NSTX-U
Grounding & PCS
• McBride Switch
NSTX CAT. 2 DIAG. GND. BUS
OTHER GROUNDS PROHIBITED
CTC-EE-436
CATEGORY 2
N404
CATEGORY 1 & 2 CABLES
Ground Fault Monitor
Analog Links

- 25kHz bandwidth
- ±10V
- ≈1km fiber length
Real Time Control
Hardware
Front Panel Data Port (FPDP)

- 32 bit parallel data path
- Uni-directional
- 40MHz clock rate
- No addressing
- 80 wire cable
- Multi-drop
Serial FPDP

- FPDP over fiber-optic links
- Over 10km on single mode fiber
- The “Systran”
Control Computers

- Redundant Computers
- One system live
- One system hot spare/development
- Both receive live inputs
Rear of control computer
Systran

• Front Panel Data Port (FPDP) to fiber optic
• Fiber optic to FPDP
Timing Module

- Provides common clock signal to all modules
- 5,000 Hz during shot
FPDP Input Mux Module 
FIMM

- 1024 Word FIFO on each input
- Four inputs to one output
- Status to EPICS
  PC60 directory
  PC62 input status
  PC63 output status
  PC64 GIS status
Merlin Digitizer

- All but 2 replaced by SADs
- Require VME based computer for operation
Stand Alone Digitizer SAD

- 32 Analog Inputs
- ±10 volt input range
- 14 bit output padded to 16 bits
Stand Alone Digitizer Mark 2

- Improved version of SAD
- Multiple Units supported
- 50kHz capable
Digital Input & Time Stamp
DITS

- 32 bit digital input
- 48 bit 1µsec time stamp per read
- Block count
- Unique bit pattern
FPDP Output Module, Digital FOMD

- Four 16 bit outputs
- Drives Opto22 boards directly
- Optional opto-isolator outputs
Opto22 interface board
FPDP Output Module, Analog FOMA

- Eight analog outputs
- 14 bit resolution
- Output range selectable on per channel basis:
  ±10.24 volts
  0 to 10.24 volts
FPDP Output Module – Serial FOMS

• Interface from FPDP to power supply control modules
• Eight links per module
• Each Transrex uses 2 links
• Each SPA sub-unit uses 1 link
One lane signal path
Automatic Latency Test
Junction Area Crate
CAT 4 crate
CAT 3 crate
RF crate
Gas Injection Crate
SPA crate
138’ level crate & NB control
Four lane signal path