No. 124 TYPE AMPLIFIER

COMMERCIAL PRODUCTS
APPARATUS REFERENCE SHEET

NO 1-25
AMPLIFIERS
124 TYPE

4-15-41

GENERAL

The 124-type amplifiers will fit a variety of requirements, depending on the input circuit arrangement used. Certain characteristics common to all 124-type amplifiers are given below, and the individual variations are then indicated.

This sheet gives a condensation of characteristics. For more details refer to the individual sheet on the particular amplifier as follows:

Amplifier	Apparatus Reference Sheet No.
124A	1-26
124B	1-27
124C	1-28
124D	1-29
124E	1-30
103C	1-31
103D	1-32

Power Supply Requirements

105-125 volts, 50-60 cycles, 1.1 amperes, 105 watts maximum for 12 watt output connection.
105-125 volts, 50-60 cycles, 1.25 amperes, 125 watts maximum for 20 watt output connection.

Output Power

12 Watts, 2.0% total Harmonics at 400 cycles into nominal load impedence. May be reconnected from 20 watts with 5% harmonic content.

Load Impedance

Nominal load impedance of 600, 150, 30, 16, 7.5 or 1.75 ohms. Will operate satisfactorily into any load between 1 and 1200 ohms. See schematic on other side of sheet for proper strapping for load impedance to be used.

Gain

Values given are with W.E. tubes. Subtract .7 db for RCA Tubes.

Internal Output Impedance

3/4 of nominal load impedance.

Output Noise

Unweighted, -37 db relative to .001 watt for 124A,B,C,E.
-8 db relative to .001 watt for 124D.

Maximum Input Level

The figures given below for the maximum input voltages permitted with the different amplifiers are based on the limitation due to amplifier overload, input transformer harmonic generation, or heating of the input network, whichever occurs at the lowest voltage.

Size

124-type amplifiers, 19"x7"x7"
103-type amplifiers, 20"x8-1/2"x10"

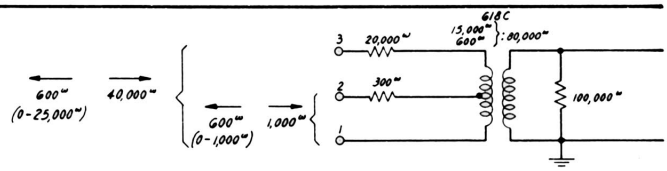
Weight

124-type amplifiers, 20 pounds
103-type amplifiers, 40 pounds

Power Switch

A power switch is supplied on all except the 124A amplifier.

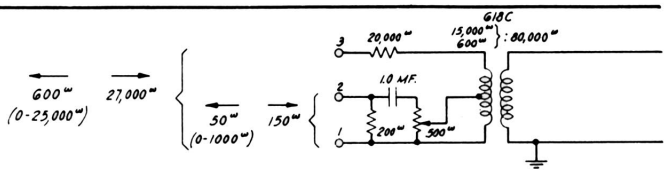
124A Amplifier
Gain 50 db - Bridging Input - Terminals 1 & 3
63 db - High Gain Input - Terminals 1 & 2
Gain Control None
Maximum Input .75V Single freq-Bridging Input
.10V Single freq-High Gain Input
Use General purpose where no gain control is required. Replaces 94C Amplifier.



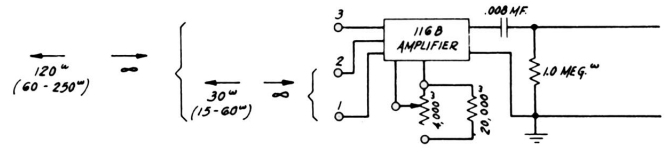
124B Amplifier SD-95104-01 Systems Circuit
Used for telephone line application - See reverse side of this sheet

---

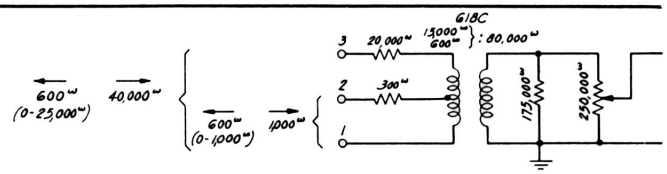
124C Amplifier SD-96330-01 -Systems Circuit
Gain 50 db - Bridging Input - Terminals 1 & 3
58 db - High Gain Input - Terminals 1 & 2
Gain Control 45 db Continuously Variable - High Gain Input Only.
Maximum Input .85V Single freq. Bridging Input
5.0V Single freq. High Gain Input
Use Used wherever a carbon microphone source is required. Replaces 109A and B Amplifiers. Used in the 103C Amplifier which replaces the 103A and B Amplifiers.



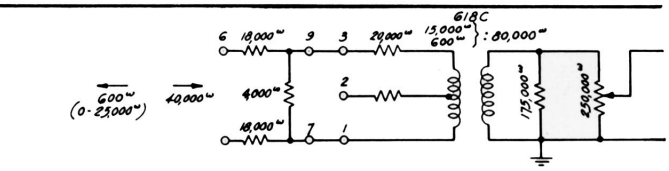
124D Amplifier
Gain 107 db
Gain Control 35 db Continuously Variable
Paralleled remote control may be used if desired.
Maximum Input .008V Single freq. terms 1 & 2
.016V Single freq. terms 1 & 3
Use General purpose where high gain is required. Replaces 86 type and 92 type Amplifiers. Used in 103D Amplifier.



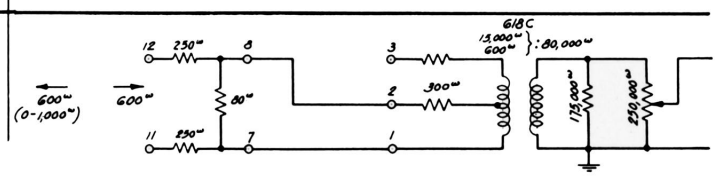
124E Amplifier - Input Arrangement #1
Gain 50 db - Bridging Input - Terminals 1 & 3
63 db - High Gain Input - Terminals 1 & 2
Gain Control 38 db in 2 db steps
Maximum Input 25V single freq. Bridging Input
3V single freq. High Gain Input
Use General purpose where gain control is desired. Replaces 94D Amplifier.



124E Amplifier - Input Arrangement #2
Gain 30 db
Gain Control 38 db in 2 db steps
Maximum Input 100V Single frequency
Use Same as for Input Arrangement #1 when higher input levels are available.

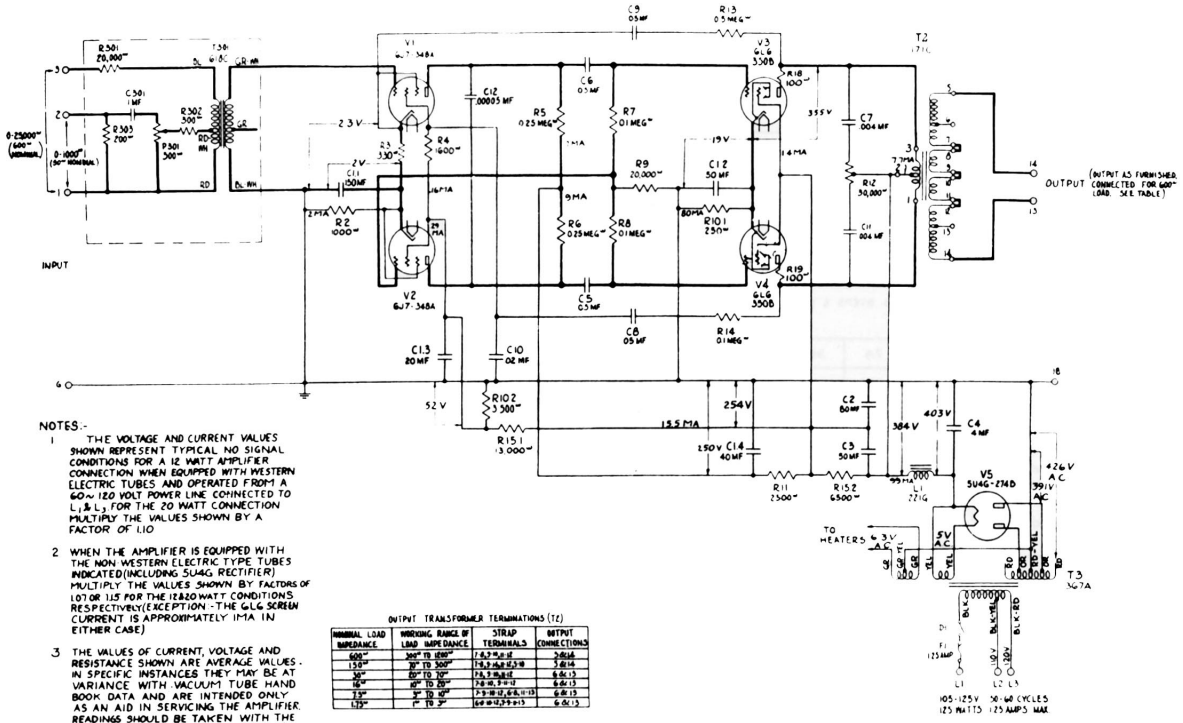


124E Amplifier - Input Arrangement #3
Gain 43 db
Gain Control 38 db in 2 db steps
Maximum Input 10V Single freq.
Use Same as for Input Arrangement #1 when higher input levels are available and where a 600 ohm internal input impedance is desired.



No. 124 TYPE AMPLIFIER

SCHEMATIC



NOTES:-

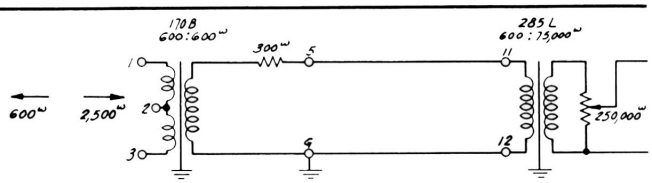
1. THE VOLTAGE AND CURRENT VALUES SHOWN REPRESENT TYPICAL NO SIGNAL CONDITIONS FOR A 12 WATT AMPLIFIER CONNECTION WHEN EQUIPPED WITH WESTERN ELECTRIC TUBES AND OPERATED FROM A 60~ 120 VOLT POWER LINE CONNECTED TO L_1 & L_2. FOR THE 20 WATT CONNECTION MULTIPLY THE VALUES SHOWN BY A FACTOR OF 1.10
2. WHEN THE AMPLIFIER IS EQUIPPED WITH THE NON WESTERN ELECTRIC TYPE TUBES INDICATED (INCLUDING 5U4G RECTIFIER) MULTIPLY THE VALUES SHOWN BY FACTORS OF 1.07 OR 1.15 FOR THE 12&20 WATT CONDITIONS RESPECTIVELY (EXCEPTION - THE GLG SCREEN CURRENT IS APPROXIMATELY 1MA IN EITHER CASE)
3. THE VALUES OF CURRENT, VOLTAGE AND RESISTANCE SHOWN ARE AVERAGE VALUES. IN SPECIFIC INSTANCES THEY MAY BE AT VARIANCE WITH VACUUM TUBE HAND BOOK DATA AND ARE INTENDED ONLY AS AN AID IN SERVICING THE AMPLIFIER. READINGS SHOULD BE TAKEN WITH THE EQUIVALENT OF A 'VOLT-OHMMETER' WHOSE RESISTANCE IS AT LEAST 1000 OHMS PER VOLT.

OUTPUT TRANSFORMER TERMINATIONS (T2)

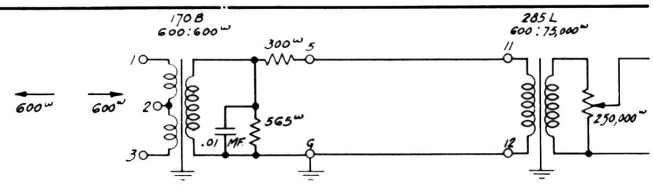
NOMINAL LOAD IMPEDANCE	WORKING RANGE OF LOAD IMPEDANCE	STRAP TERMINALS	OUTPUT CONNECTIONS
600~	300~ TO 1000~	1-8, 7-9	5-6&14
150~	70~ TO 300~	7-9, 2-4&10-12	5-6&14
30~	20~ TO 70~	7-9, 2-4&10-12	6-6&13
16~	10~ TO 20~	7-9, 2-4&10-12	6-6&13
7.5~	5~ TO 10~	7-9, 2-4, 6-6&10-12	6-6&13
1.75~	1~ TO 3~	6-6&10, 7-9, 2-4&13	6-6&13

SCHEMATIC
124C AMPLIFIER
(TYPICAL OF 124 TYPE AMPLIFIERS)

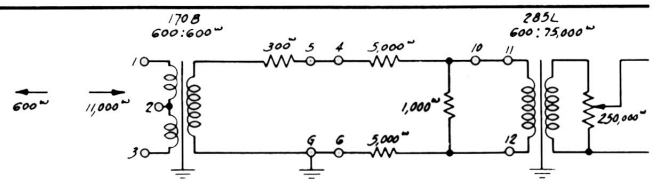
124B Amplifier - Input Arrangement #1
Gain 46.6 db
Gain Control 38 db in 2 db steps
Maximum Input 2.4V single freq.
Use Primarily designed for associate company use. Meets Bell System longitudinal balance requirement.



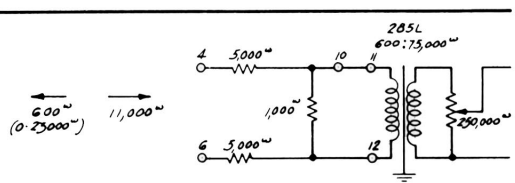
124B Amplifier - Input Arrangement #2
Gain 60.6 db
Gain Control 38 db in 2 db steps
Maximum Input 2.4V single freq.
Use Same as for Input Arrangement #1 where an internal input impedance of 600 ohms is required.



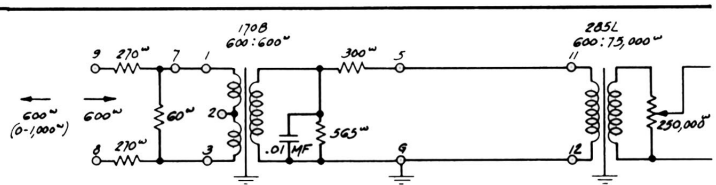
124B Amplifier - Input Arrangement #3
Gain 45.4 db
Gain Control 38 db in 2 db steps
Maximum Input 2.4V single freq.
Use Same as Input Arrangement #1 where a high internal input impedance is required for bridging purposes.



124B Amplifier - Input Arrangement #4
Gain 45.4 db
Gain Control 38 db in 2 db steps
Maximum Input 38.5V Single freq.
Use For bridging purpose where high levels are encountered. This arrangement does not meet the longitudinal balance requirements.



124B Amplifier - Input Arrangement #5
Gain 40.6 db
Gain Control 38 db in 2 db steps
Maximum Input 10V single freq.
Use Same as Input Arrangement #1 where an internal input impedance of 600 ohms is required, and where high levels are encountered.



No. 124 TYPE AMPLIFIER

COMMERCIAL PRODUCTS
APPARATUS REFERENCE SHEET

NO 1-25A
AMPLIFIERS
124 TYPE

12-20-40

AMPLIFIER		124A		124B					124C		124D		124E				103C			103D	
		BRIDGING INPUT	HIGH GAIN INPUT	ARRANGEMENT NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	BRIDGING INPUT	HIGH GAIN INPUT	30™ INPUT	120™ INPUT	ARRANGEMENT NO. 1 BRIDGING INPUT	ARRANGEMENT NO. 1 HIGH GAIN INPUT	ARRANGEMENT NO. 2	ARRANGEMENT NO. 3	NOMINAL (AS SHIPPED)	REPEATING COIL INPUT	BRIDGING INPUT	30™ INPUT (AS SHIPPED)	120™ INPUT
GAIN IN DECIBELS (SEE NOTE 1)		50	63	66.6	60.6	45.4	45.4	40.6	50	58	107	107	50	63	30	43	58	58	50	107	107
GAIN CONTROL		NONE		38DB IN 2DB STEPS & OFF					NONE	45DB CONTINUOUSLY VARIABLE	35DB CONTINUOUSLY VARIABLE		38DB IN 2DB STEPS & OFF				45DB CONTINUOUSLY VARIABLE		NONE	35DB CONTINUOUSLY VARIABLE	
MAX. SINGLE FREQ INPUT VOLTAGE		0.75	0.1	2.4	2.4	2.4	38.5	10	0.85	5	.008	.016	25	3	100	10	5	5	0.85	.008	.016
INPUT TERMINALS		1 & 3	1 & 2	1 & 3	1 & 3	1 & 3	4 & 6	8 & 9	1 & 3	1 & 2	1 & 2	1 & 3	1 & 3	1 & 2	5 & 6	11 & 12	1 & 2	3 & 6	WIRING CHANGE REQ.	1 & 2	WIRING CHANGE REQ.
SOURCE IMPEDANCE IN OHMS	NOMINAL	600	600	600	600	600	600	600	600	50	30	120	600	600	600	600	50	50	600	30	120
	OPERATING RANGE	0-25000	0-1000	600	600	600	0-25000	0-1000	0-25000	0-1000	15-60	60-250	0-25000	0-1000	0-25000	0-1000	0-1000	50-1000	0-25000	15-60	60-250
INTERNAL INPUT IMPEDANCE IN OHMS (APPROX.)		40000	1000	2500	600 SEE NOTE 2	11000	11000	600 SEE NOTE 2	27000	150	HIGH UNTERMINATED INPUT TRANSFORMER		40000	1000	40000	600	150	125	27000	HIGH UNTERMINATED INPUT TRANSFORMER	
LOAD IMPEDANCE	AS SHIPPED NOMINAL	7.5		600					600		600		7.5				600			600	
	AVAILABLE NOMINAL	600, 150, 30, 16, 7.5 OR 1.75																			
	AVAILABLE OPERATING RANGE	1 - 1200																			
INTERNAL OUTPUT IMPEDANCE IN OHMS (APPROX.)	TERMINALS 13 & 14	3/4 OF NOMINAL LOAD IMPEDANCE																			
	TERMINALS 16 & 17			600 OHMS WHEN OUTPUT COIL IS STRAPPED FOR 600 OHM LOAD IMPEDANCE. (AS SHIPPED)																	
OUTPUT POWER	AS SHIPPED	12 WATTS 2% TOTAL HARMONICS AT 400 CYCLES INTO NOMINAL LOAD IMPEDANCE																			
	AVAILABLE	20 WATTS, 5% TOTAL HARMONICS AT 400 CYCLES INTO NOMINAL LOAD IMPEDANCE																			
OUTPUT NOISE IN DB RELATIVE TO .001 WATT (UNWEIGHTED)		-37		-37					-37		-8		-37				-37			-8	
FREQUENCY CHARACTERISTIC MEASURED BETWEEN NOMINAL SOURCE AND LOAD IMPEDANCES		±1 DB, 25-10000 ~ -2 DB AT 16000 ~		±1 DB 25-10000 ~ -4 DB AT 16000 ~	±1 DB 25-10000 ~ -3 DB AT 16000 ~				±1 DB 25-3000 ~ -3 DB AT 4000 ~	-17.5 DB AT 50 ~ -4.5 DB AT 200 ~ +1.8 DB AT 10000 ~	±1 DB 25-10000 ~ -2 DB AT 16000 ~		-2 DB AT 25 ~ ±1 DB 35-10000 ~ -2 DB AT 16000 ~				-17.5 DB AT 50 ~ -4.5 DB AT 200 ~ +1.8 DB AT 10000 ~		±1 DB 50-5000 ~ -3 DB AT 16000 ~	±1 DB AT 10000 ~ -2 DB AT 16000 ~	
POWER REQUIRED	A C	105-125 VOLTS 50-60 CYCLES { FOR 20 WATT OUTPUT CONNECTION, 1.25 AMPERES, 125 WATTS; FOR 12 WATT OUTPUT CONNECTION, 1.1 AMPERES, 105 WATTS																			
	D C	NONE		NONE					NONE		NONE		NONE				14-60 VOLTS FOR RELAY AND CARBON MICROPHONE			14-60 VOLTS FOR RELAY	
EXTERNAL POWER SUPPLY FACILITIES		NONE																			
FUSE		1.25 AMPERE "BUSS FUSTAT" ON CHASSIS																			
POWER SWITCH		NO		YES					YES		YES		YES				YES			YES	
DIMENSIONS		19" x 7" x 7"															20" x 8 1/2" x 10"				
WEIGHT		20 POUNDS															40 POUNDS				
FINISH		CHASSIS - ALUMINUM LACQUER; MAT - BLACK ENAMEL - CODE - 3; ALUMINUM GRAY - CODE - 15; ALUMINUM LACQUER - CODE - 24; 124 B AND C ONLY															BLACK CRINKLED ENAMEL				
VACUUM TUBES		WE OR RCA: 2-348 A OR 2-6J7 OR 6J7G; 2-350 B OR 2-6L6 OR 6L6G; 1-274 B OR 1-5T4 OR 5U4G									SAME AS FOR 124A & 1-RCA-1612		SAME AS FOR 124A							SAME AS FOR 124A & 1-RCA-1612	
COVER		102A COVER TO PROTECT APPARATUS AND VACUUM TUBES WGT 3 LBS																			
ASSEMBLY		ESX-675954															ESX-676175				
SCHEMATIC		ESXX-675955		ESXX-676164					ESXX-676165		ESXX-676166		ESXX-676195				ESXX-676176			ESXX-676178	
WIRING DIAGRAM		ESX-675956		ESX-676167					ESX-676168		ESX-676169		ESX-676196				ESX-676177			ESX-676179	
APPARATUS REFERENCE SHEET		1-26		1-27					1-28		1-29		1-30				1-31			1-32	

NOTES:
1. GAIN AT 1000 CYCLES BETWEEN NOMINAL SOURCE AND LOAD IMPEDANCES, WITH W.E. TUBES
2. 600 OHMS ± 10% BETWEEN 50 - 8000 CYCLES