

SWITCHBOARD CABLE AND WIRE
 COLOR COMBINATIONS

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1. GENERAL

1.1 Scope of Section

1.11 This section covers the general principles underlying the use of colors on the conductors of switchboard cables.

1.12 The color combinations and types of conductor insulation used in the various codes of switchboard cable are covered in Section 100 of this handbook.

1.13 Refer to Section 103 for an explanation of conductor insulation abbreviations.

2. COLORS - GENERAL INFORMATION

2.1 Purpose of Colors

2.11 The purpose of having differently colored conductors in switchboard cables is:

- A. To permit the conductors to be connected without making continuity tests to identify the ends, thereby expediting the connecting operation.
- B. To facilitate maintenance of the equipment.

2.2 Regular Colors

2.21 The regular colors used, either separately or combined, in identifying the conductors of switchboard cables, with their abbreviations, follow:

<u>Color</u>	<u>Abbreviation</u>	<u>Color</u>	<u>Abbreviation</u>
Black	BK	Red	R
Blue	BL	Slate	S
Brown	BR	Violet	V
Green	G	White	W
Orange	O	Yellow	Y

2.3 Novelty Colors

2.31 Novelty colors are obtained by twisting two strands of colored fabric together with two strands of white fabric before the strands are placed on the wire. The white and colored strands impart a spotted appearance to the insulation.

2.32 Novelty colors are abbreviated without reference to the white which identifies the novelty color, i.e., novelty red-white and novelty black-white are abbreviated NR and NBK respectively. Novelty colors are used only in BH wire.

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2.4 Color Code

2.41 Some of the regular colors have been arranged and combined to form a color code of twenty colors (basic colors), as listed in Column 1 of Figure 1. The color code is the basis for all color combinations for regular wires in switchboard cables.

2.5 Determining Cable Lead Colors

2.51 The colors used on the leads in a given code of switchboard cable can be found in Paragraph 3 of this section, by first obtaining the following information from Section 100:

- A. Conductor insulation (Pe, etc.)
- B. Color combination number (IC-20C, 26C-50C, etc.)
- C. Are the leads singles, pairs, triples or quads.
- D. Are the leads regular or spare.

3. COLOR COMBINATIONS

3.1 General

3.11 Separate sets of color combinations have been assigned to the differently insulated regular wires used in the various types of switchboard cable. In each case the color combinations have been assigned a definite combination number.

3.12 Abbreviations for combination colors such as red-green, red-blue-white, etc., are written with a hyphen between the color abbreviations thus:
R-G, R-BL-W, etc.

3.2 Polyethylene-Insulated Conductors and BY Conductors of 741A and 742A Cables

3.21 The color combination for Polyethylene-Insulated conductors is shown in Figure 2. This color combination is for cables. 750A through 764A and 754E.

BASIC COLORS		SINGLE RED TRACER	PAIRED WITH WHITE	PAIRED WITH SAME BASIC COLOR HAVING NOVELTY RED TRACER
COMBN NO	COLORS			
1	Blue	1	1	181
2	Orange	2	2	182
3	Green	3	3	183
4	Brown	4	4	184
5	Slate	5	5	185
6	Blue-White	6	6	186
7	Blue-Orange	7	7	187
8	Blue-Green	8	8	188
9	Blue-Brown	9	9	189
10	Blue-Slate	10	10	190
11	Orange-White	11	11	191
12	Orange-Green	12	12	192
13	Orange-Brown	13	13	193
14	Orange-Slate	14	14	194
15	Green-White	15	15	195
16	Green-Brown	16	16	196
17	Green-Slate	17	17	197
18	Brown-White	18	18	198
19	Brown-Slate	19	19	199
20	Slate-White	20	20	200

FIG. 1 COLOR COMBINATIONS FOR WIRES WITH SERVED TEXTILE INSULATION (PAR. 2.41, AND 3.31)

3.22 The color combination for BY conductors of 741A and 742A cables is shown in Figure 2.

PAIR	BASIC COLOR	PAIRED WITH
1	Blue	White
2	Orange	White
3	Green	White
4	Brown	White
5	Slate	White
20A	Brown	Slate
21	Blue	Red
22	Orange	Red
23	Green	Red
24	Brown	Red
25	Slate	Red
41	Blue	Black
42	Orange	Black
43	Green	Black
44	Brown	Black
45	Slate	Black
45A	White	Black
201	Blue	Yellow
202	Orange	Yellow
203	Green	Yellow
204	Brown	Yellow
205	Slate	Yellow

FIG. 2 PAIR COLOR COMBINATIONS FOR POLYETHYLENE-INSULATED CONDUCTORS FOR 750A-764A CABLES AND BY CONDUCTORS OF 741A and 742A CABLES (PAR. 3.21 and 3.22)

3.3 For Wires With Braided (Woven) Insulation (DACBL + PVC CBL)

3.31 Color combinations for switchboard cable wires having braided insulations (DACBL + PVC CBL) are shown in Figure 3. The braided insulation on these wires makes the use of novelty colors impracticable, and, therefore, a red tracer is used instead of the novelty red. Otherwise these combinations conform with pair combinations 181 to 200 used for cables with served wire as shown in Figure 1.

PAIR COMB.NO.	COLORS		TRIPLE COMB.NO.	COLORS		
	TIP	RING		TIP	RING	SLEEVE
1 B to 20 B	20 BASIC COLORS WITH RED TRACER	20 BASIC COLORS	1B TO 10B	WHITE	1ST 10 BASIC COLORS	1ST 10 BASIC COLORS WITH RED TRACER

FIG. 3 COLOR COMBINATIONS FOR SWITCHBOARD CABLE WIRES WITH BRAIDED (WOVEN) INSULATION (PAR. 3.31)

3.4 For Plastic (PVC) Insulated Wire (Type "BU" and "BY") (Except 741A and 742A Cables)

3.41 Color combinations for plastic insulated conductors are shown in Figure 4. In wires of this type, in which the outer textile insulation is omitted, there are limited number of solid colors. Multicolored combinations are obtained by stenciling colored dots and dashes on a solid-colored background. Numerals 1, 2, and 3 are placed between the letters in the designations for identification. The dots, dashes and numerals have a significance in forming and reading of color designation.

Examples:

Function	Color Code	Description
Tip	BL1W	A blue wire with single white dots spaced about 3/4" apart.
Ring	BL2W	A blue wire with two white dots spaced about 1/8" apart: The distance between pair of dots is about 3/4".
Singles	BL3W	A blue wire with white dashes about 1/4" long spaced about 3/4" apart.

Comb. No.	Pairs		Singles
	Tip	Ring	
1-c	BL1W	BL2W	BL3W
2-c	O1W	O2W	O3W
3-c	G1W	G2W	G3W
4-c	BR1W	BR2W	BR3W
5-c	S1W	S2W	S3W
6-c	BL1R	BL2R	BL3R
7-c	O1R	O2R	O3R
8-c	G1R	G2R	G3R
9-c	BR1R	BR2R	BR3R
10-c	S1R	S2R	S3R
11-c	BL1BK	BL2BK	BL3BK
12-c	O1BK	O2BK	O3BK
13-c	G1BK	G2BK	G3BK
14-c	BR1BK	BR2BK	BR3BK
15-c	S1BK	S2BK	S3BK
16-c	BL1Y	BL2Y	BL3Y
17-c	O1Y	O2Y	O3Y
18-c	G1Y	G2Y	G3Y
19-c	BR1Y	BR2Y	BR3Y
20-c	S1Y	S2Y	S3Y

FIG. 4 SINGLE, AND PAIR COLOR COMBINATIONS FOR NON-QUADED SWITCHBOARD CABLE CONDUCTORS WITH PLASTIC INSULATION (TYPE BU AND BY) (PAR. 3.41)

3.5 For Irradiated Polyvinyl Chloride (IPVC) Insulated Wire (Type DMI)

3.51 Color combinations for DMI (IPVC) coded wire contained in "R" Type Cable are shown in Figure 5. Multicolored combinations are obtained by stenciling colored dashes or dots on a solid colored background. The first color symbol in the color designation indicates the background color and the second color symbol indicates the color of the dashes or dots.

Examples:

Function	Color Code	Description
Tip	W-BL	A white wire with blue dashes about 3/16" long spaced about 1/2" apart.
Ring	BL-W	A blue wire with white dashes about 3/16" long spaced about 1/2" apart.
Singles	W3BL	White wire with clusters of 3 blue dots. Each dot about 1/16" long.

NOTE: An exception to the above are those colors followed by a parenthesis (). For better contrast the colors shown in the () are the true colors, but will be indicated on standard drawings as shown in the column preceding the (). Example - R30 (O3R) indicates an orange wire with 3 red dots, but will be listed as R30 on standard drawings.

3.52 Quadded Wire Color Combinations

3.521 For quadded wires used in toll cables, a total of 20 color combinations are provided for both the first and second pairs of quads as shown in Figure 6.

3.53 Irradiated Polyvinyl Chloride (IPVC) Insulated Wire (Type DP-2).

3.531 Type DP-2 wire is basically the same as DM-1 wire, except DP wire has a nominal wall thickness one mil greater and a higher tin content on the conductor. Currently DP-2 wire replaced DP-1 and BW wire for local cables and cross connections. Plans for the future, call for DP-2 wire to replace DM-1 wire. R cables with DP-2 wire will then be designated R-2 cables. These cables will have the same color codes as shown in Figure 5.

PAIRS			SINGLES
COMB. NO.	TIP	RING	
26c	W-BL	BL-W	W3BL
27c	W-O	O-W	W3O
28c	W-G	G-W	W3C
29c	W-BR	BR-W	W3BR
30c	W-S	S-W	W3S
31c	R-BL	BL-R	R3BL
32c	R-O	O-E	R3O (O3R)
33c	R-G	G-R	R3G
34c	R-BR	BR-R	R3BR (BR3R)
35c	R-S	S-R	R3S (S3R)
36c	BK-BL	BL-BK	BK3BL (BL3BK)
37c	BK-O	O-BK	BK3O (O3BK)
38c	BK-G	G-BK	BK3G (G3BK)
39c	BK-BR	BR-BK	BK3BR (BR3BK)
40c	BK-S	S-BK	BK3S (S3BK)
41c	Y-BL	BL-Y	Y3BL
42c	Y-O	O-Y	Y3O
43c	Y-G	G-Y	Y3G
44c	Y-BR	BR-Y	Y3BR
45c	Y-S	S-Y	Y3S
46c	W-BL	BL	
47c	W-O	O	
48c	W-G	G	
49c	W-BR	BR	
SPARE PAIRS			
6c	BK-W	W-BK	BK3W (W3BK)
7c	Y-W	W-Y	Y3W (W3Y)
8c	W-R	R-W	W3R
9c	Y-R	R-Y	Y3R
10c	BK-R	R-BK	BK3R R3BK

FIG. 5 SINGLE, PAIR, AND SPARE COLOR COMBINATIONS FOR SWITCHBOARD CABLE CONDUCTORS WITH IPVC INSULATION (TYPE DMI WIRE) (PAR. 351)

3.6 For Wires With PE PVC Insulation Used in ABAM and ABMM Coded Cables

NOTE: ABAM and ABMM coded cables are normally used for exchange Area Cable. When used in place of Central Office Switchboard Cable, the following applies:

3.61 Color combinations for the wires used in ABAM and ABMM coded cables use only solid colors, as shown in Figure 7. The twenty-five (25) color combinations used are achieved by pairing each of the five (5) basic colors BL, O, G, BR and S, (ring leads) with the five (5) colors W, R, BK, Y and V (tip leads). The spare pair color combinations used are also shown in Figure 7.

COMB. NO.	PAIR #1		PAIR #2	
	TIP	RING	TIP	RING
26C	W-BL	BL-W	W-3BL	BL-3W
27C	W-O	O-W	W-3O	O-3W
28C	W-G	G-W	W-3G	G-3W
29C	W-BR	BR-W	W-3BR	BR-3W
30C	W-S	S-W	W-3S	S-3W
31C	R-BL	BL-R	R-3BL	BL
32C	R-O	O-R	R-3O*	O
33C	R-G	G-R	R-3G	G
34C	R-BR	BR-R	R-3BR*	BR
35C	R-S	S-R	R-3S*	S
36C	BK-BL	BL-BK	BK-3BL*	W
37C	W-BK-O	O-BK	BK-3O*	R
38C	BK-G	G-BK	BK-3G*	BK
39C	BK-BR	BR-BK	BK-3BR*	Y
40C	BK-S	S-BK	BK-3S*	V
41C	Y-BL	BL-Y	Y-3BL	BL-3Y
42C	Y-O	O-Y	Y-3O	O-3Y
43C	Y-G	G-Y	Y-3G	G-3Y
44C	Y-BR	BR-Y	Y-3BR	BR-3Y
45C	Y-S	S-Y	Y-3S	S-3Y

FIG. 6 COLOR COMBINATIONS FOR 500R THROUGH 506R CABLES (QUADEDDED-TYPE DM WIRE)

*The second color is the base color and the first color designates the ink mark. (Par. 3.521)

3.7 For Wires Used in Connectorized Cables

3.71 Color combinations for the wires used in connectorized cables are shown in Figure 8. Cables are furnished single ended, with one end equipped or double ended, with both ends equipped, and can be ordered either way. Wire has vinyl insulations.

3.8 Modified Inside Wiring Color Code

3.81 Color combinations for the "modified inside wiring color code" are shown in Figure 9. Color combinations are obtained by placing a continuous longitudinal colored stripe on a basic colored wire.

Examples:

Function	Color Code	Description
Tip	W-BL	A white wire with a continuous longitudinal stripe of blue extending approximately 90° around the circumference of the PVC Skin.
Ring	BL-W	A blue wire with a continuous longitudinal stripe of white etc.

REGULAR PAIRS								
Comb. No.	Tip	Ring	Comb. No.	Tip	Ring	Comb. No.	Tip	Ring
1	W	BL	26-50	Same as 1-25		601-625	Same as 1-25	
2	"	O	51-75	"	"	626-650	"	"
3	"	G	76-100	"	"	651-675	"	"
4	"	BR	101-125	"	"	676-700	"	"
5	"	S	126-150	"	"	701-725	"	"
6	R	BL	151-175	"	"	726-750	"	"
7	"	O	176-200	"	"	751-775	"	"
8	"	G	201-225	"	"	776-800	"	"
9	"	BR	226-250	"	"	801-825	"	"
10	"	S	251-275	"	"	826-850	"	"
11	BK	BL	276-300	"	"	851-875	"	"
12	"	O	301-325	"	"	876-900	"	"
13	"	G	326-350	"	"			
14	"	BR	351-375	"	"			
15	"	S	376-400	"	"			
16	Y	BL	401-425	"	"			
17	"	O	426-450	"	"			
18	"	G	451-475	"	"			
19	"	BR	476-500	"	"			
20	"	S	501-525	"	"			
21	V	BL	526-550	"	"			
22	"	O	551-575	"	"			
23	"	G	576-600	"	"			
24	"	BR						
25	"	S						
SPARE PAIRS								
						Comb. No.	Tip	Ring
						1	W	R
						2	W	BK
						3	W	Y
						4	W	V
						5	R	BK
						6	R	V
						7	R	V
						8	BK	Y
						9	BK	V

FIG. 7 COLOR COMBINATIONS FOR WIRES USED IN ABAM AND ABMM CODED CABLES
(PAR. 3.61)

REGULAR PAIRS		
COMB. NO.	TIP WIRE	RING WIRE
1	W-BL	BL-W
2	W-O	O-W
3	W-G	G-W
4	W-BR	BR-W
5	W-S	S-W
6	R-BL	BL-R
7	R-O	O-R
8	R-G	G-R
9	R-BR	BR-R
10	R-S	S-R
11	BK-BL	BL-BK
12	BK-O	O-BK
13	BK-G	G-BK
14	BK-BR	BR-BK
15	BK-S	S-BK
16	Y-BL	BL-Y
17	Y-O	O-Y
18	Y-G	G-Y
19	Y-BR	BR-Y
20	Y-S	S-Y
21	V-BL	BL-V
22	V-O	O-V
23	V-G	G-V
24	V-BR	BR-V
25	V-S	S-V
26-50	Repeat First 25 Colors	
51-75	Repeat First 25 Colors	
76-100	Repeat First 25 Colors	
101-125	Repeat First 25 Colors	

FIG. 8 COLOR COMBINATIONS FOR WIRES USED IN CONNECTORIZED CABLES (PAR. 3.71)

REGULAR PAIRS		
COMB. NO.	TIP WIRE	RING WIRE
1	W-BL	BL-W
2	W-O	O-W
3	W-G	G-W
4	W-BR	BR-W
5	W-S	S-W
6	R-BL	BL-R
7	R-O	O-R
8	R-G	G-R
9	R-BR	BR-R
10	R-S	S-R
11	BK-BL	BL-BK
12	BK-O	O-BK
13	BK-G	G-BK
14	BK-BR	BR-BK
15	BK-S	S-BK
16	Y-BL	BL-Y
17	Y-O	O-Y
18	Y-G	G-Y
19	Y-BR	BR-Y
20	Y-S	S-Y
21	V-BL	BL-V
22	V-O	O-V
23	V-G	G-V
24	V-BR	BR-V
25	V-S	S-V
26-50	Repeat First 25 Colors	
51-75	Repeat First 25 Colors	
76-100	Repeat First 25 Colors	
101-125	Repeat First 25 Colors	

FIG. 9 COLOR COMBINATIONS FOR WIRES USED IN THE MODIFIED INSIDE WIRING COLOR CODE (PAR.3.81)

Arrows not used due to the number of changes.

Engineering Planning Manager
(Installation)

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