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being gated open for as short as a five ns interval without signal degradation. Channel sensitivity was factory preset at one count per photoelectron, and the built in amplifier was capable of passing 700 channels of information. Electrical power was supplied by a model 1218 solid state detector controller.

c. Pulse Generator

Gate control for the detector was provided by a model 1211 high voltage pulse generator, which had the capability of triggering the OMA gate to be open for as short as 10 ns or for as long as 999 μs. The generator could also delay the gate open start time for 100 ns up to 999 ms in order to allow the detector to look at a distinct time interval during the laser-target interaction-plasma production cycle. For the experiments reported in this thesis, the delay time was set to 100 ns and the gate was set to be open for 900 μs. Trigger release for the model 1211 came directly from the model 1218 detector controller, which received its triggering ultimately from the HP model 214A pulse generator, which also provided the trigger for the wave meter.

Therefore, the sequence of events that occurred when the detector controller was put in a ready status by a computer, was that the trigger button on the HP model 214A pulse generator was depressed, sending a signal to the model 1211 pulse generator and the wave meter at the same time. The model 1211 would then send a signal to the laser, which would produce a pulse at the lithium target, causing a short burst of plasma. The model 1211, preset to wait a certain amount of time, then sent a trigger to open the model 1420 detector gate just before the plasma light had travelled through the fiber optic and the spectrometer to reach the detector. The detector amplified and transmitted the plasma spectral signal to the model 1218 detector controller, which passed the channel by channel digitized information to the computer for edited numerical screen display.

d. Computer control and data storage

A Digital Equipment LSI 11 microprocessor and associated software provided the control signal to the model 1218 detector controller, in order to enable the model 1211 pulse generator to fire the laser and operate the detector gate mechanism. The computer would then receive the digitized plasma information from the detector controller, display certain parameters such as maximum and minimum relative intensity on the screen, and await further instructions, such as to save the information to disk, prepare for another shot, or other operations. A graphics program allowed the information to be displayed graphically for 700 channels, plotted horizontally, versus

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