DIGITAL TRANSMISSION SYSTEMS
DSX-3 AND DSX-4 CROSS-CONNECTS
GENERAL DESCRIPTION

CONTENTS PAGE

1. GENERAL

FUNCTION

1.01 The function of the DSX-3 and DSX-4 digital cross-connects is to provide access to outputs and inputs of equipments having a common signal format and bit rate. The DSX-3 and DSX-4 cross-connects provide a means of convenient circuit assignment and rearrangement and restoration for central office equipment operating at the DS3 rate (44.736 Mb/s) and the DS4 rate (274.176 Mb/s). Such equipment includes the M13 and M34 digital multiplexes, the CMG-3 mastergroup coder, and terminal equipment for the 3A-RDS, T4M, DR-18, and WT4 digital transmission systems. The relationship of these systems and the cross-connects, as well as their relationship to present or proposed lower bit-rate systems in the digital transmission hierarchy, is shown in Fig. 1.

1.02 Whenever this section is reissued, the reasons for reissue will be stated in this paragraph.

PRINCIPLE OF OPERATION

1.03 Figure 2 shows a simplified schematic for a cross-connect. Connections are made from the equipment to a coaxial jack on a panel which is mounted to the cross-connect cabinet. Coaxial cross-connecting jumper cords are then used to connect two pieces of equipment together, for example, equipment A and equipment B in Fig. 2. Rearrangement of the equipment can be accomplished without recabling simply by moving cross-connecting jumper cords, as shown in dotted form in Fig. 2, to connect equipment C to equipment B.

1.04 To ensure that the signal level reaches each receiver (at the equipment) at the correct level through any length of cable up to a certain maximum length, line build-out (LBO) networks must be provided, either at the cross-connect or at the equipment. Thus the signal reaches the cross-connect at an equal level in all cases. The LBO on the receiver side may be provided by automatic circuitry in the receiver itself.

1.05 In actual practice, these LBOs are usually provided at the equipment. This is true of all equipment presently interfacing with DSX-3; thus, no LBOs are needed at the DSX-3. At the DSX-4, the M34, DR-18, and WT4 equipments provide their own LBOs; however, since two equipment types, T4M and M34A, do not have LBOs in one direction, special panels (see 2.08 and 2.10) which can mount LBOs must be used. (LBOs must be added to the cross-connect for these equipment types only on the line from the transmitter; the receiver has a built-in automatic LBO.)

1.06 Lines to and from equipment are of two different types: "regular lines" carrying working circuits which are depicted in Fig. 2 and "standby lines" which are used in conjunction with the regular lines to carry traffic during rolling or other circuit order work, or during restoration of office cable failures. Each type is handled in a separate manner and on separate types of panels at the cross-connect. Figure 3 shows how the regular lines panels are arranged. Coaxial cables from equipment transmitters enter the cross-connect in the rear of the panels and are terminated on panel jacks designated OUT. Similarly, cables going to the equipment receivers terminate on IN jacks. Each type of equipment normally terminates on a separate panel for ease of identification and administration. If LBOs were required, a similar arrangement would ensue, except that LBOs would be inserted in the line before terminating on the jack.

1.07 Standby lines are configured in the cross-connect cabinet in the same manner as regular lines, except that normal-through jacks are required on the front panel so that plugging operations during circuit order work can be done with a minimum disruption of service. The circuit shown in Fig. 4 is used. Figure 5 shows how standby lines panels are arranged. Two types of cords are used: a standby jumper cord to connect standby equipment back on itself for continual monitoring or to connect between standby equipments, and a temporary patch cord to provide temporary route paths during circuit rearrangement operations. The use of these cords is described more fully in Part 3. LBOs, if required, are simply connected in series with the office cables.

1.08 To provide identification of cross-connecting jumper cords and to thereby reduce errors in patching operations, tracer lamps are provided on regular lines panels. Depressing a pushbutton at one end of the jumper cord causes a lamp to light at the other end. A description of this feature is given in 2.07.

2. PHYSICAL DESCRIPTION

CABINETS

2.01 Figures 6 and 7 are front and rear views, respectively, of a DSX-3 or DSX-4 cross-connect bay. The bay is a 7-foot enclosed metal cabinet with full-length front and rear doors to provide physical protection for the large number of coaxial cables in the cross-connect bay. Once all office cables from transmit and receive equipments have been connected at the back of the cross-connect panels and the jumper and patch cords have been connected on the front of the panels, all doors should be closed on the cabinet. The cabinet meets the new equipment building standards (NEBS) and is designed to use the NEBS ED-97738 cable rack. The designation strips mounted at the top front of the cabinets are the only difference between DSX-3 and DSX-4 cabinets. When installations require more than one DSX-3 or DSX-4 cabinet, cabinets of the same type should be placed adjacent to permit jumper and patch cords to be run directly between them. Floor plans should be arranged so as not to block growth to the ultimate number of cabinets.

2.02 At the front of the DSX-3 or DSX-4 cross-connect cabinet, Fig. 6, vertical cable ducts on each side of the panels provide space to route jumper and patch cords so that congestion in front of the panels is avoided. Slots on each side of the cable duct are used to route cords into and out of the duct. There are 2-inch by 3-inch cable troughs on the top and at the bottom of the cabinet. These troughs are used to run jumper and patch cords between adjacent bays. The cabinet provides 72 inches of vertical space for mounting

panels 13-1/4 inches wide. At the rear of the cabinet, Fig. 7, vertical cable ducts, 7-inches wide, are provided on each side of the panels to accommodate a maximum of 156 728A-type office cables each from the terminal equipment.

POWER PANEL

2.03 Figure 6 shows a 2-inch-high ED-2C340-30 power panel mounted at the top of the bay. The power panel provides −24V to light tracer lamps on the regular lines cross-connect panels. Input to the panel is supplied by −48 volt office battery. The power panel will supply current to light approximately ten lamps simultaneously at normal intensity. As more than that number are lighted, the lamp intensity becomes successively lower. The lamp being lighted can be on the cross-connect panel on which the switch is activated or on the panel at the other end of the jumper cord. Switches S1 and S2 are provided to cut power off to the tracer lamps when it is not needed. S1 is mounted on the right side of the power panel and is used to cut power off when the doors are open. S2 is mounted top center on the power panel with an arm extending out which cuts power off when the doors are closed. A red lamp above switch S1 lights when the power is on. The power panel also provides telset jacks for a local office order wire.

DIGITAL NETWORK ORDER-WIRE PANEL

2.04 Mounted in the bay under the power panel is a 4-inch-high optional ED-2C386 digital network order-wire (DNOW) panel (see Fig. 8). This order-wire panel provides communications for the craft inside the office or to distant offices as well. Normally only one bay in a multibay configuration of cross-connect cabinets would be equipped with a DNOW. If an order-wire panel is not mounted in a bay, the space for this panel may be left vacant for future use of a DNOW or used to mount a cross-connect panel.

CROSS-CONNECT PANELS

2.05 A DSX-3 or DSX-4 cross-connect bay is assembled by installing one or a combination of the four types of cross-connect panels listed in Table A. The four types of panels are described in the following paragraphs.

2.06 ***Regular Lines Panels:*** The ED-2C353 regular lines panel has five rows of pushbutton lamps and jacks numbered from bottom to top (see Fig. 9) to provide termination for thirty 2-way circuits. In each row there are six OUT pushbutton lamps, pin jacks, and snap-on coaxial jacks and six IN pushbutton lamps, pin jacks, and snap-on coaxial jacks. The ED-2C353 panel does not provide built-in LBO networks. This panel will be used in cross-connect bay applications where LBO networks are built into the transmit (source) side of the equipment and LBO networks are either built into the receive side of the equipment or the equipment has automatically equalized receivers (this includes most applications). Office coaxial cables from the equipments are wired into the coaxial jacks at the rear of the panel. Use of the ED-2C353 panels provides a compact cross-connect bay with considerable space savings over a panel requiring LBOs.

TABLE A

DSX-3 AND DSX-4 CROSS-CONNECT PANELS

DESIGNATION	TYPE	LBO	HEIGHT (INCHES)	NO. OF 2-WAY CIRCUITS
ED-2C353	Regular Lines	No	14	30
ED-2C354	Standby Lines	No	3	6
ED-2C355	Regular Lines	Yes	12	12
ED-2C356	Standby Lines	Yes	6	6

2.07 The snap-on coaxial jacks are used to terminate the coaxial jumper cords whereas the pin jacks terminate the tracer lamp leads. Pushbutton switches on the cross-connect panel operate the tracer lamps. When one of these pushbuttons is depressed, the lamp being depressed lights and the lamp at the terminal end of the jumper cord also lights. The tracer lamp current to the terminal end is carried on the outer shield of the miniature triax cable (see Fig. 10). When a pushbutton is depressed, it is almost flush with the panel and is about 1/4 inch lower than a pushbutton that is not depressed. The same pushbutton that was depressed to light the lamps has to be depressed and released to extinguish the lamps. If more than ten lamps are lighted at one time (lamps at both ends of five jumper cords), a reduction of lamp intensity will result; however, this condition should not be encountered in normal use of the cross-connect.

2.08 The ED-2C355 regular lines panel (see Fig. 11) has two rows of pushbutton lamps, pin jacks, and snap-on coaxial jacks. In each row there are six sets of pushbutton lamps and jacks on the OUT and IN sides of the panel to provide termination for twelve 2-way circuits. The major difference between the ED-2C353 panel and the ED-2C355 panel is that the ED-2C355 panel has space provided for LBO networks. These LBO networks are mounted on printed circuit boards and housed in metal boxes. The LBO networks are coded 4246A through D. See table below for code and approximate cable length. These LBO networks are set in the back side of the cross-connect panel, and connections are made to the front of the panel and to the equipment through snap-on coaxial connectors. The panel can be equipped with LBOs only for lines requiring them. Thus, lines not requiring LBOs can use P93Q407 coaxial cords in place of the LBOs.

LBO NETWORK CODE	*CABLE LENGTH
4246A	0—40 feet
4246B	25—75 feet
4246C	65—100 feet
4246D	100—150 feet
None (use P93Q407 coaxial cord)	135—165 feet

*** Cable lengths are nominal. For precise values, see connecting equipment documentation.**

2.09 ***Cross-Connecting Jumper Cords:*** These cords are used with the regular lines panels and are available in 15 assorted lengths, from 9 inches up to a maximum of 27 feet (see ED-2C340-10, Table B). They are equipped with snap-on coaxial plugs and tracer tip plugs on each end (see Fig. 10) and are normally used only to make cross-connections between regular lines panels.

2.10 ***Standby Lines Panels:*** There are two types of standby lines panels (see Table A). The ED-2C354 panel, Fig. 12, is not equipped with LBOs. The ED-2C356 panel, Fig. 13, is provided with space to mount the same LBO networks as the ED-2C355 regular lines panel. Once again for the ED-2C356 panel, LBOs are not used on lines not requiring them; instead, the P93Q407 coaxial cord is used. Both standby lines panels provide termination for six 2-way circuits and have a row of two types of jacks, six of each type on the OUT side and six on the IN side of the panel. The bottom jacks are snap-on coaxial jacks used for looping back transmit to receive on a standby equipment or to connect between standby equipments. The top jacks are normal-through 619B-type jacks which are wired in series with the snap-on coaxial jacks (see Fig. 4).

2.11 ***Standby Jumper and Temporary Patch Cords:*** Two types of cords are used with the standby lines panels. The first type is the standby jumper cord required to perform loop-back connections for standby equipment between the OUT and IN snap-on coaxial jacks on standby lines panels. This cord is presently available in a 10-inch length only (code 841475221) and is equipped with a snap-on coaxial plug on each end. The second type is the temporary patch cord equipped with a 440-type plug on each end to mate with the 619B-type jacks on the standby lines panels. This cord is available in 15 assorted lengths from 9 inches up to a maximum of 27 feet (see ED-2C340-10, Table C). When the 440-type plugs are inserted, connections to the snap-on coaxial jacks are broken and loop-back connections to the standby equipment are broken without unplugging the standby jumper cords.

2.12 In the event that cross-connect panels are installed and connected to service or standby equipment, but cross-connecting or standby jumper cords have ***not*** been installed or have been removed,

KS-21175 75-ohm terminating plugs should be connected to each front panel snap-on coaxial jack.

2.13 When the DS3 Error Rate Test Set (see Section 103-487-100) is used at the DSX-3 cross-connect, P2FF-type test cords are required. These cords have a 440-type plug on the test set end and a snap-on coaxial plug on the other end. Seven P2FF-type test cords should be ordered for each DSX-3 installation.

OFFICE ARRANGEMENTS

2.14 The cross-connects can be engineered to provide a great number of types of panel groupings to meet specific needs. The only constraints on panel groupings are that DSX-3 and DSX-4 should be in separate cabinets and that growth of standby lines panels should be from top to bottom and regular lines panels from bottom to top. Panel groupings of entire cabinets with only regular lines panels or entire cabinets with only standby lines panels are permissible and would provide a centralized restoration point. Preferably all cables terminating on a single panel should be from one type of equipment (for example, M13 or M34). Figures 14 through 16 show some of these typical panel groupings in a cross-connect bay.

DESIGNATIONS

2.15 Screened markings are provided on all four types of cross-connect panels during manufacture to identify the OUT and IN sides of the panel and to number the rows of apparatus when more than one row is contained on a panel. Screened markings identify OUT and IN circuits 1 through 6 on the standby lines panels, whereas the pushbutton lamps are numbered to provide similar identification on the regular lines panels.

2.16 Jack appearances are identified for office record purposes by bay number, regular lines or standby lines panel number, row number, and jack number. A block is provided on each panel for stamping of the panel number. The numbering scheme used is "RL1", "RL2", etc, for regular lines panels from the bottom up, and "SL1", "SL2", etc, for standby lines panels from the top down (see Fig. 14 through 16). Correlation of the jack number to the particular equipment is given in office records and may also be stamped by the installer or the operating company on the panel or on designation labels affixed to the cabinet.

3. CROSS-CONNECTING AND PATCHING OPERATIONS

DEFINITIONS

3.01 At the lower levels of the digital hierarchy, specifically the DS1 and DS2 levels where the DSX-1 and DSX-2 equipments are used, cross-connecting is accomplished by hardwiring cross-connect panels. This cross-connecting operation is effected by permanent wiring from the back of the OUT jack on the panel to the back of an associated IN jack on the same or another panel. Thus, the cross-connecting operation does not require the use of patch cables for normal operation. The patching operation at the DSX-1 and DSX-2, therefore, is used to defeat the normal hardwired cross-connections by using the front panel jacks and patch cables during temporary circuit rearrangement or during restoration procedures. On the other hand, at the DS3 and DS4 levels of the digital hierarchy, the cross-connecting, loop-back, and temporary patching operations are performed with cords at the front of the DSX-3 or DSX-4 cross-connect panels.

3.02 For the purpose of this section the following definitions apply:

Cross-connecting operations are performed

(a) With ***cross-connecting jumper cords*** between two regular lines panels to connect one equipment source to the receiver of a second equipment to establish normal service, or

(b) With ***standby jumper cords*** at a single standby lines panel to connect an equipment source to its own or another receiver as required to exercise standby equipment and trunks.

These two operations are more fully described in 3.03 and 3.04.

Patching operations are performed with ***temporary patch cords,*** usually at or between standby lines panels. These operations are made to provide temporary route paths for circuit rearrangement or during restoration procedures, as described more fully in 3.05 through 3.13.

CROSS-CONNECTING OPERATIONS

3.03 There are two types of cross-connecting operations to be performed at a DSX-3 or DSX-4 cross-connect. The first type of operation involves connecting one equipment transmitter (source) to the receiver of a second equipment using a cross-connecting jumper cord between the regular lines panels. This operation is performed for both directions of transmission. It should be noted that while transmission systems require only one cross-connection per direction of transmission, multiplexes require multiple cross-connections. For example, at the DSX-3, six cross-connections (six DS3 level signals) are required for each direction of transmission to cross-connect six M13 multiplexes to one fully equipped M34 multiplex. Figure 17 shows typical acceptable cross-connecting jumper cord routing for interconnecting regular lines panels in three cross-connect bays. Procedures for making cross-connections for the M13, M34, and interconnecting transmission systems are given in Section 365-671-000 (TOP).

3.04 The second type of cross-connecting operation consists of connecting the output of a standby equipment back to its own input ("loopback") or to the input of another standby equipment, using a standby jumper cord at standby lines panels. An example of this operation is the M13 multiplexer output being looped back at the DSX-3 to the demultiplexer input of the same muldem. Figure 17 shows a standby jumper cord connected as a loopback across a single standby lines panel, and also shows a standby jumper cord connected between standby lines panels in adjoining bays. During patching operations at the standby lines panels, these cross-connections are automatically disabled when the temporary patch cords are plugged in. Procedures for making loop-back cross-connections for the M13, M34, and interconnecting transmission systems are given in Section 365-671-000 (TOP).

PATCHING OPERATIONS

3.05 Two general types of patching operations can be performed at the DSX-3 and DSX-4 cross-connects. The first patching operation involves only a single office cross-connect installation (either DSX-3 or DSX-4) and is used for temporary restoration of office cable. The second and more complex patching operation is designated "rolling" and involves two cross-connects which can be at the same or different levels in the digital hierarchy and can be located in the same or different offices. The main purpose of the rolling operation is to permanently transfer or reroute traffic without service interruption. As a secondary application, portions of the rolling procedure can be used for temporary restoration of failed service by using standby lines and standby equipment to bypass the faulty apparatus.

3.06 ***Equipment Requirements for Patching Operations:*** The features required by the equipments preceding and following the cross-connect for both types of patching operations are identical. The only difference is that standby equipment and standby parallel paths between cross-connects are not required for temporary restoration of office cable between equipment which goes through a single cross-connect. The first four minimum requirements are shown in Fig. 18 and are required in all patching operations. The fifth requirement shown in Fig. 18 applies to the rolling operation only. Additional jacks are required for other purposes, for example, test access.

3.07 A head-end bridge (hybrid output or equivalent) is required at each regular service equipment output preceding the cross-connect (see Fig. 18). The hybrid output serves for setting up a head-end bridge to provide a duplicate of the regular signal to the standby trunk. Standby trunks from the transmitting equipment to the cross-connect provide dual feeds for rearrangement and restoration. The standby trunks may be part of the standby equipment or independent standby office trunks with appropriate conditioning (LBOs). The standby trunks must be accessible with jack outputs at the transmit end as shown in Fig. 18. The number of standby trunks should correspond to the number of service trunks to be rearranged.

3.08 The standby trunks also provide a dual feed from the cross-connect to the receiving equipment. A normal-through jack is required on the input of the regular service equipment following the cross-connect to permit a tail-end patch from the dual feed into the equipment. For rolling operations, a standby path between cross-connects is provided to serve as a parallel path for a dual feed between cross-connects. The standby used for protection can serve this purpose.

3.09 These features permit the traffic to be cut over from one route to another route by

plugging in or pulling out a single end of a patch cord. Although this results in a short "hit" that causes reframes in the terminal downstream, the disturbance is short enough (less than 140 milliseconds at the end terminals) not to cause a carrier group alarm (CGA) or the cutoff of customers. Data transmission users will be affected, however. Therefore, Special Service or Data Test Centers should be contacted prior to ***any*** patching operations. Procedures other than those required here, and those which would require simultaneous insertion or removal of both ends of a patch cord or even simultaneous patching at different locations would result in a longer "hit", causing a probable loss of traffic. These procedures are, consequently, not considered acceptable.

3.10 ***Required Communication Facilities:*** Patching requires coordinated action at a number of locations. Adequate communication facilities are required at all locations involved in patching operations to enable the craft personnel to communicate and perform their patching operations in the correct sequence. Communications may be handled by frame line circuits within offices and by the digital network order-wire circuit between and within offices.

3.11 ***Temporary Restoration of Office Cable:*** A case of temporary patching to transfer service from regular service trunks to standby office trunks is shown in Fig. 19. This patching operation uses three temporary patch cords and involves four steps. When these four steps have been performed, service is being carried on the standby office trunks, and the cross-connecting jumper cord can be removed at the regular lines panel to enable trouble clearance. If the standby office trunks utilized in this procedure were being used to loop back standby equipment, minor alarms may occur at the transmitting standby equipment when step 1 is performed and at the receiving standby equipment when step 2 is performed. Office audible alarms can be silenced by the alarm cutoff (ACO) switches at the equipment involved. When the regular office trunks are returned to service, the temporary patch cords should be removed in the reverse order at the earliest reasonable time and equipment alarms restored.

3.12 ***Rolling Procedures:*** The general rolling procedure consists of the following three major operations:

Operation 1: Bypass regular cross-connecting jumper cords by placing traffic onto temporary alternate routes consisting of appropriate standby trunks, temporary patch cords, and standby equipment.

Operation 2: Rearrange cross-connecting jumper cords according to the new routing plan and use terminating plugs where unused equipment is involved.

Operation 3: Return traffic from the temporary alternate routes to the new routes and remove the temporary patch cords placed in operation 1.

The standby trunks and equipment are tied up during the three operations. If these standbys provide protection switching for regular trunks and equipment, part of the regular system is left unprotected during rolling. However, all three operations can be performed in a reasonable period of time.

3.13 In the case of temporary rerouting of traffic (for example, in service restorations where the failure cannot be bypassed by protection switching circuitry at the equipment), the same procedure is followed, but operation 2 is omitted. Operation 1 restores traffic over standby trunks and equipment. Operation 3 returns traffic to regular trunks and equipment after the failure has been repaired.

3.14 ***Rolling Between Cross-Connects at Different Hierarchy Levels:*** In some cases, a route to be rolled may terminate at cross-connects that are not at the same hierarchy level. This means that the route passes through a multiplex and that for each appearance at the higher level cross-connect there are several appearances at the lower level cross-connect. The three operations described in the preceding paragraphs apply also for these cases if each operation is performed on all appearances involved.

3.15 ***Signal Verification:*** Before any traffic cutover to a different path during a rolling

operation (that is, before a tail-end cutover is performed), it is highly advisable to verify the validity of the signal arriving at the tail end. This can generally be done by temporarily patching the signal from the path in question into the standby receiver at that location, or by using test equipment such as the DS3 Error Rate Test Set (DS3 ERTS) or the 21H Portable Violation Monitoring Test Set (PVM).

4. REFERENCES

DRAWINGS

NUMBER	TITLE
SD & CD-96621-01	DSX-3/DSX-4 Cross-Connects
ED-2C340-10, -11	Method of Cabling for DSX-3 and DSX-4 Typical Bay
ED-2C353-30	DSX-3 or DSX-4 Regular Lines Panel
ED-2C354-30	DSX-3 or DSX-4 Standby Lines Panel
ED-2C355-30	DSX-3 or DSX-4 Regular Lines Panel Arranged for LBOs
ED-2C356-30	DSX-3 or DSX-4 Standby Lines Panel Arranged for LBOs
ED-2C447	Installation Guide for High-Speed Digital Transmission Equipment

BELL SYSTEMS PRACTICES

SECTION	TITLE
103-486-102	J98721H Portable Violation Monitoring Test Set—Description, Operation, and Maintenance
103-487-100	DS3 Error Rate Test Set (KS-21366,L1 and KS-21424, L1)—Description and Operation
365-301-101	DSX-1 Patch and Cross-Connect—General Description and Operation
365-302-101	DSX-2 Patch and Cross-Connect—Description and Operation
365-550-100	T4M Digital Line—General Description
365-571-000	T4M Digital Line (TOP)
365-601-100	M13 Digital Multiplex—General Description
365-603-100	M34A Digital Multiplex—General Description
365-603-103	M34 Digital Multiplex—General Description
365-671-000	M13 and M34 Digital Multiplex System (TOP)

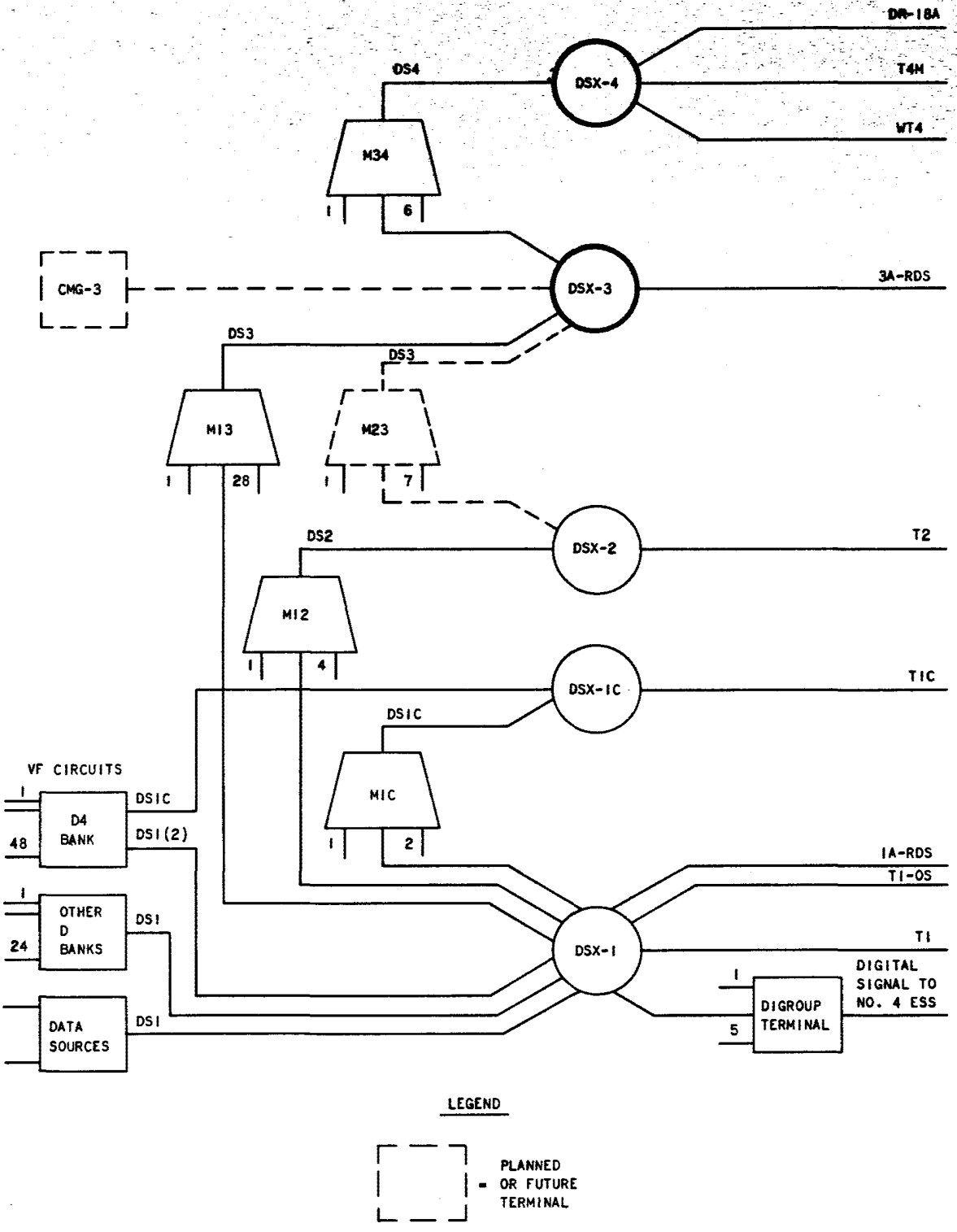
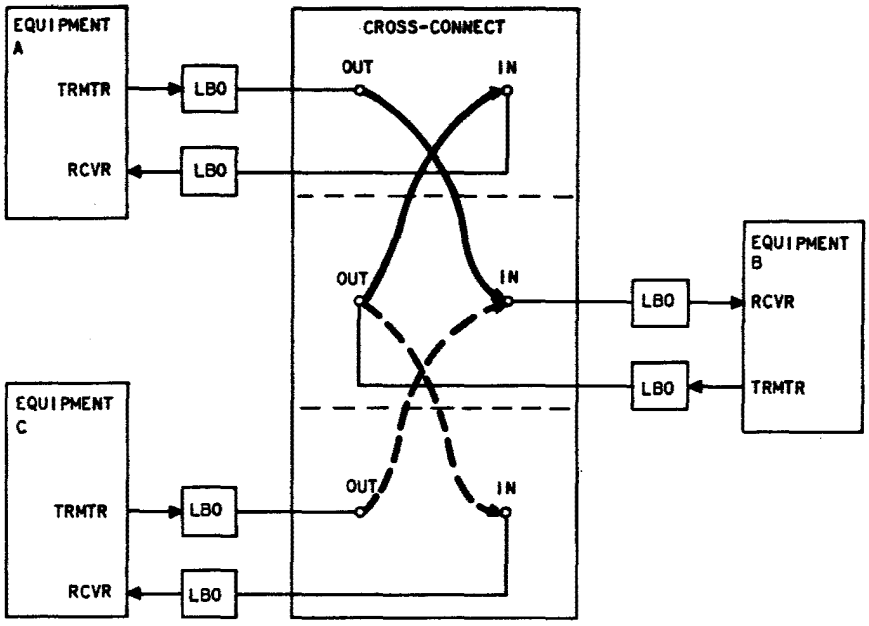


Fig. 1—Digital Hierarchy and Transmission Facilities



NOTE:
LBO CAN BE LOCATED EITHER IN EQUIPMENT OR CROSS-CONNECT.

Fig. 2—Simplified Schematic of a Cross-Connect

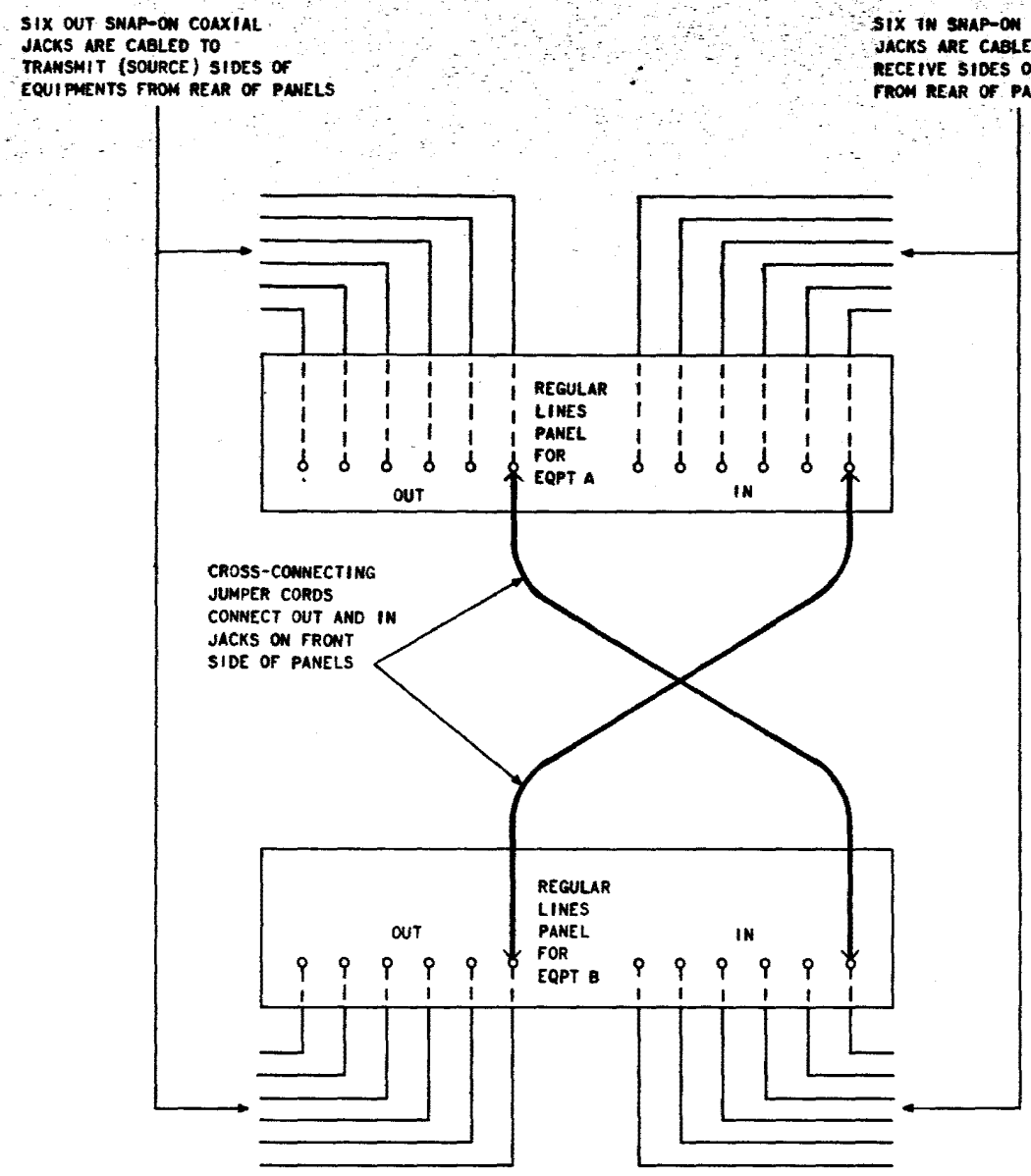
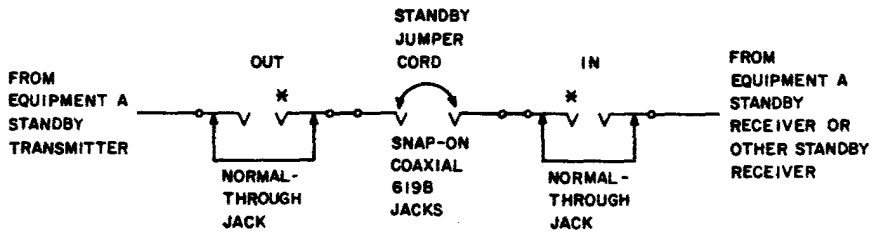


Fig. 3—Typical Arrangement for Regular Lines Cross-Connect Panels (Without LBOs)



* THIS JACK IS NOT ACCESSIBLE (COVERED BY PANEL).

Fig. 4—Simplified Schematic of a Standby Lines Cross-Connect Panel

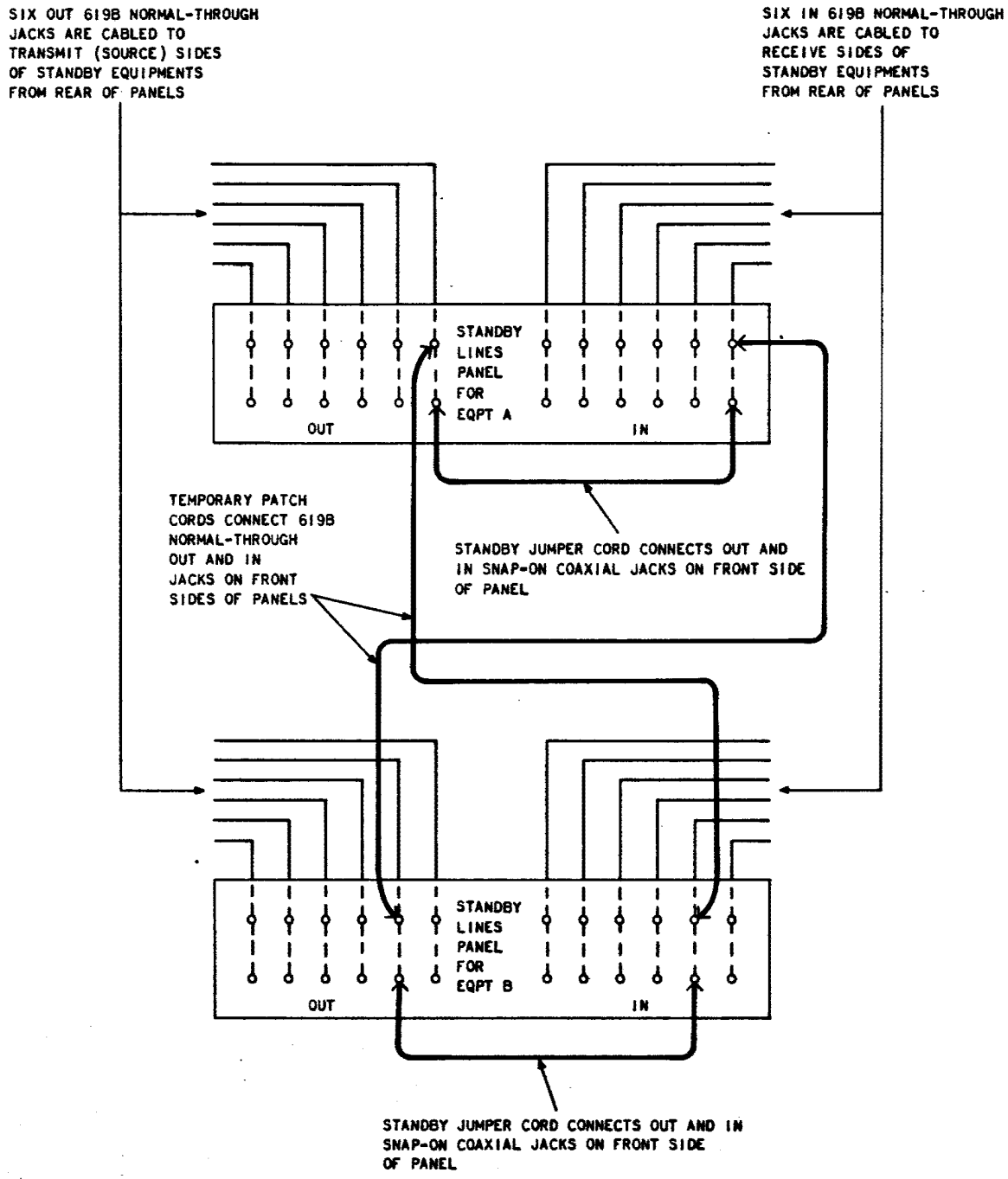


Fig. 5—Typical Arrangement for Standby Lines Cross Connect Panels (Without LBOs)

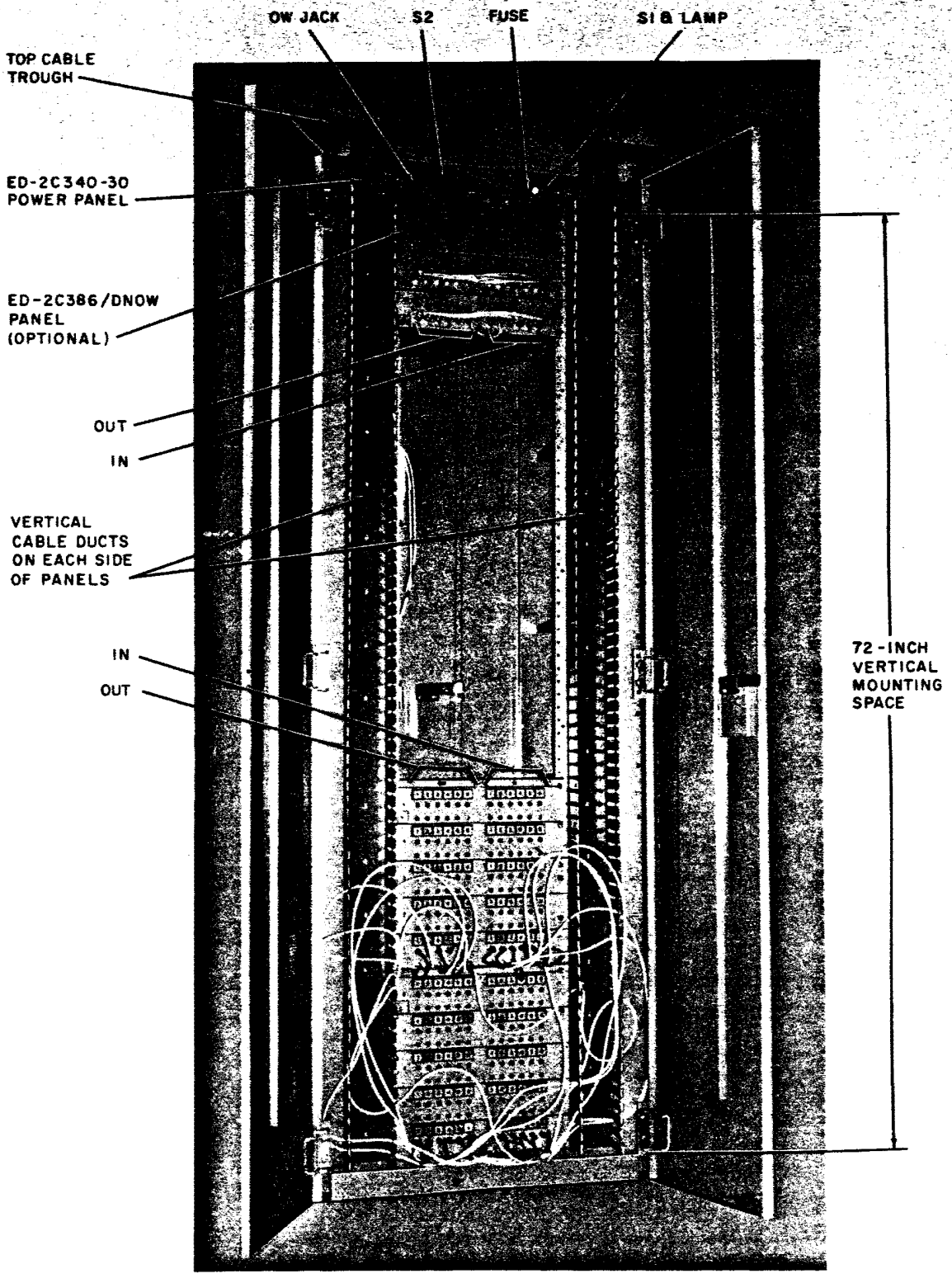


Fig. 6—DSX-3/DSX-4 Cross-Connect Cabinet—Front View

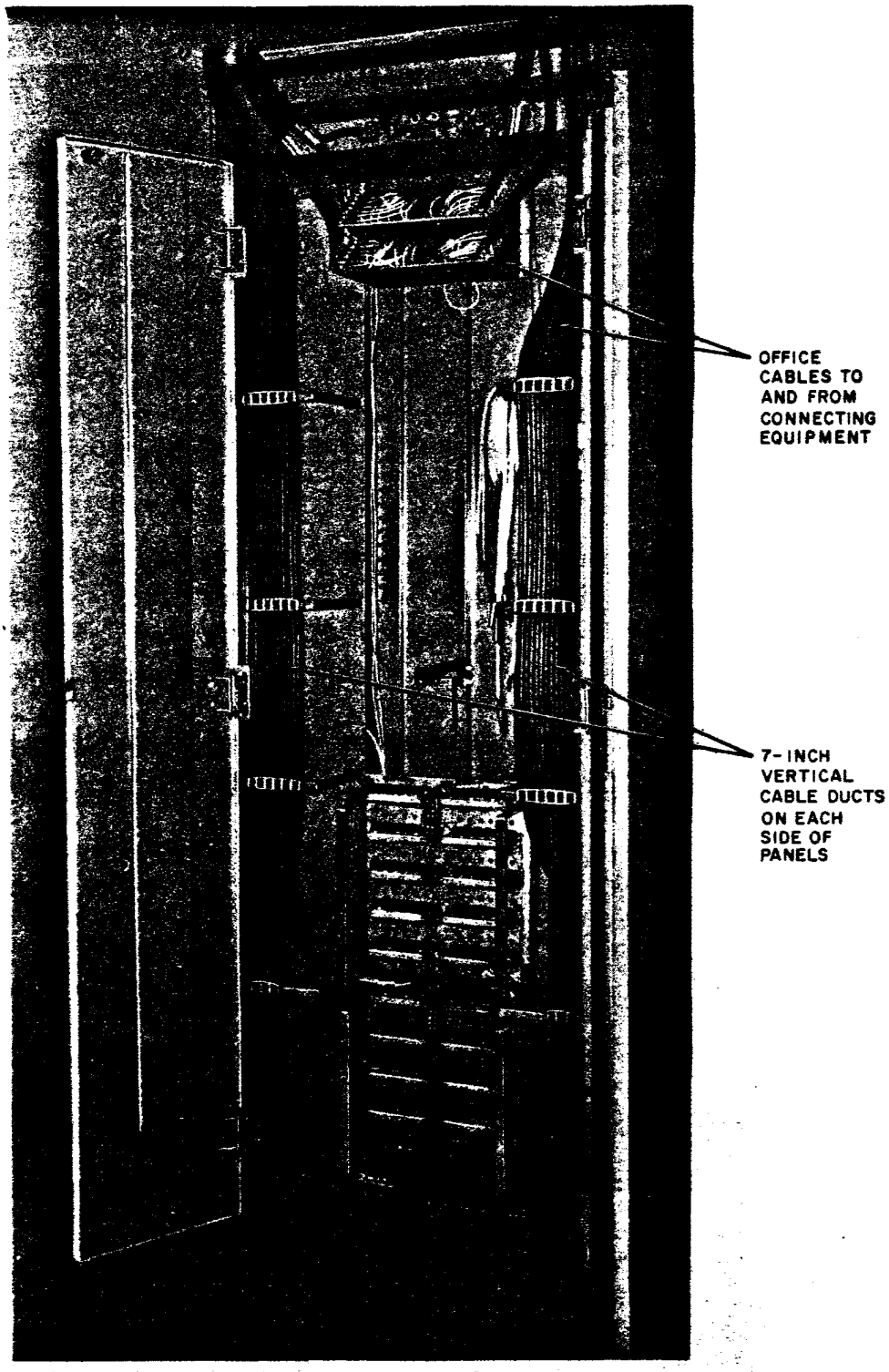


Fig. 7—DSX-3/DSX-4 Cross-Connect Cabinet—Rear View

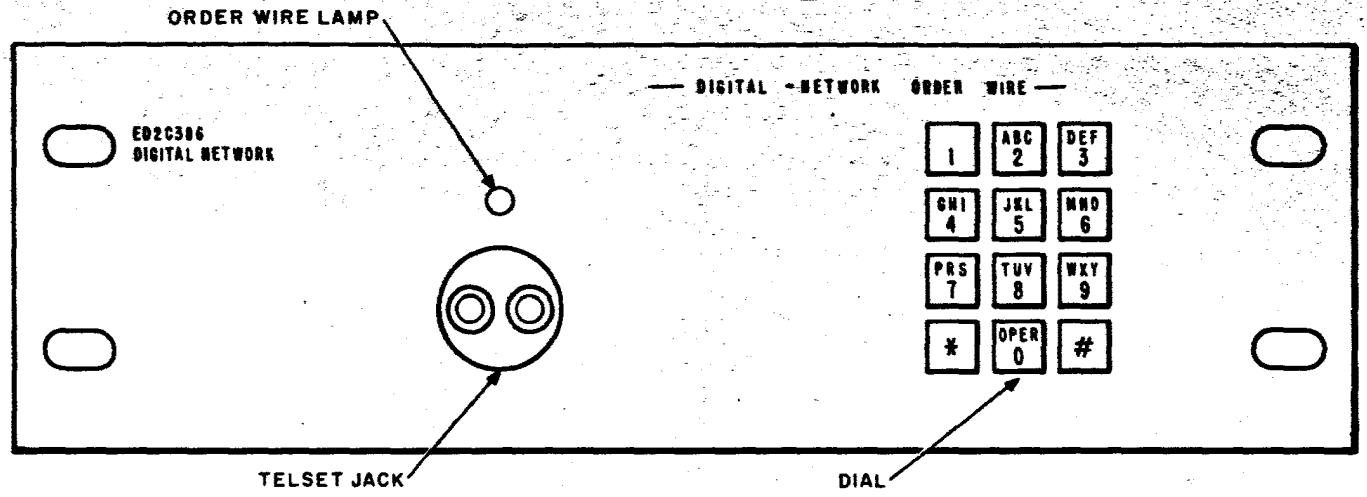


Fig. 8—ED-2C386 Digital Network Order-Wire (DNOW) Panel

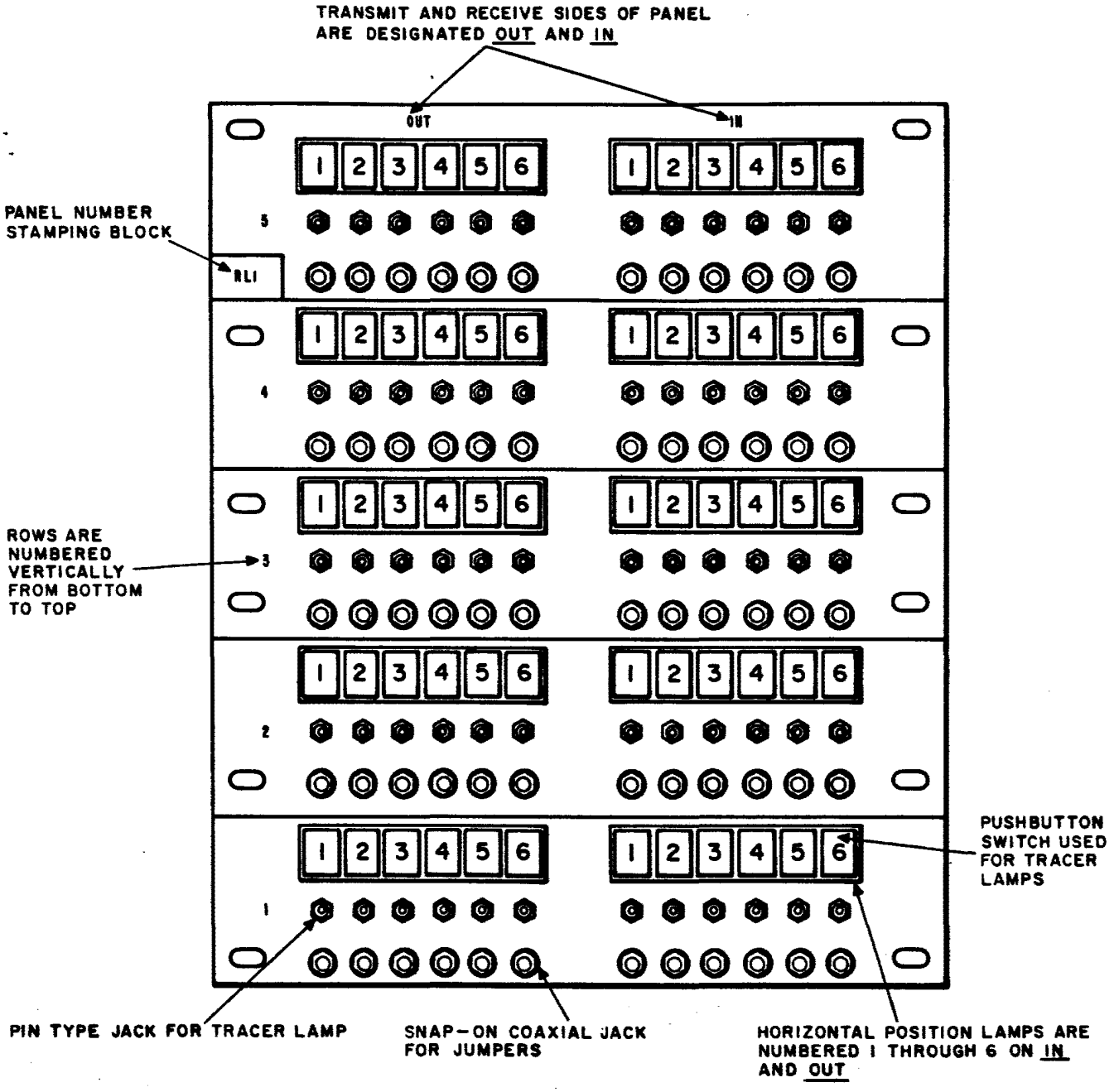


Fig. 9—ED-2C353 Regular Lines Panel

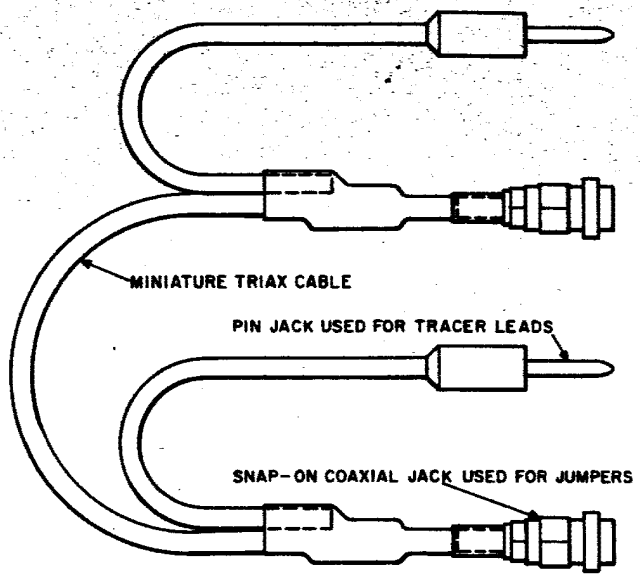


Fig. 10—Cross-Connecting Jumper Cord

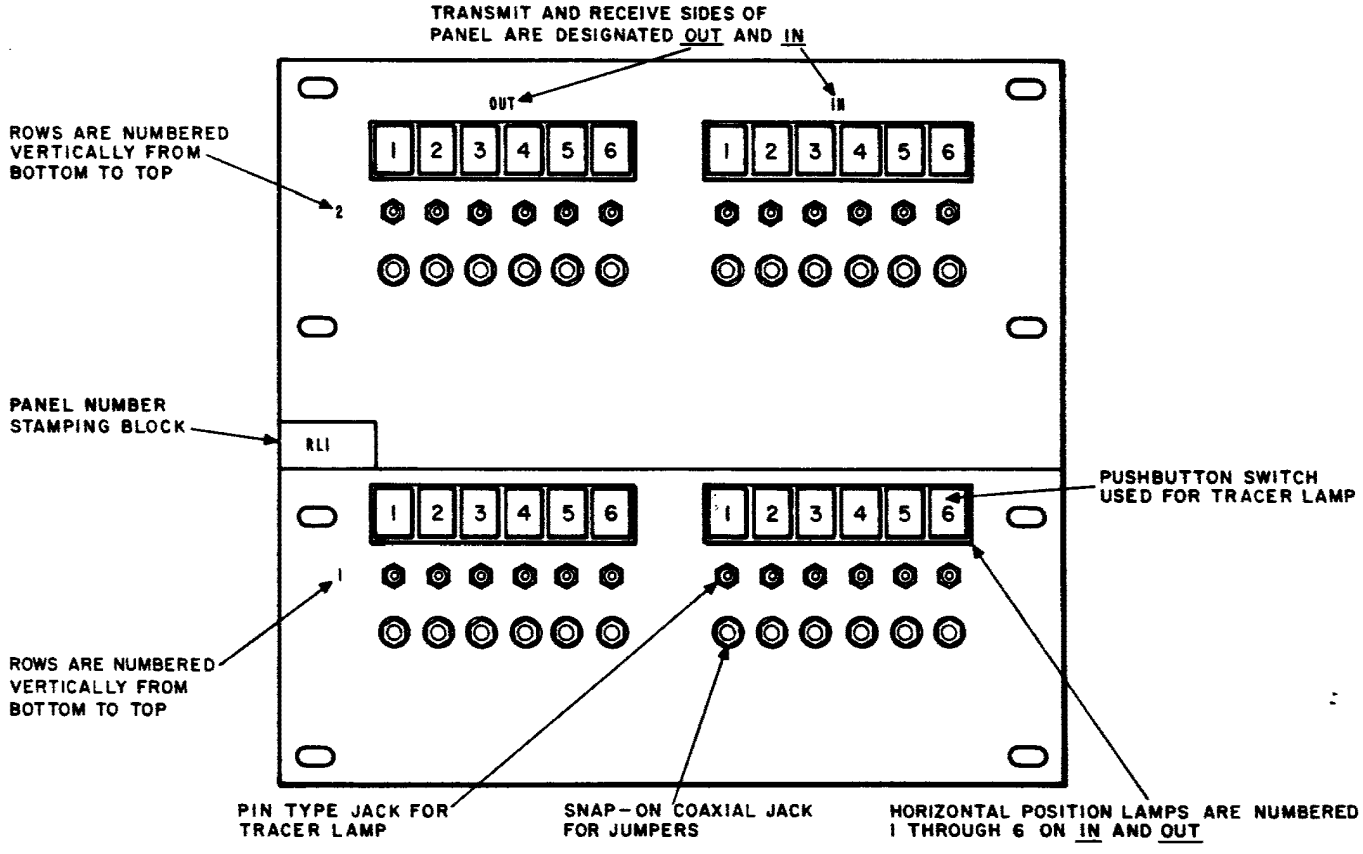


Fig. 11—ED-2C355 Regular Lines Panel (With LBOs)

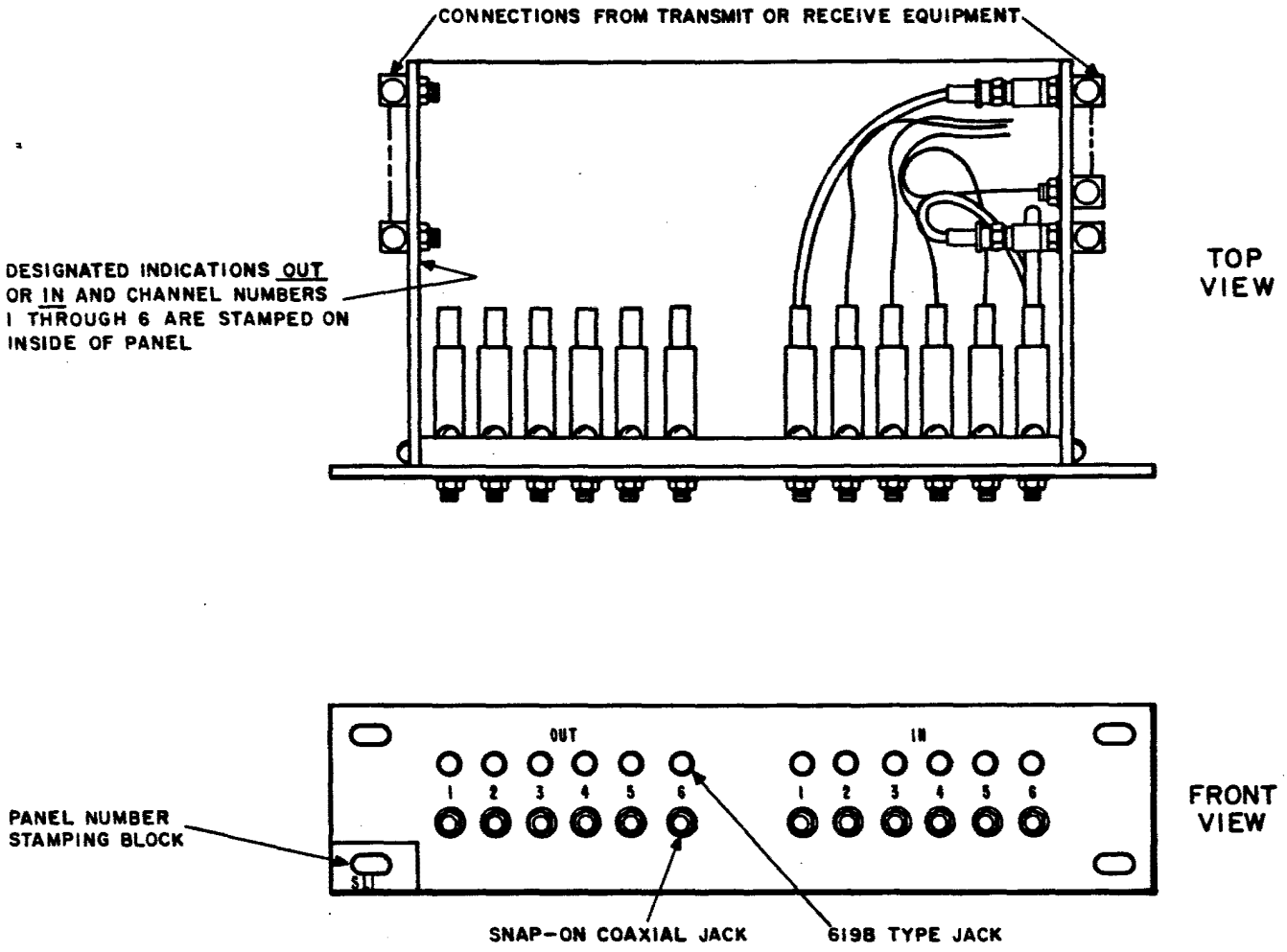


Fig. 12—ED-2C354 Standby Lines Panel

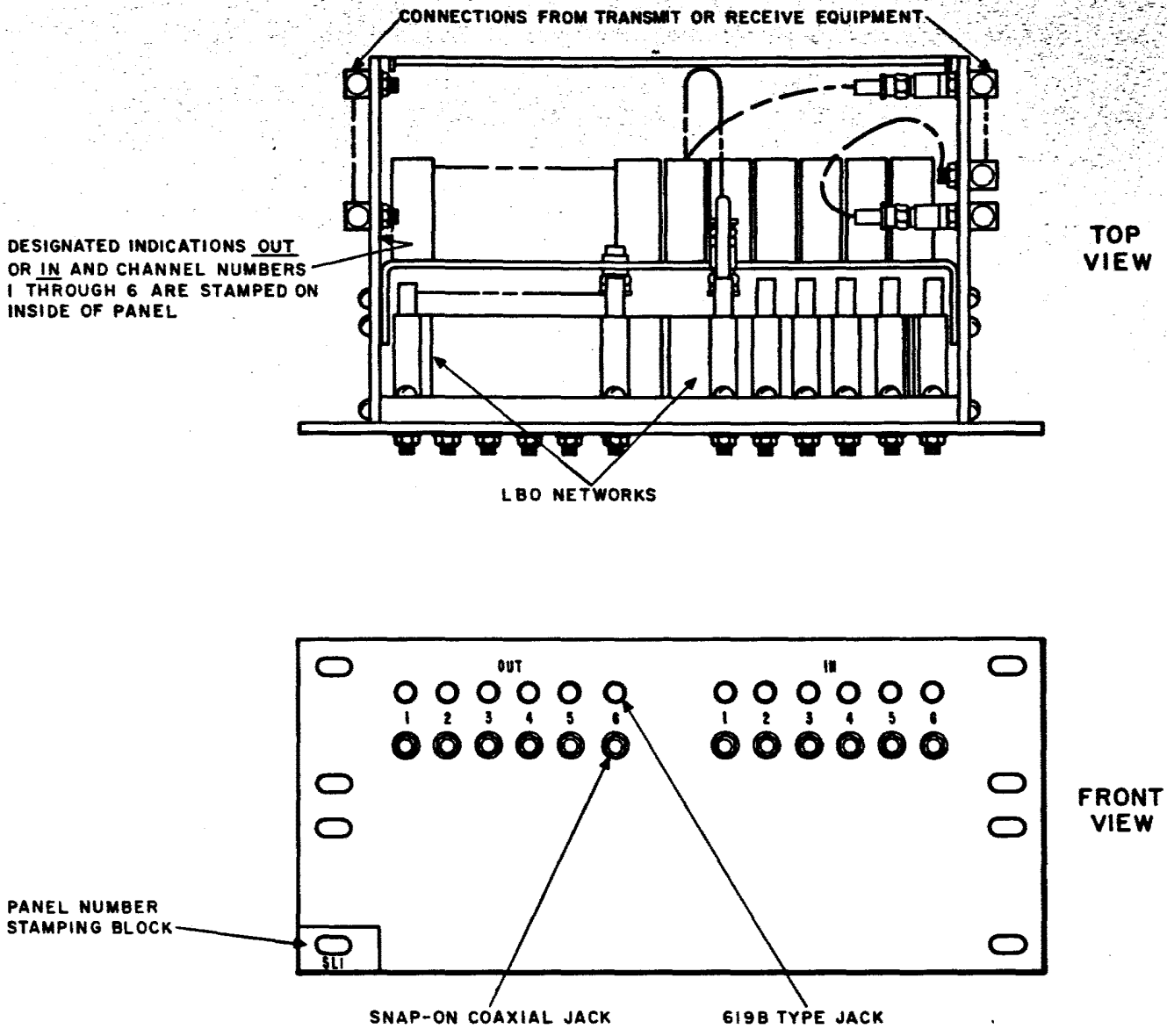


Fig. 13—ED-2C356 Standby Lines Panel (With LBOs)

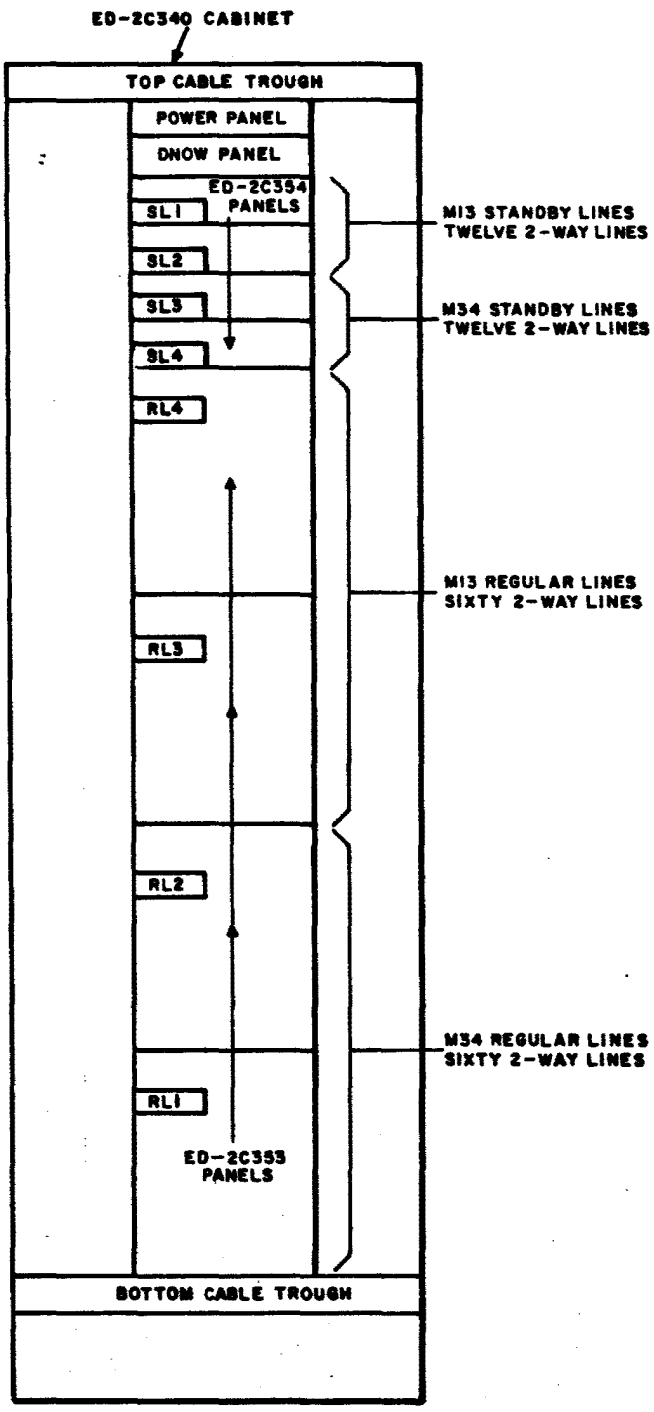


Fig. 14—Typical DSX-3 Panel Grouping

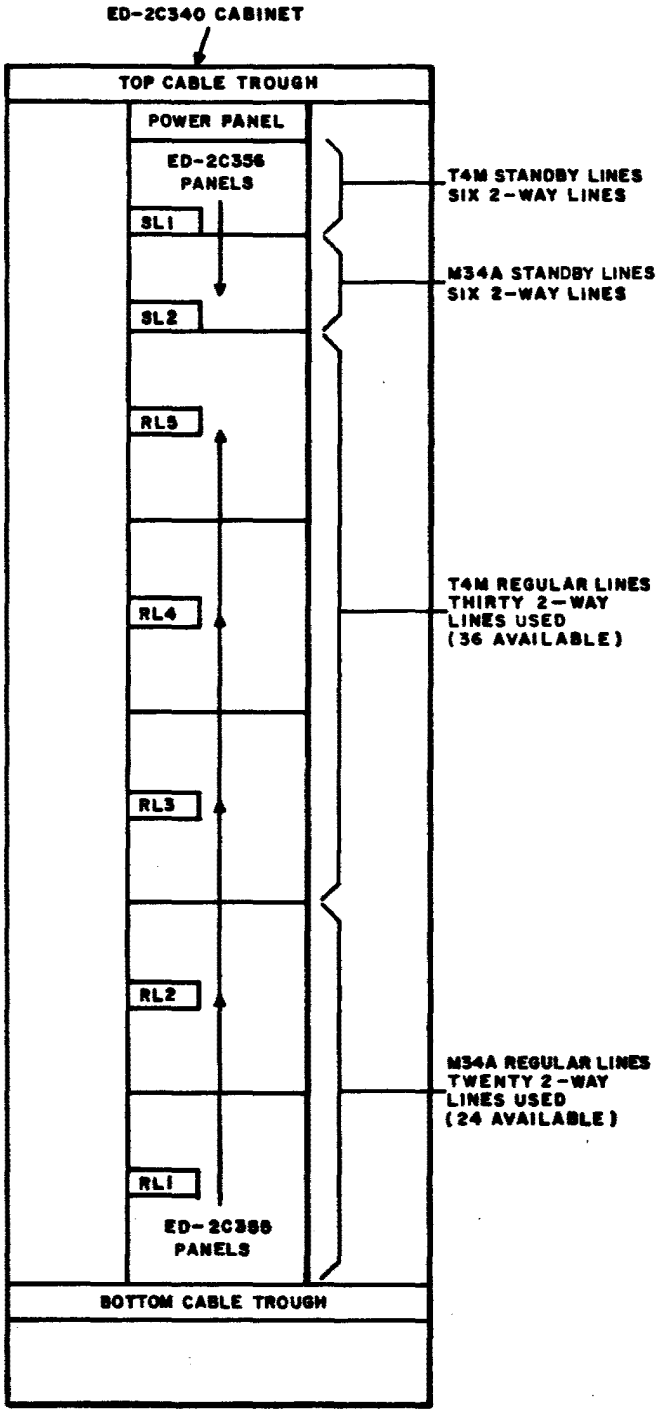


Fig. 15—Typical DSX-4 Panel Grouping for Equipment not Having Built-In LBOs

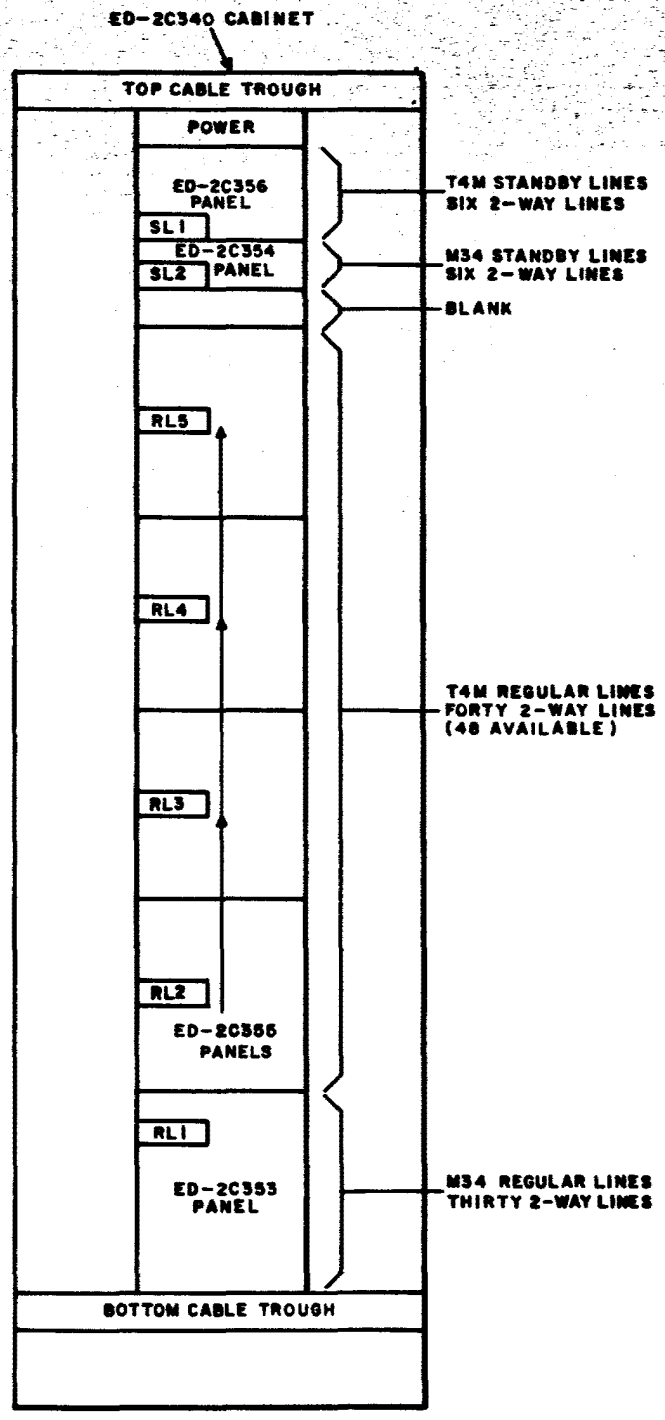
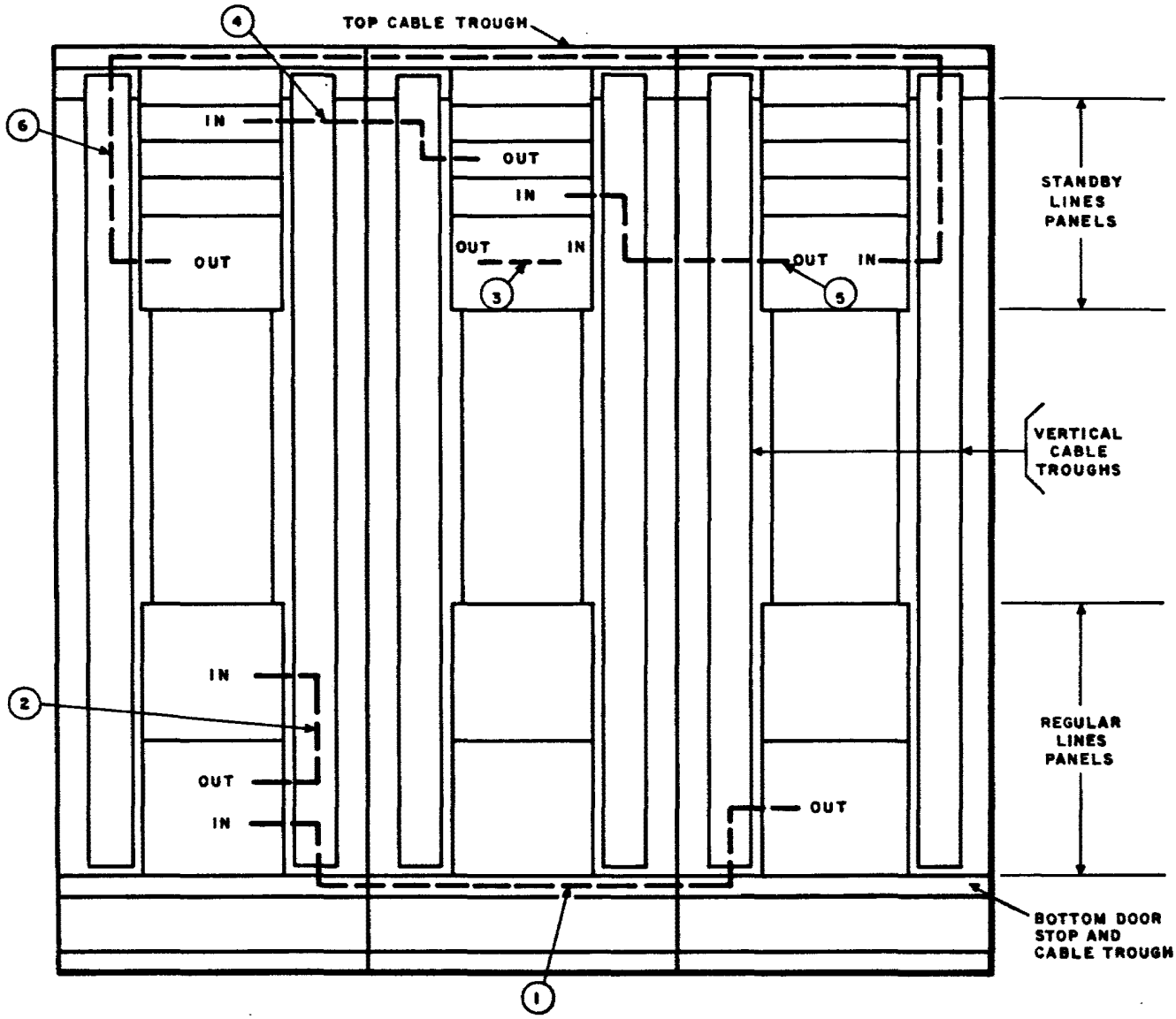
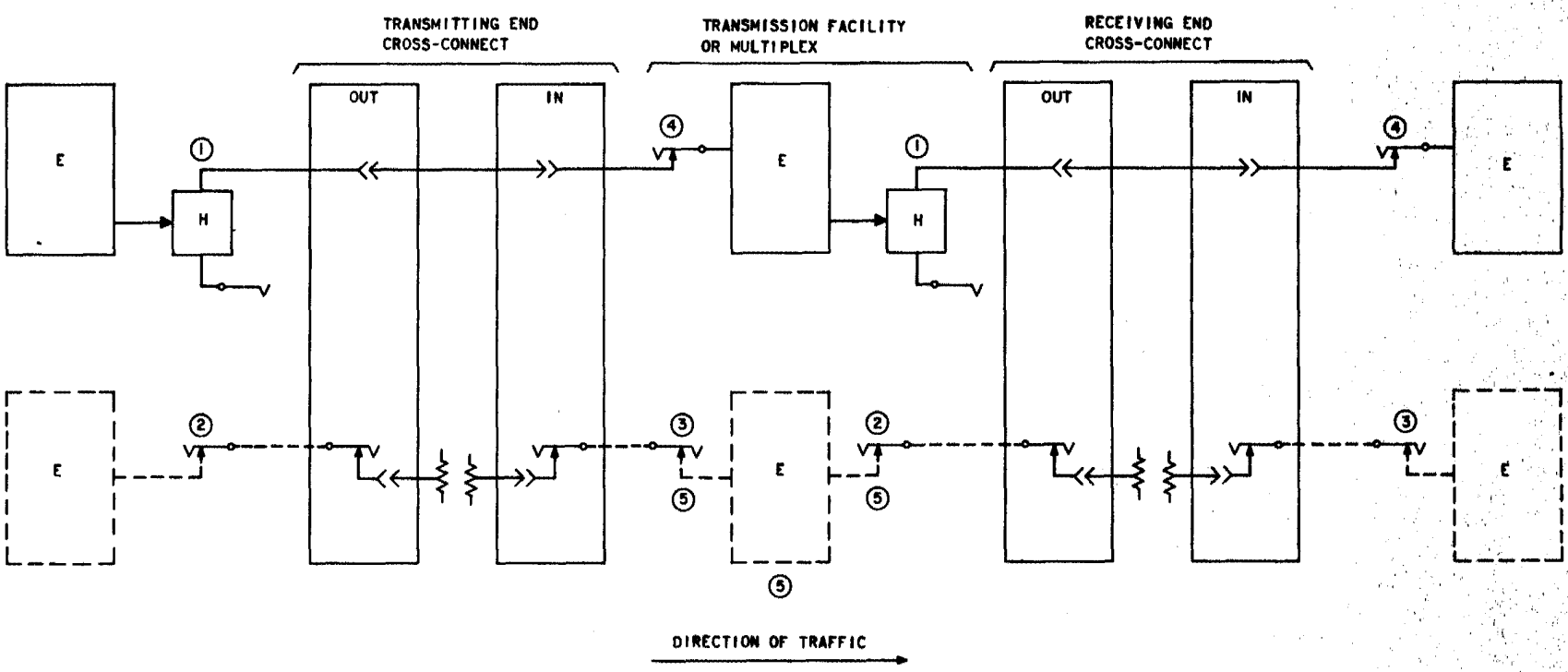


Fig. 16—Typical DSX-4 Panel Grouping for M34 Having Built-In LBOs



CORD NO.	CORD TYPE	ROUTING PATH
1	CROSS-CONNECTING JUMPER	BETWEEN BAYS VIA BOTTOM CABLE TROUGH
2	CROSS-CONNECTING JUMPER	ON SAME BAY VIA VERTICAL CABLE TROUGH
3	STANDBY JUMPER	ON SAME STANDBY PANEL
4	STANDBY JUMPER	BETWEEN ADJOINING BAYS
5	TEMPORARY PATCH	BETWEEN ADJOINING BAYS
6	TEMPORARY PATCH	BETWEEN BAYS VIA TOP CABLE TROUGH

Fig. 17—Typical Acceptable Jumper and Patch Cord Routing Paths, 3-Bay Cross-Connect Configuration



LEGEND:

——— REGULAR SERVICE TRUNKS AND EQUIPMENT

– – – – – STANDBY TRUNKS AND EQUIPMENT

E — EQUIPMENT, EG, A TRANSMISSION FACILITY OR A MULTIPLEX

H — HYBRID (OR EQUIVALENT)

75-OHM TERMINATING PLUG

MINIMUM EQUIPMENT REQUIREMENTS FOR PATCHING

① HEAD-END BRIDGE AT EQUIPMENT OUTPUT

② DUAL FEED TO CROSS-CONNECT

③ DUAL FEED FROM CROSS-CONNECT

④ NORMAL-THROUGH JACK AT EQUIPMENT INPUT

⑤ PARALLEL PATH BETWEEN CROSS-CONNECTS (APPLIES ONLY TO "ROLLING")

Fig. 18—General Schematic of Equipment During Patching Operations

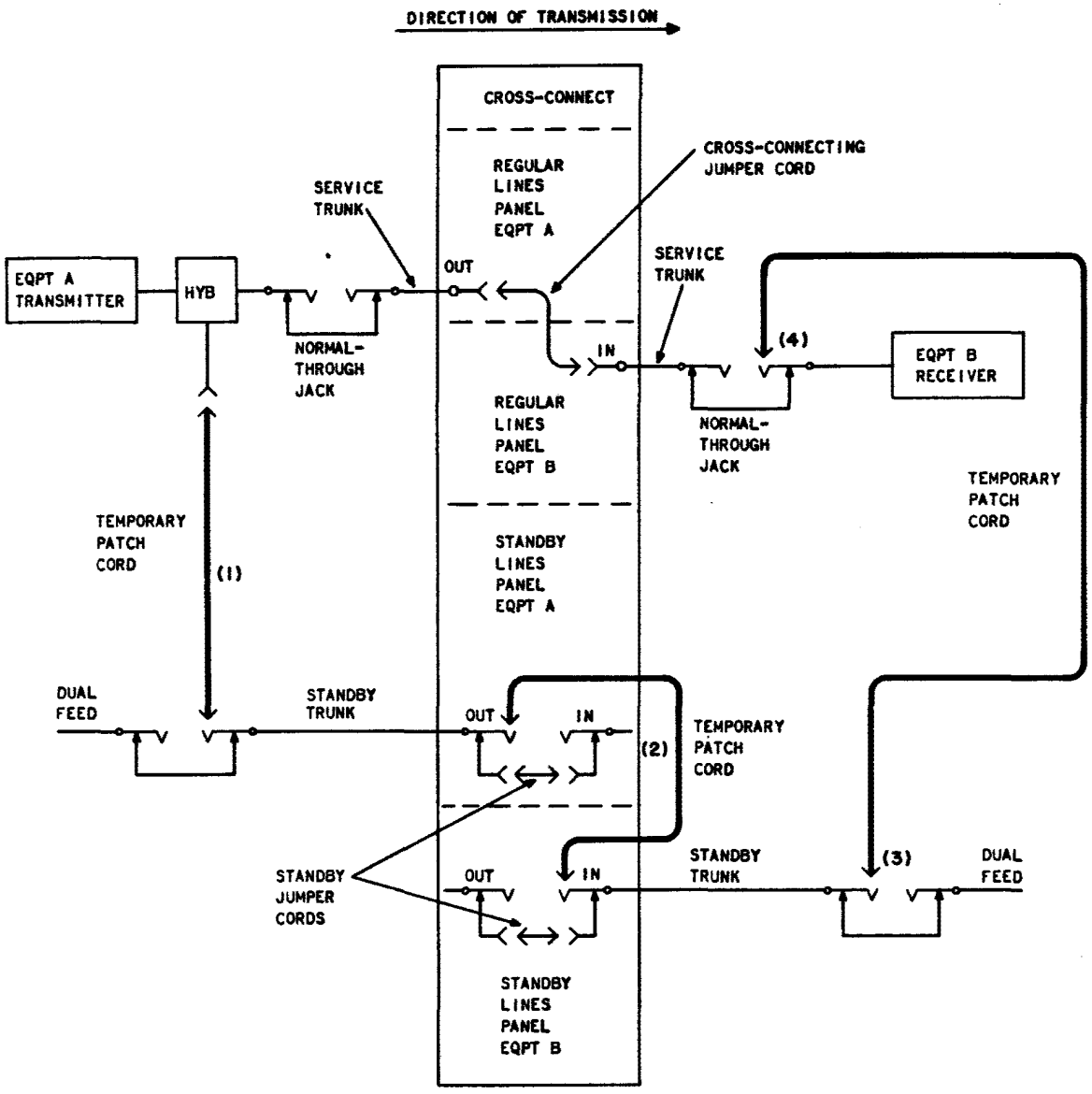


Fig. 19—Patching Operation to Restore Office Cables