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WARNING

The following servicing instructions are for use by qualified personnel. To avoid personal injury, do not perform any servicing other than that contained in operating instructions unless you are qualified to do so. Refer to the Operators Safety Summary and Service Safety Summary prior to performing any service.

PLEASE CHECK FOR CHANGE INFORMATION AT THE REAR OF THIS MANUAL.

PFG 5105/5505
Programmable Pulse/ Function Generator
SERVICE

Tektronix, Inc.
P.O. Box 500
Beaverton, Oregon 97077

070-7332-00
Product Group 75

Serial Number _____

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INSTRUMENT SERIAL NUMBERS

Each instrument manufactured by Tektronix has a serial number on a panel insert, tag, or stamped on the chassis. The letter at the beginning of the serial number designates the country of manufacture. The last five digits of the serial number are assigned sequentially and are unique to each instrument. Those manufactured in the United States have six unique digits. The country of manufacture is identified as follows:

B010000 — Tektronix, Inc. Beaverton, Oregon, USA
G100000 — Tektronix Guernsey, Ltd., Channel Islands
E200000 — Tektronix United Kingdom, Ltd., London
J300000 — Sony/Tektronix, Japan
H700000 — Tektronix Holland, NV, Heerenveen, The Netherlands

Instruments manufactured for Tektronix by external vendors outside the United States are assigned a two digit alpha code to identify the country of manufacture (e.g., JP for Japan, HK for Hong Kong, IL for Israel, etc.).

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Thanks

Dave & Lynn Henderson
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PREFACE

This Service manual provides only servicing information intended for use by qualified service persons. No operating information is included in this manual. For instrument specifications and operating information refer to the PFG 5105/5505 Instruction Manual.

Additional Documentation for the PFG 5105 and PFG 5505

Instruction Manual—070-7331-XX

Instrument Interfacing Guide—070-7329-XX

Reference Guide—070-7330-XX

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OPERATORS SAFETY SUMMARY

The general safety information in this part of the summary is for both operating and servicing personnel. Specific warnings and cautions will be found throughout the manual where they apply, but may not appear in this summary. Safety information applies to both the PFG 5105 and PFG 5505 unless noted otherwise.

TERMS

In This Manual

CAUTION statements identify conditions or practices that could result in damage to the equipment or other property.

WARNING statements identify conditions or practices that could result in personal injury or loss of life.

As Marked on Equipment

CAUTION indicates a personal injury hazard not immediately accessible as one reads the marking, or a hazard to property including the equipment itself.

DANGER indicates a personal injury hazard immediately accessible as one reads the marking.

SYMBOLS

In This Manual

This symbol indicates where applicable cautionary or other information is to be found.

As Marked on Equipment

DANGER – High voltage.

Protective ground (earth) terminal.

ATTENTION – refer to manual.

Power Souce

This product is intended to operate from a power module connected to a power source (PFG 5105) or from a power source (PFG 5505) that will not apply more than 250 volts rms between the supply conductors or between either supply conductor and ground. A protective ground connection by way of the grounding conductor in the power cord is essential for safe operation.

Grounding the Product

This product is grounded through the grounding conductor of the power module power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle before connecting to the product input or output terminals. A protective ground connection by way of the grounding conductor in the power module power cord is essential for safe operation.

Danger Arising from Loss of Ground

Upon loss of the protective-ground connection, all accessible conductive parts can render an electric shock.

Use the Proper Power Cord (PFG 5505)

Use only the power cord and connector specified for your product. Use only a power cord that is in good condition. See Operating Instructions section of the Instruction Manual for power cord configuration. Refer cord and connector changes to qualified service pesonnel.

Use the Proper Fuse

To avoid fire hazard, use only the fuse of correct type, voltage rating and current rating as specified in the parts list of this manual.

Refer fuse replacement to qualified service personnel.

Do Not Operate in Explosive Atmospheres

To avoid explosion, do not operate this product in an explosive atmosphere, unless it has been specifically certified for such operation.

Do Not Operate Without Covers

To avoid personal injury, do not operate this product without covers or panels installed. Do not apply power to the plug-in via a plug-in extender.

SERVICE SAFETY SUMMARY

FOR QUALIFIED SERVICE PERSONNEL ONLY

Refer also to the preceding Operator Safety Summary.

Do Not Service Alone

Do not perform internal service or adjustment of this product unless another person capable of rendering first aid and resuscitation is present.

Use Care When Servicing With Power On

Dangerous voltages may exist at several points in this product. To avoid personal injury, do not touch exposed connections and components while power is on.

Disconnect power before removing protective panels, soldering, or replacing components.

Power Source

This product is intended to operate in a power module connected to a power source (PFG 5105) or from a power source (PFG 5505) that will not apply more than 250 volts rms between the supply conductor and ground. A protective ground connection by way of the grounding conductor in the power cord is essential for safe operation.

Section 1
THEORY OF OPERATION

FUNCTIONAL DESCRIPTION

This section contains a brief functional description of the PFG 5105/5505 Programmable Function Generator (referred to as PFG in the remainder of this section).

The PFG circuitry generates six waveform functions: sine, triangle, square, single-pulse, double-pulse, and dc.

Refer to the PFG Module Block Diagram in the Diagram section.

The circuitry is contained on 7 circuit board assemblies:

A1	CPU Board
A2	Pulse Board
A3	Analog Board
A4	Output Board
A5	Synthesizer Board (Option 02)
A6	Interconnect Board
A7	Keyboard/Display Board

The CPU circuitry is programmed via the front-panel keys and/or the GPIB (IEEE-488 bus) to select the specified waveform output variations.

CPU Board (A1)

The CPU board contains the PFG operating firmware. It controls all instrument functions as directed by the front panel and/or the IEEE-488 bus (GPIB).

The CPU major components and their functions are:

- **8085A Microprocessor and Memories (A1 Diagrams 1 and 4):**

  8 x 8K "scratch" SRAM contains user-selectable control functions and front panel setups.

  32 x 8K EPROM contains the firmware.

- **IEEE-488 Bus Interface–GPIB (A1 Diagram 2).** GPIB controller and drivers for edge-connector interface with the power module mainframe.
- **Battery Backup and Low Battery Indicator (A1 Diagram 5).** Provides backup battery and monitoring circuitry for the SRAM.
- **Keyboard/Display Interface (A1 Diagrams 3 and 5).** Provides the keyboard controller and the keyboard/liquid crystal display (LCD) drivers.
- **Power control/serial data bus (A1 Diagram 4)** to the Pulse, Synthesizer, Analog, and Output board circuits.

Pulse Board (A2)

The Pulse board circuits provide the following:

- Single, delayed-single, and double pulse outputs
- DACs to set width and delay duration
- Voltage reference for DACs
- Sweep generator and SWEEP OUT
- External TRIG IN shaper
- Internal rate generator
- TTL SYNC OUT via delay line
- CPU to Pulse board interface

The pulse circuits operate in three modes: single pulse, delayed pulse and double pulse.

The pulse is generated by one shot circuits that are triggered by the leading edge of the clock signal applied to their inputs.

Pulse duration is determined by a timing capacitor that is charged from a fixed current source to a voltage level that is proportional to the pulse duration.

When the timing capacitor voltage reaches a point slightly above the value of the span voltage input reference, the comparator resets the one-shot and a pulse appears at the one-shot circuit output.

WIDTH MODE—A single output pulse is generated each time the leading edge of the TTL clock triggers the "width" one-shot.

DELAYED MODE—A single delayed pulse output is generated by linking two one-shot circuits in series. The "delay" one-shot is triggered by each leading edge of the TTL clock and the "delayed-width" one shot is triggered by the trailing edge of the "delay" one-shot.

DOUBLE PULSE MODE—A double pulse output is generated when both "width" and "delay" one-shots are simultaneously triggered by the TTL clock. The first pulse is generated by the "width" one-shot output. The second pulse is generated by the "delay width" one-shot when it is triggered by the trailing edge of the "delay" one-shot output.

Analog Board (A3)

The Analog board's functions and major components are:

- Generate a triangle waveform upon which all other waveforms in the PFG are based.
- Derive the sine and square waveforms from the triangle waveform. and provide a TTL synchronization signal (clock) to the Pulse board to trigger the generation of pulses.
- Frequency modulate waveforms with externally generated signals.
- Together with the Output board, generate dc and offset voltages.
- AM-modulate sine, square and triangle waveforms.

The triangle waveform is generated using a voltage to frequency conversion technique. A capacitor is charged from a constant current source. The time required to charge and discharge the capacitor determines the period of one cycle and therefore the frequency.

The triangle waveform is buffered and applied to the voltage comparator. As the level of the triangle wave crosses the upper and lower switching levels of the comparator, a square wave is generated. This square wave is fed back to the triangle generator for controlling the change/discharge cycle of the triangle waveform.

A sine wave shaper circuit converts the triangle wave to a sine wave.

The function selector circuit, under CPU control, selects the waveform that goes to the Output board.

In triggered and gate modes, the trigger circuit stops the triangle generator by forward biasing a diode to sink the current source and prevent the timing capacitor from charging to the switching level. This stops the waveform generation and holds the triangle output at a baseline dc level.

Output Board (A4)

Output board functions and major components are:

- Output amplifier for signal output waveforms originating on the Pulse and Analog boards.
- Edge connector power input interface with the power module mainframe.
- Ac and dc output level control, input from the Analog board.
- Power supply functions develop +5 Vdc from the mainframe +8 Vdc, and generate +15 and −15 V from 25 Vac of the mainframe. Regulators make use of dedicated pass transistors in the mainframe.

Synthesizer Board, Opt. 02 (A5)

The Synthesizer board locks the PFG output frequency to a highly accurate frequency reference. The Synthesizer board circuits compare the SYNC OUT signal to a quartz oscillator reference and generate a correction voltage that locks the PFG main VCO frequency to the reference frequency. The Synthesizer board also contains circuitry that monitors the lock condition and generates a lock-error signal if the synthesizer is unlocked.

Interconnect Board (A6)

The Interconnect board is the instrument's backplane. Multipin connectors on the Interconnect board mate with connectors on the CPU, Pulse, Synthesizer, Analog and Output boards.

SMB connectors on the Interconnect board mate with connectors on the Pulse, Analog, and Output boards to interface TRIG IN, SYNC OUT, SWEEP OUT, VCO/FM IN, AM IN, and OUTPUT signals.

Keyboard/Display Board (A7)

The major Keyboard components are:

- The Keyboard consists of 54 pushbuttons, 21 each with built-in LEDs.
- BNC connectors and pin jacks are used for signal input and output.
- An LCD display with adjustable contrast and backlighting is the primary source of instrument status.

The Keyboard functions are:

- Command and data input to the PFG via pushbuttons.
- Signal input and output via BNC connectors, as follows:

TRIG IN	Trigger In
SYNC OUT	Synchronizing pulse output
SWEEP OUT	Sweep waveform output
VCO/FM IN	Frequency modulation input
AM IN	Amplitude modulation input
OUTPUT	Signal output

Status and data for the PFG are displayed on a 2 x 16 LCD module.

Section 2
PERFORMANCE CHECK PROCEDURE

Introduction

This procedure checks the electrical performance requirements as listed in the Specification section in the PFG 5105/5505 Instruction Manual. Perform the adjustment procedure if the instrument fails to meet these checks. If readjustment does not correct the discrepancy, circuit troubleshooting is indicated. This procedure can be used to determine acceptability of performance in an incoming inspection facility. The performance check may be done at any ambient temperature between 0°C and +50°C.

Test Equipment Required

The test equipment listed in Table 2-1, or equivalent, is suggested to do the performance check procedure or internal adjustment procedure.

NOTE

In the following procedures, all tests for the PFG 5105/5505 are run under power up and output on conditions unless otherwise specified. The PFG 5105/5505 should be powered-on at room temperature for 1/2 hour before testing.

Table 2-1
TEST EQUIPMENT REQUIRED

Description	Performance Requirements	Perf. Check Sec. 2	Adj. Proc. Sec. 3	Example
Power Module[1]		X	X	TM 5003
Oscilloscope/Plug-ins	Bandwidth >150 MHz	X	X	TEKTRONIX 7704A Series
GPIB Controller		X		TEKTRONIX PEP 301
Distortion Analyzer	Frequency range 10 Hz–100 kHz	X	X	TEKTRONIX AA 501A[2]
Digital Voltmeter	4 1/2 digits, true RMS	X	X	TEKTRONIX DM 5010[2]
Universal Counter	20 MHz, Time A B, Period	X	X	TEKTRONIX DC 510[2]
Function Generator	10 MHz output	X		TEKTRONIX FG 502[2]
Power Supply	Range ± 17V	X		TEKTRONIX PS 503A[2]
Spectrum Analyzer	100 kHz to 1.5 GHz, 30 dB resolution	X		TEKTRONIX7704A/7L12
Differential Amplifier	1 mV to 5V/div range	X		TEKTRONIX7A13
Oscilloscope Probe	X10, bandwidth ≥ 150 MHz		X	TEKTRONIXP6133
50 Ω Feedthrough Termination	± 1% to 20 MHz (high frequency)	X	X	Tektronix Part No. 011-0049-01
Precision 50 Ω Feed-through Termination	± 0.1% (dc to 100 kHz)	X	X	Tektronix Part No. 011-0129-00
BNC 50 Ω Coaxial Cables (2)		X	X	Tektronix Part No. 012-0482-00

1 Not required for PFG 5505
2 Requires TM 5000 Power Module

Table 2-1(Cont)
TEST EQUIPMENT REQUIRED

Description	Performance Requirements	Perf. Check Sec. 2	Adj. Proc. Sec. 3	Example
BNC T Connector		X	X	Tektronix Part No. 103-0030-00
Flexible Extender Cable			X	Tektronix Part No. 067-0645-02
Analog Board Extender			X	Tektronix Part No. 118-8360-00
Right Angle CPU Board Extender			X	Tektronix Part No. 118-8363-00

Preparation

1. Check that the power module line selector is set to the correct voltage.

2. Insert the PFG 5105 into the TM 5003 power module and turn the power on. (Or, for the PFG 5505, just turn the power on.)

3. The performance check should be done after a warm-up period of a half hour at any ambient temperature between 0°C and +50°C (20°C to 30°C for selected amplitude accuracy tests).

NOTE

In the following procedure, the PFG 5105 and PFG 5505 instruments will be referred to as PFG.

PFG front panel buttons are grouped in the following areas according to use: PARAMETER, FUNCTION, TRIG, MODE, DATA, INCREMENT, SETUPS and OUTPUT. In the following PFG setup instructions, front-panel areas are shown in small type above each button to be pushed. When a range, such as 12.1 Hz to 12 MHz, is given under DATA, use any setting in that range.

1. Check Operating Modes

Test Equipment Required:

50 Ω Coaxial Cable
50 Ω Feedthrough Termination
Oscilloscope
FG 502 Function Generator

a. Connect the 50 Ω coaxial cable and the 50 Ω feedthrough termination from the PFG OUTPUT to the oscilloscope vertical input.

b. Set the PFG:

PARAMETER	DATA	DATA
FREQ	100 kHz	ENTER
OUTPUT	FUNCTION	MODE
ON	∿ (sine wave)	CONT

c. CHECK—oscilloscope display for a steady 100 kHz sine wave.

d. Set the PFG:

MODE	TRIG
TRIG	EXT

e. Set the function generator for a square wave output with a high and low level of 0 V to + 2 V at 5 kHz and connect it to the PFG TRIG IN connector.

f. CHECK—oscilloscope display for one cycle of sine wave per trigger event.

g. Set the PFG:

MODE
GATE

h. CHECK—oscilloscope display for approximately 10 sine waves per gating waveform. (The exact number will depend on function generator frequency.)

i. Set the PFG:

MODE
BURST

j. CHECK—oscilloscope display for two cycles of sine wave per trigger event.

k. Set the PFG:

TRIG	MODE
MAN	GATE

l. CHECK—oscilloscope display for an output sine wave occurring only when the PFG EXEC button is depressed.

m. Disconnect the function generator.

n. Set the PFG:

MODE
CONT

2. Check Frequency Accuracy

Test Equipment Required:

50 Ω Coaxial Cable
DC 510 Universal Counter

a. Connect the 50 Ω coaxial cable from the PFG SYNC OUT connector to the frequency counter input.

b. Set the PFG:

PARAMETER	DATA	DATA
SPCL	230	ENTER

INCREMENT	
⇑ or ⇓	(Toggle FREQ LOCK ON)

PARAMETER	DATA	DATA
FREQ	0.012 Hz to 0.100 Hz	ENTER

c. CHECK—that the frequency displayed on the counter reads within ±10% of the selected value.

d. Set the PFG:

PARAMETER	DATA	DATA
FREQ	0.101 Hz to 120 Hz	ENTER

e. CHECK—that the frequency displayed on the counter reads within ±5% of the selected value.

f. Set the PFG:

PARAMETER	DATA	DATA
FREQ	121 Hz to 12 MHz	ENTER

g. CHECK—that the frequency displayed on the counter reads within ±0.5% of the selected value.

3. Check Amplitude Accuracy

Test Equipment Required:

50 Ω Coaxial Cable
50 Ω Precision Feedthrough Termination
DM 5010 Digital Voltmeter

a. Set the PFG:

PARAMETER	DATA	DATA
FREQ	1 kHz	ENTER

PARAMETER	DATA	DATA
AMPL	1.0 V to 9.99 V	ENTER

b. Connect the 50 Ω coaxial cable and the precision 50 Ω feedthrough termination from the PFG OUTPUT to the input of the digital voltmeter. Set the DVM to measure AC_{rms} voltages.

c. Convert the selected peak to peak amplitude to rms amplitude, using one of the following formulas:

$V_{rms} = 0.2887\ V_{pp}$ for the triangle waveform.
$V_{rms} = 0.3535\ V_{pp}$ for the sine waveform.
$V_{rms} = 0.5\ V_{pp}$ for the square waveform

d. CHECK—that the voltmeter reads within ±2% ±20 mV of the converted value.

e. Set the PFG:

PARAMETER	DATA	DATA
AMPL	10 mV to 999 mV	ENTER

f. Convert the V_{pp} to V_{rms} using the formulas given in paragraph c.

g. CHECK—the voltmeter reads within ±3% ±5 mV of the calculated rms value.

4. Check DC Accuracy

Test Equipment Required:

50 Ω Coaxial Cable
50 Ω Precision Feedthrough Termination
DM 5010 Digital Voltmeter

a. Connect the 50 Ω coaxial cable and precision 50 Ω feedthrough termination from the PFG OUTPUT to the digital voltmeter input. Set the DVM to measure dc voltages.

b. Set the PFG:

FUNCTION	DATA	DATA
DC	−4.99 V to +4.99 V	ENTER

c. CHECK—the voltmeter reads within ±0.6% ±20 mV of the programmed dc voltage.

5. Check Offset Accuracy

Test Equipment Required:

50 Ω Coaxial Cable
50 Ω Precision Feedthrough Termination
Oscilloscope with 7A13 Differential Plug-in

a. Connect the 50 Ω coaxial cable to the PFG OUTPUT. Connect the 50 Ω precision feedthrough termination to the other end of the cable and to the 7A13's +INPUT.

b. Set the PFG to test the 1 to 9.99 V Amplitude range:

PARAMETER	DATA	DATA
FREQ	1 kHz	ENTER
	FUNCTION (square wave)	
AMPL	1 V	ENTER
OFFSET	4.49 V	ENTER

c. Set the 7A13 Vertical Sensitivity to 0.2 V/Div. Adjust the 7A13 to null the AC positive peak voltage to zero.

d. CHECK—that the null voltage reads 4.99 V ±0.6% ±20 mV.

e. Set the PFG to test the 0.1 to 0.999 V Amplitude range:

PARAMETER	DATA	DATA
AMPL	100 mV	ENTER
OFFSET	449 mV	ENTER

f. Set the 7A13 Vertical Sensitivity to 20 mV/Div. Adjust the 7A13 to null the AC positive peak voltage to zero.

g. CHECK—that the null voltage reads 0.499 V ±0.6% ±20 mV.

h. Set the PFG to test the 0.01 to 0.099 V Amplitude range:

PARAMETER	DATA	DATA
AMPL	10 mV	ENTER
OFFSET	44 mV	ENTER

i. Set the 7A13 Vertical Sensitivity to 2 mV/Div. Adjust the 7A13 to null the AC positive peak voltage to zero.

j. CHECK—that the null voltage reads 49 mV ±0.6% ±20 mV.

k. Set the PFG:

PARAMETER	DATA	DATA
OFFSET	0 mV	ENTER

6. Check Amplitude Flatness

Test Equipment Required:

50 Ω Coaxial Cable
50 Ω Feedthrough Termination
Oscilloscope

a. Connect the 50 Ω coaxial cable and the 50 Ω feedthrough termination from the PFG OUTPUT to the oscilloscope vertical input.

b. Set the PFG:

PARAMETER	DATA	DATA
FREQ	1 kHz	ENTER
AMPL	5 V	ENTER
	FUNCTION (sine wave)	

c. Set up a 6 division reference amplitude on the oscilloscope.

d. Set the PFG:

PARAMETER	DATA	DATA
FREQ	0.012 Hz to 120 kHz	ENTER

e. CHECK—the oscilloscope display for a 6 division display ±5% (5.70 to 6.3 divisions).

f. Set the PFG:

PARAMETER	DATA	DATA
FREQ	121 kHz to 1.2 MHz	ENTER

g. CHECK—the oscilloscope display for a 6 division display +25%, −20% (4.8 to 7.5 divisions).

h. Set the PFG:

PARAMETER	DATA	DATA
FREQ	1.21 MHz to 12 MHz	ENTER

i. CHECK—the oscilloscope display for a 6 division display +40%, −30% (4.2 to 8.4 divisions).

j. Repeat steps a through i for the triangle, pulse and square functions.

7. Check Sine Distortion

Test Equipment Required:

50 Ω Coaxial Cable
50 Ω High-Frequency Feedthrough Termination
AA 501A Distortion Analyzer
7704A/7L12 Spectrum Analyzer

a. Connect the 50 Ω coaxial cable and the high-frequency 50 Ω feedthrough termination from the PFG OUTPUT to the distortion analyzer input.

b. Set the PFG:

PARAMETER	DATA	DATA
AMPL	1 V to 9.99 V	ENTER

MODE	FUNCTION
CONT	∿ (sine wave)

PARAMETER	DATA	DATA
FREQ	121 Hz to 100 kHz	ENTER

c. CHECK—the total harmonic distortion (THD) is <0.6%.

d. Set the PFG:

PARAMETER	DATA	DATA
FREQ	12 Hz to 120 Hz	ENTER

e. CHECK—the THD is <1.0%.

f. Move the coaxial cable from the distortion analyzer to the spectrum analyzer.

NOTE

Remove 50 Ω feedthrough termination if not needed by spectrum analyzer.

g. Set the PFG:

PARAMETER	DATA	DATA
FREQ	100.1 kHz to 1 MHz	ENTER

h. CHECK—all harmonics are at least 30 dB below the fundamental.

i. Set the PFG:

PARAMETER	DATA	DATA
FREQ	1.001 MHz to 12 MHz	ENTER

j. CHECK—all harmonics are at least 20 dB below the fundamental.

8. Check Time Symmetry

Test Equipment Required:

50 Ω Coaxial Cable
50 Ω High-Frequency Feedthrough Termination
DC 510 Universal Counter

a. Connect the 50 Ω coaxial cable and the high-frequency 50 Ω feedthrough termination from the PFG OUTPUT to the counter input.

b. Set the PFG:

FUNCTION
⊓⊔ (square wave)

PARAMETER	DATA	DATA
FREQ	121 Hz to 120 kHz	ENTER

c. Measure the period and width of the square wave.

d. Calculate the time symmetry error using the formula:

$$\text{Symmetry Error} = \frac{\frac{P}{2} - W}{P} \times 100 \text{ (in \%)}$$

e. CHECK—that the calculated time symmetry error is <0.5%.

f. Set the PFG:

PARAMETER	DATA	DATA
FREQ	121 kHz to 1.2 MHz	ENTER

g. CHECK—that the calculated time symmetry error is <1%.

h. Set the PFG:

PARAMETER	DATA	DATA
FREQ	1.21 MHz to 12 MHz	ENTER

i. CHECK—that the calculated time symmetry error is <5%.

9. Check Square Wave

Test Equipment Required:

50 Ω Precision Coaxial Cable
50 Ω Feedthrough Termination
Oscilloscope

a. Connect the precision 50 Ω coaxial cable with the 50 Ω feedthrough termination from the PFG OUTPUT to the oscilloscope vertical input (with the termination at the scope input).

b. Set the PFG:

FUNCTION
(square wave)

PARAMETER	DATA	DATA
FREQ	1 MHz	ENTER
AMPL	9.99 V	ENTER

c. CHECK—the risetime is ≤15 ns from 10% point to 90% point.

d. CHECK—the falltime is ≤15 ns from 90% point to 10% point.

e. CHECK—aberrations are <8% peak to peak.

10. Check Internal Trigger

Test Equipment Required:

Coaxial Cable
DC 510 Universal Counter

a. Connect the coaxial cable from the PFG OUTPUT to the counter input. Set the counter for period measurements.

b. Set the PFG:

PARAMETER	DATA	DATA
FREQ	10 MHz	ENTER

FUNCTION	MODE	TRIG
(square wave)	TRIG	INT

PARAMETER	DATA	DATA
RATE	1 s to 200 ns	ENTER

c. CHECK—the counter reading is ±0.01% of the selected RATE.

11. Check Synthesizer Accuracy

NOTE

Perform this check only if Option 02 is installed.

Test Equipment Required:

50 Ω Coaxial Cable
50 Ω Feedthrough Termination
DC 510 Universal Counter

a. Connect the 50 Ω coaxial cable with the 50 Ω feedthrough termination from the PFG OUTPUT to the frequency counter input.

b. Set the PFG:

MODE
SYNT

PARAMETER	DATA	DATA
FREQ	12.1 Hz to 12 MHz	ENTER

c. CHECK—the counter reading is within ±0.005% of the selected value.

12. Check Amplitude Modulation

Test Equipment Required:

50 Ω Coaxial Cable (2)
50 Ω Feedthrough Termination
FG 502 Function Generator
Oscilloscope

a. Connect the 50 Ω coaxial cable from the function generator output to the PFG AM INPUT connector.

b. Connect the 50 Ω coaxial cable and the 50 Ω feedthrough termination from the PFG OUTPUT to the oscilloscope input. Connect another 50 Ω coax cable from the oscilloscope external input to the PFG SYNC OUT. Set the oscilloscope to trigger on the function generator SYNC OUT.

c. Set the function generator to a frequency of 100 Hz. 5 V peak to peak triangle wave centered around a zero volt reference.

d. Set the PFG:

PARAMETER	DATA	DATA
FREQ	100 kHz	ENTER
PARAMETER	DATA	DATA
AMPL	4.5 V	ENTER
FUNCTION	MODE	MODE
(sine wave)	CONT	AM (LED on)

e. CHECK—the displayed output has at least 100% modulation.

f. Turn off AM MODE by pressing AM button (LED off).

13. Check VCO Operation

Test Equipment Required:

50 Ω Coaxial Cable
DC 510 Universal Counter
PS 503A Power Supply

a. Connect the 50 Ω coaxial cable from the PFG OUTPUT to the frequency counter input. Set counter to measure frequency.

b. Connect a cable from the power supply to the PFG VCO/FM INPUT connector.

c. Set the PFG:

PARAMETER	DATA	DATA
FREQ	100 kHz	ENTER
	FUNCTION	MODE
	(square wave)	FM (LED on)
PARAMETER	DATA	DATA
SPCL	260[a]	ENTER

[a](Frequency Range Lock—press INCREMENT once to turn Lock ON.)

d. Set the power supply to zero volts.

e. Note the frequency displayed on the counter.

f. Set the power supply to +5 V.

g. Note the frequency displayed on the counter.

h. CHECK—the ratio of the two displayed frequencies is >500:1.

i. Turn Lock OFF by pressing INCREMENT once. Turn off FM MODE by pressing FM button (LED off).

14. Check Sync Out

Test Equipment Required:

50 Ω Coaxial Cable
Oscilloscope

a. Connect the 50 Ω coaxial cable from the PFG SYNC OUT connector to the oscilloscope vertical input.

b. Set the PFG:

PARAMETER	DATA	DATA
FREQ	10 kHz	ENTER

c. CHECK—the SYNC OUT switches from 0 volts to at least 2 volts.

15. Check Pulse Width Accuracy

Test Equipment Required:

50 Ω Feedthrough Termination
50 Ω Coaxial Cable
DC 510 Universal Counter

a. Connect the 50 Ω coaxial cable with the 50 Ω feedthrough termination from the PFG OUTPUT to the universal counter input. Set the counter to WIDTH-A mode.

b. Set the PFG:

PARAMETER	DATA	DATA
SPCL	230	ENTER
INCREMENT		
⇑ or ⇓	(Toggle FREQ LOCK ON)	
PARAMETER	DATA	DATA
FREQ	500 kHz	ENTER
PULSE WIDTH	DATA	DATA
	0.040 μs-0.099 μs	ENTER
FUNCTION		
PULSE		

c. CHECK—that the pulse width displayed on the counter reads within ±5.0% ±10 ns of the selected value.

d. Set the PFG:

PULSE WIDTH	DATA	DATA
	0.100 μs-0.999 μs	ENTER

e. CHECK—that the pulse width displayed on the counter reads within ±5.0% ±10 ns of the selected value.

f. Set the PFG:

PARAMETER	DATA	DATA
FREQ	7 Hz	ENTER
PULSE WIDTH	DATA 1.0 μs-9.99 μs	DATA ENTER

g. CHECK—that the pulse width displayed on the counter reads within ±5.0% ±10 ns of the selected value.

h. Set the PFG:

PULSE	DATA	DATA
WIDTH	10.0 μs-99.9 μs	ENTER

i. CHECK—that the pulse width displayed on the counter reads within ±5.0% ±10 ns of the selected value.

j. Set the PFG:

PULSE	DATA	DATA
WIDTH	100 μs-999 μs	ENTER

k. CHECK—that the pulse width displayed on the counter reads within ±5.0% ±10 ns of the selected value.

l. Set the PFG:

PULSE	DATA	DATA
WIDTH	1.00 ms-9.99 ms	ENTER

m. CHECK—that the pulse width displayed on the counter reads within ±5.0% ±10 ns of the selected value.

n. Set the PFG:

PULSE	DATA	DATA
WIDTH	10.0 ms-99.9 ms	ENTER

o. CHECK—that the pulse width displayed on the counter reads within ±5.0% ±10 ns of the selected value.

16. Check Zero Delay Accuracy From Sync to Pulse

Test Equipment Required:

50 Ω Feedthrough Termination
50 Ω Coaxial Cable (2)
DC 510 Universal Counter

a. Connect a 50 Ω coaxial cable from the PFG SYNC OUT to Channel A of the universal counter.

b. Connect the second 50 Ω coaxial cable with the 50 Ω feedthrough termination from the PFG OUTPUT to Channel B of the counter.

c. Set the counter to TIME A-B mode.

d. Set the PFG:

PULSE	DATA	DATA
WIDTH	0.040 μs	ENTER
PARAMETER	DATA	DATA
FREQ	500 kHz	ENTER

e. CHECK—that the value displayed on the counter reads 0 ±10 ns.

17. Check Pulse Delay Accuracy

Test Equipment Required:

50 Ω Feedthrough Termination
Two 50 Ω Coaxial Cables
DC 510 Universal Counter

a. Connect a 50 Ω coaxial cable from the PFG SYNC OUT to Channel A of the universal counter.

b. Connect the second 50 Ω coaxial cable with the 50 Ω feedthrough termination from the PFG OUTPUT to Channel B of the counter.

c. Set the counter to TIME A-B mode.

d. Set the PFG:

PARAMETER	DATA	DATA
FREQ	500 kHz	ENTER
PULSE WIDTH	DATA 0.100 μs	DATA ENTER
PULSE DELAY	DATA 0.040 μs-0.099 μs	DATA ENTER

e. CHECK—that the delay time displayed on the counter reads within ±5.0% ±10 ns of the selected delay value.

f. Set the PFG:

PULSE	DATA	DATA
WIDTH	0.100 μs	ENTER
PULSE DELAY	DATA 0.100 μs-0.999 μs	DATA ENTER

g. CHECK—that the delay time displayed on the counter reads within ±5.0% ±10 ns of the selected delay value.

h. Set the PFG:

PARAMETER	DATA	DATA
FREQ	7 Hz	ENTER
PULSE WIDTH	DATA 1.00 μs	DATA ENTER
PULSE DELAY	DATA 1.00 μs-9.99 μs	DATA ENTER

i. CHECK—that the delay time displayed on the counter reads within ±5.0% ±10 ns of the selected delay value.

j. Set the PFG:

PULSE WIDTH	DATA 10.0 μs	DATA ENTER
PULSE DELAY	DATA 10.0 μs-99.9 μs	DATA ENTER

k. CHECK—that the delay time displayed on the counter reads within ±5.0% ±10 ns of the selected delay value.

l. Set the PFG:

PULSE WIDTH	DATA 100 μs	DATA ENTER
PULSE DELAY	DATA 100 μs-999 μs	DATA ENTER

m. CHECK—that the delay time displayed on the counter reads within ±5.0% ±10 ns of the selected delay value.

n. Set the PFG:

PULSE WIDTH	DATA 1 ms	DATA ENTER
PULSE DELAY	DATA 1 ms-9.99 ms	DATA ENTER

o. CHECK—that the delay time displayed on the counter reads within ±5.0% ±10 ns of the selected delay value.

p. Set the PFG:

PULSE WIDTH	DATA 10.0 ms	DATA ENTER
PULSE DELAY	DATA 10.0 ms-99.9 ms	DATA ENTER

q. CHECK—that the delay time displayed on the counter reads within ±5.0% ±10 ns of the selected delay value.

18. Check Sweep Characteristics

Test Equipment Required:

50 Ω Coaxial Cable
DC 510 Universal Counter
Oscilloscope

a. Connect the 50 Ω coaxial cable from the PFG OUTPUT to the universal counter input (set to measure frequency).

b. Connect the oscilloscope in parallel to the counter.

c. Set the PFG:

FUNCTION (square wave)

PARAMETER AMPL	DATA 5 V	DATA ENTER
PARAMETER OFFSET	DATA 0 V	DATA ENTER
SWEEP START	DATA 4 kHz	DATA ENTER
SWEEP STOP	DATA 120 kHz	DATA ENTER
SWEEP RUN	MODE TRIG	

d. CHECK—that the counter reads between 1 kHz and 7 kHz.

e. Set the PFG:

MODE CONT

PARAMETER RATE	DATA 100 ms	DATA ENTER

f. Wait for the peak of the sweep cycle.

g. CHECK—that the counter reads between 114 kHz and 126 kHz.

19. Check SWEEP OUTPUT

Test Equipment Required:

50 Ω Coaxial Cable
Oscilloscope

a. Connect the 50 Ω coaxial cable from the PFG SWEEP OUT connector to the oscilloscope vertical input.

b. Set the PFG:

SWEEP START	DATA 1 kHz	DATA ENTER
SWEEP STOP	DATA 120 kHz	DATA ENTER
PARAMETER RATE	DATA 1 μs	DATA ENTER
SWEEP RUN		

c. CHECK—that a positive going ramp waveform with an amplitude limit of 5 V is displayed on the oscilloscope.

20. Check GPIB Bus

Test Equipment Required:

Coaxial Cable
PEP 301 Controller

a. Connect the selected controller to the PFG power module.

b. Run a GPIB talker-listener program using settings and queries command.

c. Check for proper response to commands and queries.

This completes the Performance Check Procedure.

Section 3
INTERNAL ADJUSTMENT PROCEDURE

Introduction

Use this adjustment procedure to restore the PFG 5105 or PFG 5505 to original performance requirements. This procedure need not be performed unless the instrument fails to meet the Performance Requirements of the electrical characteristics listed in the Specification section, or if the Performance Check procedure cannot be completed satisfactorily. Adjustment is also recommended following instrument repair or modification. The adjustments must be made at an ambient temperature of +20°C to +30°C.

Satisfactory completion of all adjustment steps in this procedure ensures that instrument performance will meet the Performance Requirements.

Services Available

Tektronix, Inc. provides complete instrument repair and adjustment at local field service centers and at the factory service center. Contact your local Tektronix field office or representative for further information.

Test Equipment Required

The test equipment (or equivalent) listed in Section 2, Table 2-1 is required for adjustment of the PFG 5105 or PFG 5505. Specifications given for the test equipment are the minimum necessary for accurate adjustment. All test equipment is assumed to be correctly calibrated and operating within specifications. If other test equipment is substituted, the adjustment setup may need to be altered to meet the requirements of the equipment used.

Preparation for Adjustment

WARNING

To avoid electric shock hazard, disconnect the instrument from the power source before removing the instrument from the power module/cabinet.

To make internal adjustments to the PFG 5105 or PFG 5505 you must operate the instrument with a flexible extender cable outside the power module/cabinet.

NOTE

Before attempting to remove the PFG 5505 from the cabinet, remove the Phillips screw from the front edge of the cabinet.

Pull on both release latches on the front panel and slide the instrument out of the power module/cabinet assembly.

Remove both side covers and the back panel of the instrument to gain access to all adustments. Connect the instrument to the power module/cabinet with two extender boards, one for the Analog board and one for the CPU board.

Adjustment Procedure

For complete adjustment procedure cycle, perform all of the following steps in the same order as listed in this section. For a specific adjustment, use the proper adjustment description and perform only the setups related to the specific procedure.

All instrument settings required for each adjustment procedure step are stored in the instrument memory. To access the stored test setup, press SPCL key, enter 5 1 0 in the DATA keypad, then press ENTER. Test No 1 will be displayed in the LCD display. To activate Test No 1, press the ENTER key. When another test setup is required, enter the desired test number, then press ENTER.

NOTE

In the following procedure, the PFG 5105 and PFG 5505 instruments will be referred to as PFG.

1. Power Supply

(Refer to Fig. 3-1—A4 Output Board.)

a. Set the PFG to the calibration mode Test No 1 by pressing front-panel keys in order as follows:

SPCL 510 ENTER ENTER

b. Connect the voltmeter plus (+) lead to TP801, minus (–) lead to ground.

c. ADJUST—R806 for a voltmeter reading of +15.00 V ±0.01 V.

d. Move the plus lead to TP802.

e. ADJUST—R811 for a reading of –15.00V ±0.01 V.

f. Remove voltmeter leads.

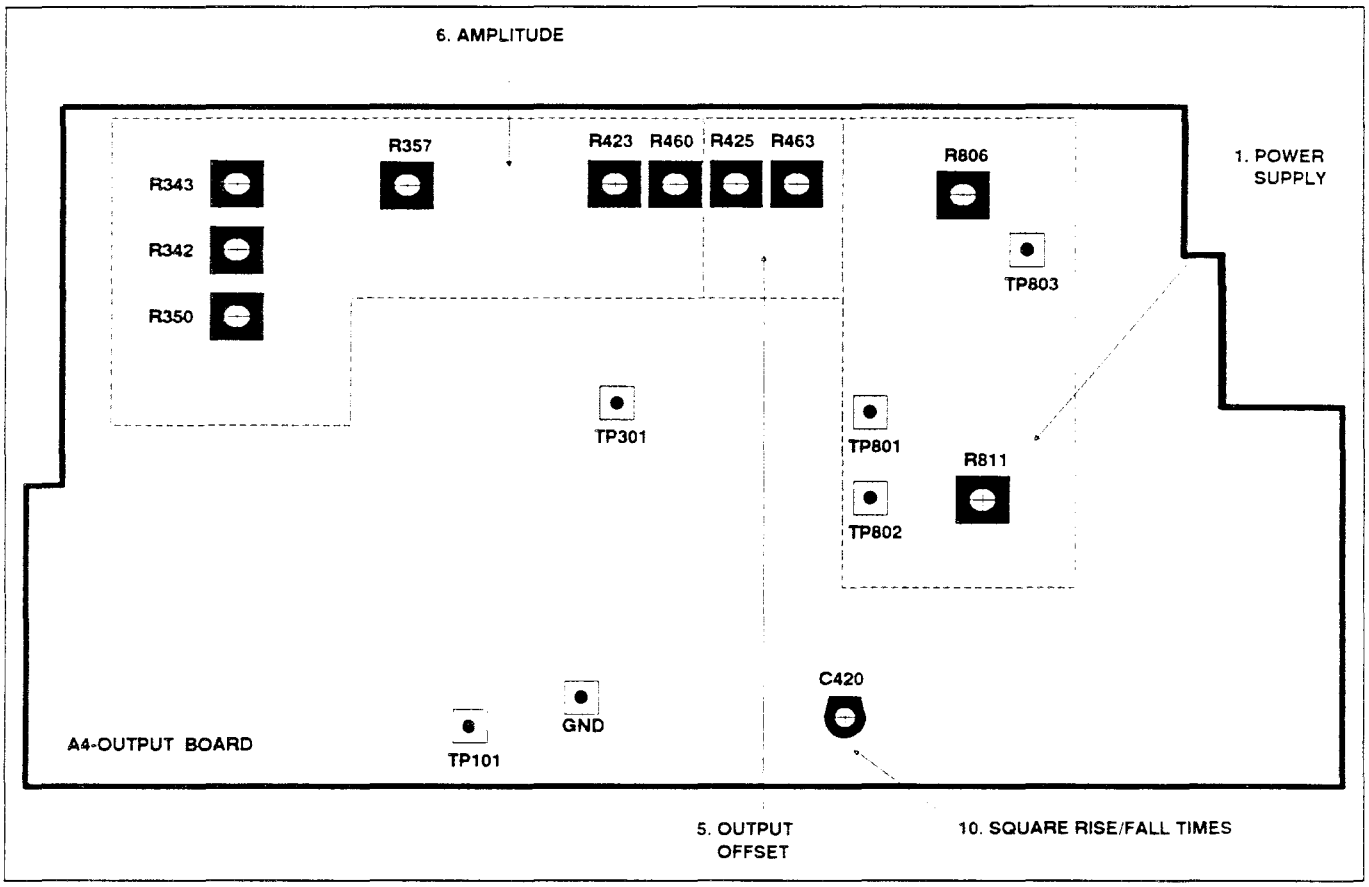


Fig. 3-1. A4 Output Board Adjustment Locations.

2. Voltage Reference

(Refer to Fig. 3-2—A3 Analog Board.)

a. Set PFG to Test 1 setup.

b. Connect DVM (set to read dc volts) plus lead to TP2, minus (–) lead to ground.

c. ADJUST—R13 for a reading of +10.240 V ±5 mV.

d. Move the DVM plus lead to TP1.

e. ADJUST—R15 for a reading of 0.000 V ±5 mV.

f. Remove the DVM leads.

3. Trigger Line Base

(Refer to Fig. 3-2—A3 Analog Board.)

a. Connect oscilloscope with a 10X probe to R170.

b. ADJUST—R175 to center the displayed triangle wave about ground (within ±1 minor division).

c. Move oscilloscope probe to TP3.

d. Set PFG to Test 2 setup.

e. ADJUST—R187 for 0.000 V ±5 mV.

f. Remove oscilloscope probe.

4. Frequency and Symmetry Accuracy

(Refer to Fig. 3-2—A3 Analog Board.)

NOTE

Frequency and symmetry calibrations are interactive and must be performed in one procedure.

a. Connect the PFG SYNC OUT to the counter input A set to FREQ.

b. Set PFG to Test 3 setup.

c. ADJUST—R103 for a counter reading of 1200 Hz ±1 Hz.

d. Set PFG to Test 4 setup.

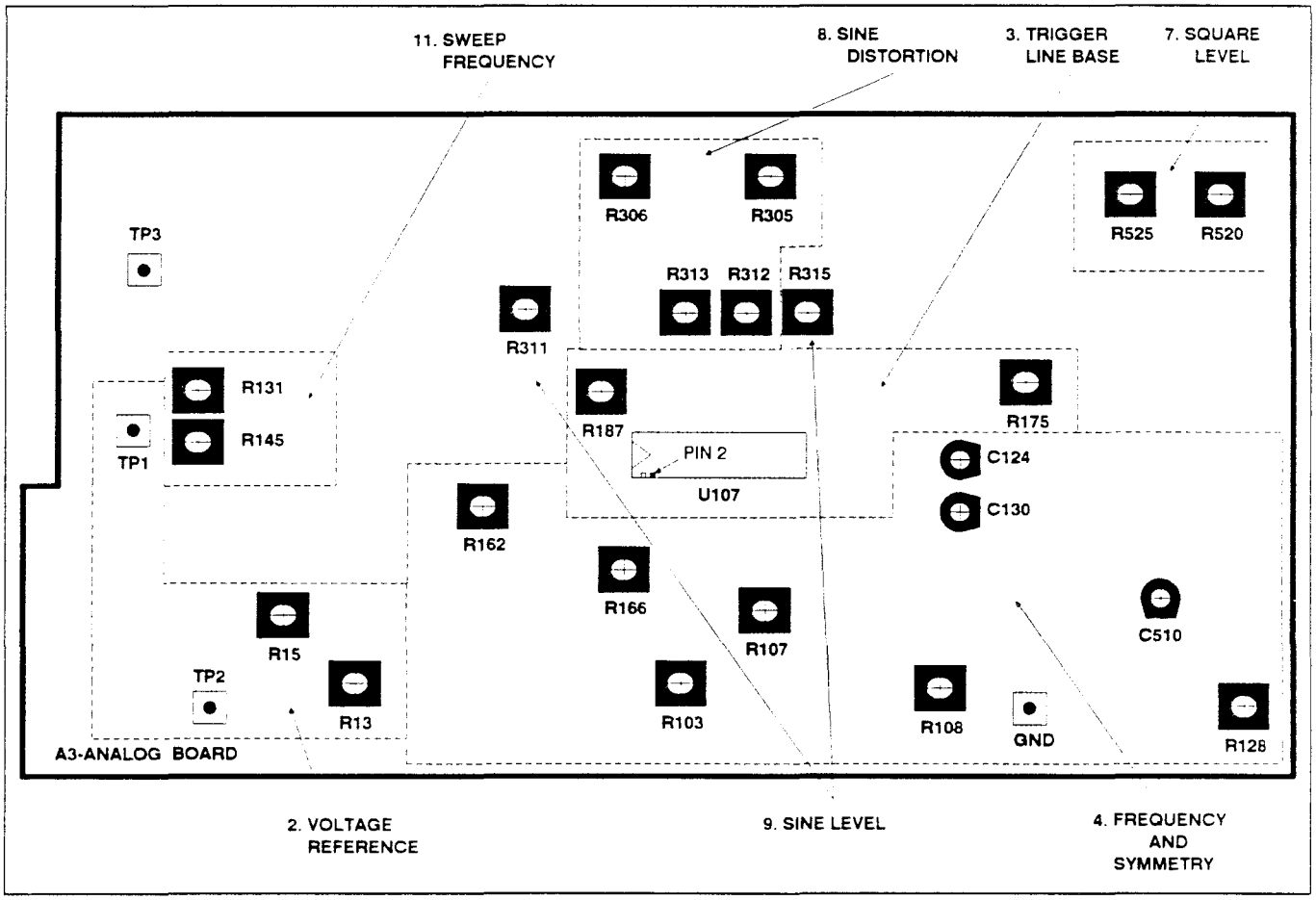


Fig. 3-2. A3 Analog Board Adjustment Locations.

e. ADJUST—R107 for a counter reading of 121 Hz ± 1 Hz.

f. Set PFG to Test 3 setup.

g. ADJUST—R108 for a waveform symmetry of 50% ± 0.2% using the period and width function of the counter and the formula:

$$\text{SYM ERROR\%} = \frac{\frac{P}{2} - W}{P} \times 100 \text{ (in \%)}$$

h. Set PFG to Test 4 setup.

i. ADJUST—R128 for a symmetry reading of 50% ± 0.2%.

j. Repeat steps b to i to obtain the required readings.

k. Set the PFG to Test 5 setup.

l. ADJUST—C124 for a frequency reading of 1.21 MHz ± 5 kHz.

m. Set PFG to Test 6 setup.

n. ADJUST—C510 for a frequency reading of 12.00 MHz ± 0.1 MHz.

o. Repeat steps k to n to obtain the required readings.

p. Set PFG to Test 7 setup.

q. ADJUST—C130 for a frequency reading of 1.200 MHz ± 0.01 MHz.

r. Set PFG to test 8 setup.

s. ADJUST—R162 for a frequency reading of 120 Hz ± 1 Hz.

t. Set PFG to Test 9 setup.

u. ADJUST—R166 for a waveform symmetry of 50% ± 0.2%.

v. Repeat steps r to s to obtain the required readings.

5. Output Offset

(Refer to Fig. 3-1—A4 Output Board.)

a. Set the PFG to Test 12 setup.

b. Connect the PFG OUTPUT to the DVM input with the precision 50 Ω cable (012-0482-00) and the precision 50 Ω termination (011-0129-00).

c. ADJUST—R463 on the OUTPUT board for a voltmeter reading of 0.000 V ± 2 mV.

d. Set the PFG to Test 13 setup.

e. ADJUST—R425 on the Output board for a voltmeter reading of 4.990 V ± 2 mV.

6. Amplitude

(Refer to Fig. 3-1—A4 Output Board.)

a. Connect the DVM (set to measure dc volts) and the oscilloscope vertical input to the PFG OUTPUT with the precision 50 Ω coaxial cable, the BNC T-connector, the second precision 50 Ω coaxial cable, and the precision 50 Ω feedthrough termination (see Fig. 3-3).

b. Set the PFG to Test 14 setup.

c. ADJUST—R343 (on Output board) for a symmetrical waveform around ground on the oscilloscope within ± 0.1 division.

d. Set the PFG to Test 15 setup.

e. ADJUST—R357 (on Output board) for a symmetrical waveform around ground on the oscilloscop within ± 0.1 division.

f. Interaction occurs with the above adjustments. Repeat b through e until all voltmeter readings are within the specified limits.

g. Set the DVM to read AC_{rms}.

h. Set the PFG to Test 14 setup.

i. ADJUST—R423 (on Output board) for a DVM reading of 2.880 V_{rms} ± 5 mV_{rms}.

j. Set the PFG to Test 17 setup.

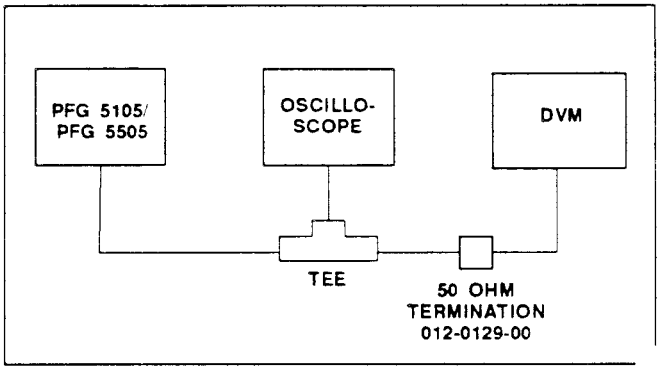


Fig. 3-3. Amplitude Adjustment Connections.

k. ADJUST—R460 (on Output board) for a DVM reading of 0.961 V_{rms} ±1 mV_{rms}.

l. Set the PFG to Test 15 setup.

m. ADJUST—R342 (on Output board) for a DVM reading of 0.288 V_{rms} ±1 mV_{rms}.

n. Set the PFG to Test 16 setup.

o. Connect the PFG OUTPUT to the distortion analyzer with the precision 50 Ω coaxial cable and the precision 50 Ω feedthrough termination.

p. ADJUST—R350 (on Output board) for a minimum distortion reading.

q. Repeat steps b through p due to interaction.

r. Disconnect distortion analyzer.

7. Square Level

(Refer to Fig. 3-2—A3 Analog Board.)

a. Connect the DVM (set to measure ac_{rms} volts) and the oscilloscope vertical input (set to dc) to the PFG OUTPUT with the precision 50 Ω coaxial cable, the BNC T-connector, the second precision 50 Ω coaxial cable, and the precision 50 Ω feedthrough termination (see Fig. 3-3).

b. Set the PFG to Test 10 setup.

c. ADJUST—R520 and R525 for a DVM reading of 4.995 V_{rms} ±5 mV_{rms}, and a symmetrical waveform about ground on the oscilloscope.

8. Sine Distortion

(Refer to Fig. 3-2—A3 Analog Board.)

a. Connect the distortion analyzer and the oscilloscope vertical input to the PFG OUTPUT with the precision 50 Ω coaxial cable, the BNC T-connector, the second precision 50 Ω coaxial cable, and the precision 50 Ω feedthrough termination (see Fig. 3-4).

b. Set the PFG to Test 11 setup.

c. ADJUST—R305 and R312 (on the Analog board) for minimum distortion reading (<0.5%).

d. ADJUST—R313 and R306 (on the Analog board) for a rounded, flat-top sine wave on the oscilloscope.

e. Repeat steps c and d for minimum distortion.

9. Sine Level

(Refer to Fig. 3-2—A3 Analog Board.)

a. Connect the digital voltmeter (set to measure V_{rms}) and the oscilloscope vertical input to the PFG OUTPUT with the precision 50 Ω coaxial cable, the BNC T-connector, the second precision 50 Ω coaxial cable, and the precision 50 Ω feedthrough termination (see Fig. 3-3).

b. Set the PFG to Test 11 setup.

c. ADJUST—R311 for a DVM reading of 3.531 V_{rms} ±5 mV_{rms}.

d. ADJUST—R315 for a symmetrical sine wave about ground (dc coupled).

e. Repeat steps c and d due to interaction.

10. Square Rise/Fall Times

(Refer to Fig. 3-1—A4 Output Board.)

NOTE

All the PFG PC boards must be installed without extenders for this test.

a. Connect the PFG OUTPUT to the oscilloscope vertical input with the precision 50 Ω coaxial cable, and the high frequency 50 Ω feedthrough termination.

b. Set the PFG to Test 20 setup.

c. ADJUST—C420 (on the Output board, accessible through the right side cover) for the best rise/fall time and minimum aberrations.

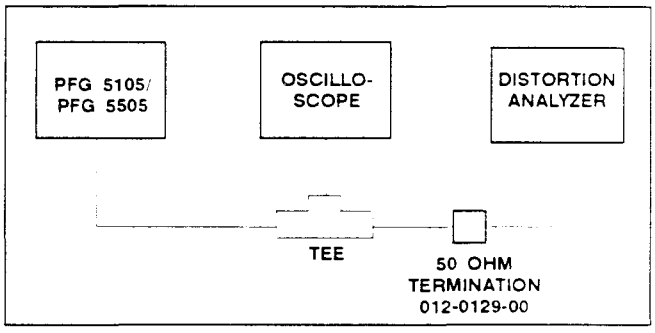


Fig. 3-4. Sine Distortion Adjustment Connections.

11. Sweep Frequency

(Refer to Fig. 3-2—A3 Analog Board.)

a. Connect the frequency counter input to the PFG OUTPUT with the 50 Ω coaxial cable, and the 50 Ω feedthrough termination.

b. Set the PFG to Test 18 setup.

c. ADJUST—R145 for a counter reading of 121 Hz ±5 Hz.

d. Set the PFG to Test 19 setup.

e. When the counter reading is ≈100 kHz, change the PFG RATE to 1 sec and adjust R131 as in the next step.

f. ADJUST—R131 for a counter reading of 120 kHz ±1 kHz.

g. Repeat steps b through f due to interaction.

12. Synthesizer Reference Frequency (Option 02 Only)

(Refer to Fig. 3-5—A5 Synthesizer Board.)

a. Connect the frequency counter probe to TP900 on the SYNT board.

NOTE

The ANALOG board extension can be used to extend the SYNT board.

b. ADJUST—C932 for a counter reading of 4,000,000 Hz ±2 Hz.

13. Pulse Width

(Refer to Fig. 3-6—A2 Pulse Board.)

NOTE

Calibration of the Pulse board is best accomplished by using the 90° CPU extender and removing the shield between the Pulse board and the CPU board to give access to the adjustments on the Pulse board.

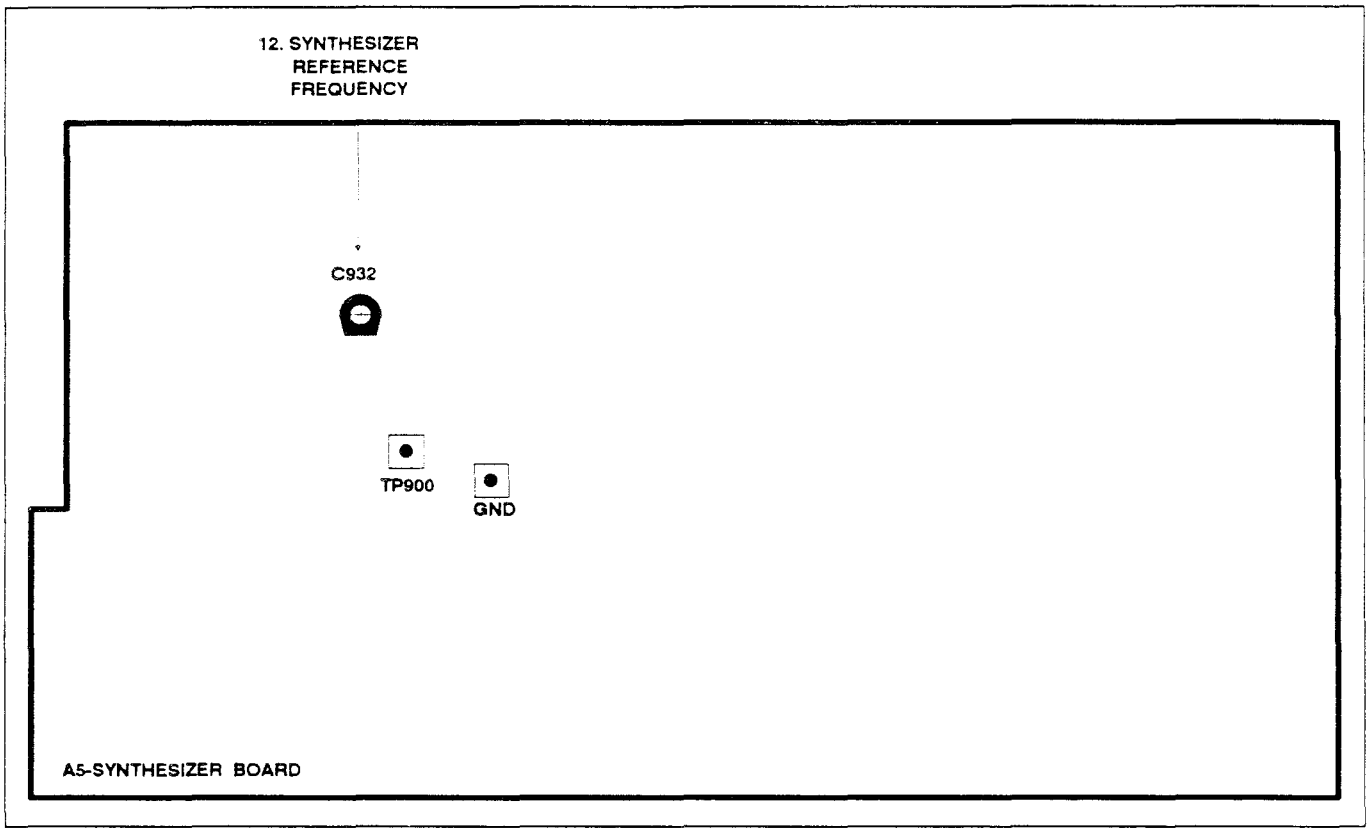


Fig. 3-5. A5 Synthesizer Board Adjustment Locations.

a. Connect the PFG OUTPUT with a 50Ω termination to the counter input A.

b. Set the counter to WIDTH-A mode.

c. Set the PFG to Test 21 setup.

d. ADJUST – C207 for a counter reading of 0.099 μs ±0.001 μs.

e. Set the PFG to Test 23 setup.

f. ADJUST – C216 for a counter reading of 0.999 μs ±0.010 μs.

g. Set the PFG to Test 24 setup.

h. ADJUST – R223 for a counter reading of 0.100 μs ±0.001 μs.

i. Repeat steps e through h.

j. Repeat steps c and d.

k. Set the PFG to Test 23 setup.

l. ADJUST – R220 for a counter reading of 0.999 μs ±0.010 μs.

m. Set the PFG to Test 24 setup.

n. ADJUST – R223 for a counter reading of 0.100 μs ±0.001 μs.

o. Repeat steps k through n to obtain the required readings.

p. Set the PFG to Test 22 setup.

q. CHECK – for a counter reading of 0.040 μs ±0.005 μs.

r. Set the PFG to Test 25 setup.

s. ADJUST – R219 for a counter reading of 9.99 ms ±0.01 ms.

t. Set the PFG to Test 26 setup.

u. ADJUST – R216 for a counter reading of 1.00 ms ±0.01 ms.

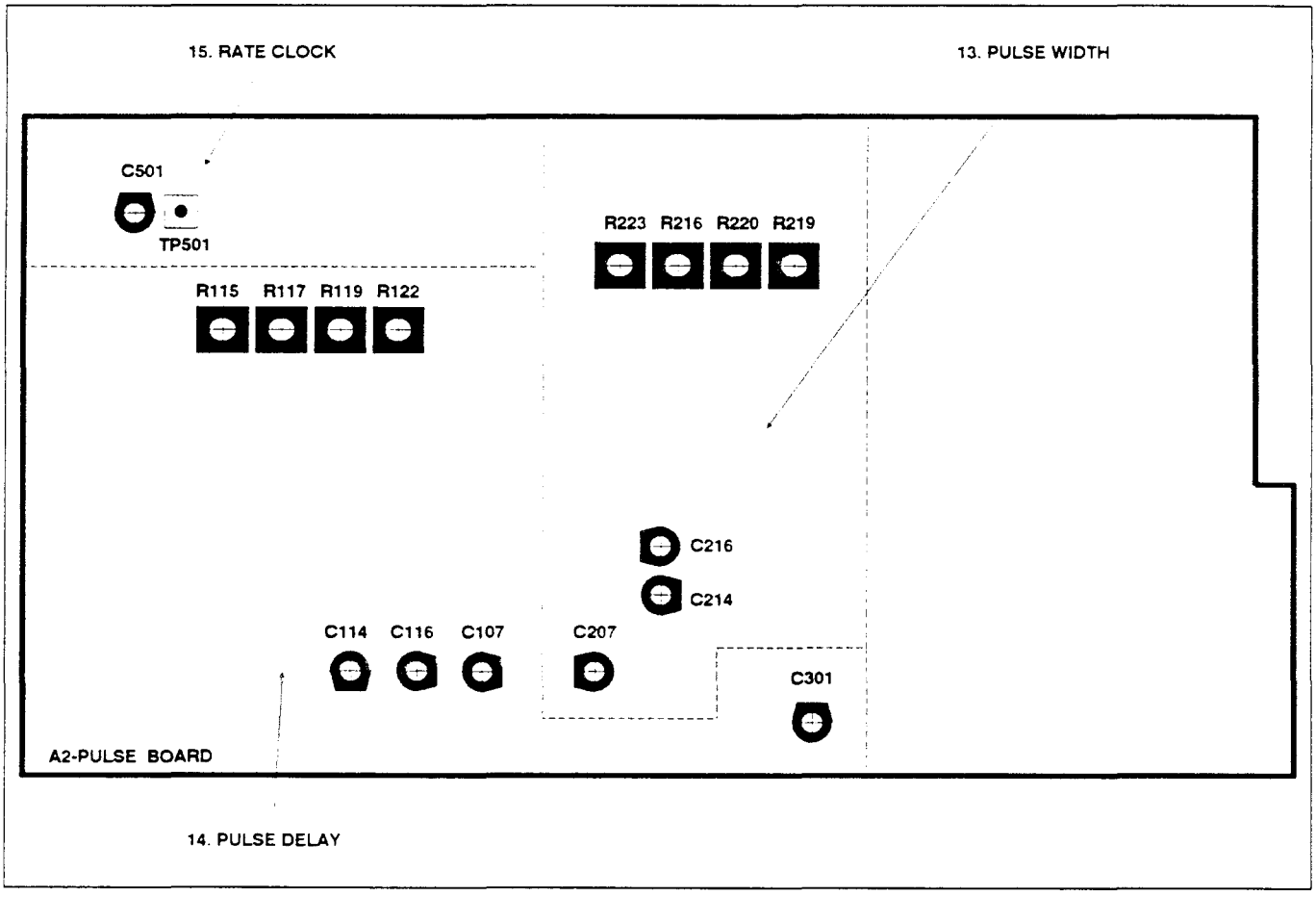


Fig. 3-6. A2 Pulse Board Adjustment Locations.

v. Repeat steps r through u to obtain the required readings.

w. Set the PFG to Test 29 setup.

x. ADJUST – C214 for a counter reading of 9.99 μs ±0.010 μs.

y. Set the PFG to Test 27 setup.

z. CHECK – for a counter reading of 99.9 ms ±5.0 ms.

aa. Set the PFG to Test 28 setup.

bb. CHECK – for a counter reading of 10.0 ms ±0.5 ms.

14. Pulse Delay

(Refer to Fig. 3-6 – A2 Pulse Board.)

a. Connect the PFG SYNC OUT to the counter input A.

b. Connect the PFG OUTPUT with a 50Ω termination to the counter input B.

NOTE

Both BNC cables must be the same length..

c. Set the counter to TIME A-B mode.

d. Set the PFG to Test 21 setup.

e. ADJUST – C301 for a counter reading of 0.00 ns ±5.0 ns.

f. Set the PFG to Test 30 setup.

g. ADJUST – C107 for a counter reading of 0.099 μs ±0.001 μs.

h. Set the PFG to Test 32 setup.

i. ADJUST – C116 for a counter reading of 0.999 μs ±0.010 μs.

j. Set the PFG to Test 33 setup.

k. ADJUST – R122 for a counter reading of 0.100 μs ±0.001 μs.

l. Repeat steps h through k.

m. Repeat steps f and g.

n. Set the PFG to Test 32 setup.

o. ADJUST – R119 for a counter reading of 0.999 μs ±0.010 μs.

p. Set the PFG to Test 33 setup.

q. ADJUST – R122 for a counter reading of 0.1 μs ±0.001 μs.

r. Repeat steps n through q to obtain the required readings.

s. Set the PFG to Test 31 setup.

t. CHECK – for a counter reading of 0.040 μs ±0.005 μs.

u. Set the PFG to Test 34 setup.

v. ADJUST – R117 for a counter reading of 9.99 ms ±0.01 ms.

w. Set the PFG to Test 35 setup.

x. ADJUST – R115 for a counter reading of 1.00 ms ±0.01 ms.

y. Repeat steps v through x to obtain the required readings.

z. Set the PFG to Test 38 setup.

aa. ADJUST – C114 for a counter reading of 9.99 μs ±0.01 μs.

bb. Set the PFG to Test 36 setup.

cc. CHECK – for a counter reading of 99.9 ms ±5.0 ms.

dd. Set the PFG to Test 37 setup.

ee. CHECK – for a counter reading of 10.0 ms ±0.5 ms.

15. Rate Clock

(Refer to Fig. 3-6 – A2 Pulse Board.)

a. Connect the counter probe to TP501 on the Pulse board.

b. ADJUST – C501 for a counter reading of 10,000,000 Hz ±5 Hz.

This ends the Adjustment Procedure.

Section 4
MAINTENANCE

GENERAL INFORMATION

Introduction

This section of the manual provides maintenance instructions and servicing information for the PFG 5105 and the PFG 5505 (and power module).

WARNING

Dangerous potentials exist at several points throughout the instrument and power module. When the power module must be operated with the cabinet removed, do not touch exposed connections or components. Disconnect power before cabinet removal, cleaning, or replacing parts.

Static-Sensitive Components

CAUTION

Static discharge may damage semiconductor components in this instrument.

This instrument contains electrical components that are susceptible to damage from static discharge. See Table 4-1 for relative susceptibility of various classes of semiconductors. Static voltages of 1 kV to 30 kV are common in unprotected environments.

Observe the following precautions to avoid damage:

1. Minimize handling of static-sensitive components.
2. Transport and store static-sensitive components or assemblies in their original containers, on a metal rail, or on conductive foam. Label any package that contains static-sensitive assemblies or components.
3. Discharge the static voltage from your body by wearing a grounded wrist strap while handling these components. Servicing static-sensitive assemblies or components should be performed only at a static-free work station by qualified service personnel.
4. Allow nothing capable of generating or holding a static charge on the work station surface.
5. Keep the component leads shorted together whenever possible.
6. Pick up components by the body, never by the leads.
7. Do not slide the components over any surface.
8. Avoid handling components in areas that have a floor or work surface covering capable of generating a static charge.
9. Use a soldering iron that is connected to earth ground.
10. Use only special antistatic suction type or wick type desoldering tools.

Test Equipment

Before using any test equipment to make measurements on static-sensitive components or assemblies, be certain that any voltage or current supplied by the test equipment does not exceed the limits of the component to be tested.

Table 4-1
RELATIVE SUSCEPTIBILITY TO STATIC DISCHARGE DAMAGE

Semiconductor Classes	Relative Susceptibility Levels[a]
MOS or CMOS microcircuits or discretes, or linear microcircuits with MOS inputs. (Most Sensitive)	1
ECL	2
Schottky signal diodes	3
Schottky TTL	4
High-frequency bipolar transistors	5
JFETs	6
Linear microcircuits	7
Low-power Schottky TTL	8
TTL (Least Sensitive)	9

[a]Voltage equivalent for levels:
1 = 100 to 500 V
2 = 200 to 500 V
3 = 250 V
4 = 500 V
5 = 400 to 600 V
6 = 600 to 800 V
7 = 400 to 1000 V (est.)
8 = 900 V
9 = 1200 V

(Voltage discharged from a 100 pF capacitor through a resistance of 100 ohms.)

Cleaning Instructions

This instrument should be cleaned as often as operating conditions require. Loose dust accumulated on the outside of the instrument can be removed with a soft cloth or small brush. Remove dirt that remains with a soft cloth dampened in a mild detergent and water solution. Do not use abrasive cleaners.

CAUTION

To clean the front panel use freon, isopropyl alcohol, or denatured ethyl alcohol. Do not use petroleum based cleansing agents. Do not use air or any solvent to clean the Display (front panel) board. Before using any other type of cleaner, consult your Tektronix Service Center or representative.

The best way to clean the interior is to blow off the accumulated dust with dry, low-velocity air (approximately 5 lb/in^2) or use a soft brush or cloth dampened with a mild detergent and water solution.

Hold the board such that the residue runs away from the connectors. Do not scrape or use an eraser to clean the edge connector contacts. Abrasive cleaning can remove the gold plating.

CAUTION

Circuit boards and components must be dry before applying power.

Obtaining Replacement Parts

Electrical and mechanical parts can be obtained through your local Tektronix Field Office or representative. However, many of the standard electronic components can be obtained from a local commercial source. Before purchasing or ordering parts from a source other than Tektronix, Inc., check the Replaceable Electrical Parts list for the proper value, rating, tolerance, and description.

Ordering Parts

When ordering replacement parts from Tektronix, Inc., it is important to include all of the following information.

1. Instrument type (include modification or option numbers).
2. Instrument serial number.
3. A description of the part (if electrical, include the component number).
4. Tektronix part number.

Soldering Techniques

WARNING

To avoid electric shock hazard, disconnect the instrument from the power source before soldering.

The reliability and accuracy of this instrument can be maintained only if proper soldering techniques are used when repairing or replacing parts. General soldering techniques which apply to maintenance of any precision electronic equipment should be used when working on this instrument. Use only 60/40 rosin-core, electronic-grade solder. The choice of soldering iron is determined by the repair to be made.

When soldering on circuit boards or small wiring, use only a 15 watt, pencil type iron. A higher wattage soldering iron can cause the etched circuit wiring to separate from the board base material and melt the insulation from small wiring. Always keep the soldering iron tip properly tinned to ensure the best heat transfer to the solder joint. Apply only enough heat to remove the component or to make a good solder joint. To protect heat sensitive components, hold the component lead with a pair of long-nose pliers between the component body and the solder joint. Use a solder removing wick to remove excess solder from connections or to clean circuit board pads.

Semiconductors

To remove the in-line integrated circuits installed in sockets, use an extracting tool. This tool is available from Tektronix, inc.; order Tektronix Part Number 003-0619-00. If an extracting tool is not available, use care to avoid damaging the pins. Pull slowly and evenly on both ends of the integrated circuit. Try to avoid disengaging one end before the other. IC's that are soldered in should be carefully unsoldered, using commercially available de-soldering tools. If these tools are not available, the pins in the IC may be clipped with diagonal cutters, and the pins then individually removed from the board.

PFG 5505 ONLY—POWER MODULE DISASSEMBLY

WARNING

To avoid electric-shock hazard, disconnect the power source and other instrumentation connected to the instrument before disassembly.

NOTE

To disassemble the PFG 5505 Power Module, refer to the following removal procedures and exploded views in the Replaceable Mechanical Parts section at the back of this manual.

Power Module Cabinet Removal

Remove the Phillips screw from the bottom front edge of the cabinet. It is located just to the left of the cabinet bottom seam.

Pull on the two release latch handles to slide the function generator out of the cabinet.

Before removing the cabinet, turn the power switch off and disconnect the line voltage cord. Remove any plug-in modules and the handle assembly.

Two screws on each side and two screws on the bottom secure the cabinet to the Power Module front casting. Additionally, four screws located on the bottom and two screws on the back hold the power supply to the cabinet. Remove the screws and slide the power supply assembly out through the front of the cabinet. Reinstall the cabinet to protect the interior from dust and to remove personnel shock hazards.

Power Module Board Removal

1. Remove the power supply assembly from the power module. Refer to Cabinet Removal in this section of the manual for instructions.
2. On the power supply assembly, remove the screws on each side and on the bottom that secure the series-pass transistor clamp. Remove the clamps.
3. Remove the six screws on the interface connector side of the power supply assembly that secure the circuit board to the chassis.
4. Disconnect from the circuit board the three connectors going to the transformer.
5. Disconnect the GPIB cable from the GPIB board assembly.
6. Slide the circuit board out of the power supply assembly.

Voltage Selector/Fuse Holder/Switch/ Line Filter Assembly Removal

1. Remove the cabinet. Refer to PFG 5505 Power Module Cabinet Removal in this section of the manual.
2. Disconnect the connectors from the terminals on the back of the voltage selector/fuse holder assembly, labeling each wire.
3. Remove the two screws that secure the assembly.

Series Pass Transistor Replacement

NOTE

A new adhesive insulator plate must be applied to the transistor before installation. To maintain proper insulating characteristics, do not reuse the insulating plate from the transistor being replaced.

To replace a series pass transistor, remove the cabinet; then remove the circuit board. Refer to Cabinet Removal and Circuit Board Removal in this section of the manual.

1. Unsolder and remove the transistor being replaced, from the circuit board.
2. Carefully bend the new transistor leads according to the dimensions in Fig. 4-1.
3. Apply a new adhesive insulator plate to the transistor side having exposed metal.
4. Reinstall the circuit board into the power supply assembly.
5. Insert the leads of the replacement transistor into the circuit board holes, with the insulating plate facing the metal chassis.
6. Reinstall the transistor clamp.

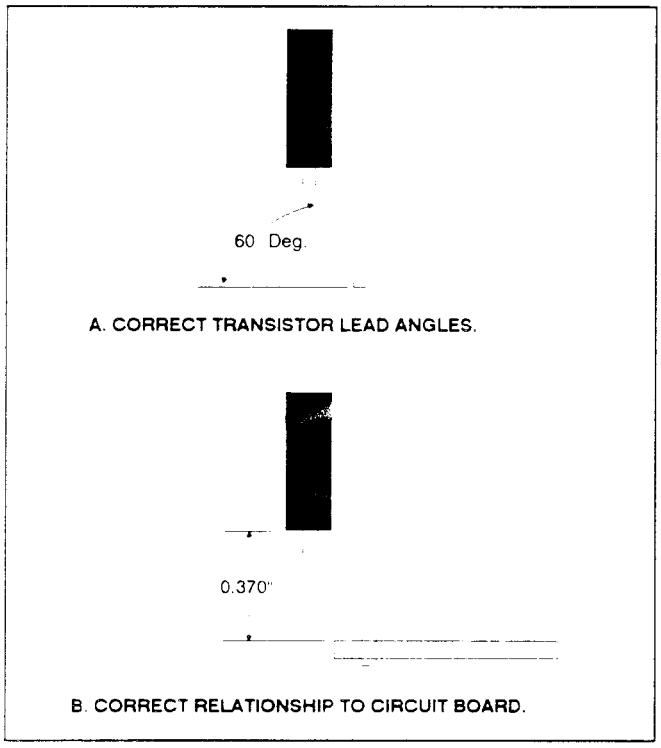


Fig. 4-1. Series Pass Transistor Replacement.

7. Solder the transistor onto the board, applying minimum heat.
8. Reinstall the assembly into the power module cabinet. Reinstall the handle assembly.

PFG 5105/5505 DISASSEMBLY

WARNING

To avoid electric-shock hazard, remove the PFG 5105/5505 from the power module before disassembly.

NOTE

To disassemble the PFG 5105/5505, refer to the following removal procedures and exploded views in the Replaceable Mechanical Parts section at the back of this manual.

Side Cover Removal

The two side panels are snapped into the top and bottom rails of the PFG 5105/5505. To aid removal, there are cutouts along each of the long edges of the covers. To remove, insert tweezers or a small straight-edged screwdriver into the cutout near the back edge of the cover, and carefully pry the cover away from the rail.

To replace covers, insert the front edge of the cover into the groove along the inside edge of the front frame assembly. Then press the cover down over the rails.

Internal Fuse Replacement

Remove the PFG 5105 or PFG 5505 from its power module. Remove the right side cover.

Three fuses are located toward the rear of the Output board. To remove a fuse, carefully pull it out of the fuse holder. Correct fuse values are marked on the circuit board. Fuse replacement information is shown in the following table.

After fuse replacement, reinstall the side cover.

Internal Fuses

Cir. No.	Description	TEK Part No.
FS801	1A, 250 V, DIN, Slow	159-0302-00
FS802	1A, 250 V, DIN, Slow	159-0302-00
FS803	2A, 250 V, DIN, Time Lag	159-0107-00

Release Latch Handle and Slider Removal

All plastic parts of the latch assemblies and the coil springs are individually replaceable. However, if a latch tension spring becomes damaged, the bottom frame rail assembly that it is attached to must be replaced.

1. Remove the side cover(s) from the PFG 5105/5505.
2. Pull the release latch handle out about 1/8" and hold.
3. Using a small screwdriver, move the release latch slider forward slightly while pushing down on the release latch handle to free the handle shaft from the slider. Pull out on handle to remove.
4. To repair the release latch assembly, remove the bottom rail that it is fastened to. The rails are held with screws into the front and rear panel assemblies and the Interface board mounting blocks.
5. To replace the release latch handle, push the handle shaft through the slot in the front panel as far as it will go and hold it. Using a small screwdriver move the release latch slider forward and the handle upward until the T-shaped end of the handle engages the end of the slider.

Rear Panel Removal

1. Remove side covers.
2. Remove the screw, lock washer, and flat washer holding the Output board to the rear panel.
3. Remove the four screws holding the rear panel to the top frame assembly.
4. Remove the four guide studs holding the rear panel to the bottom chassis assembly. (Use a 3/16" hex wrench.)
5. Remove the rear panel.
6. Reassemble in reverse order

Plug-in Circuit Board Removal

The following boards are plugged into the A6 Interconnect board (left to right, viewing from the rear):

- Output board (A4)
- Analog board (A3)
- Synthesizer board (A5) – Option 02
- Pulse board (A2)
- CPU board (A1)

To remove the plug-in boards:

1. Remove side panels.
2. Remove rear panel.
3. Carefully unplug and remove board from the function generator.

NOTE

For troubleshooting purposes, boards can be reconnected with an extender board or cable.

Front Panel Assembly Removal

1. Remove side panels
2. Remove release latch handles.
3. Remove 12 screws holding front panel assembly to top and bottom frame assemblies.
4. Unplug two ribbon cables from the Interface board. Pull the front panel assembly away from the top and bottom frame assemblies as you unplug the cables.
5. Note locations of coax cables at front panel BNC connectors for reconnection.
6. Unsolder coax cables to complete the removal.
7. Reassemble in reverse order.

Key/Display Board Assembly (A7) Removal

1. Remove Front Panel Assembly , except do not unsolder coax cables.
2. Remove seven screws, lock washers and flat washers holding the Key/Display board assembly to the front frame casting.
3. Remove the board.

CAUTION

Handle the Key/Display board assembly carefully. The display device is fragile.

4. Reassemble in reverse order.

Interconnect Board Assembly (A6) Removal

1. Remove all boards from the instrument.
2. Remove front panel assembly.
3. Remove six screws, lock washers and flat washers holding the Interface board to the mounting blocks attached to the top and bottom frame assemblies.
4. Remove the Interface board.
5. Reassemble in reverse order.

Section 5
OPTIONS

The following options are available for the PFG 5105/ 5505.

PFG 5105 Option:

Option 02 – provides an internal, frequency-lock synthesizer.

PFG 5505 Options:

Option 02 – provides an internal, frequency-lock synthesizer.

The following are PFG 5505 power options:

Option A1 – changes the power to Universal European (220 Volt, 15 Amp, 50 Hz).

Option A2 – changes the power to United Kingdom (240 Volt, 13 Amp, 50 Hz).

Option A3 – changes the power to Australian (240 Volt, 10 Amp, 50 Hz).

Option A4 – changes the power to North American (240 Volt, 15 Amp, 60 Hz).

Option A5 – changes the power to Switzerland (220 volt, 10 Amp, 50 Hz).

REPLACEABLE ELECTRICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important when ordering parts to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

LIST OF ASSEMBLIES

A list of assemblies can be found at the beginning of the Electrical Parts List. The assemblies are listed in numerical order. When the complete component number of a part is known, this list will identify the assembly in which the part is located.

CROSS INDEX-MFR. CODE NUMBER TO MANUFACTURER

The Mfr. Code Number to Manufacturer index for the Electrical Parts List is located immediately after this page. The Cross Index provides codes, names and addresses of manufacturers of components listed in the Electrical Parts List.

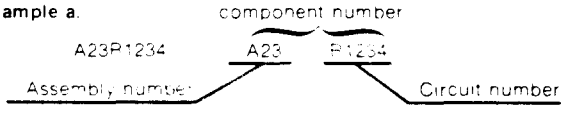
ABBREVIATIONS

Abbreviations conform to American National Standard Y1.1.

COMPONENT NUMBER (column one of the Electrical Parts List)

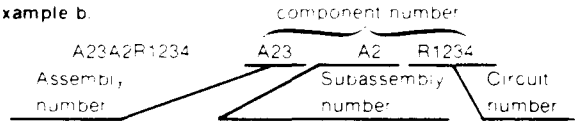
A numbering method has been used to identify assemblies, subassemblies and parts. Examples of this numbering method and typical expansions are illustrated by the following.

Example a.



Read: Resistor 1234 of Assembly 23

Example b.



Read: Resistor 1234 of Subassembly 2 of Assembly 23

Only the circuit number will appear on the diagrams and circuit board illustrations. Each diagram and circuit board illustration is clearly marked with the assembly number. Assembly numbers are also marked on the mechanical exploded views located in the Mechanical Parts List. The component number is obtained by adding the assembly number prefix to the circuit number.

The Electrical Parts List is divided and arranged by assemblies in numerical sequence (e.g., assembly A1 with its subassemblies and parts, precedes assembly A2 with its subassemblies and parts).

Chassis-mounted parts have no assembly number prefix and are located at the end of the Electrical Parts List.

TEKTRONIX PART NO. (column two of the Electrical Parts List)

Indicates part number to be used when ordering replacement part from Tektronix.

SERIAL/MODEL NO. (columns three and four of the Electrical Parts List)

Column three (3) indicates the serial number at which the part was first used. Column four (4) indicates the serial number at which the part was removed. No serial number entered indicates part is good for all serial numbers.

NAME & DESCRIPTION (column five of the Electrical Parts List)

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

MFR. CODE (column six of the Electrical Parts List)

Indicates the code number of the actual manufacturer of the part. (Code to name and address cross reference can be found immediately after this page.)

MFR. PART NUMBER (column seven of the Electrical Parts List)

Indicates actual manufacturers part number.

CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
00213	NYTRONICS COMPONENTS GROUP INC SUBSIDIARY OF NYTRONICS INC	ORANGE ST	DARLINGTON SC 29532
00779	AMP INC	2800 FULLING MILL PO BOX 3608	HARRISBURG PA 17105
01121	ALLEN-BRADLEY CO	1201 S 2ND ST	MILWAUKEE WI 53204-2410
03508	GENERAL ELECTRIC CO SEMI-CONDUCTOR PRODUCTS DEPT	W GENESEE ST	AUBURN NY 13021
04222	AVX CERAMICS DIV OF AVX CORP	19TH AVE SOUTH P O BOX 867	MYRTLE BEACH SC 29577
12969	UNITRODE CORP	5 FORBES RD	LEXINGTON MA 02173-7305
22526	DU PONT E I DE NEMOURS AND CO INC DU PONT CONNECTOR SYSTEMS DIV MILITARY PRODUCTS GROUP	515 FISHING CREEK RD	NEW CUMBERLAND PA 17070-3007
24546	CORNING GLASS WORKS	550 HIGH ST	BRADFORD PA 16701-3737
26742	METHODE ELECTRONICS INC BACPLAIN DIVISION	7444 W WILSON AVE	CHICAGO IL 60656
27264	MOLEX INC	2222 WELLINGTON COURT	LISLE IL 60532-1613
31781	EDAC INC	20 RAILSIDE RD	DON MILLS ONT CAN M3A 1A4
56289	SPRAGUE ELECTRIC CO WORLD HEADQUARTERS	92 HAYDEN AVE	LEXINGTON MA 02173-7929
71400	BUSSMANN DIV OF COOPER INDUSTRIES INC	114 OLD STATE RD PO BOX 14460	ST LOUIS MO 63178
75498	MULTICOMP INC	3005 SW 154TH TERRACE #3	BEAVERTON OR 97006
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON OR 97077-0001

PLUG-IN

COMPONENT NO.	TEKTRONIX PART NO.	SERIAL NO EFFECTIVE	SERIAL NO DISCONT.	NAME & DESCRIPTION	MFR CODE	Mfr. Part No.
A2	118-7941-00			Ckt Board Assy:Pulse Board	80009	118-7941-00
A4	118-7852-00			Ckt Board Assy:Output Board	80009	118-7852-00
A5	118-7750-00			Ckt Board Assy:Analog Board	80009	118-7750-00
A6	118-7751-00			Ckt Board Assy:Interconnect Board	80009	118-7751-00
A7	118-8048-00			Ckt Baord Assy:Keyboard, PFG Board	80009	118-8048-00
A8	118-7856-01			Ckt Baord Assy:Synthesizer Board	80009	118-7856-01
A1	118-8047-00			Ckt Baord Assy:CPU Board	80009	118-8047-00

POWER SUPPLY

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A1	671-1237-00			CIRCUIT BD ASSY:POWER SUPPLY	80009	671-1237-00
A1C1030	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	MA201E223MAA
A1C2020	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	MA201E223MAA
A1C2050	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	MA201E223MAA
A1C3010	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	MA201E223MAA
A1C3060	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	MA201E223MAA
A1C4011	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	MA201E223MAA
A1C4021	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	MA201E223MAA
A1C4030	290-1186-00			CAP,FXD,ELCTLT:4700UF,20%,50WVDC	56289	81D472M050KD5
A1C4060	290-1186-00			CAP,FXD,ELCTLT:4700UF,20%,50WVDC	56289	81D472M050KD5
A1C5010	290-1187-00			CAP,FXD,ELCTLT:18000UF,20%,16WVDC	56289	81D183M016KD5
A1C5030	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	MA201E223MAA
A1C5050	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	MA201E223MAA
A1CR3031	152-0488-00			SEMICOND DVC,DI:BRIDGE,SI,200V,1.5A	80009	152-0488-00
A1CR3070	152-0198-00			SEMICOND DVC,DI:RECT,SI,200V,3A,A249	03508	1N5624
A1CR4010	152-0198-00			SEMICOND DVC,DI:RECT,SI,200V,3A,A249	03508	1N5624
A1CR4012	152-0198-00			SEMICOND DVC,DI:RECT,SI,200V,3A,A249	03508	1N5624
A1CR4020	152-0198-00			SEMICOND DVC,DI:RECT,SI,200V,3A,A249	03508	1N5624
A1CR4070	152-0198-00			SEMICOND DVC,DI:RECT,SI,200V,3A,A249	03508	1N5624
A1J1040	131-2484-00			TERM SET,PIN:8 PIN,INSULATED	27264	09-61-1081
A1J1070	131-1078-00			CONN,RCPT,ELEC:CKT BD,28/56 CONTACT	31781	303-056-520-301
A1J1071	131-1078-00			CONN,RCPT,ELEC:CKT BD,28/56 CONTACT	31781	303-056-520-301
A1J1072	131-1078-00			CONN,RCPT,ELEC:CKT BD,28/56 CONTACT	31781	303-056-520-301
A1J2020	131-2527-00			TERM SET,PIN:HEADER,1 X 7,0.156 CTR	26742	3107-11-207-01
A1J3060	131-2789-00			CONN,RCPT,ELEC:HEADER,1 X 4,0.156 SPACING	27264	09-61-1045
A1Q2070	151-0918-00			TRANSISTOR:PNP POWER,15A,80V	80009	151-0918-00
A1Q3070	151-0917-00			TRANSISTOR:NPN POWER,15A,80V	80009	151-0917-00
A1Q5040	151-0917-00			TRANSISTOR:NPN POWER,15A,80V	80009	151-0917-00
A1R3030	303-0202-00			RES,FXD,CMPSN:2K OHM,5%,1W	01121	GB 2025
A1R3031	303-0202-00			RES,FXD,CMPSN:2K OHM,5%,1W	01121	GB 2025
A1R4040	308-0252-00			RES,FXD,WW:390 OHM,5%,3W	00213	1240S 390-5
A1R5030	303-0511-00			RES,FXD,CMPSN:510 OHM,5%,1W	01121	GB5115
A1R5031	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	CMA 07
A1R5033	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	CMA 07
A1R5034	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	CMA 07
A1VR5030	152-0512-00			SEMICOND DVC,DI:ZEN,SI,9.1V,5%,1W,DO-41	12969	UZ8709
A2	671-1266-00			CIRCUIT BD ASSY:GPIB CONNECTOR	80009	671-1266-00
A2J1010	131-2542-00			CONN,RCPT,ELEC:CKT BD,24 CONTACT,RIGHT	00779	552791-2
A2J1110	131-1789-00			CONN,RCPT,ELEC:RTANG,2/10 0.025 SQ PINS	22526	65268-008
F100	159-0016-00			FUSE,CARTRIDGE:3AG,1.5,250V,FAST BLOW	71400	AGC-CW-1 1/2
FL100	119-3436-00			FILTER,ELEC:LINE FILTER W/AC CONN,ON/	80009	119-3436-00
T100	120-1772-00			TRANSFORMER,PWR:	75498	128-7065-EA
W100	196-3196-00			LEAD,ELECTRICAL:18 AWG,2.0 L,5-4	80009	196-3196-00

DIAGRAMS AND CIRCUIT BOARD ILLUSTRATIONS

Symbols

Graphic symbols and class designation letters are based on ANSI Standard Y32.2-1975.

Logic symbology is based on ANSI Y32.14-1973 in terms of positive logic. Logic symbols depict the logic function performed and may differ from the manufacturer's data.

The overline on a signal name indicates that the signal performs its intended function when it is in the low state.

Abbreviations are based on ANSI Y1.1-1972.

Other ANSI standards that are used in the preparation of diagrams by Tektronix, Inc. are:

Y14.15, 1966	Drafting Practices.
Y14.2, 1973	Line Conventions and Lettering.
Y10.5, 1968	Letter Symbols for Quantities Used in Electrical Science and Electrical Engineering.

American National Standard Institute
1430 Broadway
New York, New York 10018

Component Values

Electrical components shown on the diagrams are in the following units unless noted otherwise:

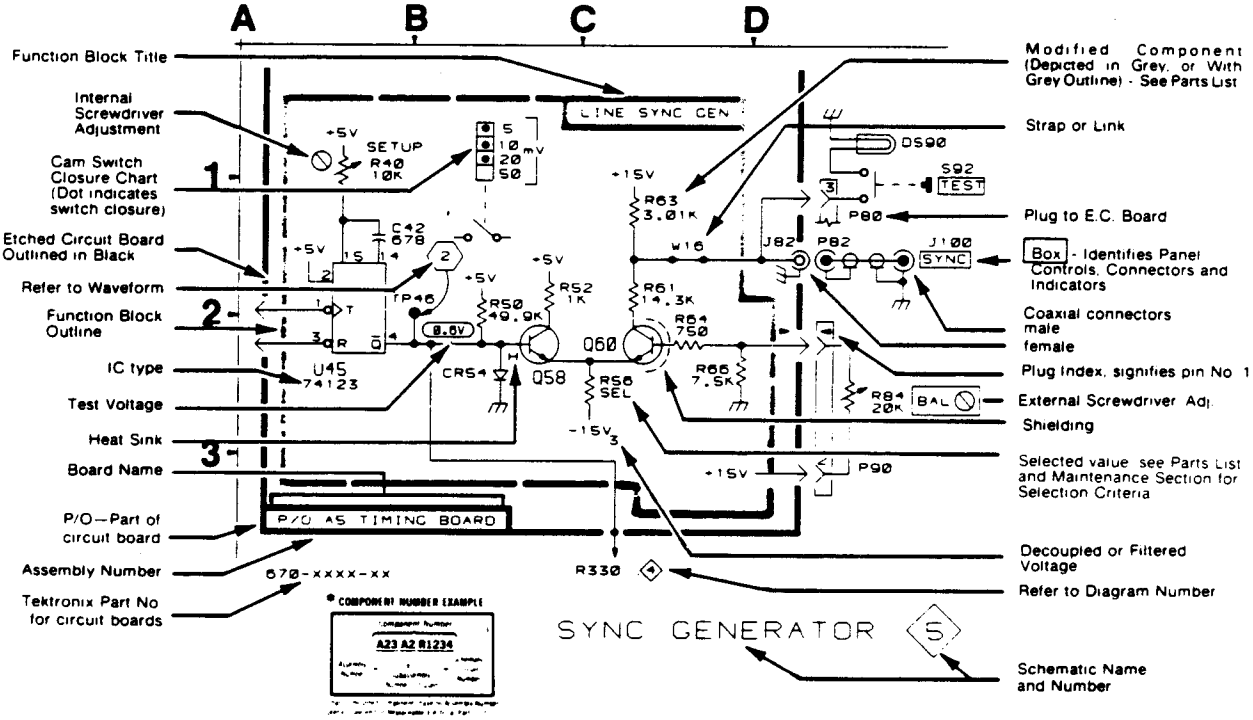
Capacitors = Values one or greater are in picofarads (pF). Values less than one are in microfarads (μF).
Resistors = Ohms (Ω).

The information and special symbols below may appear in this manual.

Assembly Numbers and Grid Coordinates

Each assembly in the instrument is assigned an assembly number (e.g., A20). The assembly number appears on the circuit board outline on the diagram, in the title for the circuit board component location illustration, and in the lookup table for the schematic diagram and corresponding component locator illustration. The Replaceable Electrical Parts list is arranged by assemblies in numerical sequence; the components are listed by component number *(see following illustration for constructing a component number).

The schematic diagram and circuit board component location illustration have grids. A lookup table with the grid coordinates is provided for ease of locating the component. Only the components illustrated on the facing diagram are listed in the lookup table. When more than one schematic diagram is used to illustrate the circuitry on a circuit board, the circuit board illustration may only appear opposite the first diagram on which it was illustrated; the lookup table will list the diagram number of other diagrams that the circuitry of the circuit board appears on.



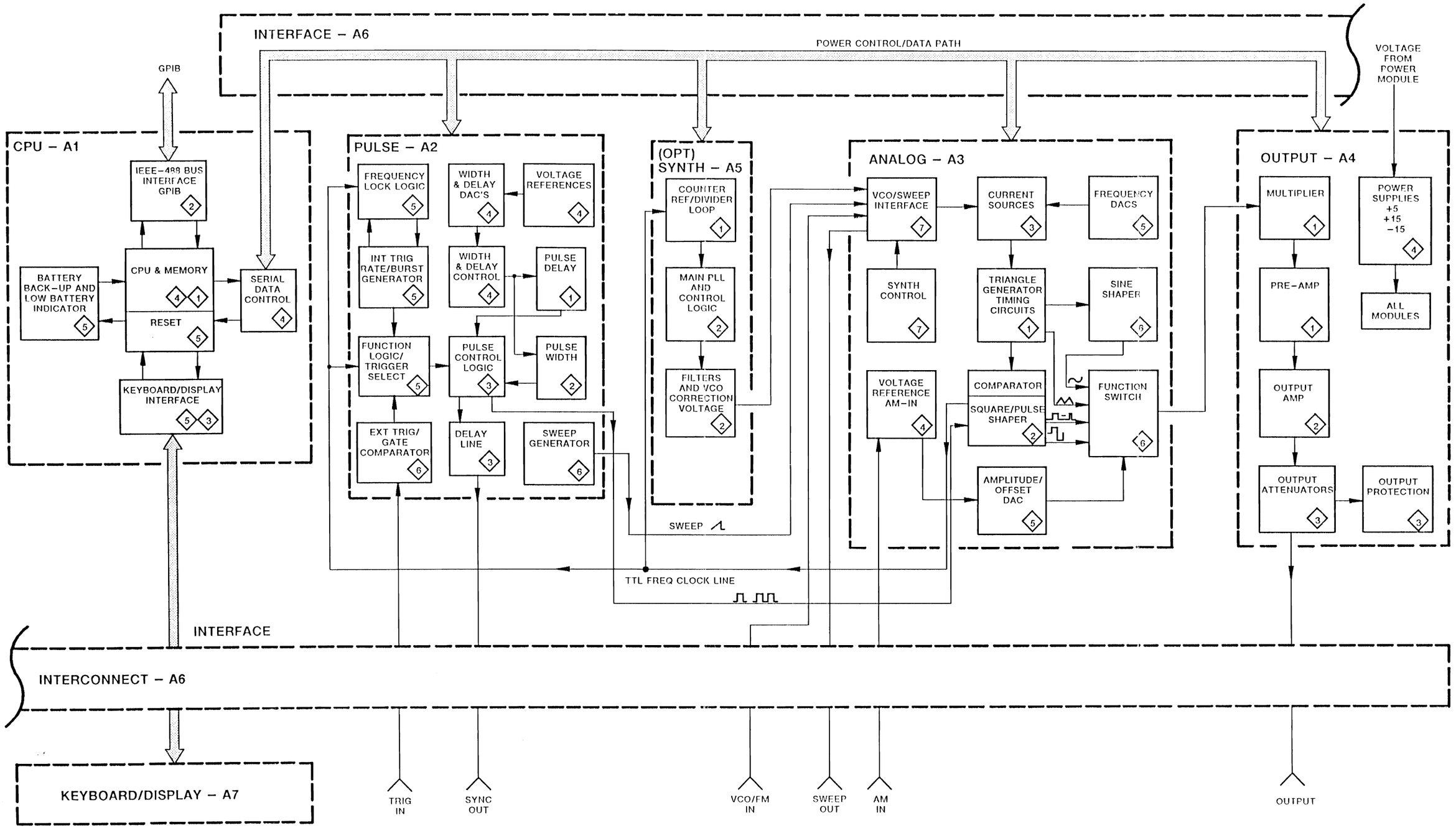


Fig. 7–1

PFG 5105/5505 MODULE BLOCK DIAGRAM

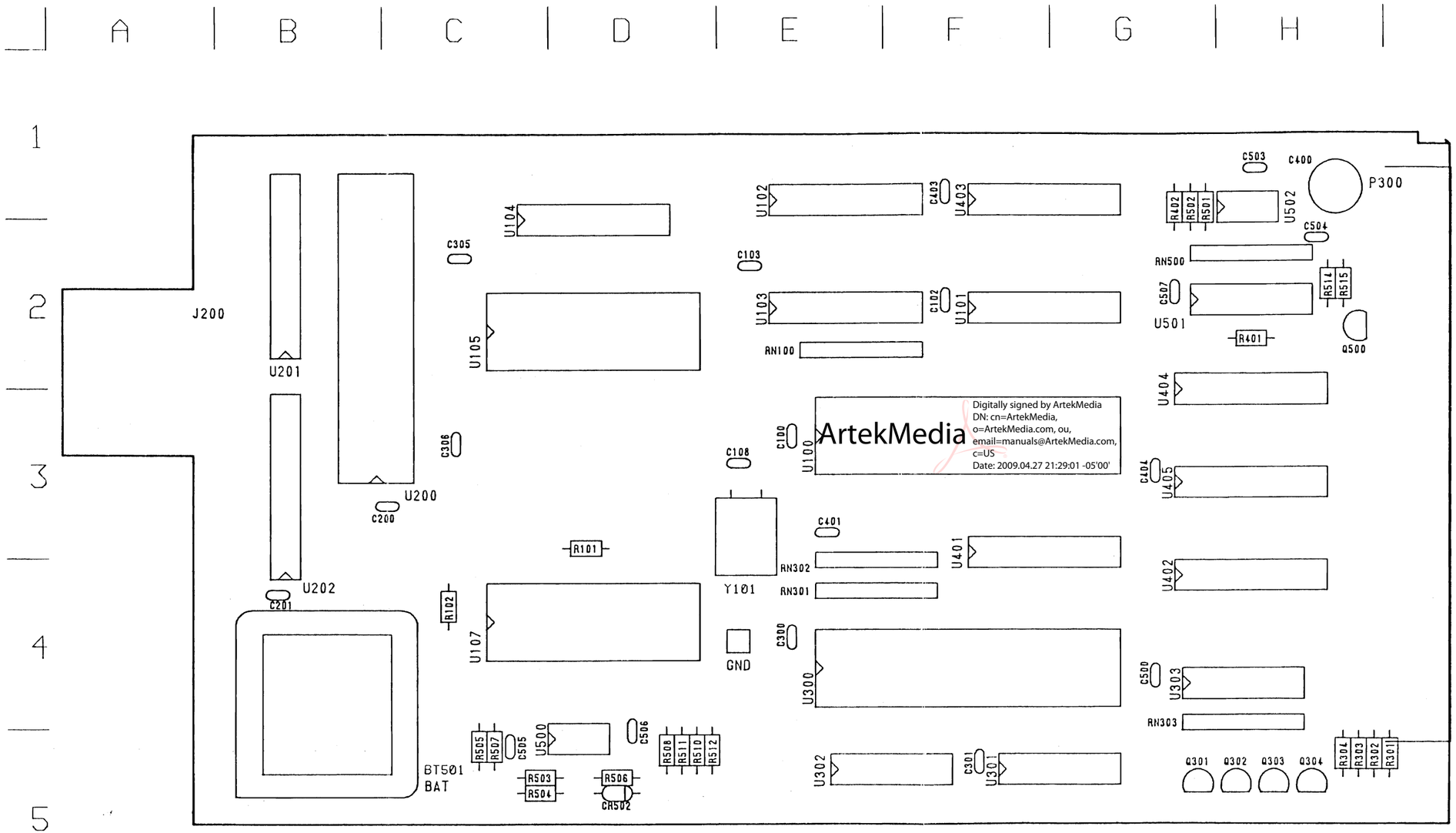
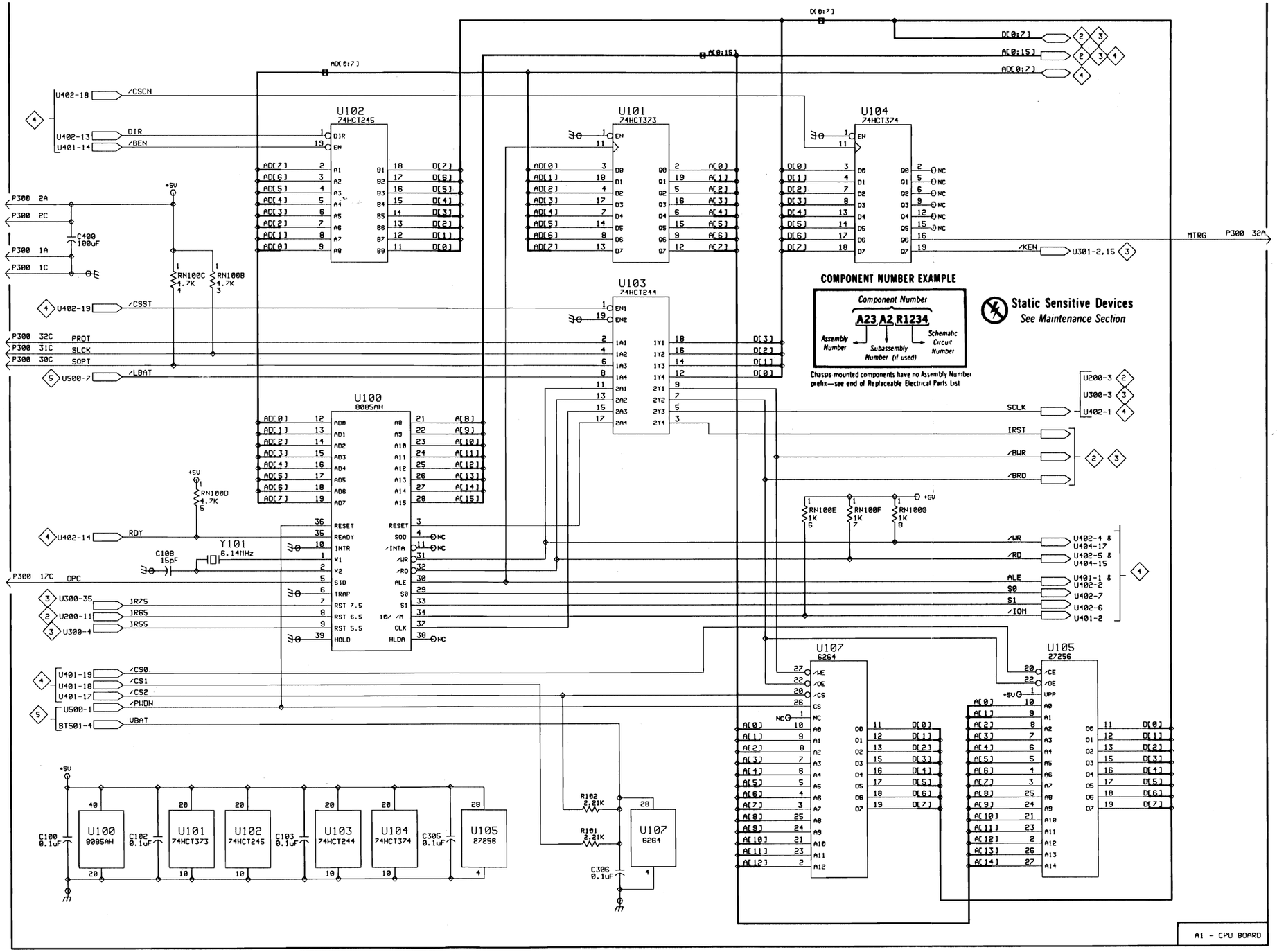


Fig. 7–2. A1 – CPU Circuit Board Assembly.

Table 7-1 (A1)

MICROPROCESSOR AND MEMORY ◇1◇ A1 - CPU BOARD, ASSEMBLY A1

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C100	B10	E3	RN100F	K6	E2
C102	C10	F2	RN100G	K6	E2
C103	D10	E2			
C108	C7	E3	U100	F5	E3
C305	F10	C2	U100	B10	E3
C306	H10	C3	U101	H2	F2
C400	B3	H1	U101	C10	F2
			U102	E2	E1
P300	B3	H1	U102	D10	E1
P300	B7	H1	U103	E10	E2
P300	03	H1	U103	H4	E2
			U104	E10	C2
R101	H10	A3	U104	K2	C2
R102	H9	C4	U105	G10	C2
			U105	M8	C2
RN100B	D4	E2	U107	I10	C4
RN100C	C4	E2	U107	K8	C4
RN100D	D6	E2			
RN100E	J6	E2	Y1	D7	E3



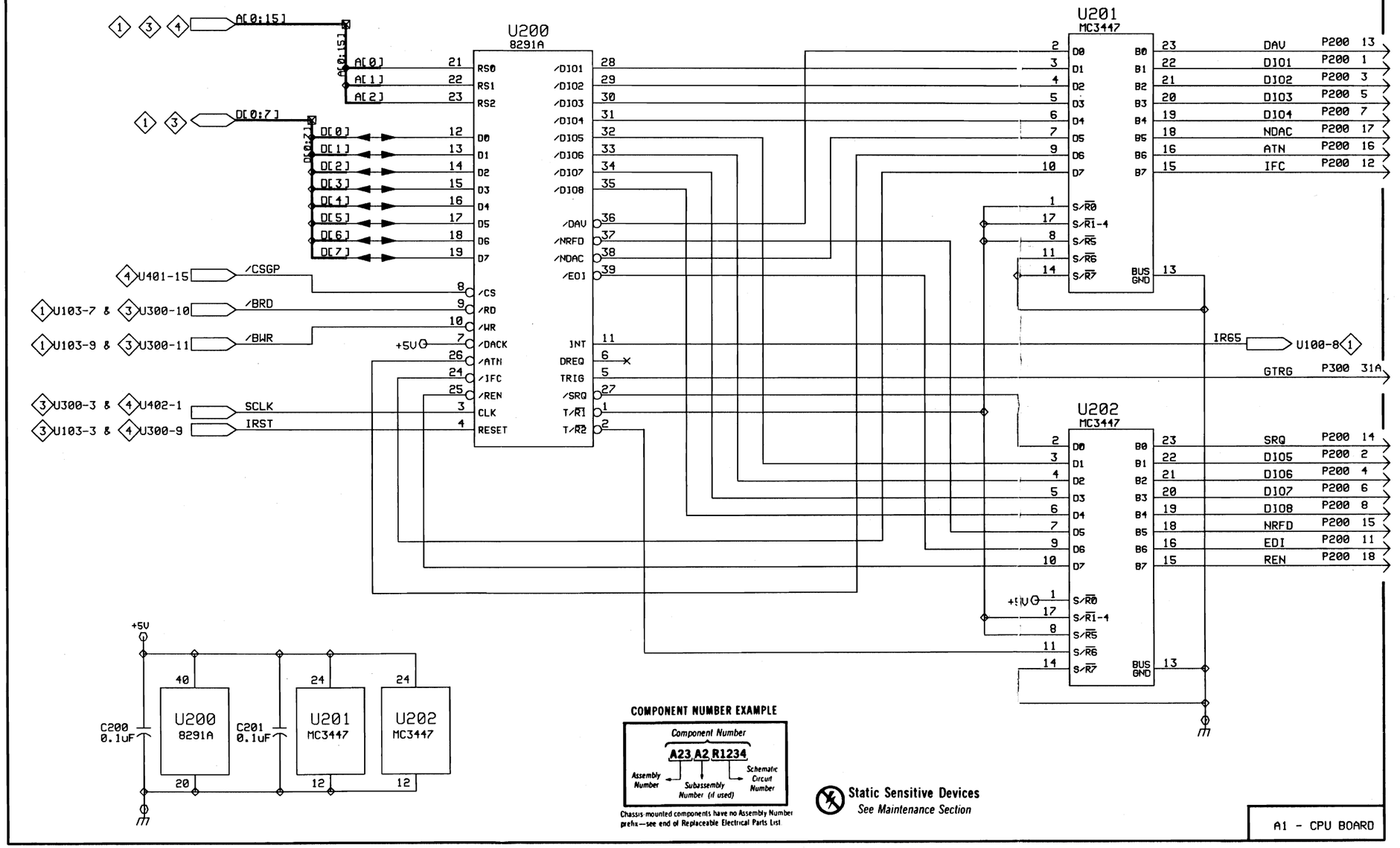
PFG5105

MICROPROCESSOR AND MEMORY 1 A1

Table 7-2 (A1)

GPIB INTERFACE ◇2◇ A1 - CPU BOARD, ASSEMBLY A1

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C200	B7	B3	U200	C7	B2
C201	C7	B4	U200	E2	B2
			U201	D7	B2
P200	K2	A2	U201	J2	B2
P200	K5	A2	U202	D7	B3
P300	K4	H1	U202	J5	B3



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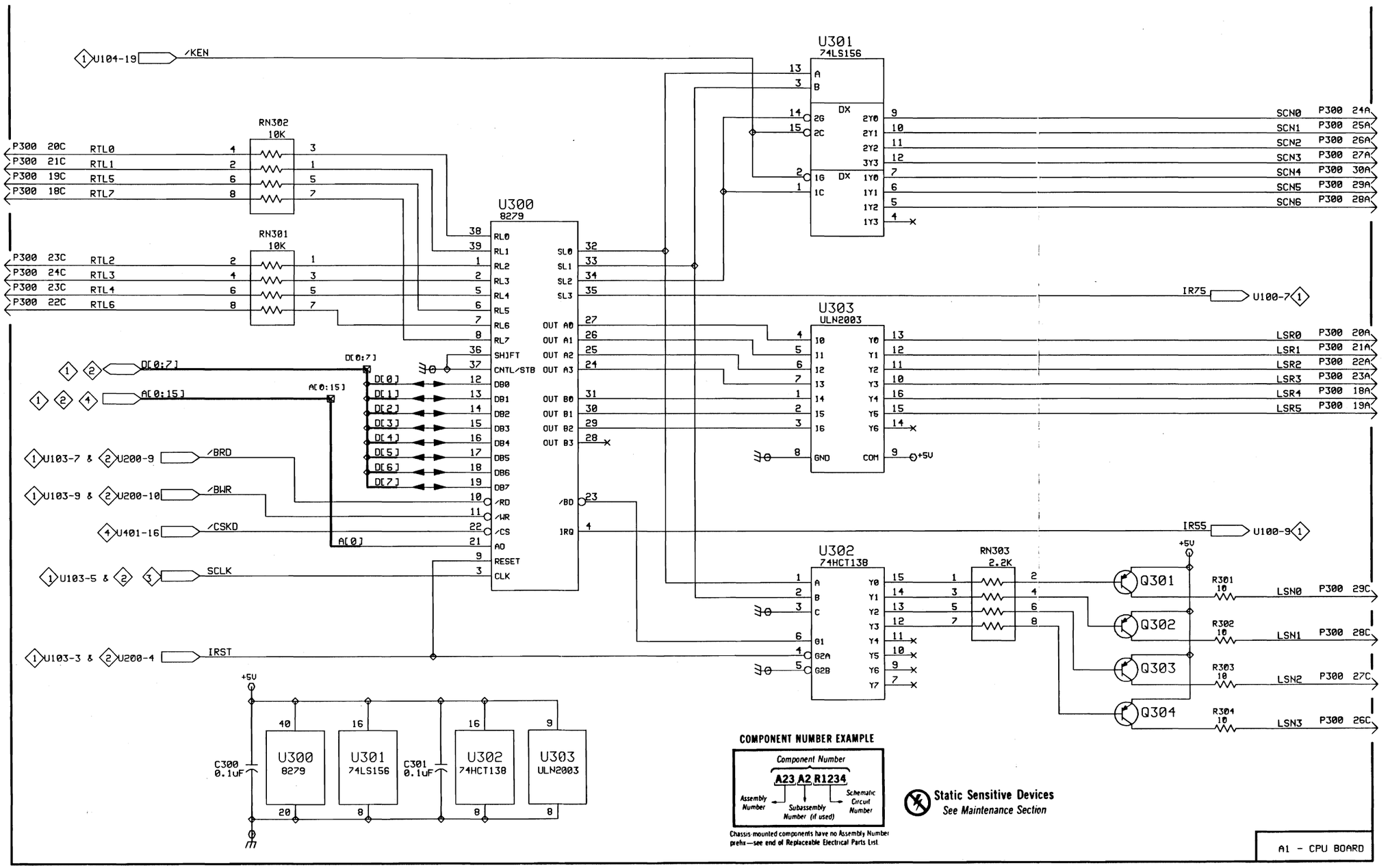
GPIP INTERFACE 2 A1

Table 7-3 (A1)

KEYBOARD CONTROLLER ◇3◇ A1 - CPU BOARD, ASSEMBLY A1

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C300	C8	E3	R303	L7	H5
C301	E8	F5	R304	L7	H5
P300	B3	H1	RN301	D4	H5
P300	M2	H1	RN302	D3	H5
P300	M4	H1	RN303	J6	H5
P300	M6	H1			
			U300	D8	E3
Q301	K6	G5	U300	F3	E3
Q302	K6	H5	U301		F5
Q303	K7	H5	U301	H2	F5
Q304	K7	H5	U302	F8	E5
			U302	H6	E5
R301	L6	H5	U303	F8	G4
R302	L6	H5	U303	H4	G4



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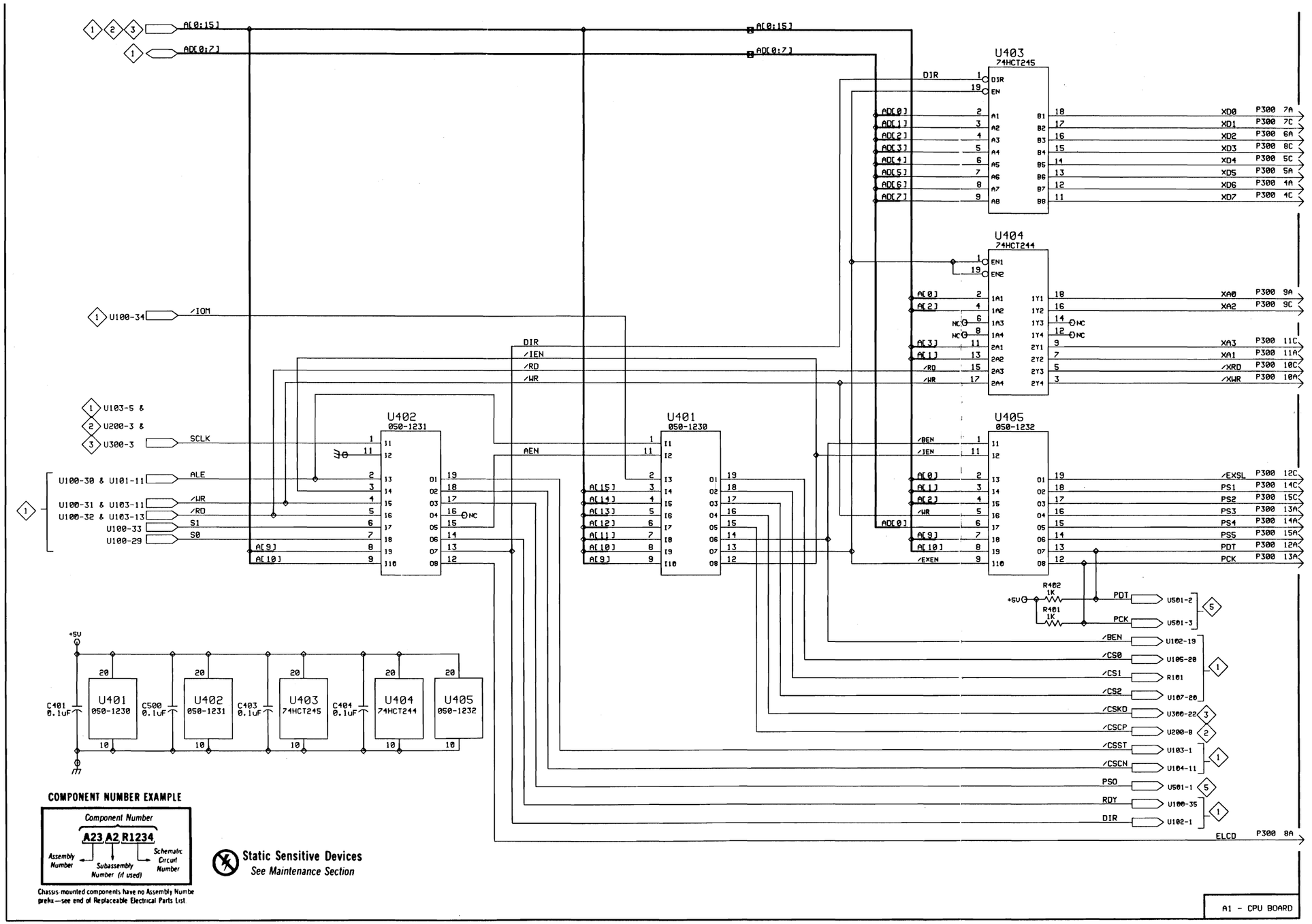
KEYBOARD CONTROLLER 3 A1

Table 7-4 (A1)

ADDRESS DECODER 4 A1 - CPU BOARD, ASSEMBLY A1

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C401	B8	E3	U401	B8	F3
C403	D8	F1	U401	H5	F3
C404	E8	G3	U402	C8	G4
C500	C8	G4	U402	E5	G4
			U403	D8	F1
P300	N2	H1	U403	L2	F1
P300	N4	H1	U404	E8	G2
P300	N6	H1	U404	L3	G2
P300	N9	H1	U405	F8	G3
			U405	L5	G3
R401	L7	H2			
R402	L7	G1			



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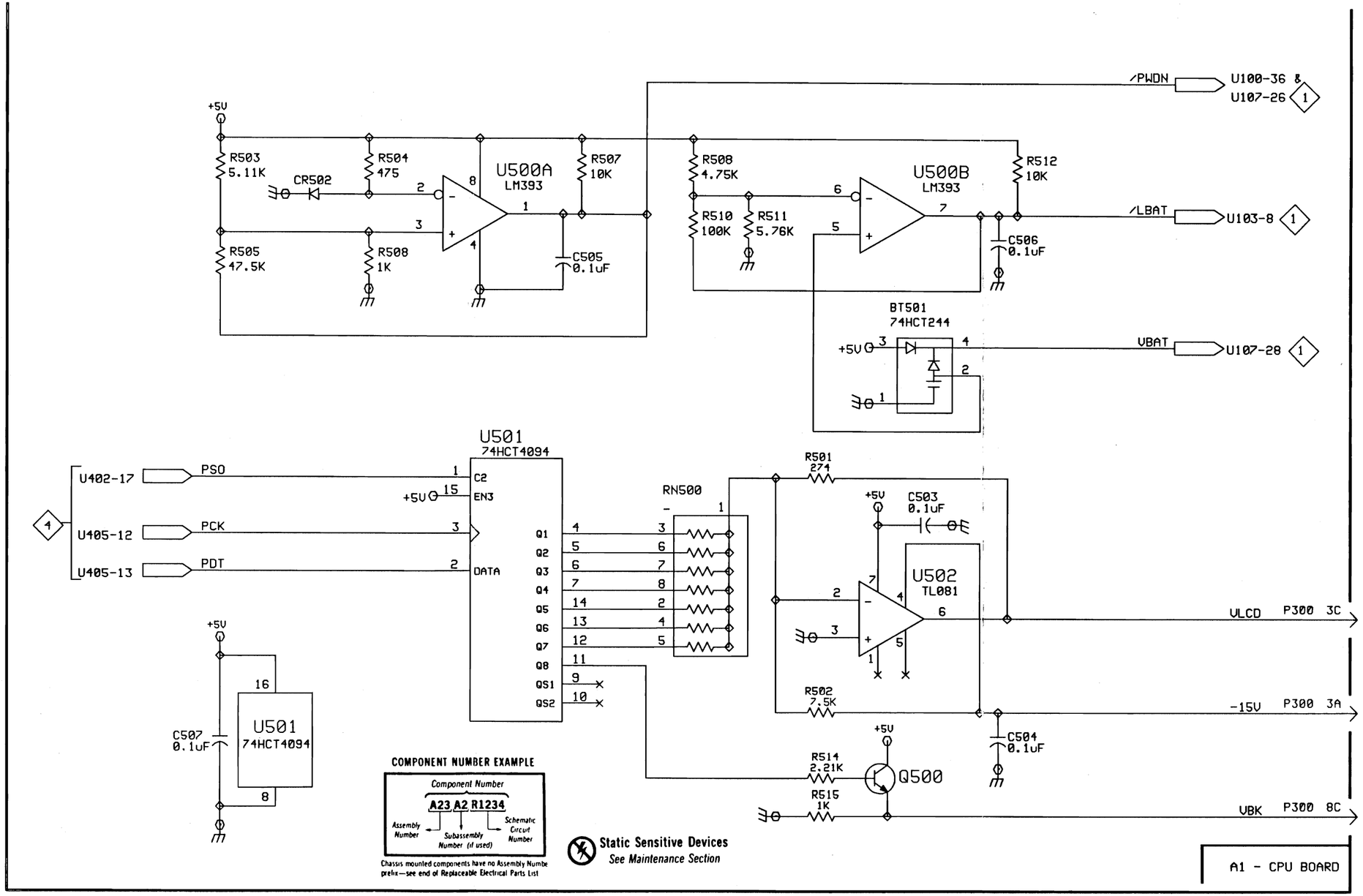
ADDRESS DECODER 4 A1

Table 7-5 (A1)

RESET AND DISPLAY CONTROL ◇5◇ A1 - CPU BOARD, ASSEMBLY A1

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
BT501	G3	B4	R504	D2	C5
			R505	C3	C5
C503	G4	H1	R507	E2	C5
C504	H6	H2	R508	D3	D5
C505	E3	C5	R508	F2	D5
C506	H3	D5	R510	F2	D5
C507	C6	G2	R511	F2	D5
			R512	H2	D5
CR502	C2	D5	R514	G6	H5
			R515	G6	H2
P300	J5	H1			
P300	J6	H1	RN500	F5	H2
Q500	G6	H2	U500A	D2	D5
			U500B	G2	D5
R501	G4	G1	U501	C6	G2
R502	G6	G1	U501	E4	G2
R503	C2	C5	U502	G5	H1



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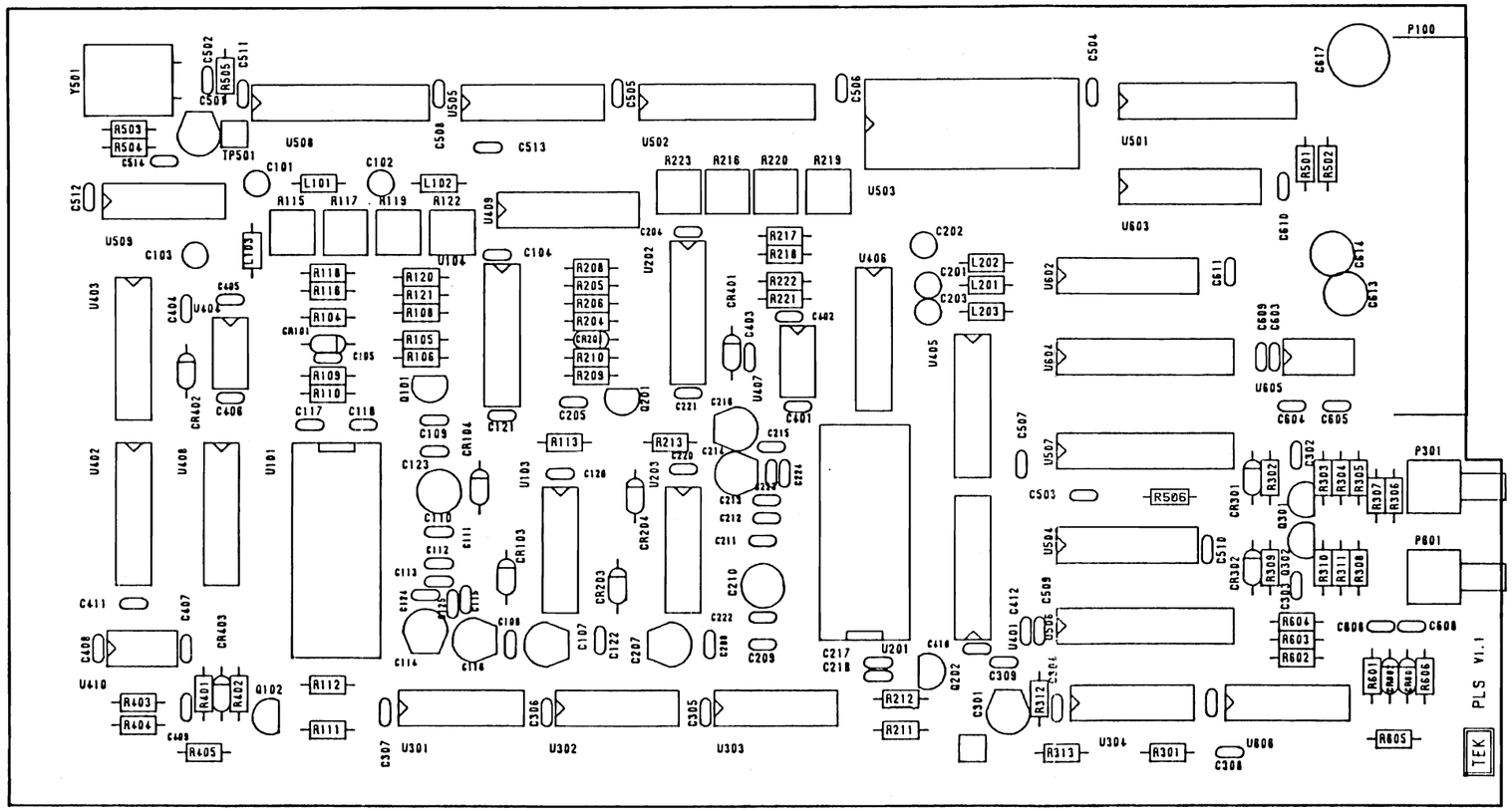
RESET AND DISPLAY CONTROL 5 A1



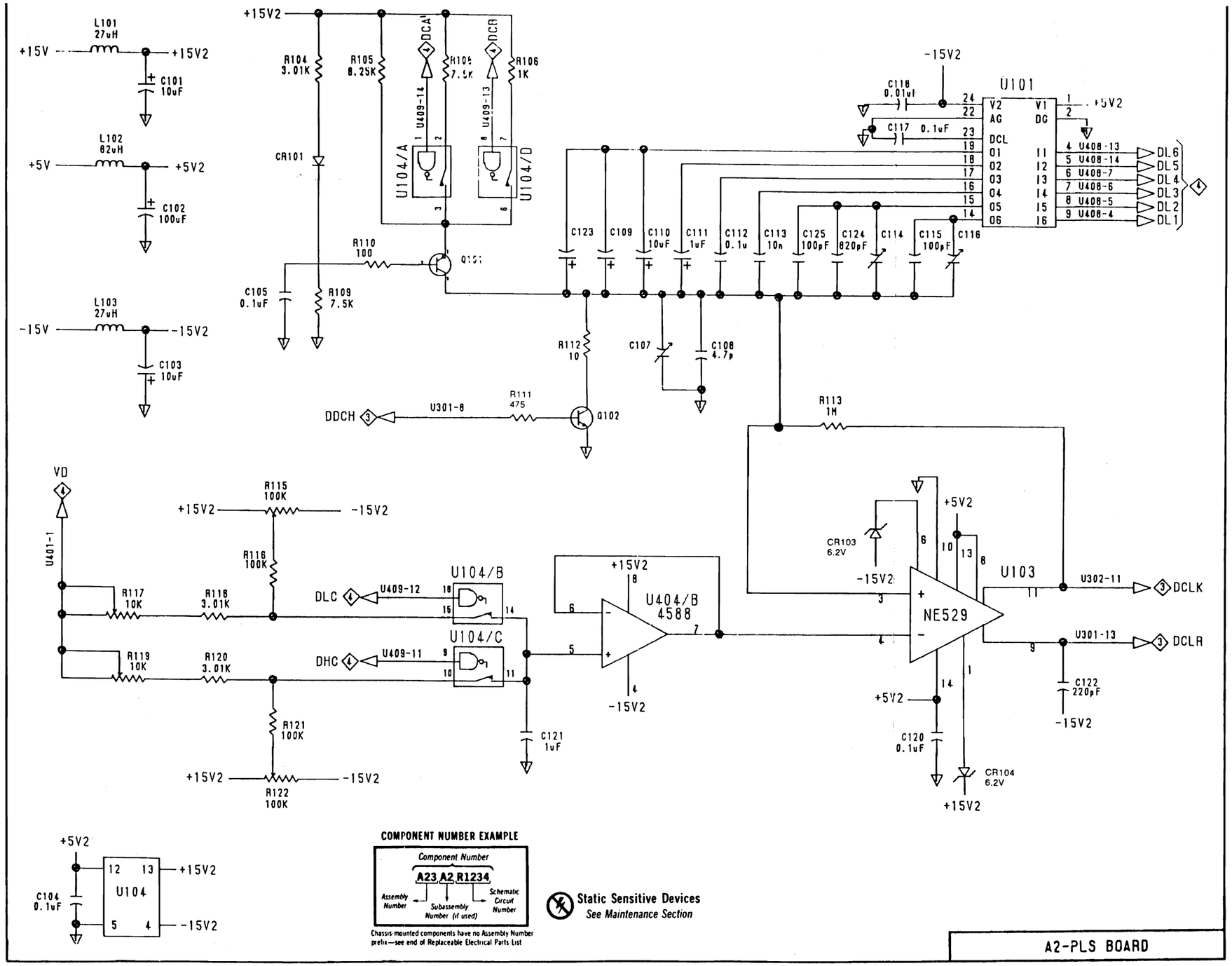
A2

Fig. 7–3. A2 – PLS Circuit Board Assembly.

Table 7-1 (A2)

DELAY CIRCUIT ◇1◇ A2 - PLS BOARD, ASSEMBLY A2

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C101	B2	B2	Q101	E3	C3
C102	B3	C2	Q102	G5	B4
C103	B4	B2			
C104	B10	C2	R104	D1	B2
C105	D4	B2	R105	E1	C2
C107	C4	D4	R106	F1	C2
C108	C4	C4	R108	E1	C2
C109	G3	C3	R109	D4	B3
C110	H3	C3	R110	E3	B3
C111	H3	C3	R111	F5	B4
C112	H3	C3	R112	G4	B4
C113	J3	C3	R113	I5	C3
C114	J3	C4	R115	D6	B2
C115	J3	C4	R116	D6	B2
C117	J2	B3	R117	B7	B2
C118	J2	C3	R118	C7	B2
C120	J8	D3	R119	B7	C2
C121	F8	C3	R120	C7	C2
C122	L8	D4	R121	D8	C2
C123	G3	C3	R122	D9	C2
C124	I3	C4			
C125	J3	C4	U101	K2	B3
			U103	K7	C3
CR101	D2	B2	U104	B10	C2
CR103	J6	C3	U104	E2	C2
CR104	K8	C3	U104B	F7	C2
			U104C	F7	C2
L101	B1	B2	U104D	F2	C2
L102	B2	C2	U404B	G7	B2
L103	B4	B2			



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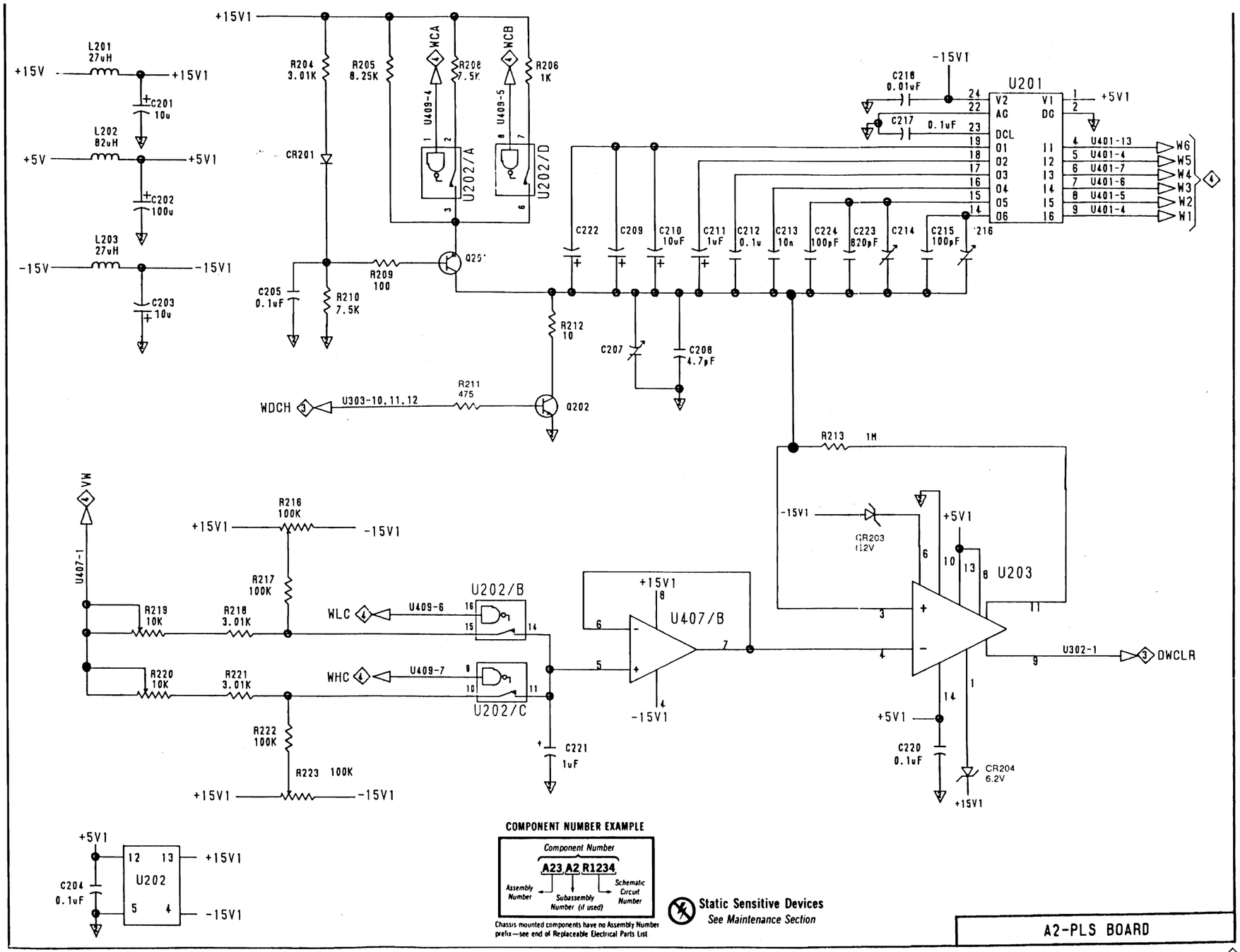
DELAY CIRCUIT 1 A2

Table 7-2 (A2)

WIDTH CIRCUIT ◇2◇ A2 - PLS BOARD, ASSEMBLY A2

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C201	C2	D2	Q201	F3	D3
C202	C3	D2	Q202	G5	D4
C203	C4	D2			
C204	B10	D2	R204	D2	D2
C205	D4	D3	R205	E2	D2
C207	H4	D4	R206	G2	D2
C208	H4	D4	R208	F2	D2
C209	H3	D4	R209	E4	D3
C210	H3	D3	R210	E4	D2
C211	H3	D3	R211	F5	D4
C212	J3	D3	R212	G4	D4
C213	J3	D3	R213	J5	D3
C214	J3	D3	R216	D6	D2
C215	K3	D3	R217	D7	D2
C216	K3	D3	R218	D7	D2
C217	J2	D4	R219	C7	D2
C218	J2	D4	R220	C8	D2
C220	K8	D3	R221	D8	D2
C221	G8	D3	R222	D8	D2
C222	G3	D4	R223	D9	D2
C223	J3	D3			
C224	J3	E3	U201	L2	D3
			U202	C10	D2
CR201	D3	D2	U202A	F3	D2
CR203	J6	D3	U202B	F7	D2
CR204	K8	D3	U202C	F8	D2
			U202D	G3	D2
L201	B2	D2	U203	K7	D3
L202	B2	D2	U407B	H7	D2
L203	B3	D2			



COMPONENT NUMBER EXAMPLE

Component Number: A23 A2 R1234
(A23: Assembly Number; A2: Subassembly Number (if used); R1234: Schematic Circuit Number)

Chassis mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List

Static Sensitive Devices
See Maintenance Section

A2-PLS BOARD

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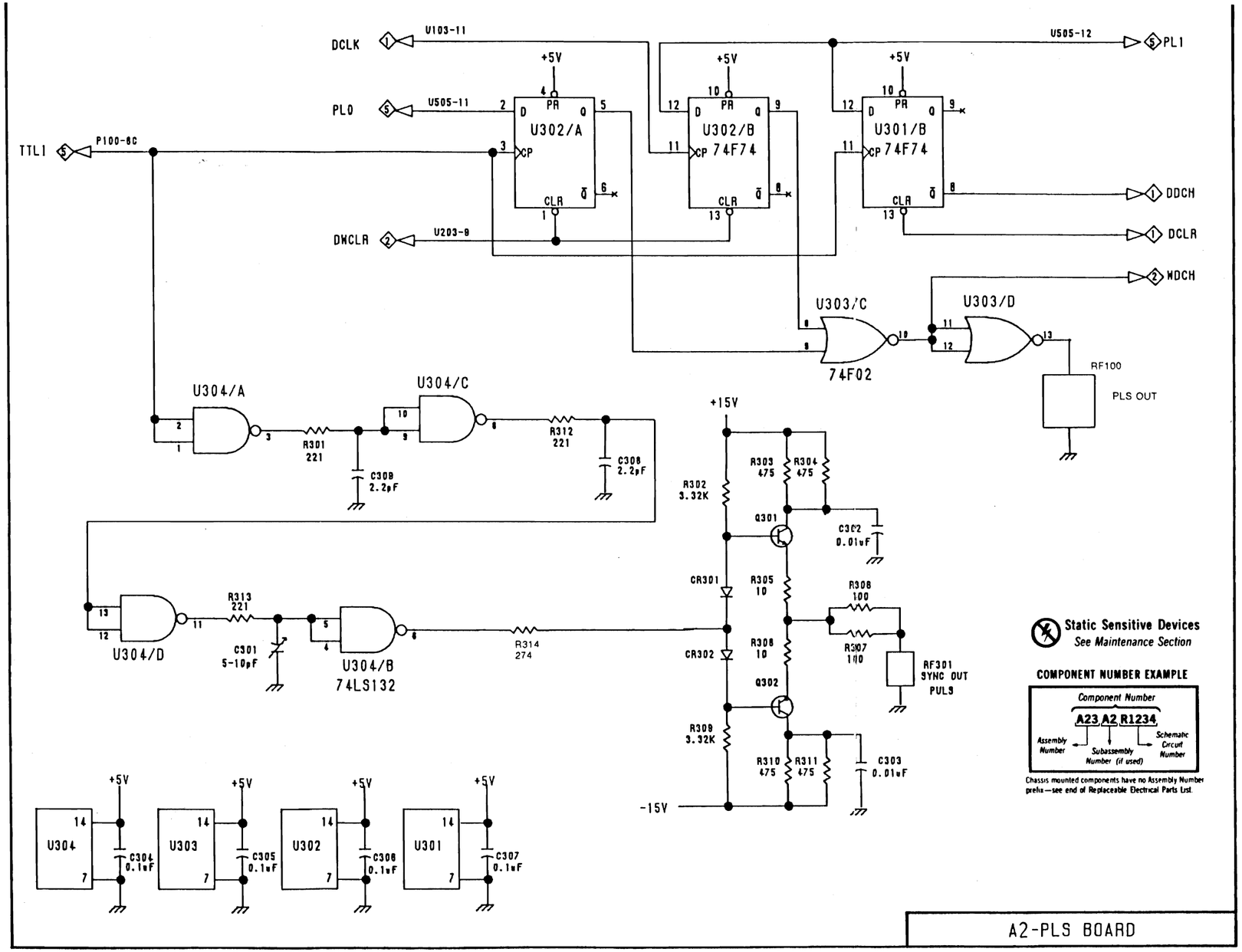
WIDTH CIRCUIT 2 A2

Table 7-3 (A2)

PFG LOGIC 3 A2 - PLS BOARD, ASSEMBLY A2

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C301	C6	D4	R307	I7	G3
C302	I6	G3	R308	H7	G3
C303	I8	G4	R309	H7	G3
C304	B9	F4	R310	H8	G3
C305	C9	D4	R311	H8	G3
C306	D9	C4	R312	F5	F4
C307	E9	C4	R313	C6	F4
C308	G5	G4	R314	F7	
C309	D5	F4			
			* RF100	K4	
CR301	H6	G3			
CR302	H7	G3	U301	E9	C4
			U301B	I2	C4
P301	I7	G3	U302	D9	D4
			U302A	F2	D4
Q301	H6	G3	U302B	H2	D4
Q302	H7	G3	U303	B9	D4
			U303C	I4	D4
R301	D5	F4	U303D	J4	D4
R302	H5	G3	U304	A9	F4
R303	H5	G3	U304A	C5	F4
R304	I5	G3	U304B	D7	F4
R305	H6	G3	U304C	E5	F4
R306	I6	G3	U304D	B6	F4

* Located on back of circuit board.



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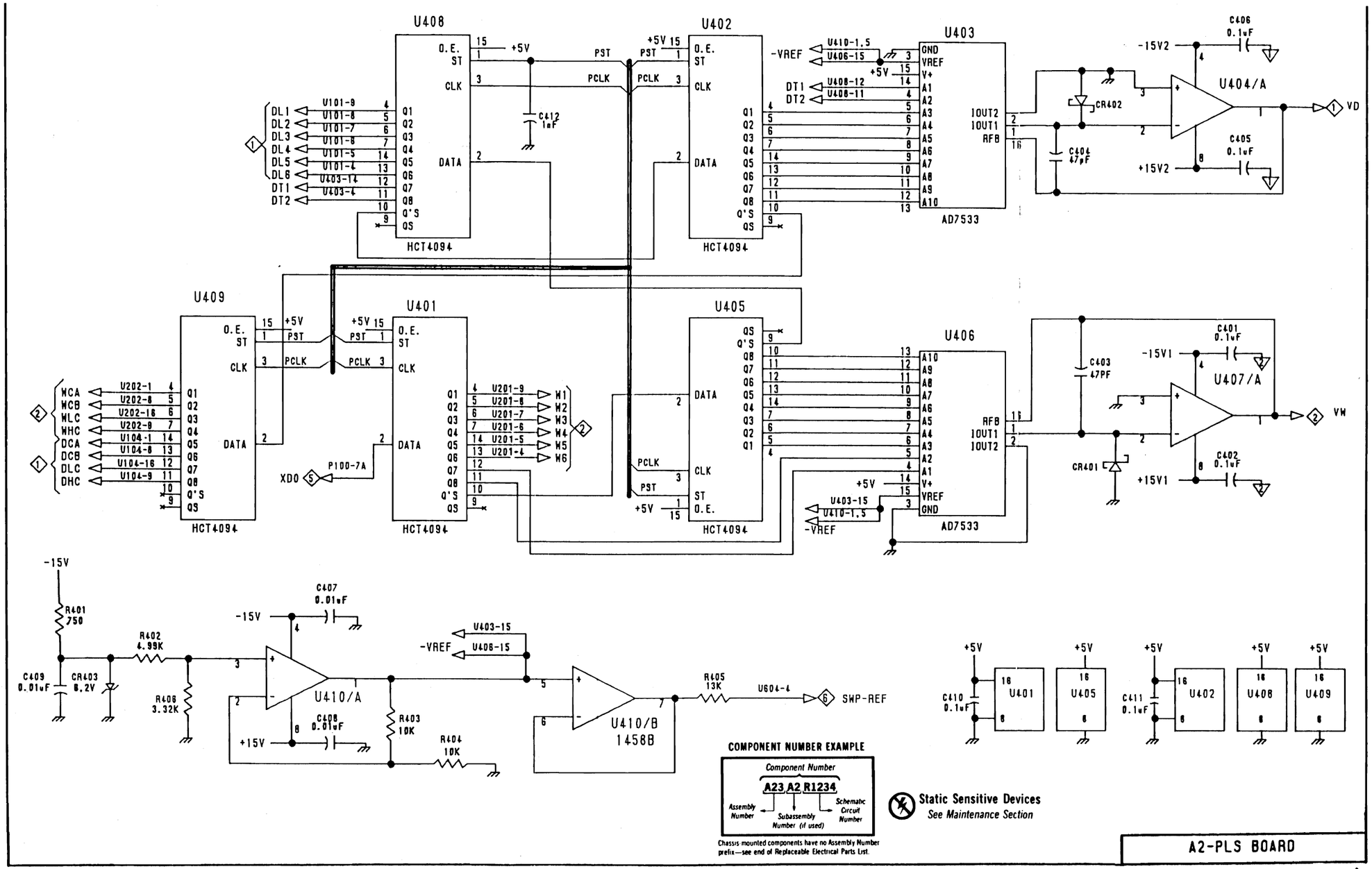
PFG LOGIC 3 A2

Table 7-4 (A2)

PFG DAC ◇4◇ A2 - PLS BOARD, ASSEMBLY A2

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C401	N4	D3	R404	F8	A4
C402	N5	D2	R405	H8	B4
C403	L4	D2	R406	C8	
C404	L2	B2			
C405	N2	B2	U401	E4	D3
C406	N1	B3	U401	K8	D3
C407	D7	B4	U402	H1	A3
C408	D8	A4	U402	M8	A3
C409	B8	B4	U403	K1	A2
C410	K8	D4	U404A	M2	B2
C411	M8	A4	U405	H4	D2
C412	F2	F4	U405	L8	D2
			U406	K4	D2
CR401	L5	D2	U407A	M5	D2
CR402	L2	B3	U408	E1	B3
CR403	B8	B4	U408	N8	B3
			U409	C4	C2
R401	B7	B4	U409	N8	C2
R402	B7	B4	U410A	D8	A4
R403	E8	A4	U410B	G8	A4



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PFG DAC 4 A2

Table 7-5 (A2)

PFG CPU INTERFACE ◇5◇ A2 - PLS BOARD, ASSEMBLY A2

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C501	N8	B1	R505	K7	B1
C502	L8	B1	R506	M5	F3
C504	B9	F1			
C505	C9	D1	U501	B9	F1
C506	D9	D1	U501	D1	F1
C507	I9	F3	U502	C9	D1
C508	F9	C1	U502	D6	D1
C509	G9	F4	U503	D3	D1
C510	E9	F3	U503	D9	D1
C511	J9	B1	U504	F9	F3
C512	K7	A2	U504	H1	F3
C513	G4	C1	U505	G9	C1
C514	J7	B2	U505	H4	C1
			U506	H9	F4
P100	A2	G1	U506	L1	F4
P100	A6	G1	U507	I9	F3
P100	N2	G1	U507	L4	F3
P100	N4	G1	U508	H6	B1
P100	N6	G1	U508	J9	B1
			U509	K7	A2
R501	C3	G2	U509E	L6	A2
R502	C3	G2	U509F	M7	A2
R503	L7	A1			
R504	M6	A1	Y501	L7	A1

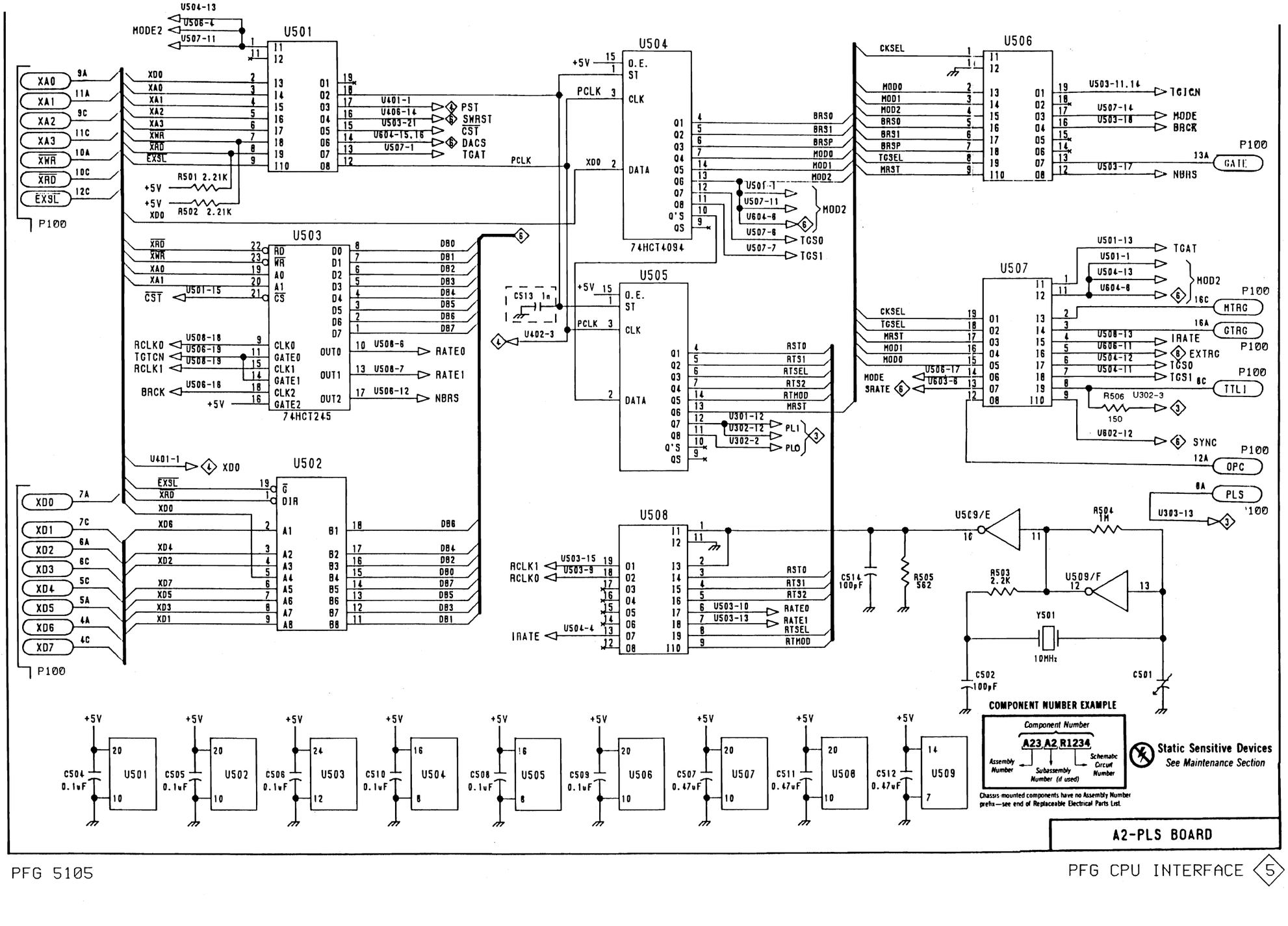
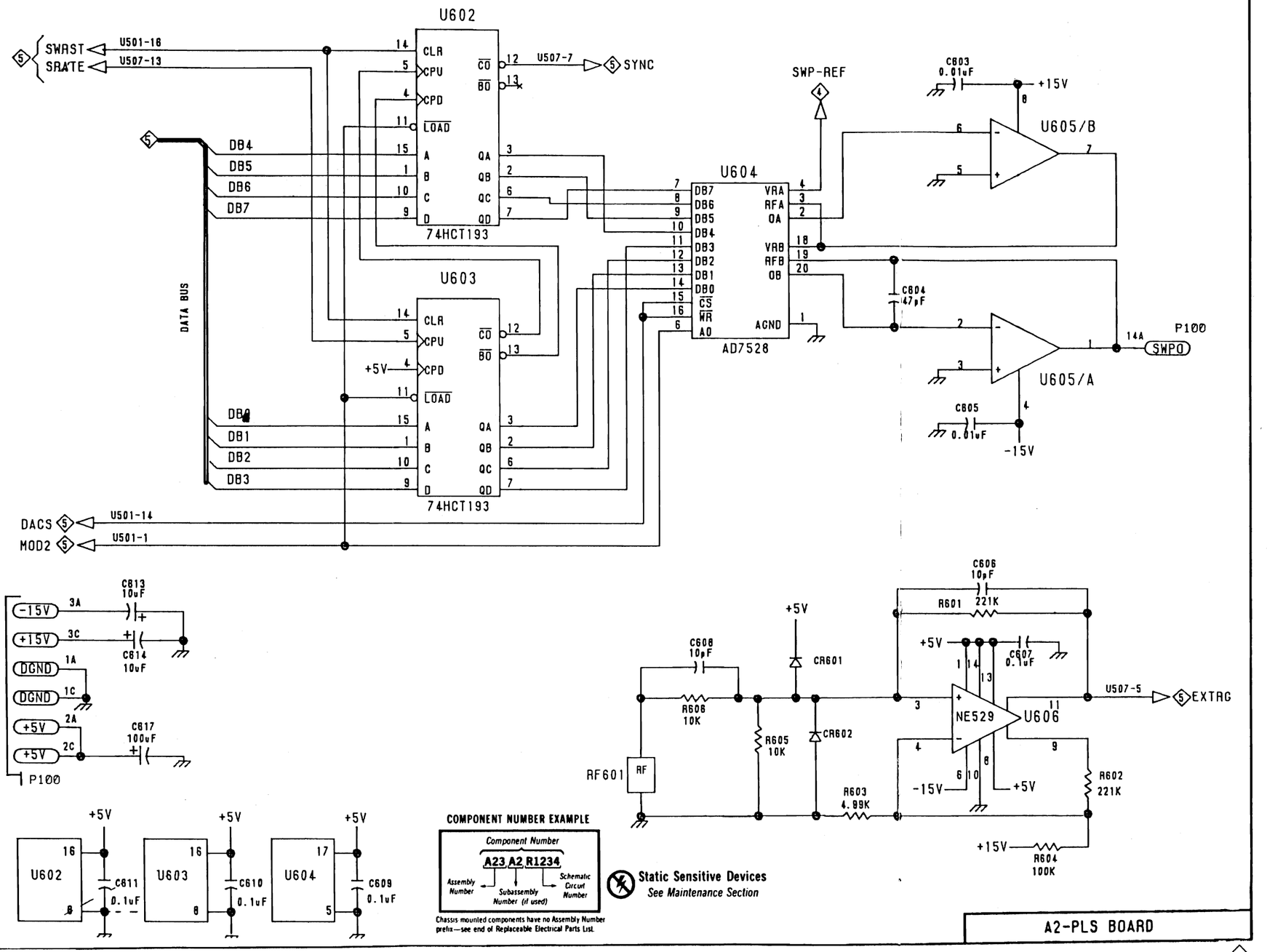


Table 7-6 (A2)

EXT TRIG SWEEP CIRCUITS ◇6◇ A2 - PLS BOARD, ASSEMBLY A2

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C603	K2	G2	R601	K7	G4
C604	J4	G3	R602	L8	G4
C605	K5	G3	R603	I8	G4
C606	K7	G4	R604	K9	G4
C607	K7		R605	I8	G4
C608	H7	G4	R606	H8	G4
C609	E9	G2			
C610	C9	G2	RF601	G8	G3
C611	B8	G2			
C613	B7	G2	U602	A9	F2
C614	B7	G2	U602	F1	F2
C617	B8	G1	U603	C9	F2
			U603	F4	F2
CR601	I7	G4	U604	D9	F2
CR602	I8	G4	U604	H3	F2
			U605A	K4	G2
P100	A7	G1	U605B	K2	G2
P100	L4	G1	U606	K8	G4



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EXT TRIG SWEEP CIRCUITS 6 A2

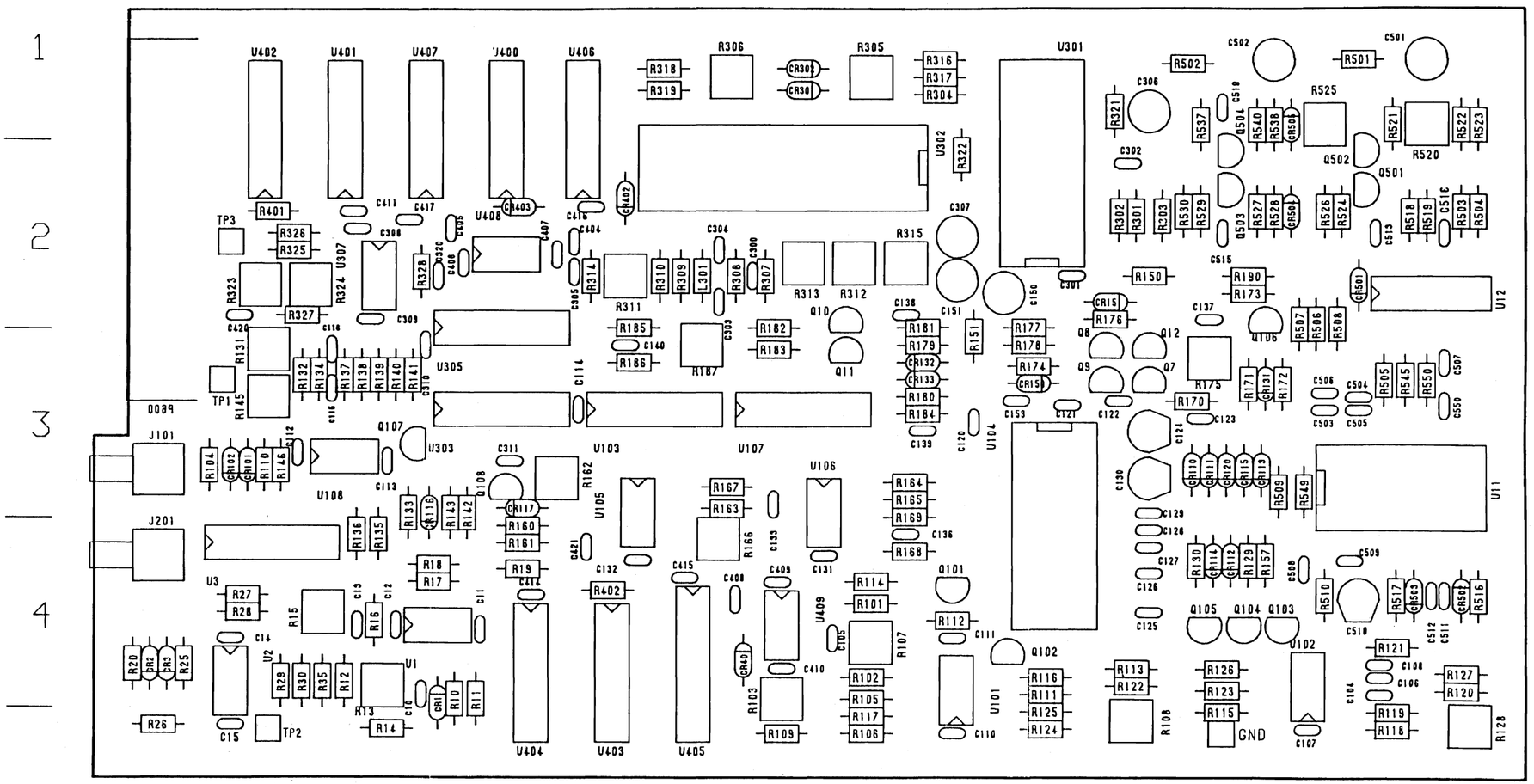

Fig. 7–4. A3 – Analog Circuit Board Assembly.

Table 7-1(A3)

TIMING CIRCUITS ◇1◇ — ANALOG BOARD, ASSEMBLY A3

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C114	B6	C3	R162	G3	C3
C120	C1	E3	R163	B5	D3
C121	D1	F3	R164	C4	E3
C122	D1	F3	R165	D4	E3
C123	C2	G3	R166	D6	D4
C124	D2	F3	R167	D6	D3
C125	D2	F4	R168	D4	E4
C127	D2	F4	R169	E5	E3
C128	D2	F4	R170	F2	G3
C128	E2	F4	R173	F5	G2
C129	E2	F3	R174	F1	F3
C130	E2	F3	R175	F3	G3
C131	A4	E4	R176	F4	F2
C132	B4	D4	R177	F4	F3
C133	C5	D3	R178	F4	F3
C137	F5	G2	R179	G2	E3
C138	E5	E2	R180	G5	E3
C138	G2	E2	R181	G2	E3
C139	G5	E3	R182	B4	D3
C140	H3	D3	R183	G4	D3
C153	F2	F3	R184	G5	E3
			R185	H2	D3
CR132	G3	E3	R186	H3	D3
CR133	G4	E3	R187	H1	D3
CR150	F2	F3	R190	F6	G2
CR151	F4	F2			
			U103	B1	C3
Q7	F2	F3	U104	C1	F3
Q8	F3	F3	U105	A5	D3
Q9	F3	F3	U106	D5	E3
Q10	G2	E2	U107	A6	D3
Q11	G4	E3	U107A	E4	D3
Q12	F5	F3	U107B	E4	D3
			U107C	B4	D3
R160	A4	C4	U107D	C4	D3
R161	A5	C4			

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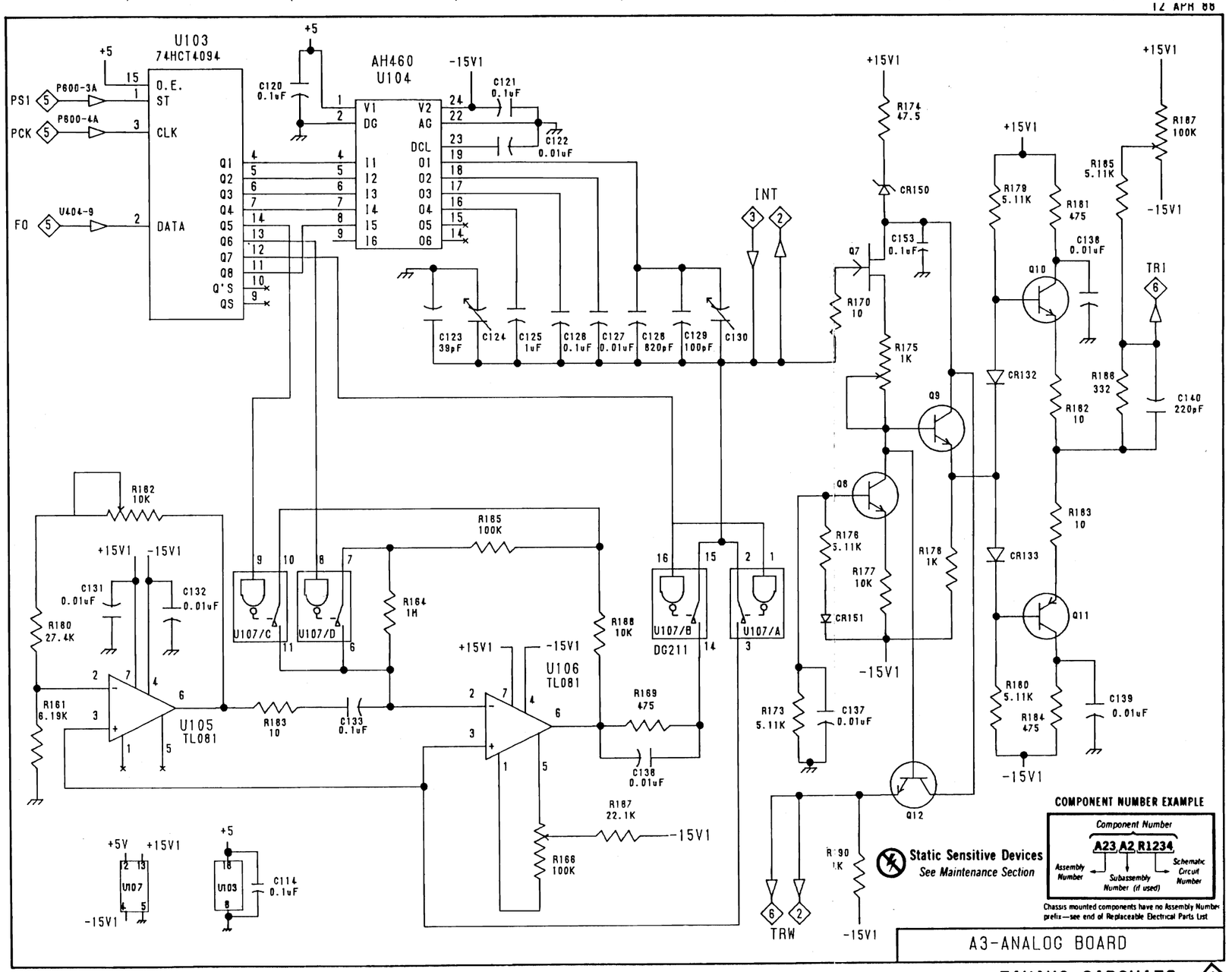

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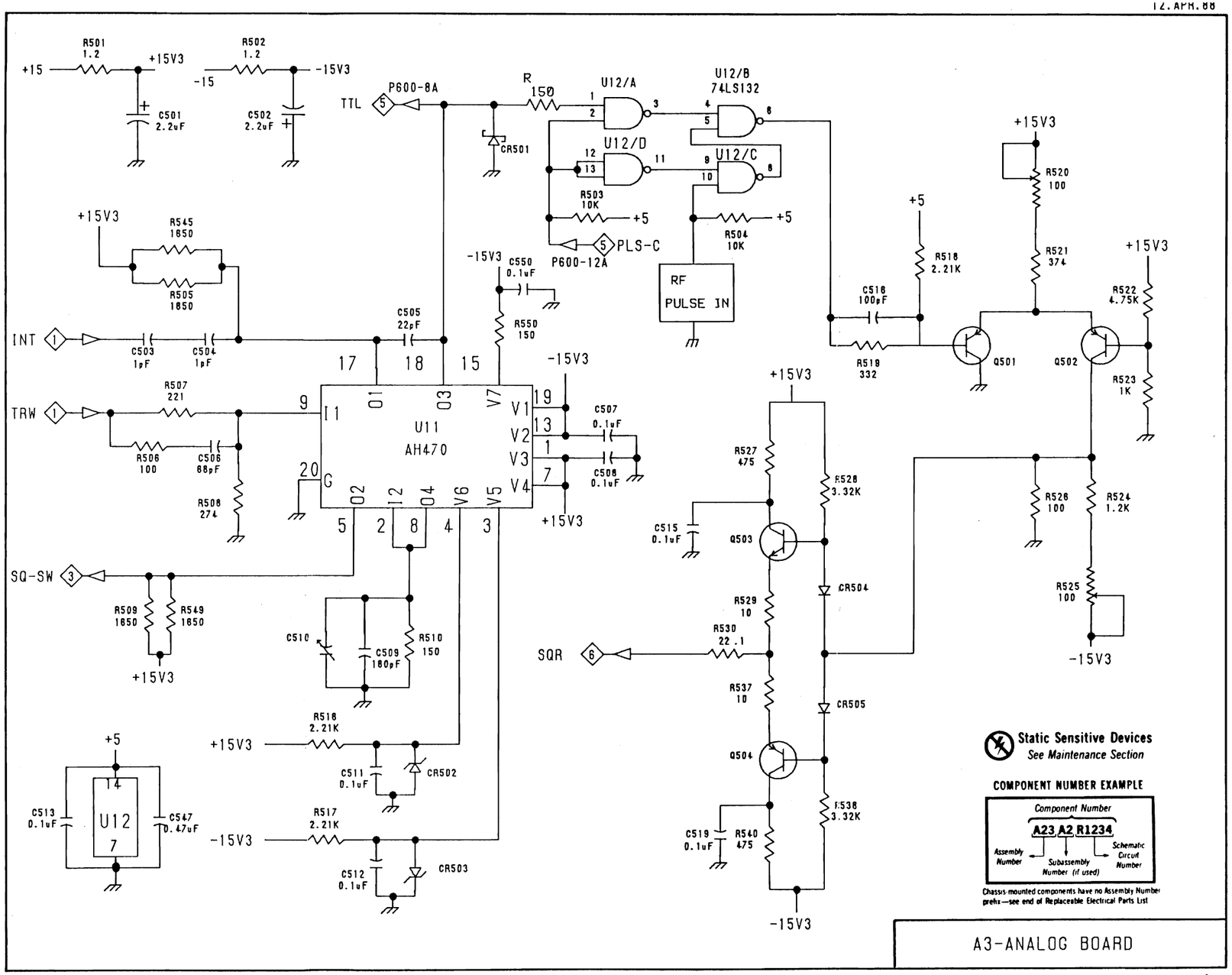
TIMING CIRCUITS 1 A3

Table 7-2(A3)

COMPARATOR ◇2◇ — ANALOG BOARD, ASSEMBLY A3

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C501	B1	H1	R505	B2	H3
C502	B1	G1	R506	B3	G2
C503	B3	G3	R507	B3	G2
C504	B3	H3	R508	B3	G2
C505	C3	H3	R509	B4	G3
C506	B3	G3	R510	C4	G4
C507	D3	H3	R517	C5	H4
C508	D3	G3	R518	C5	H2
C509	C4	G4	R518	F2	H2
C510	C4	G4	R519	F3	H2
C511	C5	H4	R520	G2	H1
C512	C6	H6	R521	G2	H1
C513	A5	H2	R522	H2	H1
C515	E4	G2	R523	H2	H1
C518	F2	G1	R524	G3	G2
C519	E5		R525	G4	G1
C547	B5		R526	G3	G2
C550	D2	H3	R527	E3	G2
			R528	F3	G2
CR501	D1	G2	R529	E4	G2
CR502	C5	H4	R530	E4	G2
CR503	C6	H4	R537	E5	G1
CR504	F4	G2	R538	F5	G1
CR505	F5	G1	R540	E5	G1
			R545	B2	H3
Q501	G3	H2	R549	B4	G3
Q502	G3	H2	R550	D2	H3
Q503	E4	G2			
Q504	E5	G2	U11	C3	H3
			U12	A5	H2
R501	A1	H1	U12A	D1	H2
R502	B1	G1	U12B	E1	H2
R503	D2	H2	U12C	E2	H2
R504	E2	H2	U12D	D1	H2



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COMPARATOR ◇2 A3

Table 7-3(A3)

CURRENT SOURCES ◇3◇ — ANALOG BOARD, ASSEMBLY A3

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C104	E2	H4	R108	E5	F5
C105	B1	E4	R109	B3	D5
C106	E4	H4	R111	B6	F4
C107	F1	G5	R112	C2	E4
C108	E2	H4	R113	D1	F4
C110	C3	E5	R114	C3	E4
C111	C4	F4	R115	D6	G5
C150	B6	F2	R116	D6	F4
C151	B5	E2	R117	A2	E5
			R118	E1	H5
CR110	G3	G3	R119	E2	H5
CR111	G4	G3	R120	E3	H4
CR112	F3	G4	R121	E4	H4
CR113	F3	G3	R122	E5	F4
CR114	F3	G4	R123	E5	G4
CR115	F3	G3	R124	D5	F5
CR120	G3	G3	R125	D3	F5
CR131	H3	G3	R126	E1	G4
			R127	E3	H4
Q101	D3	E4	R128	E3	H5
Q102	D5	F4	R129	F4	G4
Q103	F2	G4	R130	F2	G4
Q104	F4	G4	R150	A5	F2
Q105	G4	G4	R151	A4	E3
Q106	H2	G2	R157	E3	G4
			R171	H3	G3
R101	B2	E4	R172	G2	G3
R102	B1	E4			
R103	A3	D4	U101A	C5	E4
R105	B4	E4	U101B	C3	E4
R106	B1	E5	U102A	E2	G4
R107	A1	E4	U102B	E4	G4

A | B | C | D | E | F | G | H

1 | 2 | 3 | 4 | 5 | 6

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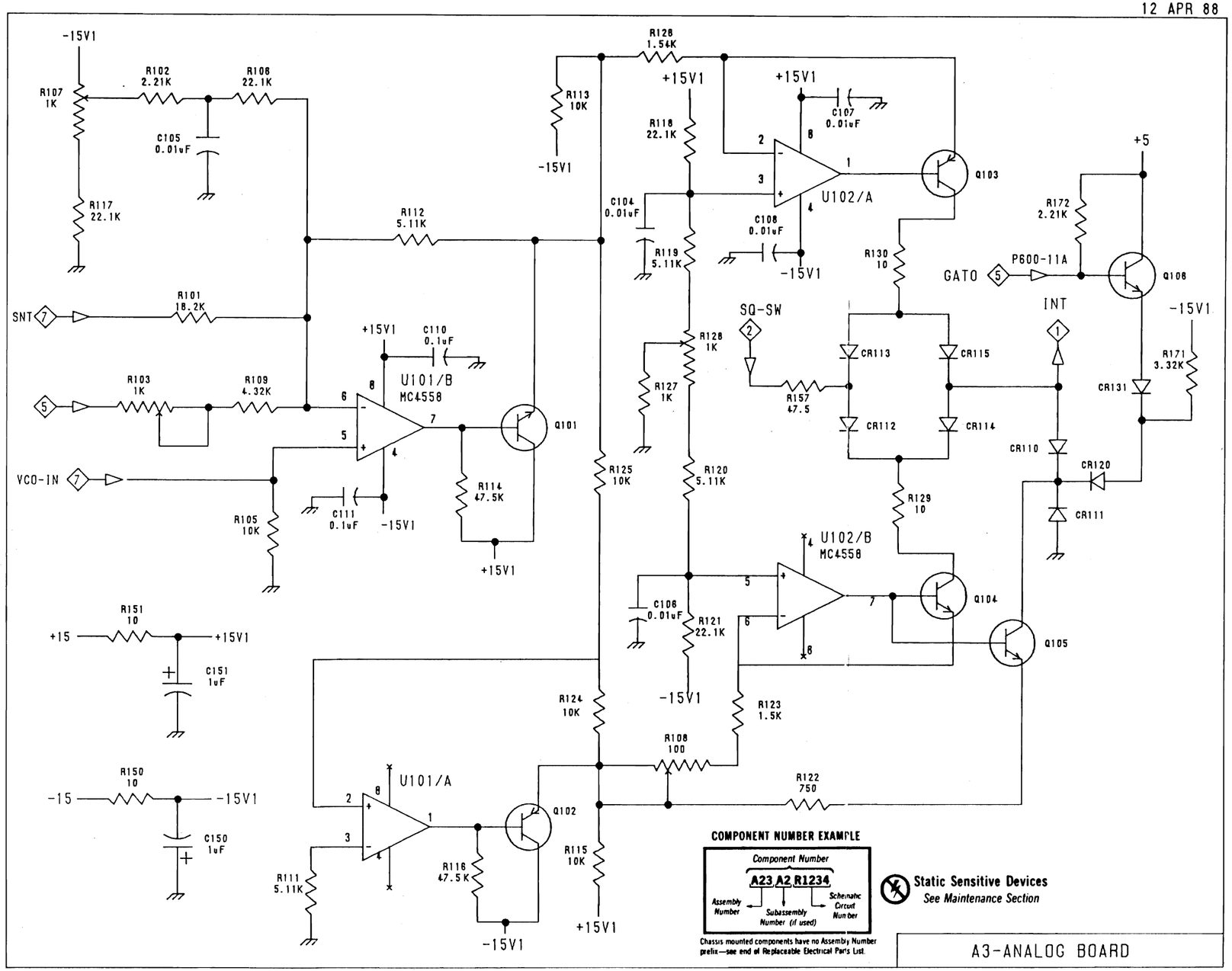

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CURRENT SOURCES 3 A3

Table 7-4(A3)

VOLTAGE REFERENCE ◇4◇ — ANALOG BOARD, ASSEMBLY A3

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C10	A2	B4	R18	F1	C4
C11	C1	C4	R19	F2	C4
C12	C2	B4	R20	C4	A4
C13	E2	B4	R25	C3	A4
C14	D3	A4	R26	C4	A5
C15	D5	A5	R27	E4	A4
			R28	F4	A4
CR1	B2	C4	R29	G4	B4
CR2	C4	A4	R30	F5	B4
CR3	C4	A4	R35	F5	B4
J201	B4	A4	TP1	G2	A3
			TP2	C2	B5
R10	B1	C4			
R11	B2	C4	U1A	C2	B4
R12	C2	B4	U1B	F2	B4
R13	B3	B4	U2A	C4	B4
R14	B3	B5	U2B	G4	B4
R15	E2	B4	U3	E4	A4
R16	F2	B4	U3A	E4	A4
R17	F1	C4	U3D	E4	A4

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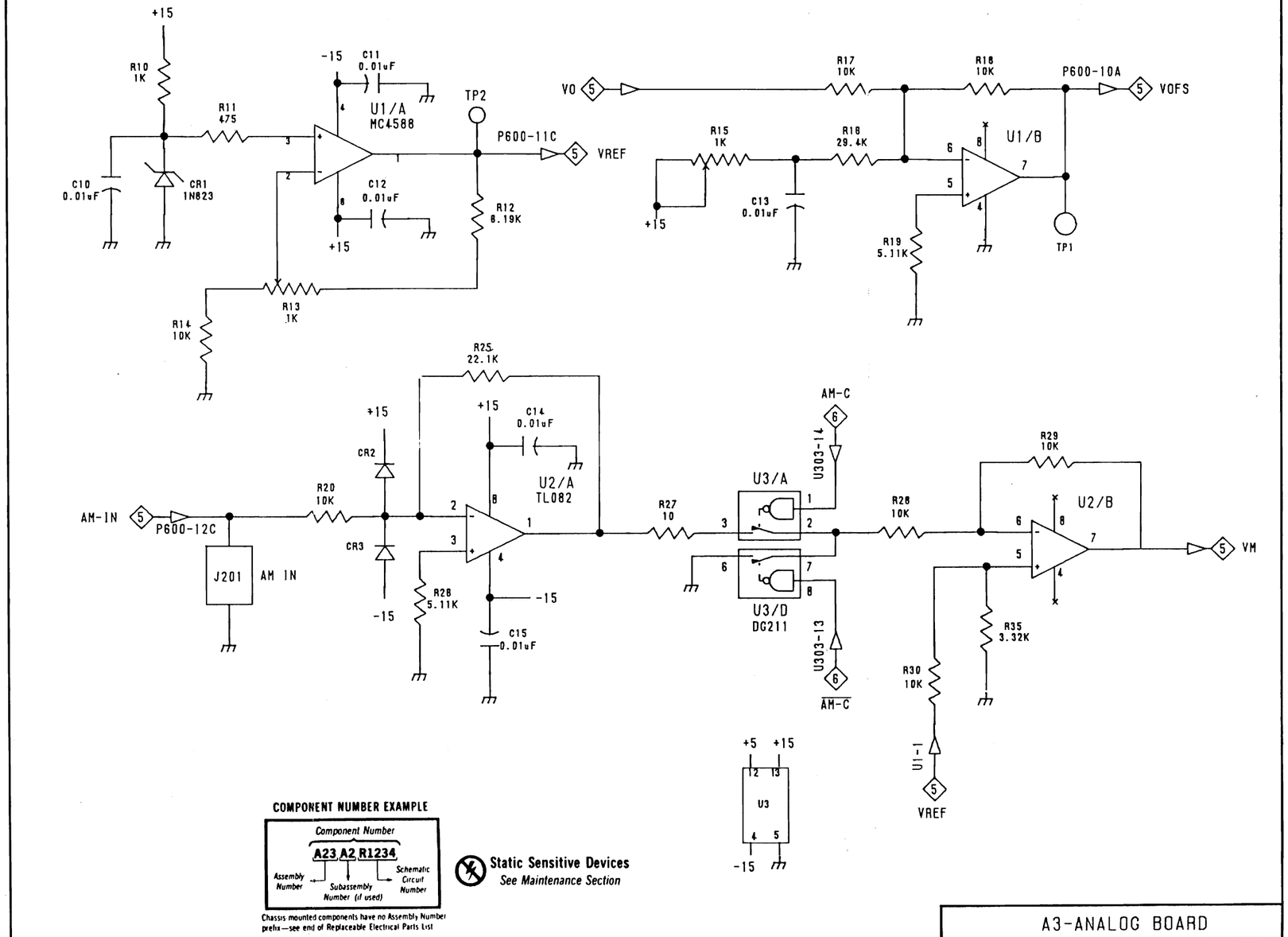

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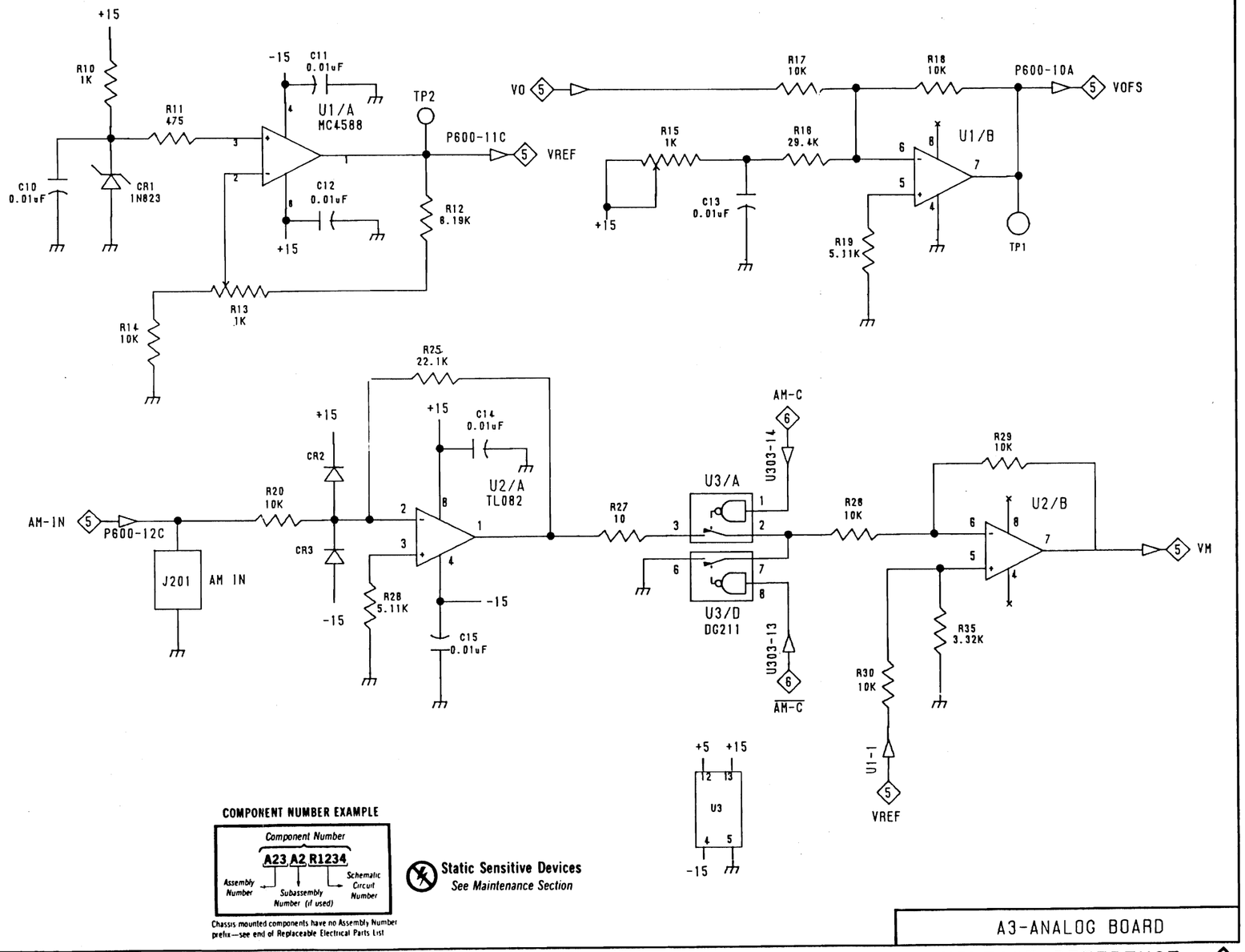
VOLTAGE REFERENCE 4 A3

Table 7-5(A3)

DAC CIRCUITS ◇5◇ — ANALOG BOARD, ASSEMBLY A3

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C404	G1	C2	R401	B1	B2
C405	G3	C2	R402	C3	C4
C407	G2	C2			
C406	G1	C2	U400	B1	C1
C408	G5	D4	U401	B6	B1
C409	G5	D4	U401	C2	B1
C410	H5	D4	U402	D2	B1
C411	B6	B2	U403	C4	C4
C414	C6	C4	U404	C6	C4
C415	C6	D4	U404	D4	C4
C417	D6	B2	U405	C6	D4
C418	D6		U405	F5	D4
C421	B4	C4	U406	D6	C1
			U406	F1	C1
CR401	G5	D4	U407	D6	B1
CR402	G2	D2	U407	F3	B1
CR403	G3	C2	U408A	G1	C2
			U408B	G3	C2
P600	A1	A2	U409	G5	D4



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VOLTAGE REFERENCE 4 A3

Table 7-5(A3)

DAC CIRCUITS ◇5◇ — ANALOG BOARD, ASSEMBLY A3

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C404	G1	C2	R401	B1	B2
C405	G3	C2	R402	C3	C4
C407	G2	C2			
C406	G1	C2	U400	B1	C1
C408	G5	D4	U401	B6	B1
C409	G5	D4	U401	C2	B1
C410	H5	D4	U402	D2	B1
C411	B6	B2	U403	C4	C4
C414	C6	C4	U404	C6	C4
C415	C6	D4	U404	D4	C4
C417	D6	B2	U405	C6	D4
C418	D6		U405	F5	D4
C421	B4	C4	U406	D6	C1
			U406	F1	C1
CR401	G5	D4	U407	D6	B1
CR402	G2	D2	U407	F3	B1
CR403	G3	C2	U408A	G1	C2
			U408B	G3	C2
P600	A1	A2	U409	G5	D4

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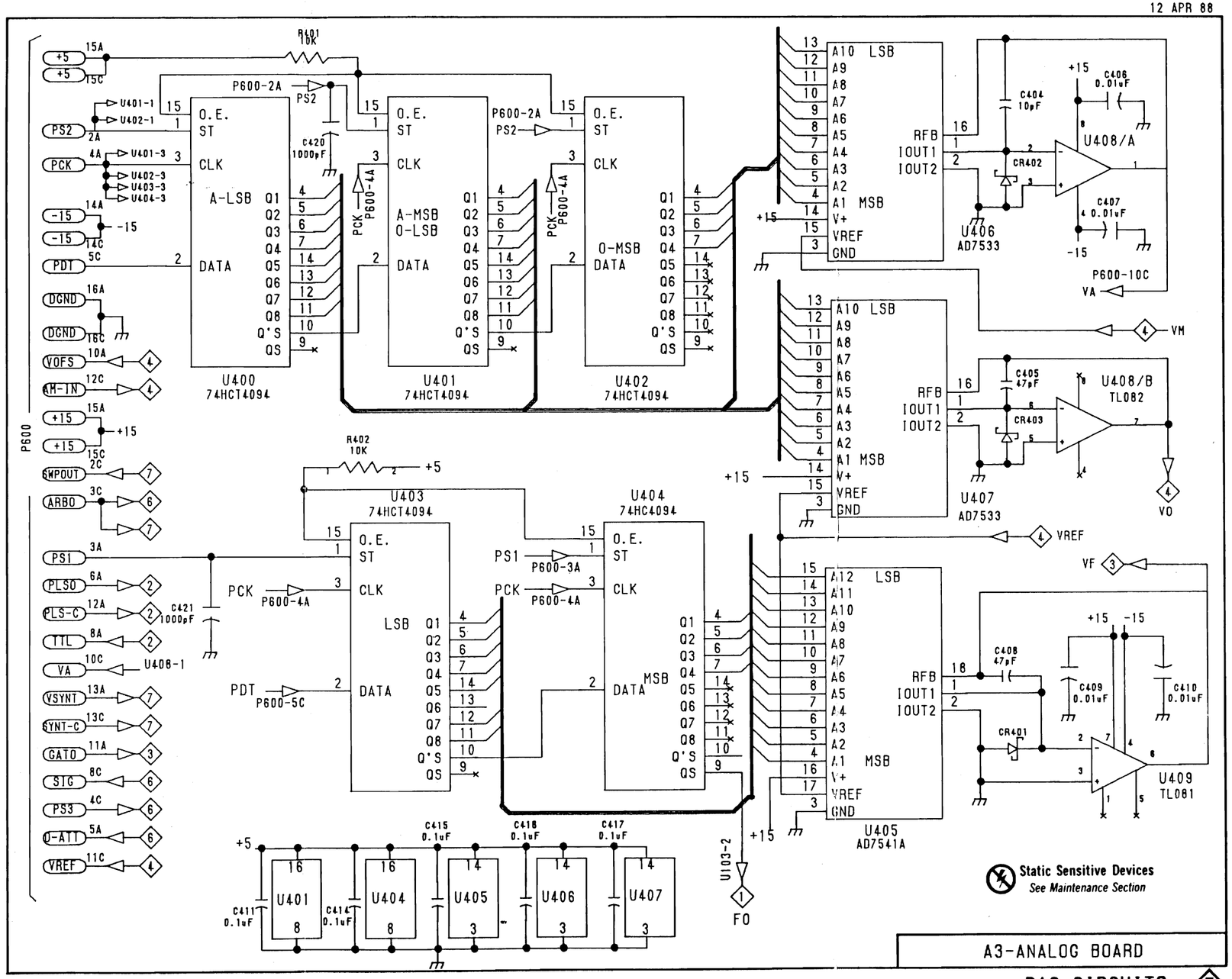

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Table 7-6(A3)

SINE SHAPER ◇6◇ — ANALOG BOARD, ASSEMBLY A6

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C301	A2	F2	R312	F2	E2
C302	B1	F2	R313	F3	E2
C303	D1	D3	R314	G3	C2
C304	E1	D2	R315	F3	E2
C305	G3	C2	R316	E3	E1
C306	G1	F1	R317	E4	E1
C307	G2	E2	R318	D4	D1
C308	E5	B2	R319	D4	D1
C309	E5	B2	R321	H1	F1
C310	A6	B3	R322	H2	E2
C311	A3	C3	R323	D5	B2
C320	E5	C3	R324	D6	B2
			R325	D5	B2
CR301	D3	E1	R326	D5	B2
CR302	E4	E1	R327	E5	B2
			R328	E4	B2
L301	E1	D2			
			TP3	G4	A2
R301	B1	F2			
R302	B1	F2	U301	B2	F1
R303	A2	F2	U302	D2	D2
R304	C2	E1	U303	B3	C3
R305	C2	E1	U303	B6	C3
R306	C3	D1	U305	B5	C3
R307	D1	D2	U305A	G3	C3
R308	E1	D2	U305B	G3	C3
R309	E1	D2	U305C	F5	C3
R310	E1	D2	U305D	G3	C3
R311	F2	D2	U307	E5	B2

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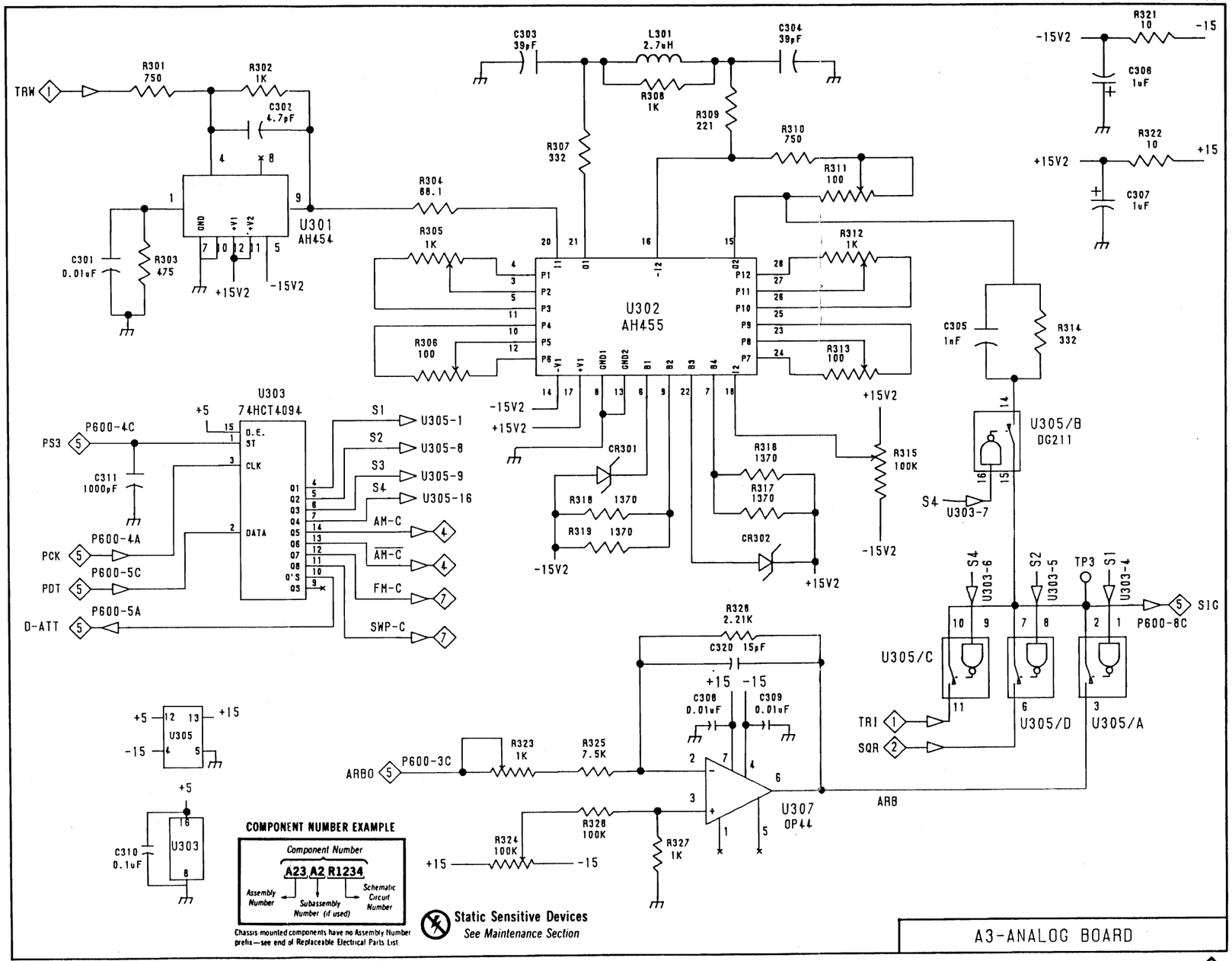

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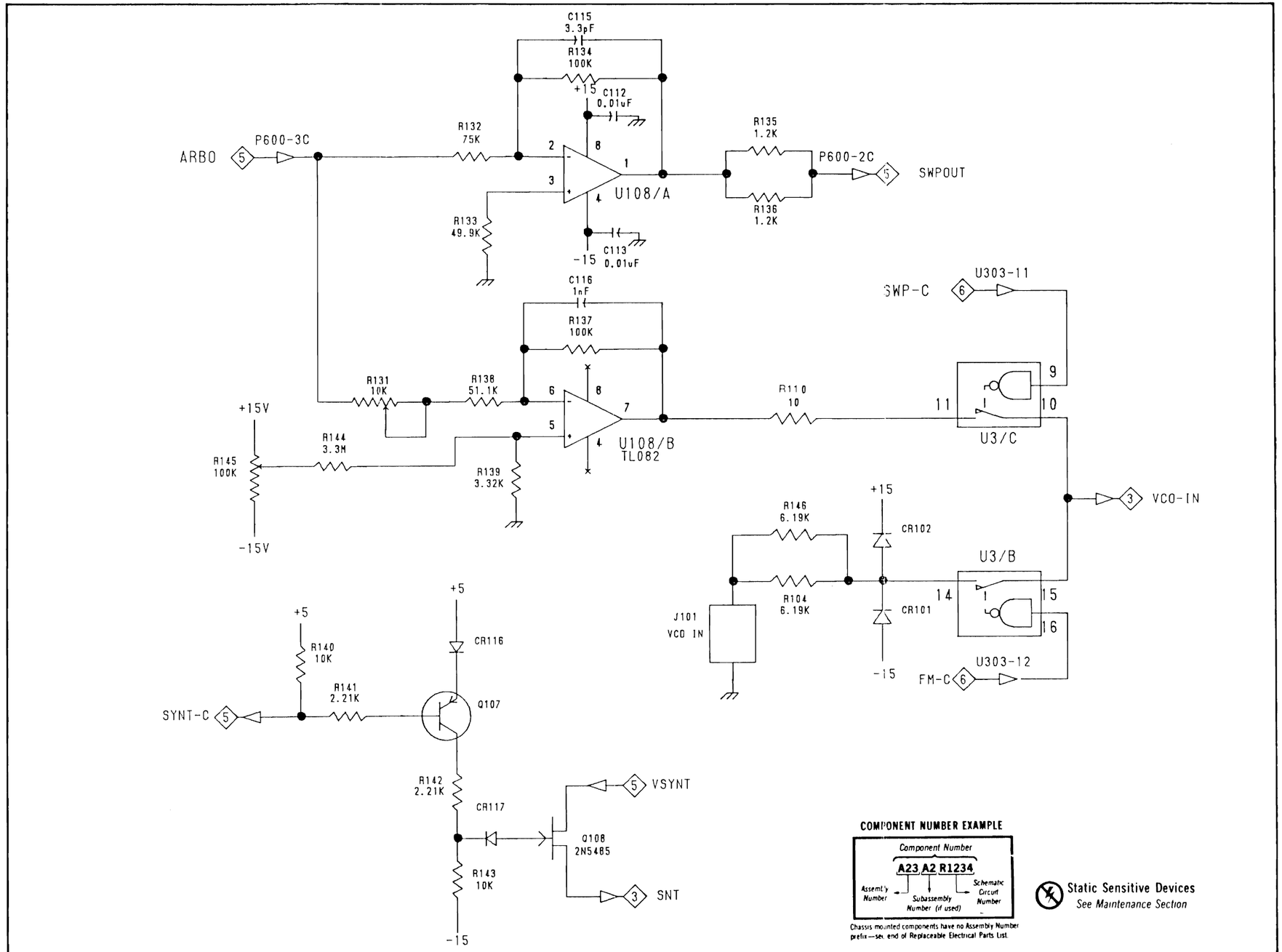
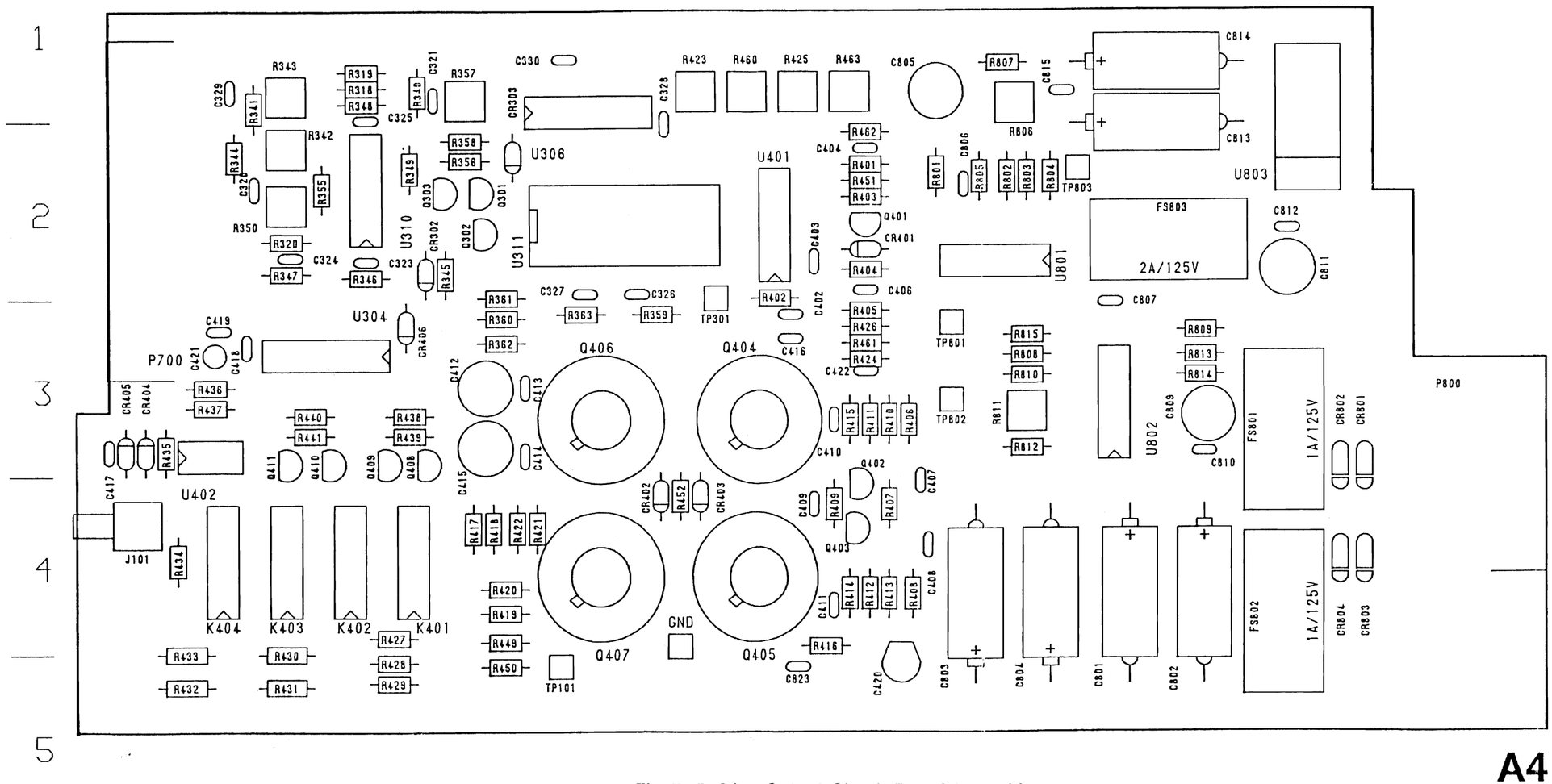
SINE SHAPER ⑥ A3

Table 7-7(A3)

SWEEP INTERFACE ◇7◇ — ANALOG BOARD, ASSEMBLY A3

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C112	E1	B3	R133	D2	B4
C113	E2	B3	R134	D1	B3
C115	D1	B3	R135	E2	B4
C116	D3	B3	R136	E2	B4
			R137	D3	B3
CR101	F4	B3	R138	D3	B3
CR102	F4	A3	R139	D4	B3
CR116	C5	B4	R140	C5	B3
CR117	D6	C3	R141	C5	B3
			R142	C6	C3
J101	E5	A3	R143	C6	C3
			R144	C4	
Q107	C5	B3	R145	B4	B3
Q108	D6	C3	R146	F4	B3
R104	F4	A3	U3B	G4	A4
R110	F3	B3	U3C	G3	A4
R131	C3	B3	U108A	D2	B3
R132	D2	B3	U108B	D3	B3





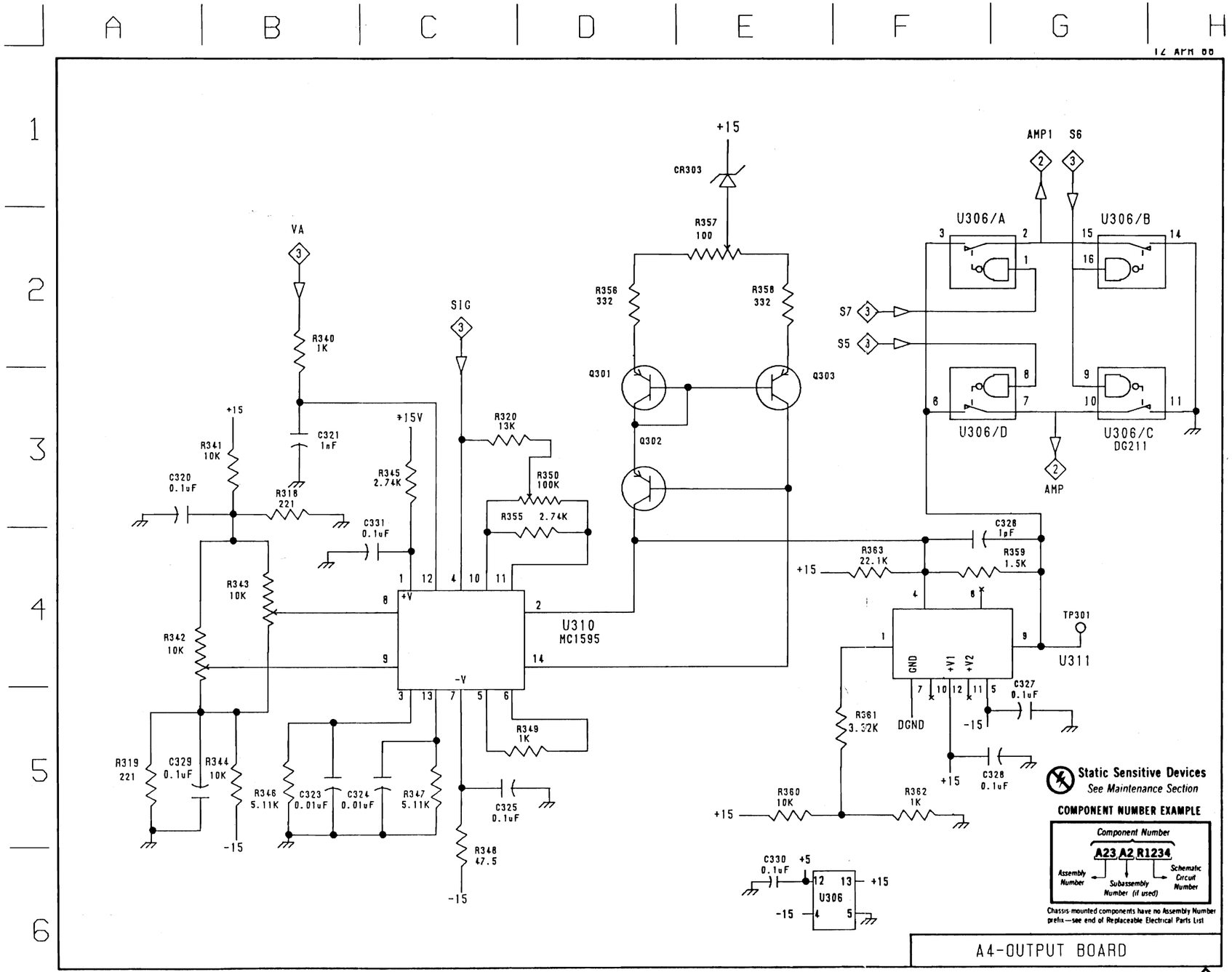
A4

Fig. 7–5. A4 – Output Circuit Board Assembly.

Table 7-1(A4)

MULIPLIER AND PREAMPLIFIER ◇1◇ OUTPUT BOARD, ASSEMBLY A4

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C320	A3	B2	R345	C3	C2
C321	B3	C1	R346	B5	B2
C323	B5	B2	R347	C5	B2
C324	C5	B2	R348	C5	B1
C325	C5	B1	R349	D5	C2
C326	F4	D2	R350	D3	B2
C327	G5	D2	R355	D4	B2
C328	G5	D1	R356	D2	C2
C329	A5	B1	R357	E2	C1
C330	E6	C1	R358	E2	C2
C331	C4		R359	F4	D3
			R360	E5	C3
CR303	E1	C1	R361	F5	C3
			R362	F5	C3
Q301	D3	C2	R363	F4	D3
Q302	D3	C2			
Q303	E3	C2	TP301	G4	D3
R318	B3	B1	U306	E6	C2
R319	A5	B1	U306A	F2	C2
R320	C3	B2	U306B	G2	C2
R340	B2	C1	U306C	G3	C2
R341	B3	B1	U306D	F3	C2
R342	A4	B2	U310	C4	B2
R343	B4	B1	U311	F4	C2
R344	B5	B2			



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MULTIPLIER AND PREAMPLIFIER

1 A4

Table 7-2(A4)

OUTPUT AMPLIFIER ◇2◇ ANALOG BOARD, ASSEMBLY A4

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C402	B4	E3	R406	E2	E3
C403	C3	E2	R407	E3	E4
C404	B4	E2	R408	E5	E4
C406	B1	E2	R409	E3	E4
C407	D3	E4	R410	E2	E3
C408	D4	E4	R411	F2	E3
C409	E3	E4	R412	E5	E4
C410	F2	E3	R413	F5	E4
C411	F5	E4	R414	F5	E4
C412	G3	C3	R415	F2	E3
C413	G3	C3	R416	F3	E4
C414	G5	C3	R417	G2	C4
C415	G5	C3	R418	G2	C4
C416	C5	E3	R419	G3	C4
C420	F3	E5	R420	G3	C4
C422	D4	E3	R421	G5	C4
C823	F3	E5	R422	G5	C4
			R423	C5	D1
CR401	C2	E2	R424	D5	E3
CR402	F3	D4	R425	C5	E1
CR403	F4	D4	R426	D5	E3
			R449	G4	C4
Q401	B3	E2	R450	G4	C5
Q402	E2	E4	R451	A3	E2
Q403	E5	E4	R452	F4	D4
Q404	F2	D3	R460	C6	D1
Q405	F4	D4	R461	D5	E3
Q406	G2	D3	R462	A4	E2
Q407	G4	D4	R463	A5	E1
R401	B4	E2	TP101	G3	C5
R402	C4	E2			
R403	B2	E2	U401A	C3	E2
R404	C2	E2	U401B	B3	E2
R405	D3	E3	U401C	A3	E2

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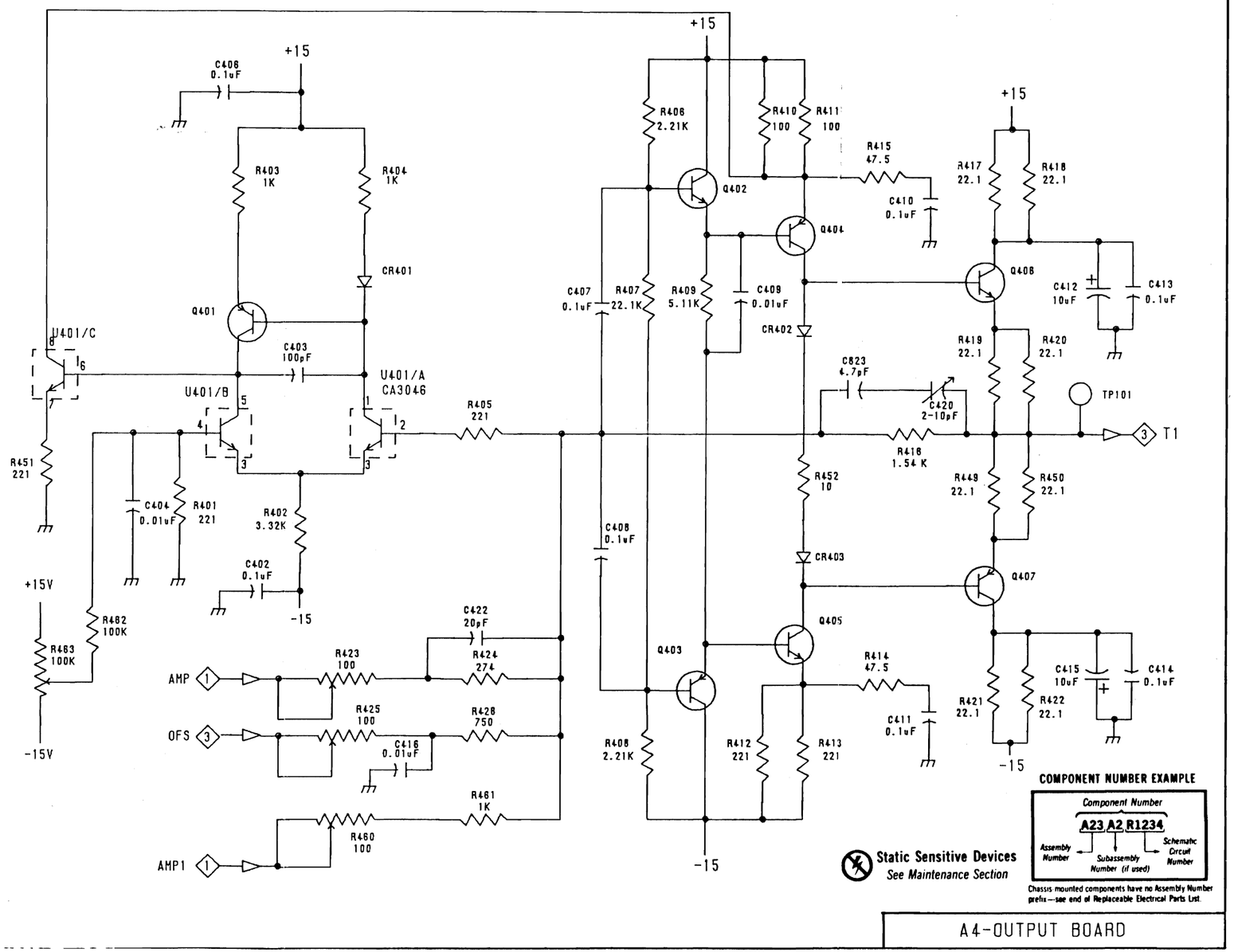

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OUTPUT AMPLIFIER 2 A4

Table 7-3(A4)

OUTPUT ATTENUATOR ◇3◇ OUTPUT BOARD, ASSEMBLY A4

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C417	G2	A3	R427	F4	B4
C418	B6	B3	R428	G4	B5
C419	B4	A3	R429	G4	B5
C421	C2	A3	R430	G5	B5
			R431	G5	B5
CR404	F2	A3	R432	G5	A5
CR405	F2	A3	R433	G5	A5
CR406	C2	C3	R434	G2	A4
			R435	G2	A3
J101	H5	A4	R436	C1	A3
			R437	D2	A3
K401	E4	C4	R438	D4	C3
K402	F4	B4	R439	D4	C3
K403	F5	B4	R440	D5	B3
K404	F6	A4	R441	D6	B3
P700	A1	A3	U304	A6	B3
			U304	B4	B3
Q408	D3	C3	U402A	E2	A3
Q409	D4	B3	U402B	E1	A3
Q410	D5	B3			
Q411	D6	B3			

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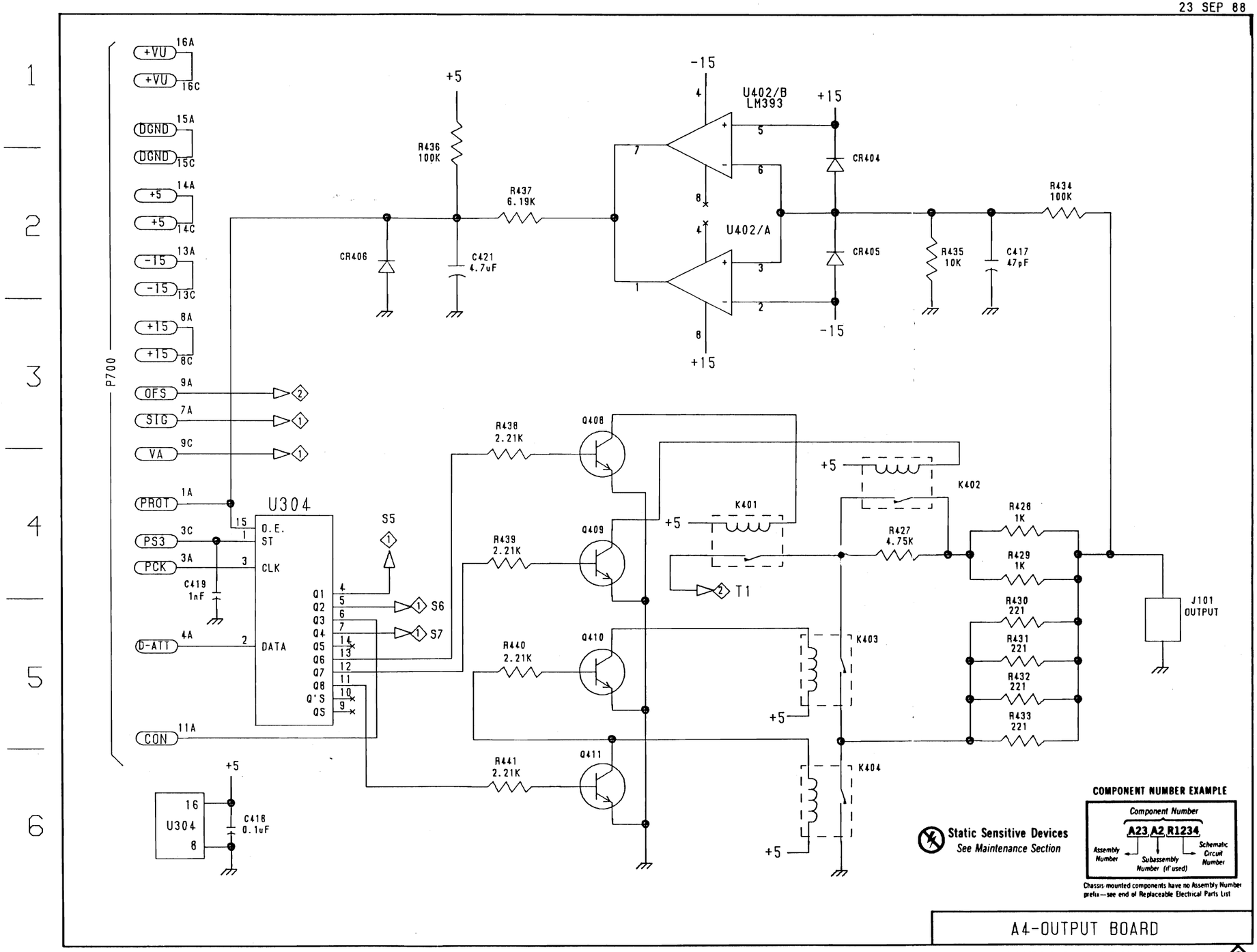

A4-OUTPUT BOARD

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OUTPUT ATTENUATOR 3 A4

Table 7-4(A4)

POWER SUPPLY ◇4◇ OUTPUT BOARD, ASSEMBLY A4

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C801	C2	G4	P800	G2	H3
C802	D2	G4	P800	G4	H3
C803	C4	F4	P800	H2	H3
C804	D4	F4	P800	H4	H3
C805	E2	F1			
C806	E2	F2	R801	F2	F2
C807	G2	G3	R802	E2	F2
C809	E4	G3	R803	F2	F2
C810	E4	G3	R804	F2	F2
C811	C5	H2	R805	E2	F2
C812	C5	H2	R806	F3	F1
C813	C6	G1	R807	F3	F1
C814	C6	G1	R808	E5	F3
C815	D6	F1	R809	E5	G3
C820	B2		R810	F6	F3
C821	B3		R811	E6	F3
C822	B5		R812	E6	F3
			R813	F4	G3
CR801	C2	H3	R814	F4	G3
CR802	C2	H3	R815	H4	F3
CR803	C2	H4			
CR804	C2	H4	TP801	E2	F3
			TP802	E4	F3
FS801	B1	G3			
FS802	B3	G4	U801	G2	F2
FS803	B5	G2	U802	G5	G3
			U803	B6	H2
P800	A3	H3			

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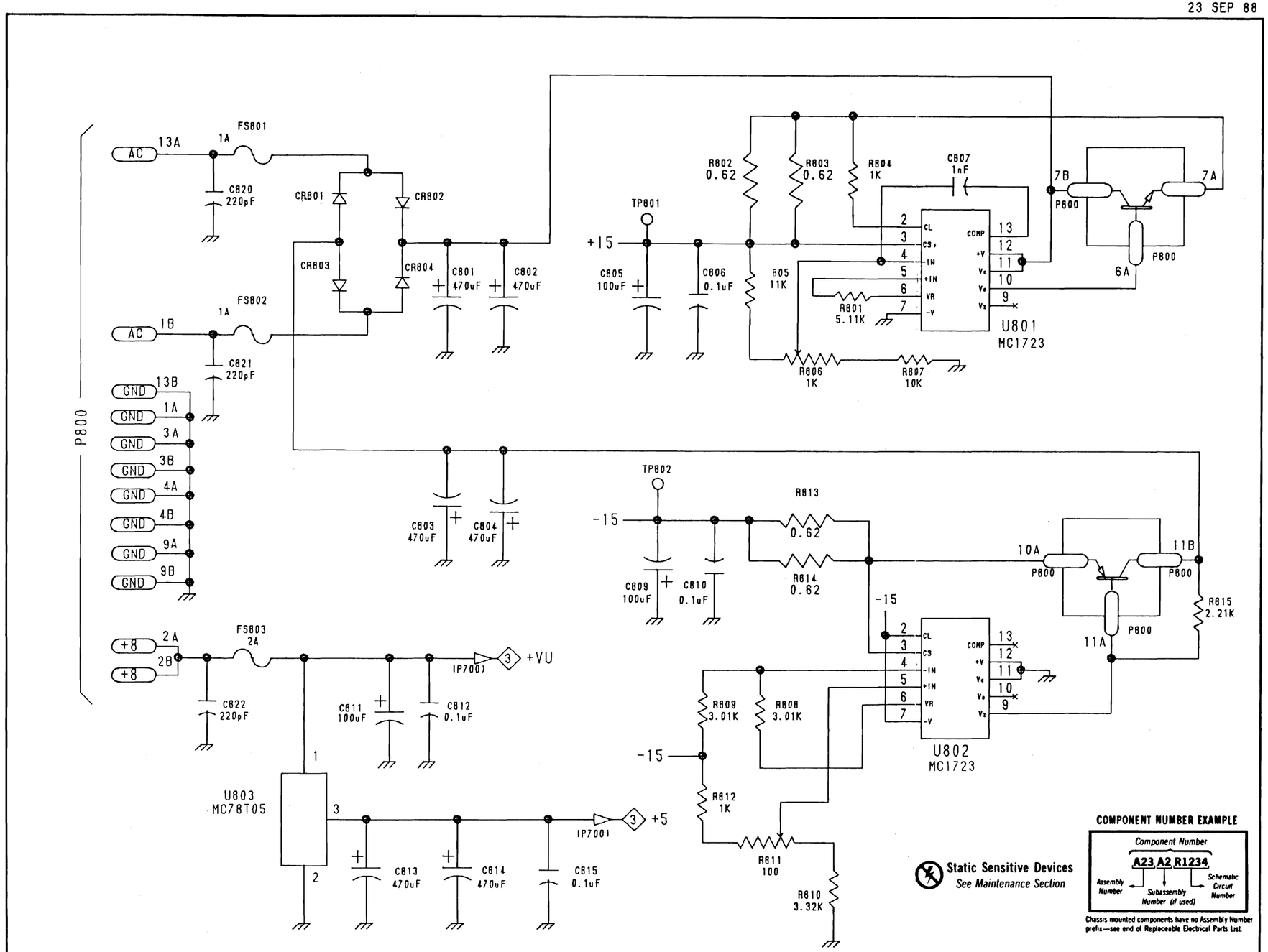

COMPONENT NUMBER EXAMPLE

Component Number: A23 A2 R1234
(Assembly Number / Subassembly Number (if used) / Schematic Circuit Number)

Chassis mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

Static Sensitive Devices
See Maintenance Section

A4-OUTPUT BOARD

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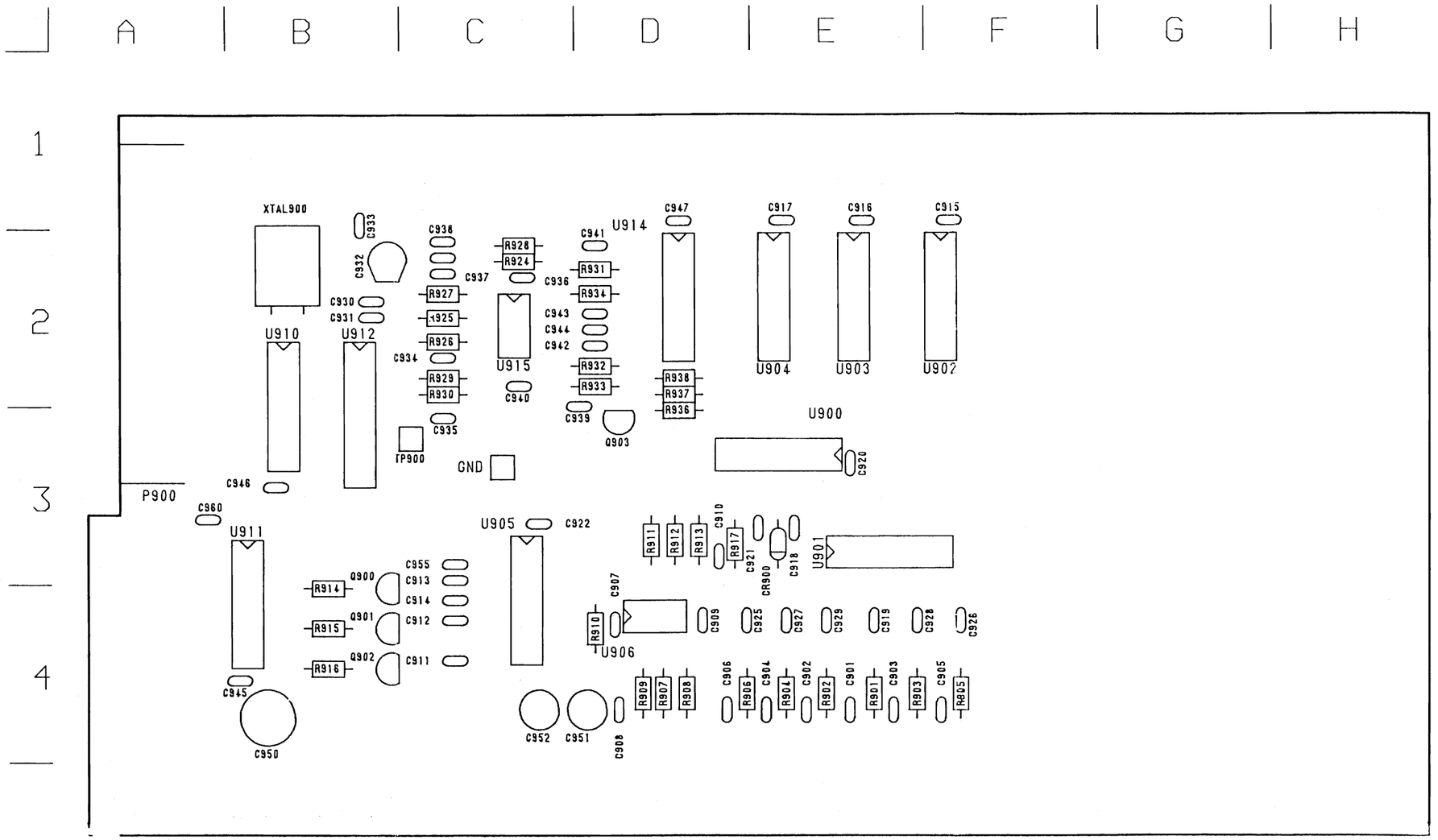
POWER SUPPLY 4 A4



A5

Fig. 7–6. A5 – Synt Circuit Board Assembly.

Table 7-1(A5)

SYNTHESIZER REFERENCE LOOP ◇1◇ SYNT BOARD, ASSEMBLY A5

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C930	D1	B2	R925	E2	C2
C931	D1	B2	R926	F2	C2
C932	D1	B2	R927	F1	C2
C933	D1	B2	R928	G2	C2
C934	F2	C2	R929	F3	C2
C935	F3	C3	R930	F3	C2
C936	H2	C2	R931	G4	D2
C937	F1	C2	R932	F4	D2
C938	G1	C2	R933	F5	D2
C939	G1	D3	R934	F5	D2
C940	G2	C2	R936	C5	D3
C941	G4	D2	R937	C5	D2
C942	F5	D2	R938	D5	D2
C943	E5	D2			
C944	D4	D2	TP900	E2	C3
C945	A6	B4			
C946	B6	B3	U910	B1	B2
C947	C6	D1	U910	B6	B2
C950	A1	B4	U911	A6	B3
C951	A1	D4	U911	B3	B3
C952	A1	C4	U912	D2	B2
C960	B1	A3	U914	B6	D2
			U914	D5	D2
P900	A4	A3	U915A	G2	C2
			U915B	G4	C2
Q903	C6	D3			
			XTAL900	D1	B2
R924	H2	C2			

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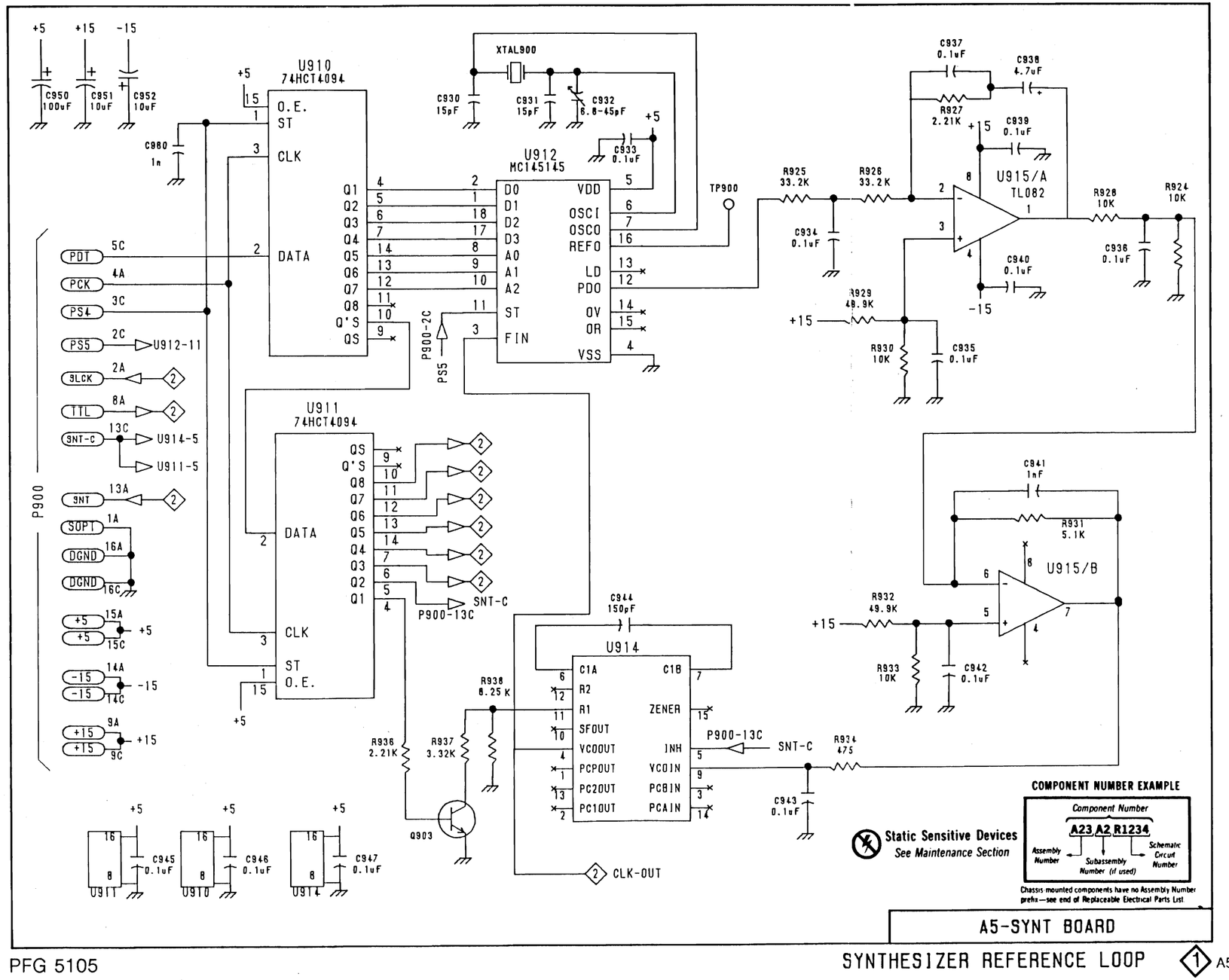

A5-SYNT BOARD

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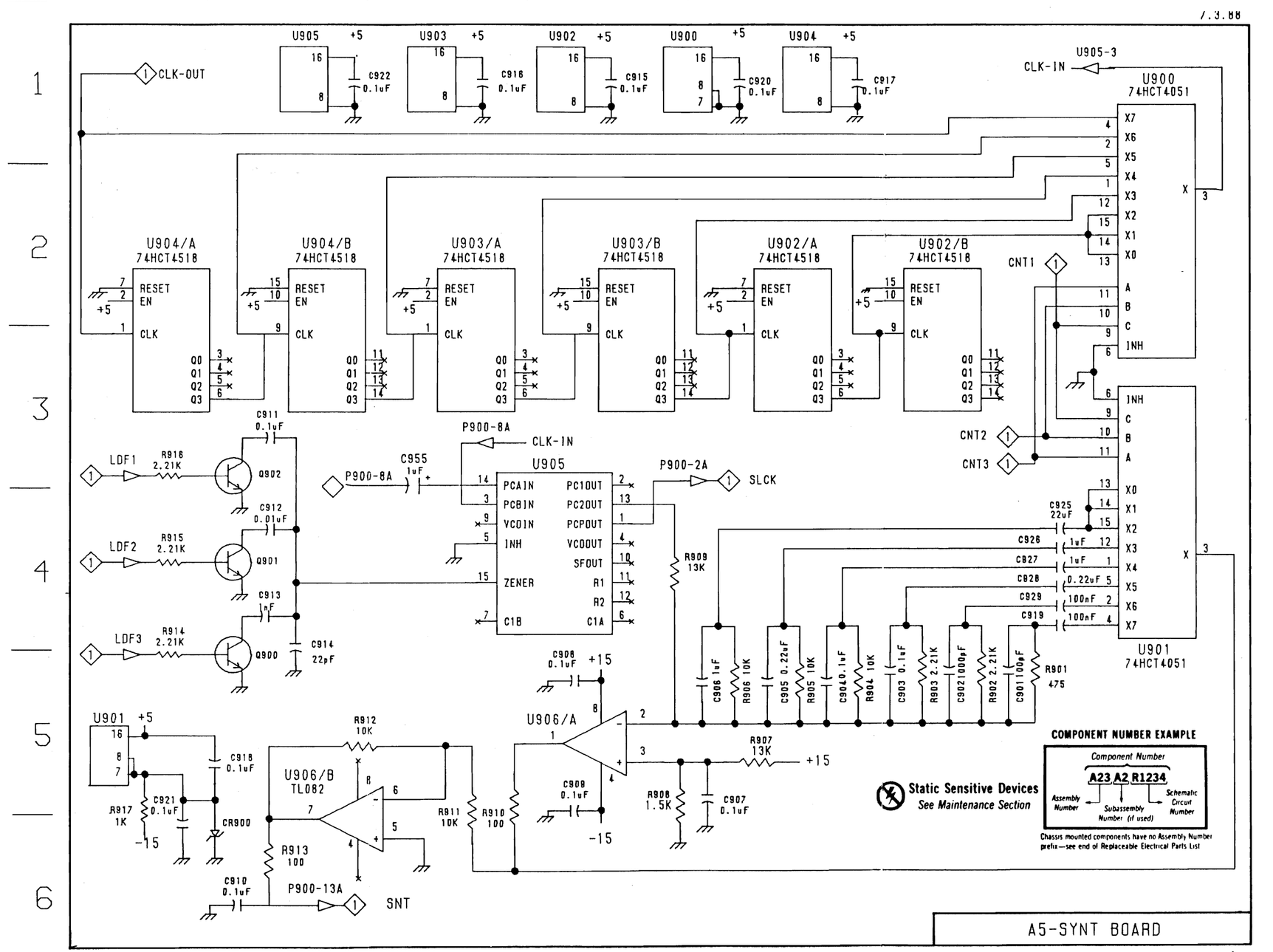
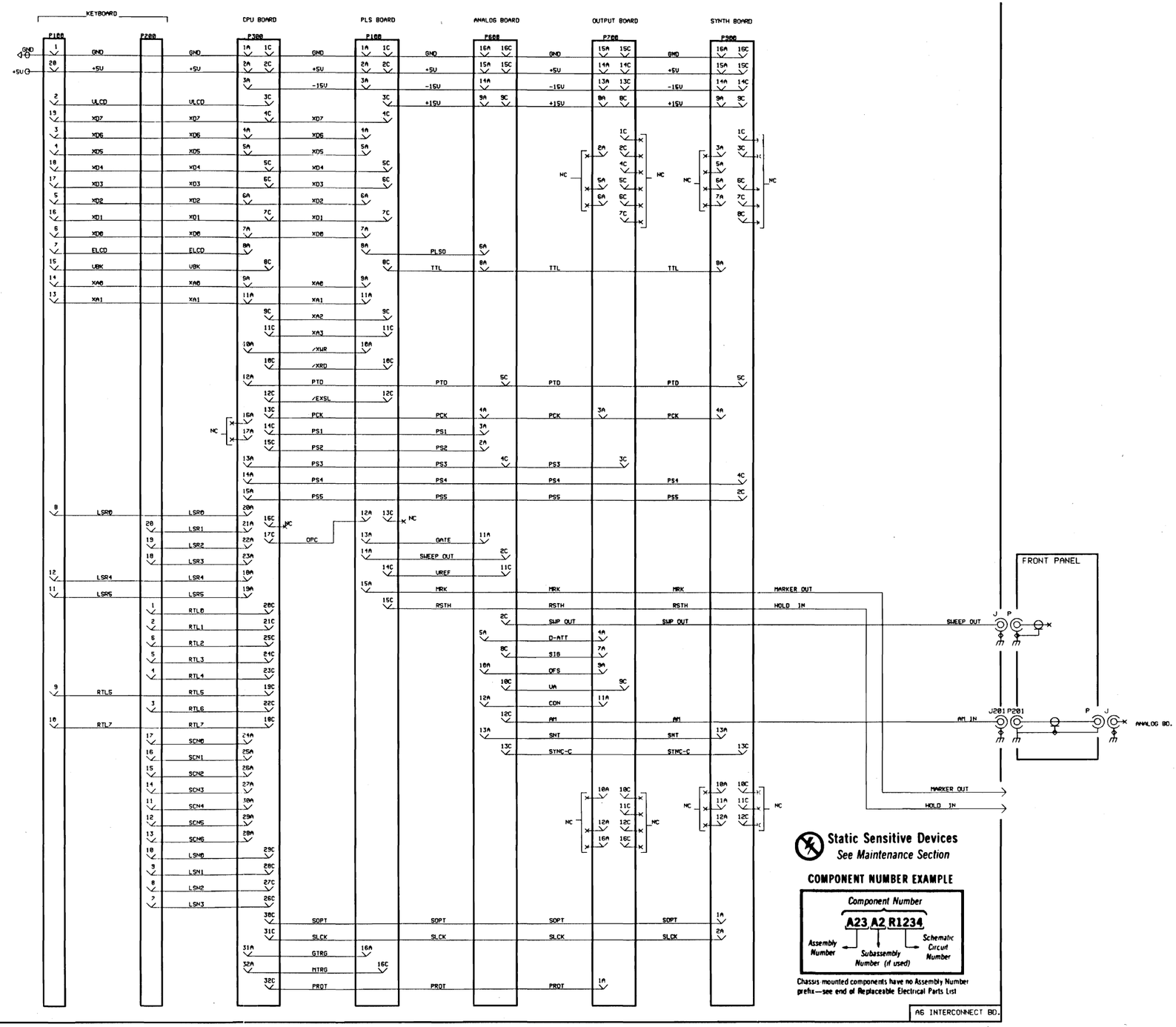
SYNTHESIZER REFERENCE LOOP (1) A5

Table 7-2(A5)

SYNTHESIZER FILTERS ◇2◇ SYNT BOARD, ASSEMBLY A5

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C901	F5	E4	R902	F5	E4
C902	F5	E4	R903	F5	E4
C903	F5	E4	R904	F5	E4
C904	E5	E4	R905	E5	F4
C905	E5	F4	R906	E5	D4
C906	E5	D4	R907	E5	D4
C907	E5	D4	R908	D5	D4
C908	D5	D4	R909	D4	
C910	B6	D3	R910	C5	D4
C911	B3	C4	R911	C5	D3
C912	B4	C4	R912	B5	D3
C913	B4	C3	R913	B6	D3
C914	B4	C4	R914	A4	B4
C915	D1	F1	R915	A4	B4
C916	C1	E1	R916	A3	B4
C917	F1	E1	R917	A5	D3
C918	B5	E3			
C919	G4	E4	U900	D1	E3
C920	E1	E3	U900	G1	E3
C921	A6	E3	U901	A5	E3
C922	B1	C3	U901	G3	E3
C925	G4	D4	U902	D1	F2
C926	G4	E4	U902A	E2	F2
C927	G4	E4	U902B	F2	F2
C928	G4	E4	U903	C1	E2
C929	G4	E4	U903A	C2	E2
C940	E5		U903B	D2	E2
C955	C3	C3	U904	E1	E2
			U904A	A2	E2
CR900	B6	E3	U904B	B2	E2
			U905	B1	C3
Q900	B5	B4	U905	D4	C3
Q901	B4	B4	U906A	D5	D4
Q902	B3	B4	U906B	B5	D4





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INTERCONNECT BOARD 1 A6

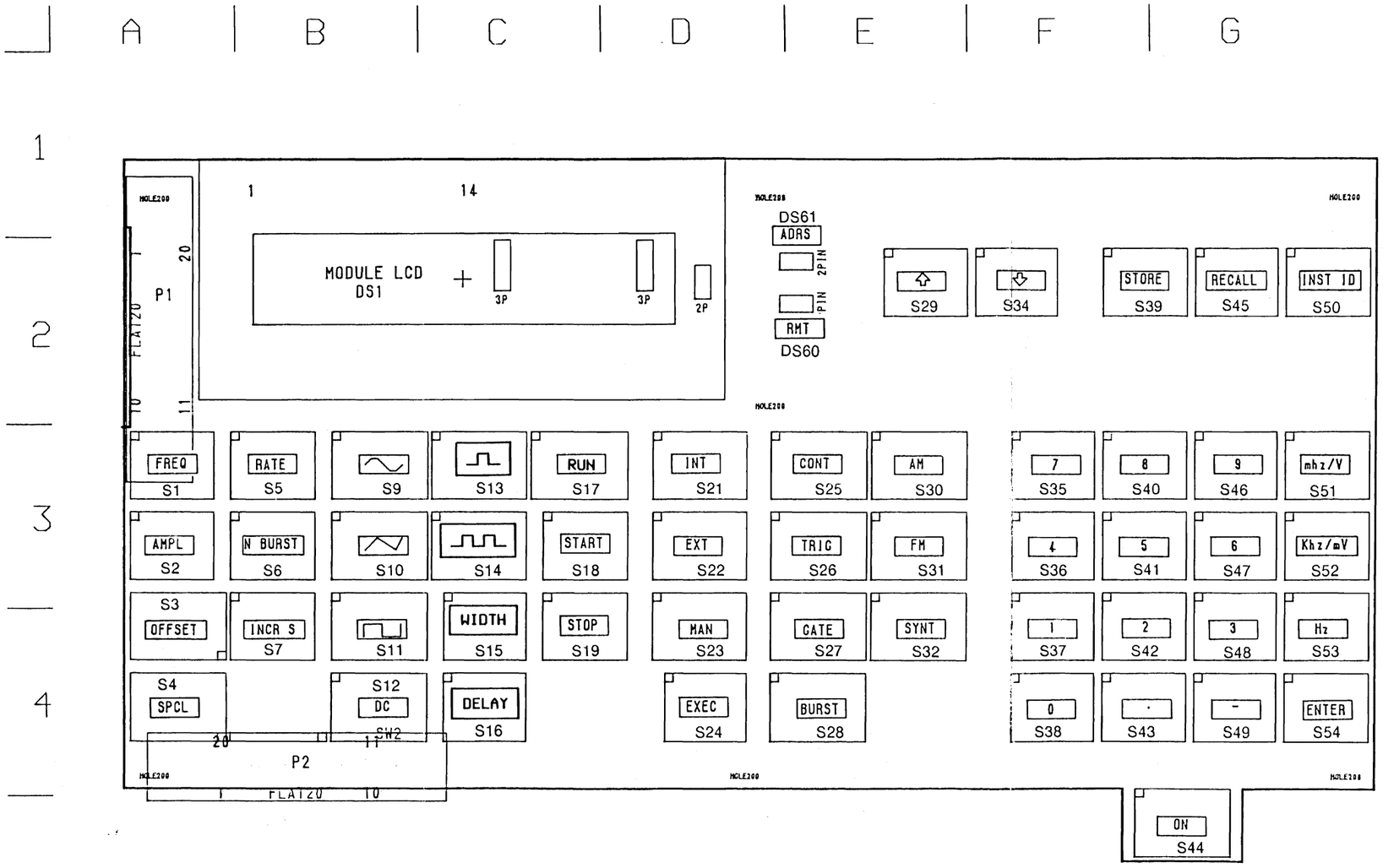


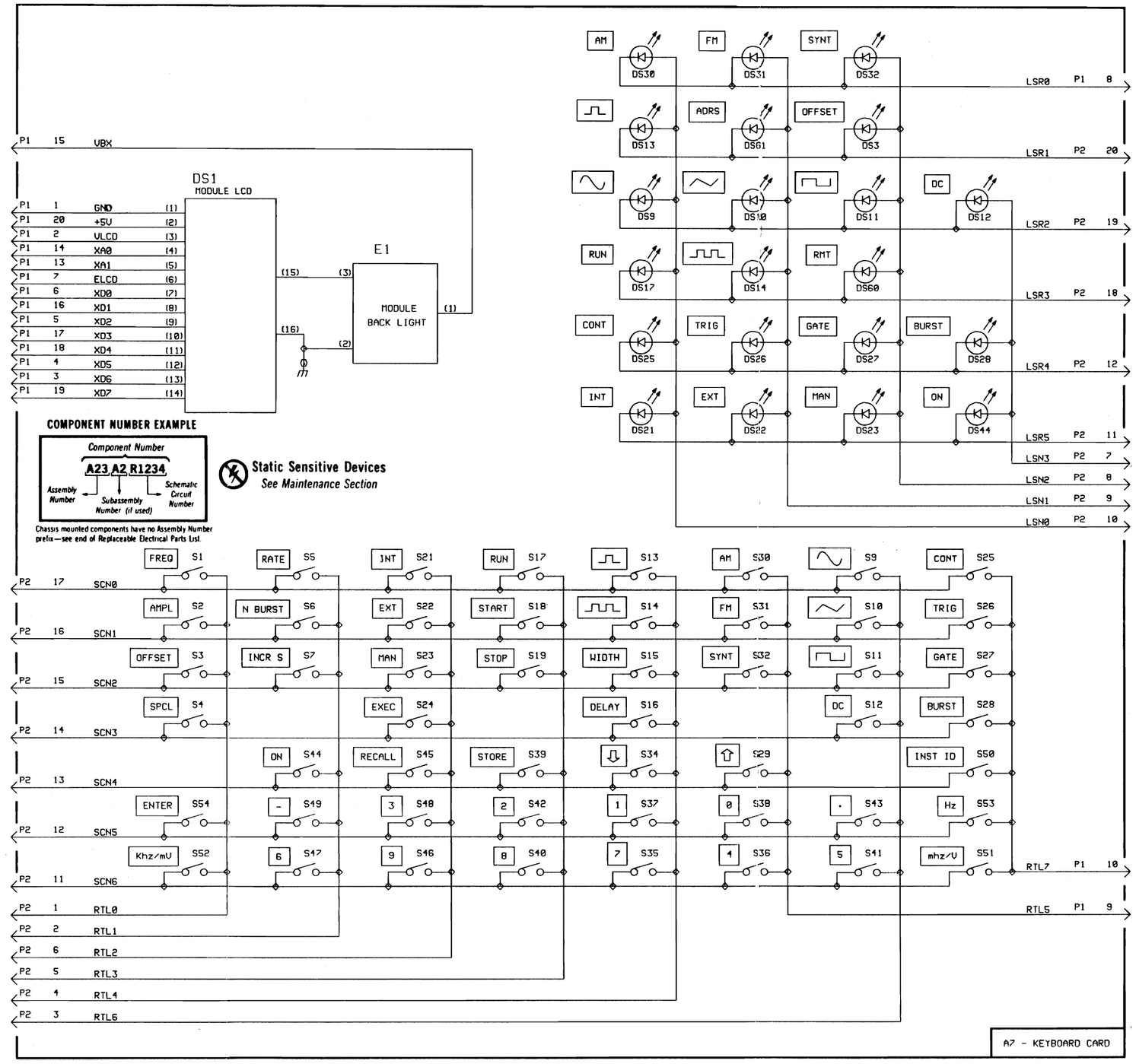
Fig. 7–7. A7 – Keyboard Circuit Board Assembly.

A7

Table 7-1 (A7)

FRONT PANEL KEYBOARD - DISPLAY ◇1◇ A7 - KEYBOARD CARD, ASSEMBLY A7

CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
DS1	C3	B2	S12	I7	B4
DS3	I2	A3	S13	G6	C3
DS9	G3	B3	S14	G6	C3
DS10	H3	B3	S15	G7	C4
DS11	I3	B4	S16	G7	C4
DS12	J3	B4	S17	F6	C3
DS13	G2	C3	S18	F6	C3
DS14	H3	C3	S19	F7	C4
DS17	G3	C3	S21	E6	D3
DS21	G4	D3	S22	E6	D3
DS22	H4	D3	S23	E7	D4
DS23	I4	D4	S24	E7	D4
DS25	G4	E3	S25	J6	E3
DS26	H4	E3	S26	J6	E3
DS27	I4	E4	S27	J7	E4
DS28	J4	E4	S28	J7	E4
DS30	G1	E3	S29	H8	E2
DS31	H1	E3	S30	H6	E3
DS32	I1	E4	S31	H6	E3
DS44	J4	G5	S32	H7	E4
DS60	I3	E2	S34	G8	F2
DS61	H2	E1	S35	G8	F3
			S36	H8	F3
E1	D3		S37	G8	F4
			S38	H8	F4
P1	A2	A2	S39	F8	F2
P1	K1	A2	S40	F8	F3
P1	K8	A2	S41	I8	F3
P2	A6	B4	S42	F8	F4
P2	K2	B4	S43	I8	F4
			S44	D8	G5
S1	C6	A3	S45	E8	G2
S2	C6	A3	S46	E8	G3
S3	C7	A3	S47	D8	G3
S4	C7	A3	S48	E8	G4
S5	D6	B3	S49	D8	G4
S6	D6	B3	S50	J8	G2
S7	D7	B4	S51	J8	G3
S9	I6	B3	S52	C8	G3
S10	I6	B3	S53	J8	G4
S11	I7	B4	S54	C8	G4



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FRONT PANEL KEYBOARD - DISPLAY ◇1 A7

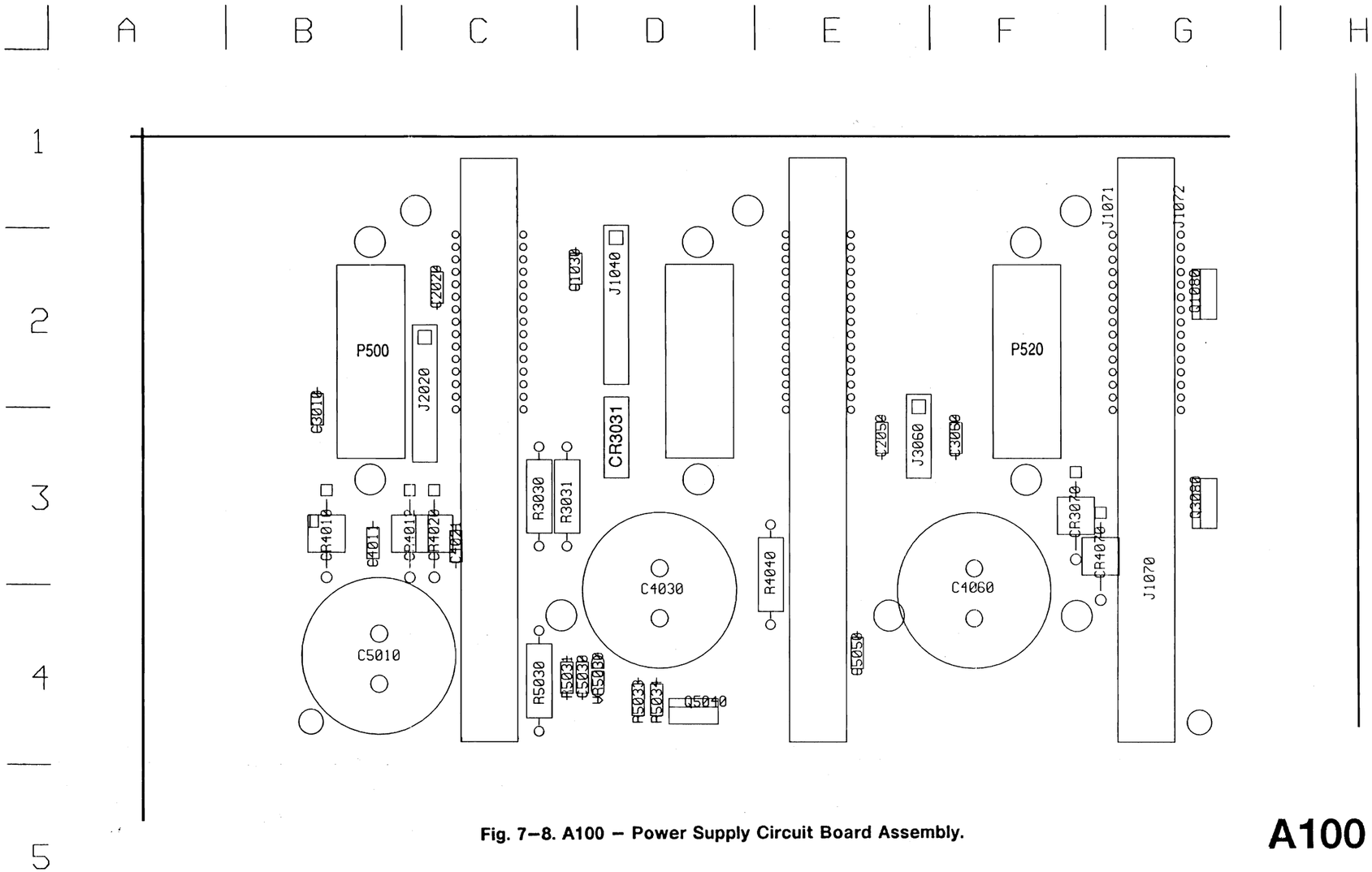


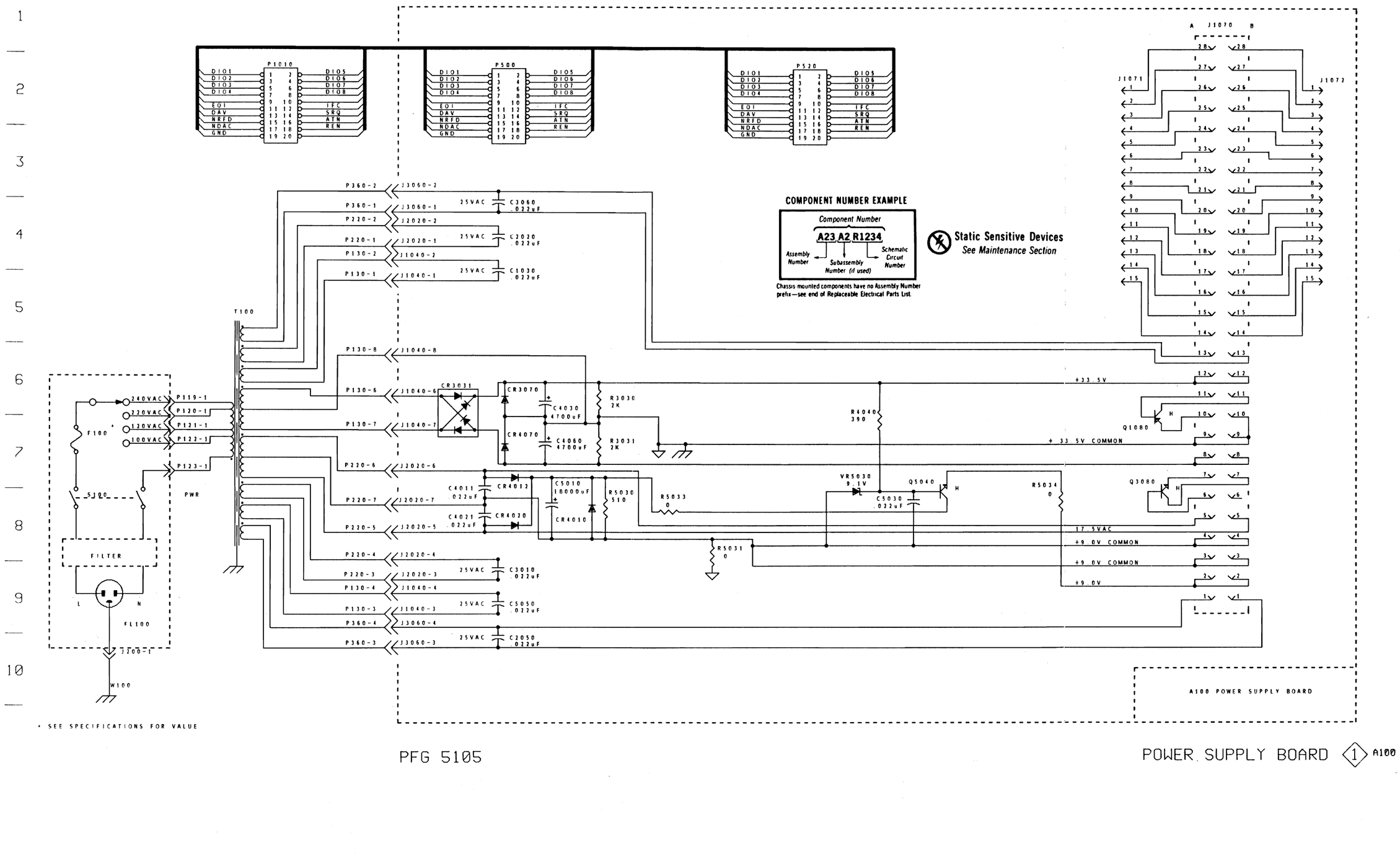
Fig. 7–8. A100 – Power Supply Circuit Board Assembly.

A100

Table 7-1 (A100)

POWER SUPPLY BOARD ◇1◇ A100 - POWER SUPPLY BD, ASSEMBLY A100

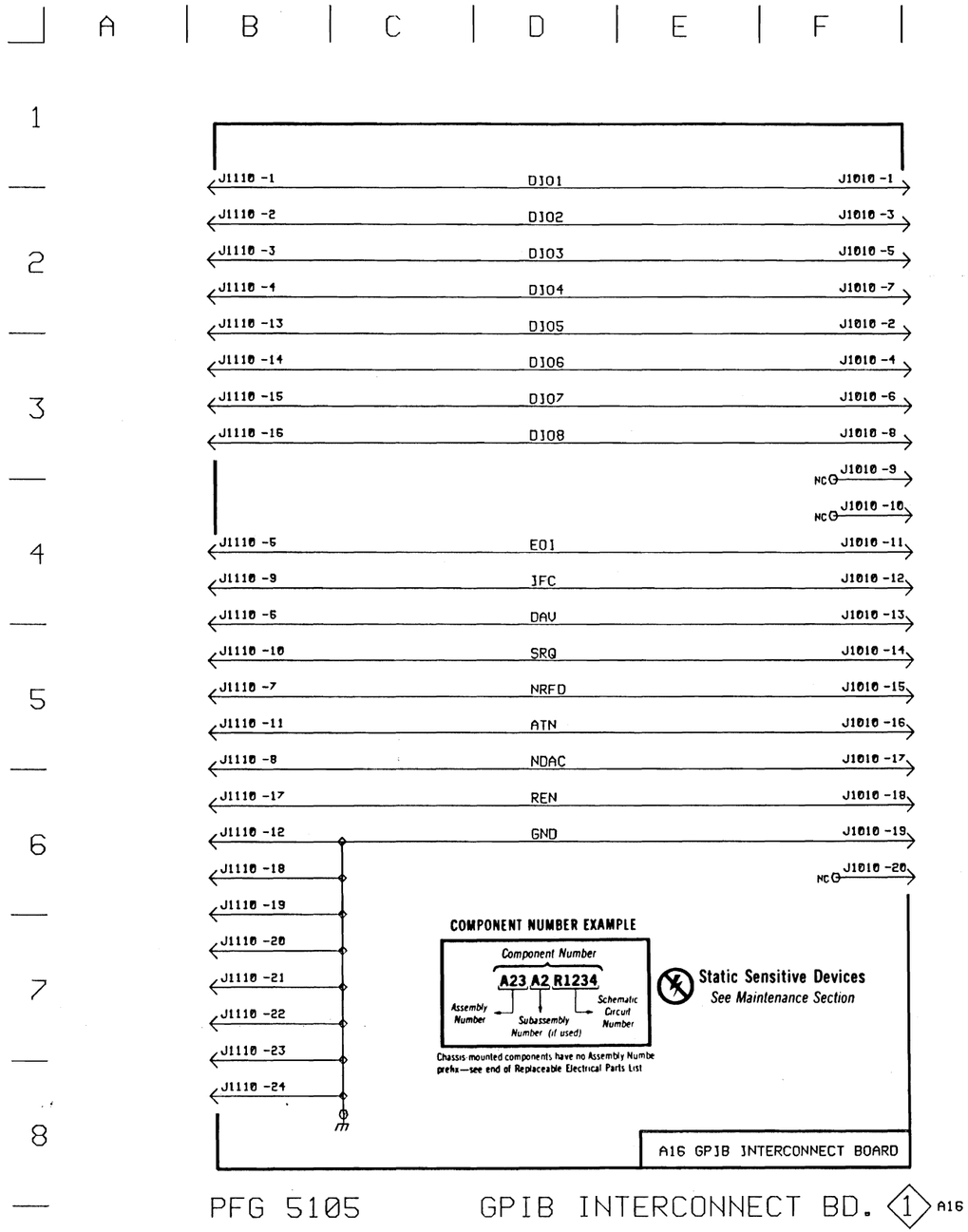
CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEMATIC LOCATION	BOARD LOCATION
C1030	G4	C2	P520	L2	F2
C2020	G4	C2			
C2050	G10	E3	Q1080	P7	G2
C3010	G9	B2	Q3080	P8	G3
C3060	G4	F3	Q5040	M8	D4
C4011	G8	B3			
C4021	G8	C3	R3030	I6	C3
C4030	H6	D4	R3031	I7	C3
C4060	H7	F3	R4040	L6	E3
C5010	H8	B4	R5030	I8	C4
C5030	M8	D4	R5031	J8	C4
C5050	G9	E4	R5033	J8	D4
			R5034	O8	D4
CR3031	G6	D3			
CR3070	G6	F3	VR5030	L8	D4
CR4010	I8	B3			
CR4012	G7	C3	F100	A7	OFF BD.
CR4020	G8	C3			
CR4070	G7	F3	FL100	B9	OFF BD.
J1040	F4	D2	J200	B10	OFF BD.
J1040	F6	D2			
J1040	F9	D2	P1010	D2	OFF BD.
J1070	Q1	G3	P119	C6	OFF BD.
J1071	P2	G1	P120	C6	OFF BD.
J1072	R2	G1	P121	C7	OFF BD.
J2020	F4	C2	P122	C7	OFF BD.
J2020	F7	C2	P123	C7	OFF BD.
J3060	F10	E3			
J3060	F4	E3	S100	A8	OFF BD.
P500	G2	B2	T100	D5	OFF BD.



* SEE SPECIFICATIONS FOR VALUE

PFG 5105

POWER SUPPLY BOARD ⟨1⟩ A100



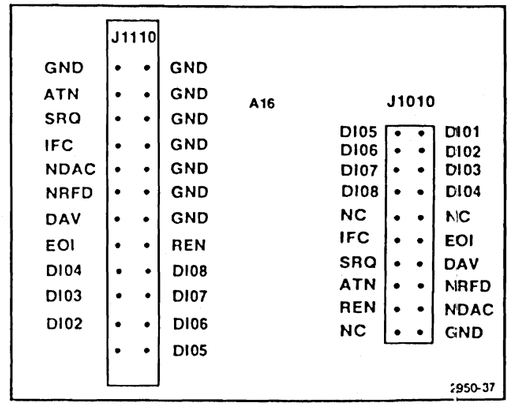


Fig. 7–9. A16 – GPIB Interconnect Circuit Board Assembly.

REPLACEABLE MECHANICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

ITEM NAME

In the Parts List, an item Name is separated from the description by a colon(:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations.

INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. Following is an example of the indentation system used in the description column.

1 2 3 4 5 Name & Description

Assembly and/or Component
Attaching parts for Assembly and/or Component

END ATTACHING PARTS

Detail Part of Assembly and/or Component
Attaching parts for Detail Part

END ATTACHING PARTS

Parts of Detail Part
Attaching parts for Parts of Detail Part

END ATTACHING PARTS

Attaching Parts always appear in the same indentation as the item it mounts, while the detail parts are indented to the right. Indented items are part of, and included with, the next higher indentation.

Attaching parts must be purchased separately, unless otherwise specified.

ABBREVIATIONS

Abbreviations conform to American National Standards Institute Y1.1

CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
00779	AMP INC	2800 FULLING MILL PO BOX 3608	HARRISBURG PA 17105
07416	NELSON NAME PLATE CO	3191 CASITAS	LOS ANGELES CA 90039-2410
12327	FREEWAY CORP	9301 ALLEN DR	CLEVELAND OH 44125-4632
73743	FISCHER SPECIAL MFG CO	111 INDUSTRIAL RD	COLD SPRING KY 41076-9749
74932	INDUSTRIAL SPECIALTIES, INC.		WARREN, MI 48091
78189	ILLINOIS TOOL WORKS INC SHAKEPROOF DIV	ST CHARLES ROAD	ELGIN IL 60120
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON OR 97077-0001
83309	ELECTRICAL SPECIALITY CO SUB OF BELDEN CORP	345 SWIFT AVE	SOUTH SAN FRANCISCO CA 94080-6206
83385	MICRODOT MFG INC GREER-CENTRAL DIV	3221 W BIG BEAVER RD	TROY MI 48098
86928	SEASTROM MFG CO INC	701 SONORA AVE	GLENDALE CA 91201-2431
93907	TEXTRON INC CAMCAR DIV	600 18TH AVE	ROCKFORD IL 61108-5181
TK0435	LEWIS SCREW CO	4300 S RACINE AVE	CHICAGO IL 60609-3320
TK0858	STAUFFER SUPPLY CO (DIST)	810 SE SHERMAN	PORTLAND OR 97214
TK1569	GERHART TOOL AND DIE	1116 W ISABEL ST	BURBANK CA 91506

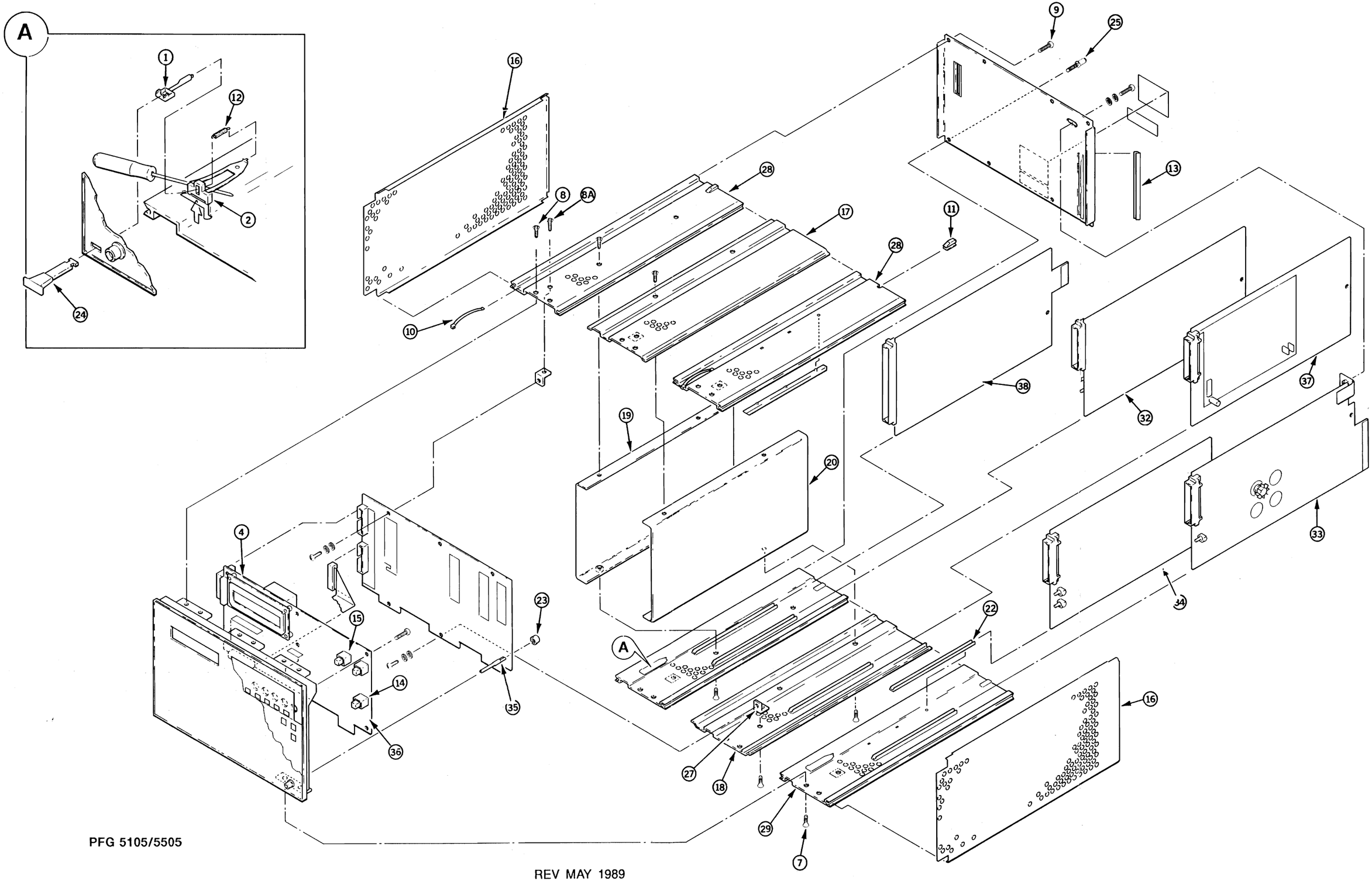
PLUG-IN

FIG. & INDEX NO.	TEKTRONIX PART NO.	SERIAL NO. EFFECTIVE	SERIAL NO. DISCONT.	QTY	NAME & DESCRIPTION	MFR CODE	Mfr. Part No.
-----	070-7331-xx			1	Manual, Instruction (not shown)	80009	070-7331-xx
-----	070-7329-xx			1	Instrument I/f Guide (not shown)	80009	070-7329-xx
-----	070-7330-xx			1	Reference Guide (not shown)	80009	070-7330-xx
1-1	105-0865-00			2	Bar, Latch Release	80009	105-0865-00
1-2	105-0866-00			2	Latch, Retaining	80009	105-0866-00
-----	146-0071-00			1	Battery, Lithium (not shown)	80009	146-0071-00
1-4	150-1206-00			1	Display, Liquid Xtal	80009	150-1206-00
-----	159-0107-00			1	Fuse, Cartridge, 2A (not shown)	80009	159-0107-00
-----	159-0302-00			2	Fuse, Cartridge, 1A slow (not shown)	80009	159-0302-00
1-7	211-0507-00			6	Screw, 6/32 x 0.188	80009	211-0507-00
1-8	211-0541-00			12	Screw, 6/32 x 0.250	80009	211-0541-00
1-88	211-0105-00			14	Screw, 4-40 x 0.188 Flat,100 Deg,Poz	80009	211-0105-00
1-9	213-0868-00			6	Screw, 6/32 x 0.375	80009	213-0868-00
1-10	214-1061-00			2	Contact, Elec.	80009	214-1061-00
1-11	214-3089-00			1	Lockout, Plug-In	80009	214-3089-00
1-12	214-3143-00			2	Spring, Helical	80009	214-3143-00
1-13	255-0581-00			0.8ft	Plastic Channel	80009	255-0581-00
1-14	260-2455-00			32	Switch, Pushbutton	80009	260-2455-00
1-15	260-2454-01			19	Switch, PSHBTN, Illuminated	80009	260-2454-01
1-16	337-2665-00			2	Shield, Elec, Side	80009	337-2665-00
1-17	337-3453-00			1	Shield, Elec. Top Center	80009	337-3453-00
1-18	337-3454-00			1	Shield, Elec. Btm Center	80009	337-3454-00
1-19	337-3424-00			1	Shield, Elec, CPU - Pulse	80009	337-3424-00
1-20	337-3478-01			1	Shield, Internal	80009	337-3478-01
-----	348-0012-00			1	Grommet, Rubber (not shown)	80009	348-0012-00
1-22	351-0604-00			10	Guide, CKT BD., PL	80009	351-0604-00
1-23	351-0698-00			5	Guide, Connector	80009	351-0698-00
1-24	366-1851-01			2	Knob, Latch	80009	366-1851-01
1-25	386-3657-01			1	Support, Plug-In	80009	386-3657-01
-----	210-1365-00			1	Washer, Flat, 0.141 ID X 0.266 OD X 0.5 (not shown)	80009	210-1365-00
1-27	386-4212-00			6	Support, Ckt Board	80009	386-4212-00
1-28	426-2227-00			2	Frame Sect., Top	80009	426-2227-00
1-29	426-2230-00			2	Frame Sect., Bottom	80009	426-2230-00
-----	131-0106-00			6	Connector, BNC (not shown)	80009	131-0106-00
-----	210-0207-00			6	Lug, Solder, Ground (not shown)	80009	210-0207-00

FIG. & INDEX NO.	TEKTRONIX PART NO.	SERIAL NO EFFECTIVE	SERIAL NO DISCONT.	QTY	NAME & DESCRIPTION	MFR CODE	Mfr. Part No.
					PLUG-IN		
	CIRCUIT BOARDS:						
1-32	----- -----			-	Ckt Board Assy:Pulse Board(see A2 REPL)		
1-33	----- -----			-	Ckt Board Assy:Output Board(see A4 REPL)		
1-34	----- -----			-	Ckt Board Assy:Analog Board(see A5 REPL)		
1-35	----- -----			-	Ckt Board Assy:Interconnect Board (see A6 REPL)		
1-36	----- -----			-	Ckt Board Assy:Keyboard, PFG Board (see A7 REPL)		
1-37	----- -----			-	Ckt Board Assy:Synthesizer Board (see A3 REPL)		
1-38	----- -----			-	Ckt Board Assy:CPU Board(see A1 REPL)		
	CUSTOMER SERVICE KITS:						
---	118-8366-00			1	Front Panel Assembly (not shown) Includes: 1 ea Subpanel, Front 1 ea Overlay, Front Panel PFG 6 ea BNC Cable Clamp 6 ea BNC Connector	80009	118-8366-00
---	386-5644-02			1	Rear Panel Assembly (not shown) Includes: 1 ea Rear Panel 2 ea Labels 0.8 ft Channel, Plastic	80009	386-5644-02
---	118-8367-00			1	Cable Kit (not shown) Includes: 3 ea Coax RG 174, 7 cm long 1 ea Coax RG 174, 9 cm long 2 ea Coax RG 174, 11 cm long 1 ea FLA Cable, 20 wires, 3 cm long 1 ea FLA Cable, 20 wires, 7 cm long	80009	118-8367-00
---	118-8360-00			1	ECB Extender, Analog (not shown)	80009	118-8360-00
---	118-8361-00			1	ECB Extender, AKB/PLS (not shown)	80009	118-8361-00
---	118-8362-00			1	ECB Extender, Output (not shown)	80009	118-8362-00
---	118-8363-00			1	ECB Extender, CPU (not shown)	80009	118-8363-00
	OPTIONAL ACCESSORIES:						
---	200-3554-00			1	Dust Cover (not shown)	80009	200-3554-00
---	016-0620-00			1	Rain Cover (not shown)	80009	016-0620-00
---	016-0351-00			1	Accessory Pouch (not shown)	80009	016-0351-00
---	016-0565-01			1	Carrying Case (not shown)	80009	016-0565-01

POWER SUPPLY

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1-1	426-2289-00			1	FRAME PNL,CAB.:	80009	426-2289-00
					ATTACHING PARTS		
-2	211-0503-00			6	SCREW,MACHINE:6-32 X 0.188,PNH,STL	93907	ORDER BY DESCR
					END ATTACHING PARTS		
-3	361-1507-00			1	SPACER,MTG:7.8 L X 0.7 W X 0.063 THK	80009	361-1507-00
					ATTACHING PARTS		
-4	213-0107-00			2	SCREW,TPG,TF:4-40 X 0.25,TYPE C,FLH,100 DEG	83385	ORDER BY DESCR
					END ATTACHING PARTS		
-5	334-7567-00			1	MARKER,IDENT:MKD PFG5505	07416	ORDER BY DESCR
-6	334-7342-00			1	MARKER,IDENT:MARKED TEKTRONIX,HANDLE	80009	334-7342-00
-7	348-1068-00			2	FOOT,HANDLE:NON SKID	80009	348-1068-00
-8	367-0398-00			1	HANDLE,GRIP:LEXAN	80009	367-0398-00
					ATTACHING PARTS		
-9	211-0467-00			2	SCREW,MACHINE:6-32 X 1.0,FILLISTER HEAD	80009	211-0467-00
					END ATTACHING PARTS		
-10	367-0397-00			2	ARM,PIVOT:HANDLE	80009	367-0397-00
					ATTACHING PARTS		
-11	212-0144-00			2	SCREW,TPG,TF:8-16 X 0.562 L,PLASTITE	93907	225-38131-012
					END ATTACHING PARTS		
-12	348-0430-00			4	BUMPER,PLASTIC:BLACK POLYURETHANE	74932	SJ5027
-13	200-3646-00			1	COVER,PLUG-IN:POWER SUPPLY,ALUMINUM	80009	200-3646-00
					ATTACHINAG PARTS		
-14	211-0504-00			2	SCREW,MACHINE:6-32 X 0.250,PNH,STL	TK0435	ORDER BY DESCR
-15	212-0023-00			4	SCREW,MACHINE:8-32 X 0.375,PNH,STL	93907	ORDER BY DESCR
					END ATTACHING PARTS		
-16	----- -----			1	TRANSFORMER,PWR: (SEE T100 REPL)		
					ATTACHING PARTS		
-17	210-0586-00			1	NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	78189	211-041800-00
					END ATTACHING PARTS		
-18	212-0515-00			4	SCREW,MACHINE:10-32 X 2.25,HEX HD,STL	93907	ORDER BY DESCR
-19	210-0805-00			4	WASHER,FLAT:0.204 ID X 0.438 OD X 0.032,STL	12327	ORDER BY DESCR
-20	210-0812-00			4	WASHER,FLAT:0.188 ID X 0.375 OD X 0.31	83309	ORDER BY DESCR
-21	166-0227-00			4	INSUL SLVG,ELEC:0.187 ID X 1.5 L,MYLAR	80009	166-0227-00
-22	407-3420-00			2	BRACKET,CLAMP:TRANSISTOR	80009	407-3420-00
					ATTACHING PARTS		
-23	211-0012-00			3	SCREW,MACHINE:4-40 X 0.375,PNH,STL	93907	ORDER BY DESCR
-24	211-0025-00			6	SCREW,MACHINE:4-40 X 0.375,FLH,100 DEG,STL	TK0435	ORDER BY DESCR
					END ATTACHING PARTS		
-25	----- -----			1	CIRCUIT BD ASSY:GPIB CONN (SEE A2 REPL)		
-26	210-0202-00			1	.TERMINAL,LUG:0.146 ID,LOCKING,BRZ TIN PL	86928	A-373-158-2
-27	210-0586-00			4	.NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	78189	211-041800-00
-28	214-3312-00			1	.HARDWARE KIT:JACKSOCKET FOR GPIB	00779	552633-4
	386-5949-00			1	.PLATE,ADAPTER:ALUMINUM	80009	386-5949-00
-29	174-1709-00			1	CA ASSY,SP,ELEC:20 COND,12.4 L,RIBBON	80009	174-1709-00
					ATTACHING PARTS		
-30	211-0295-00			4	SCREW,SHOULDER:2-56 X 0.54,HEX HD,STL	80009	211-0295-00
-31	210-0405-00			4	NUT,PLAIN,HEX:2-56 X 0.188,BRS CD PL	73743	12157-50
-32	210-0054-00			4	WASHER,LOCK:#4 SPLIT,0.025 THK STL	78189	ORDER BY DESCR
-33	210-0850-00			4	WASHER,FLAT:0.093 ID X 0.281 OD X 0.02,STL	12327	ORDER BY DESCR
					END ATTACHING PARTS		
-34	----- -----			1	CIRCUIT BD ASSY:PWR SPLY (SEE A1 REPL)		
					ATTACHING PARTS		
-35	211-0008-00			6	SCREW,MACHINE:4-40 X 0.25,PNH,STL	93907	ORDER BY DESCR
					END ATTACHING PARTS		
					CIRCUIT BD ASSY INCLUDES:		
-36	214-1593-02			3	.KEY,CONN PLZN:CKT BOARD CONN	80009	214-1593-02
-37	129-0160-00			6	.SPACER,POST:0.25 L,4-40 THRU,BRS	80009	129-0160-00
-38	348-0640-00			6	GROMMET,PLASTIC:BLACK,ROUND,0.188 ID	80009	348-0640-00
-39	214-3026-00			6	SPRING,GROUND:CU BE	TK1569	ORDER BY DESCR
-40	334-3379-04			1	MARKER,IDENT:MKD GROUND SYMBOL (12)	80009	334-3379-04
-41	348-0430-00			4	BUMPER,PLASTIC:BLACK POLYURETHANE	74932	SJ5027
-42	119-3358-00			1	FUSE DRAWER:VOLTAGE SELECTOR	80009	119-3358-00
-43	211-0025-00			2	SCREW,MACHINE:4-40 X 0.375,FLH,100 DEG,STL	TK0435	ORDER BY DESCR
-44	210-0586-00			2	NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	78189	211-041800-00
-45	210-0586-00			1	NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	78189	211-041800-00
-46	342-0860-00			3	INSULATOR,XSTR:POLYSULFONE,BLACK OR NATURAL	80009	342-0860-00
-47	211-0244-00			2	SCR,ASSEM WSHR:4-40 X 0.312,PNH STL	TK0858	211-0244-00
-48	441-1910-00			1	CHAS,PWR SUPPLY:ALUMINUM	80009	441-1910-00



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REV MAY 1989

Fig. 1. Plug In Exploded View

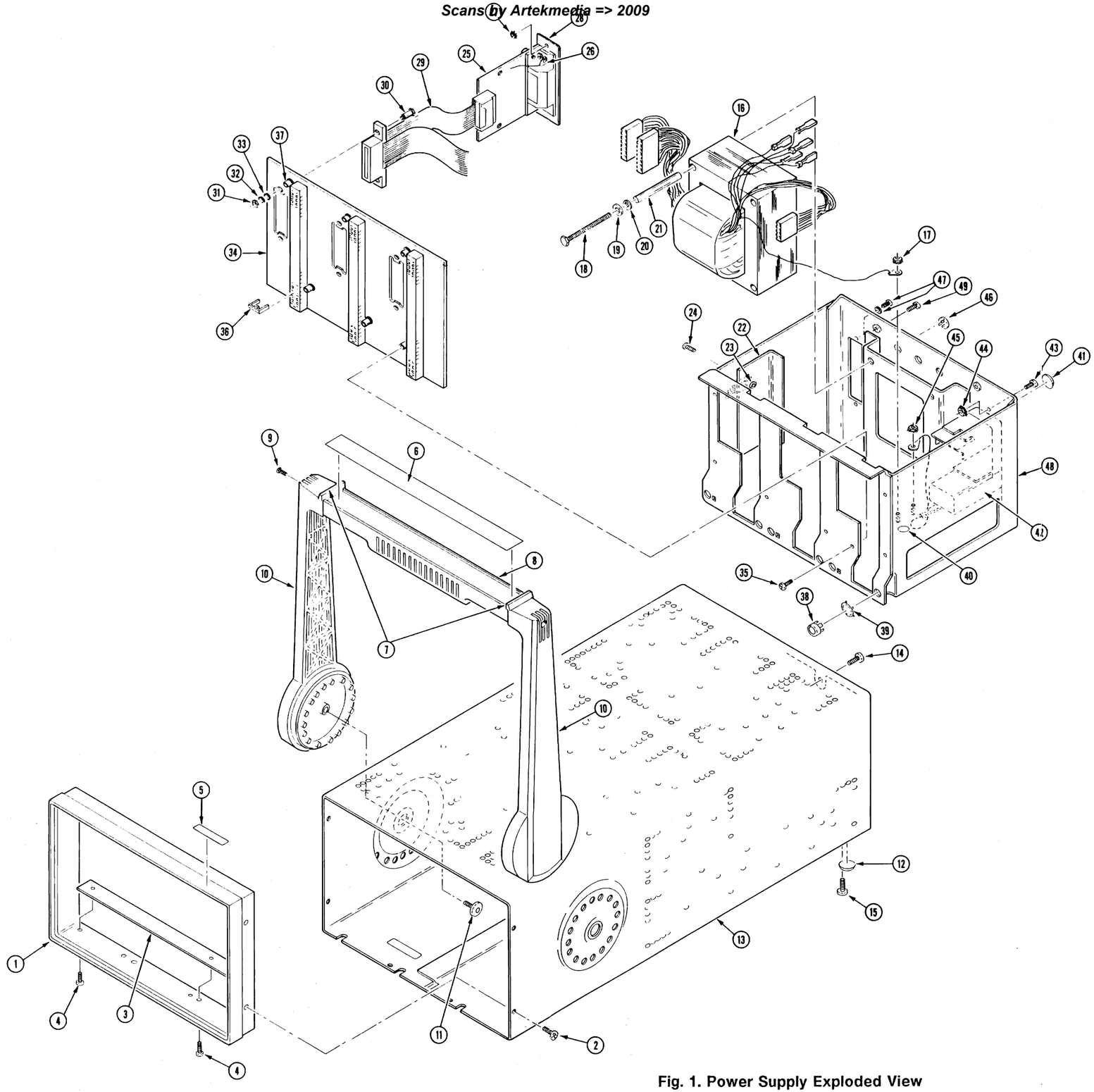

Fig. 1. Power Supply Exploded View

MANUAL CHANGE INFORMATION

At Tektronix, we continually strive to keep up with latest electronic developments by adding circuit and component improvements to our instruments as soon as they are developed and tested.

Sometimes, due to printing and shipping requirements, we can't get these changes immediately into printed manuals. Hence, your manual may contain new change information on following pages.

A single change may affect several sections. Since the change information sheets are carried in the manual until all changes are permanently entered, some duplication may occur. If no such change pages appear following this page, your manual is correct as printed.

Tektronix®
COMMITTED TO EXCELLENCE

MANUAL CHANGE INFORMATION

Date: Apr 27, 1989 Change Reference: C1/0489

Product: PFG 5105/5505 Prog Pulse/Function Generator Manual Part No: 070-7332-00

DESCRIPTION

For all Serial Numbers, please make the following changes:

Section 8

REPLACEABLE MECHANICAL PARTS

Change:

Page 8-3

1-8A	14	211-0105-00	Screw, 4-40 x 0.188 Flat,100 Deg,Poz