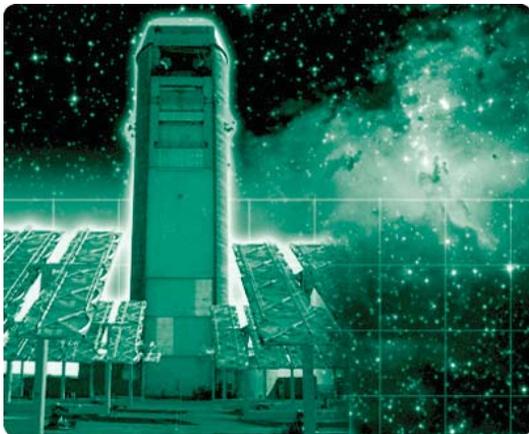




Application Overview

The story of astronomy has been largely one of extending mankind's ability to observe the universe using an ever expanding portion of the electromagnetic (EM) spectrum. The development of radio astronomy enabled astronomers to identify galactic collisions and remnants of exploding stars that visible observations only hinted at, or missed entirely. One of the most exciting, recent developments in astronomy has been the emerging ability to observe gamma rays, which occupy the highest energy reaches of the EM spectrum. The study of Cherenkov radiation (produced when gamma rays are absorbed high in the earth's atmosphere) has allowed ground based astronomers to open a new window in the electromagnetic observation spectrum. Cherenkov radiation is faint and brief (lasting only a few nanoseconds), and sensitive electronics are needed to detect it and to determine the direction from which the gamma rays originated.



Using Digitizer Technology in Gamma Ray Telescopes

The Study of Cherenkov Radiation by Ground Based Observatories

Solution Description

- U1063A, 8-bit, 4 channel, 250 MHz, 1 GS/s, cPCI digitizer.
- U1064A, 8-bit, 4 channel, 1 GHz, 1-4 GS/s, cPCI digitizer.
- U1065A, 10-bit, 4 channel, 2 GHz, 2-8 GS/s, cPCI digitizer.

Key Features and Added Value

- High channel density with fast 1 GHz sampling rate opens new possibilities for detecting Cherenkov radiation.
- Channel synchronization and rapid data transfer enables cross channel measurements to be made more quickly and with greater precision than with conventional testing systems.
- The ability to control the data acquisition hardware under a RTLinux operating system improves data throughput and minimizes data loss.
- Memory segmentation assists minimizing digitizer dead time and helps to improve data collection efficiency.

Key Requirements

- The ability to synchronize multiple data acquisition channels, to collect the data and transfer it at high speed (up to 100 Mbytes/s) to a PC for processing.
- Typical systems involve 50 or more channels. We have the best solutions for multi-channel applications as we can provide unique hardware (smaller size and lower power) and software capabilities (support for Linux, VxWorks and AcqirisMAQS, a dedicated multi-channel software program).

Resources

- U1063A, 8-bit, cPCI digitizer brochure: <http://cp.literature.agilent.com/litweb/pdf/5989-7470EN.pdf>
- U1064A, 8-bit, cPCI digitizer brochure: <http://cp.literature.agilent.com/litweb/pdf/5989-7444EN.pdf>
- U1065A, 10-bit, cPCI digitizer brochure: <http://cp.literature.agilent.com/litweb/pdf/5989-7443EN.pdf>
- Article "Astronomy Probing Deep Space": <http://cp.literature.agilent.com/litweb/pdf/5989-7125EN.pdf>
- Data Converter product selection guide: <http://cp.literature.agilent.com/litweb/pdf/5989-8038EN.pdf>
- Digitizers website: www.agilent.com/find/embedded-digitizers

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