

DOOR ALARM SYSTEM

DLARM71

This project describes a burglar alarm that can monitor both windows and doors with conventional magnetic contacts - even other optional NC or NO connectors are compatible with this circuit. This electronic circuit is powered by the voltage 9VDC and one 9 volt battery ensures operation even if the mains supply get cut off. The supply voltage should be close to 9 volts. Used 12 volt is a potential risk of rushing current through D4.

The circuit is based on standard CMOS logic as well as the dual comparator LM393 - nothing strange in other words. Information of the number of in and out passes is provided by means of a standard LED 7-segment display. After 25 seconds every time a door or window has opened - activated one or more buzzers during a certain interval. When one enters your dwelling has one barely half a minute for to deactivating the alarm. This is done with a modified 3.5 stereo jack plug which you could say is equivalent to an electronic key.

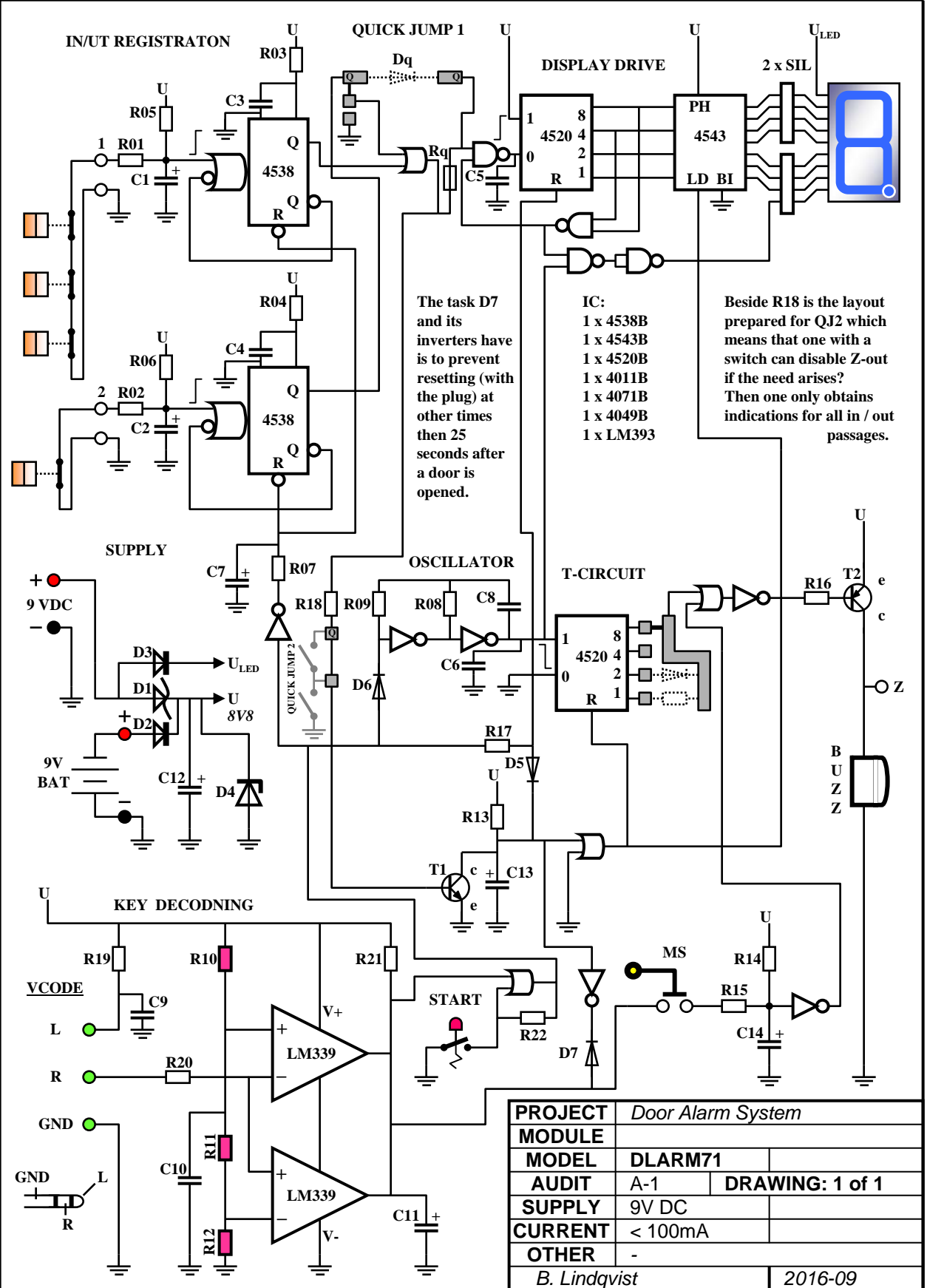
The jack plugs specific resistances between the terminals or channels produce a voltage that if it is right - reset the entire alarm system. If the voltage deviates only slightly in either direction, one obtains no reset. This is an ingenious safety innovation that one not easily can be outwitted. One can not, for example: from the outside measures either the voltage or the resistance and thus crack the code. I am not the man behind this circuit.

It is difficult to disable the alarm system without leading to damage. If someone dismantles the panel affected a micro switch and the built-in buzzer sounds a little more than a minute, even if the panel is refitted directly. If the panel is off continuously sounds the buzzer constantly. If damage is done to silent the buzzer is there another possibility to maintain a second alarm function. Many buzzers emit a tone around 4000 Hz. By using another construction here (WSM) is there an ability to wirelessly set up a distant alarm - through that a microphone records the typical sound from a buzzer.

Press the start button just before you leave your home - you then have 20 seconds to get out and close/lock the door - shortly thereafter is the alarm system activated. A pulse from a magnetic contact triggers a monostable multivibrator (4538), which in turn clocks up of two binary counters (4520), which is presented as a digit by the display driver (4543). The circuit has an oscillator that clocks the second counter whose output starts the buzzer (if you did not in time reach the reset). The buzzer output can be activated earlier or almost immediately when a magnetic contact gets indication. This requires that the output 1, 2 or 4 (4520) is selected instead of 8. The point on the display will flash when the alarm is activated. When the alarm is reset (only the key can reset/deactivate the alarm) illuminates a zero and the point is off. If more than 9 pulses from the magnetic contacts are recorded (10 and 11) turns the display off but the point remains flashing. When the number of passes reaching 12 turns the display blank and the point stops blinking - steady light. No more changes occur before the alarm is reset. The buzzer output Z can however be activated infinitely many times.

"Quick Jump 1" requires that the foil is abraded over Rq and the Q-output together with the or-input that is pulled to ground. A diode Dq (1N4148) is soldered between Q -- Q. Then can the display register an indication without the alarm turns on. Suitable when you want to monitor a mail drop or the like (applies to alarm input 2). See drawing!

CIRCUIT DIAGRAM



PROJECT	Door Alarm System	
MODULE		
MODEL	DLARM71	
AUDIT	A-1	DRAWING: 1 of 1
SUPPLY	9V DC	
CURRENT	< 100mA	
OTHER	-	
B. Lindqvist		2016-09

SMR1206:
R03 = 100k
R04 = 100k
R05 = 10k
R06 = 10k
R08 = 4M7
R09 = 10M
R13 = 4M7
R14 = 10M
R15 = 100Ω
R16 = 10k
R17 = 100Ω
R21 = 1M
R22 = 10k
Rq = 10k

SMC1206:
C3 = 100n
C4 = 100n
C5 = 10n
C6 = 10n
C9 = 100n

Hole mount IC:
4011B
4543B
4520B
4071B
4049B
4538B
LM393

Other components:
R01 & R02 = 2k2 , hole mount
R07 = 3M3 , hole mount
R18 = 47k , hole mount
R19 = 1-10k , hole mount
R20 = 1k , hole mount
C1 & C2 = 22μ , 16V , E-lytic , hole mount
C12 = 220μ , 16V , E-lytic , hole mount
C7, C13&C14 = 10μ , 20V , Tantalum, SMD
C11 = 2μ2 , 20V , Tantalum , SMD
C8 = 330n , Plastic , hole mount
D1 = STPS1L60 , Schottky , hole mount
D2 & D3 = 1N4007 , hole mount
D4 = Zener 12V/ 5W , hole mount
D5, D6 & D7 = BAS32 , SMD
T1 = BC847 , SMD
T2 = BC557B , hole mount
7SEG-DISP = LED (common anode)
MS = Mini Micro Switch PCB
Stereo Jack = 3.5 mm PCB
START = Simple pushbutton
BUZZ = Buzzer for 9V PCB

Special:
2 pc. of SIL R-NET = four independent 470Ω
6-pin terminal block PCB

Double side board. The project is SMD-based but some are PCB components, as the IC's...
Some hole mounted components can be regarded as SMD! Holes should be drilled for IC plus and IC minus. Holes with a **red ring** must be soldered on both sides. Do not drill holes for SIL resistors and the LED display!

PROJECT	
Door Alarm System	
MODULE	
DLARM71	
AUDIT	
A-1	DRAWING: 1 of 1
OTHER	
Component side (top)	

B. Lindqvist 2016-09

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6-pin terminal block PCB**

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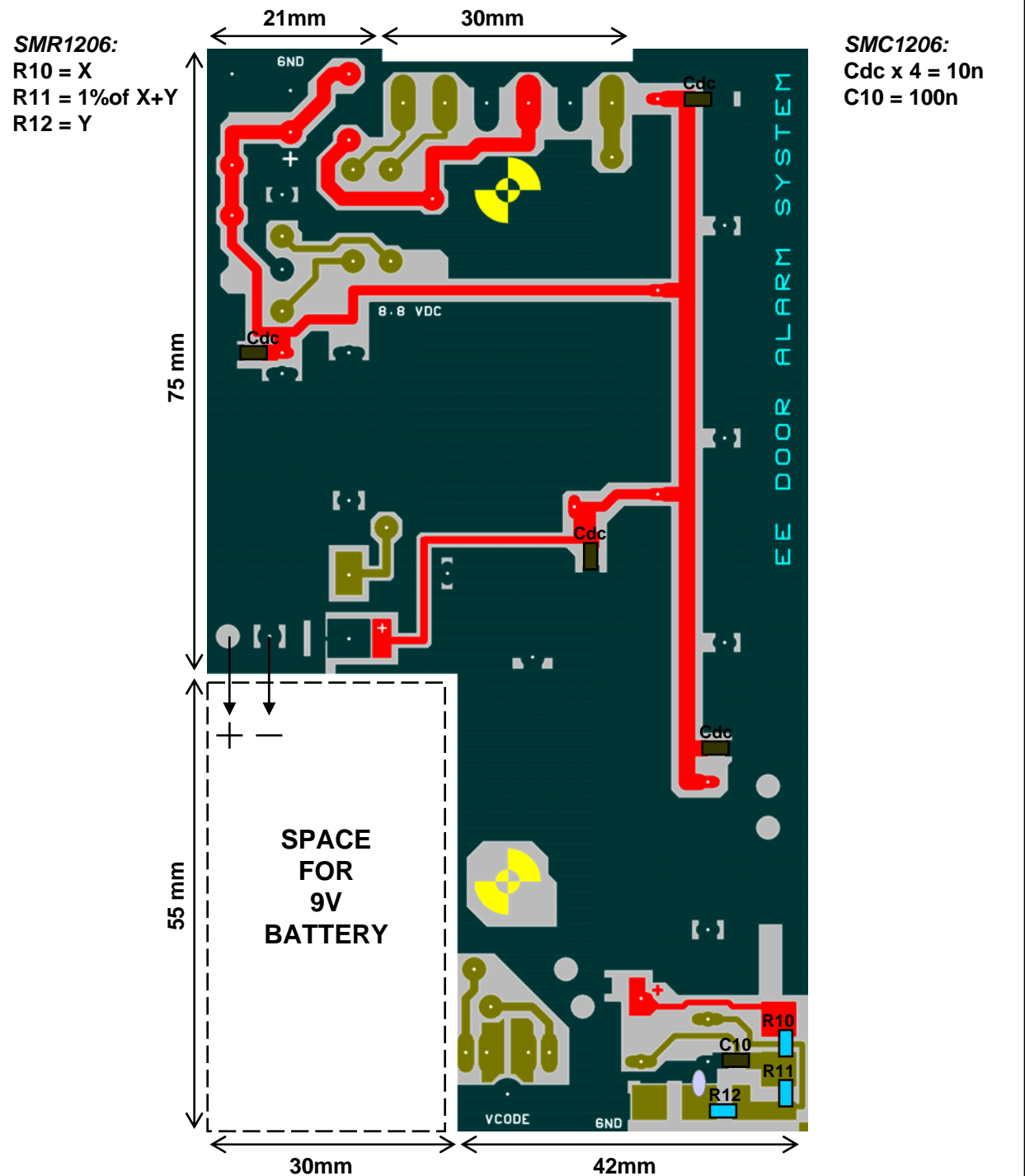
C3 = 100n
C4 = 100n
C5 = 10n
C6 = 10n
C9 = 100n

4011B
4543B
4520B
4071B
4049B
4538B
LM393

R01 & R02 = 2k2 , hole mount
R07 = 3M3 , hole mount
R18 = 47k , hole mount
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PROJECT	<i>Door Alarm System</i>	
MODULE		
MODEL	DLARM71	
AUDIT	A-1	DRAWING: 1 of 1
OTHER	<i>Component side (top)</i>	
<i>B. Lindqvist</i>		<i>2016-09</i>

PLACING OF COMPONENTS



The ground side includes a ground plane and the power supply plus some wiring regarding hole mounted components. The resistances for the VCODE will be soldered here and a number of decoupling capacitors. No ground loops!

PROJECT	Door Alarm System	
MODULE		
MODEL	DLARM71	
AUDIT	A-1	DRAWING: 1 of 1
OTHER	Ground (plane) side	
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DOOR ALARM SYSTEM

WSM

Wireless Sub-alarm Module receives and activates by the sound of a buzzer with a typical tone of 4 kHz. The module's sensitivity can be set very high so that it can be located tens of yards from the sound source (DLARM71). Several different alarm functions can then be placed at arbitrary locations in the neighborhood. For example: one can provide a device that, when a tone from a buzzer is registered - calls and send email to the property owner's cell phone. Another device can be hidden and when activated - starts a camera etc.

WSM is a selective receiver for audio signals that have a certain decoding ability. When the right tone has been detected for a certain time - the output "Out" get high, in addition one can use two oscillators to drive various LEDs and/or buzzers / sirens. For control of more advanced features must oneself complement WSM with the necessary equipment.

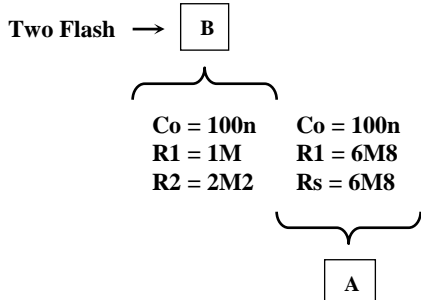
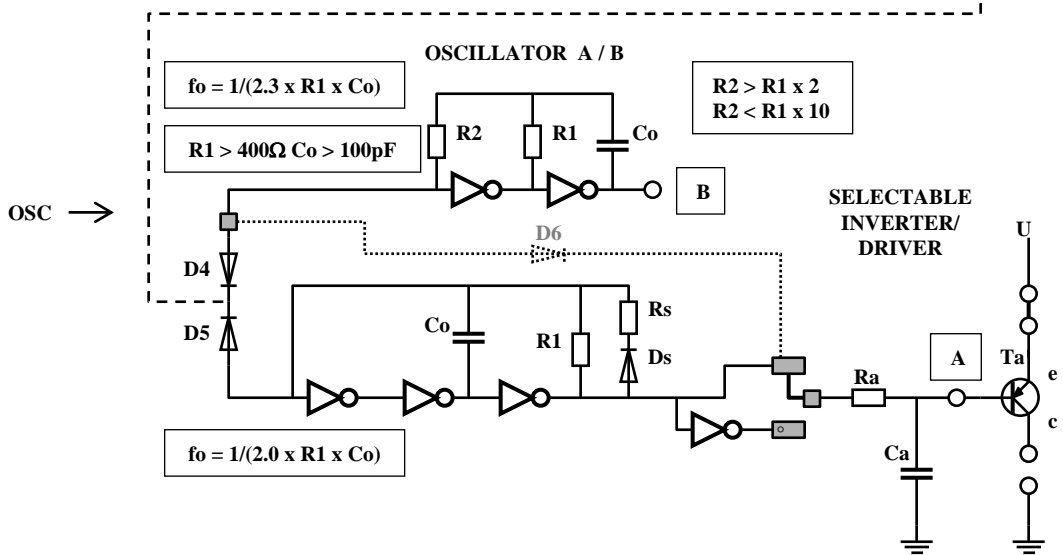
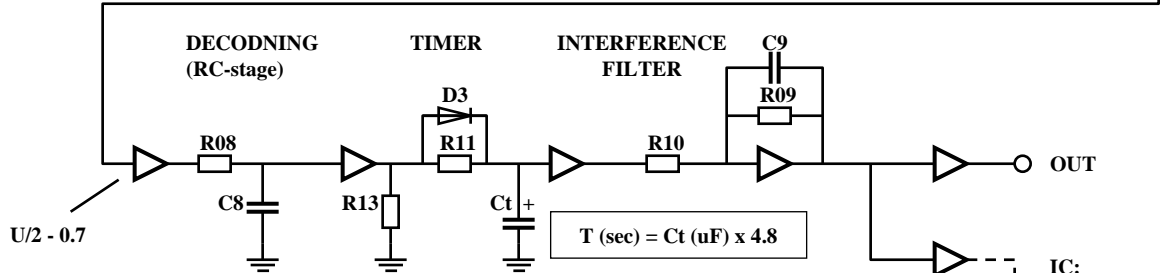
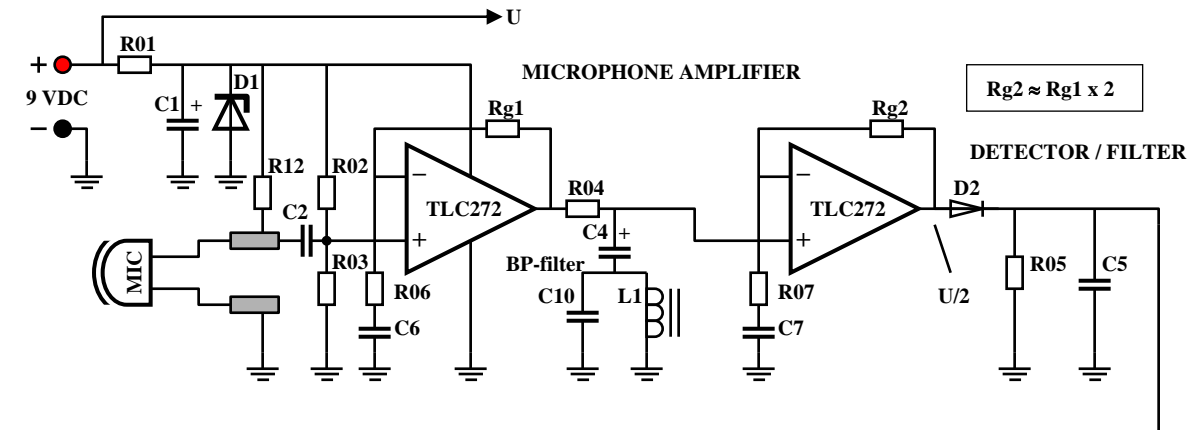
The microphone amplifier is based on the dual CMOS operational amplifier TLC272 that is well suitable to handle high gains and sensitive sources. My own experience of the 272 is that it easily breaks down if the supply voltage starts to oscillate or happen to rise above the maximum limit. Nothing happens however if one avoids such cases. It is two identical inverting stages in series but with different gain. For changing the gain: change the values of R_{g1} and R_{g2} according to the formula! Between the amplifier stages is a band pass filter which is dimensioned for decoding the selected frequency. This filter is blurry and lets through a lot of sounds that is quite aside but its function is satisfactory. One can for example let out a shrill whistle and in that way activate WSM. In order to adapt the circuit for a different frequency must the LC circuit be reconfigured (C_{10} & L_1) where even R_{04} is important. In addition changes: C_2 , C_5 , R_{05} , C_6 and C_7 . C_4 can be ignored.

It is the RC stage after the first buffer stage which determines the time of the sound duration before the circuit is activated. At this way filtered sounds and noises out - one not want shall causing activation. Human speech does not lead to activation but loud music can... Next the decoding stage is the timer circuit: a state = 1 here leads to activation and the capacitor C_t 's size determines how long the activation time will be. The last buffer stage combines a delay and hysteresis circuit which suppresses noise when switching on and off the unit. Switches rapidly between on/off cause the disturbances to slips through and the unit are activated briefly.

The two oscillators or square-wave generators can be avoided if one chooses the right PCB layout. These universal oscillation-circuits are based on the CMOS inverter 4049, which is closely related to the buffers. Here is the opportunity to achieve a flashing beacon or a pulsating alarm sound. Newer high-intensity LED requires a fairly moderate current, and that even a CMOS circuit can drive directly - or then you use the transistor? If you want two quick flashes and a pause so you should choose the component values according to the "Two Flash", thereto needs a rectifier diode (D_6) connected between the oscillators.

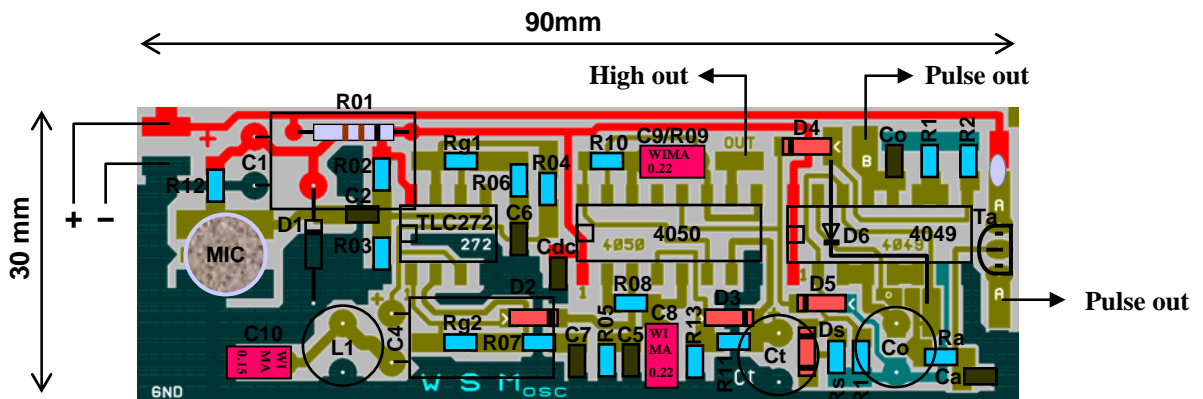
The module current consumption in standby is negligible.

MODULE CIRCUIT DIAGRAM



PROJECT	Door Alarm System	
MODULE	Wireless Sub-alarm	
MODEL	WSM	WSMosc
AUDIT	A-1	DRAWING: 1 of 1
SUPPLY	9-12V DC	
CURRENT		
OTHER	-	
B. Lindqvist		2016-09

MODULE PLACING OF COMPONENTS



The PCB that not include an oscillator has the length of 68 mm, instead of 90 mm that is the length of the above-depicted

SMR1206:

R02 = 100k
R03 = 100k
R04 = 1k
R05 = 1M
R06 = 1k
R07 = 1k
R08 = 6M8
R09 = 6M8
R10 = 2M2
R11 = 6M8
R12 = 22k
R13 = 10k

SMC1206:

Cdc = 100n
C2 = 820p
C5 = 10n
C6 = 47n
C7 = 47n

Other components:

R01 = 100Ω , hole mounted
C1 = 220μ , 16V , E-lytic , hole mounted
C4 = 22μ , 16V , E-lytic , hole mounted
C8 & C9 = 220n , Plastic , hole mounted
C10 = 150n , Plastic , hole mounted
L1 = 10mH , 20-60Ω , hole mounted
D1 = Zener 16V/5W , hole mounted
D2, D3, D4, D5 & Ds = BAS32 , SMD
D6 = 1N4148 , hole mounted

Rg1 = 100k
Rg2 = 220k

IC (hole mounted):

TLC272 = Precision dual operational amplifier
4050B = Hex buffer
4049B = Hex inverting buffer

The circuit requires only a single sided board.
All components should be handled as SMD,
thus made, all soldering take place on the same
side. No holes need to be drilled.

PROJECT	Door Alarm System	
MODULE	Wireless Sub-alarm	
MODEL	WSM	WSMosc
AUDIT	A-1	DRAWING: 1 of 1
OTHER		
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PHOTOS

