

Phillips Scientific

Octal 300 MHz Discriminator

NIM MODEL 708

FEATURES

- * Guaranteed 300 MHz Operation
- * Eight Totally Independent Channels
- * Deadtimeless Updating Output Stage
- * Fast Veto and Bin Gate Inhibiting

DESCRIPTION

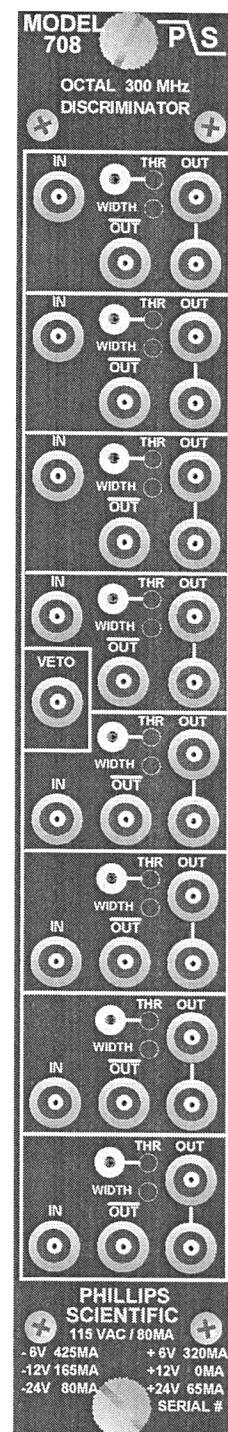
Utilizing the most advanced technology, the Model 708 Octal Discriminator is the only octal discriminator boasting a 300 MHz continuous repetition rate capability.

The updating stage ensures deadtimeless operation for coincidence applications, while the double-pulse resolution is a remarkable 3.3nSec for counting applications. A fifteen turn potentiometer provides continuous output width adjustment from 2nSec to over 50nSec for each channel.

The threshold is variable from -10mV to -1Volt with a fifteen turn potentiometer on each channel. The threshold setting is easily determined from a front panel test point that provides a DC voltage equal to ten times the actual threshold.

Inhibiting of the discriminator can be accomplished in two ways. A front panel LEMO input accepts a NIM level pulse for fast vetoing of all channels. The fast veto is capable of inhibiting a single pulse from a 300 MHz input pulse train. Secondly, a slow bin gate via the rear panel connector inhibits all eight channels and is enabled or disabled from a rear panel slide switch.

The outputs are the current source type with one pair of negative bridged outputs and one complement for each channel. When only one output of the bridged pair is used, a double-amplitude NIM pulse (-32mA) is generated, making it ideal for driving long cables with narrow pulses. When both connector pairs are used, a normal NIM level (-16mA) is produced. The transition times are less than 1.0nSec, and their shapes are virtually unaffected by the loading conditions of the other outputs.



Phillips Scientific

"A THEORY DEVELOPMENT COMPANY"

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INPUT CHARACTERISTICS

General:

One LEMO connector input per channel; 50ohms, $\pm 1\%$, direct coupled; less than $\pm 2\%$ input reflection for a 1.0nSec input risetime; Input protection clamps at ± 7 Volt and ± 5 Volts, and can withstand ± 2 Amps (± 100 Volts), for 1 μ Sec with no damage to the input.

Threshold:

From -10 mV to -1 Volt; 15-turn screwdriver adjustment; better than $\pm 0.2\%/^{\circ}\text{C}$ stability; A 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 (-500mV), 50 ohms, direct coupled; must precede the negative edge of input pulse by 3nSec; Capable of gating a single pulse in a 300 MHz continuous pulse train.

Bin Gate:

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

GENERAL PERFORMANCE

Continuous Repetition Rate:

Greater than 300 MHz, 3db bandwidth, 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 8.0 nSec.

Multiple Pulsing:

No multiple pulsing; One and only one output pulse regardless of input pulse amplitude or duration.

Power Supply Requirements:

- 6 Volts @ 425 mA	+6 Volts @ 320 mA
-12 Volts @ 165 mA	+12 Volts @ 0 mA
-24 Volts @ 80 mA	115 VAC @ 80mA
	+24 Volts @ 65 mA

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

Operating Temperature:

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

OUTPUT CHARACTERISTICS

General:

Three LEMO connector outputs per channel; One negative bridged pair and one complement output. The bridged outputs deliver -32mA into a single 50 ohm load (-1.6Volts) and -16mA (-800mV) with both terminated. The complement is quiescently -16mA and goes to 0 mA during output. The output rise and fall times are less than 1.0nSec from 10% to 90% levels.

Width Control:

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

Updating Operation:

The output pulse will be retriggered if a new input pulse occurs while the output is active. A 100% duty cycle can be achieved.

MODEL 708 OCTAL 300 MHz DISCRIMINATOR

(Front Panel Description)

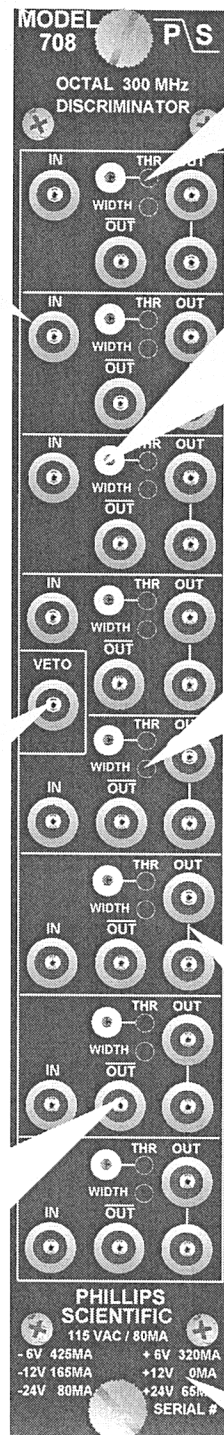
Standard # 1 NIM Packaging
in accordance with TID-20893

Discriminator Input
50 ohms Direct Coupled

Fast Inhibit Input;
Accepts Normal NIM Input Level
50 ohm Impedance

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

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



Threshold Control;
15-Turn Screwdriver Adjustment
Variable from -10mV to -1 Volt.

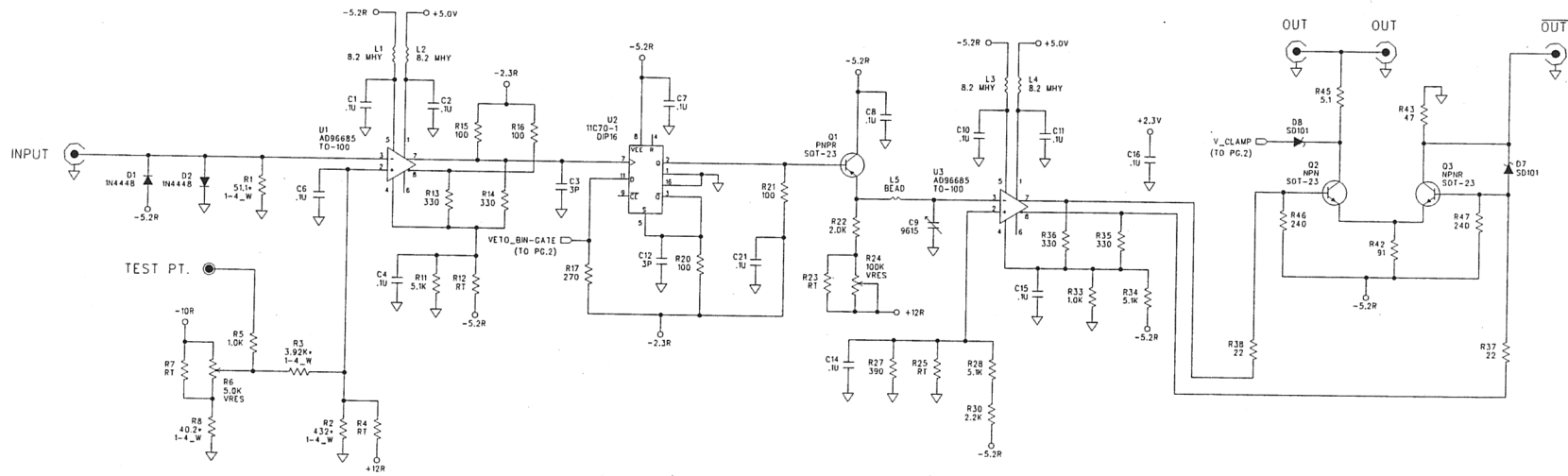
Threshold Monitor Test Point;
Provides a DC Voltage Equal to Ten
Times the Actual Threshold Setting,
(-100mV to -10Volts)

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

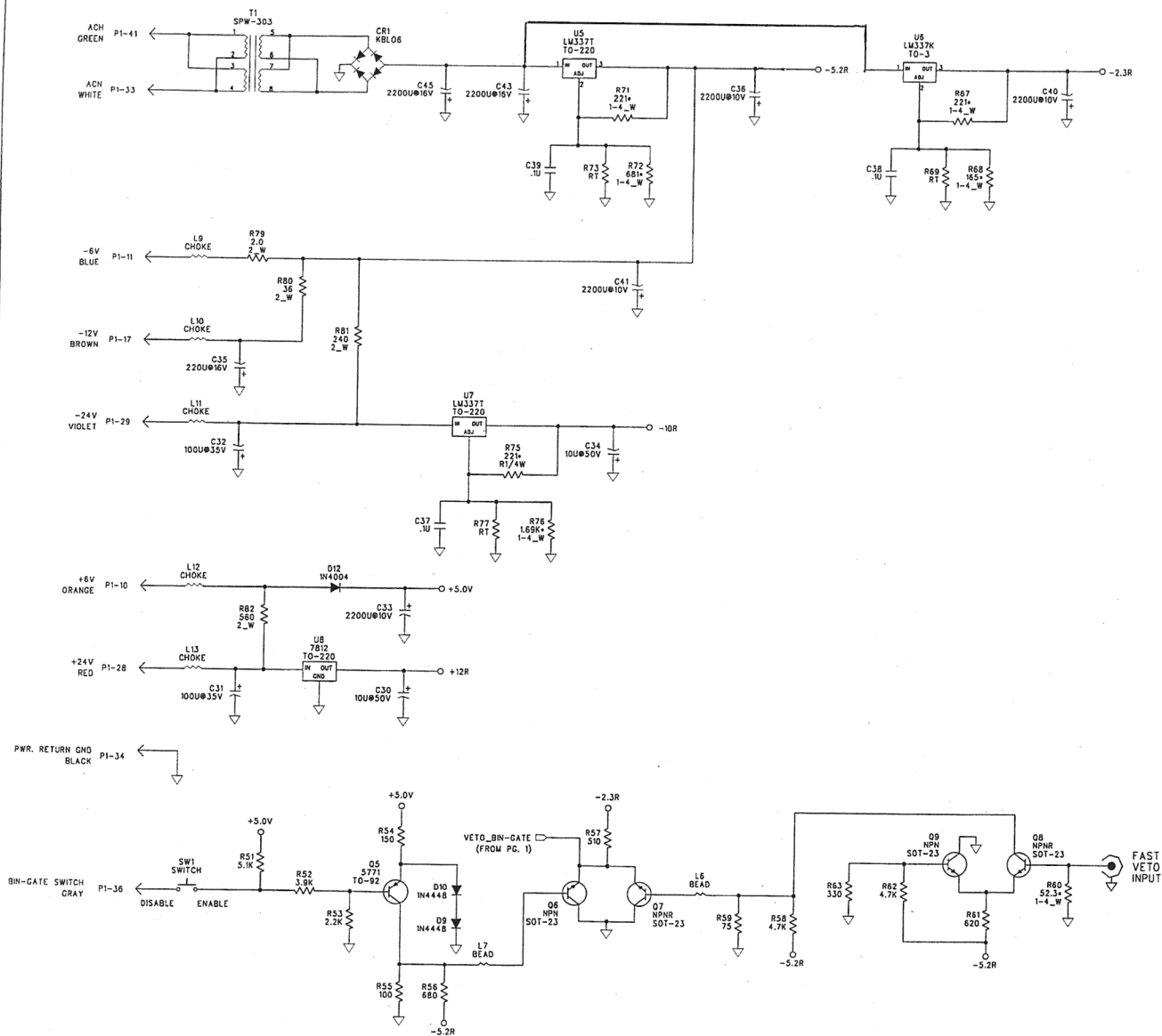
Double-Amplitude Bridged Output;
-32mA (-1.6 Volts into 50 ohms,
-.8 Volt into Two 50 ohm Loads)

NIM Voltage and Current
Requirements

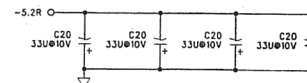
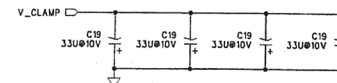
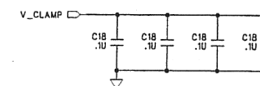
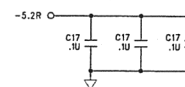
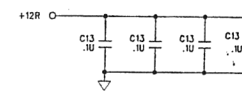
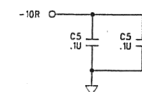
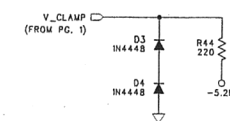
ONE OF EIGHT CHANNELS



PHILLIPS SCIENTIFIC		
MODEL 708		
MODEL 708 300MHz DISCRIMINATOR		
DATE	REV.	FILE
12-16-04	REV. E	70801



COMMON TO ALL CHANNELS



PHILLIPS SCIENTIFIC

MODEL 708
MODEL 708 300MHz DISCRIMINATOR

DATE	REV.	FILE
12-16-04	REV. E	70802

<u>Ident.</u>	<u>Qty.</u>	<u>Part Number</u>	<u>Description</u>
R1	8	006551R1	51.1 ohm 5% CF 1/4 resistor
R2	8	00654320	432 ohm 5% CF 1/4 resistor
R3	8	00653921	3.92K ohm 5% CF 1/4 resistor
R4	8	00000000	Resistor Trim
R5	8	00101001	1.0K ohm 5% CF 1/8 resistor
R6	8	05215001	5.0K ohm 15 turn 3/4 rect pot
R7	8	00000000	Resistor Trim
R8	8	006540R2	40.2 ohm 5% CF 1/4 resistor
R9-10			Not Used
R11	8	00105101	5.1K ohm 5% CF 1/8 resistor
R12	8	00000000	Resistor Trim
R13	8	00103300	330 ohm 5% CF 1/8 resistor
R14	8	00103300	330 ohm 5% CF 1/8 resistor
R15	8	00101000	100 ohm 5% CF 1/8 resistor
R16	8	00101000	100 ohm 5% CF 1/8 resistor
R17	8	00102700	270 ohm 5% CF 1/8 resistor
R18-19			Not Used
R20	8	00101000	100 ohm 5% CF 1/8 resistor
R21	8	00101000	100 ohm 5% CF 1/8 resistor
R22	8	00102001	2.0K ohm 5% CF 1/8 resistor
R23	8	00000000	Resistor Trim
R24	8	05201003	100K ohm 15 turn 3/4 rect pot
R25	8	00000000	Resistor Trim
R26			Not Used
R27	8	00103900	390 ohm 5% CF 1/8 resistor
R28	8	00105101	5.1K ohm 5% CF 1/8 resistor
R29			Not Used
R30	8	00102201	2.2K ohm 5% CF 1/8 resistor
R31-32			Not Used
R33	8	00101001	1.0K ohm 5% CF 1/8 resistor
R34	8	00105101	5.1K ohm 5% CF 1/8 resistor
R35	8	00103300	330 ohm 5% CF 1/8 resistor
R36	8	00103300	330 ohm 5% CF 1/8 resistor
R37	8	001022R0	22 ohm 5% CF 1/8 resistor
R38	8	001022R0	22 ohm 5% CF 1/8 resistor
R39-41			Not Used
R42	8	001091R0	91 ohm 5% CF 1/8 resistor
R43	8	001047R0	47 ohm 5% CF 1/8 resistor
R44	1	00102200	220 ohm 5% CF 1/8 resistor
R45	8	00105R10	5.1 ohm 5% CF 1/8 resistor
R46	8	00103300	240 ohm 5% CF 1/8 resistor
R47	8	00103300	240 ohm 5% CF 1/8 resistor
R48-50			Not Used
R51	1	00105101	5.1K ohm 5% CF 1/8 resistor
R52	1	00103901	3.9K ohm 5% CF 1/8 resistor
R53	1	00102201	2.2K ohm 5% CF 1/8 resistor
R54	1	00101500	150 ohm 5% CF 1/8 resistor
R55	1	00101000	100 ohm 5% CF 1/8 resistor
R56	1	00106800	680 ohm 5% CF 1/8 resistor
R57	1	00105100	510 ohm 5% CF 1/8 resistor
R58	1	00104701	4.7K ohm 5% CF 1/8 resistor
R59	1	001075R0	75 ohm 5% CF 1/8 resistor
R60	1	006552R3	52.3 ohm 1% RN 1/4 resistor
R61	1	00106200	620 ohm 5% CF 1/8 resistor
R62	1	00104701	4.7K ohm 5% CF 1/8 resistor
R63	1	00103300	330 ohm 5% CF 1/8 resistor

<u>Ident.</u>	<u>Qty.</u>	<u>Part Number</u>	<u>Description</u>
R64-66			Not Used
R67	1	00652210	221 ohm 1% RN 1/4 resistor
R68	1	00651650	165 ohm 1% RN 1/4 resistor
R69	1	00000000	Resistor Trim
R70			Not Used
R71	1	00652210	221 ohm 1% RN 1/4 resistor
R72	1	00656810	681 ohm 1% RN 1/4 resistor
R73	1	00000000	Resistor Trim
R74			Not Used
R75	1	00652210	221 ohm 1% RN 1/4 resistor
R76	1	00651691	1.69K ohm 1% RN 1/4 resistor
R77	1	00000000	Resistor Trim
R78			Not Used
R79	1	00342R00	2.0 ohm 5% MOF 2w resistor
R80	1	003436R0	36 ohm 5% MOF 2w resistor
R81	1	00342400	240 ohm 5% MOF 2w resistor
R82	1	00345600	560 ohm 5% MOF 2w resistor
C1	8	10151003	.1 mfd cer mono capacitor
C2	8	10151003	.1 mfd cer mono capacitor
C3	8	10103P00	3.0 pfd NPO cer disc capacitor
C4	8	10151003	.1 mfd cer mono capacitor
C5	2	10151003	.1 mfd cer mono capacitor
C6	8	10151003	.1 mfd cer mono capacitor
C7	8	10151003	.1 mfd cer mono capacitor
C8	8	10151003	.1 mfd cer mono capacitor
C9	8	13000015	9615 5-25 pfd variable capacitor
C10	8	10151003	.1 mfd cer mono capacitor
C11	8	10151003	.1 mfd cer mono capacitor
C12	8	10103P00	3.0 pfd NPO cer disc capacitor
C13	4	10151003	.1 mfd cer mono capacitor
C14	8	10151003	.1 mfd cer mono capacitor
C15	8	10151003	.1 mfd cer mono capacitor
C16	8	10151003	.1 mfd cer mono capacitor
C17	3	10151003	.1 mfd cer mono capacitor
C18	4	10151003	.1 mfd cer mono capacitor
C19	4	10813305	33 mfd @ 10v tan capacitor
C20	4	10813305	33 mfd @ 10v tan capacitor
C21	8	10151003	.1 mfd cer mono capacitor
C22-29			Not Used
C30	1	10551005	10 mfd @ 50v al el capacitor
C31	1	10541006	100 mfd @ 35v al el capacitor
C32	1	10541006	100 mfd @ 35v al el capacitor
C33	1	10612207	2200 mfd @ 10v al el capacitor
C34	1	10551005	10 mfd @ 50v al el capacitor
C35	1	10522206	220 mfd @ 16v al el capacitor
C36	1	10612207	2200 mfd @ 10v al el capacitor
C37	1	10151003	.1 mfd cer mono capacitor
C38	1	10151003	.1 mfd cer mono capacitor
C39	1	10151003	.1 mfd cer mono capacitor
C40	1	10612207	2200 mfd @ 10v al el capacitor
C41	1	10612207	2200 mfd @ 10v al el capacitor
C42			Not Used
C43	1	10622207	2200 mfd @ 16v al el capacitor
C44			Not Used
C45	1	10622207	2200 mfd @ 16v al el capacitor

<u>Ident.</u>	<u>Qty.</u>	<u>Part Number</u>	<u>Description</u>
L1	8	15000001	8.2 mhy choke
L2	8	15000001	8.2 mhy choke
L3	8	15000001	8.2 mhy choke
L4	8	15000001	8.2 mhy choke
L5	8	15000003	Slim bead - 1 turn
L6	1	15000004	Large bead - 1 turn
L7	1	15000004	Large bead - 1 turn
L8			Not Used
L9	1	15000000	Power Inductor
L10	1	15000000	Power Inductor
L11	1	15000000	Power Inductor
L12	1	15000000	Power Inductor
L13	1	15000000	Power Inductor
T1	1	15500002	Power Transformer
D1	8	20004448	1N4448 diode
D2	8	20004448	1N4448 diode
D3	1	20004448	1N4448 diode
D4	1	20004448	1N4448 diode
D5-6			Not Used
D7	8	2020101C	SD101 schottky diode
D8	8	2020101C	SD101 schottky diode
D9	1	20004448	1N4448 diode
D10	1	20004448	1N4448 diode
D11			Not Used
D12	1	20004004	1N4004 diode
CR1	1	2030BL06	KBL06 Bridge Rectifier
Q1	8	2420PNPR	PNP (SMD) reverse transistor
Q2	8	2420NPN0	NPN (SMD) (R2) transistor
Q3	8	2420PNPR	NPN (SMD) reverse transistor
Q4			Not Used
Q5	1	24005771	2N5771 PNP transistor
Q6	1	2420NPN0	NPN (SMD) transistor
Q7	1	2420PNPR	NPN (SMD) reverse transistor
Q8	1	2420PNPR	NPN (SMD) reverse transistor
Q9	1	2420NPN0	NPN (SMD) transistor
U1	8	38006971	AD96685BH (PS006971) IC
U2	8	38006822	11C70DC replacement assembly
U3	8	38006971	AD96685BH (PS006971) IC
U4			Not Used
U5	1	3010337T	LM337T TO-220 regulator
U6	1	3010337K	LM337K TO-3 regulator
U7	1	3010337T	LM337T TO-220 regulator
U8	1	3010812T	7812T TO-220 regulator

MODEL 708 PARTS LIST

Rev.D

<u>Ident.</u>	<u>Qty.</u>	<u>Part Number</u>	<u>Description</u>
	8	40000016	16 Pin DIP Socket
	16	40000010	10 Pin TO-100 Socket
	33	40100000	Lemo Connector
	33	40100001	Lemo Lock Washer
	24	40100002	Lemo Solder Lug
	33	40100003	Lemo Spanner Nut
	9	40100005	Lemo Sheild
	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
TP1	8	40950001	Test Point
	2	40950002	Solder Lug
S1	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	58007080	Front Panel
	4	65025603	2-56 x 3/16" Flat Head Phillips Screw
	6	65044003	4-40 x 3/16" Flat Head Phillips Screw
	7	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 Washer
	2	68000602	1/16" Nylon Shoulder Washer
	1	68000601	1/8" Nylon Shoulder Washer
	1	68001002	1/8" Nylon Spacer
	2	72000012	3/4" Roll Spacer
	2	73000000	3/16" Rivet
	2	73010000	Stand-Off
	2	73010001	Captive Screw
	1	75000001	TO-220 Insulating Washer
	1	75000001	TO-3 Insulating Washer
	1	75000002	TO-3 Insulating Cover
	1	85007060	Model 708 Printed Circuit Board