

# Phillips Scientific

## Octal Two-Fold Logic Unit

## NIM MODEL 758

### FEATURES

- \* 150 MHz Rate Capability
- \* Deadtimeless Updating Operation
- \* Eight Independent Channels
- \* 1 nSec Input Coincidence Width
- \* Fast Veto and Bin Gate Inhibiting

### DESCRIPTION

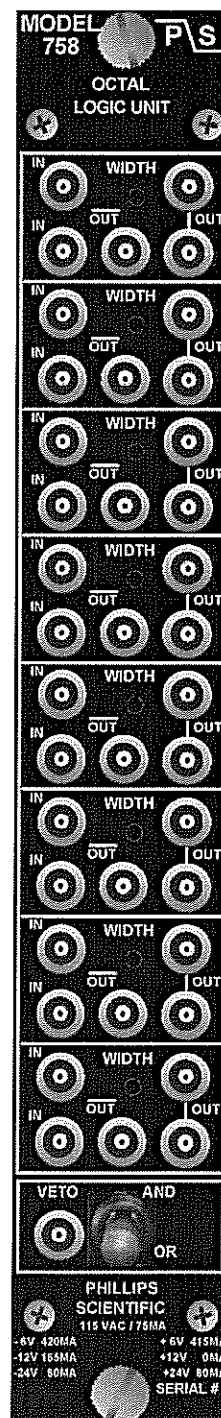
The model 758 is a high performance, eight channel, two-input logic unit packaged in a single width NIM module. It performs logical AND, OR, Fan-in and Fan-out functions.

Each channel has two logic inputs, an output width control, and three outputs. A two position switch is common to all eight channels for selecting either the AND/OR logic functions.

Inhibiting of the logic unit 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 4nSec to 150nSec. The updating design permits deadtimeless operation which is desirable for fast coincidence applications at high rates.

The 758 has three high impedance, current switching outputs per channel. They are configured as one pair of double amplitude bridged outputs and one complemented NIM level. When only one output from the bridged pair is used, a double amplitude NIM pulse (-32mA) is generated, useful for driving long cables with narrow pulse widths. Two normal NIM levels are produced when both of the bridged outputs operate into 50 ohm loads. The output risetimes and falltimes are typically 1.5nSec, and their shapes are unaffected by the loading conditions of the other outputs.



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## INPUT CHARACTERISTICS

### Logic Inputs:

Two LEMO connector inputs per section; 50 ohm input impedance,  $\pm 2\%$ , direct coupled; accepts NIM level logic signals (-500mV or greater). Outputs will be produced with inputs of 1nSec or greater width. Inputs are protected against damage from  $\pm 100$ Volt transients of 1 $\mu$ Sec duration.

### Fast Veto:

One LEMO connector input common to all eight channels; accepts normal NIM level pulse (-500mV), 50 ohm impedance, direct coupled; The veto input must precede by 5nSec, the negative edge of input signal that would ordinarily satisfy the logic conditions; Requires a 4nSec minimum input pulse width.

### Bin Gate:

Rear panel slide switch enables or disables the slow bin gate via the rear connector. Signal levels are in accordance with the TID-20893 standard. Inhibits the module within 10nSec after the bin gate signal is applied.

## GENERAL PERFORMANCE

### Logic Functions:

A two position locking-toggle switch selects the logical AND, OR function for all eight sections. All functions have leading edge inhibit and produce restandardized outputs.

### Coincidence Width:

Overlap times of 1nSec or greater will produce outputs.

### Continuous Repetition Rate:

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

### Pulse-Pair Resolution:

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

### Input to Output Delay:

Less than 8.0nSec.

### Multiple Pulsing:

None; 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  | 115 VAC @ 75mA    |
|                    | +24 Volts @ 80 mA |

**Note:** All currents are within NIM specification limits permitting 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 ND-524.

### Quality Control:

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

## OUTPUT CHARACTERISTICS

### General:

Three (3) LEMO connector outputs per section; One negative NIM bridged pair and one complemented output. The bridged output delivers -32mA (-1.6 Volts), into a single 50 ohm load and -16mA (-800 mV) with both terminated. The complement is quiescently -16mA and goes to 0mA during output. The output rise and fall times are less than 1.5nSec from 10% to 90% levels.

### Width Control:

One front panel control per channel; 15-turn screwdriver adjustment; outputs continuously variable from 4nSec to 150nSec, updating; Output width stability is  $\pm 0.15\%$ /°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 a 100% duty cycle can be achieved.

12/03

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## MODEL 758 OCTAL AND/OR LOGIC UNIT

( Front Panel Description )

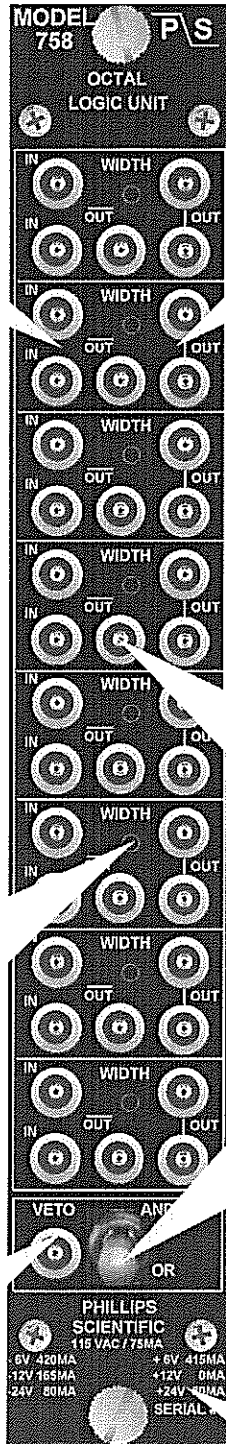
Standard # 1 NIM Packaging  
in accordance with TID-20893

Two NIM Logic Inputs;  
50 ohms Direct Coupled

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

Fast Inhibit Input; 50 ohms;  
Accepts Normal NIM Input Level  
to Inhibit All Eight Logic Sections

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



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

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

Two Position Toggle Switch;  
Switch Selects AND/OR Logic  
Function for All Sections.

NIM Voltage and Current  
Requirements

75801

75805

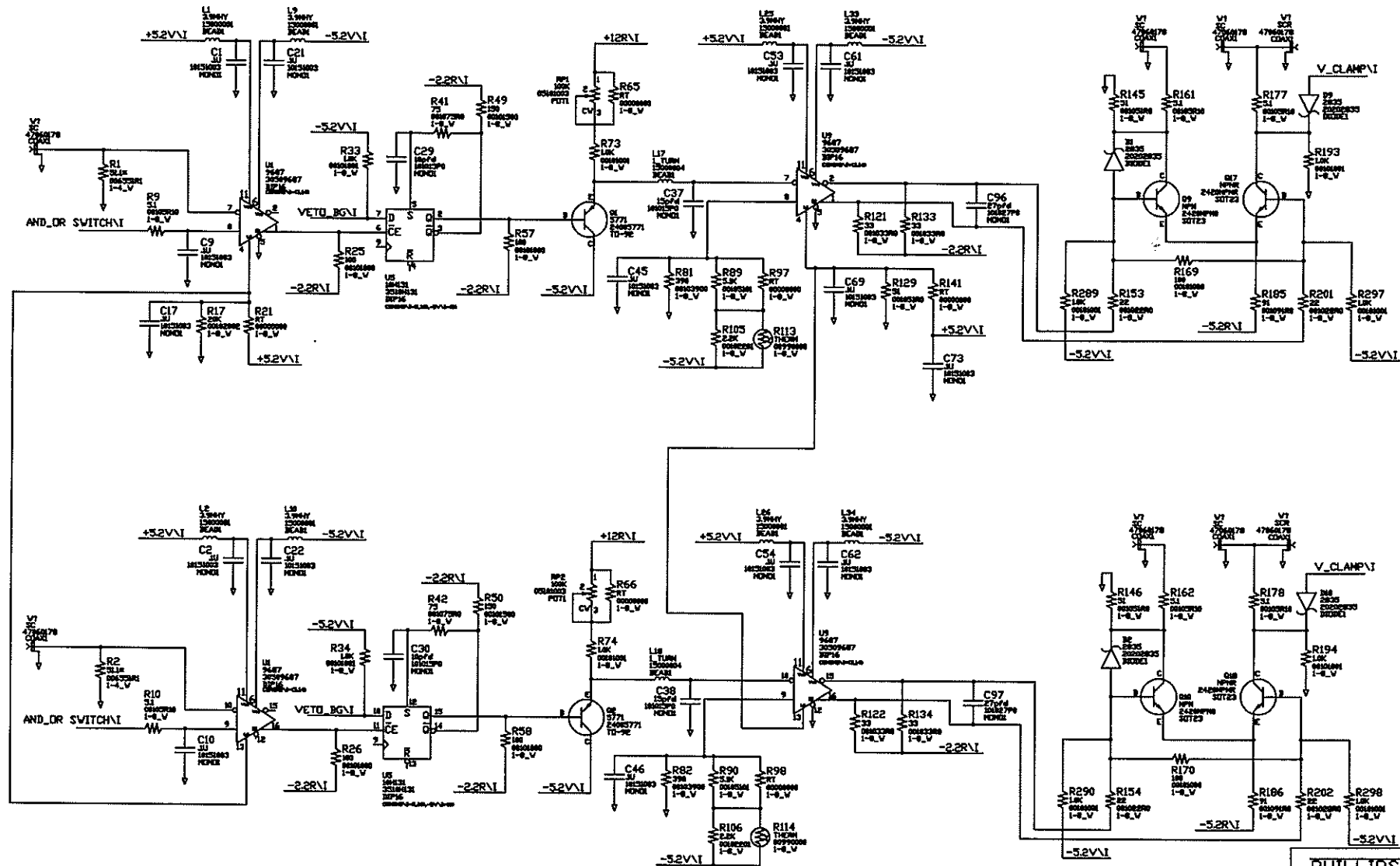
75802

75806

75803

75804

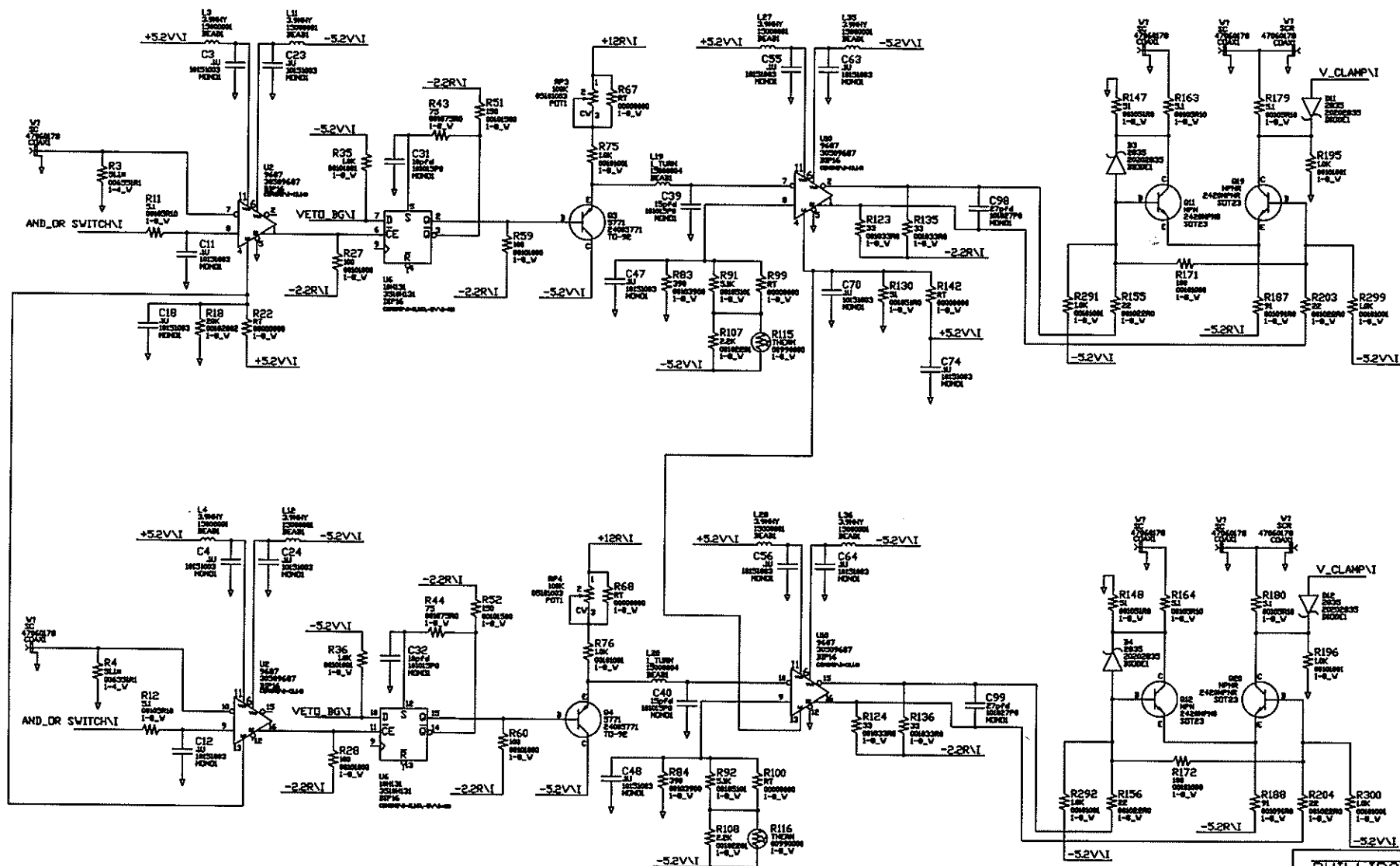
| PHILLIPS \ SCIENTIFIC           |        |       |
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| MODEL 758 8Ch. OCTAL LOGIC UNIT |        |       |
| DATE                            |        | FILE  |
| 11-21-94                        | REV. C | 75800 |



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MODEL 758 8ch. OCTAL LOGIC UNIT

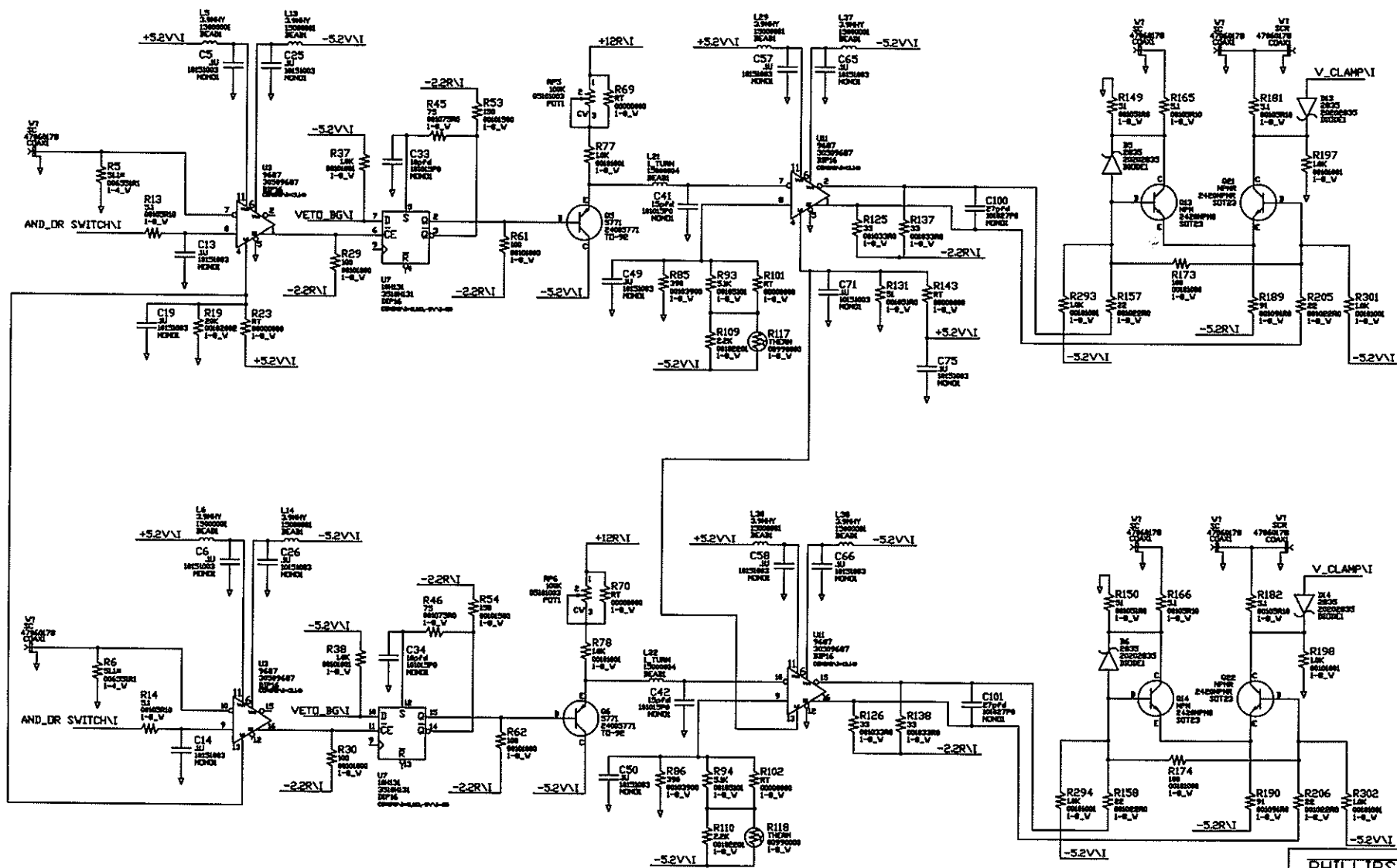
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| 11-21-94 | REV. C 75801 |



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MODEL 758 8ch. OCTAL LOGIC UNIT

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| 11-21-94 | REV. C | 75802 |

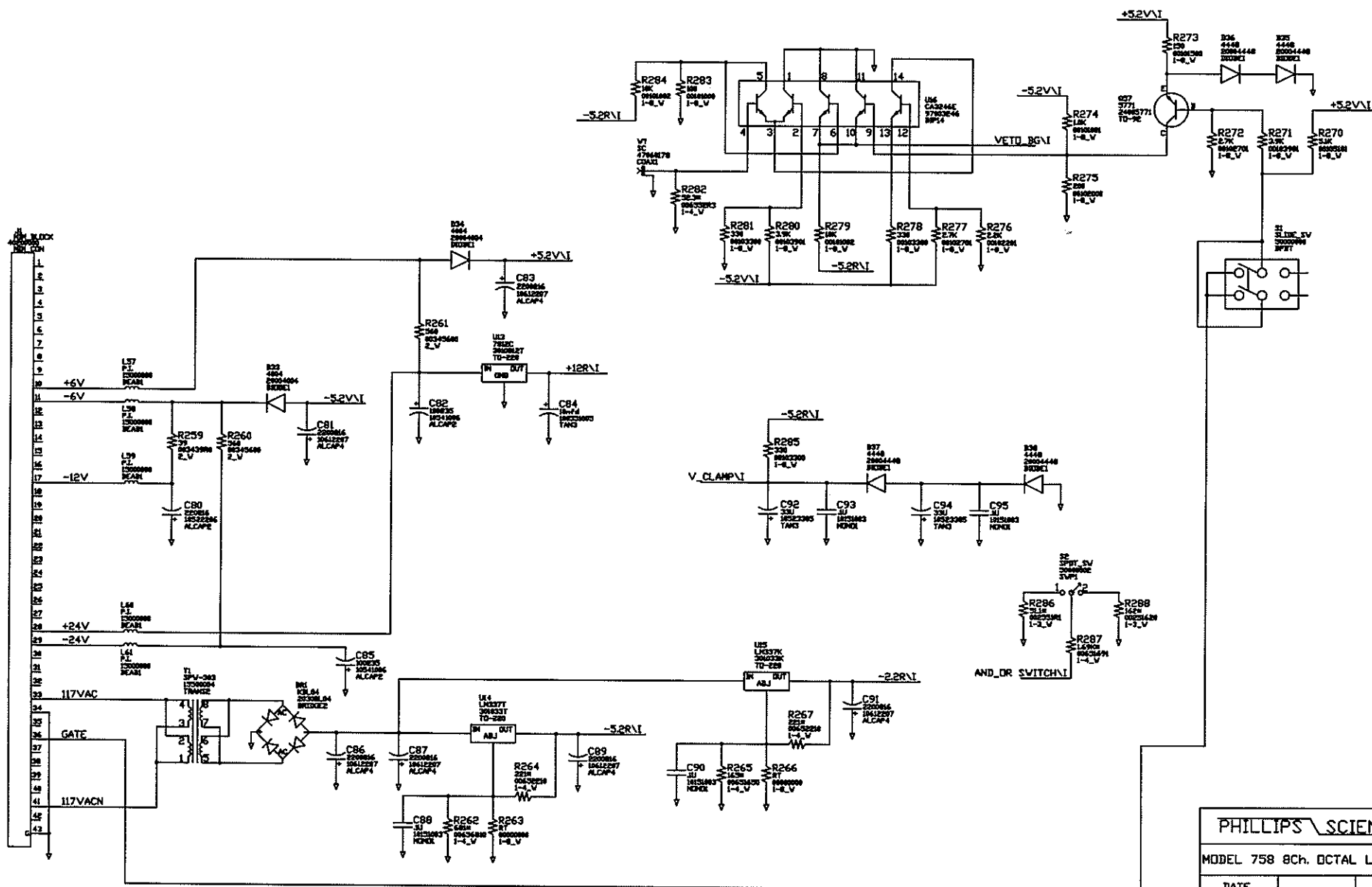


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MODEL 758 8ch. OCTAL LOGIC UNIT

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| 11-21-94 | REV. C 75803 |

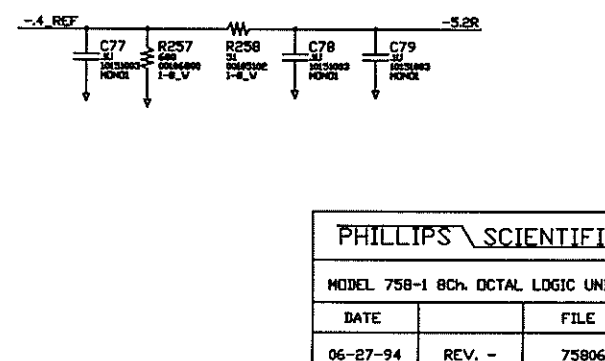
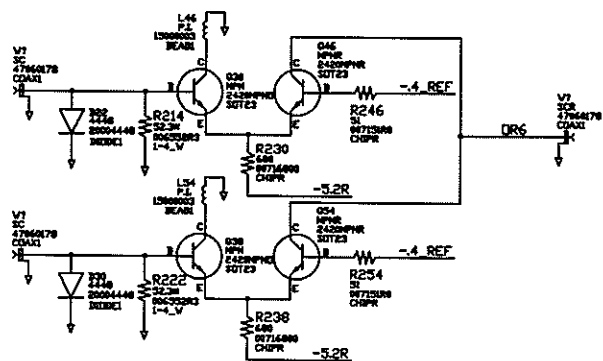
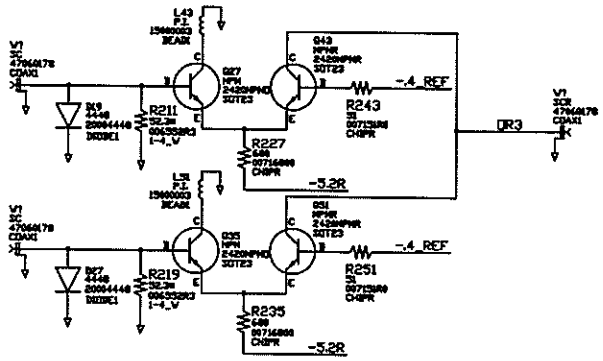
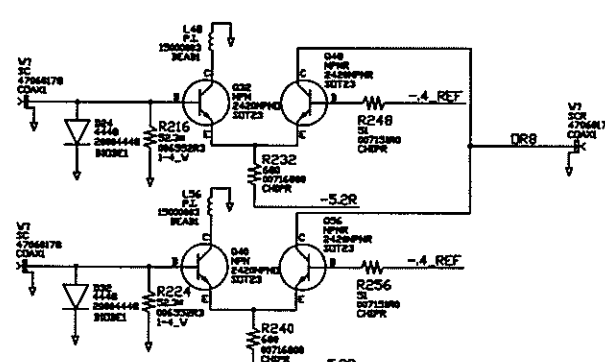
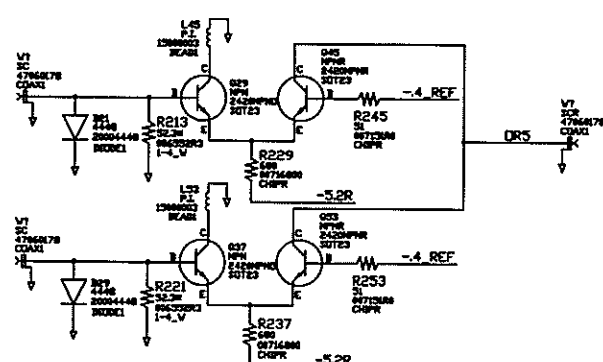
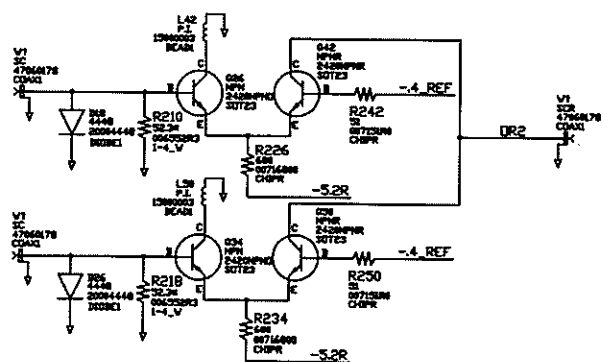
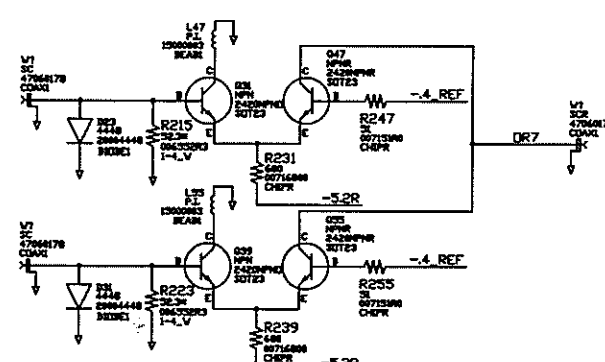
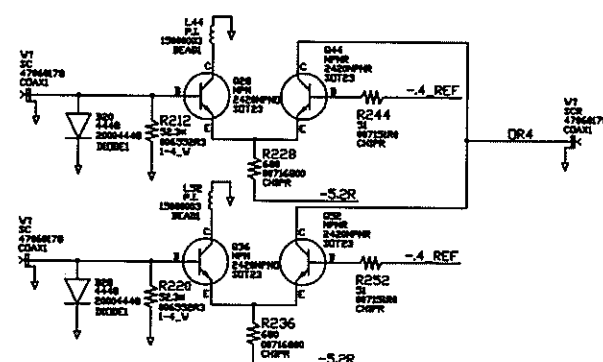
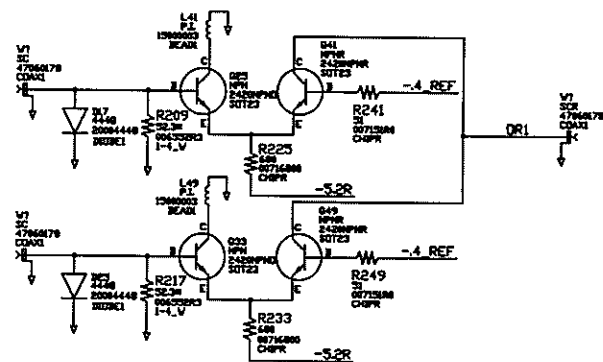




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MODEL 758 8ch. DCTAL LOGIC UNIT

| DATE     | FILE   |
|----------|--------|
| 11-21-94 | REV. C |
|          | 75805  |



| PHILLIPS SCIENTIFIC               |        |       |
|-----------------------------------|--------|-------|
| MODEL 758-1 8Ch. OCTAL LOGIC UNIT |        |       |
| DATE                              | REV.   | FILE  |
| 06-27-94                          | REV. - | 75806 |

## MODEL 758-1 PART LIST

REV. -

| <u>Ident.</u> | <u>Qty.</u> | <u>Part Number</u> | <u>Description</u>            |
|---------------|-------------|--------------------|-------------------------------|
| R209-224      | 16          | 00255231           | 52.3 ohms 1% CF 1/3           |
| R225-240      | 16          | 00106800           | 680 ohms 5% CF 1/8            |
| R241-256      | 16          | 001051R0           | 51 ohms 5% CF 1/8             |
| R257          | 1           | 00106800           | 680 ohms 5% CF 1/8            |
| R258          | 1           | 001051R0           | 51 ohms 5% CF 1/8             |
| <br>C77-79    | <br>3       | <br>10151003       | <br>.1 $\mu$ fd               |
| <br>L41-56    | <br>16      | <br>15000003       | <br>1 Turn on 14000003        |
| <br>D17-32    | <br>16      | <br>20004448       | <br>1N4448 Diode              |
| <br>Q25-40    | <br>16      | <br>2420NPN0       | <br>NPN (SMD) (R2) Transistor |
| Q41-56        | 16          | 2420NPNR           | NPN (SMD) reverse             |
|               | 1           | 85007581           | 758-1 Printed Circuit Bd.     |

| <u>Ident.</u> | <u>Qty.</u> | <u>Part Number</u> | <u>Description</u>   |
|---------------|-------------|--------------------|----------------------|
| R1-8          | 8           | 002551R1           | 51.1 ohms 1% CF 1/3  |
| R9-16         | 8           | 00105R10           | 5.1 ohms 5% CF 1/8   |
| R17-20        | 4           | 00102002           | 20K ohms 5% CF 1/8   |
| R21-24        | 4           | 00000000           | Resistor Trim        |
| R25-32        | 8           | 00101000           | 100 ohms 5% CF 1/8   |
| R33-40        | 8           | 00101001           | 1.0K ohms 5% CF 1/8  |
| R41-48        | 8           | 001075R0           | 75 ohms 5% CF 1/8    |
| R49-56        | 8           | 00101500           | 150 ohms 5% CF 1/8   |
| R57-64        | 8           | 00101000           | 100 ohms 5% CF 1/8   |
| R65-72        | 8           | 00000000           | Resistor Trim        |
| R73-80        | 8           | 00101001           | 1.0K ohms 5% CF 1/8  |
| R81-88        | 8           | 00103900           | 390 ohms 5% CF 1/8   |
| R89-96        | 8           | 00105101           | 5.1K ohms 5% CF 1/8  |
| R97-104       | 8           | 00000000           | Resistor Trim        |
| R105-112      | 8           | 00102201           | 2.2K ohms 5% CF 1/8  |
| R113-120      | 8           | 00990000           | Thermister           |
| R121-128      | 8           | 001033R0           | 33 ohms 5% CF 1/8    |
| R129-132      | 4           | 001051R0           | 51 ohms 5% CF 1/8    |
| R133-140      | 8           | 001033R0           | 33 ohms 5% CF 1/8    |
| R141-144      | 4           | 00000000           | Resistor Trim        |
| R145-152      | 8           | 001015R0           | 51 ohms 5% CF 1/8    |
| R153-160      | 8           | 001022R0           | 22 ohms 5% CF 1/8    |
| R161-168      | 8           | 00105R10           | 5.1 ohms 5% CF 1/8   |
| R169-176      | 8           | 00101000           | 100 ohms 5% CF 1/8   |
| R177-184      | 8           | 00105R10           | 5.1 ohms 5% CF 1/8   |
| R185-192      | 8           | 001091R0           | 91 ohms 5% CF 1/8    |
| R193-200      | 8           | 00101001           | 1.0K ohms 5% CF 1/8  |
| R201-208      | 8           | 001022R0           | 22 ohms 5% CF 1/8    |
| R259          | 1           | 001039R0           | 39 ohms 5% CF 1/8    |
| R260          | 1           | 00105600           | 560 ohms 5% CF 1/8   |
| R261          | 1           | 00105600           | 560 ohms 5% CF 1/8   |
| R262          | 1           | 00256810           | 681 ohms 1% CF 1/3   |
| R263          | 1           | 00000000           | Resistor Trim        |
| R264          | 1           | 00252210           | 221 ohms 1% CF 1/3   |
| R265          | 1           | 00251650           | 165 ohms 1% CF 1/3   |
| R266          | 1           | 00000000           | Resistor Trim        |
| R267          | 1           | 00252210           | 221 ohms 1% CF 1/3   |
| R270          | 1           | 00105101           | 5.1K ohms 5% CF 1/8  |
| R271          | 1           | 00103901           | 3.9K ohms 5% CF 1/8  |
| R272          | 1           | 00102701           | 2.7K ohms 5% CF 1/8  |
| R273          | 1           | 00101500           | 150 ohms 5% CF 1/8   |
| R274          | 1           | 00101001           | 1.0K ohms 5% CF 1/8  |
| R275          | 1           | 00102000           | 200 ohms 5% CF 1/8   |
| R276          | 1           | 00102201           | 2.2K ohms 5% CF 1/8  |
| R277          | 1           | 00102701           | 2.7K ohms 5% CF 1/8  |
| R278          | 1           | 00103300           | 330 ohms 5% CF 1/8   |
| R279          | 1           | 00101002           | 10K ohms 5% CF 1/8   |
| R280          | 1           | 00103901           | 3.9K ohms 5% CF 1/8  |
| R281          | 1           | 00103300           | 330 ohms 5% CF 1/8   |
| R282          | 1           | 002552R3           | 52.3 ohms 1% CF 1/3  |
| R283          | 1           | 00101000           | 100 ohms 5% CF 1/8   |
| R284          | 1           | 00101002           | 10K ohms 5% CF 1/8   |
| R285          | 1           | 00103300           | 330 ohms 5% CF 1/8   |
| R286          | 1           | 002551R1           | 51.1 ohms 1% CF 1/3  |
| R287          | 1           | 00251691           | 1.69K ohms 1% CF 1/3 |
| R288          | 1           | 00251620           | 162 ohms 1% CF 1/3   |

## MODEL 758 PART LIST

Rev. C

| <u>Ident.</u> | <u>Qty.</u> | <u>Part Number</u> | <u>Description</u>           |
|---------------|-------------|--------------------|------------------------------|
| R289-304      | 16          | 00101001           | 1.0K ohms 5% CF 1/8          |
| RP1-8         | 8           | 05101003           | 100K ohms Potentiometer      |
| C1-28         | 28          | 10151003           | .1 $\mu$ fd                  |
| C29-36        | 8           | 101010P0           | 10 pfd NPO ceramic           |
| C37-44        | 8           | 101015P0           | 15 pfd NPO ceramic           |
| C45-76        | 32          | 10151003           | .1 $\mu$ fd                  |
| C80           | 1           | 10522206           | 220 $\mu$ fd @16v Al. Elect. |
| C81           | 1           | 10622207           | 2200 $\mu$ @16v Al. Elect.   |
| C82           | 1           | 10541006           | 100 $\mu$ @35v Al. Elect.    |
| C83           | 1           | 10551005           | 10 $\mu$ @50v Al. Elect.     |
| C85           | 1           | 10541006           | 100 $\mu$ @35v Al. Elect.    |
| C86           | 1           | 10622207           | 2200 $\mu$ @16v Al. Elect.   |
| C87           | 1           | 10622207           | 2200 $\mu$ @16v Al. Elect.   |
| C88           | 1           | 10151003           | .1 $\mu$ fd                  |
| C89           | 1           | 10622207           | 2200 $\mu$ @16v Al. Elect.   |
| C90           | 1           | 10151003           | .1 $\mu$ fd                  |
| C91           | 1           | 10622207           | 2200 $\mu$ @16v Al. Elect.   |
| C92           | 1           | 10523305           | 33 $\mu$ fd @16v Al. Elect.  |
| C93           | 1           | 10151003           | .1 $\mu$ fd                  |
| C94           | 1           | 10523305           | 33 $\mu$ fd @16v Al. Elect.  |
| C95           | 1           | 10151003           | .1 $\mu$ fd                  |
| C96-103       | 1           | 101027P0           | 27 pfd NPO ceramic           |
| L1-16         | 16          | 15000001           | 3.9 $\mu$ hy RF Chokes       |
| L17-24        | 8           | 15000004           | 1 Turn on 14000003           |
| L25-40        | 16          | 15000001           | 3.9 $\mu$ hy RF Chokes       |
| L57-61        | 5           | 15000000           | Power Inductor               |
| T1            | 1           | 15500004           | Power Transformer            |
| BR1           | 1           | 2030BL04           | KBL04 Bridge Rectifier       |
| D1-16         | 16          | 20002835           | 2835 Schottky Diode          |
| D33-34        | 2           | 20004004           | 1N4004 Diode                 |
| D35-38        | 4           | 20004448           | 1N4448 Diode                 |
| Q1-8          | 8           | 24005771           | 2N5771 PNP Transistor        |
| Q9-16         | 8           | 2420NPN0           | NPN (SMD) (R2) Transistor    |
| Q17-24        | 8           | 2420NPNR           | NPNR (SMD) reverse           |
| Q57           | 1           | 24005771           | 2N5771 PNP Transistor        |
| U1-4          | 4           | 30509687           | 9687 IC                      |
| U5-8          | 4           | 3510H131           | 10H131P IC                   |
| U9-12         | 4           | 30509687           | 9687 IC                      |
| U13           | 1           | 3010812T           | 7812 TO-220 Regulator        |
| U14           | 1           | 3010337T           | LM337T TO-220 Regulator      |
| U15           | 1           | 3010337K           | LM337K TO-3 Regulator        |
| U16           | 1           | 30503246           | CA3246E IC                   |
|               | 40          | 40100000           | RF Connector                 |
|               | 40          | 40100001           | Lock Washer                  |
|               | 40          | 40100002           | Solder Lug                   |
|               | 40          | 40100003           | Spanner Nut                  |

| <u>Ident.</u> | <u>Qty.</u> | <u>Part Number</u> | <u>Description</u>                      |
|---------------|-------------|--------------------|-----------------------------------------|
| J1            | 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                              |
| S1            | 1           | 50000000           | SLIDE_SW                                |
| S2            | 1           | 50000002           | SPDT_SW                                 |
|               | 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           | 85007100           | Model 705/710/758 Printed Circuit Board |