

Table 1: Digital 2048 kHz Clock Interfaces

| Pulse Shape | Signal Requirement | |
|-----------------------|--------------------|------------------|
| Type of Interface | Coaxial Pair | Symmetrical Pair |
| Impedance | 75Ω | 120Ω |
| Max Peak Voltage (V) | 1.5V | 1.9V |
| Min Peak Voltage (V1) | 0.75V | 1.0V |
| Max Jitter at Output | (see Table 2) | |

Table 2: Maximum Permissible Jitter at Synchronization Interfaces

| Output Interfaces | Frequency Accuracy | Measurement Bandwidth, -3 dB Frequencies (Hz) | Peak-to-Peak Amplitude (UIpp) |
|---------------------|-------------------------|---|-------------------------------|
| PRC | G.811 | 20–100k | 0.05 |
| SSU | G.812 | 20–100k | 0.05 |
| SEC | 4.6ppm (refer to G.813) | 20–100k | 0.5 |
| | | 49–100k | 0.2 |
| PDH Synchronization | ±50ppm | 20–100k | 1.5 |
| | | 18–100k | 0.2 |

Note: For other specifications (i.e., noise tolerance at input ports), please refer to G.812 and G.813 for SSU and SEC, respectively.

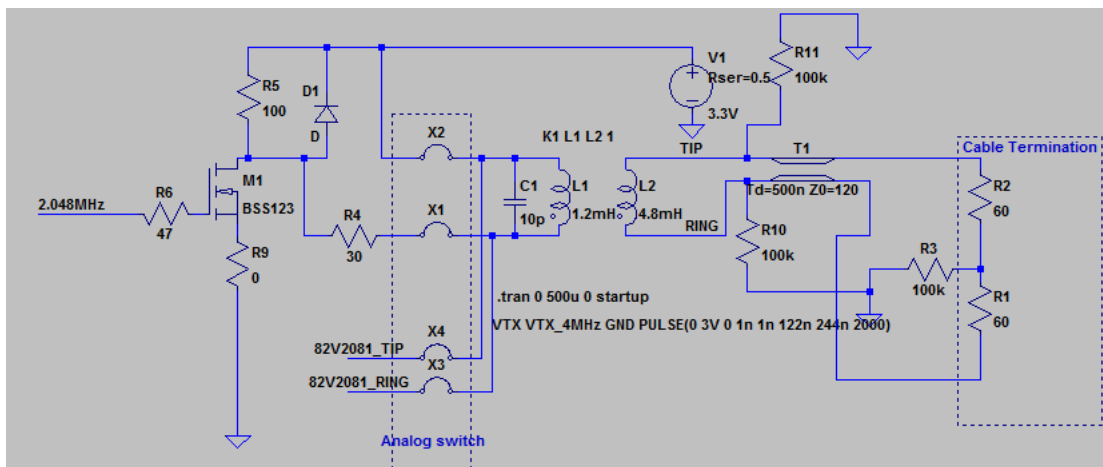
Receive and Transmit of 2048kHz Clock

By configuring 82V2081 in “slicer” mode (R_MD[1:0] = 00), the receiver will work in slicer mode. The 2.048MHz clock can be received and output at RDP/RDN. In order to transmit the clock, the following circuit in Figure 1 is proposed.

The transmitter needs to be external for G.703 Section 13 support. For the external circuit to work, 82V2081's own transmitter needs to be in high impedance to avoid signal conflict. That can be realized by setting T_OFF = 1.

External circuit in Figure 1 is shown below. The circuitry consists of discrete components. The 2.048MHz is a 3.3V CMOS clock input signal. The transistor (M1) is used to boost transmitter's driving capability into the transmission lines. The power for the transistor can be 3.3V or 2.5V. The selection of 3.3V or 2.5V is discussed in the following section. The transformer is modeled from our suggested turn ratio = 1:2 transformers (refer to AN-377).

Figure 1. Proposed External Transmitter Circuit



Transmitted pulses are analyzed with the following simulation results. Figure 2 shows the transmitted pulses with 3.3V power supply for the transistor (M1). The total pulse amplitude is 4.1V with 2.4V DC offset. The net signal amplitude is 1.7V, meeting pulse amplitude requirement for twisted-pair transmission (refer to Table 1 above).

Figure 2. Transmitted Pulses with 3.3V

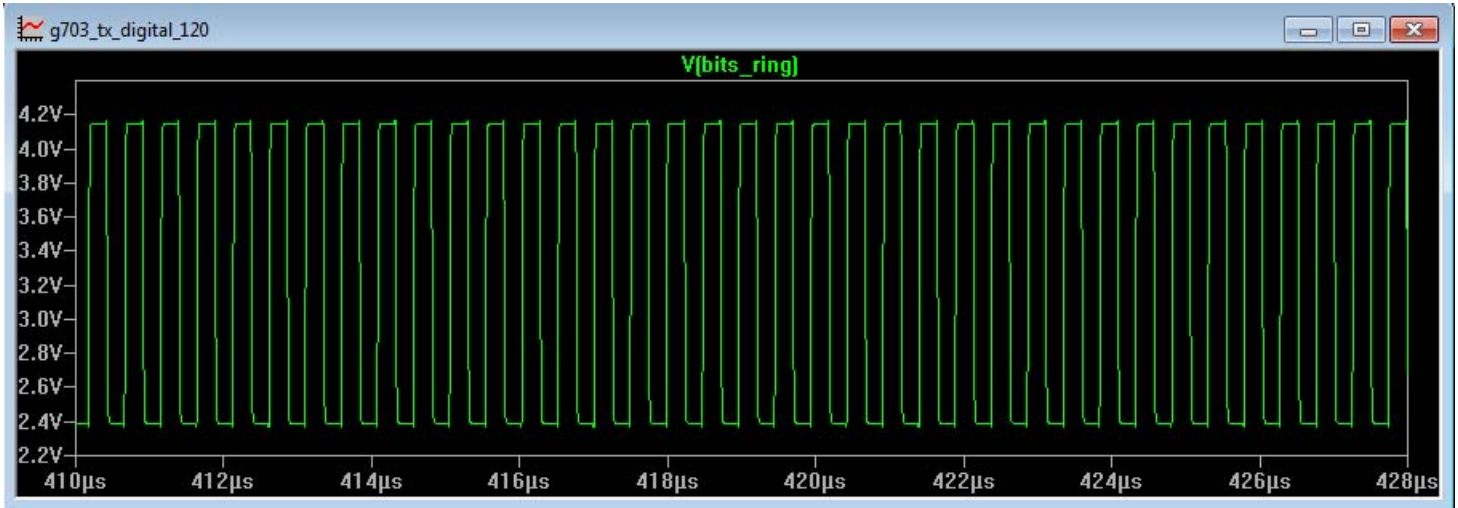
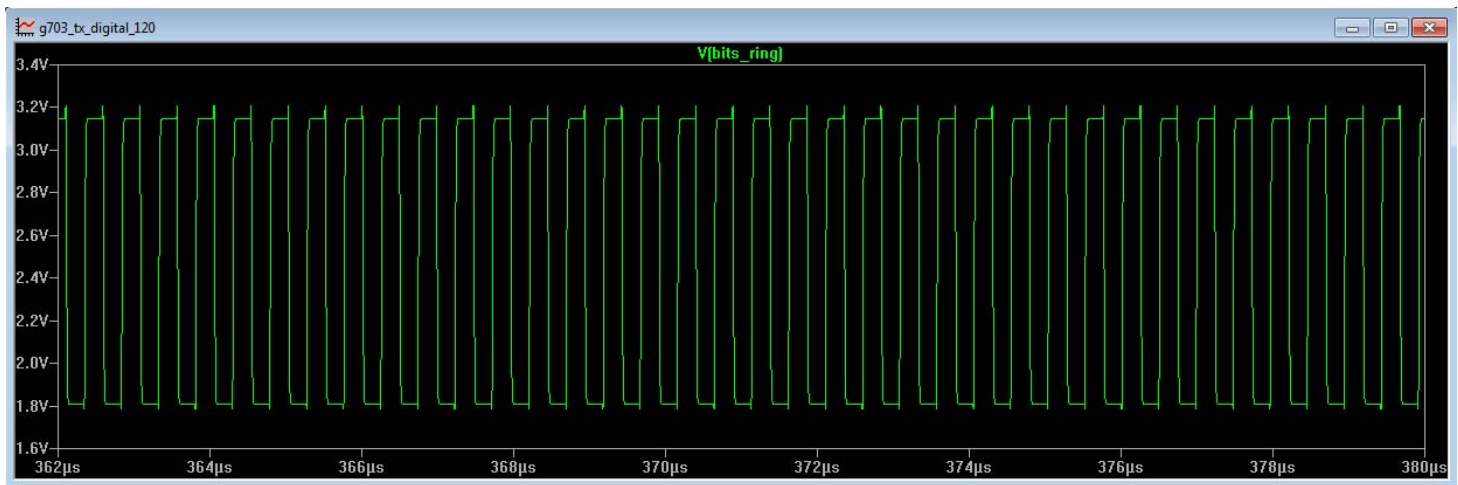


Figure 3 shows the lower transmitted pulse amplitude with transistor power supply of 2.5V. In this condition, total signal amplitude is close to 3.2V with a DC offset 1.8V, leaving the net signal amplitude of about 1.4V, also meeting required signal level (Table 1).

Figure 3. Transmitted Pulses with 2.5V



X1~X4 are 4 analog switches. Any STDP with low Ron can be used. Analog switches are used to isolate the 82V2081's own circuit from external transmitter. When 2.5V is used as the transistor power supply, the transmitted pulses have an overall amplitude of 3.2V, which will not conduct the ESD diodes used in the circuit as a protection diodes. In this condition, X3 and X4 are not needed.

Circuit Implementations

The circuit uses a transistor, a 1:2 transformer and a few analog switches. The transistor used in the example is BSS123. Other transistors can be used with similar specifications. The transformer can be selected from IDT's transformer selection guide [AN-377](#) with a turn ratio of 1:2. R5 is a current-limiting resistor. The power rating for this resistor should be $\geq 0.1W$. R4 is the termination impedance. For 120Ω twisted-pair transmission line, R4 = 30Ω. For 75Ω coax transmission, it is 18.75Ω.

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