

# HERMETICALLY SEALED AUDIO COMPONENTS

For over fifteen years UTC has been the largest supplier of transformer components for military applications, to customer specifications. Listed below are a number of types, to latest military specifications, which are now catalogued as UTC stock items.

**Terminals** on items H-20 through H-24 are neoprene-ceramic assemblies. All other units employ glass bead headers, but can be supplied with neoprene-ceramic terminals where required. For **printed circuit use**, wire terminals on glass header units can be straightened out without injury. Straight wire terminals available on production orders.

The **frequency response ratings** are based on military requirements. Actually, most of the units that do not carry DC are appreciably better in response than the range shown.

The **level ratings** are maximum level for reasonable distortion at the lowest frequency specified. For higher frequencies considerably higher levels are permissible.

The **impedance ratings** are listed in standard manner. Obviously, a transformer with a 15,000 ohm primary impedance can operate from a tube representing a source impedance of 7700 ohms, etc. In addition, transformers can be used for applications differing considerably from those shown, keeping in mind that impedance ratio is constant. Lower source impedance will improve response and level ratings . . . higher source impedance will reduce frequency range and level rating.



RC-25 CASE

Length ..... 1 1/2"  
 Width ..... 5/8"  
 Height ..... 1 1/8"  
 Mounting (slot centers) 1 1/8 to 1 3/8"  
 Screws ..... 4-40 Fil.  
 Cutout ..... 7/8 Dia.  
 Unit Weight ..... 1.5 oz.

## MINIATURE AUDIO UNITS...RC-25 CASE

Type No.	Application	MIL Type	Pri. Imp. Ohms	Sec. Imp. Ohms	DC in Pri. MA	Response ± 2 db (Cyc.)	Max. level dbm	
H-1	Mike, pickup, line to grid	TF1A10YY	50, 200 CT, 500 CT*	50,000	0	50-10,000	+ 5	
H-2	Mike to grid	TF1A11YY	82	135,000	50	250-8,000	+21	
H-3	Single plate to single grid	TF1A15YY	15,000	60,000	0	50-10,000	+ 6	
H-4	Single plate to single grid, DC in Pri.	TF1A15YY	15,000	60,000	4	200-10,000	+14	
H5	Single plate to P.P. grids	TF1A15YY	15,000	95,000 CT	0	50-10,000	+ 5	
H-6	Single plate to P.P. grids, DC in Pri.	TF1A15YY	15,000	95,000 split	4	200-10,000	+11	
H-7	Single or P.P. plates to line	TF1A13YY	20,000 CT	150/600	4	200-10,000	+21	
H-8	Mixing and matching	TF1A16YY	150/600	600 CT	0	50-10,000	+ 8	
H-9	82/41:1 input to grid	TF1A10YY	150/600	1 meg.	0	200-3,000 (4 db.)	+10	
H-10	10:1 single plate to single grid	TF1A15YY	10,000	1 meg.	0	200-3,000 (4 db.)	+10	
H-11	Reactor	TF1A20YY	300 Henries-0 DC, 50 Henries-3 Ma. DC, 6,000 Ohms.					



RC-50 CASE

Length ..... 1 5/8"  
 Width ..... 1 5/8"  
 Height ..... 2 3/16"  
 Mounting ..... 1 3/16"  
 Screws ..... #6-32  
 Cutout ..... 1 1/2 Dia.  
 Unit Weight ..... 8 oz.

## COMPACT AUDIO UNITS . . . RC-50 CASE

Type No.	Application	MIL Type	Pri. Imp. Ohms	Sec. Imp. Ohms	DC in Pri. MA	Response ± 2 db (Cyc.)	Max. level dbm	
H-19	Line to grid. Balanced, center tapped primary . . . 1:14 ratio. Multiple hi-permalloy (75 DB) shielding	TF1A10YY	250 CT 500 CT	50,000 100,000	0	30-20,000	+ 6	
H-20	Single plate to 2 grids, can also be used for P.P. plates	TF1A15YY	15,000 split	80,000 split	0	30-20,000	+12	
H-21	Single plate to P.P. grids, DC in Pri.	TF1A15YY	15,000	80,000 split	8	100-20,000	+23	
H-22	Single plate to multiple line	TF1A13YY	15,000	50/200, 125/500**	8	50-20,000	+23	
H-23	P.P. plates to multiple line	TF1A13YY	30,000 split	50/200, 125/500**	8 BAL.	30-20,000	+19	
H-24	Reactor	TF1A20YY	450 Hys.-0 DC, 250 Hys.-5 Ma. DC, 6000 ohms 65 Hys.-10 Ma. DC, 1500 ohms					



SM CASE

Length ..... 1 1/16"  
 Width ..... 1/2"  
 Height ..... 2 3/32"  
 Screw ..... 4-40 Fil.  
 Unit Weight ..... 8 oz.

## SUBMINIATURE AUDIO UNITS . . . SM CASE

Type No.	Application	MIL Type	Pri. Imp. Ohms	Sec. Imp. Ohms	DC in Pri. MA	Response ± 2 db (Cyc.)	Max. level dbm	
H-30	Input to grid	TF1A10YY	50***	62,500	0	150-10,000	+13	
H-31	Single plate to single grid, 3:1	TF1A15YY	10,000	90,000	0	300-10,000	+13	
H-32	Single plate to line	TF1A13YY	10,000****	200	3	300-10,000	+13	
H-33	Single plate to low impedance	TF1A13YY	30,000	50	1	300-10,000	+15	
H-34	Single plate to low impedance	TF1A13YY	100,000	60	.5	300-10,000	+ 6	
H-35	Reactor	TF1A20YY	100 Henries-0 DC, 50 Henries-1 Ma. DC, 4,400 ohms.					
H-36	Transistor Interstage	TF1A15YY	25,000 (DCR800)	1,000 (DCR110)	.5	300-10,000	+10	
H-37	Transistor output	TF1A15YY	500 (DCR50)	50 (DCR5)	3.5	300-10,000	+15	

\* 200 ohm termination can be used for 150 ohms or 250 ohms, 500 ohm termination can be used for 600 ohms.

\*\* 200 ohm termination can be used for 150 ohms or 250 ohms, 125/500 ohm termination can be used for 150/600 ohms.

\*\*\* can be used with higher source impedances, with corresponding reduction in frequency range. With 200 ohm source, secondary impedance becomes 250,000 ohms . . . loaded response is -4 db. at 300 cycles.

\*\*\*\* Can be used for 500 ohm load . . . 25,000 ohm primary impedance . . . 1.5 Ma. DC.

# OUNCER AUDIO UNITS

## STANDARD AND PLUG-IN TYPES

UTC OUNCER components represent the acme in compact quality transformers. These units, which weigh one ounce, are fully impregnated and sealed in a drawn aluminum housing  $\frac{7}{8}$ " diameter . . . mounting opposite terminal board.

Ouncer items are ideal for portable broadcast, hearing aid, aircraft, concealed service, and similar applications. High fidelity characteristics are provided, uniform within approximately 1 DB from 30 to 20,000 cycles, except for O-14, O-15, and units carrying DC which are intended for voice frequencies. Maximum level +8 dbm.

"P" series units are identical to the UTC OUNCER units but are sealed in bakelite housings with plug-in base to fit standard octal socket. While of submersion proof design, these units weigh but two ounces. Oversize pins in the base make it impossible to dislodge these units from their sockets.

OUNCER Type No.	Application	Pri. Imp.	Sec. Imp.	PLUG-IN Type No.
O-1	Mike, pickup or line to 1 grid	50, 200/250, 500/600	50,000	P-1
O-2	Mike, pickup or line to 2 grids	50, 200/250, 500/600	50,000	P-2
O-3	Dynamic mike to 1 grid	7.5/30	50,000	P-3
O-4	Single plate to 1 grid	15,000	60,000	P-4
O-5	Single plate to 1 grid, D.C. in Pri.	15,000	60,000	P-5
O-6	Single plate to 2 grids	15,000	95,000	P-6
O-7	Single plate to 2 grids, D.C. in Pri.	15,000	95,000	P-7
O-8	Single plate to line	15,000	50, 200/250, 500/600	P-8
O-9	Single plate to line, D.C. in Pri.	15,000	50, 200/250, 500/600	P-9
O-10	Push pull plates to line	30,000 ohms plate to plate	50, 200/250, 500/600	P-10
O-11	Crystal mike or pick-up to line	50,000	50, 200/250, 500/600	P-11
O-12	Mixing and matching	50, 200/250	50, 200/250, 500/600	P-12
O-13	Reactor, 300 Hys.—no D.C.; 50 Hys.—3 MA. D.C.,	6000 ohms		P-13
O-14	50:1 mike or line to 1 grid	200	$\frac{1}{2}$ megohm	P-14
O-15	10:1 single plate to 1 grid	15,000	1 megohm	P-15
O-16	Mike or line to grid	250 C.T.	50,000	



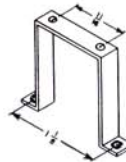
OUNCER CASE

Dia. ....  $\frac{7}{8}$ "  
 Ht. ....  $1\frac{1}{16}$ "  
 Mtg. ....  $1\frac{1}{16}$ "  
 Scr. .... 2-56  
 Wt. .... 1 oz.



PLUG-IN CASE

Dia. ....  $1\frac{1}{2}$ "  
 Ht. ....  $1\frac{1}{2}$ "  
 Skt. .... St. Oct.  
 Wt. .... 2 oz.



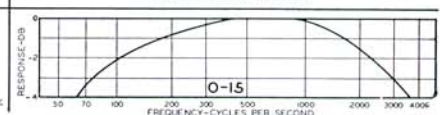
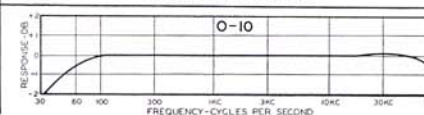
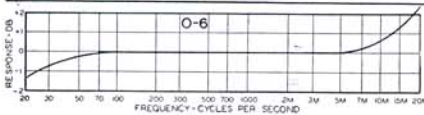
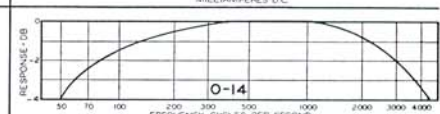
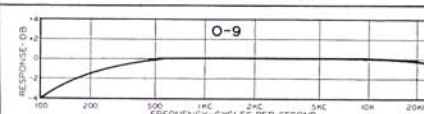
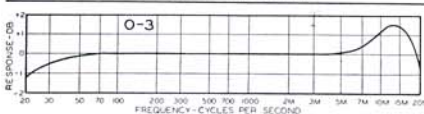
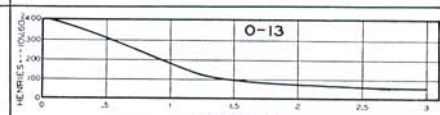
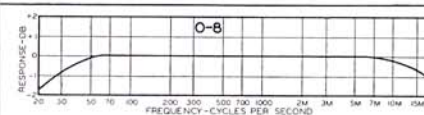
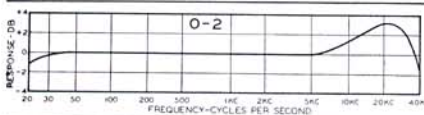
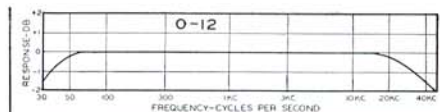
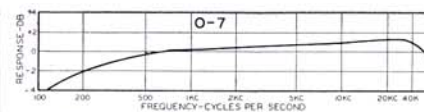
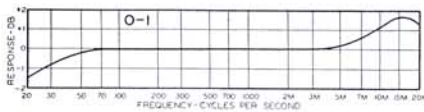
Ouncer chassis mount bracket available on production orders



O-16 CASE

Dia. ....  $1\frac{1}{16}$ "  
 Ht. ....  $1\frac{1}{2}$ "  
 Mtg. ....  $1\frac{1}{2}$ "  
 Scr. .... 6-32  
 Wt. .... 3 oz.  
 Clamp ....  $1\frac{5}{16}$ " x  $1\frac{7}{8}$ "

This transformer provides very low hum pickup . . . employs two heavy gauge hypermalloy shields plus orientable mounting. Primary centertap is balanced to 1%. Can be used for 150, 200, 250, 500, or 600 ohm sources . . . 200:1 impedance ratio.



## MICROPHONE CABLE TRANSFORMERS

UTC Cable transformers are designed to be inserted in the cable circuit, and are ruggedly constructed to withstand mechanical abuse. The cable connections (supplied less cable) are made through spring strain relief to terminal boards inside the end caps.  $1\frac{1}{2}$ " diameter . . .  $2\frac{1}{2}$ " long . . .  $\frac{1}{2}$  lb.

Type MC-1—primary tapped 30/50 and 200/250 ohms, secondary to grid, standard fidelity.

Type MC-2—primary tapped 30/50 and 200/250 ohms, secondary to grid, high fidelity.



# UTC LEADERSHIP IN HIGH FIDELITY

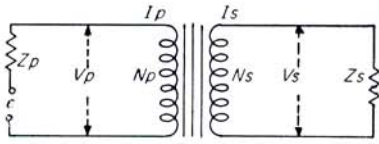


Fig 1  
ELECTRICAL CIRCUIT OF AN IDEAL TRANSFORMER WITH 100 PERCENT EFFICIENCY

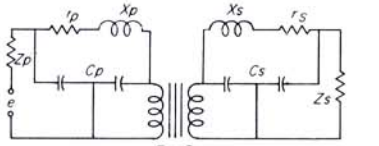


Fig 2  
ILLUSTRATING A PHYSICAL TRANSFORMER

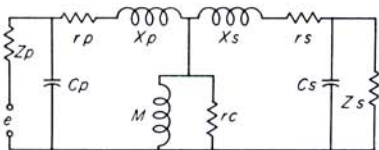


Fig 3  
EQUIVALENT T NETWORK OF THE SAME TRANSFORMER IN FIG 2

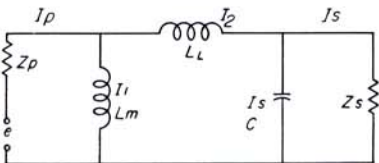


Fig 4  
A SIMPLIFICATION OF THE EQUIVALENT TRANSFORMER CIRCUIT SHOWN IN FIG 3

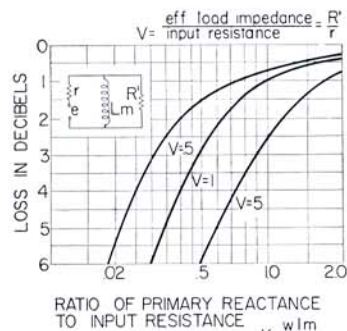


FIG 5 CURVES SHOWING THE LOSS DUE TO SHUNTING EFFECT OF THE PRIMARY OF A TRANSFORMER

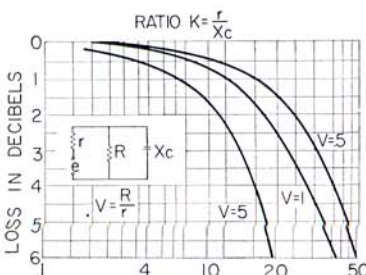


FIG 6 CURVES SHOWING THE LOSS DUE TO DISTRIBUTED CAPACITY IN AN AUDIO FREQUENCY CIRCUIT

## FACTORS CONTROLLING FREQUENCY RESPONSE

The figures at the left indicate the basic story with reference to high fidelity audio transformers. Figure 1 represents an ideal transformer having 100% efficiency. Figure 2 shows the equivalent of a practical transformer with its varied reactances and capacities. Figure 3 is an equivalent "T" network of the same transformer, which can be further simplified to the basic elements illustrated in Figure 4. It is apparent from Figure 4 that  $L_{lm}$  (primary inductance) represents a reactance which drops with frequency and, as a consequence, controls the low frequency response.  $L_l$  (the leakage reactance) and  $C$  (the distributed capacity) similarly control the high frequency response. Figures 5 and 6 respectively show the frequency attenuation curves for given primary inductance and distributed capacity.

## UTC FREQUENCY RESPONSE

It is obvious from the above that high primary inductance will provide good low frequency response. For a particular core structure this necessitates the use of a large number of turns in the transformer windings. Unfortunately, as the turns are increased, both leakage reactance and distributed capacitance increase, with a corresponding loss in the higher frequencies. This effect is minimized in UTC transformers by employing transformer core material of exceptional permeability, so that a minimum number of turns are required. In low level transformers we employ Hipermalloy, which is a stable nickel iron alloy selected for maximum characteristics. In high level transformers oriented grain silicon steels provide maximum permeability and minimum distortion. Uniquely low distributed capacity and leakage reactance are obtained through special winding methods. Output transformers will have as many as 16 interleaved windings to provide extremely low leakage reactance. Input transformers employ sectional windings to effect very low distributed capacity.

## WAVE FORM DISTORTION

Low wave form distortion requires great care in both design and manufacture. UTC high fidelity products provide a minimum of such distortion through the use of conservative flux densities, symmetrical coupling in pushpull windings, low leakage reactance, and negligible resonance in coil structures. For example, low distortion in high level transformer designs, necessitates excellent response down to 7 cycles to assure negligible distortion at 20 to 30 cycles. For low distortion at high frequencies, in addition to primary and secondary windings being interleaved, excellent coupling is provided between primary halves. As an example, the LS-692 modulation transformer employs 10 sections in each primary half . . . with these sections individually cross-interleaved.

## SHIELDING

Inductive pickup in low level transformers is a basic circuit problem. The balanced coil structure, a development of the UTC engineering staff, is employed in the bulk of UTC low level transformers to provide very low pickup. This structure employs two accurately balanced astatic coils . . . virtually neutralizing stray pickup. In addition, the UTC high fidelity lines are housed in heavy high conductivity die castings, plus additional multiple alloy shields for many of the designs. While it is customary to make such shields of 47% nickel alloy, all UTC shields are 78% nickel to provide the greatest hum attenuation possible.

## FLEXIBILITY

The multi-tapped winding, a development of the UTC engineering staff, provides a wide range of impedances in high fidelity transformers with excellent coupling and balance. High efficiency and full response are obtained at any of the impedances specified.

## RELIABILITY

The designs of UTC high fidelity transformers are inherently centered around ruggedness and reliability. In addition, however, UTC quality control, which is accepted as the highest in the industry, assures the fulfillment of these design requirements in the ultimate manufactured product. The recognition of the dependability of UTC units is illustrated by their usage in the finest broadcast equipment, produced by such organizations as RCA, General Electric, etc.

# LINEAR STANDARD AUDIO TRANSFORMERS

The ever increasing use of wide range equipment for broadcast service has reached the point where the major limiting factor is the frequency range of the transformers employed. UTC Linear Standard components represent the closest approach to the ideal transformer from the standpoint of uniform frequency response, low wave form distortion, high efficiency, thorough shielding, and dependability.

## LINEAR STANDARD AUDIO UNITS FEATURE:

**UNIFORM FREQUENCY RESPONSE . . .** at low frequencies, is effected through the use of HIPERM-ALLOY, a STABLE nickel iron alloy of very high initial permeability. Uniform high frequency response is the result of multiple section interleaved windings arranged in a semi-toroidal coil structure. This, plus special winding methods and insulations, assures a minimum of distributed capacity and leakage reactance.

**UTC LINEAR STANDARD** transformers are the ONLY audio units with a **GUARANTEED** response . . .  $\pm 1$  DB from 20 to 20,000 cycles.

For low distortion, high level units far exceed this . . .  $\pm 1$  DB from 7 to 50,000 cycles.

**MINIMUM HUM PICKUP . . .** is accomplished through the use of a hum balanced, semi-toroidal, coil structure which affords maximum neutralization of external fields. In addition, all units employ high conductivity outer case for maximum shielding. For very low level applications, units whose code numbers end in X employ multiple alloy shielding, making possible a transformer with extremely low inductive pickup.

**DEPENDABILITY . . .** is a function of external and internal structure. Linear Standard units are housed in rugged die cast cases of precise dimension with reversible mounting to permit above chassis or subchassis wiring. The solid terminal posts on low absorption bakelite are arranged in a circular layout so that a round chassis hole will clear all terminals. Coils are vacuum baked and impregnated. **Semi-hermetic sealing** is accomplished through the use of a high adhesion compound poured through the large opening opposite the terminal board after controlled preheating of the unit for full compound penetration.

## LOW IMPEDANCE TO GRID TRANSFORMERS

Type No.	Application	Primary Impedance	Secondary Impedance	$\pm 1$ db from	Max. Level dbm	Relative * hum	Unbal. DC in prim'y	Case No.
LS-10	Low impedance mike, pickup, or multiple line to grid	50, 125/150, 200, 250, 333, 500/600 ohms	60,000 ohms in two sections	20-20,000	+19	-74 DB	.5 MA	LS-1
LS-10X	As above	As above	50,000 ohms	20-20,000	+17	-92 DB-Q	.5 MA	LS-1
LS-12	Low impedance mike, pickup or multiple line to push pull grids	50, 125/150, 200, 250, 333, 500/600 ohms	120,000 ohms overall, in two sections	20-20,000	+19	-74 DB	.5 MA	LS-1
LS-12X	As above	As above	80,000 ohms overall, split	20-20,000	+17	-92 DB-Q	.5 MA	LS-1
LS-14	Low impedance mike, pickup, or parallel mixer to grid	2.5, 5.5, 10, 15, 22, 30, 38, 60 ohms	60,000 ohms in two sections	20-20,000	+19	-74 DB	.5 MA	LS-1
LS-14X	As above	As above	50,000 ohms	20-20,000	+17	-92 DB-Q	.5 MA	LS-1
LS-15X	Three isolated lines or pads to one or two grids	30, 50, 200, 250 ohms each primary	60,000 ohms overall, in two sections	20-20,000	+17	-92 DB-Q	.5 MA	LS-1
LS-18	High level multiple line to push pull grids	50, 125/150, 200, 250, 333, 500/600 ohms	50,000 ohms overall, in two sections	20-20,000	+28	-50 DB	.5 MA	LS-2
LS-26	Bridging line to single or push pull grids	5,000 ohms	60,000 ohms in two sections	15-20,000	+23	-74 DB	0 MA	LS-1

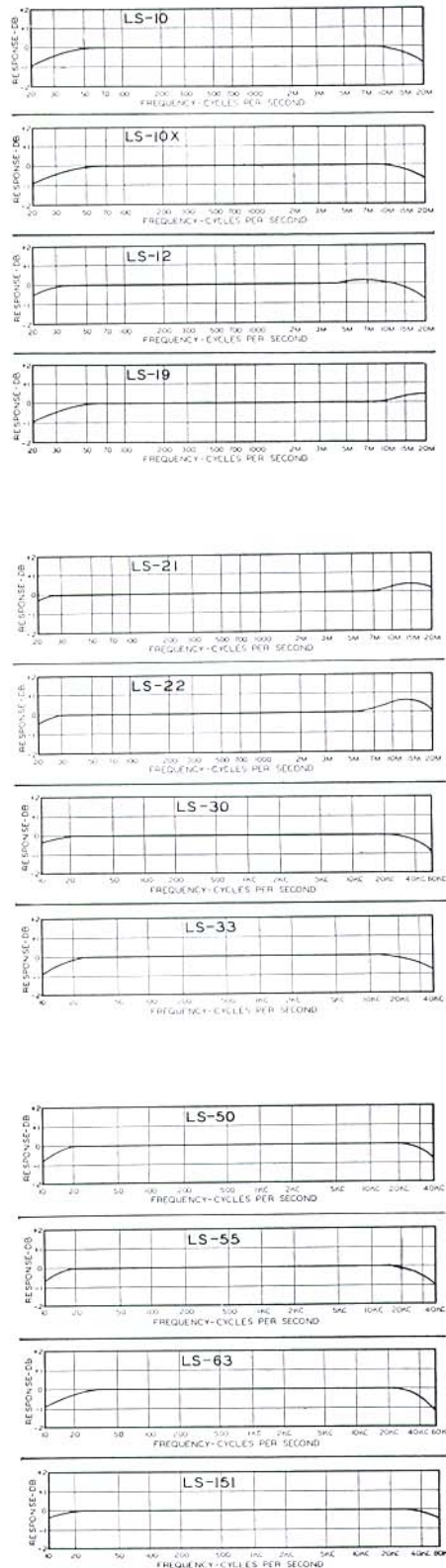
## MIXING TRANSFORMERS

Type No.	Application	Primary Impedance	Secondary Impedance	$\pm 1$ db from	Max. Level dbm	Relative * hum	Unbal. DC in prim'y	Case No.
LS-30	Mixing, low impedance mike, pickup, or multiple line to multiple line	50, 125/150, 200, 250, 333, 500/600 ohms	50, 125/150, 200, 250, 333, 500/600 ohms	7-50,000	+23	-74 DB	.5 MA	LS-1
LS-30X	As above	As above	As above	20-20,000	+20	-92 DB-Q	.3 MA	LS-1
LS-31	Three isolated lines or pads to multiple line	30, 50, 200, 250 ohms each primary	50, 125/150, 200, 250, 333, 500/600 ohms	20-20,000	+23	-74 DB	.5 MA	LS-1
LS-31X	As above	As above	As above	20-20,000	+20	-92 DB-Q	.3 MA	LS-1
LS-32	Mixing, low impedance mike, pickup or parallel mixer to multiple line	2.5, 5.5, 10, 15, 22, 30, 38, 60 ohms	50, 125/150, 200, 250, 333, 500/600 ohms	20-20,000	+23	-74 DB	.5 MA	LS-1

The values of unbalanced DC shown will effect approximately 1.5 DB loss at 30 cycles.

\* Comparison of hum balanced unit with shielding to normal uncased type.

Q Multiple alloy magnetic shield.





LS-1 CASE

Length ..... 3 1/8"  
 Width ..... 2 5/8"  
 Height ..... 3 1/4"  
 Mounting ..... 1 1/16" x 2 7/16"  
 Screws ..... 6-32  
 Cutout ..... 1 7/8" dia.  
 Unit Weight ..... 3 lbs.



LS-2 CASE

Length ..... 4 7/16"  
 Width ..... 3 1/2"  
 Height ..... 4 3/16"  
 Mounting ..... 2 1/16" x 3 1/16"  
 Screws ..... 8-32  
 Cutout ..... 2 3/4" dia.  
 Unit Weight ..... 7.5 lbs.



LS-3 CASE

Length ..... 5 3/16"  
 Width ..... 5"  
 Height ..... 4 1/16"  
 Mounting ..... 4 7/16" x 5 1/2"  
 Screws ..... 10-24  
 Cutout ..... 3 3/4" dia.  
 Unit Weight ..... 15 lbs.

## INTERSTAGE AUDIO TRANSFORMERS

Type No.	Application	Primary Impedance	Secondary Impedance	± 1 db from	Max. Level dbm	Relative * hum	Unbal. DC in prim'y	Case No.
LS-19	Single plate to push pull grids like 2A3, 6L6, 5881 Split secondary	15,000 ohms	95,000 ohms 1.25:1 each side	20-20,000	+20	-50 DB	0 MA	LS-1
LS-21	Single plate to push pull grids. Split pri. and sec.	15,000 ohms	135,000 ohms; 3:1 overall	10-20,000	+20	-74 DB	0 MA	LS-1
LS-40	Single plate to push pull grids. Split secondary	15,000 ohms	135,000 ohms; 3:1 overall	30-20,000	+20	-74 DB	8 MA	LS-1
LS-22	Push pull plates to push pull grids. Split primary and secondary	30,000 ohms plate to plate	80,000 ohms; turn ratio 1.6:1 overall	20-20,000	+28	-50 DB	.25 MA	LS-2
LS-25	Push pull plates to push pull grids. Medium level. Split primary and sec.	30,000 ohms plate to plate	50,000 ohms; turn ratio 1.3:1 overall	20-20,000	+23	-74 DB	1 MA	LS-1

## PLATE, CRYSTAL, PHOTOCCELL, AND BRIDGING TO LINE TRANSFORMERS

Type No.	Application	Primary Impedance	Secondary Impedance	± 1 db from	Max. Level dbm	Relative * hum	Unbal. DC in prim'y	Case No.
LS-27	Single plate to multiple line	15,000 ohms	50, 125/150, 200, 250, 333, 500/600	30-15,000 cycles	+23	-74 DB	8 MA	LS-1
LS-50	Single plate to multiple line	15,000 ohms	50, 125/150, 200, 250, 333, 500/600	10-40,000	+23	-74 DB	0 MA	LS-1
LS-51	Push pull low level plates to multiple line	30,000 ohms plate to plate	50, 125/150, 200, 250, 333, 500/600	10-40,000	+24	-74 DB	1 MA	LS-1
LS-150	Bridging from 50 to 500 ohm line to line	4,000 ohms, bridging	50, 125/150, 200, 250, 333, 500/600	7-50,000	+23	-74 DB	1 MA	LS-1
LS-151	Bridging from 50 to 500 ohm line to line	16,000 ohms, bridging	50, 125/150, 200, 250, 333, 500/600	7-50,000	+26	-74 DB	1 MA	LS-1

## HYBRID AND REPEAT COILS

Type No.	Application	Pri. and Sec. Impedances	± 1 db from	Max. Level dbm	Relative * hum	Max. Unbal. DC in Pri.	Case No.
LS-140	Line to line for isolating balanced and unbalanced circuits; balanced for maximum reduction cross talk (70 DB)	500/600 ohms split 500/600 ohms split	30-20,000	+18	-92 DB-Q	0 MA	LS-1
LS-141	Three sets of balanced windings for hybrid service, centertapped	500/600 ohms 500/600 ohms	30-15,000	+18	-74 DB	0 MA	LS-1
LS-143	High efficiency ring and talk repeat coil, for low frequency ringing	500/600 ohms 500/600 ohms	Efficient 15/12,000 cycles	+33	-74 DB	5 MA	LS-2

## DRIVER TRANSFORMERS

Type No.	Application	Primary Impedance	Refl. Sec. Impedance	± 1 db from	Max. Level	Max. Unbal. DC in Pri.	Case No.
LS-6	Driver, push pull 2A3's, etc., to push pull 845 or 211D grids	5,000 ohms plate to plate	2:25 primary impedance; turns ratio 1.5:1 overall	20-20,000	15 watts	5 MA	LS-2
LS-47	Driver from push pull 2A3's, or similar to class B 838's, 805's, or ZB120's	5,000 ohms plate to plate	.1 pri. impedance turns ratio, Pri./1/2 Sec. 3.2:1	20-20,000	20 watts	5 MA	LS-2
LS-48	Driver transformer push pull 845's to 805 grids in class B	12,000 ohms plate to plate	.038 pri. impedance turns ratio, Pri./1/2 Sec. 5.1:1	20-20,000	40 watts	15 MA	LS-3

## HIGH LEVEL MATCHING TRANSFORMERS

Type No.	Application	Primary Impedance	Secondary Impedance	± 1 db from	Max. Level	Case No.
LS-33	High level line matching	50, 125, 200, 250, 333, 500/600 ohms	1.2, 2.5, 5, 7.5, 10, 15, 20, 30, 50, 125, 200, 250, 333, 500/600	10-40,000	20 watts	LS-2
LS-34	High level line matching	50, 125, 200, 250, 333, 500/600 ohms	1.2, 2.5, 5, 7.5, 10, 15, 20, 30, 50, 125, 200, 250, 333, 500/600	10-40,000	40 watts	LS-3

The values of unbalanced DC shown will effect approximately 1.5 DB loss at 30 cycles.

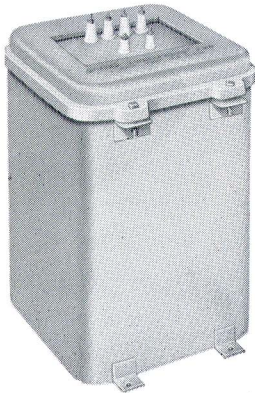
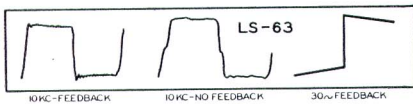
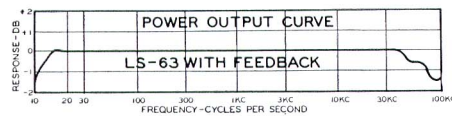
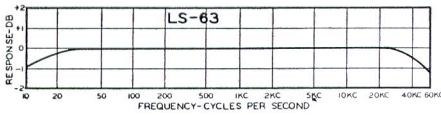
\* Comparison of hum balanced unit with shielding to normal uncased type.

Q Multiple alloy magnetic shield.

# LS OUTPUT TRANSFORMERS... THE FINEST

While the UTC Linear Standard line is generally designed for a flat response from 20 cycles to 20 Kc., a much wider response is required for output transformers. A transformer that would be down 1 DB at 20 cycles and 20 Kc. would have substantial distortion components at 30 cycles and 10 Kc. As is noted in the left curve below, typical UTC output transformers are down less than 1 DB at 10 cycles and less than 1 DB at 50 Kc. Because of this, a fine power output curve is possible. The center curve below indicates the power output response curve of a "Williamson" Amplifier employing the LS-63. The third figure below illustrates square waves obtained with the LS-63 transformer. Of particular interest is the short rise time, which is far superior for UTC transformers than any standard make which we have measured. The excellent high frequency response is evident both with and without feedback. At the low frequency end the high inductance of these transformers is illustrated by the small angle at the top of the 30 cycle square wave.

The above characteristics are obtained only by maintaining high primary inductance and low leakage reactances. For the LS-63 the primary inductance is 300 Hys. at 50 volts, 60 cycles. The leakage reactance of each half primary to the secondary is approximately 11 Mhy., and the leakage reactance of each half primary to the other half primary is approximately 20 Mhy.



LS-6 CASE

Length .....15 3/4"  
 Width .....13"  
 Height . . . LS-691 .....24"  
 Height . . . LS-692 .....28"  
 Mounting Dimension 7 3/8" x 14 1/16"  
 Mounting Hole .....3/8" dia.  
 Unit Weight .....350 lbs.  
 Unit Weight . . . LS-691 .....370 lbs.  
 Unit Weight . . . LS-692 .....520 lbs.

## DIMENSIONS

Type No.	L	W	H	Mtg.	Wt.
LS-66	9 3/4	4 3/4	6 3/4	3 7/8 x 9 1/8	37
LS-102	9 3/4	4 3/4	6 3/4	3 7/8 x 9 1/8	37
LS-103	13 1/8	8 1/2	10 1/4	7 1/4 x 12 1/2	58
LS-106	17 1/4	10	13 1/4	8 1/2 x 16 1/2	156

## OUTPUT TRANSFORMERS TO LINE AND VOICE COIL

Type No.	Primary will match following typical tubes	Primary Impedance	Secondary Impedance	± 1 db from	Max. Level	Case No.
LS-52	Push pull 6AQ5, 6V6, 6L6, 5881	8,000 ohms	500, 333, 250, 200, 125, 50, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2	7-50,000	20 watts	LS-2
LS-54	Same as above	8,000 ohms	30, 20, 15, 10, 7.5, 5, 2.5, 1.2	7-50,000	20 watts	LS-2
LS-55	Push pull 2A3's, 300B, 6L6's, 6AS7G, 6080, 350B	5,000 ohms plate to plate and 3,000 ohms plate to plate	500, 333, 250, 200, 125, 50, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2	7-50,000	20 watts	LS-2
LS-57	Same as above	5,000 ohms plate to plate and 3,000 ohms plate to plate	30, 20, 15, 10, 7.5, 5, 2.5, 1.2	7-50,000	20 watts	LS-2
LS-58	Push pull parallel as above.	2,500 ohms plate to plate and 1,500 ohms plate to plate	500, 333, 250, 200, 125, 50, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2	10-50,000	40 watts	LS-3
LS-60A	Push pull 2A3's, push pull parallel triode: 1614, 1625, 807, 5881, KT-66	4,600 ohms plate to plate	15, 10, 7.5, 5, 3.75, 2.5, 1.2	7-50,000	30 watts	LS-3
LS-61	Push pull triode: 6AS7G, 6080, 6L6, 5881, KT-66, 807, 1614	10,000 ohms plate to plate and 6,000 ohms plate to plate	500, 333, 250, 200, 125, 50, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2	7-50,000	20 watts	LS-2
LS-63	Same as above	10,000 ohms plate to plate and 6,000 ohms plate to plate	30, 20, 15, 10, 7.5, 5, 2.5, 1.2	7-50,000	20 watts	LS-2
LS-6L1	Self bias push pull 6L6's, 5881, KT-66, 6146 triode, 6159 triode	9,000 ohms plate to plate	500, 333, 250, 200, 125, 50, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2	7-50,000	30 watts	LS-3
LS-6L3	Same as above	9,000 ohms plate to plate and 3,800 ohms plate to plate	30, 20, 15, 10, 7.5, 5, 2.5, 1.2	7-50,000	30 watts	LS-3
LS-6L4	Push pull 6146, 6159, 6L6's fixed bias or push pull parallel 6L6's self bias	4,500 ohms plate to plate	500, 333, 250, 200, 125, 50, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2	12-50,000	55 watts	LS-3

## MODULATION TRANSFORMERS

(No DC in Secondary)

Type No.	Primary will match following typical tubes	Primary Impedance	Secondary Impedance	± 1 db from	Max. Level	Case No.
LS-56	Push pull 2A3's, 6A5G's, 300B's, 6AS7G, 6L6, 6080	5,000 ohms plate to plate and 3,000 ohms plate to plate	6000, 5000, 4000, 1800, 1500, 1000, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2	10-50,000	20 watts	LS-2
LS-66	Class B 838, ZB120, 805	9,000 ohms plate to plate	5000, 4200, 4100, 3500, 3300, 2650, 2500, 2100, 1250, 600	10-50,000	260 watts	*
LS-691	Class B, 833A, 250TH	10,400 ohms plate to plate	4500, 4000, 3500, 2750, 2000	20-40,000	1000 watts	LS-6
LS-692	Class B push pull parallel 833A's	4,750 ohms plate to plate	2500, 2000, 1750, 1500, 1250	20-40,000	2500 watts	LS-6

## MODULATION REACTORS

Type No.	Application	Inductance	DC Current	DC Resistance	Insulation Test Voltage
LS-102	Modulation reactor	50 hy	350 MA	250 ohms	5000
LS-103	Modulation reactor	50 hy	500 MA	175 ohms	7500
LS-106	Modulation reactor	50 hy	750 MA	120 ohms	10000

# UTC HIPERMALLOY TRANSFORMERS

## LOW IMPEDANCE TO GRID AND MIXING TRANSFORMERS

Type No.	Application	Primary Imp. (ohms)	Secondary Impedance	± 1 db from	Max. Level dbm	DC in Prim'y	Case No.
HA-100	Low impedance mike, pickup, or multiple line to grid	50, 125/150, 200, 250, 333, 500/600	60,000 ohms in two sections	30-20,000	+18	.5 MA	H-1
HA-100X	Same as above but with multiple alloy shield to effect very low hum pickup				+16		H-1
HA-101	Low impedance mike, pickup, or multiple line to P.P. grids	50, 125/150, 200, 250, 333, 500/600	120,000 ohms overall, split	30-20,000	+18	.5 MA	H-1
HA-101X	As above but with multiple alloy shield to effect very low hum pickup		80,000 ohms overall, split	30-20,000	+16	.5 MA	H-1
HA-103A	Low impedance mike, pickup, or parallel mixer to grid	2.5, 5.5, 10, 15, 22, 30, 38, 60	60,000 ohms in two sections	30-20,000	+18	.5 MA	H-1
HA-108	Mixing, low impedance mike, pickup, or multiple line	50, 125/150, 200, 250, 333, 500/600	50, 125/150, 200, 250, 333, 500/600	20-50,000	+20	.5 MA	H-1
HA-108X	Same as above but with multiple alloy shield to effect very low hum pickup				+18		H-1
HA-130X	Three isolated lines or pads to one or two grids with tri-alloy internal shield	30, 50, 200, 250 each primary	60,000 ohms overall, in two sections	30-20,000	+18	.5 MA	H-1

## INTERSTAGE AUDIO TRANSFORMERS

Type No.	Application	Primary Imp.	Secondary Impedance	± 1 db from	Max. Level dbm	DC in Prim'y	Case No.
HA-104	Single plate to P.P. grids like 2A3, 6L6 (split secondary)	15,000 ohms	95,000 ohms 2.5:1	30-20,000	+20	0 MA	H-1
HA-105	Single plate to single grid (split secondary)	15,000 ohms	60,000 ohms 2:1 turn ratio	30-20,000	+20	0	H-1
HA-106	Single plate to push pull grids (split secondary)	15,000 ohms	135,000 ohms 3:1 ratio overall	30-20,000	+20	0	H-1
HA-107	Push pull plates to push pull grids (split primary and secondary)	30,000 ohms plate to plate	80,000 ohms 1.6:1 turn ratio overall	30-20,000	+28	.25 MA	H-2
HA-137	Push pull plates to push pull grids (split Pri. and Sec.)	30,000 ohms plate to plate	68,000 ohms 1.5:1 turn ratio	30-20,000	+20	0	H-1

## PLATE AND CRYSTAL TO LINE TRANSFORMERS

Type No.	Application	Primary Imp.	Secondary Imp. ohms	± 1 db from	Max. Level dbm	DC in Prim'y	Case No.
HA-111	Crystal microphone or pickup, to multiple line	100,000 ohms	50, 125/150, 200, 250, 333, 500/600	30-20,000 measured with resistive source	+18	0	H-1
HA-113	Single plate to multiple line	15,000 ohms	50, 125/150, 200, 250, 333, 500/600	30-40,000	+21	0 MA	H-1
HA-133	Single plate to multiple line (D.C. in Pri.)	15,000 ohms	50, 125/150, 200, 250, 333, 500/600	30-40,000	+22	8 MA	H-1
HA-114	Push pull low level plates to multiple line	30,000 ohms plate to plate	50, 125/150, 200, 250, 333, 500/600	30-40,000	+23	1 MA	H-1

## OUTPUT TRANSFORMERS

Type No.	Application	Primary Imp.	Secondary Imp.	Power	Max. Level dbm	DC in Prim'y	Case No.
HA-134	Push pull, 6L6, or 2A3's to line	5000/9400 ohms plate to plate	50, 125/150, 200, 250, 333, 500/600	10-50,000 15 watts		5 MA	H-2
HA-135	Push pull 2A3's, etc. to voice coil	3000/5000 ohms plate to plate	30, 20, 15, 10, 7.5, 5, 2.5, 1.2	10-50,000 18 watts		5 MA	H-2

## POWER TRANSFORMERS AND CHOKES

Type No.	Application	Primary Voltage 50/60 cycles	High Voltage	Filament Windings	Case No.
HP-122	Pre-amp. power supply using 6X4, 6X5GT rectifier	115	220-0-220 15 MA	6.3 V.C.T.-.6A 6.3 V.C.T.-1.2A	H-1
HP-123	Pre-amp. or tuner power supply using 6X4, 6X5GT rectifier	115	275-0-275 35 MA	6.3 V.C.T.-.6A 6.3 V.C.T.-2A	H-2

Type No.	Application	Inductance	DC Current	DC Resistance	Test Voltage	Case No.
HC-115	Parallel feed and filter choke	Series-400 hy Parallel-100 hy	2.5 MA 5 MA	6000 ohms 1500 ohms	1500	H-1
HC-116	Parallel feed and filter choke	Series-600 hy Parallel-150 hy	8 MA 16 MA	3400 ohms 850 ohms	1500	H-2
HC-117	Parallel feed and filter choke	Series-200 hy Parallel-40 hy	15 MA 35 MA	3200 ohms 800 ohms	1500	H-1

The UTC Hipermalloy audio and power transformers are specifically designed for portable and compact service. While light in weight, neither dependability nor fidelity has been sacrificed. The frequency characteristic of the Hipermalloy audio units is uniform from 30 to 20,000 cycles. They incorporate a Hipermalloy nickel iron core and hum balanced coil structure. The rugged die cast case is of high conductivity alloy finished in grey, arranged for mounting with the terminals either up or down. DC in Primary shown is maximum unbalanced.



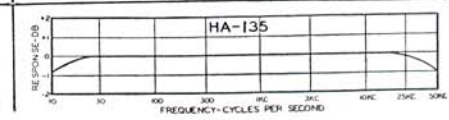
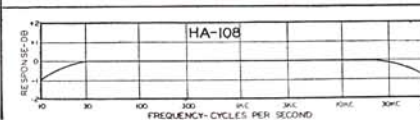
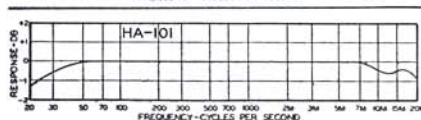
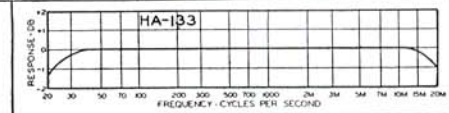
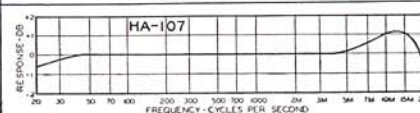
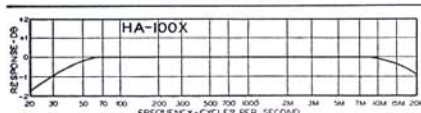
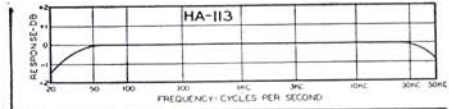
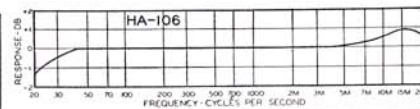
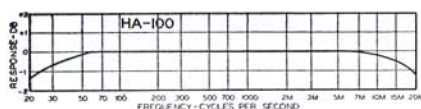
TYPE H-1 CASE

Length .....	2 3/8"
Width .....	1 1/4"
Height .....	3 1/8"
Mounting .....	1 3/8" x 1 1/4"
Screws .....	6-32
Cutout .....	1 1/8" dia.
Unit Weight .....	2 lbs.



TYPE H-2 CASE

Length .....	3 1/8"
Width .....	2 3/8"
Height .....	3 1/2"
Mounting .....	2" x 2 3/4"
Screws .....	6-32
Cutout .....	2 1/8" dia.
Unit Weight .....	5 lbs.



# ULTRA COMPACT AUDIO UNITS

The **UTC Ultra compact** audio units are small and light in weight, ideally suited to remote amplifier and similar compact equipment. High fidelity is obtainable in all individual units, the frequency response being  $\pm 2$  DB from 30 to 20,000 cycles.

All units except those carrying DC in Primary employ a true hum balancing coil structure, which combined with a high conductivity outer case, effects good inductive shielding. The die-cast case provides for top or bottom mounting. Maximum operating level + 15 dbm.

## LOW IMPEDANCE TO GRID AND MIXING TRANSFORMERS

Type No.	Application	Primary Impedance	Secondary Impedance	$\pm 2$ db from
A-10	Low impedance mike, pickup, or multiple line to grid	50, 125/150, 200/250, 333, 500/600 ohms	50,000 ohms	20-20,000
A-11	Low impedance mike, pickup, or line to 1 or 2 grids	50, 200, 500	50,000 ohms	50-20,000 multiple alloy shield for extremely low hum pickup
A-12	Low impedance mike, pickup, or multiple line to push pull grids	50, 125/150, 200/250, 333, 500/600 ohms	80,000 ohms overall, in two sections	20-20,000
A-14	Dynamic microphone to one or two grids	30 ohms	50,000 ohms overall, in two sections	20-20,000
A-20	Mixing, low impedance mike, pickup, or multiple line to multiple line	50, 125/150, 200/250, 333, 500/600 ohms	50, 125/150, 200/250, 333, 500/600 ohms	10-50,000
A-21	Mixing, low impedance mike, pickup, or line to line	50, 200/250, 500/600	50, 200/250, 500/600	30-30,000 multiple alloy shield for extremely low hum pickup



TYPE A CASE

Length ..... 1½"  
 Width ..... 1½"  
 Height ..... 2"  
 Mounting ..... 1½" sq.  
 Screws ..... 4-40  
 Cutout ..... 1⅜" dia.  
 Unit Weight ..... ½ lb.

## INTERSTAGE AUDIO TRANSFORMERS

Type No.	Application	Primary Impedance	Secondary Impedance	$\pm 2$ db from
A-16	Single plate to single grid	15,000 ohms	60,000 ohms, 2:1 turn ratio	20-20,000
A-17	Single plate to single grid 8 MA unbalanced D.C.	As above	As above	40-20,000
A-18	Single plate to two grids. Split primary, can also be used for P.P. plates	15,000 ohms	80,000 ohms overall, 2.3:1 turn ratio overall	20-20,000
A-19	Single plate to two grids 8 MA unbalanced D.C.	15,000 ohms	80,000 ohms overall, 2.3:1 turn ratio overall	40-20,000

## PLATE AND CRYSTAL TO LINE TRANSFORMERS

Type No.	Application	Primary Impedance	Secondary Impedance	$\pm 2$ db from
A-24	Single plate to multiple line	15,000 ohms	50, 125/150, 200/250, 333, 500/600 ohms	20-40,000
A-25	Single plate to multiple line 8 MA unbalanced D.C.	15,000 ohms	50, 125/150, 200/250, 333, 500/600 ohms	40-20,000
A-26	Push pull low level plates to multiple line	30,000 ohms plate to plate	50, 125/150, 200/250, 333, 500/600 ohms	20-40,000
A-27	Crystal microphone to multiple line	100,000 ohms	50, 125/150, 200/250, 333, 500/600 ohms	30-20,000 measured with non-inductive source
A-30	Audio choke, 250 henrys @ 5 MA 6000 ohms D.C., 65 henrys @ 10 MA 1500 ohms D.C. 450 henrys @ 0 MA			
A-32	Filter choke 60 henrys @ 15 MA 2000 ohms D.C., 15 henrys @ 30 MA 500 ohms D.C.			

