Farnell
AN AVNET COMPANY

/ ACCESS ASSEMBLE ASPIRE

Martina Lucchese
Regional Sales Manager, Farnell Italy

June 2025

Farnell

- Your global HIGH SERVICE distributor of products and technology for electronic, industrial, maintenance and Test

- Access to over 1 million products in stock for fast delivery in 24-48 hours

- Multichannel Service with easy access to our w and local sales support

/WHO WE ARE

EDUCATION & RESEARCH foc

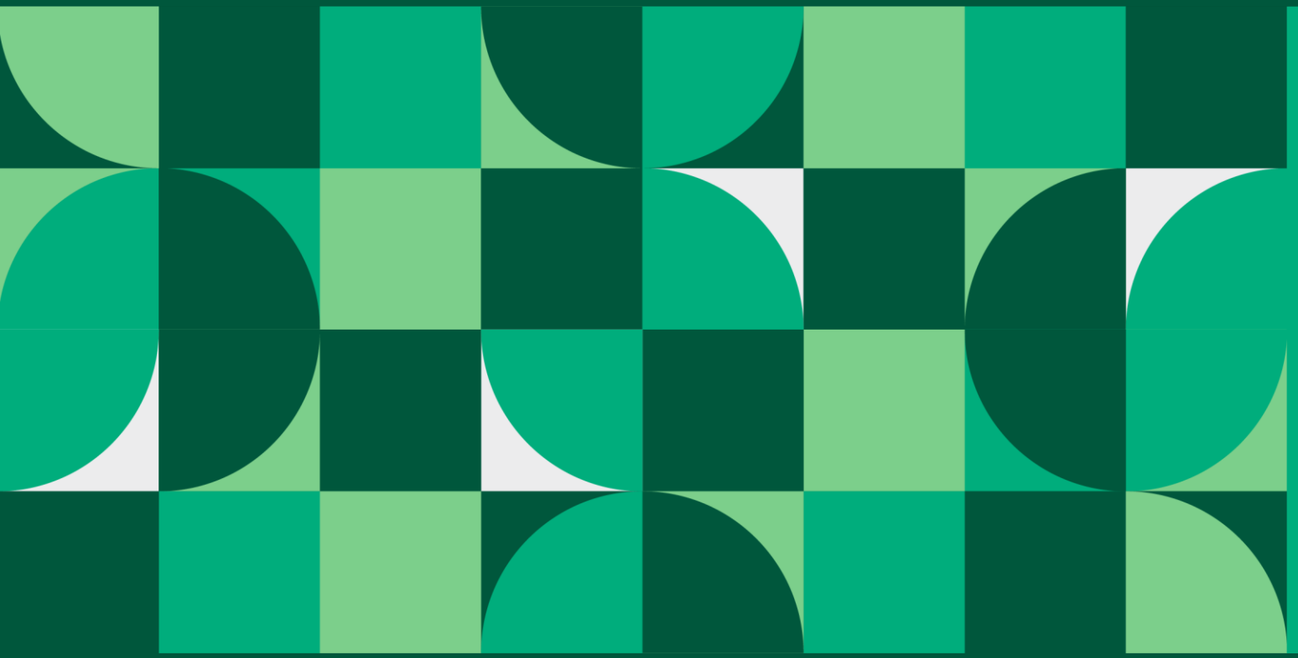
Farnell
AN AVNET COMPANY

- Present on the MEPA digital platform and have a dedicated Team
- Special terms & discounts for schools, universities and research centres
- Access to TEST equipment from leading brand
- Educational kits and development platforms like Raspberry Pi, Arduino and Micro:bit

Inspiring the next generation

Authorized Distributor NI

- Hundreds of products, Hardware & Software, in stock for fast delivery
- Real time availability on www.farnell.com.
- A team of NI Experts to help you choose the best solution



NI is now part of Emerson.

NI Platforms in High Precision X-Rays Measurements

INFN Frascati

Andrea Riva - NI

Country Sales Manager

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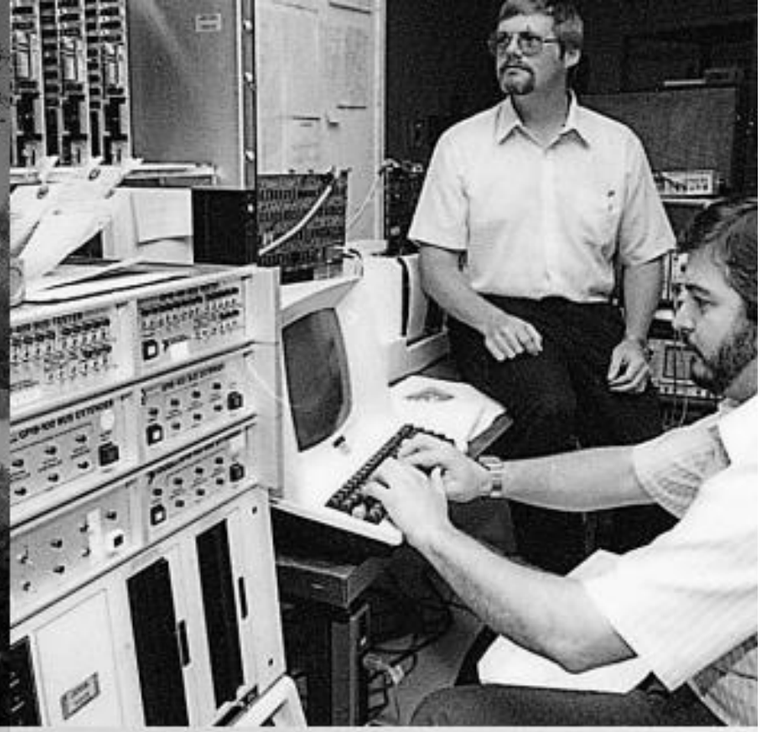

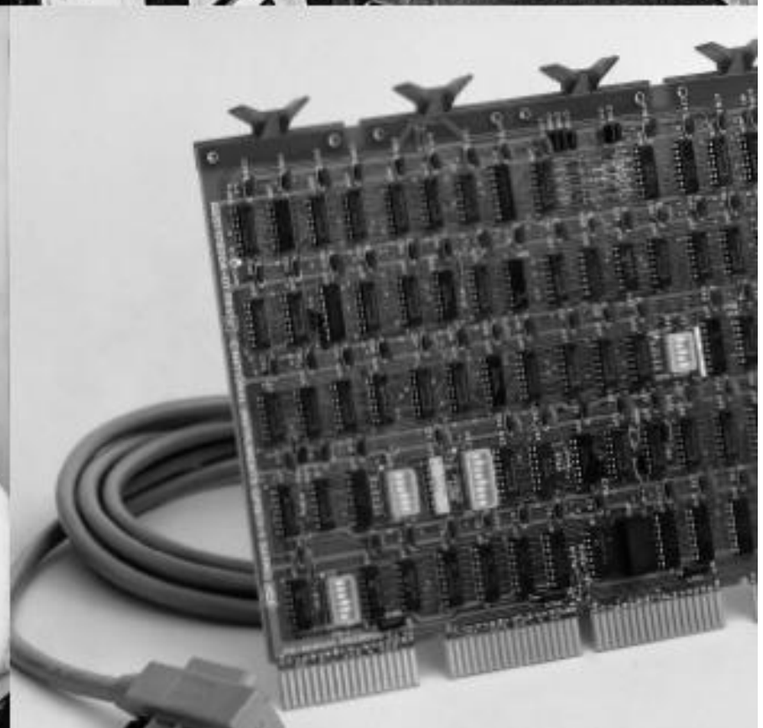

How It Started

In 1976, three ambitious engineers—James Truchard (Dr. T), Jeff Kodosky, and Bill Nowlin—were inspired to start a business where people could land their dream job, flourish in a city they love, and make a difference. And so they did—right out of Dr. T's garage.

It started with an idea as bold as it was simple—connect a test instrument to a computer—and the way technology was tested and measured would change forever.

Decades later, connection is still at the heart of NI—influencing how we think and everything we do.

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NI is now part of Emerson

Future proofing Test & Measurement for our customers through NI's integrated software centric approach

45
Years in T&M

35K
Customers Worldwide

7K
Employees Worldwide

1000+
Partners

Growth Sectors

- Semiconductor
- Aerospace/Defense
- Transportation
- Manufacturing & More

Products & Applications

- Design & Prototyping
- Automated Validation
- Production Test

INTERNAL - NI CONFIDENTIAL

Our Mission

NI equips engineers and enterprises with systems that accelerate productivity, innovation, and discovery.

NI HW Platforms

PC-Based Systems

PC-based measurement and controls systems provide electrical and physical measurement capabilities for engineers who need a customizable, accurate, yet cost-effective way of conducting benchtop measurements.

Best for:
- Benhchtop measurement
- Fixed-channel count
- No signal conditioning

CompactDAQ

CompactDAQ is a cost-effective approach to benchtop measurement. Pair sensor-specific, conditioned I/O modules with software optimized for DAQ applications.

Best for:
- High-channel-count distributed DAQ applications
- Benchtop test and measurement
- Mixed sensor measurements

CompactRIO

CompactRIO hardware provides an industrial control and monitoring solution using sensor- or protocol-specific, conditioned I/O modules with real-time capabilities.

Best for:
- Real-time processing needs
- Industrial monitoring and control applications
- Long-term testing in the field

PXI

PXI hardware combines high performance, modularity, and software connectivity make it ideal for test applications that require high accuracy, high-channel count, mixed measurements.

Best for:
- Production test systems for electronic devices
- Automated validation test
- High-channel/high-speed test
- Combining instruments, sensor, and electrical measurements

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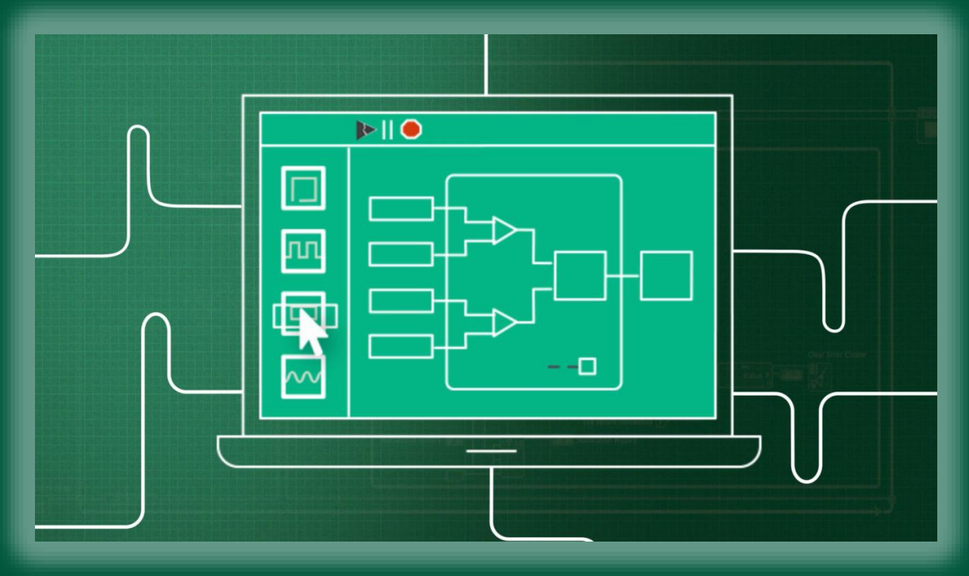
NI LabVIEW



Code development is the tool,

not the purpose

LabVIEW™

A graphical programming environment engineers use to develop automated research validation and production test systems.

Create Professional User Interfaces

View data and control your test system via an interface UI built from drag-and-drop UI elements.

Integrate All Your Instruments

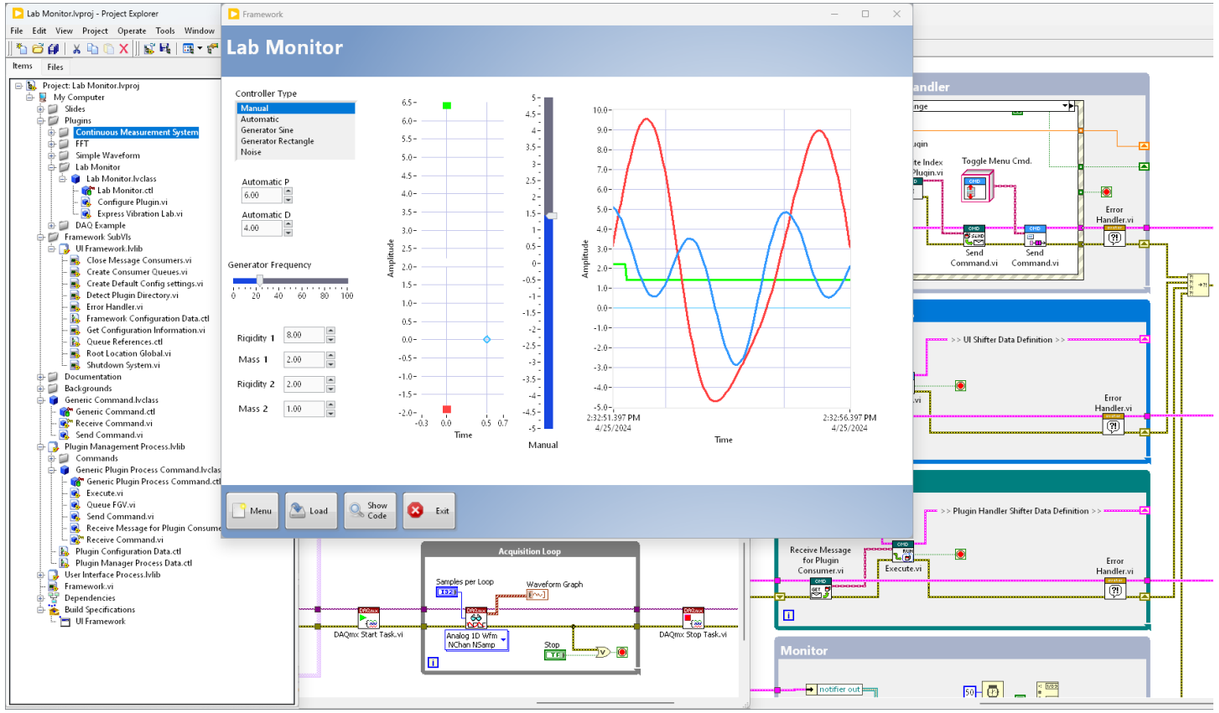
Acquire data from and control any instrument with 1,000s of device drivers and industry-standard protocols.

Program Like You Think

Save development time by creating and visualizing applications using dataflow programming.

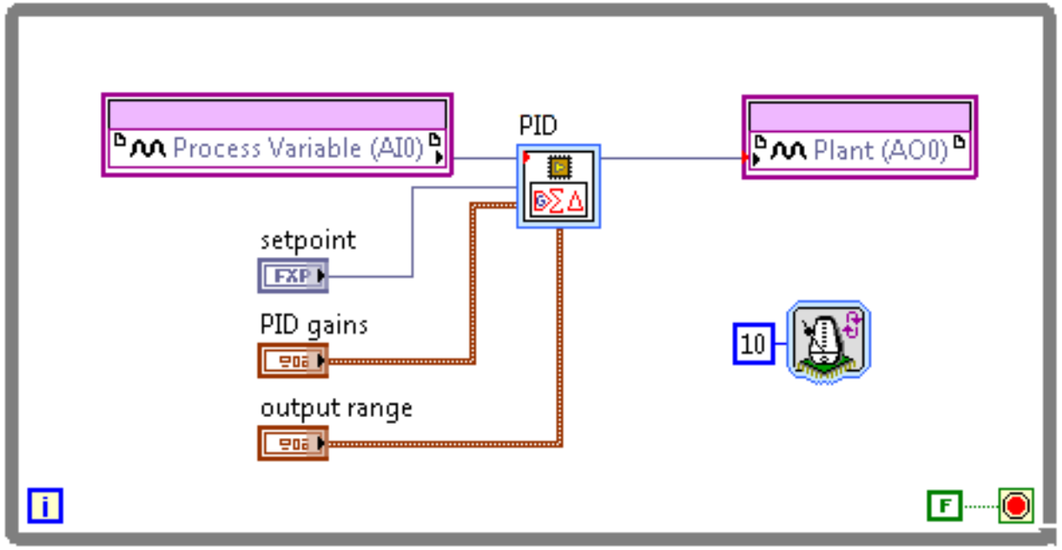
Use Other Code

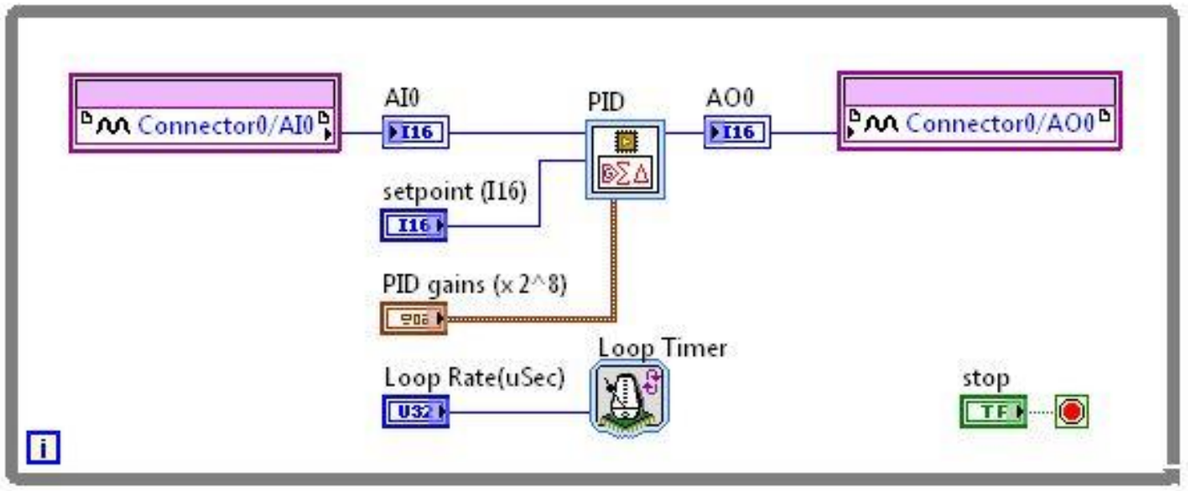
Leverage other and existing code written in Python, C/C++, MATLAB®, and .NET.



LabVIEW FPGA Module

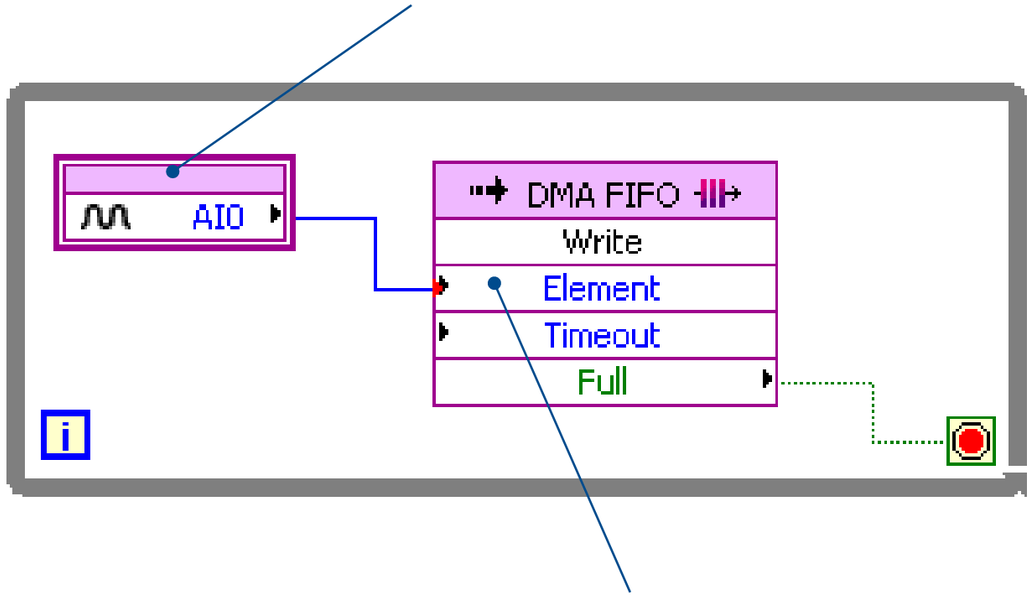
- Use LabVIEW to design hardware
- Utilize with a variety of platforms
- Offload the most critical pieces of your application
  - High-speed control
  - Inline signal processing
  - Custom protocols
  - Custom timing, triggering, and synchronization
  - Fast stimulus/response testing



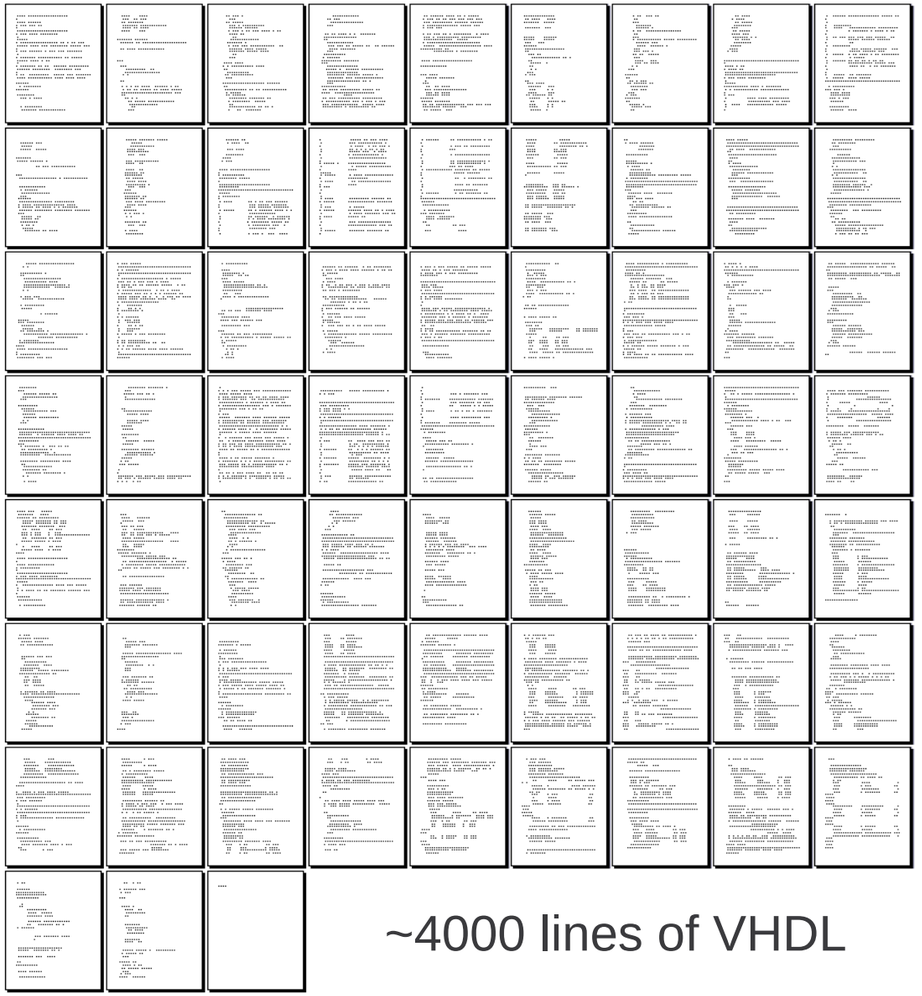


Abstraction of Hardware Complexities

Acquire analog data point-by-point



Directly transfer analog data to processor memory via FIFO for data logging, display, etc.

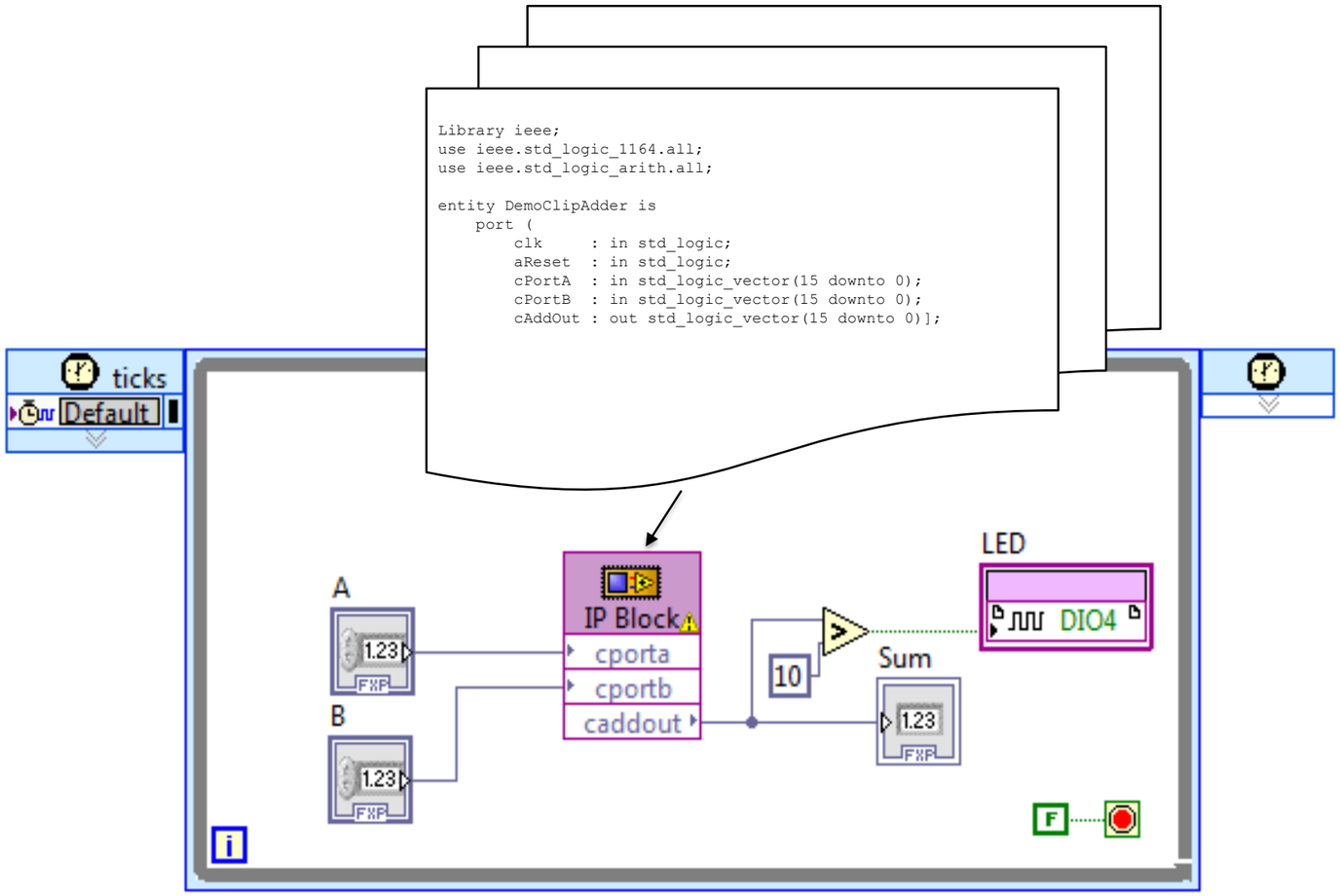


~4000 lines of VHDL

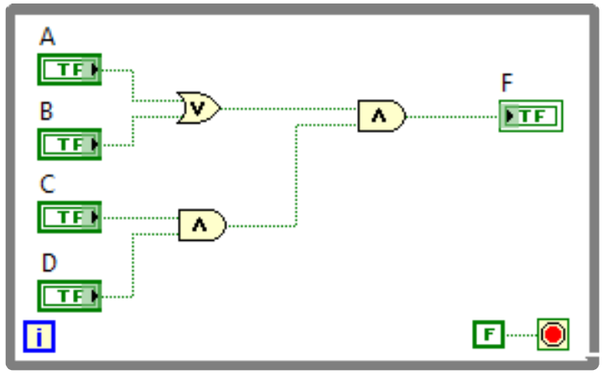
Reuse of Existing HDL Algorithms

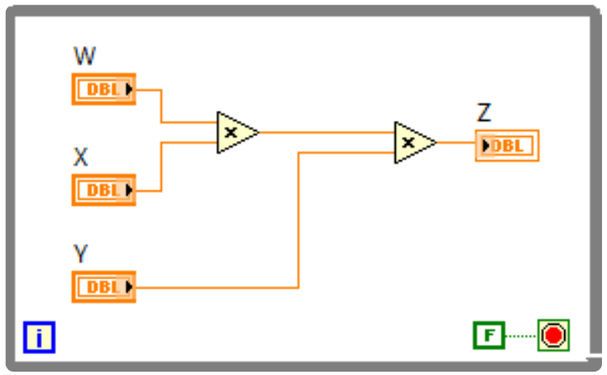
- Increase application development efficiency and leverage existing team expertise

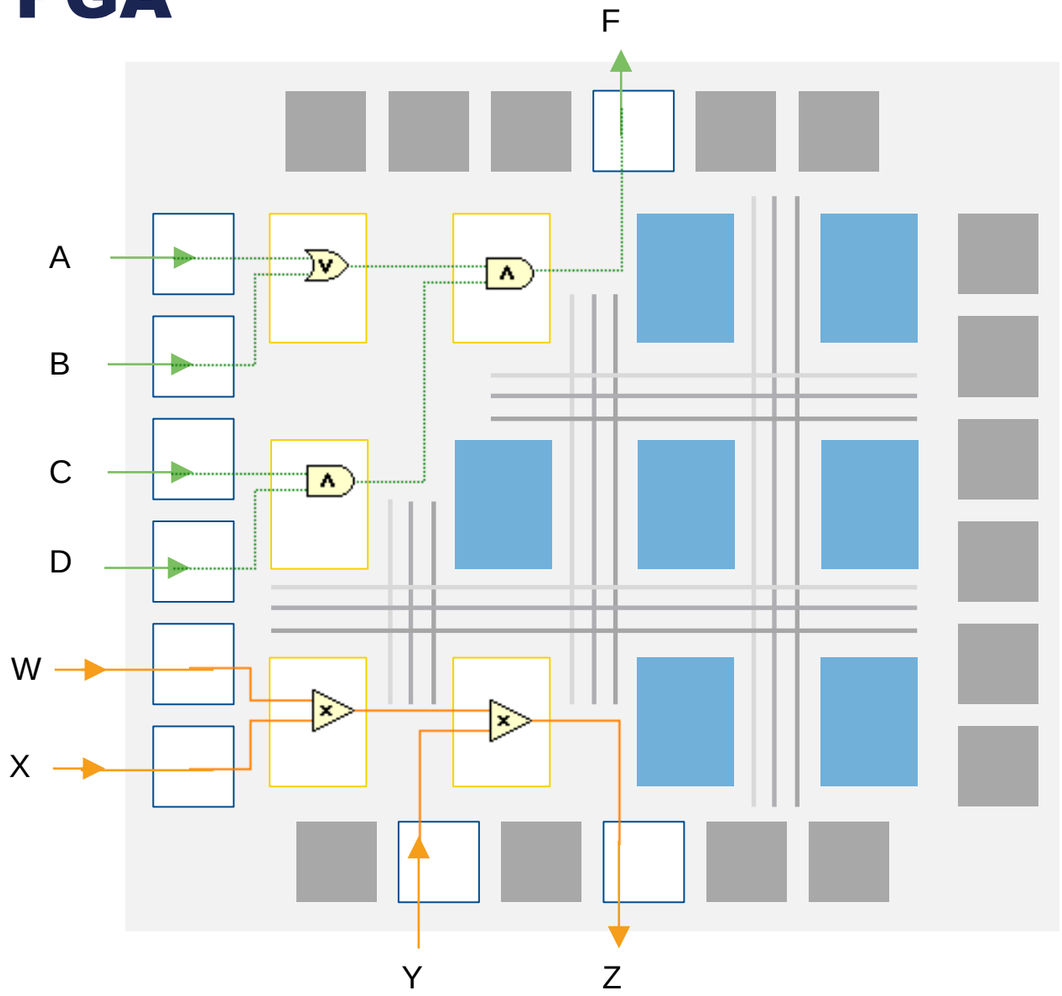
- Similar to calling a DLL in LabVIEW for the desktop



Mapping LabVIEW to an FPGA







LabVIEW AI Assistant

LabVIEW Generative AI Early Access Request

LabVIEW in X-Rays Measurements

Case Studies

LabVIEW control software for scanning micro-beam X-ray fluorescence spectrometer

Contents lists available at SciVerse ScienceDirect

Talanta

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LabVIEW control software for scanning micro-beam X-ray fluorescence spectrometer

Pawel Wrobel*, Mateusz Czyzycki, Leszek Furman, Krzysztof Kolasinski, Marek Lankosz, Alina Mrenca, Lucyna Samek, Dariusz Wegrzynek

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Spectrometry

ABSTRACT

Confocal micro-beam X-ray fluorescence microscope was constructed. The system was assembled from commercially available components – a low power X-ray tube source, polycapillary X-ray optics and silicon drift detector – controlled by an in-house developed LabVIEW software. A video camera coupled to optical microscope was utilized to display the area excited by X-ray beam. The camera image calibration and scan area definition software were also based entirely on LabVIEW code. Presently, the main area of application of the newly constructed spectrometer is 2-dimensional mapping of element distribution in environmental, biological and geological samples with micrometer spatial resolution. The hardware and the developed software can already handle volumetric 3-D confocal scans. In this work, a front panel graphical user interface as well as communication protocols between hardware components were described. Two applications of the spectrometer, to homogeneity testing of titanium layers and to imaging of various types of grains in air particulate matter collected on membrane filters, were presented.

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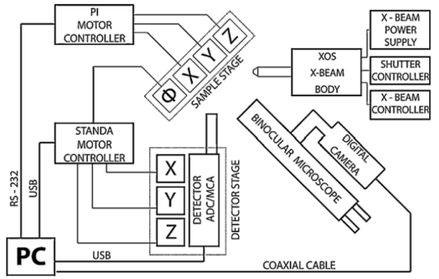


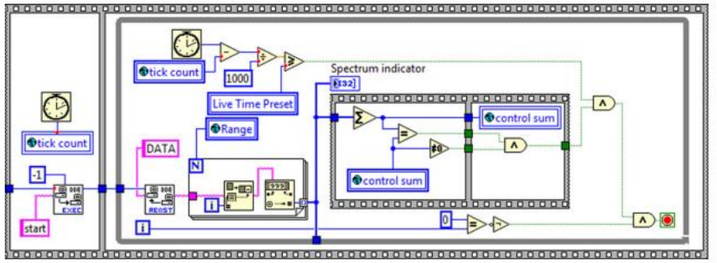


Fig. 4. Spectrum acquisition loop. If the preset live time elapse and total sum of spectra (control sum) does not change the loop stops.

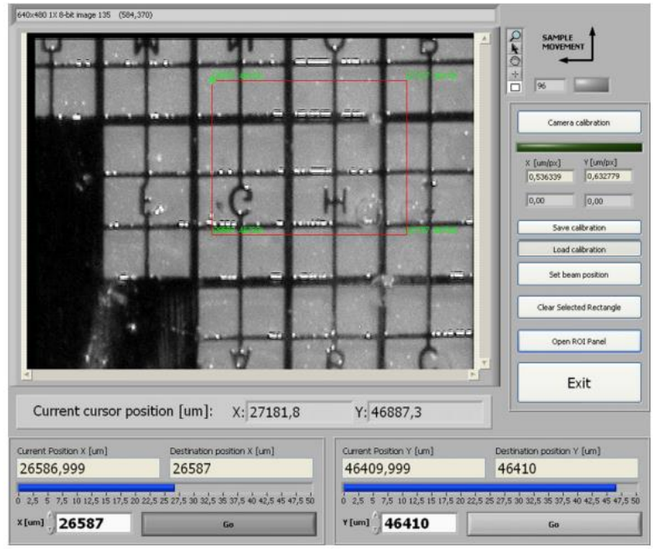
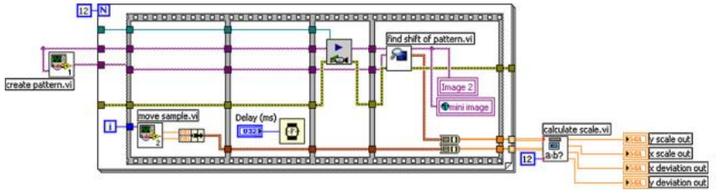


Fig. 5. Screenshot of the front panel of the camera VI. Sample stage control panel is located on the bottom of the front panel.



A LabVIEW based user-friendly X-ray phase-contrast imaging system software platform

Submitted to “Journal of X-Ray Science and Technology”

A LabVIEW based user-friendly X-ray phase-contrast imaging system software platform

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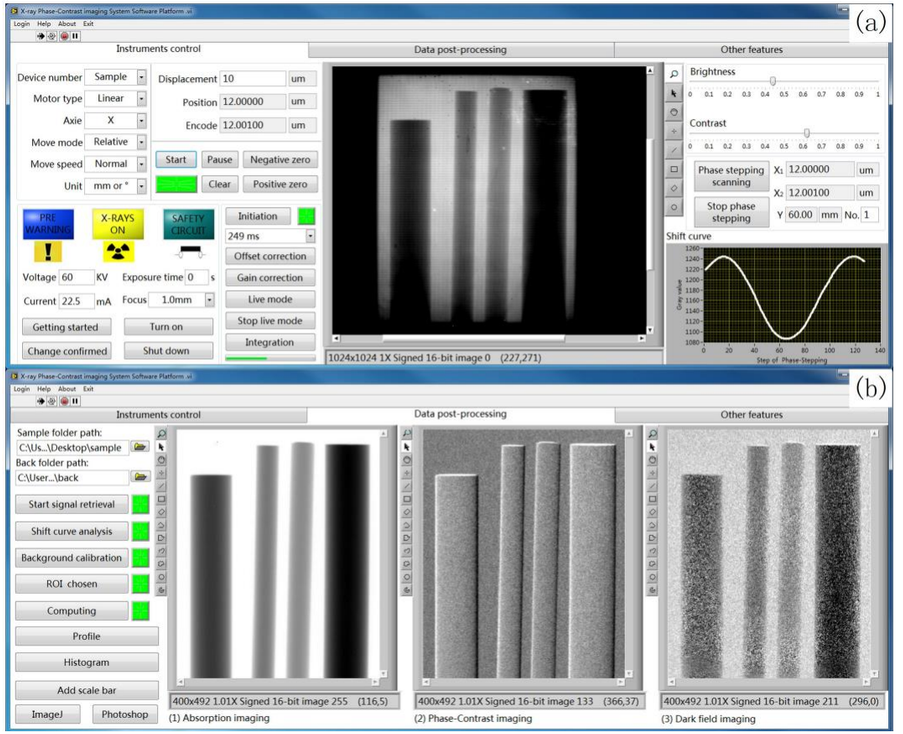
Abstract: X-ray phase-contrast imaging can provide greatly improved contrast over conventional absorption-based imaging for weakly absorbing samples, such as biological soft tissues and fibre composites. In this manuscript, we introduce an easy and fast way to develop a user-friendly software platform dedicated to the new grating-based X-ray phase-contrast imaging setup recently built at the National Synchrotron Radiation Laboratory of the University of Science and Technology of China. Unified management and control of 21 motorized positioning stages, of an ultra-precision piezoelectric translation stage and of the X-ray tube are achieved with this platform. The software package also covers the automatic image acquisition of the phase-stepping scanning with a flat panel detector. Moreover, a data post-processing module for signals retrieval and other custom features are in principle available. With a seamless integration of all necessary functions in a unique package, this software platform will greatly support the user activity during experimental runs.



LabVIEW interface with Tango control system for a multi-technique X-ray spectrometry IAEA beamline end-station at Elettra Sincrotrone Trieste

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LabVIEW interface with Tango control system for a multi-technique X-ray spectrometry IAEA beamline end-station at Elettra Sincrotrone Trieste

P.M. Wrobel [a,b], M. Bogovac [a], H. Sghaier [a,c], J.J. Leani [a,d], A. Migliori [a], R. Padilla-Alvarez [a], M. Czyzycki [a,b], J. Osan [a,e], R.B. Kaiser [a], A.G. Karydas [a,f,*]

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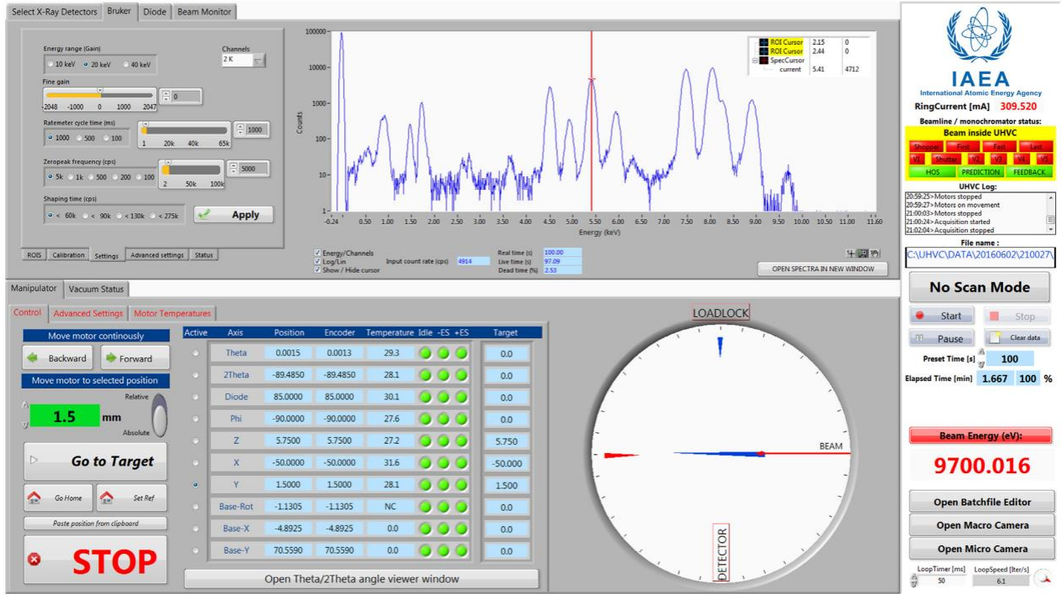

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ABSTRACT

A new synchrotron beamline end-station for multipurpose X-ray spectrometry applications has been recently commissioned and it is currently accessible by end-users at the XRF beamline of Elettra Sincrotrone Trieste. The end-station consists of an ultra-high vacuum chamber that includes as main instrument a seven-axis motorized manipulator for sample and detectors positioning, different kinds of X-ray detectors and optical cameras. The beamline end-station allows performing measurements in different X-ray spectrometry techniques such as Microscopic X-Ray Fluorescence analysis (μXRF), Total Reflection X-Ray Fluorescence analysis (TXRF), Grazing Incidence/Exit X-Ray Fluorescence analysis (GI-XRF/GE-XRF), X-Ray Reflectometry (XRR), and X-Ray Absorption Spectroscopy (XAS). A LabVIEW Graphical User Interface (GUI) bound with Tango control system consisted of many custom made software modules is utilized as a user-friendly tool for control of the entire end-station hardware components. The present work describes this advanced Tango and LabVIEW software platform that utilizes in an optimal synergistic manner the merits and functionality of these well-established programming and equipment control tools.

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Edge Detection for X-Ray Image using LabVIEW

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Edge Detection for X-Ray Image using LabVIEW

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Abstract: Medical imaging has emerged as a new field of research in image processing which consist of image enhancement, visualization, and edge detection. The main objective is to improve medical diagnosis so that we can obtain an image-based information, which focuses on detection of pathological deformations specially for x-ray images. Medical images consist of object edges and noise, hence it is difficult to distinguish the exact edge from noise. Edge detection technique acts as a fundamental tool in feature extraction and feature detection. Edges are nothing but are changes of intensity in an image. Sobel operator, a popular operator used for edge detection algorithms is considered in this work. Sobel operator uses a derivative approximation for finding out edges and uses 2-D spatial gradient measurement for images with vertical and horizontal gradient matrices. Labview is a graphical programming language and is used for interactive applications, hardware integration and real time processing. The proposed work has been done using Labview 14.0.

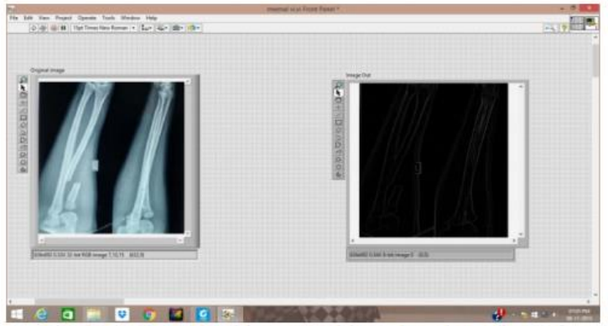

Fig 3(a) Fractured bone and its edge detection of X-ray image

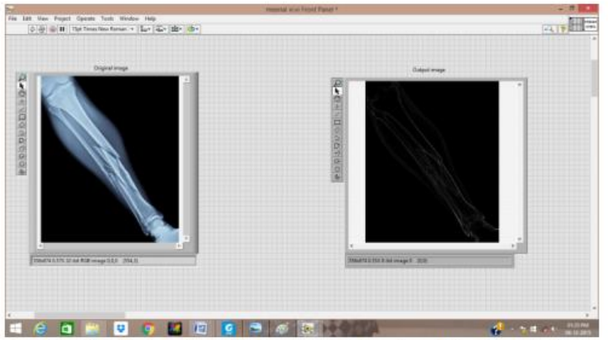

Fig 3(b) Fractured bone and its edge detection of X-ray image

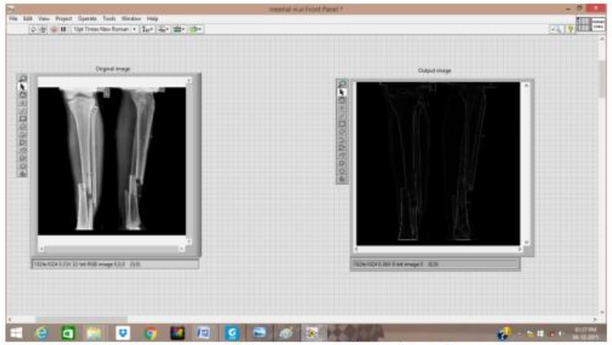

Fig 3(c) Fractured bone and its edge detection of X-ray image

EMERSON

Development Of Image Acquisition Software for Digital Radiograph and X-Ray CT

Development Of Image Acquisition Software for Digital Radiograph and X-Ray CT

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Abstract

There have been done a development of software for digital radiograph acquisition and X-ray CT. Development has been made for both software to control the rotated table and image acquisition of X-ray radiated object. This paper will have limited scope only for software module that is image acquisition result.

X-ray that is coming out from X-ray generator will be passed through via collimator, then to be pointed to object test where located on rotated table. X-ray radiated result of the object test will be captured by digital detector array or fluorescence screen. Because of fluorescence screen usage, digital camera will be used to get the projection result of X-ray to object test. Software select connected camera port and digital camera will start to record. In this system test, image acquisition and rotated table software will use machine block and ignition coil. It will be located on rotated table and to be arrange for 0^o to 360^o angles, with voltage 160kV, current 5 mA, source object to detector distance 120 cm, source to detector distance 135 cm. Image acquisition software test result shows the image is clearly seen.

Keywords: *digital Radiograph, X-Ray CT, Fluorescence screen*