Status of DORIC Test System

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November 29, 1999
ATLAS Pixel Week

Outline of Talk

- Introduction
- Fixed Data Pattern Testing
- Pseudo-random Data Pattern Testing
- Quick Look of DORIC-P

Introduction

- **DORIC-4A**
  - ◇ radiation-tolerance chip (AMS) designed for SCT to decode bi-phase masked clock, i.e. clock with command data encoded
- **DORIC-P**
  - ◇ radiation-hard version of DORIC-4A designed by OSU/Seigen for Pixel detector and fabricated using DMILL
- **Two test systems are setup at OSU and tested on DORIC-4A**
  - ◇ Fix Data Pattern Testing
  - ◇ Pseudo-random Data Pattern Testing

Fixed Data Pattern Testing

- **test extraction of clock encoded with a small, fixed pattern of data (1's) that repeats every 128 clock cycles**
- **bi-phased marked clock generated using a Rutherford board**
- **interface board built at OSU**
- **use 40-pin DIL chip carrier for wire bonding to die**
- **tested on DORIC-4A**
  - → no error up to 10^{12} pulses (night testing)

Pseudo-random Data Pattern Testing

- **test extraction of clock encoded with pseudo-random pattern of data**
- **built a board at OSU with Xilink chip (4003)**
- **use program code of Seigen to program Xilink to generate 15 (= 2^4 - 1) bits pseudo-random data**
- **use same interface board and die carrier as fixed data pattern testing**
- **tested on DORIC-4A**
  $\rightarrow$ no error up to 10^{12} pulses (night testing)
- **modified program code to generate pseudo-random data that repeat after $4.3 \times 10^9 (= 2^{32} - 1)$ clock cycles (2 minutes at 40 MHz)**
  $\rightarrow$ no error up to 10^{12} pulses (night testing)
- **modified program code to generate pseudo-random data that repeat after $1.8 \times 10^{19} (= 2^{64} - 1)$ clock cycles (15 thousand years)**
  $\rightarrow$ not yet tested

Quick Look on DORIC-P

- **received 6 DORIC-P die**
- **wire bonded two die using 40-pin DIL die carrier**
- **both die oscillate**
- **both die extracted clock at half frequency (20 MHz)**
- **no time for extensive investigation**

  → hope is trivia mistake in testing...