# *The MotionMonitor xGen Software Guide: Synchronizing Pulses*

The MotionMonitor xGen uses several methods to synchronize data. These methods differ depending on the characteristics of the device and the type of interface used by the device. In this article, methods that rely on providing a pulse signal or an event trigger to the data series are evaluated.

The simplest example are two devices that are collected at the Same measurement rate of 1 sample per time period. Even though both devices are sampled at the same rate it does not follow that the samples occur at precisely the same point in time.
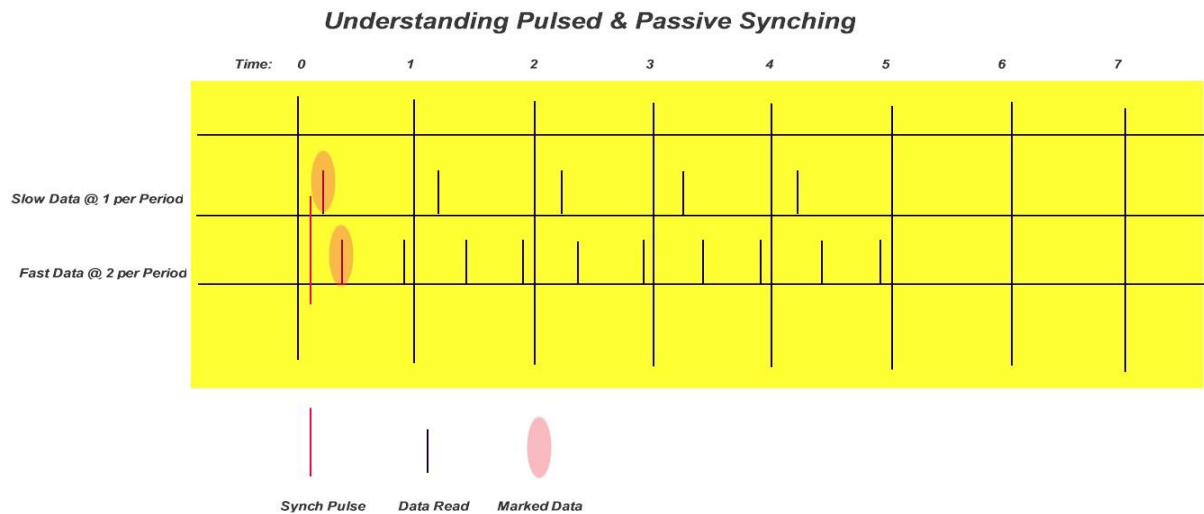
This diagram might represent a typical situation showing how a passive or independent event is used to mark two data elements for alignment.
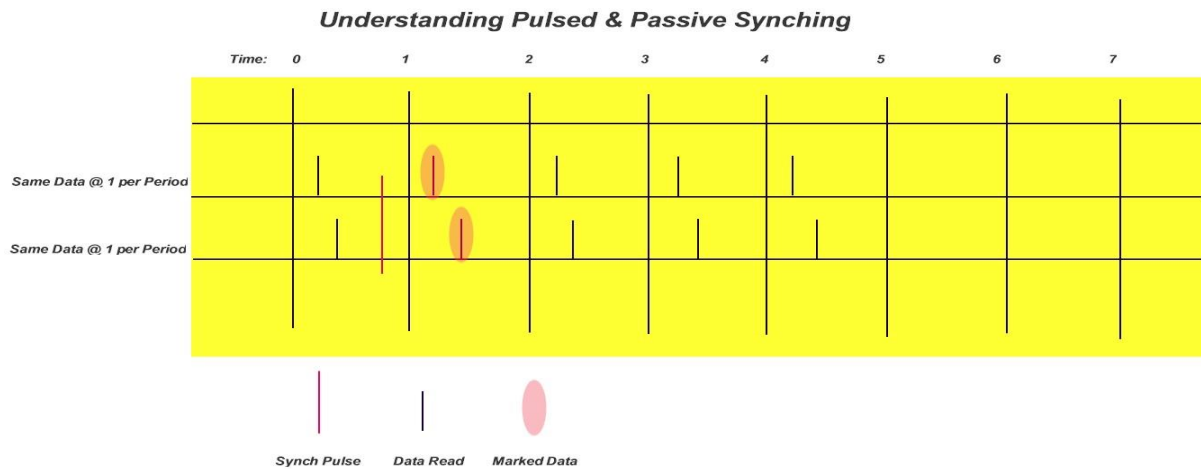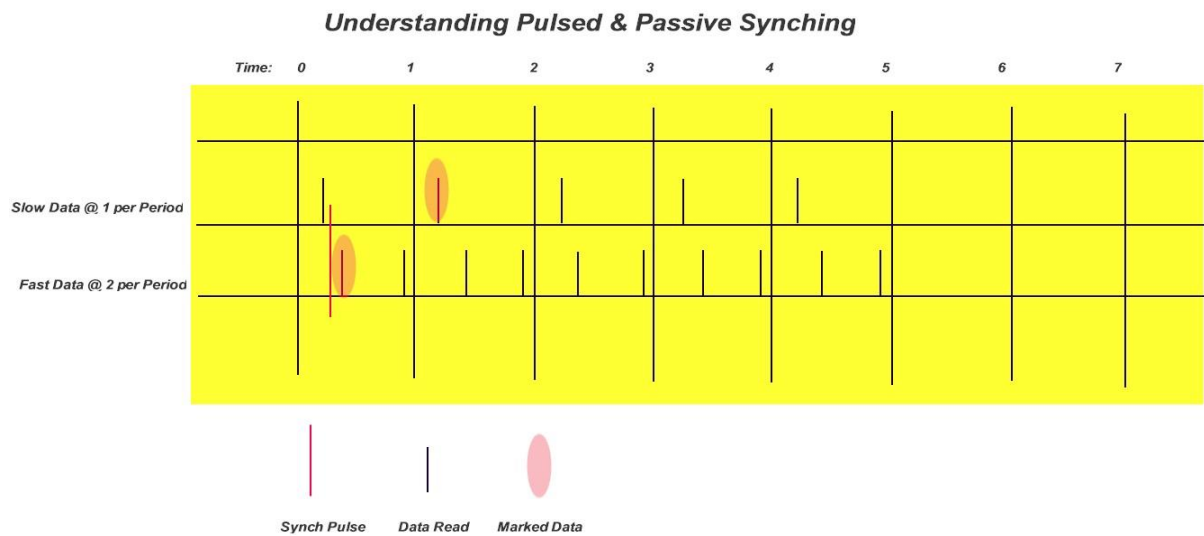

This diagram shows how the data would be aligned if the pulse occurred between the two readings. It demonstrates that marked data could be nearly one time period apart.
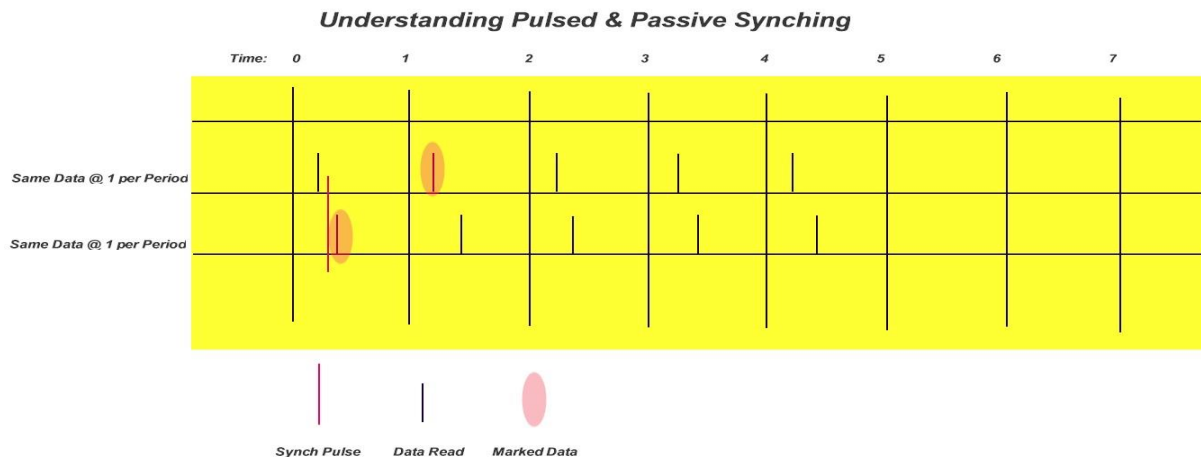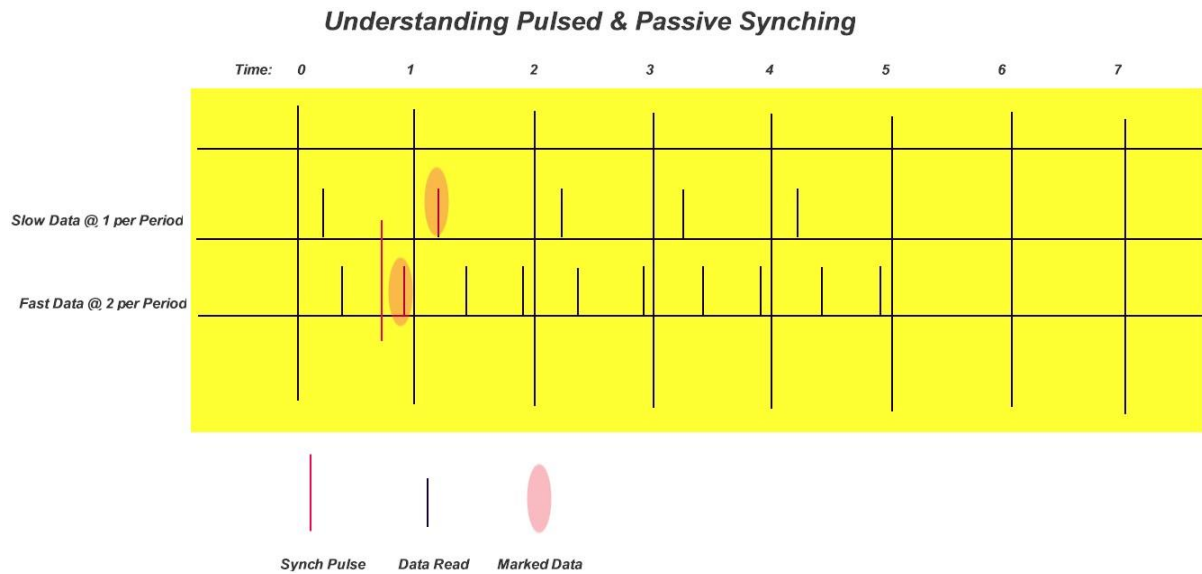
This diagram demonstrates an example of two data streams collected at different measurement rates. In the Slow Data stream, 1 sample is collected per period while the Fast Data is 2 samples per period.
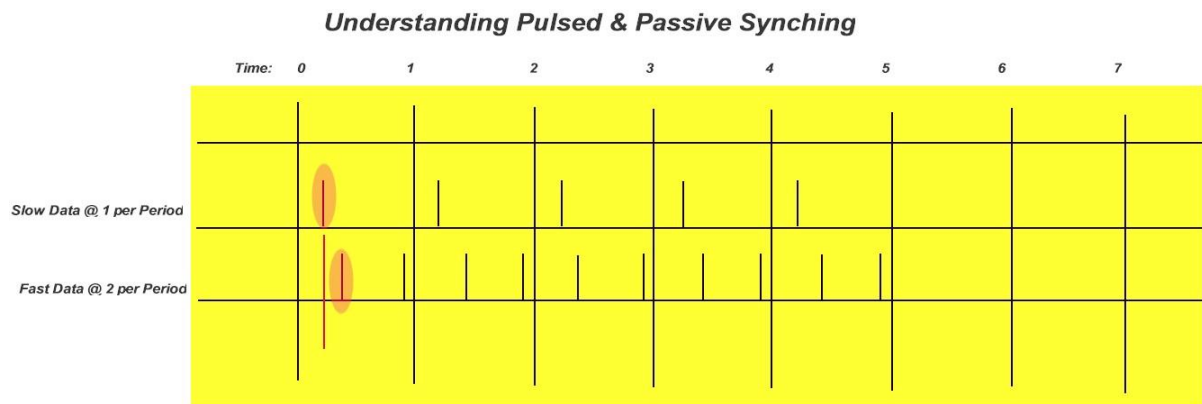
Understanding Pulsed & Passive Synching

Time: 0 1 2 3 4 5 6 7

Slow Data @ 1 per Period

Fast Data @ 2 per Period

Synch Pulse   Data Read   Marked Data

This diagram demonstrates an example where the event mark occurs between two readings with the separation in real time being almost a whole period.

Understanding Pulsed & Passive Synching

Time: 0 1 2 3 4 5 6 7

Slow Data @ 1 per Period

Fast Data @ 2 per Period

Synch Pulse   Data Read   Marked Data

This diagram demonstrates another example of alignment.

The examples above describe the use of an independent trigger or "passive" event marker to align two data sources. It is also possible to use active synching where one of the devices generates a physical pulse that is used to mark both data streams. The accuracy of alignment will depend on which device is used to trigger the device. When the Slow device generates the signal, it ensures that the next Fast sample is marked. And the higher the sampling rate of the Fast Data, the closer the two data series will be in true time.

In this example, the Fast device is generating the signal and it demonstrates that the signals could be almost one period apart in real time

Understanding Pulsed & Passive Synching
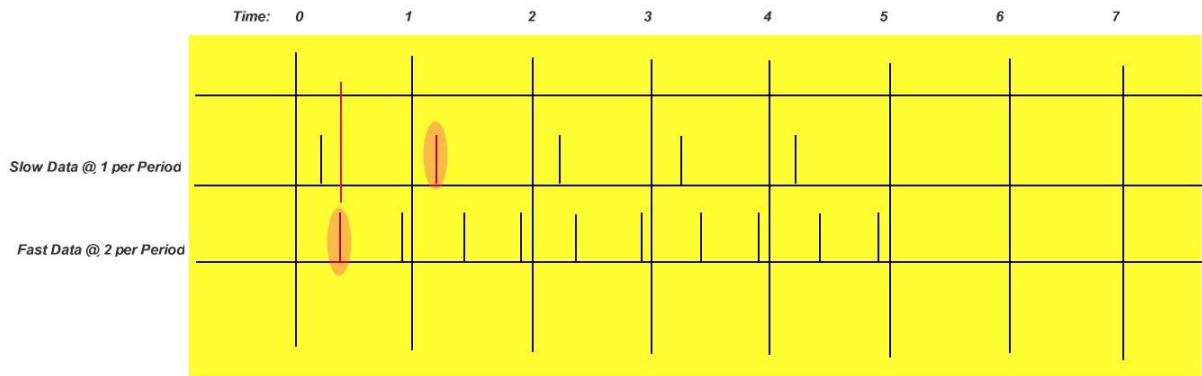
These examples would suggest that best practices would require active pulsing generated by the slowest data series when precise alignment of data is important to the study.