PCS-9710

Remote Terminal Unit

The PCS-9710 Remote Terminal Unit (RTU) adapts to all kinds of substations and power plants in high, middle and low voltage levels. It supports AC & DC analog sampling, configurable binary inputs and outputs, programmable logic, etc.

The PCS-9710 RTU is a microprocessor-controlled electronic device that interconnects objects in the physical world to one or multiple Network Control Centre(s). It adopts an object-oriented design with a unified software and hardware platforms which supports the access with nearly all kinds of intelligent devices of NR Electric and third parties.

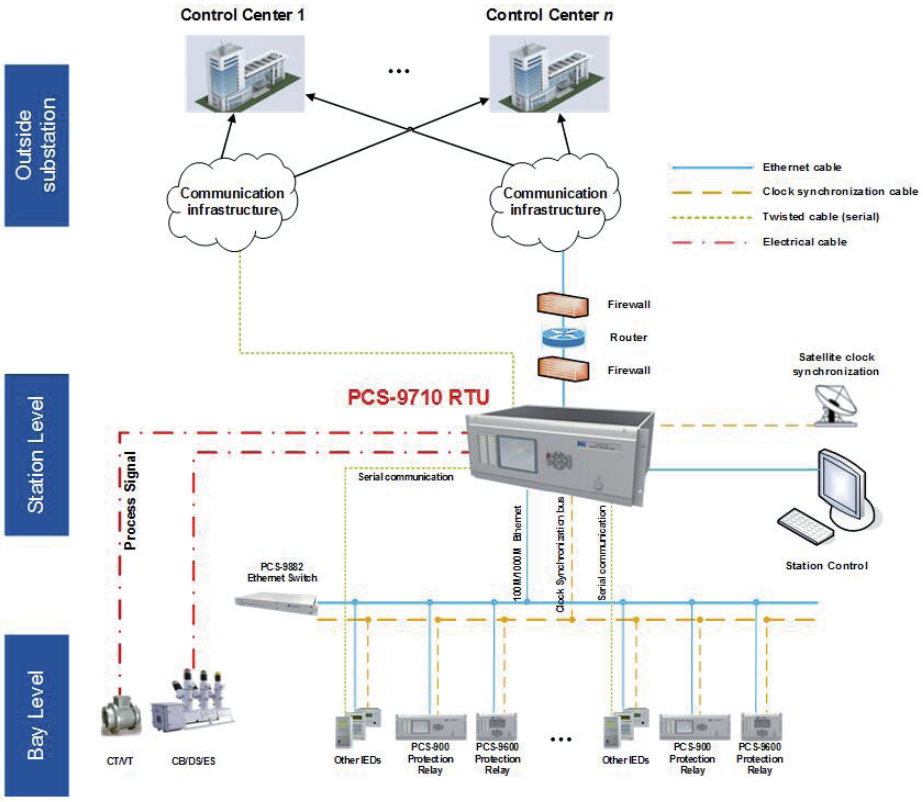

Figure 1 Typical application

Functions

- Flexible IO configuration
  The IO quantity can be freely configured according to different site need (including AC analog input, DC analog input, DC analog output, binary output, programmable logic output, binary input, etc.).

- Communication with IED
  Serial ports and Ethernet ports with optical fiber or twisted-pair cable support the communication with nearly all kinds of IED of NR Electric or third party, including protection relay, bay control unit, etc. Several protocols, IEC60870-5-103/101/104 and DNP3.0 are supported.

- Communication with dispatching centre or control centre
  Serial ports and Ethernet ports with optical fiber or twisted-pair cable support the communication (data and control command transmission) with several dispatching centres or control centres. Each independent communication channel can transmit different customized data in using protocols, such as IEC60870-5-103/101/104 and DNP3.0.

- Data calculation and synthesis
  The calculation function supports mathematical and logical operation which including AND, OR, NOT, XOR, +, -, ×,÷,delay, conversion, etc. The operation result can also be transmitted as a data.

- Operation record and query
  This device record automatically all the remote and local operation command, including CB switching, regulation, parameter modification, signal reset, etc. The records can be inquired with a condition filter.

- Time synchronization
  This device can receive clock synchronization signal via GPS antenna. It supports several timing signal formats, including IRIG-B, network SNTP, time message, etc. It can synchronize all the connected IEDs in order to unify the time in the substation.

- Remote debugging
  In using the RJ45 debugging port at the HMI panel and the auxiliary configuration software, user can query the database, communication message and operation record in the device. Meanwhile, online surveillance of device status, such as CPU load, memory occupation, disk occupation is supported. Maintainer can perform configuration modification, file upload, file download, remote reboot more easily.

- Auto-diagnostic
  The auto-diagnostic function runs during the device service. Corresponding function will be blocked with issued alarm signal when there is a detection of abnormal condition. In the same time, the connection status of all the communication channels, with connected control centre and IED, is checked periodically.

Features

- This device adopts a fully closed chassis with a complete panel. Completely separated spaces for electronic and electrical systems are provided.

- The program is designed with anti-interference measures to enhance the device EMC.

- The adoption of the new UAPC hardware platform, 16 bits parallel A/D converter, optional 320*240 graphic dot matrix LCD, and real time multi-task operating system for industrial purpose realizes a high-capacity, high-precision, fast and real time processing. With the high-precision parallel A/D converter, sampling can be conducted for all the AC signals to ensure the accuracy of analog quantity measurement.

- Dual CPUs, which locate at optional different MON modules, provide some flexible operating modes of RTU, such as master-standby mode, independent mode, etc.

- Two different chassis sizes are supported, 4U 19" (large space occupation and more modules for configuration) and 4U 9.5" (small space occupation and less but flexible module configuration), to adapt to different installation requirement.

- Interlocking logic is supported in bay level. User can program interlocking logic in using the auxiliary software and download it to RTU via network.

- Modularized hardware design makes this relay be easily upgraded or repaired by a qualified service person. Various function optional modules can satisfy various situations according to the different requirements of the users.

- Software and hardware clock synchronization are both adopted with 1ms timing accuracy to ensure the resolution of Sequence Of Events (abbreviated as SOE).

- Ethernet port and RS-232/RS-485 serial port are equiped for communication with optical fiber or twisted-pair cable.

- Dual power supply technology based on load balance is adopted.

- Up to 3 extension chassis can meet enormous IO requirement.

- Flexible device arrangement, including front & rear wiring, full & half-width chassis, extension HMI panel (with LED and keyboard), can satisfy different demands of cabinet installation.

System Application Scale

Giant System

- Access capacity: 200,000 data points
- PCS-9799+N*PCS-9710 (N>4, 4U 19" rack)

Medium System

- Access capability: 10,000 data points (centralized RTU)
- PCS-9710 (4U 19" rack) +Expanding IO

Small System

- Access capability: 10,000 data points
- PCS-9710 (4U 9.5" rack)
- Small installation space with limited IO number

Maximum accessible channels quantities

Channel	1 Rack 4U 482mm	2 Racks 4U 482mm	3 Racks 4U 482mm	3 Racks 4U 482mm	1 Rack 4U 264mm
AC analog inputs	6CT/6VT +9CT +9CT	6CT/6VT +9CT +9CT	6CT/6VT +9CT +9CT	6CT/6VT +9CT +9CT	6CT/6VT
DC analog inputs	40	80	120	160	48
DC analog outputs	20	40	60	80	24
Binary outputs	80	160	240	320	60
Programmable logic outputs	80	160	240	320	60
Binary inputs	357	735	1113	1491	147
Device power supply	Single or Double				Single
Extension serial port	6				
Panel installation mode	Front or rear				

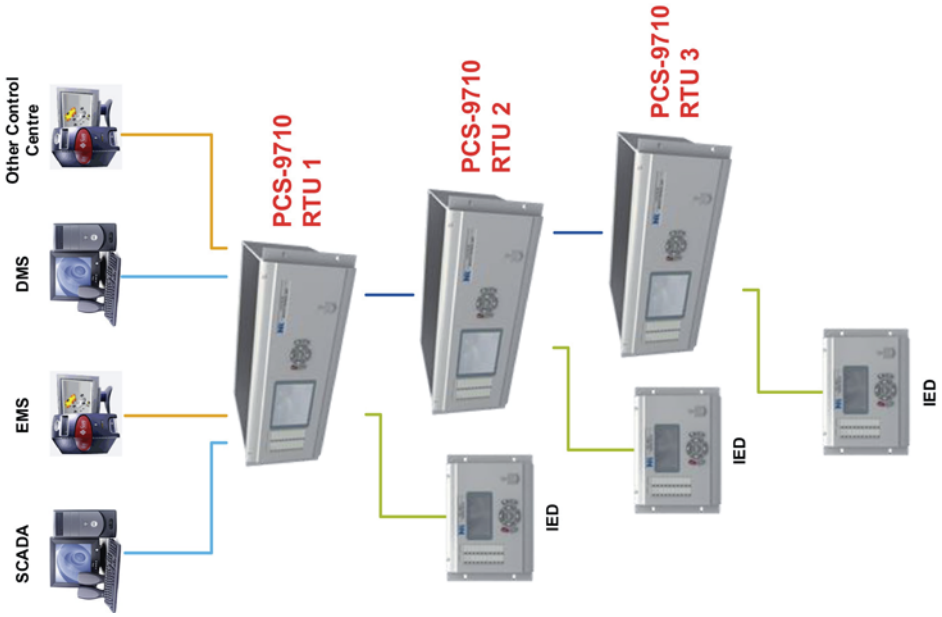

Figure 4 Hand-in-Hand Mode (Cascade)

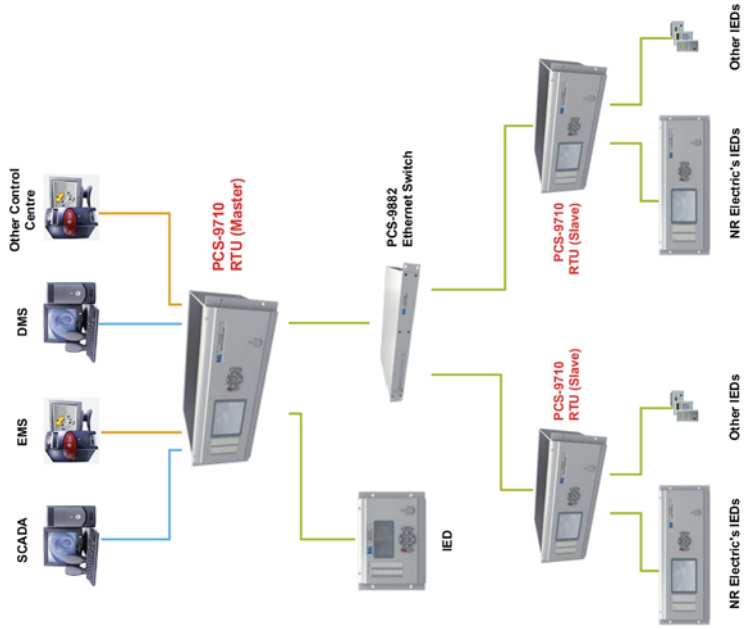

Figure 3 Master-Slave Mode (Star)

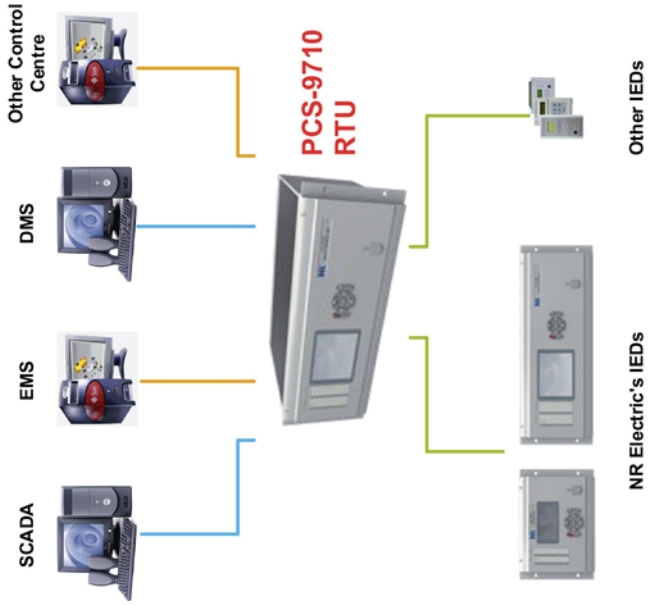

Figure 2 Single Mode