



A Low Cost Remote Control with Many Applications

Author: Vladimir Velchev
AVEX - Vladimir Velchev
Sofia, Bulgaria
email: avex@iname.com

APPLICATION OPERATION

The PIC12C508 can be used as a main component for small remote controls with a large number of a different applications. It has many advantages such as low power consumption (<1 μ A), built-in oscillator, wake-up from 'sleep' on pin change, internal pull-up resistors on I/O pins, and a low price. All these features make it ideal for a small infrared (IR) battery powered remote control. The circuit of the IR transmitter is shown on the graphical hardware representation and is very simple. Any manufacturer can use this basic circuit to design his own remote control to a specific appliance. The circuit contains a standard six-button key matrix, connected to three inputs (GP0, 1, 3) and two outputs (GP2, 4) of the PICmicro™. GP5 is connected to a transistor that is driving the IR LED. The PICmicro must be configured with internal pull-up resistors, disabled watchdog timer (WDT) for the lowest power consumption and wake-up from 'sleep' on GP0, 1 and 3. Normally the microcontroller stays in a 'sleep' mode and GP2,4 = 0. When any key is pressed, the state of input GP0, 1 or 3 changes and the PICmicro wakes up. The final step is to scan the key matrix and transmit the IR code to the target device.

The next paragraphs show examples for the functions of the six buttons for different applications. Buttons with names separated by slashes ("/") have more than one function.

Application 1: IR Remote Control for Radio

- S1 – PROGRAM+/SEARCHING PROGRAM UP
- S2 – PROGRAM-/SEARCHING PROGRAM DOWN
- S3 – VOLUME+/OK
- S4 – VOLUME-/CANCEL
- S5 – SHIFT (second function of the keys)
- S6 – SLEEP

Application 2: IR Remote Control for Cassette-, CD- or Video-Player

- S1 – PLAY/PAUSE
- S2 – F.F./REW
- S3 – STOP/EJECT
- S4 – VOLUME-/STANDBY
- S5 – VOLUME+/REC
- S6 – SHIFT (second function of the keys)

Application 3: IR Access Control Key

It can replace a magnetic card for access control if the transmitter has its own code that is added to the personal password. The receiver can be used for unlocking the doors or disarming the alarm system. You can easily remember your password by replacing the numbers of the keys by simple words. For example, the word **MICROCHIP** has a code equal to **321431224**.

- S1 – 1/6/A/B/C/D/E
- S2 – 2/7/F/G/H/I/J"
- S3 – 3/8/K/L/M/N/O
- S4 – 4/9/P/Q/R/S/T
- S5 – 5/0/U/V/W/X/Y
- S6 – ENTER

Wireless and Remote Controlled Personal Appliance

Application 4: Small IR Remote Control for TV.

- S1 - PROGRAM+/UP
- S2 - PROGRAM-/DOWN
- S3 - VOLUME+/CONTRAST+/BRIGHTNESS+/COLOR+
- S4 - VOLUME-/CONTRAST-/BRIGHTNESS-/COLOR-
- S5 - MENU/OK
- S6 - STANDBY

Application 5: IR Remote Control for TV Games

It's a good idea to increase the distance between the children and the TV set to lower the impact of the electrostatic and the magnetic fields.

- S1 - START/PAUSE
- S2 - UP
- S3 - DOWN
- S4 - LEFT
- S5 - RIGHT
- S6 - FUNCTIONAL KEY

Application 6: IR Remote Control for Computer

It can be used for "menu" based programs that are working with simple entering devices like a joystick or a mouse. It can be used for computer games to increase the lifetime of your precious keyboard.

- S1 - MENU/CANCEL
- S2 - UP
- S3 - DOWN
- S4 - LEFT
- S5 - RIGHT
- S6 - OK

Application 7: IR Remote Controller for Lights

- S1 - ON
- S2 - OFF
- S3 - POWER+
- S4 - POWER-
- S5 - reserved
- S6 - reserved

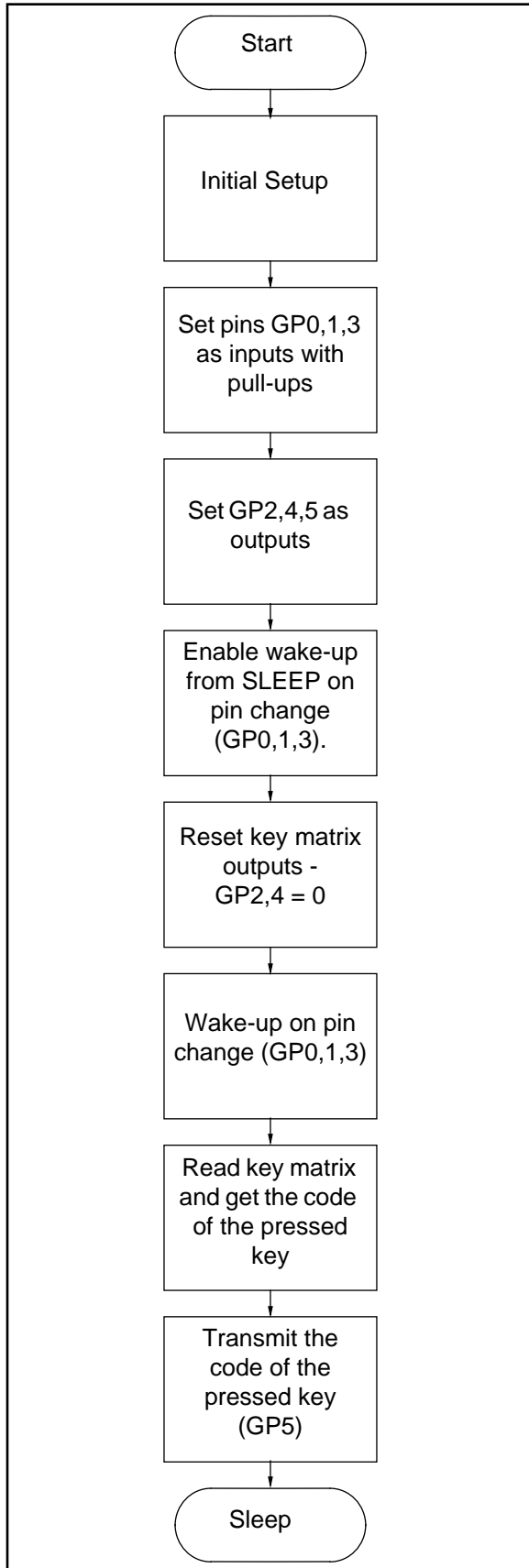
Application 8: IR Remote Control for a Clock

- S1 - TIME
- S2 - DATE
- S3 - ALARM
- S4 - SET
- S5 - +
- S6 - -

Application 9: IR Remote Control for an Air Conditioner

- S1 - ON
- S2 - OFF
- S3 - TEMPERATURE+
- S4 - TEMPERATURE-
- S5 - VENTILATION+
- S6 - VENTILATION-

FLOW CHART



GRAPHICAL HARDWARE REPRESENTATION

