
In the
Real World,
You Have a
Real Mess.

PLANT NCS DESK
NET Concentrator® System

What's the Real Mess?

- **You can't afford new twisted pair installations**
  - Our NET Concentrator® System (NCS) lets you migrate to new high speed networks, while leaving your existing "legacy" analog transmitters, sensors and valves in place

- **You have closed "Islands of Automation" because of incompatible, proprietary equipment provided by many different vendors**
  - Employing open standards like Ethernet, MODBUS/TCP and OPC, the NCS is the universal "Gateway" between your islands of automation and control system

- **Your fragile and under-performing distributed I/O is just not up to the demands of the industrial plant floor and industrial processes**
  - The NCS delivers the resolution, accuracy and isolation your process needs, while maintaining the robust operating specifications that your traditional industrial transmitters provide now

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When It's Time to Clean Up Your Real Mess… The NET Concentrator® System is Your Real Solution

- The NET Concentrator System (NCS) is the first **Process Control and Distributed I/O System** designed **SPECIFICALLY** for demanding industrial applications

- It provides everything from simple distributed I/O capabilities to advanced PID control, computation and data logging functions
- The NCS is the FIRST I/O network to deliver **"Transmitter-Like" Performance**

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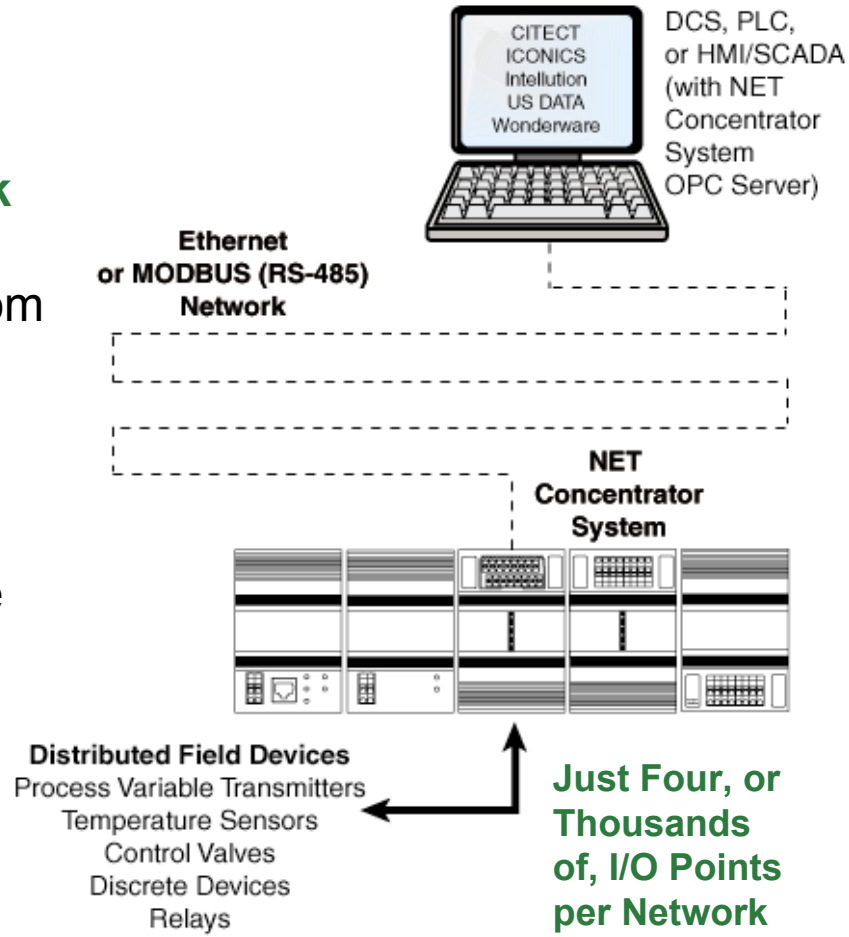
Cost-Effective Data "Concentrating"

- The NCS collects and "concentrates" just a few, or thousands of, process signals onto a **single digital data link**
- It sends monitoring signals from sensors and transmitters to the control room
- It sends control signals from a DCS, PLC or PC to the field
- It can, of course, also do both simultaneously



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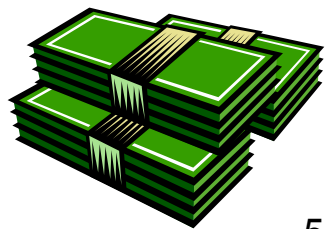
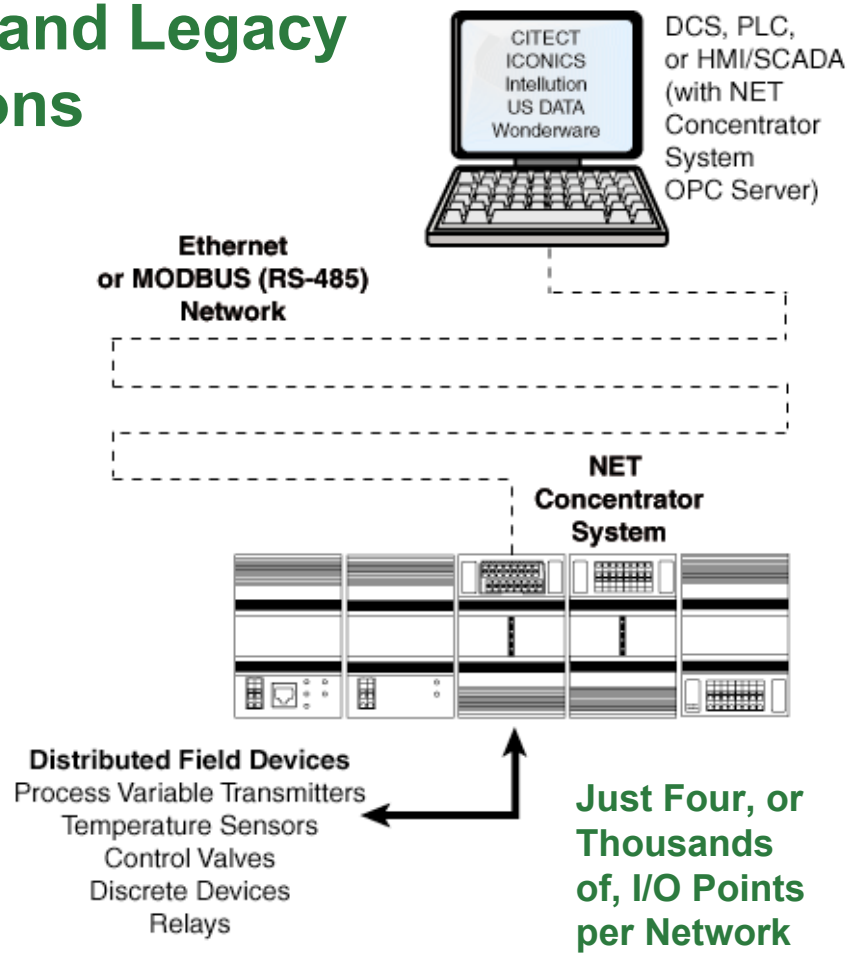
Save Thou$ands on Installation Costs

- Use the NCS instead of running wires for each individual analog and sensor signal
- Concentrate just a few, or thousands of, process signals onto a single, cost-effective Ethernet or MODBUS RTU data link
- Save on cable, conduit, connection and wire tray costs
- Use an existing Ethernet network, and eliminate the time and expense of creating a new one
- Simplify overall system design, installation and maintenance



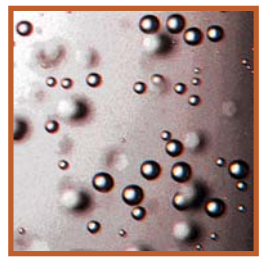
New Installations and Legacy Retrofit Applications

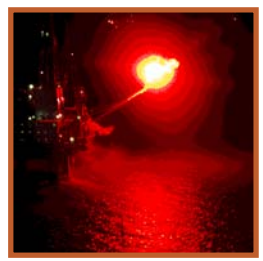
- The NCS is ideal for new distributed monitoring and control networks
- It's also perfect for applications where you want to leave existing "legacy" sensors, analog instruments and control valves in place, yet still implement a digital network



Versatile Application Possibilities

- Chemical and Petrochemical
- Semiconductor and Microelectronics
- Pharmaceuticals and Biotechnology
- Power Generation and Transmission
- Petroleum Extraction, Refining and Transport
- Pulp and Paper
- Food and Beverage
- Mining and Metal Refining
- Industrial Machinery and Equipment
- Water and Wastewater Treatment
- Environmental and Pollution Monitoring





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Whether you're managing a process right next door, or one on the other side of the world, our NCS is ready for your real world

- Modular Peer-to-Host and Peer-to-Peer Architectures
- Just Four, or Thousands of, Fully-Isolated Input/Output Points per Network
- Advanced Math Functions, PID Control, and Data Logging
- "Transmitter-Like" Performance and Design (including Industry-Best 20-bit Resolution)
- 10/100BASE-T Ethernet or MODBUS RTU (RS-485) Communication Networks
- Moore Industries OPC Server Available
- mA, V, RTD, T/C, ohm, mV, Pot, Discrete, and Relay I/O

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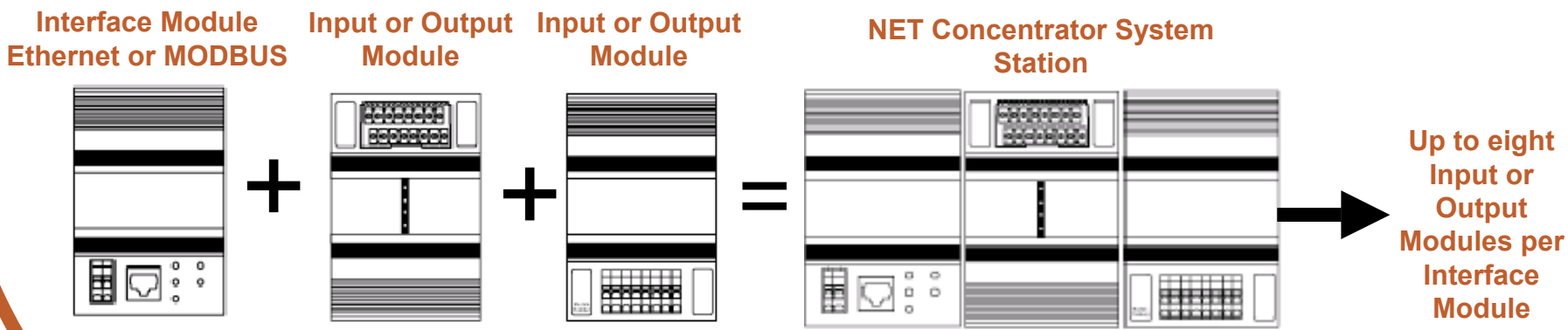
System Architecture: Modular and Expandable

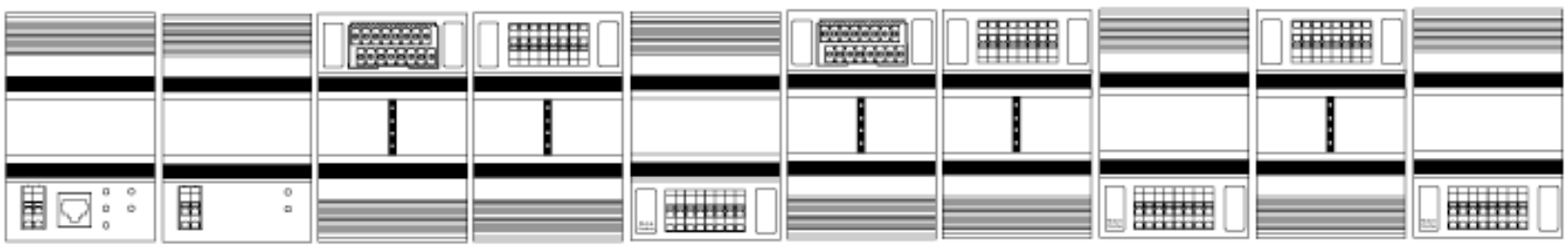
- A NET Concentrator System station consists of one Interface Module combined with just one (or up to eight) multi-channel Input and/or Output Modules

- NCS networks are made up of one or multiple NET Concentrator System stations



System Architecture: Modular and Expandable

- Any combination of Input and Output Modules can be matched with an Interface Module to create a station
- Individual I/O Modules can be added or removed from a station at any time



Interface Module | CPM Power Supply Module | Input Module | Input Module | Output Module | Input Module | Input Module | Output Module | Input Module | Output Module

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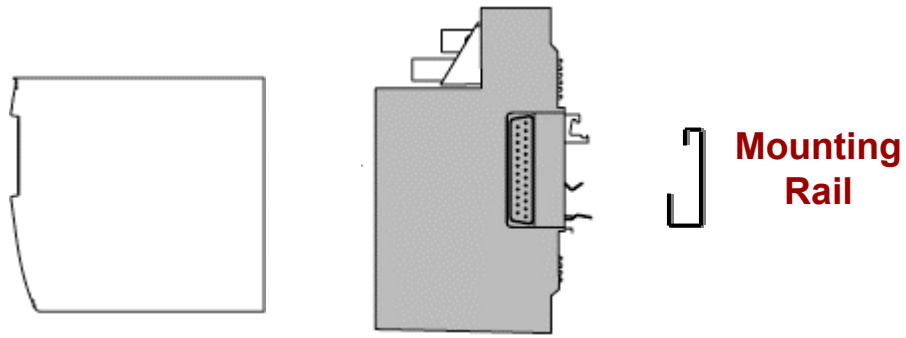
Hot Swap Module Replacement

- Flexible module design allows quick and simple “hot swap” replacement of plug-in Input and Output Module electronics

- Able to “hold” their configuration in memory, pre-programmed module electronics can be pulled off the shelf when needed, and put into service without additional programming or configuration



- Module “keying” prevents Input/Output module types from being inserted into a mounting base intended for a different I/O Module

Peer-to-Host Systems

NET Concentrator-to-DCS, PLC or PC-Based System

- Provides a cost-effective method to get monitoring and control signals to and from a host DCS, PLC or PC-based system running HMI or SCADA software
- Compatible with third-party PC-based HMI and SCADA automation software packages

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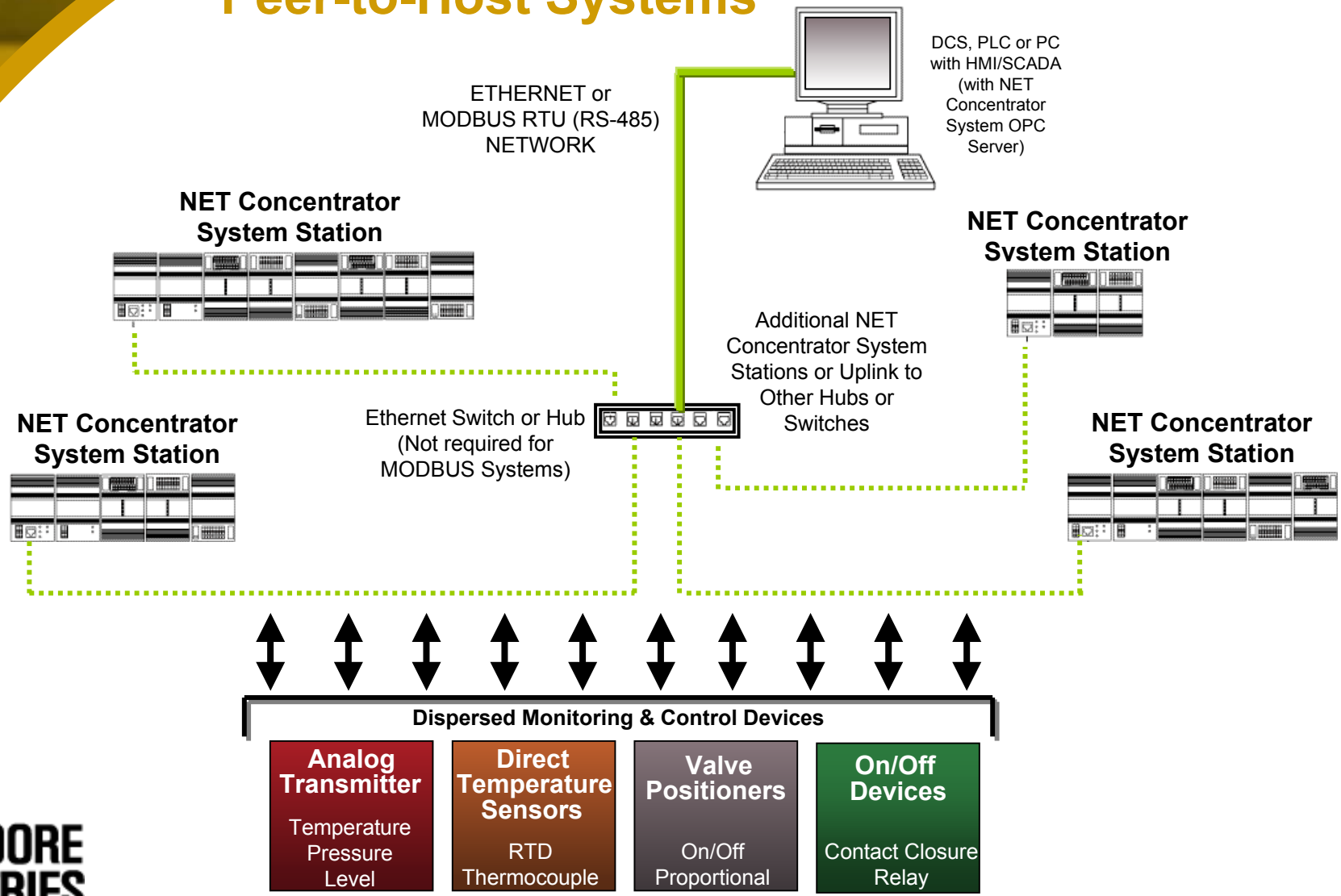
Peer-to-Host Systems



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Peer-to-Peer Systems

- Collect and “concentrate” monitoring and control signals onto a single data link
- Transmit the data within the network, and then provide identical (or proportional signals) at a matching station within the NET Concentrator System
- Handles just a few, or hundreds, of signal inputs and outputs

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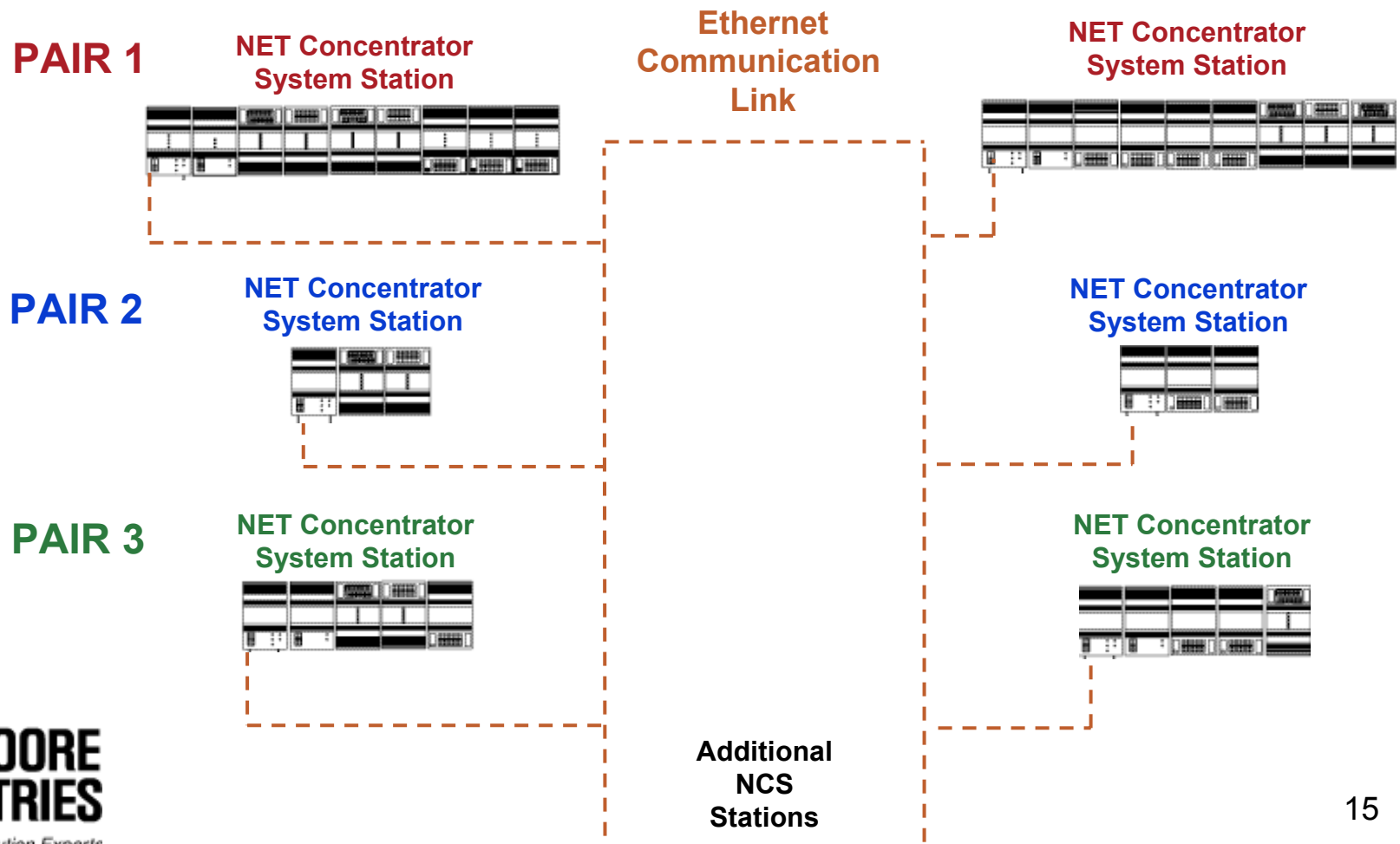
Peer-to-Peer Systems



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Data Link Options

- 10/100BASE-T Ethernet or MODBUS RTU (RS-485) Communication Networks
- **Redundant data links** for applications where you can't afford to lose data
- Wireless RF modems (900Mhz and 2.4Ghz) when wires can't be run for practical or economical reasons
- Telephone modems for inexpensive data transmission unlimited distances
- Fiber optics for hazardous or exceptionally noisy environments

Advanced Control and Math

Using AlterSys ISaGRAF Control Engine Software, the NET Concentrator System can be configured to deliver additional architecture, control, computation and functional capabilities

- Software is available from Moore Industries for use in configuring custom applications

Pre-Configured NCS Systems

- Moore Industries' **Application Services Group** provides cost-effective integration of the ISaGRAF functions with the NCS NET Concentrator System

Advanced Control and Math

- The ability to act as a single or multiple PID loop controller with simple, cascade, split action, and inverse capabilities
- Sequential control language programmability with IEC 1131.3, including ladder, function block, and structured text
- Complex math capabilities including add, subtract, multiply, divide; absolute value; square root; integrate and totalize; exponential; natural logarithm; base 10 logarithm; comparison; sine, cosine, and tangent; arc sine, arc cosine, and arc tangent
- Highly functional peer-to-peer configurations that allow “free channel mapping” and sending a process signal to multiple locations

Data Logging Capabilities

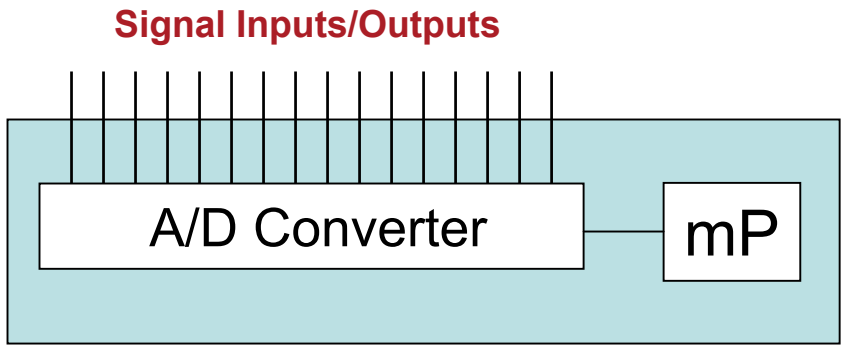
- **In Systems Using Ethernet Communications:**
  - Stores up to 32,000 points
  - Real-time clock provides for time-stamped data
  - Sample rate user-selectable for any period between once per second, to once every 24 hours
  - Non-volatile memory preserves data if power is interrupted

Why is the NET Concentrator Better?

- Most distributed I/O systems (or multiplexers as they are sometimes called) migrated to process applications from less demanding factory automation and lab environments
- An I/O system must provide the high-integrity performance that the best process variable transmitters deliver now to be fully accepted in process applications, and in applications where meticulous measurements are needed
- We drew on our over 35 years experience in developing the most precise industrial transmitters in the world to engineer the NET Concentrator System
- The NCS is Ready for the Real World because it delivers **"Transmitter-Like" Performance and Design**

The NCS is NOT Another Distributed I/O Multiplexer

- A traditional distributed I/O multiplexer processes ALL of its signal inputs/outputs through a common A/D converter and microprocessor (mP)

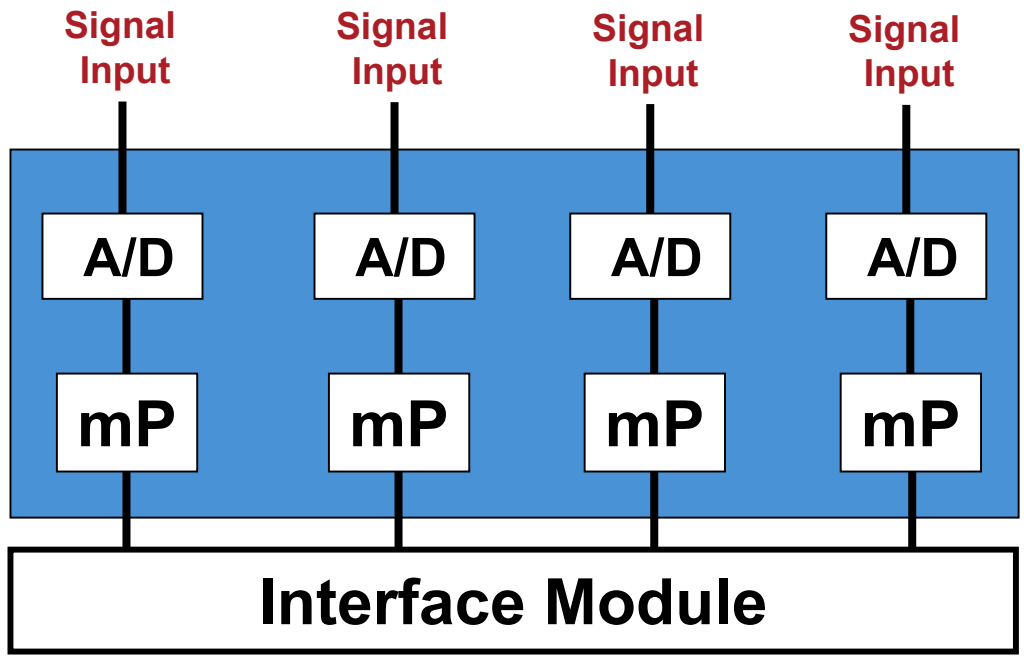


Competitor I/O Multiplexer

- This approach leaves all I/O channels extremely vulnerable to single points of failure
- Another drawback is that all channels must be set up in a similar way, which eliminates the ability to calibrate and trim each individual channel, like you would with a transmitter

The NCS Uses an Individual A/D Converter and Microprocessor for EACH of Its INPUT Channels

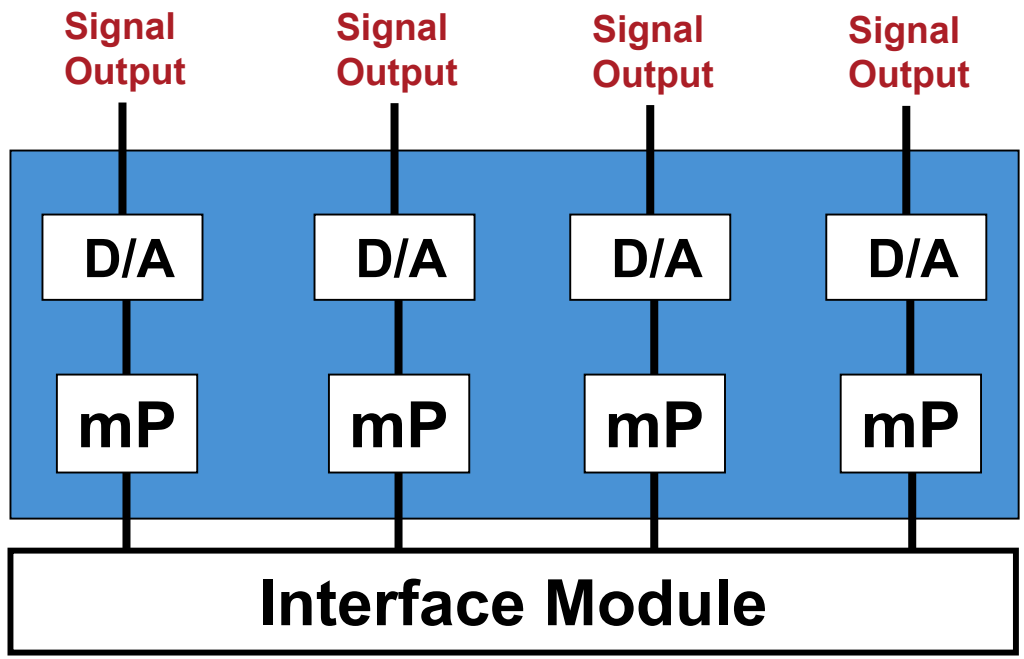
- If there is a problem with one A/D converter or microprocessor (mP), it has no effect on any of the other channels
- This approach allows each input channel to be precisely set up (such as with input trimming) to match the specific needs of each point



NET Concentrator System

The NCS Uses an Individual D/A Converter and Microprocessor for EACH of Its OUTPUT Channels

- If there is a problem with one D/A converter or microprocessor (mP), it has no effect on any of the other channels
- This approach allows each output channel to be precisely set up (such as with output trimming) to match the specific needs of each point



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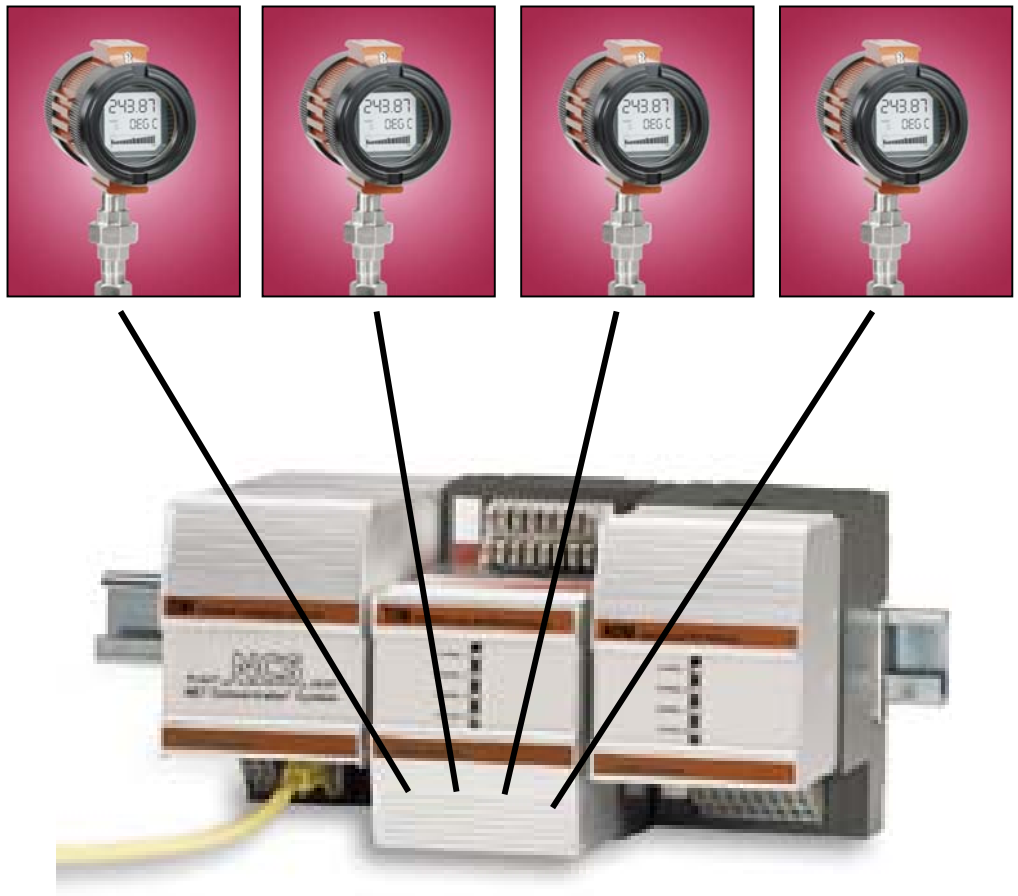
The NCS Delivers "Transmitter-Like" Performance

- It's like having individual, high-performance process transmitters integrated into your I/O strategy



"Transmitter-Like" Accuracy in an I/O System

- Industry-best **20-bit input and 18-bit output resolution** matches or exceeds the measurement precision of the very best process transmitters
- Repeatability and long-term stability provide consistent measurements for up to 5 years between calibrations
- In peer-to-host systems, accuracy is enhanced even further because there is no D/A conversion at the output

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"Transmitter-Like" Accuracy in an I/O System

- Easily surpasses the specifications claimed by all other I/O systems

Moore Industries NET Concentrator System	20-bit input 18-bit output
Automation Direct Terminal I/O	14-bit input 12-bit output
Allen Bradley Flex Integra	12-bit input 12-bit output
GE Fanuc VersaMax	16-bit input 12-bit output
OPTO 22 SNAP I/O	14-bit input 12-bit output
National Instruments FieldPoint	16-bit input 12-bit output

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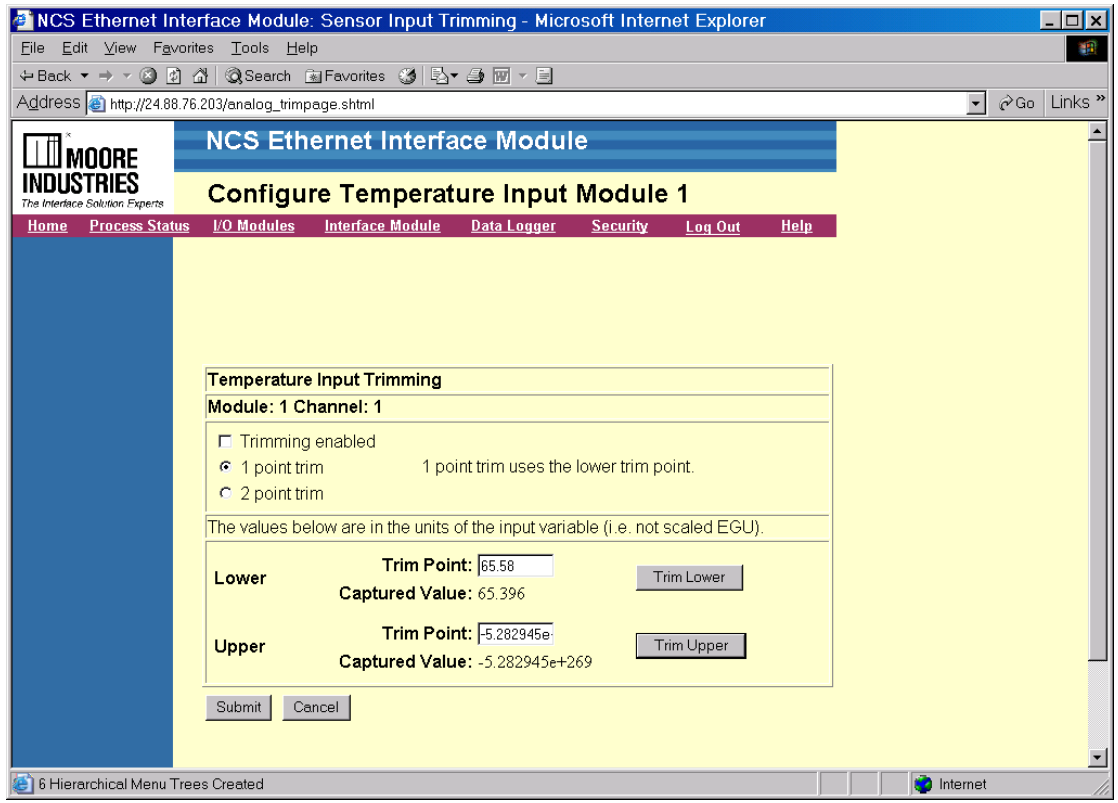
"Transmitter-Like" Accuracy in an I/O System

Precise Input and Output Trimming

- Essentially eliminates measurement errors introduced by the input (such as an RTD or T/C sensor)
- Compensates for readout device inaccuracies



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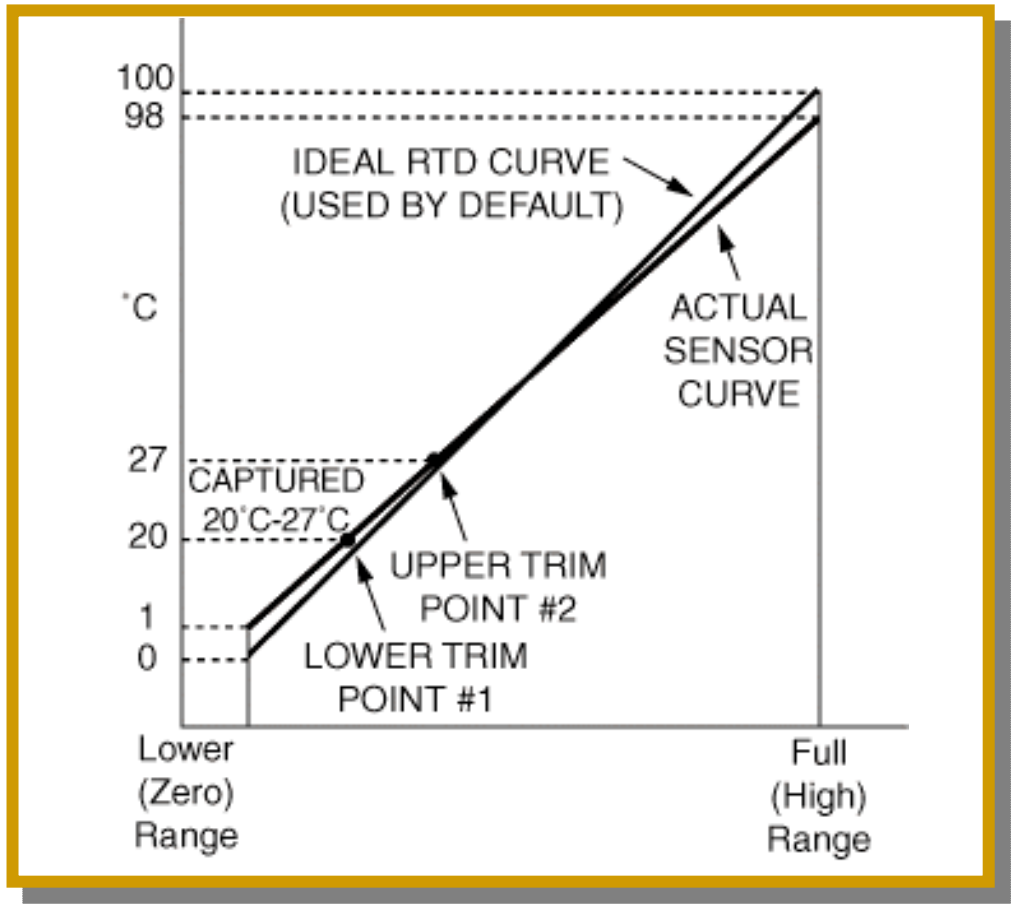
"Transmitter-Like" Accuracy in an I/O System

Trims to Read Specific Sensor Curve Segments

- The NCS can be trimmed with two data points within the selected zero and span
- This allows a complete process range to be monitored, while placing measurement emphasis on a critical segment of the range



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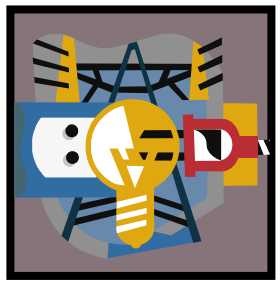
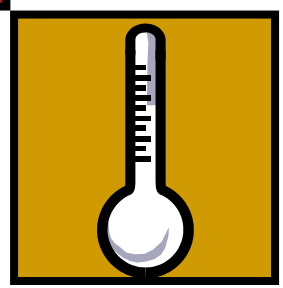
"Transmitter-Like" Design for Harsh Industrial Process Applications



- Rugged metal housings provide secure electrical connections and industrial DIN-rail mounting
- Channel-to-channel, and input-to-output signal isolation eliminates unpredictable ground loops
- RFI/EMI protection protects against plant noise.
- Installs in harsh ambient temperature conditions well outside the capabilities of comparable systems:

-40°C to +85°C **-40°F to +185°F**



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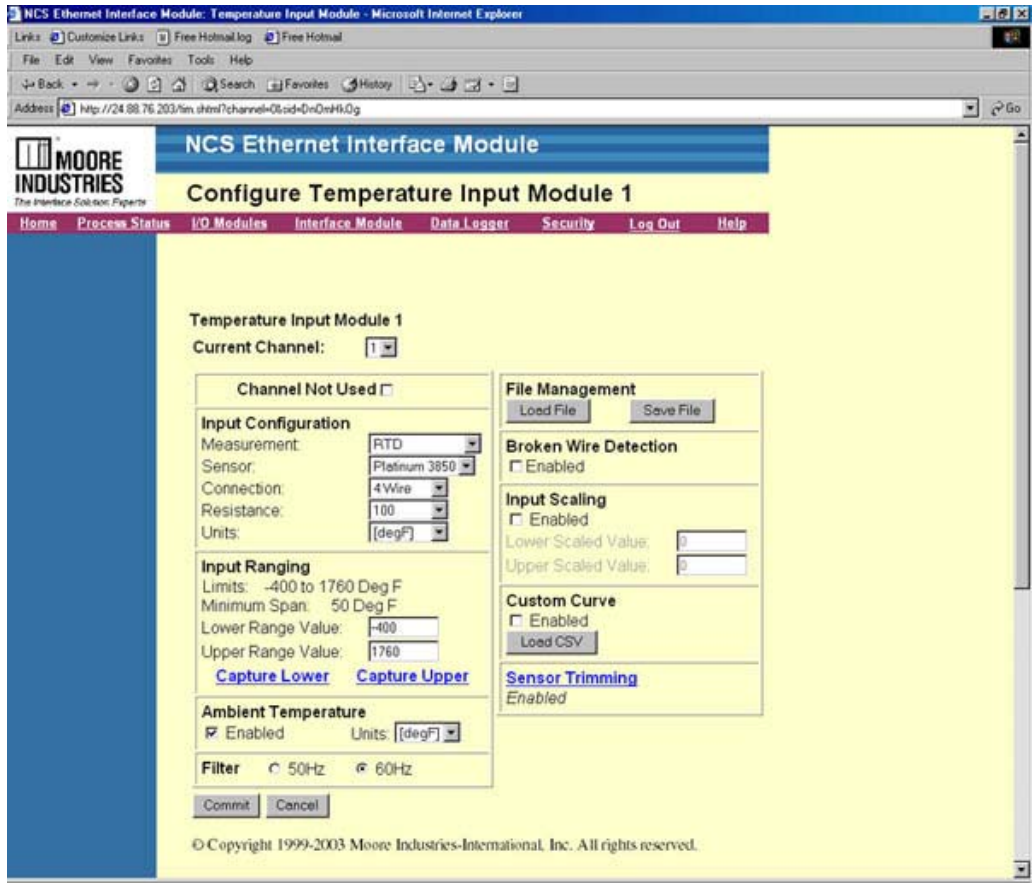
"Transmitter-Like" Programming for Fast and Simple Set Up

- All operating parameters can be viewed, selected and set in minutes using the Internet Explorer web browser (Ethernet networks) or our Intelligent PC Configuration Software (MODBUS RTU networks)



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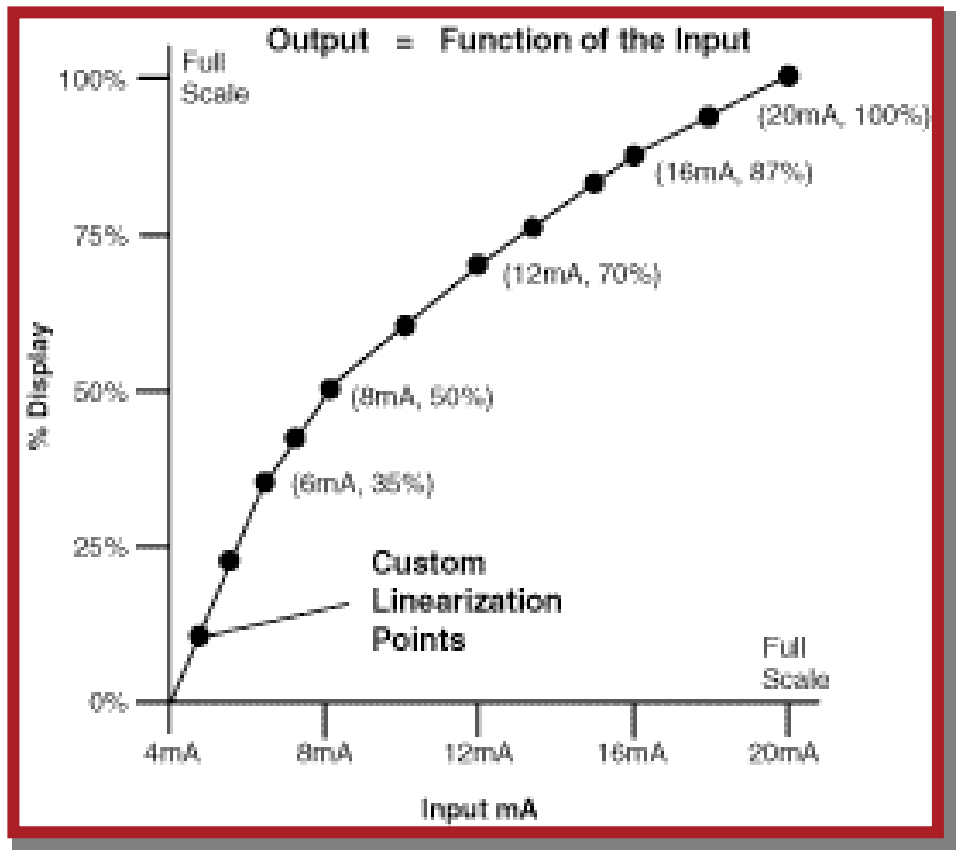
"Transmitter-Like" Versatility for Special Applications

Custom Linearization

- Up to 128 custom linearization points can be programmed when non-linear signals must be converted to linear output representations

- Typical applications include monitoring a non-linear transducer, the level of odd shaped tanks, and flow meter linearization



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Intelligent Interface Modules

Interface Module

Ethernet Networks

- Over the Internet…view and control a process anywhere in the world, from anywhere in the world

MODBUS RTU (RS-485) Networks

- Take advantage of an industry-standard communications protocol that is offered by dozens of instrument manufacturers, and implemented in thousands of applications worldwide

Ethernet Networks

- In peer-to-host systems, NET Concentrator System stations, and the number of points monitored, is limited only by the architecture of the network and the limitations of Ethernet
- In peer-to-peer systems, there can be up to 32 NET Concentrator System stations per network, allowing up to 2,048 monitoring/control points
- Designed to IEEE 802.3 Ethernet standard
- Uses popular MODBUS TCP communications protocol over Ethernet

Ethernet Networks

- 10/100BASE-T supports speeds up to 100Mb/second
- Uses standard RJ-45 connectors (telephone jack)
- Standard OPC server runs on computer-based systems along with the OPC-compliant servers offered by other manufacturers
- Supports HTTP (**H**yper**T**ext **T**ransfer **P**rotocol) and FTP (**F**ile **T**ransfer **P**rotocol) used on the World Wide Web

Ethernet Networks

Industry-Standard OPC (OLE for Process Control Interface)

- Data server acts as a centralized location for communicating with dispersed NET Concentrator System Stations
- The OPC server permits connection to stations on other remote subnets
- Delivers plug-and-play integration with popular PC-based HMI and SCADA automation software packages
- Lets you run our OPC server on computer-based systems along with OPC-compliant servers from other manufacturers

MODBUS RTU Serial (RS-485) Networks

- Widely-implemented MODBUS RTU (RS-485) serial protocol is used for peer-to-host systems
- In peer-to-host systems, there can be up to 32 (without repeaters) NCS stations per network, allowing up to 2,048 monitoring/control points. With repeaters, there can be up to 256 NCS stations, allowing up to 16,384 points.

MODBUS Serial (RS-485) Networks

- An existing twisted wire pair can be used as the data link
- For applications where high-integrity communications is required, NCS peer-to-peer systems using MODBUS provide the provision for connecting a **redundant data link**
- The secondary link is independent of the primary link
- If the primary link is severed or otherwise compromised, data transmission will continue with the NCS network

Universal Input Modules

Input Module

Analog Input Module (Four Channels)

- Any range within 0-20mA or -10 to 10V
- 20-bit input resolution
- Channel-to-channel, and input-to-output signal isolation
- Each channel supplies power to its loop (source or sink), so no external power supply is needed

Temperature Input Module (Four Channels)

- RTD (2-, 3-, 4-wire; Pt, Cu, Ni; 10 to 1000ohm)
- T/C (J, K, E, T, R, S, B, N, C)
- Direct Resistance (0-4000ohms)
- Potentiometer (100-4000ohms)
- mV (-50 to 1000mV)
- 20-bit input resolution
- Channel-to-channel, and input-to-output signal isolation

Universal Input Modules

Input Module

Discrete Input Module (Eight Channels)

- Contact Closure (24V/3.7mA, Internally Powered)
- Discrete Voltage Low Range (30Vac/Vdc)
- Discrete Voltage High Range (120/240Vac)
- Channel-to-channel, and input-to-output signal isolation

Universal Output Modules

Output Module

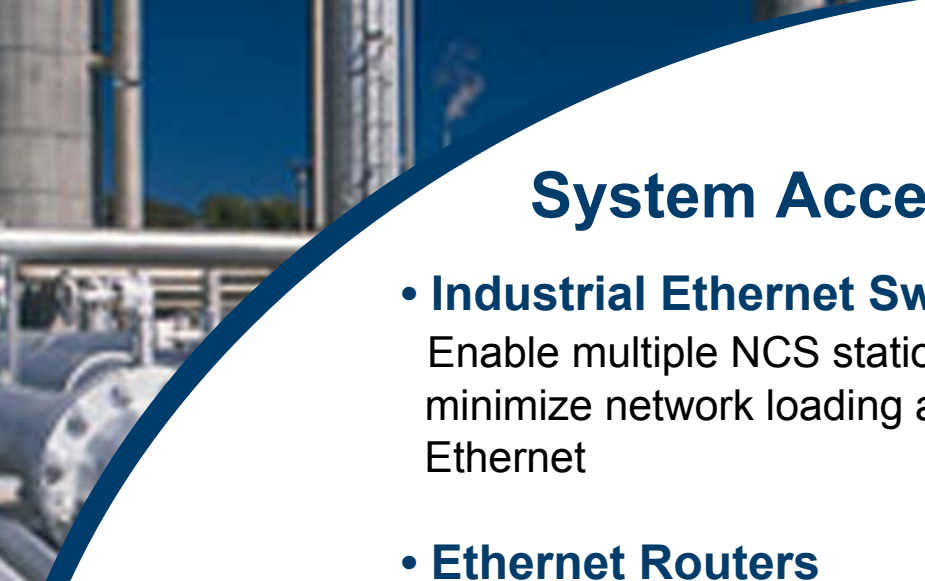
Analog Output Module (Four Channels)

- Any range within 0-20mA or 0 to 10V
- 18-bit resolution
- Channel-to-channel, and input-to-output signal isolation

Relay Output Modules (Four/Eight Channels)

- **Four Relay Model:** SPDT relay, 1 form C rated 2A@250Vac, 50/60Hz, non-inductive, or 2A@30Vdc

- **Eight Relay Model:** SPST relay, 1 form A or B rated 2A@250Vac, 50/60Hz, non-inductive, or 2A@30Vdc



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System Accessories

- **Industrial Ethernet Switches (Switches & Hubs)**
  Enable multiple NCS stations on a common Ethernet data link, and minimize network loading and improve deterministic communications over Ethernet

- **Ethernet Routers**
  Connect multiple NCS segments or sub-networks, forwards messages from one network to another, and provides message traffic isolation between segments

- **Wireless Solutions**
  900mHz and 2.4Ghz radios are available when wires can't be run for practical or economical reasons

- **Protocol Converters & Repeaters**
  RS-485-to-RS-232C and Ethernet-to-Fiber converters allow direct interface with PC-based systems

- **Instrument Power Supplies**
  Mount alongside and power the NCS

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