

# SYNC 200 Series IED Upgrade Card

## OVERVIEW

The embedded product IED upgrade card are OEM modules that provide various options to provide 3rd party devices with standard communication protocols, computation functions and other automation capabilities without any change in the end products.

SYNC 200 enables device manufacturers to have the latest protocols like IEC 61850 and DLMS/COSEM and other standard communication protocols in the end product at minimal development cost and time to market. SYNC 200 has been embedded in various devices like Protection Relays, Energy Meters, Mini RTUs, Transformer Monitoring Systems, PLCs, Switchgears and Alarm Annunciators.

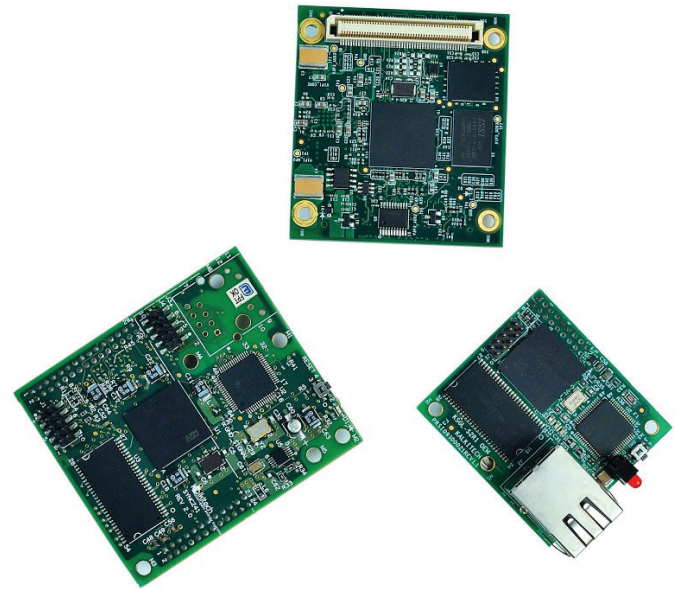
SYNC 200 are small form factor modules specifically designed for power industry applications, with superior processing capabilities as well as numerous interfacing options. SYNC 200 modules are tested to stringent temperature and environmental levels, and are field proven in a variety of industry segments. Numerous products with SYNC 200 upgrade cards have been approved by the test and certification labs by various customers.

SYNC 200 provides not just one-to-one protocol conversion, but supports the full set of protocols (popular protocols listed on the right), which makes the end device capable of multiple standard protocols. The Kalki.io Energy IoT platform can be used for remote management of module as well as end devices.

## APPLICATIONS

SYNC 200 modules have been deployed in numerous IEDs across the world. Some of the common equipment where SYNC 200 modules have been used are:

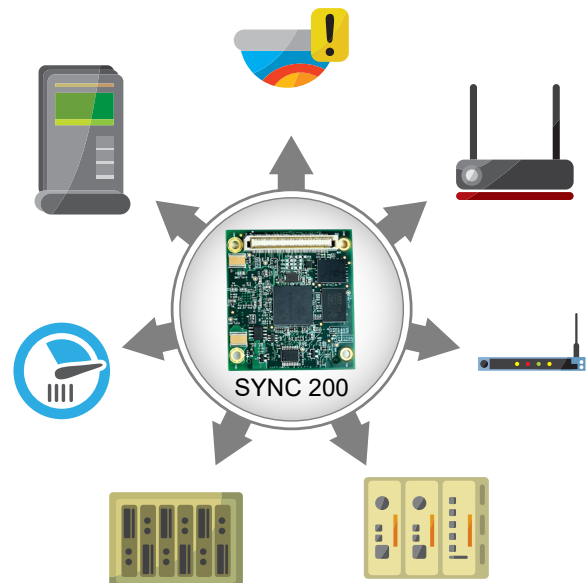
- Alarm Annunciators
- Capacitor Banks
- Circuit Breakers
- Data Loggers
- Industrial Ethernet Switches
- Intelligent Electronic Devices (IEDs)
- Programmable Logic Controllers (PLCs)
- Protection Relays
- Remote Terminal Units (RTUs)
- Switchgears
- Transformer Monitoring Systems



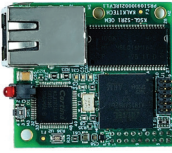
|                     |                      |                  |
|---------------------|----------------------|------------------|
| IEC 61850           | DNP 3.0 Serial & TCP | DLMS/COSEM       |
| IEC 60870-5-101/104 | IEC 60870-5-103      | MODBUS ASCII/RTU |

\* Additional protocol on request

SYNC 200 modules are also suited for high performance IEC 61850 requirements, and can be used for high speed messaging mechanisms like GOOSE using hardwired GPIOs.



# SYNC 200 Platforms



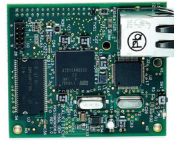
## SYNC 221

Dimensions:  
45mm x 40mm x 21.6mm

SYNC 221 is best suited for space critical applications for conversion between most standard protocols, and is almost half the size of the other models. With onboard Ethernet port, SYNC 221 is ideal for applications which require less data points support using a small form factor communication card.

Model:

- SYNC 221-M1 with on board Copper Ethernet



## SYNC 241

Dimensions:  
63mm x 55mm x 18mm\*

SYNC 241 provides up to 48 GPIOs and plug-in ethernet jack with support for copper or fiber Ethernet port plug making it possible to use this module as the building block for smart grid ready IEDs like relays, switchgears and many more.

Models:

- SYNC 241-M1: with Copper Ethernet addon
- SYNC 241-M2: with ST Fiber Ethernet addon
- SYNC 241-M4: with LC Fiber Ethernet addon
- SYNC 241-M3: with onboard Copper Ethernet port

\* Base board only



## SYNC 261

Dimensions:  
55mm x 50mm x 9mm\*

SYNC 261 powered with high-end processor, which is ideal for modern automation systems. The dual redundant communication link and can be used for various applications apart from protocol conversion, 61131 based logic engine, web-based monitoring systems.

Models:

- SYNC 261-M1: Base board with Dual Copper Ethernet Addon
- SYNC 261-M2: Base Board

\*Base board only

## KEY FEATURES

- Supports many-to-many protocol conversion
- APIs for custom protocol and applications development# (selected model)
- Extensive support provided for integration and testing: Developer Kit available for all SYNC 200 series Models, along with free remote support
- Maximum of 2 TTL ports, 48 GPIOs, I2C, SPI, USB, CAN available\*
- Supports up to 128MB RAM and 256MB Flash\*
- Supports temperature range from -40°C to +85°C
- Supports TCP/IP, UDP, SMTP, POP, FTP, HTTP, SNMP
- File Upload/Download, Remote configuration through customizable configuration tool - EasyConnect
- SSL VPN with AES, DES or 3DES encryption over WAN
- Transparent Channel/Tunneling support
- Remote Device Management from Kalki.io







\* Model dependent

## INTERFACE DETAILS

SYNC 200 can be internally plugged to the device using TTL/GPIO interfaces (+I2/SPI/USB/CAN additional) and can be connected to the external world using RS485 (to be expanded from TTL)/Ethernet Port.

When SYNC 200 IED Upgrade card is used for native protocols to IEC 61850 conversion, UART communication is too slow to meet the timing requirements needed for GOOSE. To enable fast message transfer from actual I/O points to the network, these cards are equipped with a provision of Fast-Message-GOOSE-Bus. SYNC 241 has a maximum of 48 GPIOs which can be configured as Inputs/outputs (3.3V DC) and connect to direct input and output terminals on the vendor device (can be also attached with level shifters to convert the same to 24V or 48V which can be input/outputs on the I/O terminals of vendor devices). These GPIOs can be attached directly to the GOOSE Publishers (Inputs) and GOOSE-Subscribers (outputs) which can be configured as IEC 61850 GoCB (GOOSE Control Blocks). By this method, an event change can be sent over the network within a worst case scenario of 10ms. This will work in parallel with sending less critical signals using UART communication and can send over 61850 RCBs. This feature is also available in SYNC 261 variant.

| SPECIFICATIONS                  |   | SYNC 221 (M1)  | SYNC 241 (M1/M2/M3/M4)                    | SYNC 261 (M1/M2)  |
|---------------------------------|---|--|---|-------------------|
| <b>General</b>                  | Management                                  | EasyConnect Configuration Utility/Web Server/SNMP and SSH Interface over secure network. Device also accessed using console port                             |   |                   |
|                                 | System Protocols                            | TCP/IP, UDP/IP, SMTP, POP, HTTP, FTP, SNMP, ICMP, DHCP, BOOTP, Telnet, DNS, ARP, PPPoE, DDNS   |   |                   |
|                                 | Device Security                             | NERC/CIP Compliant, SSHv2  |   |                   |
|                                 | Communication Security                      | SSL based VPN tunnel using Blowfish/AES/3DES   |   |                   |
|                                 | Logic Programming                           | AND/OR/NOT/Bit SHIFT/Split/Index support for digital and analog data, Delay operations, IEC 61131-3 based logic engine on request                            |   |                   |
|                                 | Network Management                          | SNMP Agent   |   |                   |
|                                 | Approvals                                   | IEC 61850-10 Kema*   |   |                   |
| <b>Communication</b>            | Interfaces                                  | TTL/GPIO/ETHERNET/I2C/SPI/CAN/USB  |   |                   |
|                                 | Protocol support                            | IEC 60870-5-101/103/104, DNP3 serial/TCP, Modbus RTU/ASCII/TCP, IEC 62056-DLMS, IEC 61850, IEC 61400   |   |                   |
|                                 | Protocol support for internal communication | IEC 60870-5-101/103, DNP3 serial, Modbus, IEC 62056-DLMS   |   |                   |
|                                 | Additional Protocol                         | Refer to full list of protocols at <a href="https://www.kalkitech.com/knowledge-center/protocols/">https://www.kalkitech.com/knowledge-center/protocols/</a> |   |                   |
| <b>Supported Data Point</b>     | IEC 61850, SPA                              | 800  | 800                                       | 3000              |
|                                 | DNP3, IEC 60870, Modbus and other protocols | 3000   | 3000                                      | 6000              |
| <b>Communication Interfaces</b> | Serial                                      | 2 TTL Interface  |   | 2 TTL Interface   |
|                                 | GPIO  | 4-11 IO**  |   | 16 to 48 IO**     |
|                                 | I2C   | I2C Master   |   |                   |
|                                 | Ethernet                                    | 1 10/100 BASE-TX   | Plug-in Ethernet (Refer to Addon section) |                   |
| <b>Power Requirements</b>       | Power Supply                                | 3.3 VDC  |   |                   |
|                                 | Consumption                                 | 2W   | 2W  |                   |
| <b>Physical</b>                 | Dimensions (H x W x D)                      | 21.6mm x 40mm x 45mm   | 63mm x 55mm x 18mm                        | 55mm x 50mm x 9mm |
|                                 | Weight (in grams)                           | 20   | 20  |                   |
| <b>Environmental</b>            | Operating Temperature                       | -40°C to 85°C  |   |                   |
|                                 | Rel. Humidity                               | 5%-95% RH non-condensing   |   |                   |

| Ethernet Ports  | SYNC 221 Copper onboard   | SYNC 241 Copper onboard   | SYNC 241 with Copper addon card   | SYNC 241 with Fiber ST addon card  | SYNC 241 with Fiber LC addon card   | SYNC 261 with Copper addon card   |
|-----------------|---|---|---|--|---|---|
|                 |  |  |  |  |  |  |
| Part Number     | SYNC 221-M1   | SYNC 241-M3   | SYNC 241-M1   | SYNC 241-M2  | SYNC 241-M4   | SYNC 261-M1   |
| Number of ports | 1   | 1   | 1   | 1  | 1   | 2   |
| Connector Type  | RJ45  | RJ45  | RJ45  | Fiber ST   | Fiber LC  | RJ45  |
| Speed           | 10/100Mbps  | 10/100Mbps  | 10/100Mbps  | 100Mbps  | 100Mbps   | 10/100/1000Mbps   |
| Isolation       | 1500VAC min per IEEE 802.3/ANSI X3.263  |   |   |  |   |   |
| Fiber Mode      | NA  | NA  | NA  | Multi mode   | Multi mode  |   |
| Wavelength      | NA  | NA  | NA  | 1300nm   | 1300nm  | NA  |
| Dimension       | Onboard   | Onboard   | 54mm x 40mm x 18mm  | 54mm x 29mm x 14mm   | NA  | 80mm x 55mm x 20mm  |
| LED Indications | LAN Link/Status   |   |   |  |   |   |

\* Certified for end products using 200 series

\*\* Range Depends upon IO used for full modem TTL/I2C/Debug port is multiplexed with GPIO

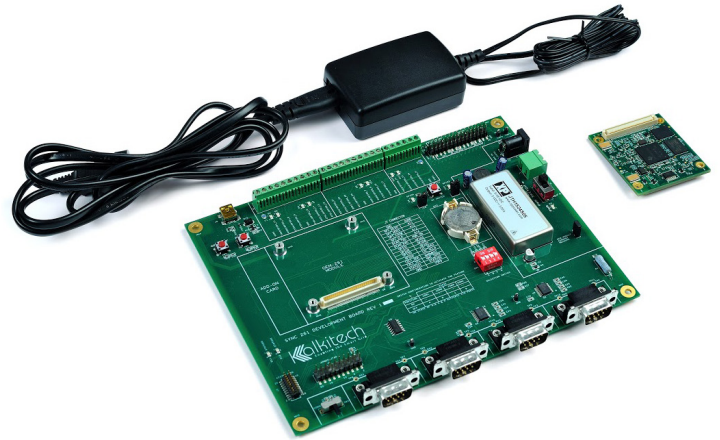
\*\*\* Applicable only for fiber ethernet port

# SYNC 205/206 Developer Kit

## OVERVIEW

Developer Kits enable users to test and integrate SYNC 200 modules to end devices quickly and easily with minimal capital costs.

SYNC 200 Development Board provides a development platform for OEM products, by projecting all the features of a SYNC 200 module to the external world as standard interfaces like RS232/RS485/IO Terminals etc., for testing and integration. The developer can use the board for customized developments on the OEM products and explore the possibilities of integrating the device into the end product. This development platform gives all options to implement and test the solutions thereby verifying proper and intended operation.



## KEY FEATURES OF DEVELOPMENT BOARD

- Four serial RS232 ports with Full Modem on COM 1 and Console port
- RS485 support
- On-Board RTC
- Wide power input range
- GPIO expansion with LED indication
- Sockets for various SYNC 200 series modules

## MODELS

- SYNC205-M2: Development Kit for SYNC 221 Module
- SYNC205-M3: Development Kit for SYNC 241 Module and Copper add-on (fiber add-on available on request)
- SYNC206-M1: Development Kit for SYNC 261 Module

## DEVELOPER KIT INCLUDES

- SYNC 205/206 Development Board
- Modules of SYNC 221/241/261, depending on the requirement (2 nos.)
- EasyConnect Configuration Tool (CD)
- User manuals for Development kit and SYNC 200 series Module (CD)
- Ethernet Cross Cable -1 no.
- Power Adapter 12V

## CUSTOMIZATION SERVICES

Integration Support and Consultancy Services provided are:

- Product design consultancy/support
- Hardware Customization
- Software Customization
- Certification Services
- Training - Protocols
- Training - Domain

## SYNC 200 Module Integration Process

