

MODEL 2415
PROGRAMMABLE HIGH VOLTAGE
SUPPLY

March, 1983

A T T E N T I O N

AS A SAFETY FEATURE, THE FRONT PANEL CONTROLS OF THE 2415 ACT AS HARDWARE LIMITS FOR CAMAC DEMAND VALUES. THEREFORE WHEN USING CAMAC CONTROL THE OPERATOR SHOULD CHECK THAT THESE LIMITS HAVE BEEN SET HIGH ENOUGH FOR PROPER OPERATION.

CRATE POWER SHOULD BE TURNED OFF DURING INSERTION AND REMOVAL OF UNIT TO AVOID POSSIBLE DAMAGE CAUSED BY MOMENTARY MISALIGNMENT OF CONTACTS.

SEE POCKET IN BACK OF MANUAL FOR SCHEMATICS, PARTS LISTS AND ADDITIONAL ADDENDA WITH ANY CHANGES TO MANUAL.

A T T E N T I O N

GENERAL INFORMATION

PURPOSE

This manual is intended to provide instruction regarding the setup and operation of the covered instruments. In addition, it describes the theory of operation and presents other information regarding its functioning and application.

The Service Documentation should be consulted for the schematics, parts lists and other materials that apply to the specific version of the instrument as identified by its ECO number.

UNPACKING AND INSPECTION

It is recommended that the shipment be thoroughly inspected immediately upon delivery. All material in the container should be checked against the enclosed Packing List and shortages reported promptly. If the shipment is damaged in any way, please notify the Customer Service Department or the local field service office. If the damage is due to mishandling during shipment, you may be requested to assist in contacting the carrier in filing a damage claim.

WARRANTY

LeCroy warrants its instrument products to operate within specifications under normal use and service for a period of one year from the date of shipment. Component products, replacement parts, and repairs are warranted for 90 days. This warranty extends only to the original purchaser. Software is thoroughly tested, but is supplied "as is" with no warranty of any kind covering detailed performance. Accessory products not manufactured by LeCroy are covered by the original equipment manufacturers warranty only.

In exercising this warranty, LeCroy will repair or, at its option, replace any product returned to the Customer Service Department or an authorized service facility within the warranty period, provided that the warrantor's examination discloses that the product is defective due to workmanship or materials and has not been caused by misuse, neglect, accident or abnormal conditions or operations.

The purchaser is responsible for the transportation and insurance charges arising from the return of products to the servicing facility. LeCroy will return all in-warranty products with transportation prepaid.

This warranty is in lieu of all other warranties, express or implied, including but not limited to any implied warranty of merchantability, fitness, or adequacy for any particular purpose or use. LeCroy shall not be liable for any special, incidental, or consequential damages, whether in contract, or otherwise.

PRODUCT ASSISTANCE Answers to questions concerning installation, calibration,

and use of LeCroy equipment are available from the Research System Division Customer Services Department, 700 Chestnut Ridge Road, Chestnut Ridge, New York 10977-6499 (914) 578-6030, or your local field service office.

MAINTENANCE AGREEMENTS

LeCroy offers a selection of customer support service. For example, Blue Ribbon service provides guaranteed three-day turn around on repairs, a direct access number for product application assistance, yearly calibration and the addition of engineering improvements. Maintenance agreements provide extended warranty that allows the customer to budget maintenance costs after the initial warranty has expired. Other services such as installation, training, on-site repair, and addition of engineering improvements are available through specific Supplemental Support Agreements. Please contact the Customer Service Department or the local field service office for details.

DOCUMENTATION DISCREPANCIES

LeCroy is committed to providing state-of-the-art instrumentation and is continually refining and improving the performance of its products. While physical modifications can be implemented quite rapidly, the corrected documentation frequently requires more time to produce. Consequently, this manual may not agree in every detail with the accompanying product and the schematics in the Service Documentation. There may be small discrepancies in the values of components for the purposes of pulse shape, timing, offset, etc., and, occasionally, minor logic changes. Where any such inconsistencies exist, please be assured that the unit is correct and incorporates the most up-to-date circuitry.

SOFTWARE LICENSING AGREEMENT

Software products are licensed for a single machine. Under this license you may:

- Copy the software for backup or modification purposes in support of your use of the software on a single machine.
- Modify the software and/or merge it into another program for your use on a single machine.
- Transfer the software and the license to another party if the other party accepts the terms of this agreement and you relinquish all copies, whether in printed or machine readable form, including all modified or merged versions.

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CAMAC

Single Channel, Wide Range

CAMAC Model 2415

High Voltage Power Supply

- ± 3.5 or ± 7 kV scales
- 14-bit CAMAC voltage programming
- ADC voltage/current monitor
- 8-bit current limit CAMAC programming

The LeCroy Model 2415 is a versatile, general purpose high voltage power supply packaged in a #2 CAMAC module. The output voltage and the maximum output current can be set via front-panel multi-turn potentiometers or via CAMAC programming. The front-panel voltage and current settings serve as hardware limits for the CAMAC demand values. This feature eliminates the possibility of detector damage due to inadvertent software errors or computer failures. The unit offers front-panel BNC voltage and current monitor outputs. A built-in ADC allows both to be read via CAMAC.

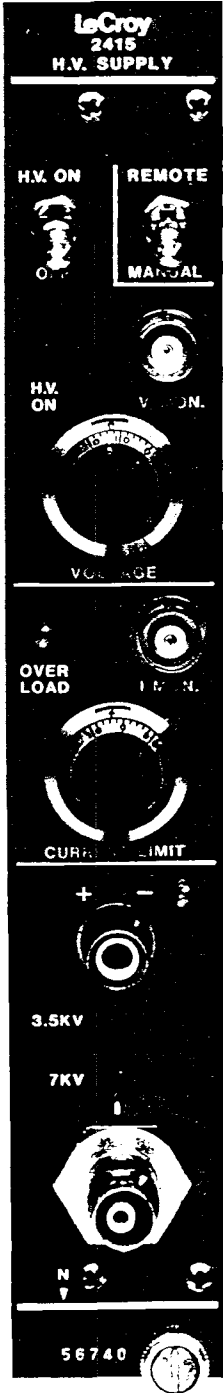
The Model 2415 offers circuit-board mounted jumpers which allow the unit to be operated in several modes. One set of jumpers selects the output polarity. The other set selects the output range: 3.5 kV or 7 kV maximum. Front-panel LEDs indicate the mode selected. The high and low level outputs are provided at separate output connectors.

When used in the ± 3.5 kV ranges, the Model 2415 offers 0.25 V CAMAC voltage programming resolution with a voltage monitor resolution of 1 V. It provides an output current of up to 2.5 mA with current monitor resolution of 0.625 μ A.

When used in the ± 7 kV ranges, the Model 2415 offers 0.5 V CAMAC voltage programming resolution with a voltage monitor resolution of 2 V. It provides an output current of up to 1.0 mA with current monitor resolution of 250 nA.

Special attention has been given to the current monitor circuitry. In the 7 kV CAMAC mode, the device can register a current of less than 1 μ A. This allows accurate diagnostics of proportional and drift chambers. In this way, a chamber system may be repaired before data are lost or catastrophic damage is done to the chamber.

The Model 2415 has been designed as a versatile, general purpose instrument and finds use in a variety of laboratory applications.



SPECIFICATIONS

CAMAC Model 2415

PROGRAMMABLE HIGH VOLTAGE SUPPLY

	±3.5 kV Configuration	±7 kV Configuration
Voltage Control		
Range	100-3500 V	200-7000 V
CAMAC Programming	14-bits	14-bits
CAMAC Programming Step	0.25 V	0.5 V
CAMAC Programming Accuracy	$\leq \pm(1.5 \text{ V} + 0.1\%)$	$\leq \pm(3 \text{ V} + 0.1\%)$
Front-Panel Adjustment	Ten-turn vernier potentiometer.	
CAMAC Monitor	500 V/turn	1000 V/turn
CAMAC Monitor Resolution	12-bit ADC	12-bit ADC
CAMAC Monitor Offset	1 V	2 V
CAMAC Monitor Offset (Response to 0 V output)	0-2 counts	0-2 counts
CAMAC Monitor Accuracy	$\pm 0.2\%$	$\pm 0.2\%$
Front-Panel Monitor	Low Impedance (< 10 Ω) voltage output, suitable for driving a meter; BNC connector.	
Front-Panel Monitor Scale	2 V/kV $\pm 0.5\%$	1 V/kV $\pm 0.5\%$
Front-Panel Monitor Offset (value for 0 V output)	$\leq \pm 4 \text{ V}$ referred to HV Output	$\leq \pm 8 \text{ V}$ referred to HV Output
Current Control		
Range	0-2.5 mA	0-1 mA
CAMAC Programming	8-bits	8-bits
CAMAC Programming Step	10 μA	4 μA
CAMAC Programming Accuracy	$\pm(1\% + 12 \mu\text{A})$	$\pm(1\% + 5 \mu\text{A})$
Front-Panel Adjustment	Ten-turn vernier potentiometer.	
CAMAC Monitor	250 μA /turn	100 μA /turn
CAMAC Monitor Resolution	12-bit ADC	12-bit ADC
CAMAC Monitor Offset	625 nA	250 nA
CAMAC Monitor Offset (Response to 0 μA load)	1 or 2 counts	1 or 2 counts
CAMAC Monitor Accuracy	$\pm 0.5\%$	$\pm 0.5\%$
Front-Panel Monitor	Low Impedance (< 10 Ω) voltage output, suitable for driving a meter; BNC connector.	
Front-Panel Monitor Scale	4 V/mA $\pm 0.5\%$	10 V/mA $\pm 0.5\%$
Front-Panel Monitor Offset (value for 0 V output)	$\leq \pm 4 \mu\text{A}$	$\leq \pm 2 \mu\text{A}$
General		
Output Power Rating	7 W	7 W
Output Ripple (at maximum current)	<50 mV rms	<50 mV rms
Output Temperature Coefficient	Typically $\pm 50 \text{ ppm}/^\circ\text{C}$, $\pm 100 \text{ ppm}/^\circ\text{C}$ maximum	
Voltage Regulation	<0.5 V (0 to 2.5 mA)	<1 V (0 to 1 mA)
Short Circuit Protection	Yes	Yes
Output Connector	SHV	Reynolds 1064-1
Controls		
HV On/Off:	Toggle switch. Turns On/Off HV output.	
Manual/Remote:	Selects front panel or CAMAC operation of voltage and current set.	
ADC:	12-bits; conversion time <30 μsec .	
Indicator Lamps		
HV On:	Voltage present at output	
Overload:	Supply in current-limiting mode	
Positive:	Positive output configuration	
Negative:	Negative output configuration	
3.5 kV	3.5 kV configuration	
7 kV	7 kV configuration.	
CAMAC Commands:	<p>Z: Clear LAM, demand voltage and current limit registers. (also occurs on CAMAC powerup)</p> <p>Q: A Q=1 signal for F(0) indicates A/D conversion complete and valid data at R1...R12. A Q=1 signal for F(8) indicates LAM is set and an overload condition has occurred since the last F(10).</p> <p>X: An X=1 (command accepted) is generated when a valid N, F command is received. (Some commands which are acknowledged by X have null function. Validity of A is not taken into account).</p> <p>L: A Look-At-Me signal is generated (if enabled by on-board jumper) when LAM is set, indicating that an overload condition has occurred since the last F(10). L is inhibited when module is addressed.</p>	
CAMAC Function Codes:	<p>F(0): Read ADC data via R1...R12 A Q=1 response indicates ADC conversion is complete.</p> <p>F(8): Test LAM. If the LAM is true, responds with Q = 1.</p> <p>F(10): Clear LAM. (LAM is set by overload condition)</p> <p>F(16)•A(0): Write demand voltage via W1...W14</p> <p>F(16)•A(1): Write current limit via W1...W8</p> <p>F(26)•A(0): Convert output voltage to digital.</p> <p>F(26)•A(1): Convert output current to digital.</p>	
Power Requirements:	<p>350 mA @ +24 V</p> <p>350 mA @ -24 V</p> <p>350 mA @ +6 V</p>	

SECTION 1

SPECIFICATIONS

1.2 Response to AC Line Failures

The 2415 has been engineered to protect sensitive loads from the effects of AC line failures. In some high voltage supply designs, a short AC line failure can cause overshoot on the output. This happens if the response to the loss of AC power is slow (due to large capacitors on the high voltage output) and the response to the restoration of line power is fast. In this set of circumstances a supply may raise the output voltage quickly and overshoot the intended target because the starting point of the output was already high. Overshoot by the 2415 is guaranteed to be less than 1% of full scale during AC power up. This is true for initial turn on in addition to recovery from temporary power failures.

SECTION 2

OPERATING INSTRUCTIONS

2.1 Control Mode Selection

Selection of control modes between CAMAC and the front panel is accomplished by the REMOTE/MANUAL switch. When this switch is in the REMOTE position, the front panel VOLTAGE and CURRENT LIMIT settings serve as hardware limits. This prevents damage to the load that may be caused by inadvertent software errors or computer failure. The user should check that these limits are set high enough for proper operation in REMOTE mode.

2.2 Front Panel Control

With high voltage off, the user should first check that the 2415 is set to the desired operating range (see Section 2.4) and plug the load into the appropriate high voltage output. A current limit should then be set using the front panel potentiometer. In both operating modes, one turn of the potentiometer is 10% of the maximum current (250 μ A/turn for 3.5 kV and 100 μ A/turn for 7 kV). If the load is sensitive to the rate of high voltage increase then the VOLTAGE potentiometer should be set to zero before implementing the HV ON switch. After turning high voltage on, the rate of increase in the voltage output and the current drawn by the load may be monitored through front panel BNC connectors while the user turns the VOLTAGE pot. Readback of the voltage (current) monitor is 2 V/kV (4 V/mA) in the 3.5 kV operating configuration and 1 V/kV (10 V/mA) for 7 kV operation. If the load is not sensitive to the rate of voltage change then the VOLTAGE pot may be set and left at the proper operating point when voltage is turned on and off.

2.3 CAMAC Control

The REMOTE/MANUAL switch should be set to REMOTE for CAMAC operation. High voltage may still be enabled or disabled using the H.V. ON/OFF switch. The VOLTAGE and CURRENT LIMIT potentiometers act as hardware limits (as described in Section 2.1). A list of CAMAC commands and CAMAC Function Codes available for use with the 2415 is given in Table 1 at the end of Section 2. Note that Q=1 is returned for F(8) if an overload has occurred and for F(0) if there is valid data on the Read lines. If the user does not want the LAM to be set by an overload condition, then this feature may be defeated by moving the LAM Enable jumper (Figure 2.1).

The fourteen bits available for voltage programming and eight bits available for current limit programming are more than sufficient to reach full scale. The user should not assume that full scale output is equal to the programming step size multiplied by the maximum CAMAC request. Actual full scale is 7 kV (1 mA) or 3.5 kV (2.5 mA).

2.4 Changing Operating Scales (see Figure 2.1)

The 2415 is factory set for -3.5 kV operation. Jumper locations have been changed in some models of the 2415. However they are always clearly labeled on the printed circuit board.

2.4.1 Changing from Negative to Positive High Voltage

The procedure to set the 2415 for positive high voltage if it has previously been set for negative output is:

1. Rotate diode array 180° so that the notch faces the front panel. A small P will be visible through the notch (Figure 2.1). Units shipped after 11/1/82 have an arrow on top of the diode array pointing toward this notch. The arrow should point toward the front of the unit when using positive high voltage and toward the rear of the module for negative output.
2. Change position of 2 jumpers in position A and 3 jumpers in position B.

2.4.2 Changing from 3.5 kV to 7 kV Operation

To change the magnitude of the voltage scale:

1. Change jumpers in positions C, D and E (Figure 2.1).
2. Change the position of the .005 μF , 4 kV capacitor. This capacitor is only used for 7 kV operation. The 3 kV position is used for storage while it is not needed.

TABLE 1

CAMAC Commands:	Z:	Clear LAM, demand voltage and current limit registers (also occurs on CAMAC powerup).
	Q:	A Q=1 signal for F(0) indicates A/D conversion complete and valid data at R1...R12. A Q=1 signal for F(8) indicates LAM is set and an overload condition has occurred since the last F(10).
	X:	An X=1 (command accepted) is generated when a valid N, F command is received. (Some commands which are acknowledged by X have null function. Validity of A is not taken into account).
	L:	A Look-At-Me signal is generated (if enabled by on-board jumper) when LAM is set, indicating that an overload condition has occurred since the last F(10). L is inhibited when module is addressed.
CAMAC Function Codes:	F(0):	Read ADC data via R1...R12. A Q=1 response indicates ADC conversion is complete.
	F(8):	Test LAM. If the LAM is true, responds with Q=1.
	F(10):	Clear LAM. (LAM is set by overload condition)
	F(16)•A(0):	Write demand voltage via W1...W14
	F(16)•A(1):	Write current limit via W1...W8
	F(26)•A(0):	Convert output voltage to digital.
	F(26)•A(1):	Convert output current to digital.

TECHNICAL INFORMATION
(SCHEMATICS, PARTS LISTS)

PART NUMBER	DESCRIPTION	QUANTITY PER
102055332	CAP CERA DISC 3KV 3300 PF	1
102094330	CAP CERA DISC 33 PF	1
102095502	CAP CERA DISC 4KV .005 UF	1
102245103	CAP CERA DISC 25V .01 UF	23
102444101	CAP CERA DISC 100V 100 PF	2
102745102	CAP CERA DISC 500 .001 UF	5
103327103	CAP CERA MONO 50V .01 UF	1
103427104	CAP CERA MONO 100V .1 UF	7
103626102	CAP CERA MONO 100 .001 UF	2
116515151	CAP DIP MICA DM10 150 PF	1
116515301	CAP DIP MICA DM10 300 PF	1
116515680	CAP DIP MICA DM10 68 PF	1
116525511	CAP DIP MICA DM15 510 PF	1
124076153	CAP POLYESTER FILM .015	4
128136472	CAP FILM/FOIL DIP 4700 PF	1
142124476	CAP TANT DIP CASE 47 UF	4
142824685	CAP TANT DIP CASE 6.8 UF	7
147956047	CAP ALUM METAL CAN 47 UF	2
161030000	RES COMP ZERO OHMS	1
161225183	RES CARBON FILM 18 K	1
161225243	RES CARBON FILM 24 K	1
161305103	RES COMP 1/4W 5% 10 K	2
161305512	RES COMP 1/4 5% 5.1 K	2
161335039	RES CARBON FILM 3.9 OHMS	2
161335102	RES CARBON FILM 1 K	3
161335103	RES CARBON FILM 10 K	3
161335132	RES CARBON FILM 1.3 K	1
161335153	RES CARBON FILM 15 K	1
161335186	RES CARBON FILM 18 MEG	1
161335202	RES CARBON FILM 2 K	1
161335203	RES CARBON FILM 20 K	2
161335221	RES CARBON FILM 220 OHMS	6
161335223	RES CARBON FILM 22 K	1
161335226	RES CARBON FILM 22 MEG	2
161335241	RES CARBON FILM 240 OHMS	1
161335244	RES CARBON FILM 240 K	2
161335272	RES CARBON FILM 2.7 K	1
161335302	RES CARBON FILM 3 K	2
161335362	RES CARBON FILM 3.6 K	1
161335363	RES CARBON FILM 36 K	4
161335390	RES CARBON FILM 39 OHMS	2
161335392	RES CARBON FILM 3.9 K	2
161335471	RES CARBON FILM 470 OHMS	3
161335623	RES CARBON FILM 62 K	1
161335753	RES CARBON FILM 75 K	1
161445471	RES CARBON FILM 470 OHMS	1
161505242	RES COMP 1W 5% 2.4 K	1
161505512	RES COMP 1W 5% 5.1 K	2
161555560	RES COMP 1W 5% 56 OHMS	2
168009001	RESISTOR PREC HV 49.9 MEG	2
168131583	RES RN55E 1% 95.3 K	1
168139489	RES RN55E .1% 10 K	2
168139518	RES RN55E .1% 20.0 K	1
168139573	RES RN55E .1% 75.0 K	9

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2415 PARTS LIST

PART NUMBER	DESCRIPTION	QUANTITY PER
168531337	RES PREC RN55D 261 OHMS	1
168531365	RES PREC RN55D 511 OHMS	1
168531393	RES PREC RN55D 1.00 K	2
168531417	RES PREC RN55D 1.78 K	1
168531421	RES PREC RN55D 1.96 K	2
168531425	RES PREC RN55D 2.15 K	2
168531441	RES PREC RN55D 3.16 K	2
168531445	RES PREC RN55D 3.48 K	2
168531449	RES PREC RN55D 3.83 K	3
168531461	RES PREC RN55D 5.11 K	2
168531473	RES PREC RN55D 6.81 K	1
168531477	RES PREC RN55D 7.50 K	1
168531485	RES PREC RN55D 9.09 K	1
168531489	RES PREC RN55D 10.0 K	4
168531501	RES PREC RN55D 13.3 K	1
168531524	RES PREC RN55D 23.2 K	1
168531535	RES PREC RN55D 30.1 K	1
168531545	RES PREC RN55D 38.3 K	1
168531581	RES PREC RN55D 90.9 K	1
168531585	RES PREC RN55D 100 K	1
168531625	RES PREC RN55D 261 K	1
168531653	RES PREC RN55D 511 K	1
175235005	RES PWR WW 2.5W 5% .5 OHM	2
181447101	RES VARI CERMET 100 OHMS	4
181447102	RES VARI CERMET 1 K	4
181447103	RES VARI CERMET 10 K	2
181447105	RES VARI CERMET 1 MEG	1
181447202	RES VARI CERMET 2 K	3
181447203	RES VARI CERMET 20 K	1
181447502	RES VARI CERMET 5 K	2
181447503	RES VARI CERMET 50 K	1
187235502	RES VARI WW 10-TURN 5% 5K	2
200031028	IC 2-INPUT NAND SN74LS00N	1
200031046	IC HEX INVERTER SN74LS04N	4
200031049	IC D-TYP FLOP SN74LS74N	1
200031051	IC 2-INPUT NOR SN74LS02N	1
200031073	IC 2-IN POS OR SN74LS32N	1
200031103	IC BUS BUFFER SN74126N	3
200032010	IC 2-INPUT NAND 74LS38PC	1
200041033	IC D-TYP FLOP SN74LS174N	1
200041039	IC MONO/MULTIVIB N74LS221	1
200041044	IC MULTIVIBR SN74LS123N	1
200041062	IC DEC/DEMULTP SN74LS138N	1
200071005	IC D-TYP FLOP SN74LS273N	2
208011004	IC TIMER NE555	1
208011008	IC VOLT COMPARATOR LM311N	2
208011010	IC PMOS ANALOG SW TL604CP	1
208011011	IC JFET OP AMP TL082CP	1
208011012	IC OP AMP TL081CP	1
208011398	IC MONO SAMPLE/HOLD LF398	1
208031004	IC PREC VOLT REG UA723C	2
208031084	IC QUAD J-FET OP AMP 084	3
208041001	IC 8-BIT DAC MONODAC-08EQ	1
208111002	IC A/D CONV ADC80AG-12	1

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2415 PARTS LIST

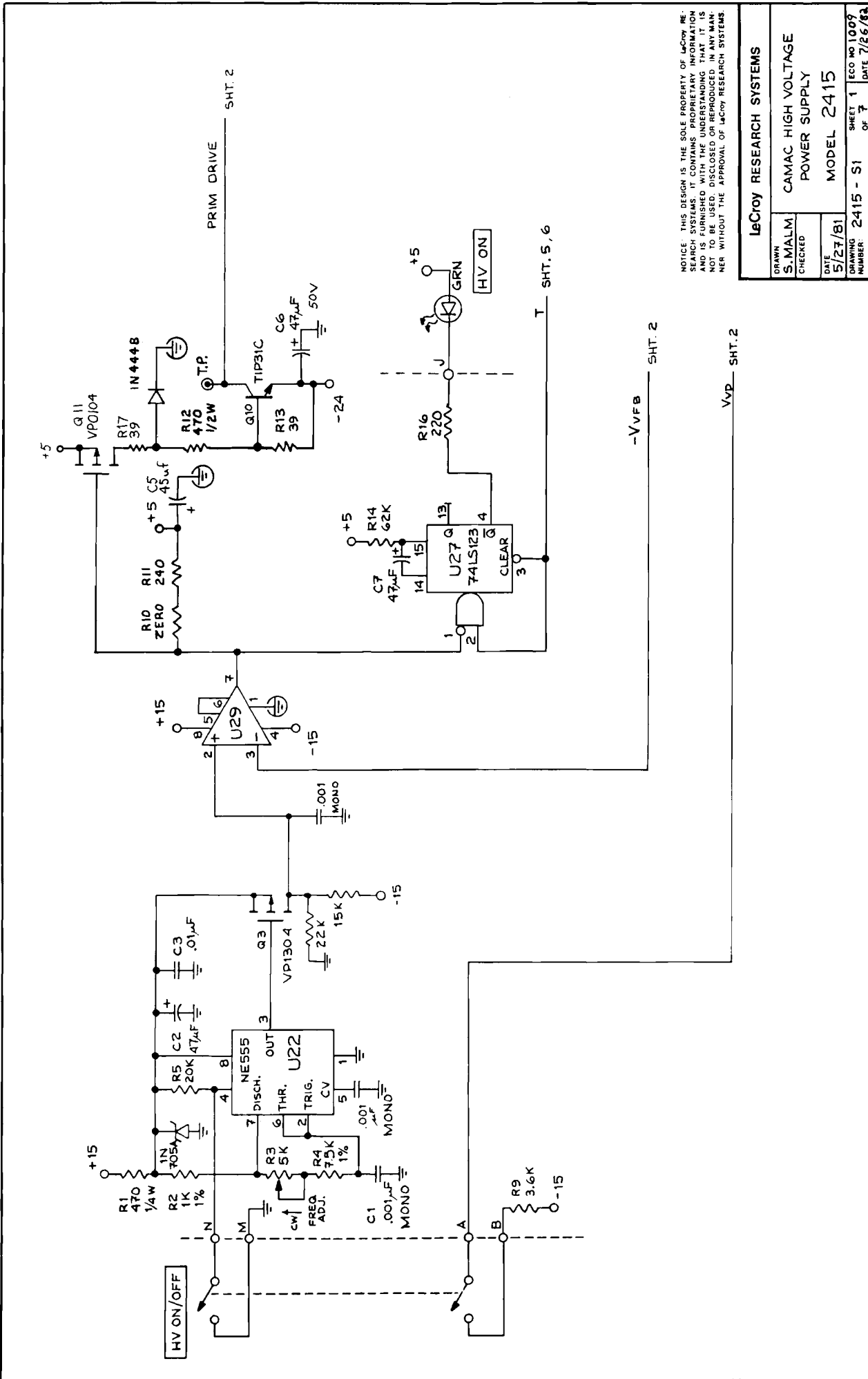
PART NUMBER	DESCRIPTION	QUANTITY PER
208183565	IC 12-BIT DAC AD565KN	1
229020055	TRANS VOLT SUPPR P6KE6.8	1
229020145	TRANS VOLT SUPPR P6KE18	2
230110005	DIODE SWITCHING 1N4448	12
235010005	DIODE RECTIFIER 1N4005	4
235040060	DIODE RECTIFIER LM60	5
240225705	DIODE ZENER 4.7V 1N5992A	1
256010102	DIODE LED (RED) DIFF LENS	2
256443322	DIODE LED (YELLOW) MV5353	2
256542222	DIODE LED (GREEN) MV5253	2
270110003	TRANSISTOR NPN 2N2222A	2
270140001	TRANSISTOR NPN 2N3866	1
271130002	TRANSISTOR NPN PWR TIP31C	1
275110001	TRANSISTOR PNP 2N2907A	2
275150003	TRANSISTOR PNP 40319	1
275170906	TRANSISTOR PNP 2N3906	1
280170306	TRANSISTOR FET N VN1306N3	1
280180001	TRANSISTOR FET "N" U1897	1
281170104	TRANSISTOR FET P VP0104N3	1
281170304	TRANSISTOR FET P VP1304N3	1
300050001	CHOKE FERRITE SINGLE LEAD	5
377011000	LABEL "DANGER ---- VAPOR"	1
377011005	LABEL: "CAUTION HAZ VOLT"	1
399011016	SOCKET SOLDER TAIL SIP-16	2
400010008	SOCKET IC ST DIP-8	7
400020014	SOCKET IC ST DIP-14	17
400030016	SOCKET IC ST DIP-16	5
400040024	SOCKET IC ST DIP-24	1
400170020	SOCKET IC ST DIP-20	2
402020000	CONNECTOR CO-AXIAL BNC	2
402070000	CONNECTOR CO-AXIAL SHV	1
402070002	CONNECTOR CO-AXIAL 10 KV	1
403980002	SHUNT ASSEMBLY 2-POS	1
405754013	SHORTING PLUG 1/2 IN HIGH	10
405764008	SOCKET SINGLE WIRE CLOSED	4
405764012	SOCKET SINGLE WIRE CLOSED	35
408022002	TERMINAL SWAGED (PC PIN)	6
408030103	WIREWRAPE PIN	1
410222102	SWITCH TOGGLE DPDT	2
433220002	FUSE PICO II 125V 3 AMP	1
433220003	FUSE PICO II 125V .5 AMP	4
440080001	TRANSFORMER HI V STEP-UP	1
454311003	HDR DIP SOLDER TO MALE 3	1
500120002	TRANSIPAD "LARGE"	2
500460005	MOUNTING KIT FOR TO-220	1
512371102	HEAT SINK FOR 2415	1
519110002	BUSHING LED BLK MP 52	6
521000004	SPACER HEX 2-56X.417	4
536221002	KNOB ASSEMBLY 10-TURN	2
540203001	SIDE COVER CAMAC STD(LIP)	1
540206078	RAIL CAMAC STD TOP W/LIP	2
540206178	RAIL CAMAC STD BOT W/LIP	2
540209022	REAR PANEL CAMAC SIZE #2	1
555430003	CAPTIVE SCREW ASSEMBLY	1

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LECROY CORPORATION
2415 PARTS LIST

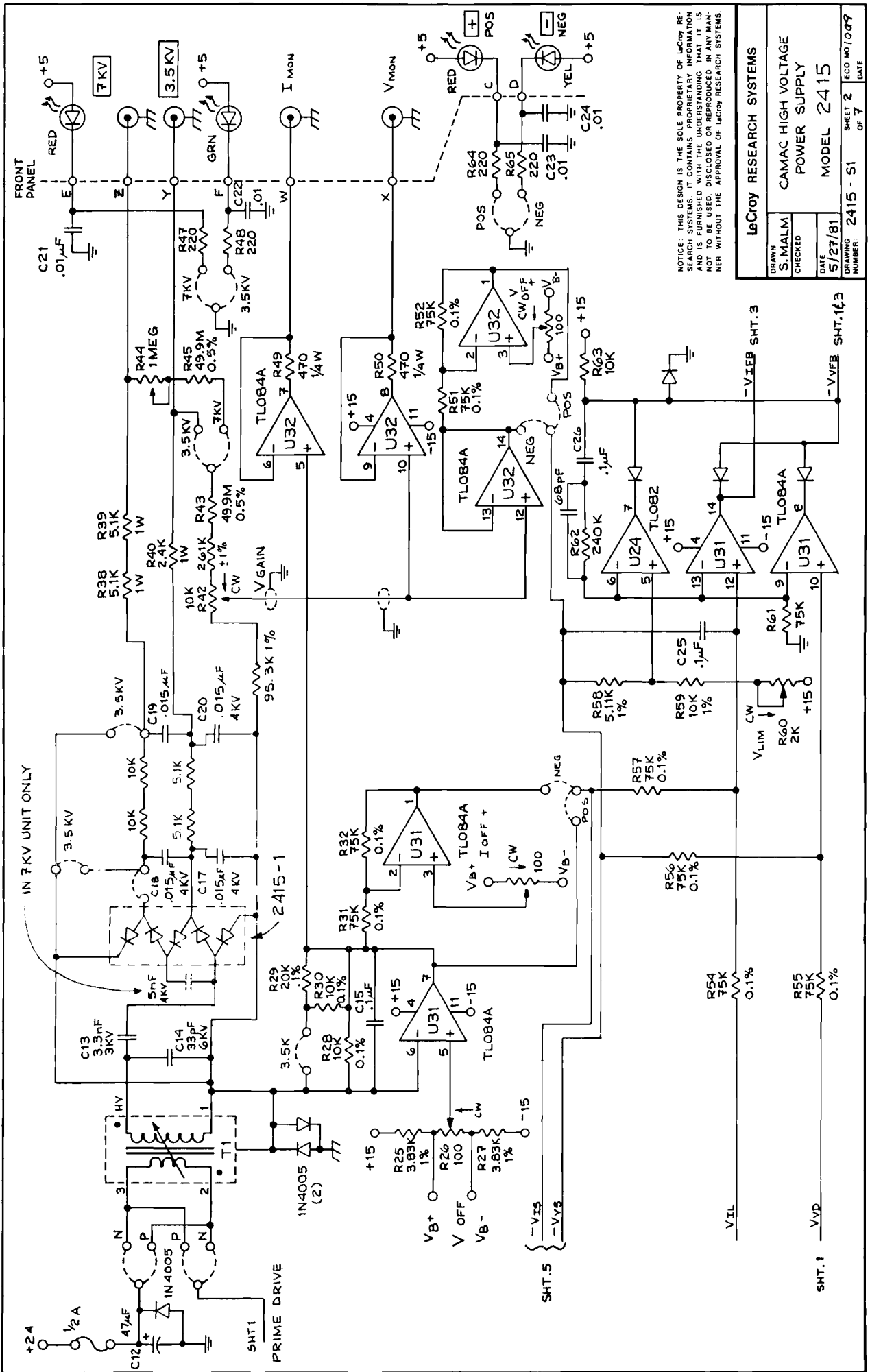
PART NUMBER	DESCRIPTION	QUANTITY PER
560256005	SCREW PHILIPS 2-56X5/16	4
560440003	SCREW PHILIPS 4-40X3/16	8
560440004	SCREW PHILIPS 4-40X1/4	2
560440005	SCREW PHILIPS 4-40X5/16	6
560440006	SCREW PHILIPS 4-40X3/8	1
567440006	SCREW FLAT PHIL 4-40X3/8	4
568256002	SCREW FLAT PHIL 2-56X1/8	4
574409005	WASHER SHOULDER NYLON #4	1
575410002	WASHER FLAT SS .250 OD #4	1
576410001	WASHER SPLIT LOCK SIZE 4	2
589601124	WIRE SPECIAL HI VOLTAGE	1
590991024	WIRE TEFLON 7/32 WHT 24	20
591603030	WIRE SINGLE BLU AWG 30	1
593910001	CABLE CO-AXIAL RG178B/U	1
594120003	TIEWRAP	9
595003018	SLEEVING SHRINK BLK 3/32"	1
595901022	SLEEVING TEFLON AWG 22	1
702415001	INSULATION BD UNCLAD 2415	1
712415003	PC BD PREASS'Y 2415	1
712415013	PC BD PREASS'Y 2415-1	1
722415003	FRONT PNL PREASS'Y 2415	1
732415002	SIDE CAMAC LEFT 2415	1

End of report. 184 Details encountered.



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LACROY RESEARCH SYSTEMS	
DRAWN S. MALM	CAMAC HIGH VOLTAGE POWER SUPPLY
CHECKED	MODEL 2415
DATE 5/27/81	SHEET 1 OF 7
DRAWING NUMBER: 2415 - S1	ECO NO 1009 DATE 7/26/82



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LaCroy RESEARCH SYSTEMS	
DRAWN S. MALM	CAMAC HIGH VOLTAGE
CHECKED	POWER SUPPLY
DATE 5/27/81	MODEL 2415
DRAWING NUMBER 2415 - S1	SHEET 2 OF 7
	ECO NO / 0 0 7 DATE

SHT. 1

SHT. 5

SHT. 3

VVD

VIL

-VVS
-VVS

+15
V OFF
VB-

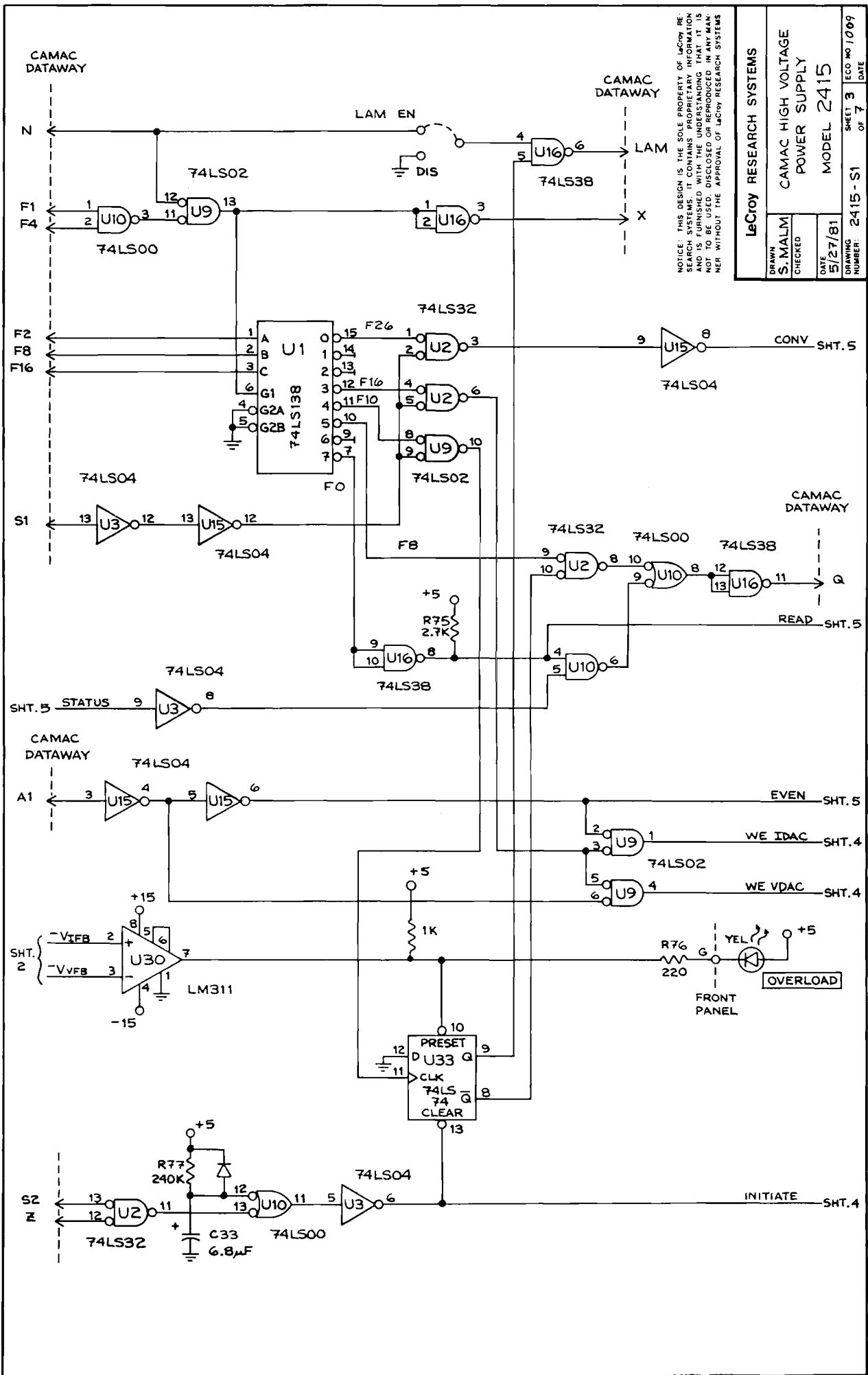
VB+

PRIME DRIVE

SHT1

IN 7KV UNIT ONLY

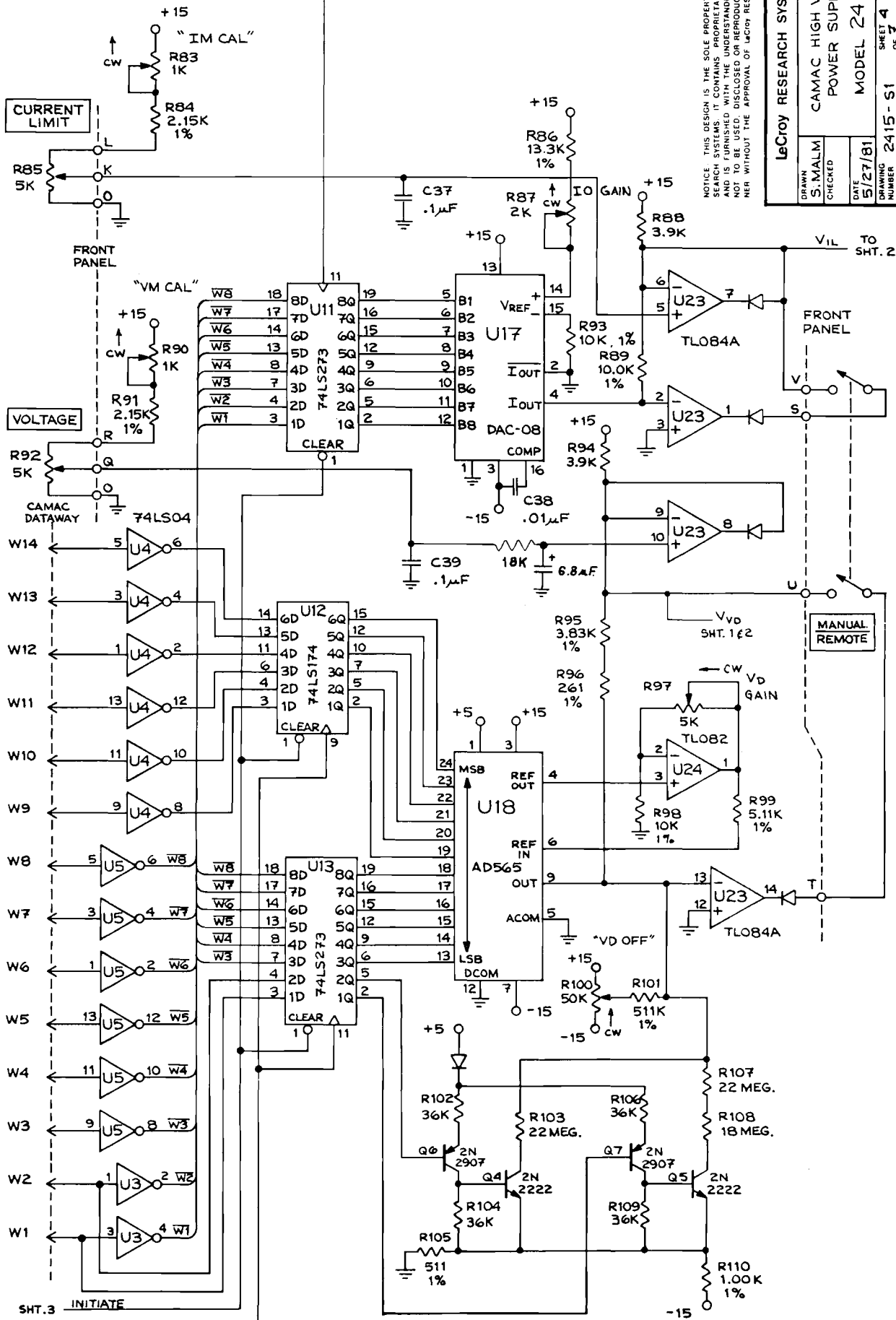
FRONT PANEL



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LeCroy RESEARCH SYSTEMS		ECO NO 1009
CAMAC HIGH VOLTAGE POWER SUPPLY MODEL 2415		SHEET 3 OF 7
DATE 5/27/81	DRAWING NUMBER 2415-S1	DATE
DRAWN S. MALM	CHECKED	

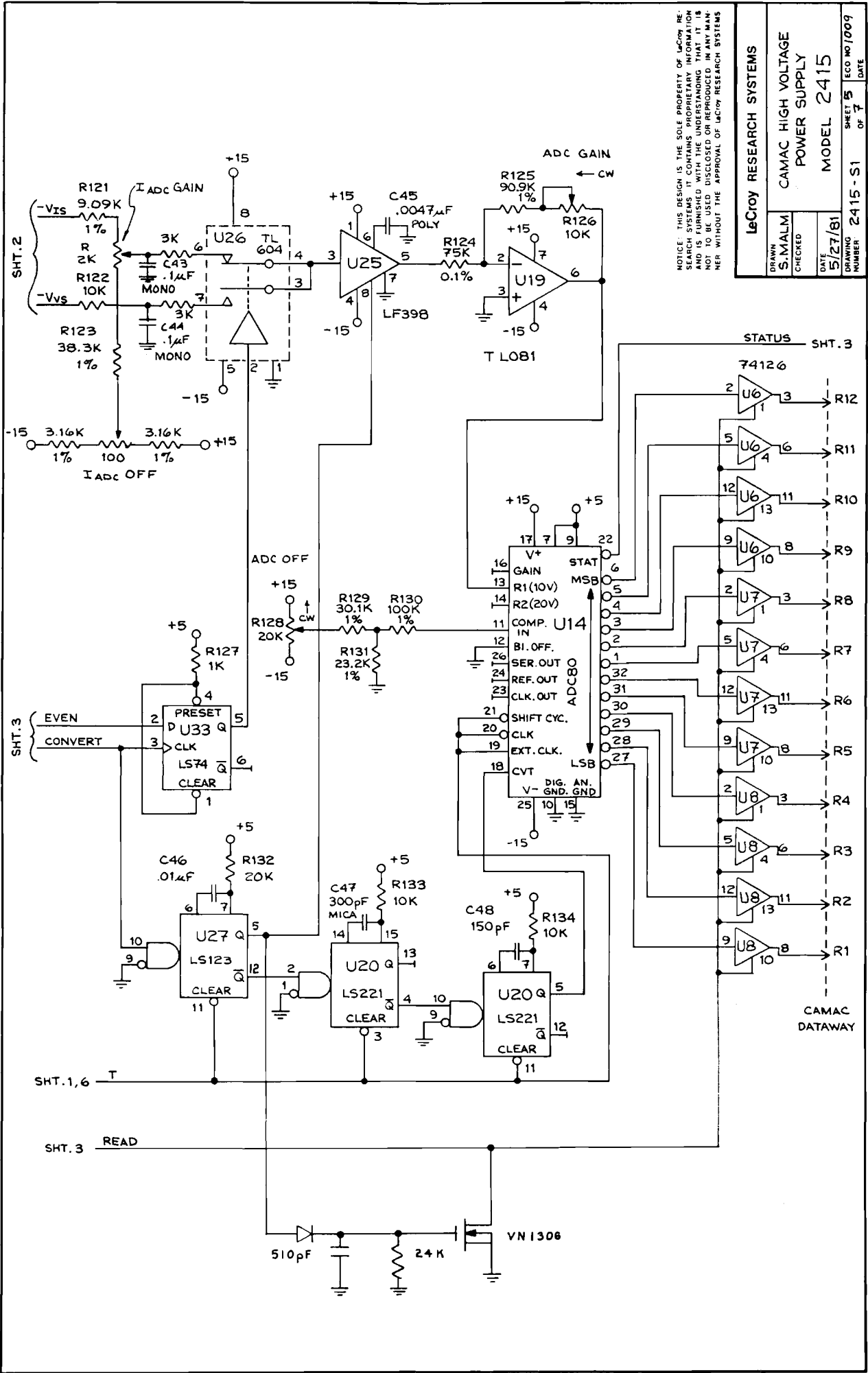
SHT.3 WE IDAC



SHT.3 INITIATE
SHT.3 WE VDAC

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LeCroy RESEARCH SYSTEMS	
CAMAC HIGH VOLTAGE POWER SUPPLY MODEL 2415	
DRAWN S.MALM	CHECKED
DATE 5/27/81	DRAWING NUMBER 2415 - S1
SHEET 4 OF 7	
DATE ECCO 101009	



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LeCroy RESEARCH SYSTEMS		ECO NO 1009
CAMAC HIGH VOLTAGE POWER SUPPLY		DATE
MODEL 2415		OF 7
DRAWN S.MALM	CHECKED	DRAWING NUMBER 2415-S1
DATE 5/27/81		DATE

SHT. 2

STATUS SHT. 3

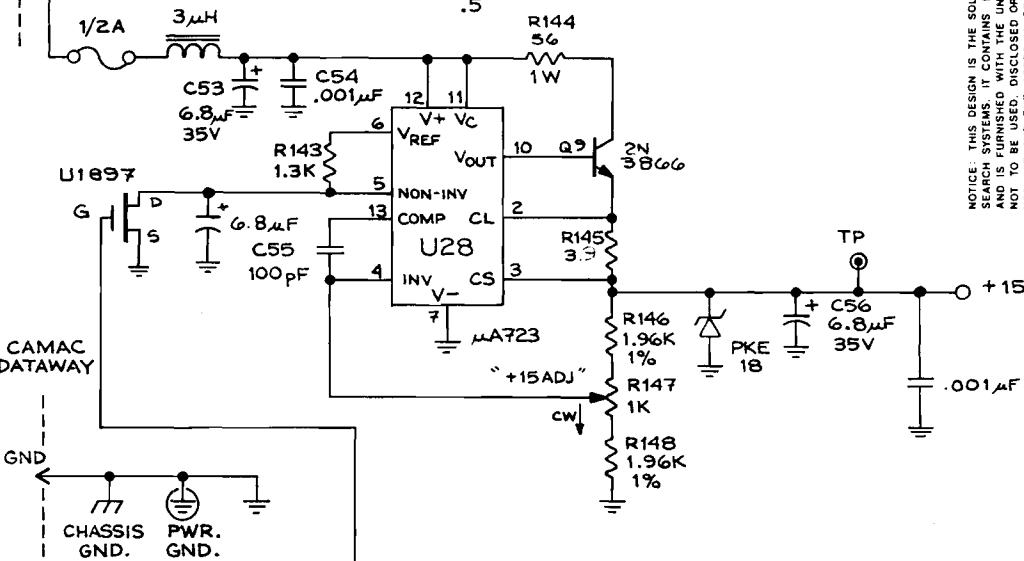
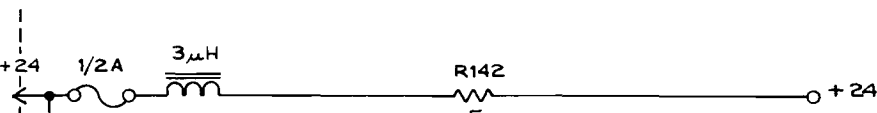
SHT. 3

SHT. 1,6 T

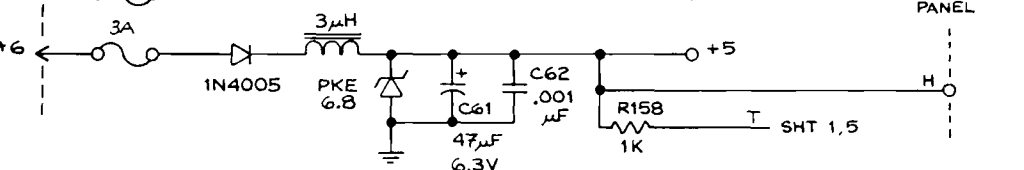
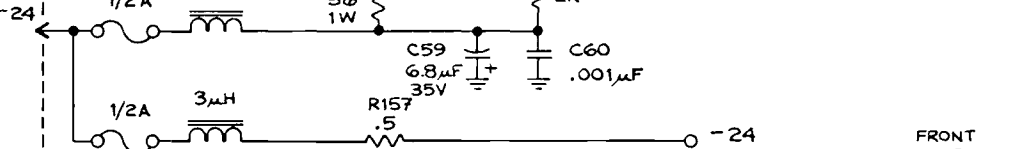
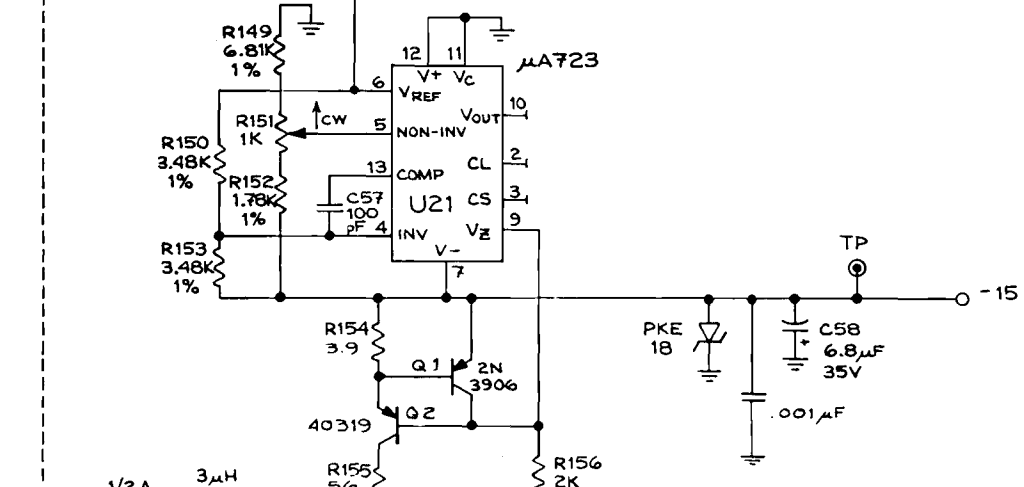
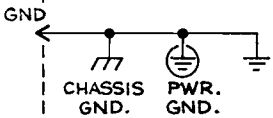
SHT. 3 READ

CAMAC DATAWAY

CAMAC DATAWAY



CAMAC DATAWAY



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Lacroy RESEARCH SYSTEMS	
DRAWN S. MALM	CAMAC HIGH VOLTAGE POWER SUPPLY
CHECKED	MODEL 2415
DATE 5/27/81	DRAWING NUMBER 2415 - S1
SHEET 6	ECO NO / 009
OF 7	DATE

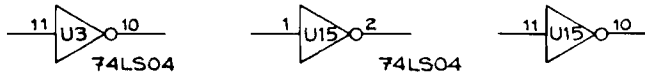
FRONT PANEL

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LeCroy RESEARCH SYSTEMS		CAMAC HIGH VOLTAGE POWER SUPPLY MODEL 2415		ECO NO 1009
DRAWN S. MALM	CHECKED	DATE 5/27/81	SHEET 7	DATE
DRAWING NUMBER: 2415 - S1			OF	

DEVICE	DESIGNATION	+24	+15	+5	GND	-15	-24
74LS00	U10			14	7		
74LS02	U9			14	7		
74LS04	U4,5			14	7		
7409	U3,6,7,8,15			14	7		
74LS32	U2			14	7		
74LS38	U16			14	7		
74LS74	U33			14	7		
74LS138	U1			16	8		
74LS174	U12			16	8		
74LS221	U20,27			16	8		
74LS273	U11,13			20	10		
ADC80	U14	17	7,9	10,15	25		
AD565	U18	3	1	5,12	7		
DAC08	U17	13		1	3		
LF398	U25	1		7	4		
LM311	U29,30	8		1	4		
NE555	U22		8	1			
TILO81	U19	7			4		
TLO82	U24	8			4		
TLO84A	U23,31,32	4			11		
TL604	U26	8		1	5		
μ A723	U21				12	7	
μ A723	U28	12		7			

UNUSED DEVICES



NOTES:

- 1) P.C. PLUG-IN BOARD 2415-1 CONSISTS OF FIVE LM60 DIODES (SHOWN POLARIZED FOR POSITIVE (+) POWER SUPPLY). REVERSE POLARITY FOR NEGATIVE (-) VERSION.
- 2) OPTION JUMPERS ARE LABELED FOR INSTALLED FUNCTION (7KV, 3.5KV, POS., NEG.)
- 3) ADDITIONAL .01 μ F AND/OR 6.8 μ F CAPACITORS, NOT SHOWN, MAY BE USED ON VOLTAGE BUSES.
- 4) REFERENCE DESIGNATIONS:

SHT.	USED	OMITTED
1	R1-17, C1-7	R18-24, C8-11
2	R25-65, C12-26	R66-74, C27-32
3	R75-77, C33	R78-82, C34-36
4	R83-110, C37-39	R111-120, C40-42
5	R121-134, C43-48	R135-141, C49-52
6	R142-158, C53-62	R159 \rightarrow , C63 \rightarrow