Cable Splicing
3M Modular Splicing System

Contents

(continued)

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Contents, continued

1. General

1.1 Purpose

This practice describes and illustrates the 3M Modular Splice System including the modules, tools, and applications.

1.2 Filing Instructions

Remove and discard Issue 2 and replace with this issue in your practices set.

1.3 Reason For Reissuing

This practice is being issued to establish guidelines for the use of the Super-Mini and Super-Mate splicing modules as the only system standard materials for splicing ALL new construction of 25 pairs and more and when practical in existing splices.

1.4 Supersedures

This practice supersedes the following documents:

- GTE Practice 632-100-901 CA, MS^{2}® Super-Mini Module — Cable Splicing.
- All local policies and procedures relating to the use of splicing modules, tools, or guidelines associated with the use of the splicing modules referenced in this practice.

1.5 Copyright and Responsibility

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1.6 Disclaimer

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2. 3M Splice System Description

2.1 Introduction

The 3M Splicing System is a 25-pair modular splice system that permits pluggable cable rearrangements and single pair repairs within the original module, without disrupting service of the other pairs.

All necessary tools for production splicing activities are available as either underground or buried kits or ordered as individual tools. Tools within each kit are compatible with all splice configurations and applications described in this practice.

2.2 Module Description

The 3M Super-Mini and Super-Mate modules are the only modules approved for use within GTE and will:

- Accept 22 through 28 AWG solid copper conductors insulated with paper, pulp, PIC, or foam skin.
- Connect and trim off 25 pairs of conductors at one time without stripping the insulation.
- Accept any combination of wire, 22 through 28 AWG, and insulation types within one module.

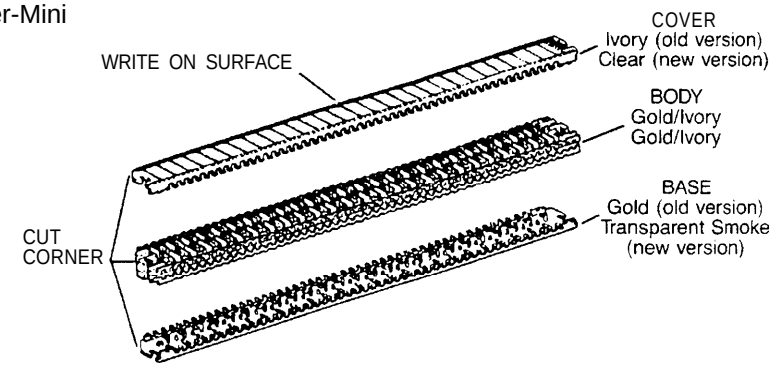
Both series modules are available in fire retardant material.

Each module consists of:

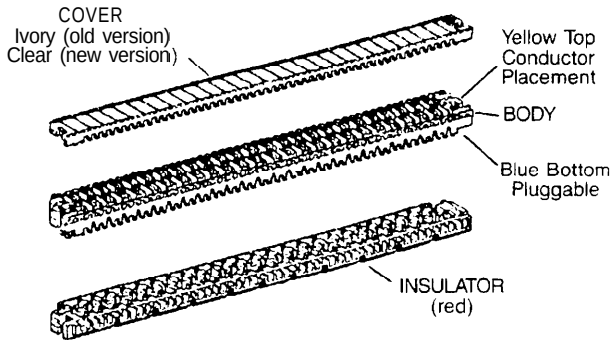
- Individual elements.
- Cutoff blades.
- Test entry ports.
- Removable covers and bases for reentry, stacking, or plugging.

The Super-Mini and Super-Mate modules are illustrated below.

Super-Mini



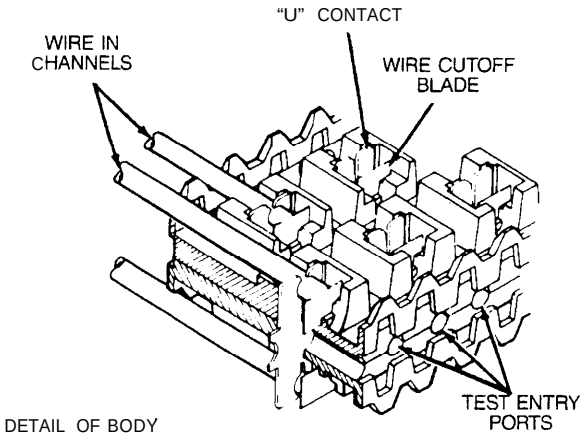
Super-Mate



2. 3M Splice System Description, continued

2.2 Module Description, continued

The following diagram illustrates the wiring components of the modules.



3. Application Guidelines

3.1 Introduction

The 3M Modular Splice System is the only GTE-approved production splice method and must be used on:

- All new cable construction of 25 pair and over.
- Any repair or rearrangement where the use of modules would be feasible.

Modules are used as described in the following chart.

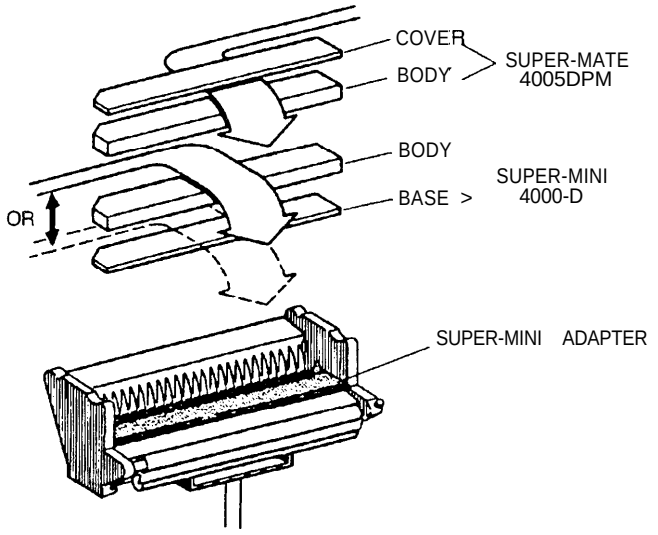
Type of Module:	Will be used when:
Super-Mini	Constructing Foldback, two-wire splices of 25 pair or more when no bridging cable exists. Clearing ends of nonworking pairs or dead-end pairs on the C.O. side wire of a splice.
Super-Mate	Constructing three wire splices such as: • Bridge splices. • Apparatus splices. • Half tap/cable transfers. Clearing ends on the field side wiring (stubs, apparatus tails, etc.).
Super-Mate or Super-Mini	Making rearrangements or additions whenever feasible in existing discrete connector or modular splices.

3.2 Use of Modules

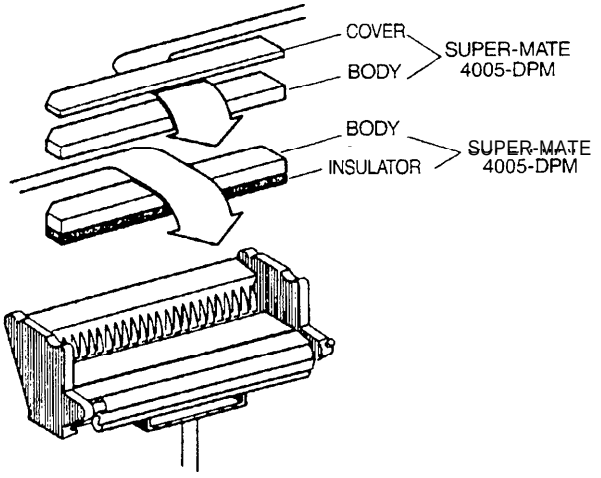
Follow these guidelines when performing moduiar splice activities.

- The central office side wiring will ALWAYS be laid into the connector first, with the field side wiring on top.
- The combination of module type and bank configuration dictates the length of the splice opening, bundle, and closure size.
- Use Super-Mini modules to clear pairs on the central office side wiring.
- Use Super-Mate modules to clear pairs on the field side wiring.
- The Super-Mate module can only be plugged into the top of the Super-Mini module. It CANNOT be connected to the bottom.

The Super-Mate and Super-Mini stacking combination is illustrated below.



Typical Super-Mate module splice configuration is illustrated below.



4. Splice Rig Assembly

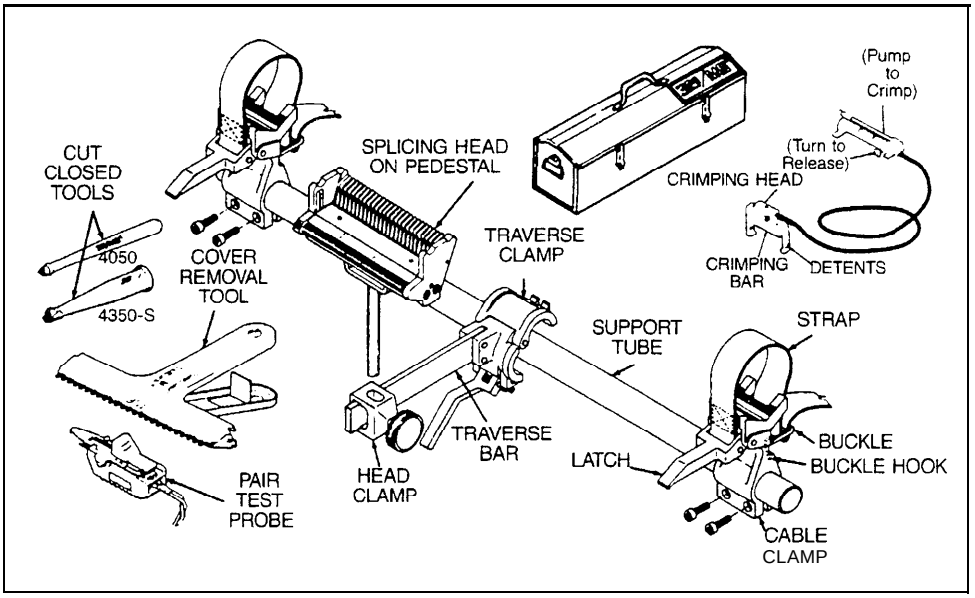
4.1 Parts Identification

The Modular Splicing Rigs are available as kits that include the necessary tools for constructing or reentering modular splices.

A variety of 3M Splice Rig Kits are standard within GTE; each is available with exclusive parts.

The following illustration provides parts identification and a description of basic components of the 4021 M kit. Kits identified with (-2) contain two splicing heads.

NOTE: Not all kits contain the same components.



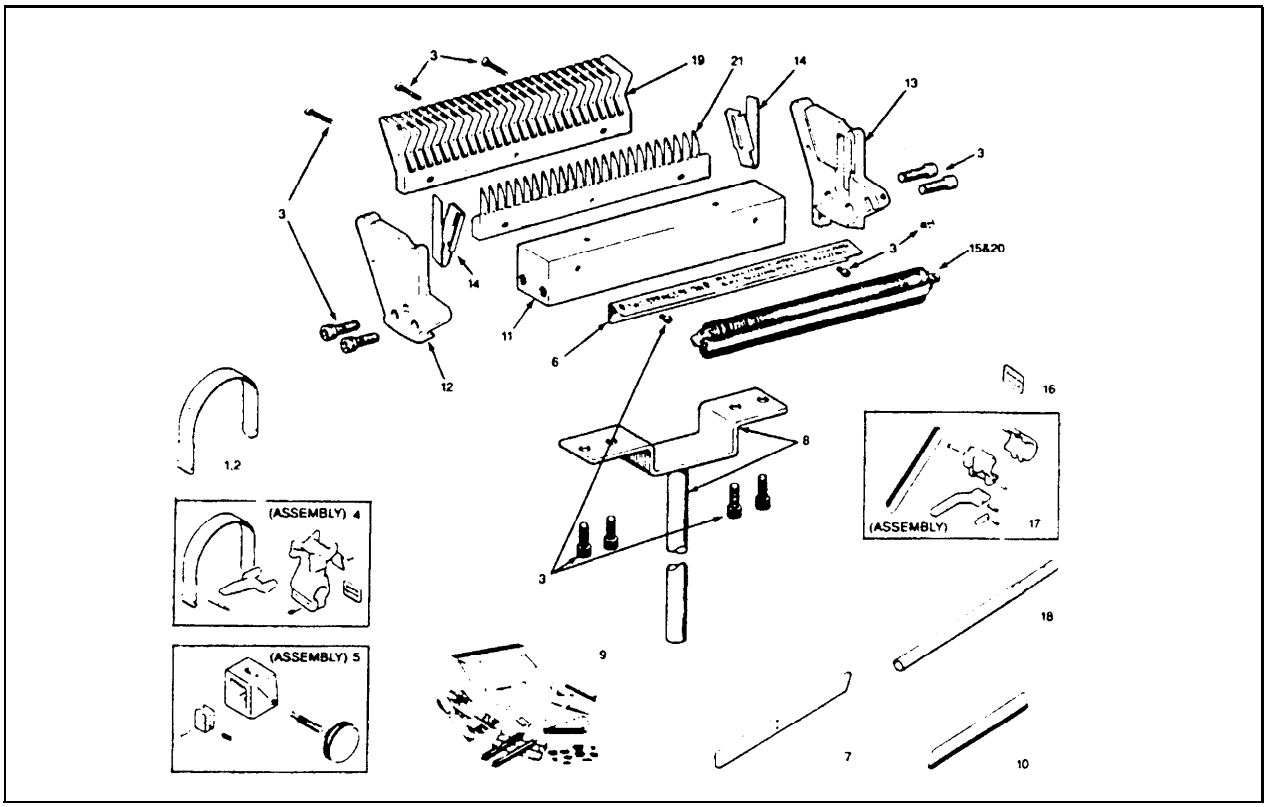
NOTE: All parts of the various splicing rig kits are material coded separately for the convenience of ordering spare parts.

Refer to 3M catalog for descriptive component listing of each kit.

4. Splice Rig Assembly, continued

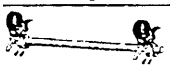
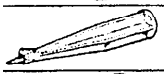
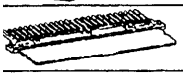
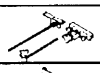
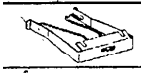
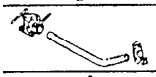
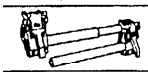
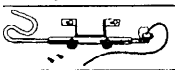
4.2 Splice Kit Nomenclature

Kit component listings and nomenclature of various splice rig components are as follows



ITEM	STOCKNUMBER	UPC	DESCRIPTION	PKG
1	78-8004-0855-7 SJ	26287	24” Cable Strap	l/es.
2	78-80 12-9575-5 SJ	26601	36” Cable Strap	1/cs.
3	78-80 12-9498-O SJ	26.593	Bag of Assorted Screws [577672]	1/cs.
4	78-8004-0844- 1 SJ	26286	Clamp Assembly [571885]	1/cs.
5	78-8004-0837-5 SJ	26284	Hand Knob Clamp Assembly [576293]	1/cs.
6	78-80 11-2558-o SJ	26479	Head Tape Plate	1/cs.
7	78-8004-084 l-7 SJ	26285	Long Traverse Bar	1/cs.
8	78-801 l-2557-2 SJ	26478	Pedestal	1/cs.
9	78-80 12-95 18-5 SJ	26595	Repair Parts Kit	1/cs.
10	78-8004-0862-3 SJ	26288	Short Traverse Bar	1/cs.
11	78-8004-0869-8 SJ	26289	Splice Head Body [576836]	1/cs.
12	78-8026-77 13-4 SJ	26860	Splice Head Side Plate — Left Hand (576334)	1/cs.
13	78-8026-77 14-2 S J	26861	Splice Head Side Plate — Right Hand (576335)	1/cs.
14	78-8004-0875-5 SJ	26293	Splicing Head Leaf Spring (578205)	1/cs.
15	78-80 1 l-2508-5 SJ	26476	Spring Wire Retainer 20-24,26-28 Gauge (5773101	1/cs.
16	26- 1004-5022-5 S J	17551	Strap Buckle	1/cs.
17	78-8004-0836-7 SJ	26283	Traverse Clamp Assembly [5718888]	1/cs.
18	78-8006-2467-4 SJ	26330	Tube Support Extension Assembly	1/cs.
19	78-8054-9695-3 SJ	I7636	Wire Guide Kit [575494]	1/cs.
20	78-801 l-2559-8 SJ	26480	Wire Retainer Assembly 22-26 Gauge (5773091	1/cs.
21	78-801 l-2560-6 SJ	26481	Wire Separator Kit [575495]	1/cs.

4.2 Splice Kit Nomenclature, continued

Rig/Kit Components		Type of Rig or Kit									
		4020M	4021M	4021M-2	4022M	4025K	4045K	4046A	4046AT	4046B	4046BT
	4041 Splicing Head Assy	*	*	**	**	*	*				
	Pedestal	*	*	*	**		*				
	Traverse Clamp Assy w/ Long Bar	*	*	*	**						
	Short Traverse Bar	*	*	*	*						
	Head Clamp	*	*	*	**						
	4042 Support Tube Assy	*	*	*	*						
	4031 Hand/Hydraulic Crimping Unit		*	*		*	*				
	4047 Pair Test Plug	*	*	*	*	*	*			*	*
	4051 Wire Insertion and Cutoff Tool	*	*	*	*	*	*			*	*
	4053 Cover Removal Tool	*	*	*	*	*	*			*	*
	Allen Wrenches	*	*	*	*	*	*	*	*	*	*
	4052T Check Comb	**	**	**	**	**	*	*	*	*	*
	Carrying (Rig) Case	*	*	*	*	*	*	*	*	*	*
	4025 Modular Connecting Head w/ Support Assy					*					
	4044 Quick Connect Splicing Head Frame Adapter					*					
	4045 Universal Splicing Head Support Assy						*				
	4046 Mechanical Crimper							*		*	
	4046 Mechanical Crimper w/ In Head Testing								*		*
	4053 PM Removal Tool									*	*
	Collapsible Support Tube									*	*
	Head and Bar Clamp							*	*	*	*
	4046 Adjustable Traverse Clamp							*	*	*	*
	Wire Group Holder							*	*	*	*

5. Splice Rig Components

5.1 4041 Splicing Head

The splicing head is used with the support rig for:

- Initial termination of conductors in modules.
- Making connection with preterminated modules.

Wire guides on the splicing head are color coded and used to:

- Enable speed and accuracy by allowing conductors of color coded PIC and tagged Pulp/Paper cables to be laid in their proper positions.

- Permit ease of separating tip and ring side of the conductors for proper alignment within the channels.

Conductors are ALWAYS laid in the module with the:

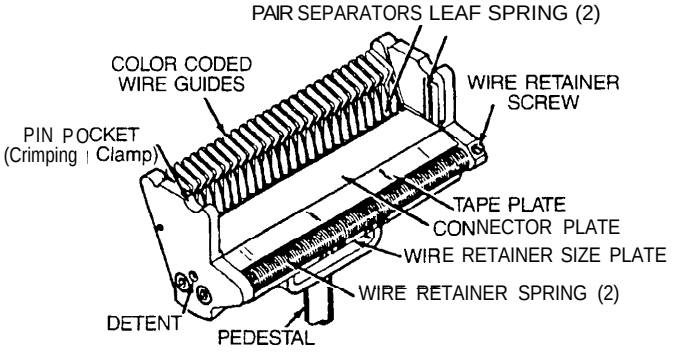
- Tip conductor on the left side of the wire splitter.
- Ring conductor on the right side of the wire splitter.

The splice head will hold the following module combinations:

- One Super-Mini and one Super-Mate.
- Two Super-Mates.
- Three Super-Mates (only those heads manufactured after 1987).

NOTE: Two splicing heads exist in the field; one manufactured prior to 1987, the other after 1987. The maximum capacity of the pre-1987 splicing head is two modules as indicated above.

The splicing head is illustrated below.



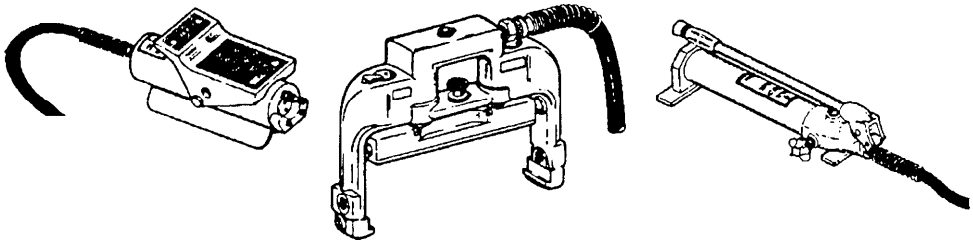
4041 **SPLICING HEAD**

5.2 4030 Air and 4031 Hand Hydraulic Crimping Unit

The crimping unit is used to hydraulically compress the initial wire termination in the module. It includes a:

- Crimping head to contain the module on the splicing head during crimping procedure.
- Hand or air hydraulic pump with air bleed-off valve to release crimping bar after connection is complete.
- Hydraulic Crimping Bar contained in the crimping head and activated by a hand pump to crimp module at factory set, 4400 PSI.

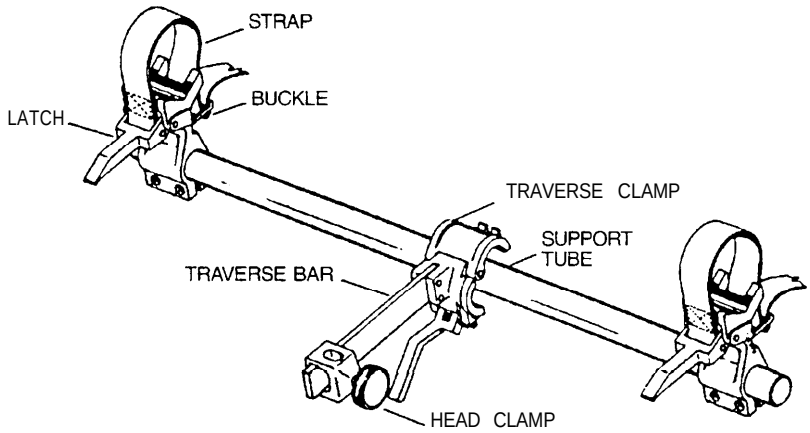
Both units are illustrated below.



4030/AIR HYDRAULIC UNIT | **CRIMPING CLAMP** | **4031/HAND HYDRAULIC CRIMPING UNIT**

5.3 Support Tube

The tube and related components provide support for cables and tools during the splicing procedure. See illustration.



6. Hand Tools

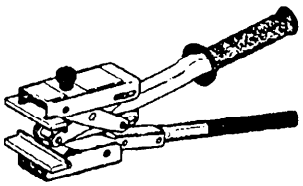
6.1 4255 Hand Press

The 4255 Hand Press is used for:

- Crimping covers or bases on Super-Mini modules.
- Plugging combinations such as:
  - Super-Mini to Super-Mate.
  - Pre-Con to Super-Mini.
  - Super-Mate to Super-Mate.

6.2 4270 Hand Presser

The 4270 is used for plugging any combinations of up to seven modules together.

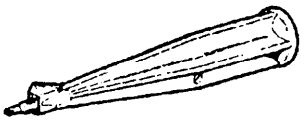


Use either the 4255 or 4270 Hand Pressers by making:

- First crimp in the center of the module.
- Second crimp to the left side of module and overlapping first crimp position.
- Third crimp to the right side of the module and overlapping first crimp position.

6.3 4051 Wire insertion Tool

The 4051 is used to make single pair conductor rearrangements within any module. This tool will implant conductor in “U” contacts and cut excess wire in an operation.



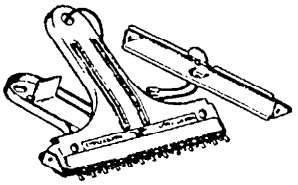
6.4 4053 Cover Removal Tool

The 4053 is designed to remove the cover and base of the module. Do **not** use it for unplugging the Super-Mate (DPM) module.

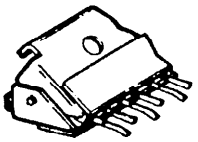
6.5 4053PM Removal Tool

The 4053PM is the only tool to be used to unplug the Super-Mate (DPM) module. Do **not use it to remove covers or bases from either module.**

The 4053 and 4053PM Removal Tools are illustrated below.



4053



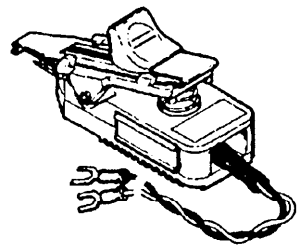
4053PM

NOTE: The enlarged pins of the 4053PM distinguish it from the 4053.

7. Accessories

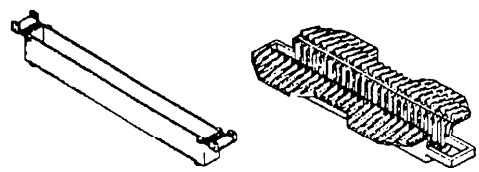
7.1 4047 Pair Test Plug

The 4047 pair test plug is used to test pairs through the access ports provided opposite the conductor entrance ports in the module.



7.2 4075s Super-Mini Sealant Box

The 4075s sealant box is designed to be installed over the Super-Mini module for moisture protection in all two wire, non-pressurized (PIC or Foam Skin) splices. It is illustrated below with the insertion tool.



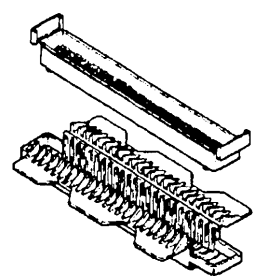
NOTE: Do not reuse sealant boxes.

7.3 4077 Series Sealant Box

The 4077 series of sealant boxes is designed to be installed over the Super-Mate (4005DPM) module for moisture protection in all non-pressurized (PIC or Foam Skin) splices. Use according to the following:

. 4077A — One Super-Mate module.
. 40778 — One Super-Mate and one Super-Mini module.
• 4077C — Two Super-Mate modules.
• 4077D — Three Super-Mate modules.

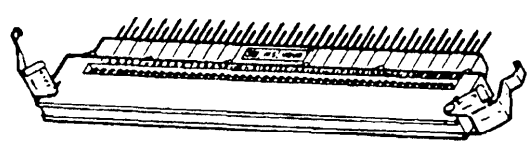
The 4077 Series Sealant Box (with insertion tool) is illustrated below.



NOTE: Do not reuse sealant boxes.

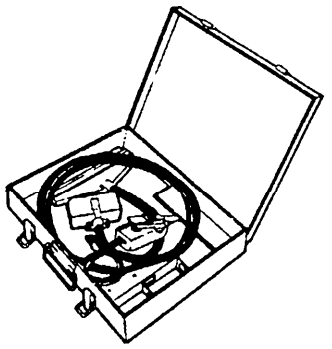
7.4 4048S Super-Mini 25-Pair Test Probe

The 4048s test probe is designed to interface with the Super-Mini or Super-Mate modules and provides access for identification of cable pairs. Clips on sides of probe are used to secure it to the module.



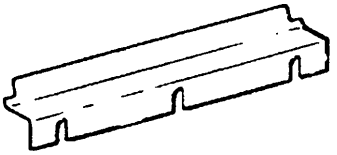
7.5 4048SA-1 Kit Super-Mini 25-Pair Probe Assembly

The 4048SA-1 kit interfaces with test equipment and rotary switches with Cinch Jones male plugs. The probe assembly is designed for accurate continuity testing and tagging of Super-Mini modules.



7.6 4041 Rear Spring Holder

The 4041 rear spring holder is designed to be used when addition of a second set of wire retainer springs is needed to be attached to the back of the 4041 splice head. Used when converting discrete connector splices to modules.



7.7 4041-2 and 4041-4 Uniiength Hooks

The unilength hooks attach to the splice rig to retain conductors during the construction of a unilength splice configuration.

4041-2 2" UNILENGTH HOOK
4041-4 4" UNILENGTH HOOK

7.8 Additional Tools and Accessories

Tools and accessories not listed in this section may be referenced in this practice. A listing of GTE standard materials, including spare parts for splicing rigs and modules, related to the use of the 3M Splicing System is available in the latest revision of PSB 1236. Order tools and material through normal tool requisitioning procedures.

7.9 Cleaning and Care of Tools and Accessories

Ensure that all dirt and cable filling compound have been removed from the tools and accessories after each use.

Lubricate all moving parts periodically to prevent tool damage and/or bad splice connections.

Replace worn or damaged parts immediately.

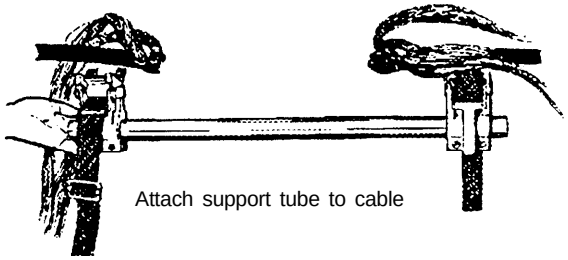
Store components and accessories in a kit container to prevent deterioration and loss.

8. Splice Rig Setup Procedures

8.1 Basic Application

The splice rig can be set up in most aerial, buried, and underground applications according to the following.

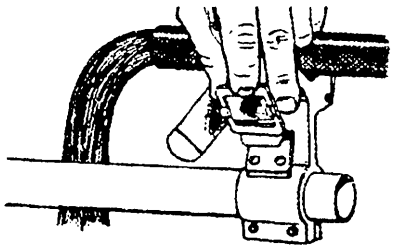
Step	Setting up the Splice Rig
1	Attach the support tube under the cable and center it on the splice opening as illustrated below.



Attach support tube to cable

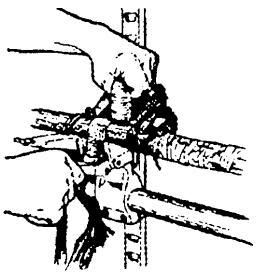
NOTE: **Buckle hooks should be toward the rear and the clamping handle toward the craftperson.**

2	Place the strap over the cable as shown.



Attach buckle

3	Tighten the strap by pulling most of the slack from the strap while the latch is in the up position.



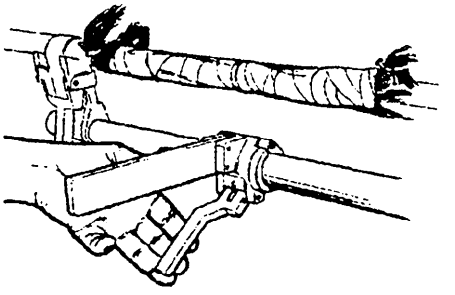
Tighten strap

4	Push the latch down to lock and secure the support tube to the cable.

8.2 Head Clamp and Splice Head Placement

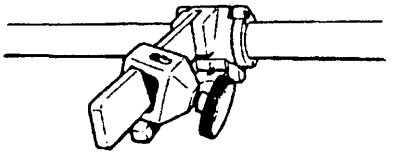
Follow this procedure to attach and position the head clamp assembly and splice head-

Step	Attaching and Positioning the Head Clamp Assembly and Splice Head
1	Attach traverse clamp assembly.



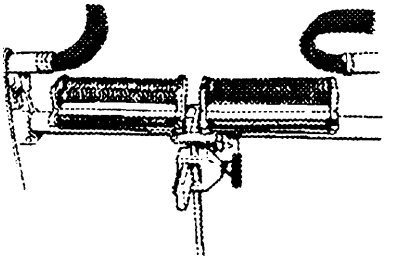
Attach traverse clamp assembly

2	Slide head clamp on traverse bar,



Slide head clamp on traverse bar

3	Insert pedestal in head clamp.

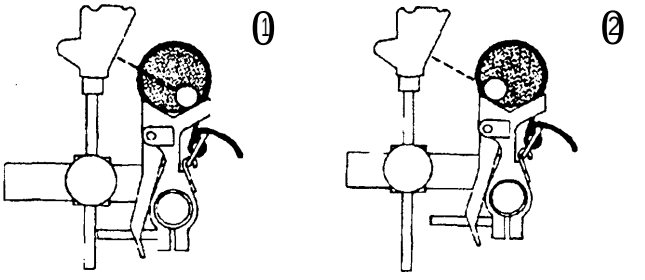


Insert pedestal in head clamp

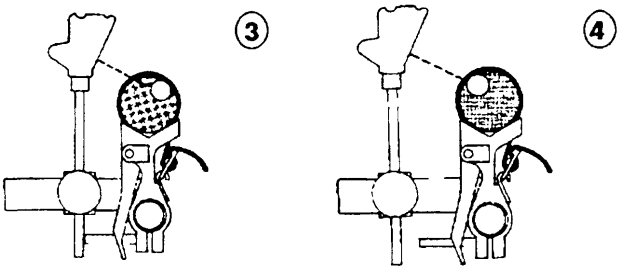
(continued)

8.2 Head Clamp and Splice Head Placement, continued

Step	Attaching and Positioning the Head Clamp Assembly and Splice Head
4	Adjust splice head(s) to the group being spliced as shown below, leaving four-inch slack between cable butt and splice head.



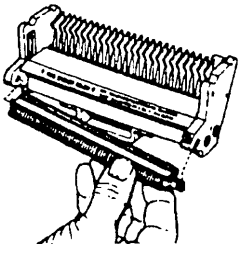
Splice back, bottom group first



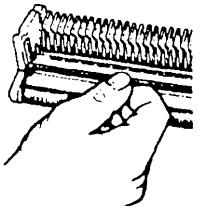
Adjust head(s) to group being handled ...
4" slack between cable butt and splice head

NOTE: Splice head must be higher than the group being spliced.

5 Set retainer spring in proper wire gauge.



NOTE: In the 4041 splice head, the gold adapter is used with the Super-Mini modules only.

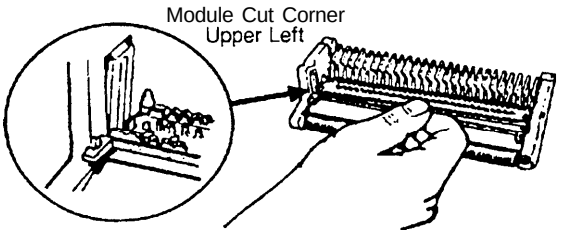


8. Splice Rig Setup Procedures, continued

8.3 Module Placement in Spf ice Head

Select the module (Super-Mini/Super-Mate) to be used and proceed according to the following.

If you are using a ...	Then
Super-Mini Module	Insert the splice Head Adapter then the module base in the Splice Head with the cut corner, top left.
Super-Mate Module	Insert the body/insulator in the Splice Head with cut corner, top left.



9. Wire Handling Procedures

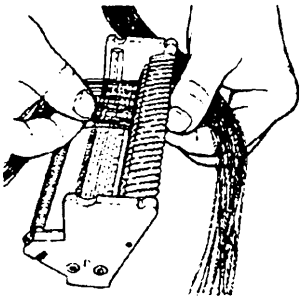
9.1 Conductor Placement in Modules

Use the following guidelines for handling and placing conductors in the module.

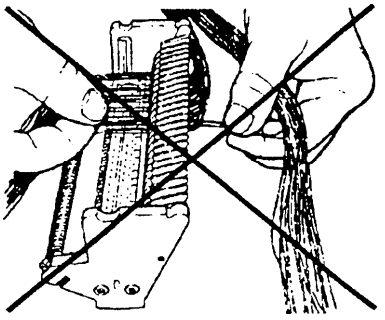
Step	Wire Handling Procedure
1	Select 25pair group (from C.O. side) and hold conductors behind the module with the left hand, feeding them into corresponding color code positions on the splice head with the right hand and securing them in the retainer spring.

NOTE: Thumb of guide hand (left) must remain close to the back of the splice head to prevent twist in pairs.

RIGHT

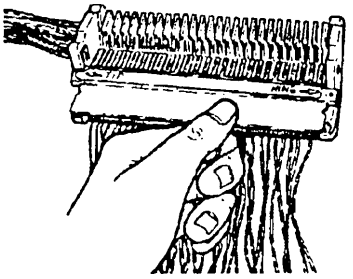
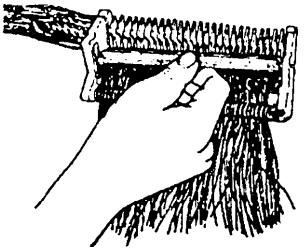


WRONG!



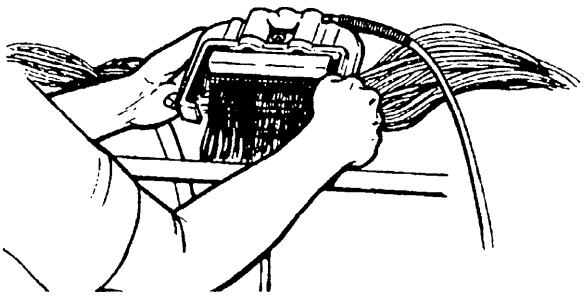
(continued)

9.1 Conductor Placement in Modules, continued

Step	Wire Handling Procedure
2	After each 25 pair has been placed in the splice head, use the check comb to be sure that: • Only one wire occupies each channel. • Pairs are lying flat. • Pairs are not reversed. Check this by: — Moving check comb left to verify tip conductors. — Moving check comb right to verify ring conductors. 
3	Install next module component and place corresponding group (field side) into module using foldback or unilength configuration and repeat steps 2 and 3. 

9.2 Crimping Modules

Use the following procedures to crimp conductors in the modules when using the 4031 hand or 4030 air/hydraulic crimpers.

Step	Crimping Conductors in the Modules
1	Rest crimper clamp on splice head with the legs angled toward you. **NOTE: Hydraulic hose can face either left or right.** 

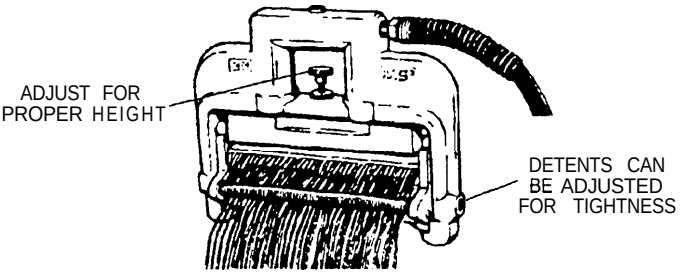
(continued)

9.2
Crimping Modules, continued

Step	Crimping Conductors in the Modules
2	Rotate the clamp until it **is** locked in an upright position by the detents.

NOTE: Crimping bar return can be adjusted to reduce the number of strokes required for crimping a two-wire connection.

Crimping bar must be completely backed off for three-wire connection.

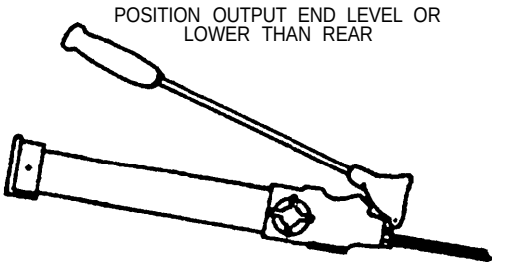


SEE STEP 3B FOR AIR/HYDRAULIC PUMP

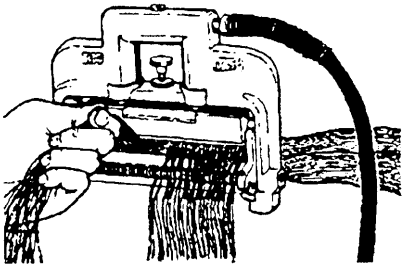
3A When using the hand/hydraulic pump:

- Position the output end (end closest to the air hose) level or lower than the rear as shown below.

HAND/HYDRAULIC PUMP



- Close the pressure release valve and operate the handle until the bypass is heard, then pump three additional times.
- Leave the crimping clamp closed and remove one-fourth to one-third of the cut conductors by lifting them straight up from the retainer spring.



(continued)

9.2 Crimping Modules, continued

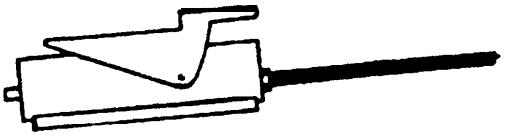
Step	Crimping Conductors in the Modules
	SEE STEP 3A FOR HAND/HYDRAULIC PUMP

3B When using the air/hydraulic pump:

- Position the output end of the foot pedal (end closest to air hose) level or higher than the rear.

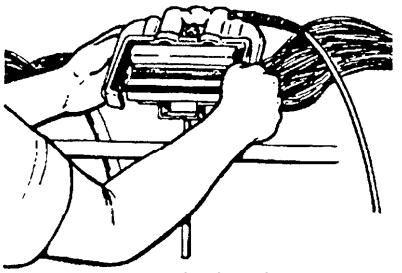
AIR/HYDRAULIC PUMP

POSITION OUTPUT END LEVEL OR HIGHER THAN REAR



- Operate the PRESS/RELEASE control to the PRESS position and hold until the pressure bypass is heard.

- Leave crimping clamp closed and remove one-fourth to one-third of the cut conductors by lifting them up from the retainer spring as shown in Step 3A above.



Remove crimping clamp

Use the 4255 and 4270 hand crimpers to crimp modules in various configurations described throughout this practice.

Overlapping crimps are required to ensure continuity through the module. Accomplish this by making the:

- First crimp in the center of the module.

- Second crimp on the left side of the module, overlapping first crimp.

- Third crimp on the right side of the module, overlapping first crimp.

10. Splice Setup and Procedures

10.1 Using the Super-Mate Connector

The following guidelines pertain to the use of the Super-Mate splice connector:

- The Super-Mate module is the only modular connector to be used for bridge and half-tap splicing within GTE Telephone Operations.
- The Super-Mate module cannot be used with the non-standard 4005D or 4005C Bridging Modules.
- The 4046 Mechanical Crimper requires the use of the Super-Mini Splice Head Adapter.
- All bridging cables will be built using the Super-Mate module in the Unilength method to insure adequate wire slack for future plugging and unplugging capabilities, as described in Paragraph 10.3 of this practice.
- Field conditions (manhole size, cable congestion, etc.), must be considered; a splice built of entirely 4005DPM modules may require a larger splice closure.

10.2 Super-Mate to Preterminated Super-Mini Module

The Super-Mate can be bridged to existing pairs with ends cleared in the base portion (female) of the Super-Mini module according to the following procedures.

Step	Bridging Super-Mate to Existing Pairs
1	Place a Super-Mini splice head adapter in the MS2 Splicing Head.
2	Place the preterminated Super-Mini module (base, body, and cover) in the MS2 splicing head.
3	Remove the cover of the preterminated module.
4	Remove the red insulator from a Super-Mate module.
5	Place the DPM body on top of the Super-Mate module body.
6	Lay the new 25-pair cable complement in the Super-Mate body.
7	Check the new complement with the check comb as described in Paragraph 9.1 of this practice.
8	Place the Super-Mini cover on the top of the module body.
9	Complete the crimping operation as described in Paragraph 9.2 of this practice.
10	Using an indelible ink marker, identify the modules by binder group on the module cover (if sealant boxes are not needed) or directly on the sealant box (if they are needed).

10.3 Unilength Splice Configuration Using Super-Mate Module

The unilength configuration provides flexibility within the splice for rearrangements at a later date and reduces problems of reentry into encapsulated splices.

The unilength measurement must be used for various splice configurations as described in this paragraph.

The unilength configuration, using Super-Mate modules, is applied to the field side wiring of all splices with the Super-Mate module when the splicing operation includes one of the following:

- A branch splice.
- An apparatus splice.
- Half tap, permanent, or temporary.

Always lay the C.O. side wiring directly into the Super-Mate module as in an in-line (straight) splice configuration.

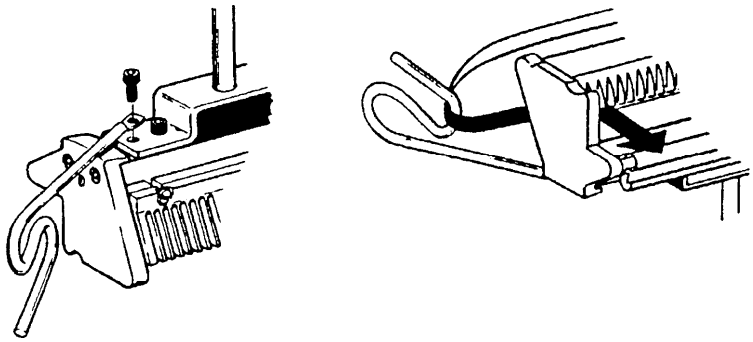
10.4 Unilength Splice and Conductor Preparation

Determine the unilength measurement by:

- Taking the complement from the field side **to** be spliced, across the length of the splice opening, plus two inches, to a loop point (Unilength Hook) and doubled back to the Splice Head, designated bank, position.

  NOTE: Conductor length must be long enough to be contained within the wire retainer spring of the splice head during the splicing operation.

- Attaching the loop hook to the splice head to construct a unilength splice as illustrated below.

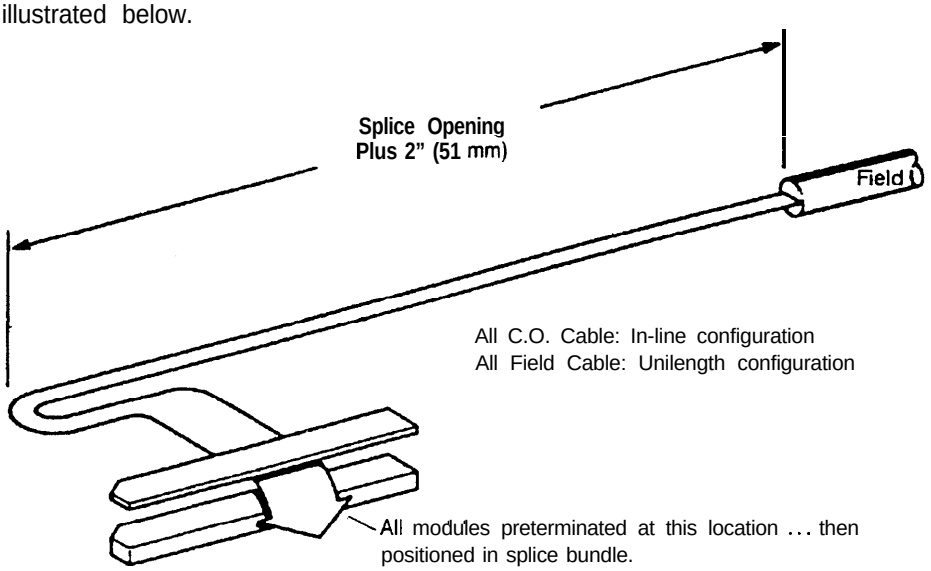


NOTE: The Loop Hook can be attached to either side of the Splice Head depending on which side of the splice opening the bridging cable is entering.

(continued)

10.4 Unilength Splice and Conductor Preparation, continued

A typical bridge using the unilength method of splicing the bridging cable is illustrated below.



Use the chart below to determine conductor lengths of the unilength splicing method.

Splice Configuration	Splice Opening	Unilength
Z-Bank	17″–19″	19″–21″
3-Bank	27" Minimum	29"
4-Bank	36" Minimum	38"

10.5 Unilength Splice Construction Procedures

Use the following procedures to construct a unilength splice using the Super-Mate Module.

Step	Constructing a Uniiength Splice Using the Super-Mate Module
1	Set up splicing rig with splicing heads as described in Section 8 of this practice.
2	Place the body with the red insulator in the MS2 Splicing Head.
3	Lay the first 25pair CO. side of the cable complement in the module body of the splice head closest to the C.O. side (first bank position) then repeat with the next 25pair to the second splice head, closest to the field side cable (second bank position). **NOTE: Always splice** 50 **cable pair at a time.**
4	Check the conductors with the check comb.

(continued)

10.5 Unilength Splice Construction Procedures, continued

Step	Constructing a Unilength Splice Using the Super-Mate Module
5	Remove the red insulator from a new Super-Mate module as follows. A. Disengage both alignment post by prying ends of insulator downward with snips inserted into end slot as illustrated below. B. Rotate insulator down and forward off Super-Mate module saving the red insulator since it is reusable.
7	Place the new module body on top of the existing module body.
8	Take first 25pair field side wiring or bridging cable across length of splice opening to the two-inch unilength hook and back to matching C.O. group, previously terminated in first splice head position, and lay into position on module body. Take second group of field cable or bridge across opening to hook and back to second splice head position.
9	Check each 25pair complement with the check comb.
I0	Place a yellow cover on top of the module body.
11	Complete the crimping operation as described in Paragraph 9.2 of this practice.
12	Identify the spliced binder groups by marking the module cover with an indelible ink marker.
13	Repeat until entire splicing operation has been completed.
14	Place sealant boxes on all modules when splice is not part of a pressurized system.

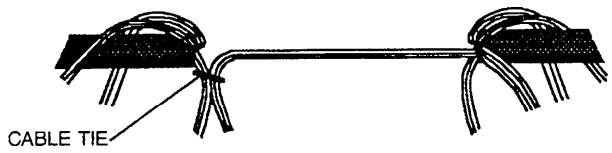
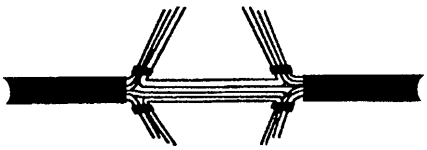
10.6 Foldback Splice Configuration

The foldback splice configuration:

- Is constructed by alternating the C.O. and field side wiring into a foldback configuration as described in Paragraph 10.7 of this practice.
- Provides maximum versatility of the spliced conductors permitting easy access for rearrangements or maintenance and reduces difficulty of reentering encapsulated splices.
- Creates a larger splice bundle as a result of the additional wire length which must be considered when selecting closure size.
- Is used when splicing through cables having no bridge, apparatus, or half-tap stubs during initial construction.

10.7 Two-Bank Foldback Splice

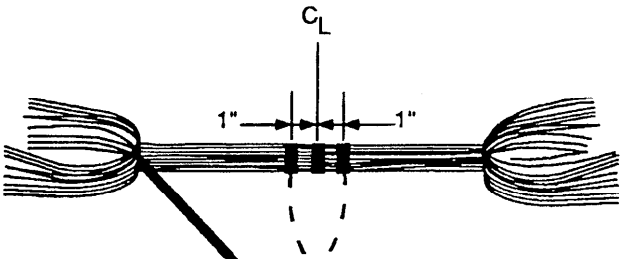
Use the following procedures to construct a one-man, two-bank foldback splice.

Step	Constructing a One-Man, Two-Bank Foldback Splice
1	Splice opening must be that recommended for the closure used. Free conductor length of each cable is two times the sheath opening plus six inches.
2	Identify all binder groups by: A. Starting with the lower back groups, apply binder identification cable tie loosely around matching binder groups as close to the cable butt as possible as illustrated below. **NOTE: Cable ties must remain loose so they can later be slid and secured at the base of the module.**  B. Alternate tie points from side to side until all matching groups are tied as shown.  **EXAMPLE: First group from C.O. will foldback into first splice head position. First group from field will be laid directly into first splice head. Second C.O. group — directly to second splice head; Second field group — foldback to second splice head.** **C.** Fold all even number groups to the left side. D. Fold all odd number groups to the right side.
3	Set up splicing rig with one splicing head as described in Paragraph 8.1.

(continued)

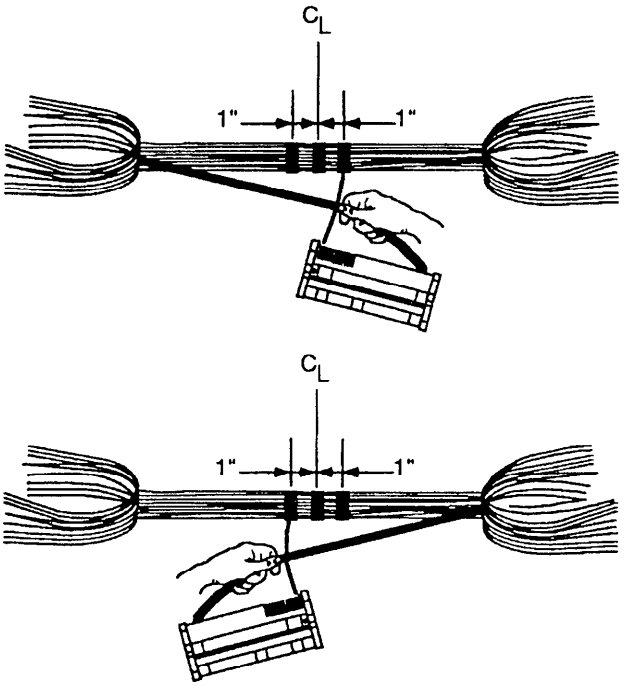
10.7 Two-Bank Foldback Splice, continued

Step	Constructing a One-Man, Two-Bank Foldback Splice
4	Measure and mark the center of the sheath opening and one inch on both sides away from center as illustrated below.



5 Repeat the following three measurements for each binder group being spliced throughout the splicing operation to prevent modules from overlapping or laying them over tie points.

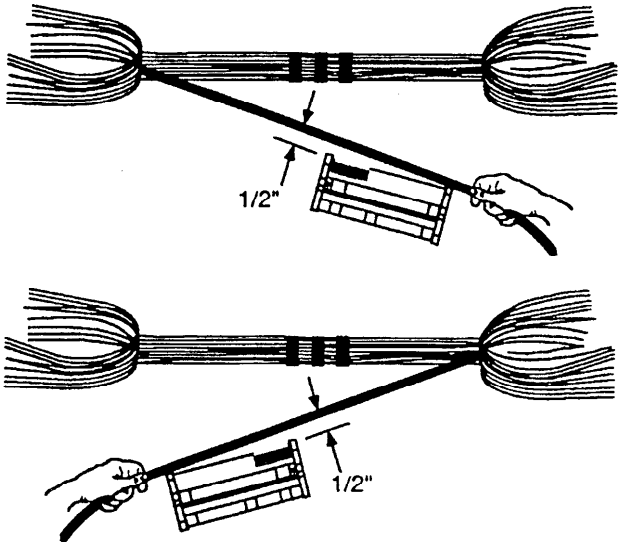
A. Align the splicing head with the marks previously established l-inch from center as illustrated below.



(continued)

10.7 Two-Bank Foldback Splice, continued

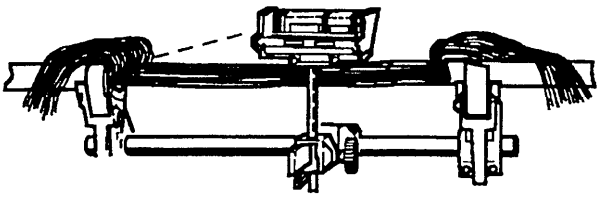
Step	Constructing a One-Man, Two-Bank Foldback Splice
5, cont.	**5.** Rotate splicing head to assure that the modules will lay parallel with the core of splice opening as illustrated below.



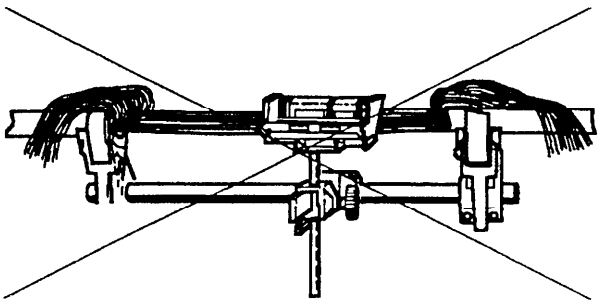
C. Adjust height of splicing head to prevent conductors from lifting out of wire channels before module is crimped and to assure easy removal of the module from the splicing head.

Position head slightly higher than origin of groups to be spliced so that wires are running at a slight angle up into the splicing head as illustrated below.

RIGHT

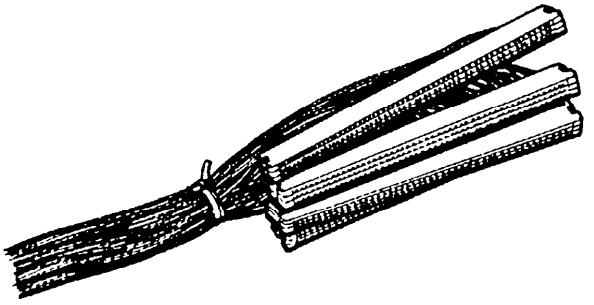
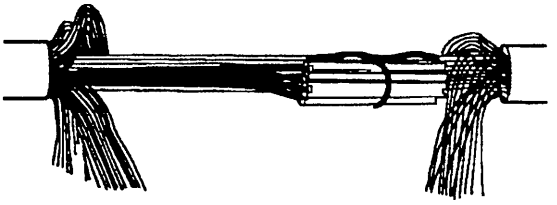
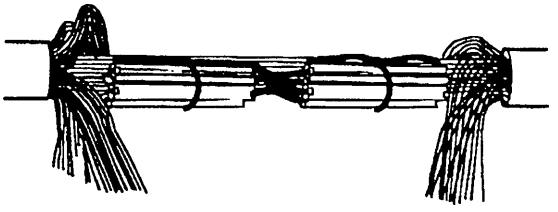


WRONG!



(continued)

10.7 Two-Bank Foldback Splice, continued

Step	Constructing a One-Man, Two-Bank Foldback Splice
6	Bundle the modules as they are being spliced.
7	Plan first module location and splice first 100-Pair group at proper location.
8	Mark each module with binder group number for identification by using indelible marker on module cover.
9	Slide binder identification cable tie from Step 2 up the binder group to the base of the module and tighten only enough to keep it from slipping from the module. Cable tie placement on the binder group is illustrated below. 
10	Lay group against core and bundle as shown in the illustration below. 
11	Move splicing head to other side and locate the position for the second group.
12	Splice, bundle, and identify the second 100-pair group as illustrated below. 

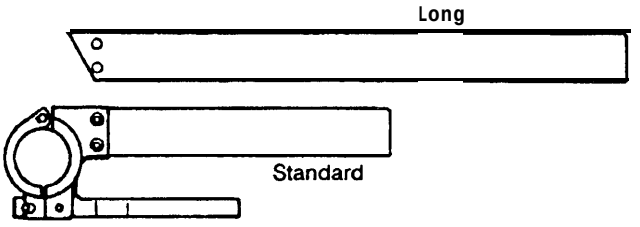
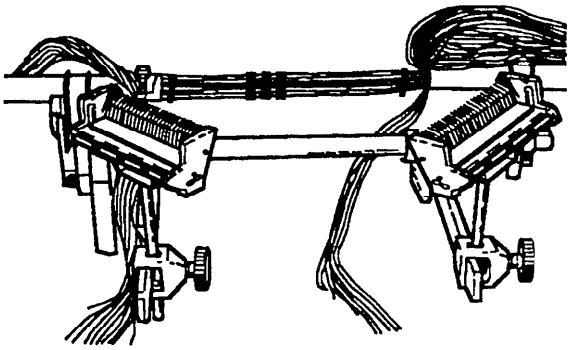
(continued)

10.7 Two-Bank Foldback Splice, continued

Step	Constructing a One-Man, Two-Bank Foldback Splice
13	Repeat the above procedures alternating left to right until the splice is complete.
14	Secure bundles in bank positions with tie cables.
15	Install sealant boxes on all modules when splice is not part of a pressurized system.

10.8 Two-Person, Two-Bank Foldback Splice

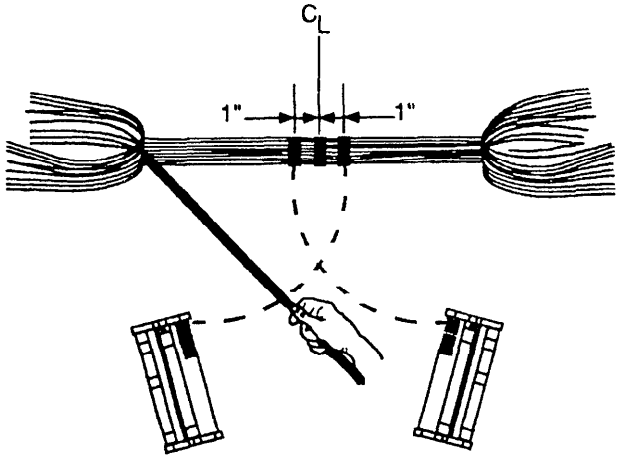
Perform the two-person, two-bank foldback splice procedure according to the following instructions.

Step	Constructing a Two-Person, Two-Bank Foldback Splice
1	Set up two splicing heads using two long traverse bars on two traverse clamps. **NOTE: Only one long traverse bar is supplied with each splicing rig kit.** The standard and long traverse bars are illustrated below. 
2	Mark cable, identify binder groups and arrange splice heads as described in Paragraph 10.7 of this practice. The two-man setup is illustrated below. 

(continued)

10.8 Two-Person, Two-Bank Foldback Splice, continued

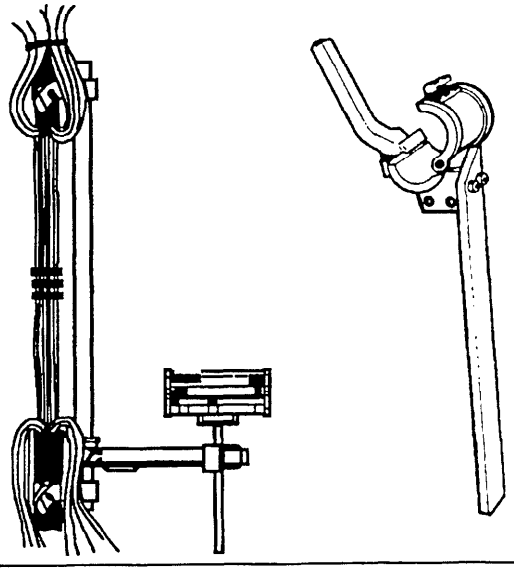
Step	Constructing a Two-Person, Two-Bank Foldback Splice
3	Splice as described in Paragraph 10.7 of this practice. Each splicer will splice from one side of the splice and check the three basic measurements. The modules spliced on the left will **swing** to the right of center and vice versa as illustrated below.



10.9 Two-Bank Vertical Foldback Splice

The two-bank vertical foldback splice is performed according to the following.

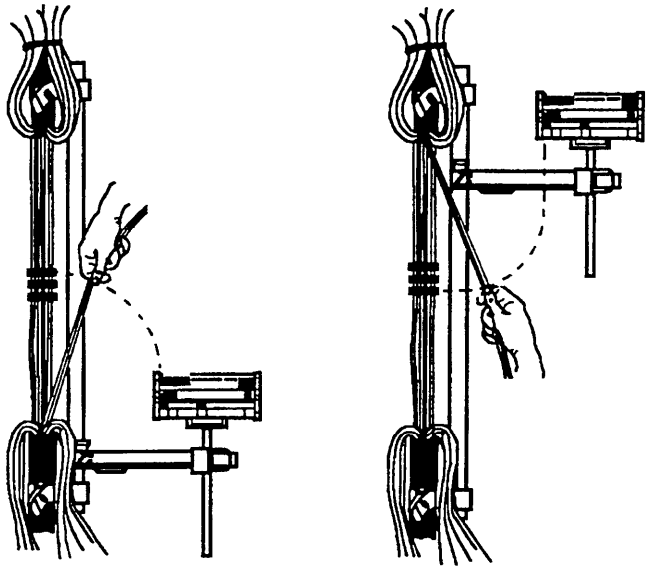
Step	Constructing a Two-Bank Vertical Foldback Splice
1	Set up support tube assembly according to the two-bank foldback procedures.
2	Mount long traverse bar in top holes of traverse clamp as illustrated below.



(continued)

10.9 Two-Bank Vertical Fold back Splice, continued

Step	Constructing a Two-Bank Vertical Foldback Splice
3	Attach traverse clamp assembly, head clamp and splicing head assembly onto support tube as illustrated under Step 5 below.
4	Measure an upper binder group so modules will fall below the one-inch mark.
5	Measure a lower binder group so the modules will fall above the one-inch mark. Splice head and binder group positioning are illustrated below.



10.10 Three-Bank Foldback Splice

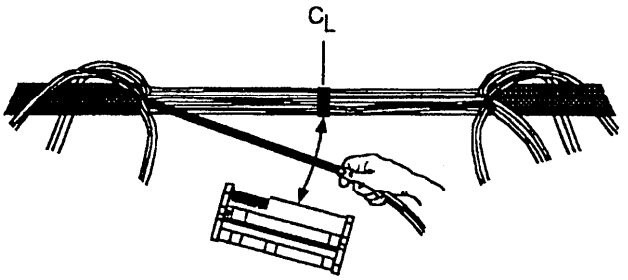
A three-bank foldback splice is constructed according to the following instructions.

Step	Constructing a Three-Bank Foldback
1	Make splice opening according to the specs of the closure being used with a minimum of 26 inches.
2	Prepare conductors so the free conductor length of field side wiring is two times the splice opening plus six inches.
3	Identify and arrange binder groups as previously outlined in Steps 9 through 11 in Paragraph 10.7 of this practice.

(continued)

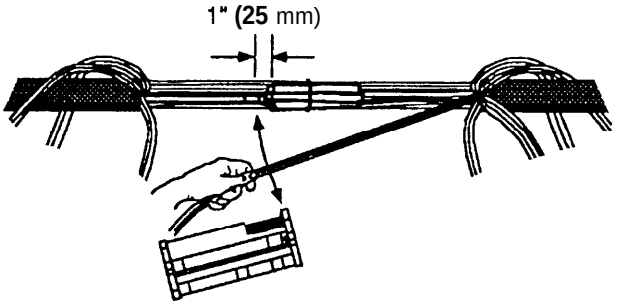
10.10 Three-Bank Foldback Splice, continued

Step	Constructing a Three-Bank Foldback
4	Mark the center of the splice and position the splicing head for the first group of the three-bank splice as illustrated below.

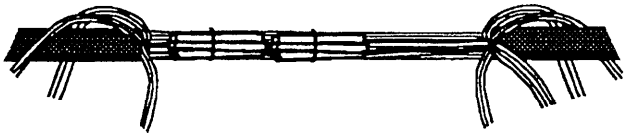


5	Splice the first 100-pair group; identify and bundle to the center of the core as illustrated. NOTE: **Splice a 100-pair group in each of the three-bank positions and repeat through the completion of splice.**

6	Position the splicing head for the second 100-pair group in the three-bank splice as illustrated.



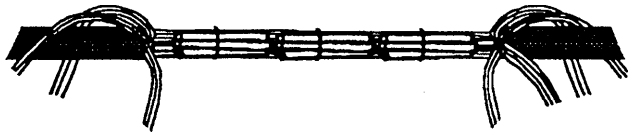
7	Splice, identify, and bundle second group and attach to the core as illustrated.



(continued)

10.10 Three-Bank Foldback Splice, continued

Step	Constructing a Three-Bank Foldback
8	Follow the above procedures for the third 100-pair group position. The three-bank positions are illustrated below.



NOTE: **Splice equal number of modules in each of the bank positions to maintain a balanced splice bundle.**

11. Splice Configurations

11.1 Apparatus Splice

Use the Super-Mate module in all apparatus splices that require an in and out arrangement, such as:

- Load Coils.
- Repeaters.
- Lattice Networks.
- Inductors.

Using the Super-Mate on apparatus splices provides the needed flexibility (plugging or unplugging) to prevent service disruption when it becomes necessary to make changes within a splice such as:

- Loading.
- Deloading.
- Additions.
- Removals.

When constructing an apparatus splice, it is important to remember that:

- The central office and corresponding field pairs are preterminated in the same splice bank position.

  NOTE: Do **not plug modules together that are designated to be used in the apparatus splice.**

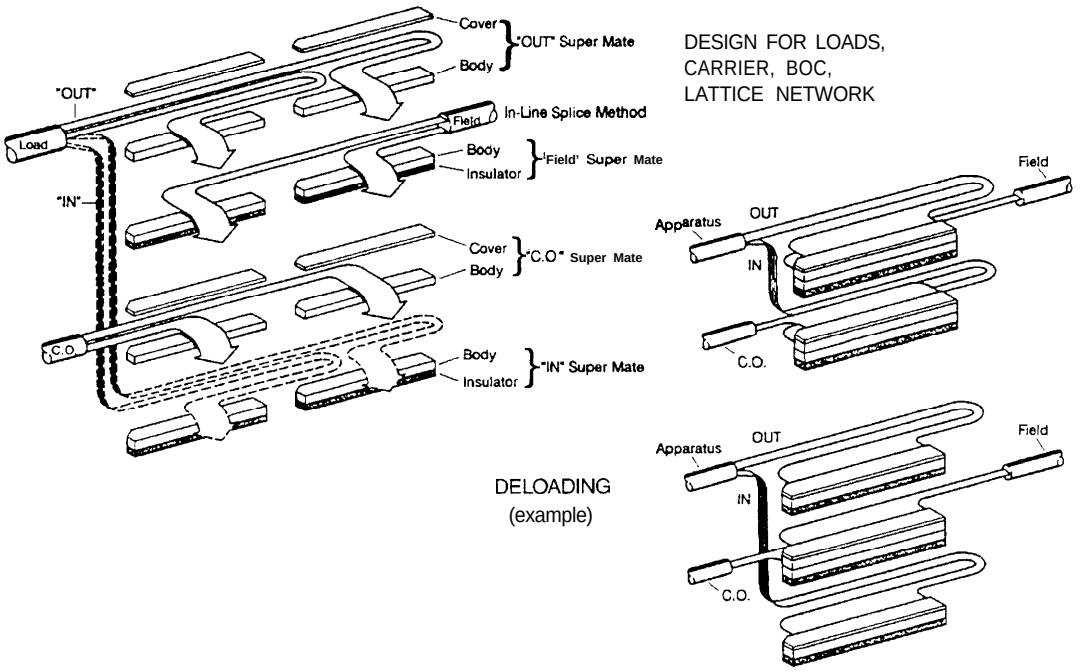
- Central office and corresponding field pairs not designated as part of the apparatus splice are to be spliced through in a unilength splice configuration.
- The apparatus housing stub(s) will be terminated using the unilength method and the pairs layed in Super-Mate modules by:
  - Color code.
  - Tagged order.
  - Matched between corresponding IN and OUT modules.

11.1 Apparatus Splice, continued

Use the following guidelines to construct an apparatus splice using the Super-Mate Module.

Step	Constructing an Apparatus Splice Using the Super-Mate Module
1	Connect the appropriate preterminated IN module from the apparatus to the bottom of the respective central office module using the **4270** hand presser. The splice configuration of each cable is as follows: Cable wiring — Splice configuration CO. side — In-Line (straight) Field side — Unilength Apparatus (In/Out) — Unilength
2	Connect the appropriate preterminated OUT module from the apparatus to the top of the respective field module using the 4270 hand presser.

The diagram below illustrates the versatility for loading and deloading using Super-Mate modules.



11.2 Capacitor Splice

Construct a capacitor splice by using the guidelines for a bridge splice as outlined in Paragraph 11.4 of this practice.

11.3 Taper Feeder Splice

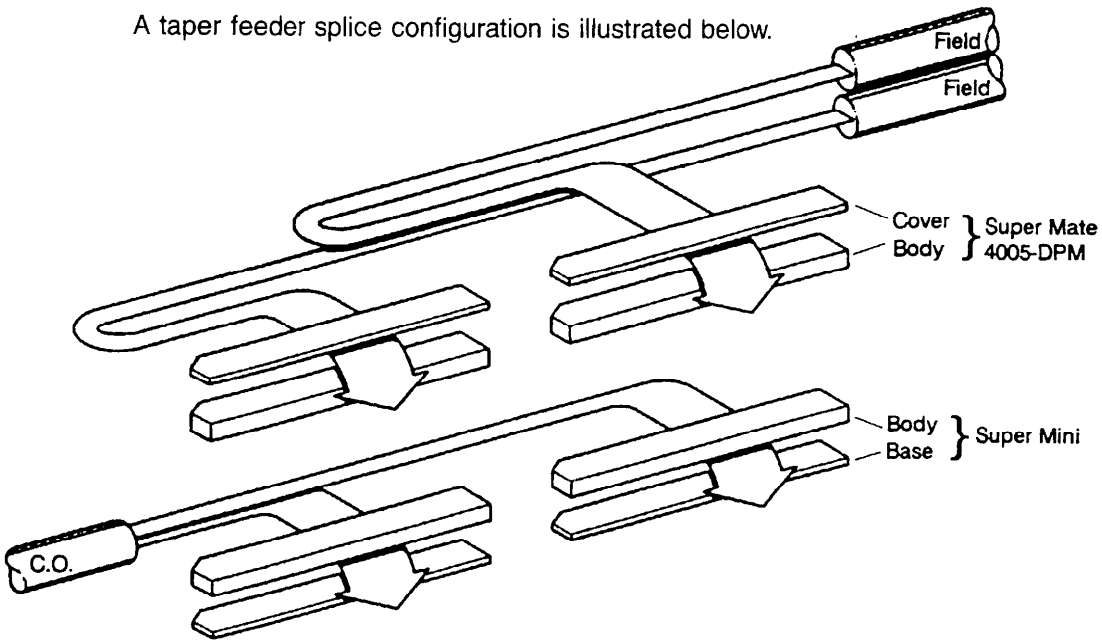
Use the taper feeder splice when circuits cannot be multipled because of bridge tap or engineering restrictions.

Construct the taper feeder splice according to the following.

Conductors from the central office are laid in the base/body bottom of a Super-Mini module according to:

- Color code on PIC.
- Random or tagged selection on paper/pulp.

A taper feeder splice configuration is illustrated below.



11.4 Super-Mate in Bridge Splice, New Construction

Use the following chart as a guideline for constructing a bridge splice with the Super-Mate module.

Step	Splicing Procedure
1	Prepare an in-line splice with the Super-Mate as described in Paragraph 10.3 of this practice.
2	Preterminate the cable to be bridged by: A. Placing the body with the red insulator in the MS2 Splicing Head. B. Laying the bridging cable in the module body using the unilength configuration. C. Checking the cable complement with the Check Comb. D. Place a yellow cover on top of the module body. E. Crimp the module with Hydraulic Crimping Unit **as** described in Crimping the Module in Paragraph 9.2 of this practice. F. Repeat the pretermination procedure for the entire bridging cable.

(continued)

11.4 Super-Mate in Bridge Splice, New Construction, continued

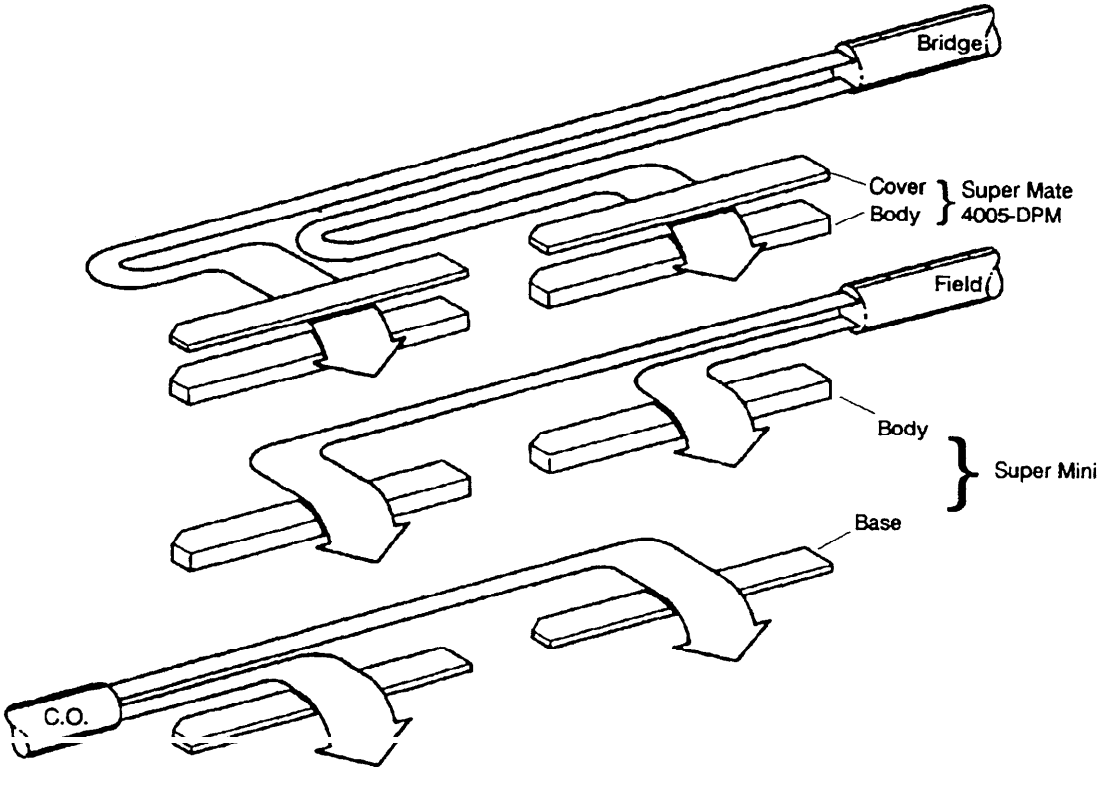
Step	Splicing Procedure
3	Remove the yellow cover from the straight splice module that will be bridged on to.
4	Remove the red insulator from the corresponding preterminated bridge module.
5	Plug the preterminated bridge module to the C.O. side of the straight splice.
6	Complete the bridge by crimping the modules using the 4270 hand crimper as described in Paragraph 9.2 of this practice.

11.5 Bridged Feeder

The bridged feeder splice multiples a continuous cable run at specific locations where a bridge tap is not a concern. Considerations are:

- Through pairs built using the unilength configuration Super-Mate modules.
- Bridging cable will be built using the unilength method and terminated in Super-Mate modules.

The bridged feeder splice is illustrated below.



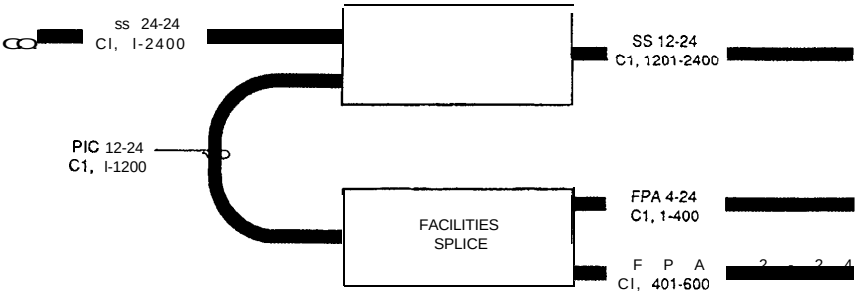
11.6 Facilities Splice

The facilities splice is:

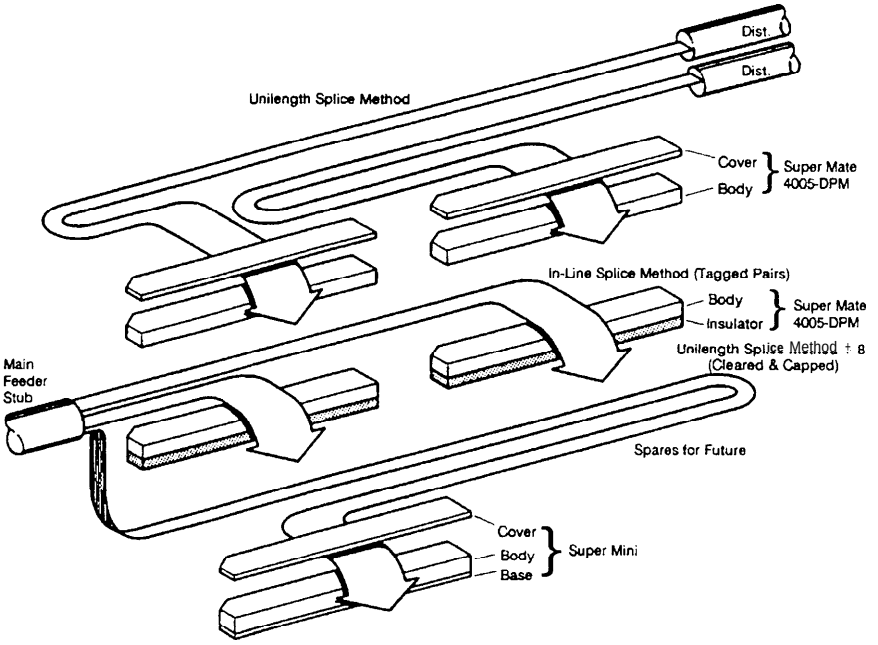
An engineering design that provides a tagged access to a feeder cable count by using a non-color coded PIC transition stub to the facilities splice, limiting access to the vulnerable, often congested main splice.

- Constructed off of pulp/paper insulated cable splices to eliminate the need to reenter those splices.

An example depicting a facilities splice layout is illustrated below.



The splicing arrangement for the facilities splice as shown above would be constructed according to the following.



Use Super-Mate modules to:

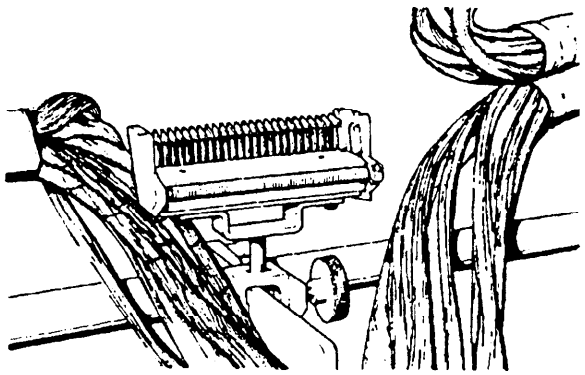
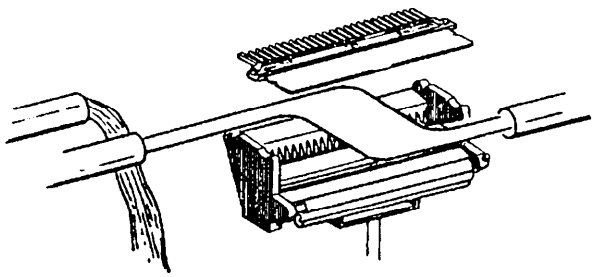
- Bridge the facilities stub cable(s) out of the main splice using the unilength method.

- Clear and cap those pairs not being used from the field/stub side wiring.

Use Super-Mini modules to clear and cap those pairs not being used from the C.O. side.

11.7 Half Tap Using Super-Mini/ Super-Mate Module

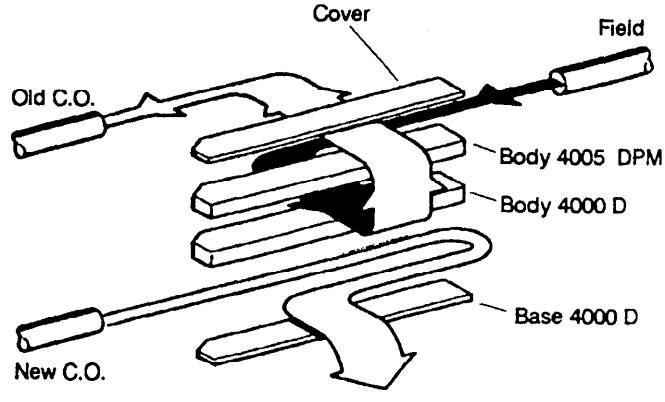
Use the following procedures when half tapping using the Super-Mini/Super-Mate module combination.

Step	Half Tapping Using the Super-Mini/Super-Mate Module Combination
1	Open existing tap cable (new cable) and prepare conductors according to specific closure guidelines and those outlined in Paragraph 10.3 of this practice.
2	Mount splicing rig with one splice head on cables as outlined in Paragraph 8.1 of this practice and as illustrated below. 
3	Lay tap (new) conductors into the base of a Super-Mini module in the unilength splice configuration.
4	Crimp Super-Mini module body using the back edge of the check comb as a temporary cover and remove cut conductors. 
5	Lay field conductors into Super-Mini body top. DO NOT CRIMP
6	Place Super-Mate body onto Super-Mini body.
7	Place corresponding through pairs (old) and lay into matching wire channels of the Super-Mate module.

(continued)

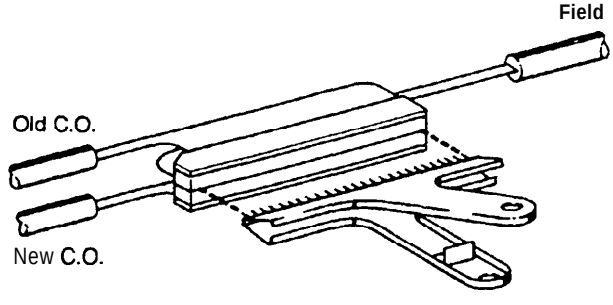
11.7 Half Tap Using Super-Mini/ Super-Mate Module, continued

Step	Half Tapping Using the Super-Mini/Super-Mate Module Combination
8	Verify with check comb, place cover, crimp, and remove cut conductors. A half tap configuration **is** illustrated below.

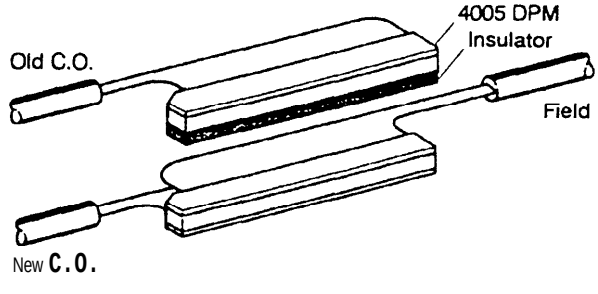


9 When related work is complete and the removal of the old C.O. is needed:

- Use the 4053PM Removal Tool to separate the old cable that is in the Super-Mate module. See illustration.



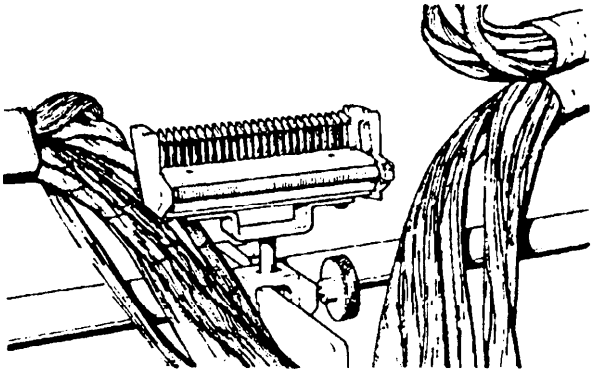
- Crimp a new cover onto the Super-Mini Module and place a red insulator on the Super-Mate module as illustrated below.



11.8 Pluggable Half Tap Using Super-Mate Module

A pluggable half tap and an alternative to the above procedure is accomplished by using the Super-Mate module as follows.

Step	Half Tapping Using the Super-Mate Module
1	Prepare existing tap cable (new) according to those guidelines on unilength splicing in Paragraph 10.3 of this practice.
2	Set up splicing rig as described in Paragraph **10.3** of this practice and as illustrated below.



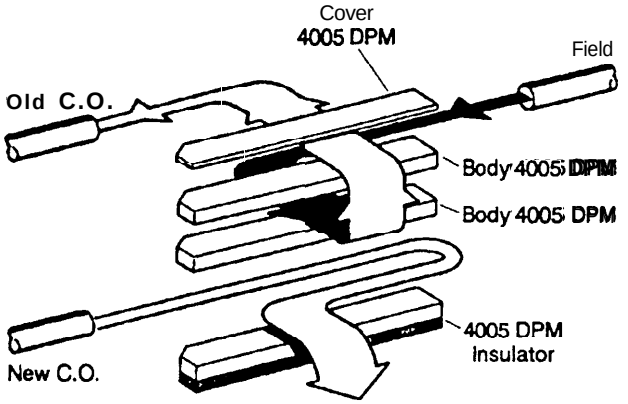
NOTE: Raise wire guide and wire separator to their maximum height by loosening the three screws at the back of the splice head and raising and retightening them.

3	Lay tap (new) conductors into a Super-Mate module in the unilength configuration.
4	Place a second Super-Mate module into the splice head and crimp using the back edge of the check comb as a temporary cover.
5	Cut and remove excess conductor wires.
6	Lay the field conductors into the second Super-Mate module, but DO NOT CRIMP
7	Place a third Super-Mate module into the splice head
8	Lay corresponding through pairs (old) into the matching wire channels of the third Super-Mate module.

(continued)

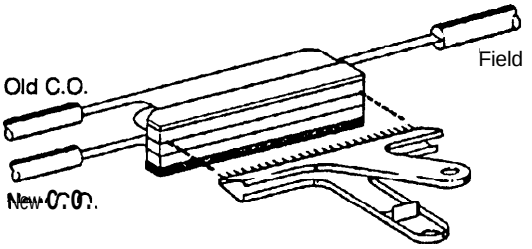
11.8 Pluggable Half Tap Using Super-Mate Module, continued

Step	Half Tapping Using the Super-Mate Module
9	Place cover, crimp, and remove conductors. The half tap configuration is illustrated below.

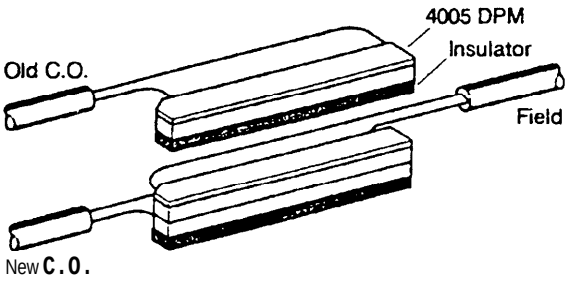


10 When related work is complete and the removal of the C.O. wire is needed:

- Use the 4053PM Removal Tool to separate the old cable that is in the Super-Mate module as illustrated below.



- Crimp a new cover onto the Super-Mate splice and place a red module insulator on the old C.O. module termination as illustrated below.



11.9 Clearing Ends

When clearing ends in modules, it is important to remember:

- The Super-Mate Module will only plug to the top of a Super-Mini module.
- A Super-Mate to a Super-Mate module offers greater versatility for cable rearrangements than does a Super-Mate to a Super-Mini module but should only be used when needed due to cost difference.
- Sealant boxes must be installed on all modules, except in pressurized systems.

11.9.1 Clearing Ends Using Super-Mini Modules

Super-Mini modules are used to clear ends on C.O. side wiring only, by:

- Placing base/body on the adapter in the splice head.
- Placing conductors in base.
- Adding body and cover then crimp.

11.9.2 Clearing Ends Using Super-Mate Module

The Super-Mate module is used to clear ends on the field side wiring and may be used on the C.O. side wiring when future loading or rearrangements are indicated.

Clear ends in the Super-Mate by:

- Placing Super-Mate body in splice head.

  NOTE: Do **not use Super-Mini adapter.**

- Lay dead pairs into body in color code or tagged order.
- Place cover over terminated wiring and crimp.

  NOTE: **Clear ends in larger pair count cable with odd count to the left, even to the right.**

12. Maintenance Procedures

12.1 Introduction

Use the procedures and tools referenced in this section in order to prevent service disruption upon reentry into a modular splice.

This portion of the practice is dedicated to the:

- Use of module reentry tools.
- Procedures to be used for making repairs or rearrangements within a module.

Module integrity must be maintained after making repairs. Do not use discrete connectors to make repairs.

12.2 4026 Module Maintenance Kit

The 4026 Module Reentry Kit is used for reentering and making repairs in the modules.

The kit consist of the following components.

Item	Use Description
Carrying Case	Container for tools within the kit.
4270 Hand Presser	For crimping any combination of Super-Mate/Mini modules.
4051 Wire Insertion/ Cutoff Tool	For inserting conductors into the elements of the Super-Mini module's body top and body bottom, and cutting off excess wire.
4047 Pair Test Plug	For making an electrical connection from the test equipment to a cable pair for tagging, testing, or establishing a talk pair.
4053PM Removal Tool	For unplugging stacked Super-Mate modules. Not to be used for removing covers of modules. Channels as needed.
4053 Cover	To be used for removing covers only from modules.
DPM/DPM Jumper Assembly (2)	Preterminated 25-pair jumper for easy access to DPM (Super-Mate) splices.
4005DPM/Bottom Test Plug Jumper	For plugging on the bottom of Super-Mini with one end, and jumper to the top of a Super-Mate on the other.

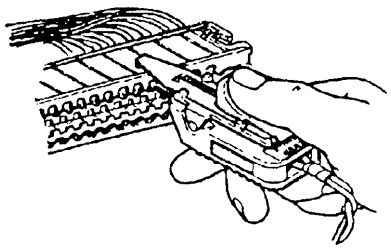
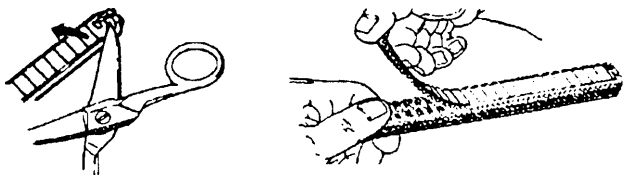
12.3 Reentry Procedures

Use the 4026 Module Maintenance Kit and the following procedures to reenter the Super-Mini/Super-Mate module **to** perform single pair maintenance or minor rearrangements.

Step	Reentering the Super-Mini/Super-Mate Module
1	Locate and carefully isolate the module from the splice bundle.
2	Remove sealant box when applicable.
3	Position module in its original splicing position.
4	Position conductors by bending them so they are level with or slightly lower than the module.

(continued)

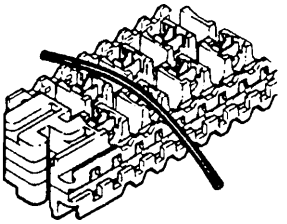
12.3 Reentry Procedures, continued

Step	Reentering the Super-Mini/Super-Mate Module
5	Before removing the cover or base of the module or separating plugged modules, use the 4255 or 4270 hand crimping tool to crimp the module in the center, on the left side, then on the right side, overlapping each crimp toward the center of the module. This reseats the conductors into the connector element ("U" contacts) preventing them from springing out when the cover/base is removed or DPM separated.
6	Position the module flat and in such a way that restricts movement and provides support under the module during the re-entry operation. The 4999 Module Stabilizer is recommended for restricting movement and stabilizing the module while inserting/reinserting conductors into the module (esp. 22 gauge) with the 4051 Wire Insertion Tool after testing or repairing.
7	Identify conductor(s) by inserting the pins of the 4047 Test Plug into the test entry ports (mid-level) of the module. Insert the long pin into the ring port, and the short pin in the tip port. The test plug fully inserted is illustrated below. 
8	Perform necessary tests.
9	Bend the conductors away from the module and lift the cut corner of the cover or base and peel it away from the module as illustrated below.  NOTE: Do **not reuse covers or bases of modules.**
10	Pull the wires to be worked on up and forward.
11	Trim off the nicked end of the conductor(s) removed from the module. **NOTE: Do not reinsert the nicked portion of the conductor into the module.**

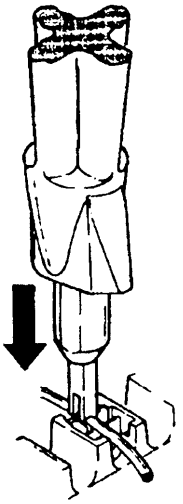
(continued)

12.3 Reentry Procedures, continued

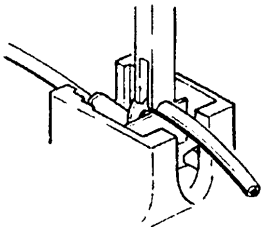
Step	Reentering the Super-Mini/Super-Mate Module
12	Make the necessary rearrangements.
13	When reinserting the same pair, pull the wire slightly forward across the "U" contact and cut-off blade leaving as much slack as possible behind the module. See illustration.



14	Align the 4051 Wire Insertion/Cut-Off Tool so that the slot of the tool is aligned with the "U" contact and the groove of the tool is aligned with the wire as illustrated below.



15	Push the tool straight down, forcing the conductor into the "U" contact. DO NOT rock the tool back and forth in the process.
16	Cut off excess wire by aligning the tool slot with the cut-off blade and the tool groove with the wire in the module as illustrated below.



(continued)

12.3 Reentry Procedures, continued

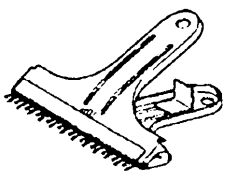
Step	Reentering the Super-Mini/Super-Mate Module
17	Install a new 4003DT/TR cover or 4004DT/TR base, whichever is applicable. **NOTE: In order to maintain 25-pair integrity in the network, it is necessary to make all repairs and reinsert conductors in the module. It is not an acceptable procedure to cut pairs out of modules and resplice with discrete connectors outside of the module.**
18	Press the module together **with** your fingers to be sure that the latches will engage when the module is crimped.
19	Use the 4270 hand press to crimp the module first in the center then one side and the other.

12.4 Stacked Module Reentry Splice Procedures

Use the following procedures to reenter a stacked module splice of Super-Mate or a combination of both Super-Mini and Super-Mate.

Step	Reentering a Stacked Module Splice
1	Verify type of module to be reentered: Super-Mate or Super-Mini.
2	Select adapter according to the list in Paragraph 12.2 of this practice.

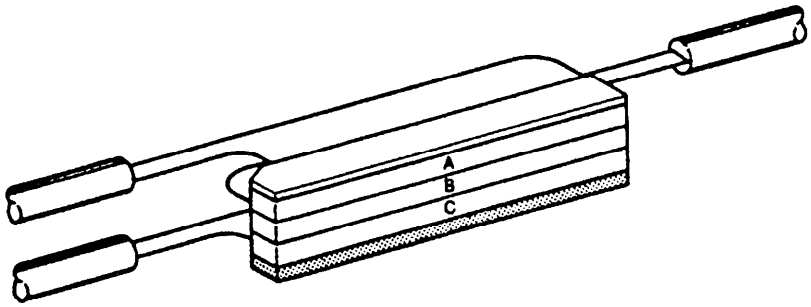
If the Bottom Module is a ...	Then use the. ..
Super-Mini	Super-Mini Adapter Strap.
Super-Mate	Super-Mate Adapter Strap

3	Follow Steps 1-6 in Paragraph 12.3 of this document.
4	Remove cover of the top module (A) using the 4053 Cover Removal Tool as illustrated below. **NOTE: Do not use the 4053PM removal tool.** 

12.4 Stacked Module Reentry Splice Procedures, continued

Step	Reentering a Stacked Module Splice
5	Remove the red insulator strip from the Super-Mate module.
6	Crimp the 4005DPM adapter module onto the top module (A) using the 4270 Hand Presser.
7	Remove the base of the bottom module (C) according to the following:

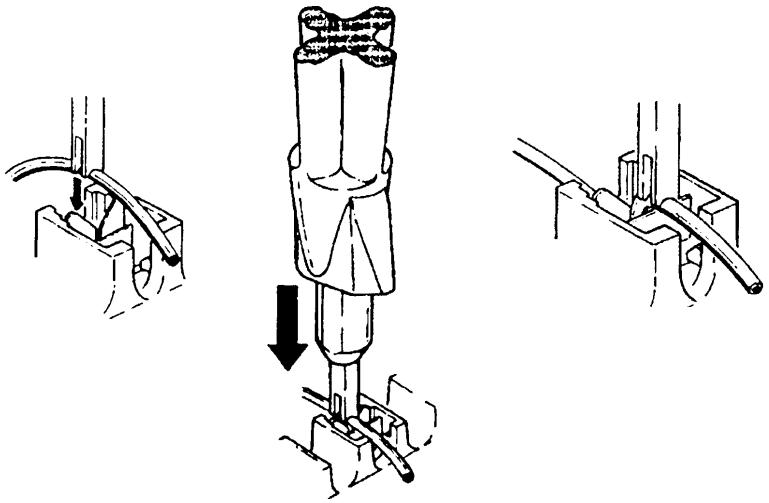
If. . .	Then . . .
The bottom module is a Super-Mini	Use the 4053 Cover Removal Tool.
The bottom module is a Super-Mate	Disengage both alignment posts by prying the ends of the insulator away from the module body with snips.

8	Crimp the other end of the adapter strap onto the top module (A) using the 4270 Hand Presser. The illustration below shows the adapter strap patch in place.  The stack can now be separated without causing service interruption,
9	Separate the stack at the location necessary to perform the repair activity by using the 4053PM Removal Tool.
10	Remove the desired pair(s) from the module elements for testing.

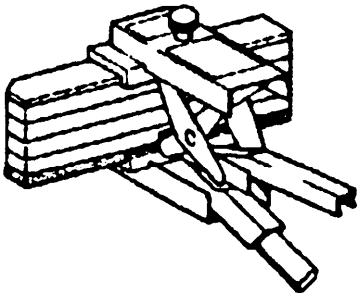
(continued)

12.4 Stacked Module Reentry Splice Procedures, continued

Step	Reentering a Stacked Module Splice
11	Replace the repaired pair back into the "U" contacts of the module by using the 4051 Insertion Tool, pushing down over the cutting blade to cut off the excess wire as illustrated below.



12	Crimp the stack of modules back together by using the 4270 Hand Presser.
13	Remove the top and bottom adapter strap by using the 4053PM Removal Tool.
14	Replace the cover on the top module and the base on the bottom module using the 4270 Hand Presser.



13. Splice Planning and Closure Sizing

13.1 General Engineering Considerations

Improper splice planning and preparation will:

- Create rapid deterioration of the conductors from movement of the modules and conductors during reentry.
- Increase the possibility of errors and service disruption.
- Create a negative impact on productivity and material cost.

When planning a splice, carefully consider the following factors:

- Space limitations at splice location.
- Number and type of cables to be included in the splice.
- Type and size of closure to be installed.

  NOTE: Refer to standard splice closure specifications on required sheath openings.

- Cable characteristics, including:

  — Number of pairs in each cable.
  — Wire gauge of the cables.
  — Type of insulation.
  — Filled or air-core.

- Splicing configuration to be used.

  NOTE: Refer to Section 11 of this practice for cable sheath and conductor preparation of the desired splicing method.

- Type of splice connector to be used.
- Use of sealant boxes.

  NOTE: The use of sealant boxes in PIC splices increases splice bundle value by approximately 25%.

Considering all of the above factors eliminates the possibility of creating a splice bundle outside diameter greater than the inside diameter of the splice closure.

The charts on the following pages provide a break-down on splice bundle size in inches based on cable pair count of 26 AWG conductors.

13.1 General Engineering Considerations, continued

Two-Bank Super-Mate Apparatus Splice*
26 AWG Conductors

Straight Splice Measurement In In-Line Configuration (4000D Super Mini Modules)

Number of Pair Bridged (4000D Super Mini and 4005-DPM Super Mate Modules)

Main Cable Pair Count	Zero	100	200	300	400	600	900	1200	1500	1800	2100	2400	2700	3000
100	1.3	1.7												
200	1.9	2.1	2.4											
300	2.2	2.6	2.7	3.0										
400	2.6	2.9	3.0	3.2	3.7									
600	3.1	3.4	3.5	3.0	4.1	4.4								
900	3.8	4.0	4.2	4.4	4.7	4.9	5.3							
1100	4.0	4.4	4.6	4.8	5.0	5.1	5.6							
1200	4.2	4.5	4.0	5.0	5.2	5.3	5.8	6.3						
1500	4.9	5.1	5.4	5.6	5.7	6.0	6.3	6.7	7.0					
1800	5.4	5.6	5.9	6.0	6.1	6.4	6.6	7.1	7.3	7.6				
2100	5.8	6.1	6.3	6.4	6.5	6.8	7.2	7.5	7.6	7.9	a.3			
2400	6.2	6.5	6.7	6.8	6.9	7.2	7.6	7.9	7.9	a.2	a.6	8.8		
2700	6.6	7.0	7.1	7.2	7.3	7.6	7.8	a.2	a.3	8.6	8.9	9.4	9.6	
3000	7.0	7.4	7.5	7.6	7.7	a.0	a.3	a.6	a.6	a.9	9.3	9.8	10.1	
3600	7.7	8.2	a.3	a.4	a.5	a.7	9.0	9.1	9.2	9.6	9.9	10.3	10.6	10.9

Values In inches

* Notes: For 22 AWG conductors increase values by 25%.
For 24 AWG conductors increase values by 12%.
If sealant boxes are used, increase values approximately 26%.

Three-Bank Super-Mate Apparatus Splice*
26 AWG Conductors

Straight Splice Measurement In In-Line Configuration (4WOD Super Mini Modules)

Number of Pair Bridged (4000D Super Mini and 4005-DPM Super Mate Modules)

Main Cable Pair Count	Zero	100	200	300	400	600	900	1200	1500	1800	2100	2400	2700	3000
300	1.8	2.1	2.4	2.7										
600	2.6	2.6	3.1	3.3	3.4	3.7								
900	3.3	3.5	3.0	4.0	4.1	4.3	4.8							
1200	3.9	4.1	4.3	4.5	4.7	5.0	5.5	5.7						
1500	4.5	4.6	4.7	4.9	5.1	5.5	5.9	6.3	6.6					
1800	5.1	5.2	5.3	5.4	5.5	5.9	6.3	6.7	7.0	7.3				
2100	5.5	5.6	5.7	5.8	5.9	6.3	6.7	7.0	7.4	7.7	7.8			
2400	5.9	6.0	6.1	6.2	6.3	6.6	7.0	7.3	7.7	a.0	8.1	a.4		
2700	6.2	6.3	6.4	6.5	6.6	6.9	7.2	7.6	a.0	a.3	a.5	a.7	8.8	
3000	6.5	6.6	6.7	6.8	6.9	7.2	7.5	7.9	8.2	a.6	a.7	9.0	9.1	9.3
3600	6.9	7.0	7.1	7.2	7.3	7.6	7.9	8.3	0.6	a.9	9.2	9.4	9.5	9.7

Values In Inches

* Notes: For 22 AWG conductors increase values by 25%.
For 24 AWG conductors increase values by 12%.
If sealant boxes are used, increase values approximately 25%.

13.1 General Engineering Considerations, continued

Four-Bank Super-Mate Apparatus Splice*
26 AWG Conductors

Straight Splice Measurement *in* In-Line Configuration

Number of Apparatus Pairs

Main Cable Pair Count	Zero 100	200	300	400	600	900	1200	1500	1800	2100
400	2.3	2.7	3.1	3.7	3.9					
600	2.7	3.1	3.5	4.0	4.2	5.1				
900	3.3	3.6	4.0	4.5	4.7	5.6	6.3			
1200	3.9	4.2	4.5	5.0	5.2	6.0	6.5	7.1		
1500	4.5	4.0	5.1	5.5	5.8	6.5	7.0	7.6	7.8	
1800	5.0	5.4	5.6	6.0	6.2	7.0	7.6	8.0	8.4	8.7
2100	5.6	5.9	6.1	6.5	6.7	7.5	8.2	8.7	9.0	9.4	9.7
2400	6.2	6.5	6.6	7.0	7.2	8.0	8.8	9.4	9.8	10.6	10.9
2700	6.7	7.0	7.2	7.5	7.7	8.5	9.3	9.8	10.3	11.2	11.5
3000	7.3	7.6	7.7	8.0	8.3	8.9	9.8	10.3	10.8	11.6	11.9
3600	8.5	8.8	8.8	9.1	9.3	9.9	10.7	11.2	11.8	12.4	12.7

Values In Inches

• Notes: For 22 AWG conductors increase values by 25%.
For 24 AWG conductors increase values by 12%.
If sealant boxes are used, increase values approximately 25%.

14. Splice Rebuilds

14.1 Conversion to Super-Mate Modules

Converting an existing discrete connector splice to Super-Mate modules requires:

- A minimum of 3-1/2 inches of slack in the conductors.
- The use of:
  - A rear spring holder

    AND
  - The front wire retainer spring.

14.2 Foldback to Foldback

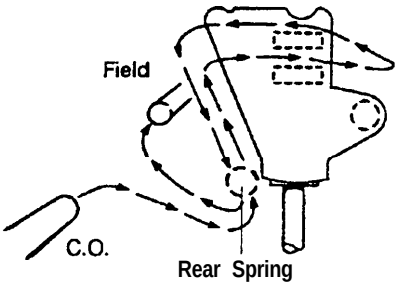
The following chart provides instructions for converting an existing foldback to Super-Mate module foldback.

Step	Converting an Existing Foldback to Super-Mate Modules Foldback
1	Place spring on holder by sliding onto the flat plate of the rear spring holder.
2	Place the splice head into the approximate position of the original connectors when were spliced.

(continued)

14.2 Foldback to Foldback, continued

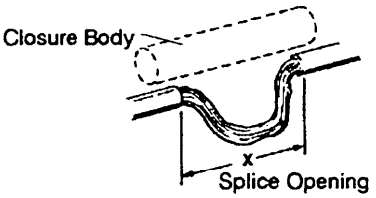
Step	Converting an Existing Foldback to Super-Mate Modules Foldback
3	Remove front wire retainer spring.
4	Straighten the wires at the rear of the existing (old) connectors.
5	Place a Super-Mate into splice head and secure existing connector to tape plate.
6	Fan C.O. conductors into body and place excess wire into rear spring.



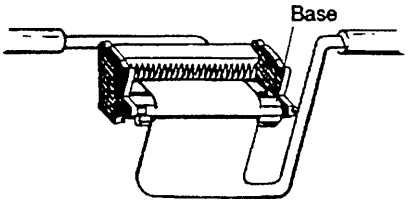
14.3 Slack Removal

Remove slack from existing splice using Super-Mini module according to the following:

Step	Removing Slack from Existing Splice
1	Remove sufficient sheath so that once slack is removed, the splice opening remaining will accommodate closure to be used.



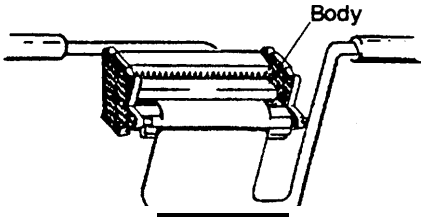
2	Set up splice rig with a single head and adapter.
3	Place Super-Mini module base in splice head and place 25-pair group in base.
4	Allow slack loop to fall down in front and below retainer spring.



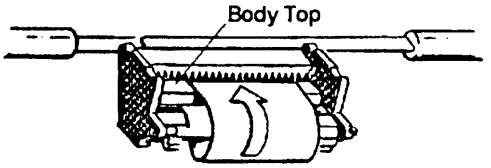
(continued)

14.3 Slack Removal, continued

Step	Removing Slack from Existing Splice
5	Place body in splice head.



6	Take conductors from other side of splice opening and place in body top, insuring that colors match those in body/bottom.



7	Place cover over filled, completed module and crimp.

14.4 Half Tapping Using Super-Mate Module

Raise the wire guide and wire separator to their maximum heights when half tapping using the Super-Mate modules. Accomplish this by loosening the three screws at the back of the splice head.

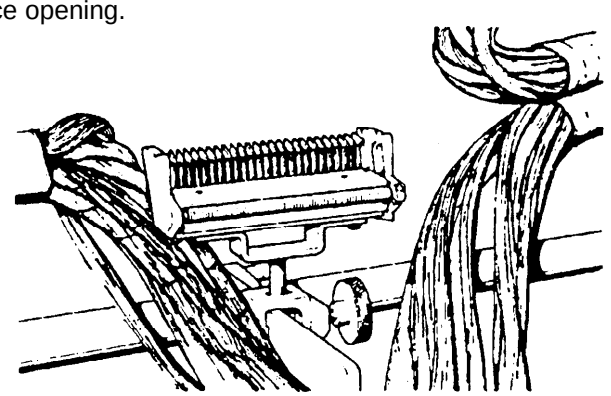
After the separator and guide are in the raised position, use the following chart to perform a half-tap with the Super-Mate module.

Step	Performing a Half Tap with the Super-Mate Module
1	Open existing tap cable (new).
2	Provide free conductor length and slack according to standard MS2 procedure for half tapping as described in Paragraph 11.8 of this practice.

(continued)

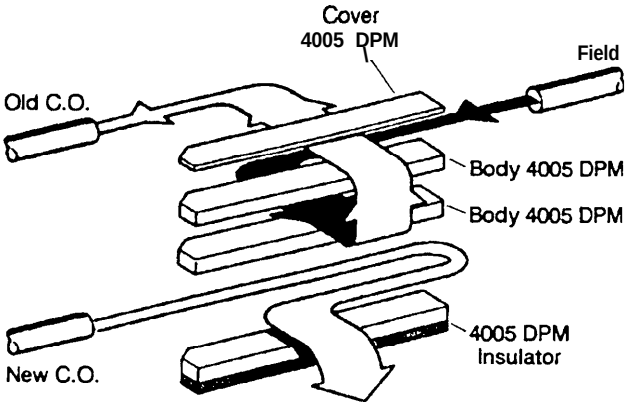
14.4 Half Tapping Using Super-Mate Module, continued

Step	Performing a Half Tap with the Super-Mate Module
3	Mount splicing rig with one splice head on cables centered in the splice opening.



NOTE: Position splice head so that the backs of modules end up positioned one inch left of center and one inch right of center.

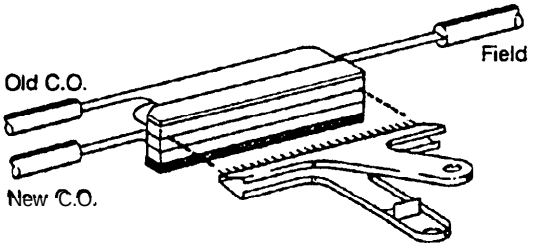
4	Lay tap (new) conductors into a Super-Mate module in the unilength configuration.
5	Place a second Super-Mate module into the splice head and crimp, using the back edge of the check comb as a temporary cover and **remove** cut conductors.
6	Lay the field conductors into the second Super-Mate module. DO NOT CRIMP
7	Place a third Super-Mate module into the splice head and lay corresponding through pairs (old) into the matching wire channels of the third module.
8	Place cover, crimp, and remove conductors.



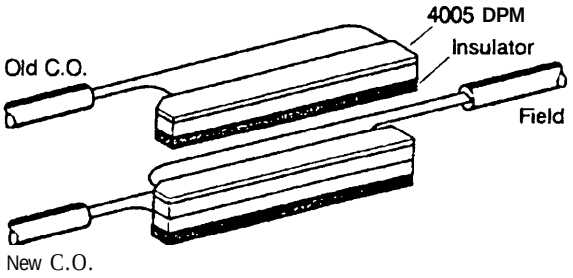
14.4 Half Tapping Using Super-Mate Module, continued

To remove the old tap, follow these instructions.

Step	Removing the Old Tap
1	Use the **4053PM** Removal Tool to separate the old cable that is the top Super-Mate module.



2	Crimp a new cover onto the Super-Mate splice and place a red module insulator on the old C.O. module termination.



14.5 Half Tapping Using Super-Mate/ Super-Mini Combination

Use the following chart when half-tapping using the Super-Mini/Super-Mate combination:

Step	Half Tapping Using the Super-Mini/Super Mate Combination
1	Open existing tap cable (new) and provide free conductor length and slack according to half-tap procedure in Paragraph 11.7 of this practice.
2	Mount splicing rig with one splice head on cables, centered in the splice opening as illustrated in Paragraph 8.1 of this practice.
3	Lay tap (new) conductors into the base of a Super-Mini module in unilength configuration.
4	Crimp Super-Mini module body using the back edge of the check comb as a temporary cover and remove cut conductors.
5	Lay field conductors into Super-Mini body. DO NOT CRIMP
6	Place Super-Mate body onto Super-Mini body.

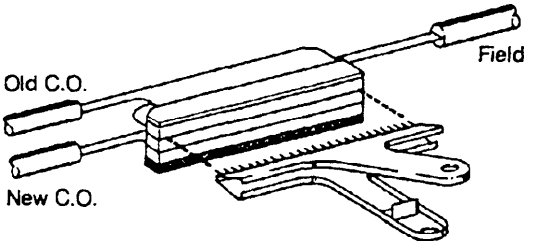
(continued)

14.5 Half Tapping Using Super-Mate/ Super-Mini Combination, continued

Step	Half Tapping Using the Super-Mini/Super Mate Combination
7	Place corresponding through pairs (old) and lay into matching wire channels of the Super-Mate module.
a	Place cover, crimp and remove cut conductors.

When removal of the old cable is required, follow these procedures.

Step	Removing Old Cable
	Use the 4053PM Removal Tool to separate the old cable that is in the Super-Mate module.



2	Crimp a new cover onto the Super-Mini module and place a red insulator on the Super-Mate module.