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CABLE SPLICING — GENERAL

MULTIPLE UNIT

AD-TYPE CABLES

CONTENTS

1. GENERAL

1.01 This section covers the description and splicing of 19-gauge ADB, 22-gauge ADA, 24-gauge ADM, and 26-gauge ADT types of multiple unit cables.

1.02 This section is reissued to:

- Include 1100-pair 22-gauge ADA, 1800-pair 24-gauge ADM, and 2700-pair 26-gauge ADT cables.
- Include new method of coloring tip and ring conductors.
- Indicate that the green-red tracer or talk pair in each white-green unit is being replaced by a white-green pair.

1.03 The new standard sizes, namely, 1100-pair 22-gauge ADA, 1800-pair 24-gauge ADM, and 2700-pair 26-gauge ADT cables with ***stalpeth or lead sheaths*** are intended primarily for use in relieving duct congestion at the entrance to a metropolitan central office. The new standard size 1800-pair 24-gauge ADMN and 2700-pair 26-gauge ADTN cables with ***stalvyn sheath*** are intended for use in open riser shafts in buildings.

1.04 Splices can be made on the new size cable using 30- and 31-type splice cases or lead sleeves with auxiliary sleeve wrapped joints.

1.05 The conductors of AD-type cables are annealed copper with pulp insulation. These cables are composed of mixed color units similar to the superseded cables.

1.06 In cables of the AD design the extra pairs are laid individually in the spaces between the units immediately under the core wrapper.

1.07 These cables are available with plastic or lead sheaths and with various standard types of outer protection as covered in Sections 626-225-106, 107, and 108.

1.08 Because of a heavy demand for pulp-insulated exchange cable, Western Electric Company, Inc. is purchasing 22-gauge, 900-pair, pulp-insulated cable, coded GC-ADAC-900, from General Cable Corporation. The core arrangement and color code of this cable is essentially the same as those manufactured by Western Electric. Therefore, no particular difference in splicing units, extra pairs, tracer pairs, etc, is involved. The major manufacture deviations of this cable from Western Electric cable is contained in Section 632-032-111.

2. DEFINITIONS

2.01 *Cable Size:* AD-type cables are made in sizes from 300 through 2700 pairs depending on the gauge. The cable size designations will be the same as the guaranteed number of pairs, namely, 300, 400, etc, through 2700 pairs.

2.02 *Unit:* A group of pairs held together by a binder. The units contain 25, 50, or 100 pairs.

2.03 *Extra Pair (Interstitial Pair):* One or more color coded pairs included in the various sizes of cables. The extra pairs are laid individually in the spaces between the units immediately under the core wrapper.

2.04 *Tracer Pair (Talk Pair):* In the ***new style*** cable it is a white-green pair and in the ***old style*** cable it is a distinctively colored pair (green-red) that is located in the outer layer of each white-green unit.

3. MIXED COLOR UNIT MAKE-UP

3.01 A mixed color unit has groups of multi-colored pairs arranged in layers and held together with a binder. The binders are color coded for manufacturing reasons and also serve to identify the gauge and layer position of the units as covered in Section 632-032-104.

3.02 Multiple-unit AD-type cables contain from 4 through 27 units. Each unit of the cable contains a combination of pairs having nine different lengths of twist, but only three different colors of insulation: white-green, white-red, and white-blue. The pair color of the outside layer is used as the identifying color of the unit for the purpose of establishing the pair count.

3.03 Mixed color units are used in 19-, 22-, 24-, and 26-gauge AD-type cables. Each unit contains pairs of three colors progressing from the outer layer of the unit to the center, as indicated in Table A. These colors are repeated in sequence when the unit has more than three layers.

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

3.04 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.

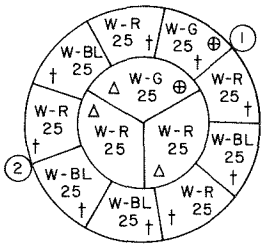
3.05 *New Method of Coloring Pulp Insulated Conductors:* The basic color scheme is not changed so it is not necessary to change the code designations. The undyed pulp insulation on the ***ring conductors*** is colored with 3/8-inch intermittent bands (15 per foot) of either green, red, or blue. These spaced colored bands provide sufficient color distinction between the different colored ring conductors and permit enough discrimination to identify the different colored units. The undyed pulp insulation on the ***tip conductors*** are not colored or stained for splicing identification purposes. This undyed pulp-insulated tip conductor is referred to as white. However, a 3/8-inch band of color stain (1 per foot) such as black or orange may be noticed on the white conductors of some of the pairs. The color intensity of these stains is muted and is used only for shop identification of the pairs. The ***tracer or talk pair*** is located in the outer layer in each white-green unit and is white-green in color since it is not necessary to have talk pairs within the units (because of the extra pairs being in the interstices).

3.06 *Old Method of Coloring Pulp-Insulated Conductors:* The pulp insulation on the ***ring conductors*** is dyed either a solid green, red, or blue. The pulp insulation on the ***tip conductors*** is dyed plain white. The short stains of color such as black or orange that may be noticed along the white conductors of some of the pairs are factory markings to indicate different lengths of pair twist. The ***tracer or talk pair*** is located in the outer layer in each white-green unit and is green-red.

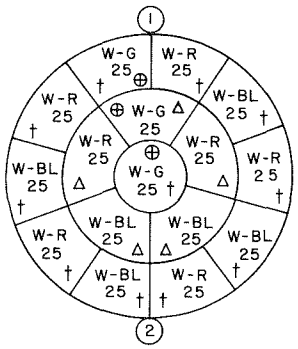
3.07 Until the necessary manufacturing conversions are completed to use only the new method of coloring the pulp insulation, cables having the new or old style colored insulation will be furnished to the field. However, ***new*** and ***old style colored conductors will not be mixed*** in the same cable.

4. EXTRA PAIR LOCATION AND IDENTIFICATION

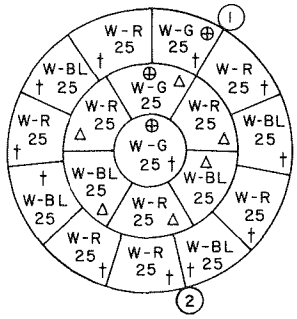
4.01 The location and color code of the extra pairs are shown in Fig. 1, 2, and 3.



300-PAIR



400-PAIR



450-PAIR

— KEY —

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

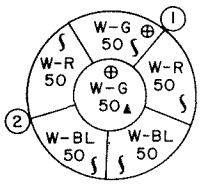
⊕ = TRACER PAIR IN SOLID-COLOR PULP ONLY. (NOTE 2).
† = BLUE BINDER STRINGS
Δ = GREEN-BLUE BINDER STRINGS
◯ = EXTRA PAIRS

NO. — EXTRA PAIR COLOR
1 — RED-BLUE
2 — GREEN-WHITE

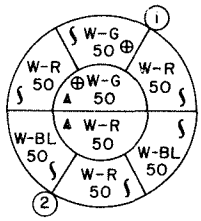
NOTES:

1. THE COLORS OF INSULATION INDICATED ARE THOSE OF THE PAIRS IN THE OUTER LAYER OF THE UNIT.
2. GREEN-RED TRACER PROVIDED ONLY IN SOLID-COLOR INSULATED CABLE; REPLACED BY A WHITE-GREEN PAIR IN MULTISTAIN PULP CABLE.

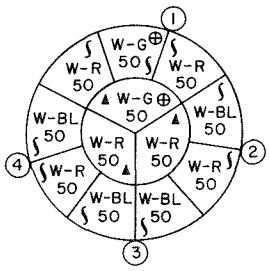
Fig. 1 — ADB — 19-Gauge Cable



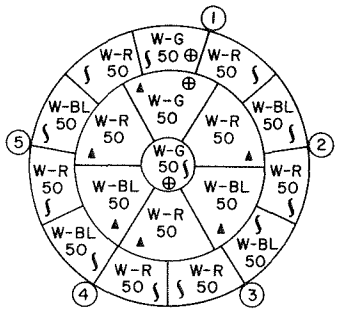
300-PAIR



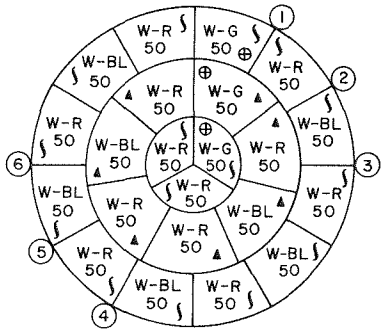
400-PAIR



600-PAIR



900-PAIR



1100-PAIR

-KEY-

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

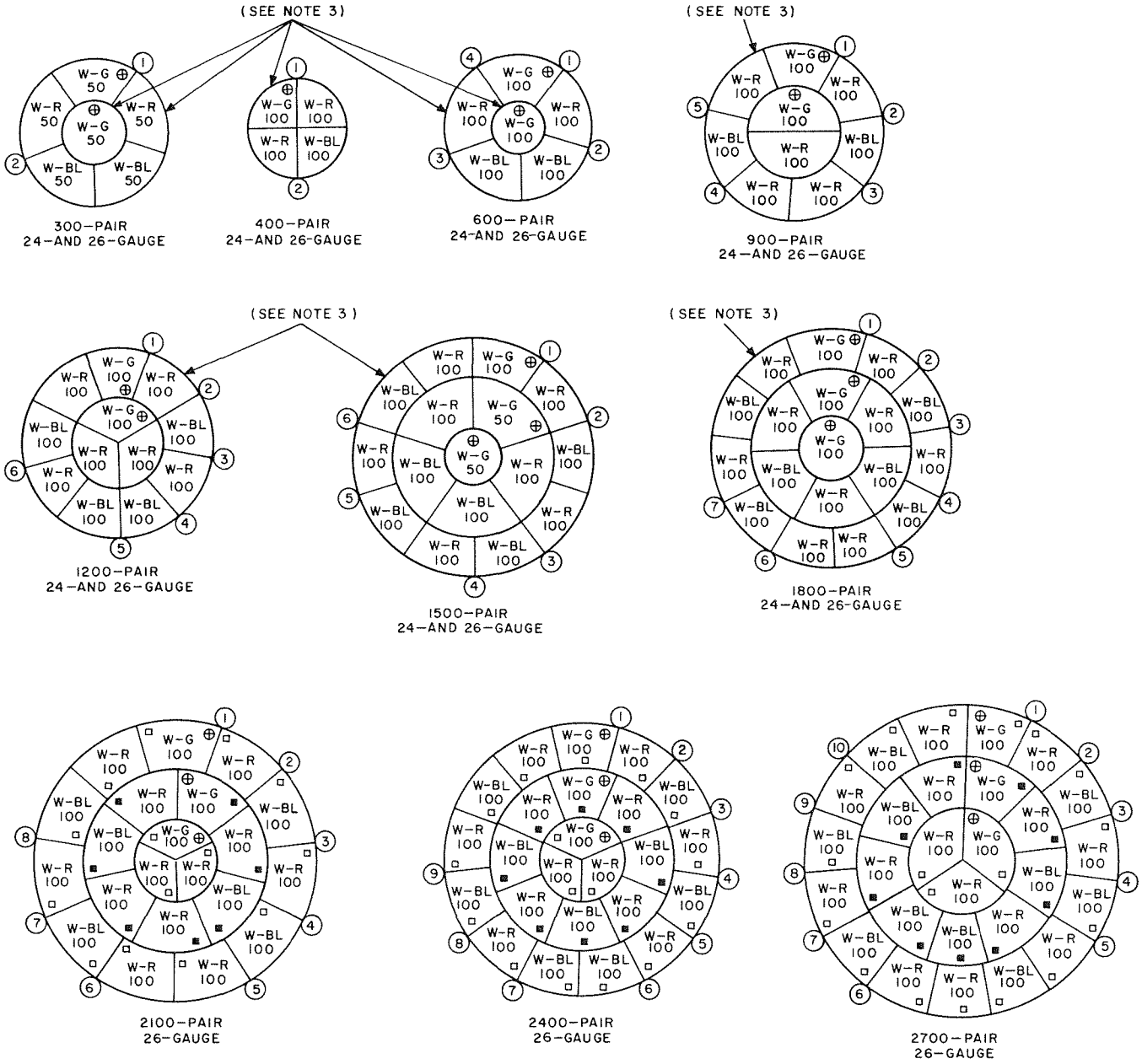
⊕ = TRACER PAIR IN SOLID-COLOR PULP ONLY. (NOTE 2)
ʃ = WHITE BINDER STRINGS
▲ = GREEN-WHITE BINDER STRINGS
◯ = EXTRA PAIR

NO. — EXTRA PAIR COLOR
1 — RED-BLUE
2 — GREEN-WHITE
3 — RED-WHITE
4 — BLUE-WHITE
5 — GREEN-WHITE/BLACK STAIN
6 — RED-WHITE/BLACK STAIN

NOTES:

1. THE COLORS OF INSULATION INDICATED ARE THOSE OF THE PAIRS IN THE OUTER LAYER OF THE UNIT.
2. GREEN-RED TRACER PROVIDED ONLY IN SOLID-COLOR PULP CABLE: REPLACED BY A WHITE-GREEN PAIR IN MULTISTAIN PULP CABLE.

Fig. 2 — ADA — 22-Gauge Cable



NOTES:

1. THE COLORS OF INSULATION INDICATED ARE THOSE OF THE PAIRS IN THE OUTER LAYER OF THE UNIT.
2. GREEN-RED TRACER PROVIDED ONLY IN SOLID-COLOR PULP CABLE; REPLACED BY A WHITE-GREEN PAIR IN MULTISTAIN PULP CABLE.
3. 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.

⊕ = TRACER PAIR IN SOLID-COLOR PULP ONLY. (NOTE 2).
□ = ORANGE-BINDER STRINGS
■ = GREEN-ORANGE BINDER STRINGS
W-G = WHITE-GREEN
W-R = WHITE-RED
W-BL = WHITE-BLUE

◯ = EXTRA PAIR

NO.	—	EXTRA PAIR COLOR
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

Fig. 3 — ADM-ADT — 24- and 26-Gauge Cables

5. ARRANGEMENT OF UNITS

5.01 The arrangement of units and interstitial pairs, the number of pairs in each unit, color of insulation, and color of binders on each units are illustrated in Fig. 1, 2, and 3.

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.

(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.

(e) The tracer (white-green or red-green) pair in each white-green unit generally takes the last pair number in the count of the unit.

(f) Fig. 4 illustrates the cable count at three typical straight splices.

7. SPLICING

7.01 The units (containing 25, 50, or 100 pairs) are the basic splicing groups and should be kept intact throughout the length of the cable.

7.02 The pairs in each unit (or larger group if two or more small units are joined to a large unit) should be spliced at random to ensure good mixing.

7.03 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 by orange-colored plastic tubes at each end of the cable.

7.04 To locate factory defective pairs, cut the cable as close to the steel can as possible; then carefully remove 6 to 8 inches of cable sheath. (See Section 632-032-105.)

7.05 ***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.

7.06 In 24- and 26-gauge cables, which are used primarily as feeders, the extra pairs should be used in numerical order according to color code.

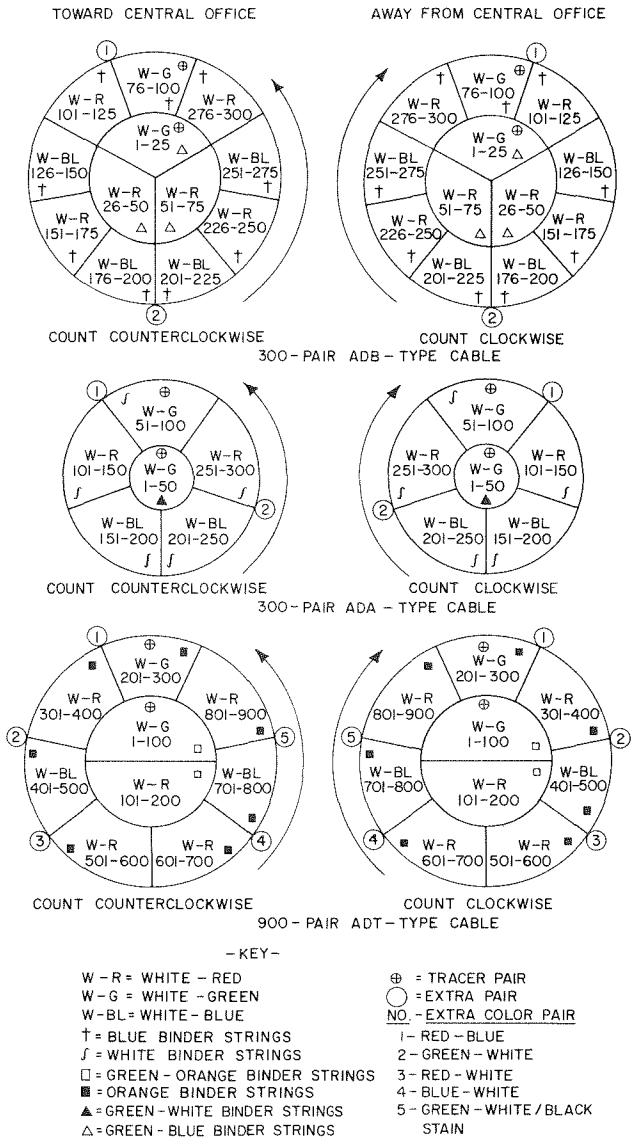


Fig. 4 — Cable Count — Typical Straight Splices

7.07 Since 19- and 22-gauge trunk cables may be used for T Carrier, the substitution should be made according to the engineer's instructions, to ensure appropriate segregation of carrier pair groups.

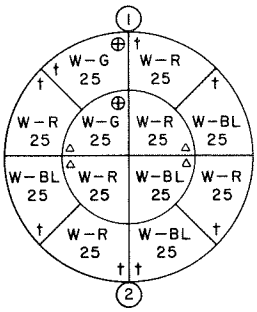
7.08 If a factory length with painted ends has been cut at the Distributing House or in the field and the workman is directed to locate the defective pair, it can be done by testing from the factory-sealed end where the defective pairs are marked.

7.09 Defective pairs should be cleared and sleeved at each end of the section involved. For further details, see Section 632-020-200.

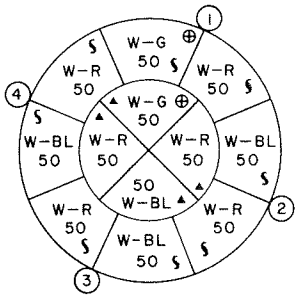
7.10 All extra pairs not used as substitutes for defective pairs should be made continuous through the splice by joining color-to-color.

8. SUPERSEDED CORE LAY-UP

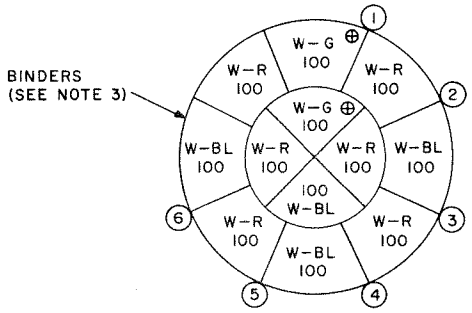
8.01 The arrangement of units used in the early production of 300-, 600-, 1200-, and 1500-pair AD-type cables is illustrated in Fig. 5.



300-PAIR
19-GAUGE



600-PAIR
22-GAUGE



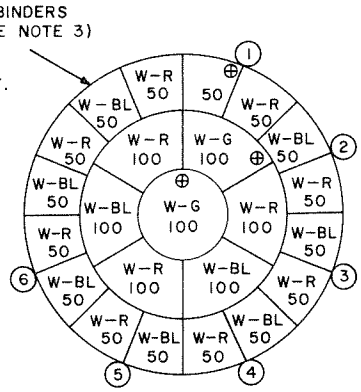
1200-PAIR
24-AND 26-GAUGE

-KEY-

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

⊕ = GREEN-RED TRACER PAIR IN SOLID COLOR PULP ONLY.
ʃ = WHITE BINDER STRINGS
† = BLUE BINDER STRINGS
△ = GREEN-BLUE BINDER STRINGS
▲ = GREEN-WHITE BINDER STRINGS
◯ = EXTRA PAIR

NO.	EXTRA COLOR PAIR
1	RED-BLUE
2	GREEN-WHITE
3	RED-WHITE
4	BLUE-WHITE
5	GREEN-WHITE/BLACK STAIN
6	RED-WHITE/BLACK STAIN



1500-PAIR
24-AND 26-GAUGE

NOTES:

1. THESE CORE MAKE-UPS WERE CHANGED TO IMPROVE THE FILL IN THE OUTSIDE LAYER THEREBY PREVENTING THE EXTRA PAIR FROM SLIPPING THROUGH THE CENTER LAYER. RATED MD 4-63.
2. THE COLORS OF INSULATION INDICATED ARE THOSE OF THE PAIRS IN THE OUTER LAYER OF THE UNIT.
3. 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