RF-Remote Control Light Switch -Bascom

Autor:
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RF Remote Control Light Switch

This is a remote controllable light switch that comes with an RF remote. The only light switch is across the room from my PC and it's a pretty large room. (The building's basically a 1-room apartment) so this works out great with the remote. Of course since I'm using the remote to cut the lights when I go to bed I'm basically using the remote from two places which brings with it the unavoidable annoyance of the remote being in the wrong place all the time. Which means I have to get up and look for it which is effectively as much of an annoyance as it was meant to solve. So I wanted a second controller that would basically be a stationary switch by my bed so I could leave the portable remote around the desk.

I popped the original remote open to see what I was dealing with. After some research I concluded that LP801B is a PT2262 clone which is a remote control encoder chip. Has a few address and data pins and generates a signal on the output pin based on the configuration of those at the time the enable pin is connected to ground.
At first I didn't think much of it and ordered some PT2262s and made a PCB which is basically a clone of the original remote adapted for components I had lying around (or just stupidly large pads where I had no idea what I was going to use when I made the board)

Not being patient enough however I started looking around to see if anyone's emulated this chip on a microcontroller before. Turns out, several people did.
So I took the code at http://www.mikroe.com/forum/viewtopic.php?f=13&t=10832 and ported it over to BASCOM for the ATTINY13.
I think that code has a bug though as the logic low component of the syncbit should be 31 times the short-pulse duration according to the datasheet not 7. (He's basically divided the datasheet units by 4 in case anyone actually looks into this) The decoders may not care as It seems to have worked for him. When I got mine to work I was using the datasheet-correct count so I didn't test with that. It took several modifications to my original board to get it working with the attiny. Had to put in 3 zeners as the PT2262 operates directly from 12v which the attiny can't do. I actually fried an ATTINY2313 the first time around because I forgot the two selector/power buttons that were still at 12v. If I knew in advance that I'd be able to do this I would've designed a much smaller board..

I was trying random numbers for the pulse duration and randomly tuning the white variable capacitor but with none of the parameters actually being correct this method was never going to work. After some wasted time I caved and connected the original remote's encoder chip data output pin to the microphone input of my netbook.

Then with the cool Soundcard Oscilloscope to which I could adapt my pulse duration.
At this point I tested my board and while tuning the variable cap it suddenly became dark in the room :) It took a few more iterations to get the delay "just right" but now it works perfectly.

I put it in a small electrical box with 2 push-buttons and installed it in an easy to reach location from the bed.

Some component leg that I forgot to cut (probably a resistor) must have punctured the battery wire though as it drained to 10v by that night and since the circuit is basically open when none of the buttons are pressed that shouldn't happen at all. I did find a puncture mark on the positive lead so that must have been it.. damn. After reseating the board in the box and making sure the battery wires don't pass under any component legs it hasn't happened again.

Project files:

Board
Very large. But the (somewhat smaller, by about 20%, still fairly large) version is on the browsing/printing PC upstairs and I'm too lazy to get it :) Note below on the jumper blocks:
[1] [2] [3]
No connection: FLOAT bit
1+3: Bit 0
2+3: Bit 1
1+2: Short out the battery
And that this PCB is for the PT2262 (and clones) so it needs modifications to be used with an AVR. At least 1 5.1V zener for the CHIPPWR and 1 per button.

The board runs off a 23A (12 volt) stack battery. Running from lower voltages may be possible but the RF circuit definitely needs to be retuned.

Schematic
The seemingly unconnected wires from the diodes on the data pins are actually connected to CHIPPWR.

PT2262 emulation code in BASCOM

```
001
$regfile = "attiny13.dat"
```

```
002
$crystal = 9600000
```

```
003
```

```
004
Declare Sub Sendbit(byval A As Byte)

005
Declare Sub Alpha()

006
Declare Sub Longa()

007
Declare Sub Synca()

008

009
Dim T As Integer
```

```
010
Dim D As Integer

011

012
Dim Number As Byte

013
Number = 10

014

015
Dim X As Byte
```

016

017
Dataout Alias Portb.2

018
Dataout = 0

019

020
Config Dataout = Output

021
Config Portb.0 = Input

022
Config Portb.1 = Input

023

024

025
If Pinb.0 = 0 Then

026

027
Do

```
028

029
 Sendbit 1 'a0

030
 Sendbit 0 'a1

031
 Sendbit 0 'a2

032
 Sendbit 2 'a3

033
 Sendbit 2 'a4
```

```
034
 Sendbit 2 'a5

035
 Sendbit 2 'a6

036
 Sendbit 0 'a7

037

038
 Sendbit 0 'btn0 (not on my unit)

039
 Sendbit 0 'btn1
```

040
Sendbit 1 'btn2

041
Sendbit 0 'btn3 (not on my unit)

042
Sendbit 3

043

044
Loop

045

```
046
End If

047

048
If Pinb.1 = 0 Then

049

050
Do

051
```

```
052
 Sendbit 1 'a0

053
 Sendbit 0 'a1

054
 Sendbit 0 'a2

055
 Sendbit 2 'a3

056
 Sendbit 2 'a4

057
 Sendbit 2 'a5
```

```
058
 Sendbit 2 'a6

059
 Sendbit 0 'a7

060

061
 Sendbit 0 'btn0 (not on my unit)

062
 Sendbit 1 'btn1

063
 Sendbit 0 'btn2
```

```
064
 Sendbit 0 'btn3 (not on my unit)

065
 Sendbit 3

066

067
Loop

068

069
```

```
070
End If

071

072

073
End

074

075
```

```
076
Sub Alpha()

077

078
 Waitus 261

079

080
End Sub

081
```

082

083
Sub Longa()

084

085
Alpha

086
Alpha

087
Alpha

088

089
End Sub

090

091
Sub Synca()

092

093
 Local Y As Byte

```
094
 For Y = 1 To 31
```

```
095
 Alpha
```

```
096
 Next Y
```

```
097
```

```
098
End Sub
```

```
099
```

```
100
Sub Sendbit(a As Abyte)

101
 Select Case A

102
 ' 0 bit

103
 Case 0:

104
 Dataout = 1

105
 Alpha
```

106
Dataout = 0

107
Longa

108
Dataout = 1

109
Alpha

110
Dataout = 0

111
Longa

```
112
 ' 1 bit
```

```
113
 Case 1:
```

```
114
 Dataout = 1
```

```
115
 Longa
```

```
116
 Dataout = 0
```

```
117
 Alpha
```

```
118
 Dataout = 1

119
 Longa

120
 Dataout = 0

121
 Alpha

122
 ' FLOAT bit

123
 Case 2:
```

124
Dataout = 1

125
Alpha

126
Dataout = 0

127
Longa

128
Dataout = 1

129
Longa

```
130
 Dataout = 0

131
 Alpha

132
 ' SYNC bit

133
 Case 3:

134
 Dataout = 1

135
 Alpha
```

```
136
 Dataout = 0

137
 Synca

138

139
 End Select

140

141
End Sub
```

Related Links

Accurate LC Meter
60MHz Frequency Meter / Counter
1Hz - 2MHz Function Generator
Voltmeter Ammeter
ESR Meter / Transistor Tester
Accurate 0-500MHz RF Power Meter
DS18S20 Dual Temperature Meter
BA1404 HI-FI Stereo FM Transmitter
BH1417 Stereo PLL FM Transmitter
500mW FM / VHF Transmitter Amplifier / Booster
50mW BH1417 Stereo PLL FM Transmitter
Phone FM Transmitter
TV Transmitter with Audio
5 Watt FM Amplifier
TDA7000 FM Receiver / TV Tuner / Aircraft Receiver
NJM2035 HI-FI Stereo Encoder / Multiplexer
USB Voltmeter
USB IO Board