METALLIC FACILITY TERMINAL
2-WIRE DUAL REPEATER (J99343PL)
SD-1C359-01
INSTALLATION AND TESTING

CONTENTS PAGE

1. INTRODUCTION

1.01 This section covers the installation and testing of the Metallic Facility Terminal (MFT) J99343PL 2-2 wire dual repeater unit.

1.02 When this section is reissued, the reason for reissue will be given in this paragraph.

1.03 The J99343PL repeater unit consists of two complete 2-2 wire terminal repeaters in a single MFT plug-in unit.

1.04 The J99343PL repeater units were designed to be used in terminal applications where signaling extension is not required. They may be used with H88 loaded 19-, 22-, 24-, or 26-gauge high-capacitance cable or 25-gauge Metropolitan Area Trunk (MAT) cable. The primary use for these repeaters is the termination of message trunk circuits.

1.05 Each repeater (two per J99343PL unit), presents 900 ohms in series with 2.16 μF capacitance impedance at both the A side (office) and B side (facility) ports. The gain of each repeater in the unit is continuously adjustable between approximately 1.0 and 7.5 dB in each direction of transmission with a maximum output limitation of +10.0 dBm.

1.06 A more thorough description of the J99343PL repeater unit is contained in Section 332-912-141.

1.07 The common language code for the J99343PL repeater unit is MT22A10AAA.

2. INSTALLATION AND CROSS CONNECTIONS

2.01 The J99343PL plug-in unit may be installed in the transmission unit slot of any standard MFT mounting arrangement wired for 4-4 wire repeaters, ie, eight transmission path leads brought out to the distributing frame.

2.02 The unit may be installed in either single- or double-module mountings. When installed in a double-module mounting, the signaling unit slot must be left vacant as no access is available for companion MFT signaling units.

2.03 Figures 1A and 1B show the distributing frame terminations for J99343PL repeater units when installed in single- and double-module MFT mountings. Both repeaters in the unit

maintain the MFT convention of A side toward the office and B side toward the facility.

2.04 The signaling leads associated with the MFT mounting are not used when the J99343PL repeater unit is installed in the mounting.

3. REPEATER ADJUSTMENTS

A. General

3.01 Each J99343PL dual repeater unit contains two individual and separate repeater circuits. These repeater circuits designated CKT 1 and CKT 2 are physically located on the top and bottom halves of the unit respectively. Each repeater on the unit must be adjusted individually.

3.02 The adjustments necessary for each repeater consist of:

- Line build out capacitance (LBOC) setting
- Gauge setting
- Gain adjustment.

3.03 The miniature rocker switches, Fig. 2, on the unit are considered to be operated when the side of the switch nearest the designation has been depressed.

3.04 The adjustments of the repeaters should not be varied to mask or correct for cable facility deficiencies or troubles. The adjustments specified in this section assume that the facilities have been properly installed and tested.

3.05 The LBOC and gauge settings should be given by the circuit layout records (CLRs) for the circuits involved.

B. LBOC Setting

3.06 The B side (facility) of each repeater has been designed to balance a full 6 kft end section, or the equivalent, of H88 loaded high-capacitance cable or 25-gauge MAT cable.

3.07 An LBOC circuit is associated with each repeater to build out the capacitance of partial end sections to the 6 kft equivalent.

3.08 The LBOC of each repeater is adjusted by correctly positioning six miniature rocker-type switches designated 002, 004, 008, 016, 032, and 064 (see Fig. 2). These designations correspond to the capacitance connected across the 2-wire line when the designated switches are operated.

3.09 Table A gives the LBOC values necessary to build out H88 loaded high capacitance and MAT cable based on the near end section length expressed in feet.

> ***Note:*** The near end section length is the distance from the repeater to the nearest load coil in the facility.

3.10 Table B shows the switches to operate in order to obtain the LBOC capacitance determined from Table A. Switches not shown operated should be in the non-operated position.

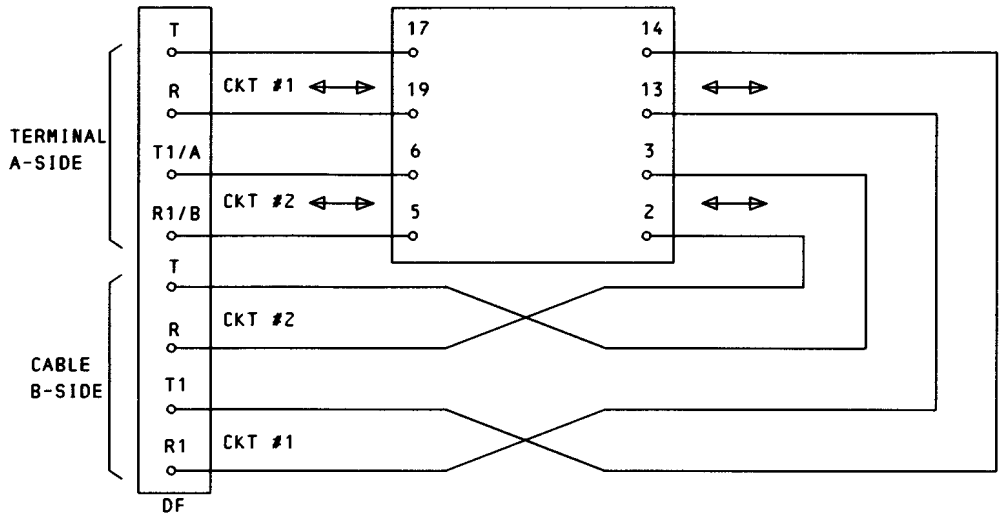
C. Gauge Setting

3.11 The gauge setting for each repeater consists of the proper positioning of eight miniature rocker-type switches, four of which are designated 19, 22, 24, and 26 respectively and four which are designated 25 collectively. The designations (Fig. 2) correspond to the gauge of cable connected to the B side of the repeater.

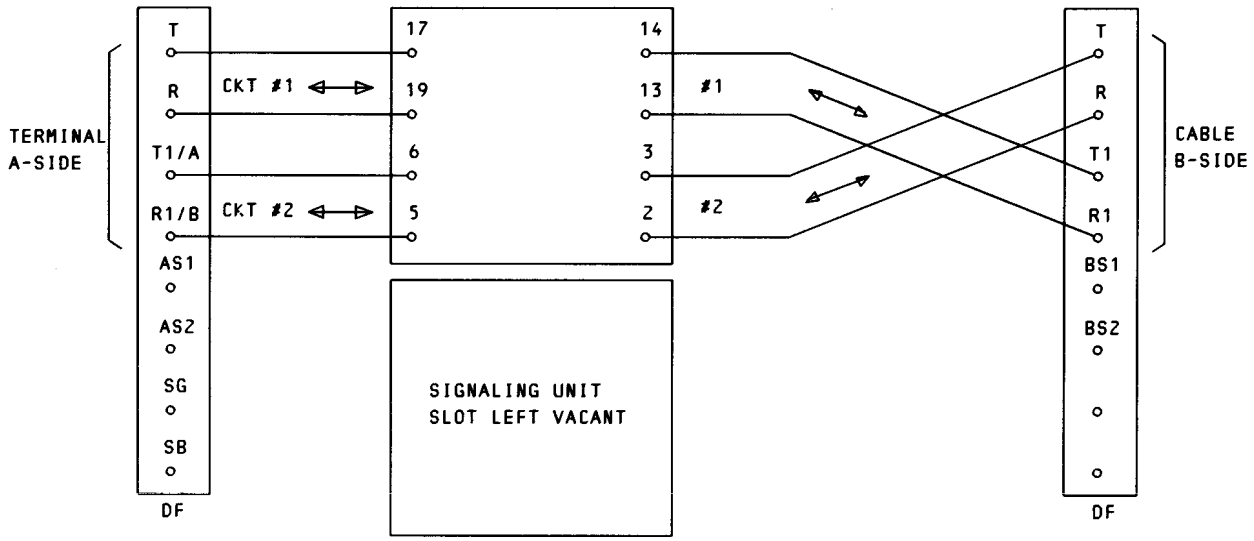
3.12 Only one gauge setting may be used per repeater. When 19-, 22-, 24-, or 26-gauge cable is used, only the one switch with the corresponding designation is operated, and all other gauge switches are to be in the non-operated position. When the facility is 25-gauge MAT cable, the four switches designated 25 are operated and all others are non-operated.

3.13 In some instances, the cable facility will be made up of mixed gauges. In these cases, the gauge setting is determined as follows:

> When there is a 3 kft or more section of single gauge cable adjacent to the repeater, the gauge of this section of cable determines the setting. When there is less than 3 kft of single gauge cable adjacent to the repeater, setting the gauge switches of the repeater to the predominant gauge used in the overall facility will usually suffice.



1A - DISTRIBUTING FRAME TERMINATION FOR J99343PL REPEATER UNIT WHEN INSTALLED IN SINGLE MODULE MFT MOUNTING



1B - DISTRIBUTING FRAME TERMINATION FOR J99343PL REPEATER UNIT INSTALLED IN DOUBLE MODULE MFT MOUNTING

Fig. 1—Distributing Frame Terminations for J99343PL Repeater Unit Installed in Single- and Double-Module MFT Mounting

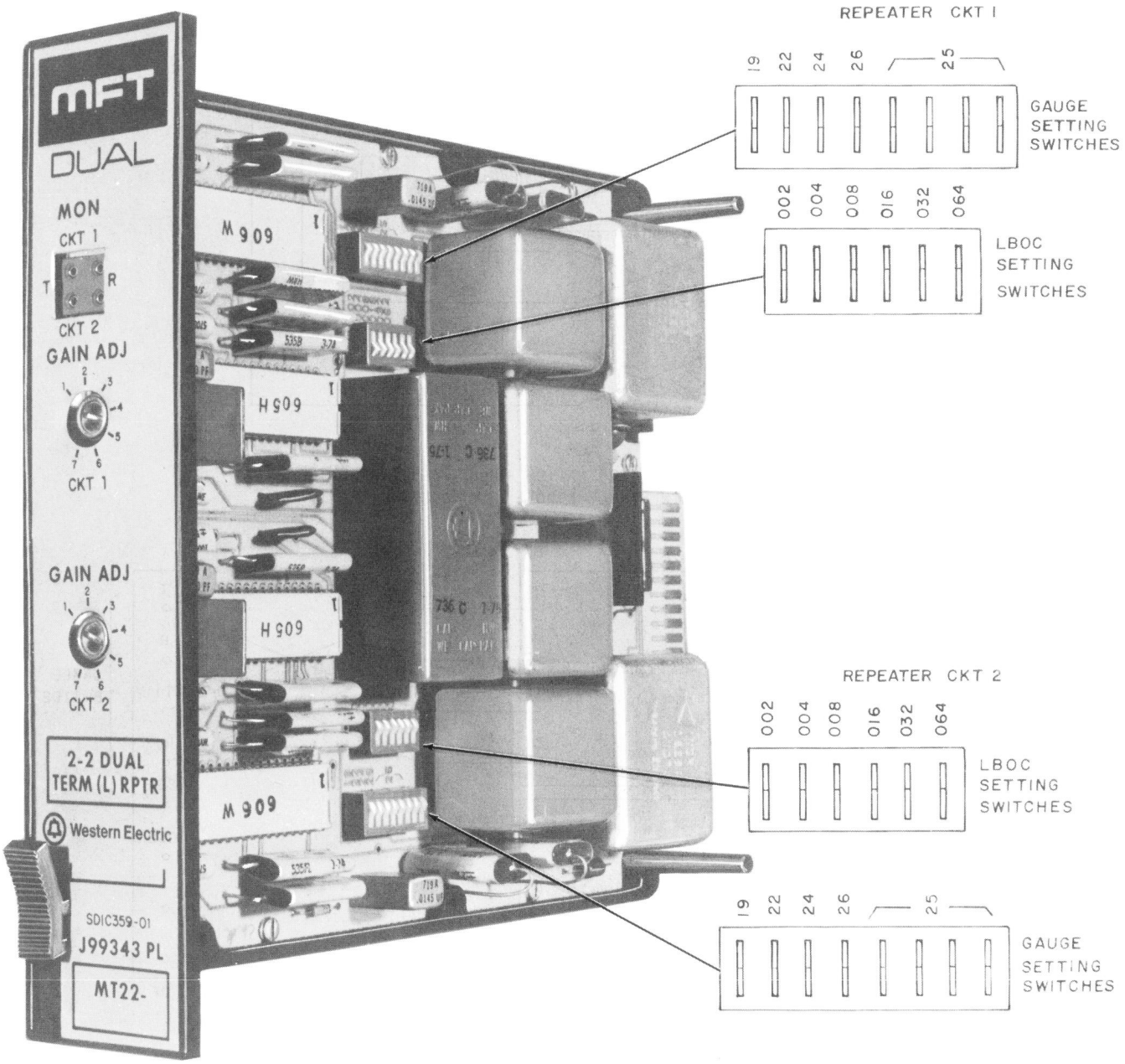


Fig. 2—J99343PL Repeater Unit

Note: The portions of the facility near the repeater have more influence on the repeater operation than those at the far end.

D. Gain Setting

3.14 Each J99343PL repeater unit has two gain controls which are accessible from the front of the unit. The upper control, designated CKT 1, controls the gain in both directions of transmission for 2-wire repeater circuit 1. The lower control, designated CKT 2, controls the gain in both directions of transmission for 2-wire repeater circuit 2.

3.15 Since the gain controls are accessible from the front of the unit, adjustments may be made without removing the unit from its mounting.

TABLE A

J99343PL REPEATER
LBOC VALUES (μF)
TO BUILD OUT H88 LOADED CABLE FACILITIES

NEAR END SECTION LENGTH (FT)*	FOR H88 LOADED 19-, 22-, 24-, 26-GAUGE CABLE ADJUST LBOC TO:	FOR H88 LOADED 25-GAUGE MAT CABLE ADJUST LBOC TO:
1000	.080	.064
1100	.078	.062
1200	.076	.060
1300	.076	.060
1400	.074	.058
1500	.072	.056
1600	.070	.056
1700	.068	.054
1800	.068	.054
1900	.066	.052
2000	.064	.050
2100	.062	.050
2200	.060	.048
2300	.060	.048
2400	.058	.046
2500	.056	.044
2600	.054	.044
2700	.052	.042
2800	.052	.042
2900	.050	.040
3000	.048	.038
3100	.046	.038
3200	.044	.036
3300	.044	.036
3400	.042	.034
3500	.040	.032
3600	.038	.032
3700	.036	.030
3800	.036	.030
3900	.034	.028
4000	.032	.026
4100	.030	.026
4200	.028	.024
4300	.028	.024
4400	.026	.022
4500	.024	.020
4600	.022	.020
4700	.020	.018
4800	.020	.018
4900	.018	.016
5000	.016	.014

* Distance to nearest loading coil

TABLE B

J99343PL REPEATER LBOC SWITCH SETTINGS

DESIRED VALUES OF LBOC (μF)	SWITCHES OPERATED TOWARD DESIGNATIONS					
	1 002	2 004	3 008	4 016	5 032	6 064
.014	●	●	●			
.016				●		
.018	●			●		
.020		●		●		
.022	●	●		●		
.024			●	●		
.026	●		●	●		
.028		●	●	●		
.030	●	●	●	●		
.032					●	
.034	●				●	
.036		●			●	
.038	●	●			●	
.040			●		●	
.042	●		●		●	
.044		●	●		●	
.046	●	●	●		●	
.048				●	●	
.050	●			●	●	
.052		●		●	●	
.054	●	●		●	●	
.056			●	●	●	
.058	●		●	●	●	
.060		●	●	●	●	
.062	●	●	●	●	●	
.064						●
.066	●					●
.068		●				●
.070	●	●				●
.072			●			●
.074	●		●			●
.076		●	●			●
.078	●	●	●			●
.080				●		●

This permits gain adjustments to be made on one repeater without interrupting service on the other repeater in the same unit.

3.16 The gain of each repeater in the J99343PL unit is adjusted on an in-circuit basis and only after the LBOC and gauge settings have been performed.

3.17 The following procedure covers the gain adjustment of each repeater in the J99343PL unit.

STEP	PROCEDURE
1	At the far end of the circuit, connect a 900-ohm impedance, 1000-Hz tone to the circuit at 0 dBm0 (transmit TLP as shown on the CLR).
2	Connect a 900-ohm impedance transmission measuring set (TMS) to the circuit at the near end terminal test point.
3	Determine from the CLR the receive TLP at the near end test point.
4	Adjust the appropriate gain control (CKT 1 or CKT 2) to obtain a TMS indication equal to the receive TLP.
5	At the far end of the circuit, connect a 900-ohm TMS in place of the 1000-Hz tone source.
6	At the near end, connect a 900-ohm, 1000-Hz tone adjusted to 0 dBm0 (transmit TLP) in place of the TMS.
7	At the far end, verify that the TMS indication equals the receive TLP ±.25 dB. ***Note:*** If this requirement is not met, the J99343PL unit should be replaced with another unit, and Steps 1 through 7 should be repeated.
8	Remove test connections.

E. Idle Repeater Adjustments

3.18 When a J99343PL repeater unit is installed in an MFT mounting and one or both of the repeaters is not to be used immediately, the unused or idle repeater(s) should be adjusted to a stable condition to prevent oscillation.

3.19 To adjust an idle repeater to a stable condition, perform the following:

(a) Adjust gain control to minimum gain (fully counterclockwise).

(b) Adjust LBOC to 064.

(c) Position all gauge switches to the non-operated position (away from designations).

4. MAINTENANCE AND TESTING

4.01 When a J99343PL repeater unit is suspected of being defective and all adjustments and cross connections have been checked, the unit should be replaced with another unit. Before installing the replacement unit, the LBOC and gauge switches of both repeaters must be adjusted.

Note: Removal of a dual repeater unit that has both repeaters in service will affect service on two circuits. When a replacement unit has been installed, the gain of both repeaters must be set. It may be advisable to perform 1004-Hz loss measurements on both circuits before again turning them up for service.

4.02 The J99343TB test extender may be used with the J99343PL unit to gain jack access for test purposes. The test extender permits the testing of cable facilities and office wiring.

4.03 The J99343TB test extender also permits transmission tests through the repeaters; however, final gain adjustments should be done on an overall circuit basis as described in Part 3D of this section. When using the test extender for repeater tests, 900-ohm impedance test equipment should be used.

4.04 The J99343TB test extender, when used with a J99343PL dual repeater, permits test jack access as follows:

Test Extender Jack	Access
T/R (2W) EQUIP	Repeater CKT 1 A side
T_1/R_1 (2W) EQUIP	Repeater CKT 1 B side
T_1/R_1 EQUIP	Repeater CKT 2 A side
T/R EQUIP	Repeater CKT 2 B side
T/R (2W) Line	CO wiring CKT 1
T_1/R_1 (2W) Line	Facility CKT 1
T_1/R_1 Line	CO wiring CKT 2
T/R Line	Facility CKT 2

4.05 The J99343TB test extender description and operation are covered in Section 332-910-102.

4.06 Defective J99343PL repeater units should be returned to Western Electric Co. for repairs. No attempts to repair these units should be made in the field.

5. REFERENCES

5.01 The following documents should be referred to for additional information when necessary.

DOCUMENT	SUBJECT
CD-, SD-1C359-01	MFT Circuit
CD-, SD-1C485-02	MFT Test Extender (J99343TB)
332-910-100	MFT General Description
332-910-101	MFT Shelf, Frame, Power Panel, and Distributing Frame Arrangements—Description
332-910-102	MFT Test Extender—Description and Operation
332-910-180	MFT General Application Information
332-912-141	MFT 2-Wire Dual Repeater (J99343PL)—Description