SEU radiation test results for SDX-19-4-1-S Optical Receivers

Test date: July 31st 2004

Mass General Hospital Proton radiation therapy unit, Boston, MA

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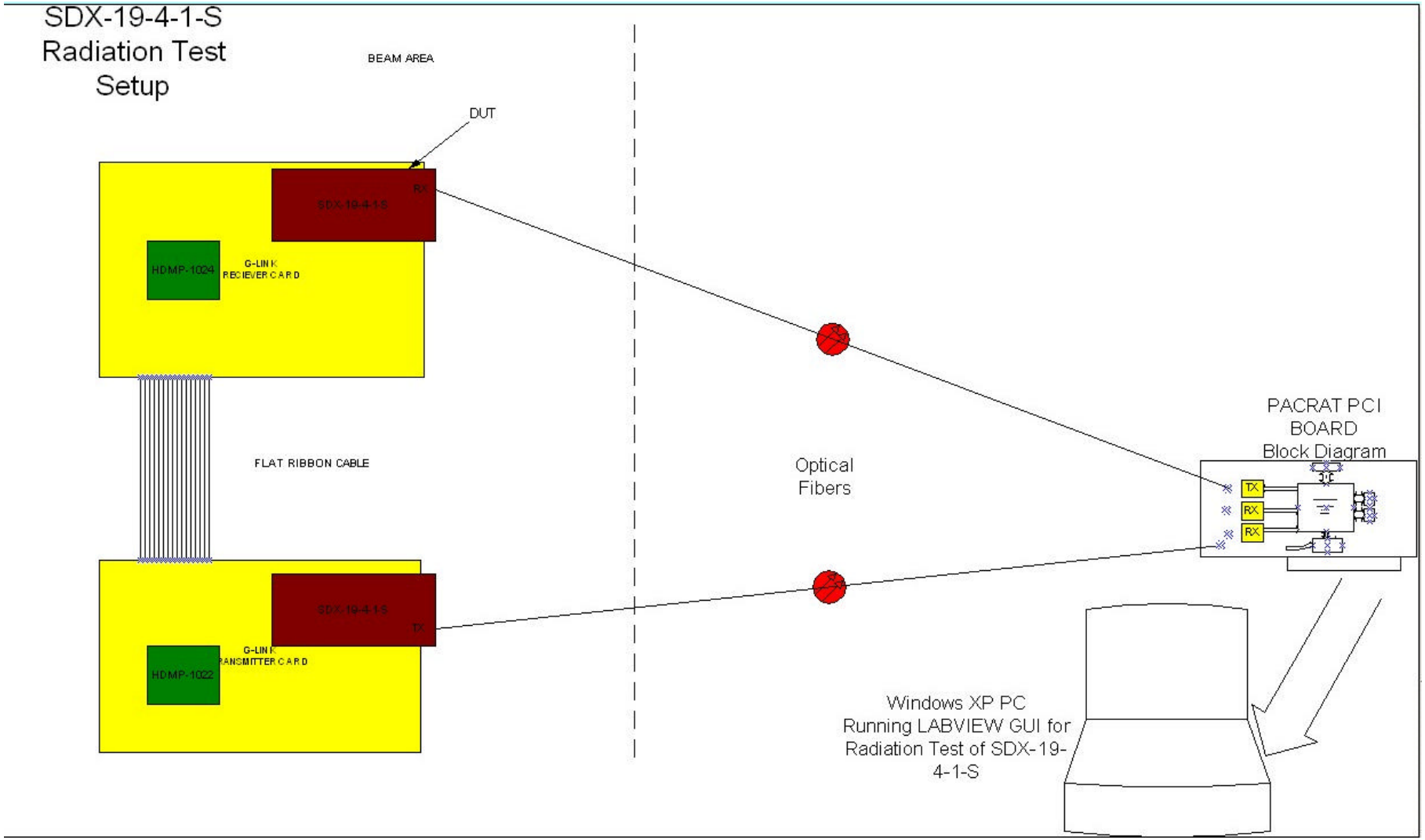
Test Setup


SDX-19-4-1-S
Radiation Test
Setup
BEAM AREA
DUT
RX
SDX-19-4-1-S
HDMP-1024
G-LINK
RECIEVER CARD
FLAT RIBBON CABLE
Optical
Fibers
PACRAT PCI
BOARD
Block Diagram
TX
RX
RX
SDX-19-4-1-S
TX
HDMP-1022
G-LINK
TRANSMITTER CARD
Windows XP PC
Running LABVIEW GUI for
Radiation Test of SDX-19-
4-1-S

Test details

- Test conducted at MGH July 31st 2004.
- Beam Parameters:
  - Energy: 225MeV
  - Calibration: Faraday Cup
- 3 devices tested for SEE
- Stack of 4 devices irradiated for TID. Devices left to cool off at MGH. Expected back this month.
- Device IDs:
  - RX4, RX3, RX1

Radiation levels CSC vs LAr

TEST	SRL	RTC Pre-sel.	RTC Qual.
TID (KRad/10years)	24.3	850.5	425.3
	5	170	87.5
NIEL (1 MeV eq n.cm^{-2}/10years)	7.1×10^{12}	7.1×10^{13}	3.55×10^{13}
	1.6×10^{12}	1.6×10^{13}	8.0×10^{12}
SEE/SEU (>20 MeV h.cm^{-2}/10years)	1.52×10^{12}	1.52×10^{13}	7.6×10^{12}
	7.7×10^{11}	7.7×10^{12}	3.8×10^{12}

RTC for CSCs

TEST	SRL	RTC Pre-sel.	RTC Qual.
TID (KRad/10years)	24.3	850.5	425.3
NIEL (1 MeV eq $n.cm^{-2}$/10years)	7.1×10^{12}	7.1×10^{13}	3.55×10^{13}
SEE/SEU (>20 MeV $h.cm^{-2}$/10years)	1.52×10^{12}	1.52×10^{13}	7.6×10^{12}

SEE Test Results

SDX-19-4-1-S OPTICAL RECIEVER RADIATION TEST RESULTS								
DEVICE ID	Flux pt/cm2.sec	TOTAL FLUENCE in pt/cm2	TOTAL BIT ERROR	LINK UP TIME Sec	LINK DOWN TIME Sec	Extrapolated Atlas bit error rate /sec	Total Run time (min)	Total Loss of locks
RX4	2.58E+10	3.59E+13	22041	1382.94	8.1241313	6.99E-05	23.18	1625
RX3	2.39E+10	3.60E+13	10189	1504.99	3.8745988	3.23E-05	25.15	775
RX1	2.74E+10	3.6E+13	17804	1307.74	6.04935955	5.65E-05	21.90	1210