

**CABLE SPlicing—GENERAL**  
**MULTIPLE UNIT**  
**AD-TYPE PULP-INSULATED CABLES**

CONTENTS	PAGE
1. GENERAL . . . . .	1
2. DEFINITIONS . . . . .	2
3. MIXED COLOR UNIT MAKEUP . . . . .	2
4. EXTRA PAIR LOCATION AND IDENTIFICATION . . . . .	6
5. ARRANGEMENT OF UNITS . . . . .	6
6. PAIR COUNT . . . . .	6
7. PAIR GROUPINGS FOR SPlicing . . . . .	8
8. SUPERSEDED CORE MAKEUPS . . . . .	8



◆ *ADA cables may contain a nonfunctioning insulated metallic screen bisecting the cable core. At the factory these cables had failed to meet BDA specifications; however, they did meet all ADA specifications. These cables were recoded and shipped as ADA cables.*

*When splicing these recoded cables, cut and fold the screen as covered in Section 632-410-205. (This section is scheduled to be reissued as Section 640-010-005.) The pair count in these recoded cables is established in the same manner as for ADA cables with similar pair sizes.*

*Note:* Although the spare pair colors in the recoded cables are not the same as ADA cables, the splicer should be able to cope with this minor difference.◆

**1. GENERAL**

- 1.01 This section covers the description and splicing of AD-type pulp-insulated multiple unit cables.
- 1.02 This section is reissued to:
  - Include information on 1200-pair 22-gauge; 3000-, and 3600-pair 26-gauge cables
  - Indicate that screened pulp-insulated cables failing to meet BDA specifications may be shipped as ADA cables
  - Show AD-type cables which have been rated Nonstandard Limited Availability.

1.03 AD-series pulp-insulated, multiple unit cables are available as **standard AD-series cables** and as **nonstandard limited availability AD-series cables**.

1.04 ◆ **Standard AD-Series Cables:** These cables are furnished in the following pair sizes and gauges:

- 22-gauge—600, 900, 1200
- 24-gauge—900, 1200, 1500, 1800
- 26-gauge—900, 1200, 1500, 1800, 2100, 2400, 2700, 3000, 3600.◆

**NOTICE**

Not for use or disclosure outside the  
Bell System except under written agreement

**1.05 ♦Nonstandard Limited Availability (NS-LA) AD-Series Cables:** These cables were former standard AD-type cables which were given a nonstandard limited availability rating because of the low demand for them. They are available but are not regarded as present standard cables. The NS-LA cables are furnished in the following pair sizes and gauges:

19-gauge—300, 400, 450

22-gauge—300, 400

24-gauge—300, 400, 600

26-gauge—300, 400, 600.♦

**1.06 ♦Conductor Insulation:** The annealed copper conductors are insulated with wood pulp applied directly to the wires.♦

**1.07** These cables are available with plastic or lead sheaths and with various standard types of outer protection as covered in the 626 Division of the Bell System Practices.

## 2. DEFINITIONS

**2.01** The following definitions are included to clarify the meaning of several terms used in this and related sections covering the AD-series cables:

**Cable Size**—In the AD-series the cable size designations are the same as the guaranteed number of pairs, namely; 300, 400, etc, through ♦3600.♦

**Unit**—An assembly of pairs held together by a binder.

**Splicing Group**—In the AD series ♦of *even count multiple unit cables*♦ the individual unit containing 25, 50, or 100 pairs is the basic splicing group. In superseded types ♦of *odd count multiple unit cables*♦ the basic group is 101 pairs, consisting of one 101-, one 50-, and one 51-pair, or three 25- and one 26-pair units as shown in Section 632-032-104.

**Extra Pairs (interstitial pairs)**—One or more color-coded pairs included in the cable to ensure

meeting the Western Electric Company, Inc. guarantee.

**Solid-Color Pairs**—Pulp-insulated pairs in which the ring conductor is colored throughout the length by dye mixed in the pulp before application to the conductor. The tip conductor of the pair is insulated with natural colored pulp with narrow bands of stain applied to indicate different twist lengths.

**Tracer Pair**—A distinctively colored (green-red) pair located in the outer layer of the white-green units. Often used as the telephone company employee's order pair. Rated MD in 1966.

## 3. MIXED COLOR UNIT MAKEUP

**3.01** Mixed color units are used in AD-type cables.

Each unit contains pairs of three colors arranged as indicated in Table A. These colors are repeated in sequence as necessary.

TABLE A

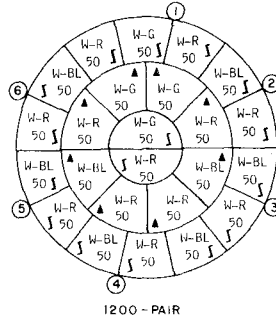
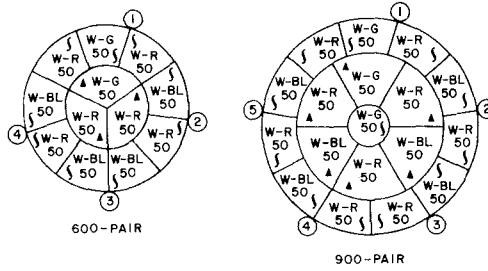
COLOR SEQUENCE OF LAYER

OUTSIDE LAYER	FIRST LAYER	CENTER
W-G	W-R	W-BL
W-R	W-BL	W-G
W-BL	W-G	W-R

**3.02** The pair color in the outer layer of a unit indicates the color of the unit for the purpose of establishing the pair count.

**3.03** The unit binders are color coded for manufacturing reasons and to identify the gauge and layer position of the units. *Standard cables* are shown in Fig. 1 and 2; *NS-LA cables* are shown in Fig. 3.

**3.04** The 19-gauge units contain 25 pairs, 22-gauge units contain 50 pairs, and 24- and 26-gauge units each contain 50 or 100 pairs.



- KEY -

- W-G = WHITE-GREEN
- W-R = WHITE-RED
- W-BL = WHITE-BLUE
- § = WHITE BINDER STRINGS
- ▲ = GREEN-WHITE BINDER STRINGS
- = EXTRA PAIR (TYPICALLY LOCATED)  
(FOR COLOR CODE OF EXTRA PAIRS,  
SEE TEXT.)

NOTES:

1. THE COLORS OF INSULATION INDICATED ARE THOSE OF THE PAIRS IN THE OUTER LAYER OF THE UNIT.
2. THE GREEN-RED TRACER PAIR FORMERLY LOCATED IN EACH WHITE GREEN UNIT WAS RATED MD IN 1966.

Fig. 1—Standard ADA Cable Layouts

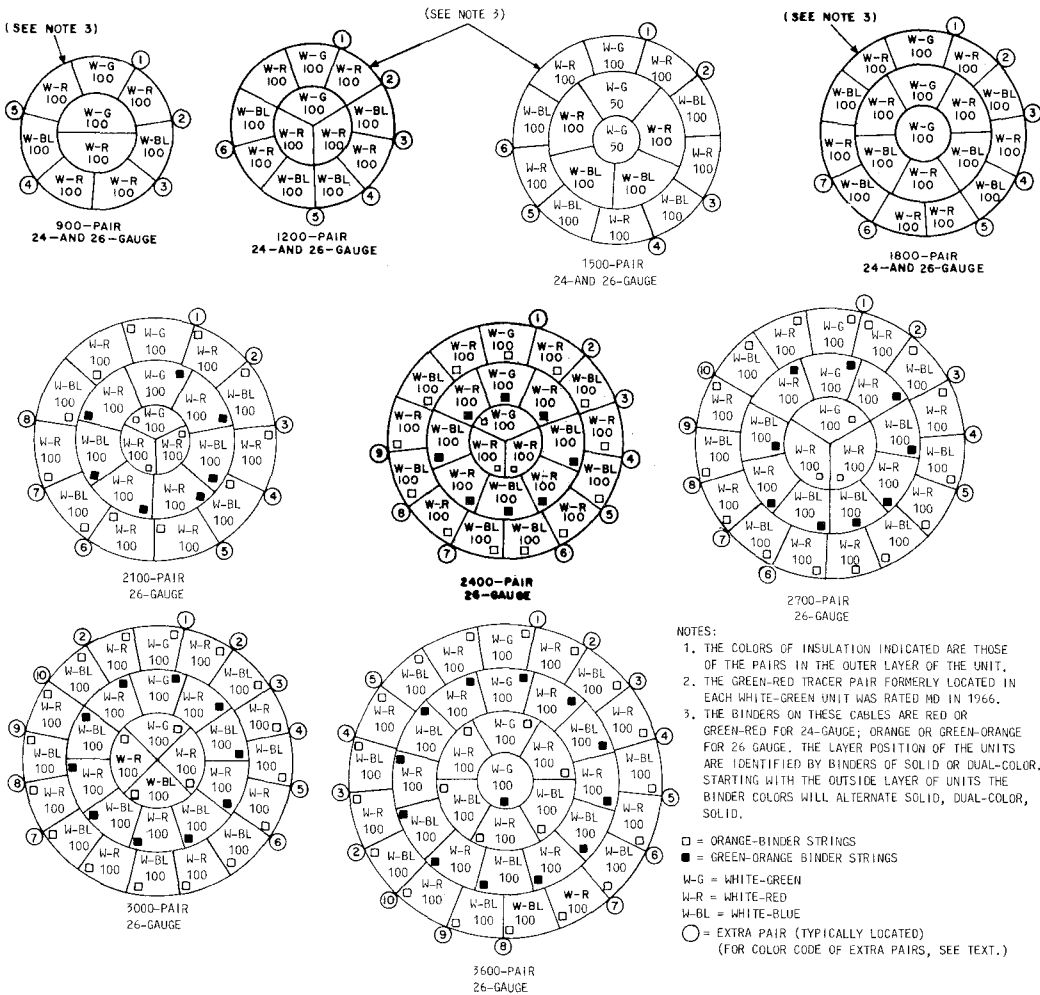
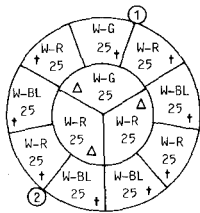
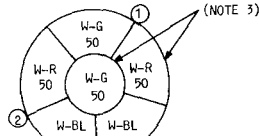


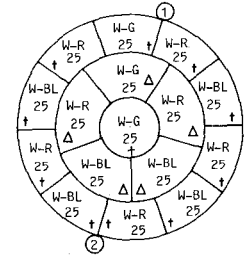
Fig. 2—Standard ADM and ADT Cable Layouts



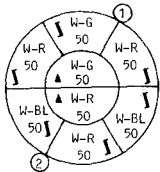
300-PAIR  
19-GAUGE



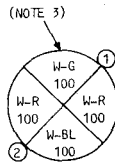
300-PAIR  
22,24-, AND 26-GAUGE



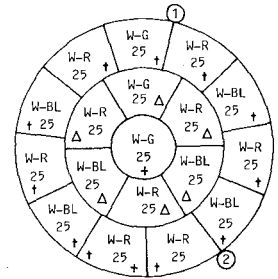
400-PAIR  
19-GAUGE



400-PAIR  
22-GAUGE



400-PAIR  
24- AND 26-GAUGE

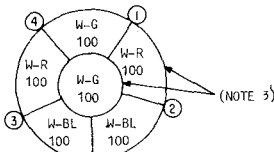


450-PAIR  
19-GAUGE

— KEY —

W - R = WHITE - RED  
W - G = WHITE - GREEN  
W - BL = WHITE - BLUE

† = BLUE BINDER STRINGS  
Δ = GREEN - BLUE BINDER STRINGS  
∩ = WHITE BINDER STRINGS  
▲ = GREEN - WHITE BINDER STRINGS  
○ = EXTRA PAIRS  
(TYPICALLY LOCATED)  
(FOR COLOR CODE OF EXTRA PAIRS, SEE TEXT).



600-PAIR  
24- AND 26-GAUGE

NOTES:

1. THE COLORS OF INSULATION INDICATED ARE THOSE OF THE PAIRS IN THE OUTER LAYER OF THE UNIT.
2. THE GREEN-RED TRACER PAIR FORMERLY LOCATED IN EACH WHITE-GREEN UNIT WAS RATED MD IN 1966.
3. THE BINDERS ON THESE CABLES ARE WHITE OR GREEN-WHITE FOR 22-GAUGE; RED OR GREEN-RED FOR 24-GAUGE; ORANGE OR GREEN-ORANGE FOR 26-GAUGE. THE LAYER POSITION OF THE UNITS ARE IDENTIFIED BY BINDERS OF SOLID OR DUAL-COLOR. STARTING WITH THE OUTSIDE LAYER OF UNITS THE BINDER COLORS WILL ALTERNATE SOLID, DUAL-COLOR, SOLID.

Fig. 3—Nonstandard-Limited Availability ADB, ADA, ADM, and ADT Cable Layouts

## 4. EXTRA PAIR LOCATION AND IDENTIFICATION

**4.01 Extra Pairs:** The extra pairs in AD-type cables are located in the spaces (interstices) between units of the outer layer. The crosstalk coupling between these interstitial pairs and those in the units is comparable to that of pairs in different units. In splicing adjacent lengths of cable containing factory defects, carrier crosstalk due to the *wandering pair* effect can be minimized by appropriate use of the interstitial pairs. The recommended method of splicing is outlined in 7.01.

**4.02 Extra Pair Color Code:** A color code has been provided for ten different extra pairs as shown in Table B. The red-blue extra pair (Pair No. 1) is used only once in any given cable. Where provided, the balance of the extra pairs (No. 2 through No. 10) is used in the color sequence as shown and is distributed as symmetrically as possible. Where it is necessary to place more than one pair in an interstice, the color coded pairs are sequential. In cables where it is necessary to include more than ten extra pairs to make up for defects, the color code shown for Pair No. 2 through No. 10 is repeated in sequence.

## 5. ARRANGEMENT OF UNITS

**5.01 Core Makeups:** The colors of insulation, arrangement of units, colors of unit binding strings, typical locations of extra pairs, and other details for the various sizes are shown in the illustrations.

## 6. PAIR COUNT

**6.01** If the cable terminates in two offices (interoffice trunks), one of the offices should be selected as the reference office for determining the direction of counting.

**6.02** The pair count of the unit is determined in the following way:

(a) The white-green unit in the center is the starting unit and has the lowest count.

TABLE B

EXTRA PAIR COLOR CODE

PAIR NO.	EXTRA PAIR COLORS
1	Red-blue
2	Green-white
3	Red-white
4	Blue-white
5	Green-white/black stain
6	Red-white/black stain
7	Blue-white/black stain
8	Green-white/orange stain
9	Red-white/orange stain
10	Blue-white/orange stain

*Note 1:* Red-blue pair is always placed alone in an interstice. (See 4.02 for manufacturing information regarding number and location of extra pairs.)

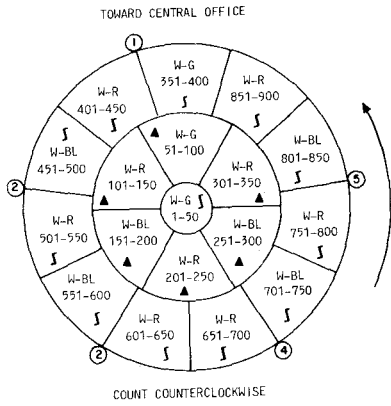
(b) The white-green unit in any layer is the marker unit for that layer and has the lowest count in the layer.

(c) Looking away from the central office, the count proceeds in a clockwise direction starting with the white-green unit.

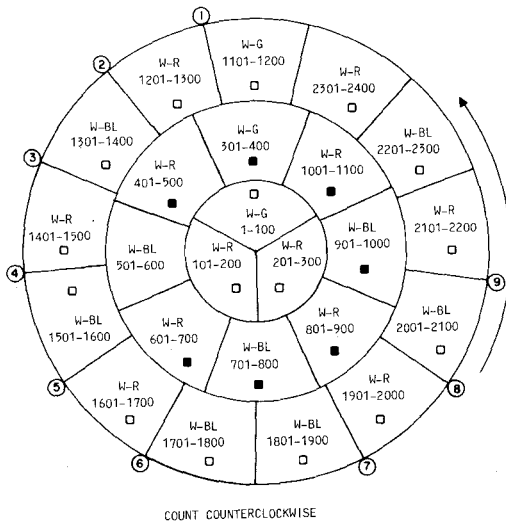
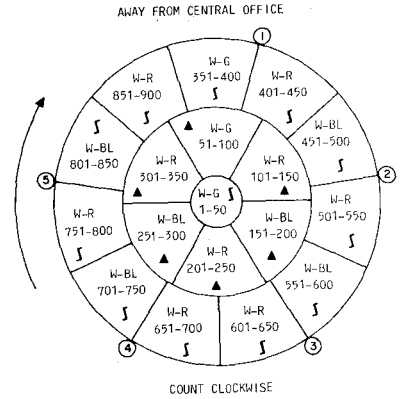
(d) Looking toward the central office, the count proceeds in a counterclockwise direction starting with the white-green unit.

*Note:* The ADA-1200 pair cable has two white-green (W-G) units in the first layer. When counting clockwise, the W-G unit on the left is the first unit; when counting counterclockwise the W-G unit on the right is first unit.

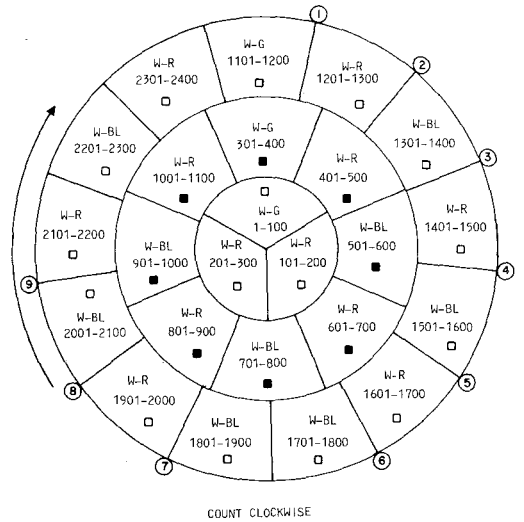
(e) Figure 4 illustrates the cable count at three typical straight splices.



900 PAIR ADA CABLE



2400 PAIR ADT CABLE



- KEY
- § = WHITE BINDER STRINGS
  - ▲ = GREEN-WHITE BINDER STRINGS
  - = ORANGE-BINDER STRINGS
  - = GREEN-ORANGE BINDER STRINGS
  - W-G = WHITE-GREEN
  - W-R = WHITE-RED
  - W-BL = WHITE-BLUE
  - = EXTRA PAIR (TYPICALLY LOCATED) (FOR COLOR CODE OF EXTRA PAIRS, SEE TEXT.)

NOTE:  
THE COLORS OF INSULATION INDICATED ARE THOSE OF THE PAIRS IN THE OUTER LAYER OF THE UNIT

Fig. 4—Cable Count—Typical Straight Splices

**7. PAIR GROUPINGS FOR SPLICING**

**7.01** The usual procedure in splicing units, defective pairs, extra pairs, etc, is as follows:

**(1) Units:**

- (a) Units of similar size should be kept intact at straight splices by joining 25- to 25-, 50- to 50-, and 100- to 100-pair units.
- (b) The pairs within each unit (or larger splicing group if two or more small units are joined to a larger unit) should be spliced at random to ensure good mixing.
- (c) At junctions of cables having units of different sizes (or at branch splices) the detail plan should specify the splicing arrangement of units. Usually the arrangement will be such that successively counted (sheath count) smaller units can be joined to the larger units; two 50-pair to a 100-pair unit, four 25-pair to a 100-pair unit, etc, so that 100-pair sheath count groups will be kept intact.

**(2) Defective Pairs:**

- (a) Cables having factory defects are painted red at each end at the factory to indicate that the ends require special attention. It is important to avoid losing the identity of the defective pairs which are identified as shown in Section 632-020-105.
- (b) If one of the painted ends has been cut off, thereby losing the factory marking of defective pairs, it will be necessary to

locate defective pairs by testing from the factory-sealed end, where the defective pairs are marked.

- (c) Defective pairs should be cleared and sleeved at each end of the section involved. Locating and handling defective pairs are covered in Section 632-020-200.

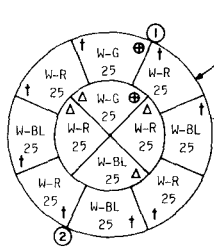
**(3) Extra Pairs:**

- (a) **Substitution of Extra Pairs:** Units having factory defective pairs should be made good by substituting **in the section involved** one or more of the extra pairs.
- (b) In 24- and 26-gauge cables, which are used primarily as feeders, the extra pairs can be used in numerical order according to color code. (See Fig. 2, 3, and Table B.)
- (c) Since 19- and 22-gauge trunk cables may be used for carrier purposes, such as T1, the engineer should include instructions on the detail plans to guide the splicer in the use of the extra pairs, to ensure appropriate segregation of carrier pair groups.
- (d) Any extra pairs not used as substitutes for defective pairs should be made continuous through the splice by joining color-to-color.

**8. SUPERSEDED CORE MAKEUPS**

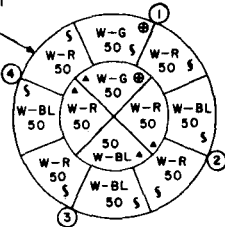
**8.01** The arrangement of units used in superseded AD-type cables is illustrated in Fig. 5.





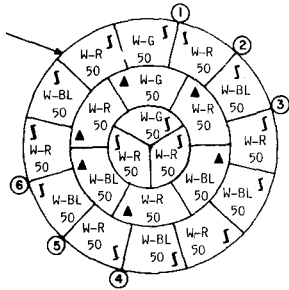
300-PAIR  
19-GAUGE

SEE NOTE 1

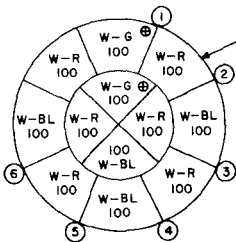


600-PAIR  
22-GAUGE

SEE NOTE 2



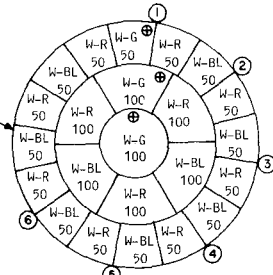
1100-PAIR  
22-GAUGE



1200-PAIR  
24-AND 26-GAUGE

SEE NOTE 1 AND 4

SEE NOTE 1 AND 4



1500-PAIR  
24- AND 26-GAUGE

-KEY-

- W-R = WHITE-RED
- W-G = WHITE-GREEN
- W-BL = WHITE-BLUE
- ⊕ = GREEN-RED TRACER PAIR
- § = WHITE BINDER STRINGS
- † = BLUE BINDER STRINGS
- △ = GREEN-BLUE BINDER STRINGS
- ▲ = GREEN-WHITE BINDER STRINGS
- = EXTRA PAIR (TYPICALLY LOCATED)  
(FOR COLOR CODE OF EXTRA PAIRS,  
SEE TABLE C AND PART 3)

NOTES

1. THESE CORE MAKE-UPS WERE CHANGED TO IMPROVE THE FILL RATED MD 4-63.
2. RATED MD IN 1975
3. THE COLORS OF INSULATION INDICATED ARE THOSE OF THE PAIRS IN THE OUTER LAYER OF THE UNIT.
4. THE BINDERS ON THESE CABLES ARE RED OR GREEN-RED FOR 24 GAUGE, ORANGE OR GREEN-ORANGE FOR 26-GAUGE, THE LAYER POSITION OF THE UNITS ARE IDENTIFIED BY BINDERS OF SOLID OR DUAL-COLOR STARTING WITH THE OUTSIDE LAYER OF UNITS THE BINDER COLORS WILL ALTERNATE SOLID, DUAL-COLOR, SOLID.

Fig. 5—Superseded Core Layouts

**CABLE SPLICING—GENERAL**  
**MULTIPLE UNIT**  
**AD-TYPE PULP-INSULATED CABLES**

**1. GENERAL**

**1.001** This addendum supplements Section 632-032-110, Issue 5. Place this pink sheet ahead of Page 1 of the section.

**1.002** This addendum is issued to revise Fig. 5.

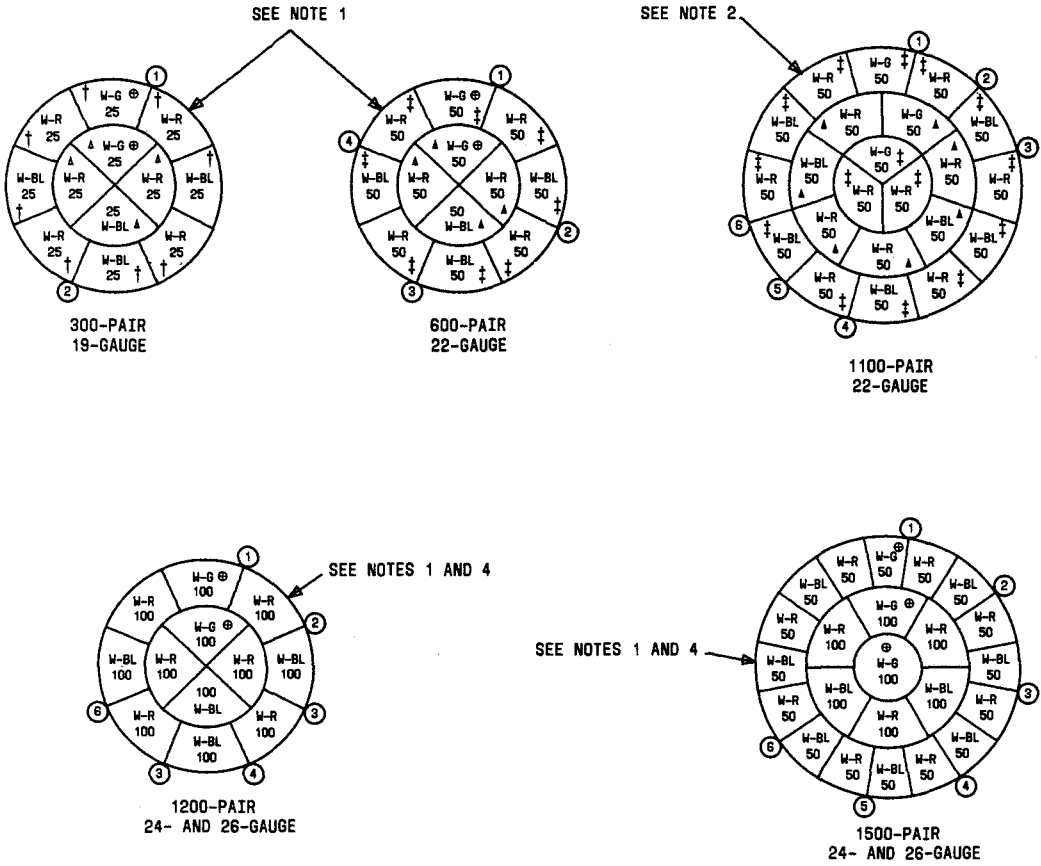
**2. CHANGES TO SECTION**

**2.001** On Page 9, Fig. 5 (Section 8) has been revised to correct the lay-up of the superseded 1100-pair 22-gauge cable.

**NOTICE**

This document is either  
AT&T - Proprietary, or WESTERN  
ELECTRIC - Proprietary

Pursuant to Judge Greene's Order of August 5, 1983,  
beginning on January 1, 1984, AT&T will cease to use  
"Bell" and the Bell symbol, with the exceptions as set  
forth in that Order. Pursuant thereto, any references to  
"BELL" and/or the BELL symbol in this document is here-  
by deleted and "expunged".



- KEY -

- W-R = WHITE-RED
- W-G = WHITE-GREEN
- W-BL = WHITE-BLUE
- ⊕ = GREEN-RED TRACER PAIR
- ‡ = WHITE BINDER STRINGS
- † = BLUE BINDER STRINGS
- ▲ = GREEN-BLUE BINDER STRINGS
- △ = GREEN-WHITE BINDER STRINGS
- = EXTRA PAIR (TYPICALLY LOCATED)  
(FOR COLOR CODE OF EXTRA PAIRS,  
SEE TABLE C AND PART 3)

NOTES

1. THESE CORE MAKE-UPS WERE CHANGED TO IMPROVE THE FILL RATED MD 4-63.
2. RATED MD IN 1975
3. THE COLORS OF INSULATION INDICATED ARE THOSE OF THE PAIRS IN THE OUTER LAYER OF THE UNIT.
4. THE BINDERS ON THESE CABLES ARE RED OR GREEN-RED FOR 24 GAUGE, ORANGE OR GREEN-ORANGE FOR 26-GAUGE, THE LAYER POSITION OF THE UNITS ARE IDENTIFIED BY BINDERS OF SOLID OR DUAL-COLOR STARTING WITH THE OUTSIDE LAYER OF UNITS THE BINDER COLORS WILL ALTERNATE SOLID, DUAL-COLOR, SOLID.

Fig. 5—Superseded Core Lay-ups