

Use of List-Mode Data Acquisition Systems for Performing Benchmark Subcritical Neutron Measurements

**William L. Myers, Gaetano J. Arnone, and Sheila G. Melton
Advanced Nuclear Technology Group (N-2)
Los Alamos National Laboratory
PO Box 1663, MS B228, Los Alamos, New Mexico 87545 USA.
bmyers@lanl.gov**

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What is List-mode Data Acquisition?

Recording a data set that can include the following information for each detection event:

Timing information

Channel number

Pulse height information

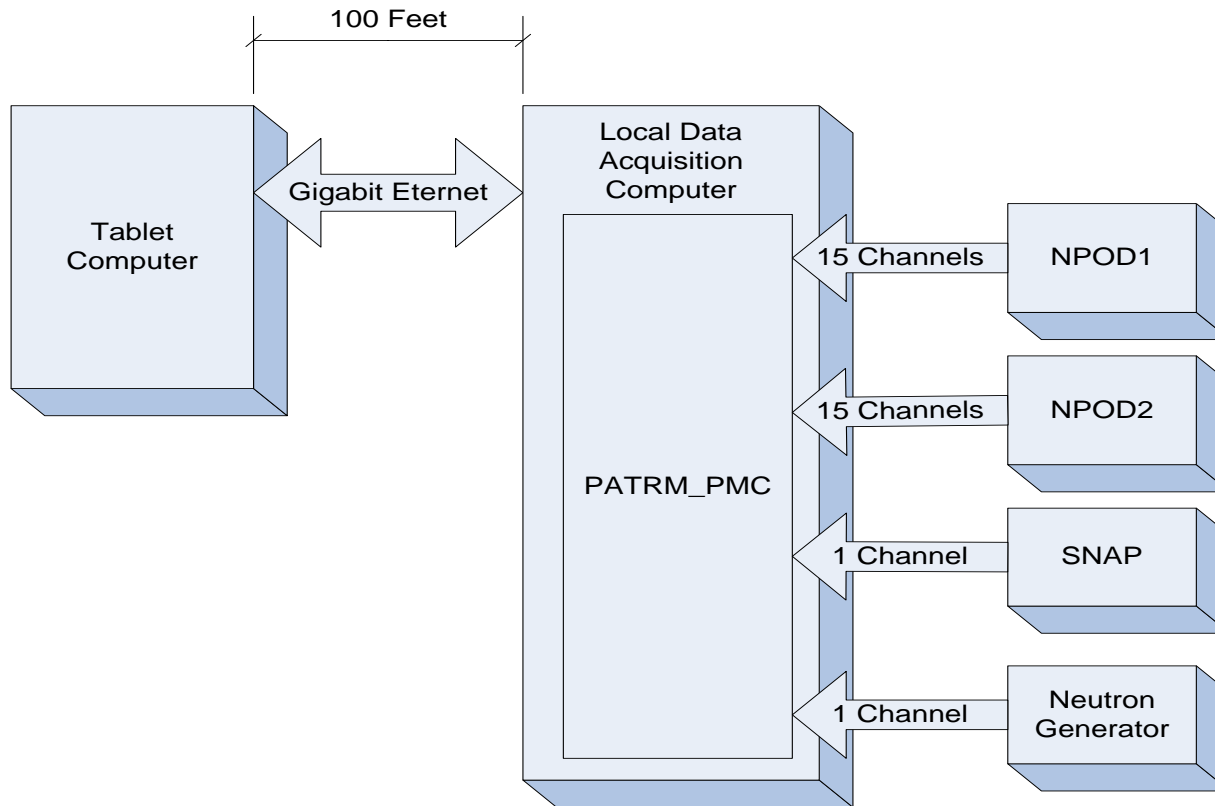
Particle type

Etc.

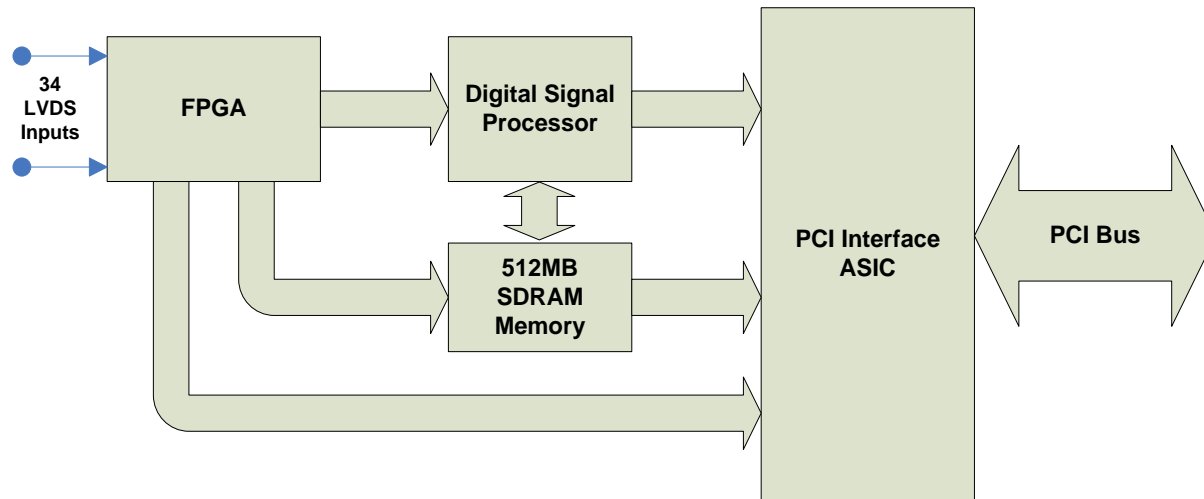
Data List allows different software algorithms to process the data.

Original Data stream is kept intact.

DAQ System Block Diagram



Basic Block Diagram of the PATRM/PMC Card Design



Basic design can be engineered to just about any form factor.

PATRM_PMC Photograph



Labview Based Control Interface

PATRIK NPOD MAIN

Ch	NPOD1	Ch
0	0	0
1	0	1
2	0	2
3	0	3
4	0	4
5	0	5
6	0	6
7	0	7
8	0	8
9	0	9
10	0	10
11	0	11
12	0	12
13	0	13
14	0	14

NPOD2

Ch	
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0
26	16384
27	0
28	0
29	0
30	0
31	0

Veto In
Snap In

NPOD1 Sum: 0
NPOD2 Sum: 16384
Hit Counter: 0

Ch: 34 Frequency: 0

Enable Acquisition

Passive Mode
Active Mode

Quit

Veto Timeout (microsec): 800
Generator Frequency (Hz): 50
TMC Clock Period (ms): 200
Acquisition Time: 0

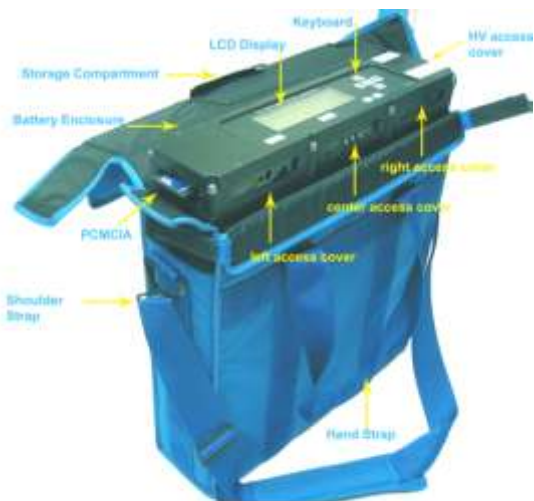
Run Number: 0
Hit Count: 0

Data File Written

Enable Diagnostics

control0 = 129 status0 = 0 control1 = 0 status1 = 0 /

Real World verses Modeling Domain



Neutron Multiplication Pod III



Environmental effects

Comparison of Results

Experimental List to Computed List Comparison

Use of Inference Models

Use of Computed Keff

How does “Benchmark” community best utilize these techniques for the evaluation process?