

J99343RA AND RF 2-4 WIRE TERMINAL REPEATERS

DESCRIPTION

METALLIC FACILITY TERMINAL

CONTENTS	PAGE	CONTENTS	PAGE
1. GENERAL	1	D. Output Power Capability	16
2. FUNCTIONAL DESCRIPTION—J99343RA, LISTS 1, 2 AND 3	2	7. APPLICATIONS	17
A. Operation	2	8. MAINTENANCE	21
B. Unit Controls	3	9. REFERENCES	21
3. FUNCTIONAL DESCRIPTION—J99343RA, LIST 4	6	1. GENERAL	
A. Operation	6	1.01 This section provides a physical description and discusses the basic functions of the 2-4 terminal repeaters, J99343RA and RF. The individual units are described in detail; transmission perfor- mance, typical applications, and maintenance philos- ophy are also discussed.	
B. Unit Controls	6	1.02 This section is being reissued to provide a gen- eral update of information. Since this is an extensive revision, no change arrows have been used to denote changes.	
4. FUNCTIONAL DESCRIPTION - J99343RF, LIST 1	8	Physical Description	
A. Operation	8	1.03 The Metallic Facility Terminal (MFT) is a standard equipment arrangement for provid- ing various transmission and/or signaling functions that may be required by metallic facilities. The 2-4 wire terminal units are MFT plug-ins that consist of a component board held by either a die-cast alumi- num or molded polycarbonate frame. The MFT unit measures 1-11/16 inches wide, 7-7/8 inches high, and 9 inches deep.	
B. Unit Controls	10	1.04 These units can be used in either a single- or a double-module mounting arrangement. They can be mounted in any slot of a single-module	
5. FUNCTIONAL DESCRIPTION - J99343RF, LIST 2	12		
A. Operation	12		
B. Unit Controls	12		
6. PERFORMANCE CHARACTERISTICS	14		
A. Amplifier/Equalizer Frequency Re- sponse	14		
B. Envelope Delay Distortion	14		
C. Longitudinal Balance	16		

NOTICE

Not for use or disclosure outside the
Bell System except under written agreement

shelf or in the transmission slot of a double-module shelf. In double-module applications, the repeater may be used with or without a companion signaling unit. Section 332-910-101 contains additional information on MFT mounting arrangements.

1.05 The 2-4 terminal repeaters, J99343RA, Lists 1, 2, 3, and 4, provide gain between loaded or nonloaded 4-wire facilities and 600- or 900-ohm 2-wire terminal equipment. They provide active equalization in the B-to-A direction of transmission. The 2-4 terminal repeaters, J99343RF, Lists 1 and 2, provide gain and equalization between loaded or nonloaded 4-wire facilities and 600- or 900-ohm 2-wire terminal equipment. They provide active equalization in both directions of transmission.

1.06 The J99343RA, Lists 1, 2, 3 and 4, are functionally similar. However, the switch format and the physical layout of the J99343RA, Lists 1, 2, and 3, differ from the List 4 and are therefore described separately. The J99343RF, Lists 1 and 2, are functionally similar. However, the switch format and physical layout of the J99343RF, List 1, differs from the List 2 and is described separately. Sections 332-912-232 and 332-912-235 provide installation, testing and information touch-up procedures for these units.

2. FUNCTIONAL DESCRIPTION—J99343RA, LISTS 1, 2 AND 3

A. Operation

2.01 The J99343RA, Lists 1, 2 and 3, are shown in Fig. 1. They provide gain between loaded or nonloaded 4-wire facilities and 600- or 900-ohm 2-wire terminal equipment. Equalization is provided in the B-to-A direction of transmission. Figure 2 is a block diagram of the J99343RA units.

Amplifier Units

2.02 Adjustable gain is provided in these repeaters by the RU1 amplifier unit. RU1 provides gain for the A-to-B direction of transmission. The controls for the amplifier units are designated GN ADJ and GN. The range of the amplifier unit gain is -20 db to +24 dB.

Caution: *For crosstalk considerations, the maximum gain of 2-4 wire repeaters typically is limited to 15 dB.*

Equalizer/Amplifier Units

2.03 Adjustable gain and equalization are provided in these repeaters by the RU2 equalizer/amplifier unit. RU2 provides gain and equalization for the B-to-A direction of transmission. The controls for gain and equalization are designated GN ADJ, GN, SLOPE, HT, and BW. The range of the amplifier unit gain is approximately -20 dB to +24 dB. Additional gain is provided by the adjustable equalizer.

Caution: *For crosstalk considerations, the maximum gain on 2-4 wire repeaters typically is limited to 15 dB.*

Coupling Transformers

2.04 The B side of each repeater has two coupling transformers that interface with the 4-wire cable facility. These transformers provide simplex leads (SX, SX1) for signaling unit access. The transformers are equipped with an impedance option switch, labeled OUT, for facility impedance matching.

Two-Transformer Hybrid

2.05 The two-transformer hybrid separates the 2-wire transmission interface into a 4-wire path through the repeater. This allows gain and equalization to be provided in each direction of transmission, however, the J99343RA repeaters provide equalization in the B-to-A direction only. The transformer hybrid is matched to the terminal equipment by the compromise network.

Compromise Networks (A-Side)

2.06 The compromise network (COMP NET) in the repeater provides hybrid balance by approximating the impedance of the 2-wire terminal equipment. The COMP NET uses 600 or 900 ohms in series with 2.15 μ F in the hybrid balance circuit. The impedance selection controls are designated HYB1 and HYB2.

Network Buildout Capacitor

2.07 The network buildout capacitor (NBOC) provides from 0 to 0.126 μ F of adjustable capacitance to balance the capacitance of the office cabling on the 2-wire side of the unit. The capacitance of the NBOC is adjusted by screw switches labeled A, B, C, D, E, and F.

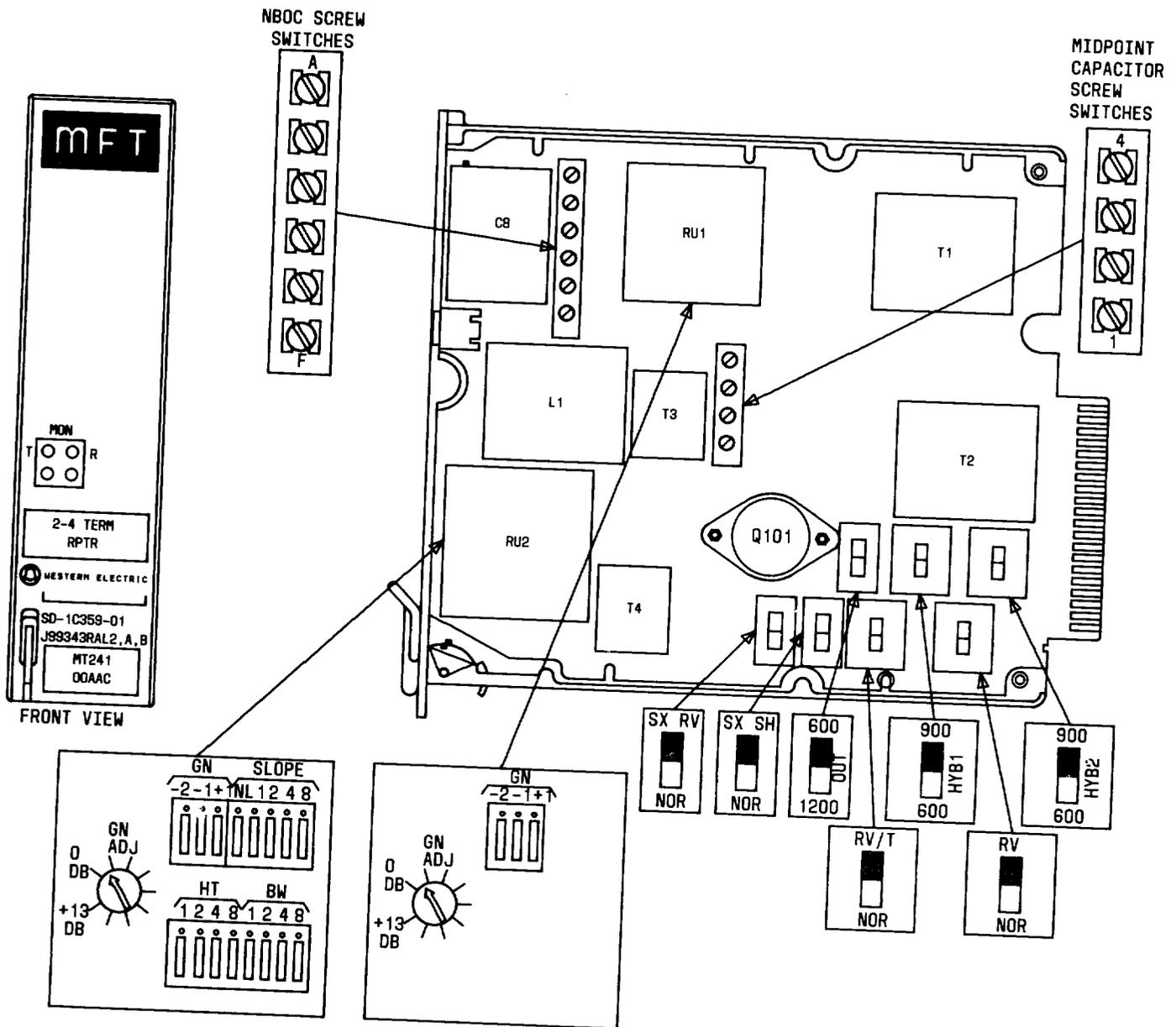


Fig. 1—J99343RA, List 1, 2, and 3 Repeater

Signaling

2.08 The A-side signaling leads (A and B) are derived from the hybrid windings and midpoint capacitor on the A side of the repeater. The SX inductors isolate the transmission path from the signaling circuit. The B-side signaling leads (SX and SX1) are derived through the transformer windings on the B

side of the repeater. The three basic signaling modes (normal, reverse, and through) are controlled by the NOR·RV and NOR·RV/T switches.

B. Unit Controls

2.09 In the following paragraphs, the rocker-type switches for a particular function are oper-

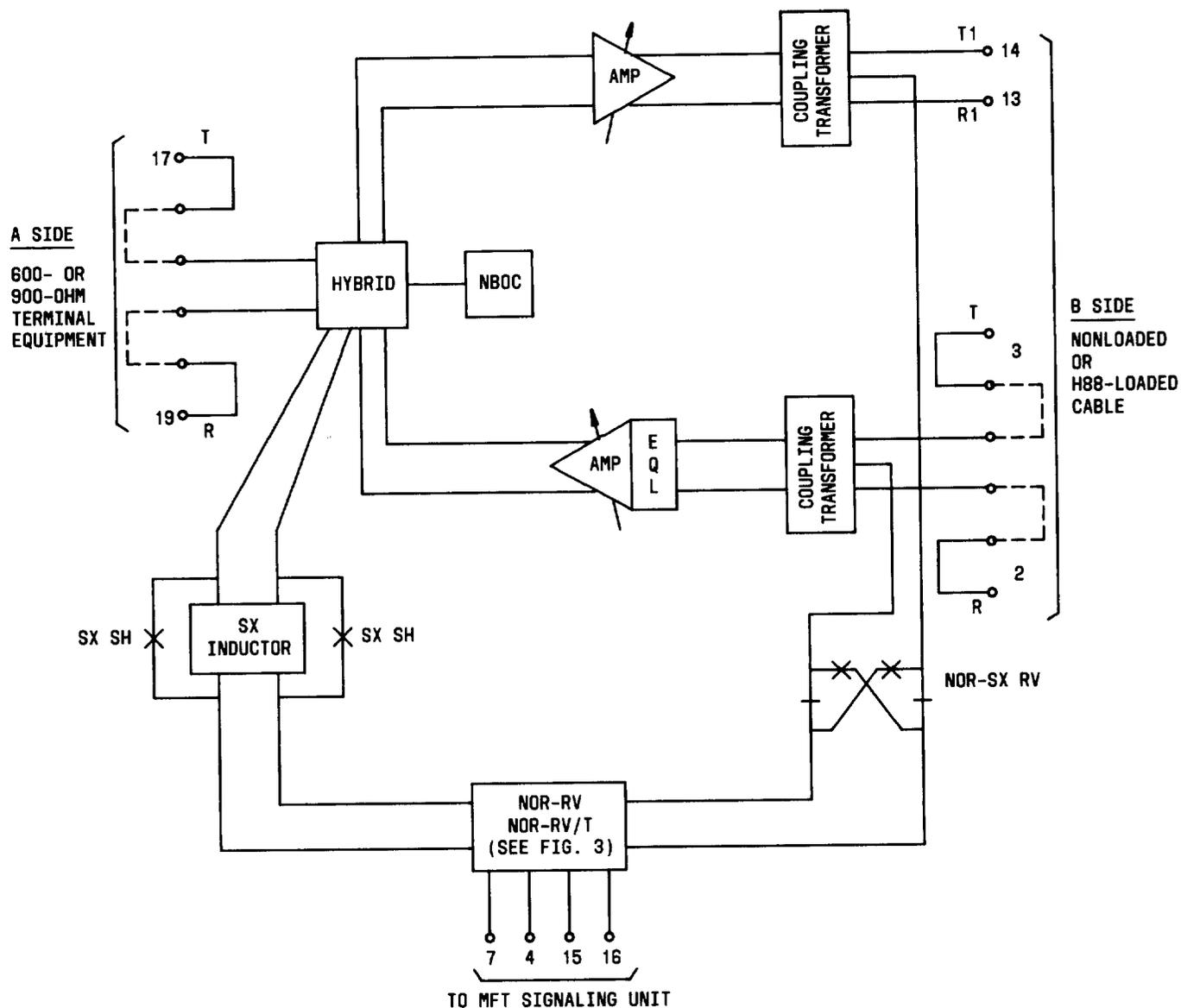


Fig. 2—Block Diagram of J99343RA

ated when depressed toward the respective designation. The sum of the values of the switches operated is the setting for that function. The unit controls are illustrated in Fig. 1.

GN ADJ and GN

2.10 The RU1 and RU2 amplifiers are controlled by a dial-type potentiometer designated GN ADJ and three rocker switches designated GN. The GN ADJ is calibrated in a range from 0 to 14 dB. Gain is

increased by rotating the dial clockwise. The GN switches are labeled -2, -1, and +1. When operated, the -2 switch provides 20 dB of loss, the -1 switch provides 10 dB of loss, and the +1 switch provides 10 dB of gain. The gain setting is the sum of the GN ADJ and GN controls. See **Caution** in paragraph 2.02.

SLOPE, HT and BW

2.11 Thirteen rocker switches [designated SLOPE (NL, 1, 2, 4, 8), HT (1, 2, 4, 8), and BW (1, 2, 4,

8) adjust the equalization in the B-to-A direction of transmission. These switches are located on the RU2 amplifier unit. The sum of the values of the switches operated and the setting of the NL switch determines the equalization. The NL switch acts as a range selector and when in the NL position provides a steeper degree of equalization. The NL switch should be in the NL position when interfacing nonloaded cable. When interfacing loaded cable, the switch is to be away from the NL designation position. See Section 332-912-232 for prescription settings for the SLOPE, HT, and BW switches.

OUT

2.12 The transformers that interface the cable facility are provided with a 600/1200 ohm impedance option switch. The 1200 ohm impedance is used for loaded cable and the 600 ohm impedance is used for nonloaded cable.

HYB1 and HYB2

2.13 The HYB1 and HYB2 switches are used to select a 600- or 900-ohm input impedance for the 2-wire (A) side of the repeater. These switches also select the proper resistance (600 or 900 ohms) for the COMP NET. The two switches are to be operated together as if they are one switch.

Midpoint Capacitor

2.14 The midpoint capacitor screw switches are labeled 1, 2, 3, and 4. Screw switches 1 and 2 provide capacitance on the line side of the hybrid. Screw switches 3 and 4 provide capacitance on the network side of the hybrid to provide hybrid balance.

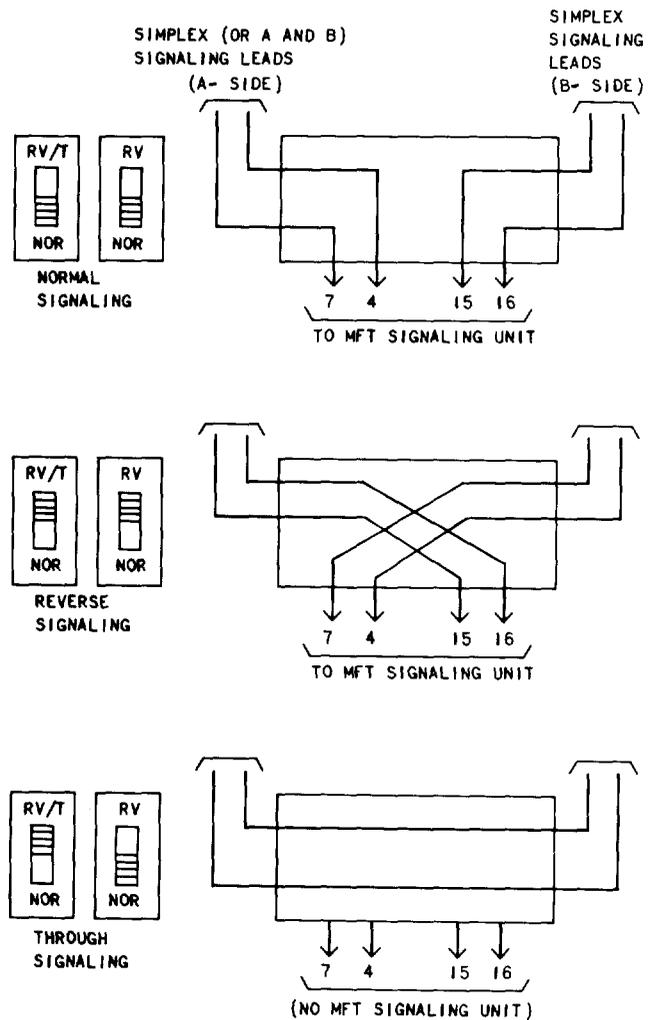
NBOC

2.15 The NBOC screw switches are labeled A, B, C, D, E, and F. These switches provide a capacitance range from 0 to 0.126 μ F and are used to balance the office cabling.

NOR-RV and NOR-RV/T

2.16 These switches are used to establish a signaling mode of either normal, reverse or through. Figure 3 gives the required switch positions to achieve a prescribed mode. These switches only affect the dc path to the signaling unit.

Note: If no companion signaling unit is used, these switches should be set for the through mode.



NOTE: THESE DIAGRAMS SHOW FUNCTIONALLY THE THREE SIGNALING CONNECTIONS. THE EXACT WIRING CONNECTIONS HAVE BEEN OMITTED FOR CLARITY.

Fig. 3—Switch Settings for Routing Signaling Leads

NOR-SX SH

2.17 This switch shorts the SX inductor when it is not required. The inductor is shorted when the switch is set in the SX SH position and not shorted in the NOR position.

NOR-SX RV

2.18 This switch reverses the two signaling leads on the B side of the repeater.

3. FUNCTIONAL DESCRIPTION—J99343RA, LIST 4**A. Operation**

3.01 The J99343RA, List 4 is shown in Fig. 4. It provides gain between loaded or nonloaded 4-wire facilities and 600- or 900-ohm 2-wire terminal equipment. Equalization is provided in the B-to-A direction of transmission. Figure 2 is a block diagram of this unit.

Amplifier Units

3.02 Adjustable gain is provided in this repeater by an integrated circuit amplifier. An individual amplifier is provided for each direction of transmission. The control for the amplifier is designated GAIN ADJUST. The range of the amplifier is -20 dB to +23.5 dB.

Caution: For crosstalk considerations, the maximum gain of 2-4 wire repeaters typically is limited to 15 dB.

Equalizer

3.03 Adjustable equalization is provided by the integrated circuit equalizer. An equalizer is provided only in the B-to-A direction of transmission. The controls for the equalizer are designated HT, BW and SLOPE.

Coupling Transformers

3.04 The B side of each repeater has two coupling transformers that interface with the 4-wire cable facility. These transformers provide simplex leads (SX, SX1) for the signaling unit access. The transformers are equipped with an impedance option switch, labeled OUT, for facility impedance matching.

Two-Transformer Hybrid

3.05 The two-transformer hybrid separates the 2-wire transmission interface into a 4-wire path through the repeater. This allows gain and equalization to be provided in each direction of transmission, however, the J99343RA, List 4, repeater provides equalization in the B to A direction only. The transformer hybrid is matched to the terminal equipment by the compromise network.

Compromise Networks (A-Side)

3.06 The COMP NET in the repeater provides hybrid balance by approximating the impedance of the 2-wire terminal equipment. The COMP NET uses 600 or 900 ohms in series with 2.15 μ F in the hybrid balance circuit. The impedance selection controls are designated HYB1 and HYB2.

Network Buildout Capacitor

3.07 The network buildout capacitor (NBOC) provides from 0 to 0.126 μ F of adjustable capacitance to balance the capacitance of the office cabling on the 2-wire side of the unit. The capacitance of the NBOC is adjusted by rocker switches labeled A, B, C, D, E, and F.

Signaling

3.08 The A-side signaling leads (A and B) are derived from the hybrid windings and midpoint capacitor on the A side of the repeater. The SX inductors isolate the transmission path from the signaling circuit. The B-side signaling leads (SX and SX1) are derived through the transformer windings on the B side of the repeater. The three basic signaling modes (normal, reverse and through) are controlled by the NOR·RV/T and NOR·RV SH switches.

B. Unit Controls

3.09 In the following paragraphs, the rocker-type switches for a particular function are operated when depressed toward the respective designation. The sum of the values of the switches operated is the setting for that function. The unit controls are illustrated in Fig. 4.

GAIN ADJUST

3.10 Ten miniature switches (designated GAIN ADJUST) control the gain of the repeater. These switches are labeled .1, .2, .4, .8, 1, 2, 4, 8, +10 and -20. The gain is adjustable from -20 dB to +23.5 dB in 0.1 dB increments.

Note: The sum of the rocker switches 1, 2, 4 and 8 should not exceed 12.

HT, BW, and SLOPE

3.11 Thirteen rocker switches [designated HT (1, 2, 4, and 8), BW (1, 2, 4, and 8), and SLOPE (NL,

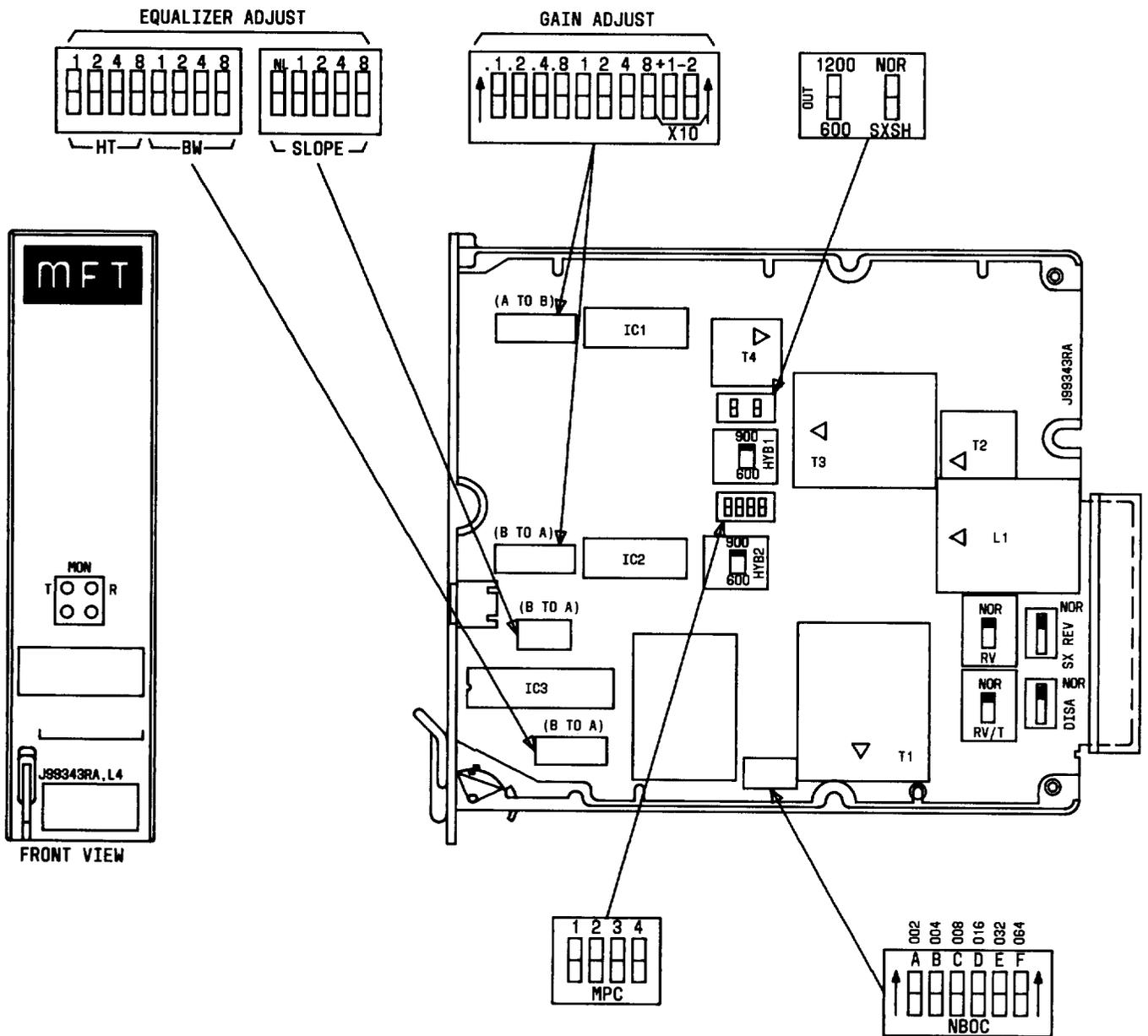


Fig. 4—J99343RA, List 4 Repeater

1, 2, 4 and 8)] adjust the equalization in the B-to-A direction of transmission. The sum of the values of these switches and the setting of the NL switch determines the equalization. The NL switch acts as a range selector and when in the NL position provides a steeper degree of equalization. The NL switch should be in the NL position when interfacing nonloaded cable. When interfacing loaded cable, the switch is to be away from the NL designation position. See Section 332-912-232 for prescription settings for the HT, BW, and SLOPE switches.

OUT

3.12 The transformers that interface the cable facility are provided with a 600/1200 ohm impedance option switch. The 1200 ohm impedance is used for loaded cable and the 600 ohm impedance is used for nonloaded cable.

HYB1 and HYB2

3.13 The HYB1 and HYB2 switches are used to select a 600- or 900-ohm input impedance for the 2-wire (A) side of the repeater. These switches also select the proper resistance (600 or 900 ohms) for the COMP NET. The two switches are to be operated together as if they are one switch.

MPC

3.14 The midpoint capacitor switches are labeled 1, 2, 3, and 4. Switches 1 and 2 provide capacitance on the line side of the hybrid. Switches 3 and 4 provide capacitance on the network side of the hybrid to provide hybrid balance.

NBOC

3.15 The NBOC switches are labeled A, B, C, D, E, and F (002, 004, 008, 016, 032, and 064, respectively), are also indicated on the printed wiring board). These switches provide a capacitance range from 0 to 0.126 μF and are used to balance the office cabling.

NOR-RV and NOR-RV/T

3.16 These switches are used to establish a signaling mode of either normal, reverse or through. Figure 3 gives the required switch positions to achieve a prescribed mode. These switches only affect the dc path to the signaling unit.

Note: If no companion signaling unit is used, these switches should be set for the through mode.

NOR-SX SH

3.17 This switch shorts the SX inductor when it is not required. The inductor is shorted when the switch is set in the SX SH position, and not shorted in the NOR position.

NOR-SX RV

3.18 This switch reverses the two signaling leads on the B side of the repeater.

NOR-DISABLE

3.19 This switch permits any companion signaling unit, having the disable function, to control the power to the repeater. In the DISABLE position, the power input to the repeater is removed during the idle circuit condition. In the NOR position, the power is continuous.

Note: If no companion signaling unit is used or if the signaling unit does not have the disabling function, the switch must be in the NOR position.

4. FUNCTIONAL DESCRIPTION - J99343RF, LIST 1

A. Operation

4.01 The J99343RF, List 1, is shown in Fig. 6. It provides gain between loaded or nonloaded 4-wire facilities and 600- or 900-ohm 2-wire terminal equipment. Equalization is provided in both directions of transmission. Figure 5 is a block diagram of this unit.

Equalizer/Amplifier Units

4.02 Adjustable gain and equalization are provided in these repeaters by the RU1 and RU2 equalizer/amplifier units. RU1 provides gain and equalization in the A-to-B direction of transmission and RU2 provides gain and equalization in the B-to-A direction. The controls for gain and equalization are designated GN ADJ, GN, SLOPE, HT, and BW. The range of the amplifier unit gain is approximately -20 dB to +24 dB. Additional gain is provided by the adjustable equalizer.

Caution: For crosstalk considerations, the maximum gain of 2-4 wire repeaters typically is limited to 15 dB.

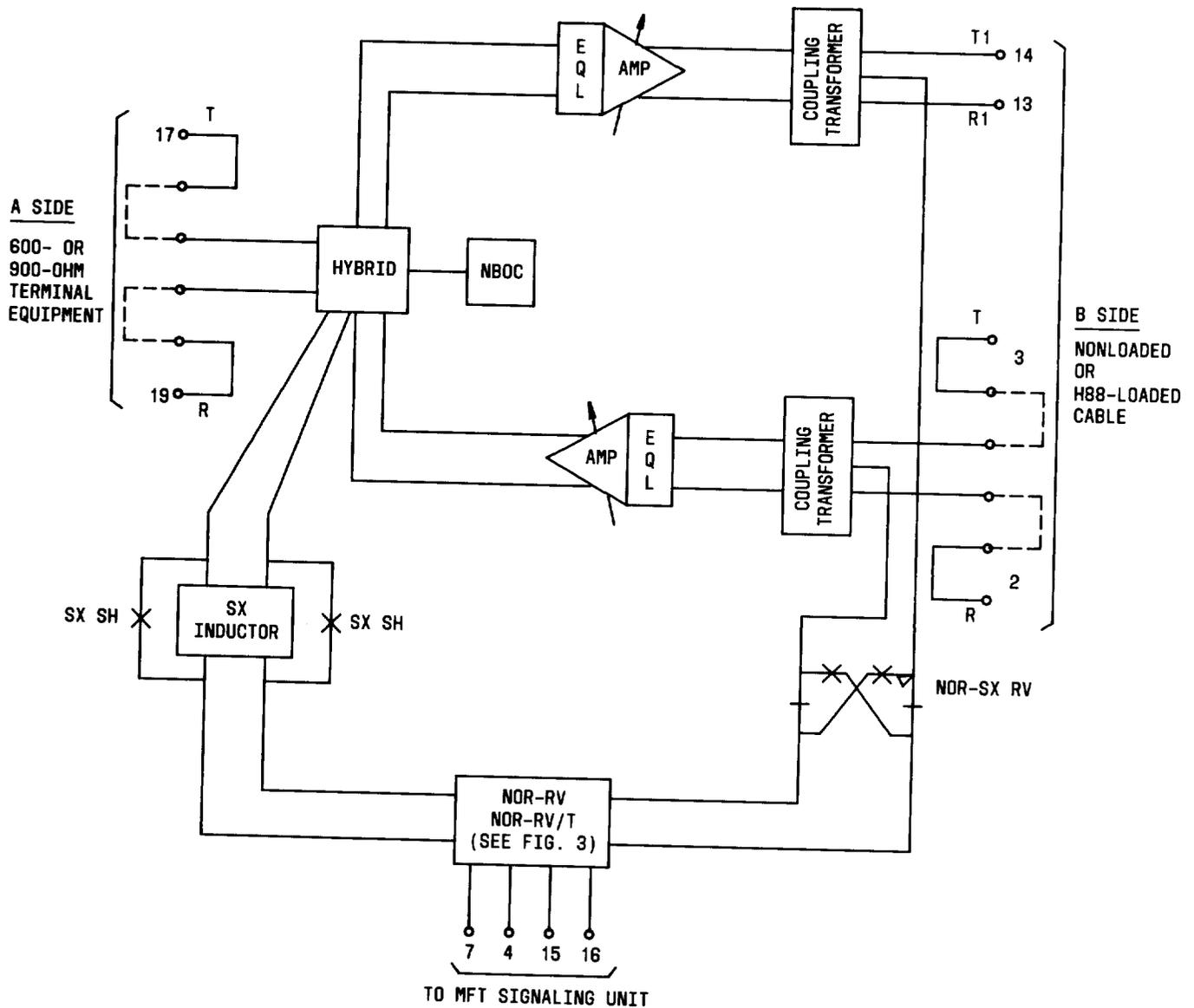


Fig. 5—Block Diagram of J99343RF

Coupling Transformers

4.03 The B side of each repeater has two coupling transformers that interface with the 4-wire cable facility. These transformers provide simplex leads (SX, SX1) for the signaling unit access. The transformers are equipped with an impedance option switch, labeled OUT for facility impedance matching.

Two-Transformer Hybrid

4.04 The two-transformer hybrid separates the 2-wire transmission interface into a 4-wire path through the repeater. This allows gain and equalization to be provided in each direction of transmission. The transformer hybrid is matched to the terminal equipment by the compromise network.

Compromise Networks (A-Side)

4.05 The COMP NET in the repeater provides hybrid balance by approximating the impedance of the 2-wire terminal equipment. The COMP NET uses 600 or 900 ohms in series with 2.15 μF in the hybrid balance circuit. The impedance option controls are designated HYB1 and HYB2.

Network Buildout Capacitor

4.06 The network buildout capacitor (NBOC) provides from 0 to 0.126 μF of adjustable capacitance to balance the capacitance of the office cabling on the 2-wire side of the unit. The capacitance of the NBOC is adjusted by screw switches labeled A, B, C, D, E, and F.

Signaling

4.07 The A-side signaling leads (A and B) are derived from the hybrid windings and midpoint capacitor on the A side of the repeater. The SX inductors isolate the transmission path from the signaling circuit. B-side signaling leads (SX and SX1) are derived through the transformer windings on the B side of the repeater. The three basic signaling modes (normal, reverse and through) are controlled by the NOR·RV and NOR·RV/T switches.

B. Unit Controls

4.08 In the following paragraphs, the rocker-type switches for a particular function are operated when depressed toward the respective designation. The sum of the values of the switches operated is the setting for that function. The unit controls are illustrated in Fig. 6.

GN ADJ and GN

4.09 The RU1 and RU2 amplifiers are controlled by a dial-type potentiometer designated GN ADJ and three rocker switches designated GN. The GN ADJ is calibrated in a range from 0 to 14 dB. Gain is increased by rotating the dial clockwise. The GN switches are labeled -2, -1, and +1. When operated, the -2 switch provides 20 dB of loss, the -1 switch provides 10 dB of loss, and the +1 switch provides 10 dB of gain. The gain setting is the sum of the GN ADJ and GN controls. See **Caution** in paragraph 4.02.

SLOPE, HT, and BW

4.10 Thirteen switches designated SLOPE (NL, 1, 2, 4, 8), HT (1, 2, 4, 8), and BW (1, 2, 4, 8,) adjust

the equalization in both directions of transmission. These switches are located on the RU1 and RU2 amplifier units. The sum of the values of the switches operated and the setting of the NL switch determines the equalization. The NL switch acts as a range selector and when in the NL position provides a steeper degree of equalization. The NL switch should be in the NL position when interfacing nonloaded cable. When interfacing loaded cable the switch is to be away from the NL designation. See Section 332-912-232 for prescription settings of the SLOPE, HT, and BW switches.

OUT

4.11 The transformers that interface a cable facility are provided with a 600/1200 ohm impedance option switch. The 1200 ohm impedance is used for loaded cable and the 600 ohm impedance for nonloaded cable.

HYB1 and HYB2

4.12 The HYB1 and HYB2 switches are used to select 600- or 900-ohm input impedance for the 2-wire (A) side of the repeater. These switches also select the proper resistance (600 or 900 ohms) for the COMP NET. The two switches are to be operated together as if they are one switch.

Midpoint Capacitor

4.13 The midpoint capacitor screw switches are labeled 1, 2, 3, and 4. Screw switches 1 and 2 provide capacitance on the line side of the hybrid. Screw switches 3 and 4 provide capacitance on the network side of the hybrid to provide hybrid balance.

NBOC

4.14 The NBOC screw switches are labeled A, B, C, D, E, and F. These switches provide a capacitance range from 0 to 0.126 μF and are used to balance the office cabling.

NOR·RV and NOR·RV/T

4.15 These switches are used to establish a signaling mode of either normal, reverse or through. Figure 3 gives the required switch positions to achieve a prescribed mode. These switches only affect the dc path to the signaling unit.

Note: If no companion signaling unit is used, these switches should be set for the through mode.

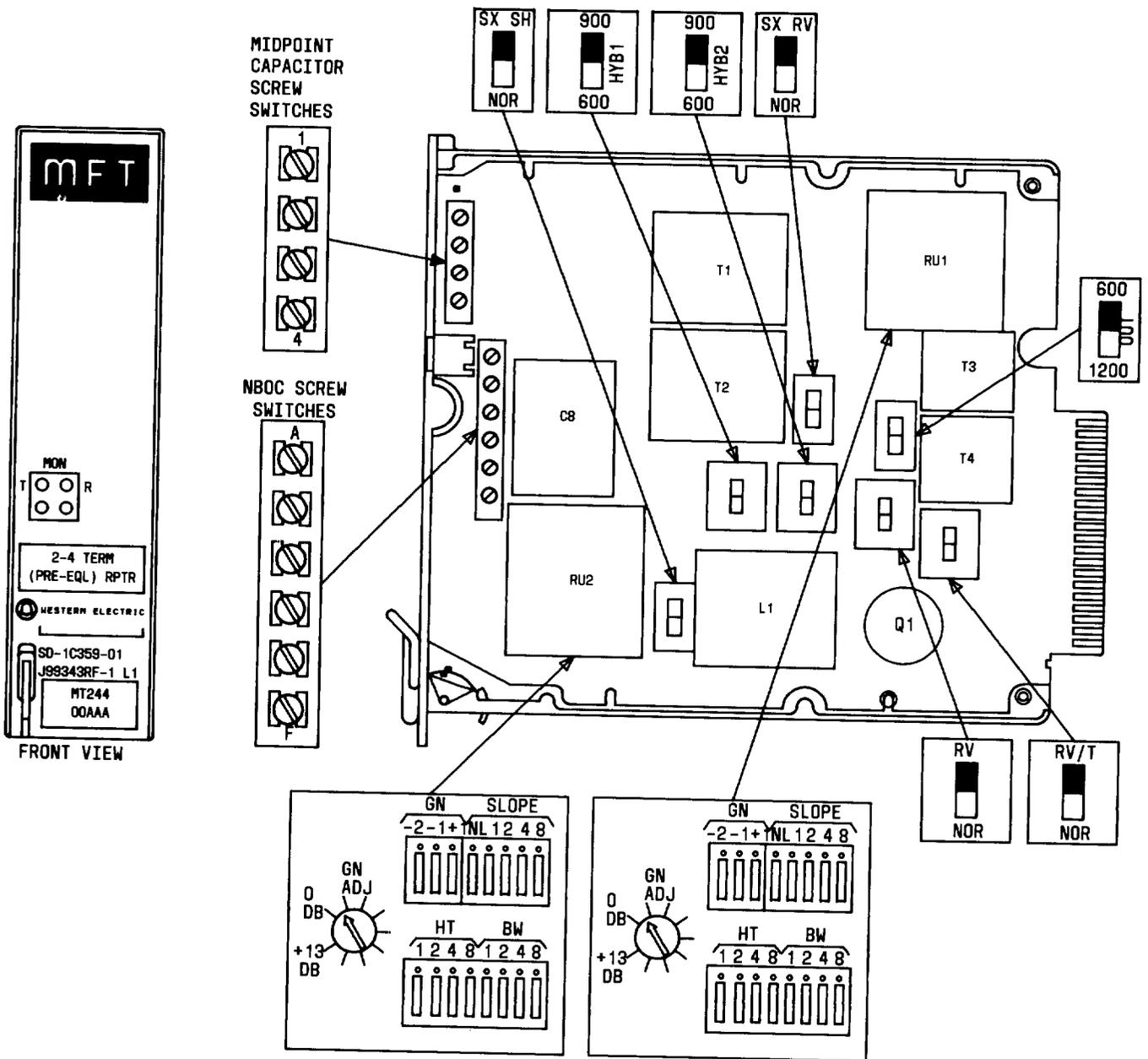


Fig. 6—J99343RF, List 1 Repeater

NOR-SX SH

4.16 This switch shorts the SX inductor when it is not required. The inductor is shorted when the switch is set in the SX SH position and not shorted in the NOR position.

NOR-SX RV

4.17 This switch reverses the two signaling leads on the B side of the repeater.

5. FUNCTIONAL DESCRIPTION - J99343RF, List 2

A. Operation

5.01 The J99343RF, List 2, is shown in Fig. 7. It provides gain between loaded or nonloaded 4-wire facilities and 600- or 900-ohm 2-wire terminal equipment. Equalization is provided in both directions of transmission. Figure 5 is a block diagram of this unit.

Amplifier Units

5.02 Adjustable gain is provided in this repeater by an integrated circuit amplifier. An individual amplifier is provided for each direction of transmission. The control for the amplifier is designated GAIN ADJUST. The range of the amplifier is -20 dB to $+23.5$ dB.

Caution: For crosstalk considerations, the maximum gain of 2-4 repeaters typically is limited to 15 dB.

Equalizers

5.03 Adjustable equalization is provided by the integrated circuit equalizers. An equalizer is provided for each direction of transmission. The controls for the equalizers are designated HT, BW, and SLOPE.

Coupling Transformers

5.04 The B side of each repeater has two coupling transformers that interface with the 4-wire cable facility. These transformers provide simplex leads (SX, SX1) for signaling unit access. The transformers are equipped with an impedance option switch, labeled OUT, for facility impedance matching.

Two-Transformer Hybrid

5.05 The two-transformer hybrid separates the 2-wire transmission interface into a 4-wire path through the repeater. This allows gain and equalization to be provided in each direction of transmission. The transformer hybrid is matched to the terminal equipment by the compromise network.

Compromise Networks (A-Side)

5.06 The COMP NET in the repeater provides hybrid balance by approximating the impedance of the 2-wire terminal equipment. The COMP NET uses 600 or 900 ohms in series with $2.15 \mu\text{F}$ in the hy-

brid balance circuit. The impedance option controls are designated HYB1 and HYB2.

Network Buildout Capacitor

5.07 The network buildout capacitor (NBOC) provides from 0 to $0.126 \mu\text{F}$ of adjustable capacitance of balance the capacitance of the office cabling on the 2-wire side of the unit. The capacitance of the NBOC is adjusted by rocker switches labeled A, B, C, D, E, and F.

Signaling

5.08 The A-side signaling leads (A and B) are derived from the hybrid windings and midpoint capacitor the A side of the repeater. The SX inductor isolates the transmission path from the signaling circuit. The B-side signaling leads (SX and SX1) are derived through the transformer windings on the B side of the repeater. The three basic signaling modes (normal, reverse and through) are controlled by the NOR·RV and NOR·RV/T and switches.

B. Unit Controls

5.09 In the following paragraphs, the rocker-type switches for a particular function are operated when depressed toward the respective designation. The sum of the values of the switches operated is the setting for that function. The unit controls are illustrated in Fig. 7.

GAIN ADJUST

5.10 Ten miniature switches (designated GAIN ADJUST) control the gain of the repeater. These switches are labeled .1, .2, .4, .8, 1, 2, 4, 8, +10 and -20 . The gain is adjustable from -20 dB to $+23.5$ dB in 0.1 dB increments.

Note: The sum of the rocker switches 1, 2, 4 and 8 should not exceed 12.

HT, BW and SLOPE

5.11 Thirteen rocker switches (designated HT [1, 2, 4 and 8], BW [1, 2, 4, and 8], and SLOPE [NL, 1, 2, 4, and 8]) adjust the equalization in each direction of transmission. The sum of the values of these switches and the setting of the NL switch determines the equalization. The NL switch acts as a range selector and when in the NL position provides a steeper degree of equalization. The NL switch should be in the NL position when interfacing nonloaded cable. When interfacing loaded cable, the switch is to be

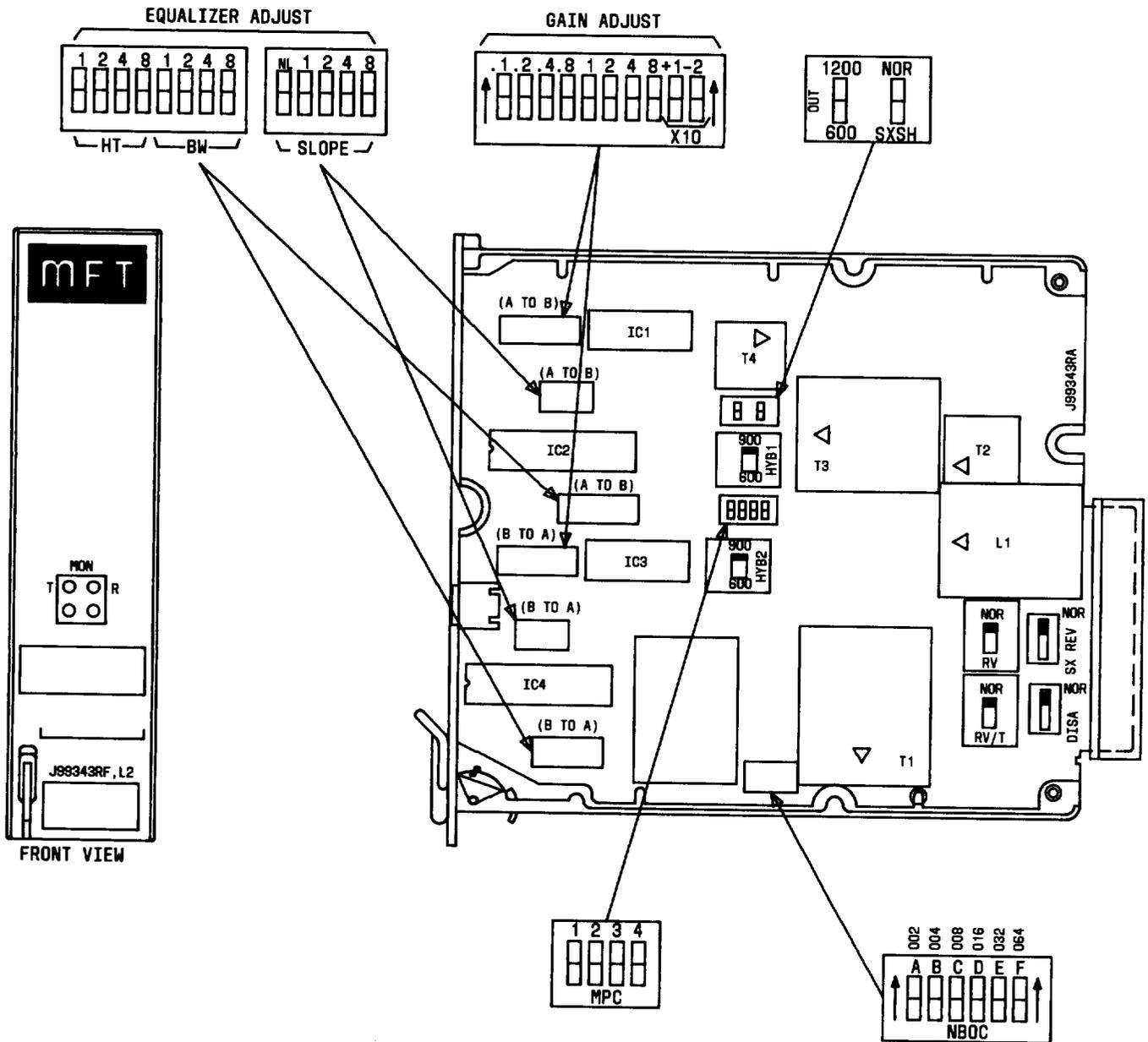


Fig. 7—J99343RF, List 2 Repeater

away from the NL designation position. See Section 332-912-232 for prescription settings of the HT, BW, and SLOPE switches.

OUT

5.12 The transformers that interface the cable facility are provided with a 600/1200 ohm impedance option switch. The 1200 ohm impedance is used for loaded cable and 600 for nonloaded cable.

HYB1 and HYB2

5.13 The HYB1 and HYB2 switches are used to select 600- or 900-ohm input impedance for the 2-wire (A) side of the repeater. These switches also select the proper resistance (600 or 900 ohms) for the COMP NET. The two switches are to be operated together as if they are one switch.

MPC

5.14 The midpoint capacitor switches are labeled 1, 2, 3, and 4. Switches 1 and 2 provide capacitance on the line side of the hybrid to match the terminal equipment. Switches 3 and 4 provide capacitance on the network side of the hybrid to provide hybrid balance.

NBOC

5.15 The NBOC switches are labeled A, B, C, D, E, and F (002, 004, 008, 016, 032, and 064 respectively, are also indicated on the printed wiring board). These switches provide a capacitance range from 0 to 0.126 μF and are used to balance the office cabling.

NOR-RV and NOR-RV/T

5.16 These switches are used to establish a signaling mode of either normal, reverse or through. Figure 3 gives the required switch positions to achieve a prescribed mode. These switches only affect the dc path to the signaling unit.

Note: If no companion signaling unit is used, these switches should be set for the through mode.

NOR-SX SH

5.17 This switch shorts the SX inductor when it is not required. The inductor is shorted when the

switch is set in the SX SH position and not shorted in the NOR position.

NOR-SX RV

5.18 This switch reverses the two signaling leads on the B side of the repeater.

NOR-DISABLE

5.19 This switch permits any companion signaling unit, having the disable function, to control the power to the repeater. In the DISABLE position, the power input to the repeater is removed during the idle circuit condition. In the NOR position, the power is continuous.

Note: If no companion signaling unit is used or if the signaling unit does not have the disabling function, the switch must be in the NOR position.

6. PERFORMANCE CHARACTERISTICS

6.01 The performance of the J99343RA and RF repeaters is discussed in the following paragraphs. Table A gives a comparison of characteristics for all versions of the 2-4 wire terminal repeaters.

A. Amplifier/Equalizer Frequency Response

6.02 Figures 8 through 11 give the frequency response of the gain and equalizer units. Figure 8 gives the response curves for various SLOPE settings with the NL switch set to interface nonloaded cable. Figure 9 provides response curves for the same SLOPE settings with the NL switch set to interface loaded cable. Figure 10 gives the response curves for various HT settings with the BW switch at a small setting. Figure 11 gives the response curves for the same HT settings with the BW switch at a large setting.

B. Envelope Delay Distortion

6.03 Figures 12 through 16 give the envelope delay distortion (EDD). Figure 12 shows the EDD for the repeater units with the equalizer disabled. Figure 13 shows the EDD for various SLOPE settings with the NL switch set to interface nonloaded cable. Figure 14 shows the EDD for the same SLOPE settings with the NL/L switch set to interface loaded

TABLE A
UNIT CHARACTERISTICS

FUNCTION	J99343RA, LIST 1, 2, AND 3 J99343RF, LIST 1	J99343RA, LIST 4 J99343RF, LIST 2	
		RA, LIST 4	RF, LIST 2
Gain	-20 dB to +24 dB	-20 dB to +23.5 dB	
Equalizer Gain* (at 1 kHz)	0 dB to +15.3 dB	0 dB to +15.3 dB	
A-side Impedance (Ohms)	600/900	600/900	
B-side Impedance (Ohms)	600/1200	600/1200	
DC Resistance (Ohms)			
4-Wire	17	17	
2-Wire (SX Inductor Shorted)	70	70	
2-Wire (SX Inductor In)	145	145	
Through Signaling	162	165	
Current Drain (mA)			
Disabled	0	0	0
No Signal	25	30	35
Typical	30-35	35-40	40-45
Maximum	50	60	65

*Equalizer gain varies with the equalizer setting.

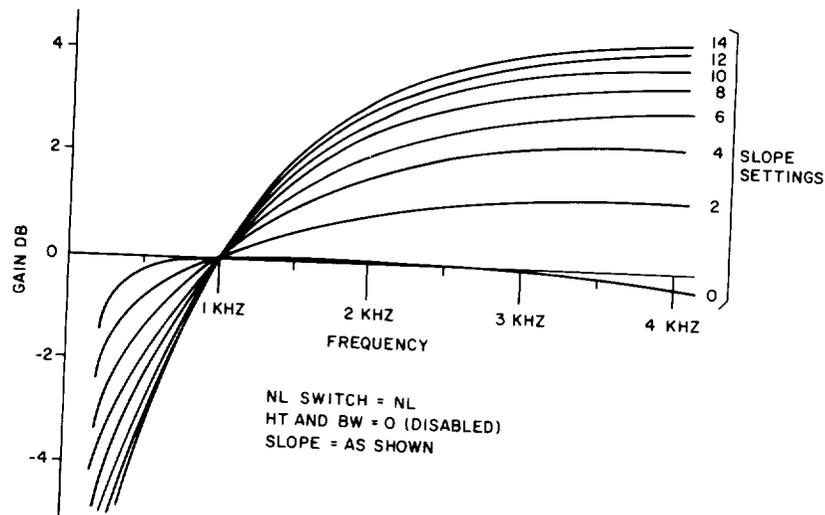


Fig. 8—Equalizer Gain-Frequency Response—Slope = Variable, NL = NL

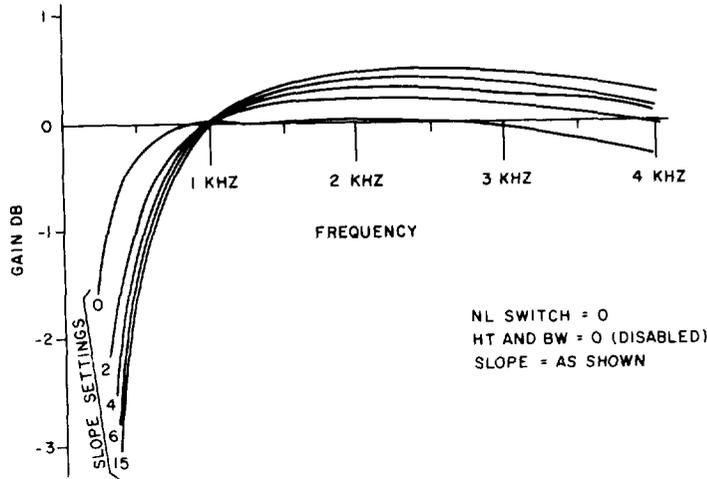


Fig. 9—Equalizer Gain-Frequency Response—Slope = Variable, NL = 0

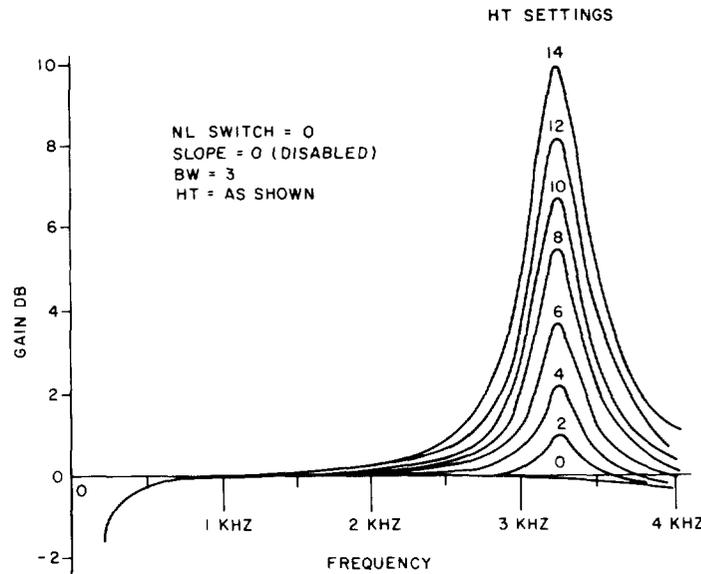


Fig. 10—Equalizer Gain-Frequency Response—BW = 3, HT = Variable

cable. Figure 15 shows the EDD for various HT settings with the BW switches at a small setting (3). Figure 16 provides the EDD for the same HT settings with the BW switches at a large setting (14).

C. Longitudinal Balance

6.04 The longitudinal balance for these repeaters is at least 60 dB from 60 Hz to 4000 Hz.

D. Output Power Capability

6.05 Figure 17 shows the output power capability of the J99343RA and RF repeaters. The output power is determined by the input power and repeater gain as shown by the +6 dB gain line in the figure. Power limiting occurs in these units at about +18 dBm.

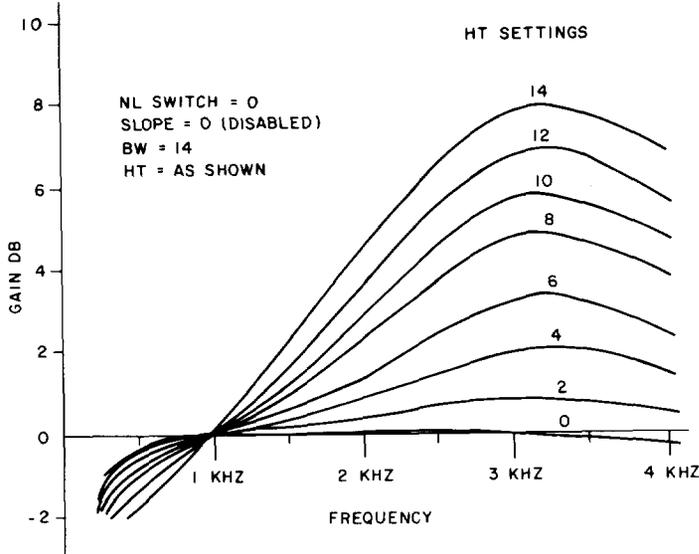


Fig. 11—Equalizer Gain-Frequency Response—BW = 14, HT = Variable

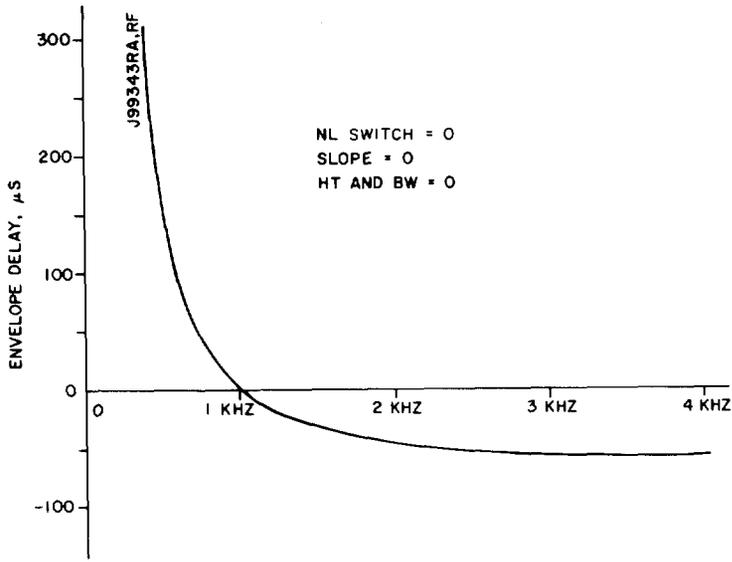


Fig. 12—Envelope Delay Distortion of J99343RA, RF Repeaters—Equalizer Disabled

7. APPLICATIONS

7.01 The J99343RA and RF units may be used to provide gain on any 4-wire metallic circuit as a terminal repeater. Figure 18 shows typical applications using the units in a foreign exchange (FX)

trunk. These units can also be used on off premises station lines (OPS), wide area telephone service (WATS) trunks and lines, and other metallic facility special service applications. Section 332-910-180 provide additional information.

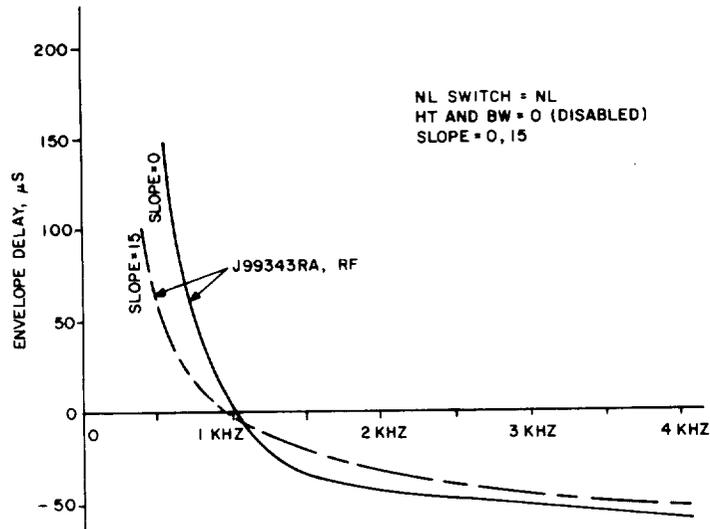


Fig. 13—Envelope Delay Distortion of J99343RA, RF Repeaters—Slope = Variable, NL = NL

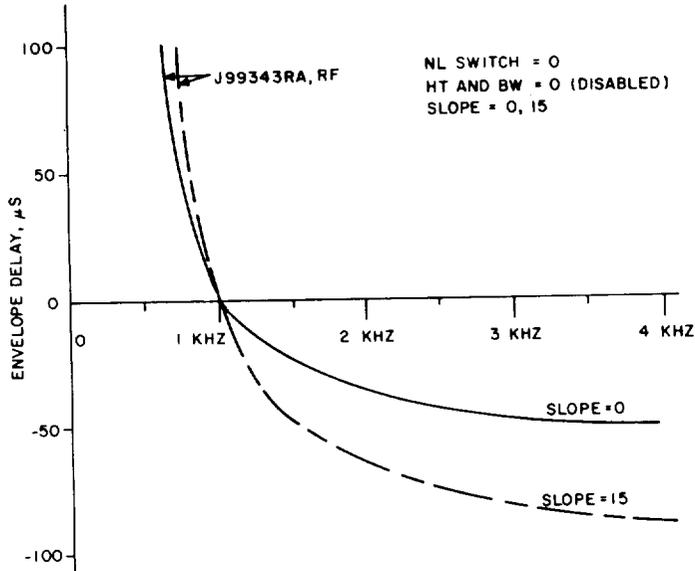


Fig. 14—Envelope Delay Distortion of J99343RA, RF Repeater—Slope = Variable, NL = 0

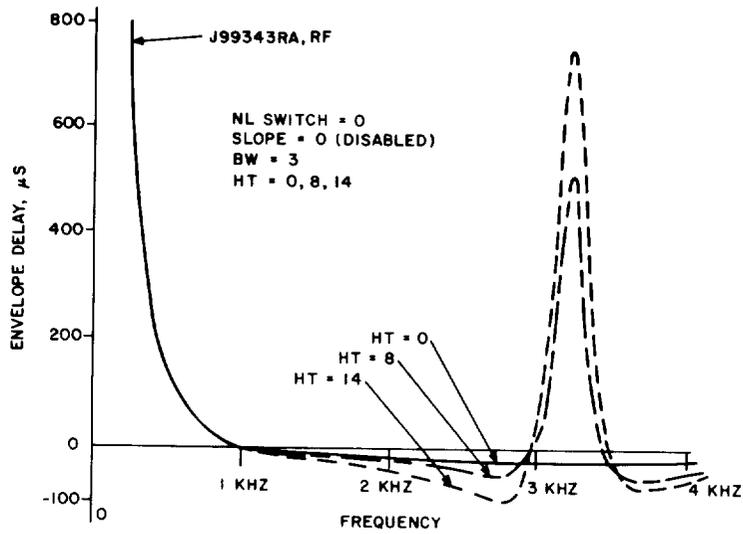


Fig. 15— Envelope Delay Distortion of J99343RA, RF Repeaters BW = 3, HT = Variable

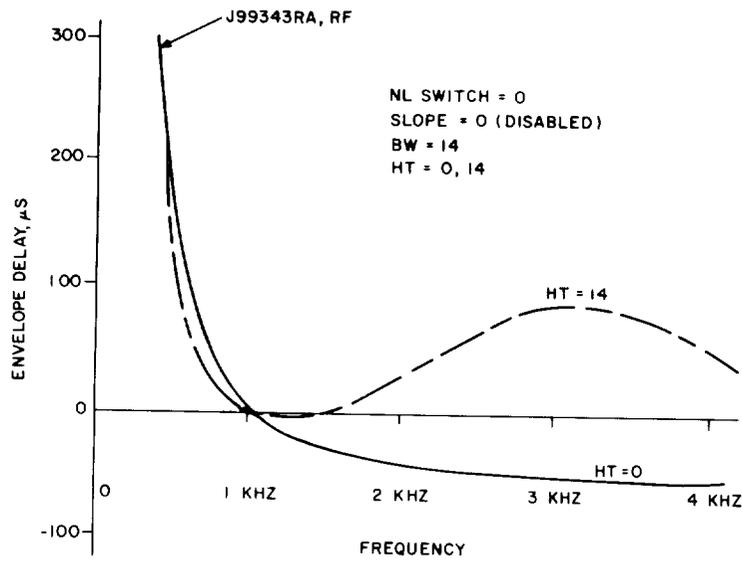


Fig. 16— Envelope Delay Distortion of J99343RA, RF Repeaters—BW = 14, HT = Variable

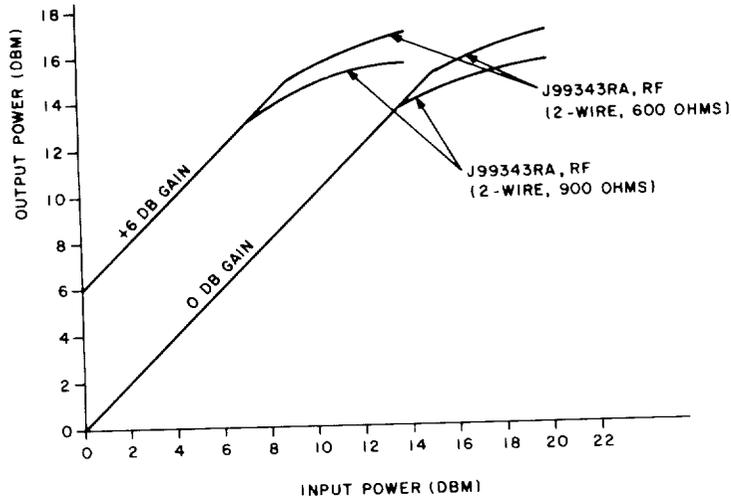
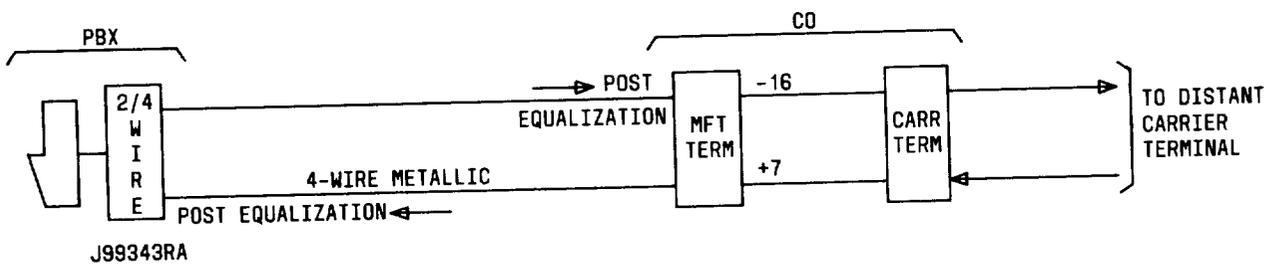
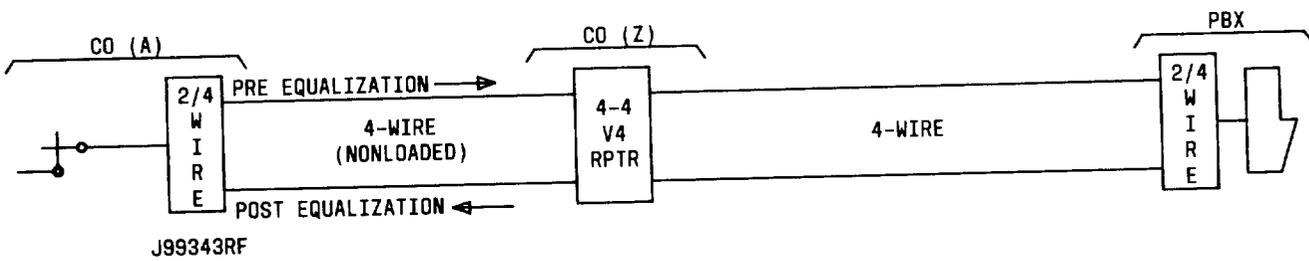


Fig. 17—Output Power Capacity of the J99343RA and RF Repeaters



J99343RA TERMINAL REPEATER



J99343RF TERMINAL REPEATER

Fig. 18—Typical Application of J99343RA, RF Repeaters

8. MAINTENANCE

8.01 MFT repeaters require no routine maintenance. If the repeater is determined to be faulty, it should be removed from service and replaced with a spare. The defective unit should be sent to the nearest Western Electric Service Center for repair.

332-912-232

Prescription Settings Procedures for 4-4 and 2-4 Wire Terminal Repeaters and 4-Wire Combined Function Units

332-912-235

Installation and Testing Procedures for 2-4 Wire Terminal Repeaters

9. REFERENCES

9.01 The following references provide additional information concerning 2-4 wire terminal repeaters.

CD-1C359-01

Common Systems, MFT—Circuit Description

REFERENCE TITLE

SD-1C359-01

Common Systems MFT—Schematic Drawing

332-910-100 MFT—General Description

332-910-101 Shelf, Frame Power Panel, and Distributing Frame Arrangement Description

332-910-180 General Application Information

The appropriate Numerical Index section should be consulted to find the current issue to the section listed and any addendum that may have been issued. The pertinent Numerical Index for the sections listed here is Section 332-000-000.