



***Society of Cable
Telecommunications
Engineers***

**ENGINEERING COMMITTEE
Construction and Maintenance Subcommittee**

AMERICAN NATIONAL STANDARD

ANSI/SCTE 87-1 2008

**Graphic Symbols
For Cable Systems Part 1:
HFC Symbols**

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GRAPHIC SYMBOLS FOR CABLE SYSTEMS

Introduction

Basic Considerations

The symbols for devices do not indicate types or model numbers of any manufacturer. They represent the function of the device operated within a cable system. The symbols permit easy addition of model or type numbers within or near their outline. If such model or type designations are used, an explanation of these designations should be placed on a legend sheet for the drawing on which the symbols appear.

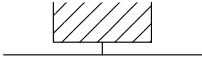




Proposed Drafting Practices

- The orientation of a symbol on a drawing, including a mirror image presentation, does not alter the meaning of the symbol.
- Line width does not affect the meaning of a symbol. In specific cases, a wider line may be used for emphasis. Generally, lines must be made sufficiently wide to avoid loss of resolution during photocopy reduction.
- Symbols shown in this text are in the approximate correct size and proportion. This relationship should be maintained as nearly as possible on any particular drawing regardless of the symbol scale.
- Symbols may be drawn to any proportional size that suits a particular drawing, depending upon reduction or enlargement anticipated. If essential for purposes of contrast, some symbols may be drawn relatively smaller than the other symbols on a drawing. The Standard recommends the use of no more than two sizes on a given drawing.
- For simplification or clarification of a drawing, parts of a symbol for devices, such as amplifiers, may be separated. If this is done, suitable designations to show proper correlation of the parts must be provided.

The Symbols

Due to the necessary crowding of symbols onto cable system mapping and grid diagrams, some symbols are structured differently than those used in electrical and electronic diagrams.

1. POLES

POWER POLE	×
TELEPHONE POLE	○
JOINT USAGE (power and telephone pole)	⊗
CABLE SYSTEMS POLE	●
CONCRETE POLE	⬡ C
STEEL POLE	⬡ S
FIBER REINFORCED POLE	⬡ F
POWER TRANSFORMER POLE	⊠
JOINT USE WITH POWER TRANSFORMER	⊠
POWER TRANSFORMER PLATFORM	⊠ ⊠
TRANSMISSION LINE CONTACT	◦
OTHER SUPPORTING TYPE STRUCTURES Show approximate structure outline or a portion thereof in this manner.	
RISER POLE Use of a number indicates vertical distance from aerial connection to ground level.	
(alternate)	
DROP POLE	
(alternate) Add "DP" by any pole	

NOTES:

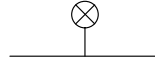
In this section, riser and drop poles are shown as joint use because this occurs most frequently.

Unless otherwise specified, the standard considers wooden poles.

The Standard states that unless otherwise specified on drawings or referenced documents, pole usage and ownership are the same. For modification, a designation may be shown adjacent to the pole symbol.

2. CABLE SUPPORT ELEMENTS

EXTENSION ARM
(used by cable systems)



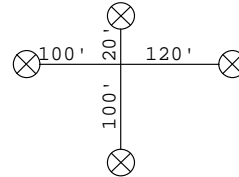
TENSION STRAND



SLACK SPAN STRAND



MID-SPAN CROSSOVER



NOTES:

In this section, poles are shown as joint because this occurs most frequently.

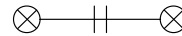
3. ANCHORING AND GUYING

PUSH BRACE

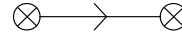
To show a push brace, the support pole is a smaller symbol.
It shall be drawn in its actual supporting location relative to the pole it is bracing.



OVERHEAD GUY



POLE-TO-POLE GUY



DOWN GUY WITH ANCHOR

"<" symbol added to anchor symbol indicates "Set Anchor"



Existing cable system anchor -

Set cable system anchor -

SIDEWALK DOWN GUY WITH ANCHOR

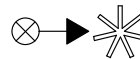
"<" symbol added to anchor symbol indicates "Set Anchor"



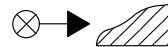
Existing cable system anchor -

Set cable system anchor -

TREE GUY



ROCK GUY



BUILDING GUY

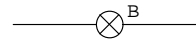


NOTES:

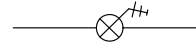
In this section, poles are shown as joint use because this occurs most frequently.

4. MISCELLANEOUS SYMBOLS

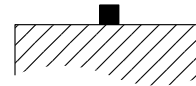
BOND



GROUND



LOCKBOX



NOTES:

In this section, poles are shown as joint use because this occurs most frequently.

5. UNDERGROUND DESIGNATIONS

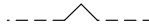
UNDERGROUND ROUTING



DIRECT BURIED CONDUIT ROUTING



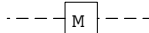
PEDESTAL



(alternate)



MANHOLE

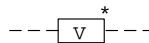


(alternate)



VAULT

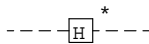
" * " = Optional user defined attribute



HANDHOLE

" * " = Optional user defined attribute

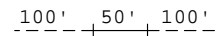
(alternate)



ROAD BORE

(solid portion with slashes)

Tick marks represent length dividers.



EXISTING POWER TRANSFORMER



6. HOUSE DROP DESIGNATIONS

HOUSE COUNT

The numeral indicates the number of actual house drops at this location.



(alternate)

The numeral on top indicates number of actual drops.
The numeral on bottom indicates number of potential house drops.



MULTIPLE DWELLING UNITS

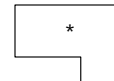
The numeral indicates the number of dwelling units.



INSTITUTIONAL BUILDING

(school, church, police, fire, etc.)

Designated appropriately as to the type of building or service.



COMMERCIAL COUNT

The numeral indicates the number of actual commercial drops at this location.



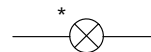
NOTES:

" * " = Optional user defined attribute

7. MAKE READY OR POLE LINE PREPARATION

MAKE READY

Arrangement of existing equipment on the pole must be altered for cable systems installation.



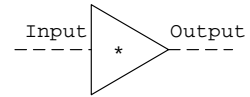
NOTES:

" * " = Optional user defined attribute

In this section, poles are shown as joint use because this occurs most frequently.

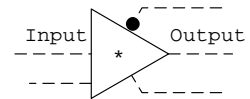
8. AMPLIFIERS

SINGLE OUTPUT AMPLIFIER

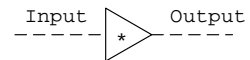


MULTIPLE OUTPUT AMPLIFIER

Dot shows high output leg, if unbalanced.



LINE EXTENDER



NOTES:

" * " = Optional user defined attribute or graphics

Examples shown are for guidance (not standard).

9. SPLITTING DEVICES

2-WAY SPLITTER



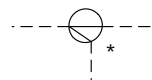
3-WAY SPLITTER

Dot shows high output leg, if unbalanced.

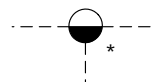


DIRECTIONAL COUPLER

*Model, value designations, or fiber color (optical coupler) are to be shown adjacent or inside symbols. The high loss leg leaves from the angular half of the symbol.



(alternate)



NOTES:

Indoor drop splits may have additional user defined symbols.

10. POWERING DEVICES

AC POWER BLOCK



AC POWER INSERTER

" * " = Optional user defined attributes



SB POWER SUPPLY

"SB" = Stand By

" * " = Optional information: voltage, current load,
PS name, status monitor.



NON-SB POWER SUPPLY

"SB" = Stand By

" * " = Optional information: voltage, current load,
PS name, status monitor.

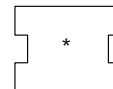


(alternate)



CENTRALIZED POWER SUPPLY

" * " = Optional information: voltage, current load,
PS name, status monitor, port numbers.



NOTE:

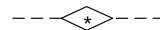
Additional graphics such as a circle around the symbol may also be used to designate new/existing locations.

11. LINE DEVICES

IN-LINE EQUALIZERS



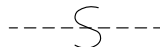
(alternate)



SPLICE



(alternate)

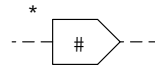


NOTES:

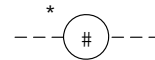
" * " = Optional user defined attribute or graphics

12. SUBSCRIBER TAPS

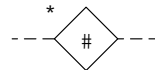
1-OUTPUT DIRECTIONAL TAP



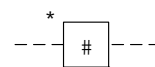
2-OUTPUT DIRECTIONAL TAP



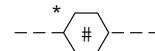
3-OUTPUT DIRECTIONAL TAP



4-OUTPUT DIRECTIONAL TAP



8-OUTPUT DIRECTIONAL TAP



NOTES:

" # " = Represents value of tap

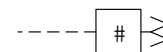
" * " = May be shown inside symbol. Represents value of pad, cable equalizer, addressable or telephony tap, or fiber color (optical tap)

Indoor taps may have additional user defined symbols.

13. LINE TERMINATORS

RF TERMINATOR

(4-output tap shown for example only)



SELF-TERMINATING TAP

Applies to lowest value tap within any family group.

(4-output tap shown for example only)

Self-terminating tap may be shown without symbol.



14. SIGNAL PROCESSING LOCATIONS

HEADEND

Location where the highest level of signal processing takes place.



PRIMARY HUB

In multi-level networks, a signal processing location connected between the headend and secondary hubs or nodes.



SECONDARY HUB

In multi-level networks, a signal processing location connected between the primary hub and the node.



NOTES:

" * " = Optional user defined attributes

15. COAXIAL CABLES

TYPICAL CABLE SYMBOLOGY

1.000 INCH (25.4MM)	—————
0.875 INCH (22.2MM)	——— — — — — —
0.750 INCH (19.1MM)	——— - - - - -
0.625 INCH (15.9MM)	— —
0.500 INCH (12.7MM)	——— - - - - .
0.412 INCH (10.5MM)	—————

OPTIONAL CABLE SYMBOLOGY

For specialty cables and cables listed in ANSI/SCTE 15, 2001

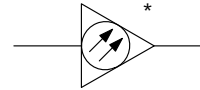
(Examples)

0.750 INCH P3	——— 750P3 ——
0.540 INCH QR	— — 540QR — —

16. OPTICAL DEVICES

OPTICAL AMPLIFIER

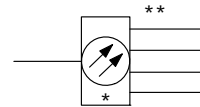
"*" = Indicates the gain (dB)



DEMULTIPLEXER

**" = Indicates number of outputs

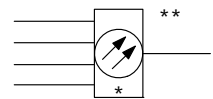
***" = Optional user defined attributes



MULTIPLEXER

**" = Indicates number of inputs

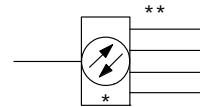
***" = Optional user defined attributes



BI-DIRECTIONAL MUX/DEMUX

**" = Indicates number of outputs

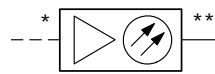
***" = Optional user defined attributes



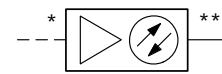
OPTICAL TRANSMITTER

" * " = Input RF level

" ** " = Output optical power



Forward Only

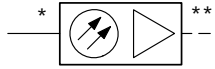


Forward / Reverse

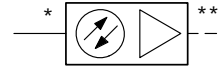
OPTICAL NODE

" * " = Input optical power

" ** " = Output RF level



Forward Only

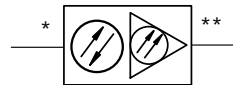


Forward / Reverse

FIBER NODE

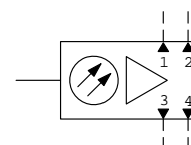
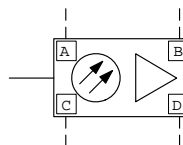
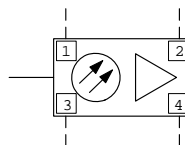
" * " = Input optical power

" ** " = Output optical power



Forward / Reverse

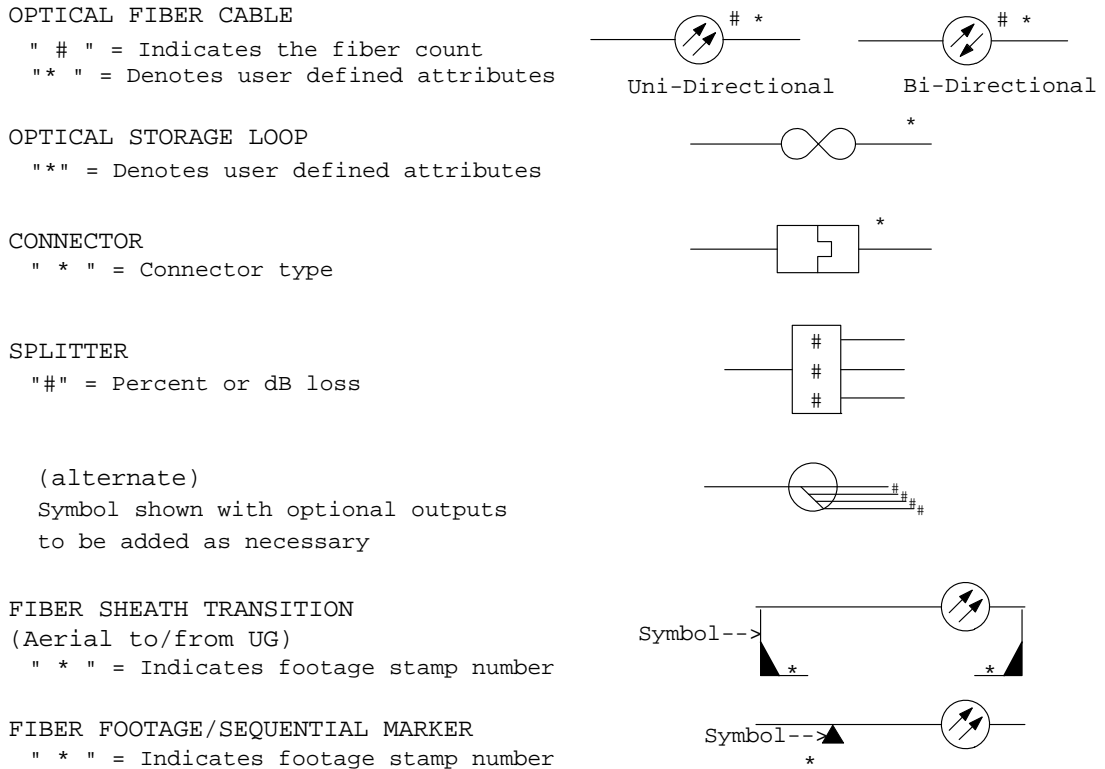
(multiple RF output examples showing various label choices)



17. OPTICAL SPLICE SYMBOLS



18. MISCELLANEOUS OPTICAL SYMBOLS

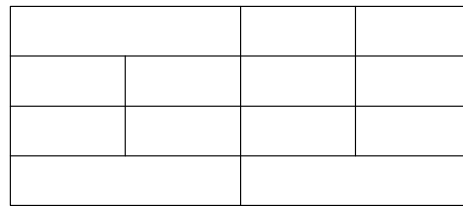
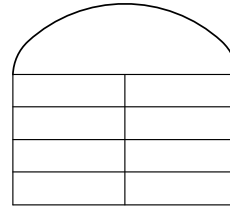
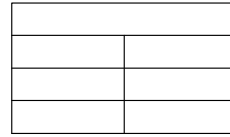


19. DATA BLOCKS

SUGGESTED STYLES
(scale to fit maps)

Information normally appearing includes:

- Amplifier Number
- Power Supply Number and Power Feed
- AC Voltage
- Amplifier Cascade
- Amplifier Output at Design Frequency
- Amplifier Input at Low Forward Channel
- Forward Equalizer
- Forward Pad
- Reverse Output Level
- Reverse Input Level
- Reverse Equalizer
- Reverse Pad
- Amplifier Part Number
- Footage to Previous Amplifier
- Passings Served by Active



NOTES:

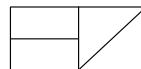
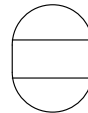
The size, shape, and rotation of the identification box is at the discretion of the designer.

20. END OF LINE BLOCKS

SUGGESTED STYLES
(scale to fit maps)

Information normally appearing includes:

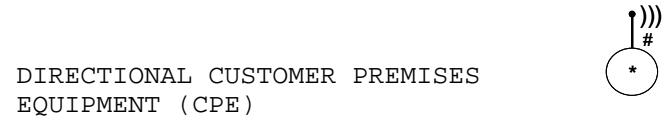
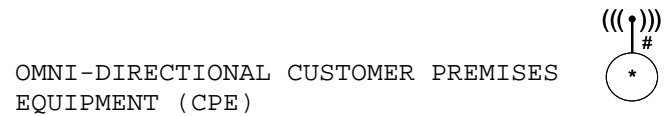
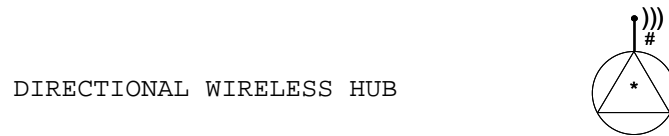
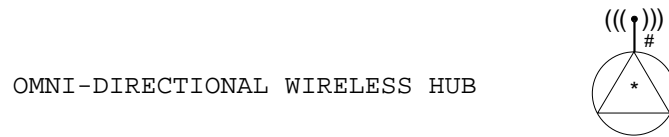
- High Digital Signal
- High Analog Signal
- Low Analog Signal
- AC Voltage



NOTES:

The size, shape, and rotation of the identification box is at the discretion of the designer.

21. WIRELESS DEVICES



NOTES:

) = Range < 150m (~500ft.) (e.g. WiFi hotspot)

) = Range between 150m and 3km inclusive (~500ft. and ~2mi.) (e.g. wireless plant extension)

)) = Range > 3km (~2mi.) (e.g. long-range microwave)

= Over-the-air frequency (e.g. 5.8GHz)

* = Optional user defined attributes (e.g. polarization; modulation type)

22. FTTX SYMBOLS



Central Office Node (CDT-Central Digital Terminal)



Main Transition Splice Closure (Transition To PONS)



Branch Splice Closure



Optical Line Terminal (OLT)
Remote Digital Terminal (RDT)



Network Access Point (NAP) Aerial
* Optical Coupler Value



Network Access Point (NAP) Underground
* Optical Coupler Value



Passive Optical Network (PON)
Local Convergence Point (LCP)
* Service Size
** Coupler Configuration



Network Interface Device (NID-Residential)
Optical Network Unit (ONU-Residential)
Optical Network Terminal (ONT-Residential)



Network Interface Device (NID-MDU)
Optical Network Unit (ONU-MDU)
Optical Network Terminal (ONY-MDU)