

Halloween Doorbell Tape Control – Dick Neubert

When trick-or-treaters pushed the doorbell button at Dick's apartment, they were greeted with the sounds of bats, werewolves and rusty-hinge squeaks from a speaker hidden in the roof over the door. Sounds from horror movies were recorded on the Right channel of a continuous-loop tape. Cue tones were recorded on the Left track between the recordings. The tape started when the doorbell button was pushed and stopped when the next cue tone appeared. Kids scattered in every direction including straight up. They always collected their treat though – he had two front doors.

The design presented here is based on the assumption that you have a cassette player without electrical remote control. It has to be stereo because the sound is recorded on one channel and control tones on the other. You'll have to open the case and modify the motor wiring to accept remote control. Many mono cassette recorders have a jack for a dictation switch. I've never seen a stereo recorder with this feature, but if you have one you won't have to hack the motor circuit. Don't assume your stereo recorder has the jacks because it has holes next to the mic jacks – they're usually just holes to accommodate the extra plug in case the mic has a switch.

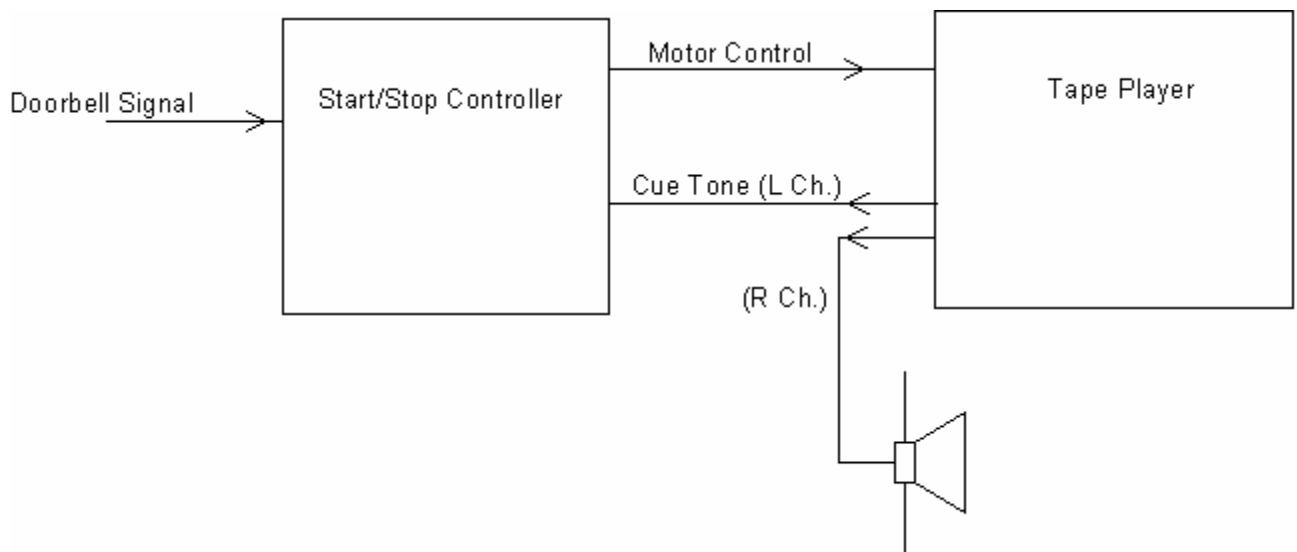
Operation is as follows:

Normally K1 is OFF and K2 is ON. K1 operates when it receives voltage from the doorbell circuit, opening the normally closed contacts and releasing K2. SCR1 switches OFF, so when K1 is de-energized K2 remains OFF. The tape runs and plays one recording. Just before reaching the beginning of the next recording on the Right channel, the cue tone plays from the Left channel and triggers SCR1, re-energizing K2 and stopping the tape. Using a continuous-loop tape avoids the need to rewind the cassette.

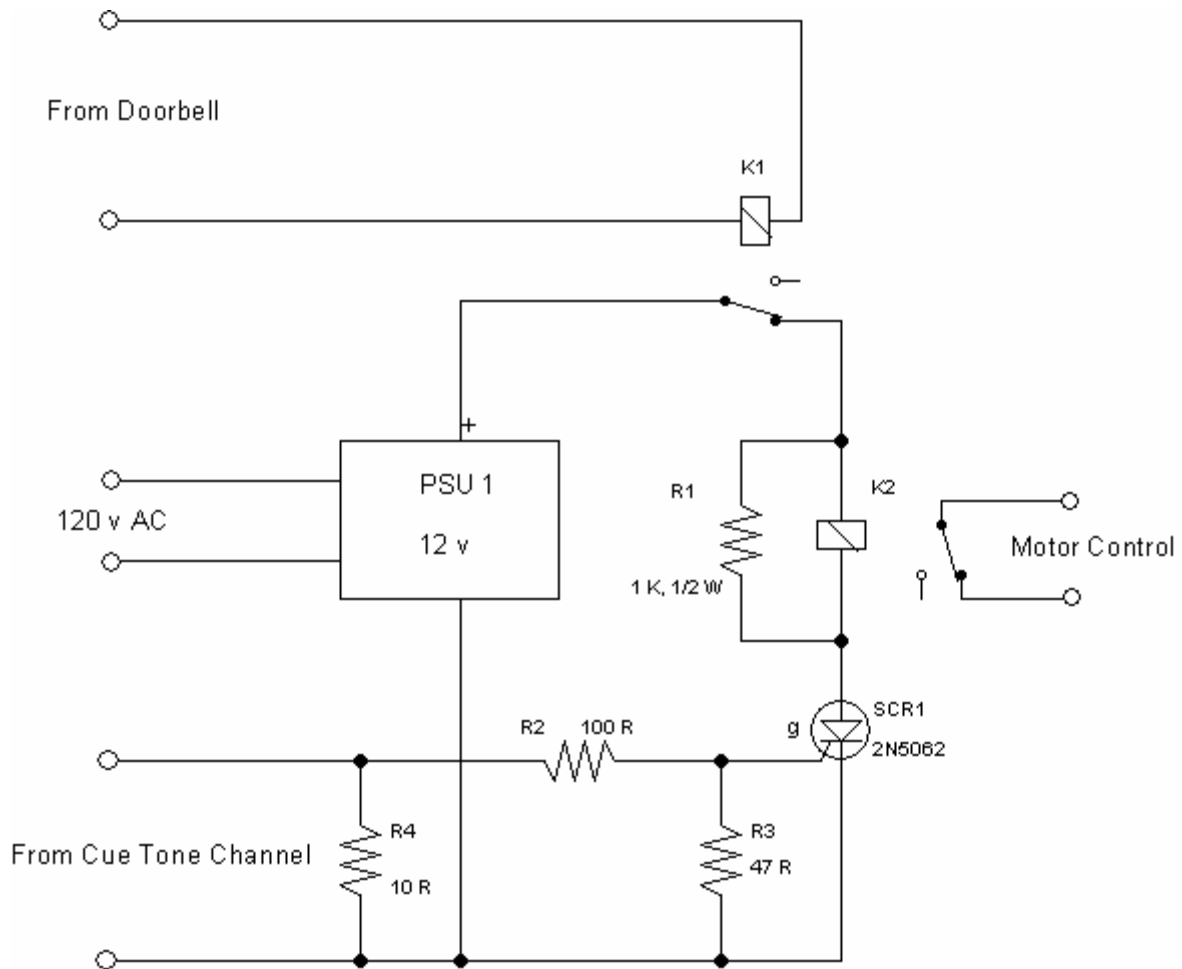
K2's contacts are Normally Closed to apply voltage to the cassette drive motor when K2 is OFF. If you have a solenoid-controlled deck with electrical remote control, you may be able to use that interface. Some upscale cassette deck motors have electronic speed control with tachometer feedback. For these, it is preferable to interrupt the motor circuit at the supply to the speed control circuit. The easiest place to do this is at the switch that closes when the drive mechanism is engaged. There may be two switches – one for motor and another for mute. K2's NC contacts should be connected in series with the motor switch. Be careful not to melt any plastic rivets when making these connections. If possible, make the connections somewhere other than right at the switch.

My project was built from surplus parts in the mid-70's. The doorbell circuit was 24v, so I used a bridge rectifier and a 24v DC relay. It turns out doorbell transformers range from 8v to 24v. I believe the 8v transformers are used only for electronic chimes. I've specified a 24v AC and a 12v AC relay for K1. For a 16v circuit, the 12v relay should work fine, since the duty cycle is too short to overheat anything. Door chime solenoids aren't rated for continuous duty either. If you actually have an 8v circuit, you might need to improvise. I'd suggest trying a bridge rectifier and a sensitive 6v DC relay, because sensitive relays have more inductance and are less apt to chatter without using a filter capacitor. If there is only one doorbell circuit, you could disconnect the chime and the transformer, use another 12v DC relay like K2, and power that circuit from the same 12v PSU used for K2.

Block Diagram:



Schematic of Start/Stop Controller:



Parts List:

Ref.	Qty.	Allied p/n	Description
R1	1	296-2187	1 K, 1/2 W
R2	1	296-5514	100 Ohm, 1/4 W
R3	1	296-2178	47 Ohm, 1/4 W
R4	1		10 Ohm, rating appropriate for Cue Channel output. R4 is needed if the Cue Channel amplifier has an output transformer.
SCR1	1	568-0639	2N5062
K1	1	850-0546 (12vAC) or 866-2020 (24vAC), see text	Relay, SPDT
K2	1	866-2554	Relay, SPDT, 12vDC
PSU1	1	928-9720	12vDC power supply

Misc:

Stereo tape player or tape deck and amplifier. Must be configured for electrical remote control (see text).

Continuous- loop tape cassette (TDK EC-3M or similar). EC-3M is a 3-minute loop. One vendor informs me that TDK is the only current mfg of loop cassettes and this is the shortest loop they make.

Making the Recording:

First find the sound effects you want to use. The Internet has a plethora of sound effects sites, some of which offer free downloads of public-domain recordings, and there are CD's available from probably all of them. Monaural is preferable because you'll be recording only in one channel. Using the Right Aux or Line In jack on your cassette machine, you can record from a CD player or your computer's Audio Out jack. Use a stereo plug for the latter to avoid shorting one channel's output to ground. Connect the Cue Tone source to the cassette recorder's Left channel input.

The cue "tone" can be anything from 60Hz hum (from your finger on a connector) to a rap on the microphone. If, however, you're using a "boom box" with a subwoofer common to both channels, you'll need to either disconnect the subwoofer, trace the machine's circuitry and find a way to disable the left channel in the subwoofer, or come up with a tone source well above the crossover frequency and record very short tones so you don't hear them in the subwoofer as the tape is stopping. You can alleviate this effect by stopping the tape immediately after the start of the cue tone. As the tape decelerates, the wavelength on the tape becomes shorter, and the tone recording ends when the tape stops. This counteracts the downward sweep of tone frequency that occurs on playback as the tape decelerates to a stop. If you have a stringed instrument and a microphone for just the left channel, plucking a string on the "wrong side" of the bridge or between the nut and the tuning peg should produce a suitably high frequency cue tone.

Record the Cue Tone first and hit Pause immediately to stop the tape in position for the sound recording. Then record the sound(s), beginning as close as possible to the Cue Tone to avoid a delay

between the doorbell button and the sound. Leave a few seconds of silence after the end of the sound recording, then record the next Cue Tone and immediately hit Pause again. I recommend the silent interval because there's apt to be some sound associated with stopping the tape, and it's less obvious if it doesn't immediately follow the intended sound. Keep track of the time – it's the only way to know when the tape loop is about to repeat. Don't record a Cue Tone after the last sound recording – you've already recorded that one.

If you prefer, you can make one master recording on a regular cassette and copy it repeatedly onto the loop tape.

For a deluxe setup, combine this project with the Lightning Strobe [insert reference] to greet your visitors with thunder (and/or other sounds) and lightning when they push the button.