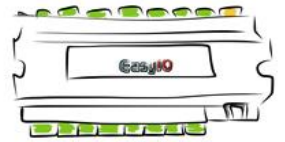


Training Program

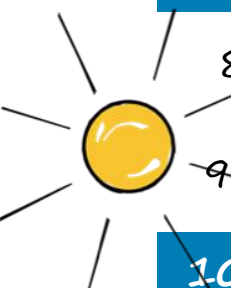
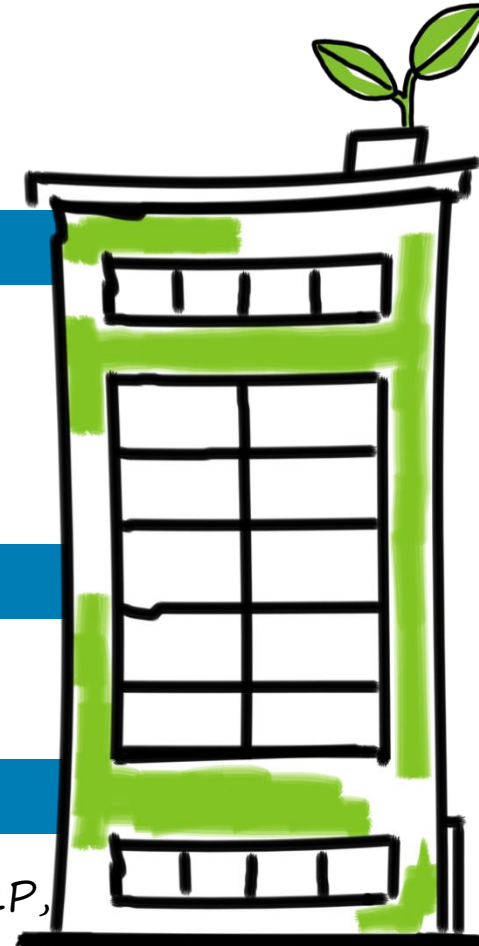
- CPT Tools – Training
- EasyIO – Sedona Training

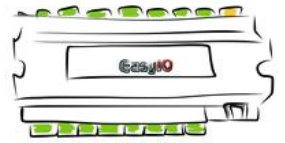




Agenda – Speed Training

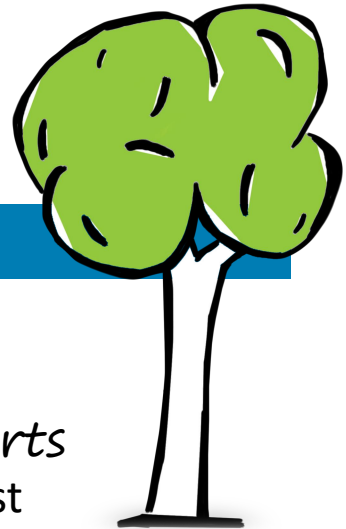
Time	Topics
8:30-9:20	Fundamentals
9:20-10:30	CPT Tool / EasyIO FG Startup
10:30-10:45	Coffee Break
10:45-11:30	Basic Sedona Kits
11:30-12:30	easyIO Advanced Kits
12:30-13:30	Lunch
13:30-16:00	FG Graphics / SQLite Database / Charts
16:00-16:15	Coffee Break
16:15-17:30	Apps Tool - Virtual FG Controller Modbus Master , BACnet, P2P,

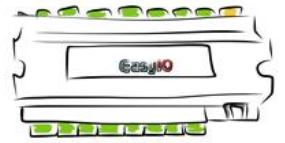




Agenda –Training

Time	Topics	
 8:30-9:20	Fundamentals	
 9:20-10:30	CPT Tool EasyIO FG Startup	FG Graphics
10:30-10:45	Coffee Break	
10:45-11:30	Basic Sedona Kits	FG Graphics
11:30-12:30	easyIO Advanced Kits	SQLite Database / Charts HTTP SQLite Query Request
12:30-13:30	Lunch	
13:30-16:00	FG Controls	P2P, Modbus Master , BACnet, EnOcean
16:00-16:15	Coffee Break	
16:15-17:00	FG Controls	Apps Tool - Virtual FG Controller Creating sedona objects, kits





EasyIO 30P and FG-LCD

■ EasyIO 30P

Sedona Workbench
BACnet IP, Ethernet, MSTP
BACnet BBMD
Modbus TCP, RTU (serial)
WEB enabled configuration
browser

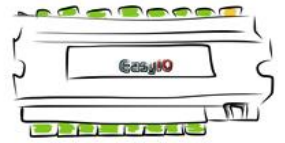
8 Digital Inputs
8 Analogue Inputs
8 Digital Outputs
4 Analogue Outputs
2 Isolated open collector Outputs
(PWM)
LED status Digital in- and
outputs



■ EasyIO FG-LCD

3.5' TFT LCD Display
Resistive Touch Screen
Panel Mount
Scheduler on board
Buzzer
SD Card Reader
1x 10/100 Ethernet Port
1x Mini USB
RTC
24V AC/DC Power
Hardware Security ID





EasyIO FG Series

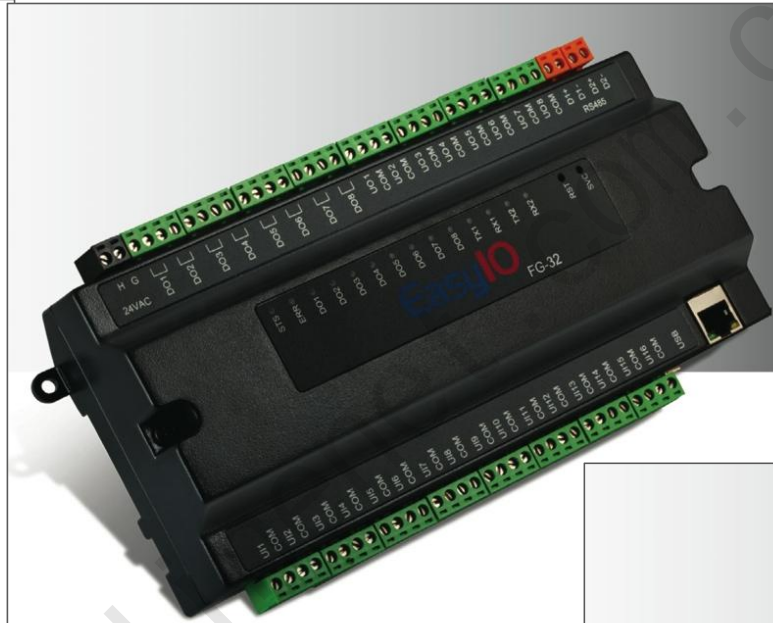
■ FG+ - 20, and 32 point

Common Specifications

- ARM 9 400MHz Main Processor
- M3 Cortex Processor for the I/O
- 64Mbyte RAM
- 128Mbyte NAND Flash
- 8G SD card built-in for Histories and Graphics
- 1x 10/100 Ethernet Port
- 2x RS485 / 1x Mini USB
- Real Time Clock
- Super Cap Apps backup
- 24V AC/DC Power
- Linux Based
- SQLite Server
- HTML5 on board !!

Version Dependent

- 20P – 12UI/2DO/6UO
- 32P – 16UI/8DO/8UO



Room Controller / EasyIO FC Series

■ SH-SMT131-V2

Intuitive Operation

Relay & 0-10V Outputs

Single or Three Fan Speed Control

Heat Pump or Heat Cool Control Logic

Card Switch, PIR, Window & Door Status Inputs

Integrated Modbus RTU Switched Input

■ FC - 20

Specifications

ARM Cortex-M3, 24MHz

2x RS485

Real Time Clock

24V AC/DC Power

Modbus RTU, BACnet MSTP

Version Dependent

20P – 12UI/2DO/6UO



SystemView - Android Tablets

■ SystemView 7 and SystemView 10

Hardware Specification 7":

CPU - ARM Cortex A7 Dual-Core, 1.2Ghz
 Display - 7 Inch IPS Display,
 Resolution: 1024 x 600,
 RAM 1GB
 Nand Flash 4GB

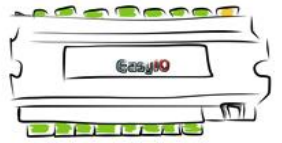
Software Features:

System Google Android 4.2.2
 Auto Run Application software when it is
 booted - **Systemview**

Interfaces:

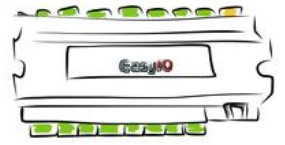
- Ethernet Interface (RJ45)
- HDMI Out
- USB Socket
- CVBS IN
- DC IN Power Terminal (9V~30V)
- Bluetooth v2.1+EDR/
- Bluetooth 3.0/3.0+HS/4.0
- Wi-Fi (802.11b/g/n)



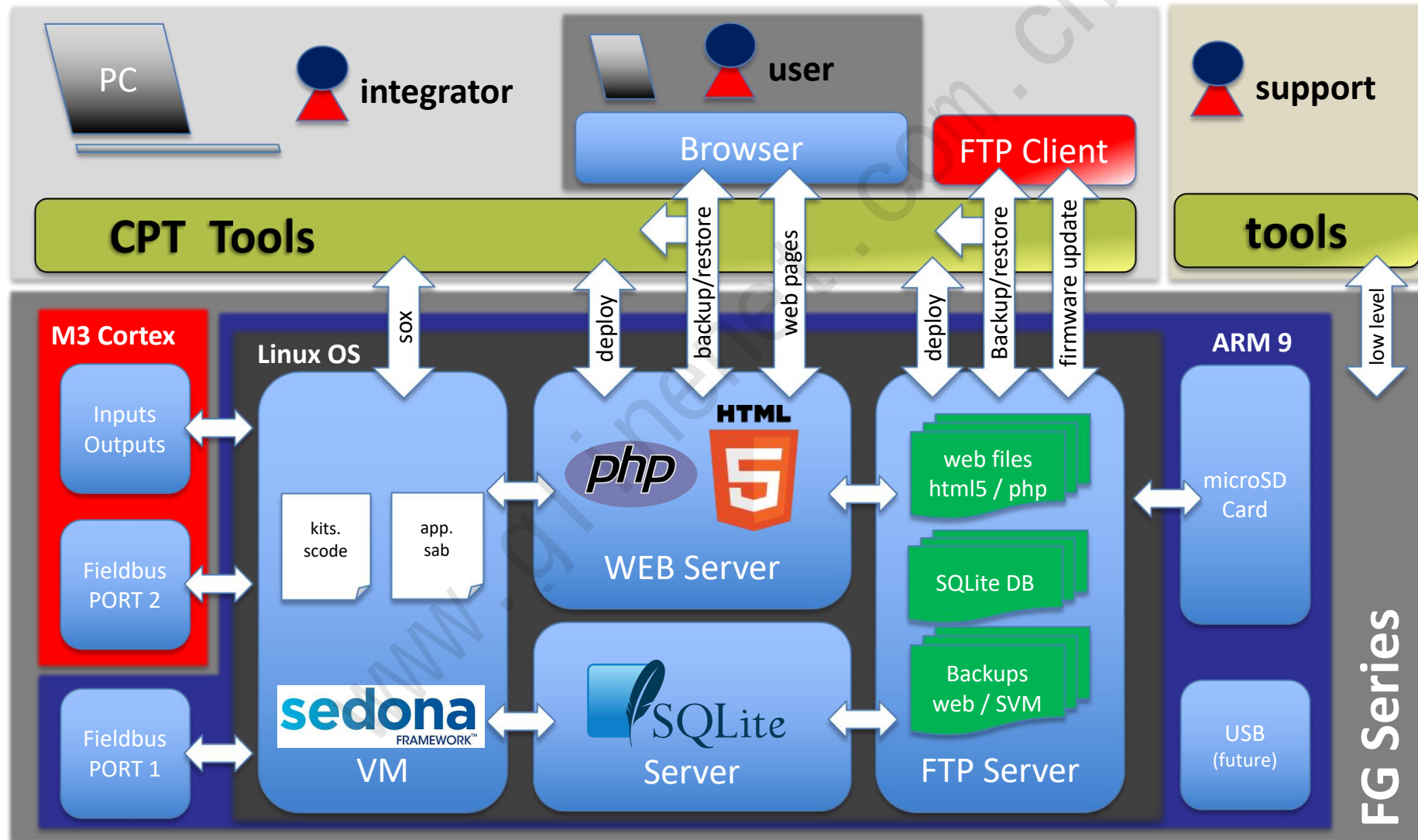


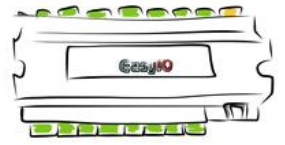
Fundamentals



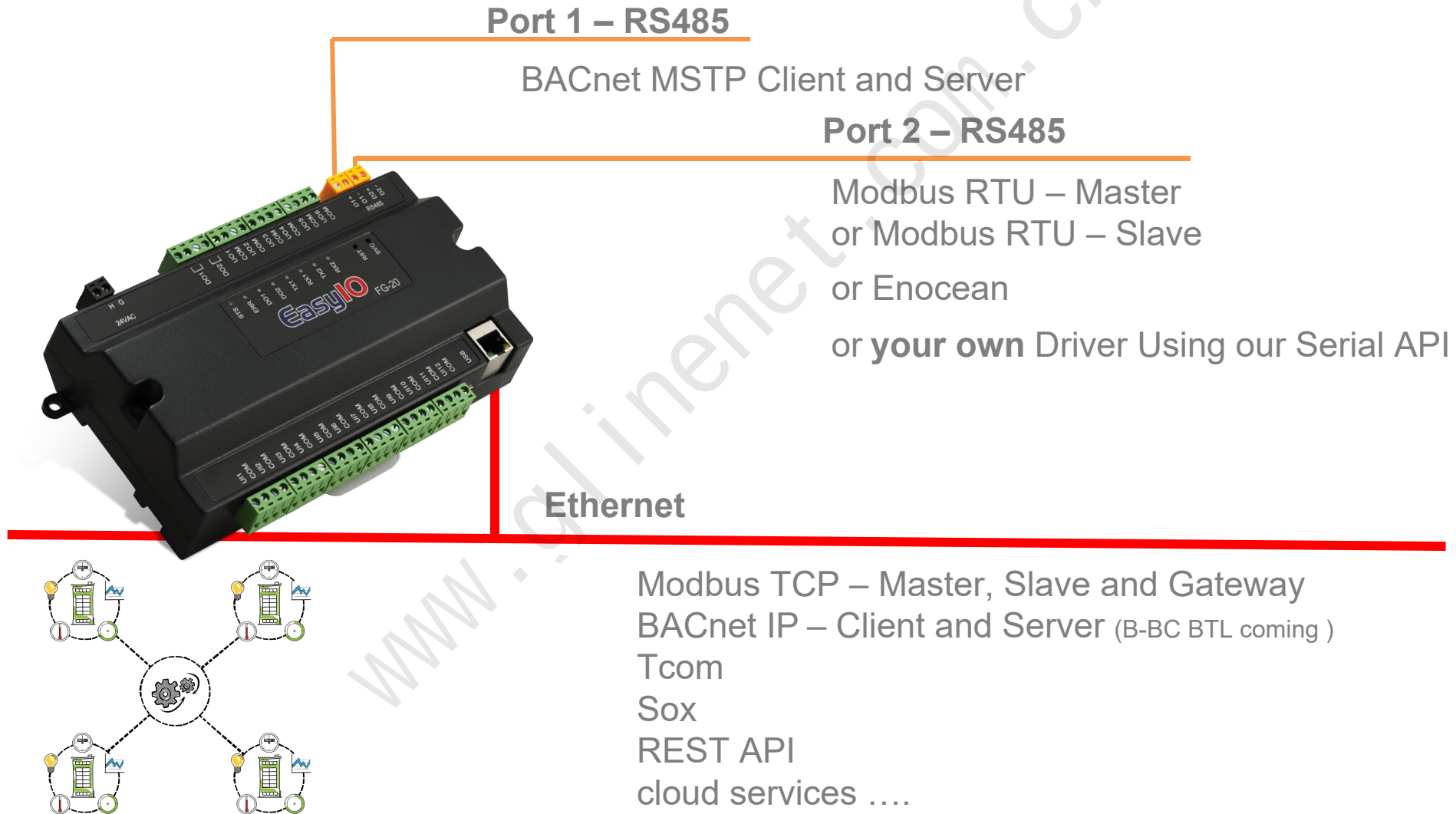


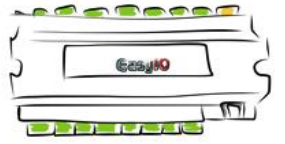
FG Architecture





EasyIO FG Series – Open Communications





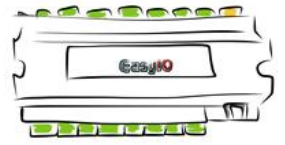
Sedona Framework

Open Source Ecosystem

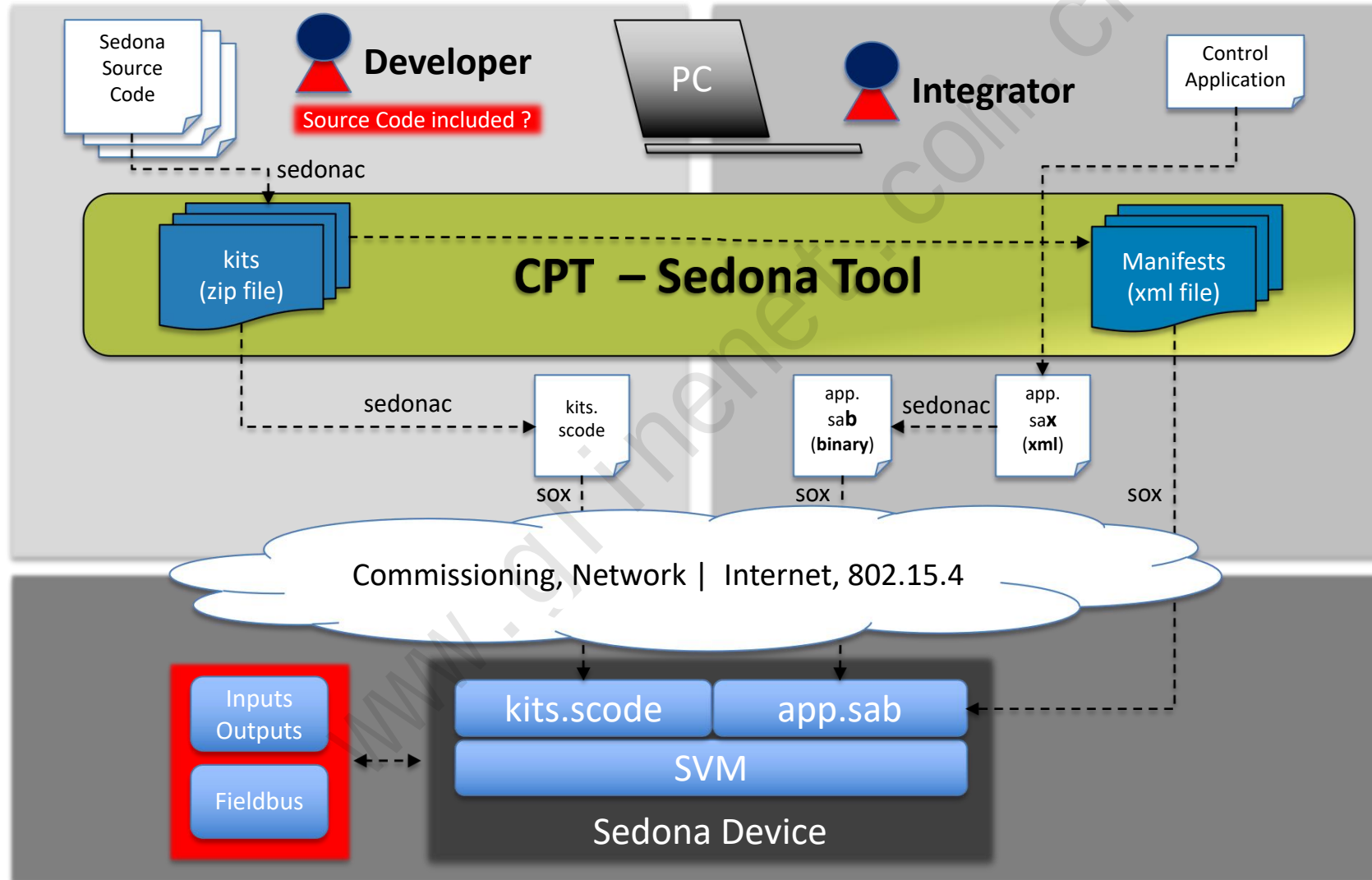
The core Sedona Framework technology is licensed under a flexible academic styled license. This makes it easy for manufacturers to Sedona Framework-enable their devices. Tools and applications written in Sedona are portable to any certified Sedona Framework device.

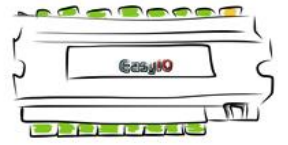
From “www.sedonadev.org”





Sedona Architecture





Sedona Definitions

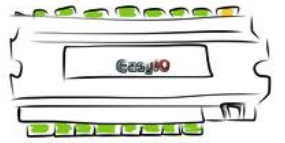
Kits / Manifests / Sox

Kits are containers for a collection of Sedona components or function blocks

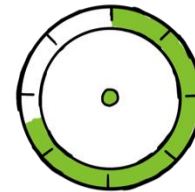
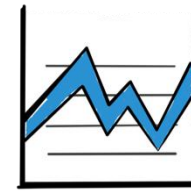
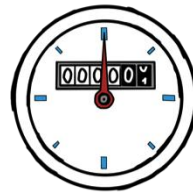
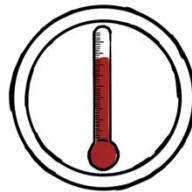
Manifests describe the components for Sedona Tools rendering via sox

Sox is the protocol used to communicate with Sedona Tools for Engineering and Commission.

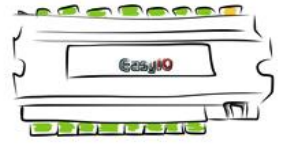
More info @ <http://sedonadev.org/doc/schema.html>



CPT Tools

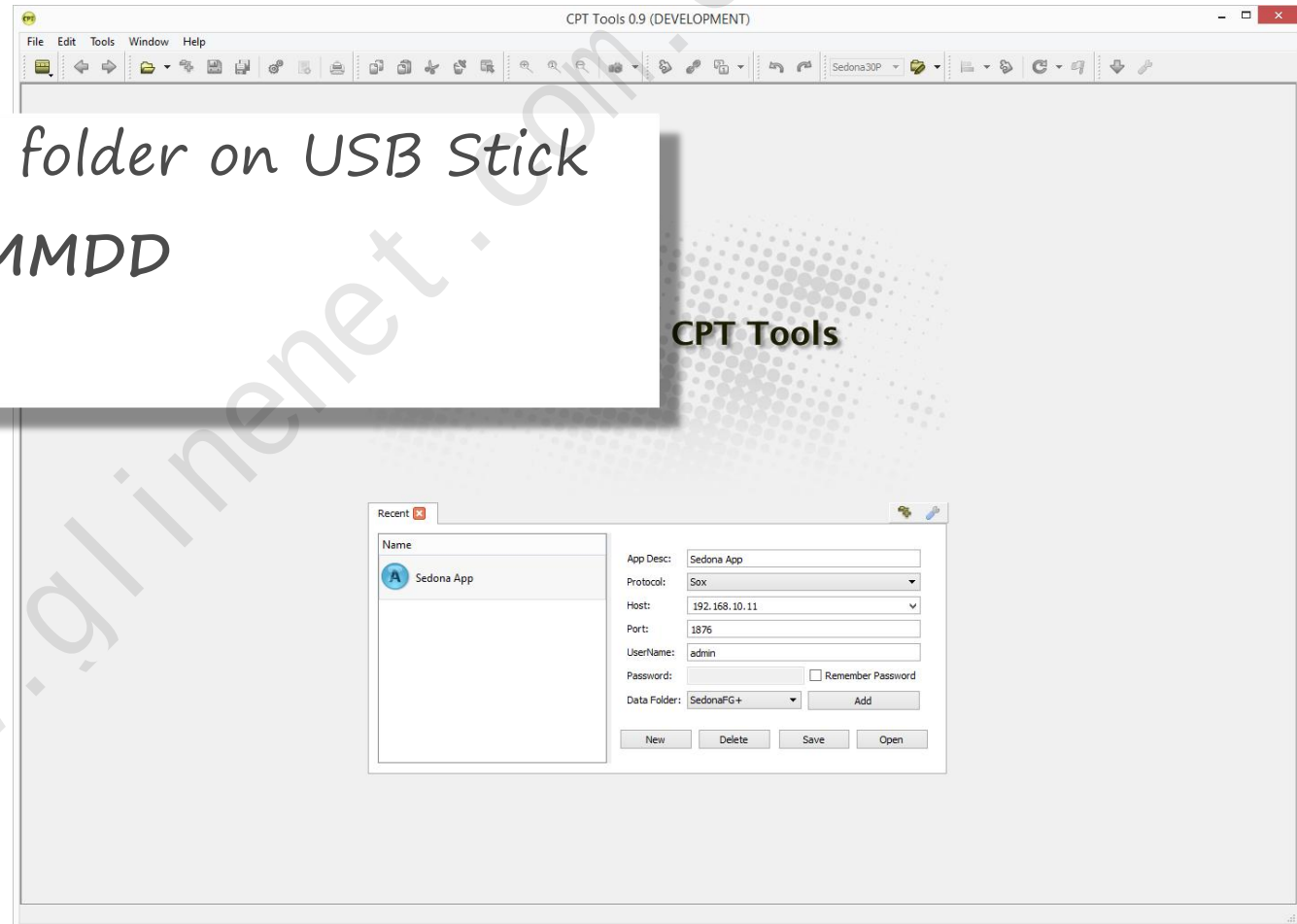


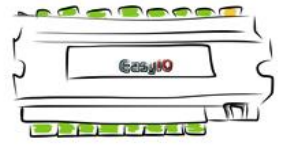
“FG Tool ”



CPT Installation and Start

Copy to PC from Software folder on USB Stick
Unzip the `cpt-dev_YYYYMMDD`
Run `cpt.exe`





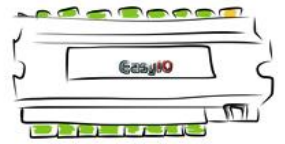
Connect to a Sedona Device

- User : admin
- Pass: _____
- Change your PC IP to Controller IP Range

The screenshot shows the 'Sedona App' configuration window. On the left, a list of apps is shown with 'Sedona App' selected. On the right, the configuration fields are as follows:

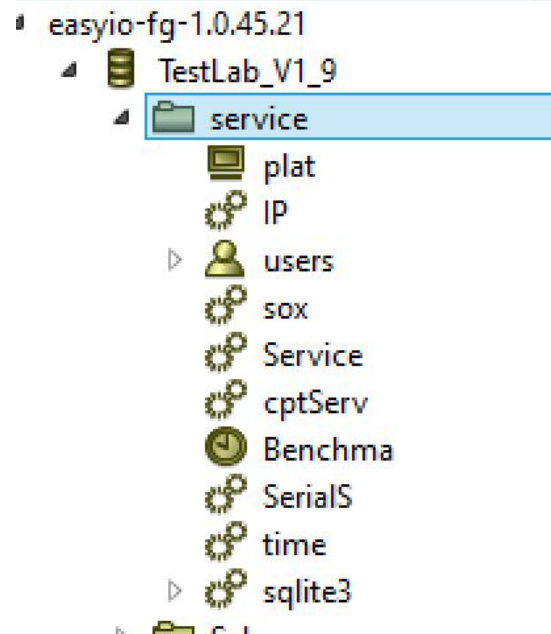
App Desc:	Sedona App
Protocol:	Sox
Host:	192.168.10.11
Port:	1876
UserName:	admin
Password:	
Remember Password:	☐
Data Folder:	SedonaFG+
Add:	Add
New:	New
Delete:	Delete
Save:	Save
Open:	Open

Lets have a Look ... on CPT



Sedona Objects and Kits

Service Folder



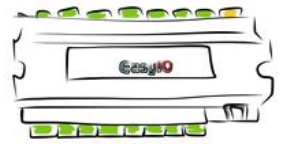
- easyioFG IP

Properties	
easyioFG::IPConfig[IP]	
Name	IP
status	Ok
currentIpAddress	192.168.10.11
currentSubnetM...	255.255.255.0
currentGateway	192.168.10.1
newIpAddress	192.168.10.11
newSubnetMask	255.255.255.0
newGateway	192.168.10.1

- datetimeStd

Properties	
datetimeStd::DateTimeServiceStd[DateTim]	
Name	DateTim
meta	622002177
nanos	447436085000000000 nanosecond
hour	15
minute	48
second	5
year	2014
month	3
day	6
dayOfWeek	4
utcOffset	0 second
osUtcOffset	false
tz	Europe/Lisbon
currentTime	06-March-2014 15:48:05 Thur
enableDst	true
isDst	Standard Time
nextDst	30-March-2014 01:00:00 Sun (start)
dstOffset	3600 second
DstStartTimeFormat	UTC
DstStartOn	Last
DstStartDOW	Sunday
DstStartMonth	3 [1,12]
DstStartDay	1 [1,31]
DstStartHour	1 [0,23]

Kits Details can be found at:
Documents/EasyIO User Guide/EasyIO FG Series / 05 EasyIO FG Series Sedona kits v1.0.pdf



Sedona Lab Exercise

Using your EasyIO FG :

Open the Lab Exercise Document and do ...

1. Connecting to the Sedona Controller
2. Sync the Controller Time and Enable DST
3. Create a Structure for your app



The screenshot shows the 'Open Sedona' dialog box with the following fields:

- Address:** Protocol: Sox, Host: 192.168.10.11, Port: 1876
- Credentials:** Username: admin, Password: (empty)
- Data Folders:** Choose sedona data folder: Default Sedona Data Folder, Add button
- Buttons:** Ok, Cancel

A 'New DateTime' sub-dialog box is open over the 'Open Sedona' dialog, showing:

- DateTime:** 2013/12/10 15:43:42 SGT
- TimeZone:** Asia/Singapore
- UTC Offset:** 8 hours
- UTC Offset Mode:** OS (selected), Configuration (radio button)
- Buttons:** Save, LocalTime

Sedona Objects and Kits

Basic Kits

- easyioFG
- control
- easyioSensor

Properties	
easyioFG::EasyIOPlatform[plat]	
Name	plat
platformId	easyio-fg-1.0.45.21
memAvailable	874943
macAddress	38:D1:35:00:04:EA
serialNo	20001157
hostId	AC52-D23BDFEA-EE35
Version	V1.5b42
powerFailureSave	No
autoSaveInterval	12 hour [0,]
recoveryMode	RestoreLastSavedApp



easyioFG [17]

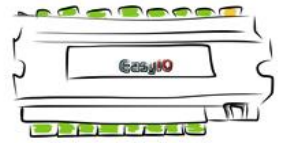
- Benchmark [60 B]
- DO [68 B]
- EasyIOPlatform [360 B]
- IPConfig [260 B]
- P_And2 [44 B]
- P_BSwitch [44 B]
- P_CmprF [60 B]
- P_CmprI [60 B]
- P_FSwitch [60 B]
- P_ISwitch [64 B]
- P_Not [44 B]
- P_Or2 [44 B]
- P_Xor [44 B]
- PriorityBool [88 B]
- PriorityFloat [140 B]
- UI [120 B]
- UO [68 B]

easyioSensor::PresetTempTable[PresetT]

Name	PresetT
meta	621674497
unit	degC
tableType	HoneyWell_20K_thermistor
out	HoneyWell_20K_thermistor
in	HoneyWell_Johnson_100Platinum

control [49]

- Add2 [48 B]
- Add4 [56 B]
- And2 [40 B]
- And4 [44 B]
- ASW [52 B]
- ASW4 [64 B]
- Avg10 [120 B]
- B2F [60 B]
- B2P [40 B]
- BSW [40 B]
- Cmpr [48 B]
- ConstBool [40 B]
- ConstFloat [40 B]
- ConstInt [40 B]
- Div2 [52 B]
- DlyOff [56 B]
- DlyOn [56 B]
- F2B [60 B]
- F2I [44 B]
- FloatOffset [48 B]
- Freq [56 B]
- Hysteresis [52 B]
- I2F [44 B]
- ISW [52 B]
- L2F [48 B]
- Limiter [52 B]
- Linearize [196 B]
- LP [116 B]
- LSeq [76 B]
- Mul2 [48 B]

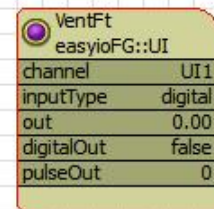


Sedona Objects and Kits

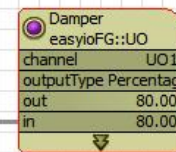
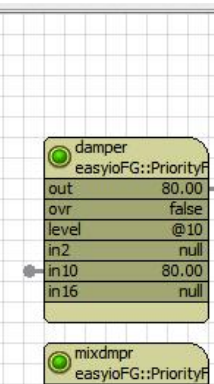
Basic Kits

- easyioFG

Universal Inputs

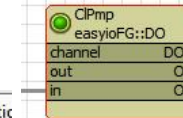
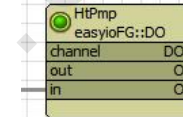
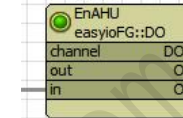


Properties	
easyioFG::UI[VentFt]	
Name	VentFt
meta	33751041
channel	UI1
inputType	digital
out	voltage0to10V current0to20mA resistance
digitalOut	
pulseOut	digital



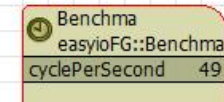
Properties	
easyioFG::UO[Damper]	
Name	Damper
meta	1090715649
channel	UO1
outputType	Percentage0to10V
out	80.000
in	80.000
scaling	1.0000
offset	0.000

Analog Outputs



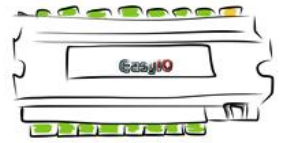
Properties	
easyioFG::DO[CIPmp]	
Name	CIPmp
meta	974848001
channel	DO3
out	none DO1 DO2 DO3 DO4 DO5 DO6 DO7 DO8 DO9
in	

Digital Outputs



Properties	
easyioFG::Benchmark[Benchma]	
Name	Benchma
cyclePerSecond	49

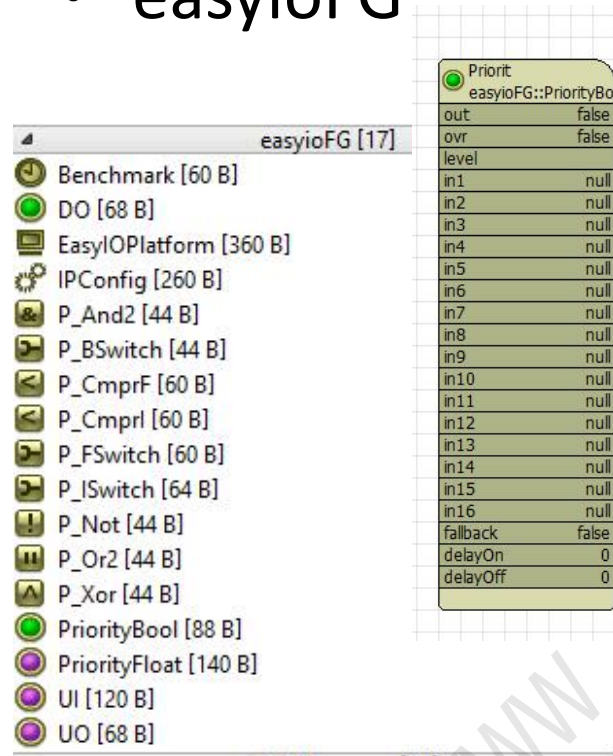
Benchmark



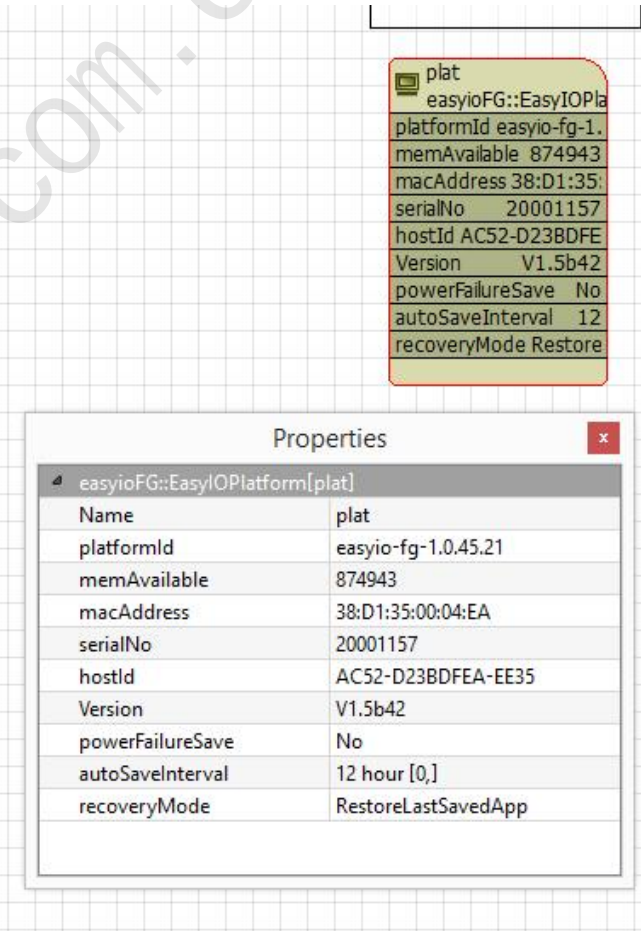
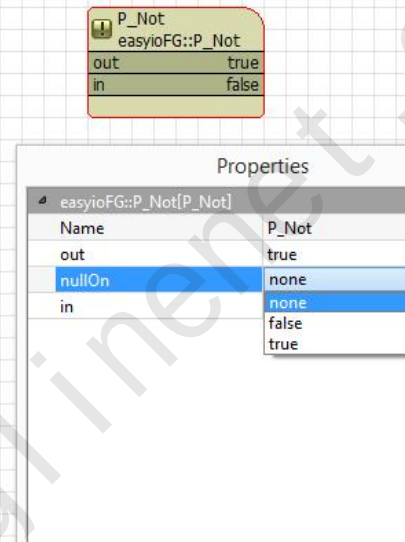
Sedona Objects and Kits

Basic Kits

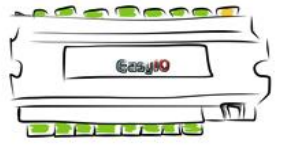
- easyioFG



Priority Objects



Platform Save / Restore



Sedona Objects and Kits

Types of Data Points

- **Bool** - stores a boolean variable.
- Boolean are expressed using the *true*, *false*, and *null* keywords. Use *null* to indicate an invalid boolean value. If used in a boolean expression, *null* will evaluate to *true*.

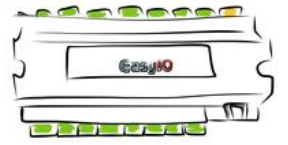
The screenshot displays the EasyIO software interface. On the left, a project workspace contains four data point objects: 'ConstBo', 'WriteBo', 'Priority', and 'DO'. Each object has a green status indicator and a list of properties. On the right, the 'Properties' panel is open, showing the detailed configuration for the selected 'easyioControl_updated::ConstBo[Co...]' object. The properties are organized into sections for different data point types.

easyioControl_updated::ConstBo[Co...]	
Name	ConstBo
meta	1292763137
out	false

easyioeuBasic::WriteBo[WriteBo]	
Name	WriteBo
meta	1293156353
out	false
in	false
rst	false
ovr	false

easyioFG::DO[DO]	
Name	DO
meta	1294336001
channel	none
out	Off
in	Off

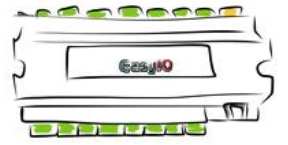
easyioFG::PriorityBo[Priority]	
Name	Priority
meta	1293615105
out	false
ovr	false
level	
in1	null
in2	null
in3	null
in4	null
in5	null
in6	null
in7	null
in8	null
in9	null
in10	null
in11	null
in12	null
in13	null
in14	null
in15	null
in16	null
fallback	false
delayOn	0 second
delayOff	0 second



Sedona Objects and Kits

Types of Data Points

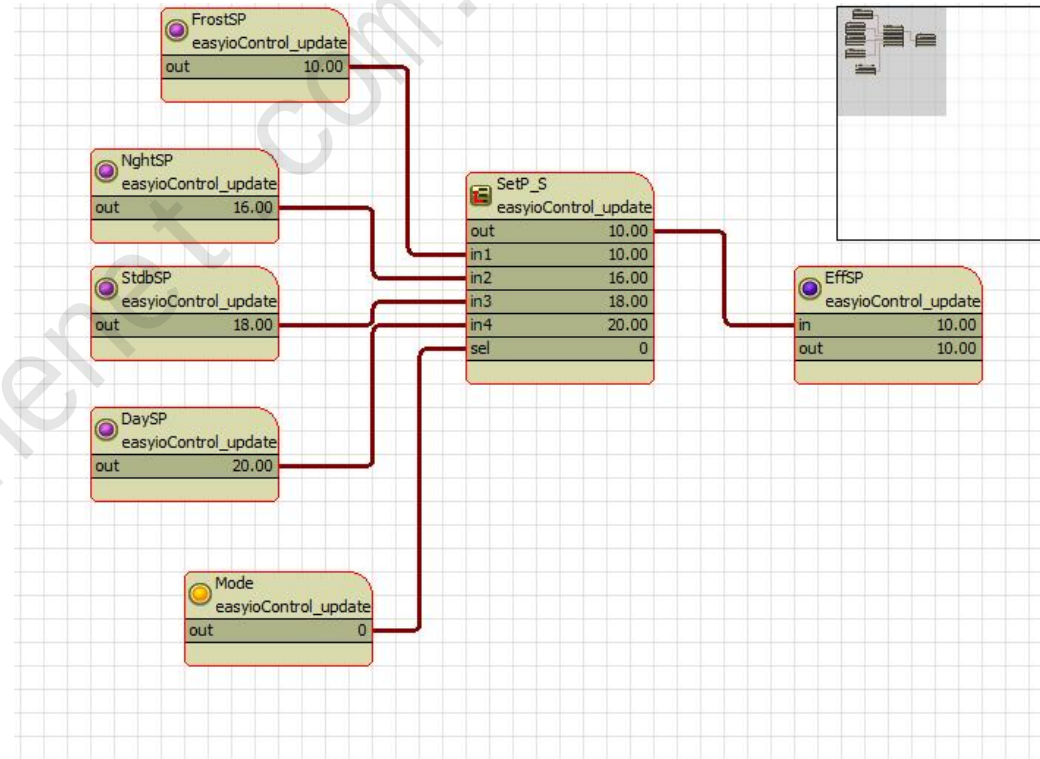
- **Integers** – There are four integer types of varying widths:
 - *byte*: unsigned 8-bit integer
 - *short*: unsigned 16-bit integer
 - *int*: signed 32-bit integer
 - *long*: signed 64-bit integer
- Both *byte* and *short* are special types that may only be used as properties
- They represent Integer values like , Fan Speed , Channel, etc .

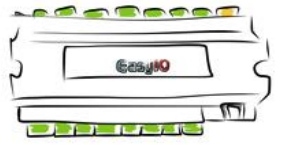


Sedona Objects and Kits

Types of Data Points

- **Float** - Maps to a 32-bit floating point value
- **Double** - 64-bit floating point.
- Floating point literals are expressed in decimal format using a "." dot as the decimal point.
- They mainly represent Real world values , like temperatures, pressures, valve positions etc .

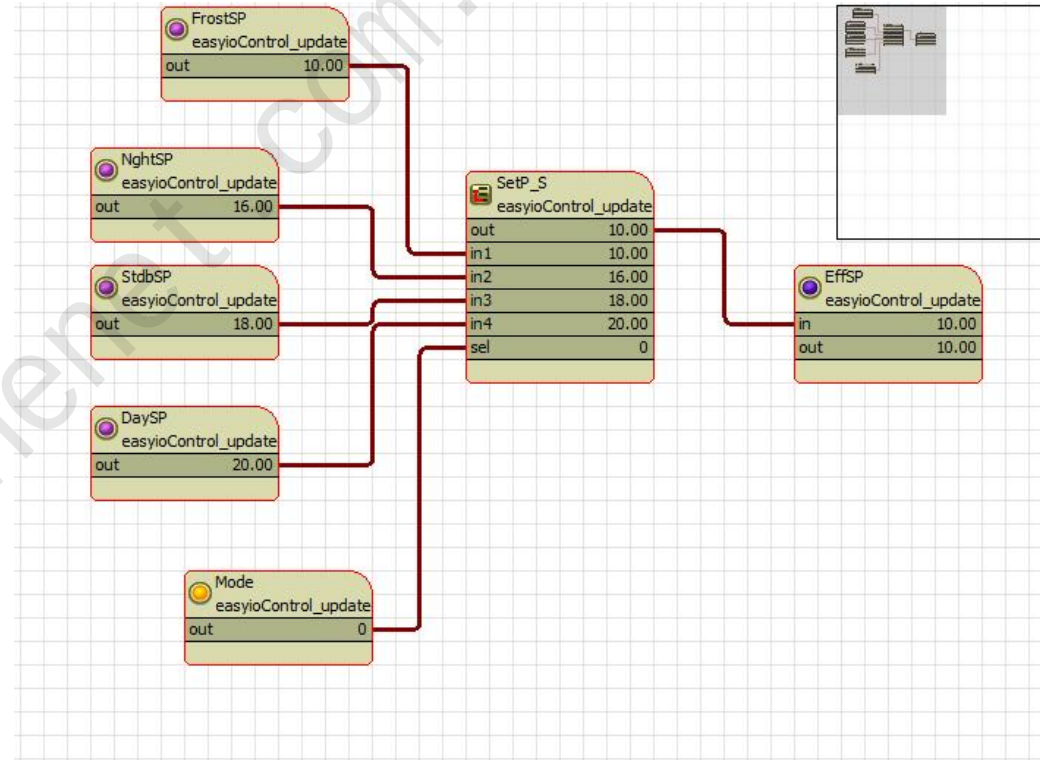


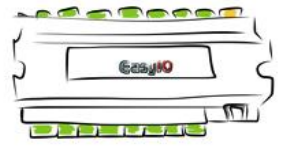


Sedona Objects and Kits

Types of Data Points

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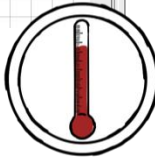
Sedona Objects and Kits

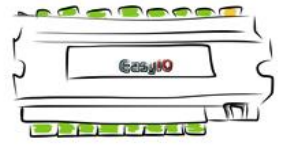
Priority Objects

- 16-level priority scheme,
- inputs in1 (highest)
- through in16 (lowest)
- plus a fallback property,
- single output out.
- has override actions that explicitly set certain input slots.
- The highest priority valid input propagates to the out

easyioFG::PriorityBool[Priorit]

Name	Priorit
meta	86376449
out	true
ovr	false
level	@10
in1	null
in2	null
in3	null
in4	null
in5	null
in6	null
in7	null
in8	null
in9	null
in10	true
in11	null
in12	null
in13	null
in14	false
in15	null
in16	null
fallback	false
delayOn	0 second
delayOff	0 second



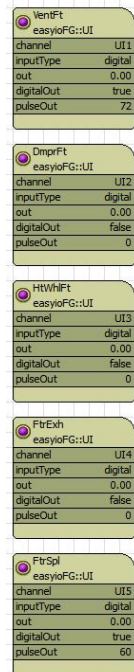


Sedona Lab Exercise

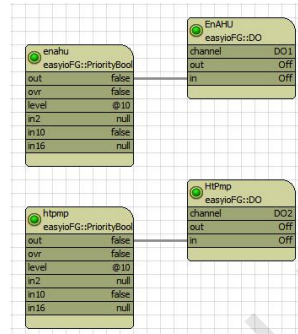
Using your EasyIO FG :

Open the Lab Exercise Document and do ...

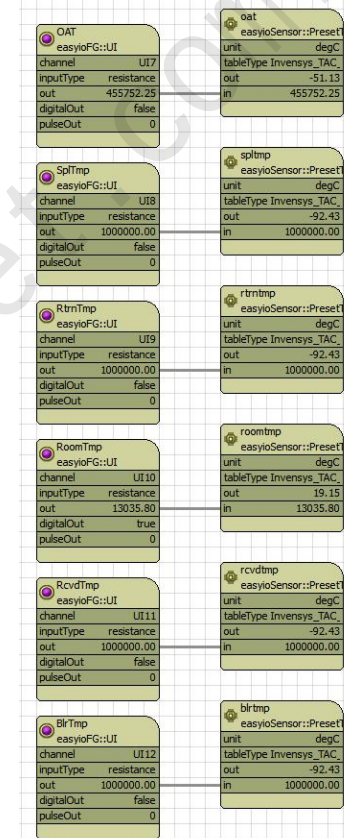
1. Inputs and Outputs Exercise



Digital Inputs

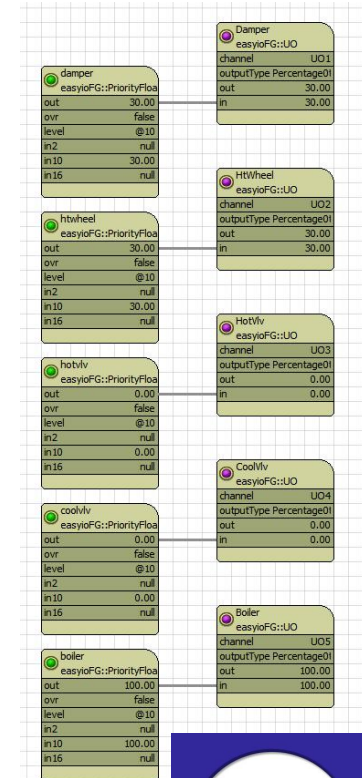


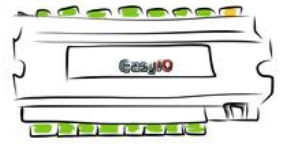
Digital Outputs



Analog Inputs

Analog Outputs

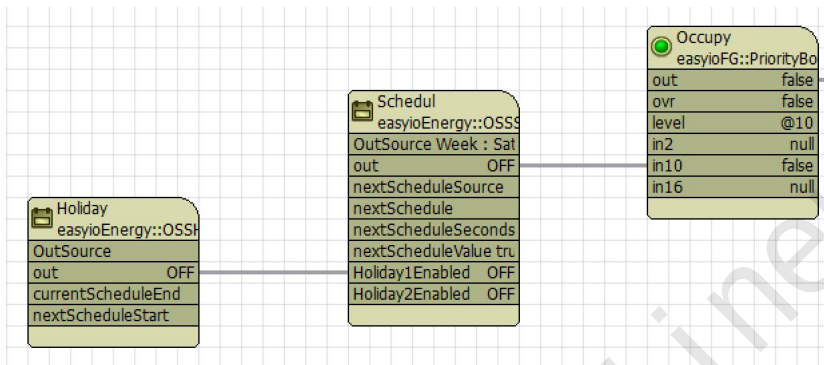




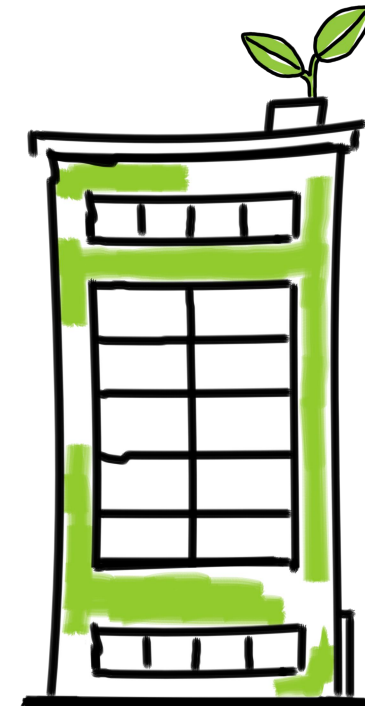
Sedona Lab Exercise

Using your EasyIO FG :

1. Schedule Lab

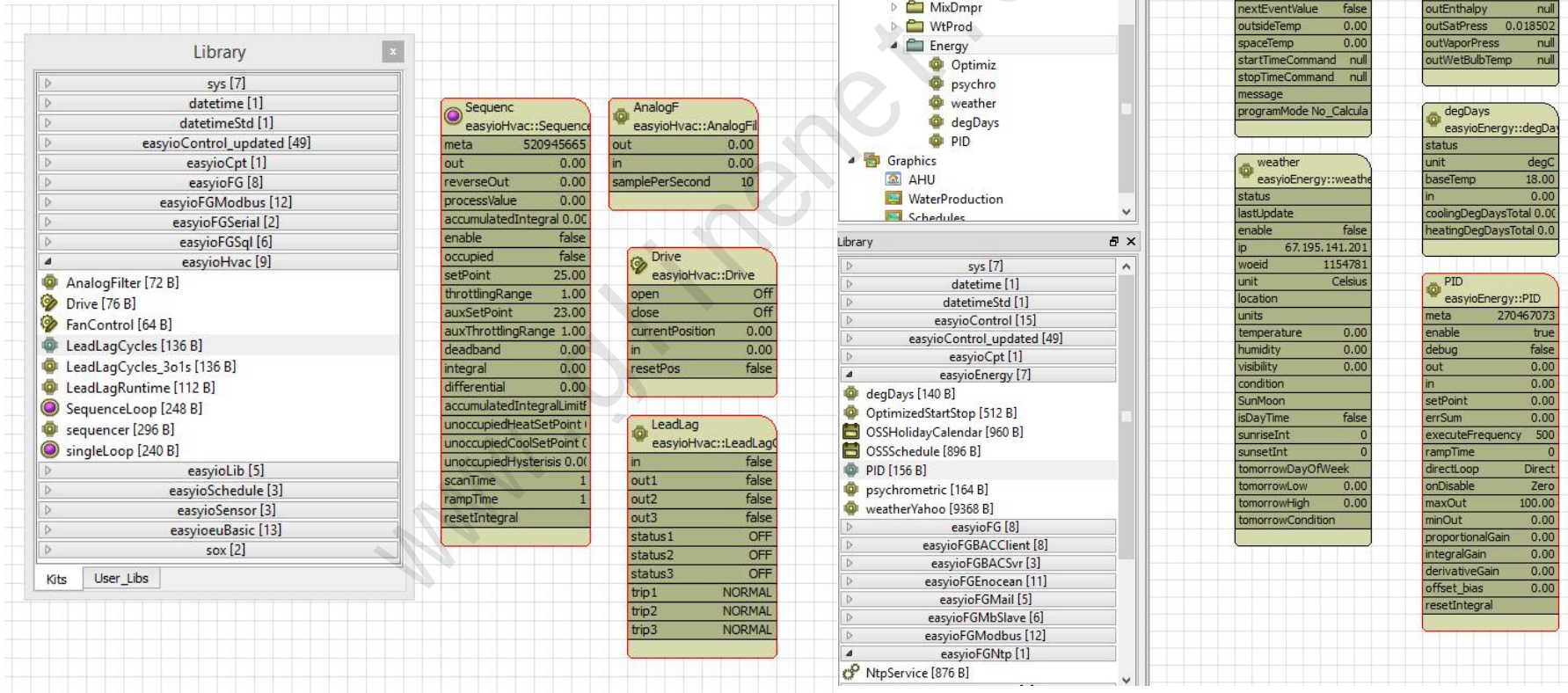


Properties	
easyioEnergy::OSSchedule[Schedule]	
Name	Schedule
Status	Ok
OutSource	Week : Sunday
out	ON
nextScheduleSo...	Week : Sunday
nextSchedule	1-May-16 17:00
nextScheduleSec...	515430000 second
nextScheduleVal...	false
Monday	OFF
MonSchedule1	0800-1700
MonSchedule2	
Tuesday	OFF
TuesSchedule1	0800-1700
TuesSchedule2	
Wednesday	OFF
WedSchedule1	0800-1700
WedSchedule2	
Thursday	OFF
ThurSchedule1	0800-1700
ThurSchedule2	
Friday	OFF
FriSchedule1	0800-1700
FriSchedule2	
Saturday	OFF
SatSchedule1	0800-1700
SatSchedule2	
Sunday	ON
SunSchedule1	0800-1700
SunSchedule2	
Holiday1Enabled	OFF
Holiday1	OFF
eventOutput1	OFF
Hol1Schedule1	
Hol1Schedule2	
Holiday2Enabled	OFF
Holiday2	OFF
eventOutput2	OFF
Hol2Schedule1	
Hol2Schedule2	
fallBackOut	false
nullOn	none



EasyIO Advanced Kits

- easyioEnergy
- easyioHVAC



The screenshot displays the EasyIO software interface, which is divided into several panes. The main workspace shows a grid of components and their properties.

Library Pane: Lists various components and their sizes in bytes (B).

Component	Size (B)
sys	[7]
datetime	[1]
datetimeStd	[1]
easyioControl_updated	[49]
easyioCpt	[1]
easyioFG	[8]
easyioFGModbus	[12]
easyioFGSerial	[2]
easyioFGSql	[6]
easyioHvac	[9]
AnalogFilter	[72]
Drive	[76]
FanControl	[64]
LeadLagCycles	[136]
LeadLagCycles_30s	[136]
LeadLagRuntime	[112]
SequenceLoop	[248]
sequencer	[296]
singleLoop	[240]
easyioLib	[5]
easyioSchedule	[3]
easyioSensor	[3]
easyioeuBasic	[13]
sox	[2]

Navigation Pane: Shows a tree view of the project structure.

- Sedona
 - NtpServ
 - DnsServ
 - Sch
 - IODgtl
 - IOAnlg
 - Vent
 - TmpCtrl
 - MixDmpr
 - WtProd
 - Energy
 - Optimiz
 - psychro
 - weather
 - degDays
 - PID
 - Graphics
 - AHU
 - WaterProduction
 - Schedules

Folder Pane: Displays the properties of the selected folder.

Property	Value
Optimiz	easyioEnergy::Optimiz
heatCoolMode	heatMode
parameterResetTime	
startDone	false
startEnable	false
stopEnable	false
scheduleStatus	false
nextEventTime	
nextEventSecond	0
nextEventValue	false
outsideTemp	0.00
spaceTemp	0.00
startTimeCommand	null
stopTimeCommand	null
message	
programMode	No_Calcula

Library Pane (Right): Lists various components and their sizes in bytes (B).

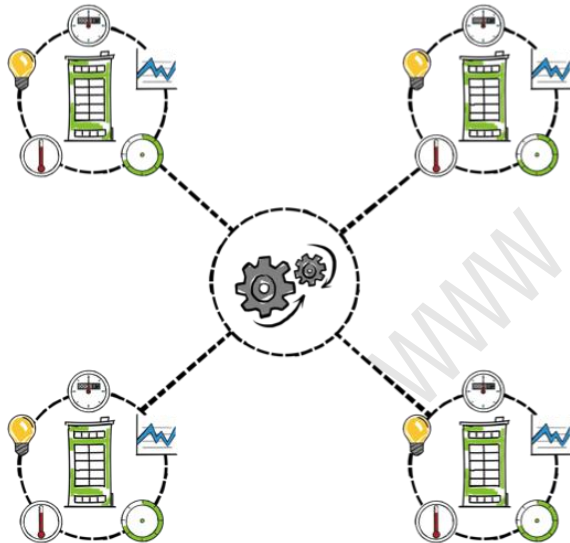
Component	Size (B)
sys	[7]
datetime	[1]
datetimeStd	[1]
easyioControl_updated	[49]
easyioCpt	[1]
easyioEnergy	[7]
degDays	[140]
OptimizedStartStop	[512]
OSSHolidayCalendar	[960]
OSSSchedule	[896]
PID	[156]
psychrometric	[164]
weatherYahoo	[9368]
easyioFG	[8]
easyioFGBACClient	[8]
easyioFGBACsvr	[3]
easyioFGEnocan	[11]
easyioFGMail	[5]
easyioFGMbSlave	[6]
easyioFGModbus	[12]
easyioFGNtp	[1]
NtpService	[876]

Component Properties: The main workspace shows the properties of the selected component, easyioHvac::AnalogFilter.

Property	Value
meta	520945665
out	0.00
reverseOut	0.00
processValue	0.00
accumulatedIntegral	0.00
enable	false
occupied	false
setPoint	25.00
throttlingRange	1.00
auxSetPoint	23.00
auxThrottlingRange	1.00
deadband	0.00
integral	0.00
differential	0.00
accumulatedIntegralLimit	
unoccupiedHeatSetPoint	
unoccupiedCoolSetPoint	
unoccupiedHysteresis	0.00
scanTime	1
rampTime	1
resetIntegral	

EasyIO FG "Drivers"

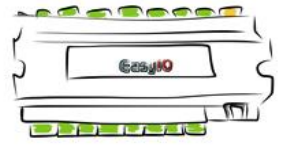
- easyioFGBACnet
- easyioFGMbSlave
- easyioFGEnocean
- easyioFGMail
- easyioFGNTP



easyioFGBACSVr [3]
easyioFGEnocean [11]
easyioFGMail [5]
BoolAlarm [408 B]
DnsService [1444 B]
FloatAlarm [520 B]
FloatAlarmEd [536 B]
SmtpService [16860 B]
easyioFGMbSlave [6]
easyioFGModbus [12]
easyioFGSerial [2]
easyioFGSerialDriver [11]

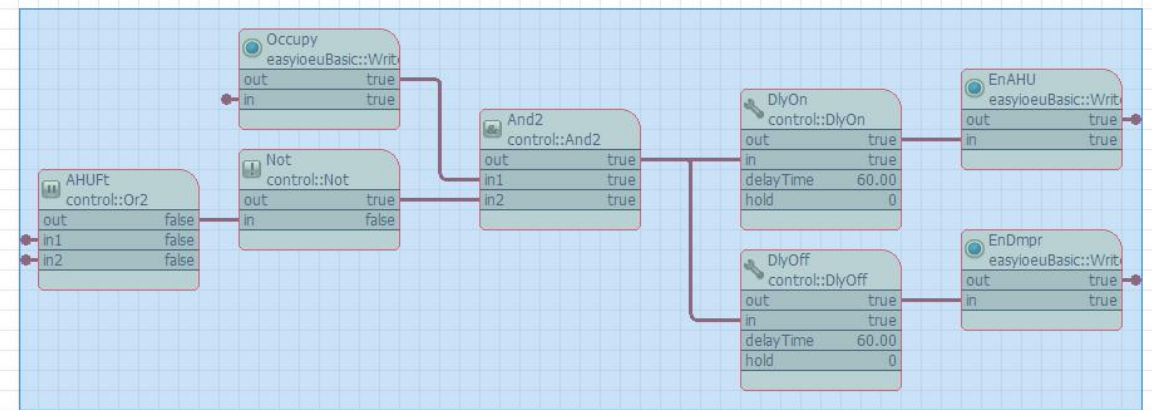
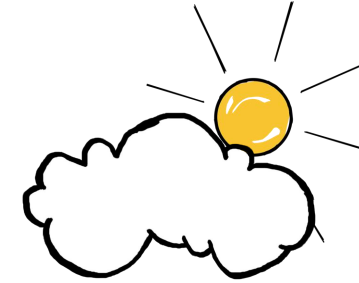
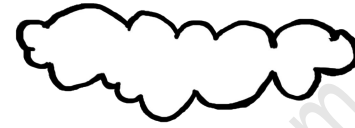
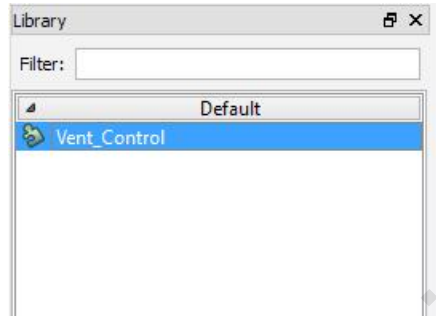
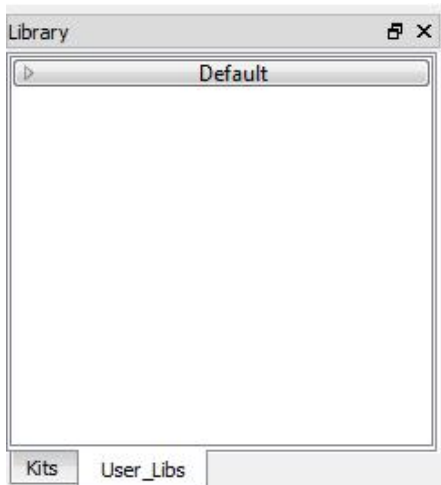
[illegible]

easyioFG [17]
easyioFGBacnet [15]
BACnetClientAI [252 B]
BACnetClientAO [400 B]
BACnetClientAV [400 B]
BACnetClientBI [252 B]
BACnetClientBO [340 B]
BACnetClientBV [340 B]
BACnetClientDevices [280 B]
BACnetClientMSI [252 B]
BACnetClientMSO [388 B]
BACnetClientMSV [388 B]
BACnetClientNetwork [168 B]
BACnetService [292 B]
BACServerAV [308 B]
BACServerBV [256 B]
BACServerNetwork [320 B]
easyioFGEnocean [11]
EnoceanBooleanBitPoint [136 B]
EnoceanBooleanPoint [156 B]
EnoceanBooleanPoint4DB [196 B]
EnoceanBooleanWritablePoint [156 B]
EnoceanDevice [140 B]
EnoceanFloatPoint [144 B]
EnoceanFloatWritablePoint [156 B]
EnoceanIntFanSpeedPoint [128 B]
EnoceanIntPoint [128 B]
EnoceanIntWritablePoint [156 B]
EnoceanNetwork [1728 B]
easyioFGMbSlave [6]
ModbusSlaveSerialNetwork [180 B]
ModbusSlaveTCPNetwork [180 B]
ModbusSvrCoilPoint [128 B]
ModbusSvrDiscretePoint [128 B]
ModbusSvrHoldingPoint [144 B]
ModbusSvrInputPoint [140 B]
easyioFGModbus [12]



User Defined Library

Create User Defined Library



Sedona Lab Exercise

Using your EasyIO FG :

1. Control Lab

