

# TMS-Trigger Module

## TMS-Trigger Module for SICOM3028GPT

Preliminary



- Designed for the SICOM3028GPT-L2GT, SICOM3028GPT-L2FT, SICOM3028GPT-L3GT, SICOM3028GPT-L3FT and managed by SICOM3028GPT chassis.
- Internal time synchronized as PTP slave with SICOM3028GPT chassis
- Supports GOOSE publish and MMS report
- Supports optical/electrical signal input/output
- Supports hot-swap for easy maintenance (only can replace the same type of module)

## Overview

TMS-trigger module is specifically designed for SICOM3028GPT series which support PTP protocol. This module works as a part of TMS(Time Management System), provide accurate trigger and response, it realizes the real-time monitoring to the synchronization condition of various devices in the network.

## Product Specifications

### Technical Specifications

- Standard
- ▼ IEEE 1588-2008(PTPv2)
  - ▼ IEC 61850-8-1(GOOSE and MMS)

### Interface

- IRIG-B port
- ▼ IRIG-B DC input/output, TTL, 4-pin 3.81mm-spacing plug-in terminal block
- Electrical signal input
- ▼ Pulse, VDC110/220, 2-pin 3.81mm-spacing plug-in terminal block
- Electrical signal output
- ▼ Pulse, 2-pin 3.81mm-spacing plug-in terminal block
- Optical signal input
- ▼ Pulse, multi-mode SC connector
- Optical signal output
- ▼ Pulse, multi-mode SC connector
- Console port
- ▼ RS232, RJ45

### LED

- Running LED: Run  
Power LED: PWR

- Electrical signal output LED: DO1  
Electrical signal input LED: DI1  
Optical signal output LED: DO2  
Optical signal input LED: DI2

### Power Requirements

Power input	3.3VDC
Power terminal	A type interface (powered by backplane)
Power consumption	<1.5W

### Physical Characteristics

Housing	Metal
Cooling	Natural cooling, fanless
Dimensions(WxHxD)	▼ 122mmx41mmx106.6mm(4.80x1.61x4.20 in.)
Weight	0.5Kg (1.102 pound)

### Environmental Limits

Operating temperature	-20°C to +85°C (-4°F to 185°F)
Storage temperature	-40°C to +85°C (-40°F to 185°F)
Ambient Relative Humidity	5%-95% (non-condensing)

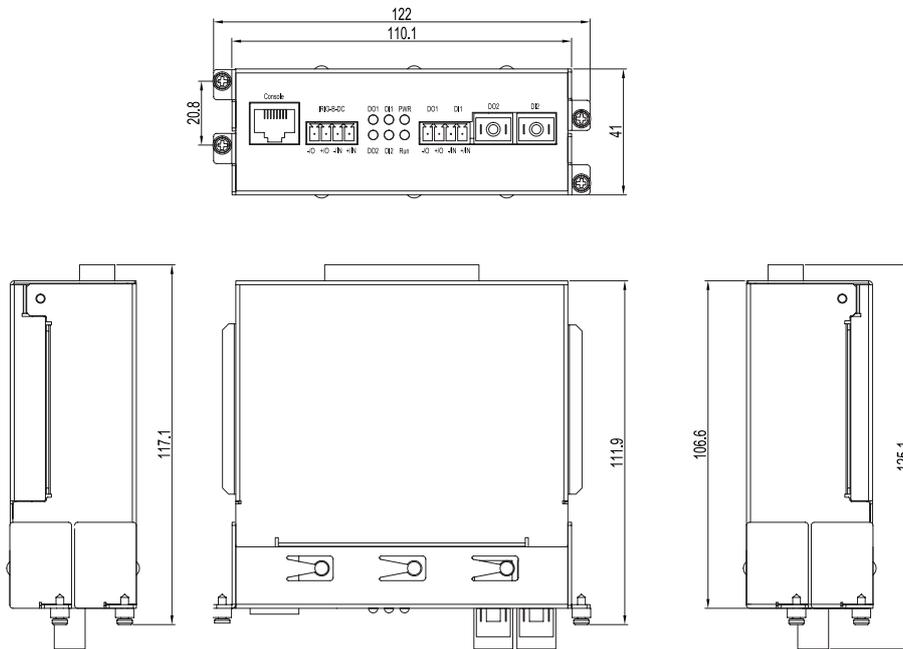
### Quality Assurance

Warranty	5 years
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### Approvals

Please check Kyland website for the latest updates.

## » Mechanical Drawing



## » Ordering Information

### Model

SM6.6-TMS-Trigger-1U

### Description

TMS-trigger module, 1 IRIG-B output, 1 IRIG-B input, 2 signal input, 2 signal output, 1 Console port

# IEC61850 modeling technology with build-in MMS service

## Why IEC 61850 MMS Management?

In SAS system, IEC 61850 is widely accepted because of its many advantages, and is being extended to other fields.

In IEC 61850 SAS system, industrial Ethernet switch is used for the communication of process network and station network. The traditional industrial Ethernet switch uses SNMP as management protocol, and the EMS network management software or OPC software is used for device management, topology management and alarm management etc.

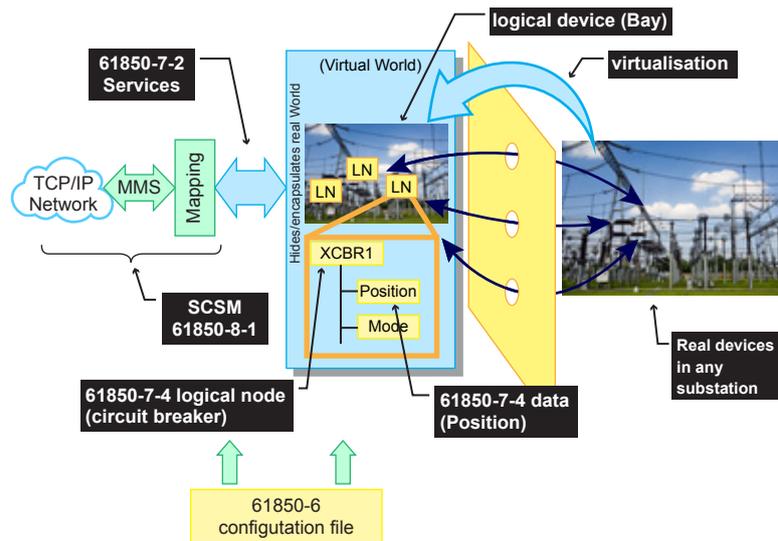
IEC61850 protocol use object oriented data modeling, abstract communication service interface for management. SNMP protocol is the way of management in telecommunication field, not suitable for smart grid industry and other industries of object oriented management model, could not be included in the in the smart grid management system. Development of industrial Ethernet management model based on IEC 61850 international standard is one of the key technologies of smart grid management.

Currently, SNMP is used for managing industrial Ethernet switches, but as the basic management mode in telecommunications, SNMP does not suit the object-oriented management mode of industrial platform such as a smart grid and cannot be integrated into the SAS management system. Therefore, developing IEC 61850-based industrial Ethernet switches management model is one of the key technologies for easy management of SAS.

Through modeling of industrial Ethernet switch for use in IEC 61850 management:

- ▼ Unified management of switches on the process layer and substation layer networks for digital substations.
- ▼ No additional devices or training on the knowledge of switches for the maintenance personnel of intelligent substations.
- ▼ No development on background. Only configuration is required for management due to the self-describing feature of IEC 61850.
- ▼ Transition to no manual intervention in intelligent substations. Status and alarm information is collected accurately and reported to the remote management system (provincial NMS).
- ▼ Automatic configuration, simplifying maintenance and management of switches.

## What is IEC 61850 Data Modeling?



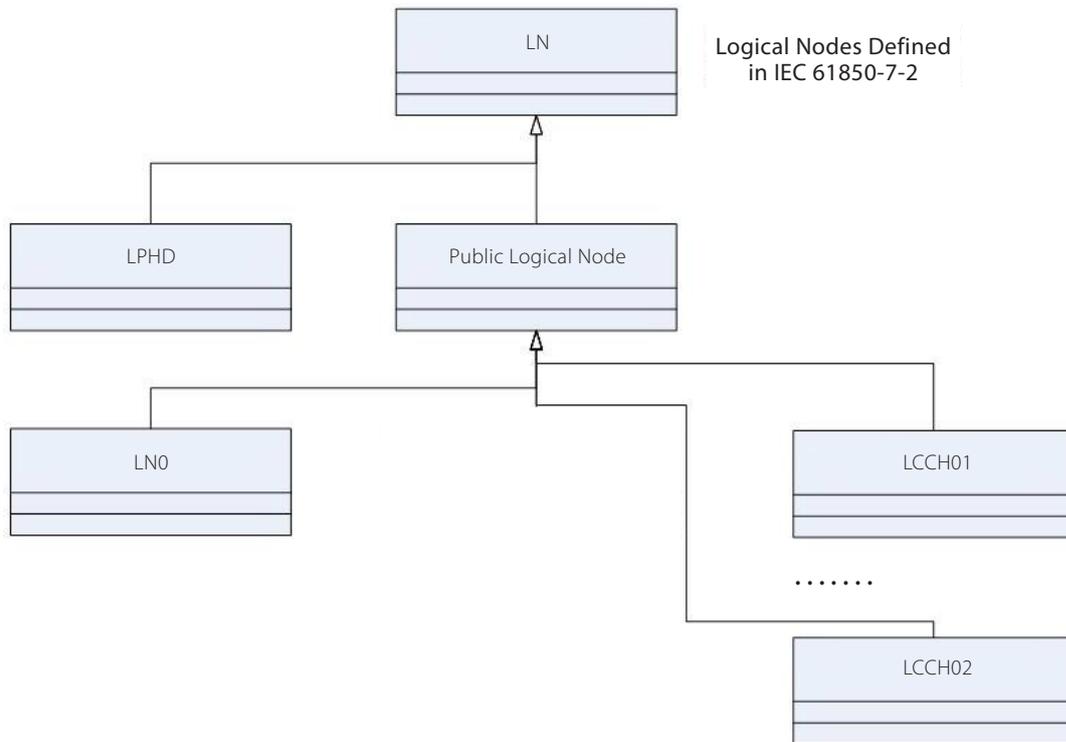
The IEC 61850 protocol stack virtualizes physical devices and functions into hierarchical data structures by information modeling, and performs certain functions by data exchange with the ACSI between different entities. Mapping between different communication protocols is implemented through SCSM, to achieve maximum compatibility and avoid impacts imposed by the development of communication protocol stacks. In system level, configuration language is standardized to achieve automatic maintenance and easy integration.

## Industrial Ethernet Switch Data Model

In Appendix A of IEC 61850-90-4, a model of an IEEE802.1D compliant bridge for use in IEC 61850 management is defined. The model abstracts the physical device of the industrial Ethernet switch to a LN (logic node), and describes the attributes of LN. The model consist of the physical base unit of the bridge and of a model for each port. The directory, dataset and report control block (BRCB, URCB) service realize the convenient management of industrial Ethernet switch in IEC 61850.

The data model is setup by following steps:

- ▼ To provide better monitoring function, Ethernet switch is regarded as a physical device in IEC 61850, running status can be queried.
- ▼ General logical node LN0. Since LN0 has nothing to do with function, only with physical device, is a specific description of the physical device; this part is compliant with the standards, no need to redefine
- ▼ Define and explain switch logic nodes (LPHD and LCCH). The mapping between data objects of LN and SNMP oid is explained to be understood by manufacturer to realize. The LCCH is a logical node defined for switch ports which contains information about port status, send and receive data counter, port configuration etc. One instance of the LCCH LN class is used for each available port.
- ▼ Data can be accessed through the service provided by MMS server.



## » Configuration File

Substation Configuration description Language (SCL) is the language and representation format specified by IEC 61850 for the configuration of electrical substation devices. This includes representation of modeled data and communication services specified by IEC 61850-7-X standard documents. The complete SCL includes data representation for substation device entities; its associated functions represented as logical nodes, communication systems and capabilities. The complete representation of data as SCL enhances the different devices of a substation to exchange the SCL files and to have a complete interoperability.

There are 4 types of SCL files in IEC 61850:

- ▼ IED Capability Description (ICD) file: It defines complete capability of an IED. This file needs to be supplied by each manufacturer to make the complete system configuration. The file contains a single IED section, an optional communication section and an optional substation part which denotes the physical entities corresponding to the IED.
- ▼ System Specification Description (SSD) file: This file contains complete specification of a substation automation system including single line diagram for the substation and its functionalities (logical nodes). This will have Substation part, Data type templates and logical node type definitions but need not have IED section.
- ▼ Substation Configuration Description (SCD) file: This is the file describing complete substation detail. It contains substation, communication, IED and Data type template sections. A .SSD file and different .ICD files contribute in making an SCD file.
- ▼ Configured IED Description (CID) file: It is a file used to have communication between an IED configuration tool to an IED. It can be considered as an SCD file stripped down to what the concerned IED need to know and contains a mandatory communication section of the addressed IED.

Four SCL configuration files realize the description and association of IED and SAS, which simplify the configuration and can realize the automatic update and remote configuration of IED and SAS. The SCL configuration file in a unified format greatly simplifies the system's integration and management difficulty.

When the industrial Ethernet switch supports MMS management, the system can regard industrial Ethernet switch as an IED device for management. The switch should provide ICD file, and to complete the automatic configuration of the CID file.

## Typical Application

