

Industrial Measurement and Control



Higher Yield | Faster Throughput | Less Downtime



ni.com



Your Local NI Engineer



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BS Electrical Engineering – Drexel University

I was born and raised in Northeastern Pennsylvania. After high school, I worked as a signal maintainer for the Reading and Northern Railroad while attending college. I graduated from Drexel University with a Bachelor's Degree in Electrical Engineering in 2001. While at Drexel, I worked for the Naval Surface Warfare Center in Philadelphia. I was involved with software testing and installation for the Naval Ship Fleet. After graduation in 2001, I started working with National Instruments as an Applications Engineer in Austin, Texas. I received intense training on NI products, provided technical product support, and taught customer education classes. In July of 2002, I moved to New Jersey as a Field Sales Engineer. In January of 2005, I transferred from New Jersey, back to Pennsylvania.



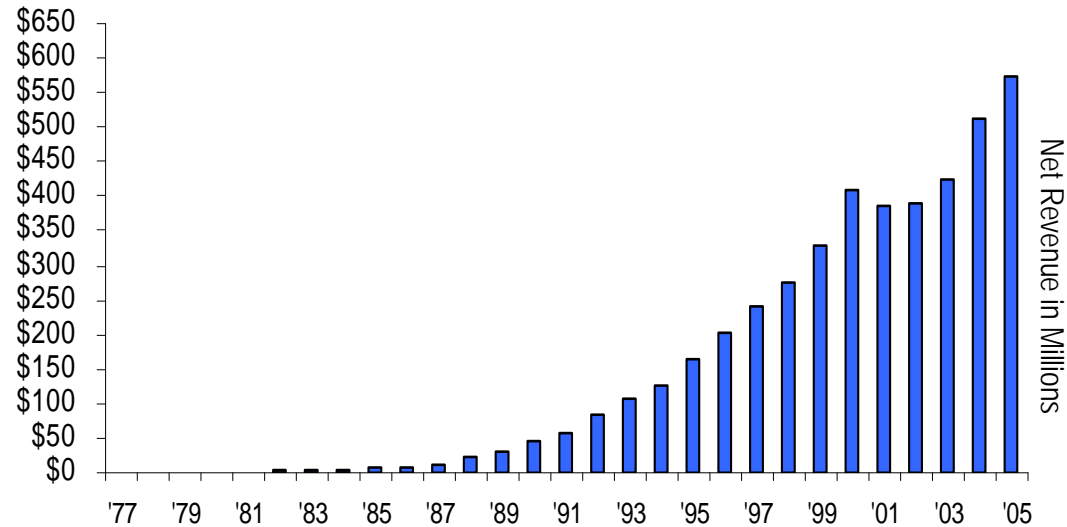
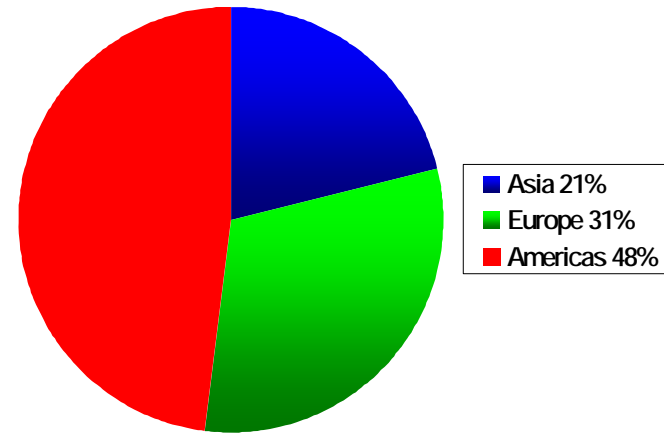
Agenda

- Introduction to NI
- LabVIEW
- PAC – Programmable Automation Controllers
- HMI – User Interface and Displays
- Motion
- Vision

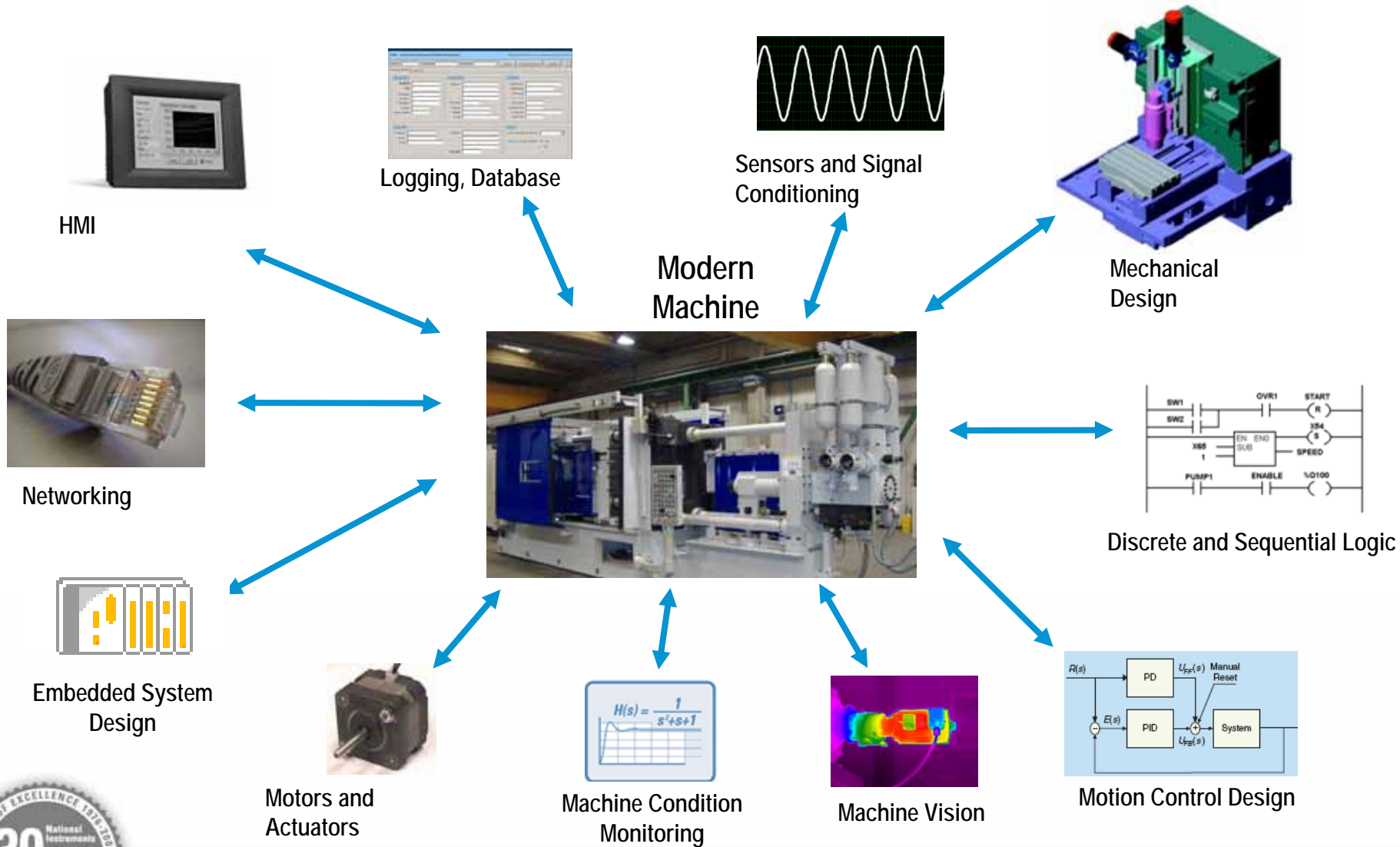


Profile

- *Leaders in Computer-Based Measurement and Automation*
- Long-Term Track Record of Growth and Profitability
- \$740M Revenue in 2007
- More than 4,300 employees; operations in 40+ countries
- *Fortune's 100 Best Companies to Work For Ninth Consecutive Year*



Modern Machine Builder's Diverse Requirements



The Hidden Costs of Machine Design

- Increasing Design Complexity and Risk
- Low-Cost, International Competition
- Multiple HW Platforms Required for Control, Monitoring, and Logging
- Smaller Development Teams, Longer Development Cycles



Protecting Against Low-Cost Competition

Unprotected IP



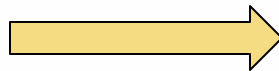
Secure IP

Control Only



Control + Monitoring
and Logging

Single Interaction
with Customer



Building Customer
Loyalty



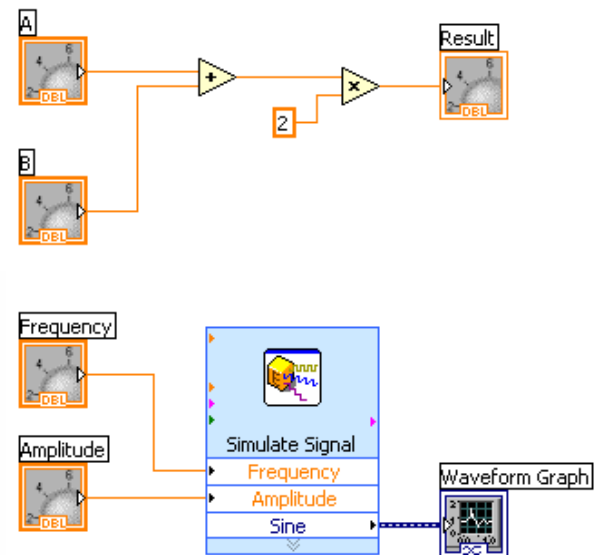


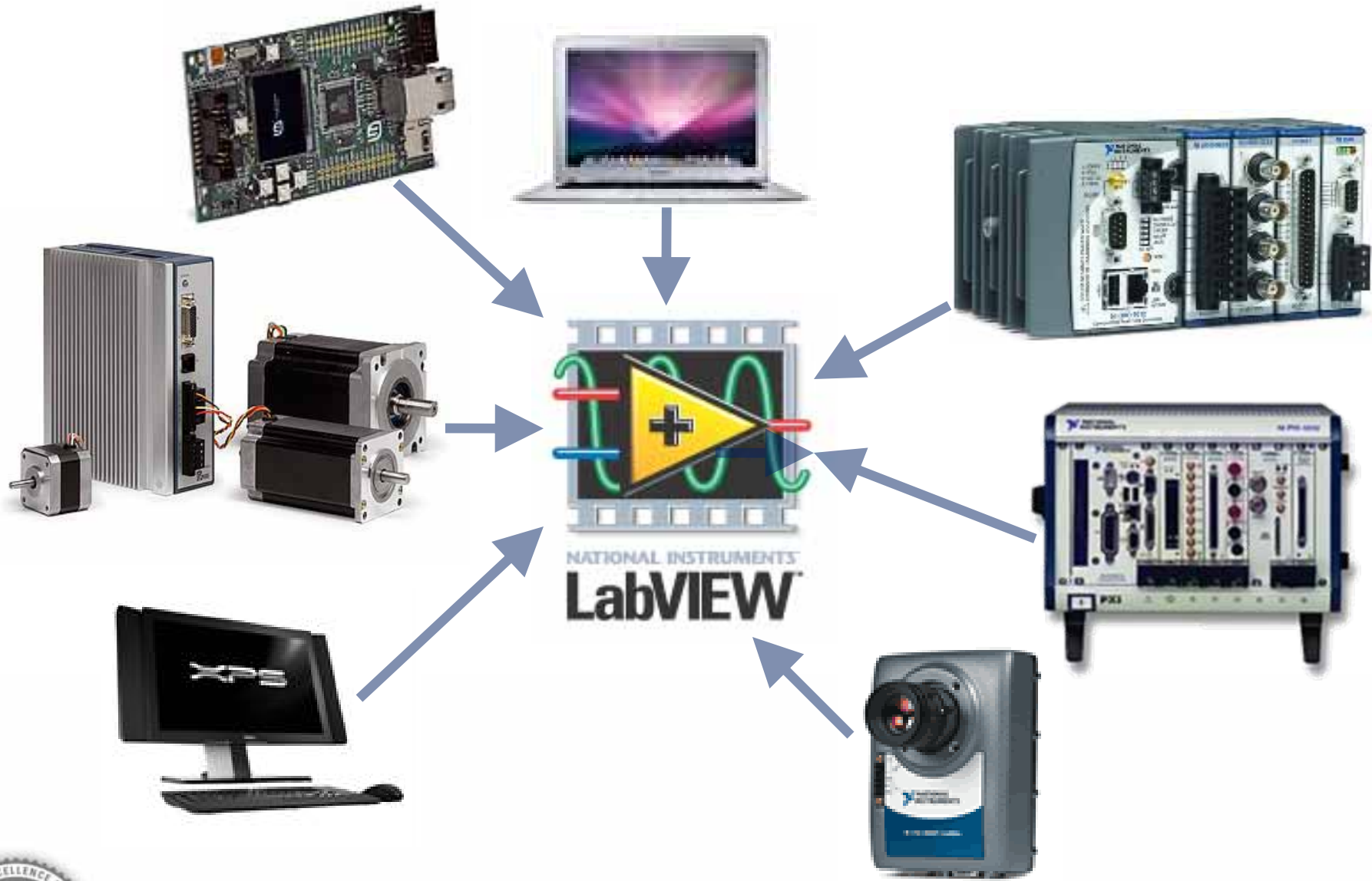
NATIONAL INSTRUMENTS

LabVIEW™



- Programming Language
- Graphical Programming Language
- Scientists, Engineers, Technicians

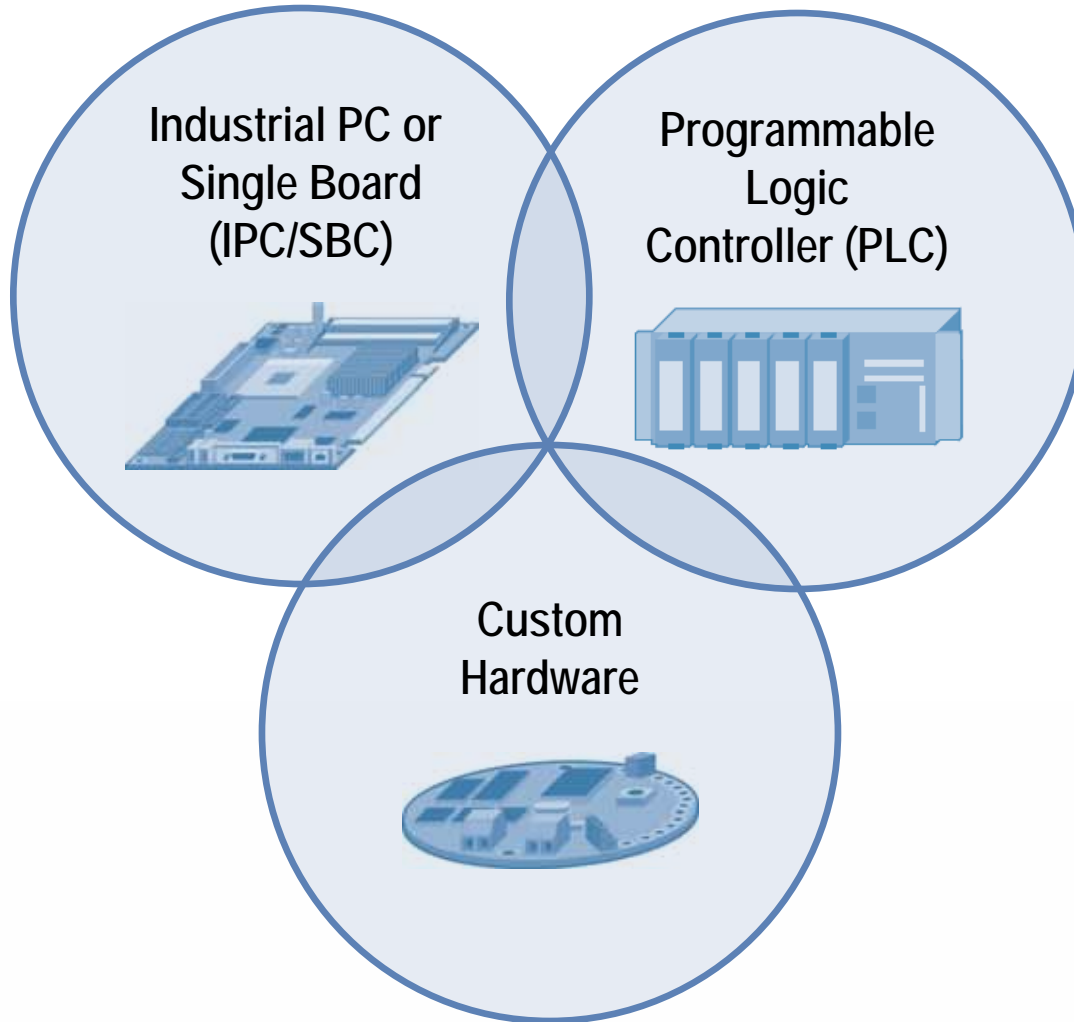




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Traditional Machine Control Platforms



Evolution of the PAC

PC



IBM PC
1981



Internet
1983

Windows 3.1
1992



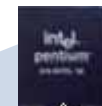
Windows 95
32 bit OS
1995



PAC

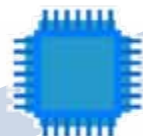
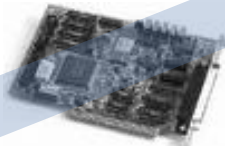
ARC Defines
PAC
2001

Allen Bradley SLC
1991



Intel
Pentium
1993

High-Resolution
ADCs
1989



FPGA
1986

Chip

Single-Chip CPU
1971



CompactRIO Reconfigurable Embedded System

Reconfigurable FPGA Circuitry

Custom hardware reliability, optimization

Flexible timing, triggering, synchronization

Extreme Durability

-40 to 70 °C temperature range

179.6 mm (7.07 in) rack, Industrial certifications

Real-Time OS

400 MHz P₀ 88.1 mm (3.47 in)

Reliable embedded control, analysis, and logging



Isolated Industrial I/O

Signal conditioning for ± 80 mV to ± 250 V

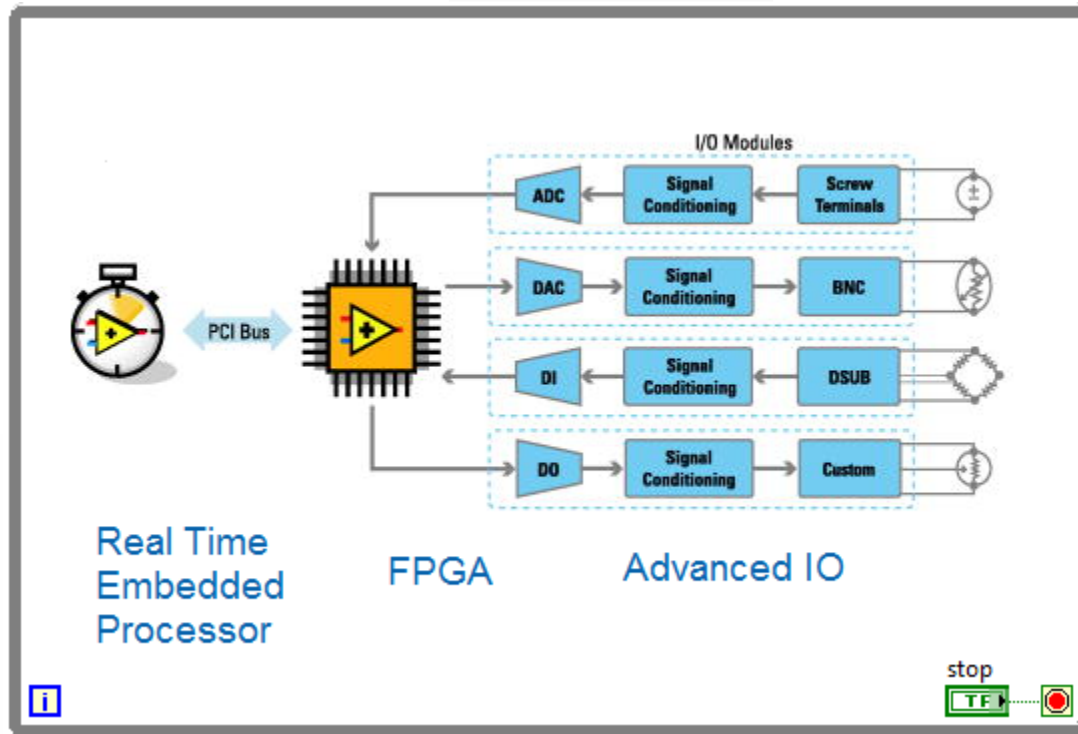
Junction box integrated into module

Small Size, Low Power Consumption

179.6 x 88.1 mm (7.07 x 3.47 in)

9 to 35 VDC power, 17 W max (7-10 W typ.)





Compact FieldPoint

Industrially hardened Components
-25 to 60 deg C operation temp range
Heavy Industrial EMC rating

Solid Metal Backplane
50G shock, 5 G vibration

Real-Time OS
Reliable operation



Redundant Power Inputs
Backup power supply
or battery

Strain Relief
Strain bars and wire tie rings

Solid Mounting Options
Panel, DIN Rail, Rack



PXI

PXI controller

- 2GHz Dual Core PC

Chassis

PXI backplane

- Bus Technology
- Timing
- Synchronization



Peripheral Slots

Instruments

- 6 ½ digit DMM
- Scope & Arb
- FPGA
- Audio analyzer
- Image Acquisition
- M Series DAQ



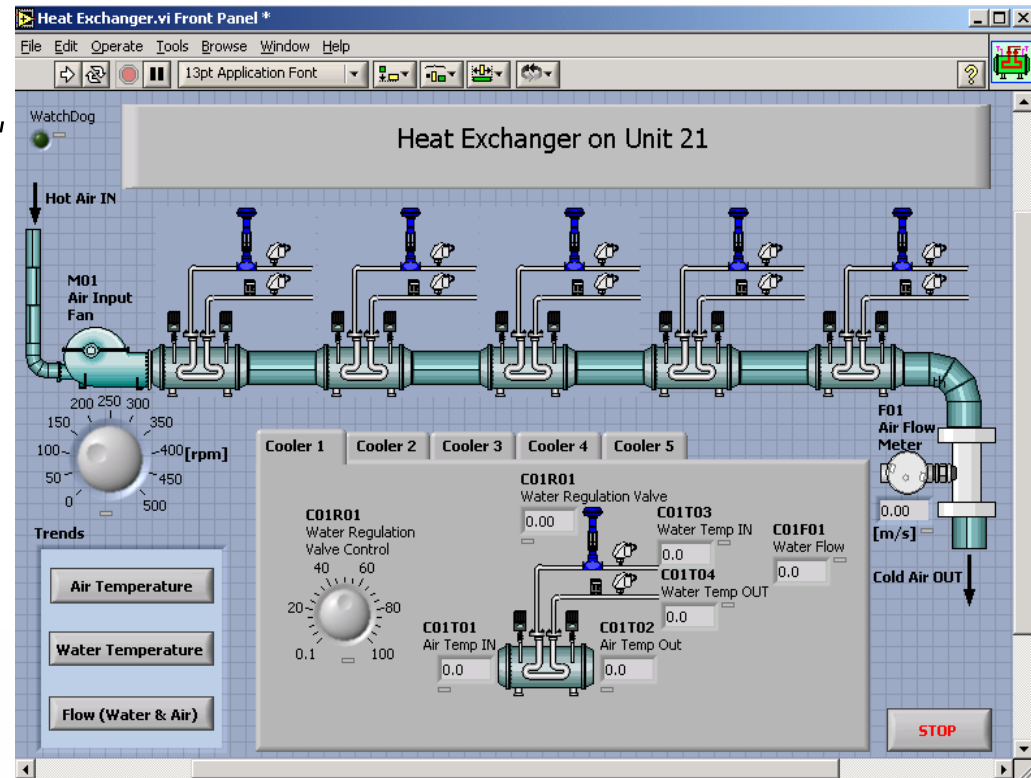
Human Machine Interface (HMI)

- PC
- Touchpanel
- LCD
- IO
- Remote Panel



LabVIEW for SCADA

- Enterprise Connectivity
 - Database tools (Oracle, SAP, SQL, Citadel, etc.)
- Security levels
- Tag manager
- Industrial graphics
- Automated logging
 - Fully SQL 92 and ODBC 2.5 compliant
- Built-in alarming

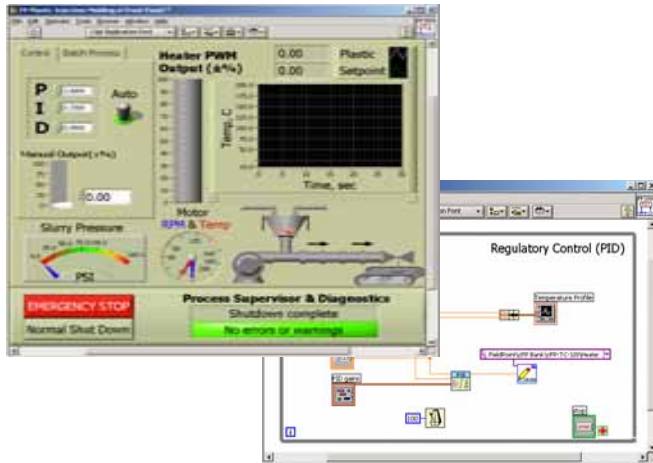


Communication Options

- Communicate between LabVIEW Real-Time devices and a local HMI over Ethernet
 - Shared variables (recommended)
 - TCP/IP
 - UDP



Methods to Connect LabVIEW to Any PLC



LabVIEW

← Digital I/O
4–20 mA →

← Industrial
Communications →

← OPC →



PLCs



Motion Control

• Motion Controllers

- Stepper and Servo Control
- Multi-axis coordination (up to 8 axis)
- Integrated I/O
- Encoder input

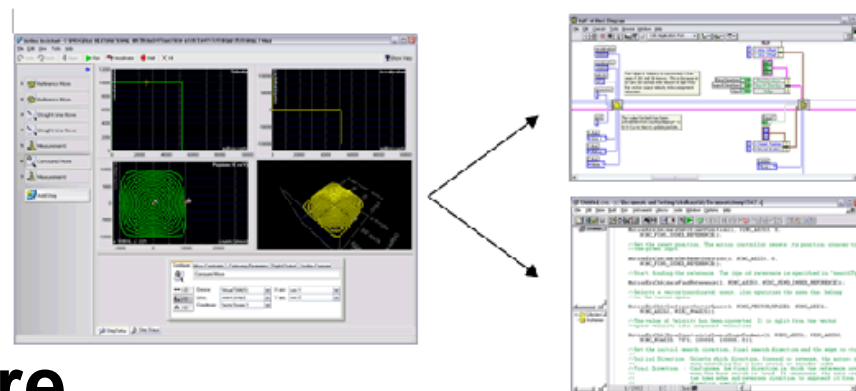


• Drives

- Stepper and Servo drives
- Connection to 3rd party drives

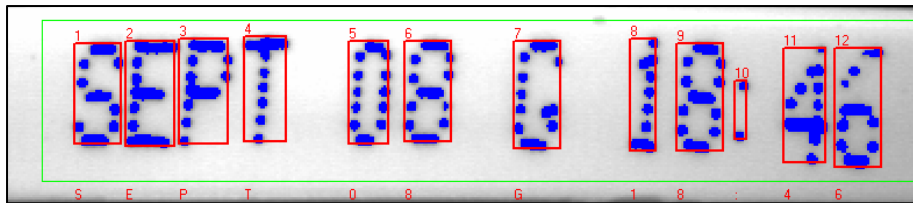
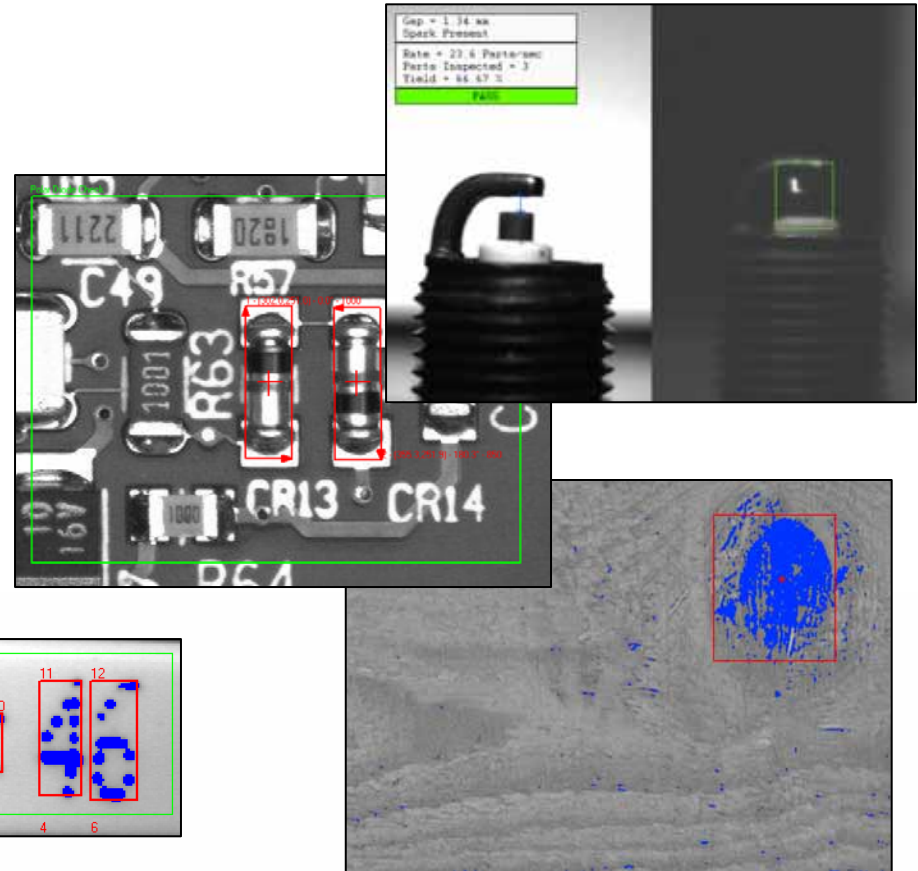
• Motors

• Motion Assistant Software

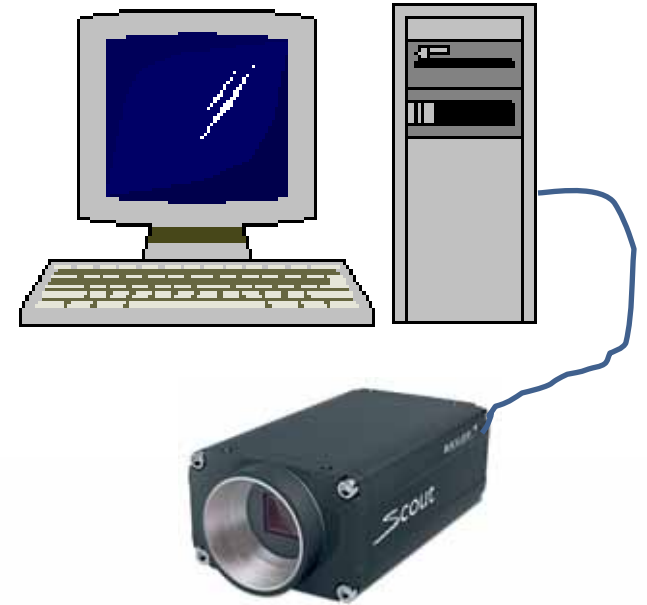


Machine Vision

- Packaging
- Robotics
- Assembly Verification
- Industrial Inspection
- OCR



Machine Vision



Thank You

