

**J, K, AND L MULTIPLEX TERMINALS
COMMON EQUIPMENT
GROUP CONNECTOR
DESCRIPTION**

B1

CONTENTS	PAGE	1. GENERAL
1. GENERAL	1	1.01 General Information
1.01 <i>General Information</i>	1	(a) Designation: B1 Group Connector J68799 (SD-64989-01) (Fig. 1)
1.02 <i>Reason for Issue</i>	1	(b) Consists of: Two one-way 60- to 108-kHz transmission circuits
1.03 <i>Characteristics</i>	3	(c) Function: Provides interconnection for any combination of J, K, or L carrier systems, via group circuits, without group-to-channel or channel-to-group translation (Fig. 2)
2. CIRCUIT DESCRIPTION	3	(d) Method of performing function:
2.01 <i>General</i>	3	(1) Accepts and reduces output level of group demodulator in receiving group circuit to required input level of group modulator in transmitting group circuit
2.02 <i>Input Jacks</i>	3	(2) Removes incoming out-of-band signals
2.03 <i>Delay Equalizer</i>	4	(3) Removes incoming group pilot signals
2.04 <i>Limiters</i>	4	(4) Provides for insertion of outgoing group pilot signals
2.05 <i>Adjustable Attenuator</i>	4	(5) Provides dual output (regular and alternate) patching facilities
2.06 <i>Bandpass Filter</i>	4	(6) Provides delay equalization (optional) for wideband data transmission.
2.07 <i>Band-elimination Filter—221T</i>	4	
2.08 <i>Band-elimination Filter—109A</i>	4	
2.09 <i>Hybrid Transformer</i>	5	
2.10 <i>Output Jacks</i>	5	
2.11 <i>Pilot Insertion Connections</i>	5	
3. CONFIGURATIONS	5	1.02 Reason for Issue
4. CABLING	5	(a) To renumber: Section 356-020-100 to 356-020-101

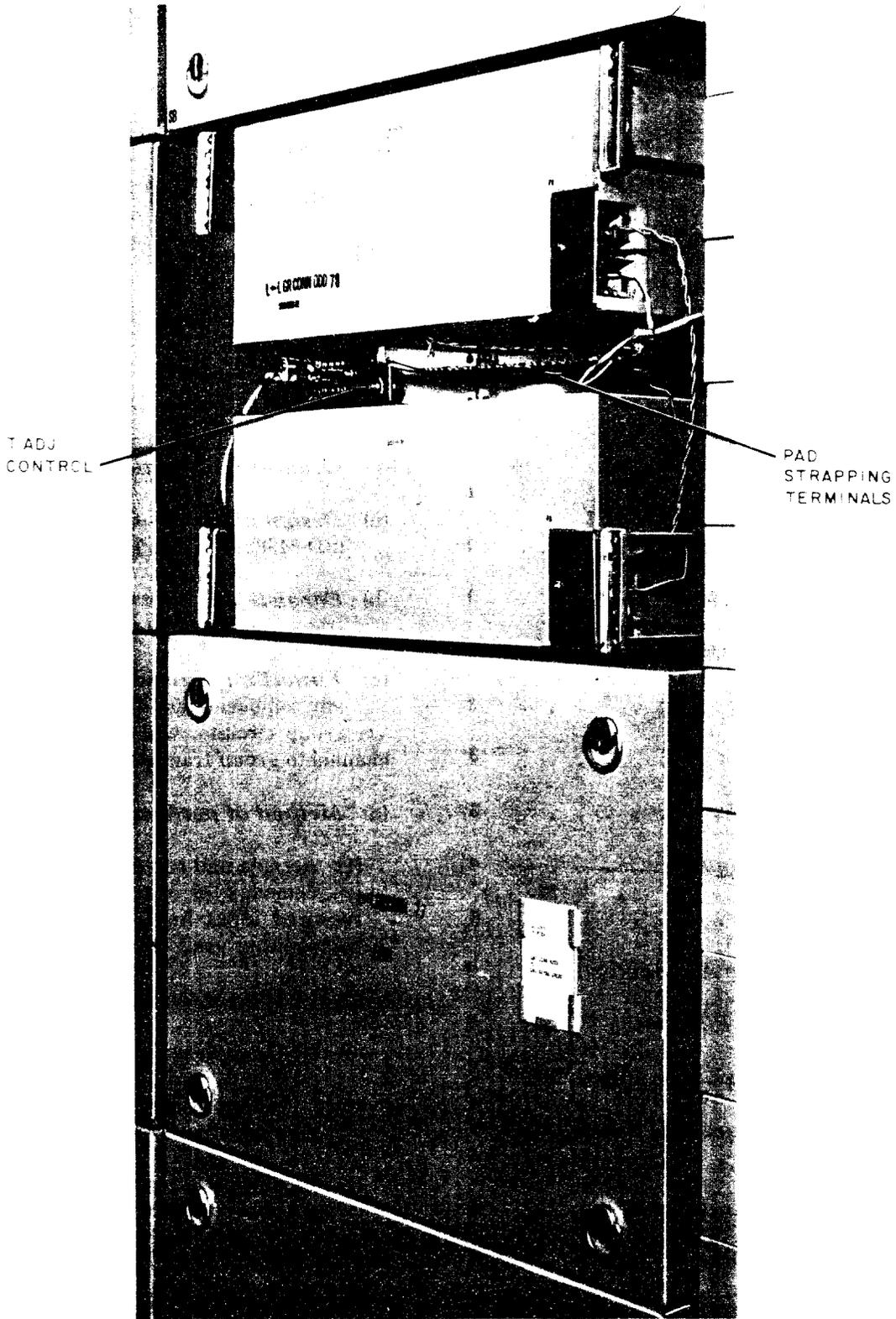


Fig. 1—L-to-L B1 Group Connector—Front View

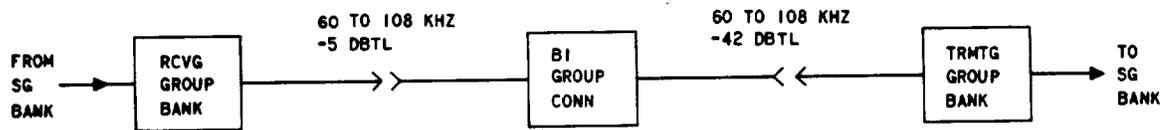


Fig. 2—L-to-L B1 Group Connector—Function

(b) **To update:** Group connector J68799 (SD-64989-01)

(c) **To delete:** Group connector J68779 (SD-64996-01) because of its limited range of usefulness and inferior transmission performance compared with the J68799 connector, which supercedes the J68779.

1.03 Characteristics

- (a) **Input source:** Group demodulator in receiving group circuit
- (b) **Input frequency band:** 60 to 108 kHz (basic group)
- (c) **Input level:** -5 dBTL
- (d) **Input impedance:** 135 ohms, balanced
- (e) **Output load:** Group modulator in transmitting group circuit
- (f) **Output frequency band:** 60 to 108 kHz (basic group)
- (g) **Blocked frequencies:** <60, 60, 64, 92, 104, 108, >108 kHz
- (h) **Output level:** -42 dBTL
- (i) **Output impedance:** 135 ohms, balanced
- (j) **Overall loss:** 37 dB
- (k) **Midband delay:** 50 microseconds
- (m) **Mounts on:** 19-inch duct-type miscellaneous bay
- (n) **Adjustments:** Straps and potentiometer (optional) on a 0- to 7.5-dB attenuator (Fig. 3).

2. CIRCUIT DESCRIPTION (FIG. 4)

2.01 General

(a) **Consists of the following items:**

- (1) Input jacks
- (2) Delay equalizer (optional)
- (3) Limiter
- (4) Adjustable attenuator
- (5) Bandpass filter
- (6) Band-elimination filter(s)
- (7) Hybrid transformer
- (8) Output jacks
- (9) Connections from pilot-insertion unit.

2.02 Input Jacks

- (a) **Type:** Dual high-frequency transmission jacks (410D)
- (b) **Designation:** GR CONN IN
- (c) **Associated jack:** GR DEM OUT
- (d) **Location:** Receiving group bank shelf (L), sealed test terminal (K), HF patch bay (J)
- (e) **Function:**
 - (1) Provides normal through-connection from group demodulator output
 - (2) Provides for lineup and maintenance patching to group connector input.

2.03 Delay Equalizer

- (a) **Type:** Inductor-capacitor network (F-56020)
- (b) **Function:** Equalizes delay over 60- to 108-kHz band to compensate for delay in other components in the group connector when wideband data signals are transmitted. See Fig. 5 for unequalized delay characteristics.

2.04 Limiter

- (a) **Type:** Thermistor (28A)
- (b) **Limiting level:** +13 dBm approximately
- (c) **Function:** Prevents high-level input signals from overloading the following (transmitting) section of the carrier system.

2.05 Adjustable Attenuator

- (a) **Type:** Resistive pads
- (b) **Overall attenuation:** 0 to 7.5 dB in 0.5-dB steps
- (c) **Method of adjustment:** Strapping and variable compensation control (T ADJ)
- (d) **Strap location:** See Fig. 3
- (e) **T ADJ (option V) location:** See Fig. 3
- (f) **Function:** Controls overall loss of group connector to 37 dB

2.06 Bandpass Filter

- (a) **Type:** Inductor-capacitor network (225D)
- (b) **Passes:** 60 to 108 kHz at 15-dB loss (Fig. 6)
- (c) **Blocks:**
 - (1) 0 to 60 kHz (> 65-dB loss)
 - (2) 108 to ∞ kHz (> 50-dB loss)
- (d) **Function:**
 - (1) Passes basic group band

- (2) Blocks all frequencies below and above the basic group band.

2.07 Band-elimination Filter—221T

- (a) **Type:** Quartz-crystal network (221T)
- (b) **Blocks**
 - (1) 60 kHz (58-dB loss) (Fig. 7)
 - (2) 64 kHz (68-dB loss)
 - (3) 92 kHz (80-dB loss)
 - (4) 108 kHz (40-dB loss)

(c) Function:

- (1) Prevents pilot frequencies from passing from group demodulator in receiving group circuit to group modulator in transmitting group circuit
- (2) Passes all other frequencies within the basic group band

Note: A narrow band at 77 kHz is also blocked because of secondary resonance of the crystal network, but this causes no detectable deterioration of performance.

2.08 Band-elimination Filter—109A

- (a) **Type:** Quartz-crystal network (109A)
- (b) **Eliminates:**
 - (1) 64 kHz (31-dB loss) (Fig. 8)
 - (2) 104 kHz (29-dB loss)
- (c) **Function:**
 - (1) Prevents pilot signals from passing from group modulator in receiving group circuit to group modulator in transmitting group circuit
 - (2) Passes all other frequencies within the basic group band.

2.09 Hybrid Transformer

- (a) **Type:** Three-port transformer (146 AK) plus balancing network
- (b) **Input impedance:** 135 ohms, balanced
- (c) **Output impedance:** 135 ohms, balanced
- (d) **Frequency range:** 10 to 110 kHz
- (e) **Function:** Provides two equal outputs (regular and alternate) for flexible patching.

2.10 Output jacks

- (a) **Type:** Dual high-frequency transmission jacks (410D)
- (b) **Designations:**
 - (1) GR CONN OUT
 - (2) GR CONN OUT ALT
- (c) **Associated jack:** GR MOD IN
- (d) **Location:** Transmitting group bank shelf (L), sealed test terminal (K), HF patch bay (J)
- (e) **Function:**
 - (1) Provides normal through-connection to group modulator input
 - (2) Provides for lineup and maintenance patching from group connector output.

2.11 Pilot Insertion Connections

- (a) **Type:** Direct to input port of hybrid transformer (Fig. 4)

- (b) **Function:** Provides for insertion of locally generated pilot via hybrid transformer

3. CONFIGURATIONS

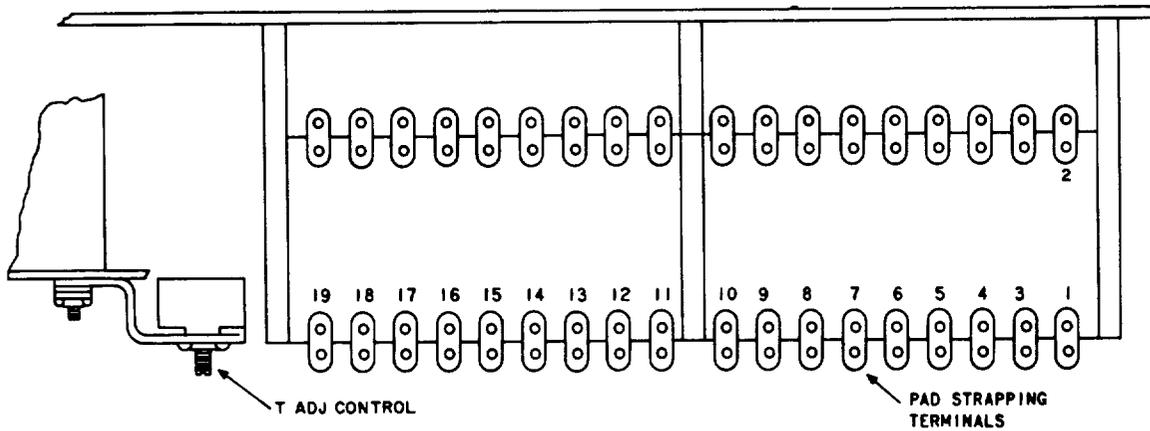
- (a) L to L (Fig. 9)
- (b) L to K (Fig. 10, 12)
- (c) L to J (Fig. 11, 12)
- (d) J East to K (Fig. 10)
- (e) J West to K (Fig. 11)
- (f) J to J (Fig. 12)
- (g) J to K (Fig. 12)
- (h) K to K (Fig. 10).

4. CABLING**4.01 Group Connector to HF Patching Jacks**

- (a) ≤ 200 feet: 720-type cable
- (b) > 200 feet: a combination of lead-covered, paper-insulated cable and 720-type cable

Note 1: Only segregated pairs are used in paper-insulated cable (see SD-59286-01).

Note 2: When the cable between the group connector and the HF patching bay exceeds 100 feet, two separate one-way group connectors are used. One is located at the transmitting HF patching bay for each direction of transmission (see ED-63302-01).



ADJUST PAD ACCORDING TO THE FOLLOWING STRAPPING DATA*

PAD LOSS-DB	TERMINALS TO BE STRAPPED			
0	1 TO 16			
	4 TO 17			
0.5	1 TO 16	15 TO 16*		
	4 TO 17			
1.0	1 TO 11	13 TO 16		
	4 TO 12	14 TO 17		
1.5	1 TO 11	13 TO 16	15 TO 16*	
	4 TO 12	14 TO 17		
2.0	1 TO 7	9 TO 16		
	4 TO 8	10 TO 17		
2.5	1 TO 7	9 TO 16	15 TO 16*	
	4 TO 8	10 TO 17		
3.0	1 TO 7	9 TO 11	13 TO 16	
	4 TO 8	10 TO 12	14 TO 17	
3.5	1 TO 7	9 TO 11	13 TO 16	15 TO 16*
	4 TO 8	10 TO 12	14 TO 17	
4.0	1 TO 3	5 TO 16		
		6 TO 17		
4.5	1 TO 3	5 TO 16	15 TO 16*	
		6 TO 17		
5.0	1 TO 3	5 TO 11	13 TO 16	
		6 TO 12	14 TO 17	
5.5	1 TO 3	5 TO 11	13 TO 16	15 TO 16*
		6 TO 12	14 TO 17	
6.0	1 TO 3	5 TO 7	9 TO 16	
		6 TO 8	10 TO 17	
6.5	1 TO 3	5 TO 7	9 TO 16	15 TO 16*
		6 TO 8	10 TO 17	
7.0	1 TO 3	5 TO 7	9 TO 11	13 TO 16
		6 TO 8	10 TO 12	14 TO 17
7.5	1 TO 3	5 TO 7	9 TO 11	13 TO 16
		6 TO 8	10 TO 12	14 TO 17

* WHEN (V) OPTION IS EMPLOYED, DO NOT STRAP TERMINAL 15 TO 16 AT ANY TIME. STRAP PAD LOSS TO NEAREST LOWER WHOLE NUMBER AND SET ADJ POTENTIOMETER(T) FOR FRACTIONAL LOSS.

Fig. 3—Pad Strapping Terminals and Variable Control for B1 Group Connector—Top View

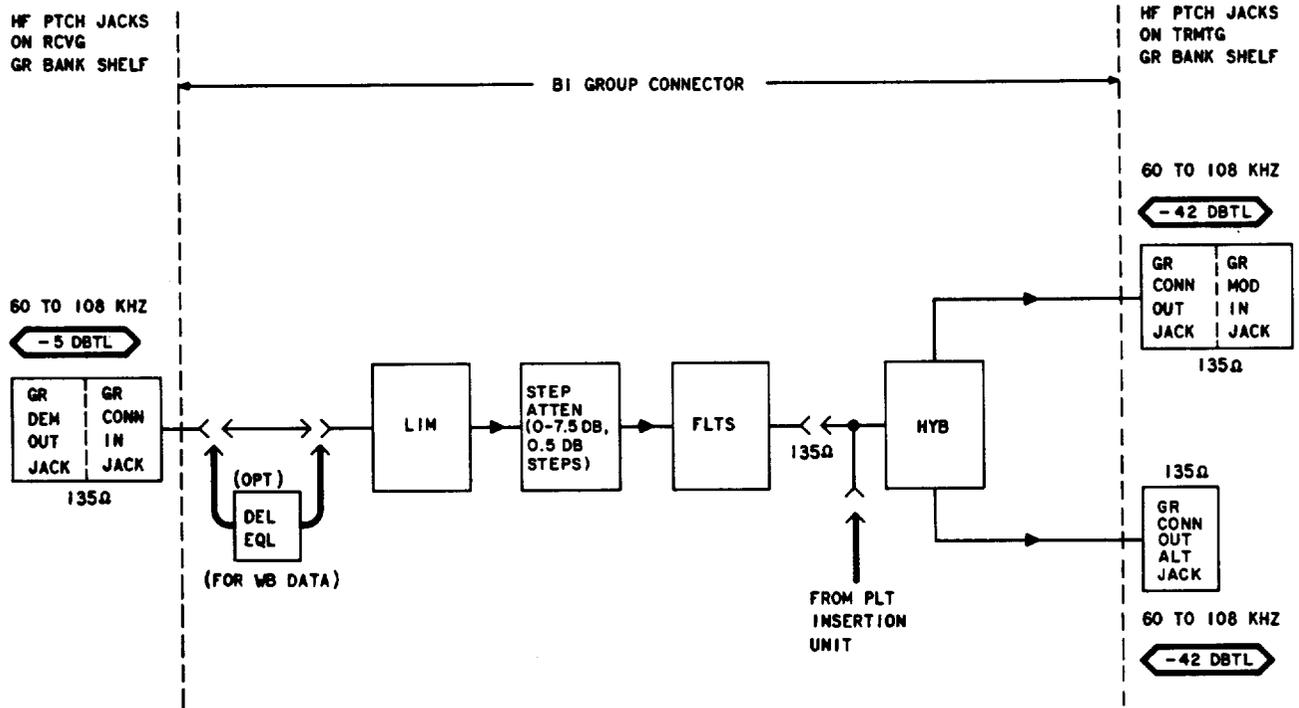


Fig. 4—L-to-L B1 Group Connector—Basic Unit

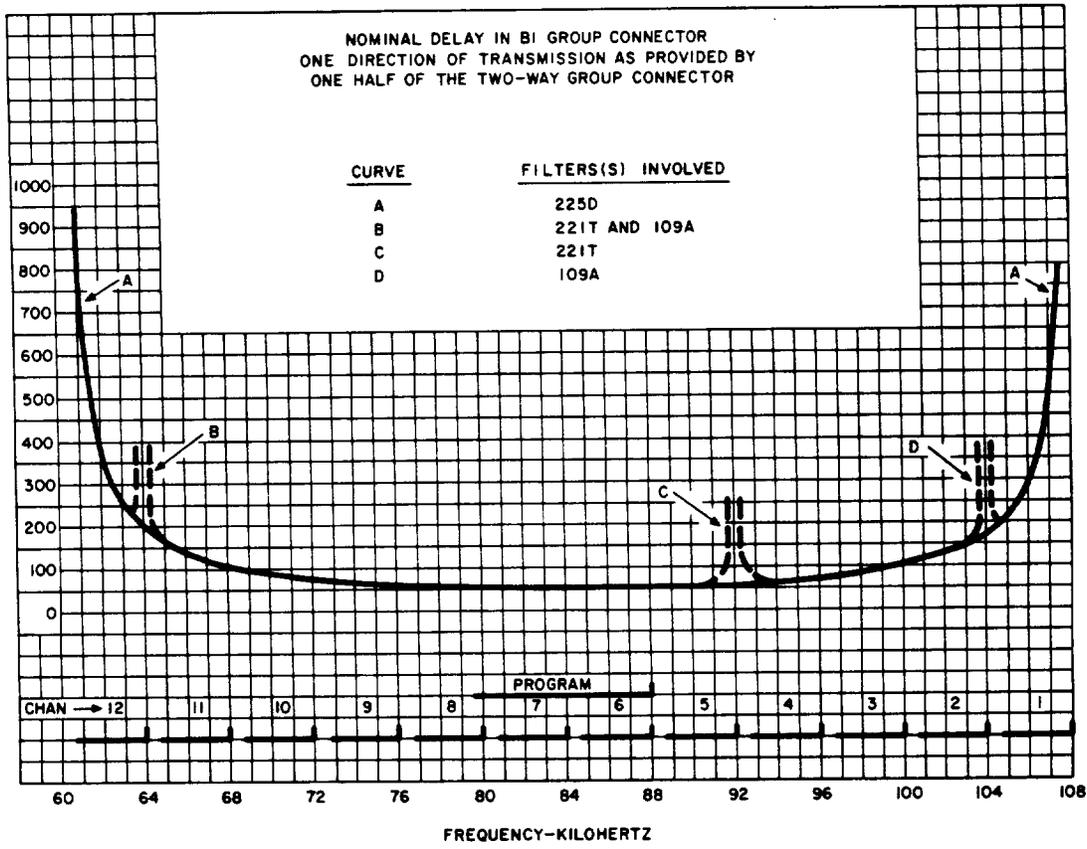


Fig. 5—Delay Vs Frequency in Unequalized B1 Group Connector

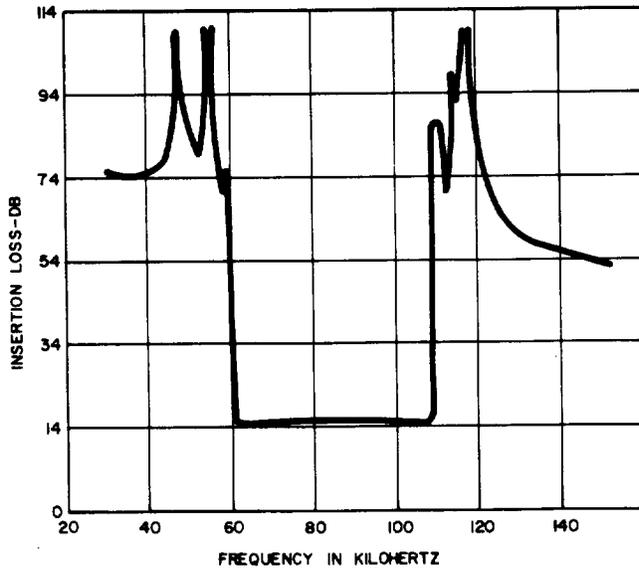


Fig. 6—Typical Insertion Loss Vs Frequency—225D Filter

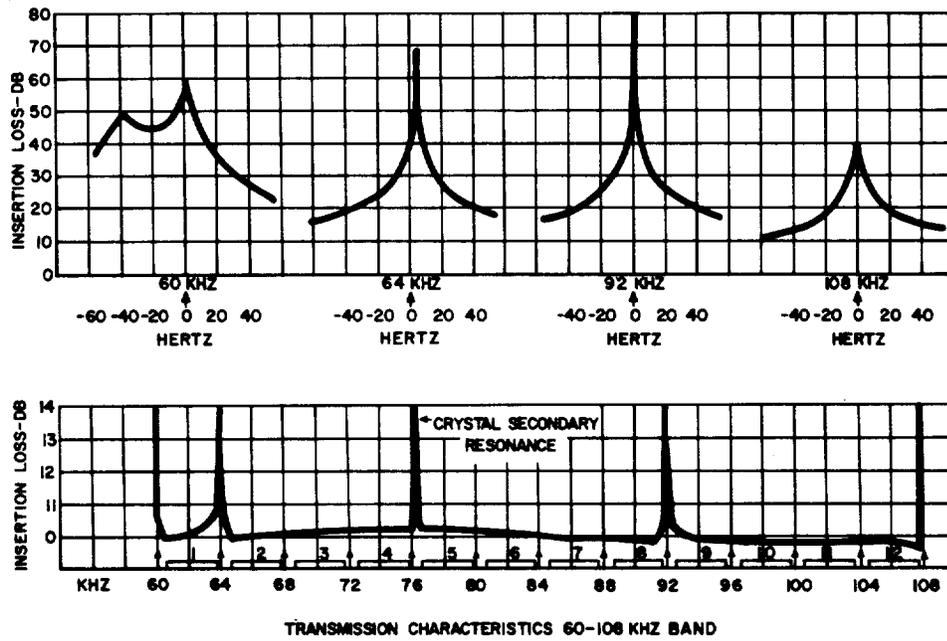


Fig. 7—Typical Insertion Loss Vs Frequency—221T Filter

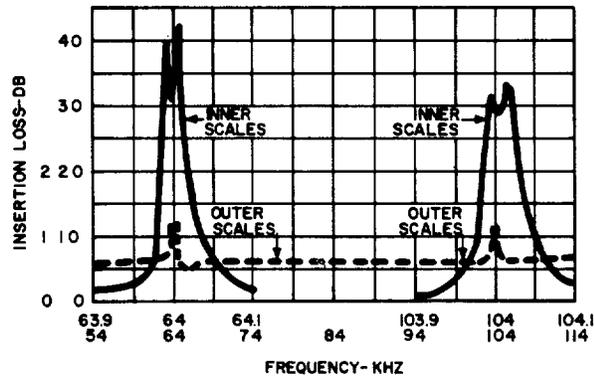
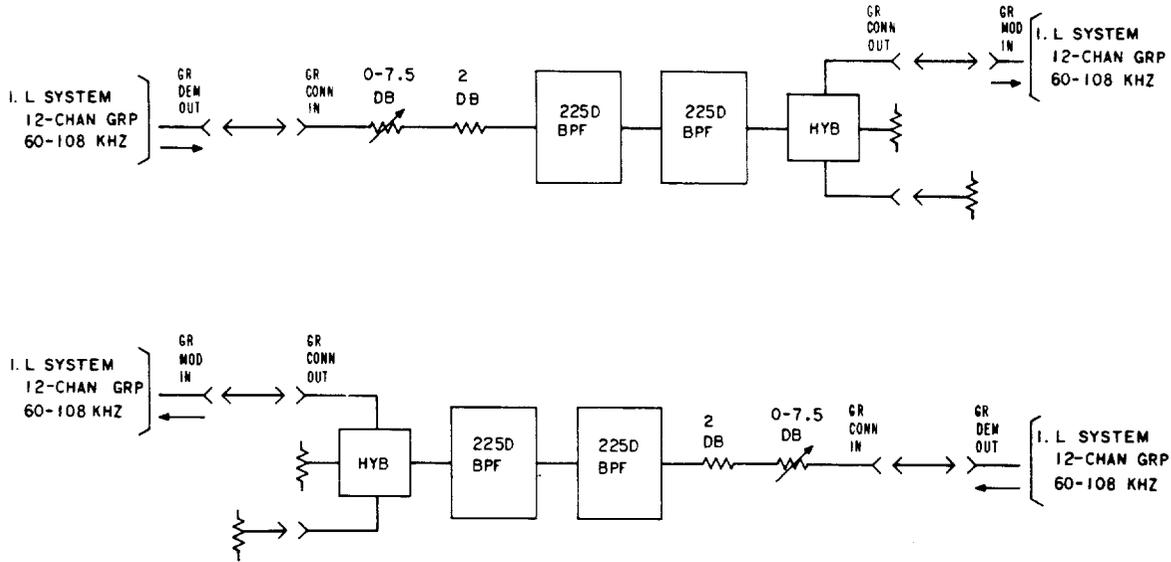


Fig. 8—Typical Insertion Loss Vs Frequency—109A Filter



BOTH HALVES OF THE CONNECTOR ARE IDENTICAL, AND THE TRANSMISSION IS ALIKE IN EACH DIRECTION. ARROWS INDICATE DIRECTION OF TRANSMISSION.

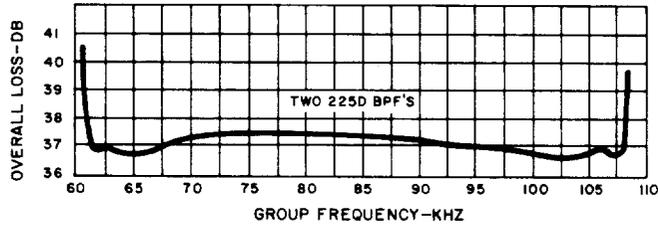


Fig. 9—B1 Group Connector for L-to-L System

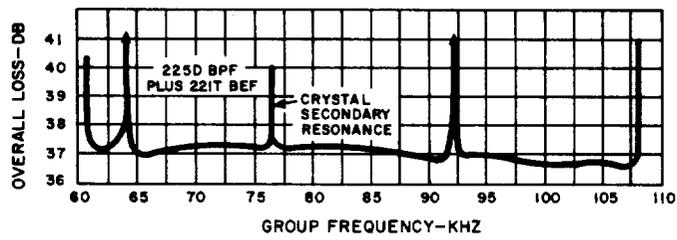
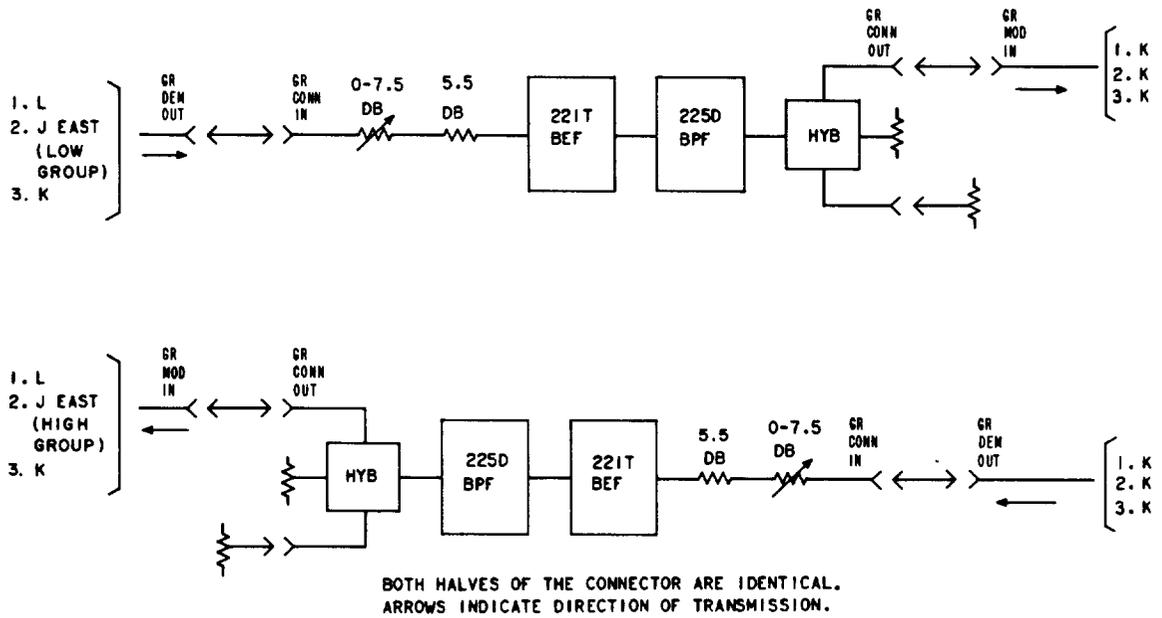
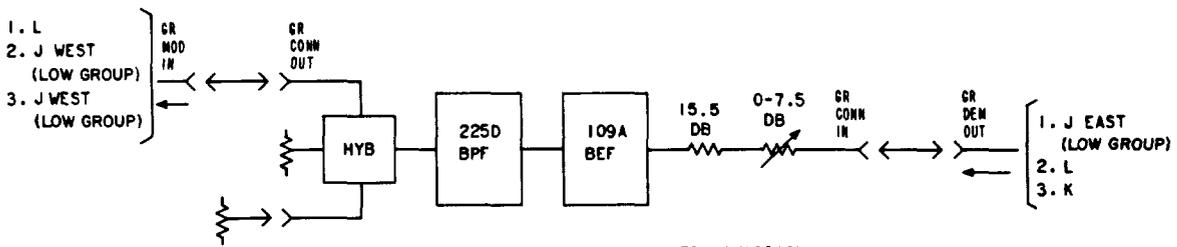
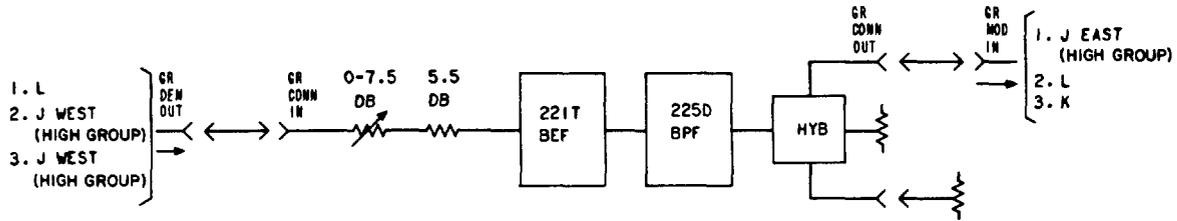


Fig. 10—B1 Group Connector for L-to-K, J-East-to-K, and K-to-K Systems



ARROWS INDICATE DIRECTION OF TRANSMISSION

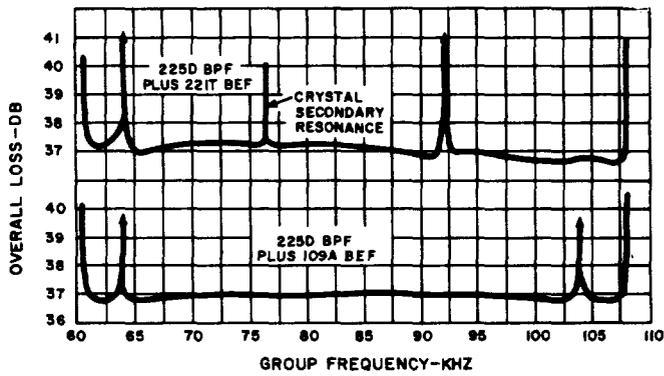


Fig. 11—B1 Group Connector for L-to-J and J-West-to-K Systems

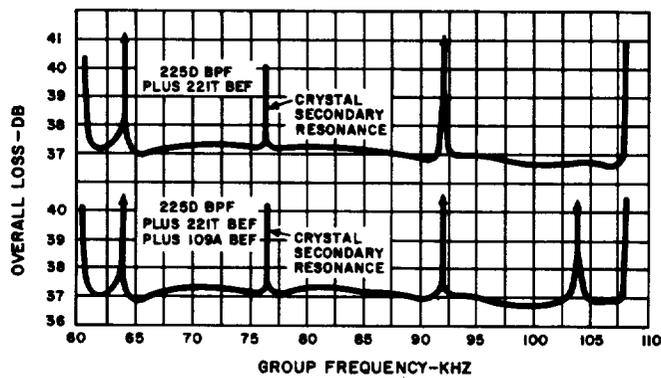
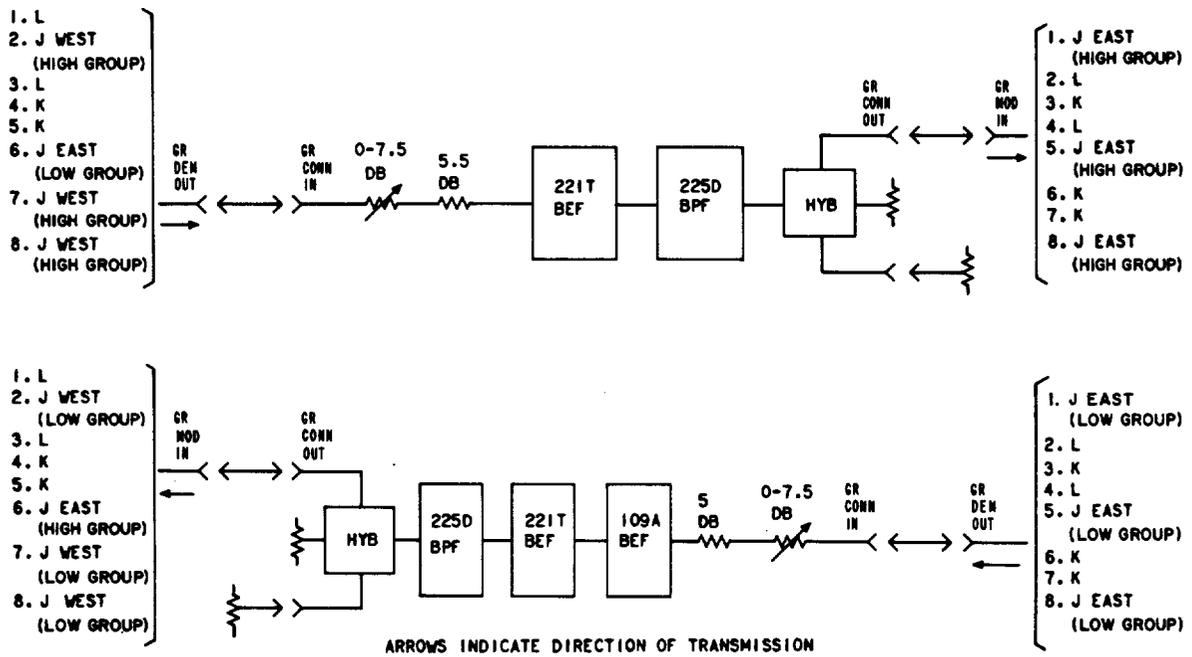


Fig. 12—B1 Group Connector for L-to-J, L-to-K, J-to-J, and J-to-K Systems