

THOMAS 7970-11
McGATHen 4112

12-3-1985

70A-4450

Procedures for adjusting the Gating Grid Pulser

The following procedures assume that the GGP is in working order and that all trouble shooting and repairing have been done. All the following procedures are carried out with the simulated sectors connected to the GGP.

1. Use an oscilloscope with a minimum bandwidth of 350 MHz. Compensate two probes of the same type by connecting both probes to the calibration output. Make adjustments to obtain the same gain and response from the two probes. The probes should have the same cable length. Use 20 - 50 nS sweep to check time propagation.
2. Adjust both the positive and negative supplies to the same potential (within tens of millivolt).
3. Set all delay adjustment switches to mid range.
4. Adjust the trigger pulse generator to run at 4 KHz and a pulse width of 20 - 40 uS. The pulse generator should be able to operate in double-pulse mode with double pulse spacing at 5 uS.
5. Monitor the drains of the 2SK176 ^{Q2} and 2SJ56 ^{Q3} in both Gate channels. Observe the risetime of the waveform and adjust the delay switches to obtain the same delay in both channels.
6. The risetime of the 2SK176 (in the positive Gate channel) may have to be adjusted by changing the drive to its gate to match the risetime of the 2SJ56 in the negative Gate channel.
7. Adjust the 20 nS delay switch (in the positive Gate channel) and the 5 nS delay switch (in the negative Gate channel) to make sure that they have enough range to provide an optimum setting. The risetime and the delay of both channels can be lined up on the oscilloscope by inverting the signal of one channel and adjust the two traces to coincide with each other.
8. Monitor the drains of the 2SK176 and the 2SJ56 in the Recharge channels. Again the drive into the 2SK176 (in the negative Recharge channel) may have to be adjusted to obtain the same risetime as the 2SJ56 in the positive Recharge channel.
9. Adjust the 20 nS delay switch (in the negative Recharge channel) to make sure that it has enough range to provide an optimum setting. The risetime and the delay of both recharge channels can be lined up on the oscilloscope by inverting the signal of one channel and adjust the two traces to coincide with each other.

If the 20 nS delay switch (in the negative Recharge channel) does not provide enough range for delay adjustment the 100-160 pF capacitor in the positive Recharge channel will have to be adjusted to get a better range.

10. Monitor the gate terminals of the ^{Q3} 2SJ56 and the ^{Q2} 2SK176 in the same grid rail and observe the gate drives to the FETs. The timing of the two signals should be such that the trailing edge of the gate drive should be 25-50 nS preceeding the leading edge of the recharge drive signal. This condition assures that the FET in the gate channel is off before the FET in the recharge channel is being turned on.
11. CHECK the power supplies voltages again to make sure both supplies are still at the same potential.
12. Connect the monitor output of the GGP to the scope. Adjust the 20 pF capacitor in the monitor circuit to obtain a good dc null of the monitor circuit.
13. The signal observed on the scope at this point will consist of two transients (spikes); the leading edge spike and the trailing edge spike. The spikes are caused by imbalance of the two channels in terms of delay, risetime and loading. Unmatched components in the monitor circuit also contribute to the production of transient.
14. The leading edge transient can be minimized by adjusting the two output tuning capacitors (180 pF) as well as the two 120 pF capacitors together with the variable delay adjustment.
15. As a final bench adjustment the delay switches and the gate drives may be slightly adjusted to obtain the smallest possible transient as monitored at the monitor output.