Small 7-key User-definable Remote Control User's Guide

SMALL 7-KEY USER-DEFINABLE REMOTE CONTROL USER'S GUIDE

Table of Contents

Small 7-key User-definable Remote Control

NOTES:

Product Version   :   **Ver 1.0**

Document Version   :   **Ver 1.0**

Chapter 1. Overview

1.1 Overview

Thanks for using this 7-key user-definable infrared remote control which is designed especially for DIY enthusiasts. This remote control utilizes NEC IR encoding mode and integrates SC6122 IC as the remote control transmitter which utilizes CMOS Technology specially designed for use on infrared remote control applications. Seven sensitive and durable dome keys are integrated.

Use an infrared decoder or a decoder along with an external infrared receiver to receive and transmit the data of the keys to a processor (like PC, MCU) on which you can write new programs to redefine the keys' functions for use in various remote control applications. The corresponding hexadecimal of each key is supplied in this manual, making the process easier.

Note: If you buy the combination of the remote control and an infrared decoder module from Sure Electronics, please make sure the processor you use supports SPI or UART communication since this infrared decoder module supports SPI/UART output.

1.2 Features

- Compact and durable
- Black, ABS packaging
- Smooth rounded shape
- Integrated with seven dome keys
- Powered by two 1.5V AA batteries
- Long service time: 3 years
- Available to use keys 100,000 times
- Low power consumption

1.3 Applications

- Volume control in amplifier application
- Smart Home like color, brightness and power control of lights, movement control of curtains
- Other remote control applications

Chapter 2. Key Description

2.1 NEC Protocol

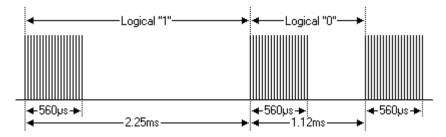This remote control utilizes NEC IR protocol for encoding.

2.1.1 Features

- 8 bit address and 8 bit command length
- Address and command are transmitted twice for reliability
- Pulse distance modulation
- Carrier frequency of 38kHz
- Bit time of 1.125ms or 2.25ms

2.1.2 Modulation

The NEC protocol uses pulse distance encoding of the bits. Each pulse is a 560μs long 38kHz carrier burst (about 21 cycles). A logical "1" takes 2.25ms to transmit, while a logical "0" is only half of that, being 1.125ms. The recommended carrier duty-cycle is 1/4 or 1/3.

FIGURE 2-1 MODULATION

2.2 Key Description

The table below lists the corresponding hexadecimal of each of the seven keys.
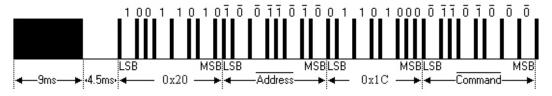
TABLE 2-1 KEY DESCRIPTION

Key	Function	Address code	Command code
ON/OFF	ON/OFF	0x20	0x1C
Up (+)	Up (+)	0x20	0x10
Down (-)	Down (-)	0x20	0x1D
SET	SET	0x20	0x11
Up (++)	Up (++)	0x20	0x18
Down (--)	Down (--)	0x20	0x15
SETOFF	SETOFF	0x20	0x19

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2.3 Example

The picture below shows a typical pulse train of the NEC protocol. With this protocol the LSB is transmitted first. In this case Address 0x20 and Command 0x1C is transmitted. A message is started by a 9ms AGC burst, which was used to set the gain of the earlier IR receivers. This AGC burst is then followed by a 4.5ms space, which is then followed by the Address and Command. Address and Command are transmitted twice. The second time all bits are inverted and can be used for verification of the received message. The total transmission time is constant because every bit is repeated with its inverted length. If you're not interested in this reliability you can ignore the inverted values, or you can expand the Address and Command to 16 bits each!

FIGURE 2-2 A TYPICAL PULSE TRAIN OF THE NEC PROTOCOL

A command is transmitted only once, even when the key on the remote control remains pressed. Every 110ms a repeat code is transmitted for as long as the key remains down. This repeat code is simply a 9ms AGC pulse followed by a 2.25ms space and a 560µs burst.
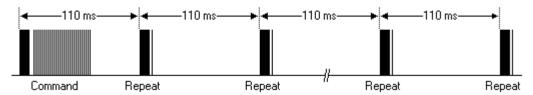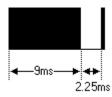
FIGURE 2-3 COMMAND TRANSMISSION

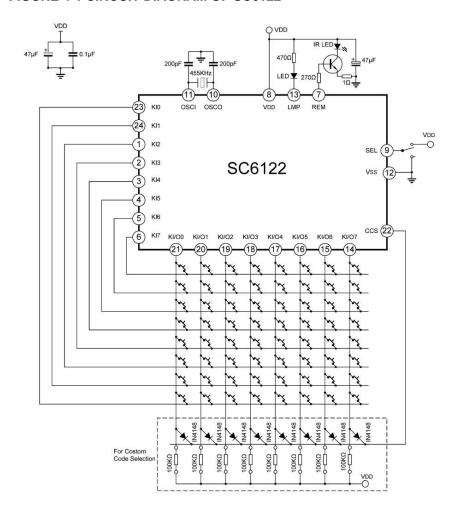**FIGURE 2-4 REPEAT CODE TRANSMISSION**

Chapter 3. Specifications

FIGURE 3-1 SPECIFICATIONS

Parameter	Value	Remark
Power Voltage	DC2.2V to DC3.2V	-
IC Quiescent Current	> 0.1 mA	
IC Low-voltage Detection	2.4V ± 0.1V (OTP) 2.4V ± 0.1V (Normal)	-
Power Consumption (Average)	8 to10mA	-
Power Consumption (Max)	30 to 50mA	-
Storage Temperature and Humidity	-10℃ to + 60℃, 90％RH（MAX）	-
Operating temperature and humidity	0℃ to + 55℃, 85%RH(MAX)	-
Resonant Frequency	Resonant frequency: 455KHZ ± 1.5KHZ Carrier wave: 37.9KHZ ± 125KHZ	Temp 25℃ Humidity: 65% to 80%RH
Straight Distance	8.0m	Temp 25℃ Humidity: 65% to 80%RH Supply voltage: 3.0V Test environment: 350Lux Same receiver Supply voltage: 3.0V Test environment: 350Lux Same receiver
Direction	Up, down, left, right direction 15° at min. 5.0m distance	-
Leakage Current	<5uA	No key pressed
Power Supply	DC2.2V to DC3.2V	-
Material of Keys	PET, force: 120-180g	-
LED consumed	35mA ± 0.5mA	VDD DC 3.0V

Chapter 4. Appendix

FIGURE 4-1 CIRCUIT DIAGRAM OF SC6122

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