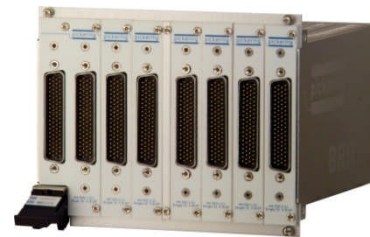
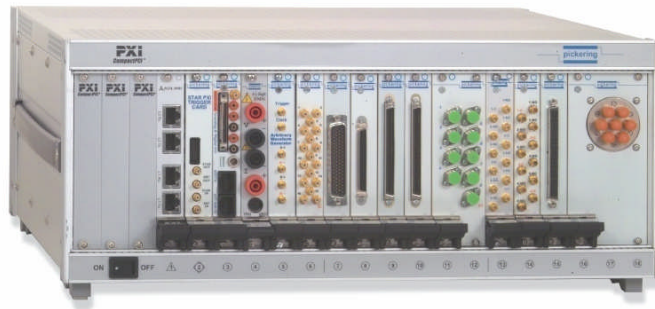


---

# PXI and Switching in Test

**Bob Stasonis**  
**Sales/Marketing Manager**  
**Pickering Interfaces**  
**Bob.stasonis@pickeringtest.com**



# *Switching isn't Wimpy Any More!*

---

- **Early PXI**
  - **General Purpose Switching**
  - **Few MHz RF**
  - **No Microwave**
  - **Limited Selection**
- **Fast Forward to 2008**
  - **Lots of Choices**
  - **Bandwidth from DC to Light**
  - **Unimagined Densities**
  - **New Technologies**



# ***PXI as a switching platform***

---

- **Companies Are Committed To PXI Switching**
- **PXI Interface Costs Are Reasonably Low**
  - **Lower than VXI**
- **Many Modules Are Available**
  - **More than 500 from Pickering alone**
- **Switching Density Achieved Is High**
  - **Up to 558 crosspoints in a single width module**

# Density

---

- **Low Level Signaling**

- **Up to 558 Relays**
  - Reed Relays
  - Surface Mount Relays

- **RF**

- **Up to 3 GHz**
- **Up to 16 to 1 in multiplexers**
  - Better RF characteristics of new board bases
  - Smaller connectors (SMB, MCX, etc.)

- **Microwave**

- **Up to 65 GHz!**
- **Up to three 6 to 1 muxes in two slots**
  - Newer technology relays



# Power

---

- **Solid State Relays**
  - MOSFET technology
  - Up to 30 AMPS @ 40 Volts
  - Up to 10 AMPS @ 200 Volts
- **Standard EM Relays - 2 Channels**
- **Solid State – 6 Channels!**



# Voltage & Special Functions

- **Up to 1000 Volts**
  - Improved board base
  - Better relay technology
- **Sensor Emulation**
  - Resistor ladders
  - Precision resistor designs
  - RTD simulation
  - Thermocouple simulation
- **Fiber Optic Switching**
  - Telecom
  - Automotive



# *Specific Example – Software Defined Radio*

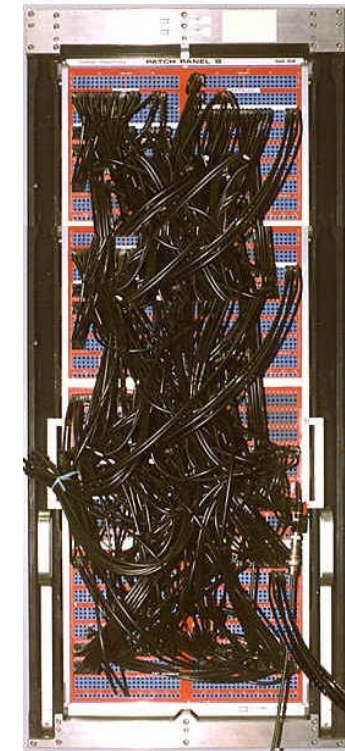
---

- **Military Communications**
- **Asynchronous test of up to 5 Radios**
- **Multiple Switch Requirements**
  - **DC Power**
  - **RF**
  - **Audio**
  - **USB**
- **Multiple Instrumentation Requirements**
- **PXI Best Solution**



# Specific Example – FADEC Test

- Full Authority Digital Engine Control
  - Engine Control for Jet Engines
- Complex Switching Requirements
  - Fault Insertion
    - Originally a manual operation (Patch Panel)
  - Medium Power Switching
- Additional Instrumentation
  - ARINC
  - MIL-STD 1553
- PXI Used Because of Complexity of switching & Instrumentation



# Going Forward

---

- “More, more, more....”
  - Density
  - Bandwidth
  - Power
- Holdbacks
  - Available connectors for 3U PXI
    - 6U minimizes this issue
  - Tighter specs
    - Mechanical relays and crosstalk
    - Limited range of SSRs
    - Ever Higher Bandwidth
  - Increased Functionality
  - Lower Test Co\$t\$

■ *All will be resolved in time*

# Switching Questions to Ask

---

- **Specs**
  - Voltage, current, frequency
  - Hot or cold switching (a.k.a., Switch and Carry Current)
  - Power
- **Application Needs**
  - Cross point matrix, multiplexer, simple switch
- **DUT Parameters**
  - # of test points, access, etc.
  - Fiber Type, Bandwidth, VSWR, Insertion loss, etc.
- **Relay Types**
  - **Reed Relays**
    - High Reliability, Low Thermal EMF
    - Higher cost, lower hot switch specs
  - **EMR – Electro-Mechanical Relays**
    - Higher current/hot switch specs, lowest cost
    - Shorter life, higher thermal EMF
  - **Solid State**
    - Virtually unlimited life, no switch bounce
    - Bandwidth and voltage limitations



# *Summary*

---

- **PXI - well suited to switching applications**
  - **Many Vendors**
  - **Lots of choices for many applications**
  - **New technology expanding possibilities**
  - **Hurdles in future, but they will be addressed**