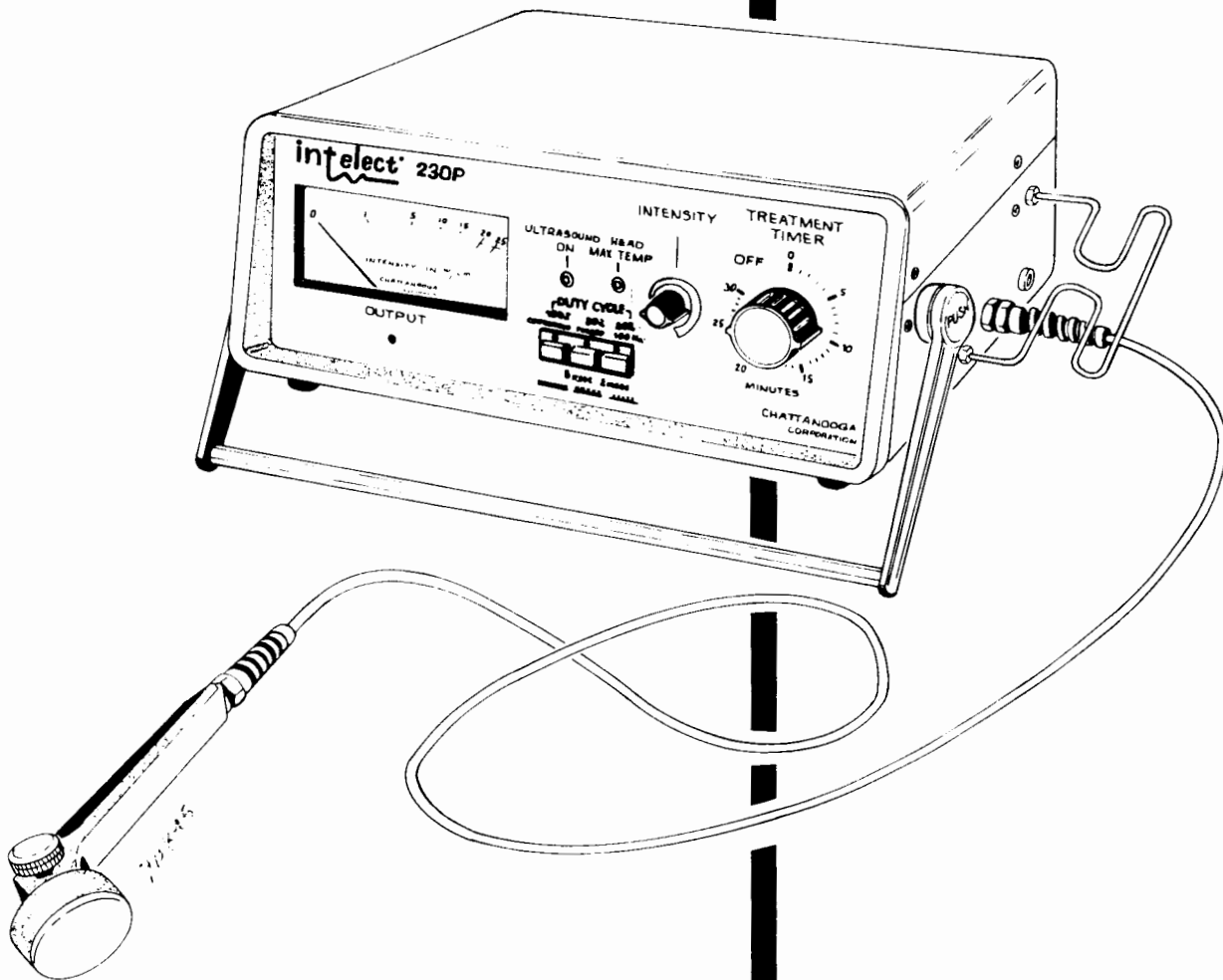


**inTelect**<sup>®</sup>

# MODEL 225P/230P ULTRASOUND



## OPERATOR'S MANUAL

- INSTALLATION
- OPERATION
- MAINTENANCE
- PARTS

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# foreword

This manual has been prepared for the owners and operators of the Intellect® Model 225P/230P. It contains general instructions on operation, safety practices, maintenance and parts information. In order to obtain maximum life and efficiency from your Model 225P/230P and to aid in the safe operation of the unit, read and understand this manual thoroughly and become totally familiar with the controls on the panel and the applicator that comes with the unit before operating it. The specifications put forth in this manual were in effect at the time of publication. However, owing to Chattanooga Corporation's policy of continuous improvement, changes to these specifications may be made at any time without obligation on the part of Chattanooga Corporation.

## full one year warranty

Chattanooga Corporation ("Company") warrants that Intellect® Model 225P/230P ("Product") is free of defects in material and workmanship.

This warranty shall remain in effect for one (1) year from the date of the original consumer purchase of this Product and extends to any owner of the Product during the warranty period. If this Product fails to function during the one year warranty period because of a defect in material and workmanship, Company or the selling dealer will replace or repair this Product without charge within a period of thirty (30) days from the date on which the defective Product is returned to the Company or the dealer. Company or the dealer will ship the replacement or the repaired Product to the consumer's residence.

### THIS WARRANTY DOES NOT COVER:

1. Replacement parts or labor furnished by anyone other than the Company, the dealer or an approved Company service agent.
2. Defects or damage caused by labor furnished by someone other than the Company, the dealer or an approved Company service agent.
3. Any malfunction or failure in the Product while it is in the possession of the owner during the warranty period if the malfunction or failure is not caused by a defect in material and workmanship or if the malfunction or failure is caused by unreasonable use, including the failure to provide reasonable and necessary maintenance.

COMPANY SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES TO PROPERTY OR BUSINESS.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

TO OBTAIN SERVICE from the Company or the selling dealer under this warranty, the owner must do or abide by the following:

1. A written claim must be made within the warranty period to the Company or the selling dealer. If the claim is made to the Company, written claim should be sent to: P.O. Box 4287, 101 Memorial Drive, Chattanooga, Tennessee 37405.
2. The Product must be returned to the Company or the selling dealer by the owner.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Company does not authorize any person or representative to create for it any other obligation or liability in connection with the sale of this Product. Any representative or agreement not contained in the warranty shall be void and of no effect.

# safety instructions

1. **WARNING:** Explosion hazard if used in the presence of flammable anesthetics.
2. **WARNING:** For continued protection against fire hazard replace fuses only with ones of the same type and rating.
3. Read, understand and practice the safety and operating instructions. Know the limitations and hazards associated with the Ultrasound. Observe the safety and operational decals placed on the unit.
4. Grounding-Make certain that the unit is electrically grounded by plugging into an electrical outlet with a ground terminal receptacle (U-ground outlet). Follow the National Electric Code.
5. The Intellect Model 225P/230P should not be connected to any other device when in use.
6. **CAUTION:** Federal law restricts this device to sale by, or on the order of, a physician or licensed practitioner.
7. The generator should be routinely checked before each use to determine that all controls function normally; especially that the INTENSITY control does properly adjust the intensity of the ultrasonic power output in a stable manner. Also determine that the TREATMENT TIME control does actually terminate ultrasonic output power when the timer reaches zero.
8. **CAUTION:**-Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous exposure to ultrasonic energy.

# specifications

Frequency - 1.0 MHz  $\pm$  5%

Duty Cycle - 100% (continuous mode)  
50%  $\pm$  10% (pulse mode)  
20%  $\pm$  10% (pulse mode)

Pulse Duration - 5 msec  $\pm$  20% (50% duty cycle pulsed mode)  
2 msec  $\pm$  20% (20% duty cycle pulsed mode)

Pulse Repetition Rate - 100 Hz  $\pm$  20%

Ultrasonic Power - variable from 1 watt to 20 watts, Intellect 230P  
variable from 1 watt to 10 watts, Intellect 225P

Output Meter Accuracy-  $\pm$  20% (for any output above 10% of maximum)

Temporal Peak/Average Intensity Ratio- 2:1,  $\pm$  20% for 50% Duty Cycle.  
5:1,  $\pm$  20% for 20% Duty Cycle.

Output:

1. Continuous - 1 MHz signal that is on as long as the timer is running.
2. Pulse - 1 MHz signal modulated 100% by the 100 Hz rectangular wave with the selected Duty cycle.

Timer Accuracy:

1. Less than 0.5 minutes for settings less than 5 minutes
2. 10% for settings from 5 minutes to 10 minutes
3. 1 minute for settings greater than 10 minutes

Applicator:

1. Effective radiating area- .8.5 CM<sup>2</sup>  $\pm$  1.5CM<sup>2</sup>, Intellect 230P ( $\pm$  18%)  
4.0 CM<sup>2</sup>  $\pm$  1.0 CM<sup>2</sup>, Intellect 225P ( $\pm$  25%)
2. Maximum beam non-uniformity ratio - 6.0:1
3. Beam type - collimating

Input power requirements:

(Domestic) 120V  $\pm$  / 60 Hz 10% 3/4 Amps  
(Export) 220V  $\pm$  / 50 Hz 10% 3/8 Amps

Size - 12" wide x 5" high x 12" deep (not including handle)

Weight - 11.5 lbs.

## **indications for ultrasound therapy \***

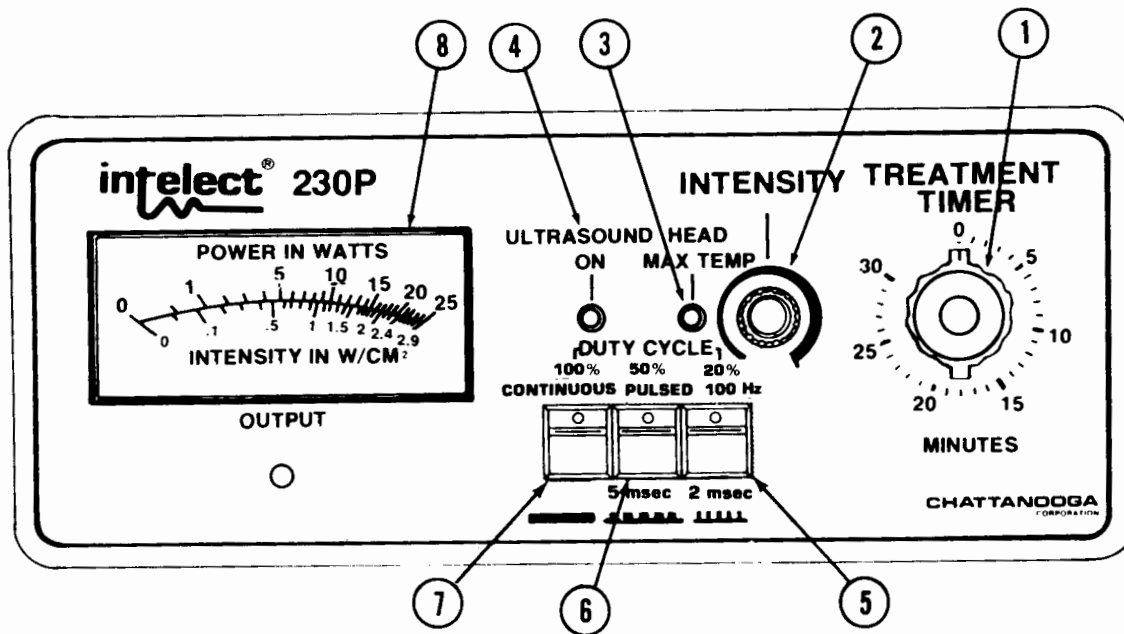
Some indications for the use of ultrasound include adhesive capsulitis, bursitis with slight calcification, myositis, soft tissue injuries, shortened tendons due to past injury, healing scar tissue and plantar warts. Ultrasound is an efficient modality when used for the treatment of all types of joint contractures resulting from capsular tightness and scarring. Ultrasound is the modality of choice to obtain therapeutic levels of heating within body structures covered by thick layers of soft tissue. Neither shortwave or microwave diathermy is able to heat these underlying structures to produce results comparable to ultrasound.

## **contraindications for ultrasound therapy \***

Ultrasound **SHOULD NOT BE USED** over the eyes or the reproductive organs. Also ultrasound **SHOULD NOT BE USED** over a pregnant uterus. Other contraindications include acute infection or sepsis, deep vein thrombosis, or arterial disease, and over anesthetized areas or conditions that cause impairment of sensations, such as chemotherapy. Ultrasound **IS NOT TO BE USED** over cancerous lesions.

REF: Lehmann, J.F., Therapeutic Heat and Cold; 13: 367-378, 1972.

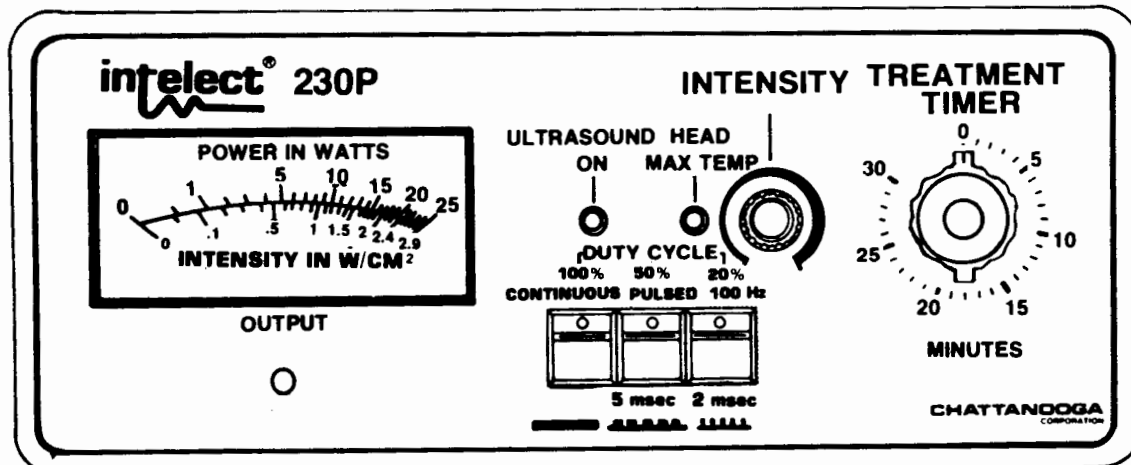
# operating controls



1. **TREATMENT TIMER/ POWER SWITCH:** This is a 0—29 minute rotary timer. When the timer is on, the green LED labeled Ultrasound On will be lit. When Timer is in the off position, power to the generator is off.
2. **INTENSITY:** Rotating this control knob clockwise increases the amount of ultrasound power being delivered.
3. **HEAD MAX TEMP LED:** This Red LED comes on when the temperature of the ultrasound head (transducer) reaches approximately 140 degrees F. At the time the LED comes on, the unit will stop producing ultrasound, the Ultrasound On LED will go out, and the Treatment Timer will continue to run. When the transducer cools to approximately 120 F, the LED will go off and the ultrasound power will be restored.
4. **ULTRASOUND ON LED:** This Green LED is on when ultrasound power is being transmitted from the transducer (sound head). This LED comes on when the Treatment Timer/Power Switch is first turned on.
5. **20% PULSED SWITCH:** By pressing this switch, the operator can select an ultrasound output of 1 MHz that is pulsed at 100 pulses per second. This produces rectangular pulses of 2 milliseconds duration, with an off time of 8 milliseconds between pulses.
6. **50% PULSED SWITCH:** By pressing this switch, the operator can select an ultrasound output of 1 MHz that is pulsed at 100 pulses per second. This produces rectangular pulses of 5 milliseconds duration, with an off time of 5 milliseconds between pulses.
7. **100% CONTINUOUS SWITCH:** By pressing this switch, the operator can select an ultrasound output that is a continuous sinusoidal waveform at a frequency of 1 MHz nominal.
8. **ULTRASOUND OUTPUT DISPLAY:** This display shows the amount of ultrasound power and intensity available at the transducer (sound head). The upper scale is calibrated in Watts and the lower scale in W/CM<sup>2</sup>. Average power is shown when in continuous (100%) mode. Peak power is shown when in pulsed (50%, 20%) mode.

# operating procedure

1. Plug the unit into a properly grounded outlet of the proper voltage and line frequency. Refer to the Nameplate on the rear of the unit.
2. Operator should adjust the applicator handle to the desired position. Tighten the thumbscrew securely.
3. Set the Treatment Timer at the 0 (Off) position, and the Intensity control at the (fully counter clockwise position).
4. At this point you may begin the treatment by applying Intellect Ultrasound Gel to the area of the patient to be treated.
5. Turn the Treatment Timer knob to the desired treatment time by turning the knob beyond the desired time and then backing up to the desired time.
6. Select the operating mode by pressing the appropriate switch. Switch 5 for the 20% Pulsed Mode, Switch 6 for the 50% Pulsed Mode, or Switch 7 for the 100% Continuous Mode. The 20% Pulsed Mode is automatically selected upon actuation of the timer.
7. You should then place the applicator in contact with the patient's body with a firm uniform pressure. You must keep the applicator moving during the treatment. Failure to keep the applicator moving may result in hazardous exposure to the ultrasound energy.
8. Adjust the Ultrasound Output by turning the Intensity control (2) until you reach the desired output. Use the Upper scale for Watts and Lower scale for W/Cm<sup>2</sup>.
9. If you need to interrupt the treatment for any reason, turn the Treatment Timer to the off position (Bell will ring). To resume treatment repeat steps 4-8.
10. At the end of the treatment, the end of treatment bell will sound and the unit will shut off.





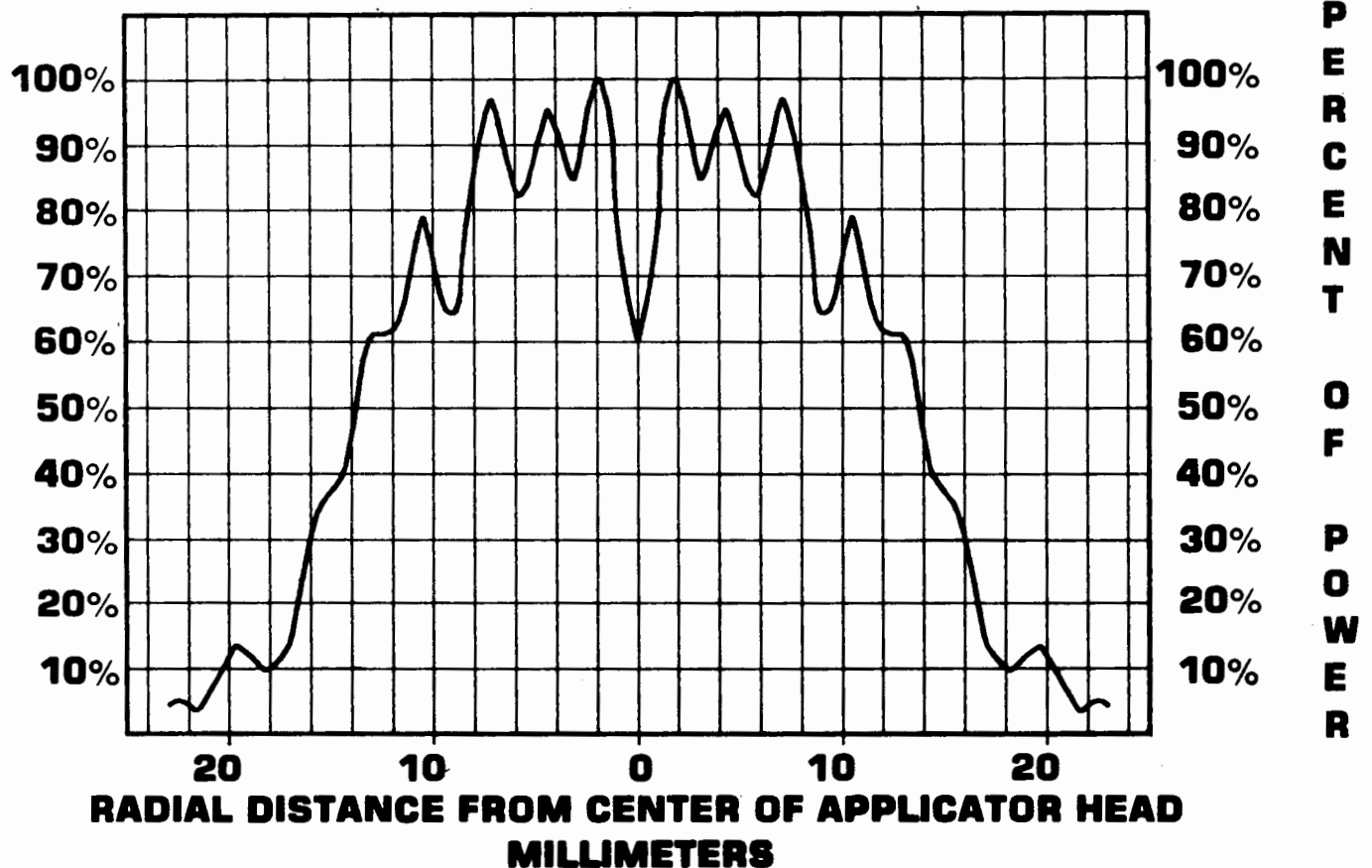
# description of ultrasonic field

The spatial distribution of the radiated field is essentially a collimated beam of ultrasonic energy having a cross-sectional area of 8.5 CM<sup>2</sup> for the 10 CM<sup>2</sup> sound head when measured at a point 5 millimeters from the transducer face.

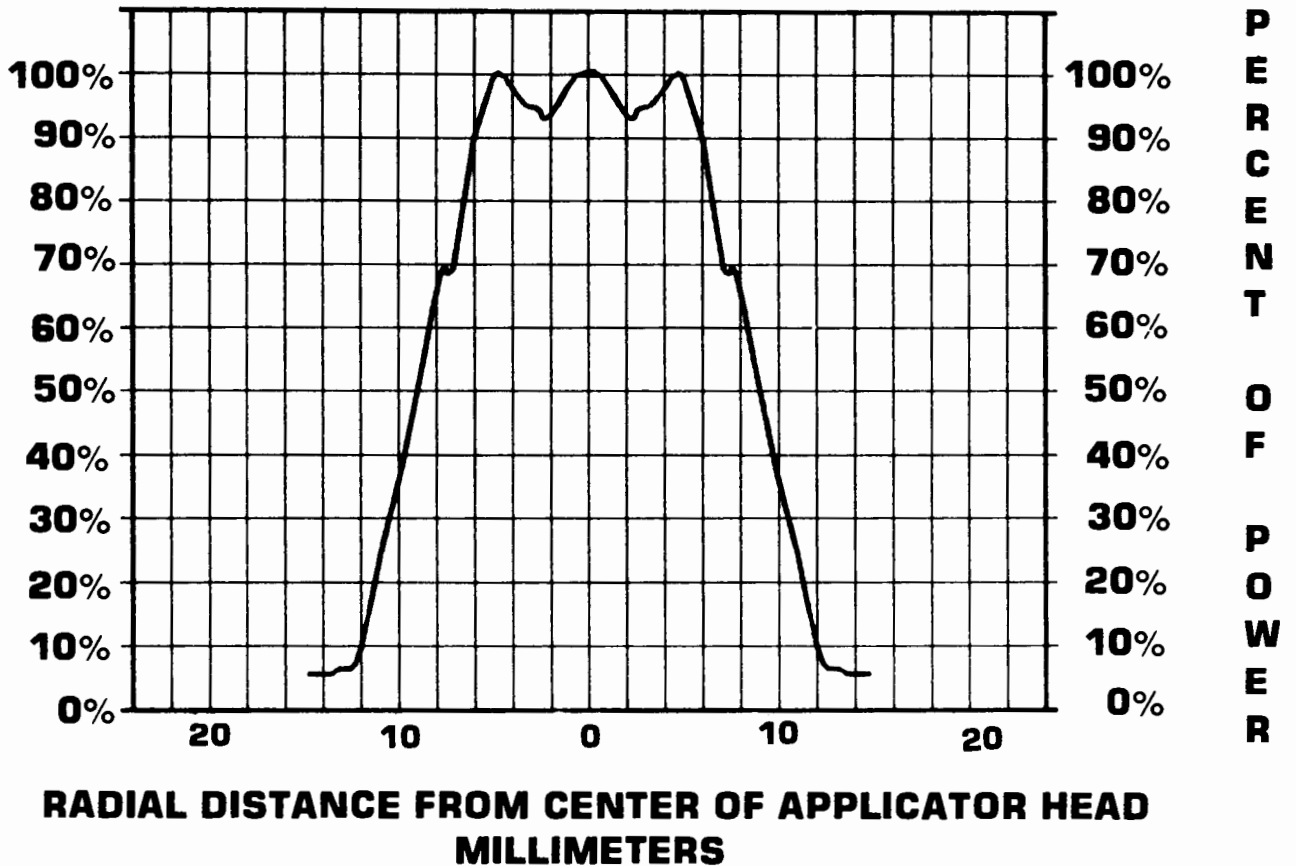
The energy distribution within the radiated field is 2.4 W/CM<sup>2</sup> maximum, and takes a generally conic shape having decreasing intensity at progressively increasing distance from the face of the transducer.

This field distribution applies for the radiation emitted into the equivalent of an infinite medium of distilled degassed water at 30 deg. C. and with line voltage variations in the range of  $\pm 10$  percent of the rated line voltage. The ultrasonic field spatial distribution of the 5 CM<sup>2</sup> sound head is essentially the same as the field of the 10 CM<sup>2</sup> sound head.

## PLOT OF ULTRASONIC FIELD SPATIAL DISTRIBUTION 10 CM<sup>2</sup>



# PLOT OF ULTRASONIC FIELD SPATIAL DISTRIBUTION 5 CM<sup>2</sup>



## abbreviations

The following abbreviations are used on the applicator heads of the Intellect 225P/230P.

- Area=Effective Radiating Area
- Coll.=Collimating
- BNR=Beam Non-Uniformity Ratio
- Freq.=Frequency

# trouble shooting

The following problems and solutions are presented to assist you in solving some of the problems that could possibly happen to your Intellect 225P or 230P.

Problem	Cause	Action To Take
No power to unit	1) Unit not plugged in. 2) No power to the receptacle.  3) Input fuse blown.	1) Plug in unit. 2) Check for tripped circuit breaker or blown fuse on the facility circuit.  3) Change the 3/4 amp. (.315 amp) slo-blo fuse located in the power entry receptacle on the back of the unit. (3/8 amp for 220 V units.) Remove Power cord prior to changing the fuse.
Unit has power but no Ultrasound output.	4) Internal fuse blown.  5) Loose connection inside unit.	4) Check the 3 amp and 1/2 amp picofuses on the power supply board. This should be done only by a Qualified Service Technician.  5) Check internal connections for proper seating of plugs in receptacles and for broken wires.
US output meter only indicates about half-scale or less when INTENSITY is set at maximum.	6) Applicator cable loose. 7) Applicator cable broken.  8) Oscillator detuned. 9) Crystal damaged.	6) Replug cable into the shield box.  7) Replace cable only with the same type of cable.  8) Recalibrate.  9) Replace transducer head in the applicator and recalibrate.
When unit is energized HEAD MAX. TEMP LED (Red) lights and beeper sounds.	10) Shorted applicator cable  11) Water in applicator head.	10) Check the cable with an ohmmeter. If the cable is shorted, re-place the cable with the same type.  11) Remove the transducer head and dry out the inside of the applicator. If the O-ring is defective, replace it. Consult the factory.
Timer will not set	12) Timer knob loose	12) Remove cap on the knob and tighten the collet. Rotate the timer fully clock-wise and then loosen the collet so that the knob is free. Align the white line on the knob with the 29 min. mark on the timer scale and re-tighten the knob collet. Perform section 4 of calibration procedure.

# **maintenance and service instructions**

1. To fully maintain compliance with Federal Regulation Title 21 (21 CFR) this unit must be recalibrated annually. It is recommended that all Chattanooga Corporation Ultrasound Products be returned to the factory or an authorized servicing dealer for repairs or recalibrations. It is also recommended after the replacement or repair of any major component. (See Section for Calibration Procedures.)
2. The following items should be checked at least monthly to insure proper operation of this unit:
  - .1 Power cord and plug. Check to make sure the cord is not frayed, kinked or has torn or cut insulation.
  - .2 Transducer (applicator) Cable. Check to make sure the cable is flexible, free of kinks, not frayed and that insulation is intact.
  - .3 Transducer (applicator) Handle. Check to make sure that it is not cracked or broken.
  - .4 Transducer (applicator) Face. Check to see that there is no build-up of gel or foreign material on the stainless steel face.
  - .5 LED's. Check each function to see if the LED is on when you are using that function.

# calibration

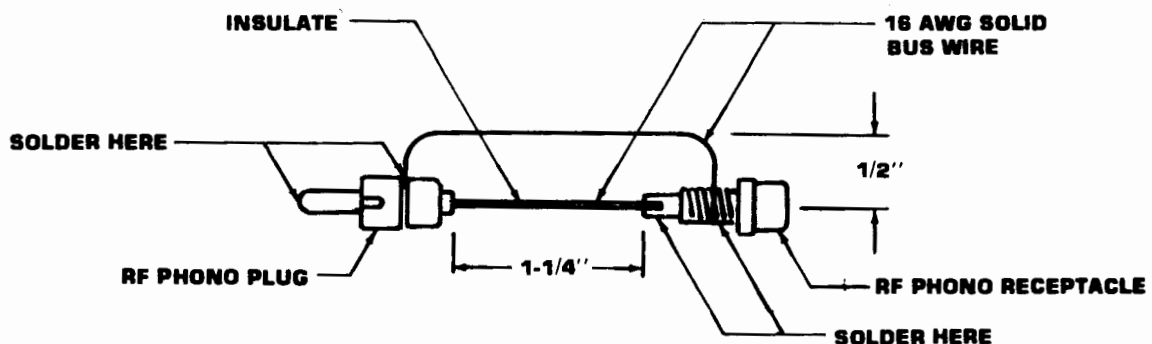
**CAUTION:** An Electrical Shock Hazard is present during several portions of the calibration procedure. Calibration should be performed by a Qualified Service Technician.

## 1. TEST EQUIPMENT REQUIRED

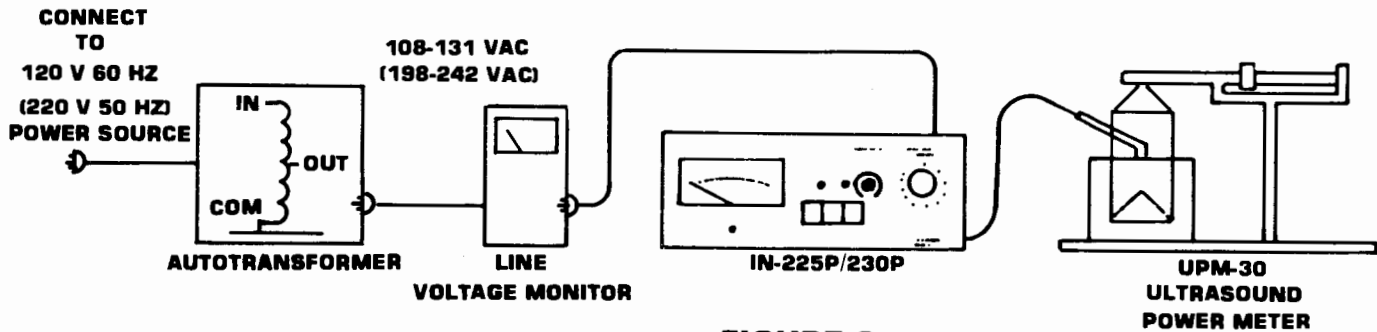
- .1 Power line monitor (expanded scale voltmeter for rated line voltage  $\pm 10\%$ ), VIZ model WV-120B or equivalent for 120VAC line.
- .2 Autotransformer, adjustable from 90% to 110% of rated line voltage, 150 watts or greater.
- .3 Ultrasound Power Meter, Ohmic Instruments Model UPM-30 or equivalent.
- .4 Oscilloscope, Hameg Hm 204-2 or equivalent.
- .5 Probe, voltage, X10, Scope, low capacitance.
- .6 Probe, current, Textronix P6021 AC current probe or equivalent.
- .7 Voltmeter, Digital, 3-1/2 digits, Simpson Model 461 or equivalent.
- .8 Probe, temperature, Fluke Model 80T-150 or equivalent.
- .9 Source of approximately 1/2 gallon of distilled de-oxygenated (<5 PPM) water at 30 degrees Celsius for use in UPM-30 power meter (item #3).
- .10 Counter, frequency, 10 MHz, Triplet 7000 or equivalent.
- .11 Stopwatch, Siliconix Model 705 or equivalent.
- .12 Applicator current transformer adapter (see Fig. 1).

## 2. INSTRUMENT PREPARATION

- .1 Remove the top cover of the unit by removing the four #6 truss head screws (two on each side) and lift the cover off the cabinet.
- .2 Remove the two #6 truss head screws between the handle latches and the bezel (one screw on each side). The Front Panel can now be tilted forward for easy access to the adjustments on the control board.
- .3 Insert a RF current probe adaptor between the ultrasound applicator cable and the RF phono receptacle on the shield box located on the rear panel. The adaptor construction is shown in Fig. 1.



**FIGURE 1**



**FIGURE 2**

### 3. TEST SET-UP

- .1 Connect the test set-up as shown in Fig.2.
- .2 Set AC input voltage with the autotransformer to 120 (220) VAC line monitor.
- .3 See OHMIC INSTRUMENTS clinical engineering notes AN-330 for operation of the UPM-30 US. Power Meter.

### 4. TIMER TEST AND ADJUSTMENT

- .1 Using a stopwatch, check the accuracy of the timer with time settings of 1 min., 5 min., 10 min., 20 min., and 29 min.. See specifications on page 4 for required timer accuracy.
- .2 If the timer accuracy is out of specification, rotate the timer knob fully clockwise and adjust the collet on the knob so that the white line on the knob is aligned with the 29 minute mark on the timer scale.
- .3 Repeat steps 4.1 and check also that the white line on the knob is aligned with the "0" position on the scale after the timer times out.

### 5. CHECK POWER SUPPLY

- .1 Rotate INTENSITY knob fully counterclockwise and the timer to its fully clockwise position.
- .2 Connect the DC digital voltmeter to the pins 1 (+) and 2 (-) on connector P2 which connects to the control board and measure the 12VDC output. It should be between 11.5 VDC and 12.5 VDC.

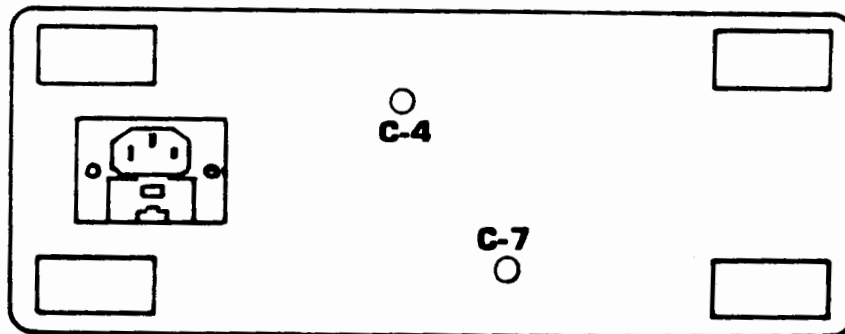
### 6. ADJUST THE DUTY CYCLE AND CHECK PULSE FREQUENCY.

- .1 Select 20% DUTY CYCLE and connect the oscilloscope voltage probe to pin #3 (signal) and ground clip to pin #2 (com.).
- .2 Adjust the time base of the oscilloscope to 1 msec/div and measure the period of the 100Hz signal. It should be between 8.0 msec and 12 msec.

- .3 Adjust the scope time base for 10 divisions of one cycle of the signal. On the control board, adjust R6 for a pulse width of 7.9 divisions.
- .4 Select 50% DUTY CYCLE and adjust R4 on the control board for a pulse width of 4.7 divisions.
- .5 Select 100% DUTY CYCLE and observe that the signal is a DC level less than .5V.

#### 7. CHECK AND ADJUST THE R.F. OSCILLATOR

- .1 Connect the scope current probe around the center conductor of the current probe adaptor and connect the voltage probe to the outside conductor.
- .2 Rotate the INTENSITY control clockwise as you observe the voltage and current waveforms on the dual channel scope. The waveforms should be within 5 degrees of being in phase and oscillation should be stable.
- .3 Repeat step 7.2 with 50% duty cycle and then with 20% duty cycle selected.
- .4 Adjust C4 through the access hole on the rear panel (see fig. 3 for location, remove hole caps) for phase correction and C7 through its rear panel access hole for oscillation stability in the pulse modes (20% and 50%).
- .6 Replace stainless hole caps on rear panel.



**FIGURE 3**

## 8. CHECK AND ADJUST MODULATED RF DUTY CYCLE

- .1 Select 20% DUTY CYCLE and observe the duty cycle of the 100 Hz modulated RF waveform. Re-adjust R6 as necessary to obtain 21% duty cycle.
- .2 Select 50% DUTY CYCLE and again observe the modulated RF waveform. Re-adjust R4 as necessary to obtain 53% duty cycle.

## 9. OUTPUT METER CALIBRATION

- .1 With electrical power removed, adjust the mechanical zero adjustment, located on the front panel under the meter, to align the meter pointer with 0 on the meter dial.
- .2 Re-apply electrical power to the unit and select 100% duty cycle.
- .3 Adjust the INTENSITY control on the front panel to obtain the rated output power on the UPM-30 for the model being used.

Model I-225 P  
10.0 Watts

Model I-230P  
20.0 Watts

- .4 Adjust the meter calibration potentiometer, R18, for an indication of the rated output for this model on the front panel output meter.
- .5 Check the accuracy of the output meter by comparing its indication to the power indicated on the UPM-30 at the power levels listed for each model.

### I-225P Meter

### UPM-30 Indication

	Minimum	Maximum
1.0 W	.86 W	1.14 W
2.0 W	1.72 W	2.28 W
5.0 W	4.3 W	5.7 W
7.0 W	6.0 W	8.0 W
10.0 W	8.6 W	11.4 W

### I-230P Meter

### UPM-30 Indication

	Minimum	Maximum
2.0 W	1.72 W	2.28 W
5.0 W	4.3 W	5.7 W
10.0 W	8.6 W	11.4 W
15.0 W	12.9 W	17.1 W
20.0 W	17.2 W	22.8 W

- .6 Vary the line voltage from 108 VAC (198VAC) to 132 VAC (242VAC) and check that the output power remains within the limits listed above.
- .7 Select 50% DUTY CYCLE and check the peak output meter accuracy by comparing its indication to the average power indication on the UPM-30.

$$\text{POWER}_{\text{avg}} = (\% \text{ Duty Cycle}) (\text{Power}_{\text{peak}})$$

### I-225P Meter Peak Power

### UPM-30 Indication Average Power

	Minimum	Maximum
1.0 W	.43 W	.57 W
2.0 W	.86 W	1.14 W
5.0 W	2.15 W	2.85 W
7.0 W	3.0 W	4.0 W
10.0 W	4.3 W	5.7 W

### I-230P Meter Peak Power

### UPM-30 Indication Average Power

	Minimum	Maximum
2.0 W	.86 W	1.14 W
5.0 W	2.15 W	2.85 W
10.0 W	4.3 W	5.7 W
15.0 W	6.5 W	8.5 W
20.0 W	8.6 W	11.4 W



- .8 Select 20% Duty Cycle and check the accuracy of the output meter by comparing its indication to the UPM-30 indications as listed below.

I-225P Meter Peak Power	UPM-30 Indication	
	Average Power	
	Minimum	Maximum
1.0 W	.18 W	.23 W
2.0 W	.34 W	.46 W
5.0 W	.86 W	1.14 W
7.0 W	1.20 W	1.60 W
10.0 W	1.72 W	2.28 W

I-230P Meter Peak Power	UPM-30 Indication	
	Average Power	
	Minimum	Maximum
2.0 W	.34 W	.46 W
5.0 W	.86 W	1.14 W
10.0 W	1.72 W	2.28 W
15.0 W	2.58 W	3.42 W
20.0 W	3.44 W	4.56 W

#### 10. CHECK HEAD MAXIMUM TEMP TRIP

- .1 Apply maximum power at 100% duty cycle to the ultrasound applicator with it coupled to the air.
- .2 Allow the applicator to heat until the HEAD MAX TEMP LED lights, the beeper sounds and the ultrasound energy is removed from the head (the output meter indication will go to zero).
- .3 After the head cools, power will be re-applied to the head (LED goes off and meter indication returns to maximum).
- .4 Let the head max. temp control cycle on and off 5 times and then with the temperature probe check the surface temperature of the stainless steel head immediately after the HEAD MAX. TEMP LED lights. The temperature must be between 133 degrees F. and 147 degrees F.

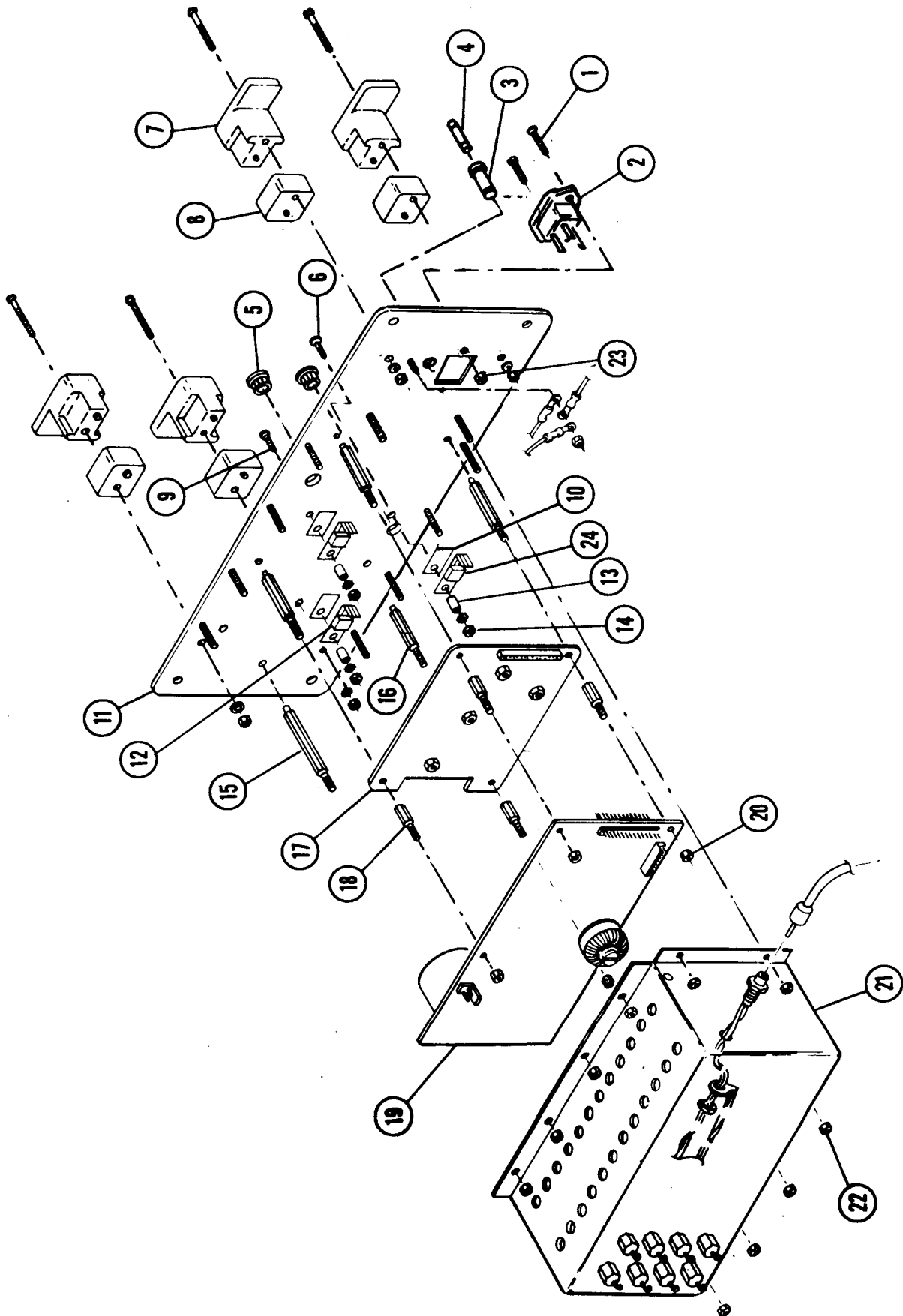
R 4 = 50% DC SET

R 6 = 20% DC SET

R 14 = INT CTRL

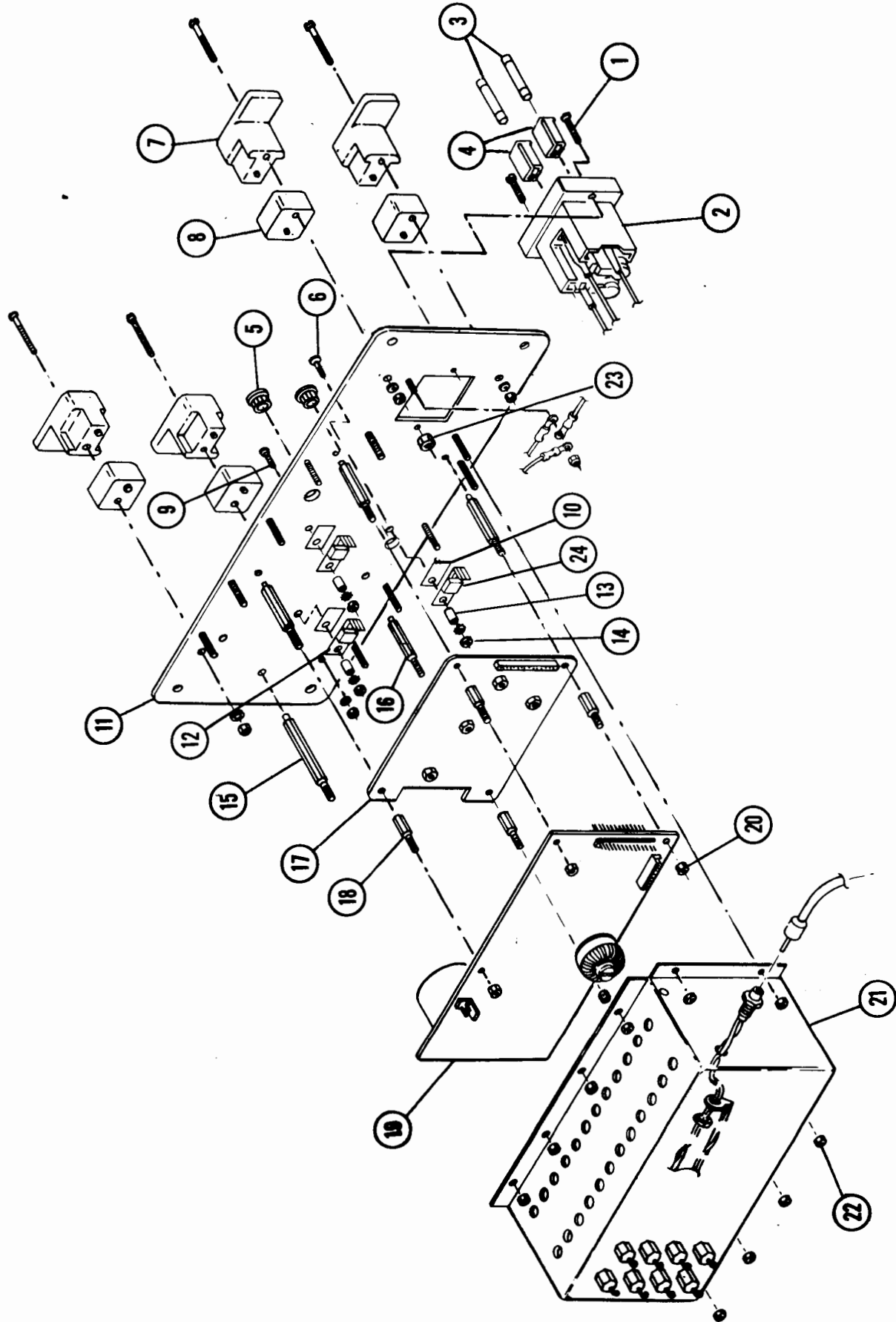
R 18 = METER ADJUST

# parts - 225P/230P rear panel assembly 120V



**parts list**  
**225P/230P**  
**rear panel**

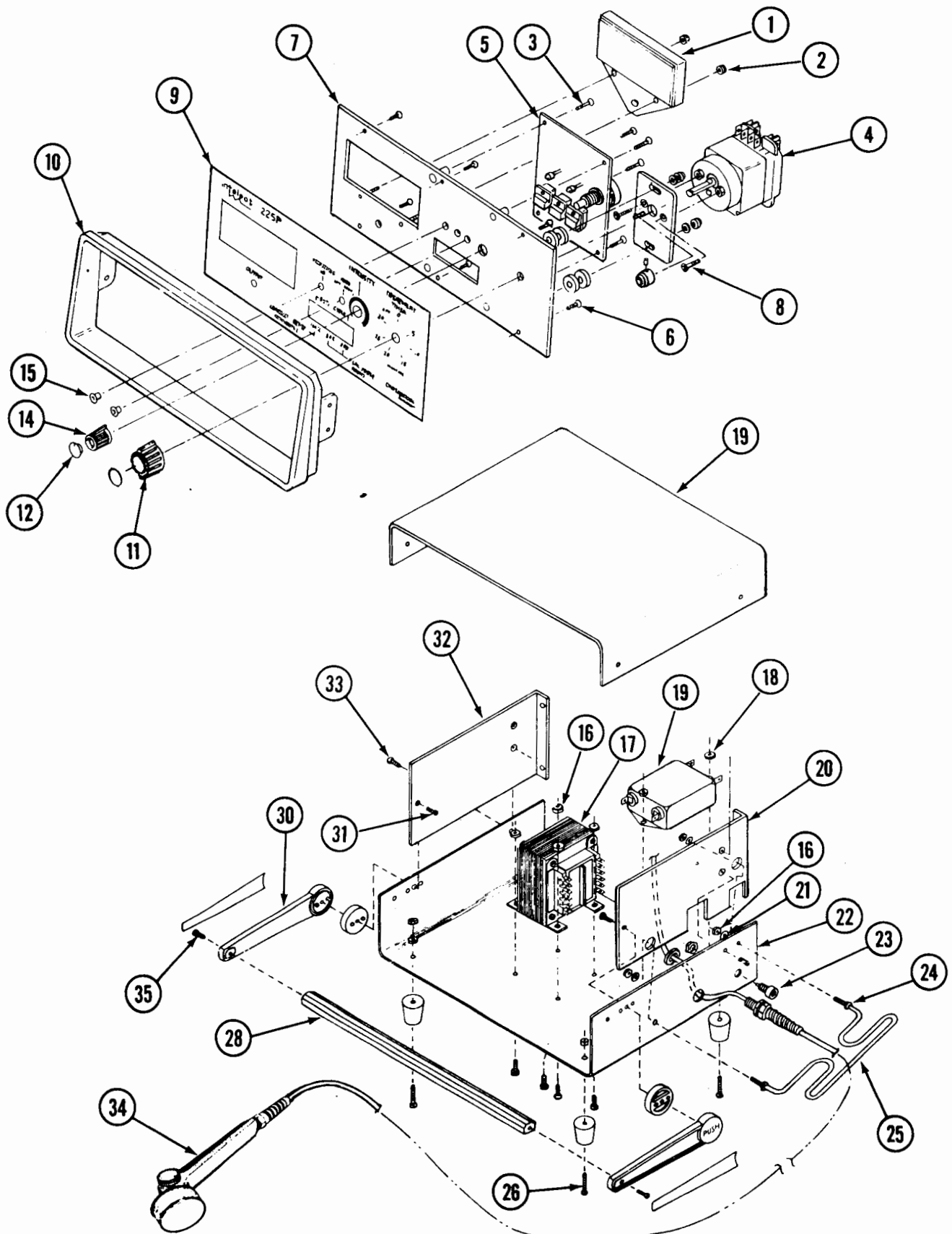
Ref	Part No.	Description		Qty.
1	70398	Screw 4-40 x 3/4 Pan Hd Phil Plt		2
2	74723	Receptacle, Power, AC	1	1
3	70179	Fuse MDA 3/4 AMP 250V Slo-Blo		1
4	70316	Fuseholder	1	1
5	71208	Plug Button NKL 5/16 Fedscrew 121		2
6	72167	Screw 4-40 x 5/16 Rd Phil Plt		3
7	73604	Holder Cord PP-40058-01		4
8	73605	Spacer Cord Holder PP-40058-01		4
9	70099	Screw 6-32 x 3/8 Rd Hd Phil Plt		5
10	79118	Insul TO-BERGQ 332307-FR54		3
11	73655	Pnl Int Port Back Pnt		1
12	73571	Trnstr D45H11		1
13	79119	Washer Sholder 7721-7PPS		3
14	72970	Nut 4-40 Kep Plt		3
15	73644	Stand-off 1-5/16 B-7317-632-Omf		1
16	71368	Stand-off 6 x 3/4 4538H-632-B12		4
17	71404	PCB OSC Power I-205 Assembled		1
	71407	PCB OSC Power I-210 Assembled		1
18	72102	Stand-off 6 x 1/2 4534-632-B12		4
19	73436	PCB Power Supply Assy, IN-230P		1
	73824	PCB Power Supply Assy, IN-225P		1
20	60768	Nut 6-32 ESNA #22NM-62 Plated		5
21	73772	Cover Shield Assy In-225P/230P		1
22	72970	Nut 4-40 Kep Plt		10
23	70628	Nut 4-40 ESNA		2
24	72435	TRNSTR D45C11		2



**parts list**  
**225P/230P**  
**rear panel**

Ref	Part No.	Description	Qty.
1	70398	Screw 4-40 x 3/4 Pan Phil Plt	2
2	73421	Rec DBLfuse Pnlcmp 83010280	1
3	73885	Fuse MDA 3/8 AMP 250V Slo,Blo	2
4	73426	Fuse Carrier PNLCMP 83020130	2
5	71208	Plug Button NKL 5/16 Fedscrew 121	2
6	72167	Screw 4-40 x 5/16 Fedscrew 121	3
7	73604	Holder Cord PP-40058-01	4
8	73605	Spacer Cord Holder PP-40058-01	4
9	70099	Screw 6-32 x 3/8 Rd Hd Phil Plt	5
10	79118	Insul TO-BERGQ 332307-FR54	3
11	73655	Pnl Int Port Back Pnt	1
12	73571	Trnstr D45H11	1
13	79119	Washer Sholder 7721-7PPS	3
14	72970	Nut 4-40 Kep Pit	3
15	73644	Stand-off 1-5/16 B-7317-632 Omf	1
16	71368	Stand-Off 6 x 3/4 4538H-632-B12	4
17	71404	PCB OSC Power I-205 Assembled (225P)	1
	71407	PCB OSC Power I-210 Assembled (230P)	1
18	72102	Stand-Off 6 x 1/2 4534-632-B12	4
19	73436	PCB Power Supply Assy IN-230P	1
	73824	PCB Power Supply Assy IN-225P	1
20	60768	Nut 6-32 ESNA #22NM-62 Plated	5
21	73772	Cover Shield Assy In-225P/230P	1
22	72970	Nut 4-40 Kep Plt	10
23	70628	Nut 4-40 ESNA	2
24	72435	Trnstr D45C11	2

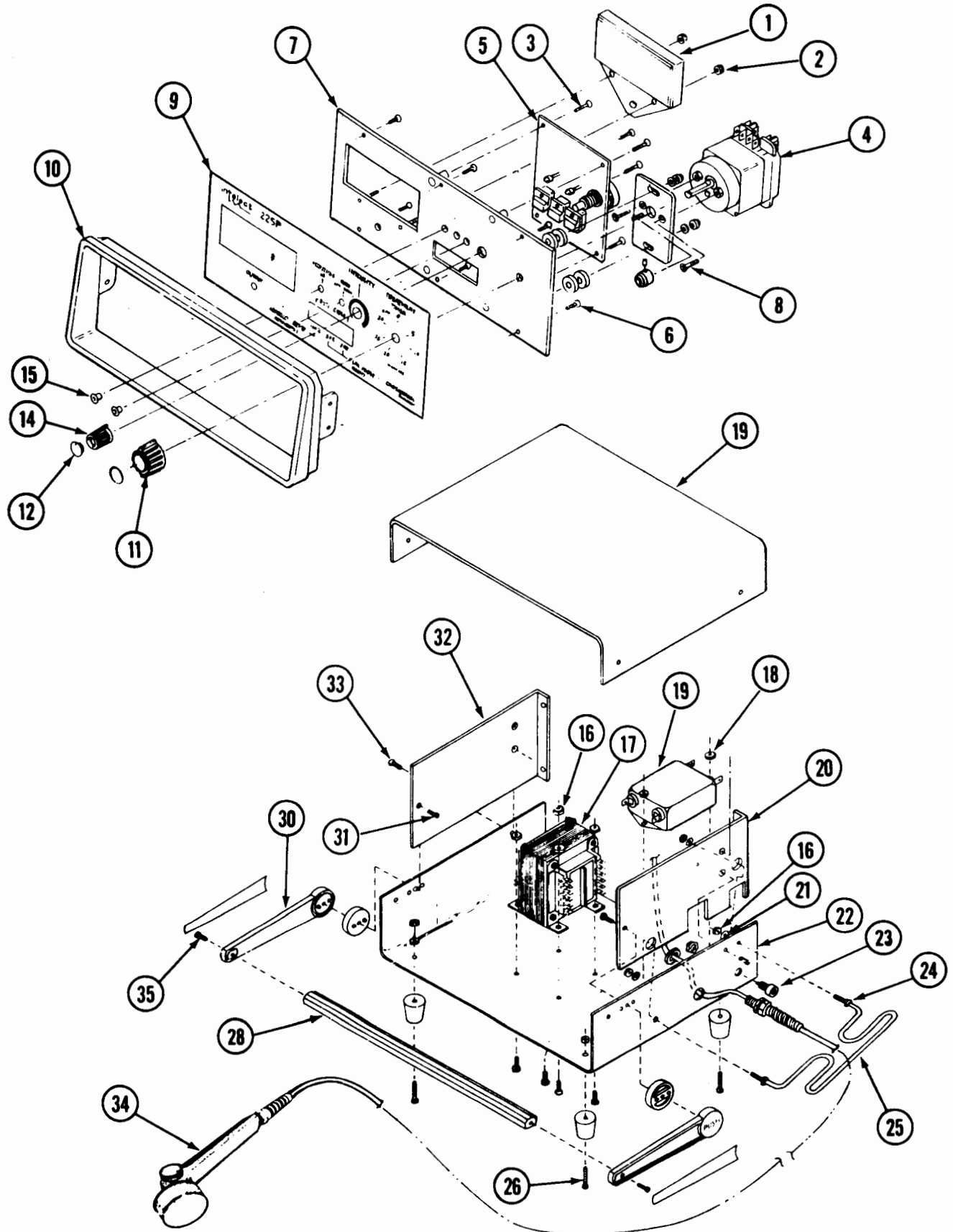
# parts - 225P/230P cabinet assembly 120V.



**parts list**  
**225P/230P**  
**cabinet assembly 120V.**

Ref	Part No.	Description	Qty.
1	73663	Meter IN-225P MOUTEC 930368-107	1
	73664	Meter IN-230P MOUTEC 930368-106	1
2	70628	Nut 4-40 ESNA	2
3	21791	Screw 6-32 x 3 <sup>3</sup> / <sub>8</sub> Pan Hd. Phil. Plated	5
4	73784	Timer Deihl 30 Minute w/cut shaft 110 V 60 Hz	1
5	73445	PCB Control BD Assy. I-230P	1
	73760	PCB Control BD Assy. I-225P	1
6	70058	Screw 4-40 x 3 <sup>8</sup> / <sub>16</sub> Round Hd. Phil. Plated	6
7	73529	Panel Intelect Port. Front	1
8	21790	Screw 6-32 x 3 <sup>8</sup> / <sub>16</sub> Flat Hd. Phil. Plated	2
9	73468	Decal Front Panel Overlay IN-225P	1
	73467	Decal Front Panel Overlay IN-230P	1
10	73585	Bezel 11"	1
11	74579	Knob Wing ELMA 026-5425	1
12	73607	Knob Cap ELMA 040-3615	1
13	73670	Knob Cap ELMA 040-5015	1
14	73606	Knob Wing ELMA 023-3426	1
15	72519	Holder LED #HLMP0103 Black	2
16	21733	Nut 8-32 ESNA	10
17	73490	Transformer A41-80-28 Signal	1
18	60768	Nut 6-32 ESNA	3
19	70484	Filter Line 3A/250V 60Hz	1
20	73587	Bracket Mounting Side, Right	1
21	70105	Washer #10 Flat Plated	2
22	73657	Panel, Bottom Intelect Portable painted	1
23	79041	Jack, Banana Smith 1508-103 Black	1
24	21024	Nut 8-32 Hex, S/S	2
25	73611	Holder Applicator U S Portable	1
26	73188	Screw 8-32 x 3 <sup>4</sup> / <sub>8</sub>	4
27	21016	Screw 8-32 x 3 <sup>8</sup> / <sub>16</sub>	4
28	73783	Handle ELMA 66-330-14, cut 11.6"	1
29	79115	Foot, Black Rubber M-195 13/16 x 25/32	4
30	73474	Support Case ELMA 63-140	1
31	70782	Screw 8-32 x 5 <sup>8</sup> / <sub>16</sub>	2
32	73593	Bracket Mounting Side, Left	1
33	71319	Screw 6-32 x 1 <sup>4</sup> / <sub>8</sub>	2
34	74582	Applicator Ultrasound, Adjustable 5 CM <sup>2</sup>	1
	74580	Applicator Ultrasound, Adjustable 10 CM <sup>2</sup>	1
	74958	Basket	

# parts - 225P/230P cabinet assembly 220V

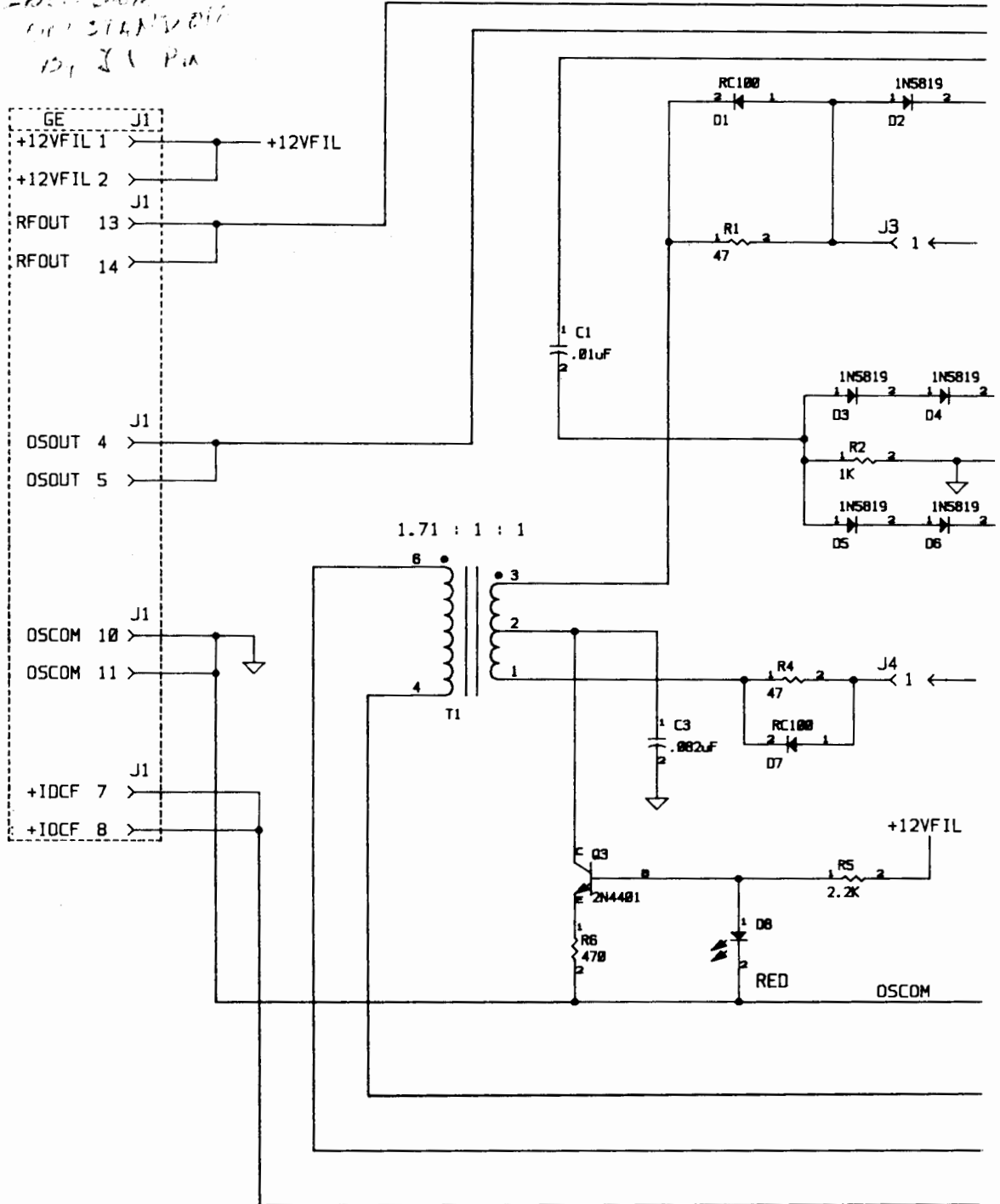


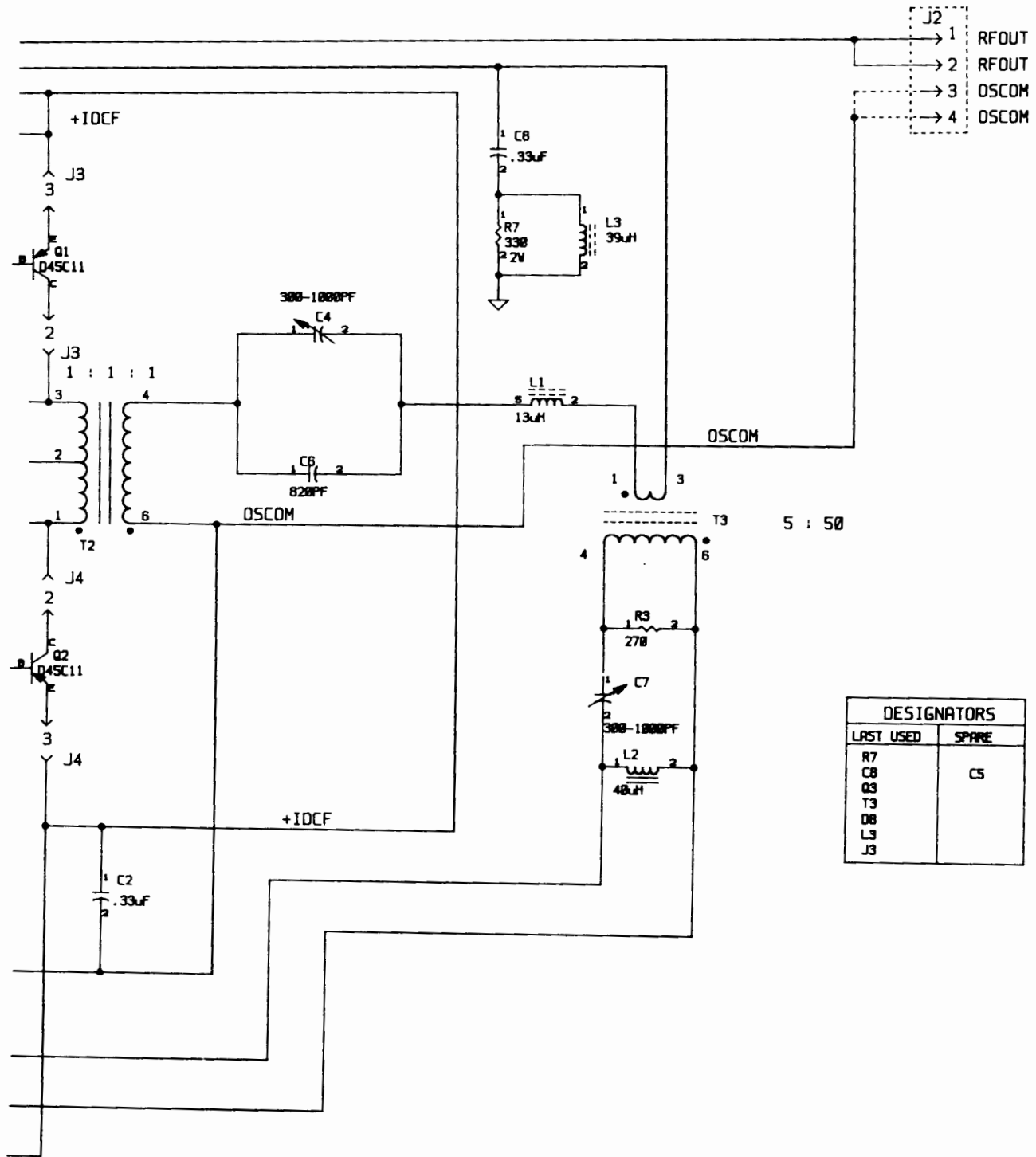


**parts list**  
**225P/230P**  
**cabinet assembly 220V.**

Ref	Part no.	Description	Qty.
1	73663	Meter U S Portable 1-225	1
	73664	Meter U S Portable 1-230	1
2	70628	Nut 4-40 ESNA	2
3	21791	Screw, 6-32 x 3/8	5
4	73785	Timer, Diehl 30 min. cut shaft	1
5	73445	PCB Control BD Assy. I-230P	1
	73760	PCB Control BD Assy. I-225P	1
6	70058	Screw, 4-40 x 3/8	6
7	73529	Panel, Int. Port Frt.	1
8	21790	Screw 6-32 x 3/8	2
9	73877	Decal, Frt. Panel 225P 50 Hz Timer	1
	73876	Decal, Frt. Panel 230P 50 Hz Timer	1
10	74585	Bezel 11"	1
11	74579	Knob Wing ELMA 026-5425	1
12	73607	Knob Cap ELMA 040-3615	1
13	73670	Knob Cap ELMA 040-5015	1
14	73606	Knob Wing ELMA 023-3426	1
15	72519	Holder LED #HLMP0103 BLK	2
16	21733	Nut 8-32 Esna	6
17	73490	Trsnfmr A41-80-28 Signal	1
18	60768	Nut 6-32 Esna #22NM-62 Plated	6
19	70496	Filter Line 2.5A/250V Schaffner	1
20	73587	Brkt Mtg Side Box Port Right	1
21	70105	Washer #10 Flat Plated	2
22	73657	Pnl Int Port Bottom Pnt	1
23	79041	Jack Banana Blk Smith 1508-103	1
24	21024	Nut 8-32 Hex SS	2
25	73611	Holder Appl U S Port	1
26	73188	Screw 8-32 x 3/4	4
27	21016	Screw 8-32 x 3/8	4
28	73783	Handle 66-330-14 Elma Cut 11.6	1
29	79115	Feet Blk Rub M-195 13/16 x 25/32	4
30	73474	Support Case 63-140 Elma	1
31	70782	Screw 8-32 x 5/8	2
32	73593	Brkt Mtg Side Box Port Left	1
33	71319	Screw 6-32 x 1/4	2
34	74582	Applicator Ultrasound, Adjustable <del>5-10</del> 10	1
	74590	Applicator Ultrasound, Adjustable <del>1-5</del> 5	1

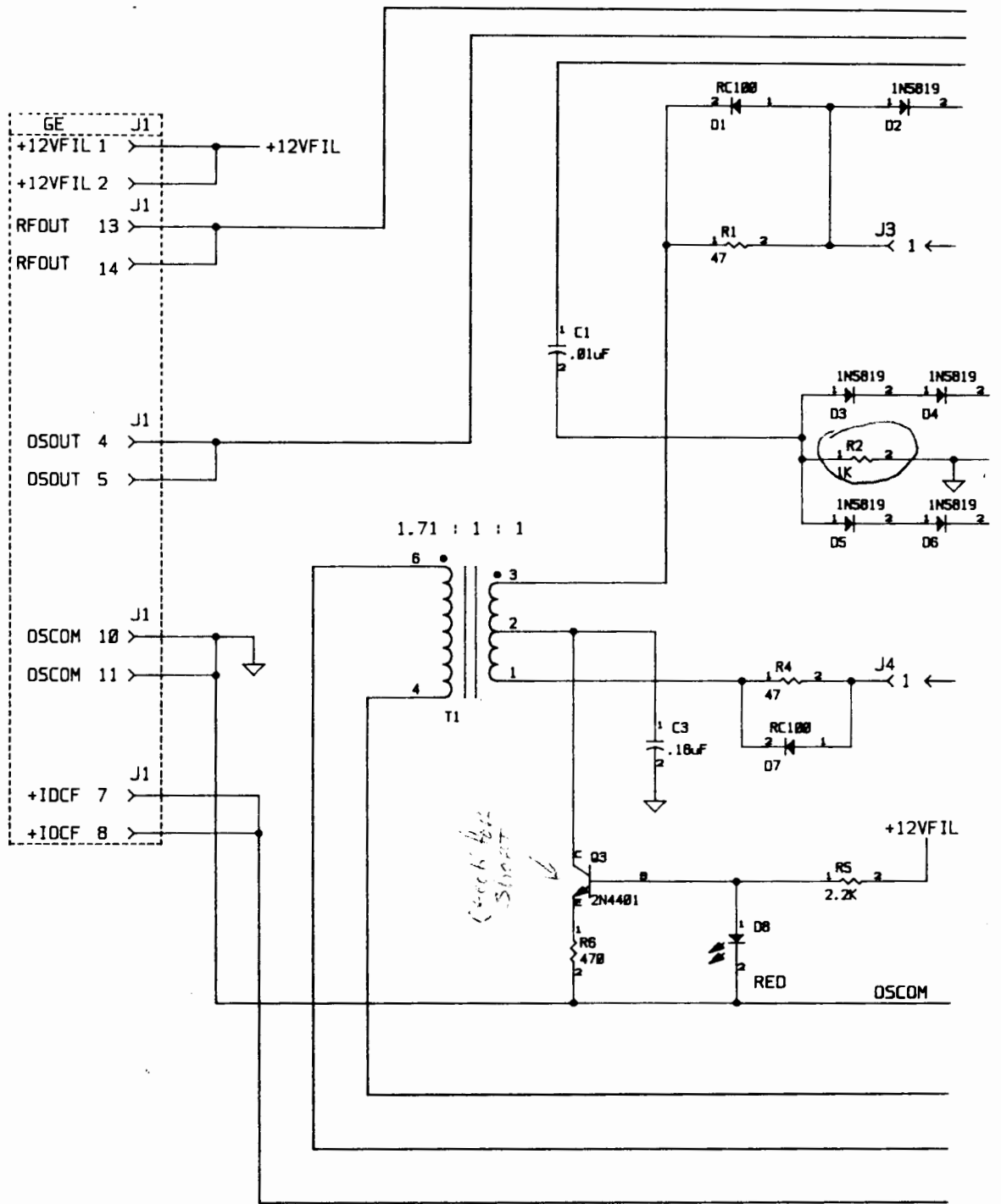
*Inductor  
100 STANVOLT  
10, 20 PA*

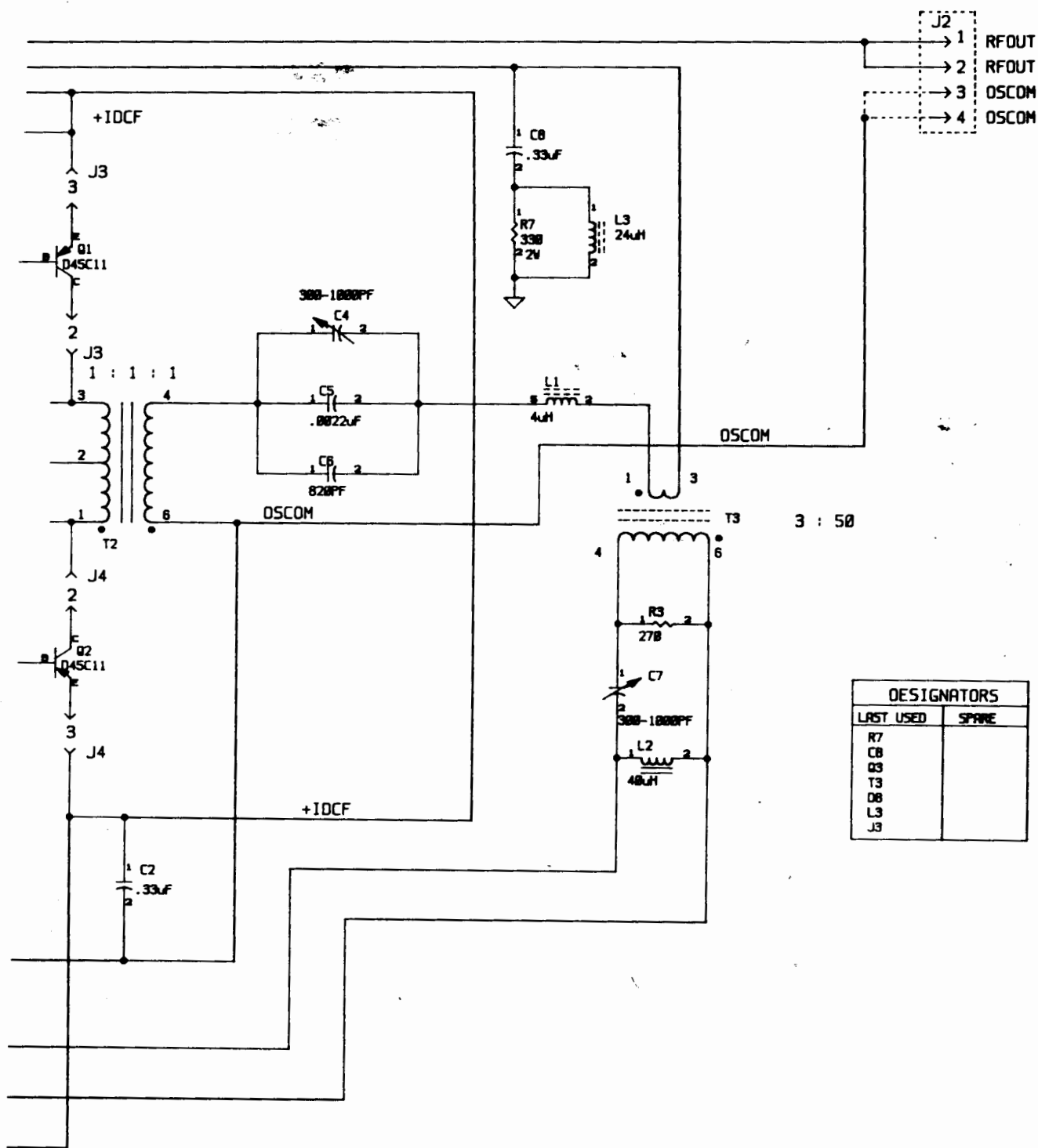




DESIGNATORS	
LAST USED	SPARE
R7	
C8	C5
Q3	
T3	
D8	
L3	
J3	

**ELECTRICAL SCHEMATIC**  
**P.C. BOARD ASSY., OSC. POWER, 5CM<sup>2</sup>**  
**E.S. 71404-D**





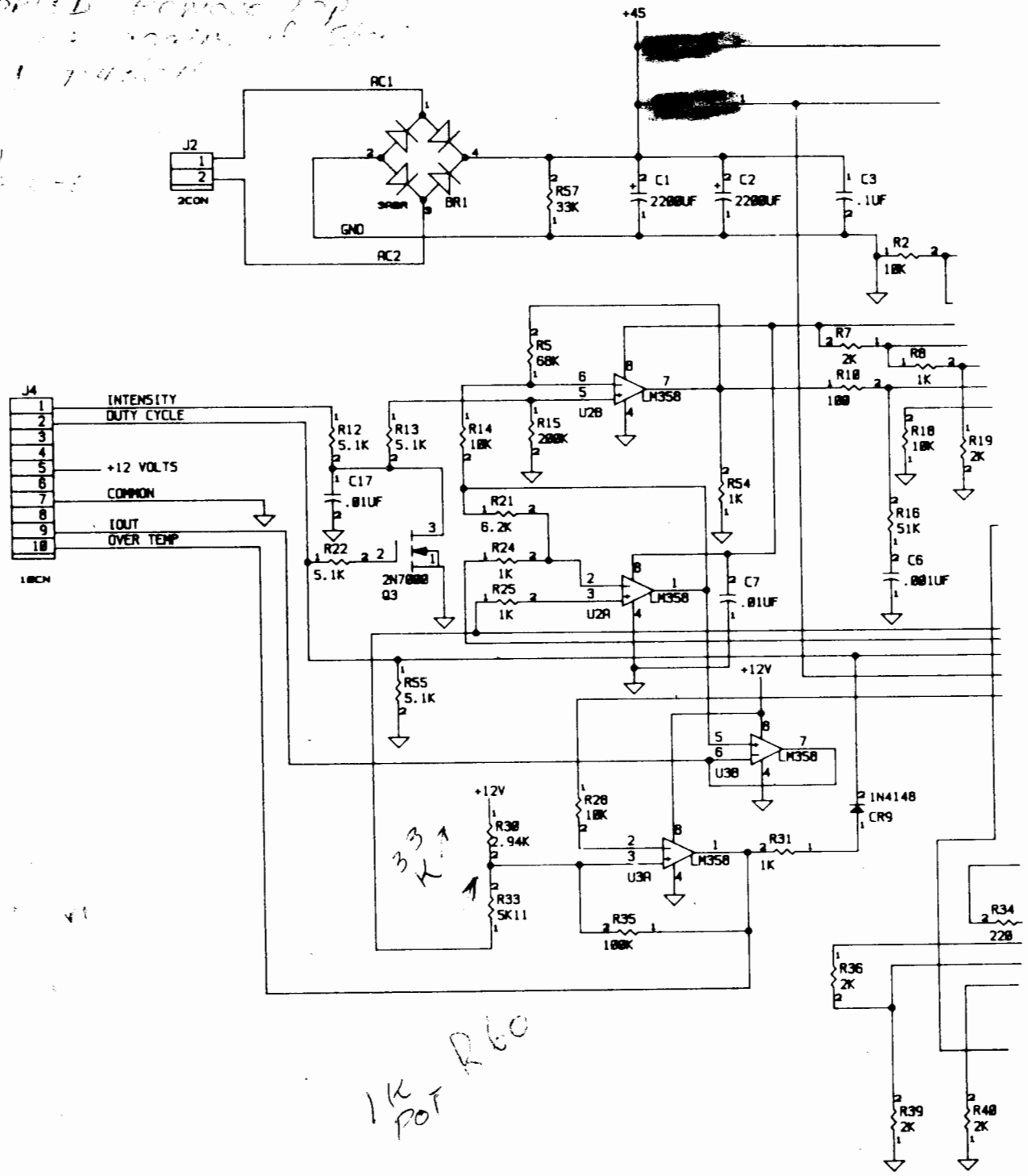
DESIGNATORS	
LAST USED	SPARE
R7	
C8	
Q3	
T3	
Q8	
L3	
J3	

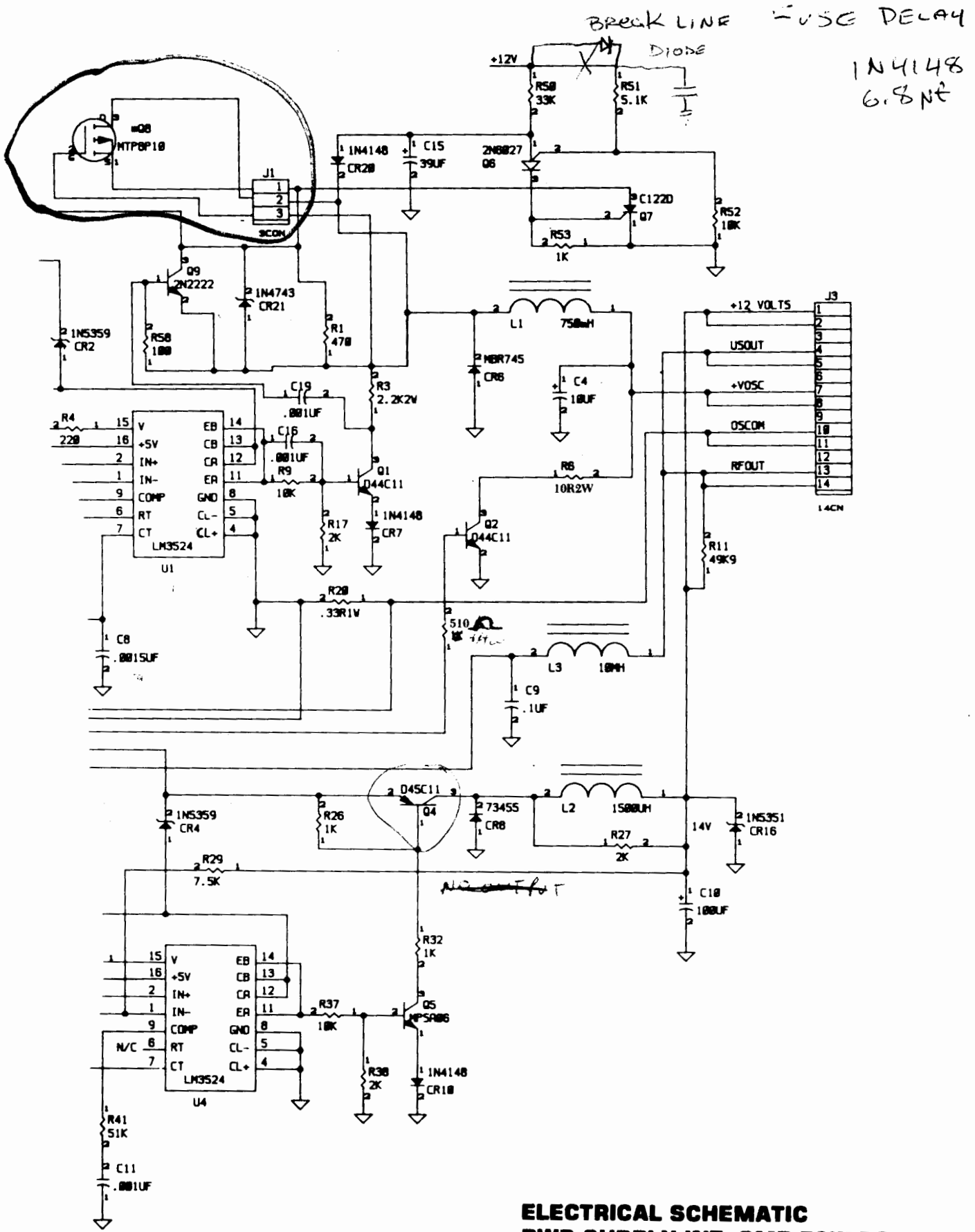
**ELECTRICAL SCHEMATIC**  
**P.C. BOARD ASSY., OSC POWER, 10CM<sup>2</sup>**  
**E.S. 71407-D**

NO OUT PUT FUSE OK  
 AP810 OK

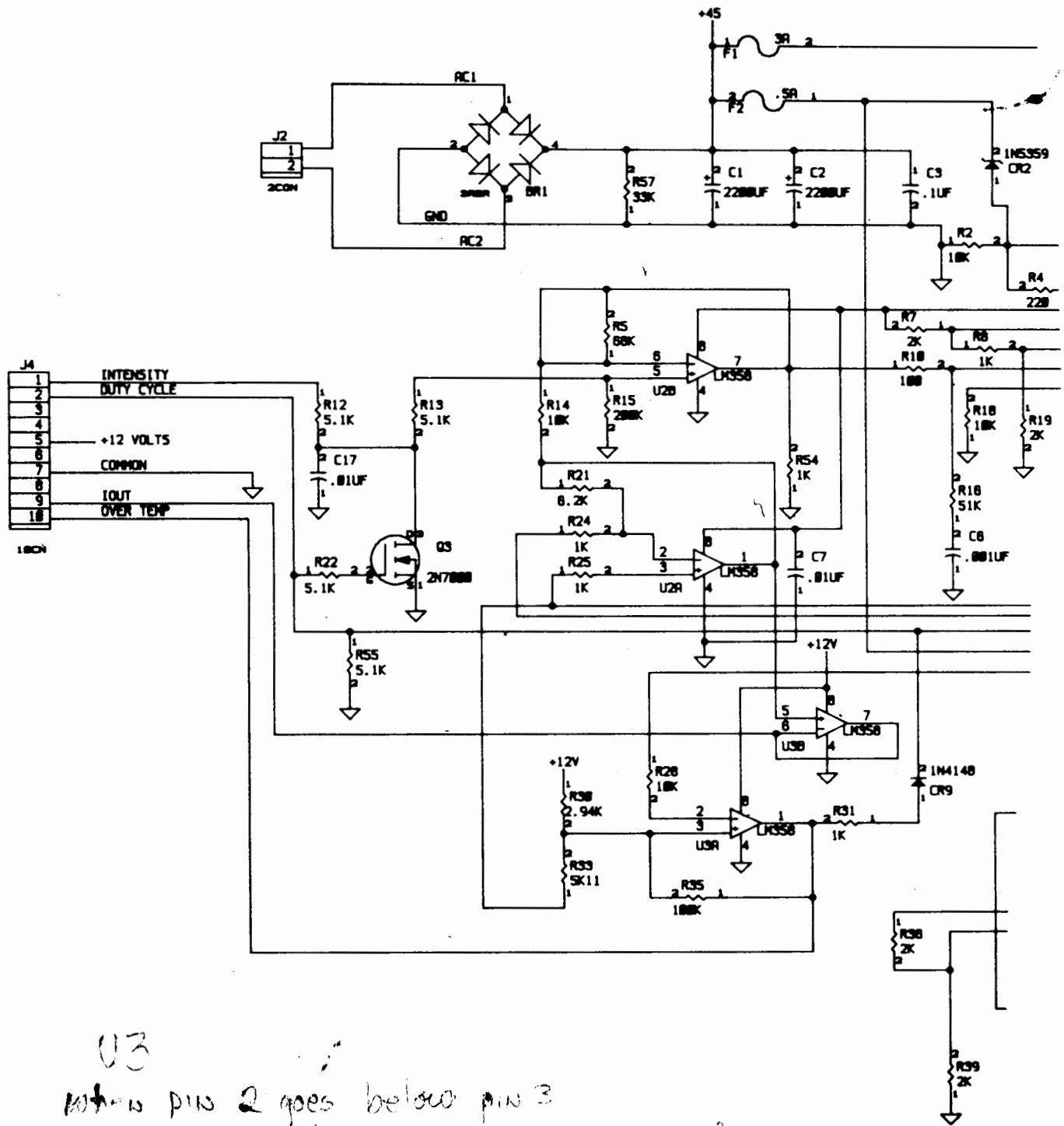
CE FLY 7 J2 20 21 22 23  
 24 25 26 27 28 29 30  
 31 32 33 34 35 36  
 37 38 39 40 41 42  
 43 44 45 46 47 48  
 49 50 51 52 53 54  
 55 56 57 58 59 60

100  
 100  
 100





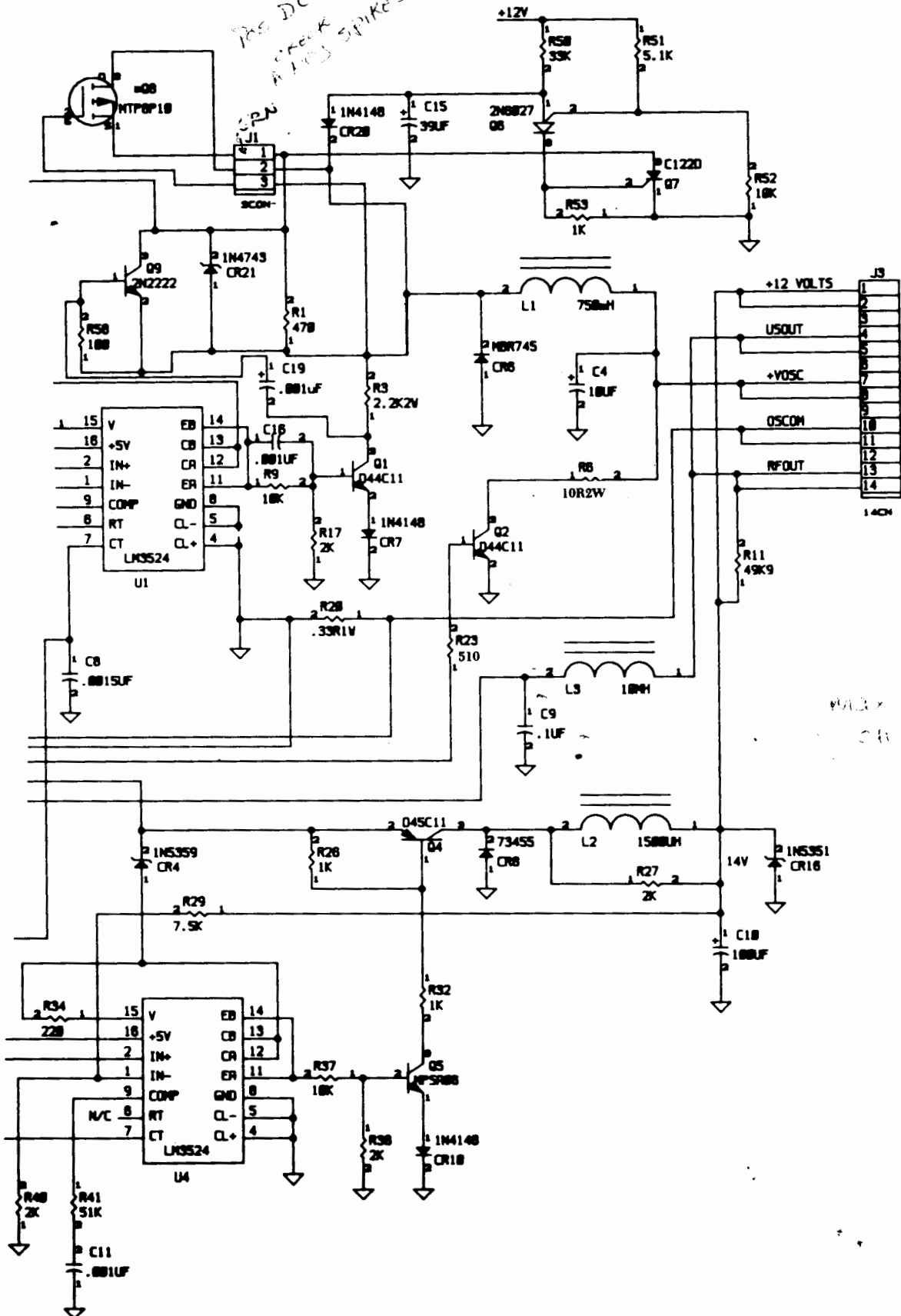
**ELECTRICAL SCHEMATIC  
PWR SUPPLY INT. SMP 50W 5CM  
S. 73824-C**



U3  
 when pin 2 goes below pin 3  
 pin 1 goes High causing max head temp.  
 3.0V



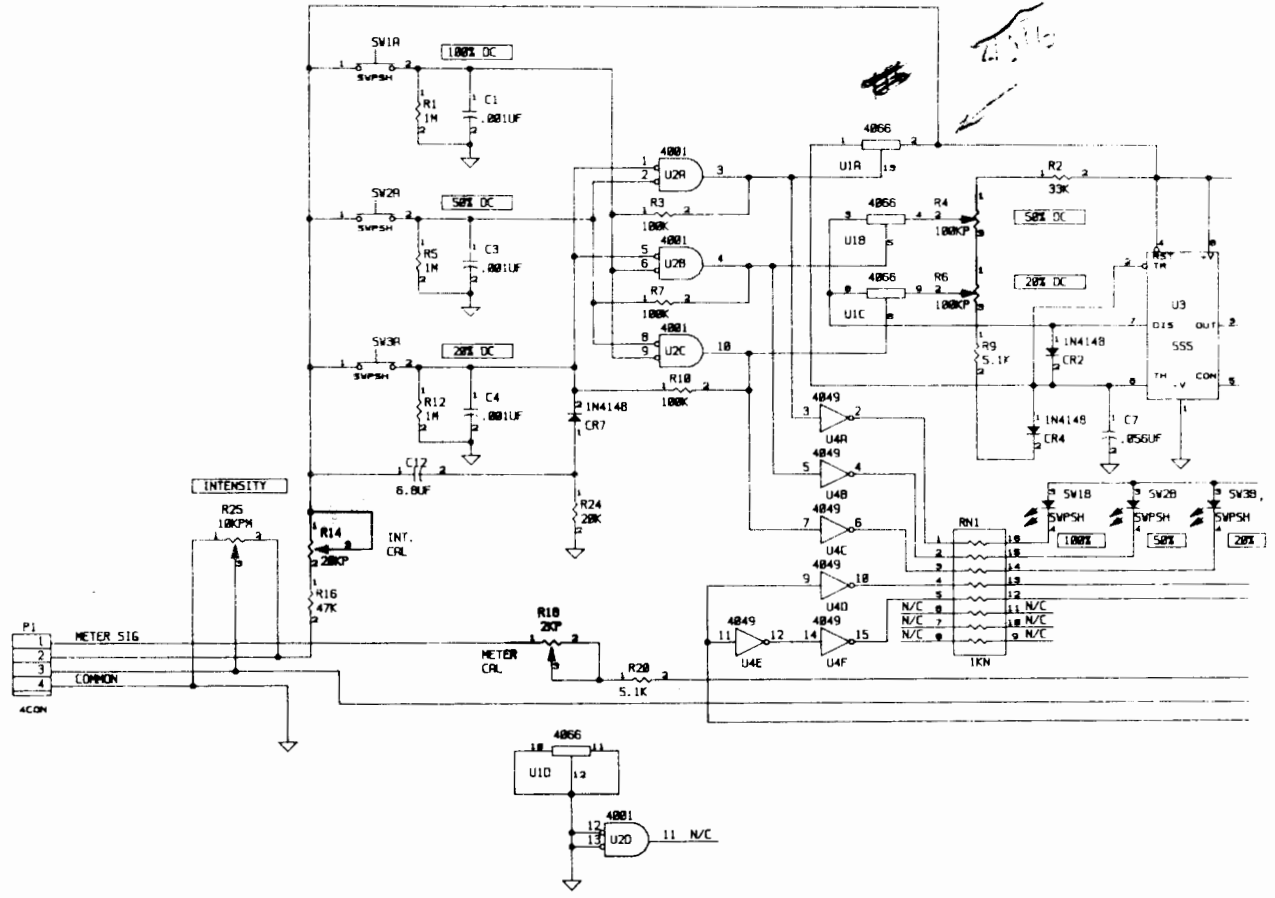
*Res DC level @  
creek  
A103 SPIKES  
Armed  
C120*

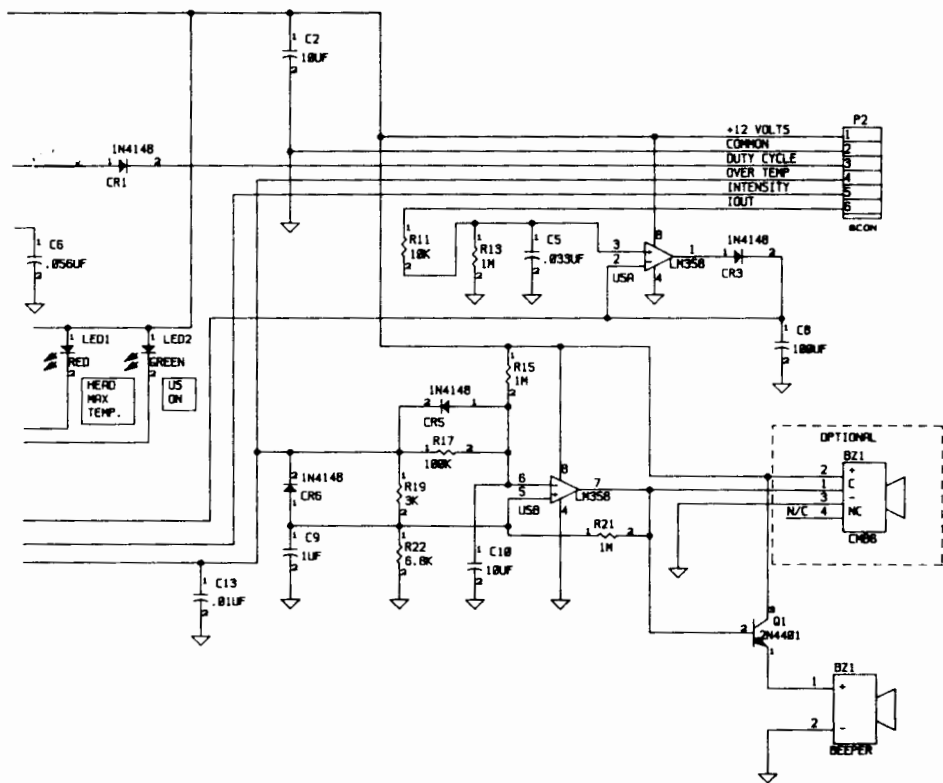


*max rated temp on  
CR CR*

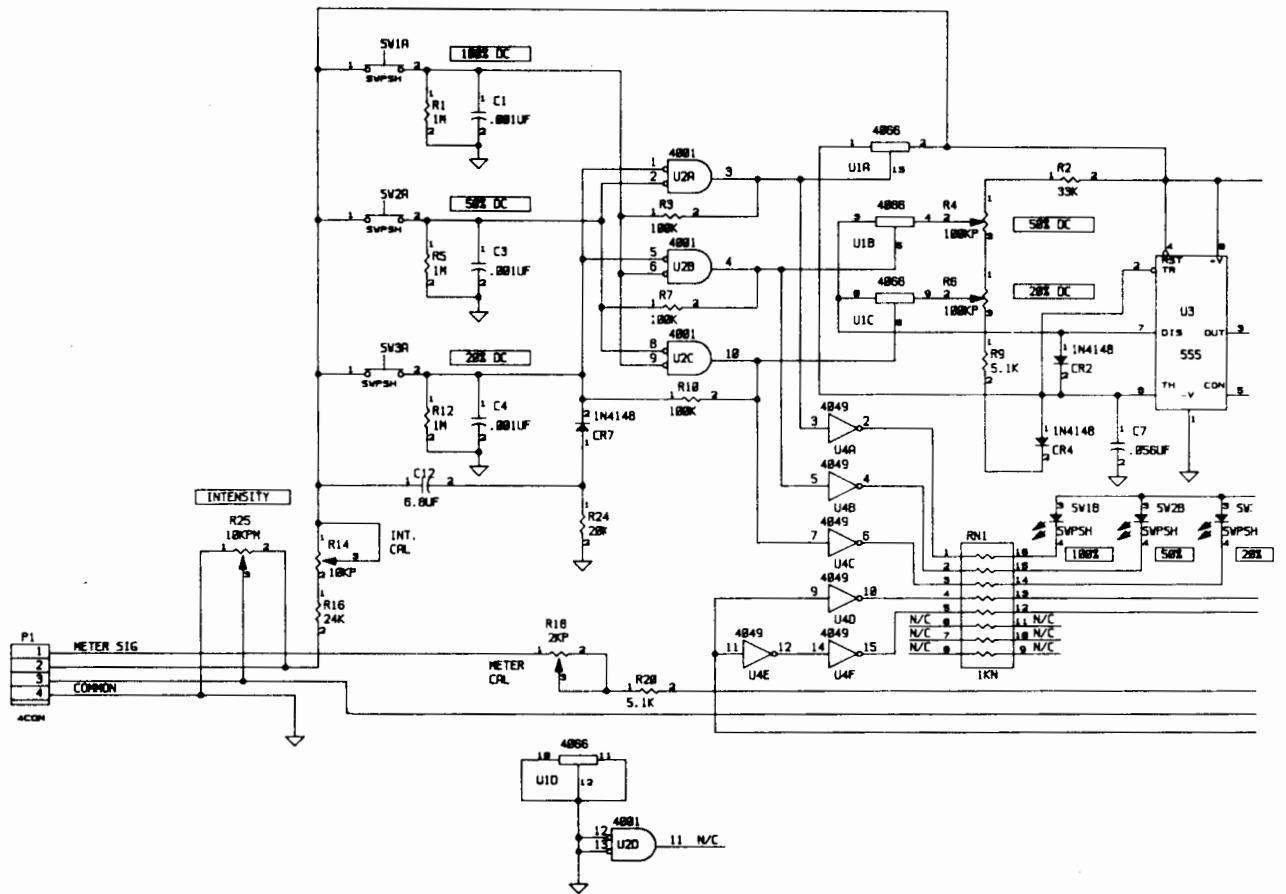
**ELECTRICAL SCHEMATIC, PCB  
PWR SUPPLY INT. SMP 50W 10CM  
S73436-D**

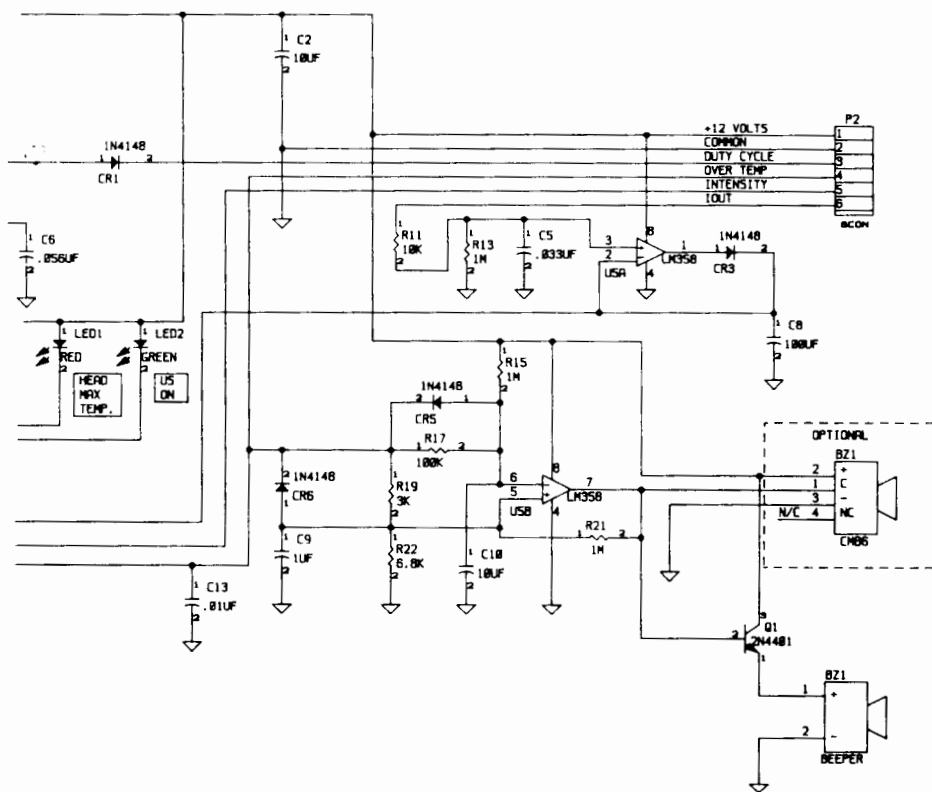
1A 1/2 AMP FUSE BLOWN  
 CK  
 2000000000  
 2.5/16





**ELECTRICAL SCHEMATIC, PCB,  
CONTROL INT PORT. US 5CM  
S. 73760-B**



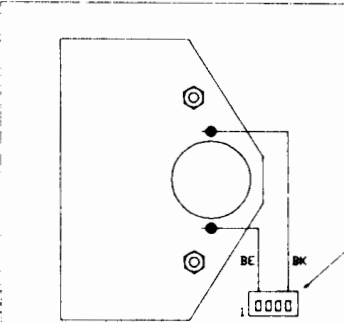


**ELECTRICAL SCHEMATIC, PCB,  
CONTROL INT PORT. US 10CM  
S. 73445-B**

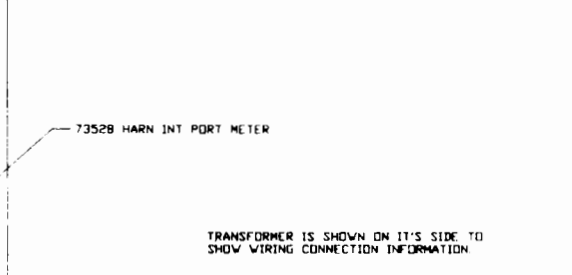
TO P2 OF CONTROL BOARD



74580 PNL FNT IN-225P ASSY.

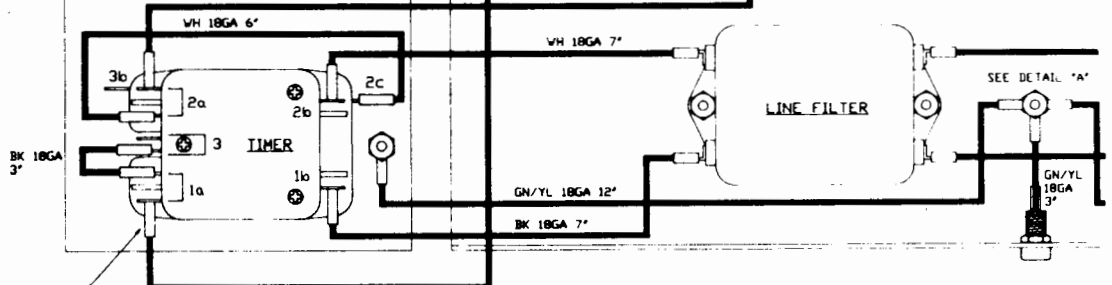
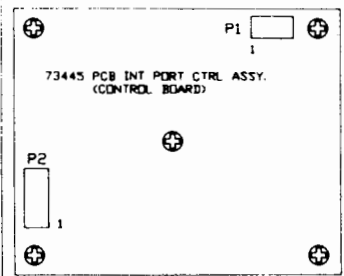


74580 PNL BOT IN-225/230P ASSY.



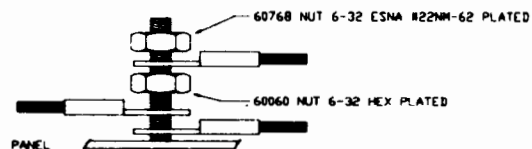
73528 HARN INT PORT METER

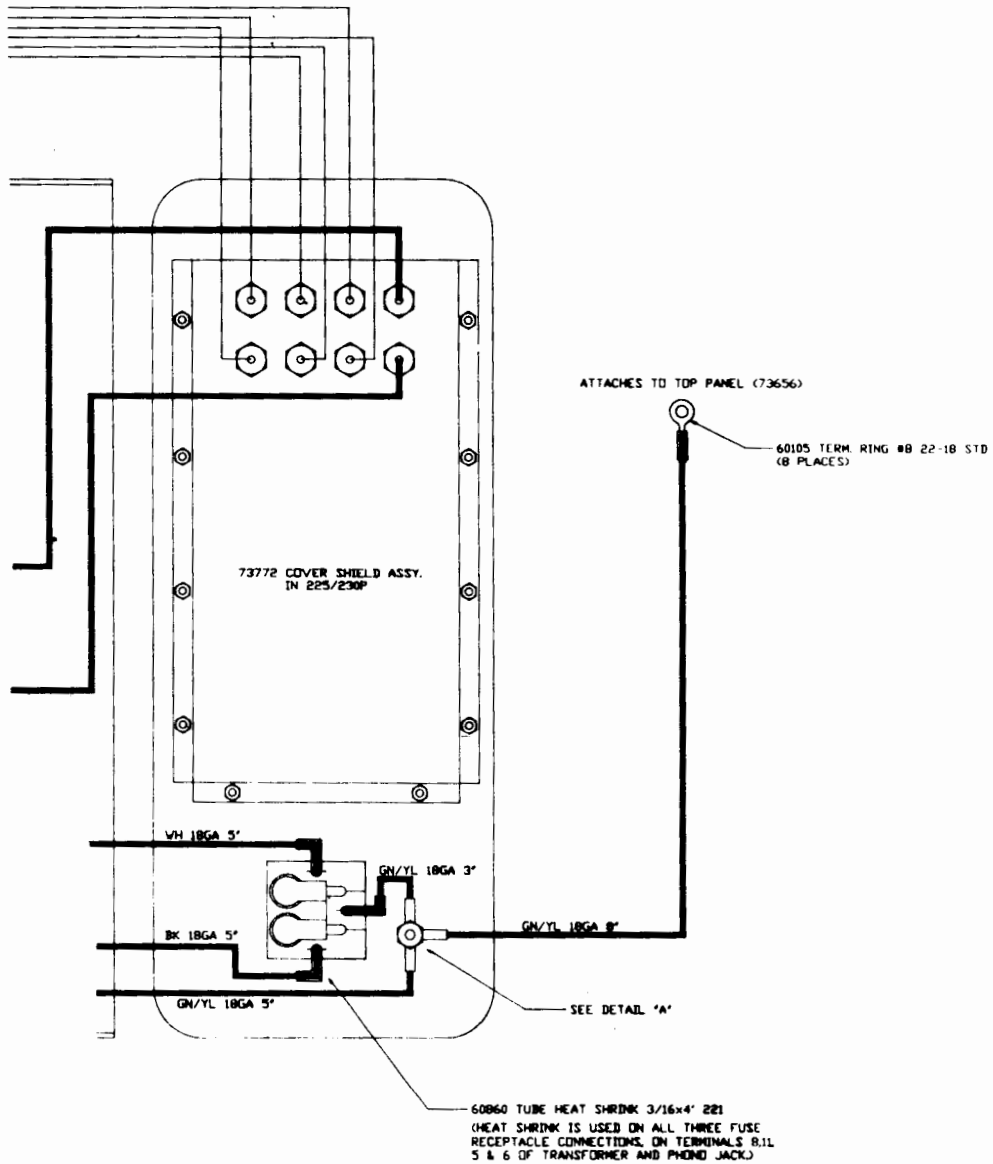
TRANSFORMER IS SHOWN ON IT'S SIDE TO SHOW WIRING CONNECTION INFORMATION



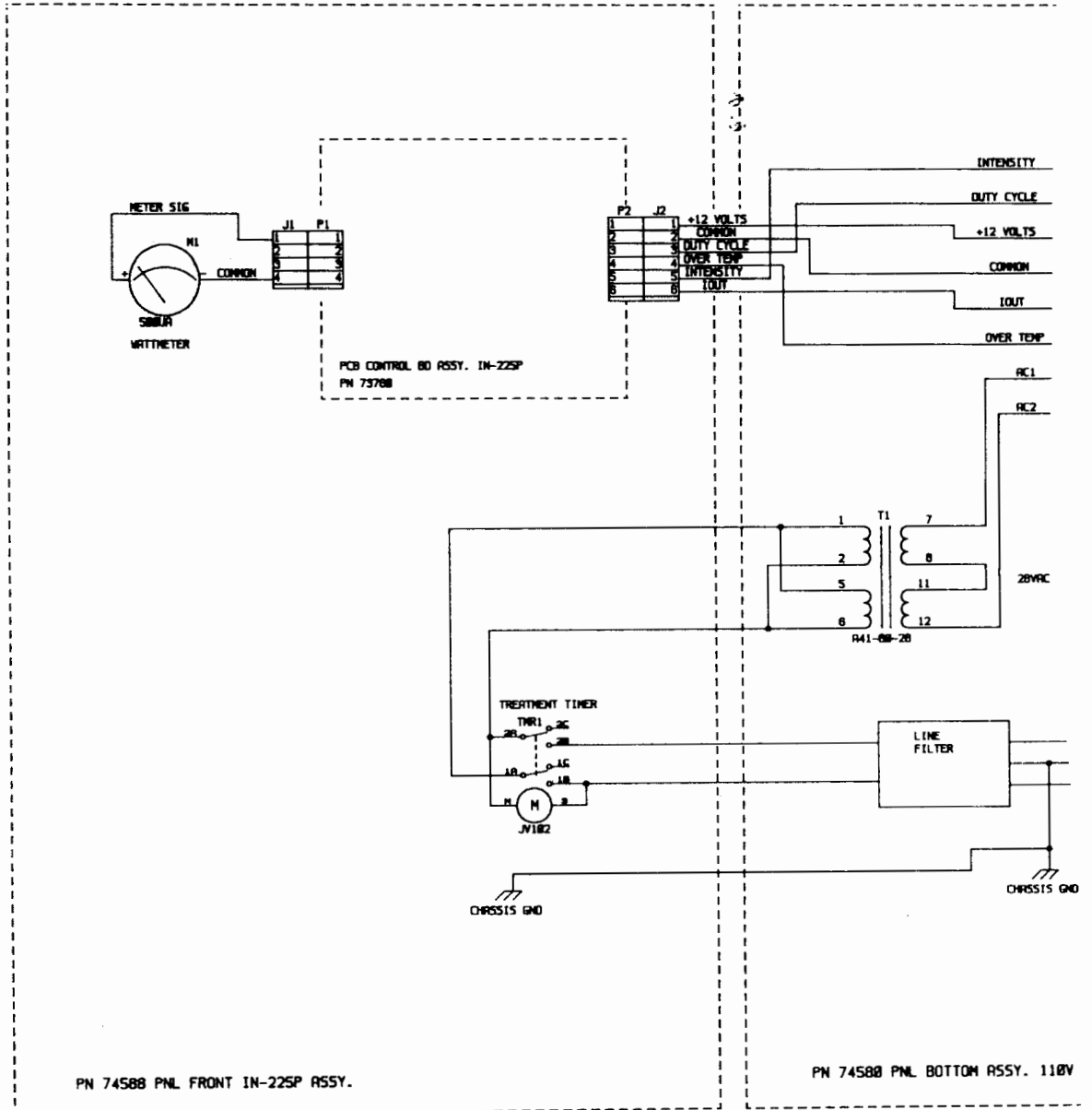
71576 TERM. FSTON 1/4 T2617 22-18  
 (71576 TERM. FSTON'S ARE USED ON ALL  
 TIMER CONNECTIONS AND ON ALL LINE  
 FILTER CONNECTIONS.)

DETAIL "A"

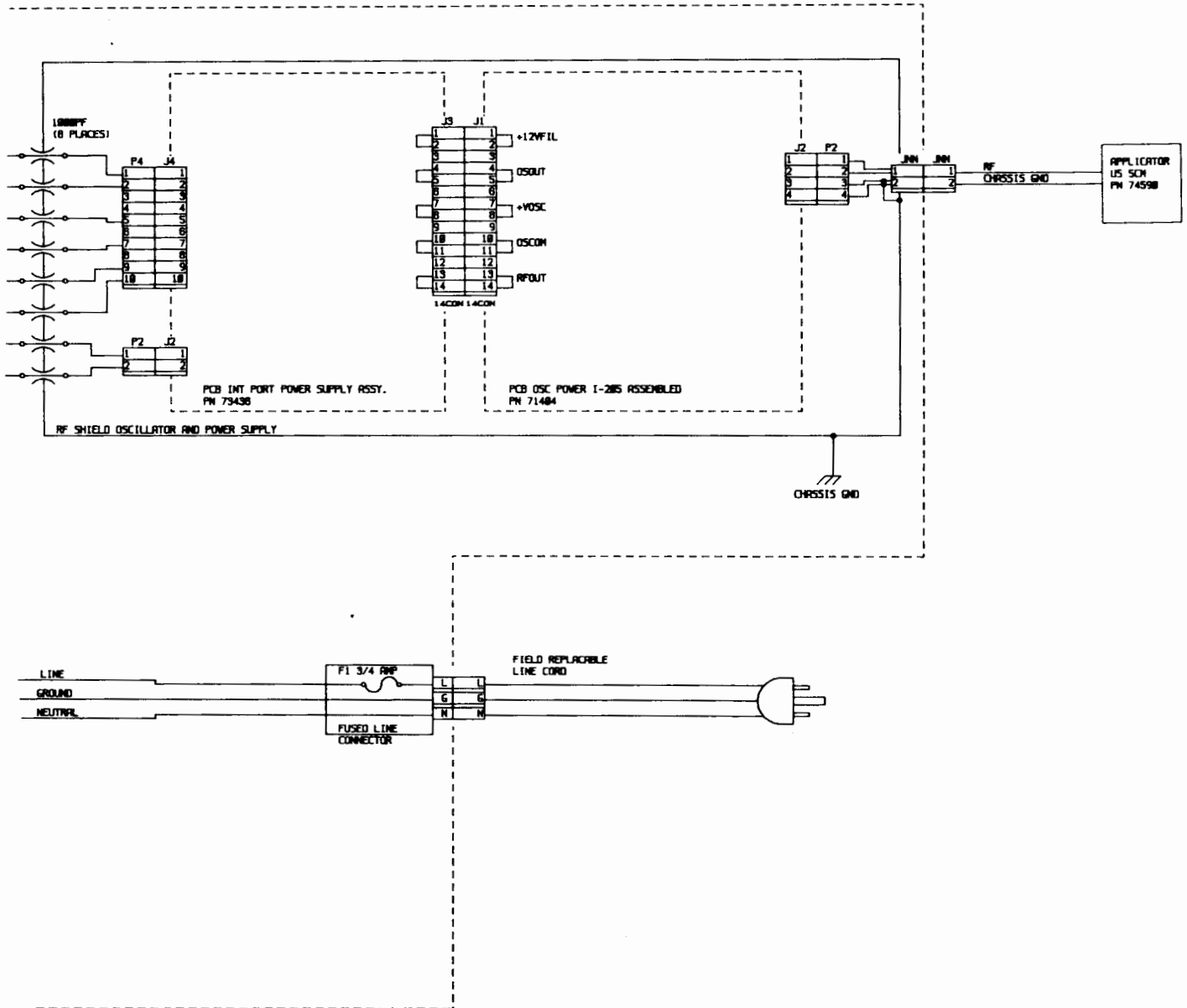




**FINAL ASSY. IN-225P 120V  
73775**





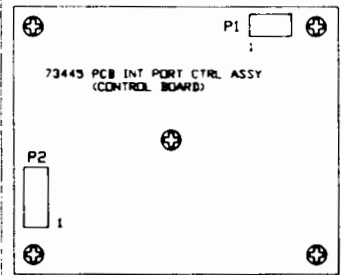
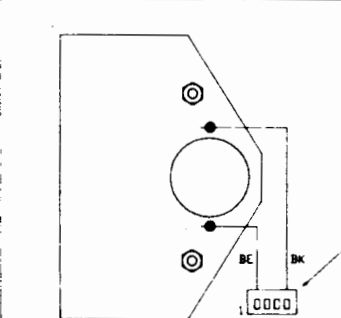


**ELECTRICAL SCHEMATIC ULTRASOUND  
UNIT INTELECT 225P 120V 60HZ.  
S. 73775-B**

TO P2 OF CONTROL BOARD



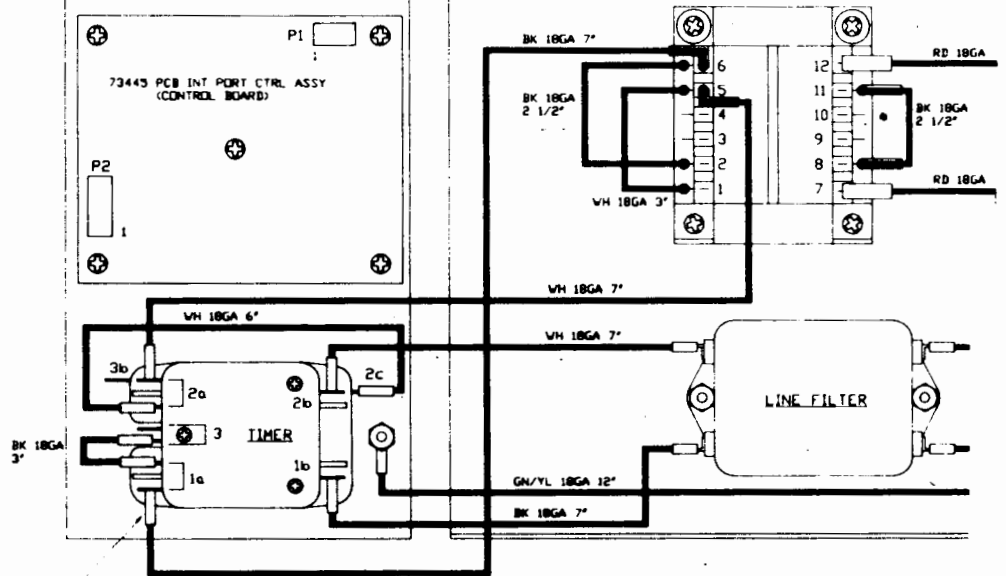
74583 PNL FNT IN230P ASSY.



74580 PNL BOT IN-225/230P ASSY

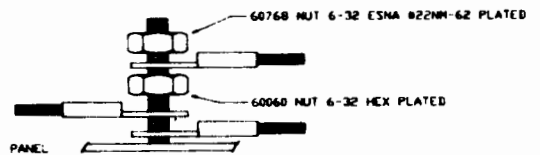
73528 HARN INT PORT METER

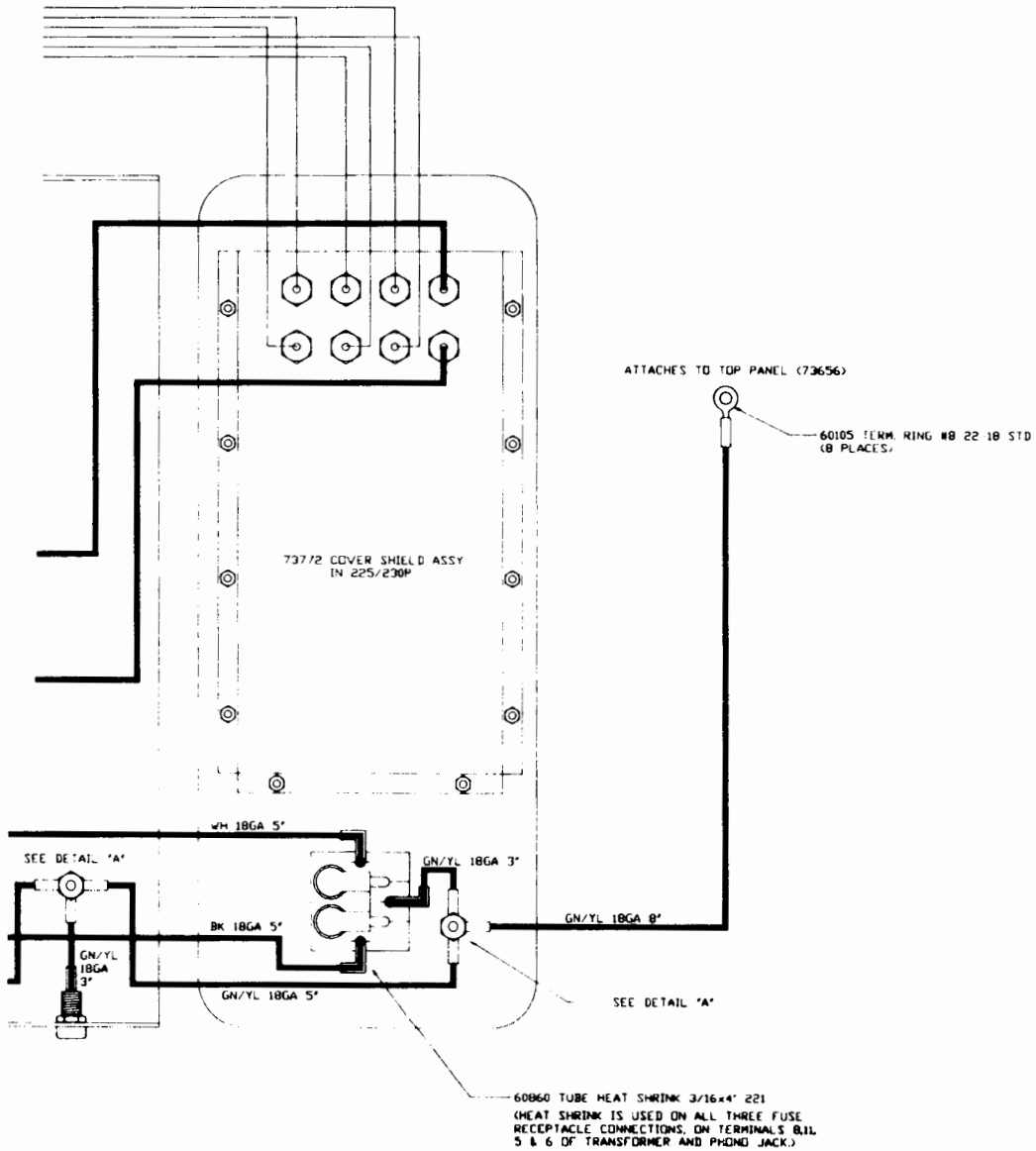
TRANSFORMER IS SHOWN ON IT'S SIDE TO SHOW WIRING CONNECTION INFORMATION



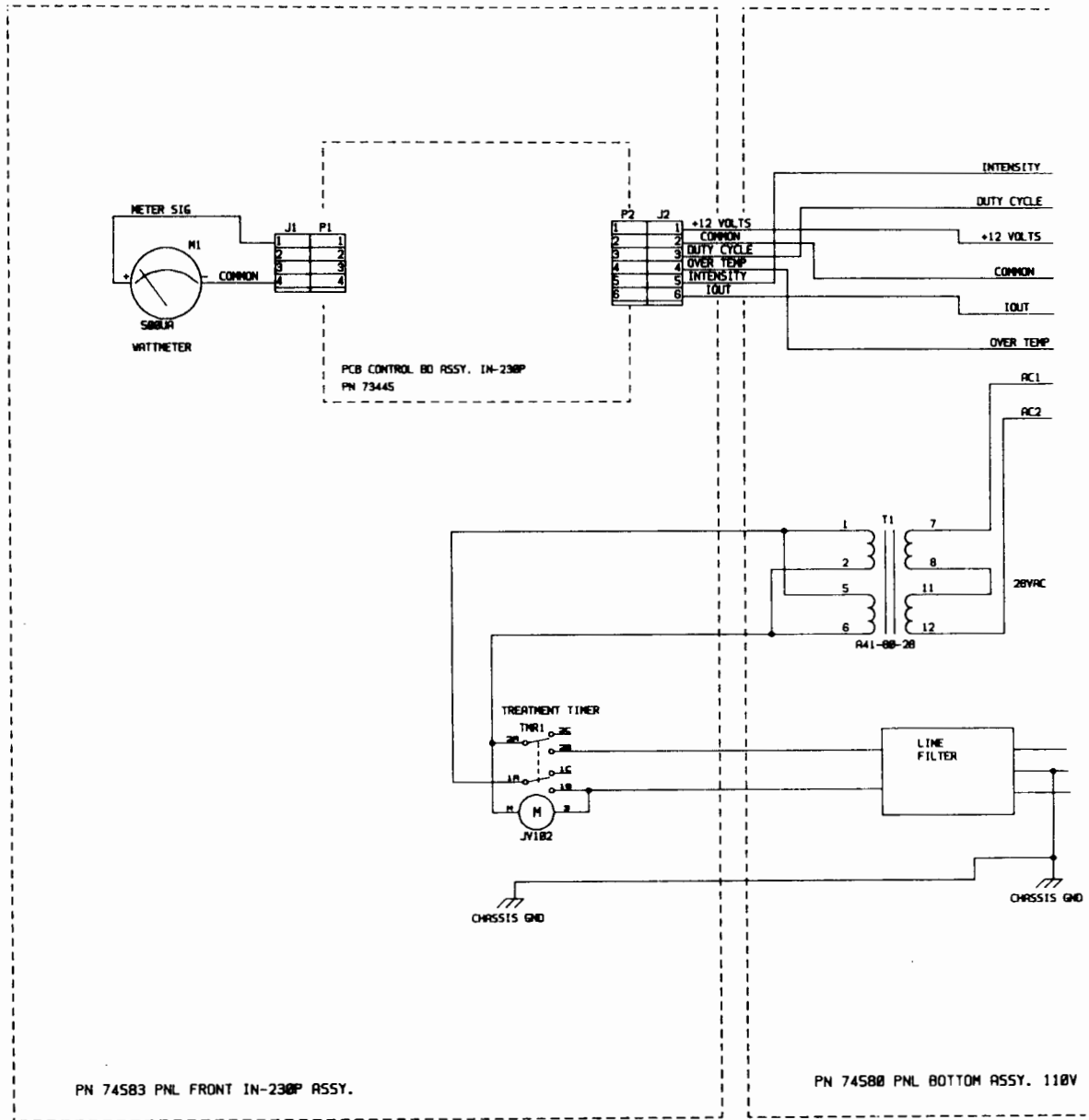
71576 TERM FSTON 1/4 TB617 22-18  
(71576 TERM FSTONS ARE USED ON ALL  
TIMER CONNECTIONS AND ON ALL LINE  
FILTER CONNECTIONS)

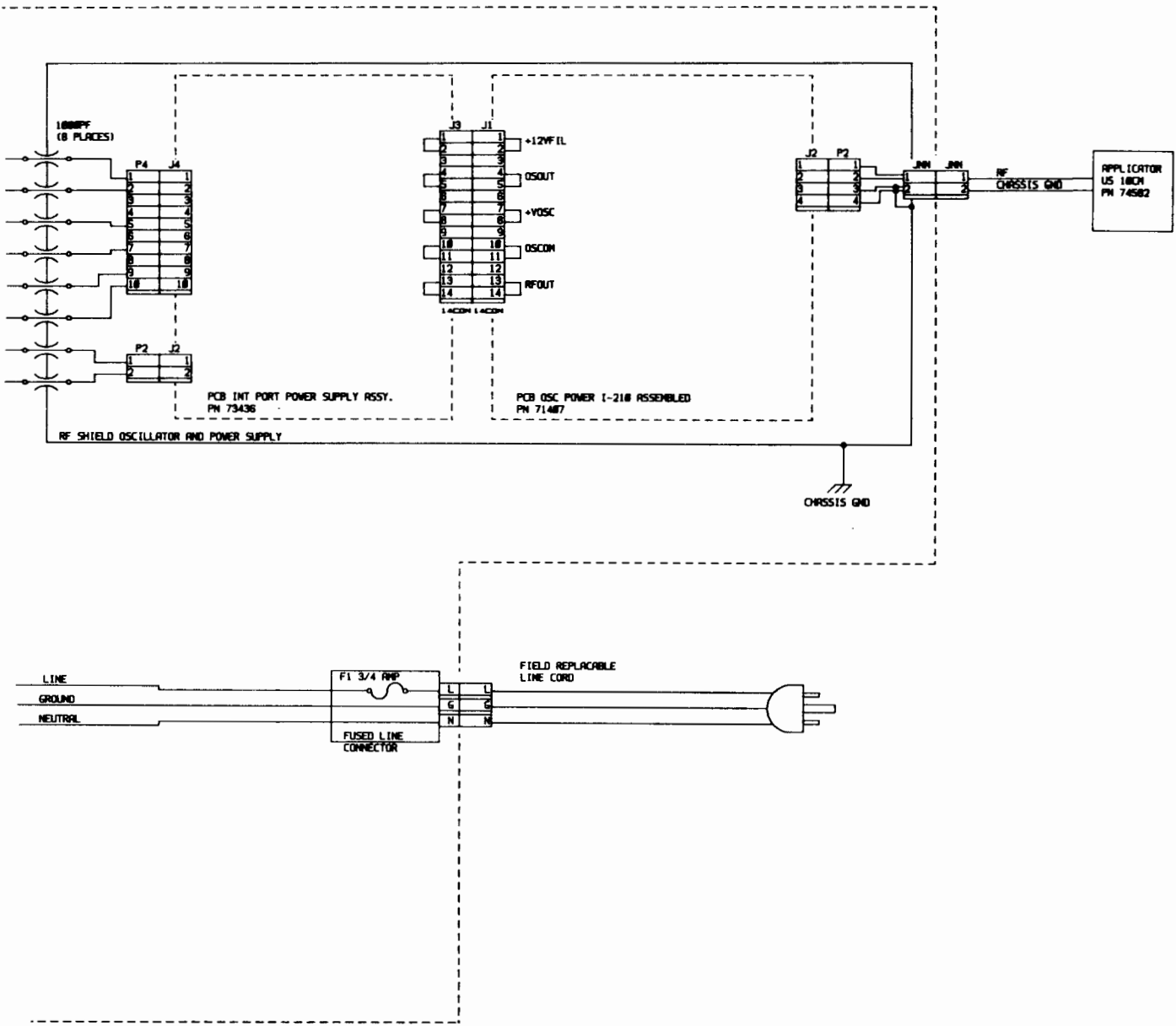
DETAIL "A"



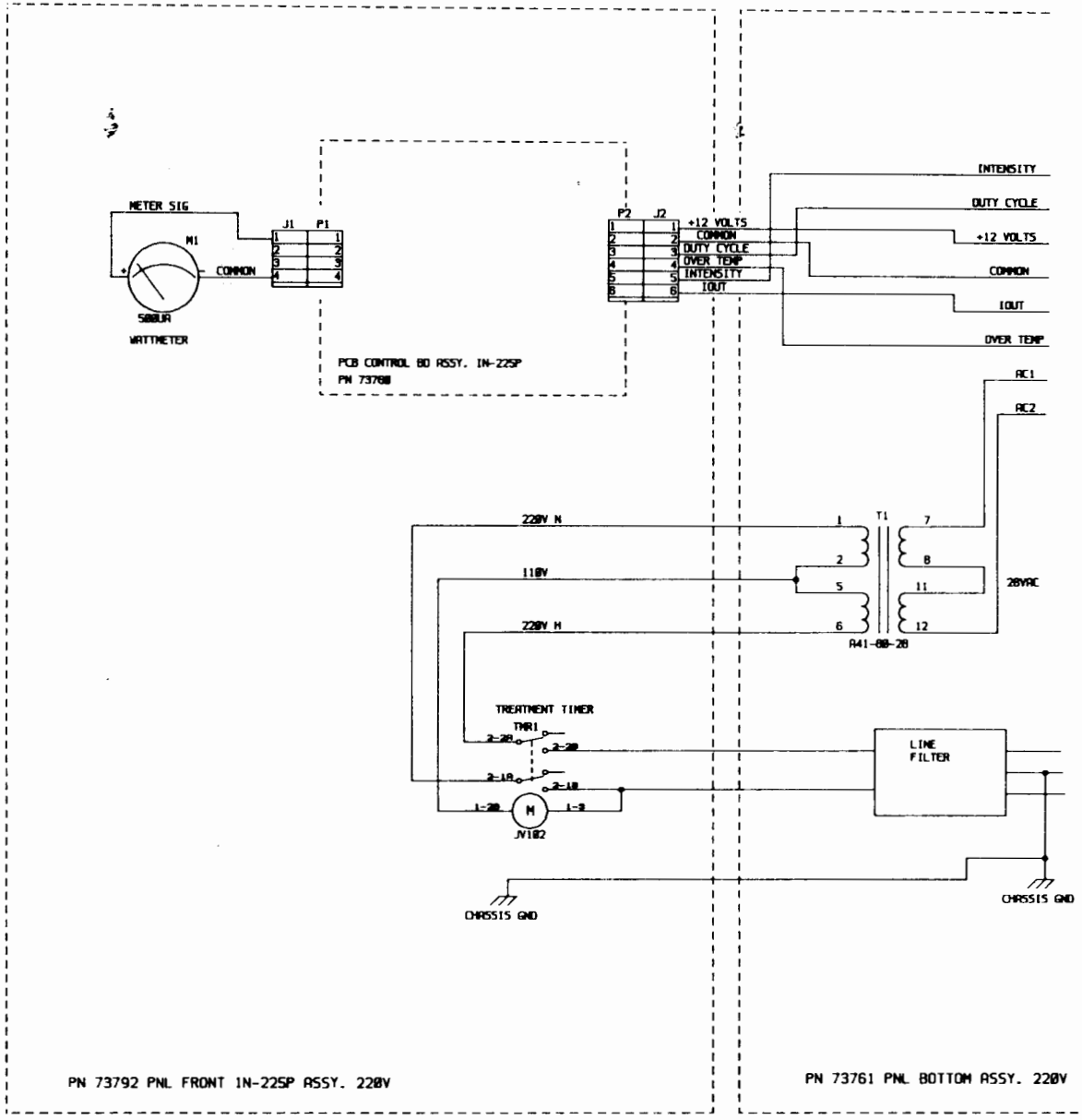


**FINAL ASSY. IN-230P 120V  
W.D. 73774-B**



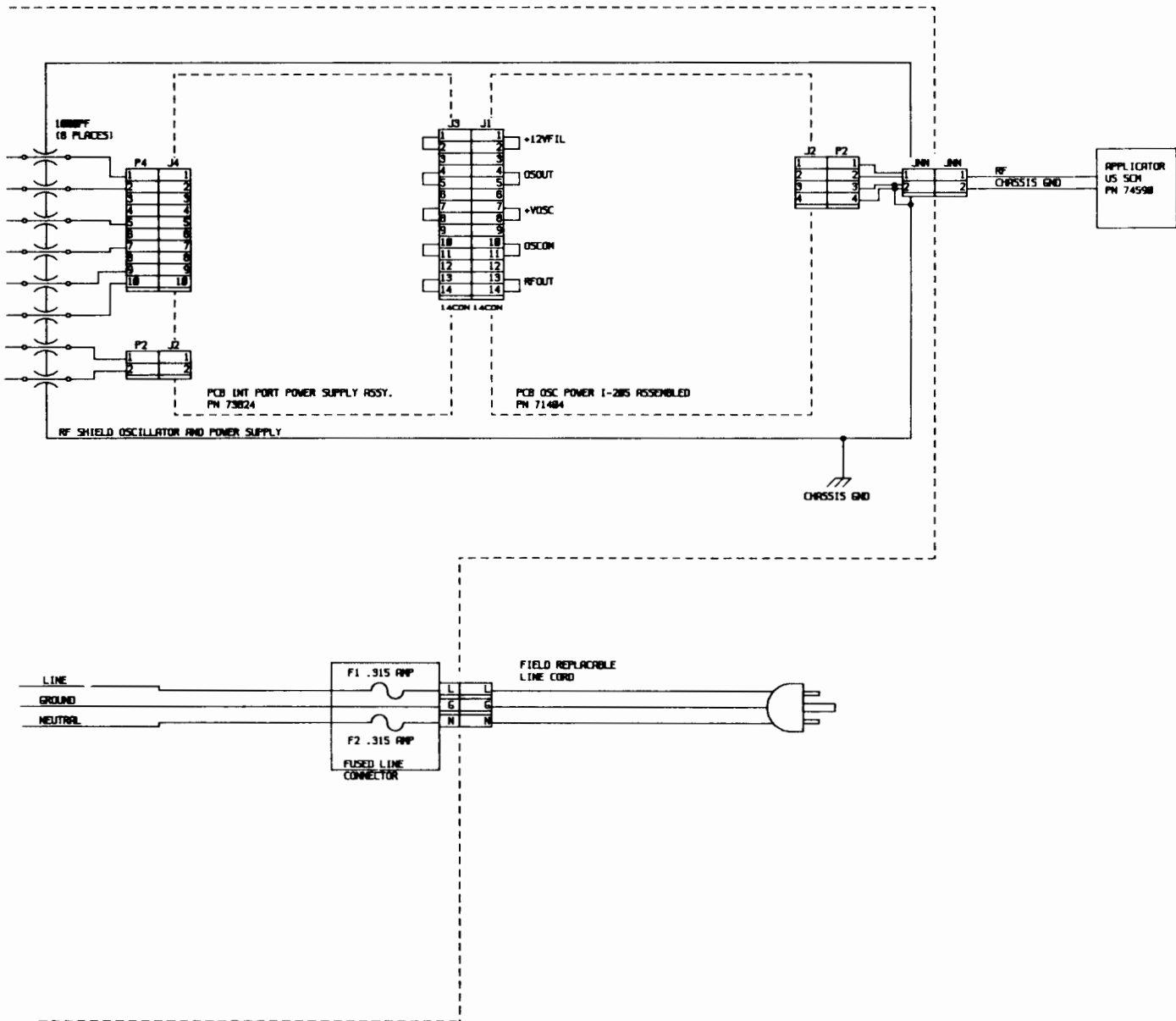


**ELECTRICAL SCHEMATIC ULTRASOUND  
UNIT INTELECT 230P 120V. 60HZ.  
S. 73774-B**



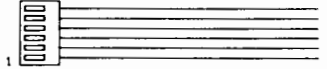
PN 73792 PNL FRONT IN-225P ASSY. 220V

PN 73761 PNL BOTTOM ASSY. 220V

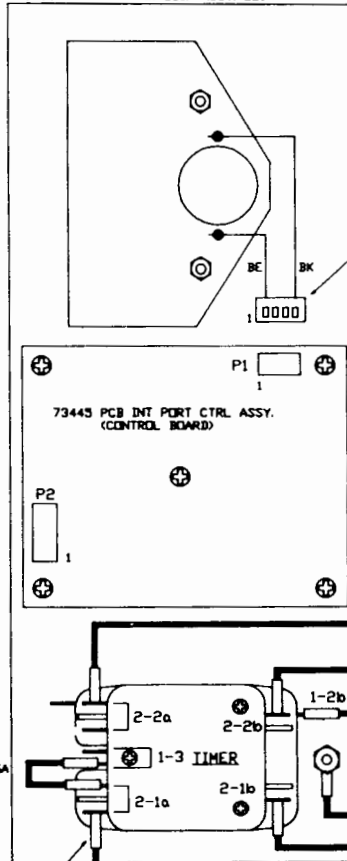


**ELECTRICAL SCHEMATIC ULTRASOUND  
UNIT INTELECT 225P/220V 50HZ.  
S. 73777-C**

TO P2 OF CONTROL BOARD



73793 PNL FRONT IN-230P ASSY. 220V



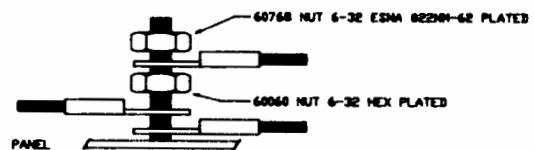
74500 PNL BOT IN-225/230P ASSY.

73528 HARN INT PORT METER

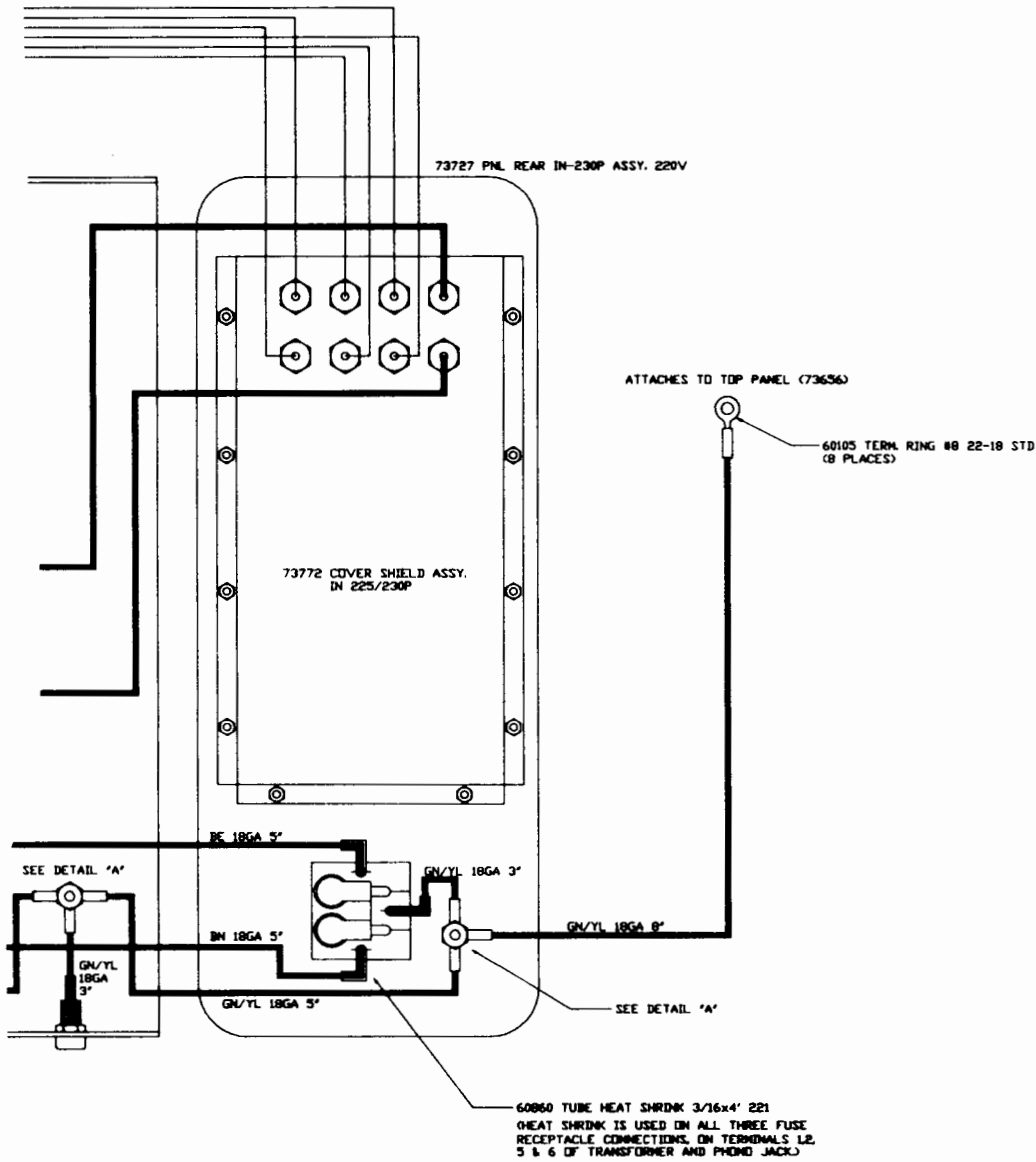
TRANSFORMER IS SHOWN ON IT'S SIDE TO SHOW WIRING CONNECTION INFORMATION.

71576 TERM FSTON 1/4 TB617 22-10  
(71576 TERM FSTONS ARE USED ON ALL  
OTHER CONNECTIONS AND ON ALL LINE  
FILTER CONNECTIONS.)

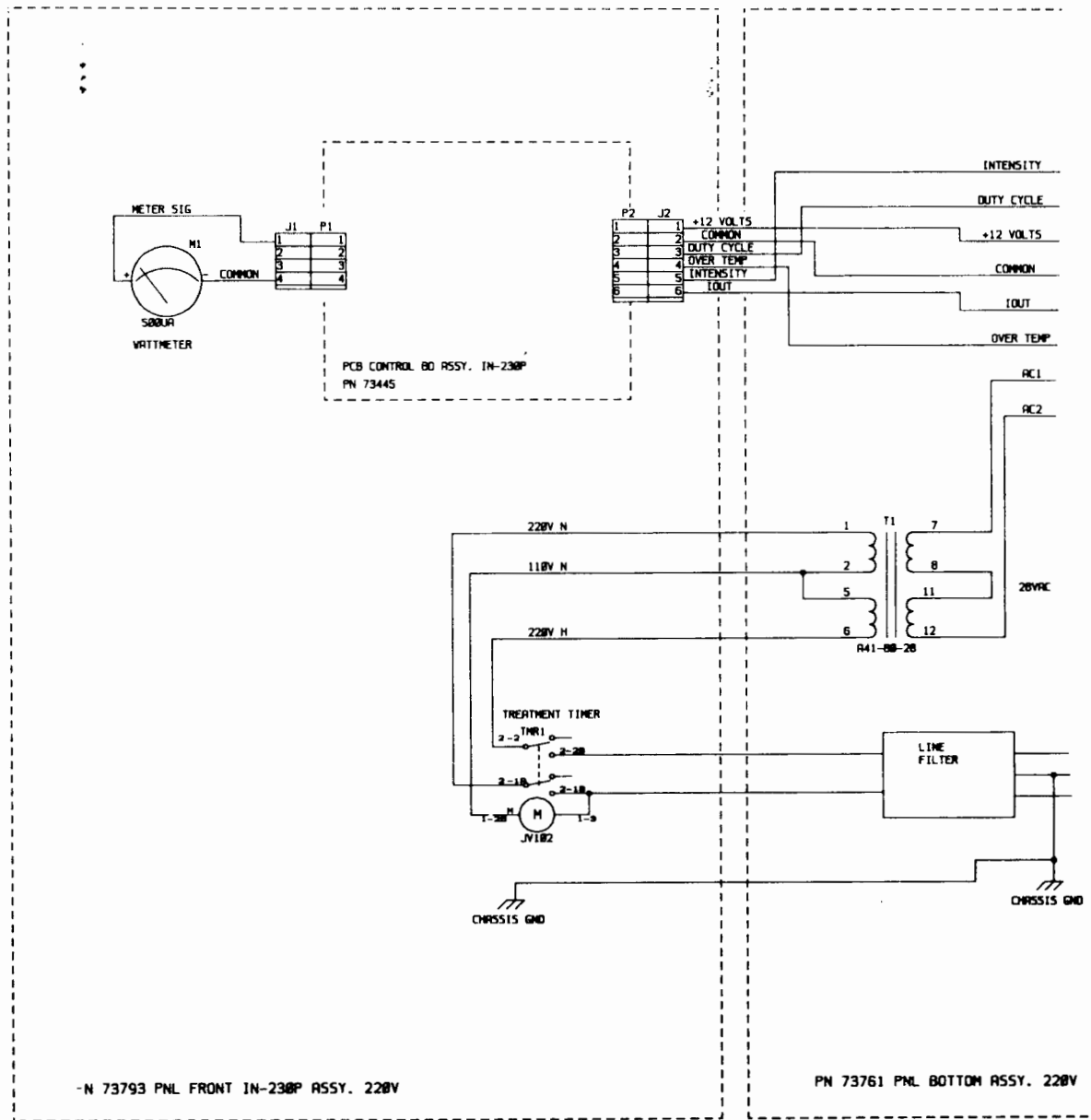
### DETAIL 'A'

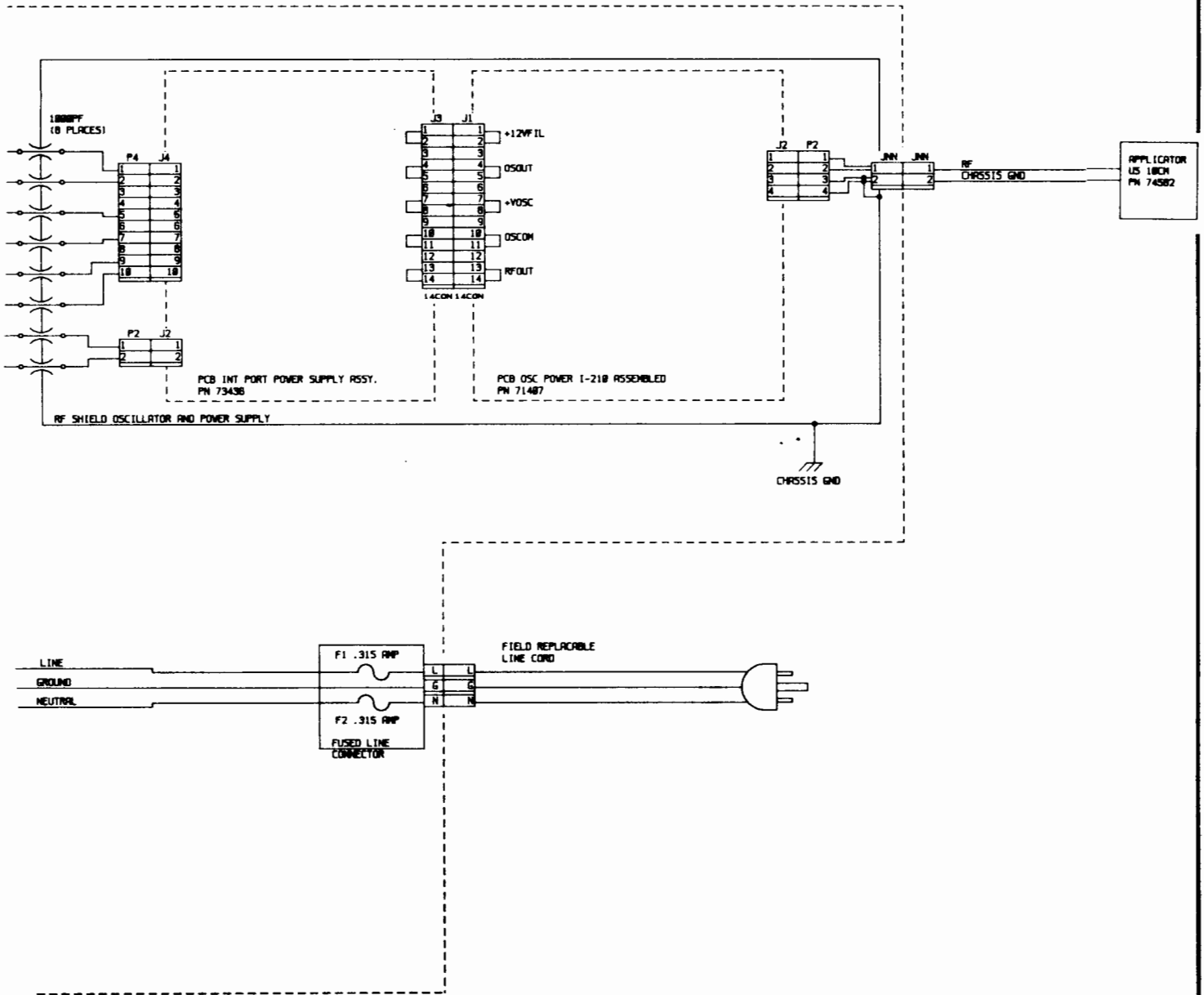






**FINAL ASSY. IN-230P 220V  
73776B**





**ELECTRICAL SCHEMATIC ULTRASOUND  
UNIT INTELECT 230P 220V. 50HZ.  
S.73776-C**

# panel designations

INTELECT MODEL 225P THERAPEUTIC ULTRASOUND GENERATOR POWER 120V 60 HZ 3/4 AMP MAX

FCC ID BWUBUKU 225P UNITED STATES OF AMERICA SERIAL No

**DANGER:** EXPLOSION HAZARD DO NOT USE IN PRESENCE OF FLAMMABLE ANESTHETICS  
**DANGER:** RISQUE D'EXPLOSION NE PAS EMPLOYER EN PRESENCE D'ANESTHETIQUES INFLAMMABLES

CERTIFIED TO THE REQUIREMENTS OF THE CANADIAN ELECTRICAL CODE CSA HAS NOT INVESTIGATED OTHER PHYSIOLOGICAL EFFECTS  
 CERTIFIE SELON LES EXIGENCES DU CODE CANADIEN DE L'ELECTRICITE L'ACNOR N'A PAS ETUDIE LES AUTRES EFFETS  
 PHYSIOLOGIQUES POSSIBLES

**CAUTION:** FEDERAL LAW RESTRICTS THIS DEVICE TO SALE BY OR ON THE ORDER OF A LICENSED PHYSICIAN OR PRACTITIONER  
**CAUTION:** RISK OF BURNS OR FIRE DO NOT USE NEAR CONDUCTIVE MATERIALS SUCH AS METAL BED PARTS, INNERSPRING MATTRESSES  
 AND THE LIKE RENEW ELECTRODE CABLES UPON EVIDENCE OF DETERIORATION

**CAUTION:** ELECTRICAL SHOCK HAZARD DO NOT REMOVE COVER REFER SERVICING TO QUALIFIED SERVICE PERSONNEL  
**WARNING:** GROUNDING RELIABILITY CAN BE ACHIEVED WHEN THIS EQUIPMENT IS CONNECTED TO AN EQUIVALENT RECEPTACLE

OSC FREQ 1.0MHZ PULSE REP 100HZ

DUTY CYCLE	TEMPORAL PEAK	AVG INTENSITY RATIO
20%		100 PPS 5
50%		100 PPS 2
100%		CONT 1

APPLICATOR DATA  
 MODEL 73580  
 FREQ 1.0 MHZ  
 BNR 6.0 1  
 TYPE COLL  
 AREA 4.0 CM<sup>2</sup>

LISTED U L  
**MEDICAL EQUIPMENT**  
 THIS DEVICE COMPLIES WITH REQUIREMENTS SET FORTH IN 21 CFR 1050.10 FCC TYPE APPROVED CHATTANOOGA TN 37405 73618C

MARKED "HOSPITAL GRADE"

CHATTANOOGA CORPORATION

INTELECT MODEL 225P THERAPEUTIC ULTRASOUND GENERATOR POWER 220V 50 HZ 3/8 AMP MAX

FCC ID BWUBUKU 225P UNITED STATES OF AMERICA SERIAL No

**DANGER:** EXPLOSION HAZARD DO NOT USE IN PRESENCE OF FLAMMABLE ANESTHETICS  
**DANGER:** RISQUE D'EXPLOSION NE PAS EMPLOYER EN PRESENCE D'ANESTHETIQUES INFLAMMABLES

CERTIFIED TO THE REQUIREMENTS OF THE CANADIAN ELECTRICAL CODE CSA HAS NOT INVESTIGATED OTHER PHYSIOLOGICAL EFFECTS  
 CERTIFIE SELON LES EXIGENCES DU CODE CANADIEN DE L'ELECTRICITE L'ACNOR N'A PAS ETUDIE LES AUTRES EFFETS  
 PHYSIOLOGIQUES POSSIBLES

**CAUTION:** FEDERAL LAW RESTRICTS THIS DEVICE TO SALE BY OR ON THE ORDER OF A LICENSED PHYSICIAN OR PRACTITIONER  
**CAUTION:** RISK OF BURNS OR FIRE DO NOT USE NEAR CONDUCTIVE MATERIALS SUCH AS METAL BED PARTS, INNERSPRING MATTRESSES  
 AND THE LIKE RENEW ELECTRODE CABLES UPON EVIDENCE OF DETERIORATION

**CAUTION:** ELECTRICAL SHOCK HAZARD DO NOT REMOVE COVER REFER SERVICING TO QUALIFIED SERVICE PERSONNEL  
**WARNING:** GROUNDING RELIABILITY CAN BE ACHIEVED WHEN THIS EQUIPMENT IS CONNECTED TO AN EQUIVALENT RECEPTACLE

OSC FREQ 1.0MHZ PULSE REP 100HZ

DUTY CYCLE	TEMPORAL PEAK	AVG INTENSITY RATIO
20%		100 PPS 5
50%		100 PPS 2
100%		CONT 1

APPLICATOR DATA  
 MODEL 73580  
 FREQ 1.0 MHZ  
 BNR 6.0 1  
 TYPE COLL  
 AREA 4.0 CM<sup>2</sup>

LISTED U L  
**MEDICAL EQUIPMENT**  
 THIS DEVICE COMPLIES WITH REQUIREMENTS SET FORTH IN 21 CFR 1050.10 FCC TYPE APPROVED CHATTANOOGA TN 37405 73618C

MARKED "HOSPITAL GRADE"

CHATTANOOGA CORPORATION

INTELECT MODEL 230P THERAPEUTIC ULTRASOUND GENERATOR POWER 120V 60 HZ 3/4 AMP MAX

FCC ID BWUBUKU 230P UNITED STATES OF AMERICA SERIAL No

**DANGER:** EXPLOSION HAZARD DO NOT USE IN PRESENCE OF FLAMMABLE ANESTHETICS  
**DANGER:** RISQUE D'EXPLOSION NE PAS EMPLOYER EN PRESENCE D'ANESTHETIQUES INFLAMMABLES

CERTIFIED TO THE REQUIREMENTS OF THE CANADIAN ELECTRICAL CODE CSA HAS NOT INVESTIGATED OTHER PHYSIOLOGICAL EFFECTS  
 CERTIFIE SELON LES EXIGENCES DU CODE CANADIEN DE L'ELECTRICITE L'ACNOR N'A PAS ETUDIE LES AUTRES EFFETS  
 PHYSIOLOGIQUES POSSIBLES

**CAUTION:** FEDERAL LAW RESTRICTS THIS DEVICE TO SALE BY OR ON THE ORDER OF A LICENSED PHYSICIAN OR PRACTITIONER  
**CAUTION:** RISK OF BURNS OR FIRE DO NOT USE NEAR CONDUCTIVE MATERIALS SUCH AS METAL BED PARTS, INNERSPRING MATTRESSES  
 AND THE LIKE RENEW ELECTRODE CABLES UPON EVIDENCE OF DETERIORATION

**CAUTION:** ELECTRICAL SHOCK HAZARD DO NOT REMOVE COVER REFER SERVICING TO QUALIFIED SERVICE PERSONNEL  
**WARNING:** GROUNDING RELIABILITY CAN BE ACHIEVED WHEN THIS EQUIPMENT IS CONNECTED TO AN EQUIVALENT RECEPTACLE

OSC FREQ 1.0MHZ PULSE REP 100HZ

DUTY CYCLE	TEMPORAL PEAK	AVG INTENSITY RATIO
20%		100 PPS 5
50%		100 PPS 2
100%		CONT 1

APPLICATOR DATA  
 MODEL 73579  
 FREQ 1.0 MHZ  
 BNR 6.0 1  
 TYPE COLL  
 AREA 8.5 CM<sup>2</sup>

LISTED U L  
**MEDICAL EQUIPMENT**  
 THIS DEVICE COMPLIES WITH REQUIREMENTS SET FORTH IN 21 CFR 1050.10 FCC TYPE APPROVED CHATTANOOGA TN 37405 73617C

MARKED "HOSPITAL GRADE"

CHATTANOOGA CORPORATION

INTELECT MODEL 230P THERAPEUTIC ULTRASOUND GENERATOR POWER 220V 50 HZ 3/8 AMP MAX

FCC ID BWUBUKU 230P UNITED STATES OF AMERICA SERIAL No

**DANGER:** EXPLOSION HAZARD DO NOT USE IN PRESENCE OF FLAMMABLE ANESTHETICS  
**DANGER:** RISQUE D'EXPLOSION NE PAS EMPLOYER EN PRESENCE D'ANESTHETIQUES INFLAMMABLES

CERTIFIED TO THE REQUIREMENTS OF THE CANADIAN ELECTRICAL CODE CSA HAS NOT INVESTIGATED OTHER PHYSIOLOGICAL EFFECTS  
 CERTIFIE SELON LES EXIGENCES DU CODE CANADIEN DE L'ELECTRICITE L'ACNOR N'A PAS ETUDIE LES AUTRES EFFETS  
 PHYSIOLOGIQUES POSSIBLES

**CAUTION:** FEDERAL LAW RESTRICTS THIS DEVICE TO SALE BY OR ON THE ORDER OF A LICENSED PHYSICIAN OR PRACTITIONER  
**CAUTION:** RISK OF BURNS OR FIRE DO NOT USE NEAR CONDUCTIVE MATERIALS SUCH AS METAL BED PARTS, INNERSPRING MATTRESSES  
 AND THE LIKE RENEW ELECTRODE CABLES UPON EVIDENCE OF DETERIORATION

**CAUTION:** ELECTRICAL SHOCK HAZARD DO NOT REMOVE COVER REFER SERVICING TO QUALIFIED SERVICE PERSONNEL  
**WARNING:** GROUNDING RELIABILITY CAN BE ACHIEVED WHEN THIS EQUIPMENT IS CONNECTED TO AN EQUIVALENT RECEPTACLE

OSC FREQ 1.0MHZ PULSE REP 100HZ

DUTY CYCLE	TEMPORAL PEAK	AVG INTENSITY RATIO
20%		100 PPS 5
50%		100 PPS 2
100%		CONT 1

APPLICATOR DATA  
 MODEL 73579  
 FREQ 1.0 MHZ  
 BNR 6.0 1  
 TYPE COLL  
 AREA 8.5 CM<sup>2</sup>

LISTED U L  
**MEDICAL EQUIPMENT**  
 THIS DEVICE COMPLIES WITH REQUIREMENTS SET FORTH IN 21 CFR 1050.10 FCC TYPE APPROVED CHATTANOOGA TN 37405 73618C

MARKED "HOSPITAL GRADE"

CHATTANOOGA CORPORATION

**CHATTANOOGA CORPORATION**

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