

## EVEN-COUNT PIC (PLASTIC-INSULATED CONDUCTOR) CABLES

### DESCRIPTION

CONTENTS	PAGE
1. GENERAL . . . . .	1
2. DESCRIPTION . . . . .	1
3. COLOR CODE . . . . .	2
4. CORE LAY-UP . . . . .	4
5. SUPERSEDED CABLES (POLYETHYLENE-INSULATED CONDUCTORS) . . . . .	7

#### 1. GENERAL

**1.01** This section covers the makeup and color code of *even count* PIC (Plastic Insulated Conductor) cables. This includes the following cables: AHC 17-gauge (aluminum), AHD 20-gauge (aluminum), AJB and BHB 19-gauge (copper), AJA and BHA 22-gauge (copper), AJM and BKM 24-gauge (copper), AJT and BKT 26-gauge (copper), and the corresponding copper conductor PIC cables which have CA-drawing designations. This section also includes information on sheath end markings for 400-, 600-, and 900-pair PIC to show direction of count, and also information on extra pairs in wire armored cables.

**1.02** This section is reissued to:

- Include AJ-type waterproof polypropylene-insulated conductor cable with alpeth or ASP sheath and UM-type protection.
- Change references to MP-type protection to UM-type protection.
- Show AHC-(17-gauge) and AHD-(20-gauge) type aluminum conductor cables as a replacement for CA-3207 (17-gauge), and CA-3210 (20-gauge) aluminum conductor cables, respectively.

**1.03** Information on superseded odd-count PIC cables is covered in Section 632-033-151.

#### 2. DESCRIPTION

**2.01 *Conductors and Insulation:*** PIC cables (83 nF per mile) consist of 17- or 20-gauge EC (grade) H-11 (temper) aluminum, or 19-, 22-, 24-, or 26-gauge annealed copper, insulated with solid polyethylene or solid polypropylene.

**2.02** AJ-type waterproof polypropylene-insulated conductor cable is similar to standard BH- or BK-type (air core) polyethylene-insulated conductor cable except that the air spaces surrounding the polypropylene-insulated pairs are filled with a compound of petroleum jelly and polyethylene which prevents water from entering the core. A filling compound is also applied under and between the aluminum and steel to prevent corrosion and eliminate any axial flow of water. AJ-type cables have the same PIC pair color code, core makeup, and lengths of pair twist as used in BH- and BK-type cables.♣

**2.03 *Cable Types and Sizes:*** The various types of PIC cables are available in the following standard pair sizes:

##### POLYETHYLENE-INSULATED CONDUCTORS (AIR CORE)

CABLE TYPES	PAIR SIZES
AHC type (17-gauge)	25, 50, 75, 100, 150, 200
AHD type (20-gauge)	25, 50, 75, 100, 150, 200, 300, 400
BHB type (19-gauge)	6, 11, 16, 25, 50, 75, 100, 150, 200, 300
BHA type (22-gauge)	11, 16, 25, 50, 75, 100, 150, 200, 300, 400, 600
BKM (24-gauge) <i>and</i> BKT (26-gauge) type	11, 16, 25, 50, 75, 100, 150, 200, 300, 400, 600, 900

##### SELF-SUPPORTING TYPES (SEE SECTION 627-700-014)

BHB (19-gauge)	6, 11, 16, 25, 50
BHA (22-gauge)	16, 25, 50, 75, 100
BKM (24-gauge)	25, 50, 75, 100, 150, 200
BKT (26-gauge)	25, 50, 75, 100, 150, 200, 300

◆POLYPROPYLENE-INSULATED CONDUCTORS  
(WATERPROOF)◆

AJB type (19-gauge)	6, 11, 16, 25, 50
AJA type (22-gauge)	11, 16, 25, 50, 75, 100
AJM (24-gauge) and AJT (26-gauge) types	25, 50, 100, 200

**2.04 Unit Makeup:** Unit-constructed cables of 6 through 25 pairs consist of a single unit. The basic subdivision in other sizes is the **Binder Group**, which has 25 distinctively colored pairs. The standard binder group may consist of a single 25-pair unit or a combination of 12- and 13-pair units having binders of the same color. Cables of 25 pairs and larger are made in multiples of 25 pairs, ie, 50, 75, 100, 150, 200, etc.

**2.05 Sheaths and Outer Protections:** These cables have a plastic core wrapper and are available with the following sheaths and outer protection:

- Alpeth, PAP, PASP, ARPAP, ARPASP, and self-supporting type (BHB-, BHA-, BKM-, and BKT-type cables)
- ◆Alpeth and ASP (AJB-, AJA-, AJM-, and AJT-type cables)◆
- ARPAP and ARPASP (AHC- and AHD-type cables)
- Lepeth sheath (CA-1812)
- Lepeth, polyethylene-jacketed lepeth, and tolpeth K sheaths (CA-1968, CA-1969, and CA-3138)
- UM-type gopher protection over alpeth, PAP, PASP, ARPAP, or ARPASP (BHB-, BHA-, BKM-, and BKT-type cables) and over ARPAP or ARPASP (AHC- and AHD-type cables)
- ◆UM-type protection over alpeth or ASP (AJB-, AJA-, AJM-, and AJT-type cables)◆
- Buried tape armor over alpeth, PAP, PASP, ARPAP, or ARPASP (BHB-, BHA-, BKM-, and BKT-type cables in sizes over one inch in diameter)
- Aerial tape armor over alpeth or PAP (CA-1910, CA-1911, CA-1912, and CA-1913)
- Galvanized or jacketed (neoprene) light wire armor over PASP (CA-1914, CA-1915, CA-1916, and CA-1917)

- Galvanized or jacketed (neoprene) single or double wire armor over lepeth (CA-1918, CA-1919, CA-1920, and CA-1921).

**2.06 ◆Length and manufacturer's identification markings,** which Western Electric Company, Inc, began to furnish in 1968 and **date of sheathing** and **cable code** which were added in 1972, are applied to the outer polyethylene jacket of alpeth, ASP, PASP, ARPAP, ARPASP, self supporting type cable, and UM-type protected cables. The markings are described in Sections 626-225-106 (Plastic Sheaths) and 626-225-108 (Outer Protections).◆

**2.07 Wire-Armored Cables:** In the wire-armored cables, one or more extra pairs are provided outside the units to serve as replacements in case there are defects in the units. The extra pairs are distinctively colored to distinguish them from the other pairs in the cable.

**2.08 Sheath End Markings:** To avoid splicing the unit with a crossover splice, the inner and outer sheath ends of 400-, 600-, and 900-pair cables are marked with bands of colored tape to indicate the progression of the unit count. When viewed from the end of the cable, **yellow** indicates **clockwise** rotation and **green** indicates **counterclockwise** rotation of the unit count.

**2.09** If practical, the adjacent lengths should be placed to permit joining the yellow and green ends for best alignment of units. When like-colored ends are to be joined, the units will not match exactly.

**2.10** In each case, units with like-colored binders should be spliced together to maintain the pair count throughout the cable.

### 3. COLOR CODE

**3.01** The pairs in each binder group and the binders are color coded to permit selection of any binder group and any pair in the cable by color.

**3.02** Table A shows the individual pair color code for cables of 6 through 25 pairs and for the units comprising the 25-pair binder groups used in the remaining sizes.

TABLE A  
COLOR CODE FOR PIC CABLE

25-PAIR COLOR CODE			BINDER GROUPS		
PAIR NUMBER SEQUENCE	COLOR CODE		STANDARD		SUPERSEDED <sup>1</sup>
	TIP	RING	12-13 PAIR UNITS	25 PAIR UNIT	8-8-9 PAIR UNITS
1	W	BL	↑ 12 ↓	↑ 25 ↓	↑ 8 ↓
2	W	O			
3	W	G			
4	W	BR			
5	W	S			
6	R	BL			
7	R	O			
8	R	G			
9	R	BR	↑ 25 ↓		↑ 8 ↓
10	R	S			
11	BK	BL			
12	BK	O			
13	BK	G			
14	BK	BR			
15	BK	S			
16	Y	BL			
17	Y	O		↑ 13 ↓	↑ 9 ↓
18	Y	G			
19	Y	BR			
20	Y	S			
21	V	BL			
22	V	O			
23	V	G			
24	V	BR			
25	V	S			
ABBREVIATIONS					
BL —Blue			W —White		
O —Orange			R —Red		
G —Green			BK —Black		
BR —Brown			Y —Yellow		
S —Slate			V —Violet		

Note 1: The 8-8-9 pair units were manufactured prior to 1964.

3.03 In each instance, the lowest numbered pair is in the center of the cable or unit and the other pairs follow in sequence, as illustrated in Fig. 1.

4. CORE LAY-UP

4.01 The binder group color code follows the same sequence as the pair color code, white-blue, white-orange, white-green, etc, but for clarity the

binder group color code designations in the figures are reversed (blue-white, orange-white, green-white, etc). This system of designations is like that used on the Bell System Cable and Wire Color Code Rule Form E-4911. Fig. 2 through 6 show the makeup of cables from 25 through 600 pairs, including the alternate design lay-up of 300-pair PIC cable. The 900-pair makeup of 24- and 26-gauge cables is shown in Fig. 7. In all sizes of PIC cable, the individual pairs can be identified by binder group colors and pair color insulation.

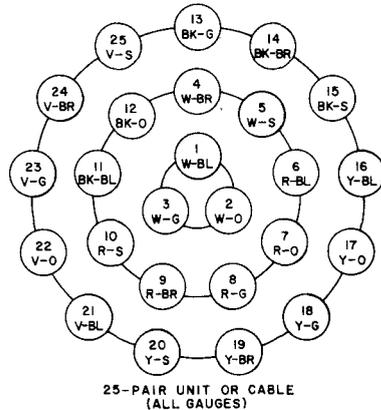
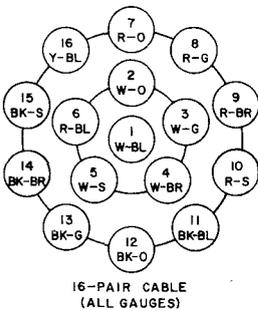
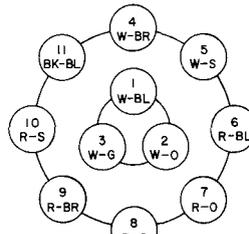
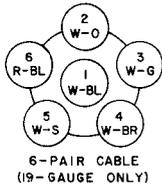


Fig. 1—PIC Pair Color Code

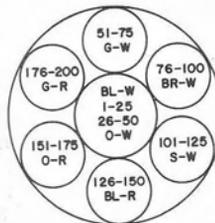
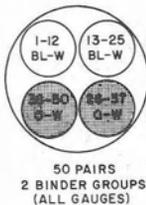


Fig. 3—200-Pair Core Makeup

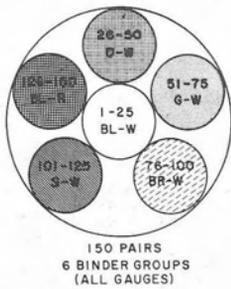
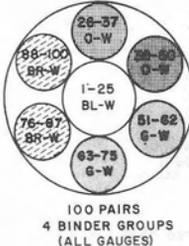
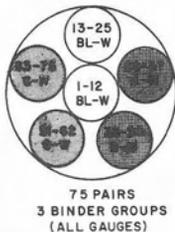


Fig. 2—25- Through 150-Pair Core Makeups

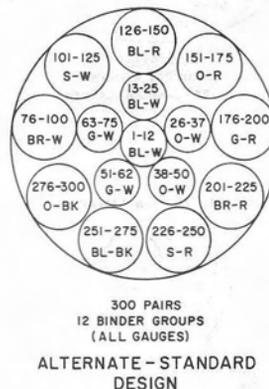
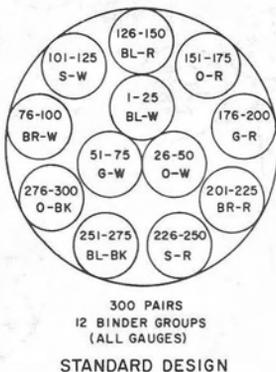


Fig. 4—300-Pair Core Makeup



**4.02** The *standard* and *alternate-standard* lay-ups used in 300-pair (copper) PIC cable (Fig. 4) contain the same number of binder groups. Therefore no significant change in splicing procedure is involved. The alternate 300-pair lay-up has been manufactured at some plants from 1965 to date.

**4.03** The 600-pair cable (Fig. 6) has 24 binder groups arranged in 12 multiunits. The 900-pair cable (Fig. 7) has 18 multiunits, 12 of which have an overall white binder; the remaining 6 multiunits have an overall red binder. Each multiunit is similar to a 50-pair cable except for binder group colors.

**4.04** In wire-armored cables, one extra pair (white-red) is provided in matching cables of 6 to 75 pairs, two extra pairs (white-red and white-black) in matching cables of 100 to 300 pairs, and three extra pairs (white-red, white-black, and white-yellow) in matching cables of 400 to 900 pairs, inclusive.

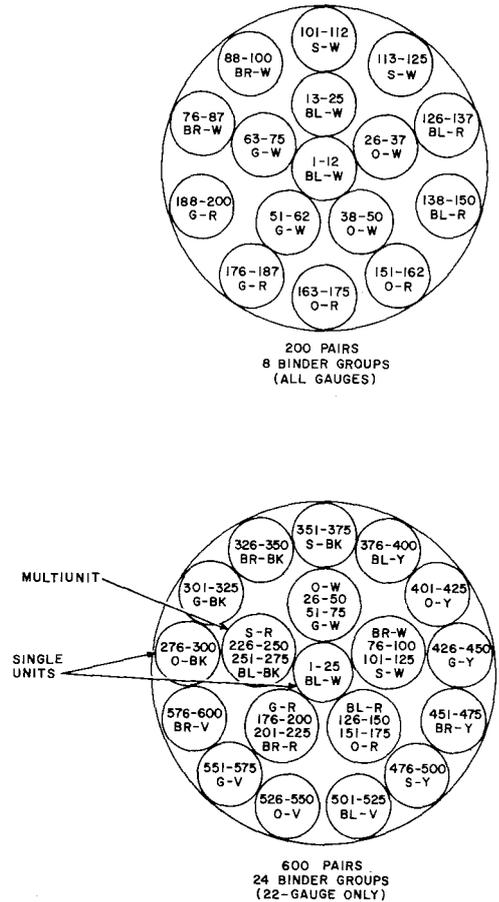
**4.05** In cables of 25 pairs and smaller, the extra pair is in the outside layer. In cables of 50 pairs and larger, the extra pairs are laid in the spaces between units.

## 5. SUPERSEDED CABLES (POLYETHYLENE-INSULATED CONDUCTORS)

### 5.01 *Superseded 200- and 600-Pair PIC (Copper Conductors) Cables—Alternate Cable Makeups:*

In 1965, slightly different unit lay-ups were used for 200- and 600-pair PIC cables (Fig. 8) which were manufactured at some plants. The 200-pair cable was made in all gauges; the 600-pair cable was made only in 22-gauge. These alternate lay-ups were adopted to provide a more compact, smoother core and to improve handling characteristics. The 200-pair alternate lay-up was rated Manufacture Discontinued in 1967; the 600-pair alternate lay-up was rated Manufacture Discontinued in 1966. The change back to the standard (original) designs of

the 200- and 600-pair cables was necessitated by problems experienced when using the alternate design cables for T-1 Carrier.

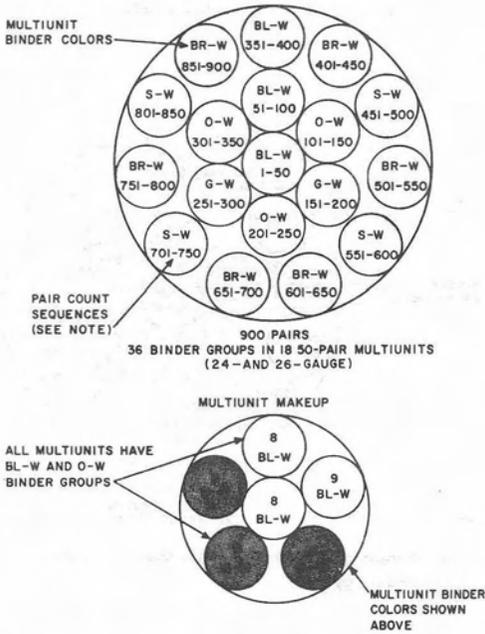


**Fig. 8—Superseded 200- and 600-Pair Alternate Core Makeups**

5.02 When the standard and alternate designs of either the 200- or 600-pair cables are used in the same run, special splicing instructions may be required.

5.03 *Superseded 900-Pair PIC (Copper Conductors)*

**Cable:** Figure 9 shows the makeup and color code of the superseded 900-pair, 24- and 26-gauge cable made prior to 1963. This cable has 36 binder groups arranged in 18 multiunits, each of which is similar to a 50-pair cable with blue-white and orange-white binder groups. To avoid crossover splicing, the multiunit binder colors are arranged symmetrically. In this design, the appearance of the core is uniform on either end of the cable reel length. However, the cable is not as suitable as the current design for individual pair color code splicing.



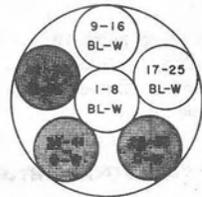
NOTE:  
THIS PAIR COUNT SEQUENCE APPLIES WHEN THE UNITS ARE COUNTED IN A CLOCKWISE DIRECTION, LOOKING AWAY FROM THE CENTRAL OFFICE.

Fig. 9—Superseded 900-Pair Core Makeup

5.04 In these 900-pair cables the selection of the multiunits for counting purposes is similar to the method used in counting multiple unit pulp cables. The blue-white multiunit binder is the starting point of each layer. When viewed from the field toward the central office, the unit sequence progresses around the core in a counterclockwise direction.

5.05 *Superseded 50-Pair (Copper Conductors)*

**Cable and Superseded Multiunits:** The makeups (prior to 1964) of the superseded 50-pair cable and multiunits used in the superseded 200-, 600-, and 900-pair cables are shown in Fig. 10 and 11. The binder group consists of a combination of 8-8-9-pair units having binders of the same color.



(19-, 22-, 24-, AND 26- GAUGE)

Fig. 10—Superseded 50-Pair Cable Core Makeup

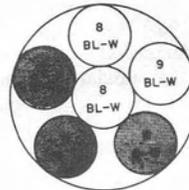


Fig. 11—Superseded Multiunit Makeup