

SWITCHING REGULATED POWER SUPPLY MAINTENANCE MANUAL

Consists of:

Installation Specification	34-026R01A20
Maintenance Specification	34-026R01A21
Schematic	34-026R06D08
Chassis Assembly	34-026R02D03
Schematic	34-027R07D08
Chassis Assembly	34-027R02D03
Component Locator	11-179R04D03
Component Locator	35-581R07C03
Component Locator	35-582R03D03
Schematic	34-029D08
Component Locator	34-029D03

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3	R03	9/75						

SWITCHING REGULATED POWER SUPPLY INSTALLATION SPECIFICATION

INTRODUCTION

INTERDATA Digital Systems feature a highly modular structure which permits configurations to suit the user's exact needs. This structure provides the means for convenient expansion as the user's requirements grow. This document describes the power supply mounting and the interconnecting cables. Note that the following discussion assumes that the equipment is mounted in standard INTERDATA cabinets.

POWER SUPPLY MOUNTING

The power supply mounts in the rear of the cabinet, behind the Processor or expansion chassis. It is attached to the right mounting upright (looking from rear) via four 10-32 pan head Phillips screws.

WARNING

BEFORE HINGING OUT THE POWER SUPPLIES, THE RACK LEVELING FEET SHOULD BE LOWERED. AFTER THE LEVELERS ARE IN CONTACT WITH THE FLOOR SURFACE, UP TO THREE POWER SUPPLIES MAY BE HINGED OUT AT ONE TIME.

When the power supply is in the installed operating position, it is secured to the left rear upright by two 10-32 screws. The power supply cable connects to terminal lugs at the right rear (looking from rear) of its respective Processor or expansion chassis via Faston lugs and a connector for fan AC power. There is adequate slack provided in the cable to allow the power supply to hinge out freely. To prevent the cable from being pinched between the power supply and the chassis support rails, a service loop is required. A maximum of five power supplies may be mounted in one rack.

Refer to the related Processor manual installation specification for expansion chassis/power supply mounting details.

PRIMARY POWER CONVERSION

The primary power may be 115 VAC or 230 VAC $\pm 10\%$, 47 to 63 Hertz (Hz), depending on the strapping options shown on Terminal Board 1 (TB1) in the functional schematic for the given power supply. INTERDATA power supplies are shipped from the factory strapped for 115 volts $\pm 10\%$.

Conversion Procedure

1. Remove the top and rear panel (one piece) from the power supply chassis to expose TB1.
2. Ascertain that the TB1 terminals are strapped in the following manner for the 115 VAC option.

1 to 2
3 to 4
5 to 6
8 to 9

3. Remove the four straps from TB1.
4. For 230 VAC option, add four straps to TB1 terminals as listed:

2 to 3 (use two straps)
4 to 5 (use two straps)

NOTE

Two straps are used for each connection to keep four straps available in the event the 115 VAC option is later desired.

5. Replace the top and rear panel (one piece) on the power supply chassis.
6. When the conversion to 230 VAC is completed, label the supply "Connected for 230 VAC Operation".

WARNING

WHENEVER THE POWER SUPPLY IS CONNECTED TO A PRIMARY POWER SOURCE, 115 VAC OR 230 VAC (DEPENDING ON THE LINE VOLTAGE) IS PRESENT AT TB1 (1C4) AND THE PRIMARY OF THE 12 VAC CONTROL TRANSFORMER T1 (1E6).

CABLING

All INTERDATA power supply output cables are equipped with Fastons which are intended to connect to the Faston tabs located on back panels of INTERDATA chassis. The Fastons and the Faston tabs are labeled to conveniently guide the installation of power supplies. The fan connection does not use Fastons. It uses a three prong nylon connector (only two prongs are used by the fans).

NOTE

Some power supplies are equipped with output cables designed to feed two back panels.

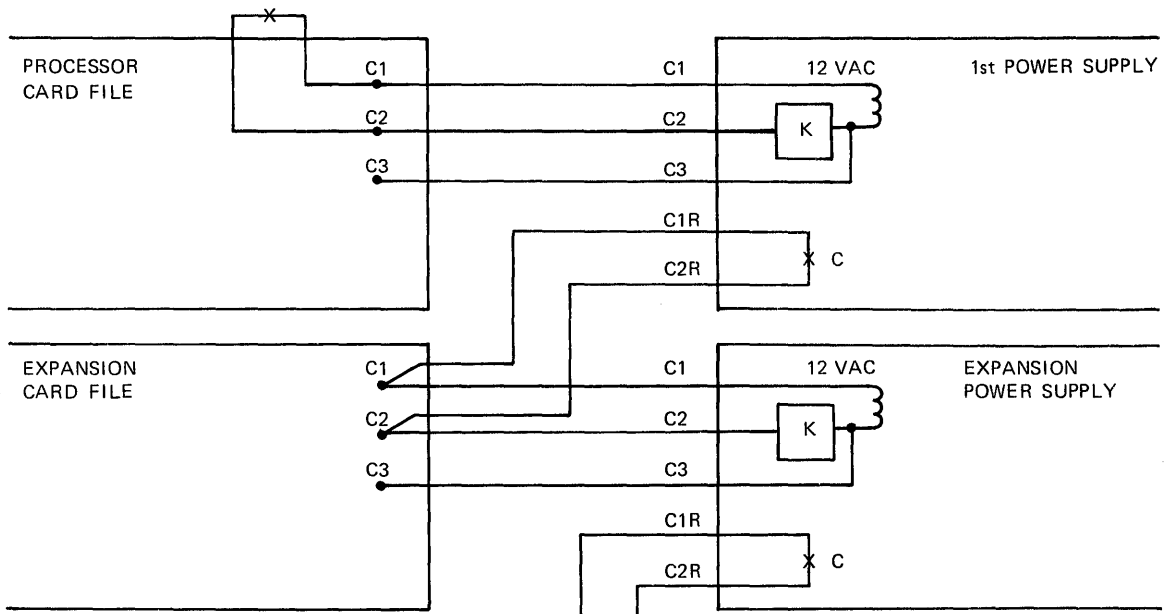
POWER SUPPLY EXPANSIONS

All power supplies covered by this manual may be expanded as shown in Figure 1. Turning the Display Panel Power LOCK-ON-OFF-switch to the ON position connects 12 VAC to Relay K of the first Power Supply. Relay K, in turn, applies power to the first Power Supply. It also closes Contact C which is connected to the next Expansion Card File via wires C1R and C2R which are part of the first power supply output cable. The second power supply is therefore turned on because its Relay K is energized through the first power supply's Contact C. The second power supply's Contact C can turn on a third power supply and so on, until all power supplies in the system are on. Up to 10 power supplies can be controlled in this manner.

EXPANDING OLDER SYSTEMS

The power supplies described in this document may be added to older systems which use 34-017, 34-020, or 34-024 Power Supplies. See Figure 2 for the connections required. Note that the older power supplies do not provide a contact to control the next power supply, but rather share the Display Panel Power LOCK-ON-OFF switch with all power supplies in the system. An INTERDATA Part Number 17-182 Cable is needed for each expansion supply, as shown.

DISPLAY PANEL POWER ON-OFF SWITCH

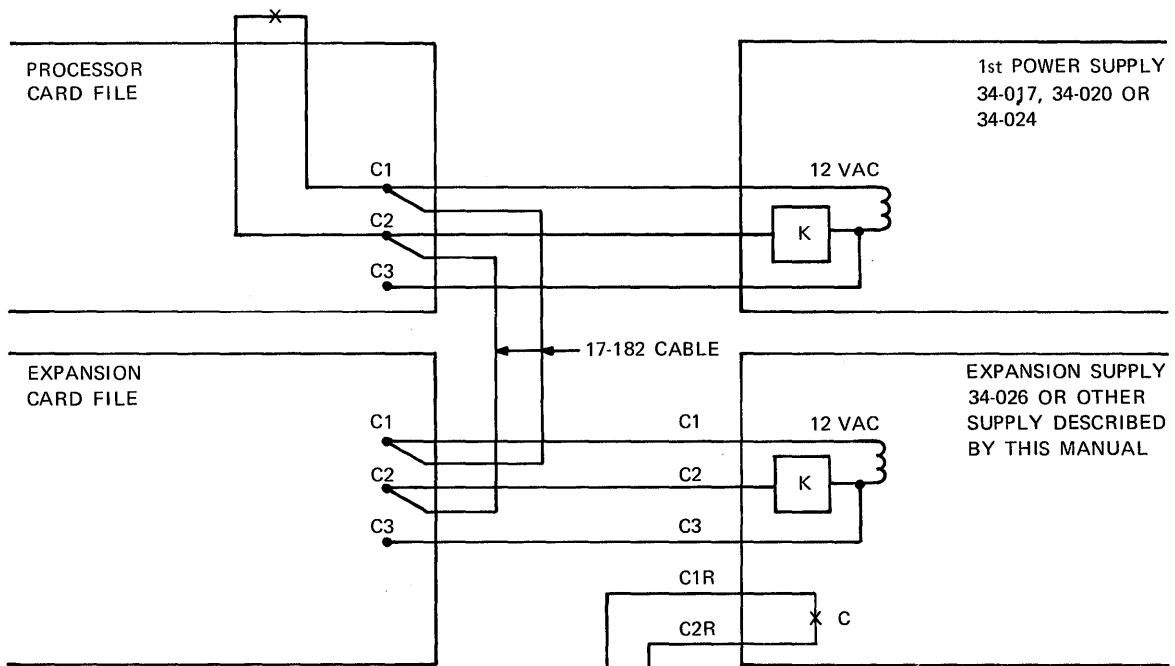


NOTE: CONNECTIONS SHOWN PERTAIN TO POWER SUPPLY 34-026 AND OTHERS DESCRIBED IN THIS MANUAL

TO C1 + C2 OF NEXT CARD FILE

Figure 1. Power Supply Expansions

DISPLAY PANEL POWER ON-OFF SWITCH



TO NEXT SUPPLY IF REQUIRED

Figure 2. Power Supply Expansion, Systems Using Previous Power Supplies

SWITCHING REGULATED POWER SUPPLY MAINTENANCE SPECIFICATION

INTRODUCTION

This specification provides maintenance information for several INTERDATA power supplies. These power supplies are very similar in their basic design approach. A given power supply described by the marketing number (a number preceded by M, such as M49-026) may have several variations. The variations are identified by INTERDATA part numbers—a number beginning with 34 (such as 34-026). All power supplies described by the marketing number have the same output rating and are interchangeable. The following is a list of the power supplies described in this document.

<u>Marketing Number</u>	<u>Part Numbers</u>	<u>P5 Output Rating</u>
M49-026	34-026	50 Amperes
M49-034	34-027	50/40 Amperes (See Output Specifications)
M49-024	34-029	24 Amperes

The *Switching Regulated Power Supply Maintenance Manual*, Publication Number 29-437 provides a schematic drawing, chassis assembly drawing, and component locator drawings (printed circuit board) for each power supply listed above. All drawings appear at the back of the manual. The following list describes the drawings that apply to each power supply.

<u>Power Supply Part Number</u>	<u>Schematic</u>	<u>Chassis Assembly</u>	<u>Component Locator</u>
34-026	34-026D08	34-026D03	35-581C03 35-582D03 11-179D03
34-027	34-027D08	34-027D03	35-581C03 35-582D03 11-179D03
34-029	34-029D08	34-029D03	35-581C03 35-582D03 11-179D03

GENERAL SPECIFICATIONS

34-026 POWER SUPPLY

Input

115 or 230 VAC \pm 10%, 50 or 60 Hz

Outputs

<u>Mnemonic</u>	<u>Normal Voltage</u>	<u>Current Rating</u>
P5	+ 5.0 VDC	50 Amperes
P15	+16.5 VDC	3.8 Amperes
N15	- 16.5 VDC	3.8 Amperes

Regulation

<u>Mnemonic</u>	
P5	\pm 1.5% (Load and Line)
P15	\pm 1% (Load and Line)
N15	\pm 1% (Load and Line)

Ripple (Maximum Peak to Peak)

<u>Mnemonic</u>	
P5	120 Millivolts
P15	300 Millivolts
N15	300 Millivolts

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Temperature Range

Operating 0°C to 55°C
Storage -40°C to +85°C

Over Voltage Protection

<u>Output</u>	<u>Type</u>	<u>Range</u>
P15	Crowbar	19.8 \pm 1.3 VDC (no adjustment)
N15	Crowbar	19.8 \pm 1.3 VDC (no adjustment)
P5	None	N/A

Output Current Limiting

<u>Output</u>	<u>Short Circuit Output Current Limit (Typical)</u>
P5	30 Amperes
P15	2.5 Amperes
N15	2.5 Amperes

34-027 POWER SUPPLY

Input

115 or 230 VAC +10%, 50 or 60 Hz

Outputs

<u>Mnemonic</u>	<u>Normal Voltage</u>	<u>Option 1 Current Rating</u>	<u>Option 2 Current Rating</u>
P5	+5.0 VDC	50 Amperes	40 Amperes
P15	+16.5 VDC	3.8 Amperes	5.0 Amperes
N15	-16.5 VDC	3.8 Amperes	5.0 Amperes

Regulation

<u>Mnemonic</u>	
P5	\pm 1.5% (Load and Line)
P15	\pm 1% (Load and Line)
N15	\pm 1% (Load and Line)

Ripple (Maximum Peak to Peak)

<u>Mnemonic</u>	
P5	120 Millivolts
P15	300 Millivolts
N15	300 Millivolts

Temperature Range

Operating 0°C to 55°C
Storage -40°C to +85°C

Over Voltage Protection

<u>Output</u>	<u>Type</u>	<u>Range</u>
P15	Crowbar	19.8 \pm 1.3 VAC (No Adjustment)
N16	Crowbar	19.8 \pm 1.3 VAC (No Adjustment)
P5	None	N/A

Output Current Limiting

<u>Output</u>	<u>Short Circuit Output Current Limit (Typical)</u>
P5	30 Amperes
P15	2.5 Amperes
N15	2.5 Amperes

THEORY OF OPERATION

This section describes the operation of the 34-026 Power Supply. All power supplies covered by this manual operate in a similar manner. Refer to the Block Diagram, Figure 1, and to Functional Schematic 34-026D08 provided in the *Switching Regulated Power Supply Maintenance Manual*, Publication Number 29-437 during the following descriptions.

Block Diagram Description

The Display Panel LOCK-ON-OFF switch connects 12 VAC to Relays K201 and K202 to power-up a system. Contacts of K201 and K202 connect the line to the Rectifier and Filter circuit through a Line Filter and Surge Resistor. An additional contact on K201 energizes the next expansion supply via C1R and C2R. The Surge Resistor prevents line surges when the supply is initially turned on, and is shorted after the first second of operation by Relay K101. The Rectifier and Filter Circuit produces 300 VDC from the AC line. The Power Stage converts the 300 VDC to a 20KHz square wave and transforms the high voltage down to appropriate levels for the 5 Volt output and ± 16 Volt Regulators. The 5 Volt output (P5) is produced by full-wave rectification into a Choke Input Filter. The Control Circuit senses the 5 Volt output and regulates it by controlling the duty cycle of the 20KHz Power Stage.

A -30 Volt Rectifier is supplied from a winding of the Power Stage Power Transformer. The -30 Volt Rectifier provides unregulated DC voltage to the -16 Volt Regulator which produces the -16 Volt output (N15). A remote thermistor located in the memory system connects to the Power Supply through the output cable to program the -16 Volt Regulator over a range required by the memory (usually -15 to -18 Volts).

The same winding on the Power Transformer that supplies the -30 Volt Rectifier also supplies the +30 Volt Rectifier. The +30 Volt Rectifier supplies DC voltage to the +16 Volt Regulator which produces the +16 Volt output (P15). The +16 Volt Regulator tracks the -16 Volt Regulator. The Control Transformer supplies 24 VAC to half-wave rectifiers which "pre-charge" the +30 Volt and -30 Volt Rectifier filter capacitors during the One Second Turn-On Delay. Relay K101 contacts then transfer the Rectifier outputs to their respective regulator circuits. The pre-charge prevents excessive stress on the Power Stage High Voltage Transistors by not requiring them to charge the filter capacitors from 0 to 30 Volts at the instant the Power Stage is enabled during the Power-Up sequence.

The Control Transformer also supplies the 20 Volt Rectifier which supplies a local 5 Volt and 12 Volt Regulator. These two regulated voltages are used to power the Power Supply's Control Circuit only.

The Time Delay Enable generates the One Second Turn-On Delay and the Enable signals which start the Control Circuit.

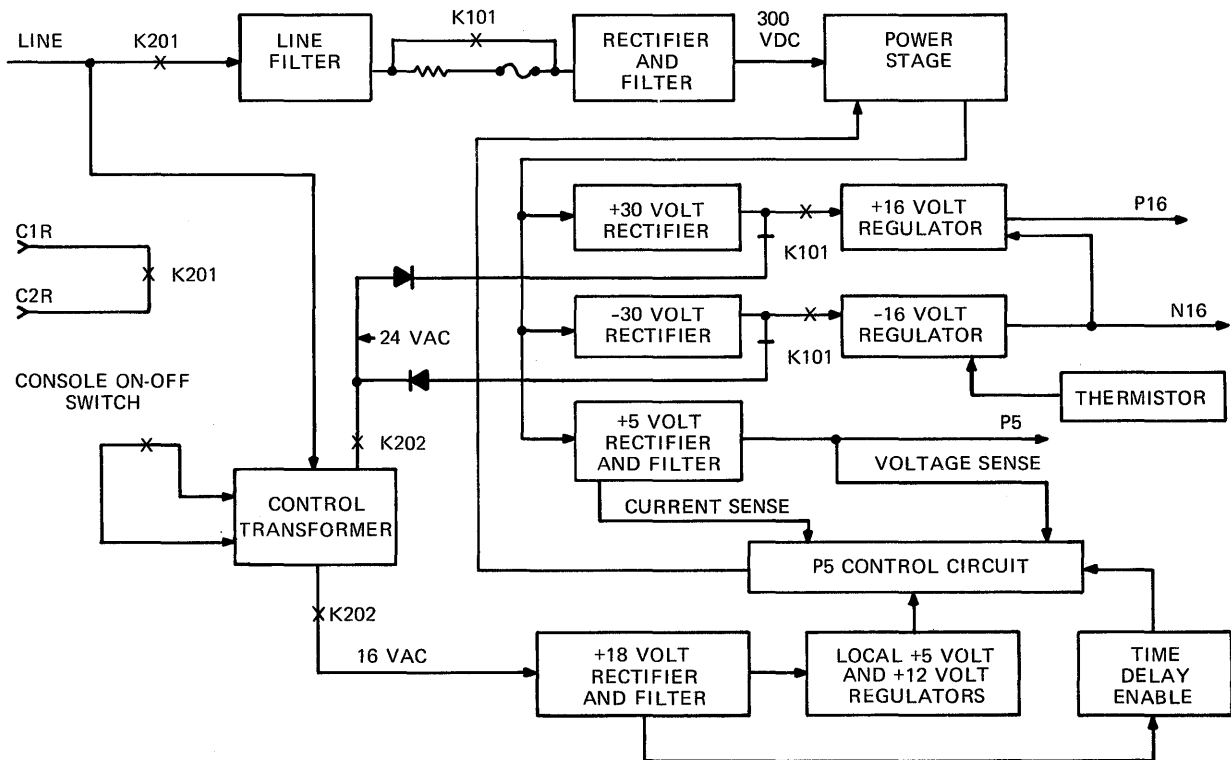


Figure 1. Functional Block Diagram

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Circuit Descriptions

The following paragraphs describe each block of the Block Diagram, Figure 1. Refer also to Functional Schematic 34-026D08 during the following discussion. The three digit coordinates in parentheses locate the circuit area or component being described. For example: (1K7) locates Q9 in Functional Schematic 34-026D08. The first digit (1) refers to Sheet 1 of the schematic. The next two digits (K7) are the coordinates on Sheet 1 at which Q9 is shown.

Rectifier and Filter (115 VAC Connection)

When the Power Supply is connected for 115 VAC line operation, the Rectifier is connected as a doubler, producing 300 VDC. For the first second following turn-on (closing of Relay K201 contacts), contacts of K101 (1H2) remain open and the Power Supply regulator circuits are disabled. With Relay K101 contact (1H2) open, the filter capacitors must charge through the Surge Resistor R201 (1E2) preventing turn-on surges from causing malfunction in equipment that had already been in operation. During the One Second Turn-On Delay, the P5, P15, and N15 Regulators are disabled and take no power from the Filter Capacitors C110, C111, C112, and C113 (2C2) allowing them to fully charge. Fuse F7 (1F2) protects the Surge Resistor (R201) in the event of a Power Supply malfunction.

Rectifier and Filter (230 VAC Connection)

When the Power Supply is connected for 230 VAC operation, a Bridge Rectifier Circuit is used rather than a doubler as in the 115 VAC connection. However, in either case, the rectifier output is approximately 300 VDC. Removing the strap between Terminal Board 201-Pin 8 and Pin 9 (1C5) converts the Rectifier (BR201) from a doubler to a bridge configuration.

Power Stage

The Power Stage uses four High Voltage Transistors Q101, Q102, Q103, and Q104 (2G2) to switch the rectified line (300 VDC) through T301 (2H1) at a 20KHz rate. Capacitors C101 and C102 actually divide the 300 Volts into two 150 Volt sources. Transistors Q101 and Q102 switch the upper 150 Volt source to T301 winding (1-2) and Q103 and Q104 switch the lower 150 Volt source to T301 winding (3-4). Base drive to Q101 and Q102 is supplied through T102 (2F3). Base drive to Q103 and Q104 is supplied through T103 (2G3). Integrated Circuits IC 6 and IC 7 (2G6) control the base drive to the High Voltage Transistors. A low drive level is supplied to T102 and T103 by Resistors R20 and R21 (2F6) respectively.

Current Transformer T101 supplies additional drive power to the High Voltage Transistor bases (through T102 and T103) as currents through these transistors increase due to increased loading of T301 secondaries. Darlington connected Transistors Q1 and Q2 (2C5) provide turn-off drive to the High Voltage Transistors. Transistors Q1 and Q2 are on when IC 6 and IC 7 are *both* off. Transistors Q1 and Q2 are *off* when *either* IC 6 or IC 7 is on. Current for the turn-off drive is supplied by T101 and T301 winding (11-12-13) to T102 and T103 in proper phase. Diodes steer the positive polarities of T101 and T301 winding (11-12-13) to T102 and T103 in proper phase. Diodes also provide necessary isolation of all transformers from each other during unwanted phases of the 20KHz cycle. An Enable voltage supplied to R20 and R21 allows the circuit to start. Without this Enable voltage the circuit can not turn the High Voltage Transistors on. This Enable voltage is supplied by the Control Circuit and is described in the Control Section.

+30 Volt and -30 Volt Rectifiers

Two Full-wave Rectifiers CR101, CR102, CR103, and CR104 (2J2) provide +30 VDC and -30 VDC. These levels supply the +16 Volt and -16 Volt Regulators. Pi filters are used for both polarities. Half-wave Rectifiers CR22 and CR23 (3C6 and 3D8) pre-charge the Filter Capacitors C104, C105, C106, and C107 (2K2) during the One Second Turn-On Delay. Relay K101 contacts (3D1 and 3E9) transfer the +30 Volt and -30 Volt Rectifier output from the pre-charge rectifiers to the +16 Volt and -16 Volt Regulators following the One Second Turn-On Delay.

-16 Volt Regulator

Integrated Circuit IC 10 (3F6) provides a negative voltage reference and error amplifier which drives the -16 Volt Pass Transistors Q108 and Q109 (3G9). Resistors R59, R54, R53, and R57 (3H6) together with an external Thermistor and Transistor Q7 (3H7) comprise a temperature programming reference divider network. Transistor Q8 (3K8) senses N15 output current through R119 and, with Q6 (3J8), R41, R42 (3K8), R39, R45 (3D6), and CR21 (3K7) providing fold-back current limiting. A fixed Threshold Crowbar provides over-voltage protection. The firing point is 19.8 volts, ± 1.3 volts. The N15 Crowbar Circuit includes CR31, Q4, CR19 and associated resistors (3K7).

If the P5 output is shorted to ground, a shut down mode of the -16 Volt Regulator (IC 10) is entered into. When the P5 output is shorted to ground, IC 1, Pin 12 (2J7) is driven negative. This negative voltage is coupled to IC 10, Pin 2 (3E6) through R60 (2J8) and CR34 (3D7) causing the N15 output to go to approximately 0 Volts.

+16 Volt Regulator

Integrated Circuit IC 9 (3E4) provides an error amplifier which drives the +16 Volt Pass Transistors Q105 and Q106 (3G1). The +16 Volt Regulator tracks the -16 Volt Regulator and therefore uses N15 as its reference. The +16 Volt Reference Divider includes R44, R56, and R43 (3J4). Transistor Q5 (3J4) senses the +16 Volt Regulator output current through R117 and together with R31 (3H4), R36 (3D4), R35 (3D5), and CR18 (3G5) provides fold-back current limiting (approximately 2 Amperes) when P15 output is shorted to ground. A fixed threshold Crowbar provides over-voltage protection. The firing point is 19.8 volts, ± 1.3 volts. The P15 Crowbar Circuit includes CR32, Q3, CR20 and associated resistors (3L4).

5 Volt Rectifier and Filter

Schottky Rectifiers CR301 and CR302 (2J4) rectify up to 50 Amperes of P5 output current. Pulsating DC is filtered through Inductor L301 and Capacitors C301 and C302 (2L4). Output current flowing through Resistor R301 provides a current sensing signal for the P5 Control Circuit.

NOTE

Typical resistance measurements of Schottky rectifiers are:

	<u>Good Forward</u>	<u>Good Reverse</u>
Triplett Type 630 VOM	1.1 Ohm (X1 Scale)	.22 Meg Ohm (X100K Scale)
Fluke 8000A DVM	162 Ohm (200 Ohm Scale)	8.2K Ohm (200K Ohm Scale)

Two test points accessible from outside the Power Supply are provided to monitor P5 output current. These test points produce 6 Millivolts/Ampere of P5 output current. Any signal measuring greater than 315 Millivolts at these test points (as measured with a DVM) indicates an overloaded power supply.

P5 Control Circuit

The P5 Control Circuit monitors the P5 output voltage and regulates the duty cycle of the Power Stage to maintain the P5 output at 5 Volts in spite of load variations or input line variations. The P5 output current is also monitored and controlled to prevent overloading the Power Supply.

A 5 Volt reference is established by IC 2 (2K9). Integrated Circuit IC 1 (2H9) compares this reference to the P5 output voltage and produces an error signal at its output, Pin 10. Integrated Circuit IC 4 (2C9) generates a pulse every 25 microseconds. The pulse triggers IC 3 (2E8) a one-shot multivibrator. The one-shot timing components are Capacitor C9 (2F8) and Resistor R15 (2G9). The error signal from IC 1 Pin 10 modifies the one-shot timing pulses over a range from 2.5 microseconds to 25 microseconds. It is the output pulse from this one-shot that controls the duty cycle of the Power Stage. The variable width pulses from IC 3 Pin 8 are applied to the two drivers, IC 7 (2G7) and IC 6 (2F6).

The driver ICs are alternately enabled by the IC 5 flip-flop (2D7) which changes state every time the one-shot generates a pulse. The driver ICs supply base drive to High Voltage Switching Transistors Q101, Q102, Q103, and Q104 (2G2) through the Driver Transformers T102 and T103 (2F3) as described previously.

Integrated Circuit IC 1 (2J7) also monitors the P5 output current flowing through a six milliohm resistor, R301 (2K4). If the P5 output load starts to draw current in excess of 57 Amperes, IC 1 (2J7) output Pin 12 goes negative and overrides the error signal from IC 1 (2H8) Pin 10. This changes the one-shot timing (IC 3) and reduces the Power Stage duty cycle, or "on" time to limit the output current to safe levels.

20 Volt Rectifier and Filter

Diodes CR24, CR25, CR26, and CR27 (1H6) form a bridge-rectifier which produces unregulated +17 VDC from a 14 VAC winding of Control Transformer T201 (1E5). The voltage is supplied to the 12 Volt Regulator and IC 2 (1M7).

+5 Volt and +12 Volt Regulators

Zener Diodes CR28 (1K7) and CR29 (1K7), together with Resistor R51 and Transistor Q11 (1K6), provide a regulated 12 Volts for the P5 Control Circuits described previously.

Integrated Circuit IC 8 (1M5), a three terminal regulator, produces +5 Volts to operate IC 3, IC 4, IC 5, IC 6, and IC 7 in the P5 Control Circuit.

Time Delay Enable

The function of the Time Delay Enable is to Enable the P5 Control Circuits only when adequate control voltages (+12 Volts and +5 Volts) are present. Also, on normal power-ups, a one second time delay is provided to allow high voltage Capacitors C110, C111, C112, and C113 (2G2) to charge through the Surge Limiting Resistor R201 (1E2) as described earlier.

Turning on power closes Relay K202 (1F6), allowing C25 (1J7) to charge. As soon as sufficient voltage exists on C25 to permit zener current in CR28 and CR29 (1K7), Q10 (1K8) turns on, which cuts off Q9 (1L7).

Cutting off Q9 allows C26 (1K8) to charge. Integrated Circuit IC 2 (1N7) with feedback Resistor R29 (1M8), together with R28, R3, and R4 (1M7) comprise a Schmitt Trigger. Integrated Circuit IC 2 output Pin 10 remains at less than 3 Volts until C26 charges to the threshold voltage established by R3 and R4 (about +3 Volts). It takes about one second for C26 to charge to the threshold voltage, at which time IC 2 output Pin 10 switches to about +12 Volts. This +12 Volt output enable signal is applied to the Power Stage as described previously, and permits the Power Supply to operate. Without the +12 Volt Enable signal, the Power Supply cannot operate.

ADJUSTMENTS

There are three potentiometer adjustments on the 34-026 Power Supply. They are the output voltage adjustments for P5, P15, and N15. Consult the appropriate systems maintenance manual for adjustment procedures. Typical adjustments are:

P5 = 5.0 Volts	}	at 25° C Ambient
P15 = 16.5 Volts		
N15 = 16.5 Volts		

Adjustment Potentiometers are located on the side of the Power Supply opposite the hinged end.

NOTE

Since the P15 Regulator tracks the N15 Regulator, always adjust the N15 output before adjusting the P15 output.

VOLTAGE MEASUREMENTS

Table 1 lists typical voltage measurements for an operating Power Supply. Other voltage measurements are shown on the schematic for any Power Supply covered by this manual.

TABLE 1. TYPICAL VOLTAGE MEASUREMENTS (A.C. IN PEAK TO PEAK VOLTS)

PIN NUMBER		1	2	3	4	5	6	7	8	9	10	11	12	13	14
IC 1	D.C.	.18	.20		-10.0		5.0	5.0		12.5	4.4		11.4	12.5	
	A.C.	.2	.06		1.0		.01	.03		1.0	.1	--	1.0	1.0	
IC 2	D.C.				2.7	8.2	7.1	0			12.1	12.5	16.8		
	A.C.				.2	.2	.01	.005			2.0	1.0	1.0		
IC 3	D.C.	0	0	4.5	5.0	5.0		0	1.6	5.0	5.0	1.6		1.5	5.0
	A.C.	.005	.005	5.0	.005	.005		.005	5.0	.005	.005	.01		1.0	.005
IC 4	D.C.	0	2.3	4.6	5.0		2.3	2.3	5.0	--	--	--	--	--	--
	A.C.	.01	2.8	4.4	.01		2.8	3.6	.005	--	--	--	--	--	--
IC 5	D.C.	5.0	1.9	1.6	5.0	1.9	1.9	0							5.0
	A.C.	.005	3.6	3.4	.01	3.4	3.6	.01							
IC 6	D.C.	1.6	1.9	10.2	0	10.2	1.6	1.9	5.0	--	--	--	--	--	--
	A.C.	3.4	3.4	20.0	.01	20.0	3.4	3.4	.01	--	--	--	--	--	--
IC 7	D.C.	1.6	1.9	10.2	0	10.2	1.6	1.9	5.0	--	--	--	--	--	--
	A.C.	3.4	3.4	20.0	.01	20.0	3.4	3.4	.01	--	--	--	--	--	--
IC 8	D.C.	C 0	B 13.1	E 5.0											
	A.C.	.01	.05	.01											
IC 9	D.C.	17.6		29.0	19.0	0	0	--	--	--	-2.9				
	A.C.	.1		.3	.1	.01	.01				.01				
IC 10	D.C.	-3.5		-15.2	-29.0	-28.2	-16.8	-26.9	-16.6	-16.6	0				
	A.C.	.01		.01	.3	.2	.1	.4	.005	.005	.01				

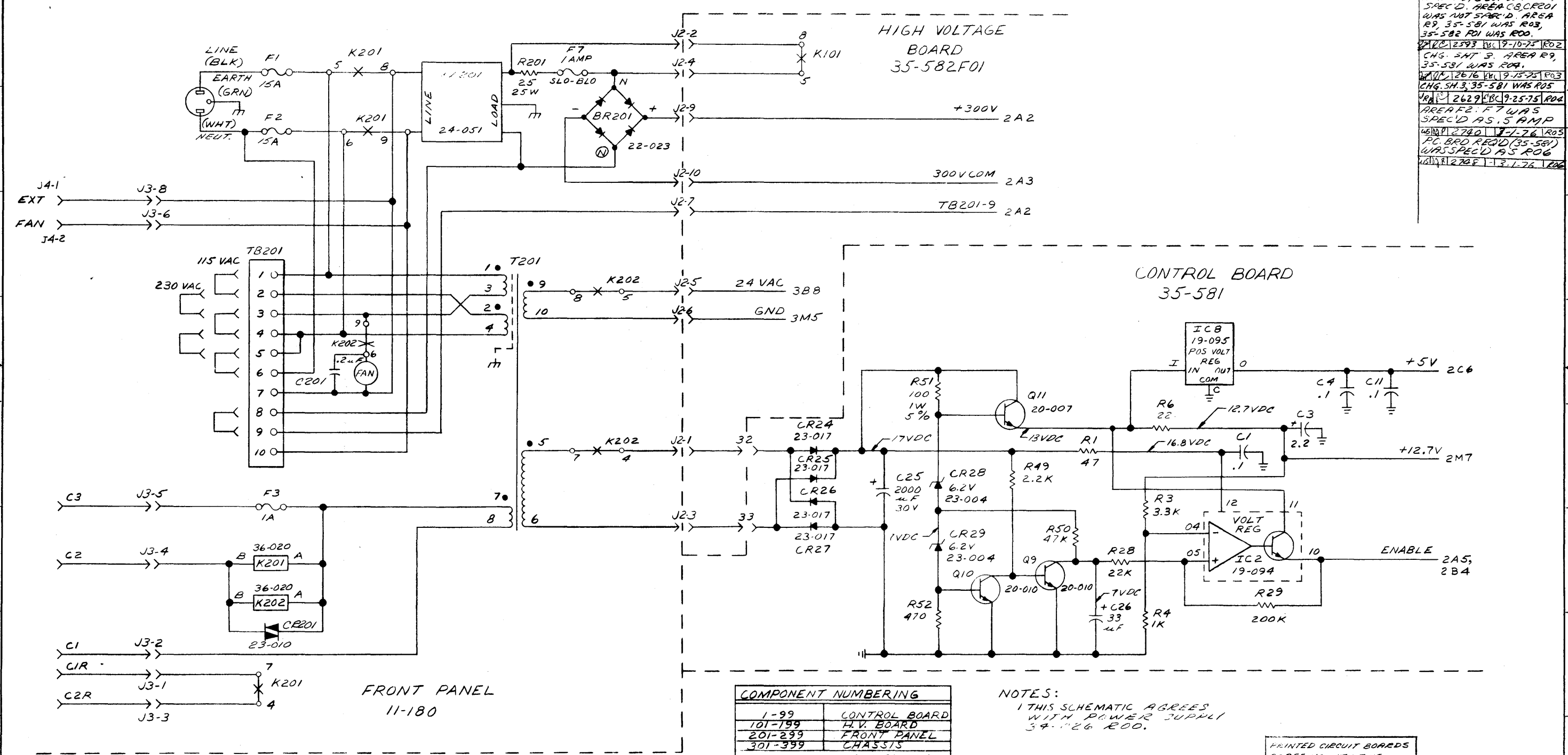
CURRENT MEASUREMENTS

The P5 output current loading can be checked by measuring the voltage across two test points. These test points are accessed from the side of the supply opposite the hinged end. Test point calibration is 6 Millivolts/Ampere ($\pm 5\%$). A supply is over-loaded when test point voltage measures greater than 315 Millivolts.

TEMPERATURE PROGRAMMING

An external thermistor may program the P15 and N15 Regulator. Two voltage vs temperature relationships are used by INTERDATA. Refer to the appropriate Memory Maintenance Manual or to the Memory Section of the System Maintenance Manual of the particular system in point to determine which voltage vs temperature characteristic is required.

REVISIONS			
PRE PRODUCTION APPROVAL	DEV	DATE	
		6-2-75	
REVISED SHT 2 35-581 WAS R00			
WBC	3051-22	7-1-75	R01
RELEASED FOR PRODUCTION ENG. C. IBC DATE 2-14-75			
CHG. SHTS 1, 2, & 3. AREA W5, C201 WAS NOT SPEC'D. AREA C8, C201 WAS NOT SPEC'D. AREA R9, 35-581 WAS R00. 35-582 R01 WAS R00.			
WBC	2593	9-10-75	R02
CHG. SHT 3. AREA R9, 35-581 WAS R0A.			
WBC	2616	9-15-75	R03
CHG. SHT 3, 35-581 WAS R05			
WBC	2629	9-25-75	R04
AREA F2: F7 WAS SPEC'D AS .5 AMP			
WBC	2740	7-1-76	R05
FC BRD. REQ'D (35-581) WAS SPEC'D AS R06			
WBC	31270E	1-2-76	R06



COMPONENT NUMBERING	
1-99	CONTROL BOARD
101-199	H.V. BOARD
201-299	FRONT PANEL
301-399	CHASSIS
FUSES AND CONNECTORS ARE EXCEPTIONS	

NOTES:
1 THIS SCHEMATIC AGREES WITH POWER SUPPLY 34-026 R00.

PRINTED CIRCUIT BOARDS AGREEING WITH THIS SCHEMATIC MUST BE AT LEAST THE FOLLOWING REVISION LEVEL

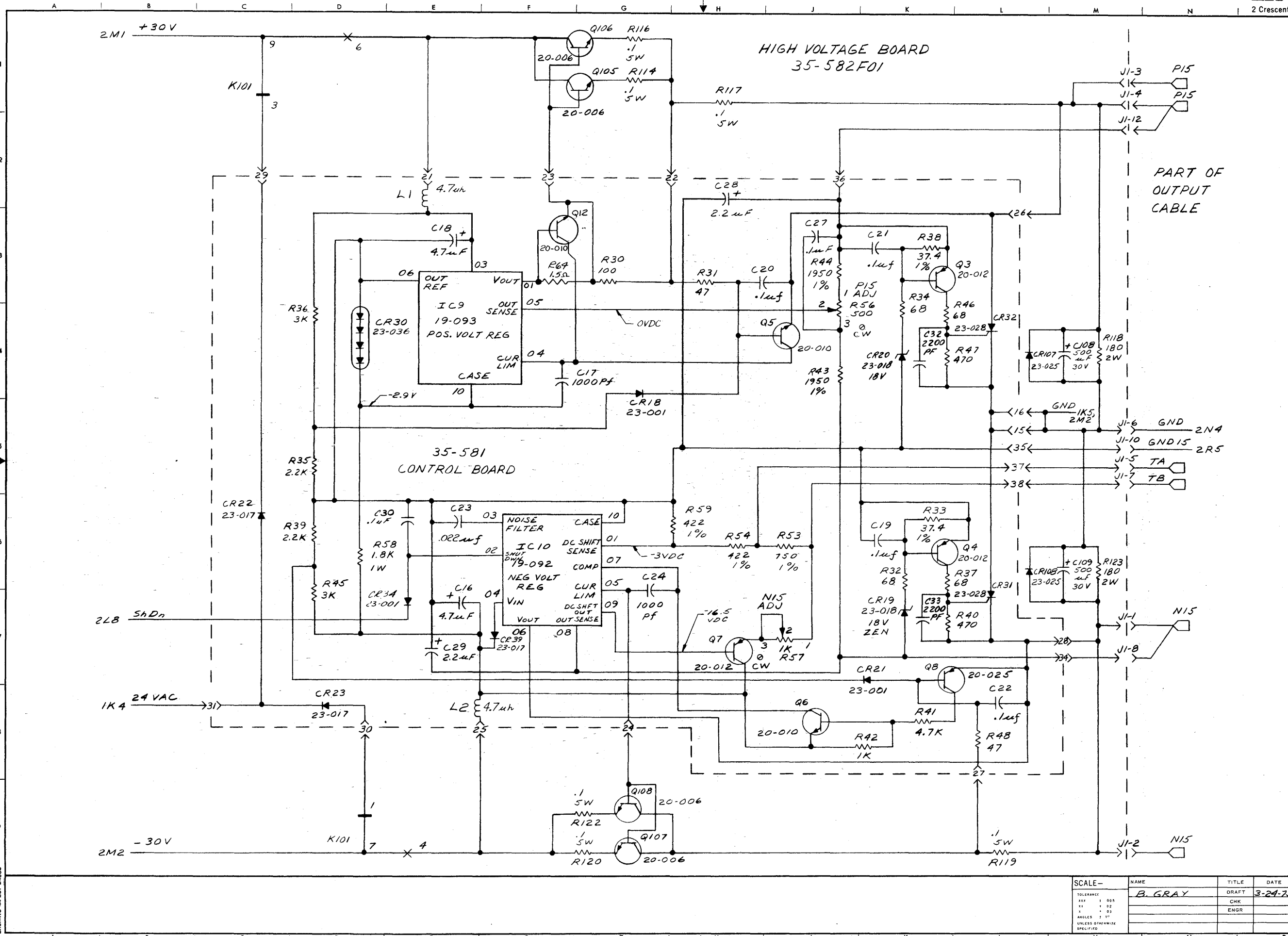
REV LEVEL	2	3		
SHEET	1	2	3	

CONTROL	35-581 R07
HI VOLT.	35-582F01 R01

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SCALE	NAME	TITLE	DATE	TITLE
	B. GRAY	DRAFT	3-23-75	FUNCTIONAL SCHEMATIC
	R. CERO	CHK	7-10-75	50 AMP POWER SUPPLY
	E. CENTOFANTI	ENGR	7-10-75	
	R.A. BARKER	QC	7-10-75	
	JAMES W. STRETT	TEST	7-10-75	

DRAWING 44-231 24536



REVISIONS

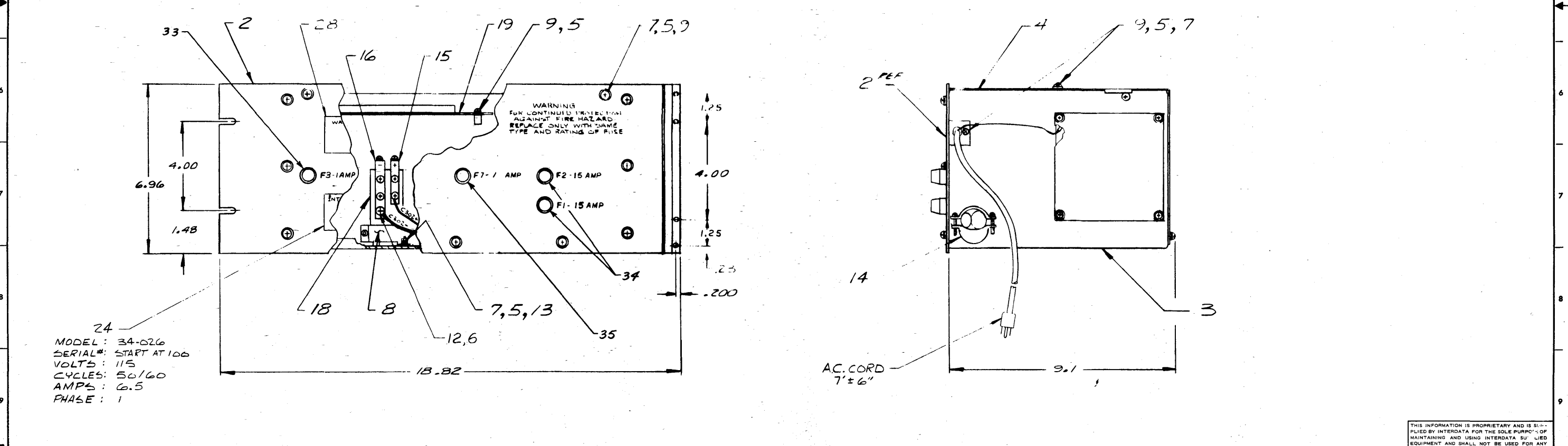
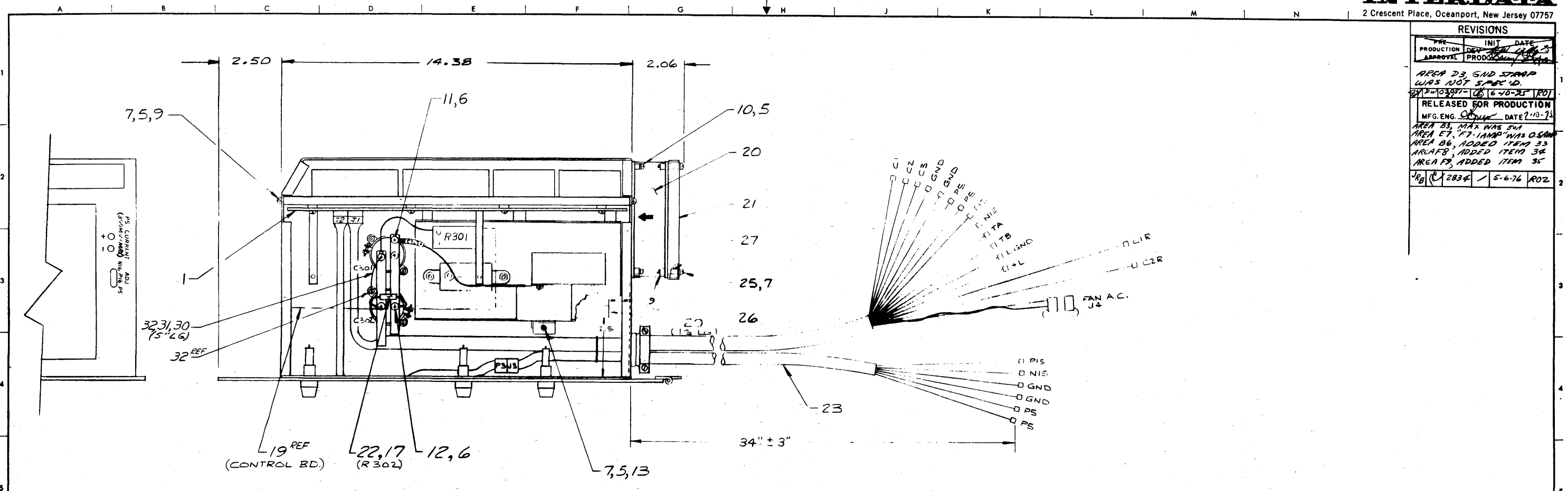
AREA E6, C23, .022 uF WAS SPEC'D AS .1 uF.
AREA F3 WAS SHOWN THUS:
AREA F3, Q12 & R64 WERE NOT SPEC'D AREA E2, R2B, ADDED L1 & L2 IN SERIES WITH CONN PIN 21 & 25 RESP.
AREA K4 & K7, ADDED C32 & C33
AREA J1, ADDED C22

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SCALE-	NAME	TITLE	DATE
1:1	B. GRAY	50 AMP POWER SUPPLY	3-24-75
TOLERANCE		CHK	
ANGLES 1"		ENGR	
UNLESS OTHERWISE SPECIFIED			
TASK NO. 03051			
DWG. NO. 34-026P03D08			
SHEET OF 3-3			

BRUNING 44-231 24538

REVISIONS		
PRE APPROVAL	INIT	DATE
PRODUCTION	DEV	4-18-75
APPROVAL	PRODUCTION	7-10-75
AREA D3 GND STRAP WAS NOT SPEC'D.		
RELEASED FOR PRODUCTION		
MFG. ENG. DATE 7-10-75		
AREA B3, MAX WAS 30A		
AREA E7, F7, IAMP WAS 0.5AMP		
AREA B6, ADDED ITEM 33		
AREA F8, ADDED ITEM 34		
AREA F9, ADDED ITEM 35		
JRB	2834	5-6-76 R02



MODEL: 34-026
SERIAL#: START AT 100
VOLTS: 115
CYCLES: 50/60
AMPS: 6.5
PHASE: 1

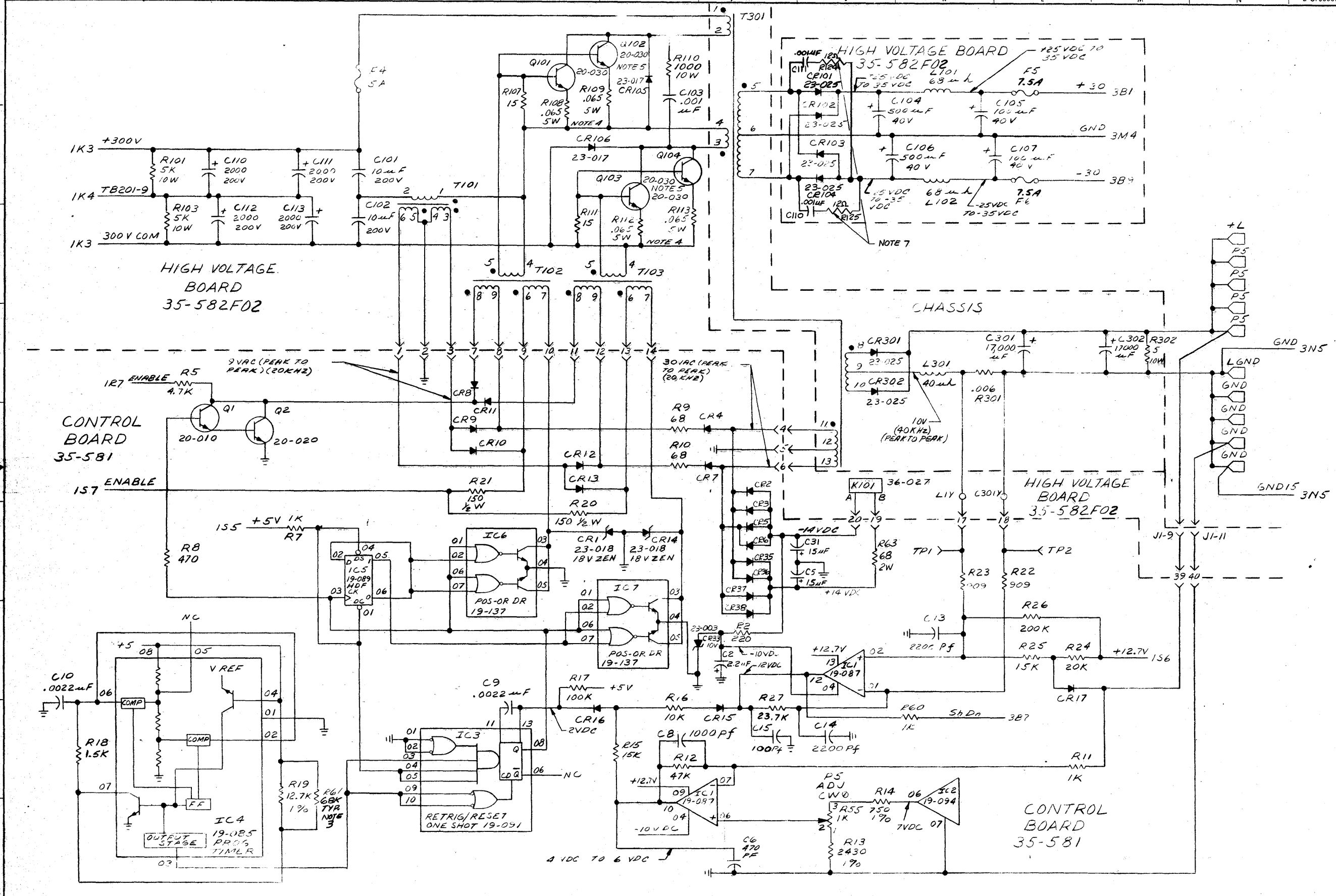
NOTES:
1. ALL DIMENSIONS ARE SHOWN FOR REF ONLY.

THIS INFORMATION IS PROPRIETARY AND IS SUPPLIED BY INTERDATA FOR THE SOLE PURPOSE OF MAINTAINING AND USING INTERDATA SUPPLIED EQUIPMENT AND SHALL NOT BE USED FOR ANY OTHER PURPOSE UNLESS SPECIFICALLY INDICATED.

SCALE	NAME	TITLE	DATE	TITLE
SCALE-1:2	V. PERRI	DRAFT	4-18-75	POWER SUPPLY 50 AMP
	W. WALKER	CHK	7-16-75	
	G. WALKER	ENGR	7-10-75	
	P. BARKER	QC	7-10-75	
	P. ABITANTE		7-10-75	

TASK NO. 03051
SHEET OF 1-1
34-026 R02 D03

REVISIONS	
AREA E4- REVERSED PINS 1 & 3	
AREA AB, R18 VALUE WAS 470. AREA D9, IC3-09 WAS CONT. TO IC3-05 CONNECTION BETWEEN IC3-09 & 03 WAS NOT SPEC'D. AREA D6, C12 WAS CONT. TO R21 & GND. AREA J1 & J2, C10, C11, R12, R15 & NOTE 7 WERE NOT SPEC'D. AREA D9, 6BK TYP WAS NOT SPEC'D.	
AREA K2: C104 & C106 VALUE WAS SPEC'D AS 100 UF	



- NOTES:
1. ALL DIODES ARE 23-001 UNLESS OTHERWISE SPECIFIED
 2. ALL RESISTORS ARE 1/4 WATT 5% UNLESS OTHERWISE SPECIFIED

3. R61 VALUE SELECTED FOR 24 USEC PERIOD (E3 USEC) AT IC4 PIN 03.
4. R108, R109, R112, AND R113 MAY BE .05W 2WATT RESISTORS.

5. Q101, Q102, Q103, & Q104 MAY BE 20-019 TRANSISTORS.
6. UNLESS OTHERWISE SPECIFIED RESISTANCE VALUES IN OHMS & CAPACITOR VALUES IN UF.
7. 150.0 OHM NETWORKS ACROSS CR103 & CR104 ARE COMBINED INTO ONE COMPONENT ON SOME POWER SUPPLIES.

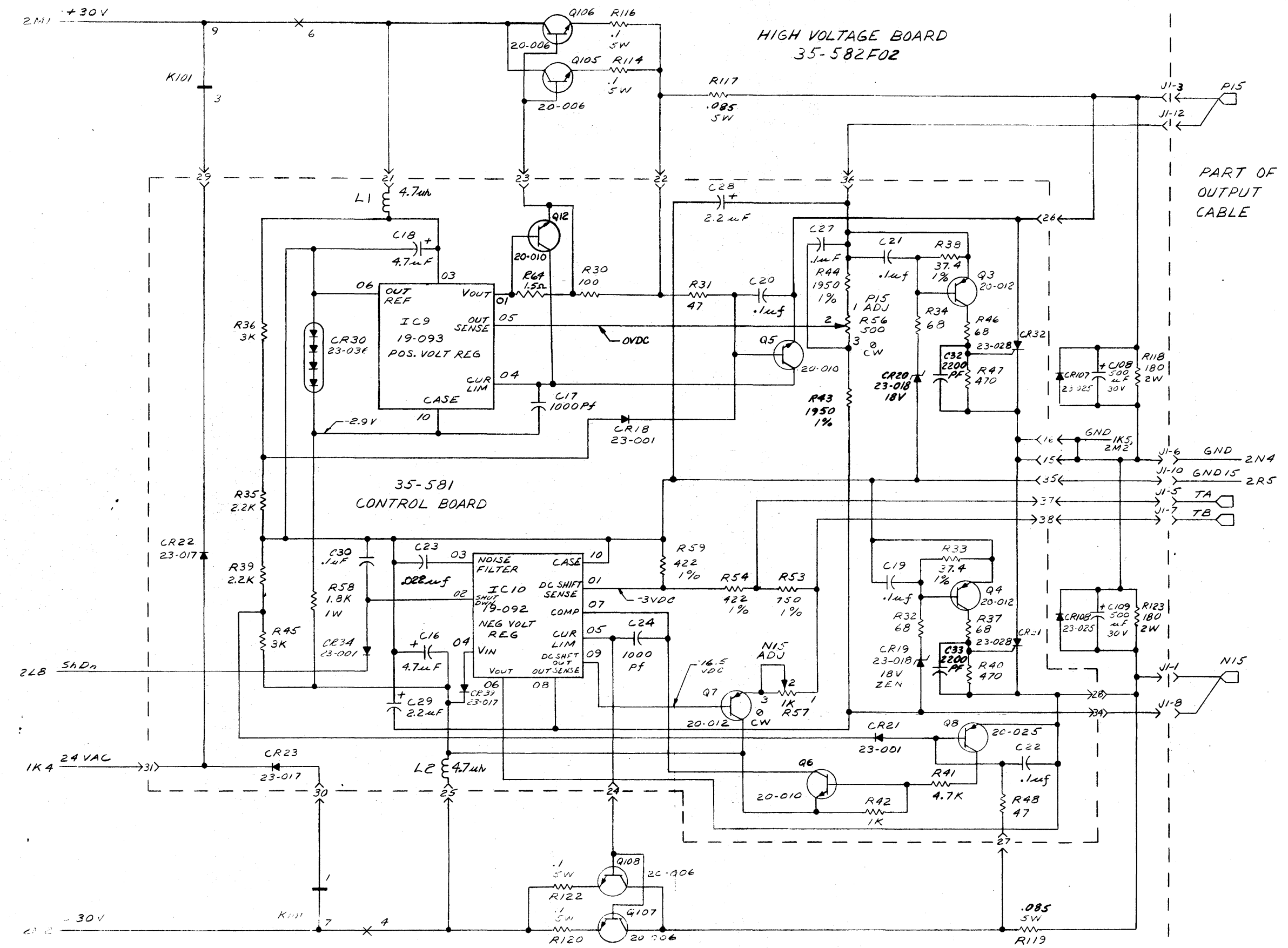
SCALE	NAME	TITLE	DATE
	B GRAY	FUNCTIONAL SCHEMATIC	8/32
		POWER SUPPLY	

34-027 R03008 2-3

HIGH VOLTAGE BOARD
35-582F02

REVISIONS

AREA E6, C23, .022 uF WAS SPEC'D AS .1 uF
AREA F3 WAS SHORING
AREA F3 Q12 & R46 WERE NOT SPEC'D. AREA E, R46 ADDED W/ L2 IN SERIES WITH CONV. PIN #1 & R5 RESP.
AREA K4 & K7, ADDED
C32 & C33
AREA L2 2676 P.C. 19-25-75 P02
AREA L2 2676 P.C. 19-25-75 P02
AREA L2 2676 P.C. 19-25-75 P02

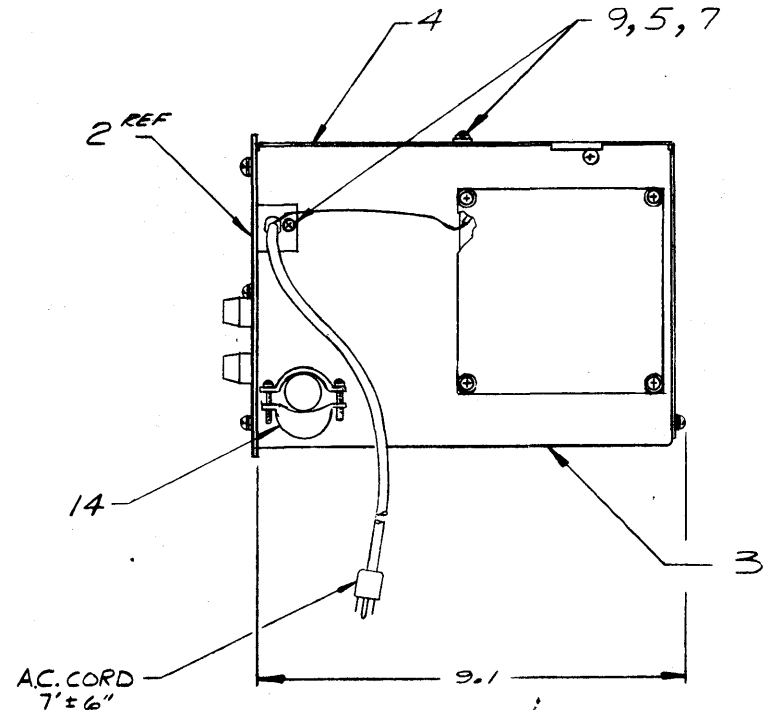
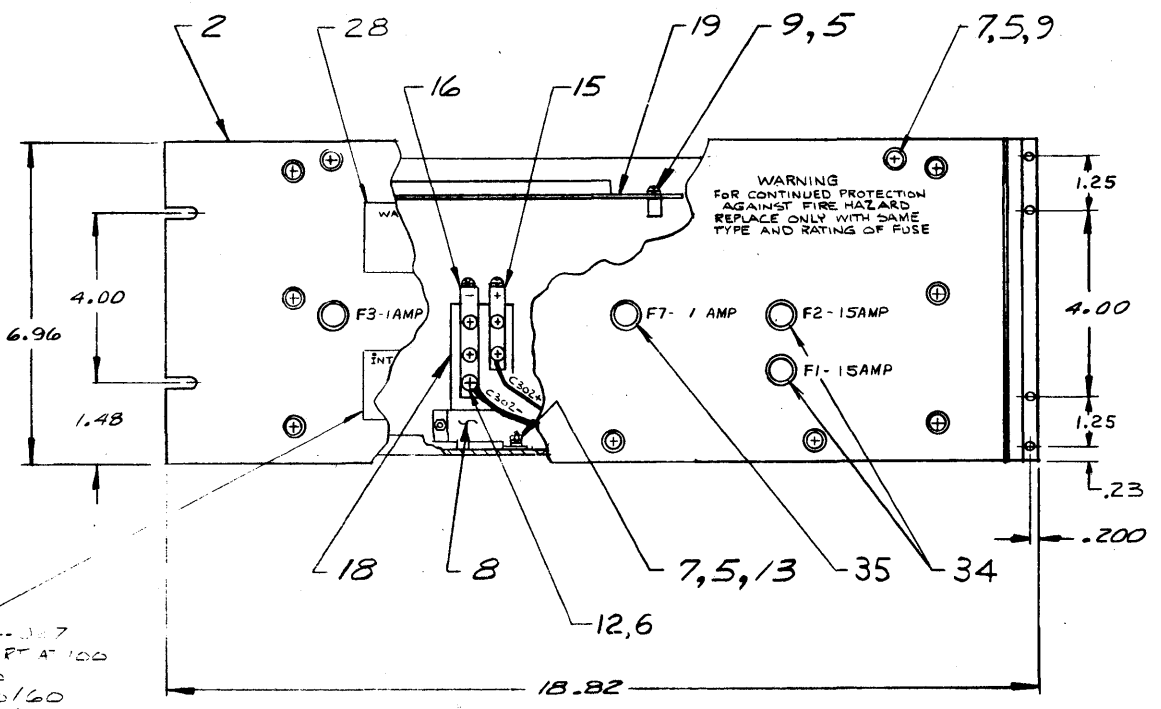
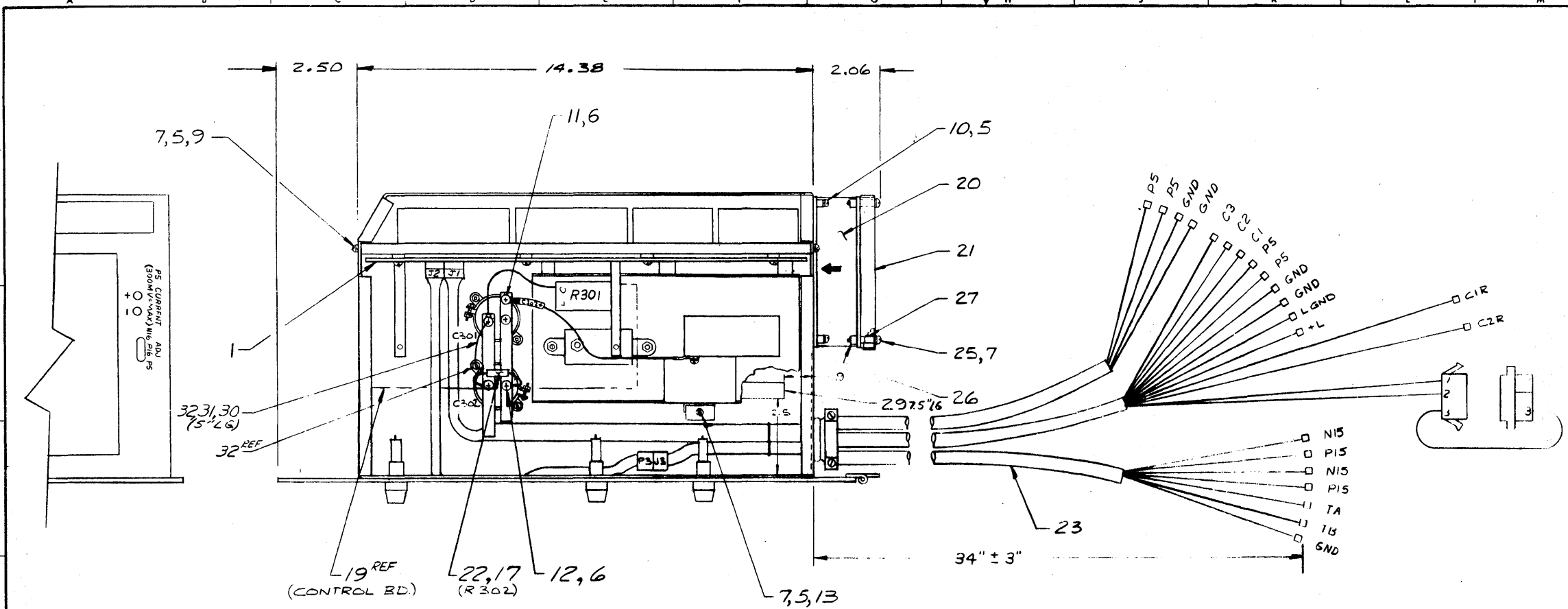


PART OF
OUTPUT
CABLE

SCALE-	NAME	TITLE	DATE
	B. GRAY	DRAFT	
		CHK	
		ENGR	
TITLE FUNCTIONAL SCHEMATIC 8/32 POWER SUPPLY			
TAX 03051			
DWT NO. 34-027, P01, 001			

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REVISIONS		
PRE APPROVAL	DEV PROD	INIT DATE
		11-18-73
AREA K4: REVISED DRAWING TO REFLECT NEW CABLE 17-357 P03 (ITEM #3) W/...		
WS RC	2882	15-6-74 R01
FOR PARTS REV LEVEL SEE VOIDED COPY		
DF F	2957	10-3-74 R02
AREA B3: 300 MV MAX WAS 300 MV = 50 A		
AREA E7: F7 WAS 0.5 AMP		
ADDED ITEMS 33, 34, 35.		
WS F	2982	10-29-74 R03



MODEL: 34-007
SERIAL#: START AT 100
VOLTS: 115
CYCLES: 50/60
AMPS: 6.5
PHASE: 1

NOTES:
1. ALL DIMENSIONS ARE SHOWN IN INCHES FOR REFERENCE ONLY.

THIS INFORMATION IS PROPRIETARY AND IS SUPPLIED BY INTERDATA FOR THE SOLE PURPOSE OF MAINTAINING AND USING INTERDATA SUPPLIED EQUIPMENT AND SHALL NOT BE USED FOR ANY OTHER PURPOSE UNLESS SPECIFICALLY INDICATED.

SCALE	NAME	TITLE	DATE	TITLE
SCALE-1:1	K. LAFFERTY	DRAFT	11 JUN 75	POWER SUPPLY
	Wally	CHK		8/32-50 AMP
	G. Wally	ENGR		
	R. BARRER			
	P. ABITANTE			

TASK NO: 03051
SHEET OF: 1-1

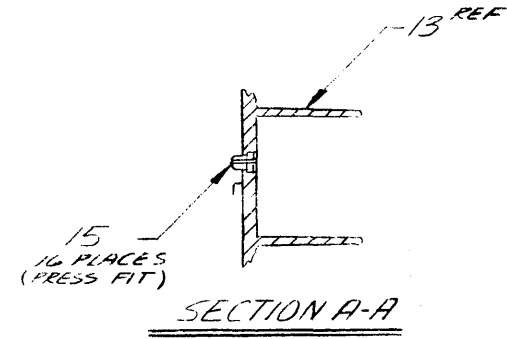
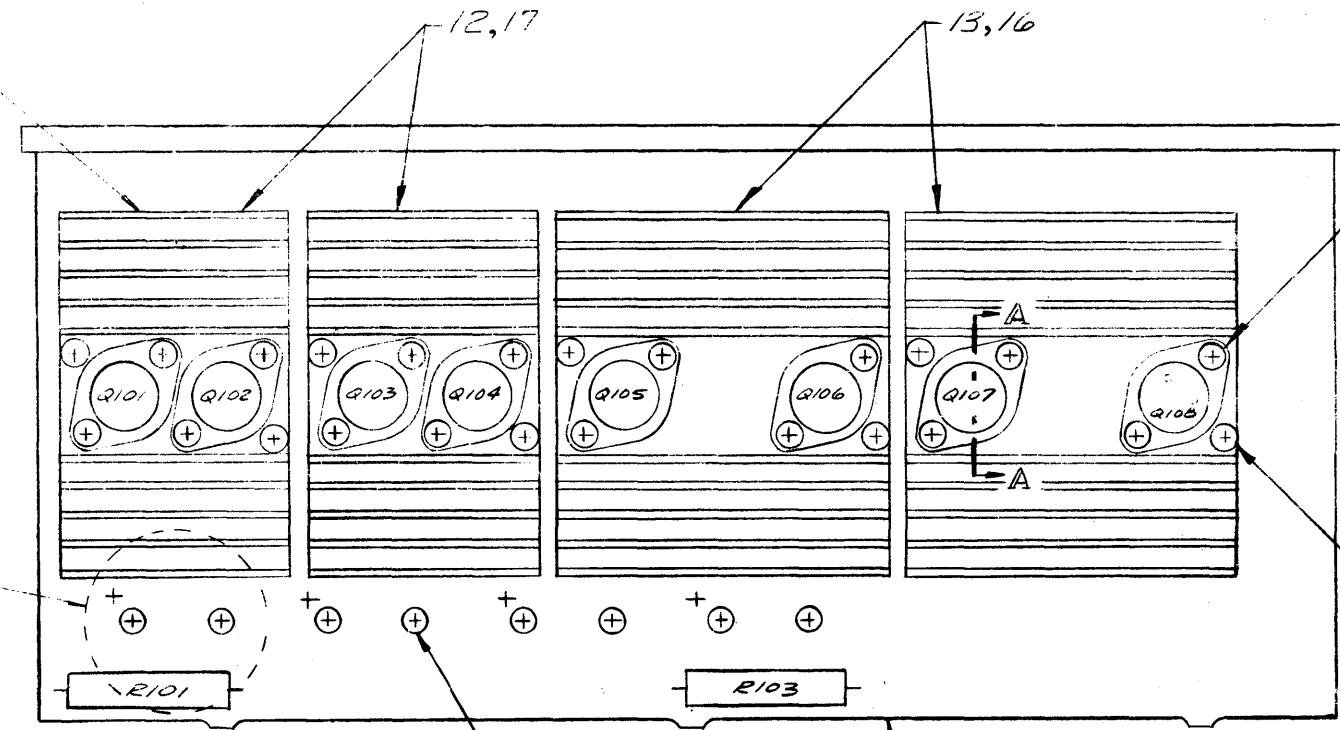
REVISIONS

NOTE 2 DELETED
NOTE FOR HEAT SINK
ORIENTATION WAS
CHANGED

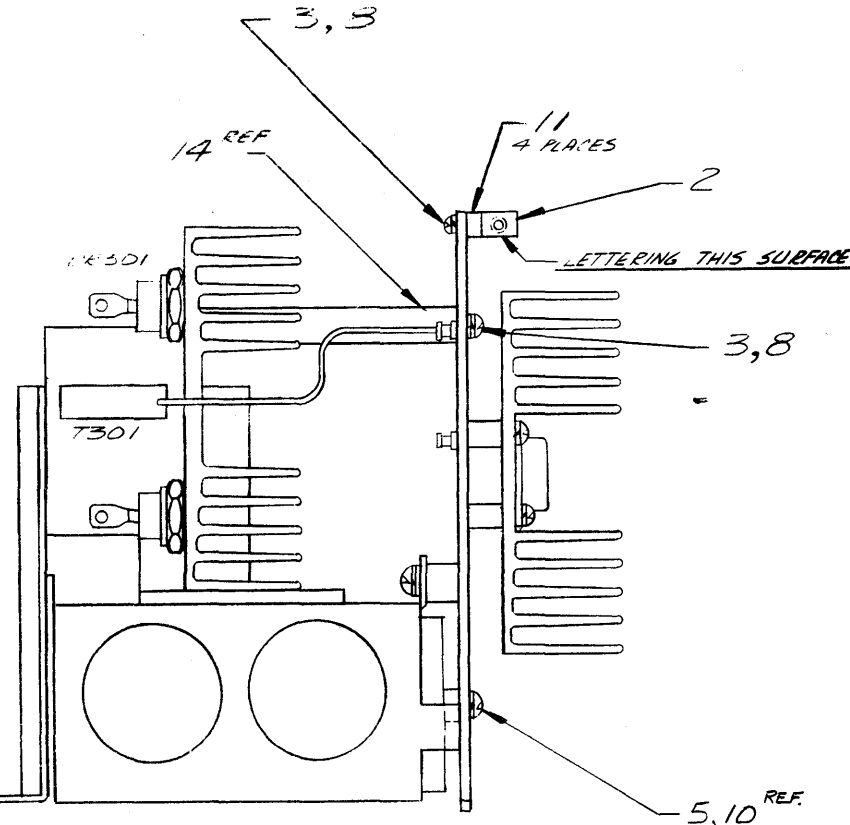
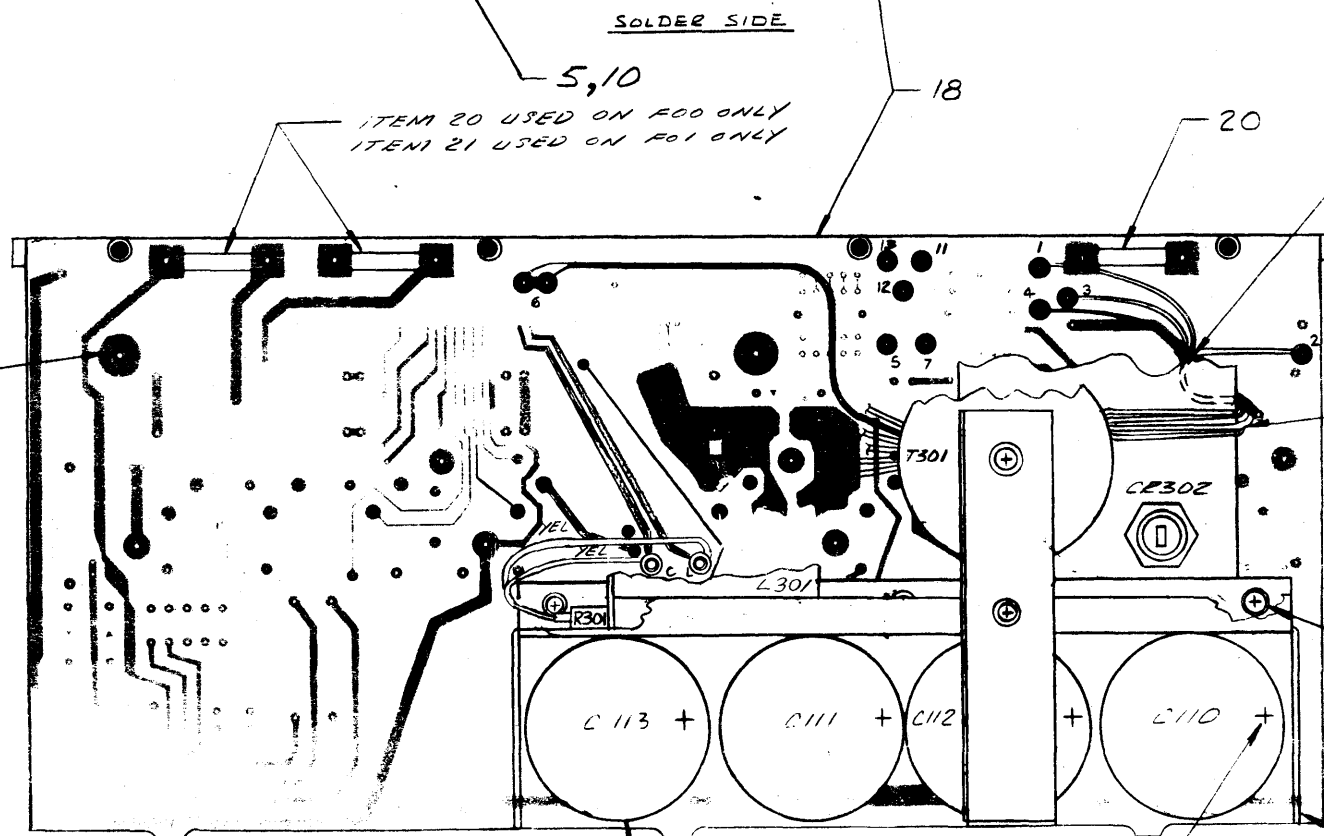
DATE	6-12-73	BY	101
PRODUCTION	BY	DATE	
APPROVAL	PROD	DATE	
RELEASED FOR PRODUCTION			
MFG. ENG.	DATE	DATE	10/1/71

REVISED CIRCUITRY
TO REFLECT 25-880
A US COPPER
W/S 2708 4-30-76 E02
FOI THICK AND W/1
WEAR NOT SPEC'D
W/S RC 2842-5-6-76 E03
ADD'D SHEET 2 & F02
W/S RC 2834-5-6-76 R04

ORIENT HEAT SINKS
WITH "TOP" MARKED
THIS SIDE



19 REF
SOLDER SIDE
5,10
ITEM 20 USED ON F00 ONLY
ITEM 21 USED ON F01 ONLY



11-179 F00 & F01

RUBBER STAMP POLARITY (+)
OF CAP. 4 PLACES

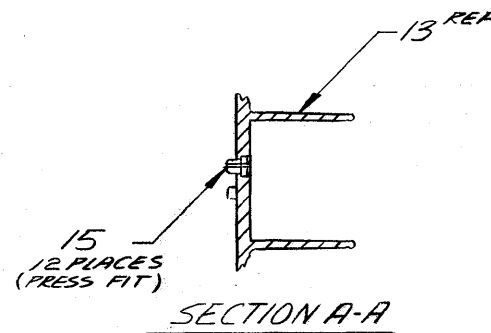
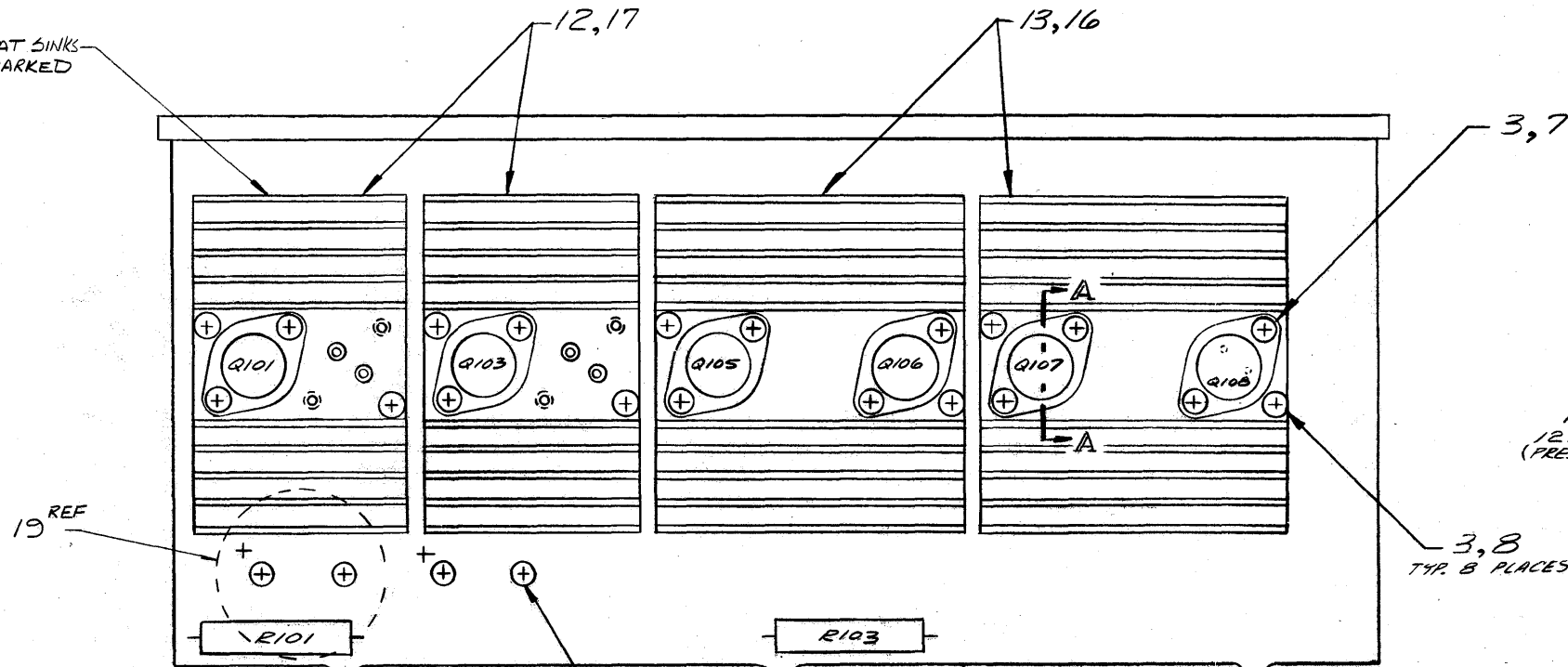
F02	SHEET 2
F01	SHEET 1
F00	SHEET 1
VARIATION	DESCRIPTION

THIS INFORMATION IS PROPRIETARY AND IS
PLIED BY INTERDATA FOR THE SOLE PURPOSE
MAINTAINING AND USING INTERDATA SUPPLY
EQUIPMENT AND SHALL NOT BE USED FOR

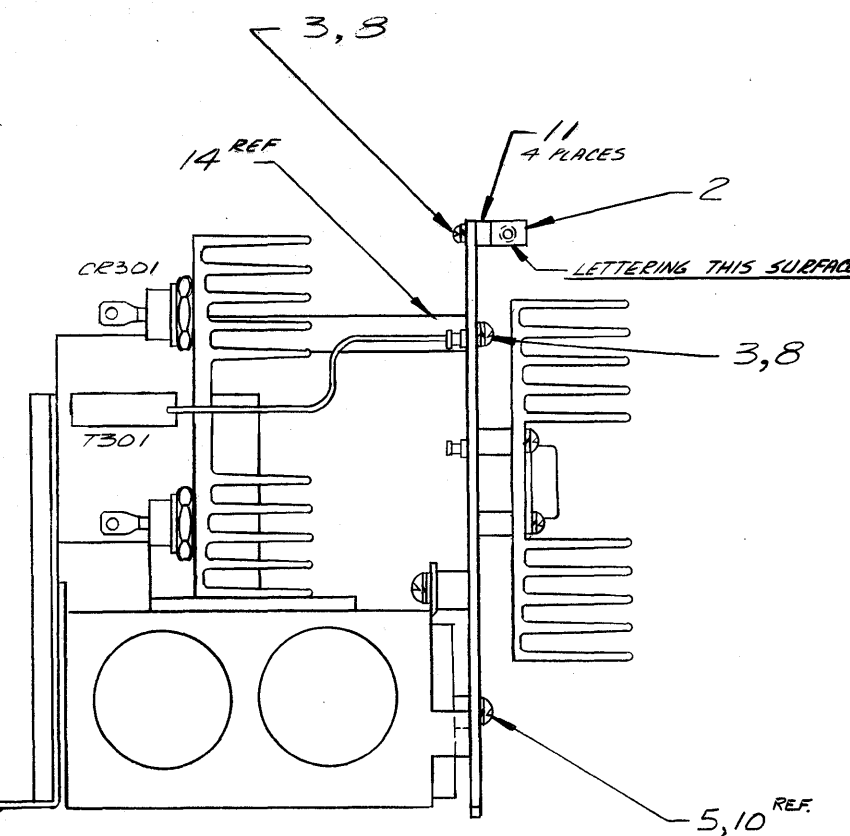
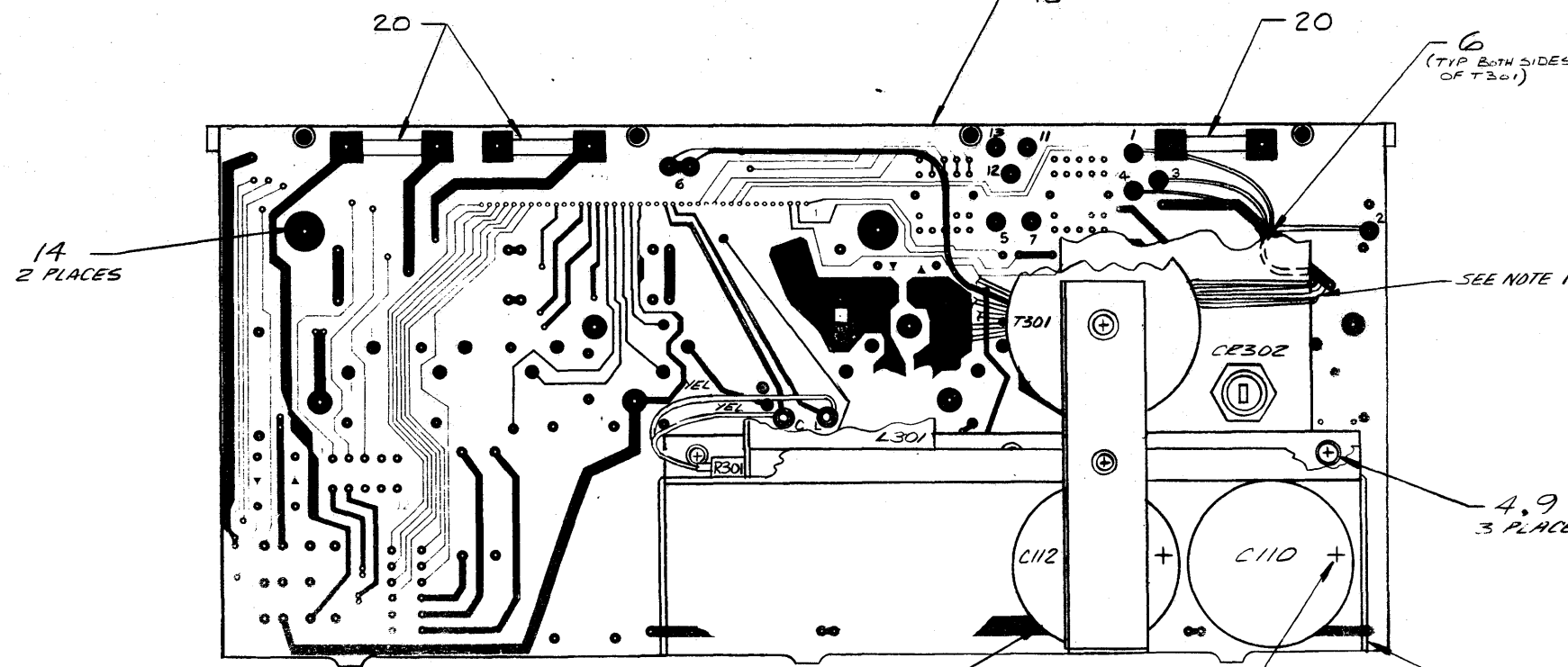
NOTES:
1. WIRES EXITING TRANSFORMER (T301) TO BE HAND
SOLDERED TO THEIR CORRESPONDING TURRET TERMINAL
ON P.C. BOARD.

NAME	TITLE	DATE	TITLE
V. P. P.	DRAFT	12-73	11-179
P. P. P.	CHK	1-74	
	APP		
	DES		

ORIENT HEAT SINKS WITH "TOP" MARKED THIS SIDE



SOLDER SIDE



LETTERING THIS SURFACE

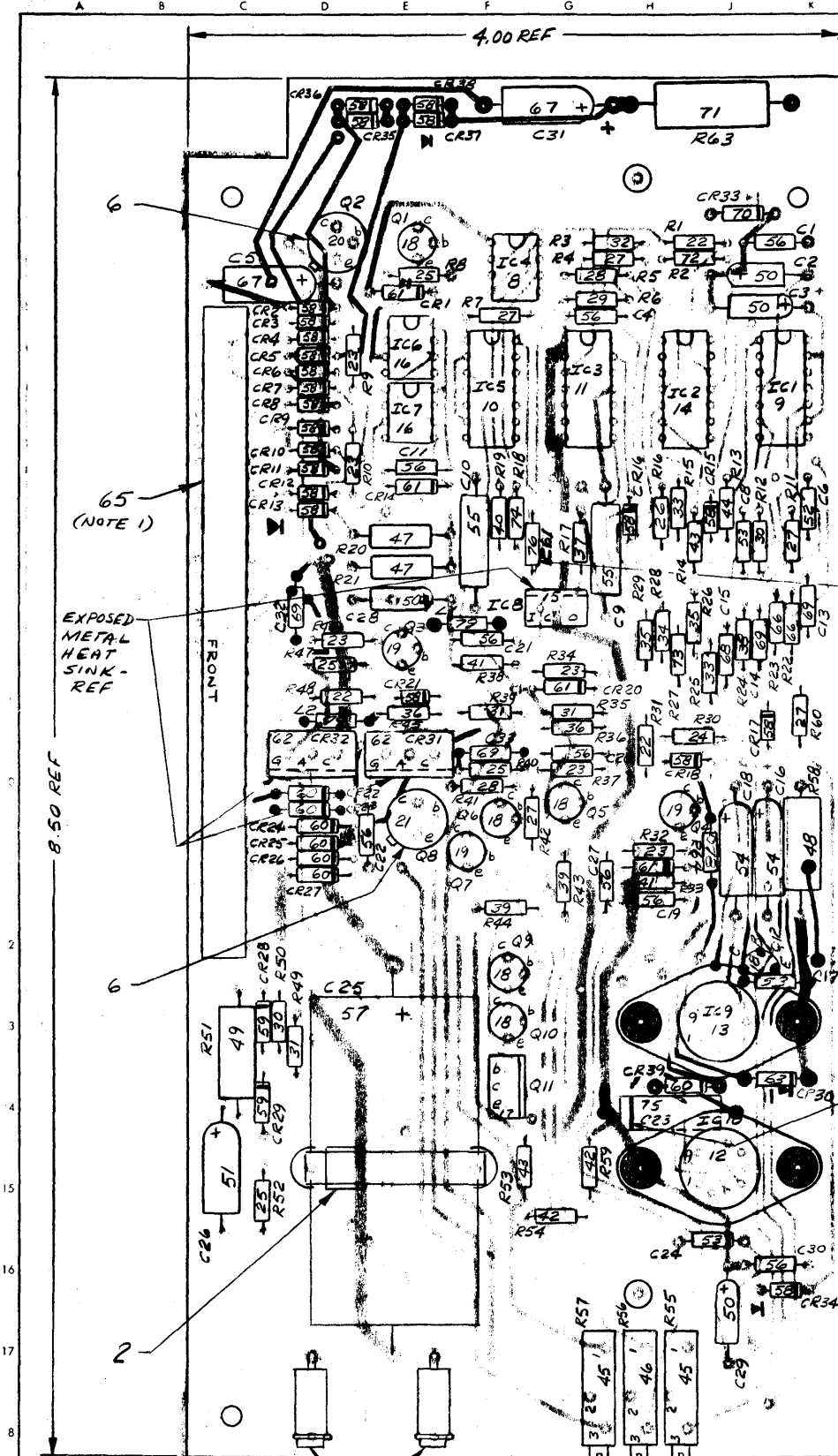
RUBBER STAMP POLARITY (+) OF CAP. 2 PLACES

11-179 F02

NOTES:
1. WIRES EXITING TRANSFORMER (T301) TO BE HAND SOLDERED TO THEIR CORRESPONDING TURRET TERMINAL ON P.C. BOARD.

NAME	TITLE	DATE	TITLE	SHEET OF
P. EDWARDS	DRAFT	4-21-76	SUB-ASSY	2
R. CERO	CHK		HI-VOLTAGE BOARD	
G. WELLY	ENGR		(25A POWER SUPPLY)	
P. A. BARRETT	DIR ENG		TASK NO. 030510V33	
R. ABITANTE	DIR ENG		11-179 ROAD	2-2

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REVISIONS	
DELETED - C7 WAS ITEM 52.	
CHANGED - REVERSED MOUNTING FOR IC9 & IC10; CHANGED VALUES FOR R1, R6, R22, R23, R50; C8, C3, C5, C13, C14, C15.	
ADDED R60, R63; C30, C31; CR33 THRU CR39.	
EXTENDED BOARD LENGTH TO AGREE WITH 35-481 R02.	
480L PROD ENG	5-12-75 R01
PRODUCTION	5-12-75
APPROVAL	7-10-75
REVISED C2.	
3051-22	7-1-75 R02
RELEASED FOR PRODUCTION	
MFG. ENG. C. DUNN	DATE 7/1/75
AREA G7, R61 & NOTE WERE NOT SPEC'D. AREA F6, R18 ITEM NO. WAS 25. AREA H19, C23 ITEM NO. WAS 56. DELETED C12, ITEM 56, AREA E7, UNDER C819. SEE VOICE R02 003 2/1/75.	
R64, L1, L2, D12 WERE NOT SPEC'D. REVISE COPPER.	
AREA D8, F10, C329, C33 RESP WERE NOT SPEC'D. REVISE COPPER.	
VALUE OF RW MAY CHANGE AT SUB-ASSY. TEST.	
AREA F6: ITEM 56 (R11) WAS NOT SPEC'D. AREA H6: R16 WAS SPEC'D AS ITEM 32.	
REVISED CIRCUITRY TO REFLECT NEW ART. WORK.	

NOTES: 1. CONTACTS CLOSEST TO EDGE OF BOARD TO BE BENT INWARD PRIOR TO SOLDERING.

SCALE - 2/1

DATE	BY	TITLE
5-5-75	J.F. FLEMING	ASSEMBLY, PRINTED CIRCUIT
7-10-75	R.F. CERO	CONTROL BOARD
7-10-75	E.B. CENTOFANTI	(POWER SUPPLY)
7-10-75	R.A. BARKER	Q.C.
7-10-75	L. PERE	MGR

DATE: 5-5-75

TITLE: ASSEMBLY, PRINTED CIRCUIT CONTROL BOARD (POWER SUPPLY)

Q3051

35-581 RCT03 1-1

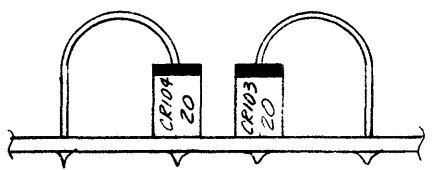
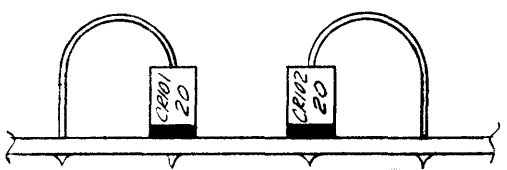
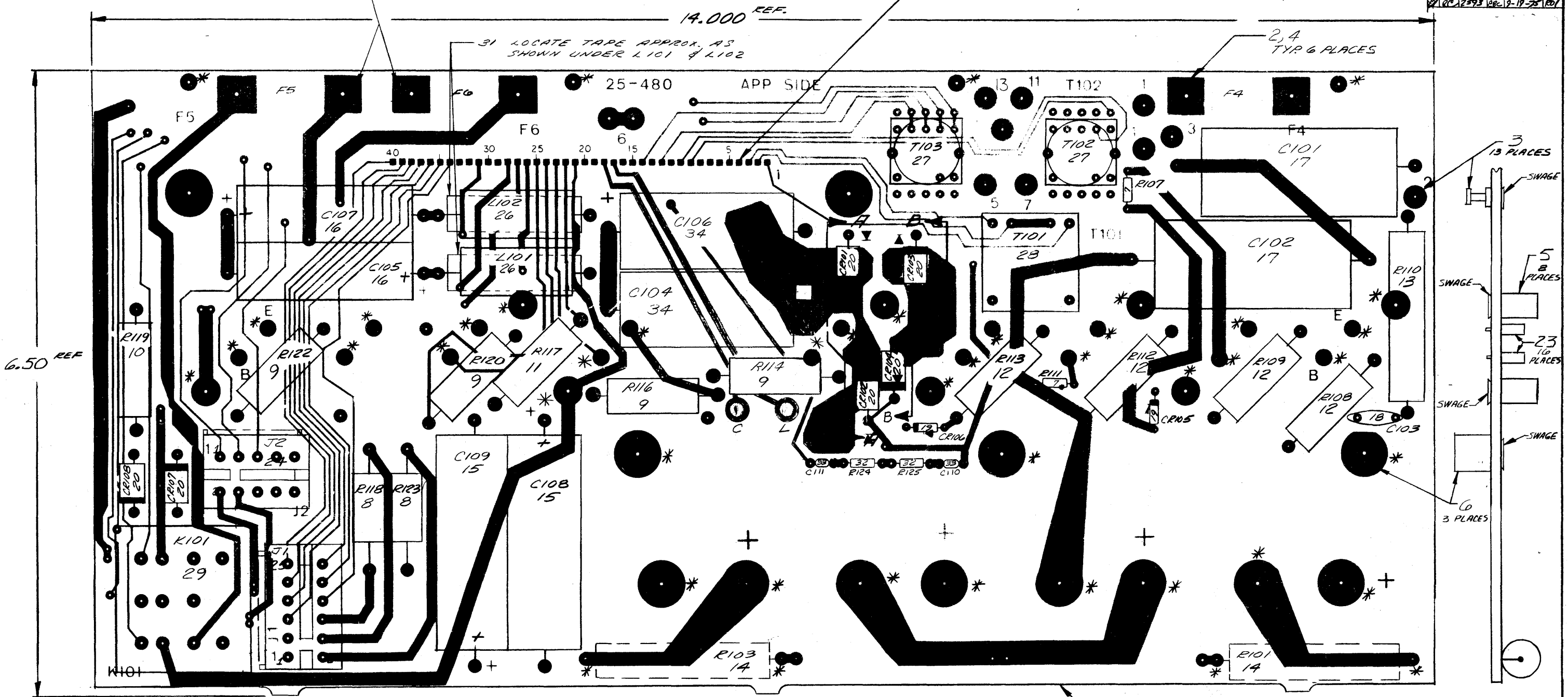
REVISED CIRCUITRY TO REFLECT 25-480 R03 COP. RELOCATED R114, R116, R117, C104 & C106 WERE ITEM 16. ADDED ITEM 9 (R114 ONLY) & C104 TO NOTE 2.
 MFG. ENG. DATE 7/1/75
 AREA BELOW CEM2, C11, R120, R122, & C10 WERE NOT SPEC'D. REVISED COOPER TO AGREE WITH R02 ARTWORK.
 27 APR 1975 19-19-75 R01

WHEN MOUNTING FUSE CLIPS, ITEM 4, NOTE POSITION OF END STOPS.

22
 TYP. 40 PLACES
 APP. SIDE

31 LOCATE TAPE APPROX. AS SHOWN UNDER L101 & L102

2, 4
 TYP. 6 PLACES



VIEW A-A (THIS TYPE OF MOUNTING FOR VARIATION ONLY) VIEW B-B (THIS TYPE OF MOUNTING FOR F02 VARIATION ONLY)

NOTES:
 1. MASK ALL HOLES MARKED WITH AN ASTERISK BEFORE WAVE SOLDERING.
 2. MOUNT & HAND SOLDER ITEMS 5, 6, 13, 14, 26 (L101 ONLY) 23, 29, 9 (R114 ONLY) & C104. AFTER WAVE SOLDERING.

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F03	SHEET 2		
F02	AS SHOWN WITH VIEW A-B & B-B		
F01	AS SHOWN LESS VIEW A-A & B-B		
VARIATION	DESCRIPTION		
NAME	TITLE	DATE	TITLE
V. PEZZI	DRAFT	2-7-75	PRT. CLT. ASSY
R. CERD	CHK	7-11-75	HI-VOLTAGE BOARD
E. CENTOFANTI	ENGR	7-10-75	
E.A. BARBER	DIR. ENG.	7-11-75	
L. PEZZI	DIR. ENG.	7-16-75	
			SHEET OF 1-2

WHEN MOUNTING FUSE CLIPS, ITEM 4,
NOTE POSITION OF END STOPS.

22
TYP. 40 PLACES
APP. SIDE

2, 4
TYP. 6 PLACES

14.000 REF.

31 LOCATE TAPE APPROX. AS
SHOWN UNDER L101 & L102

6.50 REF.

3
13 PLACES

5
8 PLACES

23
12 PLACES

6
3 PLACES

1 REF.

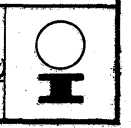
35, 36

35-582 F03

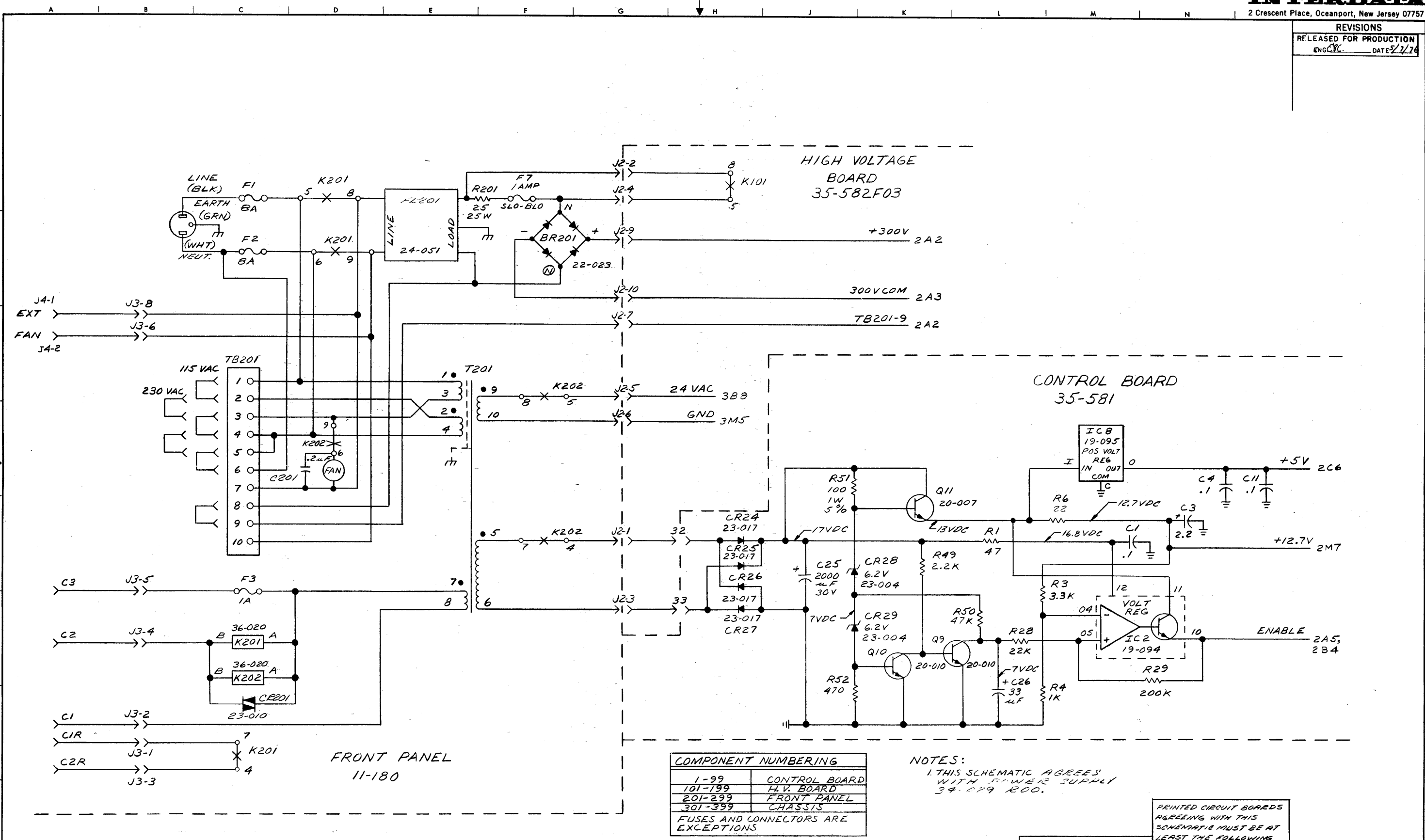
NOTES:
1. MASK ALL HOLES MARKED WITH AN ASTERISK BEFORE WAVE SOLDERING.
2. MOUNT & HAND SOLDER ITEMS 5, 6, 13, 11, 4 (L101 ONLY), 23, 29, 9 (R114 ONLY), 27, AND 39 (C104 ONLY). AFTER WAVE SOLDERING.

THIS INFORMATION IS PROPRIETARY AND IS SUPPLIED BY INTERDATA FOR THE SOLE PURPOSE OF MAINTAINING AND USING INTERDATA SUPPLIED EQUIPMENT AND SHALL NOT BE USED FOR ANY OTHER PURPOSE UNLESS SPECIFICALLY INDICATED.

NAME	TITLE	DATE	TITLE
	DRAFT		PRT. LET. ASSY
	CHK		HI-VOLTAGE BOARD
	ENGR		(25 AMP POWER SUPPLY)
			TASK NO. 03051E0N2525A
	DIR ENG		SHEET OF 2-2
			35-582 F03003



REVISIONS	
RELEASED FOR PRODUCTION	DATE 5/7/76
ENG CEC	



COMPONENT NUMBERING	
1-99	CONTROL BOARD
101-199	H.V. BOARD
201-299	FRONT PANEL
301-399	CHASSIS

FUSES AND CONNECTORS ARE EXCEPTIONS

NOTES:
1. THIS SCHEMATIC AGREES WITH POWER SUPPLY 34-079 R00.

PRINTED CIRCUIT BOARDS AGREEING WITH THIS SCHEMATIC MUST BE AT LEAST THE FOLLOWING REVISION LEVEL

CONTROL	35-581 R07
HI VOLT.	35-582F03

REV. LEVEL	1	2	3	4	5
SHEET					

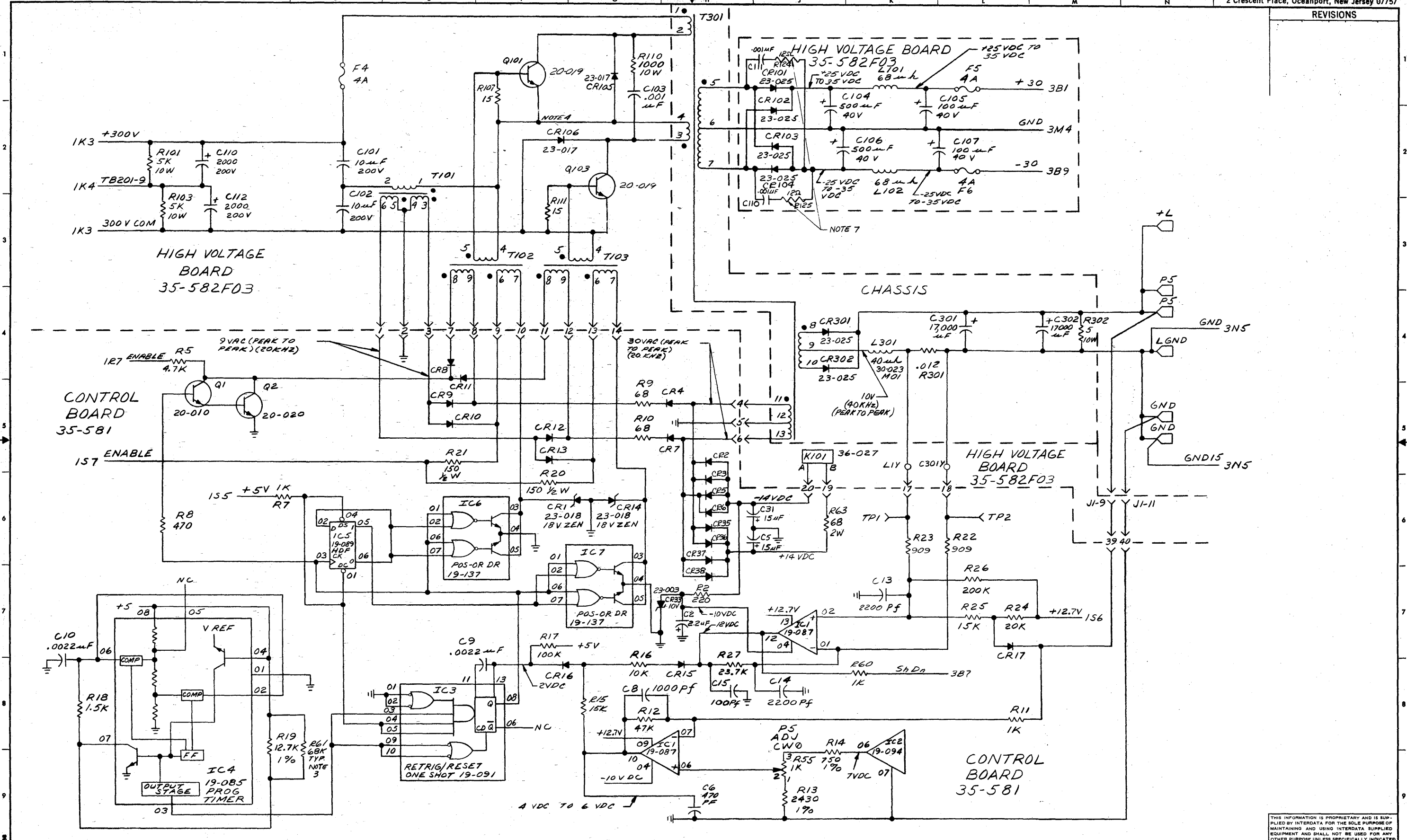
THE REVISION LEVEL OF THIS SHEET IS CONSIDERED TO BE THE REVISION LEVEL OF THE DOCUMENT.

THIS INFORMATION IS PROPRIETARY AND IS SUPPLIED BY INTERDATA FOR THE SOLE PURPOSE OF MAINTAINING AND USING INTERDATA SUPPLIED EQUIPMENT AND SHALL NOT BE USED FOR ANY OTHER PURPOSE UNLESS SPECIFICALLY INDICATED.

SCALE	NAME	TITLE	DATE	TITLE
	P. EDWARDS	DRAFT	5-7-76	FUNCTIONAL SCHEMATIC
	R. CERO	CHK	5-7-76	25 AMP
	E. CENTOANTI	ENGR	5-7-76	POWER SUPPLY
	R. A. BARKER	QC	5-7-76	
	JAMES	TEST	5-7-76	

DRAWING 44-231 2453B

REVISIONS



- NOTES:
1. ALL DIODES ARE 23-001 UNLESS OTHERWISE SPECIFIED.
 2. ALL RESISTORS ARE 1/4 WATT 5% UNLESS OTHERWISE SPECIFIED.

3. R61 VALUE SELECTED FOR 24 USEC PERIOD (±3% ±50C)
AT IC4 PIN 03.

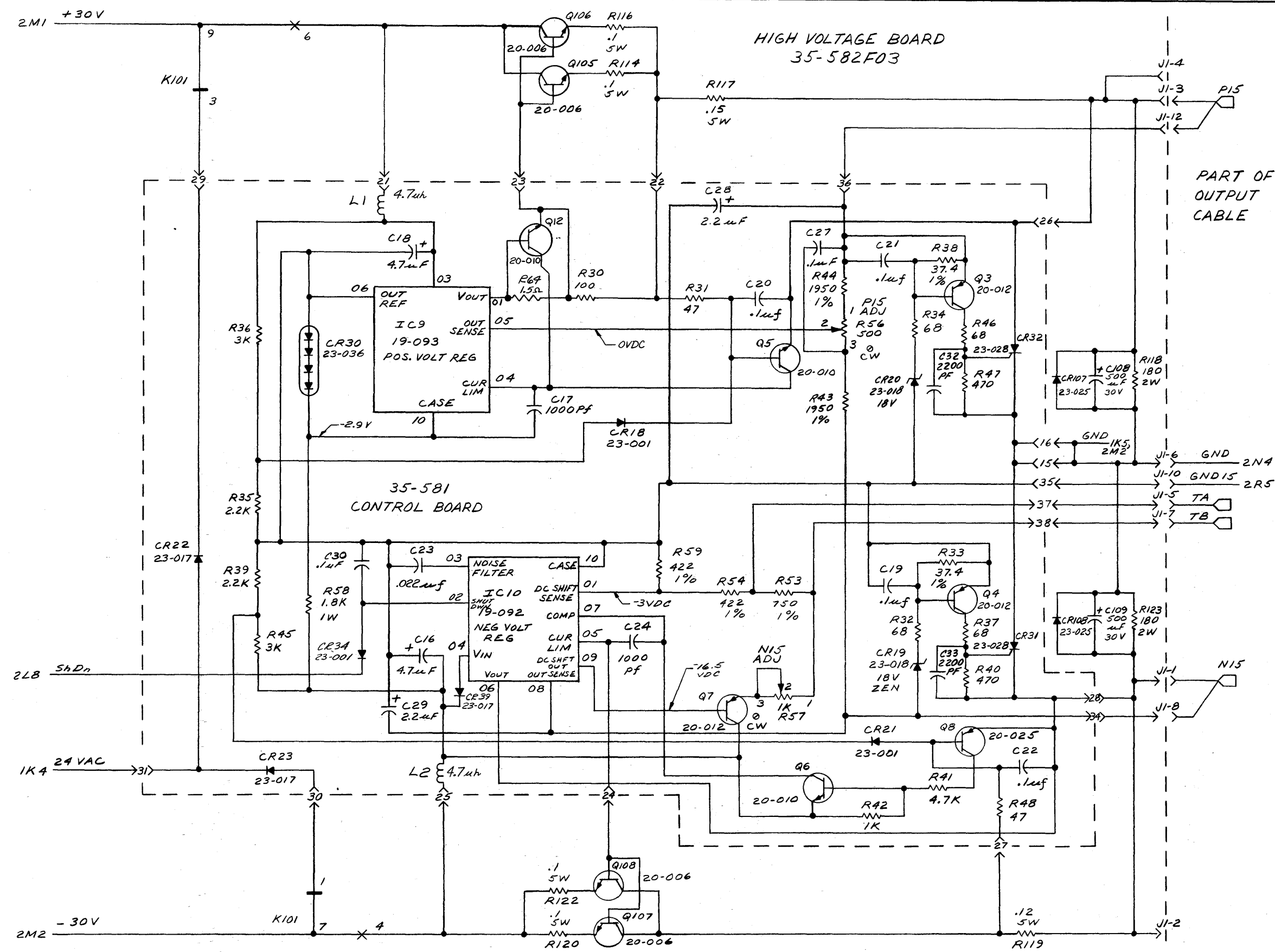
4. _____
5. UNLESS OTHERWISE SPECIFIED ALL RESISTOR VALUES ARE IN Ω. ALL CAPACITANCE VALUES ARE IN μF UNLESS OTHERWISE SPECIFIED.
6. UNLESS OTHERWISE SPECIFIED ALL RESISTOR VALUES ARE IN Ω. ALL CAPACITANCE VALUES ARE IN μF UNLESS OTHERWISE SPECIFIED.
7. 15.2 μΩ NETWORKS ACROSS CR103 & CR104 ARE COMBINED INTO ONE COMPONENT ON SOME POWER SUPPLIES.

SCALE-	NAME	TITLE	DATE
TOLERANCE: XX 2.00 X 2.02 X 2.05 ANGLES 2 10 UNLESS OTHERWISE SPECIFIED		DRAFT	
		CHK	
		ENGR	
TITLE FUNCTIONAL SCHEMATIC			
25 AMP POWER SUPPLY			
TAS: 030518/2084 SHEET OF 2-3			
DWN: 34-029 DCB			

DRAWING 44-251 24538

REVISIONS

HIGH VOLTAGE BOARD
35-582F03



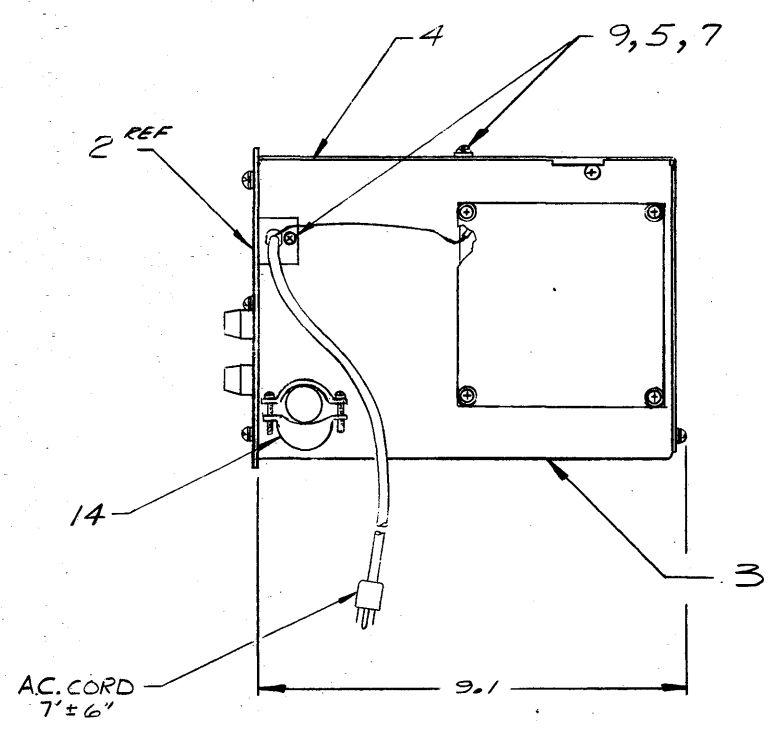
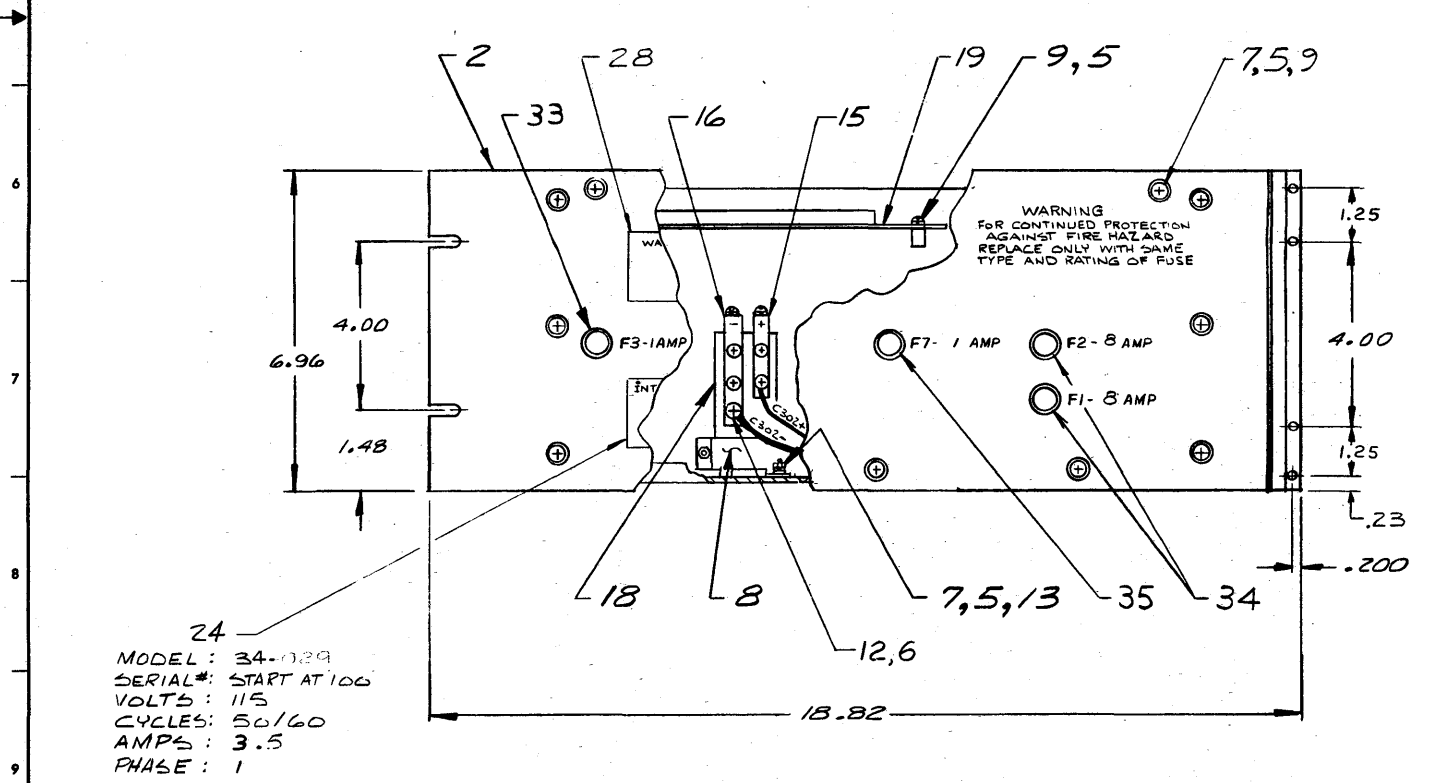
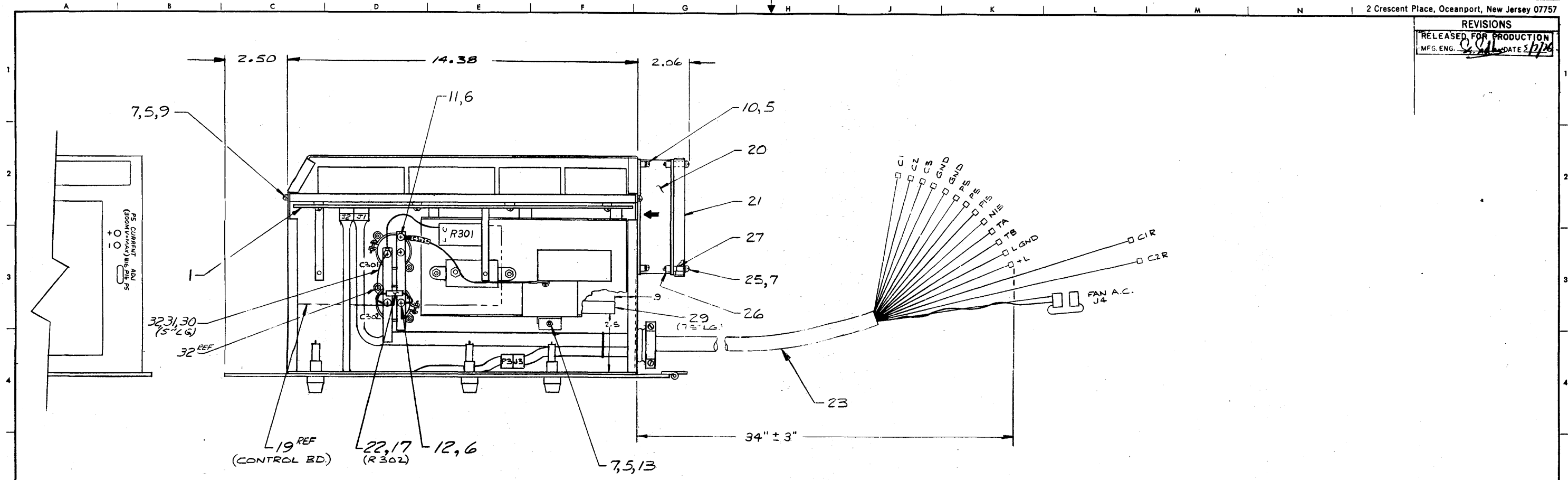
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SCALE-	NAME	TITLE	DATE
XXX 2.000		DRAFT	
XX 2.00		CHK	
X 2.00		ENGR	
UNLESS OTHERWISE SPECIFIED			

TITLE FUNCTIONAL SCHEMATIC
25 AMP
POWER SUPPLY
TASK 03051E01200A SHEET OF
NO. 34-029 DDB 3-3

REVISIONS	
RELEASED FOR PRODUCTION	
MFG. ENG. <i>S. Messina</i>	DATE <i>5/7/76</i>



MODEL: 34-029
SERIAL#: START AT 100
VOLTS: 115
CYCLES: 50/60
AMPS: 3.5
PHASE: 1

NOTES:
1. ALL DIMENSIONS ARE SHOWN IN INCHES FOR REFERENCE ONLY.

SCALE	NAME	TITLE	DATE	TITLE
SCALE-1:2	P EDWARDS	DRAFT	4-21-76	POWER SUPPLY 25 AMP
TOLERANCE:	R. CERO	CHK	5-7-76	
XXX ± .005	E. GENTOFONTI	ENGR	5-7-76	
XX ± .02	E. BYDLINSKI	Q.C.	5-7-76	
X ± .03	S. MESSINA	MGR	5-7-76	
ANGLES ± 10° UNLESS OTHERWISE SPECIFIED				TASK NO. 03073 ECH 234 DWN NO. 34-029 D03

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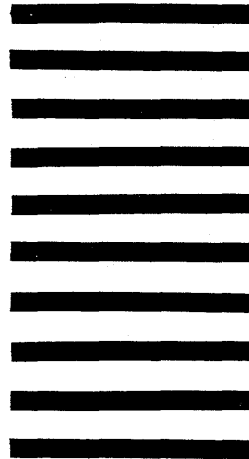
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