

Raw Mode measurements in the upgraded Main Injector BPM System

A raw mode measurement can be triggered from either I44 or I43. This document will discuss both methods.

Raw Mode from I44

If an acquisition specification contains a raw mode measurement that is enabled, the front end will only take the raw mode measurement. All the other measurements that are in the acquisition specification will be ignored.

The raw mode measurement can be triggered off of BES, or any MI or RR beam sync. A pretrigger delay in turns as well as a half bucket delay can be specified in I44 (figure 1).

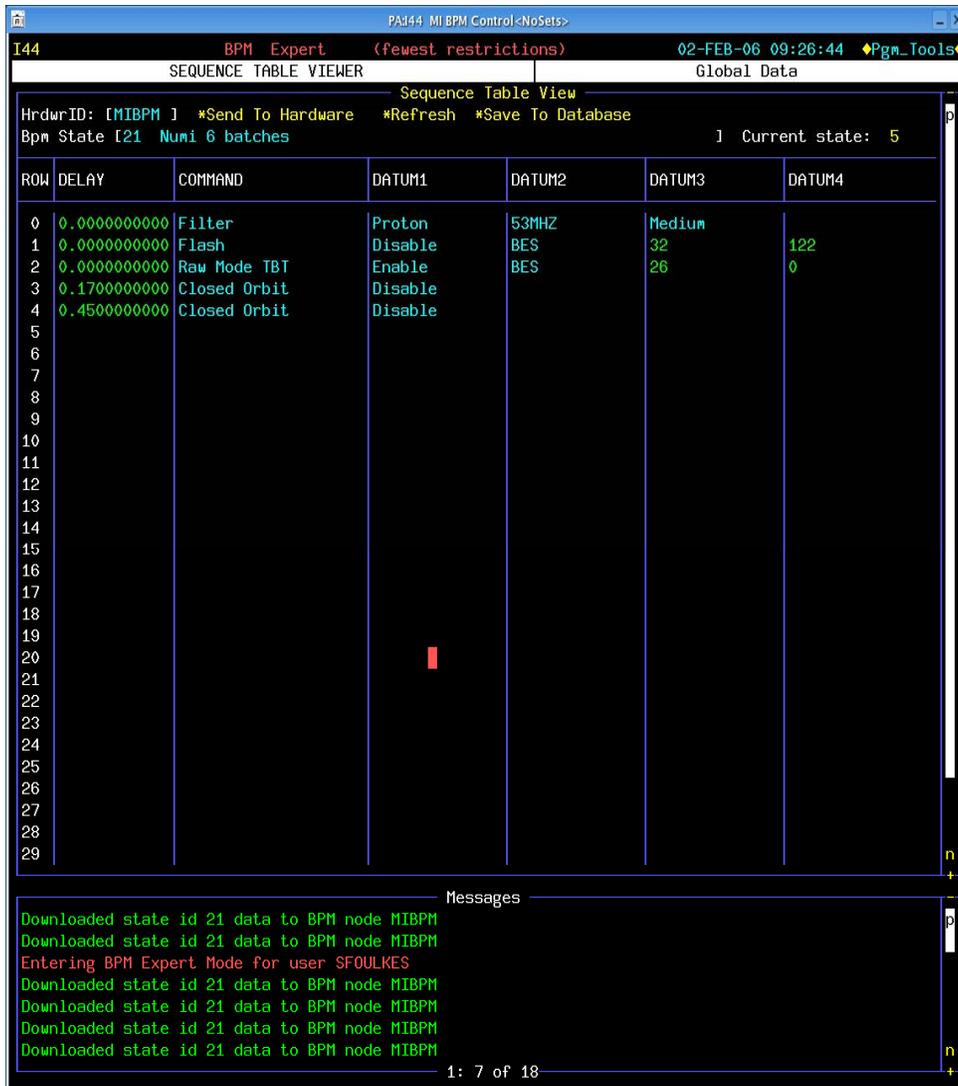


Figure 1 - I44 Setup to take a raw mode measurement on state 21, triggered off of a BES with a delay of 26 turns.

The front end only has one raw mode buffer. The buffer is only overwritten when a raw mode measurement is taken.

Raw Mode From I43

It is preferable to run raw mode from I43 as you can turn it on for the specific house you are interested in. The other houses will not be affected. Raw mode is configured through the acquisition specification box (figure 2).

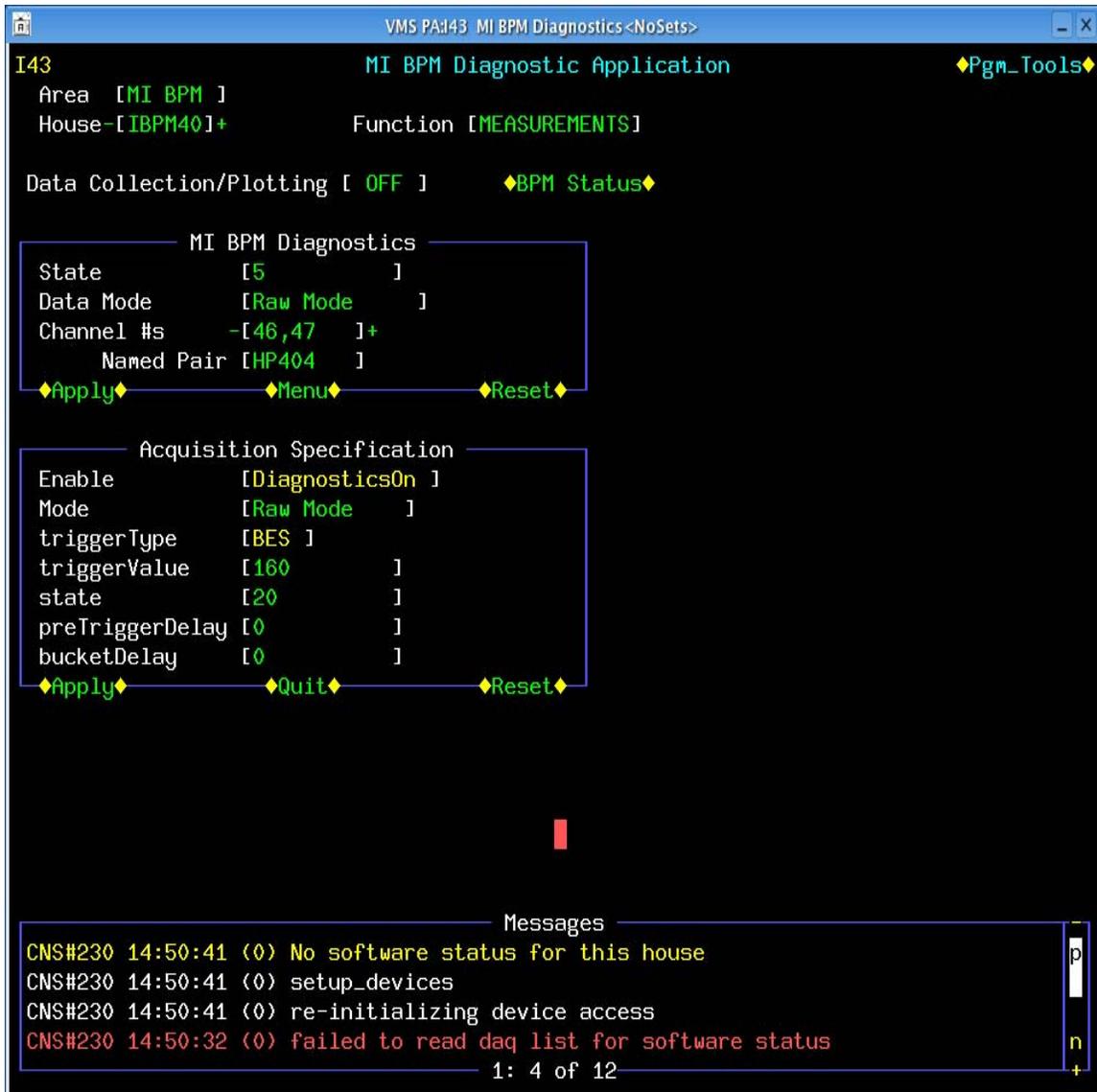


Figure 2 – Raw mode parameters are entered into the Acquisition Specification box.

To enable raw mode, set Enable to be DiagnosticsOn and Mode to be Raw Mode. The trigger type can be either BES, MIBS or RRBS. The trigger value field holds the value of the beamsync you are triggering on **in decimal**. For example, to trigger off the 0xDA beam sync you would change triggerType to MIBS and enter 218 in the triggerValue field.

The state field is the MDAT state in which the raw mode measurement will be taken. preTriggerDelay is the number of turns after the trigger to wait before sampling begins. This is useful when taking a raw mode measurement triggered off the BES, as beam does not show up for ~28 turns after the trigger. bucketDelay is the number of half buckets the timing card will wait after the trigger to begin sampling.

After entering in the appropriate parameters, hit Apply.

Reading Out Raw Mode Data Through I43

The acquired raw mode data can be read out through I43 (figure 3). In the MI BPM Diagnostics box, the data mode must be calibration. After the appropriate channel has been selected, hit apply to send the information down to the front end.

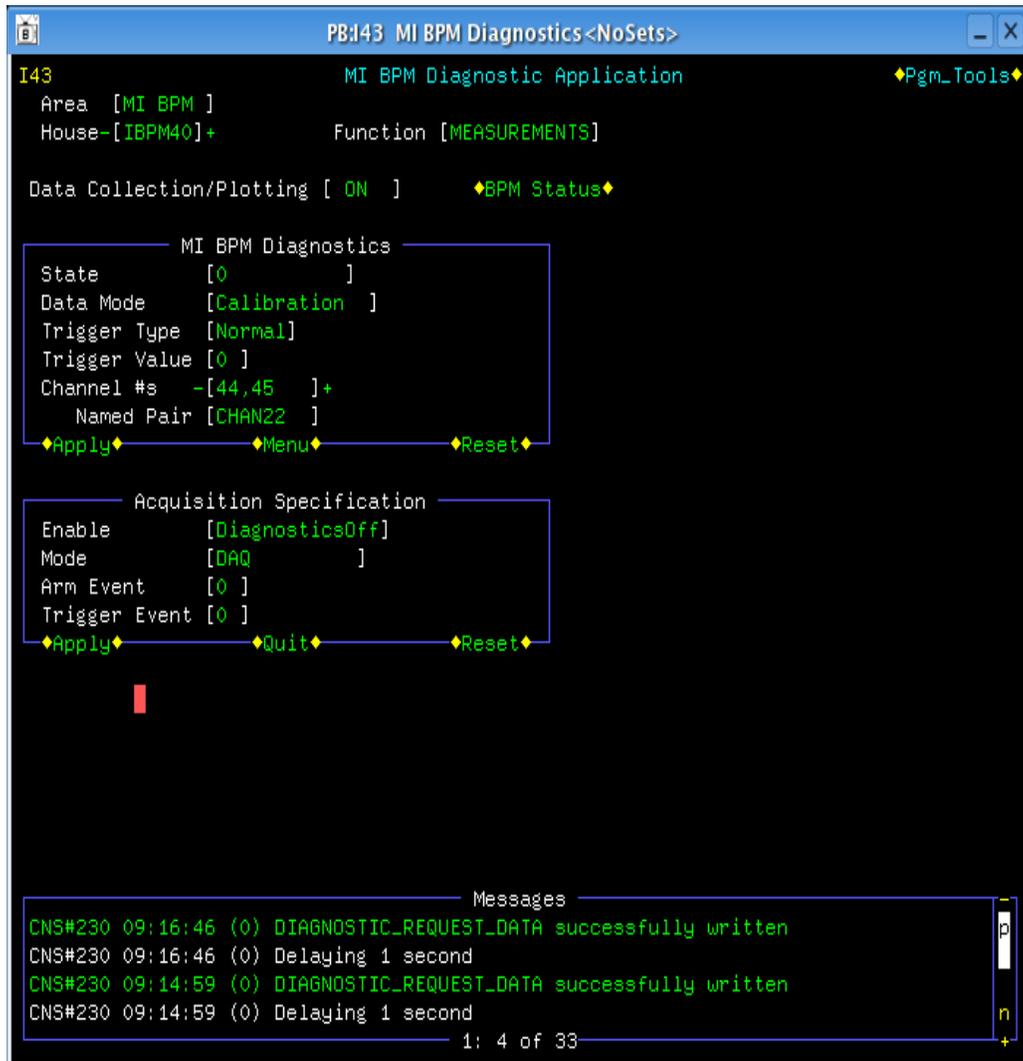


Figure 3 - I43 Setup to readout raw mode data from BPM channel 22.

Turning Data Collection/Plotting to ON will bring up a plot of the raw mode data (figure 4)

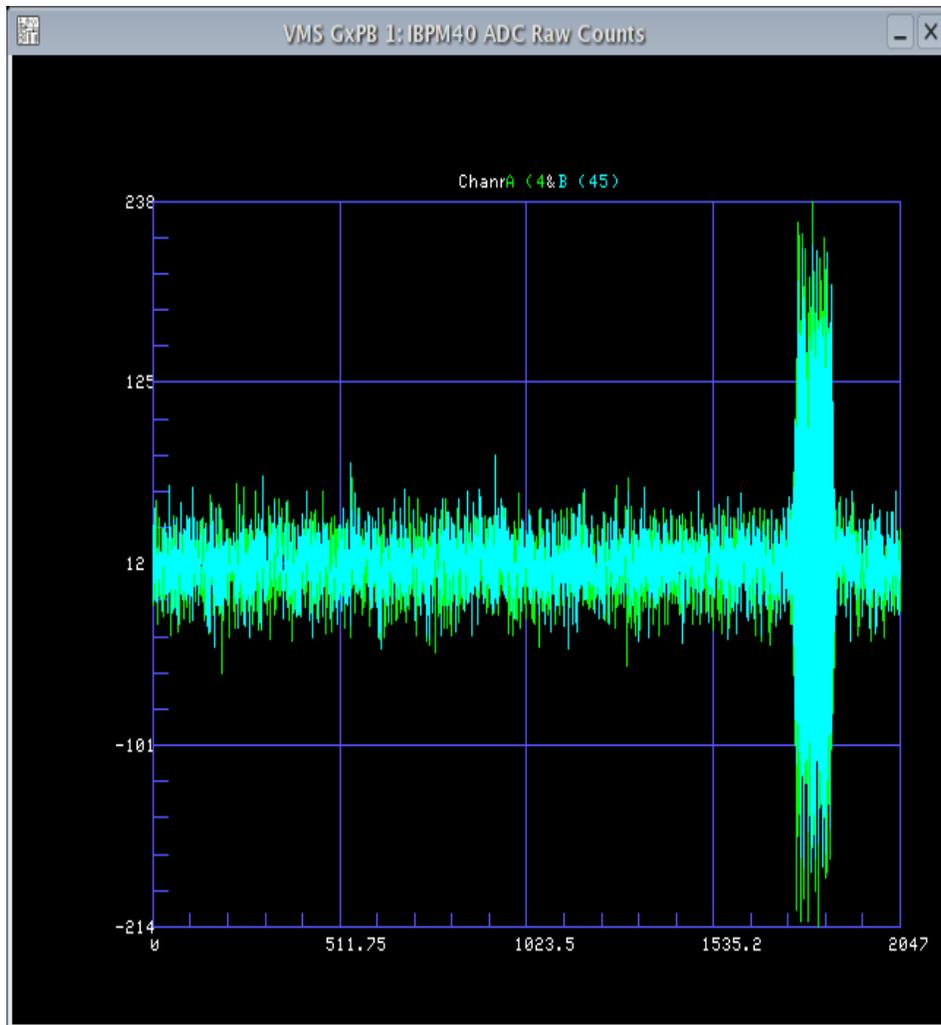


Figure 4 - Plot of raw mode data. This was acquired from MI State 21 (NUMI Only) and shows the first batch injected.

The limits on the plot as can be adjusted from I43. With the plot open, select Menu -> Set Graph Limits. From there you can adjust the limits on the plot (figure 5). When the plot limits are changed, a new plot will be drawn over the old one. Turning the Data Collection/Plotting to OFF and then ON again will fix this.

```

VMS PB143 MI BPM Diagnostics <NoSets>
I43 MI BPM Diagnostic Application
Area [MI BPM]
House-[IBPM40]+ Function [MEASUREMENTS]
Data Collection/Plotting [ ON ]

MI BPM Diagnostics
State [0]
Data Mode [Calibration]
Trigger Typ
Trigger Val
Channel #s [ Auto ]
Named Pa
Acq
Enable
Mode
Arm Event
Trigger Eve
[SINGLE]

Graph Limits
Min Max
X [0] [2047]
Channel A Channel B
Max [238] [210]
Min [-214] [-180]

Messages
CNS#230 10:06:31 (0) No active graphs
CNS#230 10:06:27 (0) No software status for this house
CNS#230 10:06:26 (0) setup_devices
CNS#230 10:06:26 (0) re-initializing device access

```

Figure 5 - The limits on the X and Y axis can be set from I43