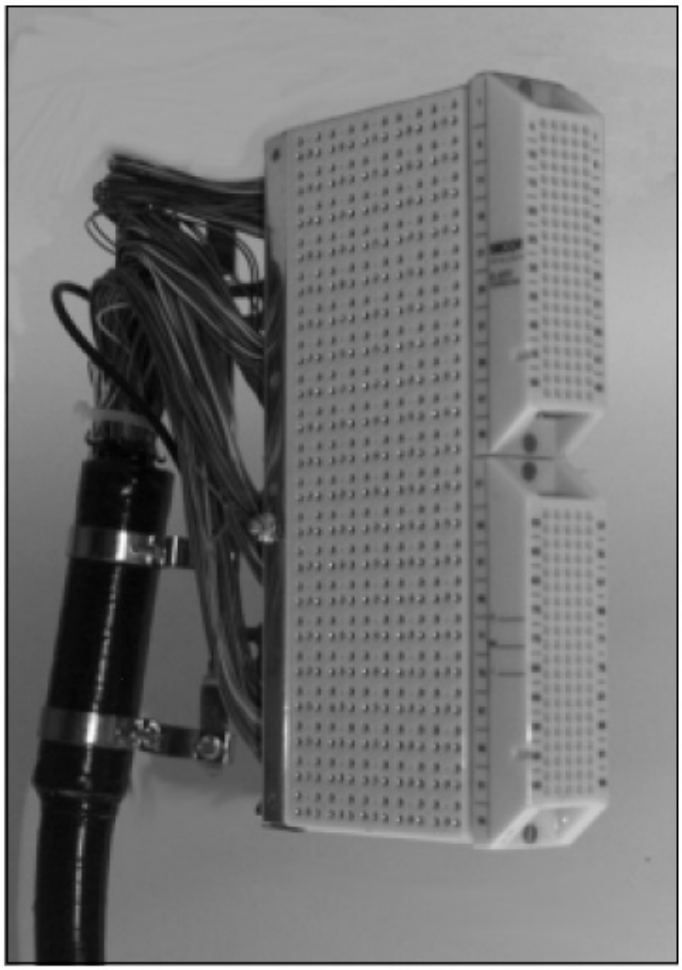

Figure 1 – C-377 Connector

Contents

1. General

1.1 This publication describes the installation of the C-377 Main Frame Connector manufactured by Bourns.

2. Description

2.1 The C-377 connector (Figure 1) is a compact sized, 100-pair unit designed to terminate outside plant cables in central offices or customer premises locations where current and/or voltage (solid state or gas tube) cable pair protection is required. The connector can be used without protection (using straight-thru modules) only if the termination features are desired.

2.2 The C-377 connector consist of a connector base. Designed for quick installation on a distributing frame, and protector modules, which plug into the connector base (Figure 1). This connector and its complement of protector modules provide features for testing, identification of incoming circuits, and disconnection of outside cable pairs in addition to current and voltage protection. Units may be ordered with or without a cable stub. Wire gauge and stub length can also be specified. See figure 2 and 3 for C377 connector dimensions.

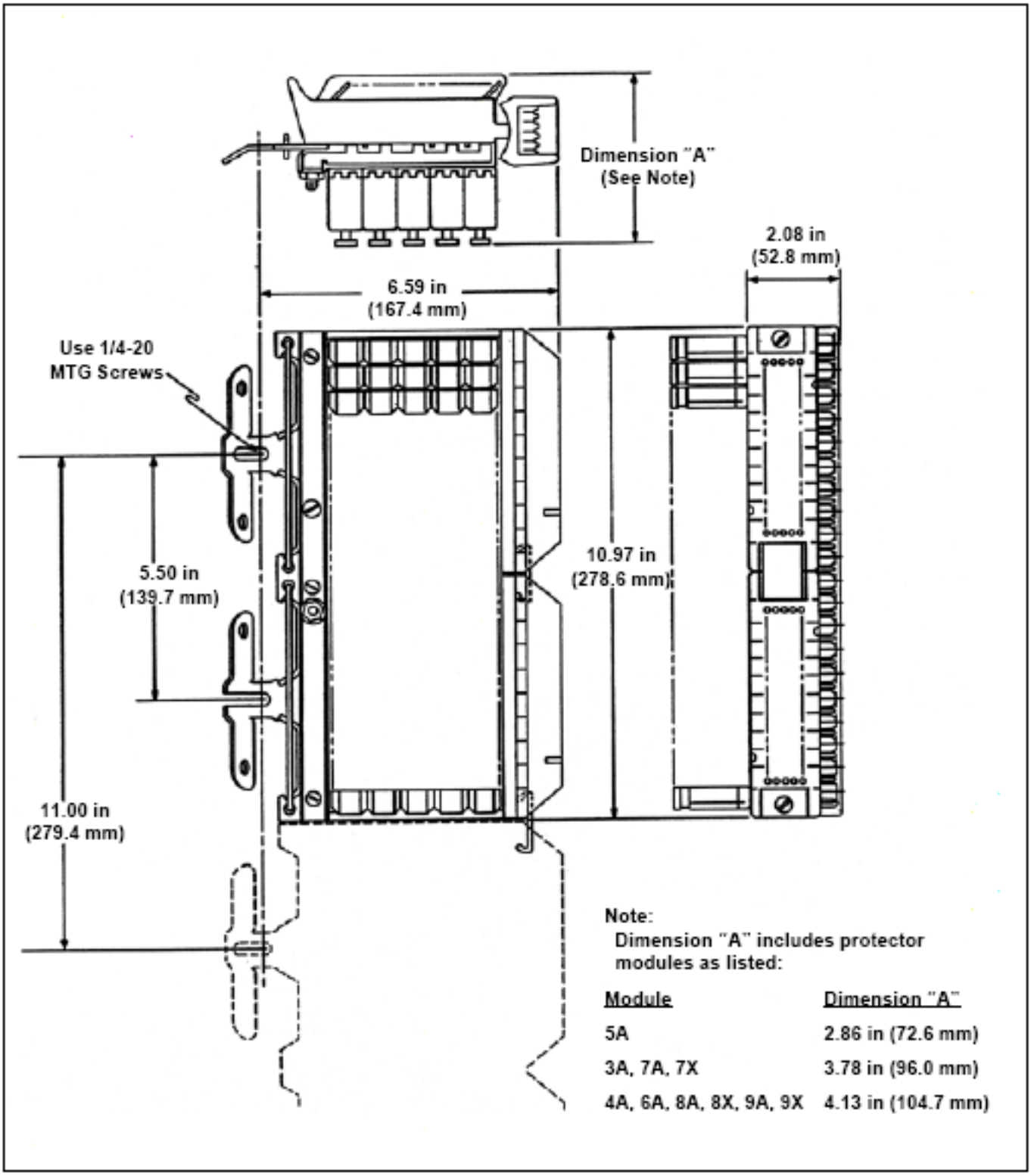

Figure 2 – C-377 Connector Dimensions

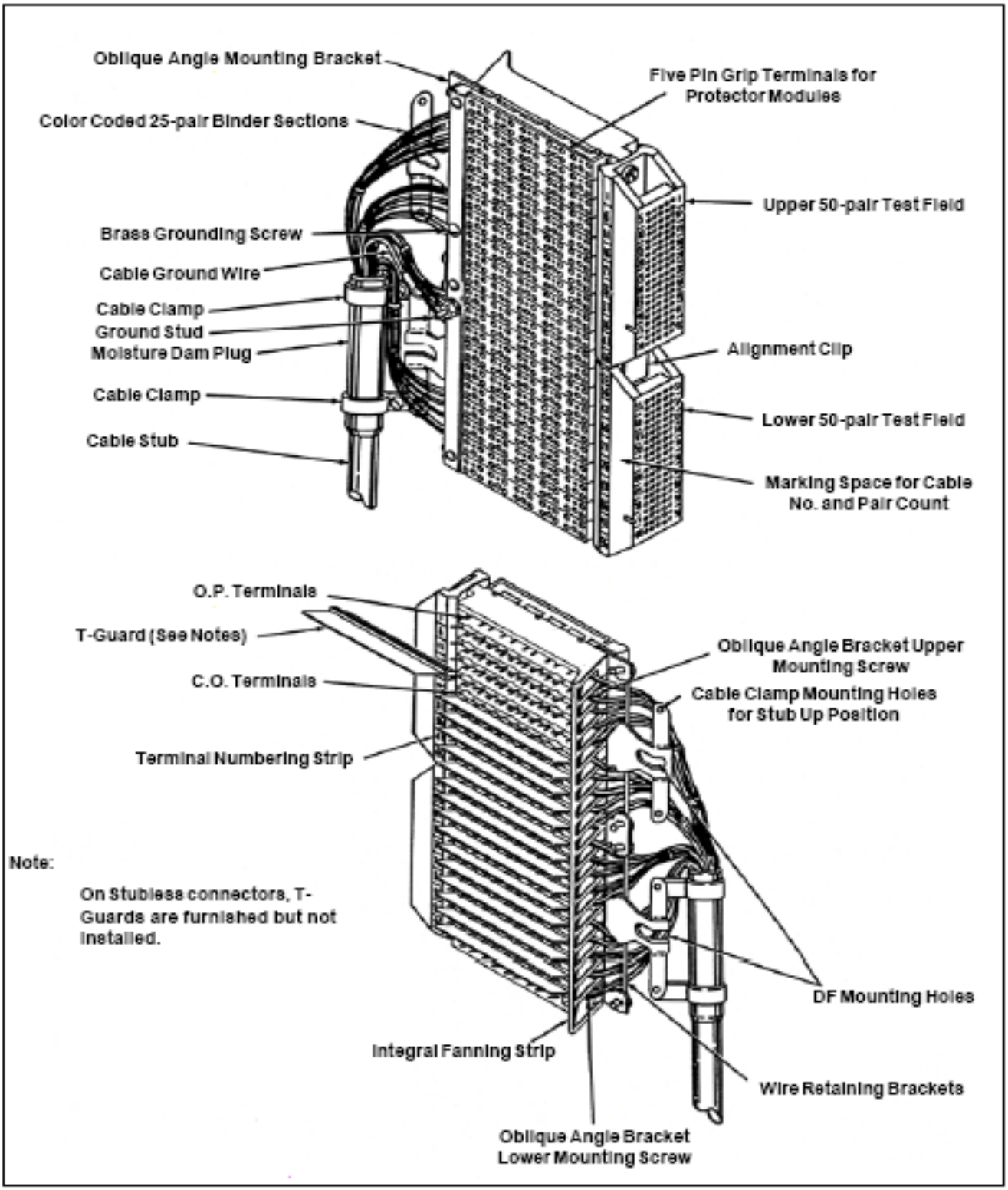

Figure 3 — Connector Base Details

2.3 **Connector base.** The connector base (Figure 3) is a one-piece, flame retardant plastic molded panel fastened to an oblique mounting bracket. Oblique angle mounting is used for easy access and rapid grouping of pairs in stubs being wired to stubless connectors. The mounting is quickly changed to the final straight-on position for wiring to the jumper terminals. The connector base panel is equipped with a group of 100 five-pin grip type terminals. Four of these terminals provide contact for tip and ring connections between outside plant cable and the inside plant jumpers. The fifth terminal provides a group connection to the ground terminal through a unique printed circuit board. This fifth terminal also serves as a polarization terminal.

2.4 Inside plant or CO (Central office) and OSP (outside plant) wire-wrap terminals are located on the back of the connector base. OSP terminals are covered with T-guards and arranged in alternate rows, thereby providing quick identification and easy access to the CO terminals. The terminals are designed for mechanical wire-wrapped connections. CO terminals are angled out, to permit easy wire-wrapping access with the connector base in the straight-on position.

2.5 Twenty large-sized, rectangular fanning strip holes are provided in the connector base for jumper pairs and are aligned with the rows of CO wire-wrap terminals. Four fanning strip holes are also formed between the oblique angle mounting bracket and two wire retaining brackets. These holes are used to group the OSP wires in bundles before entering the cable stub. Every set of 5 terminals is identified by numbers placed adjacent to the wire-wrap terminals on the side of the connector base.

2.6 A test field is located on the front edge of the connector base. The test field is divided into two fifty-pair groups, top and bottom, for test access to OSP pairs.

2.7 The connector base is furnished with or without a cable stub. When a connector base is ordered with a stub, the stub is furnished in a "stub-down" position. (The stub can be changed to a "stub-up" position on the job site: however, it is recommended that connector bases be ordered with the "stub-up" position when this is a known requirement). Extra length stubs, in increments of 10 feet, are available on request. The 101-pair ALVYN cable used for stubbing has a PVC sheath, an aluminum shield, tinned 22 or 24 gauge wire, and PVC and polyethylene insulated conductors.
The cable shield is connected directly to the C-377 frame hardware with a No. 10 AWG ground strap.
(The 22 gauge wire, 101-pair cable has a nominal O.D. of 1.3 inches, and 24 gauge wire, 101-pair cable as a nominal O.D of 1.1 inches.) Cable stubs are furnished with a moisture dam plug, which prevents the entry of moisture into the cable sheath due the warming action of the cable that can occur during temperature changes. ***These cables must not be maintained under continuous pressure.***

2.8 Prior to installing C-377 connectors, open the riser holes in the floor per local CO instructions. (For overhead cable, first follow the instructions for changing stub position (Stub 5) unless "stub-up" connectors were ordered.) Remove any fanning strips on the distributing frame vertical. The C-377 connector has fanning strips built into the connector base and mounting bracket.

3. Precautions

3.1 National Electrical Code Requirements.

3.1.1 The installation of this product, including any field-installed components, shall meet all applicable federal, state, and local laws and regulations and are implied to be suitable for indoor use only.

3.2 Underwriters Laboratories Inc. (UL) Listing.

3.2.1 Only products marked "for indoor or outdoor use" or " for outdoor use" are suitable for outdoor use. Products without this marking are not suitable for outdoor use and are implied to be suitable for indoor use only.

3.2.2 The use of a fuse ink for each and every line is recommended when connecting any equipment to the telephone circuit. For typical applications, a one-foot or longer length fuse link of at least two wire-sizes smaller than the typical wire gauge in use within the circuit is recommended.

3.2.3 It is recommended that any components added to this product be both listed for the purpose and compatible.

3.2.4 Risk of electric shock – Protector is not to be used without the arrester assembly installed.

3.3 Store the C-377 connector and the protector modules in a dry location. Do not leave the units on loading docks or in outside locations where they may be exposed to the weather.

3.4 When unpacking connectors from the shipping carton, use care so as not to damage the connector or stub.

Note: Do not bend cable stub into a short radius curve; the cable pairs may be damaged.

Note: Do not remove connector from its protective carton until it is ready for installation on the distribution frame.

3.5 When the cable entering the CO is exposed to possible contact with power conductors operating at voltages above 300 volts, the wires in the stub cable of the connector should be at least two gauges larger then the wires in the fusing link or entrance cable.

3.6 A fuse link (six-foot minimum length) or entrance cable of 24 gauge wire or finer should be used when stubbing with 22 gauge wire. When stubbing with 24 gauge wire, the fuse links or wires in the entrance cable should be 26 gauge. This will ensure that he cable stub or wiring on the rear of the base will not fuse on severe high current power faults. The current carrying capacity of the C-377 connector modules is designed to exceed the current carrying capacity of 22 gauge copper wire, in the event that a line should be subjected to a sustained power cross.

4. Installing Universal Mounting Bar

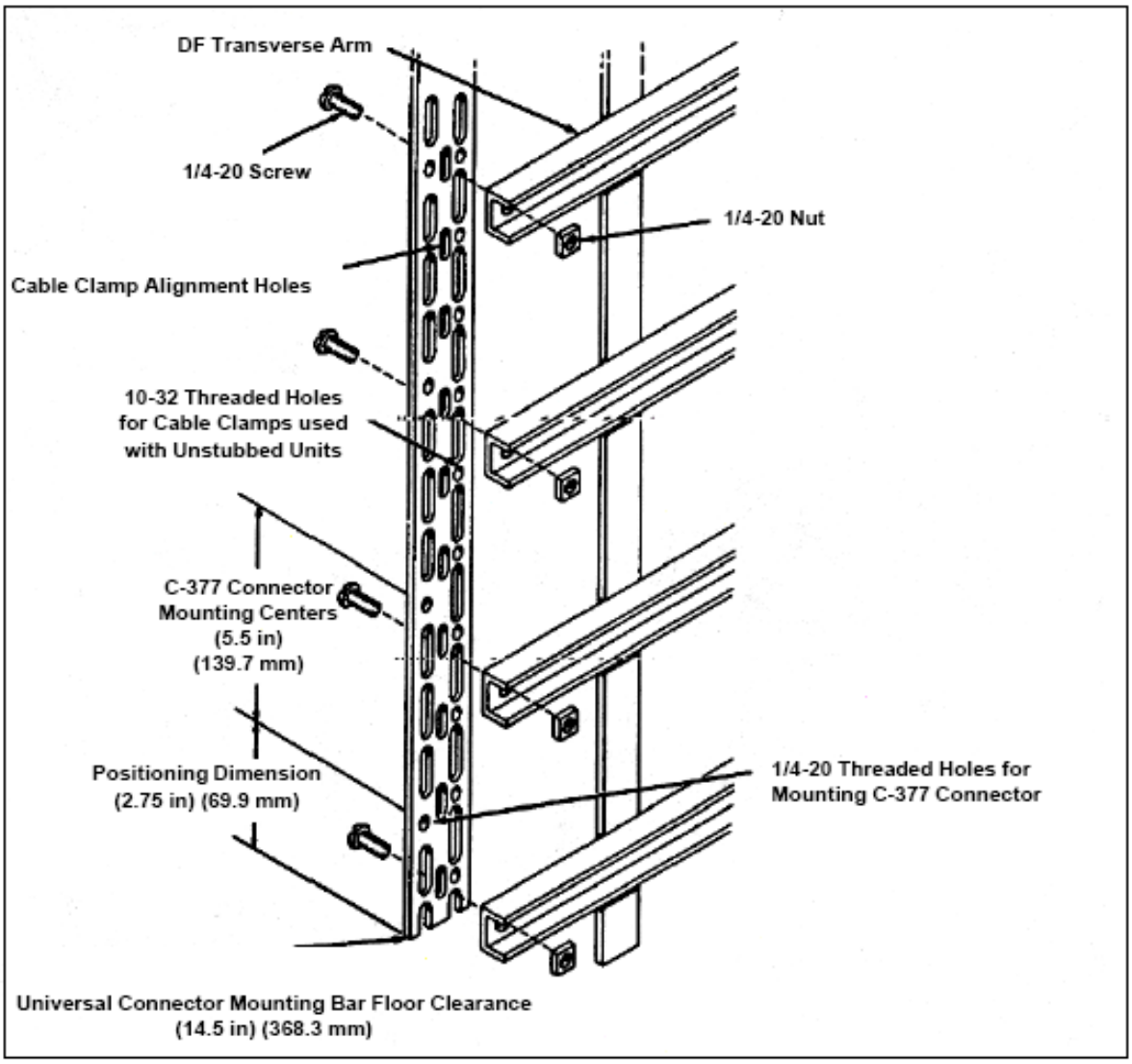

Figure 4 — Installing the Universal Connector Mounting Bar on Frame Transverse Arm

4.1 The C-377 connector may require a universal connector mounting bar to accommodate the compact spacing dimensions of the connector base. This mounting bar is used in place of the normal vertical (with 8-inch centers for mounting holes) by bolting to the ends of the transverse arms (Figure 4).

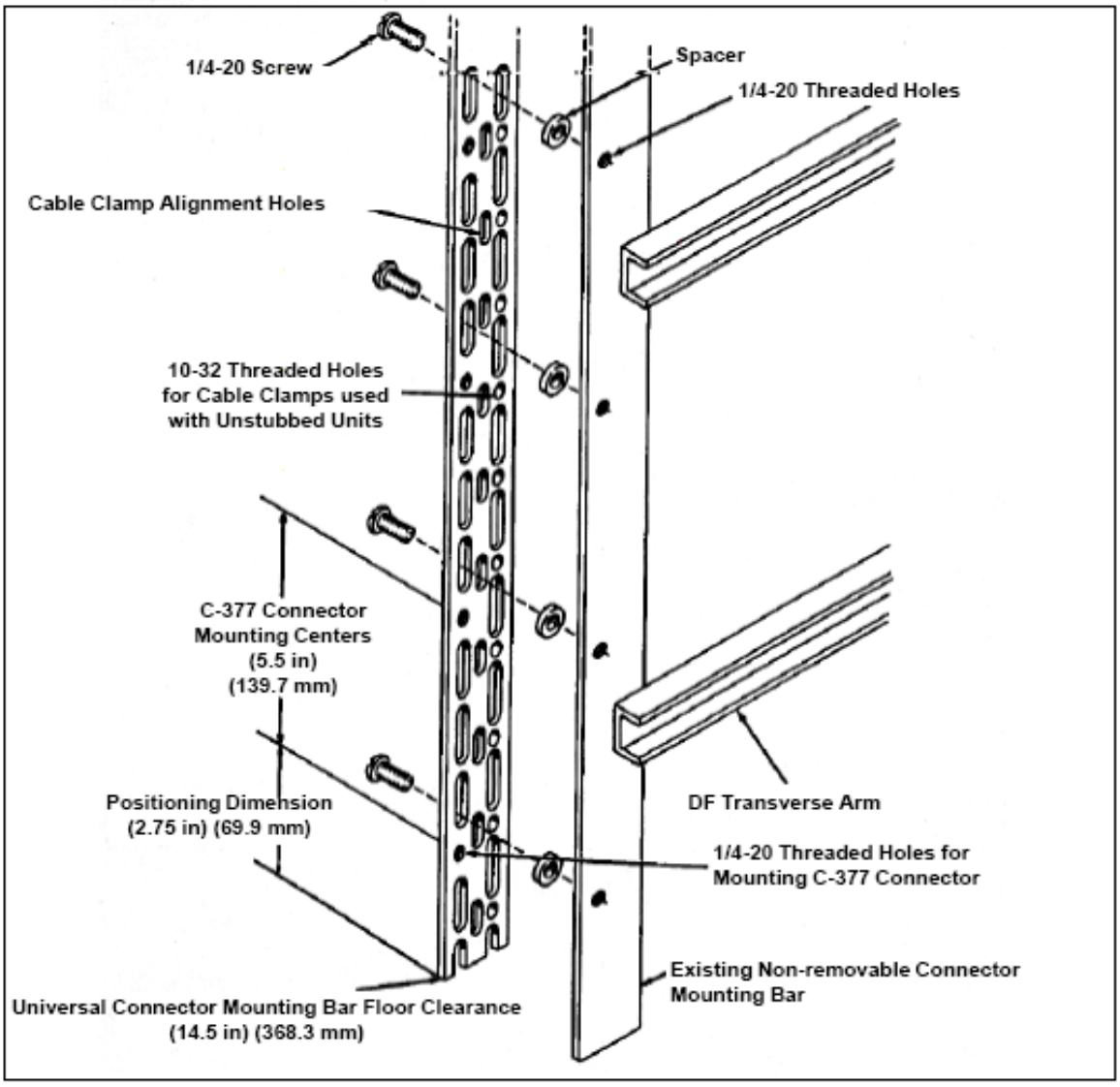

Figure 5 — Installing the Universal Connector Mounting Bar on Non-removable Frame Mounting Bar

4.2 When the existing connector mounting bar cannot be removed, the universal connector mounting bar is bolted directly over the existing bar, with the spacer washers (supplied) installed between to provide clearance for the tips of the connector mounting screws. The universal connector mounting bar should not project beyond the edge of the existing bar (Figure 5)

4.3 One end of the universal connector mounting bar will be marked to indicate the mounting position on the distributing frame. Be sure that all mounting bars are installed with the correct end toward the bottom (Figures 5 and 5).

4.4 This will ensure that the C-377 connectors will line up at the same height along the frame.

5. Changing Stub Position

5.1 If it is necessary to change the cable stub position from "stub down" to "stub up", use the following procedure. Use this method only if no other cable routing is possible. Handle the cable very carefully to avoid breaking wires. (If the "stub up" requirement is known in advance, order the C-377 connector with cable in the "stub up" position.)

5.2 Remove the two screws holding cable clamps to lower mounting position on oblique angle mounting bracket.

5.3 Remove the two screws and nuts holding cable clamps to pressure plug.

5.4 Replace cable clamps in upper mounting position on oblique angle mounting bracket using the two screws removed in step 1.

5.5 Carefully turn cable stub 180 degrees and fit pressure plug into cable clamps.

5.6 Secure cable clamps onto moisture dam with screws and nuts.

6. Protector Modules

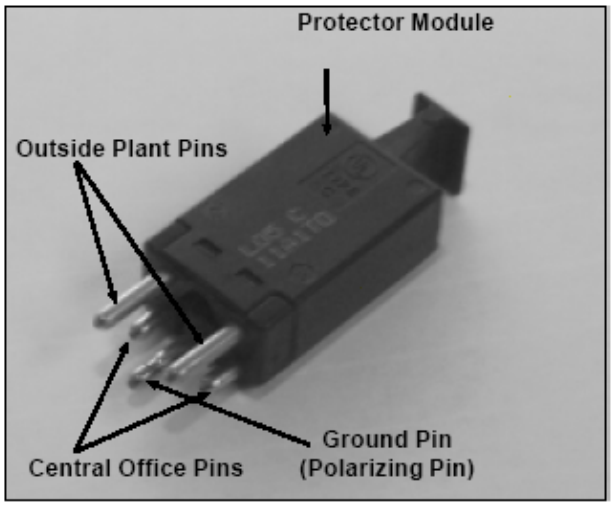

Figure 6 – Protector Module

6.1 Several types of protector modules are available to satisfy various CO requirements for line and equipment protection. The protector modules are all equipped with five contact pins and a plastic shell (Figure 6). The plastic shell for the module is made from a self-extinguishing plastic insulation material.

6.2 When inserted into the connector base, the contact pins provide the following contacts for one cable pair:

- Tip and ring to OSP (outside plant) conductors (long pins).
- Tip and ring to CO (central office) equipment (short pins).
- Ground, which also serves as a polarization pin.

6.3 When the protector modules are fully inserted (Figure 7) into the connector base, the OSP equipment and the CO equipment are connected. The grounding pin is connected to provide continuity through the connector base mounting bar and interconnected ground straps to the copper ground bar at the base of the distributing frame.

6.4 During installation, the protector modules, if installed, should be in the detent position (Figure 7). This keeps the C.O equipment disconnected from the outside plant yet the outside plant provides protection for the O.P pairs.

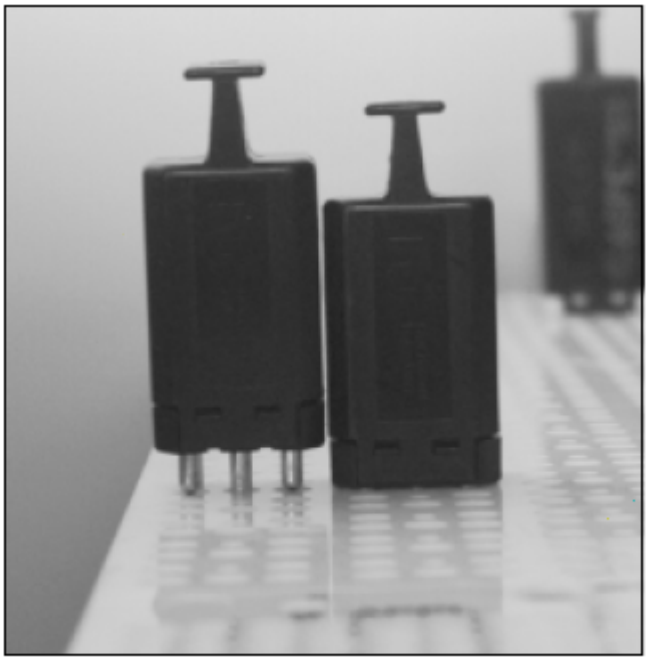

Figure 7 – Protector Module in Detent and Fully Inserted Positions

7. Installing Stubbed Connectors.

7.1 Remove connector from shipping carton. Remove any cable twist that may be present in the cable stub.

7.2 Mark the cable number and pair count on the connector and cable stub. Place cable stub through the appropriate riser hole beneath the desired vertical.

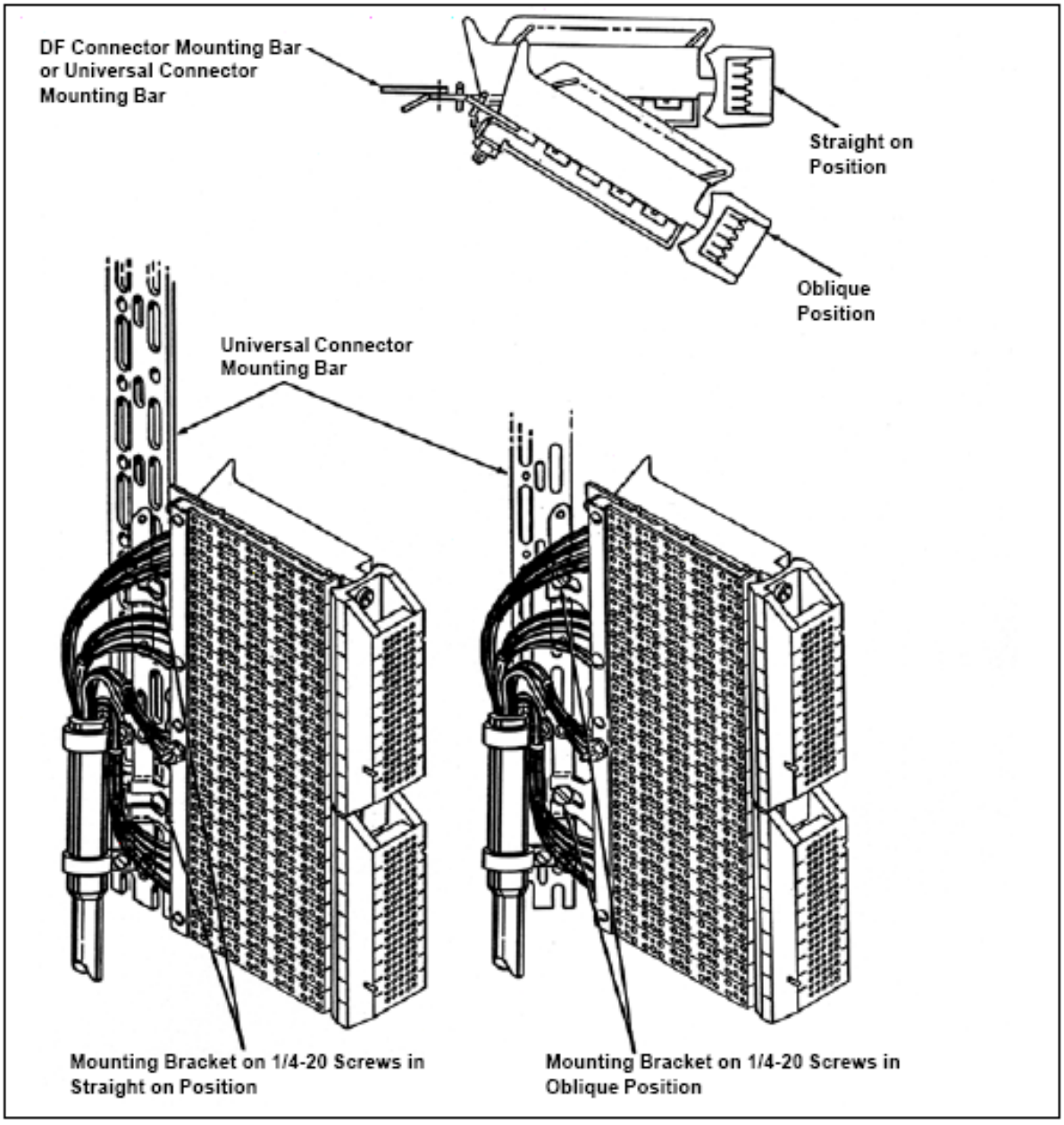

Figure 8 – Mounting Stubbed C-377 Connector to Distribution Frame

7.3 Mount connector to distributing frame connector mounting bar. Locate the two tapped holes on the left side of the connector mounting bar to be used for mounting the connector (Figure 8).
Partially thread one ¼ x 20 slotted hex head screw (two supplied) into the lower mounting hole, then slide the open slot in the lower section of the connector's oblique angle mounting bracket under the screw head. Line up the closed slot in the upper section of the connector's mounting bracket with the adapter bar, then insert and partially thread the order ¼ x 20 slotted hex head screw into the upper mounting hole. Place the connector in the straight-on position and tighten both screws.
(If access to mounting screws is difficult, the use of a short 3/8-inch nut driver may be helpful.)

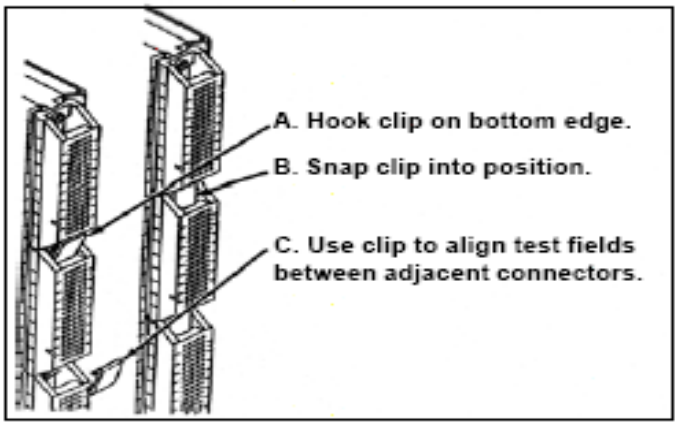

Figure 9 — Installing Alignment Clips

7.4 Install alignment clips. When all connectors have been mounted install one alignment clip (two supplied) in the open areas between the upper and lower test fields of a connector, and the other alignment clip in the similar area between test fields of adjacent connectors (Figure 9). First, hook bottom edge of clip onto connector, then press it up and in until the top edge snaps into position.

7.5 Ground the connectors. Use the method outlined below under the heading Grounding, or use local CO practices.

7.6 Arrange cable stubs. Route all cable stubs against the transverse arms and other parts of the distribution frame to provide a neat and orderly routing to the riser holes. Cable clamps on the moisture dam should be bent black to the vertical mounting bar so that the cable stubs will be out of the way for future work at the frame. Lash cable stubs to the transverse arms (and other locations, if necessary).

7.7 Seal the riser holes in the floor in accordance with local instructions.

7.8 Splice cable stub to entrance cable. The cable stub is wired with standard cable wire color coding. Cable pairs can be matched to central connector base per Table 1.

7.9 Connector base is now ready for jumpering to CO equipment. Be sure to leave protector modules in detent position to prevent any line faults from appearing on the CO jumper terminals during jumpering.

Cable pair group	Binder color	Cable pair subgroup			Tip wire color	Ring wire color (for each tip wire color)
1 - 25	Blue	1	-	5	White	1st wire-blue
		6	-	10	Red	2nd wire-orange
		11	-	15	Black	3rd wire-green
		16	-	20	Yellow	4th wire-brown
		21	-	25	Violet	5th wire-slate
26 - 50	Orange	26	-	30	White	1st wire-blue
		31	-	35	Red	2nd wire-orange
		36	-	40	Black	3rd wire-green
		41	-	45	Yellow	4th wire-brown
		46	-	50	Violet	5th wire-slate
51 - 75	Green	51	-	55	White	1st wire-blue
		56	-	60	Red	2nd wire-orange
		61	-	65	Black	3rd wire-green
		66	-	70	Yellow	4th wire-brow
		71	-	75	Violet	5th wire-slate
76 - 100	Brown	76	-	80	White	1st wire-blue
		81	-	85	Red	2nd wire-orange
		86	-	90	Black	3rd wire-green
		91	-	95	Yellow	4th wire-brown
		96	-	100	Violet	5th wire-slate

Table 1 — Cable Pair Color Codes

8. Installing Stubless Connectors

8.1 Remove connector from shipping carton.

8.2 Separate connector base, oblique angle mounting bracket, and cable clamps. Locate the two screws that hold the connector to oblique angle mounting bracket, and loosen sufficiently for their heads to clear the recessed holes in connector base. Loosen connector ground stud sufficiently for it to slip out of the notch in the mounting bracket. Do not remove screws.

8.3 Separate connector base from oblique angle mounting bracket.

8.4 Remove screw from cable clamps. Separate cable clamps from oblique angle mounting bracket.

8.5 Mount cable clamps on universal connector mounting bar (Figure 10). Mount in the proper position for installation of the C-377 connector. Use the screws removed earlier in 8.4.

8.6 Install cable stub in cable clamps (Figure 10). Obtain desired cable stub, place through appropriate riser hole beneath desired distributing frame vertical, and mount in cable clamps. Mark cable number and pair count on cable stub. Attach shield ground wire under top cable clamp screw (Figure 11). If multi-hundred sheathed cable is stubbed and formed, run shield ground to bus bar. Cable may also be moisture sealed at the sheath butt point. Use locally approved practice for grounding and moisture sealing.

8.7 Mount oblique angle mounting bracket to universal connector mounting bar. Using the two 1/4x20 hex head mounting screws (supplied), install oblique angle mounting bracket as described for the stubbed connector (Section 7.3), but place it in the oblique angle position (Figure 10).

NOTE: Cable clamps and cable must remain attached to adapter bar. Do not move clamps to mounting bracket, as on stubbed units.

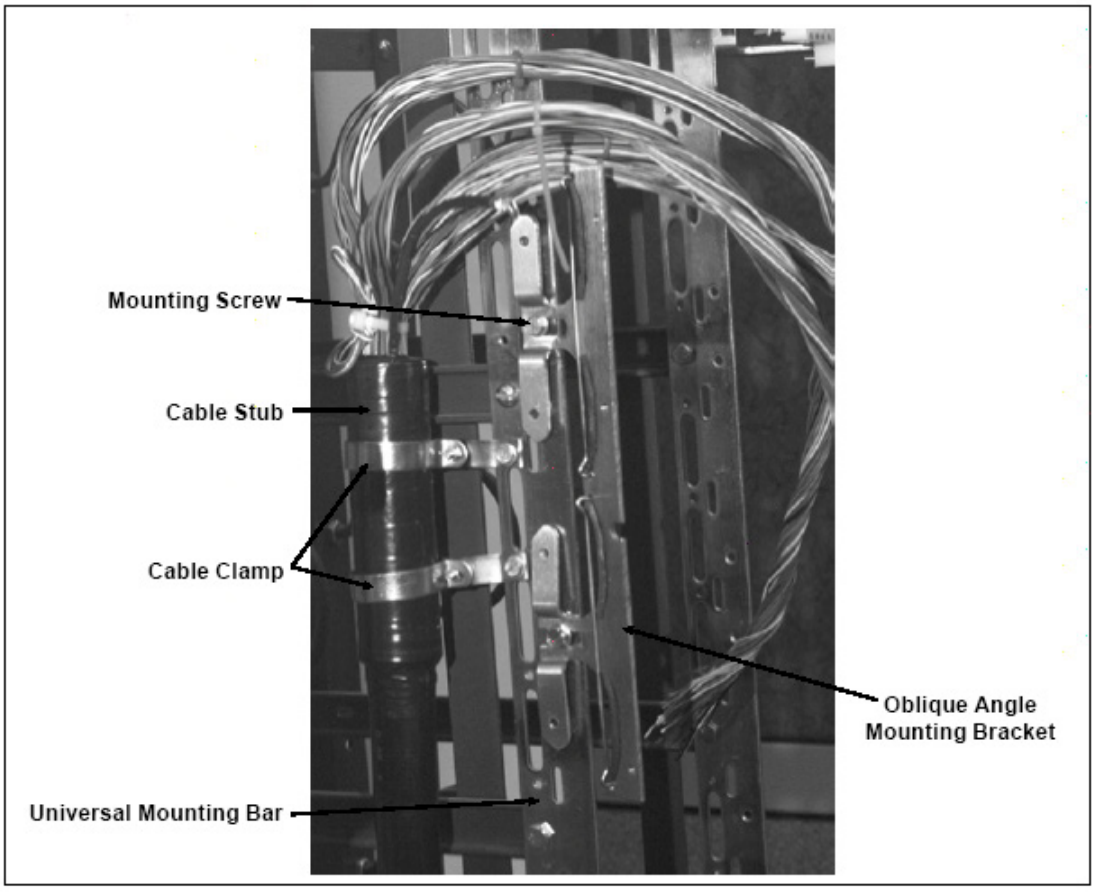

Figure 10 — Cable Clamp Mounting for Stubless Connectors

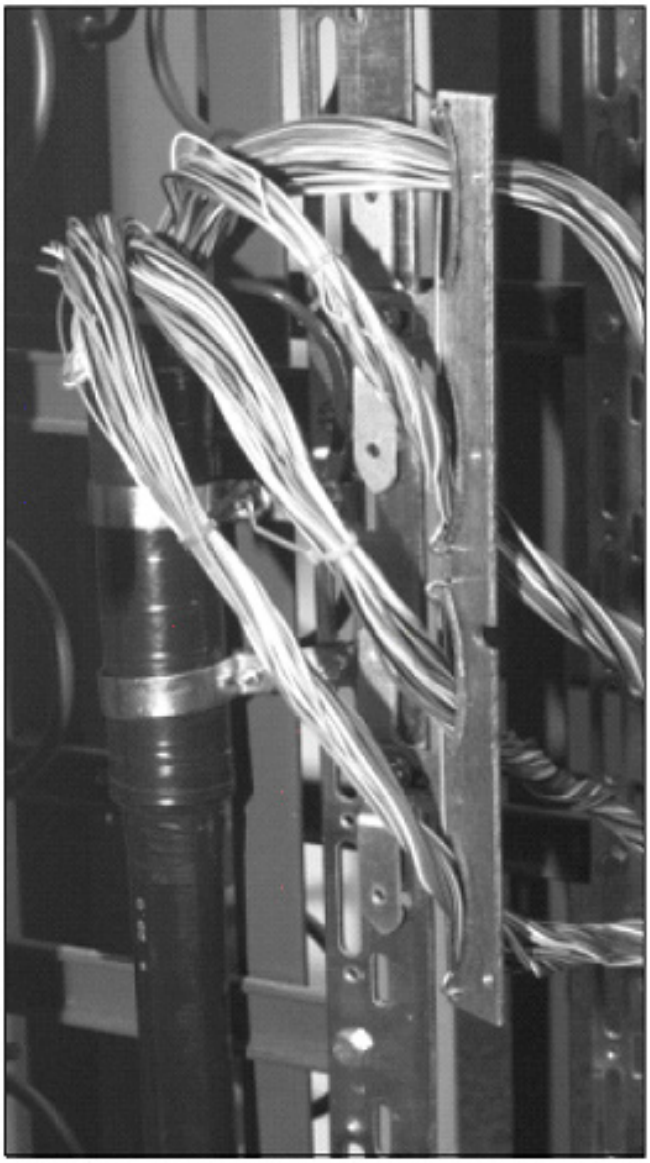

Figure 11 — Oblique Angle Mounting Bar Installation

8.8 Separate binder groups. Identify the four 25-pair binder groups of the cable stud, and feed them through the four large fanning holes between the wire retaining brackets and the edge of the oblique mounting bracket (Figure 11).

8.9 Replace connector base on oblique angle mounting bracket (Figure 12). Make sure the two mounting bracket screws fit fully into the two recessed holes in connector base, and the connector ground stud is fully inserted into the mounting bracket notch. Tighten screws and ground stud.

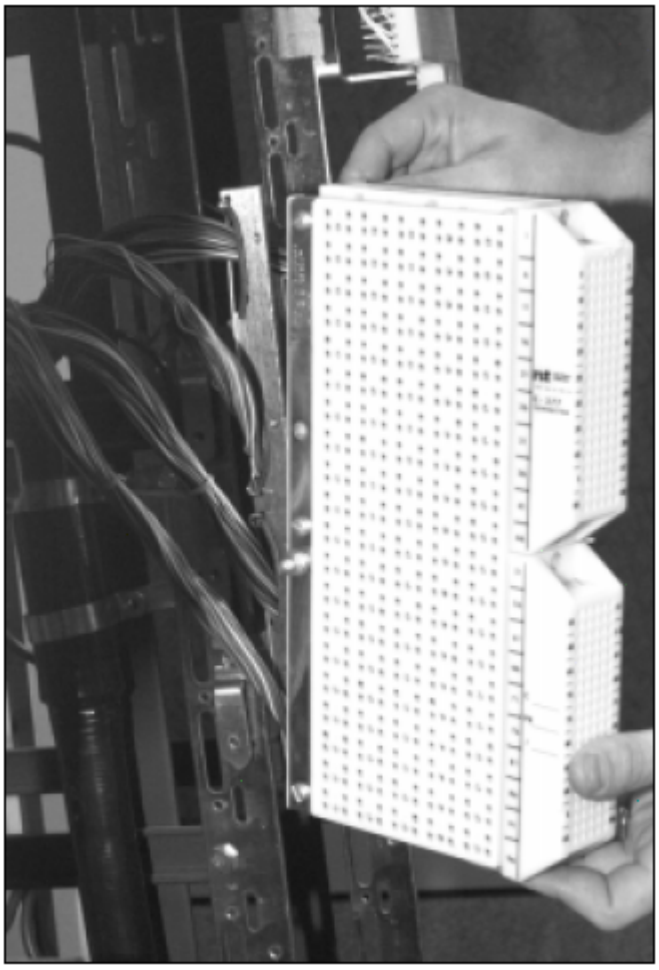

Figure 12 – Replacing Connector Base

8.10 Connect OSP pairs. Identify and separate each 25-pair binder group into five 5-pair groups, feeding them through the appropriate integral fanning strip holes on the connector base (Figure 3). Strip and connect each pair to its respective OSP terminals, building in sufficient slack to permit later changing of connector to its straight-on position without bending wires. (Use Table 1 and figure 13 as references in assigning pairs to terminals.)

8.11 Install T-guards. When wiring is complete, press T-guards straight into troughs, covering OSP terminals (Figure 3).

8.12 Change connector to straight-on position. Loosen the two hex head screws attaching oblique angle mounting bar, and move connector into its straight-on position, then tighten screws.

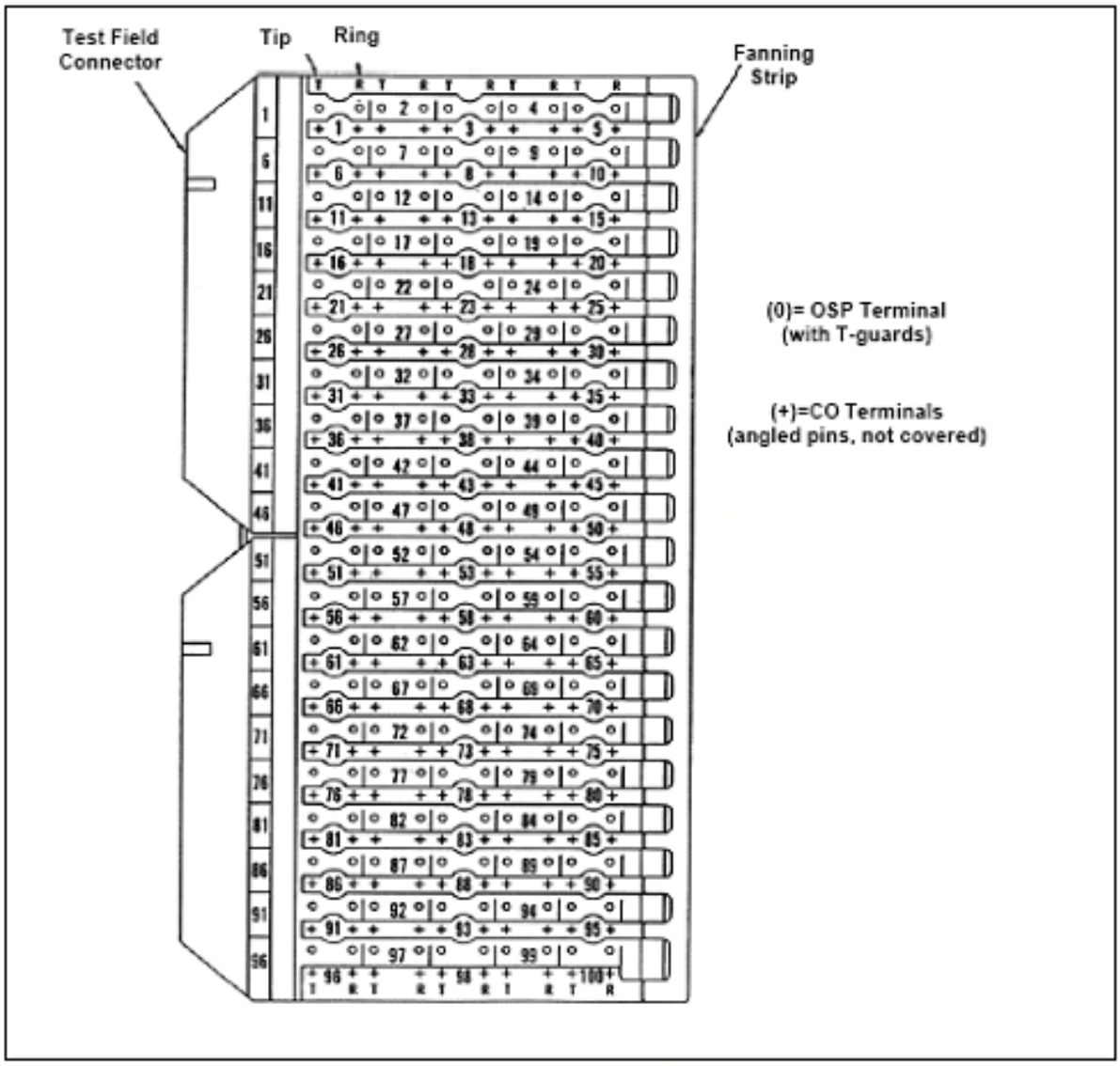

Figure 13 – C-377 Connector Terminal Assignments (viewed from wire-wrap side)

8.13 Install alignment clips. When all connectors have been mounted, install alignment clips as described for stubbed connectors (Section 7.4).

8.14 Ground the connectors. Use the grounding method described in Section 9, or use local CO practices.

8.15 Arrange cable stubs. Route all cable stubs against the transverse arms and other parts of the distributing frame to provide a neat and orderly routing to the riser holes. Lash cable stubs to the transverse arms (and other locations, if necessary).

8.16 Seal the riser holes in the floor in accordance with local instructions.

8.17 Splice cable stub to entrance cable. The cable stub is wired with standard cable wire color coding. Cable pairs can be matched to the central office jumper terminals on the back of the connector base per Table 1.

8.18 Connector base is now ready for jumpering to CO equipment. Be sure to leave protector modules in detent position to prevent any line faults from appearing on the CO jumper terminals during jumpering.

9. Grounding

9.1 Grounding of the C-377 connector can be easily accomplished by craftsperson in the field, using either the independent or the isolated grounding method, as illustrated in Figure 14.
Other local procedures may also be used, but in all cases, be sure that the connector ground stud is used for connection of ground.

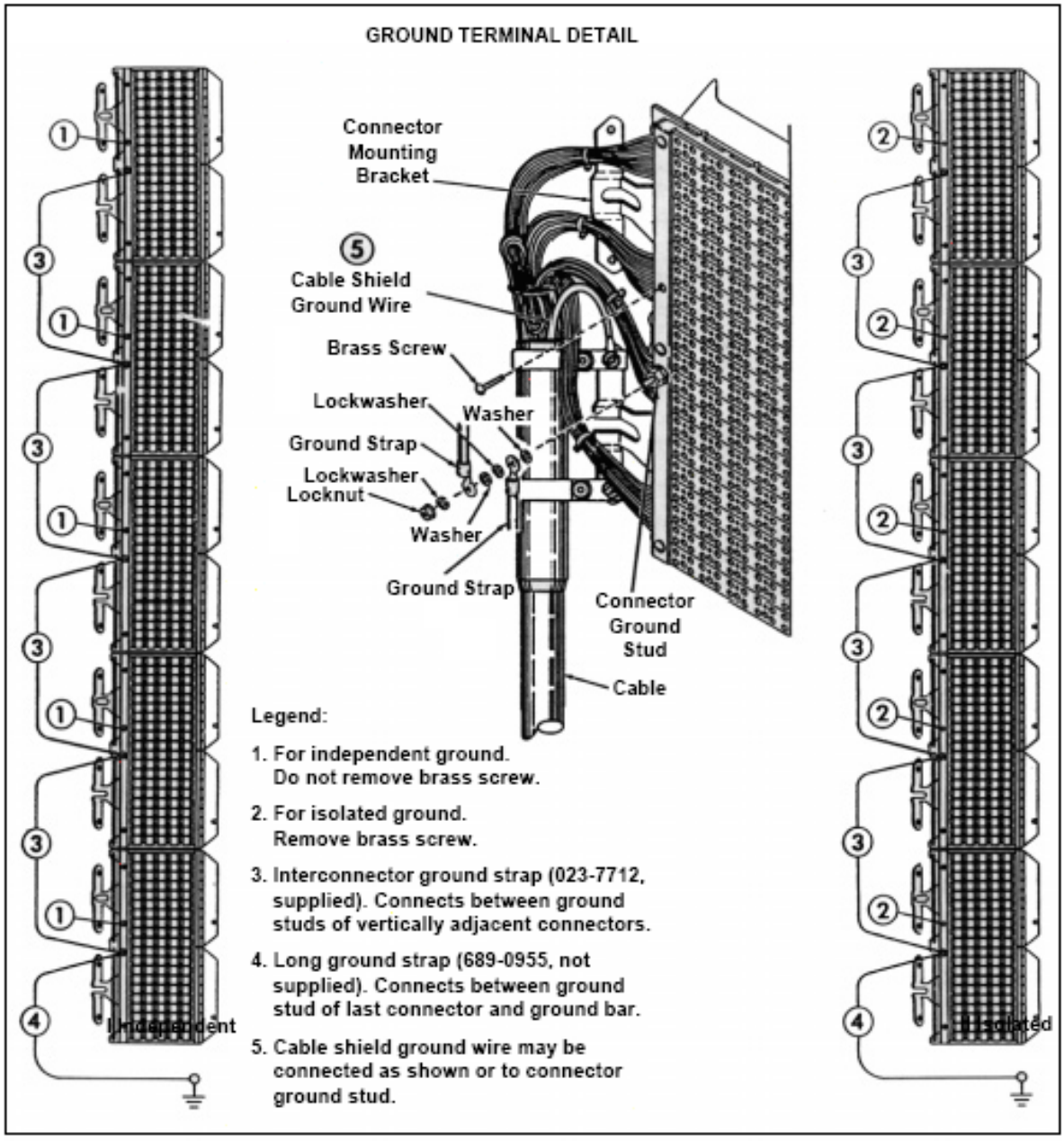

Figure 14 – C-377 Connector Grounding Methods.

9.2 Independent grounding method (Figure 14-I). In this method, the connector ground stud is connected to both the connector mounting bracket and the ground strap. [The supplied interconnected ground straps are connected between the ground studs of adjacent connectors on the same vertical, and an accessory long ground strap (catalog no. 689-0955) is connected from the last ground stud to the frame ground bus bar.] Therefore, ground is supplied to the connector from the frame ground bus bar both through the framework to the connector mounting bracket and through the linked ground straps to the ground stud.

9.3 Isolated grounding method (Figure 14-II). In this method, the connector ground stud is isolated from the connector mounting bracket by removing the brass screw. The ground strap connection is the same as in the independent method. Ground is supplied from the frame ground bus bar through the linked ground straps to each connector ground stud, but no ground circuit is carried through the frame work.

Note: If local requirements dictate isolation of the cable shield ground from the framework, the cable shield grounding wire can be disconnected from the connector mounting bracket (or connector mounting bar on field installed stubless units), and connected to the ground stud on the connector, as shown in Figure 14.

10. Marking and Jumpering

10.1 The side of the lower test field is provided with a space to mark the cable number and pair count for the connector (Figure 5). After marking, the connector can be jumpered. CO terminals are angled out for easy access when the connector is in the straight-on position. Terminal numbers are marked in black, on both sides of the test field, with a number for the beginning of every set of five terminals (1,6,11,16, etc.).Refer to Figure 15. Terminal numbers are also molded into the connector base between the rows of terminals (three numbers per row: 1,3,5,6,8,10, etc.)

10.2 All jumper wires should be routed through the connector base fanning strip holes before being wire-wrapped to the desired terminal. Use the fanning strip hole adjacent to the terminals being wired.

10.3 Replace plastic jumper field cover, if used (Figure 5).

10.4 The protector modules and the protector module field are keyed so that the protector modules can only be installed one way. When a module is initially installed, it should be placed in the "detent" position (Figure 7).

10.5 The detent position provides protection to the OSP pairs, but keeps the OSP pairs disconnected from the equipment.

CAUTION: Protectors are not considered grounded until a locally approved ground has been fully connected to the grounding system connector.

11. Connecting OSP to the CO

11.1 Push each connector module into the fully inserted position from the detent position. The outside plant and central office are then connected. This completes the installation procedure.

12. Final Testing

12.1 The connector base has two 50-pair test fields available at the top and bottom of the connector. Test points are connected directly to the outside plant cable with a separate connection for the ring and tip of every pair. The test field is marked with numbers showing the beginning and end of each row of five terminals (Figure 15).

Note: The protector modules may be placed in the detent position during testing, if desired. In this position the OSP (outside plant) and IP (inside plant) are disconnected; however protection is still connected to the OSP. If testing from the test field location, take care to be sure that test voltage does not exceed protector breakdown voltage.

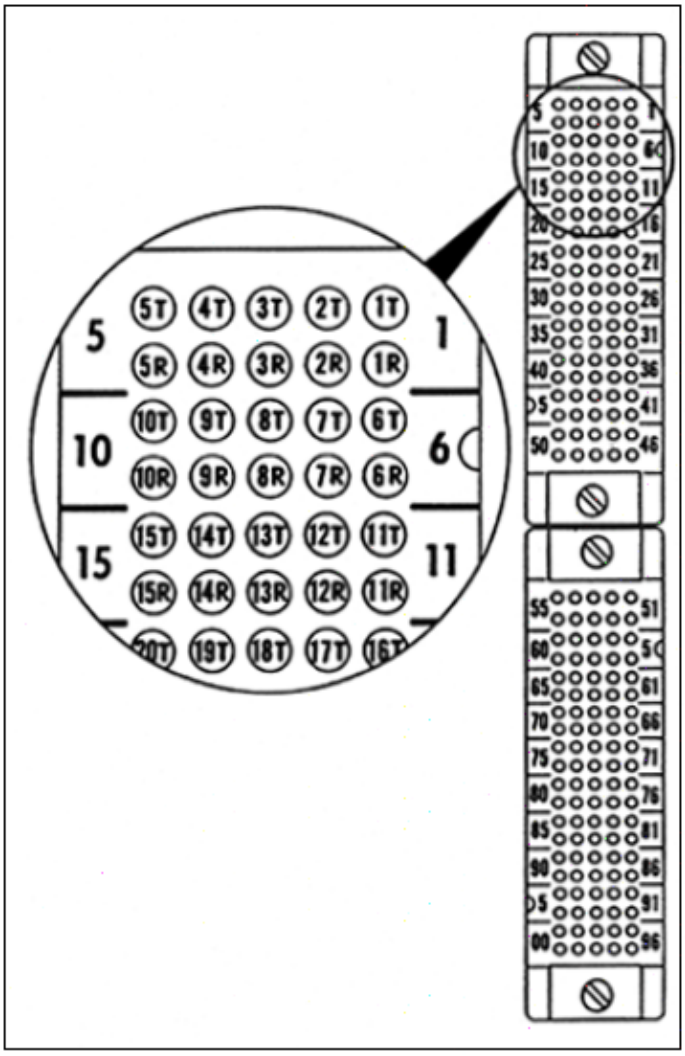

Figure 15 – Test Field Terminal Details