List of changes in Rev 1.3 comparing with Rev1.2

**Panel controller**

1. Add super fast mode

* In the super fast mode, we preload a pattern data to the panels and each panel stores the data locally in a buffer. To update display, the controller sends out the frame index as a general call to all panels.  In this way, we can get a much higher frame rate and fewer timing jitters.
* Use function loadPattern2Panels(pat\_num),  to preload the pattern data to the panels before updating display. The function will check the size of the pattern data and make sure it is less than 800 bytes, which is the buffer size in each panel. If the size is bigger than the upper limit, the function returns without loading data. The function also sets the global variable usePreloadedData as a flag, so the user can use the preloaded data to update display in all five modes. If user wants to switch to traditional way of updating display, he/she need to run set\_pattern(pat\_num). This function resets the flag usePreloadedData and traditional frame updating method is used instead.

**Panels**

* The old panel codes only supported the preloaded pattern data with gray scale 1 without row compression. The new panels codes for Rev1.3 support gs 1 to 4 without row compression and gs 1, 3, 4 with row compression.

**Matlab**

* Changed the range of the gain and bias. For old version, gain = 127 and bias = 127, so the maximum frames per second = 127 + 2.5\*127 = 444 frames per second. The limits are set because the gain\_x, gian\_y, bias\_x, and bias\_y all are int8\_t, which means from -128 to 127, in the Rev1.3, The above variables are int16\_t which ranges from [-32,768 to 32,767](http://en.wikipedia.org/wiki/30000_%28number%29).

**Known issues**

* The superfast mode only works for very short patterns since ATmega168 has only 1KB RAM.  We can pre-load at most 32 frame of pattern with gray scale level 3 or 25 frame of pattern with gray scale level 4 without row compression.
* The benchmark test may freeze the controller
* x and y channel cannot be updated at the same time