



IntelliLED EtherNet/IP Adapter

AOI User Reference Manual

Lighting System

The IntelliLED Lighting System Server provides an automated interface, through which a user can control and monitor all the connected devices in a building-wide light control system. It comes with a web interface. The IntelliLED Ethernet Adapter was produced to be able to duplicate the web interface through Ethernet IP. The functionality is made available in the Rockwell PLC with the help of some AOI instructions.

Please reference the **Dialight IntelliLED EtherNetIP Adapter – User Reference** document for details on the available objects and properties.

This document describes the Dialight IntelliLED AOIs that provide access to get and set the available IntelliLED Lighting System properties.

Revision History

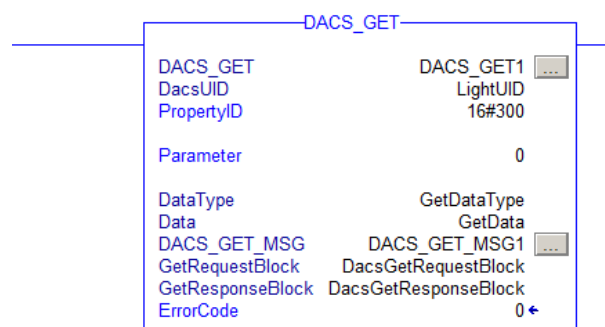
Date	Version	Changes	Author
8/2/2016	1.0	Initial version	Merwyn Essenburg
9/8/2016	1.1	Updated Events with new event: <ul style="list-style-type: none"> Schedule Event List Size Changed 	Merwyn Essenburg

AOI Overview

Four AOI's were created: IntelliLED_GET, IntelliLED_SET, IntelliLED_EVENTS and IntelliLED_EVENT_GET to package the interface and simplify the user interface to the IntelliLED system.

IntelliLED_GET

The IntelliLED_GET AOI packages the details for retrieving a property from the IntelliLED system. The property retrieved can be any of the following datatypes: BOOL, SINT, INT, DINT, STRING32 (32 char string), STRING64 (64 char string), STRING128 (128 char string). The user must know the datatype of the property, provide that information to the IntelliLED_GET AOI in the DataType user defined structure, and retrieve the data from the appropriate element of the Data user defined structure. Limitations in the PLC require that the MSG command and buffers used by the MSG command be controller-scoped variables. The MSG command must be configured manually.



Property	Description
IntelliLED_GET	Variable that holds the IntelliLED_GET AOI instruction. Can be Controller or Program scoped.
DacsUID	String type variable that holds the UID of the object instance to query.
PropertyID	PropertyID that is to be retrieved. Can be specified as decimal or hexadecimal. Note: For Rockwell PLCs, hexadecimal notation is 16#xx.
Parameter	Optional parameter based on the Property to retrieved. Must be a DINT data type.
DataType	User-defined structure that defines the property data to be retrieved. The AOI will put the data into the appropriate datatype, based on the type indicated. Options are: <ul style="list-style-type: none"> • IsBOOL • IsSINT • IsINT • IsDINT • IsSTRING32 • IsSTRING64 • IsSTRING128 Note: only one type can be selected in this user defined type. The ErrorCode value will return 999 if no type is selected, or more than 1 bit is set.
Data	The property to be retrieved. It is a user-defined structure, with a number of datatypes. The user must know which location in the structure to retrieve, based on the Datatype selected.
IntelliLED_GET_MSG	The message command to use for the property request. Must be a controller-scoped variable and must be manually configured. See below for configuration.
GetRequestBlock	An array of bytes used by the message instruction. Must be controller-scoped and a 256 byte array. The variable used here must be the same variable configured in the Message Source field.
GetResponseBlock	An array of bytes used by the message instruction. Must be controller-scoped and a 256 byte array. The variable used here must be the same variable configured in the Message Destination Element.
ErrorCode	Returns any errors from the AOI message instruction. 999 – Datatype is not defined properly. (ie not bit is set or more than 1 bit is set) 0 – OK All other numbers, see the Message command error description.
Done	Set when the AOI is completed successfully.

AOI Data Types

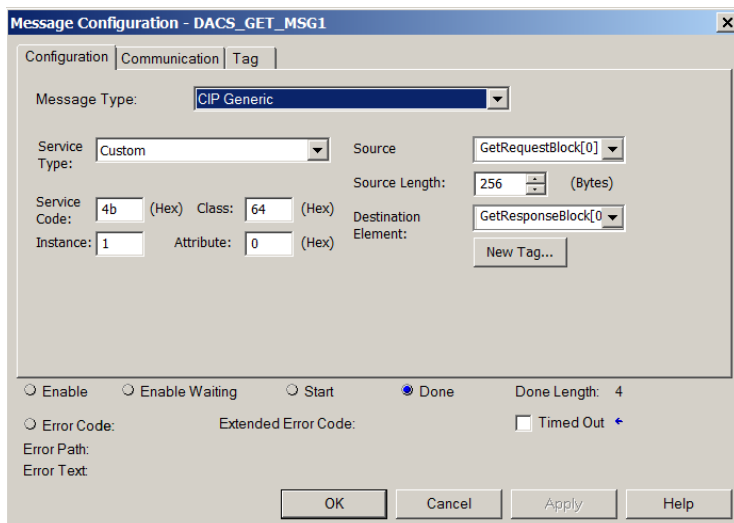
- String Types
 - STRING32 (32 character string)
 - STRING64 (64 character string)

- STRING128 (128 character string)
- DacsData
 - BOOL
 - SINT
 - INT
 - DINT
 - STRING32
 - STRING64
 - STRING128
- DacsDataType
 - IsBOOL
 - IsSINT
 - IsINT
 - IsDINT
 - IsSTRING32
 - IsSTRING64
 - IsSTRING128

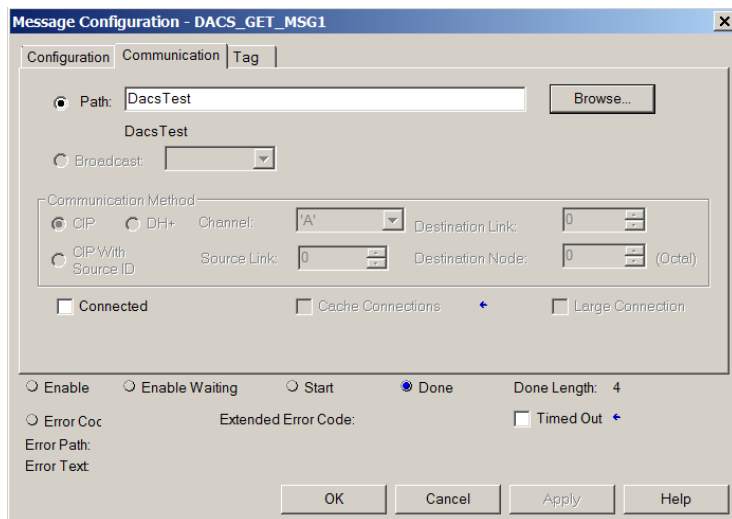
Message Configuration

There are two parts to the message configuration: CIP configuration and communication. The message command must be configured in the PLC program as follows.

The Get request requires a Message Type of CIP Generic, Service Type of Custom, Service Code of 4b, Instance of 1, Class of 64, Attribute of 0. The Source and Destination element arrays must be controller-scoped and match the parameters of the AOI for the GetRequestBlock and GetResponseBlock because the AOI uses them.

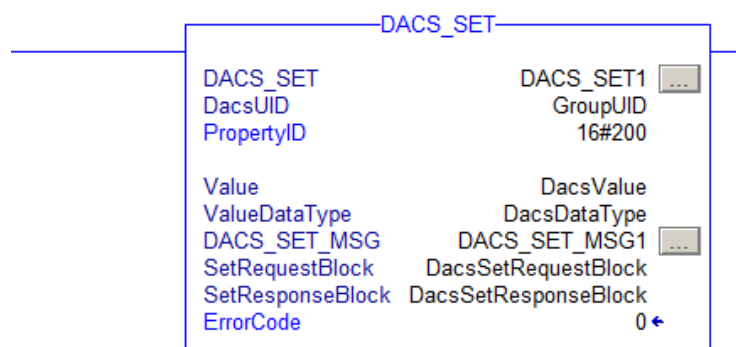


The Path must be configured on the Communication tab. This will be dependent on the IP address of the IntelliLED server and the type of PLC. The best way is to use the Browse button to find the device on the network.



IntelliLED_SET

The IntelliLED_SET AOI packages the details for setting a property in the IntelliLED system. The property to set can be any of the following datatypes: BOOL, SINT, INT, DINT and STRING. The user must know the datatype of the parameter to set: provide that information to the IntelliLED_SET AOI in the ParameterType user defined structure, and put the data into the appropriate element of the Parameter user defined structure. Limitations in the PLC require that the MSG command and buffers used by the MSG command be controller-scoped variables.



Property	Description
IntelliLED_SET	Variable that holds the IntelliLED_SET AOI instruction. Can be Controller or Program scoped.
DacsUID	String type variable that holds the UID of the object instance to retrieve.

PropertyID	PropertyID identifies the property to be set. Can be specified as decimal or hexadecimal. Note: For Rockwell PLCs, hexadecimal notation is 16#xx.
Value	Contains the data of the Property to be set. The data must be put into the appropriate field of this IntelliLED user defined structure, which must match the ParameterType selected.
ValueDataType	Defines the property data to be set. The AOI will pull the data from the appropriate parameter field based which type is selected. Note: only one type can be selected in this user defined type. The ErrorCode value will return 999 if no type is selected or more than one type is selected.
IntelliLED_SET_MSG	The message command to use for the property set. Must be a controller-scoped variable and must be manually configured. See below for configuration.
SetRequestBlock	An array of bytes used by the message instruction. Must be controller-scoped and a 256 byte array. The variable used here must be the same variable configured in the Message Source field.
SetResponseBlock	An array of bytes used by the message instruction. Must be controller-scoped and a 256 byte array. The variable used here must be the same variable configured in the Message Destination Element.
ErrorCode	Returns any errors from the AOI message instruction. 999 – Datatype is not defined properly. (ie. not selected, or more than one selection, or String mismatch.) 0 – OK All other numbers, see the Message command error description.
Done	Set when the AOI is completed successfully.

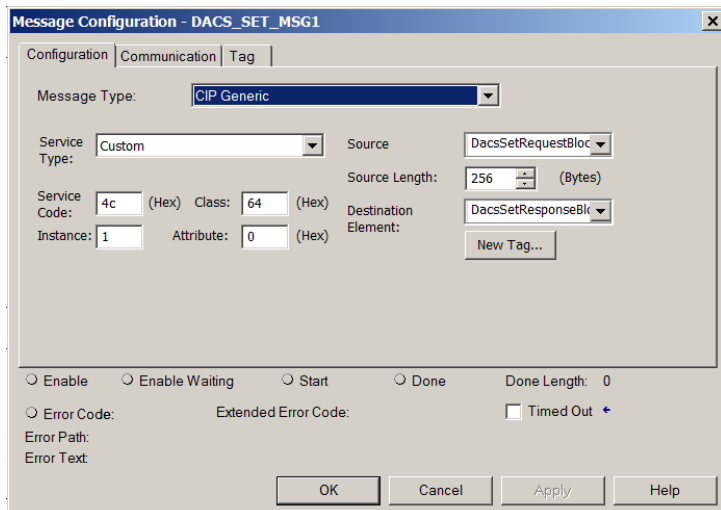
AOI Data Types

- String Types
 - STRING32
 - STRING64
- DacsParameter
 - SINT (contains data for SINT or BOOL). For BOOL it would be 0 or -1.
 - INT
 - DINT
 - STRING (length must match DacsDataType)
- DacsDataType
 - IsBOOL
 - IsSINT
 - IsINT
 - IsDINT
 - IsSTRING32
 - IsSTRING64
 - IsSTRING128 (N/A for SET Property)

Message Configuration

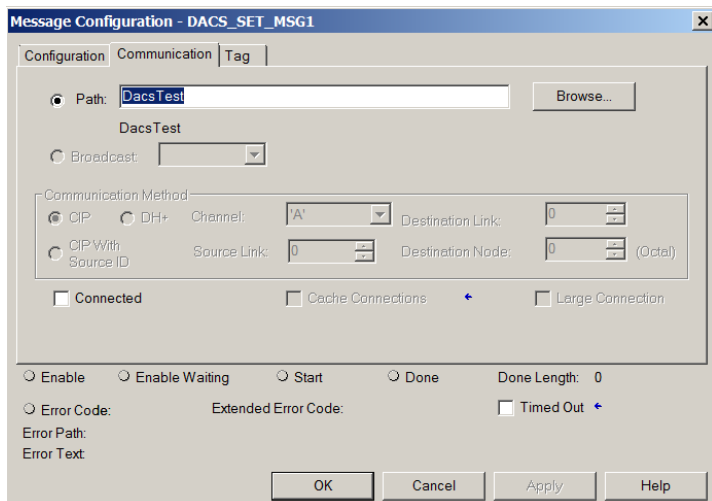
There are two parts to the message configuration: CIP configuration and communication.

The Set request requires a Message Type of CIP Generic, Service Type of Custom, Service Code of 4c, Instance of 1, Class of 64, Attribute of 0. The Source and Destination element arrays must be controller-scoped and match the parameters for the SetRequestBlock and SetResponseBlock because the AOI uses them.



The screenshot shows the 'Message Configuration - DACS_SET_MSG1' dialog box with the 'Configuration' tab selected. The 'Message Type' is set to 'CIP Generic'. The 'Service Type' is 'Custom'. The 'Service Code' is '4c' (Hex), 'Class' is '64' (Hex), and 'Instance' is '1'. The 'Attribute' is '0' (Hex). The 'Source' is 'DacsSetRequestBloc' and 'Source Length' is '256' (Bytes). The 'Destination Element' is 'DacsSetResponseBlc'. There is a 'New Tag...' button. At the bottom, there are radio buttons for 'Enable', 'Enable Waiting', 'Start', and 'Done', with 'Done Length' set to '0'. There are also checkboxes for 'Error Code', 'Extended Error Code', and 'Timed Out'.

The Path must be configured on the Communication tab. This will be dependent on the IP address of the IntelliLED server and the type of PLC. The best way is to use the Browse button to find the device on the network.



The screenshot shows the 'Message Configuration - DACS_SET_MSG1' dialog box with the 'Communication' tab selected. The 'Path' is 'DacsTest' and there is a 'Browse...' button. The 'Broadcast' checkbox is unchecked. The 'Communication Method' section has radio buttons for 'CIP' and 'DH+', with 'CIP' selected. The 'Channel' is 'A', 'Destination Link' is '0', 'Source Link' is '0', and 'Destination Node' is '0' (Octal). There are checkboxes for 'Connected', 'Cache Connections', and 'Large Connection'. At the bottom, there are radio buttons for 'Enable', 'Enable Waiting', 'Start', and 'Done', with 'Done Length' set to '0'. There are also checkboxes for 'Error Code', 'Extended Error Code', and 'Timed Out'.

IntelliLED_EVENTS

The IntelliLED_EVENTS AOI packages the details for setting event triggers for the IntelliLED system. The AOI requires the Class 1 device connection to the IntelliLED system.

Add the **IntelliLED EtherNet/IP Adapter** device, give it a name, and set the appropriate IP address. Note that it creates the Name:I in the controller-scoped variables.



Property	Description
IntelliLED_EVENTS	Variable that holds the IntelliLED_EVENTS AOI instruction. Can be Controller or Program scoped.
DacsEventCounts	The data area mapped to the device class 1 connection. Array of 128 bytes. This is a controller-scoped variable created by the device.
DacsEventDetected	Contains a DINT with a bit for each event. The bit must be cleared by the user. Can be controller or program scoped. <ul style="list-style-type: none"> 1: Gateway List Size Changed 2: Alert List Size Changed 3: Schedule List Size Changed 4: Group List Size Changed 5: Device List Size Changed 6: Emergency Override Changed 7: Motion Sensed 8: Gateway Device List Size Changed 9: Group Light Level Changed 10: Group Override Changed 11: Group Device List Size Changed 12: Group Schedule List Size Changed 13: Group WOS Enabled Changed 14: Group WDLH Enabled Changed 15: Schedule Event List Size Changed
LastEventCounts	Contains an array of 128 bytes to store the last event counts. Variable can be controller or program scoped.

AOI Data Types

- DacsServerEvents

IntelliLED_EVENT_GET

The IntelliLED_GET AOI packages the details for retrieving a property from the IntelliLED system. Limitations in the PLC require that the MSG command and buffers used by the MSG command to be controller-scoped variables.



Property	Description
IntelliLED_EVENT_GET	Variable that holds the IntelliLED_EVENT_GET AOI instruction. Can be Controller or Program scoped.
IntelliLED_GET_EVENT_MSG	The message command to use for the event request. Must be a controller-scoped variable and must be manually configured. See below for configuration.
EventID	<p>ID of the Event to retrieve.</p> <ul style="list-style-type: none"> 1: Gateway List Size Changed 2: Alert List Size Changed 3: Schedule List Size Changed 4: Group List Size Changed 5: Device List Size Changed 6: Emergency Override Changed 7: Motion Sensed 8: Gateway Device List Size Changed 9: Group Light Level Changed 10: Group Override Changed 11: Group Device List Size Changed 12: Group Schedule List Size Changed 13: Group WOS Enabled Changed 14: Group WDLH Enabled Changed 15: Schedule Event List Size Changed
EventIndex	Index of the event to retrieve. The index is the count value from the device. The index in the array matches the EventID when storing the event data from the device.
EventUID	UID of the event retrieved.

EventRequestBlock	An array of bytes used by the message instruction. Must be controller-scoped and a 256 byte array. The variable used here must be the same variable configured in the Message Source field.
EventResponseBlock	An array of bytes used by the message instruction. Must be controller-scoped and a 256 byte array. The variable used here must be the same variable configured in the Message Destination Element.

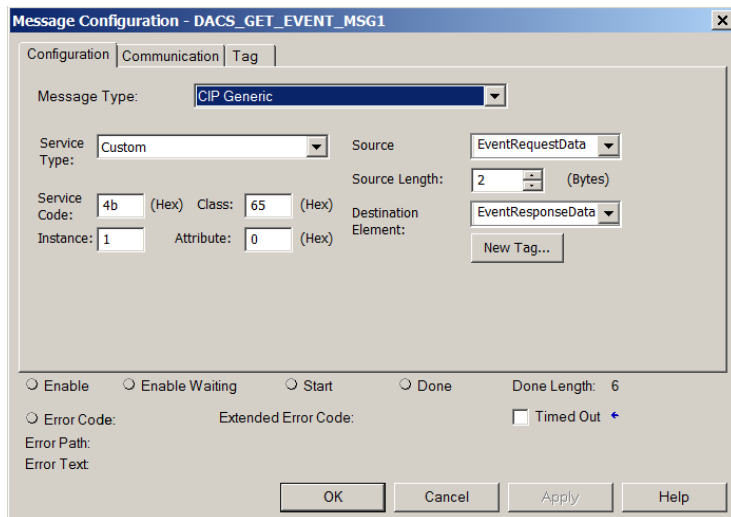
AOI Data Types

- String Type STRING32

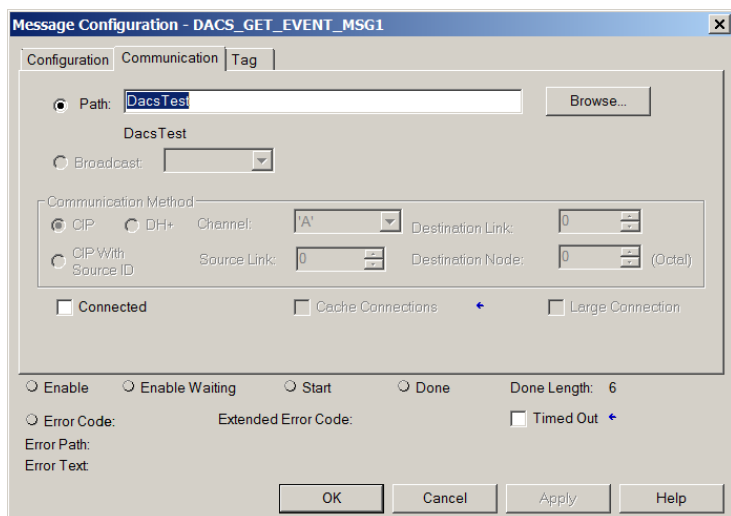
Message Configuration

There are two parts to the message configuration: CIP configuration and communication.

The Get Event request requires a Message Type of CIP Generic, Service Type of Custom, Service Code of 4b, Instance of 1, Class of 65, Attribute of 0. The Source and Destination element arrays must be controller-scoped and match the parameters for the EventRequestBlock and EventResponseBlock because the AOI uses them.



The Path must be configured on the Communication tab. This will be dependent on the IP address of the IntelliLED server and the type of PLC. The best way is to use the Browse button to find the device on the network.



AOI Usage

The following instructions will assist with installing and using the Dialight Ethernet Adapter and AOI's.

Through the Tools -> EDS Hardware Installation Tool, install the EDS sheet for Dialight.

From the Ethernet item in the I/O Configuration, add the Dialight Ethernet Adapter device and configure the appropriate Ethernet address.

IntelliLED_GET AOI

- Import the IntelliLED_GET AOI.
- Create a controller-scoped array of 256 bytes for the GetRequest.
- Create a controller-scoped array of 256 bytes for the GetResponse.
- Create a MSG type configured as described in the IntelliLED_GET section. Use the GetRequest and GetResponse arrays as defined above.
- Create a Data variable (controller or program scope) with the DacsData user defined type.
- Create a DataType variable (controller or program scope) with the DacsDataType user defined type.
- Add the IntelliLED_GET AOI to a rung.

IntelliLED_SET AOI

- Import the IntelliLED_SET AOI.
- Create a controller-scoped array of 256 bytes for the SetRequestBlock.
- Create a controller-scoped array of 256 bytes for the SetResponseBlock.
- Create a MSG type configured as described in the IntelliLED_SET section. Use the SetRequest and SetResponse arrays as defined above.
- Create a Parameter variable (controller or program scope) with the DacsParameter user defined type.

- Create a ParameterType variable (controller or program scope) with the DacsDataType user defined type.
- Add the IntelliLED_SET AOI to a rung.

IntelliLED_EVENTS AOI

- Import the IntelliLED_EVENTS AOI.
- Create a variable (controller or program scope) with the DacsServerEvents user defined type.
- Create a DINT variable (controller or program scope) to hold the event bits.
- Add the IntelliLED_SET AOI to a rung.

IntelliLED_EVENT_GET AOI

- Import the IntelliLED_EVENT_GET AOI.
- Create a controller-scoped array of 2 bytes for the EventRequestBlock.
- Create a controller-scoped array of 256 bytes for the EventResponseBlock.
- Create a MSG type configured as described in the IntelliLED_GET_EVENT section. Use the EventRequestBlock and EventResponseBlock arrays as defined above.
- Create a STRING32 variable (controller or program scope) for the EventUID that will be returned.