

### 3.1.6 Gated Acquisition

The system supports forward binning, with or without trigger rejection, and programmable variable or fixed bin duration gated acquisitions. Temporal resolution is 1 millisecond. The maximum bins (frames) per acquisition is 2. The system can sustain without data loss an event rate of 1000kcps for trigger rates in the range of 30–250bpm. A FIFO permits some tolerance of bursts in excess of 1000kcps. Trigger rates less than 30 triggers per minute can be handled for event rates below 1000kcps. Trigger periods with excessive events (approximately 2500K events per trigger interval) are automatically rejected; acquisition continues after a momentary reset of the gating circuitry. The instantaneous and average trigger rates and total triggers 'accepted' are displayed once per second. Gated acquisition is a standard selection on the acquisition set up menu and is supported from 2 to 20 frames per cycle. Gated acquisition is supported in standard and multiple beat rejection modes. Three modes of beat rejection are supported:

- ▶ None
- ▶ Bad beat
- ▶ Bad beat plus next

Bad beat rejection criteria is specified by the two values of average beats per minute, and percent deviation allowed. Hence if average heart rate is specified as 60bpm with 50% deviation allowed, beats less than 30bpm or greater than 90bpm are rejected. Gating is probably best described with an example. Assume 10 bins of 100ms duration have been prescribed with bad beat rejection limits set at 33% above and below 60bpm (40bpm = 1500ms/beat, 60bpm = 1000ms/beat, 80bpm = 750ms/beat). In this case, the events relating to an 80bpm beat will affect the first 8 bins. Note that all the events associated with this beat get histogrammed. The events relating to a 40bpm beat will affect all 10 bins, with events occurring after 1000ms being discarded. Thus it can be seen that cycles are truncated only if insufficient bins have been prescribed, not based on average heart rate.

### 3.1.7 Dynamic Frame Mode Acquisition

Dynamic acquisitions in mixed (arbitrary) frame durations is supported in any combination. The operator may prescribe any series of dynamic frame times, within the limits described in section 2.4.2 on page 1-9. As an aid in specifying dynamic acquisition, the operator is able to define a set of phases where each phase is controlled by a common set of acquisition parameters. The following parameters define a phase: number of frames, time for frame, and delay between frames. These acquisitions are recorded and displayed graphically so that the user can visualize the acquisition routine.

### 3.1.8 Axial Bed Motion

Arbitrary axial bed motion may be prescribed as a part of the acquisition scan definition, as many times as required by the operator. Axial sampling is enhanced by the operator selecting "interleaved" acquisition mode. With interleaving on, the table is automatically moved 2mm and a second data set is acquired. This results in a set of 70 slices spaced about 2mm apart, stored in two frames. In general, the operator can prescribe a single scan with multiple table positions.