

Cabling Methods Butting, Stripping, and Fanning Switchboard Cables

Contents	Subject	Page
	1. General	2
	1.1 Purpose	2
	1.2 Filing Instructions and Supersedures	2
	1.3 Reason for Reissuing	2
	1.4 Responsibility	2
	1.5 Disclaimer	2
	2. Overview	2
	2.1 Introduction	2
	2.2 References	3
	3. Butting and Stripping Switchboard Cables	4
	3.1 Before Butting and Stripping	4
	3.2 Cable Butt Locations	4
	3.3 Butting Switchboard Cable Procedure	4
	3.4 Using a Cable-Stripping Tool to Remove Cable Sheath	5
	3.5 Using a Nylon Rip Cord to Remove Cable Sheath	6
	3.6 Electrical Tape Usage Qualification	6
	4. Cable Wire Forming and Fanning	7
	4.1 Eye Protection	7
	4.2 Loose Wire Containment	7
	4.3 Wire Protection	7
	4.4 Fanning Arrangements	7
	4.5 ColorCode	7
	4.6 Wire Twist	7
	4.7 Positioning Wires for Fanning	7
	4.8 Maintenance Loops	7
	4.9 Spare and Unused Wires	8

1. General

- 1.1 Purpose** This practice provides information on the proper methods of butting, stripping, and fanning switchboard cables.
- 1.2 Filing Instructions and Supersedures** File this practice in numerical order in your GTE Telephone Operations practices set.
- This practice supersedes and cancels:
- All policies, procedures, general instructions, letters, and memoranda which address this subject.
 - Any document which provides information contrary to the information contained in this practice.
- 1.3 Reason for Reissuing** This practice has been reissued to:
- Clarify butt locations on cables for consistency.
 - Eliminate references to cable preparation differences between electronic and analog offices.
 - Introduce safety activities for butting and forming wires.
 - Introduce an alternate method of butting cables using nylon rip cord.
- Read this entire practice to ensure your familiarity with the new information.
- 1.4 Responsibility** This practice was published by the GTE Telephone Operations Administrative Services Department. For more information about this practice, contact the Headquarters COE Construction Department.
- 1.5 Disclaimer** This practice was prepared solely for the use of GTE Telephone Operations. It must be used only by its employees, contractors, customers, and end users when installing, operating, maintaining, and repairing GTE Telephone Operations' equipment, facilities and services. Any other use of this practice is forbidden. The information contained in this practice may not be applicable in all circumstances and is subject to change without notice. By using this practice the user agrees that GTE Telephone Operations will have no liability (to the extent permitted by applicable law) for any consequential, incidental, special, or punitive damages that may result.

2. Overview

- 2.1 Introduction** Before butting, stripping, and fanning cables, the installer must be familiar with:
- GTE Telephone Operations Practice 256-050-203, which includes tool and hardware requirements.
 - Other site-specific cabling documentation provided by Engineering.

2. Overview, continued

2.2 References

The following chart provides sources of supplementary information relating to this practice. The documents could be required for performing certain tasks.

See...	For Information About...
075-170-100	Cable and Support Ties - Description and Use
075-676-1 00	Eye Protection - Description and Use
200-001-000	Safety Precautions - Central Office
256-050-202	Switchboard Cable Tags and Labels - Central Office Cabling
256-050-203	Cabling Methods - Installation Planning and Safeguards
256-050-204	Cabling Methods - Running and Securing Switchboard Cable
256-050-208	Cabling Methods Switchboard Cables - Connecting (Wrap and Solder Methods)
256-050-209	Cable Buzzing Methods
256-050-211	Cable Methods - Connecting Wires - Solderless Wrap Methods
256-050-213	Cabling Methods - Spares and Unused Wires
256-050-216	Cabling Methods - Shielded and Coaxial Cables
256-1 50-201	Cabling Methods - Distributing Frames
256-224-216*	Cabling Methods - GTD-5 EAX
256-600-201	Cabling Methods - Forming and Dressing Miscellaneous Wire

* Published by AG Communication Systems.

3. Butting and Stripping Switchboard Cables

3.1 Before Butting and Stripping

Verify that the following conditions exist before butting and stripping switchboard cables:

- The correct cable is in the correct location per site cabling specifications.
- The nonplug ended cable was buzzed for final location.
- Appropriate safety tools are available (e.g., goggles, wire bag, container for disposal of cable sheathing). Refer to GTE Telephone Operations Practice 256-050-203.
- The formed and secured cable is a minimum of 18 inches longer than the longest skinner required.
- Wires within the cable are tinned copper. Nontinned wires are not acceptable for solderless wrap connections.

3.2 Cable Butt Locations

Butt the cables uniformly at the distribution frames and equipment locations.

- On distribution frames, butt cables no more than three inches behind the horizontal terminal blocks and no more than 1/8 inches below the upper arm of the first vertical terminal block served by the cable.
- On the equipment cable end, remove the cable sheath starting at the location of the equipment shelf or the unit being served, with the following exceptions that would normally require the butt to be at the top of the equipment frame or relay rack:
 - Where several units/shelves in equipment frames or relay racks are wired from an individual cable.
 - Where the bulk is such that only with the sheath removed can the needed wires be contained in the equipment frames or relay racks.
- Cables butted at locations other than directly at the shelf or unit are to be butted no more than 1 1/2 inches below the support bracket/ring and be of uniform butt lengths.

3.3 Butting Switchboard Cable Procedure

Perform the following procedure to butt switchboard cables when using either an approved cable-butting tool or a nylon rip cord.

Step	Butting Switchboard Cables
1	Mark the cable at the location where the butt cut is to be made. NOTE: Mark all cables of a group at the same time to ensure uniformity of the butt areas.
2	Place the cable into the cutting area of the cable-butting tool and completely circle the cable with the cutting edge. NOTE: Do not press the cutting edge of the tool when making a cut. Any extra pressure might force the cutting edge into the cable conductors.

(continued)

3. Butting and Stripping Switchboard Cables, continued

3.3 Butting Switchboard Cable Procedure, continued

Step	Butting Switchboard Cables
3	Carefully remove the cable-butting tool from the cable.
4	Verify that the cable-butting tool did not cut any of the cable conductors and that the butting tool cut the cable sheath sufficiently and entirely around the circumference of the cable. NOTE: Splice, replace, or cover any damaged conductors with heat shrink material. Do not use tape.

The following chart provides an alternate method of butting switchboard cables when working with cable that is manufactured with a nylon rip cord.

Step	Alternate Method of Butting Switchboard Cables
1	Use a section of rip cord approximately two feet long to wrap once completely around the cable at the desired butt location.
2	Using gloves, take the ends of the rip cord in each hand and lightly pull with the left or right hand for a distance of about five inches. Pull in the <u>opposite</u> direction about five inches. This causes a cutting action into the sheath. NOTE: Be careful not to cut into the wire area of the cable.
3	Repeat Step 2 carefully until the cable sheath is cut. NOTE: Any damaged conductors must be either spliced, replaced, or covered with heat shrink material. Tape must <u>not</u> be used.

3.4 Using a Cable-Stripping Tool to Remove Cable Sheath

Perform the following procedure when using a cable-stripping tool to remove the cable sheath.

Step	Using a Cable-Stripping Tool to Remove Cable Sheath
1	Hold the cable above the butt cut with one hand, and insert the cutting tip of the cable-stripping tool into the butt cut.
2	Pulling away from your body, pull the cable-stripping tool down the length of the sheath to the end of the cable.
3	Remove the cut cable sheath, paper and wrappings, etc., from the cable. Place the removed material in the cable sheathing bag or equivalent.
4	Trim all wrappers, binder material, etc., even with the butt.

(continued)

3. Butting and Stripping Switchboard Cables, continued

3.4

Using a Cable-Stripping Tool to Remove Cable Sheath, continued

Step	Using a Cable-Stripping Tool to Remove Cable Sheath
5	Pull the paper and binder materials (stretch) away from the butt location while trimming to allow materials to return under the butt location.
6	Group the wires by color-coded binder groups by wrapping a color-coded conductor, color-coded cable tie, or the group binder material around the associated binder groups. NOTE: If cable pairs or binder groups become lost or split they must be buzzed before fanning.

3.5

Using a Nylon Rip Cord to Remove Cable Sheath

Perform the following procedure when using a nylon rip cord (provided in most cables) to remove the cable sheath.

Step	Using a Nylon Rip Cord to Remove Cable Sheath
1	Using scissors, cut enough sheath at the end of the cable to access the nylon rip cord.
2	Wearing protective gloves, grasp the nylon rip cord and pull it to the butt point of the cable.
3	Remove the cut cable sheath, paper and wrappings, etc., from the cable. Place the removed material in the cable sheathing bag or equivalent.
4	Trim all wrappers, binder material, etc., even with the butt.
5	Pull the paper and binder materials (stretch) away from the butt location while trimming to allow materials to return under the butt location.
6	Group the wires by color-coded binder groups by wrapping a color-coded conductor, color-coded cable tie, or the group binder material around the associated binder groups. NOTE: If cable pairs or binder groups become lost or split they must be buzzed before fanning.

3.6

Electrical Tape Usage Qualification

It is permissible to use a high-quality grade gray-colored plastic tape rated in excess of 600V and 175° F. When used on cable, the gray tape is to be wound tightly and evenly starting on the wire with two square wraps. The tape will then be wrapped toward the cable sheath with an overlap of at least half the tape width for a length of approximately 1 ½" to 2" onto the cable sheath. The last two turns must be put on:

- So that the end of the tape completely overlaps the preceding turns of tape.
- Without tension.

Some equipment manufacturers use this tape on cables and brackets, and for protection on sharp edges and repair of gray switchboard cables. NTI and AT&T both use Permacel tape, which is acceptable for their standard applications.

4. Cable Wire Forming and Fanning

- 4.1 Eye Protection** Use approved eye protection when handling and fanning loose wire ends. Refer to GTE Telephone Operations Practice 075-675-I 00.
- NOTE:** After wires are fanned, fold the loose wire ends to prevent eye injury from protruding wire ends.
- 4.2 Loose Wire Containment** The following apply to loose wires:
- Do not form/run loose wires with sheath-type cables.
 - Contain wires loosely with cable ties so that indentations are not formed in the wires.
- 4.3 Wire Protection** When wires might contact sharp edges, protect the wires with one of the following:
- Grommet material.
 - Spiral wrap.
 - Other approved insulation materials.
- 4.4 Fanning Arrangements** Because numerous fanning arrangements are used in central offices, it is not feasible to cover all methods in this practice. Refer to the appropriate GTE practice and/or specifications for more specific fanning applications.
- NOTE:** Wires that will terminate under screw heads must be connected using spade-type connectors.
- 4.5 Color Code** Unless a specific color code is given for a particular unit of equipment or terminal block, color-code conductors sequentially based on the basic color code. Talking paths are always cables with paired wire to reduce crosstalk and noise induction within the circuit. Do not split pairs. If you replace one lead of a pair, replace both wires with either a twisted pair or the spare pair.
- 4.6 Wire Twist** Handle the cable so that pairs do not untwist. Do not add additional twist to paired leads.
- 4.7 Positioning Wires for Fanning** Because the wires in switchboard cables are in a specific order, they might be best selected at the butt. If pairs break out of the butt at an awkward spot, for ease of fanning turn the conductors in a clockwise or counterclockwise direction to remedy this condition.
- The wires must be fanned to the termination point in such a way to avoid intertwining the wires.
- 4.8 Maintenance Loops** On the equipment end, allow approximately 5/2 inches of additional wire slack for a maintenance loop.
- On the distribution frame, where the swivel mounting brackets have been used, leave approximately two inches of additional slack behind the block.

4. Cable Wire Forming and Fanning, continued

4.9

Spare and Unused Wires

Trim spare and unused wires to allow for termination to the furthest point of possible termination plus 12 inches (6 inches for a maintenance loop and 6 inches for stripping the leads).

On terminal blocks:

1. Fan the spare/unused wires into the furthest hole of the block from the butt.
2. Weave the wires over four holes.
3. Tuck the wires behind the terminal block.

On equipment ends:

1. Mark the leads with a cable tag to identify use.
2. Turn the leads back into the wire form. Tuck the tags into the form.

NOTE: Refer to GTE Telephone Operations Practice 256-050-213 for additional information on cabling spare and unused wires.