

## Handout

Copy of parts of manual for Teac Tascam Series 32-2B analog reel-to-reel VTR.

### *First Few Pages*

See description of some of the chips used in the circuitry. See examples of how they draw the circuitry for both positive and negative logic.

### *System Control IC operation*

Page 30. 24 pins. Shows pin out and logic diagram for the chip. See two gates connected by cross wiring – looks like flip flops.

Terminals and functions page. Looks like active level when is low value means being used. Have inputs on left of schematic and outputs on the right.

Function table and Mode shift tables. Have inputs on vertical axis and outputs on the horizontal axis. The brake line goes high when you want to apply the brakes.

Mode shift table. Is like a state table containing valid transitions.

Page 33. Time constant terminals. When power up, comes up in initial state. Power on reset circuit resets all circuits to a known state (STOP mode) upon power on. Also, when powered off, shifts state to STOP mode

As long as CR2 stays low, DPLAY OUT terminal won't become low, so doesn't go to PLAY mode. Creates a delay when PLAY pressed during FFor REW modes.

CR3 is Timer start time constant.

Skip over to page 40. Circuit in dashed box in upper center of circuit. Labeled square wave oscillator. How do we know that this is an oscillator? One's collector feeds into the other's base, and vice versa. Provides feedback. This is a classic multivibrator circuit. The exact frequency isn't critical. Could tell the pulse width by calculating the RC time constant (if the circuit gave us the values of the R and C). Put oscillation into U35, a NAND gate, and into U37, a NOR gate. There is a second U35 diagrammed differently (see the earlier pages in the handout on multiple ways of notating the same gate).

Why are pins 9 and 10 wired together on U34? U34 is a . They did this to use up the unused NAND gates and not have to add another chip to the board (a hex inverter chip). Can use either a NAND or NOR gate as an inverter by tying together the two inputs on either gate. If tie inputs together, remove possibility of them having different levels, so only two possibilities for inputs.

U37, pin 13 feeds to resistor which drops the voltage so it doesn't burn out the transistor to which the base is hooked to the other side of the resistor. The transistor drives the LED. Resistor 609 is the current limiter for the LED. Drop 1.2 volts across the LED, let the resistor 609 drop the rest. Common emitter circuit does inversion; a positive voltage on the base will result in a negative voltage at the emitter. Being fed a square wave into pin 12 will result in the square wave getting passed through the transistor, and inverted at the collector.

Q40 and Q41 are common base; using these as a gate. Limit the current and go into the base of Q42. Signal goes out of collector of Q42. Q317 in common emitter, believe it or not, despite the grounded collector. Q317 acts like a switch, shorting audio to ground when positive voltage put onto the base. The output of Q317 is grounded, which when switched on (saturated) grounds the input to the record amplifier.

### ***To Be Continued on Tuesday***

We will do more of these.

### **Quiz**

Grab a piece of paper.

### **Homework**

Read pages 34-39. Read how these circuits work. **Hand in a writeup on this on Tuesday.** Tell how does each circuit work.