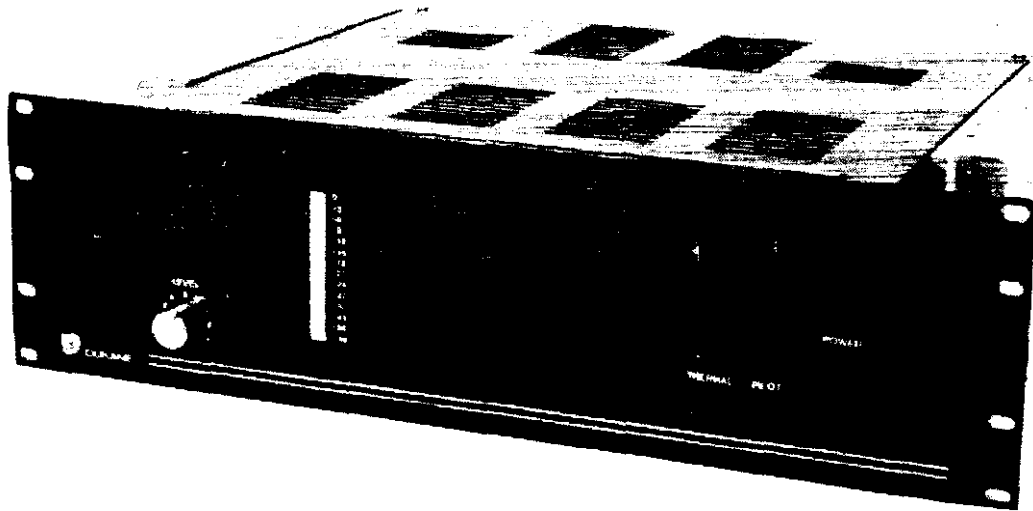


DUKANE POWER AMPLIFIER 250 WATT DIRECT COUPLED MODEL 1A2250



Installation, Operation and Service Manual

403-314



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SECTION 1

GENERAL INFORMATION

1.1 INTRODUCTION

This manual provides installation, operating, and service information for the Model 1A2250 250 watt Direct Coupled Power Amplifier manufactured by the Dukane Corporation, St. Charles, Illinois 60174.

This manual is divided into four sections as follows:

1. General Information
2. Installation Information
3. Operating Information
4. Service Information

1.2 GENERAL DESCRIPTION

The Dukane Model 1A2250 Direct Coupled Power Amplifier is designed for use in auditoriums, gymnasiums, and in field applications where professional sound quality is required. Output level is indicated by a VU light bar. The amplifier is protected from damage which could result from an over temperature condition in the output stage circuitry. A foldback circuit is employed to prevent damage in case of a short circuit developing in the speaker line(s) served by the amplifier.

The amplifier may be operated with either unbalanced or balanced input. An optional input plug-in transformer allows for balanced operation. The output of the amplifier can be either unbalanced (direct coupled) or balanced. An optional plug-in transformer allows for balanced output.

1.3 TECHNICAL SPECIFICATIONS

CONTINUOUS AVERAGE POWER OUTPUT:

250 watts.

HARMONIC DISTORTION:

Less than .05% @ 1 kHz (@ rated output).

Less than 0.5% @ 1 kHz (@ rated output)
for transformer option.

FREQUENCY RESPONSE:

20-20,000 Hz, ± 2 dB (direct coupled).

20-20,000 Hz, -3dB, +1dB (transformer).

SIGNAL TO NOISE RATIO:

Greater than -100dB below rated output
(20-20,000 Hz bandwidth).

INPUT SENSITIVITY:

1 volt rms @ 1kHz for rated output.

INPUT IMPEDANCE:

10k ohms unbalanced, 15k ohms balanced
(using 3A230 input transformer).

OUTPUT IMPEDANCE:

4 ohms direct unbalanced.

8 ohms (25 and 70.7V) balanced (output
transformer option).

OUTPUT REGULATION:

Direct, 0.5dB no load to full load @ 1kHz.

Transformer, 1dB no load to full load @
1 kHz.

CONTROLS:

Volume Control.

AC Switch.

INDICATORS:

Power On LED.

Over Temperature LED.

Color Bar VU Graphic.

POWER SOURCE:

120/240 volts, 50/60 Hz.

1.3 TECHNICAL SPECIFICATIONS (Continued)

POWER REQUIRED:

60 watts idle; 600 watts at full rated output.

TERMINATIONS:

Screw terminal strips.

FUSE:

6.25 amperes, 250V, Slow Blow (120 Vac).
- or -

3.2 amperes, 250V, Slow Blow (240 Vac).

FINISH:

Charcoal, baked enamel.

DIMENSIONS:

5-1/4" (13.3cm) high, 19" (48.3cm) wide,
14" (36 cm) deep (without optional 3A230
Input Transformer); 15-3/4" (40.5 cm)
deep (with 3A230).

NET WEIGHT:

33 pounds (14.9 kg).

ASSOCIATED EQUIPMENT:

Model 3A230 Input Transformer.

Model 438-547 Output Transformer Kit.

SECTION 2

INSTALLATION INFORMATION

2.1 INTRODUCTION

This Section of the manual contains unpacking, mounting, and wiring instructions. The information is arranged to facilitate an orderly installation. Installers should have a good understanding of this information prior to beginning installation of the amplifier.

2.2 UNPACKING

Examine the shipping carton and the amplifier. If there is any damage to the unit, bring it to the attention of the distributor from whom it was purchased. If this unit was shipped to you, notify the transportation company and place your damage claim without delay. This amplifier was carefully inspected before it was packed and shipped from the Du Kane Corporation.

2.3 EQUIPMENT MOUNTING

The IA2250 is designed for installation in a standard 19 inch rack or console. Mount the unit in the designated location using the four mounting screws provided.

2.4 POWER CONNECTIONS

The IA2250 amplifier receives ac supply input via the #321-42 fuse assembly. This assembly has a removable jumper card that allows the amplifier to operate on either 120 or 240 Vac, depending on how the jumper card is installed in the fuse assembly. Refer to Figure 2-1.

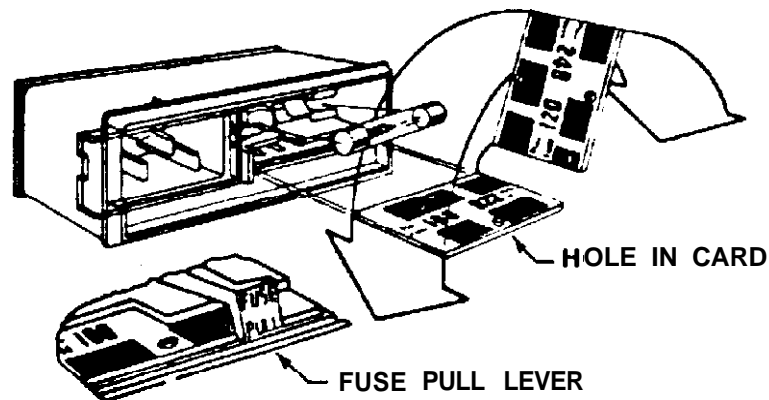


Figure 2-1. AC Supply Input and Fuse Assembly

To replace fuse (F101), remove the ac plug, slide the plastic cover up to expose the fuse. Move the lever labeled FUSE PULL upward to pop the fuse. Insert the new fuse, moving the lever downward.

The voltage selection is visible on the jumper card, either 120 or 240 when the card is inserted into the fuse assembly.

To change input voltage from 120 Vac to 240 Vac, or vice versa, remove the fuse as explained above, insert the point of a ball-point pen or pencil into the hole in the card and slide the card out of the assembly. Turn the card so that the desired voltage shows on the upper left-hand side of the card. Slide the card back into the assembly. Replace the fuse.

NOTE

Install the correct value of fuse (F101) as follows:

For 120 Vac operation: 6.25 amperes, 250V. Slow Blow.

For 240 Vac operation: 3.2 amperes, 250V. Slow Blow.

2.5 EXTERNAL CONNECTIONS

External connections are made to screw terminal strips TS1 and TB101 as shown in Figure 2-2. When the optional output transformer 438-547 is used (balanced output), the jumpers between terminals 1 and 3 and 2 and 4 on TS1 must be in place. Plug the transformer into socket PI. See Figure 4-1 for location of PI. When the output transformer is not used (unbalanced operation), the jumpers are not required.

Make external output connections to terminal strip TSI. For unbalanced operation, the speakers connect to terminals 1 and 2. For balanced operation, the speakers connect to terminals 5, 6, or 7, depending on the output desired, and terminal 8.

TB101 is for the input connections. When the optional 3A230 Input Transformer is not used, jumpers between terminals 4 and 7 and between terminals 5 and 6 of the octal socket must be in place. When the 3A230 is to be used for a balanced input, remove the jumpers and plug the 3A230 into the octal socket. Make external output connections to terminal strip TS1, as required for your particular application.

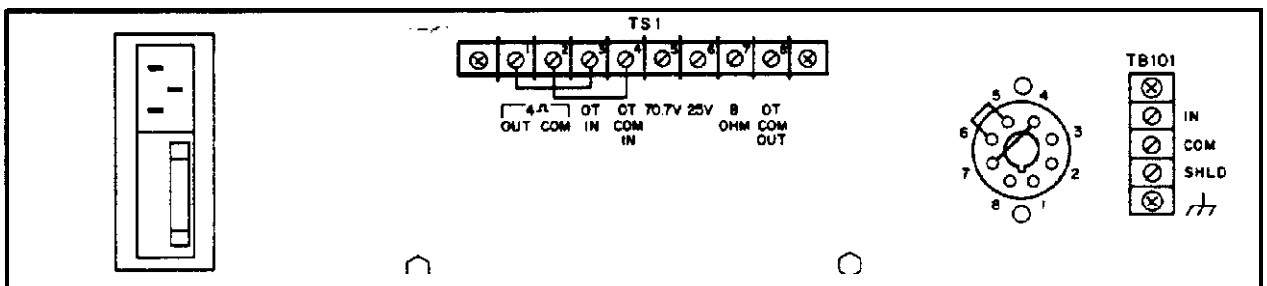


Figure 2-2. 1A2250 Rear Panel View

SECTION 4

SERVICE INFORMATION

4.1 INTRODUCTION

Standard electronic components are used in the Dukane Model IA2250 250 Watt Direct Coupled Amplifier. All replacement parts listed in the "Repair Parts List" are available through an authorized Dukane distributor, dealer, or from the factory. Any amplifier failure requiring circuit repairs should be referred to an authorized dealer or repair facility in your area. Further damage can result from improper repairs. For chassis mounted components and for each circuit board making up the amplifier, the parts are shown first, followed by the parts location, and finally by the schematic drawing.

Repair Parts List – Chassis Mounted Components
(Schematic Drawing 190-28051)

Legend	Description	Dukane Part Number
C101, 102	Capacitor, 15000uF, 100V, Electrolytic	199-9332
CR101	Rectifier, Silicon	595-44
CR102	Rectifier, Bridge, 400V	595-71
DS101, 102	Diode, Light Emitting	230-8005
F101	Fuse, 6.25A, 250V. Slow Blow (120 Vac operation)	320-010-0625
F101	Fuse, 3.2A, 250V. Slow Blow (240 Vac operation)	320-010-0320
R101	Potentiometer, 10k Ohm, Linear	601-398
R102	Resistor, 6800 Ohm, 5W. 5%	600-1050-682
S101	Switch, Rocker	680-818
T101	Transformer, Power	710-4293
- - -	Fuse Assembly, Voltage Selector/Receptacle	32142
- - -	438-547 Output Transformer Kit (Optional)	710-2173
- - -	129 Vac Power Cord (Furnished)	200-554
- - -	240 Vac Power Cord (Order Separately)	200-556

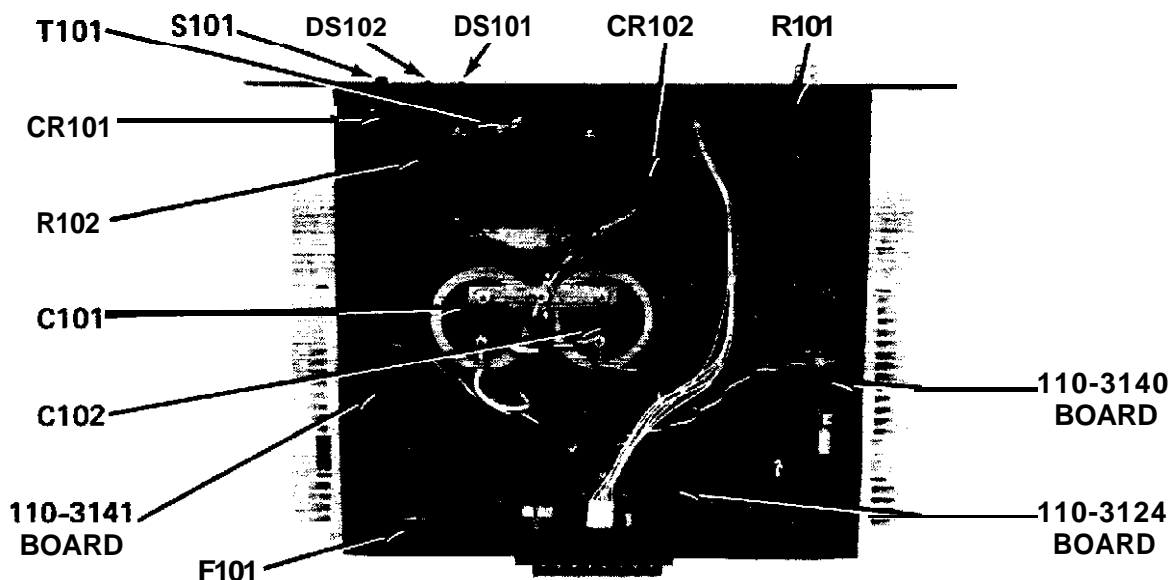
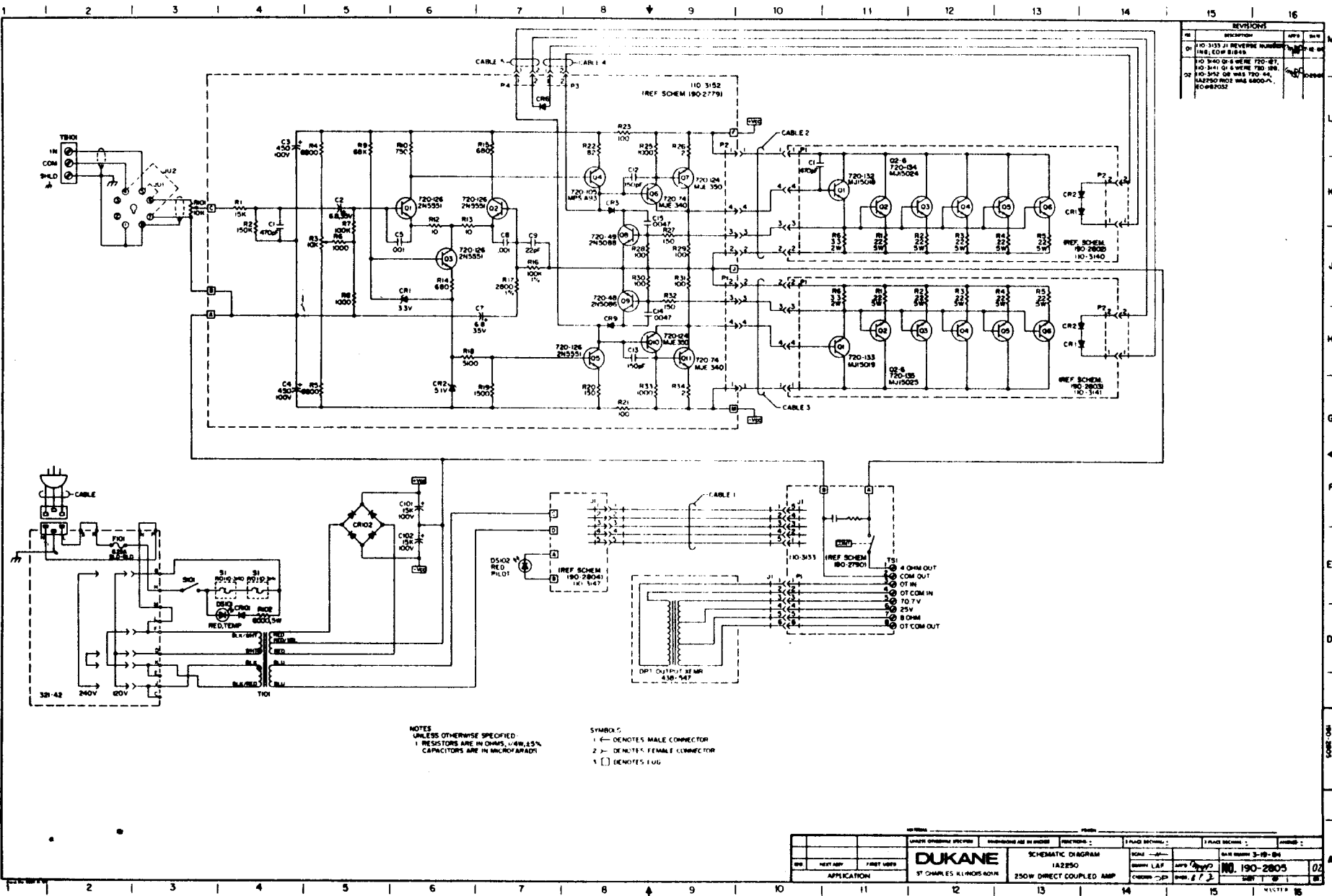


Figure 4-I. 1A2250 Chassis Mounted Components and Circuit Board Locations



REVISIONS			
NO.	DESCRIPTION	DATE	BY
01	NO 190-2805 J1 REVERSE NUMBERING (INS. COM 818)		
02	NO 190-2805 Q1 & Q2 WERE 720-27, NO 241 Q1 & Q2 WERE 720-28, NO 342 Q1 WAS 720-44, 1A250 P102 WAS 6800V, NO 6800V		

6
4-2

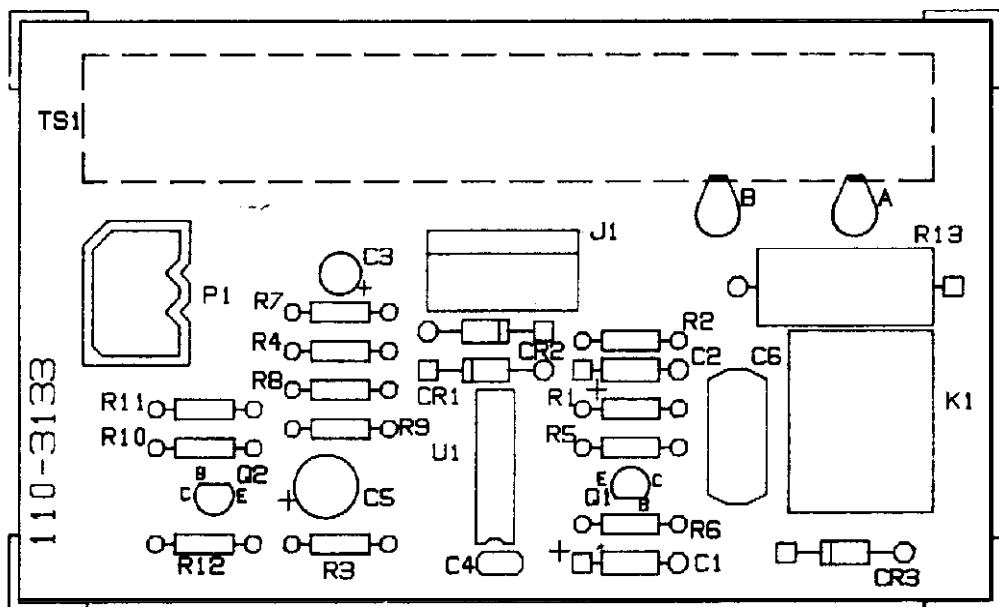
NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTORS ARE IN OHMS, 1/4W, 5%
CAPACITORS ARE IN MICROFARADS

SYMBOLS:
1 ← DENOTES MALE CONNECTOR
2 → DENOTES FEMALE CONNECTOR
[] DENOTES FUSE

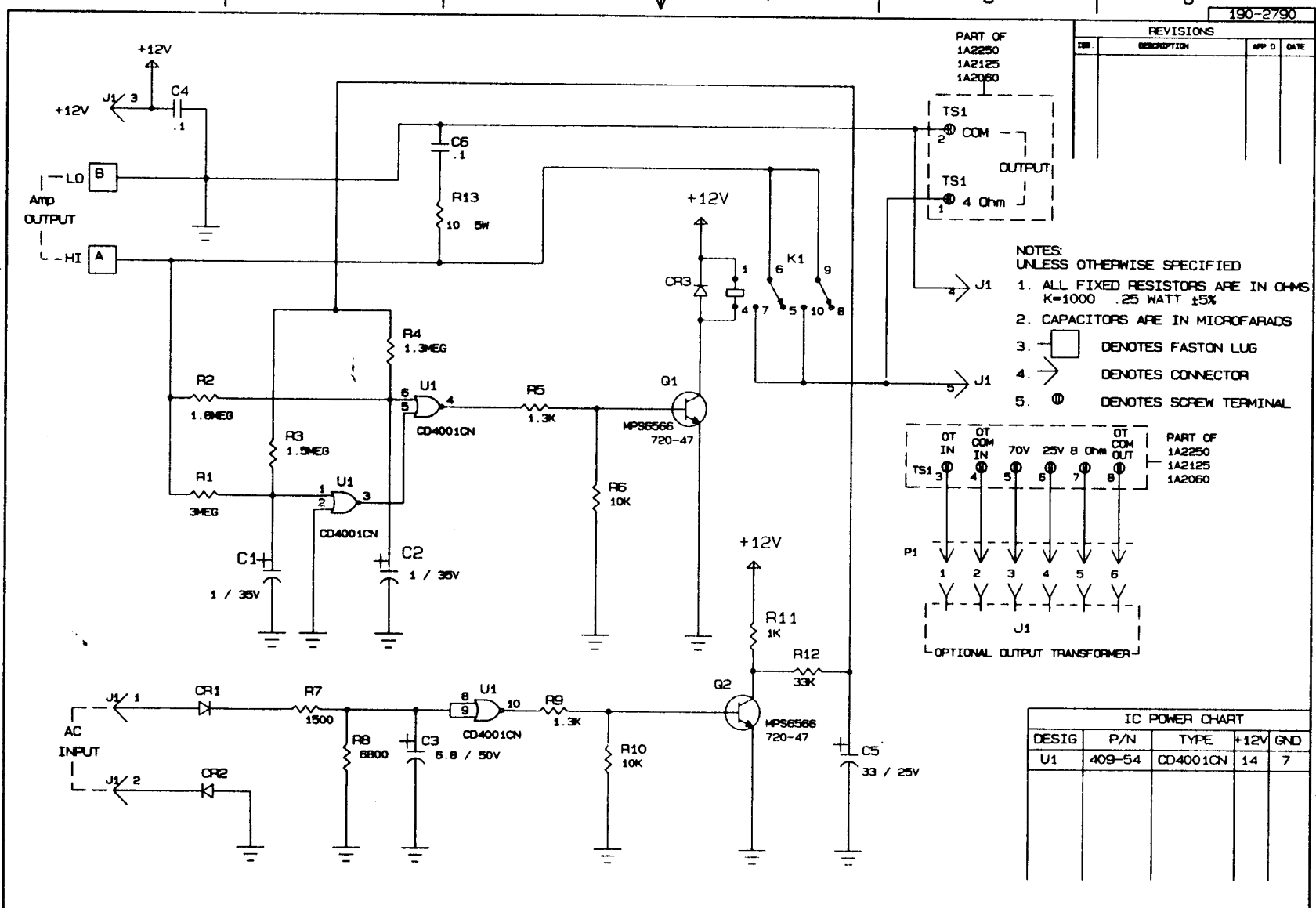
UNLESS OTHERWISE SPECIFIED		DIMENSIONS ARE IN INCHES		FUNCTIONS :		PLANT SYMBOLS :		PLANT SYMBOLS :		NUMBER :	
REV	DATE	SCALE	BY	CHKD	APP'D	DATE	NO.	REV	BY	DATE	BY
APPLICATION		DUKANE		SCHEMATIC DIAGRAM		1A2250		250W DIRECT COUPLED AMP		NO. 190-2805	
ST CHARLES, ILLINOIS 60304										02	

Repair Parts List - 1 Io-3133 Speaker Protector and Output Delay
(Schematic Drawing 190-2790)

Legend	Description	Dukane Part Number
CI, 2	Capacitor, 1 uF. 35V, Electrolytic	199-2054-105
c 3	Capacitor, 6.8uF. 50V, Electrolytic	199-2062-685
c 4	Capacitor, 0.1uF, 50V. Ceramic	199-9327
c 5	Capacitor, 33uF, 25V, Electrolytic	199-2063-336
C 6	Capacitor, 0.1uF, 200WVDC. Electrolytic	199-4046-1 04
CR1-CR3	Rectifier, Silicon	595-44
K1	Relay, i 2Vdc, 2 Form C	596-250
Q1,2	Transistor, MPS6566	720-47
R1	Resistor, 3 Megohm, 1/4W, 5%	600-0039-305
R 2	Resistor, 1.6 Megohm. 1/4W, 5%	600-0039-185
R 3	Resistor, 1.5 Megohm, 1/4W, 5%	6006(139-1 55
R 4	Resistor, 1.3 Megohm, 1/4W, 5%	600-0039-1 35
R5,9	Resistor, 1300 Ohm, 1/4W, 5%	600-0039-132
R6,10	Resistor, 10k Ohm, 1/4W, 5%	600-0039-1 03
R 7	Resistor, 1500 Ohm, 1/4W. 5%	600-0039-1 52
R 6	Resistor, 6800 Ohm, 1/4W. 5%	600-0039-682
R11	Resistor, 1000 Ohm, 1/4W, 5%	600-0039-1 02
R12	Resistor, 33k Ohm, 1/4W, 5%	600-0039-333
R13	Resistor, 10 Ohm, 5W, 5%	600-1050-100
UI	Integrated Circuit, 40018	409-54



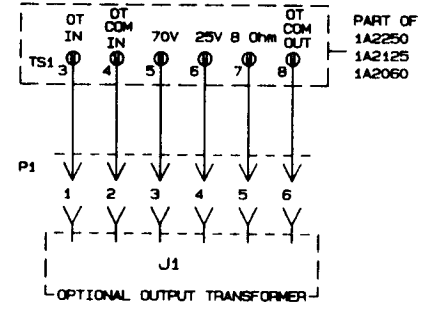
4-4



190-2790

REVISIONS		
NO.	DESCRIPTION	APP. D. DATE

- NOTES:
UNLESS OTHERWISE SPECIFIED
1. ALL FIXED RESISTORS ARE IN OHMS
K=1000 .25 WATT ±5%
 2. CAPACITORS ARE IN MICROFARADS
 3. □ DENOTES FASTON LUG
 4. → DENOTES CONNECTOR
 5. ⊕ DENOTES SCREW TERMINAL



IC POWER CHART				
DESIG	P/N	TYPE	+12V	GND
U1	409-54	CD4001CN	14	7

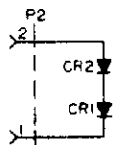
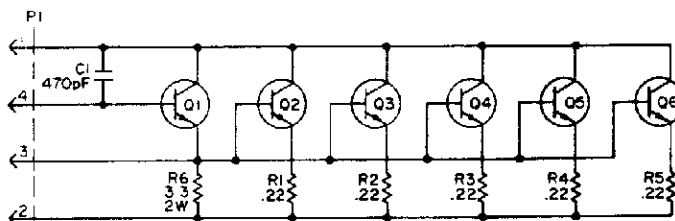
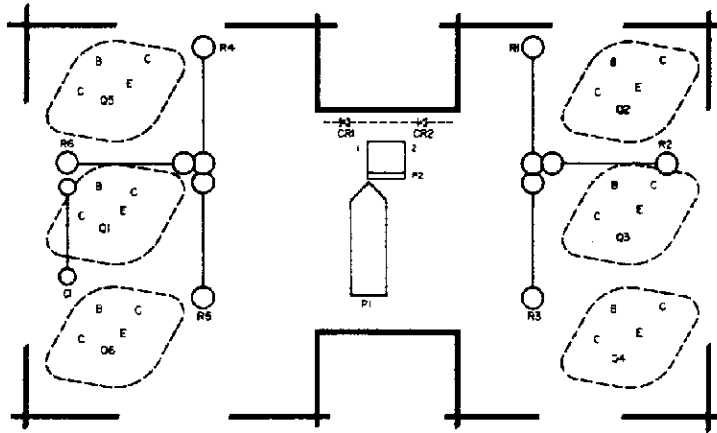
SCHEMATIC 190-2790		
COMPONENT	LAST USED	NOT USED
CAPACITOR	C6	
DIODE	CR3	
INT. OKT.	U1	
RESISTOR	R13	
TRANSISTOR	Q2	

MATERIAL		FINISH		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES FRACTIONS - 1/32		8 PLACE DECIMAL - .01		3 PLACE DECIMAL - .002		ANILES - *	
110-3133		DUKANE CORPORATION		SCHEMATIC SPEAKER PROTECTOR AND OUTPUT DELAY		SCALE -		DATE DRAWN 3/14/54		DRAWN BY	
APPLICATION		ST. CHARLES ILLINOIS U.S.A.		110-3133		APP. D.		NO. 190-2790		00	
						CHECKED		SHEET 1 OF 1		128	

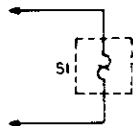
MASTER

Repair Parts List - 110-3140 250W "N" PWR PCB/HTSK
(Schematic Drawing 190-2802)

Legend	Description	Dukane Part Number
C1	Capacitor, 470pF, 630WVDC, 2.5%, PS Film	199-4028-471
CR1, 2	Rectifier, Silicon	595-44
Q1	Transistor, MJ15018	720-132
Q2-6	Transistor, MJ15024	720-134
R1-5	Resistor, 0.22 Ohm, 5W, 5%, Wire Wound	600-1050-R22
R6	Resistor, 3.3 Ohm, 2W, 5%, Wire Wound	600-1006-3R3
S1	Thermostat	702-1



Q1 720-132 MJ15018
Q2-6 720-134 MJ15024



NOTES:
UNLESS OTHERWISE SPECIFIED-
1 RESISTANCE IS IN OHMS, 5W, ±5%
CAPACITANCE IS IN MICROFARADS

SYMBOLS:
1 ← DENOTES MALE CONNECTOR.
2 > DENOTES FEMALE CONNECTOR.
3 ← DENOTES TAB ON S1.

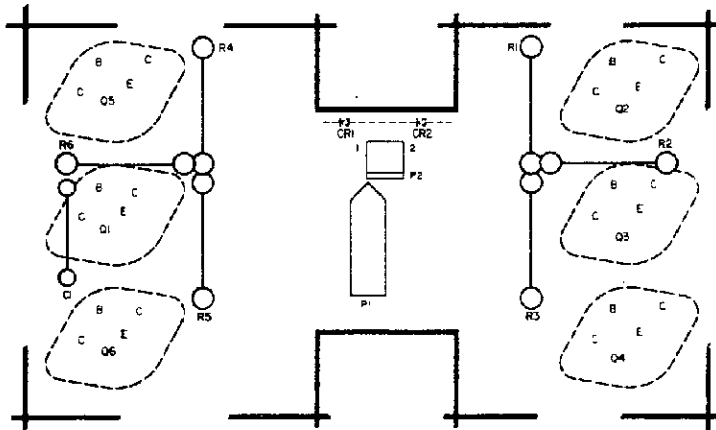
DES	LAST USED	NOT USED
RES	R6	
CAP	C1	
DIODE	CR2	
XSTR	Q6	
CONN	P2	
SWITCH	S1	

REVISIONS			
ISS.	DESCRIPTION	APP'D.	DATE
01	DI-6 WERE 720-127, 60#B20267, 74#C1024		

MATERIAL			FINISH		
UNLESS OTHERWISE SPECIFIED	DIMENSIONS ARE IN INCHES	FRACTIONS: 2	3 PLACE DECIMAL: 2	3 PLACE DECIMAL: 1	ANGLES: 1
DUKANE CORPORATION BY CHARLES, ILLINOIS U.S.A.		SCHEMATIC DIAGRAM 250W "N" PWR PCB/HTSK. 110-3140		SCALE: 1/1 DRAWN: LAF CHECKED: CH	DATE DRAWN: 3-7-84 NO. 190-2802 SHEET 1 OF 1
REV.	NEXT ASSY	FIRST USED	APPLICATION		

Repair Parts List - 110-3141 250W "P" PWR PCB/HTSK
(Schematic Drawing 190-2803)

Legend	Description	Dukane Part Number
CR1, 2	Rectifier, Silicon	595-44
Q1	Transistor, MJ15019	720-133
Q2-6	Transistor, MJ15025	720-135
R1-5	Resistor, 0.22 Ohm, 5W, 5%, Wire Wound	600-1050-R22
R6	Resistor, 3.3 Ohm, 2W, 5%, Wire Wound	600-1006-3R3
S1	Thermostat	702-1



Q1 720-133 MJ15019
Q2-6 720-135 MJ15025

RESISTOR VALUES:
R6 3.3 Ohm, 2W, 5%
R1-R5 0.22 Ohm, 5W, 5%

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	Q1, Q2 WERE TO BE USED		

NOTES
UNLESS OTHERWISE SPECIFIED-

- RESISTANCE IS IN OHMS, 5W, ±5%.
- CAPACITANCE IS IN MICROFARADS.

SYMBOLS:

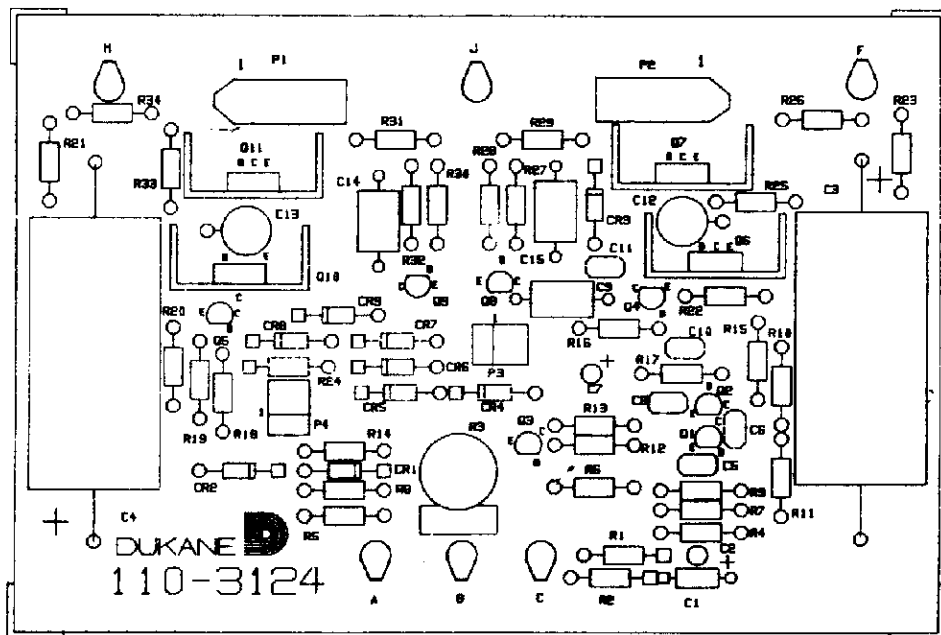
- ← DENOTES MALE CONNECTOR
- ↘ DENOTES FEMALE CONNECTOR.
- ← DENOTES TAB ON S1.
- * DENOTES OPTIONAL COMPONENT.

DES	LAST USED	NOT USED
RES	R6	
CAP	C1 *	
DIODE	CR2	
XSTR	Q6	
CONN	P2	
SWITCH	S1	

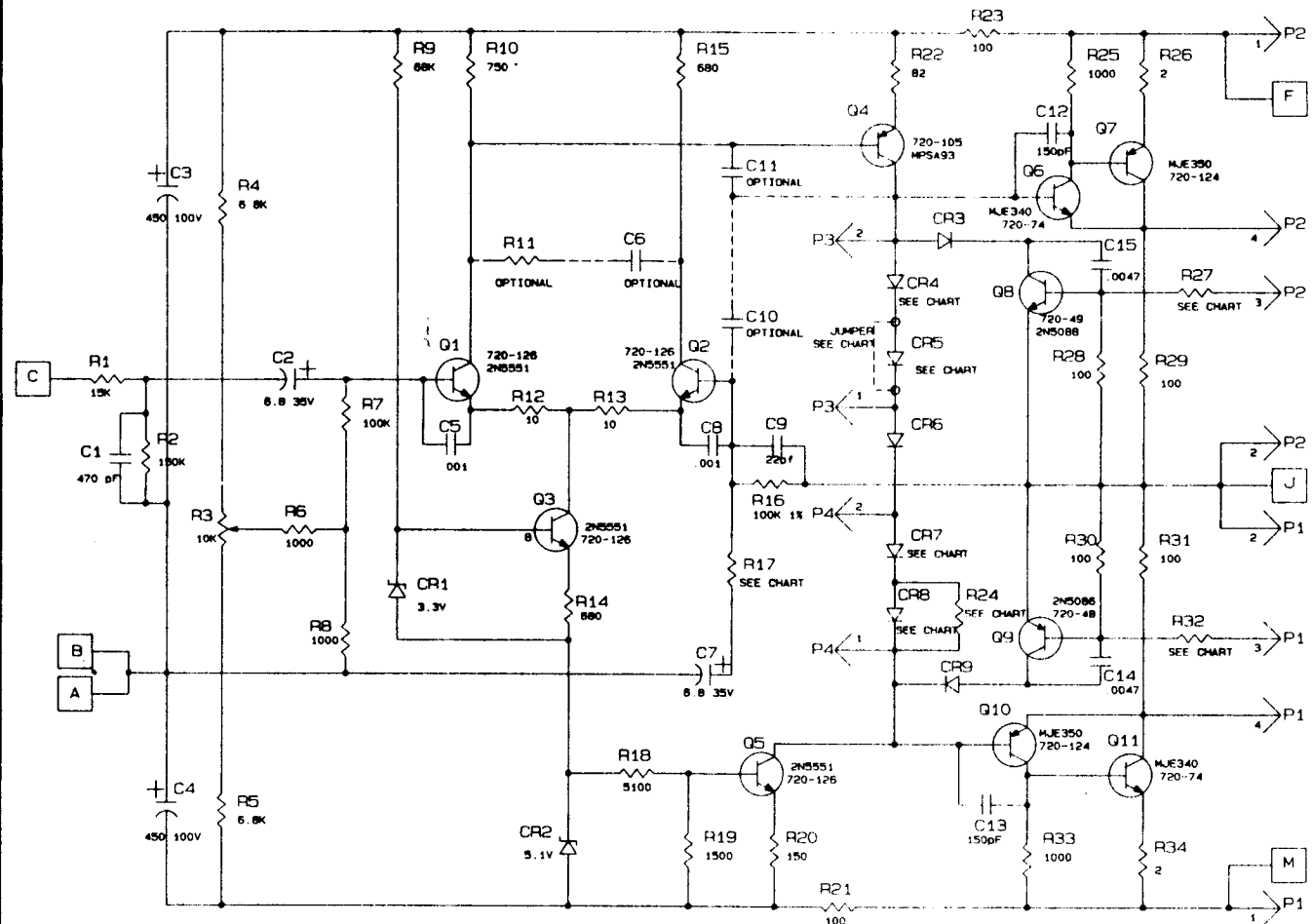
UNLESS OTHERWISE SPECIFIED	DIMENSIONS ARE IN INCHES	FRACTIONS: 1	2 PLACE DECIMAL: 1	3 PLACE DECIMAL: 1	ANGLES: 1		
REQ.	NEXT ASSY	FIRST USED	DUKANE CORPORATION ST. CHARLES, ILLINOIS U.S.A.		SCHEMATIC DIAGRAM 250W "P" PWR PCB/HTSK. 110-3141		DATE DRAWN 3-7-84
APPLICATION			DRAWN LAF	APP'D [Signature]	NO. 190-2803		S1
			CHECKED [Signature]	ENGR. [Signature]	SHEET 1 OF 1		RS

Repair Parts List – 110-3124 Direct Coupled Driver Board
(Schematic Drawing 190-2779)

Legend	Description	Dukane Part Number
C1	Capacitor, 470pF, 33V, Poly	199-4003-471
C2, 7	Capacitor, 6.8uF, 35V, Tantalum	199-2036-685
C3, 4	Capacitor, 450uF, 100V, Electrolytic	199-2068-457
C5, 8	Capacitor, 0.001uF, 500V, Disc	199-1006-102
C9	Capacitor, 22pF, 630V, 2.5%, Poly	199-4028-220
C12, 13	Capacitor, 150pF, 630V, 2.5%, Poly	199-4028-151
C14, 15	Capacitor, 4700pF, 63V, 2.5%, Poly	199-4004-472
CR1	Diode, Zener, 3.3V	230-19-003R3
CR2	Diode, Zener, 5.1V	230-19-005R1
CR3, 6, 9	Rectifier, Silicon	595-44
Q1, 2, 3, 5	Transistor, 2N5551	720-126
Q4	Transistor, MPS A93	720-105
Q6, 11	Transistor, MJE 340	720-74
Q7, 10	Transistor, MJE 350	720-124
Q8	Transistor, 2N5088	720-49
Q9	Transistor, 2N5086	720-48
R1	Resistor, 15k Ohm, 1/2W, 5%	600-0073-153
R2	Resistor, 150k Ohm, 1/2W, 5%	600-0073-154
R3	Potentiometer, 10k Ohm	601-1004-103
R4, 5	Resistor, 6.8k Ohm, 1/2W, 5%	600-0073-682
R6, 8, 25, 33	Resistor, 1000 Ohm, 1/2W, 5%	600-0073-102
R7	Resistor, 100k Ohm, 1/2W, 5%	600-0073-104
R9	Resistor, 68k Ohm, 1/2W, 5%	600-0073-683
R10	Resistor, 750 Ohm, 1/2W, 5%	600-0073-751
R12, 13	Resistor, 10 Ohm, 1/2W, 5%	600-0073-100
R14, 15	Resistor, 680 Ohm, 1/2W, 5%	600-0073-681
R16	Resistor, 100k Ohm, 1/2W, 1%	600-2005-384
R17	Resistor, 2.8k Ohm, 1/2W, 1%	600-2005-236
R18	Resistor, 5100 Ohm, 1/2W, 5%	600-0073-512
R19	Resistor, 1500 Ohm, 1/2W, 5%	600-0073-152
R20, 27, 32	Resistor, 150 Ohm, 1/2W, 5%	600-0073-151
R21, 23, 28, 29, 30, 31	Resistor, 100 Ohm, 1/2W, 5%	600-0073-101
R22	Resistor, 82 Ohm, 1/2W, 5%	600-0073-820
R26, 34	Resistor, 2 Ohm, 1/2W, 5%	600-0073-2R0



REVISIONS			
ISS	DESCRIPTION	APP'D	DATE



- NOTES
UNLESS OTHERWISE SPECIFIED
1. ALL FIXED RESISTORS ARE IN OHMS (K=1000) 50 WATT, +5%
 2. CAPACITORS ARE IN MICROFARADS
 3. DENOTES FASTON LUG
 4. DENOTES CONNECTOR

SUBSTITUTE VALUES AS SHOWN BELOW

REF. DESIG	110-3152 VALUE	110-3153 VALUE	110-3154 VALUE
R17	2.8K 1%	3.74K 1%	6.81K 1%
R27	150	220	100
R32	150	220	100
CR4	X	X	1N5061
CR5	X	X	JUMPER
CR7	X	X	1N5061
CR8	X	X	1N5061
R24	X	X	SELECTED

X INDICATES NO COMPONENT

SCHEMATIC 190-2779		
COMPONENT	LAST USED	NOT USED
CAPACITOR	C15	
DIODE	CR9	
INT. CKT		
RESISTOR	R34	
TRANSISTOR	Q11	

110-3154	MATERIAL	FINISH
110-3153	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES FRACTIONS: 1/64 2 PLACE DECIMAL: .01 3 PLACE DECIMAL: .002 ANGLES: °	
110-3152	110-3124	
REQ.	NEXT ASSY.	FIRST USED
APPLICATION		

DUKANE CORPORATION
ST. CHARLES, ILLINOIS, U.S.A.

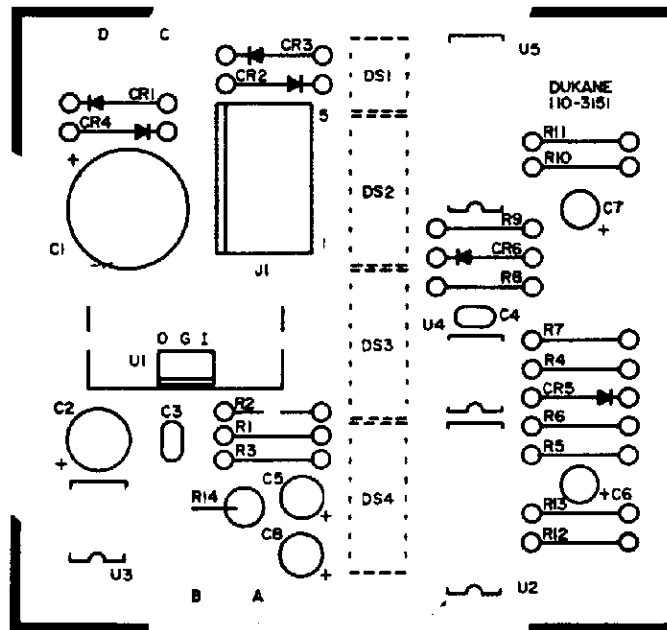
SCHEMATIC
DIRECT COUPLE DRVR. BD.
110-3124

SCALE:
DRAWN BY:
CHECKED:
APP'D:
DATE DRAWN: 2/26/64
PN. 190-2779
SHEET 1 OF 1

51 4-8

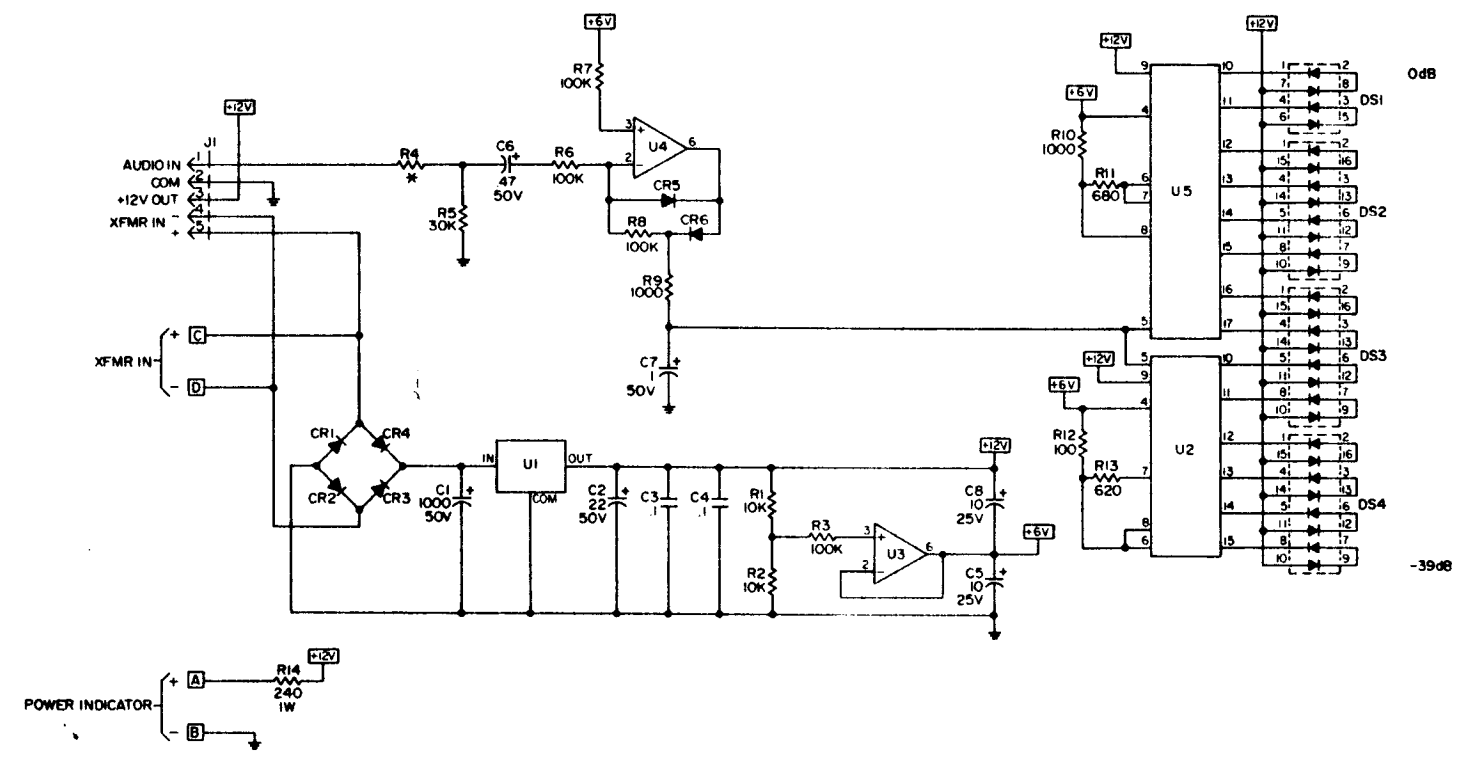
Repair Parts List - 110-3151 Meter Board
(Schematic Drawing 190-2804)

Legend	Description	Dukane Part Number
C1	Capacitor, 1000uF, 50V, Electrolytic	199-2062-108
C2	Capacitor, 22uF, 50V, Electrolytic	199-2062-226
C3, 4	Capacitor, 0.1uF, 50V, Disc	199-9327
C5, 8	Capacitor, 10uF, 25V, Electrolytic	199-2063-106
C6	Capacitor, 0.47uF, 50V, Electrolytic	199-2062-474
C7	Capacitor, 0.1uF, 50V, Electrolytic	199-2062-105
CR1-6	Rectifier, Silicon	595-44
DS1	Diode LED Display pcb	230-8017-201
DS2	Diode LED Display pcb	230-8017-408
DS3, 4	Diode LED Display pcb	230-8017-414
R1, 2	Resistor, 10k Ohm, 1/4W, 5%	600-0039-103
R3, 6, 7, 8	Resistor, 100k Ohm, 1/4W, 5%	600-0039-104
R4	Resistor, 270k Ohm, 1/4W, 5%	600-0039-274
R5	Resistor, 30k Ohm, 1/4W, 5%	600-0039-303
R9, 10	Resistor, 1k Ohm, 1/4W, 5%	600-0039-102
R11	Resistor, 680 Ohm, 1/4W, 5%	600-0039-681
R12	Resistor, 100 Ohm, 1/4W, 5%	600-0039-101
R13	Resistor, 620 Ohm, 1/4W, 5%	600-0039-621
R14	Resistor, 240 Ohm, 1W, 5%	600-0110-241
U1	Integrated Circuit, LM340T12.0	408-39
U2, 5	Integrated Circuit, LM3915	408-86
U3, 4	Integrated Circuit, MC1741SCP1	408-18



REVISIONS			
ISS.	DESCRIPTION	APP'D	DATE

7
4-10

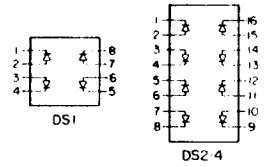


NOTES:
UNLESS OTHERWISE SPECIFIED-
1. RESISTORS ARE IN OHMS, 1/4W, ±5%.
CAPACITORS ARE IN MICROFARADS.
* 2. R4 VALUES AS FOLLOWS:
110-3147 - 270K, 1/4W, 5% (600-0039-274)
110-3148 - 180K, 1/4W, 5% (600-0039-184)
110-3149 - 120K, 1/4W, 5% (600-0039-124)

SYMBOLS:
1. ♂ DENOTES MALE CONNECTOR.
2. □ DENOTES LUG.

DES	LAST USED	NOT USED
RES	R14	
CAP	C8	
DIODE	CR6	
DISPLAY	DS4	
INT CKT	U5	
CONN	J1	
LUGS	D	

DES	TYPE	PART No	+12V	GND
U1	LM340T12	408-39	-	-
U3,4	MC1741	408-18	7	4
U2,5	LM3915	408-86	3	2



MATERIAL			FINISH			
UNLESS OTHERWISE SPECIFIED:		DIMENSIONS ARE IN INCHES	FRACTIONS: -	2 PLACE DECIMAL: -	3 PLACE DECIMAL: -	ANGLES: -
NO.	NEXT ASSY	FIRST USED	DUKANE SCHEMATIC DIAGRAM METER BD ST CHARLES ILLINOIS 60174 110-3151		DATE DRAWN 3-13-84	00
APPLICATION					CHECKED <input checked="" type="checkbox"/> ENGR.	NO. 190-2804