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DSP TECHNOLOGY

OPTIMA-860

CAMAC POWERED CRATE

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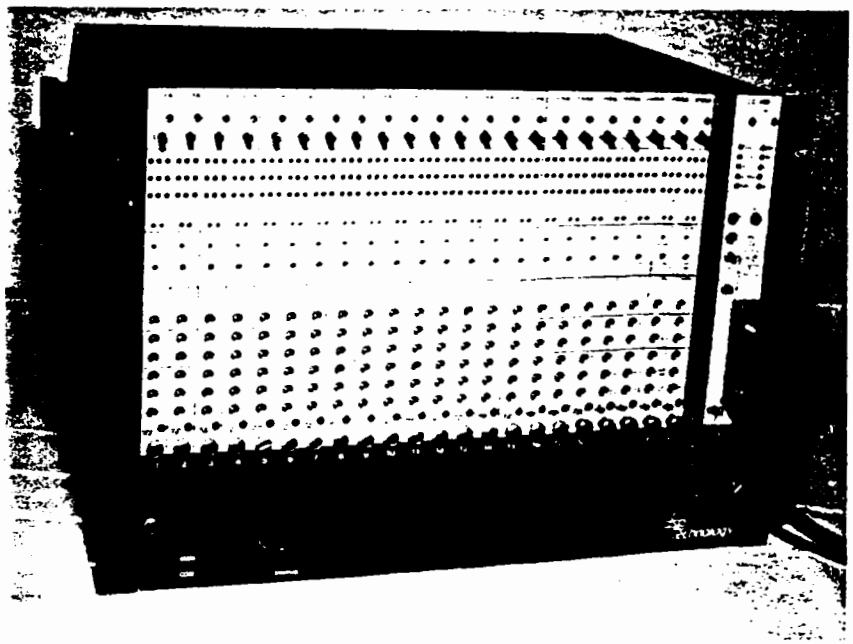
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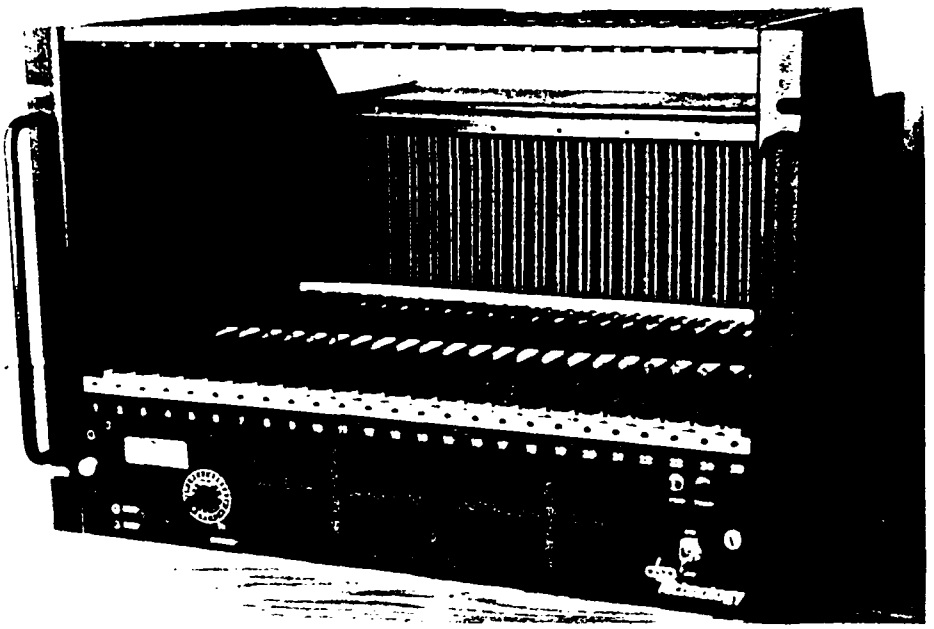
INSTRUMENT MODULE HOUSINGS

Model Optima-860 25 Slot, 60A, IEEE-583, Rack Mount Housing
Model Maxima-885 25 Slot, 85A, IEEE-583, Rack Mount Housing



FEATURES

- 20 Year MTBF based on installation history
- Reliable, low ripple and low noise linear power supply technology.
- Maximum protection for all power supply systems
  - SCR overvoltage protection
  - Overcurrent short circuit protection
  - Dual thermal switch overheating protection
- Reinforced steel crate construction with long life non-galling cast aluminum, electroless nickel-plated guide rails.
- Modular power supply with integral support shelf and quick release mechanism for no-tool power supply removal.
- 3 fan - 400 CFM (optional 6 fan 800 CFM) bottom mount, slide out blower tray for fast easy removal uses venturi-type, ball bearing fans to provide maximum module ventilation.
- Exceeds all CAMAC (IEEE-583-1982) and ESONE report, EUR 4100e, Type CP-1 power supply requirements for:
  - Regulation
  - Ripple and Noise
  - Long-Term Stability



DESCRIPTION

The DSPT Optima-860 and Maxima-885 are designed for long-term trouble free use. The reinforced steel crate and aluminum card guides provide system protection from shock and vibration and easy replacement of the plug-in modules. The modular design of the crate allows easy access to the fan and power supply assemblies for fast removal. Both sub-assemblies can be removed without disturbing the plug-in module cabling to reduce system maintenance down time.

Over 17 years of CAMAC crate manufacturing has given DSPT the know-how to manufacture the highest quality crates available. Rigorous quality assurance procedures and standards are followed throughout the production cycle, including a 48 hour burn-in and final test under load conditions. Precision-cast and machined full depth, self-centering module-insertion guide rails insure a long life and smooth alignment of the CAMAC modules with the Dataway connectors.

System safety is assured by over voltage, current and thermal protection on all power supplies. No damage results to the power supply if there is a continuous short circuit. Thermal cut-off switches protect the system whenever the internal temperature exceeds a safe limit. Front panel indicaters show at-a-glance the condition of the fuse and thermal protections.

Stable thermal conditions are maintained with three low-vibration, low-noise, venturi-type, ball-bearing fans rated at 134 CFM each. For high temperature environments an optional six fan unit can be easily installed to take maximum advantage of the large air intake openings on the front panel and bottom cover to provide clean cooling air through the high efficiency dust filters.

Front panel metering using an LCD display provides easy confirmation of ± 6V and ± 24V supply voltages and currents used within the system. Test jacks are provided to allow continuous monitering of all supply voltages. Front panel mounting provides easy access to the power switch. All of the features outlined above have made DSPT's crates the industry standard for CAMAC design excellence.

SPECIFICATIONS - INSTRUMENT MODULE HOUSING

INPUT: 115 VAC +10%/-12%, 50-60 Hz nominal (standard), (optional 100 V ac or 200 V ac)

OUTPUTS

		Maximum Current	
		860	885
± 6V	each	50 A	
	combined	60 A	85 A
± 12 V	each	3 A	
± 24 V	each	6 A	
± 12V ± 24V	combined	9 A	

	Maximum Power	
	@ 25° C	@ 50° C
+ 6 V, ± 12 V*, 24 V combined	400 W	375 W
– 6 V, - 24 V combined	400 W	375 W
All outputs combined	500 W	450 W

* treated as 24 V for power calculations

Overvoltage Protection: All output voltages are protected by silicon control rectifiers (SCR) that are activated by ac line transients, large load-current changes, or internal circuit failure.

Overcurrent and Short Circuit Protection: A fold-back type current-limiting circuit reduces output current to a low-safe level if either condition occurs. Removal of the failure condition will result in automatic reset of the circuit.

Thermal Protection: Both heat sinks have two thermal switches each; one provides front panel indication of overload and the other disconnects main power from the system.

Metering: ± 6V and ± 24V supply voltages and currents, switch selectable metering to an LCD display.

Test Jacks: Front panel mounted for all output voltages.

Line and Load Regulation: ± 0.2% for ± 6V and ± 24 V outputs, ± 2.0% for ± 12 V outputs.

Ripple and Noise: 15 mV peak-to-peak, on ± 6 V and ± 24 V outputs, 50 mV peak-to-peak on ±12 V outputs. 50 Mhz bandwidth

Transient Recovery: 50 µsec typical.

Long-term Stabililty: Less than 0.2% for 24 hr. after 1 hr. warm-up (constant ambient temperature).

Temperature Coefficient: 0.02% per degree centigrade maximum.

MECHANICAL

Rackmount:
12.3 H x 19.0" W x 21.6" D*

*Depth behind front panel. 22.4" overall

WEIGHT

89 lbs. Shippihg weight 102 lbs.

ENVIRONMENTAL:

Operating Temperature: 0.0° C to 50° C (32° F to 122° F) at less than 90% relative humidity, non-condensing.

Storage Temperature: -10.0° C to 70° C (14° F to 158° F) at less than 90% relative humidity, non-condensing.

SPECIFICATIONS - INSTRUMENT MODULE HOUSING

OPTIONS:

1) NIM holes - Jacking screw holes for NIM modules in both upper and lower guide grills.
2) Viking blocks - set of 12 blocks to accommodate 36-pin Viking card-edge connectors (required with DSP's E-200 series ADC modules).
3) NIM holes and Viking blocks.
4) 230 V ac, 50 Hz input power
5) 100 V ac, 50 Hz input power
6) Six fans.
7) RM-800 separately rack mountable power supply.
8) Status monitor bit: optional monitoring of all outputs and thermal overloads. Provides single relay contact closure.
9) Triangle Air Deflector and Intake Duct - for convenient benchtop mounting.

ORDERING INFORMATION (Part Number)

8 X X X X X X X

- Status Bit (0=No Status Bit, 1=Status Bit)
- Fan Tray (0=No Fan Tray, 1=3 Fans, 2=6 Fans)
- Voltage Monitoring Option (0=No Option, 1=Volt Monitoring Connector).
- Power Supply Line Voltage (0=No Power Supply, 1=100 VAC, 2=115 VAC, 3=220 VAC)
- Power Supply Type (0=None, 1=PS860, 2=PS885, 3=RM800)
- Card Rack (0= None, 1=Standard CAMAC, 2=NIM, 3=Viking Block, 4=Viking Block and NIM)
- Crate Style (0=None, 1=Optima or Maxima, 2 = SLACDRC)

FEATURES:

* Positive-support, quick-disconnect power supply
* Status-bit option
* Maximum air flow with venturi-type ball-bearing fans
* Partitioned fan tray for baffling air flow properly
* Easily replaced high-adhesion dust filters
* Separate cooling fan for power supply
* Cast-precision-machined, non-galling guides
* Self-centering module-insertion guides
* Full-depth-grill casting
* Low-vibration, low-noise operation
* Metering for voltage and current
* Overvoltage and current limiting

GENERAL DESCRIPTION

The Optima-860 CAMAC (IEEE-583, Computer Automated Measurement and Control) powered crate is an assembly made up of three basic units: the crate, the power supply and the blower drawer. Unless specified otherwise in this manual, physical and electrical specifications of the Optima-860 meet or exceed the requirements of a Type CP-1 power supply and ESONE report EUR 4100e.

The crate assembly is constructed of steel and precision cast-aluminum upper and lower racks for long trouble-free use. Only the highest quality components are employed throughout for high operational reliability. The power supply's modular construction assures ease of maintenance and minimum downtime.

The precision construction of the crate allows CAMAC modules to be inserted and removed while the power supply is on, there by minimizing the downtime required to replace defective modules.

All outputs of the power supply are protected from overvoltage and overcurrent. No damage to the power supply results if there is a continuous short circuit. A thermal warning and a thermal cut off switch protect the power supply when ever the internal temperature exceeds a safe limit.

Standard 115 Vac or option 100 or 230 Vac operation and option voltage monitor provides a status bit when ever any output voltage deviates from the normal output level or if there is a thermal overload.

TECHNICAL SPECIFICATIONS

Mechanical:

* Width: 22.4 in.
* Height: 12.3 in.
* Depth: 21.6 in. behind front panel
* Weight: 88 lb

Electrical:

* Input:
  115V + 10%/- 12% Vac, 60 Hz, standard
  230V + 10%/- 12% Vac, 47 Hz to 64 Hz, optional
  100V + 10%/- 12% Vac, 47 Hz to 64 Hz, optional

* Output voltage and current:
  ±6V at 0 A to 50 A, current shared to 60 A total
  ±24V at 0 A to 6 A, current shared to 9 A total
  ±12V at 0 A to 3 A, current shared to 24V output

* Output power: 550 W at 25° C derated to 500 W at 50° C

NOTE

OUTPUT POWER is the sum of two groups of output voltages multiplied by their respective load currents. The sum of the two groups MUST NOT EXCEED 550 W at 25° C and must be derated to 500 W at 50° C.

Group 1 outputs: +6V, +24V and ±12V combined output power must not exceed 400 W at 25° C. The ±12V output currents are considered +24V outputs for power calculations.

Group 2 outputs: -6V and -24V combined output power must not exceed 400 W at 25°C and 375 W at 50° C.

* Line and load regulation:
  ±0.2% for ±6V and ±24V outputs
  2.0% for ±12V output

* Ripple and noise: 10 mV peak to peak, 50 MHz bandwidth

* Transient recovery: 50 microseconds, typical

* Long-term stability: less than 0.2% for 24 hr after 1 hr warm up (constant ambient temperature)

* Temperature coefficient: 0.02%/° C, maximum

* Remote sensing: ±6V, ±24V outputs

* Circuit protection: fuses on pass transistors and on main ac power lines

* Overload protection: overload and overcurrent protection on all outputs

* Thermal protection: both heat sinks sensed for overtemperature; thermal overload indicator on front panel of blower; overtemperature sensor on heat sinks to cut off power

* Metering: $\pm$6V and $\pm$24V and current
  $\pm$12V and current

* Test jacks: all output voltages

* Status-bit monitor: optional monitoring of all outputs and thermal overload overtemperature; and provides relay contact closure when limits are exceeded

* Blower air flow: over 300 ft^3/min with unloaded crate

Environmental:

* Operating temperature: 0° C to 50° C (32° F to 122° F at less than 90% relative humidity

OPERATING INSTRUCTIONS

Installation:

Before the crate is mounted in the rack, the power supply must first be removed. After the crate is mounted, the power supply can be reinstalled as shown in drawing No. 106816, Power Supply Removal Diagram. The ac-line cord must be connected to 115 Vac, 60 Hz.

Turn-On:

The power supply must not be turned on until Dataway PG-26 has been connected to the power supply as shown in drawing No. 106816. Although no damage results from turning on the power prematurely, one or more regulators can go into overvoltage. When the power is turned on, the amber light on the front panel of the blower comes on, and the front panel meter indicates the proper output voltages. If any output voltage reads low, it is necessary to check the meter for current. If there is current flow, the related output is probably in overvoltage. If so, the power must be shut off for about 10 seconds. If the condition persists when the power is turned on again, the fuse(s) should be checked for that output voltage. Fuses are located under the cover at the rear of the power supply (see drawing No. 106812). A blown fuse, which usually indicates an internal circuit failure, should not be replaced without first checking pass transistors. The maximum power is 550 W. Exceeding this maximum load can cause damage to power supply.

NOTE

OUTPUT POWER is the sum of two groups of output voltages multiplied by their respective load currents. The sum of the two groups MUST NOT EXCEED 550 W at 25° C and must be derated to 500 W at 50° C.

Group 1 outputs: +6V, +24V and $\pm$12V combined output power must not exceed 400 W at 25° C. The $\pm$12V output current are considered +24V outputs for power calculations.

Group 2 outputs: -6V and -24V combined output power must not exceed 400 W at 25° C and 375 W at 50° C.

Overvoltage:

All output voltages are protected by overvoltage circuits that can be activated by ac line transients, large load current changes, or internal circuit failure. When an overvoltage circuit is activated, a silicon control rectifier (SCR) is turned on, placing a short circuit across the load. The overcurrent protection circuits limit the current to a safe value. The ac power must be turned off for approximately 10 seconds to deactivate the overvoltage circuit.

Overcurrent Short Circuit:

The outputs of the power supply are protected against overcurrent and short circuits by fold-back-type current-limiting circuits. A load beyond the current trip point causes the output current to be reduced to a low safe value. The current trip level for each output is set approximately 10% over the maximum current. On the $\pm$6V outputs, the current trip level must NEVER be set higher than 10% over the maximum current; otherwise, the power supply is damaged.

Voltage Adjustment:

Voltage adjustment potentiometers for the $\pm$6V and $\pm$24V outputs are located at the rear of the power supply (see drawing No. 106812, Major Feature Callout). Each potentiometer allows a minimum adjustment of 2%. The output voltage should be measured at the Dataway when making voltage adjustments.

Blower Front-Panel Test Jacks:

Adjacent to the meter on the front panel of the blower are test jacks for measuring the approximate voltage of the Dataway. The test jacks must not be used to measure the power supply regulation or ripple.

Thermal Overload:

Four thermal switches incorporated in the design of the power supply protect it from overloads. Two of these thermal switches are mounted on each of the two heat sinks.

If either heat sink overheats, one of its thermal switches disconnects the main power. One thermal switch on each heat sink turns on the thermal overload indicator on the front panel of the blower if excessive power is being drawn from the heat sink or if the heatsink overheats from inadequate air flow or too high an ambient temperature. The other thermal switch disconnects the main power if a maximum safe heat sink is reached.

CIRCUIT DESCRIPTION

General:

The different sections of the Optima-860 are shown in drawing No. 106808, PCS 800 Series Block Diagram. The blower section contains the voltage and current monitoring circuitry and meter, the overtemperature indicator, the output test jacks, the ac power on/off switch and the status-bit option. The crate houses the blower and contains the Dataway. The power supply contains all the circuitry and components for the regulated output voltages. Drawing No. 106812 shows the location of all controls indicators and mechanical features.

Blower Section:

The blower section is described in Drawing No. 106810, Simplified Blower Block Diagram, Chassis Drawing No. 280100, Schematic Drawing is No. A-OFDB-SD, Switch Board Assembly Drawing No. A-OFDB-03-AD, Switch Board Schematic is Drawing No. A-OFDB-03-SD, Display Board Assembly Drawing No. A-OFDB-02-AD, Display Board Schematic Drawing No. A-OFDB-02-SD. The blower schematic drawings show the interconnection between the power supply, the blower and the blower fans. It also shows the interconnections to the metering printed-circuit boards.

The metering circuitry consists of two printed-circuit boards; the Display Board (A-OFDB-02) and the Switch Board (A-OFDB-03). The Reference Voltage for the Display Board has been pre-set and sealed thru R1 at the factory. The Switch Board can be re-calibrated in the following manner. Rotate switch to +24V, place a DVM across the test jacks located on the front panel of the blower. Adjust R7 on Switch Board for a LCD reading equal to that of the DVM. Rotate switch to +12V and adjust R2 for a LCD reading equal to that of the DVM. Adjust the following metered voltages in the same manner, R3 is +6V, R4 is -6V, R5 is -12V and R6 is -24V.

Metering adjustments of current reading is done thru R8 for +24I, R9 for +12I, R10 for +6I, R11 for -6I, R12 for -12I and R13 for -24I. Using a Dynamic Load to simulate half of the full load current rating, of the prospective supply voltage. Adjust the corresponding pot for an LCD reading of that value (example: +6V is rated for 50 Amps, set Dynamic Load for 25 Amps).

****CAUTION****

Disconnecting the power Supply from the Dataway opens the "V-sense" lines used to regulates the outputs of the supply. DO NOT OPERATE THE SUPPLY IN THIS CONDITION...Jumper all "V-sense" lines to their respective voltage and all "sense return" lines to common before power-up.

Do not use Front Panel Test Jacks for drawing current from the supply voltages.

Known resistive load modules could be used in place of the Dynamic Load, taking into account that the $\pm$24V and $\pm$12V currents are shared. Example drawing 1 Amp on +12V and 1Amp on +24V will show 2 Amps on the +24I Scale. Do Not use Load Modules that will draw more than 3 Amps per pin contact into the dataway.

If blower is equipped with the Status Bit Option use the dataway for DVM monitoring of the supply voltages when setting the voltage adjustment pots on the Switch Board for the LCD reading. Also note that the +24I position will have about 60 mAmps of current showing on it. Meter reading accuracy should be within + or - 1% after calibration.

The status-bit option shown on drawing No. 106565, Schematic Status Bit Option; and drawing No. 106567, Assembly PCB Status Bit Option. All voltages $\pm$6, $\pm$12 and $\pm$24 are added in precesion resistor networks, and the results are compared to a precision voltage references. Two differential comparators monitor plus and minus output voltages. The output of the comparator drives the output relay through a relay driver circuit using Q1 & Q2. Relay K1 is energized when a fault is present. R11 and R16 provide plus and minus voltage sensitivities, respectively and are factory set to cause the status bit change when any input voltage changes more than $\pm$1.5% from the nominal.

All adjustments are factory set to be within acceptable limits. These adjustments are typically good for at least one year. Yearly calibration verification is recommended to maintain the system within acceptable limits.

Power Supply:

Drawing No. BD106960, Block Diagram PS200/800 Power Supply, shows the basic elements of the power supply and their relation to the crate or the blower. The two heat sinks and associated regulator printed-circuit board are subassemblies that can be removed easily.

Drawing No. SD106961, Schematic Chassis Wiring PS200/800 Power Supply, shows the interconnections for the blower, the crate, the power supply transformer, the rectifiers, the filters with associated fusing and the fan circuitry. The drawing also shows connections to the removable heat sinks assemblies. The outputs of the transformer T1 feed full-wave rectifiers with capacitor filtering. Drawing No. MD106947, Major Component Diagram PS200/800, shows the location of all chassis components and subassemblies.

Heat-Sink Assemblies:

There are two heat sink assemblies: the positive heat sink assembly containing all the circuitry for +6 V, +24V and $\pm$12V outputs; and the negative heat sink assembly containing all the circuitry for -6V and -24V outputs. Both heat sinks which plug into the chassis wiring, are readily accessible for maintenance. The negative heat sink assembly can be extended easily out of the chassis to allow for hot testing on both sides of the assembly.

Positive Heat-Sink Assembly:

Drawing No. 106962, Assembly Positive Heat Sink Power Supply PS200/800, shows the location of all the components in the assembly. Drawing No. SD106963, Schematic Regulator shows the entire circuitry of the heat sink assembly. The heat sink assembly contains the pass-transistor circuitry, the driver, the regulator, the overvoltage and overcurrent circuitry for the +6V, +24V and $\pm$12V outputs.

Each regulator circuit utilizes a precision voltage regulator integrated circuit (IC) 723, which includes a stable voltage reference and overcurrent circuitry. A voltage divider across the output of each supply feed the precision regulator IC. The output of the regulator IC is connected to a series of driver transistors, which in turn drive the series pass transistor (no drive transistor is required in the $\pm$12V outputs). The precision regulator for the +6V output derives its supply voltage from the +24V in order to satisfy the minimum 12V input-to-output of the regulator IC.

Each pass transistor and power driver is individually fused. These fuses are located along the outer edge of the regulator printed-circuit board for easy access and removal. The fuses are used to protect the power supply in case of pass transistor or circuit failure. If a fuse blows, a new fuse must not be inserted until after the pass transistor has been checked. Failure to do so can lead to additional circuit failure.

The positive output overcurrent circuits utilize the precision regulator overcurrent capability. The load current is sensed by series low-value resistors whose output voltage turns on the overcurrent circuit of the regulator IC when the maximum load current is reached. Current foldback limiting is achieved in the positive regulators by R11 and R13, providing a positive feedback current to pin 2 of the regulator IC. The current limit trip point present at the factory and should not need adjusting.

The current limiting circuitry of the -12V output incorporates a separate transistor Q15 that senses the voltage across the current sense resistor. When turned on because of an overcurrent, the output of Q15 shorts out the base of another pass transistor Q14. Positive feedback is provided through R75 to the current limit sensing transistor Q15.

Both the +6V and the +24V outputs contain overvoltage protection sensors, which turn on the SCR crowbars if an overvoltage occurs. The +6V and the +24V outputs are set to crowbar approximately 7V and 26V, respectively. The ±12V outputs utilize the overvoltage circuits of the ±24V outputs by coupling through the voltage dropping zener diodes CR1 and CR3. Once an SCR has been turned on, the power supply must be off for approximately 10 seconds to reset the SCR.

Both the +6V and the +24V output driver circuits incorporate frequency-shaping networks R67-C18 and R68-C19 to achieve high degree of stability.

Negative Heat-Sink Assembly:

The negative heat sink assembly is similar to the positive heat sink assembly and also plugs into the chassis wiring (see drawing 106965, Assembly Neg Heat Sink, and drawing No. SD106966, Schematic Regulator -6 and -24Vdc). The heat sink assembly contains the pass transistors, the drivers, the regulators, and the overvoltage and overcurrent circuitry for the -6V and -24V outputs.

Because of the negative output, the precision voltage regulator U1 and U3 are operated in the inverted mode. Except for the current trip circuitry, the negative and the positive circuits are essentially the same. Where as the positive circuits utilize the internal overcurrent circuit of the regulator IC, the negative circuits incorporate external current-limiting transistors Q8 and Q13. When the voltage across the sense resistor R11 or R32 and R33 exceeds the bias required to turn on Q8 or Q13, the base-to-emitter voltage of the drive transistor Q7 and Q12 is reduced, causing the output voltage to fall almost to zero volts. Each current trip circuit has current foldback limiting by biasing Q8 and Q13 to a more negative source. The current-limiting trip point is preset at the factory and should not require field adjustment.

CAMAC Crate:

The crate houses the removable blower tray supports the power supply and incorporates the type of Dataway bus developed by the University of California Lawrence Berkeley Laboratory. Precision cast-and-machined guide rails insure the power alignment of CAMAC modules with their Dataway connectors. Drawing No. 106679, Dataway Wiring , shows the power buses and power-and sense wiring to and from the Dataway.

SERVICE AND MAINTEMANCE

The modular design of the power supply (see drawing No. MD106947) makes manufacturing, repair and maintenance easy to do.

If the user does not have personnel qualified to handle repairs, the defective assembly can be removed and returned to the factory. A replacement assembly usually can be shipped within 24 hr.

Heat-Sink Assemblies:

The two heat sinks are plug-in assemblies that can be easily removed for replacement or repair (see regulator schematics drawing No. SD106963 or drawing No. SD106966).

The positive heat sink assembly is adjacent to the top of the power supply and all of its components are easily accessible (see drawing No. MD106947). All IC's and low powered transistors are mounted in sockets. If the heat sink has to be removed, the cables are first disconnected from the printed-circuit board and the thermal switches, then four mounting screws holding the heat sink to the base plate can be

removed. Two guide pins align the heat sink hole to the mounting-plate holes, making it easy to reinstall the positive heat sink.

The negative heat sink is located below the positive heat sink. Two guide pins extend from the mounting plate through the heat sink, allowing the negative heat sink to be pulled out for live troubleshooting. In the extended position, all components are readily accessible. As with the positive heat sink, all integrated circuits and low-powered transistors are mounted on sockets. A second set of support-pin holes, which protrude only part way through the fins of the negative heat sink, provide a solid, fixed and extended support for the heat sink. By sliding the heat sink off the mounting guide holes and over to the troubleshooting holes, the heat sink is held in place in the extended position.

To extend or remove the negative heat sink, the four mounting screws holding the heat sink to the base plate are removed first.

NOTE

Do not test the negative heat sink under full power except for brief moments, because the heat sink is not being properly cooled in the extended position.

Fans and Filters:

The blower fans are the lifetime-lubricated type. The filters should be inspected periodically and cleaned by immersion in soap and warm water. A filter can be removed easily pulling it out from the panel;it is replaced by lucking it back in.

Fuses:

Fuses other than the two main line fuses protect the power supply. These fuses are in series with each pass transistor and normally do not blow unless a pass transistor or a driver transistor has shorted.

NOTE

These fuses must not be replaced without first checking for transistor shorts. To do so can result in circuitry damage.

Test Points:

Test jacks for all output voltages are provided on the front panel. Bacause the test jacks are connected to regulator sense leads and through 2.2 kilohm resistors, the jacks must not be used to test power supply regulation or ripple and noise. These measurements must be made where the sense leads are terminated on the Dataway.

Voltage Adjustment:

Voltage adjustment potentiometers are provided for each regulator on the regulator printed-circuit board. The $\pm$6V and $\pm$24V adjustments are accessible through the rear of the power supply.

Overcurrent:

The overcurrent trip points are factory set at 5% to 10% above the rated output current. The adjusment potentiometers are R33 and R66 on the positive heat sink and R12 and R34 on the negative heat sink. The ±6V output current fold-back trip points are set by adjusting the potentiometer until the output voltage starts to drop off at 5% to 10% above the maximum load current. The ±24V output current adjustment potentiometers are adjusted for a 0.5-A to 1.0-A current with the output shorted.

REPLACEABLE PARTS

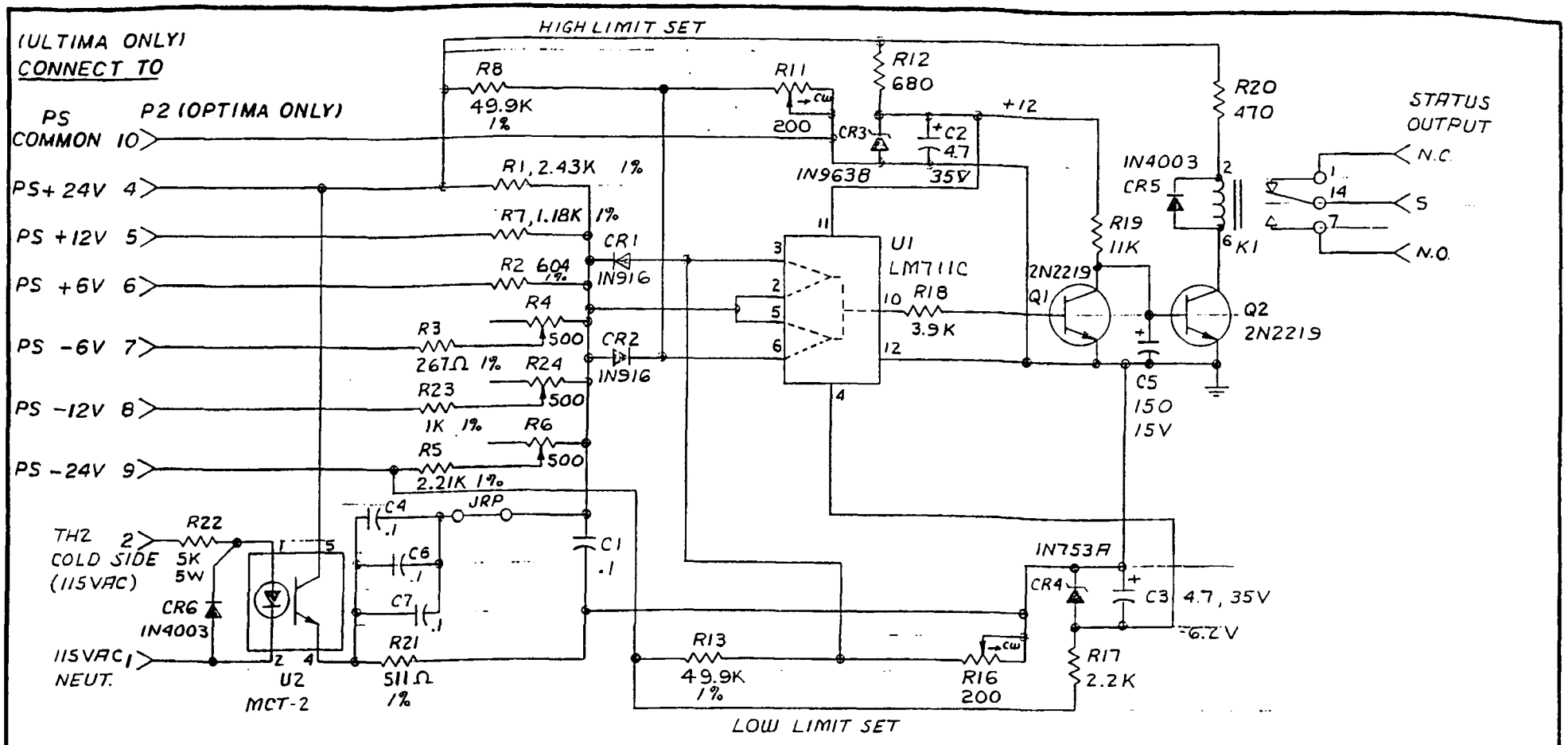
NOTE

Readily available standard components have been used with this unit when ever possible. Special components or subassemblies, however, can be obtained directly from DSP Technology.

When ordering parts, the information below should always be included:

* DSP part number
* Description of part, including circuit reference
* Model and serial number of unit
* Complete description, function and location of part (if part is not listed)

Assembly No.	Assembly Name
106962	Positive Heat Sink Assembly
106965	Negative Heat Sink Assembly
106567	Status Monitor Assembly Option
A-OFDB-02	Assembly Display Board (standard)
A-OFDB-03	Assembly Switch Board (standard)



SYM	DESCRIPTION	DATE	APPROVAL
C6	SEE ECO # 663	3-24-83	
C5	R1 WAS 2.93Ω IS 2.93K	8-25-83	
C4	MANUAL UPDATE, ECO 427	8-15-83	
C3	SEE ECN 1133	1-29-83	
C2	U1 WAS MC1711C, U2 WAS MCT26	3-22-82	ech
C1	C5 VALUE WAS 120, 35V	3-15-82	ech
C	REDRAWN PER ECO 196	11-2-81	

REVISIONS

FINISH ~

DIMENSIONAL TOLERANCES UNLESS OTHERWISE NOTED
DECIMAL | ANG.
XX± ~ | XXX± ~ | ± ~
SCALE: ~ | NO. REQ'D. ~
NEXT ASS'Y. 106717

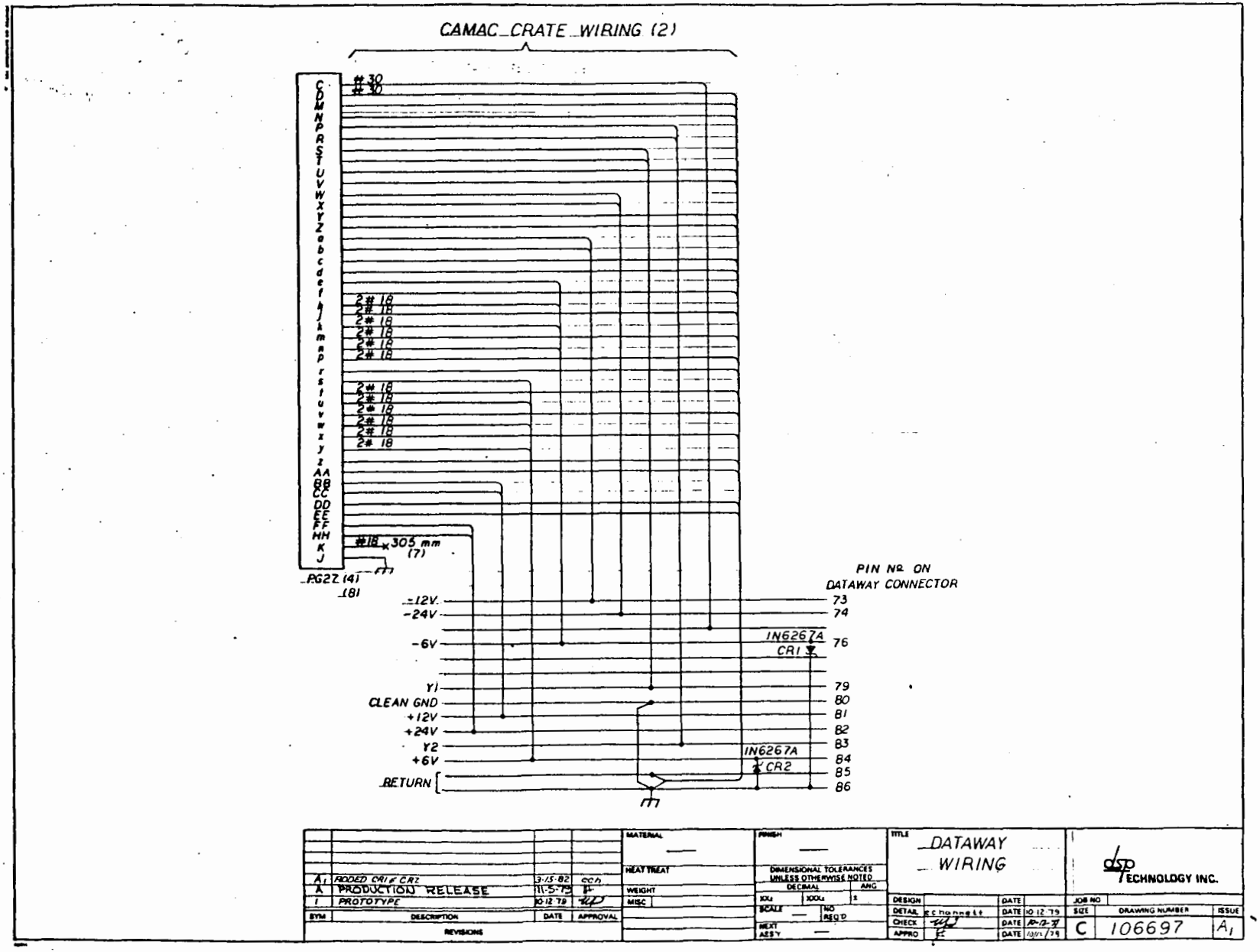
TITLE SCHEMATIC, STATUS BIT OPTION

DESIGN		DATE	
DRAWN	e.c.hannett	DATE	11-2-81
CHECK		DATE	
APPRO		DATE	

dsp Technology Inc

SIZE	DRAWING NUMBER	ISSUE
B	106565	C6

SHEET 1 OF 1



SYM	DESCRIPTION	DATE	APPROVAL
A1	RODED CR1 & CR2	3-15-82	ccn
A	PRODUCTION RELEASE	11-5-79	
1	PROTOTYPE	10-12-79	

REVISIONS

MATERIAL —
HEAT TREAT
WEIGHT
MISC

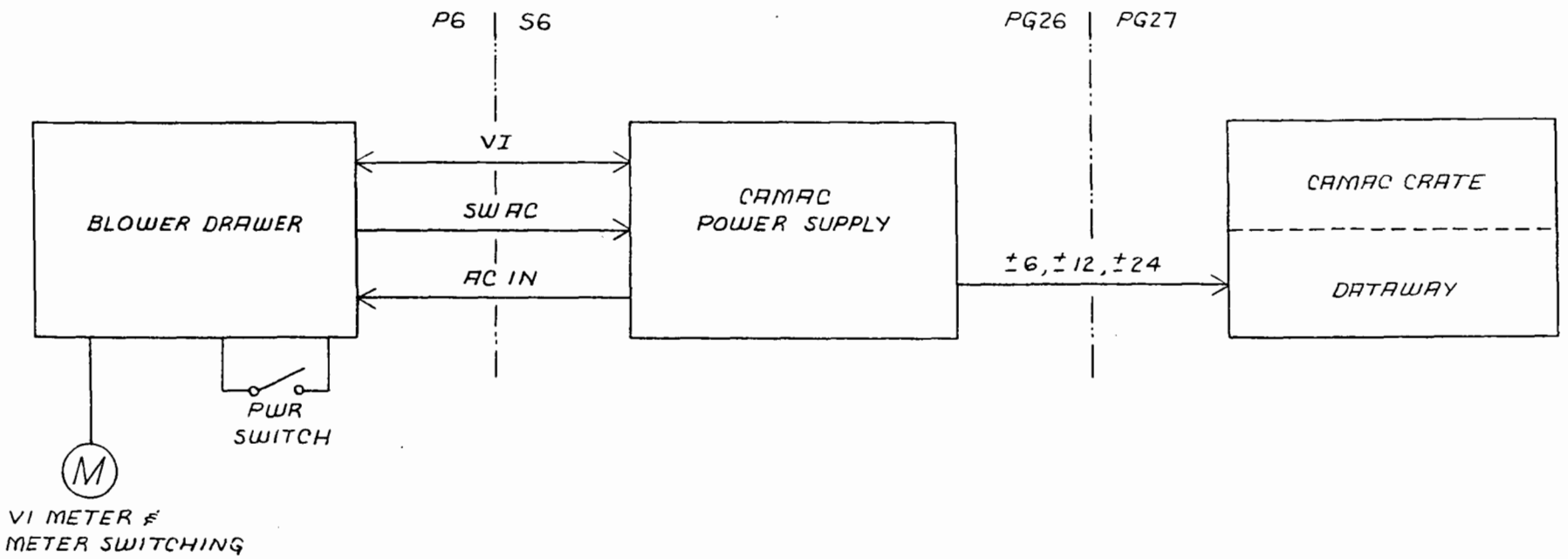
FINISH —
DIMENSIONAL TOLERANCES UNLESS OTHERWISE NOTED
DECIMAL | ANG
XX± | XXX± | ±
SCALE — | NO REQ'D
NEXT ASSY —

TITLE DATAWAY WIRING

DESIGN		DATE	
DETAIL	R C Hannah	DATE	10-12-79
CHECK		DATE	10-12-79
APPRO		DATE	10/12/79

DSP TECHNOLOGY INC.

JOB NO			
SIZE	DRAWING NUMBER		ISSUE
C	106697		A1



SYM	DESCRIPTION	DATE	APPROVAL
B	SEE DCO 009	6-1-82	

REVISIONS

FINISH ~

DIMENSIONAL TOLERANCES UNLESS OTHERWISE NOTED

DECIMAL		ANG
XX± ~	XXX± ~	± ~

SCALE: ~ NO. REQ'D.

NEXT ASS'Y. ~

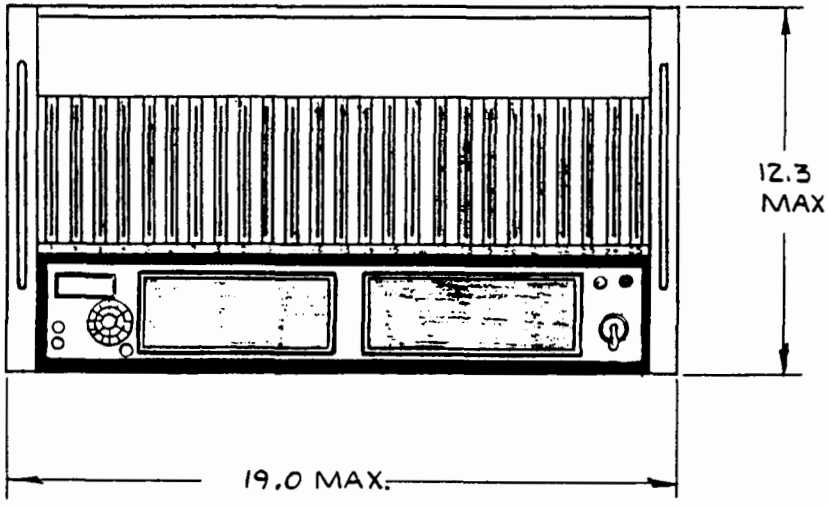
TITLE PCS BLOCK DIAGRAM

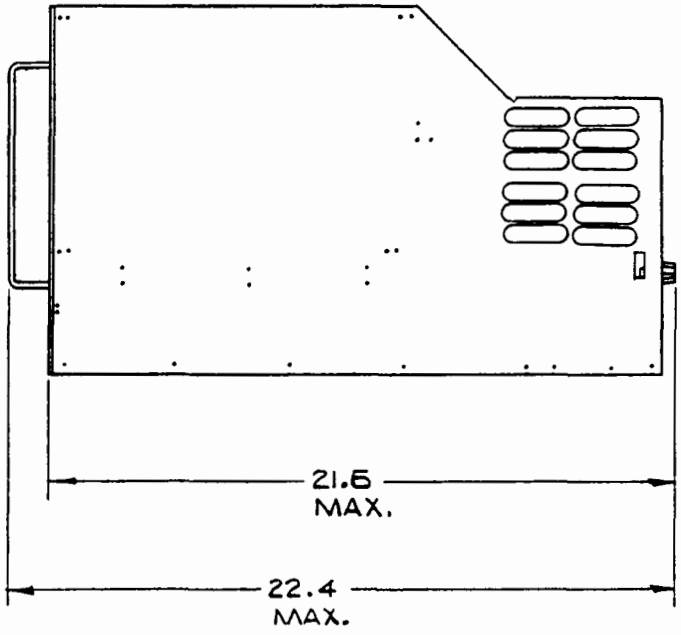
dsp TECHNOLOGY INC.

DESIGN		DATE	
DRAWN	e.c. hannett	DATE	6-1-82
CHECK		DATE	
APPRO		DATE	

SIZE	DRAWING NUMBER	ISSUE
B	106808	B

SHEET 1 OF 1





NOTE : ALL DIMENSIONS ARE IN INCHES.

SYM	DESCRIPTION	DATE	APPROVAL
D	ECO 1001	5/14/80	
C	ECO # 518	4-6-84	
B	ECO 502	2/13/84	

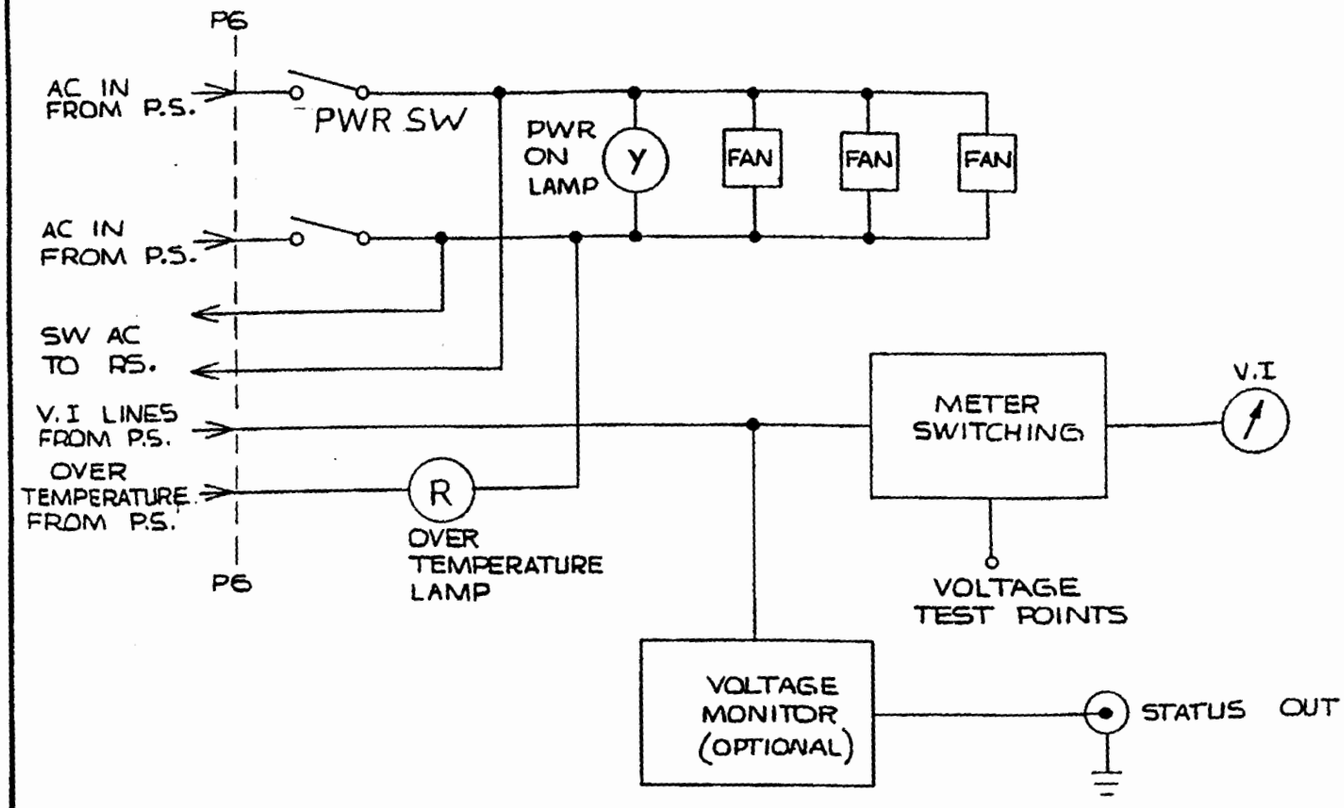
REVISIONS

TITLE	OUT LINE DIMENSIONS CAMAC CRATE		
DESIGN	BL	DATE	11-5-79
DRAWN	FRANK	DATE	9-14-79
CHECK	MJ	DATE	11-5-79
APPRO		DATE	11/5/79

dsp technology

SIZE	DRAWING NUMBER	ISSUE
B	106809	D

SHEET 1 OF 1



SYM	DESCRIPTION	DATE	APPRO
B	ECO # 518	4-6-84	
A1	MANUAL UPDATE, ECO 427	8-15-95	
A	PRODUCTION RELEASE	11-5-79	
2	PROTOTYPE	10-12-79	

REVISIONS

TITLE SIMPLIFIED BLOWER BLOCK DIAGRAM

CAMAC SERIES

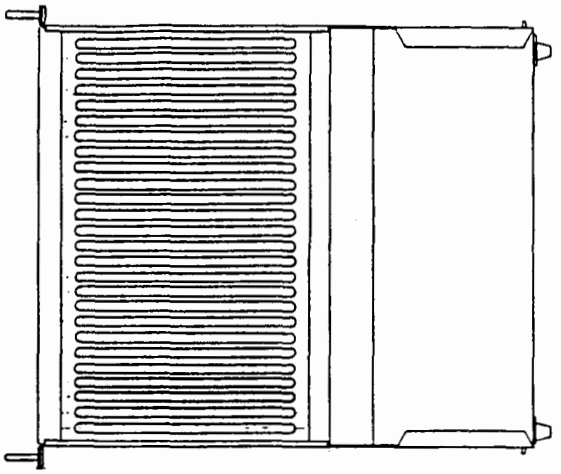
DESIGN		DATE	11-5-79
DRAWN	FRANK	DATE	9-11-79
CHECK		DATE	10-12-9
APPRO		DATE	10/12/79

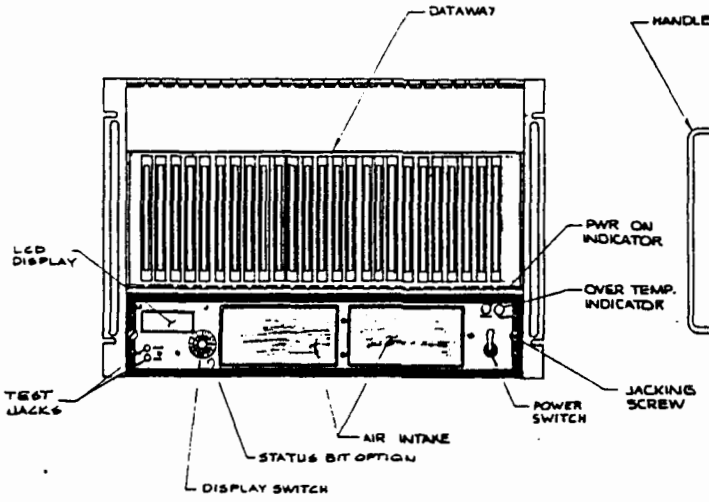
DSP TECHNOLOGY INC.

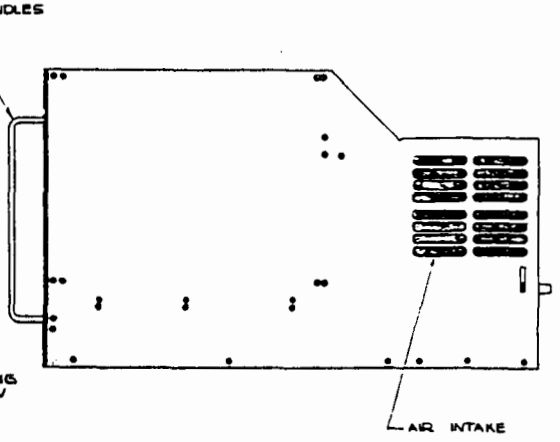
SIZE	DRAWING NUMBER	ISSUE
B	106810	B

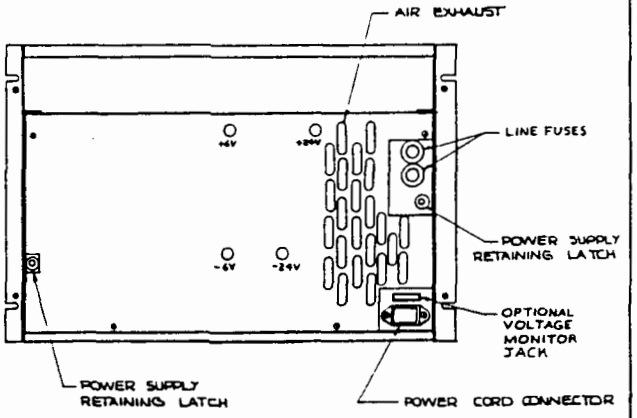
SHEET 1 OF 1

REVISIONS				
LTR	DESCRIPTION	BY	APPROVAL	DATE
1	PROTO RELEASE			
A	PRODUCTION RELEASE			8-5-79
A1	ECO 427			9/5/80
B	ECO # 518			4-6-81
C	ECO 1068	JC		5/11/82

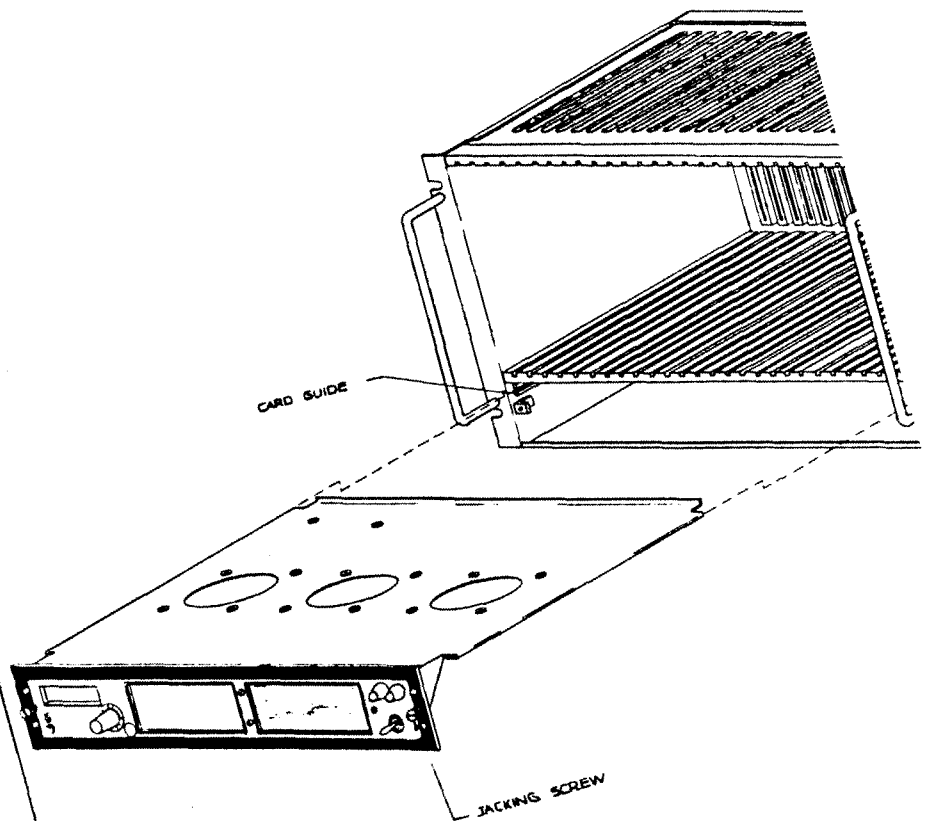




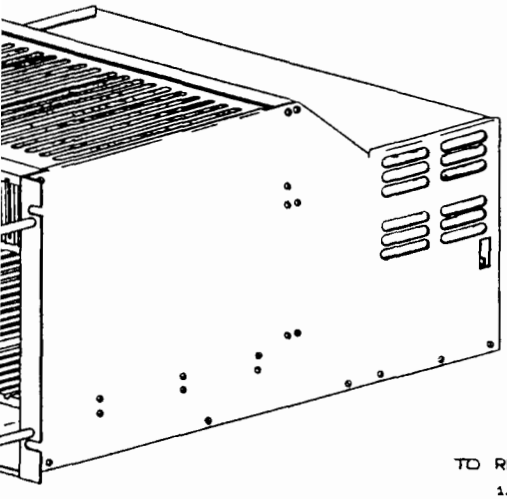




TITLE: MAJOR FEATURE CALL-OUT CAMAC PCS				dsp technology	
DESIGN	[illegible]	DATE 11-2-79	SIZE	DRAWING NUMBER	ISSUE
DRAWN	FRANK	DATE 9-20-79	D	106812	C
CHECK	JD	DATE 11-2-79			
APPRO	[illegible]	DATE 11-2-79	SHEET 1 OF 1		


CARD GUIDE
JACKING SCREW

REVISIONS				
LTR	DESCRIPTION	BY	APPROVAL	DATE
1	PROTOTYPE RELEASE			
A	PRODUCTION RELEASE			
A1	ECO 427 - NEW SWITCH			5-15-87
B	ECO # 518			4-6-89
C	ECO 1001	JC		5/10/90



TO REMOVE BLOWER:

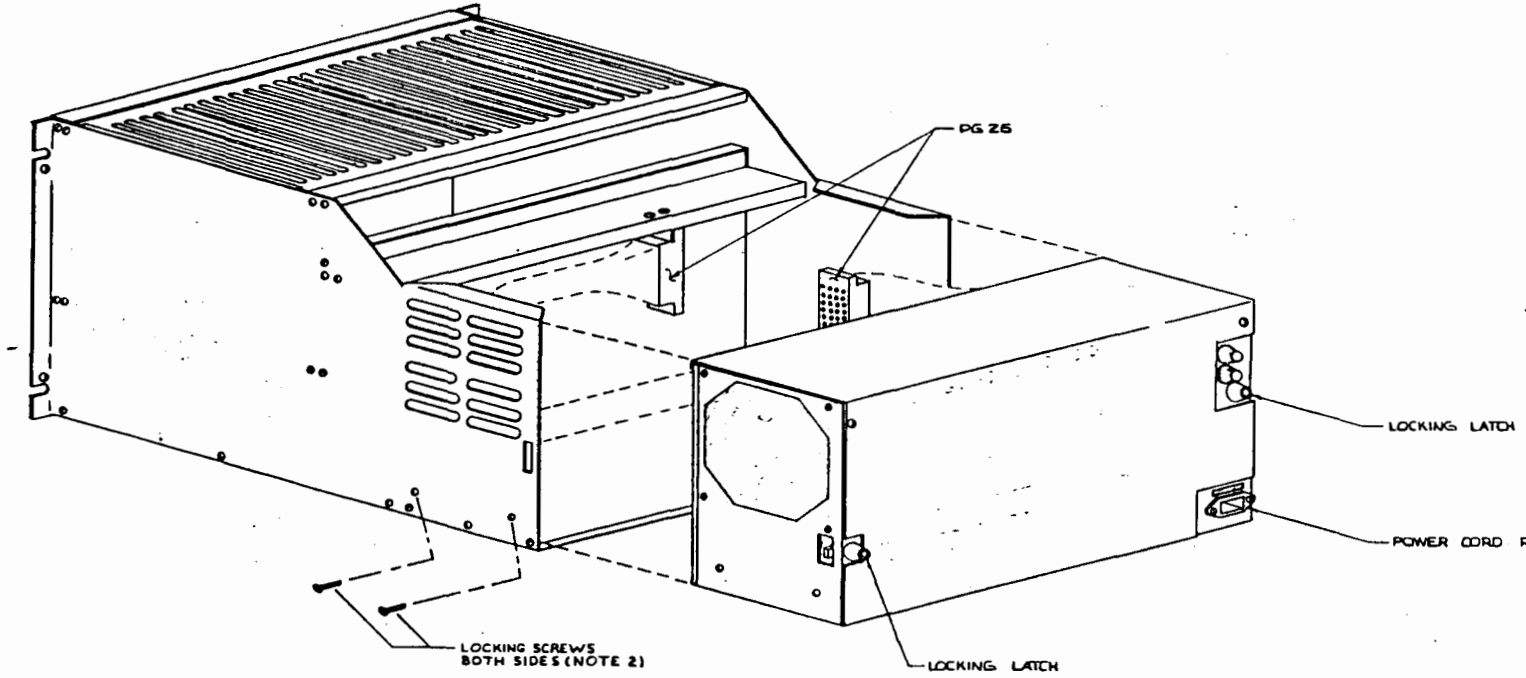
1. UNPLUG POWER CORD
2. UNSCREW BLOWER FRONT PANEL JACKING SCREWS (SEE CALLOUT.)
3. PULL BLOWER TRAY OUT.

TO INSTALL BLOWER:

1. UNPLUG POWER CORD.
2. PUSH BLOWER TRAY INTO GROOVES AS SHOWN.
3. TIGHTEN JACKING SCREWS INTO CRATE.
4. PLUG IN POWER CORD.

TITLE					
BLOWER REMOVAL DIAGRAM CAMAC SERIES				dsp Technology	
DESIGN		DATE	11-4-88	SIZE	DRAWING NUMBER	ISSUE
DRAWN	FRANK	DATE	9-21-89	D	108812	C
CHECK		DATE	11-3-89			
APPRO		DATE		SHEET 1 OF 1		

REVISIONS				
LTR	DESCRIPTION	BY	APPROVAL	DATE
1	PROTO RELEASE			
A	PRODUCTION RELEASE		B	11-1-79
A1	RELEASE PER ECN 1003	CON		7-13-81
B	ECO 453		V.D.C.	9-6-83
C	REVISED PER ECO # 518		L. Ly	4-4-84



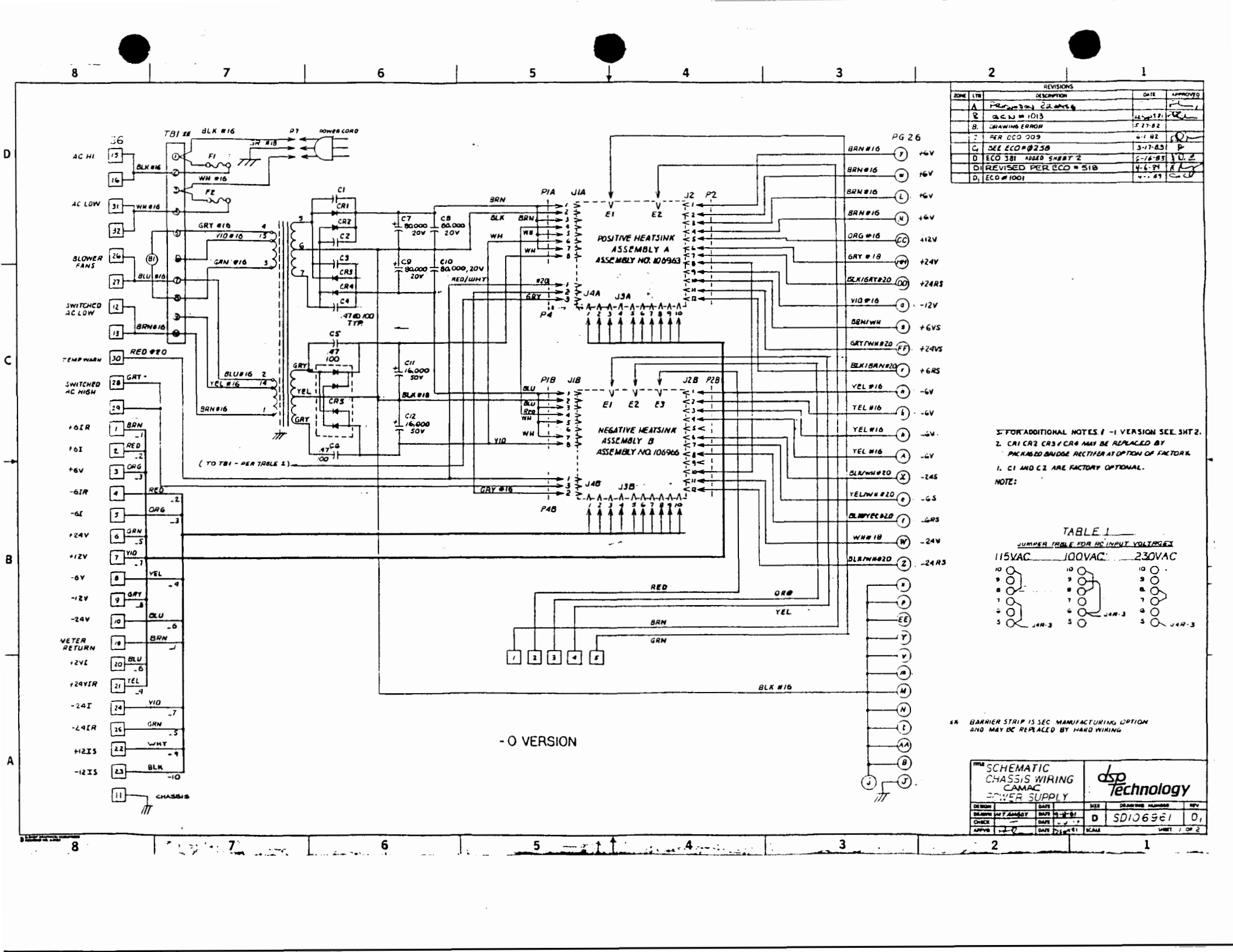
TO REMOVE POWER SUPPLY :

1. UNPLUG POWER CORD.
2. REMOVE THE 4 LOCKING SCREWS HOLDING PS TO CRATE SIDES.
3. RELEASE POWER SUPPLY LOCKING LATCHES UNTIL LATCH ARMS DISENGAGE CRATE.
4. PULL POWER SUPPLY OUT UNTIL SUFFICENT ROOM IS AVAILABLE TO DISCONNECT PG-26
   CAUTION: DO NOT PULL POWER SUPPLY TO FAR OUT.
5. DISCONNECT PG-26
6. PULL POWER SUPPLY OUT FROM SUPPORTING SHELF.

TO INSTALL :

1. REVERSE ABOVE PROCEDURE. BE SURE TO TIGHTEN LOCKING LATCHES SECURELY.

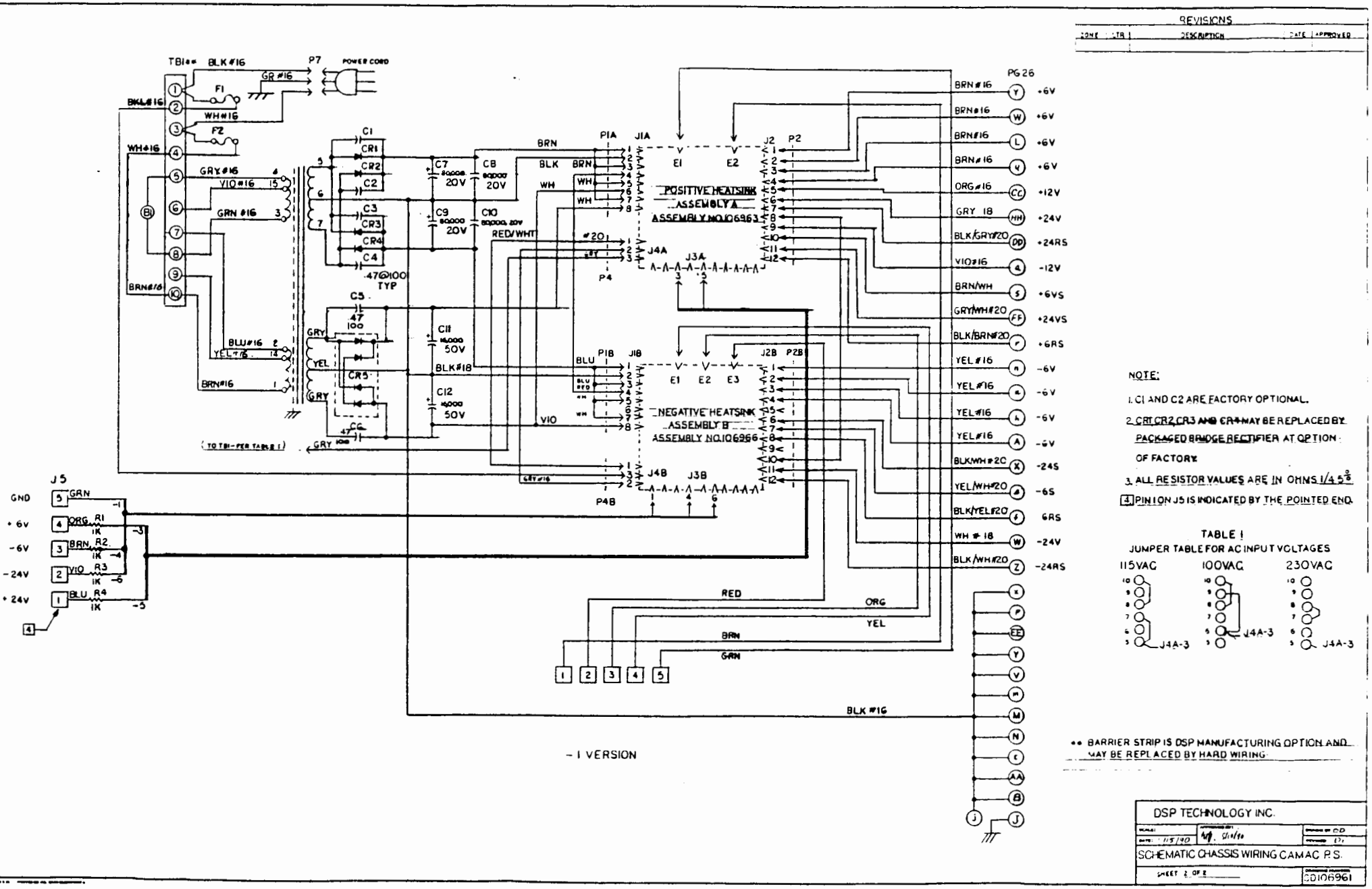
TITLE	POWER SUPPLY REMOVAL DIAGRAM CAMAC SERIES	dsp TECHNOLOGY INC.	
DESIGN	[illegible]	DATE	
DRAWN	FRANA	DATE	
CHECK	TL	DATE 5-7-79	
APPRO		DATE	
SIZE	DRAWING NUMBER	ISSUE	
D	106516	C	
SHEET	1 OF 1		

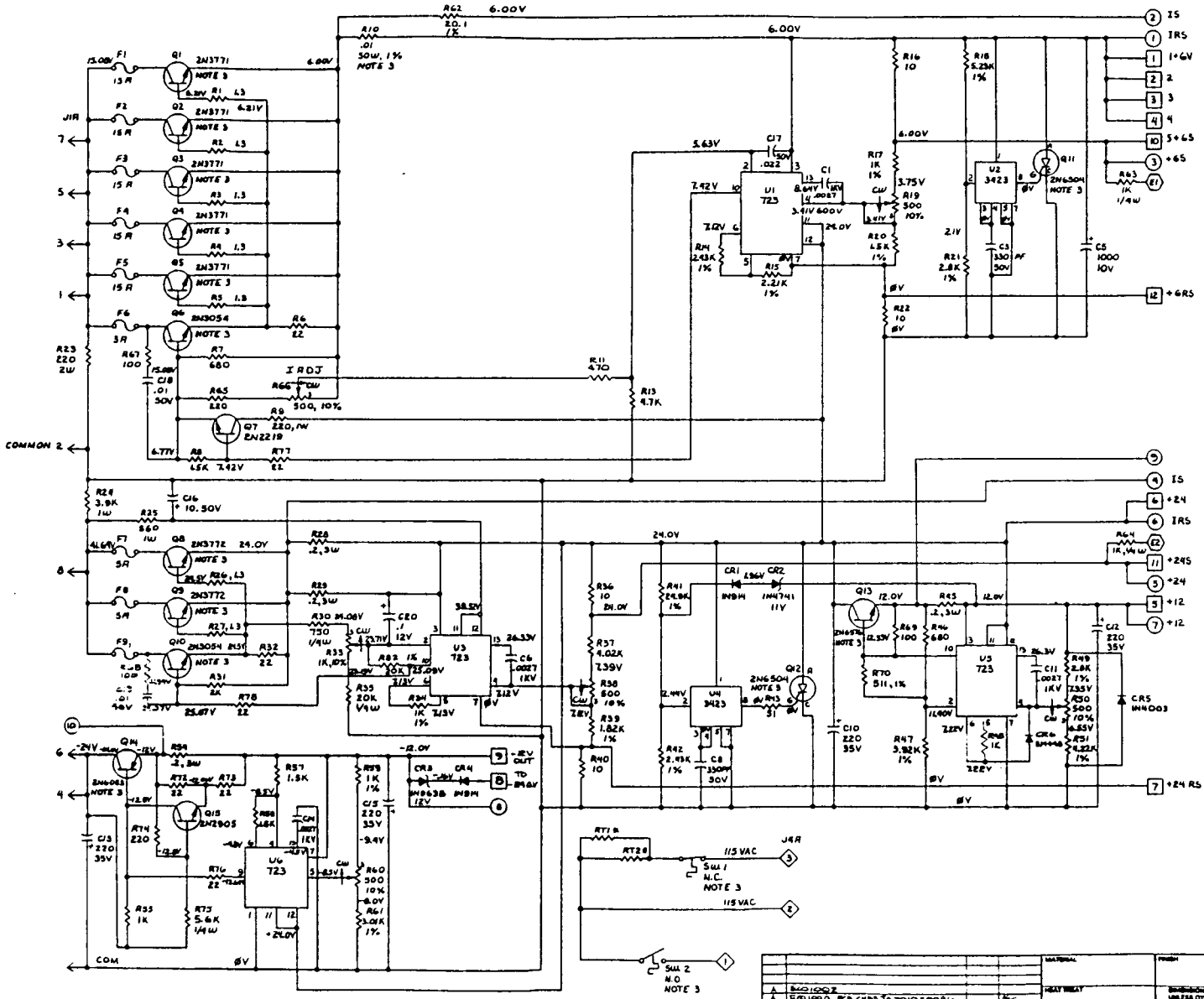


1. FOR ADDITIONAL NOTES & -1 VERSION SEE SHT 2.
2. CR1 CR2 CR3 & CR4 MAY BE REPLACED BY PACKAGED BRIDGE RECTIFIER AT OPTION OF FACTORY.
1. C1 AND C2 ARE FACTORY OPTIONAL.

NOTE:

** BARRIER STRIP IS SEC MANUFACTURING OPTION AND MAY BE REPLACED BY HAND WIRING


REVISIONS
ZONE | LTR | DESCRIPTION | DATE | APPROVED
TB1 BLK #16
P7 POWER CORD
GR #16
F1
WH #16
F2
C1
CR1
CR2
C2
C3
CR3
CR4
C4
.47@100 TYP
C5
47 100
CR5
C7 80000 20V
C8 80000 20V
C9 80000 20V
C10 80000, 20V
C11 40000 50V
C12 40000 50V
C6 47 100
RED/WHT
BLK#18
VIO
GRY #16
BRN
BLK
WH
BLU
P1A J1A
P1B J1B
P4
P4B
J4A J3A
J4B J3B
E1 E2
E1 E2 E3
J2 P2
J2B P2B
POSITIVE HEATSINK ASSEMBLY A ASSEMBLY NO.106963
NEGATIVE HEATSINK ASSEMBLY B ASSEMBLY NO.106966
PG 26
BRN #16 +6V
BRN #16 +6V
BRN #16 +6V
BRN #16 +6V
ORG #16 +12V
GRY 18 +24V
BLK/GRY #20 +24RS
VIO #16 -12V
BRN/WH +6VS
GRY/WH #20 +24VS
BLK/BRN #20 +6RS
YEL #16 -6V
YEL #16 -6V
YEL #16 -6V
YEL #16 -6V
BLK/WH #20 -24S
YEL/WH #20 -6S
BLK/YEL #20 6RS
WH #18 -24V
BLK/WH #20 -24RS
BLK #16
RED
ORG
YEL
BRN
GRN
J5
GND GRN
+6V ORG R1 1K
-6V BRN R2 1K
-24V VIO R3 1K
+24V BLU R4 1K
(TO TB1-PER TABLE I)
- I VERSION
NOTE:
1. C1 AND C2 ARE FACTORY OPTIONAL.
2. CR1,CR2,CR3 AND CR4 MAY BE REPLACED BY PACKAGED BRIDGE RECTIFIER AT OPTION OF FACTORY.
3. ALL RESISTOR VALUES ARE IN OHMS 1/4 5%
4. PIN ON J5 IS INDICATED BY THE POINTED END.
TABLE I
JUMPER TABLE FOR AC INPUT VOLTAGES
115VAC
100VAC
230VAC
J4A-3
** BARRIER STRIP IS DSP MANUFACTURING OPTION AND MAY BE REPLACED BY HARD WIRING
DSP TECHNOLOGY INC.
SCHEMATIC CHASSIS WIRING CAMAC P.S.
SD106961



CONDITIONS: (OF TEST VOLTAGES SHOWN)

1. OUTPUT ADJUSTED TO 6.00V AND 24.00V.
2. NO LOAD ON OUTPUTS.
3. 115VAC 60Hz INPUT.
4. ALL VOLTAGES WITH RESPECT TO COMMON.

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. ALL RESISTORS ARE 1/2W, 5% & VALUES ARE IN OHMS.
2. ALL CAPACITOR VALUES ARE IN MICRO FARADS.
3. COMPONENT IS MOUNTED DIRECTLY TO THE HEATSINK SEE PARTS LIST PL106962
4. ±12V CIRCUITS ARE OPTIONAL
5. > INDICATES J1A
   □ INDICATES J2A
   ○ INDICATES J3A
   ◇ INDICATES J4A
   ○ INDICATES WIRE WRAP PIN ON P.C.B.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	ECO 1002		
A	ECO 1000 PER CHGS TO 7010-6886		
D1	RELEASE	4/88	
D2	ECO # 321	4-8-97	

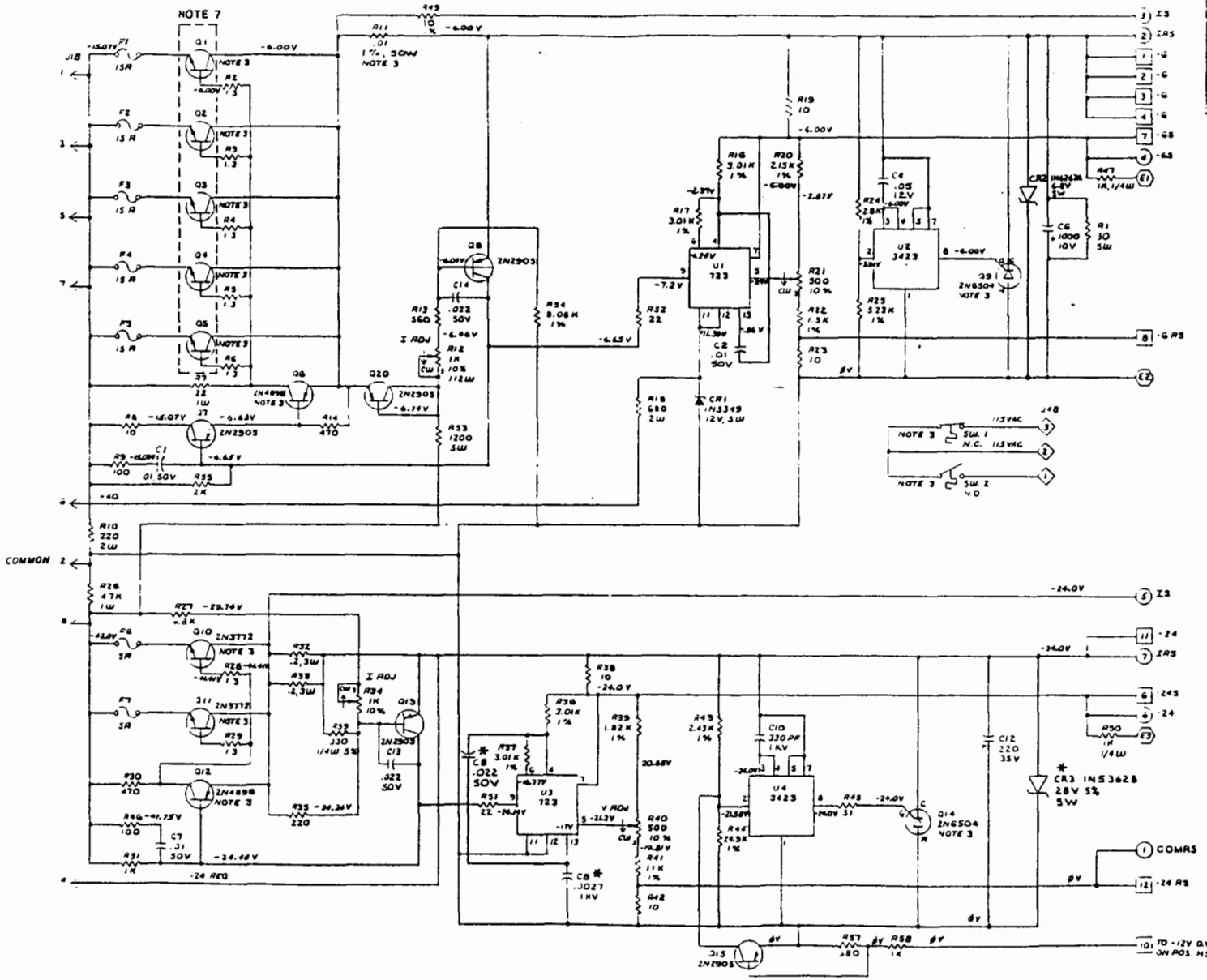
TITLE: SCHEMATIC, REGULATOR, +6, +24 & ±12 Vdc

dsp technology inc

DESIGN	DATE	
DETAIL	DATE	5-8-97
CHECK	DATE	4/88
APPRO	DATE	

JOB NO

SIZE D | DRAWING NUMBER SD106963 | ISSUE A



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	PRODUCTION RELEASE ECO 203	12-3-81	
	C	RELEASE - SEE ECO # 219	5-19-82	
	C_1	CHANGED Q10 & Q11 FROM 2N3771 TO 2N3772 PER ECO 222	9-30-82	
	C_2	ADDED VOLTAGES & CONDITIONS	3-7-83	
	D	ECN 1183 - ECO 385	6-21-83	
	D_1	REVISED PER ECO # 521	9-14-84	
	E	ECO 1001	5-6-89	

CONDITIONS: (OF TEST VOLTAGES SHOWN)

1. OUTPUTS ADJUSTED TO -6.00V AND -24.00V.
2. NO LOADS ON OUTPUTS.
3. 115 VAC 60Hz INPUT.
4. ALL VOLTAGES WITH RESPECT TO COMMON.

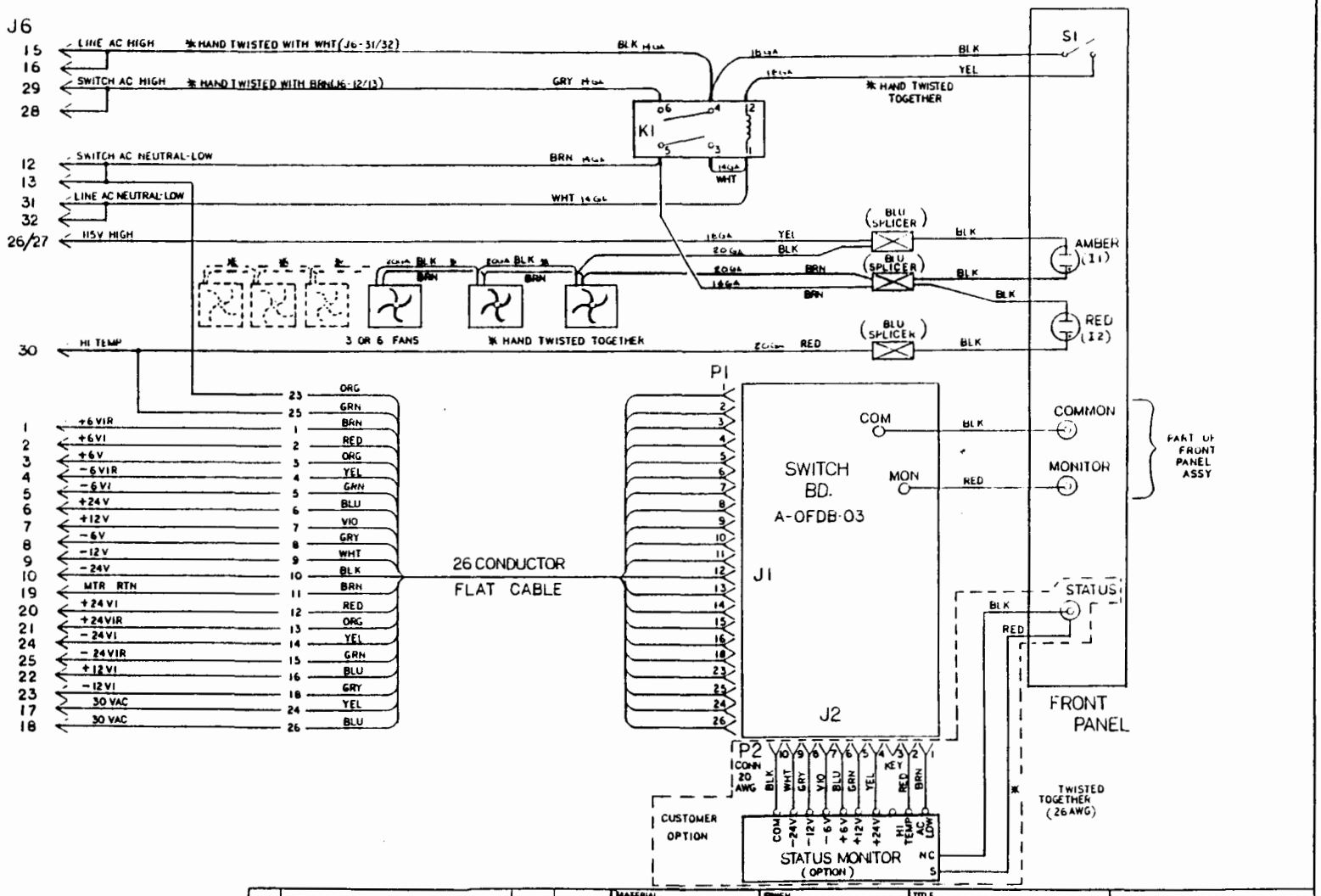
NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE 1/2 W, 5% & VALUES ARE IN OHMS.
2. ALL CAPACITOR VALUES ARE IN MICRO FARADS.
3. COMPONENT IS MOUNTED DIRECTLY TO THE HEATSINK. SEE PARTS LIST PL106965.
4. > INDICATES J18
   □ INDICATES J28
   ○ INDICATES J38
   ·> INDICATES J48
   ○ INDICATES WIRE WRAP PIN ON P.C.B.
5. C8(.0027) IS FOR OPTION 1 ONLY. *
6. C8(.022) & CR3 ARE FOR OPTION 2 ONLY. *
7. Q1-Q5 INSTALLED ON HEATSINK ASSY.

TITLE: SCHEMATIC, REGULATOR, -6 AND -24 Vdc

dsp technology

DESIGN		DATE	SIZE	DRAWING NUMBER	REV
DRAWN		DATE	D	SD106966	E
CHECK		DATE			
APPVD		DATE	SCALE —	SHEET 1 OF 1	



A	PRODUCTION RELEASE		
SYM	DESCRIPTION	DATE	APPROVAL

REVISIONS

MATERIAL | FINISH | HEAT TREAT | WEIGHT | MISC | DIMENSIONAL TOLERANCES UNLESS OTHERWISE NOTED DECIMAL ANG. XX ± XXX ± 2° | SCALE NO REQ'D | NEXT ASSY

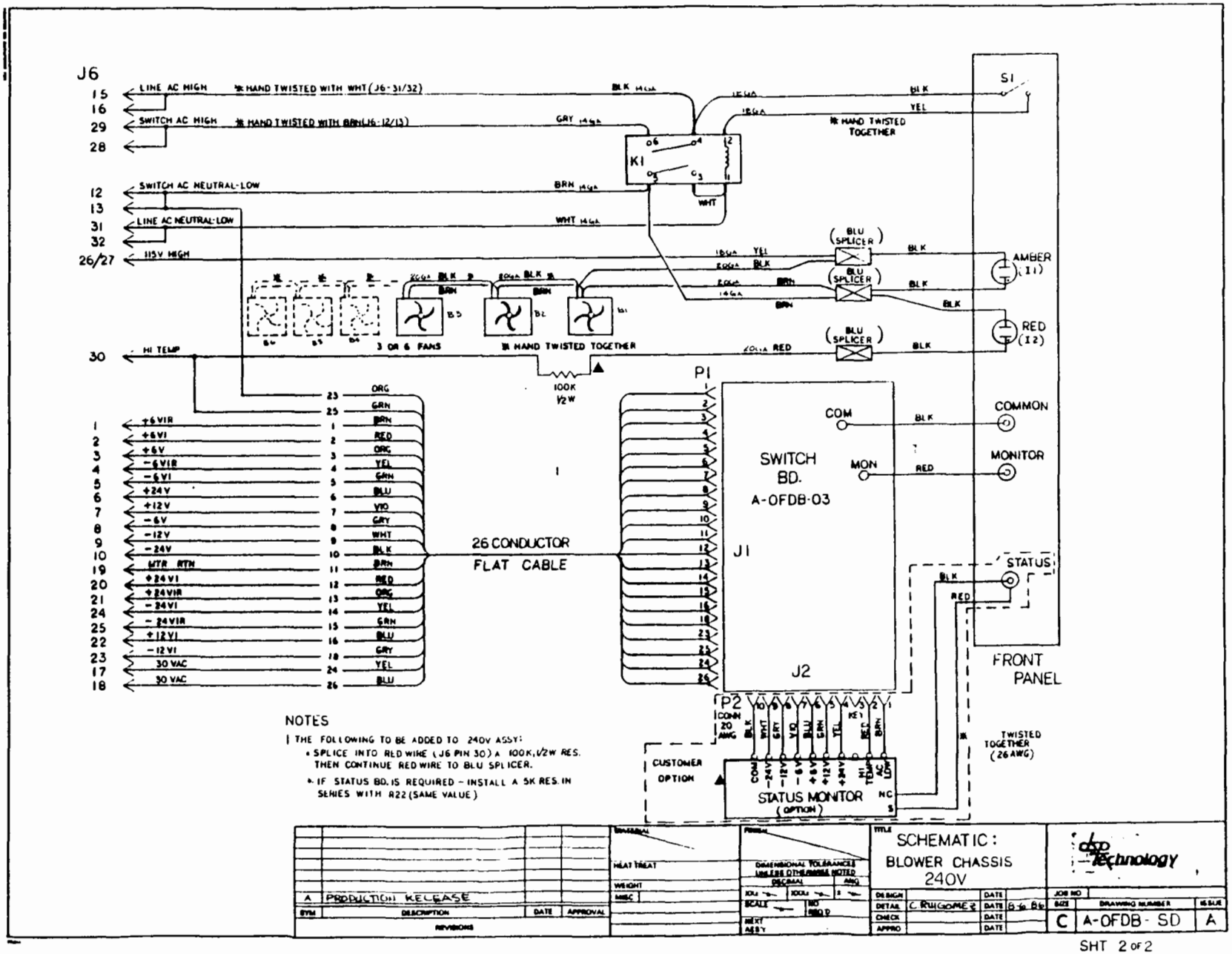
TITLE: SCHEMATIC: BLOWER CHASSIS 115V

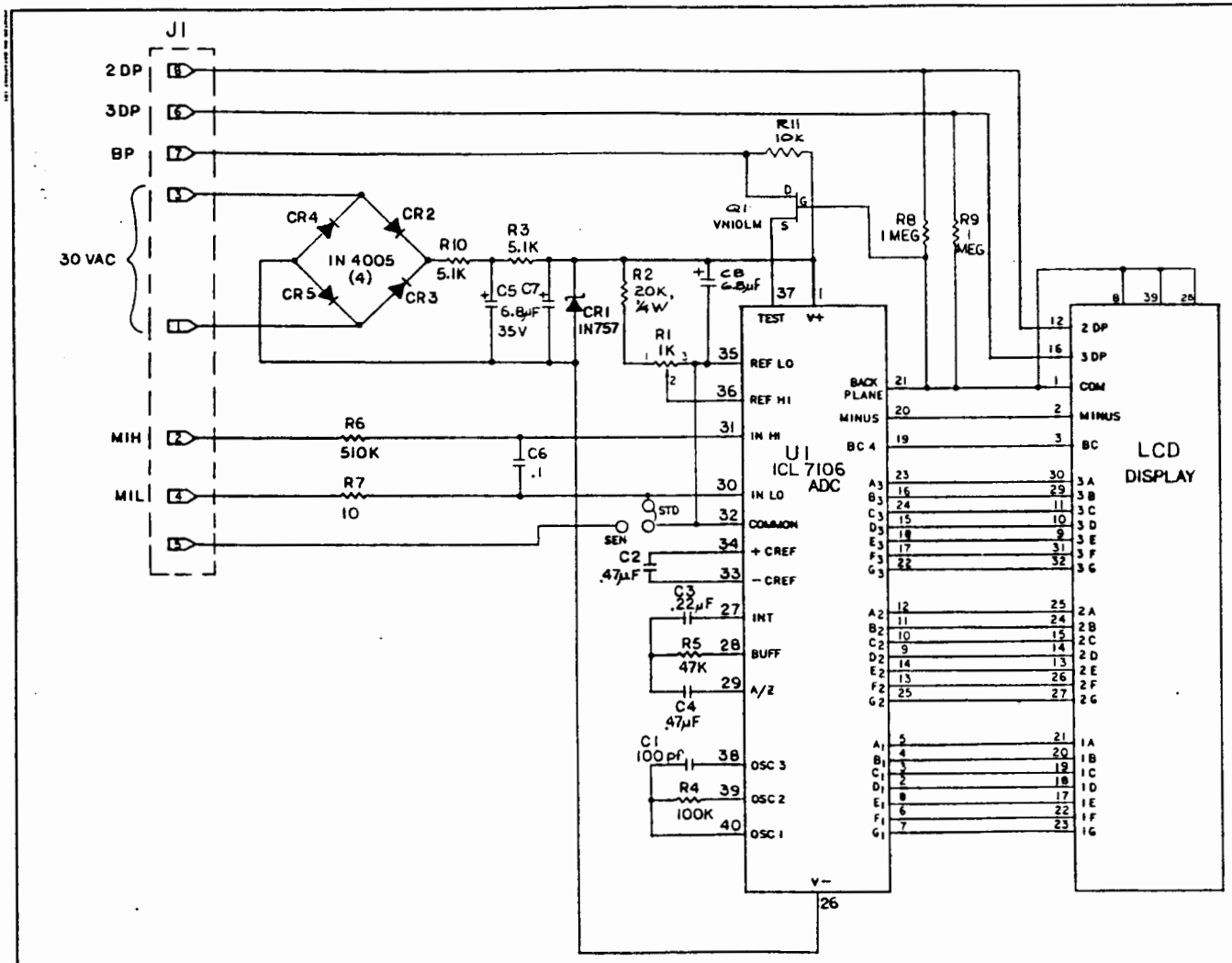
dsp Technology

DESIGN		DATE	
DETAIL	C. KUIKSOME	DATE	6-6-84
CHECK		DATE	
APPRO		DATE	

JOB NO		
SIZE	DRAWING NUMBER	ISSUE
C	A-OFDB-SD	A

SHT 1 OF 2


J6
15
16
29
28
LINE AC HIGH
SWITCH AC HIGH
* HAND TWISTED WITH WHT (J6-31/32)
* HAND TWISTED WITH BRN (J6-12/13)
12
13
31
32
SWITCH AC NEUTRAL-LOW
LINE AC NEUTRAL-LOW
26/27
115V HIGH
30
HI TEMP
100K 1/2W
K1
S1
* HAND TWISTED TOGETHER
BLU SPLICER
AMBER (I1)
RED (I2)
3 OR 6 FANS
* HAND TWISTED TOGETHER
P1
J1
J2
SWITCH BD. A-OFDB-03
COM
MON
COMMON
MONITOR
STATUS
FRONT PANEL
26 CONDUCTOR FLAT CABLE
+6V IR
+6V I
+6V
-6V IR
-6V I
+24V
+12V
-6V
-12V
-24V
MTR RTN
+24V I
+24V IR
-24V I
-24V IR
+12V I
-12V I
30 VAC
30 VAC
ORG
GRN
BRN
RED
ORG
YEL
GRN
BLU
VIO
GRY
WHT
BLK
BRN
RED
ORG
YEL
GRN
BLU
GRY
YEL
BLU
P2
CONN 20 AWG
TWISTED TOGETHER (26 AWG)
CUSTOMER OPTION
STATUS MONITOR (OPTION)
NOTES
1 THE FOLLOWING TO BE ADDED TO 240V ASSY:
a SPLICE INTO RED WIRE (J6 PIN 30) A 100K, 1/2W RES. THEN CONTINUE RED WIRE TO BLU SPLICER.
b IF STATUS BD. IS REQUIRED - INSTALL A 5K RES. IN SERIES WITH R22 (SAME VALUE)
A PRODUCTION RELEASE
SCHEMATIC: BLOWER CHASSIS 240V
C. RUIGOMEZ
C A-OFDB-SD A
SHT 2 OF 2



SYM	DESCRIPTION	DATE	APPROVAL
	REVISIONS		
D	ECO 1004	10-25-87	MC
C	SEE ECO # 1003	9-23-87	MC
C	ECO # 1002	7-1-87	MC
A	PRODUCTION RELEASE		

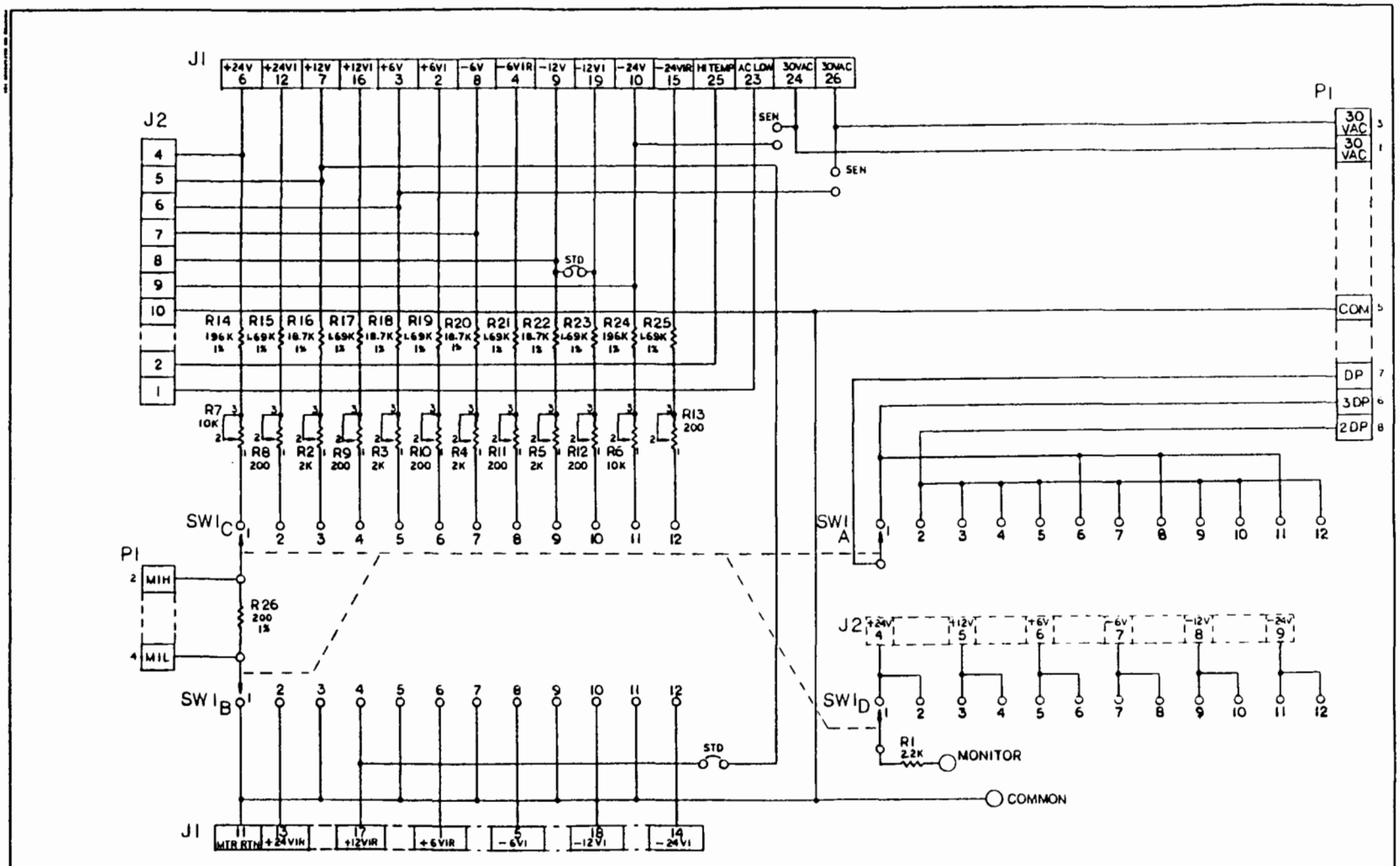
MATERIAL
HEAT TREAT
WEIGHT
MISC
FINISH
DIMENSIONAL TOLERANCES UNLESS OTHERWISE NOTED
DECIMAL ANG
XX± XXX± ±
SCALE NO REQ'D
NEXT ASS'Y

TITLE
SCHEMATIC:
DISPLAY BOARD
A-OFDB-02 (STANDARD)

DESIGN		DATE	
DETAIL	C RANSOMER	DATE	7-30-87
CHECK		DATE	
APPRO		DATE	1-30-87

DSP TECH

JOB NO		
SIZE	DRAWING NUMBER	ISSUE
C	A-OFDB-02-SD	D



SYM	DESCRIPTION	DATE	APPROVAL
D	ECO 1002	7-24-96	
C	REDESIGN RELEASE		
B	REDESIGN RELEASE		
A	RELEASE		

REVISIONS

MATERIAL

HEAT TREAT

WEIGHT

MISC

FINISH

DIMENSIONAL TOLERANCES UNLESS OTHERWISE NOTED
DECIMAL ANG
XX± XXX± ±

SCALE NO REQ'D

NEXT ASSY

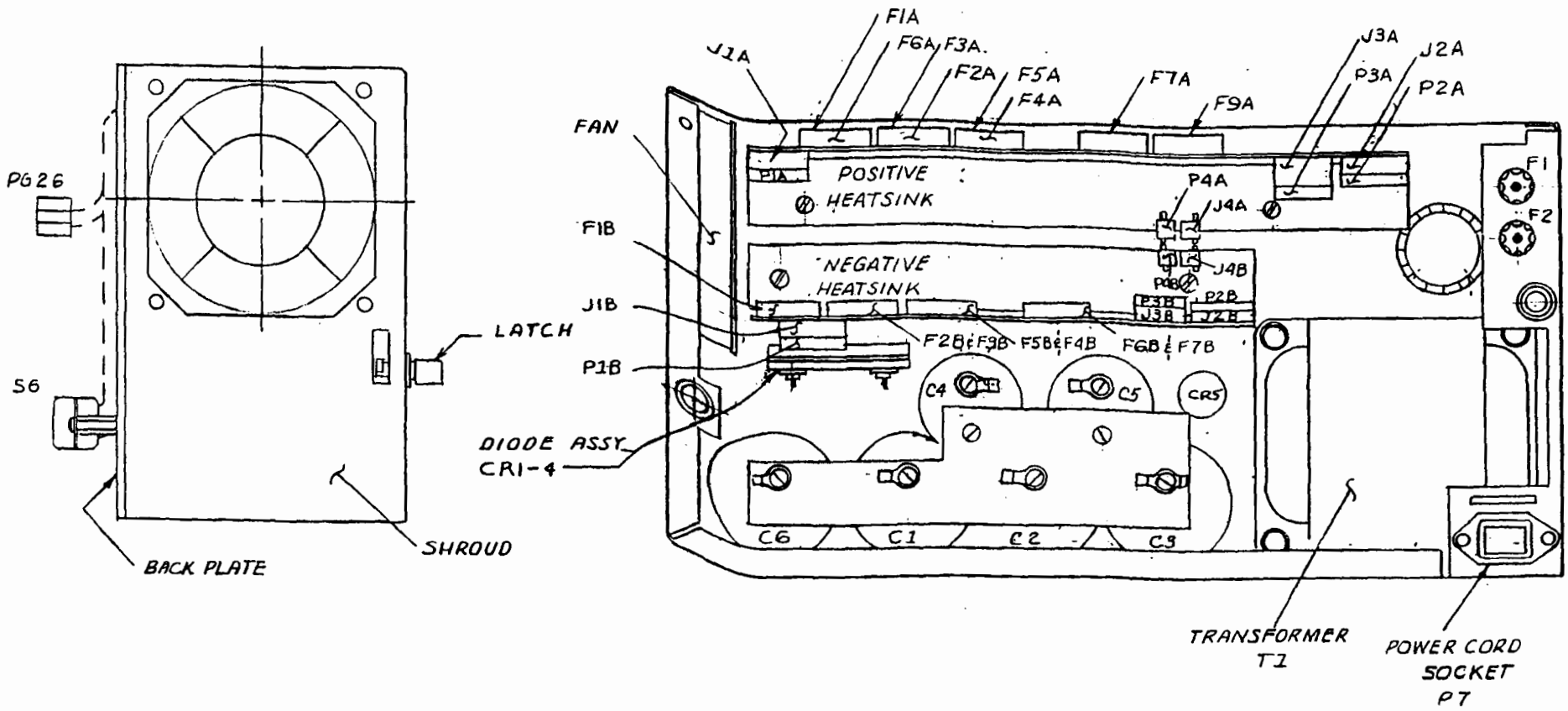
TITLE
SCHEMATIC :
SWITCH BOARD
A-OFDB-03 (STANDARD)

DSP TECH ...

DESIGN		DATE	
DETAIL	C. RUBOMEZ	DATE	8-1-96
CHECK		DATE	
APPRO		DATE	

JOB NO

SIZE	DRAWING NUMBER	ISSUE
C	A-OFDB-03SD	D



SYM	DESCRIPTION	DATE	APPROVAL
B	ECO # 518	9-6-84	
A1	MANUAL UPDATE, ECO 427	8-15-83	
A	RELEASE	7-14-81	

REVISIONS

FINISH

DIMENSIONAL TOLERANCES UNLESS OTHERWISE NOTED
DECIMAL: XX± .01, XXX± .005; ANG ±
SCALE:
NO. REQ'D.
NEXT ASS'Y.

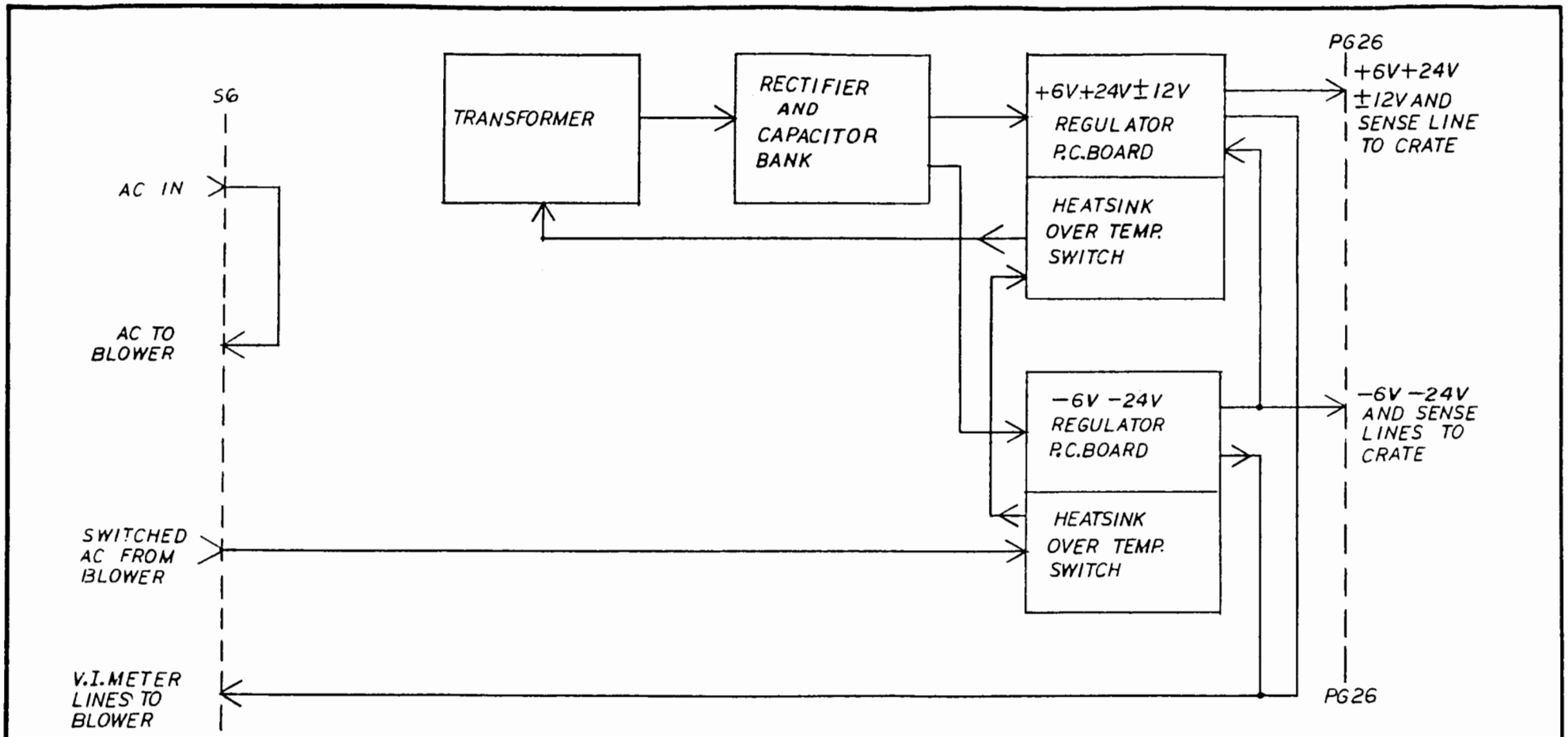
TITLE
MAJOR COMPONENT
DIAGRAM CAMAC
POWER SUPPLY

DESIGN		DATE	
DRAWN	mf embery	DATE	6-24-81
CHECK		DATE	7/14/81
APPRO		DATE	7 JAN 82

DSP TECHNOLOGY INC.

SIZE	DRAWING NUMBER	ISSUE
B	MD106947	B

SHEET 1 OF 1



SYM	DESCRIPTION	DATE	APPROVAL
C	ECO #518	4-6-81	
B1	MANUAL UPDATE, ECO 427	8-15-83	
B	PER DCO 009	6-1-82	
A	RELESE	7-14-81	

REVISIONS

FINISH

DIMENSIONAL TOLERANCES UNLESS OTHERWISE NOTED

DECIMAL		ANG.
XX±	XXX±	±

SCALE: NO. REQ'D.

NEXT ASS'Y.

TITLE BLOCK DIAGRAM CAMAC POWER SUPPLY

dsp TECHNOLOGY INC.

DESIGN		DATE	
DRAWN		DATE	6-9-81
CHECK		DATE	7-14-81
APPRO		DATE	7-22-81

SIZE	DRAWING NUMBER	ISSUE
B	BD106960	C

SHEET 1 OF 1

OPTIMA-860 MANUAL REVISION RECORD

DATE	DESCRIPTION	REFERENCE
11/30/81	Supersedes manual dated 9/24/81	
4/13/82	Supersedes manual dated 3/8/82	
6/3/82	Added warning for output power	
9/17/82	Updates drawings	
8/19/83	Updated drawings and text	ECO#427 affecting crates with serial No. 5000 and above
2/8/90	Updated blower section	

dsp Technology Inc.

PRODUCT WARRANTY

(Excludes Software)

DSP TECHNOLOGY ("DSP") warrants its products to be free from defects in material and workmanship and to meet DSP's performance specifications. The warranty period is one year from the date of shipment to the buyer. The warranty is limited by the paragraphs below.

RETURN TO FACTORY

If a buyer discovers a defect in a DSP product covered by this agreement, buyer's exclusive remedy is to ship the product back to DSP's Fremont factory, where DSP will, at its option, either repair or replace the product. This remedy applies if DSP receives the returned product on or before the tenth day after the expiration of the warranty period and the buyer notifies DSP of the defect before returning the product.

COST TO BUYER OF REPAIRS OR REPLACEMENT

Buyer must prepay freight charges to DSP. DSP will pay standard return freight to buyer. Buyer will be charged for premium freight if that method of transport is requested by buyer. There is no other charge for repair or replacement during the warranty period.

TRANSFERRABLE WARRANTIES

In addition to the foregoing warranty, DSP also provides the buyer the transferrable warranty, if any, provided to DSP by the manufacturers of other products such as terminals and disk systems supplied by SEC as part of a total system.

LIMITATION OF WARRANTY AND LIABILITY

The foregoing constitutes DSP's entire warranty, expressed, implied, and/or statutory (except as to title), and to any other party for any breach of such warranty and for damages, whether direct, special, incidental, or consequential. Other than as expressly provided in this document, no warranties expressed or implied, including any warranty of merchantability or fitness for a particular purpose are made. No employee, representative, or agent or seller has any authority expressed or implied to alter or supplement the terms of this warranty.

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