

Plus+

ST950 Plus+ Layout Design Tool Quick Start Guide

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Issue 2

Change History

Version	Date	Change	Author
1	March 2020	First Release	Mart Newton
2	May 2020	TS009486	Antonio Rhodes

The electronic version of this handbook can be found on the Siemens website www.siemens.co.uk/traffic in the Handbooks section under Downloads.

1 INTRODUCTION

1.1 Purpose

This document will give the user an overall insight into how the Plus+ Layout Design Tool is to be configured and operates whilst highlighting some methods to use whilst undergoing the design process.



Info

It is assumed that the user has a basic understanding of AutoCad, some of the instructions will not be fully explained to a user that has no experience with AutoCad. Menus that are specific to the design tool will however be explained.

1.2 Software

To be able to run the design tool software, you will first need to have AutoCad 2018 (or later) and KeySignals 8.4.5 (or later) installed. You will then be able to run the design tool installation file, and this will run alongside AutoCad and KeySignals.

1.3 Contact Us

If you have any comments on this handbook, or need any further information, you can contact us at trafficwebmaster.stc@siemens.com.

2 INITIAL SETUP

Before a user can begin creating utilising the design tool fully, there are several steps that need to be taken.

It is recommended that any drawing is opened via KeySignals link, rather than directly opening an existing drawing. This will ensure that KeySignals will load correctly.

2.1 KeySignals Settings

2.1.1 Sockets / Magnets

To allow for easy connections between poles, street equipment, sockets, ducts and chambers it is recommended that sockets and magnet connections are enabled within the KeySignals settings.

2.1.2 Data Template

Even though KeySignals item already have some properties, additional information is required to allow the design tool to evaluate the network adequately. To do this the user should access the access the following KeySignals settings.

Keysoft BIM 3D -> Manage Data Template -> "PlusPlusPlugin.bundle" should be selected, if not select open, locate and select. As you close down the window you will be asked to confirm that you wish to use this as the current template.

3 NEW DRAWING

Described below are steps to creating a new Plus+ traffic signal design.



Info

When Plus+ junctions are being designed from scratch a complete ring is to be provided if this is possible and consistent with the number of nodes required. This is to allow for an upgrade to 'Rings' once the feature is available.

3.1 Plus+ Controller

3.1.1 Dimensions

In order for the design tool to be able identify which traffic signal equipment is to be considered, it identifies the Plus+ traffic signal controllers within the drawing. This can be found:

KeySIGNALS -> Other E't -> Controllers Image Menu -> Select P+ controller.

You will then be presented with several parameters that are required before you can choose the controller location:

- Choose "Width", default 1.0m
- Choose "Depth", default 0.5m
- Choose "Height", default 1.25m
- Choose "Door Hinged on Left", default Yes

Any changes made here will be reflected in the controller icon. Once the dimensions have been decided you can then place the controller in the chosen location with the correct orientation.

3.1.2 Properties

As the Plus+ system relies heavily on a consistent link between design and installation, the controller properties are used to transfer the designers contact details through to the Installation Configuration File.

As with other KeySignals items, if you double click on the Plus+ controller you will have access to its properties. Included under the "Street Furniture" heading you will need to complete the following:

- Author email
- Author Name
- Revision Number
- Site Name

If an attempt is made to verify a Plus+ design an error message will appear stating that these fields are empty.

3.2 Traffic Signal Poles

All poles can be selected and placed on the drawing as normal, however these should ideally be placed in the actual pole number order. The KeySignals program increments a new poles identity number each time it is placed in the drawing, having these in the correct order now will save time in having to relabel them later on.

The pole length can also be amended, this will be reflected on whether you place a tall or stubby pole. These heights will have an impact on the cable lengths which in turn has an effect on the viability of the Plus+ network.

3.2.1 Modifying Signals

If a Signal is to be moved from one location and added to another, the user has two options within the Design Tool:

1. Move the Signal from the old position to the new position
2. Delete the Signal in the old position and add a new Signal in the new position.

Moving

If a Signal is 'moved' on the drawing, the Node on-street will need to be moved as well. Even if the Signal is assigned to a new Phase, the Controller recognises that the Node within the Signal is the same. If the properties are unchanged, the Node will illuminate without manual intervention **EVEN IF IT IS STILL FITTED IN THE ORIGINAL POSITION.**

Deleting

If a Signal is deleted and a new Signal created, the Node in that new Signal will not be automatically associated with any of the Nodes that previously existing at the site. The new Signal will not illuminate until the user pairs the physical Node with the required new Signal.

Therefore, use option 1 and 'move' the signal only if the intention is to also move the physical signal (and Node) on-street.

Use option 2 and 'add' new Signals if they are to be installed at new positions. Don't be tempted to 're-use' and 'move' existing signals that are to be removed.



Info

If it is noticed that two Signals have been assigned the wrong Phase and should be swapped, the recommended procedure is to change the Phase information on the existing signal symbols. If instead the two signals are interchanged by moving their positions, the physical signals on-street will need to be moved as well.

3.3 Pole Sockets, Chambers & Ducts

Pole sockets, chambers and ducts are to be added to the design as required. As previously stated it is recommended that the "sockets" and "magnets" are enabled which will ensure all of the equipment will be connected together successfully.

3.4 Traffic Signal Equipment

All signal head and pedestrian indicators to be added to poles as normal, this includes extension brackets and side-hung brackets. All overhead detection to be added as normal.

3.5 Plus+ Cable

To utilise the design tool correctly, specific Plus+ cable must be specified whilst using KeySignals, this can be found:

KeySIGNALS -> Duct Types -> Cables Draw -> Cable – P Plus

3.5.1 Cable Arrangements

There are several ways to connect the traffic signal controller and the street equipment together with the cable:

- Ring
- Arm
- Spur (connected from a ring)

Generally, the ring is the most desirable connection method for Plus+. This will ensure that the resilience of the network is maintained in the event of a collision with a traffic signal pole or a cable strike, generally resulting in the signals remaining operational. The design tool will calculate whether the proposed layout is viable, dependent on load, the number of nodes and cable length. Design decisions need to be made as to the layout of the ring, ie connect all poles in order or a selection to the furthest point of the ring and the remainder on the return path. Each choice has its benefits, if a site has a high chance of cable strike or disruption then it may be beneficial to keep cable lengths between poles to a minimum throughout the ring.

3.5.2 Connections

Now you must connect the Plus+ traffic signal controller to the equipment located on the street following the required duct network. You must start from the controller, and if utilising a ring, finish at the controller. If you are connecting a selection as an arm, then you must also draw the cable from the controller and out to the poles. A spur connection must run from the ring it is associated with and then to the "spur" pole. To attach the cable to a cabinet / pole / duct box you will need to click on to the item or socket associated with that item and press the space bar once finished, alternatively right-click and select "End" when finished.

3.6 Data Validation

Before any calculations can be run, we need to be certain that all of the required equipment is now connected to the relevant Plus+ controller. To ensure no information is omitted from the network the following validations should take place on a pole by pole basis. Double left-click on each of the items to access the "KeySignals Properties" for each item.

3.6.1 Poles

Height of Pole - ensure that this length matches your design pole length.

- Physically Connected Cables – "Is connected" to be ticked, this shows the Design tool that this pole is to be considered when running any calculations. It is possible to have a pole

in the network that is used as a by-pass if an adequate duct network isn't available on site.

- Pole Number – is this correct and matches the design layout?
- Connections – this tab will allow you to see what items are currently installed on the pole.

3.6.2 Traffic Signal Heads

- Is Secondary Head – If the signal head requires secondary hoods, this will should be ticked (this will already be selected if a secondary aspect has been chosen from Signal Heads menu.)
- Solar Cell – The default is "Not_Fitted", if a solar cell is required then this will need to be altered to "Fitted" on the drop-down menu. The Photo-Cell KeySignals item is for display purposes only.
- Pole Number – This should match the pole number as confirmed in the previous section.
- Detector_Input_Name_1 (Vehicle) / 2 / 3 / 4 – Over head detectors need to be associated with a RAG node to allow the controller to interpret the individual input. Each RAG node can have up to 4 detectors associated to it, if extra are required then these will need associating with another node. For detectors 1 – 3 it is suggested that they should be aligned in order of Vehicle, On-crossing and Kerbside. These are purely suggestions and are to try and maintain consistency across an installation.
- Phase – Each signal head has to be assigned a phase, if a high-level repeater is to be installed then this will require a separate phase as well.
- Phase "Arrow Direction" – Each arrow has to have a phased assigned to it as well, this can be the same as the full RAG that it is installed along side.
- Switched BoxSign Phase – Associated switch sign Phase (if fitted).

3.6.3 Far-sided Pedestrian Signal Heads

- Phase - Each signal head must be assigned a phase.
- Detector_Input_Name_1 (Vehicle) / 2 / 3 / 4 – Over head detectors can be associated to pedestrian signal head similar to Traffic Signal Heads.

3.6.4 Near-sided Pedestrian Signals & Push Button Units

- Tactile Knurled Knob – If a tactile unit is required in a near-sided pedestrian indicator then this option will need to be selected. This will then display the "Tactile" icon on the drawing.
- Phase - Each signal head must be assigned a phase.
- Audible – Available options include 0 / 1 / 2, if this selection is 0 then no audibles will be included. 1 = Quiet audibles, 2 = Loud audibles.
- Detector Name – Input name for the push button, this will need to match the IC4 configuration.
- Button Type – Mechanical or Piezo buttons can be selected from the drop-down menu.

3.6.5 Over Head Detector

- Name – Input name for the detector, this needs to match the detector name for the associated RAG node and the IC4 configuration.

4 EXISTING DRAWING TO BE CONVERTED

If you have an existing drawing that is to be upgraded, then the first thing you must do is ensure that the “Data Template” is updated to the latest available as described earlier. From there you will need to replace the controller for a Plus+ model and progress through the Data Validation section to ensure that all of the required information is available.

5 PLUS+ VIABILITY CALCULATIONS / DETAILS

In order to ensure that the chosen Plus+ network is viable, the design tool will run several calculations each time any of the following output options are selected:

- Cable Specification
- Power Table
- Bill of Quantity Table (exportable Excel version available)
- Installation Configuration File
- Installation Node Reference Sheet
- Input / Output Table

These will aid the designer in ascertaining if the chosen layout is the most optimal or whether amendments should be made. To access either of these, choose one of them from the "Siemens" tab, you will then be prompted to select the relevant Plus+ controller.

5.1 Cable Specification

This diagram will show the layout of the Plus+ connections around the network. It is essential that the duct network is accurate as this will ensure that the cables can be installed as shown with the correct lengths.

5.1.1 Configuration Connections

The cable specification that is generated will reflect the cables that have been connected and will show then in the required configurations, either an arm or a ring, with the relevant CIC connections shown. These connection details are required by the Field Service team that will install the signals.

5.1.2 Network Load

The colour of the cable specification will alter depending on the % load at CTB, Power Bank and the Power Kit:

Cable Colour	Load On the Network
Green	< 75%
Amber	75% - 90%
Red	90% < (Shown as an "Invalid Network")

Table 1 : Load / Colour Relationship

More details of why a network maybe showing as invalid can be found within the Power Table.

5.2 Power Table

Included in this table are the main components required to support the desired Plus+ network, including, but exclusively:

- Number of CICs
- Cable connections on the CTB
- Cable Length between each connection
- Power Required at Pole
- Cable Voltage Drop

- Load at CTB %
- Power Bank Load %
- Power Kit Load %

The various “Load %” sections are colour coded just that same as the cable schematic. Using this information, you can make a judgement to see whether it would be preferable to amend the proposed design. This could be from splitting an existing loop into several or utilising a spur rather than extending the ring.

An assessment needs to also be made of the proposed traffic signals and their future use. If there is a chance that the signals could be upgraded in the future it is recommended that that are designed so that the Power Table outputs are all green. If there is no scope to amend the design in the future and installation costs are a key factor, then there is potential for the design to remain unchanged if it is within the amber section.

5.3 Bill of Quantity

Once this option has been selected, you will be asked to place a new table which will detail the number of each piece of Plus+ equipment that is to be utilised by the chosen Plus+ controller. This can also be exported into an Excel document if the Export BoQ option is chosen. This will not include any ducts, chambers or pole sockets are to be installed.

5.4 Installation Configuration File

An integral part of the Plus+ process is ensuring that the controller can relate to which node is located on which pole and which phase it is relevant to. To achieve this, the design tool can export an “Installation Configuration File” for a verified Plus+ layout. This is then to be passed on the Field Service team for the installation team to utilise and map nodes as they are installed.

5.5 Installation Node Reference Sheet

These are to aid with the installation and documentation of each node location. A series of sheets are created detailing each node along with its type, phase and inputs / outputs associated with it. There will be a section available to apply one part of the two-part QR code that is applied to each individual node.

5.6 Input / Output Table

This table details every node that has been configured to have an input / output associated with it. Details will include the type of node and which poles it is installed on, then it will detail the input / output name and which input / output slot it is to be connected to.

6 KNOWN ISSUES

This section lists the known issues with the design tool. This section should be amended as the issues are resolved.

1. **Issue** [PLUS-4089](#) : The Design Tool is programmed to check connections based on ducts rather than cables so a cabinet connected to a pole without ducting is not recognised. **Workaround:** Add small length of ducting.
2. **Issue** [PLUS-4090](#) : Support Tactile Paving/Mat Detector does not work as even though there is a symbol for it in KeySIGNALS underneath the "Detectors" option but currently doesn't work with the Design Tool.
3. **Issue** [PLUS-4303](#) : Because of the way the Design Tool handles connections at the moment, having a pole too close to a duct box may make it think it's connected to the cable even if you're trying to skip it. **Workaround:** On the STS Drawing, move either the Duct Box or Pole a little to increase the distance between them. The Cable can then be drawn through the Duct Box and 'skip' the Pole.
4. **Issue** [PLUS-4453](#) : The Design Tool currently allows a user to specify a PDU/Wait with both quiet Audibles (i.e. loud and quiet fitted) and tactile to be fitted. There is not enough physical space in the PDU/Wait to accommodate both audibles and a tactile unit. **Workaround:** Don't do it.
5. **Issue** [PLUS-4454](#) : If a Spur cable starts at a Pole with 2 or more RAG Nodes, the Design Tool currently selects one of the RAG Nodes as the candidate to generate the Spur and adds this information to the Site Layout XML. **Workaround:** Designer to ensure there is a note that identifies the Spur.
6. **Issue** [PLUS-4629](#) : If a solar cell is placed onto the network on the drawing but a node has not specified its "Solar Cell" attribute as being "Fitted", the generated Site Layout will not have indicate that the node has a solar cell fitted. **Workaround:** Designer to ensure the Solar Cell attribute is appropriately set.
7. **Issue** [PLUS-4767](#) : Louvers - Not reflected in BoQ. **Workaround:** Designer to ensure an appropriate note is added to the design, if required.
8. **Issue** [PLUS-4768](#) : Small overhead detectors are not recognised. **Workaround:** Don't use small overhead detectors – design test can be used if necessary.

For more information

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www.siemens.co.uk/traffic

Siemens Mobility
<http://www.mobility.siemens.com/mobility>

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