



APPENDIX **D**

Industry-Standard Wiring Plans

About Wiring Standards

In a traditional cable headend, a large number of wires connect the various components of the headend system. To organize the many wires, some cable operators use color-coding on the wire jackets based on signal type, and channel number or program content.

With the advancement of two-way Data-over-Cable services and fiber-optic nodes on the network, the cable headend wiring has become even more complex:

- A single upstream cable can now carry signals from multiple services and from many combinations of fiber-optic nodes—not just one.
- Each fiber-optic node has different content provided by the digital data services at the same frequency or channel locations—not separate channels.
- For proper testing of the network, more downstream test points are required. In addition, upstream test points of calibrated signal amplitude are becoming essential.



Note

Several third-party companies have available commercially-manufactured equipment that includes fixed or modular splitters, combiners, and test points for headend RF management.

Many coaxial cable manufacturers offer various jacket color options for headend-grade coaxial cable. To date, there are no official standards for headend coaxial cable color schemes, although individual cable companies and multiple system operators (MSOs) have in some instances implemented their own.

The telephone industry has developed standardized color schemes for telephony wiring applications. Some of these are included here for the benefit of cable operators that have or are deploying voice services on their cable networks. This appendix also includes standardized color codes for optical fiber.

TIA/EIA Standards Information

A number of Electronic Industries Alliance (EIA) and Telecommunications Industry Association (TIA) standards are applicable to wiring. The full standards may be purchased on-line from

- TIA (<http://www.tiaonline.org>) or ordered
- Global Engineering Documents (<http://www.global.ihs.com>) 1-800-854-7179 (U.S. and Canada) or 1-303-397-7956 (Outside the U.S. and Canada).

Following is a list of applicable standards:

- TIA/EIA Telecommunications Building Wiring Standards Collection (complete set available on CD-ROM or in hard copy)
- TIA/EIA-568A—Commercial Building Telecommunications Cabling Standard
- TIA/EIA-569A—Commercial Building Standard for Telecommunications Pathways and Spaces
- TIA/EIA-570A—Residential Telecommunications Cabling Standard
- TIA/EIA-598—Optical Fiber Cable Color Coding
- TIA/EIA-606—The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
- TIA/EIA-607—Commercial Building Grounding and Bonding Requirements for Telecommunications
- TIA/EIA TSB 72—Centralized Optical Fiber Cabling Guidelines
- TIA/EIA TSB 75—Additional Horizontal cabling practices for open Offices
- TIA/EIA TSB 95—Additional performance Guidelines for 4-Pair 100 OHM Category 5 Cabling

In addition, the following relevant standards are available from Global Engineering Documents.

- FIBS PUB 175—Federal Building Standard for Telecommunication Pathways and Spaces
- FIBS PUB 176—Residential and Light Commercial Telecommunications Wiring Standard

Optical Fiber Color Codes

The most common color code for optical fiber is based on the 10 colors that are used for plastic insulated conductor copper cables. Two other colors have been added to bring the optical fiber color code to twelve. These colors are now standardized under *TIE/EIA-598—Optical Fiber Cable Color Coding*.

The coloring specified in TIA/EIA-598 are used to identify individual optical fibers when the colors are applied to the surface of the coated fiber or included directly in the fiber's secondary coating. Buffered fibers have colored plastic buffering jackets. The standard colors also may be used to identify units (groups of fibers or loose tubes) or ribbons on a given cable. As well, units and ribbons may be identified with printed markings.

Table D-1 TIA/EIA-598 Color Code

Position	Color
1	Blue
2	Orange
3	Green
4	Brown
5	Slate
6	White
7	Red
8	Black
9	Yellow
10	Violet
11	Rose
12	Aqua

Telephone Wire Color Codes

To help simplify wire management, AT&T has devised a uniform scheme for dealing with large numbers of wires for the telephone industry. The scheme uses two color codes—one for large numbers of wires organized in pairs—and the other for smaller numbers of wires that can also be organized in pairs. Cisco recommends that you try to implement this wiring scheme whenever possible.

For large numbers of wires, each pair is assigned a two-color code. The colors are selected from two groups of five, resulting in what is called a *binder-group* of 25 pairs. The colors used for a group are white, red, black, yellow, and violet. The colors used for “pair within a group” are blue, orange, green, brown, and slate.

Each pair must have a unique color combination. One wire within each pair has a solid background of its group color and stripes of the “pair within a group” color; the second wire has the colors reversed. [Table D-2](#) lists the sequences. Note that red-brown and red-orange wires may be easily confused.

Table D-2 Telephone Industry 25-Pair Color Code and Pin Numbers

Pair Number	Wire Number	Solid Color	Stripe Color	Pin Number
1	1	White	Blue	26
1	2	Blue	White	1
2	1	White	Orange	27
2	2	Orange	White	2
3	1	White	Green	28
3	2	Green	White	3
4	1	White	Brown	29
4	2	Brown	White	4
5	1	White	Slate	30
5	2	Slate	White	5
6	1	Red	Blue	31
6	2	Blue	Red	6
7	1	Red	Orange	32
7	2	Orange	Red	7
8	1	Red	Green	33
8	2	Green	Red	8
9	1	Red	Brown	34
9	2	Brown	Red	9
10	1	Red	Slate	35
10	2	Slate	Red	10
11	1	Black	Blue	36
11	2	Blue	Black	11
12	1	Black	Orange	37
12	2	Orange	Black	12
13	1	Black	Green	38
13	2	Green	Black	13
14	1	Black	Brown	39
14	2	Brown	Black	14
15	1	Black	Slate	40
15	2	Slate	Black	15
16	1	Yellow	Blue	41
16	2	Blue	Yellow	16
17	1	Yellow	Orange	42
17	2	Orange	Yellow	17
18	1	Yellow	Green	43
18	2	Green	Yellow	18

Table D-2 Telephone Industry 25-Pair Color Code and Pin Numbers (continued)

Pair Number	Wire Number	Solid Color	Stripe Color	Pin Number
19	1	Yellow	Brown	44
19	2	Brown	Yellow	19
20	1	Yellow	Slate	45
20	2	Slate	Yellow	20
21	1	Violet	Blue	46
21	2	Blue	Violet	21
22	1	Violet	Orange	47
22	2	Orange	Violet	22
23	1	Violet	Green	48
23	2	Green	Violet	23
24	1	Violet	Brown	49
24	2	Brown	Violet	24
25	1	Violet	Slate	50
25	2	Slate	Violet	25

Cables with more than 25 pairs of wires are constructed from 25-pair groups. Very large cables have other variations generally not encountered inside terminal wire plants.

For small wiring groups, such as wires for an individual telephone station or terminal, you may use a second color-code scheme. [Table D-2](#) lists this color code and the usual correspondence with the paired-wire color code. The alternate color code is included, because sometimes the station wire uses the first three pairs of the standard color code (white-blue, blue-white, and so on), while other times it uses the six alternate color wires.

Table D-3 Alternate Color-Code Scheme for Smaller Numbers of Wires

Pair Number	Wire Number	Solid Color	Stripe Color	Alternate Color	Pin Number
1	1	White	Blue	Green	4
1	2	Blue	White	Red	3
2	1	White	Orange	Black	2
2	2	Orange	White	Yellow	5
3	1	White	Green	White	1
3	2	Green	White	Blue	6

