



SYNERGY
SYSTEMS & SOLUTIONS

ENABLING THE **FUTURE** OF INFRASTRUCTURE AUTOMATION



President's note

At SSS, we are "driven by Intellect and Excellence".

We are a Made in India company which empowers industries by building automation systems, striving for excellence by providing customizations as per our customer needs. We believe that our customers are partners in our mission and we go above and beyond to provide highest levels of customer satisfaction. SSS has a culture of strong support system where employees and associates come together to deliver their best results. I believe that a company's results are their best form of advertisement.

We are proud to be working relentlessly for last 25 years and will continue to ensure highest quality of service delivery.

Vidhu Aggarwal

Company

Overview

Synergy Systems & Solutions (SSS) is an Original Equipment Manufacturer (OEM) and end-to-end solution provider for industrial automation requirements. Over the last two and a half decades, we have established credentials in various verticals - Power, Railways and Oil & Gas with prestigious Government, Public and Private customers like Indian Railways, DMRC, PGCIL, UPPTCL, IOCL, GAIL, BHEL, Siemens, GE and many more. SSS has a pan-India presence in terms of its solution deployment. We also have references in South-East Asia and Africa.

SSS has an impeccable track record of having successfully delivered every single project in its 25 year history.

Vision

- To Inspire our Employees & Associates to have pride and respect in our Vision.
- To Consistently 'Evolve and Innovate' our products and ourselves with 'latest technology by optimal use of all our Resources'.
- To endeavour in creating valued Synergy between all our stake holders to Ensure Mutual Growth.
- To Support our Products throughout its life cycle.

Mission



To Design, Manufacture, Supply & Service High Quality "Made in India" Products

Quick Facts

Year Founded – 1994

Headquarters – Faridabad, India

Clients ~60

Employees ~325

RTUs in service ~5000

SCADA control centres ~150

Facilities

Administrative

SSS is located in Faridabad, INDIA. A modern 10,000 sq.ft. facility houses administrative, finance, projects management and is the headquarters of SSS.

R&D

SSS has in-house Research & Development (R&D) facility for design, development of its automation solutions. The R&D facility has a team of software developers, hardware design engineers, and testers handling the high-level application software, embedded firmware and electronics design requirements.

Production

SSS manufacturing and assembly facility is located at a separate unit having an area of ~20,000 sq.ft. in Faridabad, INDIA. The unit has facilities for R&D, electronics manufacturing, production testing, panel assembly and staging for customer inspections.

Testing

SSS has testing facilities for EMI/EMC, environmental conditions for product validation.

Training

For conducting training to its employees and for customer personnel, a dedicated training facility is located in SSS headquarters. Classroom and hands-on training sessions can be conducted at this facility of SSS.

Leadership



**Vidhu
Aggarwal**

PRESIDENT

An Electronics & Communications graduate of 1987, Mr. Vidhu Aggarwal is the founder and proprietor of SSS. He has design and engineering experience in Oil & Gas automation, project management and execution, financial management, sales & marketing.



**Deepak
Bajaj**

**VICE
PRESIDENT**

An Information Technology graduate of 2001, Mr. Deepak Bajaj is associated with SSS since year 2000. He leads a team of software engineers involved in design, development of SSS solutions and is also involved in project management of strategic accounts. He also heads the QA department along with Mr. Sanjay Malhotra.



**Sanjay
Malhotra**

**SR. VICE
PRESIDENT**

An Engineering graduate of 1989, Mr. Sanjay Malhotra is associated with SSS from its inception. He is the chief architect of SIRIUS SCADA software, and is now actively involved in contract management and execution of all turnkey projects.



**Krishnan
Venkataraman**

**VICE
PRESIDENT**

An Information Technology graduate of 2001, Mr. Krishnan Venkataraman is associated with SSS since year 2000. He leads a team of software and hardware engineers involved in design, development of SSS products. He is also responsible for design & development of new applications.

Timeline & Achievements

Founded
in
1994

● Timeline
● Achievements

1994-2000
Engineering, I&C, Software
Development Support, Sales & Marketing
to ABB, Norway for Pipeline SCADA, TAS

2003
SCADA solution for Hydro Power
Station at Vietnam

2005
Developed Terminal
Automation System – ITA

2007
Vendor approval received for
Railway Traction SCADA

2009
2nd Generation Remote Terminal
Unit – HUSKY 6049-E70

2012
Upgraded 5 more HVDC SCADA
systems in India

2014
Developed EMS software

2016
Developed WinDCU Software

2018
• Developed SIRIUS RAS
• Developed DCU-E70

2022
• Advanced Distribution
Management System (ADMS)
• Certification of RTU as per IEC
62351 cyber security standard

2002
SIRIUS-based turnkey project for IOCL

2004
• Successfully upgrade of SCADA System for
Rihand-Dadri HVDC
• First SIRIUS-based SCADA solution for
Indian Railways

2006
Developed Remote Terminal Unit – HUSKY RTU
6049-E10

2008
• Expanded Railway Network
• RTUs for cross-country gas pipelines

2008-12
3rd Generation Remote Terminal
Unit – HUSKY 6049-E70

2012-13
RTUs and DCUs for 400/220/132kv & 66/33/
11kv Substations

2015
Developed Wireless 2016 Router, Mini RTU

2017
Certification accorded for IEC61850 and
IEC60870-5-104 by DNV-GL (KEMA)

2019
Developed Bay Controller Unit

**Serving
the
Nation
for 25 years**

Hardware

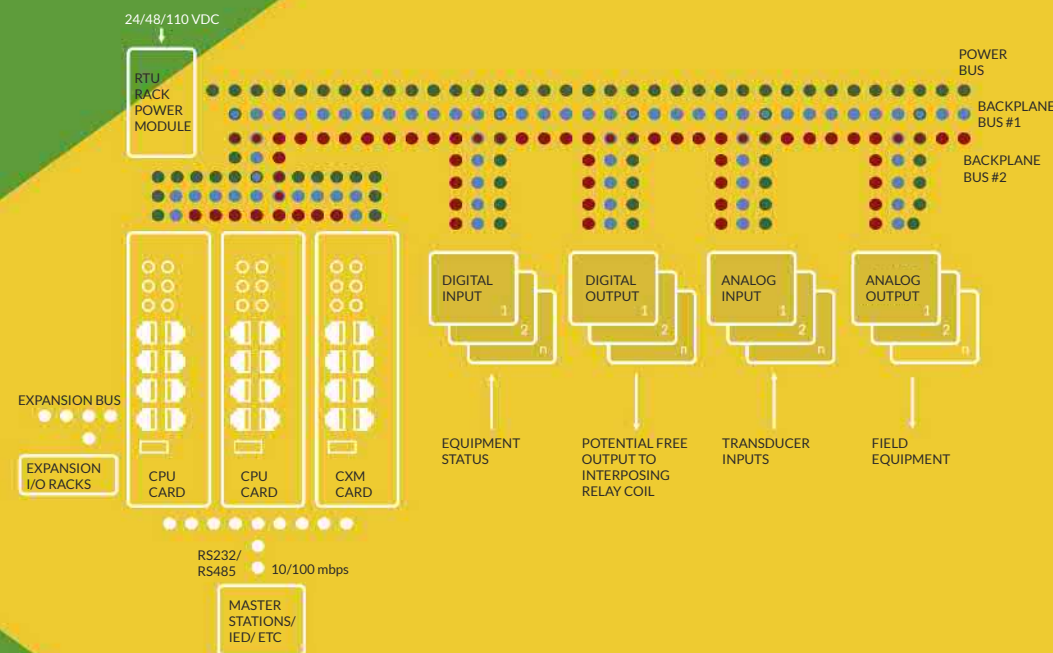
HUSKY RTU 6049-E70
 HUSKY RTU 6049-E70m (FRTU / Mini-RTU)
 HUSKY DCU-E70
 HUSKY SBRTU (Single-board RTU)
 L2 Managed Ethernet Switch
 LTE Router
 HUSKY Bay Control Unit (BCU)
 Interface Converters
 DC Power Supply (DCPS)
 GPS Receiver
 Industrial Grade L3 Managed Ethernet Switch*
 HUSKY Bay Control & Protection Unit (BCPU)*
 Programmable Logic Controller (PLC)*

HUSKY RTU 6049-E70

HUSKY RTU 6049-E70 has been designed to address data acquisition and control requirements of various industry segments. The RTU follows a scalable architecture that's expandable while maintaining flexibility and adaptability to suit different application scenarios.



The RTU is designed for mounting in 4U-high sub-racks. Choice of I/O modules with varying densities, and chassis backplanes are available for optimal configuration of different application needs. The RTU can be configured to suit I/O requirements of medium to high range applications, through addition of I/O modules and expansion racks. All racks have generic I/O slots, which can be used for any of the supported I/O modules. This architecture aids in flexibility of system design while keeping costs to the optimum.



*under development

System Design Capacity

Maximum Wired Tags

Digital Input | 2048
Digital Output | 1024
Analog Input | 1024
Analog Output | 512
Counters | 512

Maximum CXM Modules

4

Maximum Devices

32 devices per serial port
256 devices maximum

Event Buffer Capacity

10000 events
File-based logging for higher capacities

Maximum Virtual Tags

Boolean | 4096
16-bit Integer | 2048
32-bit Integer | 2048
32-bit Float | 2048
Timers | 128

Maximum I/O Racks

8

General Operating Parameters

Nominal Input voltage | 24/48/110 VDC
Relative Humidity | 95%
Operating Temperature | -25~+70°C

Maximum Communication tasks

48

Hardwired I/O Modules

Digital Input Module

Up to 32 channels per module
1ms SoE
24/48/110VDC input ranges
Pulse counter
Digital Measurands

Digital Output Module

Up to 16 channels per module
Potential free NO contact
Select-before-Execute hardware logic

Remote I/O Modules

Up to 16 channels per module
Isolated & surge protected communication link with CPU
Isolated Power Supply

DC Analog Input Module

Up to 16 channels per module
Voltage and Current Inputs (user selectable)
Bipolar, Differential Inputs
15 + sign-bit resolution
Accuracy of 0.1% (FS)

AC Analog Input Module

Up to 16 channels per module
PT Voltage Measurement
15 + sign-bit resolution
Accuracy of 0.1% (FS)

DC Analog Output Module

Up to 4 channels per module
Voltage and Current Outputs (user selectable)
15 + sign-bit resolution
Accuracy of 0.1% (FS)

Time Synchronization

The RTU's real-time clock (RTC) can be time synchronized from an external master clock like a GPS receiver over SNTP or serial-based ASCII (E.g., NMEA 0183) protocols. The RTU also supports time synchronization messages provided by SCADA protocols like IEC 870-5, DNP3.0, etc. HUSKY RTU supports up to eight time sources with various input possibilities including the above mentioned sources.

Slave devices connected to the RTU can be time synchronized by the RTU using its RTC as the time base.

IEC61850

HUSKY RTU supports both client and server functions. As a client, RTU can acquire real-time data from IEDs and transfer them over control-centre protocols such as IEC 60870-5-104. Thus, it can function as a gateway to modern Substation Automation Systems. This implementation is certified by UCA as per IEC61850 Ed.2.

As a server, the RTU can function to provide access to "legacy" I/O over IEC 61850 station bus by higher-order systems such as SAS.

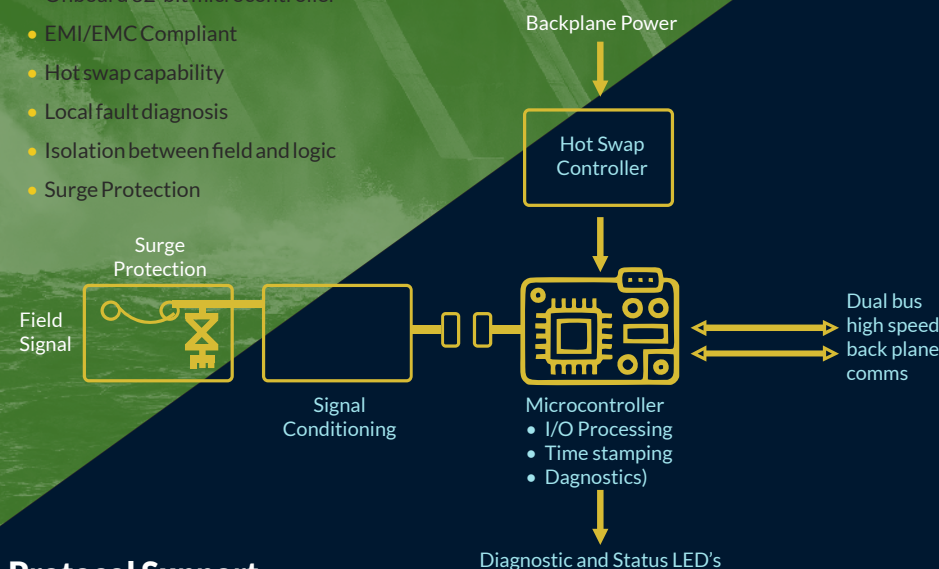
I/O Architecture

All I/O modules are designed with an onboard dedicated 32-bit microcontroller. This aids in faster I/O scanning and maintaining of time-stamps as close to the field interface as possible. Further, I/O module specific intelligence is offloaded by the CPU to these microcontrollers, thereby alleviating the load on the main processor.

While interfacing with field signals, all I/O modules provide a minimum of 1kV isolation between the field and the internal logic. Further, all field signals that enter the I/O modules are protected against transients. Module-specific input protection, if any, is also provided to prevent damage to the module in case of inadvertent inputs or wrong wiring.

Features common to all of the I/O modules of the RTU 6049-E70:

- Dual redundant high speed I/O bus
- Any I/O module can be inserted into any of the I/O slots in a backplane
- Onboard 32-bit microcontroller
- EMI/EMC compliant
- Hot swap capability
- Local fault diagnosis
- Isolation between field and logic
- Surge Protection



Protocol Support

Slave Protocol

IEC 60870-5-101 (CPRI Certified)*
IEC 60870-5-104 (DNPVGL Certified)*
DNP 3.0 Serial/TCP
Modbus RTU/TCP
RP570
DLMS Server
IEC 61850 MMS Server

*With IEC 62351 Security Extensions

Master Protocols

IEC 60870-5-101
IEC 60870-5-104
IEC 60870-5-103
DNP 3.0 Serial/TCP
Modbus RTU/TCP
IEC 61850 MMS (DNPVGL Certified)
GOOSE Subscriber
SPA Bus Interface
ABB LON Network Interface
DLMS/COSEM Client HDLC/TCP

Certifications & Experience

- Compliant to IEC61850-3 EMI/EMC standards
- IEC61850 Client certified by UCA
- Cyber Security as per IEC62351 by CPRI
- IEC60870-5-101/104 Slave certification
- Integration with all major IED vendors over IEC61850
- Integration with all major SCADA/EMS/DMS vendors over IEC 60870-5-104, -101, DNP3 protocols

Logic Programming

RTU supports implementation of custom application logics via the IEC 61131 Programming Languages. The integrated editor supports ST, LD, FBD, IL, SFC languages, with support for online monitoring and debugging of logics.

Built-in function block libraries are available as building blocks to implement application-specific logics.

Communications

RTU 6049-E70 supports both serial-based and Ethernet-based communications on a variety of protocols. Communications can be for either acquisition of data from subordinate devices or transfer of information to a higher level system like SCADA. Further, peer-to-peer or horizontal communications can be performed by the RTU in case of multi-node architectures.

Both serial and Ethernet interfaces are available on the processor module itself. Additional interfaces can be added to the RTU through communication extender modules (CXMs). These modules are installed alongside the processor module in the processor rack and communicate with the processor over the backplane bus.

CXMs are available in two variants –

- Passive - provides physical interfaces only, no processing capability
- Active (Intelligent) - provides physical interfaces as well as protocol intelligence

RTU 6049-E70 supports traditional copper-based interfaces like RS232, RS485, 10/100-baseT Ethernet. Fiber-optic based Ethernet interface are also available on select CXM modules.

The RTU can also interface with PSTN leased-line or dial-up modems using RS232 ports. GSM/3G/4G modems and router modules are available for wireless communications.

Managed Ethernet switches as a rack-module are also available.

Configuration & Diagnostics

Husky Studio

- Integrated Configuration & Diagnostics Tool
- Windows based RTU configuration software
- I/O Rack Configuration
- Communication Tasks Configuration
- Master (Host)/Slave Database Configuration
- Mapping across different protocols
- Import / Export via Excel
- Online configuration download / upload
- RTU memory view
- Fault Diagnostics
- Connect via Serial / Ethernet Link
- Protocol Trace Viewer

System Redundancy

RTU 6049-E70 supports redundancy of the following functions –

- Rack power supplies – Supports installation of two power supplies in same rack for redundant operation
- Processor module (incl. communication extender modules)
- Communication channels towards master stations and IEDs

Processor Redundancy

RTU 6049-E70 supports dual redundancy of the processor modules by having a master-standby mechanism. Two options are available for implementing processor redundancy. First option allows installing of processor modules in separate racks, each with its own set of power supply and communication extender modules. In this scenario, I/O modules are installed in expansion racks only.

The second option provides processor redundancy in the same rack, while sharing the power supply module, and allowing I/O modules to be installed along with the processor module. In this arrangement, non-intelligent communication extender modules cannot be installed along with the processors.

Both the processors are interconnected through the expansion bus. One of the processor modules assumes the role of the master CPU, while the other assumes the standby role. The master CPU performs all RTU functions including I/O scanning, communications, logic execution, etc. The standby CPU monitors the master CPU, and assumes the master role, in case the master CPU fails, and performs a cold start of the communication channels towards subordinate devices. The online CPU also performs database and event synchronization with the standby CPU. Dedicated multi-ported RAM option is also available for this purpose.

Communications Redundancy

Redundancy of communication channel between RTU and external world (IEDs and master stations) can be enabled in the RTU via Husky Studio. Redundancy of communication channels is based on active-passive concept, wherein one of the two channels is used for active communications, while the passive one is used for periodic health check of the link. When RTU detects failure of the active communication channel, it switches over to the passive channel making it active.

Cyber Security

The RTU has multiple features to enforce cyber security requirements for securing the RTU functions, and to meet IEEE 1686 & NERC/CIP recommendations. Security extensions as per IEC 62351 are also supported.

- **Role-based access control to RTU for configuration / diagnostics**
- **Audit log to track**
 - Network Connection requests
 - Configuration download/upload
 - Husky Studio login/logout
 - Reboot / power reset condition
 - Audit events like login/logout, configuration download, etc. can be monitored over SCADA protocols
 - Audit log alarm for events like 3 consecutive failed login attempts
- **White-listing of IPs for connection acceptance**
 - Non-whitelisted IPs are rejected from making connections to the RTU over SCADA protocols.
- **System Hardening**
 - In-built firewall blocks unwanted/ unused TCP/UDP ports
 - Preventing execution of unauthorized third-party applications
 - Digitally signed firmware and configuration files
- **Electronic Security Perimeter between WAN and LAN**
 - VPN or SSL/TLS based encrypted exchanges
- **Role-based access control (RBAC)**
 - Multiple users with independent access control rights (up to 10 users)
 - Password complexity enforcement
- **Web-interface to monitor the RTU live data, logs**
- **Diagnostic ports can be enabled/disabled via SCADA protocols**

HUSKY RTU 6049-E70m



RTU 6049-E70m is a compact Remote Terminal Unit (RTU) to cater to the needs of remote data collection / automated monitoring/controlling systems, which typically have very low I/O counts. Built using the proven technology of RTU 6049-E70, the Mini-RTU offers a customized and cost-efficient solution for remote data collection applications. The Mini-RTU features an embedded 32-bit microprocessor and a real-time operating system that provide the computing power to effectively meet the requirements of data collection and aggregation from a multiple devices, and to communicate the data to single or multiple central stations.

The Mini-RTU is an ideal choice for the applications that require interfacing with intelligent devices and with a limited number of hardwired I/O. It has in-built Ethernet ports (copper/fiber) and RS232/RS485 serial ports. The built-in wireless RF modem provides the RTU with RF communication capabilities. This allows use of public wireless infrastructure like GSM/GPRS/3G/4G to connect the RTU with central SCADA stations. The compact arrangement of the Mini-RTU allows it to be deployed in wall-mounted enclosures. The Mini-RTU supports both DIN rail as well as flush mounting.

Applications

Feeder RTU
Water Utilities
Wireless I/O
Automated Meter Reading
Local Automation Unit
Gas Distribution

HUSKY DCU-E70

DCU-E70 is a multi-functional computing device suitable for Industrial Automation applications and compliant to IEC61850-3 standard. DCU-E70 offers multiple serial and Ethernet ports for connecting to SCADA/HMI systems and field devices (IEDs), along with a rich set of communication protocols. Three major models are available under the DCU-E70 series



Model - A

High performance, up to 8x Ethernet, 12x Serial Ports

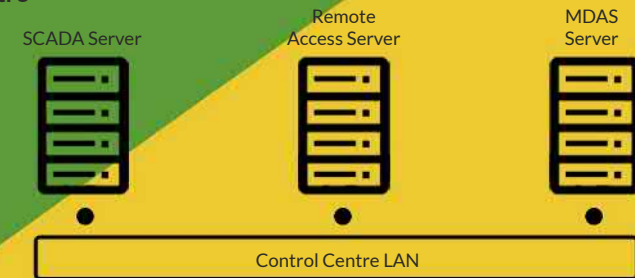
Model - B

Entry Level, with up to 2x Ethernet, 4x Serial Ports

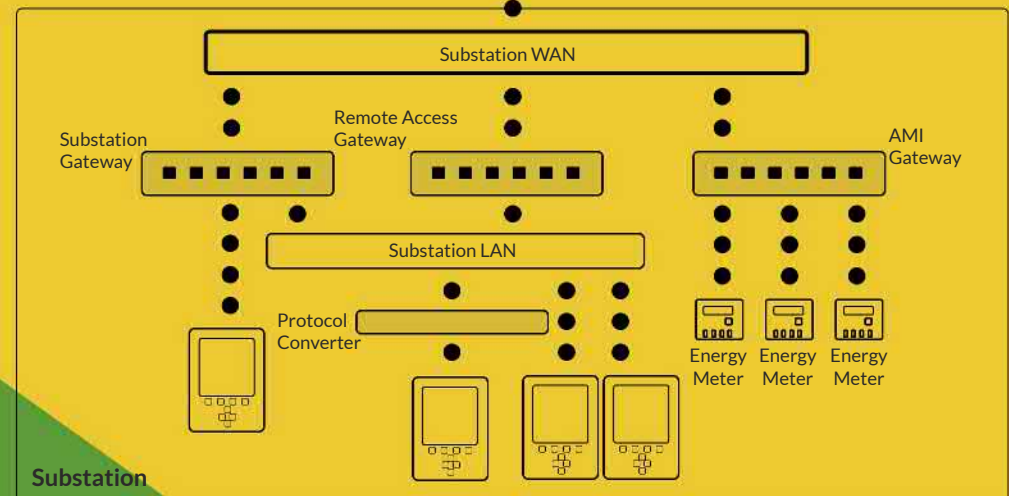
Model - C

Medium Level, with up to 4x Ethernet, 4x Serial Ports

Control Centre



VPN



Substation

Communications

DCU-E70 supports traditional copper-based interfaces like RS232, RS485, 10/100/1000-baseT Ethernet. Fiber-optic based Ethernet interface are also available on select models. Model B & C also feature capability to house in-built 4G modem with dual-SIM feature for wireless communications.

Functions

DCU-E70 can be used in multiple roles such as a Substation Gateway, Protocol Converter, Data Concentrator, M2M Gateway, Metering Gateway, Serial Device Server, VPN Router-cum-Firewall. A single unit of DCU-E70 can handle multiple devices providing a common and consistent interface to SCADA/HMI centers.

DCU supports acquisition of disturbance records and real-time status and measurements, protection events from protection devices. The DCU can also act as a remote access gateway for protection devices.

Cyber Security

With the proliferation of public communication networks like Internet, GPRS, etc. in SCADA applications, many IEDs are now directly connected to these networks. Therefore securing these devices is a major requirement in order to prevent cyber attacks which compromise the entire application being controlled by the SCADA system.

DCU can be deployed as an electronic security perimeter (ESP) that acts like a firewall between the public networks and the IEDs.

The DCU provides the following functions to achieve a cyber-secure network

- Firewall that allows only specific hosts to connect with the gateway
- Audit Logs for user actions, connection attempts, connection denials, etc.
- TLS VPN support
- Secure Execution Environment which prevents execution of malware or third-party applications
- Authenticated pass-through channels
- Role-based Access Control

Protocol Support

Slave Protocols

IEC 60870-5-101
IEC 60870-5-104
DNP 3.0 Serial/TCP
Modbus RTU/TCP
RP570
DLMS Server
IEC 61850 MMS Server

Master Protocols

IEC 60870-5-101
IEC 60870-5-104
IEC 60870-5-103
DNP 3.0 Serial/TCP
Modbus RTU/TCP
IEC 61850 MMS
SPA Bus Interface
Alstom Courier
DLMS/COSEM Client HDLC/TCP



HUSKY SBRTU

HUSKY SBRTU is a high-performance single board RTU powered by an ARM microprocessor. The RTU provides communication interfaces as well as process I/O in a compact form factor.

The RTU can be equipped with up to 4 nos. of Ethernet (copper/fiber) ports and up to 4 nos. of RS232/RS485 serial ports and various process I/O options (DI, DO, AI, AO & RTD) are available. Additionally, 3G/4G and Wi-Fi wireless interfaces are also supported as an option. The SBRTU supports industry-standard protocols such as Modbus RTU/TCP, IEC 60870-5-101/104, DNP3.

Communications

SBRTU supports traditional copper-based interfaces like RS232, RS485, 10/100-baseT Ethernet.

The RTU has option for wireless modem interface for communicating over radio networks. Different radio technologies can be used based on the chosen modem. Currently, 2G/3G/4G networks are supported. The use of the modem does not consume any of the serial ports available to the user. Certain models have option for dual SIM interface for providing redundancy of network provider. Additionally, an optional Wi-Fi interface can be provided, which makes the RTU function as a Wi-Fi hotspot or Wi-Fi station. The Wi-Fi hotspot feature allows laptops / tablets to connect to the RTU over Wi-Fi for diagnostics and configuration purpose.

Hardwired I/O

Digital Inputs

- 12/24/48VDC input ranges
- Pulse counter
- Digital Measurands

Digital Outputs

- Potential free NO contact (24VDC @ 7A)
- Select-before-Execute hardware logic

DC Analog Inputs

- Voltage and Current Inputs (user selectable)
- Bipolar, Differential Inputs
- 15 + sign-bit resolution
- Accuracy of 0.1% (FS)

DC Analog Outputs

- Voltage and Current Outputs (user selectable)
- 15 + sign-bit resolution
- Accuracy of 0.1% (FS)

RTD Inputs (in lieu of AI)

- 2-wire/3-wire/4-wire
- PT50 / PT100 / PT200 / PT500 / PT1000
- Accuracy of 0.1% (FS)

L2 MANAGED ETHERNET SWITCH

Ethernet Switch Modules

HUSKY series Ethernet switch modules provide small form-factor, fixed-port managed industrial switches.

- Supports 10/100 BaseT, 100BaseFX
- Priority queues: 802.1P VLAN, and IPTOS priority
- Ingress and Egress rate control
- 802.1w Rapid Spanning Tree Protocol (RSTP)
- Web Interface for Configuration
- Rack and DIN-rail mount options



LTE ROUTER

HUSKY 2G/3G/4G Router that enables any Ethernet device to communicate with a central location over 2G/3G/4G networks over a secured VPN (IPsec, TLS). The VPN is a transparent channel which can be used to exchange any kind of TCP/UDP traffic on both the directions. The end devices and the control center communicate using private, static IP addresses, over a public, dynamic IP network.

Features

- 4x switched Ethernet 10/100Mbps ports
- Multiple VPNs for connectivity with different control centres over same wireless network
- Optional RS232 / RS485 serial port for serial devices
- Dual SIM operation with cold switch-over of wireless networks
- Rack and DIN-rail mount options



HUSKY BC(P)U

HUSKY Bay Control & Protection Unit (BCPU), provides fully automated monitoring and control of substation switching devices. Bay control requirements can be customized via inbuilt logic engine utilizing the hardwired digital and analog I/O modules.

A modular architecture allows choice of digital I/O combinations as per need, include optional communication modules for communications with higher-order systems.

In-built HMI allows local monitoring of bay status and measurements, along with recorded history of sequence-of-events. Local control of the switching equipment can also be performed through the HMI.

Features

- Monitoring and control capabilities for multiple switches
- Millisecond-resolution SoE recording
- Select-before-Execute control
- Configurable control pulse duration
- Supervision of control execution and operation termination
- Interlocking logic through IEC61131 function blocks
- Remote communications over IEC61850, Modbus, IEC60870-5-104 protocols
- Counting of switch operations
- Graphical HMI for viewing SLD of bay, events, measurements
- 3-Phase protection functions (under development)



INTERFACE CONVERTERS

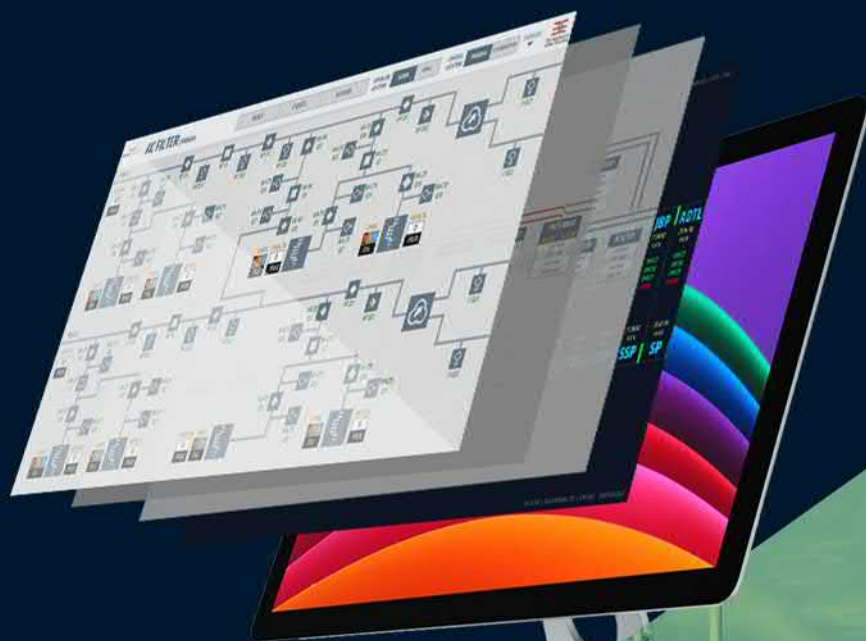
Interface converters are standalone devices for conversion of media or physical interface protocol. All converters are suitable for DIN-rail mounting, with universal AC/DC power input option.

- RS232 to RS485(2-wire/4-wire)/RS422 converter
- Serial device server, for connecting serial devices to Ethernet
- Ethernet media converter, for fiber - copper media conversion
- Serial to fiber converter, for converting RS232/RS485/RS422 to fiber media



Software

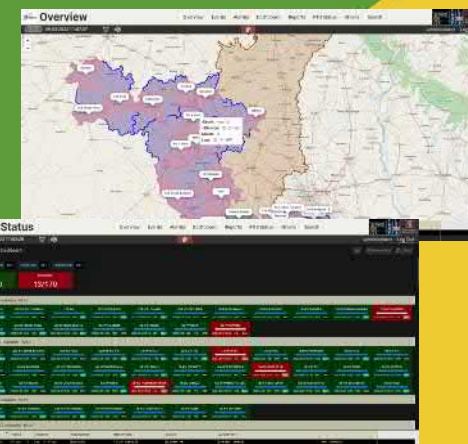
SIRIUS
SIRIUS EMS
SIRIUS RAS
SIRIUS ADMS
WinDCU
iTAS



SIRIUS

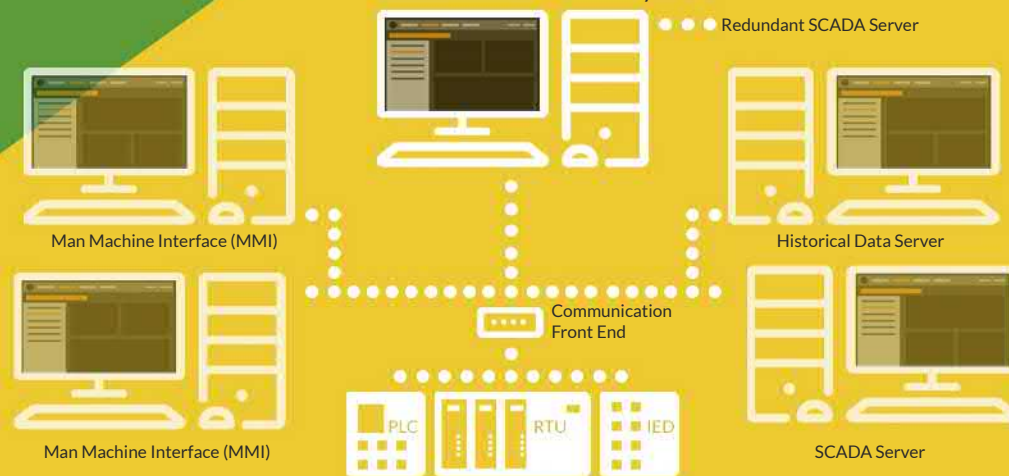
SIRIUS is an Integrated Process Management and Control System designed to provide an all-embracing solution to Process Control Requirements. It includes all the software and hardware components required to perform functions covering the following:

- Data acquisition from the process
- Data processing
- Taking pre-programmed intelligent control actions
- Archiving and statistical analysis
- Displaying data in a useful manner to the user
- Executing control actions as specified by the user



Scalable Architecture with HA Support

All in one SCADA Server / MMI/
Front End / Communication / History



Man Machine Interface

- Thick & Thin (Web) Clients
- Alarms and Events
 - Prioritized & Filtered Lists
 - Audible tones for different priorities
 - Latest Alarm(s) always visible
- Historical & Realtime Trends
- Runtime Maintenance of I/O
- Block/De-block acquisition
- Command tagging
- Alarm inhibition



Historian

Historical Data Server (HDS) houses the database used for storage of logged data. Main server is responsible for logging all the data on HDS. HDS is an SQL database server that provides the storage space for various types of logging requirements.

HDS provides data services to all its clients using ODBC and/or REST API. HDS provides mechanisms for data compression, data roll-ups for old data, maintenance e.g. taking disk backups so that some data could be made offline. The offline data could be made online using data restore mechanisms.

HDS supports querying of logging related details in order to make it possible for a client to provide a more user-friendly interface. Typical clients of HDS are the trending & reporting package and MMI Clients.

Development Environment

Integrated Development Environment (IDE) is a configuration tool used for configuring SCADA applications. IDE provides with a single application to configure SCADA system and allows distributing configuration on multiple machines from the engineering machine.

IDE is a complete integrated development environment that allows rapidly designing and distributing SCADA projects. IDE is a window based program used to configure the information required for the control and monitoring of a process.

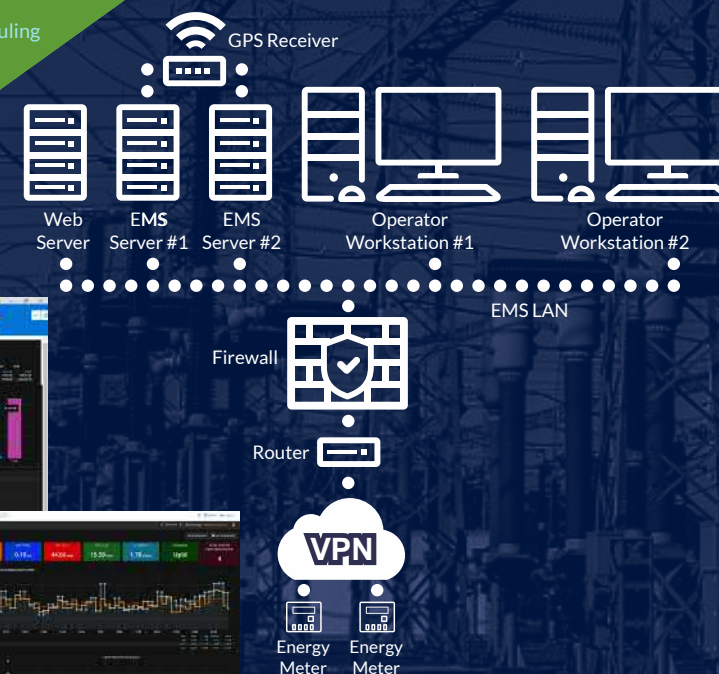
SIRIUS EMS

Energy Management Software provides meter data acquisition (MDAS) functions as well as energy market applications such as Open Access power purchase demand forecasting and scheduling

Features

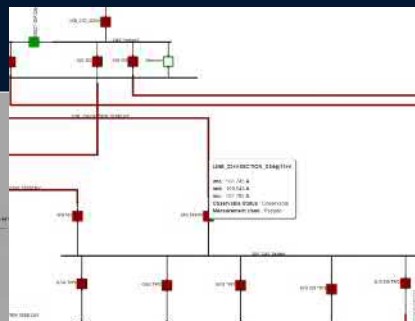
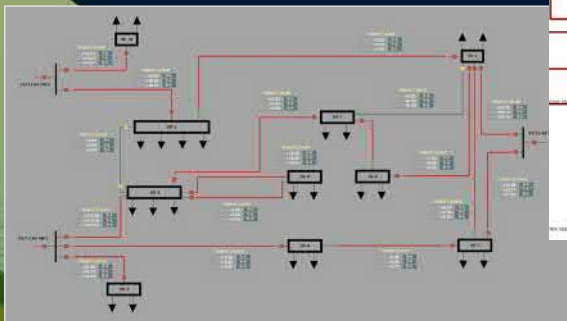
- Supports Modbus, DLMS meters directly as well as through RTU/DCUs
- Support for virtual meters
- Machine learning based short-term demand forecasting
- Dynamic demand tracking and bias correction
- Graphical tools to aid analysis
- Display of real-time data, tools to analyse historical data
- Scalability & Availability:
 - Separate historical data storage with redundancy option
 - Dual Redundant Servers for forecasting/scheduling calculations
- Data Acquisition Interfaces:
 - IEC60870-5-101, IEC60870-5-104, DNP 3.0, DLMS/COSEM
 - Provision to capture real-time data as well as block data (currently in 15 minute blocks)
 - Real-time data can be transferred to LDC SCADA System
 - Block data used for forecasting and scheduling
 - Enhanced security through firewall/VPN
- SCADA Interfaces:
 - Interface with SCADA System for real-time and block data capturing
 - Can act as RTU slave for SLDC SCADA Master.
 - Can provide forecasted, scheduled, and actual consumption block data and real-time data over DLMS/COSEM to other metering applications
 - IEC60870-5-104, IEC60870-5-101, DNP 3.0, DNP 3.0 over TCP/IP

Typical System Architecture



Advanced Distribution Management System (ADMS)

- CIM-based Network Modelling**
 In-built editor for importing and/or creating IEC CIM based network models and data exchange with other applications. Import of CIM RDF/XML files to build the system database.
- Load Flow Application**
 Distributed unbalanced 3-phase load flow algorithm for planning and offline/on-demand studies. Computes node voltage profiles and angles, branch currents, network losses.
- State Estimation**
 The distribution state estimator (DSE) module is a unique tool for real time monitoring, control, protection, and optimization of dynamic parameters to the improve the efficiency, power quality and stability of distribution networks. There are three vital steps in overall DSE (1) Observability Analysis (2) State Estimation (3) Bad Data Processing.
- Volt/Var Control & Optimization**
 VVO module's primary function is for maintaining the real time voltage and reactive power at all the load buses of the distribution network. It provides room for power loss reduction, lowering the peak demand or consumption.
- Fault Location, Isolation, and Service Restoration (FLISR)**
 The FLISR module locates the faulted line section in a network, based upon the input from intelligent electronic devices (IEDs), and then isolates the faulted line sections by issuing command to remote controlled switches (RCSs).
- Enterprise Service Bus (ESB) Integration**
 Integration with off-the-shelf ESB solutions like WSO2 for import/export of data between ADMS modules and third-party applications over a standardized interface.
- Load Shedding Application**
 Load shedding's objectives include limiting of voltage and frequency limit violation. The load shedding application may be based upon the lowering of frequency or upon time of the day such as during peak demand hours to limit the peak power demand.
- GIS Integration**



SIRIUS ADMS

SIRIUS RAS

SIRIUS Remote Accessibility System or SIRIUS RAS is the suite of software tools that setup a critical infrastructure protection (CIP) mechanism in place at substations, as well as provides secure and authorized access to substation IEDs, both locally as well as remotely.

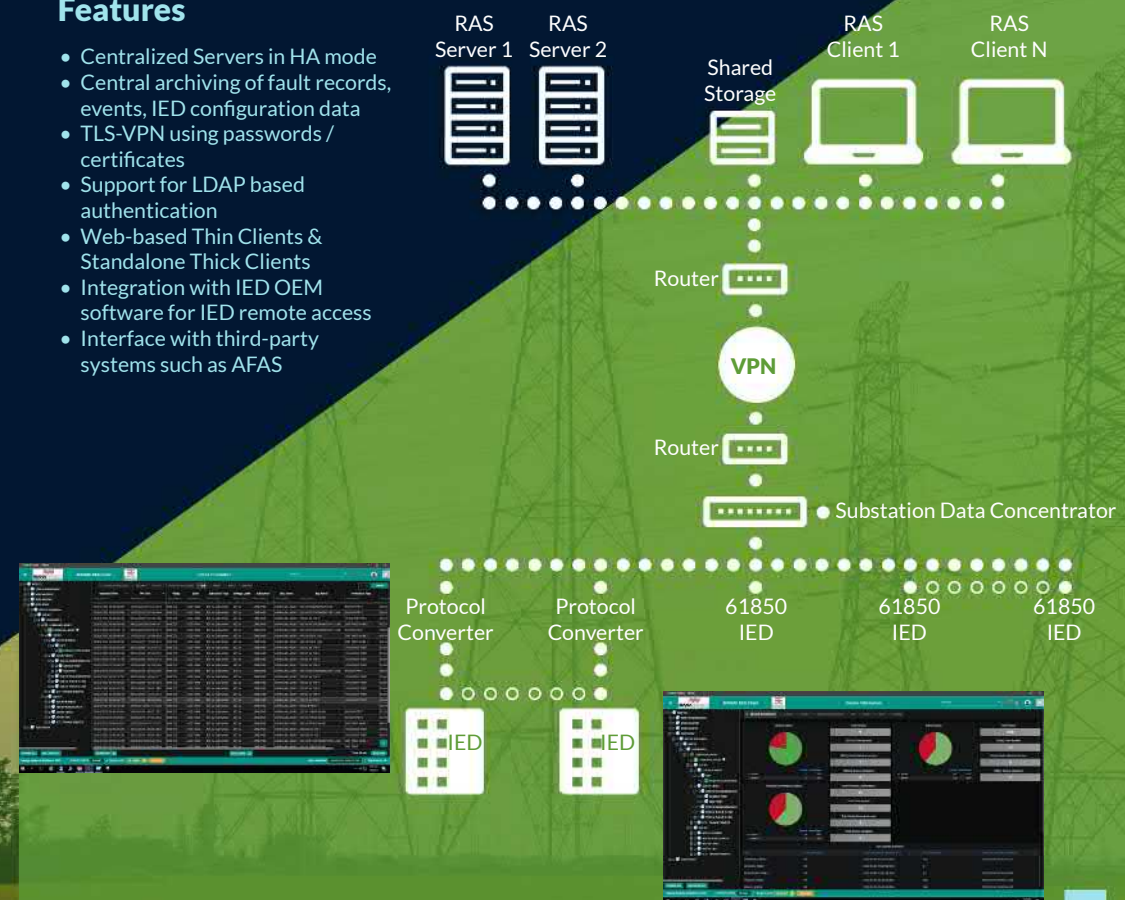
The primary functions of SIRIUS-RAS are following –

- Provide an electronic security perimeter (ESP) and single point of access to the substation IEDs (HUSKY DCU-E70 is used as an ESP)
- Enable secure and authorized access to substations IEDs remotely and locally
- Make IED data available centrally at utility's network operations centre (NOC) over a secure channel
- Allow authorized personnel to parameterize or configure a substation's IEDs. As part of this, RAS maintains the substation-wise IED inventory, as well as versioned history of each IED's configuration files.

Features

- Centralized Servers in HA mode
- Central archiving of fault records, events, IED configuration data
- TLS-VPN using passwords / certificates
- Support for LDAP based authentication
- Web-based Thin Clients & Standalone Thick Clients
- Integration with IED OEM software for IED remote access
- Interface with third-party systems such as AFAS

Typical System Architecture



WinDCU

WinDCU is a software gateway which can function as a protocol converter, data concentrator or a SCADA front-end. WinDCU is available for Windows and Linux platforms, and functions on off-the-shelf server hardware.

Features

- Supports up to 2,000,000 points
- Translate between any supported protocol
- IEC61131-3 Logic Support
- Supports reporting by exception
- Supports Select-before-Execute operation
- Event buffering for back-filling
- Protocol trace capturing
- HUSKY Studio based configuration
- In-built web-server for diagnostics and monitoring
- High Availability (HA) mode supported

Slave Protocols

- IEC 60870-5-101
- IEC 60870-5-104
- DNP 3.0 Serial/TCP
- Modbus RTU/TCP
- RP570
- DLMS Server
- IEC 61850 MMS Server
- OPC UA Server

Master Protocols

- IEC 60870-5-101
- IEC 60870-5-104
- IEC 60870-5-103
- DNP 3.0 Serial/TCP
- Modbus RTU/TCP
- IEC 61850 MMS
- SPA Bus Interface
- Alstom Courier
- DLMS/COSEM Client HDLC/TCP

iTAS

iTAS (Integrated Terminal Automation Software) is a full-fledged application built on top of SIRIUS, for automation of tank-truck, rail-wagon loading at oil marketing terminals.

Features

- Tank-Truck (T/T) Loading Operations
- Rail-Wagon Loading Operations
- Orders & Sales Consolidation
- Tank Farm Management
- Pump House Automation
- Integration with business process (e.g., ERP)
- Scalable & Redundant Architecture
- Hot Standby LRC Redundancy
- Communications Redundancy
- Proven integration capability with variety of field devices
- Security Functions
- Restricted Access to Operating System, System Database
- All Operator Actions Logged
- LPG Loading and Unloading
- Pack Loading & Unloading
- TT Bottom Loading and Top Loading
- Integration with Bio-metric Systems
- Automated Top-up
- OLA Screen for Driver Information
- Hand Held Wagon Registration
- Tab based Security Authorization
- TT Lock Management
- Multi-Language EDU Integration
- Integration with Weigh Bridge
- Door-to-Door Philosophy
- Integration with SAP Web Services including SOAP, REST and WSDL
- Order Management
- Online Density Measurement and Correction
- Customised Wagon Placement in Gantry

Protocol Drivers

Batch Controllers

- Contrec 1010 Single & Dual Arm CB
- Contrec 1010 CJ Dual Arm
- Contrec MODBUS
- Accuload 2 Single Arm
- Accuload 3 Single Arm
- Smart Load Single & Dual Arm
- Fusion 4 for Mass Base
- Emerson DL8000
- Danload 2000
- CMRK

DETs and EDUs

- STAL DET
- EDU Single Line, Two Line and Fifteen Line, Makdine

Card Readers

- Next Watch
- FMC
- Sentry

Weigh Bridge

- Rice Lake
- Avery





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