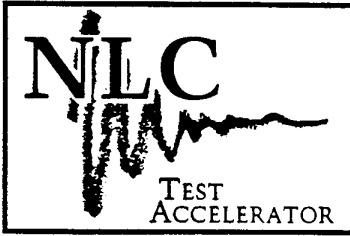


NLCTA-Note #65

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Subject: Support function changes to add a second klystron to an NLCTA modulator

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This document describes the support function changes necessary to add a second klystron to the NLCTA modulator. Those support functions that will be changed include: (1) the drive system, (2) additional reflected energy protection for the second klystron, (3) changes to the ion pump distribution, (4) additional instrumentation for the combiner load (refer to schematic on page 2).

Drive to the second klystron will come from the existing TWTA. Power from this TWTA will be split into two drive signals, one will have a 100 kw phase shifter to correct the relative phase of the two klystrons. Possibly a variable vane attenuator will be added to one drive line if space permits. Drive amplitude for both klystrons will be controlled by the pin-diode attenuator in the low level distribution system. In station 1 this will be added and the stepper motor controller channel that is currently used for the variable vane attenuator will be used on the relative phase shifter. Station 0 will be converted to a pin-diode attenuator and the stepper motor controller channel currently used to drive the variable vane attenuator will be used on station 2's relative phase shifter.

The reflected energy signals from both klystrons will be summed in an analog combiner after the 4-port couplers and sent to the existing reflected energy protection modules. The trip point will be raised from 5 MW to 10 MW.

Five additional vacuum pumps will be needed; three for the klystron itself, one for the window vac pump, and one for the tee load. There are two controllers for the existing klystron. The three klystron vac pumps will be combined on one controller and the other controller will be used for the three new klystron pumps. The current spare pump controller will be used for the window and an additional spare controller will be installed to power the tee load pump.

There will be 2 additional directional couplers, one for the new klystron's reflected energy and the other to measure the power into the load. Each coupler will require an additional heliax run to its 4-port coupler. It is proposed that 2 unused heliax runs from the roof area will be extended to the klystron area, one to measure power into the load and another to replace the heliax run for the RE test cable which will be used for the second klystron's RE so the path lengths of the 2 RE signals are consistent.

The load is not capable of handling the full potential power it may receive so it will be interlocked with a klixon and monitored on SCP with a thermocouple.

