

Cable Tools

© Samuel L. Jones, June 2002

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Documentation Quality and my phone #

While I have enjoyed creating and using AutoPlot, I find creating the documentation required to share this work to be tedious in the extreme. The necessity of creating that documentation does not go away. Should you find this documentation wanting please feel free to contact me in any manner to help with your questions. My work phone is (310) 825-5823 and my home phone is (310) 207-0392. Hopefully, if you are stuck in a hotel room at midnight, you are in New York, not Anchorage, but the appropriate hours to call are the hours appropriate to the urgency of your need. Any overseas users, if you're desperate enough to spend the money, I'll answer the phone. I can always be reached by email at sjones@arts.ucla.edu. If I'm backpacking or diving, I won't be collecting mail or answering the phone, but an "out of office" response will be sent back to you by my email program.

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Cable Tools are part of AutoPlot Tools for SpotLight.

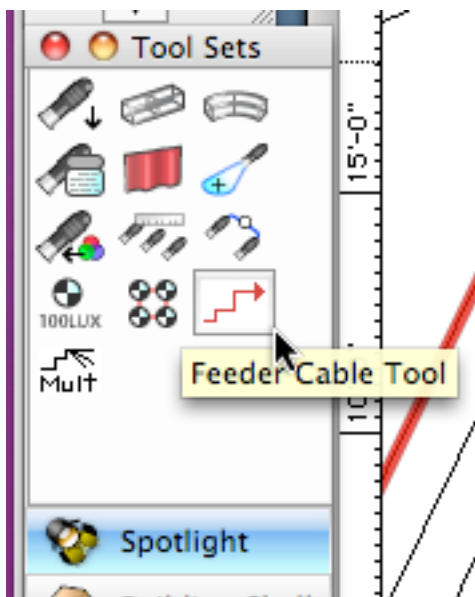
Follow the directions for installing AutoPlot Tools for SpotLight or AutoPlotVW.

What is the "Feeder Cable" Tool?

The "Feeder Cable" Tool will allow you to draw a single polyline that represents the path of your feeder cable run. A feeder cable run is considered to be a run of cable from a power source like a generator or a company switch to a power distribution entity such as a dimmer pack or a power distro box.

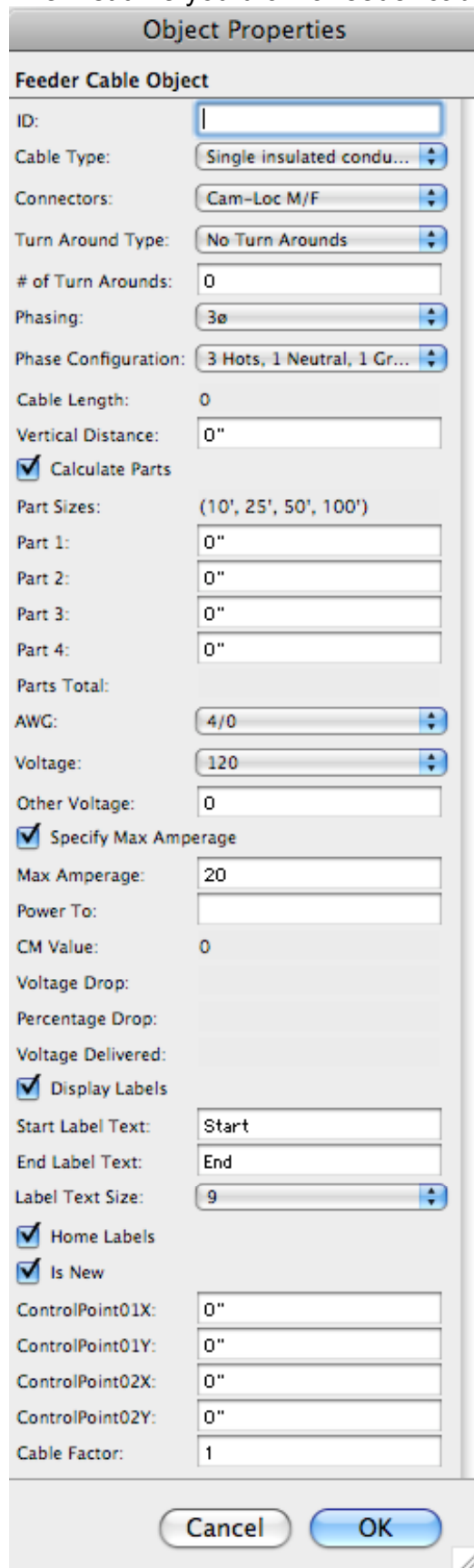
The "Feeder Cable" Tool is not a 3D tool. See the "Vertical Distance" parameter explanation below. I did a lot of experimenting with 3D polylines to see if I could use them for this tool. It turns out that editing 3D polylines is not worth the effort. I know that there are many of you out there that want a 3D tool, but, trust me, that time is not now. The issues of vertices identification and vertices directly over other vertices present too many problems. If you would like to discuss this with me, feel free to drop me a note or call. If the 3D editing improves its ease of use in later versions, I will include a 3D version of this tool. Even then I think you will find the 2D tool a more convenient option.

Feeder Cable Insertion Tool



Select the Feeder Cable tool and Draw a poly line representing the path you want to have your feeder cable take.

The first time you draw a feeder cable in a document an "Object Properties" palette will appear:



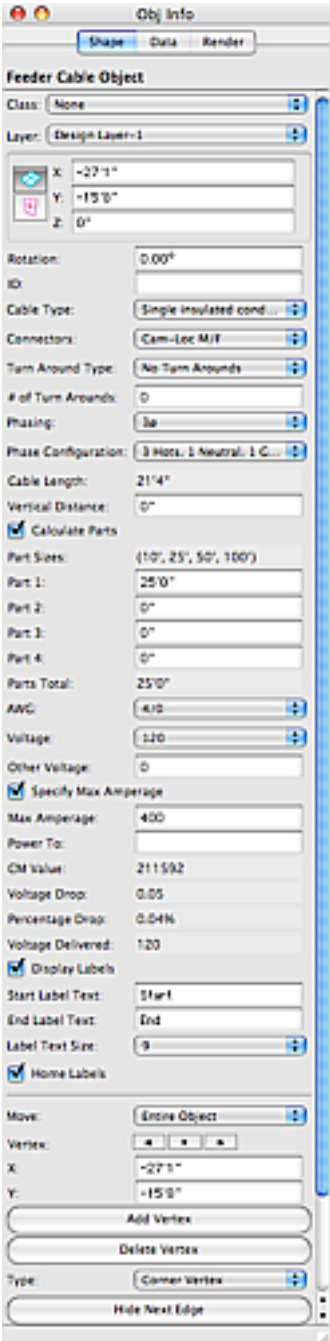
The image shows a software palette titled "Object Properties" for a "Feeder Cable Object". It contains various input fields and checkboxes for configuring cable properties. The fields include ID, Cable Type, Connectors, Turn Around Type, # of Turn Arounds, Phasing, Phase Configuration, Cable Length, Vertical Distance, Part Sizes, Part 1-4, Parts Total, AWG, Voltage, Other Voltage, Max Amperage, Power To, CM Value, Voltage Drop, Percentage Drop, Voltage Delivered, Start Label Text, End Label Text, Label Text Size, ControlPoint01X-02Y, Cable Factor, and checkboxes for Calculate Parts, Specify Max Amperage, Display Labels, Home Labels, and Is New. The palette has "Cancel" and "OK" buttons at the bottom.

| Feeder Cable Object | |
|--|----------------------------|
| ID: | |
| Cable Type: | Single insulated condu... |
| Connectors: | Cam-Loc M/F |
| Turn Around Type: | No Turn Arouns |
| # of Turn Arouns: | 0 |
| Phasing: | 3ø |
| Phase Configuration: | 3 Hots, 1 Neutral, 1 Gr... |
| Cable Length: | 0 |
| Vertical Distance: | 0" |
| <input checked="" type="checkbox"/> Calculate Parts | |
| Part Sizes: | (10', 25', 50', 100') |
| Part 1: | 0" |
| Part 2: | 0" |
| Part 3: | 0" |
| Part 4: | 0" |
| Parts Total: | |
| AWG: | 4/0 |
| Voltage: | 120 |
| Other Voltage: | 0 |
| <input checked="" type="checkbox"/> Specify Max Amperage | |
| Max Amperage: | 20 |
| Power To: | |
| CM Value: | 0 |
| Voltage Drop: | |
| Percentage Drop: | |
| Voltage Delivered: | |
| <input checked="" type="checkbox"/> Display Labels | |
| Start Label Text: | Start |
| End Label Text: | End |
| Label Text Size: | 9 |
| <input checked="" type="checkbox"/> Home Labels | |
| <input checked="" type="checkbox"/> Is New | |
| ControlPoint01X: | 0" |
| ControlPoint01Y: | 0" |
| ControlPoint02X: | 0" |
| ControlPoint02Y: | 0" |
| Cable Factor: | 1 |

Cancel OK

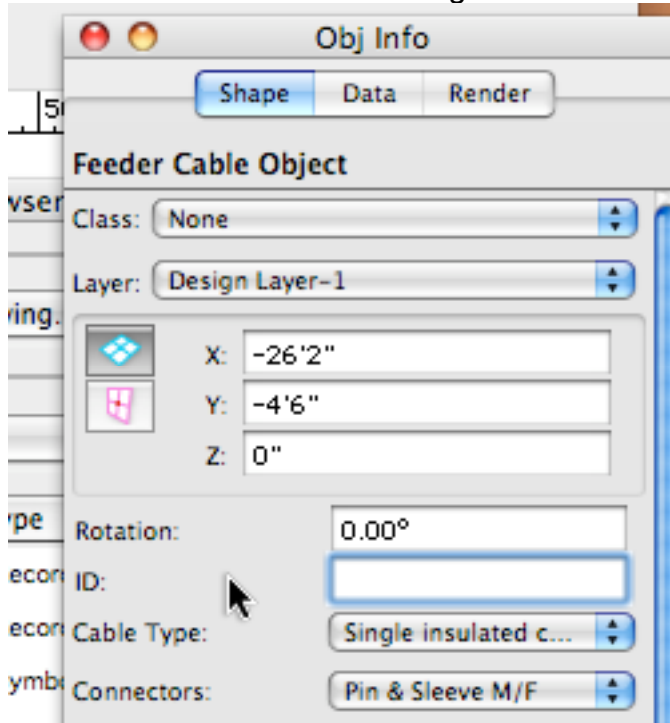
Click on either the "OK" button or the "Cancel" button it does not matter. Do not worry about any of the settings in this palette; just dismiss it. There is no way for me to keep this palette from appearing, but it will only appear the first time you use the tool in a document. Once you have dismissed this palette Your feeder cable will be redrawn and the "Object Info" (OI) palette will appear for that feeder cable.

Feeder Cable Object - The Object Info Palette

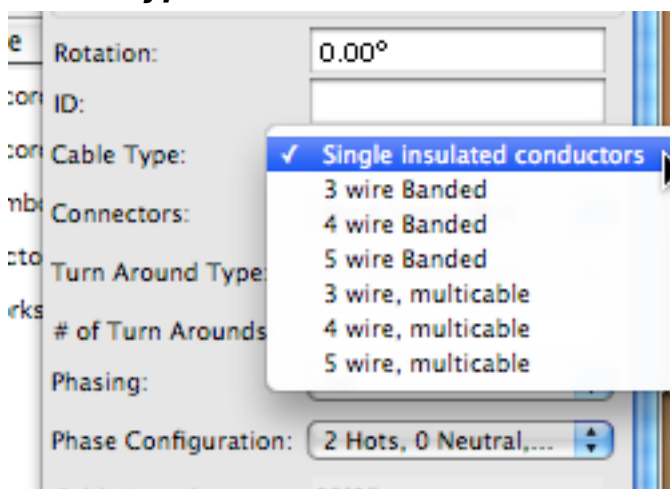


ID

The "ID" field is a text field designed to hold any identification value you wish to enter.



Cable Type



The "Cable Type" field describes the cable needed to make the power feed. It may describe multiple cables or single cables.

Single Insulated Conductors

This describes a run of multiple cables of the same AWG. The number of cables needed will be described in the "Phase Configuration" field. Typically this will be 5 – 4/0 cables for 3 hots, 1 neutral, and a ground. The "Feeder Cable Count WKS" will count the number of cables needed by all the different runs based on the phase configuration described.

3 wire Banded

4 wire Banded

5 wire Banded

These are essentially the same as "single insulated conductors; however they are bundled together at regular intervals. The number of cables in the bundle is specified. Rental houses rent these as single entities described by the number of wires in each set of banded cables. The "Feeder Cable Count WKS" will count the number of banded bundles, not number of cables needed by all the different runs based on the specified number of wires.

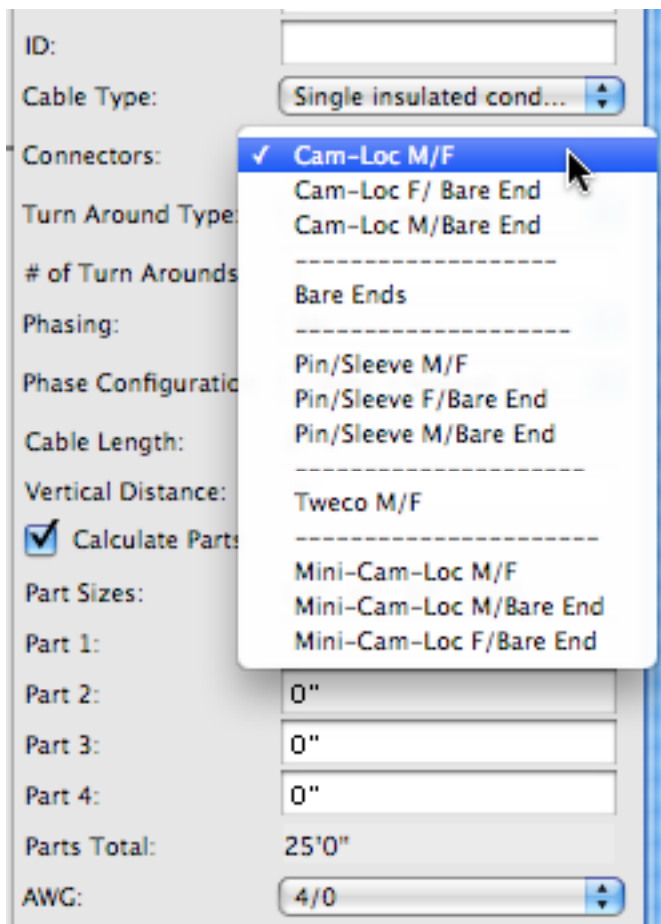
3 wire Multicable

4 wire Multicable

5 wire Multicable

These are multiple, color coded insulated wires of the specified AWG.wrapped in another SO or similar type of insulator. They will usually end, but not always, in pin and sleeve connectors.

Connectors

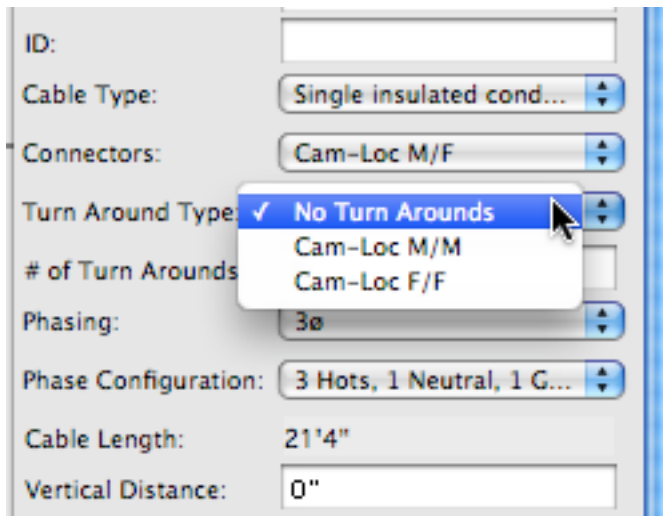


The screenshot shows a software interface for specifying cable connectors. The 'Connectors' dropdown menu is open, displaying a list of connector types. The 'Calculate Parts' checkbox is checked. Other fields include 'Cable Type' (Single insulated cond...), 'Cable Length' (25'0"), and 'AWG' (4/0).

| Field | Value |
|---|--------------------------|
| ID: | |
| Cable Type: | Single insulated cond... |
| Connectors: | Cam-Loc M/F (selected) |
| Turn Around Type: | |
| # of Turn Arouds: | |
| Phasing: | |
| Phase Configuratio: | |
| Cable Length: | 25'0" |
| Vertical Distance: | |
| <input checked="" type="checkbox"/> Calculate Parts | |
| Part Sizes: | |
| Part 1: | |
| Part 2: | 0" |
| Part 3: | 0" |
| Part 4: | 0" |
| Parts Total: | 25'0" |
| AWG: | 4/0 |

This is where you specify what connectors you want on your cables. There are no specifications for Male to Male or Female to Female, because this will always be achieved by the use of "Turnarounds".

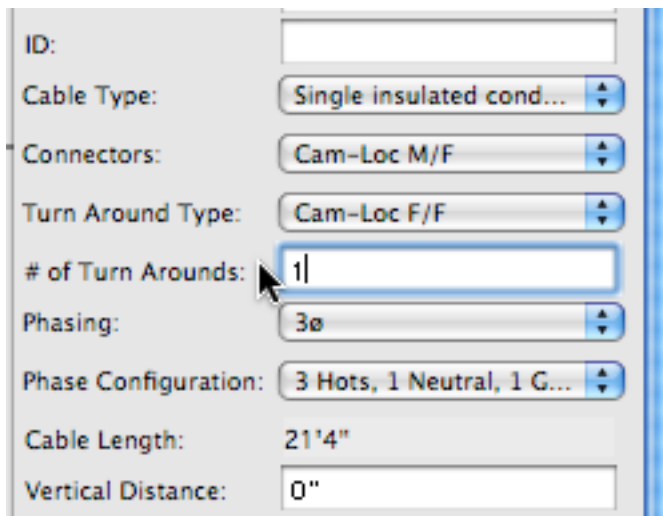
Turn Around Type



A screenshot of a software interface showing a dropdown menu for 'Turn Around Type'. The menu is open, displaying three options: 'No Turn Arounds' (selected with a checkmark), 'Cam-Loc M/M', and 'Cam-Loc F/F'. The background shows other fields: ID (empty), Cable Type (Single insulated cond...), Connectors (Cam-Loc M/F), # of Turn Arounds (empty), Phasing (3ø), Phase Configuration (3 Hots, 1 Neutral, 1 G...), Cable Length (21'4"), and Vertical Distance (0").

This is where you specify what kind of "Turn Around" you want with the specified cable run. There are no "turn arounds" for Tweco and Pin/Sleeve connectors that I could find, and of course this is not applicable to "Bare Ends". (See "# of Turn Arounds")

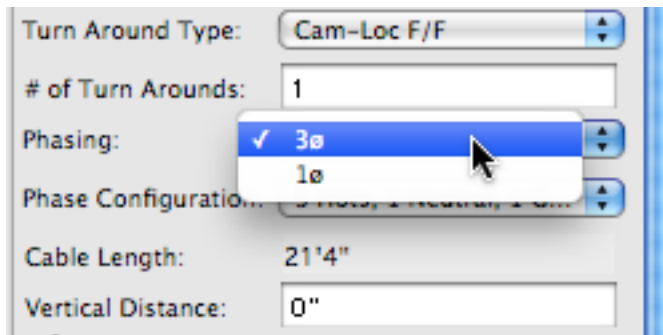
of Turn Arounds



A screenshot of a software interface showing the '# of Turn Arounds' input field. The field contains the number '1'. The background shows other fields: ID (empty), Cable Type (Single insulated cond...), Connectors (Cam-Loc M/F), Turn Around Type (Cam-Loc F/F), Phasing (3ø), Phase Configuration (3 Hots, 1 Neutral, 1 G...), Cable Length (21'4"), and Vertical Distance (0").

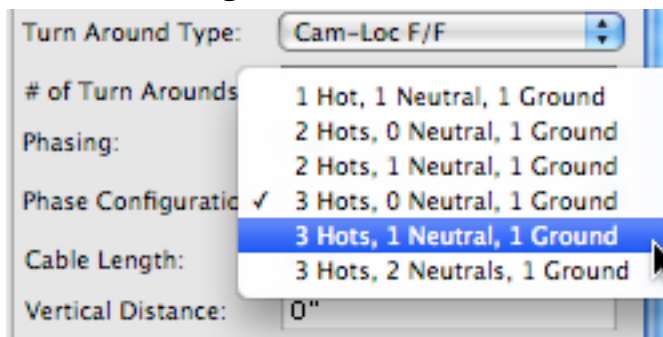
This will specify the number of turn arounds of the specified type used by this particular feeder run. Some times power sources, company switches and distros will have either the neutral or the ground with a different gender connector from the hots, and this is the reason for the specification of turn arounds. Be sure you know the gender configuration of your power sources. (Always a good idea.)

Phasing



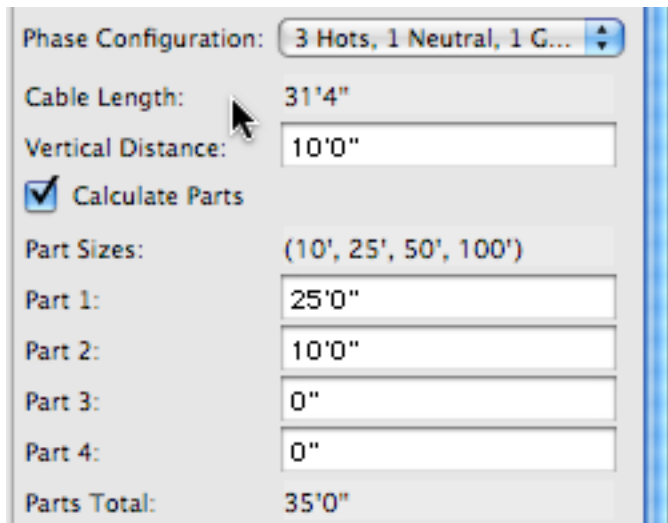
I only know of two configurations. Those configurations with 3 hots are 3 phase. Other configurations are single phase. When you select a phase configuration the "Phasing" will be selected for you. In later versions of this tool this parameter will be static text that you cannot edit.

Phase Configuration



This parameter was an eye opener. When I started designing this tool it became apparent that there were many different configurations of wiring power that I had never heard of. I did a canvas of a number of electricians and lighting directors around the country, and the list above is what I ended up with. There are some other configurations that do not have a ground. These configurations always relied on a ground stake closer to the end of the run to reduce the amount of cable needed. I have not included these configurations.

Cable Length

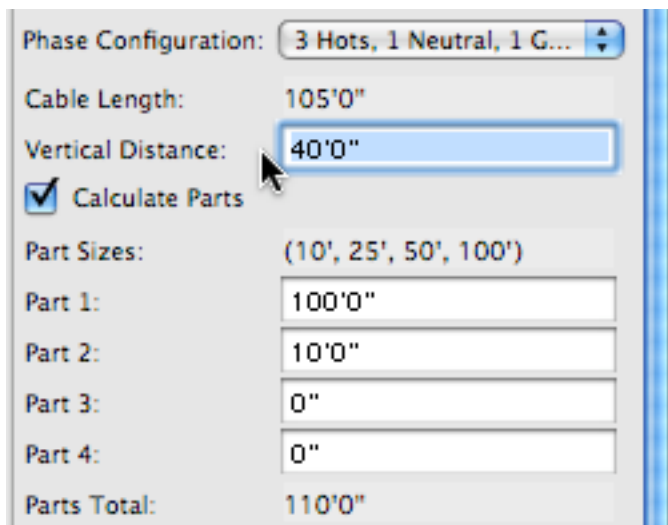


A screenshot of a software dialog box titled "Cable Length". It features a "Phase Configuration" dropdown menu set to "3 Hots, 1 Neutral, 1 G...". Below this, the "Cable Length" is displayed as a static text field with the value "31'4\"". The "Vertical Distance" is an editable text field containing "10'0\"". A checked checkbox labeled "Calculate Parts" is present. Under "Part Sizes", the default values "(10', 25', 50', 100')\" are listed. Four individual part length fields are shown: "Part 1:" (25'0\"), "Part 2:" (10'0\"), "Part 3:" (0\"), and "Part 4:" (0\"), each with a corresponding input box. At the bottom, the "Parts Total:" is calculated as "35'0\"".

| | |
|---|---------------------------|
| Phase Configuration: | 3 Hots, 1 Neutral, 1 G... |
| Cable Length: | 31'4" |
| Vertical Distance: | 10'0" |
| <input checked="" type="checkbox"/> Calculate Parts | |
| Part Sizes: | (10', 25', 50', 100') |
| Part 1: | 25'0" |
| Part 2: | 10'0" |
| Part 3: | 0" |
| Part 4: | 0" |
| Parts Total: | 35'0" |

This is a static text field that cannot be edited. It displays the combination of the perimeter of the polyline that you have drawn and the value in the "Vertical Distance" parameter. If the cable run has no vertical dimension, the "Cable Length" will equal the perimeter of the polyline, but this is rare.

Vertical Distance



A screenshot of the same software dialog box, but with the "Vertical Distance" field highlighted by a mouse cursor. The "Cable Length" now shows "105'0\"". The "Vertical Distance" field now contains "40'0\"". The "Calculate Parts" checkbox remains checked. The "Part Sizes" are still "(10', 25', 50', 100')\". The individual part lengths have been updated: "Part 1:" is now "100'0\"", "Part 2:" is "10'0\"", "Part 3:" is "0\"", and "Part 4:" is "0\"". The "Parts Total:" is now "110'0\"".

| | |
|---|---------------------------|
| Phase Configuration: | 3 Hots, 1 Neutral, 1 G... |
| Cable Length: | 105'0" |
| Vertical Distance: | 40'0" |
| <input checked="" type="checkbox"/> Calculate Parts | |
| Part Sizes: | (10', 25', 50', 100') |
| Part 1: | 100'0" |
| Part 2: | 10'0" |
| Part 3: | 0" |
| Part 4: | 0" |
| Parts Total: | 110'0" |

This is the field where the user enters the total rise and fall distance that the cable travels. Consider the following scenario.

A company switch is on one side of the stage and the cable travels 10 feet on the ground to under a truss. It then rises 20' to the truss. It then runs 40 feet across the stage to the end of the truss. It then descends 20 feet to the floor, and finally travels 15' to the dimmer rack. The polyline on the drawing would be 65 feet long (10'+40'+15'). This would not take into account the 20' up and the 20' down that the cable travels. You need to put 40' in the "Vertical Distance" edit box so that it can be added to the perimeter to define a total length of 105 feet.

CABLE PARTS

All feeder cable runs are made up of standard lengths of cable. In the above example, the 105 foot run is made up of 1 – 100' cable and 1 – 10' cable. The total of the cable parts is 110 feet and listed below the Parts 1 – 4 edit boxes. If the feeder cable is specified as single insulated conductors using 3 hots, 1 neutral, and 1 ground, It would mean the "Feeder Cable Count WKS" would list 5 – 100' and 5 – 10' cable to make this run.

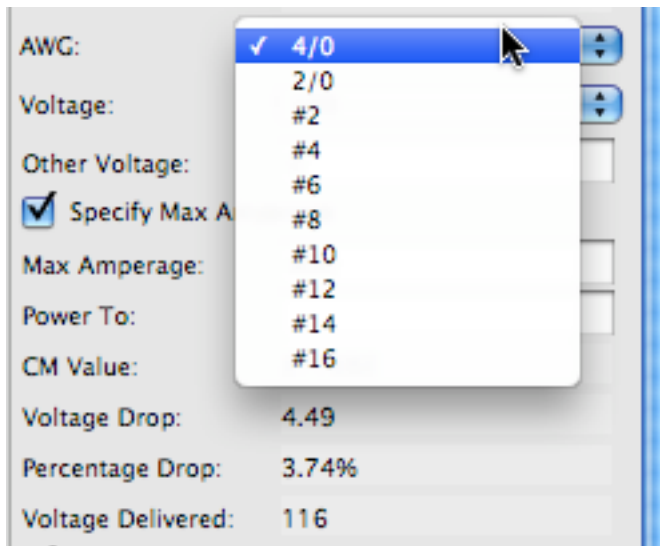
Calculate Parts

This is a check box where the user specifies whether the OIP should calculate the length of the needed parts and fill in the different parts edit boxes. When this box is checked the only lengths that the OIP knows about is 100', 50', 25, and 10'. If you have other lengths in your inventory that you would like to use, for examplek 75' or 15' you will need to make sure this box is not checked, and you will fill in the part lengths you want to use by hand. In later versions, it is hoped that the part size inventory can be specified, but that is not the case yet.

Part 1-4 and Parts Total

These boxes are used to specify the standard lengths to be used to make the feeder cable run. The boxes must be filled out in order. You cannot have an empty "Part 1" edit box and a value in the "Part 2" edit box. The Part 1 cable is assumed to be the part closest to the power source. Parts 2 through 4 work their way toward the power destination. In most cases you will only fill out the Part 1 box, but there will be many times when you will need to add cables together to make the run. If the feeder cable run is specified as single insulated conductors the parts configuration applies to each hot, neutral, and ground when counting cable. The order of the part lengths will be used by other commands in the "Cable Tools" so pay attention to it. The "Parts Total" is just a sum of all the parts.

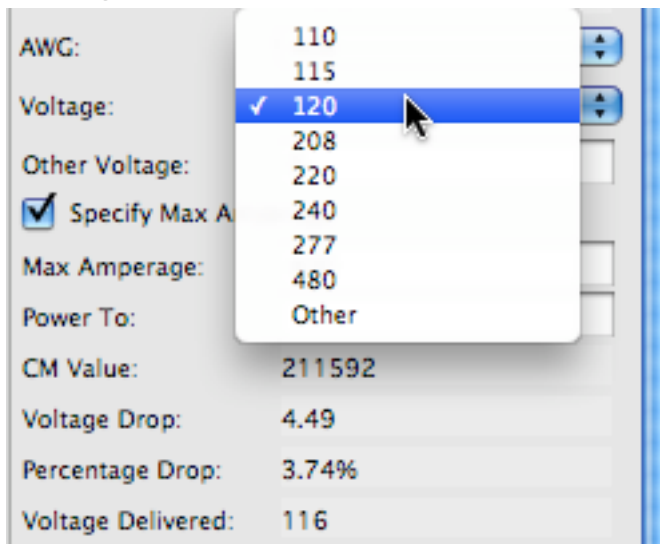
AWG



A screenshot of a software interface for cable selection. The 'AWG:' field has a dropdown menu open, showing options: 4/0 (selected with a checkmark), 2/0, #2, #4, #6, #8, #10, #12, #14, and #16. Other fields include 'Voltage:', 'Other Voltage:', a checked 'Specify Max A' box, 'Max Amperage:', 'Power To:', 'CM Value:', 'Voltage Drop: 4.49', 'Percentage Drop: 3.74%', and 'Voltage Delivered: 116'.

This is the AWG for all the cable in the feeder cable run. All the different cables are assumed to be the same size. Voltage drops are based on AWG, Voltage, and cable length values. I have given you more AWG choices than you can possibly need. If anyone uses a feeder cable run with an AWG size below #10 (#12, #14, or #16), please drop me a note describing your rig. Actually, anything below #6 would be strange and of note.

Voltage



A screenshot of a software interface for voltage selection. The 'Voltage:' field has a dropdown menu open, showing options: 110, 115, 120 (selected with a checkmark), 208, 220, 240, 277, 480, and 'Other'. Other fields include 'AWG:', 'Other Voltage:', a checked 'Specify Max A' box, 'Max Amperage:', 'Power To:', 'CM Value: 211592', 'Voltage Drop: 4.49', 'Percentage Drop: 3.74%', and 'Voltage Delivered: 116'.

This indicates the voltage supplied by the power source and will be used to determine voltage drop. If the voltage supplied is not listed pick "Other" and enter the value in the "Other Voltage" field.

Other Voltage

AWG: 4/0

Voltage: 120

Other Voltage: 0

☒ Specify Max Amperage

Max Amperage: 400

Power To:

This is where the user enters voltage values that are not in the drop down menu. If any value besides "Other" is selected in the "Voltage" drop down menu a zero will be placed in this field.

Specify Max Amperage

AWG: 4/0

Voltage: 120

Other Voltage: 0

☒ Specify Max Amperage

Max Amperage: 400

Power To:

If this box is checked the OIP will enter the maximum value of amperage load that can be handled by the cable with the specified AWG. The maximum amperage capacity comes from examining the following two tables:

http://www.houwire.com/products/technical/article310_17.htm

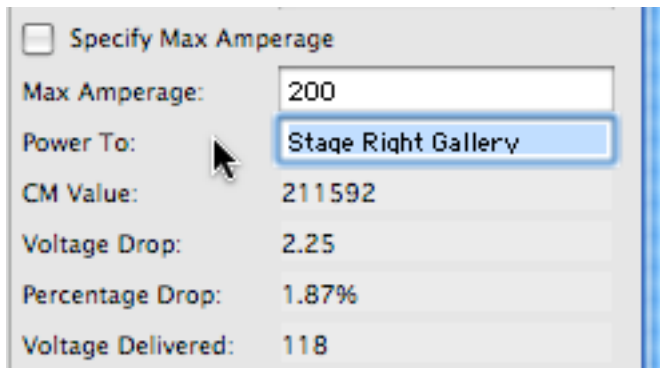
<http://www.esta.org/tsp/documents/docs/BSRE1-18-1r13.pdf>

IMPORTANT: There are many circumstances in which one may need to de-rate the cable amperage to a lower value. Primarily this will happen as a result of higher ambient temperatures or cable stacking. If you are not familiar with reasons for de-rating the maximum amperage capacity of feeder cables be sure to consult a licensed electrician.

Max Amperage

If the "Specify Max Amperage" is NOT checked, you can put ANY value you wish into this box. In all the cases that I know about, the values that go into this box should be at or BELOW the value placed there by the "Specify Max Amperage" check box. Later versions of this tool will probably enforce that limit.

Power To



A screenshot of a software dialog box with a light gray background. At the top left is a checkbox labeled "Specify Max Amperage" which is unchecked. Below it are several input fields and labels: "Max Amperage:" with a text box containing "200"; "Power To:" with a dropdown menu showing "Stage Right Gallery" and a mouse cursor hovering over it; "CM Value:" with a text box containing "211592"; "Voltage Drop:" with a text box containing "2.25"; "Percentage Drop:" with a text box containing "1.87%"; and "Voltage Delivered:" with a text box containing "118".

One can put any note that you want into this edit text box. It is designed to be used to specify a geographical location to which the power is being directed. It may be helpful when creating tables of power runs. I will be interested to hear if you find this field of any use at all.

Computing Voltage Drops

The voltage drop on a single phase over the length of the run based on the specified AWG and Voltage values will be computed by the OIP of each feeder cable run. The Voltage drop is based on the following formula and all cables are assumed to be copper NOT aluminum.

$$\text{Voltage Drop} = (2 \times K \times I \times L) / (\# \times A)$$

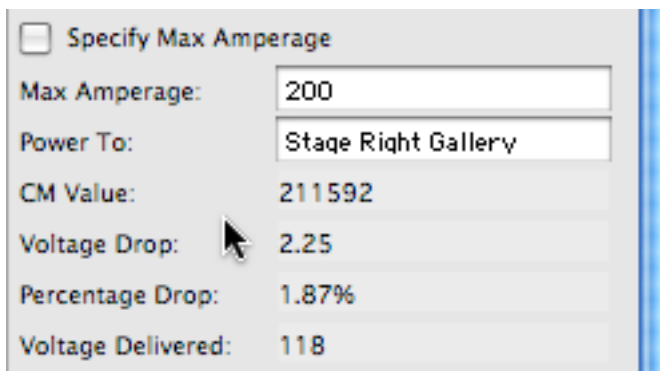
K = 10.8 (the specific resistance of copper

I = Current (Amperage)

L = Cable Length in feet

A = Cross Section of Cable (circular mills or CM)

= Conductors PER phase.



A screenshot of a software dialog box, identical to the one above. It shows the same fields: "Specify Max Amperage" (unchecked), "Max Amperage:" (200), "Power To:" (Stage Right Gallery), "CM Value:" (211592), "Voltage Drop:" (2.25), "Percentage Drop:" (1.87%), and "Voltage Delivered:" (118). A mouse cursor is now hovering over the "Voltage Drop:" field.

CM Value

This is the circular mills value based on the AWG value specified

Voltage Drop

This is the number of volts lost from the specified voltage value

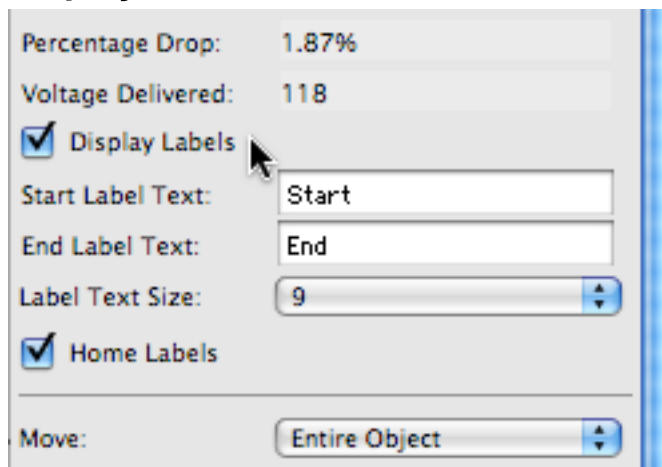
Percentage Drop

This is the percentage of the specified voltage that is lost over the length of the run

Voltage Delivered

This is the voltage delivered to the end of the cable run.

Display Labels



There is a label on each end of the polyline



You can enter the text that you want to have displayed, and you can decide if and when those labels will be displayed. If you activate the second button in the mode bar in the top left corner of the drawing window,



you will see control points that will allow you to move the labels wherever you want.



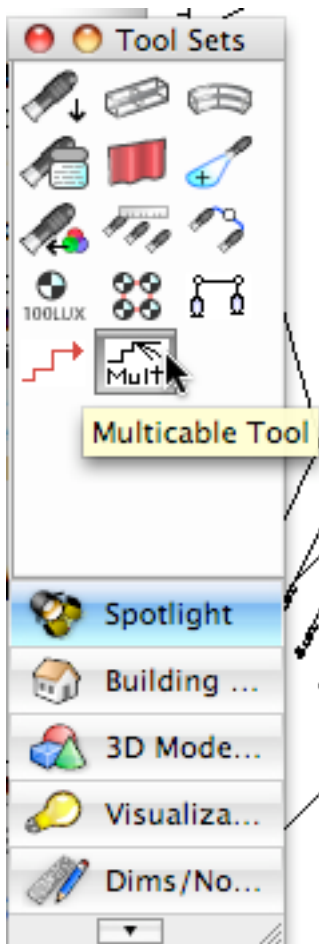
This will only be possible if the "**Home Labels**" button is NOT checked. With the "**Home Labels**" button checked the labels will always be moved to the beginning and end of the polyline.

What is the "Multicable" Tool?

The "Multicable" Tool will allow you to draw a single polyline that represents the path of your Multicable cable run. A multicable run is considered to be a run of 6 circuit multicable, Socco or Veam, from a power distro like a dimmer rack or a power distro box to fixtures or a socco twofer. If the multicable run ends at a multicable twofer then the two multis on the other side of the run are considered separate runs. This is done because then multicable can be counted for the shop or rental order.

The "Multicable" Tool is not a 3D tool. See the "Vertical Distance" parameter explanation below. I did a lot of experimenting with 3D polylines to see if I could use them for this tool. It turns out that editing 3D polylines is not worth the effort. I know that there are many of you out there that want a 3D tool, but, trust me, that time is not now. The issues of vertices identification and vertices directly over other vertices present too many problems. If you would like to discuss this with me, feel free to drop me a note or call. If the 3D editing improves its ease of use in later versions, I will include a 3D version of this tool. Even then I think you will find the 2D tool a more convenient option.

Multicable Tool



Select the Multicable tool and Draw a poly line representing the path you want to have your multicable run to take.

The first time you draw a multicable in a document an "Object Properties" palette will appear:

Object Properties

Multicable Object

ID:

Cable Length: 0

Vertical Distance: 0"

☒ Calculate Parts

☒ 10ft (smallest) then 25ft increments

☐ 8ft increments

Part 1: 0"

Part 2: 0"

Part 3: 0"

Part 4: 0"

Parts Total:

☐ Break Out ONLY

Start Label Text:

End Label Text:

Break Out Type: SPG

Break Out Length: 6'0"

☐ Staggered

☐ Draw Break Out Range

Break Out Location:

Break Out Text Size: 12

Break Out 1:

Break Out 2:

Break Out 3:

Break Out 4:

Break Out 5:

Break Out 6:

Break In Type: SPG

Break In Length: 6'0"

Break In Location:

Break In Text Size: 12

Break In 1:

Break In 2:

Break In 3:

Break In 4:

Break In 5:

Break In 6:

Display On Drawing:

☒ Display Break Ins

☒ Display Break Outs

☒ Home Breakouts

☒ Display Start Label

☒ Display End Label

☒ Home Labels

Cancel

OK

Click on either the "OK" button or the "Cancel" button it does not matter. Do not worry about any of the settings in this palette; just dismiss it. There is no way for me to keep this palette from appearing, but it will only appear the first time you use the tool in a document. Once you have dismissed this palette Your multicable will be redrawn and the "Object Properties" (OI) palette will appear for that multicable.

Multicable Object - The Object Info Palette

Obj Info

Shape Data Render

Multicable Object

Class: None

Layer: Design Layer-1

X: -38'8"
Y: -17'6"
Z: 0"

Rotation: 0.00°

ID:

Cable Length: 64'6"

Vertical Distance: 0"

☒ Calculate Parts

Part Lengths:

☒ 10ft (smallest) then 25ft increments
☐ 8ft increments

Part 1: 50'0"
Part 2: 10'0"
Part 3: 10'0"
Part 4: 0"
Parts Total: 70'0"

☐ Break Out ONLY

Start Label Text:

End Label Text:

Break Out Type: SPG

Break Out Length: 6'0"

☐ Staggered

☐ Draw Break Out Range

Break Out Location:

Break Out Text Size: 12

Break Out 1:
Break Out 2:
Break Out 3:
Break Out 4:
Break Out 5:
Break Out 6:

Break In Type: SPG

Break In Length: 6'0"

Break In Location:

Break In Text Size: 12

Break In 1:
Break In 2:
Break In 3:
Break In 4:
Break In 5:
Break In 6:

Obj Info

Shape Data Render

Multicable Object

Break In Length: 6'0"

Break In Location:

Break In Text Size: 12

Break In 1:
Break In 2:
Break In 3:
Break In 4:
Break In 5:
Break In 6:

Display On Drawing:

☒ Display Break Ins
☒ Display Break Outs
☒ Home Breakouts
☒ Display Start Label
☒ Display End Label
☒ Home Labels
☒ Rotate Labels

Label Text Size: 12

Max Amperage: 20

Voltage: 115

Other Voltage: 0

AWG: #12

Voltage Delivered: 111

Voltage Drop: 4.27

Percentage Drop: 3.71%

CM Value: 6530

Show Hide Parameters:

☒ Show Parts
☒ Show Break Ins
☒ Show Break Outs
☒ Show Voltage

Move: Entire Object

Vertex: ◀ ▶

X: -38'8"
Y: -17'6"

Add Vertex

Delete Vertex

Type: Corner Vertex

Hide Next Edge

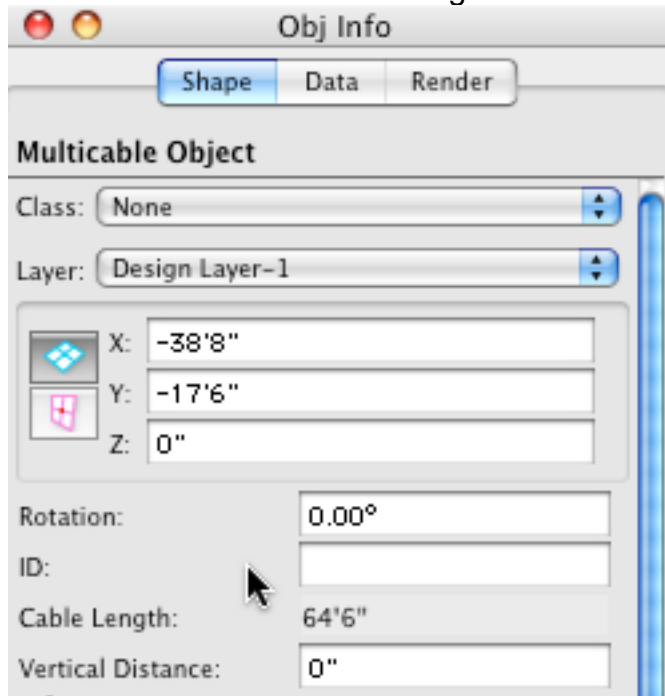
Vertices: 3

Perim: 64'6.856"

Area: sq ft

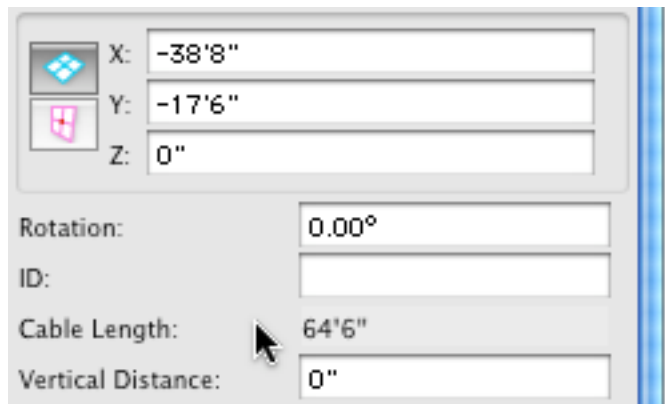
ID

The "ID" field is a text field designed to hold any identification value you wish to enter.



The screenshot shows the 'Obj Info' dialog box with the 'Shape' tab selected. Under the 'Multicable Object' section, the 'Class' is set to 'None' and the 'Layer' is 'Design Layer-1'. The coordinates are X: -38'8", Y: -17'6", and Z: 0". The 'Rotation' is 0.00°. The 'ID' field is empty and highlighted with a mouse cursor. The 'Cable Length' is 64'6" and the 'Vertical Distance' is 0".

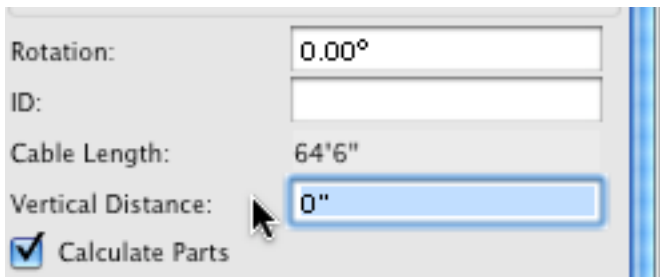
Cable Length



This screenshot is a close-up of the 'Obj Info' dialog box, focusing on the 'Multicable Object' section. The 'Cable Length' field, which displays '64'6"', is highlighted with a mouse cursor. The other fields (X, Y, Z, Rotation, ID, and Vertical Distance) are visible but not the focus.

This is a static text field that cannot be edited. It displays the combination of the perimeter of the polyline that you have drawn and the value in the "Vertical Distance" parameter. If the cable run has no vertical dimension, the "Cable Length" will equal the perimeter of the polyline, but this is rare.

Vertical Distance



Rotation: 0.00°
ID:
Cable Length: 64'6"
Vertical Distance: 0"
☒ Calculate Parts

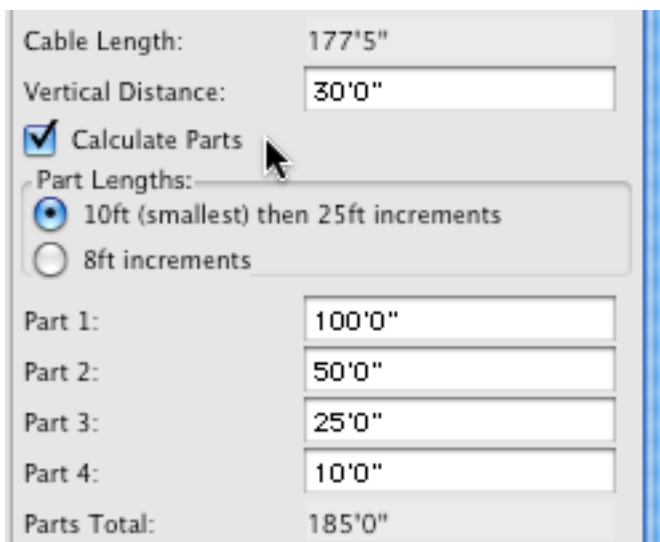
This is the field where the user enters the total rise and fall distance that the cable travels. Consider the following scenario.

A dimmer rack is on one side of the stage and the cable travels 10 feet on the ground to under a truss. It then rises 20' to the truss. It then runs 40 feet across the stage to the end of the truss. It then descends 20 feet to the floor, and finally travels 15' to a standing light tree. The polyline on the drawing would be 65 feet long (10'+40'+15'). This would not take into account the 20' up and the 20' down that the cable travels. You need to put 40' in the "Vertical Distance" edit box so that it can be added to the perimeter to define a total length of 105 feet.

CABLE PARTS

All multicable runs are made up of standard lengths of cable. In the example below, the 177 foot run is made up of 1 – 100' cable, 1 – 50' cable, 1 – 25' cable, and 1 – 10' cable. The total of the cable parts is 185 feet and listed below the Parts 1 – 4 edit boxes.

Calculate Parts



Cable Length: 177'5"
Vertical Distance: 30'0"
☒ Calculate Parts
Part Lengths:
☒ 10ft (smallest) then 25ft increments
☐ 8ft increments
Part 1: 100'0"
Part 2: 50'0"
Part 3: 25'0"
Part 4: 10'0"
Parts Total: 185'0"

This is a check box where the user specifies whether the OIP should calculate the length of the needed parts and fill in the different parts edit boxes. When this box is checked the only lengths that the OIP knows about is 100', 50', 25, and 10'. If you have other lengths in your inventory that you would like to use, for examplek 75' or 15' you will need to make sure this box is not checked, and you will fill in the part lengths you want to use by hand. You have 2 sets of standard lengths

to choose from. The second choice, "8ft increments" is based on the Christie Lights inventory. In later versions, it is hoped that the part size inventory can be specified, but that is not the case yet.

Part 1-4 and Parts Total

These boxes are used to specify the standard lengths to be used to make the feeder cable run. The boxes must be filled out in order. You cannot have an empty "Part 1" edit box and a value in the "Part 2" edit box. The Part 1 cable is assumed to be the part closest to the power source. Parts 2 through 4 work their way toward the power destination. In most cases you will only fill out the Part 1 box, but there will be many times when you will need to add cables together to make the run. The order of the part lengths will be used by other commands in the "Cable Tools" so pay attention to it.

The "Parts Total" is just a sum of all the parts.

Break Out ONLY

Sometimes you will have a veam or socco outlet in the wall or at the dimmer rack to which you only want to attach a break out and then attach individual portable cable runs to the .breakout. In this case you will want to have an indication of the bread out so that you can count it. When this box is checked you will not be allowed to enter values in the "Part" edit boxes, because no multicable run is being made.

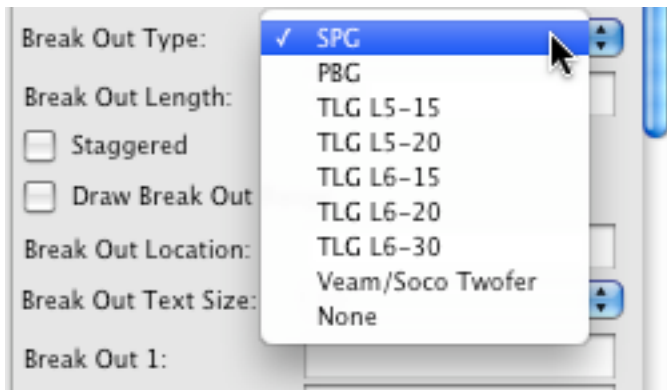
"Start" and "End" Label Text

There is a label on each end of the polyline



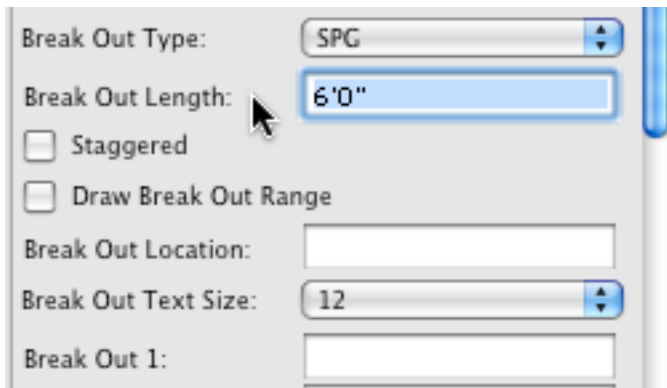
You can enter the text that you want to have displayed. If you do not want those labels displayed, do not put any value in the text boxes.

Break Out Type



This drop down menu allows you to specify the kind of break out connectors you wish to have for this run. Notice that a Veam/Soco Twofer is considered a break out.

Break Out Length



This edit box allows you to specify the length of the break out cables.

Staggered

Break Out Type:

Break Out Length:

☒ Staggered

☐ Draw Break Out Range

Break Out Location:

Break Out Text Size:

Break Out 1:

This check box allows you to specify if the break out has staggered lengths. If this box is checked, the "Break Out Length" box will lose much of its meaning, but I would tend to put the length of the longest break out cable in that field.

Draw Break Out Range

Break Out Type:

Break Out Length:

☐ Staggered

☒ Draw Break Out Range

Break Out Location:

Break Out Text Size:

Break Out 1:



This check box will make a circle at the end of the multicable run that has a diameter **equivalent to the "Break Out Length" minus 6 inches**. If you uncheck the this box the circle will disappear.

Break Out Location

☐ Draw Break Out Range

Break Out Location:

Break Out Text Size:

Break Out 1:

Break Out 2:

Break Out 3:

Break Out 4:

Break Out 5:

Break Out 6:

This is a text box that will allow you to notate the location of the breakout. This may be of use to you in your worksheets, or not; TBD.

Break Out Text Size

and

Break Outs 1-6

☐ Draw Break Out Range

Break Out Location:

Break Out Text Size:

Break Out 1:

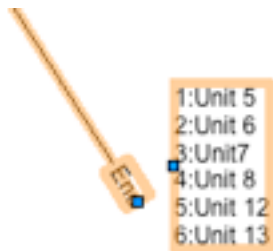
Break Out 2:

Break Out 3:

Break Out 4:

Break Out 5:

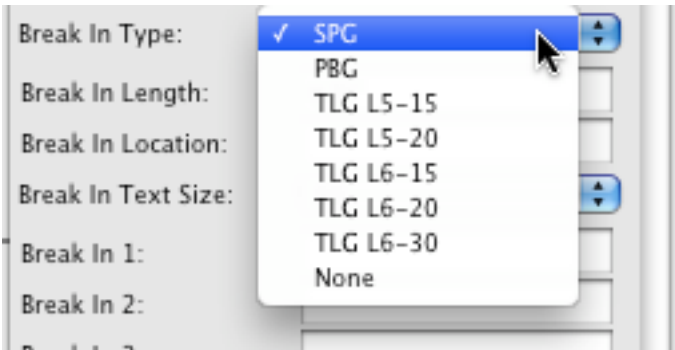
Break Out 6:



You may wish to note what is plugged into each receptacle of the break out. If that is the case, you can make those notes here. If you wish those notes to be displayed on the drawing, you can specify the text size here. If the "Home Break Outs" box mentioned below is unchecked, you can

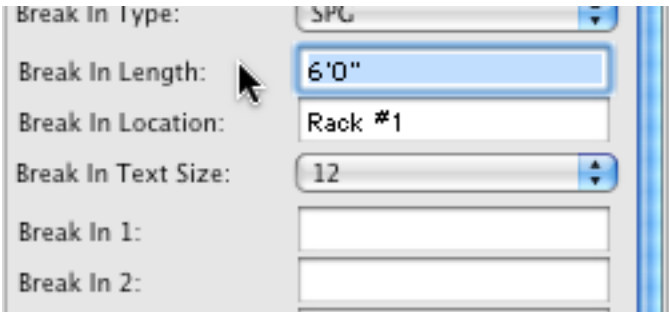
move the text using its control point to different places on the drawing out of the way of other drawing elements. There is a button further down the OIP that will let you specify as to whether or not your notes will be displayed on the plot.

Break In Type



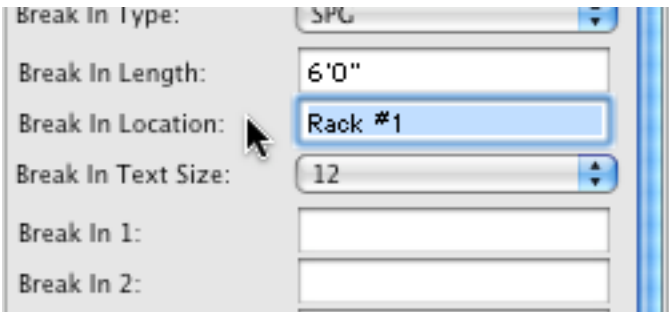
This drop down menu allows you to specify the kind of break in connectors you wish to have for this multicable run. Notice that a Veam/Soco Twofer is NOT an option here. Twofers can only be considered as break outs.

Break In Length



This edit box allows you to specify the length of the break in cables.

Break In Location

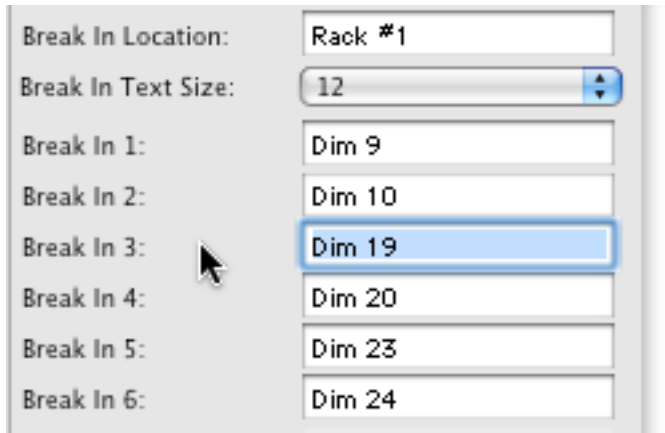


This is a text box that will allow you to notate the location of the break in. This may be of use to you in your worksheets, or not; TBD.

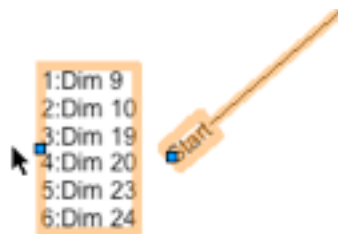
Break In Text Size

and

Break In 1-6



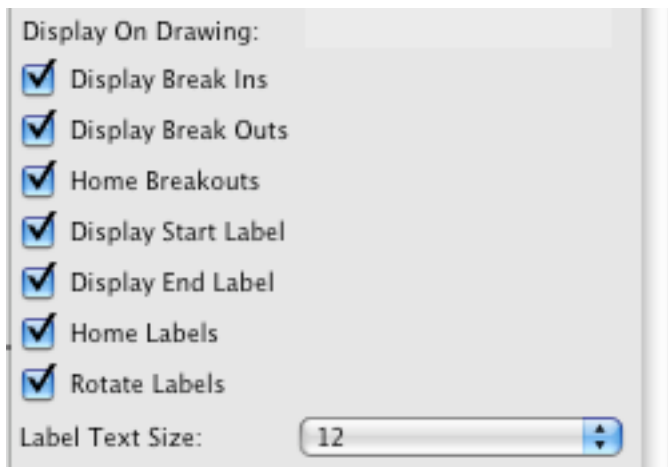
A screenshot of a software dialog box for configuring break in settings. It contains several input fields and a list. The fields are: 'Break In Location:' with 'Rack #1', 'Break In Text Size:' with '12', 'Break In 1:' with 'Dim 9', 'Break In 2:' with 'Dim 10', 'Break In 3:' with 'Dim 19' (highlighted with a blue selection bar), 'Break In 4:' with 'Dim 20', 'Break In 5:' with 'Dim 23', and 'Break In 6:' with 'Dim 24'. A mouse cursor is pointing at the 'Break In 3' field.



You may wish to note where each plug of the break in is going. If that is the case, you can make those notes here. If you wish those notes to be displayed on the drawing, you can specify the text size here. If the "Home Break Outs" box mentioned below is unchecked, you can move the text using its control point to different places on the drawing out of the way of other drawing elements. There is a button further down the OIP that will let you specify as to whether or not your notes will be displayed on the plot.

Display On Drawing

This collection of check boxes lets you control what is displayed on the drawing. Nothing you do here will effect the data entered in the OIP.



Display Break Ins

Display Break Outs

These buttons determine if the values in the Break Out 1-6 and the Break In 1-6 are displayed on the drawing.

Home Break Outs

This button determines if both the Break Out 1-6 and the Break In 1-6 labels are locked to their respective ends of the cable run. If this box is unchecked, you can move the text using its control point to different places on the drawing out of the way of other drawing elements.

Display Start Label

Display End Label

These buttons determine if the values in the "Start Label" and "End Label" text boxes are displayed on the drawing.

Home Labels

This button determines if the text in the "Start Label" and the "End Label" text boxes are locked to their respective ends of the cable run. If this box is unchecked, you can move the text using its control point to different places on the drawing out of the way of other drawing elements.

Rotate Labels

If this button is checked the "Start" and "End" labels will always align with the cable. If it is not checked the Start and End labels will remain right reading.

Label Text Size

If this menu allows you to specify the font size of the "Start" and "End" label text

VOLTAGE

The multicable object will compute the voltage drop of the multicable run based on the values entered in the fields described below.

| | |
|--------------------|-------|
| Label Text Size: | 12 |
| Max Amperage: | 20 |
| Voltage: | 115 |
| Other Voltage: | 0 |
| AWG: | #12 |
| Voltage Delivered: | 104 |
| Voltage Drop: | 10.51 |
| Percentage Drop: | 9.14% |
| CM Value: | 6530 |

Max Amperage

This is the maximum amperage that you will put on each circuit of the multicable run.

Voltage

This is the voltage that you will use on each circuit of the multicable run.

Other Voltage

If you have selected "OTHER" from the voltage drop down menu, this is the voltage that you will use on each circuit of the multicable run.

AWG

This is the wire size for each circuit of the multicable run.

Voltage Delivered

Voltage Drop

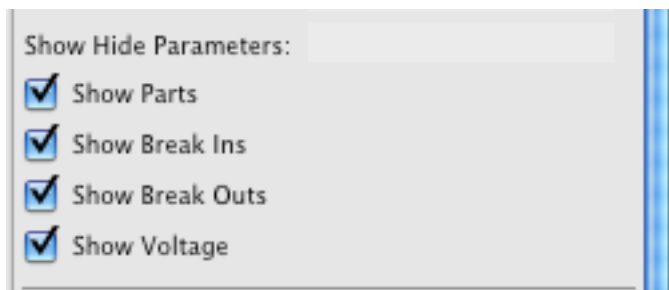
Percentage Drop

CM Value

These are the voltage drop values computed from the values you have entered..

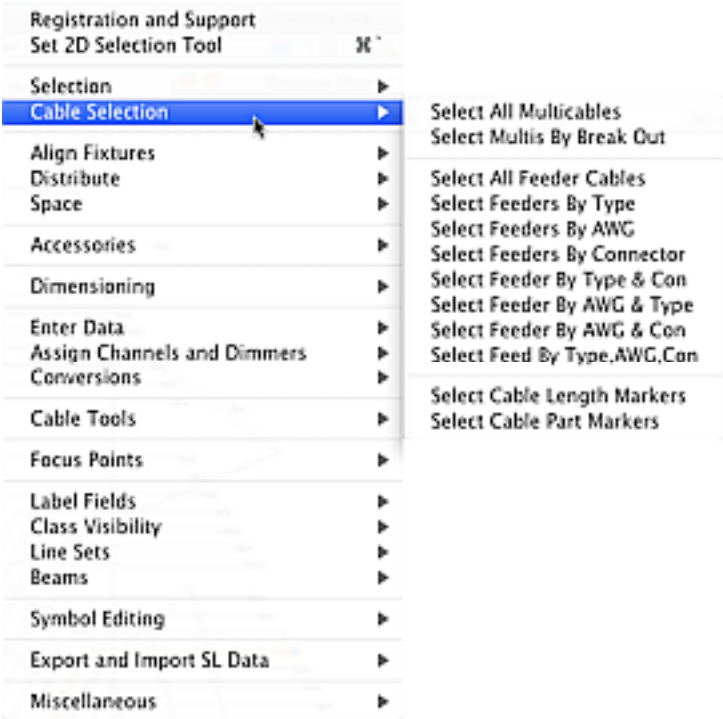
Show Hide Parameters

The multicable object has a long and cumbersome OIP. The check boxes below will allow you to hide or show certain groups of parameters that you may or may not care about. This will hopefully minimize the scrolling around you need to do. Checkiing or not checking these boxes will have no effect on the data contained in the effected parameters.



Menu Commands for the Feeder Cable and Multicable
There are a few commands that will help you get the most out of the Feeder Cable and Multicable object

Cable Selection



These commands facilitate the selection of cables by various criteria.

Cable Tools

| | |
|-----------------------------|----|
| Registration and Support | |
| Set 2D Selection Tool | 38 |
| Selection | ▶ |
| Cable Selection | ▶ |
| Align Fixtures | ▶ |
| Distribute | ▶ |
| Space | ▶ |
| Accessories | ▶ |
| Dimensioning | ▶ |
| Enter Data | ▶ |
| Assign Channels and Dimmers | ▶ |
| Conversions | ▶ |
| Cable Tools | ▶ |
| Focus Points | ▶ |
| Label Fields | ▶ |
| Class Visibility | ▶ |
| Line Sets | ▶ |
| Beams | ▶ |
| Symbol Editing | ▶ |
| Export and Import SL Data | ▶ |
| Miscellaneous | ▶ |

| |
|-----------------------------|
| Make Feeder Cable Count WKS |
| Make Multicable Count WKS |
| Place IDs on Select Multis |
| Get Distance Start to Click |
| Mark Cable Parts |
| Mark Specified Distance |

Make Feeder Cable Count WKS

This command will create a worksheet listing the Feeder Cable runs and counting the parts.

Make Multicable Count WKS

This command will create a worksheet listing the Multicable runs and counting the parts.

Place Ids on Select Multis

This command will place an alphanumeric ID based on a starting letter that you enter. If you enter "A", the selected multicables will be given the following Ids: A, B, C, D, etc. If you enter "AA", the selected multicables will be given the following Ids: AA, AB, AC, AD, etc.

Get Distance Start to Click

This command will work with both Feeder Cable objects and Multicable objects.

If you click on a cable, the position you clicked on will be marked with a locus and the distance from the start of the cable will be displayed over the locus. You can specify if the "Vertical Distance" is to be added to the distance. This command can be handy if you want to know the distance from the start of the cable run to a particular architectural or light plot feature..

Mark Cable Parts

This command will mark the end of each cable part listed in the OIP.

Mark Specified Distance

This command will mark the location on the cable run of a specified distance from the start of the cable run.