

Handout

SMPTE Time Code –kind of like the one we got earlier.

An aid for the ones decoder, which is the next thing to build.

Added the value of a counter, reset to zero when find the synchronizing word.

Assignment for Thursday

Come up with counter counts. Certain relationships between the counter number and the frames (the 80 bits in the time code). Locate as many relationships as you can; list them on a sheet of paper.

Counters come only in multiples of 4, unless you use a D flip flop which comes in multiples of 2.

There are 64 bits in the time code value, which is a multiple of 4 ($16 * 4$). When the counter gets to 64, it is on the first bit of the synchronization word.

Previous Handout

The data rate is 2400 Hz, but the clock rate is 1200 Hz, since each half wave of the clock is the time it takes to send one data bit. So, the handout needs to be corrected.

Diagram 1 of a PLL circuit locking into the incoming SMPTE time code.

Block Diagram of SMPTE Time Code Reader

Diagram 2.

First stage/circuit is an amplifier/isolator/level shifter. It takes the SMPTE time code signal and amplifies it to TTL voltage levels.

Next stage/circuit is the PLL.

Another circuit is the Manchester decoder that translates to TTL ones and zeros.

We are splitting the clock from the data. The clock goes down one path, the data goes down the other. The clock path synchronizes a clock to the incoming data. The data path carries the data and translates it to TTL ones and zeros.

The ones decoder is the circuit that detects the synchronizing word.

Relationships within SMPTE Time Code

There are two extra bits at the end of the synchronization word, which indicates the direction of the code.

Useful to synchronize since can use an oscilloscope to see what's happening in the signal.

User bits are the most significant bits of each 8-bit byte in the data portion of the SMPTE time code signal. We have today's date encoded into the user bits of the SMPTE time code signal we will use in the studio, coming from the download from the satellite.

When the time counter has the value 10 decimal (00001010 binary), why should we always see the value of 1? This is the drop frame bit, which we are always using.

Lab

Groups that have a locked PLL can go on to the ones decoder (or the data decoder, then the ones decoder).

Bob & Terry will do the counter method of the ones decoder. Two groups will build using the shift register implementation, the other two groups will build using the counter implementation.