Advantech AE Technical Share Document

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Category	■ FAQ □ SOP	**Related OS**	NA
Abstract	StreamingAI Setting Parameters in Advantech DAQNavi framework		
Keyword	Analog Input, StreamingAI, bufferedAI, DAQNavi		
Related Product	PCI-1706, PCI-1710U/UL, PCI-1711, PCI-1712, PCI-1713, PCI-1714U/UL, PCI-1715U, PCI-1716, PCI-1718, PCI-1741U, PCI-1742U, PCI-1747U, PCIE-1802, PCIE-1810, PCIE-1816/H, PCIE-1840, USB-4702, USB-4704, USB-4711A , USB-4716, PCM-3718H, PCM-3718HG, PCM-3718HO		

For high-speed, rapid data acquisition, it's impossible to let the computer run really fast using a while or for loop. This should take more CPU loading and the efficiency is limited because of the limitation on operating system. To access high-speed data acquisition, we should use StreamingAI instead.

The data flow process of StreamingAI could be separate into several parts:
The board acquires and saves the data to the on-board FIFO (first-in-first-out memory) and then move FIFO data to system memory as the FIFO is filled to a set level through DMA (direct memory access) or system interrupt. The system memory is a specific piece of memory that is allocated by DAQNavi device driver with the parameters *Samples* and *Interval Count* for DAQNavi 3.0, or *Section Length* and *Section Count* in DAQNavi 4.0. The parameter *Samples* is the overall software FIFO size which is divided into several pieces by interval count. Interval Count is a parameter to determine when the system interrupt would be generated. Every time the system interrupt is generated, a call-back function of DataReady event would be invoked and then user could use the method GetData to copy the data back from DAQNavi memory to user program. The following figure describes this architecture.

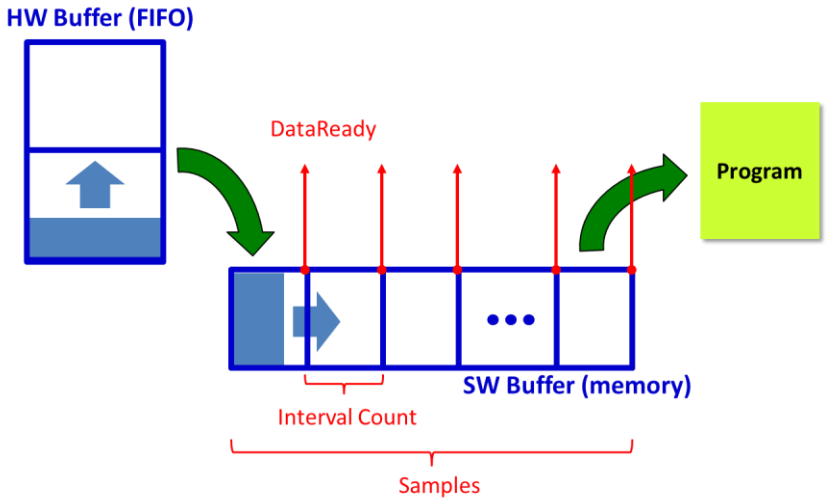

Fig. 1 DAQNavi 3.0 BufferedAI Memory Architecture

In DAQNavi 4.0, we use *Section Length* and *Section Count* to describe the relation between Interval Count and Samples we used to describe in DAQNavi 3.0. The Section Length is an equal term as Interval Count and Section Count is the count of interval count. The concept is similar and can be described as the formula below:

$$\text{Samples} = (\text{Section Length}) \times (\text{Section Count})$$

The application of setting the buffer parameter is to determine how often the user would like to get the data back or moreover to do some calculation further. The following table explains the relations among these parameters by several examples.

	Interval count	Samples	Sampling Rate(S/s)	DataReady Count per second	Time Interval between interrupts(s)	Data Count using One-buffer mode
Example1	1000	2000	1000	1	1	2000
Example2	1000	5000	5000	5	0.2	5000
Example3	1000	1000	2000	2	0.5	1000

Table1. Example for different parameter setting

The Samples could be set much larger to prevent Overrun event which is generated as the SW FIFO data is overwritten from happening.

Reference:

For more information, please launch the website:

Advantech Support Portal
http://support.advantech.com.tw/support/new_default.aspx

Adam Forum
http://forum.adamcommunity.com/forumdisplay.php?fid=279

What does interval count mean? And what is the recommended value?
http://forum.adamcommunity.com/viewthread.php?tid=95275&extra=page%3D1