1A1335 3 1A1360 1A1400

REVISIONS			
ISS.	DESCRIPTION	APP'D	DATE
01	C31 WAS 5	RH	1/14/76

NOTES:
UNLESS OTHERWISE SPECIFIED;
1. ALL FIXED RESISTORS ARE HALF WATT.
2. RESISTANCE VALUE IN OHMS K=1000 OHMS.
3. TOLERANCE ON ALL FIXED RESISTORS ±5%.
4. CAPACITANCE VALUE IN MICROFARADS.
5. → DENOTES MALE CONNECTOR ON P.C. BOARD.
6. ⊢ DENOTES FEMALE CONNECTOR.
7. ⊘ DENOTES SCREW TERMINALS.
8. VOLTAGE MEASUREMENTS MADE WITH 20,000 OHMS PER VOLT V.O.M. WITH RESPECT TO COM AND NO INPUT SIGNAL.
9. R46 POT IS NOT A VOLUME CONTROL POT. ADJUST POT SO THAT LESS THAN 0.1 V.D.C. UNDER IDLE IS MEASURED ON PIN 18.

MIC 1
MIC 2
TB101
TB102
TB103 PREC'D
J101 AUX INPUT .4V @ 1K HZ
-15 dBm @ 1K HZ 600Ω INPUT
FERRITE BEAD
1K HZ @ .5VAC, R4 AND R11 SET FOR VAC 18V AT PIN 18
110-1581 P.C. BOARD
600μV (VAC) @ 1K HZ BALANCED 150Ω
SEE TABLE *2
SEE TABLE *1 FOR WIRE CONN.
T102 TB104
P101 105-125V 50-60 HZ
F101 RESET FUSE
S101
T101
IC1
Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q101 Q102 Q103 Q104
CR1 CR2 CR3 CR4 CR5

EBC
BOTTOM VIEW
Q1,Q3 720-49 (2N5088)
Q2,Q4 720-48 (2N5086)
Q5 720-47 (MPS6568)
Q6,Q7,Q8 720-55 (2N5210)

1 2 3 4 5 6 7 8 9 10
TOP VIEW
IC1 408-16
(EBFS-0245)

TABLE *1

WIRE	MODEL	1A1335		1A1360		1A1400	
	TRANS FORMER	710-2155		710-2154		710-2156	
		COLOR	LOAD	COLOR	LOAD	COLOR	LOAD
①	70.7V	RED	142Ω	RED	82Ω	RED	50Ω
②	25V	BLUE	16Ω	BLUE	10.41Ω	BLUE	6.25Ω
③	16Ω		16Ω	YEL	16Ω	YEL	16Ω
④	8Ω	VIO	8Ω	GRN	8Ω	GRN	8Ω
⑤	DRIVE PT		8Ω	VIO	5.55Ω	VIO	2.68Ω
⑥	4Ω	GRN	4Ω	WHT	4Ω	WHT	4Ω
⑦	COM	BLK	COM	BLK	COM	BLK	COM

TABLE *2

COMP Nº	1A1335	1A1360	1A1400
Q1,Q2,Q3,Q4	2N5294	2N3055	2N3055
Q103,Q104	2N3055	2N3055	2N3055
R50, R52	40Ω/5W/5%	.5Ω/5W/5%	.5Ω/5W/5%
R51, R53	.22Ω/5W/5%	.22Ω/5W/5%	.22Ω/5W/5%

404-958

MATERIAL		FINISH	
UNLESS OTHERWISE SPECIFIED:	DIMENSIONS ARE IN INCHES	FRACTIONS ±	2 PLACE DECIMAL ±
3 PLACE DECIMAL ±	ANGLES ±		

REQ.	NEXT ASSY	USED ON
APPLICATION		

DUKANE
ST CHARLES, ILLINOIS 60174

SCHEMATIC DIAGRAM AMPLIFIER
MODEL 1A1335 1A1360 1A1400

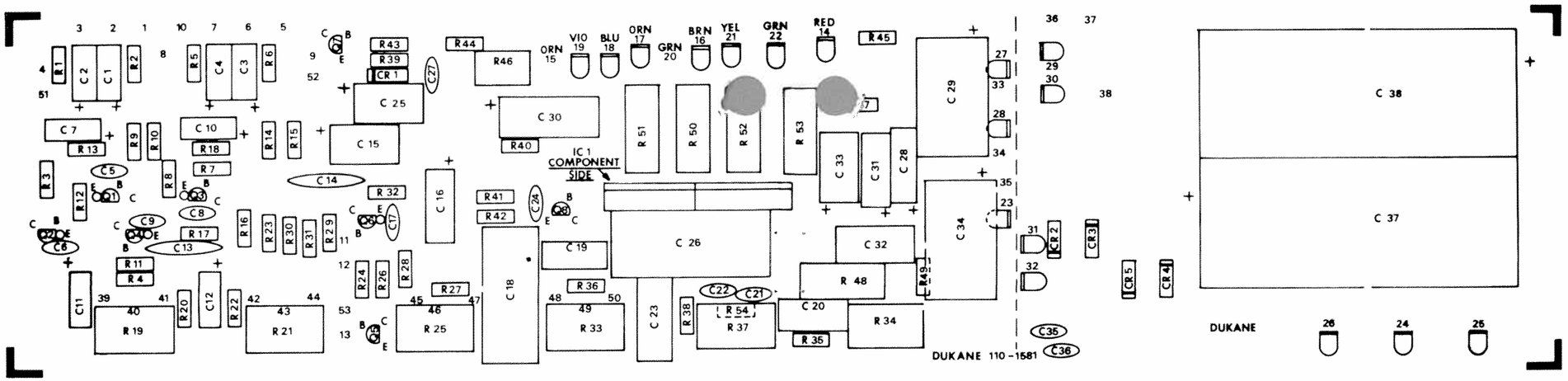
SCALE
DRAWN
APP'D
CHECKED RHW
ENGR.
DATE DRAWN 12-18-75
NO. 190-2072 01
SHEET 1 OF 1 ISS.

NOTES

The Dukane Package Amplifiers are identical, except for the output stages and the power transformer, to allow modern manufacturing processes to keep quality high, while keeping prices low. The following tables indicate, by part description and Dukane part number, the parts that are different in the three amplifiers. The power transformers are different, but since the color coding on all three are exactly the same, the transformers have not been included in the wiring tables.

PARTS TABLE

	1A1335	1A1360	1A1400
F101	Circuit Breaker 0.9A operate, 1.575A break 516-7	Circuit Breaker 1.25A operate, 2.188A break 516-8	Circuit Breaker 2A operate, 3.5A break 516-10
R50	1 ohm, 5%, 5 watt, WW 600-1050-1RO	0.22 ohm, 5%, 5 watt, WW 600-1050-R50	0.5 ohm, 5%, watt, WW 600-1050-R50
R51	0.22 ohm, 5%, 5 watt, WW 600-1050-R22	0.22 ohm, 5%, 5 watt, WW 600-1050-R22	0.22 ohm, 5%, 5 watt, WW 600-1050-R22
R52	1 ohm, 5%, 5 watt, WW 600-1050-1RO	0.5 ohm, 5%, 5 watt, WW 600-1050-R50	0.5 ohm, 5%, 5 watt, WW 600-1050-R50
R53	0.22 ohm, 5%, 5 watt, WW 600-1050-R22	0.22 ohm, 5%, 5 watt, WW 600-1050-R22	0.22 ohm, 5%, 5 watt, WW 600-1050-R22
Q101	Transistor (2N5294) 720-32	Transistor (2N3055) 720-10	Transistor (2N3055) 720-10
Q102	Transistor 2N5294) 720-32	Transistor (2N3055) 720-10	Transistor (2N3055) 720-10
Q103	Transistor (2N3055) 720-10	Transistor (2N3055) 720-10	Transistor (2N3055) 720-10
Q104	Transistor (2N3055) 720-10	Transistor (2N3055) 720-10	Transistor (2N3055) 720-10
T101	Power Transformer 710-4240	Power Transformer 710-4239	Power Transformer 710-4238
T102	Audio Transformer 710-2155	Audio Transformer 710-2154	Audio Transformer 710-2156

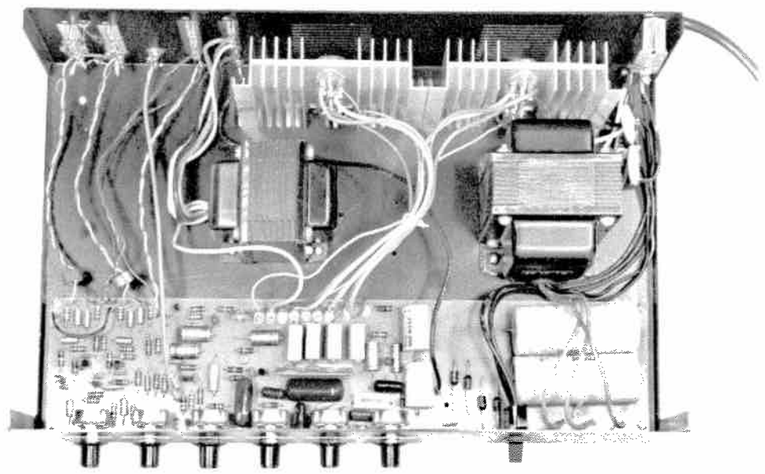


REPAIR PARTS LIST

LEGEND	DESCRIPTION	DUKANE PART NUMBER
C1,2,3,4 7,10,11,12	CAPACITOR, 5 uF, 'lytic, 25 WVDC	199-2021-505
C5,6,8,9, 17,24	CAPACITOR, 470 PF, Disc Ceramic	199-1009-505
C13,14	CAPACITOR, 0.02 uF, Disc Ceramic	199-1012-203
C15,25,33	CAPACITOR, 100 uF, 'lytic, 25 WVDC	199-2021-107
C16	CAPACITOR, 5 uF, 'lytic, 50 WVDC	199-2048-505
C18	CAPACITOR, 0.33 uF, Film, 200 WV	199-4046-334
C19	CAPACITOR, 0.0033 uF, Mylar, 100 WVDC	199-4043-332
C20	CAPACITOR, 0.015 uF, Mylar, 100 WVDC	199-4043-153
C21,22	CAPACITOR, 0.05 uF, Disc Ceramic, 50 WVDC	199-1011-503
C23	CAPACITOR, 0.047 uF, Film, 200 WVDC	199-4046-473
C26	CAPACITOR, 0.68 uF, Film, 200 WVDC	199-4046-684
C27	CAPACITOR, 270 PF, Disc Ceramic	199-1009-271
C28	CAPACITOR, 0.47 uF, 'lytic, 50 WVDC	199-2048-474
C29,34	CAPACITOR, 400 uF, 'lytic, 35 WVDC	199-2035-407
C30	CAPACITOR, 50 uF, 'lytic, 50 WVDC	199-2048-506
C31	CAPACITOR, 2.2 uF, 'lytic, 50 WVDC	199-2048-225
C32	CAPACITOR, 0.1 uF, Film, 200 WVDC	199-4046-104
C35,36	CAPACITOR, 0.01 uF, Disc Ceramic	199-1012-103
C37,38	CAPACITOR, 4000 uF, 'lytic, 50 WVDC	199-2048-408
CR1	DIODE, Zener, 22.0V	230-19-00022
CR2,3,4,5	DIODE, Silicon, 100 PRV	230-21-00100
IC1	INTEGRATED CIRCUIT, Audio Driver	408-16
Q1,3	TRANSISTOR, 2N5088	720-49
Q2,4	TRANSISTOR, 2N5086	720-48
Q5	TRANSISTOR, MPS6566	720-47
Q6,7,8	TRANSISTOR, 2N5210	720-59

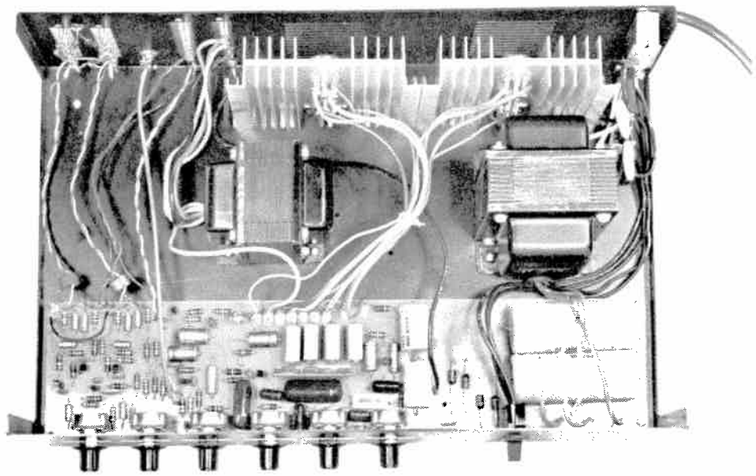
REPAIR PARTS LIST

LEGEND	DESCRIPTION	DUKANE PART NUMBER
R1,2,4,5, 6,7,29	RESISTOR, 470,000 ohm, 5%, 5 watt	600-0073-474
R3,8	RESISTOR, 100,000 ohm, 5%, 1/2 watt	600-0073-104
R9,14	RESISTOR, 82,000 ohm, 5%, 1/2 watt	600-0073-823
R10,13,15, 18, 31	RESISTOR, 680,000 ohm, 5%, 1/2 watt	600-0073-684
R11,16,30	RESISTOR, 22,000 ohm, 5%, 1/2 watt	600-0073-223
R12,17	RESISTOR, 10 ohm, 5%, 1/2 watt	600-0073-100
R19,21,33	RESISTOR, variable, 100,000 ohm	601-340
R20,22	RESISTOR, 47,000 ohm, 5%, 1/2 watt	600-0073-473
R23	RESISTOR, 330 ohm, 10%, 1/2 watt	600-0080-331
R23,27	RESISTOR, 100,000 ohm, 10%, 1/2 watt	600-0080-104
R25	RESISTOR, variable, 300,000 ohm	601-339
R26	RESISTOR, 47,000 ohm, 10%, 1/2 watt	600-0080-473
R28,41	RESISTOR, 220,000 ohm, 5%, 1/2 watt	600-0073-224
R32	RESISTOR, 680 ohm, 5%, 1/2 watt	600-0073-681
R34,37	RESISTOR, variable, 100,000 ohm	601-341
R35	RESISTOR, 3300 ohm, 5%, 1/2 watt	600-0073-332
R36	RESISTOR, 27,000 ohm, 5%, 1/2 watt	600-0073-273
R38	RESISTOR, 4700 ohm, 5%, 1/2 watt	600-0073-472
R39	RESISTOR, 13,000 ohm, 5%, 1/2 watt	600-0073-133
R40	RESISTOR, 820,000 ohm, 5%, 1/2 watt	600-0073-824
R42,43	RESISTOR, 1000 ohm, 5%, 1/2 watt	600-0073-102
R44,47	RESISTOR, 120,000 ohm, 5%, 1/2 watt	600-0073-124
R45,49	RESISTOR, 22 ohm, 5%, 1/2 watt	600-0073-220
R46	RESISTOR, variable, 50,000 ohm	601-1003-503
R48	RESISTOR, 10 ohm, 10%, 5 watt, WW	600-1007-100
R54	RESISTOR, 1.0 ohm, 5%, 1/2 watt	600-0073-133



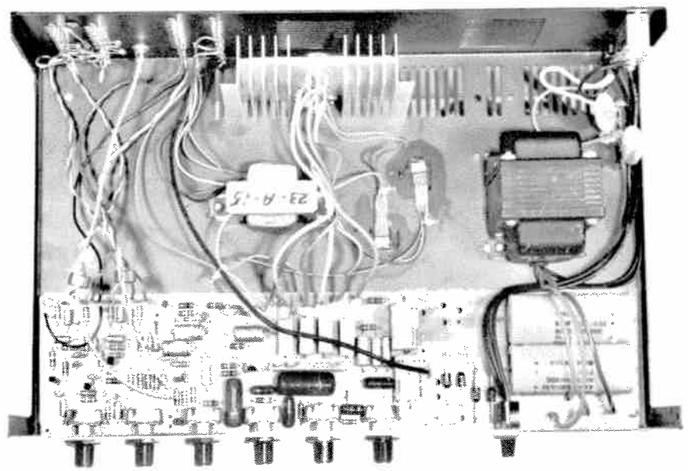
REPAIR PARTS LIST 1A1400

LEGEND	DESCRIPTION	DUKANE PART NUMBER
C101,102	CAPACITOR, 0.001 uF, Disc Ceramic	199-1006-102
C103,104	CAPACITOR, 0.01 uF, 1400 WV, Disc Ceramic	199-9255
J101	RECEPTACLE, Phono Jack	597-222
Q101,102	TRANSISTOR	720-10
Q103,104		
R101,102	RESISTOR, 300 ohm, 1/2 watt, 5%	600-0073-301
R103,104	RESISTOR, 2 ohm, 1/2 watt, 5%	600-0073-2RO
R105,106	RESISTOR, 75 ohm, 1/2 watt, 5%	600-0073-750
R107	RESISTOR, 1,000 ohm, 1/2 watt, 5%	600-0073-102
	ON PCB 110-1581	
R50,52	RESISTOR, 0.5 ohm, 5 watt, 5%, WW	600-1050-R50
R51,53	RESISTOR, 0.22 ohm, 5 watt, 5%, WW	600-1050-R22
T101	TRANSFORMER, Power	710-4238
T102	TRANSFORMER, Audio Output	710-2156
	ASSEMBLY, Printed Circuit Board	110-1581
	MISC. HARDWARE	
	CORD, Power	200-204
TB101,102	TERMINAL STRIP	703-452
TB103,104	TERMINAL STRIP	703-314



REPAIR PARTS LIST 1A1360

LEGEND	DESCRIPTION	DUKANE PART NUMBER
C101, 102	CAPACITOR, 0.001 uF, Disc Ceramic	199-1006-102
C103, 104	CAPACITOR, 0.01 uF, 1400 WV, Disc Ceramic	199-9255
J101	RECEPTACLE, Phono Jack	597-222
Q101, 102	TRANSISTOR	720-10
Q103, 104		
R101, 102	RESISTOR, 300 ohm, 1/2 watt, 5%	600-0073-301
R103, 104	RESISTOR, 2 ohm, 1/2 watt, 5%	600-0073-2RO
R105, 106	RESISTOR, 75 ohm, 1/2 watt, 5%	600-0073-750
R107	RESISTOR, 1,000 ohm, 1/2 watt, 5%	600-0073-102
	ON PCB 110-1581	
R50, 52	RESISTOR, 0.5 ohm, 5 watt, 5%, WW	600-1050-R50
R51, 53	RESISTOR, 0.22 ohm, 5 watt, 5%, WW	600-1050-R22
T101	TRANSFORMER, Power	710-4239
T102	TRANSFORMER, Audio Output	710-2154
	ASSEMBLY, Printed Circuit Board	110-1581
	MISC. HARDWARE	
	CORD, Power	200-204
TB101, 102	TERMINAL STRIP	703-452
TB103, 104	TERMINAL STRIP	703-314



REPAIR PARTS LIST 1A1335

LEGEND	DESCRIPTION	DUKANE PART NUMBER
C101, 102	CAPACITOR, 0.001 uF, Disc Ceramic	199-1006-102
C103, 104	CAPACITOR, 0.01 uF, 1400, Disc Ceramic	199-9255
J101	RECEPTACLE, Phono Jack	597-222
Q101, 102	TRANSISTOR	720-32
Q103, 104	TRANSISTOR	720-10
R101, 102	RESISTOR, 300 ohm, 1/2 watt, 5%	600-0073-301
R103, 104	RESISTOR, 2 ohm, 1/2 watt, 5%	600-0073-2RO
R105, 106	RESISTOR, 75 ohm, 1/2 watt, 5%	600-0073-750
R107	RESISTOR, 1,000 ohm, 1/2 watt, 5%	600-0073-102
	ON PCB 110-1581	
R50, 52	RESISTOR, 1 ohm, 5 watt, 5%, WW	600-1050-1RO
R51, 53	RESISTOR, 0.22 ohm, 5 watt, 5%, WW	600-1050-R22
T101	TRANSFORMER, Power	710-4240
T102	TRANSFORMER, Audio Output	710-2155
	ASSEMBLY, Printed Circuit Board	110-1581
	MISC. HARDWARE	
	CORD, Power	200-204 200-204
TB101, 102	TERMINAL STRIP	703-452
TB103, 104	TERMINAL STRIP	703-314

WIRING TABLE FOR T102 (OUTPUT TRANSFORMER)

TERMINAL		WIRE COLOR CODE		
		1A1335 710-2155	1A1360 710-2154	1A1400 710-2156
70.7V	TB101	RED	RED	RED
25V	TB101	BLUE	BLUE	BLUE
16	TB101	BLUE	YELLOW	YELLOW
8	TB101	VIOLET	GREEN	ORANGE
Pin 19	110-1581	VIOLET	VIOLET	VIOLET
4	TB101	GREEN	WHITE	WHITE
COMMON		BLACK	BLACK	BLACK

APPENDIX

here's how to get more out of your DUKANE PACKAGE AMPLIFIERS

If the loudspeaker arrangement is poor, the best amplifier will seem to sound poor. Several physical factors must be considered in loudspeaker installation and the text that follows is selected to assist in achieving better sound system performance. The chief fundamentals of sound system installation are covered with numerous suggestions for the widest possible use and best operation of your Dukane Package Amplifier.

Space prevents a very extensive, all-inclusive cyclopedic treatment of audio systems. In unusual or special situations, it might be advisable to consult a competent audio engineer or technician for installation assistance. In the majority of instances, however, your Dukane Package Amplifier, installed as outlined here, will perform to the pleasure and satisfaction of your most particular audience.

CONE OR HORN LOUDSPEAKERS. There are three basic considerations in deciding between paper cone or horn type loudspeakers. (1) available audio power; (2) number of loudspeakers to comprise a system (area coverage); (3) placement (indoors or outdoors). In addition, special frequency-dividing speaker arrangements are also available. The table below suggests some practical loudspeaker selections:

AMPLIFIER POWER LEVEL	NO. LOUDSPEAKERS FOR INDOOR USE	NO. LOUDSPEAKERS FOR OUTDOOR USE
10 to 20 watts	Up to four 12-inch	One weatherproof 8-inch trumpet
20 to 35 watts	Up to six 12-inch	Two w.p. 8-inch trumpets
35 to 60 watts	Up to ten 12-inch	Up to four w.p. 8-inch trumpets
60 to 100 watts	For more than ten	Up to four w.p. 12-inch trumpets

A speaker system requires consideration of the size and shape of the area to be covered, construction materials (reflective or absorbent of sound), surrounding noise level loudspeakers are expected to overcome, normal use of system (music or speech, or both), sound quality requirements and, finally, cost of installation.

LOUDSPEAKER PLACEMENT. The most important considerations in loudspeaker installation are placement and proper connections. While it is understood that there are nearly an endless variety of surroundings and interiors into which a sound system may be installed and expected to perform adequately. Only the basic considerations shall be described here. Ingenuity will suggest variations in exceptional instances.

INDOOR SYSTEMS. For indoor loudspeaker systems, speakers may be mounted flat on the wall or the axis of the speakers may be turned or tilted to radiate sound at an angle with the wall. Speakers may also be mounted in corners of the room. Alcoves, balconies, cubicles, room dividers and adjoining rooms each may require special attention for sound coverage, including additional loudspeakers to prevent dead spots. Sound absorption or reverberation due to construction and interior furnishings can also require special attention.

TREBLE Tone Control. The center 0 position provides a flat treble frequency response. Turning this control counterclockwise reduces the level of the treble response; clockwise rotation of this control increases the level of the treble response.

B. Operation Suggestions

ACOUSTIC FEEDBACK. Where loudspeakers are located too near the microphone, sound from the speaker can re-enter the microphone to cause acoustic feedback (howling and ringing). To overcome this situation, either reposition the microphone or loudspeakers to obtain more distance between them, or gradually turn down amplifier MASTER volume control to stop the feedback.

While it may be possible to reset the BASS and TREBLE tone controls to partially overcome some of the cause of acoustic feedback, this is not the most effective remedy if it merely causes voices or music to "grumble" in the auditorium, making listening an uncomfortable experience for the audience. In order to preserve good reproduction of spoken words, it is important to provide a good balance between bass and treble, or else speech becomes indistinct and music is all booms and rumble.

HUM. Objectionable hum is introduced into the amplifier input if there is a defective connection between the microphone or auxiliary program source and the amplifier terminals. See paragraph B, Section II, AC POWER AND AMPLIFIER GROUNDING. It is a good practice to connect flexible braided bonding cable between the separate chassis of amplifier, tuner, phono, recorder, etc., especially where some of these units are housed in custom wood or plastic cases. Audio shields should be grounded at one end only, preferably at the amplifier ground terminal.

USE GOOD MICROPHONE TECHNIQUE. Don't shout into the microphone. Speak directly into the microphone with a normal conversational level and tone of voice. Keep six inches to one foot away from the microphone - heavy breathing and puffs and pops are most distracting and annoying to hear. Speak distinctly and deliberately with an even pace and loudness. Try to use short phrases; pause frequently - after each phrase - listen briefly for your own echo. Then resume speaking. This breaks up reverberation which otherwise can make listening difficult. Sound the final "t" and "d", the final consonant of each spoken word.

SECTION V - MAINTENANCE AND REPAIR

Although standard parts are used in this Dukane Package Amplifier, the Service Department for Dukane Corporation maintains a replacement supply of special parts that are listed on the following pages and are available through your authorized Dukane distributor or dealer.

Transistors and diodes do not require periodic checking. If it is suspected that a transistor or a diode has caused this amplifier to operate improperly, the amplifier should be referred to a qualified electronic (hi-fi, radio or television) repair technician in your vicinity. The wrong choice of semiconductor or wrong installation can cause further part failures or amplifier damage. Replacement of parts on the printed circuit board should be performed only by an authorized skilled technician for it is extremely easy to damage the circuit foil on these boards.

SECTION IV - OPERATION

A. Front Panel Controls

POWER. The primary AC power for this amplifier is controlled by the power switch. The pilot light is provided to indicate that power is on.

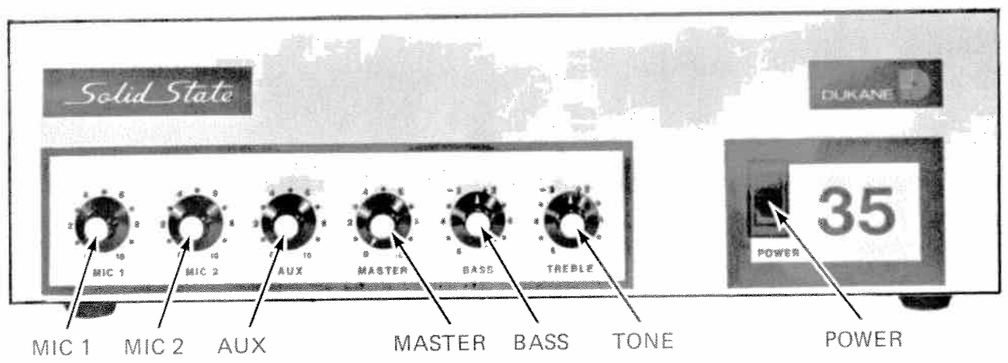


FIGURE 2

MIC 1; MIC 2. The low-impedance microphone input level is adjusted with this control. In general, this control is used to regulate the input to this amplifier to compare favorably with the auxiliary program input levels. To increase microphone input level, turn this control clockwise. When not in use, turn this control to zero.

AUX. The high-impedance auxiliary input level is adjusted for the desired program level with this control. To increase auxiliary input level, turn this control clockwise. When not in use, turn this control to zero.

MASTER. Use the MASTER volume control to regulate the overall amplifier volume rather than separately changing either MIC or AUX volume controls. Initially set MASTER volume control to maximum clockwise. Then set MIC and AUX input controls each to the highest level likely to be used, mixing inputs as desired. In general, this will be at a level too loud for comfortable listening. Gradually lower the amplifier output with the MASTER volume control for the desired listening level.

BASS Tone Control. The center 0 position provides a flat bass frequency response. Turning this control counterclockwise reduces the level of the bass response; clockwise rotation of this control increases the level of the bass response.

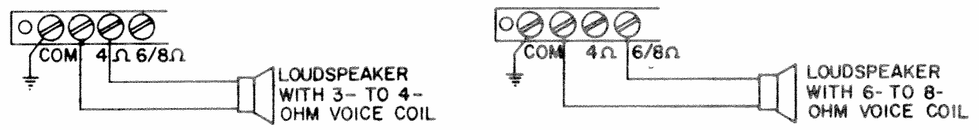
OUTDOOR SYSTEMS. For outdoor loudspeaker systems, the area to be covered and the direction of sound comprise the main problems with echoing and delayed "re-sound" often accompanying these. In general, higher amplifier power levels and directional trumpets are required for adequate outdoor coverage. Sound pressure is reduced almost 75 percent as the distance from the loudspeaker is doubled; directivity is increased as the speaker size is increased.

LOUDSPEAKER CONNECTIONS. Proper impedance matching and loudspeaker phasing are very important in loudspeaker installation. Correct impedance matching will assure that loudspeakers obtain the desired level of audio power. In-phase loudspeaker positioning furnishes audio reinforcement, but out-of-phase loudspeakers can oppose each other and cancel audio output, reducing over-all system coverage and effectiveness.

Two methods of connecting loudspeakers can be used: (1) Direct connections between the amplifier output terminals and the voice coil terminals of the loudspeaker, or (2) with a speaker line matching transformer between the amplifier and the loudspeaker. Direct connections between amplifier output and loudspeaker can be used where distance between the amplifier and loudspeaker is less than 200 feet and simple, low-impedance loudspeakers are used.

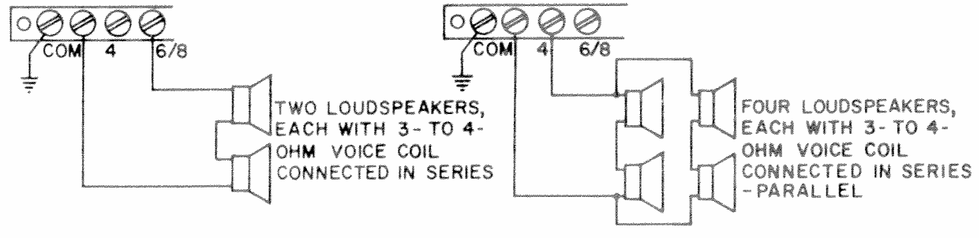
The second method is used where speaker lines are more than 200 feet long, where speakers are to operate at different power levels, and where it is important to keep line loss to a minimum. A speaker line matching transformer is used at each loudspeaker.

IMPEDANCE MATCHING WITHOUT TRANSFORMERS. In order to obtain the best transfer of power from amplifier output to loudspeaker, total speaker impedance must equal the impedance that is labeled at the amplifier output terminals. Make single speaker connections as shown below.

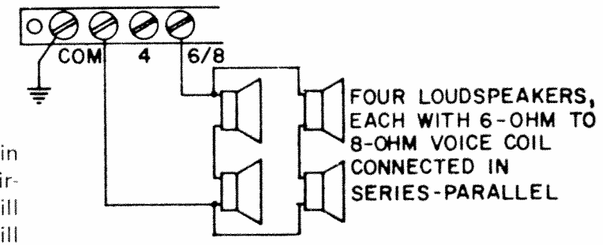


Connecting a Single Loudspeaker Directly to Amplifier

When more than one loudspeaker will comprise a transformerless sound system, loudspeakers may be connected in series to match amplifier output impedance or speakers may be connected in parallel or in series-parallel to match output impedance.



Connecting Two or More Loudspeakers Directly to Amplifier



Connecting more than two speaker lines in parallel is not recommended because circulating currents in the speaker line will be increased. Increased line current will produce increased speaker line voltage drop or loss.

POWER DISTRIBUTION TRANSFORMERLESS. In a series loudspeaker system, all speakers alike, equal power distribution will exist. In a series system of unlike speaker impedances, the higher impedance speakers will use more power. In a parallel speaker system with like speakers, equal power distribution will exist; with unlike speakers, the lower impedance speakers will use more power.

Where loudspeakers are connected transformerless, speaker cable more than 100 feet long should be at least AWG #16 wire; speaker cables 50 to 100 feet should be AWG #18 wire.

SPEAKER CONNECTION WITH MATCHING TRANSFORMERS. The use of speaker line matching transformers with long speaker lines permits the use of smaller speaker wire without large line losses. In general, speaker line matching transformers are regarded as constant-voltage transformers. The transformer primary is made to match the constant-voltage output of the amplifier, i.e., either 25 volts or 70 volts with taps for various loudspeaker power levels (1/2 watt, 1 watt, 2 watts, etc.). The secondary is made to match the speaker voice coil impedance.

CONSTANT-VOLTAGE LOUDSPEAKER SYSTEM. The speaker line matching transformer in the constant-voltage speaker line system permits either adding more loudspeakers, changing the power level of separate loudspeakers, or even disconnecting any loudspeaker without disrupting the program to the remaining loudspeakers in the system. A favorable amplifier output load exists if the total power absorbed by the loudspeakers is equal to or less than the full rated output of the amplifier.

Choose a speaker line matching transformer which most nearly suits loudspeaker impedance, desired loudspeaker power level, and provides desired speaker line voltage termination. See chart below for typical Dukane speaker line matching transformers which are available on special order.

DUKANE NO.	SPKR. LINE	SPKR. POWER	SPKR. IMPED.
710-3070	70V	15W to 50W	2-4 ohm; 6/8 ohm
	25V	1/2W to 2W	2-4 ohm; 6/8 ohm
710-3071	70V	5W to 30W	2-4 ohm; 6/8 ohm
710-3075	25V	1/2W to 2W	2-4 ohm; 6/8 ohm
710-3076	70V	1/2W to 4W	2-4 ohm; 6/8 ohm
710-3077	25V	5W to 20W	2-4 ohm; 6/8 ohm
710-3095	70V	1/2W to 4W	2-4 ohm; 6/8 ohm
710-3096	25V	1/2W to 4W	2-4 ohm; 6/8 ohm

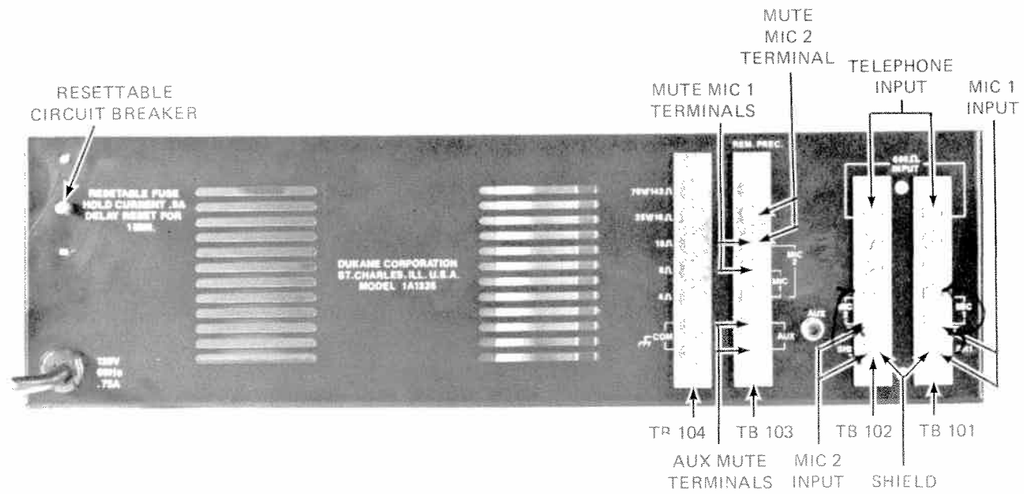


FIGURE 1

Shielded two-conductor microphone cable may be up to 500 feet long without objectionable hum pickup, depending on microphone sensitivity.

TELEPHONE. A 600 ohm input from a paging adapter may be connected to terminal 1 on TB 101 and TB 102 with the shield to terminal 6 on TB 102. When the telephone input is used, it is controlled by MIC 2 controls, and a microphone should NOT be connected to the MIC 2 input.

Shielded twisted-pair cable may be up to 500 feet long without objectionable hum pickup.

D. Output Connections

LOUDSPEAKERS. This amplifier is designed for use with 4-ohm, 8-ohm or 16-ohm loudspeakers and 25-volt or 70-volt (constant-voltage) speaker line systems (see special speaker installation appendix at the back of this manual).

Make loudspeaker connections to terminal strip TB 104 on the rear panel of this amplifier (see Fig. 1). Connect one of the twisted pair speaker leads to the appropriate impedance (or voltage) terminal and the other lead to the COM terminal.

E. Precedence Control Connections

A switch closure causes muting of at least 50 dB to the input channel to be muted. Any other input will be unaffected and heard at its original level. The cable should be a twisted pair, and may be an unlimited length. The terminals to mute MIC 1 input are terminals 4 and 5 on TB 103 (see Fig. 1). The terminals to mute MIC 2 input are terminals 3 and 5 on TB 103, and the terminals to mute an auxiliary input are terminals 6 and 7 on TB 103.

SECTION II - UNPACKING

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

SECTION III - INSTALLATION

A. Cable Lengths Between Amplifier and Other Units

For high-impedance units such as tape players, record players, etc., use shielded single-conductor cable for connection to this amplifier. Keep cable lengths less than 10 feet.

For low-impedance microphone input, use shielded two-conductor cable from microphone. Depending upon sensitivity of microphone, cable may be 500 feet long.

For output units, standard No. 18 AWG "juke box" speaker wire may be used for output connections; for 4-ohm output, up to 100 feet of speaker wire may be used without noticeable loss of speaker volume. As speaker impedance increases, i.e., 8-ohms, 16-ohms, 25-volt or 70.7 volt, greater lengths of speaker wire can be used without introducing noticeable loss.

For all cables, input cables must be kept away from speaker cables to prevent inductive feedback and kept away from power lines or transformers to prevent objectionable hum pickup. Keep speaker cables away from power cable to prevent inductive hum pickup which could be heard at the speaker.

B. AC Power and Amplifier Grounding

A three-wire AC power line cord is provided with this amplifier. The power line cord should be connected into a standard three-wire grounded outlet for 105 to 125 volt, 50-60 Hz AC power. If a three-wire outlet is not available, a three-wire adapter such as Leviton No. 5017 should be used to adapt a two wire outlet for a three-wire plug. The pigtail wire from the adapter should be fastened under the head of the screw which holds the wall plate on the receptacle.

FOR MAXIMUM SAFETY, this amplifier must be properly connected to electrical system ground. In areas where the wall outlet box and wall plate are NOT connected to ground, it will be necessary to connect a drain wire between the screw terminal marked for ground and a cold water pipe ground or a steam pipe for ground.

C. Input Connections (when identifying input terminals, refer to Fig. 1)

MICROPHONE. A low-impedance microphone (150 to 600 ohms) may be connected to MIC 1 or MIC 2 terminals. Use MIC 1 input when only one microphone is in use. MIC 1 will be connected to terminals 3 and 4 of TB 101 with the shield going to terminal 6. MIC 2 connects to terminals 3 and 4 of TB 102 with the shield to terminal 6.

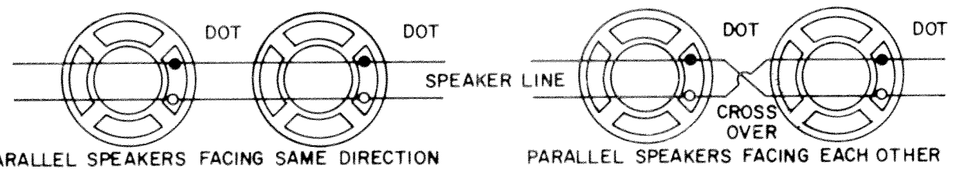
AMPLIFIER TO SPEAKER MISMATCH. It is always recommended that proper regard be given to loudspeaker impedance and the proper choice of amplifier output tap. To connect an 8-ohm speaker to the 4-ohm output of an amplifier will reduce the amplifier power to the speaker by about one-half. Conversely, connecting a 4-ohm speaker to the 8-ohm amplifier output is to be avoided; this kind of mismatch between amplifier and loudspeaker imposes a serious overload for the amplifier and its output transistors.

LOUDSPEAKER PHASING. In areas where more than one loudspeaker is to be used for sound system coverage, loudspeaker phasing must be observed in order to minimize cancellation effects. Loudspeakers can oppose one another within and around a room and thereby lower the level and the tone quality of sound in the room as well as introduce noticeable distortion into the sound in the room. A fast check is made by simply temporarily disconnecting one of the offending loudspeakers and making comparative listening tests.

Where the loudspeakers face in the same direction, the speakers are in phase when the cone and voice coil of each move outward and inward at the same time. But, where two loudspeakers face each other, the cone and voice coil of one should move outward as the cone and voice coil of the other is moving inward.

A simple and fast method for checking loudspeaker phase entails the use of a 1.5-volt dry-cell fitted with a handy pair of clip leads. Do this for each speaker in the system:

1. Connect the negative lead from the dry-cell to one of the loudspeaker terminals.
2. Carefully place fingertips on paper cone of loudspeaker near outer rim and momentarily touch other speaker terminal with other dry-cell lead.
3. If the cone movement is outward, mark the terminal which is connected to the positive dry-cell lead. If the cone movement is inward, reverse the dry-cell connections to the loudspeaker and mark the terminal which is connected to the positive dry-cell lead. A small self-sticking paper dot is ideal for terminal marking.



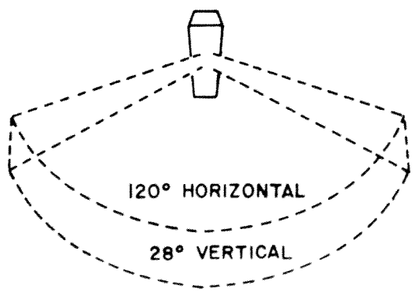
BALANCED SPEAKER LINE. For most sound systems, standard "juke box" wire to loudspeakers will furnish quite satisfactory performance: two conductor, unshielded cable is customarily used for speaker line installations of this kind. One wire is connected to the desired impedance or voltage terminal and the other wire is connected to the amplifier common terminal which may be connected to cold water pipe ground through amplifier chassis.

More elaborate systems, however, may require that, in order to eliminate objectionable hum pickup or program cross talk, etc., balanced speaker lines be used. This is especially recommended where long speaker lines run along other long speaker lines or even along long microphone or program input lines. Wherever possible, these conditions should be corrected by keeping program input lines and speaker lines separated. Where balanced speaker lines must be installed, shielded two-conductor cable should be used, shield connected to amplifier ground. Connect one conductor to the desired impedance or voltage terminal and the other wire is connected to the amplifier common. In a balanced line, any induced hum or cross talk currents which are developed in one side of the line are immediately cancelled by an equal and opposite current in the other side of the line, greatly reducing these interfering signals. The outer shield will more effectively eliminate induced signals, thus protecting the conductors inside the shield.

SOUND COLUMNS. In addition to standard paper cone loudspeakers or outdoor weatherproof trumpets, sound columns are another variety of useful reproducer for auditoriums, arenas, and theaters which have a large area to cover and it is desired to use a minimum number of speakers. A sound column may consist of a number of round or rectangular loudspeakers enclosed in a long cabinet. Depending upon the size and number of loudspeakers within the column, the output of the sound column can range from 25 to 200 watts peak music power. The terminal strip on the back of the cabinet represents the terminal impedance of the combined unit, usually between 8 to 16 ohms.

A sound column is arranged to combine the acoustic output in front of the cabinet grille. The sound effect and projection of the sound column is far greater than the projection of the individual cone speakers. Distinct sound can be heard as far away as from 100 to 200 feet from the sound column.

A typical acoustic pattern of the sound column is shown below.



TYPICAL DISPERSION PATTERN OF A SOUND COLUMN

SECTION I - GENERAL DESCRIPTION

The Dukane Package Amplifiers have inputs for two microphones and one auxiliary program source, e.g., AM/FM radio tuner, tape player, or record player with a crystal or ceramic cartridge.

Two microphone volume controls and a volume control for auxiliary program input are provided. A master volume control maintains the desired output level of this amplifier. Separate bass and treble tone controls are also provided.

Output connections are provided for 25-volt and 70-volt speaker line systems and for 4-, 8-, and 16-ohm loudspeakers and speaker systems.

TECHNICAL SPECIFICATIONS

RATED POWER OUTPUT:
- 1A1335 - 35 watts.
- 1A1360 - 60 watts.
- 1A1400 - 100 watts.

DISTORTION:
- Less than 0.3%; 1000 Hz at full output. (Less than 1.5%; 100 to 10,000 Hz at rated output.)

FREQUENCY RESPONSE:
- 50 Hz to 15,000 Hz ± 2 dB.

NOISE LEVEL:
- Mic: At least 55 dB below rated output.
- Aux: At least 70 dB below rated output.

INPUT SENSITIVITY:
- Mic input: 600 microvolts.
- Aux input: 0.4 volts.
- Telephone (input 2 only): -15 dBm (600 ohms, 137.7 millivolts).

INPUT IMPEDANCE:
- Mic: Balanced 200 ohm, nominal.
- Aux: 100,000 ohms.

LOAD IMPEDANCES:
- 4, 8, 16 ohms and 25 volt and 70.7 volt.

OVERLOAD PROTECTION:
- Rear panel mounted, resettable circuit breaker.

CONTROLS:
- Two mic volume controls.
- One aux volume control.
- One master volume control.
- One treble, one bass tone control.
- AC power switch.

TONE CONTROL RANGE:
- Bass: +8 dB to -12 dB at 50 Hz.
- Treble: +8 dB to -12 dB at 10,000 Hz.

PRECEDENCE CONTROLS:
- Individual muting circuits for each input, at least 50 dB.

POWER REQUIREMENTS:
- 1A1335 105 to 125 volts, 50-60 Hz 90VA.
- 1A1360 105 to 125 volts, 50-60 Hz 204VA.
- 1A1400 105 to 125 volts, 50-60 Hz 270VA.

CONNECTORS:
- Mic inputs: Screw terminals.
- Aux input: RCA phono type (use Dukane 570-9618 plug).
- Telephone: Screw terminals (input 2 only).
- Speaker output: Screw terminals.

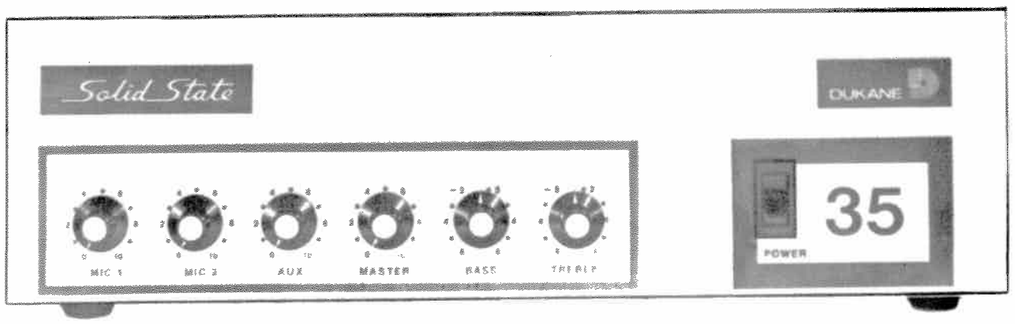
ACCESSORIES:
- Rack mount kit - 438-296 (standard EIA rack panel size). 5-1/4" (13.3 cm) high and 19" (48.3 cm) wide.
- 438-285 Front Panel Security Kit.

DIMENSIONS:
- 16" (40.6 cm) wide, 5" (12.7 cm) high, 10-3/4" (27.3 cm) deep.

FINISH:
- Black painted finish with stainless steel front panel.

WEIGHT:
- 1A1335 - 15.5 pounds (7.0 kg).
- 1A1360 - 18.5 pounds (8.4 kg).
- 1A1400 - 19.5 pounds (8.8 kg).

FRONT VIEW



REAR PANEL VIEW

This Dukane Package Amplifier is warranted to be free from defective material and workmanship for a period of one year from date of shipment from the factory (with the exception of transistors, rectifiers, and diodes which are warranted for a period of ninety days from date of shipment from the factory). Our obligation under this warranty is limited to repairing or replacing, with reasonable promptness, by authorized Dukane distributors within the specified period. This warranty does not include labor or liability for any indirect or consequential damage.

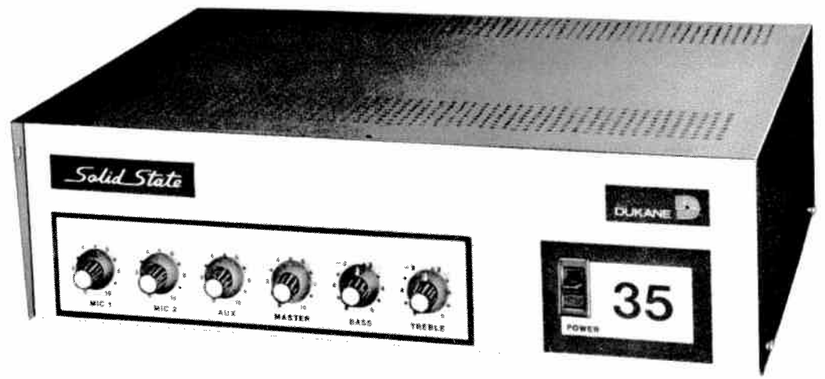
Transportation charges to and from designated repair point will be at purchaser's expense.

This warranty does not extend to any of our products which have been subjected to misuse, improper storage, neglect, accident, improper installation or application, nor shall it extend to units which have been repaired or substantially altered outside of our factory, nor to any accessories used therewith not of our manufacture.

DUKANE

INSTALLATION AND
OPERATING INSTRUCTIONS

DUKANE
PACKAGE AMPLIFIERS
MODELS 1A1335-35 WATT
1A1360-60 WATT
1A1400-100WATT



PLEASE READ THOROUGHLY BEFORE INSTALLING OR OPERATING THIS AMPLIFIER. SEE SPECIAL BACK SECTION WITH IMPORTANT LOUDSPEAKER INSTALLATION INFORMATION, BEGINNING ON PAGE 1A.

401-330
PRICE $1.25

DUKANE CORPORATION | COMMUNICATIONS SYSTEMS DIVISION | ST. CHARLES, ILLINOIS 60174