However, if the module fails the tests, very little troubleshooting can be done in the tank. The construction of the tank, and the fact that full power is applied restricts most of the module from being probed. The top board of the module is the only board accessible. For troubleshooting we must turn to pulse power.

* If a situation arises where a module fails on full power, but not on pulse power, there are certain steps that can be taken. Many signals feed to the top board on jumper stacks and can be scoped. In addition, if caution is used, internal module probing (see Section II-c) can be done. Troubleshooting is slowed somewhat as the module must be powered down whenever a probe is to be moved, but it can be done.

B. Pulse Power Testing.

To enable troubleshooting of a failing module, some method was needed to allow a module to be run in the open, and to allow signal checking to be done safely. For this purpose, pulse power supplies have been constructed. The design of these supplies has made it possible for us to troubleshoot the Cray 2 modules with relative ease.

The "Pulser" supplies a power pulse to the module under test approximately 300 usec in duration, every 16 msec.The 300 usec time duration that power is actually applied to the module under test allows more than enough time for the Dynamic Tester to transmit its data to the module under test, and recieve the results. Therefore, almost all the tests that can be performed when the module is tested under full power can also be done under pulse power.

The most important factor of the pulse power supply is that it allows the module under test to be run in the open air. The amount of time that power is actually applied to the module is so small (on for aprox. 300 usec, off for aprox. 15.7 msec), that there is plenty of time for the module to cool down between power pulses; a pulsed module running on the bench runs about 90 degrees F, barely warm to the touch.

Another advantage to pulse power is that while probing to perform signal checking (as described in the next section), there is no danger of damaging components or boards by inadvertently shorting signal leads to power pins with the scope probes.