

**COMMON SYSTEMS MAIN INTER-CONNECTING FRAME
(COSMIC)
DESCRIPTION**

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- To provide a high density terminal field which when used with the COSMOS administrative program of record keeping maintains a field of *short jumpers* by the use of preferential assignment.

1.03 The object of the COSMIC Frame System is to provide a complete package of hardware and software which will:

- Eliminate or reduce the major engineering limitations of the ESS modular frame through new design
- Establish and maintain a computer aided assignment and record keeping system
- Provide a viable set of engineering methods and programs for planning, implementing, and growth of the COSMIC MDF.
- Retain the desirable operating features of the existing modular frame and introduce additional labor saving methods.

2. MODULAR DISTRIBUTING FRAME

MODULAR FRAMEWORK

2.01 The COSMIC frame, after installation (Fig. 1), consists of modules 5.5 feet wide, 1.5 feet deep and 8 feet high and between each module is a 1.0 foot wide vertical wiring channel. A sketch of the modular arrangement is shown in Fig. 2. Each module contains eleven shelves of connecting blocks and ten horizontal wiring channels. The top and bottom shelves contain ten 50-pair connecting blocks each. The remaining nine shelves contain either ten 100-pair connecting blocks, or some combination of 100-pair and 64-pair blocks. The termination capacity of a module will range from 10,000 to 10,216 pairs depending on equipment and cable layout. Each frame lineup has an upper and lower express trough which runs its entire length and is used for running jumpers between non-adjacent modules.

2.02 A 115-volt AC appliance outlet is mounted in the rear base of the COSMIC frame on every other half-module. The wiring and appliance outlets are enclosed in the base of the frame in an integral sheet metal power conduit.

2.03 The COSMIC frame provides terminal fields (modules) with large capacities (approximately

10,000 pairs each). Each module terminates either outside plant cables or line equipment plus tie cables on the rear of the frame. The outside plant and line equipment modules are alternated down the length of the frame lineup. At present, only half modules of outside plant are used at the end of each frame lineup. Outside plant and line equipment appearances are interconnected by means of jumper wires which are run on the front side of the frame. When assigning a line equipment or tie pair to a cable pair, the initial target zone consists of all the line equipment and tie pairs in either adjacent module. This is called the short jumper assignment universe and may contain up to 20,176 pairs. All jumpers within this universe can be run without using the upper and lower express trough and are therefore called short jumpers. Jumpers which use the upper or lower express trough to connect non-adjacent modules are called long jumpers. The size of the short jumper assignment universe, coupled with the high percentage of short jumper assignments generated by COSMOS or SMFAS, results in limited usage of upper and lower express troughs for long jumpers. This allows them to be used for handling cable throws and line equipment transfers for load balancing. The COSMIC frame design also decreases the percentage of temporary long jumpers used for these contingencies. In addition, the large short jumper universe permits the termination of electromechanical switching equipment without creating express trough congestion. The three control group limitation of the ESS frame is not applicable to the COSMIC frame system. Another advantage is that although cables will be spread over the entire frame length, larger cable complements can be used without adversely affecting the equipment visibility of each cable pair. For loop cables, there is a one-to-one relationship between each 302 connector on the protector frame and a 100-pair block on the loop cable module. The five 302 connectors in each modular protector frame vertical can be cabled to five consecutive 100-pair connecting blocks (half a module shelf in a loop cable module). Identification of the protector frame-main frame loop cable locations is clearly noted on the PACE labels attached to the framework. This allows the frameperson to move from the protector frame pair location to the main frame loop pair location, or vice versa, without consulting a translation guide.

2.04 End Guards: End guards are provided for each end of the protector frame and COSMIC frame lineups. All end guards are 8 feet high.

Fig. 3 illustrates an end guard mounted on a protector frame.

CONNECTING BLOCKS

2.05 The 78C-series connecting blocks are designed specifically for the COSMIC MDF and TPDF framework. New features of the connecting blocks include the following.

- A snap-in feature which allows the blocks to be installed in a matter of seconds. Because of this feature, the blocks can be wired immediately adjacent to the framework (from the front or rear) with the aid of a portable wiring shelf and then snapped into the frame. The installer has excellent visibility and accessibility during wiring. Blocks are shipped separately from the framework. This allows ordering only those blocks initially required. Blocks needed for growth can be ordered and installed in the future as required.
- Angled entrance slots, for the jumper wire, in the fanning strips retards wire movement out of the fanning strip to protect against torsional fatigue and wire breakage.
- The fanning strips are color coded to denote the connecting block function as follows:
 - (a) Blue—Loop Pairs
 - (b) White—Tie Pairs
 - (c) Ocher yellow—ESS
 - (d) Green—Crossbar
 - (e) Orange—Step-by-Step

The fanning strips are hot-stamped at the factory to eliminate all field stenciling and associated maintenance.

- The terminal fields are color coded in a red checkerboard pattern to eliminate parallax problems and facilitate terminal pair identification.

2.06 Three sizes of connecting blocks are provided for the COSMIC frame as follows:

- One hundred pair blocks (4 paired rows by 25 columns, Fig. 4) for loop cables, electromechanical switching equipment, and tie pair requirements
- Sixty-four pair blocks (4 paired rows by 16 columns, Fig. 5) for ESS requirements
- Fifty pair blocks (2 paired rows by 25 columns, Fig. 6) for the top and bottom "half shelves" of each module for loop cable and/or tie pairs.

2.07 Fig. 7 illustrates the fanning strip codes and formats. A detailed description of each connecting block is as follows.

- (a) 78C1A-50 (50-pair, tie cable termination block). This block is equipped with 100 twin-clip connectors arranged in 25 columns with four clips in each column. The two fanning strips are color coded white, indicating that tie cable is terminated on the rear face. This block provides cross-connection capacity for 50 pairs in normal use and 100 pairs when fully bridge tapped. Up to ten of these blocks may be installed on each of shelves 1 and 11 of the COSMIC frame.
- (b) 78C1B-50 (50-pair block for loop cable pairs). This block is identical to the 78C1A-50 connecting block except the fanning strips are color coded blue, indicating that loop cable pairs (outside plant) are terminated on the block. Up to ten of these blocks may be installed on each of shelves 1 and 11 of the COSMIC frame.
- (c) 78C1A-100 (100-pair tie cable block). This block is equipped with 200 twin-clip connectors arranged in 25 columns with eight clips in each column. The fanning strips are color coded white, indicating that tie cable pairs are terminated on the block. This block provides a cross-connection capacity of 100 pairs in normal use and 200 pairs when fully bridge tapped. Up to ten such blocks may be installed on shelves 2 through 10 of the COSMIC frame.
- (d) 78C1B-100 (100-pair block for loop cable pairs). This block is identical to the 78C1A-100 except the fanning strips are color coded blue,

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indicating that loop cable pairs (outside plant) are terminated on the block.

(e) 78C1C-100 (100-pair step-by-step connecting block). This block is identical to the 78C1A-100 except the fanning strips are color coded orange, indicating that step-by-step line equipment cable is terminated on the block.

(f) 78C1D-100 (100-pair No. 1 crossbar line equipment). This block is similar to the 78C1A-100 except the fanning strips are color coded green, indicating that crossbar line equipment cable is terminated on the block.

(g) 78C2A-100 (100-pair No. 5 crossbar line equipment). This block is similar to the 78C1A-100 except the fanning strips are color coded green, indicating that No. 5 crossbar line equipment cable is terminated on the block. In addition, the number patterns on the side faces of the fanning strip (with the smaller characters) differs from a 78CID-100 block due to the unique numbering scheme used for No. 5 crossbar.

(h) 78C1A-64 (64-pair No. 1 ESS connecting block—4:1 LCR). This block is equipped with 128 twin-clip connectors arranged in 16 columns with eight clips in each column. The fanning strips are color coded ocher yellow, indicating that ESS line equipment cable is terminated on the block. The numbering pattern on the side faces of the fanning strip with smaller red characters is suitable only with ESS equipment having a 4:1 line concentration ratio (LCR). Up to sixteen 64-pair blocks may be installed on shelves 2 through 10 of the COSMIC frame.

(i) 78C2A-64 (64-pair No. 1 ESS connecting block—2:1 LCR). The fanning strips are also color coded ocher yellow, indicating that the ESS line equipment cable is terminated on the block. The numbers located on the side faces of the fanning strips (with smaller characters) aid in locating the ESS equipment having a 2:1 LCR.

2.08 Designations: Designation card holders are mounted at the top center of the front of each module. A numbered card is inserted into each card holder to number each module. Numbering depends on the lineup and floor plan of the COSMIC frame. A computer-generated label with an adhesive

back is attached to each wire retainer bar to identify the cable, equipment, or tie pair locations on the COSMIC frame and related locations on the protector frame vertical or TMDF vertical. The computer labels are covered with a clear plastic snap-on guard for protection. The computer generated label identifies the shelf number, side, block number, cable number, count, and associated protector frame connectors or equipment description.

2.09 A framework filler panel is used to cover openings in the COSMIC frame where connecting blocks are to be installed at a later date, or to fill unused openings in the frame. Two sizes of framework filler panels are available; a wide size (4-1/2 inches) for shelves 2 through 10 and a narrower one (3-1/4 inches) for shelves 1 and 11. All framework filler panels are approximately 32 inches long and are made of thin plastic with top and bottom lips for *snap-in* installation. Both sizes may be cut to the desired length with scissors. These panels are available in blue for loop cable modules, ocher yellow for switching equipment modules, and white for shelves 1 and 11 on all modules.

PROTECTOR FRAME (PF)

2.10 The protector frame used with the COSMIC framework (ED-1A220-31 group 4) is the modular low height ESS protector frame (Fig. 3). Each protector frame module is 6 1/2 feet long, 8 feet high and consists of 12 verticals. Each vertical accommodates five 302-type connectors with a capacity of 100 pairs each for a total of 500 pairs per vertical or 6000 pairs per module. Cable pairs are terminated on wire-wrap terminals at the rear of the 302-type connectors. Each protector frame module is to be equipped with a KS-21315 L2 or L3 transmitter test panel, a KS-21315 L4 or L5 test/talk panel, and a KS-20100 L1 protector unit test set. The type of test/talk panels and test panels used on each module is explained in 2.12 through 2.28. The COSMIC System uses the 3A-, 4A-, or 5A-type protectors inserted in the 302-type connectors.

TIE-PAIR DISTRIBUTING FRAME (TPDF)

2.11 The COSMIC Frame System may or may not require the use of a TPDF. For most small wire centers of 25,000 loop cable pairs (ultimate) or less, a single COSMIC lineup is adequate. If additional special service frames or

toll IDFs are needed in the wire center, tie pairs may be provided directly from the COSMIC frame to the additional frames. All tie cables and equipments are spread along the entire length of the COSMIC frame. More than 25,000 loop cable pairs using a single lineup or more than one lineup of COSMIC frames requires the use of a TPDF. TPDF framework is identical to the COSMIC framework and in accordance with the color code schemes of the connecting block functions discussed in 2.05, all TPDF connecting blocks are coded white.

TEST/TALK SYSTEM (T/TS)

2.12 The COSMIC T/TS was designed with the dual objectives of systemizing wire center communication needs and making noise levels in COSMIC frame areas as low as possible. It is a multi-channel communications system with complete channel availability at all areas of the COSMIC frame and its associated modular protector frame. Noise levels are kept low through the use of headsets for communications. Since the frameperson needs only a few tools for the COSMIC frame, the headset is not expected to be a burden. The Test/Talk System uses the following components:

- (a) COSMIC Communications Panel KS-21316 L1
- (b) COSMIC Communications Panel KS-21316 L2
- (c) COSMIC Test Panel KS-21317 L2
- (d) COSMIC Transmitter Panel KS-21318
- (e) COSMIC Transmitter/Test Panel KS-21315 L2
- (f) COSMIC Transmitter/Test Panel KS-21315 L3
- (g) COSMIC Protector Frame Test/Talk Panel KS-21315 L4
- (h) COSMIC Protector Frame Test/Talk Panel KS-21315 L5
- (i) COSMIC Double-Sided Protector Frame Transmitter Test/Talk Panel KS-21393 L1
- (j) COSMIC Double Sided Protector Frame Transmitter Test/Talk Panel KS-21393 L2

- (k) COSMIC Speaker Box Assembly KS-21347 L1 and L2

2.13 Figures 8 through 17 show the T/TS panels. Miniature jacks are employed to provide the needed channel capacity. The COSMIC panels (a), (b), (c), and (d) previously listed require the same amount of space as a 64-pair (78C1A-64 or 78C2A-64) connecting block and mount on the line equipment modules. The panels (e) through (h) are mounted as specified in the center panel space or the upper panel space on the extreme right side of the single-sided protector frame module.

2.14 A monitoring insert assembly KS-21315 L6 (Fig. 18) is used with the KS-21315-L5 jack and lamp panel for future growth of talk channels. Each assembly contains three fully equipped channels.

2.15 An insert assembly, KS-21315-L7 is also available for mounting test trunks requiring lamp appearances, but does not come equipped with jacks or lamps. These must be ordered separately and reflect the appropriate contact arrangement required for the specific circuit involved. Available parts or assemblies are:

- KS-21463 (2-conductor) and KS-21463 (3-conductor) miniature telephone jacks.
- 534A light emitting diodes used in conjunction with a KS-20762-L3 lamp jack equipped with a KS-13491-L2 (4700-ohm, 1 watt) resistor.
- KS-20761-L2 lamp jack without the resistor so that the proper resistor may be used with the light emitting diode, depending on supply voltage.
- KS-20761-L1 lamp jack uses incandescent lamps number 7381 (6.3-volt, 200-ma) rated 50K hours or number 7387 (24-volt, 40-ma) rated 25K hours.
- Lamp caps KS-20790-L1 (red), L2 (green), L3 (white), and L4 (black) to be used with incandescent lamps.

2.16 Some early installations used the KS-21315 L1 protector frame test talk panel (Fig. 19). This panel is manufacture discontinued.

2.17 Communications needs are served by 12 or 20 telephone circuits (supplied through

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miniature jack pairs) on the COSMIC communications panel and the PF test-talk panels. The telephone jacks are wired to provide the following communications services: RSB, LP, intra-frame, and inter-COSMIC. Thus, all communications needs are provided at the frames where the testing functions must be performed. Because of the panel spread, all channels are available throughout the frame system. The allocation of channels to the four functions previously mentioned depends on individual wire center needs.

2.18 The COSMIC test panel KS-21317 L2 (Fig. 10) provides test battery and ground as well as six telephone and six spare jacks. The TEL and SP circuits provide a talk and test link from the COSMIC Frame System to equipment frames. The PF transmitter/test panels provide the COSMIC test panel functions in the PF area.

2.19 The COSMIC T/TS transmitter panel KS-21318 (Fig. 11) contains a transmitter, transmit button, and call lamp. This panel mounts on the COSMIC MDF and TPDF in the space required for a 64-pair connecting block. This panel is used to alert frame personnel via the MDF loudspeakers.

2.20 The KS-21315 L2 (Fig. 12) contains a talk transmitter, transmit button, call lamp, TEL and SP jacks, test battery, ground points, and power line fuses. This transmitter/test panel is mounted on the even numbered modules of the COSMIC protector frame.

2.21 The KS-21315 L3 (Fig. 13) is identical to the KS-21315 L2 transmitter/test panel but does not contain the transmitter, transmit button, or call lamp. The mounting holes for the call lamp and transmit button are covered with hole plugs. The LTD transmitter and associated lamp and call button may be added later if desired. This transmitter/test panel is mounted on the odd-numbered modules of the COSMIC protector frame.

2.22 The KS-21315 L4 protector frame test/talk panel (Fig. 14) contains 15 jack mounting strips with a total capacity of 75 channel locations. Three of these channel locations are blocked with hole plugs and should not be used due to interference with framework details on the rear of the frame. In addition, 20 channel positions come equipped with miniature jacks and represent multiples of the talk channels on the COSMIC frame when

lamp monitors are not required. The remaining 52 channel locations may be used for additional talk channels or miscellaneous test trunk appearances. Any test trunk appearance requiring a lamp (i.e. Auto Varley) requires an alternate KS-21315 L7 mounting strip (Fig. 18) which has a capacity of three channel locations. These jack mounting strips replace existing strips in the panel. The appropriate miniature jacks required for the individual circuits are ordered separately along with one 534A LED, and one KS-20761 L3 lamp jack (comes equipped with one KS-13491 L2 4700-ohm, 1-watt resistor) per channel appearance. The LEDs should be powered from the 48-volt source with no more than 80 LEDs in a multiple. The KS-21315 L4 panel is used in conjunction with the KS-21316 L1 COSMIC TTS communications panel.

2.23 The KS-21315 L5 protector frame test/talk panel (Fig. 15) is similar to the KS-21315 L4 panel and is an alternate for that panel. The panel contains 15 jack mounting strips with a total capacity of 67 channel locations. As in KS-21315 L4, three channel locations are blocked and should not be used. The remaining 64 channels may be used for additional talk or test trunk appearances. Test trunks requiring lamps are handled in the same fashion as on the KS-21315 L4 panel. The KS-21315 L5 panel is used in conjunction with the KS-21316 L2 COSMIC communications panel.

2.24 The transmitter test/talk panel KS-21393 L1 (Fig. 16) is mounted between the verticals of the double sided protector frame. This test/talk panel contains a transmitter, call lamp, transmit button, 20 communication channels, TEL and SP miniature jacks, test battery and ground points, and power line fuses. The 60D headset is used with this panel. This panel is mounted on every tenth vertical starting with vertical 5 on a double-sided protector frame when light monitoring is not required.

2.25 The KS-21393 L2 transmitter test/talk panel (Fig. 17) is identical to the KS-21393 L1 except this panel contains 12 communication channels with light monitors. The KS-21393 L2 is also mounted on every tenth vertical starting with vertical 5 on the double-sided protector frame when light monitoring is required. The 60D headset is used with this panel.

2.26 The KS-21347 L1 or L2 COSMIC speaker box assembly, Fig. 20, consists of a speaker

mounted in a metal enclosure 6-inches by 5-inches by 4-inches deep. The KS-21347 L2 is identical except for the addition of a potentiometer to control volume. COSMIC loudspeakers are mounted on the COSMIC frame superstructure at approximately 10-foot intervals along the MDF, PF, and TPDF. The number of loudspeakers required depends on the lineup configuration and size of the wire center. The speaker box mounts to framing bars with the frame clips (Fig. 20) which come with the assembly.

2.27 RSB testing is initiated through paging a frameperson over loudspeakers to a specified channel and area of the PF or COSMIC frame. If a frameperson cannot immediately reply, the RSB can be alerted through the use of one of the transmitters. The frameperson answers RSB calls by plugging the headset into the proper channel in the requested area of the frame. From that point on, all communication associated with the testing operation is private. Channel occupancy is indicated at the RSB by lights at the LTDs.

2.28 A KS-21396 jack mounting (Fig. 21) which is mounted on conventional main distribution frames is available. This jack mounting, which utilizes full size jacks, is used to communicate between a COSMIC frame and conventional main distributing frames in offices which utilize both types of framework. Three channels are available for use with the 60B headset (large plug). These devices clamp on the cable side fanning strip of conventional frame terminal strips.

2.29 The KS-21395 L1 and L2 jack mountings (Fig. 22) are similar to and provide the same function as the KS-21396 jack mounting. Each of these units, however, has five miniature jack channels. The KS-21395 L1 has a lamp monitor for each channel. The L2 does not have lamp monitors. These units are compatible with the 60D headset and clamp to the cable side fanning strip of conventional frame terminal strips.

3. TEST/TALK SYSTEM CIRCUITS

A. Local Frame Talk Line

3.01 The Local Frame Talk Line is used for intra-COSMIC communications at the COSMIC frame and the COSMIC protection frame. A wiring option provides for lamp indicators to show channel occupancy.

3.02 The Local Frame Talk Line Unit can provide three talk-line circuits; it is equipped with one talk-line circuit. The unit consists of capacitors, relays, and repeating coils mounted on one 2- by 23-inch mounting plate. Each List 2 (maximum) provides an additional talk line circuit.

B. Inter-Frame Loudspeaker and Talk Line

3.03 The Inter-Frame Loudspeaker and Talk Line is normally connected between the COSMIC frame and a conventional MDF. When a headset is connected at one frame, a paging connection is established to the other frame. A response can then be made at the other frame by using a headset. After the answer has been received, the paging connection is disconnected and replaced by a private talk channel. Up to three private channels may be provided in addition to the inter-frame loudspeaker. An option that provides for channel-occupancy indicator lamps may be provided.

3.04 The Inter-Frame Loudspeaker and Talk Line circuit consists of the following two units:

- **Amplifier and Control Unit**—This unit consists of a KS-19221-L2 amplifier, a KS-13790-L29 potentiometer, a transformer, and relays mounted on a 2- by 23-inch mounting plate. When the signaling circuit MS lead requires contact protection as determined by the ringing plant, L-2 of the unit is used.
- **Inter-Frame Talk Line Unit**—This unit is used between the COSMIC frame system and an MDF. It consists of an induction coil, capacitors, and relays mounted on a 2- by 23-inch mounting plate.

C. Local Test Desk (LTD) Frame Talk Line

3.05 The Local Test Desk Frame Talk Line is the communications link between the COSMIC frame and the LTD. Operation of the assigned key at the LTD establishes a connection to the COSMIC frame. The indicator lamp (optional) at the frame flashes a signal to the frame personnel. Where indicator lamps are not provided, initial contact with frame personnel is established by the conventional loudspeaker. When the connection is established with the headset, the indicator lamps stop flashing.

3.06 Frame personnel may call the LTD operator by connecting a headset to the assigned trunk-talk jack, which in turn causes the lamp at the LTD to flash. When the LTD key is used, the lamp stops flashing and the talking path is established.

3.07 The LTD Frame Talk Line consists of three units:

- ***The LTD to Frame, Short-Loop Talk Line***— This unit consists of an induction coil, capacitors, and relays mounted on one 2- by 23-inch mounting plate. When the signal circuit MS lead requires contact protection, which is determined by the type of ringing plant, L-2 of this unit is used.
- ***The Long-Loop Talk Line Unit for the LTD end***—This unit provides connections for two talk lines and is equipped for one talk line. L-2 provides an additional talk line, and L-3 provides contact protection for the signaling-circuit MS lead. The unit consists of capacitors and relays mounted on one 2- by 23-inch mounting plate.
- ***The Long-Loop Talk Line Unit for the COSMIC frame end***—This unit consists of capacitors and relays mounted on one 2- by 23-inch mounting plate. When the signaling-circuit MS lead requires contact protection, L2 of this unit is used.

D. Frame Maintenance Telephone Line

3.08 The Frame Maintenance Telephone Line is used to extend by telephone lines to the COSMIC frame. Incoming calls flash the lamps at key telephone and at the COSMIC frame (wiring option). The call can be answered by connecting a headset to the assigned jack. When the call is answered, the lamps stop flashing.

3.09 The maintenance telephone line unit provides connections for two talk lines and is equipped with one talk line. List 2 provides an additional talk line. The unit consists of an induction coil, relays, a transformer, a capacitor, and printed wiring boards mounted on a 2- by 23-inch mounting plate.

4. MODIFIED CIRCUITS

A. MDF Loudspeaker Circuits

4.01 The MDF loudspeaker circuit and the remote testing loudspeaker circuit have been modified for use in the COSMIC frame area. Both of these circuits provide two-way loudspeaker communication between the LTD and the COSMIC frame. New loudspeakers have also been added as needed.

B. Test Circuits

4.02 Test circuits patched to lines at the protector frame have been modified to provide new patch cords and jacks at the COSMIC protector frame. These test circuits are test "shoes," wheatstone bridge trunks, and intermittent trouble trunks. The access jacks are mounted in the COSMIC protector frame jack panel (KS-21315-L4 or L5) where jack mounting inserts are available.

C. Talk and Miscellaneous Circuits

4.03 Headphone communication between frame personnel and central office maintenance personnel is provided by telephone jacks at both the COSMIC and protector frames. These jacks are wired to the frame talk line or to miscellaneous circuits in the central office served by the COSMIC frame. The COSMIC frame system has six telephone jack pairs that are multiplied in the frame lineup. Similarly, six 3-conductor spare jacks are provided for connection to the spare jack multiple in the central offices. Each switching entity within an office should have its own telephone and spare circuit.

5. CORDS AND ADAPTERS

A. KS-21386 L1 Miniature Plug Adapter (Fig. 23)

5.01 A KS-21386 L1 miniature plug adapter is used on the COSMIC MDF and protector frames. The adapter allows frame personnel to plug in headsets (or 4-conductor test cords such as the W4CL or W2FM) that are equipped with the large size plug ends into miniature jacks.

B. KS-21387 Test Set Patch Cord (Fig. 24)

5.02 A KS-21387 3-conductor test set patch cord is used on the COSMIC MDF and protector frames. This adapter allows frame personnel to

adapt existing test equipment with 3-conductor cords equipped with the standard size 3-conductor plug to 3-conductor miniature spare jack positions on test panels.

C. W2GY Service Observing Cord (Fig. 25)

5.03 The W2GY service observing cord has a black nylon braided jacket and consists of two tinsel conductors with vinyl insulation. The jack end is equipped with a special jack designed to install on a pair of .045-inch square terminals spaced 7/16-inch apart on the rear of 78C-type connecting blocks. The plug end is equipped with a Switchcraft TT251 plug. DC resistance is .21-ohms per foot. Standard length is 9 feet.

5.04 The service observing cord is used for interconnecting ESS line equipment appearances to service observing jack appearances on the rear of the COSMIC frame.

D. W2HA Modular PF Bridging Cord (Fig. 26)

5.05 The W2HA bridging cord has a black nylon braided jacket and consists of two tinsel conductors with PVC insulation and an outer cotton braid. One conductor is white and the other red. One end is equipped with a Switchcraft TT261 plug. The other end is finished with free conductors, each with a chuck insulated with tubing to match the color of the conductors. A length of clear flexible tubing encases the two chucks and holds them side by side for connecting to male terminals on the D-test connector used with 302-A1 or 302-B1 connectors. A clip anchored to the cord body at this end is provided to support the cord in service. DC resistance of the conductors is .18 ohms per foot. The cord is 16 feet long.

5.06 The W2FM cord is identical to the W2HA cord except the W2FM cord has a standard size plug end finish. The W2FM cord may be adapted for use with miniature jacks by using the KS-21386 L1 miniature plug adapter.

E. W4CP Modular PF Input/Output Test Cord (Fig. 27)

5.07 The W4CP test cord consists of four tinsel conductors with PVC insulation in a black nylon braid. One end is equipped with a Switchcraft TT261 plug and the other end with a 463A plug. The DC resistance of the conductors is .21 ohms per foot. Standard cord length is 16 feet.

5.08 This is a bridging cord used for connecting a cable pair appearance (at the protector unit position within a 302-type connector) to the local test desk for electrical evaluation.

F. W4CR Modular PF Varley Test Cord (Fig. 28)

5.09 The W4CR test cord consists of two cord arms. Each has a red and black twisted pair of conductors encased in a black nylon braid. At one end, the two cord arms terminate on a Switchcraft TT261 plug. The black arm is connected to the plug adjacent to the notched side of the plug shell. The red arm is connected to the other side. The other end of the black cord arm terminates on a 463A plug designated "GOOD". The other end of the red arm terminates on a 463A plug designated "BAD". Provision is made in the "BAD" cord arm to short the tip and ring and open the tip and ring as necessary in performing Varley Tests. The cord arm length is considered the cord length. DC resistance of the cord is .21 ohms per foot.

5.10 The W4CL cord is identical to the W4CR cord except the W4CL cord has a standard size end finish. The W4CL cord may be adapted for use with the miniature jacks by using the KS-21386 L1 miniature plug adapter.

G. 60D Headset (Fig. 29)

5.11 The 60D headset is a light weight "on-ear" head telephone set designed for use with the COSMIC Frame System. The 60D headset is the same as the 60B except it is equipped with an L4CS cord which has the miniature plug for the COSMIC Test/Talk system miniature jacks.

5.12 The standard 60B headset may be used with the COSMIC Frame Test/Talk system by using the KS-21386 L1 miniature plug adapter.

6. MISCELLANEOUS HARDWARE ITEMS

WIRE

6.01 A new jumper wire, which has been coded DT-24P distributing frame wire, is being used with the COSMIC Frame System. This wire is a twisted pair with 24 AWG solid copper conductors and an irradiated polyvinyl chloride (IPVC) insulation. This new wire is both smaller in diameter and lower in cost than other conventional

distributing frame wire. It also has a slicker insulation which makes dead wire removal easier.

TOOLS

Wire Insertion Tool (756C)

6.02 The wire insertion tool consists of a double-ended wire insertion head mounted in a plastic handle and insulated with a black nylon coating (Fig. 30). One end of the insertion head is designed for installing a 24-gauge conductor into the twin clip terminal of the 78C series connecting blocks. The other end is designed for installing a conductor into the connecting blocks with the single clip terminals. The insertion head can be rotated to either position by loosening the screw, rotating it 180 degrees, and retightening the screw to hold the head firmly in position. Since the 756C wire insertion tool does not have a cut off blade, the conductor must be cut to proper length prior to making the electrical connection to the connecting block.

Wire Removal Tool (724A)

6.03 The wire removal tool (Fig. 31), is provided for removing conductors from the 78C1A-50 through 78C2A-64 connecting blocks. The tool consists of a two-pronged fork with an insulated handle. The fork is sized to fit around a clip and underneath the seated conductor. Use of the 724A tool insures long terminal clip reliability as well as eliminating the possibility of disturbing or degrading adjacent wire connections during removal of wire from the terminals.

Connecting Block Removal Tool (KS-21345)

6.04 The connecting block removal tool (Fig. 32) is a steel tool with a wooden handle. It is designed with small inclines on the face of the tool. Connecting blocks are removed from the MDF by aligning the inclines on the face of the tool with the *snap-in* locks on the top rear of the connecting block and pressing the connecting block towards the front of the MDF. This action releases the top of the connecting block, allowing it to tip forward. Complete removal is afforded by lifting the connecting block off the frame engaged in the groove in the bottom connecting block fanning strip. After carefully aligning the tool initially with the snap-in locks on the connecting block, a very

rapid forward movement of the tool may provide an easier releasing action.

ROLLING WORK PLATFORM

6.05 The KS-21415 L1 or L2 rolling work platform (Fig. 33) is used in telephone central offices on low height frames. The rolling platform is built of wood and is finished with clear varnish to protect and bring out the grain.

6.06 The KS-21415 L1 rolling work platform is an A-frame ladder consisting of 10-inch high steps on both sides, with a 20-inch high work level, 18 inches wide by 36 inches long and a 15 by 18 inch folding step 30 inches from the floor. This step is normally fastened in the up position unless it is required to service upper frame shelves. Safety rails on each side project 30 inches above the platform limiting access by way of the steps. Spring loaded retracting casters support the unoccupied platform allowing it to be moved. The casters retract when weighted and each leg rests directly on the floor. Rubber bumpers on the rail legs are standard safety accessories.

6.07 Rolling work platforms were designed for use on all frames not exceeding 8 feet in height and in aisles 24 inches or greater in width. Portable ladders of this type can be used efficiently as one unit may serve two or more aisles. A 48-inch aisle between frames is sufficient space for two ladders to pass, while double access to the platform permits passage through a narrow aisle without removing the work platform.

6.08 The KS-21415 L2 rolling work platform (Fig. 33) is equipped with a slide mechanism for mounting the KS-8047 L2 wire reel horizontally beneath the platform. The reel pulls out for convenient replacement of a wire coil. A latch is provided to lock the reel centrally under the platform. Wire reel and platform combinations increase efficiency of systems with short jumper assignment methods.

Wire Reel

6.09 The wire reel assembly KS-8047 L2 (Fig. 34) may be used with the COSMIC frame. A friction brake is provided to prevent the wire reel from *free wheeling* when the wire is pulled from the reel. Tension on the wire releases the brake.

Wire is fed from the reel through the brake assembly.

7. ENGINEERING ASSISTANCE PROGRAMS (PACE)

7.01 The COSMIC frame system loop cable, tie cable, and equipment terminations are engineered with PACE (Program for Arrangement of Cables and Equipment). PACE provides the following features:

- Distributes the loop cable, tie, and equipment terminations in an optimal manner for preferential assignment.
- Generates identification labels for the front and rear of the COSMIC and modular protector frame at a fraction of the cost of hand stenciling. The labels on the COSMIC frame are color coded to conform to the connecting block function.
- Generates and maintains the official office records, thereby eliminating much of the manual drafting effort.
- Generates and maintains a frame directory of equipment and pair locations for use by the frame force.
- Provides an input tape to COSMOS or SMFAS which constructs the file of loop cable pairs, line equipment, and tie pairs on the COSMIC frame and modular protector frame.

7.02 The PACE functions will be provided by the Western Electric Regional Center engineers, upon receipt of the appropriate input information from the telephone company. PACE is an integral and essential element of the COSMIC Frame System.

7.03 A viable frame operation is not possible unless the data base is accurate and assignment rules are followed precisely. This is especially true for modular frames which require rigid adherence to preferential assignment because only limited long jumper capacity is available. There are two computer based systems which are

applicable to the COSMIC Frame System—COSMOS and SMFAS.

8. ADMINISTRATION SYSTEMS

A. COSMOS

8.01 COSMOS (Computer System for Main Frame Operations) is a mini-computer based system which provides a central data base of information, accessible and useful to many areas of the telephone company, and preferential assignment of line equipment, tie pairs, and bridge lifters. COSMOS is applicable to any type MDF or combination MDFs in a wire center. Moreover, COSMOS can run more than one wire center, with the limitation that the working lines being served by COSMOS not exceed approximately 200,000 lines. Although the major objective of COSMOS is preferential assignment, COSMOS has broad capabilities and performs many functions for Dial Administration, Plant Assignment, Repair Service, etc. Conversion to COSMOS requires that the existing plant and traffic records be input and compared and that any existing discrepancies be resolved. Record conversion can be a lengthy and somewhat expensive process (about \$1.00/line). However, the conversion process turns up more than enough "lost" line equipment and cable pairs to pay for the conversion.

B. SMFAS

8.02 SMFAS (Simplified Modular Frame Administration System) is a time shared system which in effect is only an assignment module. There is no inventory of the existing associations between cable pairs, line equipment, tie pairs, etc, nor are their statuses known. SMFAS only assigns line equipment to cable pairs, given that both the desired cable pair and a list of available line equipment have been input. SMFAS will select the best (shortest jumper) line equipment for the given cable pair. SMFAS will assign tie pairs, No. 5 Crossbar equipment, and ESS line equipment only. Because SMFAS does not have a central data base or a file system, conversion is very rapid (only a few days). Personnel can be trained in one to two days, and operating expenses are low (\$1,000 to \$2,000 per month).

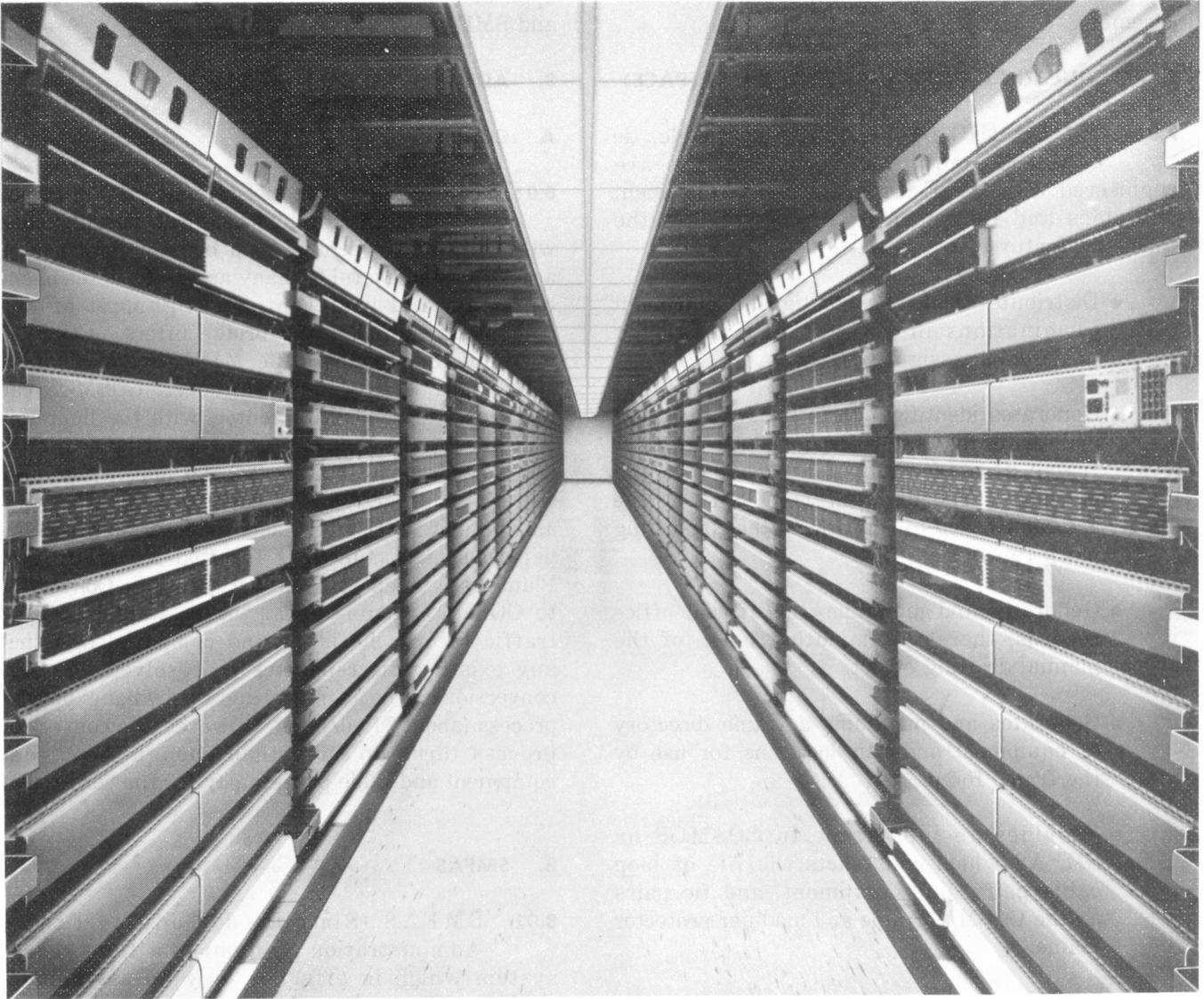
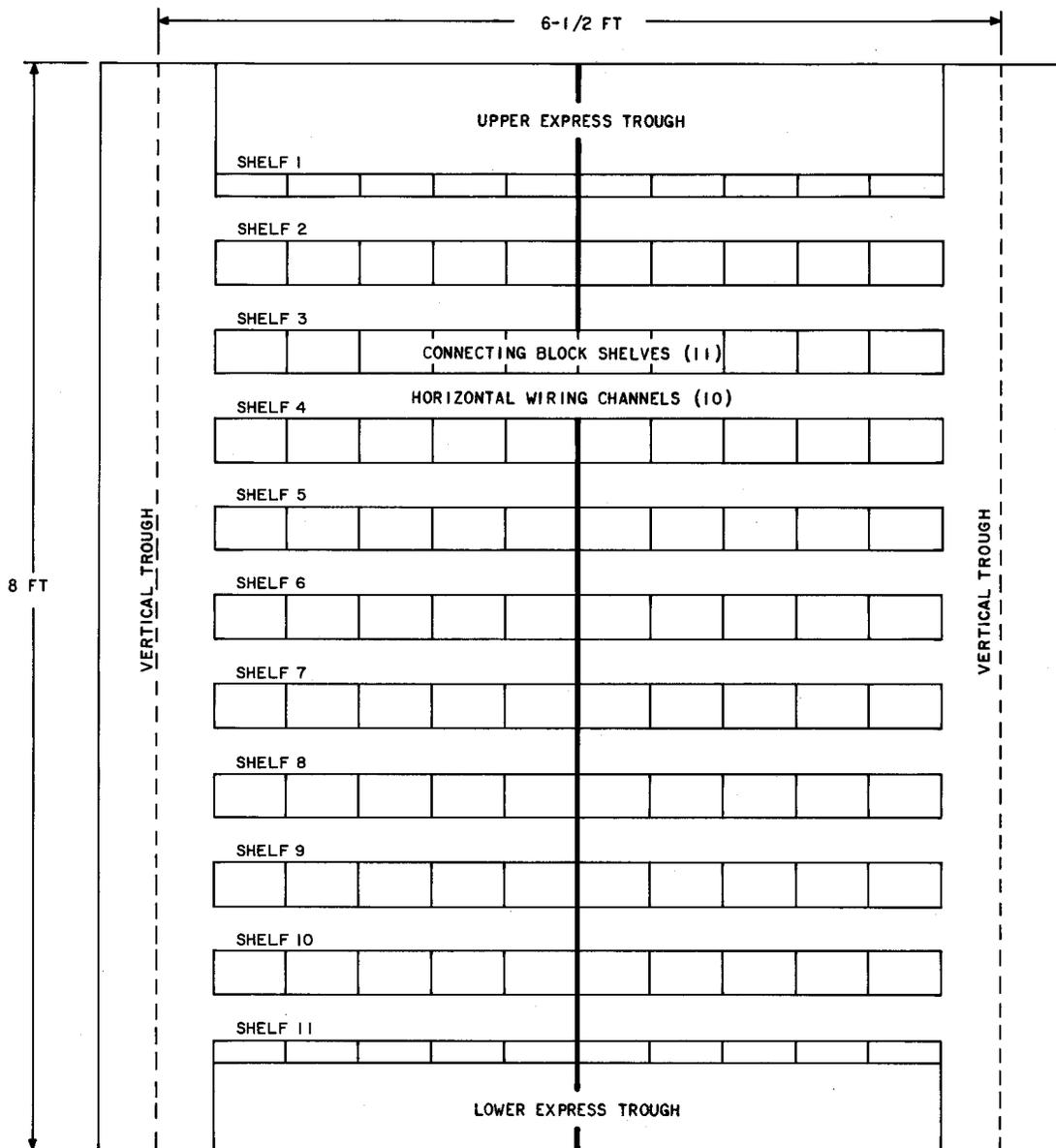


Fig. 1—Modular Main Frame System Installation



NOTES:

1. MAXIMUM DEPTH OF FRAMEWORK IS 1-1/2 FT.
2. FANNING STRIPS, WIRE DRESSING GUIDES AND MANY DESIGN DETAILS NOT SHOWN.

Fig. 2—COSMIC Module Sketch

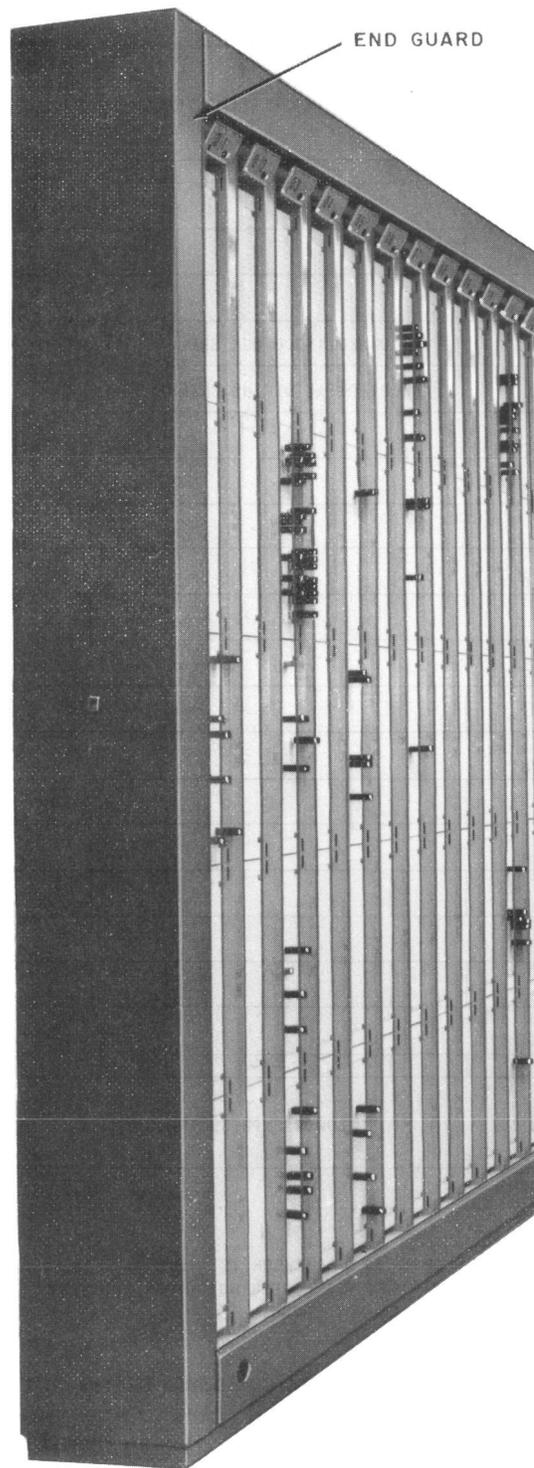


Fig. 3—Protector Frame End Guard

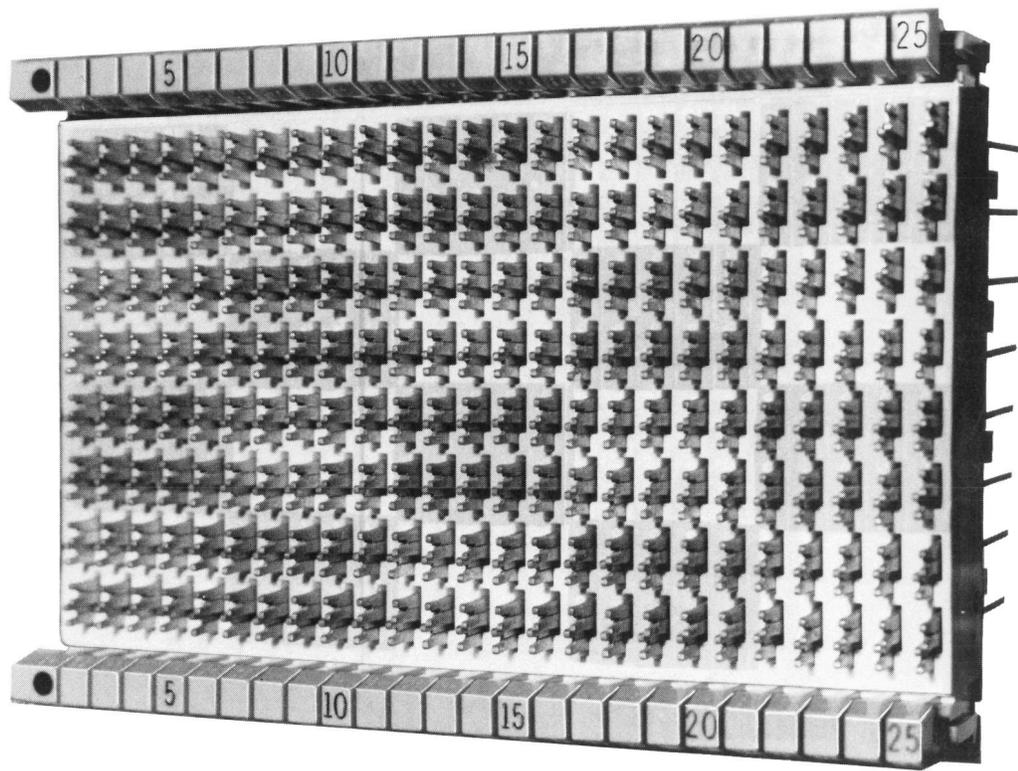


Fig. 4—100-Pair Connecting Block

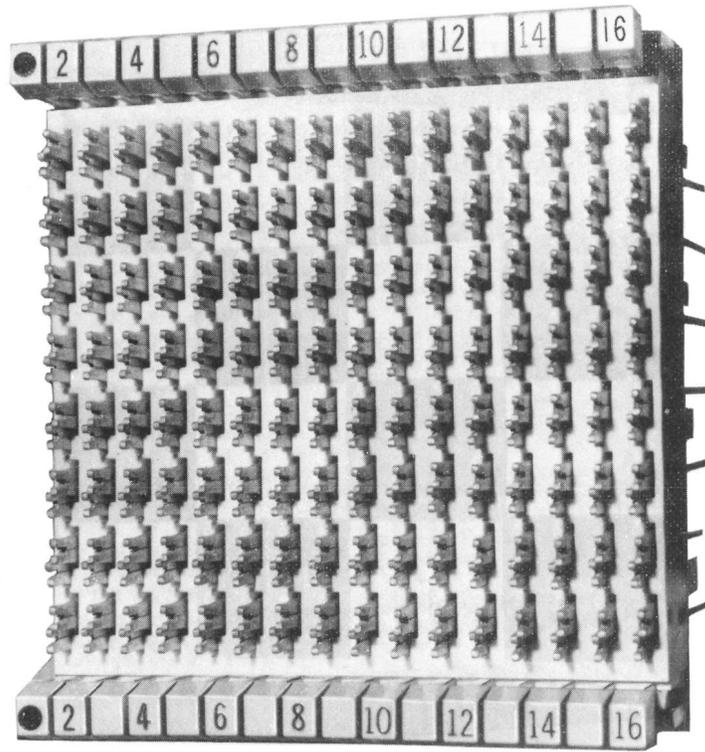


Fig. 5—64-Pair Connecting Block

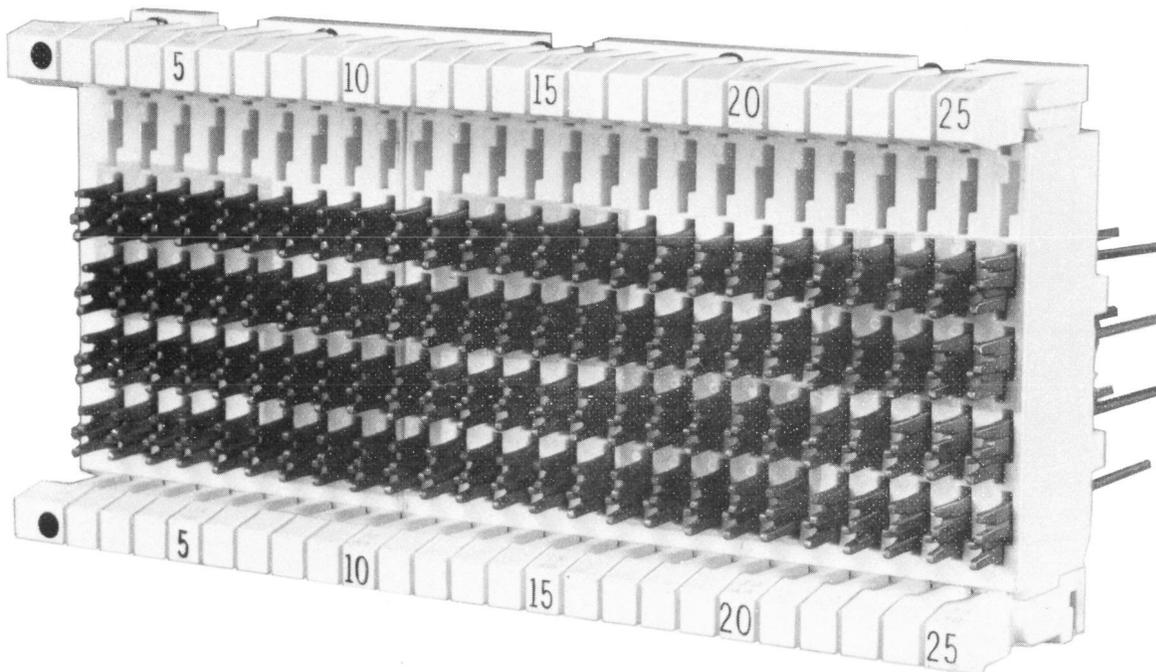


Fig. 6—50-Pair Connecting Block

FORMAT NO. 1

LOIS NO.	0 5	HG	VF		4	1 6	HG	VF		4	2 7	HG	VF		4	3 8	HG	VF		4	4 9	HG	VF		4
	●				5					10					15						20				25
	0 5	HG	VF		4	1 6	HG	VF		4	2 7	HG	VF		4	3 8	HG	VF		4	4 9	HG	VF		4

FORMAT NO. 2

ECAP NO.	01				05					10					15						20					25
	26				30					35					40						45					50
	●				5					10					15						20					25
	01				05					10					15						20					25
	26				30					35					40						45					50

FORMAT NO. 3

	51				55					60					65						70					75
	76				80					85					90						95					00
	●				5					10					15						20					25
	51				55					60					65						70					75
	76				80					85					90						95					00

FORMAT NO. 4

0 4	SW	LV	3	1 5	SW	LV	3	2 6	SW	LV	3	3 7	SW	LV	3
●	2		4		6		8		10		12		14		16
0 4	SW	LV	3	1 5	SW	LV	3	2 6	SW	LV	3	3 7	SW	LV	3

FORMAT NO. 5

0 1	SW	LV	3				7				11				15
●	2		4		6		8		10		12		14		16
0 1	SW	LV	3				7				11				15

FORMAT NO. 6

2 3	SW	LV	3				7				11				15
●	2		4		6		8		10		12		14		16
2 3	SW	LV	3				7				11				15

CODE	TERMINAL CAPACITY	USE	FANNING STRIP COLOR	FORMAT NO.	
				TOP	BOTTOM
78C1A-50	50 PR	TIE PAIRS	WHITE	2	2
78C1A-100	100 PR	TIE PAIRS	WHITE	2	3
78C1B-50	50 PR	LOOP DISTRIBUTION	BLUE	2	2
78C1B-100	100 PR	LOOP DISTRIBUTION	BLUE	2	3
78C2A-100	100 PR	NO. 5 X BAR	GREEN	1	1
78C1C-100	100 PR	STEP X STEP	ORANGE	2	3
78C1A-64	64 PR	ESS (4:1)	YELLOW	5	6
78C2A-64	64 PR	ESS (2:1)	YELLOW	4	4
78C1D-100	100 PR	NO. 1 X BAR	GREEN	2	3

Fig. 7—Fanning Strip Formats

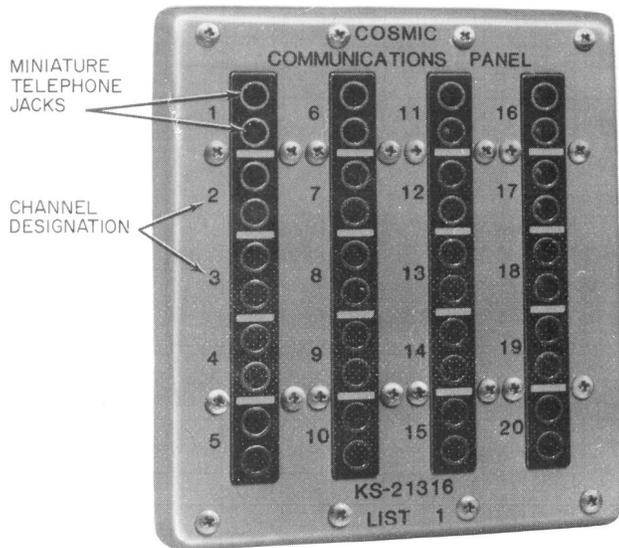
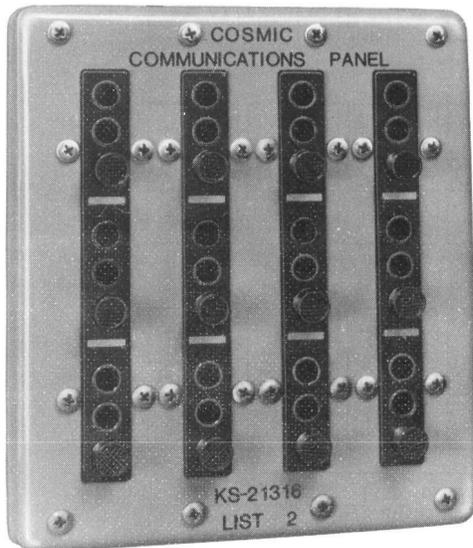


Fig. 8—KS-21316L1 COSMIC Communications Panel



12 CHANNELS EQUIPPED WITH JACKS AND LIGHT EMITTING DIODES (LEDS)

Fig. 9—KS-21316 L2 COSMIC Communications Panel

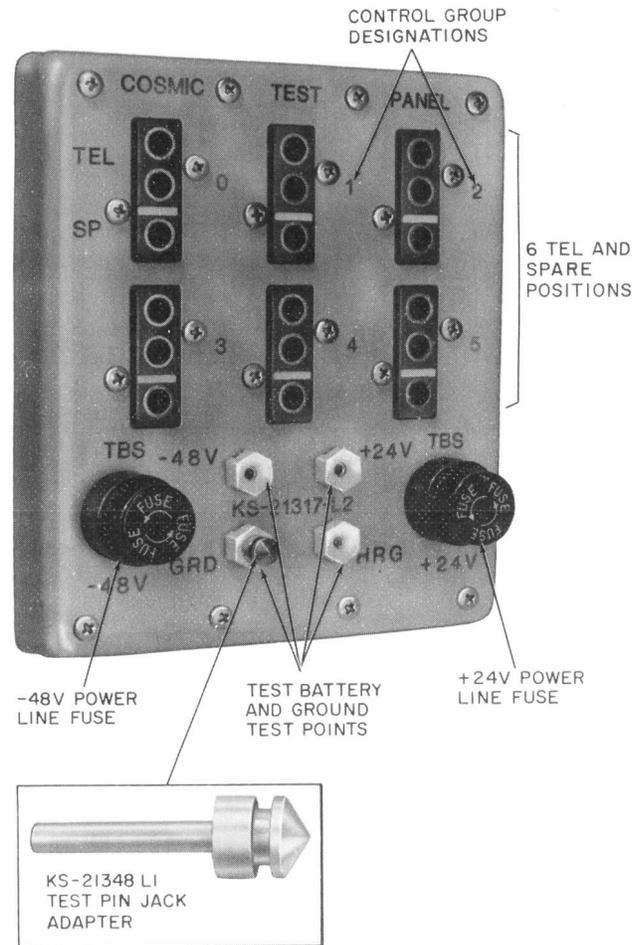


Fig. 10—KS-21317 L2 COSMIC Test Panel

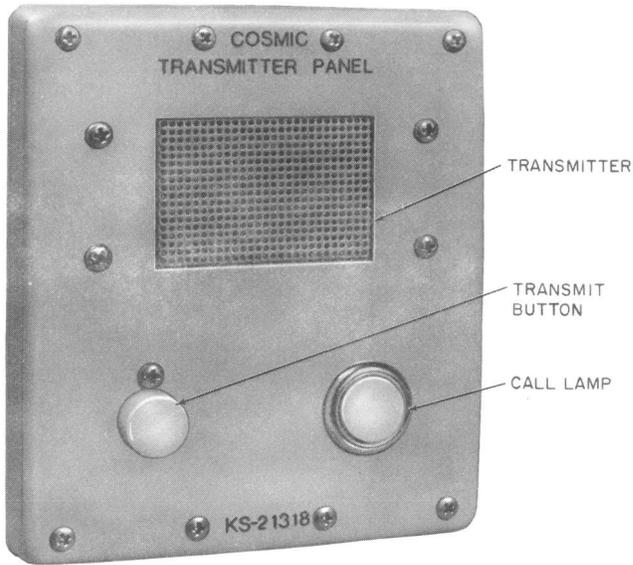


Fig. 11—KS-21318 COSMIC Transmitter Panel

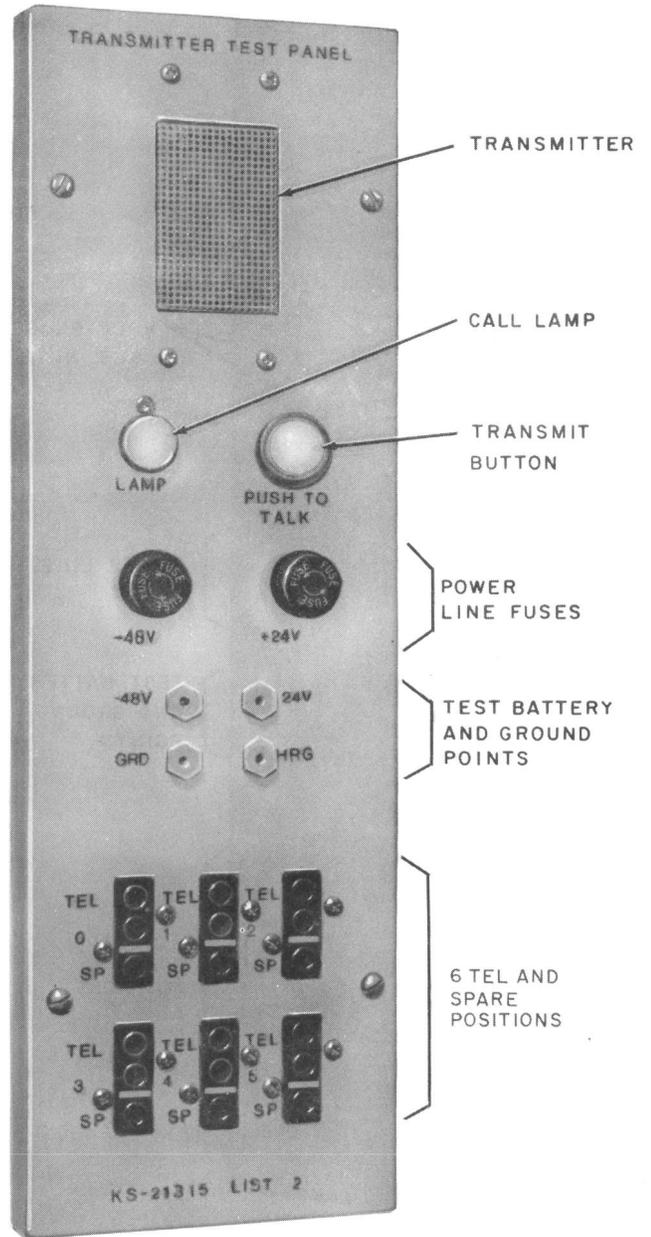
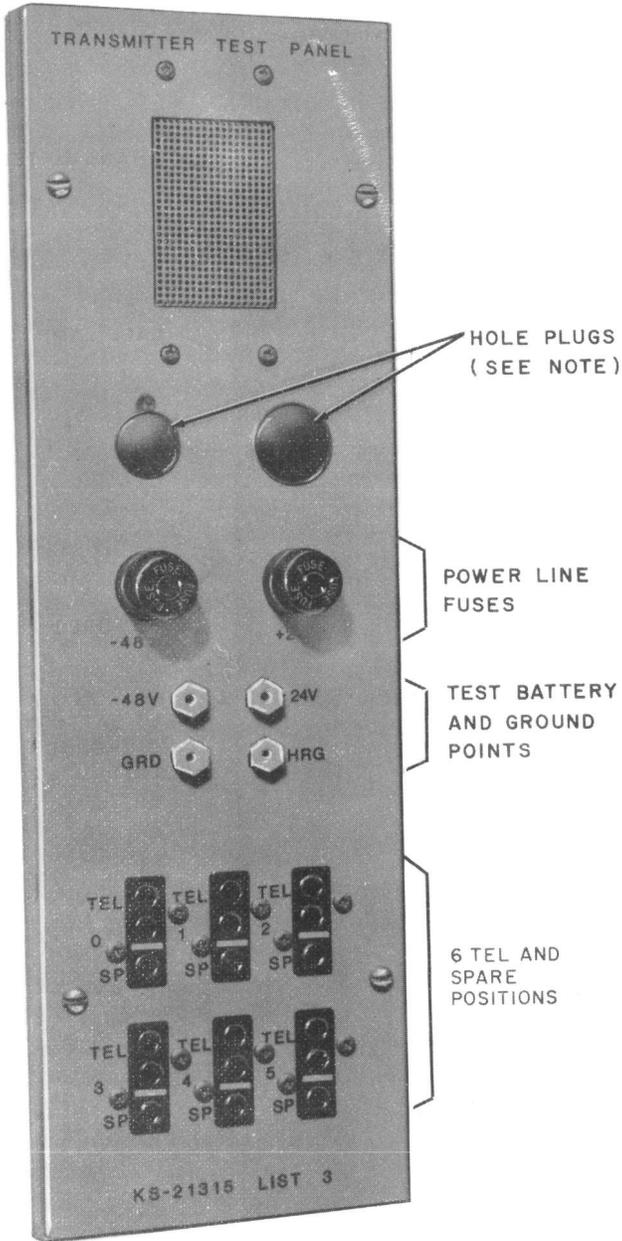


Fig. 12—KS-21315 L2 Transmitter Test Panel



NOTE:
 KS-21315 L3 DOES NOT HAVE THE TRANSMITTER, CALL LAMP, OR TRANSMIT BUTTON, THE LAMP HOLE AND PUSH TO TALK SWITCH HOLES ARE PLUGGED.

Fig. 13—KS-21315 L3 Transmitter Test Panel

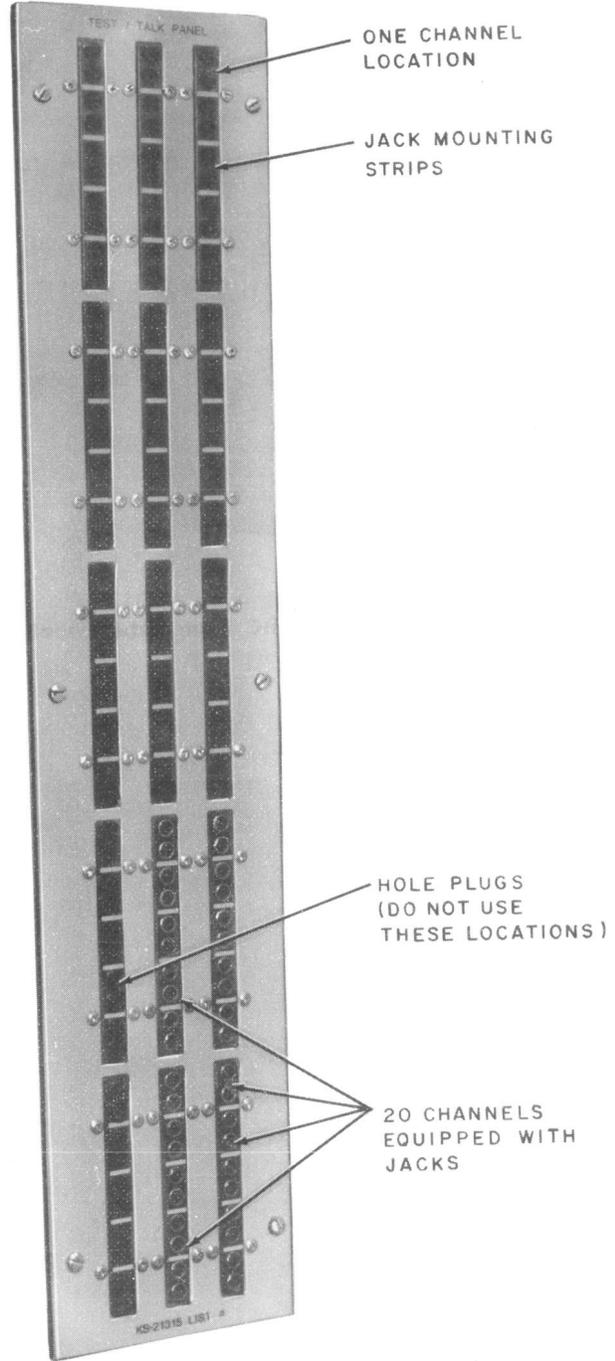


Fig. 14—KS-21315 L4 Test/Talk Panel

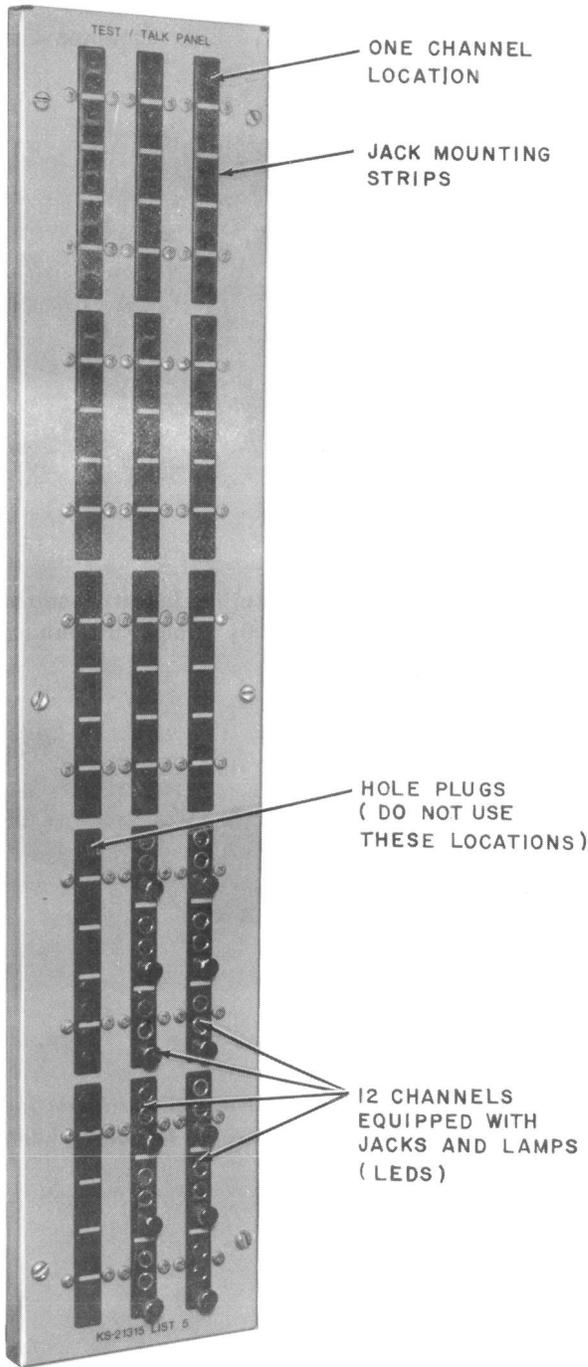


Fig. 15—KS-21315 L5 Test/Talk Panel

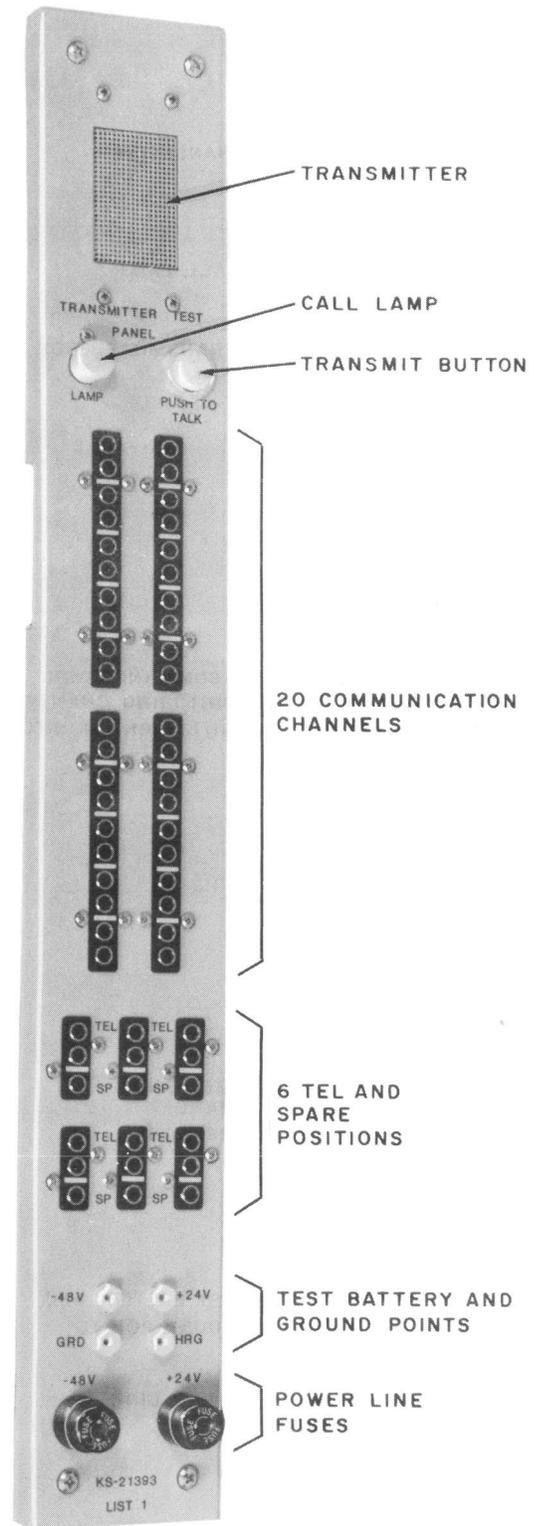


Fig. 16—KS-21393 L1 Transmitter Test Panel

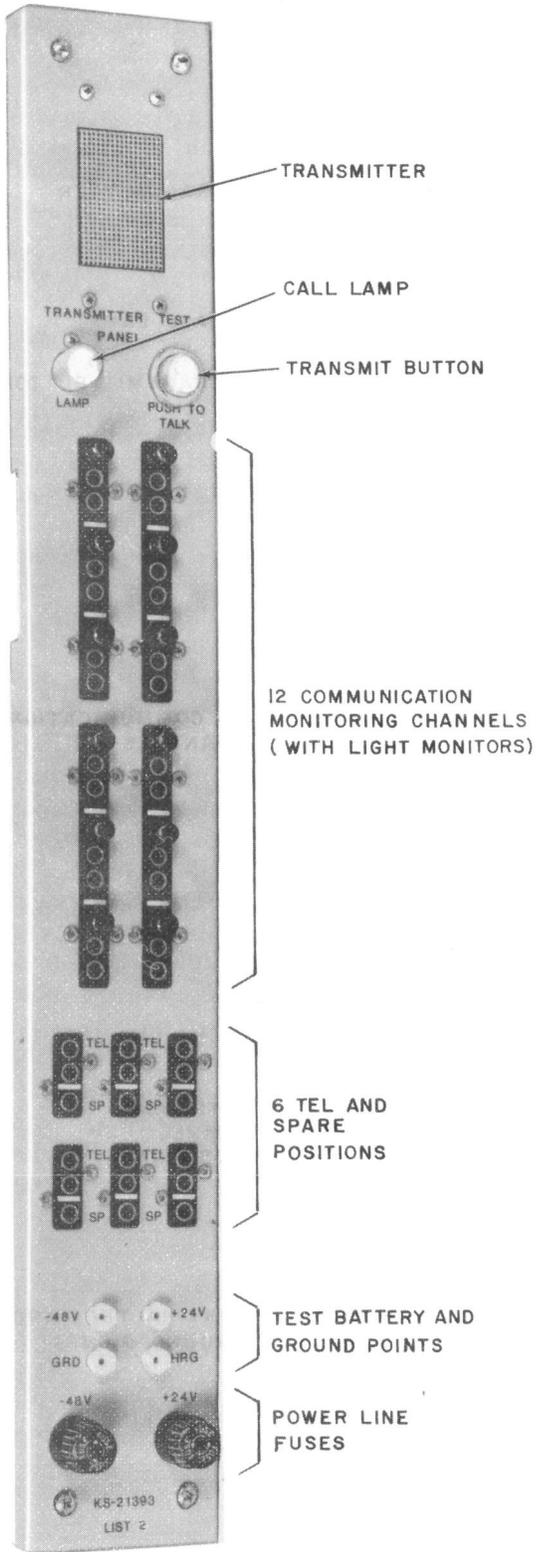


Fig. 17—KS-21393 L2 Transmitter Test Panel

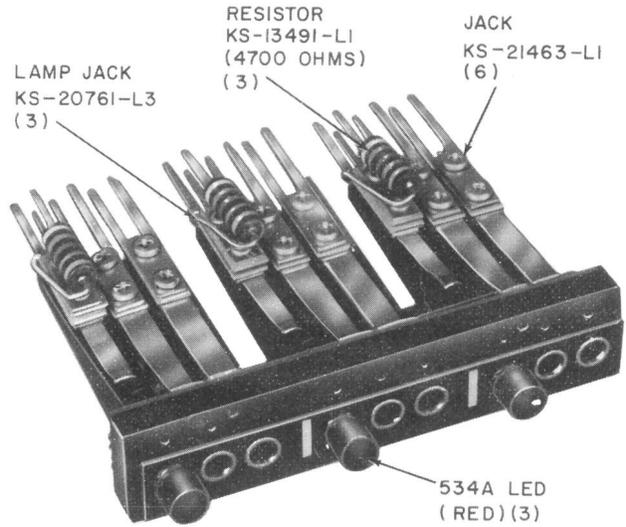


Fig. 18A—KS-21315 L6 Monitoring Insert Assembly Containing Three Fully Equipped Channels

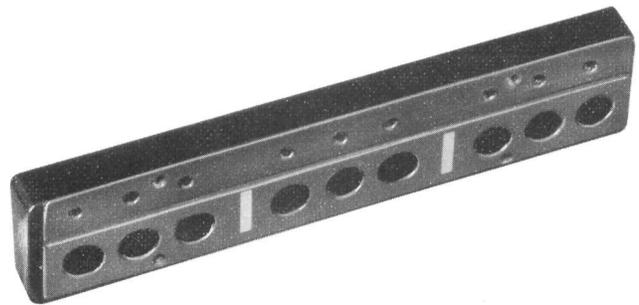


Fig. 18B—KS-21315 L7 Jack Mounting Insert Used for Test Trunk Appearance Requiring Lamps (See KS-21315 L4)

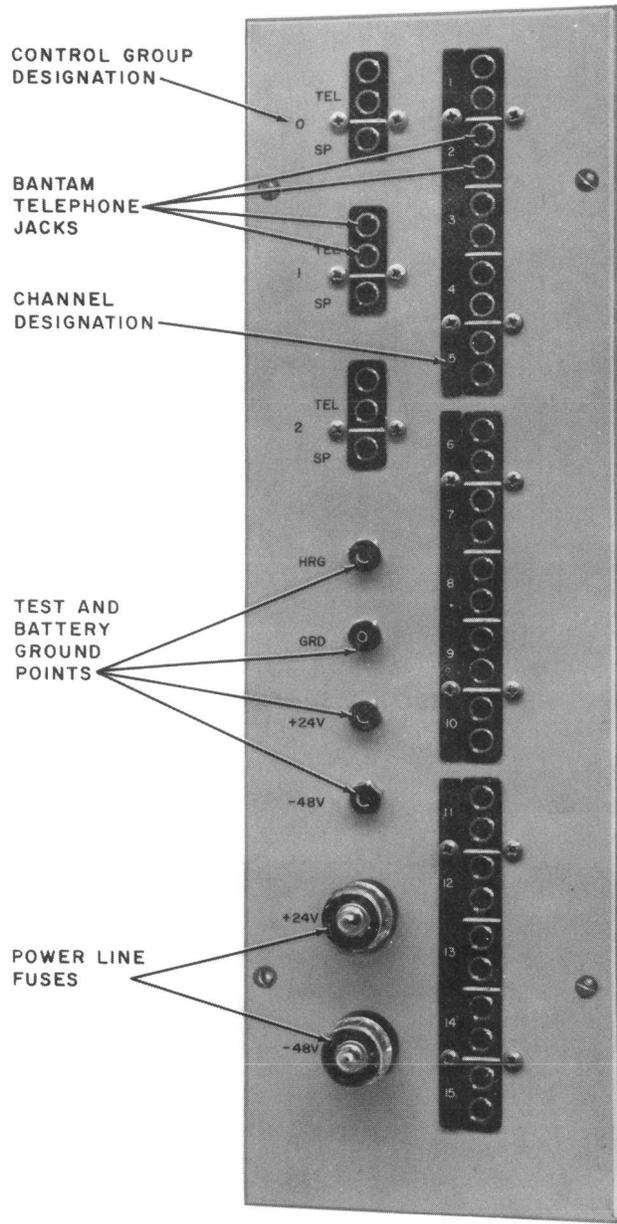
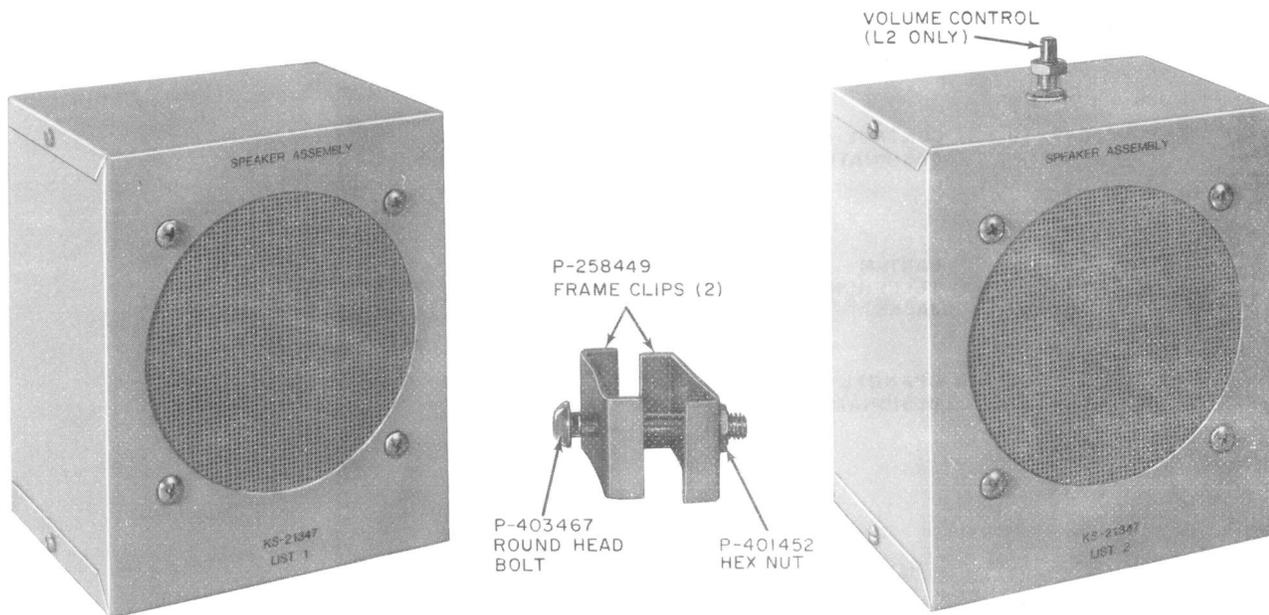


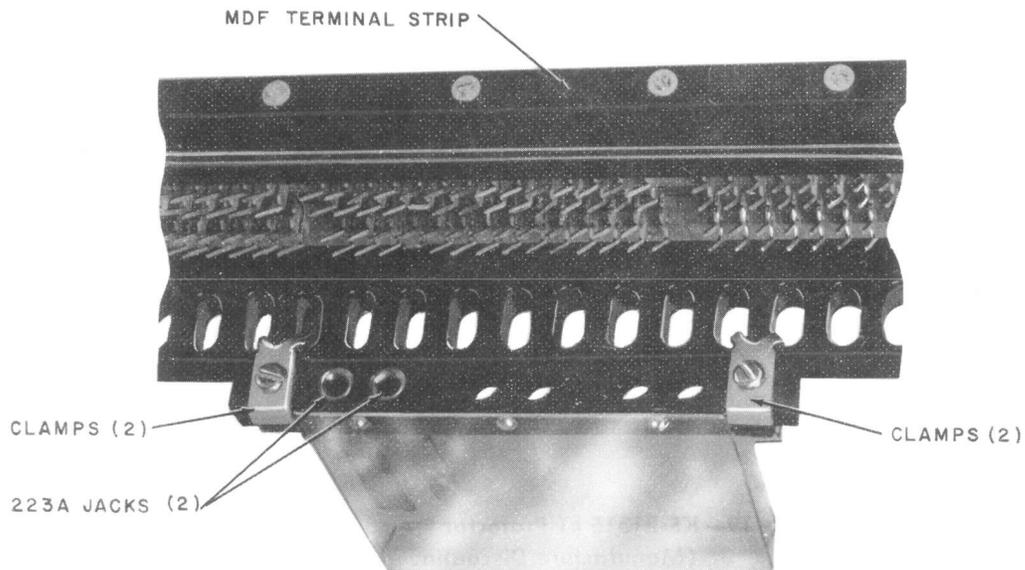
Fig. 19—KS-21315 L1 Protector Frame Test/Talk Panel
(Manufacture Discontinued)



KS-21347 L1 SPEAKER BOX ASSEMBLY IS USED TO SUMMON FRAME PERSONS TO PRIVATE COMMUNICATION CHANNELS.

KS-21347 L2 SPEAKER BOX ASSEMBLY WITH VOLUME CONTROL IS USED IN FRAME ADMINISTRATION AREA ONLY.

Fig. 20—KS-21347 Loudspeaker Assembly



A JACK MOUNTING USED ON CONVENTIONAL MAIN DISTRIBUTING FRAMES. MOUNTS UP TO THREE CHANNELS CONSISTING OF TWO 223A JACKS EACH, ON .625 INCH CENTERS BETWEEN ASSOCIATED JACKS. INTENDED FOR USE WITH THE 60B HEADSET FOR INTERFRAME COMMUNICATIONS FOR THE COSMIC TEST/TALK SYSTEM.

Fig. 21—KS-21396 Interframe Communications Jack Mounting for COSMIC Test/Talk System (Full Size Jacks)

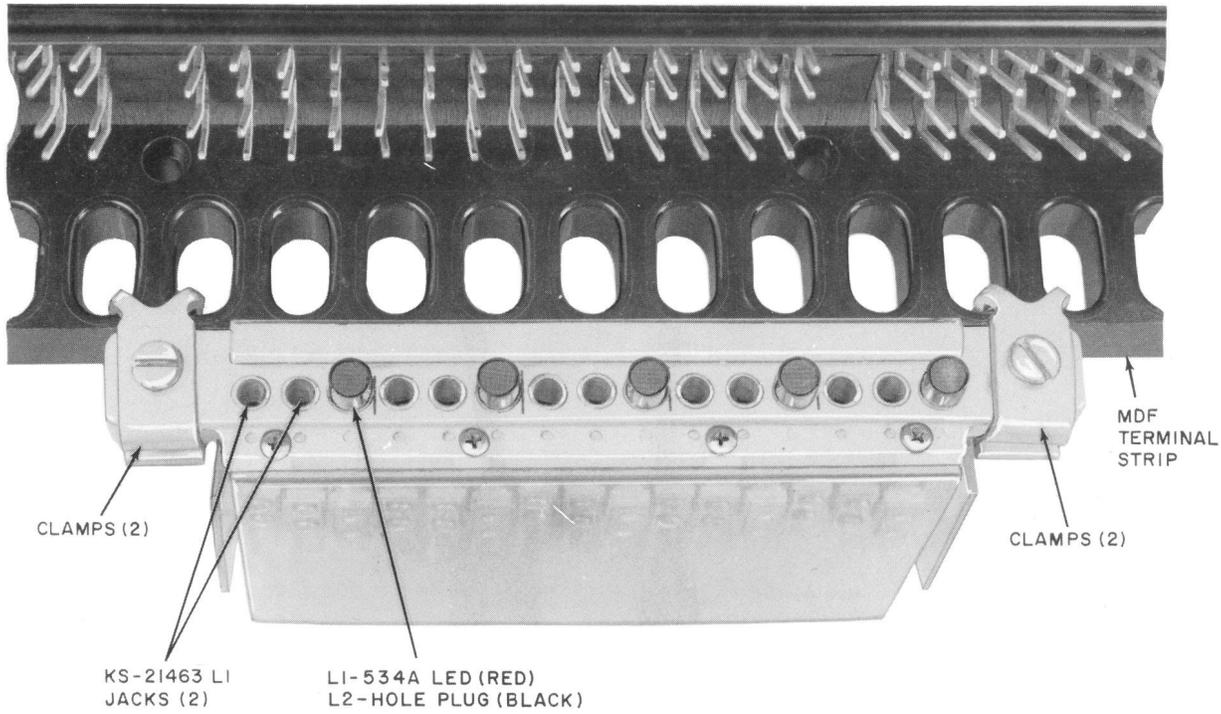


Fig. 22—KS-21395 L1 and L2 Interframe Communications Jack Mounting for COSMIC Test/Talk System (Miniature Jacks)



Fig. 23—KS-21386 L1 Miniature Plug Adapter

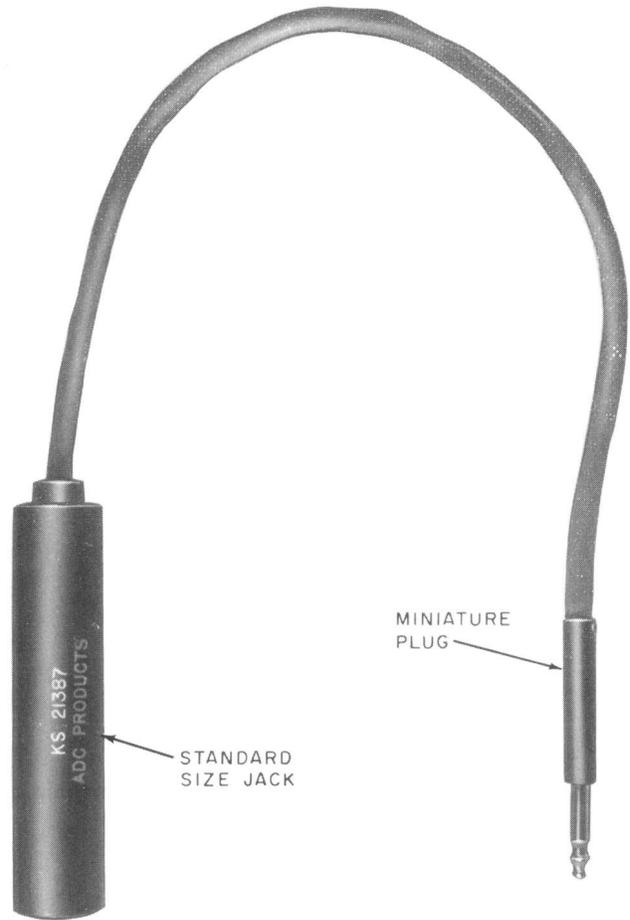


Fig. 24—KS-21387 Test Set Patch Cord



Fig. 25—W2GY Service Observing Cord



Fig. 26—W2HA Modular PF Bridging Cord



Fig. 27—W4CP Modular PF Input/Output Test Cord

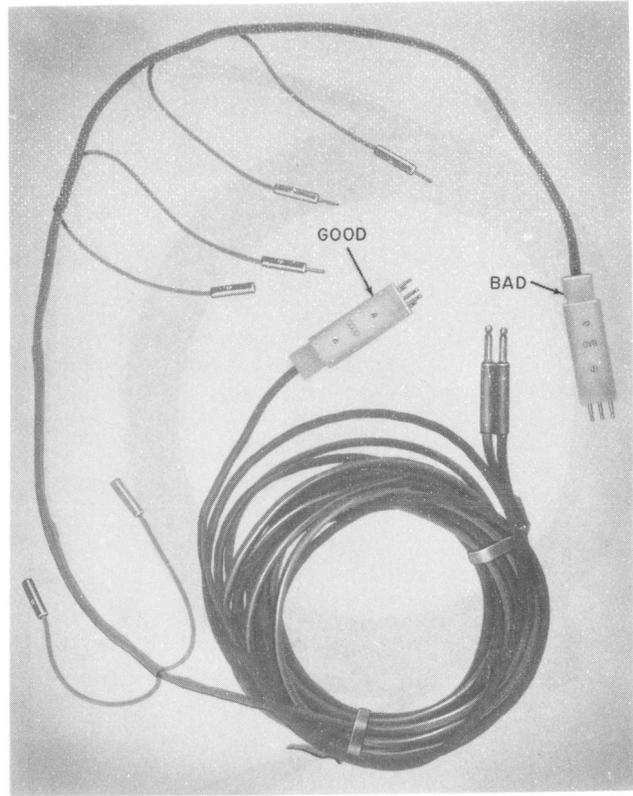


Fig. 28—Modular PF Varley Test Cord

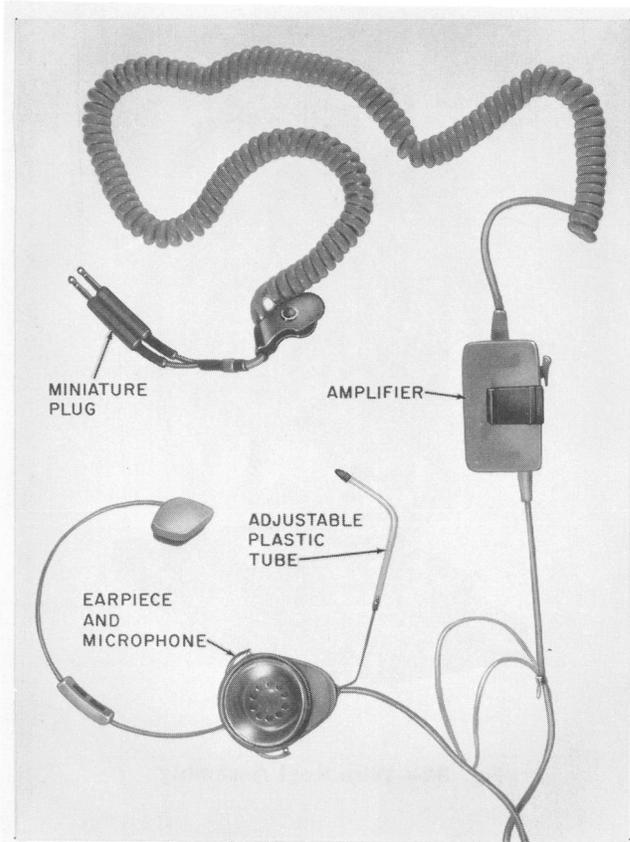


Fig. 29—60D Headset

NOTE:
756C WIRE INSERTION TOOL
MAY ONLY BE USED WITH
24-GAUGE IPVC WIRE.



Fig. 30—756C Wire Insertion Tool



Fig. 31—724A Wire Removal Tool



Fig. 32—Connecting Block Removal Tool

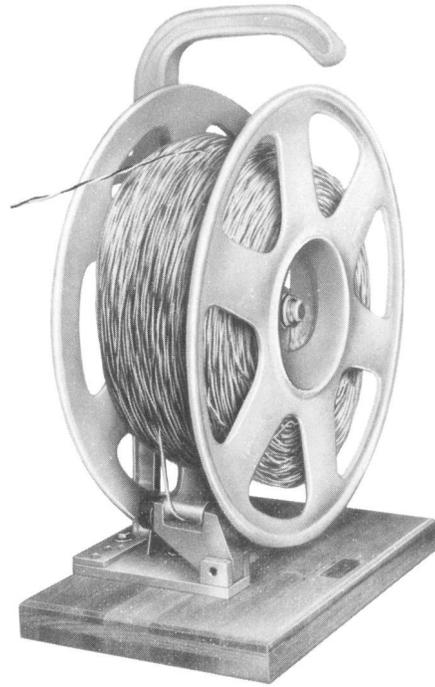


Fig. 34—Wire Reel Assembly



Fig. 33—Rolling Work Platform (Wire Reel Extended)