Drum Write Driver

The drum write driver provides the necessary currents to the drum head windings to record or erase information bits on the surface of a magnetic drum. The driver circuit operates at 250kc and consists of an emitter follower, inverter, and a power-diffused transistor capable of supplying 85 to 115ma to the magnetic head windings. There is one driver circuit on each card. A heat sink is provided for the power transistor to help dissipate the heat developed in the device.

Driver Connected to the Record Winding

When the driver is used to record a bit on the drum, a restricted T level input (±3v) is applied to pin A (sample pulse), and a CTDL T level input (±6v) is applied to pin G (gate). Pin E is connected to ground to prevent T3 from operating in saturation and pin C is left floating. A bit is recorded when the sample pulse is up and the gate input is down.

Circuit Description

To Record a Bit. Assume a starting condition when the sample pulse and gate are both down. Emitter follower action of T5 clamps the emitter voltage of T4 to −2.7v. The base voltage of T4, limited by the input divider network and the diode clamp (D17) to ground, is near 0v. T4 is biased off and the base of T21 remains at −13.5v. This base voltage for T21 is established by the divider current through R7, D4 and R5 to D9 and the −12v supply. Stabistor D9 insures at least a −1.5v bias on the power transistor at this time. With T21 off, only the constant 5ma from the sense amplifier flows through the record-sensing winding.

When the sample pulse increases to +3v, less current flows through the emitter follower T5 and sets the common emitter voltage of T4 and T5 to +3.3v. With the gate still down, the base of T4 (0v) is now forward-biased and T4 conducts. The collector of T4 increases toward +3.3v but is clamped by D16 to −6v, which limits the drive to the base of T21.

Increasing the base voltage of T21 to −6v forward-biases the power transistor into heavy conduction (85ma to 115ma). This heavy surge of current through the record winding produces a high density magnetic field that records a spot on the drum. The collector of T21 tries to drop from +30v to −12v but is clamped to ground by D1. D1 prevents T3 from operating in saturation and results in a faster cut-off of the transistor. When the sample pulse drops to −3v, T4 is reverse-biased off, and the base of T21 returns to −13.5v and cuts off the power transistor.

Driver Connected to Erase Winding

Two factors are considered when the driver is used to erase the drum information. First, the erase time is usually much greater than the record time. Second, increased current flow is needed through the erase winding to compensate for the constant 5ma of current flowing in the record-sense winding. This 5ma of current sets up a magnetic field which opposes that set up by the erase winding. Both factors cause an increase in the power dissipation required in T21. To prevent T21 from exceeding its power dissipation limits, pin C is connected to −12v (decreases the value of the emitter limiting resistor) and pin E is connected to −6v. When T3 is turned on, it is driven into saturation and the power dissipation limit is not exceeded.

Circuit operation for this function is similar to that described above for recording a bit. However, instead of a sample pulse feeding pin A, normally a constant +3v source is connected to pin A. The erase time is then controlled by the pulse width of the −T gate input.