Infrared Remote Control Receivers

Application Note

VSOP98260 for IR Code Learning Applications





ESD

- To maximize the sensitivity, the TIA input pin has only HBM class 1B ESD protection! Care should be taken never to touch or otherwise expose this pin to an adverse ESD source.

FEATURES

- Supply voltage: 2.0 V to 3.6 V
- Supply current: 0.6 mA to 0.9 mA
- Carrier-out-function: carrier frequency from 20 kHz to 60 kHz and burst length accurately correspond to the input signal
- Small outline package 2 mm x 2 mm DFN-8 package
- Can be used with either a pvhotodiode or an IR emitter used as a detector
- AC coupled input is insensitive to DC photocurrents

There is a wide interest in universal remote controls, which can be used to diminish the “clutter” of remote controls typically present in a modern living room setting. Training the universal remote to send the correct code to each of possibly many appliances in any media setting is not a simple task. Usually, the manufacturer of the universal remote control owns a database of literally thousands of brand-model combinations, and the corresponding remote control code base for each model. The universal remote must know the modulation frequency and pulse patterns represented in the code base in order to correctly transmit a valid command to the appliance via a key press. Training the universal remote requires the user to identify his appliances in the data base, and then by some means load the universal remote with the correct code base for each appliance. While some users may have little difficulty with this set-up routine, others may be challenged. Also, even the largest data bases inevitably lack some models present in the field, the number of which is mind boggling. There exists therefore a need for universal remotes to learn their codes directly from the user. Assuming the precondition that the user still possesses the original remote controls for his appliances, these remotes can be used as a “teacher” for a code learning circuit on the universal remote. The process is simple. An application program guides the user to position his appliance remote near an infrared sensitive component on the universal remote, and then asks the user to press a specific key. This causes the appliance remote to transmit an infrared code, which is received in the universal remote and stored in memory. The universal remote now knows it must also transmit this exact same code when the corresponding command is requested (e.g. “1”, “2”, … “channel up”, “volume up” etc.). This process is repeated for each key which must be learned.

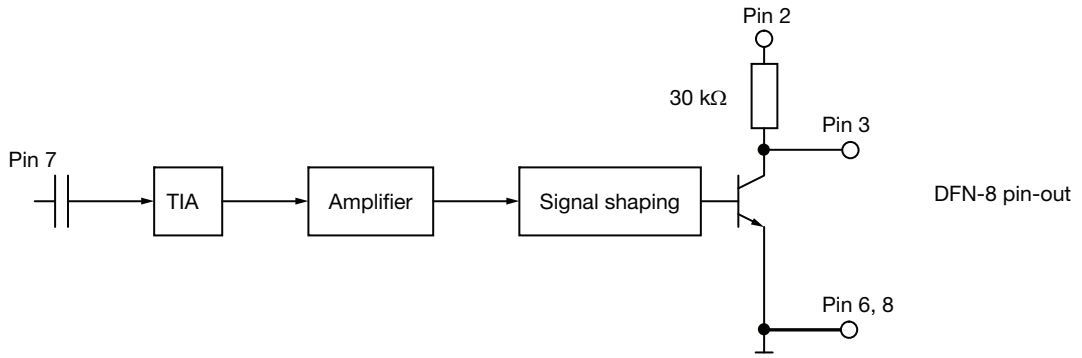
Infrared remote controls transmit their signals via an infrared LED. The simplest and least expensive code learning technique devised to date uses this same infrared LED as both the code transmitter and the code detector for receiving signals from the appliance remote. IR LEDs are not very efficient detectors. Fortunately, for code learning we want to use an inefficient detector to eliminate any spurious signals present in the room. The much stronger signal from the appliance remote, which is held close to the detector, will be enough to capture a clean signal.

APPLICATION NOTE

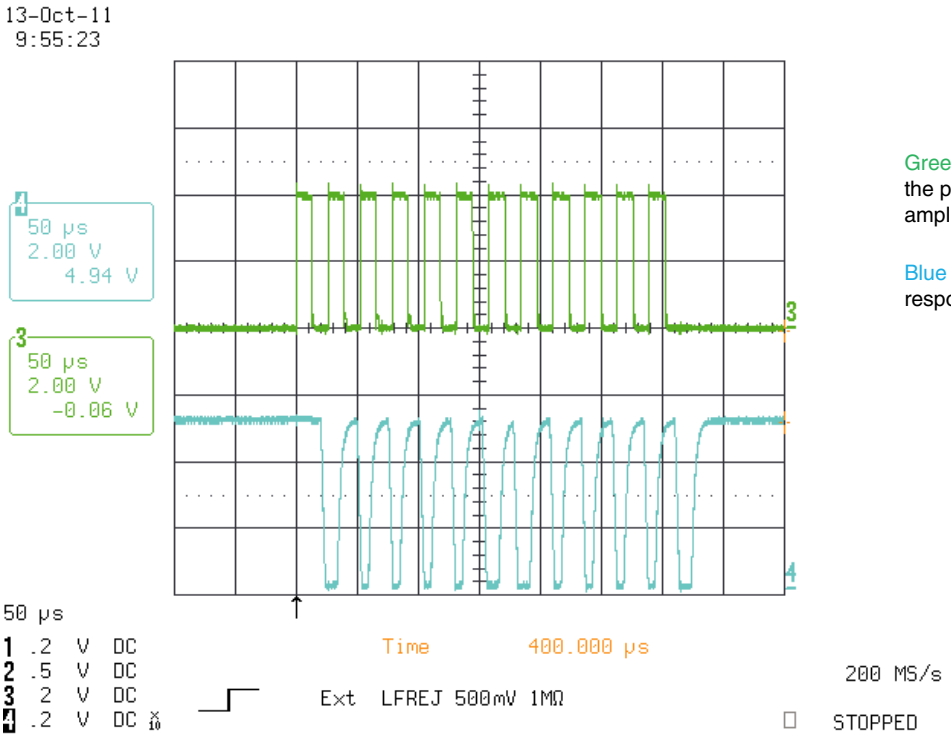
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BLOCK DIAGRAM (simplified)



TYPICAL OUTPUT WAVEFORM



Green waveform: optical input signal to the photodiode that is connected to the amplifier circuit.

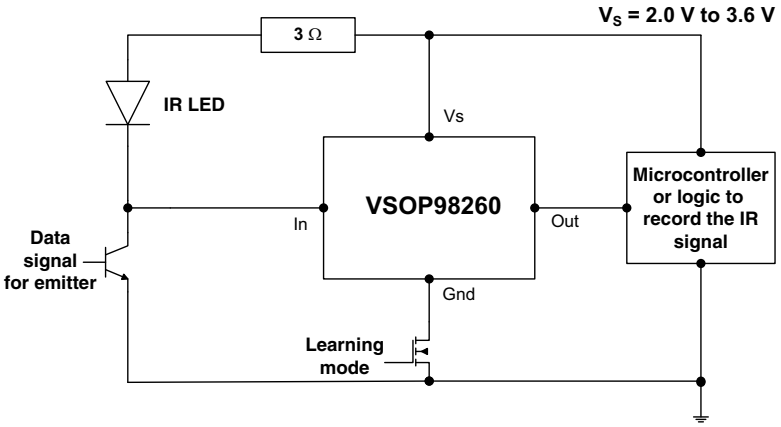
Blue waveform: output of the amplifier circuit, response to the optical signal above.

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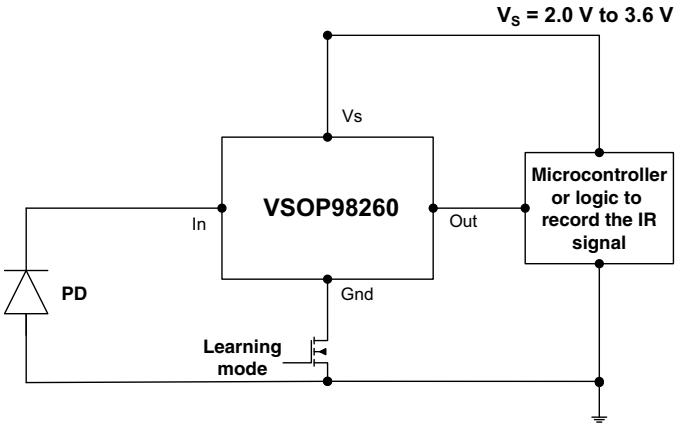
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APPLICATION CIRCUIT USING A FORWARD BIASED EMITTER AS A DETECTOR



DETECTOR (IR LED forward polarity)	SENSITIVITY (mW/m²)	RANGE (m if Ie = 100 mW/sr)
TSAL6400	100	1
VSLB5308	120	0.9
VSMB2948SL	600	0.4

APPLICATION CIRCUIT USING A REVERSE BIASED PHOTO-DIODE AS A DETECTOR



DETECTOR	SENSITIVITY (mW/m²)	RANGE (m if Ie = 100 mW/sr)
PD in reverse polarity	10	3

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