GE Lighting Control

[LIGHT SWEEP CLC340X SOFTWARE GUIDE]

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Software Installation

GE LC software is used to setup the BACnet communication parameters to interface with BMS and to program proprietary objects or create custom programming.

1. **Software installation:**

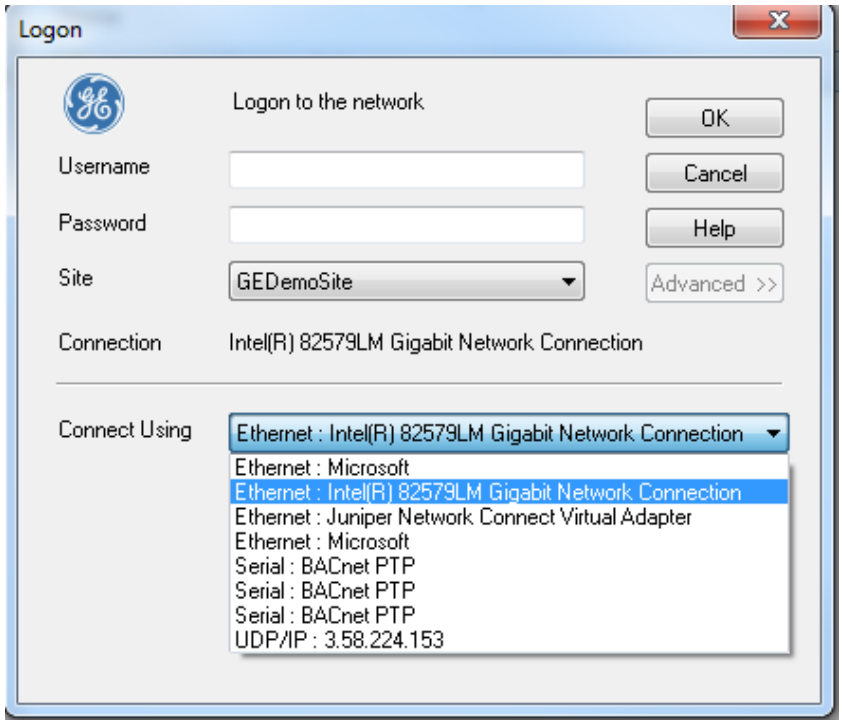
   Install the Sentinel System Driver – located in Third party Software folder

   Plug in the Sentinel Rainbow key – containing the software license

   Run the GELC Suite Setup to install the appropriate software – according to the license key.

2. **Establishing communication to the CLCBnet device**
   Once the software is installed, connect to the CLCBnet controller using the Ethernet port and launch the application.

At the Login screen select the Ethernet port under the Advanced Tab – the interface name will be displayed in the Connection line as per below window. Make sure this is the internal port and not the wireless or virtual port created by other applications.

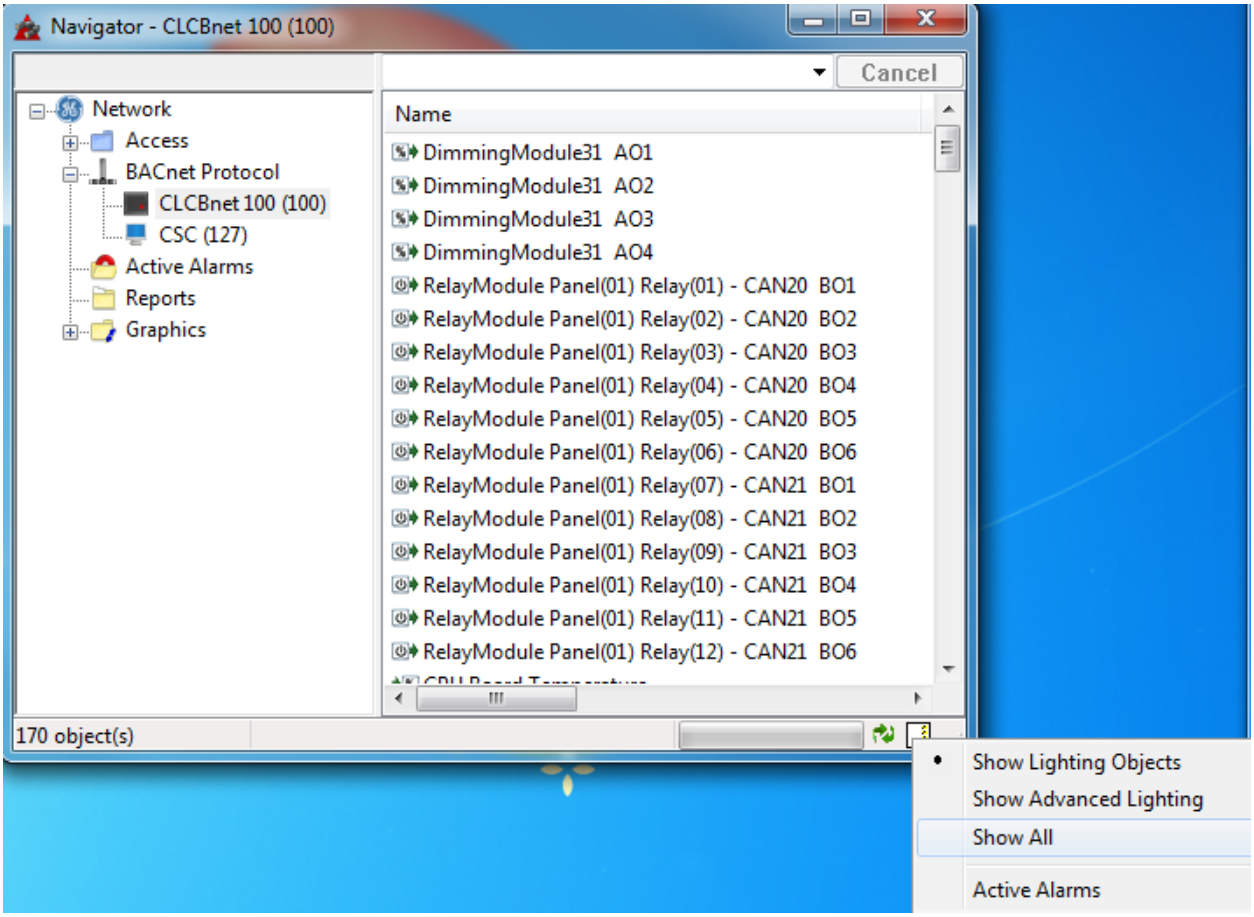


Configuring Navigator

CLCBnet device will show in the navigator – (with the default address 100).

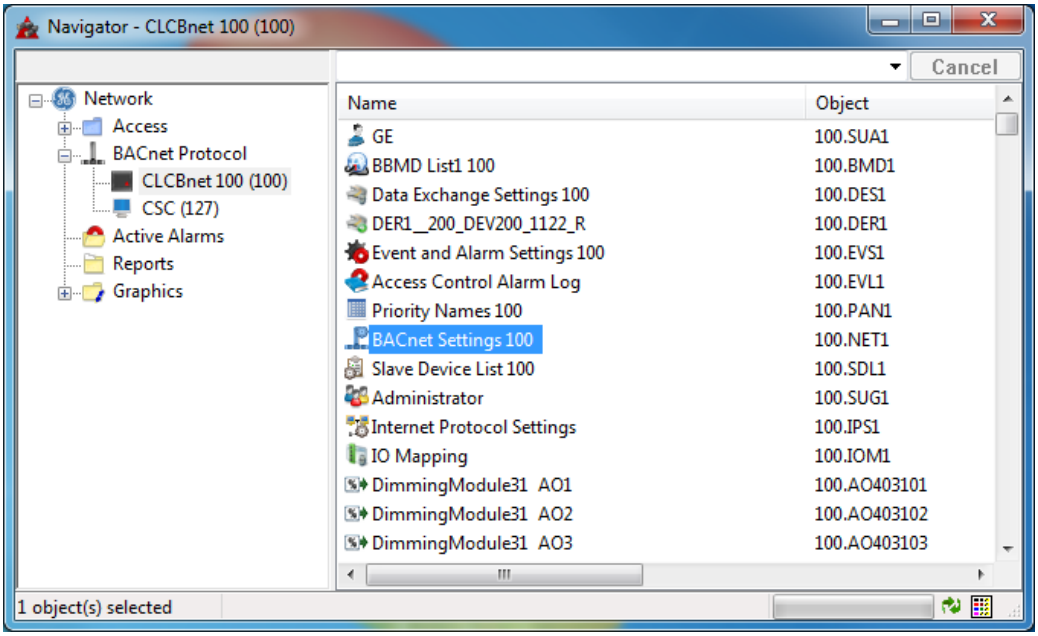
1. **Setting the CLCBnet communication parameters**
   The default view of the navigator will show only the Lighting Objects. To adjust the communication parameters this will require changing the filter to Show All option:

- Right click on the lower right corner of the Navigator window and select Show All. This will allow you to see all BACnet objects to make changes for communication type of controller and speed.



Configuring BACnet communication

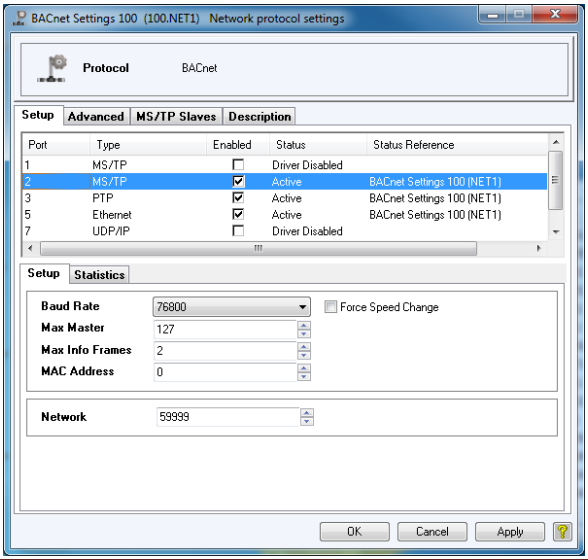
The object used to adjust the communication parameters is called BACnet Settings 100 (where 100 is the device address). Changes required to the BACnet Settings only required if integrating to building automation systems or accessing lighting control system over TCP/IP network.



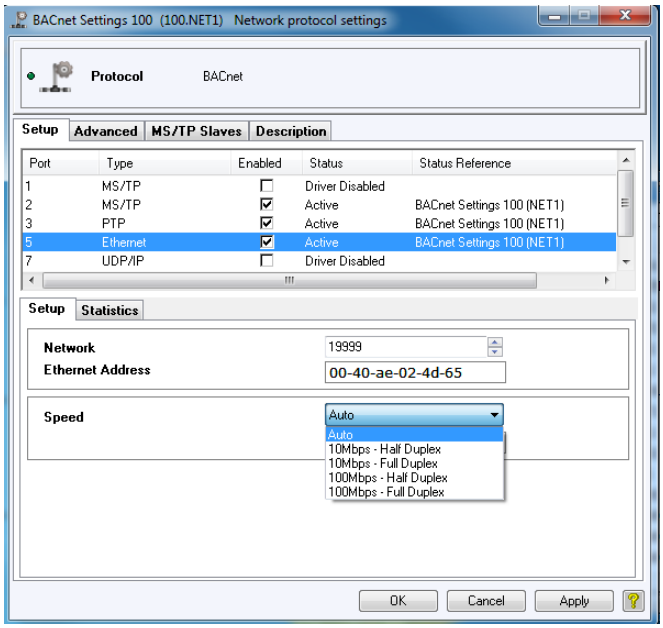
Double clicking on the BACnet Settings icon will bring the network protocol setting dialog box as seen below.

Communication parameters:

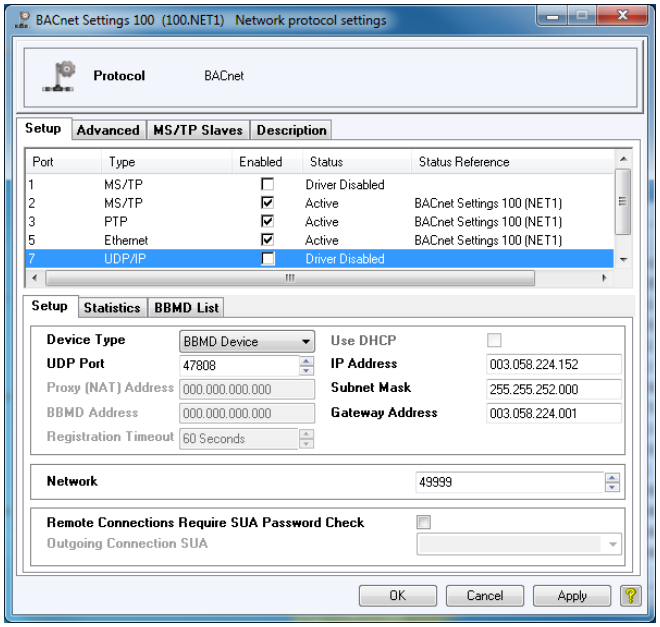
- MS/TP – Port 2 - Using the twisted shielded pair – labeled on the controller as NET2 RS-485.
    - Adjust the Baud rate required by the BMS controller
    - Change the MAC address to a unique number – default is setup to 0.



- Ethernet – enabled as default.
    - Allows changing the Speed to Auto or one of the available values: 10 or 100 Mbps with half or Full Duplex.



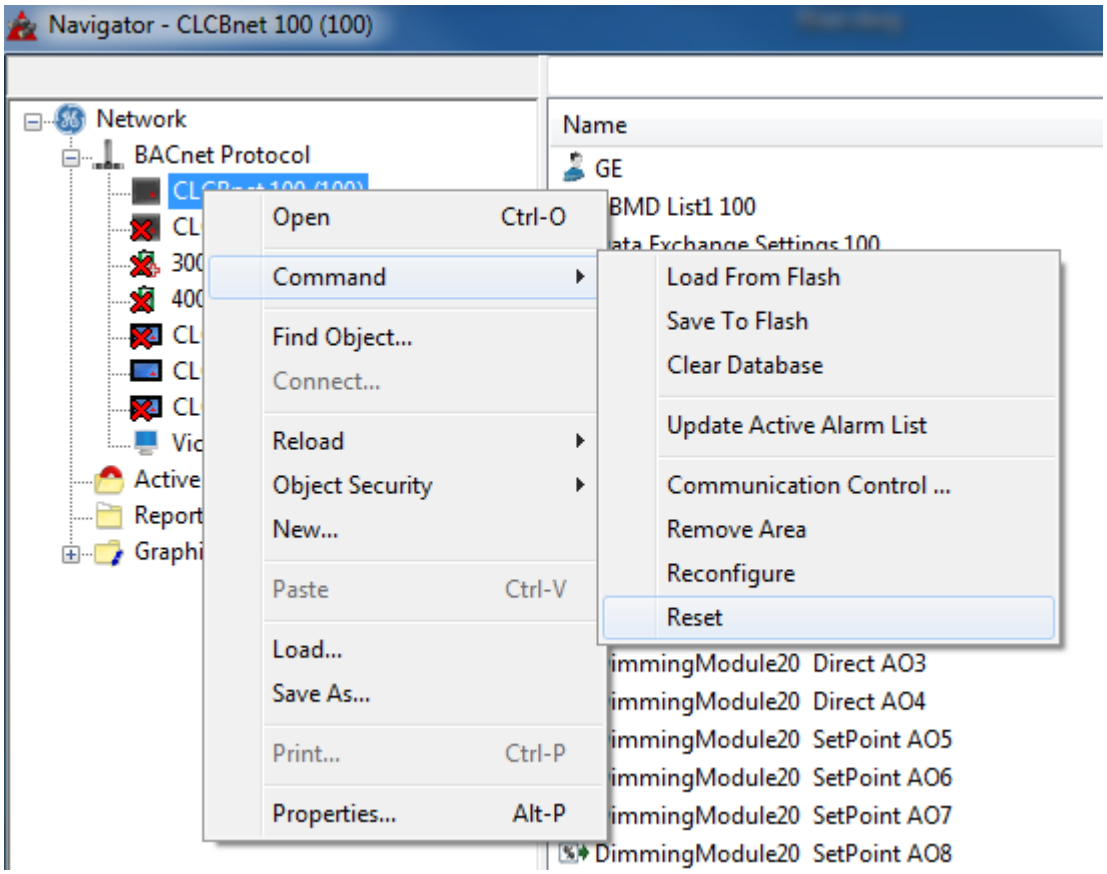
- UDP/IP – disabled by default.
    - Set the IP address, Subnet Mask and Gateway.
    - Configure the UDP Port to match the BMS controller (default is 47808).
    - If the device is in a different network than the BMS controller/computer, set the device type as BBMD. If the device is in the same network, set the type as Regular.



To enable or disable any of the ports, double click the square box and apply.

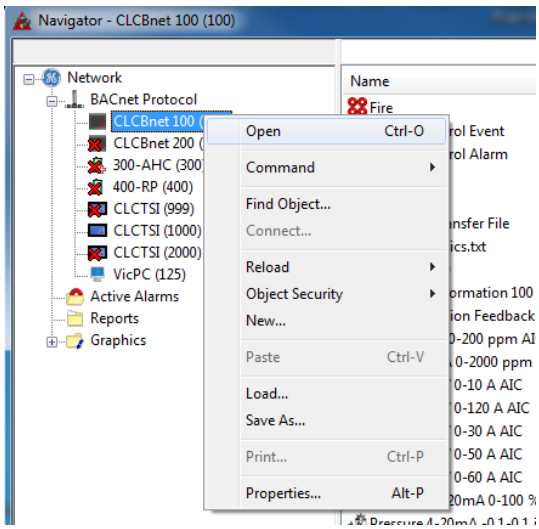
Important Notes: If the device will use the UDP/IP communication, disable the Ethernet port; else the device will create a circular network communication.

Reset the device after changing the communication parameters. To reset the device from the navigator left click on the CLCBnet controller in the network list and select Command -→ Reset and seen below.

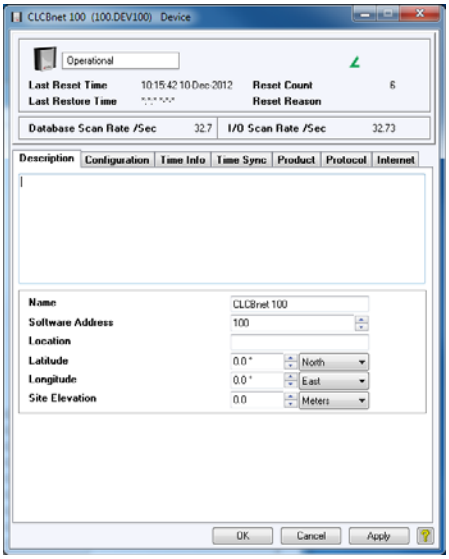


Configuring CLCBnet

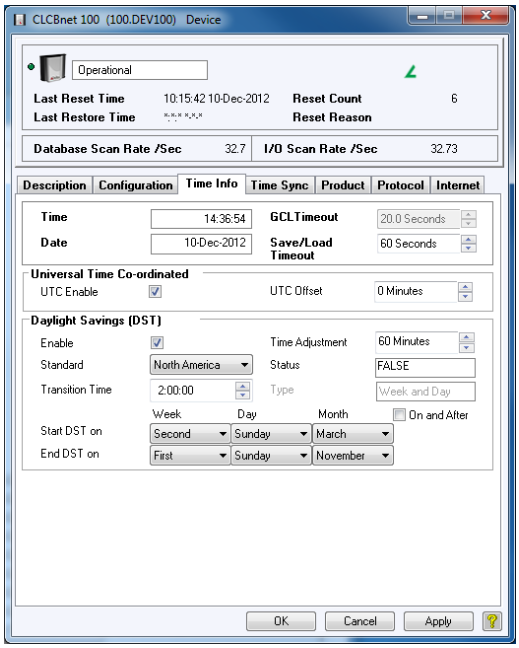
1. Setting the CLCBnet device name and BACnet address
   Right click on CLCBnet 100 in the Navigator window and select Open.



- Description tab:
  - Name
  - Software Address
  - Latitude and Longitude used for Astronomical clock function

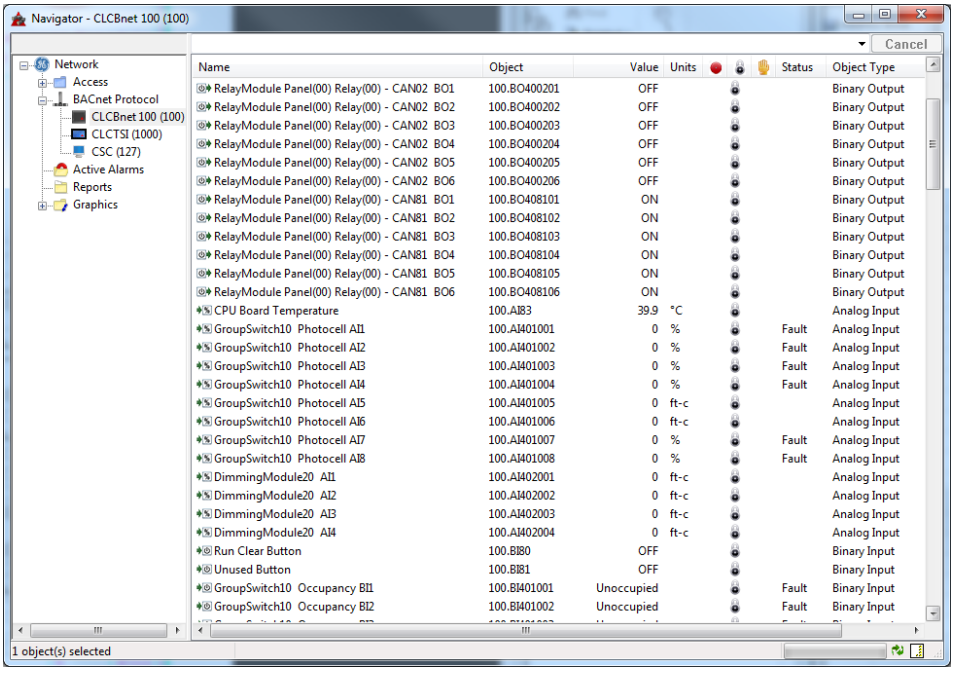


- Time Info tab:
  - Universal Time Coordinate (Enable or Disable). Used in conjunction with location parameters for Astronomic clock. UTC offset = time zone value in minutes with "-" sign (Eastern time zone = -300 minutes, Pacific time zone = -480 minutes).
  - DST Enable or Disable. Allow to select the relative dates and the transition time.



System Configuration

All network objects will be displayed in the Navigator screen. To make it easier to program the system, change the filter to Show Lighting Objects.



Based on type the lighting objects are categorized as:

- Analog Outputs – AO – dimming channels
- Binary Outputs – BO – relays
- Analog Inputs – AI – inputs defined as analog objects- dimming module inputs or group switch inputs
- Binary inputs – BI- inputs on GSM module defined as Occupancy sensors.
- Analog Values – AV – for CLCDIM module allow to setup the dimming parameters
- Binary Values – BV – Virtual objects on CLCBnet controller. Can be used as triggers for LC groups
- Schedules – SCH – eight objects on CLCBnet controller. Each CLCDLS touchscreen has also 8 schedules.
- Lighting Control Groups – LC – sixteen local groups on CLCBnet and 8 groups on each group switch module CLCGSM8 or dataline switch CLCSWT. The lighting groups are used to create different control scenarios.

Lighting BACnet Objects

2. **Dimming Module DIM4 - Channel Objects**			
Name	Object type/Offset	Object ID	Description
Dimming level output	AO 1-4	DEV.AO40xx01 DEV.AO40xx04	Controls the 0-10V dimming output Manual control - used for scenes.
Dimming level Setpoint	AO 5-8	DEV.AO40xx05 DEV.AO40xx08	Setpoint for closed loop photocell connected to corresponding Analog Input (AI)
Photocell input	AI 1-4	DEV.AI40xx01 DEV.AI40xx04	This value indicates the light level read by a photocell attached to this input. The value is used to adjust the SETPOINT (for close loop photocell) or dimming thresholds (for an open loop sensor).

Group Switch Module GSM8 - Channel Objects			
Name	Object type/Offset	Units of Measure	Description
Photocell	AI 1-8	DEV.AI40xx01 DEV.AI40xx08	If the input is defined as Photocell, this value indicates the light level read by a photocell attached to this input.
Occupancy	BI 1-8	DEV.BI40xx01 DEV.BI40xx08	If the input is defined as an Occupancy sensor, this value will show if the sensor detect occupancy: Occupied; Unoccupied.
Type	MV 1-8	DEV.MV40xx01 DEV.MV40xx08	Defines the input type (Switch, Photocell or Occupancy Sensor)
Lighting Group	LC 1-8	DEV.LC40xx01 DEV.LC40xx08	List of relay circuits controlled by the group, control type and triggers associated to the group.

Relay Module RMS6- Channel Objects			
Name	Object type/Offset	Units of Measure	Description
Relay Output	BO 1-6	DEV.BO40xx01 DEV.BO40xx06	Control the lighting circuit power relay Priority 15 - Schedule - includes the Flick Warning Priority 16 ON/OFF.

Where:

DEV is the BACnet ID of the controller – CLCBnet

xx – CAN ID – setup using the dials on each module. xx = 01 to 99

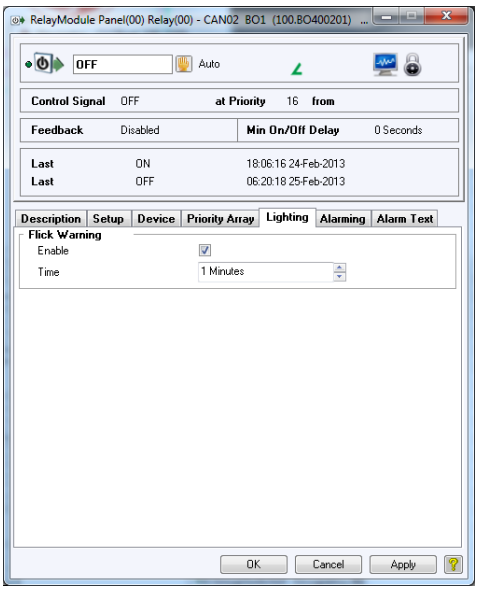
If the relay modules are configured as belonging to a panel, the BO id's will be:

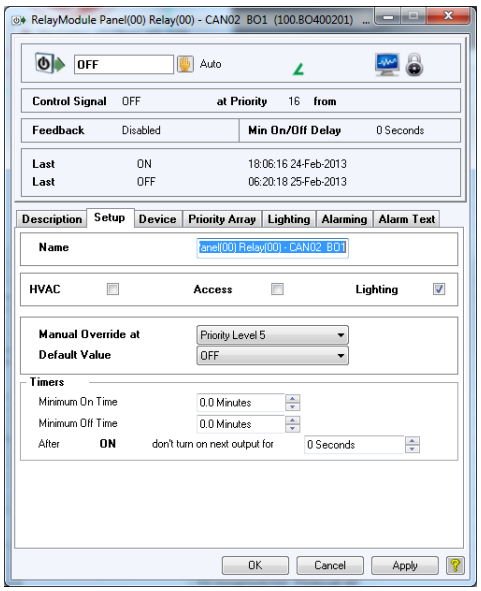
DEV.BO41yy01 – to – DEV.BO41yy48 – where yy is the panel number defined using the touchscreen.

Relay properties

To adjust relay for flick warn and duration amount this is done through the relay properties dialog box for each individual relay. To access the dialog box double click on relay.

- Lighting tab: Flick Warning: Enable/Disable and Flick time – the time between the relay flicker and the OFF transition.
- The relay will flick only if the OFF command received is a flick type command.
- The Setup tab allows changing the relay name.



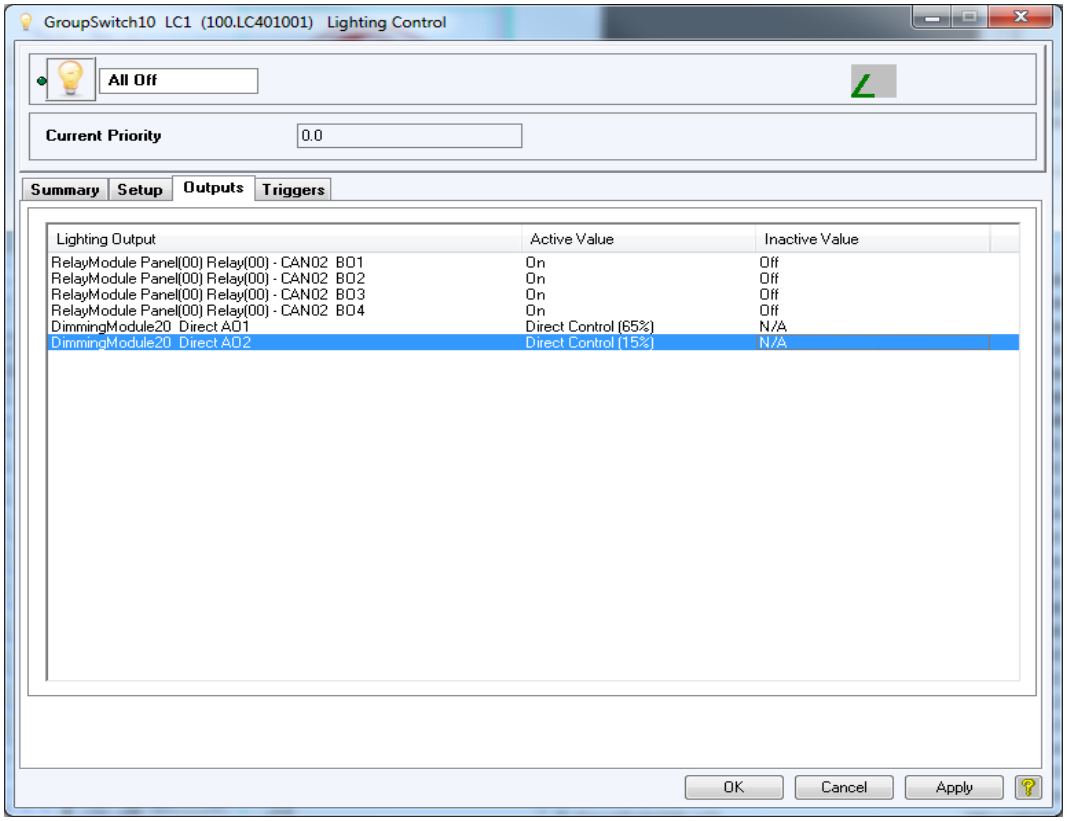


Configure the Lighting Group – LC

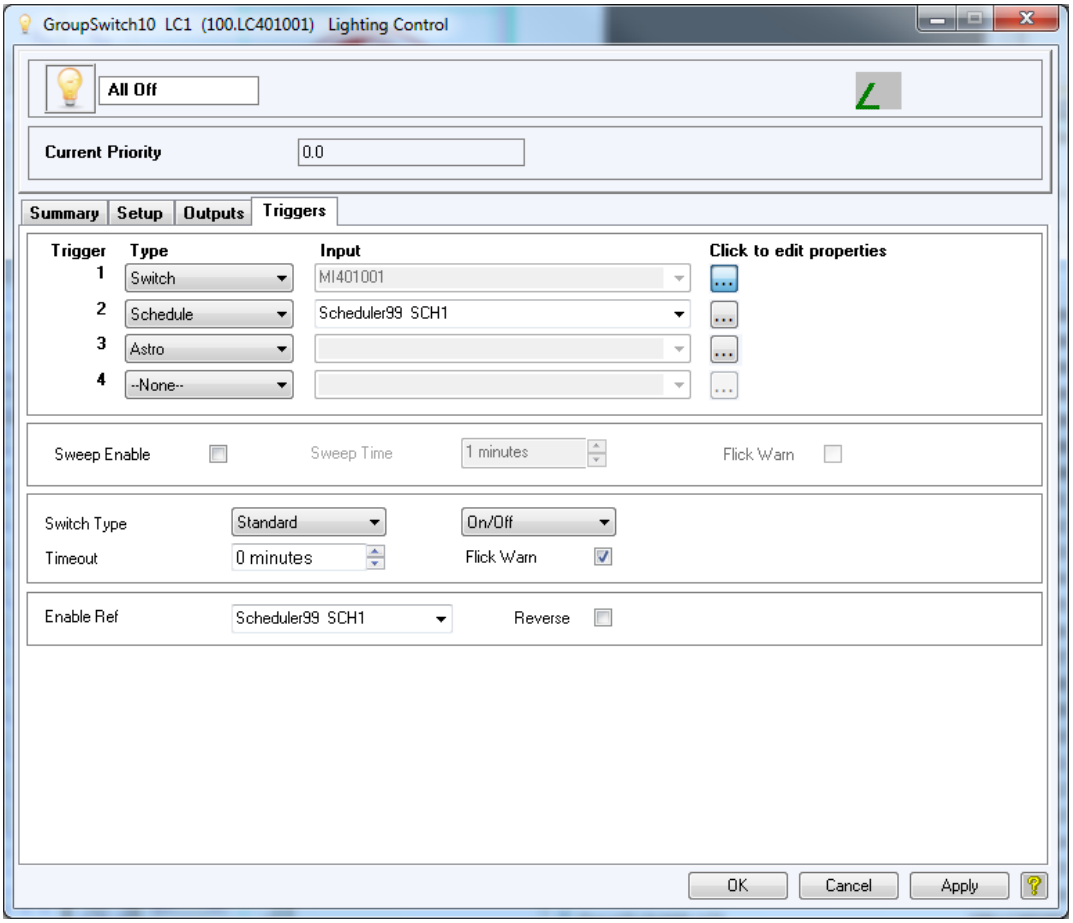
The LC objects are used to create the control logic:

1. Grouping multiple relays for the same type of control
2. Assigning trigger points – schedules, occupancy sensors, photocells
3. Create the control logic for each trigger point – ON only, ON/OFF or OFF only mode.
4. Define control scenes – when relays and dimming outputs are combined.

1. Assign relays or analog outputs to a lighting group – using the **Outputs** Tab.



2. Assign the trigger points – under **Triggers** tab

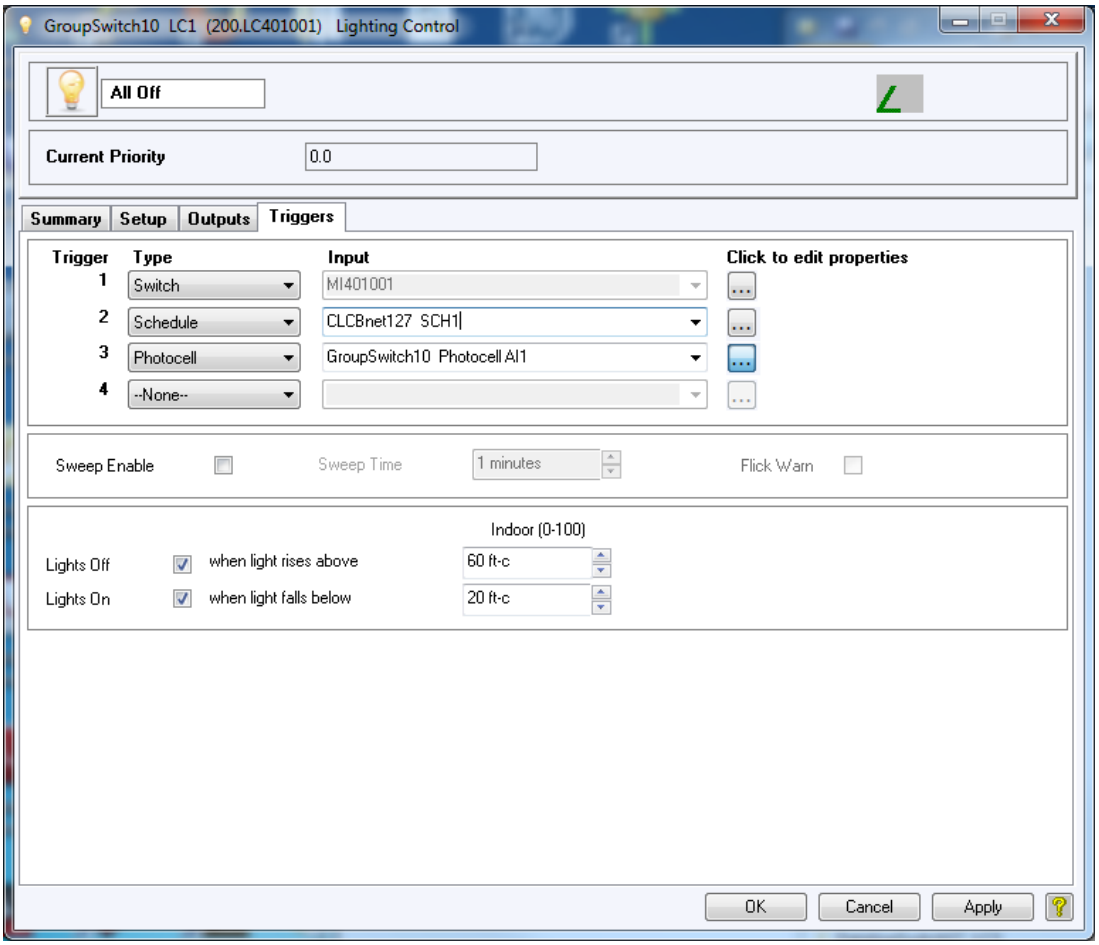


3. Select the type from the drop down Type list:

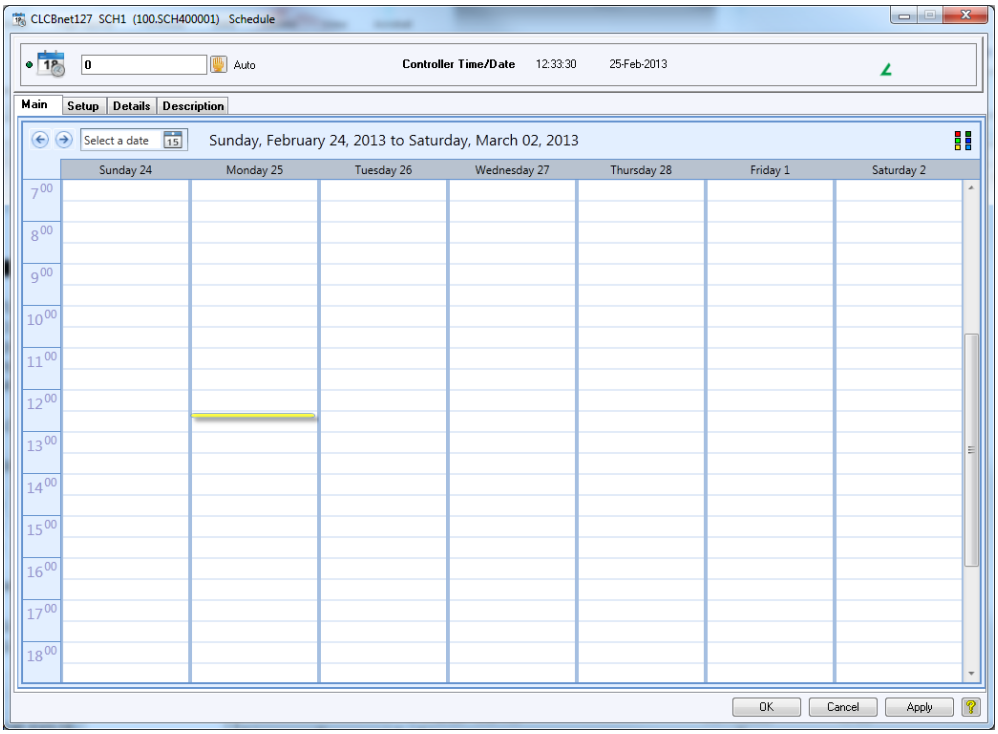
- Schedule – time schedule
- Astro – based on sunrise and sunset
- Photocell
- Occupancy sensor
- Switch
- Sweep Enable – if lights are turned ON by local override and all triggers are OFF, the sweep will turn lights OFF after the Sweep Time. If the Flick Warn is enabled, the lights will flick at the end of the Sweep Time

4. Edit the trigger properties:

- Schedule – enable the ON & OFF action and select the offset. The offset allows to utilize same schedule for multiple groups – store scheduler for retail applications. Enable the Flick warning.
- Astro – select the offset for ON and OFF based on sunrise and sunset time
- Photocell – Set the high and low light levels to turn lights ON and OFF. For indoor lighting use a dead-band equivalent to the amount of artificial lighting provided by the luminaires in order to avoid the ON/OFF oscillations.
- Occupancy sensor – allow to setup a time delay through the software. This time delay will add to the time delay configured at sensor level. Recommended is to use a sensor with time delay less than 1 minute.
- Switch – can select a reference schedule to enable/disable the switch functionality – either in direct mode (switch enabled when schedule is ON) or reverse (switch is enabled when the schedule is OFF).

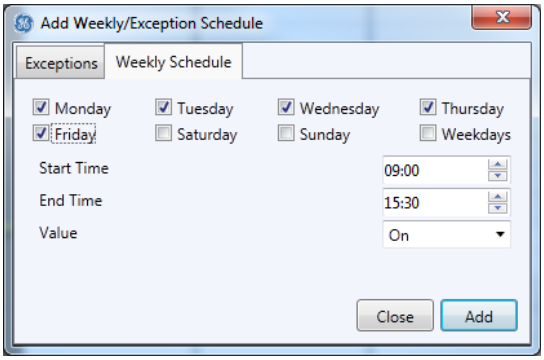


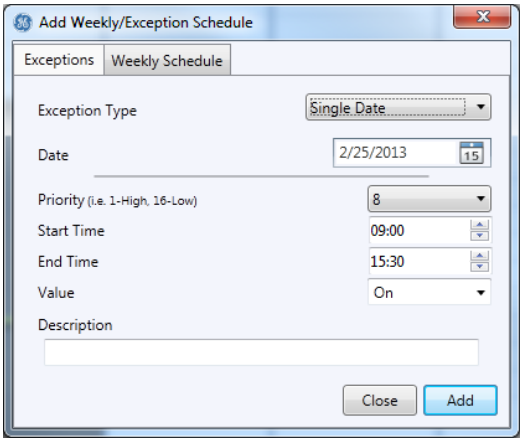
Assigning Time Schedules



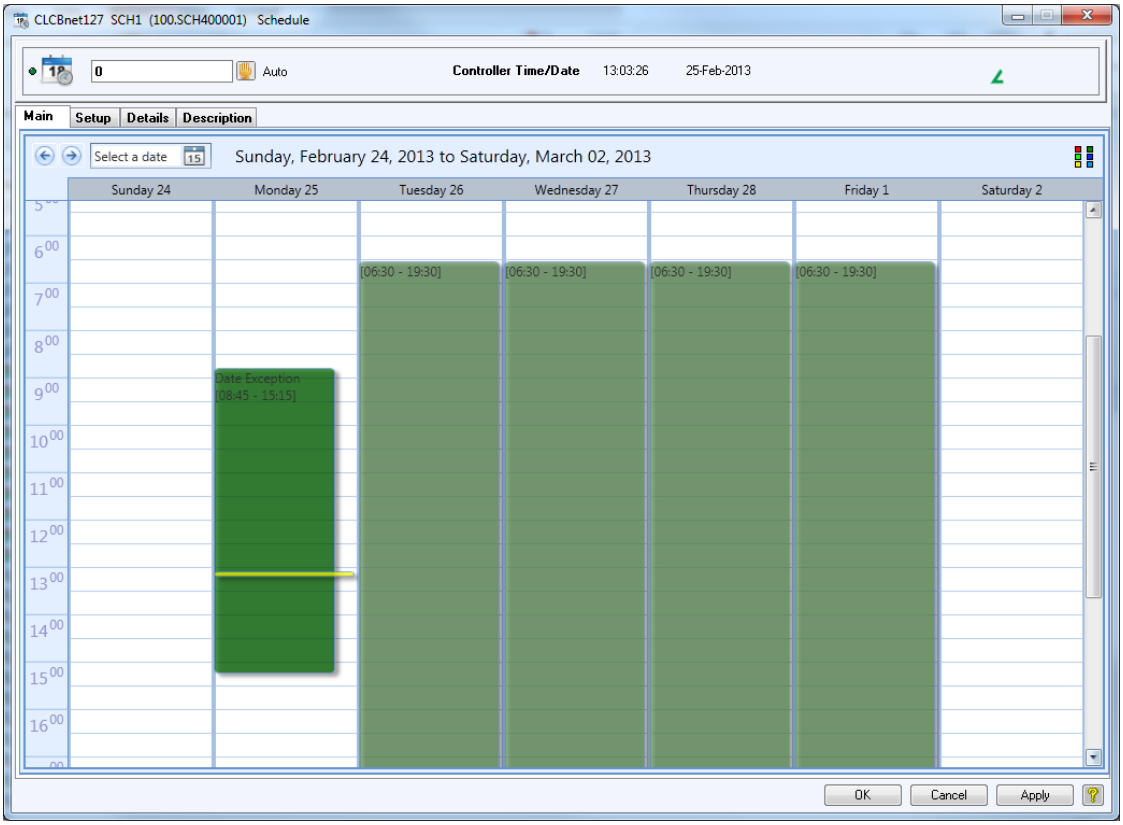
To define a time schedule:

- Double click the schedule object: For example CLCBnetxxx SCH1
- Select the day of the week to update
- Click the start time and drag to end time
- In the box that pops up select the weekly schedule
- Enter check marks for all days with similar schedule





Exceptions – holidays – must be defined for each schedule used in the system, creating a bigger flexibility in case a custom event must be assigned to a particular zone, without affecting the other schedules.



On the schedule screen, the exception is in darker color than the regular schedule.

Dimming Objects and properties

Each dimming module CLCDIM4 - has 4 channels.

Below is a detail showing dimming objects and the default names for dimming module with **CAN address 16**:

- Direct Output – read/write – changing this value will adjust the channel voltage – 100% = 10.5V (maximum); 0% = 0.5V (minimum). Most fixtures will not dim below 10% even though the control signal goes to 0.

DimmingModule16 Direct AO1	100.AO401601
DimmingModule16 Direct AO2	100.AO401602
DimmingModule16 Direct AO3	100.AO401603
DimmingModule16 Direct AO4	100.AO401604

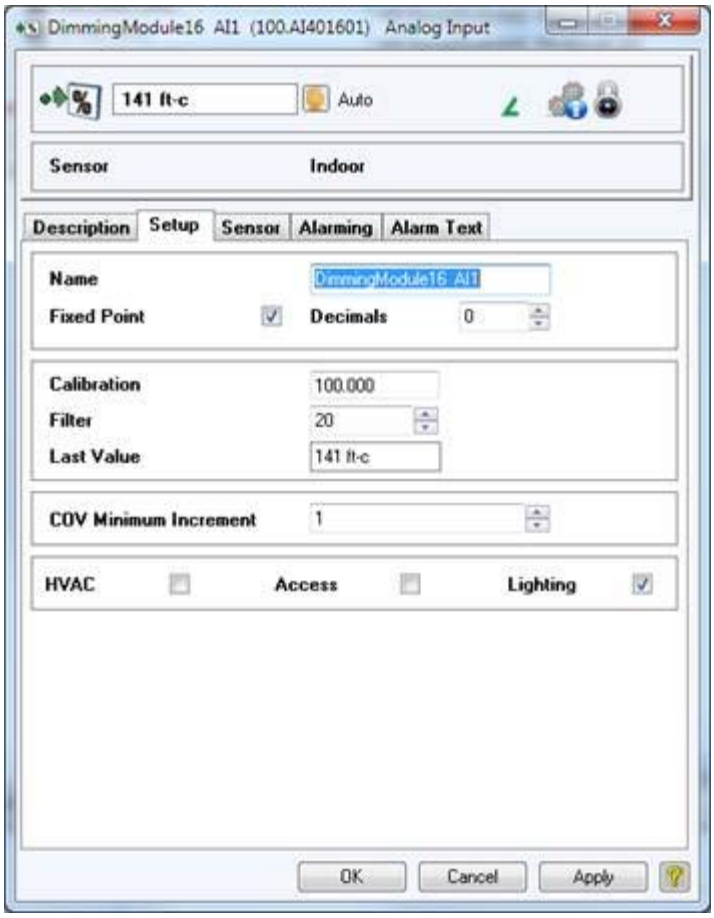
- Setpoint – used with a close loop photocell. The internal PID will change the output level based on the photocell readings to maintain a constant output – daylight harvesting. Setpoint AO5 corresponds to channel 1

DimmingModule16 SetPoint AO5	100.AO401605
DimmingModule16 SetPoint AO6	100.AO401606
DimmingModule16 SetPoint AO7	100.AO401607
DimmingModule16 SetPoint AO8	100.AO401608

- Analog Inputs – Photocells – Read only – light level detected by the sensor

DimmingModule16 AI1	100.AI401601	141	ft-c
DimmingModule16 AI2	100.AI401602	0	ft-c
DimmingModule16 AI3	100.AI401603	0	ft-c
DimmingModule16 AI4	100.AI401604	0	ft-c

- Properties for the AI object:
  - Calibration – using a light meter can calibrate the AI to display a very close light level reading, Indoor photocells are reading the floor reflected light, and based on the floor color this reading can be lower than the light level on desk level. Calibration allows to adjust from 0.5 (-100) to 2 (+100) times the reading of the sensor
  - Filter – the higher value, the slower the light level changes (filters out reading values)



- Analog Values for channel 1 – module 16:
    - AV40xx11 – Setpoint – saved in Flash Memory, The AV Setpoint is used when the system operates in stand-alone mode without BACnet controller. Changing the AV setpoint requires controller power cycle.
    - Channel Min – regardless of the control signal value the channel output will not go below this value.
    - Channel Max – regardless of the control signal value, the channel output will not go above this level.

DimmingModule16 Channel1 Setpoint	100.AV401611	50	ft-c
DimmingModule16 Channel1 Min	100.AV401612	0	%
DimmingModule16 Channel1 Max	100.AV401613	100	%

    - Ramp Rate – the Ramp UP and Ramp Down rate when the Ramp command is issued via the programmable switches (though the LC object).
    - Fade time – how long it takes to change the output level between two values – for example Fade Time can be setup up to 1 hour, simulating sunrise or sunset.
    - Input reference – read only – which input is associated to this dimming channel. Can be changed only via the touchscreen. Bu default is the physical input on the DIM module.

DimmingModule16	Channel1	RampRate	100.AV401617	20	%/s
DimmingModule16	Channel1	InputRef: AI401601	100.AV401618	0	
DimmingModule16	Channel1	FlickWarnPeriod	100.AV401619	10	min
DimmingModule16	Channel1	LocalFadeTime	100.AV401620	0	sec