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A new scheme for main ring orbit timing decoding.

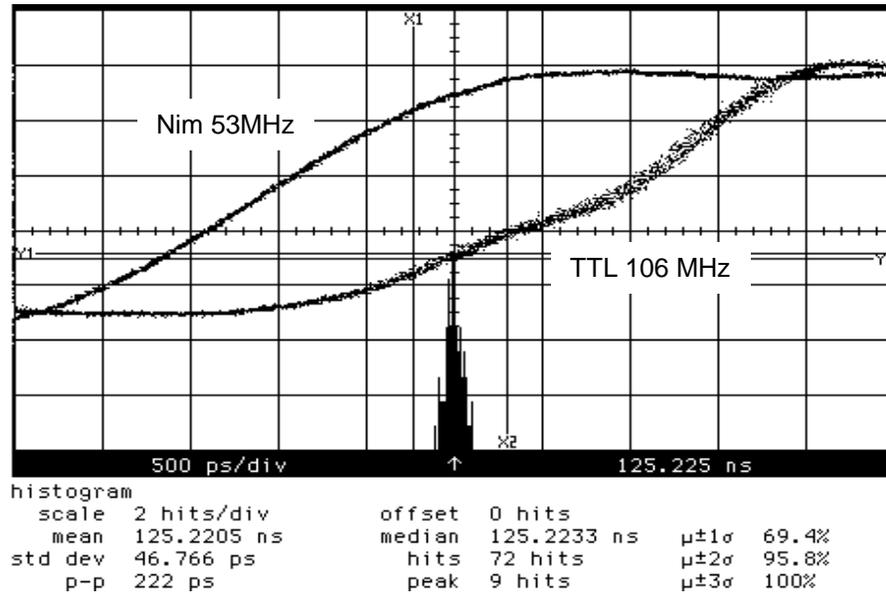
We have built the prototype Control Board using the CLC016 clock recovery chip as the basis for timing decoding and it functions satisfactorily. However, because of the enormous bandwidth of the CLC016, one must be very careful about introducing noise into the PLL loop filter components. The data sheet for the chip lists about 10 special layout techniques that should be employed for reliable operation.

Muon Electronics group has had 150 custom voltage adjustable crystal oscillators HV53-100 purchased. This amount covers all our needs for internal beam frequency oscillators (Control Boards, SCRCs, MDRCs and MFCs). The center frequency is 53.1047 MHz with a 20KHz adjustment span. Mark Kozlovsky's statement is that the maximum expected frequency deviation in the main ring RF from 53.1047 MHz is about 1KHz, so the 20KHz span of the oscillator trim should be more than adequate. A clock recovery scheme based on this oscillator has much lower phase gain and thus much less susceptibility to noise on the loop filter components. We have wired up a test circuit and it functions very well.

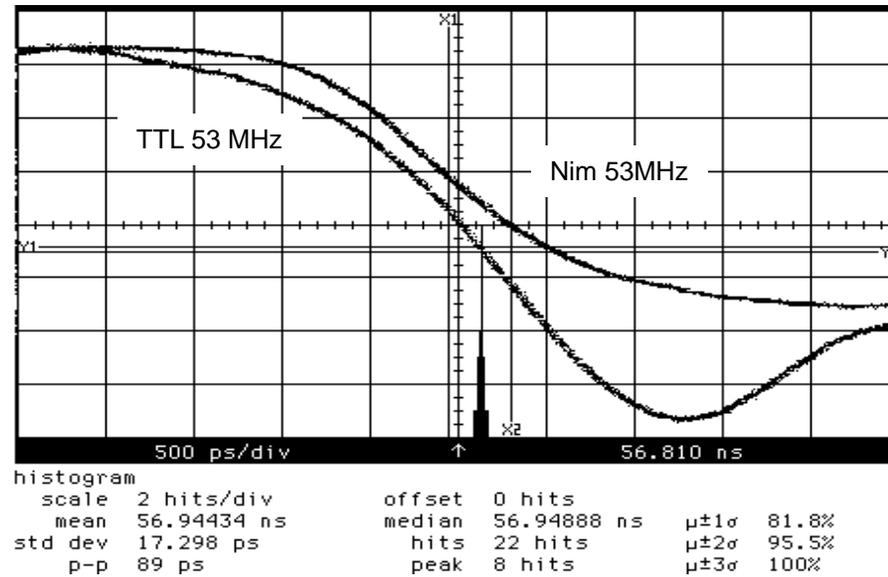
The figures show the connection arrangement and jitter measurements of this circuit. The expectation would be that the phase detector and divide by 4 logic would be implemented inside the same device used to produce First Crossing, Sync Gap and Gap. Two side benefits of this scheme are lower power (since the CLC016 which is no longer used is a 200 mW device), and only one PECL to TTL adapter. Also, additional advantage is the fact that when an external clock source is disconnected, the phase detector defaults to 50% of maximum voltage and the oscillator runs at the mid-point of its frequency range. This means that there is no need to switch clock lines when you change from external to internal clocking mode.

Jitter measurements of VXO based orbit timing decoder

Trigger on NIM 53MHz
coming to encoder.
Second



Trigger on NIM 53MHz
coming to encoder.
Second



VXO Based Orbit Timing Decoder

