NTX-U57 Controller

An L&G/Siemens TG5700 RTU and I/O Subsystem Upgrade Solution

The Minsait ACSNTX-U57 is a cost effective and feature-rich upgrade solution for L&G/Siemens TG5700 RTU & I/O subsystems. The NTX-U57 replaces the original TG5700 Controller Card piggy-back mounted on the original Termination Card (for each I/O subsystem type other than SBO Control), eliminating the need to disturb or replace any of the existing field wiring. For the utility, this means up to 60% cost savings over a traditional RTU replacement, since the work required to reproduce drawings, re-cable, and do extensive point-to-point checkout is vastly reduced. The original TG5700 Station Manager or Supervisor Module host can be replaced with an NTX series Substation Controller, or any substation system that supports DNP/IP.

Features and Benefits

- Powerful, open-system architecture based on ARM 9E 32-bit RISC processor and Linux OS

- Can be integrated with the Minsait ACS NTX-200 series substation controllers as the Supervisor Module or Station Manager Controller host, or with another substation Ethernet control platform

- Plugs directly into existing termination cards - no need to touch the existing wiring

- No changes to the existing SCADA system database are required when using the same master Host protocol

- Replaces proprietary protocol between modules with DNP 3.0 – opening the system for easy expansion

- Dual 10/100 Base T CAT5 copper or 10/100 Base FX multi-mode fiber optic Ethernet ports support DNP3, IEC 60870-5-104 or Modbus TCP/IP or UDP with up to 16 IP clients, servers, or multiples of both; also functions as an integrated 2-port Ethernet switch

- Large 14,000-point database capacity per module

- Provides time synchronization via IRIG-B (un-modulated), GPS satellite clock, NTP, IEC 60870-5-104 or DNP3 protocol

- Easily expandable by adding Minsait ACS I/O subsystems to an NTX series Supervisor Module or Station Manager Controller host, or by using Minsait ACS replacement termination panels paired with additional NTX-U57 units

- Easily configured using our intuitive, Windows-based NTX Explorer application

- Achieve NERC CIP compliance with the use of built-in solutions

NTX U57 Controller

NTX-U57/D

The NTX-U57/D upgrade module replaces the TG5700 Digital Input Logic module, which plugs directly into the original TG5700 Digtial Input termination card. All customer contact input wiring is untouched in the upgrade. Each NTX-U57/D upgrade supports 32 optically isolated Digital Inputs, configurable per point as: binary with time (SOE with 1mS resolution); binary without time (Status/Indication); or Form A or two consecutive-point Form C counters (Accumulators). Contact wetting voltage is the voltage supplied by the original TG5700 Termination Panel, or the 18-24 VDC Power Supply provided for the NTX-U57/D module.

The NTX-U57/D Binary Input Subsystem scans the 32 inputs every millisecond. Contact bounce is filtered by using a configurable sliding software filter; a chatter filter may also be configured. Each binary input point with or without time may also be non-inverted or inverted where useful for point state definitions.
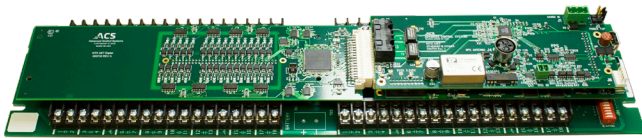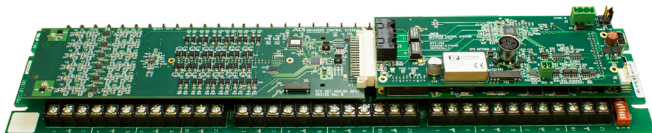

NTX-U57/D

NTX-U57/A

The NTX-U57/A upgrade module replaces the TG5700 Analog Input Logic module and plugs directly into the original TG5700 Analog Input Termination Card. All customer analog input Panel wiring is untouched in the upgrade.

The NTX-U57/A supports 24 DC differential Analog Inputs, with scaling utilized from the existing TG5700 Termination Panel Base. The NTX-U57/A uses a fully bi-polar ± 5 VDC (Jumper Configurable for ± 1, ± 2, ± 5 or ± 10 VDC), 16-bit A/D converter, and the analog termination cards carry scaling resistors. With legacy master slave protocols that support only 12-bit numeric values, the NTX-200 series substation controller, or other substation system host, normally strips out the four least significant bits. All Minsait ACS emulations of legacy protocols allow you to determine which four bits of the IED-supplied 15-bits scaled into engineering units are removed, without touching the sign bit.

NTX-U57/A

NTX-U57/C

The NTX-U57/C upgrade module for retrofit of the TG5700 combination I/O node logic module plugs directly into the original TG5700 Combination I/O Termination Panel. All customer digital and analog input and existing Interposing Control Relay Panel wiring are untouched in the upgrade.

Each NTX-U57/C upgrade supports 8 optically isolated Digital Inputs, configurable per point as binary with time (SOE with 1mS resolution); binary without time (Status/Indication); or Form A or two consecutive-point Form C counters (Accumulators). Contact wetting voltage will be the voltage supplied by the original TG5700 Termination Panel, or the 18-24 VDC Power Supply provided for the NTX-U57/C module.

Six DC differential Analog Inputs are available, with scaling resistors utilized from the existing TG5700 Combo Node Termination Panel Base. Positive 2.5 VDC and zero analog Reference Points are also provided as the 7th and 8th analog points. A fully bi-polar ± 5 VDC (Jumper Configurable for ±1, ±2, ± 5 or ±10 VDC), and a full 16-bit A/D converter is utilized.

The NTX-U57/C upgrade module provides 4 on-board Trip/Close Relay output pairs that are expandable, using up to 28 T/C external interposing control relay pairs. The NTX-U57/C supports assigning T/C contact momentary relay closure times, in 1-millisecond increments, for each relay via the DNP3 or IEC 60870-5-104 TCP/IP or UDP protocol network interface to an NTX-U57/C control interface.

The second 2-wire serial I/O LAN conductors may be used for RS485 Slave interfaces to up to 15 NTU-U57/R Relay Controller Subsystems and/or the NTX-U57/DA Analog Output Subsystem. Single channel and quad-channel Analog Output Modules for up to 16 isolated 4-20ma Analog Output Channels are an option with the NTX-U57/C.

Also, a fully compliant IEC 61131 NTX Logix PLC Program Run-Time License can be included with any NTX-U57/C delivery as an additional option.
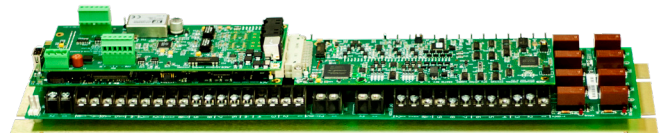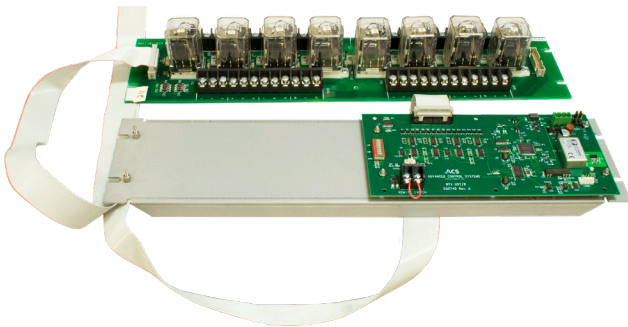

NTX-U57/C

NTX-U57/R

The NTX-U57/R replacement in the Minsait ACS upgrade incorporates a Binary Output Controller with an RS485 serial interface to any NTX-U57 upgrade panel's unused second TG5700 RS485 conductor. Minsait ACS or customer-supplied isolated 24 VDC power supply will provide each module with 24 VDC power that will utilize the original TG5700 daisy-chained power conductors.

The existing TG5700 Control Relay Panel is removed, and the ribbon cables are simply moved from the TG5700 Relay Output Controller to the 26-pin cable connectors on the NTX-U57/R replacement. The NTX-U57/R provides an optically isolated, high-current 8 x 8 driver matrix for addressing each group of 4 T/C (or Latch/Reset) relays on up to 8 TG5700 Control Relay Modules, for a maximum of 32 relay pairs per NTX-U57/R. The original addressing jumpers are re-used as binary addresses 0 through 15 to select which U57/R Controller is being addressed by the master. Up to 16 NTX-U57/R Relay Controllers can be supported with a maximum of 1024 relays per upgraded TG5700 system.

NTX-U57/R

Replacement Termination Boards

Minsait ACS has also developed replacement TG5700 Analog, Digital and Combo Node termination boards. These replacement Termination boards can be purchased with our NTX-U57 upgrade I/O subassembly modules to expand an existing TG5700 I/O configuration, or separately in case of a TG5700 Termination board failure. These modules are not intended to work with original TG5700 Logic boards, but with Minsait ACS Upgrade Logic boards only.
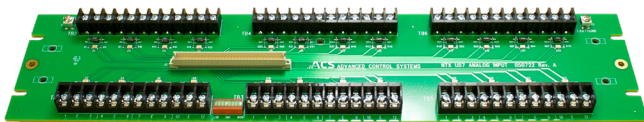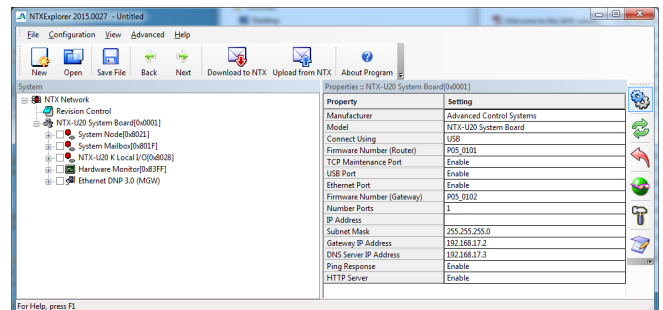

Termination Board

NTX Explorer Configuration Software

NTX Explorer is the application provided for configuring each of the NTX-U57 I/O Subsystems, as well as an NTX-200 series host controller. NTX Explorer runs on Windows XP, Windows 7, Windows 8, and Windows 10. The NTX-U57 controllers are configured via connection to the local maintenance port using a mini-USB cable, or remotely
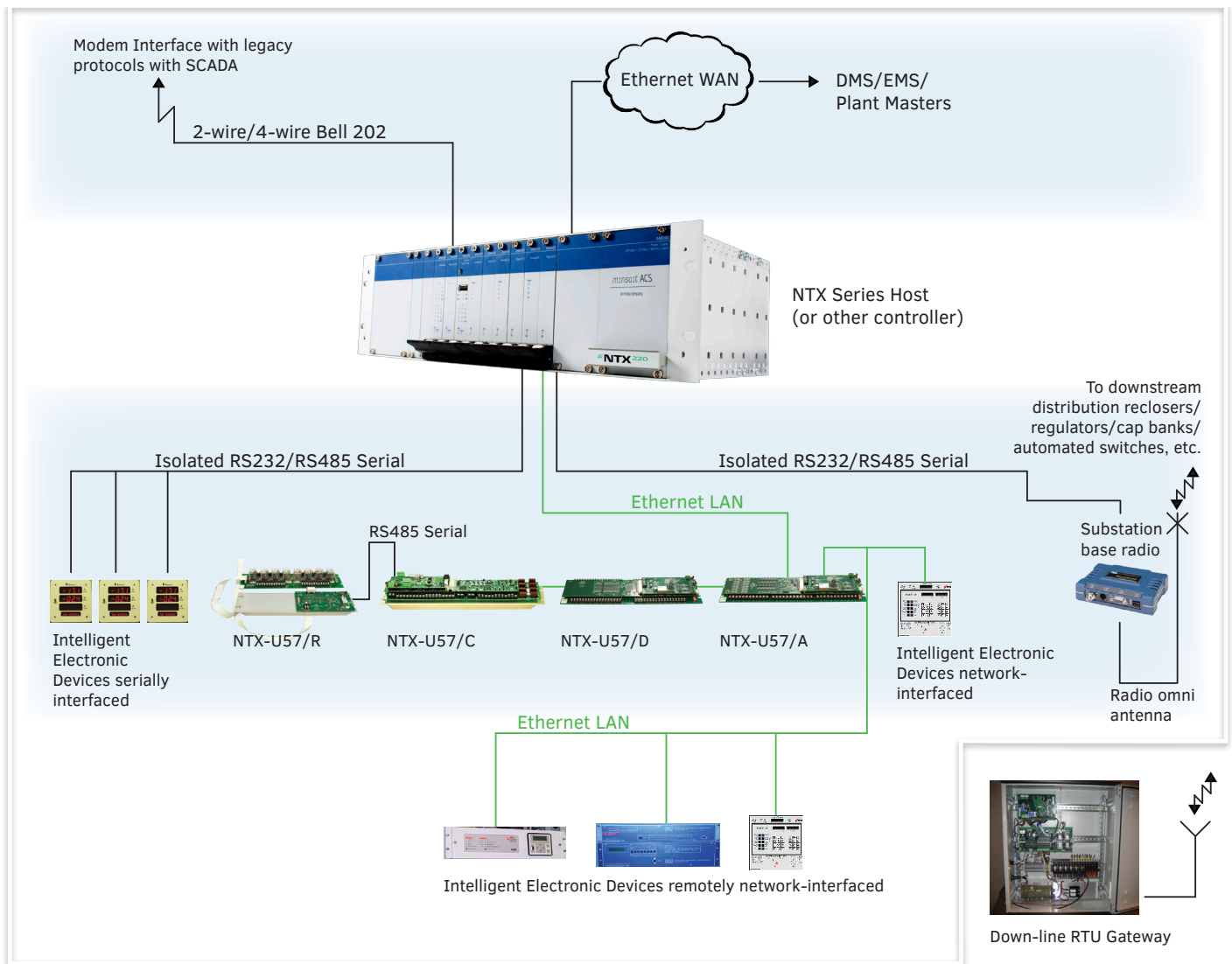
via a secured Ethernet connection. Each I/O panel may be configured for its IP and DNP3 or Modbus register addresses, along with all the internal panel database and communications parameters. NTX-U57 Ethernet ports may be configured for up to 64 IP clients, servers, or multiples of both. NTX Explorer (via the integrated Monitor feature) allows the user to view, in real-time, all the physical database values configured in each NTX-U57 I/O Subsystems and diagnose internal or external problems in the field. Locally wired or IED I/O values may also be manually overridden for testing purposes and, with password permissions, control relays can be manually operated through the application.

NTX Explorer

NTX-U57 Controller

Example: upgrade architecture using NTX-U57

Modem Interface with legacy protocols with SCADA

Ethernet WAN

DMS/EMS/ Plant Masters

2-wire/4-wire Bell 202

NTX Series Host (or other controller)

To downstream distribution reclosers/ regulators/cap banks/ automated switches, etc.

Isolated RS232/RS485 Serial

Isolated RS232/RS485 Serial

Ethernet LAN

RS485 Serial

Substation base radio

Intelligent Electronic Devices serially interfaced

NTX-U57/R

NTX-U57/C

NTX-U57/D

NTX-U57/A

Intelligent Electronic Devices network-interfaced

Radio omni antenna

Ethernet LAN

Intelligent Electronic Devices remotely network-interfaced

Down-line RTU Gateway

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