M34 DIGITAL MULTIPLEX
DIGITAL TRANSMISSION FACILITIES
SYSTEM APPLICATION AND
EQUIPMENT DESIGN REQUIREMENTS
COMMON SYSTEMS

1. GENERAL

SCOPE

1.01 This specification, together with the supplementary information listed herein, covers the equipment design requirements for the manufacture and installation of the M34 digital multiplex. This family of equipment includes the M34 digital multiplex with the M34 monitor and switch.

1.02 Detailed reasons for reissue will be found in **6. REASONS FOR REISSUE.**

CAPACITY

1.03 The M34 digital multiplex has the 2-way capacities shown in Table A.

TABLE A

M34 CAPACITY

DIGITAL SOURCES	NUMBER PER M34 MULDEM
DS4 digital signals (274.176 Mb/s)	1
DS3 digital signals (44.736 Mb/s)	6
DS1 digital signals (1.544 Mb/s)	168
Voice channels (digitally encoded)	4032
Voice channels (coded from U600 mastergroup through CMG-3)	3600
DDS 56-kb/s wideband data channels (using T1DM multiplexer)	3864

1.04 The M34 allows any mixture of the above digital sources, up to its capacity limit of one DS4 signal.

DESCRIPTION

1.05 The M34 digital multiplex is a terminal that time division multiplexes up to six incoming digital signals at the third level (DS3) in the digital hierarchy into a single digital signal at the fourth level (DS4) in the digital hierarchy. Inputs to the multiplex can be from any system generating an acceptable 44.736-Mb/s DS3 signal, such as the M13 multiplex, CMG-3 mastergroup coder, or 3A RDS digital radio system. These six inputs can be asynchronous (ie, not synchronized as to their data rate) and can be driven over office cable within a considerable range of distances.

1.06 In the multiplex, the inputs are synchronized and then multiplexed on a time division basis. The resulting DS4 signal, at 274.176 Mb/s, can directly feed a number of transmission systems such as the T4M coaxial line or the DR18 digital radio system. Fig. 1 shows the various systems in the digital hierarchy.

1.07 In addition to the multiplexing function, the M34 also provides demultiplexing of a DS4 signal into six DS3 signals. Operations in the demultiplexing path are the reverse of those in the multiplexing path; thus 2-way service is provided. The six DS3 outputs of the demultiplexer preserve the characteristics of the individual DS3 inputs at the originating end. Fig. 2 shows a block diagram of the multiplexing and demultiplexing circuitry of the M34.

1.08 The physical unit that makes up the multiplexer and demultiplexer circuitry is termed a muldem.

1.09 The interface between the M34 digital multiplex and other equipment is normally accomplished through a DSX-3 cross-connection at the DS3 rate and a DSX-4 cross-connection at the DS4 rate.

These cross-connections provide a centralized interconnection point for all equipment in an office having a common signal rate. Cabling between the M34 and the cross-connections (or other equipment, if a cross-connection is not used) is by 728-type coaxial cable (see 5.08).

1.10 The M34 digital multiplex contains a time-shared performance monitor and automatic protection switching. Circuitry for providing these functions is contained in a separate bay termed the monitor and switch bay.

M34 Muldem Bay

1.11 All M34 bays are mounted on 26-inch wide by 12-inch deep unifrrame framework meeting the specifications of the New Equipment Building System (NEBS), Section 800-610-164. The M34 muldem bay is designed to accommodate two muldems. Each muldem contains the circuitry shown in Fig. 2 to provide the multiplexing and demultiplexing functions described above. Associated with each muldem is its own power converter shelf that supplies the various voltages used by the circuitry. Each bay also provides for fusing of the power converters within the bay.

1.12 Up to ten M34 muldems may be arranged in a system that is monitored and protected by a single centrally located monitor and switch bay. An eleventh muldem is used as the standby. These 11 muldems are contained in six 7-foot bays (with the last bay containing a single muldem only).

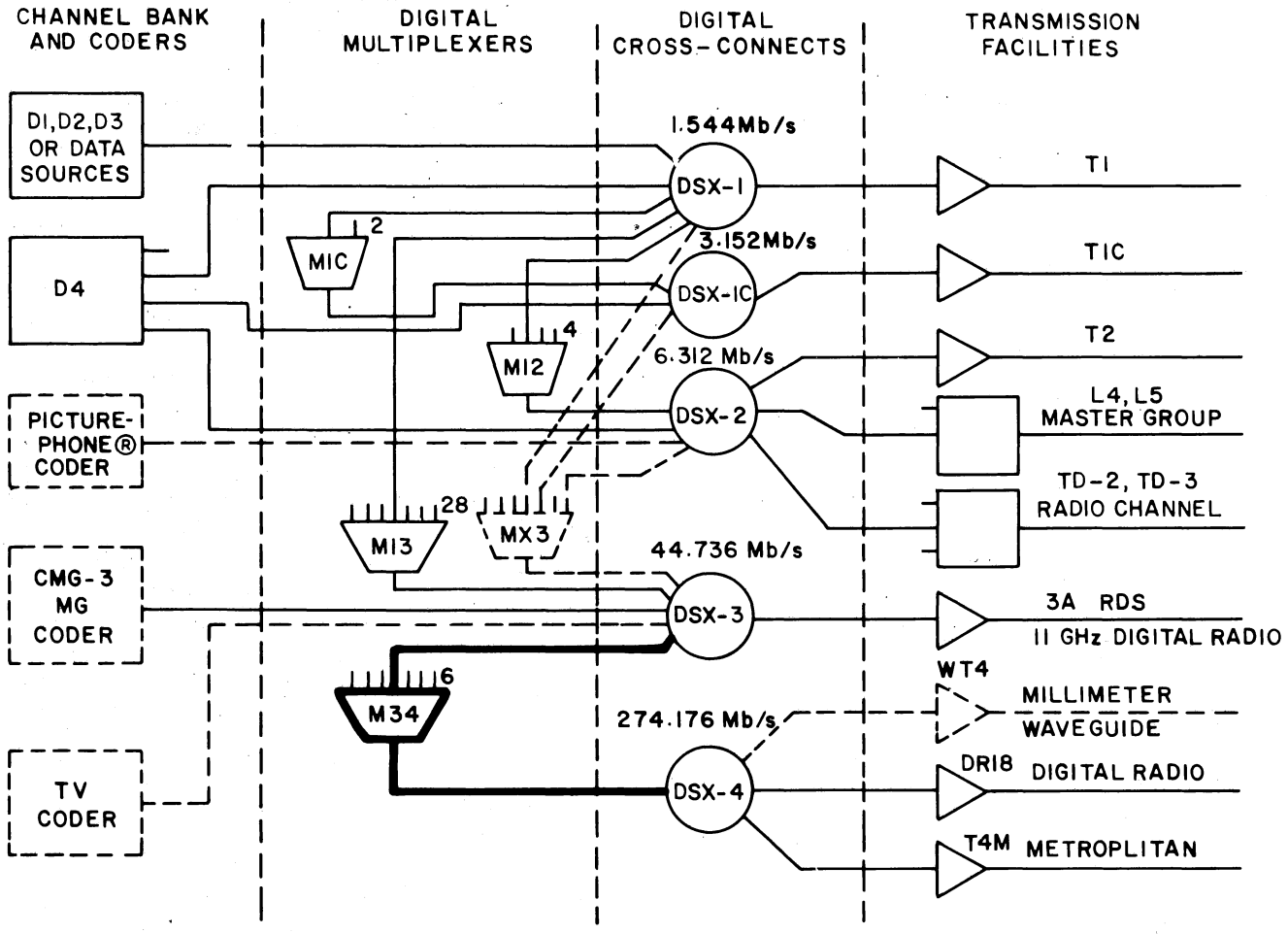

Fig. 1—Position of the M34 Multiplex in the Digital Hierarchy

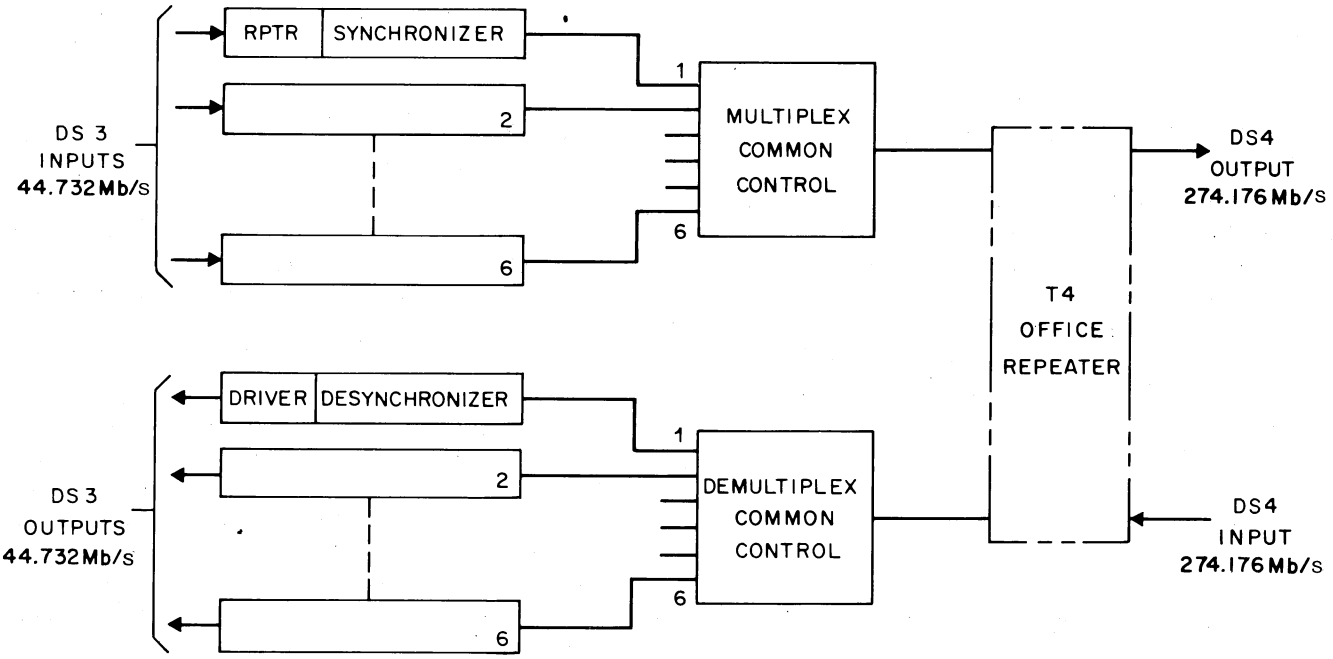

Fig. 2—M34 Multiplexing and Demultiplexing Circuitry

1.13 The M34 muldem plug-in units are tabulated in Table C. However, it is not expected that they will be maintained in the field except for direct replacement. For this reason, detailed plug-in unit information is not included in this specification.

Monitor and Switch Bay

1.14 The M34 monitor and switch bay provides for monitoring and automatic switching of up to 11 (ten service and one standby) of the M34 muldems described in 1.11. The monitor continuously cycles through all equipped muldems and compares inputs and outputs on a bit-by-bit basis to establish an error rate. If the error rate of a muldem exceeds a specified amount (10^{-6}), a signal is generated to switch that muldem out of service and switch the standby into service. The failed muldem is comprehensively tested and a diagnostic display is used to aid the craftsperson to quickly locate the fault. The monitor also checks its own operation once each cycle. Up to ten operating muldems may be protected in this manner, with an additional muldem used as a standby.

1.15 The interface between the M34 multiplex equipment and the T4M or DR18 system is the DSX-4 cross-connect. Cabling between the M34 multiplex and the cross-connection terminates on the M34 monitor and switch bay. The interface between the M34 monitor and switch equipment and the M34 muldem equipment is accomplished through 730-type and KS-19224 L2 coaxial cabling with plug attachments at the muldem end.

1.16 The M34 monitor and switch bay contains hybrids and jack access to provide complete restoration and to facilitate rolling operations.

1.17 Line build-out (LBO) networks 4253A (4.4-dB loss), 4253B (3.3-dB loss), 4253C (2.2-dB loss), and 4253D (1.1-dB loss), or patch cords 841475221 (0-dB loss) are to be selected for the monitor and switch bay DS4 standby inputs and outputs to compensate for varying cable lengths between the M34 multiplex and the DSX-4 cross-connection. (See 5.12 and SD-1C159-01-D4, Note 309.)

1.18 The M34 monitor and switch plug-in units are tabulated in Table D. As in the case of

muldem plug-in units, it is not expected that these plug-in units will be maintained in the field except for direct replacement.

POWER

1.19 The input voltage for the M34 multiplex is supplied by −48 volt office battery. Muldem units are, for reliability reasons, fed by separate equipment feeders from the battery distribution frame board (BDFB) and fused separately at the BDFB. Information on power distribution is given in SD-82046-01.

1.20 The normal operating range of the −48 volt input power units is from −42.75 to −53.00 volts. Versions for +140 volt input will be made available, as required.

1.21 The current per frame is:

M34 muldem bay : 12.8 amperes.

M34 monitor and switch bay : 7 amperes.

1.22 The power units are individually fused in both the muldem bays and the monitor and switch bay. The fuses are located on the fuse and alarm panels.

1.23 The power units and their ratings are:

131A power unit : ±6.3 volts at 3.0 amperes each.

131B power unit : −2.1 volts at 15.0 amperes.

132B power unit : −5.6 volts at 17.0 amperes.

ALARMS

M34 Alarms

1.24 The alarms are accessible at the fuse and alarm panel on the monitor and switch bay and may be paralleled, if required.

1.25 The major and minor alarms, diagnostic indications, and status indications can be remoted via the E-type status reporting and control system, or equivalent. The test panel on the monitor and switch bay displays the type and location of the failure. The panel also contains the test controls and alarm cutoffs.

MAINTENANCE ORDER-WIRE FACILITY

1.26 Maintenance of high-speed digital transmission systems requires an interchange of information between terminal offices.

1.27 The M34 monitor and switch bay has optional order-wire facilities as follows:

(a) The local order-wire facility (local frame line circuit) consists of jacks for a head telephone set. The jacks may be connected to a local order-wire loop.

(b) The digital network order-wire (DNOW) facility provides the circuitry to interface with the SS3 order-wire system. This system provides the signaling and talking path electronics to connect station sets located at the same or at different locations on a 4-wire voice-frequency line. This facility at the M34 consists of jacks for a head telephone set and a dial and lamp for signaling and supervision.

1.28 The local telephone facility is normally provided on each M34 monitor and switch bay. If the DNOW panel is to be furnished instead, it is recommended that each M34 monitor and switch bay (and therefore each M34 system) be furnished separately with the DNOW panel.

TEST EQUIPMENT

1.29 The KS-21366 L2 transmitter and the KS-21424 L2 receiver, Fig. 3, are used during installation and maintenance testing of the M34 multiplex. These test sets allow accurate error rate measurements to be made through an M34 multiplex. The tests can be made at the DSX-3 cross-connecting bay, or at the M34 monitor and switch bay. Order one KS-21366 L2 and one KS-21424 L2 per office.

1.30 The J98721H portable violation monitoring (PVM) test set is used to determine the error rate of the DS4 signal at the M34 muldem while the system is in service. Out-of-service measurements can be made with the PVM provided a proper DS3 signal is introduced into the M34 from a KS-21366 test set. Order one J98721H and one ED-2C465-( ) installation and acceptance test kit per office.

EQUIPMENT CONFIGURATIONS

1.31 The physical configurations of the various bays of equipment available are described here. Details on the ordering options are given in **4. EQUIPMENT.** Further equipment information may be obtained from the individual unit drawings tabulated in the Subdivisions of Equipment and Detailed Index.

A. M34 Muldem Bay

1.32 The M34 muldem bay provides for automatically protected service when used with the M34 monitor and switch bay. A fully equipped version, J98723C, and a partially equipped version, J98723M, are available

1.33 Both versions use a 7-foot uniframe framework and are shop wired. Plug-in units are equipped separately by J98723G, as outlined in **4. EQUIPMENT.**

1.34 The J98723C bay is shown in Fig. 4. The J98723M bay is the same as the J98723C bay less the upper muldem and converter shelves, and is used for the tenth muldem in an M34 system.

1.35 Coaxial cables to and from the J98723C and M bays are terminated on ED-2C302-30 cable transition panels. The 2-muldem ED-2C302-( ) panel, Fig. 5, contains the 560B jacks for accepting the plug ends of all DS3 and DS4 coaxial cables.

1.36 The J98723AN fuse and alarm panel assembly, associated with the J98723C and M bays, is mounted below the cable transition panel. Input fuses are provided for all power entering the bay and terminal strips are located here for connection to the monitor and switch bay J98723E. A red lamp is located on the fuse block at the left side of the panel to indicate a blown fuse in the −48 volt circuit. Two shelf levels house the circuit packs needed to provide the multiplexing and demultiplexing functions.

1.37 J98723AB muldem shelf assemblies, Fig. 6, are mounted in the J98723C and M muldem bays in varying quantities, as shown in Fig. 7. A J98723AC power converter shelf assembly, Fig. 8, is located below each muldem. The 4-inch high shelf assembly contains four power units required to supply the muldem dc voltage.

1.38 A heat baffle is located below each muldem. The heat baffle minimizes shelf thermal interaction and allows air to enter the perforated front cover, cool the circuit packs, and be exhausted to the rear of the bay.

1.39 A bay designation panel, which fills an unused bay mounting space, is mounted between the upper converter shelf assembly and the heat baffle.

1.40 A blank panel is used to fill the unused bay mounting space located above the lower converter shelf.

B. M34 Monitor and Switch Bay

1.41 The M34 monitor and switch bay provides for monitoring of up to 11 associated M34 muldems (ten service and one standby) and for automatically initiating a switch action to place a standby muldem into service when a failure is detected. A description of this function is given in 1.14. All bays are shop wired. Plug-in units are equipped separately by J98723J, as outlined in **4. EQUIPMENT.**

1.42 The J98723E monitor and switch bay is shown in Fig. 9. The following paragraphs describe the assemblies contained in the bay, starting from the top.

1.43 The ED-2C301-30 cable transition panel, Fig. 10, receives all the coaxial cables entering or leaving the bay. The panel attaches directly to the frame and is the central ground for the M34 digital multiplex system. The panel allows access to each muldem DS3 and DS4 standby line and also provides a mounting panel for the line build-out networks (4253A, B, C, and D).

1.44 The J98723AL fuse and alarm panel assembly contains the fusing for the −48 volt battery distribution, and the contact closures and visual indicators for major, minor, and fuse alarms. The panel also provides for the distribution of E-type status reporting and control system wires.

1.45 The J98723AM converter shelf assembly, Fig. 11, contains the power units that supply dc power to the other plug-in units.

1.46 Mounted under the converter baffle assembly is a panel that is provided on an optional basis. The J98723E,L3 provides the J98723AP frame filter panel assembly that contains a local telephone facility. The J98723E,L2 provides the J98723AE frame filter panel assembly, Fig. 12, that contains both a local

telephone facility and a digital network order wire (see 1.27). The frame filter filters the −48 volt power fed to the numerous 48-volt circuits located throughout the bay.

1.47 The J98723AF test panel assembly, Fig. 13, is used for the failure diagnostic display. With the aid of the display, the source of an alarm can be determined and the failed signal or circuit can be identified. The panel also shows the status of the protection switching system.

1.48 The J98723AH interface and bridge shelf assembly No. 1, Fig. 14, contains the interface circuit packs for muldems 1 through 5 plus the standby and DS3 bridge L1 (level 1) circuit packs for the same muldems. The interface circuit packs and the DS3 bridge L1 circuit packs are equipped, depending upon the number of muldems in service.

1.49 The J98723AJ interface and bridge assembly No. 2, Fig. 15, contains the interface circuit packs for muldems 6 through 10, the T3 test source circuit pack, the DS4 bridge circuit pack, the DS3 bridge L2 circuit packs, and the DS3 bridge L1 circuit packs for muldems 6 through 10. The interface circuit packs and DS3 bridge L1 circuit packs are equipped, depending upon the number of muldems in service. All other circuit packs are always equipped.

1.50 The J98723AK standby switch shelf assembly, Fig. 16, contains the standby switch circuit packs. These packs are equipped, depending on which DS3 channels are equipped in any of the M34 muldem circuits being monitored and switched. Normally, the shelf will be equipped for all six DS3 signals. The two standby switch circuit packs for DS4 signals are always equipped.

1.51 The J98723AG monitor and control shelf assembly, Fig. 17, contains the performance monitor, office repeater, and common control circuit packs. This shelf assembly is always fully equipped with circuit packs.

1.52 A heat baffle is located below the monitor and control shelf, the standby switch shelf, and the converter shelf assembly. The heat baffle minimizes shelf thermal interaction and allows air to enter the perforated front cover, cool the circuit packs, and be exhausted to the rear of the bay.

1.53 Cable racks ED-97738-01, stile strips ED-97774-( ), base covers 840047815 or outlet box assembly 840047799, and frame designation holders ED-97776-( ) are required for the bay (see 5.03). If the M34 bays are to be installed in an 11-foot 6-inch lineup extender brackets ED-97856-70 are available.

FLOOR PLAN ARRANGEMENT

1.54 The details for the floor plan layouts of the M34 bays are covered in Section 800-610-164, and in Floor Plan Data FPD 801-525-153-1. (See Fig. 18.) The 2 feet 6 inches for the maintenance aisle and the 2 feet 0 inch for the wiring aisle are permissible, providing proper precautions are taken in the building air conditioning design and distribution system to account for the high heat dissipation in the bays.

1.55 For installations with conventional or class II cooling systems, KS-21344 dropped air diffusers, or equivalent, are connected to the overhead supply ducts and located below cable racks in the maintenance aisle. Approximately one diffuser should be provided for every 3 kilowatts of equipment heat dissipation.

1.56 The recommended sequence for equipping an M34 lineup of less than ten service muldems is in numerical order from one to ten (see Fig. 18). This recommendation leads to a systematic, left-to-right fill of the various plug-in units in a partially equipped M34 monitor and switch bay. This recommendation is for convenience only, and the M34 muldems can be added in any sequence desired.

1.57 The modular cooling system, J85512, will provide adequate equipment cooling without additional measures.

1.58 Due to cable length restrictions, only the ED-97738-01 type cable rack shall be used and there shall be no columns or other office equipment between the M34 monitor and switch bay and its associated M34 muldem bays.

1.59 Detailed office planning information is contained in Section 760-100-085, Digital Transmission Office Planning, and Section 760-100-032, NEBS in Existing Buildings. Valuable information for central office engineering and installation of the M34 is given in ED-2C447-01. It is strongly recommended that this installation guide be consulted during installation engineering.

2. SUPPLEMENTARY INFORMATION

801-000-000—Numerical Index—Common Systems
800-020-001—Checking List—Equipment Design Requirements
800-600-000—Checking List—General Equipment Requirements
081-420-105—Coaxial Materials and Tools
103-486-102—J98721H PVM Test Set—Description
103-487-100—DS3 Error Rate Test Set—Description and Operation
161-202-100—120-, 130-, 140-Type Power Units—Pulse Width Control DC-DC Converters—Summarizing Specification—Power Systems
201-646-101—General Purpose 4-Wire Order Circuit System
365-011-300—Digital Transmission System—Service Maintenance Plan
365-303-101—DSX-3 and DSX-4 Cross-Connects—General Description
365-320-100—T1 Carrier System Order Wire Facility—Description
365-550-100—T4M Digital Line—General Description
365-550-101—T4M Span Terminating Frame—Description
365-550-102—T4M Add/Drop Office—General Description
365-571-000—T4M Digital Line—TOP Manual
365-601-100—M13 Multiplex—General Description
365-601-101—M13 Muldem—Description
365-603-101—M34 Digital Multiplex—Muldem Description
365-603-103—M34 Digital Multiplex—General Description
365-603-104—M34 Monitor, Protection Switching, and Alarm Circuits—Description
365-671-501—Digital Transmission Networks Containing High Capacity DS3 and DS4 Systems Maintenance Operations—TOP
365-671-511—M34 Digital Multiplex Maintenance Operations—TOP
365-671-521—M13 (Option Y) Digital Multiplex Maintenance Operations—TOP
760-100-032—NEBS in Existing Buildings
760-100-085—Digital Transmission Office Planning
795-209-167—Common Language Encoder—M34 Digital Multiplex Frame (DMBC)
795-209-177—Common Language Encoder—M34 Multiplex Circuit Packs (DMGC)
800-610-164—New Equipment Building System (NEBS) General Equipment Requirements
801-523-183—Performance Requirements—Span Terminating Frame
855-353-100—T4M Transmission Engineering Consideration
855-353-101—System Application—T4M Digital Line Transmission and Outside Plant Design Guide
J68769—804-627-156—Telephone Set Panel
J1A054—801-801-155—Cable Racks for Uniframe Framework
J85512—802-011-150—Modular Cooling System
J90606—801-006-158—Cable Racks for Uniframe Framework
J97039—801-015-152—Universal Framework (Uniframe)
J98710—801-523-150—T1 Carrier System—Order Wire Facility
J98721—801-523-152—T4M Digital Line Equipment
J98724—801-525-154—M13 Digital Multiplex Equipment
J99340—801-026-155—General Purpose 4-Wire Order Circuit
J99367—801-523-157—Equipment Design Requirements (DR-18)
J99368—801-523-158—Station Equipment (DR-18)
J99369—801-523-159—Radio Equipment (DR-18)
J99370—801-523-160—Power and Maintenance (DR-18)
J99371—801-523-161—Radio Line Terminating Frame (DR-18)
J99372—801-523-162—Radio Line Monitoring system (DR-18)
X-74300—Building Engineering Standards
KS-19224—Coaxial Cabling
KS-21344—Dropped Air Diffusers
KS-21366—DS3 Error Rate Test Set—Transmitter
KS-21424—DS3 Error Rate Test Set—Receiver
Floor Plan Data—FPD 801-525-153-1—M34 Digital Multiplex (7 Feet 0 Inch)—J98723C, E and M Bays

3. DRAWINGS

For additional drawings forming a part of this specification, see listings under Subdivisions of Equipment and Detailed Index.

Circuits

SD-1C245-01—General Purpose Order Circuit
SD-1P083-01—Digital Transmission Network, Order Wire Applique Schematic
SD-5G141-01-1—L4 Carrier Order Wire Circuit

SD-56073-01—L or N Carrier Telephone Set Circuit
SD-82046-01—DC Distribution Circuits for Digital Systems
SD-82271-01—131-Type Power Unit Circuit
SD-82272-01—132-Type Power Unit Circuit
SD-96379-01—Local Frame Line Circuit
SD-96607-01—T Carrier Administration Application Schematic
SD-96621-01—DSX-3 and DSX-4 Cross-Connect Circuit
SD-97085-01—T1 Carrier Order Wire Circuit
SD-99503-01—Digital Facilities Interconnection Circuit (DS1 and DS2)

Equipment

ED-1A159-10—Method of Terminating Battery and Ground Feeders
ED-1A198-( )—End Guards for J97039 Framework
ED-2C234-13—Method of Cabling Drawing for Application of Formed Cables (M34)
ED-2C234-24—Installer Connected Formed Coaxial Cable for 7-Frame Complex (M34)
ED-2C340-( )—DSX-3 and DSX-4 Cross-Connect Bays
ED-2C441-( )—Grounding Methods for High-Speed Digital Transmission Equipment
ED-2C447-01—Common Systems, Installation Guide for High-Speed Digital Transmission Equipment
ED-97735-( )—Single Bay Framework, 7 Feet 0 Inch High, 1 Foot 0 Inch Deep
ED-97738-( )—Uniframe Bay—Frame-Mounted Cable Rack
ED-97774-( )—Stile Strips for J97039 Framework
ED-97776-( )—Frame Designation Holder for J97039 Framework
ED-97784-( )—Method of Grounding Uniframe Frameworks
ED-97785-( )—Method of Installing Frameworks
ED-97791-( )—Hardware for Junctioning and Attaching Uniframe Frameworks
ED-97856-70—Extender Bracket for 7 Foot 0 Inch Bay

4. EQUIPMENT

ED-2C298-( )—AT&TCo Std—Baffle Assembly

ED-2C300-( )—AT&TCo Std—Card Extender Assembly

ED-2C301-30—AT&TCo Std—Cable Transition Panel Assembly

Group 1—Assembly, wiring, and equipment required to provide a cable transition panel assembly for use on the M34 monitor and switch bay per SD-1C159-01.

ED-2C302-30—AT&TCo Std—Cable Transition Panel Assembly

Group 1—Assembly and equipment required to provide a cable transition panel assembly for use on a 7-foot 2-muldem M34 muldem bay per SD-1C158-02.
Group 2—Same as group 1, except equipped for one muldem.

ED-2C465-( )—AT&TCo Std—M34 Installation and Acceptance Test Kit

Note

A. The telephone company shall order one ED-2C465-( ) test kit for each office.

J98723B—Reserved

J98723C—AT&TCo Std—M34 Muldem Bay—Double Muldem Arrangement Mounted on 7-Foot 0-Inch by 26-Inch Uniframe Type Framework

List 1—Framework, assembly, wiring, and equipment required for shop-wired M34 muldem, power converter, and fuse and alarm circuits per SD-1C158-02 using uniframe type framework, and wired for −48 volt office battery. Bay includes two J98723AB M34 muldem shelf assemblies, two J98723AC converter shelf assemblies, one J98723AN,L1 fuse and alarm panel assembly, and one ED-2C302-30,GR1 cable transition panel assembly. (See SD-1C158-02, App Fig. 1 through 4.)

J98723E—AT&TCo Std—M34 Monitor and Switch Bay—Shelf and Panel Arrangement Mounted on a 7-Foot 0-Inch by 26-Inch Uniframe Type Framework (See Note A)

List 1—Framework, assembly, wiring, and equipment required for shop-wired M34 monitor and switch shelf assemblies, power converter, and

fuse and alarm circuits per SD-1C159-01 using a 7-foot 0-inch uniframe framework, and wired for a −48 volt office battery. The bay includes an ED-2C301-30 cable transition panel assembly (less two 4253 networks), a J98723AL fuse and alarm panel assembly, a J98723AM converter shelf assembly, a J98723AH interface and bridge shelf assembly No. 1, a J98723AJ interface and bridge shelf assembly No. 2, a J98723AK standby a switch shelf assembly, a J98723AG monitor and control shelf assembly, and a J98723AF test panel assembly.

List 2—Equipment required in addition to list 1 to equip an M34 monitor and switch bay with a J98723AE frame filter and digital network order-wire panel assembly per SD-1C159-01, App Fig. 12 and 14. (See Note A.)

List 3—Equipment required in addition to list 1 to equip an M34 monitor and switch bay with a J98723AP frame filter and order-wire panel assembly per SD-1C159-01, App Fig. 11 and 14. (See Note A.)

Note

A. Order one list 2 or list 3 per list 1.

J98723G—AT&TCo Std—Muldem Plug-In Circuit Packs (See Notes A Through F and Table C)

List 1—Plug-in units common to a muldem.

List 2—Plug-in units required in addition to list 1 to equip one DS3 channel. (Maximum six lists 2 per list 1.)

List 6—Circuit pack card extender [ED-2C300-( )] desirable for test purposes. (One recommended per office.)

Notes

A. For a fully equipped M34 muldem bay, order two lists 1 and twelve lists 2.

B. No equalizers or LBOs are required for input and output cables. They are included on the circuit packs.

C. Muldem designated as standby must have as many DS3 channels equipped as muldem(s) being protected.

D. Circuit pack schematic information is contained in SD-1C157-01.

E. Plug-in unit complement for each list is shown in Table C.

F. Unfilled circuit pack positions for partially equipped installations may be filled, if desired, by ordering any combination of 127A or 127B apparatus blanks, as required. See Fig. 6 for plug-in unit arrangement for fully equipped muldem shelf J98723AB. Apparatus blanks are provided with the lists for all positions unfilled in a fully equipped frame.

G. The 127E apparatus blank is to be located in position 1 of the upper level of the J98723AB (M34) muldem shelf assembly. This apparatus blank contains the route designation label.

J98723H—AT&TCo Std—Muldem Plug-In Circuit Pack Spares (See Notes A and B and Table C)

List 1—Spare plug-in units recommended per office for first muldem equipped and every second muldem thereafter.

List 2—Spare plug-in units recommended per office in addition to list 1 for the first muldem equipped and every tenth muldem thereafter.

Notes

A. This will provide approximately 10 percent spare plug-in units per office after several muldem bays have been ordered.

B. The plug-in unit complement for each list is shown in Table C.

J98723J—AT&TCo Std—Monitor and Switch Plug-In Circuit Packs (See Notes A Through F and Table D)

List 1—Common circuit packs, power units, and 24 6-foot patch cords required to provide for acceptance and trouble clearing procedures of the M34 monitor and switch bay. Included are all monitor and control shelf assembly circuit packs per SD-1C157-01 and SD-1C159-01, App Fig. 7; all converter shelf

assembly power units per App Fig. 13; two DS3 bridge L1 circuit packs per App Fig. 5 for the first three service muldems; and the DS3 bridge L2 circuit pack, the DS4 bridge circuit pack, and the T3 test source circuit pack per App Fig. 1.

List 2—Plug-in units required in addition to list 1 to provide the automatic switching function of the M34 monitor and switch bay. Included are interface circuit packs for the standby muldem and two DS4 standby switch circuit packs per SD-1C157-01 and SD-1C159-01, App Fig. 2 and 6. Order one list 2 per monitor and switch bay. (See Note B.)

List 3—Plug-in units required in addition to lists 1 and 2 to provide standby switch circuits for each DS3 channel (1 through 6) per SD-1C157-01 and SD-1C159-01, App Fig. 3. Normally, six lists 3 are required for each monitor and switch bay. Order less only for cases where standby and all equipped service muldems have one or more common (same DS3 number) channels unequipped.

List 4—Plug-in units required in addition to lists 1, 2, and 3 to provide two interface circuits for an M34 service muldem per SD-1C157-01 and SD-1C159-01, App Fig. 4. Order one list 4 for each muldem equipped for service, up to ten lists 4 per monitor and switch bay.

List 5—Plug-in units required in addition to lists 1, 2, 3, and 4 to provide one DS3 bridge L1 circuit per SD-1C157-01 and SD-1C159-01, App Fig. 5. Order one list 5 for the fourth service muldem and each second service muldem thereafter, up to four lists per M34 monitor and switch bay. (See Note C.)

List 6—Circuit pack card extender [ED-2C300-( )] to be used for test purposes (one recommended per office).

Notes

A. For a fully equipped J98723E monitor and switch bay, order one list 1, one list 2, six lists 3, ten lists 4, four lists 5, and one list 6, if required.

B. Interface and DS4 standby switch circuit packs for the standby muldem are included in list 2.

C. Two DS3 bridge L1 circuit packs for the standby and first three service muldems are included in list 1. Two are provided to ensure an adequate number for installation and acceptance test.

D. Unfilled circuit pack positions for partially equipped installations may be filled by ordering 127A, 127B, and 127C apparatus blanks as follows. Each list 3 not equipped: order two 127B apparatus blanks; each list 4 not equipped: order two 127C apparatus blanks; each list 5 not equipped: order one 127A apparatus blank. Apparatus blanks are provided with list 1 for all positions unfilled in a fully equipped monitor and switch bay.

E. The plug-in unit complement for each list is shown in Table D.

F. The 127F apparatus blank is to be located in position 1 of the J98723AG monitor and control shelf assembly. This apparatus blank contains the LBO setting and switching information label for JS42.

J98723K—AT&TCo Std—Monitor and Switch Plug-In Circuit Pack Spares (See Notes A Through C and Table D)

List 1—Spare plug-in units recommended per office for each M34 monitor and switch bay.

List 2—Spare plug-in units recommended per office in addition to list 1 for the first M34 monitor and switch bay and every fifth bay thereafter.

List 3—Spare plug-in units recommended per office in addition to lists 1 and 2 for the first M34 monitor and switch bay and every tenth bay thereafter.

List 4—Spare plug-in untis recommended per office in addition to lists 1, 2, and 3 for the first M34 monitor and switch bay and every tenth bay thereafter. (See Note A.)

Notes

A. These plug-in units are also used in the M34 muldem shelf assemblies. Therefore, a common sparing plan could be instituted.

B. The spare plug-in unit complement for each list is shown in Table D.

C. This will provide approximately 10 percent spare plug-in units per office after several M34 monitor and switch bays have been ordered.

J98723L—Reserved

J98723M—AT&TCo Std—M34 Muldem Bay—Single Muldem Arrangement (Tenth Muldem in an M34 System) Mounted on a 7-Foot 0-Inch by 26-Inch Uniframe Type Framework

List 1—Framework, assembly, wiring, and equipment required for shop-wired M34 muldem, power converter, and fuse and alarm circuits per SD-1C158-02 using a uniframe-type framework, and wired for a −48 volt office battery. The bay includes one J98723AB M34 muldem shelf assembly, one J98723AC converter shelf assembly, one J98723AN,L2 fuse and alarm panel assembly, and one ED-2C302-30,GR2 cable transition panel assembly.

J98723N—Reserved

J98723AB—AT&TCo Std—M34 Muldem Shelf Assembly

List 1—Assembly, wiring, and equipment required for an M34 muldem shelf assembly for use on an M34 muldem bay per SD-1C158-02.

J98723AC—AT&TCo Std—Converter Shelf Assembly

List 1—Assembly, wiring, and equipment required for a converter shelf assembly per SD-1C158-02.

J98723AE—AT&TCo Std—Frame Filter and Digital Network Order-Wire Panel Assembly

List 1—Assembly, wiring, and equipment required for a frame filter and digital network orderwire panel assembly for use on an M34 monitor and switch bay per SD-1C159-01.

J98723AF—AT&TCo Std—Test Panel Assembly

List 1—Assembly, wiring, and equipment required to provide a test panel assembly for use on an M34 monitor and switch bay per SD-1C159-01.

J98723AG—AT&TCo Std—Monitor and Control Shelf Assembly

List 1—Assembly, wiring, and equipment required to provide an M34 monitor and control shelf assembly for use on an M34 monitor and switch bay per SD-1C159-01.

J98723AH—AT&TCo Std—Interface and Bridge Shelf Assembly No. 1

List 1—Assembly, wiring, and equipment required to provide an interface and bridge shelf assembly No. 1 for use on an M34 monitor and switch bay per SD-1C159-01.

J98723AJ—AT&TCo Std—Interface and Bridge Shelf Assembly No. 2

List 1—Assembly, wiring, and equipment required to provide an interface and bridge shelf assembly No. 2 for use on an M34 monitor and switch bay per SD-1C159-01.

J98723AK—AT&TCo Std—Standby Switch Shelf Assembly

List 1—Assembly, wiring, and equipment to provide a standby switch shelf assembly for use on an M34 monitor and switch bay per SD-1C159-01.

J98723AL—AT&TCo Std—Fuse and Alarm Panel Assembly

List 1—Assembly, wiring, and equipment to provide a −48 volt fuse and alarm panel for use on an M34 monitor and switch bay per SD-1C159-01.

J98723AM—AT&TCo Std—Converter shelf Assembly

List 1—Assembly, wiring, and equipment required for a converter shelf assembly for use on an M34 monitor and switch bay per SD-1C159-01.

J98723AN—AT&TCo Std—Fuse and Alarm Panel Assembly

List 1—Assembly, wiring, and equipment required to provide a −48 volt fuse and alarm panel assembly for use on a 2-muldem M34 muldem bay per SD-1C158-02.

List 2—Same as list 1, except equipped for a 1-muldem M34 muldem bay.

J98723AP—AT&TCo Std—Frame Filter and Order-Wire Panel Assembly

List 1—Assembly, wiring, and equipment required to provide a frame filter and order-wire panel assembly for use on an M34 monitor and switch bay per SD-1C159-01.

5. GENERAL NOTES AND INDEXES

5.01 Maintenance practices will occasionally call for the use of test equipment normally found in central offices.

5.02 Specification X-74300, Building Engineering Standards and Section 800-610-164, New Equipment Building System General Equipment Requirements are part of New Equipment Building Systems (NEBS). X-74300 applies primarily to building and line engineering, and specifies standards for central office layout and design. Section 800-610-164 applies to all new systems of central office equipment, covering only that portion of design concerning the spatial and environmental equipment-building interfaces.

5.03 To complete M34 installations, stile strips are required and may be selected as follows:

ED-97774-( ),GR1—Stile strips, 7-foot 0-inch framework.

The ED-97776-( ) bay designation holder is required with the specified ED-97738-01 cable rack. ED-97785-( ) shows the method of installing frameworks. Either an 840047815 or an 840047799 base cover with an appliance outlet is required for the front and rear of the bay. (See applicable SD equipment notes for specific requirements.) End guards per ED-1A198-( ) are used at the ends of bay lineups. See ED-2C447-01 for details on these items.

5.04 Cable brackets (P-45G416) and clips (P-45G741) are used on an as required basis.

5.05 The bottom of all frameworks shall be isolated from ground per J97039.

5.06 The following lamps and fuses should be available in the central office.

(a) ***Lamps:*** T1-3/4 No. 327 and 381 (Dialight); A3 lamp 100316702; Shelly lamp and cap for 401230578.

(b) ***Fuses:*** 70A, C, D, and F.

5.07 Coaxial patch cords for rolling and office cable restoration for the M34 are coded as: P2EB Coaxial Cord (3, 6, and 9 feet available). Twenty-four 6-foot cords are provided with the circuit pack lists as appropriate; however, additional quantities or different lengths may be ordered as desired.

5.08 Cabling restrictions on coaxial cable are as follows:

(a) ***DS3 728 Type:*** Less than 450 feet from the M34 to the DSX-3.

(b) ***DS4 728 Type:*** Less than 150 feet from the M34 to the DSX-4 (less than approximately 325 feet from the M34 to the transmission system span terminating frame if the DSX-4 is not used). (See the applicable SD for the exact requirement.)

5.09 For special circuit, equipment, and information notes on the M34 muldem bay and M34 monitor and switch bay see SD-1C158-02-D and SD-1C159-01-D, respectively.

5.10 Locking strips are to be kept in a closed position except when inserting or extracting circuit packs.

5.11 Order one KS-21366 L2 transmitter, one KS-21424 L2 receiver, and one J98721H PVM per office.

5.12 The two DS4 spare office trunks that terminate on the cable transition panel (ED-2C301-30) require a LBO network or cord for various trunk lengths as shown in Table B.

TABLE B

LBO NETWORKS AND CORDS

728A CABLE LENGTH BETWEEN M34 MONITOR AND SWITCH CIRCUIT AND DSX-4 CROSS-CONNECT (FT)	NETWORK OR CORD ON CABLE TRANSITION PANEL (ED-2C301-30)
0-40	4253B, 3.3 dB
40-75	4253C, 2.2 dB
75-110	4253D, 1.1 dB
110-150	841475221, Patch Cord

5.13 Codes J98723R through Y are unassigned.

List of A&M Only and Mfr Disc. Equipment

EQUIPMENT	RATING	DETAILS LAST SHOWN IN ISSUE	REPLACING EQUIPMENT
ED-2C297-30,GR1 & GR2	Mfr Disc.	1	—
ED-2C299-30,GR1	Mfr Disc.	1	—
ED-2C436-( ),GR1 & GR2	Mfr Disc.	1	—
J98723A,L1, L2 & L3	Mfr Disc.	1	—
J98723D,L1	Mfr Disc.	1	—
J98723F,L1	Mfr Disc.	1	—
J98723G,L3, L4 & L5	Mfr Disc.	1	—
J98723H,L3	Mfr Disc.	1	—
J98723P,L1	Mfr Disc.	1	—
J98723AA,L1	Mfr Disc.	1	—
J98723AD,L1	Mfr Disc.	1	—
J98723AR,L1 & L2	Mfr Disc.	1	—

The above equipment has been replaced as indicated. Where A&M Only items appear, the issue numbers shown are those of the issue in which the rating was first applied.

SUBDIVISIONS OF EQUIPMENT AND DETAILED INDEX

WE J drawings should be ordered by referring to the prefix and base number and requesting the current dash (-) number.

EQUIPMENT CODE	AT&T RATING OF UNIT	TITLE	EQUIPMENT DRAWING	CIRCUIT DRAWING	MTG PLATES PER UNIT
ED-2C298-( )	Std	Baffle Assembly	ED-2C298-( )		1
ED-2C300-( )	Std	Card extender Assembly	ED-2C300-( )		
ED-2C301-30	Std	Cable Transition Panel Assembly	ED-2C301-( )	SD-1C159-01	1
ED-2C302-30	Std	Cable Transition Panel Assembly	ED-2C302-( )	SD-1C158-02	1
ED-2C465-( )	Std	M34 Installation and Acceptance Test Kit	ED-2C465-( )		
J98723C (DMBC)	Std	M34 Muldem Bay—Double Muldem Arrangement Mounted on 7-Foot 0-Inch by 26-Inch Uniframe Type Framework	J98723C-( )	SD-1C158-02	

EQUIPMENT CODE	AT&T RATING OF UNIT	TITLE	EQUIPMENT DRAWING	CIRCUIT DRAWING	MTG PLATES PER UNIT
J98723E (DMBC)	Std	M34 Monitor and Switch Bay—Shelf and Panel Arrangement Mounted on a 7-Foot 0-Inch by 26-Inch Uniframe Type Framework	J98723E-( )	SD-1C159-01	
J98723G (DMGC)	Std	Muldem Plug-In Circuit Packs	J98723G-( )	SD-1C157-01	
J98723H (DMGC)	Std	Muldem Plug-In Circuit Pack Spares	J98723H-( )	SD-1C157-01	
J98723J	Std	Monitor and Switch Plug-In Circuit Packs	J98723J-( )	SD-1C157-01 SD-1C159-01	
J98723K	Std	Monitor and Switch Plug-In Circuit Pack Spares	J98723K-( )	SD-1C157-01	
J98723M (DMBC)	Std	M34 Muldem Bay—Single Muldem Arrangement (Tenth Muldem in an M34 System) Mounted on a 7-Foot 0-Inch by 26-Inch Uniframe Type Framework	J98723M-( )	SD-1C158-02	
J98723AB	Std	M34 Muldem Shelf Assembly	J98723AB-( )	SD-1C158-02	12
J98723AC	Std	Converter Shelf Assembly	J98723AC-( )	SD-1C158-02	2
J98723AE	Std	Frame Filter and Digital Network Order-Wire Panel Assembly	J98723AE-( )	SD-1C159-01	2
J98723AF	Std	Test Panel Assembly	J98723AF-( )	SD-1C159-01	2
J98723AG	Std	Monitor and Control Shelf Assembly	J98723AG-( )	SD-1C159-01	6
J98723AH	Std	Interface and Bridge Shelf Assembly No. 1	J98723AH-( )	SD-1C159-01	6
J98723AJ	Std	Interface and Bridge Shelf Assembly No. 2	J98723AJ-( )	SD-1C159-01	6
J98723AK	Std	Standby Switch Shelf Assembly	J98723AK-( )	SD-1C159-01	6
J98723AL	Std	Fuse and Alarm Panel Assembly	J98723AL-( )	SD-1C159-01	1
J98723AM	Std	Converter Shelf Assembly	J98723AM-( )	SD-1C159-01	2
J98723AN	Std	Fuse and Alarm Panel Assembly	J98723AN-( )	SD-1C158-02	1
J98723AP	Std	Frame Filter and Order-Wire Panel Assembly	J98723AP-( )	SD-1C159-01	2
J98723B	Reserved				
J98723L	Reserved				
J98723N	Reserved				

Circuit Schematic Index

CIRCUIT DRAWING	J98723 EQPT CODE
SD-1C157-01	G,H,J,K
SD-1C158-02	ED-2C302-30, C,M,AB,AC,AN
SD-1C159-01	ED-2C301-30, E,J,AE, AF,AG,AH,AJ, AK,AL,AM,AP

6. REASONS FOR REISSUE

1. To revise 1.06, 1.11, 1.15, 1.33, 1.36, and 1.59.

2. To update Fig. 1 and Fig. 6.

3. To add BSP references to **2. SUPPLEMENTARY INFORMATION.**

4. To change reference to Floor Plan Data in **2. SUPPLEMENTARY INFORMATION** from Section 7.1, Sheet 192 to FPD 801-525-153-1.

5. To delete ED-2C361-( ) 931D, E Connector Repair Kit from **4. EQUIPMENT.**

6. To add Note A to ED-2C465-( ) in **4. EQUIPMENT.**

7. To add Common Language Equipment (CLE) codes to J codes C, E, G, H, and M in **SUBDIVISIONS OF EQUIPMENT AND DETAILED INDEX.**

8. To revise 5.02.

9. To revise Tables C and D.

TABLE C

SUMMARY OF PLUG-IN UNITS (MULDEM BAY)

CODE	TITLE	QUANTITY FURNISHED				
		J98723G			J98723H	
		L1	L2	L6	L1	L2
JS1 CP	Desynchronizer		1		1	
JS2 CP	T3 Interface		1		1	
JS3 CP	Synchronizer		1		1	
JS4 CP	Multiplexer Output	1				1
JS5 CP	Multiplexer Code Generator	1				1
JS6 CP	Multiplexer Timing	1				1
JS7 CP	Multiplexer Control	1				1
JS10 CP	Demultiplexer Framing	1				1
JS11 CP	Demultiplexer Timing	1				1
JS12 CP	Demultiplexer Code Generator	1				1
JS13 CP	Demultiplexer Super Framing	1				1
JS14 CP	Demultiplexer Input	1				1
216A RPTR	Repeater	1				1
127A APP BLK	Single-space Apparatus Blank	4				
127B APP BLK	Double-space Apparatus Blank	10				
127E APP BLK	Double-space Apparatus Blank with Route Designation label	1				
131A PWR UN	Power Converter, ±6.3V	1				1
131B PWR UN	Power Converter, −2.1V	1				1
132B PWR UN	Power Converter, −5.6V	2				2
ED-2C300-( ) CD EXT	Card Extender (931-Type Connector Only)			1		

TABLE D

SUMMARY OF PLUG-IN UNITS (MONITOR AND SWITCH BAY)

CODE	TITLE	QUANTITY FURNISHED									
		J98723J						J98723K			
		L1	L2	L3	L4	L5	L6	L1	L2	L3	L4
JS10 CP	Demultiplexer Framing	1									1
JS11 CP	Demultiplexer Timing	1									1
JS12 CP	Demultiplexer Code Generator	1									1
JS13 CP	Demultiplexer Super Framing	1									1
JS14 CP	Demultiplexer Input	1									1
JS22 CP	T3 Test Source	1								1	
JS23 CP	Multiplexer Interface		1		1			1			
JS24 CP	Demultiplexer Interface		1		1			1			
JS25 CP	Standby Switch		2	2				1			
JS26 CP	Switch Driver	1								1	
JS27 CP	Lamp Driver	2							1		
JS28 CP	DS3 Bridge L1	2				1		1			
JS29 CP	DS3 Bridge L2	1								1	
JS30 CP	DS4 Bridge	1								1	
JS31 CP	Bridge Driver	2							1		
JS32 CP	Parity Monitor	1								1	
JS33 CP	Selector	1								1	
JS34 CP	Monitor Elastic Store	1								1	
JS35 CP	Comparator	1								1	

TABLE D (Cont)

SUMMARY OF PLUG-IN UNITS (MONITOR AND SWITCH BAY)

CODE	TITLE	QUANTITY FURNISHED									
		J98723J						J98723K			
		L1	L2	L3	L4	L5	L6	L1	L2	L3	L4
JS36 CP	Violation Monitor	1								1	
JS37 CP	Timer	1								1	
JS38 CP	Sequencer	1								1	
JS39 CP	Fault Locator	1								1	
JS40 CP	Switcher	1								1	
JS41 CP	Alarm Control	1								1	
JS42 CP	Memory	1								1	
216A RPTR	Repeater	1									1
127A APP BLK	Single-space Apparatus Blank	2									
127F APP BLK	Single-space Apparatus Blank with LBO Switching Label	1									
ED-2C300-( ) CD EXT	Card Extender (931-Type Connector Only)						1				
131A PWR UN	Power Unit, ±6.3V	1									1
131B PWR UN	Power Unit, −2.1V	1									1
132B PWR UN	Power Unit, −5.6V	1									1

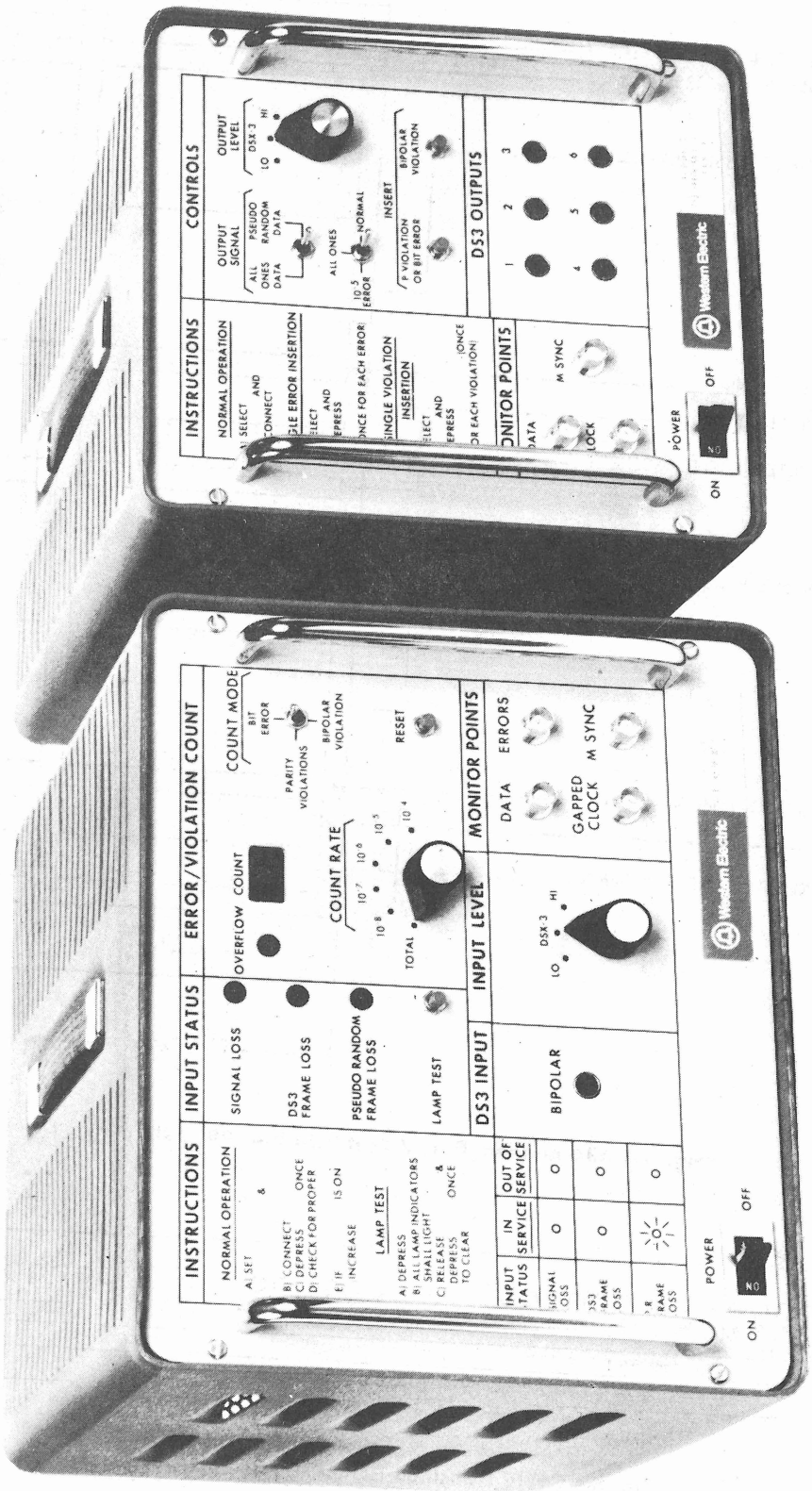

Fig. 3—DS3 Error Rate Test Set—Transmitter and Receiver

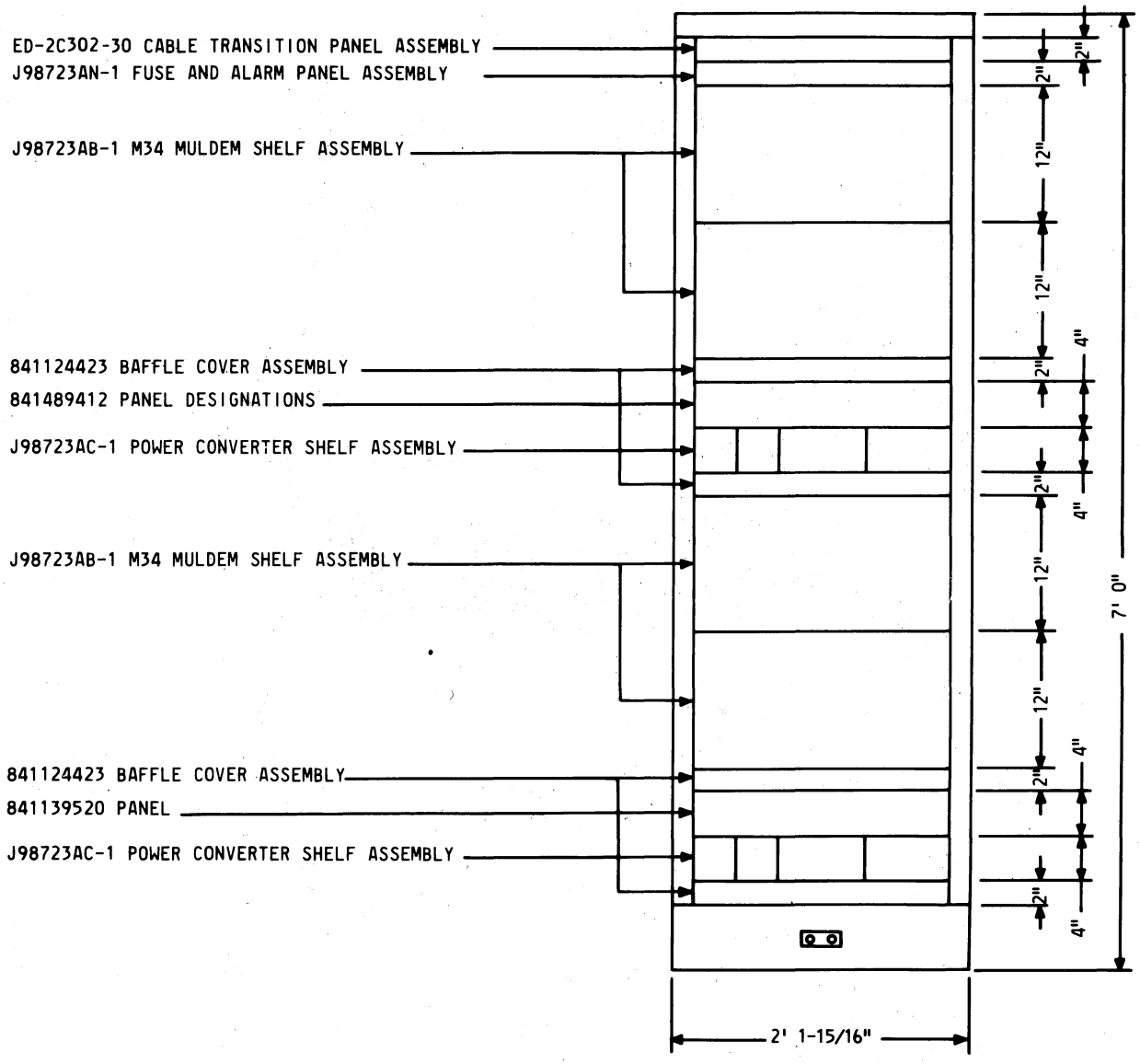

Fig. 4—M34 Muldem Bay, 7 Feet 0 Inch—J98723C

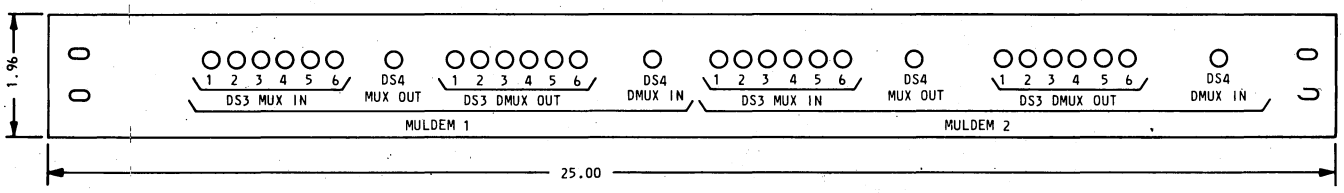

Fig. 5—Cable Transition Panel—ED-2C302-( )

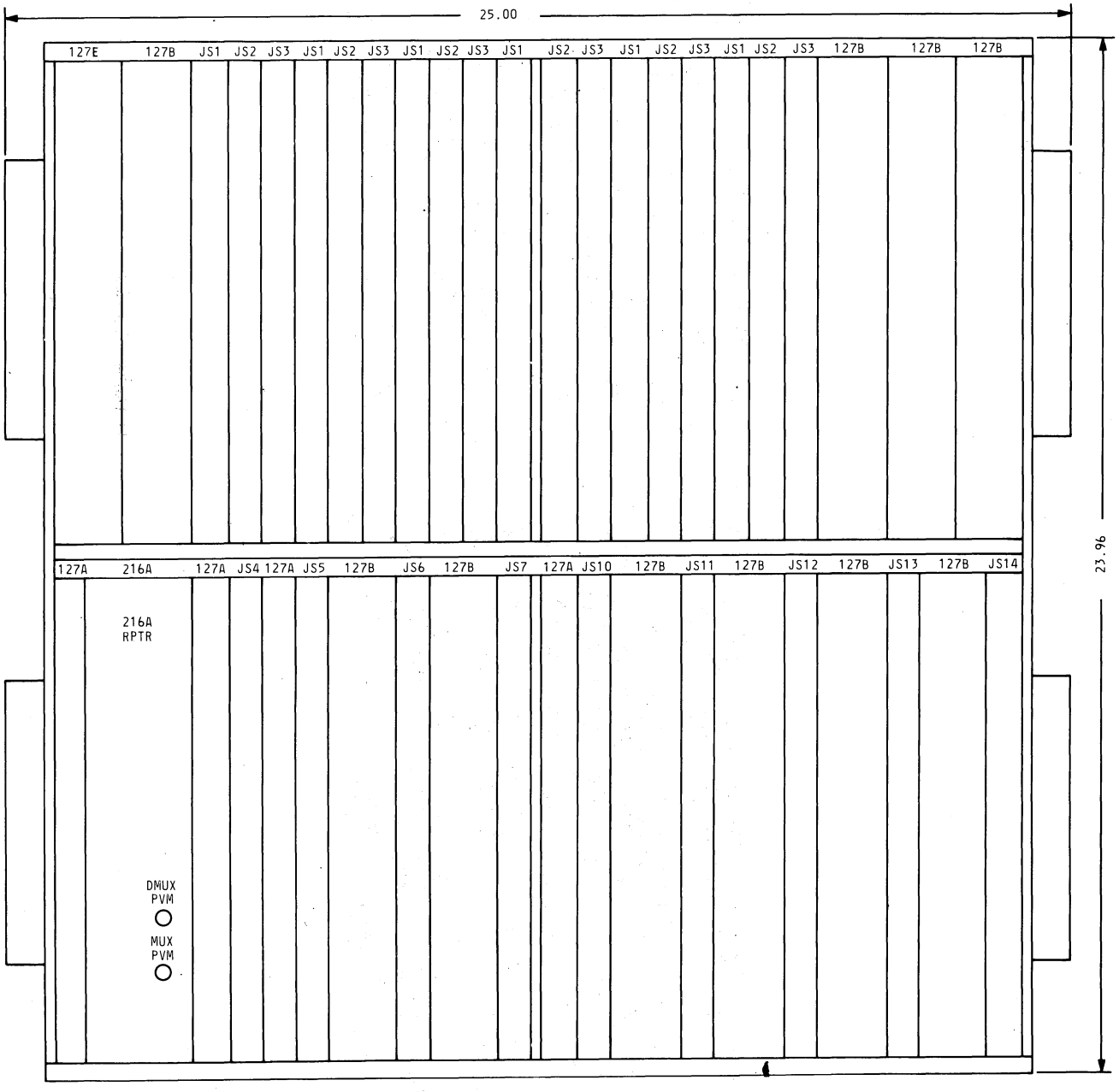

Fig. 6—M34 Muldem Shelf Assembly—J98723AB

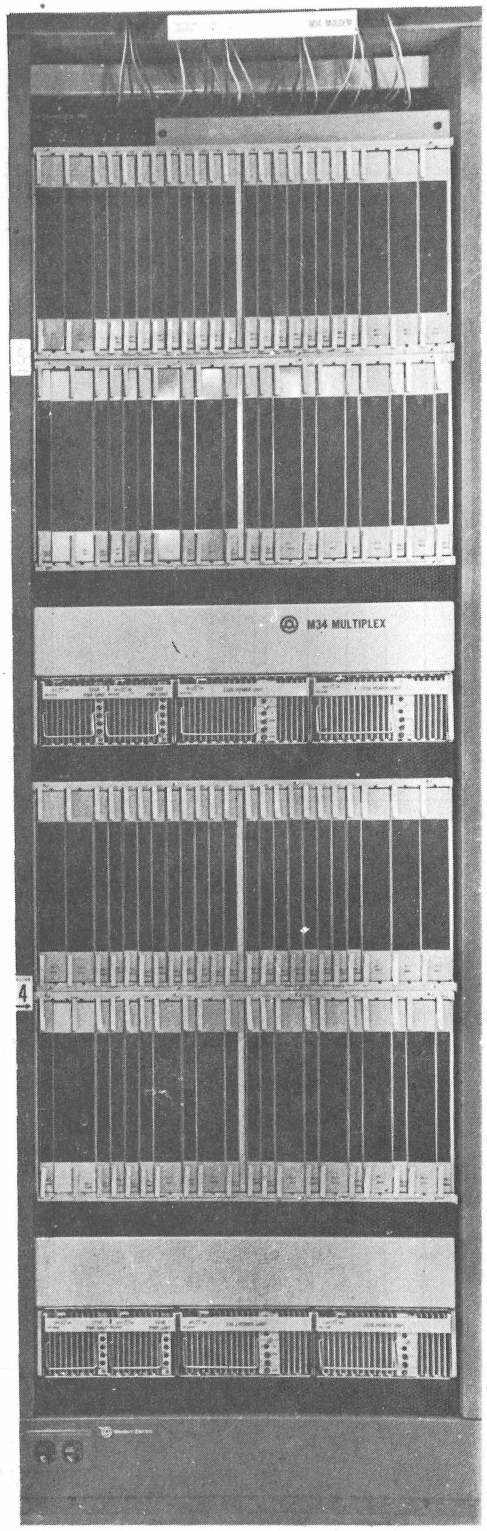

Fig. 7—M34 Muldem Bay, 7 Feet 0 Inch—J98723C

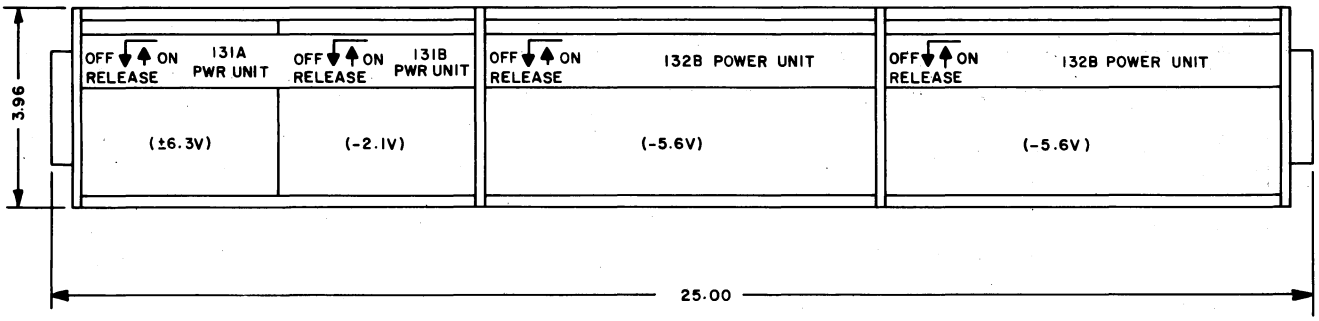

Fig. 8—Power Converter Shelf Assembly—J98723AC

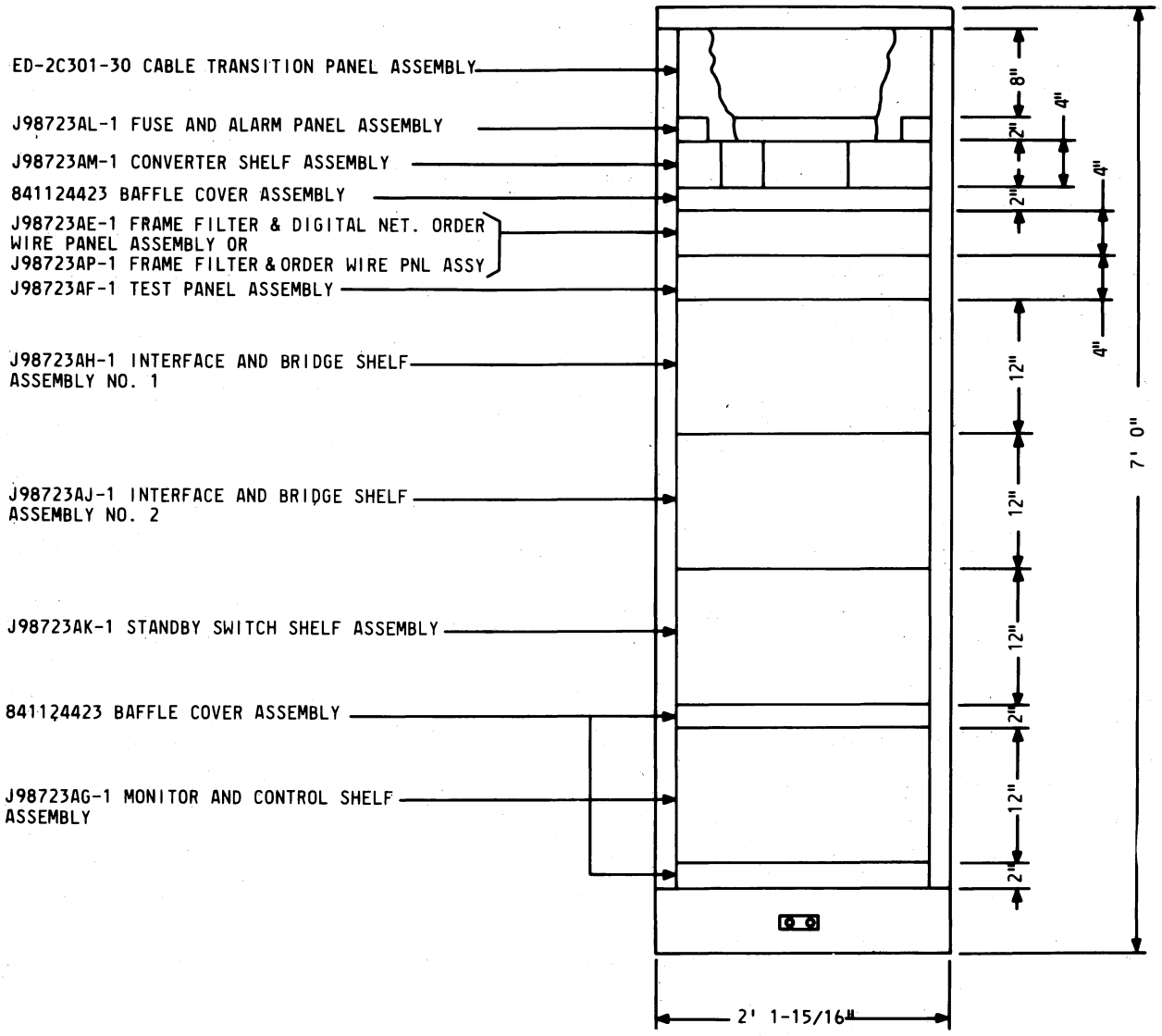

Fig. 9—M34 Monitor and Switch Bay—J98723E

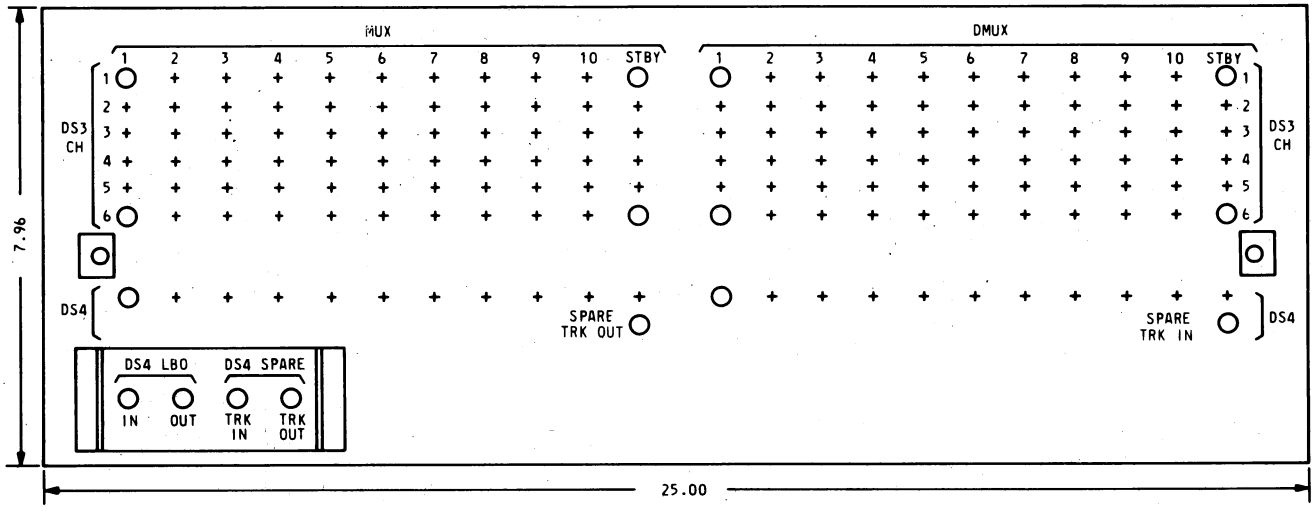

Fig. 10—Cable Transition Panel—ED-2C301-30

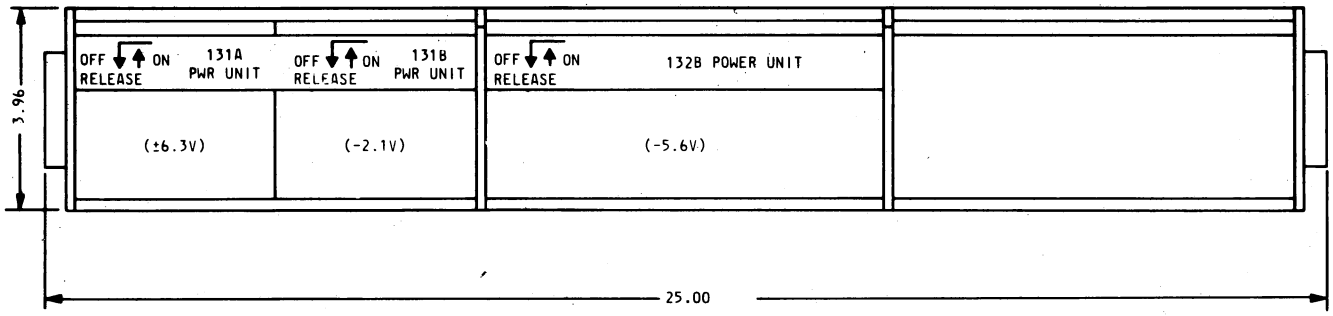

Fig. 11—Converter Shelf Assembly—J98723AM

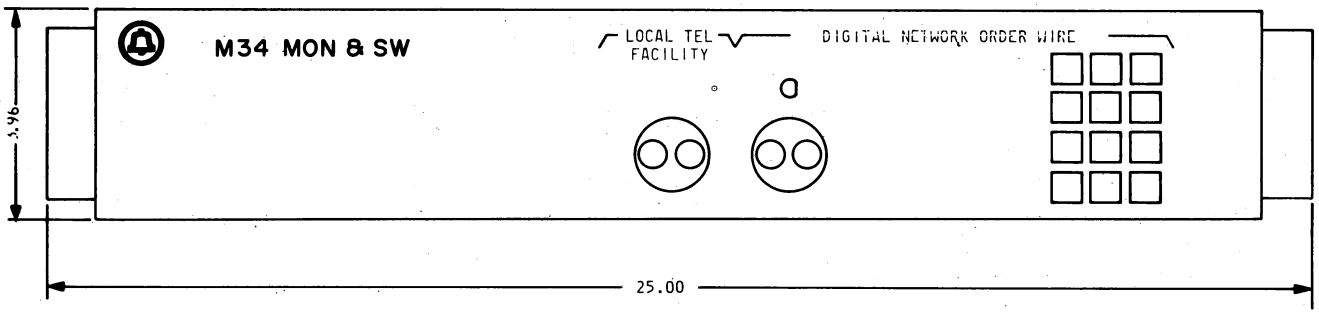

Fig. 12—Frame Filter Panel Assembly—J98723AE

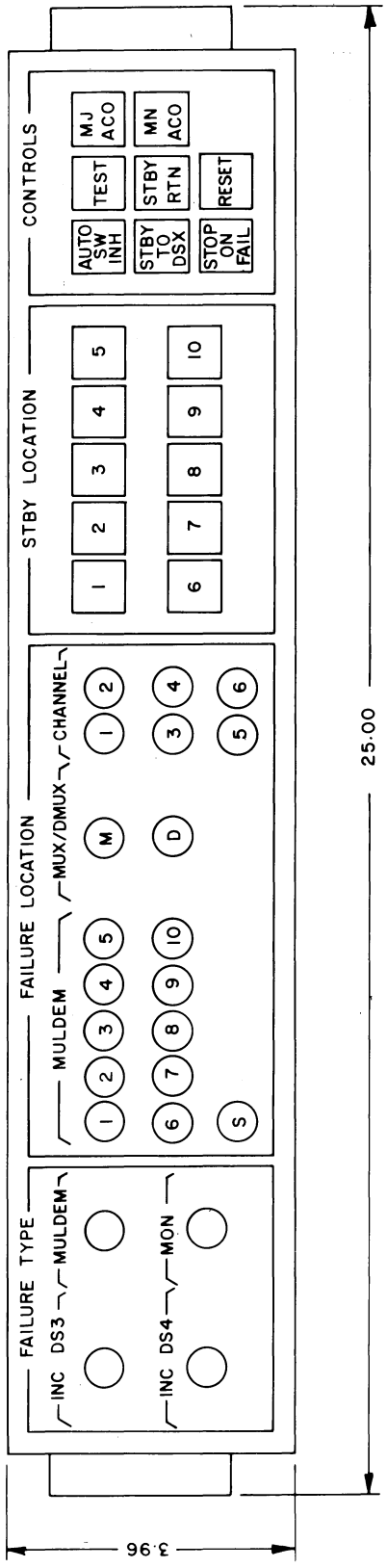

Fig. 13—Test Panel Assembly—J98723AF

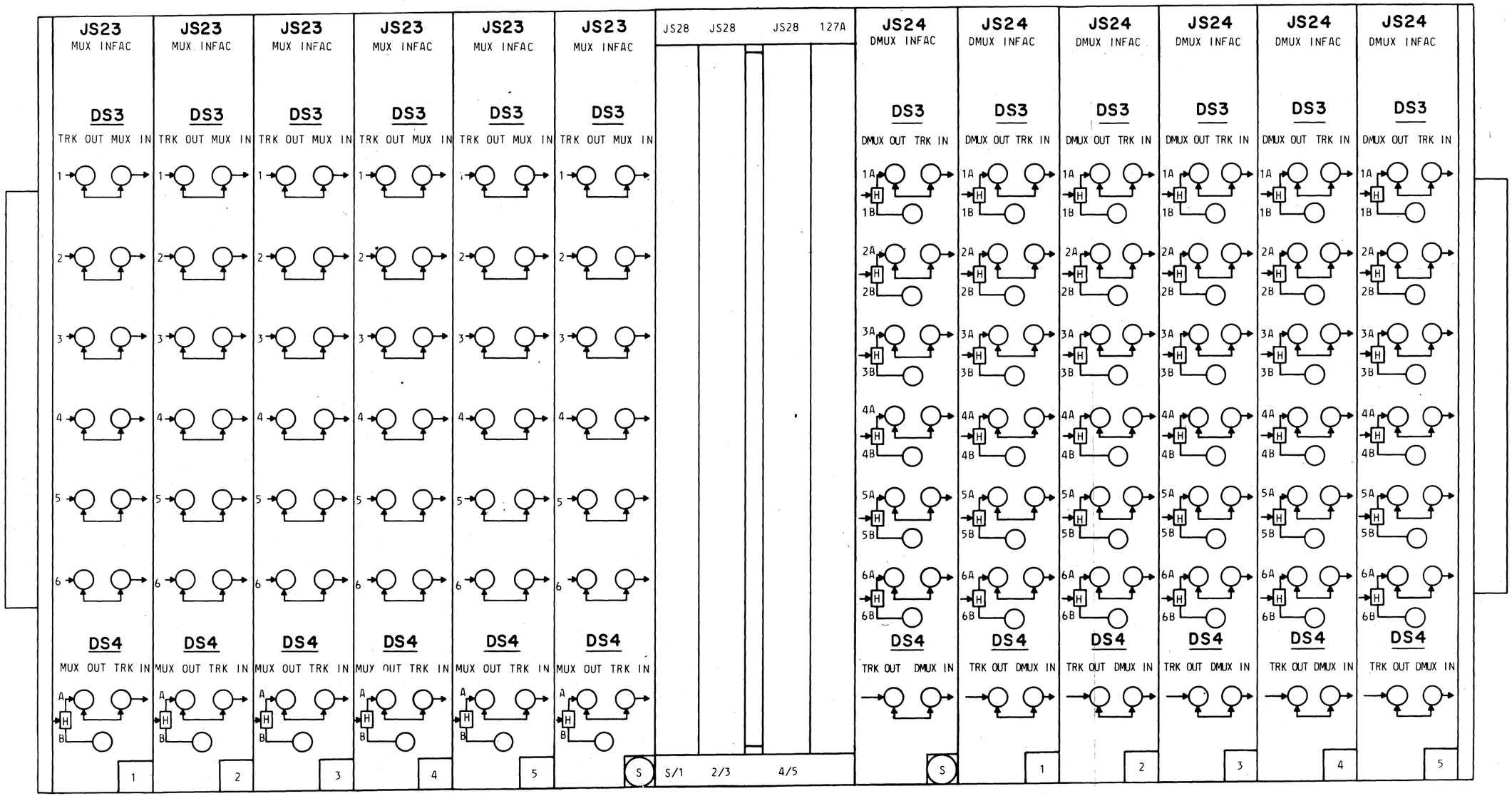

Fig. 14—Interface and Bridge Assembly No. 1—J98723AH

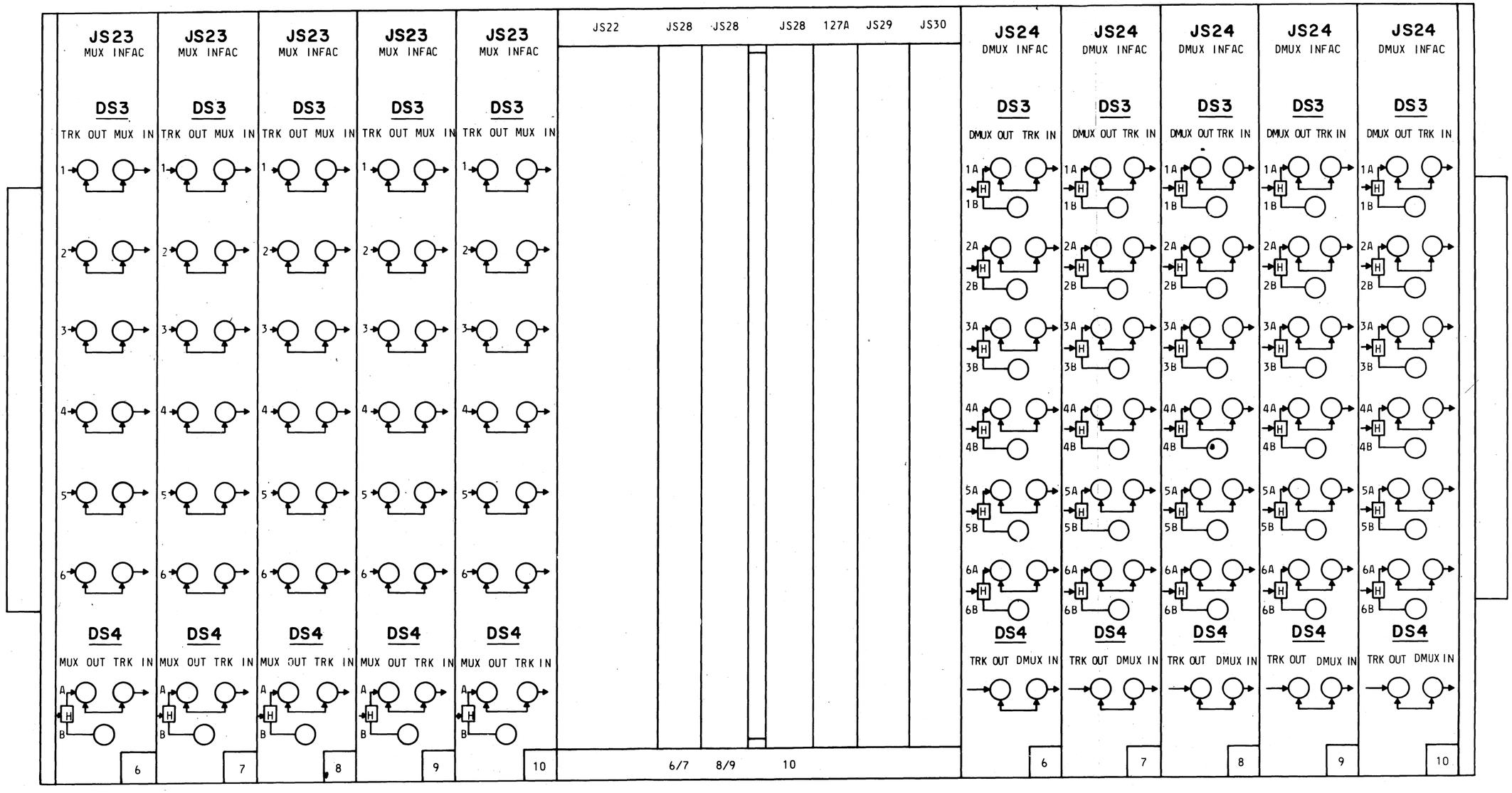

Fig. 15—Interface and Bridge Assembly No. 2—J98723AJ

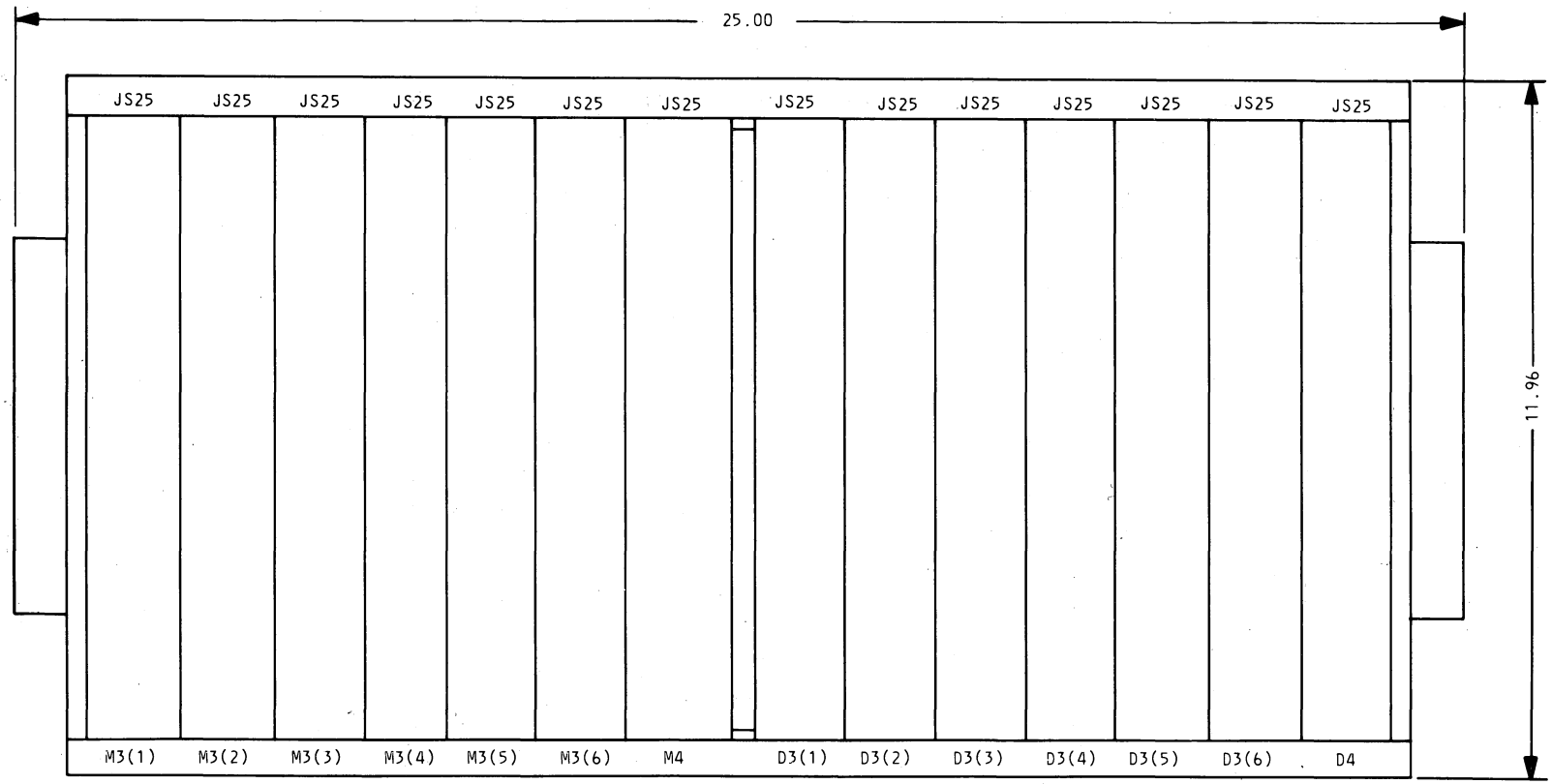

Fig. 16—Standby Switch Shelf Assembly—J98723AK

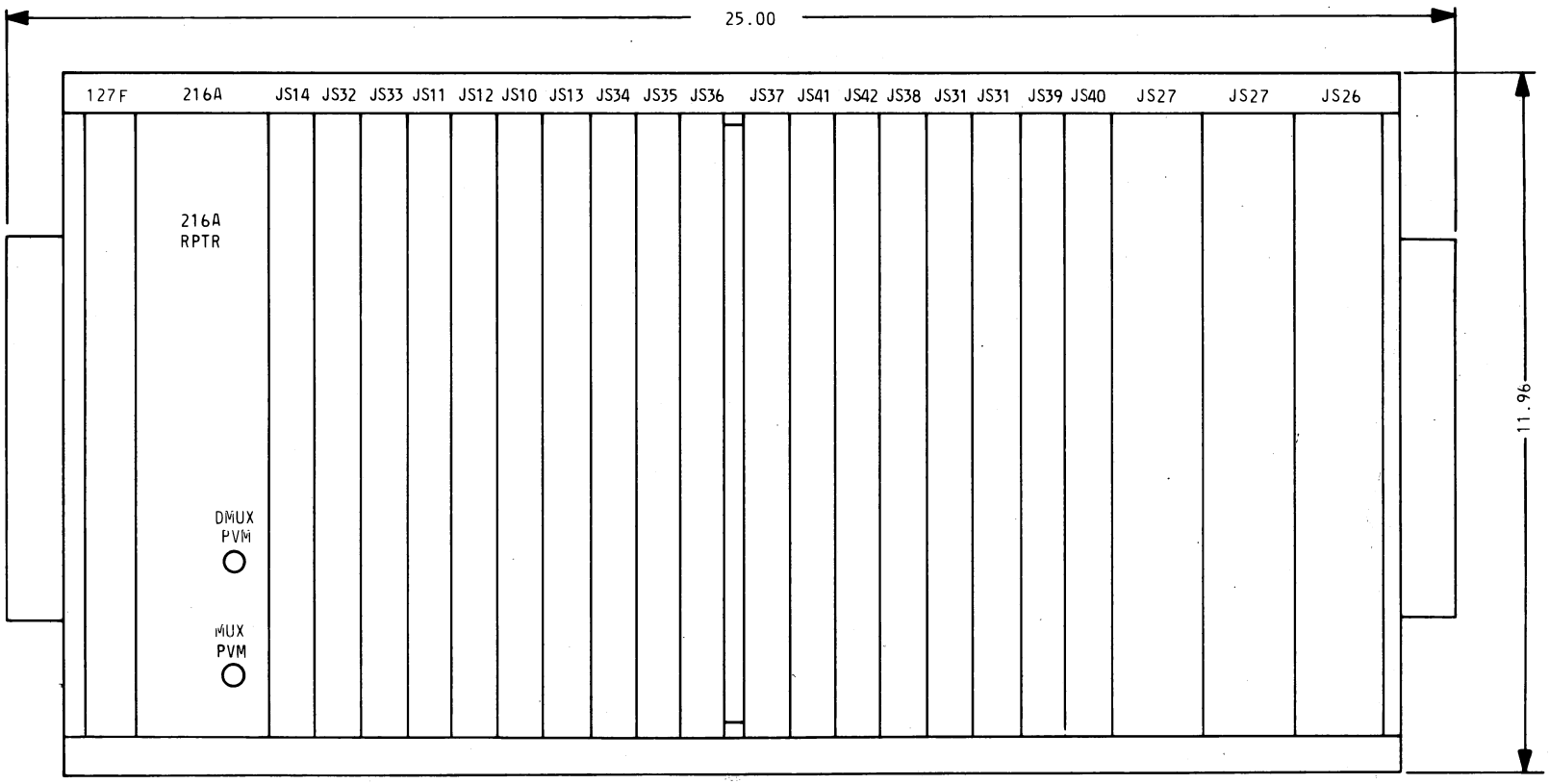

Fig. 17—Monitor and Control Shelf Assembly—J98723AG

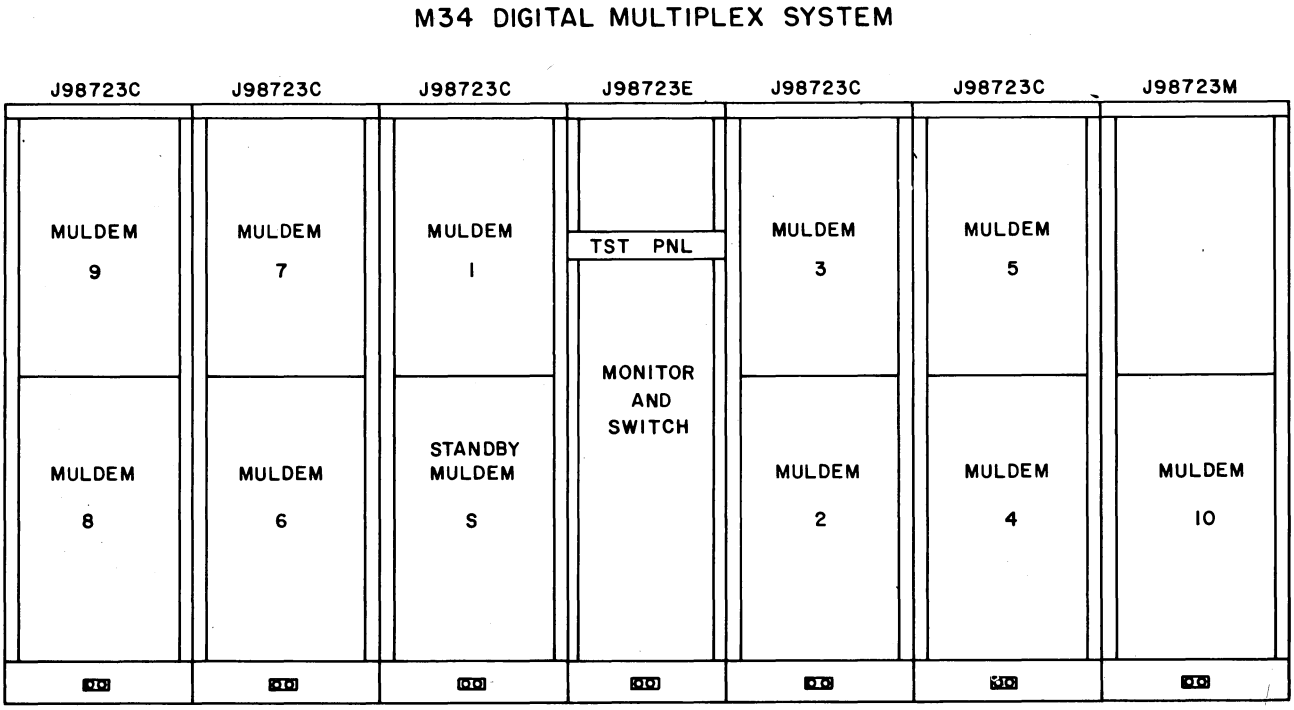

Fig. 18—M34 Digital Multiplex System

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