

# **ALTEC LANSING/PEERLESS**

## **SECTION V**

### **TRANSFORMERS**

- **15036 Hybrid Transformer**
- **15189 Line Transformer**
- **15192 Line Transformer**
- **15257 Repeating Coil**
- **15337 Line Transformer**
- **15338 Line Transformer**
- **15339 Line Transformer**



Figure 1. ALTEC 15192 Transformer, Typical

#### GENERAL

These ALTEC Telecommunication Products Transformers are accessory items designed for use in voice frequency communication systems. All may be used in conjunction with the ALTEC plug-in transistor amplifiers, equalizers and balance networks to establish telephone repeater systems; and all but the 15036 Repeating Coil are of the plug-in type. Each transformer is provided with electrostatic shielding to minimize longitudinal effects.

A description of each transformer follows, and a Table of Specifications will be found in Figure 2.

#### 15189 HYBRID TRANSFORMER

Two ALTEC 15189 Transformers are used to form a hybrid arrangement which is mechanically compact, highly efficient in performance and provides optional two-wire impedances of 600 or 900 ohms, and four-wire impedance of 600 ohms. The insertion loss of the hybrid is 3.7 dB at 1000 Hz, the transhybrid loss is in excess of 55 dB for frequencies from 200 to 1000 Hz, 52 dB at 2000 Hz, and 50 dB at 3000 Hz. The frequency characteristics is  $\pm 1$  dB from 200 to 6000 Hz. The line windings are capable of carrying 150 mA dc. With an out-of-balance current of 100 mA in these windings, the increased insertion loss

TABLE OF TRANSFORMER SPECIFICATIONS

Transformer Model Number	15189	15192	15257	15036
Type:	Hybrid Transformer	Line Transformer	Line Transformer	Repeating Coil
Primary Impedances:	600 $\Omega$ , 900 $\Omega$ 300 $\Omega$ , 450 $\Omega$ 1200 $\Omega$ , 1800 $\Omega$	600 $\Omega$ , 900 $\Omega$ 150 $\Omega$ , 250 $\Omega$	150 $\Omega$	500/600 $\Omega$ 125/150 $\Omega$
Secondary Impedances:	600 $\Omega$	600 $\Omega$	600 $\Omega$	500/600 $\Omega$ 125/150 $\Omega$
Insertion Loss:	3.7 dB from 300 to 6000 Hz 4.2 dB at 200 Hz 7.4 dB at 100 Hz	0.5 dB at 1000 Hz	0.5 dB at 1000 Hz	---
Frequency Response:	$\pm 1$ dB from 200 to 6000 Hz	$\pm 1$ dB from 100 to 10,000 Hz	$\pm 1$ dB from 100 to 10,000 Hz	$\pm 1$ dB from 20 to 20,000 Hz
Maximum Operating Level:	+10 dBm	+20 dBm	+20 dBm	+23 dBm
Maximum Current In Line Winding:	150 mA	100 mA	100 mA	150 mA
Maximum Out-of-Balance Current in Line Winding:	150 mA	100 mA	100 mA	(not applicable)
Dimensions -- Height:	3-7/16 inches	3-7/16 inches	3-7/16 inches	3-1/8 inches
Width:	1-1/2 inches	1-1/2 inches	1-1/2 inches	1-1/2 inches
Depth:	2 inches	2 inches	2 inches	2 inches
Mounting Socket:	Amphenol 77-MIP-12	Amphenol 77-MIP-12	Amphenol 77-MIP-12	None (not plug-in)
Weight:	1 lb.	1 lb.	1 lb.	15 oz.

Figure 2. Table of Transformer Specifications

*Specifications and components subject to change without notice. Overall performance will be maintained or improved.*



TELECOMMUNICATIONS

relative to the balanced current condition (or to the no current condition) at a frequency of 100 Hz is insignificant. A wide range of hybrid balancing networks is available for use in conjunction with the ALTEC 15189 Transformer.

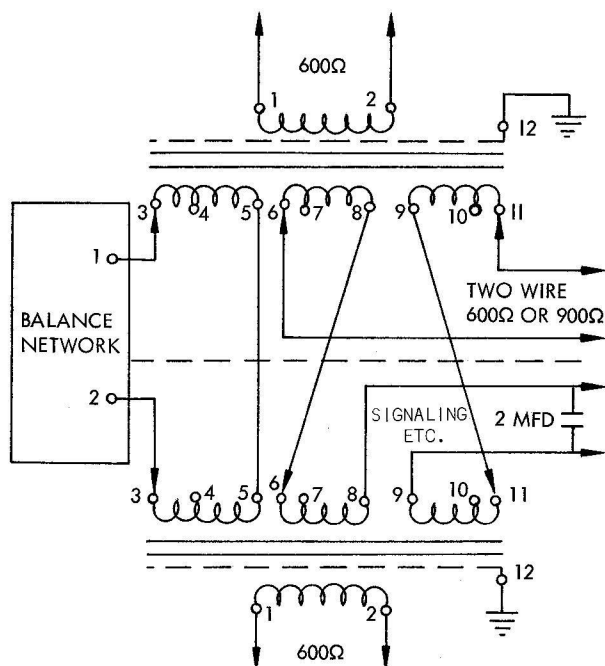
When a pair of 15189 Transformers are used to form a hybrid, the optional two-wire line impedances may be obtained by selecting socket lugs as indicated in the schematic (Figure 4).

When used singly, the transformer can be used to match its drop side impedance of 600 ohms to line side impedances of 300, 450, 1200 or 1800 ohms with two center tap connections available to establish bypass signaling circuits.

When a single 15189 Transformer is used (e.g., as a line transformer), adjustments at the socket lugs are necessary at the line side of the transformer in order to obtain the impedances shown in Figure 3.

IMPEDANCE TABLE - 15189		
Line Impedances	Connect to Transformer Taps	Center Tap Signaling Facilities
300	7 and 10	Strap 8 to 9
450	6 and 11	Strap 8 to 9
1200	4 and 10	Strap 5 to 6, and 8 to 9
1800	3 and 11	Strap 5 to 6, and 8 to 9

Figure 3. 15189 Transformer Connections Table



FOR TWO WIRE IMPEDANCE OF 900Ω USE TAPS 3, 6, & 11.  
FOR TWO WIRE IMPEDANCE OF 600Ω USE TAPS 4, 7, & 10.  
SCHEMATIC ILLUSTRATES TWO 15189 TRANSFORMERS CONNECTED TO FORM A HYBRID.

Figure 4. Schematic, 15189

## 15192 LINE TRANSFORMER

The ALTEC 15192 Transformer, designed to match a drop side impedance of 600 ohms to line impedances of 600 or 900 ohms, enables bypass signaling circuits to be derived at the center of the line windings. If center connections are not required, the two-line side windings may be paralleled to match line impedances of 150 or 250 ohms. The transformer has a frequency response of  $\pm 1$  dB from 100 to 10,000 Hz; can be operated at a level of +20 dBm; and handle an out-of-balance current value of 100 mA in the line windings with negligible effect on the insertion loss at 50 Hz.

The connection and strapping information necessary to obtain the various line impedances is shown in Figure 5.

IMPEDANCE TABLE - 15192		
Line Side	Transformer Taps	Center Tap Signaling Facilities
900	6 and 11 (Strap 8 to 9)	Yes
600	7 and 10 (Strap 8 to 9)	Yes
250	Strap 6 to 9 and 8 to 11	No
150	Strap 7 to 9 and 8 to 10	No

Figure 5. 15192 Transformer Connections Table

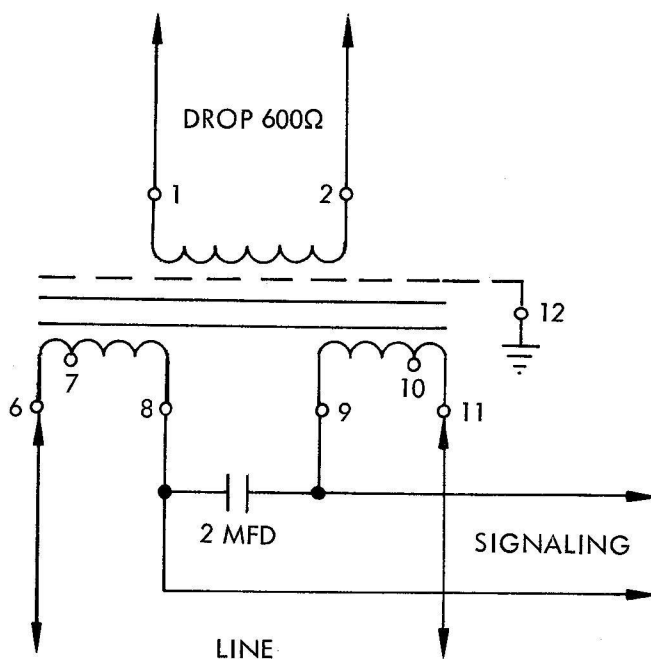


Figure 6. Schematic, 15192

## 15257 LINE TRANSFORMER

The ALTEC 15257 Line Transformer, used in telephone repeater systems such as the ALTEC 7300A/7303A or the 7301A Telephone Repeater Terminating Units, is designed to match a drop side impedance of 600 ohms to a line impedance of 150 ohms, and to enable bypass signaling circuits to be derived at the center of the line windings. The unit has a frequency response of  $\pm 1$



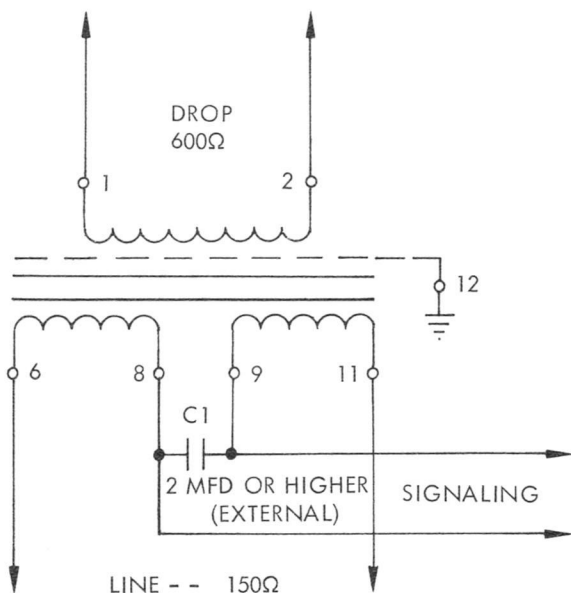


Figure 7. Schematic, 15257

dB from 100 to 10,000 Hz, and may be operated at a level of +20 dBm. It will handle an out-of-balance dc current value of 100 mA in the windings with negligible effect on the insertion loss at 50 Hz. A schematic drawing of the 15257 transformer is shown in Figure 7.

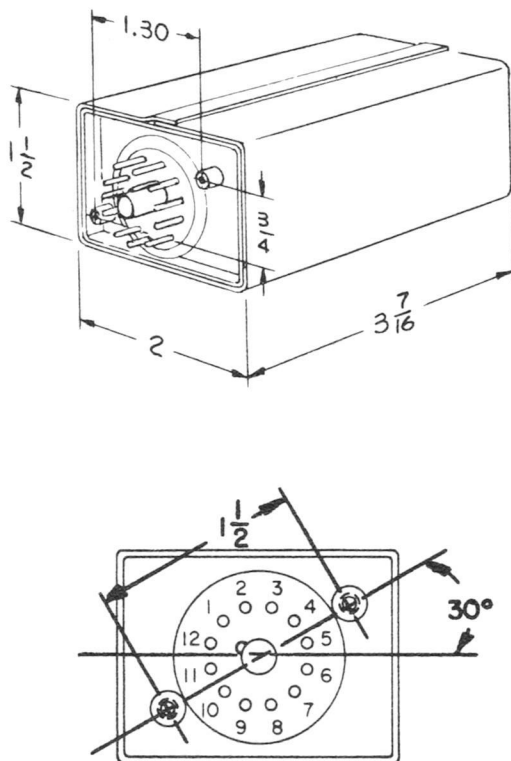


Figure 8. Dimensional Drawing, 15189, 15192 and 15257

## INSTALLATION (See Figure 8)

The ALTEC 15189 Hybrid Transformer, 15192 Line Transformer and 15257 Line Transformer are plug-in units which mount in an Amphenol 77-MIP-12 socket. The transformer should be inserted carefully to prevent possible damage to the pins of the plug. After the connection is completed, two 6-32 metal retaining screws should be installed to secure the installation.



Figure 9. 15036 Repeating Coil

## 15036 REPEATING COIL

The ALTEC 15036 Transformer, a high quality repeating coil, is designed for operation between the impedance combinations shown in Figure 10. The frequency response is flat within  $\pm 1$  dB from 20 to 20,000 Hz. The maximum operating level is +23 dBm (0.001 watt reference). It has an electrostatic shield and windings are balanced to provide 80 dB attenuation for longitudinal current when used in balanced circuits. Windings will carry 150 mA of ringing current. The coil structure and case provide approximately 50 dB of magnetic shielding.

The 15036 Repeating Coil mounts with two 6-32 metal retaining screws. Mounting hole placement and dimensions are shown in Figure 12. The overall case dimensions are: 3-1/8 inches high by 1-1/2 inches wide by 2 inches deep.

IMPEDANCE TABLE - 15036			
Source Impedance	Center Tap	Primary Connect To	Strap
500/600	2 - 4	1 and 6	2 to 4
125/150	5	1 and 6	1 to 4, 2 to 6
Load Impedance	Center Tap	Secondary Connect To	Strap
500/600	9 - 11	7 and 12	9 to 11
125/150	8	7 and 12	7 to 11, 9 to 12
Phase coils are in series aiding connection when 2-4, 6-7 and 9-11 are strapped.			

Figure 10. 15036 Transformer Connections Table

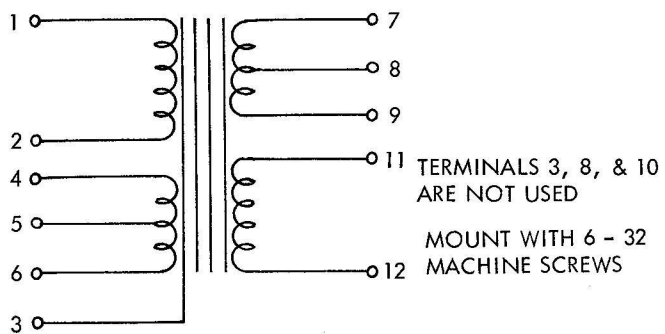


Figure 11. Schematic, 15036

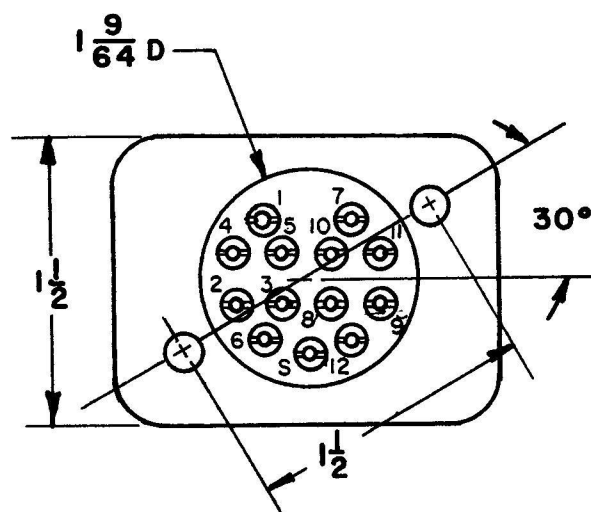


Figure 12. Mounting Information 15036

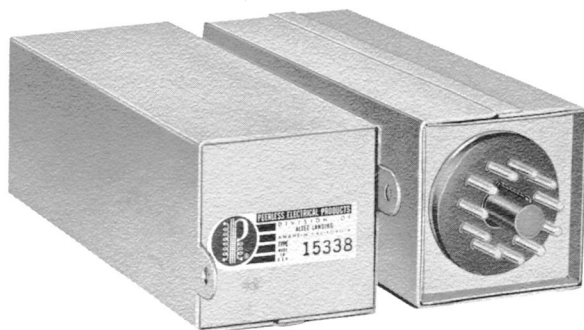


Figure 1. Altec 15338 Transformer, Typical

## GENERAL

These new ALTEC Telecommunication Products Transformers are accessory items designed for use in voice frequency communication systems. All may be used in conjunction with the ALTEC plug-in transistor amplifiers, equalizers and balance networks to establish telephone repeater systems; and all are of the 11-

pin plug-in type. Any of the three types, up to a total of ten, can be mounted within the ALTEC 12910 Mounting Panel or a similar type of mounting.

A description of each transformer follows, and a Table of Specifications will be found in Figure 2.

## 15337 HYBRID TRANSFORMER

Two ALTEC 15337 Transformers are used to form a hybrid arrangement which is mechanically compact, highly efficient in performance and provides optional two-wire impedances of 600 or 900 ohms, and four-wire impedances of 600 ohms. The insertion loss of the hybrid transformer is 3.8 dB at 1000 Hz. The frequency characteristic is  $\pm 1$  dB from 200 to 6000 Hz. The line windings are capable of carrying 150 mA dc. With an out-of-balance current of 100 mA in these windings, the increased insertion loss, relative to the balanced current condition (or to the no current condition) at a frequency of 100 Hz is insignificant.

	TABLE OF TRANSFORMER SPECIFICATIONS		
Transformer Model Number	15337 (Two reqd.)	15338	15339
Type:	Hybrid Transformer	Line Transformer	Line Transformer
Primary Impedances:	600 $\Omega$ , 900 $\Omega$ 300 $\Omega$ , 450 $\Omega$ 1200 $\Omega$ , 1800 $\Omega$	600 $\Omega$ , 900 $\Omega$ 150 $\Omega$ , 250 $\Omega$	150 $\Omega$
Secondary Impedances:	600 $\Omega$	600 $\Omega$	600 $\Omega$
Insertion Loss:	3.8 dB from 300 to 6000 Hz 4.2 dB at 200 Hz 5.0 dB at 100 Hz	0.6 dB at 1000 Hz	0.6 dB at 1000 Hz
Frequency Response:	$\pm 1$ dB from 200 to 6000 Hz	$\pm 1$ dB from 100 to 10,000 Hz	$\pm 1$ dB from 100 to 10,000 Hz
Maximum Operating Level:	+10 dBm	+20 dBm	+20 dBm
Maximum Current In Line Winding:	100 mA	100 mA	100 mA
Maximum Out-of-Balance Current In Line Winding:	100 mA	100 mA	100 mA
Dimensions -- Height: Width: Depth:	5 inches 1 5/8 1 5/8	5 inches 1 5/8 1 5/8	5 inches 1 5/8 1 5/8
Mounting Socket:	Amphenol 78-S11	Amphenol 78-S11	Amphenol 78-S11
Weight:	1 lb	1 lb	1 lb

Figure 2. Table of Transformer Specifications

Specifications and components subject to change without notice. Overall performance will be maintained or improved.

When used singly, the transformer can be used to match its drop side impedance of 600 ohm to line side impedances of 300, 450, 1200 or 1800 ohm with two center tap connections available to establish bypass signaling circuits.

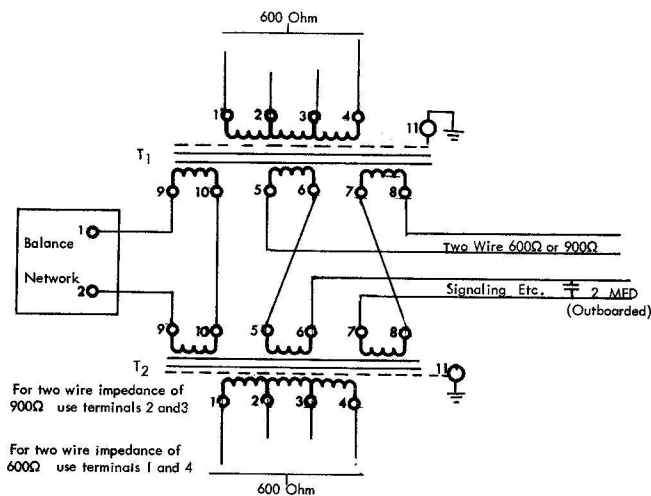


Figure 3. Schematic Illustrating Hybrid Connection Using Two 15337 Transformers

### 15338 LINE TRANSFORMER

The ALTEC 15338 Transformer, designed to match a drop side impedance of 600 ohm to line impedances of 600 or 900 ohm, enables bypass signaling circuits to be derived at the center of the line windings. If center connections are not required, the two-line side windings may be paralleled to match line impedances of 150 or 250 ohm. The transformer has a frequency response of  $\pm 1.0$  dB from 100 to 10,000 Hz; can be operated at a level of +20 dBm; and handle an out-of-balance current value of 100 mA in the line windings with negligible effect on the insertion loss at 50 Hz.

IMPEDANCE TABLE - 15338		
Line Side	Transformer Taps	Center Tap Signaling Facilities
900	5 and 6 (Strap 7 to 10)	Yes
600	3 and 4 (Strap 7 to 10)	Yes

Figure 4. 15338 Transformer Impedance Table

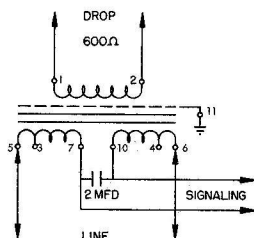


Figure 5. 15338 Schematic

### 15339 LINE TRANSFORMER

The ALTEC 15339 Line Transformer is designed to match a drop side impedance of 600 ohm to a line impedance of 150 ohm, and to enable bypass signaling circuits to be derived at the center of the line windings. The unit has a frequency response of  $\pm 1.0$  dB from 100 to 10,000 Hz, and may be operated at a level of +20 dBm. It will handle an out-of-balance dc current value of 100 mA in the windings with negligible effect on insertion loss of 50 Hz.

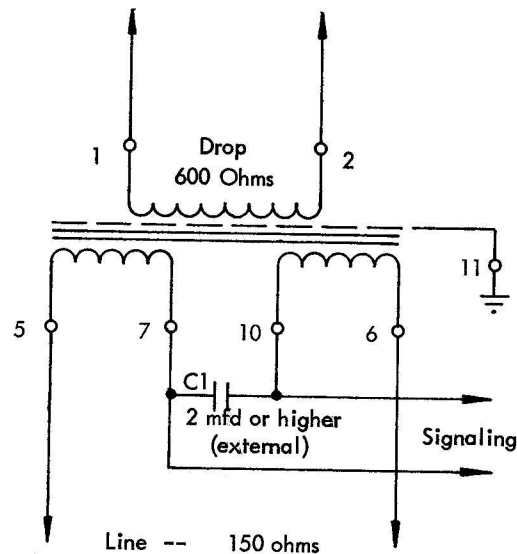


Figure 6. 15339 Schematic

### INSTALLATION

The ALTEC 15337 Hybrid Transformer, 15338 Line Transformer and the 15339 Line Transformer are plug-in units which mount in an Amphenol 78-S11 socket. When inserted into the ALTEC 12910 Mounting Panel care should be taken to prevent possible damage to the pins of the plug. In the event of a malfunction, use an ALTEC 13204 Extractor Tool to remove the unit from the mounting panel.

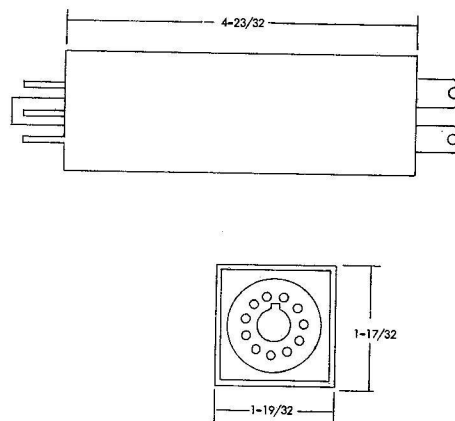


Figure 7. Dimensional Drawing of 15337, 15338, 15339 Transformers