

## SECTION IV

### MAINTENANCE

#### 1. GENERAL

The components used in the Type 274-A Cathode-ray Oscillograph have been selected and tested to provide long, trouble-free operating life. It must be recognized, however, that trouble may be expected at some time during the life of the instrument. This section is included to provide useful information for the location and correction of such trouble.

#### 2. DRAWINGS

The schematics of the circuits located just inside of the back cover give the complete information as to how the various components are connected. A list of parts with their descriptions is given on the page accompanying the schematic diagrams.

### WARNING

DANGEROUS POTENTIALS AS HIGH AS 1200 VOLTS ARE FOUND IN THIS INSTRUMENT. SINCE THESE POTENTIALS MAY BE DANGEROUS TO HUMAN LIFE, THEY SHOULD BE TREATED WITH PROPER CAUTION.

#### 3. CIRCUIT VOLTAGES

Table 4-1 is included to give the voltages and resistances that are found between the socket connections of the various tubes and ground. The meter used for these measurements has an internal resistance of 20,000 ohms per volt. Naturally voltages or resistance measurements taken with a meter having a lower internal resistance will differ from the values of this table.

It should be remembered that the values given are nominal and considerable variation may be experienced due to various line voltage conditions and component tolerances. Generally, a variation of  $\pm 10\%$  is to be expected and 20% may not be uncommon. Judgment is often required to determine if a particular deviation is indicative of trouble.

#### 4. WARRANTY

##### DU MONT INSTRUMENTS.

All instruments manufactured by Allen B. Du Mont Laboratories, Inc., are guaranteed to equal or exceed all specifications for that particular instrument as published by

the company. They are further guaranteed against defective materials, other than the cathode-ray tube, and workmanship for a period of one year from date of sale, and we will promptly repair the instrument or replace it, at our discretion, at any time within the guarantee period should any defect develop from these causes or the instrument be not as represented, upon our inspection of the equipment.

In order that this guarantee be effective, it is necessary that the enclosed guarantee card be properly filled out and mailed to the factory immediately upon receipt of the equipment. Complete information should be given, since a record of every instrument is maintained at our office. This record constitutes our source of information when any correspondence is necessary. Both the *type number* and the *serial number* of the instrument must be given on this card in order that the information be complete.

##### DU MONT CATHODE-RAY TUBES.

All industrial cathode-ray tubes manufactured and sold by Allen B. Du Mont Laboratories are guaranteed for a life of 1,000 hours or for six months, depending upon which expires first. The only exceptions to this guarantee are burned-out heaters and broken glass. Cathode-ray tubes will be promptly replaced within the guarantee period if, upon our inspection, the tube has failed within less than its normal expected life.

In order that this guarantee be effective, it is necessary that the enclosed guarantee card be properly filled out and mailed to the factory immediately upon receipt of the equipment. Complete information should be given in order that the records which we maintain on your particular tube will be accurate. When correspondence is necessary, both *type number* and *serial number* of the tube should be mentioned. The serial number of Du Mont cathode-ray tubes will be found on the glass stem of the electron gun.

#### 5. SERVICE

Du Mont equipment is designed and manufactured in accordance with the best practices of modern engineering, and it is fully inspected before it leaves our factory. Under normal operation it may be expected to give long, trouble-free service. In order to insure factory service and proper consideration within the guarantee period, the enclosed guarantee card should be properly filled out and mailed to the factory immediately upon receipt of the equipment.

In many cases, equipment has been returned to us, without authorization, and without any need for our examina-

tion, resulting in unnecessary shipping costs. In the event that you feel you have not received satisfactory operation from this equipment, you should immediately contact our Instrument Service Department, mentioning the *type number and serial number*, completely outlining all characteristics of the failure, and describing the method in which the equipment has been used.

It is important that such information be given, since much time often can be saved when all operating conditions are known. With such information we often are able to make decisions and suggestions which will avoid returning it to our plant. The foregoing applies also to Du Mont cathode-ray tubes.

All equipment returned to our plant should be shipped, carefully packed, via express prepaid. Cathode-ray tubes larger than five inches screen diameter should be shipped separately and should not be left mounted in their socket within the instrument. In addition, all equipment should be properly identified either by a packing slip or, preferably, by a suitable tag affixed to it. Unidentified equipment which has been returned to us is a serious source of needless errors and delays.

## 6. REPLACEMENT PARTS

When ordering replacement parts, always give the *type number and serial number* of the instrument and refer to the part by its symbol designation and its description on the schematic.

## 7. SPECIFICATIONS

The right is reserved to change the specifications of any equipment, without notice, at any time. This right shall not incur any liability to Allen B. Du Mont Laboratories, Inc., to change equipment previously sold, or to supply new equipment in accordance with earlier specifications.

## THE DU MONT "OSCILLOGRAPHER"

The Du Mont "Oscillographer," a quarterly publication, is published regularly by the Allen B. Du Mont Laboratories. It is sent free of charge to engineers, research workers, and those engaged in the use and application of cathode-ray equipment. When sending requests for subscriptions and address-change notice, please supply the following: name, company name, company address, type of business, and title of individual.

## WARNING

EXERCISE EXTREME CARE WHEN HANDLING THE CATHODE-RAY TUBE. IT MAY BE SCRATCHED AND THEREBY WEAKENED TO THE POINT WHERE IT MAY EASILY BE BROKEN. THE BREAKING OF THIS TUBE MAY CAUSE AN IMPLOSION AND RESULT IN PERSONAL INJURY FROM FLYING GLASS PARTICLES.

# TABLE OF VOLTAGE AND RESISTANCE

K=1000 OHMS

NEW  
274-A @ 5K $\omega$ /V.  
SCALE

Pin No.	Resistance to Ground in Ohms	D-C Voltage to Ground @ 250V	Control Affecting Reading
V-1 Type 6AC7—Vertical Amplifier			
1	0	0	VERTICAL AMP
2	0	0	
3	<del>1K</del> 0	<del>24</del> 0	
4	0 to 1 meg.	0	
5	1K	2.4	
6	48K	70	
7	0.6 ohm	6.3 ac	
8	200K	210	
V-2 Type 6AC7—Horizontal Amplifier			
1	0	0	HORIZONTAL AMP
2	0	0	
3	<del>1K</del> 0	<del>24</del> 0	
4	0 to 1 meg.	0	
5	1K	2.4	
6	48K	70	
7	0.6 ohm	6.3 ac	
8	200K	190-215	
V-3 Type 884—Sweep Generator			
1	0 to 100K (only SYNC. Amp.)	0-2.5	FINE AND COARSE FREQUENCY AND SYNC AMP
2	0	0	
3	500K to 5 meg.	7.5-45	FINE AND COARSE FREQUENCY
4	NC	NC	
5	10K to 110K (only SYNC. Amp.)	0-0.24	SYNC AMP (Fine & coarse)
6	NC	NC	
7	0.6	6.3 ac	FINE FREQUENCY CONTROL
8	1.3K	5.6-6.2	
V-4 Type 80—High Voltage Rectifier			
1	3K	1000 ac	5,000 volt. scale
2	2 meg.	-1500	
3	2 meg.	-1500	
4	3K	1000 ac	
V-5 Type 80—Low Voltage Rectifier			
1	100K	480	390
2	540 ohms	380 ac	
3	540 ohms	380 ac	
4	100K	480	
V-6 Type 5BP-A—Cathode-Ray Tube			
1	1.5 meg.	-1100	HORIZONTAL POSITIONING
2	NC	NC	
3	5 meg.	+75 to -75	-500 FOCUS
4	700K to 1 meg.	-600 to -900	
5	NC	NC	VERTICAL POSITIONING
6	5 meg.	+75 to -75	
7	0	0	INTENSITY CONTROL
8	0	0	
9	0	0	
10	2 meg.	-1100	
11	1.5 meg.	-1100	

*Piercing v. 33 103 55 (D-66) 6@25*

Test sig - horz direct 4 inches (4) Test sig - horz amp -  
 amp. = 4 inches = 30 (3)

Counting sweep - 4 inches = 75 (5)

Interferer goes out at  
 approx 75-80

# PATENT NOTICE

Manufactured under one or more of the following U. S. Patents:

1,844,117	1,960,333	1,999,407	2,000,014	2,014,106
2,067,382	2,082,327	2,085,576	2,087,280	2,093,231
2,153,800	2,157,749	2,162,009	2,168,256	2,164,176
2,185,705	2,186,634	2,186,635	2,190,020	RE. 21,326
2,201,309	2,207,048	2,208,254	2,208,507	2,221,398
2,225,099	2,227,822	2,229,556	2,245,409	2,245,428
2,249,942	2,249,943	2,263,115	2,269,129	2,280,790
2,280,728	2,290,592	2,297,742	2,297,752	2,299,471
2,299,510	2,315,848	2,319,691	2,321,149	2,323,353
2,331,401	2,337,980	2,338,336	2,338,646	2,343,630
2,345,549	2,346,509	2,347,933	2,352,263	2,356,738
2,364,687	2,365,476	2,372,455	2,372,901	2,373,114
2,379,488	2,384,931	2,390,025	2,391,082	2,391,090
2,391,273	DES. 143,796	2,396,014	2,398,535	2,398,953
2,404,185	2,408,193	2,409,419	2,410,920	2,414,313
2,414,634	2,419,118	2,419,777	2,423,362	2,426,419
2,429,834	2,435,564	2,435,630	2,436,265	2,437,173
2,438,568	2,438,706	2,438,717	2,439,186	2,440,597
2,441,334	2,442,138	2,442,264	2,442,545	

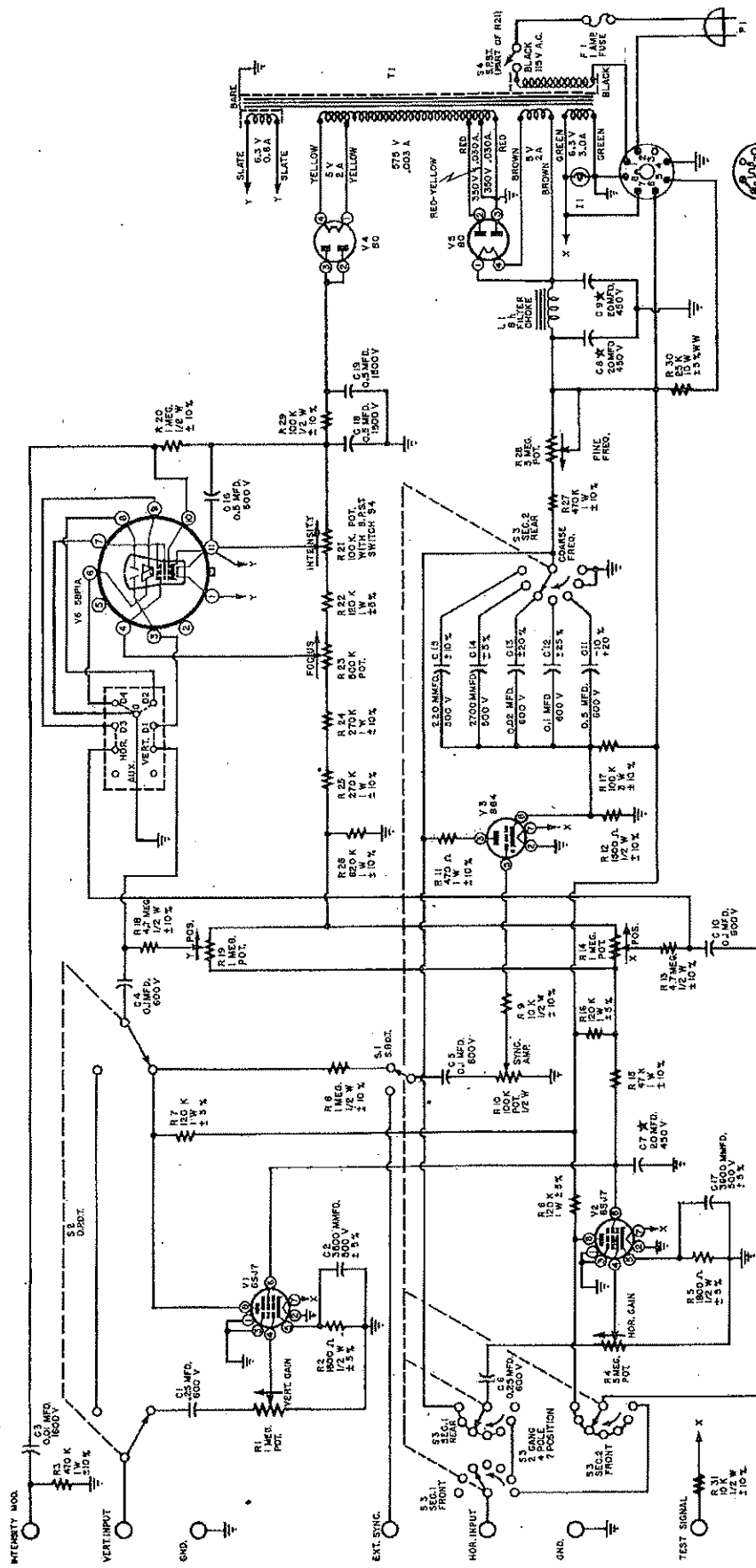
Other Patents Pending

ALLEN B. DU MONT LABORATORIES, INC.

CLIFTON, N. J., U. S. A.

## PARTS LIST—TYPE 274

SYMBOL DESIGNATION	REFERENCE DRAWING OR PART NO.	DESCRIPTION
C1	3-152	CAPACITOR, fixed: paper; wax; 0.25 mfd; 600 V; $\pm 30-10\%$
C2	CM35B362J	CAPACITOR, fixed: mica; 3600 mmfd; 500 V; $\pm 5\%$
C3	3-1140	CAPACITOR, fixed: paper; wax; 0.01 mfd; 1600 V; $\pm 30-10\%$
C4	3-1195	CAPACITOR, fixed: paper; wax; 0.1 mfd; 600 V; $\pm 30-10\%$
C5		Same as C4
C6		Same as C1
C7	3-1160	CAPACITOR, fixed: electrolytic; 20+20+20 mfd; 450 V
C8		Part of C7
C9		Part of C7
C10		Same as C4
C11	3-1082	CAPACITOR, fixed: paper; wax; 0.5 mfd; 600 V; $\pm 20-10\%$
C12	3-1138	CAPACITOR, fixed: paper; wax; 0.1 mfd; 600 V; $\pm 25\%$
C13	3-1139	CAPACITOR, fixed: paper; wax; 0.02 mfd; 600 V; $\pm 20\%$
C14	CM30B272J	CAPACITOR, fixed: mica; 2700 mmfd; 500 V; $\pm 5\%$
C15	CM20B221K	CAPACITOR, fixed: mica; 220 mmfd; 500 V; $\pm 10\%$
C16		Same as C11
C17		Same as C2
C18	3-360	CAPACITOR, fixed: paper; 0.5 mfd; 1500 V; $\pm 20-10\%$
C19		Same as C18
F1	11-3	FUSE, cartridge: 1 amp.
I1	39-4	LAMP, incandescent: miniature bayonet base
L1	21-338	INDUCTOR, fixed: filter; 8 hy.
P1	46-108	CABLE, power: copper; 2 #18 ga. stranded conductors; w/2 prong male plug one end
P2	9-294	CONNECTOR, male contact; 8 pin
R1	1-287	RESISTOR, variable: composition; 1 megohm; 1/2 W; $\pm 20\%$
R2	RC21BF182J	RESISTOR, fixed: composition; 1800 ohm; 1/2 W; $\pm 5\%$
R3	RC31BF474K	RESISTOR, fixed: composition; 470,000 ohm; 1 W; $\pm 10\%$
R4	1-421	RESISTOR, variable: composition; 5 megohm; 2 W; $\pm 20\%$
R5		Same as R2
R6	RC31BF124J	RESISTOR, fixed: composition; 120,000 ohm; 1 W; $\pm 5\%$
R7		Same as R6
R8	RC21BF105K	RESISTOR, fixed: composition; 1 megohm; 1/2 W; $\pm 10\%$
R9	RC21BF103K	RESISTOR, fixed: composition; 10,000 ohm; 1/2 W; $\pm 10\%$
R10	1-388	RESISTOR, variable: composition; 100,000 ohm; 1/2 W; $\pm 20\%$
R11	RC31BF471K	RESISTOR, fixed: composition; 470 ohm; 1 W; $\pm 10\%$
R12	RC21BF152K	RESISTOR, fixed: composition; 1500 ohms; 1/2 W; $\pm 10\%$
R13	RC21BF475K	RESISTOR, fixed: composition; 4.7 megohm; 1/2 W; $\pm 10\%$
R14		Same as R1
R15	RC31BF473K	RESISTOR, fixed: composition; 47,000 ohm; 1 W; $\pm 10\%$
R16		Same as R6
R17	2-257	RESISTOR, fixed: composition; 100,000 ohm; 3 W; $\pm 10\%$
R18		Same as R13
R19		Same as R1
R20		Same as R8
R21	1-463	RESISTOR, variable: composition; 100,000 ohm; 1/2 W; $\pm 20\%$ ; with SPST switch S4
R22		Same as R6
R23	1-288	RESISTOR, variable: composition; 500,000 ohm; 1/2 W; $\pm 20\%$
R24	RC31BF274K	RESISTOR, fixed: composition; 270,000 ohm; 1 W; $\pm 10\%$
R25		Same as R24
R26	RC31BF824K	RESISTOR, fixed: composition; 820,000 ohm; 1 W; $\pm 10\%$
R27		Same as R3
R28		Same as R4
R29	RC21BF104K	RESISTOR, fixed: composition; 100,000 ohm; 1/2 W; $\pm 10\%$
R30	2-8	RESISTOR, fixed: wire wound; 25,000 ohm; 10 W; $\pm 5\%$
R31		Same as R9
S1	5-10	SWITCH, toggle: SPDT
S2	5-12	SWITCH, toggle: DPDT
S3	5B-4647	SWITCH, 2 gang 4 pole: 7 pos. (formerly 5-198)
S4		Part of R21
T1	20D-4641	TRANSFORMER, plate and filament: (formerly 20-329)
V1	25-6SJ7	TUBE, electron: Triple-grid detector amplifier
V2		Same as V1
V3	25-884	TUBE, electron: Thyatron
V4	25-80	TUBE, electron: Full wave high-vacuum rectifier
V5		Same as V4
V6	25-5BP1A	TUBE, electron: Cathode-Ray



SCHEMATIC OF CIRCUIT. TYPE 274 CATHODE-RAY OSCILLOGRAPH

Ref. Dwg. DD-4652-C  
Issue 5

# COMPONENTS PARTS LIST

## TYPE 274-A CATHODE-RAY OSCILLOGRAPH

### CAPACITORS

Symbol	Part No.	Description
C1	03001520/3-152	.25 $\mu$ f 600 V paper
C2	03033350/CM35B512J	5100 $\mu$ f 500 V $\pm 5\%$ mica
C3	03011400/3-1140	.01 $\mu$ f 1600 V paper
C4	03011950/3-1195	.1 $\mu$ f 600 V paper
C5	03011950/3-1195	.1 $\mu$ f 600 V paper
C6	03001520/3-152	.25 $\mu$ f 600 V paper
C7	03011600/3-1160	20/20/20 $\mu$ f 450 V elec.
C8	03033370/CM35B622J	6200 $\mu$ f 500 V $\pm 5\%$ mica
C9	03011950/3-1195	.1 $\mu$ f 600 V paper
C10	03010820/3-1082	.5 $\mu$ f 600 V paper
C11	03011880/3-1188	.1 $\mu$ f 600 V paper
C12	03011890/3-1189	.02 $\mu$ f 600 V paper
C13	03029340/CM30B272J	2700 $\mu$ f 500 V $\pm 5\%$ mica
C14	03020470/CM20B221K	220 $\mu$ f 500 V $\pm 10\%$ mica
C15	03003600/3-360	.5 $\mu$ f 1500 V paper
C16	03003600/3-360	.5 $\mu$ f 1500 V paper
C17	03010820/3-1082	.5 $\mu$ f 600 V paper
C20	03007790/3-779	1.5/7 $\mu$ f 500 V var ceramic

### FUSES

F1	11000760/11-3	1 amp
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### LAMPS

I1	12000840/39-4	.25 amp
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### INDUCTORS

L1	21003380/21-338	8 hy filter
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### RESISTORS

R1	01011120/1-287	1 meg $\pm 20\%$ 1/2 W var
R2	02030480/RC20BF102J	1000 $\pm 5\%$ 1/2 W
R3	02035090/RC30BF474K	470,000 $\pm 10\%$ 1 W
R4	01011120/1-287	1 meg $\pm 20\%$ 1/2 W var
R5	02030480/RC20BF102J	1000 $\pm 5\%$ 1/2 W
R6	02034000/RC30BF154J	150,000 $\pm 5\%$ 1 W
R7	02034000/RC30BF154J	150,000 $\pm 5\%$ 1 W
R8	02032130/RC20BF105K	1 meg $\pm 10\%$ 1/2 W
R9	02031890/RC20BF103K	10,000 $\pm 10\%$ 1/2 W
R10	01011080/1-888	100,000 $\pm 20\%$ 1/2 W var
R11	02034730/RC30BF471K	470 $\pm 10\%$ 1 W
R12	02031760/RC20BF321K	1300 $\pm 5\%$ 1/2 W
R13	02032210/RC20BF475K	4.7 meg $\pm 10\%$ 1/2 W
R14	01011120/1-287	1 meg $\pm 20\%$ 1/2 W var
R15	02034970/RC30BF473K	47,000 $\pm 10\%$ 1 W
R16	02033960/RC30BF104J	100,000 $\pm 5\%$ 1 W
R17	02071540/2-257	100,000 $\pm 10\%$ 3 W
R18	02032210/RC20BF475K	4.7 meg $\pm 10\%$ 1/2 W
R19	01011120/1-287	1 meg $\pm 20\%$ 1/2 W var
R20	02032130/RC20BF105K	1 meg $\pm 10\%$ 1/2 W
R21	01014500/1-463	100,000 $\pm 20\%$ 1/2 W var
R22	02035020/RC30BF124K	120,000 $\pm 10\%$ 1 W
R23	01011110/1-288	500,000 $\pm 20\%$ 1/2 W var
R24	02035040/RC30BF184K	180,000 $\pm 10\%$ 1 W
R25	02035040/RC30BF184K	180,000 $\pm 10\%$ 1 W
R26	02035120/RC30BF824K	820,000 $\pm 10\%$ 1 W
R27	02035090/RC30BF474K	470,000 $\pm 10\%$ 1 W
R28	01015340/1-421	5 meg $\pm 20\%$ 2 W var
R29	02032040/RC20BF184K	180,000 $\pm 10\%$ 1/2 W
R30	02034890/RC30BF683K	68,000 $\pm 10\%$ 1 W
R31	02031890/RC20BF103K	10,000 $\pm 10\%$ 1/2 W
R32	02032210/RC20BF475K	4.7 meg $\pm 10\%$ 1/2 W
R33	02032040/RC20BF184K	180,000 $\pm 10\%$ 1/2 W
R34	01023900	1200 $\pm 20\%$ 1.5 W wire wd.

### SWITCHES

S1	05000100/5-10	Toggle SPDT
S2	05000120/5-12	Toggle DPDT
S3	5B-13386	Rotary 4P7T

### TRANSFORMERS

T1	20C-13382	Transformer
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### TUBES

V1	25000120/25-6AC7	Elec 6AC7
V2	25000120/25-6AC7	Elec 6AC7
V3	25000740/25-884	Elec 884
V4	25000720/25-80	Elec 80
V5	25000720/25-80	Elec 80
V6	25000520/25-5BP	Elec 5BP

### CABLE ASSEMBLY

W1	50002980/46-108	Cable Assembly Power
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*Additional copies of this manual may be secured at a cost of fifty cents each or five dollars per dozen copies; postpaid in the United States of America only.*