

**SHELF, FRAME, POWER PANEL,
AND DISTRIBUTING FRAME ARRANGEMENTS**
DESCRIPTION
METALLIC FACILITY TERMINAL



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NOTICE

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1. GENERAL

1.01 This section describes the frames, shelves, power panels, and wiring arrangements to the distributing frame for the Metallic Facility Terminal (MFT).

1.02 The reasons for reissuing this section are listed below:

- (a) Adds a paragraph which states that the J87304A DC-DC converter complies with the requirements for FCC Class B computing.
- (b) Adds information on the J99401A special purpose shelf assembly.
- (c) Changes the terminology of the wired rear frame assembly to "backplate".
- (d) Notes that the J99394A, B, C, G, H, J and K frames are manufacture discontinued (MD), and that they are replaced by the J99394D, E, F, L, M, N, and P frames respectively. (These new frames use the type 4 maintenance connector and its controller; the older frames use the type 3 connector.)

Revision arrows are used to emphasize the more significant changes. The Equipment Test Lists are not affected.

1.03 The MFT circuit is a standard arrangement for supplying transmission and/or signaling treatment to circuits operating on metallic facilities. Plug-in assemblies are used to furnish the necessary voice-frequency transmission functions, eg, gain, 2-wire to 4-wire conversion, equalization, etc. Other plug-ins perform signaling conversion or extension as required. The passive transmission units function as the interface between the signaling unit and the facilities. The newest concept in plug-in assemblies is the combined function units, which combine the func-

tions of the transmission and signaling units into the same plug-in.

1.04 Two basic mounting arrangements for the plug-ins are available. These are the single- and double-module arrangements. The double-module mounting permits the incorporation of two plug-ins, any repeater and any signaling unit or any passive transmission unit and any signaling unit, into the same circuits, as required. The single-module mounting accommodates a single plug-in per circuit. This plug-in can be a repeater in the "through-signaling" mode, or a loop signaling extender (LSE) for boosting the circuit's signaling range, or a combined function unit such as the J99343GA (2-wire transmission units plus loop signaling only—LSO/2-W). It should be noted that the LSEs and the combined function units can also be used in the transmission slots of the double-module mounting, however, with less efficient use of space since the adjacent signaling slot would be unused.

1.05 The double-module shelf consists of 12 mounting slots wired in pairs to accommodate 6 circuits. One slot, designated TU, is for the transmission unit; the other, designated SU, is for the signaling unit. All connections between the mountings are factory wired.

1.06 The single-module shelf accommodates 12 circuits (one per slot). The single-module arrangement, when compared to the double-module, offers a higher concentration of circuits per frame which makes them more economical, especially with the advent of the combined function units.

1.07 There are four basic series of MFT frames which have been developed over the years for MFT applications. This section presents a description of these series, from the newest to the oldest (see Parts 2 through 5). Also included will be the manufacturing rating for these frames and equipment, if the rating is other than standard (such as MD or A&M). In addition, information has been included in each descriptive part on the changes that are required in order for each series of frames to accommodate the combined function units (paragraph 1.03).

1.08 Chronologically, the first series of frames was the J99343 (Part 5) which was used originally for all MFT applications with the J99343A and B shelves factory-wired in place. The next series, J99378 (Part 4), was developed to incorporate auxil-

iliary equipment for installations with Switched Maintenance Access Systems (SMAS). Reducing costs and installation time became motivating factors in the development of the connectorized-modular concept of J99386 series (Part 3). These frames are functionally equivalent to the J99343 non-SMAS frames. By applying these same considerations for the SMAS applications, the J99394 (Part 2) series of frames was developed. This series offers the latest concepts in SMAS access (including removal of costly MAC jacks found in the J99378) and a reorganized list structure to allow more flexibility in the ordering process. The early models of the J99394 series used the type 3 maintenance connectors; the new frames use the more economical type 4 connectors and controllers.

1.09 Several power panels have also been developed for the MFT installations. They are described in Part 7.

Note: See Caution in paragraph 7.02.

1.10 A major advantage of MFT equipment is that both transmission and signaling units are contained in a single frame. All cross-connections between the transmission and signaling units are factory wired on the shelf connectors, thus reducing the number of leads to the distributing frame. Recommendations for terminating MFT equipment on the distributing frame are given in Part 8.

1.11 Related references and drawings are listed in Part 10.

2. CONNECTORIZED—MODULAR SMAS FRAMES WITHOUT "MAC JACK" CONNECTORS—J99394

A. General

2.01 The J99394 is the latest series of MFT connectorized-modular (MFTCM) frames. These frames incorporate the connectorizing concepts of the J99386 frames and are electrically equivalent to the J99378 SMAS frames with one major advantage. The J99394's are not required to provide the "MAC JACK" (maintenance access) connectors for local testing. Recent BTL studies indicate that the need for local testing access is doubtful and that significant savings can be realized by the elimination of this feature. These savings, plus those in the manufacturing and installation processes, including the connectorized backplates, reduce the comparative cost of these frames considerably. These savings and the emphasis

on making these frames more readily available should cause the J99394 series to be very attractive to the telephone companies. Figure 1 shows the J99394A frame.

2.02 Each of the J99394 frames and associated single- or double-module backplates are designed to accommodate the combined function units without additional changes.

B. SMAS Connector—Centralized Testing

2.03 These frames provide the normal SMAS access capability for centralized testing. With the inclusion of the type 3 maintenance connectors on the early frames (A, B, C, G, H, J, K), and type 4 on the newer frames (D, E, F, L, M, N, P), centralized testing can be furnished for either the SMAS 3 or 5 systems. The SMAS 4 (MD) is cross-connected at the distributing frame which means it can be used with any of the four series of MFT frames. Each type 3 connector can access up to 24 single or double-module circuits. These connectors are optional and do not have to be ordered with the frames and shelves. However, appropriate spacing for the connector(s) will still be provided on these frames. With this type provisioning, the task of adding SMAS to a frame is drastically simplified. Generally, all that would be involved is removing the non-SMAS shorting plugs, installing the SMAS connector(s), and installing associated cabling. Connections from the type 3 maintenance connectors is completely connectorized.

Caution: *On type 3 maintenance connectors, removal of the shorting plug, for later installation of deferred SMAS, will interrupt in-service circuits. See Handbook 80, Section 469, for methods that avoid service interruption. Type 4 maintenance connectors do not have this problem.*

2.04 The maintenance connector contains the relays and associated circuitry to provide a normal through circuit connection or to perform the necessary switching function for remote circuit access through the associated maintenance system (SMAS 3 or 5). Four circuit leads are accessible to the maintenance connector. The T1, R1 leads on the MFT B-side are always accessible. The other two circuit

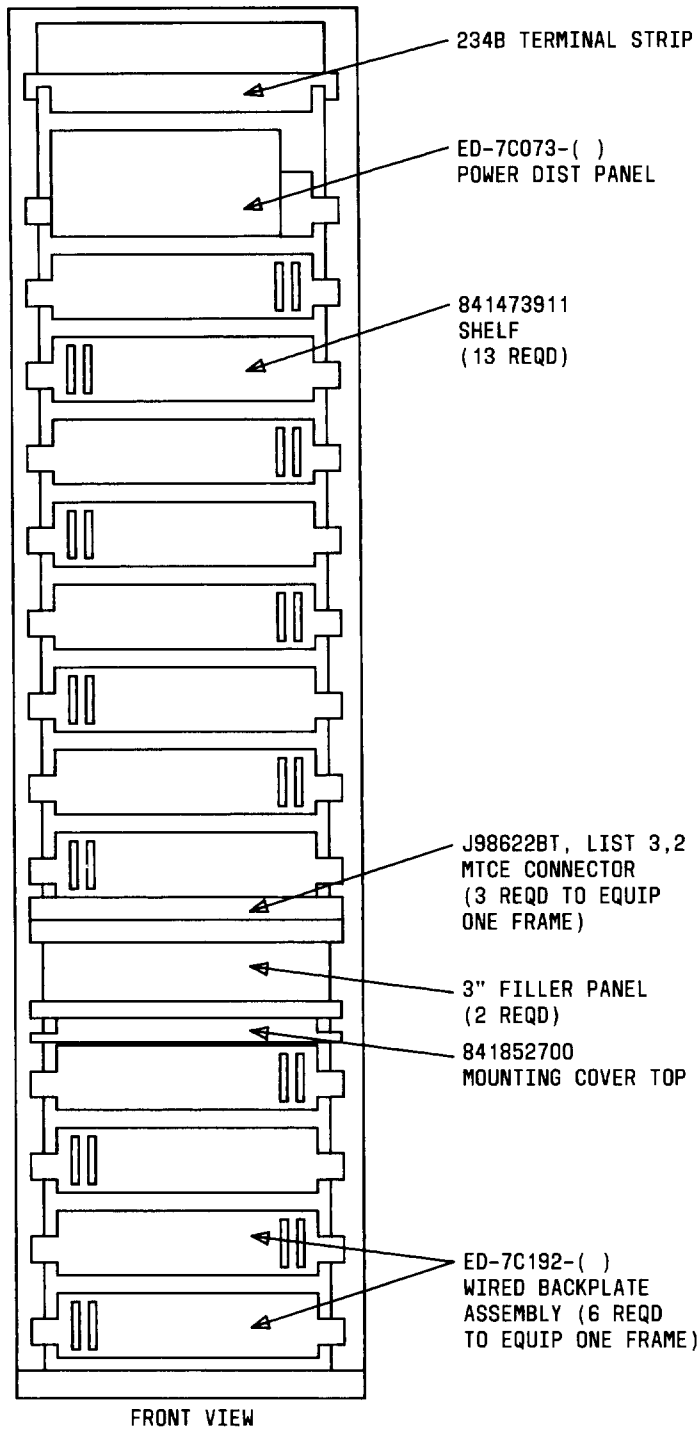


Fig. 1—J99394A (MD), 11' 6" Double Module Frame (Typical Type 3 Maintenance Connector Frame)

leads that are accessible depend upon the wiring on the particular circuit plug-in. These leads will be either the T, R or T1/A or R1/B leads on the MFT A-side or T, R leads on the MFT B-side as shown in Fig. 2. If the maintenance connectors are not initially ordered, then shorting plugs are required to maintain circuit continuity.

Caution: *On type 3 maintenance connectors, removal of the shorting plug, for later installation of deferred SMAS, will interrupt in-service circuits. See Handbook 80, Section 469, for methods that avoid service interruption. Type 4 maintenance connectors do not have this problem.*

2.05 On the early frames, the control leads plus the power and alarm leads for the maintenance connectors used on the J99394 frames are terminated on the 234 terminal strip at the top of each frame. This is done for the purpose of multiplying a maximum of ten of these connectors on the same control leads when interfacing a SMAS 3 System. Connections to SMAS 5 are also made at this terminal strip. The new 394 frames (D, E, F, L, M, N, P) do not have the terminal strip. Type 4 maintenance connector controllers connect directly to the stage 1 networks.

C. Backplates—ED-7C191-() and ED-7C192-()

2.06 The connectorized-modular backplates (rear portion of the mounting shelves containing the plug-in connectors) have the standard MFT input/output (I/O) leads terminating into specific 24 or 50 pin connectors. The I/O leads designated as optional (such as SX, SX1, D, F, etc) are not connectorized and must be wired by an installer on an "as-required" basis.

2.07 These backplates are wired in accordance with two basic wiring plans; the single-module (Fig. 3) and double-module (Fig. 4). Each backplate provides wiring and plug-in connectors for two shelves or 24 plug-ins. The ED-7C191-() single-module backplate (Fig. 5) can accommodate 24 MFT circuits (equaling the capability of one type 3 or type 4 maintenance connector). The ED-7C192-() double-module backplates (Fig. 6) will handle 12 MFT circuits (transmission and signaling). The type 3 or type 4 maintenance connector can accommodate two double-module backplates equaling four shelves or 24 circuits.

2.08 Power is supplied to each backplate via the 14-pin connector on the side of the upper backplate level.

D. Frames and List Arrangements—J99394

2.09 A total of seven J99394 MFT frames are available; one for each arrangement required. Available are: 11-foot 6-in. single- and double-module frames (see Fig. 1); 9-foot single- and double-module frames; 7-foot single- and double-module frames; and a 7-foot "growth" frame which is associated with the single-module "power" frame. The 7-foot double module frame always comes as a dual frame arrangement. The J-numbering and list structure is unique to these frames and are not to be confused with that of the J99386 frames (Part 3). The individual J-numbers for these frames are J99394D, E, F, L, M, N, and P, which replace, respectively, the J99394A, B, C, G, H, J, and K (MD). Each letter suffix relates directly to the specific frame, representing the overall height and modular arrangement (single or double) of that frame. For description and individual list structure of each frame, see paragraphs 2.11 and 2.12.

2.10 A list structure has been organized for each frame code to provide maximum flexibility in ordering associated equipment. This list structure can facilitate the ordering of fully equipped frames with SMAS maintenance connectors or frames partially equipped that do not have the SMAS maintenance connectors, but have through transmission paths.

2.11 The following describes each of the new J99394 frames and the associated list structure. Note that the quantity of maintenance connectors (24 circuits per unit) always conforms to the number of circuits in a frame, but the number of maintenance connector controllers (MCC) varies from 0 to 2.

J99394D—11-Foot 6-Inch Frame

(a) The J99394D-() Metallic Facility Terminal Connectorized Modular (MFTCM) frame with SMAS provision has an 11-foot 6-inch unequal flange cable duct framework and provides for 72 MTF circuits per FS2 of SD-7C018-02 (double-module arrangement) plus SMAS access and power distribution circuit elements. (See Note 5.)

- J99394D-(), L1: Frame, three type 4 maintenance connector housing (J1P033AT, L1), six backplate assemblies (ED-7C192-[]), shelves, hardware and wiring to equip one 11-foot 6-inch frame for 72 MFT circuits per FS2 of

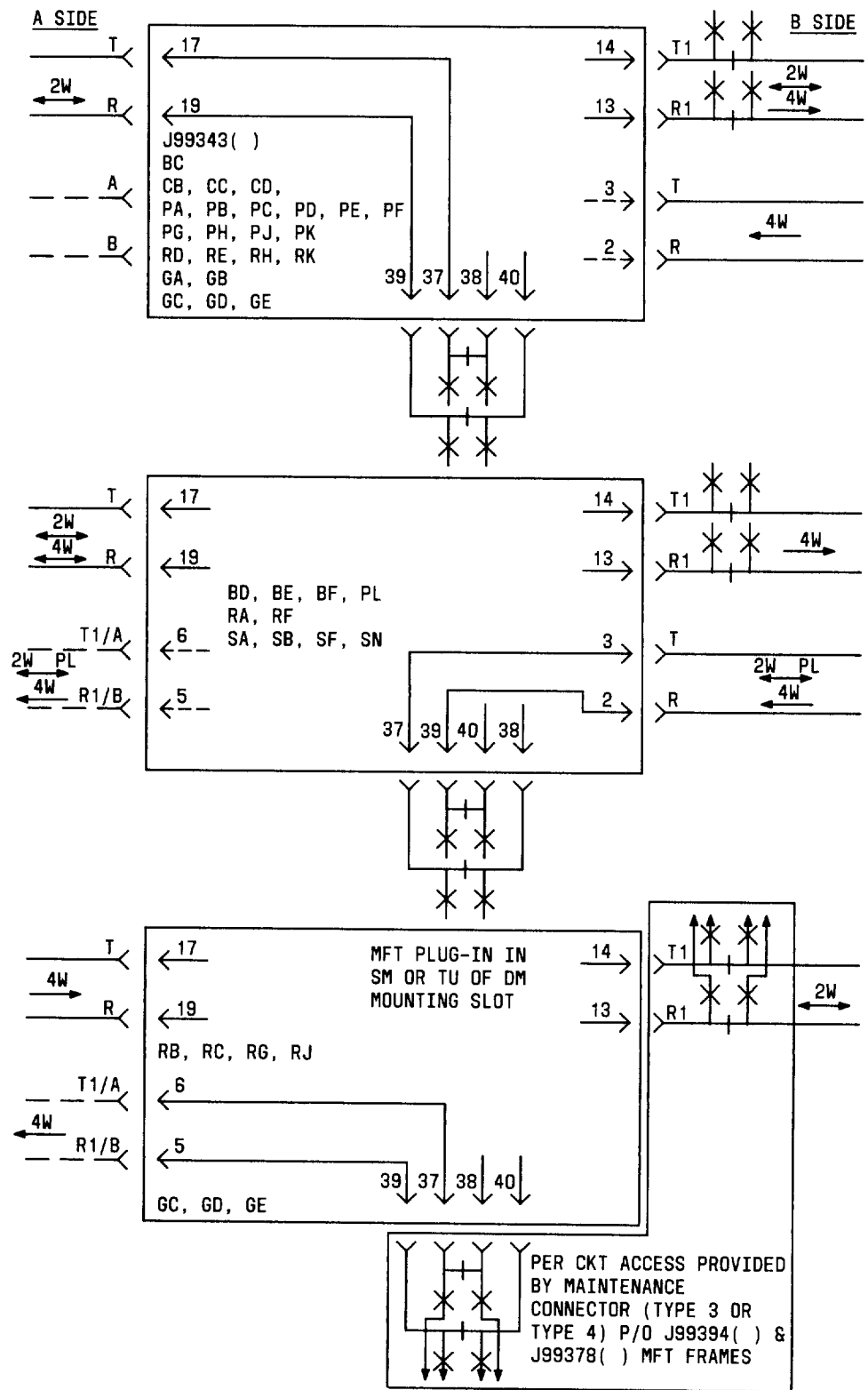
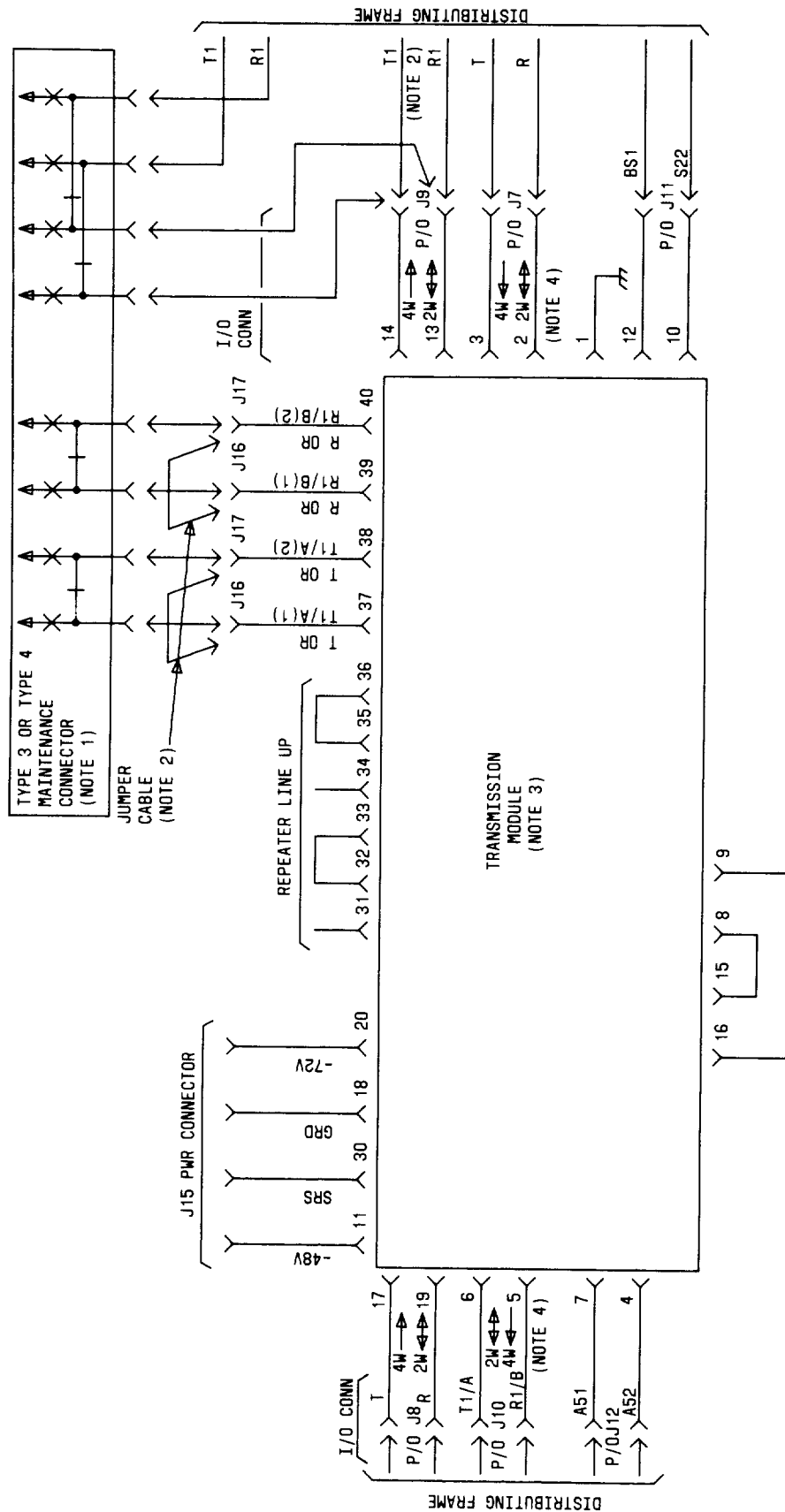
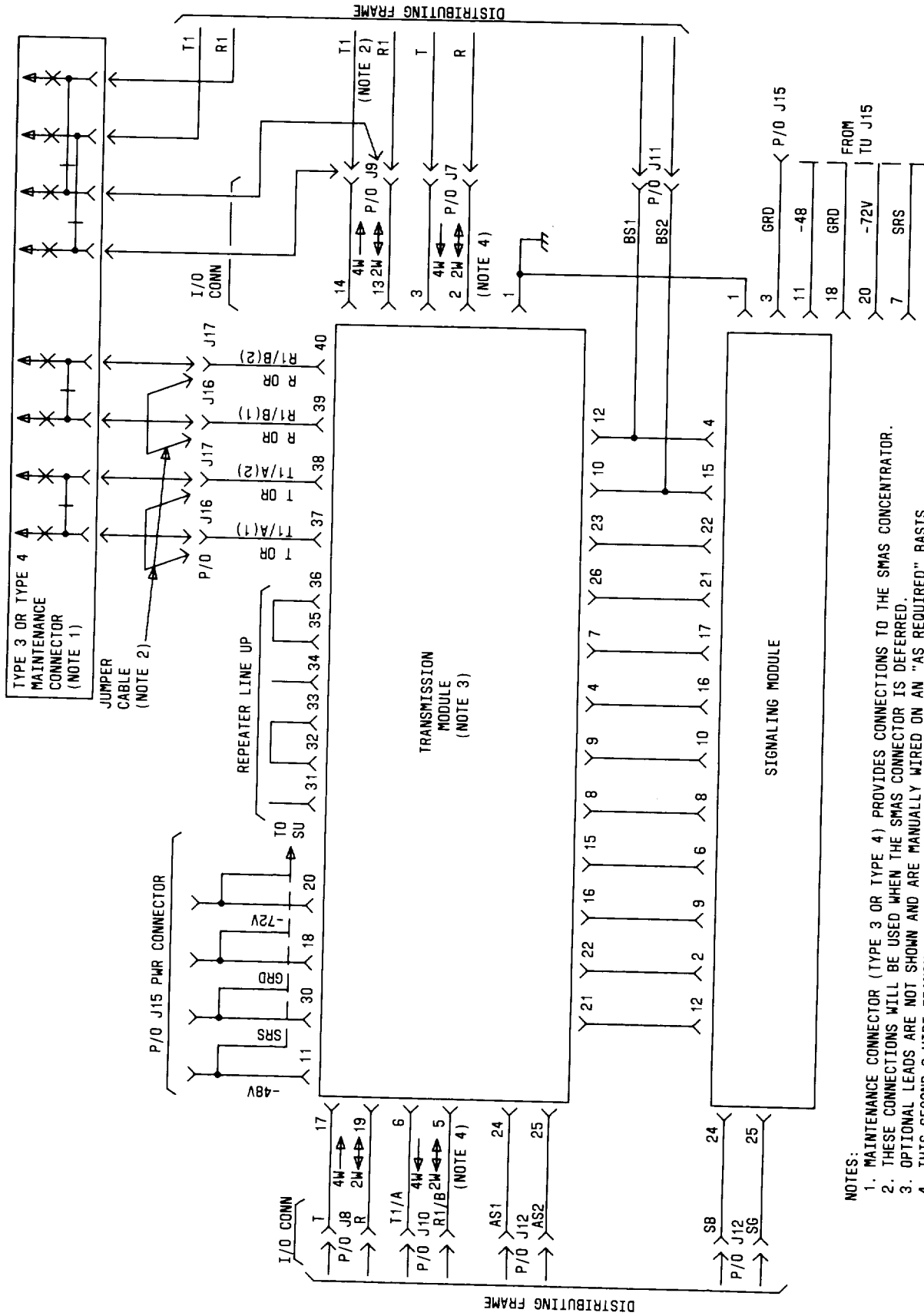


Fig. 2—SMAS Access Points on MFT Plug-ins



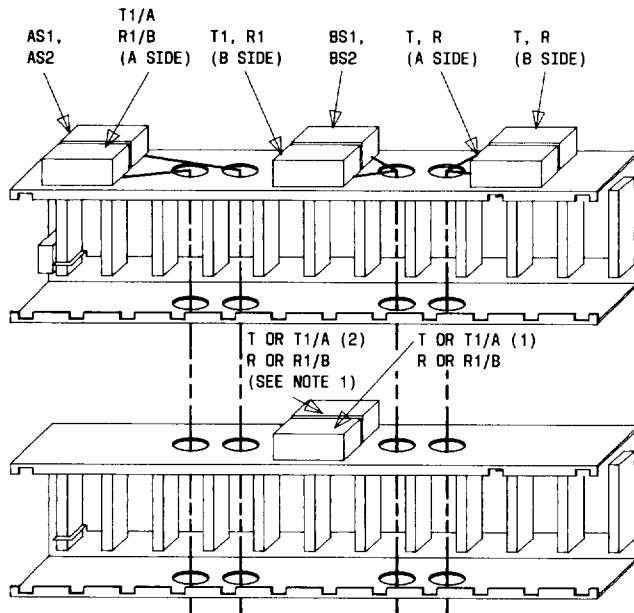
- NOTES:
1. MAINTENANCE CONNECTOR (TYPE 3 OR TYPE 4) PROVIDES CONNECTIONS TO THE SMAS CONCENTRATOR. THESE CONNECTIONS WILL BE USED WHEN THE SMAS CONNECTOR IS DEFERRED.
 2. THESE CONNECTIONS WILL BE USED WHEN THE SMAS CONNECTOR IS DEFERRED.
 3. OPTIONAL LEADS ARE NOT SHOWN AND ARE MANUALLY WIRED ON AN "AS REQUIRED" BASIS.
 4. THIS SECOND 2-WIRE TRANSMISSION PATH IS SHOWN FOR DUAL 2-WIRE CIRCUIT PLUG-INS.

Fig. 3—ED-7C191 Backplate Wiring for Single Modules



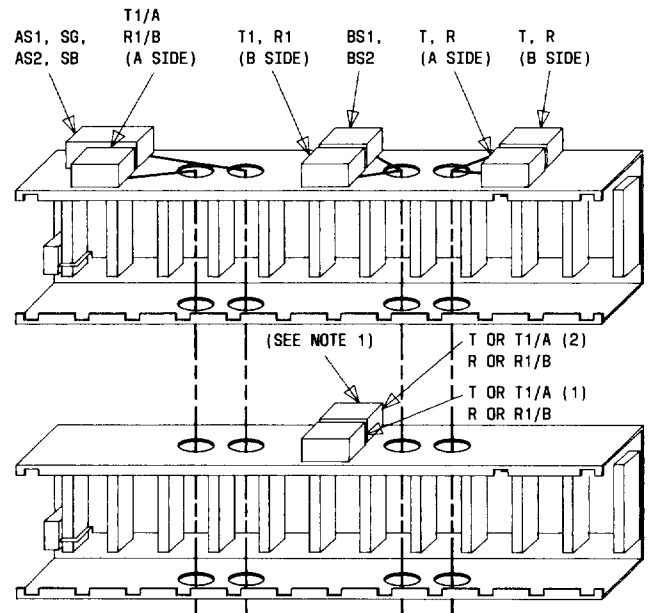
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 3. OPTIONAL LEADS ARE NOT SHOWN AND ARE MANUALLY WIRED ON AN "AS REQUIRED" BASIS.
 4. THIS SECOND 2-WIRE TRANSMISSION PATH IS SHOWN FOR DUAL 2-WIRE CIRCUIT PLUG-INS.

Fig. 4—ED-7C192 Backplate Wiring for Double Modules



NOTE 1:
 (1) DENOTES LINE SIDE &
 (2) DENOTES EQUIPMENT SIDE FOR SMAS ACCESS

Fig. 5—Single Module Backplate (ED-7C191)



NOTE 1:
 (1) DENOTES LINE SIDE &
 (2) DENOTES EQUIPMENT SIDE FOR SMAS ACCESS

Fig. 6—Double Module Backplate (ED-7C192)

SD-7C018-02 (double-module arrangement) and for SMAS and power distribution. (See Notes 1 and 3.)

- J99394D-(), L2: Equipment in addition to that provided by List 1 to provide one J1P033AU, L1 maintenance connector controller housing. (See Note 2.)

J99394E—9-Foot Frame

(b) The J99394E-() MFTCM frame with SMAS provision has a 9-foot unequal-flange cable-duct framework and provides for 48 MFT circuits per FS2 of SD-7C018-01 (double-module arrangement), plus SMAS access and power distribution circuit elements. (See Note 5.)

- J99394E-(), L1: Frame, two type 4 maintenance connector housings (J1P033AT, L1), four backplate assemblies (ED-7C192-[]), shelves, hardware, and wiring to equip one 9-foot frame for 48 MFT circuits per FS2 of SD-7C018-02 (double-module arrangement) and for SMAS and power distribution. (See Notes 1 and 3.)

- J99394E-(), L2: Equipment in addition to that provided by List 1 to provide one J1P033AU, L1 maintenance connector controller housing. (See Note 2.)

J99394F—7-Foot Frame

(c) The J99394F-() MFTCM frame with SMAS provision has a 7-foot dual unequal-flange cable-duct frame that provides for 96 circuits, per FS2 of SD-7C018-02 (double-module arrangement) plus SMAS access and power distribution circuit elements. (See Note 5.)

- J99394F-(), L1: Frame, four type 4 maintenance connector housings (J1P033AT, L1), eight backplate assemblies (ED-7C192-[]), shelves, hardware, and wiring to equip one 7-foot frame for 96 MFT circuits per FS2 of SD-7C018-02 (double-module arrangement) and for SMAS and power distribution. (See Notes 1 and 3.)
- J99394F-(), L2: Equipment in addition to that provided by List 1 to provide one J1P033AU, L1 maintenance connector controller housing. (See Note 2.)

J99394L—11-Foot 6-Inch Frame

(d) The J99394L-() MFTCM frame with SMAS provision is an 11-foot 6-inch unequal-flange cable duct frame that provides for MFT 144 circuits per FS1 of SD-7C018-02 (single-module arrangement) plus SMAS access and power distribution circuit elements. (See Note 5.)

- J99394L-(), L1: Frame, six type 4 maintenance connector housings (J1P033AT, L1), six backplate assemblies (ED-7C191-[]), shelves, hardware, and wiring to equip one 11-foot 6-inch frame for 144 MFT circuits per FS1 of SD-7C018-02 (single-module arrangement) and for SMAS and power distribution. (See Notes 1 and 3.)
- J99394L-(), L2: Equipment in addition to that provided by List 1 to provide one J1P033AU, L1 maintenance connector controller housing. (See Note 2.)

J99394M—9-Foot Frame

(e) The J99394M-() MFTCM frame with SMAS provision has a 9-foot unequal-flange cable-duct framework that provides for MFT 96 circuits per FS1 of SD-7C018-02 (single-module arrangement) plus SMAS access and power distribution circuit elements. (See Note 5.)

- J99394M-(), L1: Frame, four type 4 maintenance connector housings (J1P033AT, L1), four backplate assemblies (ED-7C191-[]), shelves, hardware, and wiring to equip one 9-foot frame for 96 MFT circuits per FS1 of SD-7C018-02 (single-module arrangement) and for SMAS and power distribution. (See Note 1 and 3.)
- J99394M-(), L2: Equipment in addition to that provided by List 1 to provide one J1P033AU, L1 maintenance connector controller housing. (See Note 2.)

J99394N—7-Foot Frame

(f) The J99394N-() MFTCM frame with SMAS provision has a 7-foot unequal-flange cable-duct framework that provides for 72 MFT circuits per FS1 of SD-7C018-02 (single-module arrangement) plus SMAS and power distribution circuit

elements. It also provides power for 96 additional MFT circuits in an adjacent J99394P-() frame if present. (See Note 5.)

- J99394N-(), L1: Frame, three type 4 maintenance connector housings (J1P033AT, L1), three backplate assemblies (ED-7C191-[]), shelves, hardware, and wiring to equip one 7-foot frame for 72 MFT circuits per FS1 of SD-7C018-02 (single-module arrangement) and for SMAS and power distribution. (See Notes 1, 3, and 4.)
- J99394N-(), L2: Equipment in addition to that provided by List 1 to provide one J1P033AU, L1 maintenance connector controller housing. (See Note 2.)

J99394P—7-Foot Frame

(g) The J99394P-() MFTCM frame with SMAS provision has a 7-foot unequal-flange cable-duct framework and provides for 96 MFT circuits per FS1 of SD-7C018-02 (single-module arrangement) plus SMAS access. This is a growth frame without power distribution provision and should be installed adjacent to a J99394N-() frame which power is supplied. (See Note 5.)

- J99394P-(), L1: Frame, four type 4 maintenance connector housings (J1P033AT, L1), four backplate assemblies (ED-7C191-[]), shelves, hardware, and wiring to equip one 7-foot frame for 96 MFT circuits per FS1 of SD-7C018-02 (single-module arrangement) and for SMAS access. (See Note 1, 3, and 4.)
- J99394P-(), L2: Equipment in addition to that provided by List 1 to provide one J1P033AU, L1 maintenance connector controller housing. (See Note 2.)

List-Structure Notes:

- (1) These frames are provided with factory wired MC and MCC housings only. The active SMAS maintenance connector relay-board (J1P033AT,L2) and the passive VF patch-through board (J1P033AT,L3) must be ordered separately by the operating companies as needed. The patch-through board is used when active SMAS access is to be deferred and can be replaced later by the relay board without circuit interruption. Where

provisioning with active type 4 relay boards is to be deferred, the fully cabled type 4 MC housings must be provided with patch-through boards by the operating company in order to have circuit continuity. In order to simplify circuit administration by the Trunks Integrated Record Keeping System (TIRKS) and to prevent proliferation of Common Language Equipment Identification (CLEI) codes, operating companies are strongly urged to completely provision frames with either the patch-through boards or with the relay boards and not with a mixture of both. When the patch-through boards are replaced by the relay boards for active SMAS access, all units on a frame should be exchanged. At least one plug-in patch-through board per office should be retained for maintenance and repair. The J98622BR communication panel is available for surface mounting on these frames. In addition, mounting space is provided on five of the seven (D, E, L, M, and N) frames and at convenient height, for miscellaneous mounting either an ED-3C660 or a J98626AA communication panel. On the "F" frame less space is available and hence only a J98622BR or a J98626AA can be accommodated. There is no need for a communication panel on the J99394P "growth" frame.

(2) List 2, which provides the type 4 maintenance connector controller housing (J1P033AU,L1), must be ordered with the frame for installations in which a controller (MCC) will be required. Single frame installations require an MCC. The MCC relay board (J1P033AU,L2) must be ordered separately by the user. Deferred installation of the MCC relay board may be made without service interruption because the MCC is not in the VF transmission path.

(3) Power Distribution Panel ED-7C073-32 (FS3 and 4 of SD-7C007-01) provides for either -48V talk-battery or an optional -72V talk-battery for extended range. If -72 volt talk-battery is required, either the J99343YA filter, per options "T" or "S" of SD-7C018-02, must be used or alternatively a -24 volt floating add-on converter, J98304,L1 per option "V" of SD-7C018-02, must be used. Twenty Hz ringing is also supplied for the frames. Fusing and alarms are provided for frame equipment panels as required.

(4) The J99394N also provides power for 96 additional circuits in an adjacent J99394P frame, if present. The J99394P is a growth frame without

power distribution provision and should be installed next to a J99394N frame from which power is supplied.

(5) MFT Plug-ins must be ordered separately from PICS as required.♦

2.12 The following describes each of the MD MFT frames and associated list structure. (Notice the maximum number of circuits attainable in each frame.)

J99394A—11-Foot 6-Inch Frame

(a) The J99394A (MD) Metallic Facility Terminal Connectorized Modular (MFTCM) frame with SMAS provision is an 11-foot 6-inch unequal flange cable duct framework that provides for 72 circuits per FS13 of SD-7C018-01 (double-module arrangement).

- J99394A, List 1—Framework, assembly, 13 mounting shelves, terminal strip, and ground lug.
- J99394A, List 2—ED-7C073-31 power distribution and alarm panel and associated wiring. (See Note 1.)
- J99394A, List 3—Six ED-7C192-() backplate assemblies. (See Notes 2, 3, and 4.)
- J99394A, List 4—Three J98622BT, List 3 equipped with List 2 SMAS maintenance connectors and associated cables. (See Note 5.)
- J99394A, List 5—Cables necessary to complete MFT circuits when List 3 is deferred. Note that service is interrupted when installing a deferred unit unless expensive bridging techniques are used per Handbook 80.

J99394B—9-Foot Frame

(b) The J99394B (MD) MFTCM frame with SMAS provision is a 9-foot unequal flange cable duct framework that provides for 48 circuits per FS13 of SD-7C018-01 (double-module arrangement).

- J99394B, List 1—Framework, assembly, 9 mounting shelves, terminal strip, and ground lug.
- J99394B, List 2—ED-7C073-31 power distribution and alarm panel and associated wiring. (See Note 1.)

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- J99394B, List 3—Four ED-7C192-() backplate assemblies. (See Notes 2, 3, and 4.)
- J99394B, List 4—Two J98622BT, List 3 equipped with List 2 SMAS maintenance connectors and associated cables. (See Note 5.)
- J99394B, List 5—Cables necessary to complete MFT circuits when List 3 is deferred. Note that service is interrupted when installing a deferred unit unless expensive bridging techniques are used per Handbook 80.
- J99394G, List 3—Six ED-7C191-() backplate assemblies. (See Notes 2, 3, and 4.)
- J99394G, List 4—Six J98622BT, List 3 equipped with List 2 SMAS maintenance connectors and associated cables. (See Note 6.)
- J99394G, List 5—Cables necessary to complete MFT circuits when List 3 is deferred. Note that service is interrupted when installing a deferred unit unless expensive bridging techniques are used per Handbook 80.

J99394C—7-Foot Frame

(c) The J99394C (MD) MFTCM frame with SMAS provision is a 7-foot dual unequal flange cable duct framework that provides for 96 circuits per FS13 of SD-7C018-01 (double-module arrangement).

- J99394C, List 1—Framework, assembly, 17 mounting shelves, terminal strip, and ground lug.
- J99394C, List 2—ED-7C073-31 power distribution and alarm panel and associated wiring. (See Note 1.)
- J99394C, List 3—Eight ED-7C192-() backplate assemblies. (See Notes 2, 3, and 4.)
- J99394C, List 4—Four J98622BT, List 3 equipped with List 2 SMAS maintenance connectors and associated cables. (See Note 5.)
- J99394C, List 5—Cables necessary to complete MFT circuits when List 3 is deferred. Note that service is interrupted when installing a deferred unit unless expensive bridging techniques are used per Handbook 80.

J99394G—11-Foot 6-Inch

(d) The J99394G (MD) MFTCM frame with SMAS provision is an 11-foot 6-inch unequal flange cable duct framework that provides for 144 circuits per FS12 of SD-7C018-01 (single-module arrangement).

- J99394G, List 1—Framework, assembly, 13 mounting shelves, terminal strip, and ground lug.
- J99394G, List 2—ED-7C073-31 power distribution and alarm panel and associated wiring. (See Note 1.)

J99394H—9-Foot Frame

(c) The J99394H (MD) MFTCM frame with SMAS provision is a 9-foot unequal flange cable duct framework that provides for 96 circuits per FS12 of SD-7C018-01 (single-module arrangement).

- J99394H, List 1—Framework, assembly, 9 mounting shelves, terminal strip, and ground lug.
- J99394H, List 2—ED-7C073-31 power distribution and alarm panel and associated wiring. (See Note 1.)
- J99394H, List 3—Four ED-7C191-() backplate assemblies. (See Notes 2, 3, and 4.)
- J99394H, List 4—Four J98622BT, List 3 equipped with List 2 SMAS maintenance connectors and associated cables. (See Note 6.)
- J99394H, List 5—Cables necessary to complete MFT circuits when List 3 is deferred. Note that service is interrupted when installing a deferred unit unless expensive bridging techniques are used per Handbook 80.

J99394J—7-Foot Frame

(d) The J99394J (MD) MFTCM frame with SMAS provision is a 7-foot unequal flange cable duct framework that provides for 72 circuits per FS12 of SD-7C018-01 and also provides power for 96 additional circuits in an adjacent J99394K frame (single-module arrangement).

- J99394J, List 1—Framework, assembly, 7 mounting shelves, terminal strip, and ground lug.
- J99394J, List 2—ED-7C073-31 power distribution and alarm panel and associated wiring. (See Note 1.)

- J99394J, List 3—Three ED-7C191-() backplate assemblies. (See Notes 2, 3, and 4.)
- J99394J, List 4—Three J98622BT, List 3 equipped with List 2 SMAS maintenance connectors and associated cables. (See Note 6.)
- J99394J, List 5—Cables necessary to complete MFT circuits when List 3 is deferred. Note that service is interrupted when installing a deferred unit unless expensive bridging techniques are used per Handbook 80.

J99394K—7-Foot Frame

(e) The J99394K (MD) MFTCM frame with SMAS provision is a 7-foot unequal flange cable duct framework that provides for 96 circuits per FS12 of SD-7C018-01. This is a growth frame and should be installed adjacent to a J99394J frame from which power is supplied (single-module arrangement).

- J99394K, List 1—Framework, assembly, 8 mounting shelves, and ground lug.
- J99394K, List 2—Four ED-7C191-() backplate assemblies. (See Notes 2, 3, and 7.)
- J99394K, List 3—Four J98622BT, List 3 equipped with List 2 SMAS maintenance connectors and associated cables. (See Note 6.)
- J99394K, List 4—Cables necessary to complete MFT circuits when List 3 is deferred.

Note 1: The power distribution panel provides for either -48V talk battery or an optional -72V talk battery for double module frames. If -72V talk battery is required for a double module frame, either the J99343YA filter, per option B or ZA, or the J87304, L1 DC-DC converter, per option A, is required. The plug-in unit must be ordered separately as required. The -72V talk battery is not provided for single-module frames.

Note 2: MFT plug-ins must be ordered separately as required.

Note 3: Frames may be partially equipped. See Note 5 for double module frames and Note 6 for single module frames.

Note 4: When List 3 is deferred, List 5 must be ordered.

Note 5: One J98622BT, List 3 equipped with List 2 with appropriate cable serves two ED-7C191-() twin backplate assemblies. The length of this cable varies with circuit position. When SMAS maintenance connectors are deferred and equipped one at a time it will be necessary to specify the correct cable by code. The necessary information will be provided in the J specification.

Note 6: One J98622BT, List 3 equipped with List 2 with appropriate cable serves one ED-7C191-() twin backplate assembly. The length of this cable varies with circuit position. When SMAS maintenance connectors are deferred and equipped one at a time it will be necessary to specify the correct cable by code. The necessary information will be provided in the J specification.

Note 7: When List 3 is deferred, List 4 must be ordered.

3. CONNECTORIZED-MODULAR FRAMES— J99386

A. General

3.01 The J99386 series of frames for MFT installations is of modular construction (Fig. 7) with all input/output wiring connectorized and are mechanically similar to the J99394 series. These connectors replace the wire wrap terminal blocks used in the top of the J99343 and J99378 frames and simplify manufacturing and installation processes.

3.02 The frames are the functional equivalent of the J99343 series with major changes to the shelf assemblies. The modular frames utilize connectorized backplates which contain the plug-in connectors and surface wiring. The backplates are available in both the double-module (J99386C) and the single-module (J99386D) circuit arrangements. To optimize wiring and to minimize the number of connectors required, the backplates are factory wired in vertical pairs. This assembly is referred to as a twin backplate assembly.

B. SMAS Retrofit

3.03 The J99386 series of frames were originally designed without SMAS access capability.

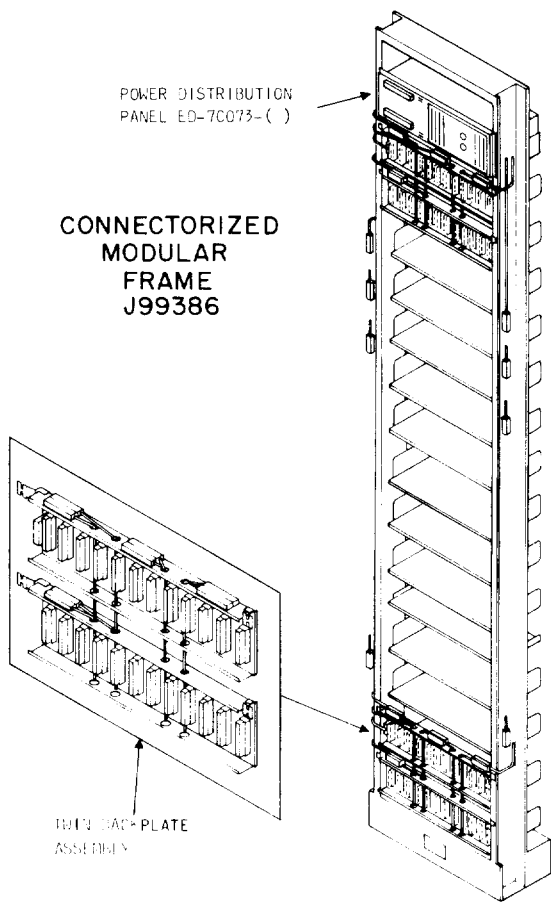


Fig. 7—Connectorized Modular Frame J99386

Provisions are now available to allow retrofitting these frames with SMAS access.

3.04 The retrofitting procedure for circuits which are not in service consists of:

- (a) Connecting backplate terminals 37, 38, 39, and 40 to a miscellaneous mounted SMAS maintenance connector as shown in Fig. 8 (test to verify these connections).
- (b) Remove jumper connections between terminals 37 and 38 and between terminals 39 and 40.
- (c) Connect backplate terminals 14 and 13 (T1/R1) to SMAS maintenance connector per CAD 10 for J99386C shelf, or per CAD 11 for J99386D shelf.

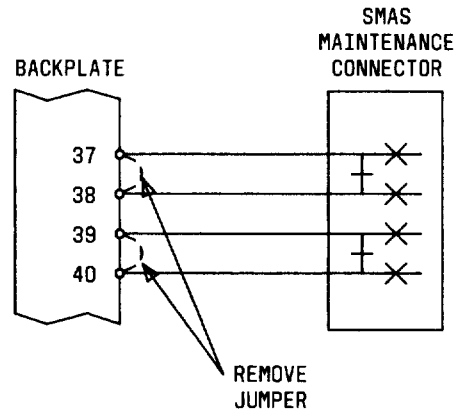


Fig. 8—SMAS Access Lead Arrangement for J99386 and J99343 Frames

3.05 The retrofitting procedure for circuits in service is similar to paragraph 3.04 as follows:

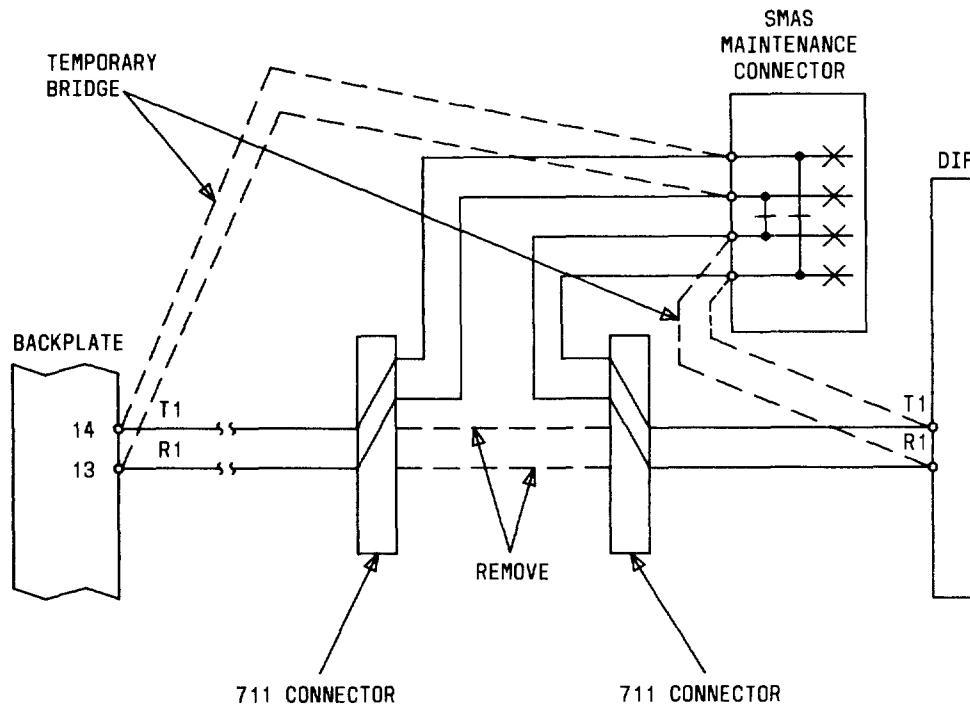
- (a) Similar to paragraph 3.04(a).
- (b) Similar to paragraph 3.04(b).
- (c) Route T1 and R1 leads through a miscellaneous mounted SMAS maintenance connector by tapping into existing T1 and R1 leads as shown in Fig. 9.
- (d) See Handbook 80 for alternate methods.

Caution: *Extreme care must be taken and strict adherence to procedures described in handbook 80 must be observed to prevent service interruptions during retrofit.*

- (e) The use of ITE 6157 is recommended to test active circuits without service interruption.
- (f) After taps are completed and tested, remove wires from between 711 connectors.

C. Backplates

3.06 The J99386C double-module twin backplate assembly is wired in accordance with FS2 of SD-7C018-01 for 12 double-module circuits (24 mounting slots). All input/output leads terminate in 24-pin or 50-pin connectors. Power leads are terminated in a 14-pin connector. Figure 10 shows the con-



NOTE:
DIRECT ACCESS FROM THE DIF AND THE BACKPLATE TO THE MAINTENANCE CONNECTOR IS POSSIBLE THROUGH THE USE OF A TEMPORARY ALTERNATE BRIDGING METHOD (WHICH DOES NOT USE THE 711 CONNECTORS).

Fig. 9—SMAS Access to T1 and R1 Leads on J99386 Frames

connector locations and the lead assignments. Figure 20 gives the basic leads provided by the J99343A-2 shelf wiring. This is the same basic lead plan provided by the equivalent J99386C double-module backplate.

3.07 The J99386D single-module with backplate assembly is wired in accordance with FS1 of SD-7C018-01 for 24 single-module circuits. All input/output leads terminate in 50-pin connectors and the power leads are terminated in a 14-pin connector. The connector locations and lead assignments are shown in Fig. 11. Figure 21 gives the basic leads provided by the J99343B-1 shelf wiring. This is the same basic plan provided by the equivalent J99343D single-module backplate.

3.08 Three wiring options have been available for each backplate assembly and are represented

by equipment code list numbers. List 1 is the assembly with 14 leads for double-module circuits or 12 leads for single-module circuits. List 2 (A&M only) provides G and G1 leads for repeater disabling. List 3 (MD) supplies additional wiring for noncut and terminate trunk circuits (D and F leads). These backplates are not recommended for miscellaneous mounting arrangements.

D. Frames

3.09 These connectorized frames differ from the other MFT frames in that the letter suffix of the J-number designates only the frame height. Three standard heights are available: 11-foot 6-inches (J99386F), 9-foot (J99386G), and 7-foot (J99386H and J99386J). List 1 of these frames con-

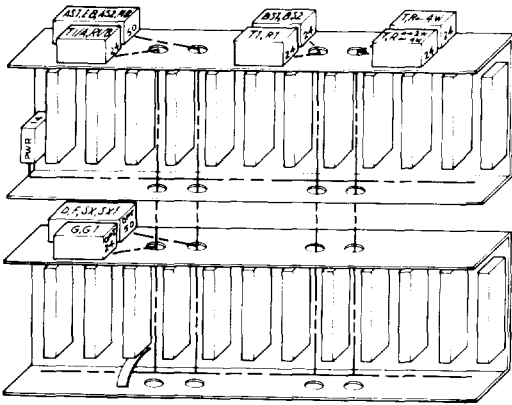


Fig. 10—J99386C Double-Module Twin Backplate Assembly

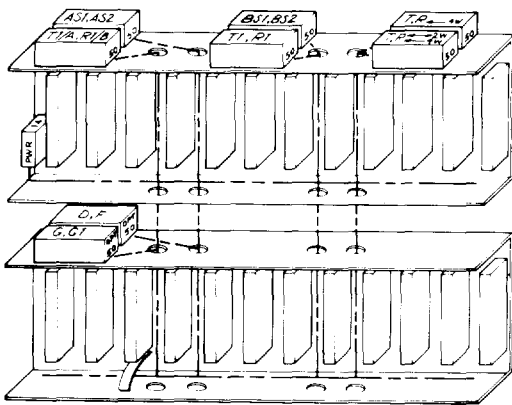


Fig. 11—J99386D Single-Module Twin Backplate Assembly

sists of the framework, power distribution panel (except J99386J and L), and the appropriate number of shelf assemblies less backplates. Additional list numbers are used to add complete sets of backplates. The 7-foot growth frame, coded J99386J, is available for use in conjunction with the J99386H frame. The J99386J, List 1 frame does not include a power distribution panel.

3.10 At the present time, frames are shipped only with complete sets of all double-module or all single-module backplate assemblies. The backplates supplied as frame equipment code lists are List 1 backplates (without wiring options). Wiring options must now be added to the backplates by an installer

on an "as required" basis since the change in the ratings of Lists 2 and 3.

3.11 The J99386 series of frames are equipped and wired to accommodate the use of the new combined function units; however, the associated backplates (J99386C and D) were not wired initially. Option K of SD-7C018-01 (issue 8B) FS1 and FS2 indicates the appropriate wire straps required on each backplate. These straps are to be added by an installer on any appropriate in-service backplate which is to be used with the combined units. These straps will be added to all subsequent backplates in manufacturing.

3.12 The equipment specification (Section 801-406-162) gives frame list numbers which contain mixtures of single- and double-module backplates in a single-bay framework. These list numbers are rated MD and are not available.

3.13 The following describes the various arrangements available with the connectorized modular MFT frames.

J99386C—Double-Module Twin Backplate

- (a) Twin backplate assembly wired for 12 double-module circuits
- List 1—Framework, assembly, wiring, and common equipment for 12 double-module circuits per FS2 of SD-7C018-01 (14 leads)
 - List 2—(A&M) Equipment and wiring in addition to List 1 for wiring option Y (G and G1 leads)
 - List 3—(MD) Equipment and wiring in addition to List 1 for wiring option Z (D, F, SX, and SX1 leads).

J99386D—Single-Module Twin Backplate

- (b) Backplate assembly wired for 24 single-module circuits.
- List 1—Framework, assembly, wiring, and common equipment for 24 single-module circuits per FS1 of SD-7C018-01 (12 leads).
 - List 2—(A&M) Equipment and wiring in addition to List 1 for wiring option Y (G and G1 leads).

- List 3—(MD) Equipment and wiring in addition to List 1 for wiring option Z (D and F leads).

J99386F—11-foot 6-inch Frame

- (c) An 11-foot 6-inch frame arranged for 14 mounting shelves.
- List 1 (MD)—Framework, assembly, power wiring, and common equipment. Includes 14 mounting shelves.
 - List A (MD)—Shelf and ED-7C019-31 power distribution panel
 - List B (MD)—Required in addition to List 1 for one shelf and ED-7C073-30 power distribution panel
 - List 2—Additional equipment and wiring for seven J99386C twin backplates. Will terminate 84 double-module circuits.
 - List 6—Additional equipment and wiring for seven J99386D twin backplates. Will terminate 168 single-module circuits.
 - List 7—Framework, assembly, power wiring, and common equipment for 14 mounting shelves. Also includes ED-7C073-31 power distribution panel and mounting shelf.

Note: Lists 3, 4, and 5 (not shown) are rated MD and were never available.

J99386G—9-foot Frame

- (d) A 9-foot frame arranged for 11 mounting shelves.
- List 1—Framework, assembly, power wiring, and common equipment. Includes 11 mounting shelves and one shelf-mounted ED-7C073-31 power distribution panel.
 - List 2—Additional equipment and wiring for five J99386C twin backplates. Will terminate 60 double-module circuits.
 - List 5—Additional equipment and wiring for five J99386D twin backplates. Will terminate 120 single-module circuits.

Note: Lists 3 and 4 are rated MD and were never available.

J99386H—7-foot "Power" Frame

- (e) A 7-foot power frame.

- List 1—Framework, assembly, power wiring, and common equipment. Includes nine mounting shelves and one shelf-mounted ED-7C073-31 power distribution panel which also is used as power supply for adjacent "growth" frame (J99386J).
- List 2—Additional equipment and wiring for four J99386C twin backplates. Will terminate 48 double-module circuits.
- List 5—Additional equipment and wiring for four J99386D twin backplates. Will terminate 96 single-module circuits.

Note: Lists 3 and 4 are rated MD and were never available.

J99386J—7-foot "Growth" Frame

- (f) A 7-foot growth frame.

- List 1—Framework, assembly, power wiring, and common equipment. Includes eight mounting shelves. Power must be supplied by adjacent J99386H frame.

Note: The J99386H frame may be either to the right or left of the J99386J "growth" frame but it must be adjacent.

- List 2—Equipment and wiring for four J99386C twin backplates. Terminates 48 double-module circuits.
- List 5—Equipment and wiring for four J99386D twin backplates. Terminates 96 single-module circuits.

J99386K—7-foot "Power" Frame

- (g) A 7-foot power frame utilizing an ESS 26-inch framework.

The J99386K frame is similar to the J99386H frame except the K frame utilizes ESS 26-inch framework.

- List 1—Framework, assembly, power wiring, and common equipment. Includes nine

mounting shelves and one shelf-mounted ED-7C073-31 Group 2 power distribution panel which is also used as power supply for adjacent "growth" frame (J99386L).

- List 2—Additional equipment and wiring for four J99386C twin backplates. Will terminate 48 double-module circuits.
- List 3—Additional equipment and wiring for four J99386D twin backplates. Will terminate 96 single-module circuits.

J99386L—7-foot "Growth" Frame

(h) A 7-foot growth frame utilizing an ESS 26-inch framework. The J99386L frame is similar to the J99386J frame except the L frame utilizes ESS 26-inch framework.

- List 1—Framework, assembly, power wiring, and common equipment. Includes eight mounting shelves. Power must be supplied by adjacent J99386K power bay.

Note: The J99386K frame may be either to the right or left of the J99386L "growth" frame but it must be adjacent.

- List 2—Equipment and wiring for the J99386C twin backplates. Will terminate 48 double-module circuits.
- List 3—Equipment and wiring for four J99386D twin backplates. Will terminate 96 single-module circuits.

3.14 Due to the flexibility of these connectorized frames, they supersede the J99343 series of MFT frames. Also, deferral of "List" equipment in ordering is not recommended, as with J99394 frames, since this has not proven to be economical.

4. SMAS FRAMES—J99378

A. General

4.01 The J99378 (MD) series of frames (Fig. 12) was developed for installation in offices equipped with SMAS or contemplating the installation of such a system. Applications in non-SMAS environments may also be justified to facilitate manual circuit testing and minimize the need for the J99343TB test ex-

tender where routine testing of transmission levels is required.

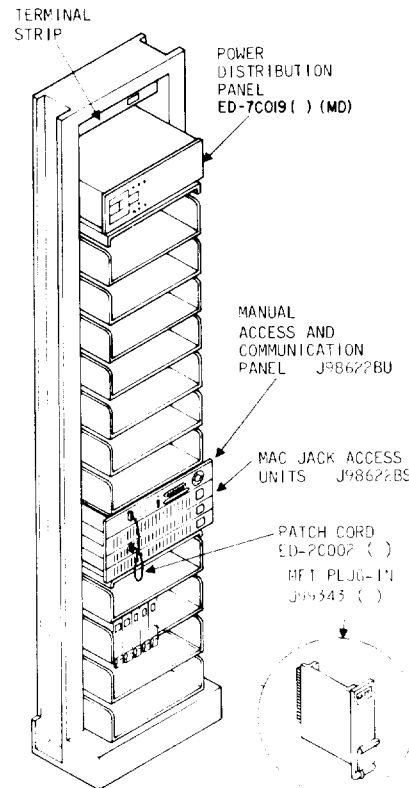


Fig. 12—J99378 Frame (MD)

4.02 The J99378 frames are the functional equivalent of the J99394 frames with additional auxiliary equipment to permit circuit access for manual testing and maintenance. At this writing, the continued need for the J99378 frame is under review.

4.03 The basic frame arrangement includes a power distribution panel, ED-7C019-(); shelf assemblies ED-7C053-() wired for either single-module (Fig. 13), FS3 of SD-7C018-01, or double-module (Fig. 14), FS4 of SD-7C018-01, operation; one type 3 connectorized MAC jack access panel, J98622BS, for each 24 circuits; and one type 3 manual access and communications panel, J98622BU (callout on Fig. 12). The manual access and communications panel may be installed in every frame; however, it is a frame option and is recommended to be installed in one out of every three frames.

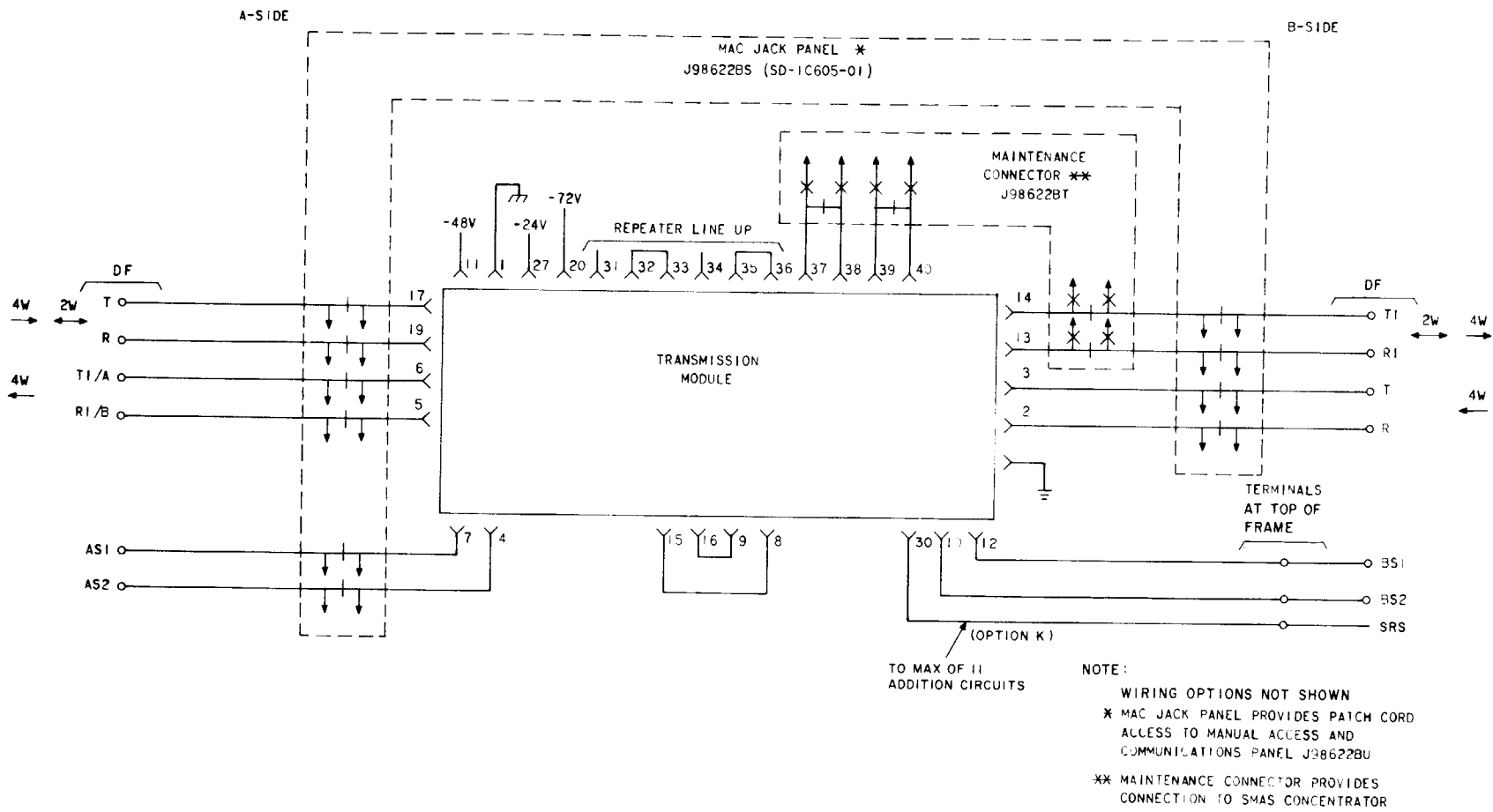


Fig. 13—ED-7C053-30 Single-Module Shelf Wiring

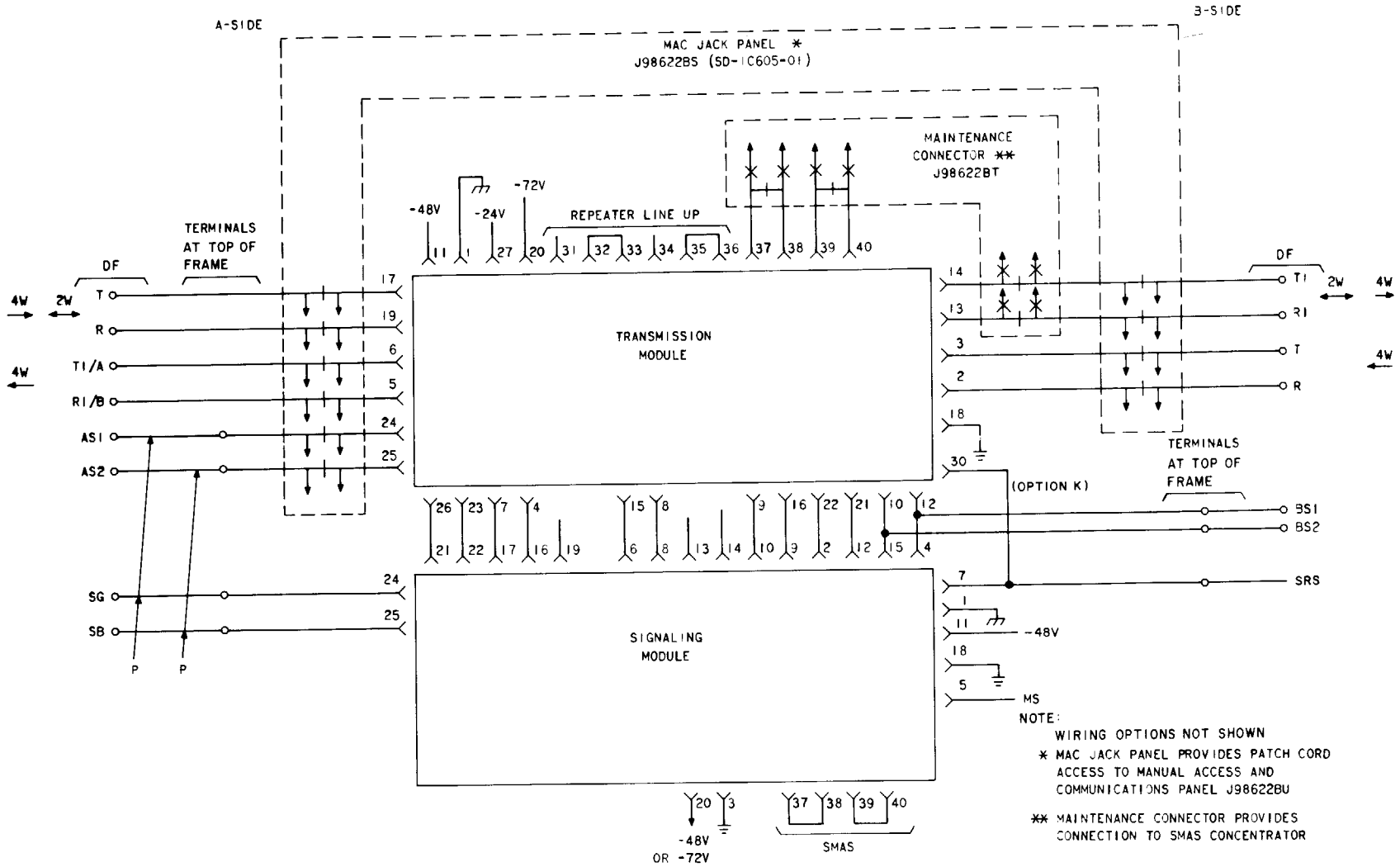


Fig. 14—ED-7C053-31 Double-Module Shelf Wiring

4.04 Manual access for testing is accomplished by connecting the manual access and communications panel to the MAC jack of the circuit to be tested with an ED-2C002 patch cord. The circuit can then be monitored and tested using the facilities of the manual access panel. The manual access panel has splitting jack access to the following leads:

A-side	B-side
T, R	T, R
T1/A, R1/B	T1, R1
AS1, AS2	

4.05 The MAC jack access unit, J98622BS, also acts as the mounting shelf for the type 3 maintenance connector, J98622BT (Fig. 15), for those offices using centralized testing.

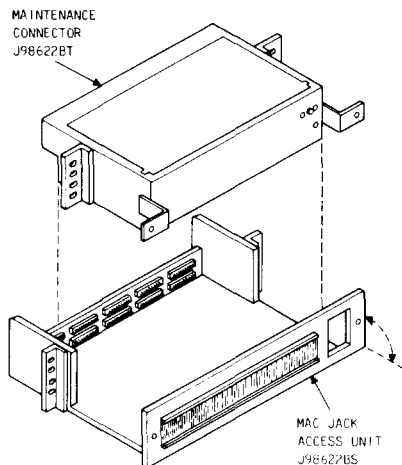


Fig. 15—J98622BT Maintenance Connector and MAC Jack Access Unit

4.06 The J99378 frames require wiring option K (SD-7C018-01, Issue 8B) to add shelf strapping, making them compatible with the new type combined function units. This option must be added on in-service equipment "as required" by an installer. Subsequent frames from the shop will come with this option. In addition, the J99378 single-module frames, requiring this compatibility, must have option ZD (SC-7C081-01, Issue 8B) installed. The ZD provides for the installation of ED7C171-30 ringing

distribution panel and associated wiring. At this writing, this option is available for field installation only. It cannot be ordered in a coded frame.

B. Frames

4.07 The following are SMAS frames for MFT installations and each is available with optional -72 volt talk battery.

J99378A Double Module Frame (MD)

(a) An 11-foot 6-inch frame arranged for 72 double-module circuits.

- List 1—Provides frame hardware, shelves, and wiring to the top of the frame. Also includes an ED-7C019-31 power distribution panel and three MAC jack panels (J98622BS).
- List 2—When added to List 1, provides three J98622BT SMAS connector panels.
- List 3—Added to List 1 and 2 provides a J98622BU communications panel. (In addition, the flush/recessed mounting option must be specified.)

J99378B Double-Module Frame (MD)

(b) A 9-foot frame arranged for 48 double-module circuits.

- List 1—Provides frame hardware, shelves, and wiring to the top of the frames plus an ED-7C019-31 power distribution panel and three J98622BS MAC jack panels.
- List 2—With List 1, adds three J98622BT SMAS connector panels.
- List 3—With List 1, 2 provides a J98622BU communication panel.

J99378C Double-Module Frame (MD)

(c) A 7-foot duct-type frame arranged for 36 double-module circuits.

- List 1—Provides frame hardware, shelves, and wiring plus two J98622BS MAC jack panels.
- List 2—Should be specified for single frame installations where no growth bay is used.

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List 3 adds an ED-7C019-31, group 1, 2 power distribution panel to the List 1 equipment.

- List 3—Adds an ED-7C019-31, group 1, 7 power panel for dual frame installations where the J99378D “growth” frame is used.
- List 4—With 1, 2, or 3 adds two J98622BT SMAS connector panels.
- List 5—Provides the J98622BU communication panel.

J99378D Double-Module Frame (MD)

(d) A 7-foot growth frame used in conjunction with the J99378C power frame.

- List 1—Provides frame hardware, shelves, and wiring and one J98622BS MAC jack panel.
- List 2—With List 1, provides a J98622BT SMAS connector panel.

J99378E Single-Module Frame (MD)

(e) An 11-foot 6-inch duct-type frame arranged for 120 single-module circuits.

- List 1—Provides frame hardware, shelves, and wiring plus a ED-7C019-30 power distribution panel and five J98622BS MAC jack panels.
- List 2—With List 1, provides five J98622BT SMAS connector panels.
- List 3—Added to List 1, 2 provides the J98622BU communication panel. (Must specify mounting arrangement.)

J99378F Single-Module Frame (MD)

(f) A 9-foot duct-type frame arranged for 96 single-module circuits.

- List 1—Provides frame hardware, shelves, and wiring plus the ED-7C019-30 power distribution panel and four J98622BS MAC jack panels.
- List 2—With List 1, provides 4 J98622BT SMAS connector panels.

- List 3—With List 1, 2, provides the J98622BU communication panel. Specify type mounting and circuit.

J99378G Single-Module Frame (MD)

(g) A 7-foot duct-type frame arranged for 72 single-module circuits.

- List 1—Provides all frame hardware, shelves, and wiring plus three J98622BS MAC jack panels.
- List 2—Provides the ED-7C019-30, group 1, 2 power distribution panel for single frame operation (no adjacent J99378H growth frame).
- List 3—Added to List 1, provides the ED-7C019-30, group 1, 7 for dual frame operation (the basic power frame J99378G and adjacent J99378H growth frame).
- List 4—Provides three J98622BT SMAS connector panel when specified with List 1 and 2 or 3.
- List 5—Provides the J98622BU communications panel. Specify mounting.

J99378H Single-Module Frame (MD)

(h) A 7-foot duct-type frame utilizing power from an adjacent J99378G power frame arranged for 72 single-module circuits.

- List 1—Provides frame hardware, shelves and wiring plus three J98622BS MAC jack panels.
- List 2—With List 1, provides a J98622BT SMAS connector panel.

4.08 Equipment engineering information for the J99378 frames may be found in Section 801-406-161. Equipment engineering information for the MAC jack access unit J98622BS, type 3 maintenance connectors J98622BT, and the manual access and communications panel J98622BU may be found in Section 801-408-151.

5. NON-SMAS FRAMES—J99343

A. General

5.01 The J99343 series of shop-wired frames (Fig. 16) came in three standard heights (11'6", 9'0", and 7'0"), wired in either the single-module circuit arrangement (J99343B shelf) or the double-module circuit arrangement (J99343A shelf, see Part 6). All connections to the distributing frame are made through 234-type terminal strips at the top of the frames.

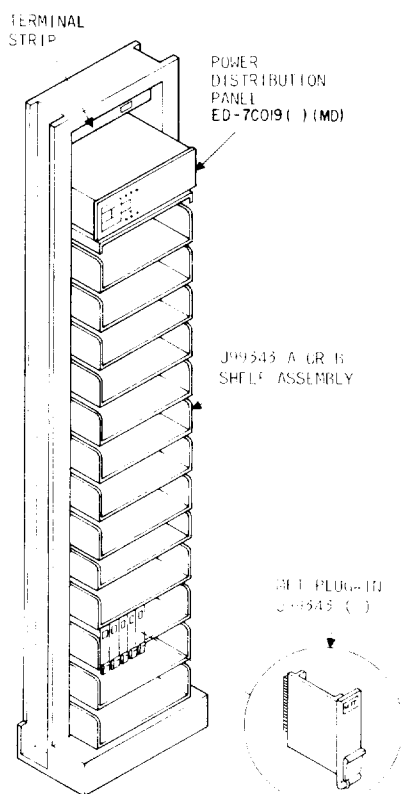


Fig. 16—J99343 Frame (MD)

5.02 Equipment engineering information for the various frames is contained in Section 801-406-160. All the J99343 frames described in this part have been MD except the J99343M two shelf-double module arrangement which is standard.

5.03 For compatibility with the new combined function units, the J99343 frames must contain option ZV (SD-1C359-01). This option allows for

the incorporation of the ED7C171-30 ringing distribution panel and associated wiring. At present, this option is available only as an installer option. No provisions have been made for the shop to install this panel in the coded frames. In addition, option ZW must be included in both the J99343A double-module shelf assembly and the J99343B single-module assembly. In-service shelves are wired by an installer on an "as required" basis while subsequent ones are shop wired.

B. SMAS Retrofit

5.04 The J99343 series of frames were originally designed without SMAS access capability. Provisions are now available to allow retrofitting these frames with SMAS access. The retrofitting procedure for J99343 frames consists of:

- (a) Connect terminals 37, 38, 39, and 40 to a miscellaneous mounted SMAS maintenance connector as shown in Fig. 8. (Test to verify these connections)
- (b) Remove jumper connections between terminals 37 and 38 and between terminals 39 and 40 on the backplate.
- (c) Connect terminals 14 and 13 to the SMAS maintenance connector and connect it into the terminal strip at the top of the frame as shown in Fig. 17.
- (d) After verifying that connections per part (c) are correct, remove existing leads between terminals 14 and 13 and the terminal strip at the top of the frame.
- (e) Circuits in service may be inadvertently interrupted by SMAS retrofit. Strict adherence to Handbook 80, Section 469, procedures is required for such retrofit.

C. Double-Module Frames

5.05 The J99343 double-module frames are available with an optional -72 volt talk battery. This option is recommended for all applications to enhance the signaling range. The -72 volt option requires a J99343YA 72-volt filter or a J87304-L1 dc-dc converter (see paragraph 7.02) which must be ordered separately.

5.06 The double-module frames are equipped with the ED-2C294-30 (MD) and ED-2C295-30 (MD)

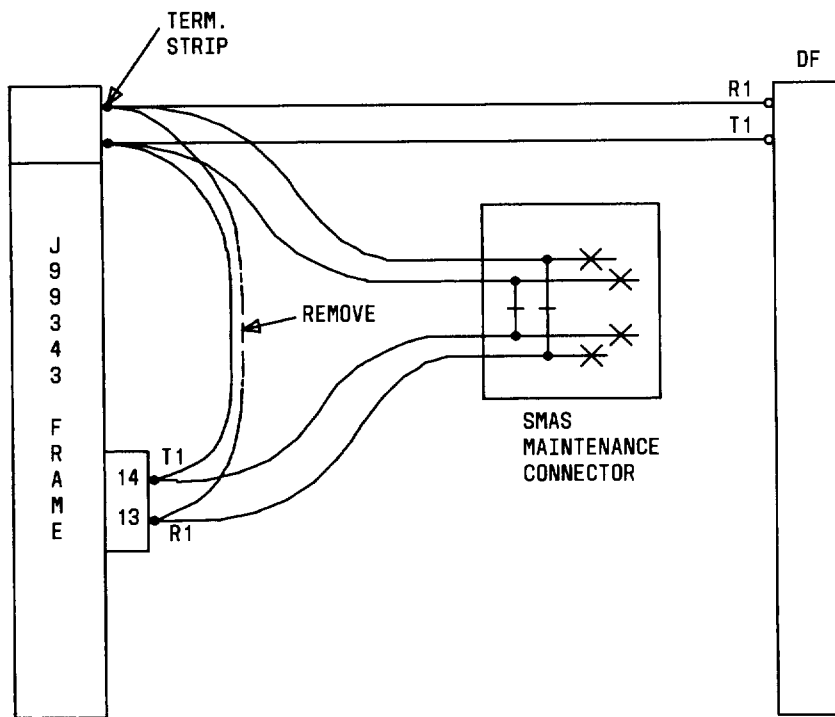


Fig. 17—SMAS Access to T1 and R1 Leads on J99343 Frames

or the ED-7C019-31 power distribution panels. These panels are capable of supplying either -48 volt or -72 volt talk battery when equipped with the 72-volt filter or dc-dc converter.

5.07 The following describes the J99343 series of **double-module** frames.

J99343C—11-Foot 6-Inch Frame (MD)

- (a) An 11-foot 6-inch duct-type frame for 78 circuits. It was replaced by J99343T frame.

J99343D—9-Foot Frame (MD)

- (b) A 9-foot duct-type frame for 60 circuits. The function of the frame is replaced by J99343U frame.

J99343E—7-Foot Frame (MD)

- (c) A 7-foot duct-type frame for 42 circuits and was replaced by J99343N frame.

J99343M

- (d) A two shelf-double module assembly (Fig. 18) equipped with two J99343A shelves and an ED-7C020-30 power distribution panel. This arrangement for small office applications may be mounted in any 23-inch framework with 26 inches of vertical height. Connections to the distributing frame are through 234-type wire wrap terminal strips. Connections for alarms are also provided. For the -72 volt talk battery option, the dc-dc converter (ED-7C072) or 72-volt filter (ED-7C071) must be ordered separately. It will interface up to 12 double-module circuits.

J99343N—7-Foot Frame (MD)

- (e) A 7-foot duct-type frame for 42 circuits. This frame may be equipped to furnish power for the J99343P growth frame by using the ED-7C019-31 group 1, 9 power distribution panel. For use in single-frame installations, the ED-7C019-31 group 1, 3 power panel may be used. It replace the J99343E frame and has been functionally replaced by the J99386H connectorized frame.

J99343P—7-Foot Frame (MD)

(f) A 7-foot frame for 48 circuits used in conjunction with the J99343N power frame. No power panel is furnished. The J99386J frame replaces this frame.

J99343T—11-Foot 6-Inch Frame (MD)

(g) An 11-foot 6-inch duct-type frame for 78 circuits. Uses the ED-7C019-31 power distribution panel. It replaces the J99343C frame and has been replaced by the J99386F connectorized frame.

J99343U—9-Foot Frame (MD)

(h) A 9-foot duct-type frame for 60 circuits. Furnished with the ED-7C019-31 power distribution panel. It replaces the J99343D frame and has been replaced by J99386G frame.

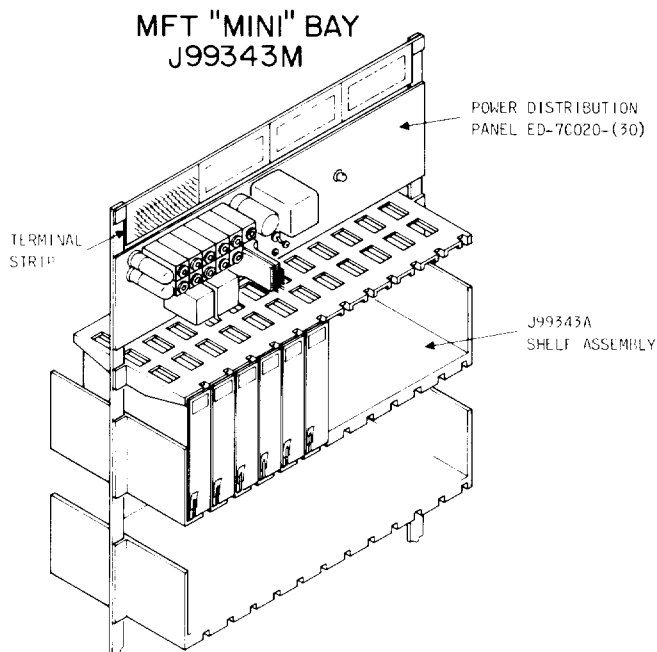


Fig. 18—MFT J99343M

D. Single-Module Frames

5.08 The single-module frames are similar in appearance to the double-module frames with the major differences being power distribution panels and shelf wiring.

5.09 The power panel used in single-module frames, ED-2C277-30 for -48 volt operation, is described in more detail in Part 7.

5.10 The following listing describes each of the single-module frames.

J99343F—1-Foot 6-Inch Frame (MD)

(i) An 11-foot 6-inch duct-type frame for 156 circuits. Uses the ED-2C277-30 power panel (-48 volt operation only). It was replaced by J99343J frame.

J99343G—9-Foot Frame (MD)

(j) A 9-foot duct-type frame for 120 circuits. For -48 volt operation only and was functionally replaced by J99343K.

J99343H—7-Foot Frame (MD)

(k) A 7-foot duct-type frame for 84 circuits. For -48 volt operation only. The J99343R frame was its replacement.

J99343J—11-Foot 6-Inch Frame (MD)

(l) An 11-foot 6-inch duct-type frame for 156 circuits. Option for -72 volt talk battery. It replaces the J99343F frame and has been replaced by J99386F connectorized frame.

J99343K—9-Foot Frame (MD)

(m) A 9-foot duct-type frame for 108 circuits. Option for -72 volt talk battery. It replaces the J99343G frame and has been functionally replaced by J99386G frame.

J99343R—7-Foot Frame (MD)

(n) A 7-foot duct-type frame for 84 circuits. May be used to feed power to an adjacent J99343S frame. Option for -72 volt talk battery. Replaced the J99343H frame. J99386H replaces this frame.

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J99343S—7-Foot Frame (MD)

- (o) A 7-foot duct-type frame for growth powered by an adjacent J99343R power frame. Mountings for 96 circuits. It has been replaced by J99386J frame.

6. MISCELLANEOUS MOUNTED SHELVES

A. General

6.01 Miscellaneous mounted double-module shelves along with a power distribution panel were used for the initial MFT installations.

6.02 The shelf assemblies require 8 inches of vertical mounting space and may be mounted in any 23-inch framework with 10- or 12-inch guardrails. When mounted one above the other, the bottom of the upper shelf furnishes the top rails for the lower shelf. A cover (list 2 of the shelf specification) is used to furnish the top rails for a single shelf or the top rail for a group of shelves. This cover adds one-half inch to the overall height of the assembly.

B. Double-Module Shelf—J99343A-1 (MD)

6.03 The J99343A-1 was the first generation double-module shelf assembly. It was designed primarily for use with the J99343BA 2-wire transmission unit (MD) and the J99343AA or AB loop signaling repeaters (MD).

6.04 The J99343A-1 shelf wiring and wiring from the shelf to the distributing frame is shown in Fig. 19. The wiring connections are shown as they appear before the incorporation of a class change on Issue 8A of SD-1C359-01 (see paragraph 6.05). This arrangement has been replaced by the J99343A-2 shelf.

C. Double-Module Shelf—J99343A-2

6.05 Features incorporated in later MFT plug-ins included:

- SMAS access
- Direct access to the signaling unit for E&M-like functions
- Repeater line-up access
- Repeater enable connections between signaling and transmission units

which necessitated changes to the shelf wiring. The J99343A-2 shelf was designed to incorporate these changes. This shelf became standard on Issue 8A of SD-1C359-01 and is compatible with all MFT plug-ins. The shelf wiring arrangement is shown in Fig. 20 (FS6 of SD-1C359-01).

6.06 For miscellaneous installations, the J99343A-2 List 1 and List 2 (as required) should be mounted with one each of the ED-2C294-30 and ED-2C295-30 power distribution panels (now rated MD) or one ED-7C019-31 power distribution panel. See Part 7 for more information on power panels.

Caution: Power distribution panels should be in the same or adjacent framework.

6.07 The J99343A-2 shelf must include option ZW (SD-1C359-01) in order to be compatible with the new combined function units. This is an installer option on in-service equipment and shop standard on subsequent shelves.

D. Single-Module Shelf—J99343B-1

6.08 The single-module shelf assembly J99343B-1 is designed for miscellaneous mounting in offices which have high concentrations of circuits requiring only transmission treatment or dc signaling extension using the LSEs.

6.09 The J99343B-1 shelf wiring is shown in Fig. 21 (FS4 of SD-1C359-01).

6.10 When miscellaneous mounted, it is recommended that the J99343B-1 shelf be mounted with the ED-2C277-30 (MD) or the ED-7C019-30 power distribution panels. More details on power panels may be found in Part 7.

6.11 Option ZW (SD-1C359) must be included in these shelves to be compatible with the new combined function units. This is to be done by an installer on in-service equipment and by the shop on subsequent shelves. In addition, option ZV (SD-1C359) must be included in all single-module frames to provide the ED7C171-30 ringing distribution panel on an installer option (not available from shop on coded frames). This information pertains to both miscellaneous and coded frame arrangements.

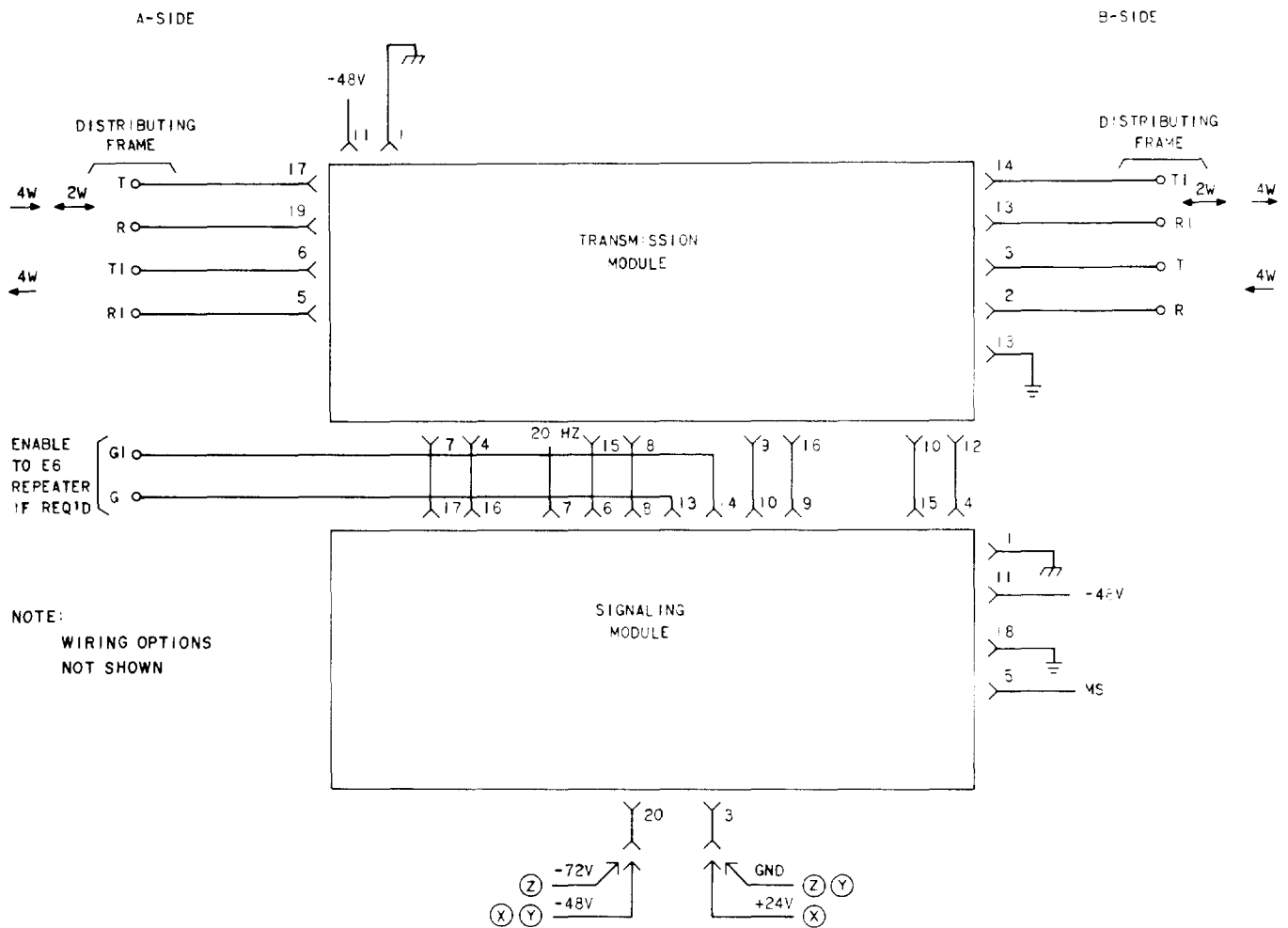


Fig. 19—J99343A-1 Shelf Wiring (MD)

E. Special Purpose Shelf Assembly—J99401A

6.12 The J99401A shelf provides 12 plug-in slots and has the same dimensions as the J99343B, L2 MFT shelf. It is intended for use in any standard 23-inch frame with applications where there is concern about minimizing crosstalk and interference via cabling to other equipment. Shielded interconnections are specified, and separately-fused battery feeds for individual circuits are required.

6.13 The J99401A Shelf Assembly is intended to accept input and output signals in Type 761A shielded-pair cable (Fig. 22). The individual twisted pairs are to be installer wired directly to the 928A unit connectors (one per circuit) mounted on the

shelf. In this way, maximum intercable isolation is obtained. Termination details are covered in ED-92524-16. No prewiring is provided with the shelf assembly. Both 2-wire and 4-wire installations are defined in SD7C101-01.

6.14 Each of the 12 circuits receives talk-battery power via an independent shielded circuit. Installer wiring is required to connect each 928A connector on the shelf to a miscellaneous office -48 dc distribution panel. Separate fuses are specified for protection of each power circuit.

Program Amplifier Applications

6.15 While a number of future applications are anticipated for the J99401A shelf, it is initially

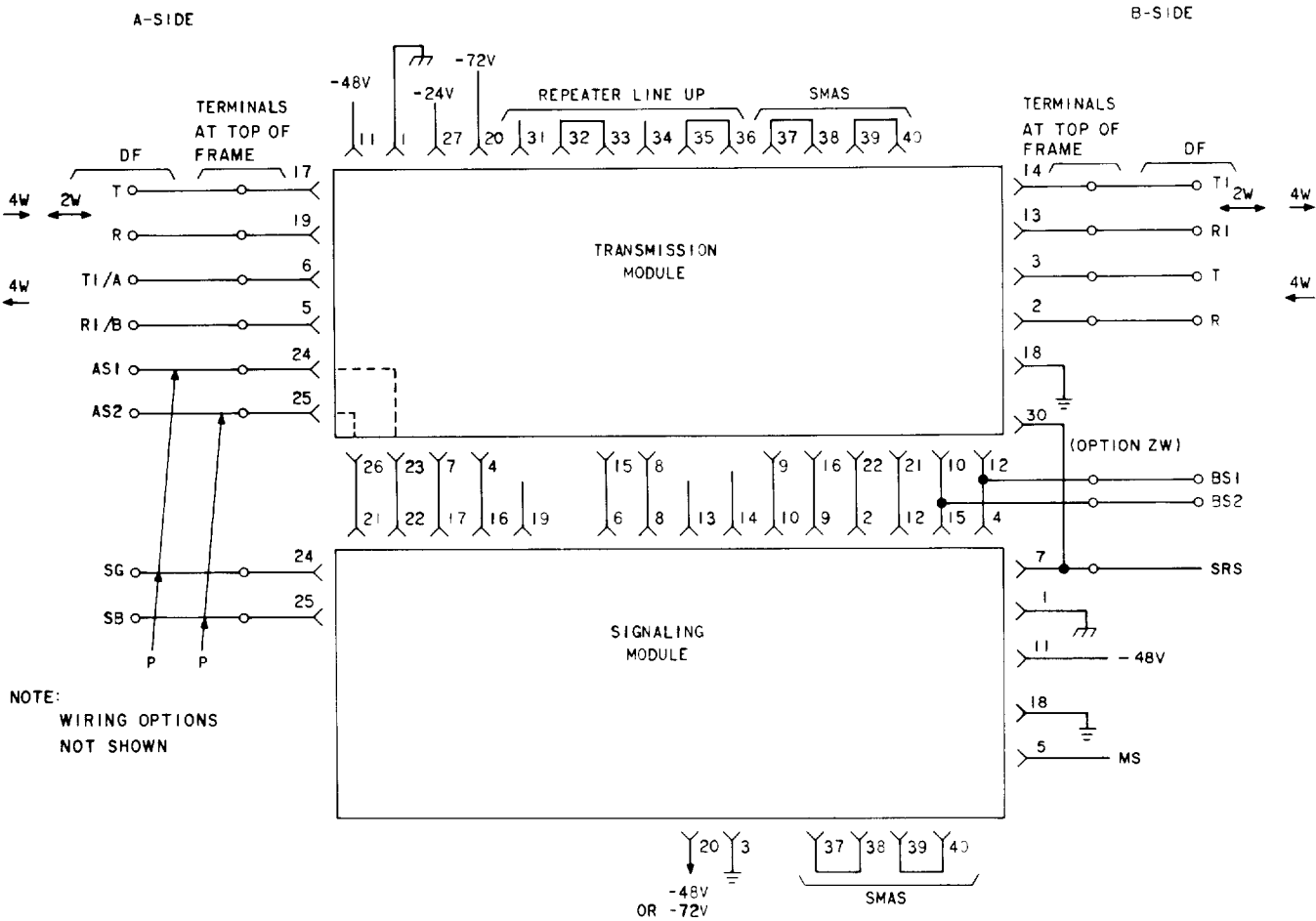


Fig. 20—J99343A-2 Shelf Wiring

intended for 5, 8, or 15 kHz program services. **In such applications, caution must be exercised to prevent crosstalk interference from and to adjacent circuits.** Moreover, any possible coupling of interfering energy via common power-distribution impedances should be minimized. The J99401A shelf with shielded input/output cabling is recommended for this type application, and amplifier units having MFT compatibility may be used.⚡

7. POWER DISTRIBUTION PANELS

A. General

7.01 The power distribution panels used with MFT shelves or frames fuse and distribute talk bat-

tery (-48 or optional -72 volts), -48 volt battery for the plug-ins, and 20-Hz ringing when furnished.

B. Talk Battery

7.02 All MFT frames furnish filtered and fused -48 volt talk battery to each mounting slot. All double-module frames are capable of furnishing optional -72 volt talk battery.

Note: The power distribution panel will furnish either -48 volt or -72 volt talk battery for double module frames. Mixtures of -48 and -72 volt talk battery supplies are not possible from the same distribution panel.

The optional -72 volt talk battery is available in three different ways:

- (a) -72 volt external source (bay option B)

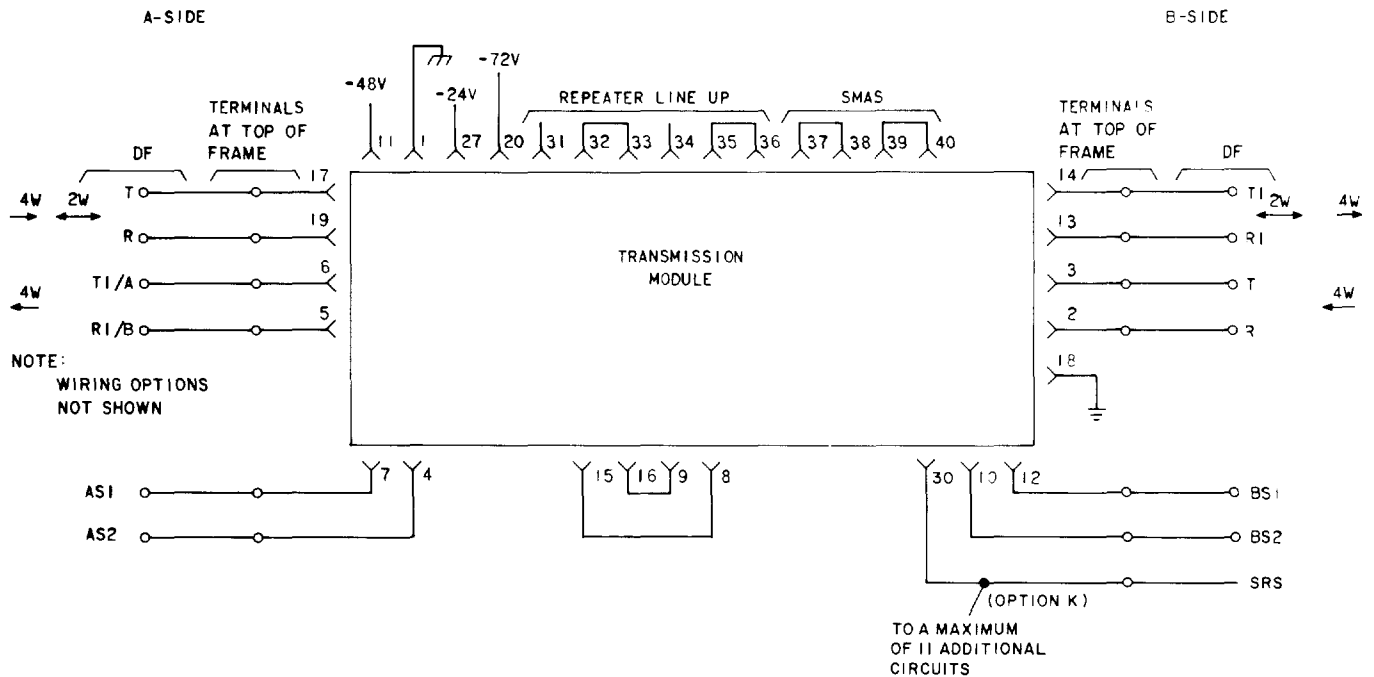


Fig. 21 — J99343B-1 Shelf Wiring

(b) Combining an external floating 24-volt power source with the -48 volt battery to produce an effective -72 volts (bay option ZA)

(c) Combining an internal floating 24-volt source with the -48 volt battery to produce an effective -72 volts (bay option A).

When an external -72 volt source or an external floating 24-volt supply is used, the power distribution panel must be equipped with the J99343YA plug-in 72-volt filter (Fig. 23). For use of the internal floating 24-volt supply, the J87304-L1 dc-dc plug-in converter is required (Fig. 24).

CAUTION: Use only the J87304A-1 List 1 dc-dc converter in the MFT power panels. Do not use the J87304A-1 Lists 1, 2; it is not intended for MFT applications.

7.03 ♦ This equipment generates and uses radio frequency energy. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against radio frequency interference in commercial and residential

installations. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, the user may find the booklet "How to Identify and Resolve Radio-TV Interference Problems" helpful. This booklet, prepared by the Federal Communications Commission, is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4. ♦

7.04 The -72 volt talk battery is fused and distributed to the signaling unit slots of factory wired double-module frames. It may also be connected to transmission unit slots of the J99343 frames by specifying option ZG. Single-module frames may be equipped for -72 volt talk battery by specifying options A, B, or ZA, as discussed in paragraph 7.02, on frames with the appropriate power panels.

C. -48 Volts DC for Plug-ins

7.05 The -48 volt central office supply is fused and distributed to all mounting slots in the various frames. This -48 volts is used to power all circuits and is used for talk battery when the -72 volt talk battery option is not specified.

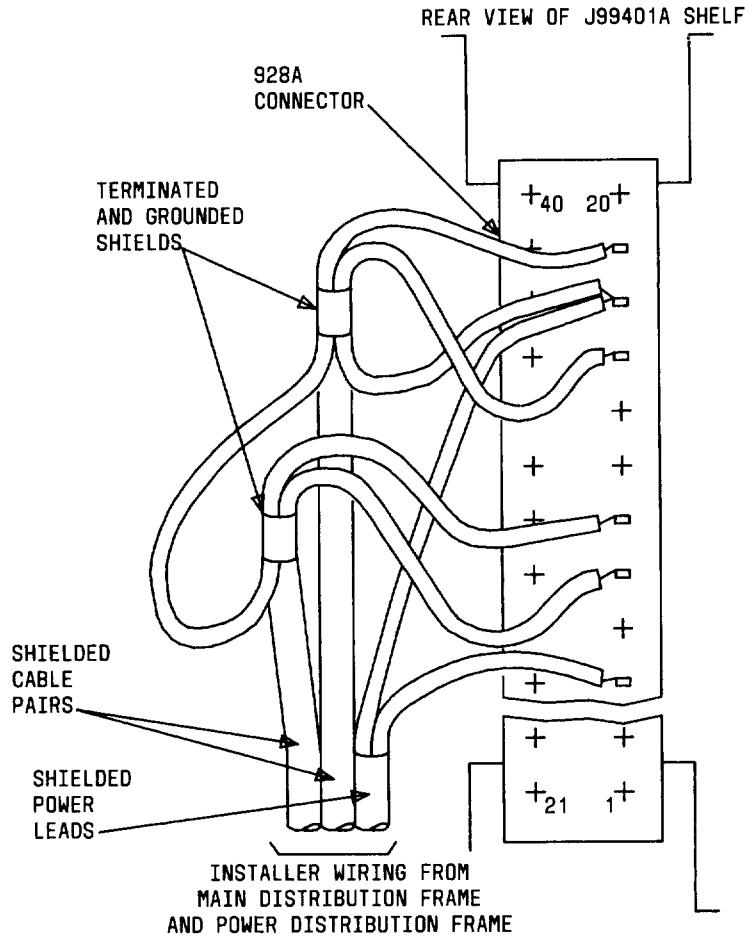


Fig. 22—Connections to J99401A Shelf

D. Ringing

7.06 The power distribution panels fuse and distribute 20-Hz ringing (86 volts RMS superimposed on -48 volts dc) from the central office supply to all signaling unit mounting slots as well as the transmission slot in the newer J99394 and J99386 series of frames. The other series of frames require additional wiring options and, for the single-module frame, additional equipment (ED-7C171-30 ringing distribution panel). See the appropriate descriptive part of this section for more information.

E. Descriptions

7.07 The following paragraphs briefly describe the power panels associated with MFT frames discussed in this section.

- ED-7C171-30 ringing distribution panel (MD) is a 2" by 23" unit equipped to distribute the superimposed ringing source (SRS) for up to 120 plug-in slots of the J99343 and J99378 single-module frames. This panel is wired per FS2 of SD-7C007-01 and can be miscellaneously mounted or mounted in a coded frame. It is required when its associated single-module frame is to contain the new combined function plug-in units. At present, the panel is available only as an installer's option. No provisions have been made for the shop to install this panel in coded frames. It is shown as option ZV in SD-1C359 for the J99343 frames and as ZD in SD-7C018-01 for the J99378 frames.
- ED-7C073-31 power distribution panel is an 8" by 23" unit equipped with -48 volt filter,

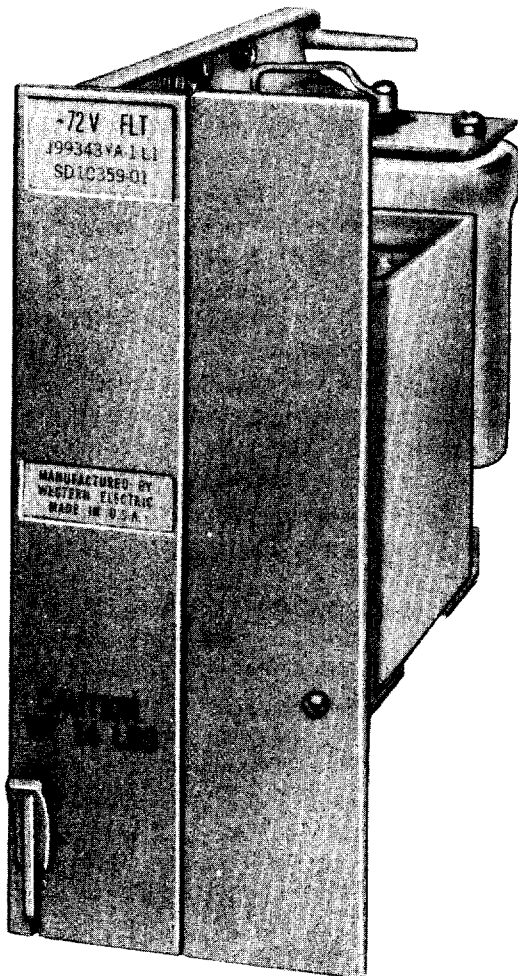


Fig. 23—72-Volt Filter J99343YA

fuses, alarm relays, resistance lamps, and space for mounting either the J87304A-1, List 1 dc-dc converter or J99343YA plug-in filter. This unit replaces the ED-7C073-30 panel and is identical to that unit with the exception of the front panel circuit breaker which has been replaced by a 25A ampere fuse (Fig. 25). This unit distributes -48 volts, optional -72 volt and 20-Hz ringing for up to 96 double-module circuits or 192 single-module circuits. Power is available for SMAS connectors as well. This panel is used with the J99394A, B, C, GH and J connectorized frames and with the older J99386F, G, H, and K frames.

- ED-7C073-30 power distribution panel (MD) is an 8" by 23" unit equipped with -48 volt

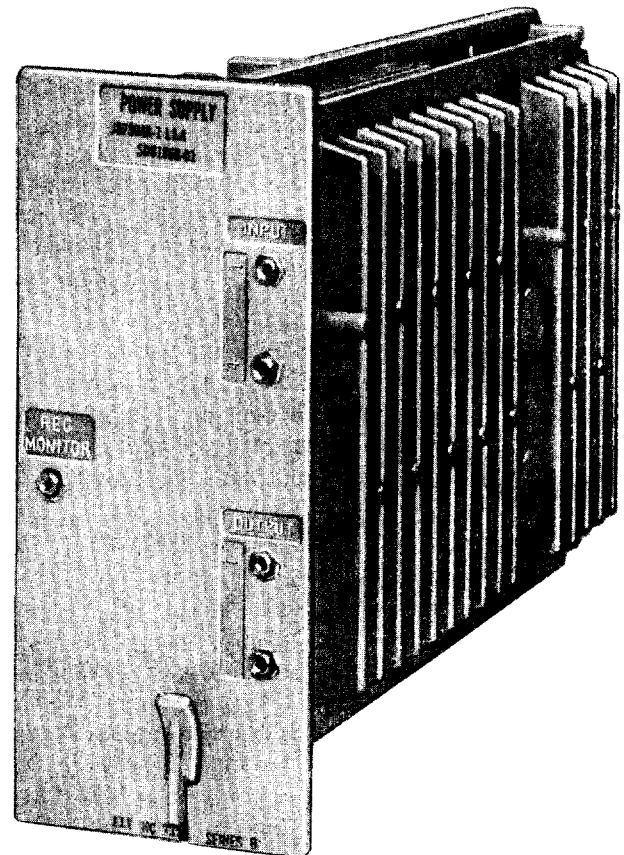


Fig. 24—J87304A-1, L1 DC-DC Converter

filter, fuses, alarm relays, resistance lamps, and space for mounting either the J87304A-1, List 1 dc-dc converter or the J99343YA plug-in filter (Fig. 25). This unit fuses and distributes -48 volts (or optional -72 volts) and 20-Hz ringing for up to 96 double-module circuits or 192-single-module circuits. Power and fuses are also provided for up to eight SMAS maintenance connectors and one manual access and communications panel. It was used originally in the J99386 series of frames and has been replaced by ED-7C073-31.

- ED-7C020-30 power distribution panel is a 6" by 23" unit which contains a battery filter (-48 volts), fuses, alarm relay, 2 resistance lamps, and space for mounting a floating 24-volt dc-dc converter (ED-7C072-30) or a -72 volt filter (ED-7C071-30). This unit fuses and distributes -48 volts (or optional -72 volts) and 20-Hz ringing for up to 12 double-module circuits. It is used in the J99343M frame.

- ED-7C019-31 power distribution panel (MD) (Fig. 26) is an 8" by 23" unit which replaces the ED-2C294-30 filter, fuse, and alarm panel and the ED-2C295-30 dc-dc converter and filter shelf. It contains a -48 volt filter, fuses, alarms relays, resistance lamps, and space for mounting either the J87304A-1, List 1 dc-dc converter or the J99343YA plug-in filter. This unit fuses and distributes -48 volts (or optional -72 volts) and 20-Hz ringing sources for up to 90 **double-module** circuits. Additionally, it contains fusing for up to six maintenance connectors and one manual access and communications panel. This unit is used in applications with the J99378 series of double module-SMAS frames. It was also retrofitted into the older non-SMAS J99343 double-module frames.
- ED-7C019-30 power distribution panel (MD) is an 8" by 23" unit which replaces the ED-2C277-30 filter, fuse, and alarm panel. It contains a -48 volt filter, fuses, alarm relays, and space for mounting either the J87304A-1, List 1 dc-dc converter or the J99343YA plug-in filter. It accomplishes fusing and filtering of -48 volt or optional -72 volt talk battery for up to 180 single-module circuits. Additionally, it contains fusing for up to six maintenance connectors and one manual access and communications panel. This panel is used with two series of single-module frames; the J99378 (SMAS) and J99343 (non-SMAS).
- ED-2C277-30 filter, fuse, and alarm panel (MD) is a 4" by 23" unit containing -48 volt filter, fuses, and alarm relays. It accomplishes filtering and fusing for up to 156 single-module circuits. Different list numbers are available which contain various numbers of fuses for use in specific applications. This unit was replaced by the ED-7C019-30 and it was used on the original J99343 frames for single-module application.
- ED-2C294-30 filter, fuse, and alarm panel (MD) is a 6" by 23" unit containing a -48 volt filter, fuses, and alarm relays. It accomplishes fusing and distribution of -48 volts and 20-Hz ringing sources for up to 78 double-module circuits. Different list numbers of the unit are available which contain varying numbers of fuses for use in specific applica-

tions. This unit has been replaced by the ED-7C017-31 and was used with the J99343 double module frames.

- ED-2C295-30 dc-dc converter and filter shelf (MD) (Fig. 27) is a 4" by 23" unit equipped with three fuses and up to 15 resistance lamps. It includes space for mounting either the J87304A-1, List 1 dc-dc converter plug-in or the J99343YA plug-in filter. This unit is used with the ED-2C294-30 filter, fuse, and alarm panel when -72 volt talk battery is required. Different list numbers of the unit are available which contain various numbers of resistance lamps for use in specific applications. The combined functions of this unit and ED-2C294-30 have been replaced by ED-7C017-31.

Note: The ED-2C295-30 dc-dc converter and filter shelf must be equipped with an ED-7C097-30 shorting connector for -48 volt operation. (See FS7 of SD-1C359-01.)

- ED-1C716-30 filter, fuse, and alarm panel (MD) is a 6" by 23" unit equipped with -48 volt filter, fuses, and alarm relays. It accomplishes fusing and distribution of -48 volts and 20-Hz ringing sources for up to 72 double-module circuits. This unit was replaced by ED-2C294-30.
- ED-1C276-30 fuse panel (MD) is a 2" by 23" unit equipped to fuse either the optional -72 volt talk battery or the optional +24 volts (which is combined with -48 volts to obtain a -72 volt source). This fuse panel is used with the ED-1C716-30 filter, fuse, and alarm panel when -72 volt talk battery is required. Both of these panels (ED-1C716-30 and 1C276-30) have been replaced by the ED-2C294-30 for single-module applications which have since been replaced by ED-7C019-31.

8. DISTRIBUTING FRAME ARRANGEMENTS

A. General

8.01 The following paragraphs describe the recommended wiring arrangements between MFT frames and the distributing frame (DF). See SD-1C359-01 or SD-7C018-01 for more detail on wiring options.

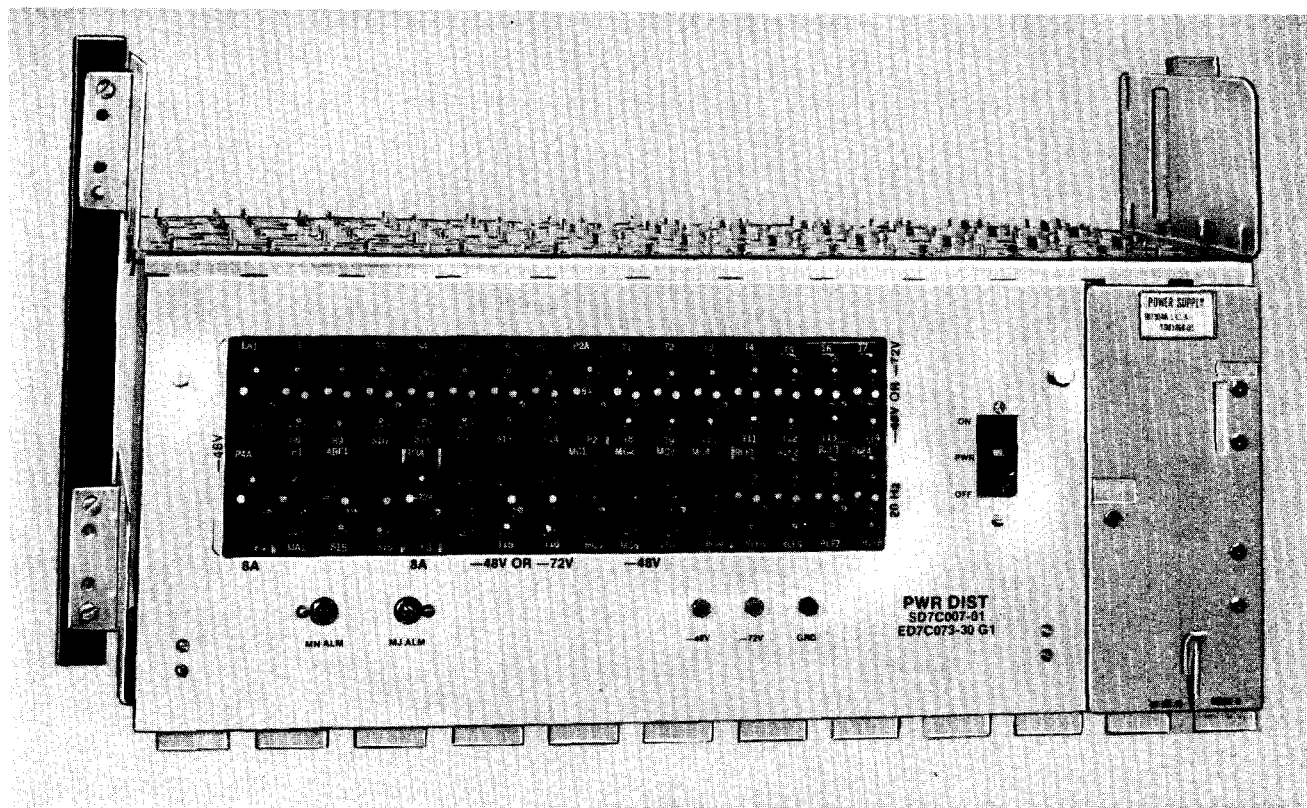


Fig. 25—ED-7C073-30 Power Distribution Panel Equipped With J87304A-1, L1A DC-DC Converter

8.02 The number of leads terminated on the DF is dependent on many factors such as:

- Type of office (exchange, toll, PBX location, etc)
- Type of circuits terminated (2-wire, 4-wire)
- Types of service (POTS, special services, toll, etc) in relation to signaling
- Available space on DF and associated hardware
- Forecasted growth.

These factors should be considered in determining the proper MFT-to-DF wiring arrangements for a given office.

B. Double-Module Frames and Shelves

8.03 For maximum flexibility, when available DF space is not a limiting factor, 12- or 14-lead "Universal" wiring is the recommended choice. The 12-lead arrangement shown in Fig. 28 is recommended for locations without requirements for Type II or III E&M signaling lead interfaces. For installations requiring Type II or III E&M signaling lead interfaces, the 14-lead "Universal" wiring as shown in Fig. 29 is recommended. The 14-lead arrangement provides compatible looped E&M leads for ESS offices and is recommended for offices in which it is anticipated that ESS will be installed.

8.04 Where applications of "universal" wiring cannot be implemented due to limited DF space, a mixture of 4-lead and 12- or 14-lead terminations may be used on a per frame basis (not recommended to mix on individual frames). The ratio of mountings cabled for 4 leads versus 12 or 14 leads must be based on specific office requirements (typically two-thirds

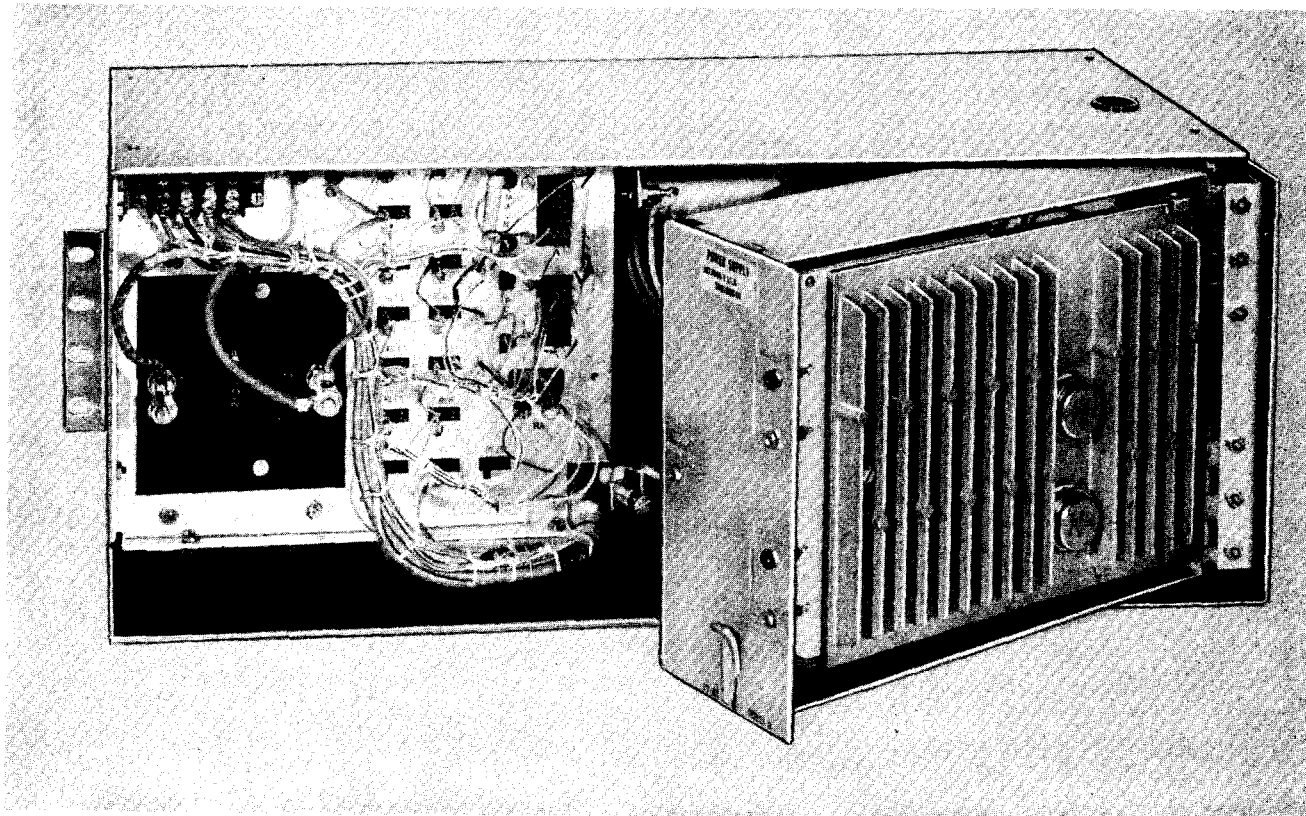


Fig. 26—ED-7C019-31 Power Distribution Panel (MD) Equipped With J87304A, L1A DC-DC Converter

4 leads and one-third 12 or 14 leads). The mixed arrangement of 4 and 14 leads is shown in Fig. 30. The 12-lead arrangement may be used instead of the 14-lead arrangement shown if Type II or III E&M signaling lead interfaces are not required.

C. Single-Module Frames and Shelves

8.05 Single-module circuits may be terminated on the DF in three ways: all 2-wire operation (4 leads) as shown in Fig. 31, mixed 2-wire and 4-wire operation without signaling lead access as shown in Fig. 32, or mixed 2-wire and 4-wire operation with signaling lead access as shown in Fig. 33.

8.06 The all 2-wire (4-lead) configuration shown in Fig. 30 is not compatible with the Dual 2-2 trunk repeaters (two 2-wire repeaters on a single plug-in) or the amplitude and delay equalizer (J99343SN). If it is known these two units will not be

used, the all 2-wire arrangement requires minimum DF space for terminations.

8.07 The single-module wiring arrangement shown in Fig. 32 requires eight leads to the DF and is compatible with all MFT units which may be used in the single-module mountings, but does not provide external signaling lead access.

8.08 The arrangement shown in Fig. 33 is compatible with all transmission units and also provides external signaling lead access. This arrangement is recommended for maximum flexibility and to ensure compatibility with future MFT units. Where DF space is limited, the 8-lead arrangement shown in Fig. 32 is recommended.

8.09 For cabling the double-module frames to the distributing frame, it is recommended that the available type 93 connecting blocks be used to

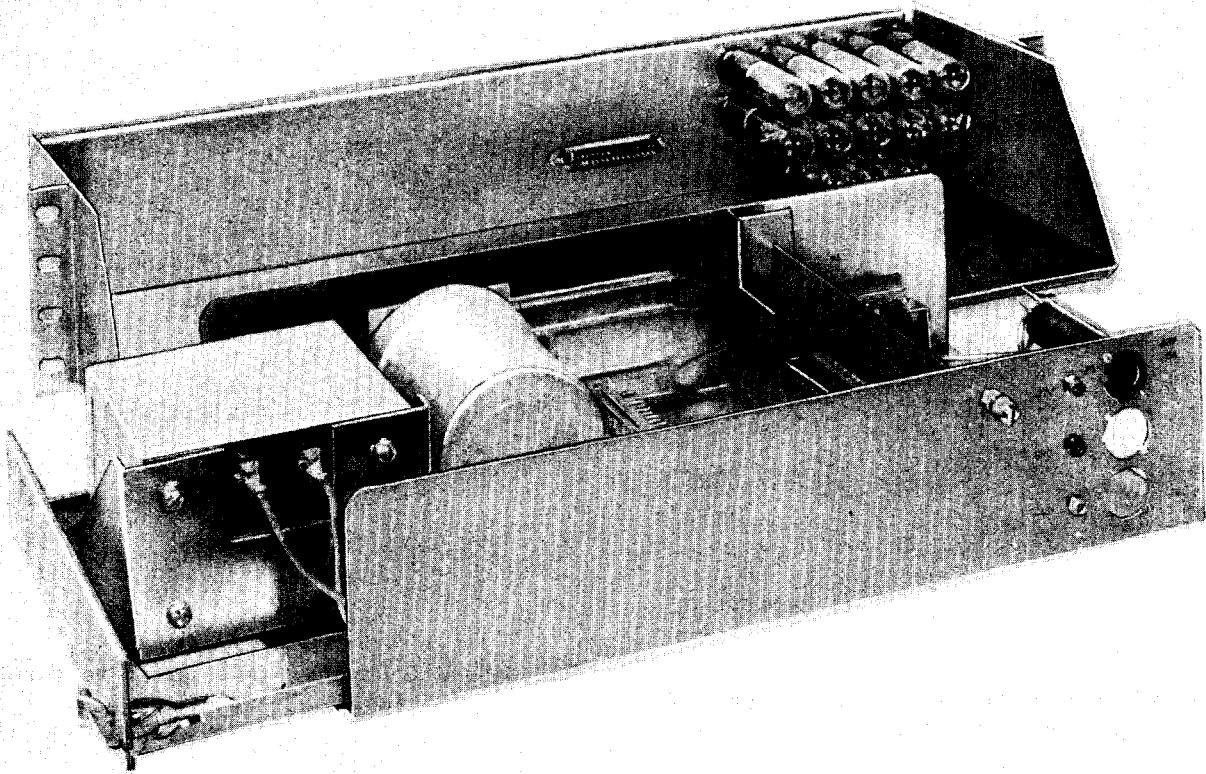


Fig. 27 — ED-2C295-30 DC-DC Converter and Filter Shelf Equipped With J99343YA Filter

reduce frame congestion particularly for “universally wired” circuits.

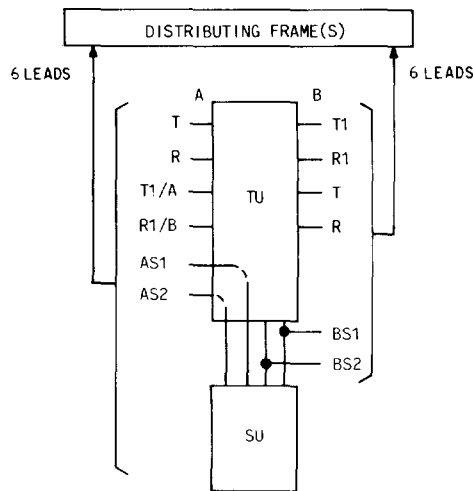
9. RECOMMENDED COMMUNICATIONS PANEL FOR MFT FRAMES

9.01 A communications panel (CP) for MFT frame applications would be used to help facilitate manual testing of circuits associated with that frame(s). Of the four series of MFT frames, only the J99378 frames come standard with a CP which is the J98622BU, manual access and communication panel. The J99394, J99386 and J99343 frames do not come with such panels. If this arrangement is desired for these frames, then one of the two recommendations, described in the following paragraphs, should suffice for most situations.

9.02 Two recommendations are made for MFT CP arrangements. The first recommendation is for the use of the J98622BR-1 miscellaneous communications panel (SD-1C591-01). This CP provides all the basic functions suggested for such a panel, with no modification to the unit itself. This panel basically provides features for communication plus jack access to the various transmission/noise equipment for measurement and source inputs. Also, this panel requires no additional spacing in the frames, since it will mount vertically between frames.

9.03 The next choice, which in some cases would be a first choice, is the ED-3C660 communication panel. In cases where only communication functions are required, then this panel would be the best choice since it is considerable cheaper than the J98622BR panel. This ED-3C660 panel does, however, require 4-

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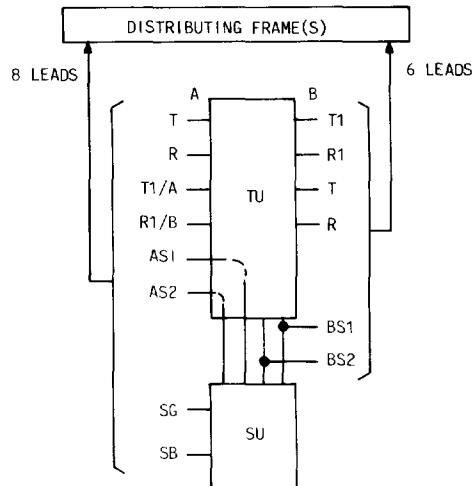


COMPATIBILITY

SIGNALING UNITS	TRANSMISSION UNITS
ALL	ALL

(NOT COMPATIBLE WITH OFFICES REQUIRING TYPE II OR III E AND M SIGNALING LEAD INTERFACES, SUCH AS ESS OFFICES.)

Fig. 28—MFT Double-Module Wiring to Distributing Frame (12 Leads)



COMPATIBILITY

SIGNALING UNITS	TRANSMISSION UNITS
ALL	ALL

(COMPATIBLE WITH ALL OFFICES)

Fig. 29—MFT Double-Module Wiring to Distributing Frame (14 Leads)

inch by 23-inch spacing in the proximity of the equipment being tested which in some situations may be a problem.

9.04 Which communications panel is "best" of the two recommendations depends primarily on the particular parameters to which the panel is being applied.

10. REFERENCES

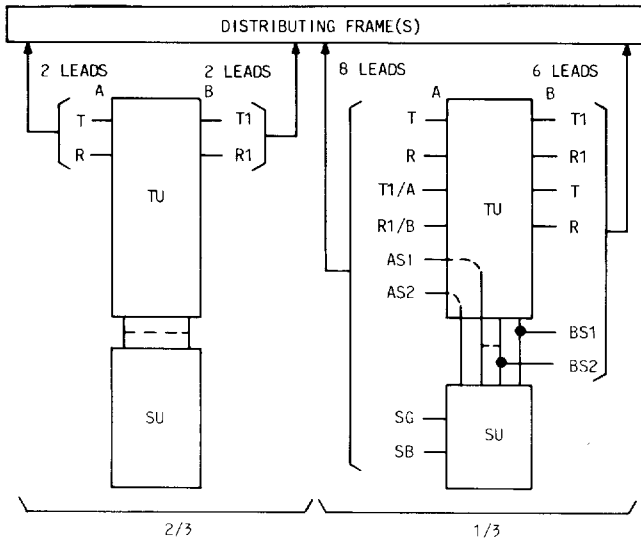
10.01 The following documents contain additional information on MFT equipment.

SECTION	TITLE
801-406-160	MFT—Equipment Design and Requirements J99343
801-406-161	MFT—Equipment Design Requirements J99378
801-406-162	MFT—Equipment Design Requirements J99386
801-406-163	MFT—Equipment Design Requirements J99394
801-408-151	VF Transmission SMAS Bays and Associated Panels

SECTION	TITLE
332-910-100	General Description of MFT
332-910-180	General Application Information for MFT

Drawings

SD-1C359-01	SD-7C007-01
SD-1C604-01	SD-7C017-01
SD-1C605-01	SD-7C018-01



COMPATIBILITY		COMPATIBILITY	
SIGNALING UNITS	TRANSMISSION UNITS	SIGNALING UNITS	TRANSMISSION UNITS
LSR	2-WIRE TRANSMISSION UNIT	ALL	ALL
LSE	2-2 REPEATERS (SINGLE)		
PLAR			

Fig. 30—MFT Double-Module Wiring to Distributing Frame (4-Lead and 14-Lead Mix)

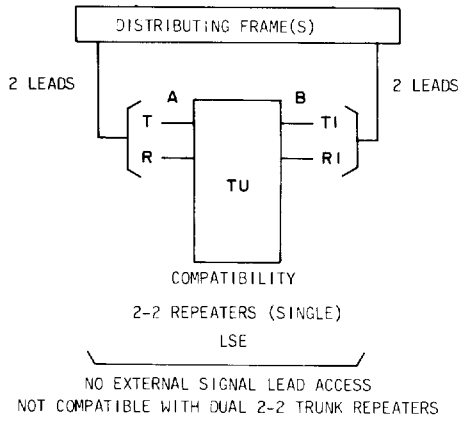


Fig. 31—MFT Single-Module Wiring to Distributing Frame—2-Wire Operation (4 Leads)

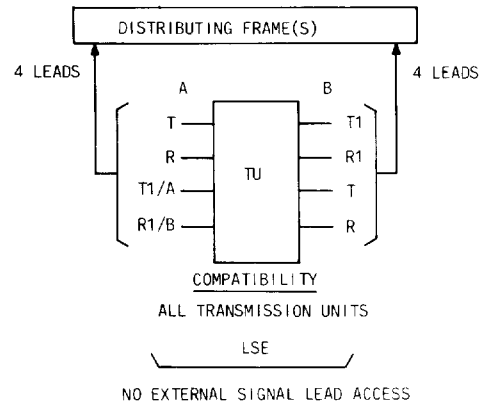


Fig. 32—MFT Single-Module Wiring to Distributing Frame—4-Wire Operation (8 Leads)

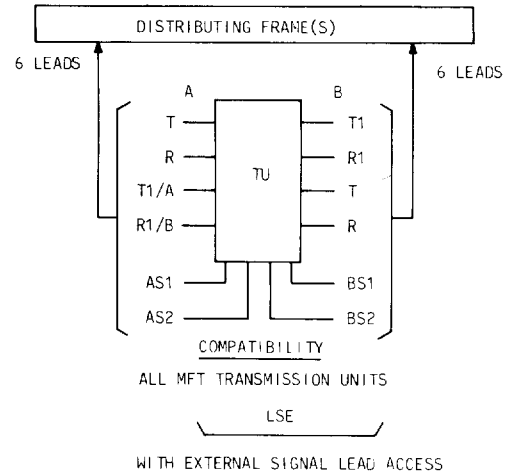


Fig. 33—MFT Single-Module Wiring to Distributing Frame—2/4 Wire Operation With External Signaling Lead Access (12 Leads)