

Substation Automation Solutions

minsait ACS

An Indra company

Minsait ACS is a leading provider of smart grid solutions to the global electric power industry. Our automation product lines include a wide range of flexible and cost-effective distribution, transmission & power plant substation and feeder automation solutions. Our NTX series of intelligent automation controllers are available in pole-top and substation models.

As older substations are modernized or new substations are built, more device integration capability and less local I/O will be required. We support all applications with highly reliable, technically advanced client/server, peer-to-peer distributed multiple 32-bit microprocessor technology. Incorporating an embedded Linux® operating system that is fully secured (with no user accessibility) provides a stable platform for all distributed microprocessor nodes in each model. Our integration of IEDs is completely vendor transparent. Anyone with Windows® experience will find NTX Explorer Configuration and Monitor tools very intuitive. It's as close to plug-and-play as you can get.

All NTX series models can be configured with high-speed isolated RS-232 or RS-485 serial and 10/100 Base T DNP3 over TCP/IP or UDP Ethernet ports, as well as serial ports supporting most popular legacy protocols. The NTX series also incorporates both serial and TCP/IP or UDP Modbus RTU protocol. Both serial and TCP/IP DNP3 and Modbus RTU protocols are configurable as a client, a server, or multiples of both. IEC 60870-5-101 Serial Primary/Secondary and IEC 60870-5-104 Ethernet Client & Server are also supported.

Minsait ACS offers an NTX series product for every need with a high emphasis on individual module commonality. Detailed product sheets for each of these solutions are also available. Please contact us for help in determining which of our substation automation/integration products is right for your application.

NTX-20

The NTX-20 controller is a low-cost intelligent controller, ideal for data concentrator, protocol translation, and substation distributed circuit breaker/transformer bay automation or pole-top/pad-mount switch control for distribution automation. It is 35mm DIN rail-mounted, with a small complement of external I/O modules. The NTX-20 includes an Ethernet interface, and supports DNP over TCP/IP and Modbus RTU TCP/IP as well as several legacy protocols. It supports two 9-pin serial and one RJ45 Ethernet port, with up to 15 virtual ports.



NTX-20 controller

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NTX-200

The NTX-200 substation controller is the smallest of our NTX-200 series modular card file substation system designs. It incorporates complete substation management functionality in a compact unit and adds the ability to interface to large amounts of data from IEDs, and to a small to medium amount of locally wired I/O in the substation.

The NTX-200 can be used in a traditional centralized equipment rack or a wall-mounted cabinet. The standard NTX-200 has a half-width card file (9" W x 5.25" H x 12" D) that can be bottom-mounted with top/rear access. A 19" rack card file is available as an option, for front/rear access rack mounting. A four slot Node Motherboard supports the primary System Controller with one 10/100baseT Ethernet and two serial RS232/RS485 Serial Ports. An additional three Ethernet/Quad-Serial Gateways may be support.

It has a three-slot I/O motherboard that supports up to three 16-point DC Analog Input Modules; three 32-point Digital Input Modules; or three Bell 202 FSK modems - or any combination of these modules in the three slots. The I/O is not expandable beyond the base 3-slot I/O motherboard. The NTX-200 can also serve as a remote Data Acquisition and Control node in a distributed substation system. It supports up to 14 serial and 4 Ethernet ports with up to 204 virtual IP ports.



NTX-200 controller



NTX-220 front view

NTX-220

Our mid-size option, the NTX-220, provides complete substation management functionality. It can interface to a very large amount of data from integrated IEDs, and to a medium to large amount of data from hardwired local I/O in the substation. Multiple user-defined subsets of this data can be transmitted to one or more master stations in the master's native protocol. A medium amount of local analog and digital inputs or Bell 202 modems can be configured in the 6 I/O module motherboard slots available.

Multiple high-performance ARM9E 32-bit RISC microprocessors, each programmed to support specific functions, are linked together using an internal peer-to-peer network. Up to five high capacity NTX Ethernet/quad-serial gateways make the NTX-220 an ideal, low-cost substation solution for data concentrator and protocol converter for small- to medium-sized transmission or distribution substations. A full-width 19" card file supports up to 18 serial and 5 Ethernet ports, with up to 267 virtual IP ports.



NTX-240 expanded chassis

NTX-240

NTX-240 is suitable for any size substation that has large serial and Ethernet port requirements for data concentration/integration applications. It is primarily used to upgrade legacy Minsait ACS RTUs and legacy RTUs from other vendors. It is available in a standard half-width card file with front/rear or front-only access, which supports up to 18 serial and 5 Ethernet ports, with up to 267 virtual IP ports. An optional 19" rack-mounted full-width card file is also available.



NTX-260 front card file

NTX-260

Our top-of-the-line substation system, the NTX-260 is ideal for very large substation or power plant installations that require a high number of serial and Ethernet ports. It incorporates complete substation management functionality with support for a sizable amount of local I/O for full integration of old and new substation designs. It is also ideal for applications requiring data concentration and/or protocol translation for many substation devices. The NTX-260 architecture includes servers (such as NTX Gateway to IEDs) that produce data and clients (such as the NTX gateway supplying the virtual databases to the master) that receive data. It can also transmit multiple user-selected subsets of this data to one or more master stations in the master's native protocol.

The NTX-260 uses a distributed CPU processing architecture based on multiple high-performance ARM9E (Advanced RISC Machine) 32-bit microprocessors, with each programmed to support specific functions and linked together using an internal peer-to-peer network. This distributed architecture design makes the NTX-260 an ideal solution for high capacity data concentrator and protocol converter applications including power plants, transmission, and distribution substations. A full-width 19" card file supports up to 30 serial and 8 Ethernet ports, with up to 456 virtual IP ports. When an external NTX-I/O12 expansion card file is added, the local inputs and outputs are expandable in groups of 12 I/O slots & 256 relay outputs each. The expansion chassis uses DNP3/IP through a built-in 2-port Ethernet switch that interfaces to the NTX-260 System Controller.

NTX Explorer Configuration and Monitor

The NTX Explorer and Monitor programs runs on a PC using Microsoft® Windows® (XP, WIN7, WIN8, WIN 10) operating systems. It emulates the standard PC Windows Explorer file management system to minimize special training requirements. Drag-and-drop techniques are employed for database-mapping. NTX Explorer is used for configuration of the unit, whether in the field or the convenience of your office. Using Ethernet links to the NTX provides an easy way to remotely download or upload a configuration to or from the NTX via the WAN. Configuration parameters include baud rate, Virtual RTU addresses, modem type, local I/O configurations, etc. All configuration changes can be made

independently, stored in a file on the PC, and downloaded to the NTX when it is convenient. The existing configuration in an NTX can also be uploaded to a PC.

NTX Monitor is used for field diagnostics. It displays real-time data and functions such as binary and counter inputs, SOE data, analog points, IED inputs and outputs, state and activity of the binary output system, and internal LAN traffic. Local and IED control points can be tested directly in NTX Monitor, making it extremely helpful in the troubleshooting of IED communications (through the monitor of communications statistics for each connected device) and applications.

Monitored local input data can be modified manually by a technician for testing or database verification purposes. Monitored data has two quality flags associated with each data value in the database:

- Data that is not updating from the external source (off-line IED, etc.) is displayed with a gray background
- Manually modified data is displayed with a red background

With a 10/100 Ethernet interface to the controller, NTX Explorer can be connected via a WAN for remote configuration.

Successful legacy RTU upgrade program

In the early 1980s, we began an upgrade program to upgrade our MPR-3000 series RTUs, which were delivered in the 1970s and 1980s. Since that time, we have added successive generations of enhanced RTU solutions, and continue this upgrade policy today with the latest in our line of substation automation controllers - the NTX series. We then began to examine legacy RTUs from other manufacturers to see where we could repeat these successes. We started with the Moore Power Systems RTUs - formally dropped from support by the original product vendor. These products have a card file design like our own models. We successfully implemented a Moore Power Systems MPS-9000 and MPS-9000S upgrade in a single day at a large mid-western utility, at a tremendous cost saving to the utility versus the replacement cost. The utility had previously replaced seven similar Moore Systems legacy RTUs with another vendor's RTUs—a project that took over two years to complete.

Our success with upgrading these Moore Power Systems legacy RTUs led us to explore other upgrade opportunities. We have implemented programs at many utilities, upgrading more than 27 different models. For a detailed list, please contact a Minsait ACS sales representative.

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NTX series model comparisons

The chart below briefly compares the NTX series models. This is not a comprehensive comparison. For a copy of the comprehensive product comparison, or detailed information on a specific product, please contact a Minsait ACS sales representative.

| | NTX-20 | NTX-200 | NTX-220 | NTX-240 | NTX-260 |
|---|---|---|---|---|--|
| Replaces previous ACS model | NTU-7575 base | Fully expanded NTU-7575; small Connex 30/ Connex 60 | Small Connex 30/ larger Connex 60 gateway; smaller I/O capacity for Connex 30 | Connex 60 or Connex 30 data concentrator/ protocol translation applications & 2 nd source RTU upgrade host | Fully loaded Connex 30 plus |
| Carrier/card file dimensions | 200 x 108 x 70 mm (8" x 4.25" x 2.75") | 42 HP wide, 3 U high (9" w x 5.25" h x 12" d) Optional 84 HP (19") | 84 HP wide, 3 U high (19" w x 5.25" h x 12" d) | 42 HP wide, 3 U high (9" w x 5.25" h x 12" d) Optional 84 HP (19") | 84 HP wide, 3 U high (19" w x 5.25" h x 12" d) |
| Ethernet quad-serial gateway node: maximum installed | N/A | 3 | 4; no I/O 1 slot (control output); 1 slot (optional expanded I/O) | 4; no I/O 2 slots used for legacy I/O interfaces | 7; no I/O 2 slots used for I/O interfaces |
| Virtual Ethernet ports | 15 | 204 | 267 | 267 | 456 |
| Total NTX ports supported: isolated serial ports | 2 | 14 | 18; no control and DA050235 I/O controller used | 18; no I/O; 2 node slots used for legacy I/O interfaces | 30; no I/O; 2 node slots used for I/O interfaces |
| Local binary inputs supported | Base 16 + 4 expansion; groups of 8 inputs each (48 points max.); isolated 18-36 VDC contact wetting | 32-point modules; card file mounted; max. of 3 slots (96 points max. with no analog inputs); isolated 24 VDC contact wetting | 32-point modules, card file mounted; max. of 6 slots (192 points max. with no analog inputs); isolated 24 VDC contact wetting | For legacy ACS or 2nd source upgrades; can support max. of 512 points | 32-point modules, card file mounted; max. of 8 slots (256 points max. with no analog inputs); isolated 24 VDC contact wetting; NTX-I/O12 expansion card files with 12 slots each |
| Local DC analog inputs supported | 6 (expansion) 35 mm DIN rail-mounted (groups of 6 inputs each); 36 points max. | 16 DC analog input modules, card file mounted; max. of 3 slots (groups of 16 inputs each; 48 points max. with no binary inputs) | 16 DC analog input modules, card file mounted; max. of 6 slots (groups of 16 inputs each; 96 points max. with no binary input points) | For legacy ACS and 2nd source upgrades with max. of 256 DIN rail or card file analog input points | 16 DC analog input modules, card file mounted; max. of 8 slots (groups of 16 inputs each; 128 points max. with no binary input points) NTX-I/O12 expansion card files with 12 modules each |
| Local DC analog outputs supported | 2; 35 mm DIN rail-mounted | Up to 16; 35 mm DIN rail-mounted | Up to 16; 35 mm DIN rail-mounted | Up to 16; 35 mm DIN rail-mounted | Up to 16; 35 mm DIN rail-mounted |
| Local control relay outputs supported | 24 | 24 | 256 relays (less one quad-gateway) and for legacy ACS and 2nd source RTU control interfaces | 256 relays (less one quad-gateway) and for legacy ACS and 2nd source RTU control interfaces | 256 relays (less one quad-gateway) and for legacy ACS and 2nd source RTU control interfaces |

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