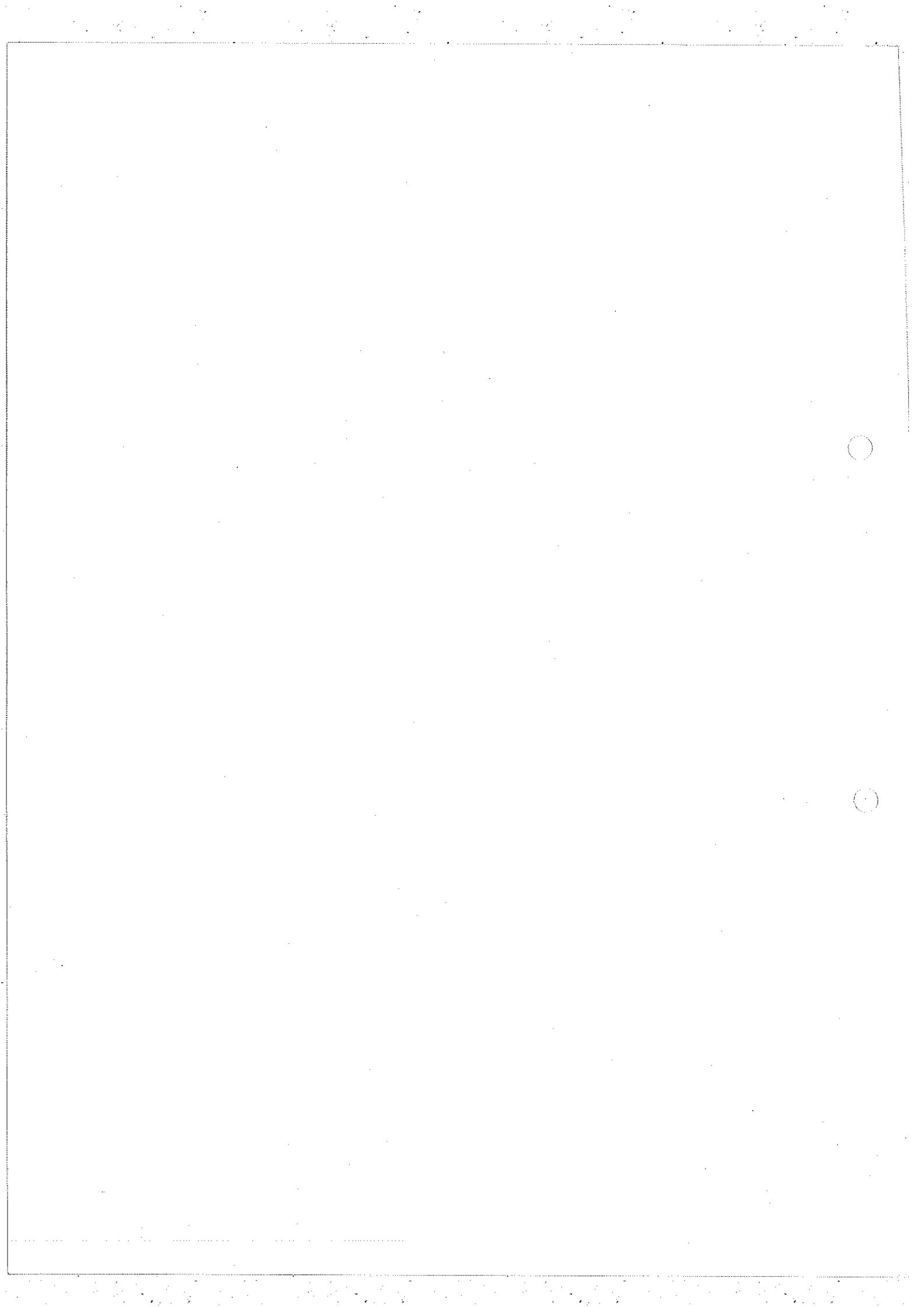


NIM MODEL 365AL

DUAL 4-FOLD MAJORITY
LOGIC GATE WITH VETO

APRIL 1984



A T T E N T I O N

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

100-1000

100-1000



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.

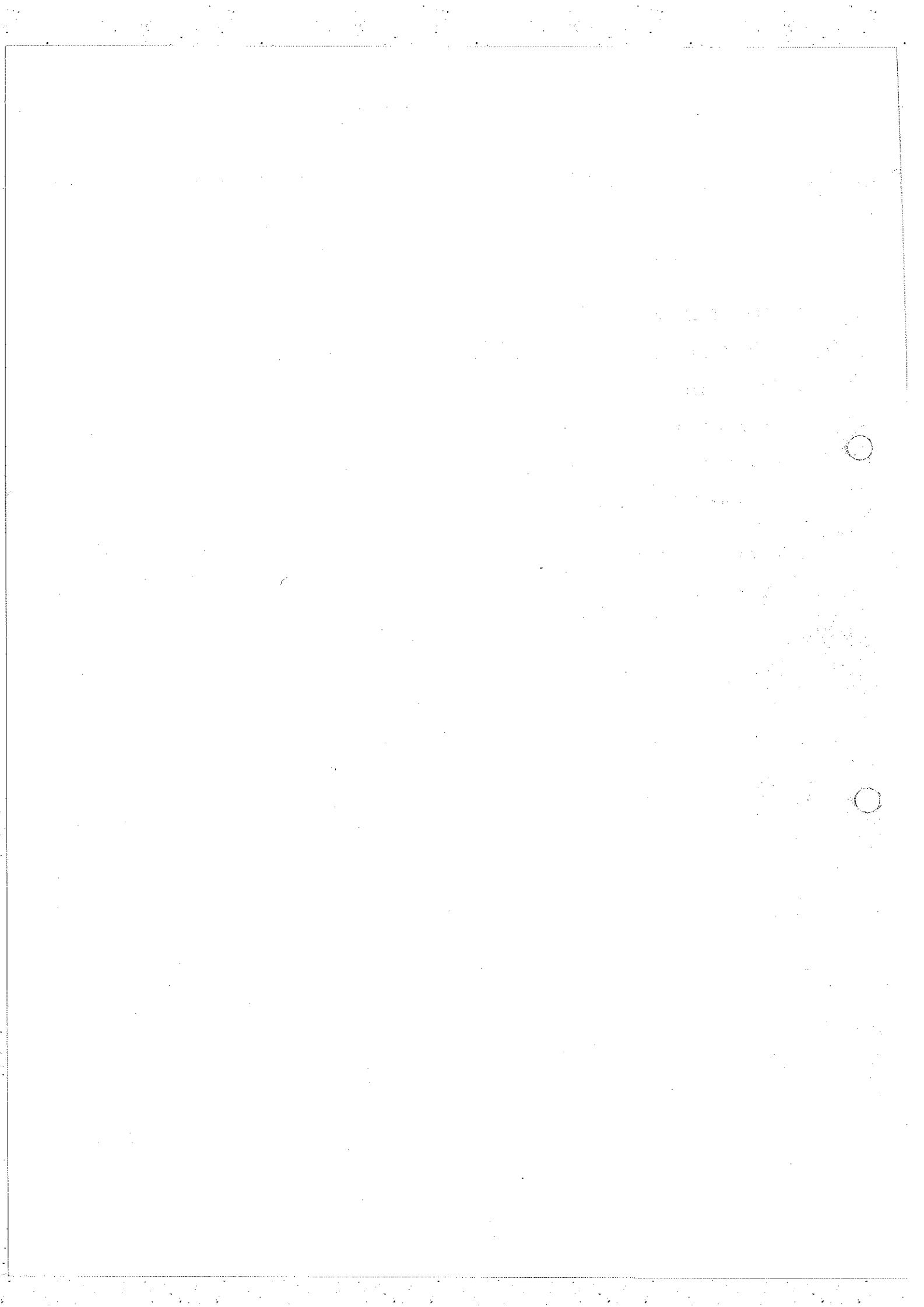
SOFTWARE LICENSING AGREEMENT

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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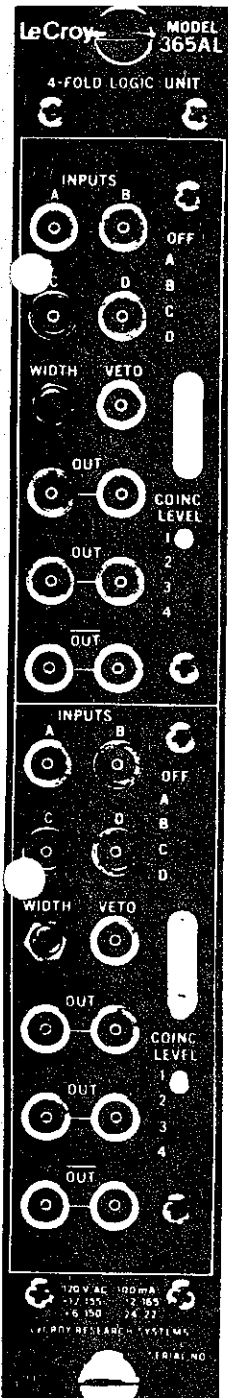
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NIM Standard Dual Majority Logic Unit

Model 365AL

2-Channel, 4-Fold Majority Logic Unit With Veto



The Model 365AL offers an unmatched combination of flexibility, compactness, and performance at a reasonable cost. It provides the functions of fan-in, coincidence, inhibit, and majority logic with high fan-out capability along with 150 MHz operation. Each of the two identical channels accepts standard NIM logic signals at each of the four logic inputs and one veto input.

Front-panel selectors allow programming of one to four simultaneous negative input signals required for an output and provide the ability to disable the separate logic inputs without removing cables. Separate veto inputs are provided for inhibiting the unit regardless of the state of the other inputs. The inhibit need only overlap the leading edge of the coincidence. A single output pulse is produced regardless of input amplitude or duration (no multiple pulsing).

The output pulse duration of the Model 365AL may be continuously set from 3.8 nsec to 50 nsec by a multiturn front-panel potentiometer. The duration is independent of input overlap time, amplitude, and rate. Because it is updating, it may be retriggered even before the end of an output pulse that is already present. Two sets of dual (32 mA) negative outputs and one set of dual complementary outputs are provided. Each may be fanned out to two later inputs or be used as a means of cable clipping or reverse terminating.

SPECIFICATIONS

NIM Model 365AL

DUAL 4-FOLD MAJORITY LOGIC UNIT WITH VETO

INPUT CHARACTERISTICS

Logic Inputs: 4 Lemo-type connectors; 50 Ω impedance; NIM level input requirements; each input can be separately enabled or disabled.

Veto Input: Lemo-type connector; 50 Ω impedance; NIM level input requirements. Requires 3 nsec minimum width delayed 3 nsec from leading edge of input.

Bin Gate: Via rear connector; clamp to ground from +4 volts inhibit; rise and falltimes < 50 nsec.

OUTPUT CHARACTERISTICS

Outputs: Three; two negative (quiescently 0 mA, -32 mA during output), one positive (quiescently -32 mA, 0 mA during output).

Fan-Out: 6-fold, if each output drives two 50 Ω loads. (Any used output pair should drive 25 Ω for proper amplitude and shape.)

Duration: Continuously adjustable from less than 4 nsec to greater than 50 nsec by means of front-panel screwdriver-adjustable potentiometer. Updating.

Output Rise and Falltimes 1.2 nsec typical. (Falltime is 2.2 nsec max. at 10 nsec pulse width and longer.)

GENERAL

Functions: AND; OR; Majority Logic; Leading Edge Inhibit; Complement; Pulse standardization without multiple pulsing; coincidence level determined by front-panel selector.

Coincidence Width: 1 nsec up, determined by input pulse durations.

Rate: 150 MHz minimum.

Input-Output Delay: Approximately 10 nsec.

Double Pulse Resolution: Typical 5 nsec; (6.5 nsec for triple pulses).

Packaging: NIM single-width module; Lemo-type connectors used for all inputs and outputs.

Power Requirements: +12 V at 55 mA*
-12 V at 165 mA
-24 V at 22 mA
115 V AC at 70 mA

*Increases to 120 mA if both channels in 4-fold coincidence.

SPECIFICATIONS SUBJECT TO CHANGE.

SECTION 1

SPECIFICATIONS

1.2 Inputs

The Model 365AL is a dual 4-fold logic gates which offer the functions of fan-in, coincidence, leading edge inhibit, majority logic, and pulse standardization. Each of two identical channels accepts standard NIM logic signals at each of the four logic inputs and one veto input. All inputs are terminated in 50 Ω . Lemo-type connectors are used.

A front-panel selector allows programming the number of simultaneous negative inputs required for an output. With its majority logic capability, the unit may be used to perform voter coincidence such as 1 of 1, 2, 3, 4 (logic fan-in), 2 of 3, 4, or 3 of 4 as well as the standard coincidences of 2 of 2, 3 of 3, 4 of 4. Any of the inputs serves as an inhibit input when driven with a complementary logic signal. A separate VETO input is provided for inhibiting the output regardless of the state of other inputs.

A front-panel selector is provided for programming the participating inputs. Inserting the programming pins in any of the designated OFF positions disables that input and eliminates the necessity of removing input cables. A separate storage location is provided for holding the programming pins not in use.

1.3 Outputs

Once the input coincidence conditions have been satisfied, the Model 365AL generates three double-amplitude NIM fast logic outputs. Each output is provided with two paralleled connectors to enable the signal to be clipped, back-terminated, or fanned-out to two 50 Ω loads. The positive output, or complement, (OUT), is quiescently at a logical one state (-32 mA) and switches to 0 mA (or 0 volts) for the duration of the output. The two negative outputs (OUT) are quiescently at zero and switch to -32 mA (-800 mV if both connectors drive 50 Ω loads) during an output.

The output duration of each channel of the 365AL is adjustable by means of a front-panel potentiometer from 3.5 nsec to 50 nsec.

The Model 365AL is a deadtimeless circuit which will respond to input signals even when an output is already present. The minimum pulse pair separation is under 6 nsec for an equivalent continuous pulsetrain (CW from RF terminology) rate of greater than 160 MHz. If a second coincidence is detected during the time of the output from a first coincidence the unit will extend the output duration to reflect the occurrence of the second signal. The net output pulse, being the logical sum of two standard output pulses, is of standard amplitude and retains the time information contained in the input signals.

The Model 365AL offers non-multiple-pulsing operation to assure unambiguous response to input pulses regardless of their amplitude or duration. The 365AL will not produce multiple pulses even with input pulses that substantially exceed the output pulse in duration.

1.4 Bin Gate

Both channels of the 365AL may be gated off by means of the NIM bin gate. The bin gate enters the module via the rear multipin power connector and a rear-panel On-Off switch. Quiescently at +5 volts, the bin gate must be clamped to ground to inhibit the logic unit. The bin gate is direct-coupled, and has rise and fall times of approximately 50 nsec.

1.5 Addenda to Specifications

Number of Channels:	Two, both identical.
Input Levels: NIM logic levels:	Logical zero, $0 \text{ mA} \pm \text{mA}$; logical one, $16 \text{ mA} \pm 2 \text{ mA}$.
Input Impedance:	$50 \Omega \pm 5\%$; value of impedance is constant up to the limit of input protection for negative inputs.
Input Protection:	$\pm 5 \text{ V}$ protection for pulses. DC overload characteristics are determined by the 250 mV dissipation limit of the 50Ω input terminating resistor.
Input Coupling:	Direct; coupling is independent of input risetime, duration and rate.
Input Reflections:	Dependent upon input risetime; less than 10% for input signal of 2 nsec risetime or greater.
Gate:	Logic unit may be inhibited by application of NIM Bin Gate. Bin Gate enters module via pin of rear multipin connector. Switch located on back panel disconnects Model 365AL from Bin Gate Line. Clamping Bin Gate to ground from +5 V inhibits. Clamping circuit must sink 3 mA per module. Bin Gate circuit is direct-coupled. Rise and fall times are $\leq 50 \text{ nsec}$.

Negative Outputs:	Two, both with paralleled connectors driven by common high impedance current source. Quiescently, 0 mA, current source switches to -32 mA during output.
Positive Output:	One, complementary, paralleled connectors, quiescently -32 mA (-1.6 V into 50 Ω load), switching to 0 V during an output.
Output Duration:	4 nsec FWHM to 50 nsec, continuously adjustable by means of front-panel width control.
Output Rise and Fall Times:	1.2 nsec typical, 10% to 90%; fall time slightly longer on wider widths.
Output Duration Stability:	Less than 0.1%/°C from 20°C to 60°C.
Coincidence Width:	1 nsec up, determined by input pulse duration.
Double Pulse Resolution:	Minimum separation to resolve two pulses is typically under 6 nsec.
Maximum Rate:	160 MHz typical, input and output; defined for input signals of -600 mV, 3 nsec FWHM.
Functions:	ANDing, ORing, Majority, Inhibit and Complementary logic.
Multiple Pulsing:	None, one and only one output pulse is produced for each input pulse regardless of input pulse amplitude or duration.
Power Requirements:	8.8 watts total; +12 V at <120 mA, -12 V at 165 mA, -24 V at 22 mA, 120 VAC 33 mA; voltages must be regulated to $\pm 1\%$ for Model 365AL.

Counting Efficiency:

Deadtimeless operation; recovery time is less than output pulse duration; there is no deadtime following output pulse at output durations greater than 8 nsec; output duration will update to reflect new input if retriggered while output pulse is present.

Packaging:

The Model 365AL is packaged in conformance with AEC standard for nuclear modules (AEC Report TID 20893 Rev). Completely compatible physically and electrically with LRS Power Chassis Model 1002, and with any other AEC standard power bin of any manufacturer. Model 365AL is a single-width module using Lemo-type connectors.

SECTION 2

TECHNICAL DESCRIPTION

The Model 365AL Dual 4-Fold Logic Gate is composed of six basic sections as indicated in Figure 2.1. A current switch for each input, a set of selectable current sources to set coincidence level, a tunnel diode section, a pulse forming stage, a pulse veto section and the output buffers.

The current switch at each input provides input buffering with proper termination and On-Off control. It causes an 8.6 mA current to be subtracted from the coincidence level current for the duration of the input pulse. The current switch is composed of a MC 1664 non-inverting AND gate. The input may be disabled by shorting the second input of the gate to ground causing the signal input to be ignored.

Quiescently, the output of the 1664 gate is "high" (0 V) and is supplying the current to the 523 Ω resistor which serves as the 8.6 mA current source. An input signal level (-600 mV or greater) causes the open emitter of the output of the 1664 gate to go low, allowing the MBD101 diode to conduct the 8.6 mA. Since the anodes of the four MBD101's are connected as a current summing point, each input signal causes 8.6 mA to be subtracted from the coincidence level current source.

The coincidence level current source supplies from 14.3 mA to 40.1 mA depending upon the coincidence level selected. In the "singles" position, the current source supplies 10 mA for the current source buffer, plus 4.3 mA, or 1/2 of an input current switch unit. Each additional level selected over a singles requirement increases the available current by 8.6 mA. The amount of current available is supplied by the collectors of two transistors connected in a Darlington configuration. The emitters are held at a constant voltage equal to the reference voltage generated by the coincidence level selector. The actual current is determined by the voltage across the two paralleled 432 Ω resistors at the transistor emitters. Any difference between the emitter voltage and the reference voltage is detected by the 741 operational amplifier which adjusts the Darlington input to provide the correct output. This circuit provides stable currents independent of temperature and transistor characteristics.

The tunnel diode section of the 365AL provides a fast-rise, fixed amplitude pulse anytime the inputs equal or exceed the coincidence level selected. Quiescently, the tunnel diode is in its low voltage state, being supplied with approximately 8.4 mA from the 510 Ω resistor to the -5 V supply. When the current from the input current switch exceeds that which is available from the coincidence level current source, the voltage at the current summing junction drops. This is transmitted through the differential stage (Q3, Q4) to the 10 mA tunnel diode, causing the tunnel diode to switch to its high voltage state. This in turn allows I.C. AB pin 14 to switch to its positive state. This transition is passed onto the next section of I.C. AB through the 43 Ω resistor, in addition to driving a 2 nsec printed circuit delay line. After the 2 nsec delay the emitter of Q5 is switched from

approximately -1.5 volts to -0.8 V thereby back biasing the FD777 diode allowing the current in the tunnel diode to drop to a level just sufficient to keep the diode in its high voltage state. When the input coincidence condition is removed the differential stage switches back to its quiescent state and allows the T.D. to switch back to its low level state.

The output of the delay line also drives one input of the veto gate I.C. AB (pins 12, 13 and 15), which provides a delayed signal at its output. The overlap of the normal and delayed signals cause I.C. AB-3 to provide a 2 nsec wide current pulse which is independent of the duration of input signal overlap. If either a VETO input signal or a bin gate level is present during the 2 nsec overlap, the overlap will be ignored and no output will be generated. The 2 nsec current pulse is supplied to the pulse forming section which generates the desired width output pulse.

The pulse-forming section of the 365AL, each time a current pulse is received, generates a standardized pulse (see Figure 2.2) with a width that is set by the front-panel 2 K Ω width potentiometer. The actual width is determined by a ramp and a comparator. The ramp is generated by raising a capacitor to a fixed voltage using the output of I.C. AB pin 3, and discharging it with an adjustable current source. The comparator is composed of the last section of I.C. AB which generates an output signal whose width is equal to the amount of time the ramp is above an adjustable threshold. The threshold and the adjustable current source are both determined by the front panel mounted WIDTH potentiometer. Coupling the threshold and ramp slope in this manner permits stable control of the output width over a 4.0 - 50 nsec range. Deadtimeless operation is inherent in this design because anytime a pulse is received at I.C. AB pin 3, the capacitor is again raised to the initial rundown voltage. The resulting output thus reflects the receipt of the additional coincidence by extending the output width.

The output buffers provide 32 mA current source output pulses with widths determined by the previous stage. The differential outputs of the ORing stage drive two separate differential current switching stages. Quiescently, each stage is balanced with one transistor "on" and one transistor "off". The "on" transistor of one stage is connected to the complementary output, which is quiescently at 32 mA, switching to 0 mA during an output. The "off" transistors tied to the normal (OUT) connectors quiescently supply 0 mA and switch to 32 mA during an output. Each output drives two paralleled connectors. All outputs are limited by the output clamp diodes and the -1.5 volt supply (Q9 and Q10) between 0 and -2 V.

In addition to using the standard ± 12 V from the power connector, the Model 365AL also requires +0.8 and -5.0 volts. This is supplied by an internal 5.8 volt supply using 120 VAC from the rear power connector. The positive side of the supply is referenced to +0.8 volts by an emitter follower operating from a 741 operational amplifier. The reference for the op-amp is derived from a resistor divider connected between +12 V and ground.

MODEL 365 BLOCK DIAGRAM

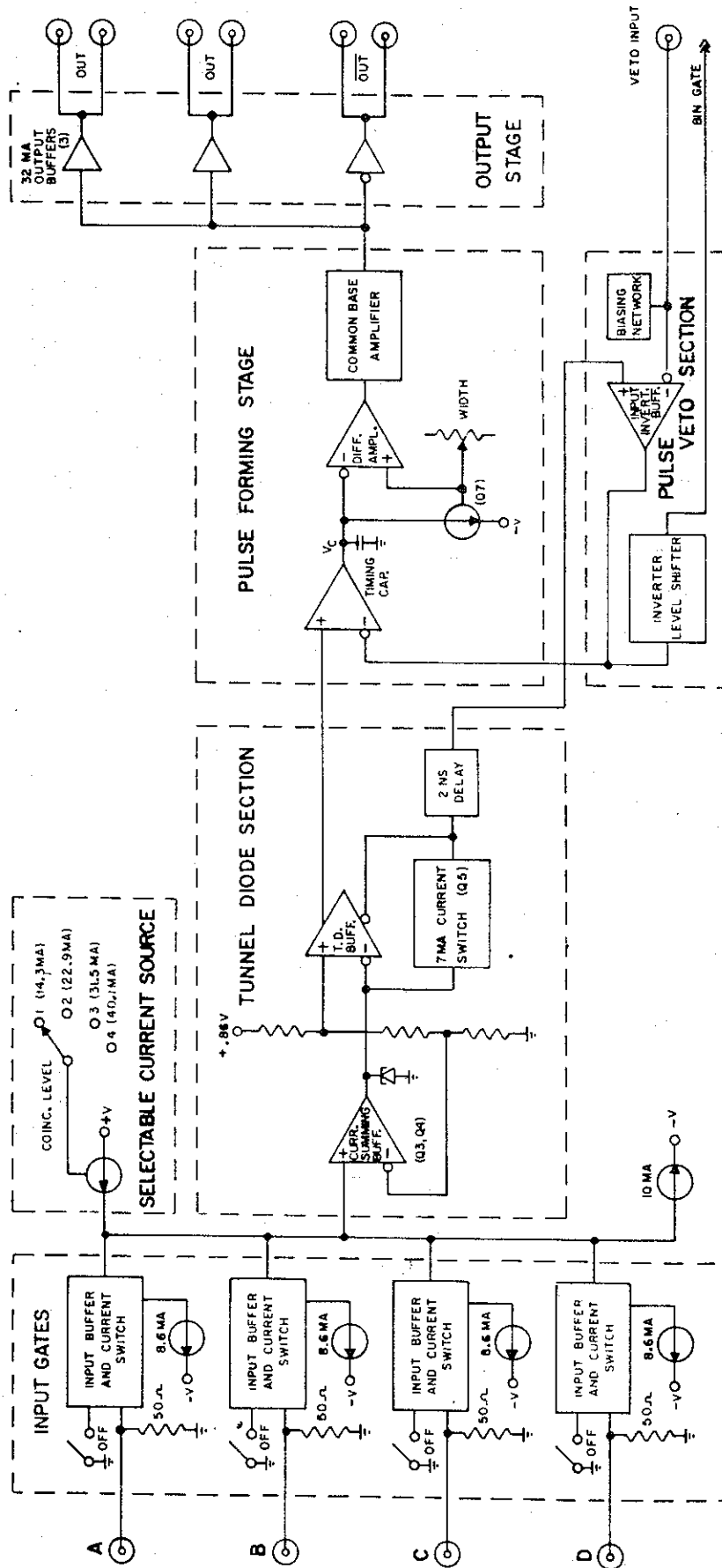
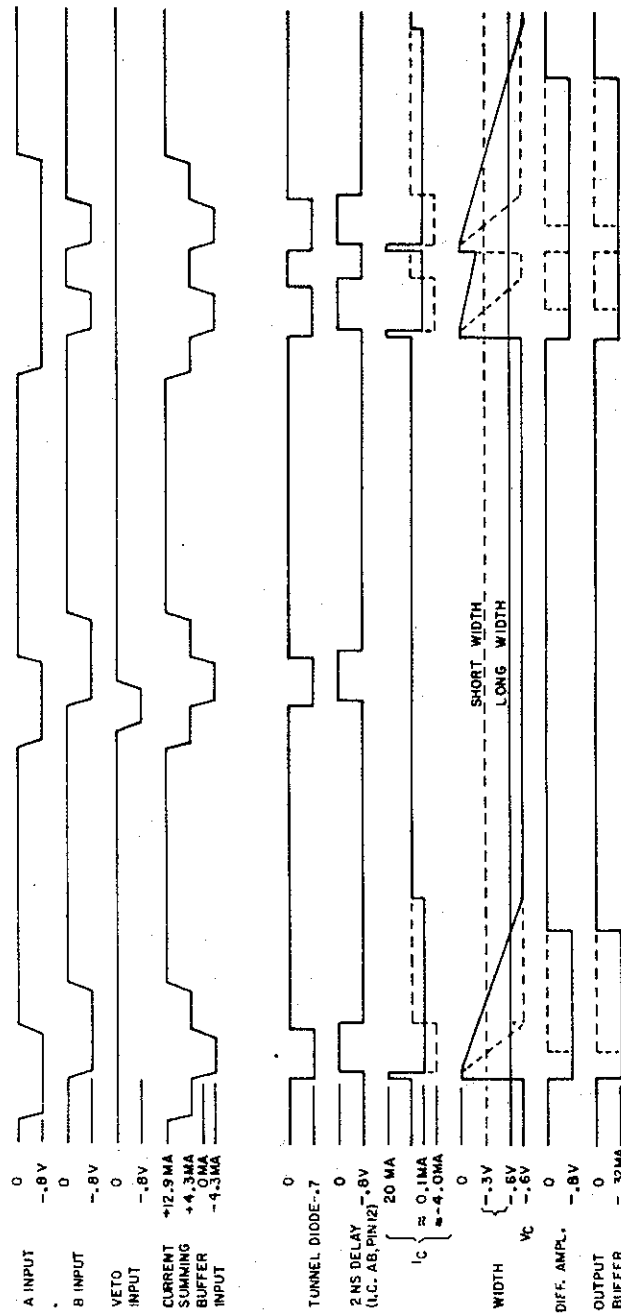


Figure 2.1

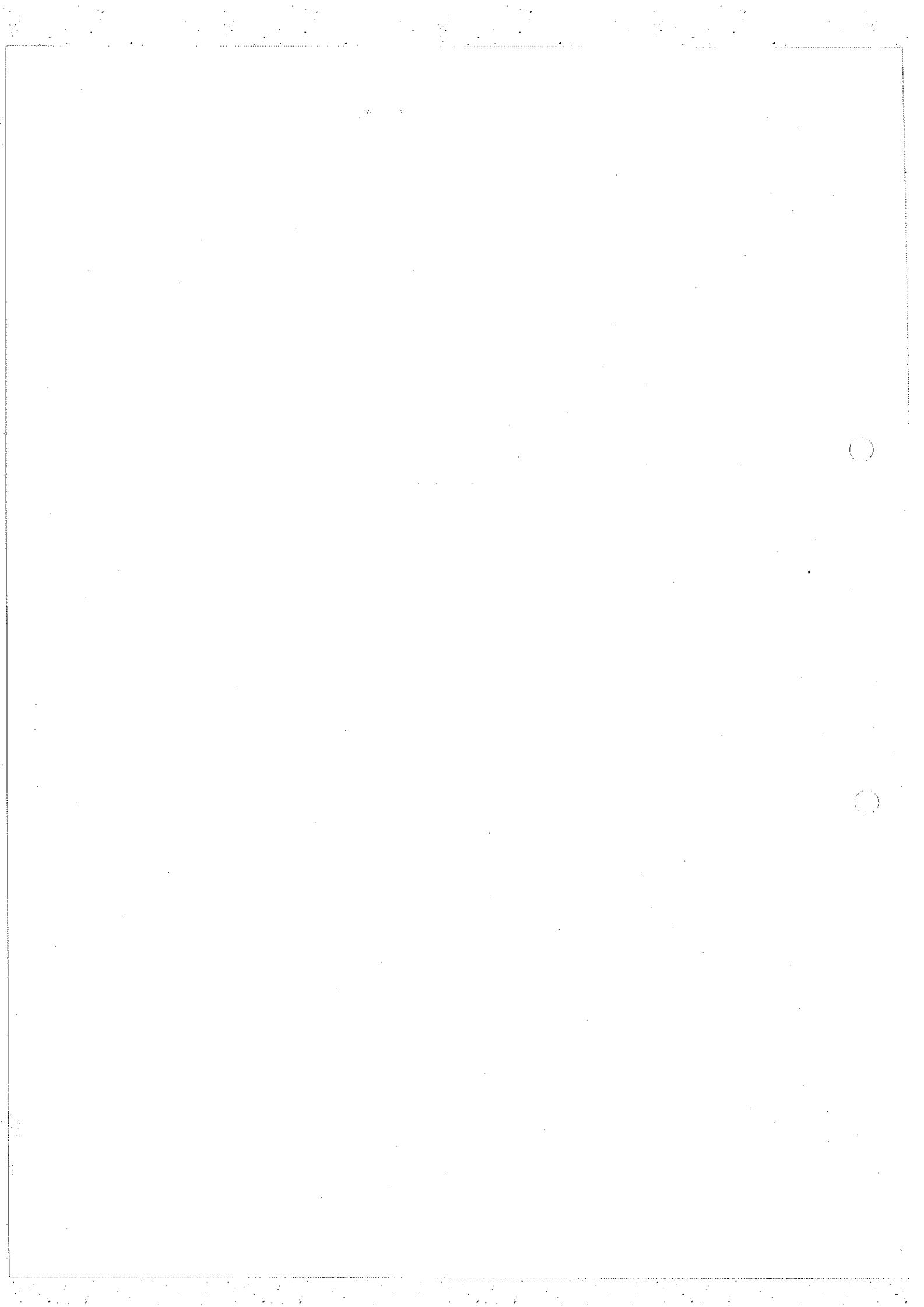
INTERNAL WAVEFORMS USING TWO INPUTS - A & B, WITH COINCIDENCE LEVEL SET AT 2.



MODEL 365

Figure 2.2

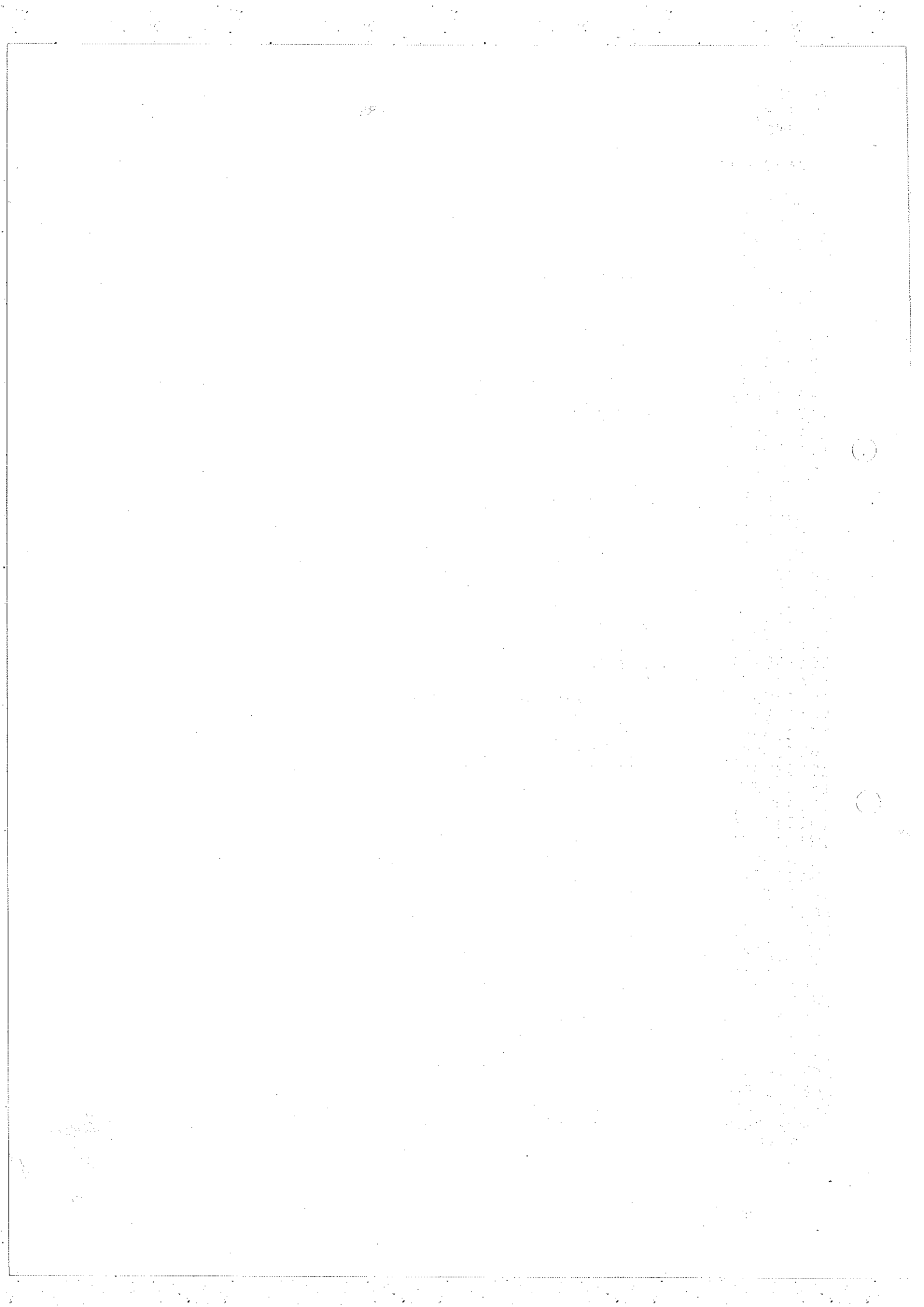
TECHNICAL INFORMATION
(SCHEMATICS, PARTS LISTS)



XENTIS V3.1A
ZZBPSS
ZZIPMS

LECROY CORPORATION
365AL PARTS LIST

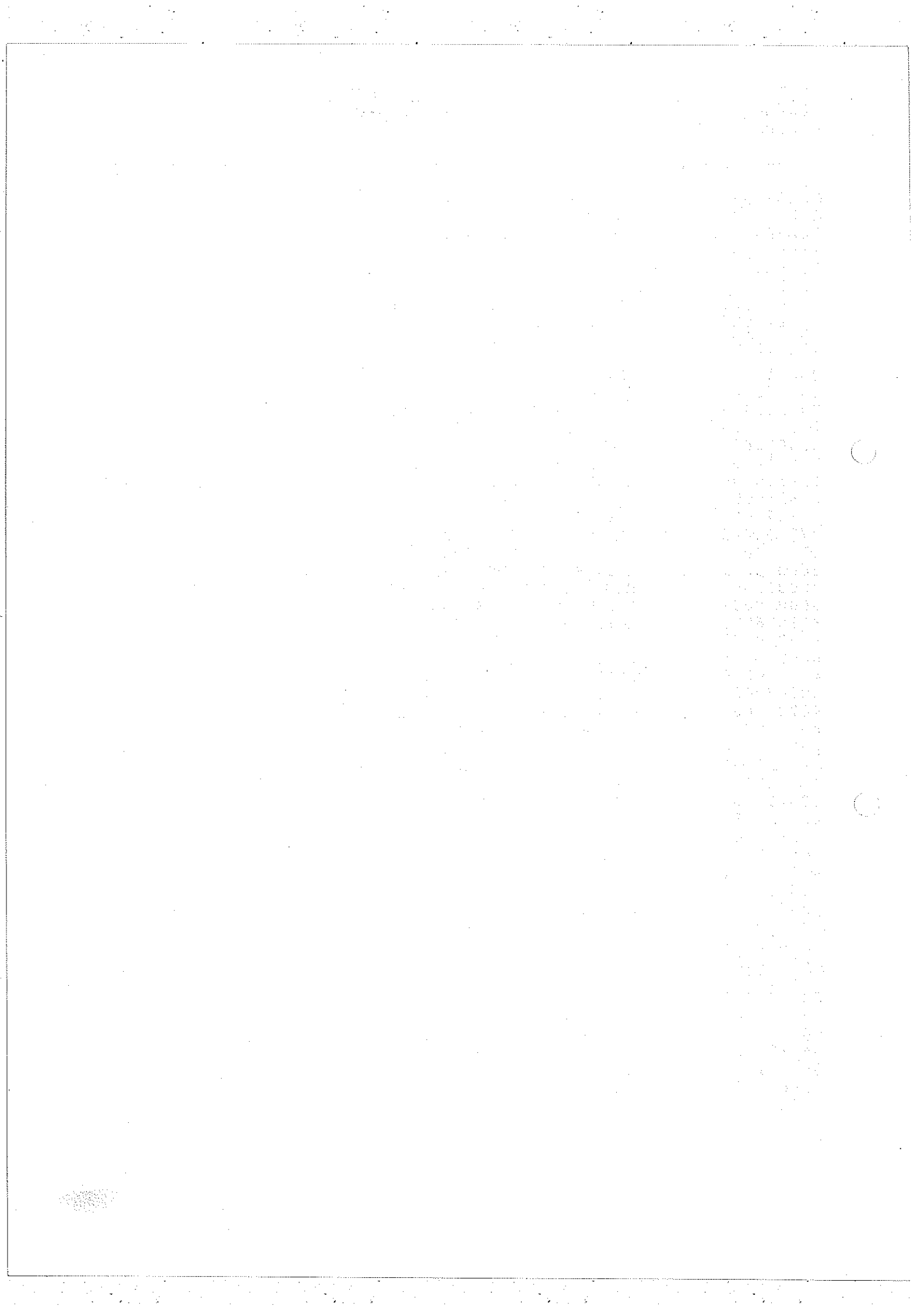
PART NUMBER	DESCRIPTION	QUANTITY PER
102145104	CAP CERA DISC 12V .1 UF	2
102245103	CAP CERA DISC 25V .01 UF	43
102444101	CAP CERA DISC 100V 100 PF	2
102444220	CAP CERA DISC 100V 22 PF	2
102444330	CAP CERA DISC 100V 33 PF	2
102745201	CAP CERA DISC 500V 200 PF	2
102745221	CAP CERA DISC 500V 220 PF	2
102944050	CAP CERA DISC 1KV 5.0 PF	2
102944100	CAP CERA DISC 1KV 10 PF	2
102944120	CAP CERA DISC 1KV 12 PF	2
102944150	CAP CERA DISC 1KV 15 PF	2
142824685	CAP TANT DIP CASE 6.8 UF	2
147447050	CAP ALUM METAL CAN 50 UF	2
161335027	RES CARBON FILM 2.7 OHMS	2
161335100	RES CARBON FILM 10 OHMS	6
161335102	RES CARBON FILM 1 K	2
161335103	RES CARBON FILM 10 K	2
161335112	RES CARBON FILM 1.1 K	2
161335121	RES CARBON FILM 120 OHMS	1
161335122	RES CARBON FILM 1.2 K	1
161335151	RES CARBON FILM 150 OHMS	2
161335152	RES CARBON FILM 1.5 K	2
161335202	RES CARBON FILM 2 K	2
161335220	RES CARBON FILM 22 OHMS	2
161335222	RES CARBON FILM 2.2 K	2
161335270	RES CARBON FILM 27 OHMS	2
161335271	RES CARBON FILM 270 OHMS	2
161335272	RES CARBON FILM 2.7 K	1
161335300	RES CARBON FILM 30 OHMS	4
161335301	RES CARBON FILM 300 OHMS	6
161335361	RES CARBON FILM 360 OHMS	2
161335362	RES CARBON FILM 3.6 K	1
161335363	RES CARBON FILM 36 K	2
161335390	RES CARBON FILM 39 OHMS	4
161335392	RES CARBON FILM 3.9 K	2
161335430	RES CARBON FILM 43 OHMS	4
161335470	RES CARBON FILM 47 OHMS	2
161335471	RES CARBON FILM 470 OHMS	2
161335510	RES CARBON FILM 51 OHMS	8
161335511	RES CARBON FILM 510 OHMS	3
161335560	RES CARBON FILM 56 OHMS	2
161335561	RES CARBON FILM 560 OHMS	2
161335562	RES CARBON FILM 5.6 K	1
161335620	RES CARBON FILM 62 OHMS	2
161335680	RES CARBON FILM 68 OHMS	2
161335682	RES CARBON FILM 6.8 K	2
161335750	RES CARBON FILM 75 OHMS	3
161335911	RES CARBON FILM 910 OHMS	6
161445301	RES CARBON FILM 300 OHMS	4
161445561	RES CARBON FILM 560 OHMS	1
168531358	RES PREC RN55D 432 OHMS	4
168531362	RES PREC RN55D 475 OHMS	3
168531366	RES PREC RN55D 523 OHMS	8
168531391	RES PREC RN55D 953 OHMS	2



XENTIS V3.1A
ZZBPSS
ZZIPMS

LECROY CORPORATION
365AL PARTS LIST

PART NUMBER	DESCRIPTION	QUANTITY PER
168531397	RES PREC RN55D 1.10 K	2
168531401	RES PREC RN55D 1.21 K	2
168531439	RES PREC RN55D 3.01 K	4
168531465	RES PREC RN55D 5.62 K	1
181427103	RES VARI CERMET 10 K	2
182527202	RES VARI CERMET 2 K	2
204021003	IC 2-IN OR GATE MC1664L	2
204021004	IC LINE RECEIVER MC1692L	2
208011001	IC SINGLE OP AMP UA741C	3
230110003	DIODE SWITCHING FD 777	2
230110005	DIODE SWITCHING 1N4448	10
240225702	DIODE ZENER 2.7V 1N5986A	2
240225703	DIODE ZENER 3.6V 1N5989A	2
250136104	DIODE TUNNEL LEG05010B04	2
253010835	DIODE HOT CARRIER HP2835	26
270110001	TRANSISTOR NPN PN2369A	7
270130401	TRANSISTOR NPN A401	8
270150001	TRANSISTOR NPN 2N3053	1
270170001	TRANSISTOR NPN 2N5770	2
275150003	TRANSISTOR PNP 40319	3
275170002	TRANSISTOR PNP 2N5771	6
300010001	BEAD SHIELDING FERRITE	24
300020001	BEAD SHIELDING "1/2" SIZE	6
300050001	CHOKER FERRITE SINGLE LEAD	4
301016823	INDUCTOR MOLDED 82.00 UH	4
315030002	POWER SUPPLY	1
400010008	SOCKET IC ST DIP-8	3
400030016	SOCKET IC ST DIP-16	4
402030000	CONNECTOR CO-AXIAL LEMO	22
402030002	SPANNER NUT SMALL OD LEMO	22
402030003	GROUND LUG NONLOCK LEMO	12
402030004	GROUND STRAP "H" LEMO	10
404030030	CONN PC EDG/EYELET 30	2
405112001	CONNECTOR BLOCK (PIN)	1
405212002	GUIDE PIN (MALE)	1
405213001	GUIDE PIN (MALE)	1
405312001	GUIDE PIN (FEMALE)	2
405410016	CONNECTOR PIN (MALE)	0
405613001	CONNECTOR HOOD	1
405750003	PROGRAM PIN FOR PC CONN	10
420212001	SWITCH SLIDE DPDT	1
500120002	TRANSIPAD "LARGE"	4
521400008	SPACER ROUND #4 1/4	4
521400022	SPACER ROUND #4 11/16	2
521440002	SPACER HEX 4-40X1/16	2
521440008	SPACER HEX 4-40X1/4	1
540103102	SIDE COVER NIM LEFT	1
540103103	SIDE COVER NIM RIGHT	1
540105001	BRACKET NIM WRAP SIZE #1	2
555611001	CAPTIVE SCREW 6-32	2
555621002	CAPTIVE SCREW RETAINER	2
560440003	SCREW PHILIPS 4-40X3/16	5
560440005	SCREW PHILIPS 4-40X5/16	4
560440012	SCREW PHILIPS 4-40X3/4	4



XENTIS V3.1A
ZZBPSS
ZZIPMS

LECROY CORPORATION
365AL PARTS LIST

PART NUMBER	DESCRIPTION	QUANTITY PER
560440014	SCREW PHILIPS 4-40X7/8	2
567256004	SCREW FLAT PHIL 2-56X1/4	4
568440003	SCREW FLAT PHIL 4-40X3/16	10
575410007	WASHER FIBER #4 (.250 OD)	2
578400001	WASHER SHAKEPROOF SIZE 4	2
581440001	NUT HEX SMALL OD SIZE 4	4
585141237	RIVET "POP" ALU 1/8X.237	2
590001022	WIRE TEFLON 7/30 BLK 22	2
590111022	WIRE TEFLON 7/30 BRN 22	1
590221022	WIRE TEFLON 7/30 RED 22	16
590441022	WIRE TEFLON 7/30 YEL 22	2
590551022	WIRE TEFLON 7/30 GRN 22	1
590881022	WIRE TEFLON 7/30 GRAY 22	3
590991022	WIRE TEFLON 7/30 WHT 22	2
591101022	WIRE BUS TIN-COPP AWG 22	3
593910001	CABLE CO-AXIAL RG178B/U	2
595901020	SLEEVING TEFLON AWG 20	1
710365013	PC BD PREASS'Y 365A	1
720365013	FRONT PNL PREASS'Y 365AL	1
740000002	WRAPAROUND NIM 1 BIN GATE	1

End of report. 128 Details encountered.

