

汽车电子检测平台的实现

金玮
资深工程师

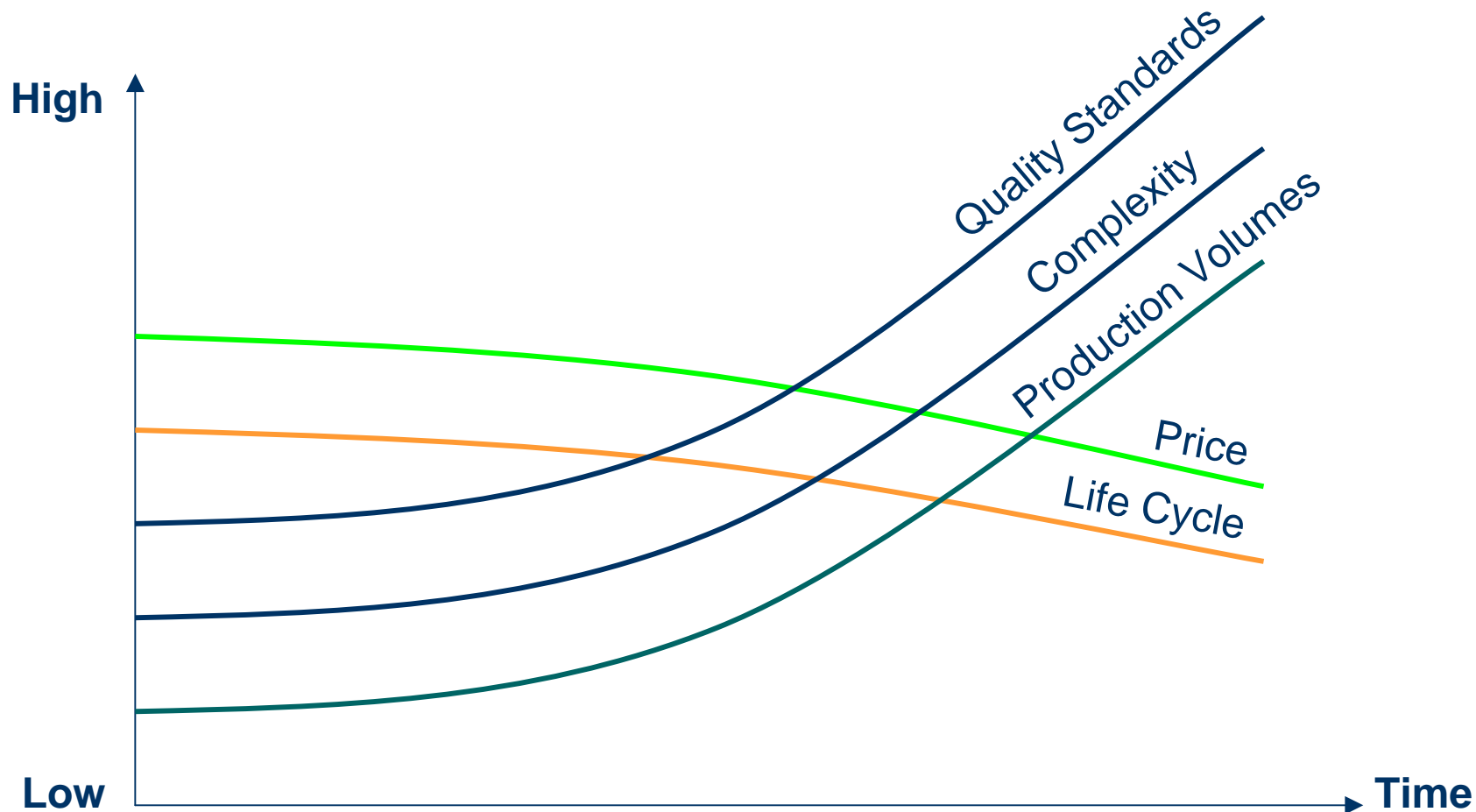
大纲

- 聚星公司
- 虚拟仪器平台应对现代工业挑战
- 聚星汽车电子检测套件
- 案例
- 服务的模式和多赢的局面

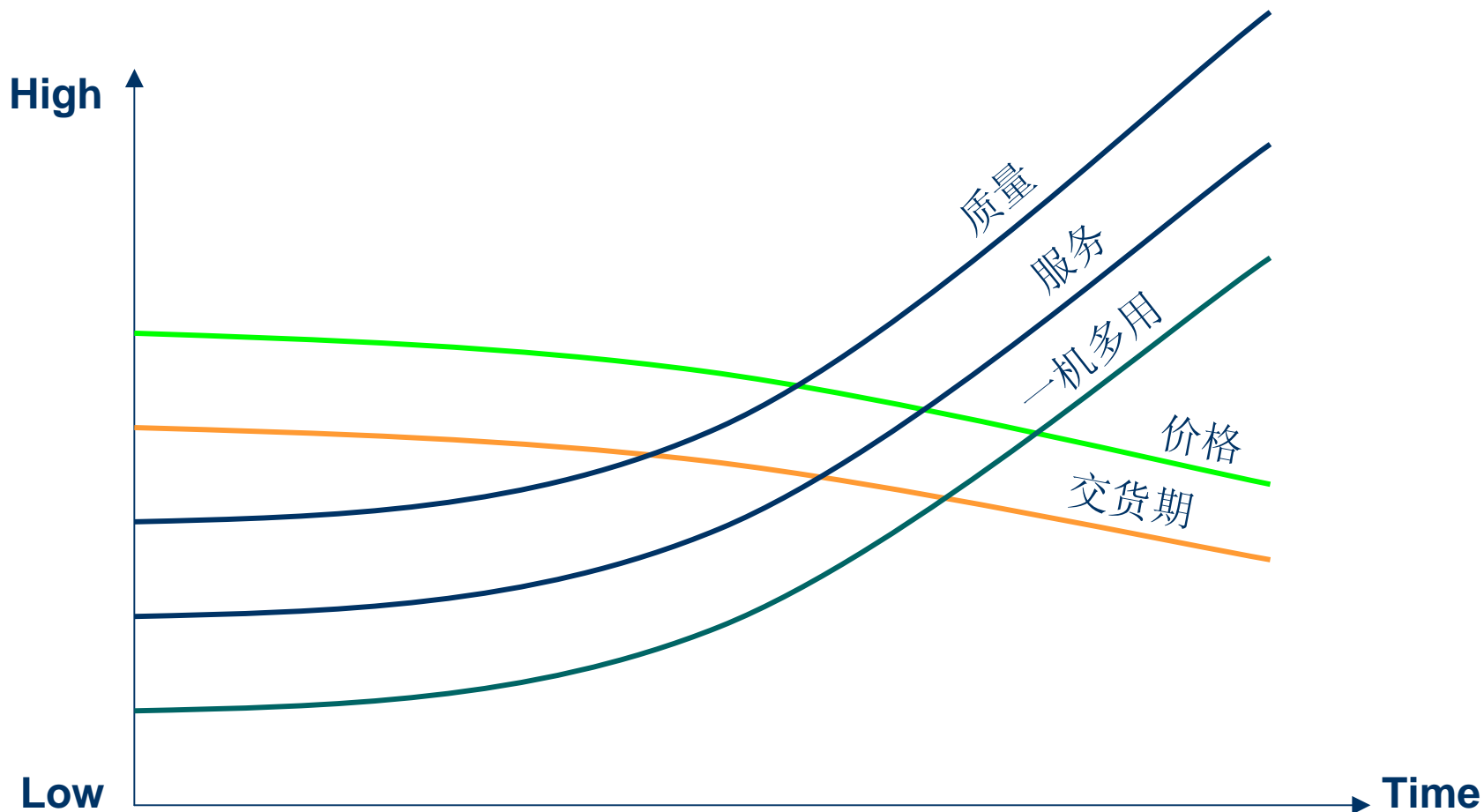
聚星仪器有限公司介绍

- National Instruments推荐的联盟商
- 提供虚拟仪器集成的全面服务
 - 个性化仪器，软件及功能模块，软件工程服务
 - LabVIEW和TestStand高级培训
- 去年集成NI产品排名三甲
- 2名曾任NI研发经理
- 中国仅有的二名获NI认证的LabVIEW开发工程师
- 6项美国专利、4项中国发明专利

工业趋势的挑战



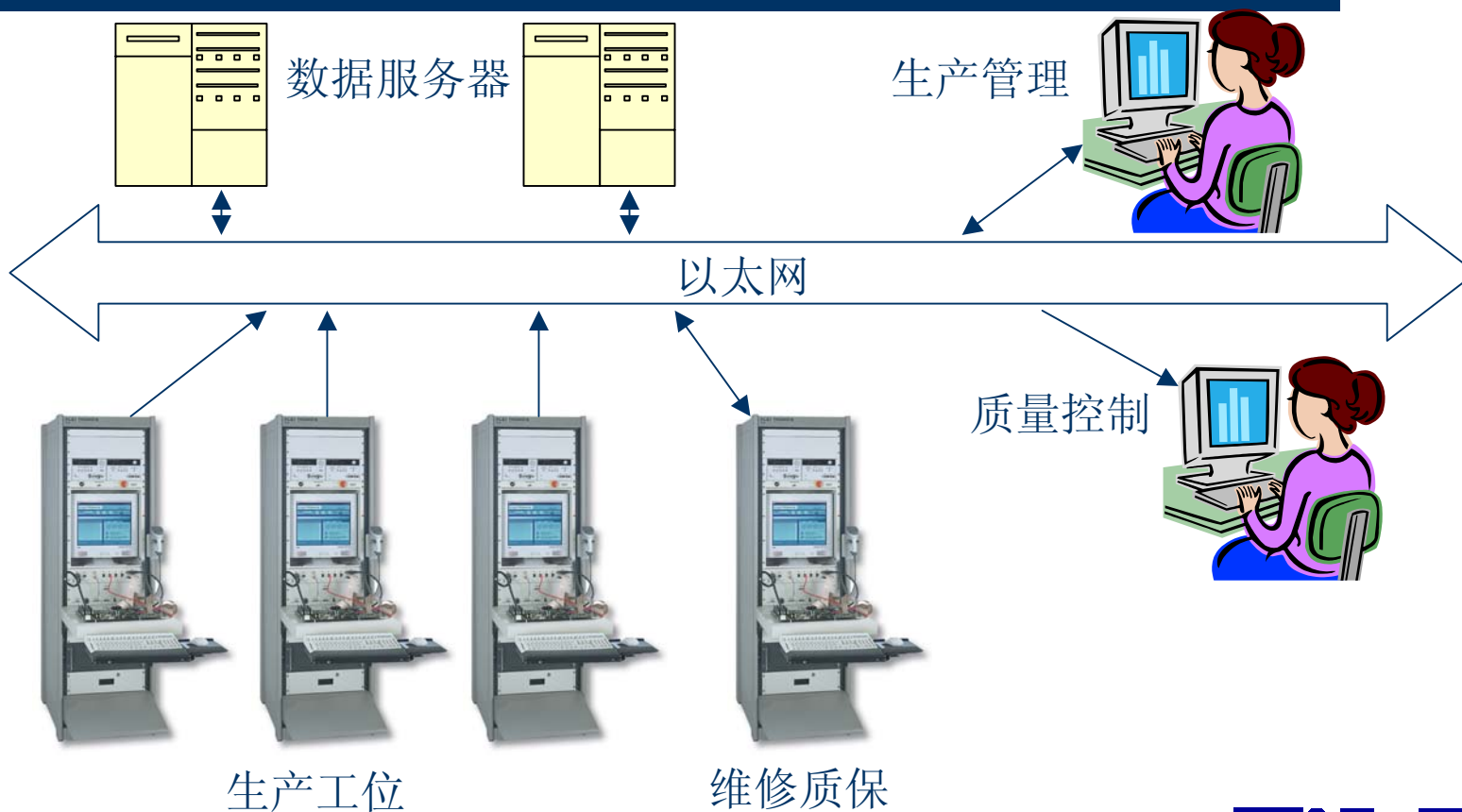
系统集成市场的挑战



迎接挑战- 测试平台标准化

- 模块化硬件平台
 - 降低成本投入
 - 提高设备再利用率
 - 提高灵活可扩展能力
- 标准化软件平台
 - 提高系统质量
 - 简化系统维护
 - 缩短开发周期

标准化生产管理网络



标准化硬件平台



GPIB 总线



专用配套仪器

标准化软件平台

Production Monitor / Test Data Query

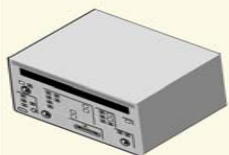
SQL Server

Tester GUI

Test Stand

Test & Measurement Automation Modules

LabVIEW



GPIB



Serial



DAQ



Motion



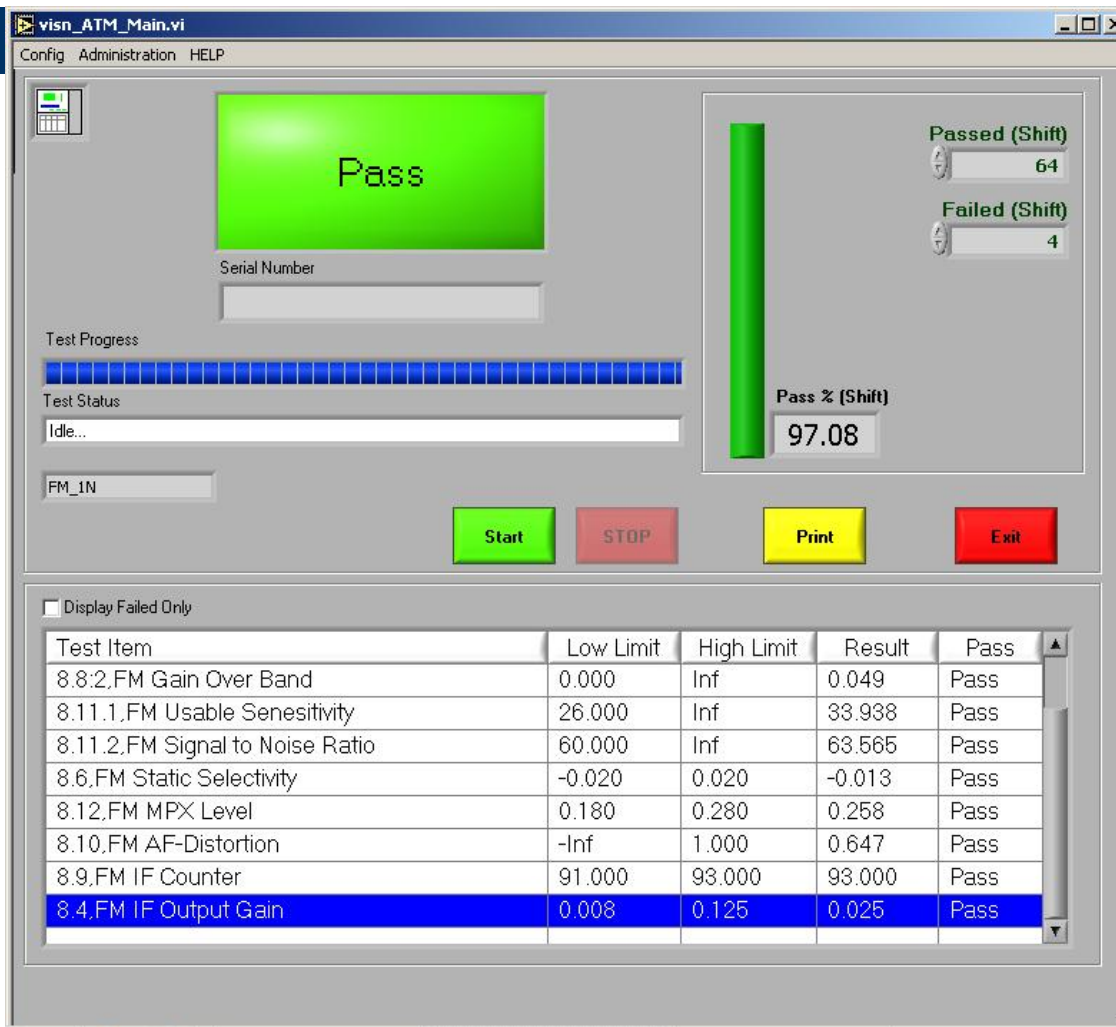
Vision



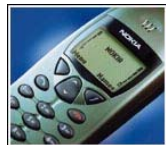
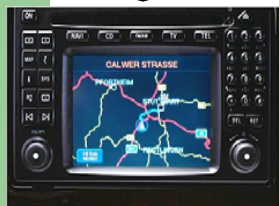
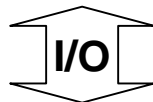
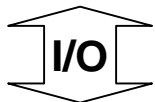
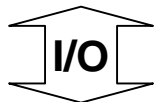
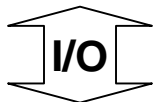
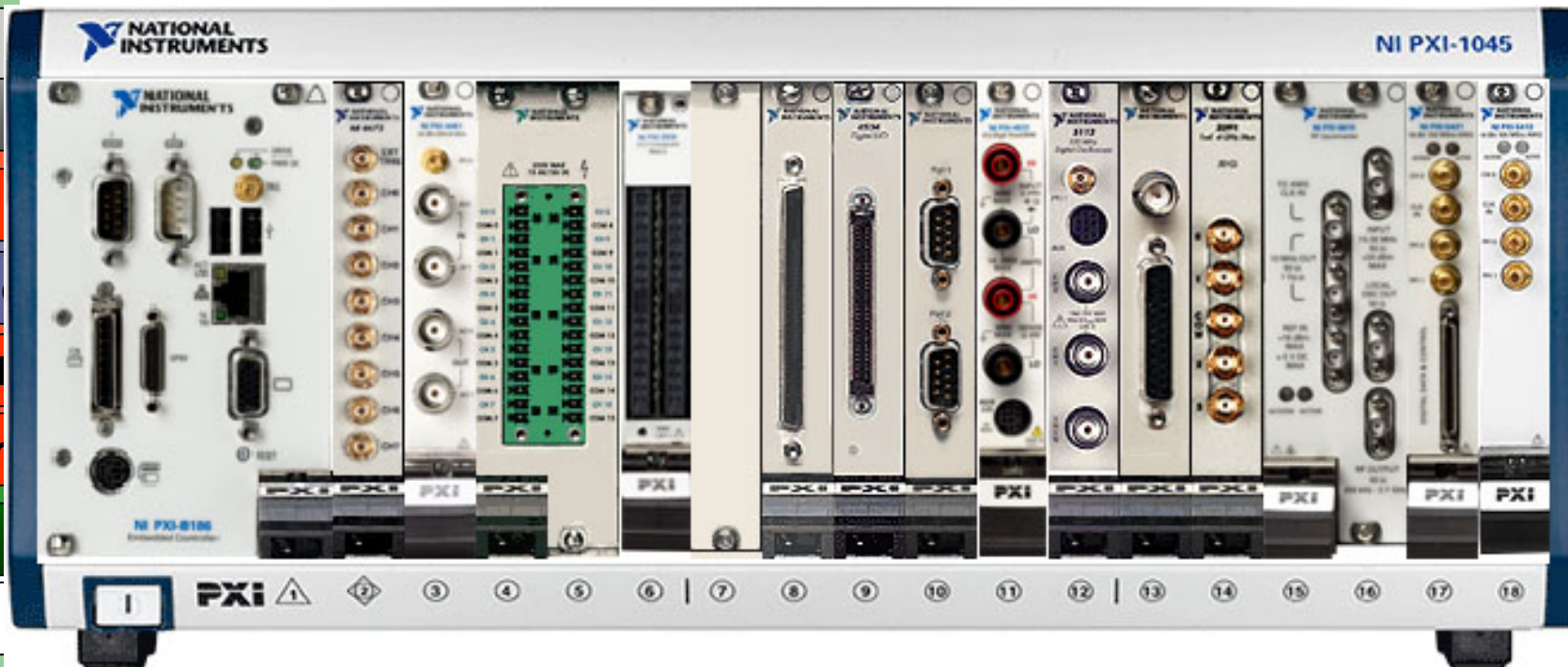
FieldPoint

PXI

标准化操作员界面



汽车电子测试平台

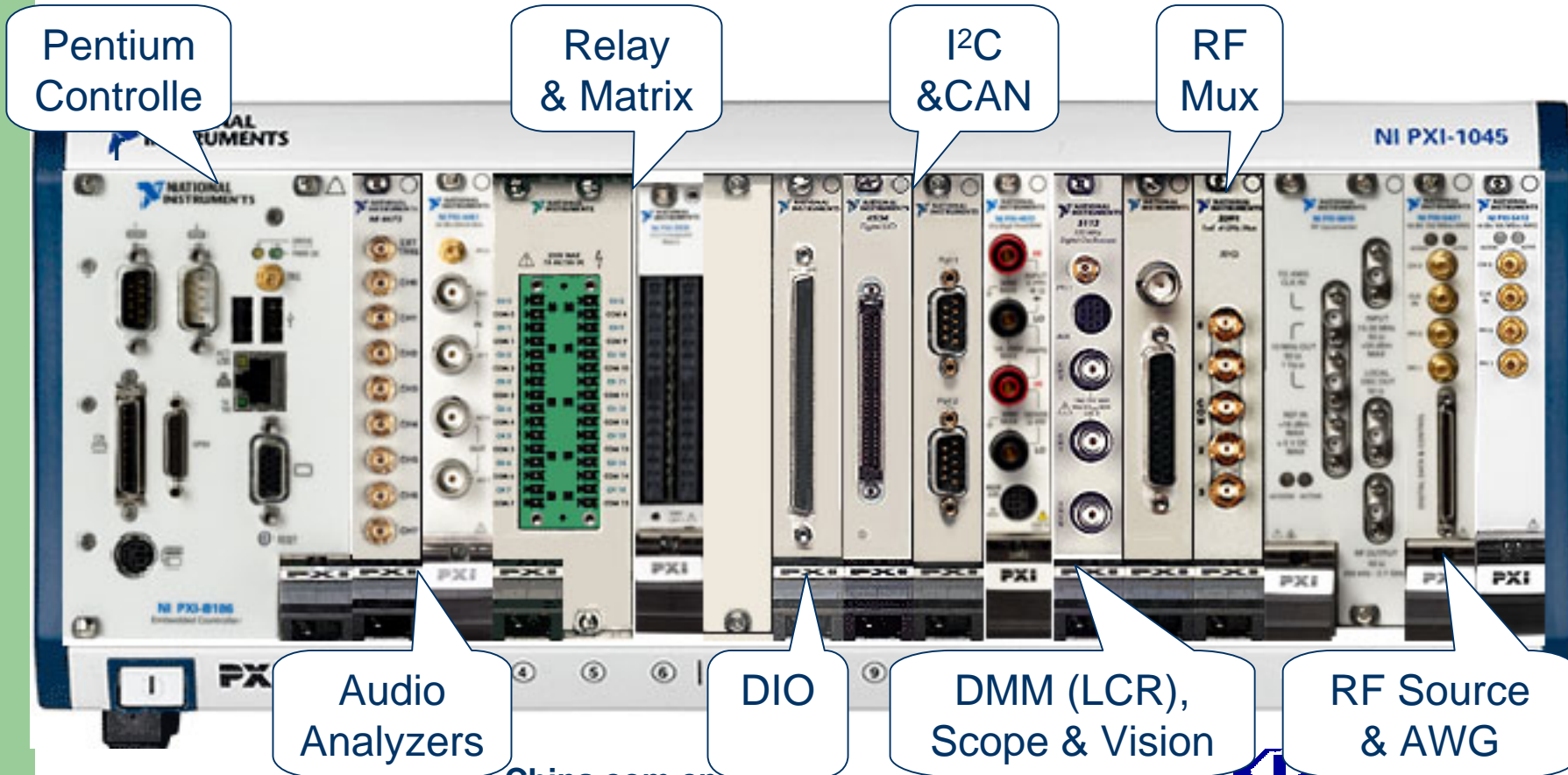


CAN, MOST,
IDB-1394



www.VI-China.com.cn

PXI Platform for Automotive



Role of Test Management Software

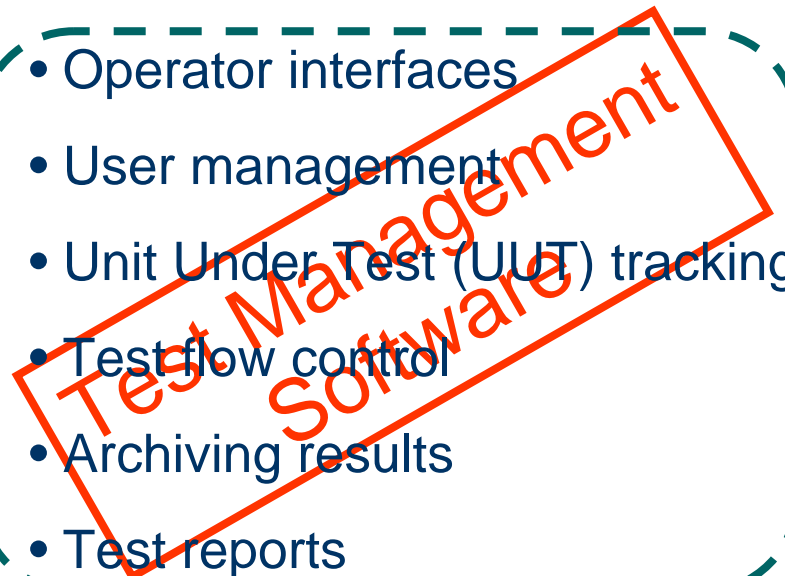
Components of a Test System:

Operations different for each product tested:

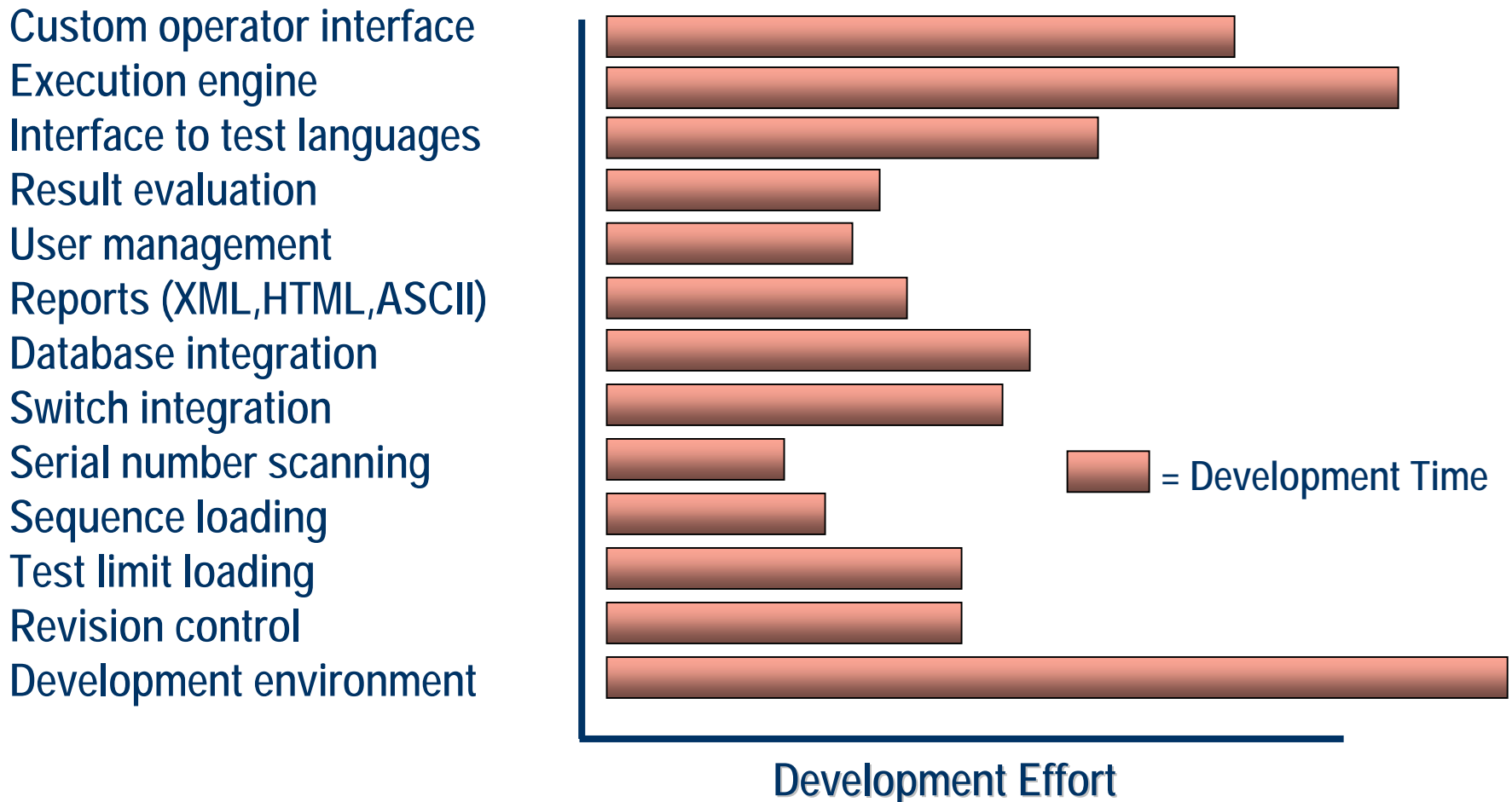
- UUT & fixture control
- Configuring instruments
- Data acquisition
- Measurements
- Analyzing results
- Test strategies

Operations repeated for each product tested:

- Operator interfaces
- User management
- Unit Under Test (UUT) tracking
- Test flow control
- Archiving results
- Test reports

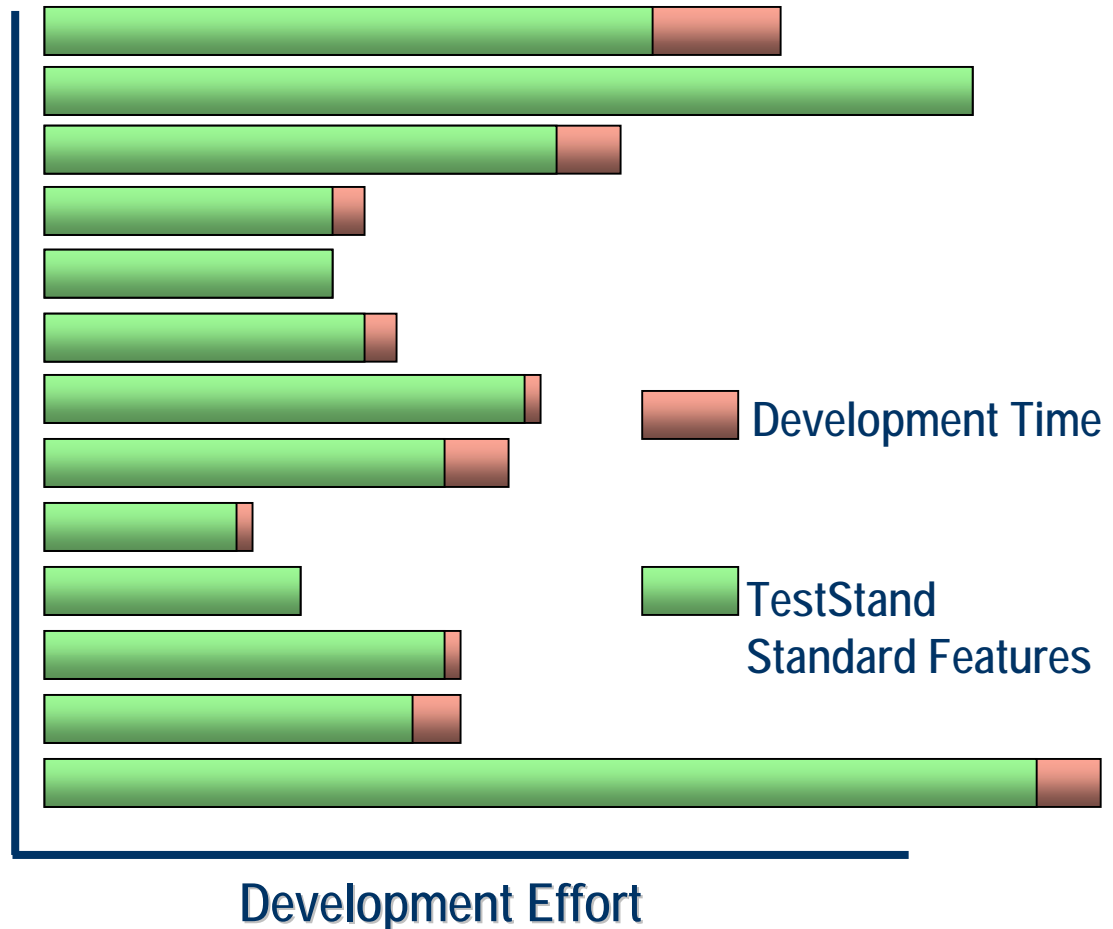


Build versus Buy Development Costs



TestStand Reduces Development Costs

Custom operator interface
Execution engine
Interface to test languages
Result evaluation
User management
Reports (XML,HTML,ASCII)
Database integration
Switch integration
Serial number scanning
Sequence loading
Test limit loading
Revision control
Development environment



Role of Test Management Software

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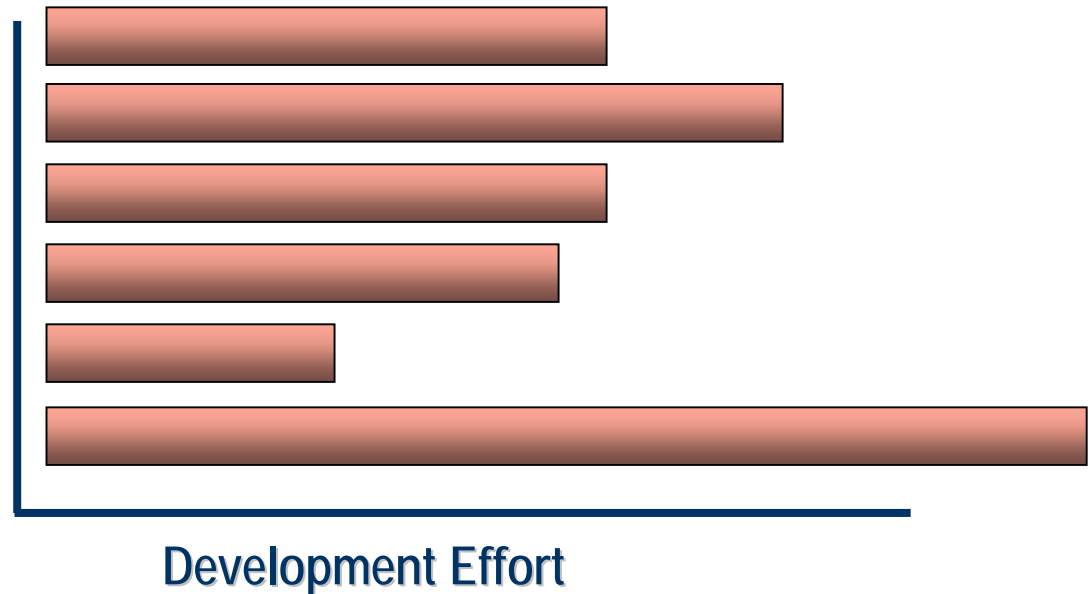
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Test Software Development Costs

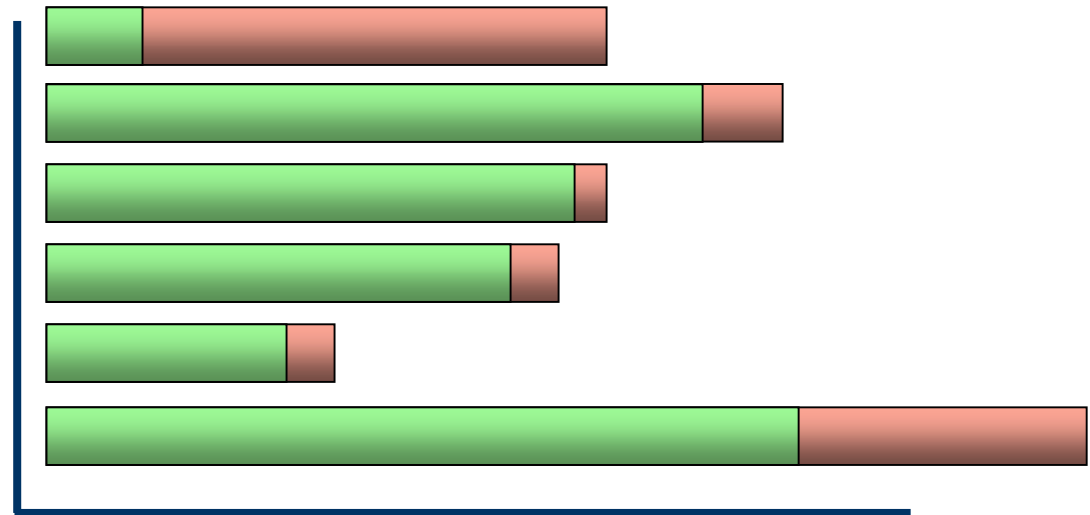
UUT & fixture control
Configuring instruments
Data acquisition
Measurements
Analyzing results
Test strategies



 = Development Time

VISN Test Framework Reduces Costs

UUT & fixture control
Configuring instruments
Data acquisition
Measurements
Analyzing results
Test strategies



Development Effort

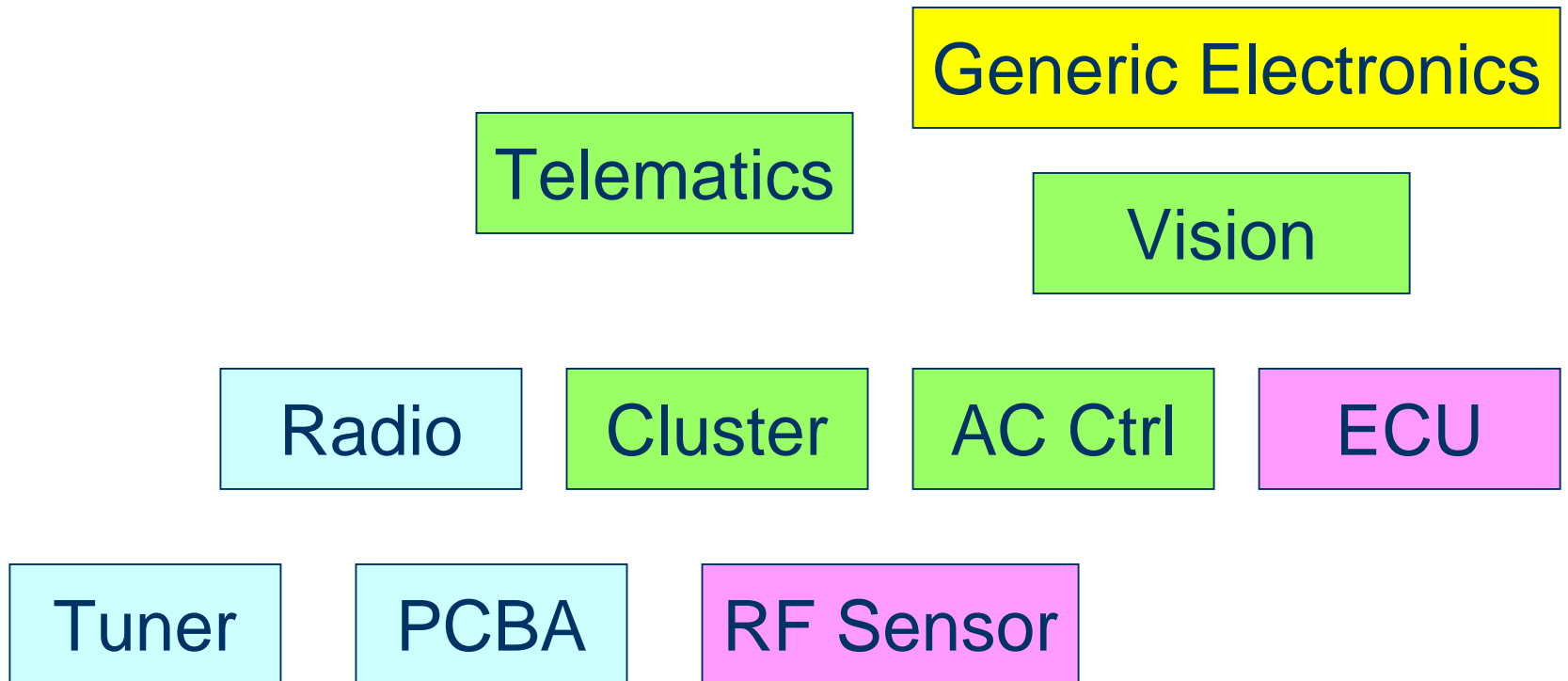


= VISN Test Framework
Standard Features



= Development Time
Standard Features

VISN Test Framework Roadmap



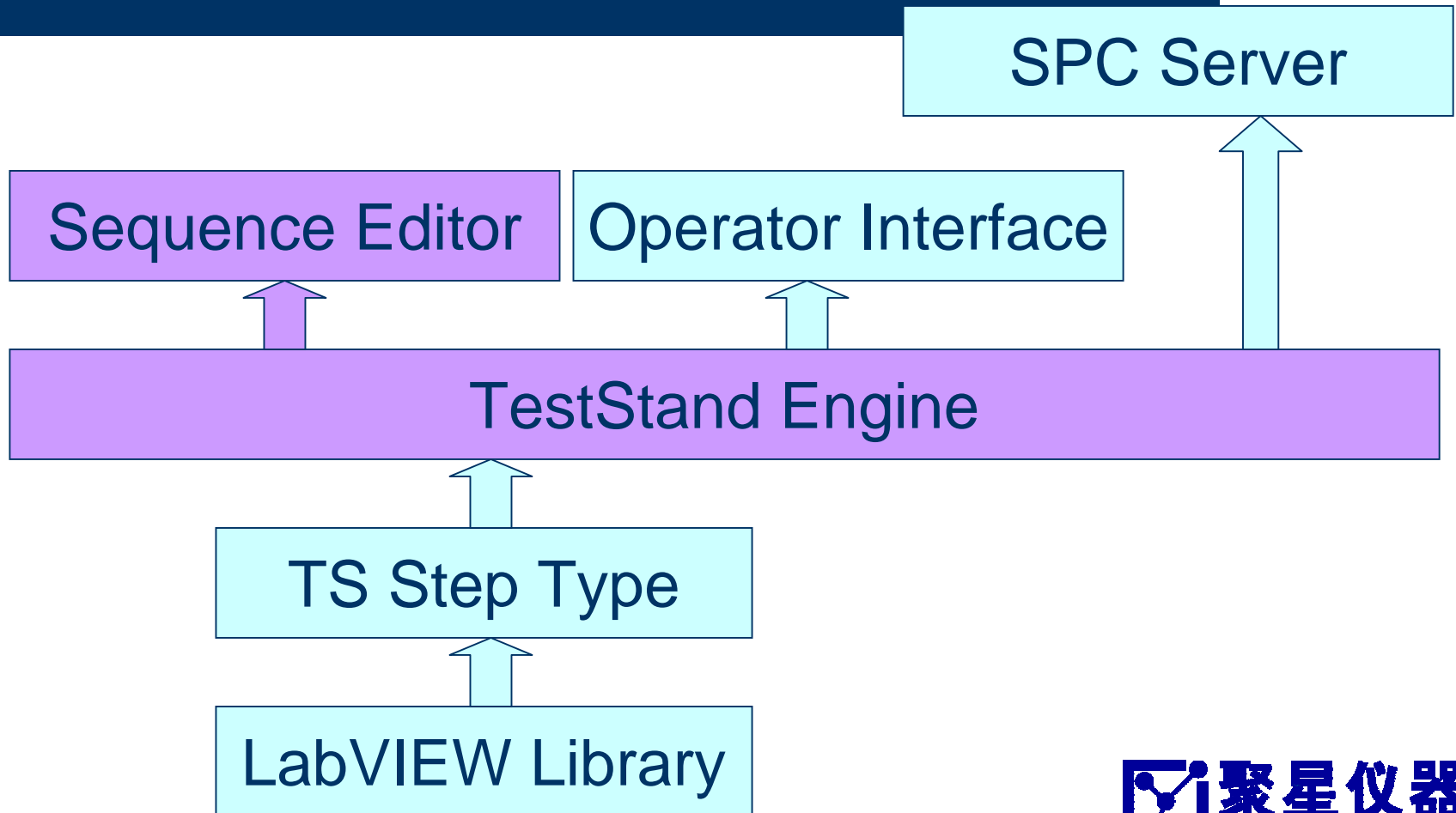
VISN Radio Test Framework

- Installation
- Components
- Test Sequence Configuration
- Customize for New Hardware

Installation

- LabVIEW >> User Library
 - Radio Test, Radio Control, Radio Source Control, Audio Analysis
- TestStand >> Customized Step Type
 - Test Step, Step Setup
 - Limit Loader, Test Report
- Operator Interface for TestStand
- SPC Server for SQL DB

Software Architecture

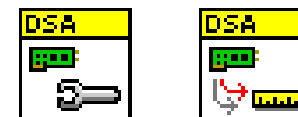
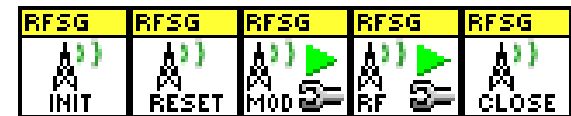


Components

- SPC Server
 - SQL based, generic for all tests
- Operator Interface
 - Generic for all sequential tests
- TestStand Step Types
- LabVIEW Library

LabVIEW Library

- Radio Control
 - Power, Tuning, CD, Sound, Generic RD/WR
- Radio Source
 - AM, FM, Stereo, RDS
 - NI-5671, VP-8131/8194
- Audio Analyzer
 - Filter, Frequency, Amplitude, SINAD, THD
 - NI-447x, 446x



Radio Test Capability

- AM / FM
 - Noise limit sensitivity
 - IF / image suppression
 - Selectivity and blocking
 - Inter-modulation
 - AGC
 - SNR
 - Distortion
- FM / FM Stereo
 - Merit Sensitivity
 - AM suppression
 - Channel equality
 - Pilot / sub-carrier suppression
- CD
 - Output level
 - SNR
 - Channel separation
 - THD
 - Frequency response
 - Dynamic range
- Sound
 - Balance / Fader / Bass / Tremble
 - Auto loudness
 - Output level
 - Telephone mute

TestStand Step Type

The screenshot shows the TestStand Sequence Editor interface. The title bar reads "TestStand - Sequence Editor [Edit] - [D:\... \Automotive Test\RD4\Development\TestStand Source\RD4_Alignment.seq]". The menu bar includes File, Edit, View, Execute, Debug, Configure, Source Control, Tools, Window, and Help. The toolbar contains icons for file operations and execution. The main window displays a sequence of steps in a table:

Step	Description	Flow Properties	Comment
AMFM Source Reset	FileGlobals.RadioSourceHandle.reseted		
Sensor Temperature			
Wait 1s_Copy			
Read Sensor Temperature			
Sensor Supply			
Wait 0.5s			
Read Sensor Supply			
Read Front Version			
Wait 0.5s_Copy			
Read Front Version			
AM Alignment			
FM Alignment			
FM Crosstalk Alignment			
Set Source to FM 98M 74dBuV s			
Wait 1s			
Read CDSP Crosstalk			
AMFM Source Reset			
<End Group>			

A context menu is open over the "AMFM Source Reset" step. The menu is organized into several sections:

- Insert Step**: Select an AMFM Source to Reset (Ctrl+E), Specify Module... (Ctrl+M), Edit Code..., Preconditions... (Ctrl+R), Breakpoint, Run Mode, Cut (Ctrl+X), Copy (Ctrl+C), Paste (Ctrl+V), Delete (Del), Rename (F2), Run Selected Steps, Run Selected Steps Using, Loop on Selected Steps..., Loop on Selected Steps Using.
- Tests**: Action, VISN Radio (expanded to show: VISN Circuit Measurement, VISN Utilities, HP34970), Flow Control.
- Sequence Call**: Statement, Label, Goto, Message Popup, Call Executable (EXE), Property Loader.
- FTP**: FTP Files.
- Synchronization**: Synchronization, Database, IVI, LabVIEW Utility.
- Radio Source** (expanded from VISN Radio): Initialize, Radio Control, Audio Analysis, Modulation and Carrier Setup, Close.

Radio Test Steps

- Radio Source →
- Radio Control ↘
- Audio Analysis ↙

- Initialize
- Reset
- Modulation and Carrier Setup
- Close

- Initialize Radio
- Radio Power
- Set Radio
- Close Radio
- Write Radio Property
- Read Radio Property
- Radio Command Test

- Frequency Response Test
- Radio SNR Test
- DSA Waveform Measurement
- DSA Close
- DSA Initialize

Configure Steps 1

- Step Configuration

visn_AMFM_Initialize_Config.vi

Please Sselect AMFM Source Initializing Parameters

AMFM Source Handle: FileGlobals.RadioSourceHan Browse...

Model Name: "NI-5671" Browse...

Resource Name: "rfuc" Browse...

Antenna Loss in dB: 1.5 Browse...






Reset?

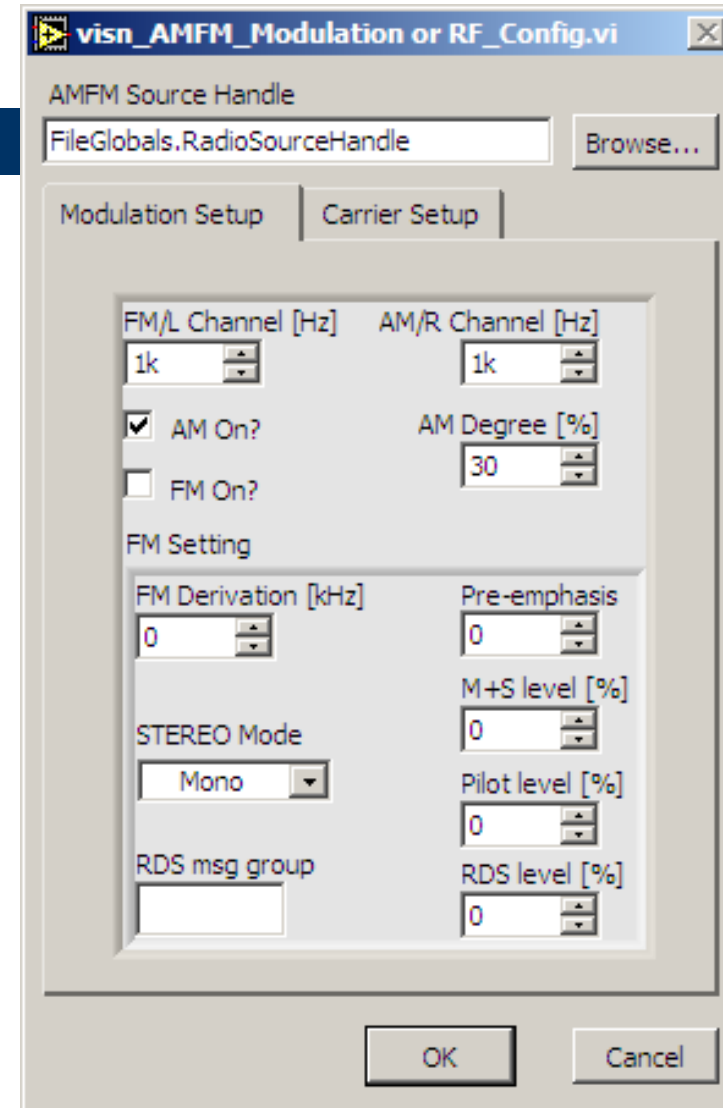
OK Cancel

Step	Description
Initialize DIO	Action, DIO_Initialize.
Select Radio Model	Action, RD4_Select M
Radio Source Initialize	Radio Model=NI-5671
Ini	Insert Step
<End	Configure AMFM Source Initialization Ctrl+E
	Specify Module... Ctrl+M

Configure Steps 2

- Step Configure

Step	Description
 AM DC Level Curve Learning	
 Set Source to AM 1.053M RF 58dBuV	Source=FileGlo
 Tuner	Insert Step
 Wait	
 Real-time	Configure AMFM Source Output Ctrl+E
	Specify Module... Ctrl+M



Adopt New Hardware

- Build Radio or Radio Source VIs
- Following Naming Guidelines
- Auto Adopt in TS

Generic Radio Control

RADIO 71	RADIO VISION	RADIO VISION	RADIO VISION	RADIO VISION	RADIO VISION	RADIO VISION
	Power	Tune	CD	Sound		
RADIO VISION	RADIO VISION	RADIO VISION	RADIO VISION			
Function	Property	Property	CMD debug			

359 Radio Control

Radio 359	Radio 359	Radio 359	Radio 359	Radio 359	Radio 359	Radio 359
	Power	Tune	CD	Sound		
Radio 359	Radio 359	Radio 359	RADIO 359			
Function	Property	Property	CMD debug			

Land Rover Radio Control

Radio LR	Radio LR	Radio LR	Radio LR	Radio LR	Radio LR	Radio LR
	Power	Tune	CD	Sound		
Radio LR	Radio LR	Radio LR	RADIO LR			
Function	Property	Property	SET IGNITION			

RD4 Radio Control

Radio RD4	Radio RD4	Radio RD4	Radio RD4	Radio RD4	Radio RD4	Radio RD4
	Power	Tune	CD	Sound		
Radio RD4	Radio RD4	Radio RD4	RADIO RD4			
Function	Property	Property	CTRL ENGINE			

Generic Radio Source

RFSG INIT	RFSG RESET	RFSG MOD	RFSG RF	RFSG CLOSE
INIT	RESET	MOD	RF	CLOSE

NI-5671 Radio Source

AM/FM 5671 Init	AM/FM 5671 Reset	AM/FM 5671 Mod	AM/FM 5671 RF	AM/FM 5671 Close
Init	Reset	Mod	RF	Close
AM/FM 5671 SIMPLE	AM/FM 5671 UPDATE			
EG 5671 SIMPLE	EG 5671 UPDATE			

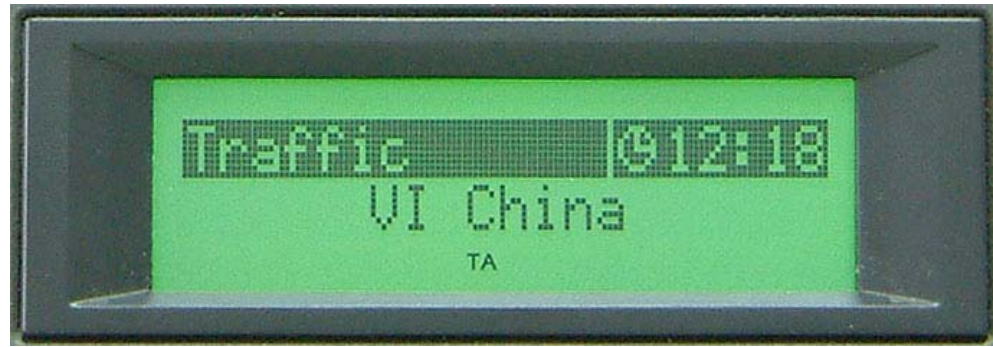
VP-8131 Radio Source

AM/FM 8131 Init	AM/FM 8131 Reset	AM/FM 8131 Mod	AM/FM 8131 RF	AM/FM 8131 Close
Init	Reset	Mod	RF	Close
AM/FM 8131 Any CMD				

VP-8194 Radio Source

AM/FM 8194 Init	AM/FM 8194 Reset	AM/FM 8194 Mod	AM/FM 8194 RF	AM/FM 8194 Close
Init	Reset	Mod	RF	Close
AM/FM 8194 Any CMD				

Success Story

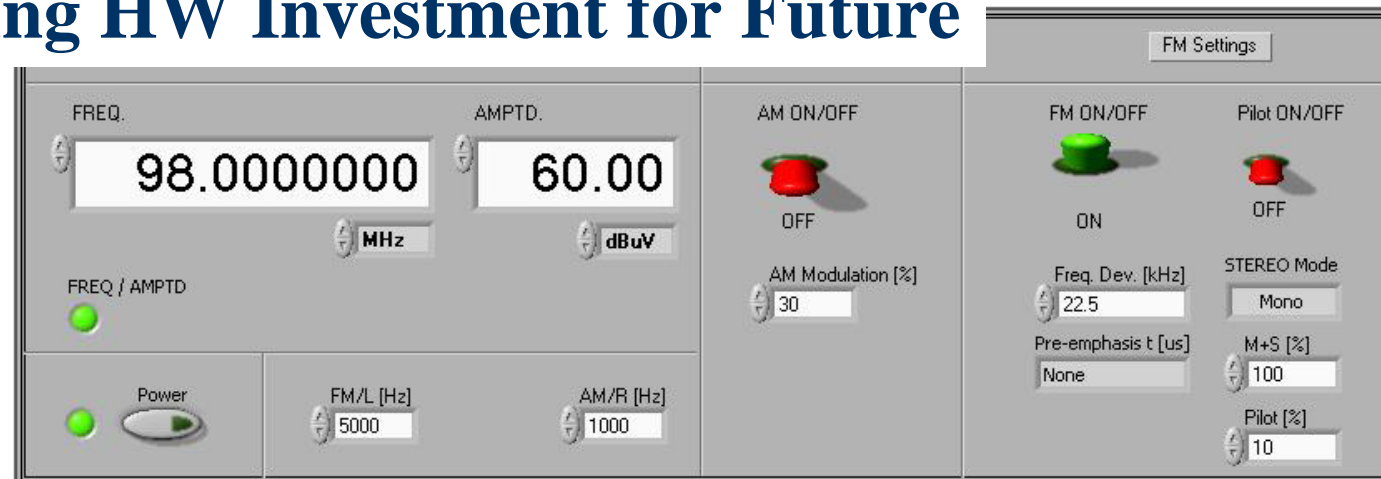


- Tuner Alignment and Test
 - 20+ systems for massive production and QA
 - PHILIPS TEA6845 / 6846 / 6848 tuners
- Radio Online and QA Functional Test
 - TL972 Standard
 - CAN Volcano and KWP2000 protocol
- Cluster Functional and Durability Test
 - CAN, Vision, Voltage and Current
- Future: Telematics, GPS, RF Sensor ...

Based on
Wireless Test Toolset

Stereo Radio RF Source

- Receiver / Radio / Tuner Test
- NI 5671
- AM, SSB, FM Mono, FM Stereo, RDS
- Protecting HW Investment for Future



多方合作框架



部分用户

Valeo
法雷奥

SIEMENS VDO
Automotive

NOKIA
CONNECTING PEOPLE



SHARP
..... be sharp

中国普天
CHINA PUTIAN

信威通信

ALCATEL
上海贝尔



DTT
大唐电信



通用电气公司

BYD 比亚迪股份有限公司

Contact Info

- E-mai: info@vi-china.com.cn
- 上海，曲阳路800号，商务大厦，1103
- 电话 021-6553 5066
- 传真 021-6554 2803
- 主页： www.vi-china.com.cn