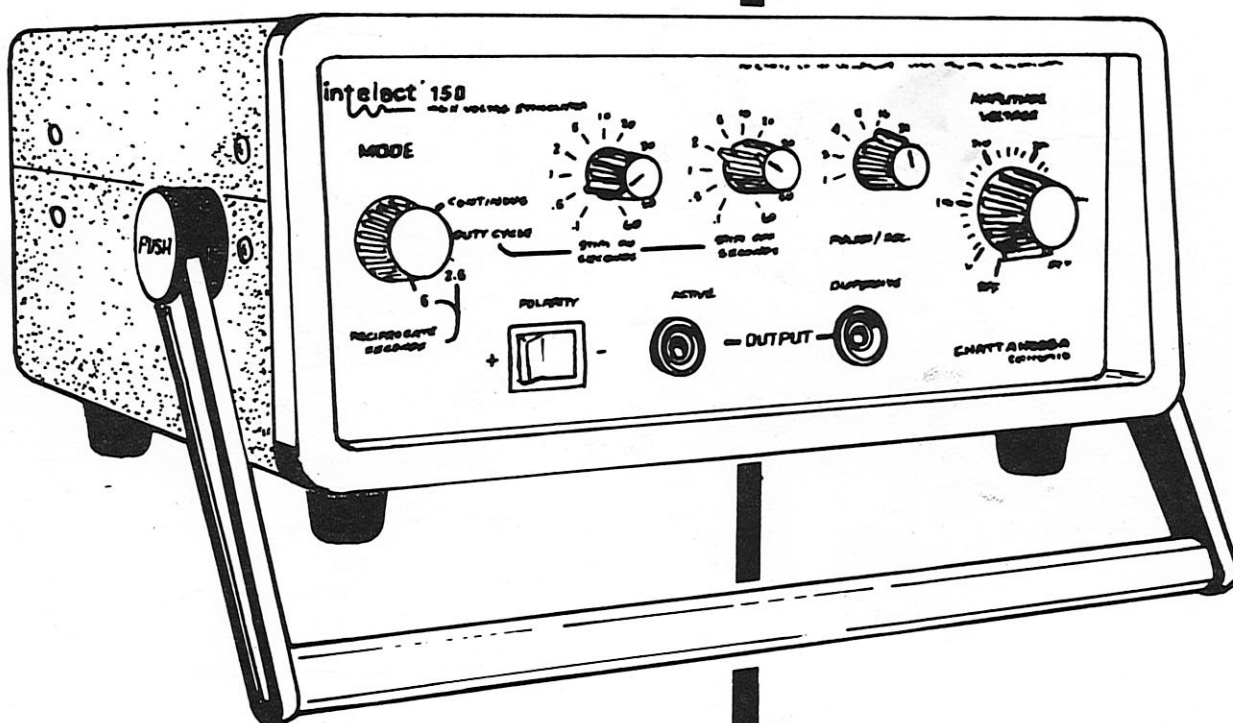


# intelect<sup>®</sup> model 150

HIGH VOLTAGE STIMULATOR



## OPERATOR'S MANUAL

- INSTALLATION
- OPERATION
- MAINTENANCE
- PARTS

**CHATTANOOGA**  
CORPORATION

101 MEMORIAL DRIVE, DAYTON, OHIO 45424



OPERATOR'S MANUAL

MODEL 1000

1970

1000

1000

# table of contents

DESCRIPTION	PAGE
FOREWORD, WARRANTY .....	2
SAFETY INSTRUCTIONS, PATIENT SAFETY, INDICATIONS, CONTRAINDICATIONS .....	3
GENERAL INFORMATION, SYSTEM SPECIFICATIONS .....	4
INSTALLATION .....	5
OPERATING INSTRUCTIONS .....	6-8
HAND-HELD PROBE APPLICATION .....	8
CONTROL PANEL .....	9-10
MODES OF TREATMENT .....	10-11
PARTS LIST .....	12-13
ELECTRIC SCHEMATICS .....	14-20
CALIBRATION .....	21-22
TROUBLE SHOOTING .....	23

# foreword

This manual has been prepared for the owners and operators of Intellect® Model 150. It contains general instructions on operation, safety practices, maintenance and parts information. In order to obtain maximum life and efficiency from your Intellect® Model 150 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 various electrodes that come 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 150 ("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 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 Company, the dealer or an approved Company service agent.
2. Defects or damage caused by labor furnished by someone other than 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 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 Company or the selling dealer. If the claim is made to Company, the written claim should be sent to 4717 Adams Road, Chattanooga, Tennessee 37343.
2. The Product must be returned to 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. Read, understand and practice the safety and operating instructions. Know the limitations and hazards associated with Intellect® 150. Observe the safety and operational decals placed on the unit.
2. Intellect® 150 should not be connected to any other electrical device when in use.

## instructions for patient safety

1. Know stimulation characteristics, parameters, indications, and contraindications.
2. Be sure to use electrode pads that are clean, moist, and firmly attached to patient.
3. Be certain that no other electrical devices are attached to the unit.
4. When changing parameters of stimulation such as Pulse Rate, Polarity, Stim-On, Stim-Off, Continuous, Duty Cycle, or Reciprocate, **Be sure to turn Amplitude down first.**
5. Remember that most patients are totally unfamiliar with electrical stimulation and some of them might have anxieties during the initial sensations. If patient is overly fearful, either discontinue first treatment or set intensity at a level where patient just feels the current. Usually low amplitude stimulation results in gradually increased tolerance.

## indications for treatment

This device is indicated for the following:

- For helping to reduce post-injury or post-surgical local edema.
- For temporarily relaxing muscle spasms.
- For increasing localized circulation.
- To assist in reeducating muscles that have atrophied from disuse or injury.
- For helping to prevent post-surgical phlebo-thrombosis through stimulation of calf muscles.
- For helping to reduce chronic and acute pain when etiology is known.

## contraindications for non-treatment

This device should not be used on patients with cardiac pacemakers.

This device should not be used over the carotid sinus area.

This device is not to be used transcerebrally.

This device should not be used to relieve pain syndromes until etiology has been established.

This device should not be used over a pregnant uterus.

This device should not be used over or near cancerous malignancy.

# general information

The Intellect® 150 is a **high voltage** nerve and muscle stimulator designed to deliver short duration high amplitude pulses transcutaneously. Output can be characterized as having a constant voltage and constant charge, which means that the voltage and charge available in each pulse varies very little with load.

The limited pulse duration minimizes the stinging and irritating effects of the stimulus at strong muscle contraction levels. The Intellect® 150 will deliver pulses that are variable in intensity with variable pulse repetition rates into both electrodes or alternating electrodes and with the ability to cycle the stimulation on and off at varying times.

## specifications

OUTPUT VOLTAGE - 0-500V (PEAK)

OUTPUT CURRENT - 0-2500 mA Peak (into 200 ohm load)

OUTPUT CURRENT - 1.8 mA Average max. (at 500V and 128 PPS)

PULSE FREQUENCY - 1, 2, 4, 8, 16, 32, 64, 128, PPS

RECIPROCATATE TIMES - 2.5, 5 seconds

INTERRUPTED TIMES - .1, .5, 1, 2, 5, 10, 20, 30, 40, 50, 60, seconds

POWER REQUIREMENTS - Either 120V ( 1 / 16A) or 220V (40. mA) line current. See model label on back of unit for ratings.

### AREA OF CONDUCTION SURFACES OF ELECTRODES -

4" diameter active electrode = 11 in<sup>2</sup> (7,100 mm<sup>2</sup>)

3" diameter active electrode = 7.64 in<sup>2</sup> (4,900 mm<sup>2</sup>)

8" x 10" dispersive pad = 71.3 in<sup>2</sup> (46,000 mm<sup>2</sup>)

### MAXIMUM AVERAGE CURRENT DENSITY AT ELECTRODES -

.37 uA/mm<sup>2</sup> (3" diameter electrode)

### MAXIMUM AVERAGE POWER DENSITY AT ELECTRODES -

184 uW/mm<sup>2</sup> (3" diameter electrode)

TECHNICAL SPECIFICATION OF PULSE SHAPE - The output is a fast rising dual pulse with approximately 75 microseconds spacing between pulses.

PULSE WIDTH - First peak is 5 microseconds at one-half pulse height and second peak is 8 microseconds at one-half pulse height. These measurements are with load impedance of 1,000 ohms. Pulse width varies according to body impedance (load resistance).

MAXIMUM OUTPUT CHARGE IN TWIN PULSE - 14.2 MICROCOULOMBS

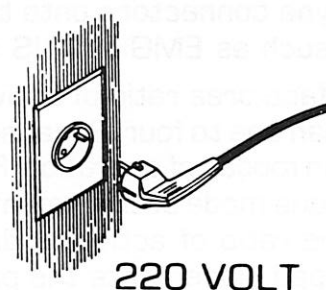
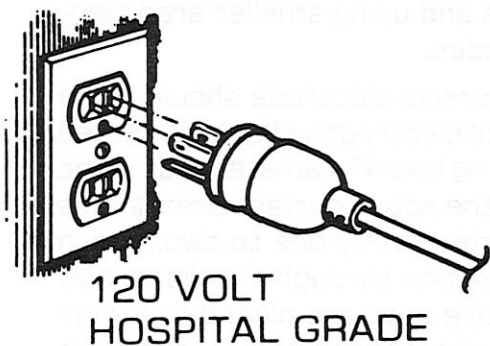
# installation

Remove the Intellect® 150 and any additional items ordered with the unit from the carton and inspect for damage that may have occurred in shipment.

The following is a list of accessories that should be included with the unit as standard accessories:

QTY.	DESCRIPTION	CATALOG NO.
1	Coiled Cord, Black	74114
1	Dispersive Lead	74113
1	Active Lead	74669
1	Bifurcated Lead, Red	72849
1	Bifurcated Lead, Green	74087
1	Bifurcated Lead, Black	72855
1	Nylatex Set	1260
1	Instruction Booklet	74668
1	Probe Assy.	70857
1	Spot Applicator	79005
1	Rectangular Applicator	79008
1	Spot Applicator Sponge	79059
1	Rectangular Applicator Sponge	79062
1	8 x 10 Sponge	79061

Plug the hospital grade plug into the proper 120V grounded outlet, or a 220V outlet as required. The unit is now ready for use.



# **general operating instructions**

In considering the various stimulation parameters, one must note that the following forms of muscle contractions are obtainable by this unit:

- Tetanic contractions
- Twitch contractions
- Reciprocating contractions of two or more muscles

Also, the following types of pad placements can be used with this device:

- Monopolar placement
- Bipolar placement
- Specific point placement
- Multiple electrode placement

A Monopolar type treatment involves the use of a large dispersive pad and one or more small active pads. The large dispersive pad serves as the non-treatment pad where stimulation is not needed and where a splash-over effect and group muscle contractions are required from the active pads only.

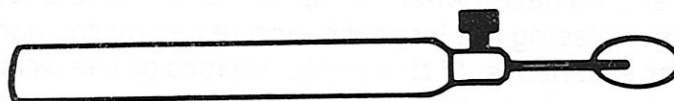
The Bipolar treatment involves pads of equal size placed at each end of a muscle and is used where specific rather than group muscle contractions are required, such as in motor point stimulation or reeducation of an individual muscle.

Specific Point placement involves using any one of several hand probe electrodes for stimulation of a specific motor point, trigger point, or other body point location. See Hand-Held Probe Accessories section for details of types and use of electrodes.

Multiple Electrode placements involve the use of two to four 3" diameter pads. Also, greater numbers of electrodes can be placed by adding more "Y" or bifurcated type connectors onto the active connectors and using smaller area electrodes such as EMG or TNS stick-on type electrodes.

The surface area ratio of active electrodes to dispersive electrode should be no more than one to four. Because of this, the number of electrodes should be limited in certain modes of operation. For example: When using two 4" diameter pads in the Continuous mode of treatment, both pads become the active surface area. In this case, the ratio of active to dispersive will be approximately one to two, and in certain pad placements the patient may feel stimulation through the dispersive pad, particularly in the stomach area when the active pads are placed over high threshold areas such as the lower back. The slight stimulation through the dispersive pad is not detrimental to active pad stimulation but may be slightly annoying to the patient.

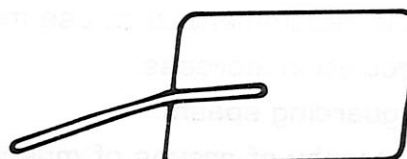
## HAND PROBE AND ACCESSORIES (OPTIONAL)



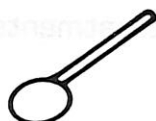
**HAND PROBE  
70857**



**LARGE SPOT ELECTRODE  
79006**



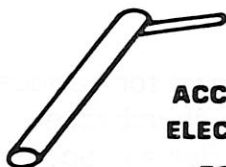
**RECTANGULAR ELECTRODE  
79008  
SPONGE COVER 79030**



**SMALL SPOT ELECTRODE  
79005**



**ROLLER ELECTRODE  
SMALL 79003  
LARGE 79004**



**ACCUSTIM  
ELECTRODE  
79007**



**INSULATED  
SHAFT  
ELECTRODE  
79002**

## **uses for monopolar treatment**

Monopolar arrangements are indicated where a "splash-over" type of stimulation pattern is desired. An example of this is placing the large dispersive pad on the back and an active 4" diameter pad over the wrist extensors. In this mode, flexors of the wrists as well as triceps and biceps muscles of the arm will be stimulated and contract at higher yet well tolerated intensities.

Also, this arrangement causes deeper penetration of the current and is recommended when deeper nerve or muscle stimulation is required.

Therefore, it is recommended to use monopolar techniques for the following:

- Limb circulation increase.
- Muscle guarding spasm.
- Disuse atrophy of groups of muscles.
- Muscle reeducation of groups of muscles.

## **bipolar treatment techniques**

By replacing the large 8 x 10 dispersive pad with a small 4-inch or 3-inch diameter electrode pad and placing both pads across a given muscle, specific muscle contractions can be produced.

This type of pad arrangement is recommended for the following treatments:

- Motor point stimulation.
- Reeducation of a specific muscle after disuse atrophy.
- Prevention of atrophy.
- Post-injury of a specific muscle.
- Temporary inhibition of spasticity (slowly contracting extensors).

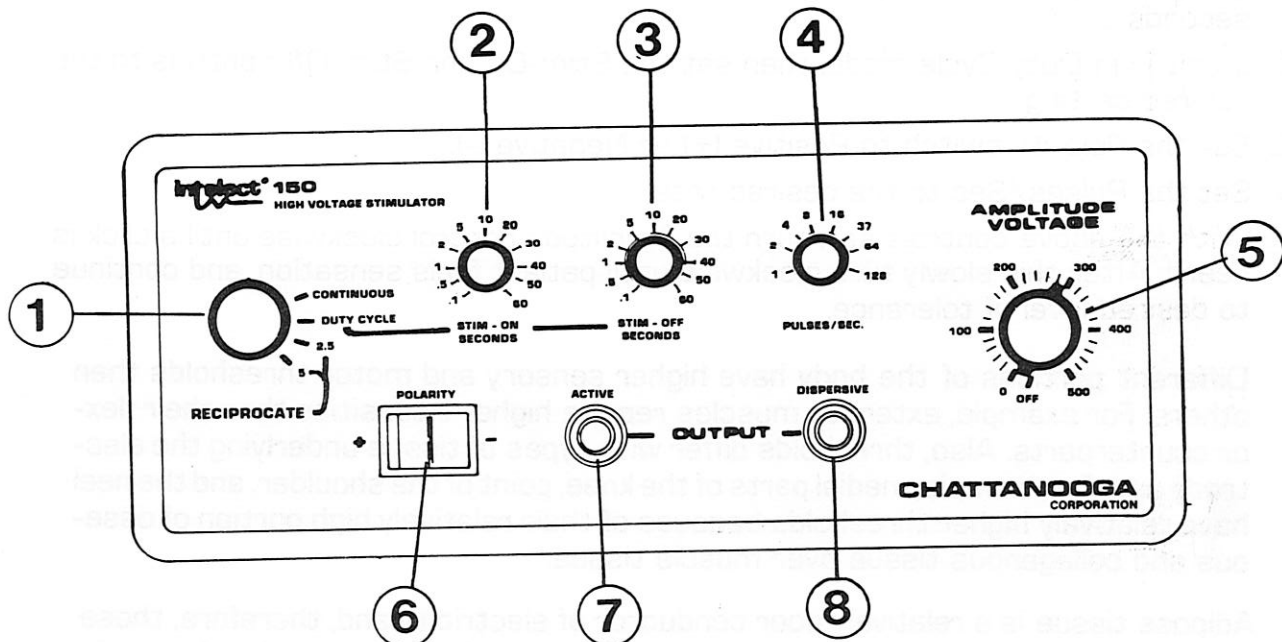
# **hand-held probe application**

The probe is a hand-held electrode designed for treating localized areas or for locating painful trigger point areas. The Amplitude control knob is on the front panel.

The probe comes with a disconnect mechanism on the shaft which allows for various electrodes to be used. The electrodes to be used can be secured by a thumbscrew. The electrodes are prevented from rotating about their axis by aligning the flat surface of the shaft so that it is perpendicular to the thumbscrew before twisting the screw clockwise to tighten.



# control panel operation



1. **MODE SELECTOR SWITCH** - This switch selects one of the three modes of operation: Continuous, Duty Cycle, and Reciprocate. In the Continuous mode, the red and black pads are active continuously. In the Duty Cycle mode, the red and black pad outputs are cycled on and off together at times selected by the Stim-On, Stim-Off time controls. In the Reciprocate mode, the red and black outputs are active alternately for 2.5 or 5 seconds as selected.
2. **STIM-ON SWITCH** - Sets the on time in the Duty Cycle mode from .1 to 60 seconds.
3. **STIM-OFF SWITCH** - Sets the off time in the Duty Cycle mode from .1 to 60 seconds.
4. **PULSE/SEC. CONTROL** - Pulse rates from one pulse per second to 128 pulses per second are selected by this control.
5. **AMPLITUDE POWER CONTROL** - This control is used to turn unit on and off and to adjust intensity from 0 to 500 volts.
6. **POLARITY SWITCH** - Positive (+) or Negative (-) polarity of active electrode pads or probe is selected by this switch.
7. **ACTIVE OUTPUT** - Jack for active electrode connection.
8. **DISPERSIVE OUTPUT** - Jack for dispersive electrode connection.

## PROGRESSION OF CONTROL SETTINGS

The suggested progression of control settings, **including the determination of patients' tolerance to treatment**, follows:

1. Set the Mode Selector Switch on the left of the panel to the desired setting: either Continuous, Duty Cycle, Reciprocate 2.5 seconds, or Reciprocate 5 seconds.
2. If unit is in Duty Cycle mode, then set the Stim-On and Stim-Off controls to the desired setting.
3. Set the Polarity switch to Positive (+) or Negative (-).
4. Set the Pulses/Sec to the desired rate.
5. With the above controls set, turn the Amplitude control clockwise until a click is heard. After this slowly turn clockwise until patient feels sensation, and continue to desired level of tolerance.

Different portions of the body have higher sensory and motor thresholds than others. For example, extensor muscles require higher intensities than their flexor counterparts. Also, thresholds differ with types of tissue underlying the electrode pad. For example, medial parts of the knee, point of the shoulder, and the heel have relatively higher thresholds because of their relatively high portion of osseous and collagenous tissue over muscle tissue.

Adipose tissue is a relatively poor conductor of electricity and, therefore, those areas of the body require much higher intensities. Fat does not insulate pain receptors in the skin and, therefore, high voltage stimulation may be advantageous in contracting muscles of obese people because of its relatively greater degree of penetration.

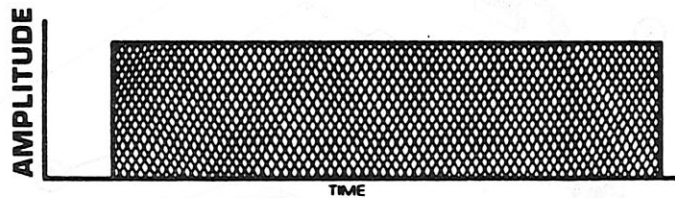
## modes of treatment

The following are graphics illustrations of the Intellect® 150's different modes of operation. Amplitude as indicated on the Amplitude dial is represented by the vertical line. The diagonal lines going up from left to right represent pulses through the black electrode and the diagonal lines going down from left to right

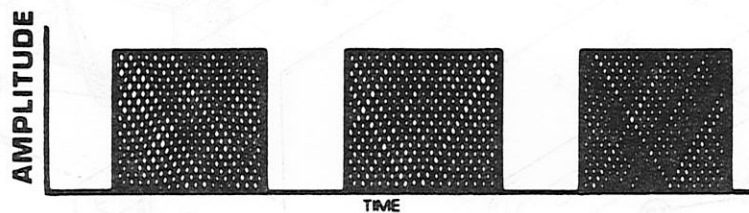


represent pulses through the red electrode. NOTE: The illustrations are not drawn to exact scale and no attempt is made to accurately portray the actual number of pulses in any give time period (i.e. pulses per second).

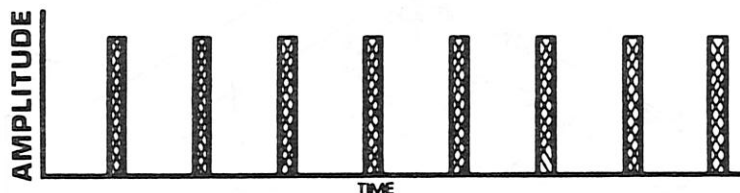
**CONTINUOUS MODE** - In the Continuous mode of treatment, both pads (or both sets of pads) are on continuously throughout the duration of the treatment. Both pads (or sets of pads) are on at the same time.



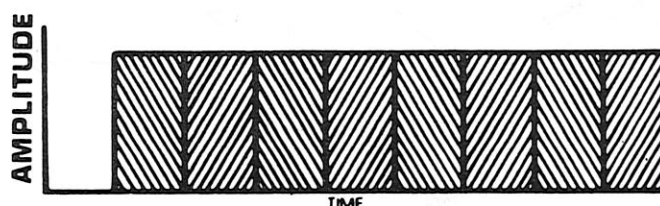
**DUTY CYCLE MODE** - In the Duty Cycle mode of treatment, both pads (or sets of pads) cycle on and off at rates selected with the Stim-On and Stim-Off controls. Both pads (or sets of pads) are either on or off at the same time.



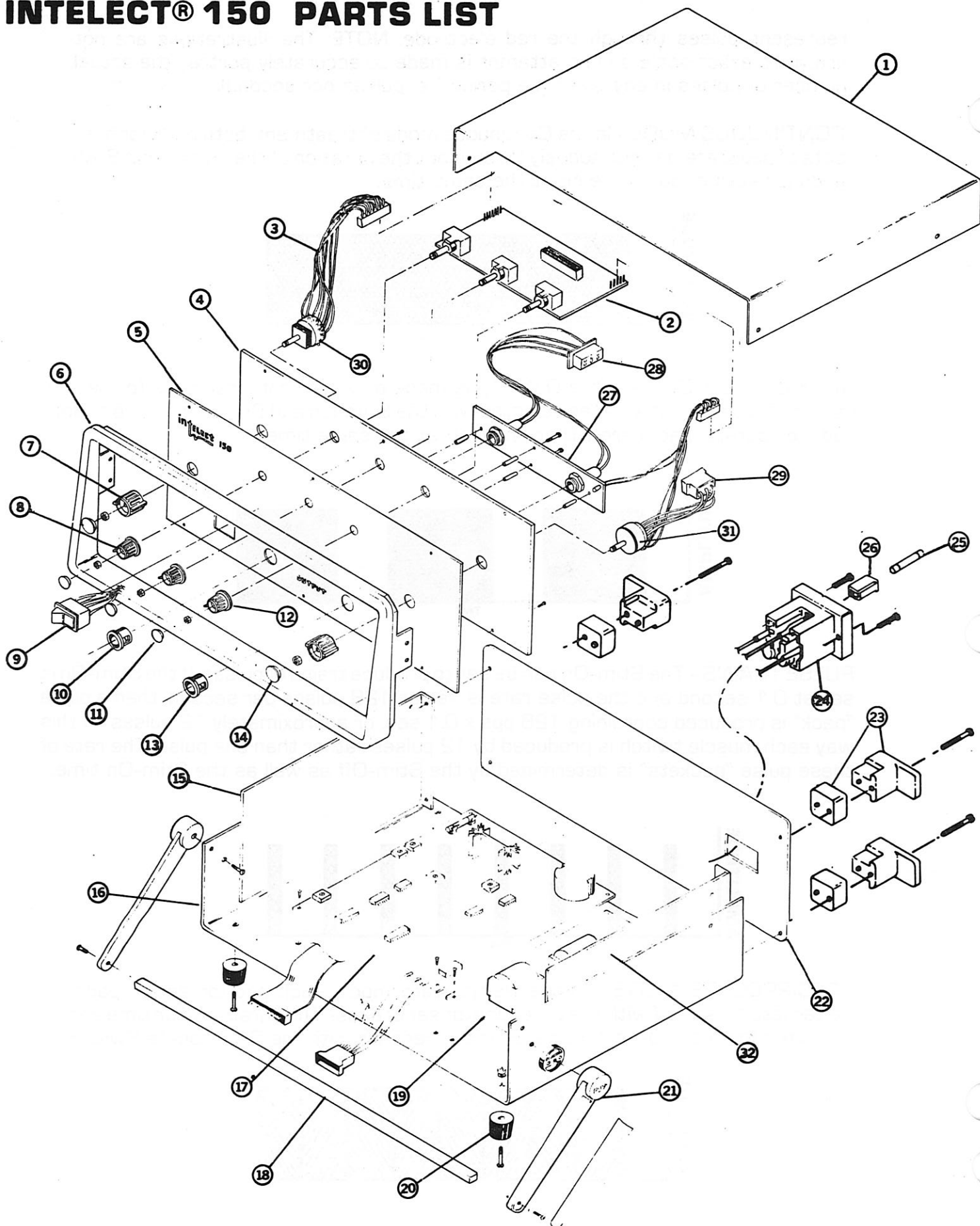
**PULSE TRAINS** - The Stim-On can be set to produce trains of pulses. If the Stim-On is set at 0.1 second and the pulse rate is set at 128 pulses per second, then a pulse "pack" is produced containing  $128 \text{ pps} \times 0.1 \text{ sec.}$  or approximately 12 pulses. In this way each muscle twitch is produced by 12 pulses rather than one pulse. The rate of these pulse "packets" is determined by the Stim-Off as well as the Stim-On time.



**RECIPROCATE MODE** - In the Reciprocate mode, each pad (or set of pads) alternate on and off with the other pad (or set of pads). The duration of on time and off time for the pads is set at 2.5, or 5.0 seconds with the Reciprocate Switch.



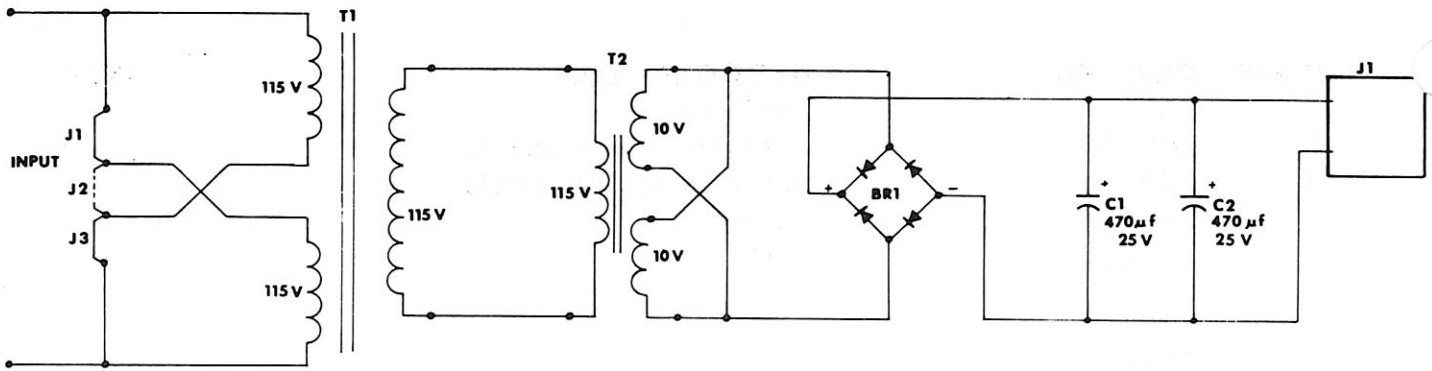
# INTELECT® 150 PARTS LIST



# **Intelect® 150 parts list**

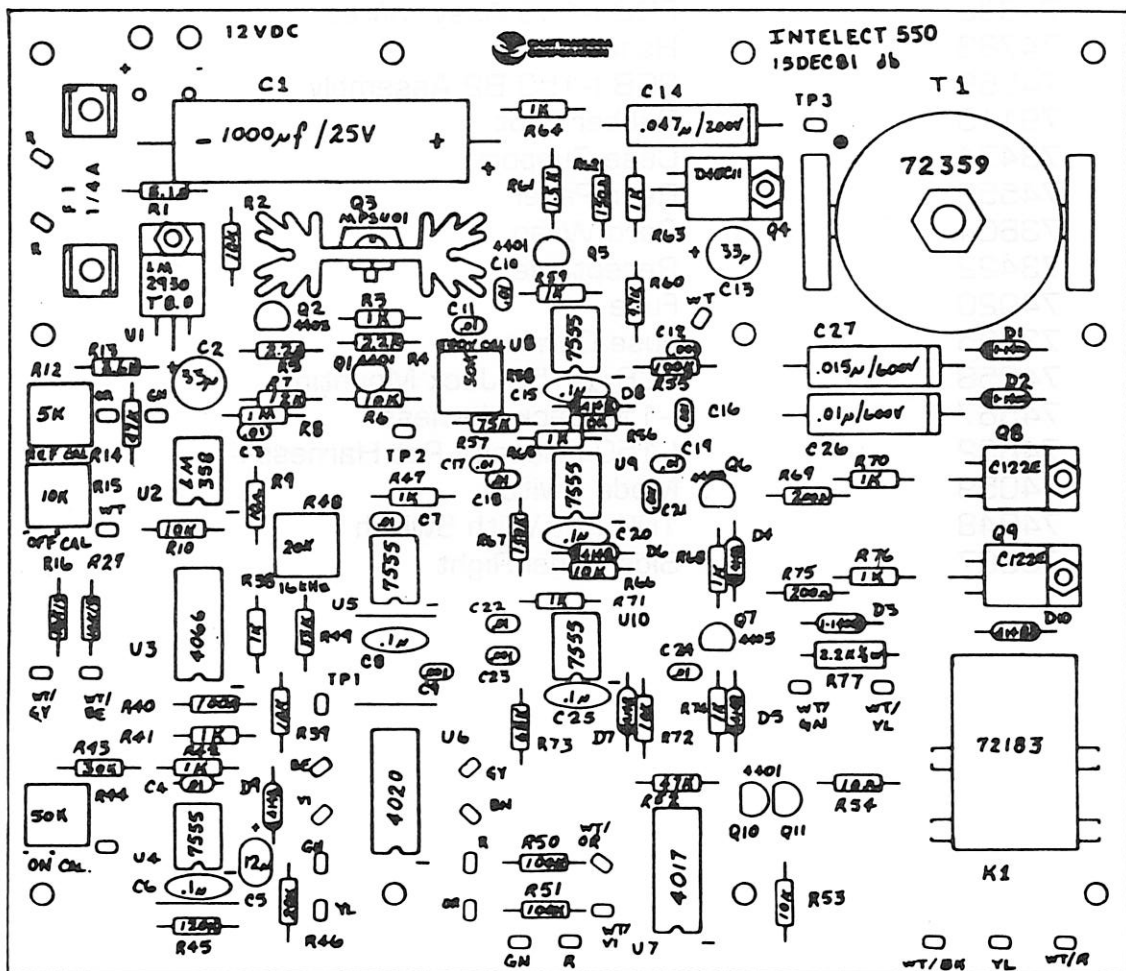
<b>ITEM</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>	<b>QTY.</b>
1	73656	Top Cover	1
2	74565	Interface PCB Assembly	1
3	74568	Mode Switch Assembly	1
4	74533	Front Panel	1
5	74665	Overlay	1
6	74117	Bezel	1
7	73972	Knob	2
8	73606	Knob	3
9	74043	Switch Harness	1
10	74106	Bushing	1
11	74112	Knob Cap	3
12	74078	Knob Skirt	3
13	74107	Bushing	1
14	73607	Knob Cap	2
15	73593	Side Panel Left	1
16	74562	Bottom Panel	1
17	74633	PCB I-150 Assy. Wired	1
18	74783	Handle	1
19	74566	PCB I-150 B2 Assembly	1
20	79115	Rubber Foot	4
21	73474	Case Support	2
22	74559	Rear Panel	1
23	73604	Cord Wrap	4
24	73422	Receptacle	1
25	74020	Fuse	1
26	73425	Fuse Carrier	1
27	74058	PCB I-150 Jack Mounting	1
28	74567	I-150 Jack Harness	1
29	74632	I-150 Intensity Pot Harness	1
30	74059	Mode Switch	1
31	74048	10K Pot With Switch	1
32	73587	Side Panel Right	1

# PCB, POWER SUPPLY

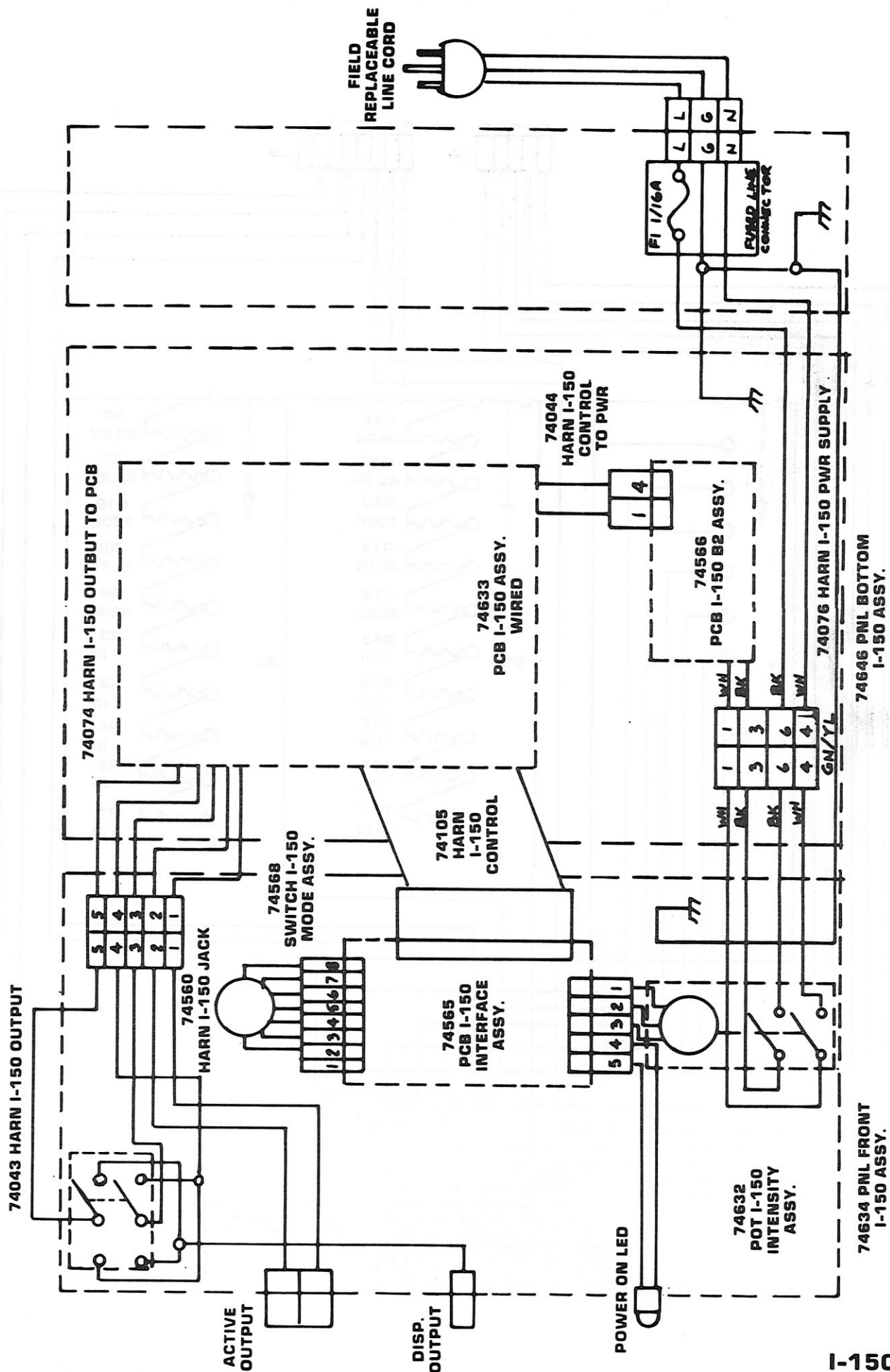


**INPUT  
RATED LINE VOLTAGE  
108-132 V/60 HZ.  
207-253 V/50 HZ.**

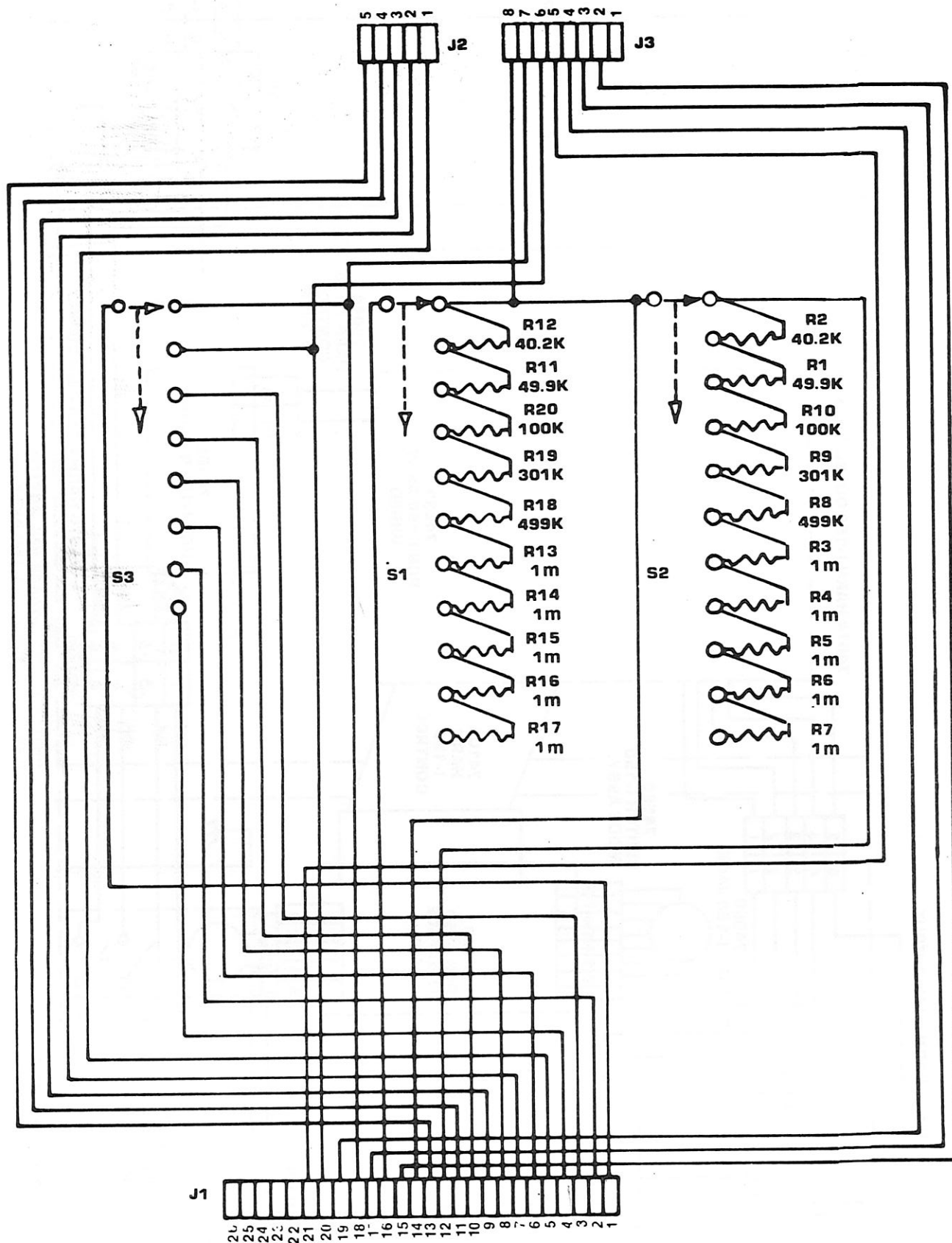
**NOTE: 120V CONNECTIONS AS SHOWN  
USE ONLY J2 FOR 230 V.**



**P.C. BOARD LAYOUT  
INTELECT I-150**



**I-150 BLOCK  
DIAGRAM**



**I-150 FRONT PANEL  
SCHEMATIC**



# Intelect® 150

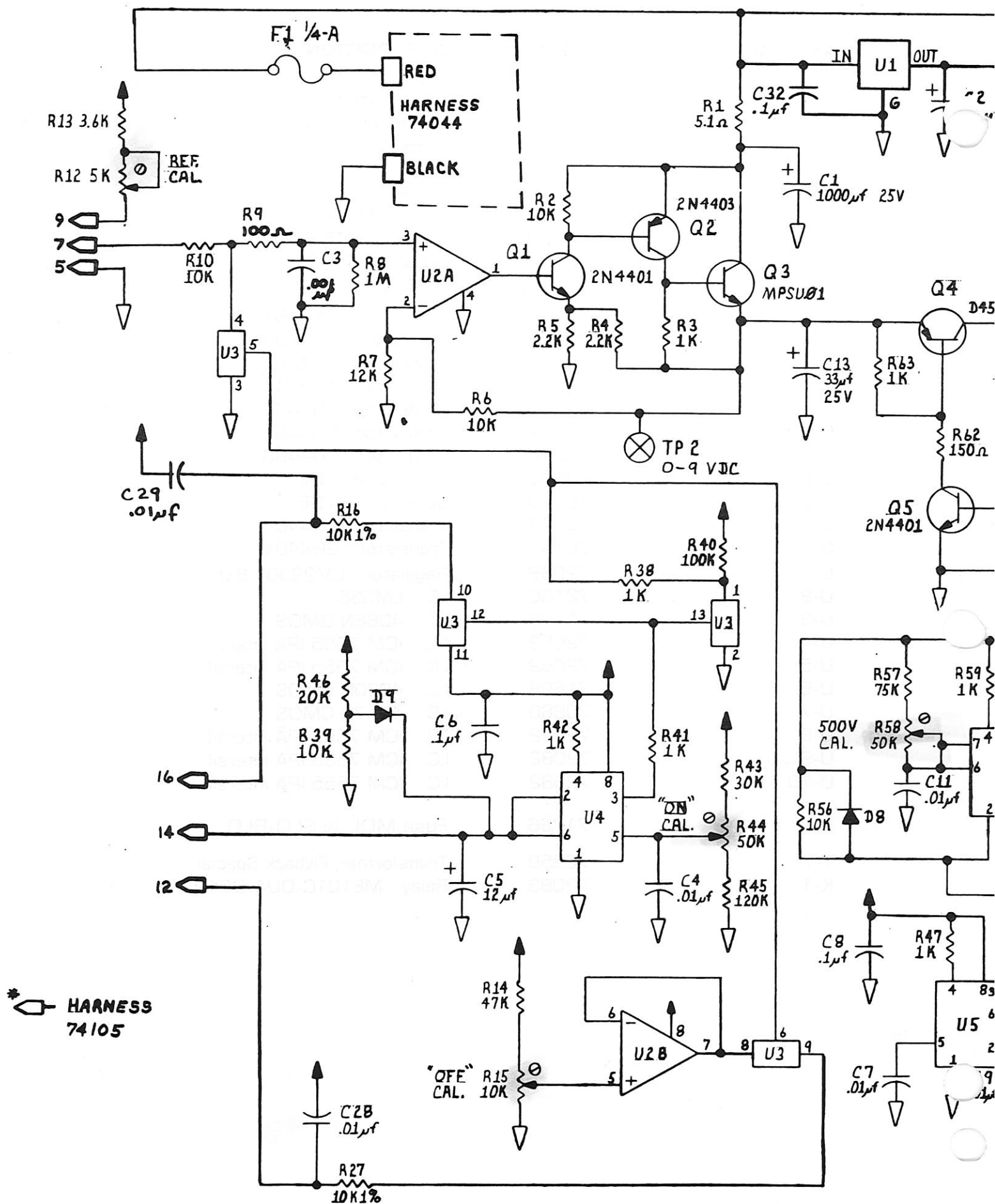
## SCHEMATIC PARTS LIST

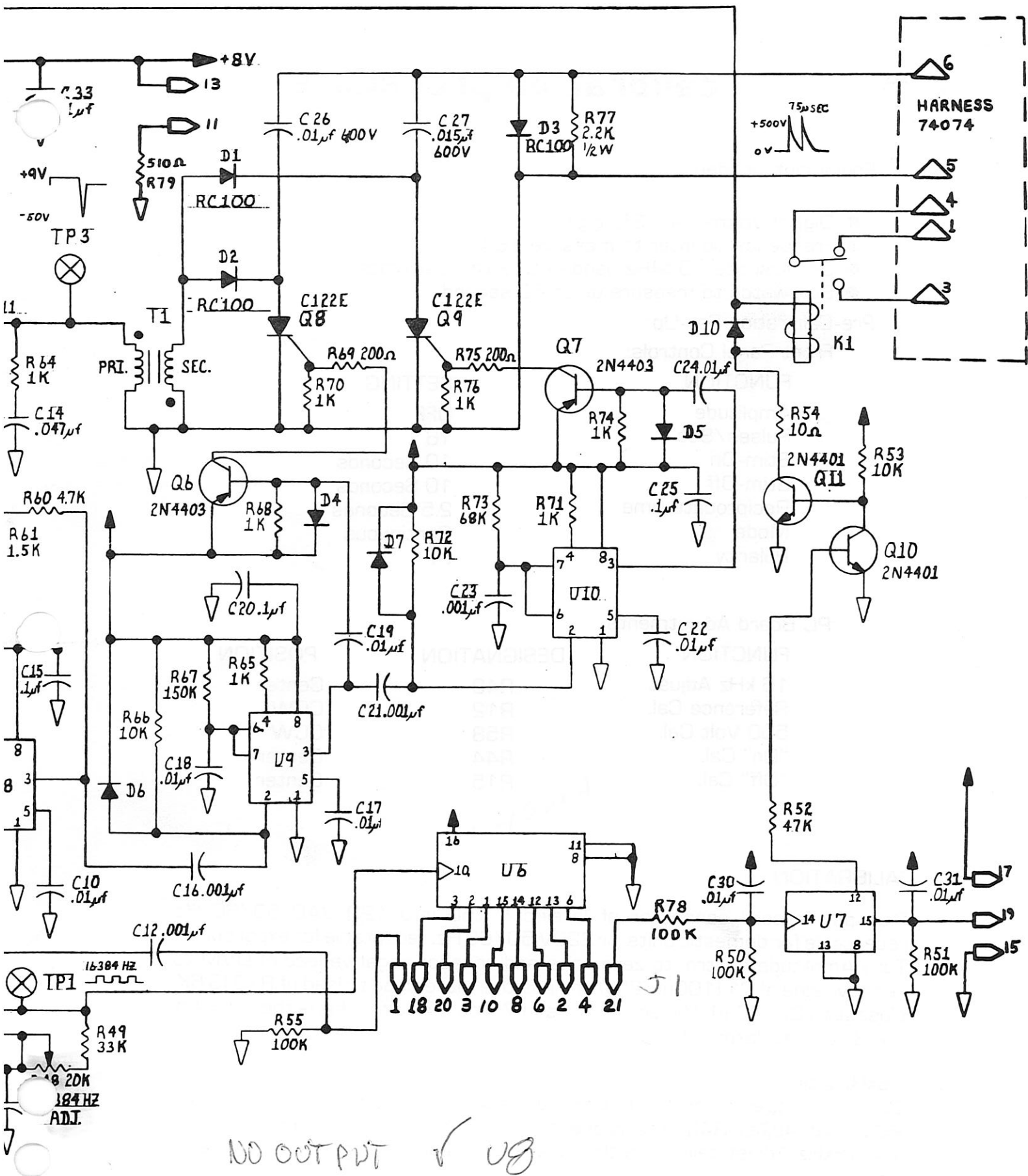
REF. NO.	PART NO.	DESCRIPTION	
R-1	70528	Resistor 5.1 ohm	1/4W CF 5%
R-2	70017	Resistor 10K	1/4W CF 5%
R-3	70012	Resistor 1K	1/4W CF 5%
R-4	70579	Resistor 2.2K	1/4W CF 5%
R-5	70579	Resistor 2.2K	1/4W CF 5%
R-6	70017	Resistor 10K	1/4W CF 5%
R-7	70593	Resistor 12K	1/4W CF 5%
R-8	70024	Resistor 1M	1/4W CF 5%
R-9	70005	Resistor 100 ohm	1/4W CF 5%
R-10	70017	Resistor 10K	1/4W CF 5%
R-12	70756	Trimpot 5K 72PMR5K	
R-13	70582	Resistor 3.6K	1/4W CF 5%
R-14	70605	Resistor 47K	1/4W CF 5%
R-15	70038	Trimpot 10K 72PMR10K	
R-16	71863	Resistor 10K	1/4W MF 1%
R-27	71863	Resistor 10K	1/4W MF 1%
R-38	70012	Resistor 1K	1/4W CF 5%
R-39	70017	Resistor 10K	1/4W CF 5%
R-40	70021	Resistor 100K	1/4W CF 5%
R-41	70012	Resistor 1K	1/4W CF 5%
R-42	70012	Resistor 1K	1/4W CF 5%
R-42	70600	Resistor 30K	1/4W CF 5%
R-44	70760	Trimpot 50K 72PMR50K	
R-45	70613	Resistor 120K	1/4W CF 5%
R-46	70019	Resistor 30K	1/4W CF 5%
R-47	70012	Resistor 1K	1/4W CF 5%
R-48	70759	Resistor 20K 72MR20K	
R-49	70601	Resistor 33K	1/4W CF 5%
R-50	70021	Resistor 100K	1/4W CF 5%
R-51	70021	Resistor 100K	1/4W CF 5%
R-52	70605	Resistor 47K	1/4W CF 5%
R-53	70017	Resistor 10K	1/4W CF 5%
R-54	70001	Resistor 10 ohm	1/4W CF 5%
R-55	70021	Resistor 100K	1/4W CF 5%
R-56	70017	Resistor 10K	1/4W CF 5%
R-57	70610	Resistor 75K	1/4W CF 5%
R-58	70760	Trimpot 50K 72PMR50K	
R-59	70012	Resistor 1K	1/4W CF 5%
R-60	70585	Resistor 4.7K	1/4W CF 5%
R-61	70013	Resistor 1.5K	1/4W CF 5%
R-62	70006	Resistor 150 ohm	1/4W CF 5%
R-63	70012	Resistor 1K	1/4W CF 5%
R-64	70012	Resistor 1K	1/4W CF 5%
R-65	70012	Resistor 1K	1/4W CF 5%

Ref. No	Part No.	Description	
R-66	70017	Resistor 10K	1/4W CF 5%
R-67	70615	Resistor 150K	1/4W CF 5%
R-68	70012	Resistor 1K	1/4W CF 5%
R-69	70561	Resistor 200 ohm	1/4W CF 5%
R-70	70012	Resistor 1K	1/4W CF 5%
R-71	70012	Resistor 1K	1/4W CF 5%
R-72	70017	Resistor 10K	1/4W CF 5%
R-73	70609	Resistor 68K	1/4W CF 5%
R-74	70012	Resistor 1K	1/2W CF 5%
R-75	70561	Resistor 200 ohm	1/4W CF 5%
R-76	70012	Resistor 1K	1/4W CF 5%
R-77	70886	Resistor 2.2K	1/2W CC 5%
R-78	70021	Resistor 100K	1/4W CF 5%
R-79	70011	Resistor 510 ohm	1/4W CF 5%
C-1	70269	Capacitor 1000 uF 25 V Elec.	
C-2	72196	Capacitor 33 uF 25 V Elec.	
C-3	70044	Capacitor .01 uF 100 V Mylar	
C-4	70043	Capacitor .001 uF 100 V Mylar	
C-5	71970	Capacitor 12 uF 35 V Tant.	
C-6	71733	Capacitor .1 uF 50 V Disc	
C-7	70044	Capacitor .01 uF 100 V Mylar	
C-8	71733	Capacitor .1 uF 50 V Disc	
C-9	70043	Capacitor .001 uF 100 V Mylar	
C-10	70044	Capacitor .01 uF 100 Mylar	
C-11	70044	Capacitor .01 uF 100 V Mylar	
C-12	70043	Capacitor .001 uF 100 V Mylar	
C-13	72196	Capacitor 33 uF 25 V Elec.	
C-14	72436	Capacitor .047 uF 200 V Poly	
C-15	71733	Capacitor .1 uF 50 V Disc	
C-16	70043	Capacitor .001 uF 100 V Mylar	
C-17	70044	Capacitor .01 uF 100 V Mylar	
C-18	70044	Capacitor .01 uF 100 V Mylar	
C-19	70044	Capacitor .01 uF 100 V Mylar	
C-20	71733	Capacitor .1 uF 50 V Disc	
C-21	70043	Capacitor .001 uF 100 V Mylar	
C-22	70044	Capacitor .01 uF 100 V Mylar	
C-23	70043	Capacitor .001 uF 100 V Mylar	
C-24	70044	Capacitor .01 uF 100 V Mylar	
C-25	71733	Capacitor .1 uF 50 V Disc	
C-26	72329	Capacitor .01 uF 600 V Mylar	
C-27	72330	Capacitor .015 uF 600 V Mylar	
C-28	70044	Capacitor .01 uF 100 V Mylar	
C-29	70044	Capacitor .01 uF 100 V Mylar	
C-30	70044	Capacitor .01 uF 100 V Mylar	
C-31	70044	Capacitor .01 uF 100 V Mylar	
C-32	71733	Capacitor .1 uF 50 V Disc	
C-33	71733	Capacitor .1 uF 50 V Disc	



REF. NO.	PART NO.	DESCRIPTION
D-1	71969	Diode MR1-1400
D-2	71969	Diode MR1-1400
D-3	71969	Diode MR1-1400
D-4	70029	Diode IN4148
D-5	70029	Diode IN4148
D-6	70029	Diode IN4148
D-7	70029	Diode IN4148
D-8	70029	Diode IN4184
D-9	70029	Diode IN4148
D-10	70029	Diode IN4148
Q-1	70747	Transistor 2N4401
Q-2	70032	Transistor 2N4403
Q-3	72091	Transistor MPSU01
Q-4	72435	Transistor D45C11
Q-5	70747	Transistor 2N4401
Q-6	70032	Transistor 2N4403
Q-7	70032	Transistor 2N4403
Q-8	70859	SCR C122E GE
Q-9	70859	SCR C122E GE
Q-10	70747	Transistor 2N4401
Q-11	70747	Transistor 2N4401
U-1	72089	Regulator LM2930T-8.0
U-2	72130	I.C. LM358
U-3	71708	I.C. 4066N CMOS
U-4	72082	I.C. ICM 7555 IPA Intersil
U-5	72082	I.C. ICM 7555 IPA Intersil
U-6	71698	I.C. 4020N CMOS
U-7	70860	I.C. 4017N CMOS
U-8	72082	I.C. ICM 7555 IPA Intersil
U-9	72082	I.C. ICM 7555 IPA Intersil
U-10	72082	I.C. ICM 7555 IPA Intersil
F-1	71766	Fuse MDL 1/4 SLO-BLO
T-1	72359	Transformer, Flyback Special
K-1	72083	Relay ME101C-OUA-DC12





**SCHEMATIC DIAGRAM  
I-150 MAIN PCB  
ES-70890**

# calibration procedure

## Equipment Needed:

- Digital Voltmeter 3½ digit
- Frequency Counter to measure 16 kHz
- Oscilloscope 10 MHz bandwidth with Dual Trace
- Stopwatch to measure up to 60 seconds

## Pre-Calibration Set-Up:

### Front Panel Controls:

FUNCTION	SETTING
Amplitude	OFF
Pulses/Sec	16
Stim-On	10 Seconds
Stim-Off	10 Seconds
Reciprocate time	2.5 Seconds
Mode	Continuous
Polarity	(-)

### PC Board Adjustments

FUNCTION	DESIGNATION	POSITION
16 kHz Adjust	R48	Center
Reference Cal.	R12	CCW
500 Volt Cal.	R58	CCW
"On" Cal.	R44	Center
"Off" Cal.	R15	Center

## CALIBRATION

1. Plug power cord connector of Intellect® 150 into 120 VAC 50/60 Hz. receptacle for domestic units, or 220V 50/60 Hz. receptacle for export units. Turn Amplitude control to zero volts and connect negative lead of DVM to negative side of C1 (100uf/25v) and positive meter lead to lead of R13 (3.6K) closest to C2 (33uf). Meter should read 7.6 to 8.4 volts. This is the output of the 8 volt regulator U1.
2. 16kHz Adjust  
Connect frequency counter to common negative (- lead of C1) and to TPI on PC Board. Adjust R48 until frequency counter reads 16,384 Hz + 300 Hz. The 16kHz Adjust calibrates the Pulses/Sec. control and the Reciprocate time.

3. Reference Cal.

Connect DVM to TP2 and circuit common negative. Turn Amplitude control fully clockwise and adjust R12 until meter reads 9.00 Volts  $\pm$  .05 volts. This adjusts the reference for the Amplitude control. This voltage will vary from 0 volts to 9 volts for a 0 volt to 500 volt output.

4. 500 Volt Cal.

Connect oscilloscope to Dispersive and active jacks. With Amplitude control set at maximum and pulse rate at 128 pps adjust R58 for 500 volt control peak on 'scope. Check wave shape of double pulses and check pulse spacing to be 75 usec  $\pm$  5 usec. CAUTION: Output is a 500 volt negative going pulse with respect to circuit common. It is not dangerous, but it will bite.

5. Duty Cycle Calibrate

"Stim-On" Cal. - Connect 'scope to common negative and TP2. Set Amplitude control to 250 volts. Put Mode switch in Duty Cycle position. The voltage at TP2 should now start switching between 0 and 4.5 volts. Measuring the length of time that voltage at TP2 is high with stopwatch, adjust R44 for 10 second  $\pm$  0.5 seconds.

"Stim-Off" Ca. - The "Off" time is the time that the voltage at TP2 stays at 0 volts. Adjust R15 for an "Off" time of 10 seconds  $\pm$  0.5 seconds. Check the 1 second and the 60 second times on both the "On" and "Off" controls. Visually check the values of the timing resistors on both switches.

6. Place Mode Switch into Reciprocate.

Attach Oscilloscope to dispersive and active red outputs and check 2.5 and 5 second times, then attach Oscilloscope to dispersive and active black outputs and check 2.5 and 5 second times.

7. Place Mode Switch into Continuous.

Attach Oscilloscope to dispersive and active outputs. Visually check output frequency at all points of the Pulses/Sec. control.

8. Check both active outputs with Oscilloscope in the Continuous and Duty Cycle modes.

9. Check outputs in Continuous mode with Oscilloscope to make sure that both (+) and (-) polarity are correct.

10. Attach Oscilloscope to dispersive pad and active outputs and check to see that output voltage agrees with Amplitude control at 100V, 200V, 300V, 400V points.

# trouble shooting

## INDICATIONS

1. No stimulation out

## MALFUNCTIONS

Dispersive wire is broken.

## REMEDY

Replace Wire.

Both wires to active electrode pads broken.

Replace Wire.

Malfunction on circuit board.

Return to factory for repair.

Both active electrodes or dispersive electrodes are dry.

Moisten electrodes.

Blown fuse (internal)

Replace fuse with 1/4A SB fuse

Dispersive pad faulty.

Replace dispersive pad.

Blown fuse (External)

Replace with 1/16A SB fuse.

Unit not plugged in.

Plug in.

2. No stimulation out of one pad.

Dry electrode.

Moisten electrode.

Broken wire.

Replace Wire.

3. Too much stimulation out of dispersive pad.

Only a small area of 8 x 10 black surface is conducting stimulation.

Move dispersive pad on patient so that entire surface is in contact with patient (back, abdomen or thigh).

Dirty dispersive pad.

Clean with soap and water or replace pad.

Too much active pad surface.

Use smaller active electrodes; or use one-half the number electrodes; or use unit on Reciprocate instead of Continuous or Duty Cycle.

4. No stimulation out of hand-held probe.

Dispersive pad is not on patient.

Place dispersive pad on patient.

Dispersive wire is broken.

Replace Wire.

Dry sponge on probe electrode.

Moisten sponge.

Probe not connected.

Connect probe to active lead.

# Panel Designations

<b>infect<sup>®</sup></b> MODEL 150		S.N. <input type="text"/>	
<b>CAUTION:</b> BEFORE CONNECTING, READ INSTRUCTIONS.			
<b>CAUTION:</b> FEDERAL LAW RESTRICTS THIS DEVICE TO SALE BY OR ON THE ORDER OF A LICENSED PHYSICIAN OR PRACTITIONER.			
<b>CAUTION:</b> ELECTRIC SHOCK HAZARD. DO NOT REMOVE COVER. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.			
<b>WARNING:</b> HAZARDOUS ELECTRICAL OUTPUT. THIS IS FOR USE ONLY BY QUALIFIED PERSONNEL.			
<b>WARNING:</b> GROUNDING RELIABILITY CAN ONLY BE ACHIEVED WHEN THIS EQUIPMENT IS CONNECTED TO AN EQUIVALENT RECEPTACLE MARKED "HOSPITAL GRADE."			
<b>WARNING:</b> RISK OF FIRE. REPLACE FUSE AS MARKED.			
RISK CLASS 2 CSA STANDARD C22.2 NO. 125			
FUSE		INPUT POWER	
1/16 AMP / 250V. SLO-BLO		120V 6 WATTS 50/60HZ	
CHATTANOOGA CORPORATION Chattanooga, Tennessee 37405		2	MEDICAL EQUIPMENT
			74666

<b>infect<sup>®</sup></b> MODEL 150		S.N. <input type="text"/>	
<b>CAUTION:</b> BEFORE CONNECTING, READ INSTRUCTIONS.			
<b>CAUTION:</b> FEDERAL LAW RESTRICTS THIS DEVICE TO SALE BY OR ON THE ORDER OF A LICENSED PHYSICIAN OR PRACTITIONER.			
<b>CAUTION:</b> ELECTRIC SHOCK HAZARD. DO NOT REMOVE COVER. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.			
<b>WARNING:</b> HAZARDOUS ELECTRICAL OUTPUT. THIS IS FOR USE ONLY BY QUALIFIED PERSONNEL.			
<b>WARNING:</b> GROUNDING RELIABILITY CAN ONLY BE ACHIEVED WHEN THIS EQUIPMENT IS CONNECTED TO AN EQUIVALENT RECEPTACLE MARKED "HOSPITAL GRADE."			
<b>WARNING:</b> RISK OF FIRE. REPLACE FUSE AS MARKED.			
RISK CLASS 2 CSA STANDARD C22.2 NO. 125			
FUSE		INPUT POWER	
100mA / 250V SLO-BLO		100V 6 WATTS 50/60HZ	
CHATTANOOGA CORPORATION Chattanooga, Tennessee 37405		2	MEDICAL EQUIPMENT
			74695

<b>infect<sup>®</sup></b> MODEL 150		S.N. <input type="text"/>	
<b>CAUTION:</b> BEFORE CONNECTING, READ INSTRUCTIONS.			
<b>CAUTION:</b> FEDERAL LAW RESTRICTS THIS DEVICE TO SALE BY OR ON THE ORDER OF A LICENSED PHYSICIAN OR PRACTITIONER.			
<b>CAUTION:</b> ELECTRIC SHOCK HAZARD. DO NOT REMOVE COVER. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.			
<b>WARNING:</b> HAZARDOUS ELECTRICAL OUTPUT. THIS IS FOR USE ONLY BY QUALIFIED PERSONNEL.			
<b>WARNING:</b> GROUNDING RELIABILITY CAN ONLY BE ACHIEVED WHEN THIS EQUIPMENT IS CONNECTED TO AN EQUIVALENT RECEPTACLE MARKED "HOSPITAL GRADE."			
<b>WARNING:</b> RISK OF FIRE. REPLACE FUSE AS MARKED.			
RISK CLASS 2 CSA STANDARD C22.2 NO. 125			
FUSE		INPUT POWER	
40mA / 250V TIME-LAG		220V 6 WATTS 50/60HZ	
CHATTANOOGA CORPORATION Chattanooga, Tennessee 37405		2	MEDICAL EQUIPMENT
			74694