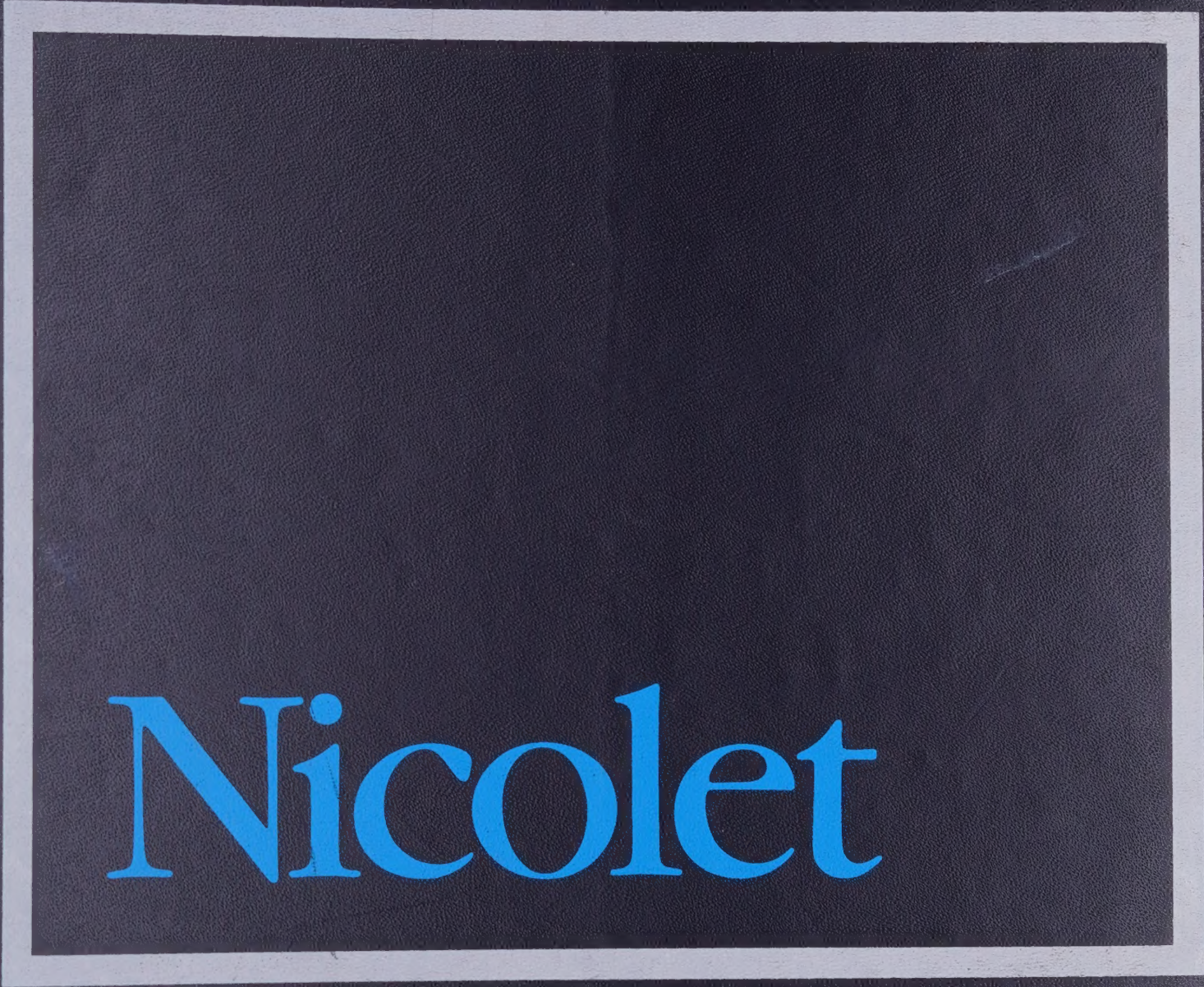




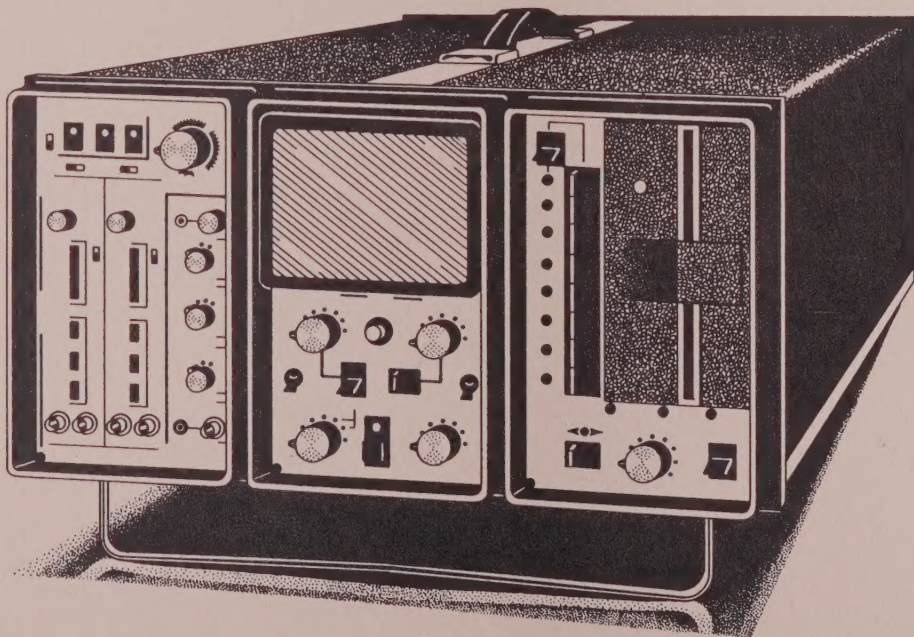
Nicolet

Digital
Oscilloscope

WE Nicolet

SERVICE MANUAL

SERIES 2090 DIGITAL OSCILLOSCOPES





Digitized by the Internet Archive
in 2024

https://archive.org/details/manualsplus_01928

TABLE OF CONTENTS

CONTENTS -----	1	NOTES -----	6
INTRODUCTION -----	2	DIAGRAM MNEMONICS -----	7
SPECIFICATIONS -----	3	SIGNAL FLOW -----	8
ASSEMBLY IDENTIFICATION -----	4	RENEWAL PARTS LIST -----	9
CALIBRATION PROCEDURES -----	5	DIAGRAMS -----	10

INTRODUCTION

WARNING: The service instructions in this manual are intended for qualified personnel only. High voltages exist within this instrument.

► **IMPORTANT:** Read each procedure before servicing this instrument. If any questions arise, contact -

Nicolet Instrument Corporation
Oscilloscope Division, Service Dept.
Madison, Wisconsin 53711
Telephone (608) 271-3333

The general descriptions beginning on page 2-5 describe the basic front panel controls.

Refer to the 2090 Operation Manual if detailed descriptions are required.

CAUTION: Refer to the Power Requirements, page 2-2 before applying power to this instrument.

► **IMPORTANT:** The LIVE button should be pressed after changing a plug-in front panel control setting.

POWER REQUIREMENTS

The Model 2090 Digital Oscilloscope is designed to operate from any of these four single phase power source voltages: 101, 115, 202, 230 volts AC, all $\pm 10\%$.

The allowable power line frequency is 50-60 Hz $\pm 5\%$.

The power source must include:

- #1. A neutral wire at or near ground potential.
- #2. A separate safety ground at ground potential.
- #3. A line (hot) wire.

Figure 2-1 illustrates the locations of the neutral, line, and earth ground terminals located on the male power connector at the rear of the 2090.

WARNING: Inspect the voltage selection switch (Figure 2-2) at the rear of this instrument for the correct setting BEFORE applying power. Use Table 2-1 to verify the correct setting.

INPUT VOLTAGE RANGE	LEFT SWITCH POSITION	RIGHT SWITCH POSITION
101 $\pm 10\%$	Right	Left
115 $\pm 10\%$	Left	Left
202 $\pm 10\%$	Right	Right
230 $\pm 10\%$	Left	Right

Table 2-1

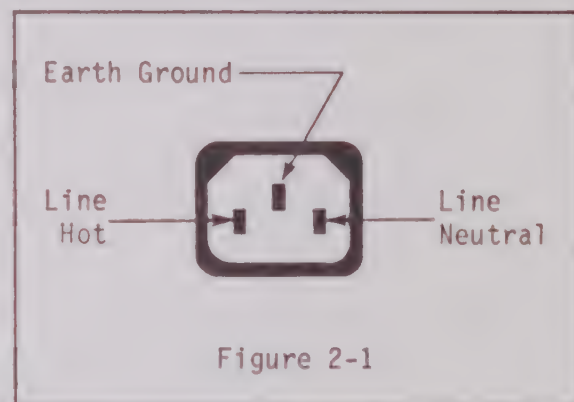


Figure 2-1

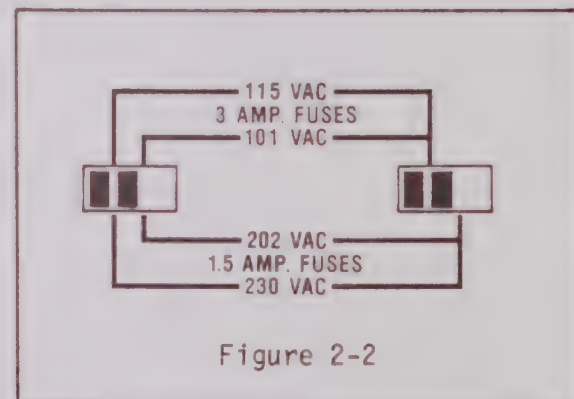


Figure 2-2

THE FUSES

Table 2-2 tabulates the required slow-blow fuses for the input power range being used.

INPUT VOLTAGE RANGE	REQUIRED SLOW-BLOW FUSE SIZES FOR VOLTAGE RANGE SELECTED
101 $\pm 10\%$	3.0 amperes
115 $\pm 10\%$	3.0 amperes
202 $\pm 10\%$	1.5 amperes
230 $\pm 10\%$	1.5 amperes

Table 2-2

THERMAL CUT-OUT

In the event of excessive temperature, power is shut off automatically. It will return after the temperature returns to a safe level.

► **IMPORTANT:** The power cutoff is slow acting. It is not designed to guard against overheating due to high storage temperatures followed by operation before the internal chassis has cooled to within the recommended operating environmental temperature.

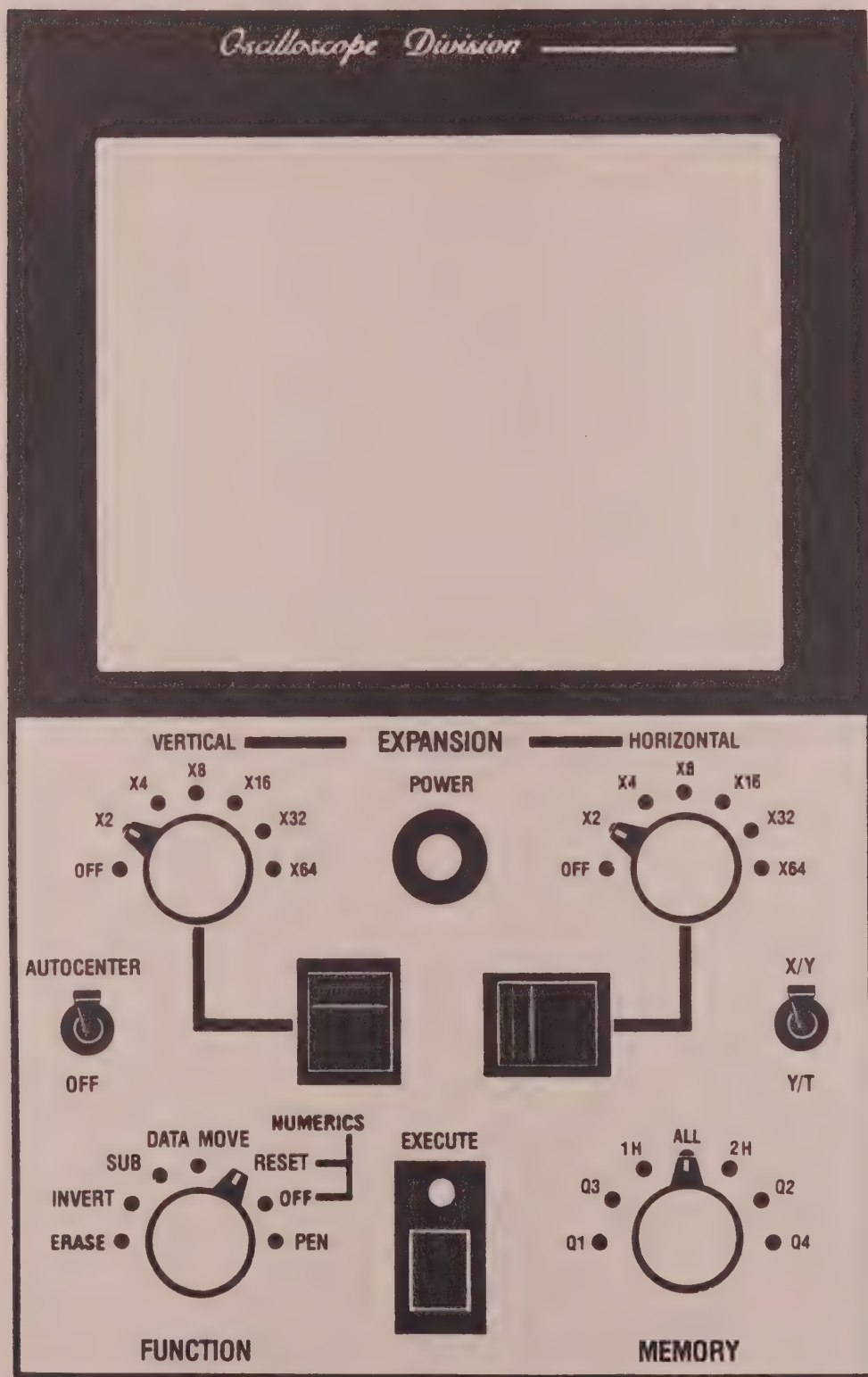
ENVIRONMENT

This instrument may be operated at air temperatures ranging from 0°C to 33°C.

To operate at air temperatures ranging from 0°C to 45°C, reduce the incoming AC voltage 9% from the nominal input.

The 2090 may be stored at temperatures ranging from -55°C to +70°C.

Mainframe



INTRODUCTION

The Mainframe includes a display memory, display screen and various controls to manipulate the display screen components.

➤ **IMPORTANT:** When using the Model 201 Plug-in, the mainframe's MEMORY switch must be in either the ALL, 1H, or 2H position when recording data.

NOTE: To simplify the following discussions, the number of addresses (words) that can be stored in the display memory will be rounded off as follows -

- 4,096 words = (4K)
- 2,048 words = (2K)
- 1,024 words = (1K)

➤ **IMPORTANT:** The term "Hold Mode" will be used to indicate that the plug-in is in the Hold Last mode, (Live and Hold Next LEDs off, Hold Last LED illuminated).

MAINFRAME FEATURES

- Horizontal expansion of up to X64.
- Vertical expansion of up to X64.
- Autocentering
- Choice of XY or YT displays.
- 4096 word, 12 bit display memory which can be left intact or divided into halves or quarters.
- Multiple function abilities; including arithmetic manipulations and pen recording outputs.

POWER SWITCH

Press the Power switch to apply or remove power from the oscilloscope.

WARNING: Before applying power to this instrument, refer to page 2-2.

VERTICAL EXPANSION SWITCH

Vertically expands the displayed waveform by up to 64 times.

HORIZONTAL EXPANSION SWITCH

Horizontally expands the displayed waveform by up to 64 times.

CURSOR PADDLES

Reposition the displayed waveform and/or cursors on the screen.

AUTOCENTER SWITCH

The waveform passes through screen center when Autocenter is combined with Vertical and Horizontal Expansion. The crosshair traces the waveform when Autocenter is used without expansion.

XY/YT SWITCH

XY - One waveform is displayed as a function of another, (voltage vs. voltage).

YT - Displays waveforms as voltage functions of time, (voltage vs time).

MEMORY SWITCH

Determines the display memory size that will record signals, and which waveform(s) will be displayed.

ALL ----- 4,096 (4K) words.

1H,2H ----- 2,048 (2K) words, each.

Q1,Q2,Q3,Q4 - 1,024 (1K) words, each.

NOTE: The 201 plug-in must be in the ALL, 1H, or 2H position when recording signals.

FUNCTION SWITCH

The EXECUTE button must be pressed, unless otherwise noted, before the selected function will be performed.

ERASE - Clears the screen of "clutter" after powering up.

INVERT - Multiplies the displayed waveform by (-1).

SUB - Subtracts one waveform from another. Can also be used to "add" two waveforms by INVERTING one of the waveforms before executing the SUB function.

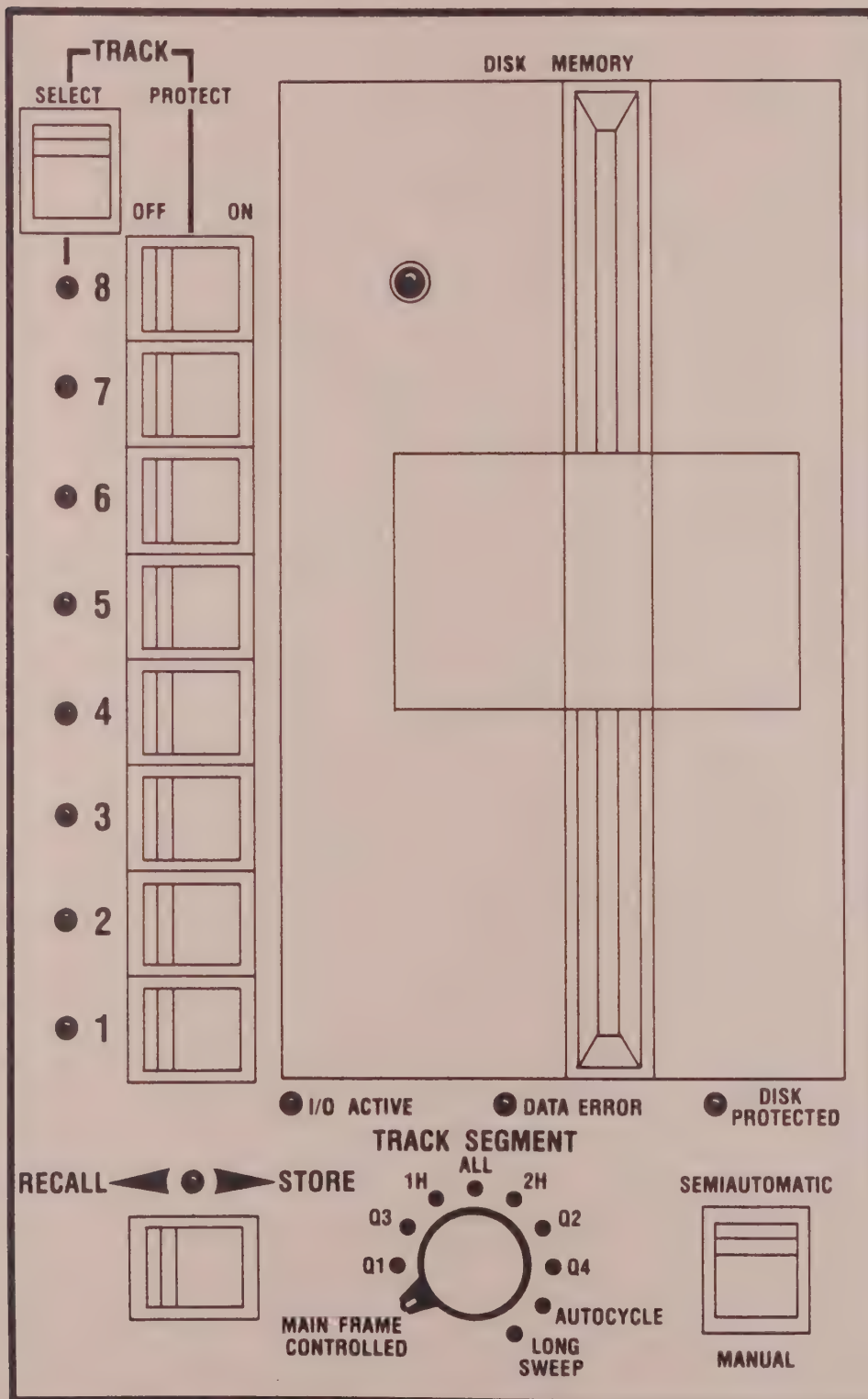
DATA MOVE - Vertically repositions a selected waveform to the level of the horizontal cursor. All other data points shift by the same amount.

RESET NUMERICS - Resets the voltage-time origins (0,0) to any point on the screen selected by the crosshair. Usually used in combination with Autocenter, selecting a specific data point to become the new (0,0) origins.

NUMERICS OFF - Removes the time and voltage numerics from the screen. It is not necessary to press the Execute button.

PEN - Initiates a pen recording output

Disk Recorder



INTRODUCTION

The optional magnetic disk recorder records waveforms on floppy disks for later recall.

WARNING: To guard against physical damage to the disk heads and/or diskette, ALWAYS open the drive's door when:

- a. Power is turned off,
- b. Applying/removing power,
- c. The drive is not in use,
- d. Transporting the instrument.

DISK RECORDER FEATURES

- Media: 5-1/4" floppy diskette, single-sided, single-density, soft-sectored, 48 TPI.
- Capacity: Eight 4K, sixteen 2K, or thirty-two 1K records per diskette.
- Protection: Specific tracks or entire diskette write protection.
- Autocycle: Automatic, consecutive capture-and-store of up to 32 waveforms.
- Long Sweep: Continuous recording of up to 32K of data at sweep speeds of 500 microseconds per point, or slower.

NOTE: Long sweeps are available on 2090-3C units using all plug-in models except the Model 204-A plug-in.

MEMORY SWITCH (Mainframe Front Panel)

Determines whether the selected diskette track will remain intact (ALL), or divide into either "halves" (1H or 2H) or "quarters" (Q1, Q2, Q3, or Q4) when the Track Segment switch is in the Mainframe Controlled position.

The MEMORY switch is located on the Mainframe's Front Panel.

TRACK SEGMENT SWITCH

Selects the AUTOCYCLE mode, LONG SWEEP mode, or diskette track size.

NOTE: Always select equal sizes on the mainframe's MEMORY switch and TRACK SEGMENT switch. For example, if the TRACK SEGMENT switch is in the 1H position, the MEMORY switch should be placed to either 1H or 2H.

The mainframe's MEMORY switch determines the track's segment size when the TRACK SEGMENT switch is in the Mainframe Controlled position.

RECALL/STORE SWITCH

RECALL: Recalls data from the diskette for display when pressed to the left (Recall) position. The LED illuminates during the transfer.

STORE: Stores the displayed data on the diskette when pressed to the right (Store) position. The LED illuminates during the transfer.

SEMIAUTOMATIC/MANUAL SWITCH

SEMIAUTOMATIC: Data is automatically recorded onto the diskette each time the plug-in enters the Hold Mode, (Hold Last LED illuminated only).

MANUAL: Data is recorded onto the diskette only when the RECALL/STORE switch is pressed to the Store position. NOTE: The plug-in must be in the Hold Mode, (Hold Last LED illuminated only).

TRACK SELECT SWITCH

Increments/decrements the diskette to the desired track number for the next store/recall operation. The green LEDs identify which track has been selected.

TRACK PROTECT SWITCHES

Individual tracks are protected by placing the associated switch to the ON position. Data can be replaced by new data when the switch is left in the OFF position.

I/O ACTIVE LED

Illuminates when the input/output circuits of the oscilloscope are busy. The disk recorder cannot be manually operated when the I/O Active LED is illuminated.

DATA ERROR LED

Illuminates when the disk recorder circuits sense a data error.

NOTE: Data errors are rare and are not always detectable. Valuable data should be visually examined after a Data Error has occurred. If a data error occurs, it is advisable to replace the diskette.

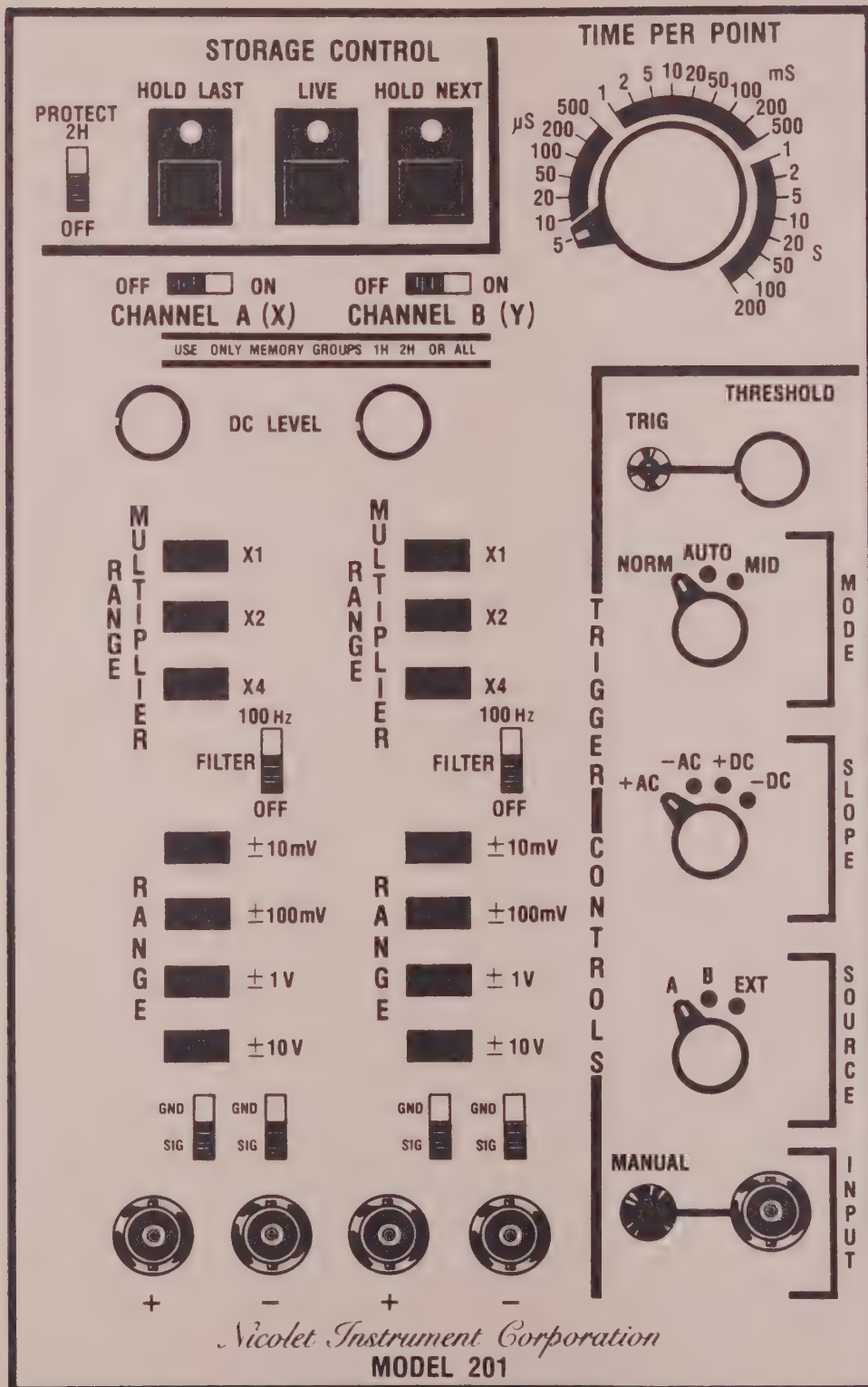
DISK PROTECTED LED

Illuminates when a "protect" tab is affixed over the rectangular notch at the top of the diskette. Data cannot be recorded onto the diskette unless the tab is removed.

UNLABELED LED ON DISK DRIVE

Illuminates when the recorder is storing/recalling data from the diskette.

Model 201 Plug-in



INTRODUCTION

The Model 201 Plug-in is designed for low frequency, high sensitivity measurements.

► **IMPORTANT:** The mainframe's Memory switch must be in the ALL, H1, or H2 position to acquire data. The quarters positions (Q1, Q2, Q3, and Q4) can only be used to display stored waveforms.

MODEL 201 PLUG-IN FEATURES

- Two 12-bit, 200 Kiloherzt digitizers.
 - High impedance, differential amplifiers.
 - 4K word memory.
 - Positive or negative triggering.
 - Normal or Mid trigger displays.
 - Protect mode to compare "live" and "saved" signals.
 - Remote control abilities.
-

STORAGE CONTROL BUTTONS

The Storage Control buttons determine whether the displayed data will remain "live" or be stored in the display memory.

LIVE - New signals are acquired and displayed on the screen each time a valid trigger is received.

HOLD NEXT - The signal following the next valid trigger (after Hold Next is pressed) is stored in memory and displayed on the screen.

HOLD LAST - The signal that followed the last valid trigger (before the Hold Last button is pressed) is stored in memory and displayed on the screen. A signal already being acquired when the button is pressed is held in memory.

CHANNEL SWITCH

Selecting the ON position allows the channel to acquire data and display it on the screen.

NOTE: The mainframe's Memory switch must be in the ALL, H1, or H2 position.

PROTECT SWITCH

Allows the operator to compare "live" and "saved" signals in the Live mode.

NOTE: The mainframe's Memory switch must be in the "ALL" position.

TIME PER POINT SWITCH

Selects the time resolution of the signal to be acquired.

Sweep speeds are expressed as time-per-point rather than time-per-centimeter.

VOLTAGE RANGE BUTTONS

Allows the oscilloscope to accept input signals ranging from +10 millivolts to +40 volts full scale.

DC LEVEL CONTROL

Vertically positions the displayed signal on the screen by introducing a dc offset voltage.

FILTER SWITCH

When switched on, a 100 Hz signal is attenuated -3 dB by an RC filter.

SIG/GND SWITCHES

SIG - Allows both ac and dc signal components to enter the amplifier.

GND - Blocks signals from entering the amplifier.

TRIGGER THRESHOLD & TRIGG'D LED

Adjusts the voltage level that must be crossed by the triggering signal in order to qualify as a valid trigger.

The green LED indicator illuminates throughout each sweep.

TRIGGER MODE SWITCH

Selects triggers to be generated internally in the absence of a valid trigger or solely by an external input signal. It also selects the "mid" trigger mode.

NORM - Externally triggered.

AUTO - Internally triggered.

MID - 25% pre-trigger and 75% post-trigger events are displayed.

TRIGGER SLOPE SWITCH

Selects the signal's voltage transition that will qualify it as a valid trigger.

+AC - Only increasing ac voltages qualify as valid trigger sources. DC signals are blocked.

-AC - Only decreasing ac voltages qualify as valid trigger sources. DC signals are blocked.

+DC - Increasing ac or dc voltages qualify as valid trigger sources.

-DC - Decreasing ac or dc voltages qualify as valid trigger sources.

TRIGGER SOURCE SWITCH

Selects whether triggers are derived from signals input to the channel A or channel B amplifier, or by signals input to the Ext input BNC.

(A) - Triggers are derived from signals input to channel A.

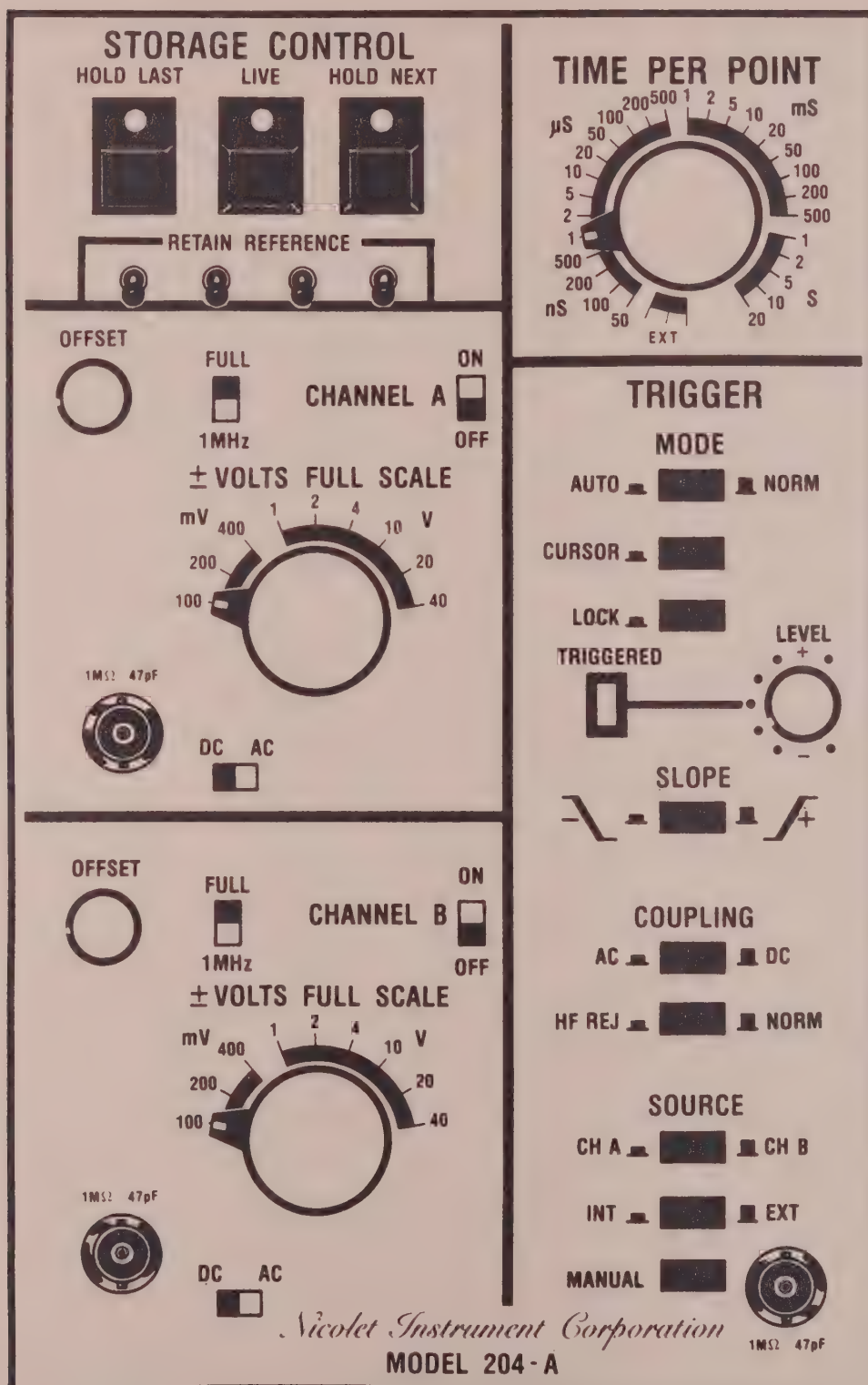
(B) - Triggers are derived from signals input to channel B.

EXT - Triggers are derived from signals input to the EXT input BNC.

MANUAL TRIGGER BUTTON

Manually triggers a sweep when valid trigger sources are not available.

Model 204-A Plug-in



INTRODUCTION

The Model 204-A Plug-in is designed for high frequency measurements.

MODEL 204-A PLUG-IN FEATURES

- Two 8-bit, 20 Megahertz digitizers.
 - High impedance, single-ended amplifiers.
 - 4K word memory.
 - Positive or negative triggering.
 - Normal or Cursor trigger displays.
 - Retain Reference mode to compare "live" and "saved" signals.
 - Remote control abilities.
-

STORAGE CONTROL BUTTONS

The Storage Control buttons determine whether the displayed data will remain "live" or be stored in the display memory.

LIVE - New signals are acquired and displayed on the screen each time a valid trigger is received.

HOLD NEXT - The signal following the next valid trigger (after Hold Next is pressed) is stored in memory and displayed on the screen.

HOLD LAST - The signal that followed the last valid trigger (before the Hold Last button is pressed) is stored in memory and displayed on the screen. A signal already being acquired when the button is pressed is held in memory.

CHANNEL SWITCH

Selecting the ON position allows the channel to acquire data and display it on the screen.

RETAIN REFERENCE SWITCHES

Allows the operator to compare "live" and "saved" signals in the Live mode.

TIME PER POINT SWITCH

Selects the time resolution of the signal to be acquired.

Sweep speeds are expressed as time-per-point rather than time-per-division.

VOLTAGE RANGE SWITCHES

Allows the oscilloscope to accept input signals ranging from ± 100 millivolts to ± 40 volts full scale.

OFFSET CONTROL

Vertically positions the displayed signal on the screen by introducing a dc offset voltage.

DC/AC SWITCHES

DC - Allows both ac and dc signal components to enter the amplifier.

AC - Blocks the dc component. Allows only the ac component to enter the amplifier.

FILTER SWITCH

When switched on, a 1 Megahertz signal is attenuated -3 dB by an RC filter.

TRIGGER LEVEL & TRIGG'D LED

Adjusts the voltage level that must be crossed by the triggering signal in order to qualify as a valid trigger.

The green LED indicator illuminates throughout each sweep.

TRIGGER MODE BUTTONS

Selects triggers to be generated internally in the absence of a valid trigger or solely by an external input signal. It also selects the Cursor trigger mode.

NORM - Externally triggered.

AUTO - Internally triggered.

CURSOR - Both pre- and post-trigger events are displayed.

LOCK - Allows the Vertical Cursor to be moved without losing the trigger time (T=0) when operating in the Cursor trigger mode.

TRIGGER SLOPE BUTTONS

Selects the signal's voltage transition that will qualify it as a valid trigger.

$\nearrow$ - Only increasing voltages qualify as valid trigger sources.

$\searrow$ - Only decreasing voltages qualify as valid trigger sources.

TRIGGER COUPLING BUTTONS

Selects whether ac or dc voltages will qualify as valid trigger sources, and whether or not the triggering signals will be filtered.

AC - Only ac voltages qualify as valid trigger sources.

DC - Only dc voltages qualify as valid trigger sources.

HF REJ - When switched on, a 20 kilohertz signal is attenuated -3 dB.

NORM - All frequencies of the signal enter the trigger detection circuit.

TRIGGER SOURCE BUTTONS

Selects whether triggers are derived from signals input to the channel A or channel B amplifier; by signals input to the Ext input BNC; or manually input when valid triggers are not available.

CH A - Triggers are derived from signals input to channel A.

CH B - Triggers are derived from signals input to channel B.

INT - Selected when triggers are to be derived from either channel A or channel B input signals.

EXT - Selected when triggers are to be derived from signals applied to the EXT input BNC.

MANUAL TRIGGER BUTTON

Manually triggers a sweep when valid trigger sources are not available.

Blank

Model 205-A Plug-in

STORAGE CONTROL

HOLD LAST



LIVE



HOLD NEXT



TIME PER POINT



CH A

OFFSET



FILTER

5 MHz



FULL

ON



OFF

± VOLTS FULL SCALE



1MΩ 47pF



DC



AC

GND

SAVE



OFF

CH B

OFFSET



FILTER

5 MHz



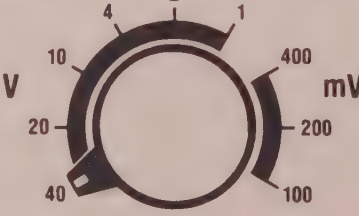
FULL

ON



OFF

± VOLTS FULL SCALE



1MΩ 47pF



DC



AC

GND

SAVE



OFF

TRIGGER

TRIGG'D



LEVEL



CURSOR



NORM

LOCK



OFF

SLOPE

+



-

MODE

AUTO



NORM

CH B

OFFSET



FILTER

5 MHz



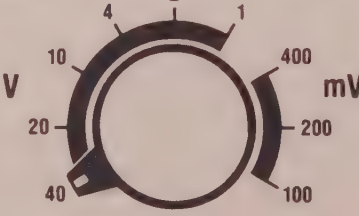
FULL

ON



OFF

± VOLTS FULL SCALE



1MΩ 47pF



DC



AC

GND

SAVE



OFF

COUPLING

AC



DC

HF REJ



NORM

SOURCE

CH A



CH B

INT



EXT

EXT CLOCK



1MΩ 47pF





MODEL 205-A

INTRODUCTION

The Model 205-A Plug-in is designed for high frequency measurements.

The plug-in houses the controls and circuitry used to acquire input signals for display on the screen.

MODEL 205-A PLUG-IN FEATURES

- Two 8-bit, 50 Megahertz digitizers.
 - High impedance, single-ended amplifiers.
 - 4K word memory.
 - Positive or negative triggering.
 - Normal or Cursor trigger displays.
 - Save mode to compare "live" and "saved" signals.
 - Remote control abilities.
-

STORAGE CONTROL BUTTONS

The Storage Control buttons determine whether the displayed data will remain "live" or be stored in the display memory.

LIVE - New signals are acquired and displayed on the screen each time a valid trigger is received.

HOLD NEXT - The signal following the next valid trigger (after Hold Next is pressed) is stored in memory and displayed on the screen.

HOLD LAST - The signal that followed the last valid trigger (before the Hold Last button is pressed) is stored in memory and displayed on the screen. A signal already being acquired when the button is pressed is held in memory.

CHANNEL SWITCH

Selecting the ON position allows the channel to acquire data and display it on the screen.

SAVE SWITCHES

Allows the operator to compare "live" and "saved" signals in the Live mode.

TIME PER POINT SWITCH

Selects the time resolution of the signal to be acquired.

Sweep speeds are expressed as time-per-point rather than time-per-division.

VOLTS FULL SCALE SWITCHES

Allows the oscilloscope to accept input signals ranging from +100 millivolts to +40 volts full scale.

OFFSET CONTROL

Vertically positions the displayed signal on the screen by introducing a dc offset voltage.

DC/AC/GND SWITCHES

DC - Allows both ac and dc signal components to enter the amplifier.

AC - Only the ac components enter the amplifier. Dc components are blocked.

GND - Grounds the amplifier's input.

FILTER SWITCH

5 MHz - A 5 Megahertz signal is attenuated -3 dB by an RC filter.

FULL - The full bandwidth is inspected.

TRIGGER LEVEL & TRIGG'D LED

Adjusts the voltage level that must be crossed by the triggering signal in order to qualify as a valid trigger.

The green LED indicator illuminates throughout each sweep.

TRIGGER AUTO/NORM SWITCH

Selects triggers to be generated internally in the absence of a valid trigger or solely by an external input signal.

NORM - Externally triggered.

AUTO - Internally triggered.

TRIGGER CURSOR/NORM SWITCH

Selects whether pre-trigger and/or post-trigger events will be displayed.

NORM - Only post-trigger events are displayed.

CURSOR - Both pre- and post-trigger events are displayed.

TRIGGER LOCK SWITCH

Allows the Vertical cursor to be moved without losing the trigger time (T=0) when operating in the Cursor Trigger mode.

TRIGGER SLOPE SWITCH

Selects the signal's voltage transition that will qualify it as a valid trigger.

(+) - Only increasing voltages qualify as valid trigger sources.

(-) - Only decreasing voltages qualify as valid trigger sources.

TRIGGER AC/DC SWITCH

Selects whether ac or dc voltages will qualify as valid trigger sources.

AC - Only ac voltages qualify as valid trigger sources.

DC - Ac or dc voltages qualify as valid trigger sources.

TRIGGER HF REJ/NORM SWITCH

When switched on, a 4.0 megahertz signal is attenuated -3 dB.

TRIGGER CH A/CH B SWITCH

Selects whether triggers are derived from signals input to the channel A or channel B amplifier. The Trigger INT/EXT switch must be in the INT position.

CH A - Triggers are derived from signals input to channel A.

CH B - Triggers are derived from signals input to channel B.

TRIGGER INT/EXT SWITCH

Selects whether triggers will be derived from signals input to the amplifiers or via signals input to the EXT input BNC.

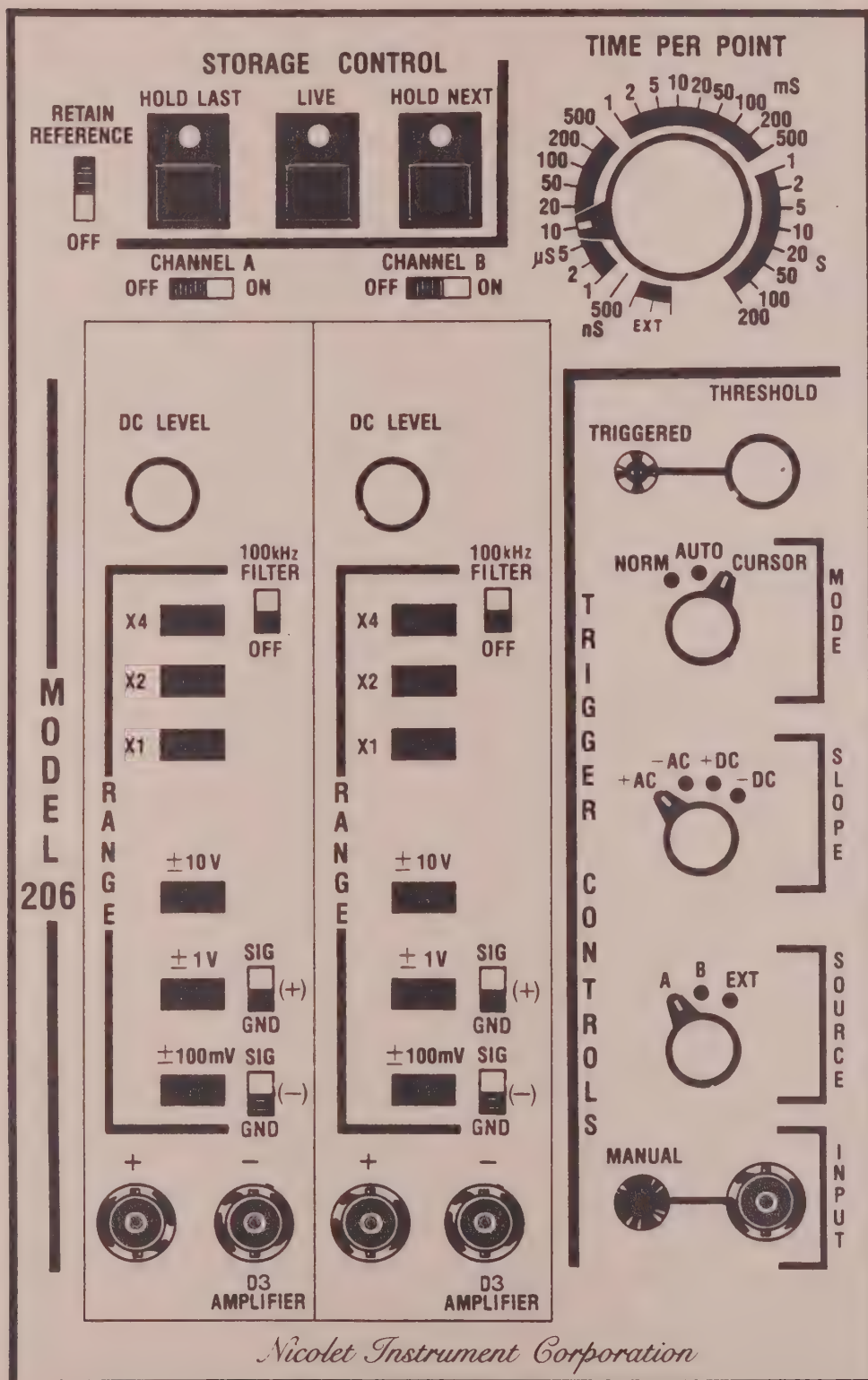
INT - Selected when triggers are to be derived from either channel A or channel B input signals.

EXT - Selected when triggers are to be derived from signals applied to the EXT input BNC.

EXTERNAL CLOCK CONNECTOR

Inputs external clocking pulses when the Time Per Point switch is in the EXT position.

Model 206 Plug-in



INTRODUCTION

The Model 206 plug-in is designed for medium frequency measurements.

The plug-in houses the controls and circuitry used to acquire input signals for display on the screen.

MODEL 206 PLUG-IN FEATURES

- Two 12-bit, 2 Megahertz digitizers.
- High impedance, differential amplifiers.
- 4K word memory.
- Positive or negative triggering.
- Normal or Cursor trigger displays.
- Retain Reference to compare "live" and "saved" signals.
- Remote control abilities.

STORAGE CONTROL BUTTONS

The Storage Control buttons determine whether the displayed data will remain "live" or be stored in the display memory.

LIVE - New signals are acquired and displayed on the screen each time a valid trigger is received.

HOLD NEXT - The signal following the next valid trigger (after Hold Next is pressed) is stored in memory and displayed on the screen.

HOLD LAST - The signal that followed the last valid trigger (before the Hold Last button is pressed) is stored in memory and displayed on the screen. A signal already being acquired when the button is pressed is held in memory.

CHANNEL SWITCH

Selecting the ON position allows the channel to acquire data and display it on the screen.

NOTE: At least one channel must be turned ON. Turning both channels off will give misleading information on the screen.

RETAIN REFERENCE SWITCH

Allows the operator to compare "live" and "saved" signals in the Live mode.

TIME PER POINT SWITCH

Selects the time resolution of the signal to be acquired.

Sweep speeds are expressed as time-per-point rather than time-per-division.

VOLTAGE RANGE BUTTONS

Allows the oscilloscope to accept input signals ranging from +100 millivolts to +40 volts full scale.

DC LEVEL CONTROL

Vertically positions the displayed signal on the screen by introducing a dc offset voltage.

FILTER SWITCH

When switched on, a 100 kHz signal is attenuated -3 dB by an RC filter.

SIG/GND SWITCHES

SIG - Allows both ac and dc signal components to enter the amplifier.

GND - Blocks signals from entering the amplifier.

TRIGGER THRESHOLD & TRIGG'D LED

Adjusts the voltage level that must be crossed by the triggering signal in order to qualify as a valid trigger.

The green LED indicator illuminates during each sweep.

TRIGGER MODE SWITCH

Selects triggers to be generated internally in the absence of a valid trigger or solely by an external input signal. It also selects the "cursor" trigger mode.

NORM - Externally triggered.

AUTO - Internally triggered.

CURSOR - Both pre- and post-trigger events are displayed.

TRIGGER SLOPE SWITCH

Selects the signal's voltage transition that will qualify it as a valid trigger.

+AC - Only increasing ac voltages qualify as valid trigger sources. DC signals are blocked.

-AC - Only decreasing ac voltages qualify as valid trigger sources. DC signals are blocked.

+DC - Increasing ac or dc voltages qualify as valid trigger sources.

-DC - Decreasing ac or dc voltages qualify as valid trigger sources.

TRIGGER SOURCE SWITCH

Selects whether triggers are derived from signals input to the channel A or channel B amplifier, or by signals input to the Ext input BNC.

(A) - Triggers are derived from signals input to channel A.

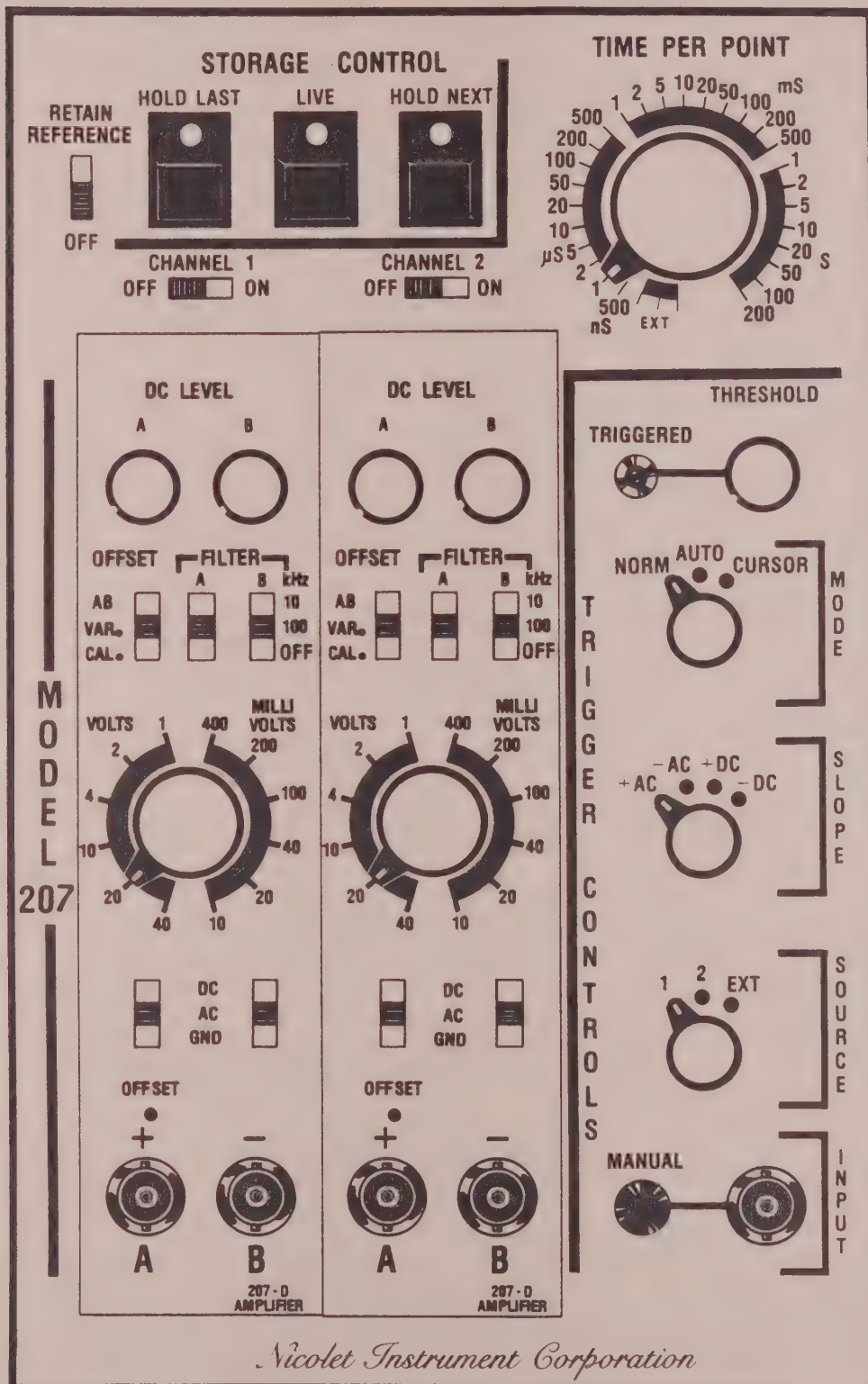
(B) - Triggers are derived from signals input to channel B.

EXT - Triggers are derived from signals input to the EXT input BNC.

MANUAL TRIGGER BUTTON

Manually triggers a sweep when valid trigger sources are not available.

Model 207 Plug-in



INTRODUCTION

The Model 207 plug-in is designed for medium frequency measurements and functions in all respects like the Model 206 plug-in with a D3 amplifier.

In addition to the features described at the right, the Model 207 plug-in includes:

- #1. The ability to function as a four input system at lower acquisition rates, (Multiplexed Mode).
- #2. The ability to time share the ADC's, (Multiplexed Mode).
- #3. Increased sensitivity provided by the three additional voltage ranges, (10, 20, and 40 mV) of the Volts Full Scale switch.
- #4. AC coupling provided by individual DC/GND/AC input switches for each input.

MODEL 207 PLUG-IN FEATURES

- Either two 12-bit, 2 Megahertz, high impedance differential amplifiers, or four 12-bit, 100 Kiloherztz), high impedance single-ended amplifiers.
- 4K word memory.
- Positive or negative triggering.
- Normal or Cursor trigger displays.
- Retain Reference to compare "live" and "saved" signals.
- Remote control abilities.

STORAGE CONTROL BUTTONS

The Storage Control buttons determine whether the displayed data will remain "live" or be stored in the display memory.

LIVE - New signals are acquired and displayed on the screen each time a valid trigger is received.

HOLD NEXT - The signal following the next valid trigger (after Hold Next is pressed) is stored in memory and displayed on the screen.

HOLD LAST - The signal that followed the last valid trigger (before the Hold Last button is pressed) is stored in memory and displayed on the screen. A signal already being acquired when the button is pressed is held in memory.

CHANNEL SWITCH

Selecting the ON position allows the channel to acquire data and display it on the screen.

NOTE: At least one channel must be turned ON. Turning both channels off will give misleading information on the screen.

RETAIN REFERENCE SWITCH

Allows the operator to compare "live" and "saved" signals in the Live mode.

TIME PER POINT SWITCH

Selects the time resolution of the signal to be acquired.

Sweep speeds are expressed as time-per-point rather than time-per-division.

VOLTAGE RANGE SWITCHES

Allows the oscilloscope to accept input signals ranging from +10 millivolts to +40 volts full scale.

OFFSET SWITCH

Selects Standard or Multiplexed modes of operation.

AB - Multiplexed, four channel operation.

VAR - Standard, two channel operation.

CAL - Standard, two channel operation.

DC LEVEL CONTROL

Vertically positions displayed signals on the screen by introducing a dc offset voltage. Control (A) is used when the OFFSET switch is in the VAR position. If the switch is in the AB position, control (A) is used for the (+ or A) input, and control (B) is used for the (- or B) input.

FILTER SWITCH

Selects whether a 10 kHz or 100 kHz will be attenuated -3 dB by an RC filter when switched on. Filter A attenuates signals applied to the (+ or A) input BNC in the Standard and Multiplexed modes. Filter B attenuates signals applied to the (- or B) input BNC in the Multiplexed mode only.

DC/GND/AC SWITCHES

DC - Allows both ac and dc signal components to enter the amplifier.

GND - Blocks signals from entering the amplifier.

AC - Blocks the dc component. Only ac signals enter the amplifier.

OFFSET ADJUST

Vertically positions the displayed signal on the screen by introducing a dc offset voltage when the OFFSET switch is in the CAL position.

TRIGGER THRESHOLD & TRIGG'D LED

Adjusts the voltage level that must be crossed by the triggering signal in order to qualify as a valid trigger.

The green LED indicator illuminates during each sweep.

TRIGGER MODE SWITCH

Selects triggers to be generated internally in the absence of a valid trigger or solely by an external input signal. It also selects the "cursor" trigger mode.

NORM - Externally triggered.

AUTO - Internally triggered.

CURSOR - Both pre- and post-trigger events are displayed.

TRIGGER SLOPE SWITCH

Selects the signal's voltage transition that will qualify it as a valid trigger.

+AC - Only increasing ac voltages qualify as valid trigger sources. DC signals are blocked.

-AC - Only decreasing ac voltages qualify as valid trigger sources. DC signals are blocked.

+DC - Increasing ac or dc voltages qualify as valid trigger sources.

-DC - Decreasing ac or dc voltages qualify as valid trigger sources.

TRIGGER SOURCE SWITCH

Selects whether triggers are derived from signals input to the channel 1 or channel 2 amplifier, or by signals input to the Ext input BNC.

(A) - Triggers are derived from signals input to channel 1.

(B) - Triggers are derived from signals input to channel 2.

EXT - Triggers are derived from signals input to the EXT input BNC.

MANUAL TRIGGER BUTTON

Manually triggers a sweep when valid trigger sources are not available.

Blank

2090 SPECIFICATIONS

MAINFRAME	
Memory Size:	4K words, 12 bits
Addressable Subgroups:	Halves (2K), Quarters (1K)
Storage Capacity:	Normally 8 waveforms (16 max.)
Display:	6-inch, high definition
Expansion:	Up to X64, both axes, cursor-interactive
Numerics:	
(a) YT Display Mode:	Time and Voltage
(b) XY Display Mode:	X-voltage and Y-voltage
Numeric Displays (XY/YT):	
(a) Normal:	Absolute numerics
(b) Reset Numerics:	Relative numerics
Arithmetic Functions:	Subtract, Invert, Data Move
Autocenter:	
(a) Unexpanded Display:	Automatic lock of cursor to waveform
(b) Expanded Display:	Automatic waveform centering
Pen:	Analog output to XY pen recorder

PARAMETER	PLUG-INS				
	201	204-A	205-A	206	207
Inputs:	2 Diff.	2 Sgl-End	2 Sgl-End	2 Diff.	2 Diff. or 4 Sgl-End
Vertical Resolution:	12-bits (0.025%)	8-bits (0.4%)	8-bits (0.4%)	12-bits (0.025%)	12-bits (0.025%)
Max. Sweep Length:	4096 pts. (Note 1)	4096 pts.	4096 pts.	4096 pts. (Note 1)	4096 pts. (Note 1)
Max. Digitizing Rate					
a. 2 inputs:	5 μ S/pt.	50 nS/pt.	20 nS/pt.	500 nS/pt.	500 nS/pt.
b. 4 inputs:	N/A	N/A	N/A	N/A	10 μ S/pt.
Min. Digitizing Rate:	200 S/pt.	20 S/pt.	5 S/pt.	200 S/pt.	200 S/pt.
Time Base Accuracy:	0.01%	0.01%	0.01% (Note 4)	0.01%	0.01%
External Clock Input:	No	Yes	Yes	Yes	Yes
Overall Accuracy (%F.S.):	0.2	0.5	0.5	0.2	0.2 (Note 2)
Linearity:	0.1% F.S.	0.5% F.S.	0.5% F.S.	0.1% F.S.	0.1% F.S.
Noise (RMS, open inputs):	0.025% F.S. (+7 μ V)	0.25% F.S.	0.3% F.S.	0.025% F.S. (+10 μ V)	0.03% F.S. (+10 μ V)
Drift, (%F.S./°C):	0.03	0.35	0.35	0.06	0.15
Inputs					
a. Coupling:	DC	AC/DC	AC/DC/GND	DC	AC/DC/GND
b. Ranges (Full Scale):	$\pm$ 10mV to $\pm$ 40V	$\pm$ 100mV to $\pm$ 40V	$\pm$ 100mV to $\pm$ 40V	$\pm$ 100mV to $\pm$ 40V	$\pm$ 10mV to $\pm$ 40V
c. Impedance (ohms):	10,000M (Note 3)	1M (47 pF)	1M (47 pF)	1M (47 pF)	1M (47 pF)
d. Filter (RC, Switchable):	100Hz	1MHz	5MHz	100KHz	10K, 100KHz
Safe Overload					
a. At max. sensitivity:	100V	100V	100V	100V	10V
b. At min. sensitivity:	200V	200V	200V	200V	200V
Analog Bandwidth					
a. At max. sensitivity:	5 KHz	7 MHz	25 MHz	350 KHz	100 KHz
b. At min. sensitivity:	60 KHz	7 MHz	25 MHz	650 KHz	500 KHz
D.C. Offset Range:	100% F.S.	100% F.S.	100% F.S.	100% F.S.	200% F.S.
Common Mode					
a. Voltage Range:	150% F.S.	N/A	N/A	200% F.S.	1000% F.S.
b. Rejection Ratio:	72 dB	N/A	N/A	72 dB	72 dB
Trigger Range					
a. External:	$\pm$ 5V	$\pm$ 5V	$\pm$ 5V	$\pm$ 3V	$\pm$ 3V
b. Internal:	100% F.S.	100% F.S.	100% F.S.	100% F.S.	100% F.S.
Trigger Sensitivity					
a. External:	0.25V	0.1V	0.25V	0.25V	0.25V
b. Internal:	10% F.S.	1% F.S.	5% F.S.	10% F.S.	10% F.S.
Max. Pre-Trigger Delay (% of Sweep Time):	25	100	100	100	100

NOTE 1: Longer sweeps are possible with the optional disk recorder.

NOTE 2: Overall accuracy on 10mV, 20mV, and 40mV ranges is 1.5% of full scale.

NOTE 3: The input impedance of the 201 is 1 Megohm on 10V, 20V, and 40V ranges.

NOTE 4: In slow sweep mode (Time Per Point settings of 20 μ S or longer, or EXT-slow mode) a point-to-point jitter of up to 250nS may occur. This can be avoided by operating in the pre-trigger mode.

Specifications are subject to change without notice.

DISK RECORDER

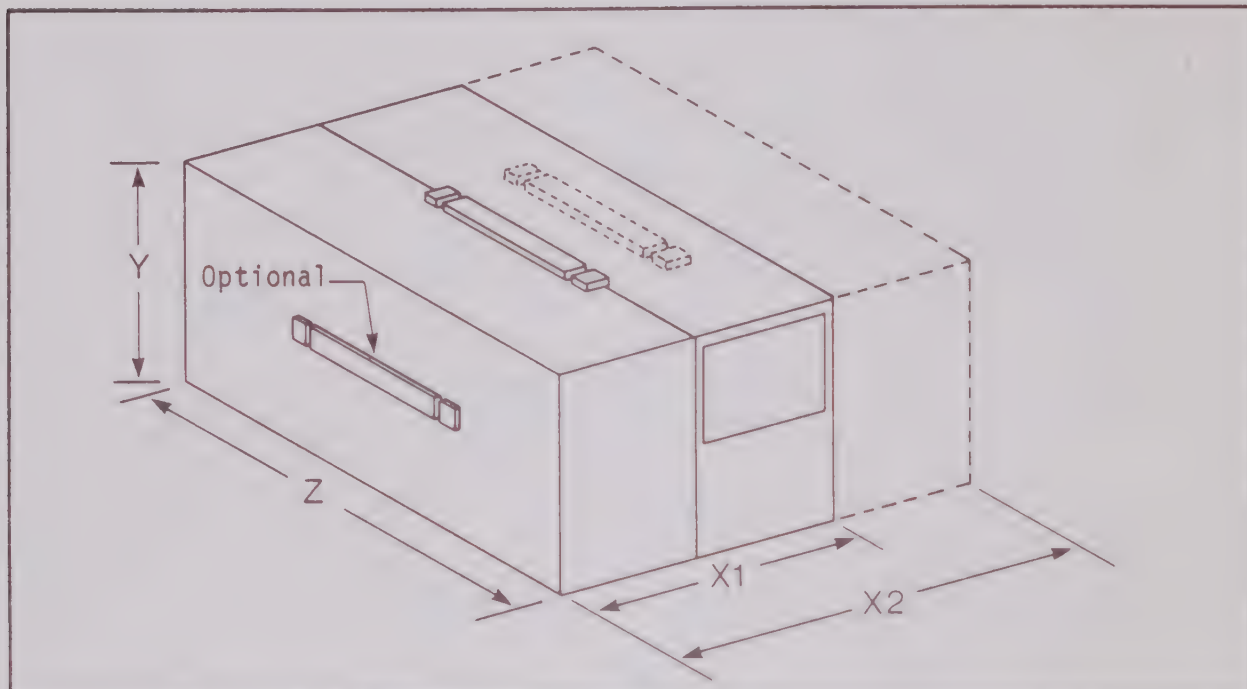
Disk Recorder Type:	5-1/4" Floppy, single sided, single density, soft-sectored.
Storage Capacity/Diskette:	Eight 4K, sixteen 2K or thirty-two 1K records.
Write Protection:	Switchable, track-specific.
Autocycle:	Automatic consecutive capture-and-store of up to 32 records.
Long Sweep:	Continuous recording of up to 32K of data at sweep speeds of 500 microseconds per point or slower, (2090-3C/206 or 201 only).

DIGITAL I/O

Interfaces Available:	Thirteen-bit parallel binary, IEEE-488 (GPIB), RS-232C.
Minimum Transfer Times (4K):	Parallel Binary, 8 milliseconds. GPIB ASCII, 7 seconds GPIB Binary, 2.5 seconds. RS-232C ASCII, 24 seconds. RS-232C Binary, 8.5 seconds.

APPROXIMATE POWER REQUIREMENTS

2090-2:	101, 115, 202, 230VAC (+10%); 50-60Hz (+5%); 225 volt-amperes.
2090-3:	101, 115, 202, 230VAC (+10%); 50-60Hz (+5%); 300 volt-amperes.



APPROXIMATE DIMENSIONS

X1	Basic Frame Width (2090-2)	11-1/4" (28.6 cm)
X2	Basic Frame Width (2090-3)	16-15/16" (43.2 cm)
	Side Mounted Carrying Handle, add	1/2" (1.3 cm)
	Side Mounted Bumpers, add	1/4" (0.6 cm)
Y	Basic Frame Height	8-3/4" (22.2 cm)
	Top Mounted Carrying Handle, add	1/2" (1.3 cm)
	Bottom Mounted Feet, add	5/8" (1.6 cm)
Z	Basic Frame Length	18-1/4" (46.4 cm)
	Front Panel Control Knobs, add	5/16" (0.8 cm)

APPROXIMATE WEIGHTS

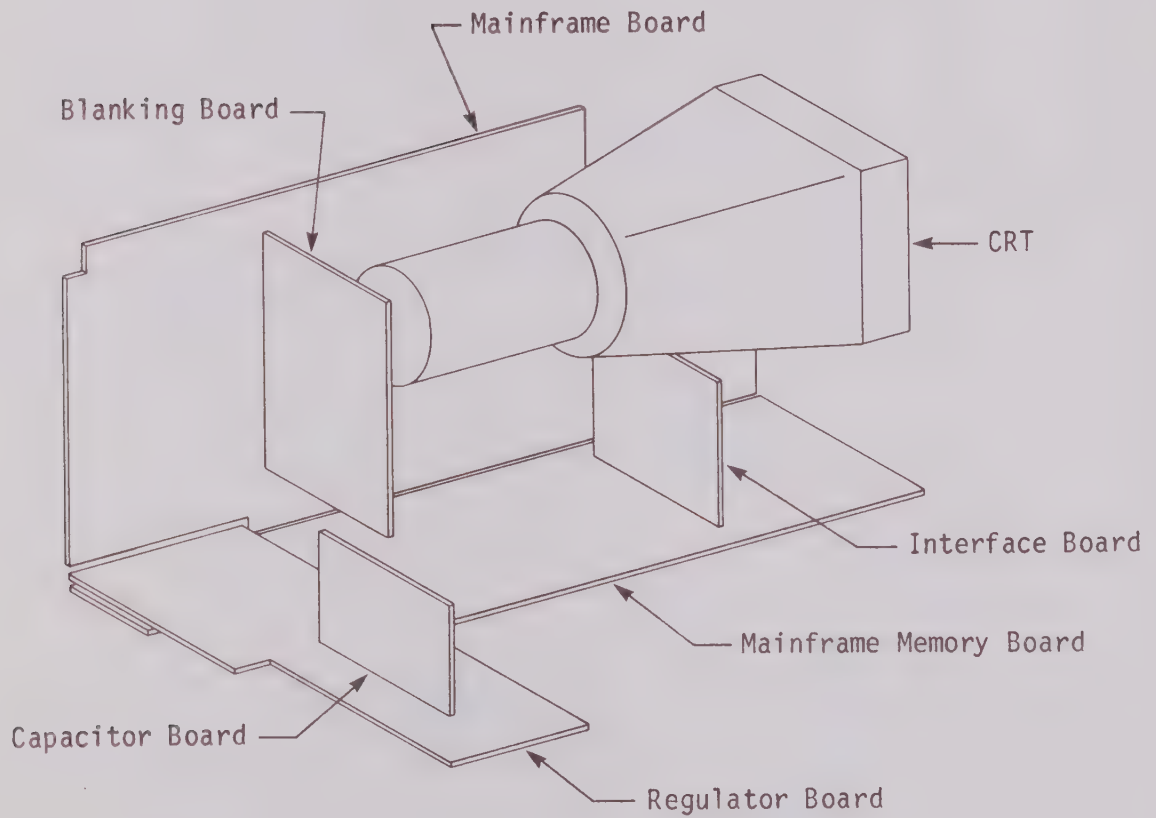
Model 2090-2 with one plug-in.	30 lbs. (13.5 kg)
Model 2090-3 with one plug-in and disk recorder.	46 lbs. (20.7 kg)

INTRODUCTION

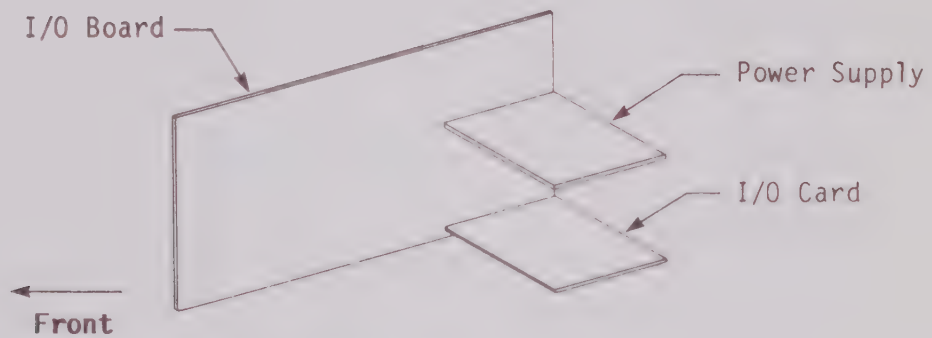
This section identifies the major assemblies of the 2090 Digital Oscilloscope.

ASSEMBLY	PAGE
Mainframe	4-3
Input/Output Bay	4-4
I/O Bay with 2081/2082	4-5
I/O Bay with 003	4-6
201 Plug-in	4-7
204-A Plug-in	4-8
205-A Plug-in	4-9
206 Plug-in	4-10
207 Plug-in	4-11

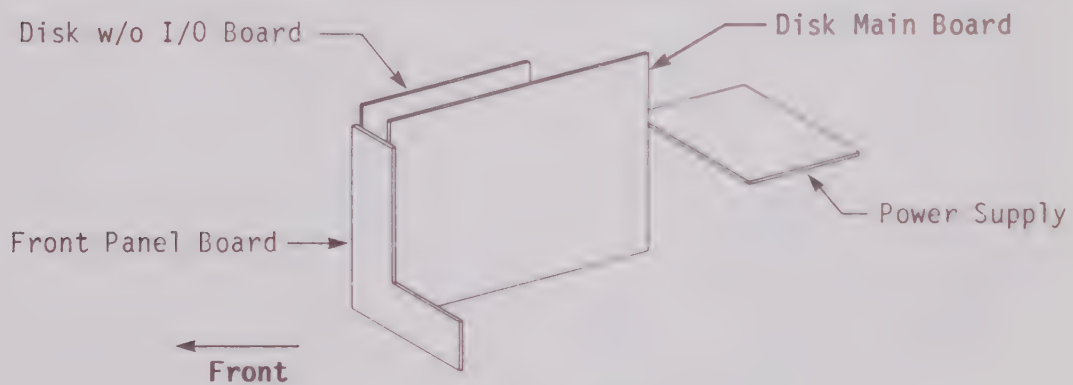
MAINFRAME



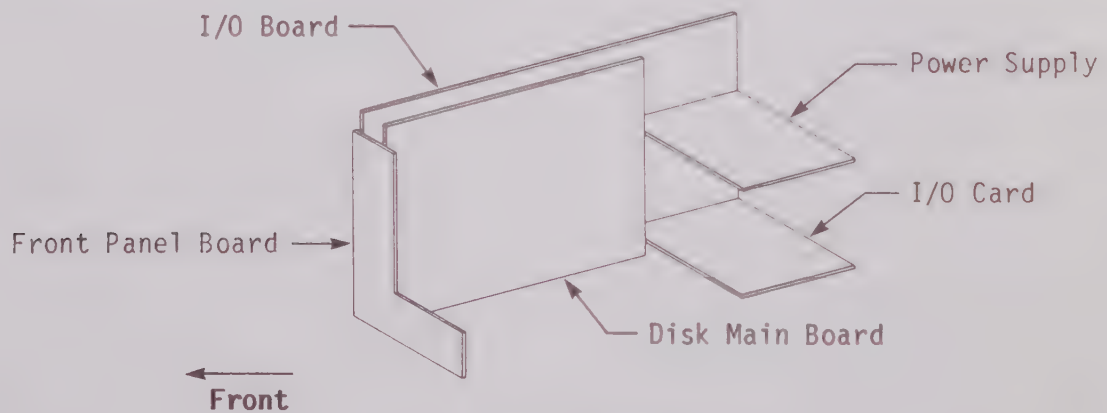
INPUT/OUTPUT BAY



Model 2090-3A

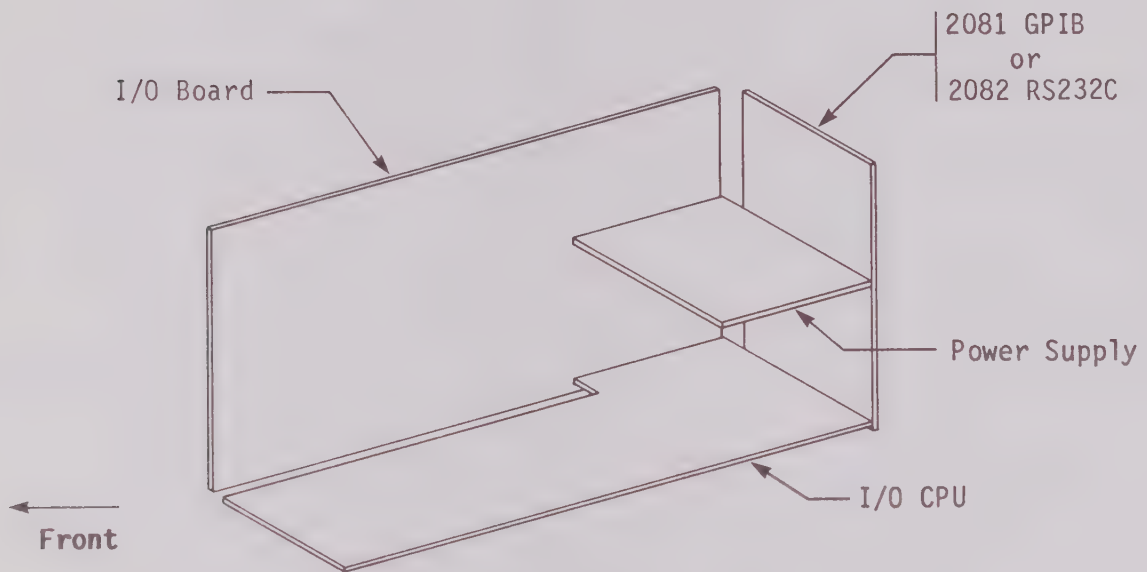


Model 2090-3B

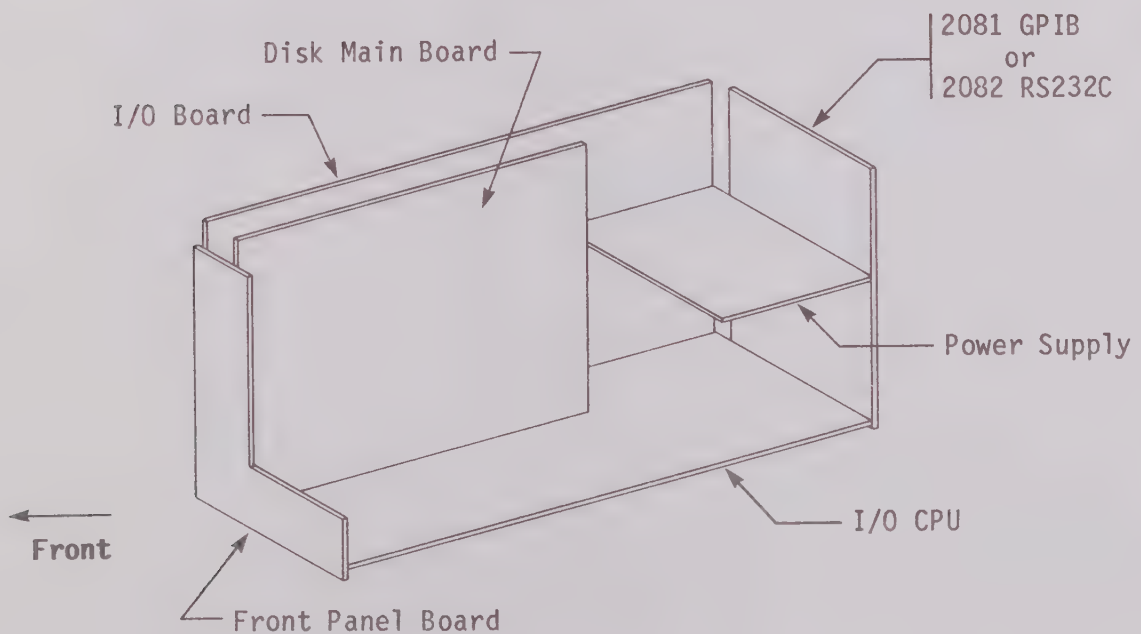


Model 2090-3C

INPUT/OUTPUT BAY WITH 2081/2082 ACCESSORIES

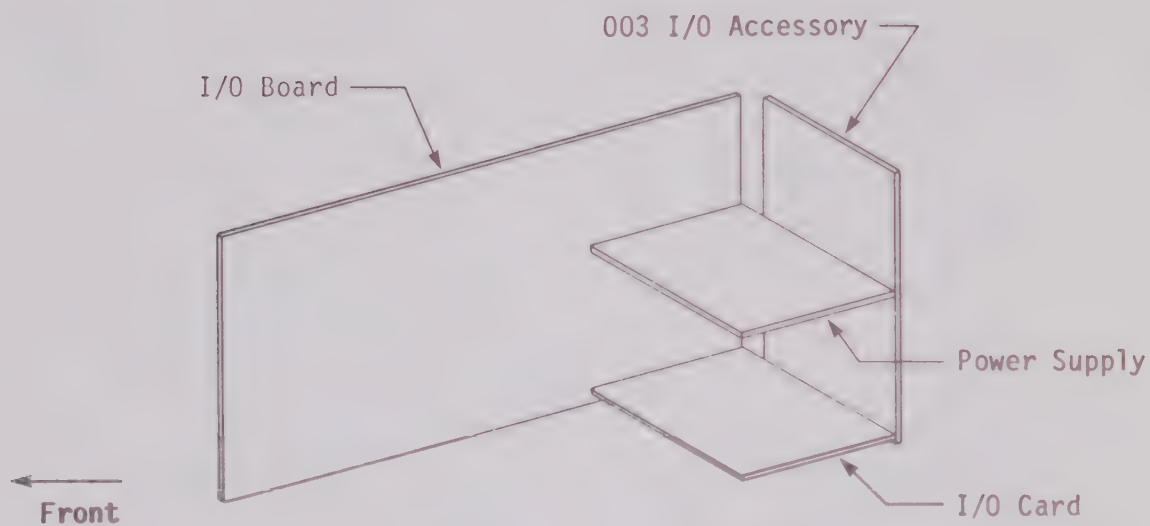


Model 2090-3A With 2081/2082 Accessory

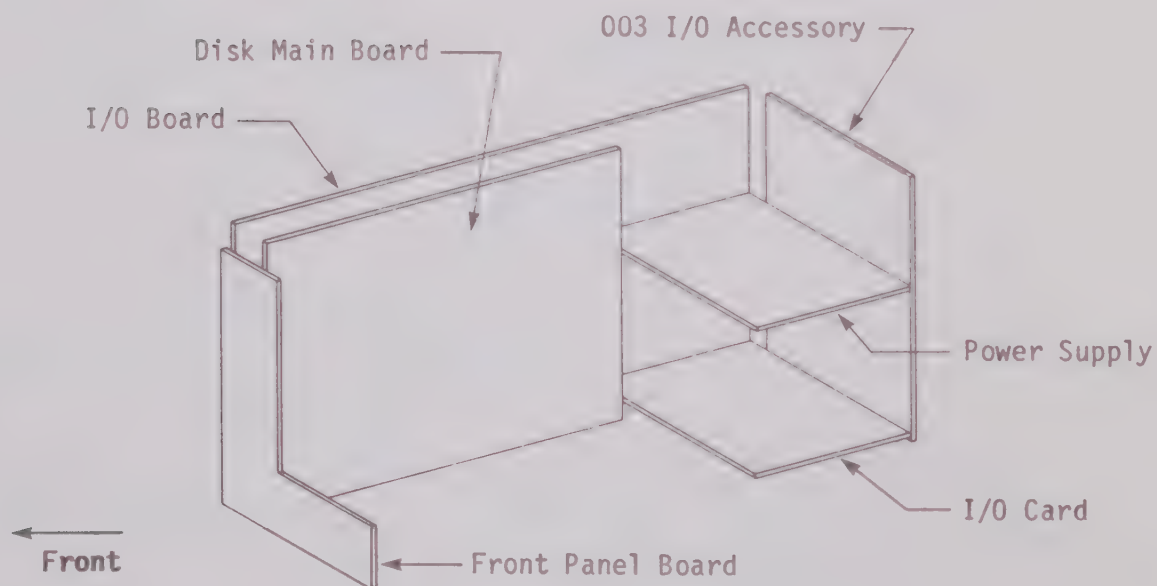


Model 2090-3C With 2081/2082 Accessory

INPUT/OUTPUT BAY WITH 003 ACCESSORIES

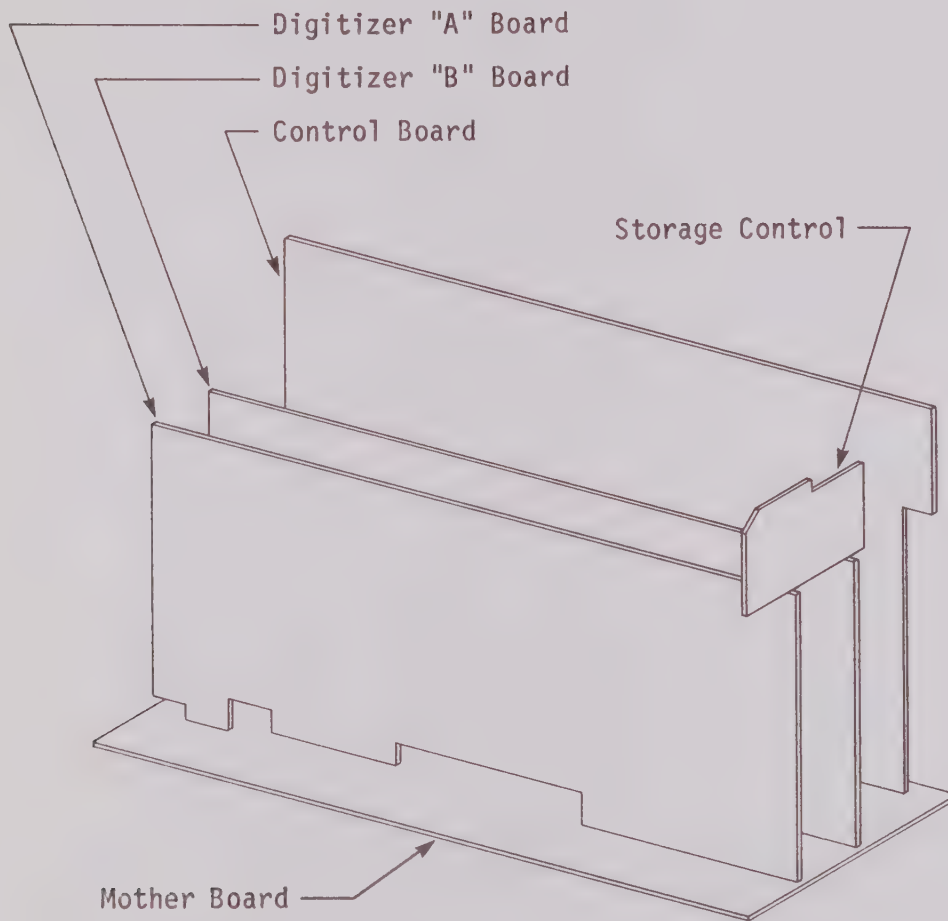


Model 2090-3A With 003 Accessory

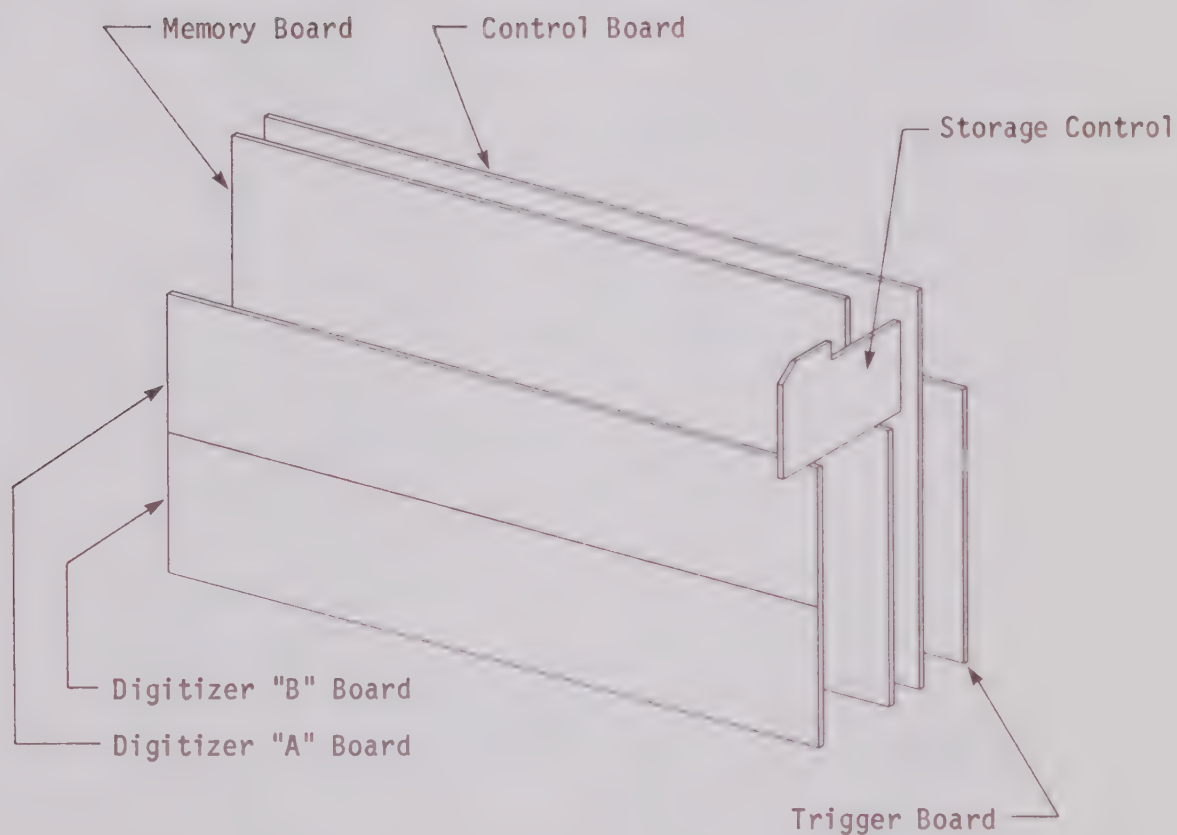


Model 2090-3C With 003 Accessory

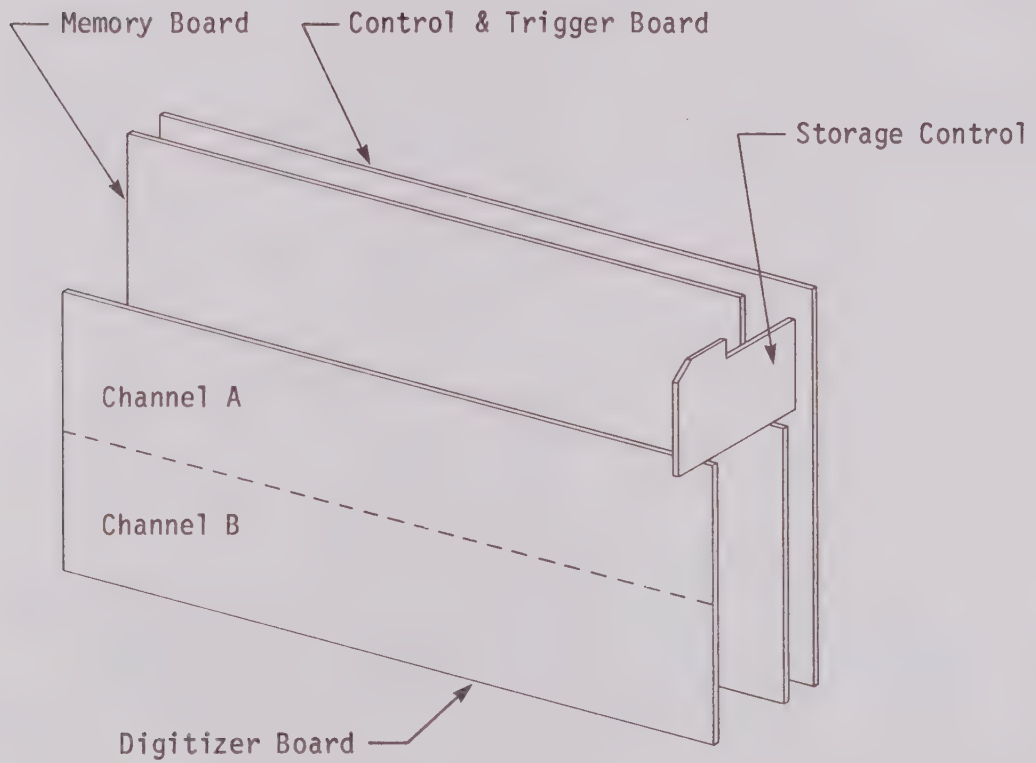
201 PLUG-IN



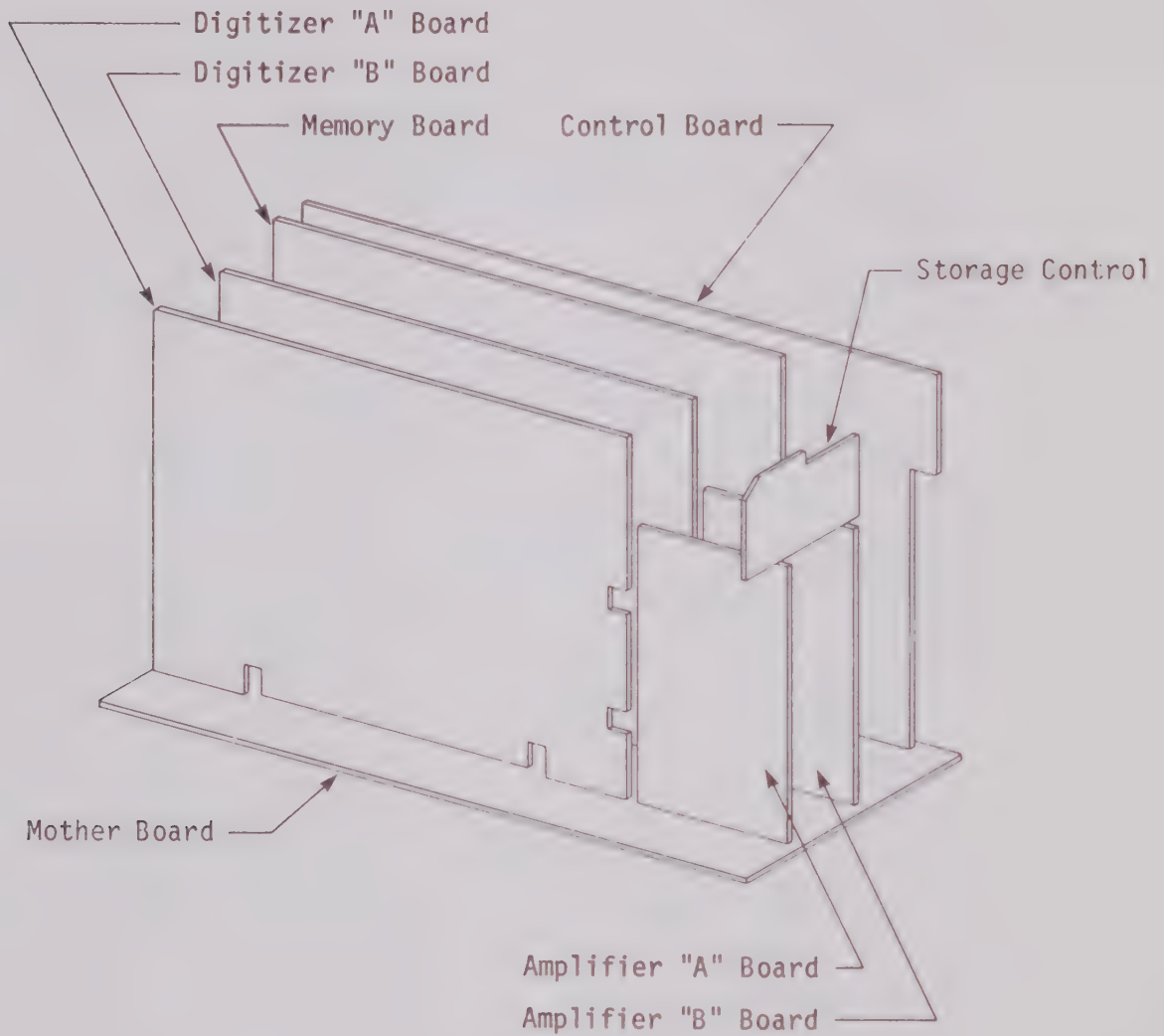
204-A PLUG-IN



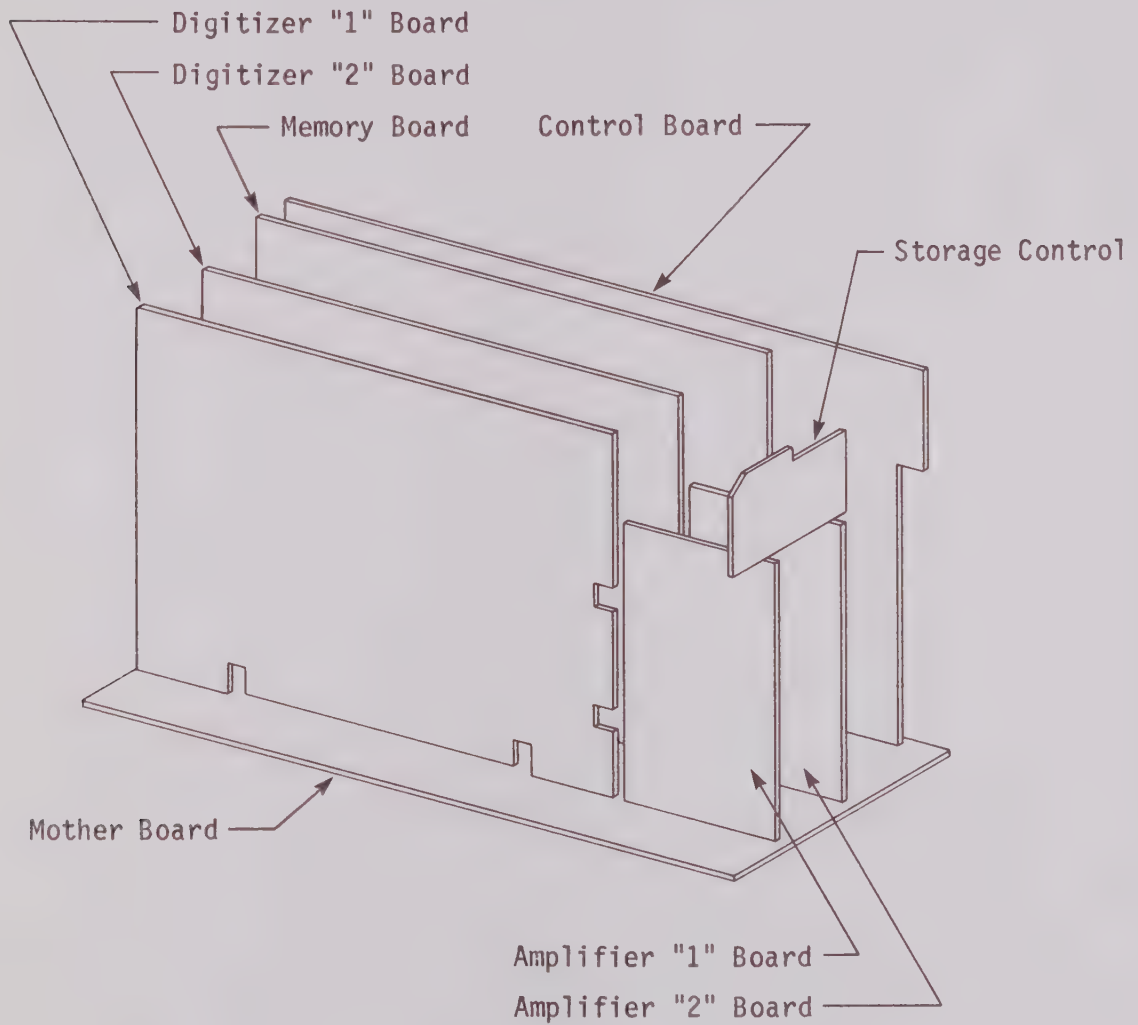
205-A PLUG-IN



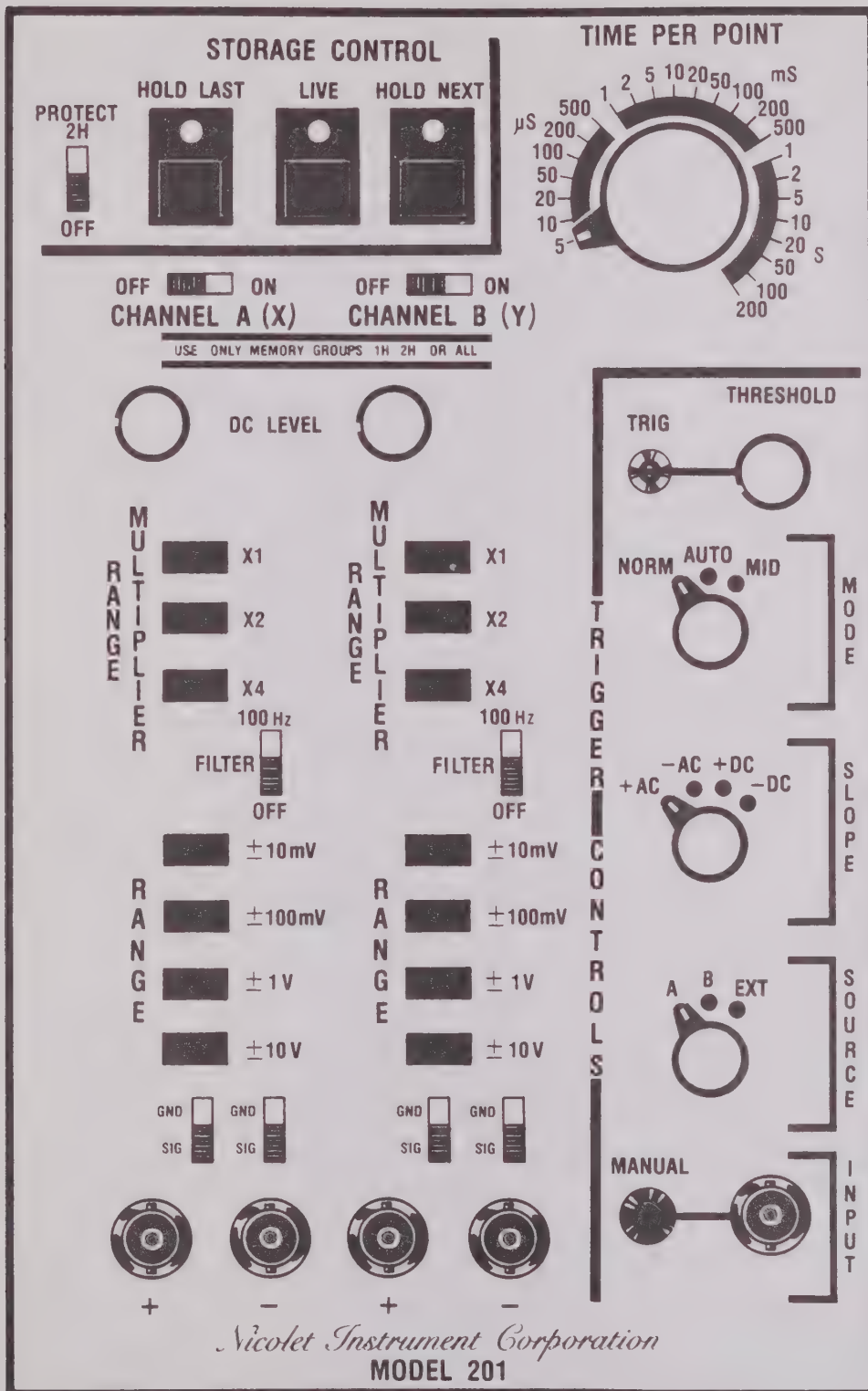
206 PLUG-IN



207 PLUG-IN



Model 201 Plug-in



INTRODUCTION

This section contains the alignment and calibration procedures for the **Model 201 Plug-in**. Read each procedure before servicing this instrument.

WARNING: High voltages exist within this instrument. Observe all safety standards set by your place of employment. This instrument should be serviced by qualified personnel only.

► **IMPORTANT:** The plug-in must be removed to access the channel B trim pots. Perform procedures 2.0.0 through 7.0.0 for the channel A Amplifier and then repeat for the channel B Amplifier.

► **IMPORTANT:** These procedures are sequential. Do not skip any procedures or steps.

INDEX

PROCEDURE	PAGE
1.0.0. Preparation	5-3
2.0.0. Set-Up	5-5
3.0.0. Voltage Check	5-6
4.0.0. ADC Gain & Offset	5-7
5.0.0. Balance	5-10
6.0.0. Common Mode	5-12
7.0.0. Gain	5-13
8.0.0. Time Base	5-18
9.0.0. Reassembly	5-19

REQUIREMENTS

The following materials are required to perform the **Model 201 Plug-in** alignment procedures.

FUNCTION GENERATOR

- #1. Output: Square and Triangle waves with sync output.
- #2. Amplitudes: $100\text{mV}_{\text{pp}} - 20\text{V}_{\text{pp}}$
- #3. Frequencies: $0.2\text{ Hz} - 10\text{ kHz}$

DIGITAL MULTIMETER

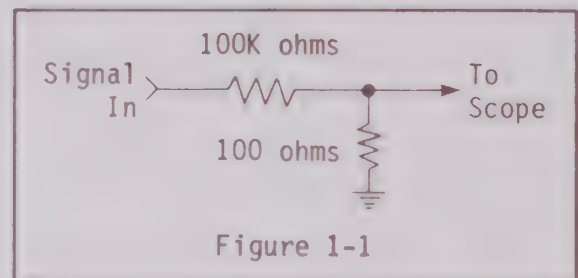
- #1. Resolution: 4-1/2 or 5 digits
- #2. Accuracy: .005% of input, DC Volts

TOOLS

- #1. Phillips screwdriver, (#1)
- #2. Common screwdriver, (3/16")
- #3. Nonmetallic adjustment screwdriver.
- #4. Hex Wrench, (1/16")

NETWORK

- #1. Attenuator:



1.0.0. PREPARATION

1.1.0. PREPARING CHANNEL A

WARNING: Remove all power from the 2090 before proceeding.

- 1.1.1. Remove the bottom cover and set aside.
- 1.1.2. Remove the two left side cover securing screws.

NOTE: Remove the left cover only when performing measurements or adjustments and then replace immediately.

1.2.0 PREPARING CHANNEL B

► **IMPORTANT:** Perform procedure 1.2.0 only when adjusting channel B.

WARNING: Remove all power from the 2090 before proceeding.

- 1.2.1. Remove the left side cover.
- 1.2.2. Unplug the Ground Connector, (Figure 1-1).

NOTE: It is not necessary to reconnect the ground after the plug-in has been removed.

- 1.2.3. Remove the four plug-in front panel securing screws and slide the plug-in half way out of the scope.

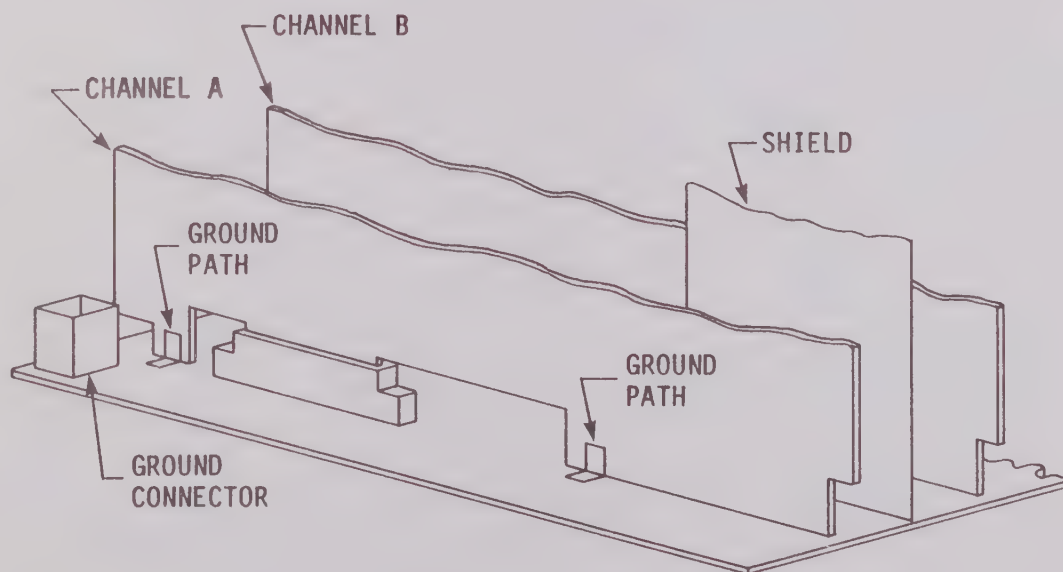


Figure 1-1

- 1.2.4. Disconnect the ribbon cable from the rear of the plug-in.
- 1.2.5. Slide the plug-in the rest of the way out and set it to the left side of the scope.

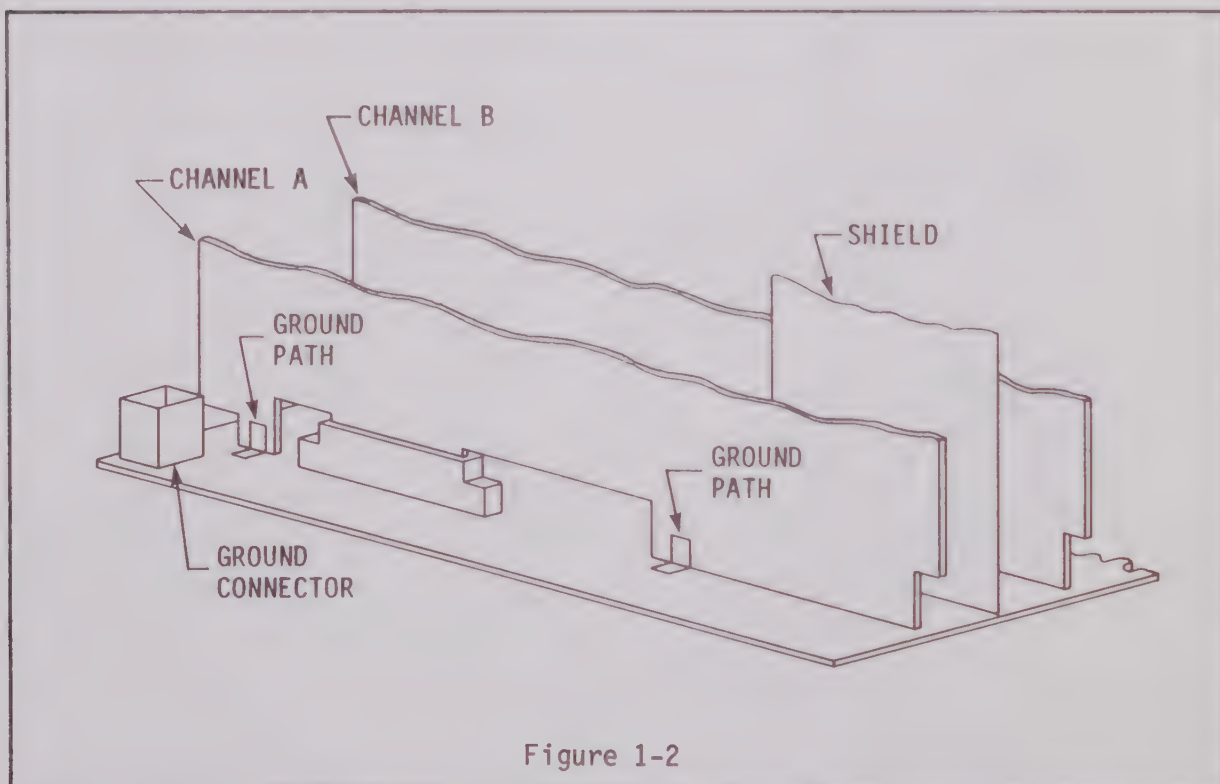
WARNING: Place the plug-in on a nonconductive workbench free of metal, such as solder splashes.

- 1.2.6. Remove the channel A DC Level control knob.
- 1.2.7. Disconnect the ground path between the Mother board and Channel A Amplifier board, (Figure 1-2).
- 1.2.8. Unsolder the channel A (+) input BNC-to-Amplifier wire.

CAUTION: A wire is still attached between the (-) input BNC and Amplifier board. Use care during step 1.2.9.

- 1.2.9. Unplug the channel A Amplifier board.
- 1.2.10. Unsolder the channel A (-) input BNC-to-Amplifier wire.
- 1.2.11. Set the channel A Amplifier board on a clean surface.
- 1.2.12. Reconnect the ribbon cable to the plug-in.
- 1.2.13. Reapply power to the scope.

NOTE: Cover the plug-in with a cloth between adjustments.



2.0.0. SET-UP PROCEDURE

MAINFRAME CONTROLS

Power On/Off:	ON
Vertical Expansion:	OFF
Horizontal Expansion:	OFF
Autocenter switch:	OFF
XY/YT switch:	YT
Memory switch:	ALL
Function switch:	RESET NUMERICS

DISK DRIVE (If supplied)

Track Protect switches:	Don't Care
Semi-Auto/Manual switch:	MANUAL
Track Segment:	MAINFRAME CONTROLLED

201 PLUG-IN

Storage Control:	LIVE
Protect 2H:	OFF
Time Per Point:	5 μ S
100 Hz Filter:	OFF
Range:	1 mV
Range Multiplier:	X1
Trigger Mode:	AUTO
Trigger Slope:	-DC
Input BNC switches:	GND
Channel A switch:	ON (if adjusting channel A).
Channel B switch:	ON (if adjusting channel B).
Trigger Source:	NOTE

NOTE: If the signal generator does not have a sync output, place the Trigger Source switch to (A) when servicing channel A, and to (B) when servicing channel B. If it has a sync output, place the switch to EXT and input the sync output to the EXT input BNC.

3.0.0. VOLTAGE CHECK

WARNING: The entire plug-in must be recalibrated if any of the voltage trimpot settings are altered. This procedure must be performed by qualified service personnel and only after replacing components.

NOTE: Allow the scope to warm up 15 minutes before proceeding.

3.1.1. Multimeter range: 0-20 mVDC

3.1.2. DC Level: Adjust trace to center of screen.

3.1.3. Measure the voltage at OVTP, (Figure 3-1).

3.1.4.

SPECIFICATION (See Figure 3-1)
Adjust R22 to near 0 volts.

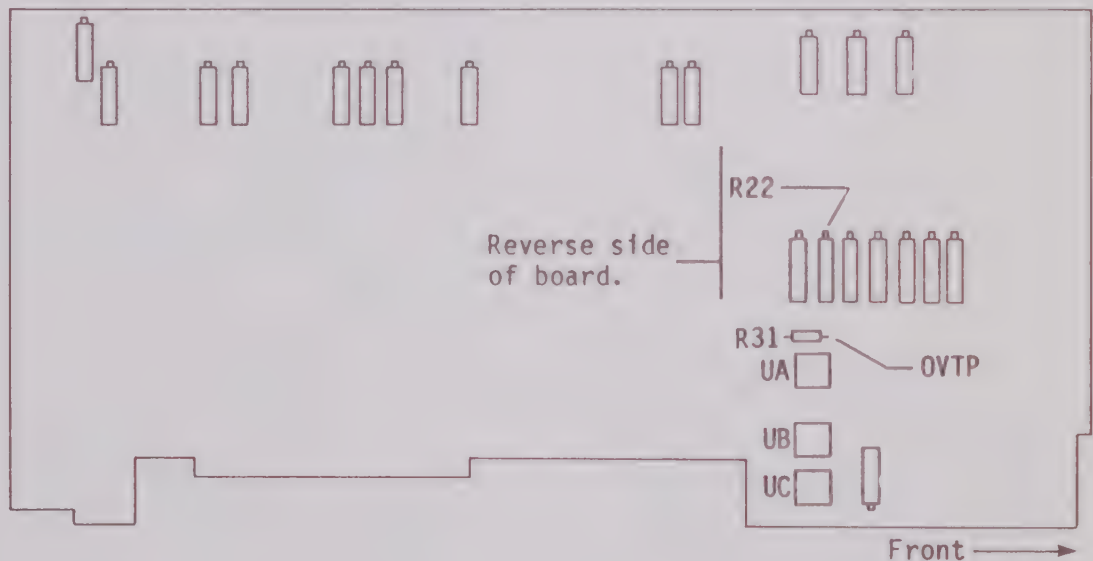


Figure 3-1

4.0.0. ADC GAIN & OFFSET ADJUSTMENTS

4.1.0. GAIN & OFFSET TEST

- 4.1.1. Range: 1V
- 4.1.2. Vertical Expansion: X32
- 4.1.3. Trigger Mode: NORM
- 4.1.4. (+) input switch: SIG
- 4.1.5. Apply a triangle waveform to the (+) input BNC.
 - a. Adjust for a one period display.
 - b. Adjust for a full screen display.

NOTE: If necessary, reposition the waveform using the Up/Down Cursor paddle.

- 4.1.6. DC Level: Full CCW
- 4.1.7. Slowly adjust the DC Level control fully clockwise while observing for Gain (Figure 4-1) or Offset (Figure 4-2) separations.

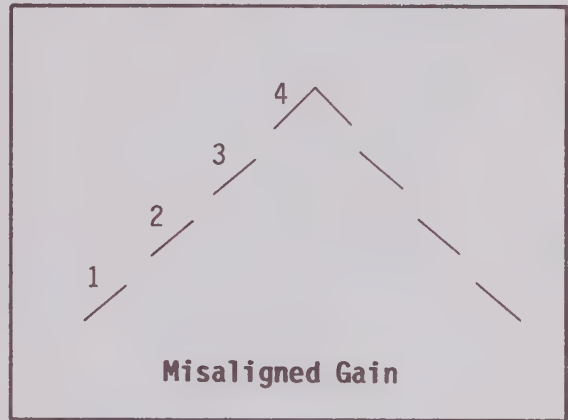
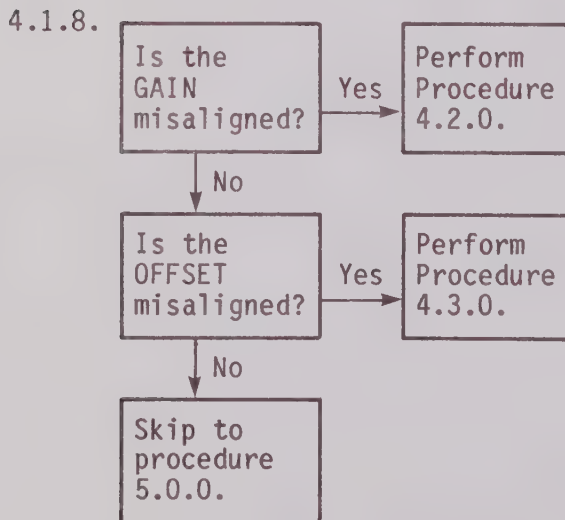


Figure 4-1



Figure 4-2

4.2.0. GAIN ADJUSTMENTS

4.2.1. Input a triangle wave to the (+) input BNC.

- a. Adjust for a one period, full screen display.

4.2.2. DC Level control: Full CCW

4.2.3. Slowly adjust the DC Level control in the CW direction until a full screen triangle waveform appears.

4.2.4. Slowly adjust the trimpot selected from 4.2.5 (starting with Stage 5) until a separation appears on the waveform.

NOTE: The DC Level control may require additional adjustment to isolate each separation as the trimpots are adjusted.

4.2.5.

STAGE	TRIMPOT
	See Figure 4-3
5	R133
4	R111
3	R91
2	R78
1	R52

4.2.6.

SPECIFICATION
Readjust the same trimpot until the separation disappears.

4.2.7. Repeat Step 4.2.4 for the next stage.



Figure 4-3

4.3.0. OFFSET ADJUSTMENTS

4.3.1. DC Level control: Full CCW.

4.3.2. Slowly adjust the DC Level control in the CW direction until a full screen triangle wave appears.

4.3.3. Slowly adjust the trimpot selected from 4.3.4 (starting with Stage 5) until a separation appears on the waveform.

NOTE: The DC Level control may require additional adjustment to isolate each separation as the trimpots are adjusted.

4.3.4.

STAGE	TRIMPOT
	See Figure 4-3
5	R125
4	R107
3	R85
2	R83
1	R51

4.4.0. GAIN & OFFSET CONFIRMATIONS

4.4.1. With the triangle waveform still applied to the (+) input BNC, slowly adjust the DC Level control from full CCW to full CW while observing for separations.

4.4.2.

SPECIFICATION

Repeat Procedure 4.0.0. if separations are observed.

4.4.3. Disconnect the signal generator from the input BNC.

4.3.5.

SPECIFICATION

Readjust the same trimpot until the separation disappears.

4.3.6. Repeat Step 4.3.3 for the next stage.

5.0.0. BALANCE ADJUSTMENTS

5.1.0. 10mV & 100mV RANGES

- 5.1.1. SIG/GND switches: GND
- 5.1.2. Range: 10mV
- 5.1.3. Range Multiplier: X1
- 5.1.4. Vertical Expansion: OFF
- 5.1.5. DC Level control: Adjust trace to center of screen.
- 5.1.6. Vertical Expansion: X64
- 5.1.7. Autocenter: ON, then OFF
- 5.1.8. Range switch: 100mV
 - a. Observe the trace for a vertical shift.

5.1.9.

SPECIFICATION (See Figure 5-1)

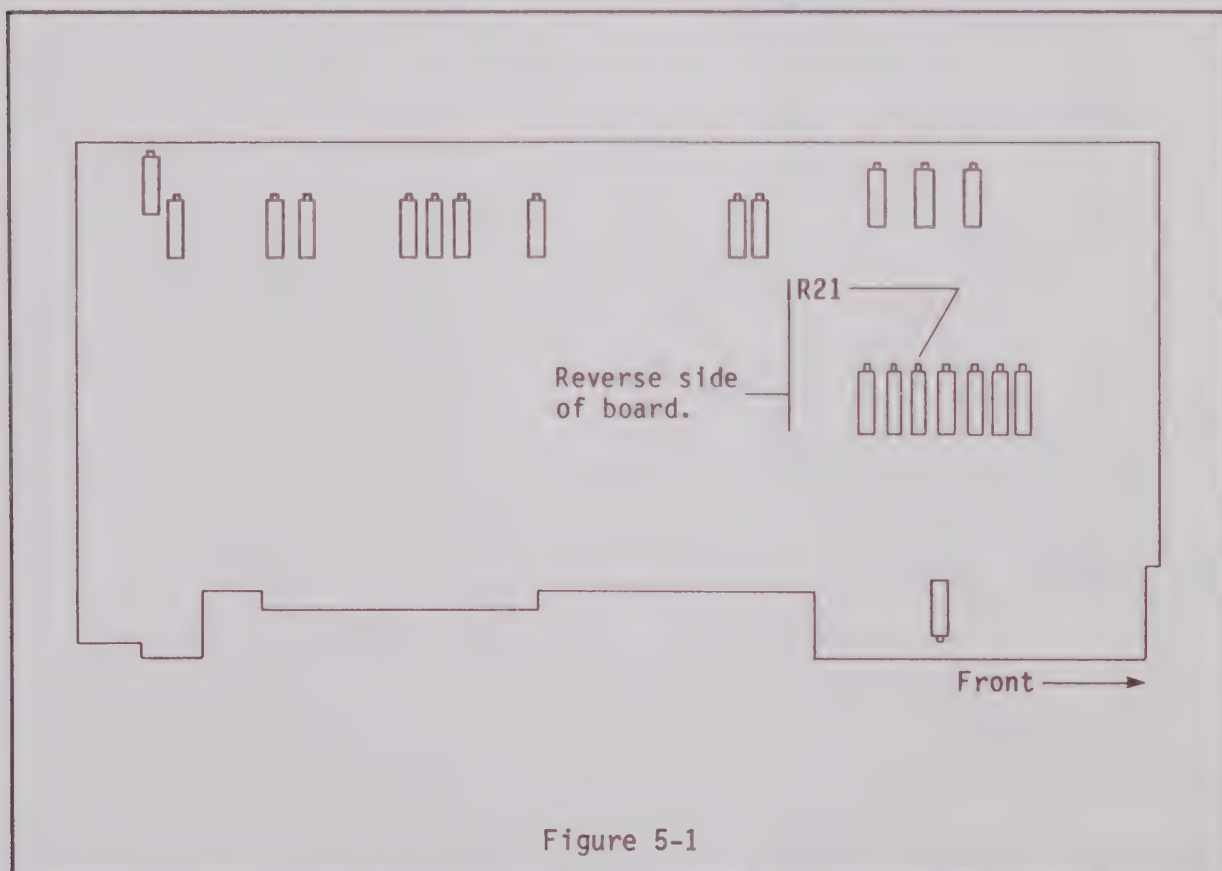
Adjust R21 until the trace is aligned with the horizontal cursor.

NOTE: Make the first adjustment without vertical expansion if the shift is excessive.

5.1.10.

SPECIFICATION

Repeat Steps 5.1.7 thru 5.1.9 until minimum shifting is achieved.



5.2.0. X1 & X4 MULTIPLIERS

5.2.1. Range Multiplier: X4

5.2.2. Autocenter: ON, then OFF

5.2.3. Range Multiplier: X1

- a. Observe trace for vertical shift.

5.2.4.

SPECIFICATION
(See Figure 5-2)

Adjust R40 until the trace is aligned with the horizontal cursor.

5.2.5. Repeat Steps 5.2.1 through 5.2.4 until minimum shifting is observed.

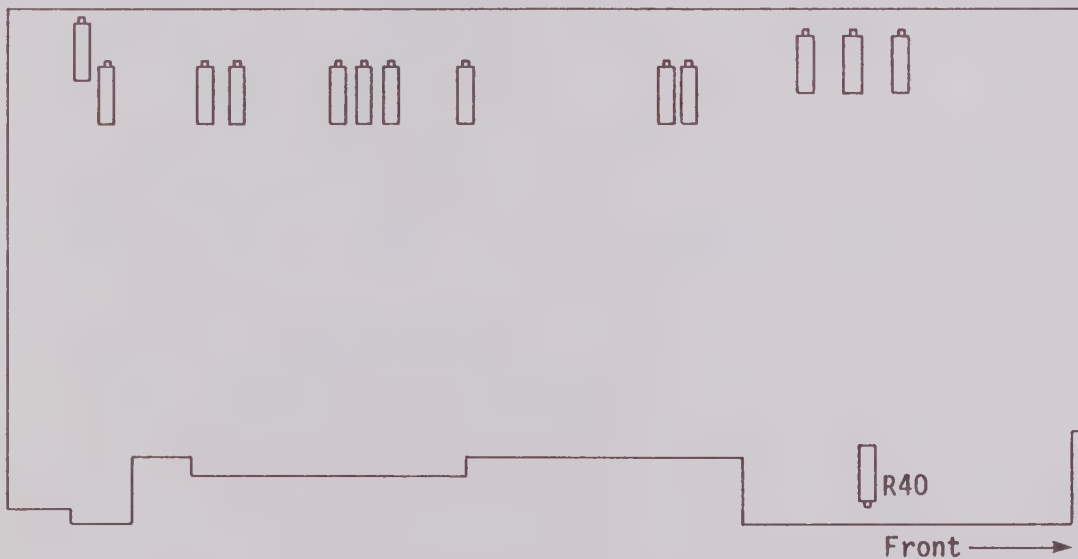


Figure 5-2

6.0.0. COMMON MODE ADJUSTMENT

- 6.1.1. Range: 1V
- 6.1.2. Range Multiplier: X1
- 6.1.3. Vertical Expansion: OFF
- 6.1.4. (+) Input BNC switch: SIG
- 6.1.5. Apply a 100 Hz square wave to the (+) input BNC and adjust the waveform's amplitude for a 3/4 full screen display.

NOTE: The Offset and Trigger Level controls may require adjustment.

- 6.1.6. (-) Input BNC switch: SIG
- 6.1.7. Apply the same signal to the (-) input BNC.

NOTE: The signal must be applied to both the (+) and (-) input BNC's at this point.

- 6.1.8. Autocenter: ON
- 6.1.9. Vertical Expansion: X64

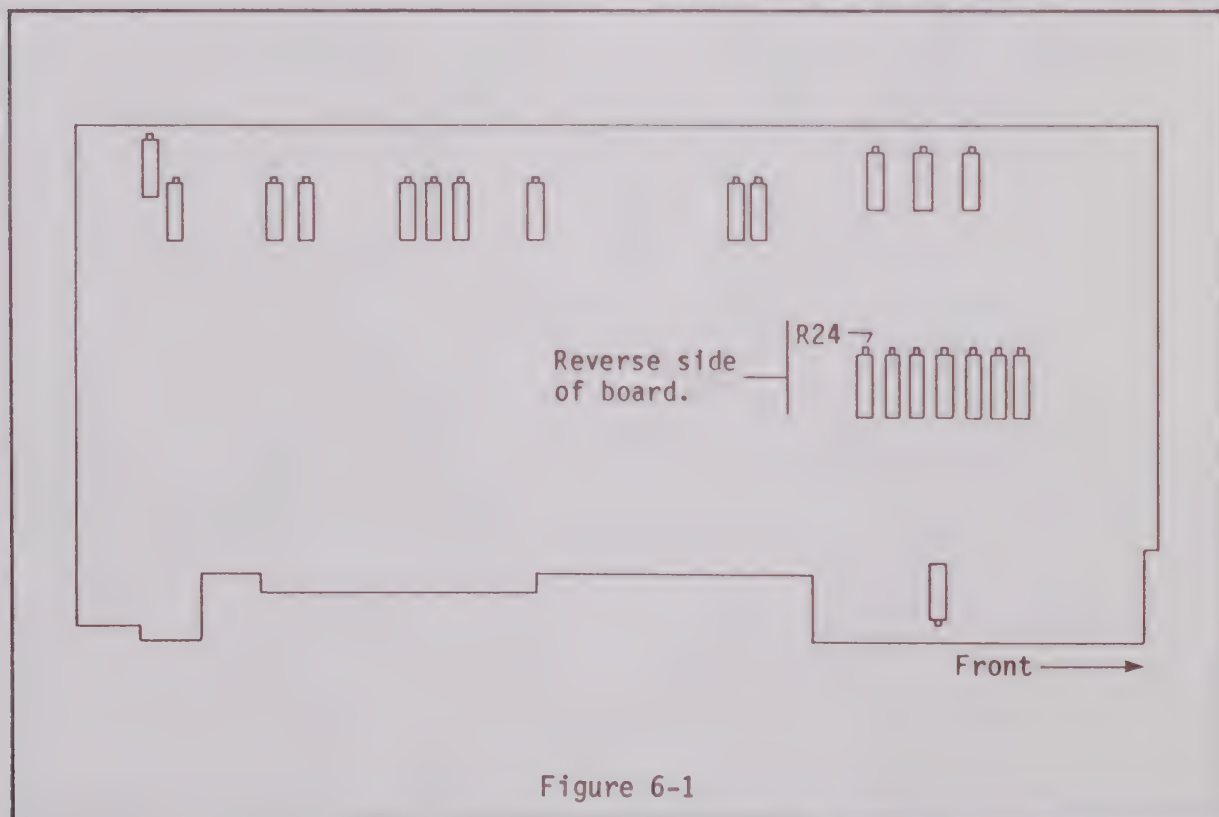
CAUTION: Use a nonconductive screwdriver during Step 6.1.10. to avoid shorting across components.

6.1.10.

SPECIFICATION
(See Figure 6-1)

Adjust R24 for the best straight line.

- 6.1.11. Vertical Expansion: OFF



7.0.0. GAIN ADJUSTMENTS

7.1.0. 1V, 2V, +10V & 100mV RANGES

7.1.1. (-) Input BNC switch: GND

7.1.2. Memory switch: ALL

7.1.3. Filter switch: ON

7.1.4. Time Per Point: 2 mS

7.1.5. Autocenter: OFF

7.1.6. Place the Range, Multiplier, and Multimeter to the ranges selected from 7.1.7. (starting with Step #1) and then continue with 7.1.8.

7.1.7.

STEP	RANGE	MULT.	METER
#1	1V	X1	0-2V
#2	1V	X2	0-4V
#3	1V	X4	0-10V
#4	10V	X1	0-20V
#5	100mV	X1	0-200mV

7.1.8. Apply a 0.2 Hz Square wave signal to the (+) input BNC and adjust the waveform's amplitude for a 3/4 full screen display.

NOTE: The Offset and Trigger Level controls may require adjustment.

7.1.9. Remove the signal from the (-) input BNC and apply the signal to the multimeter.

NOTE: The signal should be input to the (+) input BNC and the multimeter at this point.

7.1.10. Record both (+) and (-) multimeter readings and ADD absolute values to obtain the peak-to-peak voltage.

7.1.11. Press the HOLD NEXT button.

NOTE: Wait until the waveform has been stored, (Hold Last LED illuminated only) before continuing.

7.1.12. Autocenter switch: ON

7.1.13. Vertical Expansion: X64

NOTE: Several levels of data points will be displayed due to a certain amount of "noise," (Figure 7-1).

7.1.14. Position the crosshair over the level with the majority of data points, (Figure 7-2).

7.1.15. Vertical Expansion: OFF

7.1.16. Function switch: RESET

7.1.17. Depress the Execute button.
a. The Time and Voltage Numerics reset to zero.

7.1.18. Position the crosshair over the opposite peak of the waveform.

7.1.19. Vertical Expansion: X64

7.1.20. Position the crosshair over the level with the majority of data points and record the peak-to-peak voltage.

7.1.21. Compute the Percent Error, (Equation 7-1).

7.1.22.

SPECIFICATION
The percent error should be less than 0.05%.

PERCENT ERROR EQUATION

$$\% \text{ Error} = \frac{V_s - V}{V_{fs}} \times 100$$

Equation #1

V = Voltage (Vpp) reading on scope.
 Vs = Standard meter voltage reading.
 Vfs = Volts Full Scale range x 2.048.
 (e.g., For the +2V range,
 Vfs = 2 x 2.048 = 4.096V.)



Figure 7-1



Figure 7-2

7.1.23. Adjust the trimpot selected from 7.1.26 for the Step in progress until the Percent Error is less than 0.05%.

7.1.24.

STEP	TRIMPOT
	Figure 7-3
#1	R9
#2	R7
#3	R5
#4	R15
#5	R19

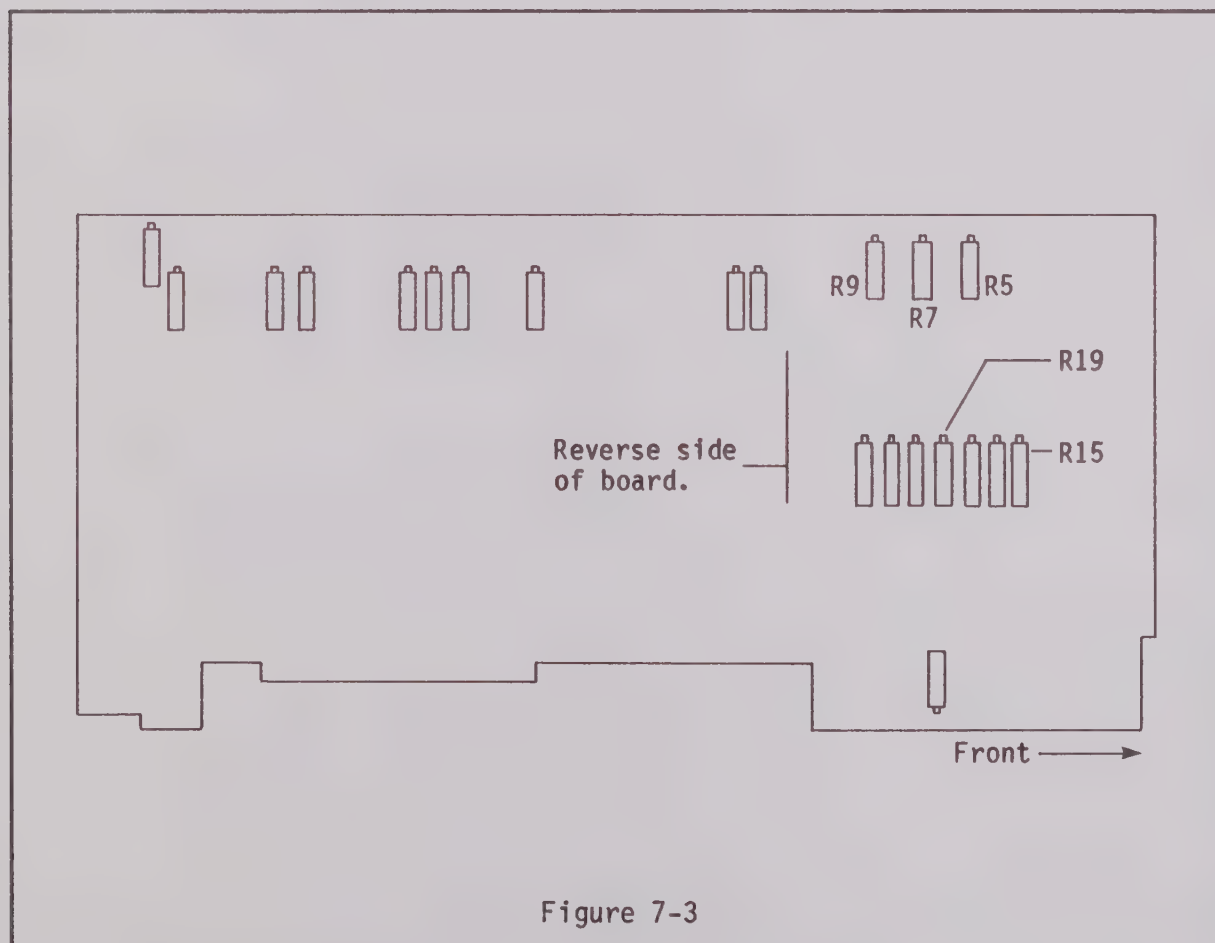
7.1.25. Press the LIVE button.

7.1.26. Vertical Expansion: OFF

7.1.27. Autocenter switch: OFF

7.1.28. Repeat Steps 7.1.11. through 7.1.27. until the Percent Error is less than 0.05%.

7.1.29. Repeat Steps 7.1.6 through 7.1.28 for the next "step" listed in Table 7.1.7.



7.2.0. 10mV RANGE

7.2.1. Range: 10mV

7.2.2. Apply the Square wave signal to the (+) input BNC using the attenuator network (Figure 7-4) and adjust for a 3/4 full screen display.

NOTE: The Offset and Trigger Level controls may require adjustment.

7.2.3. Multimeter range: 0-20mV

7.2.4. Apply the same signal to the multimeter.

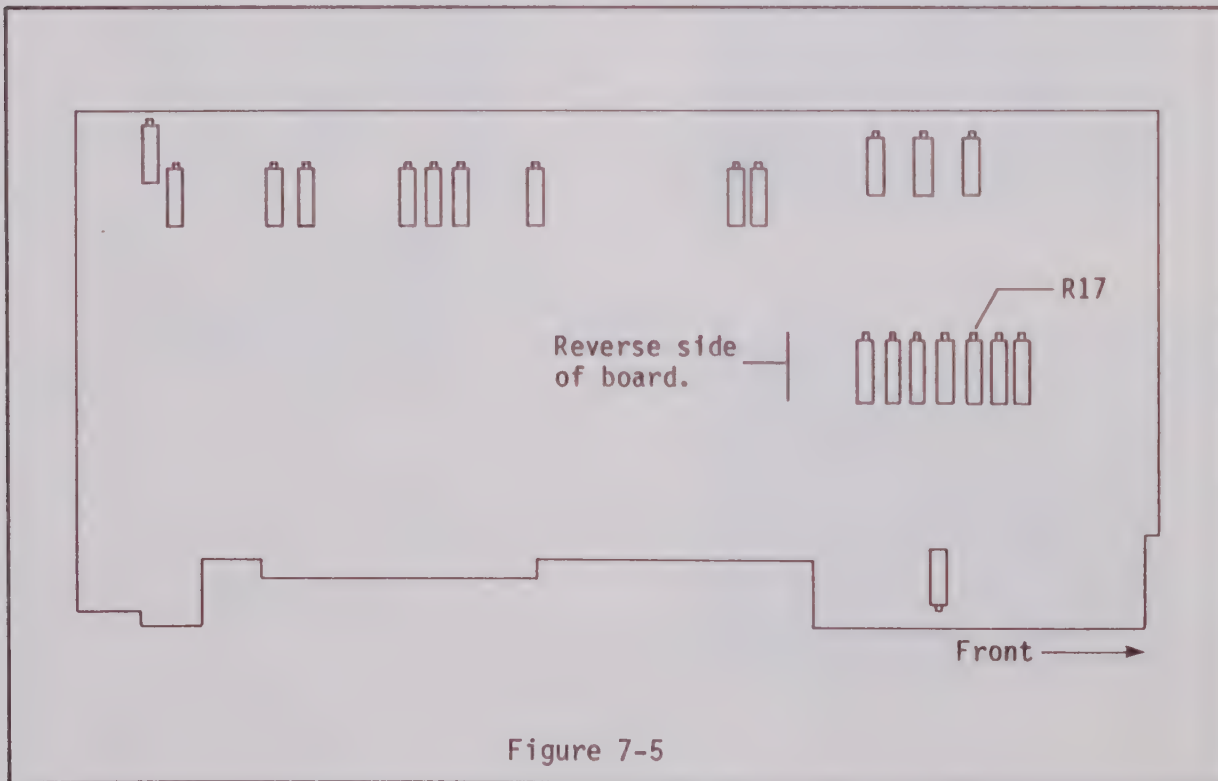
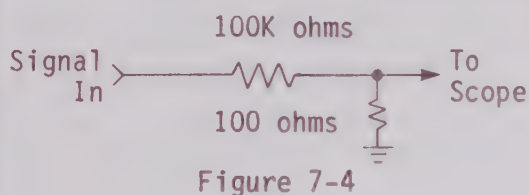
NOTE: The square wave signal must be input to the (+) input BNC and the meter at this point.

7.2.5. Substitute R17 for Step 7.1.24 and repeat Steps 7.1.10. through 7.1.28.

7.2.6.

SPECIFICATION
(See Figure 7-5)

Adjust R17 until the Percent Error is less than 0.05%.



7.3.0. -10V RANGE

7.3.1. Remove the attenuator network.

7.3.2. Range: 10V

7.3.3. Reapply the square wave signal to the (+) input BNC and adjust for a 3/4 full screen display.

7.3.4. Apply the same signal to the (-) input BNC.

NOTE: The signal must be applied to both the (+) and (-) inputs.

7.3.5. Autocenter: ON

7.3.6. Vertical Expansion: X64

7.3.7.

SPECIFICATION
(See Figure 7-6)

Adjust R15 for the best straight line.

7.3.8. Vertical Expansion: OFF

7.3.9. Remove the signals from the input BNCs.

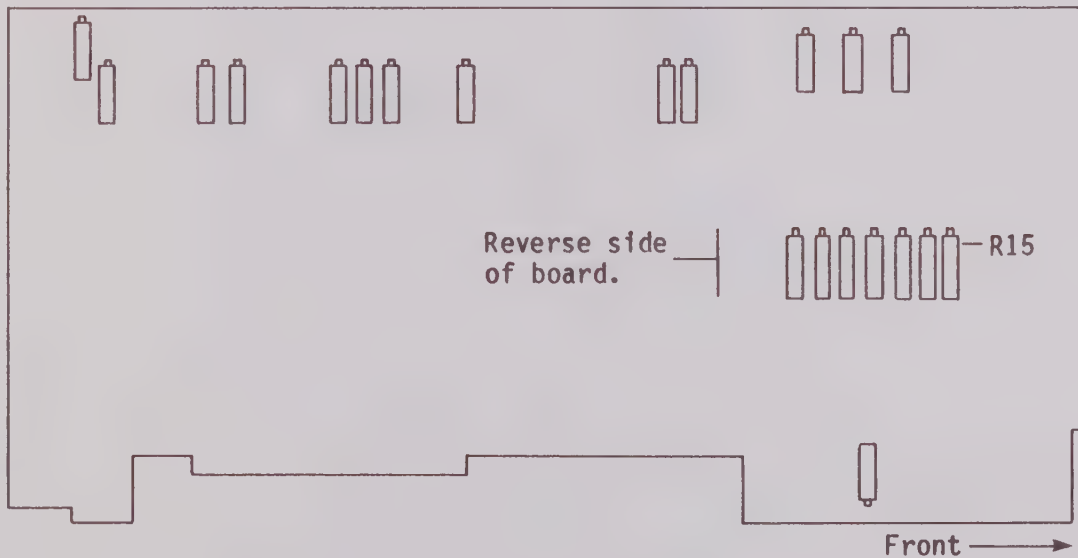


Figure 7-6

8.0.0. TIME BASE CHECK

NOTE: No adjustments are performed in this test. The oscillator circuitry will require repair if Specification 8.2.3 is not met. Use a calibrated digital frequency counter.

8.1.1. Turn on the 2090 and allow it to warm up.

CAUTION: Carefully perform the next step to prevent shorting the probe to other pins or traces.

8.2.2. Measure the frequency (Time Base) at IC32, Pin 2, (Figure 8-1).

8.2.3.

SPECIFICATION
The measured frequency should be no greater than 20.005 MHz or less than 19.995 MHz

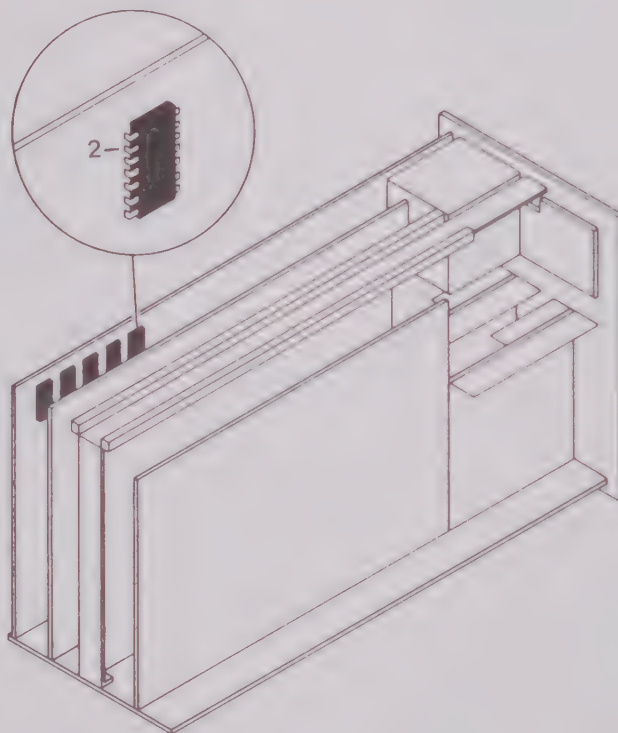


Figure 8-1

9.0.0. OSCILLOSCOPE REASSEMBLY

WARNING: Remove all power from the 2090 before continuing.

► **IMPORTANT:** Perform this procedure after both channel A and channel B adjustments have been completed.

- 9.1.1. Disconnect the ribbon cable from the rear of the plug-in.
- 9.1.2. Resolder the (-) input BNC wire.
- 9.1.3. Plug the channel A Amplifier board into the Mother board.
- 9.1.4. Resolder the (+) input BNC wire.

- 9.1.5. Replace the DC Level control knob and secure.

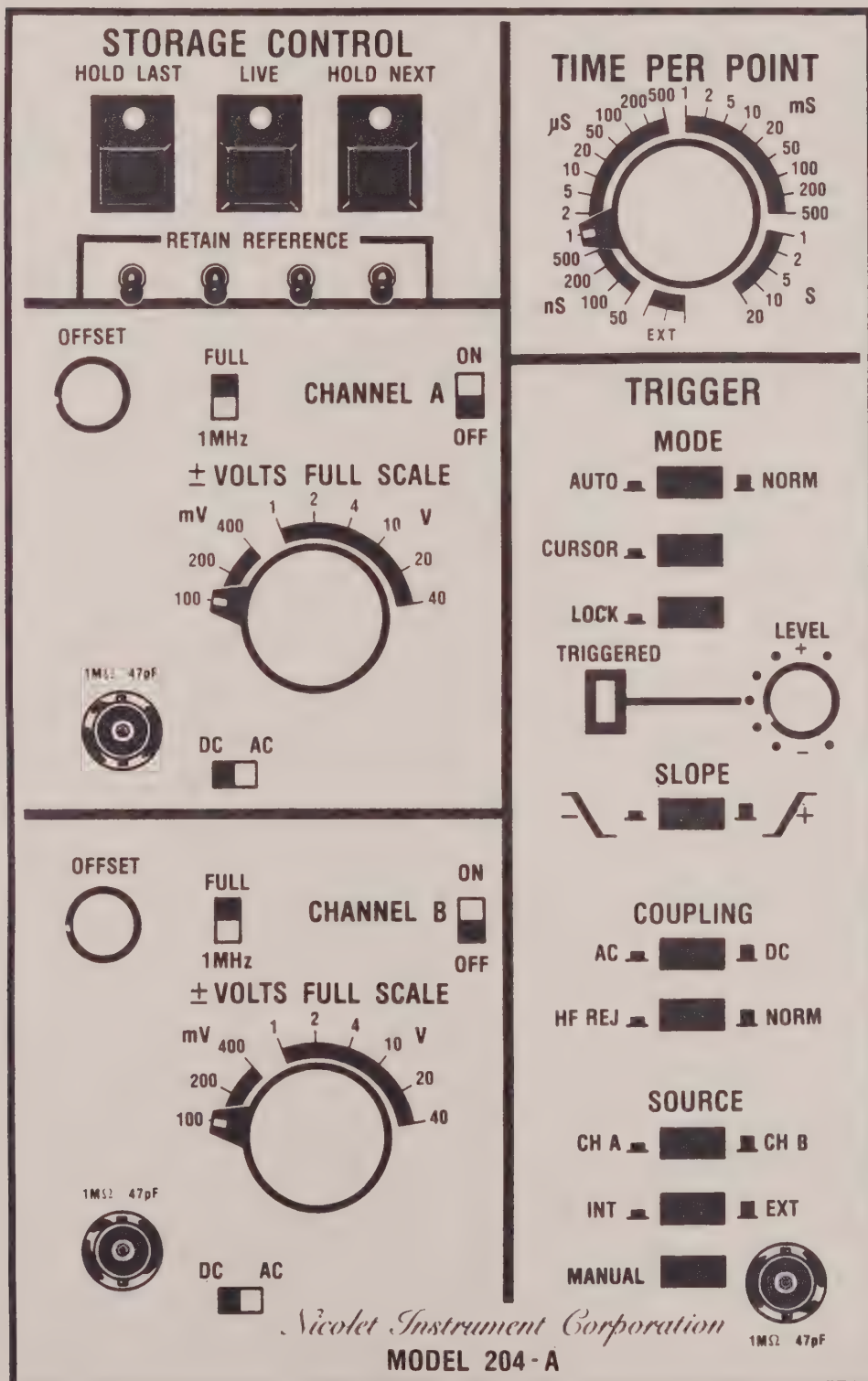
- 9.1.6. Slide the plug-in halfway into the scope and reconnect the ribbon cable to the rear of the plug-in.

- 9.1.7. Slide the plug-in the rest of the way into the scope and reconnect the ground to the Ground Connector.

CAUTION: Inspect the interior of the oscilloscope for any loose connections or foreign objects.

- 9.1.8. Replace the left side cover and secure.

Model 204-A Plug-in



INTRODUCTION

This section contains the alignment and calibration procedures for the **Model 204-A Plug-in**. Read each procedure before servicing this instrument.

WARNING: High voltages exist within this instrument. Observe all safety standards set by your place of employment. This instrument should be serviced by qualified personnel only.

► **IMPORTANT:** Perform procedures 2.0.0 through 9.0.0 for the channel A Amplifier and then repeat for the channel B Amplifier.

► **IMPORTANT:** These procedures are sequential. Do not skip any procedures or steps.

INDEX

PROCEDURE	PAGE
1.0.0. Preparation	5-4
2.0.0. Set-Up	5-5
3.0.0. Voltage Check	5-6
4.0.0. Input Resistance	5-7
5.0.0. Balance	5-8
6.0.0. Amplifier Response	5-9
7.0.0. Gain	5-10
8.0.0. Frequency Comp.	5-13
9.0.0. Input Capacitance	5-15
10.0.0. Time Base Check	5-18

REQUIREMENTS

The following materials are required to perform the **Model 204-A Plug-in** alignment procedures.

FUNCTION GENERATOR

- #1. Output: Square wave with sync output.
- #2. Amplitudes: $100 \text{ mV}_{pp} - 20 \text{ V}_{pp}$
- #3. Frequencies: $0.2 \text{ Hz} - 20 \text{ MHz}$

DIGITAL MULTIMETER

- #1. Resolution: 4-1/2 or 5-1/2 digits
- #2. Accuracy: .05% of input, DC volts

ANALOG OSCILLOSCOPE

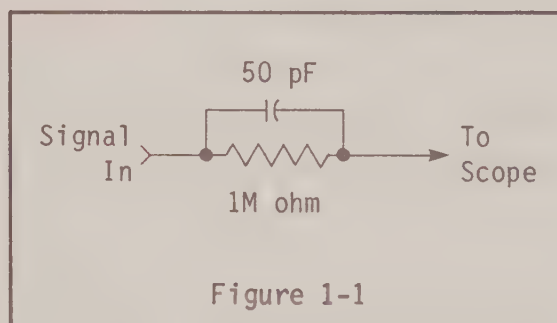
- #1. Bandwidth: 100 MHz

TOOLS

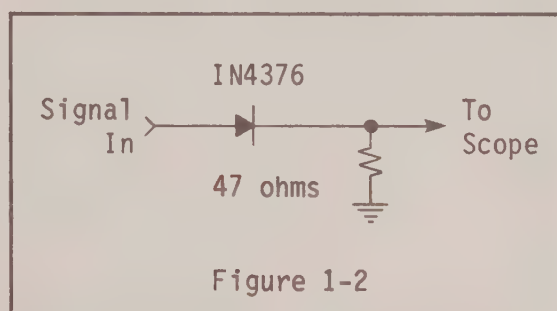
- #1. Phillips screwdriver, (#1)
- #2. Common screwdriver, (3/16")
- #3. Nonmetallic adjustment screwdriver.

NETWORKS

- #1. Input Capacitance:



- #2. Frequency Compensation:



1.0.0. PREPARATION

The left side cover must be removed to prepare the **Model 204-A Plug-in** for alignment.

WARNING: Remove all power from the 2090 before proceeding.

NOTE: All of the adjustments should be performed with the digitizer shields in place and the plug-in's front panel secured to the frame. Some adjustments will be affected if the shields are not in place.

1.1.1. Remove the two left side cover securing screws, but do not remove the cover.

NOTE: Remove the cover only when making adjustments and then replace immediately.

2.0.0. SET-UP PROCEDURE

MAINFRAME CONTROLS

Power On/Off: ON
Vertical Expansion: OFF
Horizontal Expansion: OFF
Autocenter switch: OFF
XY/YT switch: YT
Memory switch: ALL
Function switch: RESET NUMERICS

DISK DRIVE (If supplied)

Track Protect switches: Don't Care
Semi-Auto/Manual switch: MANUAL
Track Segment: MAINFRAME CONTROLLED

204-A PLUG-IN

Channel A switch: ON (If adjusting channel A).
Channel B switch: ON (If adjusting channel B).
Storage Control: LIVE
Time Per Point: 500nS
Volts Full Scale: 100mV
1 MHz Filter: FULL
Retain Reference: (All down) OFF
Offset Control: Adjust trace to center of screen.
Trigger Slope: (-)
Trigger Mode:
a. Auto/Norm: AUTO
b. Cursor: Out
c. Lock: Out
Trigger Coupling:
a. AC/DC: DC
b. HF REJ/NORM: NORM
Trigger Source:
a. ChA/ChB: NOTE 1
b. Int/Ext: NOTE 1
Trigger Level: Adjust for a stable trace.

NOTE 1: If the signal generator does not have a sync output, position the Trigger Source buttons to INT and (A) when adjusting channel A, or INT and (B) when adjusting channel B. If it has a sync output, select EXT and connect the sync output to the EXT input BNC.

3.0.0. VOLTAGE CHECK

WARNING: The entire plug-in must be recalibrated if any of the voltage trimpot settings are altered. This procedure must be performed by qualified service personnel and only after replacing components.

NOTE: Allow the scope to warm up 15 minutes before proceeding.

3.1.1. Multimeter range: 0-20 Vdc

3.1.2. Measure the voltage at -2VTP, (Figure 3-1).

3.1.3.

SPECIFICATION
(See Figure 3-1)

Adjust R9 for -2 Vdc $\pm 1\%$

CAUTION: Use an insulated probe during Step 3.1.4 to avoid shorting to the heatsink.

3.1.4. Measure the voltage at +6VTP, (Figure 3-1).

3.1.5.

SPECIFICATION
(See Figure 3-1)

Adjust R40 for +6 Vdc $\pm 1\%$

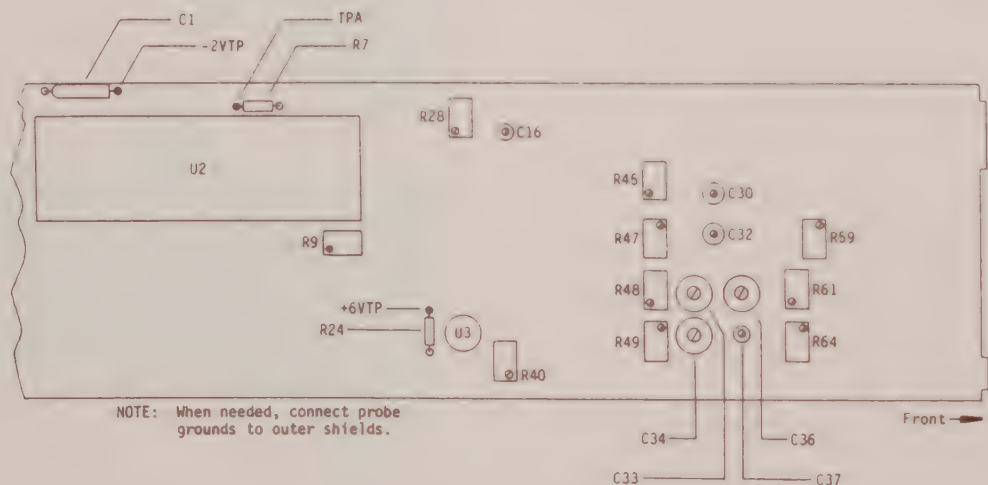


Figure 3-1

4.0.0. INPUT RESISTANCE CHECK

4.1.1. Multimeter range: 2 Megohms

4.1.2. Connect the multimeter to the input BNC.

4.1.3.

SPECIFICATION
Record the resistance reading, (1 Megohm <u>+1%</u>).

4.1.4. Volts Full Scale: 1V

4.1.5.

SPECIFICATION (See Figure 4-1)
Adjust R48 for the same reading as recorded in Step 4.1.3, (<u>+1%</u>).

4.1.6. Volts Full Scale: 10V

4.1.7.

SPECIFICATION (See Figure 4-1)
Adjust R49 for the same reading as recorded in Step 4.1.3, (<u>+1%</u>).

4.1.8. Disconnect the multimeter from the input BNC.

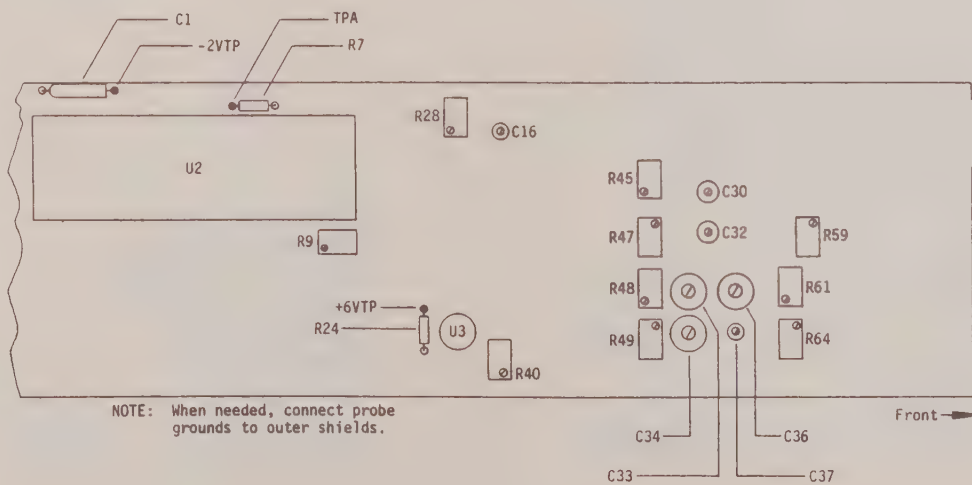


Figure 4-1

5.0.0. BALANCE ADJUSTMENTS

- 5.1.1. Ground the input BNC.
 5.1.2. Volts Full Scale: 100 mV
 5.1.3. Filter switch: 1 MHz
 5.1.4. Vertical Expansion: X16
 5.1.5. Autocenter: ON, then OFF
 5.1.6. Volts Full Scale: Switch between the 100, 200 and 400 mV ranges.
 a. Observe the trace for a vertical shift.

5.1.7.

SPECIFICATION
 (See Figure 5-1)

Adjust R59 until the trace is aligned with the horizontal cursor.

NOTE: Make the first adjustment without vertical expansion if the shift is excessive.

- 5.1.8. Repeat Steps 5.1.5 through 5.1.7 until minimum shifting is achieved.
 5.1.9. Volts Full Scale: Switch between all of the ranges.
 a. Observe the trace for a vertical shift.

5.1.10.

SPECIFICATION
 (See Figure 5-1)

If necessary, readjust R59 for minimum shifting of the trace.

- 5.1.11. Vertical Expansion: OFF
 5.1.12. Unground the input BNC.

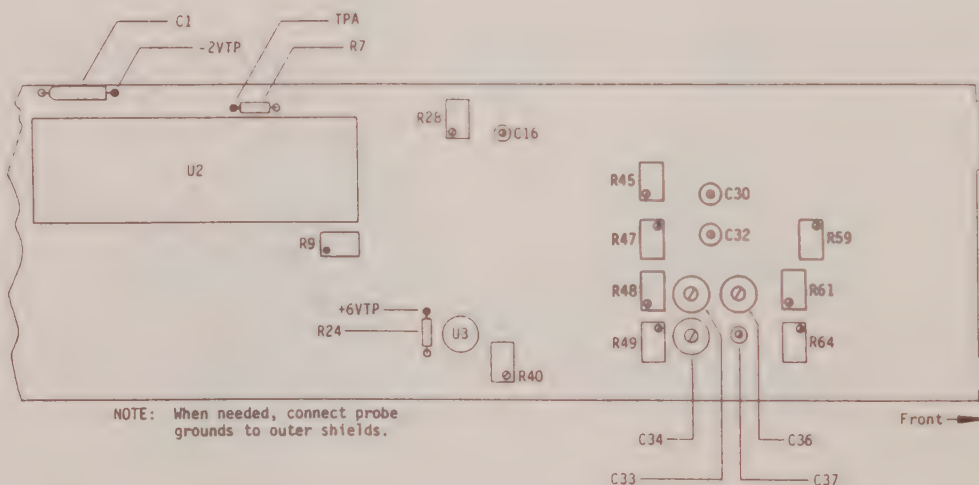


Figure 5-1

6.0.0. AMPLIFIER RESPONSE

6.1.1. Volts Full Scale: 100 mV

6.1.2. Filter switch: FULL

6.1.3. Signal Generator: Apply a 100 kHz square wave (20 MHz or better bandwidth) to the input BNC and adjust its amplitude for a 3/4 full screen display.

NOTE: The OFFSET and trigger LEVEL controls may require adjustment.

6.1.4. Analog Scope Settings:
 Channel 1: 0.5 V/Div.
 Channel 2: 50 mV/Div. Inverted
 Coupling: DC
 Time Base: 0.05 μ Sec/Div.
 Trigger: Internal
 Slope: (-)

6.1.5. Connect the analog scope to the output of the signal generator and to test point TPA on the Digitizer board, (Figure 5-1).

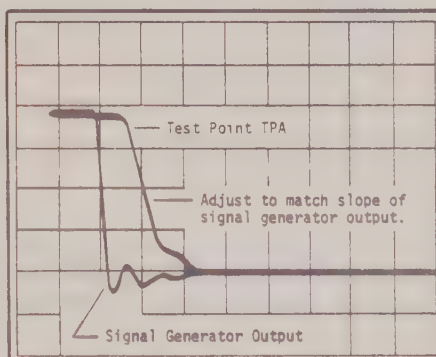
6.1.6.

SPECIFICATION (See Figure 5-1)

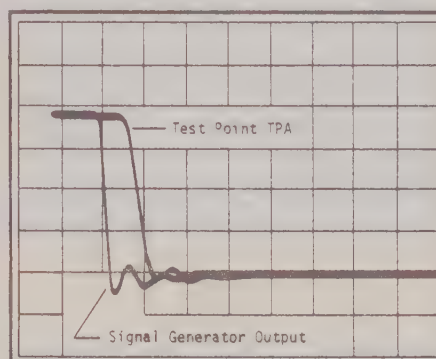
Adjust C16 until the slopes of the signal source's output and test point TPA are identical. See Figures 6-1 and 6-2.

CAUTION: Turning C16 too far in the counterclockwise direction may cause the adjustment screw to fall out.

6.1.7. Disconnect the analog scope.



Unacceptable Response
 Figure 6-1



Acceptable Response
 Figure 6-2

7.0.0. GAIN ADJUSTMENTS

NOTE: Adjust channel A first and then channel B as required.

- 7.1.1. Memory switch: Q1
- 7.1.2. Autocenter: OFF
- 7.1.3. Filter switch: 1 MHz
- 7.1.4. Time Per Point: 5 mS
- 7.1.5. Place the Volts Full Scale, and Multimeter to the ranges selected from 7.1.6. (starting with Step #1) and then continue with 7.1.7.

7.1.6.

STEP	V.F.S.	METER
#1	100mV	0-200mVdc
#2	200mV	0-400mVdc
#3	400mV	0-800mVdc
#4	1V	0-2Vdc
#5	10V	0-20Vdc

- 7.1.7. Apply a 0.2 Hz Square wave signal to the input BNC and adjust the waveform's amplitude for a 3/4 full screen display.

NOTE: The Offset and Trigger Level controls may require adjustment.

- 7.1.8. Input the same signal to the multimeter.

NOTE: The signal should be input to both the plug-in and the multimeter at this point.

- 7.1.9. Record both (+) and (-) multimeter readings and ADD absolute values to obtain the peak-to-peak voltage.

- 7.1.10. Press the HOLD NEXT button.

NOTE: Wait until the waveform has been stored, (Hold Last LED illuminated only) before continuing.

- 7.1.11. Autocenter switch: ON

7.1.12. Vertical Expansion: X16

NOTE: Several levels of data points will be displayed due to a certain amount of "noise," (Figure 7-1).

7.1.13. Position the crosshair over the level with the majority of data points, (Figure 7-2).

7.1.14. Vertical Expansion: OFF

7.1.15. Function switch: RESET

7.1.16. Press the Execute button.
a. The Time and Voltage Numerics reset to zero.

7.1.17. Position the crosshair to the opposite peak of the waveform.

7.1.18. Vertical Expansion: X16

7.1.19. Position the crosshair over the level with the majority of data points and record the peak-to-peak voltage.

7.1.20. Compute the Error, (Equation 7-1).

7.1.21.

SPECIFICATION

The error should be less than the Error Value listed in 7.1.22 for the Step in progress.

7.1.22.

STEP	ERROR VALUE
#1	1 mV
#2	2 mV
#3	4 mV
#4	10 mV
#5	0.1 V

ERROR VALUE EQUATION

$$\text{Error} = V_m - V_s$$

Equation 7-1

V_m = Meter (Vpp) voltage reading recorded in Step 7.1.9.

V_s = Scope (Vpp) voltage reading recorded in Step 7.1.19.

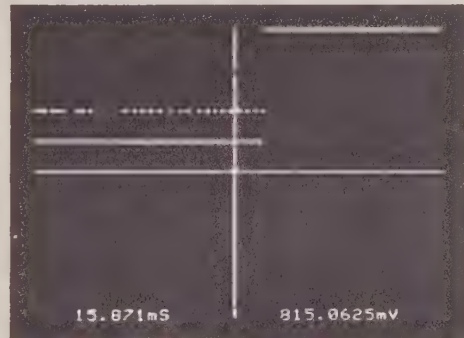


Figure 7-1

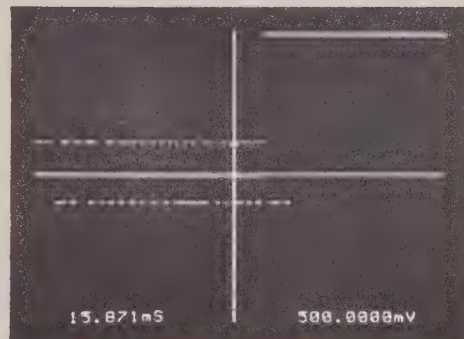


Figure 7-2

7.1.23. Adjust the trimpot selected from 7.1.24 for the Step in progress until the Error Value is less than listed in Step 7.2.22.

7.1.24.

STEP	TRIMPOT
	Figure 7-3
#1	R28
#2	R47
#3	R45
#4	R61
#5	R64

7.1.25. Press the LIVE button.

7.1.26. Vertical Expansion: OFF

7.1.27. Autocenter switch: OFF

7.1.28. Repeat Steps 7.1.10 through 7.1.27 until the Error is less than that which is listed in specification 7.1.22.

7.1.29. Repeat Steps 7.1.5. through 7.1.27 for the next "step" listed in Table 7.1.6.

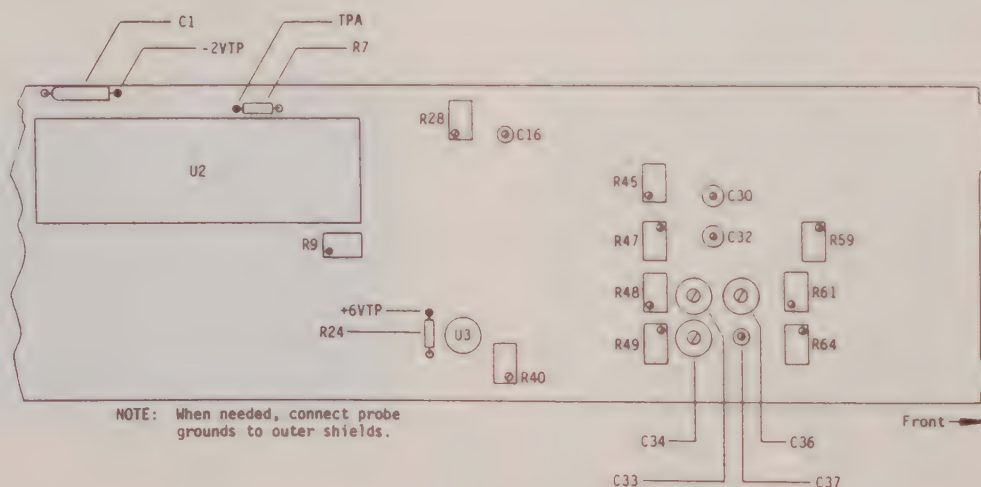


Figure 7-3

8.0.0. FREQUENCY COMPENSATION

- 8.1.1. Vertical Expansion: OFF
- 8.1.2. Filter switch: FULL
- 8.1.3. Memory switch: ALL
- 8.1.4. Select the Volts Full Scale (VFS), Time Per Point (TPP) and Signal Generator output (GEN) ranges from 8.1.5. (starting with Step #1) and then continue with 8.1.6.

8.1.5.

STEP	VFS	TPP	GEN
#1	200mV	50nS	100kHz
#2	400mV	50nS	100kHz
#3	1V	500nS	10kHz
#4	2V	500nS	10kHz
#5	4V	500nS	10kHz
#6	10V	500nS	10kHz

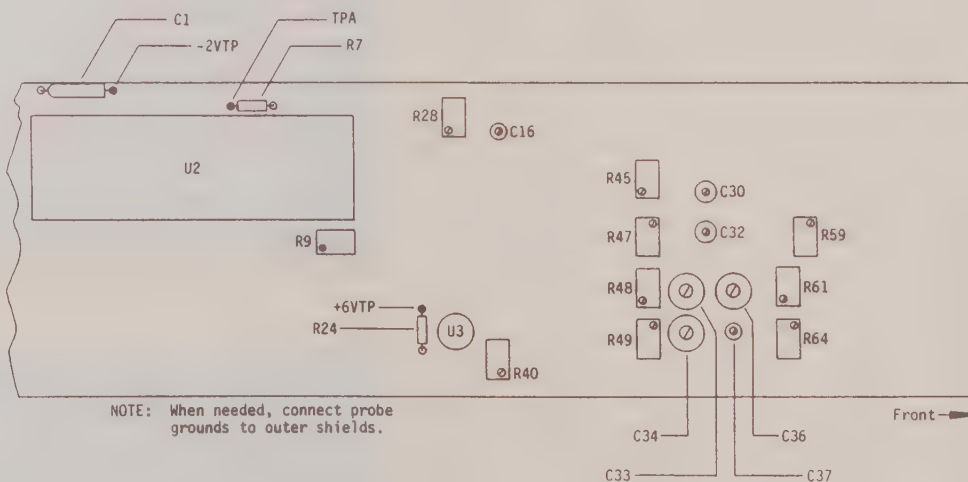


Figure 8-1

8.1.6. Apply a square wave to the input BNC using the Frequency Compensation Network (Figure 1-2) and adjust its amplitude for a 3/4 full screen display.

8.1.7. Vertical Expansion: X4

8.1.8. Horizontal Expansion: X16

8.1.9. Autocenter: ON

8.1.10. Offset control: Adjust for minimum "noise" on display.

8.1.11.

SPECIFICATION
(See Figure 8-1)

Adjust the trimmer selected from 8.1.12 (for the step in progress) for the best negative cycle response, (Figures 8-2 thru 8-4).

8.1.12.

STEP	TRIMMER
#1	C32
#2	C30
#3	C36
#4	C32
#5	C30
#6	C37

8.1.13. Vertical Expansion: OFF

8.1.14. Horizontal Expansion: OFF



Figure 8-2 - With overshoot



Figure 8-3 - With undershoot



Figure 8-4 - Acceptable

9.0.0. INPUT CAPACITANCE

The series number of the Model 204-A Digitizer board must be determined to select the proper Input Capacitance procedure.

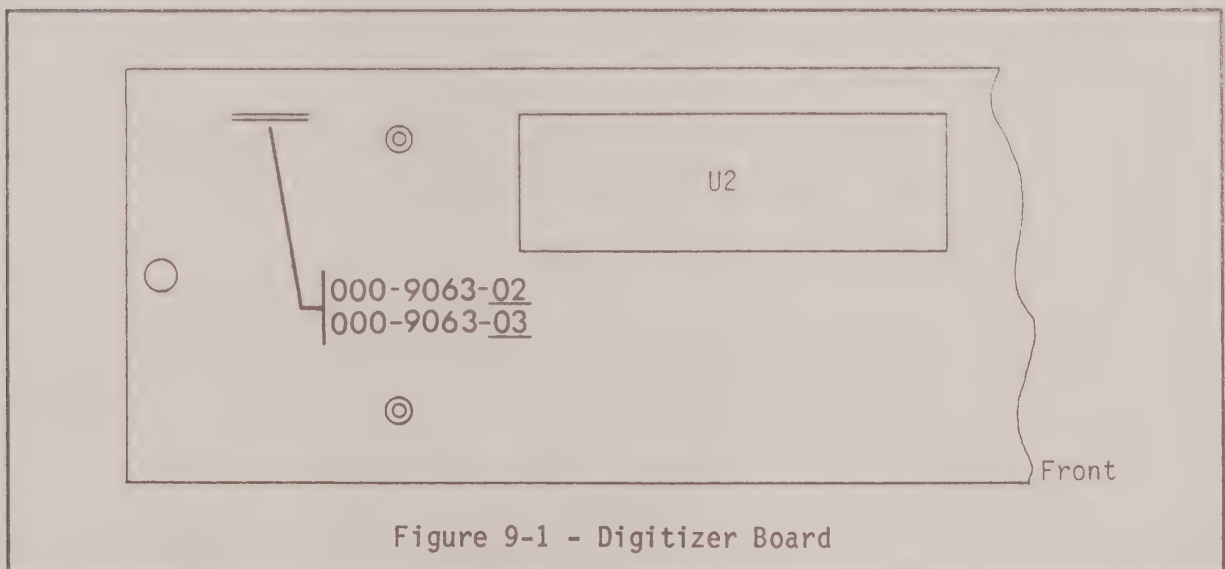
To determine the series, locate the Digitizer board's part number, (Figure 9-1).

Last Two Digits = 02 (or lower)

- a. Perform Procedure 9.1.0, page 5-16.

Last Two Digits = 03 (or higher)

- a. Perform Procedure 9.2.0, page 5-17.



9.1.0. SERIES -02 OR LOWER

- 9.1.1. Volts Full Scale: 1V
- 9.1.2. Time Per Point: 50 nS
- 9.1.3. Apply a 10 kHz square wave signal to the input BNC using the capacitance network illustrated in Figure 1-1, page 5-3.
- a. Adjust the signal's amplitude for a 3/4 full screen display.

9.1.4. Vertical Expansion: X4

9.1.5. Horizontal Expansion: X2

9.1.6.

SPECIFICATION
(See Figure 9-2)

Adjust C33 for the best square wave response.

9.1.8. Volts Full Scale: 10V

- 9.1.9. Apply a 10 kHz square wave signal to the input BNC using the capacitance network.
- a. Adjust the signal's amplitude for a 3/4 full screen display.

9.1.10. Vertical Expansion: X4

9.1.11.

SPECIFICATION
(See Figure 9-2)

Adjust C34 for the best square wave response.

► **IMPORTANT:** Repeat Procedure 8.0.0. (Frequency Compensation) after completing this procedure to verify proper alignment.

9.1.7. Vertical Expansion: OFF

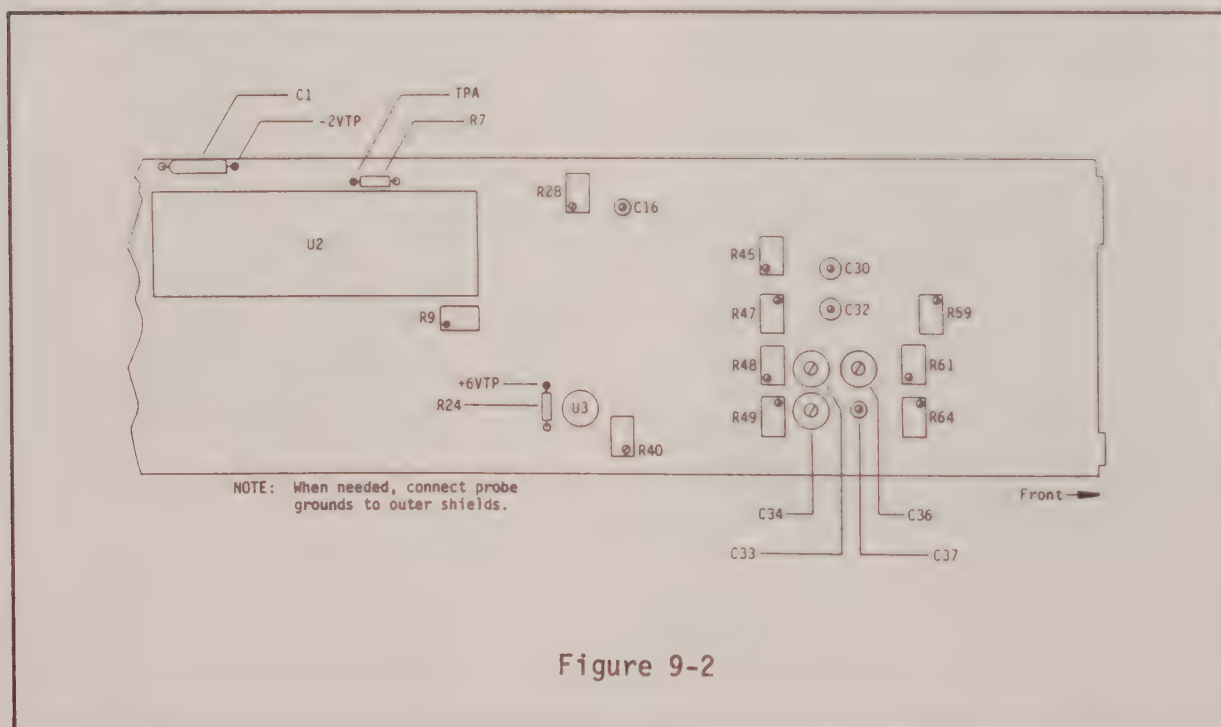


Figure 9-2

9.2.0. SERIES -03 OR GREATER

- 9.2.1. Volts Full Scale: 100 mV
- 9.2.2. Time Per Point: 50 nS
- 9.2.3. Apply a 10 kHz square wave signal to the input BNC using the capacitance network illustrated in Figure 1-1, page 5-3.
- a. Adjust the signal's amplitude for a 3/4 full screen display.
- 9.2.4. Horizontal Expansion: X2
- 9.2.5. Retain Reference switches:
- a. Switches 1 & 3: UP
- b. Switches 2 & 4: DOWN
- 9.2.6. Volts Full Scale: 1V
- a. Adjust the signal's amplitude for a 3/4 full screen display.
- 9.2.7. Vertical Expansion: X4
- 9.2.8. Offset control: Adjust until retained waveform and "live" waveform are superimposed.

9.2.9.

SPECIFICATION
(See Figure 9-2)

Adjust C33 until the slopes of the "live" waveform match the slopes of the "retained" waveform.

- 9.2.10. Vertical Expansion: OFF
- 9.2.11. Volts Full Scale: 10V
- 9.2.12. Adjust the signal's amplitude for a 3/4 full screen display, or as large a signal obtainable from the signal generator.
- 9.2.13. Vertical Expansion: X8
- 9.2.14.

SPECIFICATION
(See Figure 9-2)

Adjust C34 until the slopes of the "live" waveform match the slopes of the "retained" waveform.

- 9.2.15. Horizontal Expansion: OFF
- 9.2.16. Retain Reference switches:
- a. Place all four switches in the down (Off) positions.

► **IMPORTANT:** Repeat Procedure 8.0.0. (Frequency Compensation) after completing this procedure to verify proper alignment.

10.0.0. TIME BASE CHECK

NOTE: Use a Calibrated Digital Frequency Counter in this procedure.

10.1.1. Turn on the 2090 and allow it to warm up.

NOTE: No adjustments are performed in this test. The oscillator circuitry will require repair if Specification 10.2.3 is not met.

CAUTION: Carefully perform the next step to prevent shorting the probe to other pins or traces.

10.2.2. Measure the frequency (Time Base) at IC32, Pin 2, (Figure 10-1).

10.2.3.

SPECIFICATION
The measured frequency should be no greater than 20.005 MHz or less than 19.995 MHz

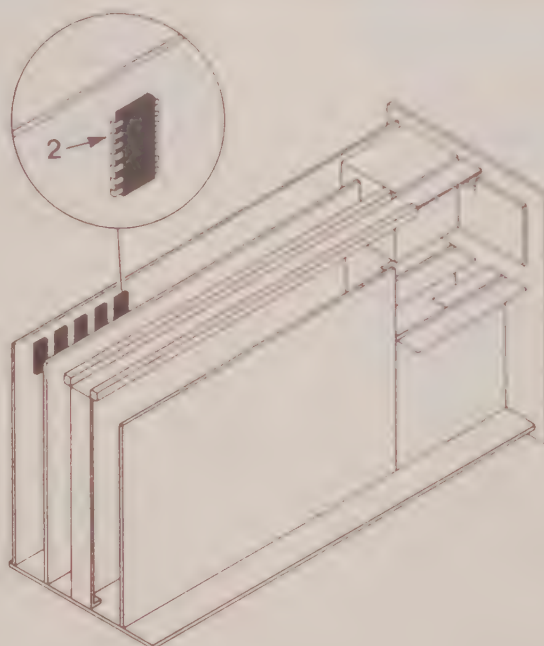


Figure 10-1

Model 205-A Plug-in

STORAGE CONTROL

HOLD LAST



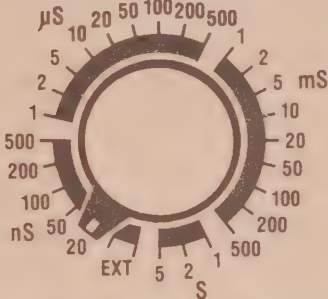
LIVE



HOLD NEXT



TIME PER POINT



CH A

OFFSET 

FILTER 5 MHz  FULL

± VOLTS FULL SCALE

V  400 mV

1MΩ 47pF 

DC  AC

GND

SAVE  OFF

ON  OFF

TRIGG'D 

LEVEL 

TRIGGER

CURSOR  NORM

LOCK  OFF

SLOPE +  -

MODE AUTO  NORM

CH B

OFFSET 

FILTER 5 MHz  FULL

± VOLTS FULL SCALE

V  400 mV

1MΩ 47pF 

DC  AC

GND

SAVE  OFF

ON  OFF

COUPLING AC  DC

HF REJ  NORM

SOURCE

CH A  CH B

INT  EXT

EXT CLOCK  1MΩ 47pF 

 **MODEL 205-A**

Nicolet Instrument Corporation

INTRODUCTION

This section contains the alignment and calibration procedures for the **Model 205-A Plug-in**. Read each procedure before servicing this instrument.

WARNING: High voltages exist within this instrument. Observe all safety standards set by your place of employment. This instrument should be serviced by qualified personnel only.

► **IMPORTANT:** Perform procedures 2.0.0 through 9.0.0 for the channel A Amplifier and then repeat for the channel B Amplifier.

► **IMPORTANT:** These procedures are sequential. Do not skip any procedures or steps.

INDEX

PROCEDURE	PAGE
1.0.0. Preparation	5-4
2.0.0. Set-Up	5-5
3.0.0. Voltage Check	5-7
4.0.0. Balance	5-12
5.0.0. Input Resistance	5-13
6.0.0. Gain	5-14
7.0.0. Frequency Comp.	5-17
8.0.0. Input Capacitance	5-19
9.0.0. ADC Alignment Check	5-21
10.0.0. Time Base Check	5-22

REQUIREMENTS

The following materials are required to perform the **Model 205-A Plug-in** alignment procedures.

FUNCTION GENERATOR

- #1. Output: Square wave with sync output.
- #2. Amplitudes: $100 \text{ mV}_{pp} - 20 \text{ V}_{pp}$
- #3. Frequencies: $0.2 \text{ Hz} - 20 \text{ MHz}$

DIGITAL MULTIMETER

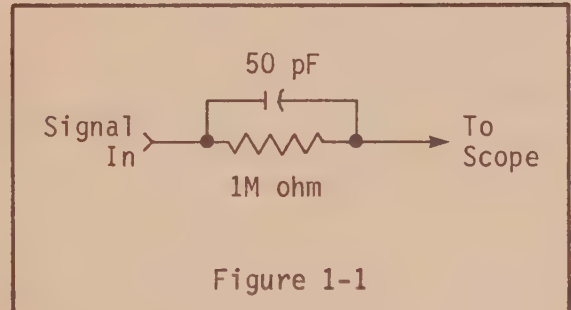
- #1. Resolution: 4-1/2 or 5-1/2 digits
- #2. Accuracy: .05% of input, DC volts

TOOLS

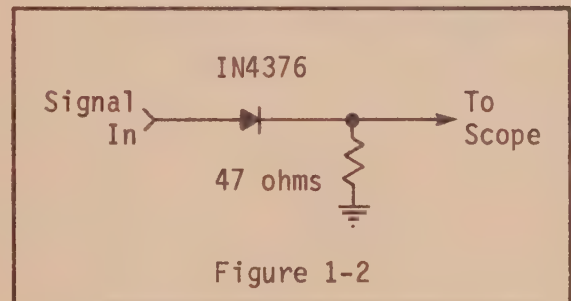
- #1. Phillips screwdriver, (#1)
- #2. Common screwdriver, (3/16")
- #3. Nonmetallic adjustment screwdriver.

NETWORKS

#1. Input Capacitance:



#2. Frequency Compensation:



1.0.0. PREPARATION

The left side cover must be removed to prepare the **Model 205-A Plug-in** for alignment.

WARNING: Remove all power from the 2090 before proceeding.

NOTE: All of the adjustments should be performed with the digitizer shields in place and the plug-in's front panel secured to the frame. Some adjustments will be affected if the shields are not in place.

1.1.1. Remove the two left side cover securing screws, but do not remove the cover.

NOTE: Remove the cover only when making adjustments and then replace immediately.

2.0.0. SET-UP PROCEDURE

MAINFRAME CONTROLS

Power On/Off:	ON
Vertical Expansion:	OFF
Horizontal Expansion:	OFF
Autocenter switch:	OFF
XY/YT switch:	YT
Memory switch:	ALL
Function switch:	DATA MOVE

DISK DRIVE (If supplied)

Track Protect switches:	Don't Care
Semi-Auto/Manual switch:	MANUAL
Track Segment:	MAINFRAME CONTROLLED

205-A PLUG-IN

Channel A switch:	ON (If adjusting channel A).
Channel B switch:	ON (If adjusting channel B).
Storage Control:	LIVE
Time Per Point:	20nS
Volts Full Scale:	100mV
5 MHz Filter:	FULL
Save:	OFF
DC/AC/GND:	GND
Offset Control:	Adjust trace to mid screen.
Trigger Slope:	(+)
Trigger Mode:	
a. Auto/Norm:	AUTO
Trigger:	
b. Cursor/Norm:	NORM
c. Lock:	OFF
Trigger Coupling:	
a. AC/DC:	DC
b. HF REJ/NORM:	NORM
Trigger Source:	
a. ChA/ChB:	NOTE 1
b. Int/Ext:	NOTE 1
Trigger Level:	Adjust for a stable trace.

NOTE 1: If the signal generator does not have a sync output, position the Trigger Source buttons to INT and (CH A) when adjusting channel A, or INT and (CH B) when adjusting channel B. If it has a sync output, select EXT and connect the sync output to the EXT input BNC.

3.0.0. VOLTAGE CHECKS

WARNING: The entire plug-in must be recalibrated if any of the voltage trimpot settings are altered. This procedure must be performed by qualified service personnel and only after replacing components.

► **IMPORTANT:** The 205-A plug-in must be removed and a power extender cable manufactured (Figure 3-1) to perform the Voltage Checks. A power extender cable is available from the Nicolet Oscilloscope Field Service Department.

CAUTION: Remove all power from the oscilloscope before proceeding.

- 3.1.1. Remove the 205-A plug-in from the first bay and set the plug-in to the left of the oscilloscope on a non-conductive surface.
- 3.1.2. Connect the power extender cable between the 205-A plug-in and the power cables from the Regulator board, (Figure 3-1).
- 3.1.3. Reconnect the ribbon cable to the rear of the 205-A plug-in.
- 3.1.4. Reapply power to the 2090 oscilloscope.

NOTE: Allow the scope to warm up 30 minutes before proceeding.

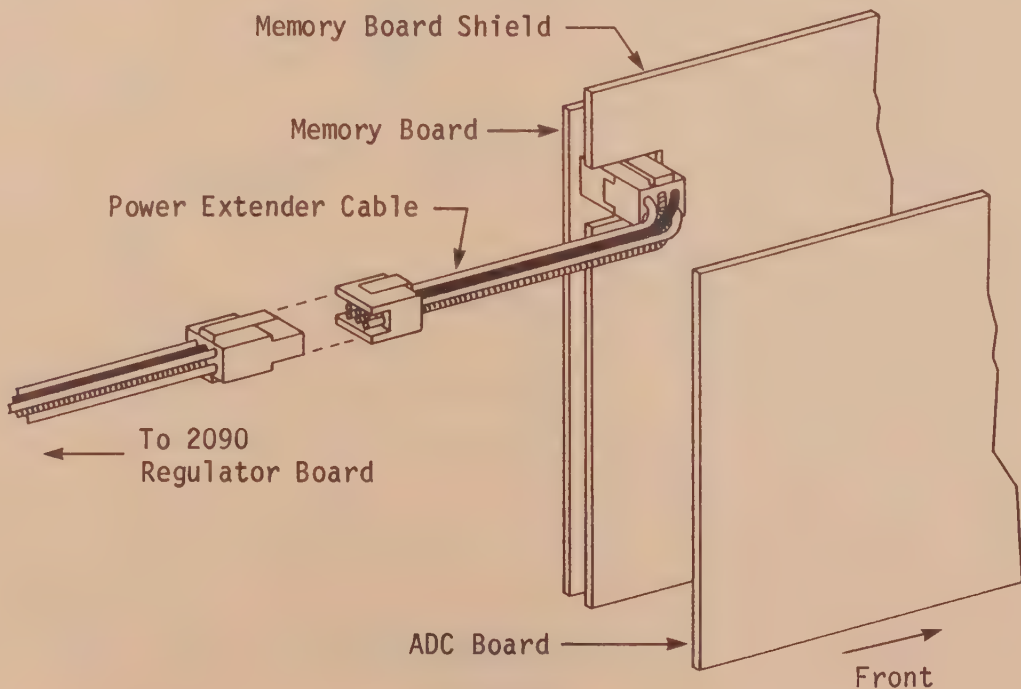


Figure 3-1

3.1.5. Multimeter range: 0-20 Vdc

3.1.6. Measure the voltage at -2VTP on the 205-A Memory board, (Figure 3-2).

3.1.7.

SPECIFICATION
(See Figure 3-2)

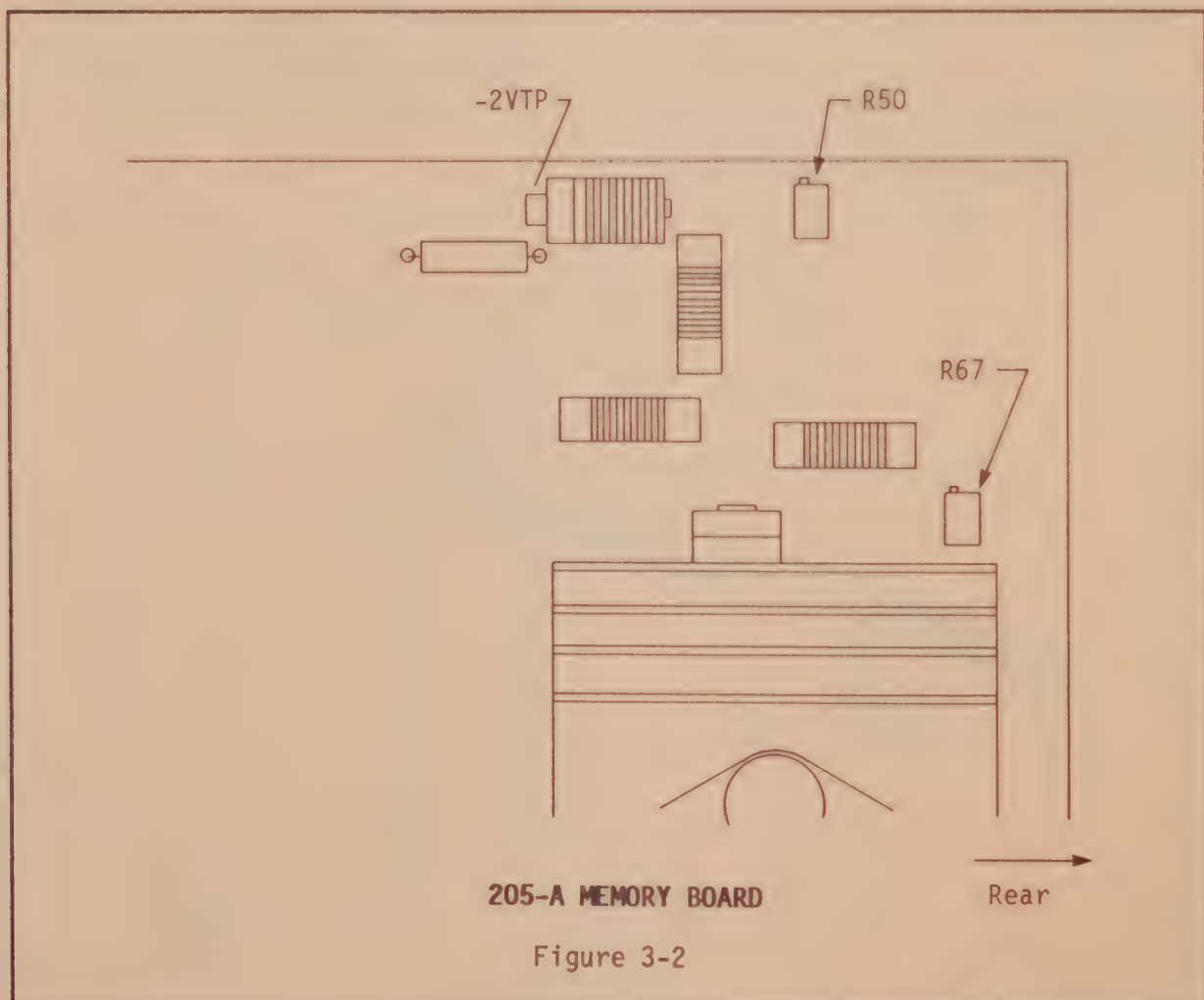
If necessary, adjust pot R50 at the rear of the Memory board for a -1.96 to -2.04Vdc reading.

3.1.8. Measure the voltage at U45 (Pin 8) on the rear of the 205-A Control board, (Figure 3-3, page 5-9).

3.1.9.

SPECIFICATION
(See Figure 3-2)

If necessary, adjust pot R67 at the rear of the Memory board for a -5.096 to -5.304 Vdc reading.

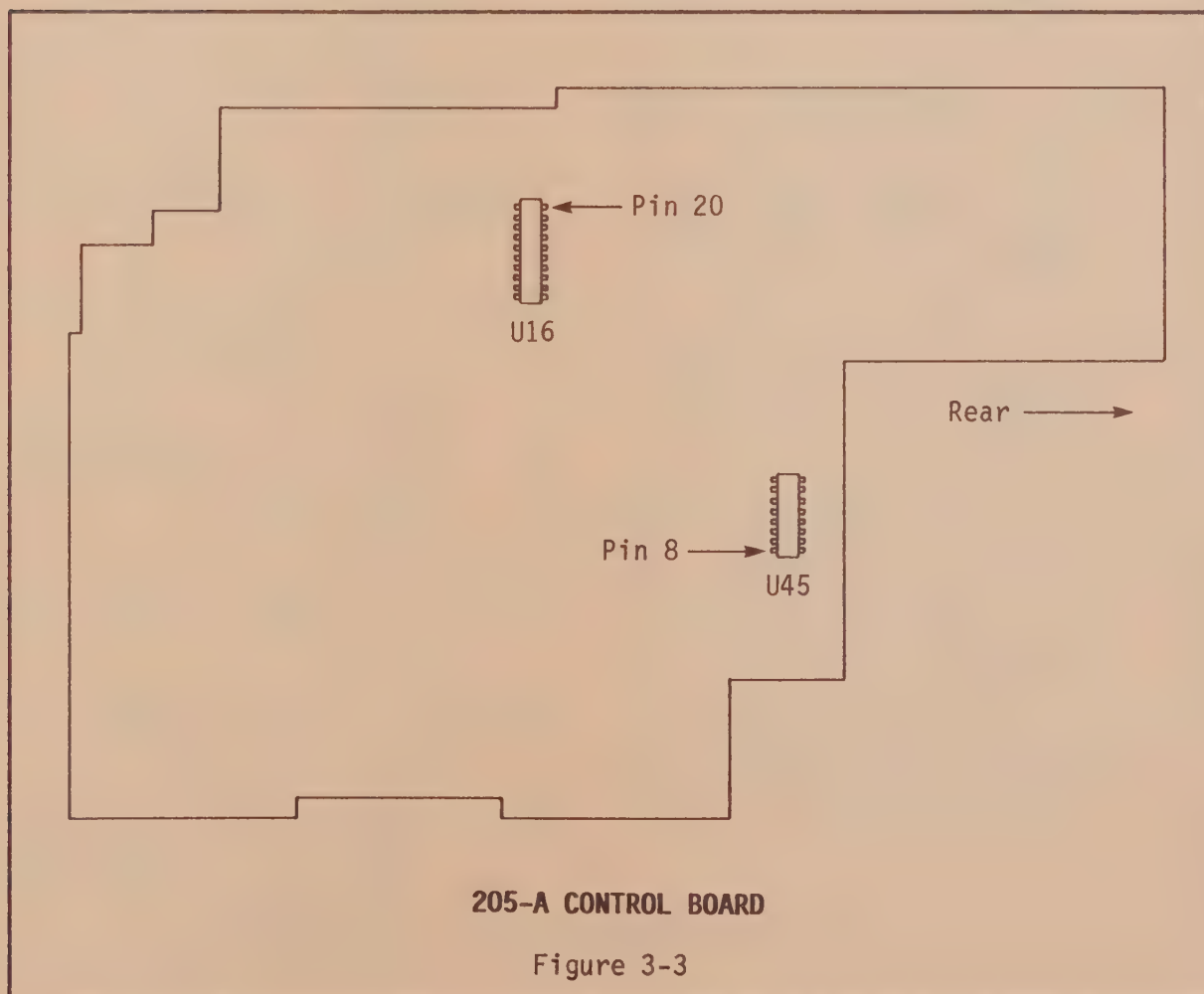
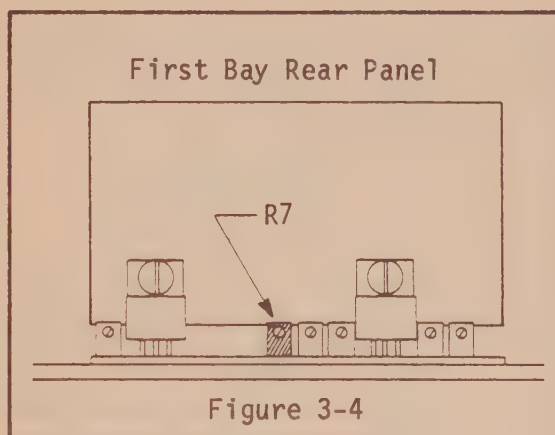


3.1.10. Measure the voltage at U16 (Pin 20) on the rear of the 205-A Control board, (Figure 3-3).

3.1.11.

SPECIFICATION
(See Figure 3-4)

If necessary, adjust pot R7 on the Mainframe's Regulator board for a +4.9 to +5.1V reading.



- 3.1.12. Measure the voltage at +6VTP on the channel A ADC board, (Figure 3-5).

3.1.13.

SPECIFICATION
(See Figure 3-5)

If necessary, adjust pot R164 on the channel A ADC board for a +5.88 to +6.12 Vdc reading.

- 3.1.14. Measure the voltage at -2VTP on the channel A ADC board, (Figure 3-5).

3.1.15.

SPECIFICATION
(See Figure 3-5)

If necessary, adjust pot R163 on the channel A ADC board for a -1.96 to -2.04 Vdc reading.

- 3.1.16. Measure the voltage at -6VTP on the channel A ADC board, (Figure 3-5).

3.1.17.

SPECIFICATION

There is no adjustment. If a voltage from -5.7 to -6.3 Vdc is NOT measured, repair the unit.

- 3.1.18. Measure the voltage at -5.2VTP on the channel A ADC board, (Figure 3-5).

3.1.19.

SPECIFICATION

There is no adjustment. Repair the unit if a voltage from -5.1 to -5.3 Vdc is NOT measured.

- 3.1.20. Measure the voltage at +12VTP on the channel A ADC board, (Figure 3-5).

3.1.21.

SPECIFICATION

There is no adjustment. Repair the unit if a voltage from +11.76 to +12.24 Vdc is NOT measured.

- 3.1.22. Measure the voltage at +6VTP on the channel B ADC board, (Figure 3-5).

3.1.23.

SPECIFICATION
(See Figure 3-5)

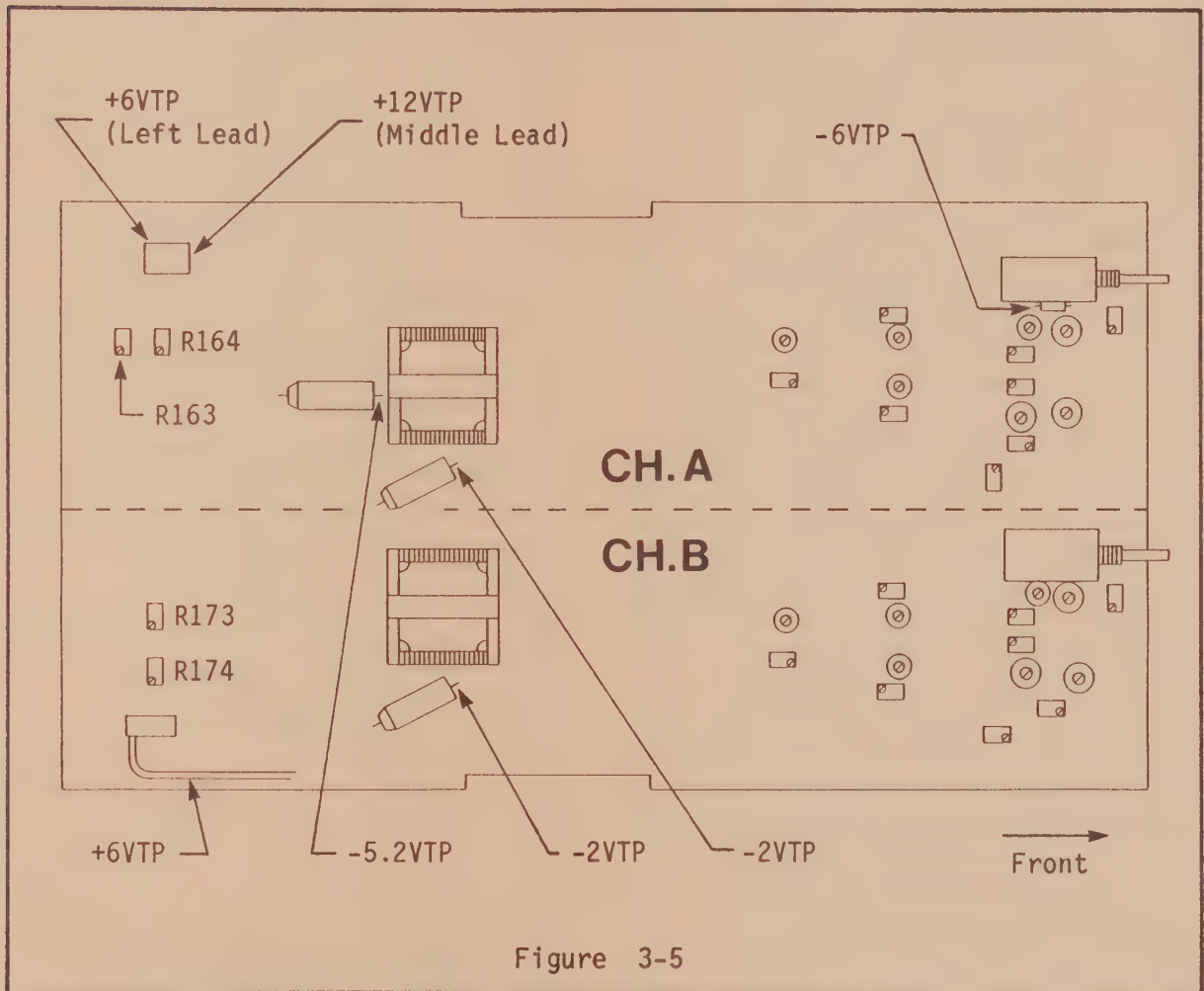
If necessary, adjust pot R174 on the channel B ADC board for a +5.88 to +6.12 Vdc reading.

- 3.1.24. Measure the voltage at -2VTP on the channel B ADC board, (Figure 3-5).

3.1.25.

SPECIFICATION
(See Figure 3-5)

If necessary, adjust pot R173 on the channel B ADC board for a -1.96 to -2.04 Vdc reading.



4.0.0. BALANCE ADJUSTMENTS

4.1.1. Autocenter: ON, then OFF

4.1.2. Volts Full Scale: Switch to 400 mV and then back to the 100 mV range.

a. Observe the trace for a vertical shift.

4.1.3.

SPECIFICATION	
Adjust the trimpot selected from 4.1.4 for the channel being adjusted until the trace is aligned with the horizontal cursor.	

4.1.4.

CHANNEL	TRIMPOT
	(See Figure 4-1)
A	R169
B	R178

4.1.5. Vertical Expansion: X8

4.1.6. Repeat steps 4.1.1 thru 4.1.4 until shifting is minimal.

4.1.7. Vertical Expansion: OFF

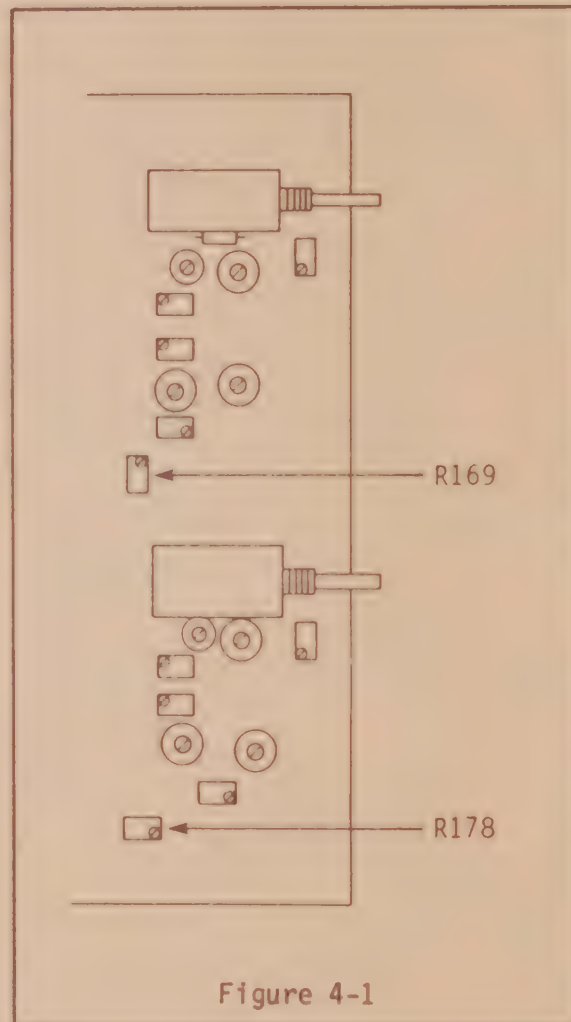


Figure 4-1

5.0.0. INPUT RESISTANCE CHECK

5.1.1. DC/AC/GND switch: DC

5.1.2. Set the meter to 2 Megohms and connect it to the input BNC.

5.1.3.

SPECIFICATION
Record the 100mV range resistance, (1 Megohm <u>+1%</u>).

5.1.4. Volts Full Scale: 1V

5.1.5.

SPECIFICATION
Adjust the trimpot (from 5.1.6) equal to the reading in Step 5.1.3, (<u>+1%</u>).

5.1.6.

CHANNEL	TRIMPOT
	(See Figure 5-1)
A	R168
B	R179

5.1.7. Volts Full Scale: 10V

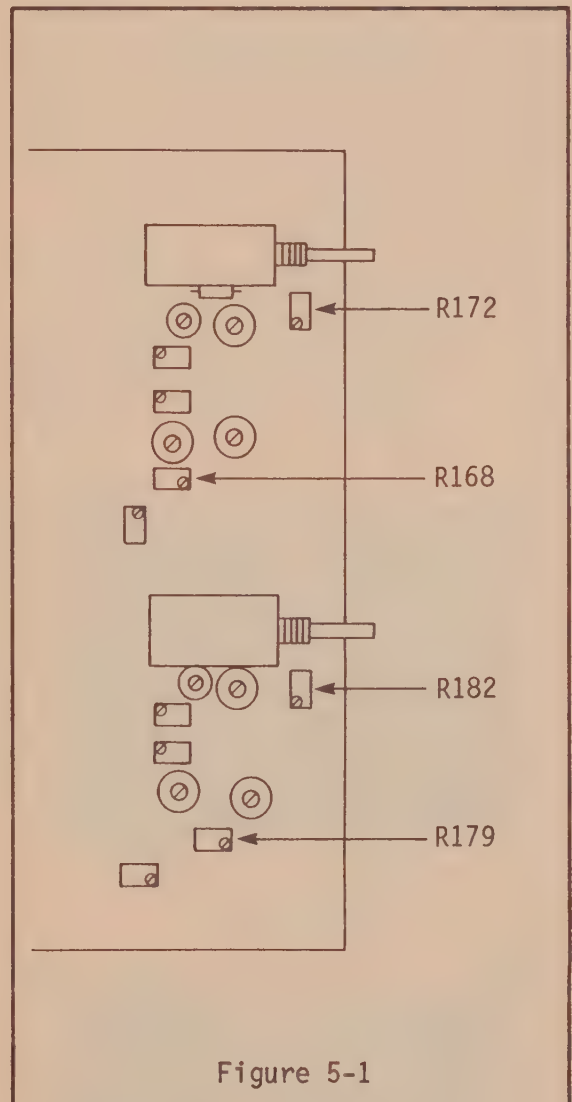
5.1.8.

SPECIFICATION
Adjust the trimpot (from 5.1.9) equal to the reading in Step 5.1.3, (<u>+1%</u>).

5.1.9.

CHANNEL	TRIMPOT
	(See Figure 5-1)
A	R172
B	R182

5.1.10. Disconnect the multimeter from the input BNC.



6.0.0. GAIN ADJUSTMENTS

NOTE: Adjust channel A first and then channel B as required.

6.1.1. Volts Full Scale: 100mV

6.1.2. Memory switch: ALL

6.1.3. Autocenter: OFF

6.1.4. Filter switch: 5 MHz

6.1.5. Time Per Point: 5 mS

6.1.6. Place the Volts Full Scale and Multimeter to the ranges selected from 6.1.7. (starting with Step #1) and then continue with 6.1.8.

6.1.7.

STEP	V.F.S.	METER
#1	100mV	0-200mVdc
#2	200mV	0-400mVdc
#3	400mV	0-800mVdc
#4	1V	0-2Vdc
#5	10V	0-20Vdc

6.1.8. Apply a 0.2 Hz Square wave signal to the input BNC and adjust the waveform's amplitude for a 3/4 full screen display.

NOTE: The Offset and Trigger Level controls may require adjustment.

6.1.9. Input the same signal to the multimeter.

NOTE: The signal should be input to both the plug-in and the multimeter at this point.

6.1.10. Record both (+) and (-) multimeter readings and ADD absolute values to obtain the peak-to-peak voltage.

6.1.11. Press the HOLD NEXT button.

NOTE: Wait until the waveform has been stored, (Hold Last LED illuminated only) before continuing.

6.1.12. Autocenter switch: ON

6.1.13. Vertical Expansion: X16

NOTE: Several levels of data points will be displayed due to a certain amount of "noise," (Figure 6-1).

6.1.14. Position the crosshair over the level with the majority of data points, (Figure 6-2).

6.1.15. Vertical Expansion: OFF

6.1.16. Function switch: RESET

6.1.17. Press the Execute button.
a. The Time and Voltage Numerics reset to zero.

6.1.18. Position the crosshair to the opposite peak of the waveform.

6.1.19. Vertical Expansion: X16

6.1.20. Position the crosshair over the level with the majority of data points and record the peak-to-peak voltage.

6.1.21. Compute the Error, (Equation 6-1).

6.1.22.

SPECIFICATION

The error should be less than the Error Value listed in 6.1.23 for the Step in progress.

6.1.23.

STEP	ERROR VALUE
#1	1 mV
#2	2 mV
#3	4 mV
#4	10 mV
#5	0.1 V

ERROR VALUE EQUATION

$$\text{Error} = V_m - V_s$$

Equation 6-1

V_m = Meter (V_{pp}) voltage reading recorded in Step 6.1.10.

V_s = Scope (V_{pp}) voltage reading recorded in Step 6.1.20.

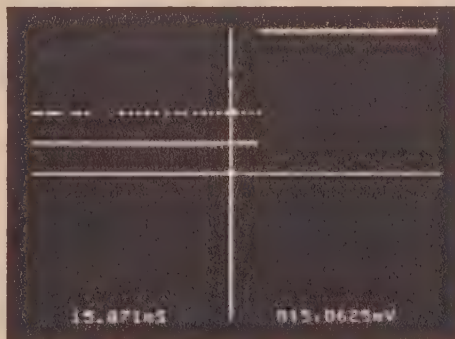


Figure 6-1

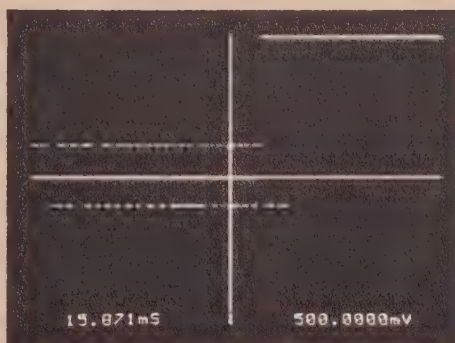


Figure 6-2

6.1.24. Adjust the trimpot selected from 6.1.25 for the Volts Full Scale range selected until the Error Value is less than listed.

6.1.25.

VOLTS FULL SCALE RANGE	TRIMPOT (See Figure 6-3)	
	Ch A	Ch B
100mV	R40	R115
200mV	R60	R140
400mV	R53	R133
1V	R80	R158
10V	R76	R155

6.1.26. Press the LIVE button.

6.1.27. Vertical Expansion: OFF

6.1.28. Autocenter switch: OFF

6.1.29. Repeat Steps 6.1.11 through 6.1.28 until the Error is less than listed in specification 6.1.22.

6.1.30. Repeat Steps 6.1.6 through 6.1.29 for the next "step" listed in Table 6.1.7.

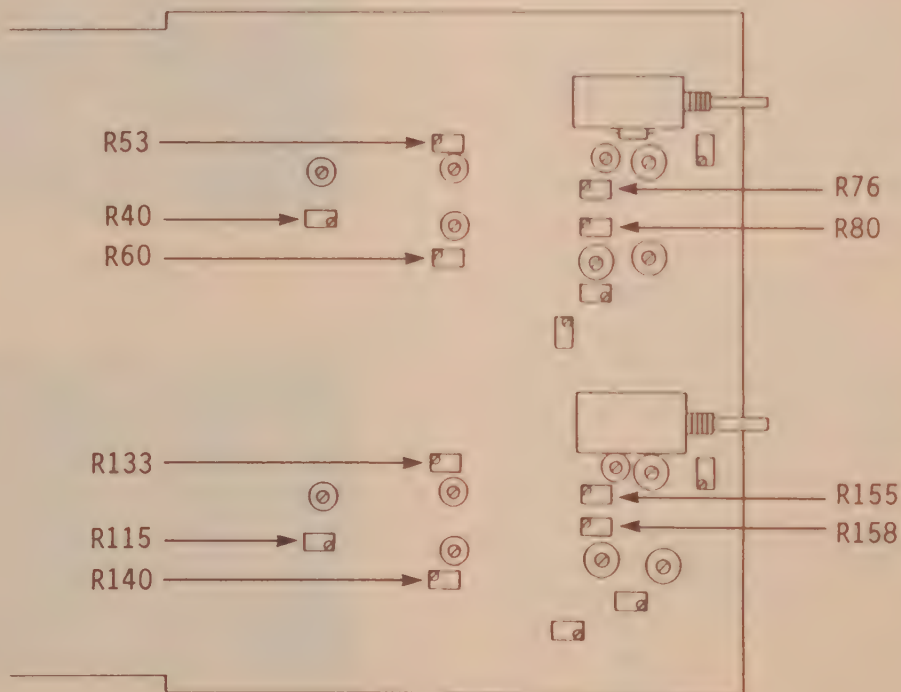


Figure 6-3

7.0.0. FREQUENCY COMPENSATION

- 7.1.1. Vertical Expansion: OFF
 7.1.2. Filter switch: FULL
 7.1.3. Memory switch: ALL
 7.1.4. Time Per Point: 20nS
 7.1.5. Select the Volts Full Scale ranges from 7.1.6 (starting with Step #1) and then continue with 7.1.7.

7.1.6.

STEP	VOLTS FULL SCALE
#1	200mV
#2	400mV
#3	1V
#4	10V

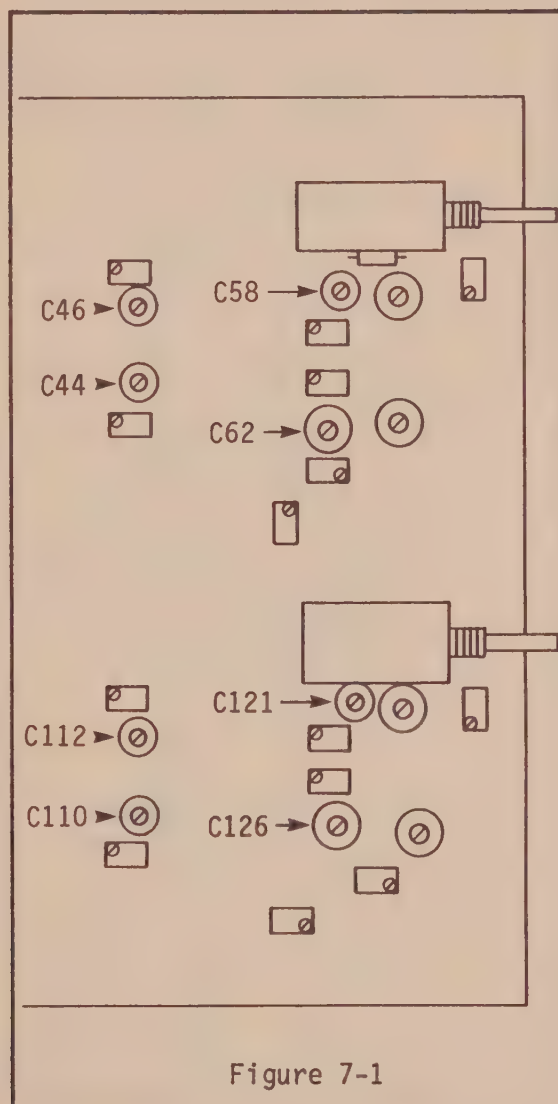


Figure 7-1

7.1.7. Apply a 100 kHz square wave to the input BNC using the Frequency Compensation Network (Figure 1-2, page 5-3) and adjust its amplitude for a 3/4 full screen display.

7.1.8. Vertical Expansion: X4

7.1.9. Horizontal Expansion: X16

7.1.10. Autocenter: ON

7.1.11. Offset control: Adjust for minimum "noise" on display.

7.1.12.

SPECIFICATION (See Figure 7-1)	
Adjust the trimmer selected from 7.1.13 (for the step in progress) for the best negative cycle response, (Figures 7-2 through 7-4).	

7.1.13.

STEP	TRIMMER (See Figure 7-1)	
	Ch A	Ch B
#1	C44	C110
#2	C46	C112
#3	C62	C126
#4	C58	C121

7.1.14. Vertical Expansion: OFF

7.1.15. Repeat 7.1.1 thru 7.1.13 for the next Step.

7.1.16. Horizontal Expansion: OFF

7.1.17. Vertical Expansion: OFF

7.1.18. Remove the Frequency Compensation Network.



Figure 7-2 - With overshoot



Figure 7-3 - With undershoot



Figure 7-4 - Acceptable

8.0.0. INPUT CAPACITANCE

- 8.1.1. Volts Full Scale: 100 mV
- 8.1.2. Apply a 10 kHz square wave signal to the input BNC using the capacitance network illustrated in Figure 1-1, (page 5-3).
- Adjust the signal's amplitude for a 3/4 full screen display.
- 8.1.3. Horizontal Expansion: X2
- 8.1.4. Save switch: ON
- 8.1.5. Volts Full Scale: 1V
- Adjust the signal's amplitude for a 3/4 full screen display.
- 8.1.6. Vertical Expansion: X4
- 8.1.7. Offset control: Adjust until the "saved" and "live" wave forms are superimposed.

8.1.8.

SPECIFICATION
Adjust the trimmer selected from 8.1.9 until the slopes of the "live" waveform match the slopes of the "saved" waveform.

8.1.9.

VOLTS FULL SCALE RANGE	TRIMMER (See Figure 8-1)	
	Ch.A	Ch.B
1V	C63	C128

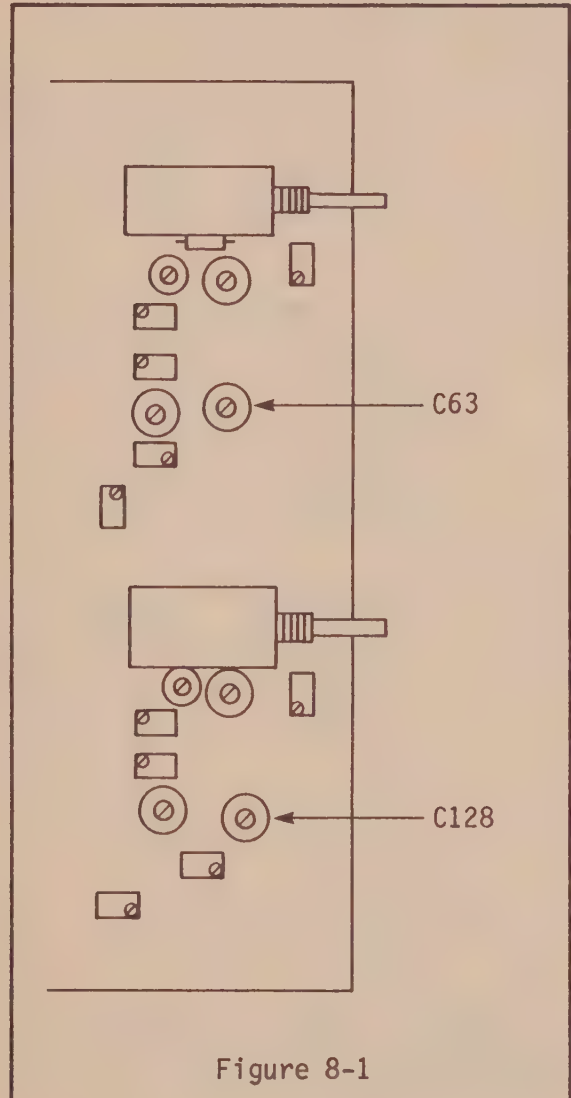


Figure 8-1

- 8.1.10. Vertical Expansion: OFF
 8.1.11. Volts Full Scale: 10V
 8.1.12. Adjust the signal's amplitude for a 3/4 full screen display, or as large a signal obtainable from the signal generator.
 8.1.13. Vertical Expansion: X8
 8.1.14.

SPECIFICATION
Adjust the trimmer select- from 8.1.15 until the slopes of the "live" wave- form match the slopes of the "saved" waveform.

8.1.15.

VOLTS FULL SCALE RANGE	TRIMMER (See Figure 8-2)	
	Ch.A	Ch.B
10V	C59	C122

- 8.1.15. Horizontal Expansion: OFF
 8.1.16. Save switch: OFF
 8.1.17. Remove the Capacitance Network.

► **IMPORTANT:** Repeat Procedure 7.0.0 (Frequency Compensation) after completing this procedure to verify proper alignment.

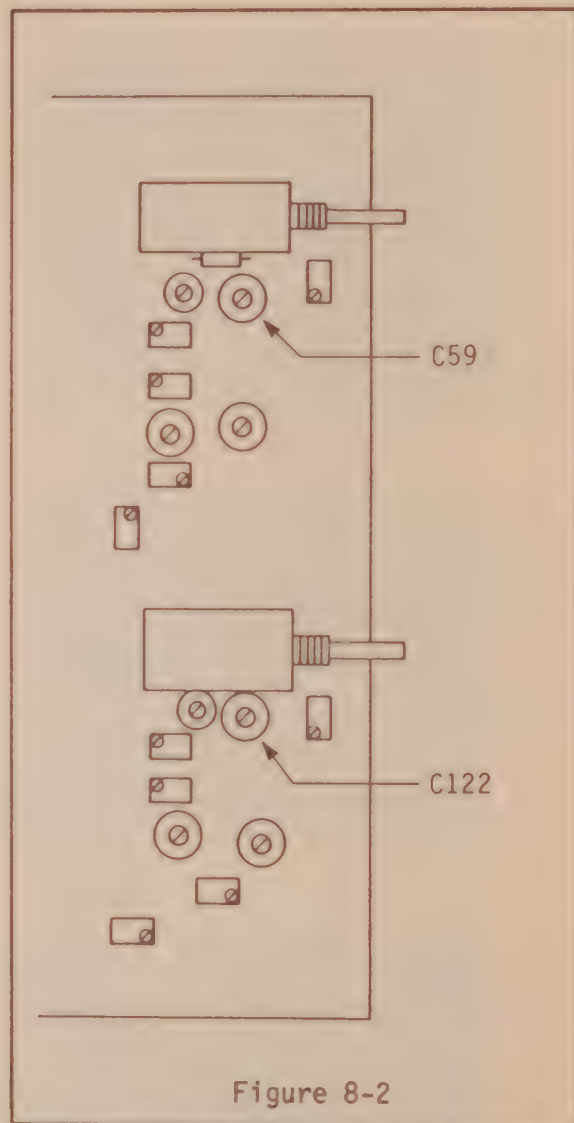


Figure 8-2

9.0.0. ADC ALIGNMENT CHECK

- 9.1.1. Volts Full Scale: 100mV
- 9.1.2. 5 MHz Filter: FULL
- 9.1.3. Input a 12 kHz triangle wave-form signal to the input BNC.
- 9.1.4. Vertical Expansion: X8
- 9.1.5. Adjust the signal's amplitude and position the vertical cursor until the signal is displayed on the screen as illustrated in Figure 9-1.
- 9.1.6. Offset control: Slowly adjust the offset from the full counterclockwise to full clockwise position while observing the screen for "flying points" (Figure 9-2) or "missing levels" (Figure 9-3).

9.1.7.

SPECIFICATION

If flying points or missing levels are noted, the plug-in must be repaired.

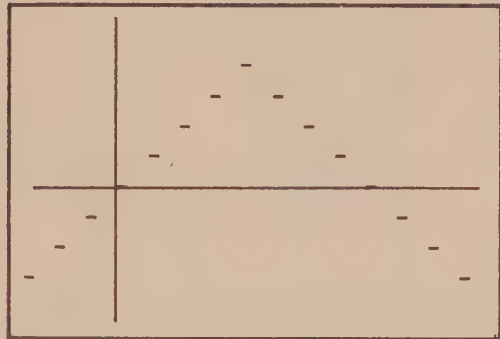


Figure 9-1 - Vertical X8

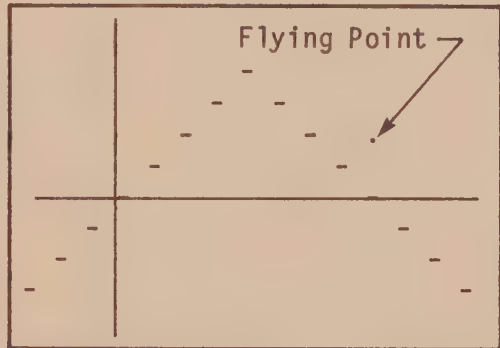


Figure 9-2 - Flying Point

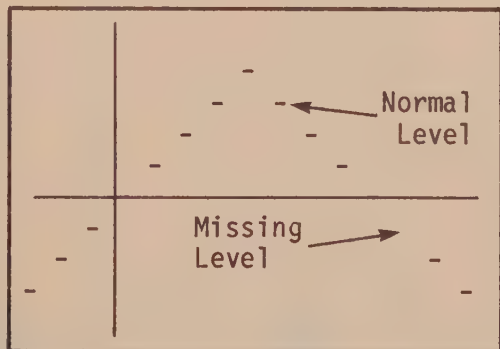


Figure 9-3 - Missing Level

10.0.0. TIME BASE CHECK

NOTE: Use a Calibrated Digital Frequency Counter in this procedure.

10.1.1. Turn on the 2090 and allow it to warm up.

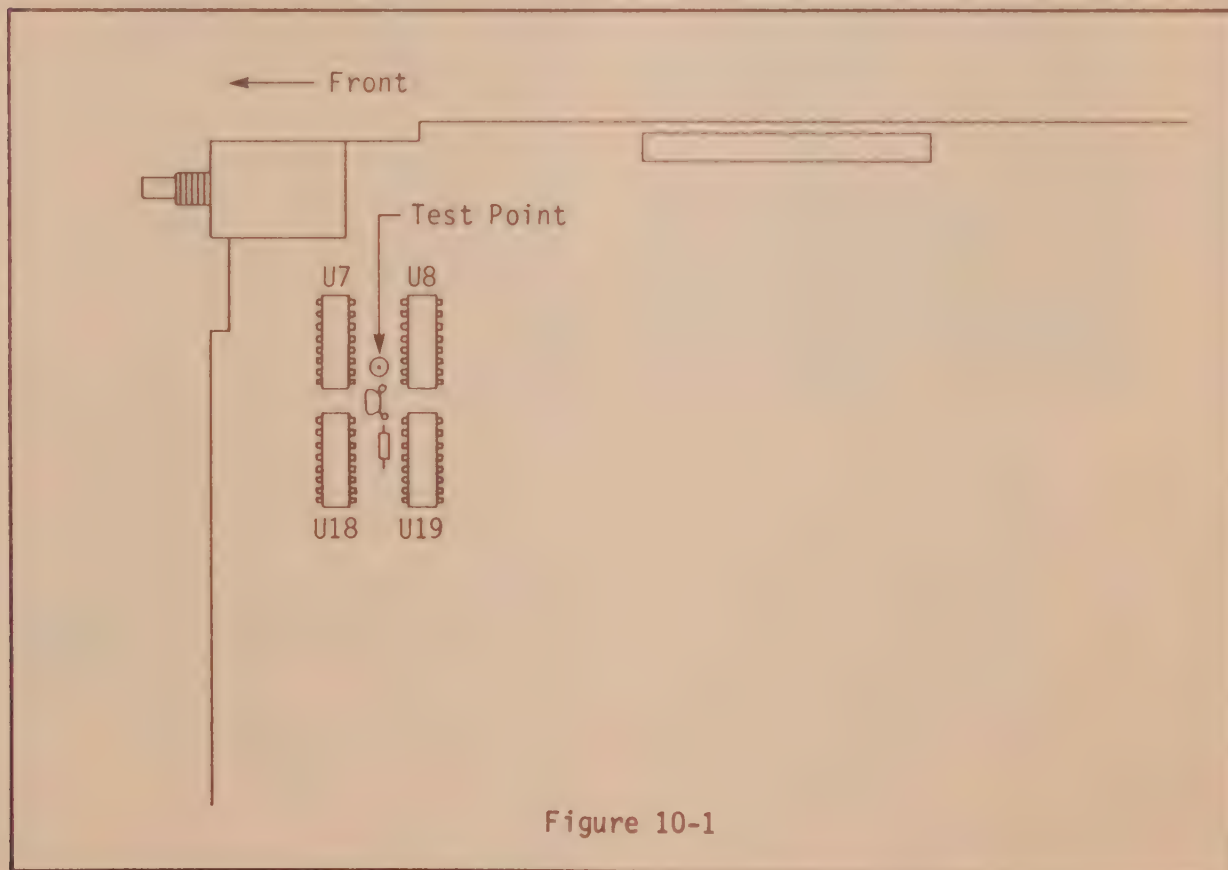
NOTE: No adjustments are performed in this test. The oscillator circuitry must be repaired if Specification 10.2.3 is not met.

CAUTION: Carefully perform the next step to prevent shorting the probe to other pins or traces.

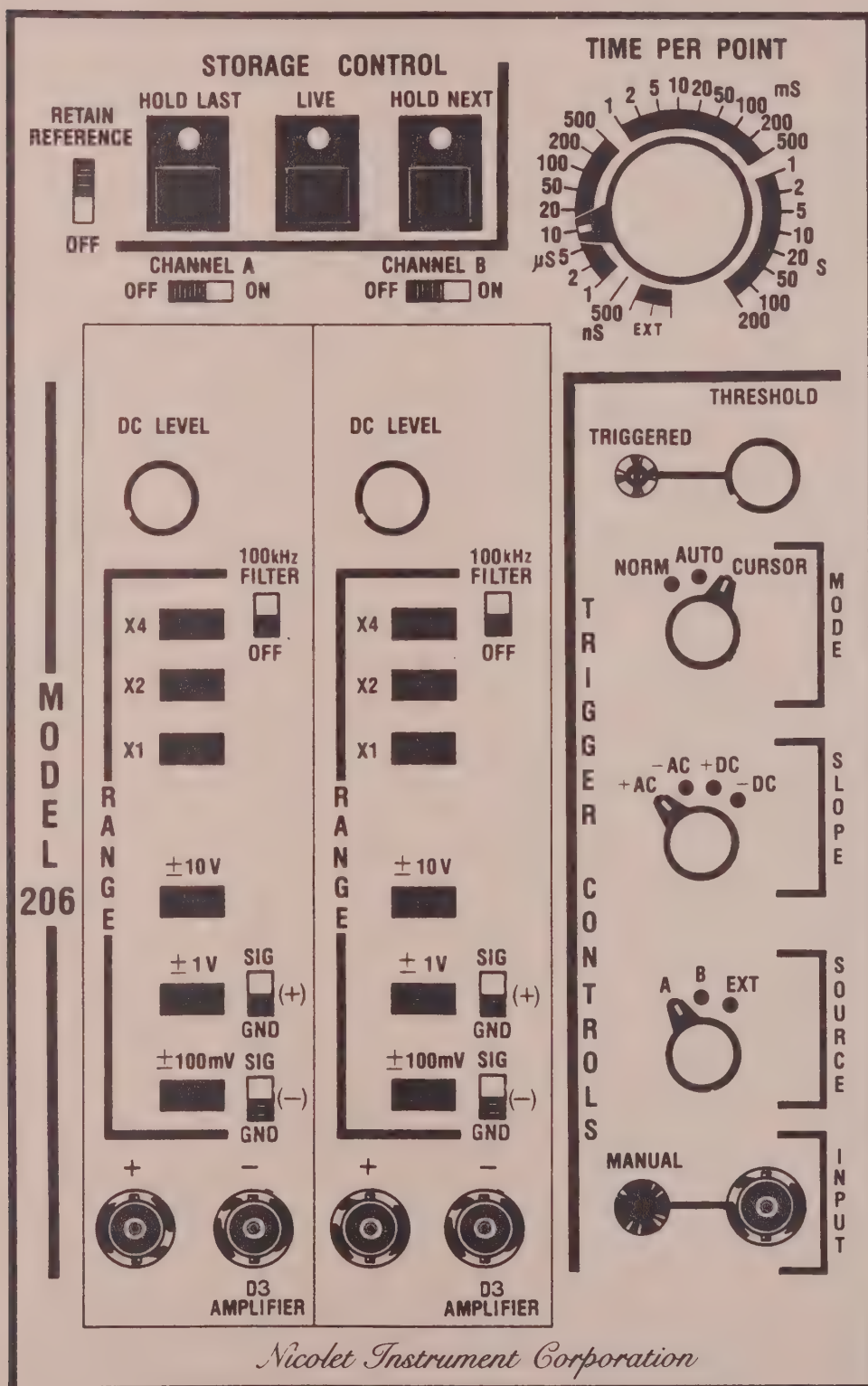
10.2.2. Measure the frequency (Time Base) at the test point located between U7 and U8 on the Memory Board, (Figure 10-1).

10.2.3.

SPECIFICATION
The measured frequency should not be greater than 20.005 MHz nor less than 19.995 MHz.



Model 206 Plug-in



INTRODUCTION

This section contains the alignment and calibration procedures for the **Model 206 Plug-in with D3 Amplifiers**. Read each procedure in its entirety before servicing this instrument.

WARNING: High voltages exist within this instrument. Observe all safety standards set by your place of employment. This instrument should be serviced by qualified personnel only.

INDEX

PROCEDURE	PAGE
1.0.0. Preparation	5-4
2.0.0. Set-Up	5-7
3.0.0. Voltage Check	5-8
4.0.0. ADC Gain & Offset	5-10
5.0.0. Balance	5-14
6.0.0. Gain	5-16
7.0.0. Frequency Comp.	5-20
8.0.0. Time Base Check	5-21
9.0.0. Reassembly	5-22

► **IMPORTANT:** The plug-in must be removed to access the channel B trim-pots. Perform procedures 2.0.0 through 7.0.0 for the channel A Amplifier and then repeat the same procedures for the channel B Amplifier.

► **IMPORTANT:** These procedures are sequential. Do not skip any procedures or steps.

REQUIREMENTS

The following materials are required to perform the **Model 206 Plug-in** (with D3 amplifier) alignment procedures.

FUNCTION GENERATOR

- #1. Output: Square and Triangle waves with sync output.
- #2. Amplitudes: 100 mV_{pp} - 20 V_{pp}
- #3. Frequencies: 0.2 Hz - 10 kHz

DIGITAL MULTIMETER

- #1. Resolution: 4-1/2 or 5-1/2 digits
- #2. Accuracy: .02% of input, DC volts

EXTENDER BOARD

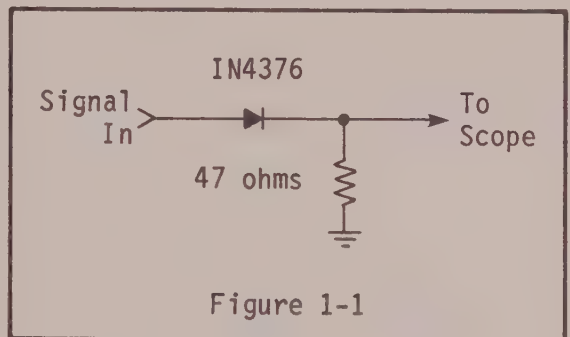
- #1. Furnished with 2090.

TOOLS

- #1. Phillips screwdriver
- #2. Common screwdriver
- #3. Nonmetallic adjustment screwdriver.

NETWORK

- #1. Frequency Compensation Network:



1.0.0. PREPARATION

1.1.0. PREPARING CHANNEL A

► **IMPORTANT:** Perform procedure 1.1.0 only when adjusting channel A.

WARNING: Remove all power from the 2090 before continuing.

- 1.1.1. Remove the left side cover and set it aside.
- 1.1.2. Disconnect the ground between the channel A D3 Amplifier and Mother boards, (Figure 1-1).

- 1.1.3. Remove the two D3 Amplifier securing screws and carefully pull the D3 Amplifier out.
- 1.1.4. Insert the Extender board between the channel A D3 Amplifier and ADC boards.
- 1.1.5. Ground the channel A D3 Amplifier board to the plug-in.

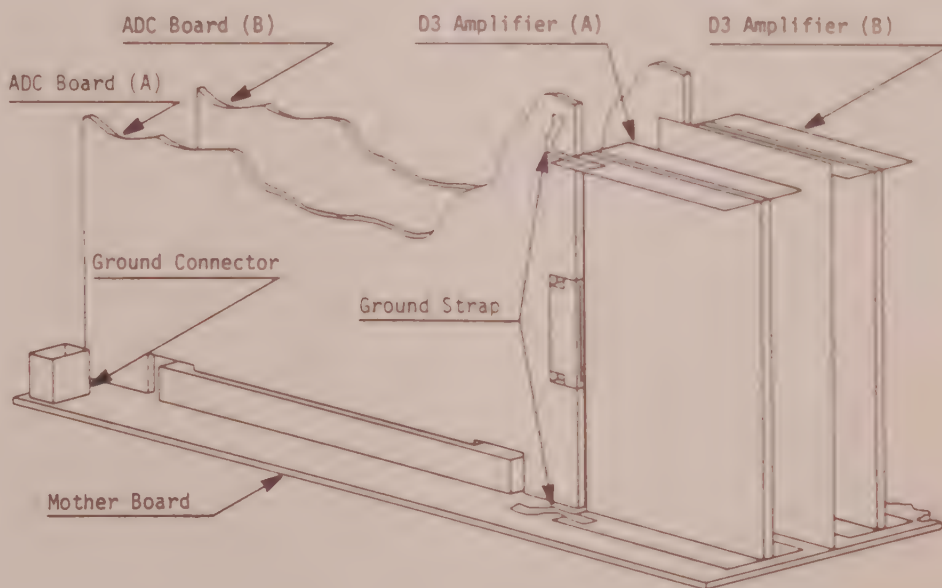


Figure 1-1

1.2.0. PREPARING CHANNEL B

► **IMPORTANT:** Perform procedure 1.2.0 only when adjusting channel B.

WARNING: Remove all power from the 2090 before continuing.

- 1.2.1. Remove the left side cover and set it aside.
- 1.2.2. Unplug the extended channel A D3 Amplifier board (Figure 1-2) and set it aside.
- 1.2.3. Unplug the channel A ADC board and set it aside.
- 1.2.4. Disconnect the channel B D3 Amplifier to Mother board ground connection.
- 1.2.5. Remove the two channel B D3 Amplifier front panel securing screws and carefully pull the D3 Amplifier out.
- 1.2.6. Insert the Extender board between the channel B D3 Amplifier and ADC boards.
- 1.2.7. Ground the channel B D3 Amplifier board to the plug-in.

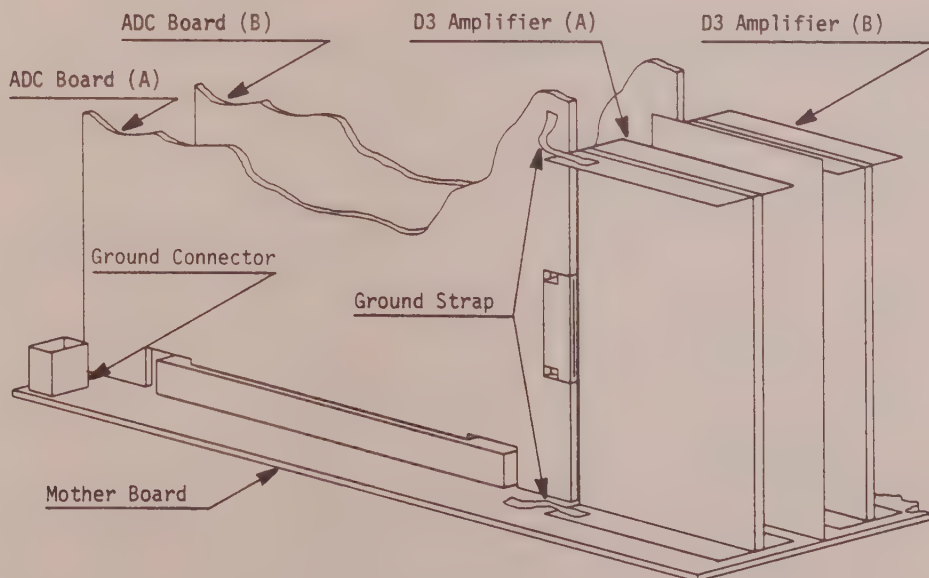


Figure 1-2

1.3.0. REMOVING THE PLUG-IN

- **IMPORTANT:** Perform this procedure only when adjustments are required on the channel B ADC board during either of these two procedures:
- 3.0.0. Voltage Check
 - 4.0.0. ADC Gain & Offset Adjustments

WARNING: Remove all power from the 2090 before continuing.

- 1.3.1. Remove the left side cover and set it aside.
- 1.3.2. Remove the four plug-in front panel securing screws.
- 1.3.3. Disconnect the ground cable from the Mother board, (Figure 1-3).

- 1.3.4. Carefully slide the plug-in half way out of the frame and disconnect the ribbon cable from the rear of the plug-in.

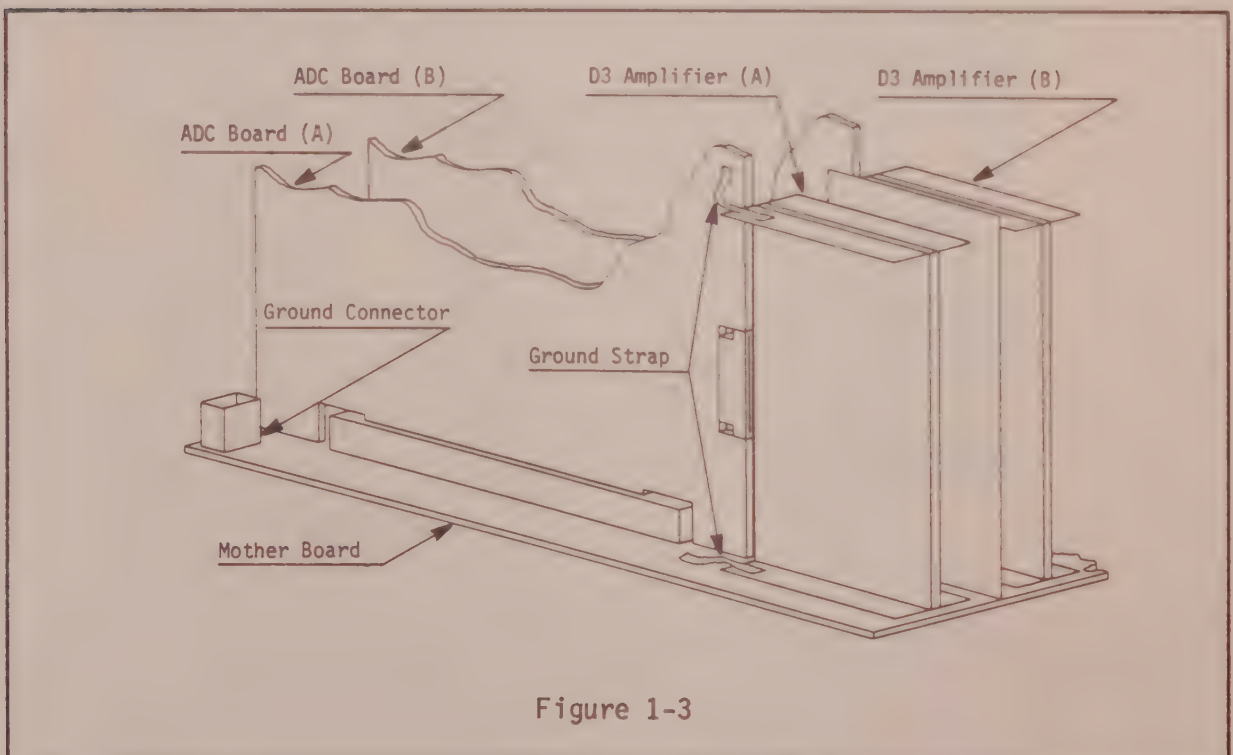
- 1.3.5. Carefully slide the plug-in out of the frame and set it to the left of the scope.

WARNING: Place the plug-in on a nonconductive surface free of metal such as solder splashes.

- 1.3.6. Reconnect the ribbon cable to the rear of the plug-in.

NOTE: It is not necessary to reconnect the ground cable to the plug-in.

- 1.3.7. Cover the plug-in with a clean cloth between adjustments.



2.0.0. SET-UP PROCEDURE

MAINFRAME CONTROLS

Power On/Off:	ON
Vertical Expansion:	OFF
Horizontal Expansion:	OFF
Autocenter switch:	OFF
XY/YT switch:	YT
Memory switch:	ALL
Function switch:	RESET NUMERICS

DISK DRIVE (If supplied)

Track Protect switches:	Don't Care
Semi-Auto/Manual switch:	MANUAL
Track Segment:	MAINFRAME CONTROLLED

206 PLUG-IN

Storage Control:	LIVE
Retain Reference:	OFF
Time Per Point:	500nS
100 kHz Filter switches:	OFF
Range:	10V
Range Multiplier:	X2
Trigger Mode:	AUTO
Trigger Slope:	-DC
Input BNC switches:	GND
Channel A switch:	ON (if adjusting channel A)
Channel B switch:	ON (if adjusting channel B)
Trigger Source:	NOTE

NOTE: If the signal generator does not have a sync output, place the Trigger Source switch to (A) when servicing channel A, and to (B) when servicing channel B. If it has a sync output, place the switch to EXT and input the sync output to the EXT input BNC.

3.0.0. VOLTAGE CHECK

WARNING: The entire plug-in must be recalibrated if any of the voltage trimpot settings are altered. This procedure must be performed by qualified service personnel and only after replacing components.

NOTE: Allow the scope to warm up 15 minutes before proceeding.

3.1.1. Multimeter range: 0-20 Vdc

3.1.2. Measure the voltage at +5VTP, (Figure 3-2).

3.1.3.

SPECIFICATION
(See Figure 3-1)

Adjust R7 for +5 Vdc +1%

3.1.4. Multimeter range: 0-40 Vdc

3.1.5. Measure the voltage at +25VTP, (Figure 3-2).

3.1.6.

SPECIFICATION
(See Figure 3-2)

Adjust R72 for +25 Vdc +1%

3.1.7. Measure the voltage at -25VTP, (Figure 3-2).

3.1.8.

SPECIFICATION
(See Figure 3-2)

Adjust R74 for -25 Vdc +1%

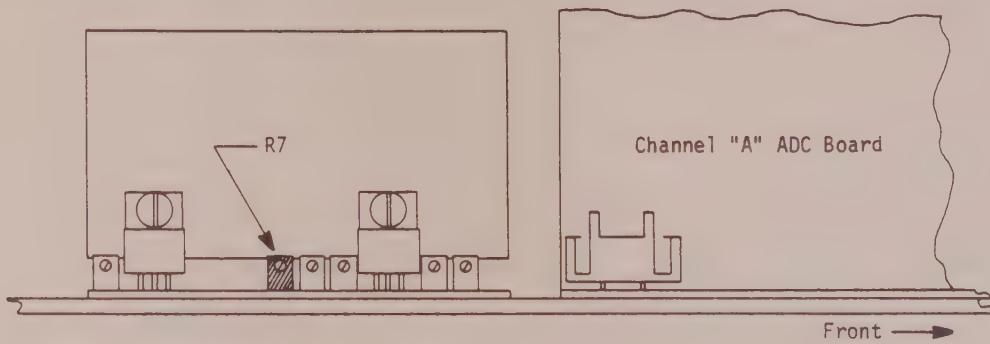
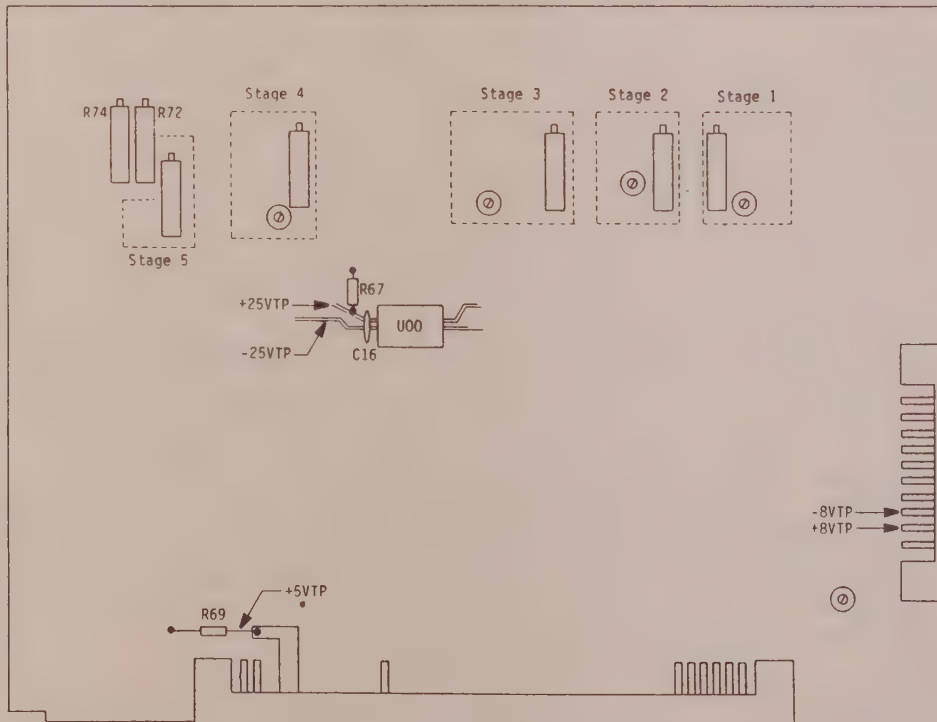


Figure 3-1



Mode1 206 ADC Board

Figure 3-2

4.0.0. ADC GAIN & OFFSET ADJUSTMENTS

4.1.0. GAIN & OFFSET TEST

NOTE: One channel on, the other off.

- 4.1.1. Range: 1V
 - 4.1.2. Multiplier: X2
 - 4.1.3. Trigger Mode: NORM
 - 4.1.4. 100 kHz Filter: ON
 - 4.1.5. (+) input switch: SIG
 - 4.1.6. Apply a triangle waveform to the (+) input BNC and adjust for a one period, full screen display.
 - 4.1.7. Vertical Expansion: X32
- NOTE:** If necessary, reposition the waveform using the Up/Down Cursor paddle.
- 4.1.8. DC Level: Full CCW
 - 4.1.9. Slowly adjust the DC Level control fully clockwise while observing for Gain (Figure 4-1) or Offset (Figure 4-2) separations.

4.1.10.

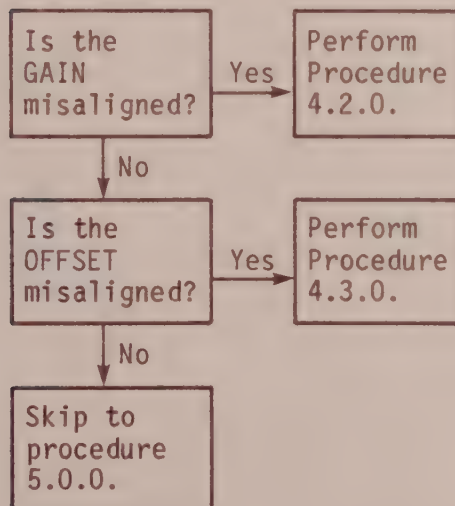


Figure 4-1

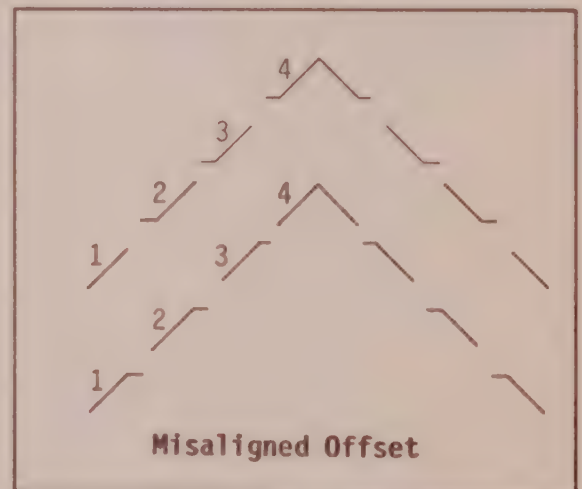


Figure 4-2

4.2.0. GAIN ADJUSTMENTS

4.2.1. Input a triangle wave to the channel to be adjusted.
a. Adjust for a one period, full screen display.

4.2.2. DC Level control: Full CCW

4.2.3. Slowly adjust the DC Level control in the CW direction until a full screen triangle waveform appears.

4.2.4. Slowly adjust the trimpot selected from 4.2.5. (starting with Stage 4) until a separation appears on the waveform.

4.2.5.

STAGE	TRIMPOT
	See Figure 4-3
4	R66
3	R1
2	R1
1	R32

4.2.6.

SPECIFICATION
Readjust the same trimpot until the separation disappears.

4.2.7. Repeat Step 4.2.4 for the next stage.

NOTE: The DC Level control may require additional adjustment to isolate separations.

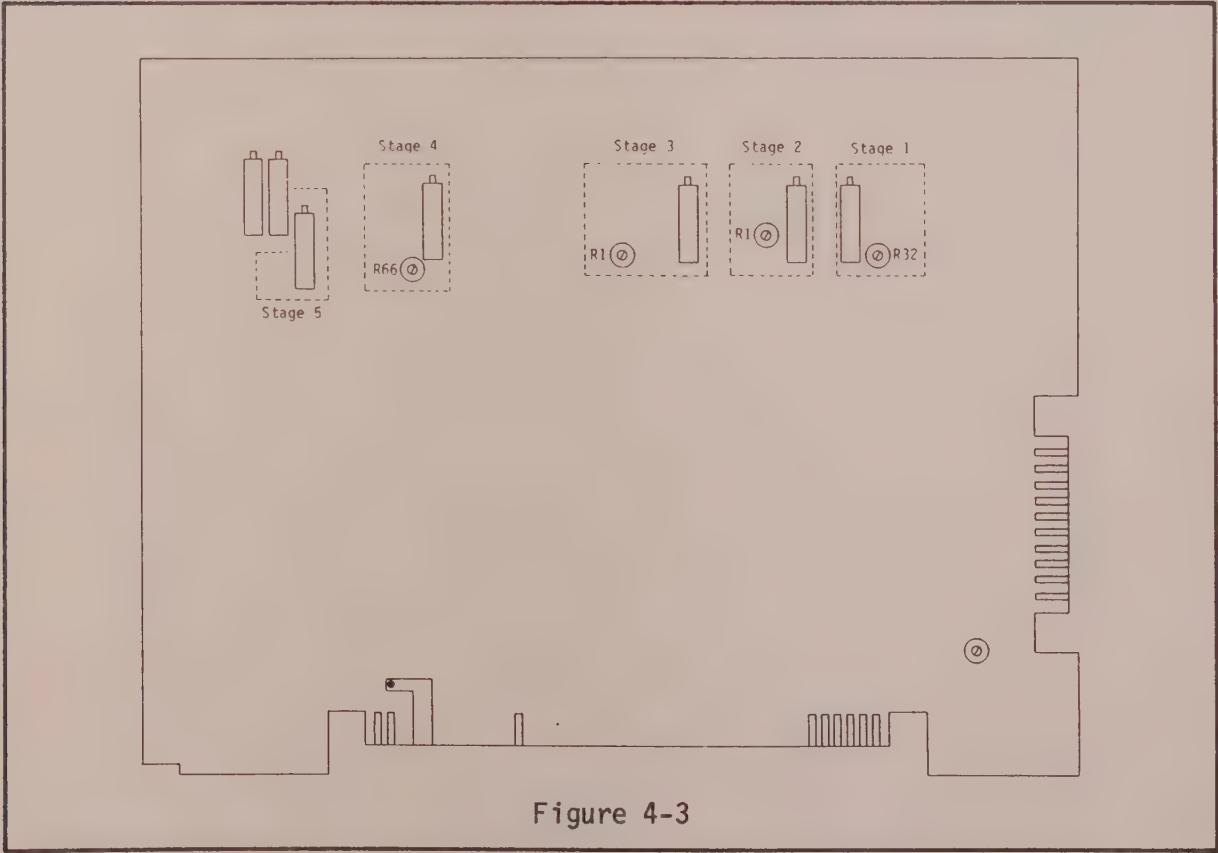


Figure 4-3

4.3.0. OFFSET ADJUSTMENTS

4.3.1. DC Level control: Full CCW.

4.3.2. Slowly adjust the DC Level control in the CW direction until a full screen triangle wave appears.

4.3.3. Slowly adjust the trimpot selected from 4.3.4 (starting with Stage 5) until a separation appears on the waveform.

NOTE: The DC Level control may require additional adjustment to isolate separations as each trimpot is adjusted.

4.3.4.

STAGE	TRIMPOT
	See Figure 4-4
5	R49
4	R49
3	R49
2	R49
1	R26

4.3.5.

SPECIFICATION
Readjust the same trimpot until the separation disappears.

4.3.6. Repeat Step 4.3.3 for the next stage.

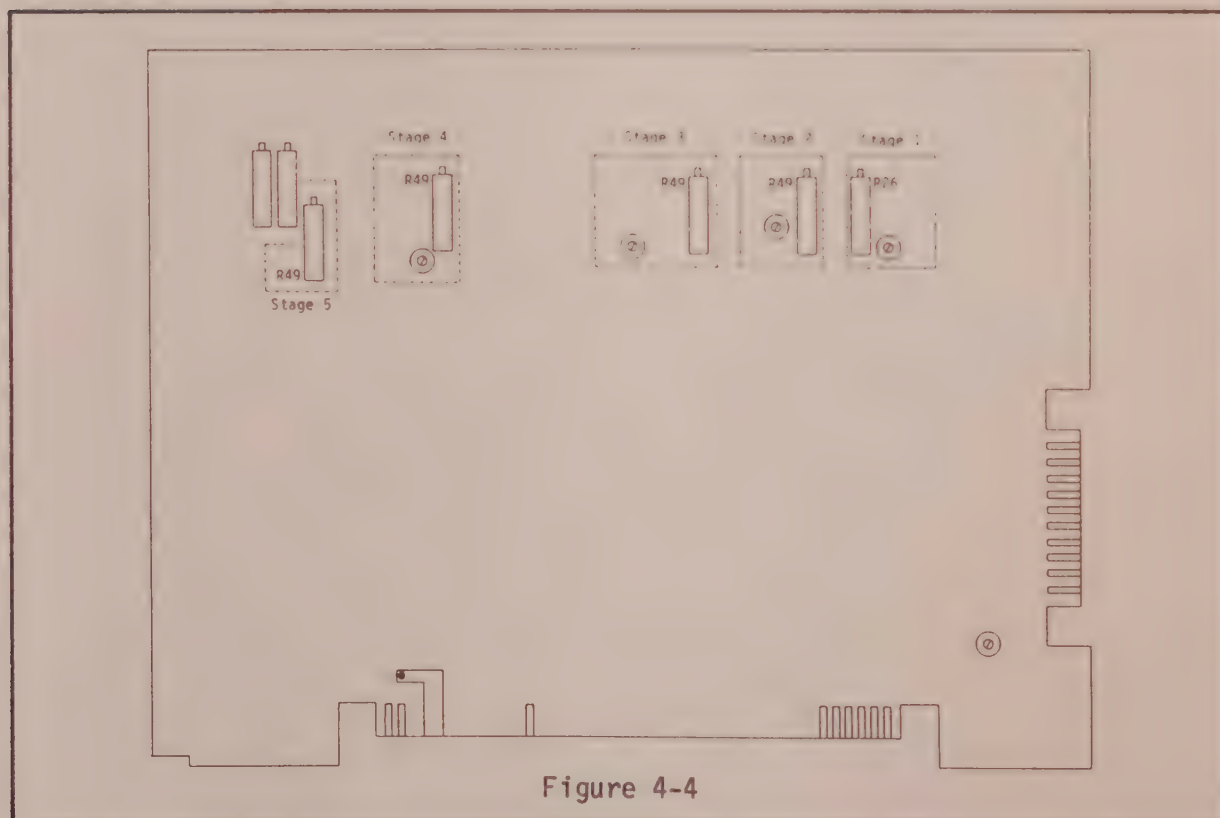


Figure 4-4

4.4.0. GAIN & OFFSET CONFIRMATIONS

4.4.1. Input the triangle waveform to the (+) input BNC and slowly adjust the DC Level control from full CCW to full CW while observing for separations.

4.4.2.

SPECIFICATION
Repeat Procedure 4.0.0. if separations are seen.

4.4.3. Disconnect the signal generator from the scope.

4.5.0. REINSTALLING THE PLUG-IN

Perform this procedure after the channel B ADC Gain & Offset Adjustments have been completed and verified.

CAUTION: Remove all power from the 2090 before continuing.

4.5.1. Disconnect the ribbon cable from the rear of the plug-in.

4.5.2. Carefully slide the plug-in half way into the frame and reconnect the ribbon cable to the rear of the plug-in.

4.5.3. Reconnect the ground cable to the Mother board.

4.5.4. Secure the plug-in with four front panel securing screws.

4.5.5. Replace the left side cover but do not secure.

4.5.6. Reapply power to the scope.

5.0.0. BALANCE ADJUSTMENTS

NOTE: One channel on, the other off.

5.1.0. 100mV & 1V MULTIPLIER BALANCE

5.1.1. Input BNC switches: GND

5.1.2. Connect the multimeter to TPA, (Figure 5-1).

5.1.3.

SPECIFICATION (See Figure 5-1)
Adjust R6 nearest to 0 VDC

5.1.4. Vertical Expansion: OFF

5.1.5. Range Multiplier: X1

5.1.6. DC Level control: Adjust trace to center of screen.

5.1.7. Vertical Expansion: X32

5.1.8. Autocenter: ON, then OFF

5.1.9. Range: 100 mV
a. Observe the trace for a vertical shift.

5.1.10.

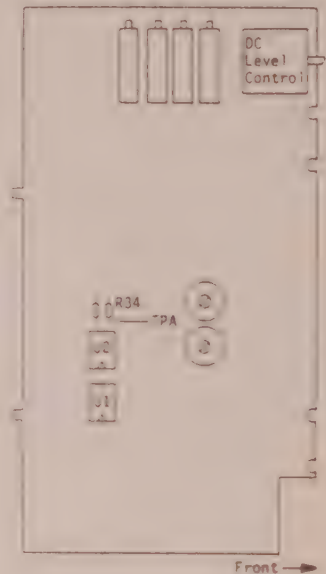
SPECIFICATION (See Figure 5-1)
Adjust R5 until the trace and horizontal cursor are aligned.

NOTE: Make the first adjustment without vertical expansion if the shift is excessive.

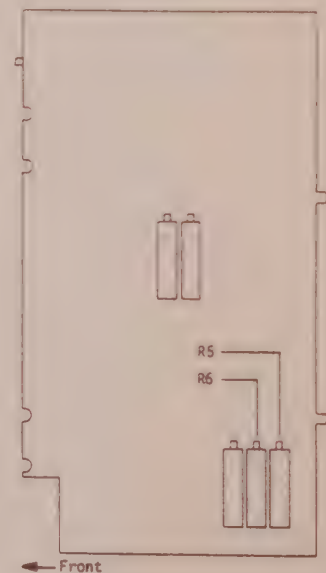
5.1.11. Range: 1V

5.1.12.

SPECIFICATION
Repeat steps 5.1.8 through 5.1.11 until minimum shifting is achieved.



Left Side View



Right Side View

Figure 5-1

5.2.0. X1 & X2 MULTIPLIER BALANCE

5.2.1. Range Multiplier: X2

5.2.2. Autocenter: ON, then OFF

5.2.3. Range Multiplier: X1

- a. Observe trace for vertical shift.

5.2.4.

SPECIFICATION (See Figure 5-2)
Adjust R4 until the trace and horizontal cursor are aligned.

NOTE: Make the first adjustment without vertical expansion if the shift is excessive.

5.2.5. Repeat Steps 5.2.1 through 5.2.4 until minimum shifting is observed.

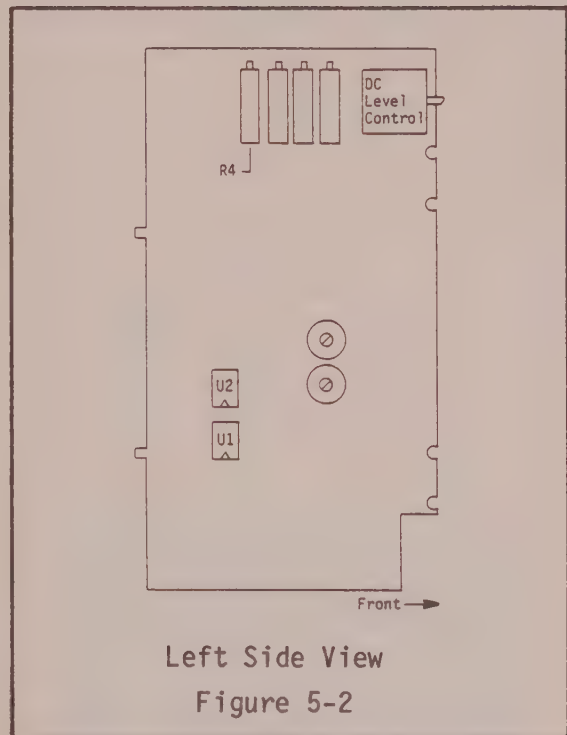
5.2.6. Range Multiplier: Switch between X1, X2 and X4.

- a. Observe the trace for minimum shifting.

5.2.7.

SPECIFICATION
Repeat steps 5.2.1. through 5.2.6. until minimum shifting is achieved.

5.2.8. Unground the (+) input BNC.



6.0.0. GAIN CALIBRATION

6.1.0. 200mV, 100mV, 2V & 20V RANGES

- 6.1.1. Memory switch: Q1
- 6.1.2. Filter switch: ON
- 6.1.3. Time Per Point: 5 mS
- 6.1.4. Autocenter: OFF
- 6.1.5. Vertical Expansion: OFF
- 6.1.6. Place the Range, Multiplier, and Multimeter to the ranges selected from 6.1.7. (starting with Step #1) and then continue with 6.1.8. Return to 6.1.7 at the end of this procedure and repeat for the next step listed until all five steps are finished.

6.1.7.

STEP	RANGE	MULT.	METER
#1	1V	X1	0-4V
#2	1V	X2	0-4V
#3	1V	X4	0-10V
#4	100mV	X1	0-200mV
#5	10V	X1	0-40V

- 6.1.8. Apply a 0.2 Hz Square wave signal to the (+) input BNC and adjust the waveform's amplitude for a 3/4 full screen display.

NOTE: The Offset and Trigger Level controls may require adjustment.

- 6.1.9. Input the same signal to the multimeter.

NOTE: The signal should be input to both the plug-in and the multimeter.

- 6.1.10. Record both (+) and (-) multimeter readings and ADD absolute values to obtain the peak-to-peak voltage.
- 6.1.11. Press the HOLD NEXT button.

NOTE: Wait until the waveform has been stored, (Hold Last LED illuminated only) before continuing.

- 6.1.12. Autocenter switch: ON

6.1.13. Vertical Expansion: X64

NOTE: Several levels of data points will be displayed due to a certain amount of "noise," (Figure 6-1).

6.1.14. Position the crosshair over the level with the majority of data points, (Figure 6-2).

6.1.15. Vertical Expansion: OFF

6.1.16. Function switch: RESET

6.1.17. Press the Execute button.
a. The time and voltage numerics reset to zero.

6.1.18. Position the crosshair to the opposite peak of the waveform.

6.1.19. Vertical Expansion: X64

6.1.20. Position the crosshair over the level with the majority of data points and record the peak-to-peak voltage.

6.1.21. Compute the Percent Error, (Equation #1).

6.1.22.

SPECIFICATION

The percent error should be less than 0.2%.

PERCENT ERROR EQUATION

$$\% \text{ Error} = \frac{V_s - V}{V_{fs}} \times 100$$

Equation #1

V = Voltage (Vpp) reading on scope.
Vs = Standard meter voltage reading.
Vfs = Volts Full Scale range x 2.048.
(e.g., For the +2V range,
Vfs = 2 x 2.048 = 4.096V.)

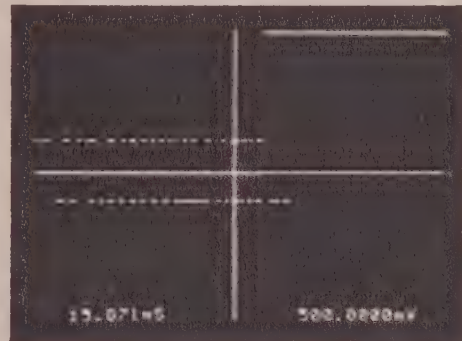


Figure 6-1

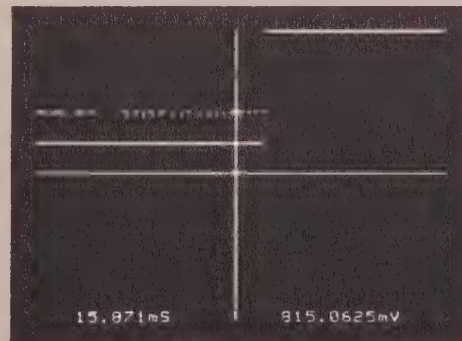


Figure 6-2

6.1.23. Adjust the trimpot selected from 6.1.24 for the Step in progress until the Percent Error is less than 0.2%.

6.1.24.

STEP	TRIMPOT
	Figure 6-3
#1	R3
#2	R2
#3	R1
#4	R7
#5	R9

6.1.25. Press the LIVE button.

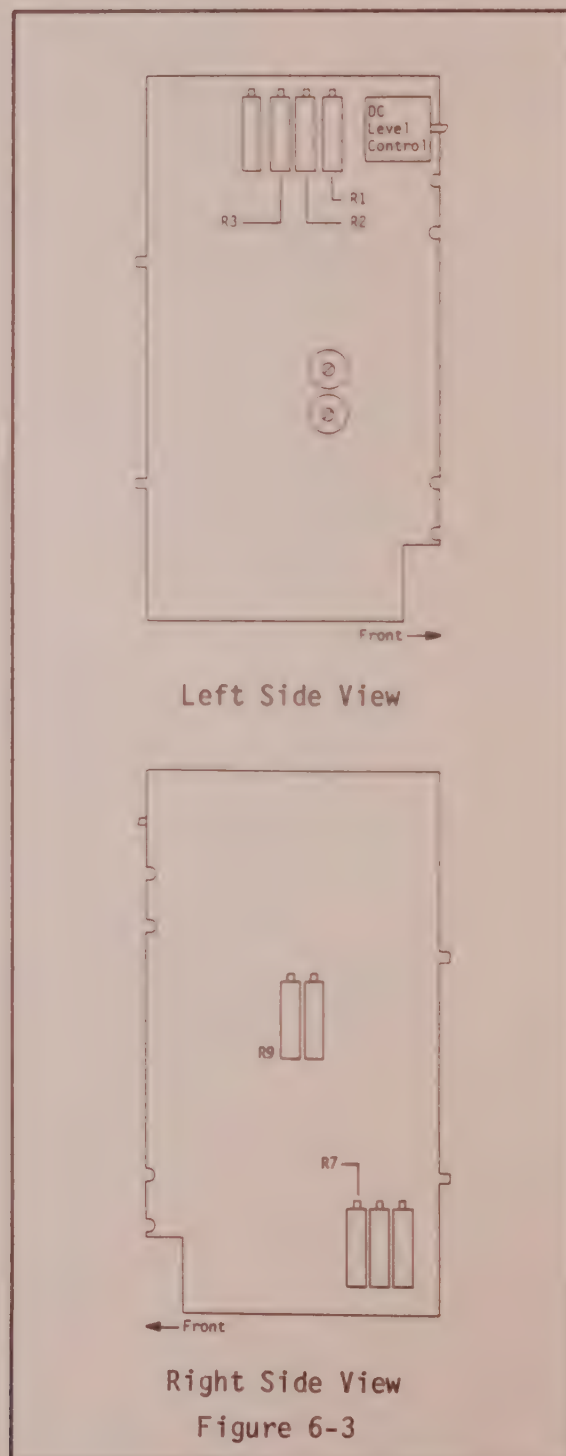
6.1.26. Vertical Expansion: OFF

6.1.27. Autocenter switch: OFF

6.1.28. Repeat Steps 6.1.11 through 6.1.27 until the Percent Error is less than 0.2%.

6.1.29. Return to Step 6.1.6 and repeat for the next step listed in Table 6.1.7.

6.1.30. Disconnect the multimeter after completing all five ranges.



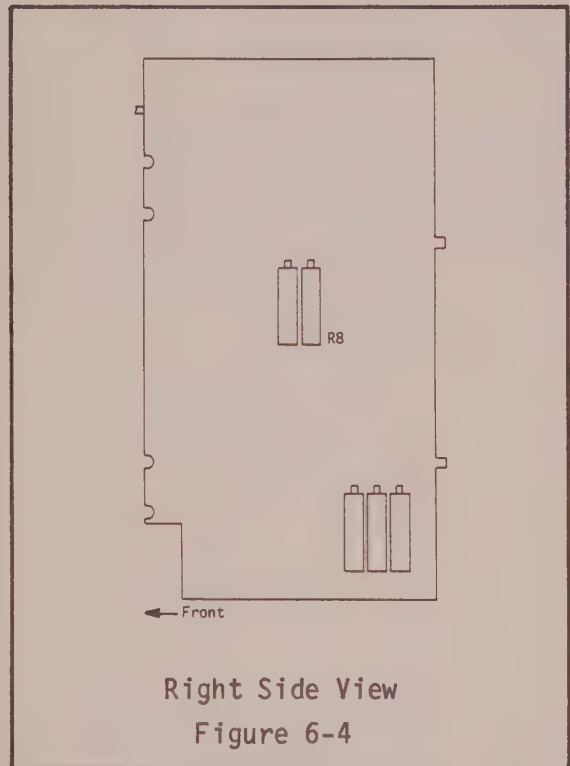
6.2.0. -10V RANGE ADJUSTMENT

- 6.2.1. Time Per Point: 500 nS
6.2.2. Memory switch: ALL
6.2.3. Apply a 1 kHz square wave to the (+) input BNC.
a. Adjust the signal's amplitude for a 3/4 full screen display.
6.2.4. (-) Input BNC switch: SIG
6.2.5. Apply the same signal to the (-) input BNC.

NOTE: The square wave signal must be input to the (+ & -) input BNCs at this point.

- 6.2.6. Vertical Expansion: X32
6.2.7. Autocenter: ON
6.2.8.

SPECIFICATION (See Figure 6-4)
Adjust R8 for the best straight line.



7.0.0. FREQUENCY COMPENSATION

- 7.1.1. Filter switch: OFF
- 7.1.2. Autocenter: ON
- 7.1.3. (-) Input switch: GND
- 7.1.4. Vertical Expansion: OFF
- 7.1.5. Apply a 10 kHz square wave to the (+) input BNC using the Frequency Compensation network illustrated in Figure 7-1.
- a. Adjust the signal's amplitude for a 3/4 full screen display.
- 7.1.9. Vertical Expansion: X32
- 7.1.10. Horizontal Expansion: X16
- 7.1.11.

SPECIFICATION (See Figure 7-1)

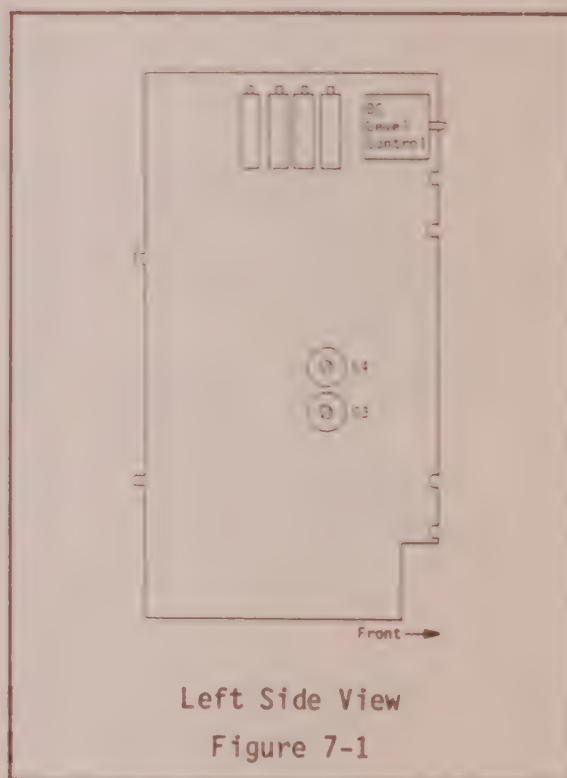
Adjust C4 for a minimum overshoot/undershoot on the negative portion of the square wave.

- 7.1.12. Vertical Expansion: OFF
- 7.1.13. Disconnect the signal from the (+) input BNC.
- 7.1.14. Ground the (+) input BNC.
- 7.1.15. (-) input BNC switch. SIG
- 7.1.16. Apply the signal to the (-) input BNC using the Frequency Compensation network.
- a. Adjust the signal's amplitude for a 3/4 full screen display.
- 7.1.19. Vertical Expansion: X32

7.1.20.

SPECIFICATION (See Figure 7-1)

Adjust C3 for a minimum overshoot/undershoot on the negative portion of the square wave.



8.0.0. TIME BASE CHECK

NOTE: No adjustments are performed in this test. The oscillator circuitry will require repair if Specification 8.2.3 is not met. Use a calibrated digital frequency counter.

8.1.1. Turn on the 2090 and allow it to warm up.

CAUTION: Carefully perform the next step to prevent shorting the probe to other pins or traces.

8.2.2. Measure the frequency (Time Base) at IC32, Pin 2, (Figure 8-1).

8.2.3.

SPECIFICATION
The measured frequency should be no greater than 20.005 MHz or less than 19.995 MHz

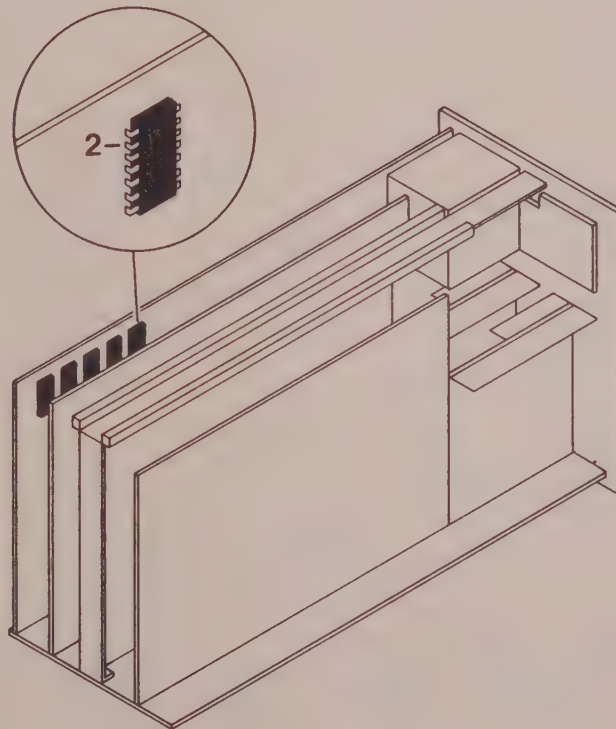


Figure 8-1

9.0.0. OSCILLOSCOPE REASSEMBLY

WARNING: Remove all power from the 2090 before continuing.

► **IMPORTANT:** Perform this procedure after both channel A and channel B adjustments have been completed.

9.1.1. Reinstall the channel B D3 amplifier board and reconnect the D3 to Mother board ground.

9.1.2. Replace the two D3 amplifier securing screws.

9.1.3. Reinstall the channel A Amplifier board.

9.1.4. Reinstall the channel A D3 amplifier board and reconnect the D3 to Mother board ground.

9.1.5. Replace the two D3 amplifier securing screws.

9.1.6. Reconnect the ribbon cable and ground connector to the plug-in.

9.1.7. Replace the left side cover on the oscilloscope.

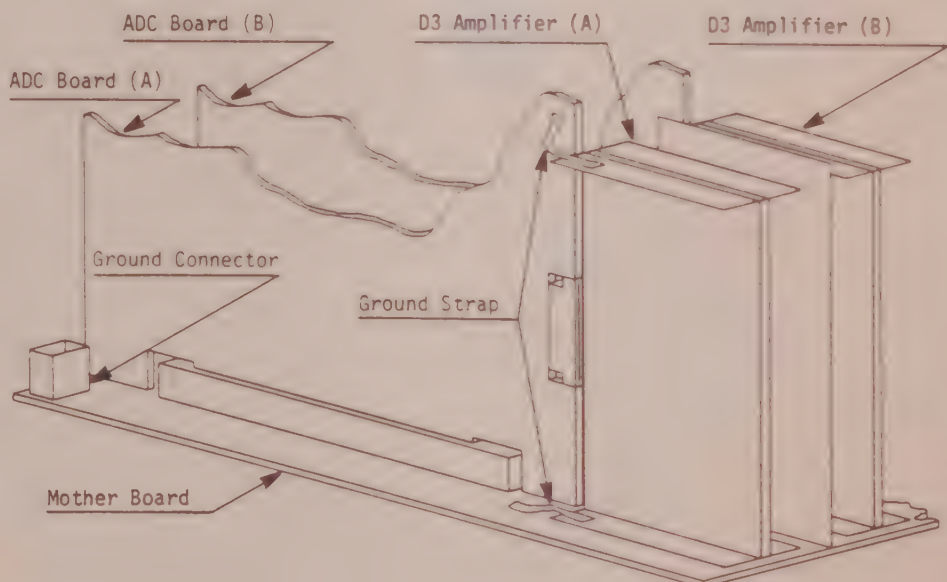
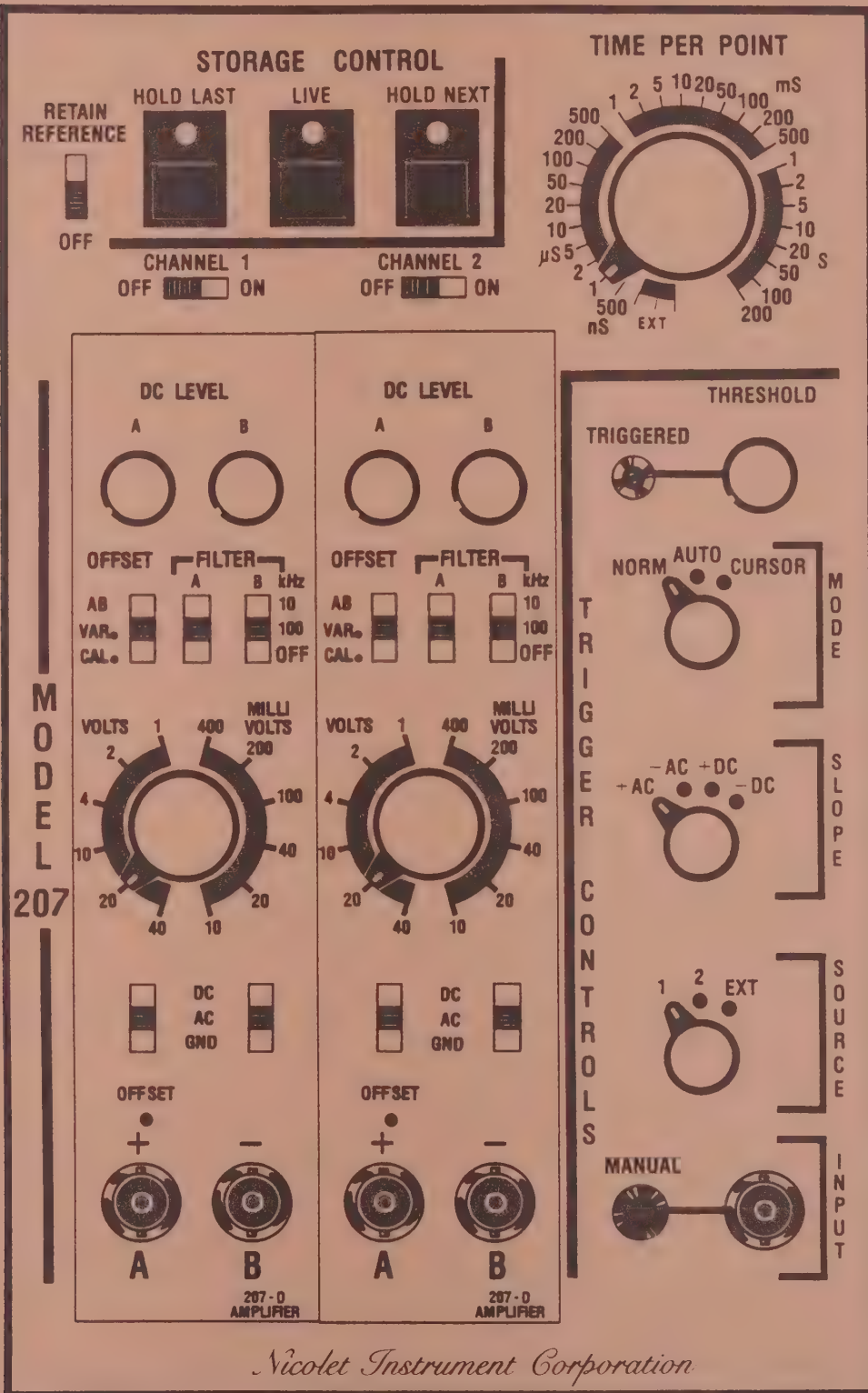


Figure 9-1

Model 207 Plug-in



INTRODUCTION

This section contains the alignment and calibration procedures for the **Model 207 Plug-in**. Read each procedure in its entirety before servicing this instrument.

WARNING: High voltages exist within this instrument. Observe all safety standards set by your place of employment. This instrument should be serviced by qualified personnel only.

► **IMPORTANT:** The plug-in must be removed to access the channel B trim pots. Perform procedures 2.0.0 through 7.0.0 for the channel A Amplifier and then repeat for the channel B Amplifier.

► **IMPORTANT:** These procedures are sequential. Do not skip any procedures or steps.

INDEX

PROCEDURE	PAGE
1.0.0. Preparation	5-4
2.0.0. Set-Up	5-7
3.0.0. Voltage Check	5-8
4.0.0. ADC Gain & Offset	5-10
5.0.0. Multiplexer	5-15
6.0.0. Balance	5-16
7.0.0. Frequency Comp.	5-18
8.0.0. Common Mode	5-21
9.0.0. Gain	5-22
10.0.0. Input Capacitance	5-25
11.0.0. Time Base Check	5-27
12.0.0. Reassembly	5-28

REQUIREMENTS

The following materials are required to perform the **Model 207 Plug-in** alignment procedures.

FUNCTION GENERATOR

- #1. Output: Square and Triangle waves
- #2. Amplitudes: 100mV_{pp} - 20V_{pp}
- #3. Frequencies: 0.2 - 10 kHz

DIGITAL MULTIMETER

- #1. Resolution: 4-1/2 or 5-1/2 digits
- #2. Accuracy: .02% of input, DC Voltage

COUNTER

- #1. Frequency Counter: 50 MHz minimum

EXTENDER BOARD

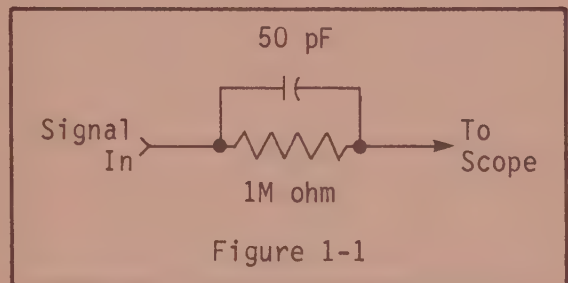
- #1. Furnished with 2090.

TOOLS

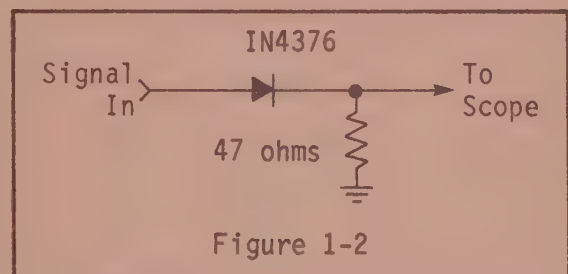
- #1. Phillips screwdriver
- #2. Common screwdriver
- #3. Nonmetallic adjustment screwdriver

NETWORKS

- #1. Input Capacitance Network:



- #2. Frequency Compensation Network:



1.0.0. PREPARATION

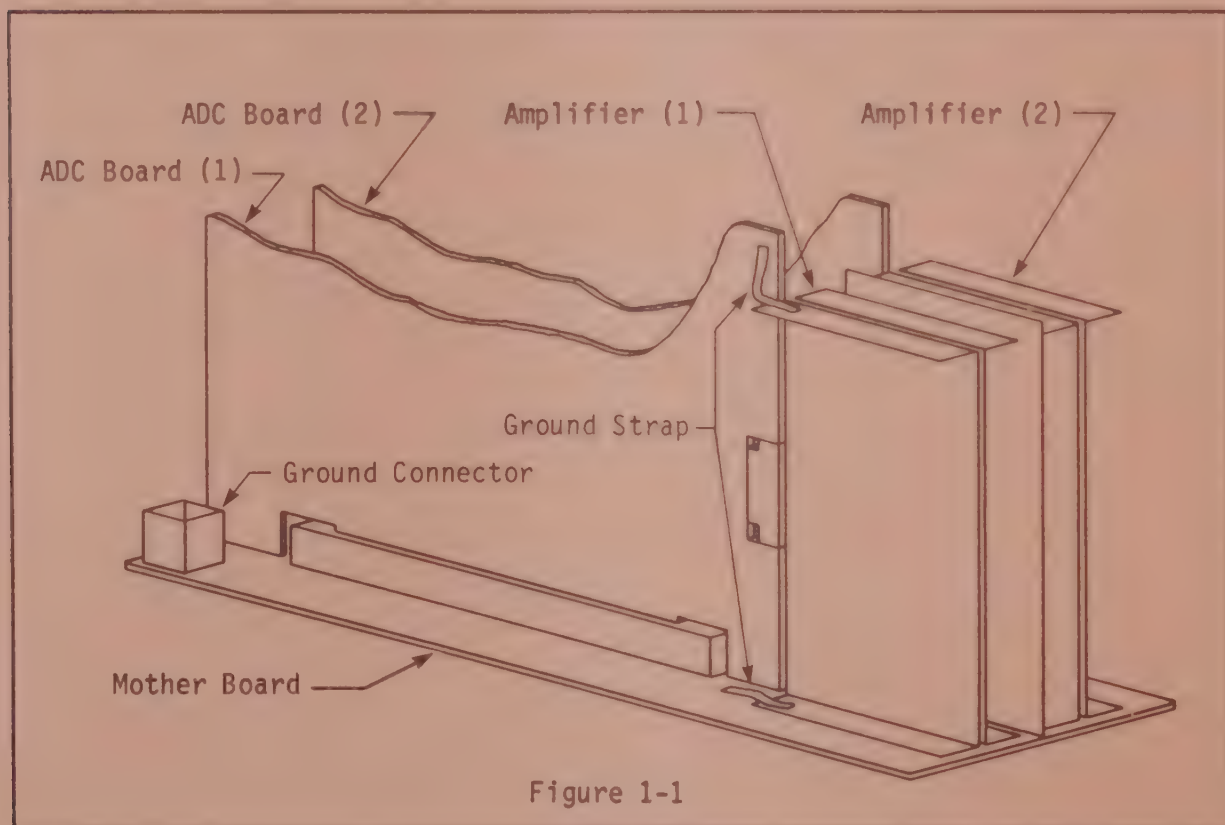
1.1.0 PREPARING CHANNEL 1

► **IMPORTANT:** Perform procedure 1.1.0 only when adjusting channel 1.

WARNING: Remove all power from the 2090 before continuing.

- 1.1.1. Remove the left side cover and set it aside.
- 1.1.2. Disconnect the ground between the channel 1 Amplifier and Mother boards, (Figure 1-1).

- 1.1.3. Remove the two front panel Amplifier securing screws and pull the Amplifier out.
- 1.1.4. Insert the Extender board between the channel 1 Amplifier and ADC boards.
- 1.1.5. Ground the channel 1 Amplifier board to the plug-in.



1.2.0 PREPARING CHANNEL 2

► **IMPORTANT:** Perform procedure 1.2.0 only when adjusting channel 2.

WARNING: Remove all power from the 2090 before continuing.

- 1.2.1. Remove the left side cover and set it aside.
- 1.2.2. Unplug the extended channel 1 Amplifier board (Figure 1-1) and set it aside.
- 1.2.3. Unplug the channel 1 ADC board and set it aside.
- 1.2.4. Disconnect the channel 2 Amplifier to Mother board ground connection.
- 1.2.5. Remove the two channel 2 Amplifier front panel securing screws and carefully pull the Amplifier out.
- 1.2.6. Insert the Extender board between the channel 2 Amplifier and ADC boards.
- 1.2.7. Ground the channel 2 Amplifier board to the plug-in.

1.3.0. REMOVING THE PLUG-IN

► **IMPORTANT:** Perform this procedure only when adjustments are required on the channel 2 ADC board during either of these two procedures:
3.0.0. Voltage Check
4.0.0. ADC Gain & Offset Adjustments

WARNING: Remove all power from the 2090 before continuing.

- 1.3.1. Remove the left side cover and set it aside.
- 1.3.2. Remove the four plug-in front panel securing screws.
- 1.3.3. Disconnect the ground cable from the Mother board, (Figure 1-1).
- 1.3.4. Carefully slide the plug-in half way out of the frame and disconnect the ribbon cable from the rear of the plug-in.
- 1.3.5. Carefully slide the plug-in out of the frame and set it to the left of the scope.

WARNING: Place the plug-in on a nonconductive surface free of metal such as solder splashes.

- 1.3.6. Reconnect the ribbon cable to the rear of the plug-in.

NOTE: It is not necessary to reconnect the ground cable to the plug-in.

- 1.3.7. Cover the plug-in with a clean cloth between adjustments.

2.0.0 SET-UP PROCEDURE

MAINFRAME CONTROLS

Power On/Off: ON
Vertical Expansion: OFF
Horizontal Expansion: OFF
Autocenter switch: ON
XY/YT switch: YT
Memory switch: ALL
Function switch: RESET NUMERICS

DISK DRIVE

Track Protect switches: Don't Care
Semi-Auto/Manual switch: MANUAL
Track Segment: MAINFRAME CONTROLLED

207 PLUG-IN

Storage Control: LIVE
Retain Reference: OFF
Time Per Point: 10 μ S
Filter: OFF
Range: 2V
Mode: VAR
Input BNC switches: GND
Trigger Mode: AUTO
Trigger Slope: -DC
Trigger Source: Notes 1 & 2
Channel 1 switch: ON (if adjusting
channel 1)
Channel 2 switch: ON (if adjusting
channel 2)

NOTE 1: If the signal generator does not have a sync output, place the Trigger Source switch to (1). If it has a sync output, place the switch to EXT and input the sync output to the EXT input BNC.

NOTE 2: The 207 triggers internally on the A (+) inputs only.

3.0.0. VOLTAGE CHECK

WARNING: The entire plug-in must be recalibrated if any of the voltage trimpot settings are altered. This procedure must be performed by qualified service personnel and only after replacing components.

NOTE: Allow the scope to warm up 15 minutes before proceeding.

3.1.1. Multimeter range: 0-20 VDC

3.1.2. Measure the voltage at +5VTP, (Figure 3-2).

3.1.3.

SPECIFICATION
(See Figure 3-1)

Adjust R7 for +5 VDC +1%.

3.1.4. Multimeter range: 0-40 VDC

3.1.5. Measure the voltage at +25VTP, (Figure 3-2).

3.1.6.

SPECIFICATION
(See Figure 3-2)

Adjust R72 for +25 VDC +1%

3.1.7. Measure the voltage at -25VTP, (Figure 3-2).

3.1.8.

SPECIFICATION
(See Figure 3-2)

Adjust R74 for -25 VDC +1%

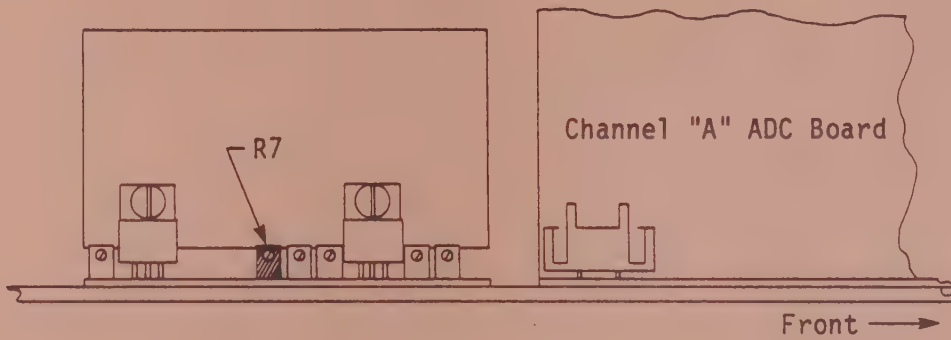


Figure 3-1

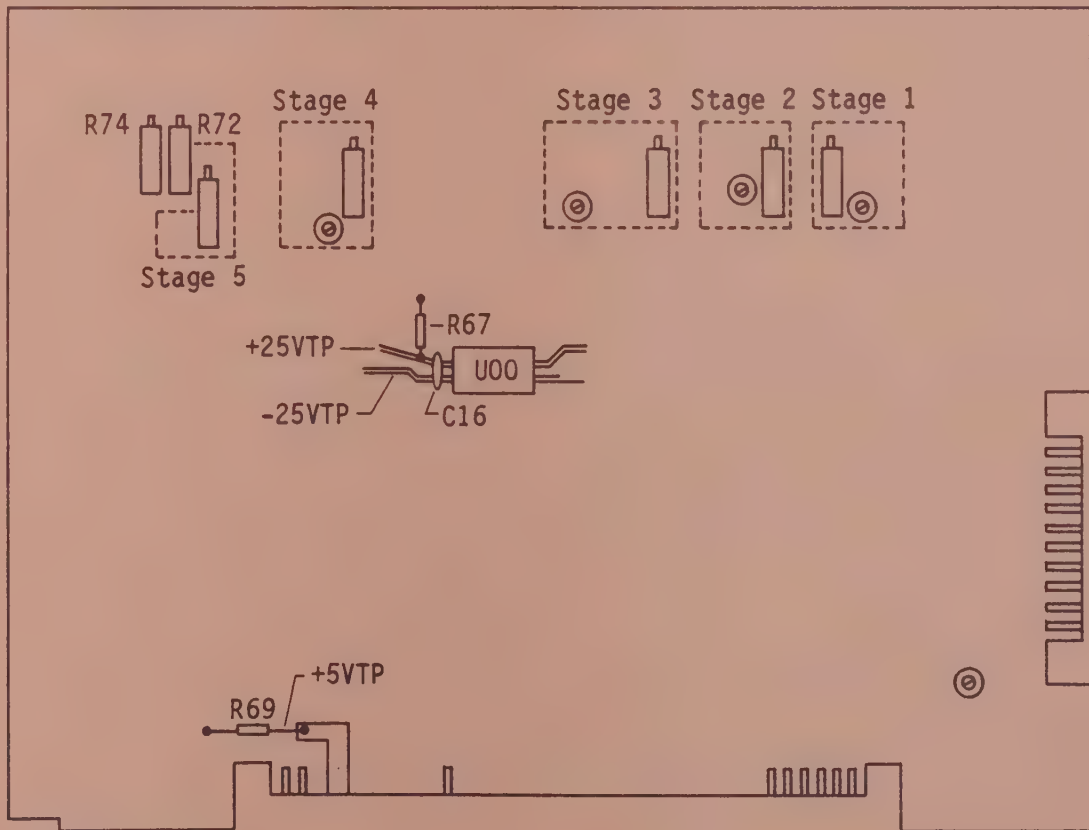


Figure 3-2

4.0.0. ADC GAIN & OFFSET ADJUSTMENTS

4.1.0. GAIN & OFFSET TEST

- 4.1.1. Range: 1V
- 4.1.2. 100 kHz Filter switch: ON
- 4.1.3. Trigger Mode: NORM
- 4.1.4. (+) input switch: DC
- 4.1.5. Apply a triangle waveform to the (+) input BNC.
 - a. Adjust for a one period display.
- 4.1.6. Vertical Expansion: X32
 - a. Adjust the signal for a full screen display.

NOTE: If necessary, reposition the waveform using the Left/Right Cursor paddle.

- 4.1.7. DC Level: Full CCW
- 4.1.8. Slowly adjust the DC Level control fully clockwise while observing for Gain (Figure 4-1) or Offset (Figure 4-2) separations

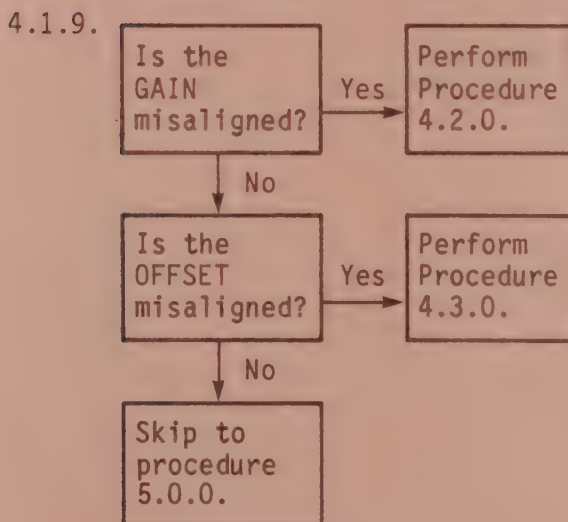


Figure 4-1

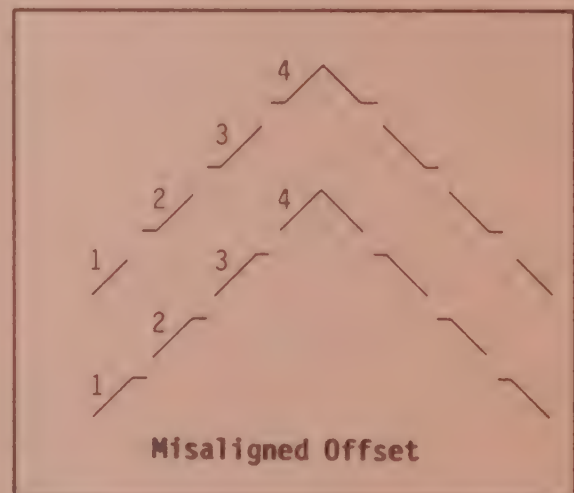


Figure 4-2

4.2.0 GAIN ADJUSTMENTS

- 4.2.1. Input a triangle wave to the channel to be adjusted.
a. Adjust for a one period, full screen display.
- 4.2.2. DC Level control: Full CCW
- 4.2.3. Slowly adjust the DC Level control in the CW direction until a full screen triangle waveform appears.
- 4.2.4. Slowly adjust the trimpot selected from 4.2.5. (starting with Stage 4) until a separation appears on the waveform.
- NOTE:** The DC Level control may require additional adjustment to isolate separations.

4.2.5.

STAGE	TRIMPOT
	See Figure 4-3
4	R66
3	R1
2	R1
1	R32

4.2.6.

SPECIFICATION
Readjust the same trimpot until the separation disappears.

- 4.2.7. Repeat Step 4.2.4 for the next stage.

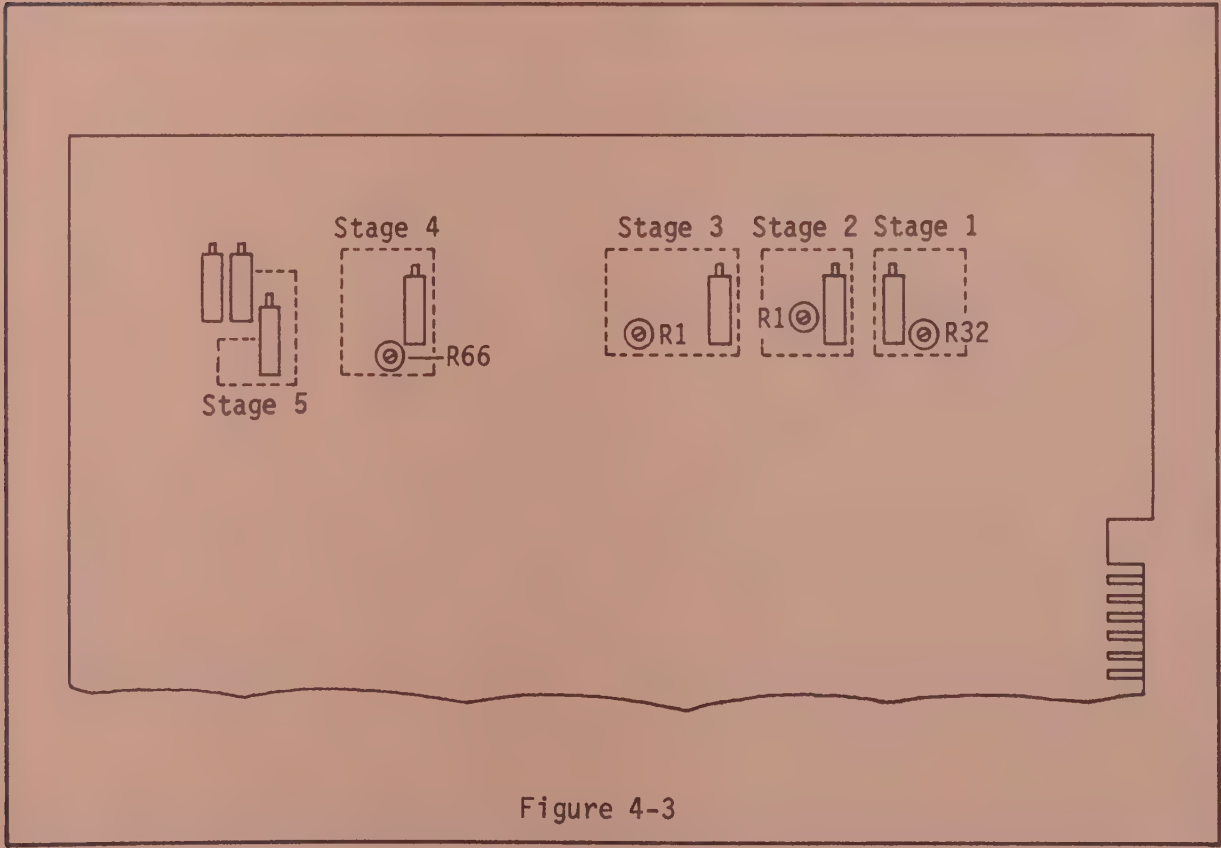


Figure 4-3

4.3.0. OFFSET ADJUSTMENTS

4.3.1. DC Level control: Full CCW.

4.3.2. Slowly adjust the DC Level control in the CW direction until a full screen triangle waveform appears.

4.3.3. Slowly adjust the trimpot selected from 4.3.4 (starting with Stage 5) until a separation appears on the waveform.

NOTE: The DC Level control may require additional adjustment to isolate separations.

4.3.4.

STAGE	TRIMPOT
	See Figure 4-4
5	R49
4	R49
3	R49
2	R49
1	R26

4.3.5.

SPECIFICATION
Readjust the same trimpot until the separation disappears.

4.3.6. Repeat Steps 4.3.3 for the next stage.

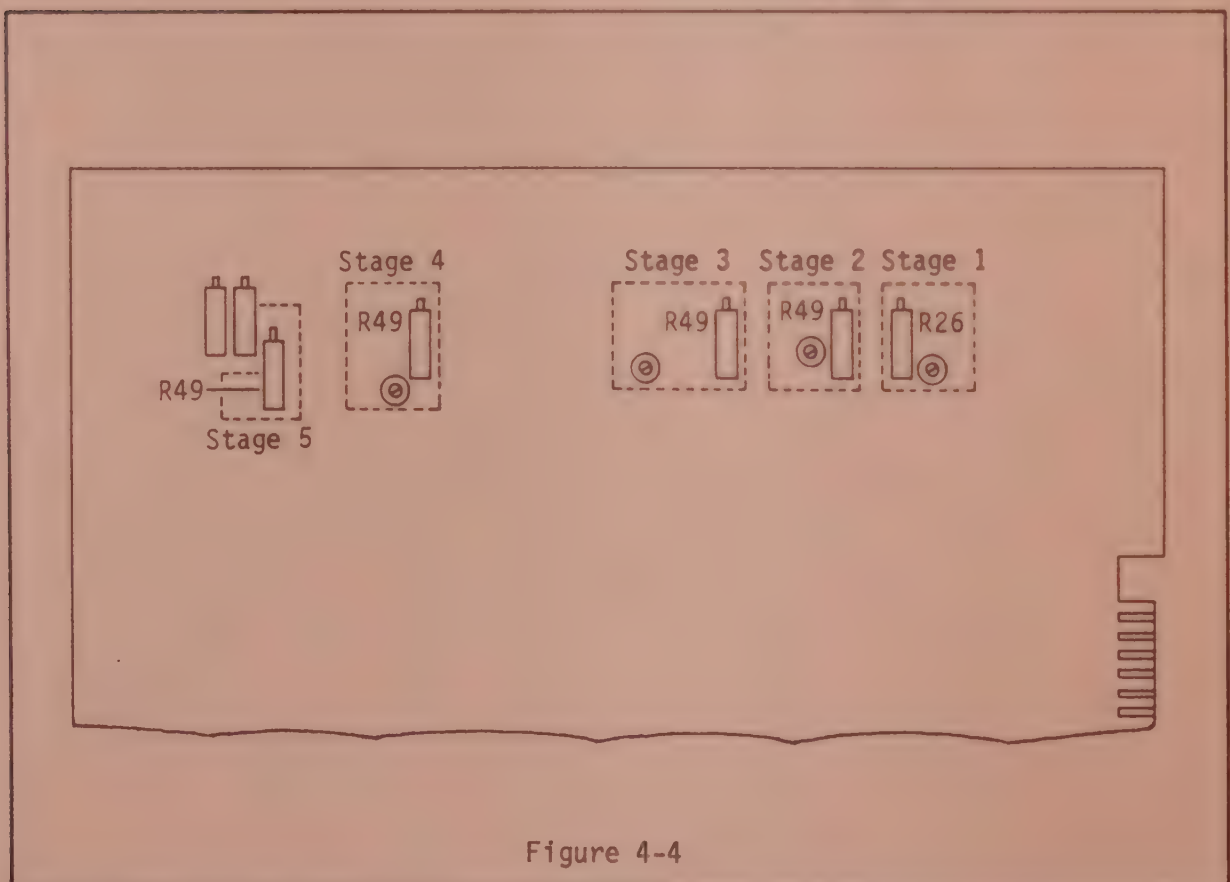


Figure 4-4

4.4.0. GAIN & OFFSET CONFIRMATIONS

4.4.1. Input the triangle waveform to the (+) input BNC and slowly adjust the DC Level control from full CCW to full CW while observing for separations.

4.4.2.

SPECIFICATION
Repeat Procedure 4.0.0 if separations are seen.

4.4.3. Disconnect the signal generator from the input BNC.

4.5.0. REINSTALLING THE PLUG-IN

Perform this procedure after the channel 2 ADC Gain & Offset Adjustments have been completed and verified.

CAUTION: Remove all power from the 2090 before continuing.

4.5.1. Disconnect the ribbon cable from the rear of the plug-in.

4.5.2. Carefully slide the plug-in half way into the frame and reconnect the ribbon cable to the rear of the plug-in.

4.5.3. Reconnect the ground cable to the Mother board.

4.5.4. Secure the plug-in with four front panel securing screws.

4.5.5. Replace the left side cover but do not secure.

4.5.6. Reapply power to the scope.

5.0.0. MULTIPLEXER PULSE WIDTH ADJUST

5.1.1. Adjust R4 (Figure 5-2) for a pulse width of 300 nS (Figure 5-1) at pin 6 of U6 (Figure 5-2).

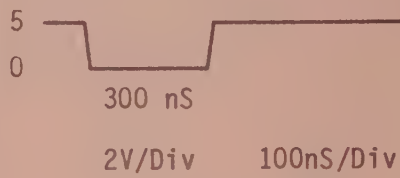
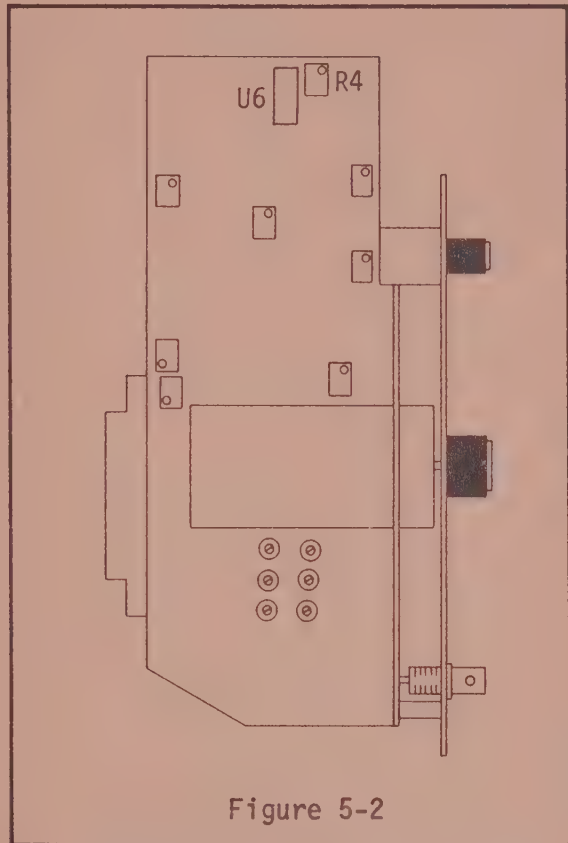


Figure 5-1



6.0.0. BALANCE ADJUSTMENTS

6.1.0. (+) INPUT BALANCE

- 6.1.1. Filter (A & B) 10 kHz
- 6.1.2. Mode switch: AB
- 6.1.3. Range switch: 200 mV
- 6.1.4. Input BNC switches: GND
- 6.1.5. "A" DC Level control: Adjust the "A" trace to screen center.
- 6.1.6. "B" DC Level control: Adjust to separate the "A" and "B" traces.
- 6.1.7. Autocenter switch: Turn on (ensure that crosshair is centered over the "A" trace), and then turn off.
- 6.1.8. Vertical Expansion: X32
- 6.1.9. Place the Range switch to the 100 mV position while observing the trace for a vertical shift.

6.1.10.

SPECIFICATION (See Figure 6-1)

Adjust R46 until the trace is aligned with the Horizontal cursor.

NOTE: Make the first adjustment without vertical expansion if the shift is excessive.

- 6.1.11. Range: 200 mV
- 6.1.12. Repeat Steps 6.1.7 through 6.1.11 until minimum shifting is achieved.

- 6.1.13. Switch through all ranges, (except 40, 20, and 10 mV).

6.1.14.

SPECIFICATION

Minimal shifting should be observed in all ranges.

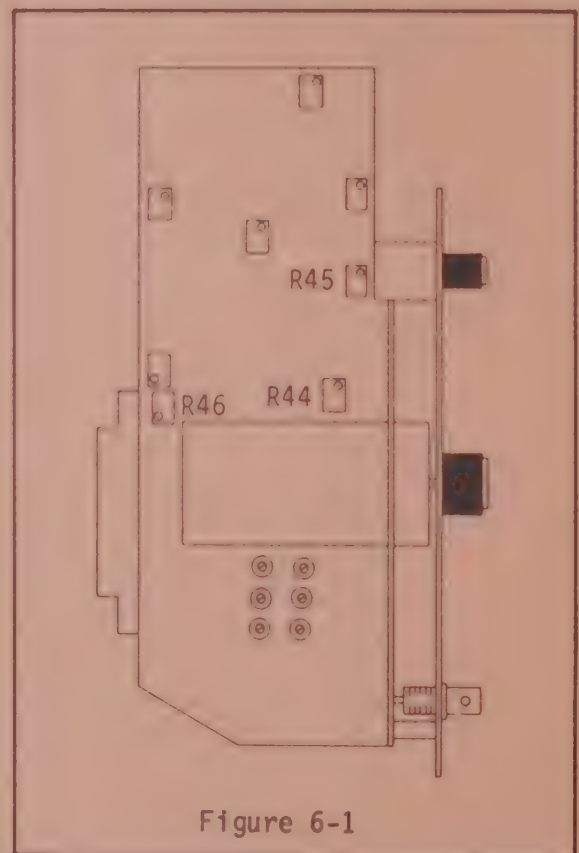


Figure 6-1

6.2.0. DIFFERENTIAL BALANCE

- 6.2.1. Mode switch: VAR
- 6.2.2. Adjust "A" DC Level control to position trace to screen center.
- 6.2.3. Vertical Expansion: X32
- 6.2.4. Range: 200 mV
- 6.2.5. Autocenter: ON, then OFF.
- 6.2.6. Place the Range switch to the 100 mV position while observing the trace for a vertical shift.
- 6.2.7.
- | |
|---|
| SPECIFICATION
(See Figure 6-1) |
| Adjust R44 until the trace is aligned with the Horizontal cursor. |
- 6.2.8. Repeat Steps 6.2.4. through 6.2.7 until minimum shifting is achieved.
- 6.2.9. Check all ranges (except 40, 20, 10 mV ranges) for minimal shifting.

6.3.0. - INPUT BALANCE

- 6.3.1. Mode switch: AB
- 6.3.2. "B" DC Level control: Adjust "B" trace to screen center.
- 6.3.3. "A" DC Level control: Adjust to separate "A" and "B" traces.
- 6.3.4. Range: 200 mV
- 6.3.5. Autocenter switch: Turn on, (ensure that crosshair is centered over the "B" trace).
- 6.3.6. Vertical Expansion: X32
- 6.3.7. Autocenter switch: OFF
- 6.3.8. Place the Range switch to the 100 mV position while observing the trace for a vertical shift.
- 6.3.9.
- | |
|---|
| SPECIFICATION
(See Figure 6-1) |
| Adjust R45 until the trace is aligned with the Horizontal cursor. |
- 6.3.10. Repeat Steps 6.3.4 through 6.3.8 until minimum shifting is achieved.
- 6.3.11. Switch through all ranges, (except 40, 20, 10 mV).
- 6.3.12.

SPECIFICATION

Minimal shifting should be observed in all ranges.

7.0.0. FREQUENCY COMPENSATION ADJUST

7.1.0. +1V ADJUST

- 7.1.1. Range: 1V
- 7.1.2. Time Per Point: 500 nS
- 7.1.3. Mode switch: VAR
- 7.1.4. Filter (A & B): OFF
- 7.1.5. Vertical Expansion: OFF
- 7.1.6. (+) Input BNC switch: DC
- 7.1.7. Apply a 10 kHz square wave to the (+) input BNC using the Frequency Compensation Network and adjust the waveform's amplitude not to exceed 3/4 full screen.
- 7.1.8. Autocenter switch: ON
- 7.1.9. Vertical Expansion: X16
- 7.1.10. Horizontal Expansion: X8
- 7.1.11.

SPECIFICATION (See Figure 7-1)

Adjust C15 for minimum overshoot or undershoot on the negative cycle.

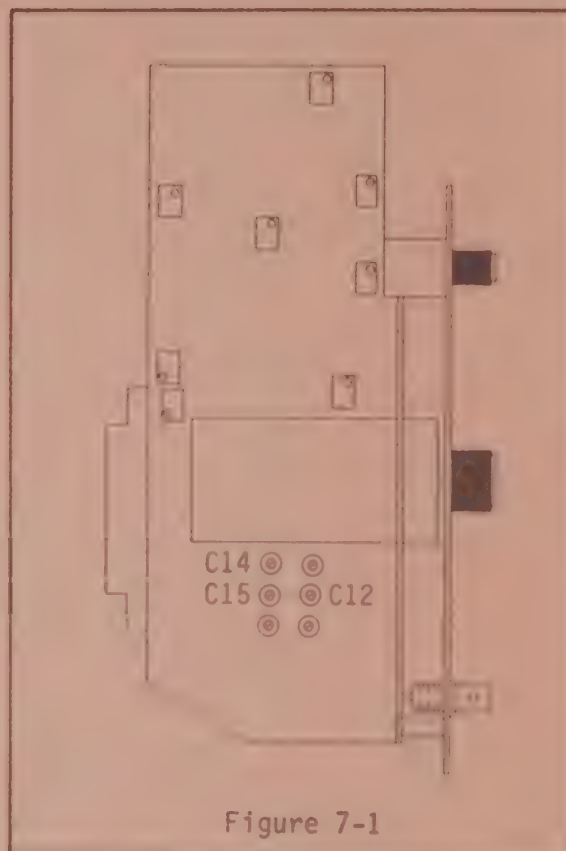


Figure 7-1

7.2.0. -1V ADJUST

- 7.2.1. (+) Input BNC switch: GND
- 7.2.2. (-) Input BNC switch: DC
- 7.2.3. Apply a 10 kHz square wave to the (-) input BNC using the Frequency Compensation Network and adjust the waveform's amplitude not to exceed 3/4 full screen.
- 7.2.4. Autocenter switch: ON
- 7.2.5. Vertical Expansion: X16
- 7.2.6. Horizontal Expansion: X8
- 7.2.7.

SPECIFICATION (See Figure 7-1)
--

Adjust C12 for minimum overshoot or undershoot on the negative cycle.

7.3.0. +10V ADJUST

- 7.3.1. (-) Input BNC switch: GND
- 7.3.2. (+) Input BNC switch: DC
- 7.3.3. Apply a 10 kHz square wave to the (+) input BNC using the Frequency Compensation Network and adjust the waveform's amplitude to not exceed a 3/4 full screen display.
- 7.3.4. Autocenter switch: ON
- 7.3.5. Vertical Expansion: X16
- 7.3.6. Horizontal Expansion: X8
- 7.3.7.

SPECIFICATION (See Figure 7-1)
--

Adjust C14 for minimum overshoot or undershoot on the negative cycle.

7.4.0. -10V ADJUST

7.4.1. (+) Input BNC switch: GND

7.4.2. (-) Input BNC switch: DC

7.4.3. Apply a 10 kHz square wave to the (-) input BNC using the Frequency Compensation Network and adjust the waveform's amplitude to not exceed a 3/4 full screen display.

7.4.4. Autocenter switch: ON

7.4.5. Vertical Expansion: X16

7.4.6. Horizontal Expansion: X8

7.4.7.

SPECIFICATION
(See Figure 7-2)

Adjust C11 for minimum overshoot or undershoot on the negative cycle.

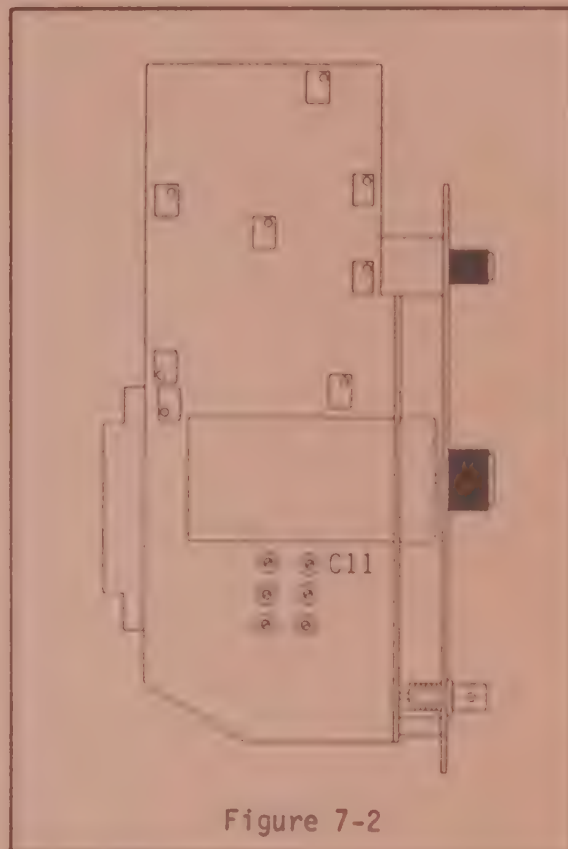


Figure 7-2

8.0.0. COMMON MODE ADJUSTMENT

- 8.1.1. Mode switch: VAR
8.1.2. Vertical Expansion: OFF
8.1.3. Horizontal Expansion: OFF

8.1.4. Apply a 10 kHz square wave to the (-) input BNC and adjust the waveform's amplitude for a 3/4 full screen display.

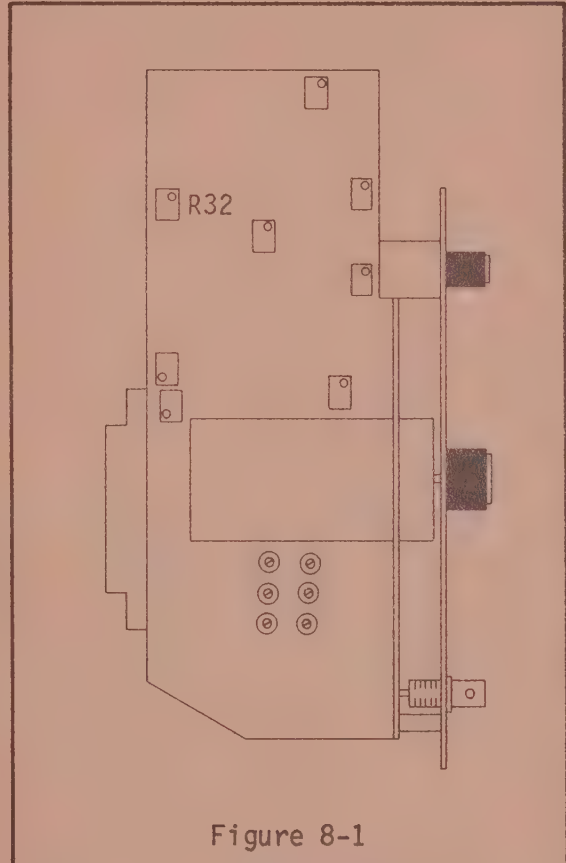
NOTE: The Offset and Trigger Level controls may require adjustment.

- 8.1.5. (+) Input BNC switch: DC
8.1.6. Apply the same signal to the (+) input BNC.

NOTE: The signal should be input to the (+) and (-) inputs at this point.

- 8.1.7. Vertical Expansion: X32
8.1.8. Horizontal Expansion: X8
8.1.9.

SPECIFICATION (Figure 8-1)
Adjust R32 for the best straight line.



9.0.0. GAIN ADJUSTMENTS

9.1.0. (+) INPUT (A)

9.1.1. Multimeter range: 0-4V

9.1.2. Mode: VAR

9.1.3. Filter (A & B): 10KHz

9.1.4. (+) Input: DC

9.1.5. (-) Input: GND

9.1.6. Time Per Point: 5 mS

9.1.7. Memory Group: Q1

9.1.8. Place the Range switch to the position selected from 9.1.9. (starting with the 1V range) and continue.

9.1.9.

PROCEDURE	RANGE
1	1V
2	10mV

9.1.10. Apply a 0.2 Hz Square wave signal to the (+) input BNC and adjust the waveform's amplitude for a 3/4 full screen display.

NOTE: The Offset and Trigger Level controls may require adjustment.

9.1.11. Record both (+) and (-) multimeter readings and ADD absolute values to obtain the peak-to-peak voltage.

9.1.12. Press the HOLD NEXT button.

NOTE: Wait until the waveform has been stored, (Hold Last LED illuminated only) before continuing.

9.1.13. Autocenter switch: ON

9.1.14. Vertical Expansion: X64

NOTE: Several levels of data points will be displayed due to a certain amount of "noise," (Figure 9-1).

9.1.15. Position the crosshair over the level with the majority of data points, (Figure 9-2).

9.1.16. Vertical Expansion: OFF

9.1.17. Function switch: RESET

9.1.18. Depress the Execute button.
a. The Time and Voltage Numerics indicate zero.

9.1.19. Position the crosshair to the opposite peak of the waveform.

9.1.20. Vertical Expansion: X64

9.1.21. Position the crosshair over the level with the majority of data points and record the peak-to-peak voltage.

9.1.22. Compute the Percent Error, (Equation #1).

9.1.23.

SPECIFICATION

The percent error should be less than those listed in 9.1.24 for the range being adjusted.

9.1.24.

RANGE	PERCENT ERROR
1V	Less than 0.2%
10mV	Less than 1.5%

PERCENT ERROR EQUATION

$$\% \text{ Error} = \frac{V_s - V}{V_{fs}} \times 100$$

Equation #1

V = Voltage (Vpp) reading on scope.
 Vs = Standard meter voltage reading.
 Vfs = Volts Full Scale range x 2.048.
 (e.g., For the +2V range,
 Vfs = 2 x 2.048 = 4.096V.)



Figure 9-1

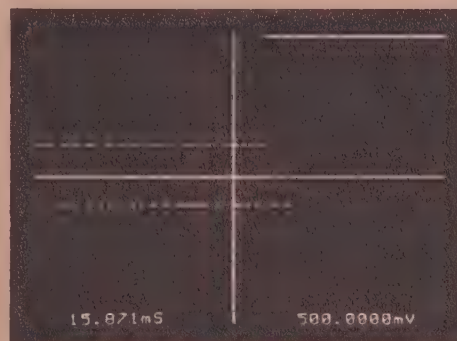


Figure 9-2

9.1.25. Adjust the trimpot selected from 9.1.26 for the range being adjusted until the Percent Error specification (9.1.23.) is met.

9.1.26.

RANGE	TRIMPOT
	(Figure 9-3)
1V	R48
10mV	R33

9.2.0. - INPUT (B)

► **IMPORTANT:** The display of the (-) Input (B) calibration signal will have two traces. Ensure that the scope measurement is from the Square wave's peak-to-peak signal and not from the (A) trace.

9.2.1. (+) Input switch: GND

9.2.2. (-) Input switch: DC

9.2.3. Mode switch: AB

9.2.4. Move the Square wave input signal from the (+) input BNC to the (-) input BNC.

9.2.5. Repeat Procedure 9.1.0, Steps 9.1.10 through 9.1.24 for the (-) Input adjustment.

NOTE: Substitute the following trimpot adjustments for Step 9.1.25.

9.2.6.

RANGE	TRIMPOT
	(Figure 9-3)
1V	R47

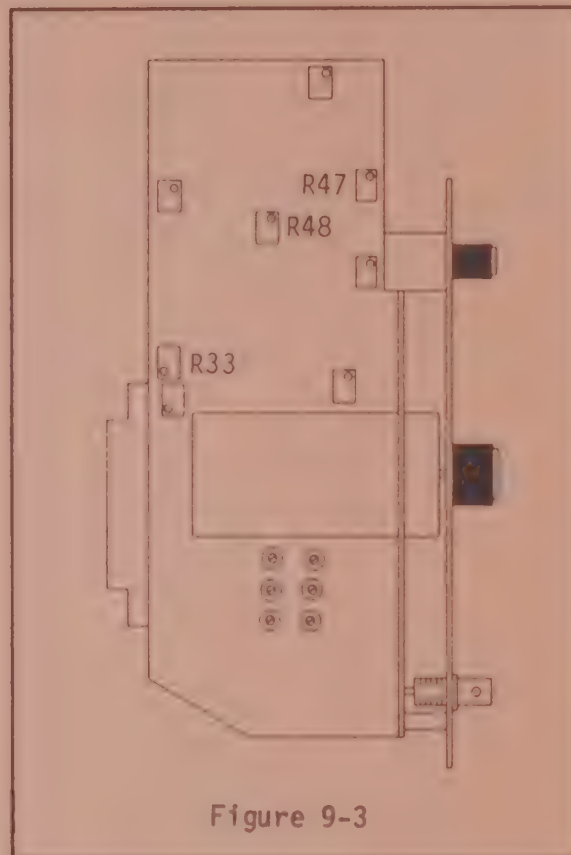


Figure 9-3

10.0.0. INPUT CAPACITANCE

10.1.0. (+) INPUT BNC

- 10.1.1. Mode switch: VAR
- 10.1.2. Range switch: 100mV
- 10.1.3. (-) Input switch: GND
- 10.1.4. (+) Input switch: DC
- 10.1.5. Filter (A & B): OFF (Note 1)

Note 1: On earlier models, place the Filter switch to the 1000 KHz position.

- 10.1.6. Time Per Point: 500nS
- 10.1.7. Autocenter switch: ON
- 10.1.8. Memory switch: ALL
- 10.1.9. Apply a 10 KHz Square wave to the (+) input BNC using the Input Capacitance Network and adjust the waveform's amplitude for a 3/4 full screen display.
- 10.1.10. Horizontal Expansion: X16
- 10.1.11. Retain Reference: ON
- 10.1.12. Range: 1V
- 10.1.13. Adjust the input signal's amplitude to match the amplitude of the retained waveform.
- 10.1.14. Vertical Expansion: X8
- 10.1.15.

SPECIFICATION (Figure 10-1)

Adjust C21 until the slopes of both waveforms match.

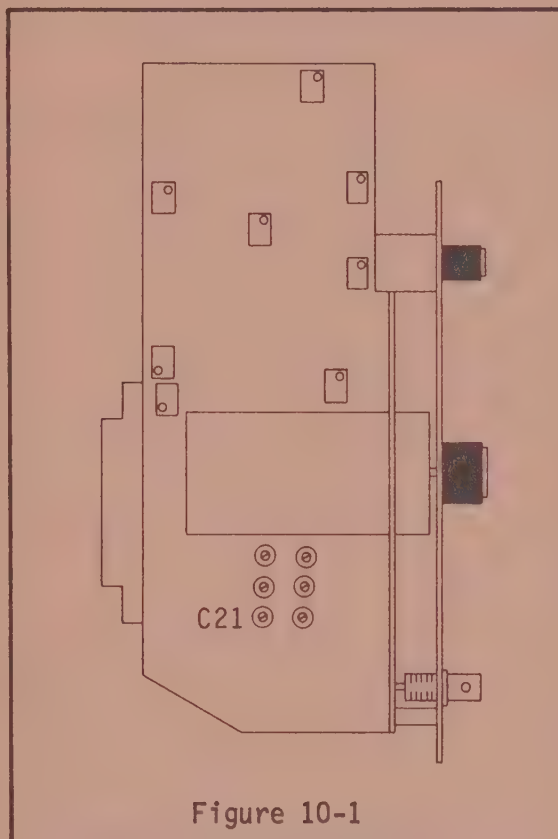


Figure 10-1

10.2.0. (-) INPUT BNC

- 10.2.1. Retain Reference: OFF
- 10.2.2. Horizontal Expansion: OFF
- 10.2.3. Vertical Expansion: OFF
- 10.2.4. Range: 100mV
- 10.2.5. (+) Input: GND
- 10.2.6. (-) Input: DC
- 10.2.7. Remove the square wave signal from the (+) input BNC and apply it to the (-) input BNC using the Input Capacitance Network. Adjust the square wave's amplitude for a 3/4 full screen display.
- 10.2.8. Horizontal Expansion: X16
- 10.2.9. Retain Reference: ON
- 10.2.10. Range: 1V
- 10.2.11. Adjust the input signal's amplitude to match the amplitude of the retained waveform.

10.2.12.

SPECIFICATION (Figure 10-2)

Adjust C19 until the slopes of both waveforms match.
--

- 10.2.13. Remove the input signal and Input Capacitance Network from the (-) input BNC.

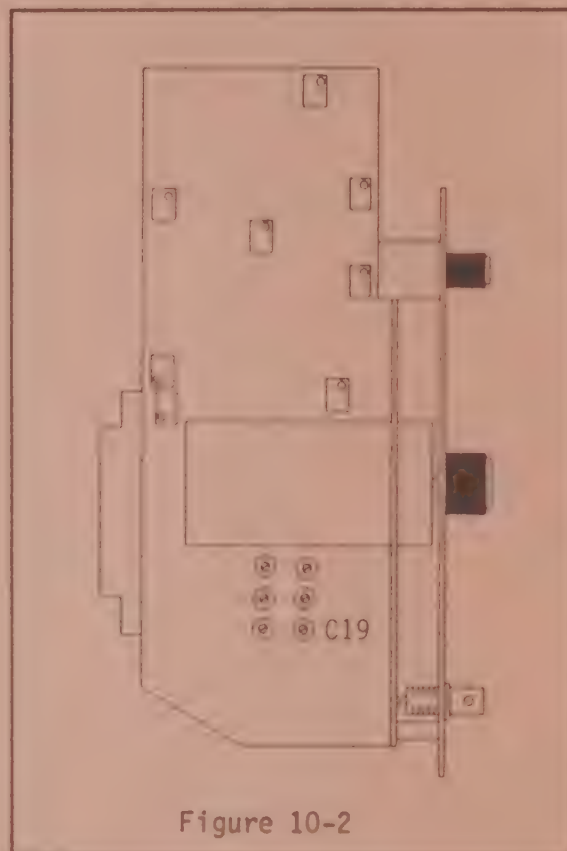


Figure 10-2

11.0.0. TIME BASE CHECK

NOTE: No adjustments are performed in this test. The oscillator circuitry will require repair if Specification 12.2.2 is not met. Use a calibrated digital frequency counter.

11.1.1. Turn on the 2090 and allow it to warm up.

CAUTION: Carefully perform the next step to prevent shorting the probe to other pins or traces.

11.2.1. Measure the frequency (Time Base) at IC32, Pin 2, (Figure 11-1).

11.2.2.

SPECIFICATION
The measured frequency should be no greater than 20.005 MHz or less than 19.995 MHz

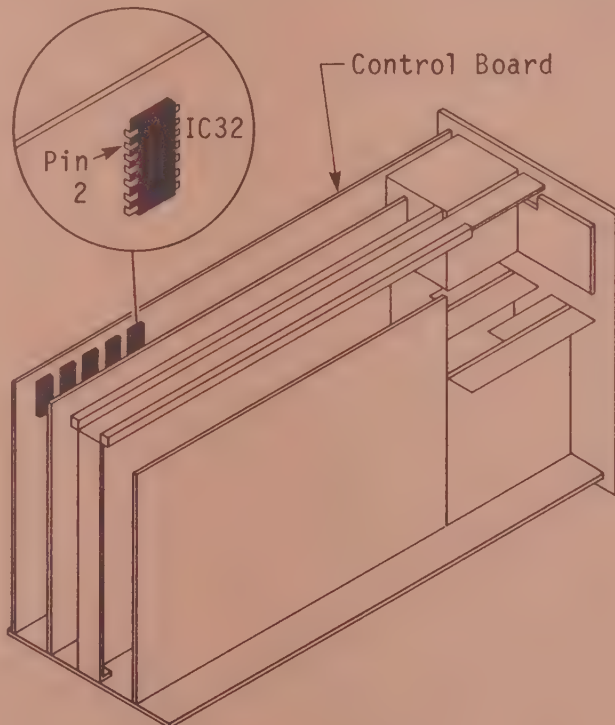


Figure 11-1

12.0.0. OSCILLOSCOPE REASSEMBLY

WARNING: Remove all power from the 2090 before continuing.

➤ **IMPORTANT:** Perform this procedure after both channel 1 and channel 2 adjustments have been completed.

- 12.1.1. Reinstall the channel 2 Amplifier board and reconnect the Amplifier to Mother board ground.
 - 12.1.2. Replace the two Amplifier front panel securing screws.
 - 12.1.3. Reinstall the channel 1 Amplifier board.
 - 12.1.4. Reinstall the channel 1 Amplifier board and reconnect the Amplifier to Mother board ground.
 - 12.1.5. Replace the two Amplifier front panel securing screws.
 - 12.1.6. Ensure that the ribbon cable is connected to the rear of the plug-in and the ground cable is connected to the Mother board.
 - 12.1.7. Replace the left side cover on the oscilloscope.
-

NOTES

MNEMONICS DEFINITIONS

MNEMONIC	DEFINITION	MNEMONIC	DEFINITION
(*)	Signal Stays On Board	I/O	Input/Output
ADC	Analog-To-Digital Converter	MEM	Memory
CNTL	Control	MF	Mainframe
CONN	Connector	PL	Plug-in
EXT	External	STORE CONT	Storage Control
FP	Front Panel	TRIG	Trigger

NOTE: The (-) sign at the end of a mnemonic identifies a negated command.

For example, RESET- = RESET

MNEMONIC	NAME	ORIGINATES	DESTINATION
01 thru 04	9900 Clock Phases	DISK MAIN ----- *	
		I/O CPU 2081/2082	
1CS-	Chip 1 Select	207 MEMORY ----- *	
1RW-	Read Write	207 MEMORY ----- *	
2CS-	Chip 2 Select	207 MEMORY ----- *	
2CH	Two Channel	207 CONTROL ----- *	
2 CH	Two Channels	201 CONTROL INPUT/OUTPUT	
		206 CONTROL ----- *	
2RW-	Read Write	207 MEMORY ----- *	
-2V REF	-2 Volt Reference	205-A ADC ----- *	
3CS-	Chip 3 Select	207 MEMORY ----- *	
3RW-	Read Write	207 MEMORY ----- *	
4CS-	Chip 4 Select	207 MEMORY ----- *	
4RW-	Read Write	207 MEMORY ----- *	
4MHz	Clock Freq. (Same as CLOK 1)	PLUG-IN CONTROL - INPUT/OUTPUT	
4MHZ	Clock Freq.	205A MEMORY ----- 205A CONTROL	
A TRIG	Channel A Internal Trigger	204A ADC ----- 204A TRIGGER	
AA-	Address Advance	INPUT/OUTPUT --- *	
AADCLK	Channel A ADC Clock	205A MEMORY ----- 205A ADC	
AAS	Advance Scratchpad Address	201 CONTROL----- *	
AC SW	Autocenter Switch	MAINFRAME FP --- MAINFRAME	
AC1	Address Control Bit 1	DISK MAIN ----- INPUT/OUTPUT	
AC1-	Address Control Bit 1	I/O CPU ----- INPUT/OUTPUT	
		EXT CONNECTOR .. INPUT/OUTPUT	
AC2	Address Control Bit 2	DISK MAIN ----- INPUT/OUTPUT	
AC2-	Address Control Bit 2	INPUT/OUTPUT --- INPUT/OUTPUT	
		EXT CONNECTOR .. INPUT/OUTPUT	
ADCCLK	ADC Clock	205A MEMORY ----- *	
ADDQ	Advance Address by Quarters	INPUT/OUTPUT --- *	
ADD1	Advance Address by One	INPUT/OUTPUT --- *	
AL	Channel A Lower 1K	204A MEMORY ----- *	
AN2,3,6,8	Channel A Normalization Bits	204A ADC ----- 204A MEMORY	
AREF	Channel A Reference	205A MEMORY ----- 205A CONTROL	
ASA	Advance Scratchpad Address	206 CONTROL ----- 206 MEMORY	
		207 CONTROL 207 MEMORY	
ASW	Channel A On/Off Switch	201 STORE CONT . CONTROL	
		204A MEMORY *	
		206 STORE CONT - 206 CONTROL	
		207 STORE CONT . 207 MEMORY	
		207 STORE CONT . 207 CONTROL	

MNEMONIC	NAME	ORIGINATES	DESTINATION
ATN	Attention	IEEE CONNECTOR -	2081
ATNI	Internal Attention In	2081 -----	*
ATRK/RELSW	Advance Track or Relsw	EXT CONNECTOR --	INPUT/OUTPUT
ATRK/RELSW-	Advance Track or Relsw	I/O CPU -----	INPUT/OUTPUT
AU	Channel A Upper 1K	204A MEMORY ----	*
AUTO	Auto Trigger Mode	201 MOTHER	*
		204A CONTROL ...	204A TRIGGER
		206 FRONT PANEL-	206 MOTHER
AXA	Advance PL Address Counter	206 CONTROL ----	*
		207 CONTROL	*
AXA-	Advance PL Address Counter	207 CONTROL ----	*
B SEL	Select CH B Normalization	201 CONTROL ----	201 MOTHER
B TRIG	Channel B Internal Trigger	204A ADC -----	204A TRIGGER
BADCLK	Channel B ADC Clock	205A MEMORY ----	205A ADC
BC0 thru BC2	Bus Control Bits 0 thru 2	MAINFRAME -----	*
BDEN	Channel B Data Enable	205A CONTROL ---	205A MEMORY
BL	Channel B Lower 1K	204A MEMORY ----	*
BLANK-	Display Blanking	MAINFRAME -----	BLANKING
BN2,3,6,8	Channel B Normalization Bits	204A ADC -----	204A MEMORY
BREF	Channel B Reference	205A MEMORY ----	205A CONTROL
BSW	Channel B On/Off Switch	201 STORE CONT .	201 CONTROL
		204A MEMORY	*
		206 STORE CONT -	206 CONTROL
		207 STORE CONT .	207 CONTROL
BU	Channel B Upper 1K	204A MEMORY ----	*
BUSS 0 thru 11	Mainframe Bus	MAINFRAME -----	MAINFRAME MEM
		205A CONTROL ...	MAINFRAME MEM
		207 MEMORY	MAINFRAME MEM
BUSS0 thru 11	Plug-in Bus	PLUG-IN CONTROL-	MAINFRAME MEM
		INPUT/OUTPUT ...	MAINFRAME MEM
C0 thru C3	2901 Command Code	MAINFRAME -----	*
C1 thru C4	Timing Signals	206 CONTROL ----	*
		207 CONTROL	*
CFFJ	Clear Flip Flop Jump	INPUT/OUTPUT ---	*
CH A INT TRIG	Channel A Internal Trigger	207 AMP -----	207 MOTHER
CH B INT TRIG	Channel B Internal Trigger	207 AMP -----	207 MOTHER
CHA	Channel A On	205A MEMORY ----	205A CONTROL
CHB	Channel B On	205A MEMORY ----	205A CONTROL
CIL-	Clock Input Latch	INPUT/OUTPUT ---	*
CLK1	Clock 1	205A CONTROL ---	MAINFRAME MEM

MNEMONIC	NAME	ORIGINATES	DESTINATION
CLOK A-	MF Address Clock	MAINFRAME -----	*
CLOK XA-	Plug-in Address Clock	PLUG-IN CONTROL-	INPUT/OUTPUT
		201 CONTROL	MAINFRAME MEM
		204A CONTROL ...	MAINFRAME MEM
		206 CONTROL	MAINFRAME MEM
		PLUG-IN CONTROL-	MAINFRAME MEM
CLOK 1	Clock 1 (4MHz)	206 CONTROL-----	*
CLOK 1 13	Clock 1 (4MHz)	DISK MAIN -----	*
CLR TIMER	Clear Timer	INPUT/OUTPUT ---	*
COL	Clock Output Latch	206 CONTROL ----	*
CONT SWP	Continuous Sweep	207 CONTROL	*
COUNT 13-	Count 13	DISK MAIN -----	*
CRL	Cursor Lock	204A TRIGGER ---	204A CONTROL
CRUCLK	9900 CRU Clock	DISK MAIN -----	*
CRUIN	9900 CRU In	DISK MAIN -----	*
		2081	I/O CPU
		2082	I/O CPU
CRUOUT	9900 CRU Out	DISK MAIN -----	*
		2081	I/O CPU
		2082	I/O CPU
CTLI	Changes to (I/O ACTIVE-)	HP CABLE -----	2085N
CTLO-	Control Line 0	HP CABLE -----	2085N
DO - D7	Data 0 - Data 7	205A ADC -----	205A CONTROL
		205A ADC	205A MEMORY
D1 - D2	Clock	207 CONTROL ----	*
D R/W-	Data Read/Write	MAINFRAME -----	MAINFRAME MEM
		I/O CPU	INPUT/OUTPUT
		2085N	INPUT/OUTPUT
D W/R-	Data Write/Read	DISK MAIN -----	INPUT/OUTPUT
DAB	Disk Active Buffer	INPUT/OUTPUT ---	*
DACI-	Internal Data Accepted In	2081 -----	*
DACO-	Internal Data Accepted Out	2081 -----	*
DATA E	Data Enable	201 CONTROL ----	201 MOTHER
DAV	Data Available	EXT IEEE -----	2081
DAVI-	Internal Data Available In	2081 -----	*
DAVO	Internal Data Available Out	2081 -----	*
DBIN	9900 Data Bus In	I/O CPU -----	2081, 2082
		DISK MAIN	*
DEC12	Decision 1 and 2	201 CONTROL ----	201 MOTHER
		201 CONTROL	201 ADC

MNEMONIC	NAME	ORIGINATES	DESTINATION
DEC34	Decision 3 and 4	201 CONTROL ----	201 MOTHER
		201 CONTROL	201 ADC
DEC56	Decision 5 and 6	201 CONTROL ----	201 MOTHER
		201 CONTROL	201 ADC
DEN-	Data Enable (same as INT-)	206 CONTROL ----	*
		207 CONTROL	207 MEMORY
DEPSYNC	Delayed ECL Pulsed Sync	205A MEMORY ----	*
DI 0 - DI 11	Data In	2085N -----	INPUT/OUTPUT
DIRECTION-	Floppy Head Direction	DISK MAIN -----	FLOPPY
DISK ACTIVE	Disk Active	DISK MAIN -----	FLOPPY FP
		DISK MAIN	I/O CPU
		INPUT/OUTPUT ...	I/O CPU
DISK ACTIVE-	Disk Active	DISK MAIN -----	INPUT/OUTPUT
DISK ERROR-	Disk Error	DISK MAIN -----	I/O CPU
		DISK MAIN	INPUT/OUTPUT
DISK PROTECTED	Disk Protected	DISK MAIN -----	FLOPPY FP
DISK/PL-	Disk/Plug-in	INPUT/OUTPUT ---	*
DO 0 - DO 11	Data Out	INPUT/OUTPUT ---	2085N
DOT	Numeric Display Dot	MAINFRAME -----	*
DOWN-	Vertical Cursor Down	MAINFRAME FP ---	MAINFRAME
DR	Becomes DUMP RET	207 CONTROL ----	*
DRCS-	Disk Request Continuous Sweep	DISK MAIN -----	INPUT/OUTPUT
DSEPCLK	Disk Separate Clock	205A MEMORY ----	*
DUMP RET	Dump Return	206 CONTROL ----	*
		207 CONTROL	*
DUMP	Dump	201 CONTROL ----	*
		206 CONTROL	*
		207 CONTROL	*
DUMP-	Dump	207 CONTROL ----	*
DWELL	Internal Sample Clock	206 CONTROL ----	*
		207 CONTROL	*
DXADON	Delayed Plug-in Add. Cnt Done	205A MEMORY ----	*
E-2	Enable Divided by Two	205A MEMORY ----	*
E100+	Enable 100MHz	205A MEMORY ----	*
EAACLK	External Address Advance Clock	205A MEMORY ----	*
EAUTO	ECL Auto	205A CONTROL ---	*
EB	ECL B Channel Data Enable	205A MEMORY ----	*
EB-	ECL B Channel Data Enable	205A MEMORY ----	*
EC-	Enable Clear	INPUT/OUTPUT ---	*
EDUMP	ECL Dump	205A CONTROL ---	*
EDUMP	ECL Dump	205A MEMORY ----	*

MNEMONIC	NAME	ORIGINATES	DESTINATION
EDUMP-	ECL Dump	205A MEMORY ----	*
EDWELL	ECL Dwell	205A MEMORY ----	*
EDDWELL	ECL Dwell	205A MEMORY ----	*
EEAA-	ECL External Address Advance	205A MEMORY ----	*
EL-	Enable Load	INPUT/OUTPUT ---	*
ELEFT	ECL Left	205A MEMORY ----	*
ELXA	ECL Load Plug-in Add. Counter	205A CONTROL ---	*
EMID-	ECL Mid	205A MEMORY ----	*
EN SHIFT COUNT	Enable Shift Count	DISK MAIN -----	*
EN WAIT	Enable Wait	DISK MAIN -----	*
EOC	End Of Conversation	206 PL CONTROL -	*
		207 PL CONTROL .	*
EOI	End Or Identify	EXT IEEE -----	2081
EOII	Internal End Or Identify In	2081 -----	*
EOIO	Internal End Or Identify Out	2081 -----	*
EP	External Pulse	206 MOTHER -----	206 CONTROL
		207 MOTHER	207 CONTROL
		204A TRIGGER ...	*
EPRETRIG	External Pretrigger	205A CONTROL ---	*
EPSYNC	ECL Plug-in Sync	205A MEMORY ----	*
EPSYNC-	ECL Plug-in Sync	205A MEMORY ----	*
ERIGHT	ECL Right	205A MEMORY ----	*
ESADCLK	ECL Scratch Add. Cntr. Clock	205A MEMORY ----	*
ESYNC	ECL Sync	205A MEMORY ----	*
ETRIG	ECL Trigger	205A CONTROL ---	205A MEMORY
EX	Execute	MAINFRAME FP ---	MAINFRAME
EX-	Execute	MAINFRAME -----	MAINFRAME FP
EXACLK	ECL Plug-in Add. Counter Clock	205A MEMORY ----	205A CONTROL
EXADCLK	ECL X Address Clock	205A CONTROL ---	*
EXADON	ECL Plug-in Add. Counter Done	205A CONTROL ---	205A MEMORY
EXADON-	ECL Plug-in Add. Counter Done	205A CONTROL ---	*
EXALDCLK	ECL Plug-in Add. Cnt Load Clock	205A CONTROL ---	*
EXAOVF'-	ECL Plug-in Add. Cntr Overflow	205A CONTROL ---	*
EXAOVF	ECL Plug-in Add. Cntr Overflow	205A CONTROL ---	*
EXAOVF-	ECL Plug-in Add. Cntr Overflow	205A CONTROL ---	*
EXAUP	ECL Plug-in Add. Counter Up	205A CONTROL ---	*
EXTRIG	External Trigger	205A CONTROL ---	*
F.P. LED	Front Panel LED (On/Off)	MAINFRAME -----	MAINFRAME FP
FAIL-	Fail	DISK MAIN -----	*
FAST-	Fast	206 CONTROL ----	206 MEMORY
		207 CONTROL	207 MEMORY

MNEMONIC	NAME	ORIGINATES	DESTINATION
FG0 thru FG2	Forced Memory Group	206 CONTROL ---- *	
		207 CONTROL *	
FN0 thru FN2	Function Switch	MAINFRAME FP --- MAINFRAME	
FORCE XA	Force Plug-in Address Counter	201 CONTROL ---- *	
GO thru G2	Memory Group Switch	MAINFRAME FP --- MAINFRAME	
		MAINFRAME FP ... 201 CONTROL	
		MAINFRAME FP ... 204A CONTROL	
		MAINFRAME FP ... 205A CONTROL	
		MAINFRAME FP ... 206 CONTROL	
		MAINFRAME FP ... 207 CONTROL	
		MAINFRAME FP ... INPUT/OUTPUT	
		MAINFRAME FP ... DISK MAIN	
GO/T0	Memory Group or Track Select	INPUT/OUTPUT --- I/O CPU	
		INPUT/OUTPUT ... I/O DRIVER	
G1/T1	Memory Group or Track Select	INPUT/OUTPUT --- I/O CPU	
		INPUT/OUTPUT ... I/O DRIVER	
G2/T2	Memory Group or Track Select	INPUT/OUTPUT --- I/O CPU	
		INPUT/OUTPUT ... I/O DRIVER	
H D/A	Horizontal DAC Output	MAINFRAME ----- BLANKING	
H LAST-	Hold Last	REMOTE CONN ---- MAINFRAME	
H NEXT-	Hold Next	REMOTE CONN ---- MAINFRAME	
HALT-	Halt	DISK MAIN ----- *	
HEAD LOAD-	Floppy Head Load	DISK MAIN ----- FLOPPY	
HEX0 thru HEX2	Horizontal Expansion Switch	MAINFRAME FP --- MAINFRAME	
H.K.	Horizontal Cursor	207 CONTROL ---- *	
H.K.-	Horizontal Cursor	MAINFRAME ----- 206 CONTROL	
HK-	Horizontal Cursor	205A CONTROL --- *	
HKEN-	Horizontal Cursor Enable	205A CONTROL --- *	
HK0 thru HK11	Horizontal Cursor Bits 1 - 11	205A CONTROL --- *	
		206 CONTROL *	
		207 CONTROL *	
H LAST-	Hold Last Button	205A STORE CONT- *	
HNO thru HN9	Horizontal Normalization	201 CONTROL ---- *	
		205A CONTROL ... *	
		207 CONTROL *	
HN12-15	Horizontal Normalization	205A CONTROL --- *	
HN-	%	207 CONTROL ---- *	
HNEXT-	Hold Next Button	205A STORE CONT- *	
HOLD	Hold	201 CONTROL ---- 201 ADC	
HOLD-	Hold	INPUT/OUTPUT --- *	

MNEMONIC	NAME	ORIGINATES	DESTINATION
HOLD LAST	Same as (H LAST-)	201 STORE CONT - 201 CONTROL 204A STORE CONT. 204A CONTROL 206 STORE CONT . 206 CONTROL INPUT/OUTPUT ... DISK MAIN INPUT/OUTPUT ... PL CONNECTOR 2081/2082 I/O CPU	
HOLD NEXT	Same as (H NEXT-)	201 STORE CONT - 201 CONTROL 204A STORE CONT. 201 CONTROL 206 STORE CONT . 206 CONTROL INPUT/OUTPUT ... DISK MAIN INPUT/OUTPUT ... PL CONNECTOR 2081/2082 I/O CPU	
I TRIG	Internal Trigger	201 ADC ----- 201 MOTHER	
IO thru I8	2901 Instruction	MAINFRAME ----- *	
IA0 thru IA8	Program Prom Address	MAINFRAME ----- *	
IFC	Interface Clear	IEEE CONNECTOR - 2081	
INDEX-	Floppy Generated Index Pulse	FLOPPY ----- DISK MAIN	
INDEX P	Index Pulse	DISK MAIN ----- *	
INT-	Same as (PL INT-)	INPUT/OUTPUT --- PL CONNECTOR 201 CONTROL *	
		204A CONTROL ... *	
		206 CONTROL *	
		I/O CPU ----- *	
INTR DISK-	Interrupt Disk	I/O CPU ----- *	
INTR LIVE-	Interrupt Live	I/O CPU ----- *	
INT1 thru INT4	Interrupt 1-4	2081/2082 ----- I/O CPU	
I/O-	Becomes (D R/W- or N R/W-)	2085N ----- INPUT/OUTPUT	
I/O ACTIVE	I/O Active	INPUT/OUTPUT --- DISK MAIN	
I/O ACTIVE B	I/O Active Buffered	DISK MAIN ----- FLOPPY FP	
I/O ACTIVE-	I/O Active	2085N ----- INPUT/OUTPUT 2081/2082 I/O CPU	
		I/O CPU INPUT/OUTPUT	
I/O FLAG	I/O Flag	INPUT/OUTPUT --- DISK MAIN INPUT/OUTPUT ... I/O CPU	
		I/O DRIVER ----- 2085N	
I/O FLAG-	I/O Flag	MAINFRAME ----- MAINFRAME FP	
I/O LITE	Execute LED	I/O DRIVER ----- INPUT/OUTPUT	
I/O RCS-	I/O Request Continuous Sweep	I/O CPU INPUT/OUTPUT DISK MAIN ----- INPUT/OUTPUT	
I/O STEP	I/O Step	I/O CPU ----- INPUT/OUTPUT	
I/O STEP-	I/O Step	I/O DRIVER INPUT/OUTPUT	
J0 thru J3	MF Jump Codes	MAINFRAME ----- *	

MNEMONIC	NAME	ORIGINATES	DESTINATION
JUMP-	JUMP	MAINFRAME -----	*
K2 thru K11	MF Constants	MAINFRAME -----	*
LAJ-	Load Address Jump	INPUT/OUTPUT ---	*
LAST	Hold Last	205A CONTROL ---	*
LCSA-	Left Chip Select Channel A	205A MEMORY ----	*
LCSB-	Left Chip Select Channel B	205A MEMORY ----	*
LED1 thru LED8	Floppy Track LEDs	DISK MAIN -----	FLOPPY FP
LEFT-	Horizontal Cursor Left	MAINFRAME FP ---	MAINFRAME
LISTEN	Listen	2081 -----	*
LIVE B-	Buffered Live	INPUT/OUTPUT ---	DISK MAIN
		INPUT/OUTPUT ...	I/O DRIVER
		I/O DRIVER	2085N
LIVE	Live Mode	PL CONNECTOR ---	INPUT/OUTPUT
		201 CONTROL	201 MOTHER
		204A CONTROL ...	204A MOTHER
		205A CONTROL ...	*
		206 CONTROL	206 MOTHER
		207 CONTROL	207 MOTHER
		207 CONTROL	*
LIVE B-	Buffered Live	I/O DRIVER -----	2085N
LOAD-	Load	206 CONTROL -----	206 ADC
		207 CONTROL	207 ADC
		INPUT/OUTPUT ...	*
LOAD/SHIFT-	Load/Shift	DISK MAIN -----	*
LOCK-	Lock Switch	205A CONTROL ---	*
LOOP	Loop	206 CONTROL -----	*
		207 CONTROL	*
LWEN-	Left Write Enable	205A MEMORY ----	*
MCK	Memory Clock	204A CONTROL ---	204A MEMORY
MDP-	Memory Disk Protected	FLOPPY -----	DISK MEMORY
MEMEN-	Memory Enable	DISK MAIN -----	*
		I/O CPU	*
MEX	Memory Execute	204A CONTROL ---	204A MEMORY
MF - PL	Mainframe To Plug-in	INPUT/OUTPUT ---	MAINFRAME MEM
		205A CONTROL ...	*
		206 CONTROL	MAINFRAME MEM
		207 CONTROL	MAINFRAME MEM
MF CLOK-	Mainframe Clock	MF MEMORY -----	MAINFRAME
MF INT-	Mainframe Interrupt	MAINFRAME -----	MAINFRAME MEM
MF R/W-	Mainframe Read/Write	MAINFRAME -----	MAINFRAME MEM
MFBC-	Mainframe Bus Control	MAINFRAME -----	MAINFRAME MEM

MNEMONIC	NAME	ORIGINATES	DESTINATION
MFBCN-	MF Bus Control Normalization	MAINFRAME -----	MAINFRAME MEM
MFN R/W-	MF Normalization Read/Write	MAINFRAME -----	MAINFRAME MEM
MG0 & MG1	Memory Group Bits 0 & 1	201 CONTROL ----	*
		205A CONTROL ...	*
		206 CONTROL	*
		207 CONTROL	*
MID	Mid Signal Trigger	201 MOTHER -----	201 CONTROL
		204A MOTHER	*
		206 MOTHER	206 CONTROL
		207 MOTHER	207 CONTROL
MID SW	Mid Cursor Trigger Switch	201 MOTHER -----	201 CONTROL
MOTOR ON-	Floppy Motor On	DISK MAIN -----	FLOPPY
MR1 thru MR4	Memory Register 1,2,3,4	I/O CPU -----	2081
MR1-	Memory Register 1	DISK MAIN -----	*
MRO	Memory Register 0	DISK MAIN -----	*
MRO B-	Buffered Memory Register 0	DISK MAIN -----	*
MRX-	Memory Register	DISK MAIN -----	*
MSWP-	Memory Sweep	206 CONTROL ----	*
		207 CONTROL	207 MOTHER
MUX	Multiplexer	207 AMP -----	207 CONTROL
N2,N3,N6,N8	Normalization Bits	201 ADC -----	*
		206 AMP	*
		207 MOTHER	201 CONTROL
N SEL	Normalization Select	206 MEMORY -----	206 MOTHER
		207 MEMORY	207 MOTHER
N W/R-	Normalization	DISK MAIN -----	INPUT/OUTPUT
NA2,NA3,NA6,NA8	Channel A Normalization Bits	201 ADC -----	201 MOTHER
NB2,NB3,NB6,NB8	Channel B Normalization Bits	201 ADC -----	201 MOTHER
N.C.	No Connection (Not a Signal)	205A CONTROL ---	*
NC	No Connection (Not a Signal)	205A CONTROL ---	*
NEXT	Next	201 CONTROL ----	*
		205A CONTROL ---	*
NI	Normalization In	I/O DRIVER -----	INPUT/OUTPUT
NO	Normalization Out	INPUT/OUTPUT ---	I/O CPU
NO-OP	No Operation	MAINFRAME -----	*
NORM	Normal	205A CONTROL ---	*
NRFD	Not Ready For Data	IEEE CONNECTOR -	2081
NSEL	Normalization Select	207 MEMORY -----	*
ON LINE	RS232 On Line	2082 -----	*
ONE	Logic One	205A MEMORY ----	*
OVR	2901 Overflow	MAINFRAME -----	*

MNEMONIC	NAME	ORIGINATES	DESTINATION
P1 thru P8	Track LEDs	FLOPPY FP -----	DISK MAIN
P1,P2,P3,P4	Timing Signals	206 CONTROL ----	206 ADC
		201 CONTROL	*
P4B	P4 Buffered	207 ADC -----	*
P7	Timing Signal	206 CONTROL ----	206 ADC
PCE-	Plug-in Control Enable	INPUT/OUTPUT ---	*
PCTL-	Becomes (I/O STEP-)	HP CABLE -----	2085N
PEN H	Horizontal Pen Output	MAINFRAME -----	REAR BNC
PEN V	Vertical Pen Output	MAINFRAME -----	REAR BNC
PFLG	Becomes (I/O FLAG-)	HP CABLE -----	2085N
PL BUSY	Plug-in Busy	206 CONTROL ----	INPUT/OUTPUT
		207 CONTROL	INPUT/OUTPUT
PL INT-	Plug-in Interrupt (See INT-)	PL CONNECTOR ---	MAINFRAME MEM
PLINT-	Plug-in Interrupt	205A CONTROL ---	*
PL NORM	Plug-in Normalization	PLUG-IN CONTROL-	MAINFRAME MEM
		207 CONTROL	MAINFRAME MEM
PL NR/W-	PL Normalization Read/Write	INPUT/OUTPUT ---	MAINFRAME MEM
		MAINFRAME	MAINFRAME MEM
		DISK MAIN	MAINFRAME MEM
		PLUG-IN CONTROL.	INPUT/OUTPUT
		I/O CPU	INPUT/OUTPUT
		2085N	INPUT/OUTPUT
PLNR/W-	PL Normalization Read/Write	205A CONTROL ---	*
PL R/W-	Plug-in Read/Write	PLUG-IN CONTROL-	MAINFRAME
PLR/W-	Plug-in Read/Write	205A CONTROL ---	*
PL/DISK-	Plug-in/Disk	I/O DRIVER -----	INPUT/OUTPUT
		I/O CPU	INPUT/OUTPUT
		2085N	INPUT/OUTPUT
PLBC-	Plug-in Bus Control	201 CONTROL ----	MAINFRAME MEM
PLJ2- & PLJ3-	Plug-in Jump 2 & 3	MAINFRAME -----	Not Used
PLP-	Parallel Load Pulse	DISK MAIN -----	*
PP	Timing Signal	207 CONTROL ----	*
PP-	Timing Signal	206 CONTROL ----	*
		207 CONTROL	*
PRESET-	Preset	HP CABLE -----	*
PRETRIG	Pretrigger	205A CONTROL ---	*
PSTS-	Becomes (DISK ACTIVE-)	HP CABLE -----	2085N
QSWP1	Quick Sweep 1	206 CONTROL ----	*
		207 CONTROL	*
QSWP1-	Quick Sweep 1	207 CONTROL ----	*

MNEMONIC	NAME	ORIGINATES	DESTINATION
RAM CE-	RAM Chip Enable	DISK MAIN -----	*
RCFF-	Reset Clear Flip Flop	I/O CPU	*
RCL-	Floppy Recall	INPUT/OUTPUT ---	*
RCS	Request Continuous Sweep	FLOPPY FP -----	DISK MAIN
RCS-	Request Continuous Sweep	INPUT/OUTPUT ...	DISK MAIN
		INPUT/OUTPUT ---	*
		INPUT/OUTPUT ---	206 CONTROL
		INPUT/OUTPUT ...	207 AMP
		INPUT/OUTPUT ...	207 CONTROL
		INPUT/OUTPUT ...	201 CONTROL
RCSA-	Right Chip Select Channel A	205A MEMORY ----	*
RCSB-	Right Chip Select Channel B	205A MEMORY ----	*
RD/WR-	Read/Write	205A CONTROL ---	*
RE	Read Enable	DISK MAIN -----	*
READ DATA-	Read Floppy Data	FLOPPY -----	DISK MAIN
READ EN	Read Enable	DISK MAIN -----	*
READY	Ready	DISK MAIN -----	*
RELSW-	Release Switch (Live Mode)	REMOTE CONN ----	MAINFRAME
		DISK MAIN	INPUT/OUTPUT
		STORE CONT	PL CONTROL
		204A TRIGGER ...	*
		205A STORE CONT.	*
		206 STORE CONT .	206 MOTHER
		207 STORE CONT .	207 MOTHER
		2085N	I/O DRIVER
		I/O CPU	INPUT/OUTPUT
REN	Remote Enable	IEEE CONNECTOR	2081
RENI-	Internal Remote Enable In	2081 -----	*
RESET-	Reset	DISK MAIN -----	*
		I/O CPU	*

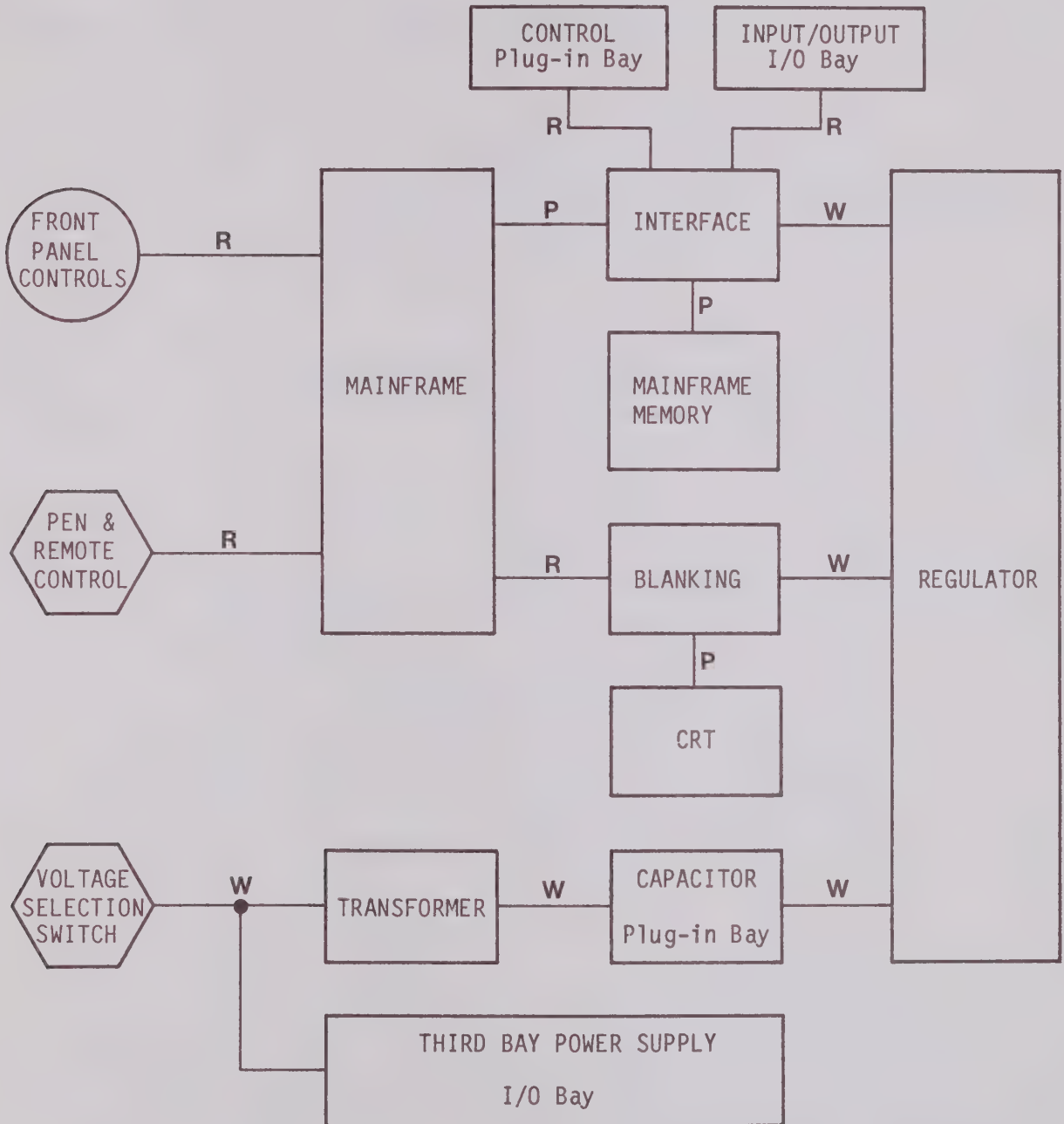
MNEMONIC	NAME	ORIGINATES	DESTINATION
RFDI-	Internal Ready For Data In	2081 -----	*
RFDO	Internal Ready For Data Out	2081 -----	*
RI/OF-	Reset I/O Flag	INPUT/OUTPUT ---	*
RIGHT-	Horizontal Cursor Right	MAINFRAME FP ---	MAINFRAME
RLY 1	Relay 1	207 AMP -----	*
RLY 2	Relay 2	207 AMP -----	*
RLY 3	Relay 3	207 AMP -----	*
ROMI CS-	Chip Select ROM I	I/O CPU -----	*
ROMPLR/W-	ROM Plug-in Read/Write	205A CONTROL ---	*
RRO thru RR3	Retain Reference Switch	204A STORE CONT-	*
RSA0 - RSA9	Address 0 - 9	205A MEMORY ----	*
RSP	Read Shift Pulse	DISK MAIN -----	*
RTI-	Reset Time Interrupt	DISK MAIN -----	*
R/W-	Read/Write	206 MEMORY -----	*
RW	Read Write	201 CONTROL ----	*
		207 CONTROL	207 MEMORY
RWEN-	Read Write Enable	205A MEMORY ----	*
RXA	Reset PL Address Counter	201 CONTROL ----	*
		206 CONTROL	*
		207 CONTROL	*
SO thru S4	Memory Select	FLOPPY FP -----	DISK MAIN
		205A CONTROL ...	*
SO' thru S4'	Memory Select	205A CONTROL ---	*
SA0 thru SA9	Scratch Pad Memory Address	201 MEMORY -----	*
		206 MEMORY	*
		207 CONTROL	*
SA00	Scratchpad Address 00	206 CONTROL ----	206 MEMORY
SADCLK	Scratchpad Address Clock	205A CONTROL ---	*
SAR/W-	Scratch Pad Memory Read/Write	206 CONTROL ----	*
		207 CONTROL	*

MNEMONIC	NAME	ORIGINATES	DESTINATION
TXACHK-	TTL Plug-in Add. Ctr. Check	205A CONTROL --- *	
TXALDCLK	TTL Plug-in Add. Clock	205A CONTROL --- *	
TXAOVF	TTL Plug-in Add. Ctr. Ovrflow	205A CONTROL --- *	
TXAU/D-	TTL Plug-in Add. Cntr. Up/Dwn	205A CONTROL --- *	
TXAU/DM-	TTL Plug-in Add. Cntr. Up/Dwn	205A CONTROL --- *	
UP +	Up Plus	206 CONTROL ---- *	
		207 CONTROL *	
UP -	Up Minus	MAINFRAME FP --- MAINFRAME	
V D/A	Vertical DAC Output	MAINFRAME ----- BLANKING	
VBB	Pin 1 of U7	205A MEMORY ---- *	
VBB PIN 1	Pin 1 of U7	205A MEMORY ---- *	
VCK	Vector Clock	207 CONTROL ---- 207 AMP	
VEXO thru VEX2	Vertical Expansion Switch	MAINFRAME FP --- MAINFRAME	
VNO thru VN9	Vertical Normalization	PLUG-IN CONTROL- *	
VN2, 3, 6, 8	Vertical Normalization	205A MEMORY ---- *	
		207 MEMORY ----- 207 MOTHER	
W	Write	201 CONTROL ---- *	
WE-	Write Enable	DISK MAIN ----- INPUT/OUTPUT	
		I/O CPU 2081/2082	
WG	Write Gate	DISK MAIN ----- *	
W/R- D	Write/Read Data	DISK MAIN ----- INPUT/OUTPUT	
W/R- N	Write/Read Normalization	DISK MAIN ----- INPUT/OUTPUT	
WRITE DATA-	Write Data To Floppy	DISK MAIN ----- FLOPPY	
WRITE GATE	Write Gate	DISK MAIN ----- FLOPPY	
WSP-	Write Shift Pulse	DISK MAIN ----- *	
X TO B-	Data To Plug-in Bus	INPUT/OUTPUT --- *	
XA EN-	Plug-in Address Cntr Enable	206 CONTROL ---- *	
XA TO B-	Address to Plug-in Bus	INPUT/OUTPUT --- *	
XAO thru XA11	Plug-in Address	201 CONTROL ---- *	
		205A CONTROL ... *	
		206 CONTROL *	
		207 CONTROL *	
XADCLK	X Address Clock	205A CONTROL --- *	
XAEN	Plug-in Address Cntr Enable	201 CONTROL ---- *	
XCHE	Plug-in Cursor Horizontal End	206 CONTROL ---- *	
		207 CONTROL 207 MEMORY	
XCHE INHB-	Plug-in Curs Hor End Inhibit	206 CONTROL ---- *	
		207 CONTROL *	
YT-	XY or YT Mode Switch	MAINFRAME FP --- MAINFRAME	

INTRODUCTION

This section contains the basic signal flow paths of the Model 2090 Nicolet Digital Oscilloscope.

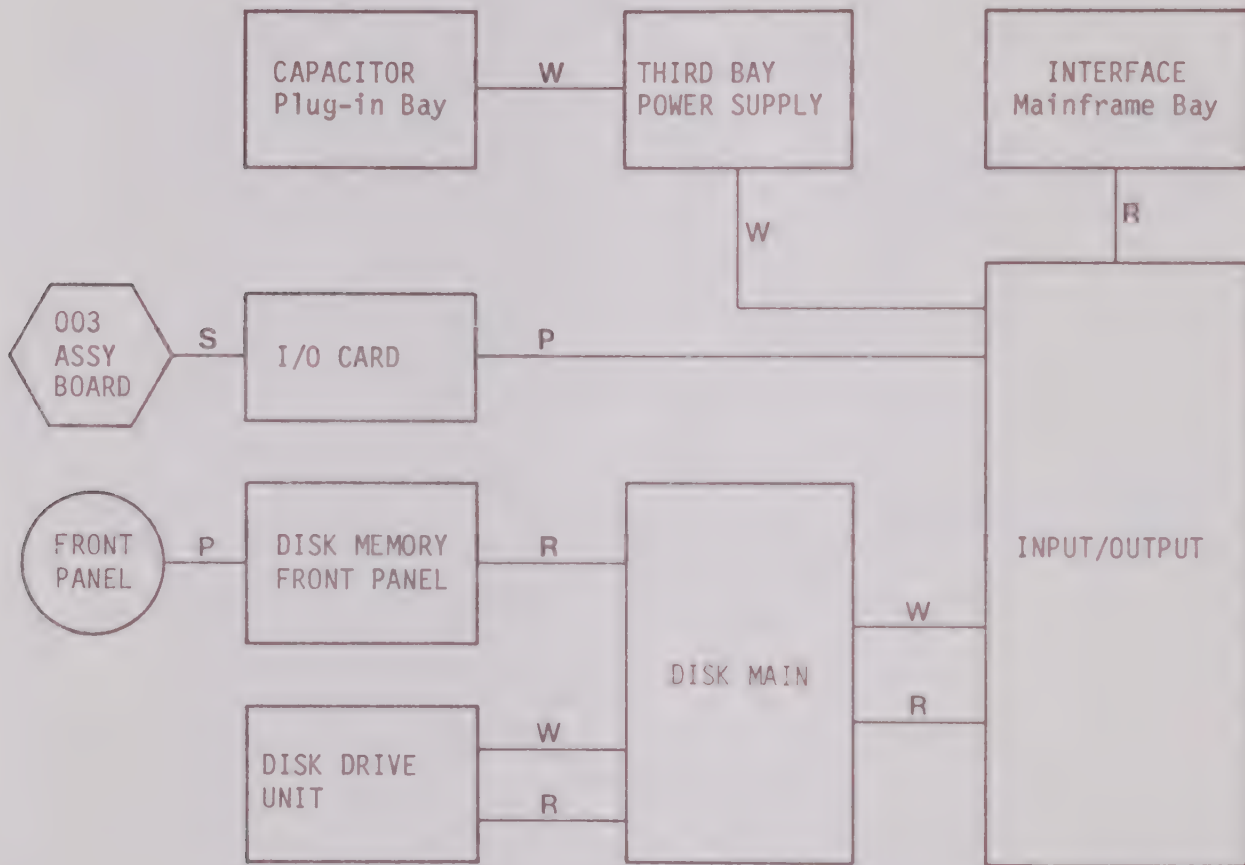
MAINFRAME BAY	8-3
INPUT/OUTPUT BAY	
3A/3C Standard Configuration with 003 I/O Card Accessory	8-4
3A/3C with 2081/2082 Interface Accessories	8-5
3B Configuration	8-6
PLUG-IN BAY	
Model 201 Plug-in	8-7
Model 204-A Plug-in	8-8
Model 205-A Plug-in	8-9
Model 206 Plug-in	8-10
Model 207 Plug-in	8-11

MAINFRAME

- | | |
|---|------------------------|
| ☐ Printed Circuit Boards | P = Plug-in Connection |
| ☐ Front Panel Controls | R = Ribbon Connection |
| <input type="hexagon"/> Rear Panel Controls | W = Wire Connection |
| | S = Solder Connection |

INPUT/OUTPUT BAY

Model 3A/3C Standard Configuration with Model 003 I/O Accessory Cable Board



□ PRINTED CIRCUIT BOARDS

○ FRONT PANEL CONTROLS

⬡ REAR PANEL CONTROLS

P = Plug-in Connection

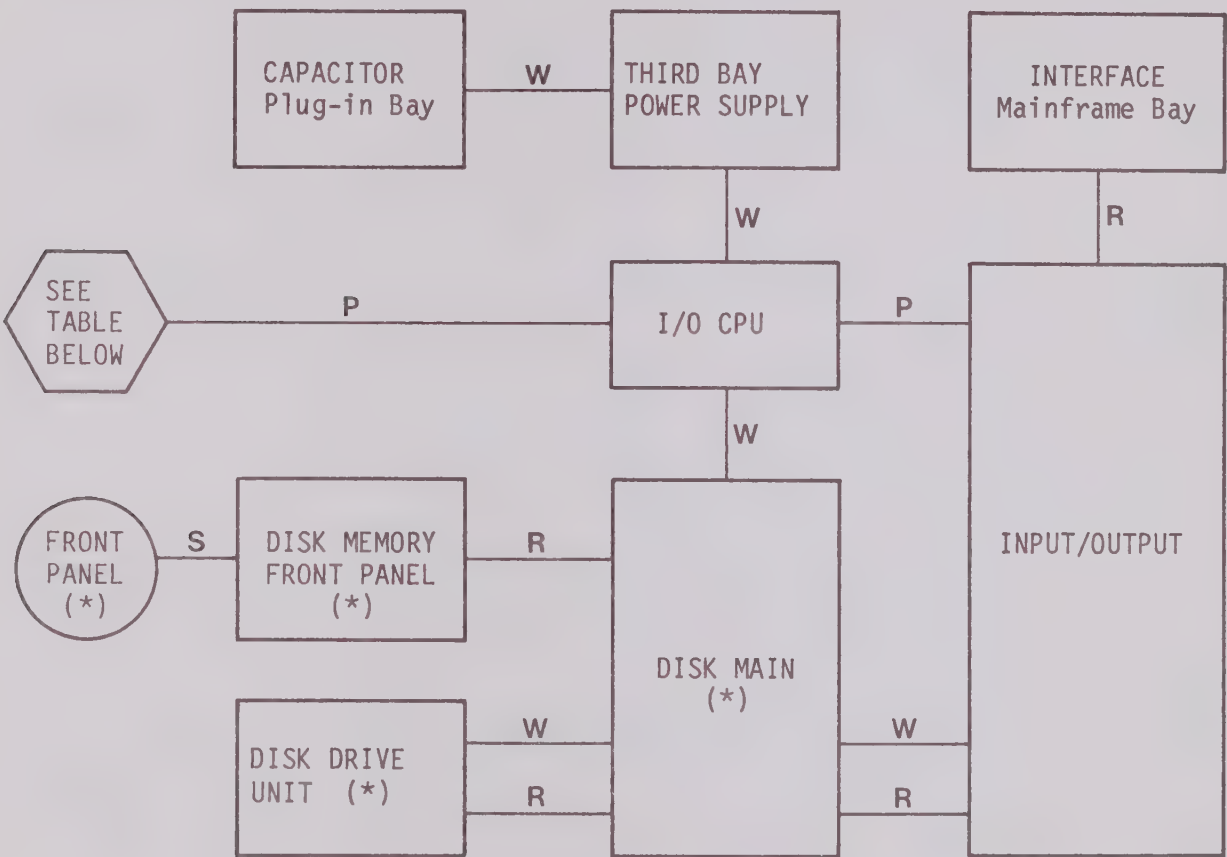
R = Ribbon Connection

W = Wire Connection

S = Solder Connection

INPUT/OUTPUT BAY

Model 3A/3C Configurations with 2081/2082 Interfaces



PRINTED CIRCUIT BOARDS

FRONT PANEL CONTROLS

REAR PANEL CONTROLS

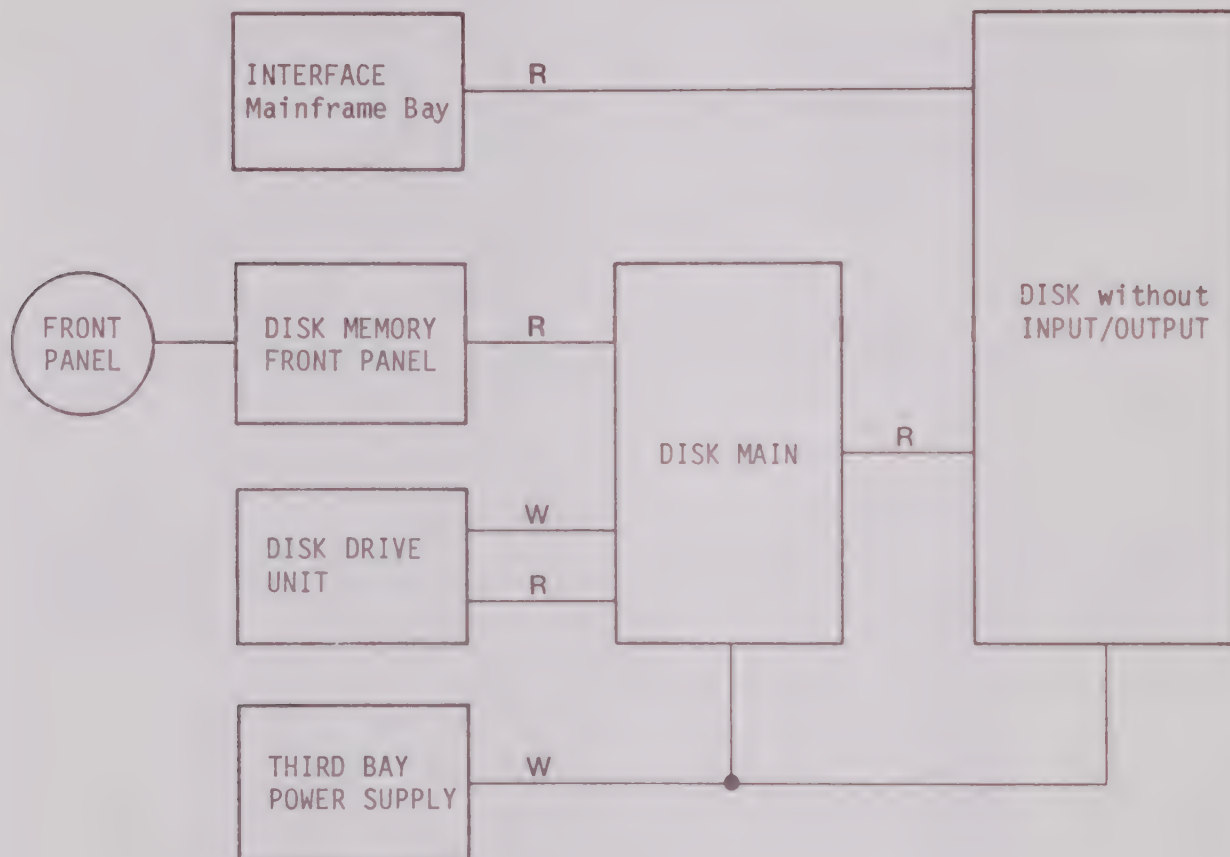
P = Plug-in Connection
R = Ribbon Connection
W = Wire Connection
S = Solder Connection

MODEL NUMBER	BOARD
2081	GPIB Board
2082	RS232C Interface

* 3C Configuration only

INPUT/OUTPUT BAY

Model 3B Configuration



□ PRINTED CIRCUIT BOARDS

○ FRONT PANEL CONTROLS

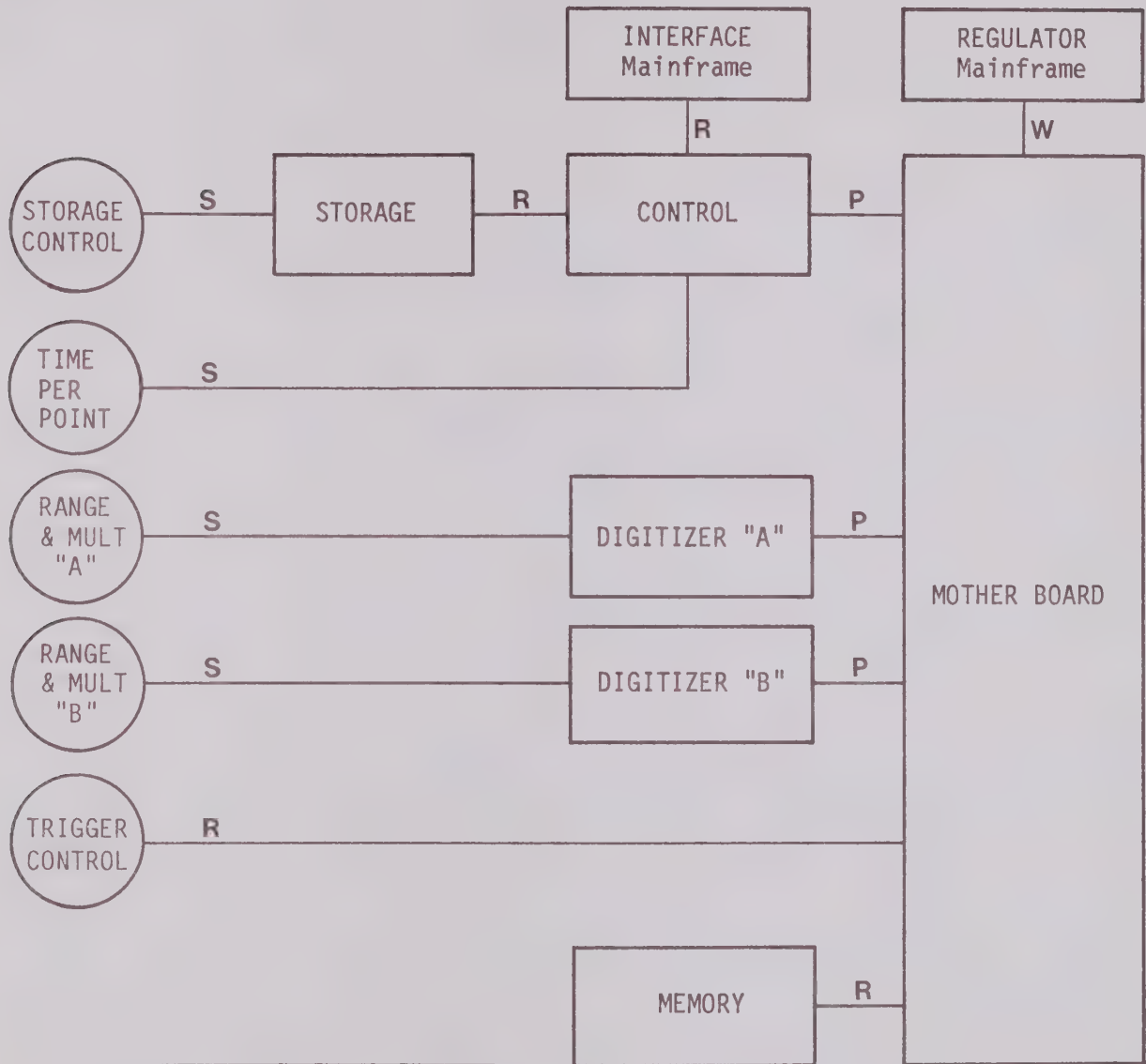
⬡ REAR PANEL CONTROLS

P = Plug-in Connection

R = Ribbon Connection

W = Wire Connection

S = Solder Connection

MODEL 201 PLUG-IN

□ PRINTED CIRCUIT BOARDS

○ FRONT PANEL CONTROLS

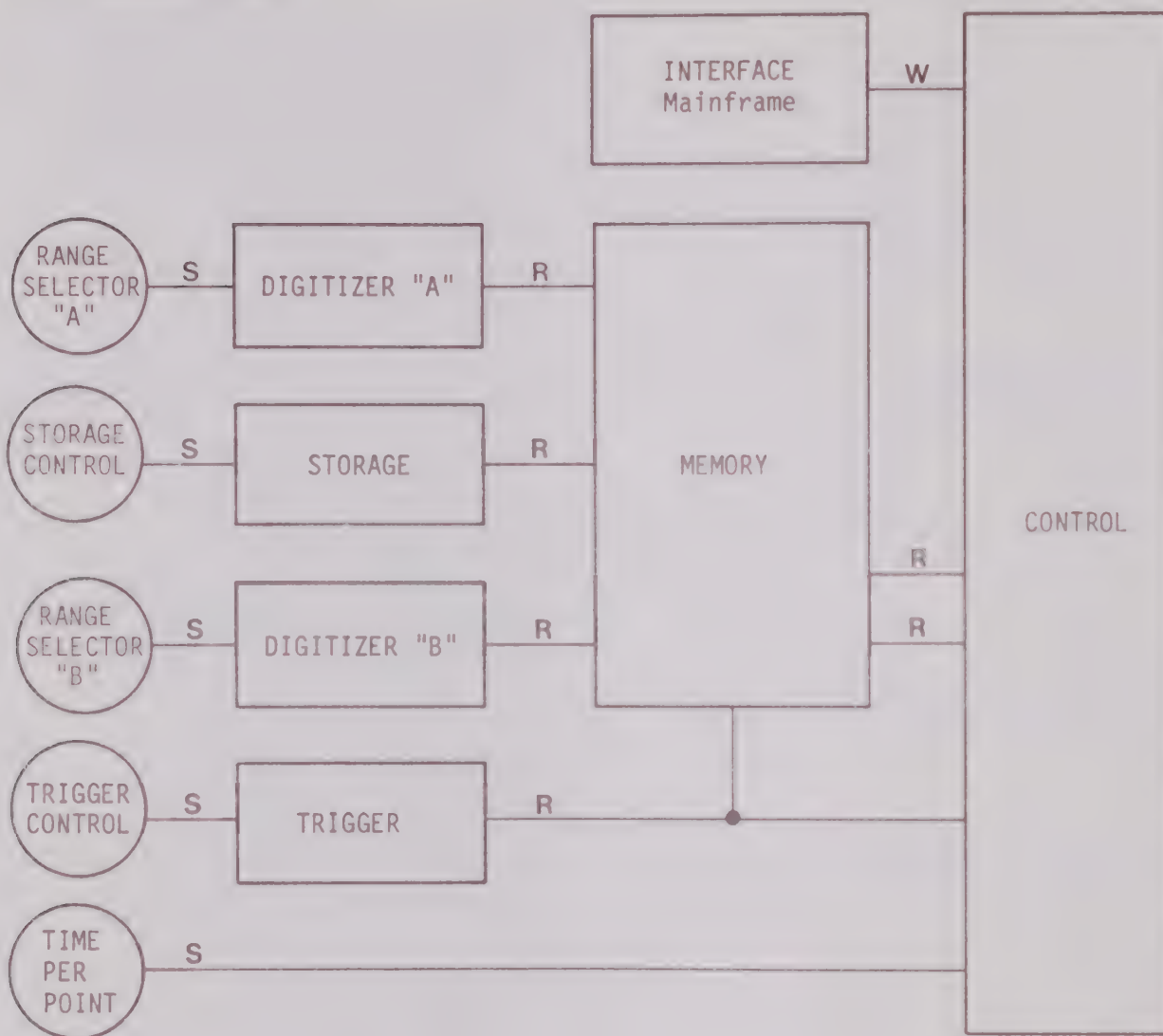
⬡ REAR PANEL CONTROLS

P = Plug-in Connection

R = Ribbon Connection

W = Wire Connection

S = Solder Connection

MODEL 204-A PLUG-IN

□ PRINTED CIRCUIT BOARDS

○ FRONT PANEL CONTROLS

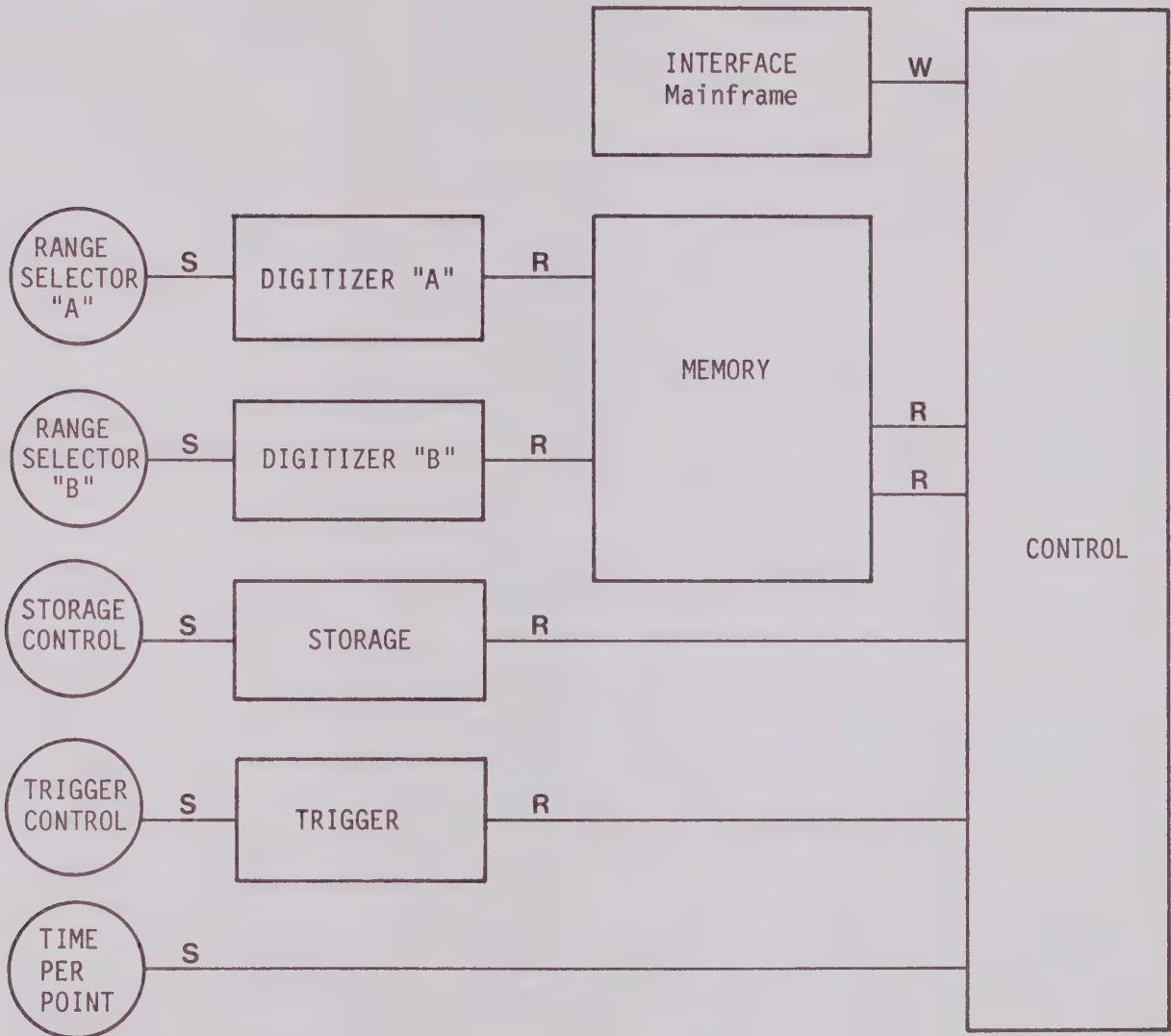
⬡ REAR PANEL CONTROLS

P = Plug-in Connection

R = Ribbon Connection

W = Wire Connection

S = Solder Connection

MODEL 205 PLUG-IN

□ PRINTED CIRCUIT BOARDS

○ FRONT PANEL CONTROLS

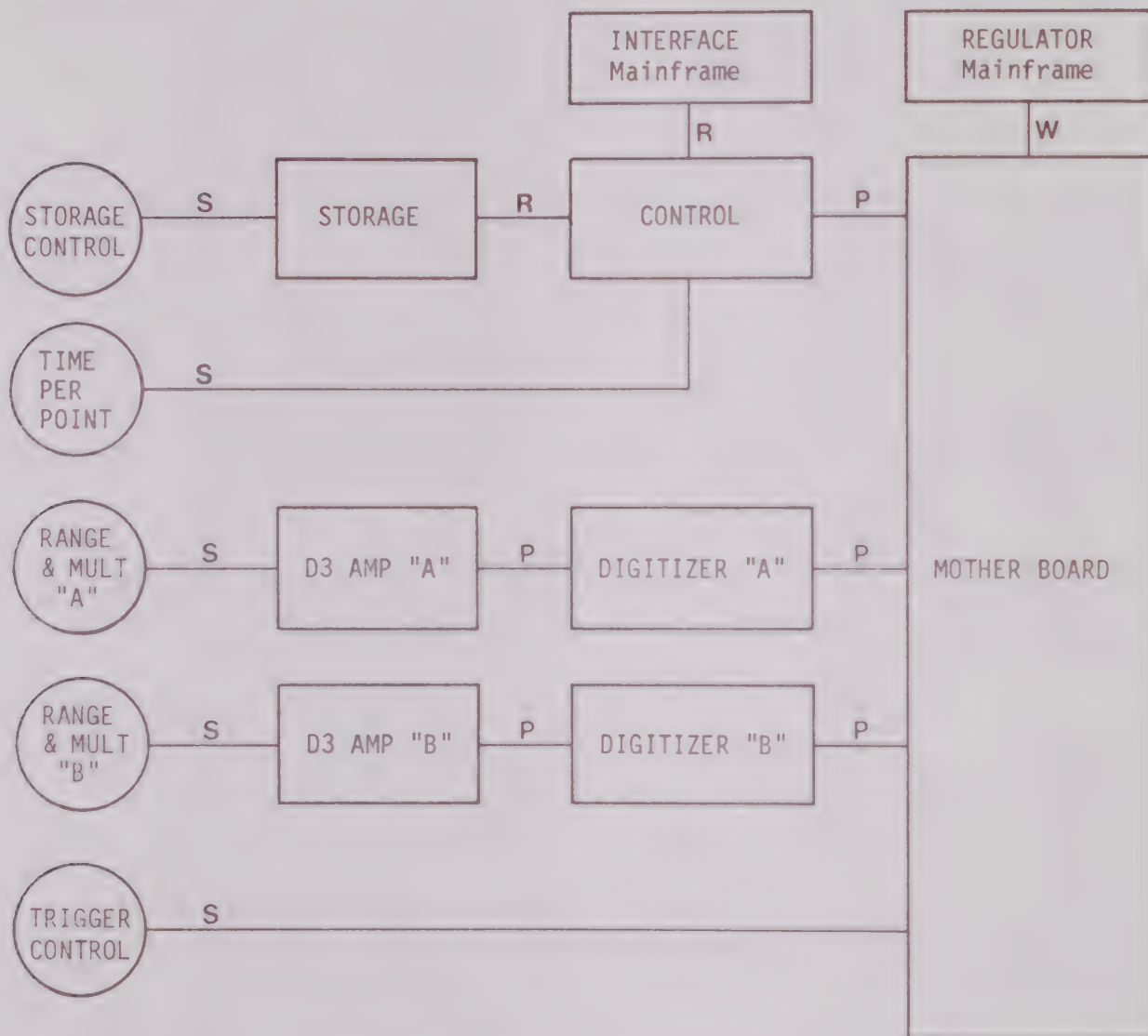
⬡ REAR PANEL CONTROLS

P = Plug-in Connection

R = Ribbon Connection

W = Wire Connection

S = Solder Connection

MODEL 206 PLUG-IN

☐ FRONT PANEL CONTROLS

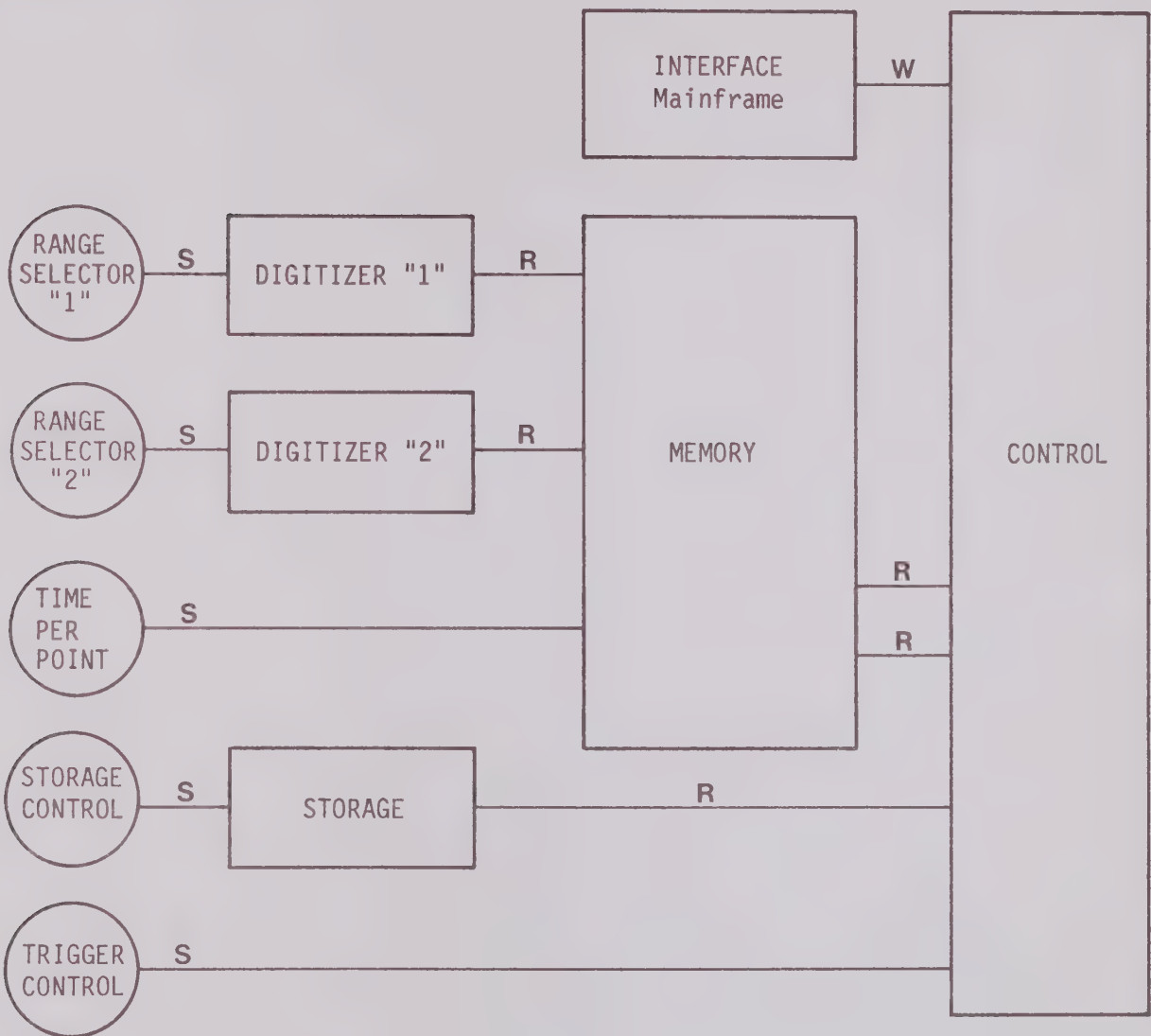
☐ REAR PANEL CONTROLS

P = Plug-in Connection

R = Ribbon Connection

W = Wire Connection

S = Solder Connection

MODEL 207 PLUG-IN

□ PRINTED CIRCUIT BOARDS

○ FRONT PANEL CONTROLS

⬡ REAR PANEL CONTROLS

P = Plug-in Connection

R = Ribbon Connection

W = Wire Connection

S = Solder Connection

PARTS LIST INDEX

The Parts List Index locates the MAJOR ASSEMBLY descriptions in the parts list.

Use the "Quick-Find" indexes to locate specific SUBASSEMBLIES.

PARTS LIST INDEX		
MAJOR ASSEMBLY		SUBASSEMBLY QUICK-FIND INDEXES
Description	Parts List	
Mainframe	9-13....17	9-3
2090-3A Mainframe With I/O	9-11....19	9-4
2090-3C Mainframe With I/O and Disk	9-21....30	9-4
2090-3B Mainframe With Disk	9-31....40	9-5
201 Plug-in	9-41....44	9-6
204-A Plug-in	9-45....51	9-7
205-A Plug-in	9-53....58	9-8
206 Plug-in	9-59....64	9-9
207 Plug-in	9-65....70	9-10
2081 IEEE-488 (GPIB)	9-71....72	9-4
2082 RS-232C	9-73....74	9-4
003 General Interface	9-75	9-4

PARTS LIST SAMPLE

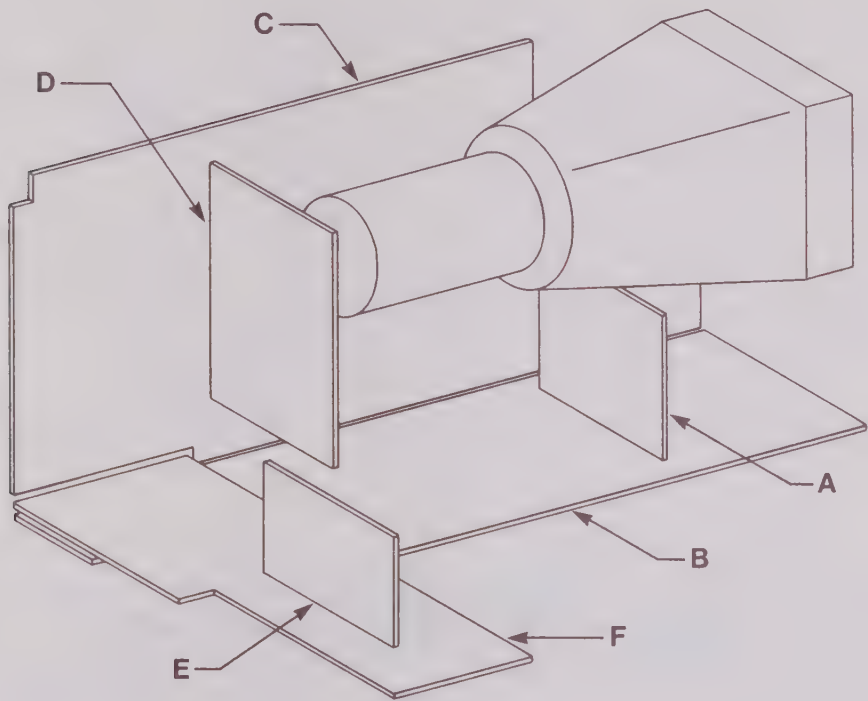
Major Assembly Parent & Page Numbers → PARENT: 885-002100 | 9-xx

Major Assembly Description →

2090-3A DIGITAL I/O

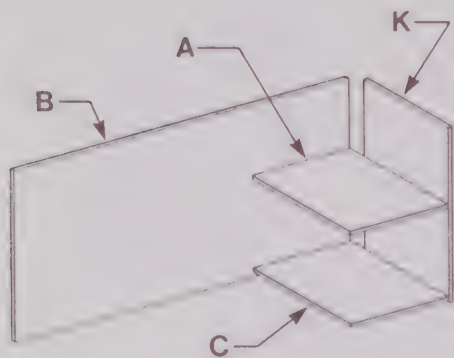
LEVEL	PART NO.	DESCRIPTION	QUANTITY
1	415-006800	2090 I/O CONN CARD	1.000
*2	000-902402	PCB/I/O CARD/2090-3	1.000
**3	134-715303	IC/7438N O/C 2-NAND	1.000
**3	011-721000	BRKT/PWR SPLY MTG/2090	1.000
Subassembly Part Number	Design Revision Level PC Board Part Number listed on diagrams and etched on board		

MAINFRAME

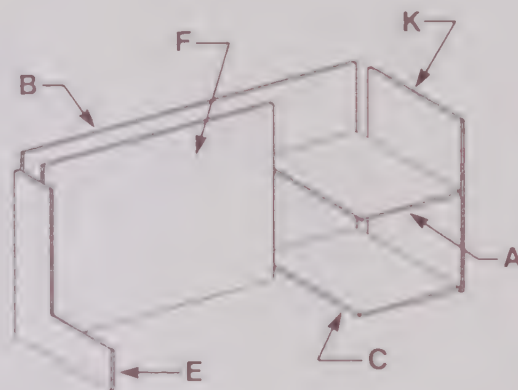


MAINFRAME				
ITEM	PRINTED CIRCUIT BOARDS	PART NUMBERS		DIAGRAMS (Tab 10)
		Assembled Board	Components	
A	Interface Board	415-007100	Page 9-15	Page 010
B	Mainframe Memory Board	415-007000	Page 9-15	Page 030
C	Mainframe Board	415-004900	Page 9-13	Page 050
D	Blanking Board	415-005000	Page 9-14	Page 070
E	Capacitor Board	465-011700	Page 9-17	Page 070
F	Regulator Board	465-011500	Page 9-16	Page 070

INPUT/OUTPUT BAY WITH 003 ACCESSORY

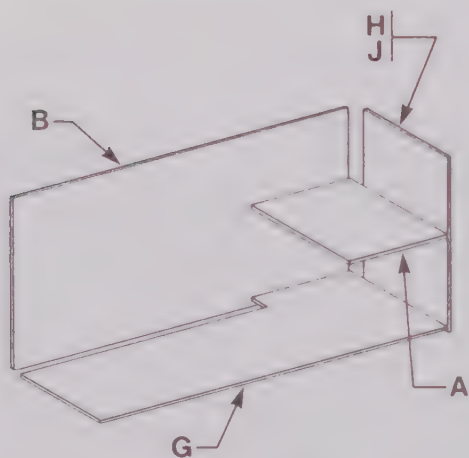


Model 2090-3A with 003 Accessory

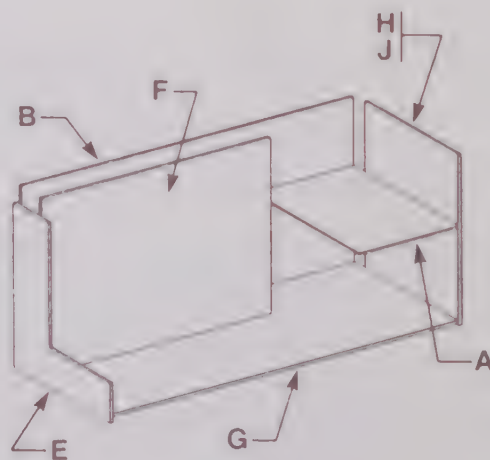


Model 2090-3C with 003 Accessory

INPUT/OUTPUT BAY WITH 2081/2082 ACCESSORIES

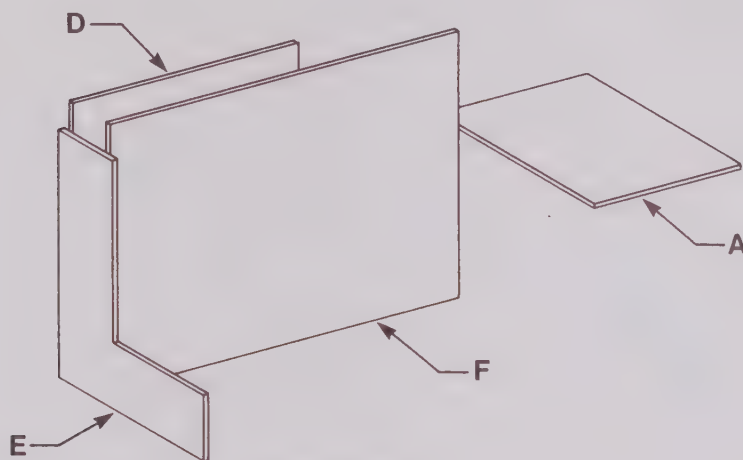


Model 2090-3A with 2081/2082 Accessory



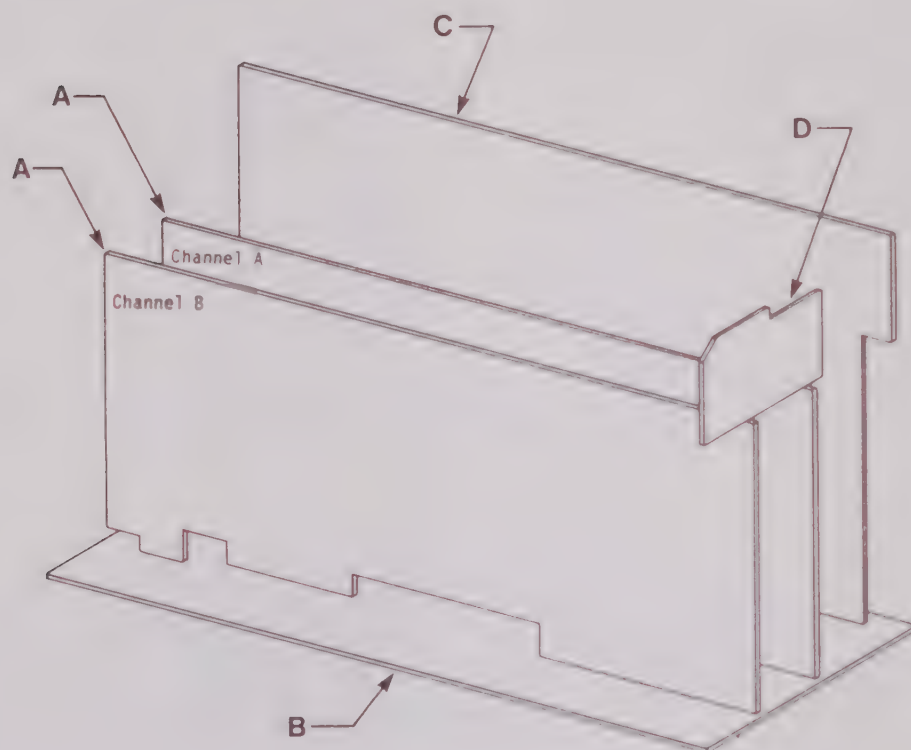
Model 2090-3C with 2081/2082 Accessory

MODEL 2090-3B INPUT/OUTPUT BAY

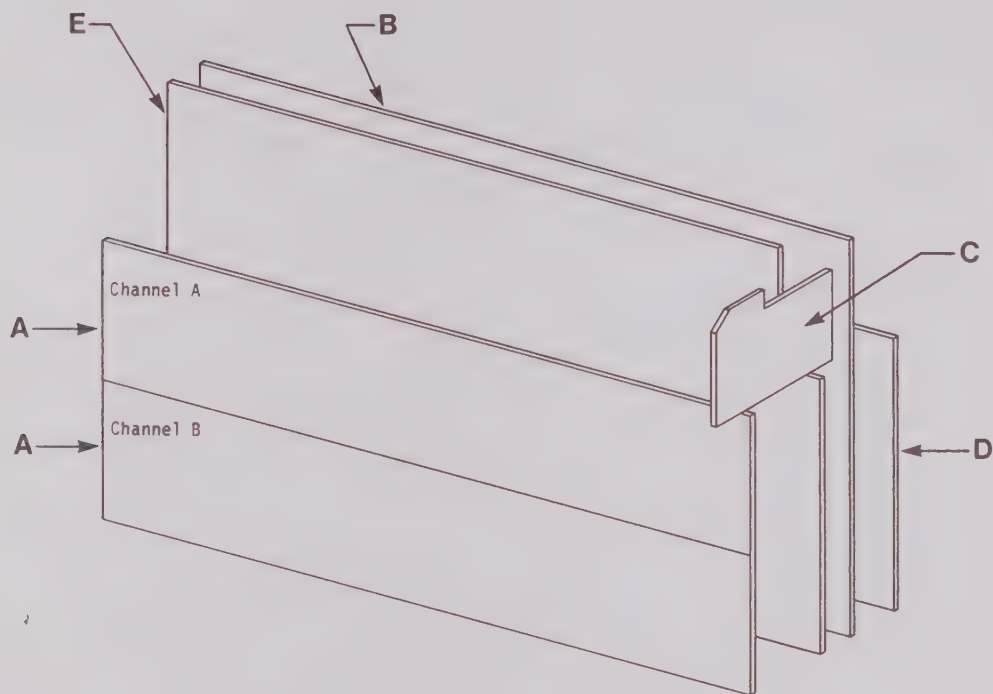


Model 2090-3B

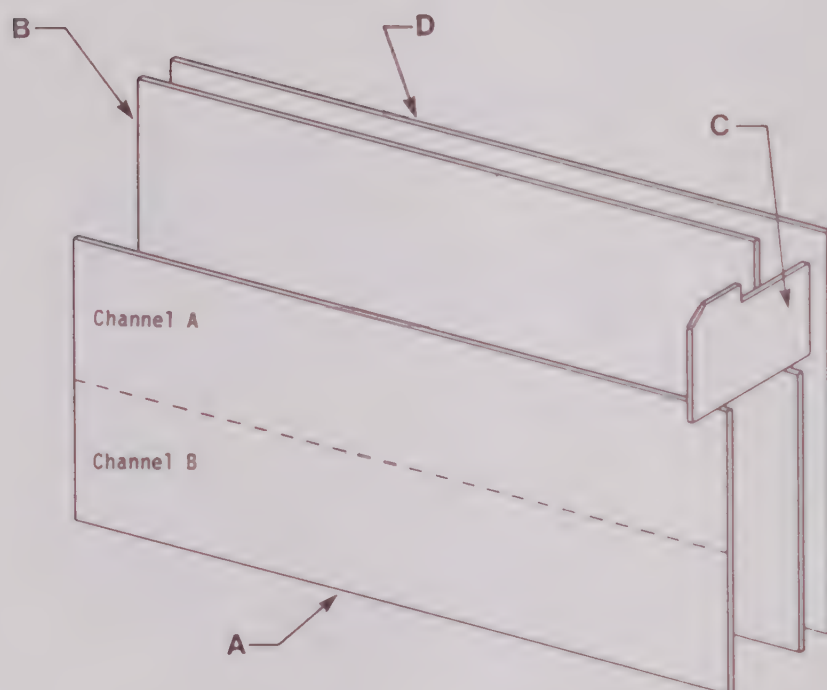
INPUT/OUTPUT BAY				
ITEM	PRINTED CIRCUIT BOARDS	PART NUMBERS		DIAGRAMS (Tab 10)
		Assembled Board	Components	
A	Power Supply Board	415-005500	Pg 12,23,34	Page 070
B	Input/Output Board	415-007400	Page 9-11	Page 330
C	Input/Output Card	415-006800	Page 11,33	Page 330
D	Disk w/o I/O Board	415-009000	Page 9-23	Page 350
E	Front Panel Board	465-001500	Page 22,32	Page 370
F	Disk Main Board	465-005700	Page 21,31	Page 390
G	Input/Output CPU Board	415-009200	Page 9-73	Page 410
H	2081 (GPIB) Board	415-009100	Page 9-71	Page 420
J	2082 (IEEE) Board	415-002400	Page 9-73	Page 430
K	003 I/O Acc'y Board	415-006900	Page 9-75	Page 460

201 PLUG-IN

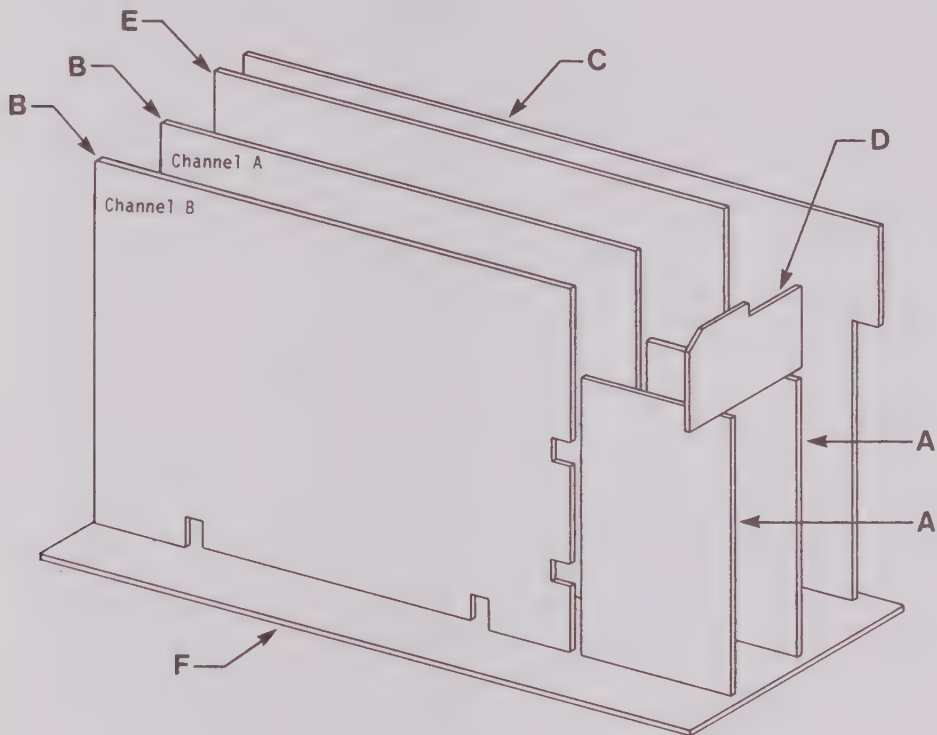
201 PLUG-IN				
ITEM	PRINTED CIRCUIT BOARDS	PART NUMBERS		DIAGRAMS (Tab 10)
		Assembled Board	Components	
A	Digitizer Board	415-009600	Page 9-43	Page 090
B	Mother Board	415-009500	Page 9-41	Page 110
C	Control Board	415-009400	Page 9-41	Page 130
D	Storage Control Board	415-006000	Page 9-44	Page 190

204-A PLUG-IN**204-A PLUG-IN**

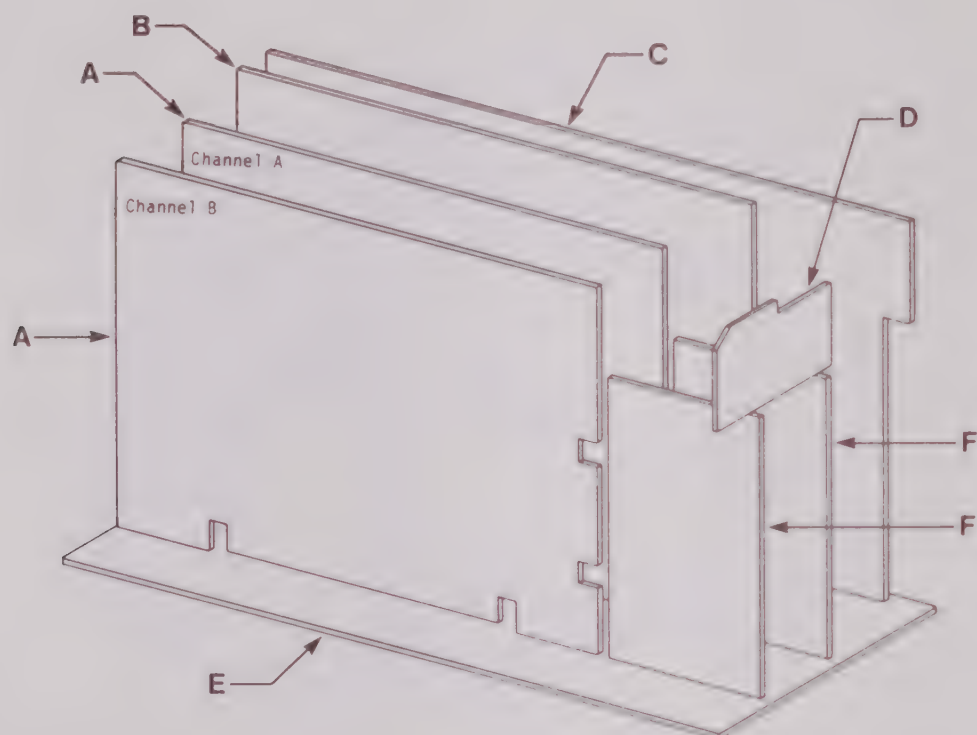
ITEM	PRINTED CIRCUIT BOARDS	PART NUMBERS		DIAGRAMS (Tab 10)
		Assembled Board	Components	
A	Digitizer Board	415-010700	Page 9-46	Page 150
B	Control Board	415-010900	Page 9-48	Page 170
C	Storage Control Board	415-010500	Page 9-50	Page 190
D	Trigger Board	415-010600	Page 9-45	Page 190
E	Memory Board	415-010800	Page 9-47	Page 210

205-A PLUG-IN

205-A PLUG-IN				
ITEM	PRINTED CIRCUIT BOARDS	PART NUMBERS		DIAGRAMS (Tab 10)
		Assembled Board	Components	
A	Digitizer Board	615-000400	Page 9-56	Page 490
B	Control & Trigger Bd	615-000200	Page 9-53	Page 510
C	Storage Control Board	415-012800	Page 9-58	Page 530
D	Memory Board	615-000300	Page 9-54	Page 550

206 PLUG-IN**206 PLUG-IN**

ITEM	PRINTED CIRCUIT BOARDS	PART NUMBERS		DIAGRAMS (Tab 10)
		Assembled Board	Components	
A	D3 - Amplifier Board	415-011400	Page 9-63	Page 230
B	Digitizer Board	415-005800	Page 9-59	Page 250
C	Control Board	415-005900	Page 9-61	Page 270
D	Storage Control Board	415-006000	Page 9-63	Page 270
E	Memory Board	415-004000	Page 9-59	Page 290
F	Mother Board	415-006200	Page 9-62	Page 310

207 PLUG-IN

207 PLUG-IN				
ITEM	PRINTED CIRCUIT BOARDS	PART NUMBERS		DIAGRAMS (Tab 10)
		Assembled Board	Components	
A	Digitizer Board	415-013100	Page 9-66	Page 570
B	Memory Board	415-004000	Page 9-65	Page 290
C	Control Board	415-013200	Page 9-67	Page 590
D	Storage Control Board	415-006000	Page 9-70	Page 270
E	Mother Board	415-006200	Page 9-65	Page 610
F	Amplifier Board	415-012000	Page 9-69	Page 630

2090-3A DIGITAL I/O

LEVEL	PART NO.	DESCRIPTION	QUANTITY
1	475-006300	2090-3A FINALING	1.000
*2	465-001900	2090-3 DIGITAL I/O FRONT PANE	1.000
**3	022-713700	DIO LEDR 406-P 2V 10MA M IN	1.000
**3	024-723300	CON 2F REC/CRP AMP 1-350354-9	1.000
**3	068-727104	PAN/2090 FRONT BAY 3	1.000
*2	475-005900	2090 BLANKING BOARD COVER	1.000
**3	042-711401	COVER/2090 BLANKING #1	1.000
***4	042-708601	COVER/BLANK	1.000
**3	042-712600	COVER/2090 BLANKING #2	1.000
***4	042-708601	COVER/BLANK	1.000
*2	475-006000	3 BAY FRAME BOTTOM COVER ASSY	1.000
**3	042-710904	COVER/BOTTOM 2090/4090	1.000
**3	051-702600	FOOT/757-R LAVELLE	2.000
**3	268-704300	MECH MISC/TILT STAND/14"	1.000
*2	477-001700	BEZEL/GRETICULE ASSEMBLY	1.000
**3	164-700501	GRAT/BLUE	1.000
**3	268-703001	BEZEL/2090 SERIES	1.000
*2	011-724501	BRKT/2090 FRAME GROUND	1.000
*2	017-704200	LABEL/HI VOLT/2090	4.000
*2	017-900400	LABEL/2090-III	1.000
*2	042-712500	COVER/LINE VOLTAGE	1.000
*2	042-712803	COVER/2090-3 L SIDE	2.000
*2	051-700100	BUMPER/SJ5514	2.000
*2	051-900400	BUMPER/2090 BLANKING BD.	1.000
1	675-000700	2090 BAY 3 WITH I/O BD	1.000
*2	415-006800	2090 I/O CONN CARD	1.000
**3	000-902402	PCB/I/O CARD/2090-3 CS	1.000
**3	134-715303	IC/7438N O/C 2-NAND	5.000
**3	011-721000	BRKT/PWR SPLY MTG/2090	2.000
*2	415-007400	2090 DIGITAL I/O BD	1.000
**3	000-902207	PCB/2090 I/O	1.000
**3	134-712803	IC/74LS00N 2-NAND	3.000
**3	134-712903	IC/74LS04N HEX INVERTER	2.000
**3	134-713203	IC/74LS74N FLIP-FLOP	4.000
**3	134-713703	IC/74LS253N MULTIPLEXER	1.000
**3	134-715303	IC/7438N O/C 2-NAND	2.000
**3	134-716803	IC/74LS175N REGISTER	2.000
**3	134-720403	IC/74LS02N 2-NOR	1.000
**3	134-731903	IC/74LS395N SHIFT REGISTER	3.000
**3	134-720503	IC/74LS174N REGISTER	5.000
**3	134-721203	IC/74LS163N COUNTER	2.000
**3	134-723003	IC/74LS14N HEX INVERTER	1.000
**3	134-723903	IC/74LS257 MULTIPLEXER	5.000
**3	134-730903	IC/74LS367N HEX DRIVER	2.000
**3	134-712903	IC/74LS04N HEX INVERTER	1.000
**3	134-718803	IC/74LS175N REGISTER	1.000
**3	134-720403	IC/74LS02N 2-NOR	1.000

2090-3A DIGITAL I/O

LEVEL	PART NO.	DESCRIPTION	QUANTITY
***3	134-722403	IC/74LS139N MULTIPLEXER	1.000
***3	134-723003	IC/74LS14N HEX INVERTER	3.000
***3	134-723903	IC/74LS257 MULTIPLEXER	1.000
***3	134-730903	IC/74LS367N HEX DRIVER	2.000
***3	134-731003	IC/74LS138N MULTIPLEXER	2.000
***3	134-731903	IC/74LS395N SHIFT REGISTER	1.000
***3	023-700200	CAP 1000PF 100V 05% MICA R AR	1.000
***3	023-702400	CAP .01MF 100V 20% CERM P SP	6.000
***3	023-711100	CAP 4.7MF 10V 10% TANT G KE	8.000
***3	024-723400	CON 2M HDR/SOL AMP 9-35C360-1	1.000
***3	024-733200	CON 6M HDR/SOL AMP 9-350259-1	1.000
***3	024-737200	CON 56PIN/AMP 67907-3	1.000
***3	024-740700	CON 20F DIP/SOL 641264-3 AM	2.000
***3	085-707700	CBL/50 COND/7" 5100831 SY	1.000
***3	100-700700	RES NET/CSP10E-01-502J	2.000
***3	201-100200	RES 10K 01% 1/8W PGE	4.000
***3	201-332000	RES 332 01% 1/8W PRE	1.000
***3	024-738500	CON 1M HDR/SOL CAD72SP100 CA	50.000
***3	051-700100	BUMPER/SJ5514	2.000
***3	405-002300	2090 I/O BOARD CABLE	1.000
****4	015-706401	PIN F 18-26GA 350665-1 TIN AM	6.000
****4	024-726900	CON 6F REC/CRP AMP 1-350241-9	1.000
***3	134-728803	IC/18S42 PROM (74S472)	2.000
***3	017-716500	LABEL/3C90 SERIAL NUMBER	1.000
*2	675-000400	3RD BAY FRAME WITH SUPPLY	1.000
***3	475-006100	2090 BAY 3 FRAME	1.000
****4	034-714804	RAIL/2090 SIDE	1.000
****5	112-700400	EXTRUSION/RAIL SIDE	1.000
****4	034-715403	RAIL/PLUG-IN	1.000
****5	112-700704	EXTRUSION/PLUG-IN RAIL	1.000
****4	034-900001	RAIL/2090-2 TO 2090-3 CONNECT	4.000
****5	112-700500	EXTRUSION/RAIL	1.000
****5	129-900102	FRAME/END 2090/4090 ROUNDED	2.000
****5	129-900500	FRAME/END 2090/4090 PAINTED	1.000
****5	129-702100	FRAME/END 2090/4090 CASTING	1.000
***3	665-000300	2090 BAY 3 REAR PANEL ASSY	1.000
****4	415-005500	2090 POWER SUPPLY 3D BAY 3	1.000
****5	405-001900	2090 3RD BAY PWR SUP CABLE	1.000
****5	015-706401	PIN F 18-26GA 350665-1 TIN AM	6.000
****5	024-726900	CON 6F REC/CRP AMP 1-350241-9	1.000
****5	000-902104	PCB/2090 BAY 3 POWER SUPPLY	1.000
****5	006-701400	WASH/NO J TEFLON	4.000
****5	011-721900	BRKT/THIRD BAY P.S./2090.3	2.000
****5	021-708800	TRN NPN 2N5301 40V 200W J MO	2.000
****5	022-700800	DIO RECT 1N4004 400V 1A G TX	6.000
****5	022-707100	DIO TRRM 3SM2 200V 2A G SE	4.000
****5	023-700200	CAP 1000PF 100V 05% MICA R AR	2.000

2090-3A DIGITAL I/O

LEVEL	PART NO.	DESCRIPTION	QUANTITY
*****5	023-704700	CAP 1MF 35V 10% TANT G KE	1.000
*****5	023-711000	CAP 22MF 35V 10% TANT G KE	4.000
*****5	023-714000	CAP 100MF 50V ALUM G SP	1.000
*****5	023-716200	CAP 8800MF 25V ALUM S CA	2.000
*****5	023-717500	CAP 23KMF 15V ALUM S ME	1.000
*****5	024-719500	CON 9M HDR/SOL AMP 9-350262-1	1.000
*****5	026-705400	PCT 500 PCB .7W 3006P1501 BR	2.000
*****5	032-700800	INSUL/DIODE	2.000
*****5	098-704700	HT SNK/THM6006B-2-2	1.000
*****5	106-702700	RES .36 5% 2W	1.000
*****5	106-706100	RES .18 5% 5W	1.000
*****5	121-702400	REG -1.2T0-37V 1.5A 337T E NA	1.000
*****5	121-702600	REG 2T038V .15A LAS1000 A LA	2.000
*****5	201-124000	RES 124 01% 1/8W PRE	1.000
*****5	201-150000	RES 150 01% 1/8W PRE	1.000
*****5	201-200100	RES 2K 01% 1/8W PRE	1.000
*****5	201-221100	RES 2.21K 01% 1/8W PRE	2.000
*****5	201-274000	RES 274 01% 1/8W PRE	2.000
*****5	201-301000	RES 301 01% 1/8W PRE	2.000
*****5	201-365000	RES 365 01% 1/8W PRE	1.000
*****5	201-604000	RES 604 01% 1/8W PRE	2.000
*****5	201-681900	RES 68.1 01% 1/8W PRE	1.000
****4	445-000500	2090 TRANSFORMER BAY 3	1.000
*****5	015-706301	PIN M 18-26 GA TIN	6.000
*****5	015-706401	PIN F 18-26GA 350665-1 TIN AM	6.000
*****5	019-707700	XFORMER/DG-447 FOREST	1.000
*****5	024-719800	CON 9F REC/CRP AMP 1-350242-9	1.000
*****5	024-727000	CON 6M REC/CRP AMP 1-350234-9	1.000
****4	068-728005	PAN/2090 REAR BAY 3	1.000
****4	002-706500	PLATE/I/O COVER	1.000
1	675-2090-3	2090-3 UNIT ASSEMBLY	1.000
**2	413-004900	2090 MAIN FRAME BD	1.000
**3	000-900304	PCB/2090 MAIN FRAME	1.000
**3	134-712903	IC/74LS04N HEX INVERTER	1.000
**3	134-718503	IC/74S182N CARRY LOOKAHEAD	1.000
**3	134-705703	IC/741CP	2.000
**3	134-713203	IC/74LS74N FLIP-FLOP	6.000
**3	134-724903	IC/74S169 COUNTER	3.000
**3	134-730903	IC/74LS367N HEX DRIVER	6.000
**3	134-731003	IC/74LS138N MULTIPLEXER	3.000
**3	134-731603	IC/74LS251N MULTIPLEXER	2.000
**3	134-732103	IC/96L02 MONOSTABLE FC	1.000
**3	134-720503	IC/74LS174N REGISTER	4.000
**3	134-713703	IC/74LS253N MULTIPLEXER	1.000
**3	013-701100	CONTACT/MALE CONTACT JUMPER	1.000
**3	021-702200	TRN NPN 2N3903 40V 1W B MO	1.000
**3	021-702500	TRN NPN 2N3302 36V .36W A MO	2.000

2090-3A DIGITAL I/O

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	022-701100	DIO 6ERM 1N270 80V .2A G IT	5.000
**3	023-701600	CAP 2.2MF 20V 10% TANT G KE	2.000
**3	023-702400	CAP .01MF 100V 20% CERM R SP	2.000
**3	023-711100	CAP 4.7MF 10V 10% TANT G KE	9.000
**3	023-711300	CAP .1MF 250V 10% PLYE R SE	7.000
**3	024-715900	CON 16F DIP/SOL 641262-3 AM	1.000
**3	024-721300	CON 24F DIP/SOL 641266-3 AM	2.000
**3	024-724800	CON 40F DIP/SOL 641268-3 AM	3.000
**3	024-737200	CON 56PIN/AMP 67907-3	1.000
**3	024-738500	CON 1M HDR/SOL CAD72SP100 CA	86.000
**3	024-740700	CON 20F DIP/SOL 641264-3 AM	5.000
**3	024-759900	CON 1F HDR/SOL SS-120-T-2 SAM	4.000
**3	026-705500	POT 1K PCB .7W 3006P1102 BR	2.000
**3	100-700700	RES NET/CSP10E-01-502J	3.000
**3	121-700900	RES -15V .35A 79M15AUC E FC	1.000
**3	134-724500	IC/DAC8C-CBI-V 12BIT DAC	2.000
**3	134-764100	IC/29C1A 4 BIT SLICE PROCESSO	3.000
**3	201-100000	RES 100 01% 1/8W PRE	1.000
**3	201-100200	RES 10K 01% 1/8W PRE	1.000
**3	201-100300	RES 100K 01% 1/8W PRE	1.000
**3	201-150000	RES 150 01% 1/8W PRE	1.000
**3	201-392000	RES 392 01% 1/8W PRE	6.000
**3	201-475100	RES 4.75K 01% 1/8W PRE	11.000
**3	201-487200	RES 49.7K 01% 1/8W PRE	1.000
**3	134-717403	IC/14S10 PROM (74S287)	1.000
**3	134-728803	IC/16S42 PROM (74S472)	5.000
*2	415-005000	2090 BLANKING BD	1.000
**3	000-900203	PCB/2090 BLANKING	1.000
**3	021-700600	TRN NPN 2N2484 60V .36W A MO	4.000
**3	021-702200	TRN NPN 2N3903 40V 1W B MO	1.000
**3	021-711100	TRN NPN MPSU10 300V 1W E MO	4.000
**3	021-712100	TRN VMOS 8S250 45V .8W B ITT	1.000
**3	022-700800	DIO RECT 1N4004 400V 1A G TX	1.000
**3	022-703000	DIO ZENR 1N5232 5.6V .5W G MO	1.000
**3	022-703200	DIO ZENR 1N5256 30V .5W G MO	1.000
**3	022-719800	DIO TRRF 1N4152 30V .5W G FC	1.000
**3	023-702400	CAP .01MF 100V 20% CERM R SP	2.000
**3	023-707500	CAP 6.8MF 35V 10% TANT G KE	1.000
**3	023-711100	CAP 4.7MF 10V 10% TANT G KE	1.000
**3	023-711300	CAP .1MF 250V 10% PLYE R SE	6.000
**3	023-719400	CAP .01MF 3000V 20% CERM R SP	2.000
**3	026-705700	POT 5K PCB .7W 3006P1502 BR	5.000
**3	026-706200	POT 50K PCB .7W 3006P1503 BR	1.000
**3	026-706400	POT 1M PCB .7W 3006P1105 BR	1.000
**3	052-705100	LAMP/NEON 72V 1.3MA	4.000
**3	105-022300	RES 22K 05% 2W	2.000
**3	105-027300	RES 27K 05% 2W	2.000

2090-3A DIGITAL I/O

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	108-047100	RES 470 05% 1/4W	2.000
**3	134-729403	IC/6N137	1.000
**3	201-100100	RES 1K 01% 1/8W PRE	1.000
**3	201-100400	RES 1M 01% 1/8W PRE	1.000
**3	201-127300	RES 127K 01% 1/8W PRE	1.000
**3	201-143200	RES 14.3K 01% 1/8W PRE	1.000
**3	201-152200	RES 15.2K 01% 1/8W PRE	1.000
**3	201-178000	RES 178 01% 1/8W PRE	1.000
**3	201-221300	RES 221K 01% 1/8W PRE	1.000
**3	201-226200	RES 22.6K 01% 1/8W PRE	3.000
**3	201-237200	RES 23.7K 01% 1/8W PRE	1.000
**3	201-243200	RES 24.3K 01% 1/8W PRE	1.000
**3	201-249100	RES 2.49K 01% 1/8W PRE	1.000
**3	201-280200	RES 28K 01% 1/8W PRE	1.000
**3	201-475100	RES 4.75K 01% 1/8W PRE	1.000
**3	201-523200	RES 52.3K 01% 1/8W PRE	1.000
**3	201-665200	RES 66.5K 01% 1/8W PRE	1.000
**3	201-976200	RES 97.6K 01% 1/8W PRE	1.000
**3	202-107300	RES 107K 01% 1/4W PRE	1.000
**3	202-200300	RES 200K 01% 1/4W PRE	4.000
**3	202-634200	RES 63.4K 01% 1/4W PRE	1.000
**3	202-787200	RES 78.7K 01% 1/4W PRE	1.000
**3	024-724600	CON 10F REC/IDP MMM 3473-6000	1.000
**3	024-734900	CON 8M HDR/SCL BRG 65532-408	1.000
**3	024-735900	CON 10PIN/3M3474.0001T	1.000
**3	405-002000	2090 BLANKING BOARD CABLE	1.000
***4	015-706401	PIN F 18-26GA 350665-1 TIN AM	8.000
***4	024-719900	CON 15F REC/CRP AMP 1-350244-	1.000
**2	415-007000	► 2090 4K MEMORY BD	1.000
**3	000-900403	PCB/2090 MEMORY 4K	1.000
**3	134-723903	IC/74LS257 MULTIPLEXER	3.000
**3	134-730903	IC/74LS367N HEX DRIVER	2.000
**3	134-736903	IC/74LS241N OCTAL BUFFER	3.000
**3	134-754300	IC/2147 4KX1 RAM	13.000
**3	134-723003	IC/74LS14N HEX INVERTER	1.000
**3	134-723903	IC/74LS257 MULTIPLEXER	1.000
**3	134-736803	IC/74LS374N REGISTER	4.000
**3	134-730903	IC/74LS367N HEX DRIVER	1.000
**3	023-702400	CAP .01MF 100V 20% CERM R SP	1.000
**3	023-711100	CAP 4.7MF 10V 10% TANT G KE	4.000
**3	024-737200	CON 56PIN/AMP 67907-3	1.000
**3	100-700700	RES NET/CSP10E-01-502J	1.000
**3	108-047100	RES 470 05% 1/4W	1.000
**2	415-007100	► 2090-3 INNER CONN BD 4K	1.000
**3	000-900500	PCB/INTERFACE BD/2090	1.000
**3	024-725000	CON 12M HDR/SOL AMP 9-350265-	1.000
**3	085-707900	CBL/50 COND/DAISY CHAIN	1.000

2090-3A DIGITAL I/O

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	085-707901	CBL/50 COND 23" HDR/PC/EDG	1.000
**2	415-011500	2090 POWER SUP REG BD VER. II	1.000
**3	000-900008	PCB/2090 REGULATOR VER. II	1.000
**3	019-706000	XFORMER/ITA-1552-11	1.000
**3	022-700800	DIO RECT 1N4004 400V 1A G TX	6.000
**3	022-705100	DIO ZENR 1N5268 82V .5W G MO	1.000
**3	022-706900	DIO TRRF FM50 5KV .01A G SE	2.000
**3	022-707000	DIO TRRF S2F 200V 1A G SE	5.000
**3	022-711900	DIO BRIC VE48X 400V 1A G VA	1.000
**3	023-029200	CAP 22MF 15V 10% TANT G KE	1.000
**3	023-704700	CAP 1MF 35V 10% TANT G KE	3.000
**3	023-707300	CAP 1MF 200V 10% MYLR G TR	2.000
**3	023-711200	CAP 220MF 10V 10% TANT G KE	1.000
**3	023-719400	CAP .01MF 3000V 20% CERM R SP	5.000
**3	023-719700	CAP 2.2MF 50V 10% TANT G KE	3.000
**3	024-719600	CON 15M HDR/SOL 9-350269-1 AM	1.000
**3	024-725000	CON 12M HDR/SOL AMP 9-350265-	1.000
**3	024-784100	CON 20M HDR/SOL 9-350272-1 AM	1.000
**3	026-705400	POT 500 PCB .7W 3006P1501 BR	5.000
**3	026-706000	POT 20K PCB .7W 3006P1203 BR	1.000
**3	101-010500	RES 1M 10% 1/2W	2.000
**3	101-022500	RES 2.2M 10% 1/2W	2.000
**3	105-012100	RES 120 05% 2W	1.000
**3	106-703600	RES 200M 10% 1W	1.000
**3	108-015300	RES 15K 05% 1/4W	1.000
**3	201-100000	RES 100 01% 1/8W	1.000
**3	201-100200	RES 10K 01% 1/8W	1.000
**3	201-100300	RES 100K 01% 1/8W	1.000
**3	201-124000	RES 124 01% 1/8W	2.000
**3	201-200100	RES 2K 01% 1/8W	1.000
**3	201-200300	RES 200K 01% 1/8W	1.000
**3	201-221000	RES 221 01% 1/8W	2.000
**3	201-221100	RES 2.21K 01% 1/8W	1.000
**3	201-249000	RES 249 01% 1/8W	2.000
**3	201-249100	RES 2.49K 01% 1/8W	1.000
**3	201-301000	RES 301 01% 1/8W	1.000
**3	201-332100	RES 3.32K 01% 1/8W	1.000
**3	201-499100	RES 4.99K 01% 1/8W	2.000
**3	201-619200	RES 61.9K 01% 1/8W	1.000
**3	201-825000	RES 825 01% 1/8W	1.000
**3	006-701400	WASH/NO J TEFLON	2.000
**3	011-720900	BRKT/INTEN. FOCUS/2090	1.000
**3	011-721000	BRKT/PWR SPLY MTG/2090	2.000
**3	019-707006	XFORMER/HV WINDING 2090/4090	1.000
**3	021-708800	TRN NPN 2N5301 40V 200W D MO	1.000
**3	021-713500	TRN NPN SJE1716 60V 75W E MO	2.000
**3	022-718900	DIO ZENR 1N4736 6.8V 1W G MO	1.000

2090-3A DIGITAL I/O

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	023-700200	CAP 1000PF 100V 05% MICA R AR	1.000
**3	023-706900	CAP 50MF 50V ALUM G SP	1.000
**3	023-713500	CAP 4.7MF 50V 10% TANT G KE	2.000
**3	023-719700	CAP 2.2MF 50V 10% TANT G KE	2.000
**3	026-706500	POT 500K PML 38592A31504A 3R	2.000
**3	032-700800	INSUL/DIODE	1.000
**3	032-700900	INSUL/DIODE	7.000
**3	067-700300	CORE/E1960-S-298A	2.000
**3	070-703400	FUSE/.75 A/276.750 LITTLEFUSE	1.000
**3	079-700300	THERMOS/PTH487AC18E222TS MU	1.000
**3	098-700200	HT SNK/207CB W	1.000
**3	098-704000	HT SNK/EXPL P.S.	1.000
**3	098-704302	HT SNK/2090 REGULATOR VER. II	1.000
**3	103-027000	RES 27 05% 1W	1.000
**3	106-703500	RES .1 05% 10W	1.000
**3	121-702100	REG 5 TO 30V 1A 78GU1C E FC	1.000
**3	121-702300	REG 1.2 TO 37V 1.5A 317T E NA	2.000
**3	121-702400	REG -1.2TO-37V 1.5A 337T E NA	2.000
**3	121-702600	REG 2TO38V .15A LAS1000 A LA	1.000
**3	201-143200	RES 14.3K 01% 1/8W PRE	1.000
**3	201-274000	RES 274 01% 1/8W PRE	1.000
**3	201-365000	RES 365 01% 1/8W PRE	1.000
**3	201-604000	RES 604 01% 1/8W PRE	1.000
**3	011-723103	BRKT/HI VOLT XFORMER/EXPL	1.000
**3	017-704200	LABEL/HI VOLT/2090	1.000
**3	405-001800	2090 REGULATOR BOARD CABLE	1.000
****4	015-706401	PIN F 18-26GA 350665-1 TIN AM	30.000
****4	024-721900	CON 20F REC/CRP 1-350245-9 AM	1.000
****4	024-722500	CON 12F REC/CRP AMP 1-350243-	1.000
****4	024-726900	CON 6F REC/CRP AMP 1-350241-9	1.000
*2	465-001300	2090 REAR PANEL BAY 1	1.000
**3	415-011700	2090 CAPACITOR 3D VER. II	1.000
****4	000-900106	PCB/CAP BD/EXP SERIES	1.000
****4	022-705300	DIO BRID VS647 600V 2A J VA	2.000
****4	023-716200	CAP 8800MF 25V ALUM S CA	2.000
****4	023-717500	CAP 28KMF 15V ALUM S ME	2.000
****4	023-719000	CAP 2000MF 50V ALUM S CA	2.000
****4	405-002100	2090 CAPACITOR BOARD CABLE	1.000
*****5	015-706401	PIN F 18-26GA 350665-1 TIN AM	23.000
*****5	024-719900	CON 15F REC/CRP AMP 1-350244-	1.000
*****5	024-722500	CON 12F REC/CRP AMP 1-350243-	1.000
*****5	085-702400	CORD/428-056 ROTRON	1.000
**3	022-718000	DIO RECT SCPA-2 200V8.5A Q SE	1.000
**3	068-726708	PAN/2090 REAR BAY 1	1.000
**3	072-700100	FAN/WISPER WR2A1	1.000
**3	114-702600	FLTR/FAN/PAMOTER#5502	1.000
*2	465-001400	2090 FRONT PANEL	1.000

2090-3A DIGITAL I/O

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	068-726906	PAN/2090 FRONT BAY 2	1.000
**3	068-741002	PAN/2090 FRONT SUB	1.000
**3	015-706301	PIN M 18-26 GA TIN	4.000
**3	024-721700	CON 4M REC/CRP AMP 1-350233-9	1.000
**3	010-701200	NUT/80-7013-19 DECOR. LICO	1.000
**3	011-723001	BRKT/2090 STRAIN RELIEF	1.000
**3	017-704600	LABEL/LOGO/JEWEL	1.000
**3	022-722100	DIO LEDG HLMP3553 1.6V 20MA H	1.000
**3	025-715500	SW/RO PA166-011-0AA CL	2.000
**3	025-716100	SW/LE 2PL2PS 7215J61GE CE	2.000
**3	025-716500	SW/LB 2P2T	1.000
**3	025-727100	SW/RO 2FL11PS 045773-SK-1 S	1.000
**3	025-727200	SW/PB SPDT 8121-J82 CE	1.000
**3	025-734300	SW/RO 1FL2-7PS PA166-025 CL	1.000
**3	025-739900	SW/TO 1P2T 7101P3/7099-2 BLAC	2.000
**3	045-703301	KNOB/KX-12322 1/A"	4.000
**3	085-900002	CBL/20 COND/922511-26-99-13 A	1.000
**2	475-001700	2090-3 CABINET ASSEMBLY	1.000
**3	034-714702	RAIL/2090 TOP CENTER	1.000
**4	112-700300	EXTRUSION/RAIL SIDE	1.000
**3	034-714804	RAIL/2090 SIDE	1.000
**4	112-700400	EXTRUSION/RAIL SIDE	1.000
**3	034-714903	RAIL/2090-2 CONNECTOR	4.000
**4	112-700500	EXTRUSION/RAIL	1.000
**3	034-715302	RAIL/2090 CORNER SUPPORT	1.000
**3	034-715403	RAIL/PLUG-IN	1.000
**4	112-700704	EXTRUSION/PLUG-IN RAIL	1.000
**3	034-900001	RAIL/2090-2 TO 2090-3 CONNECT	4.000
**4	112-700500	EXTRUSION/RAIL	1.000
**3	044-704308	SHIELD/2090 CRT	1.000
**3	049-700100	HANDLE/VIN 1776-354-324 (.156	1.000
**3	129-702101	FRAME/ENC 2090/4090 SQUARE	2.000
**4	129-900500	FRAME/END 2090/4090 PAINTED	1.000
**3	129-702100	FRAME/END 2090/4090 CASTING	1.000
**4	129-900102	FRAME/END 2090/4090 ROUNDED	2.000
**4	129-900500	FRAME/END 2090/4090 PAINTED	1.000
**3	129-702100	FRAME/END 2090/4090 CASTING	1.000
**3	015-701600	PIN F 26-30GA 86015-3 TIN AM	2.000
**3	024-740300	CON AMP 87499-3/2PIN	1.000
**3	027-700600	CRT/55261 D14-261GH AM	1.000
**3	084-701002	CHAN/2090 FRAME	2.000
**4	112-702100	EXTRUSION/SUPPORT CHANNEL	1.000
**3	084-900101	CHAN/2090 FRAME/SHORT	2.000
**3	051-700100	BUMPER/SJ5514	2.000
**3	051-700300	BUMPER/SJ-5018 1/4" BLACK MM	7.000
**2	665-000200	2090 BAY 2 REAR PANEL ASSY	1.000
**3	068-726611	PAN/2090 REAR BAY 2	1.000

2090-3A FLOPPY DISK

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	070-703000	FUSE/SLO BLO 3AG3	1.000
**3	000-906502	PCB/2090 VOLTAGE SELECT	1.000
**3	015-702600	PIN M 24-26GA 350185-1 TIN AM	2.000
**3	015-702700	PIN M 18-26GA 350036-1 TIN AM	9.000
**3	024-721600	CON 4F REC/CRP AMP 1-350240-9	1.000
**3	024-726900	CON 6F REC/CRP AMP 1-350241-9	1.000
**3	024-730800	CON 15 PIN 1-350237-9	1.000
**3	025-735200	SW/SL 4PL2PS GF-642-0006A C	2.000
**3	102-700200	MOVISTOR/V130LA10A	2.000
**3	114-701800	FLTR/5 AMP 6HS CORCOM	1.000
**3	011-901001	BRKT/2090 TRANSFORMER SUPPORT	2.000
**3	019-708700	XFORMER/DJ346	1.000
**3	024-711500	CON 5F CIR/SOL SWC 61HA5F	1.000
**3	024-721400	CON 1F CXL/SOL APH 31-010	2.000
**3	024-724600	CON 10F REC/IDP MMM 3473-6000	1.000
**3	060-703600	POST/BINDING 7/16" #110 HH	1.000
**3	070-701100	FUSE/348870 BODY BLACK	1.000
**3	070-701200	FUSE/348007 CAP	1.000
*2	017-704200	LABEL/HI VOLT/2090	2.000
*2	026-713800	POT 250K PCB .25W EY5705 CT	1.000
1	695-000300	2090 MAIN FRAME ACCESSORY KIT	1.000
*2	024-711600	CON 5M CIR/SOL SWC 12CL5M	1.000
*2	085-703800	CORD/A/C/LINE P2392 SW	1.000

2090-3B FLOPPY DISK

LEVEL	PART NO.	DESCRIPTION	QUANTITY
1	415-005700	► 2090 DISK BD	1.000
*2	000-901906	PCB/2090 DISK MAIN BD	1.000
*2	134-705303	IC/7404N HEX INVERTER	1.000
*2	134-712803	IC/74LS00N 2-NAND	4.000
*2	134-713203	IC/74LS74N FLIP-FLOP	8.000
*2	134-712903	IC/74LS04N HEX INVERTER	1.000
*2	134-716903	IC/74148N PRIORITY ENCODER	1.000
*2	134-717503	IC/74S138N DEMULTIPLEXER	1.000
*2	134-718103	IC/74LS191N COUNTER	1.000
*2	134-720403	IC/74LS02N 2-NOR	3.000
*2	134-720503	IC/74LS174N REGISTER	2.000
*2	134-720803	IC/74LS10N 3-NAND	1.000
*2	134-722005	IC/4040B CMOS 12 STAGE BIN CO	1.000
*2	134-722403	IC/74LS139N MULTIPLEXER	1.000
*2	134-725303	IC/7406N O/C HEX INVERTER	2.000
*2	134-730903	IC/74LS367N HEX DRIVER	4.000
*2	134-731503	IC/74LS259N ADDRESSABLE LATCH	3.000
*2	134-731603	IC/74LS251N MULTIPLEXER	1.000
*2	134-731803	IC/74LS155N DEMULTIPLEXER	1.000
*2	134-731903	IC/74LS395N SHIFT REGISTER	4.000
*2	134-732003	IC/74LS92N COUNTER	1.000
*2	134-731603	IC/74LS251N MULTIPLEXER	3.000
*2	019-707800	INDUCT/NYTRONICS/WEE 0.47UH	1.000
*2	022-719800	DIO TRRF 1N4152 30V .5W G FC	1.000
*2	023-029200	CAP 22MF 15V 10% TANT G KE	3.000
*2	023-700100	CAP 100PF 500V 05% MICA R AR	2.000
*2	023-700300	CAP 500PF 500V 05% MICA R AR	1.000
*2	023-702400	CAP .01MF 100V 20% CERM R SP	1.000
*2	023-715100	CAP .03MF 50V CERM R AR	6.000
*2	023-718000	CAP 390PF 50V 05% MICA R AR	1.000
*2	024-715900	CON 16F DIP/SOL 641262-3 AM	1.000
*2	024-733200	CON 64 HDR/SOL AMP 9-350259-1	1.000
*2	024-734400	CON 18F DIP/SOL 641263-3 AM	4.000
*2	024-738500	CON 1M HDR/SOL CAD72SP100 CA	34.000
*2	024-740700	CON 20F DIP/SOL 641264-3 AM	3.000
*2	026-705800	POT 10K PCB .7W 3006P1103 BR	1.000
*2	100-700700	RES NET/CSP10E-01-502J	2.000
*2	134-731403	IC/TIM9904A (74LS362) CLK T	1.000
*2	134-731700	IC/2111A-4N 256 X 4 STATIC RA	4.000
*2	134-732103	IC/96L02 MONOSTABLE FC	1.000
*2	191-709000	CRYS/12 MHZ .05% HC25	1.000
*2	201-010000	RES 10 01% 1/8W PRE	4.000
*2	201-100000	RES 100 01% 1/8W PRE	1.000
*2	201-100100	RES 1K 01% 1/8W PRE	3.000
*2	201-100200	RES 10K 01% 1/8W PRE	5.000
*2	201-124200	RES 12.4K 01% 1/8W PRE	1.000
*2	201-150000	RES 150 01% 1/8W PRE	2.000

2090-3B FLOPPY DISK

LEVEL	PART NO.	DESCRIPTION	QUANTITY
*2	201-200200	RES 20K C1% 1/8W PRE	1.000
*2	201-226200	RES 22.6K C1% 1/8W PRE	1.000
*2	201-274000	RES 274 C1% 1/8W PRE	1.000
*2	201-332000	RES 332 C1% 1/8W PRE	7.000
*2	201-475100	RES 4.75K C1% 1/8W PRE	2.000
*2	015-701500	PIN 1F 22-30GA 61173-1 TIN AM	4.000
*2	024-703600	CON 4F REC/CRP 1-480424-0 AM	1.000
*2	024-734100	CON 64F DIP/SOL ICN649S5 RO	1.000
*2	024-733500	CON 1M HOR/SOL CAD72SP100 CA	34.000
*2	025-739600	SW/PB 1P1TM MDP AU05 IE	1.000
*2	134-731300	IC/9900JL PROCESSOR	1.000
*2	134-728803	IC/18S42 PROM (74S472)	2.000
*2	095-709100	CBL/34 COND/AP 922523-34-99-1	1.000
1	465-001500	2090 DISK FRONT PANEL	1.000
*2	020-900004	CHAS/DISK CIRCUIT BOARD	1.000
*2	034-715500	GUIDE/SCAN8E 11633-1	4.000
*2	222-009000	P.E. 2090 DISK DRIVE 48TPI	1.000
*2	068-727807	PAN/2090 DISK FRONT	1.000
*2	068-740902	PAN/2090 DISK FRONT SUB	1.000
*2	000-902002	PC3/2090 DISK LED	1.000
*2	022-722000	DIO LEUR HLMP3200 1.5V 10MA H	4.000
*2	022-722100	DIO LEDG HLMP3553 1.6V 20MA H	8.000
*2	085-709000	CBL/34 COND/AP 922522-34-99-0	1.000
*2	011-901500	BRKT/2090 DISK RL	1.000
*2	025-715500	SW/RO PA166-C11-GAA CL	1.000
*2	025-718100	SW/LE 2PL2PS 7215J61GE CE	2.000
*2	025-719600	SW/LE 1PL2PS 7101J61 CE	9.000
*2	045-703301	KN03/KX-12322 1/AH	1.000
1	475-001500	2090-3 FINAL ASSEMBLY	1.000
*2	475-005900	2090 BLANKING BOARD COVER	1.000
**3	042-711401	COVER/2090 BLANKING #1	1.000
**4	042-708601	COVER/BLANK	1.000
**3	042-712600	COVER/2090 BLANKING #2	1.000
**4	042-708601	COVER/BLANK	1.000
*2	475-006000	3 BAY FRAME BOTTOM COVER ASSY	1.000
**3	042-710904	COVER/BOTTOM 2090/4090	1.000
**3	051-702600	FOOT/757-R LAVELLE	2.000
**3	268-704300	MECH MISC/TILT STAND/14"	1.000
*2	477-001700	BEZEL/GRETICULE ASSEMBLY	1.000
**3	164-700501	GRAT/BLUE	1.000
**3	268-703001	BEZEL/2090 SERIES	1.000
*2	011-724501	BRKT/2090 FRAME GROUND	1.000
*2	017-704200	LABEL/HI VOLT/2090	6.000
*2	017-900400	LABEL/2090-III	1.000
*2	042-712500	COVER/LINE VOLTAGE	1.000
*2	042-712803	COVER/2090-3 L SIDE	2.000
*2	051-700100	BUMPER/SJ5514	2.000

2090-3B FLOPPY DISK

LEVEL	PART NO.	DESCRIPTION	QUANTITY
1	675-000600	➤ 2090 BAY 3 WITH W/O I/O BD	1.000
*2	415-009000	➤ 2090 DISK W/O I/O BD	1.000
***3	405-002200	2090 DISK W/O I/O CABLE	1.000
****4	015-706301	PIN M 18-26 GA TIN	5.000
****4	015-706401	PIN F 18-26GA 350665-1 TIN AM	6.000
****4	024-726900	CON 6F REC/CRP AMP 1-350241-9	1.000
****4	024-727000	CON 6M REC/CRP AMP 1-350234-9	1.000
***3	000-902702	PCB/2090 DISK W/O I/O	1.000
***3	134-730903	IC/74LS367N HEX DRIVER	6.000
***3	134-712803	IC/74LS00N 2-NAND	1.000
***3	134-713203	IC/74LS74N FLIP-FLOP	1.000
***3	023-702400	CAP .01MF 100V 20% CERM R SP	3.000
***3	023-711100	CAP 4.7MF 10V 10% TANT G KE	1.000
***3	023-715100	CAP .05MF 50V CERM R AR	2.000
***3	100-700700	RES NET/CSP10E-01-502J	1.000
***3	201-010000	RES 10 01% 1/8W PRE	3.000
***3	024-738500	CON 1M HDR/SOL CAD72SP100 CA	50.000
***3	085-707801	CBL/50 COND/AP 922539-50-99-1	1.000
***3	051-900300	BUMPER/3091 PROCESSOR/FOAM	1.000
*2	675-000400	➤ 3RD BAY FRAME WITH SUPPLY	1.000
***3	475-006100	2090 BAY 3 FRAME	1.000
****4	034-714804	RAIL/2090 SIDE	1.000
*****5	112-700400	EXTRUSION/RAIL SIDE	1.000
****4	034-715403	RAIL/PLUG-IN	1.000
*****5	112-700704	EXTRUSION/PLUG-IN RAIL	1.000
****4	034-900001	RAIL/2090-2 TO 2090-3 CONNECT	4.000
*****5	112-700500	EXTRUSION/RAIL	1.000
****4	129-900102	FRAME/END 2090/4090 ROUNDED	2.000
*****5	129-900500	FRAME/END 2090/4090 PAINTED	1.000
*****6	129-702100	FRAME/END 2090/4090 CASTING	1.000
***3	665-000300	➤ 2090 BAY 3 REAR PANEL ASSY	1.000
****4	415-005500	➤ 2090 POWER SUPPLY BD BAY 3	1.000
*****5	405-001900	2090 3RD BAY PWR SUP CABLE	1.000
*****6	015-706401	PIN F 18-26GA 350665-1 TIN AM	6.000
*****6	024-726900	CON 6F REC/CRP AMP 1-350241-9	1.000
*****5	000-902104	PCB/2090 BAY 3 POWER SUPPLY	1.000
*****5	006-701400	WASH/NO J TEFLON	4.000
*****5	011-721900	BRKT/THIRD BAY P.S./2090.3	2.000
*****5	021-708900	TRN NPN 2N5301 40V 200W D MO	2.000
*****5	022-700900	DIO RECT 1N4004 400V 1A S TX	6.000
*****5	022-707100	DIO TRRM 3SM2 200V 2A G SE	4.000
*****5	023-700200	CAP 1000PF 100V 05% MICA R AR	2.000
*****5	023-704700	CAP 1MF 35V 10% TANT G KE	1.000
*****5	023-711000	CAP 22MF 35V 10% TANT G KE	4.000
*****5	023-714000	CAP 10JMF 50V ALUM G SP	1.000
*****5	023-716200	CAP 8800MF 25V ALUM S CA	2.000
*****5	023-717500	CAP 28KMF 15V ALUM S ME	1.000

2090-3B FLOPPY DISK

LEVEL	PART NO.	DESCRIPTION	QUANTITY
*****5	024-719500	CON 9M HDR/SOL AMP 9-350262-1	1.000
*****5	026-705400	POT 500 PCB .7W 3006P1501 BR	2.000
*****5	032-700800	INSUL/DIODE	2.000
*****5	098-704700	HT SNK/THM60068-2-2	1.000
*****5	106-702700	RES .36 5% 2W	1.000
*****5	106-706100	RES .19 5% 5W	1.000
*****5	121-702400	REG -1.2T0-37V 1.5A 337T E NA	1.000
*****5	121-702600	REG 2T038V .15A LAS1000 A LA	2.000
*****5	201-124000	RES 124 01% 1/8W PRE	1.000
*****5	201-150000	RES 150 01% 1/8W PRE	1.000
*****5	201-200100	RES 2K 01% 1/8W PRE	1.000
*****5	201-221100	RES 2.21K 01% 1/8W PRE	2.000
*****5	201-274000	RES 274 01% 1/8W PRE	2.000
*****5	201-301000	RES 301 01% 1/8W PRE	2.000
*****5	201-365000	RES 365 01% 1/8W PRE	1.000
*****5	201-604000	RES 604 01% 1/8W PRE	2.000
*****5	201-681900	RES 68.1 01% 1/8W PRE	1.000
*****4	445-000500	➤ 2090 TRANSFORMER BAY 3	1.000
*****5	015-706301	PIN M 18-26 GA TIN	6.000
*****5	015-706401	PIN F 18-26GA 350665-1 TIN AM	6.000
*****5	019-707700	XFORMER/DG-447 FOREST	1.000
*****5	024-719300	CON 9F REC/CRP AMP 1-350242-9	1.000
*****5	024-727000	CON 6M REC/CRP AMP 1-350234-9	1.000
*****4	068-728005	PAN/2090 REAR BAY 3	1.000
*****4	002-706500	PLATE/I/O COVER	1.000
1	675-2090-3	➤ 2090-3 UNIT ASSEMBLY	1.000
*2	415-004900	➤ 2090 MAIN FRAME 80	1.000
***3	000-900304	PCB/2090 MAIN FRAME	1.000
***3	134-712903	IC/74LS04N HEX INVERTER	1.000
***3	134-718503	IC/74S182N CARRY LOCKAHEAD	1.000
***3	134-705703	IC/741CP	2.000
***3	134-713203	IC/74LS74N FLIP-FLOP	6.000
***3	134-724903	IC/74S169 COUNTER	3.000
***3	134-730903	IC/74LS367N HEX DRIVER	6.000
***3	134-731003	IC/74LS138N MULTIPLEXER	3.000
***3	134-731603	IC/74LS251N MULTIPLEXER	2.000
***3	134-732103	IC/96LG2 MONOSTABLE FC	1.000
***3	134-720503	IC/74LS174N REGISTER	4.000
***3	134-713703	IC/74LS253N MULTIPLEXER	1.000
***3	013-701100	CONTACT/MALE CONTACT JUMPER	1.000
***3	021-702200	TRN NPN 2N3903 40V 1W B MO	1.000
***3	021-702500	TRN NPN 2N3302 36V .36W A MO	2.000
***3	022-701100	DIO GERM 1N270 80V .2A G IT	5.000
***3	023-701600	CAP 2.2MF 20V 10% TANT G KE	2.000
***3	023-702400	CAP .01MF 100V 20% CERM R SP	2.000
***3	023-711100	CAP 4.7MF 10V 10% TANT G KE	9.000
***3	023-711300	CAP .1MF 250V 10% PLYE R SE	7.000

2090-3B FLOPPY DISK

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	024-715900	CON 16F DIP/SOL 641262-3 AM	1.000
**3	024-721300	CON 24F DIP/SOL 641266-3 AM	2.000
**3	024-724800	CON 40F DIP/SOL 641268-3 AM	3.000
**3	024-737200	CON 56PIN/AMP 67907-3	1.000
**3	024-738500	CON 1M HDR/SOL CAD72SP100 CA	86.000
**3	024-740700	CON 20F DIP/SOL 641264-3 AM	5.000
**3	024-759900	CON 1F HRD/SOL SS-120-T-2 SAM	4.000
**3	026-705500	POT 1K PCB .7W 3006P1102 BR	2.000
**3	100-700700	RES NET/CSP10E-01-502J	3.000
**3	121-700900	REG -15V .35A 79M15AUC E FC	1.000
**3	134-724500	IC/DAC83-CBI-V 12BIT DAC	2.000
**3	134-764100	IC/2901A 4 BIT SLICE PROCES	3.000
**3	201-100000	RES 100 01% 1/8W PRE	1.000
**3	201-100200	RES 10K 01% 1/8W PRE	1.000
**3	201-100300	RES 100K 01% 1/8W PRE	1.000
**3	201-150000	RES 150 01% 1/8W PRE	1.000
**3	201-392000	RES 392 01% 1/8W PRE	6.000
**3	201-475100	RES 4.75K 01% 1/8W PRE	11.000
**3	201-487200	RES 48.7K 01% 1/8W PRE	1.000
**3	134-717403	IC/14S10 PROM (74S287)	1.000
**3	134-728803	IC/16S42 PROM (74S472)	5.000
*2	415-005000	2090 BLANKING BD	1.000
**3	000-900203	PCB/2090 BLANKING	1.000
**3	021-700600	TRN NPN 2N2484 60V .36W A MO	4.000
**3	021-702200	TRN NPN 2N3903 40V 1W B MO	1.000
**3	021-711100	TRN NPN MPSU10 300V 1W E MO	4.000
**3	021-712100	TRN VMOS BS250 45V .8W B ITT	1.000
**3	022-700800	DIO RECT 1N4004 400V 1A G TX	1.000
**3	022-703000	DIO ZENR 1N5232 5.6V .5W G MO	1.000
**3	022-703200	DIO ZENR 1N5256 30V .5W G MO	1.000
**3	022-719800	DIO TRRF 1N4152 30V .5W G FC	1.000
**3	023-702400	CAP .01MF 100V 20% CERM R SP	2.000
**3	023-707500	CAP 6.8MF 35V 10% TANT G KE	1.000
**3	023-711100	CAP 4.7MF 10V 10% TANT G KE	1.000
**3	023-711300	CAP .1MF 250V 10% PLYE R SE	6.000
**3	023-719400	CAP .01MF 3000V 20% CERM R SP	2.000
**3	026-705700	POT 5K PCB .7W 3006P1502 BR	5.000
**3	026-706200	POT 50K PCB .7W 3006P1503 BR	1.000
**3	026-706400	POT 1M PCB .7W 3006P1105 BR	1.000
**3	052-705100	LAMP/NEON 72V 1.3MA	4.000
**3	105-022300	RES 22K 05% 2W	2.000
**3	105-027300	RES 27K 05% 2W	2.000
**3	108-047100	RES 470 05% 1/4W	2.000
**3	134-729403	IC/6N137	1.000
**3	201-100100	RES 1K 01% 1/8W PRE	1.000
**3	201-100400	RES 1M 01% 1/8W PRE	1.000
**3	201-127300	RES 127K 01% 1/8W PRE	1.000

2090-3B FLOPPY DISK

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	201-143200	RES 14.3K 01% 1/8W PRE	1.000
**3	201-152200	RES 15.2K 01% 1/8W PRE	1.000
**3	201-178000	RES 178 01% 1/8W PRE	1.000
**3	201-221300	RES 221K 01% 1/8W PRE	1.000
**3	201-226200	RES 22.6K 01% 1/8W PRE	3.000
**3	201-237200	RES 23.7K 01% 1/8W PRE	1.000
**3	201-243200	RES 24.3K 01% 1/8W PRE	1.000
**3	201-249100	RES 2.49K 01% 1/8W PRE	1.000
**3	201-280200	RES 28K 01% 1/8W PRE	1.000
**3	201-475100	RES 4.75K 01% 1/8W PRE	1.000
**3	201-523200	RES 52.3K 01% 1/8W PRE	1.000
**3	201-665200	RES 66.5K 01% 1/8W PRE	1.000
**3	201-976200	RES 97.6K 01% 1/8W PRE	1.000
**3	202-107300	RES 107K 01% 1/4W PRE	1.000
**3	202-200300	RES 200K 01% 1/4W PRE	4.000
**3	202-634200	RES 63.4K 01% 1/4W PRE	1.000
**3	202-787200	RES 78.7K 01% 1/4W PRE	1.000
**3	024-724600	CON 10F REC/IDP MMM 3473-5000	1.000
**3	024-734900	CON 8M HDR/SOL BRG 65532-408	1.000
**3	024-735900	CON 10PIN/3M3474.0001T	1.000
**3	405-002000	2090 BLANKING BOARD CABLE	1.000
**4	015-706401	PIN F 18-26GA 35C665-1 TIN AM	8.000
**4	024-719900	CON 15F REC/CRP AMP 1-350244-	1.000
*2	415-007000	►2090 4K MEMORY RD	1.000
**3	000-900403	PCB/2090 MEMORY 4K	1.000
**3	134-723903	IC/74LS257 MULTIPLEXER	3.000
**3	134-730903	IC/74LS367N HEX DRIVER	2.000
**3	134-736903	IC/74LS241N OCTAL BUFFER	3.000
**3	134-754300	IC/2147 4KX1 RAM	13.000
**3	134-723003	IC/74LS14N HEX INVERTER	1.000
**3	134-723903	IC/74LS257 MULTIPLEXER	1.000
**3	134-736803	IC/74LS374N REGISTER	4.000
**3	134-730903	IC/74LS367N HEX DRIVER	1.000
**3	023-702400	CAP .01MF 100V 20% CERM P SP	1.000
**3	023-711100	CAP 4.7MF 10V 10% TANT G KE	4.000
**3	024-737200	CON 56PIN/AMP 67907-3	1.000
**3	100-700700	RES NET/CSP10E-01-502J	1.000
**3	108-047100	RES 470 05% 1/4W	1.000
*2	415-007100	►2090-3 INNER CONN 80 4K	1.000
**3	000-900500	PCB/INTERFACE 80/2090	1.000
**3	024-725000	CON 12M HDR/SOL AMP 9-350265-	1.000
**3	085-707900	CBL/50 COND/DAISY CHAIN	1.000
**3	085-707901	CBL/50 COND 23" HDR/PC/EDG	1.000
*2	415-011500	►2090 POWER SUP REG 80 VER. II	1.000
**3	000-900008	PCB/2090 REGULATOR VER. II	1.000
**3	019-706000	XFORMER/ITA-1552-11	1.000
**3	022-700800	DIO RECT 1N4004 400V 1A G TX	6.000

2090-3B FLOPPY DISK

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	022-705100	DIO ZENR 1N5268 82V .5W G MO	1.000
**3	022-706900	DIO TRRF FM50 5KV .01A G SE	2.000
**3	022-707000	DIO TRRF S2F 200V 1A G SE	5.000
**3	022-711900	DIO BRID VE48X 400V 1A C VA	1.000
**3	023-029200	CAP 22MF 15V 10% TANT G KE	1.000
**3	023-704700	CAP 1MF 35V 10% TANT G KE	3.000
**3	023-707300	CAP 1MF 200V 10% MYLR G TR	2.000
**3	023-711200	CAP 220MF 10V 10% TANT G KE	1.000
**3	023-719400	CAP .01MF 3000V 20% CERM R SP	5.000
**3	023-719700	CAP 2.2MF 50V 10% TANT G KE	3.000
**3	024-719600	CON 15M HDR/SOL 9-350268-1 AM	1.000
**3	024-725000	CON 12M HDR/SOL AMP 9-350265-	1.000
**3	024-784100	CON 20M HDR/SOL 9-350272-1 AM	1.000
**3	026-705400	POT 500 PCB .7W 3006P1501 BR	5.000
**3	026-706000	POT 20K PCB .7W 3006P1203 BR	1.000
**3	101-010500	RES 1M 10% 1/2W	2.000
**3	101-022500	RES 2.2M 10% 1/2W	2.000
**3	105-012100	RES 120 05% 2W	1.000
**3	106-703600	RES 200M 10% 1W	1.000
**3	108-015300	RES 15K 05% 1/4W	1.000
**3	201-100000	RES 100 01% 1/8W PRE	1.000
**3	201-100200	RES 10K 01% 1/8W PRE	1.000
**3	201-100300	RES 100K 01% 1/8W PRE	1.000
**3	201-124000	RES 124 01% 1/8W PRE	2.000
**3	201-200100	RES 2K 01% 1/8W PRE	1.000
**3	201-200300	RES 200K 01% 1/8W PRE	1.000
**3	201-221000	RES 221 01% 1/8W PRE	2.000
**3	201-221100	RES 2.21K 01% 1/8W PRE	1.000
**3	201-249000	RES 249 01% 1/8W PRE	2.000
**3	201-249100	RES 2.49K 01% 1/8W PRE	1.000
**3	201-301000	RES 301 01% 1/8W PRE	1.000
**3	201-332100	RES 3.32K 01% 1/8W PRE	1.000
**3	201-499100	RES 4.99K 01% 1/8W PRE	2.000
**3	201-619200	RES 61.9K 01% 1/8W PRE	1.000
**3	201-825000	RES 825 01% 1/8W PRE	1.000
**3	006-701400	WASH/NO J TEFLON	2.000
**3	011-720900	BRKT/INTEN. FOCUS/2090	1.000
**3	011-721000	BRKT/PWR SPLY MTG/2090	2.000
**3	019-707006	XFORMER/HV WINDING 2090/4090	1.000
**3	021-708800	TRN NPN 2N5301 40V 200W D MO	1.000
**3	021-713500	TRN NPN SJE1716 60V 75W E MO	2.000
**3	022-718800	DIO ZENR 1N4736 6.8V 1W G MO	1.000
**3	023-700200	CAP 1000PF 100V 05% MICA R AR	1.000
**3	023-706900	CAP 50MF 50V ALUM G SP	1.000
**3	023-713500	CAP 4.7MF 50V 10% TANT G KE	2.000
**3	023-719700	CAP 2.2MF 50V 10% TANT G KE	2.000
**3	026-706500	POT 500K PML 38592A31504A BR	2.000

2090-3B FLOPPY DISK

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	032-700800	INSUL/DICDE	1.000
**3	032-700900	INSUL/DIODE	7.000
**3	067-700300	CORE/E1960-S-298A	2.000
**3	070-703400	FUSE/.75 A/276.750 LITTLEFUSE	1.000
**3	079-700300	THERMOS/PTH487A01BE222TS MU	1.000
**3	098-700200	HT SNK/207CB W	1.000
**3	098-704000	HT SNK/EXPL P.S.	1.000
**3	098-704302	HT SNK/2090 REGULATOR VER. II	1.000
**3	103-027000	RES 27 05% 1W	1.000
**3	106-703500	RES .1 05% 10W	1.000
**3	121-702100	REG 5 TO 30V 1A 78GU1C E FC	1.000
**3	121-702300	REG 1.2 TO 37V 1.5A 317T E NA	2.000
**3	121-702400	REG -1.2TO-37V 1.5A 337T E NA	2.000
**3	121-702600	REG 2TO38V .15A LAS1000 A LA	1.000
**3	201-143200	RES 14.3K 01% 1/8W PRE	1.000
**3	201-274000	RES 274 01% 1/8W PRE	1.000
**3	201-365000	RES 365 01% 1/8W PRE	1.000
**3	201-604000	RES 604 01% 1/8W PRE	1.000
**3	011-723103	BRKT/HI VOLT XFORMER/EXPL	1.000
**3	017-704200	LABEL/HI VOLT/2090	1.000
**3	405-001800	2090 REGULATOR BOARD CABLE	1.000
***4	015-706401	PIN F 18-26GA 350665-1 TIN AM	30.000
***4	024-721900	CON 20F REC/CRP AMP 1-350245-9 AM	1.000
***4	024-722500	CON 12F REC/CRP AMP 1-350243-	1.000
***4	024-726900	CON 6F REC/CRP AMP 1-350241-9	1.000
**2	465-001300	2090 REAR PANEL BAY 1	1.000
**3	415-011700	2090 CAPACITOR 80 VER. II	1.000
***4	000-900106	PCB/CAP 80/EXP SERIES	1.000
***4	022-705300	DIO BRID VS647 600V 2A J VA	2.000
***4	023-716200	CAP 8800MF 25V ALUM S CA	2.000
***4	023-717500	CAP 28KMF 15V ALUM S ME	2.000
***4	023-719000	CAP 2000MF 50V ALUM S CA	2.000
***4	405-002100	2090 CAPACITOR BOARD CABLE	1.000
***5	015-706401	PIN F 18-26GA 350665-1 TIN AM	23.000
***5	024-719900	CON 15F REC/CRP AMP 1-350244-	1.000
***5	024-722500	CON 12F REC/CRP AMP 1-350243-	1.000
***5	085-702400	CORD/428-056 ROTRON	1.000
**3	022-718000	DIO RECT SCPA-2 200V8.5A Q SE	1.000
**3	068-726708	PAN/2090 REAR BAY 1	1.000
**3	072-700100	FAN/WISPER WR2A1	1.000
**3	114-702600	FLTR/FAN/PAMOTER#5502	1.000
**2	465-001400	2090 FRONT PANEL	1.000
**3	068-726906	PAN/2090 FRONT BAY 2	1.000
**3	068-741002	PAN/2090 FRONT SUB	1.000
**3	015-706301	PIN M 18-26 GA TIN	4.000
**3	024-721700	CON 4M REC/CRP AMP 1-350233-9	1.000
**3	010-701200	NUT/80-7013-19 DECOR. LICO	1.000

2090-3B FLOPPY DISK

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	011-723001	BRKT/2090 STRAIN RELIEF	1.000
**3	017-704600	LABEL/LOGO/JEWEL	1.000
**3	022-722100	DIO LEDG HLMP3553 1.6V 20MA H	1.000
**3	025-715500	SW/RO PA166-011-0AA CL	2.000
**3	025-718100	SW/LE 2PL2PS 7215J61GE C&	2.000
**3	025-718500	SW/LB 2P2T	1.000
**3	025-727100	SW/RO 2PL11PS D45773-SK-1 S	1.000
**3	025-727200	SW/P8 SPDT 8121-J82 C&	1.000
**3	025-734300	SW/RO 1PL2-7PS PA166-025 CL	1.000
**3	025-739800	SW/TO 1P2T 7101P3/7099-2 BLAC	2.000
**3	045-703301	KN08/KX-12322 1/8"	4.000
**3	085-900000	CBL/20 COND/922511-26-99-13 A	1.000
*2	475-001700	2090-3 CABINET ASSEMBLY	1.000
**3	034-714702	RAIL/2090 TOP CENTER	1.000
***4	112-700300	EXTRUSION/RAIL SIDE	1.000
**3	034-714804	RAIL/2090 SIDE	1.000
***4	112-700400	EXTRUSION/RAIL SIDE	1.000
**3	034-714903	RAIL/2090-2 CONNECTOR	4.000
***4	112-700500	EXTRUSION/RAIL	1.000
**3	034-715302	RAIL/2090 CORNER SUPPORT	1.000
**3	034-715403	RAIL/PLUG-IN	1.000
***4	112-700704	EXTRUSION/PLUG-IN RAIL	1.000
**3	034-900001	RAIL/2090-2 TO 2090-3 CONNECT	4.000
***4	112-700500	EXTRUSION/RAIL	1.000
**3	044-704308	SHIELD/2090 CRT	1.000
**3	049-700100	HANDLE/VIN 1776-354-324 (.156	1.000
**3	129-702101	FRAME/END 2090/4090 SQUARE	2.000
***4	129-900500	FRAME/END 2090/4090 PAINTED	1.000
***5	129-702100	FRAME/END 2090/4090 CASTING	1.000
**3	129-900102	FRAME/END 2090/4090 ROUNDED	2.000
***4	129-900500	FRAME/END 2090/4090 PAINTED	1.000
***5	129-702100	FRAME/END 2090/4090 CASTING	1.000
**3	015-701600	PIN F 26-30GA 86015-3 TIN AM	2.000
**3	024-740300	CON AMP 87499-3/2PIN	1.000
**3	027-700600	CRT/55261 D14-261GH AM	1.000
**3	084-701002	CHAN/2090 FRAME	2.000
***4	112-702100	EXTRUSION/SUPPORT CHANNEL	1.000
**3	084-900101	CHAN/2090 FRAME/SHORT	2.000
**3	051-700100	BUMPER/SJ5514	2.000
**3	051-700300	BUMPER/SJ-5018 1/4" BLACK MM	7.000
*2	665-000200	2090 BAY 2 REAR PANEL ASSY	1.000
**3	068-726611	PAN/2090 REAR BAY 2	1.000
**3	070-703000	FUSE/SLO BLO 3AG3	1.000
**3	000-906502	PCB/2090 VOLTAGE SELECT	1.000
**3	015-702600	PIN M 24-26GA 350185-1 TIN AM	2.000
**3	015-702700	PIN M 18-26GA 350036-1 TIN AM	9.000
**3	024-721600	CON 4F REC/CRP AMP 1-350240-9	1.000

2090-3B FLOPPY DISK

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	024-726900	CON 6F REC/CRP AMP 1-350241-9	1.000
**3	024-730900	CON 15 PIN 1-350237-9	1.000
**3	025-735200	SW/SL 4PL2PS GF-642-0006A C	2.000
**3	102-700200	MOVISTOR/V130LA10A	2.000
**3	114-701800	FLTR/6 AMP 6H9 CORCOM	1.000
**3	011-901001	BRKT/2090 TRANSFORMER SUPPORT	2.000
**3	019-708700	XFORMER/DJ346	1.000
**3	024-711500	CON 5F CIR/SOL SWC 61HASF	1.000
**3	024-721400	CON 1F CXL/SOL APH 31-010	2.000
**3	024-724600	CON 10F REC/IDP MMM 3473-6000	1.000
**3	060-703600	POST/BINDING 7/16" #110 HH	1.000
**3	070-701100	FUSE/348870 BODY BLACK	1.000
**3	070-701200	FUSE/348007 CAP	1.000
*2	017-704200	LABEL/HI VOLT/2090	2.000
*2	026-713300	POT 250K PCB .25W EY5705 CT	1.000
1	095-000300	2090 MAIN FRAME ACCESSORY KIT	1.000
*2	024-711600	CON 5M CIR/SOL SWC 12CL5M	1.000
*2	085-703800	CORD/A/C/LINE P2392 SW	1.000
1	695-000400	2090 DISK ACCESSORY KIT	1.000
*2	270-700800	DISK/DYSAN 104/1	2.000
*2	270-705200	DISK/1510 DEN MINI 104/10 DYS	2.000

2090-3C I/O & DISK

LEVEL	PART NO.	DESCRIPTION	QUANTITY
1	415-075700	►2090 DISK BD	1.000
*2	000-901906	PCB/2090 DISK MAIN BD	1.000
*2	134-705303	IC/7404N HEX INVERTER	1.000
*2	134-712803	IC/74LS00N 2-NAND	4.000
*2	134-713203	IC/74LS74N FLIP-FLOP	8.000
*2	134-712903	IC/74LS04N HEX INVERTER	1.000
*2	134-716903	IC/74148N PRIORITY ENCODER	1.000
*2	134-717503	IC/74S138N DEMULTIPLEXER	1.000
*2	134-718103	IC/74LS191N COUNTER	1.000
*2	134-720403	IC/74LS02N 2-NOR	3.000
*2	134-720503	IC/74LS174N REGISTER	2.000
*2	134-720803	IC/74LS10N 3-NAND	1.000
*2	134-722005	IC/40408 CMOS 12 STAGE BIN CO	1.000
*2	134-722403	IC/74LS139N MULTIPLEXER	1.000
*2	134-725303	IC/7406N O/C HEX INVERTER	2.000
*2	134-730903	IC/74LS367N HEX DRIVER	4.000
*2	134-731503	IC/74LS259N ADDRESSABLE LATCH	3.000
*2	134-731603	IC/74LS251N MULTIPLEXER	1.000
*2	134-731803	IC/74LS155N DEMULTIPLEXER	1.000
*2	134-731903	IC/74LS395N SHIFT REGISTER	4.000
*2	134-732003	IC/74LS92N COUNTER	1.000
*2	134-731603	IC/74LS251N MULTIPLEXER	3.000
*2	019-707800	INDUCT/NYTRONICS/WEE 0.47UH	1.000
*2	022-719800	DIO TRRF 1N4152 30V .5W G FC	1.000
*2	023-029200	CAP 22MF 15V 10% TANT G KE	3.000
*2	023-700100	CAP 100FF 500V 05% MICA R AR	2.000
*2	023-700300	CAP 500PF 500V 05% MICA R AR	1.000
*2	023-702400	CAP .01MF 100V 20% CERM R SP	1.000
*2	023-715100	CAP .05MF 50V CERM R AR	6.000
*2	023-718000	CAP 390PF 50V 05% MICA R AR	1.000
*2	024-715900	CON 16F DIP/SOL 641262-3 AM	1.000
*2	024-733200	CON 6M HDR/SOL AMP 9-350259-1	1.000
*2	024-734400	CON 18F DIP/SOL 641263-3 AM	4.000
*2	024-738500	CON 1M HDR/SOL CAD72SP100 CA	34.000
*2	024-740700	CON 20F DIP/SOL 641264-3 AM	3.000
*2	026-705800	POT 10K PCB .7W 3006P1103 RR	1.000
*2	100-700700	RES NET/CSP10E-01-502J	2.000
*2	134-731403	IC/TIM9904A (74LS362) CLK T	1.000
*2	134-731700	IC/2111A-4N 256 X 4 STATIC RA	4.000
*2	134-732103	IC/96L02 MONOSTABLE FC	1.000
*2	191-709000	CRYS/12 MHZ .05% HC25	1.000
*2	201-010000	RES 10 01% 1/8W PRE	4.000
*2	201-100000	RES 100 01% 1/8W PRE	1.000
*2	201-100100	RES 1K 01% 1/8W PRE	3.000
*2	201-100200	RES 10K 01% 1/8W PRE	5.000
*2	201-124200	RES 12.4K 01% 1/8W PRE	1.000
*2	201-150000	RES 150 01% 1/8W PRE	2.000

2090-3C I/O & DISK

LEVEL	PART NO.	DESCRIPTION	QUANTITY
*2	201-200200	RES 20K 01% 1/8W PRE	1.000
*2	201-226200	RES 22.6K 01% 1/8W PRE	1.000
*2	201-274000	RES 274 01% 1/8W PRE	1.000
*2	201-332000	RES 332 01% 1/8W PRE	7.000
*2	201-475100	RES 4.75K 01% 1/8W PRE	2.000
*2	015-701500	PIN 1F 22-30GA 61173-1 TIN AM	4.000
*2	024-703600	CON 4F REC/CPP 1-430424-0 AM	1.000
*2	024-734100	CON 64F DIP/SOL ICN649S5 RO	1.000
*2	024-738500	CON 1M HDR/SCL CAD72SP100 CA	34.000
*2	025-739600	SW/PB 1P1TM MDP AU05 IE	1.000
*2	134-731300	IC/9900JL PROCESSOR	1.000
*2	134-728803	IC/16S42 PROM (74S472)	2.000
*2	085-709100	CBL/34 COND/AP 922523-34-99-1	1.000
1	465-001500	2090 DISK FRONT PANEL	1.000
*2	020-900004	CHAS/DISK CIRCUIT BOARD	1.000
*2	034-715500	GUIDE/SCANBE 11633-1	4.000
*2	222-009000	P.E. 2090 DISK DRIVE 48TPI	1.000
*2	068-727807	PAN/2090 DISK FRONT	1.000
*2	068-740912	PAN/2090 DISK FRONT SUB	1.000
*2	000-902012	PCB/2090 DISK LED	1.000
*2	022-722010	DIO LEDR HLMP3200 1.5V 10MA H	4.000
*2	022-722100	DIO LEDG HLMP3553 1.6V 20MA H	8.000
*2	095-709000	CBL/34 COND/AP 922522-34-99-0	1.000
*2	011-901500	BRKT/2090 DISK RL	1.000
*2	025-715500	SW/RO PA166-011-0AA CL	1.000
*2	025-718100	SW/LE 2PL2PS 7215J61GF CE	2.000
*2	025-719600	SW/LE 1PL2PS 71C1J61 CE	9.000
*2	045-703301	KNOB/KX-12322 1/8"	1.000
1	475-001500	2090-3 FINAL ASSEMBLY	1.000
*2	475-005900	2090 BLANKING BOARD COVER	1.000
**3	042-711401	COVER/2090 BLANKING #1	1.000
**4	042-708601	COVER/BLANK	1.000
**3	042-712600	COVER/2090 BLANKING #2	1.000
**4	042-708601	COVER/BLANK	1.000
*2	475-006000	3 BAY FRAME BOTTOM COVER ASSY	1.000
**3	042-710904	COVER/BOTTOM 2090/4090	1.000
**3	051-702600	FOOT/757-R LAVELLE	2.000
**3	268-704300	MECH MISC/TILT STAND/14"	1.000
*2	477-001700	BEZEL/GRETICULE ASSEMBLY	1.000
**3	164-700501	GRAT/BLUE	1.000
**3	268-703001	BEZEL/2090 SERIES	1.000
*2	011-724501	BRKT/2090 FRAME GROUND	1.000
*2	017-704200	LABEL/HI VOLT/2090	6.000
*2	017-900400	LABEL/2090-III	1.000
*2	042-712500	COVER/LINE VOLTAGE	1.000
*2	042-712803	COVER/2090-3 L SIDE	2.000
*2	051-700100	BUMPER/SJ5514	2.000

2090-3C I/O & DISK

LEVEL	PART NO.	DESCRIPTION	QUANTITY
1	675-000700	2090 BAY 3 WITH I/O BD	1.000
*2	415-006800	2090 I/O CONN CARD	1.000
**3	000-902402	PCB/I/O CARD/2090-3 CS	1.000
**3	134-715303	IC/7438N O/C 2-NAND	5.000
**3	011-721000	BRKT/PWR SPLY MTG/2090	2.000
*2	415-007400	2090 DIGITAL I/O BD	1.000
**3	000-902207	PCB/2090 I/O	1.000
**3	134-712903	IC/74LS00N 2-NAND	3.000
**3	134-712903	IC/74LS04N HEX INVERTER	2.000
**3	134-713203	IC/74LS74N FLIP-FLOP	4.000
**3	134-713703	IC/74LS253N MULTIPLEXER	1.000
**3	134-715303	IC/7438N O/C 2-NAND	2.000
**3	134-718903	IC/74LS175N REGISTER	2.000
**3	134-720403	IC/74LS02N 2-NOR	1.000
**3	134-731903	IC/74LS395N SHIFT REGISTER	3.000
**3	134-720503	IC/74LS174N REGISTER	5.000
**3	134-721203	IC/74LS163N COUNTER	2.000
**3	134-723003	IC/74LS14N HEX INVERTER	1.000
**3	134-723903	IC/74LS257 MULTIPLEXER	5.000
**3	134-730903	IC/74LS367N HEX DRIVER	2.000
**3	134-712903	IC/74LS04N HEX INVERTER	1.000
**3	134-718903	IC/74LS175N REGISTER	1.000
**3	134-720403	IC/74LS02N 2-NOR	1.000
**3	134-722403	IC/74LS139N MULTIPLEXER	1.000
**3	134-723003	IC/74LS14N HEX INVERTER	3.000
**3	134-723903	IC/74LS257 MULTIPLEXER	1.000
**3	134-730903	IC/74LS367N HEX DRIVER	2.000
**3	134-731903	IC/74LS138N MULTIPLEXER	2.000
**3	134-731903	IC/74LS395N SHIFT REGISTER	1.000
**3	023-700200	CAP 1000PF 100V 05% MICA R AR	1.000
**3	023-702400	CAP .01MF 100V 20% CERM R SP	6.000
**3	023-711100	CAP 4.7MF 10V 10% TANT G KE	8.000
**3	024-723400	CON 2M HDR/SOL AMP 9-350360-1	1.000
**3	024-733200	CON 6M HDR/SOL AMP 9-350259-1	1.000
**3	024-737200	CON 56PIN/AMP 67907-3	1.000
**3	024-740700	CON 20F DIP/SOL 641264-3 AM	2.000
**3	085-707700	CBL/50 COND/7" 5100831 SY	1.000
**3	100-700700	RES NET/CSP10E-01-502J	2.000
**3	201-100200	RES 10K 01% 1/8W PRE	4.000
**3	201-332000	RES 332 01% 1/8W PRE	1.000
**3	024-738500	CON 1M HDR/SOL CAD72SP100 CA	50.000
**3	051-700100	BUMPER/SJ5514	2.000
**3	405-002300	2090 I/O BOARD CABLE	1.000
***4	015-706401	PIN F 18-26GA 350665-1 TIN AM	6.000
***4	024-726900	CON 6F REC/CRP AMP 1-350241-9	1.000
**3	134-728803	IC/18S42 PROM (74S472)	2.000
**3	017-716500	LABEL/3090 SERIAL NUMBER	1.000

2090-3C I/O & DISK

LEVEL	PART NO.	DESCRIPTION	QUANTITY
*2	675-000400	➤ 3RD BAY FRAME WITH SUPPLY	1.000
**3	475-006100	2090 BAY 3 FRAME	1.000
***4	034-714804	RAIL/2090 SIDE	1.000
****5	112-700400	EXTRUSION/RAIL SIDE	1.000
****4	034-715403	RAIL/PLUG-IN	1.000
*****5	112-700704	EXTRUSION/PLUG-IN RAIL	1.000
****4	034-900001	RAIL/2090-2 TO 2090-3 CONNECT	4.000
*****5	112-700500	EXTRUSION/RAIL	1.000
****4	129-900102	FRAME/END 2090/4090 ROUNDED	2.000
*****5	129-900500	FRAME/END 2090/4090 PAINTED	1.000
*****6	129-702100	FRAME/END 2090/4090 CASTING	1.000
**3	665-000300	➤ 2090 BAY 3 REAR PANEL ASSY	1.000
****4	415-005500	➤ 2090 POWER SUPPLY BAY 3	1.000
*****5	405-001900	2090 3RD BAY PWR SUP CABLE	1.000
*****6	015-706401	PIN F 18-26GA 350665-1 TIN AM	6.000
*****6	024-726900	CON 6F REC/CRP AMP 1-350241-9	1.000
*****5	000-902104	PCB/2090 BAY 3 POWER SUPPLY	1.000
*****5	006-701400	WASH/NO J TEFLON	4.000
*****5	011-721900	BRKT/THIRD BAY P.S./2090.3	2.000
*****5	021-708800	TRN NPN 2N5301 40V 200W D MO	2.000
*****5	022-700900	DIO RECT 1N4004 400V 1A G TX	6.000
*****5	022-707100	DIO TRM 3SM2 200V 2A G SE	4.000
*****5	023-700200	CAP 1000PF 100V 05% MICA R AR	2.000
*****5	023-704700	CAP 1MF 35V 10% TANT G KE	1.000
*****5	023-711000	CAP 22MF 35V 10% TANT G KE	4.000
*****5	023-714000	CAP 100MF 50V ALUM G SP	1.000
*****5	023-715200	CAP 8800MF 25V ALUM S CA	2.000
*****5	023-717500	CAP 28MF 15V ALUM S ME	1.000
*****5	024-719500	CON 9M HDR/SOL AMP 9-350262-1	1.000
*****5	026-705400	POT 500 PCB .7W 3006P1501 BR	2.000
*****5	032-700800	INSUL/DIODE	2.000
*****5	098-704700	HT SNK/THM60068-2-2	1.000
*****5	106-702700	RES .36 05% 2W	1.000
*****5	106-706100	RES .15 5% 5W	1.000
*****5	121-702400	REG -1.2TO-37V 1.5A 337T E NA	1.000
*****5	121-702600	REG 2TO38V .15A LAS1000 A LA	2.000
*****5	201-124000	RES 124 01% 1/8W PRE	1.000
*****5	201-150000	RES 150 01% 1/8W PRE	1.000
*****5	201-200100	RES 2K 01% 1/8W PRE	1.000
*****5	201-221100	RES 2.21K 01% 1/8W PRE	2.000
*****5	201-274000	RES 274 01% 1/8W PRE	2.000
*****5	201-301000	RES 301 01% 1/8W PRE	2.000
*****5	201-365000	RES 365 01% 1/8W PRE	1.000
*****5	201-604000	RES 604 01% 1/8W PRE	2.000
*****5	201-681900	RES 68.1 01% 1/8W PRE	1.000
****4	445-000500	➤ 2090 TRANSFORMER BAY 3	1.000
*****5	015-706301	PIN M 18-26 GA TIN	6.000

2090-3C I/O & DISK

LEVEL	PART NO.	DESCRIPTION	QUANTITY
*****5	015-706401	PIN F 18-26GA 350665-1 TIN AM	6.000
*****5	019-707700	XFORMER/DG-447 FOREST	1.000
*****5	024-719300	CON 9F REC/CRP AMP 1-350242-9	1.000
*****5	024-727000	CON 6M REC/CRP AMP 1-350234-9	1.000
****4	068-728005	PAN/2090 REAR BAY 3	1.000
****4	002-706500	PLATE/I/O COVER	1.000
1	675-2090-3	2090-3 UNIT ASSEMBLY	1.000
*2	415-004900	2090 MAIN FRAME BD	1.000
**3	000-900304	PCB/2090 MAIN FRAME	1.000
**3	134-712903	IC/74LS04N HEX INVERTER	1.000
**3	134-718503	IC/74S182N CARRY LOOKAHEAD	1.000
**3	134-705703	IC/741CP	2.000
**3	134-713203	IC/74LS74N FLIP-FLOP	6.000
**3	134-724903	IC/74S169 COUNTER	3.000
**3	134-730903	IC/74LS367N HEX DRIVER	6.000
**3	134-731003	IC/74LS138N MULTIPLEXER	3.000
**3	134-731603	IC/74LS251N MULTIPLEXER	2.000
**3	134-732103	IC/96L02 MONOSTABLE	1.000
**3	134-720503	IC/74LS174N REGISTER	4.000
**3	134-713703	IC/74LS253N MULTIPLEXER	1.000
**3	013-701100	CONTACT/MALE CONTACT JUMPER	1.000
**3	021-702200	TRN NPN 2N3903 40V 1W 3 MO	1.000
**3	021-702500	TRN NPN 2N3302 36V .36W A MO	2.000
**3	022-701100	DIO GERM 1N270 80V .2A G IT	5.000
**3	023-701600	CAP 2.2MF 20V 10% TANT G KE	2.000
**3	023-702400	CAP .01MF 100V 20% CERM R SP	2.000
**3	023-711100	CAP 4.7MF 10V 10% TANT G KE	9.000
**3	023-711300	CAP .1MF 250V 10% PLYE R SE	7.000
**3	024-715900	CON 16F DIP/SOL 641262-3 AM	1.000
**3	024-721300	CON 24F DIP/SOL 641266-3 AM	2.000
**3	024-724300	CON 40F DIP/SOL 641268-3 AM	3.000
**3	024-737200	CON 56PIN/AMP 67907-3	1.000
**3	024-738500	CON 1M HDR/SOL CAD72SP100 CA	86.000
**3	024-740700	CON 20F DIP/SOL 641264-3 AM	5.000
**3	024-759900	CON 1F HRD/SOL SS-120-T-2 SAM	4.000
**3	026-705500	POT 1K PCB .7W 3006P1102 BR	2.000
**3	100-700700	RES NET/CSP10E-01-502J	3.000
**3	121-700900	REG -15V .35A 79M15AUC E FC	1.000
**3	134-724500	IC/DAC80-CBI-V 12BIT DAC	2.000
**3	134-764100	IC/2901A 4 BIT SLICE PROCES	3.000
**3	201-100000	RES 100 01% 1/8W PRE	1.000
**3	201-100200	RES 10K 01% 1/8W PRE	1.000
**3	201-100300	RES 100K 01% 1/8W PRE	1.000
**3	201-150000	RES 150 01% 1/8W PRE	1.000
**3	201-392000	RES 392 01% 1/8W PRE	6.000
**3	201-475100	RES 4.75K 01% 1/8W PRE	11.000
**3	201-487200	RES 48.7K 01% 1/8W PRE	1.000

2090-3C I/O & DISK

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	134-717403	IC/14S10 PROM (74S287)	1.000
**3	134-728803	IC/18S42 PROM (74S472)	5.000
*2	415-005000	2090 BLANKING BD	1.000
**3	000-900203	PCB/2090 BLANKING	1.000
**3	021-700600	TRN NPN 2N2484 60V .36W A MO	4.000
**3	021-702200	TRN NPN 2N3903 40V 1W B MO	1.000
**3	021-711100	TRN NPN MPSU10 300V 1W E MO	4.000
**3	021-712100	TRN VMOS 8S250 45V .8W B ITT	1.000
**3	022-700800	DIO RECT 1N4004 400V 1A G TX	1.000
**3	022-703000	DIO ZENR 1N5232 5.6V .5W G MO	1.000
**3	022-703200	DIO ZENR 1N5256 30V .5W G MO	1.000
**3	022-719900	DIO TRRF 1N4152 30V .5W G FIC	1.000
**3	023-702400	CAP .01MF 100V 20% CERM R SP	2.000
**3	023-707500	CAP 6.8MF 35V 10% TANT G KE	1.000
**3	023-711100	CAP 4.7MF 10V 10% TANT G KE	1.000
**3	023-711300	CAP .1MF 250V 10% PLYE R SS	6.000
**3	023-719400	CAP .01MF 300CV 20% CERM R SP	2.000
**3	026-705700	POT 5K PCB .7W 300CP1502	5.000
**3	026-706200	POT 50K PCB .7W 300CP1503	1.000
**3	026-706400	POT 1M PCB .7W 300CP1105	1.000
**3	052-705100	LAMP/NEON 72V 1.3MA	4.000
**3	105-022300	RES 22K 05% 2W	2.000
**3	105-027300	RES 27K 05% 2W	2.000
**3	108-047100	RES 470 05% 1/4W	2.000
**3	134-729403	IC/6N137	1.000
**3	201-100100	RES 1K 01% 1/8W	1.000
**3	201-100400	RES 14 01% 1/8W	1.000
**3	201-127300	RES 127K 01% 1/8W	1.000
**3	201-143200	RES 14.3K 01% 1/8W	1.000
**3	201-152200	RES 15.2K 01% 1/8W	1.000
**3	201-178000	RES 178 01% 1/8W	1.000
**3	201-221300	RES 221K 01% 1/8W	1.000
**3	201-226200	RES 22.6K 01% 1/8W	3.000
**3	201-237200	RES 23.7K 01% 1/8W	1.000
**3	201-243200	RES 24.3K 01% 1/8W	1.000
**3	201-249100	RES 2.49K 01% 1/8W	1.000
**3	201-280200	RES 28K 01% 1/8W	1.000
**3	201-475100	RES 4.75K 01% 1/8W	1.000
**3	201-523200	RES 52.3K 01% 1/8W	1.000
**3	201-665200	RES 66.5K 01% 1/8W	1.000
**3	201-976200	RES 97.6K 01% 1/8W	1.000
**3	202-107300	RES 107K 01% 1/4W	1.000
**3	202-200300	RES 200K 01% 1/4W	4.000
**3	202-634200	RES 63.4K 01% 1/4W	1.000
**3	202-787200	RES 78.7K 01% 1/4W	1.000
**3	024-724600	CON 10F REC/IDP MMM 3473-6000	1.000
**3	024-734900	CON 8M HDR/SOL BRG 65532-408	1.000

2090-3C I/O & DISK

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	024-735900	CON 10PIN/3M3474.0001T	1.000
**3	405-002000	2090 BLANKING BOARD CABLE	1.000
***4	015-706401	PIN F 18-26GA 350665-1 TIN AM	8.000
***4	024-719900	CON 15F REC/CRP AMP 1-350244-	1.000
**2	415-007000	►2090 4K MEMORY BD	1.000
**3	000-900403	PCB/2090 MEMORY 4K	1.000
**3	134-723903	IC/74LS257 MULTIPLEXER	3.000
**3	134-730903	IC/74LS367N HEX DRIVER	2.000
**3	134-736903	IC/74LS241N OCTAL BUFFER	3.000
**3	134-754300	IC/2147 4KX1 RAM	13.000
**3	134-723003	IC/74LS14N HEX INVERTER	1.000
**3	134-723903	IC/74LS257 MULTIPLEXER	1.000
**3	134-736903	IC/74LS374N REGISTER	4.000
**3	134-730903	IC/74LS367N HEX DRIVER	1.000
**3	023-702400	CAP .01MF 100V 20% CERM R SP	1.000
**3	023-711100	CAP 4.7MF 10V 10% TANT G KE	4.000
**3	024-737200	CON 56PIN/AMP 67907-3	1.000
**3	100-700700	RES NET/CSP10E-01-502J	1.000
**3	108-047100	RES 470 5% 1/4W	1.000
**2	415-007100	►2090-3 INNER CONN BD 4K	1.000
**3	000-900500	PCB/INTERFACE BD/2090	1.000
**3	024-725000	CON 12M HDR/SOL AMP 9-350265-	1.000
**3	085-707900	CBL/50 COND/DAISY CHAIN	1.000
**3	085-707901	CBL/50 COND 23" HDR/PC/EDG	1.000
**2	415-011500	►2090 POWER SUP REG BD VER. II	1.000
**3	000-900008	PCB/2090 REGULATOR VER. II	1.000
**3	019-706000	XFORMER/ITA-1552-11	1.000
**3	022-700800	DIO RECT 1N4004 400V 1A G TX	6.000
**3	022-705100	DIO ZENR 1N5268 82V .5W G MO	1.000
**3	022-706900	DIO TRRF FM5D 5KV .01A G SE	2.000
**3	022-707000	DIO TRRF S2F 200V 1A G SE	5.000
**3	022-711900	DIO BRID VE48X 400V 1A C VA	1.000
**3	023-029200	CAP 22MF 15V 10% TANT G KE	1.000
**3	023-704700	CAP 1MF 35V 10% TANT G KE	3.000
**3	023-707300	CAP 1MF 200V 10% MYLR G TR	2.000
**3	023-711200	CAP 220MF 10V 10% TANT G KE	1.000
**3	023-719400	CAP .01MF 3000V 20% CERM R SP	5.000
**3	023-719700	CAP 2.2MF 50V 10% TANT G KE	3.000
**3	024-719600	CON 15M HDR/SOL 9-350268-1 AM	1.000
**3	024-725000	CON 12M HDR/SOL AMP 9-350265-	1.000
**3	024-784100	CON 20M HDR/SOL 9-350272-1 AM	1.000
**3	026-705400	POT 500 PCB .7W 3006P1501 BR	5.000
**3	026-706000	POT 20K PCB .7W 3006P1203 BR	1.000
**3	101-010500	RES 1M 10% 1/2W	2.000
**3	101-022500	RES 2.2M 10% 1/2W	2.000
**3	105-012100	RES 120 5% 2W	1.000
**3	106-703600	RES 200M 10% 1W	1.000

2090-3C I/O & DISK

LEVEL	PART NO.	DESCRIPTION	QUANTITY
***3	108-015300	RES 15K 05% 1/4W	1.000
***3	201-100000	RES 100 01% 1/8W PRE	1.000
***3	201-100200	RES 10K 01% 1/8W PRE	1.000
***3	201-100300	RES 100K 01% 1/8W PRE	1.000
***3	201-124000	RES 124 01% 1/8W PRE	2.000
***3	201-200100	RES 2K 01% 1/8W PRE	1.000
***3	201-200300	RES 200K 01% 1/8W PRE	1.000
***3	201-221000	RES 221 01% 1/8W PRE	2.000
***3	201-221100	RES 2.21K 01% 1/8W PRE	1.000
***3	201-249000	RES 249 01% 1/8W PRE	2.000
***3	201-249100	RES 2.49K 01% 1/8W PRE	1.000
***3	201-301000	RES 301 01% 1/8W PRE	1.000
***3	201-332100	RES 3.32K 01% 1/8W PRE	1.000
***3	201-499100	RES 4.99K 01% 1/8W PRE	2.000
***3	201-619000	RES 61.9K 01% 1/8W PRE	1.000
***3	201-822500	RES 825 01% 1/3W PRE	1.000
***3	006-701140	WASH/NO J TEFLON	2.000
***3	011-701000	BRKT/INTEN. FOCUS/2090	1.000
***3	011-701100	BRKT/PWR SPLY MTG/2090	2.000
***3	019-701000	XFORMER/HV WINDING 2090/4090	1.000
***3	021-701000	TRN NPN 2N5301 40V 200W G MO	1.000
***3	021-710000	TRN NPN SJE1716 60V 75W E MO	2.000
***3	022-710000	REG ZENR 1N4736 6.8V 1W G MO	1.000
***3	023-710000	CAP 1000PF 100V 05% MICA R AR	1.000
***3	023-710000	CAP 50MF 50V ALUM G SP	1.000
***3	023-710000	CAP 4.7MF 50V 10% TANT G KE	2.000
***3	023-710000	CAP 2.2MF 50V 10% TANT G KE	2.000
***3	026-706000	POT 500K PML 38592A31504A PR	2.000
***3	032-700000	INSUL/DIODE	1.000
***3	032-700000	INSUL/DIODE	7.000
***3	067-700000	COHE/E1960-S-298A	2.000
***3	070-703400	FUSE/.75 A/276.750 LITTLEFUSE	1.000
***3	079-700000	THTRMOS/PTH487AC1RE222TS MU	1.000
***3	098-700000	HT SNK/207CB W	1.000
***3	098-704000	HT SNK/EXPL P.S.	1.000
***3	098-704000	HT SNK/2090 REGULATOR VER. II	1.000
***3	103-027000	RES 27 05% 1W	1.000
***3	106-700000	RES .1 05% 10W	1.000
***3	121-702100	REG 5 TO 30V 1A 78GU10 E FC	1.000
***3	121-702300	REG 1.2 TO 37V 1.5A 317T E NA	2.000
***3	121-702400	REG -1.2 TO -37V 1.5A 337T E NA	2.000
***3	121-702600	REG 2 TO 38V .15A LAS1000 A LA	1.000
***3	201-143200	RES 14.3K 01% 1/8W PRE	1.000
***3	201-274000	RES 274 01% 1/8W PRE	1.000
***3	201-365000	RES 365 01% 1/8W PRE	1.000
***3	201-604000	RES 604 01% 1/8W PRE	1.000
***3	011-723103	BRKT/HT VOLT XFORMER/EXPL	1.000

2090-3C I/O & DISK

LEVEL	PART NO.	DESCRIPTION	QUANTITY
***3	017-704200	LABEL/HI VOLT/2090	1.000
***3	405-001800	2090 REGULATOR BOARD CABLE	1.000
****4	015-706401	PIN F 18-26GA 350665-1 TIN AM	30.000
****4	024-721900	CON 20F REC/CRP 1-350245-9 AM	1.000
****4	024-722500	CON 12F REC/CRP AMP 1-350243-	1.000
****4	024-726900	CON 6F REC/CRP AMP 1-350241-9	1.000
*2	465-001300	➤ 2090 REAR PANEL BAY 1	1.000
***3	415-011700	➤ 2090 CAPACITOR 20 VER. II	1.000
****4	000-900106	PCB/CAP BD/EXP SERIES	1.000
****4	022-705300	J10 BRID VS647 600V 2A J VA	2.000
****4	023-716200	CAP 8800MF 25V ALUM S CA	2.000
****4	023-717500	CAP 28KMF 15V ALUM S ME	2.000
****4	023-719000	CAP 2000MF 50V ALUM S CA	2.000
****4	405-002100	2090 CAPACITOR BOARD CABLE	1.000
*****5	015-706401	PIN F 18-26GA 350665-1 TIN AM	23.000
*****5	024-719900	CON 15F REC/CRP AMP 1-350244-	1.000
*****5	024-722500	CON 12F REC/CRP AMP 1-350243-	1.000
*****5	085-702400	CORD/428-0056 ROTRON	1.000
***3	022-718000	DIO RECT SCPA-2 200V8.5A Q SE	1.000
***3	068-726700	PAN/2090 REAR BAY 1	1.000
***3	072-700100	FAN/WISPER WR2A1	1.000
***3	114-702600	FLTR/FAN/PAMOTER#5502	1.000
*2	465-001400	➤ 2090 FRONT PANEL	1.000
***3	068-726900	PAN/2090 FRONT BAY 2	1.000
***3	068-741002	PAN/2090 FRONT SUB	1.000
***3	015-706301	PIN M 18-26 GA TIN	4.000
***3	024-721700	CON 4M REC/CRP AMP 1-350233-9	1.000
***3	010-701200	NUT/80-7013-19 DECOR. LICO	1.000
***3	011-723001	BRKT/2090 STRAIN RELIEF	1.000
***3	017-704600	LABEL/LOGO/JEWEL	1.000
***3	022-722100	DIO LEDG HLMP3553 1.6V 20MA H	1.000
***3	025-715500	SW/RO PA166-J11-QAA CL	2.000
***3	025-718100	SW/LE 2PL2PS 7215J616E C&	2.000
***3	025-718500	SW/LB 2P2T	1.000
***3	025-727100	SW/RO 2PL11PS 045773-SK-1 S	1.000
***3	025-727200	SW/PB SPDT 8121-J82 C&	1.000
***3	025-734300	SW/RO 1PL2-7PS PA166-025 CL	1.000
***3	025-739800	SW/TO 1P2T 7101P3/7099-2 BLAC	2.000
***3	045-703301	KNOB/KX-12322 1/8"	4.000
***3	085-900002	➤ CBL/20 COND/922511-26-99-13 A	1.000
*2	475-001700	➤ 2090-3 CABINET ASSEMBLY	1.000
***3	034-714702	RAIL/2090 TOP CENTER	1.000
****4	112-700300	EXTRUSION/RAIL SIDE	1.000
***3	034-714904	RAIL/2090 SIDE	1.000
****4	112-700400	EXTRUSION/RAIL SIDE	1.000
***3	034-714903	RAIL/2090-2 CONNECTOR	4.000
****4	112-700500	EXTRUSION/RAIL	1.000

2090-3C I/O & DISK

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	034-715302	RAIL/2090 CORNER SUPPORT	1.000
**3	034-715403	RAIL/PLUG-IN	1.000
***4	112-700704	EXTRUSION/PLUG-IN RAIL	1.000
**3	034-900001	RAIL/2090-2 TO 2090-3 CONNECT	4.000
***4	112-700500	EXTRUSION/RAIL	1.000
**3	044-704308	SHIELD/2090 CRT	1.000
**3	049-700100	HANDLE/VIN 1776-354-324 (.156	1.000
**3	129-702101	FRAME/END 2090/4090 SQUARE	2.000
***4	129-900500	FRAME/END 2090/4090 PAINTED	1.000
***5	129-702100	FRAME/END 2090/4090 CASTING	1.000
**3	129-900102	FRAME/END 2090/4090 ROUNDED	2.000
***4	129-900500	FRAME/END 2090/4090 PAINTED	1.000
***5	129-702100	FRAME/END 2090/4090 CASTING	1.000
**3	015-701600	PIN F 26-30GA 86015-3 TIN AM	2.000
**3	024-740300	CON AMP 87499-3/2PIN	1.000
**3	027-700600	CRT/55261 014-261GH AM	1.000
**3	084-701002	CHAN/2090 FRAME	2.000
***4	112-702100	EXTRUSION/SUPPORT CHANNEL	1.000
**3	084-900101	CHAN/2090 FRAME/SHORT	2.000
**3	051-700100	BUMPER/SJ5514	2.000
**3	051-700300	BUMPER/SJ-5018 1/4" BLACK MM	7.000
**2	665-000200	2090 BAY 2 REAR PANEL ASSY	1.000
**3	068-726611	PAN/2090 REAR BAY 2	1.000
**3	070-703000	FUSE/SLO BLO 3AG3	1.000
**3	000-900502	PCB/2090 VOLTAGE SELECT	1.000
**3	015-702600	PIN M 24-26GA 350185-1 TIN AM	2.000
**3	015-702700	PIN M 18-26GA 350036-1 TIN AM	9.000
**3	024-721600	CON 4F REC/CRP AMP 1-350240-9	1.000
**3	024-726900	CON 6F REC/CRP AMP 1-350241-9	1.000
**3	024-730300	CON 15 PIN 1-350237-9	1.000
**3	025-735200	SW/SL 4PL2PS GF-642-0006A C	2.000
**3	102-700200	MOVISTOR/V130LA10A	2.000
**3	114-701300	FLTR/6 AMP 6H9 COPCOM	1.000
**3	011-901001	BRKT/2090 TRANSFORMER SUPPORT	2.000
**3	019-708700	XFORMER/DJ346	1.000
**3	024-711500	CON 5F CIR/SOL SWC 61HA5F	1.000
**3	024-721400	CON 1F CXL/SOL APH 31-010	2.000
**3	024-724600	CON 10F REC/IDP MMM 3473-6000	1.000
**3	060-703600	POST/BINDING 7/16" #11G HH	1.000
**3	070-701100	FUSE/348370 BODY BLACK	1.000
**3	070-701200	FUSE/348007 CAP	1.000
**2	017-704200	LABEL/HI VOLT/2090	2.000
**2	026-713800	POT 250K PCB .25W EY5705 CT	1.000
1	695-000300	2090 MAIN FRAME ACCESSORY KIT	1.000
**2	024-711600	CON 5M CIR/SOL SWC 12CL5M	1.000
**2	085-703300	CORD/A/C/LINE P2392 SW	1.000
1	695-000400	2090 DISK ACCESSORY KIT	1.000
**2	270-700800	DISK/DYSAN 104/1	2.000
**2	270-705200	DISK/151020EN MINI 104/10 DYS	2.000

201-2 PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
1	475-003300	➤ 201-2 MECHANICAL ASSEMBLY	1.000
*2	025-727900	SW/SL GF-126-PC-G20-18 C	3.000
*2	035-701800	BUTT/RECT SRKL/BLK W/LED S	3.000
*2	011-900202	BRKT/200-201 MOUNTING SUPPORT	3.000
*2	020-701810	CHAS/PLUG-IN	1.000
*2	034-713300	GUIDE/SCANBE #11633-4	2.000
*2	042-711005	COVER/206 AMP DIVIDER	2.000
1	675-201	➤ 201 PLUG-IN (LESS SHIELDS)	1.000
*2	415-009400	➤ 201-2 CONTROL BD	1.000
**3	000-903806	PCB/201 CONTROL	1.000
**3	022-719800	DIO TRRF 1N4152 30V .5W G FC	1.000
**3	023-029200	CAP 22MF 15V 10% TANT G KE	1.000
**3	023-700200	CAP 1000PF 100V 05% MICA R R AR	1.000
**3	023-700300	CAP 500PF 500V 05% MICA R R AR	2.000
**3	023-702400	CAP .01MF 100V 20% CERM R R SP	3.000
**3	023-711100	CAP 4.7MF 10V 10% TANT G KE	1.000
**3	023-715100	CAP .05MF 50V CERM R AR	3.000
**3	024-715900	CON 16F DIP/SOL 641262-3 AM	1.000
**3	024-738500	CON 1M HDR/SOL CAD72SP100 CA	20.000
**3	024-740700	CON 20F DIP/SOL 641264-3 AM	2.000
**3	100-700700	RES NET/CSP100-01-502J	2.000
**3	134-701803	IC/7400N 2-NAND	1.000
**3	134-711203	IC/74S74N FLIP-FLOP	2.000
**3	134-712803	IC/74LS00N 2-NAND	9.000
**3	134-712903	IC/74LS04N HEX INVERTER	1.000
**3	134-713003	IC/74LS20N 4-NAND	1.000
**3	134-713203	IC/74LS74N FLIP-FLOP	21.000
**3	134-713703	IC/74LS253N MULTIPLEXER	1.000
**3	134-713900	IC/MK5009P MOS LSI	1.000
**3	134-715503	IC/74LS153N MULTIPLEXER	2.000
**3	134-716203	IC/74S175N REGISTER	1.000
**3	134-719103	IC/74196N COUNTER	1.000
**3	134-719403	IC/74LS151N MULTIPLEXER	3.000
**3	134-720803	IC/74LS10N 3-NAND	2.000
**3	134-722303	IC/74LS298N REGISTER	3.000
**3	134-722703	IC/74LS08N 2-AND	3.000
**3	134-723903	IC/74LS257 MULTIPLEXER	3.000
**3	134-730903	IC/74LS367N HEX DRIVER	1.000
**3	134-731603	IC/74LS251N MULTIPLEXER	1.000
**3	191-706800	CRYS/4J MHZ OSC MF M1100-40M	1.000
**3	201-010000	RES 10 01% 1/8W PRE	3.000
**3	025-727000	SW/ROT/32 POS.	1.000
**3	134-728803	IC/18S42 PROM (74S472)	2.000
*2	415-009500	➤ 201-2 MOTHER BD	1.000
**3	000-903905	PCB/201 MOTHER	1.000
**3	021-706200	TRN FETJN E230 40V .35W B SL	2.000
**3	022-703800	DIO ZENR 1N5234 6.2V .5W G MO	1.000

201-2 PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
***3	022-7119800	DIO TRRF 1N4152 30V .5% G FC	2.0000
***3	023-7002000	CAP 100PF 100V 05% MICA R AR	1.0000
***3	023-7003000	CAP 500PF 500V 05% MICA R AR	1.0000
***3	023-7024000	CAP .01MF 100V 20% CERM R SP	1.0000
***3	023-7135000	CAP 4.7MF 50V 10% TANT G KE	4.0000
***3	023-7151000	CAP .05MF 50V CERM R AR	4.0000
***3	023-7170000	CAP 3PF 300V 16% MICA R AR	2.0000
***3	024-7332000	CON 6M HDR/SOL AMP 9-350259-1	1.0000
***3	024-7372000	CON 56PIN/AMP 67907-3	3.0000
***3	024-7385000	CON 1M HDR/SOL CA972SP100 CA	20.0000
***3	026-7056000	POT 2K PCB .7W 3006P1202 BR	2.0000
***3	026-7057000	POT 5K PCB .7W 3006P1502 BR	2.0000
***3	108-0153000	RES 15K 05% 1/4W	2.0000
***3	121-7027000	REG 5 TO 30V .5A 79M GU1C F FC	4.0000
***3	121-7028000	REG -2.2/-30V .5A 79M GU1C F FC	4.0000
***3	134-7119000	IC/LM318H OPAMP	2.0000
***3	134-7127000	IC/TCL820CN3	1.0000
***3	134-7128000	IC/74LS00N 2-NAND	2.0000
***3	134-7132000	IC/74LS74N FLIP-FLOP	2.0000
***3	134-7168000	IC/74LS175N REGISTER	3.0000
***3	134-7227000	IC/74LS238N 2-AND	1.0000
***3	134-7329000	IC/74LS257 MULTIPLEXER	4.0000
***3	134-7309000	IC/74LS367N HEX DRIVER	2.0000
***3	201-1000000	RES 100 01% 1/8W	1.0000
***3	201-1001000	RES 1K 01% 1/8W	2.0000
***3	201-1002000	RES 10K 01% 1/8W	1.0000
***3	201-1003000	RES 100K 01% 1/8W	1.0000
***3	201-1004000	RES 1M 01% 1/8W	1.0000
***3	201-1242000	RES 12.4K 01% 1/8W	2.0000
***3	201-1432000	RES 14.3K 01% 1/8W	2.0000
***3	201-1782000	RES 17.8K 01% 1/8W	2.0000
***3	201-2002000	RES 20K 01% 1/8W	2.0000
***3	201-2109000	RES 21 01% 1/8W	4.0000
***3	201-2210000	RES 221 01% 1/8W	1.0000
***3	201-2211000	RES 2.21K 01% 1/8W	2.0000
***3	201-2262000	RES 22.6K 01% 1/8W	1.0000
***3	201-2740000	RES 274 01% 1/8W	1.0000
***3	201-2741000	RES 2.74K 01% 1/8W	2.0000
***3	201-3161000	RES 3.16K 01% 1/8W	2.0000
***3	201-3320000	RES 332 01% 1/8W	2.0000
***3	201-3321000	RES 3.32K 01% 1/8W	2.0000
***3	201-3741000	RES 3.74K 01% 1/8W	2.0000
***3	201-4870000	RES 487 01% 1/8W	1.0000
***3	201-4872000	RES 48.7K 01% 1/8W	2.0000
***3	201-4991000	RES 4.99K 01% 1/8W	2.0000
***3	201-6810000	RES 681 01% 1/8W	1.0000
***3	201-8251000	RES 8.25K 01% 1/8W	2.0000

201-2 PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	023-7069000	CAP 50MF 50V ALUM G SP	1.0000
**2	415-0096000	▶ 201-2 ADC BD	2.0000
**3	000-9043008	PCB/201 ADC	1.0000
**3	201-1001000	RES 1K 01% 1/8W P P	10.0000
**3	201-1002000	RES 10K 01% 1/8W P P	10.0000
**3	201-1003000	RES 100K 01% 1/8W P P	6.0000
**3	201-1052000	RES 10.5K 01% 1/8W P P	1.0000
**3	201-1240000	RES 124 01% 1/8W P P	5.0000
**3	201-1500000	RES 150 01% 1/8W P P	11.0000
**3	201-1503000	RES 150K 01% 1/8W P P	1.0000
**3	201-1652000	RES 16.5K 01% 1/8W P P	1.0000
**3	201-1780000	RES 170 01% 1/8W P P	1.0000
**3	201-20001000	RES 2K 01% 1/8W P P	2.0000
**3	201-2002000	RES 20K 01% 1/8W P P	1.0000
**3	201-2102000	RES 21K 01% 1/8W P P	1.0000
**3	201-2210000	RES 2.21K 01% 1/8W P P	2.0000
**3	201-2213000	RES 221K 01% 1/8W P P	2.0000
**3	201-2262000	RES 22.6K 01% 1/8W P P	3.0000
**3	201-2490000	RES 2.49K 01% 1/8W P P	10.0000
**3	201-2492000	RES 24.9K 01% 1/8W P P	1.0000
**3	201-2740000	RES 2.74K 01% 1/8W P P	4.0000
**3	201-3242000	RES 32.4K 01% 1/8W P P	2.0000
**3	201-3320000	RES 3.32K 01% 1/8W P P	1.0000
**3	201-3740000	RES 3.74K 01% 1/8W P P	2.0000
**3	201-3742000	RES 37.4K 01% 1/8W P P	1.0000
**3	201-4020000	RES 402K 01% 1/8W P P	2.0000
**3	201-4120000	RES 4.12K 01% 1/8W P P	2.0000
**3	201-4870000	RES 48.7K 01% 1/8W P P	1.0000
**3	201-4990000	RES 499 01% 1/8W P P	1.0000
**3	201-4991000	RES 4.99K 01% 1/8W P P	1.0000
**3	201-4992000	RES 49.9K 01% 1/8W P P	14.0000
**3	201-5230000	RES 523K 01% 1/8W P P	2.0000
**3	201-5620000	RES 56.2 01% 1/8W P P	1.0000
**3	201-6190000	RES 6.19K 01% 1/8W P P	5.0000
**3	201-6490000	RES 649 01% 1/8W P P	1.0000
**3	201-7500000	RES 750 01% 1/8W P P	1.0000
**3	201-7501000	RES 7.5K 01% 1/8W P P	1.0000
**3	201-9090000	RES 9.09K 01% 1/8W P P	1.0000
**3	214-4992000	RES 49.9K .1% 1/8W P P	7.0000
**3	022-7034000	DIO ZENR 1N5227 3.6V .5W G MO	1.0000
**3	022-7116000	DIO TRRF 1N4376 10V .05A G FC	48.0000
**3	022-7141000	DIO SCHR HSCH100 1.6CV 15MA G HP	4.0000
**3	023-0292000	CAP 22MF 15V 10% TANT G KE	2.0000
**3	023-7001000	CAP 100PF 500V 05% MICA P AR	2.0000
**3	023-7002000	CAP 100PF 100V 05% MICA P AR	4.0000
**3	023-7047000	CAP 1MF 35V 10% TANT G KE	1.0000
**3	023-7067000	CAP 390PF 500V 05% MICA P AR	1.0000

201-2 PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	023-711100	CAP 4.7MF 10V 10% TANT G KE	2.0000
**3	023-713500	CAP 4.7MF 50V 10% TANT G KE	2.0000
**3	023-715100	CAP .05MF 50V CERM R AR	2.0000
**3	024-715900	CON 16F DIP/SOL 641262-3 AM	6.0000
**3	024-743100	CON 8F DIP/SOL AMP 641260-3	3.0000
**3	026-705300	POT 200 PCB .7W 3006P1201 BR	3.0000
**3	026-705400	POT 500 PCB .7W 3006P1501 BR	4.0000
**3	026-705500	POT 1K PCB .7W 3006P1102 BR	1.0000
**3	026-705900	POT 10K PCB .7W 3006P1103 BR	1.0000
**3	026-706200	POT 50K PCB .7W 3006P1503 BR	5.0000
**3	134-710200	IC/74LS83N ADDER	3.0000
**3	134-712800	IC/74LS00N 2-NAND	2.0000
**3	134-718900	IC/74LS175N REGISTER	6.0000
**3	134-722300	IC/74LS298N REGISTER	3.0000
**3	134-722700	IC/74LS08N 2-AND	3.0000
**3	134-730600	IC/CA3140EX	2.0000
**3	023-713500	CAP 4.7MF 50V 10% TANT G KE	2.0000
**3	025-732000	SW/PB 4STA/2KG-CC3100312 CL	1.0000
**3	025-732100	SW/3STA/PB/2KGC021000311	1.0000
**3	026-705600	POT 2K PCB .7W 3006P1202 BR	1.0000
**3	026-705800	POT 10K PCB .7W 3006P1103 BR	1.0000
**3	026-706600	POT 100 PCB .7W 3006P1101 BR	1.0000
**3	026-711100	POT 1K PCB .7W 83C10E20J BR	1.0000
**3	134-743000	IC/3508J OPAMP BURR BROWN	1.0000
**3	134-743500	IC/AD 545L OP AMP ANALOG DEV.	2.0000
**3	035-701300	BUTT/PUSH CL J52305-04500	7.0000
*2	465-002100	201-2 FRONT PANEL	1.0000
**3	415-006000	206 STORAGE CONTROL 30	1.0000
****4	000-900800	PCB/206 STORAGE CONTROL	20.0000
****4	024-738500	CON 1M HDR/SOL CAD72SP100 CA	2.0000
****4	025-733800	SW/PB 1P2TM SRUL/RED	1.0000
****4	J25-746800	SW/PB 1P2TM SRUL/GREEN	3.0000
****4	201-221000	RES 221 01% 1/8W PRE	3.0000
****4	201-221100	RES 2.21K 01% 1/8W PRE	3.0000
****4	201-226200	RES 22.6K 01% 1/8W PRE	3.0000
**3	068-736900	PAN/201 FRONT	1.0000
**3	068-741200	PAN/201 FRONT SUB	1.0000
**3	023-711300	CAP .1MF 250V 10% PLYE R SE	1.0000
**3	085-708700	CBL/20 COND/AP 922531-20-99-3	1.0000
**3	010-700900	NUT/BL ANODI W-NU-170	1.0000
**3	011-721600	BRKT/MOTHER 80/EXPL	1.0000
**3	022-714500	DIO LEDG 406G 1.9V 10MA M 1N	1.0000
**3	024-056900	CON 1F CXL/SOL APH 31-102	5.0000
**3	025-718000	SW/PB 8531	1.0000
**3	025-727600	SW/RO 2FL5PS PA166-040	3.0000
**3	025-727900	SW/SL GF-126-PC-G20-18	9.0000
**3	026-710000	POT 100K PML BA1470134 CL	1.0000
**3	035-701800	BUTT/RECT SRKL/BLK W/LED S	3.0000
**3	045-703200	KNOB/KPN-50CBA 1/8	3.0000
**3	045-703600	KNOB/KN-50CBA-1/8"	3.0000
**3	085-900100	CBL/20 COND/PLUG-IN FRONT	1.0000
**3	045-703500	KNOB/KPN-90CBA-1/4"	1.0000
1	695-000600	201 ACCESSORY KIT	1.0000
*2	085-718300	PROBE/X1 COLINE 906-90-604	2.0000

204-A PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
1	475-004000	204A FINALING KIT	1.000
*2	J10-701500	NUT/SQUARE .360" #8-32	1.000
*2	011-728001	BRKT/204 SUPPORT	1.000
*2	J32-702500	INSUL/#6 SCREW 1/4" PP	2.000
*2	044-900002	SHIELD/204A ADC FRONT	2.000
*2	044-900101	SHIELD/204A ADC REAR	2.000
*2	045-703501	KN08/KPN-900BA-1/4"	2.000
1	675-204A	204A PLUG-IN (LESS SHIELDS)	1.000
*2	415-010600	204A TRIGGER BD	1.000
**3	000-906906	PCB/204A-208 TRIGGER BD	1.000
**3	134-713203	IC/74LS74N FLIP-FLOP	2.000
**3	134-727600	IC/1458 OPAMP	1.000
**3	134-712803	IC/74LS00N 2-NAND	1.000
**3	134-715303	IC/7438N O/C 2-NAND	1.000
**3	134-749100	IC/NE527 VOLTAGE COMPARATOR	1.000
**3	021-701800	TRN PNP 2N3935 40V .35W B MO	1.000
**3	021-703200	TRN FETJN 2N5047 50V .2W A NA	1.000
**3	022-713000	DIO RECT FDH300 150V .2A G FC	1.000
**3	023-700100	CAP 100PF 500V 05% MICA R AR	2.000
**3	023-700400	CAP 47PF 500V 05% MICA R AR	2.000
**3	023-707500	CAP 6.8MF 35V 10% TANT G KE	2.000
**3	023-708800	CAP 33PF 500V 05% MICA R AR	1.000
**3	023-709100	CAP 20PF 500V 05% MICA R AR	1.000
**3	023-710600	CAP 10PF 1000V 10% CERM R CL	1.000
**3	023-711300	CAP .1MF 250V 10% PLYE R SE	10.000
**3	023-718800	CAP 4.7PF 500V 05% CERM G ER	1.000
**3	024-738500	CON 1M HDR/SOL CAD72 SP100 CA	34.000
**3	106-015300	RES 15K 05% 1/4W	2.000
**3	108-047000	RES 47 05% 1/4W	4.000
**3	121-702600	RES 2T038V .15A LAS1000 A LA	1.000
**3	201-100100	RES 1K 01% 1/8W PRE	2.000
**3	201-100200	RES 10K 01% 1/8W PRE	7.000
**3	201-100300	RES 100K 01% 1/8W PRE	1.000
**3	201-130100	RES 1.3K 01% 1/8W PRE	1.000
**3	201-200100	RES 2K 01% 1/8W PRE	1.000
**3	201-221000	RES 221 01% 1/8W PRE	2.000
**3	201-226200	RES 22.6K 01% 1/8W PRE	2.000
**3	201-332000	RES 332 01% 1/8W PRE	1.000
**3	201-332100	RES 3.32K 01% 1/8W PRE	1.000
**3	201-332300	RES 332K 01% 1/8W PRE	4.000
**3	201-422100	RES 4.22K 01% 1/8W PRE	1.000
**3	201-499100	RES 4.99K 01% 1/8W PRE	2.000
**3	201-681100	RES 6.81K 01% 1/8W PRE	2.000
**3	201-681300	RES 681K 01% 1/8W PRE	1.000
**3	201-681900	RES 68.1 01% 1/8W PRE	1.000
**3	025-738200	SW/PB 3PP2PL	1.000
**3	025-738300	SW/PS 5PP2PL1402PL S	1.000

204-A PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	022-714100	DIO SCHT HSCH1001 60V15MAG HP	1.000
**3	022-719800	DIO TRRF 1N4152 35V .5W G FC	1.000
**3	023-700100	CAP 100PF 500V 05% MICA R AR	2.000
**3	023-700200	CAP 100PF 100V 05% MICA R AR	1.000
**3	023-700400	CAP 47PF 500V 05% MICA R AR	1.000
**3	023-700500	CAP 250PF 500V 05% MICA R AR	1.000
**3	023-706300	CAP 150PF 500V 05% MICA R AR	1.000
**3	023-707500	CAP 6.8MF 35V 10% TANT G KE	4.000
**3	023-708800	CAP 33PF 500V 05% MICA R AR	1.000
**3	023-710200	CAP 5.6 TO 18PF 50V CERM R ST	3.000
**3	023-710600	CAP 10PF 1000V 10% CERM R CL	2.000
**3	023-711200	CAP 220MF 10V 10% TANT G KE	1.000
**3	023-711300	CAP .1MF 250V 10% PLYE R SE	15.000
**3	023-715300	CAP 3.3PF 500V 25% CERM G ER	1.000
**3	023-715500	CAP 1.5 TO .25PF TRIMMER R EF	2.000
**3	023-716400	CAP 12PF 300V 05% MICA R AR	1.000
**3	023-716900	CAP 1.5 PFD ERIE	3.000
**3	023-717900	CAP 5PF 300V 6.2% MICA R AR	2.000
**3	023-725900	CAP 3.5 TO 10PF 63V CERM R ST	2.000
**3	023-726300	CAP 22MF 35V TANT R KE	1.000
**3	026-707500	POT 50K PCB .5W 3299W1503 BR	1.000
**3	026-708000	POT 2K PCB .5W 3299W1202 BR	1.000
**3	026-710700	POT 200 PCB .5W 3299W1201 BR	1.000
**3	026-712000	POT 1K PCB .5W 3299W1102 BR	1.000
**3	026-712500	POT 5K PCB .5W 3299W1502 BR	1.000
**3	026-713200	POT 500 PCB .5W 3299W1501 BR	3.000
**3	026-713300	POT 2M PCB .5W 3299W1205 BR	2.000
**3	023-717900	CAP 8PF 300V 6.2% MICA R AR	1.000
**3	024-734100	CON 64F DIP/SOL ICN64955 RO	1.000
**3	024-738500	CON 1M HDR/SOL CAD72SP100 CA	34.000
**3	025-735100	SW/20 6PL9PS 1378P/REL-18-3 S	1.000
**3	025-743800	SW/TO 1P2T A 12KV	1.000
**3	025-743900	SW/TO 1P2T A-12KH	1.000
**3	026-713700	POT 5K PCB 1W 8301DE40J BR	1.000
**3	098-700200	HT SNK/207CB W	1.000
**3	134-748900	IC/TDS5130-1 8 BIT 50NS ADC	1.000
**2	415-010800	204A MEMORY BD	1.000
**3	405-002500	204A MEMORY BOARD CABLE	1.000
**4	015-706301	PIN M 18-26 GA TIN	3.000
**4	024-727000	CON 6M REC/CRP AMP 1-350234-9	1.000
**3	000-906705	PCB/204A MEMORY	1.000
**3	134-723903	IC/74LS257 MULTIPLEXER	5.000
**3	134-724903	IC/74S169 COUNTER	3.000
**3	134-739003	IC/74S374N REGISTER	2.000
**3	134-739103	IC/74LS244N OCTAL BUFFER	6.000
**3	134-711203	IC/74S74N FLIP-FLOP	1.000
**3	134-739203	IC/74S32N 2-OR	2.000

204-A PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	134-739303	IC/74S139N DEMULTIPLEXER	1.000
**3	134-739403	IC/74S157N MULTIPLEXER	2.000
**3	134-737400	IC/P2115AL	32.000
**3	022-700800	DIO RECT 1N4004 400V 1A G TX	2.000
**3	022-707100	DIO TRRY 3SM2 200V 2A G SE	2.000
**3	023-702400	CAP .01MF 100V 20% CERM R SP	18.000
**3	023-711100	CAP 4.7MF 10V 10% TANT G KE	4.000
**3	023-711200	CAP 220MF 10V 10% TANT G KE	2.000
**3	023-711300	CAP .1MF 250V 10% PLYE R SE	4.000
**3	023-715100	CAP .05MF 50V CERM R AR	9.000
**3	024-738500	CON 1M HDR/SOL CAD72SP100 CA	108.000
**3	026-706100	POT 50 PCB .7W 3006P15J7 BR	1.000
**3	100-700700	RES NET/CSP100-01-502J	1.000
**3	201-124000	RES 124 01% 1/8W PRG	1.000
**3	201-143000	RES 143 01% 1/8W PRG	1.000
**3	201-150100	RES 1.5K 01% 1/8W PRG	1.000
**3	201-226200	RES 22.6K 01% 1/8W PRG	2.000
**3	201-365000	RES 365 01% 1/8W PRG	1.000
**3	201-604000	RES 604 01% 1/8W PRG	1.000
**3	024-736500	CON 1M HDR/SOL CAD72SP100 CA	60.000
**3	025-743900	SW/T0 1P2T A-12KH	2.000
**3	032-700900	INSUL/GIODE	2.000
**3	034-715500	GUIDE/SCAN3E 11633-1	4.000
**3	098-705500	HT SNK/680-1.25-220 WAKEFIELD	1.000
**3	121-702400	REG -1.2T0-37V 1.5A 337T E NA	2.000
**2	415-010900	224A CONTROL 30	1.000
**3	000-906605	PCB/204A CONTROL CS	1.000
**3	134-711203	IC/74S74N FLIP-FLOP	3.000
**3	134-718803	IC/74LS175N REGISTER	1.000
**3	134-736003	IC/74S283J ADDER	1.000
**3	134-738203	IC/F10176F ECL FCH	1.000
**3	134-738403	IC/F10125F ECL TRANSLATOR	1.000
**3	134-791700	IC/F10137 UP/DOWN COUNTER ECL	2.000
**3	134-738603	IC/F10106DCQR	2.000
**3	134-738703	IC/F10115F	1.000
**3	134-738903	IC/10124F ECL TRANSLATOR	1.000
**3	134-738803	IC/F10131F ECL FLIP-FLOP	5.000
**3	134-749803	IC/10103F ECL-4-2 INPUT MOT	2.000
**3	134-715503	IC/74LS153N MULTIPLEXER	2.000
**3	134-719403	IC/74LS151N MULTIPLEXER	3.000
**3	134-731603	IC/74LS251N MULTIPLEXER	1.000
**3	134-711203	IC/74S74N FLIP-FLOP	1.000
**3	134-716003	IC/74S86 2-XOR	1.000
**3	134-718303	IC/74S02N 2-NOR	1.000
**3	134-739203	IC/74S32N 2-OR	1.000
**3	134-724903	IC/74S169 COUNTER	2.000
**3	134-739403	IC/74S157N MULTIPLEXER	1.000

204-A PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	134-711203	IC/74S74N FLIP-FLOP	1.000
**3	134-712803	IC/74LS00N 2-NAND	3.000
**3	134-713203	IC/74LS74N FLIP-FLOP	2.000
**3	134-713703	IC/74LS253N MULTIPLEXER	2.000
**3	134-716803	IC/74123N MONOSTABLE	1.000
**3	134-719403	IC/74LS151N MULTIPLEXER	1.000
**3	134-720503	IC/74LS174N REGISTER	2.000
**3	134-720803	IC/74LS10N 3-NAND	1.000
**3	134-722703	IC/74LS08N 2-AND	1.000
**3	134-723903	IC/74LS257 MULTIPLEXER	3.000
**3	134-730903	IC/74LS367N HEX DRIVER	1.000
**3	022-719800	LIO TRRF 1N4152 30V .5W G F C	1.000
**3	023-702400	CAP .01MF 100V 20% CERM G R R SP	4.000
**3	023-706800	CAP 150PF 500V 05% MICA G R R AR	1.000
**3	023-711100	CAP 4.7MF 10V 10% TANT G R R KE	4.000
**3	023-711200	CAP 220MF 10V 10% TANT G R R KE	2.000
**3	023-711300	CAP .1MF 250V 10% PLYE G R R SE	2.000
**3	023-715100	CAP .05MF 30V CERM R R R AR	23.000
**3	023-717000	CAP 3PF 300V 16% MICA R R R AR	1.000
**3	023-717900	CAP 8PF 300V 6.2% MICA R R R AR	1.000
**3	023-718200	CAP 27PF 300V 05% MICA R R R AR	1.000
**3	023-719600	CAP 18PF 300V 05% MICA R R R AR	2.000
**3	024-715900	CON 16F DIP/SOL 641262-3 AM	2.000
**3	024-738500	CON 1M HDR/SOL CAD72SP100 CA	70.000
**3	100-700700	RES NET/CSP105-01-502J	3.000
**3	100-701900	RES NFI/SIP 56 10PN 9RE	4.000
**3	108-015300	RES 15K 05% 1/4W	3.000
**3	108-047100	RES 470 05% 1/4W	1.000
**3	134-713900	IC/MK5009P MOS LSI	1.000
**3	191-705600	CRYS/100 MHZ .0025%	1.000
**3	201-100200	RES 10K 01% 1/8W P R E	4.000
**3	201-124200	RES 12.4K 01% 1/8W P R E	3.000
**3	201-150000	RES 150 01% 1/8W P R E	1.000
**3	201-221100	RES 2.21K 01% 1/8W P R E	1.000
**3	201-226200	RES 22.6K 01% 1/8W P R E	1.000
**3	201-249000	RES 249 01% 1/8W P R E	1.000
**3	201-280200	RES 28K 01% 1/8W P R E	1.000
**3	201-324200	RES 32.4K 01% 1/8W P R E	2.000
**3	201-562900	RES 56.2 01% 1/8W P R E	2.000
**3	201-825100	RES 8.25K 01% 1/8W P R E	3.000
**3	024-738500	CON 1M HDR/SOL CAD72SP100 CA	20.000
**3	024-749100	CON 2F HDR/SOL 22-15-2026 MO	1.000
**3	025-727000	SW/ROT/32 POS.	1.000
**3	032-700900	INSUL/DIODE	1.000
**3	034-715500	GUIDE/SCANSE 11633-1	4.000
**3	040-707900	CLIP/RICHCO V-1011	1.000
**3	098-705300	HT SNK/60728	1.000

204-A PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	121-722400	REG -1.2T0-37V 1.5A 337T E NA	1.000
**3	134-719503	IC/18S030 PROM (74S288)	1.000
**2	415-011800	➤ 2C4A 4K MEMORY BOARD	1.000
**3	000-911803	PCB/204A 4K MEMORY BOARD CS	1.000
**3	134-723803	IC/74LS169N3 COUNTER	6.000
**3	134-711203	IC/74S74N FLIP-FLOP	3.000
**3	134-716203	IC/74S175N REGISTER	1.000
**3	134-718303	IC/74S02N 2-NOR	1.000
**3	134-723903	IC/74LS257 MULTIPLEXER	5.000
**3	134-736803	IC/74LS374N REGISTER	4.000
**3	134-739003	IC/74S374N REGISTER	1.000
**4	134-739103	IC/74LS244N OCTAL BUFFER	4.000
**3	134-739203	IC/74S32N 2-OR	1.000
**3	134-763103	IC/74S112 DUAL JK FLIP-FLOP	1.000
**3	134-748600	IC/2148H 1KX4 RAM 70NS	8.000
**3	022-700800	DIO RECT 1N4004 400V 1A G TX	2.000
**3	023-722300	CAP .047MF 50V CERM G	22.000
**3	201-100100	RES 1K 01% 1/8W	4.000
**3	201-124000	RES 124 01% 1/8W	1.000
**3	201-143000	RES 143 01% 1/8W	1.000
**3	201-226200	RES 22.6K 01% 1/8W	2.000
**3	201-365000	RES 365 01% 1/8W	1.000
**3	201-604000	RES 604 01% 1/8W	1.000
**3	022-707100	DIO TERM 35M2 200V 2A G	2.000
**3	023-702400	CAP .01MF 100V 20% CERM G	2.000
**3	023-711100	CAP 4.7MF 10V 10% TANT G KN	1.000
**3	023-711200	CAP 220MF 10V 10% TANT G KN	2.000
**3	023-711300	CAP .1MF 250V 10% PLYE R	4.000
**3	023-726600	CAP 6.8MF 35V 10% TANT 9 KEE	3.000
**3	024-715900	CON 16F DIP/SOL 641262-3 AM	1.000
**3	024-727000	CON 6M REC/CRP AMP 1-350234-9	1.000
**3	024-738500	CON 1M HDR/SOL CAD72SP100 CA	16.000
**3	026-706100	POT 50 PCB .7W 3006P1500	1.000
**3	043-701900	STRIP/PCB B10200 620 8 300	2.000
**3	100-700700	RES NET/CSP10E-C1-502J	1.000
**3	025-743900	SW/TO 1P2T A-12KH	2.000
**3	032-700900	INSUL/DICDE	2.000
**3	034-715500	GUIDE/SCANBE 11633-1	4.000
**3	098-705500	HT SNK/68C-1.25-220 WAKEFIELD	1.000
**3	121-702400	REG -1.2T0-37V 1.5A 337T E NA	2.000
**3	015-702700	PIN M 18-26GA 350036-1 TIN AM	3.000
**3	134-719503	IC/18S030 PROM (74S288)	2.000
**2	465-002700	➤ 2C4A FRONT PANEL	1.000
**3	415-010500	➤ 2C4A STORAGE CONTROL BD	1.000
**4	000-906801	PCB/2C4A STORAGE CONTROL	1.000
**4	024-738500	CON 1M HDR/SOL CAD72SP100 CA	20.000
**4	025-733800	SW/PB 1P2TM SPUL/RED	2.000

204-A PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
***4	025-734600	SW/TO 1P2T TT11DG-PC-4(0) AL	4.000
***4	025-746800	SW/PO 1P2TM SRUL/GREEN	1.000
***4	108-016300	RES 15K 05% 1/4W	3.000
***4	201-221000	RES 221 01% 1/8W PRE	3.000
***4	201-226200	RES 22.6K 01% 1/8W PRE	4.000
**3	023-717500	CAP 23KMF 15V ALUM S ME	1.000
**3	068-900300	PAN/204A FRONT	1.000
**3	068-900400	PAN/204A FRONT SUP	1.000
**3	024-058900	CON 15 CXL/SOL APH 31-102	3.000
**3	035-701800	BUTT/RECT SRKL/BLK W/LED S	3.000
**3	011-900300	BRKT/204A FRONT RETAINER	1.000
**3	011-900601	BRKT/204A TRIGGER BD	1.000
**3	022-716600	DIC LEDG MV52124 2V 35MA L MO	1.000
**3	035-701300	BUTT/PUSH CL J52305-04500	9.000
**3	044-900202	SHIELD/204A MEMORY	1.000
**3	044-900302	SHIELD/204A TRIGGER BD	1.000
**3	045-703501	KNOB/KPN-9003A-1/4"	1.000
**3	045-703601	KNOB/KN-5003A-1/8"	3.000
**3	051-700300	BUMPER/SU-5019 1/4" BLACK MM	2.000
**3	085-708600	CBL/34 COND/AP 922541-34-99-3	2.000
**3	085-708800	CBL/26 COND/AP 922521-26-99-3	1.000
**3	085-708900	CBL/20 COND/AP 922521-20-99-0	2.000
**3	085-900201	CBL/10 & 34 COND/AP 950504	1.000
**3	123-707400	MECH MISC/RECT LED ADAPTER	1.000
*2	035-701300	BUTT/PUSH CL J52305-04500	9.000
*2	035-701800	BUTT/RECT SRKL/BLK W/LED S	3.000
*2	035-704800	BUTT/AT467K BLACK .370" NK	6.000
1	695-000700	204A ACCESSORY KIT	1.000
*2	035-718300	PROBE/X1 COLINE 906-90-604	2.000

205-A PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
1	085-718300	PROBE/X1 COLINE 906-90-604	2.000
1	675-205A	205A PLUG-IN UNIT ASSEMBLY	1.000
*2	615-000200	205A CONTROL BOARD ASSEMBLY	1.000
**3	000-915500	PCB 205A CONTROL	1.000
**3	134-712803	IC/74LS00N 2-NAND	1.000
**3	134-712903	IC/74LS04N HEX INVERTER	1.000
**3	134-713203	IC/74LS74N FLIP-FLOP	2.000
**3	134-715503	IC/74LS153N MULTIPLEXER	1.000
**3	134-716903	IC/74123N MONOSTABLE	1.000
**3	134-719403	IC/74LS151N MULTIPLEXER	4.000
**3	134-720503	IC/74LS02N 2-NOR	1.000
**3	134-720503	IC/74LS174N REGISTER	2.000
**3	134-722703	IC/74LS08N 2-AND	1.000
**3	134-724903	IC/74S169 COUNTER	2.000
**3	134-727600	IC/1458 OPAMP	1.000
**3	134-731603	IC/74LS251N MULTIPLEXER	1.000
**3	134-736803	IC/74LS374N REGISTER	5.000
**3	134-738403	IC/F10125F ECL TRANSLATOR	2.000
**3	134-738903	IC/F10131F ECL FLIP-FLOP	3.000
**3	134-738903	IC/10124F ECL TRANSLATOR	5.000
**3	134-739103	IC/74LS244N OCTAL BUFFER	3.000
**3	134-749803	IC/10103F ECL-4-2 INPUT MOT	1.000
**3	134-773400	IC/10102L ECL GATE	2.000
**3	134-792800	IC/10104F ECL 2 INPUT AND	1.000
**3	134-792900	IC/10105F ECL TRIPLE OR/NOR	1.000
**3	134-793100	IC/10136F ECL HEX COUNTER	1.000
**3	022-700800	DIO RECT 1N4004 400V 1A G TX	7.000
**3	022-709400	DIO TRRF 1N4150 50V .2A G TX	1.000
**3	022-711600	DIO TRRF 1N4376 10V .05A G FOC	2.000
**3	022-713000	DIO RECT F0H300 150V .2A G FOC	2.000
**3	022-714100	DIO SCHR HSCH1001 60V15MA G HP	2.000
**3	023-722300	CAP .047MF 50V CERM G	14.000
**3	201-010000	RES 10 01% 1/8W	2.000
**3	201-100000	RES 100 01% 1/8W	7.000
**3	201-100100	RES 1K 01% 1/8W	2.000
**3	201-100200	RES 10K 01% 1/8W	6.000
**3	201-100400	RES 1M 01% 1/8W	3.000
**3	201-130100	RES 1.3K 01% 1/8W	1.000
**3	201-150100	RES 1.5K 01% 1/8W	1.000
**3	201-169100	RES 1.69K 01% 1/8W	1.000
**3	201-200100	RES 2K 01% 1/8W	2.000
**3	201-221100	RES 2.21K 01% 1/8W	4.000
**3	201-226200	RES 22.6K 01% 1/8W	1.000
**3	201-274100	RES 2.74K 01% 1/8W	3.000
**3	201-422100	RES 4.22K 01% 1/8W	1.000
**3	201-475100	RES 4.75K 01% 1/8W	9.000
**3	201-499000	RES 499 01% 1/8W	2.000

205-A PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	201-499100	RES 4.99K 01% 1/8W	2.0000
**3	201-511100	RES 5.11K 01% 1/8W	1.0000
**3	201-523300	RES 523K 01% 1/8W	2.0000
**3	201-562900	RES 56.2 01% 1/8W	1.0000
**3	201-604000	RES 604 01% 1/8W	1.0000
**3	201-619100	RES 6.19K 01% 1/8W	2.0000
**3	021-701800	TRN PNP 2N3905 40V .35W	1.0000
**3	021-702200	TRN NPN 2N3903 40V 1W	2.0000
**3	021-710200	TRN NPN 2N5179 12V .2W	3.0000
**3	021-710300	TRN PNP A440 15V .2W	1.0000
**3	021-714000	TRN PNP MP3-H81 201 .35W	2.0000
**3	021-716100	TRN FETCN U440 25V 50MA	1.0000
**3	023-700100	CAP 100PF 500V 05% MICA	1.0000
**3	023-702400	CAP .01MF 100V 20% CERAM	2.0000
**3	023-706700	CAP 390PF 500V 05% MICA	1.0000
**3	023-706300	CAP 150PF 500V 05% MICA	2.0000
**3	023-711300	CAP .1MF 250V 10% PLYE	3.0000
**3	023-711700	CAP 47PF 300V 5% MICA	1.0000
**3	023-717900	CAP 8PF 300V 6.2% MICA	1.0000
**3	023-726400	CAP 4.7MF 10V 10% TANT	1.0000
**3	023-726600	CAP 6.8MF 35V 10% TANT	1.0000
**3	024-715900	CON 16F DIP/SOL 641262-3	6.0000
**3	024-730900	CON 28F DIP/SOL 641267-3	1.0000
**3	024-740700	CON 20F DIP/SOL 641264-3	1.0000
**3	024-755600	CON 60M HDR/SOL 929839-01-3	2.0000
**3	026-717200	POT 5K PC3 .5W	1.0000
**3	070-708200	FUSE .5A 256.500	1.0000
**3	100-705700	RES NET/SIP 56 8 PN 7	6.0000
**3	121-702600	RES 2TC33V .15A LAS1000 A	1.0000
**3	134-794400	IC/AM6801 COMPARATOR	1.0000
**3	024-749100	CON 2F HDR/SOL 22-15-2026	1.0000
**3	025-750300	SW/RO 4P22PS TIME/PT 205A	1.0000
**3	134-793000	IC/10107F ECL EXCLUSIVE OR/NO	1.0000
**3	134-717400	IC/14S10 PROM (74S287)	2.0000
**3	134-719500	IC/18S030 PROM (74S289)	3.0000
**3	134-728300	IC/18S42 PROM (74S472)	1.0000
**3	134-755700	IC/82S10CN 16X48XB FPLA	1.0000
*2	615-000300	205A MEMORY BOARD ASSEMBLY	1.0000
**3	000-9154XX	PCE/205A MEMORY BD	1.0000
**3	134-713900	IC/MK50090 MOS LST	1.0000
**3	134-715500	IC/74LS153N MULTIPLEXER	1.0000
**3	134-718800	IC/74LS175N REGISTER	1.0000
**3	134-720400	IC/74LS02N 2-NOR	1.0000
**3	134-723900	IC/74LS257 MULTIPLEXER	1.0000
**3	134-738200	IC/F10176F ECL FCH	6.0000
**3	134-738400	IC/F10125F ECL TRANSLATOR	3.0000
**3	134-738600	IC/F10106DCR	1.0000

205-A PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	134-738703	IC/F10115F	1.000
**3	134-738803	IC/F10131F ECL FLIP-FLOP	7.000
**3	134-738903	IC/10124F ECL TRANSLATOR	2.000
**3	134-749003	IC/10103F ECL-4-2 INPUT MOT	4.000
**3	134-772600	IC/LM3524N PW	1.000
**3	134-773400	IC/10102L ECL GATE	6.000
**3	134-791700	IC/F10137 UP/DOWN COUNTER ECL	3.000
**3	134-792700	IC/10101F ECL 2 INPUT OR/NOR	1.000
**3	134-792900	IC/10104F ECL 2 INPUT AND	2.000
**3	134-793000	IC/10107F ECL EXCLUSIVE OR/NO	2.000
**3	134-793100	IC/10136F ECL HEX COUNTER	6.000
**3	134-793300	IC/10173F ECL QUAD MUX	8.000
**3	134-793400	IC/10174F ECL 4 TO 1 MUX	2.000
**3	022-711600	DIO TRRF 1N4376 10V .05A G FC	3.000
**3	022-714100	DIO SCHR HS CH1001 60V15MAG HP	5.000
**3	023-722300	CAP .047MF 50V CERM G	27.000
**3	201-100000	RES 100 01% 1/8W P	1.000
**3	201-100100	RES 1K 01% 1/8W P	1.000
**3	201-100300	RES 100K 01% 1/8W P	1.000
**3	201-124000	RES 124 01% 1/8W P	1.000
**3	201-143200	RES 14.3K 01% 1/8W P	1.000
**3	201-150000	RES 150 01% 1/8W P	1.000
**3	201-169100	RES 1.69K 01% 1/8W P	1.000
**3	201-200100	RES 2K 01% 1/8W P	1.000
**3	201-221000	RES 221 01% 1/8W P	1.000
**3	201-221100	RES 2.21K 01% 1/8W P	1.000
**3	201-249100	RES 2.49K 01% 1/8W P	1.000
**3	201-332100	RES 3.32K 01% 1/8W P	2.000
**3	201-392900	RES 39.2 01% 1/8W P	2.000
**3	201-412100	RES 4.12K 01% 1/8W P	1.000
**3	201-475100	RES 4.75K 01% 1/8W P	7.000
**3	201-499000	RES 499 01% 1/8W P	1.000
**3	201-499100	RES 4.99K 01% 1/8W P	5.000
**3	201-562900	RES 56.2 01% 1/8W P	23.000
**3	201-631000	RES 681 01% 1/8W P	2.000
**3	021-702200	TRN NPN 2N3903 40V 1W R MO	3.000
**3	021-716200	TRN FETN IRF0110 100V 1W N IN	2.000
**3	022-715900	DIO SCHR VS K540 40V 5A G VA	2.000
**3	023-700100	CAP 100PF 500V 05% MICA R AR	1.000
**3	023-702400	CAP .01MF 100V 20% CERM R SP	3.000
**3	023-711200	CAP 220MF 10V 10% TANT G KE	1.000
**3	023-711300	CAP .1MF 250V 10% PLYE R SE	7.000
**3	023-715100	CAP .05MF 50V CERM R AR	1.000
**3	023-715200	CAP .001MF 2KV 20% CERM G ER	1.000
**3	023-715500	CAP 1.5 TO .25PF TRIMMER R EF	1.000
**3	023-716400	CAP 12PF 300V 05% MICA R AR	1.000
**3	023-717000	CAP 3PF 300V 16% MICA R AR	1.000

205-A PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	023-72660	CAP 6.6MF 35V 10% TANT P KE	23.0000
**3	024-73890	CON 1M HDR/SOL CAP72SP103 CA	163.0000
**3	024-74310	CON 8F DIP/SOL AMP 64126C-X	1.0000
**3	026-71300	POT 200 PCB .5W 3299X1201 BR	1.0000
**3	026-71400	POT 1K PCB .5W 3299X1102 BR	1.0000
**3	100-70570	RES NET/CSP100-01-502J	2.0000
**3	100-70350	RES NET/SIP 680 100N RE	1.0000
**3	100-70570	RES NET/SIP 56 8 PN 7 RE	20.0000
**3	106-70350	RES .1 05% 10W	1.0000
**3	106-70660	RES 0.69 1/2W .5% POE	1.0000
**3	108-04710	RES 470 05% 1/4W	1.0000
**3	134-70350	IC/13474-15Z 1KX4 25NS RAM EC	8.0000
**3	191-70360	CRYST/100 KHZ .0025%	1.0000
**3	011-40320	BRST/205A CAPACITOR	1.0000
**3	019-70450	CHECKER/COIL	2.0000
**3	019-70790	INDUCT/XYTRONICS/WEE 0.47UH	1.0000
**3	019-70940	INDUCT/360 UH 1/2W 10% RIAS	3.0000
**3	019-70010	XPFORMER/205A POWER SUPPLY	1.0000
**3	021-70100	TRANS PNP 2N3769 60V 150W	1.0000
**3	022-72360	DIO RECT SCNA2 200V 8.5A SC	1.0000
**3	023-71750	CAP 28KMF 15V ALUM S MC	1.0000
**3	024-73320	CON 6M HDR/SOL AMP 9-350259-1	1.0000
**3	025-74890	SW/T0 2P2T A-22KH	4.0000
**3	032-70030	INDUCT/DIODE	1.0000
**3	032-70090	INDUCT/DIODE	2.0000
**3	067-70090	CON/713110-L00-3C0	2.0000
**3	079-70030	THERMOS/PTH487AC19E222TS	1.0000
**3	098-70400	HT SNK/EXPL P.S.	1.0000
**3	121-70120	RES -2.2T0-30V 1A 795U10	1.0000
**3	121-70240	RES -1.2T0-37V 1.5A 337T	1.0000
**3	134-73880	IC/F10131F ECL FLIP-FLOP	1.0000
**3	615-00040	205A ADC BOARD ASSEMBLY	1.0000
**3	000-91490	POWER 205 ADC 30	1.0000
**3	134-73870	IC/F10115F	4.0000
**3	134-74980	IC/10103F ECL-4-2 INPUT MOT	4.0000
**3	134-76300	IC/OP-27GZ OPAMP	2.0000
**3	134-79420	IC/CA3102P OP-AMP	2.0000
**3	022-70030	DIO RECT 1N4004 400V 1A G TX	6.0000
**3	022-71160	DIO TRRF 1N4376 10V .05A G FC	8.0000
**3	022-71300	DIO RECT FOH300 150V .2A G FC	4.0000
**3	022-71410	DIO SCHR HSCH1001 60V154A G HD	4.0000
**3	023-72230	CAP .047MF 50V CERAM	3.0000
**3	201-00100	RES 1 01% 1/8W	16.0000
**3	201-01000	RES 10 01% 1/8W	22.0000
**3	201-10000	RES 100 01% 1/8W	20.0000
**3	201-10010	RES 1K 01% 1/8W	10.0000
**3	201-10020	RES 10K 01% 1/8W	2.0000

205-A PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	201-100400	RES 1M 01% 1/8W P P P P	4.0000
**3	201-105200	RES 10.5K 01% 1/8W P P P P	4.0000
**3	201-124000	RES 124 01% 1/8W P P P P	2.0000
**3	201-143200	RES 14.3K 01% 1/8W P P P P	2.0000
**3	201-162400	RES 1.62M 01% 1/8W P P P P	4.0000
**3	201-169100	RES 1.69K 01% 1/8W P P P P	2.0000
**3	201-178300	RES 178K 01% 1/8W P P P P	2.0000
**3	201-196400	RES 1.96M 01% 1/8W P P P P	4.0000
**3	201-200100	RES 2K 01% 1/8W P P P P	8.0000
**3	201-221100	RES 2.21K 01% 1/8W P P P P	4.0000
**3	201-249000	RES 249 01% 1/8W P P P P	2.0000
**3	201-316100	RES 3.16K 01% 1/8W P P P P	4.0000
**3	201-374100	RES 3.74K 01% 1/8W P P P P	2.0000
**3	201-422100	RES 4.22K 01% 1/8W P P P P	2.0000
**3	201-475100	RES 4.75K 01% 1/8W P P P P	2.0000
**3	201-499000	RES 499 01% 1/8W P P P P	8.0000
**3	201-499100	RES 4.99K 01% 1/8W P P P P	6.0000
**3	201-562900	RES 56.2 01% 1/8W P P P P	4.0000
**3	201-681900	RES 68.1 01% 1/8W P P P P	2.0000
**3	201-825000	RES 825 01% 1/8W P P P P	2.0000
**3	021-701900	TRN PNP 2N3905 40V .35W B A MO	2.0000
**3	021-710200	TRN NPN 2N5179 12V .2W A A MO	10.0000
**3	021-710800	TRN PNP A440 15V .2W A A AM	2.0000
**3	021-713500	TRN NPN SJE1716 60V 75W E A MO	2.0000
**3	021-714000	TRN PNP MPS-HR1 201 .35W B A MO	6.0000
**3	021-716100	TRN FETJN U440 25V 50MA A A SL	4.0000
**3	023-700100	CAP 100PF 500V 05% MICA R R AR	4.0000
**3	023-700200	CAP 1000PF 100V 05% MICA R R AR	4.0000
**3	023-709100	CAP 20PF 500V 05% MICA R R AR	13.0000
**3	023-710200	CAP 5.5 TO 18PF 50V CERM R ST	6.0000
**3	023-710600	CAP 10PF 1000V 10% CERM R SL	4.0000
**3	023-711200	CAP 220MF 10V 10% TANT G KE	4.0000
**3	023-711300	CAP .1MF 250V 10% PLYE R SE	58.0000
**3	023-715500	CAP 1.5 TO .25PF TRIMMER R EF	4.0000
**3	023-717000	CAP 3PF 300V 16% MICA R R AR	4.0000
**3	023-717800	CAP 6PF 300V 8.3% MICA R R AR	4.0000
**3	023-725900	CAP 3.5 TO 10PF 63V CERM R ST	4.0000
**3	023-726300	CAP 22MF 35V TANT R KE	17.0000
**3	023-726600	CAP 6.8MF 35V 10% TANT R KE	3.0000
**3	024-755600	CON 60M HDR/SOL 929838-01-30	8.0000
**3	024-788900	CON 20M HDR/SOL 3911370-20 SY	2.0000
**3	026-707500	POT 50K PCB .5W 3299W1503 BR	2.0000
**3	026-710500	POT 20K PCB .5W 3299W1203 BR	2.0000
**3	026-712000	POT 1K PCB .5W 3299W1102 BR	4.0000
**3	026-712500	POT 5K PCB .5W 3299W1502 BR	2.0000
**3	026-713200	POT 500 PCB .5W 3299W1501 BR	6.0000
**3	026-713300	POT 2M PCB .5W 3299W1205 BR	4.0000

205-A PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**	100-702000	RES NET/SIP 560 10PN 99E	7.000
**	100-705700	RES NET/SIP 56 8 PN 7 RE	4.000
**	121-702600	REG 2T038V .15A LAS1000 A LA	2.000
**	025-748900	SW/TO 2P2T A-22KH NK	2.000
**	025-749000	SW/TO 2P2T3PS A-24KH NK	2.000
**	025-750100	SW/RO 5P9POS S	2.000
**	026-717300	POT 1K/10K PCB .5W CL	2.000
**	134-794500	IC/TDC1025 8 BIT ADC 2JNS	2.000
**	665-000100	205A FRONT PANEL ASSEMBLY	1.000
**	415-012800	205A STORAGE CONTROL BOARD	1.000
**	000-915300	PCB/205A STORAGE CONTROL	1.000
**	025-733800	SW/PB 1P2TM SRUL/RED	2.000
**	025-746800	SW/PB 1P2TM SRUL/GREEN	1.000
**	035-701800	BUTT/RECT SRKL/BLK W/LED S	3.000
**	085-907201	CBL/10 COND 5.75" HDR/PC 2C5	1.000
**	024-788000	CON 1F JCK/SOL 3267 PO	1.000
**	068-904300	PAN/205A FRONT	1.000
**	068-904400	PAN/205A FRONT SUB	1.000
**	085-908000	CBL/COAX 4.25" BNC/HDR CHABIN	4.000
**	023-716200	CAP 8300MF 25V ALUM S CA	1.000
**	034-713300	GUIDE/SCANSE #11633-4	2.000
**	044-903501	SHIELD/205A SUPPORT	1.000
**	022-716600	DIO LEDG MV52124 2V 35MA L MO	1.000
**	032-702500	INSUL/#6 SCREW 1/4" RP	3.000
**	035-704800	BUTT/AT467K BLACK .370" NK	16.000
**	044-904100	SHIELD/205A ADC	1.000
**	045-703501	KN08/KPN-9003A-1/4"	3.000
**	045-703601	KN03/KN-5003A-1/8"	3.000
**	085-907000	CBL/40 COND 3" HDR/HDR 205	2.000
**	085-907100	CBL/40 COND 1.5" HDR/HDR 2C5	2.000
**	035-907700	CBL/COAX 19" HDR/HDR CHABIN	1.000
**	085-907800	CBL/COAX 16" HDR/HDR CHABIN	1.000
**	085-907900	CBL/COAX 6" HDR/HDR CHABIN	1.000
**	123-707400	MECH MISC/RECT LED ADAPTER	1.000

206-2 PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
1	475-001900	➤ 206 FINAL ASSEMBLY	1.0000
*2	011-723401	BRKT/206 RETAINER	1.0000
*2	034-714300	GUIDE/W/TAPE	1.0000
*2	042-711000	COVER/206 AMP DIVIDER	1.0000
*2	044-705001	SHIELD/206 MEMORY BD	1.0000
*2	051-700100	BUMPER/SJ5514	4.0000
1	675-206	➤ 206 PLUG-IN (LESS SHIELDS)	1.0000
*2	415-004000	➤ 206 MEMORY 3D (4K)	1.0000
**3	000-909000	PCB/206 MEMORY (4K)	1.0000
**3	134-755000	IC/2114 1K X 4 RAM 450NS NA	12.0000
**3	134-723903	IC/74LS257 MULTIPLEXER	10.0000
**3	134-724903	IC/74S169 COUNTER	3.0000
**3	134-716003	IC/74S86 2-XOR	1.0000
**3	023-722300	CAP .047MF 50V CERM G G CL	11.0000
**3	023-711100	CAP 4.7MF 10V 10% TANT G G KE	5.0000
**3	023-722300	CAP .047MF 50V CERM G G CL	1.0000
**3	024-715900	CON 16F DIP/SOL 641262-3 AM	1.0000
**3	134-719503	IC/18SJ30 PROM (74S288)	1.0000
*2	415-005800	➤ 206 ADC 8D	2.0000
**3	000-900910	PCB/ADC 206 & 207	1.0000
**3	134-710203	IC/74LS83N ADDER	3.0000
**3	134-710403	IC/74S00N 2-NAND	1.0000
**3	134-712803	IC/74LS00N 2-NAND	2.0000
**3	134-718803	IC/74LS175N REGISTER	4.0000
**3	134-722303	IC/74LS298N REGISTER	3.0000
**3	134-722703	IC/74LS00N 2-AND	2.0000
**3	134-710403	IC/74S00N 2-NAND	1.0000
**3	108-015300	RES 15K 05% 1/4W	5.0000
**3	108-047000	RES 47 05% 1/4W	7.0000
**3	201-001000	RES 1 01% 1/8W	1.0000
**3	201-010000	RES 10 01% 1/8W	2.0000
**3	201-100000	RES 100 01% 1/8W	3.0000
**3	201-1000100	RES 1K 01% 1/8W	9.0000
**3	201-1002000	RES 10K 01% 1/8W	12.0000
**3	201-1003000	RES 100K 01% 1/8W	6.0000
**3	201-1240000	RES 124 01% 1/8W	2.0000
**3	201-1370000	RES 137 01% 1/8W	2.0000
**3	201-1430000	RES 143 01% 1/8W	1.0000
**3	201-1432000	RES 14.3K 01% 1/8W	1.0000
**3	201-1500000	RES 150 01% 1/8W	5.0000
**3	201-1780000	RES 178 01% 1/8W	3.0000
**3	201-196100	RES 1.96K 01% 1/8W	1.0000
**3	201-2001000	RES 2K 01% 1/8W	4.0000
**3	201-2002000	RES 20K 01% 1/8W	1.0000
**3	201-2109000	RES 21 01% 1/8W	1.0000
**3	201-2210000	RES 221 01% 1/8W	1.0000
**3	201-2211000	RES 2.21K 01% 1/8W	1.0000

206-2 PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**	201-249200	RES 24.9K 01% 1/8W	10.0000
**	201-267900	RES 26.7 01% 1/8W	1.0000
**	201-274100	RES 2.74K 01% 1/8W	3.0000
**	201-316100	RES 3.16K 01% 1/8W	1.0000
**	201-374100	RES 3.74K 01% 1/8W	1.0000
**	201-392100	RES 3.92K 01% 1/8W	3.0000
**	201-402000	RES 402 01% 1/8W	1.0000
**	201-475100	RES 4.75K 01% 1/8W	5.0000
**	201-487200	RES 48.7K 01% 1/8W	7.0000
**	201-499000	RES 499 01% 1/8W	4.0000
**	201-499100	RES 4.99K 01% 1/8W	1.0000
**	201-698100	RES 6.98K 01% 1/8W	6.0000
**	201-750100	RES 7.5K 01% 1/8W	1.0000
**	201-806100	RES 8.06K 01% 1/8W	2.0000
**	021-701300	TRN PNP 2N3906 40V .35A	1.0000
**	021-702300	TRN NPN 2N3904 40V .35A	1.0000
**	021-704700	TRN NPN 2N3904 40V .35A	1.0000
**	021-706300	TRN PNP 2N3906 40V .35A	1.0000
**	022-711600	DIO TRRF 1N4376 10V .35A	1.0000
**	022-714100	DIO SHT HSCH1001 10V .35A	1.0000
**	023-039200	CAP 22MF 15V 10% TANT	1.0000
**	023-701600	CAP 2.2MF 20V 10% TANT	1.0000
**	023-702400	CAP .01MF 100V 10% TANT	1.0000
**	023-704700	CAP 1MF 35V 10% TANT	1.0000
**	023-706700	CAP 390PF 500V 10% TANT	1.0000
**	023-706900	CAP 150PF 500V 10% TANT	1.0000
**	023-709100	CAP 200PF 500V 10% TANT	1.0000
**	023-711000	CAP 22MF 35V 10% TANT	1.0000
**	023-712200	CAP .022MF 200V 10% TANT	1.0000
**	023-717900	CAP 6PF 300V 10% TANT	1.0000
**	023-719700	CAP 2.2MF 50V 10% TANT	1.0000
**	024-715900	CON 16F DIP/SOL 64126	1.0000
**	026-705600	POT 2K PCB .7W 30060	1.0000
**	026-705700	POT 5K PCB .7W 30060	1.0000
**	026-706200	POT 50K PCB .7W 30060	1.0000
**	026-707700	POT 500 PCB .5W 80142	1.0000
**	121-702700	REG 5 TC 30V .5A 78M50	1.0000
**	121-702300	REG -2.2/-30V .5A 79M50	1.0000
**	134-716900	IC/74LS175N REGISTER	1.0000
**	022-711600	DIO TRRF 1N4376 10V .35A	1.0000
**	022-714100	DIO SHT HSCH1001 10V .35A	1.0000
**	023-701600	CAP 2.2MF 20V 10% TANT	1.0000
**	100-700900	RES NET/7X25K/.01%	1.0000
**	201-100300	RES 100K 01% 1/8W	1.0000
**	201-110200	RES 11K 01% 1/8W	1.0000
**	201-137000	RES 137 01% 1/8W	1.0000
**	201-143000	RES 143 01% 1/8W	1.0000

206-2 PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	201-1500000	RES 150 01% 1/8W PRE	3.000
**3	201-1503000	RES 150K 01% 1/8W PRE	3.000
**3	201-2492000	RES 24.9K 01% 1/8W PRE	12.000
**3	201-3321000	RES 3.32K 01% 1/8W PRE	3.000
**3	201-3742000	RES 37.4K 01% 1/8W PRE	1.000
**3	201-8061000	RES 8.06K 01% 1/8W PRE	3.000
**3	201-8872000	RES 88.7K 01% 1/8W PRE	1.000
**2	415-0059000	206 CONTROL BD	1.000
**3	000-9012111	PCB/206 & 207 CONTROL BOARD	1.000
**3	134-7132003	IC/74LS74N FLIP-FLOP	11.000
**3	134-7188003	IC/74LS175N REGISTER	6.000
**3	134-7112003	IC/74LS74N FLIP-FLOP	5.000
**3	134-7309003	IC/74LS367N HEX DRIVER	4.000
**3	134-7128003	IC/74LS00N 2-NAND	4.000
**3	134-7137003	IC/74LS253N MULTIPLEXER	4.000
**3	134-7194003	IC/74LS151N MULTIPLEXER	3.000
**3	134-7101003	IC/74164N SHIFT REGISTER	2.000
**3	134-7129003	IC/74LS04N HEX INVERTER	2.000
**3	134-7155003	IC/74LS153N MULTIPLEXER	2.000
**3	134-7204003	IC/74LS02N 2-NOR	2.000
**3	134-7227003	IC/74LS08N 2-AND	2.000
**3	134-7249003	IC/74S169 COUNTER	2.000
**3	134-7013003	IC/7400N 2-NAND	1.000
**3	134-7162003	IC/74S175N REGISTER	1.000
**3	134-7179003	IC/74LS96N 2-XOR	1.000
**3	134-7191003	IC/74196N COUNTER	1.000
**3	134-7316003	IC/74LS251N MULTIPLEXER	1.000
**3	021-7027000	TRN NPN 2N4265 12V .35W B MO	2.000
**3	022-7008000	CIO RECT 1N4004 400V 1A B TX	1.000
**3	022-7141000	DIO SHT HSCH1001 60V15MAG HP	2.000
**3	023-0292000	CAP 22MF 15V 10% TANT G KE	1.000
**3	023-7001000	CAP 100PF 500V 05% MICA R AR	2.000
**3	023-7003000	CAP 500PF 500V 05% MICA R AR	1.000
**3	023-7005000	CAP 250PF 500V 05% MICA R AR	1.000
**3	023-7024000	CAP .01MF 100V 20% CERM R SP	5.000
**3	023-7106000	CAP 10PF 1000V 10% CERM R CL	1.000
**3	023-7111000	CAP 4.7MF 10V 10% TANT R KE	4.000
**3	023-7151000	CAP .05MF 50V CERM R AR	5.000
**3	024-7159000	CON 16F DIP/SOL 641262-3 AM	3.000
**3	024-7335000	CON 1M HDR/SOL CAD72SP100 CA	20.000
**3	024-7407000	CON 20F DIP/SOL 641264-3 AM	1.000
**3	100-7007000	RES NET/CSP10E-01-502J	2.000
**3	108-0470000	RES 47 05% 1/4W	2.000
**3	108-0471000	RES 470 05% 1/4W	1.000
**3	134-7139000	IC/MK5009P MOS LSI	1.000
**3	191-7046000	CRYS/40 MHZ .005% HC25	1.000
**3	201-0100000	RES 10 01% 1/8W PRE	3.000

206-2 PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	201-100100	RES 1K 01% 1/8W	2.0000
**3	201-100200	RES 10K 01% 1/8W	1.0000
**3	201-150100	RES 1.5K 01% 1/8W	1.0000
**3	201-221000	RES 221 01% 1/8W	1.0000
**3	201-221100	RES 2.21K 01% 1/8W	2.0000
**3	201-332100	RES 3.32K 01% 1/8W	1.0000
**3	201-681000	RES 681 01% 1/8W	2.0000
**3	025-727000	SW/ROT/32 POS.	1.0000
**3	134-717403	IC/14S10 PROM (74S287)	1.0000
**3	134-719503	IC/18S030 PROM (74S288)	1.0000
**3	134-723303	IC/18S42 PROM (74S472)	1.0000
**2	415-006200	206 MOTHER 30	1.0000
**3	000-901107	PCB/MOTHER 206 & 207	1.0000
**3	134-713203	IC/74LS74N FLIP-FLOP	2.0000
**3	134-716303	IC/74123N MONOSTABLE	1.0000
**3	134-712703	IC/TCL820CN3	1.0000
**3	134-723903	IC/74LS257 MULTIPLEXER	1.0000
**3	021-706200	TRN FETJN E230 40V .35W	2.0000
**3	022-703300	DIO ZENR 145234 5.2V .5W	1.0000
**3	022-719800	DIO TRRF 1N4152 30V .35W	3.0000
**3	023-700200	CAP 1000PF 100V 05% MICA	2.0000
**3	023-700300	CAP 500PF 500V 05% MICA	1.0000
**3	023-702400	CAP .01MF 100V 20% CERM	1.0000
**3	023-711100	CAP 4.7MF 10V 10% TANT	1.0000
**3	023-713500	CAP 4.7MF 50V 10% TANT	4.0000
**3	023-715100	CAP .05MF 50V CERM	4.0000
**3	023-717000	CAP 3PF 300V 16% MICA	2.0000
**3	024-733200	CON 6M HDR/SOL AMP 9-350259-1	1.0000
**3	024-737200	CON 56PIN/AMP 67907-3	2.0000
**3	024-733500	CON 1M HDR/SOL CAD72SP100 CA	2.0000
**3	024-744700	CON 30F EDG/SOL MCP MPSC125-4	2.0000
**3	108-015300	RES 15K 05% 1/4W	2.0000
**3	134-711900	IC/LM318H OPAMP	2.0000
**3	201-100200	RES 10K 01% 1/8W	2.0000
**3	201-100300	RES 100K 01% 1/8W	1.0000
**3	201-100400	RES 1M 01% 1/8W	1.0000
**3	201-124200	RES 12.4K 01% 1/8W	2.0000
**3	201-178200	RES 17.8K 01% 1/8W	2.0000
**3	201-210900	RES 21 01% 1/8W	4.0000
**3	201-221000	RES 221 01% 1/8W	1.0000
**3	201-226200	RES 22.6K 01% 1/8W	3.0000
**3	201-274000	RES 274 01% 1/8W	1.0000
**3	201-332000	RES 332 01% 1/8W	2.0000
**3	201-332100	RES 3.32K 01% 1/8W	2.0000
**3	201-487200	RES 48.7K 01% 1/8W	2.0000
**3	201-681000	RES 681 01% 1/8W	1.0000
**3	201-698100	RES 6.98K 01% 1/8W	1.0000

206-2 PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	201-825100	RES 2.25K 01% 1/8W PRE	2.0000
**3	023-706900	CAP 50M ^F 50V ALUM 5 SP	1.0000
**2	465-001600	➤ 206 FRONT PANEL	1.0000
**3	415-006000	➤ 206 STORAGE CONTROL 8D	1.0000
***4	000-900900	PCB/206 STORAGE CONTROL	1.0000
***4	024-733800	CON 1M HDR/SOL CAD72SP100 CA	20.0000
***4	025-733800	SW/PS 1P2TM SPUL/RED	2.0000
***4	025-746800	SW/PS 1P2TM SPUL/GREEN	1.0000
***4	201-221000	RES 221 01% 1/8W PRE	3.0000
***4	201-221100	RES 22.21K 01% 1/8W PRE	3.0000
***4	201-226200	RES 22.6K 01% 1/8W PRE	3.0000
**3	415-013500	➤ 206 STORAGE CONTROL (VER 2)	1.0000
***4	000-917700	PCB/206 STORAGE CONTROL	1.0000
***4	024-733800	CON 1M HDR/SOL CAD72SP100 CA	20.0000
***4	025-733800	SW/PS 1P2TM SPUL/RED	2.0000
***4	025-746800	SW/PS 1P2TM SPUL/GREEN	1.0000
***4	025-750000	SW/TG 1P2T A-12KP NK	3.0000
***4	201-221000	RES 221 01% 1/8W PRE	3.0000
***4	201-221100	RES 22.21K 01% 1/8W PRE	3.0000
***4	201-226200	RES 22.6K 01% 1/8W PRE	3.0000
**3	068-727711	PAN/206 FRONT	1.0000
**3	068-727711	PAN/206 FRONT	1.0000
**3	068-740804	PAN/206 FRONT SUB	1.0000
**3	068-740806	PAN/206/207 FRONT SUB	1.0000
**3	023-711300	CAP .1MF 250V 10% PLYE D SE	1.0000
**3	085-708700	CRL/20 COND/AP 922531-20-99-3	1.0000
**3	010-700900	NUT/BL ANODI W-NU-170	1.0000
**3	011-721607	BRKT/MOTHER BD/EXPL	1.0000
**3	022-714500	JIG LEDG 406G 1.0V 10MA M 1N	1.0000
**3	024-058900	CON 1F CXL/SOL APH 31-102	1.0000
**3	025-716000	SW/PS 6531 C&	1.0000
**3	025-727600	SW/PS 2PL5PS PA166-C40 CL	3.0000
**3	025-727900	SW/SL GF-126-PC-620-18 C	3.0000
**3	026-710000	POT 100K PML BA1470134 CL	1.0000
**3	035-701300	BUTT/RECT SRKL/BLK W/LED S	3.0000
**3	035-704300	BUTT/AT467K BLACK .370" NK	3.0000
**3	045-703203	KNOB/KPN-5008A 1/8"	3.0000
**3	045-703601	KNOB/KN-5008A-1/8"	1.0000
**3	085-900100	CRL/20 COND/PLUG-IN FRONT	1.0000
**3	020-701310	CHAS/PLUG-IN	1.0000
**3	034-713300	GUIDE/SCANBE #11633-4	2.0000
**3	045-703501	KNOB/KPN-9008A-1/4"	1.0000
**2	475-004200	➤ 206 DIII AMP ASSEMBLY	2.0000
**3	415-011400	➤ 206 DIII AMP 3D	1.0000
***4	000-907201	PCB/206 DIII AMP	1.0000
***4	134-730603	IC/CA3140EX	4.0000
***4	134-794900	IC/LF356N OP-AMP	2.0000

206-2 PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
***4	023-700100	CAP 100PF 500V 05% MICA R AR	2.0000
***4	023-700200	CAP 1000PF 100V 05% MICA R AR	1.0000
***4	023-700300	CAP 500PF 500V 05% MICA R AR	1.0000
***4	023-701600	CAP 2.2MF 20V 10% TANT G KE	2.0000
***4	023-702400	CAP .01MF 100V 20% CERM R SP	2.0000
***4	023-709100	CAP 20PF 500V 05% MICA R AR	2.0000
***4	023-711000	CAP 22MF 35V 10% TANT G KE	2.0000
***4	023-711300	CAP .1MF 250V 10% PLYE R SE	2.0000
***4	023-715100	CAP .05MF 50V CERM R AR	5.0000
***4	023-717900	CAP 8PF 300V 6.2% MICA R AR	3.0000
***4	024-743100	CON 8F DIP/SOL AMP 641260-3	1.0000
***4	026-705400	POT 500 PCB .7W 3006P1501 BR	1.0000
***4	026-705600	POT 2K PCB .7W 3006P1202 BR	2.0000
***4	026-706300	POT 100K PCB .7W 3006P1104 BR	1.0000
***4	201-100000	RES 100 01% 1/8W P	7.0000
***4	201-100100	RES 1K 01% 1/8W P	1.0000
***4	201-100200	RES 10K 01% 1/8W P	2.0000
***4	201-100300	RES 100K 01% 1/8W P	4.0000
***4	201-133200	RES 13.3K 01% 1/8W P	1.0000
***4	201-200100	RES 2K 01% 1/8W P	1.0000
***4	201-215100	RES 2.15K 01% 1/8W P	1.0000
***4	201-221100	RES 2.21K 01% 1/8W P	1.0000
***4	201-249100	RES 2.49K 01% 1/8W P	1.0000
***4	201-280200	RES 28K 01% 1/8W P	1.0000
***4	201-332000	RES 332 01% 1/8W P	2.0000
***4	201-332100	RES 3.32K 01% 1/8W P	2.0000
***4	201-499100	RES 4.99K 01% 1/8W P	3.0000
***4	201-619200	RES 61.9K 01% 1/8W P	1.0000
***4	201-698100	RES 6.98K 01% 1/8W P	1.0000
***4	201-909300	RES 909K 01% 1/8W P	2.0000
***4	214-010300	RES 10K .1% 1/8W P	6.0000
***4	023-701600	CAP 2.2MF 20V 10% TANT G KE	1.0000
***4	023-710200	CAP 5.5 TO 18PF 50V CERM ST	2.0000
***4	024-712500	CON 20F EDG/SOL CIN 252103016	1.0000
***4	025-735600	SW/PB 3L2PL SH	1.0000
***4	025-735800	SW/PB 3L4PL SH	1.0000
***4	026-705300	POT 200 PCB .7W 3006P1201 BR	1.0000
***4	026-705600	POT 2K PCB .7W 3006P1202 BR	2.0000
***4	026-706000	POT 20K PCB .7W 3006P1203 BR	2.0000
***4	134-743000	IC/3508J OPAMP BURP BROWN	1.0000
***3	024-058900	CON 1F CXL/SOL APH 31-102	2.0000
***3	035-701300	BUTT/PUSH CL J52305-04500	6.0000
***3	044-900503	SHIELD/206 DIII AMP	1.0000
***3	068-900702	PAN/206 DIII FRONT	1.0000
***3	025-734800	SW/SL 2P2T 1101M2A8 C&	2.0000
***3	026-712200	POT 5K PCB 1W 83C1DE20J BR	1.0000
***3	045-703601	KNOB/KN-5009A-1/8"	1.0000
1		206 ACCESSORY KIT	1.0000
*2		206 DII & DIII EXTENDER BD	1.0000
***3		PCB/EXTENDER BD/PLUG-IN	1.0000
***3		CON 20F EDG/SOL CIN 252103016	1.0000
*2		PROBE/X1 COLINE 906-90-604	2.0000
*2		HDWR MISC/MALE SHORTING CAP	2.0000

207 PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
1	475-001900	➤ 206 FINAL ASSEMBLY	1.000
*2	011-723401	BRKT/206 RETAINER	1.000
*2	034-714300	GUIDE/W/TAPE	1.000
*2	042-711005	COVER/206 AMP DIVIDER	1.000
*2	044-705001	SHIELD/206 MEMORY BD	1.000
*2	051-700100	BUMPER/SJ5514	4.000
1	675-207	➤ 207 PLUG-IN ASSEMBLY	1.000
*2	415-004000	➤ 206 MEMORY 3D (4K)	1.000
**3	000-909000	PCB/206 MEMORY (4K)	1.000
**3	134-755000	IC/2114 1K X 4 RAM 450NS NA	12.000
**3	134-723903	IC/74LS257 MULTIPLEXER	10.000
**3	134-724903	IC/74S169 COUNTER	3.000
**3	134-716003	IC/74S86 2-XOR	1.000
**3	023-722300	CAP .047MF 50V CERM G CL	11.000
**3	023-711100	CAP 4.7MF 10V 10% TANT G KE	5.000
**3	023-722300	CAP .047MF 50V CERM G CL	1.000
**3	024-715900	CON 16F DIP/SOL 641262-3 AM	1.000
**3	134-719503	IC/18SQ30 PROM (74S288)	1.000
*2	415-006200	➤ 206 MOTHER 3D	1.000
**3	000-901107	PCB/MOTHER 206 & 207	1.000
**3	134-713203	IC/74LS74N FLIP-FLOP	2.000
**3	134-716803	IC/74123N MONOSTABLE	1.000
**3	134-712703	IC/TCL323CN3	1.000
**3	134-723903	IC/74LS257 MULTIPLEXER	1.000
**3	021-706200	TRN FETJN E230 40V .35W B SL	2.000
**3	022-703800	DIO ZENR 1N5234 6.2V .5W G MO	1.000
**3	022-719800	DIO TRRF 1N4152 30V .5W G FC	3.000
**3	023-700200	CAP 1000PF 100V 05% MICA R AR	2.000
**3	023-700300	CAP 500PF 500V 05% MICA R AR	1.000
**3	023-702400	CAP .01MF 100V 20% CERM R SP	1.000
**3	023-711100	CAP 4.7MF 10V 10% TANT G KE	1.000
**3	023-713500	CAP 4.7MF 50V 10% TANT G KE	4.000
**3	023-715100	CAP .05MF 50V CERM R AR	4.000
**3	023-717000	CAP 3PF 300V 16% MICA R AR	2.000
**3	024-733200	CON 6M HDR/SOL AMP 9-350259-1	1.000
**3	024-737200	CON 56PIN/AMP 67907-3	2.000
**3	024-738500	CON 1M HDR/SOL CAD72SP100 CA	20.000
**3	024-744700	CON 80F EDG/SOL MCP MPS0125-4	2.000
**3	108-015300	RES 15K 05% 1/4W	2.000
**3	134-711900	IC/LM318H OPAMP	2.000
**3	201-100200	RES 10K 01% 1/8W PRE	2.000
**3	201-100300	RES 100K 01% 1/8W PRE	1.000
**3	201-100400	RES 1M 01% 1/8W PRE	1.000
**3	201-124200	RES 12.4K 01% 1/8W PRE	2.000
**3	201-178200	RES 17.8K 01% 1/8W PRE	2.000
**3	201-210900	RES 21 01% 1/8W PRE	4.000
**3	201-221000	RES 221 01% 1/8W PRE	1.000

207 PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	201-226200	RES 22.6K 01% 1/8W PRE	3.0000
**3	201-274000	RES 274 01% 1/8W PRE	1.0000
**3	201-332000	RES 332 01% 1/8W PRE	2.0000
**3	201-332100	RES 3.32K 01% 1/8W PRE	2.0000
**3	201-487200	RES 48.7K 01% 1/8W PRE	2.0000
**3	201-681000	RES 681 01% 1/8W PRE	1.0000
**3	201-698100	RES 6.98K 01% 1/8W PRE	1.0000
**3	201-825100	RES 8.25K 01% 1/8W PRE	2.0000
**3	023-706900	CAP 50MF 50V ALUM G SP	1.0000
**2	415-013100	207 ADC BOARD	2.0000
**3	201-100000	RES 100 01% 1/8W PRE	3.0000
**3	000-900910	PCB/ADC 206 & 207	1.0000
**3	134-710203	IC/74LS83N ADDER	3.0000
**3	134-710403	IC/74S00N 2-NAND	1.0000
**3	134-712803	IC/74LS00N 2-NAND	2.0000
**3	134-713803	IC/74LS175N REGISTER	4.0000
**3	134-722303	IC/74LS298N REGISTER	3.0000
**3	134-722703	IC/74LSC8N 2-AND	2.0000
**3	134-710403	IC/74S00N 2-NAND	1.0000
**3	108-015300	RES 15K 05% 1/4W	5.0000
**3	108-047000	RES 47 05% 1/4W	7.0000
**3	201-001000	RES 1 01% 1/8W	1.0000
**3	201-100100	RES 1K 01% 1/8W	1.0000
**3	201-100200	RES 10K 01% 1/8W	12.0000
**3	201-100300	RES 100K 01% 1/8W	6.0000
**3	201-124000	RES 124 01% 1/8W	2.0000
**3	201-137000	RES 137 01% 1/8W	2.0000
**3	201-143000	RES 143 01% 1/8W	1.0000
**3	201-143200	RES 14.3K 01% 1/8W	1.0000
**3	201-150000	RES 150 01% 1/8W	5.0000
**3	201-178000	RES 178 01% 1/8W	3.0000
**3	201-196100	RES 1.96K 01% 1/8W	1.0000
**3	201-200100	RES 2K 01% 1/8W	4.0000
**3	201-200200	RES 20K 01% 1/8W	1.0000
**3	201-210900	RES 21 01% 1/8W	1.0000
**3	201-221000	RES 221 01% 1/8W	1.0000
**3	201-221100	RES 2.21K 01% 1/8W	1.0000
**3	201-249200	RES 24.9K 01% 1/8W	22.0000
**3	201-267900	RES 26.7 01% 1/8W	1.0000
**3	201-274100	RES 2.74K 01% 1/8W	1.0000
**3	201-316100	RES 3.16K 01% 1/8W	1.0000
**3	201-374100	RES 3.74K 01% 1/8W	1.0000
**3	201-402000	RES 402 01% 1/8W	1.0000
**3	201-475100	RES 4.75K 01% 1/8W	5.0000
**3	201-487200	RES 48.7K 01% 1/8W	7.0000
**3	201-499000	RES 499 01% 1/8W	4.0000
**3	201-499100	RES 4.99K 01% 1/8W	1.0000

207 PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	201-698100	RES 6.98K 01% 1/8W PRE	6.000
**3	201-750100	RES 7.5K 01% 1/8W PRE	1.000
**3	201-806100	RES 8.06K 01% 1/8W PRE	2.000
**3	021-701800	TRN PNP 2N3905 40V .35W B MO	2.000
**3	021-702200	TRN NPN 2N3903 40V 1W B MO	8.000
**3	021-704700	TRN NPN 2N5224 12V .35W B MO	5.000
**3	021-706300	TRN PNP 2N3906 40V .625W B TX	15.000
**3	022-711600	DIO TRRF 1N4376 10V .05A G FC	38.000
**3	022-714100	DIO SCHT HSCH1001 60V15MAG HP	14.000
**3	023-029200	CAP 22MF 15V 10% TANT G KE	2.000
**3	023-701600	CAP 2.2MF 20V 10% TANT G KE	1.000
**3	023-702400	CAP .01MF 100V 20% CERM P SP	4.000
**3	023-704700	CAP 1MF 35V 10% TANT G KE	2.000
**3	023-706700	CAP 390PF 500V 05% MICA R AR	2.000
**3	023-706800	CAP 150PF 500V 05% MICA R AR	1.000
**3	023-709100	CAP 20PF 500V 05% MICA R AR	4.000
**3	023-711000	CAP 22MF 35V 10% TANT G KE	1.000
**3	023-712200	CAP .022MF 200V 10% PLYE G SP	1.000
**3	023-717800	CAP 6PF 300V 8.3% MICA R AR	5.000
**3	023-719700	CAP 2.2MF 50V 10% TANT G KE	2.000
**3	024-715900	CON 16F DIP/SCL 641262-3 AM	6.000
**3	026-705600	POT 2K PCB .7W 3006P1202 BR	1.000
**3	026-705700	POT 5K PCB .7W 3006P1502 BR	1.000
**3	026-706200	POT 50K PCB .7W 3006P1503 BR	5.000
**3	026-707700	POT 200 PCB .5W 8014EMF201200	4.000
**3	121-702700	REG 5 TO 30V .5A 78MGU1C E FC	2.000
**3	121-702800	REG -2.2/-30V .5A 79MGU1C E FC	2.000
**3	134-718803	IC/74LS175N REGISTER	6.000
**3	022-711600	DIO TRRF 1N4376 10V .05A G FC	8.000
**3	022-714100	DIO SCHT HSCH1001 60V15MAG HP	2.000
**3	023-701600	CAP 2.2MF 20V 10% TANT G KE	1.000
**3	100-700900	RES NET/7X25K/.01%	1.000
**3	201-100300	RES 100K 01% 1/8W PRE	1.000
**3	201-110200	RES 11K 01% 1/8W PRE	1.000
**3	201-137000	RES 137 01% 1/8W PRE	1.000
**3	201-143000	RES 143 01% 1/8W PRE	1.000
**3	201-150000	RES 150 01% 1/8W PRE	3.000
**3	201-150300	RES 150K 01% 1/8W PRE	3.000
**3	201-249200	RES 24.9K 01% 1/8W PRE	12.000
**3	201-332100	RES 3.32K 01% 1/8W PRE	3.000
**3	201-374200	RES 37.4K 01% 1/8W PRE	1.000
**3	201-392100	RES 3.92K 01% 1/8W PRE	3.000
**3	201-806100	RES 8.06K 01% 1/8W PRE	3.000
**3	201-887200	RES 88.7K 01% 1/8W PRE	1.000
**2	415-013200	207 CONTROL BOARD	1.000
**3	000-901211	PCB/206 & 207 CONTROL BOARD	1.000
**3	134-713203	IC/74LS74N FLIP-FLOP	11.000

207 PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
**3	134-718803	IC/74LS175N REGISTER	6.000
**3	134-711203	IC/74S74N FLIP-FLOP	5.000
**3	134-730903	IC/74LS367N HEX DRIVER	4.000
**3	134-712803	IC/74LS00N 2-NAND	5.000
**3	134-713703	IC/74LS253N MULTIPLEXER	4.000
**3	134-719403	IC/74LS151N MULTIPLEXER	3.000
**3	134-710103	IC/74164N SHIFT REGISTER	2.000
**3	134-712903	IC/74LS04N HEX INVERTER	2.000
**3	134-715503	IC/74LS153N MULTIPLEXER	3.000
**3	134-720403	IC/74LS02N 2-NOR	2.000
**3	134-722703	IC/74LS08N 2-AND	2.000
**3	134-724903	IC/74S169 COUNTER	2.000
**3	134-701803	IC/7400N 2-NAND	1.000
**3	134-716203	IC/74S175N REGISTER	1.000
**3	134-717903	IC/74LS98N 2-XOR	1.000
**3	134-719103	IC/74196N COUNTER	1.000
**3	134-731603	IC/74LS251N MULTIPLEXER	1.000
**3	021-702700	TRN NPN 2N4265 12V .35W	2.000
**3	022-700300	DIO RECT 1N4004 400V 1A	1.000
**3	022-714100	DIO SHT HSCH1001 60V15MA	2.000
**3	023-029200	CAP 22MF 15V 10% TANT	1.000
**3	023-700100	CAP 100PF 500V 05% MICA	2.000
**3	023-700300	CAP 500PF 500V 05% MICA	1.000
**3	023-700500	CAP 250PF 500V 05% MICA	1.000
**3	023-702400	CAP .01MF 100V 20% CERM	5.000
**3	023-710600	CAP 10PF 1000V 10% CERM	1.000
**3	023-711100	CAP 4.7MF 10V 10% TANT	4.000
**3	023-715100	CAP .05MF 50V CERM	5.000
**3	024-715900	CON 16F DIP/SOL 641262-3	3.000
**3	024-738500	CON 1M HDR/SOL CAD72SP100	20.000
**3	024-740700	CON 20F DIP/SOL 641264-3	1.000
**3	100-700700	RES NET/CSP10E-01-502J	2.000
**3	108-047000	RES 47 05% 1/4W	2.000
**3	108-047100	RES 470 05% 1/4W	1.000
**3	134-713900	IC/MK5009P MOS LSI	1.000
**3	191-704600	CRYS/40 MHZ .005% HC25	1.000
**3	201-010000	RES 10 01% 1/8W	3.000
**3	201-100100	RES 1K 01% 1/8W	2.000
**3	201-100200	RES 10K 01% 1/8W	1.000
**3	201-150100	RES 1.5K 01% 1/8W	1.000
**3	201-221000	RES 221 01% 1/8W	1.000
**3	201-221100	RES 2.21K 01% 1/8W	2.000
**3	201-332100	RES 3.32K 01% 1/8W	1.000
**3	201-681000	RES 681 01% 1/8W	3.000
**3	201-010000	RES 10 01% 1/8W	2.000
**3	025-727000	SW/ROT/32 POS.	1.000
**3	134-717403	IC/14S10 PROM (74S287)	1.000

207 PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
***3	134-719503	IC/18S030 PROM (74S288)	1.000
***3	134-728803	IC/18S42 PROM (74S472)	1.000
**2	465-002900	2070 AMP ASSEMBLY	2.000
***3	415-011900	2070 AMP BC	1.000
***4	000-913300	PCB/D4 AMPLIFIER	1.000
***4	021-704700	TRN NPN 2N5224 12V .35W R MO	1.000
***4	022-712700	DIO TRRF 1N4148 75V .1A G FC	5.000
***4	023-707000	CAP .02MF 100V 20% CERM R SP	2.000
***4	023-710600	CAP 10PF 1000V 10% CERM R CL	6.000
***4	023-711300	CAP .1MF 250V 10% PLYE R SE	3.000
***4	023-711900	CAP .0047MF 200V 10% PLYE G SP	2.000
***4	023-713200	CAP 27PF 300V 05% MICA R AR	2.000
***4	023-726300	CAP 22MF 35V TANT R KE	2.000
***4	023-734300	CAP 6 TC 22PF 63V 10% CERM ST	6.000
***4	023-734400	CAP 470PF 200V 10% CERM R KE	3.000
***4	023-734500	CAP 680PF 200V 10% CERM R KE	2.000
***4	023-734600	CAP 22PF 200V 10% CERM R KE	1.000
***4	023-734700	CAP 100PF 200V 10% CERM R KE	2.000
***4	024-712500	CON 20F EDG/SOL CIN 252103016	1.000
***4	024-715900	CON 16F DTP/SOL 641262-3 AM	2.000
***4	025-746900	SW/R0 1P12TSPS	1.000
***4	026-705600	POT 2K PCB .7W 3006P1202 BR	1.000
***4	026-707700	POT 200 PCB .5W 8014EMF201200	1.000
***4	026-711500	POT 1K PCB .5W ET14P1K ME	3.000
***4	026-711800	POT 50K PCB .5W ET14P50K ME	3.000
***4	029-705700	RELAY 5V REED HE721C05-10 HM	1.000
***4	029-705800	RELAY 5V REED HE722A05-30 HM	2.000
***4	044-902901	SHIELD/2070 SWITCH (TOP)	1.000
***4	044-903101	SHIELD/2070 SWITCH (BOTTOM)	3.000
***4	044-904500	SHIELD/205A ROTARY SWITCH	1.000
***4	134-712803	IC/74LS00N 2-NAND	1.000
***4	134-713203	IC/74LS74N FLIP-FLOP	1.000
***4	134-730603	IC/CA3140EX	2.000
***4	134-739803	IC/74LS148 OCTAL ENCODER	2.000
***4	134-743100	IC/SW7511FQ QUAD JFET SWITCH	1.000
***4	134-776503	IC/74LS01N 2-NAND OC	1.000
***4	134-794900	IC/LF356N OP-AMP	8.000
***4	201-100100	RES 1K 01% 1/8W PRE	1.000
***4	201-100200	RES 10K 01% 1/8W PRE	5.000
***4	201-100300	RES 100K 01% 1/8W PRE	2.000
***4	201-110100	RES 1.10K 01% 1/8W PRE	1.000
***4	201-152200	RES 15.2K 01% 1/8W PRE	1.000
***4	201-221100	RES 2.21K 01% 1/8W PRE	2.000
***4	201-274100	RES 2.74K 01% 1/8W PRE	2.000
***4	201-332100	RES 3.32K 01% 1/8W PRE	7.000
***4	201-475100	RES 4.75K 01% 1/8W PRE	2.000
***4	201-909100	RES 9.09K 01% 1/8W PRE	1.000

207 PLUG-IN

LEVEL	PART NO.	DESCRIPTION	QUANTITY
****4	205-101200	RES 10.1K .05% 1/8W PRE	2.000
****4	205-221100	RES 2.21K .05% 1/8W PRE	4.000
****4	205-442100	RES 4.42K .05% 1/8W PRE	2.000
****4	205-909200	RES 90.9K .05% 1.8W PRE	2.000
****4	205-909300	RES 909K .05% 1/8W PRE	2.000
***3	415-012000	➤ 207D AMP SWITCH BD	1.000
****4	000-913400	PCB/D4 SWITCH BD	1.000
****4	023-711300	CAP .1MF 250V 10% PLYE R SE	1.000
****4	025-747000	SW/SL 2P3T	2.000
****4	026-705700	POT 5K PCB .7W 3006P1502 BR	1.000
****4	201-221100	RES 2.21K .01% 1/8W PRE	1.000
***3	011-902900	BRKT/207D AMP SUPPORT	1.000
***3	023-711300	CAP .1MF 250V 10% PLYE R SE	1.000
***3	024-721400	CON 1F CXL/SOL APH 31-C10	2.000
***3	025-747000	SW/SL 2P3T	3.000
***3	026-712200	POT 5K PCB 1W 83C1DE20J BR	2.000
***3	045-703601	KNOB/KN-5008A-1/8"	2.000
***3	045-900000	KNOB/KPN-7008A-1/8 .106" SHAF	1.000
***3	068-903702	PAN 207D FRONT	1.000
***3	201-169200	RES 16.9K .01% 1/8W PRE	1.000
***3	201-280200	RES 28K .01% 1/8W PRE	1.000
***3	201-332000	RES 332 .01% 1/8W PRE	1.000
***3	201-365000	RES 365 .01% 1/8W PRE	1.000
***3	201-402000	RES 402 .01% 1/8W PRE	1.000
*2	465-003000	➤ 207 FRONT PANEL ASSEMBLY	1.000
***3	415-006000	➤ 206 STORAGE CONTROL BD	1.000
****4	000-900806	PCB/206 STORAGE CONTROL	1.000
****4	024-733300	CON 1M HDR/SOL CAD72SP100 CA	20.000
****4	025-733300	SW/PB 1P2TM SRUL/RED	2.000
****4	025-746800	SW/PB 1P2TM SRUL/GREEN	1.000
****4	201-221000	RES 221 .01% 1/8W PRE	3.000
****4	201-221100	RES 2.21K .01% 1/8W PRE	3.000
****4	201-226200	RES 22.6K .01% 1/8W PRE	3.000
***3	068-740804	PAN/206 FRONT SUB	1.000
***3	068-903900	PAN/207 FRONT	1.000
***3	023-711300	CAP .1MF 250V 10% PLYE R SE	1.000
***3	085-708700	CBL/20 COND/AP 922531-20-99-3	1.000
***3	010-700900	NUT/BL ANODI W-NU-170	1.000
***3	011-721607	BRKT/MOTHER BD/EXPL	1.000
***3	022-714500	DIO LEDG 406G 1.9V 10MA M 1N	1.000
***3	024-058900	CON 1F CXL/SOL APH 31-102	1.000
***3	025-718000	SW/PB 8531	CE
***3	025-727600	SW/RO 2PLEPS PA166-040	CL
***3	025-727900	SW/SL G-126-PC-G20-18	C
***3	026-710000	POT 100K PML BA1470134	CL
***3	045-703203	KNOB/KPN-5008A 1/8"	3.000
***3	045-703601	KNOB/KN-5008A-1/8"	1.000
***3	085-900100	CBL/20 COND/PLUG-IN FRONT	1.000
***3	020-701810	CHAS/PLUG-IN	1.000
***3	034-713300	GUIDE/SCANBE #11633-4	2.000
***3	045-703501	KNOB/KPN-9008A-1/4"	1.000
1	695-000100	207D PLUG-IN ACCESSORY KTI	1.000
*2	415-006300	206 DII & DIII EXTENDER BD	1.000
***3	000-902301	PCB/EXTENDER BD/PLUG-IN	1.000
***3	024-712500	CON 20F EDG/SOL CIN 252103016	1.000
*2	085-718300	PROBE/X1 COLINE 906-90-604	2.000

2081 INTERFACE (IEEE)

LEVEL	PART NO.	DESCRIPTION	QUANTITY
1	415-009100	► 2081 GPIB I/O BD	1.000
*2	000-904102	PCB/GP-IB 80/2081	1.000
*2	134-742400	IC/3446 488 TRANSCEIVER	4.000
*2	134-713203	IC/74LS74N FLIP-FLOP	2.000
*2	134-718803	IC/74LS175N REGISTER	2.000
*2	134-720403	IC/74LS02N 2-NOR	2.000
*2	134-731503	IC/74LS259N ADDRESSABLE LATCH	2.000
*2	134-731603	IC/74LS251N MULTIPLEXER	2.000
*2	134-712803	IC/74LS00N 2-NAND	1.000
*2	134-722703	IC/74LS03N 2-AND	1.000
*2	134-740903	IC/74LS240N OCTAL BUFFER	1.000
*2	022-719300	DIO TRRF 1N4152 30V .5W G FC	2.000
*2	023-029200	CAP 22MF 15V 10% TANT G KE	1.000
*2	023-700300	CAP 500PF 500V 05% MICA R AR	2.000
*2	023-711100	CAP 4.7MF 10V 10% TANT G KE	1.000
*2	023-715100	CAP .05MF 50V CERM R AR	3.000
*2	024-742200	CON 24F REC/SOL 552230-1 AM	1.000
*2	093-702700	FASTNER/CON/HWD 552633-4 AM	1.000
*2	100-700700	RES NET/CSP105-01-502J	1.000
*2	201-100000	RES 100 01% 1/8W PRE	2.000
*2	024-737200	CON 56PIN/AMP 67907-3	1.000
*2	025-731300	SW/TH 1P1T6 1-435668-8 AM	1.000
*2	134-712903	IC/74LS04N HEX INVERTER	1.000
1	415-009200	► 2081/2082 I/O CPU BD	1.000
*2	405-002400	2081/2082 I/O CPU BD. CABLE	1.000
**3	015-706401	PIN F 18-26GA 350665-1 TIN AM	6.000
**3	024-726900	CON 6F REC/CRF AMP 1-350241-9	1.000
*2	000-904200	PCB/2081/82 I/O CPU	1.000
*2	134-718803	IC/74LS175N REGISTER	3.000
*2	134-731503	IC/74LS259N ADDRESSABLE LATCH	2.000
*2	134-739103	IC/74LS244N OCTAL BUFFER	2.000
*2	134-712803	IC/74LS00N 2-NAND	1.000
*2	134-713203	IC/74LS74N FLIP-FLOP	1.000
*2	134-716903	IC/74143N PRIORITY ENCODER	1.000
*2	134-720403	IC/74LS02N 2-NOR	1.000
*2	134-731603	IC/74LS251N MULTIPLEXER	1.000
*2	134-731303	IC/74LS155N DEMULTIPLEXER	1.000
*2	134-736803	IC/74LS374N REGISTER	1.000
*2	134-739103	IC/74LS244N OCTAL BUFFER	1.000
*2	019-707800	INDUCT/NYTRONICS/WEE 0.47UH	1.000
*2	022-719300	DIO TRRF 1N4152 30V .5W G FC	1.000
*2	023-029200	CAP 22MF 15V 10% TANT G KE	4.000
*2	023-711100	CAP 4.7MF 10V 10% TANT G KE	1.000
*2	023-715100	CAP .05MF 50V CERM R AR	10.000
*2	023-718000	CAP 390PF 50V 05% MICA R AR	1.000
*2	024-721300	CON 24F DIP/SOL 641266-3 AM	2.000
*2	024-733200	CON 6M HDR/SOL AMP 9-350259-1	1.000

2081 INTERFACE (IEEE)

LEVEL	PART NO.	DESCRIPTION	QUANTITY
*2	024-734400	CON 18F DIP/SOL 641263-3 AM	4.000
*2	024-740700	CON 20F DIP/SOL 641264-3 AM	2.000
*2	025-739600	SW/PB 1P1TM MDP AU05 IE	1.000
*2	134-731403	IC/TIM9904A (74LS362) CLK T	1.000
*2	134-731700	IC/2111A-4N 256 X 4 STATIC RA	4.000
*2	191-709000	CRYS/12 MHZ .05% HC25	1.000
*2	201-010000	RES 10 01% 1/8W PRE	4.000
*2	201-100000	RES 100 01% 1/8W PRE	1.000
*2	201-100100	RES 1K 01% 1/8W PRE	1.000
*2	201-100200	RES 10K 01% 1/8W PRE	1.000
*2	201-124200	RES 12.4K 01% 1/8W PRE	1.000
*2	201-475100	RES 4.75K 01% 1/8W PRE	3.000
*2	011-721000	BRKT/PWR SPLY MTG/2090	2.000
*2	011-725701	BRKT/MTG/2081	3.000
*2	024-734100	CON 64F DIP/SOL ICN649S5 RO	1.000
*2	134-731300	IC/9900JL PROCESSOR	1.000
*2	134-728803	IC/18S42 PROM (74S472)	1.000
*2	134-750600	IC/2716 (2516) EPROM +5V 450N	2.000
*1	475-003200	2081 MECHANICAL ASSEMBLY	1.000
*2	017-716500	LABEL/3090 SERIAL NUMBER	1.000
*2	042-718501	COVER/2081 I/O	1.000
*3	143-710200	BOX/ZERO ZTR0-128-3-16 1"H AL	1.000
*2	123-706900	HDWR MISC/KNUPL SER. RAF598-S	3.000
*2	123-707000	HDWR MISC/RET.RING/RAF1058-SS	3.000

2082 INTERFACE (RS-232-C)

LEVEL	PART NO.	DESCRIPTION	QUANTITY
1	085-900300	CBL/2082 RS-232-C INTERCONNEC	1.000
1	415-009200	►2081/2082 I/O CPU BD	1.000
*2	405-002400	2081/2082 I/O CPU BD. CABLE	1.000
**3	015-706401	PIN F 18-26GA 350665-1 TIN AM	6.000
**3	024-726900	CON 6F REC/CRP AMP 1-350241-9	1.000
*2	000-904207	PCB/2081/82 I/O CPU	1.000
*2	134-718803	IC/74LS175N REGISTER	3.000
*2	134-731503	IC/74LS259N ADDRESSABLE LATCH	2.000
*2	134-739103	IC/74LS244N OCTAL BUFFER	2.000
*2	134-712803	IC/74LS00N 2-NAND	1.000
*2	134-713203	IC/74LS74N FLIP-FLOP	1.000
*2	134-716903	IC/74148N PRIORITY ENCODER	1.000
*2	134-720403	IC/74LS02N 2-NOR	1.000
*2	134-731603	IC/74LS251N MULTIPLEXER	1.000
*2	134-731803	IC/74LS155N DEMULTIPLEXER	1.000
*2	134-736803	IC/74LS374N REGISTER	1.000
*2	134-739103	IC/74LS244N OCTAL BUFFER	1.000
*2	019-707800	INDUCT/NYTRONICS/WEE 0.47UH	1.000
*2	022-719800	DIO TRRF 1N4152 30V .5W G FC	1.000
*2	023-029200	CAP 22MF 15V 10% TANT G KE	4.000
*2	023-711100	CAP 4.7MF 10V 10% TANT G KE	1.000
*2	023-715100	CAP .05MF 50V CERM R AR	10.000
*2	023-718000	CAP 390PF 50V 05% MICA R AR	1.000
*2	024-721300	CON 24F DIP/SOL 641266-3 AM	2.000
*2	024-733200	CON 6M HDR/SOL AMP 9-350259-1	1.000
*2	024-734400	CON 18F DIP/SOL 641263-3 AM	4.000
*2	024-740700	CON 20F DIP/SOL 641264-3 AM	2.000
*2	025-739600	SW/P3 1P1TM MDP AU05 TE	1.000
*2	134-731403	IC/TIM9904A (74LS362) CLK T	1.000
*2	134-731700	IC/2111A-4N 256 X 4 STATIC RA	4.000
*2	191-709000	CRYS/12 MHZ .05% HC25	1.000
*2	201-010000	RES 10 01% 1/8W PRE	4.000
*2	201-100000	RES 100 01% 1/8W PRE	1.000
*2	201-100100	RES 1K 01% 1/8W PRE	1.000
*2	201-100200	RES 10K 01% 1/8W PRE	1.000
*2	201-124200	RES 12.4K 01% 1/8W PRE	1.000
*2	201-475100	RES 4.75K 01% 1/8W PRE	3.000
*2	011-721000	BRKT/PWR SPLY MTG/2090	2.000
*2	011-725701	BRKT/MTG/2081	3.000
*2	024-734100	CON 64F DIP/SOL ICN649S5 RO	1.000
*2	134-731300	IC/9900JL PROCESSOR	1.000
*2	134-728803	IC/18S42 PROM (74S472)	1.000
*2	134-750600	IC/2716 (2516) EPROM +5V 450N	2.000
1	415-009900	►2082 I/O BD	1.000
*2	000-904504	PCB/2082 I/O	1.000
*2	134-731603	IC/74LS251N MULTIPLEXER	2.000
*2	134-741703	IC/75188 QUAD LINE DRIVER	2.000

2082 INTERFACE (RS-232-C)

LEVEL	PART NO.	DESCRIPTION	QUANTITY
*2	134-741803	IC/75189 QUAD LINE RECEIVER	2.000
*2	134-712803	IC/74LS00 2-NAND	1.000
*2	134-713203	IC/74LS74N FLIP-FLOP	1.000
*2	134-731503	IC/74LS259N ADDRESSABLE LATCH	1.000
*2	134-741503	IC/497AC SWITCHING VOLT REG	1.000
*2	134-741600	IC/9902 CRU UART	1.000
*2	022-719300	DIO TRRF 1N4152 30V .5W G FC	2.000
*2	023-029200	CAP 22MF 15V 10% TANT G KE	4.000
*2	023-700100	CAP 100PF 500V 05% MICA R AR	1.000
*2	023-711000	CAP 22MF 35V 10% TANT G KE	1.000
*2	023-711100	CAP 4.7MF 10V 10% TANT G KE	1.000
*2	023-715100	CAP .05MF 50V CERM R AR	6.000
*2	024-723100	CON 25F REC/SOL AMP 205738-1	1.000
*2	024-723200	CON 25M REC/SOL AMP 205737-1	1.000
*2	093-702100	FASTNER/SCR LOCK 020418-2 CI	4.000
*2	100-700700	RES NET/CSP10E-G1-5C2J	1.000
*2	101-010900	RES 1 10% 1/2W	1.000
*2	201-100200	RES 10K 01% 1/8W PRE	3.000
*2	201-110200	RES 11K 01% 1/8W PRE	1.000
*2	201-127100	RES 1.27K 01% 1/8W PRE	1.000
*2	019-709301	INDUCT/40 UH @ 100 MA BIAS	2.000
*2	019-709400	INDUCT/360 UH @ 100 MA BIAS	1.000
*2	024-737200	CON 56PIN/AMP 67907-3	1.000
*2	025-721100	SW/SL MSS-4200 AL	1.000
*2	025-731800	SW/TH 1P1T8 1-435668-8 AM	1.000
*2	051-700700	BUMPER/SJ-5017	2.000
1	416-002400	▶ RS-232C TERMINAL ADAPTER 9D	1.000
*2	000-910800	PCB/RS232 TERM ADAPTER 9D CS	1.000
*2	024-723100	CON 25F REC/SOL AMP 205738-1	1.000
*2	024-741800	CON 25F REC/SOL 206584-1 AM	1.000
*2	051-701900	BUMPER/SJ-5008 1/8" BLACK MM	4.000
1	475-003600	▶ 2082 MECHANICAL ASSEMBLY	1.000
*2	017-716500	LABEL/3090 SERIAL NUMBER	1.000
*2	042-719503	COVER/2032 I/O	1.000
**3	143-710200	BOX/ZERO ZT80-128-B-16 1"H AL	1.000
*2	123-706900	HDWR MISC/KNURL SER. RAF598-S	3.000
*2	123-707000	HDWR MISC/RET.RING/RAF1058-SS	3.000

003 - GENERAL I/O

LEVEL	PART NO.	DESCRIPTION	QUANTITY
1	415-006900	▶ 2090 OPT. 003 INTERFACE BD	1.000
*2	000-902503	PCB/2090 I/O ACC	1.000
*2	024-713000	CON 50M PCB/IDP 3426-0000 MM	2.000
*2	024-733700	CON 50M HDR/IDP 3425-6000 MM	2.000
*2	024-737200	CON 56PIN/AMP 67907-3	1.000
*2	063-702000	RELIEF/STRAIN 3448-3050 MM	2.000
*2	100-701700	RES NET/BECK 785-5-R-220/330	3.000
*2	201-221000	RES 221 01% 1/8W PRE	1.000
*2	201-332000	RES 332 01% 1/8W PRE	1.000
1	475-002700	▶ 2090 OPT. 003 MECH. MISC.	1.000
*2	017-716500	LABEL/3090 SERIAL NUMBER	1.000
*2	042-711502	COVER/I/O/002-003	1.000
**3	143-710200	BOX/ZERO ZT80-128-B-16 1"H AL	1.000
*2	123-706900	HDWR MISC/KNURL SER. RAF598-S	3.000
*2	123-707000	HDWR MISC/RET.RING/RAF1058-SS	3.000
1	017-716500	LABEL/3090 SERIAL NUMBER	1.000
1	042-711502	COVER/I/O/002-003	1.000
*2	143-710200	BOX/ZERO ZT80-128-B-16 1"H AL	1.000
1	123-706900	HDWR MISC/KNURL SER. RAF598-S	3.000
1	123-707000	HDWR MISC/RET.RING/RAF1058-SS	3.000

DIAGRAM INDEX

MAINFRAME BOARDS

4K RAM & Interface	010
Memory Board	030
Mainframe Board	050
Blanking Board	070
Regulator Board	070
III Bay Power Supply	070
Capacitor Board	070
Front Panel Wiring	450
Rear Panel Wiring	450

201 PLUG-IN BOARDS

Digitizer Board	090
Mother Board	110
Control Board	130
Storage Control Board	190

204-A PLUG-IN BOARDS

Digitizer Board	150
Control Board	170
Storage Control Board	190
Trigger Board	190
Memory Board	210

206 PLUG-IN BOARDS

D3 Amplifier Board	230
Digitizer Board	250
Storage Control Card	270
Control Board	270
Memory Board	290
Mother Board	310

INPUT/OUTPUT BOARDS

I/O Board	330
I/O Driver Board	350
Disk Without I/O	350
Disk Memory Front Panel Bd	370
Disk Main Board	390
I/O CPU Board	410
2081 RS-232C (GPIB) Board	420
2082 (IEEE) Board	430
003 (Input/output Acc'y Bd)	460

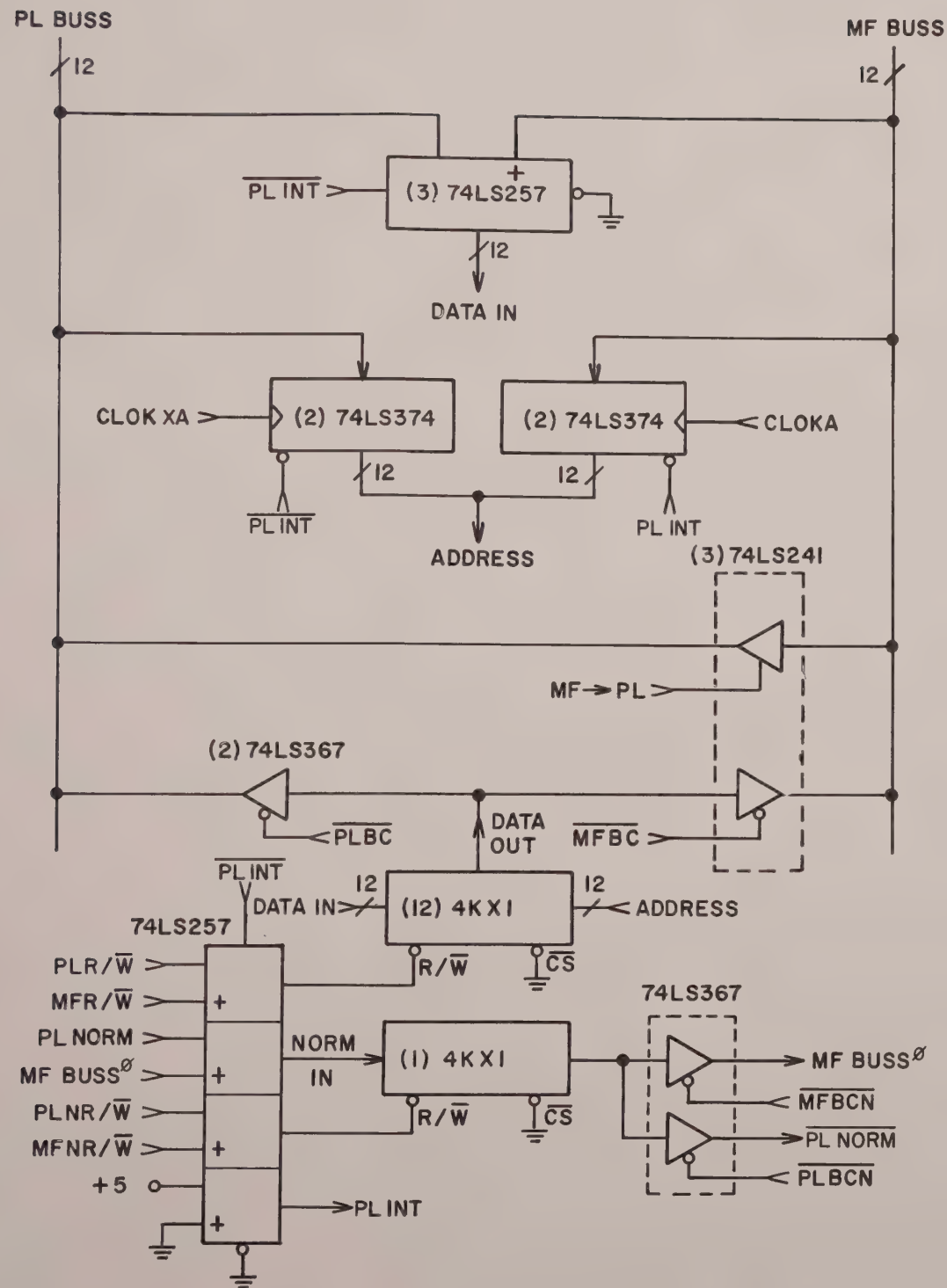
205-A PLUG-IN BOARDS

Digitizer Board	490
Control & Trigger Board	510
Storage Control Board	530
Memory Board	550

207 PLUG-IN BOARDS

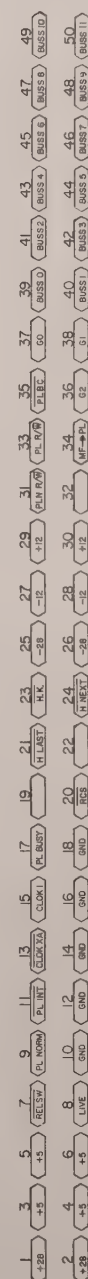
Digitizer Board	570
Storage Control Card	270 *
Control Board	590
Memory Board	290 *
Mother Board	610
Amplifier & Switch Board	630

* The Model 206 and 207 plug-ins use identical Memory boards and Storage Control Boards.

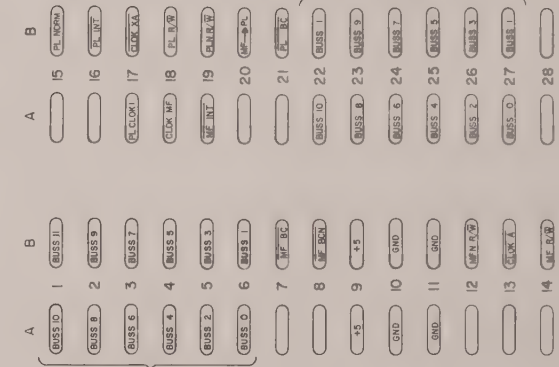


4K RAM MAIN FRAME

PLUG-IN AND I/O

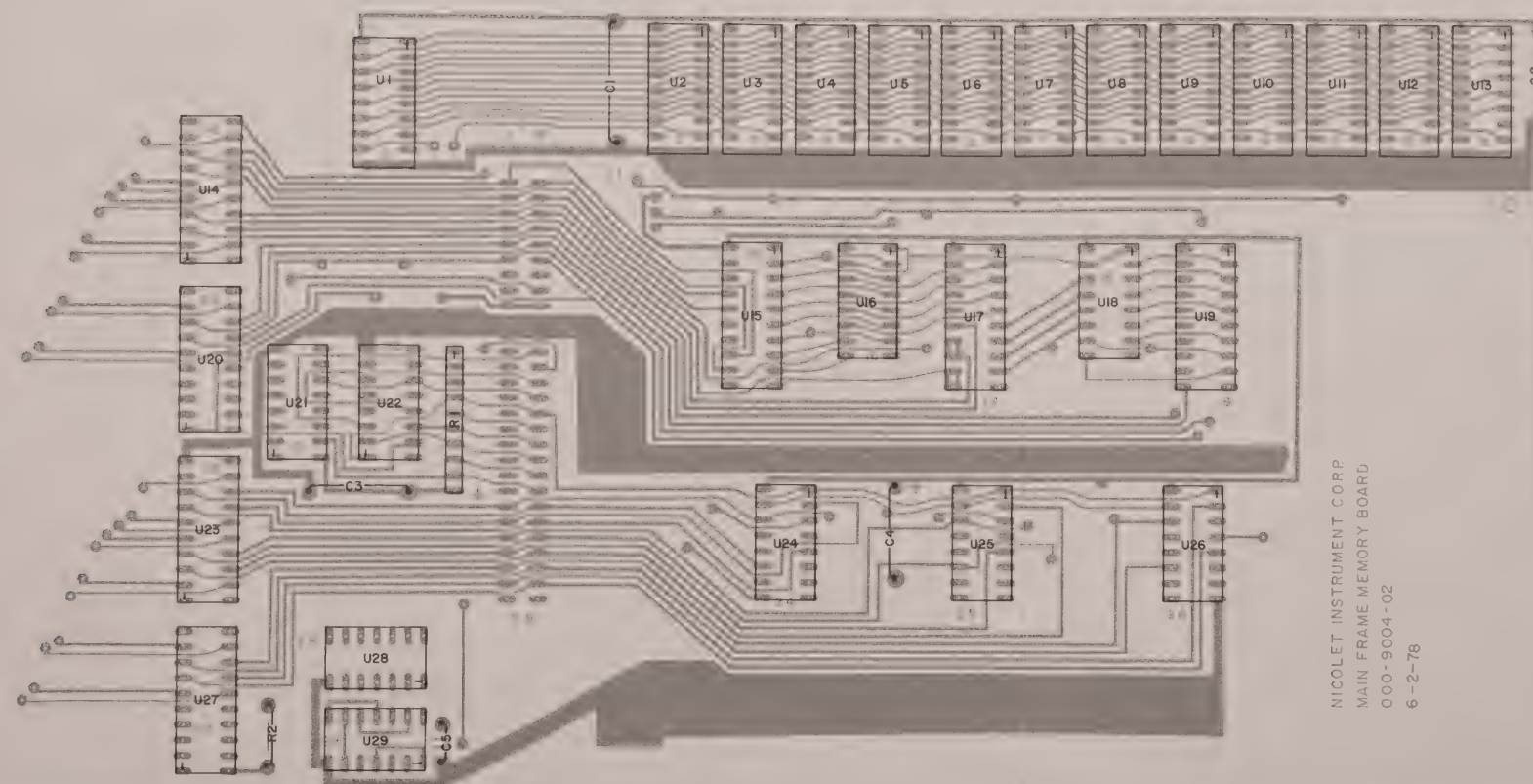


MAINFRAME MEMORY BRD.



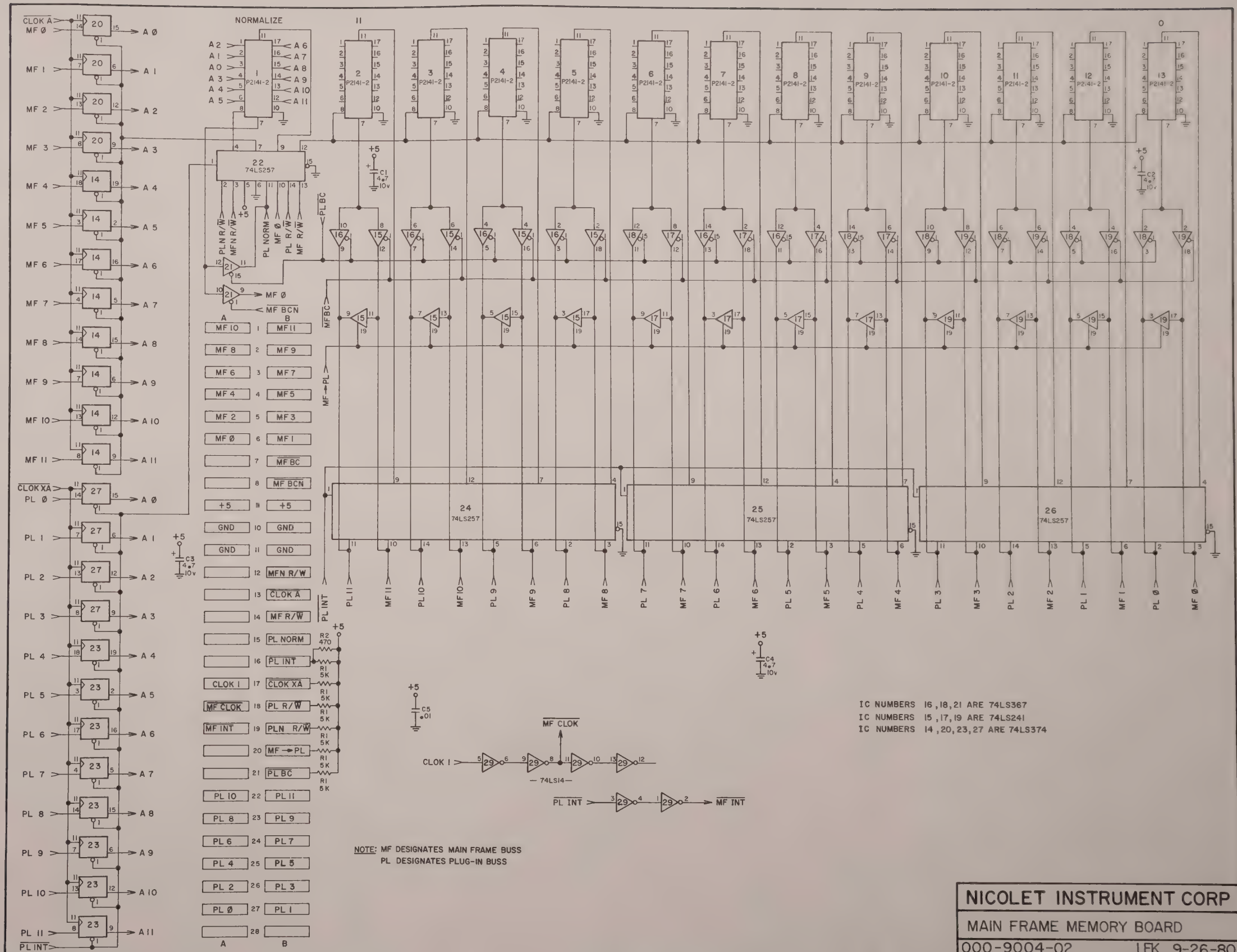
MAINFRAME BRD.

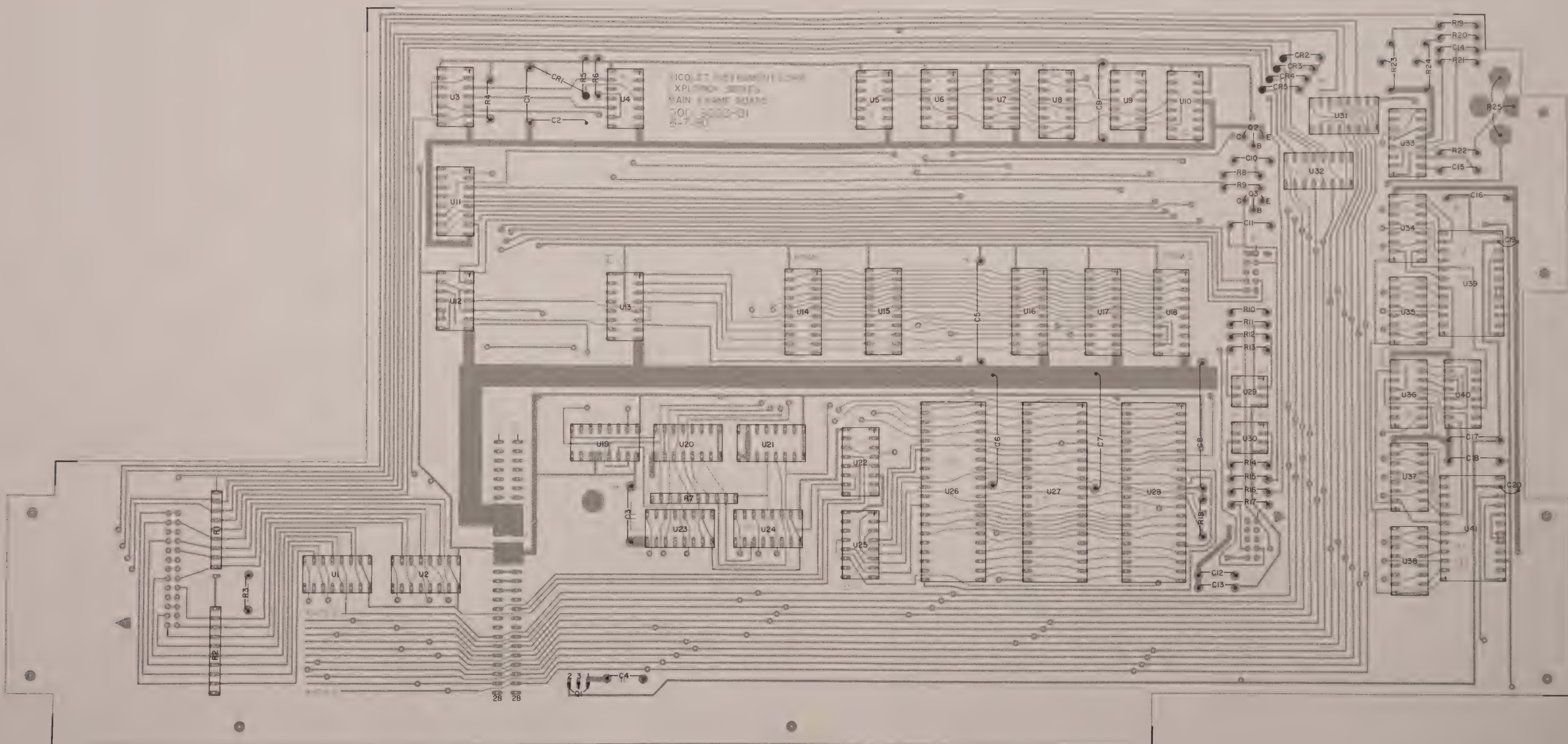




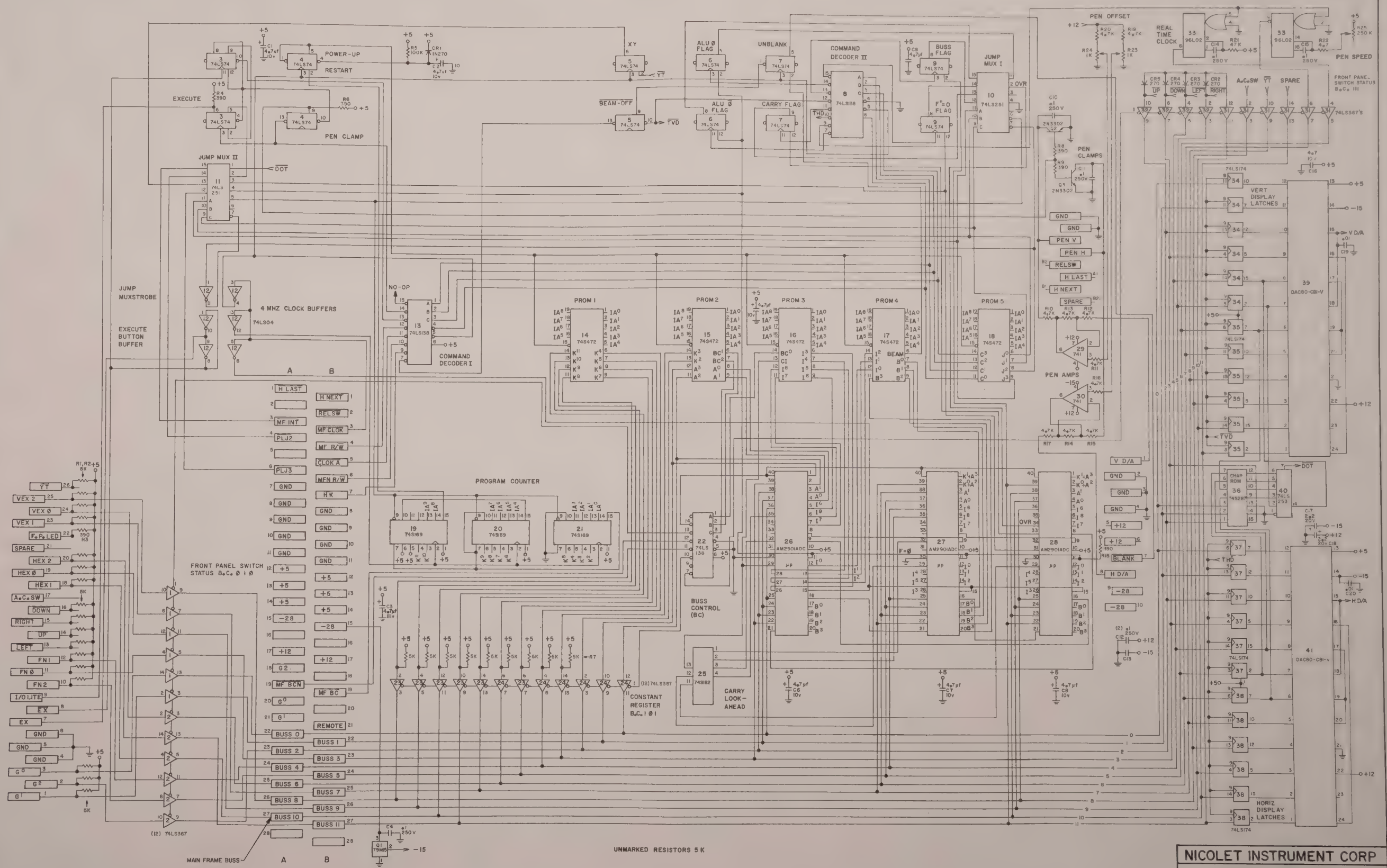
NICOLET INSTRUMENT CORP.
 MAIN FRAME MEMORY BOARD
 000-9004-02
 6-2-78

MAIN FRAME MEMORY BOARD
 — CONDUCTOR SIDE —

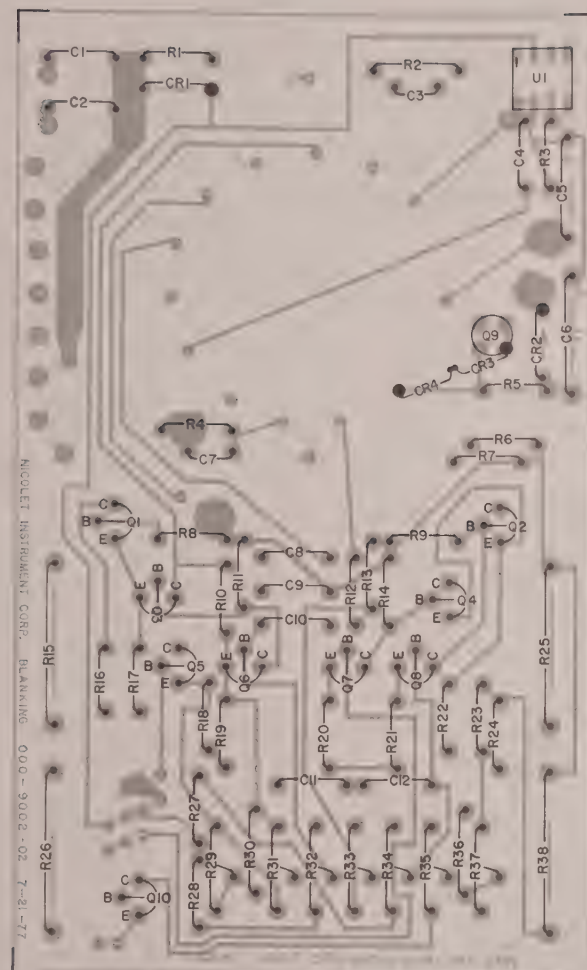




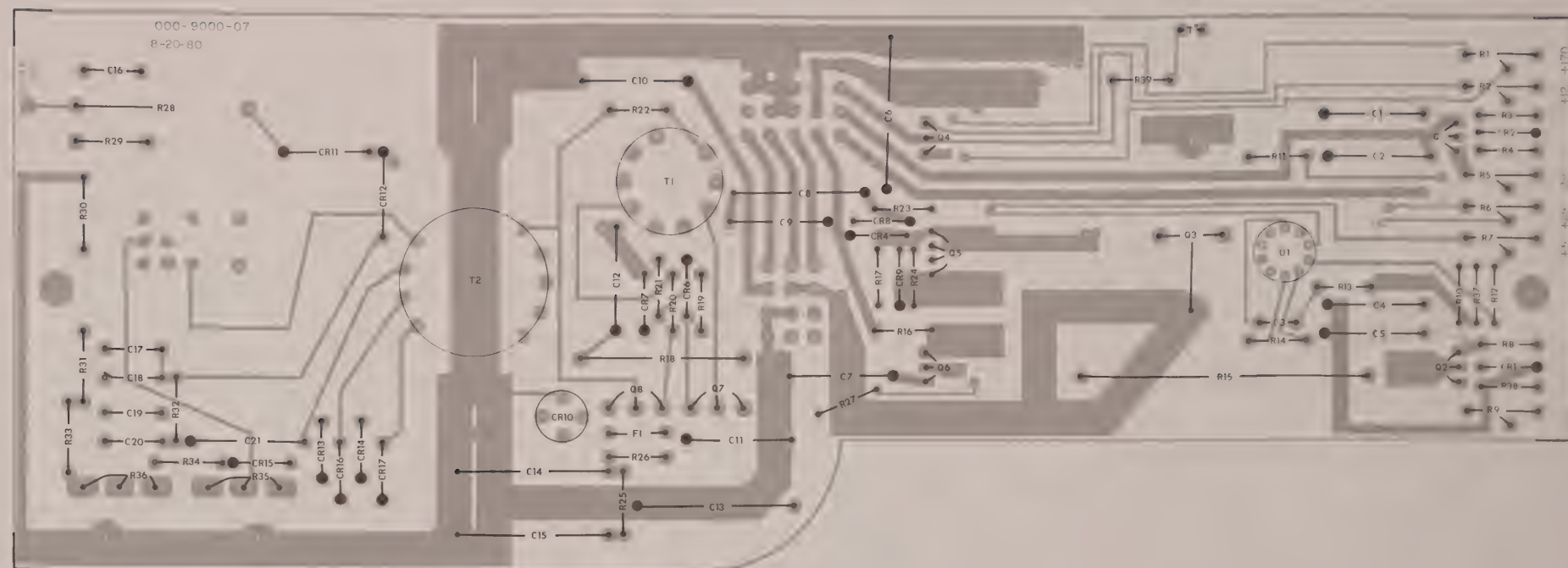
MAIN FRAME BOARD
— CONDUCTOR SIDE —



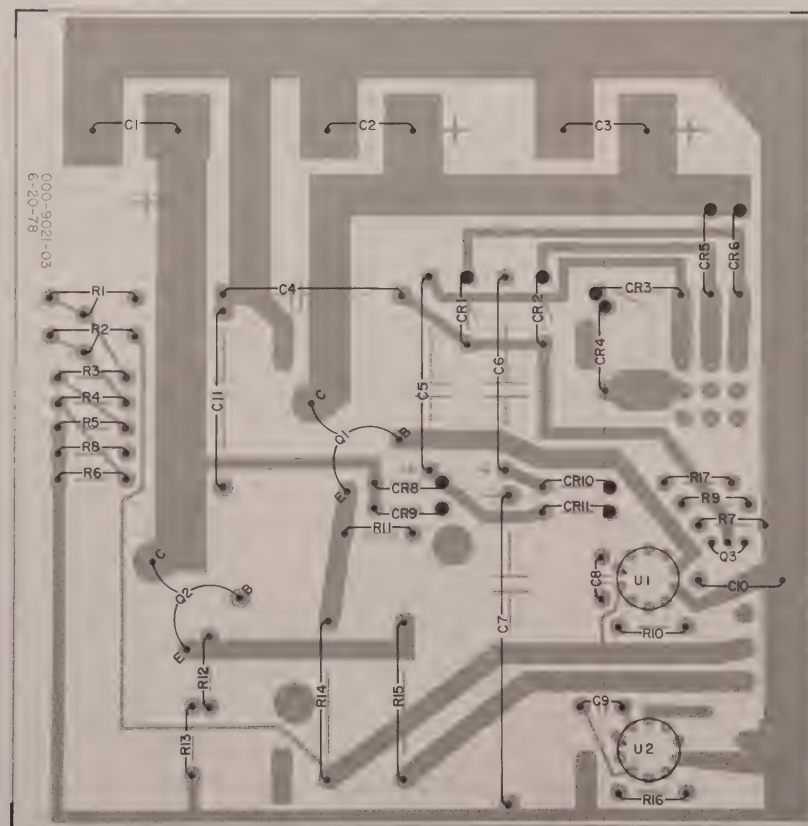
NICOLET INSTRUMENT CORP
MAIN FRAME BOARD
000-9003-01 LEK 10-6-80



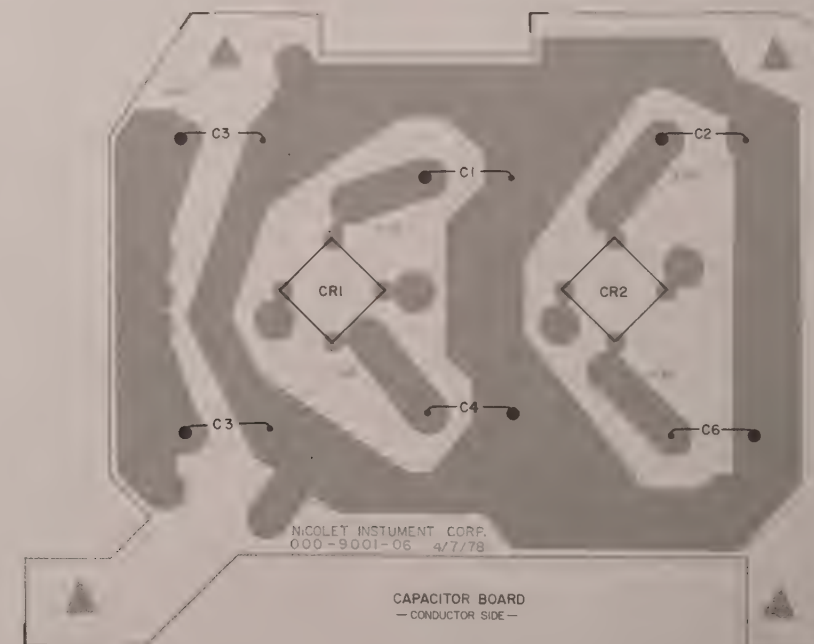
BLANKING BOARD
— CONDUCTOR SIDE —



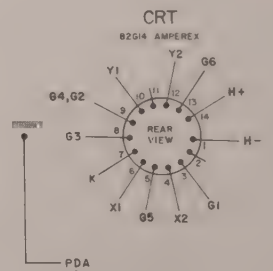
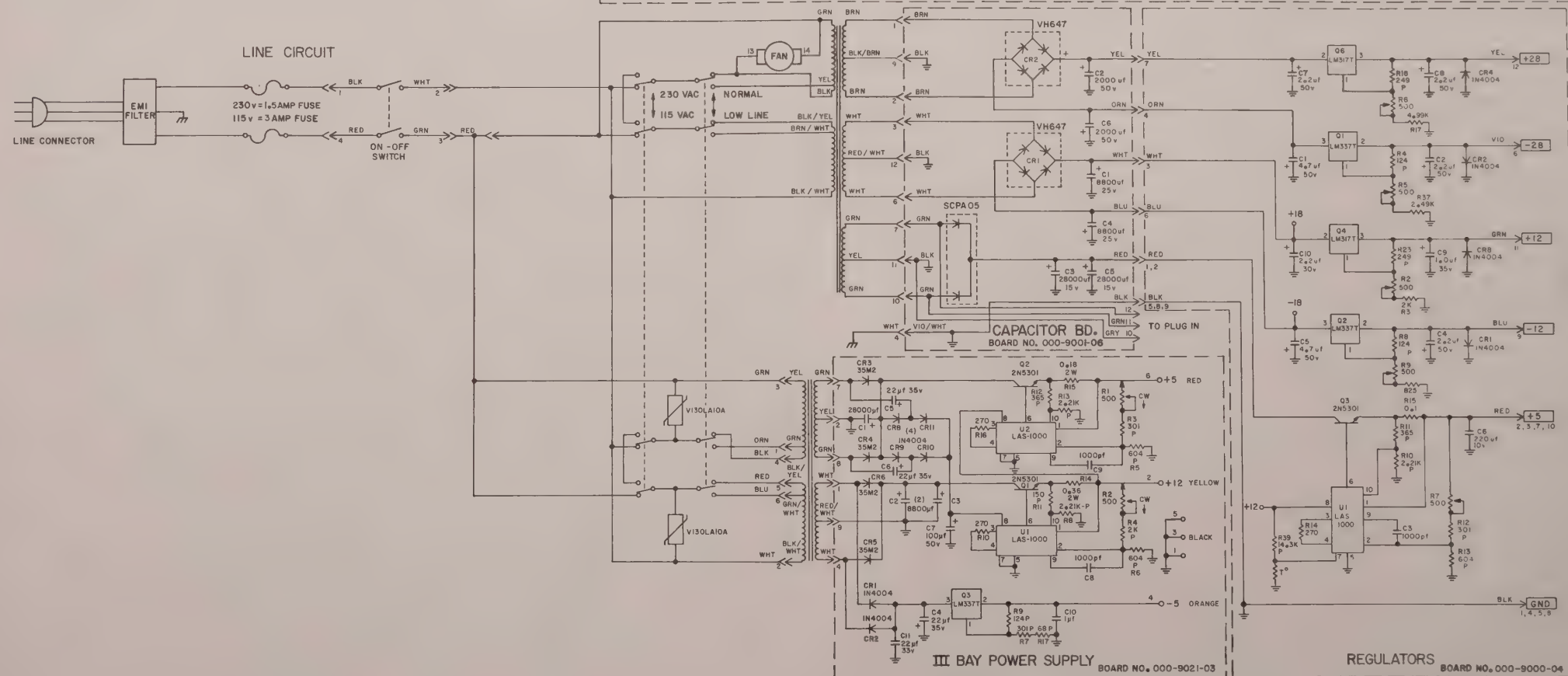
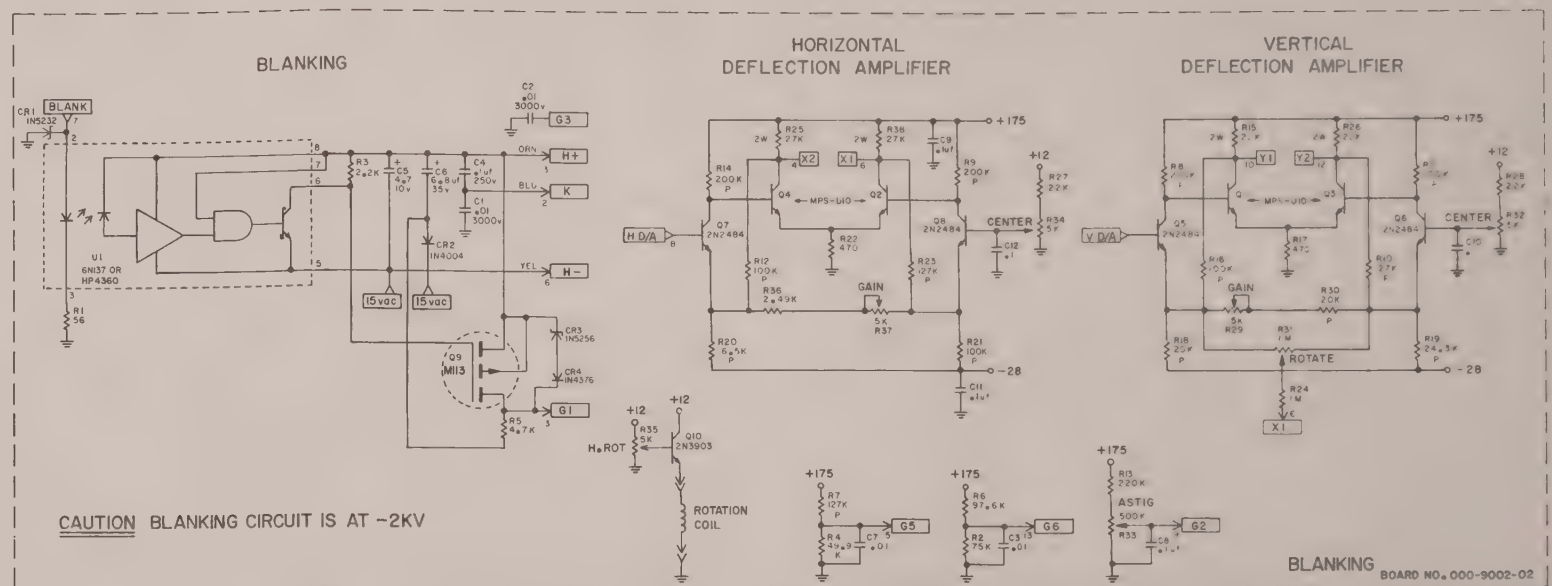
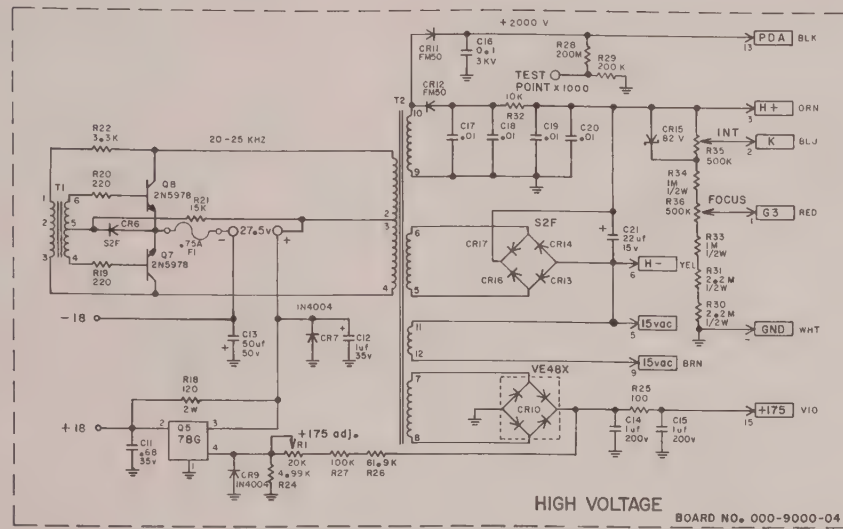
REGULATOR BOARD
— COMPONENT SIDE —

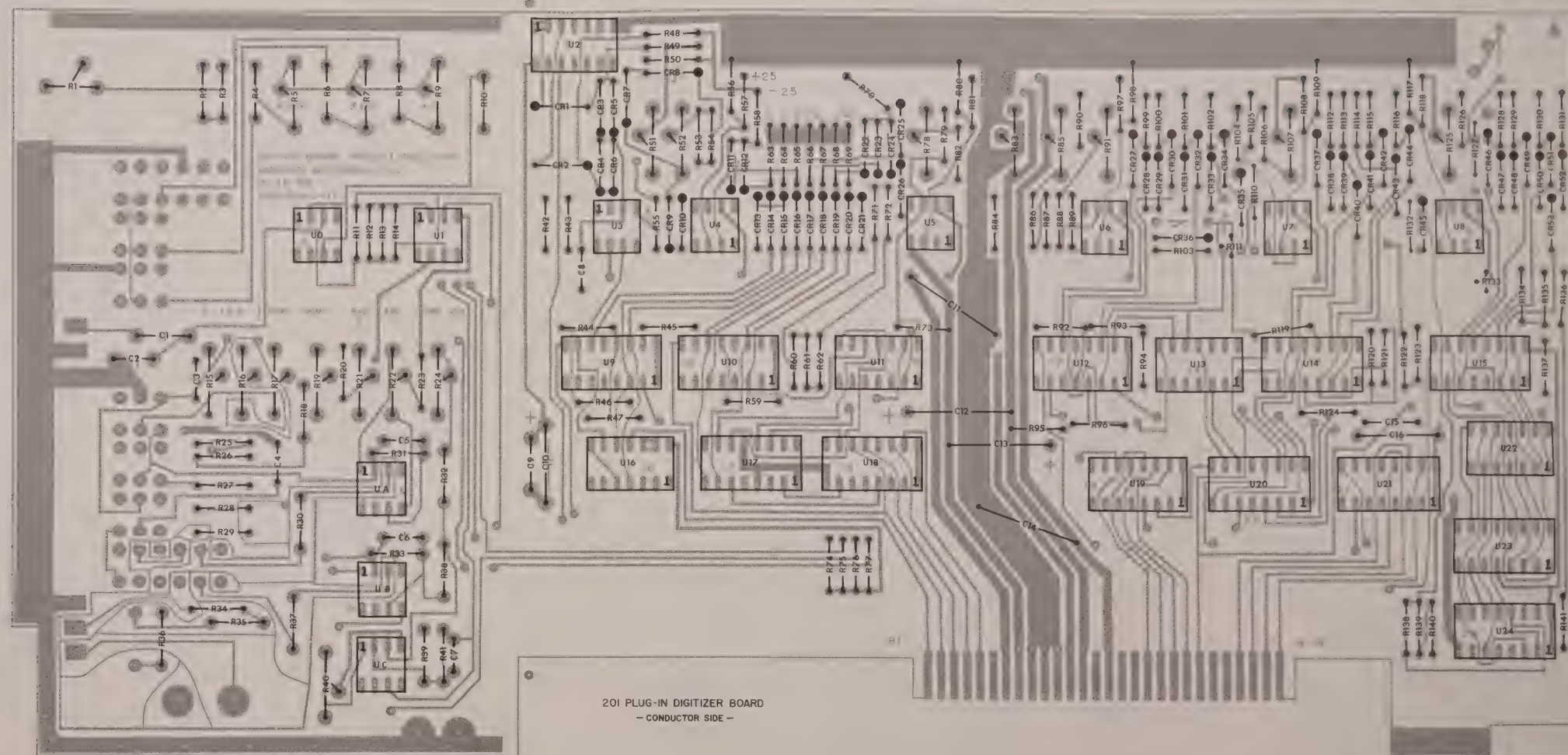


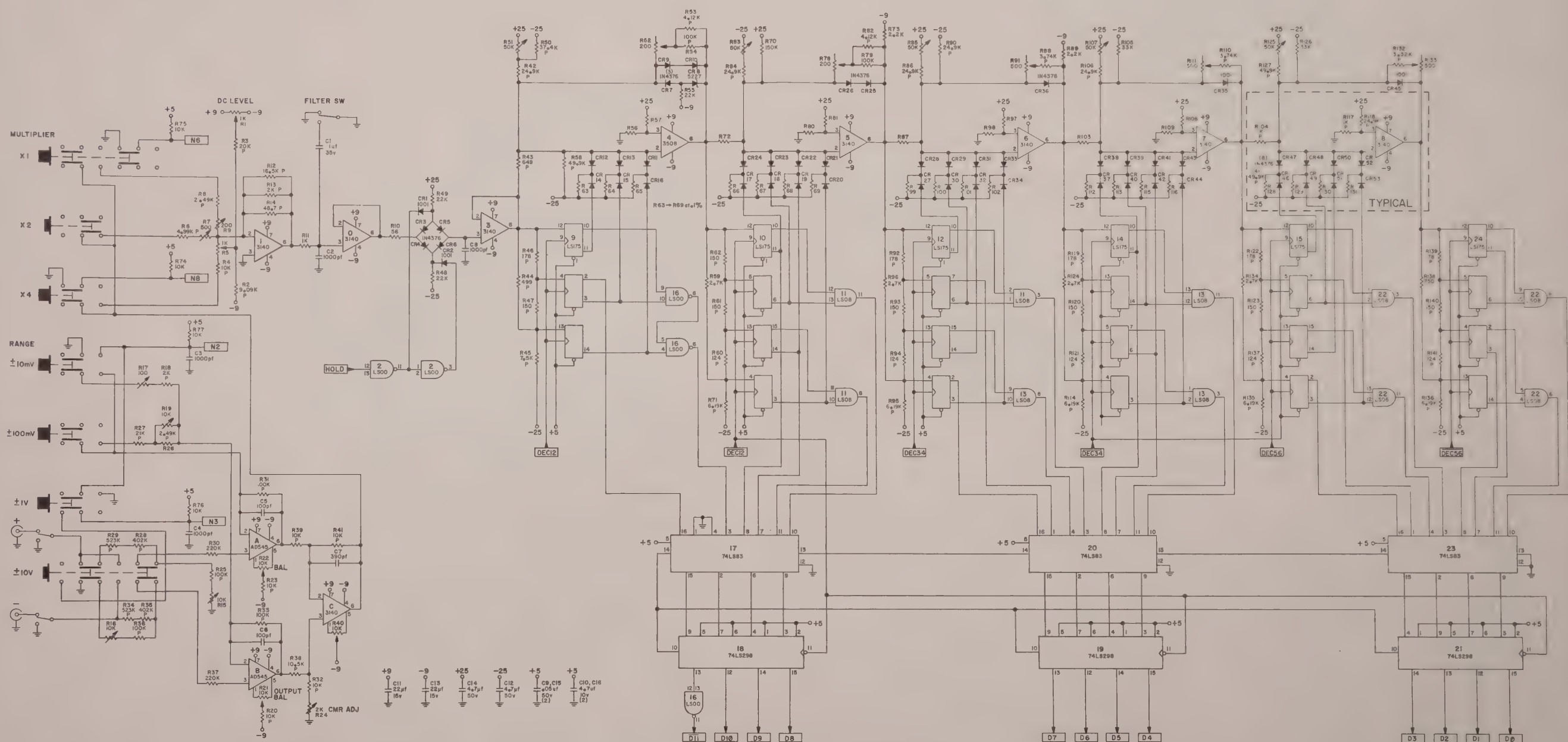
III BAY POWER SUPPLY BOARD
— CONDUCTOR SIDE —



CAPACITOR BOARD
— CONDUCTOR SIDE —

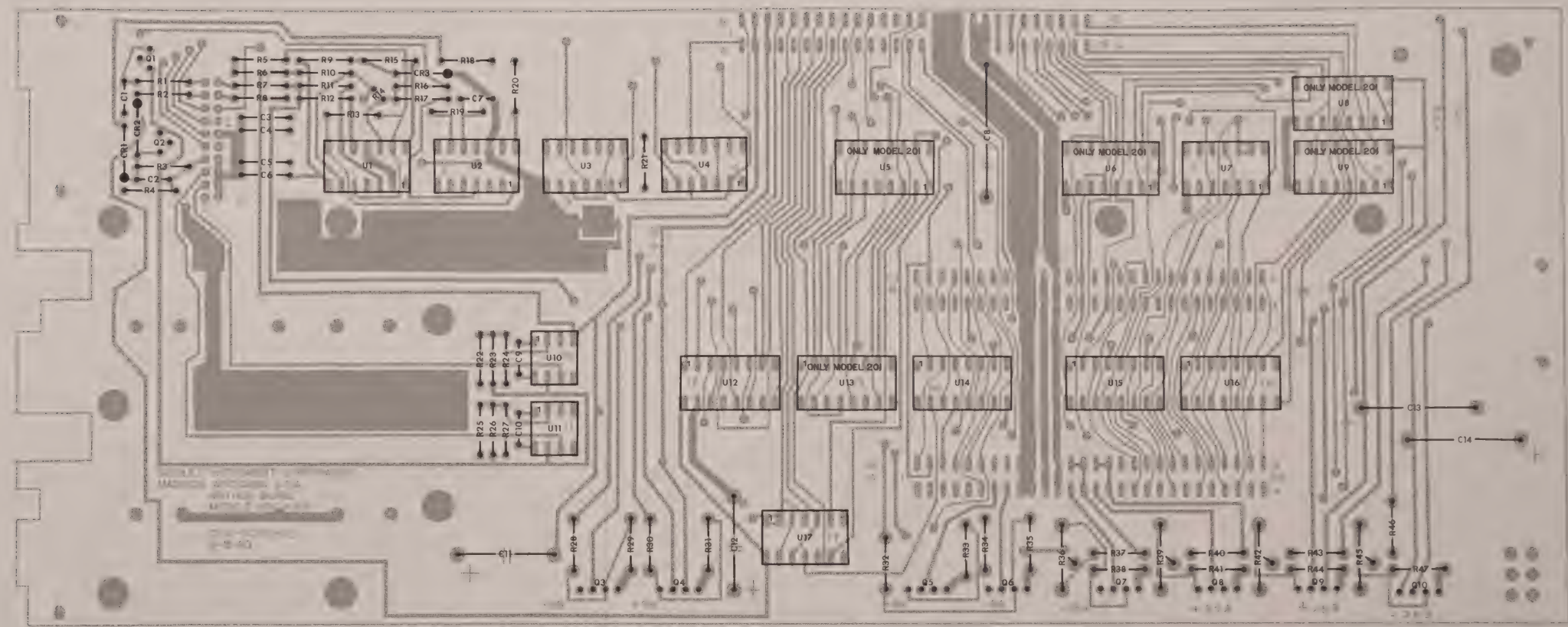




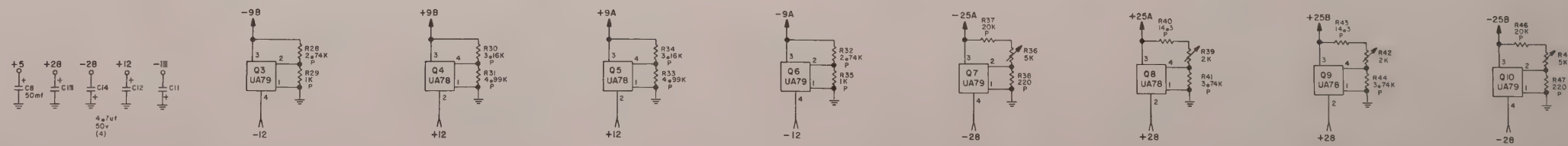
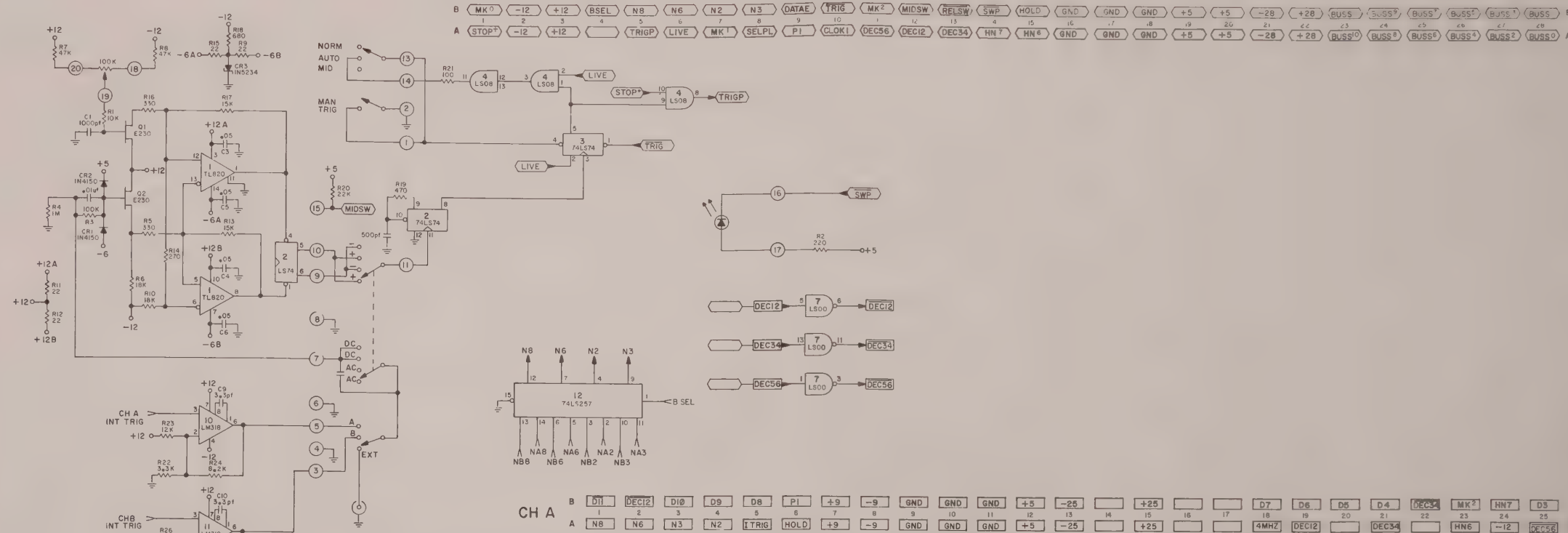


B	D11	DEC12	D10	D9	D8	P1	+9	-9	GND	GND	GND	+5	-25		+25			D7	D6	D5	D4	DEC34	MK ²	HN7	D3	D2	D1	D0	B
A	N8	N6	N3	N2	TRIG	HOLD	+9	-9	GND	GND	GND	+5	-25		+25			4MHZ	DEC12		DEC34		HN6	-12	DEC56	DEC56	MK ⁰	MK ¹	A

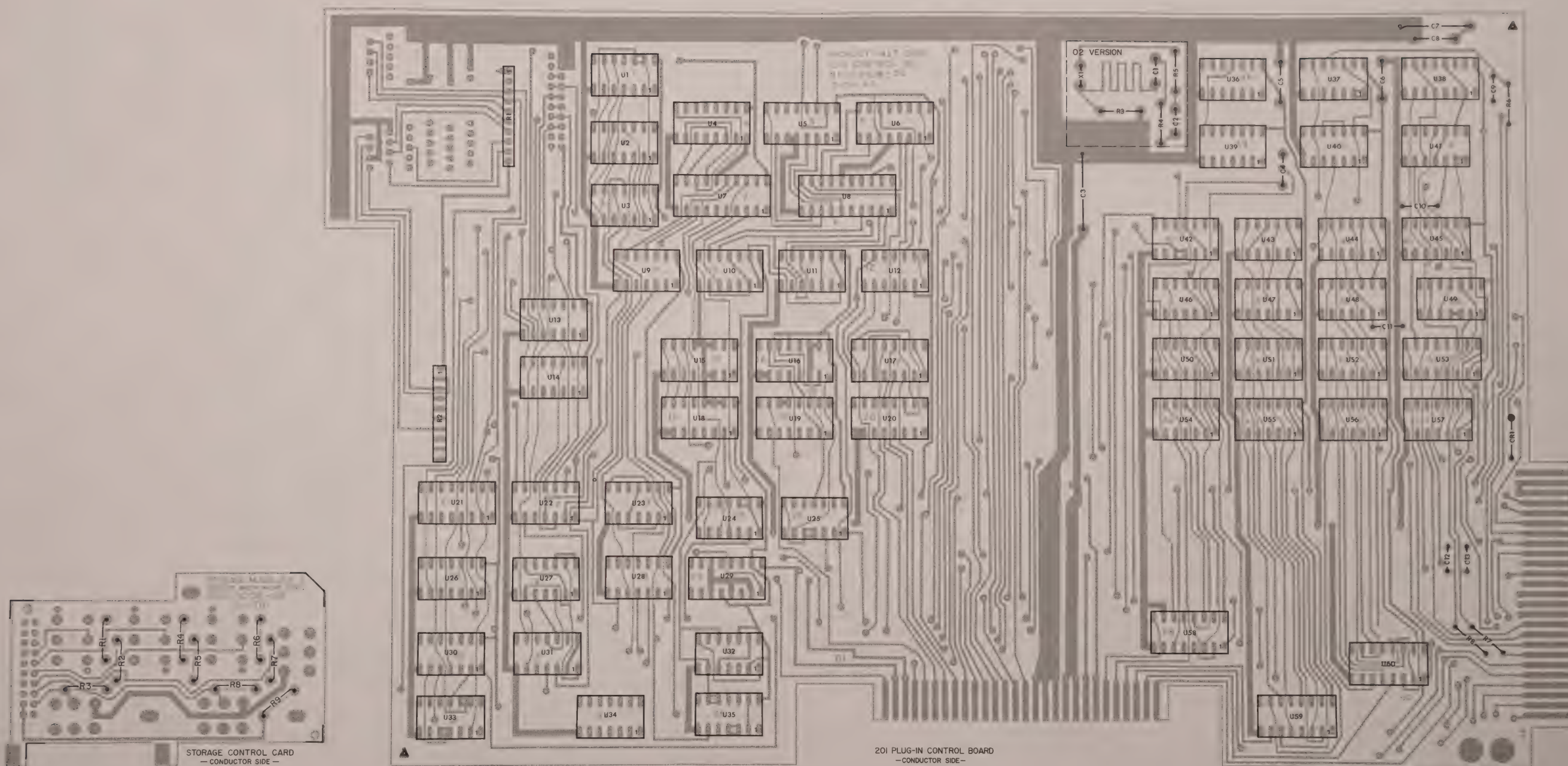
NICOLET INSTRUMENT CORP
 201 PLUG-IN DIGITIZER BOARD
 000-9040-06 LK 12-10-80

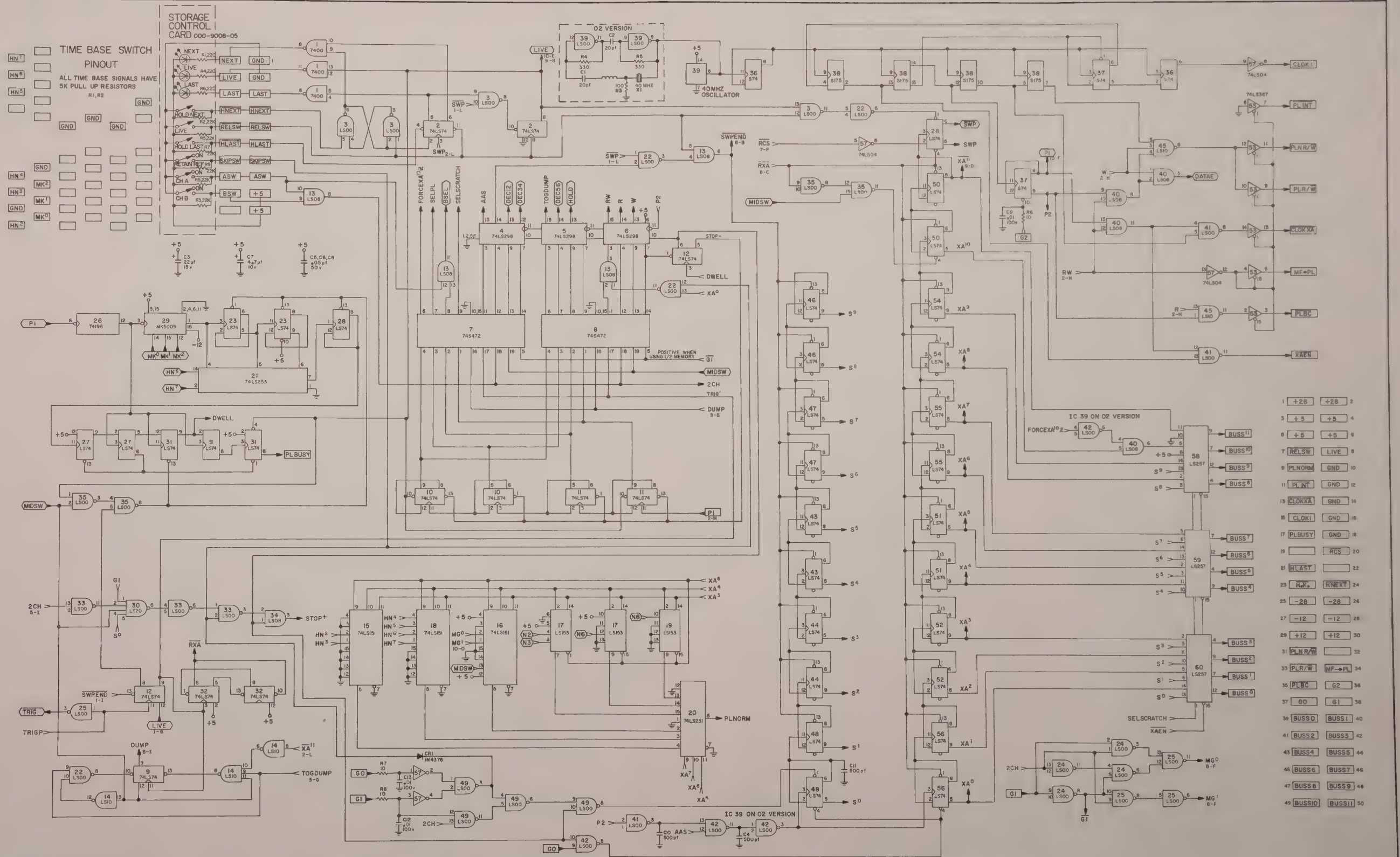


200+201 PLUG-IN MOTHER BOARD
-CONDUCTOR SIDE-

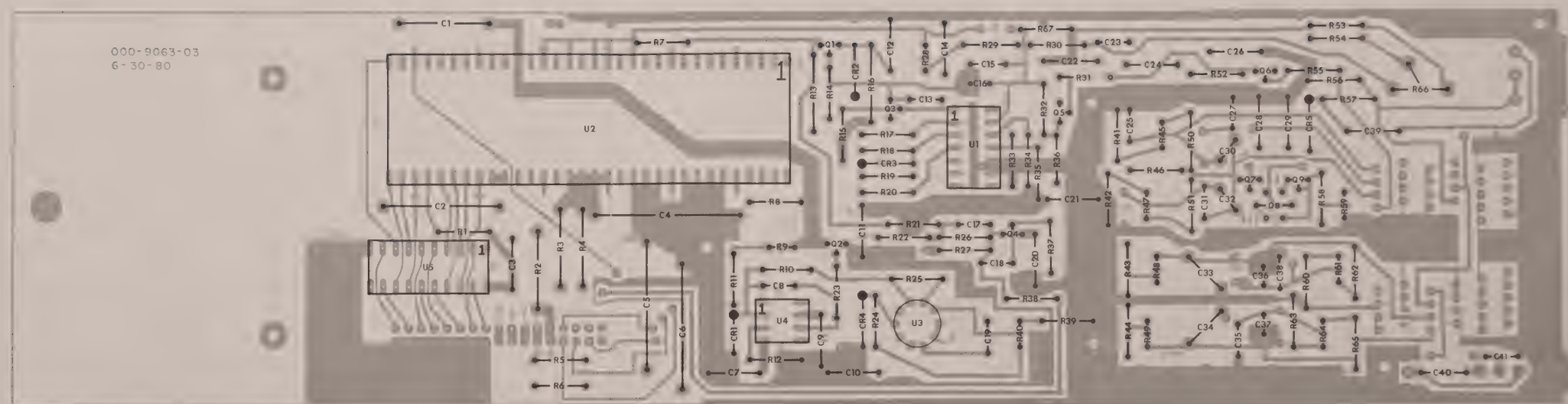


NICOLET INSTRUMENT CORP
201 PLUG-IN MOTHER BOARD
000-9039-04 LEK 09-22-80

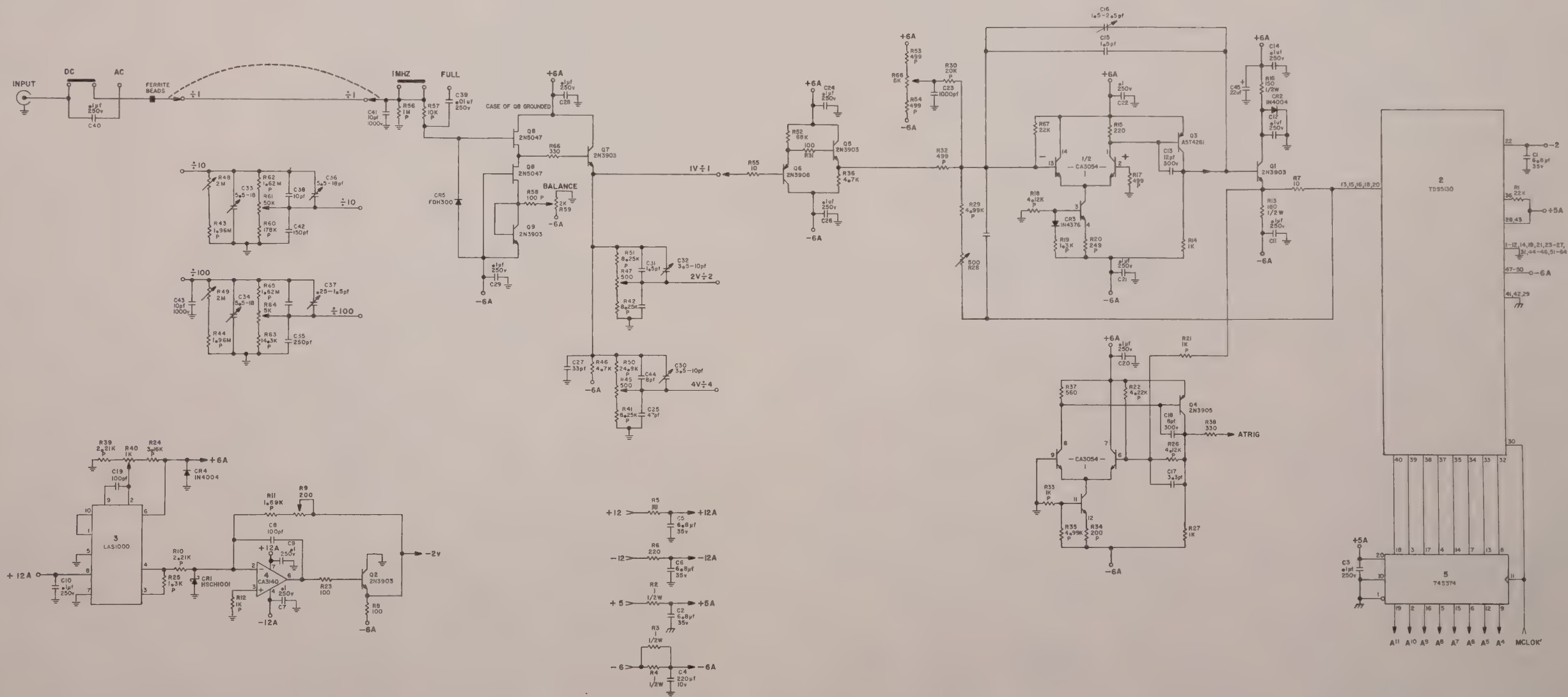




NICOLET INSTRUMENT CORP
201 PLUG-IN CONTROL BOARD
000-9038-02,04 LEK 12-10-80



204-A PLUG-IN DIGITIZER BOARD
- COMPONENT SIDE -



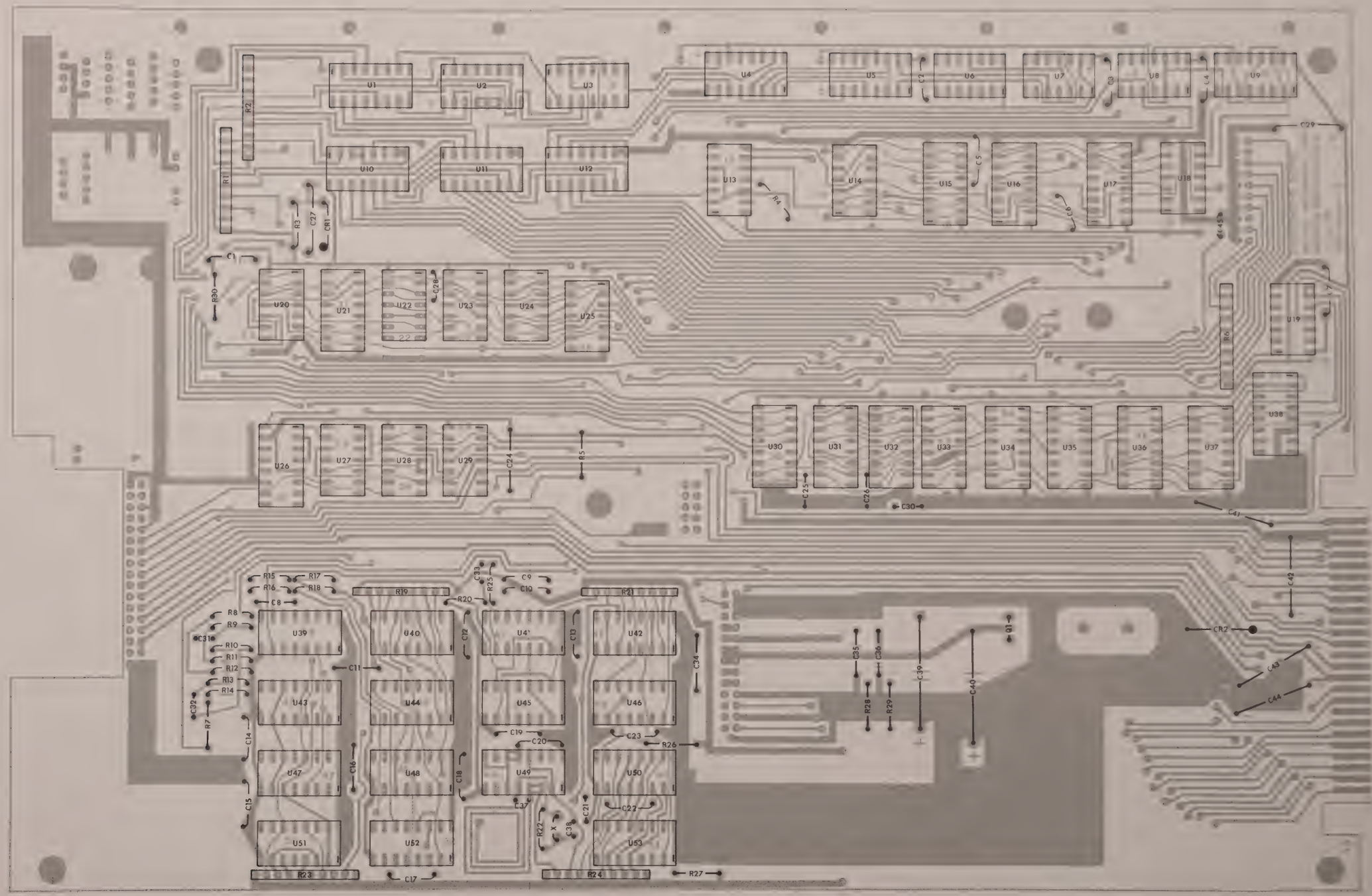
34	32	30	28	26	24	22	20	18	16	14	12	10	8	6	4	2
A ⁴	A ⁵	A ⁶	A ⁷	A ⁸	A ⁹	A ¹⁰	A ¹¹	-12	-6	-6	+12	+5	AN ⁸	AT ¹ IG	GND	GND
GND	GND	GND	GND	GND	GND	GND	GND	-12	-6	-6	+12	+5	AN ²	AN ³	AN ⁶	MCLOCK
33	31	29	27	25	23	21	19	17	15	13	11	9	7	5	3	1

(CHANNEL B CONNECTOR IS THE SAME PINOUT — REPLACE A⁶ WITH B⁶)

NICOLET INSTRUMENT CORP

204-A PLUG-IN DIGITIZER BOARD

000-9063-03 MDK 11-20-80



204-A PLUG-IN CONTROL BOARD
- CONDUCTOR SIDE -

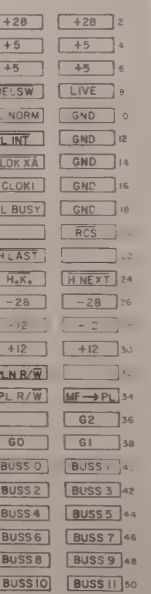
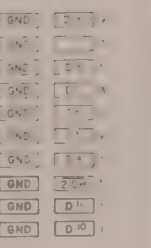
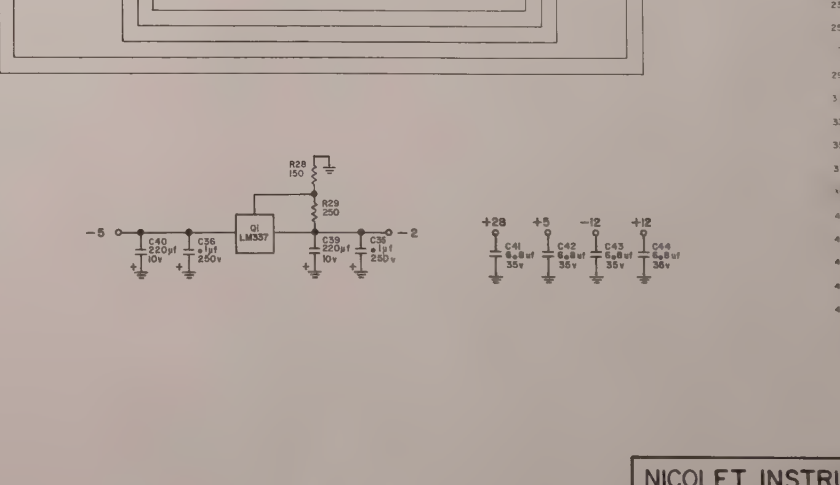
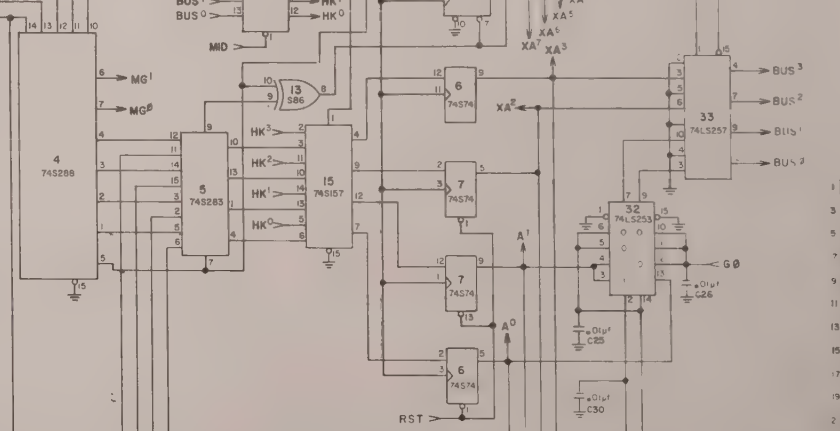
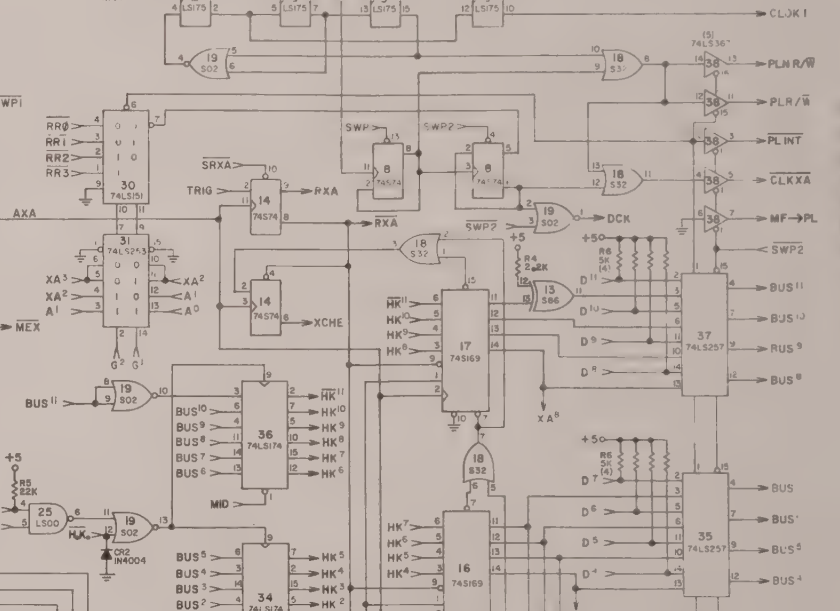
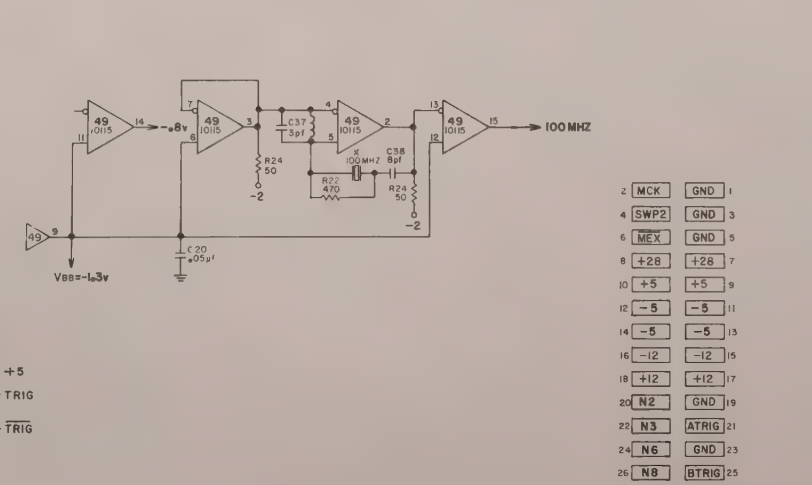
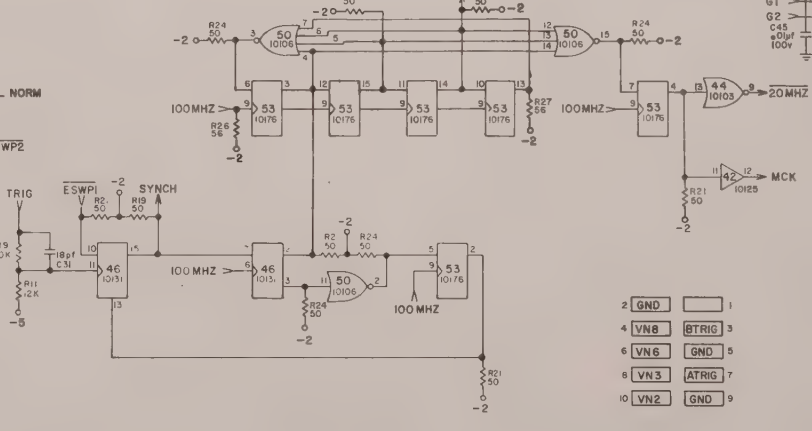
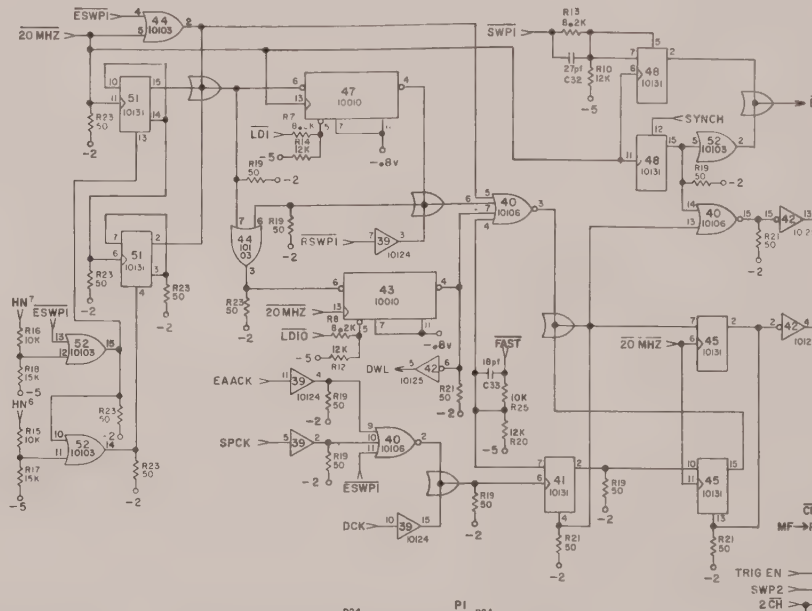
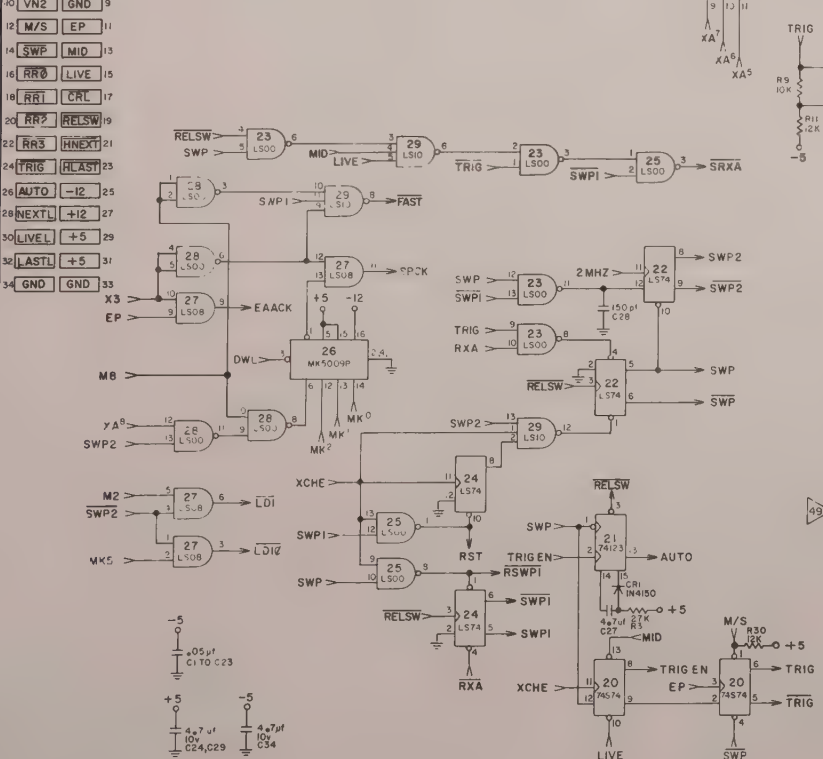
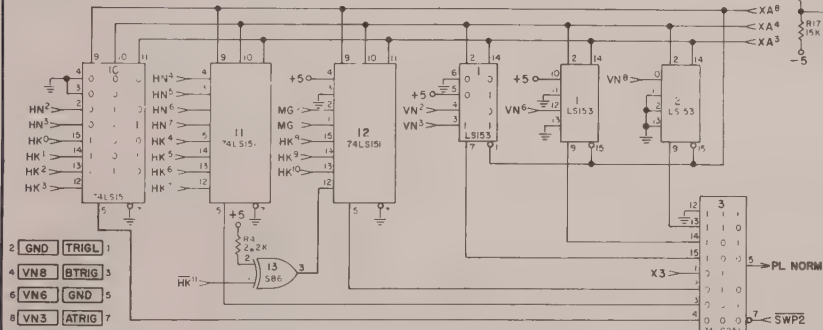


TIME BASE SWITCH PINOUT

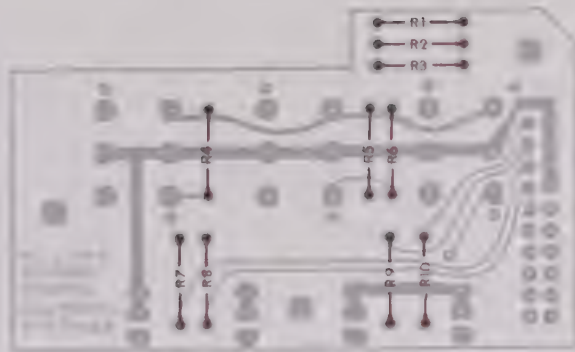
ALL TIME BASE SIGNALS HAVE 5K PULL UP RESISTORS
R1, R2.
01 VERSION IC'S 44 AND 53 ARE 95L23'S

+5

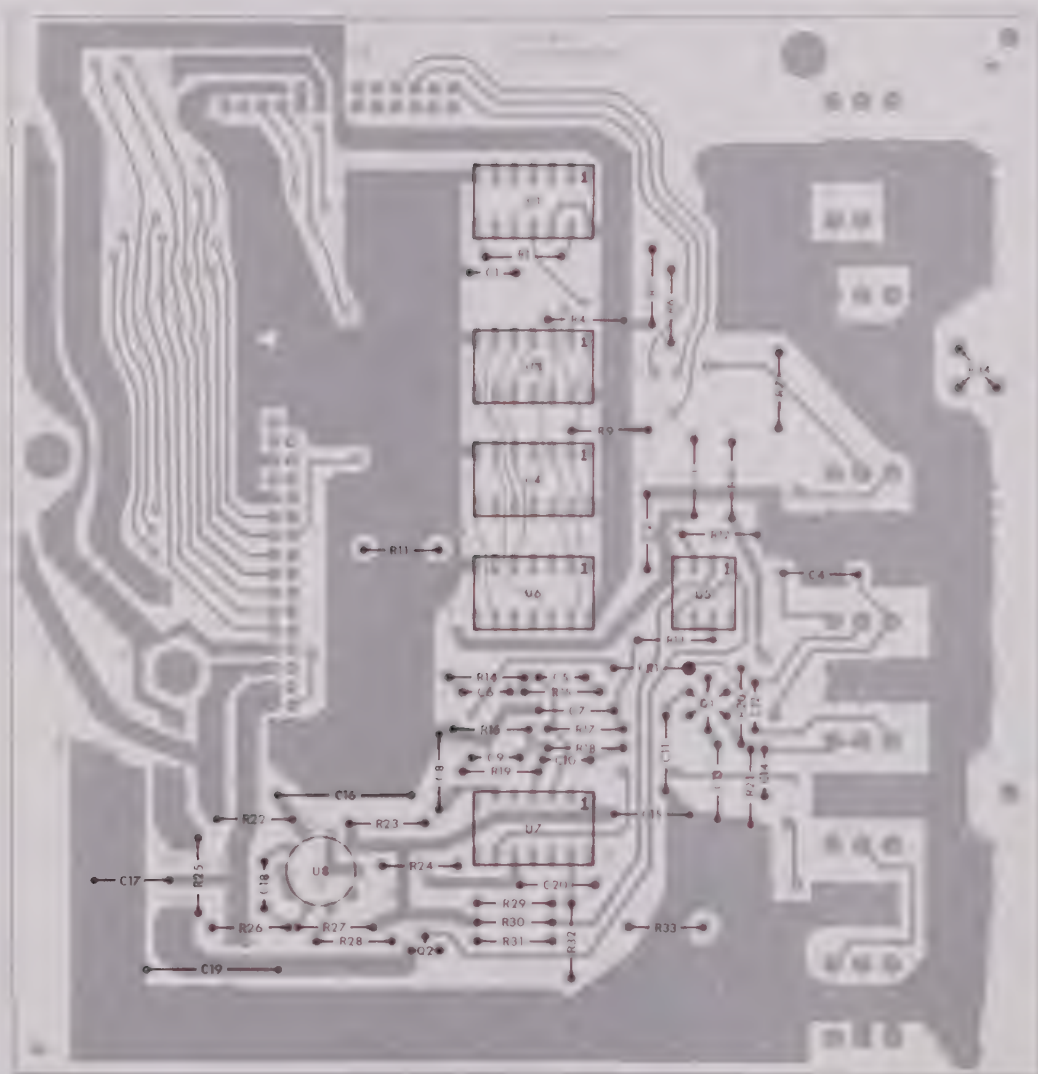
TRIGL



NICOLET INSTRUMENT CORP
204-A PLUG-IN CONTROL BOARD
000-9066-02 LK 11-28-80



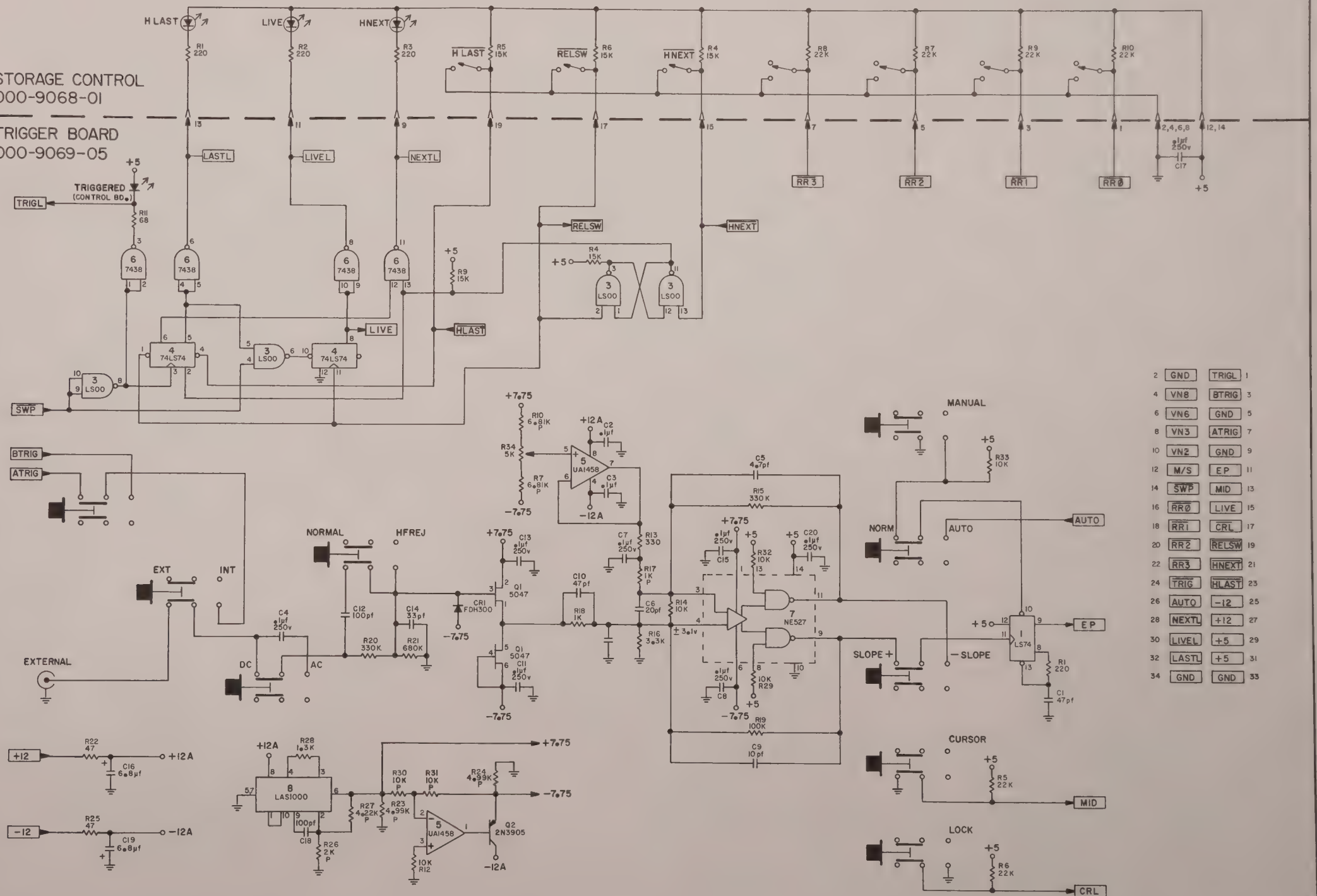
204-A STORAGE CONTROL
- CONDUCTOR SIDE -



204-A TRIGGER BOARD
- COMPONENT SIDE -

STORAGE CONTROL
000-9068-01

TRIGGER BOARD
000-9069-05

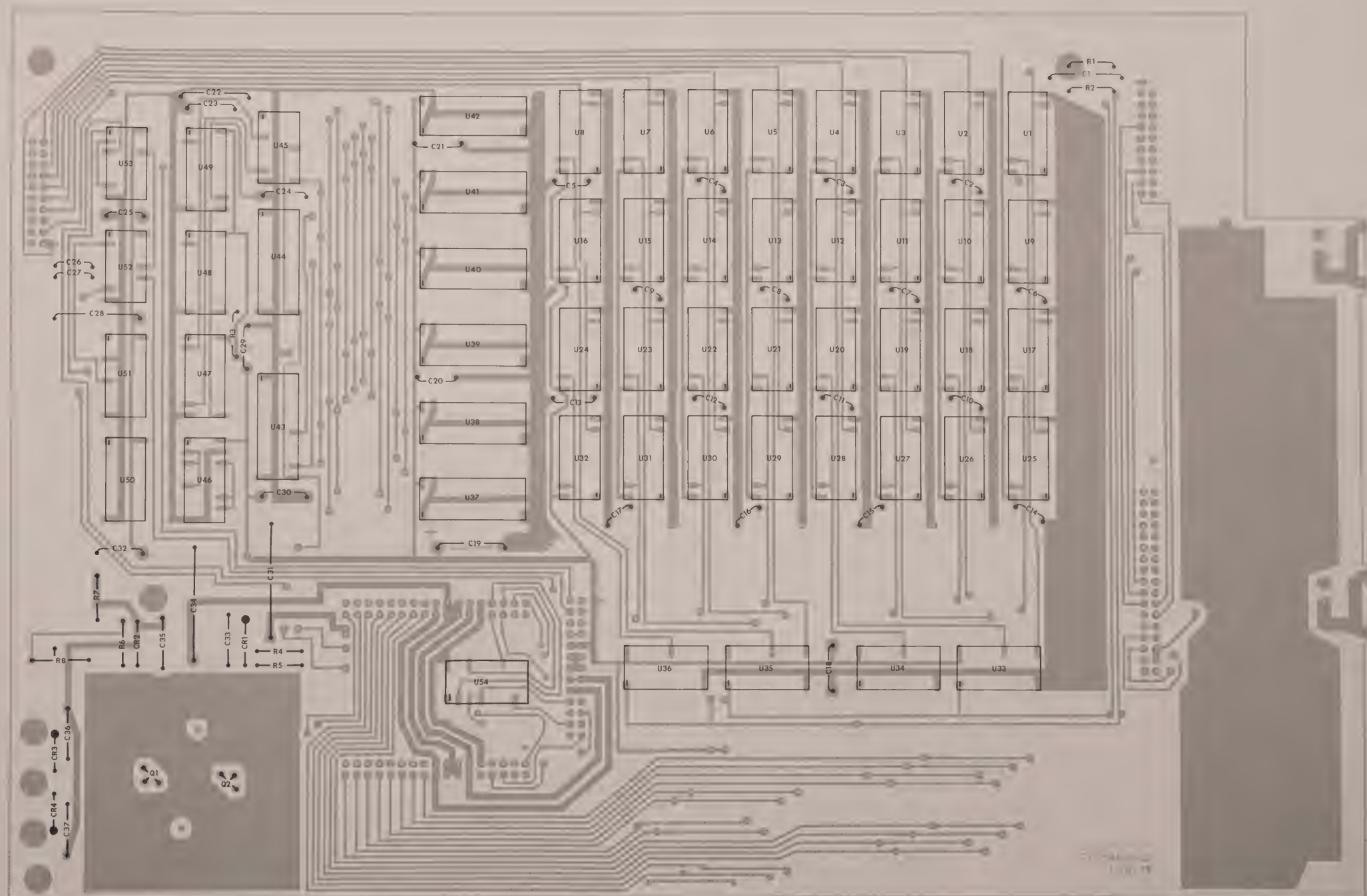


2	GND	TRIGL	1
4	VN8	BTRIG	3
6	VN6	GND	5
8	VN3	ATRIG	7
10	VN2	GND	9
12	M/S	EP	11
14	SWP	MID	13
16	RR0	LIVE	15
18	RR1	CRL	17
20	RR2	RELSW	19
22	RR3	HNEXT	21
24	TRIG	H LAST	23
26	AUTO	-12	25
28	NEXTL	+12	27
30	LIVEL	+5	29
32	LASTL	+5	31
34	GND	GND	33

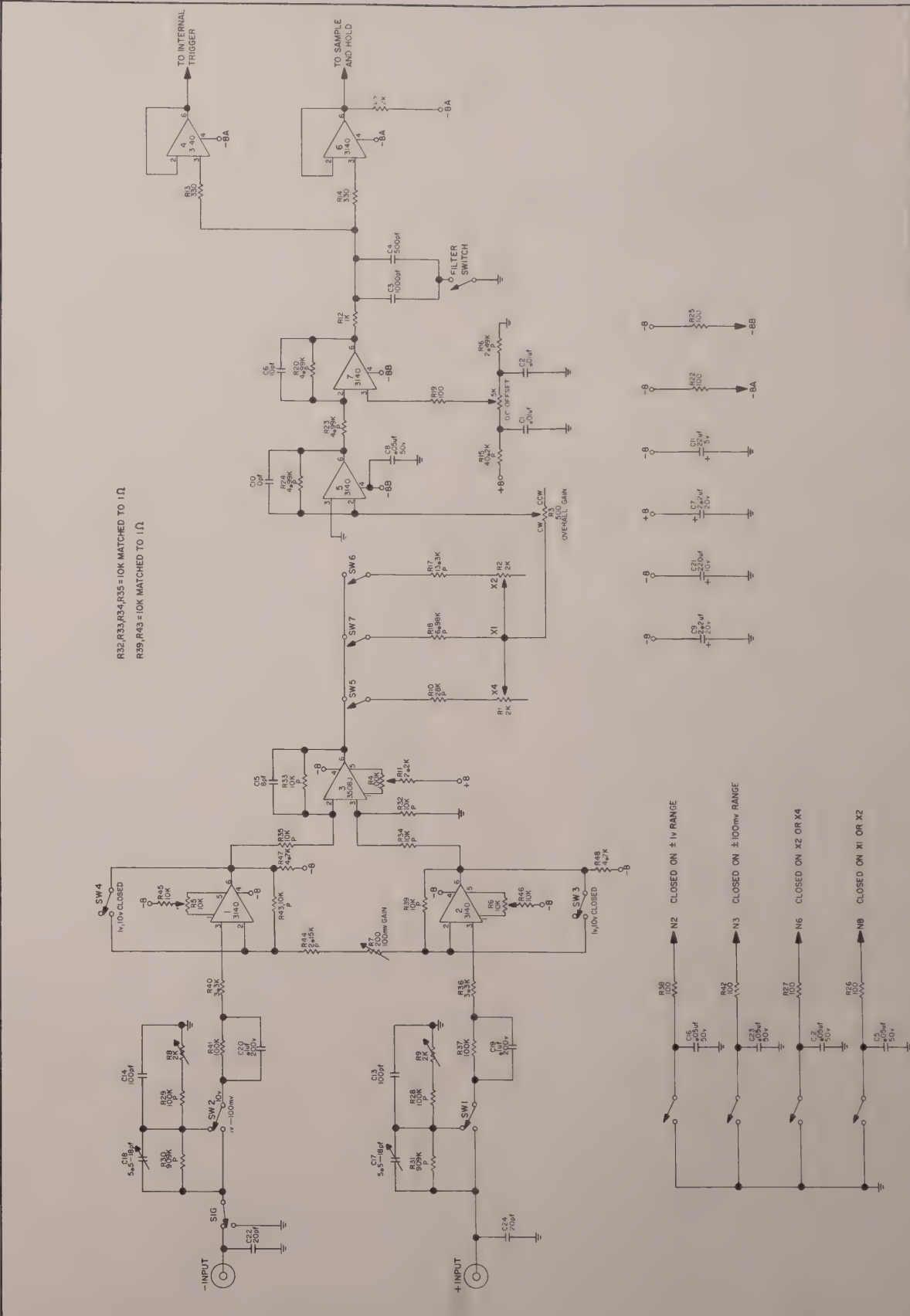
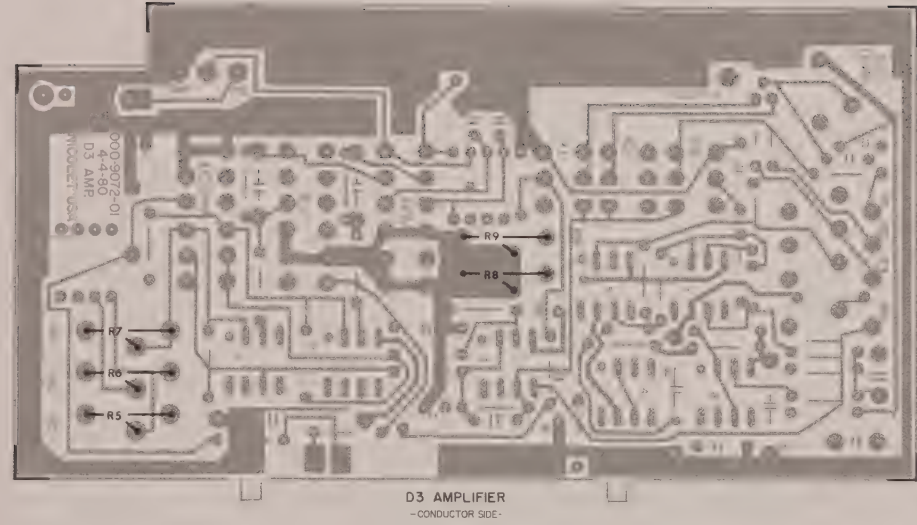
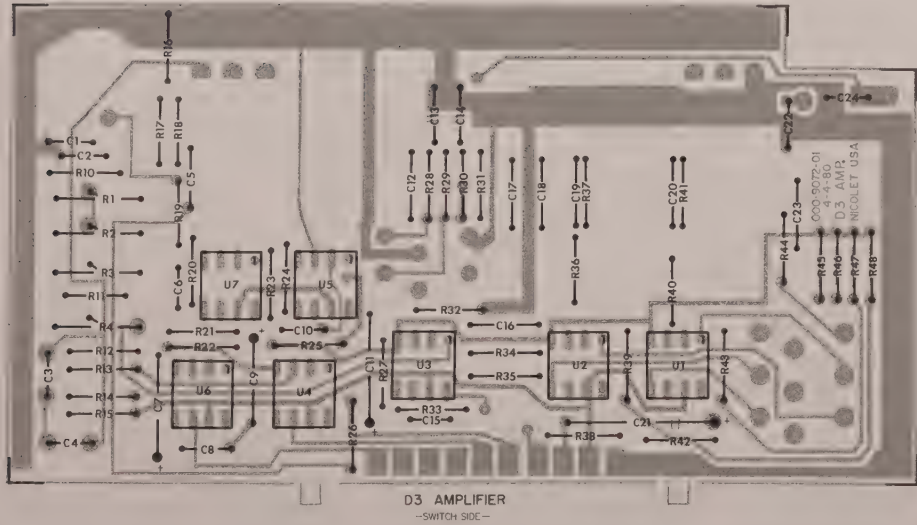
NICOLET INSTRUMENT CORP

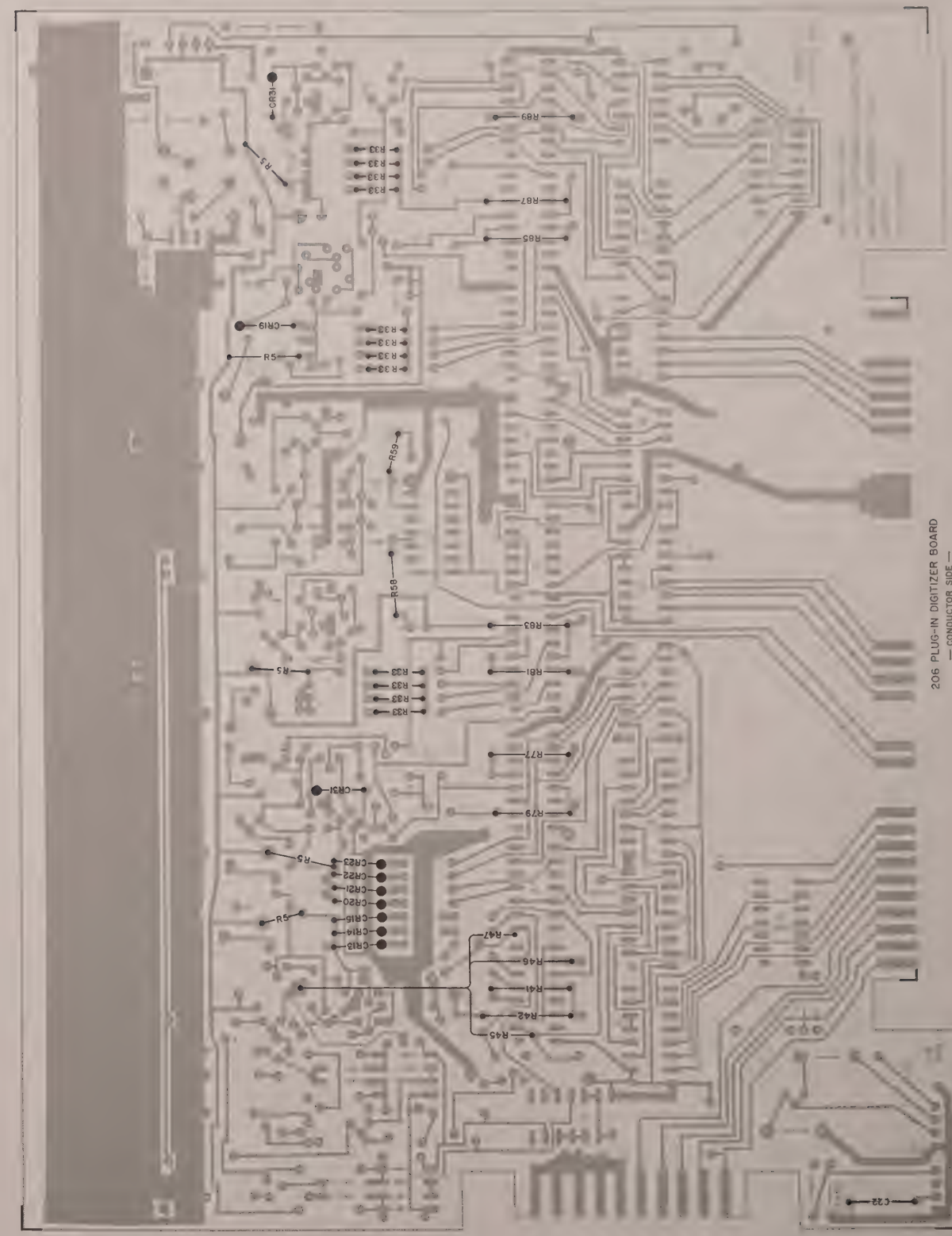
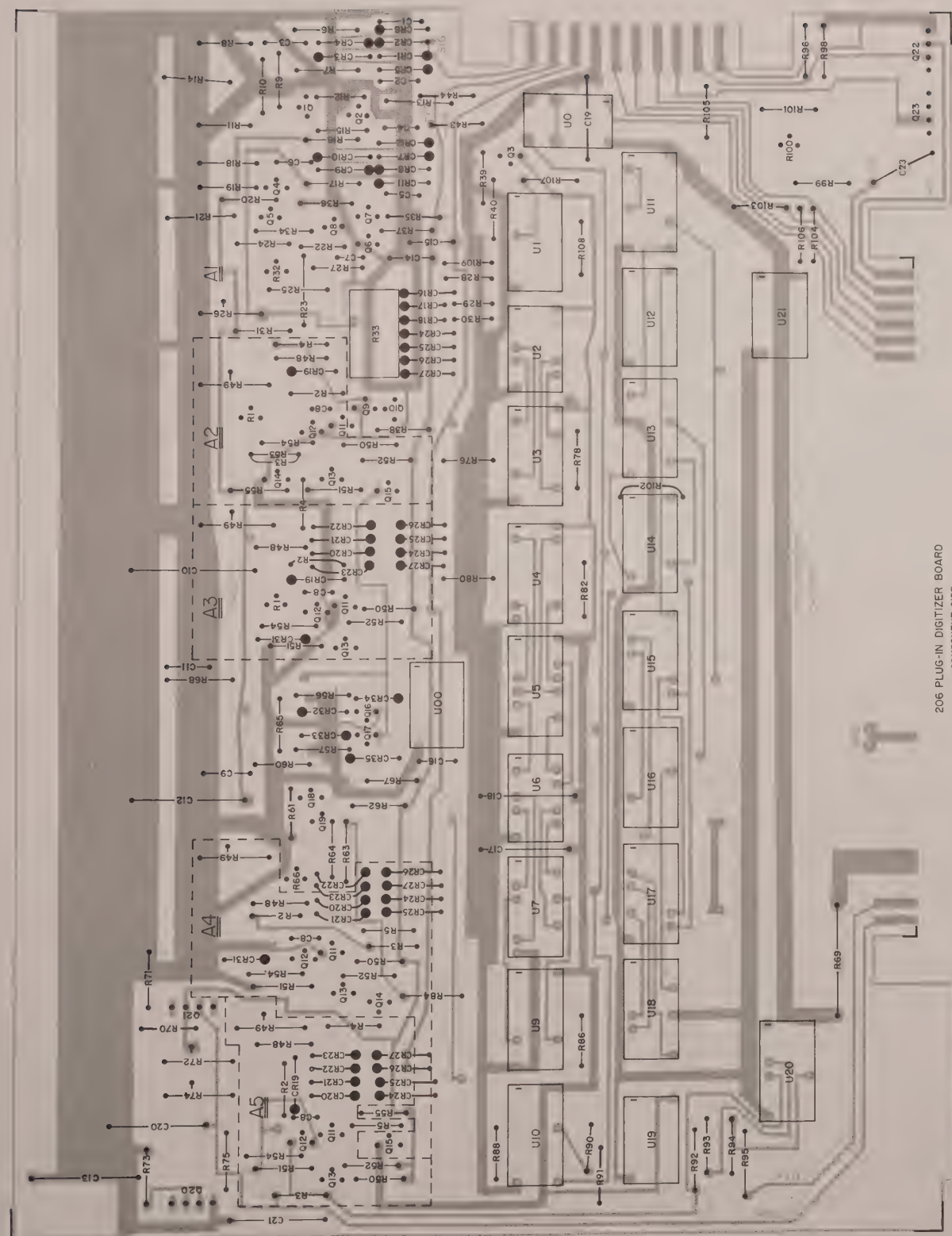
204-A PLUG-IN

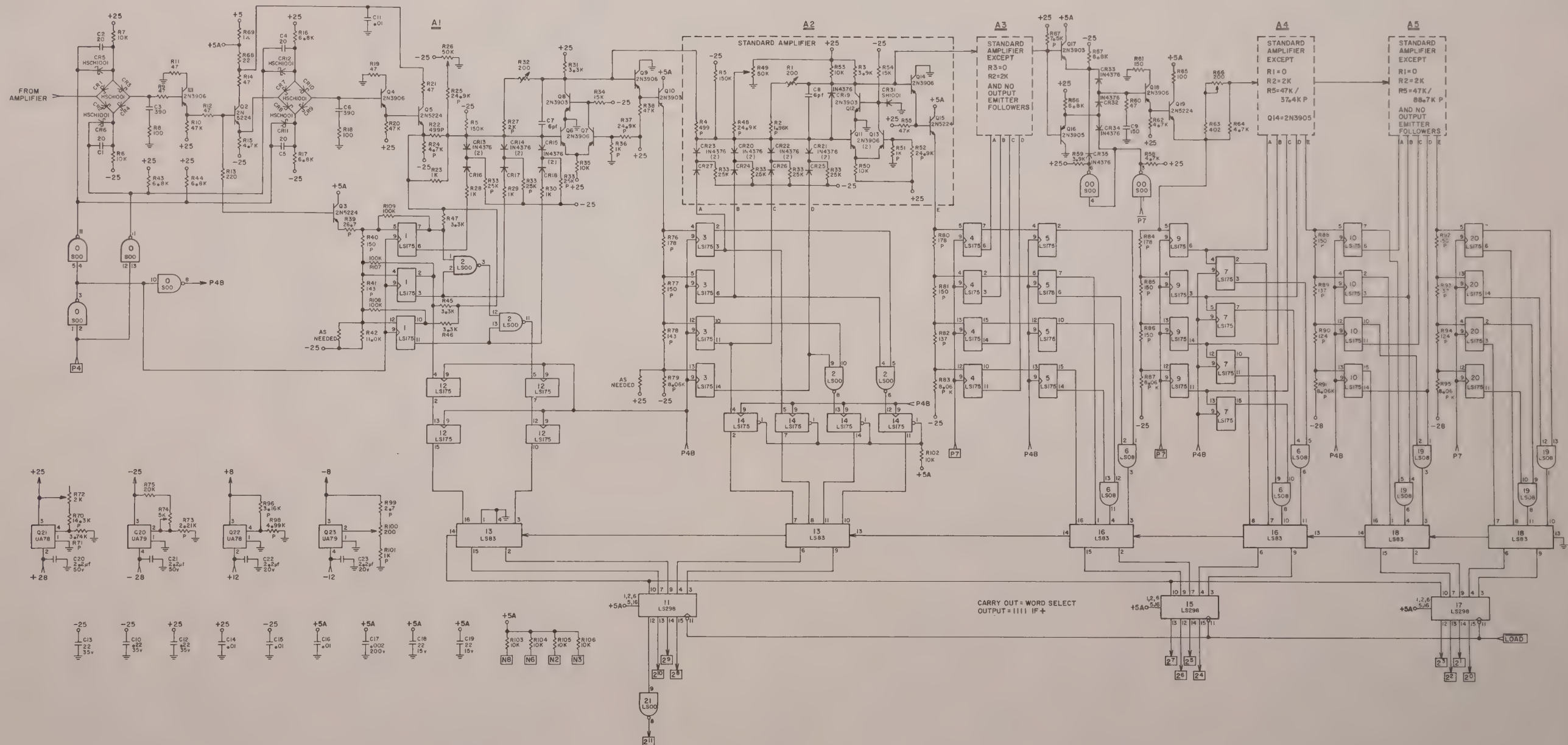
LEK 11-17-80

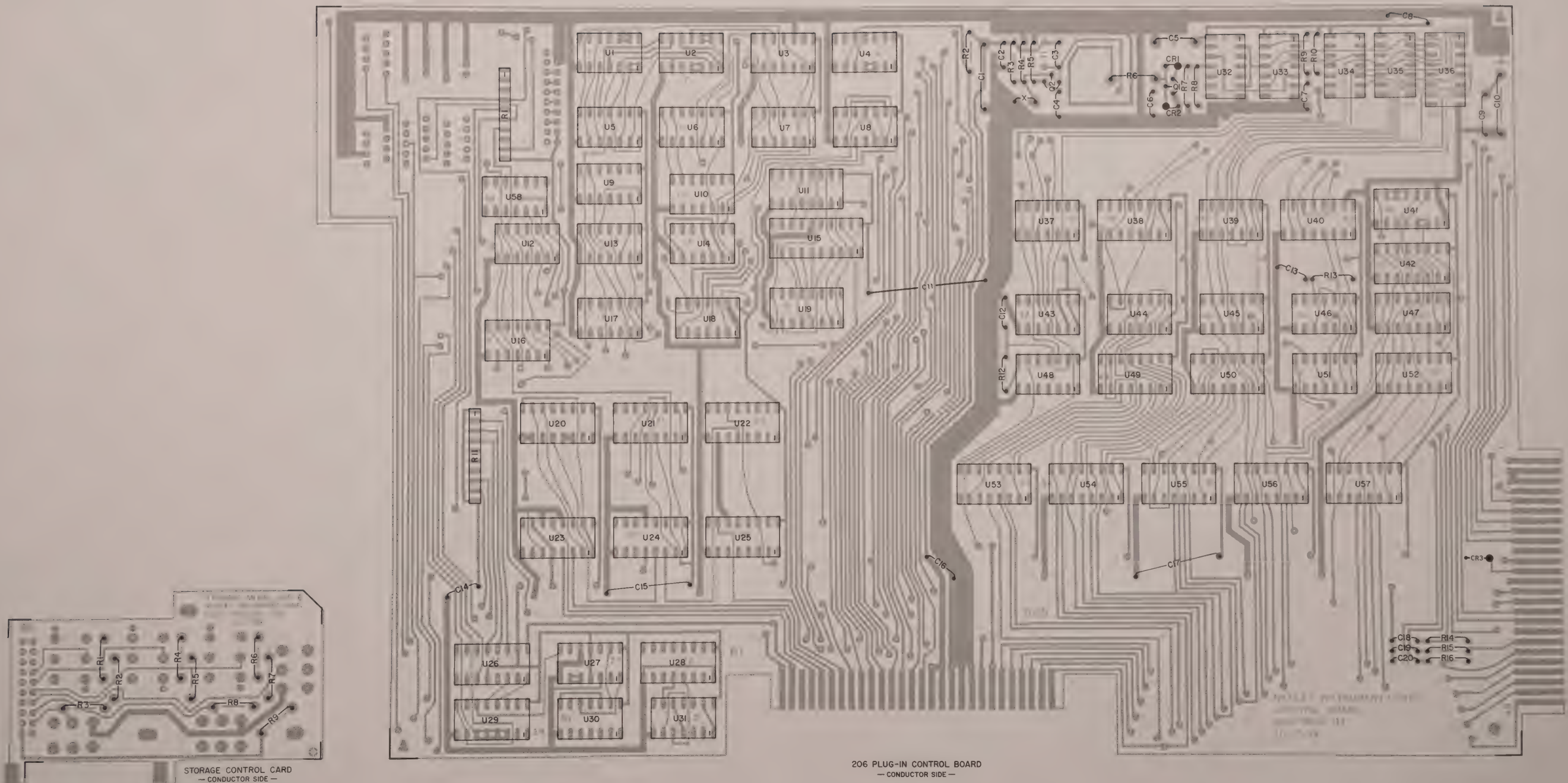


204-A PLUG IN MEMORY BOARD
— COMPONENT SIDE —

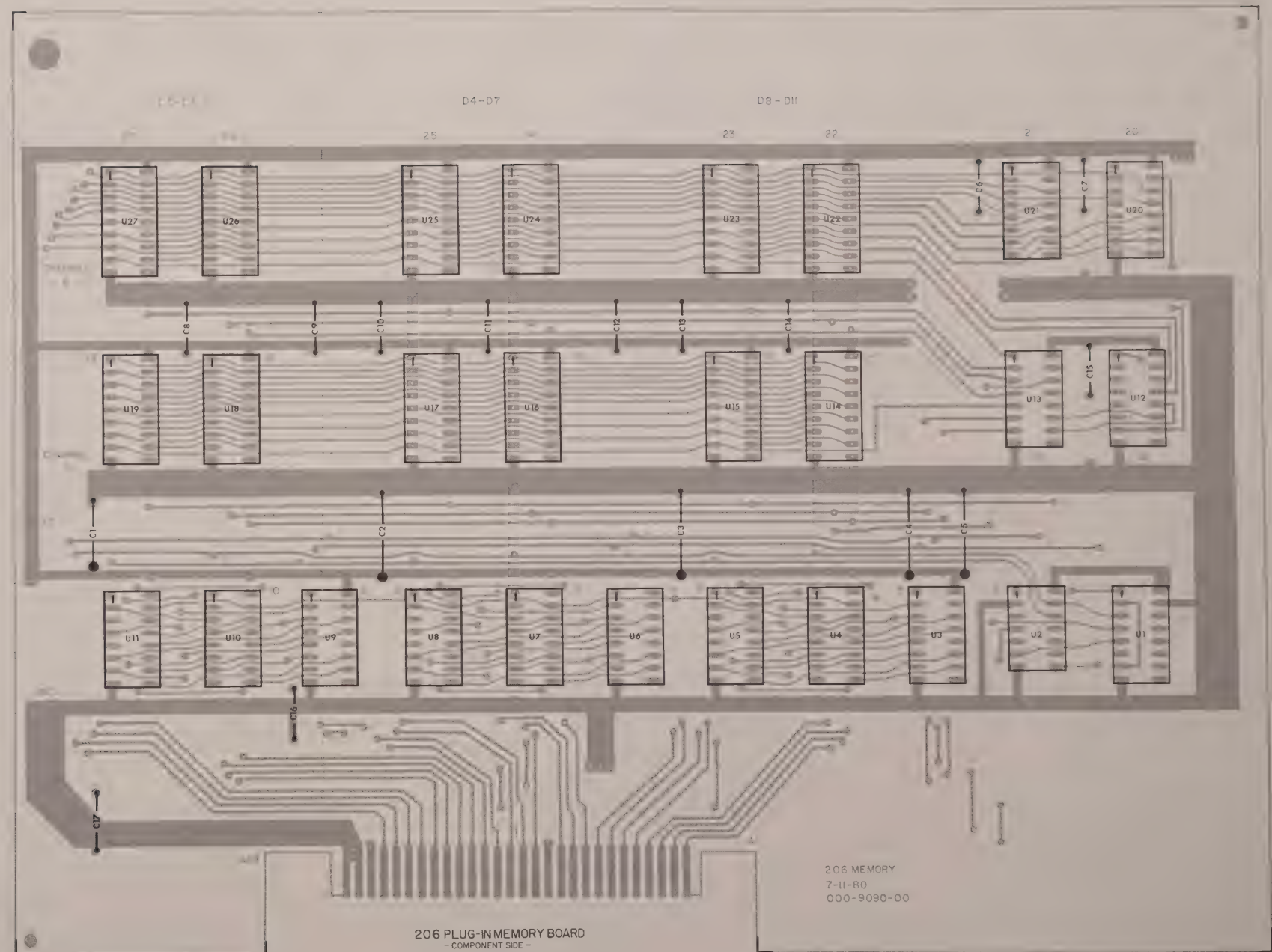


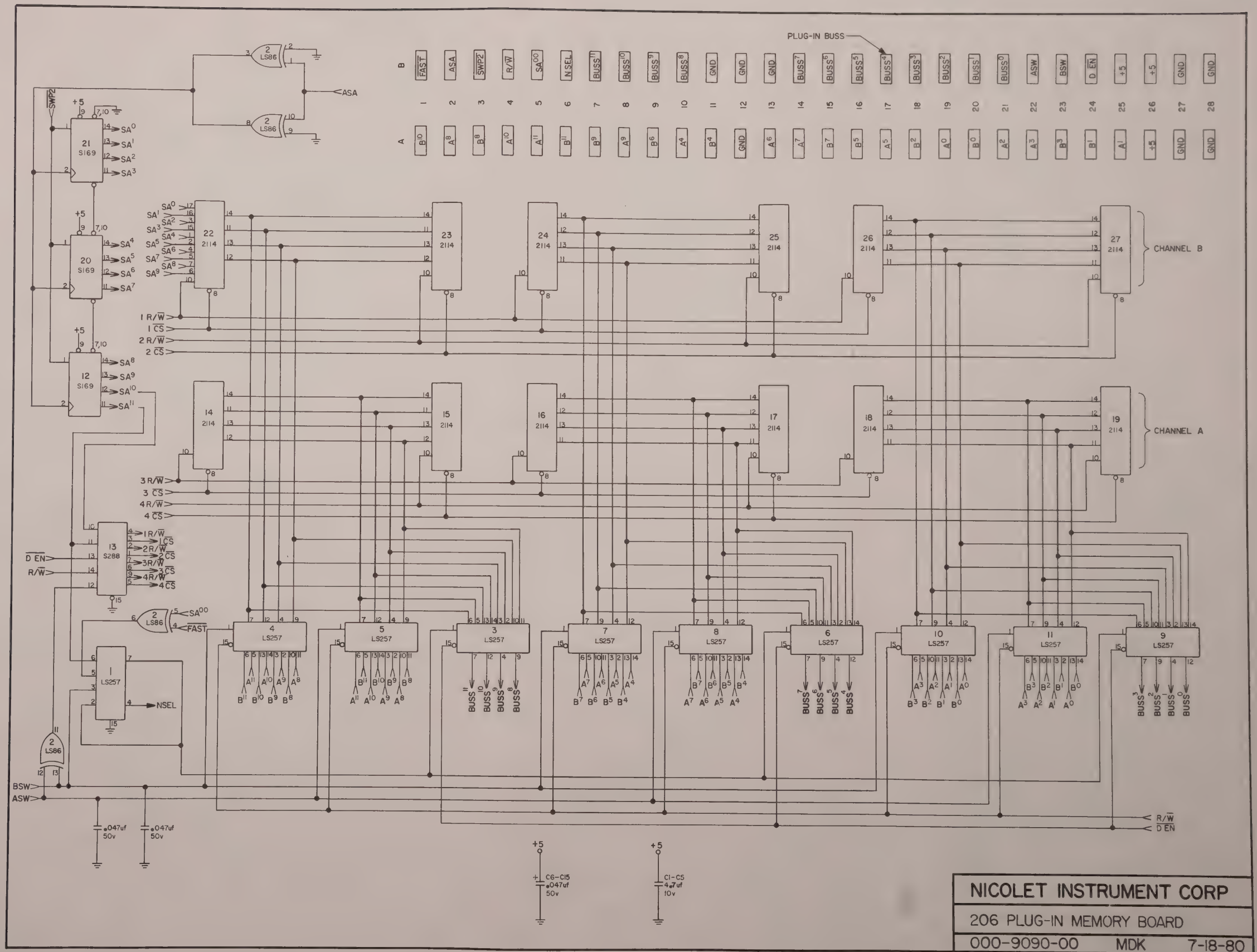




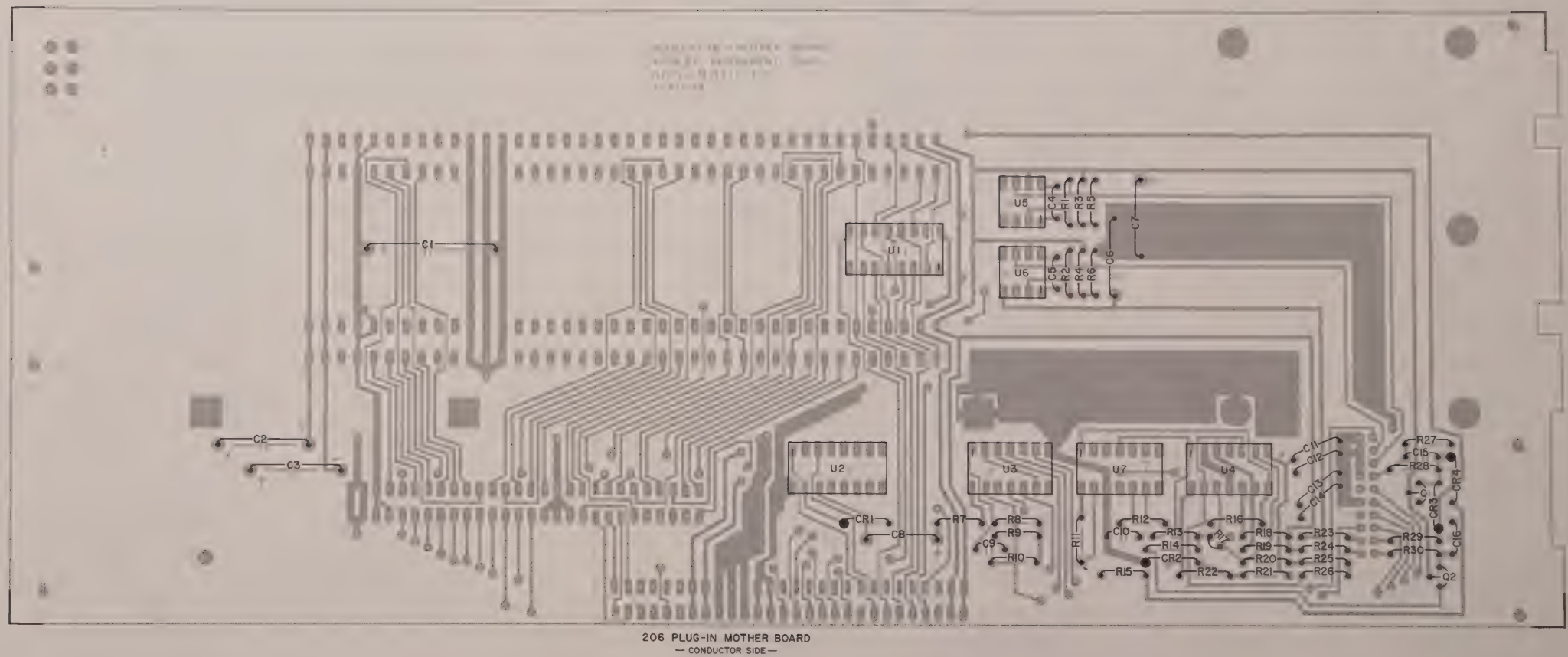


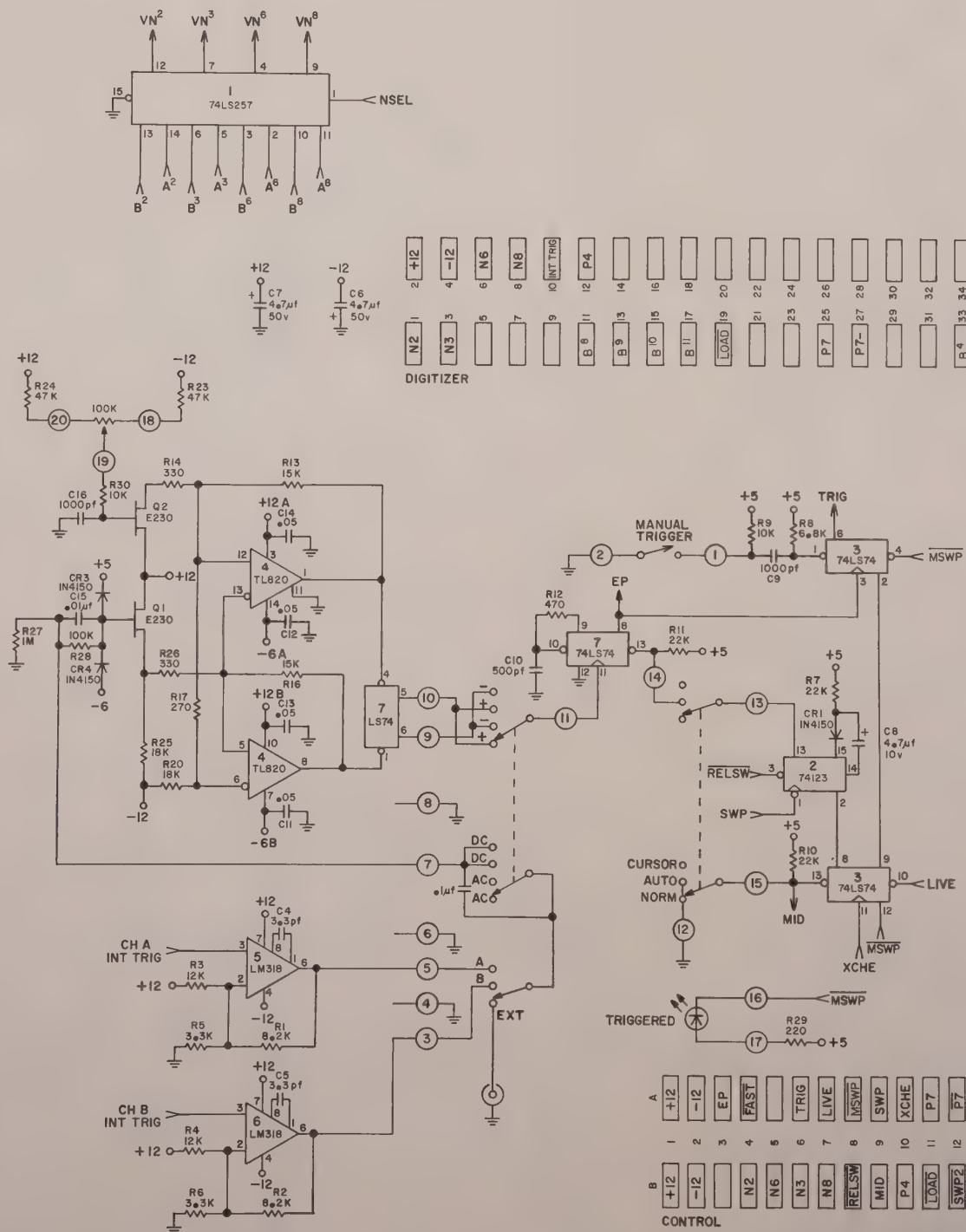






NICOLET INSTRUMENT CORP
 206 PLUG-IN MEMORY BOARD
 000-9090-00 MDK 7-18-80

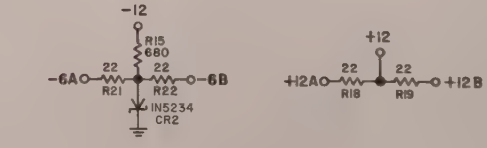




2	+12
4	-12
6	N6
8	N8
10	INT TRIG
12	P4
14	
16	
18	
20	
22	
24	
26	P7
28	
30	
32	
34	A4
36	A5
38	A6
40	A7
42	
44	
46	
48	
50	
52	
54	
56	GND
58	GND
60	GND
62	
64	
66	A0
68	A1
70	A2
72	A3
74	+5
76	
78	-28
80	+28

2	+12
4	-12
6	N6
8	N8
10	INT TRIG
12	P4
14	
16	
18	
20	
22	
24	
26	P7
28	
30	
32	
34	B4
36	B5
38	B6
40	B7
42	
44	
46	
48	
50	
52	
54	
56	GND
58	GND
60	GND
62	
64	
66	B0
68	B1
70	B2
72	B3
74	+5
76	
78	-28
80	+28

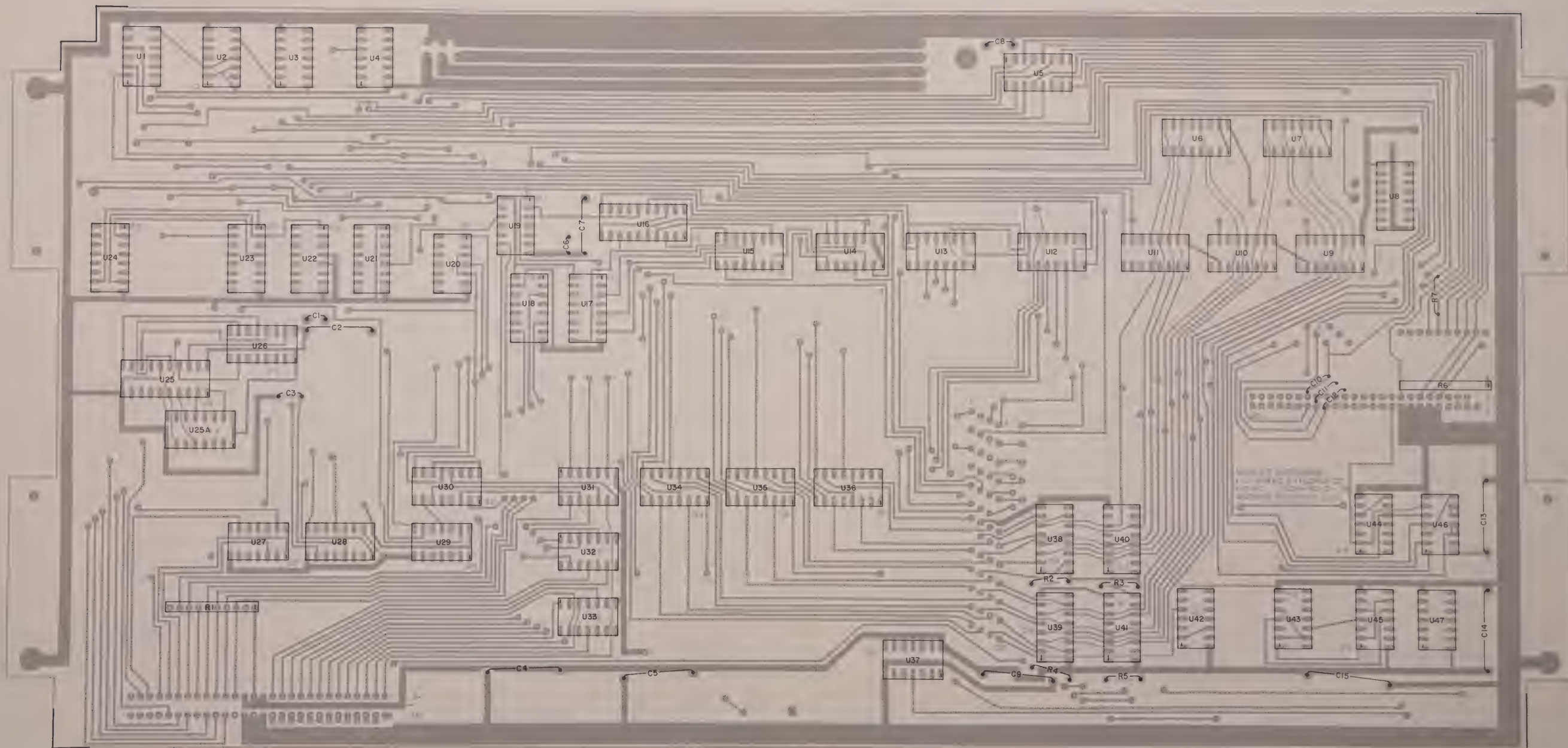
1	A10
2	A8
3	B8
4	A10
5	A11
6	B11
7	B9
8	A9
9	B6
10	A4
11	B4
12	GND
13	A6
14	A7
15	B7
16	B5
17	A5
18	B2
19	A0
20	B0
21	A2
22	A3
23	B3
24	B1
25	A1
26	+5
27	GND
28	GND



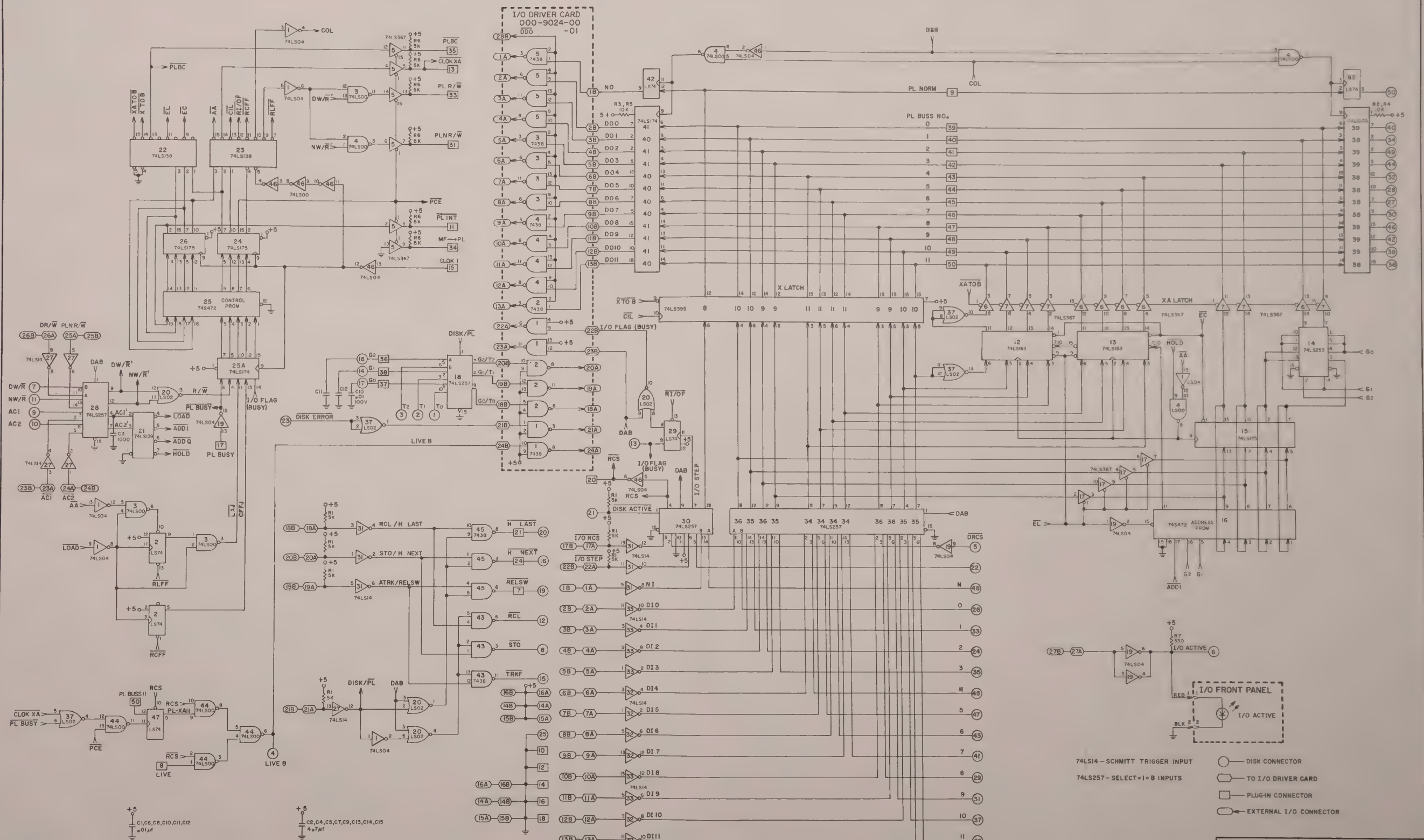
1	+12
2	-12
3	EP
4	FAST
5	
6	TRIG
7	LIVE
8	MSWP
9	SWP
10	XCHE
11	P7
12	P7
13	DEN
14	ASA
15	B5W
16	+5
17	+5
18	GND
19	GND
20	GND
21	-28
22	+28
23	BUS0
24	BUS2
25	BUS4
26	BUS6
27	BUS8
28	BUS10

NICOLET INSTRUMENT CORP
206 PLUG-IN MOTHER BOARD
000-9011-03 MDK 6-16-80

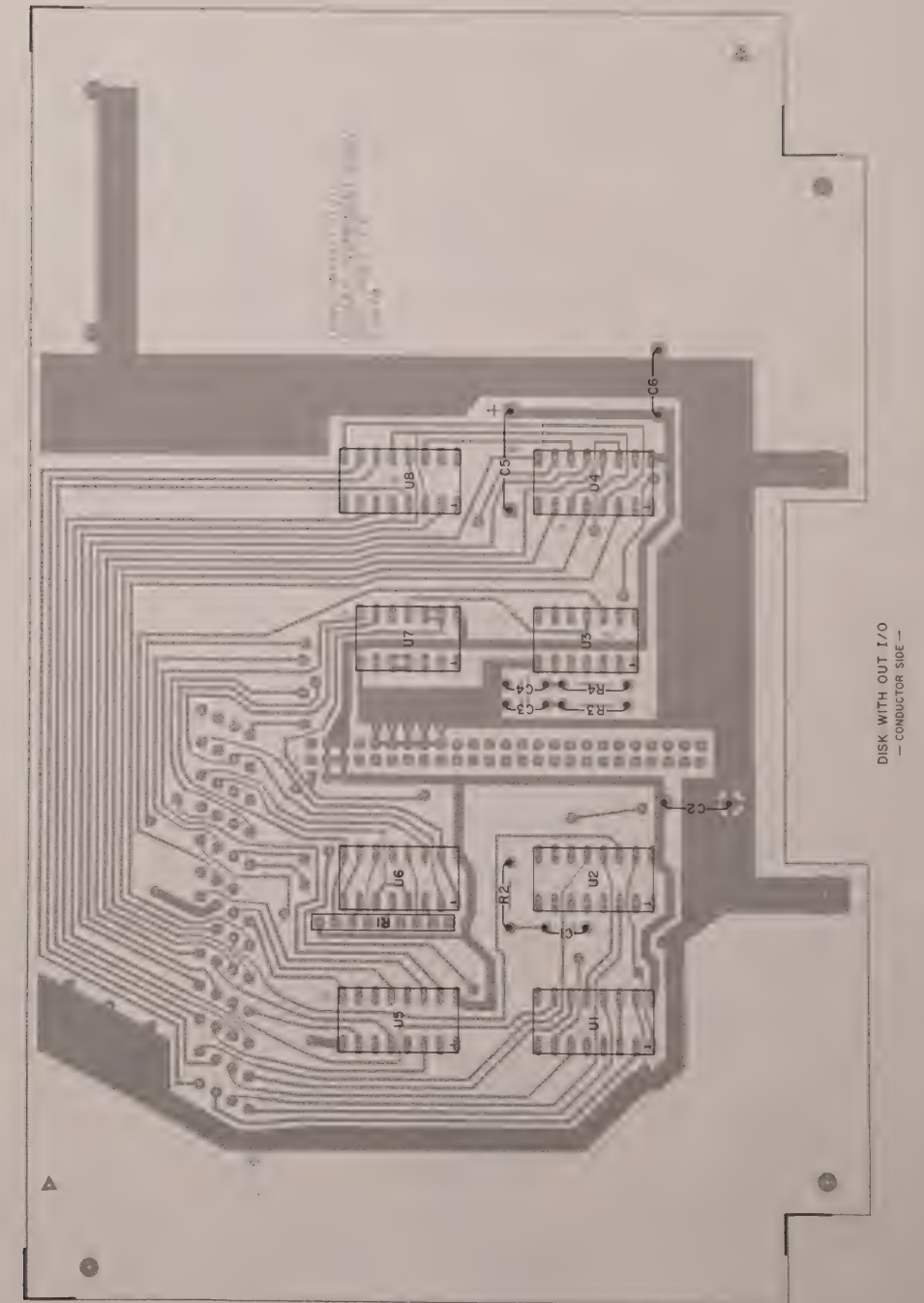
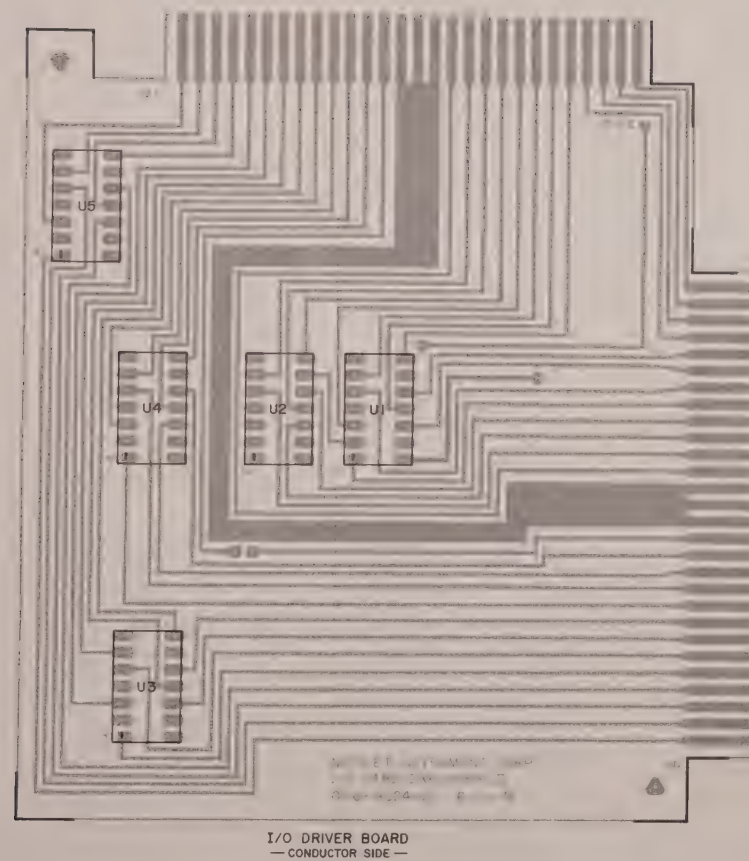
* NOTE: ON VERSIONS 00 THRU 02, FAST IS ON PIN B3, A4 IS NOT USED



I/O BOARD
— CONDUCTOR SIDE —



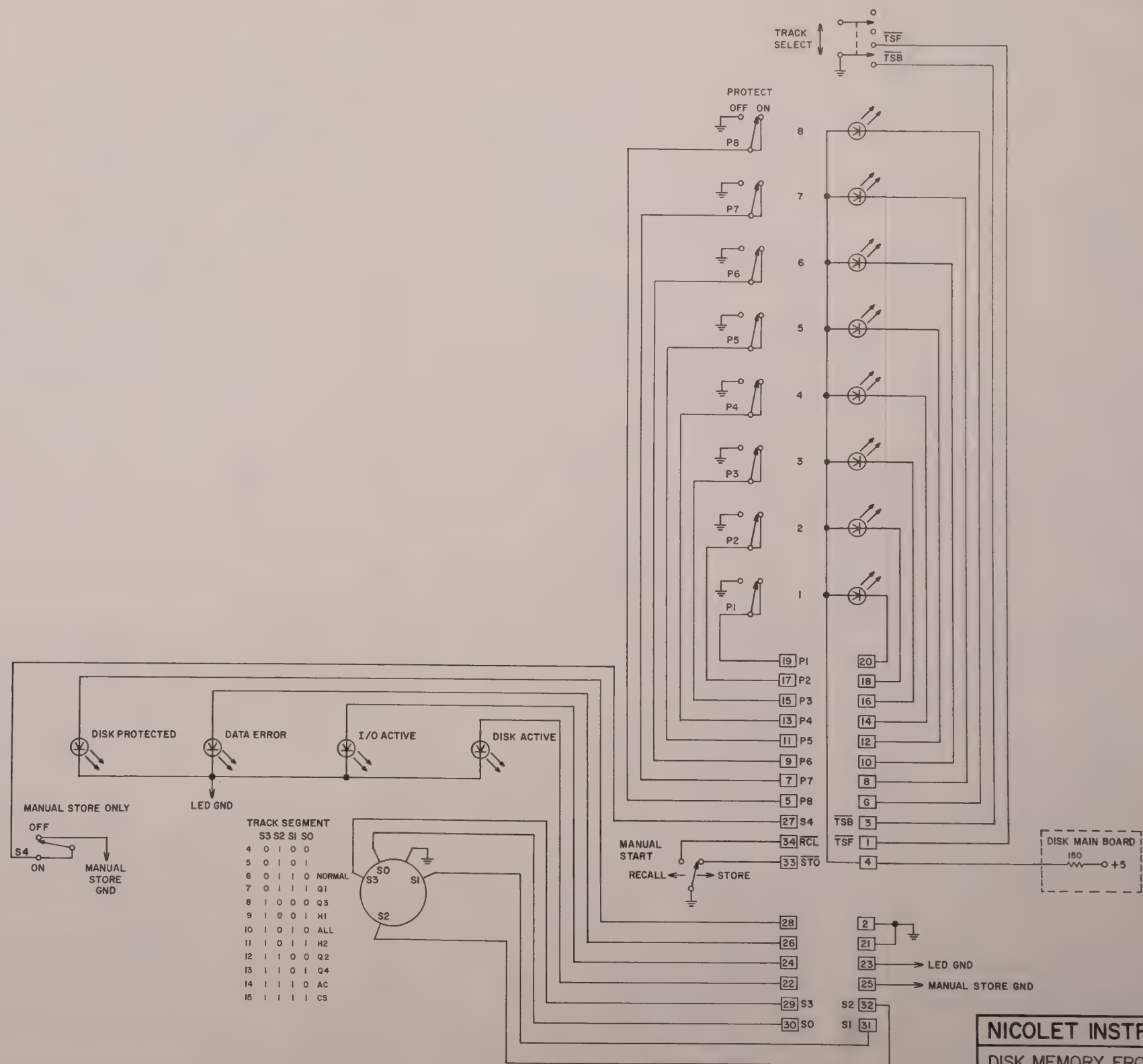
NICOLET INSTRUMENT CORP
I/O BOARDS
 000-9022-05 LK 9-26-80





350

THIS PAGE INTENTIONALLY LEFT BLANK



NICOLET INSTRUMENT CORP

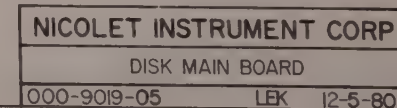
DISK MEMORY FRONT PANEL BOARD

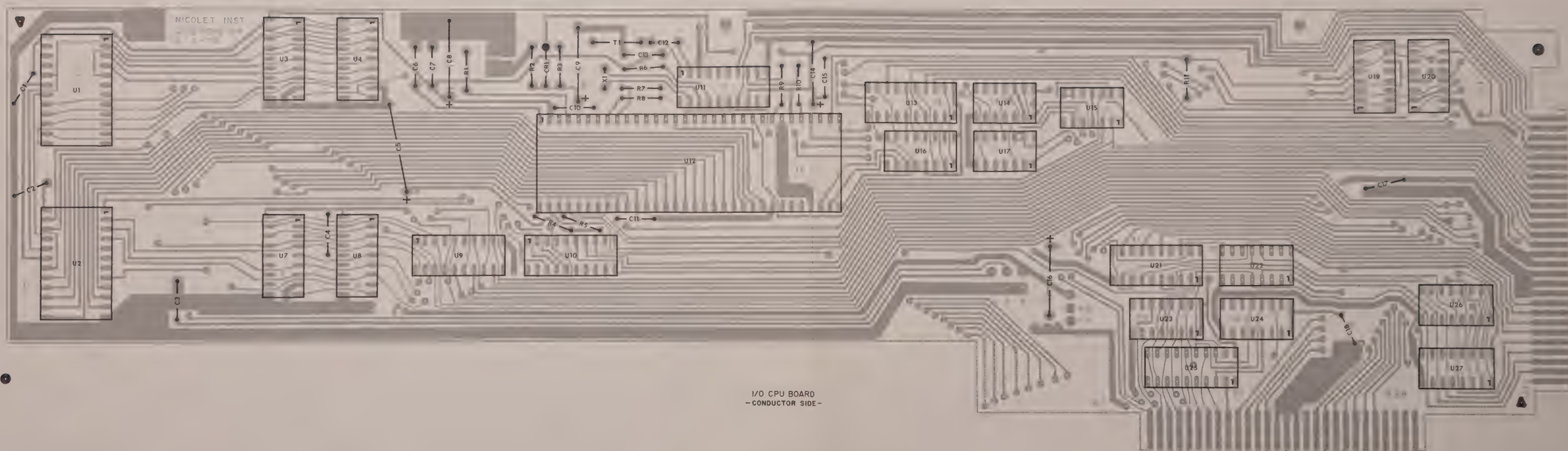
000-9020-01

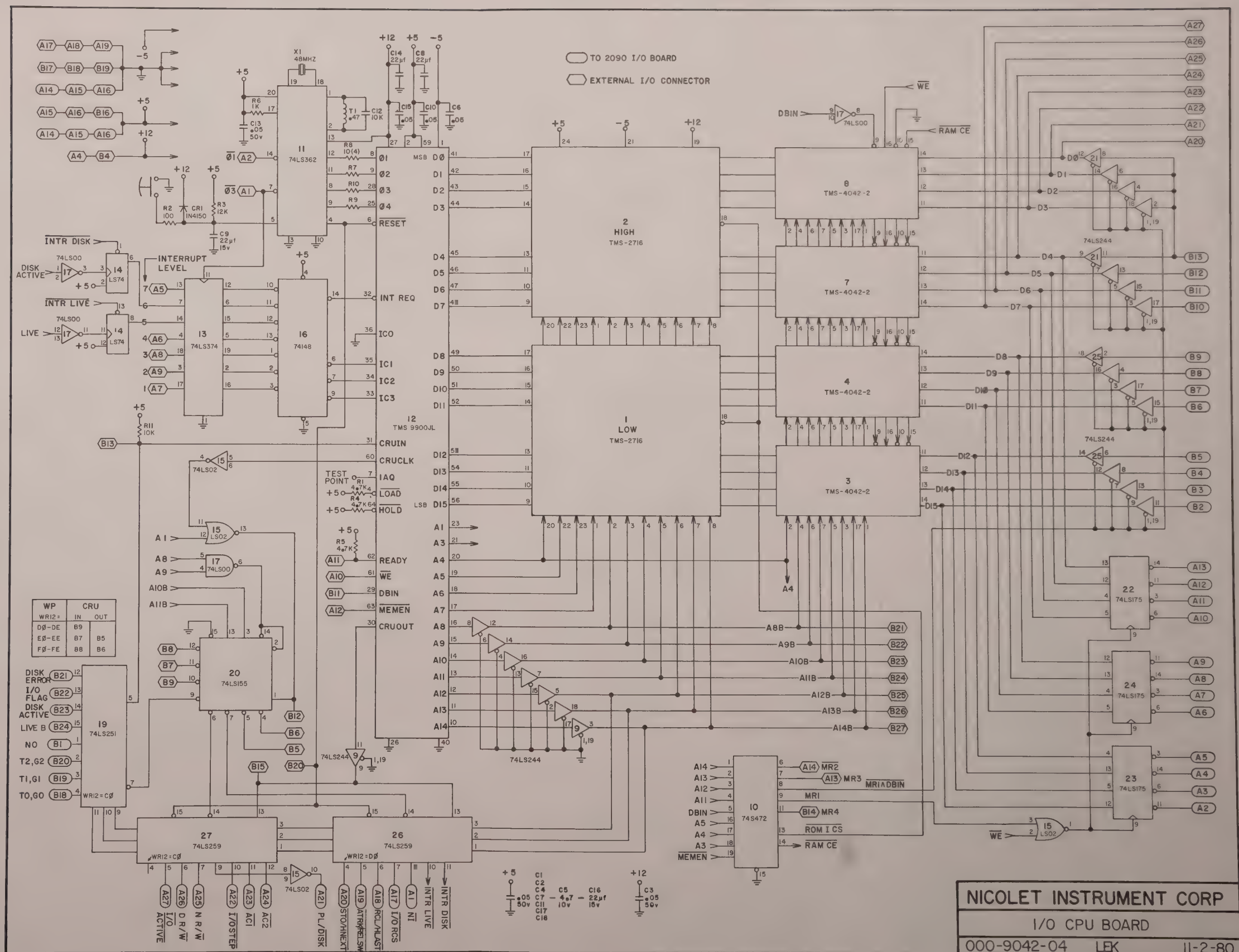
LEK 9-26-80



DISK MAIN BOARD
— CONDUCTOR SIDE —



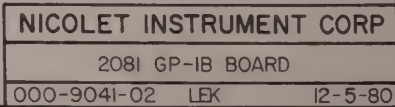


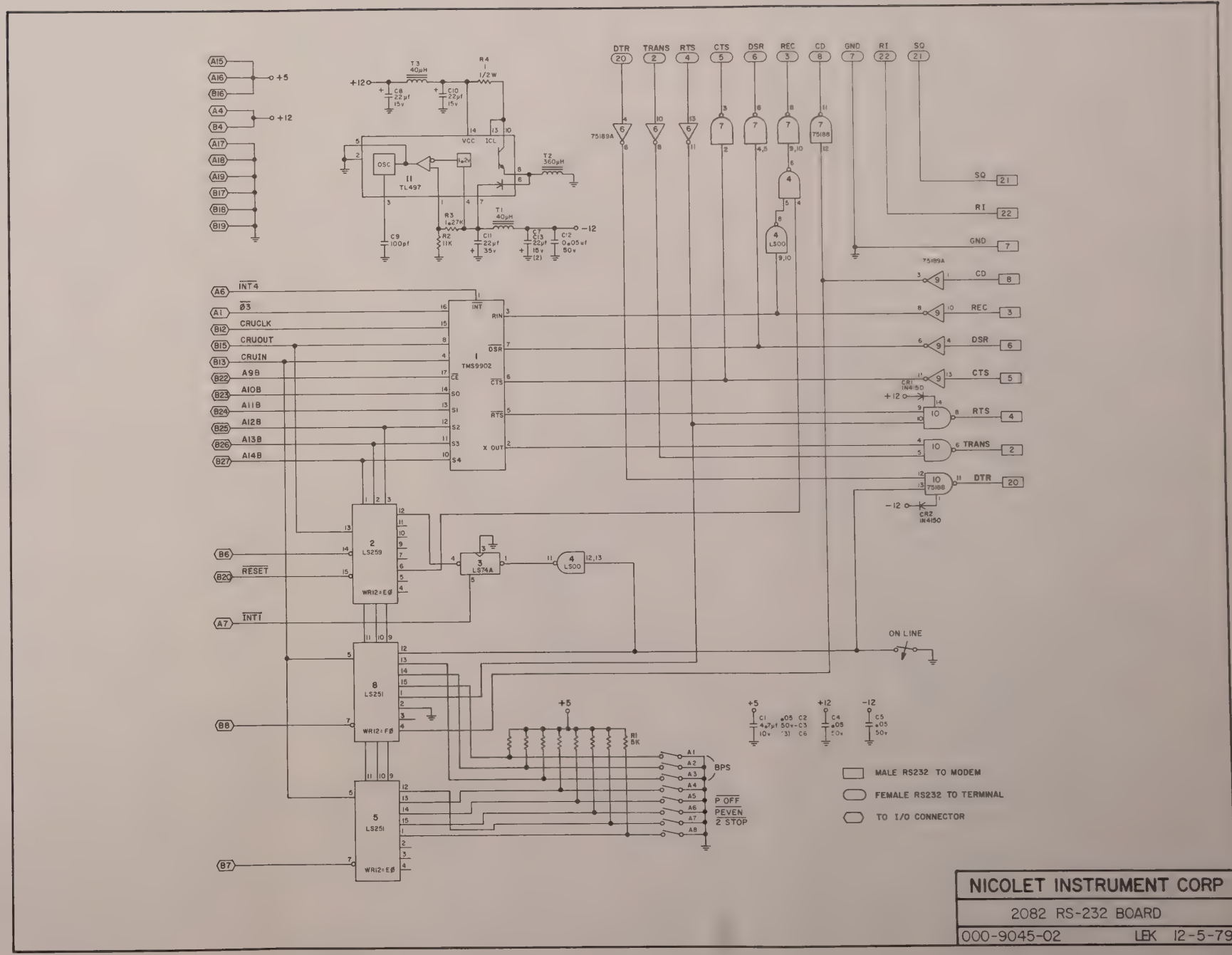
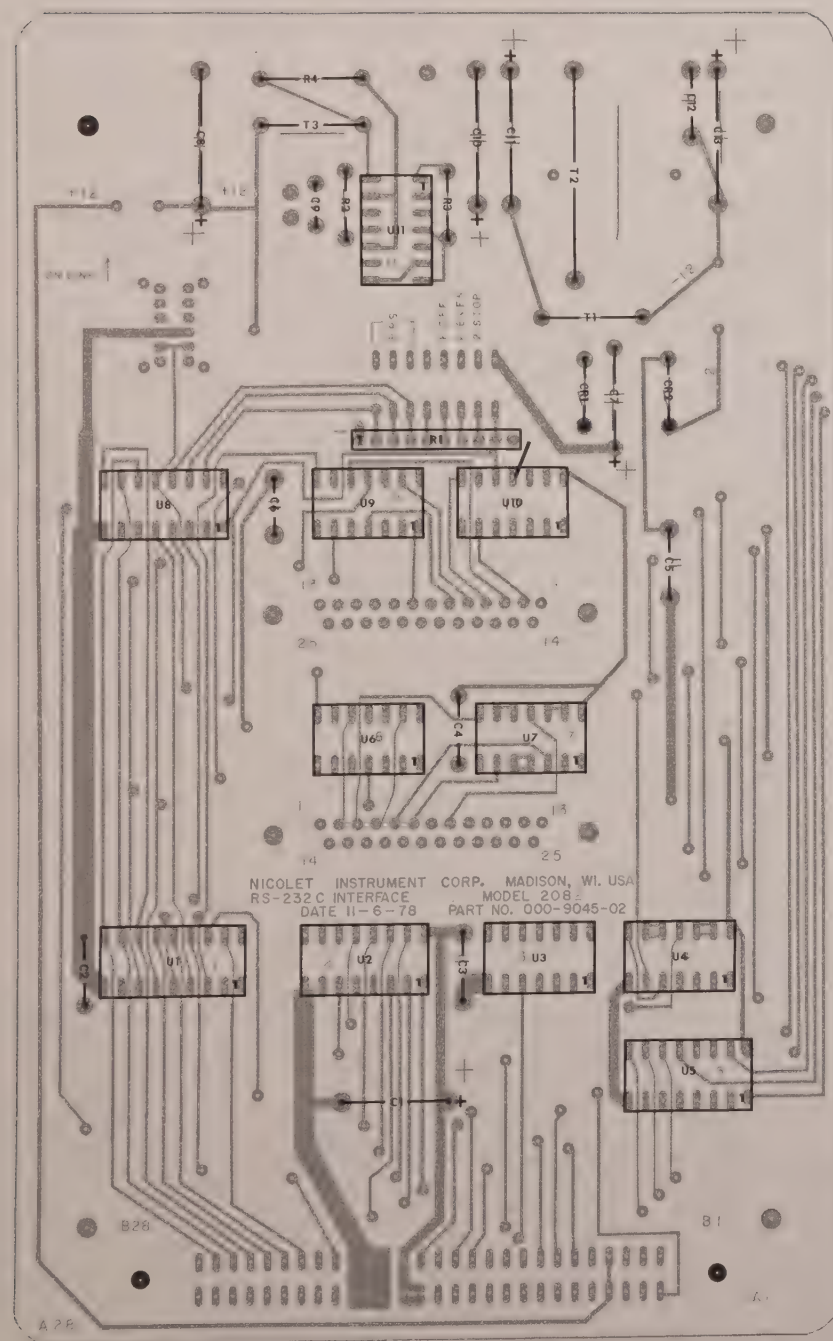


NICOLET INSTRUMENT CORP
 I/O CPU BOARD
 000-9042-04 LEK 11-2-80

NICOLET INSTRUMENT CORP
GP-1B BOARD 2081
000-9041-02
7-11-78

**COPYRIGHT 1980
Nicolet Instrument Corporation
All Rights Reserved**





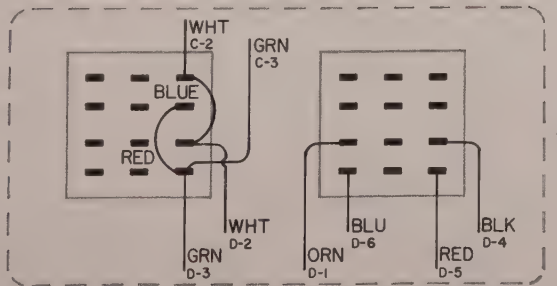
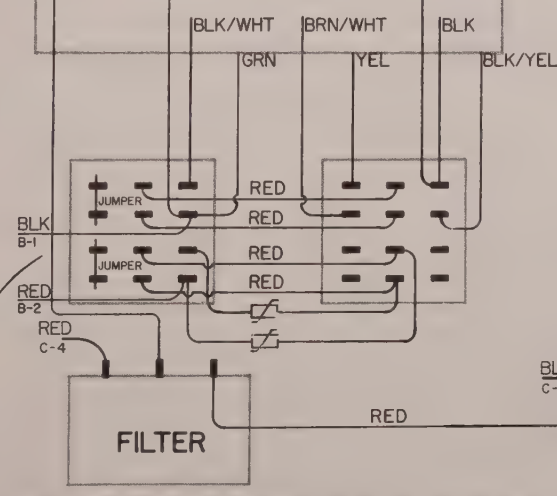
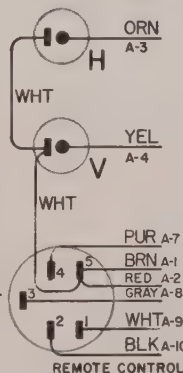
* 1 BRN	* 2 BRN	* 3 WHT
4 WHT	5 N/U	* 6 WHT
* 7 GRN	8 N/U	* 9 BLK/BRN
* 10 GRN	* 11 YEL	* 12 RED/WHT
13 RED	14 BLK	15 N/U

15 PIN MALE CONNECTOR

* - WIRING FROM TRANSFORMER

TO CAPACITOR BD.

TRANSFORMER



VOLTAGE SWITCH BD.
000-9065-01

REAR PANEL WIRING DIAGRAM

CONNECTOR-A
10 COND. FLAT CABLE

2 RED	1 BRN	KEY
4 YEL	3 ORN	
6 N/U	5 N/U	TO MAIN-FRAME BD.
8 GRAY	7 PUR	
10 BLK	9 WHT	

CONNECTOR-B
2 PIN FEMALE

2 RED	1 BLK	TO THERMOSTAT
----------	----------	---------------

CONNECTOR-C
4 PIN FEMALE

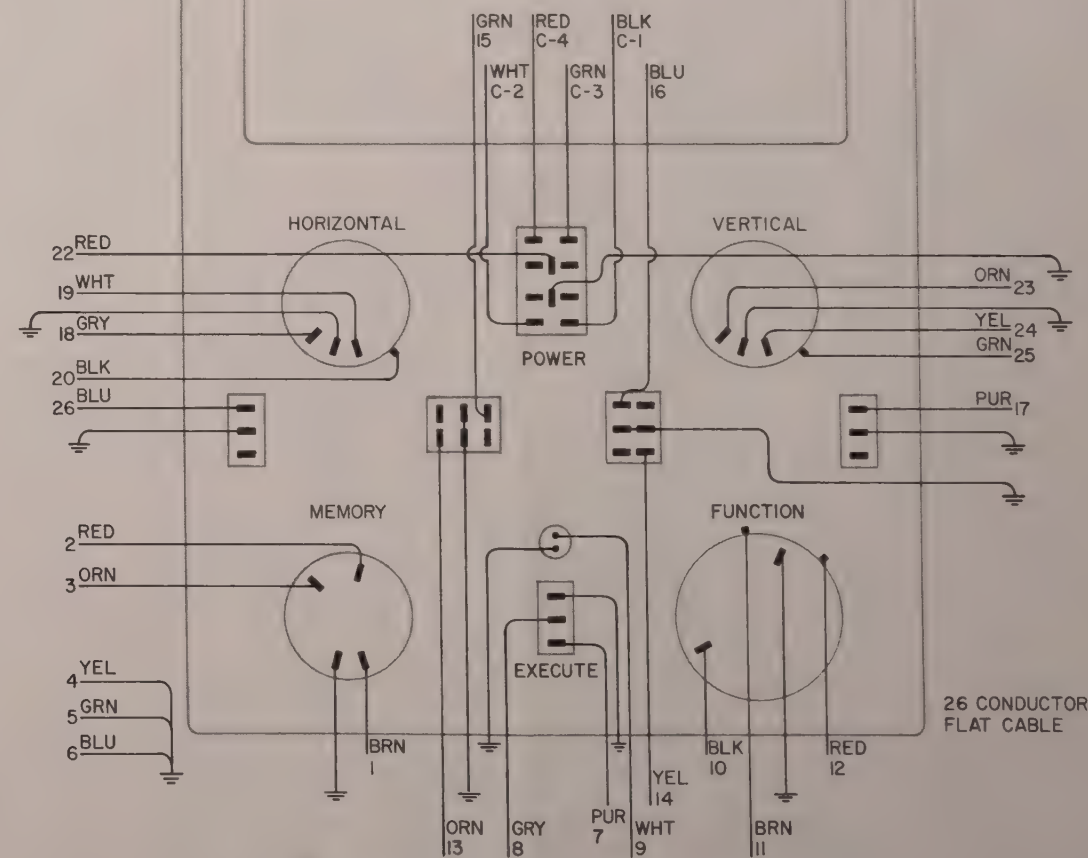
2 WHT	1 BLK	TO POWER SWITCH
4 RED	3 GRN	

CONNECTOR-D
6 PIN FEMALE

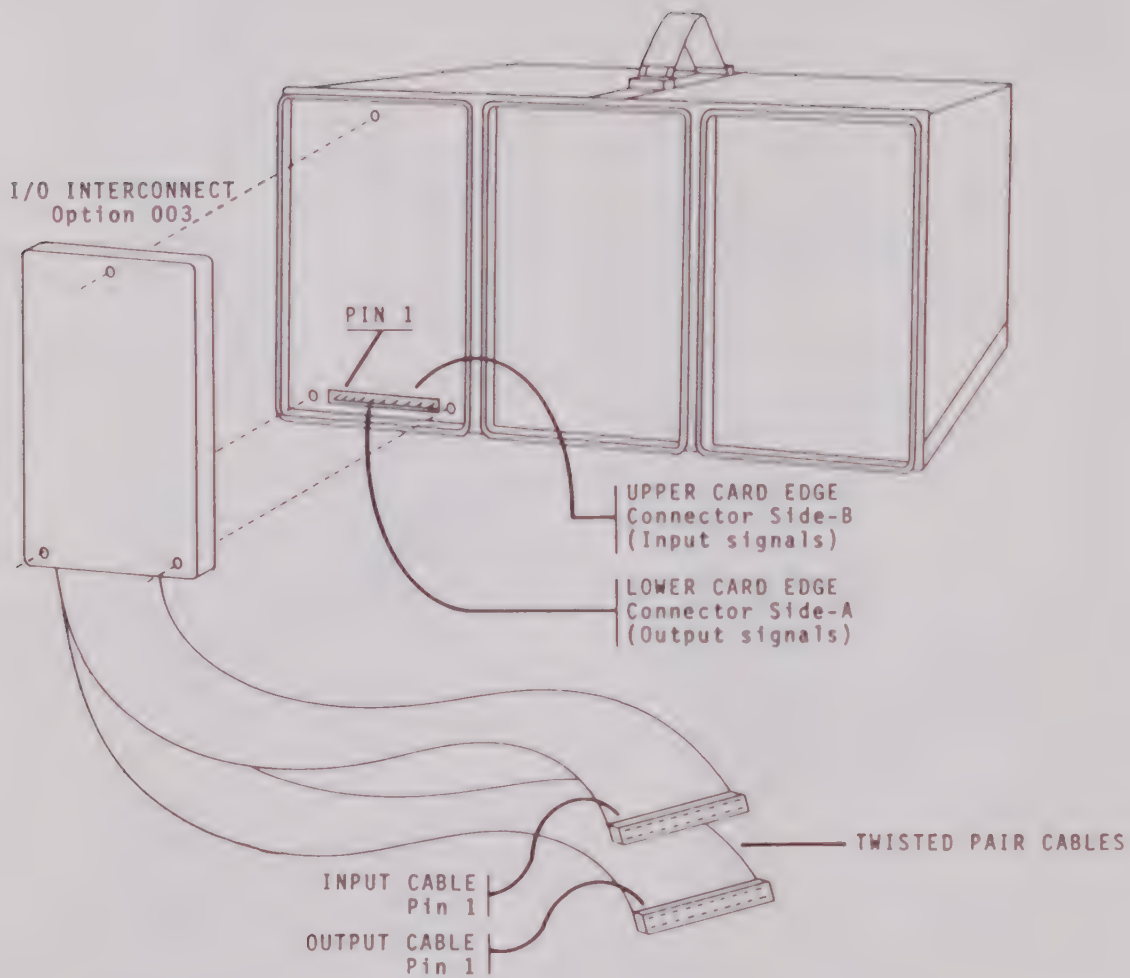
2 WHT	1 ORN	TO 3RD BAY POWER SUPPLY
4 BLK	3 GRN	
6 BLU	5 RED	

CONNECTOR-C
4 PIN MALE

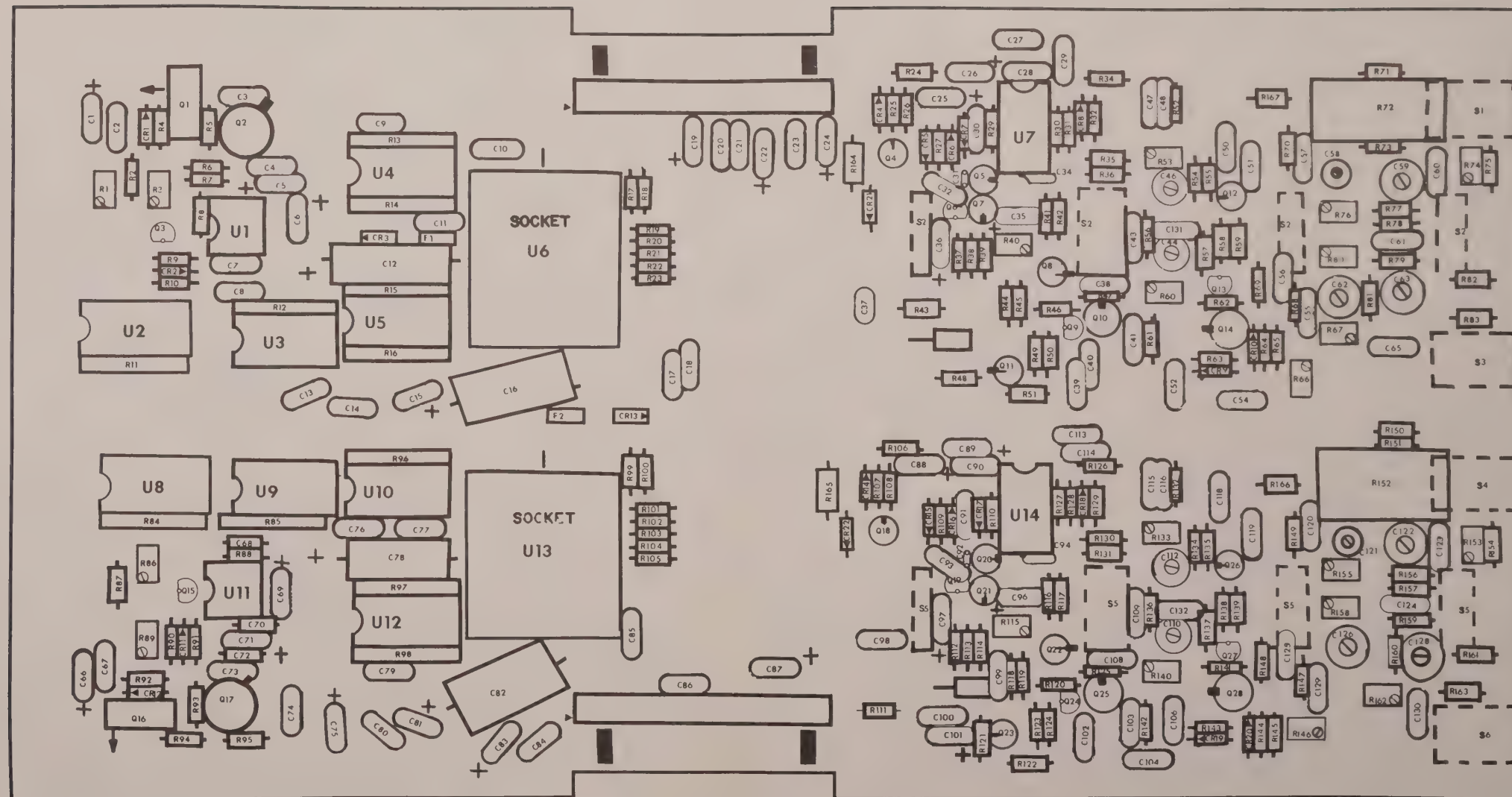
1 BLK	2 WHT
3 GRN	4 RED



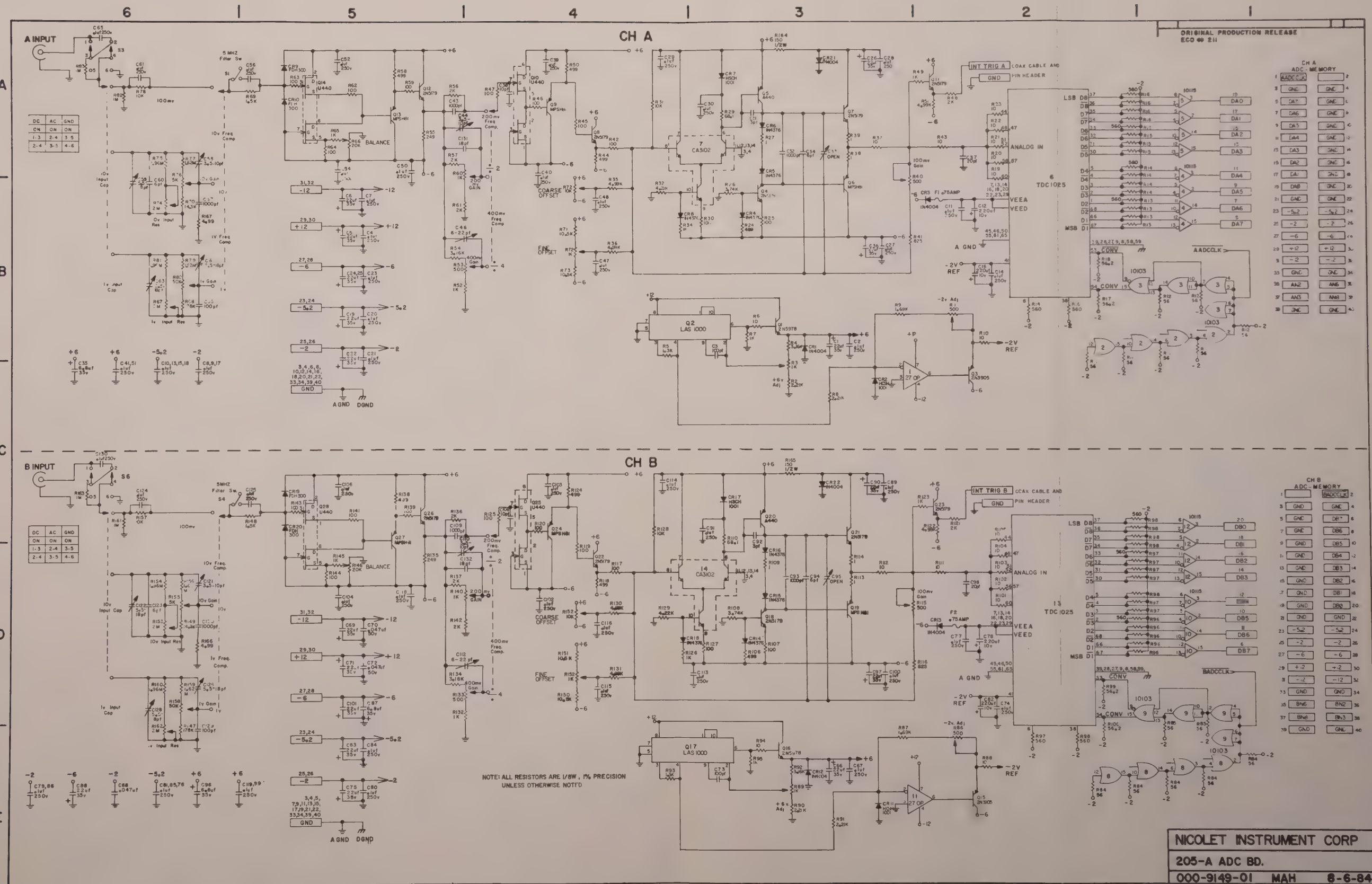
FRONT PANEL MAIN FRAME WIRING DIAGRAM

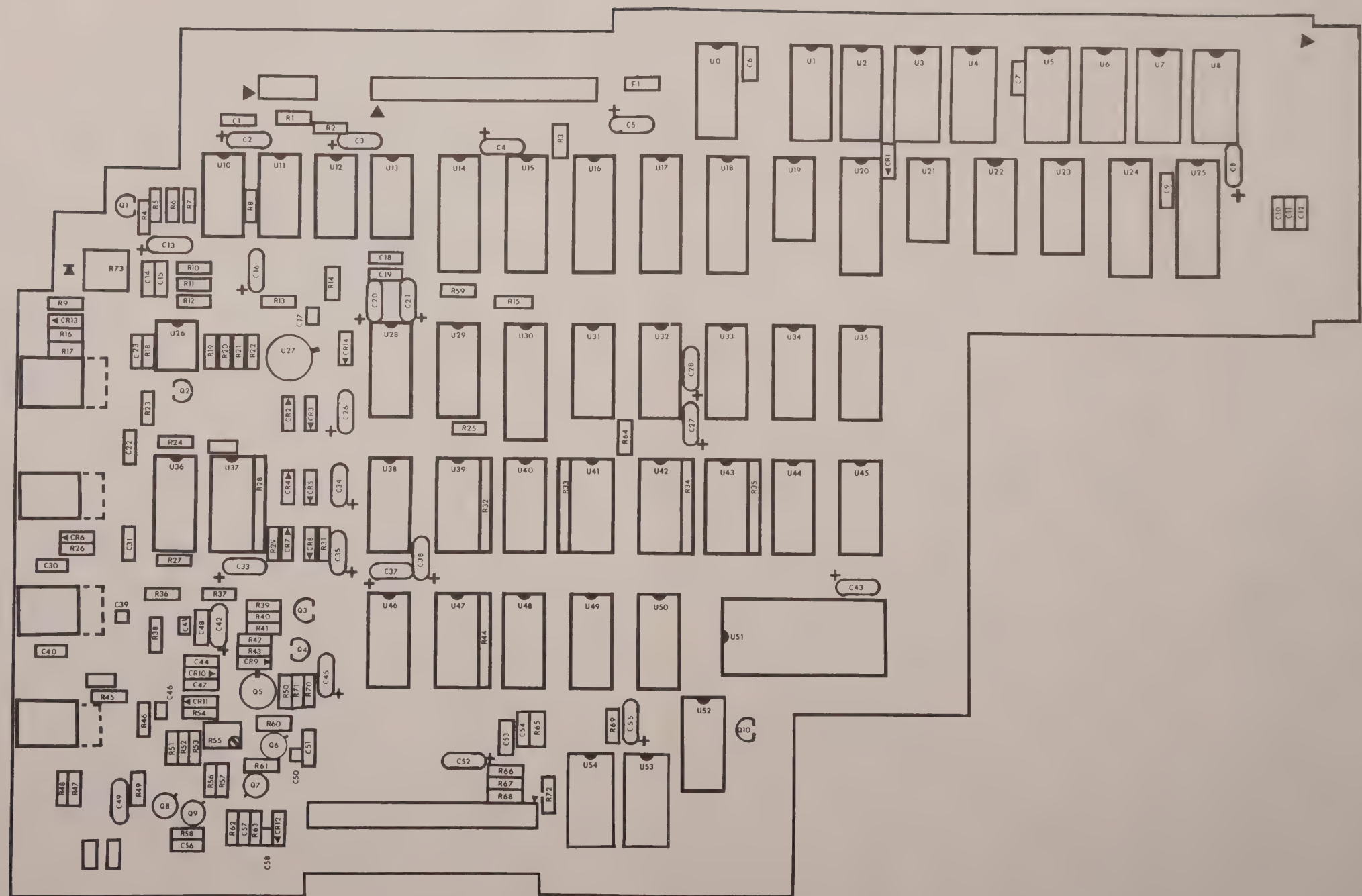


I/O INTERCONNECT
Option 003



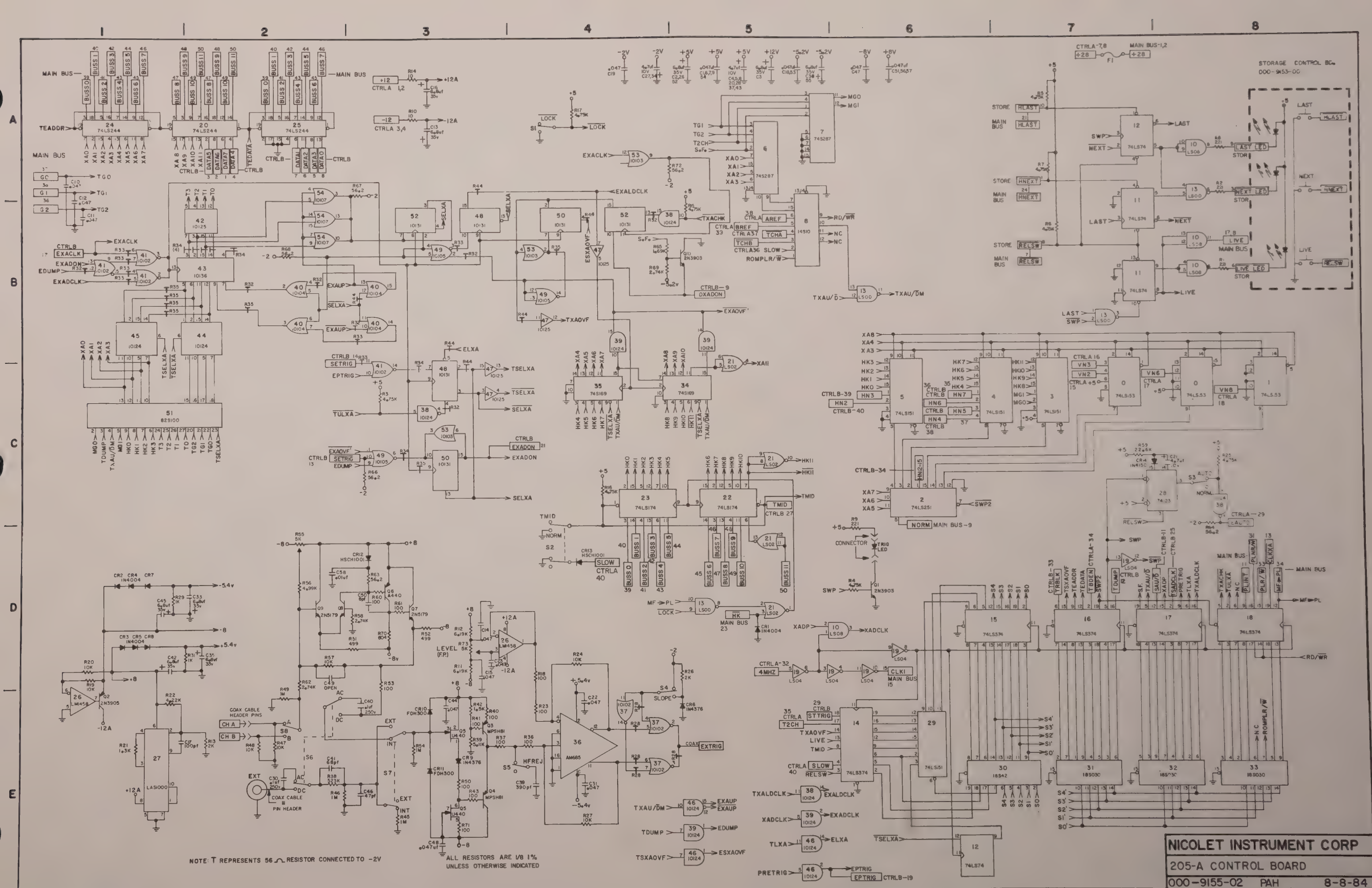
205-A ADC BOARD
COMPONENT SIDE
000-9149-01



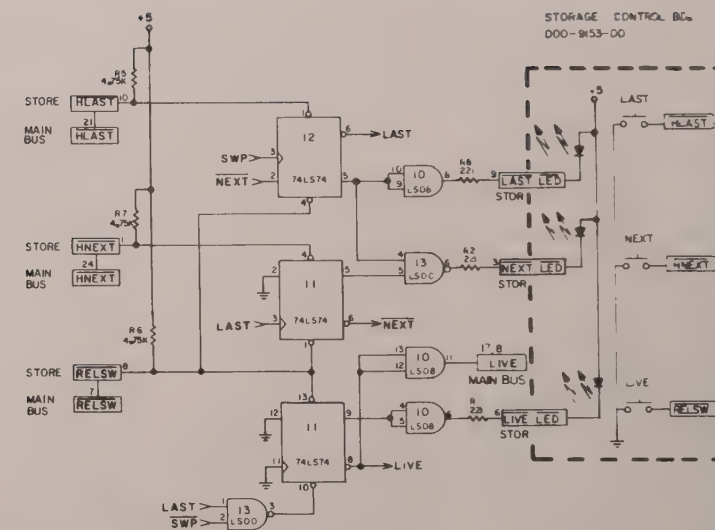


205-A CONTROL BOARD
COMPONENT SIDE
000-9155-02

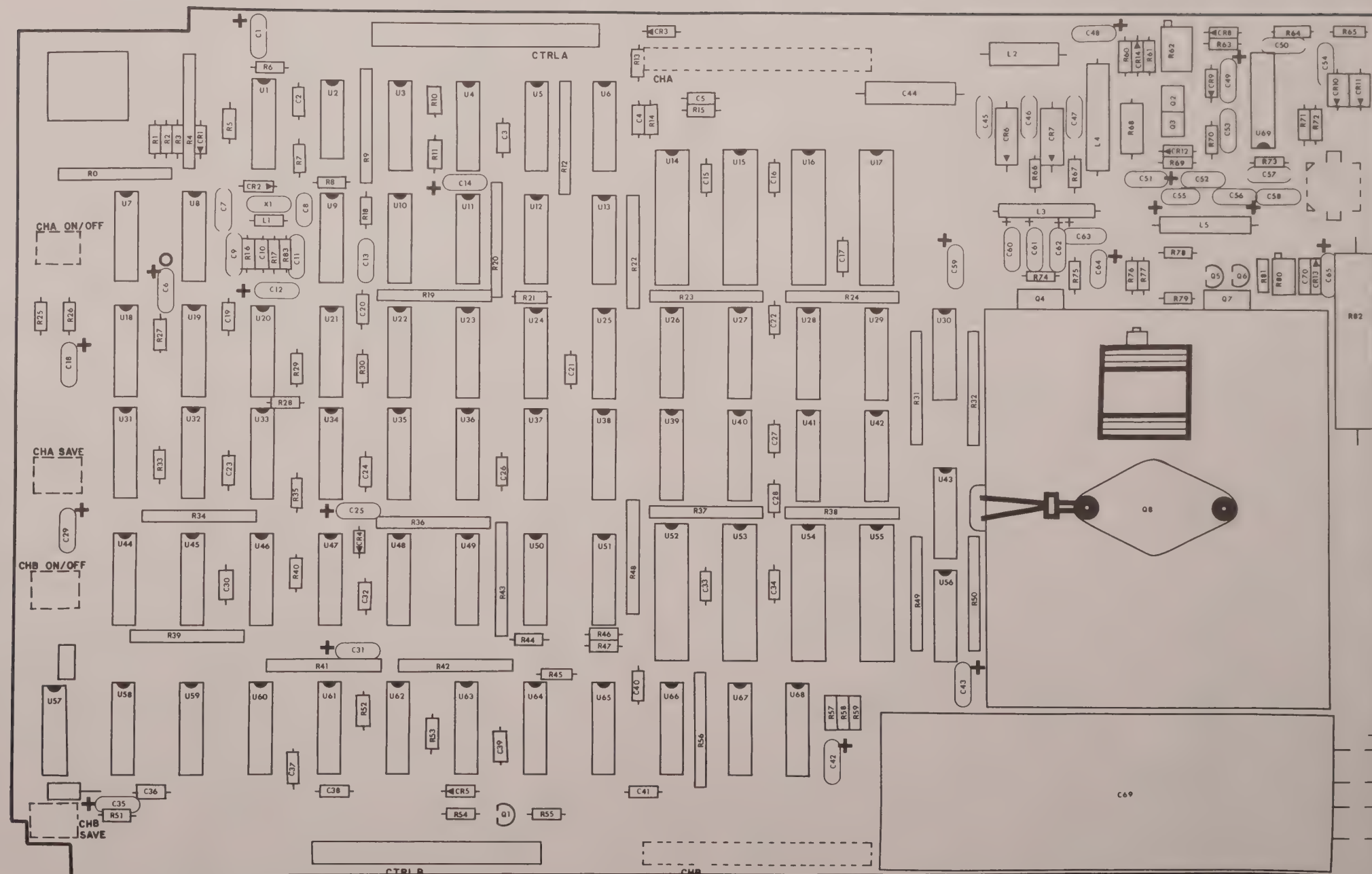
COPYRIGHT 1984
Nicolet Instrument Corporation
All Rights Reserved







205-A Storage Control Board
 Extracted from 205-A Control
 Board diagram, page 510.



205-A MEMORY BOARD
COMPONENT SIDE
000-9154-02

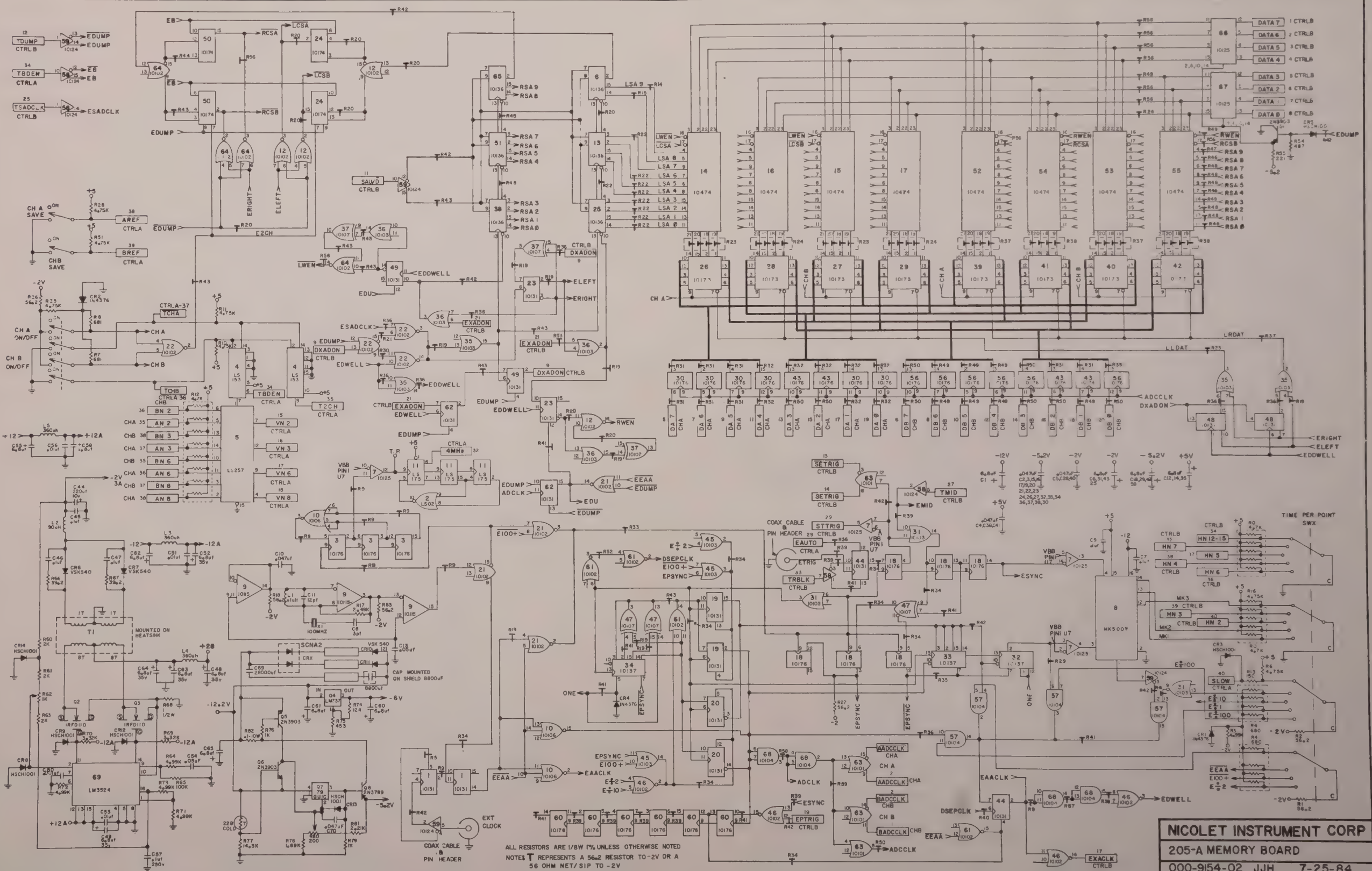
A

B

C

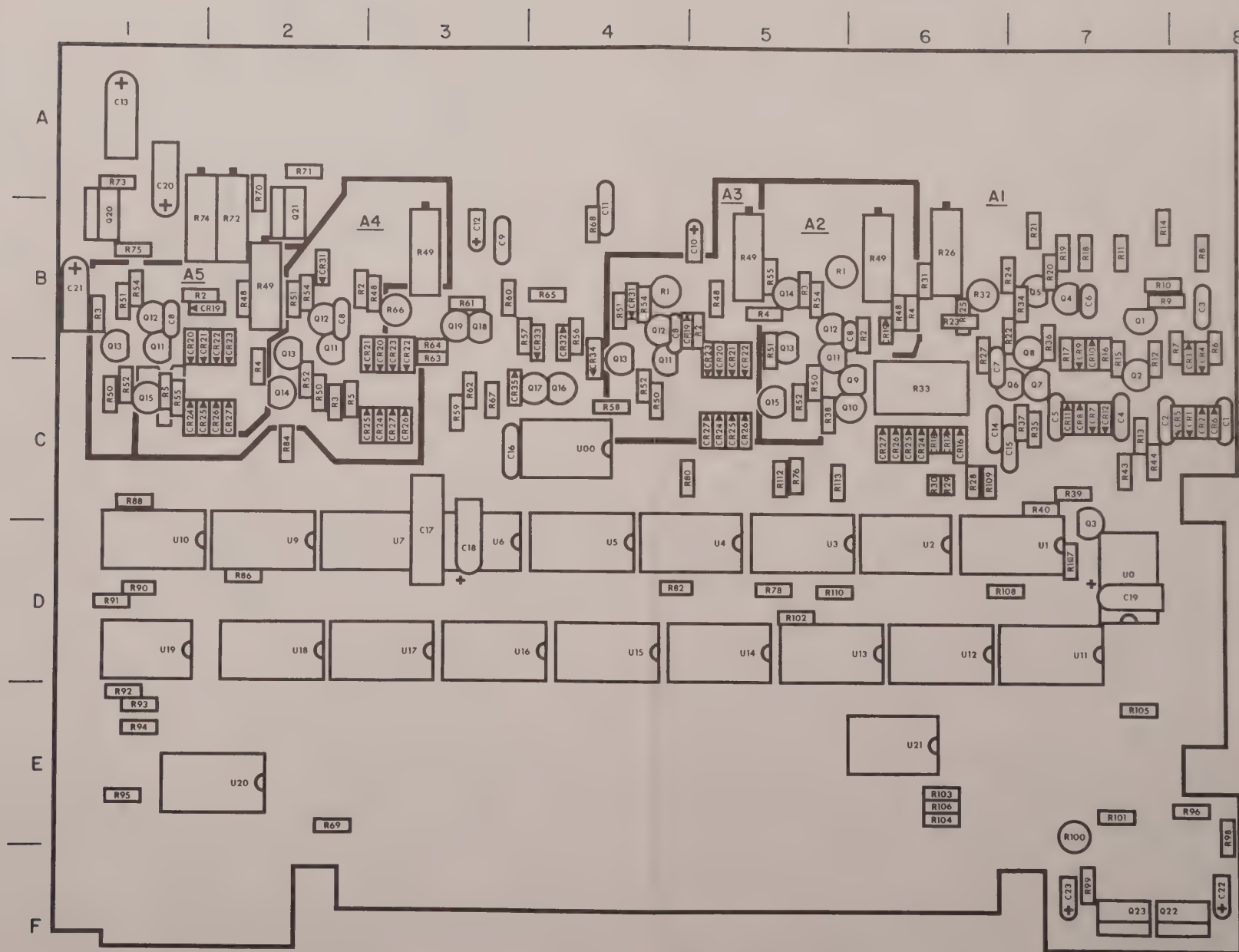
D

E

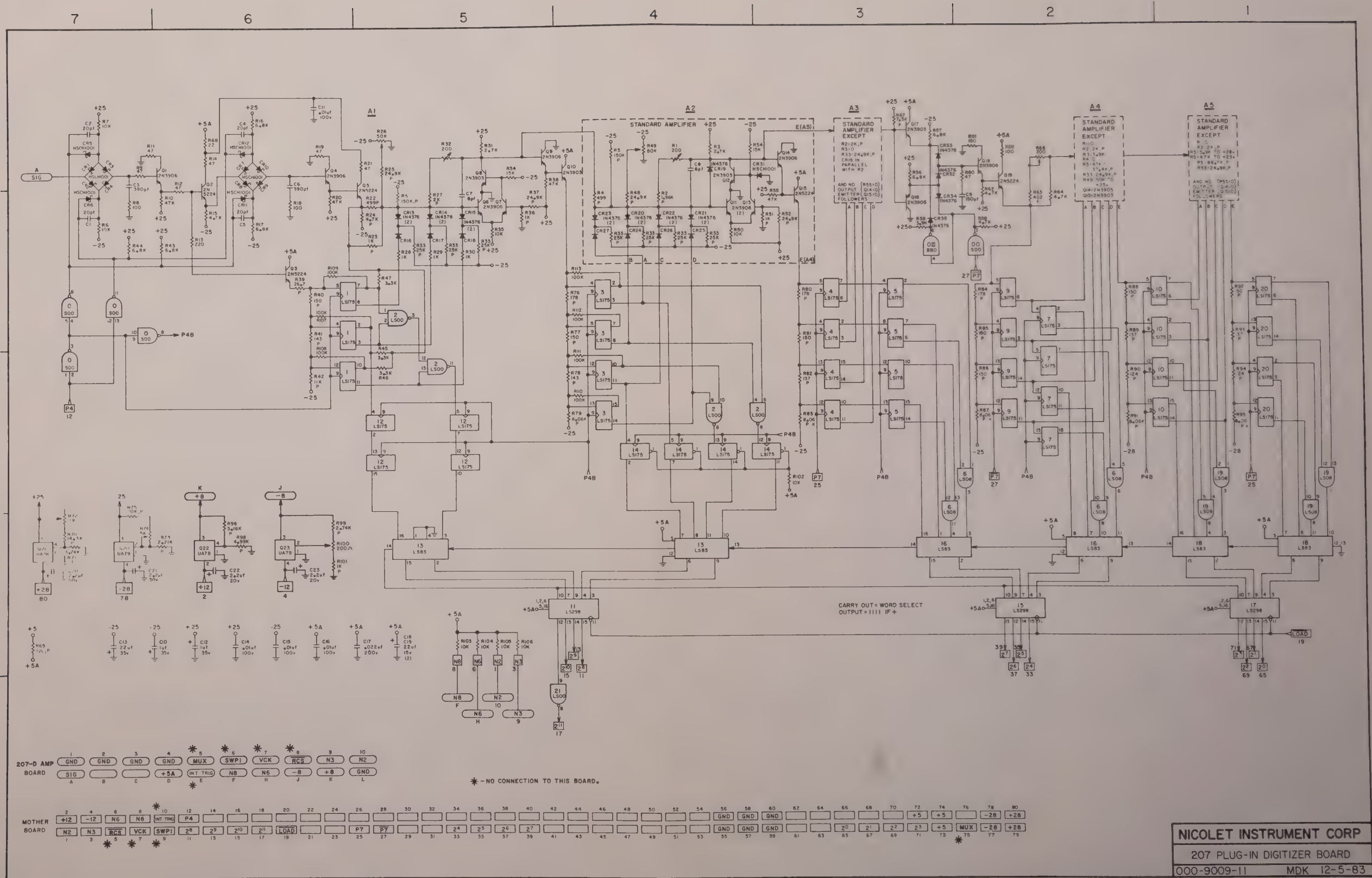


ALL RESISTORS ARE 1/8W 1% UNLESS OTHERWISE NOTED
NOTES T REPRESENTS A 562 RESISTOR TO -2V OR A
56 OHM NET/SIP TO -2V

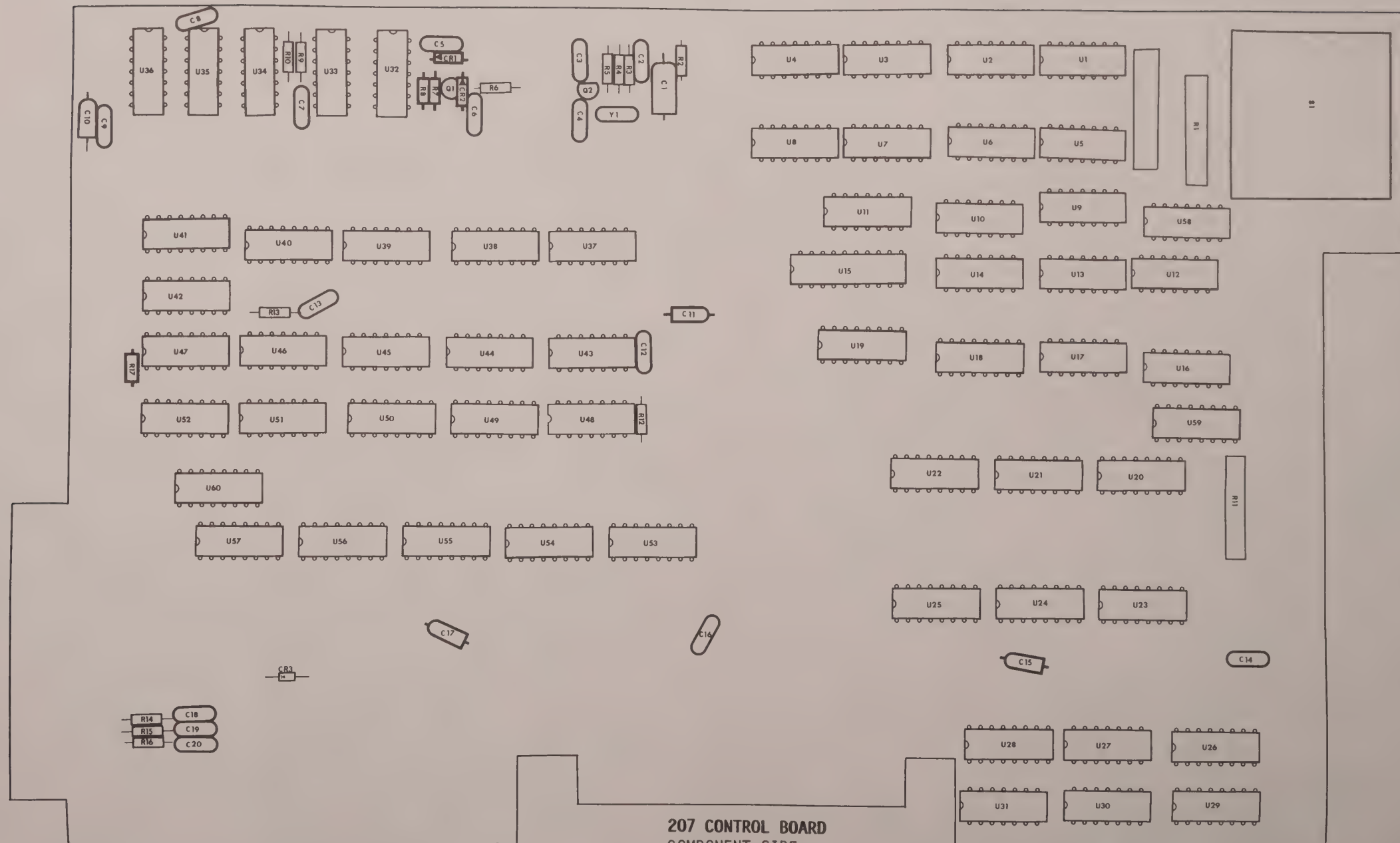
NICOLET INSTRUMENT CORP
205-A MEMORY BOARD
000-9154-02 JJH 7-25-84



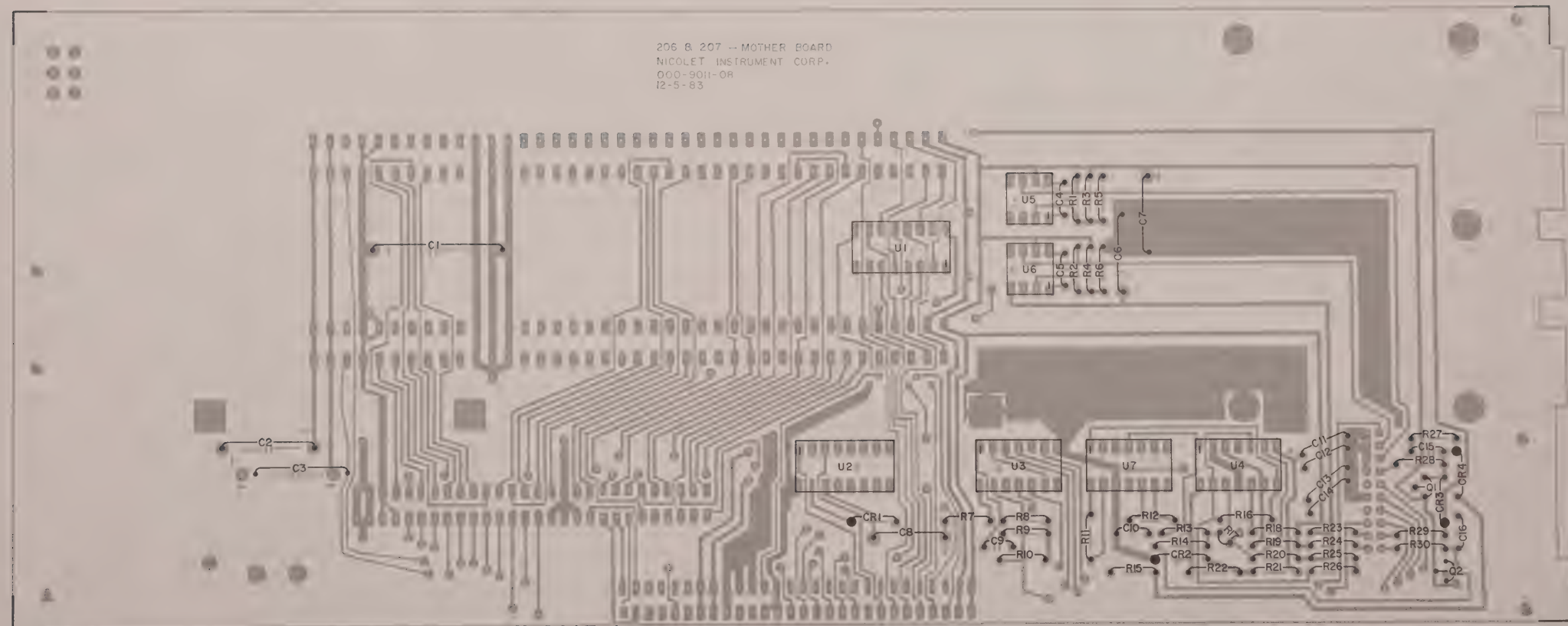
207 DIGITIZER BOARD
COMPONENT SIDE
000-9009-11A

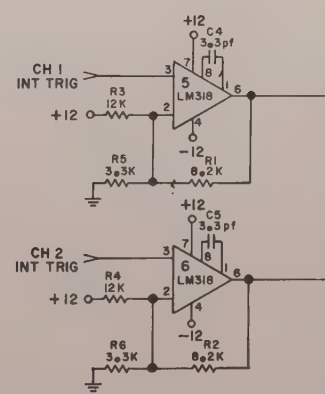
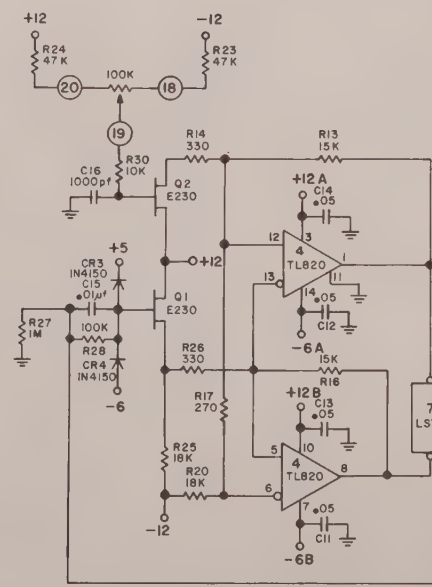
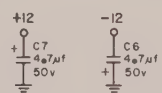
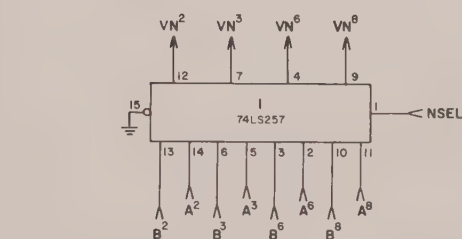


NICOLET INSTRUMENT CORP
 207 PLUG-IN DIGITIZER BOARD
 000-9009-11 MDK 12-5-83



207 CONTROL BOARD
COMPONENT SIDE
000-9012-11



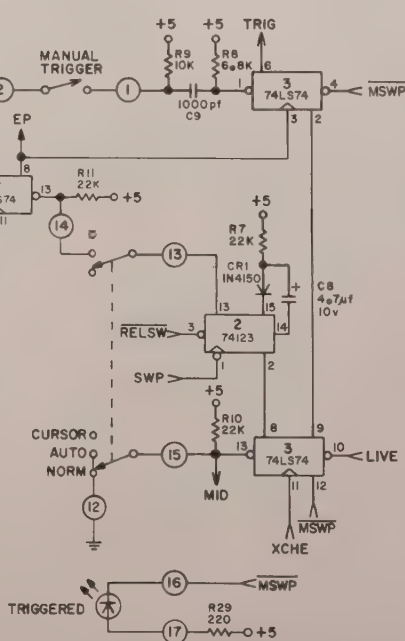


DIGITIZER

N2	1	2	+12
N3	3	4	-12
RCS	5	6	N6
VCK	7	8	N8
SWP1	9	10	INT TRIG
A8	11	12	P4
A9	13	14	
A10	15	16	
A11	17	18	
LOAD	19	20	
	21	22	
	23	24	
P7	25	26	
P7	27	28	
	29	30	
	31	32	
A4	33	34	
A5	35	36	
A6	37	38	
A7	39	40	
	41	42	
	43	44	
	45	46	
	47	48	
	49	50	
	51	52	
	53	54	
GND	55	56	GND
GND	57	58	GND
GND	59	60	GND
	61	62	
	63	64	
A0	65	66	
A1	67	68	
A2	69	70	
A3	71	72	+5
+5	73	74	+5
A MUX	75	76	
-28	77	78	-28
+28	79	80	+28

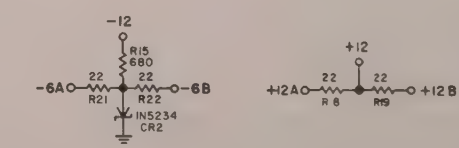
DIGITIZER

N2	1	2	+12
N3	3	4	-12
RCS	5	6	N6
VCK	7	8	N8
SWP1	9	10	INT TRIG
B8	11	12	P4
B9	13	14	
B10	15	16	
B11	17	18	
LOAD	19	20	
	21	22	
	23	24	
P7	25	26	
P7	27	28	
	29	30	
	31	32	
B4	33	34	
B5	35	36	
B6	37	38	
B7	39	40	
	41	42	
	43	44	
	45	46	
	47	48	
	49	50	
	51	52	
	53	54	
GND	55	56	GND
GND	57	58	GND
GND	59	60	GND
	61	62	
	63	64	
B0	65	66	
B1	67	68	
B2	69	70	
B3	71	72	+5
+5	73	74	+5
B MUX	75	76	
-28	77	78	-28
+28	79	80	+28



MEMORY

A	10	B
1	FAST	1
2	ASA	2
3	SWP2	3
4	R/W	4
5	SA00	5
6	N SEL	6
7	BUS11	7
8	BUS10	8
9	BUS9	9
10	BUS8	10
11	B4	11
12	GND	12
13	GND	13
14	BUS7	14
15	BUS6	15
16	BUS5	16
17	BUS4	17
18	BUS3	18
19	BUS2	19
20	BUS1	20
21	BUS0	21
22	ASW	22
23	BSW	23
24	DEN	24
25	+5	25
26	+5	26
27	GND	27
28	GND	28



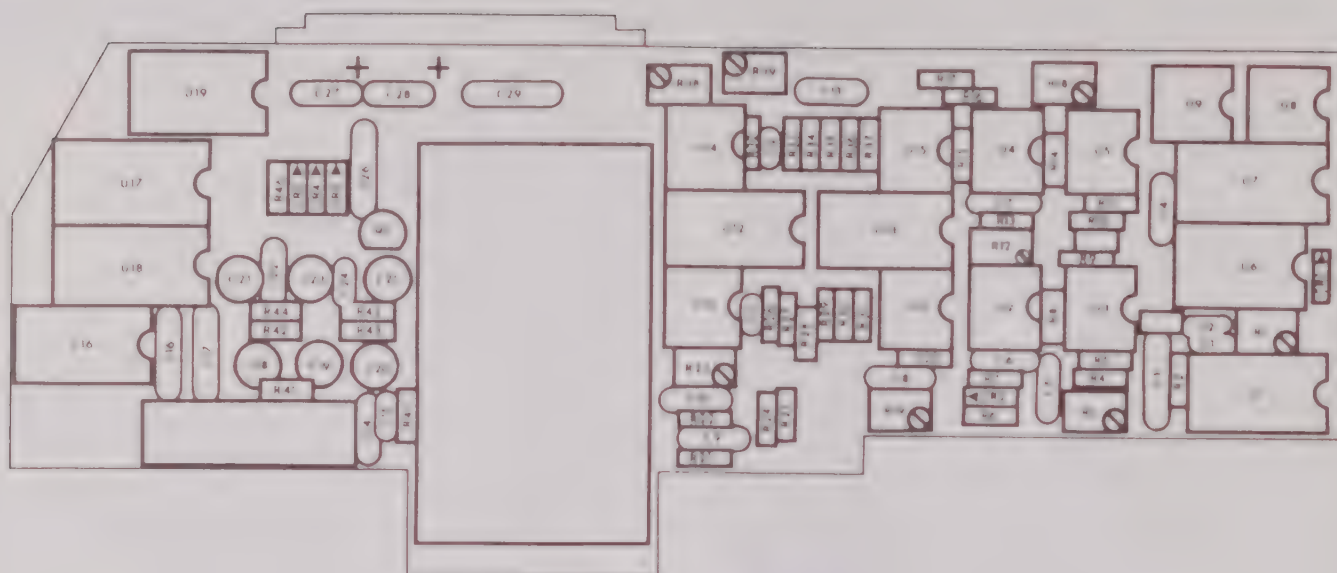
CONTROL

A	+12	1	2	+12
B	-12	3	4	-12
RCS	N2	5	6	N6
N6	N3	7	8	N8
VCK	N8	9	10	INT TRIG
TRIG	N8	11	12	P4
LIVE	N8	13	14	
MSWP	N8	15	16	
SWP	N8	17	18	
XCHE	N8	19	20	
P7	N8	21	22	
P7	N8	23	24	
DEN	N8	25	26	
ASA	N8	27	28	
BSW	N8	29	30	
+5	N8	31	32	
+5	N8	33	34	
B MUX	N8	35	36	
A MUX	N8	37	38	
GND	N8	39	40	
-28	N8	41	42	
+28	N8	43	44	
BUS1	N8	45	46	
BUS2	N8	47	48	
BUS3	N8	49	50	
BUS4	N8	51	52	
BUS5	N8	53	54	
BUS6	N8	55	56	
BUS7	N8	57	58	
BUS8	N8	59	60	
BUS11	N8	61	62	

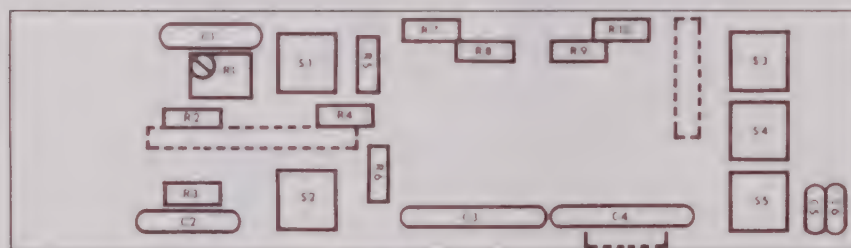
FRONT PANEL

NICOLET INSTRUMENT CORP
 207 PLUG-IN MOTHER BOARD
 000-9011-08 MDK 6-18-84

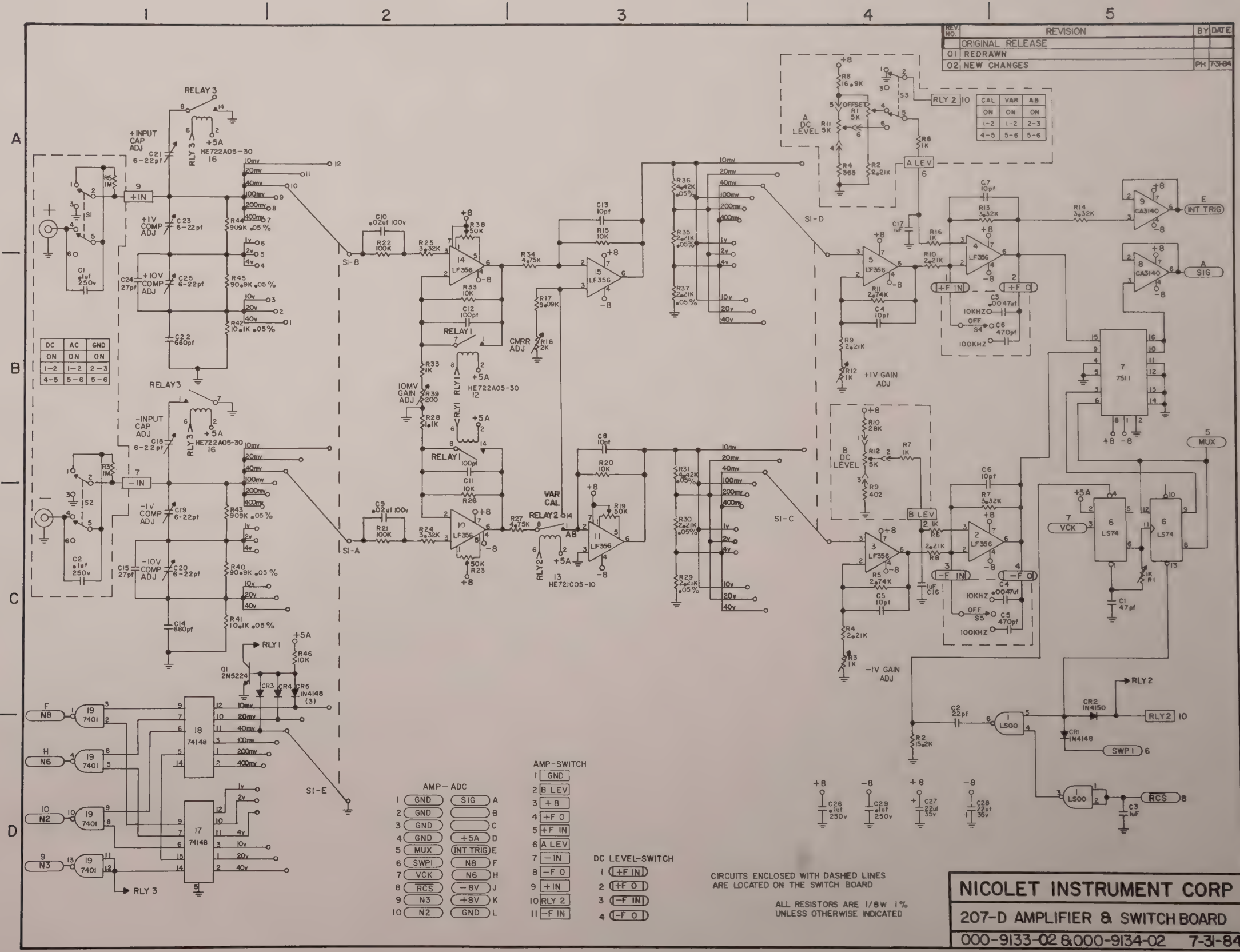
* NOTE: ON VERSIONS 00 THRU 02, FAST IS ON PIN B3, A4 IS NOT USED



207-D AMPLIFIER BOARD
 COMPONENT SIDE
 000-9133-02



207-D SWITCH BOARD
 COMPONENT SIDE
 000-9134-02



NICOLET INSTRUMENT CORP
207-D AMPLIFIER & SWITCH BOARD
000-9133-02 & 000-9134-02 7-31-84

 Nicolet