EasyIO Quick Start 03
CPT Tools

Document Change Log

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7thJan 2014
User guide updated base on CPT Tool Built 2014-01-03.

28th May 2014
Updated steps for using own image library.

4th Sept 2014
New feature: Sedona apps project folders.
New feature: Sedona Projects

15th March 2015
Update according to latest CPT dated 6th March 2015.
New feature: Backup and restore management.

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15th Oct 2015
SQL History Table widget guide.

15th July 2015
FTP port configurations for FG+
OS Account password for FG+
Dashboard feature for FG+

18th Dec 2019
Updated with FS plugins menu
Updated to accommodate FS series

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EasyIO Holdings Pte Ltd
101, Cecil Street #09-07
Tong Eng Building
Singapore 069533

Worldwide and Asia Pacific Support : support@easyio.com
Americas Support : support@easyio.pro
Europe Support : support@easyio.eu

Table of Contents

Introduction

Thank you for purchasing EasyIO products.
This user guide will help you to program any EasyIO Sedona controller in a fast and efficient manner.

This User Guide is compatible for both EasyIO 30P and the EasyIO F Series controllers.
Only the FG+ and FS Series will utilize or deploy the Graphics functions.

This user guide covers the programming and constructing Graphics in an F Series Controller utilizing the '***CPT Tool***s'

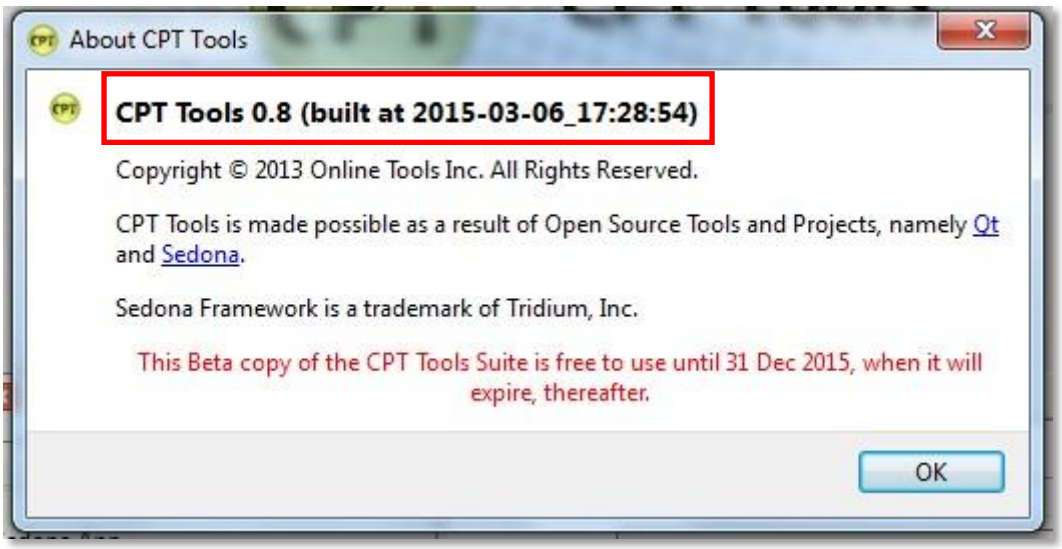
The FG+ and FS Series is an Open Source product and an industry ecosystem is beginning to provide third party configuration and management tools for the FG Series, FC Series and 30P environments. The Online Tools Inc, 'CPT Tools' is one such tool and is deployed in this user guide.

CPT Release Version

At the time of this document CPT is version 0.8 dated: 9th Oct 2015.
However CPT is updating and enhancing its features.
New revision of CPT Tool is release without prior notice.

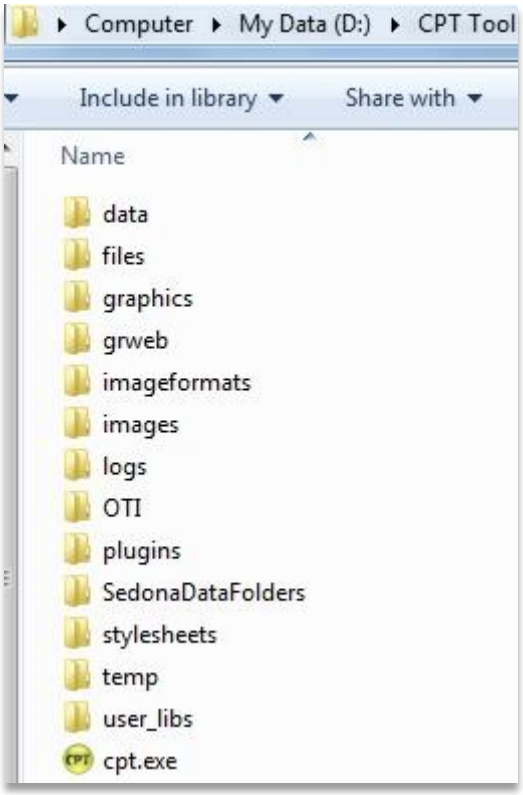
To verify the CPT release version go to drop down menu *Help>About*

In the about window refer to the build date. This is how CPT release is recognized.



CPT Tool Overview

CPT Tool is an executable file and does not require installation. The package is supplied as a zip file. Extracting the zipped file will create the file structure indicated below.
All the files need to be located in the same folder in order for CPT to run correctly.

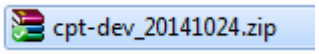


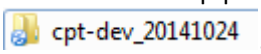
The image above shows a list of the extracted CPT Tool files.

Updating CPT

Since CPT is an executable file and do not need any installation, updating to the latest version of CPT is by merging all files from the CPT latest released bundle.

*****DO NOT create a separate folder for each release. *****

Extract the latest zip package; in this case 

the latest is dated 19th Dec 2014 to 

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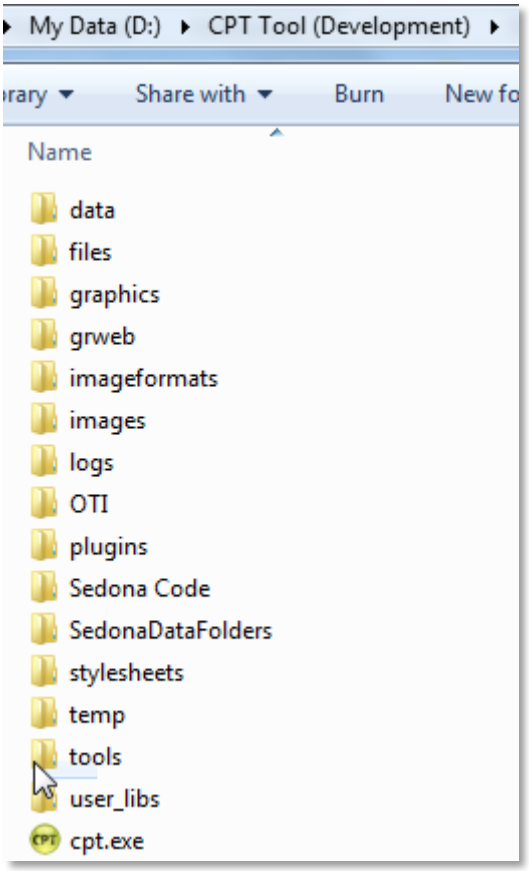
Copy the all content of the folder and merge into the current working CPT folder in your computer. Make sure to close any running CPT application before replacing/merging the files.



****

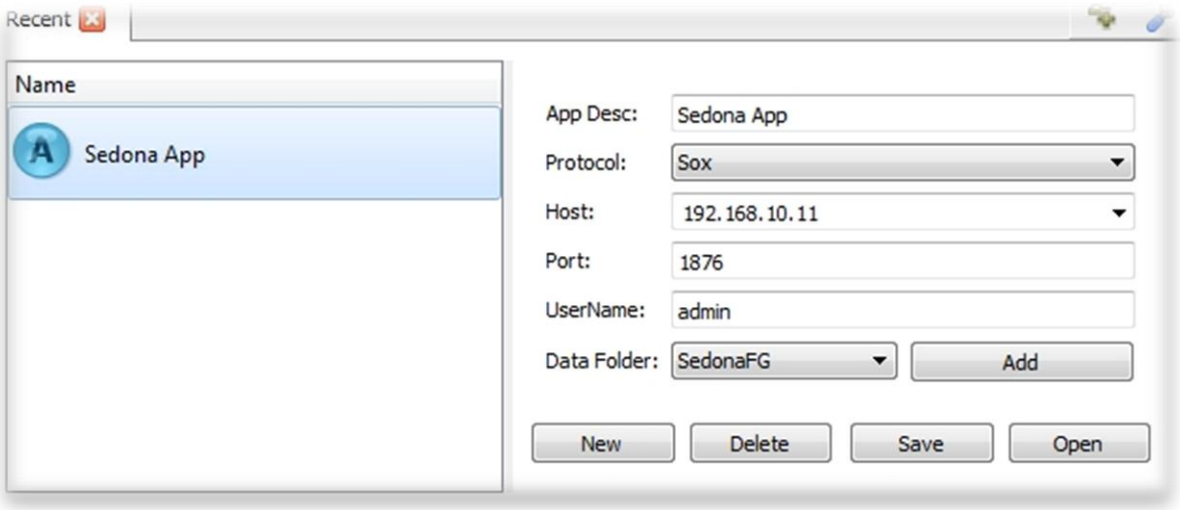
OTI.ini file holds all the project management details and saved controller configurations.
If you wish to retain the previously created project management list, *DO NOT* replace the *OTI* folder
****

Step 1

To launch the application, just double click the 

icon.
Optionally a desktop shortcut can be created.

Step 2
To connect to a Sedona controller, go to File>Open App or use the shortcut in the middle of the screen.



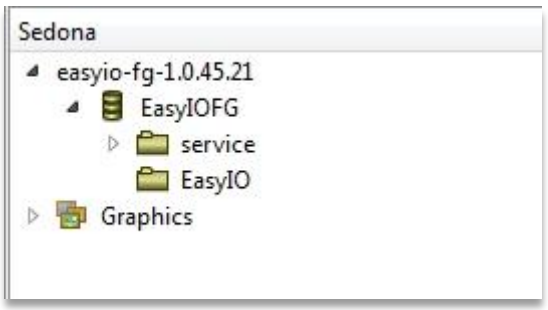
Enter the IP address of the device you are connecting to.

Default IP address for ***EasyIO FS Series***
IP address : 192.168.10.12
Subnet Mask : 255.255.255.0

Default IP address for ***EasyIO FW Series***
IP address : 192.168.10.30
Subnet Mask : 255.255.255.0

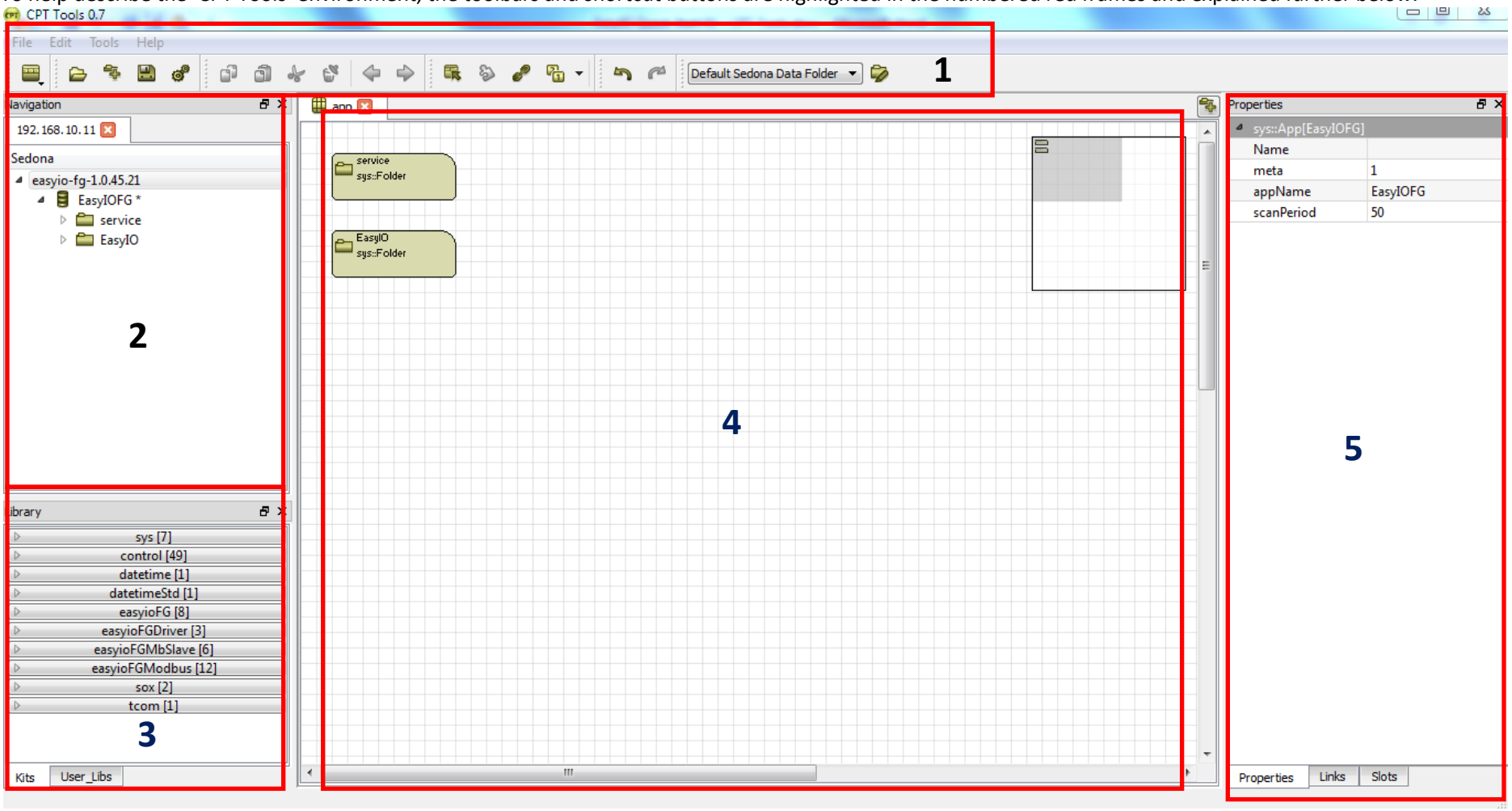
For both ***EasyIO*** controller models, the Sedona login Username is “admin” and Password is left blank (do not enter a password).

Step 3
On successful connection to the controller, you will see the controller in the Navigation (Nav) tree on the left of the screen, as shown below.



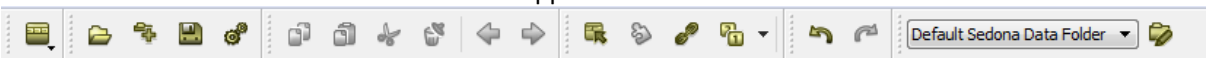
Step 4

To help describe the 'CPT Tools' environment, the toolbars and shortcut buttons are highlighted in the numbered red frames and explained further below.



Tool Bar (1a)

This tool bar contains all the shortcuts for the application.



Icon	Description	Remarks
	Side Bar Selection	Show or hide side bars.
	Open Application	Open or Connect to a Sedona Controller
	MultiTab	Open Multiple Tabs in the CPT Tool
	Save	Save the Sedona application.
	Kit Management	Manage kits, install or uninstall. Also used for kit upgrading.
	Copy Selection	Copy a selected object or folder
	Paste Selection	Paste a copied object or folder
	Cut	Cut a selected object or folder
	Delete	Delete a selected object or folder
	Select All	Select all objects in the current view
	Search	Search object within the Sedona apps.
	Zoom In	Perform a zoom in for better visibility.
	Zoom 100%	Restore the view back to 100% ratio.
	Zoom Out	Perform a zoom out for larger view.
	Create user library	Create a user defined library of objects for reuse in other applications
	Make link	Link between objects. A new window will pop and allow users to select within the Sedona Apps.
	Arrange	Automatically arrange objects in the view horizontally or vertically.
	Undo	Undo the last action
	Redo	Redo the last action
Default Sedona Data Folder	Change the Default Sedona folder to another folder	User can manage the Sedona folder manually. The Sedona folder can be a common folder shared between Niagara Workbench and CPT Tool.

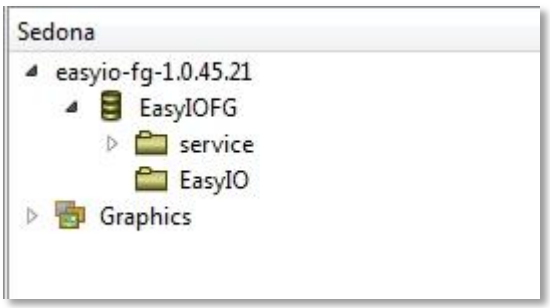
Tool Bar (1b)

This tool bar contains all the shortcuts for graphics page. it will only visible is a graphics page is view.

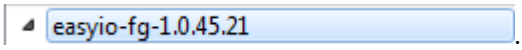
Icon	Description	Remarks
	Arrange	Arrange multiple text label or items
	User Library	To create user library for graphics
	Deploy	Deploy graphics pages into the controller micro SD card. **Deploy** : only updates changes of the graphics pages. Usually used only after a full deploy is done. **Full Deploy** : Deploy graphics pages into a new controller. Full deploy is needed if the controller has a new micro SD card or first time having graphics.
	Preview	Shortcut to preview the deployed graphics. It will launch the default web browser.
	Download	Get all graphics pages from the controller micro SD card into the computer local folder.
	Backup Management	Shortcut to manage backup. this feature allow user to perform a complete backup and stored the backup in the SD card as well as local computer. Restoring a backup that exist in the SD card into the controller is possible as well with this feature.

Navigation (2)

Navigation is possible via the side bar view of a connected Sedona Controller.
The Navigation view shows the application content in a folder tree structure.
A User can shortcut directly to the Sedona controller 'Kit Manager' via double clicking the '***easyio***' descriptor at the top of the sidebar menu.



The connected is Sedona apps name shown above the Navigation sidebar window.

Shortcut to the Kit Manager by double clicking: - 

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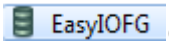
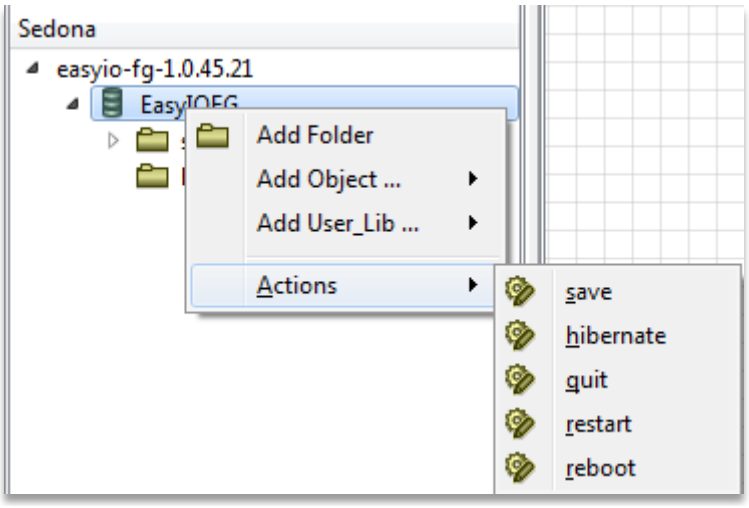
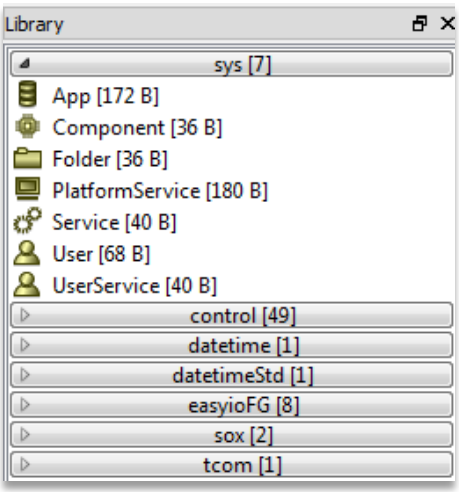
If multiple controllers are connected simultaneously, the navigation window will show multiple IP address tabs.

Right clicking the “EasyIOFG” station icon 

displays additional shortcuts and actions.



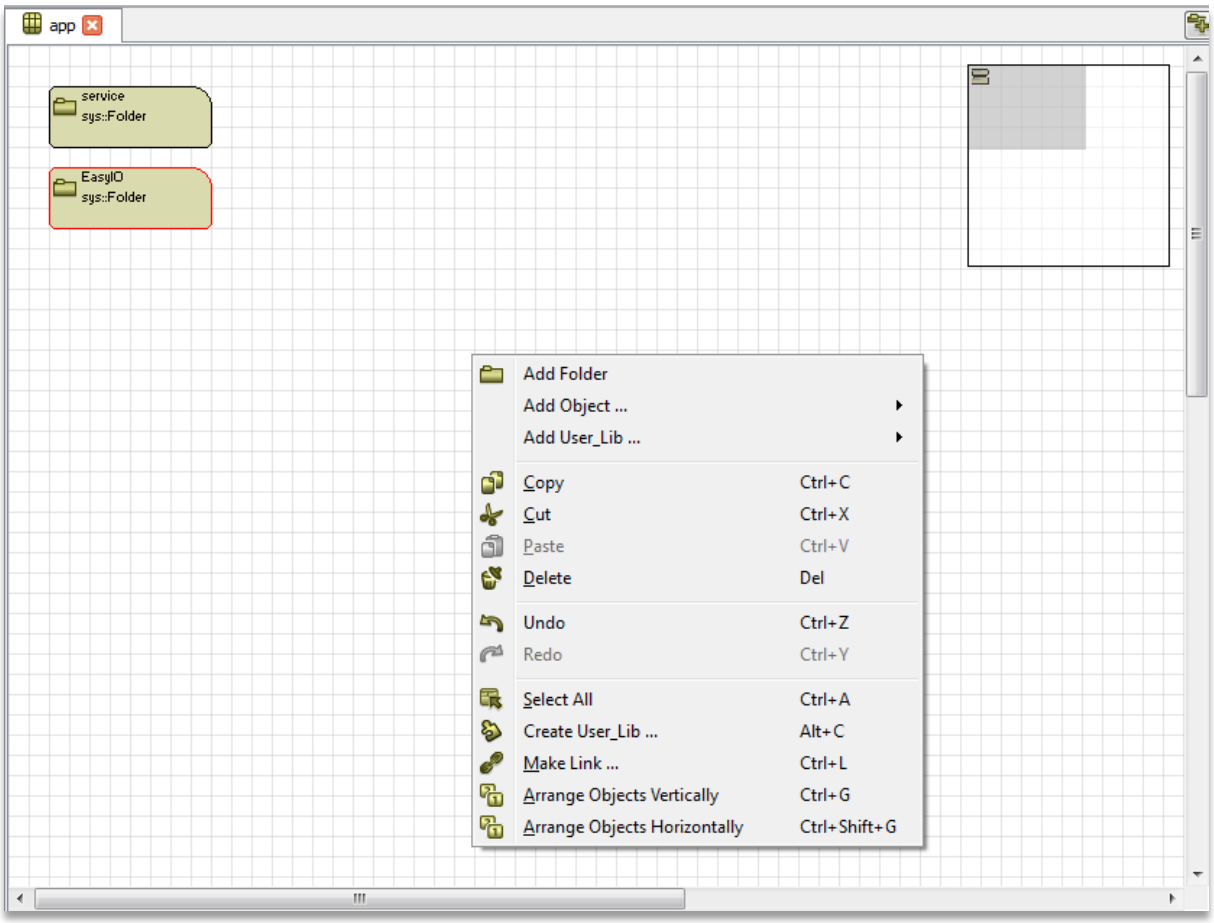
Library (3)
The ‘Library’ side bar displays the Sedona kits installed in the connected Sedona controller.
The kits are expandable and collapsible showing the content of the kit.



If a required kit is not shown in the view it indicates that the kit is not installed in the Sedona Controller. Refer to next chapter for the kit installation steps.

Workspace (4)

The 'Workspace' is the location for developing application programs.
The Workspace sheet size is not resizable.



There is a view finder in the top right corner of the Workspace sheet. The view finder enables simple object location and worksheet navigation within the workspace.

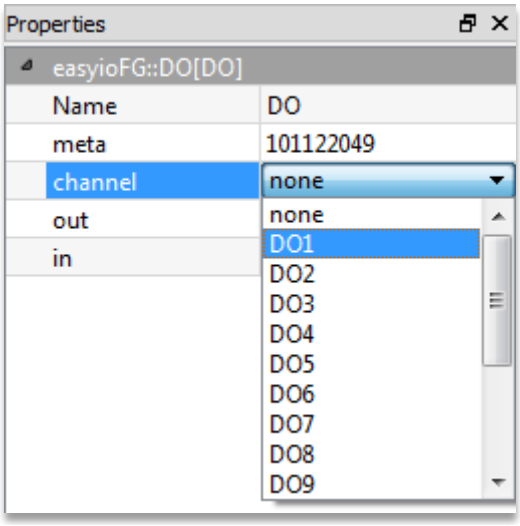
A right click on the Workspace sheet displays a dropdown menu. This menu employs shortcuts to help speed up programming tasks.

Objects can be added to the Workspace from this menu.

Properties (5)

On the right of the screen is the 'Properties' side bar.
This view shows the selected object(s) properties.
This view is capable of displaying the properties of multiple objects.

Objects properties can be edited directly from the sidebar view.
Renaming of objects and/or folders can also be completed in the Properties side bar.



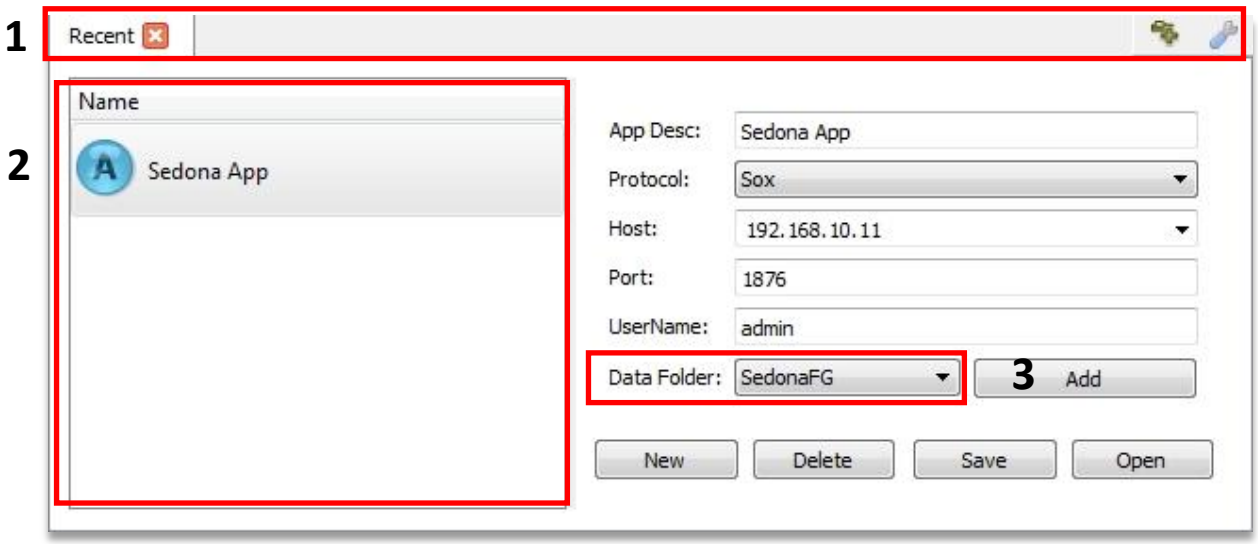
This image shows an example of selecting the "Channel" property of an FG series DO object using a dropdown menu selection from the 'Properties' sidebar.

Project management

CPT enable user to create and save projects base
User can manage multiple controllers backup in a project for future access and management.

User can also provide a controller with a preferred description.

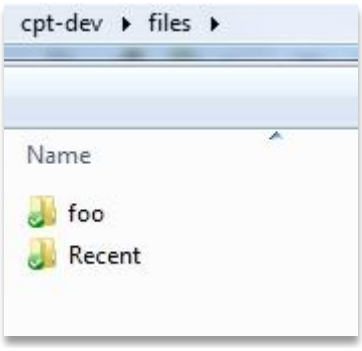
To further describe the 'CPT Tools' Project management the highlighted and numbered red frames are explained below.



Project (1)
The tabs at the top of the frame are projects created in the CPT tool.
By default CPT Tool will comes with a project named *Recent.*
Users can create multiple projects and multiple Sedona Apps in each project folder.

To create/add a project click at add icon  and give the project a name.

All files for project are stored in the folder *file*. In the example below the project is named *foo.*

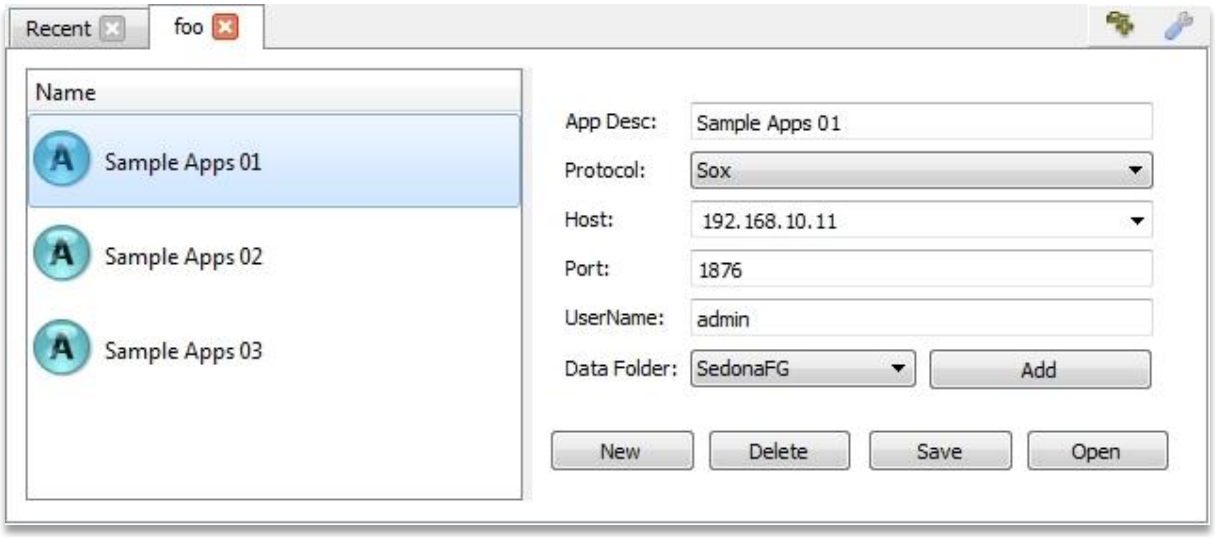


In each project folder contain all the saved project apps.

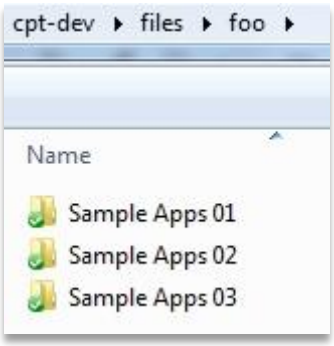
Apps (2)

This tab provides a list of the apps for respective project.

User can create and save all details pertaining for each app such as name, Sedona Data reference, IP address.



User can also rename the each controller with a preferred description for better management at the *App Desc* field. The files structure in the window is display as below.



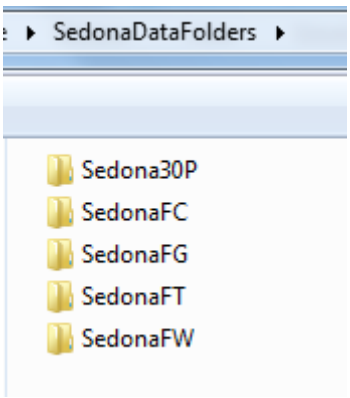
Sedona Data Folder (3)

Later CPT tools comes default with 5 Sedona folders.

Each Sedona Data folder represents each hardware model. At the moment CPT has 5 Sedona data folders each for EasyIO FG Series, EasyIO FC Series and EasyIO 30P.

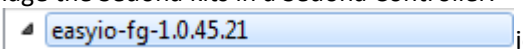
Each Sedona data folder contains kits that are supported by each model.

User error will be minimized with these dedicated Sedona Data folders.



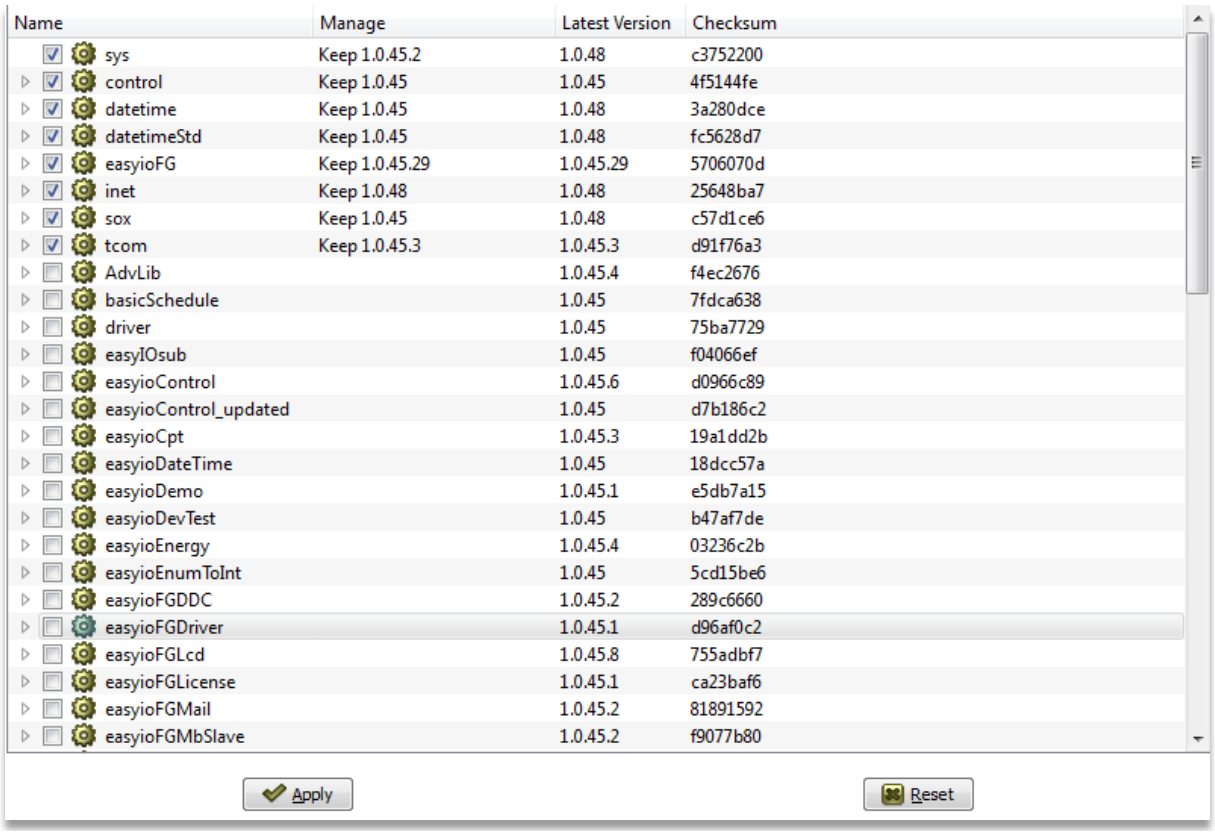
Kit Management

'Kit Management' in the CPT Tool is used to manage the Sedona kits in a Sedona Controller.

To open the Kit Manager double click the 

icon or the shortcut icon,  shown on the tool bar.

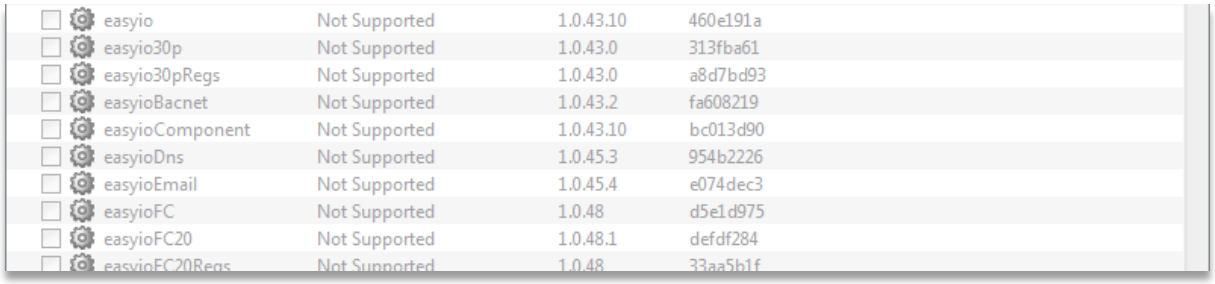
The Kit Manager will be displayed as indicated below.
The Kit Manager will display all the kits that are installed in the CPT Tool Sedona folder or inthe Sedona folder selected.



Name	Manage	Latest Version	Checksum
sys	Keep 1.0.45.2	1.0.48	c3752200
control	Keep 1.0.45	1.0.45	4f5144fe
datetime	Keep 1.0.45	1.0.48	3a280dce
datetimeStd	Keep 1.0.45	1.0.48	fc5628d7
easyioFG	Keep 1.0.45.29	1.0.45.29	5706070d
inet	Keep 1.0.48	1.0.48	25648ba7
sox	Keep 1.0.45	1.0.48	c57d1ce6
tcom	Keep 1.0.45.3	1.0.45.3	d91f76a3
AdvLib		1.0.45.4	f4ec2676
basicSchedule		1.0.45	7fdca638
driver		1.0.45	75ba7729
easyIOsub		1.0.45	f04066ef
easyioControl		1.0.45.6	d0966c89
easyioControl_updated		1.0.45	d7b186c2
easyioCpt		1.0.45.3	19a1dd2b
easyioDateTime		1.0.45	18dcc57a
easyioDemo		1.0.45.1	e5db7a15
easyioDevTest		1.0.45	b47af7de
easyioEnergy		1.0.45.4	03236c2b
easyioEnumToInt		1.0.45	5cd15be6
easyioFGDDC		1.0.45.2	289c6660
easyioFGDriver		1.0.45.1	d96af0c2
easyioFGLcd		1.0.45.8	755adbf7
easyioFGLicense		1.0.45.1	ca23baf6
easyioFGMail		1.0.45.2	81891592
easyioFGMbSlave		1.0.45.2	f9077b80

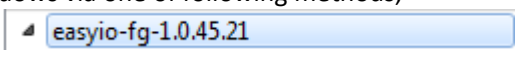
Apply Reset

There are kits that are hardware dependent, and therefore some selections may be either grayed out or indicated as "***not supported***". This is not an error. This occurs when the hardware platform does not support the application kits.



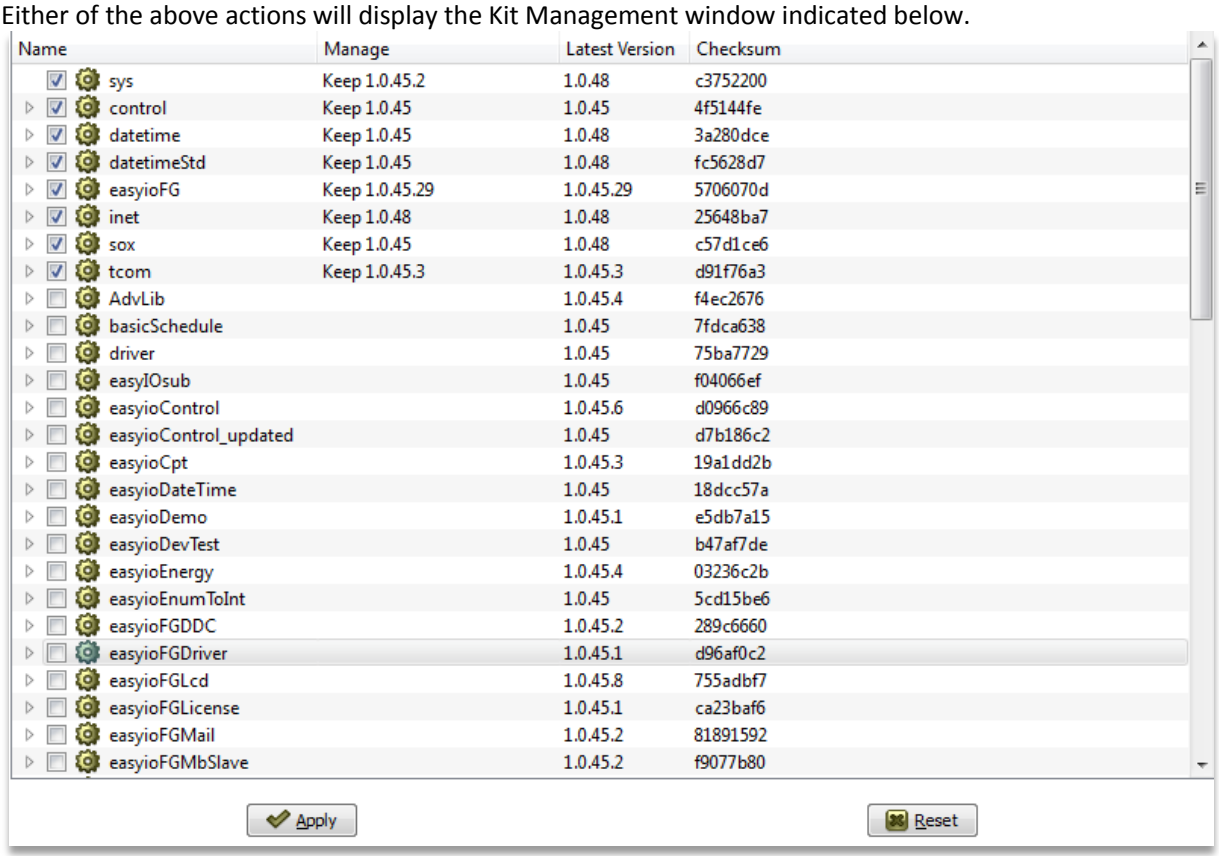
easyio	Not Supported	1.0.43.10	460e191a
easyio30p	Not Supported	1.0.43.0	313fba61
easyio30pRegs	Not Supported	1.0.43.0	a8d7bd93
easyioBacnet	Not Supported	1.0.43.2	fa608219
easyioComponent	Not Supported	1.0.43.10	bc013d90
easyioDns	Not Supported	1.0.45.3	954b2226
easyioEmail	Not Supported	1.0.45.4	e074dec3
easyioFC	Not Supported	1.0.48	d5e1d975
easyioFC20	Not Supported	1.0.48.1	defdf284
easyioFC20Regs	Not Supported	1.0.48	33aa5b1f

Following is the descriptions of the kit install/uninstall procedures.

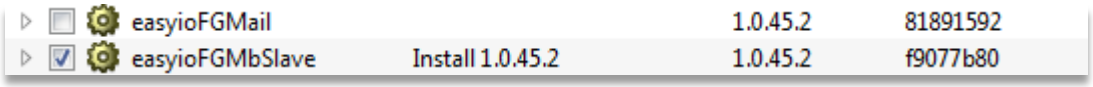
Step 1
Connect to the Sedona Controller.
Once connected access the Kit Management windows via one of following methods;
Open the Kit Manager via a double click on the 

icon or the shortcut icon,  shown on the tool bar.

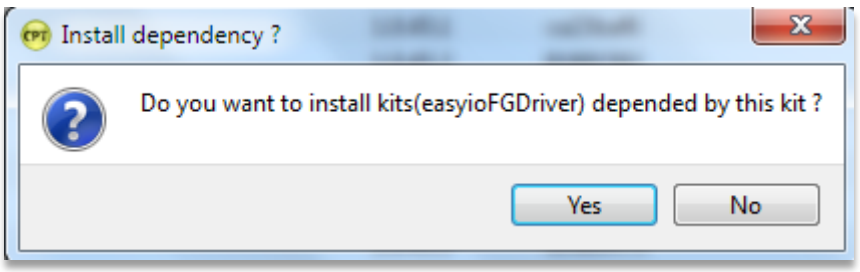
Either of the above actions will display the Kit Management window indicated below.



Step 2
To install a required kit, check the square selection box beside the kit name.
To uninstall a kit, uncheck the selection box beside the kit name.



If the kit to be installed has a dependency of other kits, and these kits are not installed,the CPT Tool will automatically prompt the user for installation of the dependent kit. Hit "***YES***" to accept it.



****Note****
DO NOT attempt to install non EasyIO kits that are not Sedona Framework version 1.0.45. Only Non Easy IO kits that are Sedona Framework 1.0.45 should be installed. Non EasyIO kits do not use the word "easyio" as a kit name prefix. Examples of non EasyIO kits are sys, sox, control, inet, dateTime and dateTimeStd. These kits do not carry the "easyio" prefix. Ensure that if such kits are installed that they are revision 1.0.45 kits ONLY.

Kits that carry a prefix with another vendors' name are owned by that particular vendor. Please refer to that vendor for any technical support issues regarding the kit.

EasyIO Sedona Products ONLY support Sedona Framework 1.0.45. This is not a system drawback; if kits other than version 1.0.45 are offered for use in the EasyIO controller please ignore them.

The Sedona kit version numbering is constructed in five (5) segments as follows;
Example: easyioFG***xxx*** 1.0.45.***yy.zz***

Segment 1	*Segment 2*	*Segment 3*	*Segment 4*	*Segment 5*
easyioFG	***xxx***	**1.0.45**	***yy***	***zz***
Represents the kit is only applicable for the EasyIO FG Series	kit name example : FGEmail	Sedona platform build	**This is the firmware version supported. This number will be incremented with each firmware release.**	**Kit revision number This number will be incremented with each kit enhancement/release.**

The following example is intended to assist in understanding the new numbering scheme.

This example is for the kit "***easyioFGBACnet 1.0.45.50.1***".

Segment 1	*Segment 2*	*Segment 3*	*Segment 4*	*Segment 5*
easyioFG	**BACnet**	**1.0.45**	**50**	**1**

Segment 1 - *"easyioFG"-* identifies that the kit is for FG Series Controller use only

Segment 2 - "*BACnet*" – identifies that the kit is the BACnet Server Kit

Segment 3 - "*1.0.45*" –identifies the Sedona platform build number

Segment 4 - *".50"* –identifies the *firmware* ***version number*** and therefore denotes the compatible controller firmware build (or version) number. In this case the *Sedona firmware version number* is "50" and therefore is only compatible with firmware build (or Firmware version number) b50 of the FG series controller firmware.

Remember that the Controller Firmware Version and the Sedona Kit Version must match. In this example the Controller Firmware Version (or Build) number must be build "50".

Segment 5 – ".1" –identifies the *kit revision number*. In this case the *revision number* is revision 1.

Please note the importance of the difference between the Sedona Kit VERSION number and the Sedona Kit REVISION number.

The Controller Firmware VERSION/BUILD number must be the same as the Sedona Kit VERSION number.

The example below shows both a compatible and incompatible example.

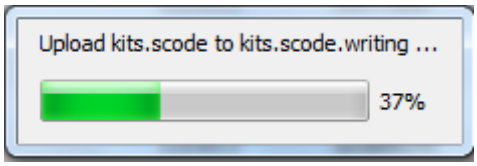
Firmware Version	Sedona Kit version	Remark
V2.0b50	1.0.45.50.1	Compatible
V2.0b33	1.0.45.49.1	Not compatible

Step 3

If you are satisfied with the kits selected for installation, click Apply 

The CPT Tool will begin to install the selected kits into the controller.

A progress bar shows the status of the kits installation.



Step 4

On completion of the kit installation, the controller will automatically reboot and disconnect.
The CPT tool will auto reconnect in 15 seconds.

Backup and Restore via Kit Management

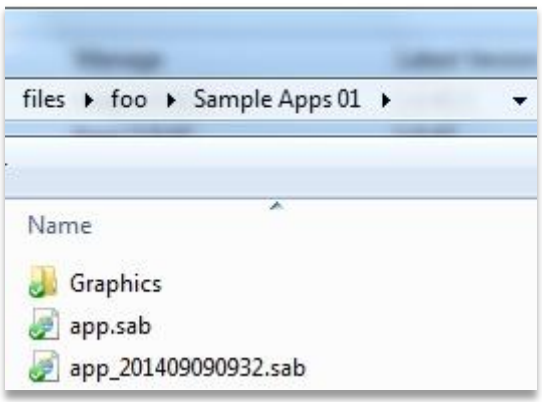
The CPT Tools platform provides a feature to backup and restore a Sedona application (app).
This backup and restore function ONLY takes the Sedona application.

These functions are available from the ***Kit Management*** *window.*
The menu button selections are at the bottom of the page and operate as follows:

Icon	Function	Remarks
Download App	Download an app from a Sedona Controller into the PC	This function only 'gets' the app.sab file. It does not get the kit.scode file.
Upload App	Uploading an app into a Sedona Controller	This function only 'puts' the app.sab file. Kits needed has to be manually installed via the Kit Manager.
Backup	Backup a Sedona app from a Sedona Controller	This function will back up both the Sedona app and kit.scode file simultaneously.
Restore	Restore a backup into a Sedona Controller	This function will restore the app and kit.scode files simultaneously. Kits will be automatically installed during the restore process.

All backup files are stored in a folder named "files" in the CPT Tool installation directory.
The files are stored with a predefined name determined by the IP address of the device.

Below is an example of the folder contents for a "Backup" of a Sedona controller in the *file* folder.



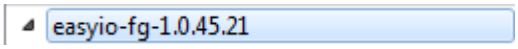
Download and Upload

To avoid confusion please note that the 'Download' action means to *retrieve* a file from a Sedona device, and the 'Upload' action means to *send* a file to a Sedona device.

To download a Sedona App *from a Sedona controller to the PC* follow the instructions below.

Step 1

Connect to a Sedona controller using the CPT Tool.

Double click double click 

or shortcut icon  on the tool bar to access the Kit Management window.

Step 2

Click 

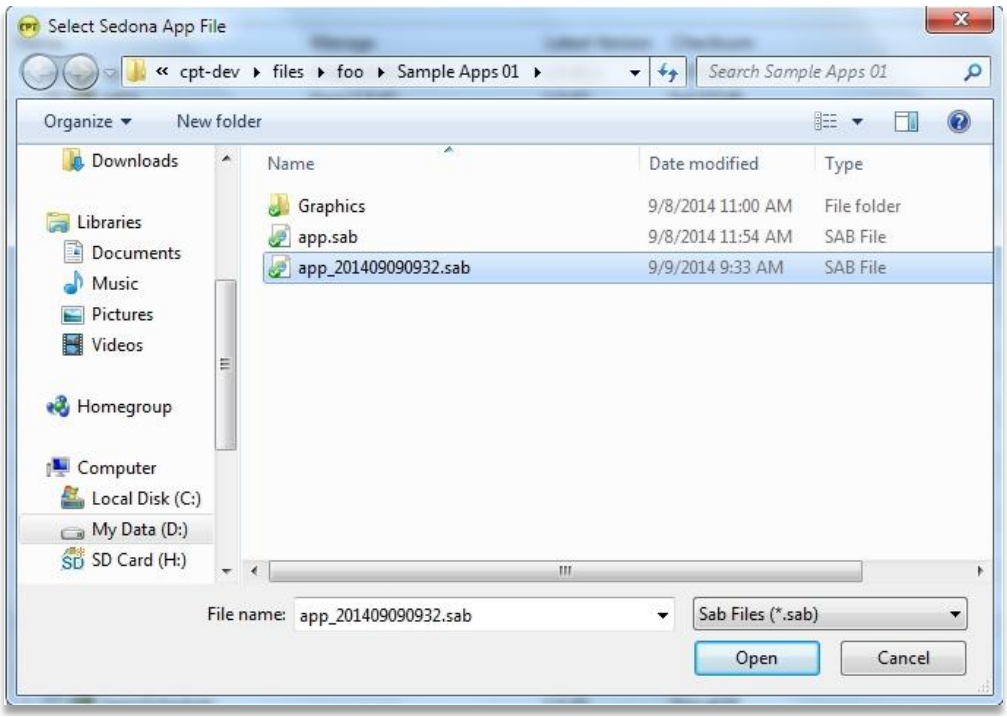
at the bottom of the window.
This function performs a 'get application' request from the controller. After clicking this button, another window (shown in Step 3 below) will be displayed.

Step 3

Give the backup application a name. By default CPT Tool will assign the App with the date and time the 'get' function was performed as the filename.

You can replace this with a name of your choice as the filename. The ".sab" extension must remain unchanged.

By default the Sedona app file will be saved in the file path/directory shown below.

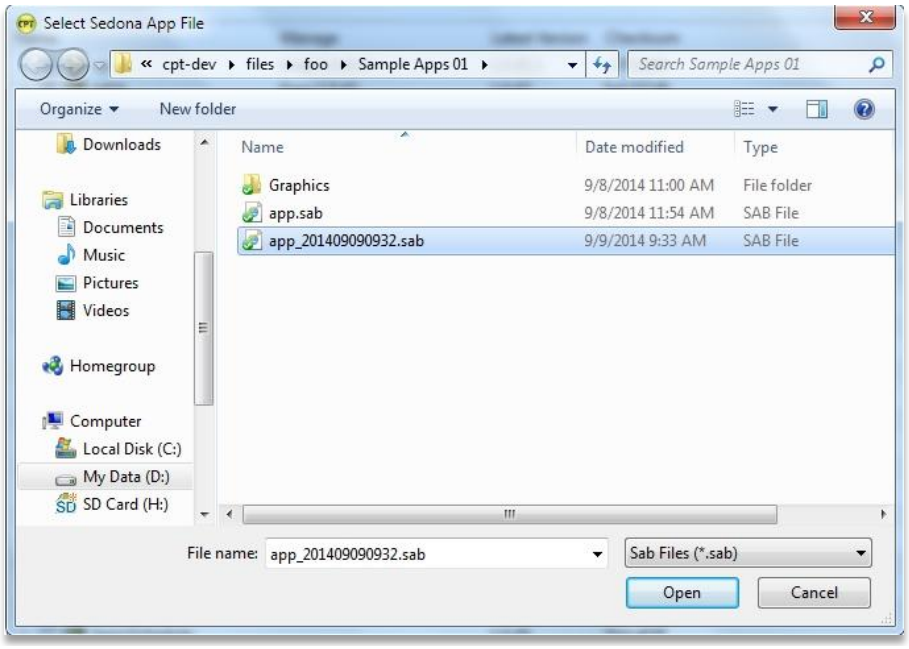


Step 4

To upload an app to a Sedona controller from the PC, click 

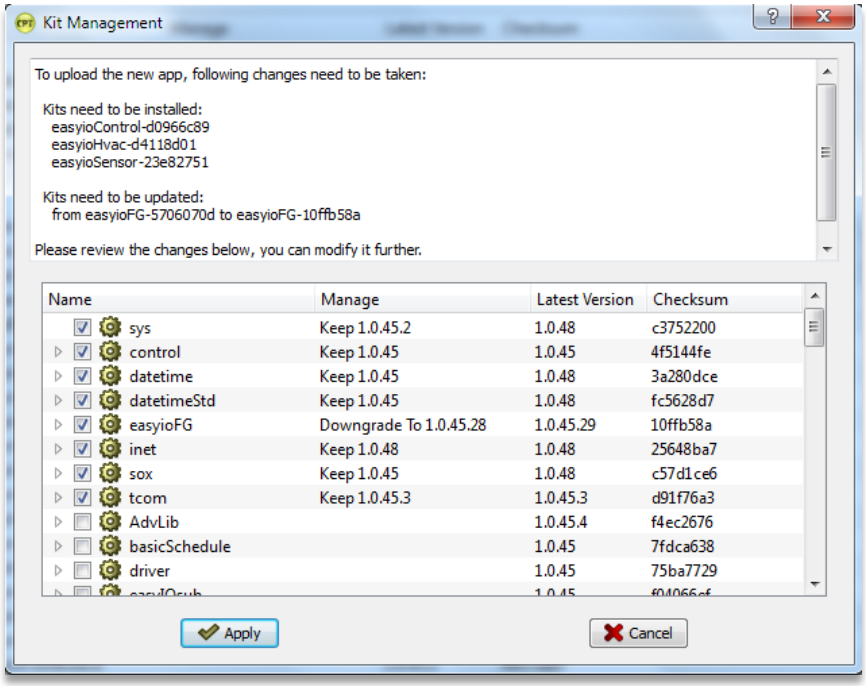
in the Kit Manager window and CPT Tool will prompt for the user for an app selection to upload.

Choose the ***xxx.sab*** file to upload to the controller (where ***xxx*** represents the filename you want to upload from the location where your files is stored) and click "***Open***".



Step 5

The CPT Tool will prompt you to install kits that are required for the app. The CPT Tool will automatically select the required kits based on the application contents. Hit ***"Apply"*** to proceed.



Step 6
The CPT Tool will begin the upload process and on completion will restart the controllers' Sedona VM (Virtual Machine), reconnection to the device will be required.

Backup and Restore

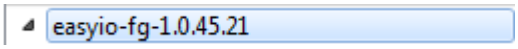
Unlike the "Upload" and "Download" functions the "Backup" and "Restore" functions provide for storage and restoration of both the ***app.sab*** and the ***kit.scode*** files to/from a Sedona Controller. This provides a full controller back up.

The "Upload" and "Download" functions provide storage and restoration files of the ***app.sab*** files only. The kits files will need to be reinstalled manually as required by the App.

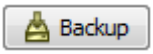
During the "Restore" process, the user will *not* be prompted for kits management by the CPT Tool. Kit Management is provided automatically along with the app Restore.

To Backup and Restore a Sedona app from a Sedona controller follow the instructions below.

Step 1
Connect to the Sedona controller via CPT Tool.

Double click the icon 

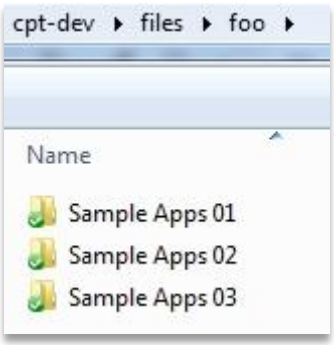
or use the shortcut icon  on the tool bar.

Step 2
Click 

at the bottom of the window.
This function performs a 'backup' request from the controller for both the ***app.sab*** and the ***kit.scode***. After clicking this button, another window (shown in Step 3 below) will be displayed.

Step 3
The backup will reside in a folder named with the folder which you named earlier.

By default the Sedona backup file will be saved in the file path/directory shown below where *foo* is the project folder name and *Sample Apps 01* is the apps name which you had given in earlier steps.

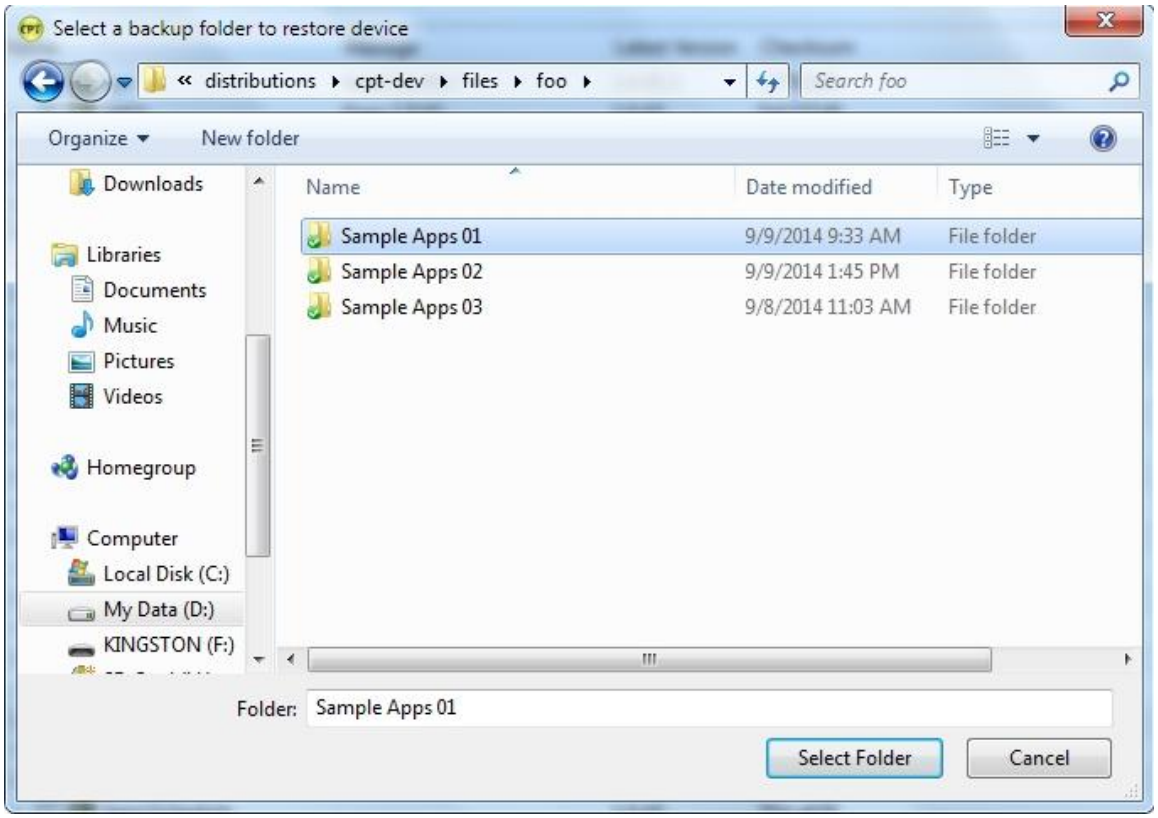


Step 4

To "Restore" a backup to a Sedona controller from the PC, click 

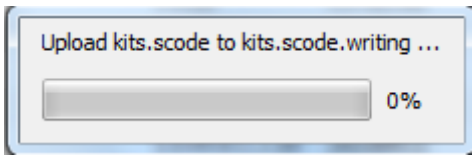
in the Kit Manager window and CPT Tool will prompt for the user for the backup selection to restore.

Choose the folder file to restore to the controller and click "***Select Folder***".



Step 5

The CPT Tool will start to install the apps and kits. The progress of the restoring process will be shown as below image.



Step 6

On completion of the kit installation, the controller will automatically reboot and disconnect.
The CPT tool will auto reconnect in 5 seconds.

If the app is password protected, you will need to manually key in the password and reconnect to the controller again.

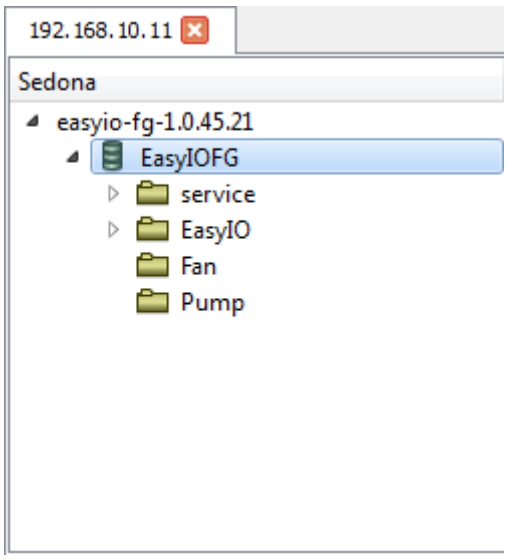
Constructing Sedona Control Programs

To build your Sedona programming application in the Sedona Controller, you will begin in the application tree.

Step 1
By default the application tree is populated with 2 default folders; a '***Service***' folder and an '**EasyIO**' folder. You can add multiple folders to the app tree to assist in organizing your programs and applications.

Tip! Good "housekeeping" for your Apps will make life easier when debugging, fault finding and servicing your Apps. We DO recommend dropping all service objects in to the "service" folder.
All other control logic should be dropped in the "***EasyIO***" folder or any other newly created folder(s) that identify the application or process involved.

The example below shows the app tree in the CPT Tool view. There are 2 additional folders created, namely "***Fan***" and "***Pump***" in which the associated application logic would be created.



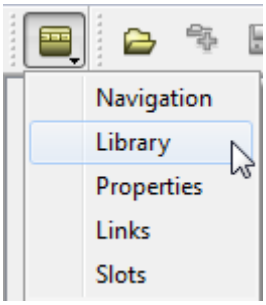
Step 2
In the following example, we are going to build a simple piece of logic that compares 2 Numerical Values. If one Numerical value is greater than the other Numerical value, it will provide a Boolean 'True' output.

Open the ***easyIO*** Folder by double clicking on the folder icon in the Navigation side bar. The Workspace for "***easyio***" will be displayed. The Workspace is where control objects from the kits are placed and connected to produce your App. In Step 3 we will drop some objects into the Workspace ready for connection.

Step 3

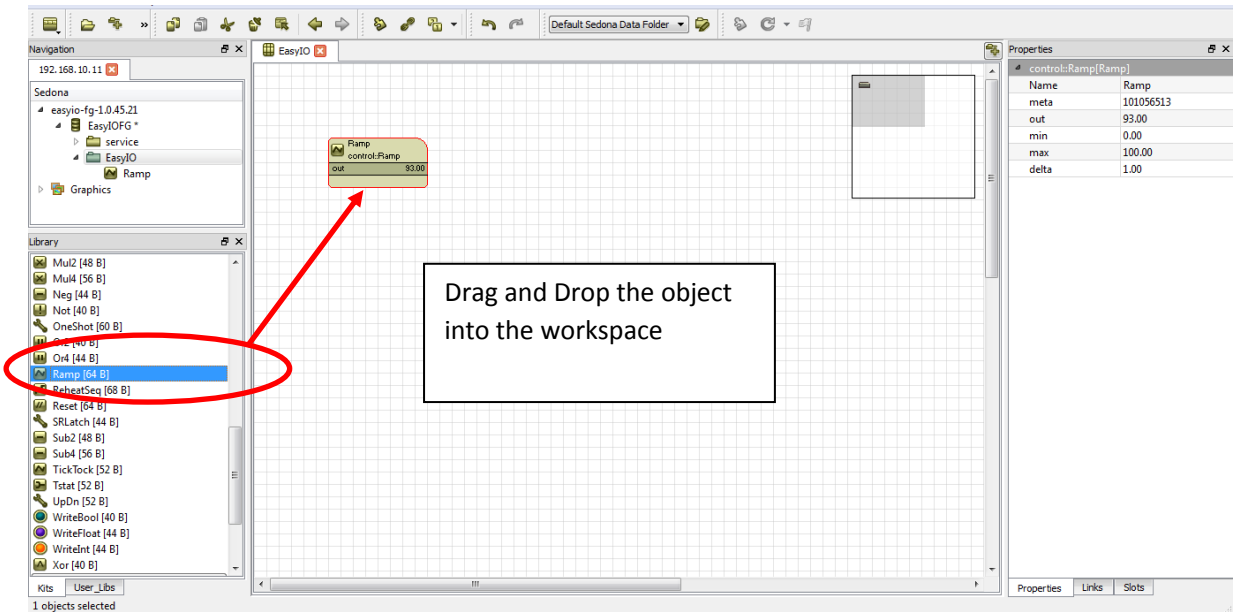
Here we will select a "***Ramp***" object and Drag and Drop it into the Workspace. The Ramp object will immediately start to ramp up and ramp down at the default rate when dropped on the page. To find the ***"Ramp"***object:-

At the Library side bar, expand the Control Library. If the Library Side bar is not seen, open it using the shortcut button at the tool bar.



Locate the Ramp object select it with a single click and holding down the mouse button, 'Drag' the Ramp object into the workspace. When it is placed in the desired location release the mouse button and 'Drop' the object in place.

The properties side bar will automatically show the Ramp object properties.

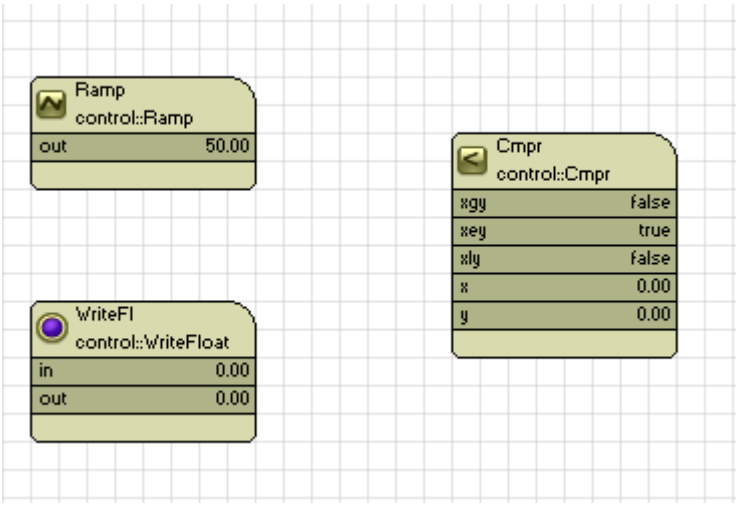


Step 4

In the same control library, locate the object named "***Cmpr***" object. Select the object via a single held mouse click then Drag and Drop it in to the workspace with the Ramp object.
Additionally from the Library locate and select the "***WriteFloat***" object dragging and dropping it into the Workspace with the other objects.

Step 5

The Workspace should now contain 3 objects as shown in the example below.

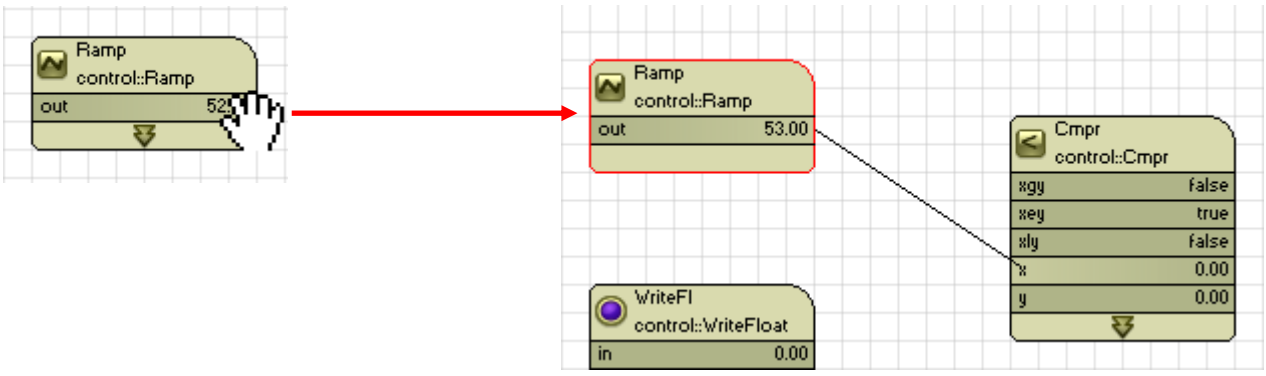


Step 6
To create link/links between objects in the same workspace, simply move the mouse pointer over the value slot you require.

A thumbnail will show, Click and hold on it the required point.

Drag the link (almost like a connection wire or line) from the source or output to the destination slot, connection point or input you require, then release the mouse button when the required input is reached (line connects the two points). The link will automatically be made.

In this example we will drag the ***Ramp*** 'output' slot from the *output side* of the control object to the 'x' input, on the *input side* of the ***Cmpr*** object. Starting from the ***Ramp*** object, click and hold on the output side of the object selecting the ***Ramp*** output slot. Next drag the connection to the ***Cmpr*** object, locate the slot marked 'x' and drag the connection over this slot.

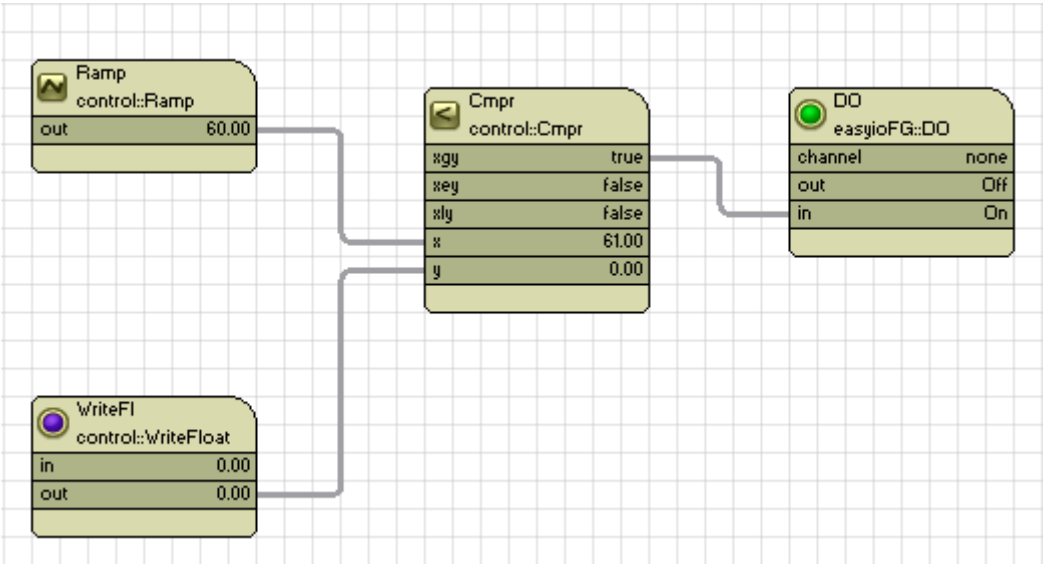


Once you are at the ***Cmpr*** destination slot 'x', release the mouse and the link will be made.
Connect the ***WriteFl*** object to the ***CMPR***'y' input in the same manner.

Step 7
Next, locate and expand the ***easyioFG*** in the Library sidebar.

Locate, Drag and Drop a ***DO*** object from the ***easyioFG*** Library into the Workspace.

Using the method described in Step 6, link the *output* "***Xgy"*** slot of ***"Cmpr"*** object to the "***DO"*** input via creating a link at the "***Xgy"*** output slot and dragging the connection wire to ***"in"*** slot on the input side of the ***"DO"*** object as shown below. The completed logic example should look like this;



Step 8
Click on the ***DO*** object to display the properties at the properties side bar. From the properties selections choose the DO 'channel' required. The channel identifier relates to the physical digital output on the controller.

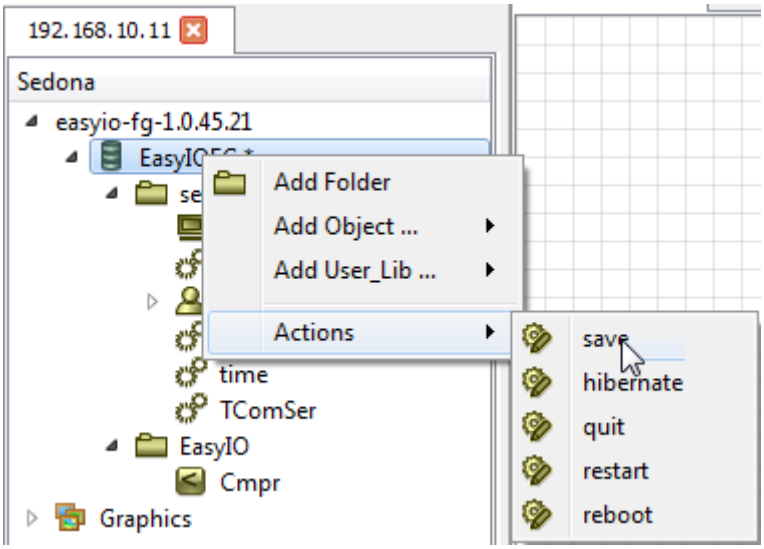
In this example, DO1 as the channel required.

Step 9
You should now notice that DO1 will start to toggle states (change from off state to on state) when the logic condition is fulfilled (x is greater than zero).

Step 10
At this point in the programming process, your Sedona app programmed in the controller is not *saved* to the flash memory. It is resident in the controller and running in the controller RAM.

To write the program to flash memory, a forced save or manual save of the application is required. If a program save is not completed, any power cycle of the controller will lose all the programmed applications as presently they have not been written to Flash memory only RAM.

In order to save the Sedona App, right click the App object and select ***'Actions'*** and choose ***'save'***.



Step 11

The ***Actions*** menu displays some other options. See the table below for a description of these selections and the result of selecting these actions.

Tip! *Please note that if the controller is power cycled or rebooted before a save is applied all work programmed after the last controller save (if any) will be lost. A regular* ***Action, save*** *selection during the programming process is advised to prevent inadvertent loss of work.*

Action Functions	Description
Save	It saves the Sedona application into the flash memory.
Hibernate	EasyIO Sedona Controllers does not support this function
Quit	To disconnect from the Sedona Controller
Restart	It will restart the Sedona VM.
Reboot	It will reboot the hardware operating System.

Constructing Graphics pages for Web Browser

Please note that this section does not apply to EasyIO 30P and FW Series controllers.
The section of the guide is based on CPT 0.8, built 2014-12-19 or later.

CPT Tool comes with a built in feature for building/creating graphics pages.

Specific to the EasyIO FG+ and FS Series is the ability for graphics pages to be built into the controller. In order to have graphics pages on board the controller, the EASYIO FG+ series controller requires a micro SD card to be installed in the micro SD card slot to carry the graphics.
For FS Series, micro SD Card is not required as it has built in 8GB of storage memory.

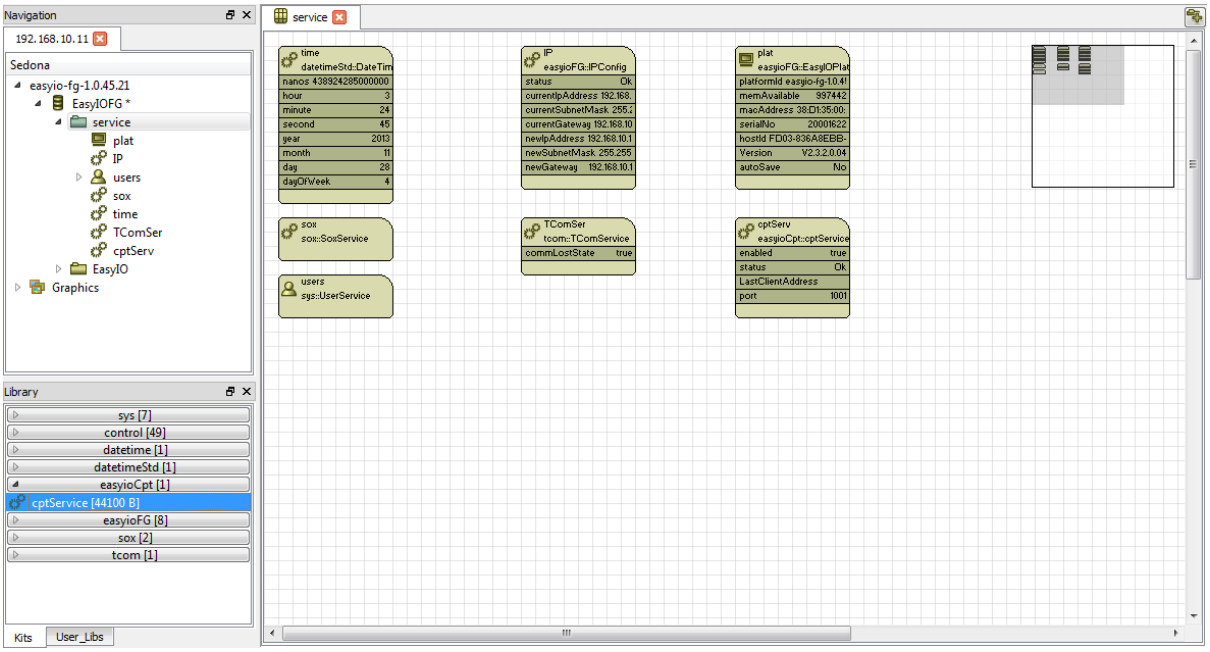
Specifications	Remark
Brand tested	Transend, Kingston
Card Family	High-Capacity (SDHC) eXtended-Capacity (SDXC) is NOT supported at the moment.
Capacity tested	2GB, 4GB, 8GB, 16GB
Class	Class 4 Class 10

Step 1
Referring to the previous topic in "Constructing a Sedona Control Program", we will be using the simple program created in the example to build a simple Graphic Page.

A Graphics page in CPT Tools is called a "***Gr page***".

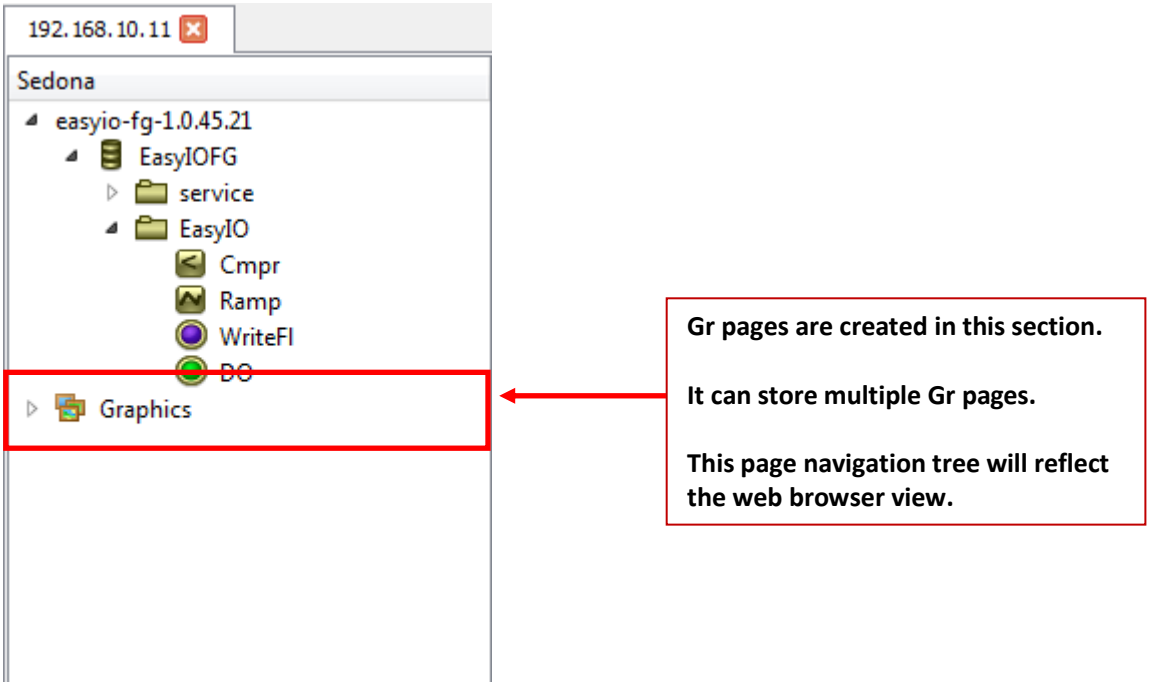
Step 2
The Sedona app requires the ***"easyioCpt"*** kit for the graphics pages. Using the Kit Manager you will need to install the ***"easyioCpt"*** kit before proceeding.

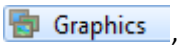
Once the kit is installed and the controller rebooted, locate drag and drop the ***cptService*** object into the service folder. The service folder should now look like this.



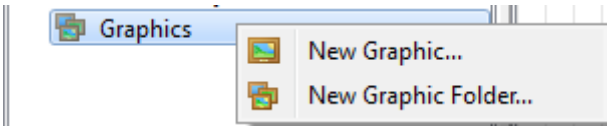
Step 3
Once the cptService is installed a further Menu selection called ***'Graphics'*** should appear in the Nav tree.

Graphics construction in CPT Tools, using the ***Gr page***, is carried out under the ***'Graphics'*** directory icon as shown below.



Step 4
Right clicking on the graphics icon, 

, in the navigation tree will display a set of options as shown below.



Step 5
Choose ***New Graphic*** and assign a name for the ***Gr page*** in the pop up window.
In this example we use the name "***Home***" for the ***Gr page***.

The user can create multiple ***Gr page***s by simply repeating step 4 to create multiple ***Gr pages*** as required.
Each page name must be unique.

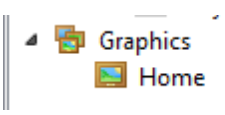


Image shows single Gr page created.

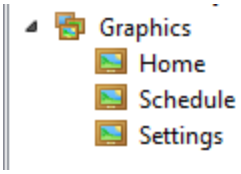
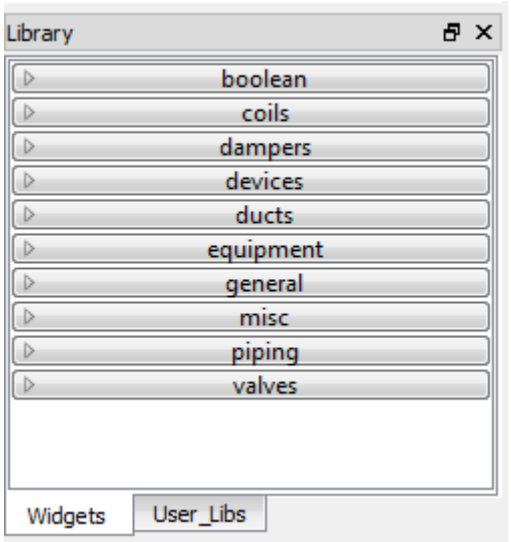


Image shows multiple Gr pages created

Step 6

To construct the graphics, double click any of the Gr page created under the ***Graphics*** directory. In this example, the ***"Home"*** is used.

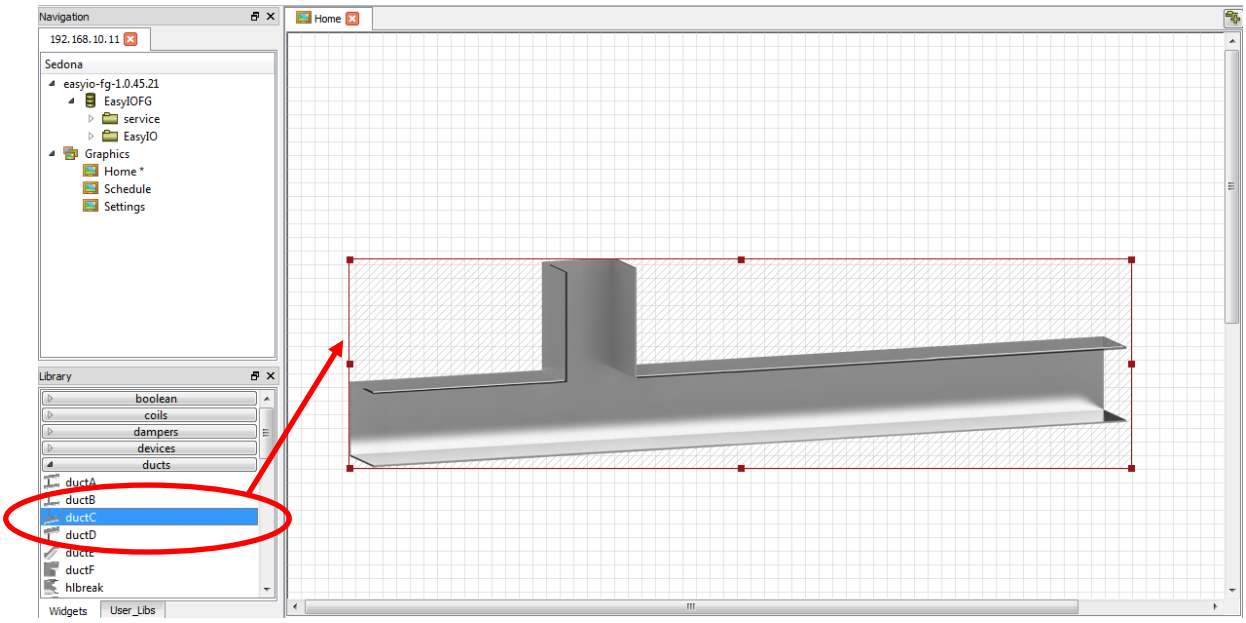
On selection of the ***"Home"Gr page*** the ***Gr page*** Workspace will be display and the Library in the sidebar view will automatically change to ***Gr Library.***



The ***Gr page*** library contains a number of default image libraries and graphics widgets.
There is an icon displayed next to each image/object which serves as a preview to the display item.

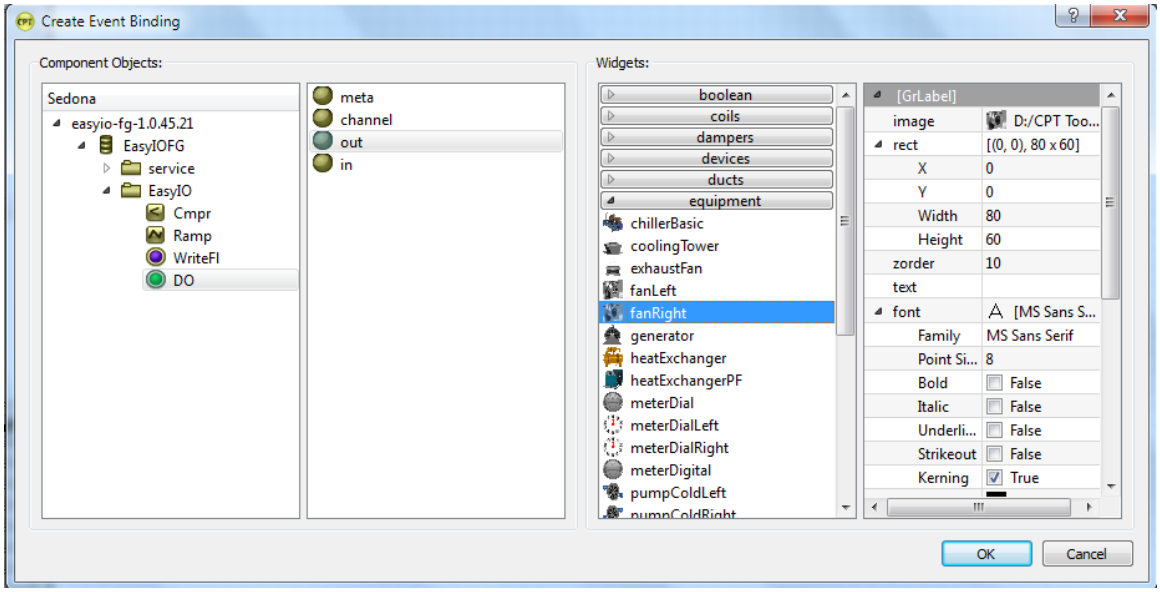
Step 7

The following steps are an example of how to construct a ***Gr page*** for a simple Air Handling Unit.
Firstly locate and expand the "***ducts***" menu in the Graphics Library, then drag and drop the duct image in to the Gr Workspace. In this example, ***"duct C"*** is used.



Images and objects *that do not require value bindings* such as but not limited to ducts, arrows and text labels are dragged and dropped directly from the Gr library.

Step 8
In order to create an animated image or object, a point or object from the Sedona App must be dragged and dropped into the Gr workspace to provide the point context or Event Binding.
In the example below, the DO object (created in the earlier example) is used to create the Event Binding. Once the point or object is dragged and dropped into the Gr Workspace a new window will display, prompting the user to choose the object slot to be selected and also to select a related widget to bind to the DO object slot from the ***Gr Library.***
The example selection is shown in the image below.



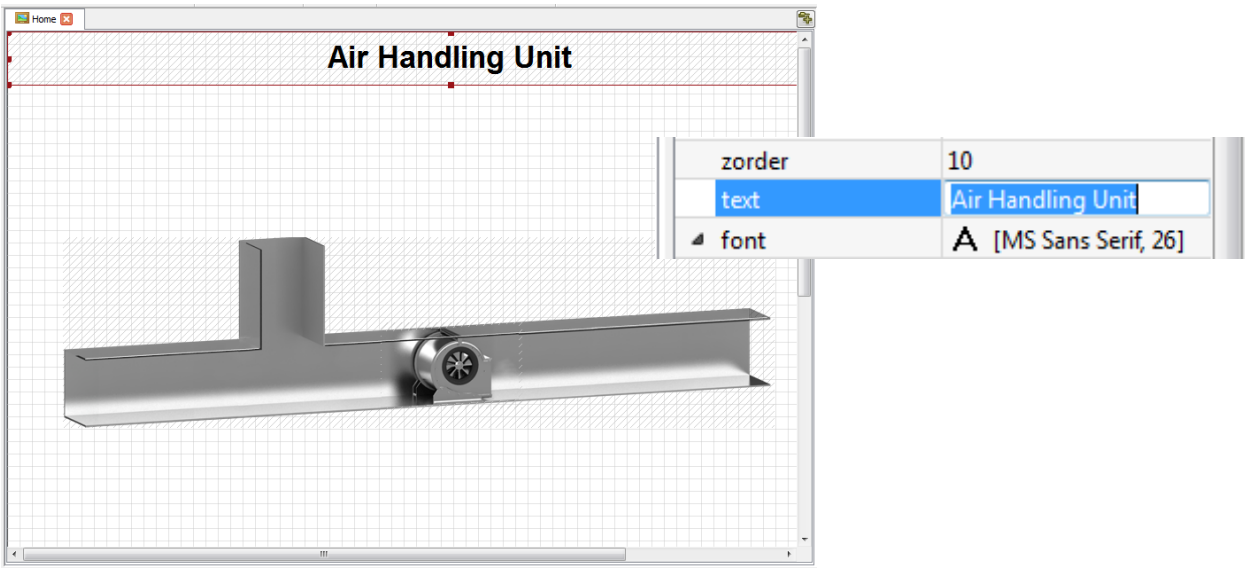
Step 9
Click OK after selecting the slots required.

The Gr Workspace will now be complete with the Fan image selected. The Fan image will be animated or stopped according to the value/status of the DO object 'out' property.

Select and Drag the Fan object to align it correctly within the duct object on the ***Gr page***.

Step 10
For text display either animated (displaying an App point status) or just plain static text, such as a label or descriptor, use the ***Label*** object located under the ***general*** tab in the Gr Library.

The placement of the object on the page is the same "Drag and Drop" technique used in previous steps. To insert static text into the object for display as a label or descriptor on the graphic, select the text ***Label*** object required in the right Sidebar and enter the text string desired in the ***text*** property. In the example used here the ***Label*** object is used as a static text descriptor and the description string "Air Handling Unit" is used in the ***text*** property.

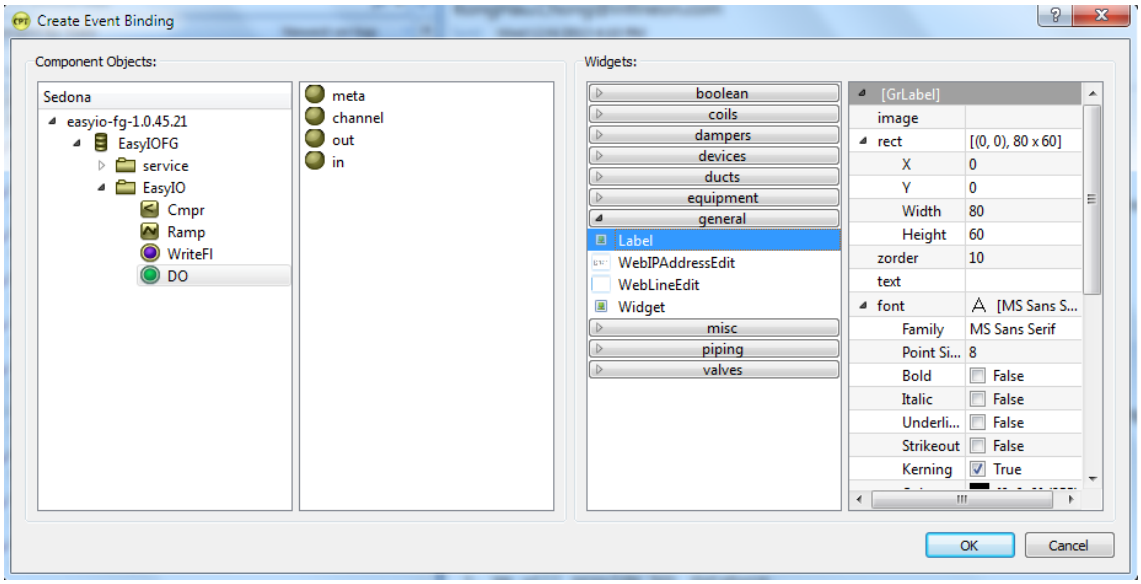


Step 11

For animated text display (displaying an App point status) such as a label or descriptor, use the ***Label*** object located under the ***general*** tab in the Gr Library.

The placement of the object on the page is the same "Drag and Drop" technique used in previous steps (Step 8).

This time instead of selecting a image widget, choose the text Label widget.



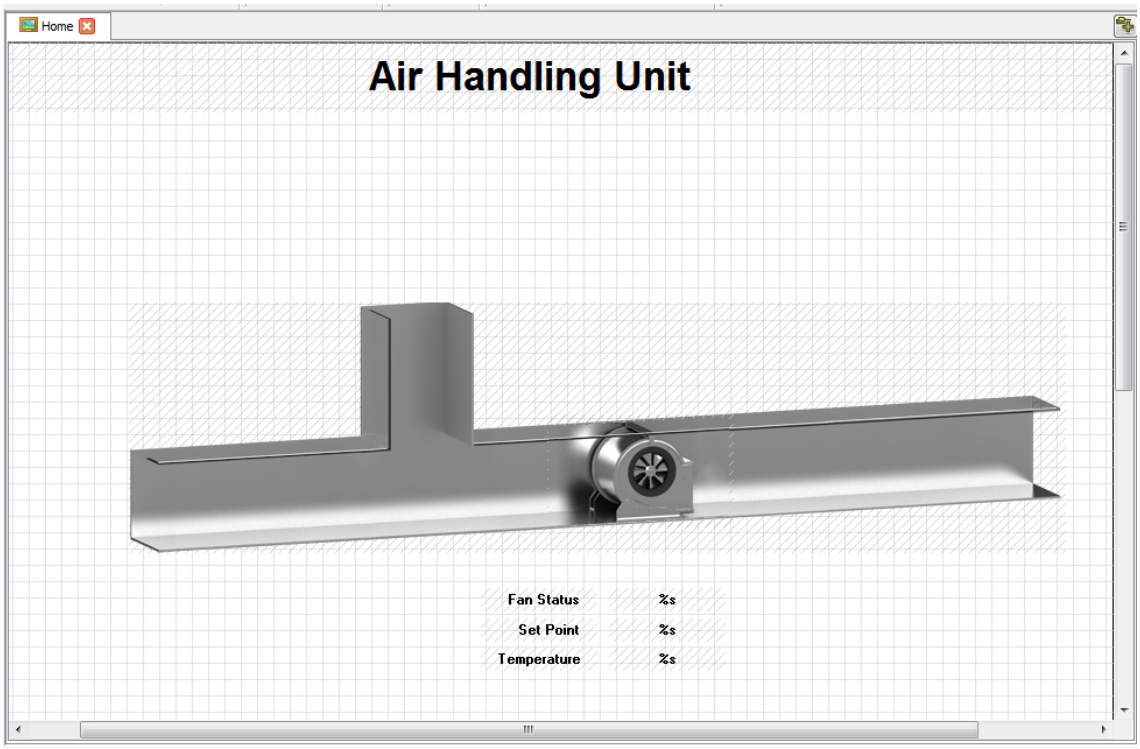


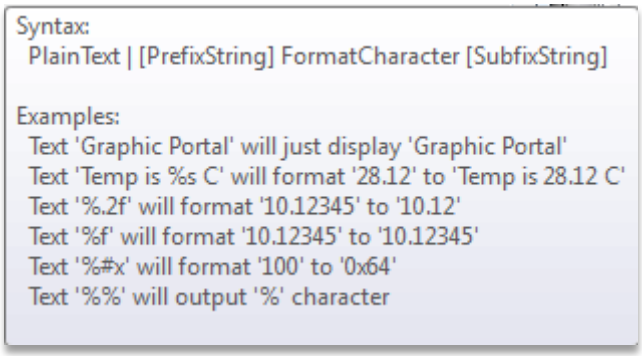
Image above shows the completed Gr page.

Step 12

Within the Label object all text value formatting can be edited. To edit these properties, select the text Label at the properties bar and click on the 'text'  property.

A new window will display.

The text formatting examples are as below.



Step 13

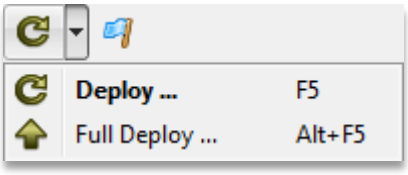
When the user is satisfied with the construction of the Gr pages, the Gr pages need to be uploaded to the EasyIO FG controller. To complete this process use the following procedure.

Make sure there is a micro SD card inserted into the micro SD card slot on the target Controller

When the controller is being written with GR pages for the first time it will require the "***Full Deploy***" command (write) on the initial graphics load to the device.

Subsequent changes to graphics on the controller will only require a normal "***Deploy***" command.

At the toolbar, locate the Deploy icon  . The icon will be enabled when a Gr page is active in the Workspace view.

Choose the ***"Full Deploy"*** 

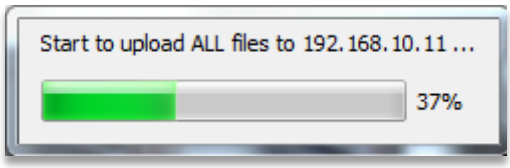
option.

A login credential is required to perform a deploy.

Username: **webuser**
Password: ***123456***

Log-in credentials are required to perform a "deploy" of any type.

Hit OK and the CPT Tool will start to deploy Gr pages and all necessary files into the SD card. During the deploying process, a status bar showing the deploying process in percentage can be seen.

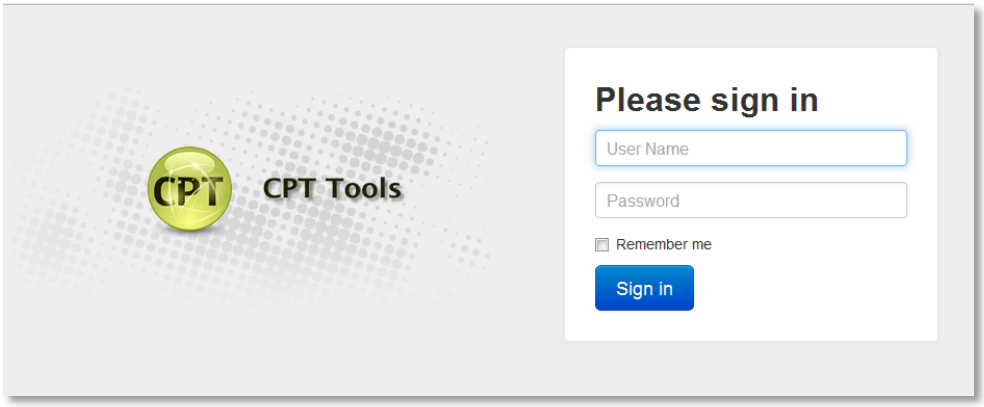


Step 14
To preview the Gr pages on the controller, launch a HTML5 compatible web browser and enter the URL as per below;

URL : http://192.168.10.11/sdcard/cpt-web/app/signin.php

OR access the controller graphics by clicking the preview icon  on the CPT Tools tool bar.
The default login for the web server is as per below.

Username: ***admin***
Password: ***hellocpt***



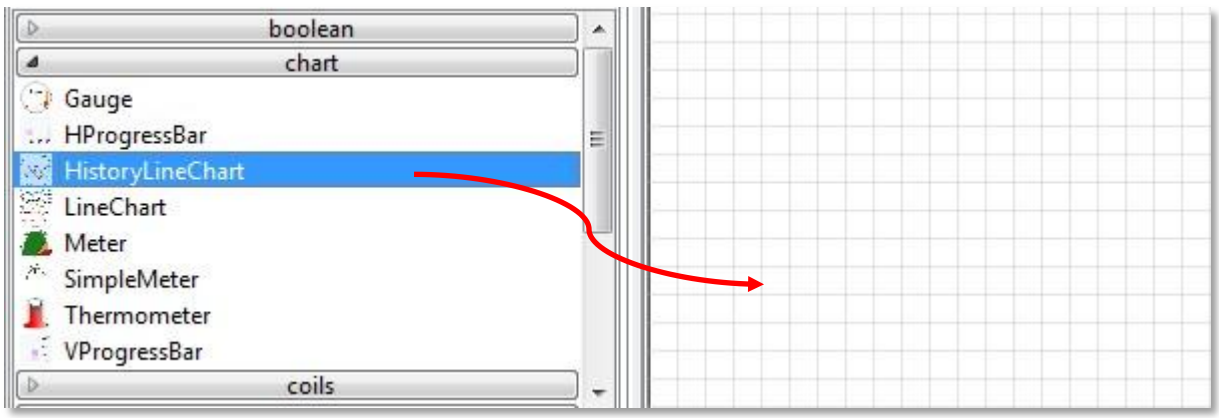
Constructing History Chart with SQL Database

SQL Lite table data can be display in CPT web graphics. This feature only available with CPT graphics.

Each history chart can display up to 4 data in a time.
Each data must retrieve from the same table.

Step 1
Make sure all the SQL tables and columns are configure properly according FG Series SQL Lite user guide.

Step 2
In the CPT graphic page drag and drop a ***historyLineChart*** widget.



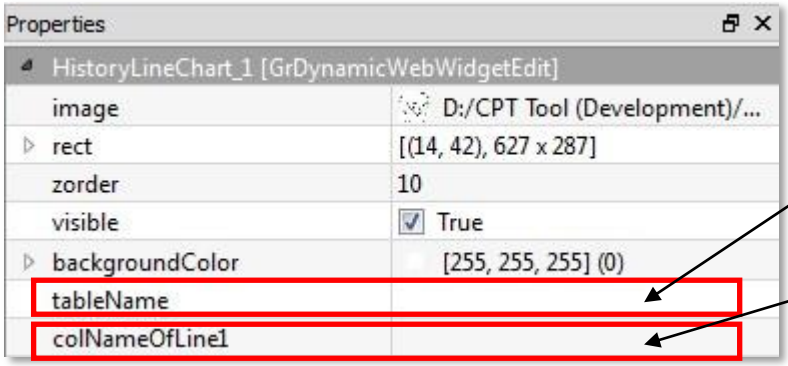
Step 3

Click the history line chart widget to display the properties.

Put in the table name and column name.

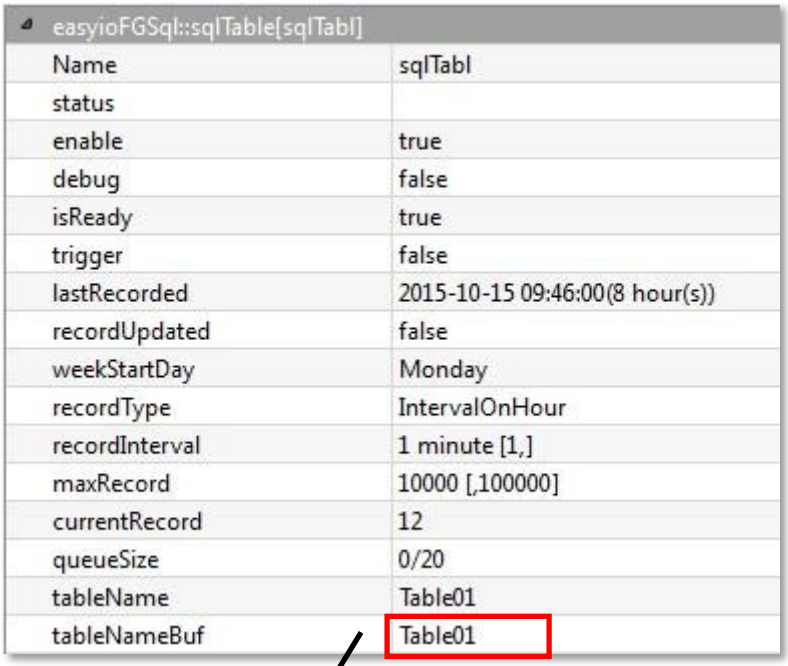
****Note that the table name property is the SQL table name and NOT the table object name. ****

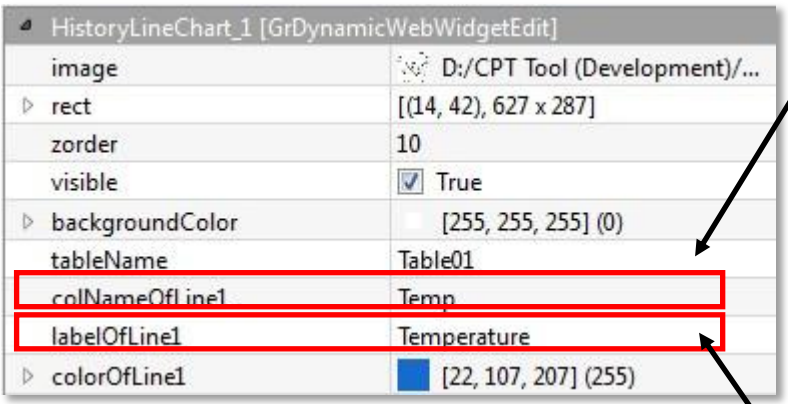
****Note that the colNameOfLine1 property is the SQL column name and NOT the column object name. ****



Insert the table name in this property.

Insert the column name in this property.



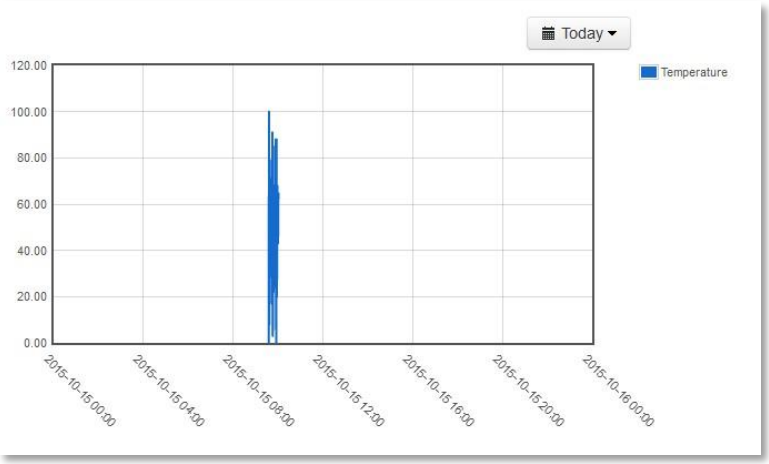


The property ***labelOfLine1*** is the display label name in the history chart when view in HTML5 compatible web browser.

easyioFGSql::sqlFloat[sqlFloa]	
Name	sqlFloa
status	
columnReady	true
columnName	Temp
lastRecordedValue	3.00
in	0.0000
covDif	1.00
trendDelta	normal

Step 4
Remember to perform a full deploy or deploy for every changes made.

Step 5
To view the History Chart login to the controller web.

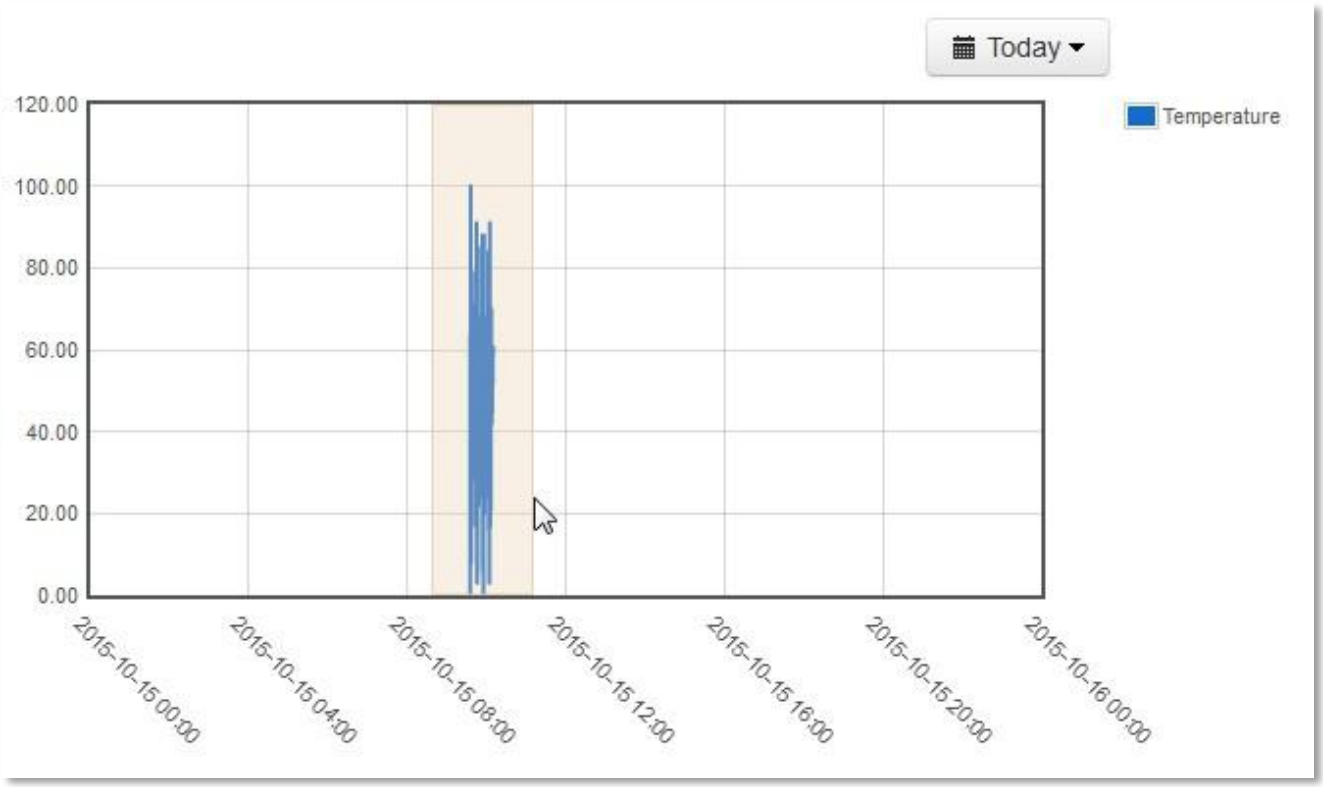


X-axis scale is automatically scaled according data min and max value.

Y-axis scale is automatically scaled according to the date time filter option. Several time range options are provided for filtering purpose.

Step 6

The chart can be zoom in by click and drag the require time range.

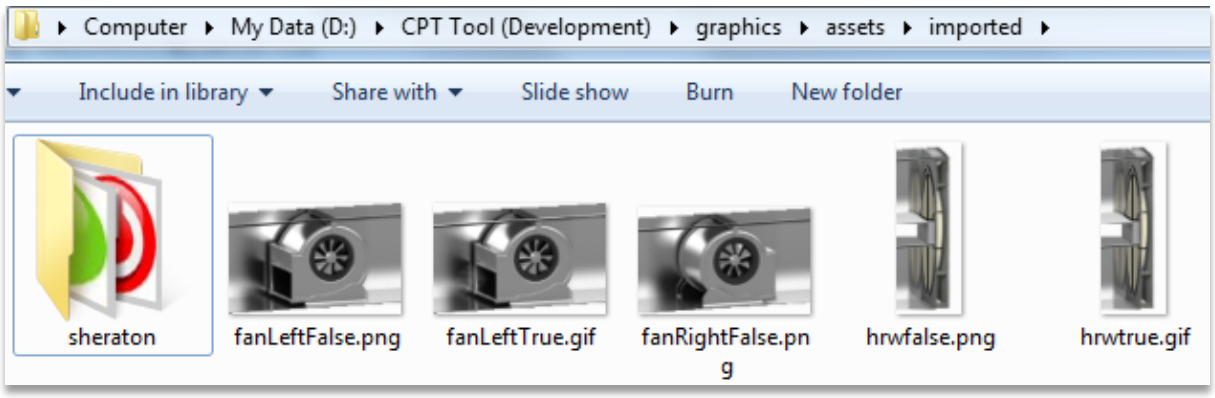


Importing 3rd party images into CPT

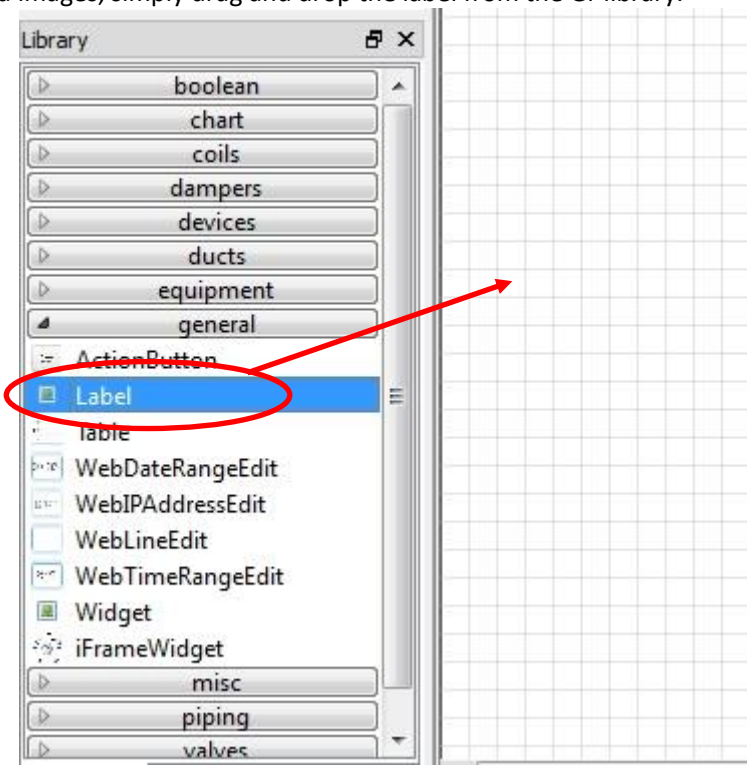
The section of the guide is based on CPT 0.7, built 2014-01-03 or later.

CPT allows user to use 3rd party static images and animation gif files.
Images have to be stored in the dedicated folder of CPT.
The mention dedicated folder is as display as below.

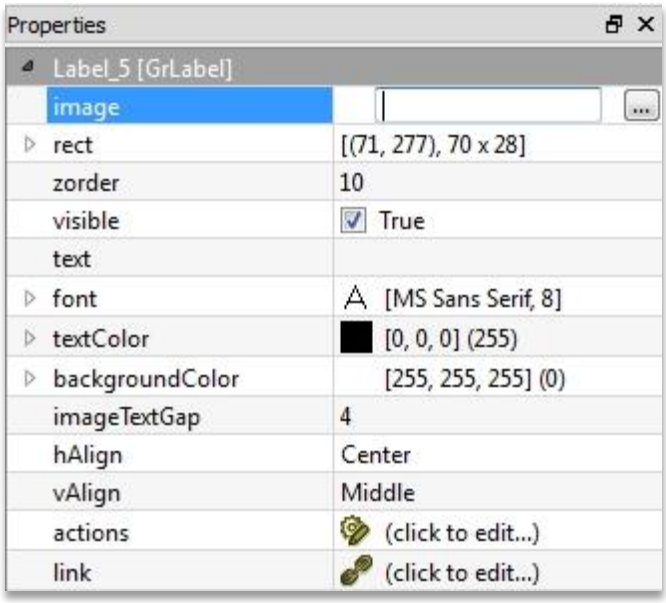
Hard Drive:/CPT Tool/graphics/assets/imported



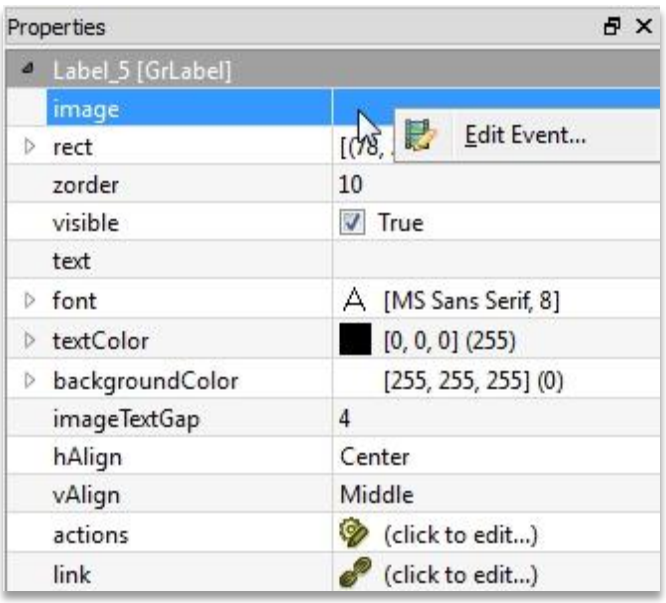
Sub folders are allowed in the directory above.
To use the imported images, simply drag and drop the label from the Gr library.



At the label property sidebar, choose either static image or animated image.

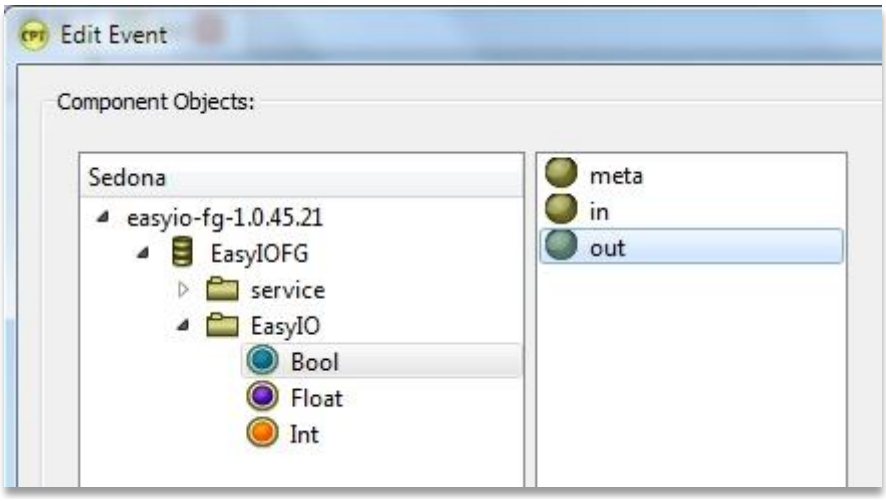


Option 1: Static image option
(Left click at the image property)



Option 2: Animated images option
(Right click at the image property)

If animated option is used, select the appropriate Boolean or Numeric or Integer slot at the popup menu. In the below example, a Boolean slot is selected.



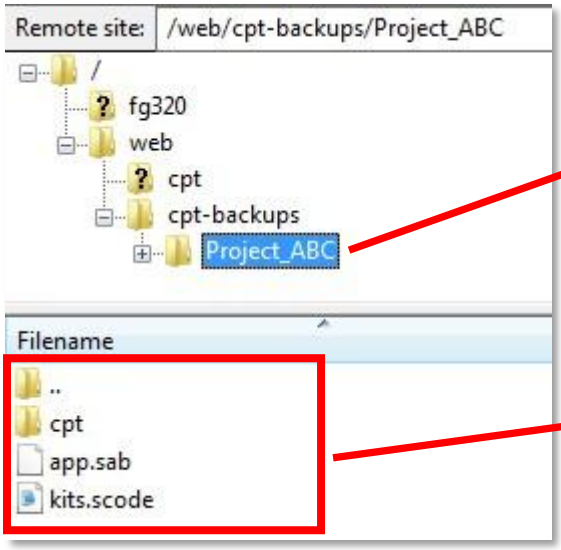
On the right of the popup menu, define the event as ***pass-through*** and define the rules and image or animated gif for each rules.

Lastly click OK to complete the settings. A full deploy is needed when using own images or animated gif or else the images are not transferred into the micro SD card.

Backup and Restore via Web

The CPT Tools web server has another option for “backups and restores” of the Application.
This option back up the Sedona application as well as Graphics from the SD card. Follow the process outlined below to complete this backup and restore process.

A folder will be created in the SD card under the cpt-backups directory. Image below shows the directory structure in the SD card view with *Filezilla* FTP program.



This is the project backup folder.

The backup is name Project_ABC

Each backup create and stored in SD card contain these files.

It contain all the CPT graphics and Sedona apps.

Backup

Step 1
Using a HTML5 compatible web browser Login to the Sedona Controller via either one of the two links described below.

URL :http://**<IP Address>**

Step 2
You will need to login as the admin user.
The default Admin username and password are noted below.

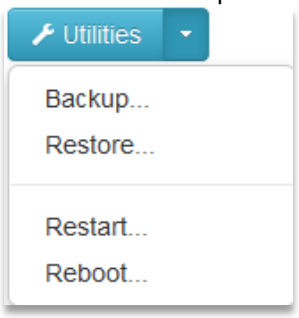
Username: ***admin***
Password :***hellocpt***

Step 3
When the admin log in has been successful, a ‘Utilities’ pull down button will be displayed on the left side of the HTML5 compatible web browser page, as indicated below.

This button will be visible only if user with admin privilege log on has been successful.

Step 4

The following menu options will display under the Utilities pull down;

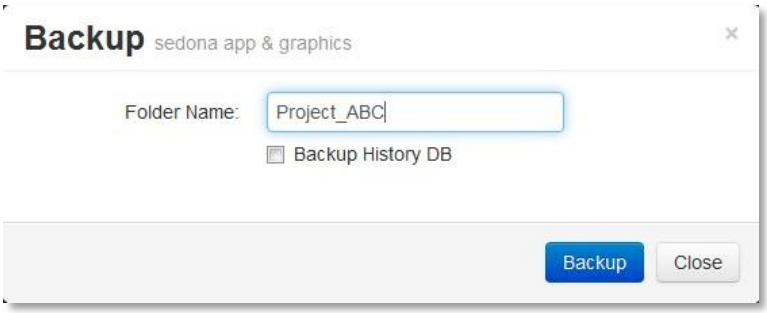


Backup	Backup a Sedona application including Gr Pages into the SD card
Restore	Restore a Backup Application from the onboard SD card into the controller.
Restart	Restart the Sedona VM
Reboot	Reboot the Sedona Controller

All backups are stored in the SD card, not in the Flash memory.

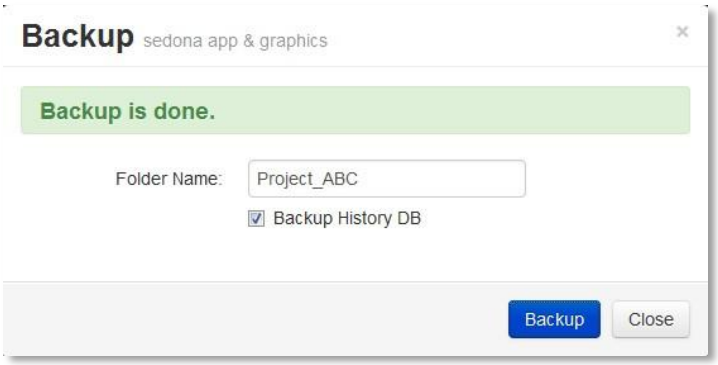
Step 5

Choose *Backup* option to backup the device and give the backup a name.
Optionally if you have a SQL Lite Database in the controller, it can be backup as well.
To backup the SQL Lite database, check the checkbox *Backup History DB.*
Multiple backup copies can be done depending to the micro SD card capacity.



Step 6

Click Backup button and the FG controller will start the backup process.
A successful backup process will display done.



Restore

Step 1

Using a HTML5 compatible web browser login to the Sedona Controller via either one of the two links described below.

URL :http://**<IP Address>**

Step 2

You will need to login as the admin user.
The default Admin username and password are noted below.

Username: ***admin***
Password :***hellocpt***

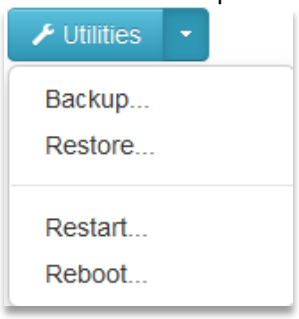
Step 3

When the admin log in has been successful, a 'Utilities' pull down button will be displayed on the left side of the HTML5 compatible web browser page, as indicated below.

This button will be visible only if user with admin privilege log on has been successful.

Step 4

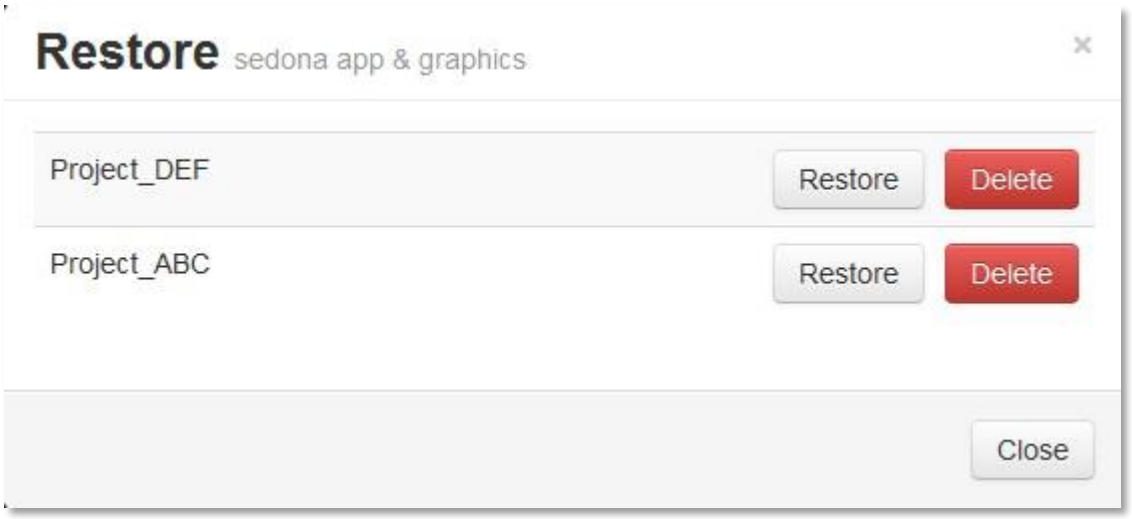
The following menu options will display under the Utilities pull down;



Backup	Backup a Sedona application including Gr Pages into the SD card
Restore	Restore a Backup Application from the onboard SD card into the controller.
Restart	Restart the Sedona VM
Reboot	Reboot the Sedona Controller

All backups are stored in the SD card, not in the Flash memory.

Step 5
Choose Restore option to restore a backup in to the controller.
If multiple backups are available in the SD card you will see the list in the pop up.



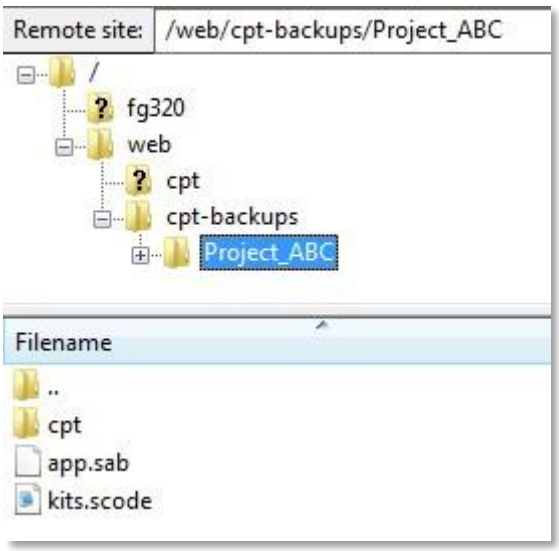
Step 6
Choose backup to restore into the controller and hit Restore.
A restore option will invoke "***Reboot***" action upon completion.

Make sure watchdog jumper is enabled in order for the controller to reboot automatically.
If required, a manual press at the Reset button will reboot the controller.

Download a backup stored in SD card into CPT

A full backup done via HTML5 compatible web browser is always stored in the EasyIO FG controller SD card.
Using an ftp client program user can navigate into the SD card to view and obtain a copy of it.
All backups are stored in ***SD card/web/cpt-backups/*** folder.

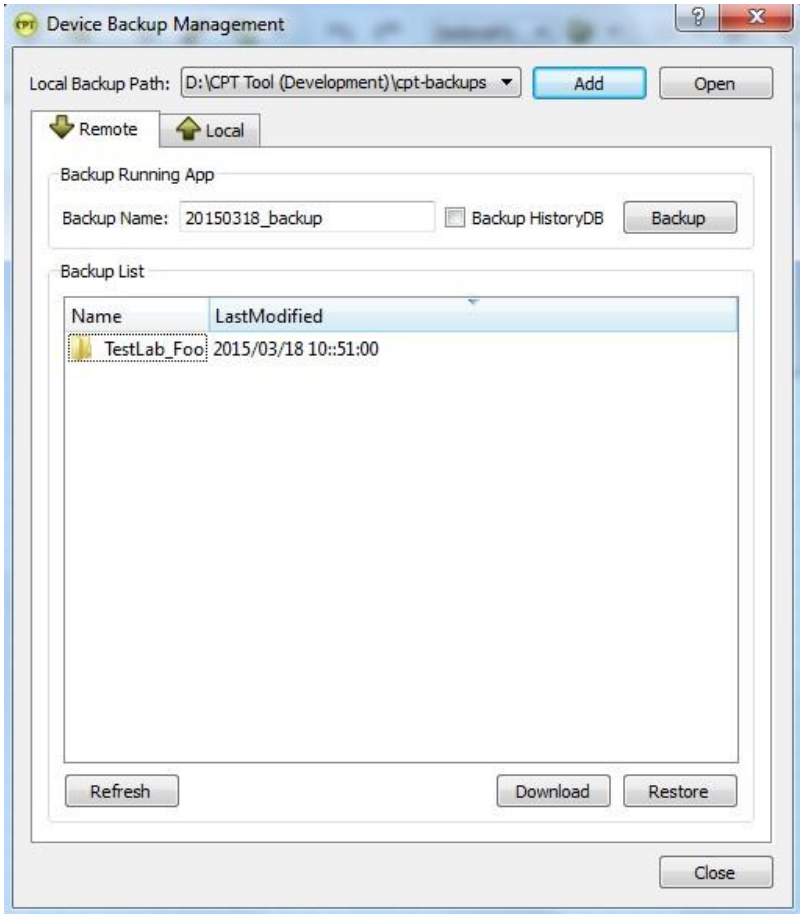
Image below shows the backup file directory structure.



User can download a copy of the backup from SD card into CPT for safe keeping.
This can either be done using any file transfer client program (FTP client) or CPT backup management.
Utilizing the CPT backup management is much easier rather than file transfer client program.

Step 1
Assuming that you have made a backup via the HTML5 compatible web browser, click at the ***Backup Management***  shortcut icon at the top right tool bar.

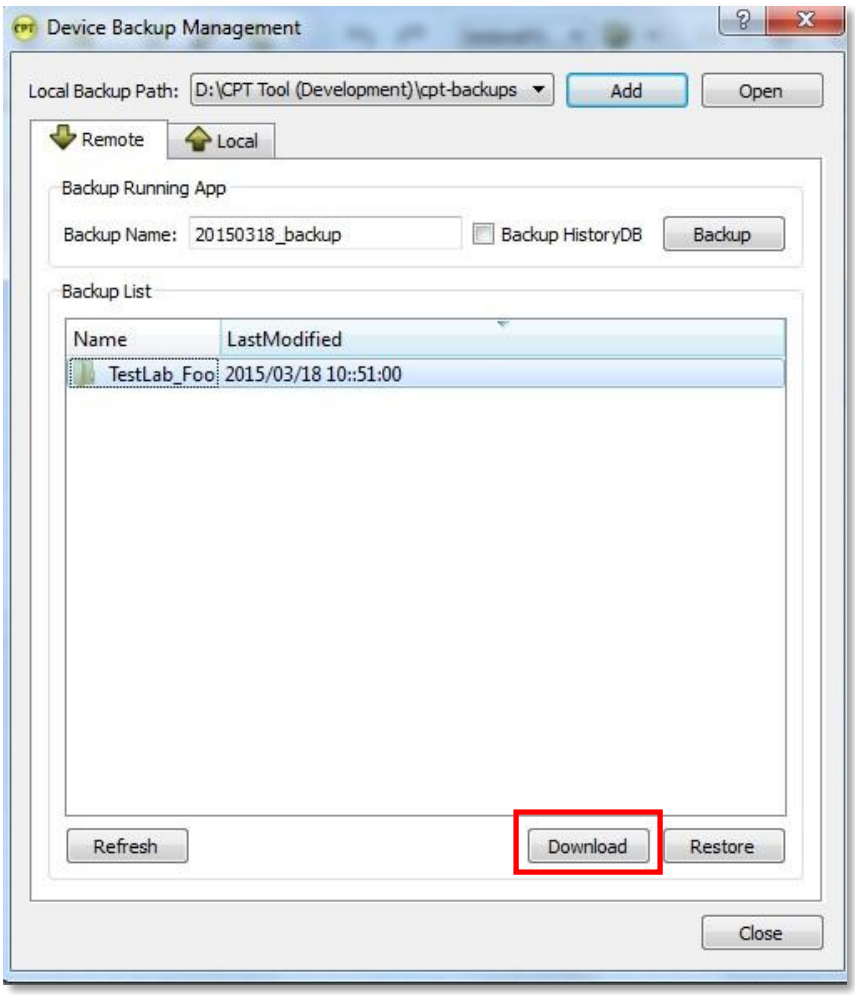
Step 2
This will launch a separate pop up window.



In this window, it displays all the backups done via web browser in the SD card.
The remote tab is the SD card content.
The local tab is the local computer content.

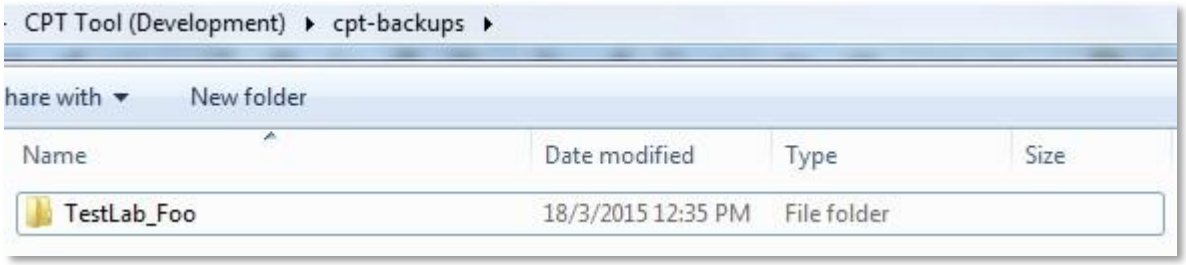
Step 3

To grab a backup from the SD card and store local computer, select the backup require and click the download button.



Step 4

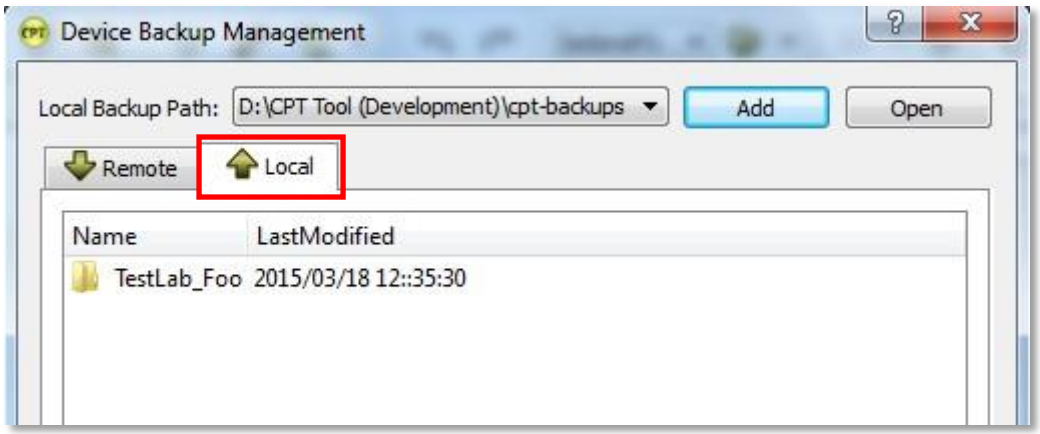
CPT will start the backup process and store the backup in ***CPT/cpt-backups*** folder by default.



Restore a backup stored in CPT EasyIO FG controller

Step 1
Connect to the EasyIO FG controller.

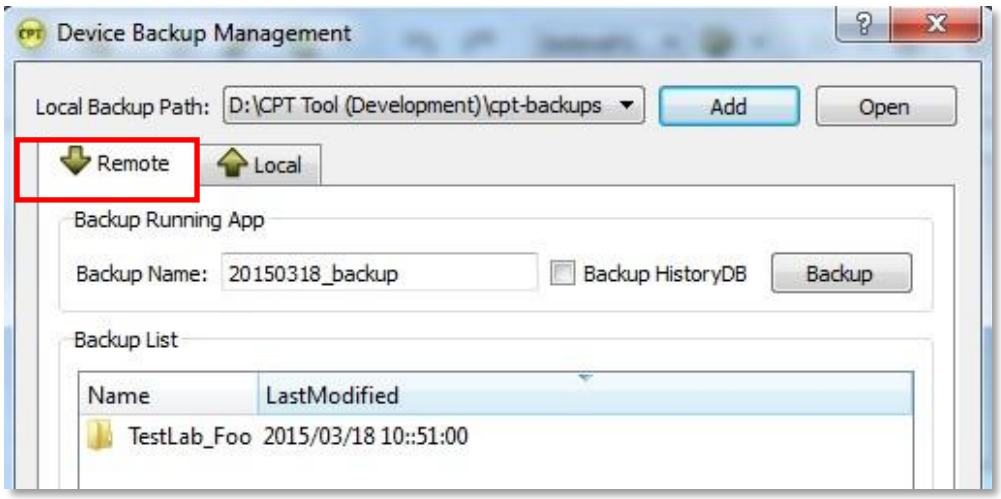
Step 2
At the backup management window, if the controller is a brand new controller and SD card insert is an empty SD card, choose the ***Local*** tab.



The local tab will display backups downloaded from SD card. It is showing the backups stored in the local computer.
In the example above, I have a backup named ***TestLab_Foo***.

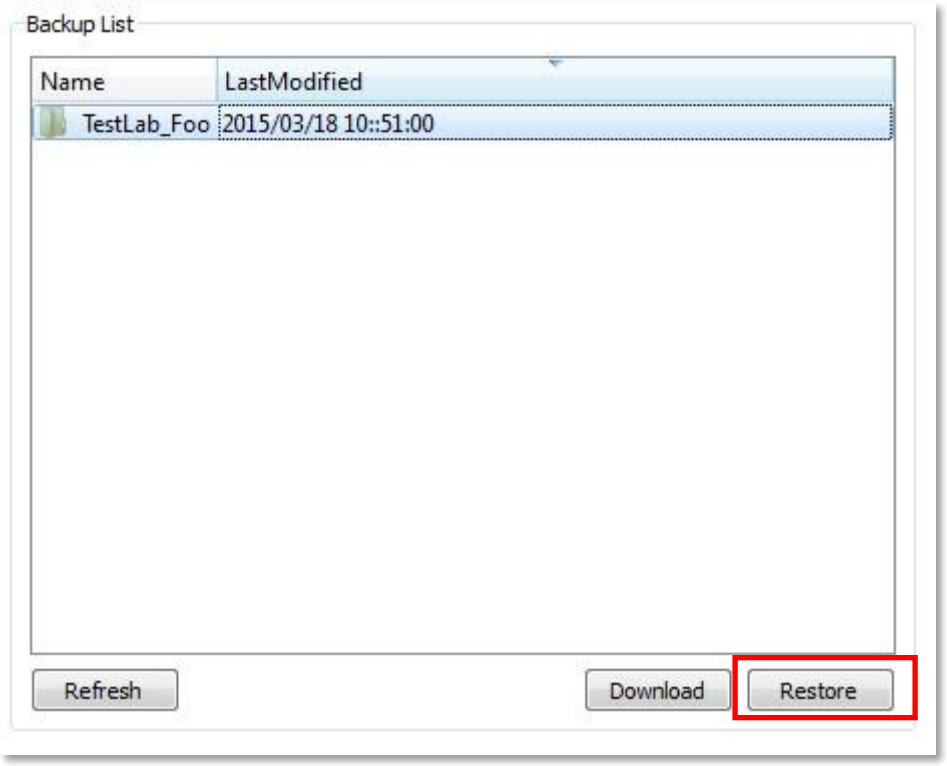
Step 3
Select the required backup and click upload.
This action will transfer the backup into the SD card.

Step 4
After a successful upload into SD card, click at ***Remote*** tab. You should able to see the backup is uploaded into the SD card.



Step 5
Select the required backup and click ***Restore***.
This will restore the Sedona apps and CPT graphics into the SD card.

Graphics deployment via CPT is not required with this step.



FS Extra features

Features below ONLY applicable to ***EasyIO FS*** Series.

Upgrade firmware

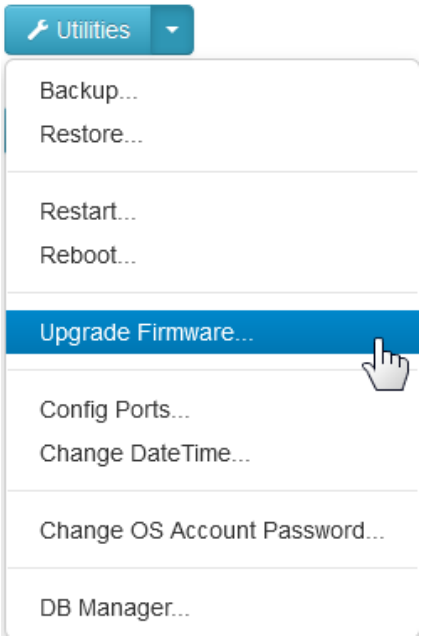
FS Series allow user to perform firmware upgrade via web browser.

In order to perform this FS Series controller firmware has to be at least v3.0b50 and above.

Step 1

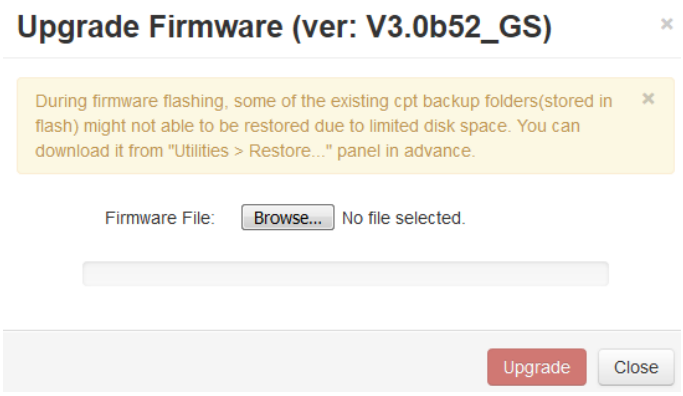
Connect to the EasyIO FS controller graphics using web browser. Login to the with the credential as explain in the previous chapter.

Once login locate the utilities menu button.
Click the button and it will display firmware upgrade option.



Step 2

A pop up window locate your firmware file by clicking browse button.
Once done, click *upgrade*. The current firmware version is also display at the pop up.



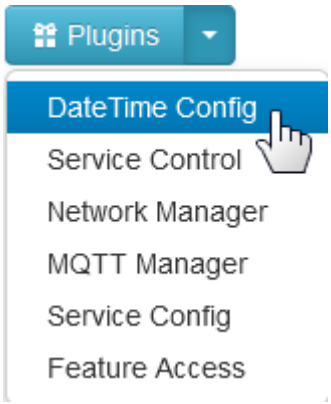
Plugins – Date Time Config

Feature available for FS Series firmware v3.0b51d and above.
Another option for user to configure the FS Series date and time.
User are able to perform time sync utilizing the NTP protocol as well.

Step 1

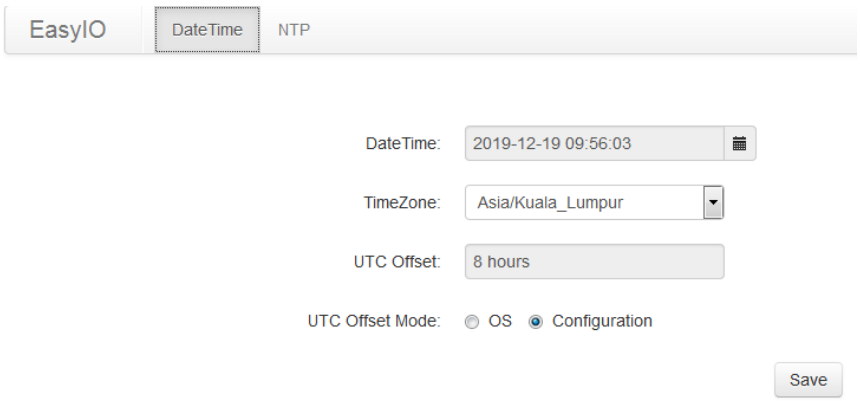
Connect to the EasyIO FS controller graphics using web browser. Login to the with the credential as explain in the previous chapter.

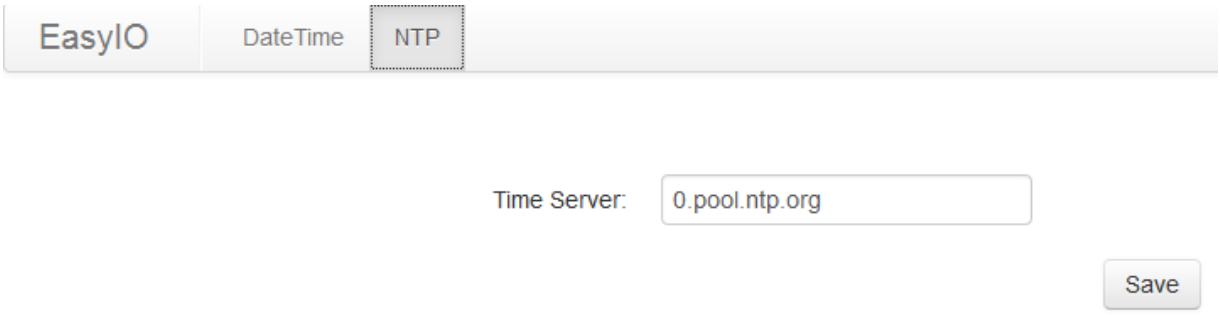
Once login locate the utilities menu button.
Click the plugins button and choose Date Time Config.



Step 2

Perform the date and time changes and also NTP server URL.





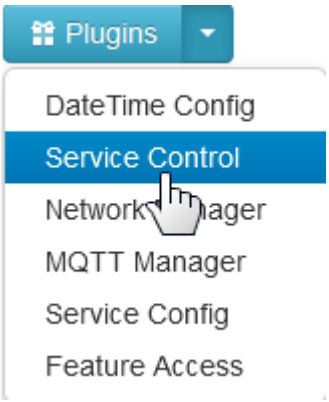
Plugins – Service Control

Feature available for FS Series firmware v3.0b51d and above.
Another option for user to control the FS Series various service.

Step 1

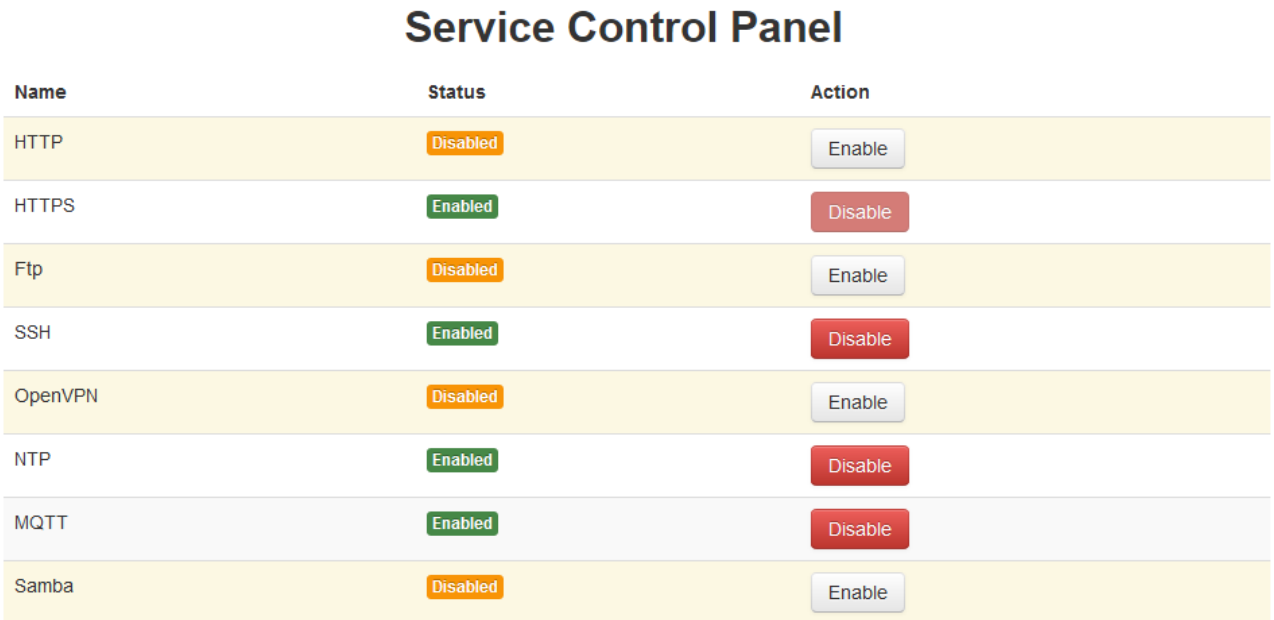
Connect to the EasyIO FS controller graphics using web browser. Login to the with the credential as explain in the previous chapter.

Once login locate the utilities menu button.
Click the plugins button and choose Service Control.



Step 2

Enable or disable certain service at this page.



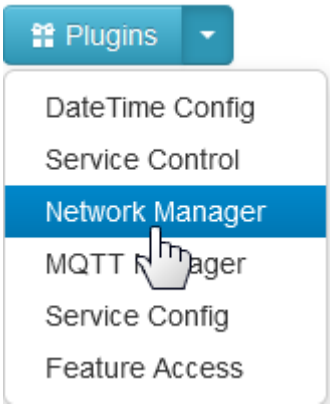
Plugins – Network Manager

Feature available for FS Series firmware v3.0b51d and above.
Another option for user to control the FS Series various service.

Step 1

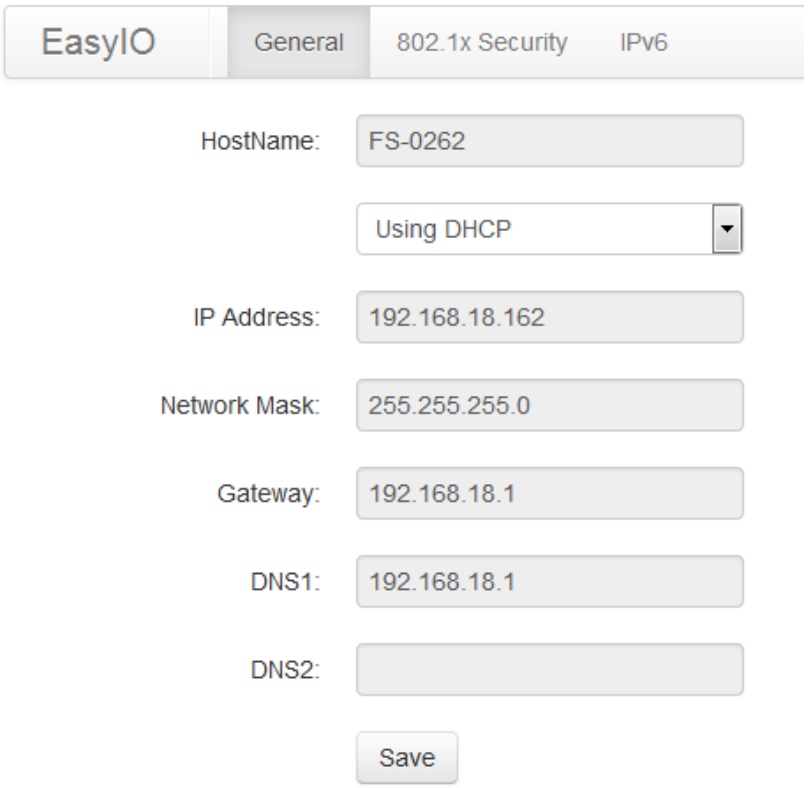
Connect to the EasyIO FS controller graphics using web browser. Login to the with the credential as explain in the previous chapter.

Once login locate the utilities menu button.
Click the plugins button and choose Network Manager.



Step 2

At this page user can change IPv4 , IPv6 and also 802.1x configurations.



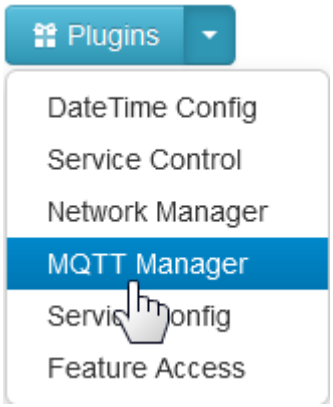
Plugins – MQTT Manager

Feature available for FS Series firmware v3.0b51d and above.
Another option for user to control the FS Series various service.

Step 1

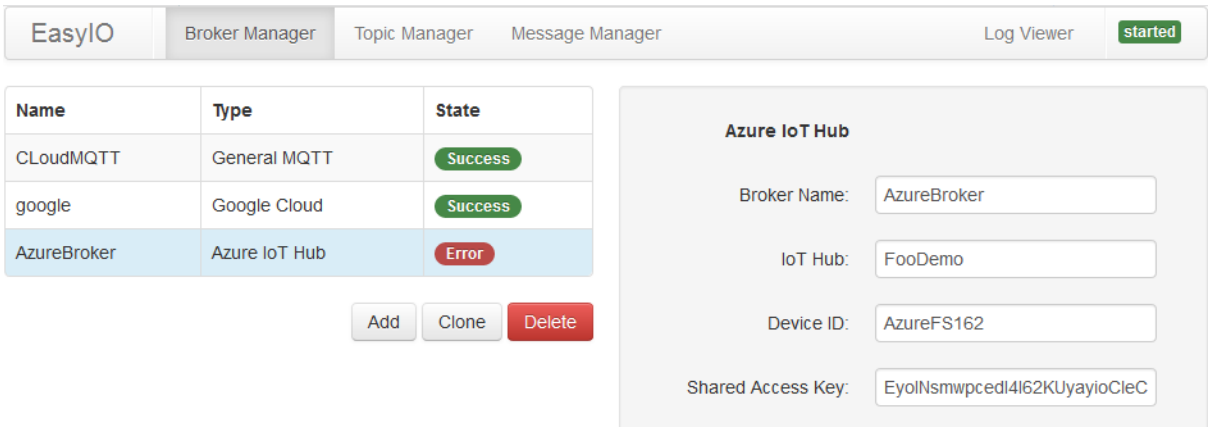
Connect to the EasyIO FS controller graphics using web browser. Login to the with the credential as explain in the previous chapter.

Once login locate the utilities menu button.
Click the plugins button and choose MQTT Manager.



Step 2

MQTT feature is configure at this page. Refer to MQTT user guide for further information.

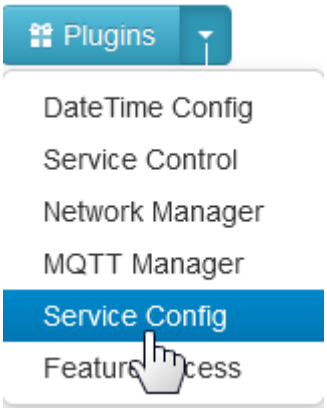


Plugins – Service Config

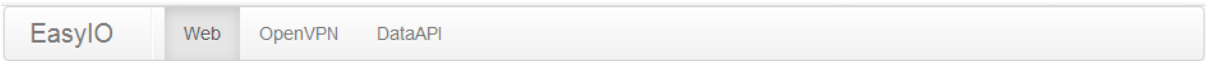
Feature available for FS Series firmware v3.0b51d and above.
Another option for user to control the FS Series various service.

Step 1
Connect to the EasyIO FS controller graphics using web browser. Login to the with the credential as explain in the previous chapter.

Once login locate the utilities menu button.
Click the plugins button and choose Service Config.



Step 2
Various service is configure at this page.



Service	Description
Web	Upload HTTPS certificate for the web server.
OpenVPN	Configure FS as Open VPN Server
DataAPI	Create and manage authentication key for EasyIO DataAPI usage.

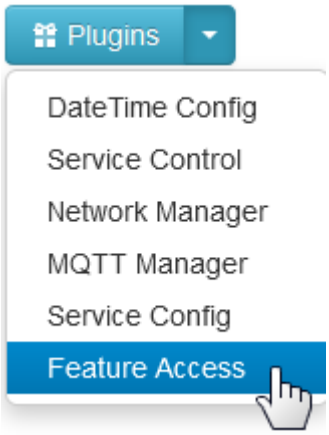
Plugins – Feature Access

Feature available for FS Series firmware v3.0b51d and above.
Another option for user to control the FS Series various service.

Step 1

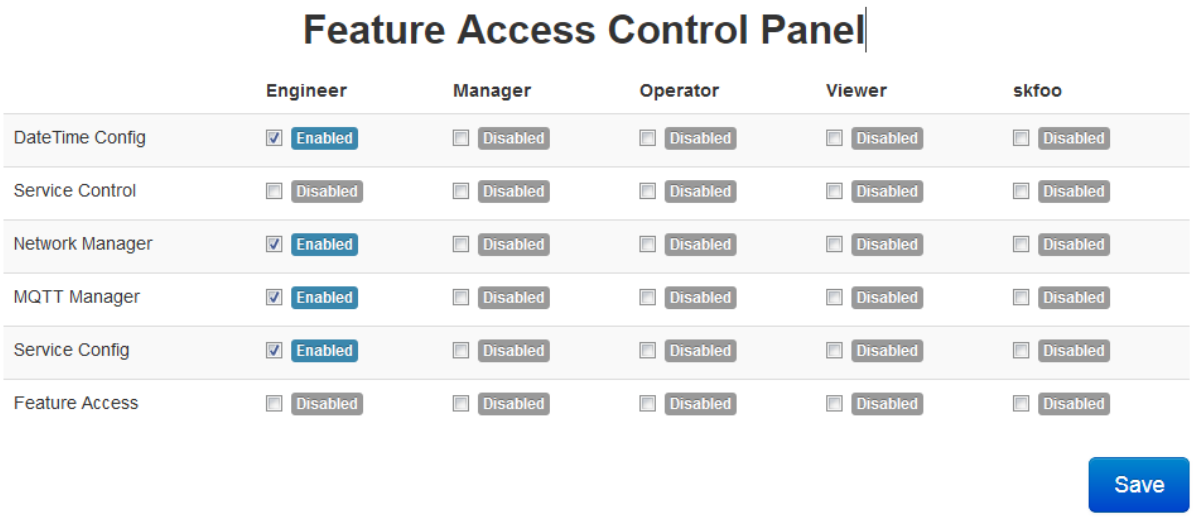
Connect to the EasyIO FS controller graphics using web browser. Login to the with the credential as explain in the previous chapter.

Once login locate the utilities menu button.
Click the plugins button and choose feature access.



Step 2

This plugin is used to limit the plugins menu access to user.
By default user Manager, Operator, Viewer DO NOT have access to plugins menu at all.



In the example above, there is a new user , skfoo, this user will not gain any access to the pluigin.
This user will not even see the plugin button.

FG+ Extra features

Features below ONLY applicable to ***EasyIO FG+*** Series.

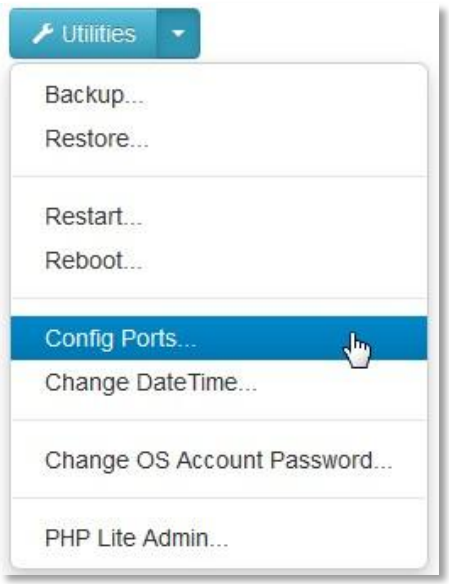
IP Port Configurations

Newer EasyIO FG+ series comes with the capability to change the CPT web and ftp ports.
By default they are respectively Port 80 and 21.
For better security all FG+ models allow end user to configure these ports.

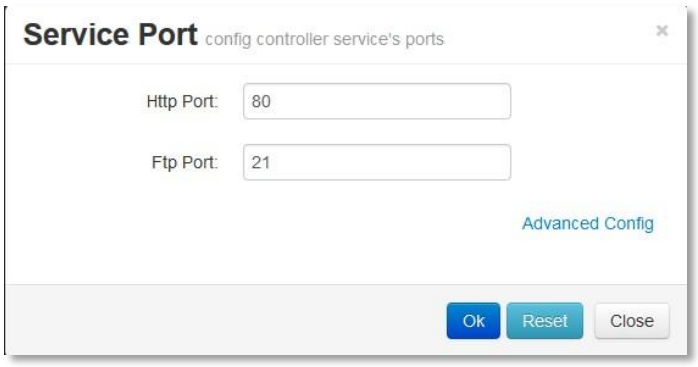
In order perform this, a full deploy with CPT is require.
CPT version has to be June 2016 or later.

Step 1
Connect to the EasyIO FG+ controller graphics using web browser. Login to the with the credential as explain in the previous chapter.

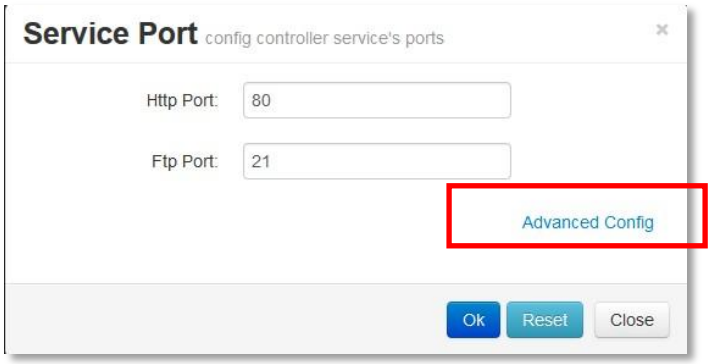
Once login locate the utilities menu button.
Click the button and it will display configure ports option.



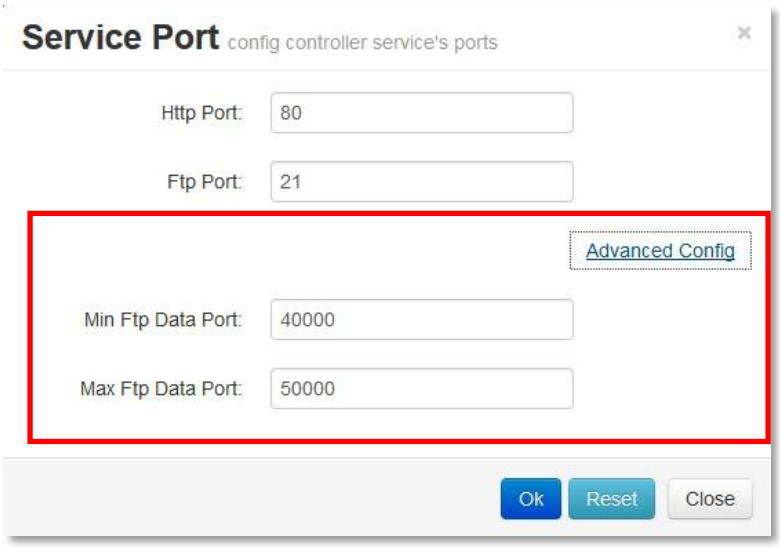
Step 2
A pop up window will display as below showing the HTTP (web) port and FTP port.
These are the default ports. To change it, simply click at the respective field.
Once complete click ok.



There are advance config if necessary. Click at the Advanced Config to display the settings.



By default FTP data transfer port is between the range of 40,000 and 50,000.
In some scenario, these ports might need tweaking in order to work with multiple device remote graphics deployment.



Step 3
Click Ok once configuration in completed.
To restore all the configurations to default simply click the ***Reset*** button.

Change OS account password

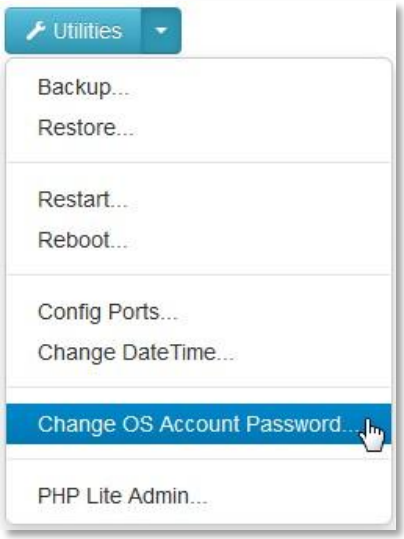
This feature allow user to change the FTP login credentials.
Default password for user ***sdcard*** and ***webuser*** is 123456 which is very vulnerable and well known in the market which is available in the internet.

For better security all FG+ models allow end user to configure these ports.

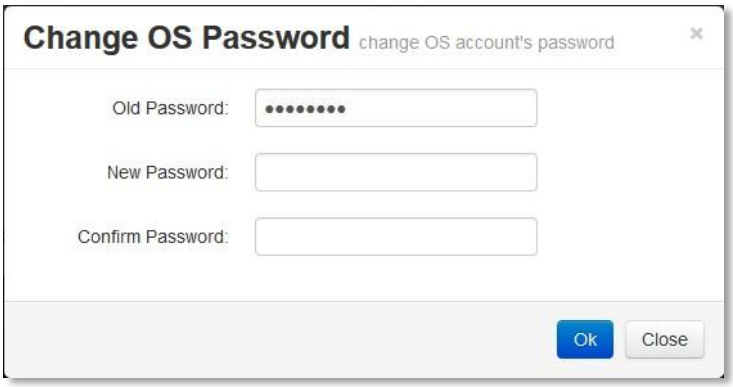
In order perform this, a full deploy with CPT is require.
CPT version has to be June 2016 or later.

Step 1
Connect to the EasyIO FG+ controller graphics using web browser. Login to the with the credential as explain in the previous chapter.

Once login locate the utilities menu button.
Click the button and it will display Change OS account option.



Step 2
A pop up window will display.
Enter the old password, new password and confirm new password fields.
Once complete click ok.



By default the old password for both sdcard and webuser account is ***123456***

****WARNING****

****There is no option to retrieve lost password****
Please make sure you keep a copy of the new password information.

To retrieve or restore default password, a firmware upgrade process is required.
All data and configuration will be lost after a firmware process is done.

Build in Dashboards

*****This feature is only available in EasyIO FG+, FS Series and FW Series ONLY.*****

This features allow user to create simple dashboard.
Dashboards feature allow data source from multiple EasyIO FG controllers as well.
For complete user guide, please refer to ***EasyIO F Series dashboard*** user guide.

Technical Support

For technical issue, please contact

Email:support@easyio.com