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 The LOD/H Technical Journal: File #6 of 12

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|   Building Your Own Blue Box   |
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|By|
|Jester Sluggo|
|Released: Nov. 27, 1986      |
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This Blue Box is based on the Exar 2207 Voltage Controlled Oscillator. There are other ways to build Blue Boxes, some being better and some not as good, but I chose to do it this way. My reason for doing so: because at the time I started this project, about the only schematic available on BBS's was the one written by Mr. America and Nickie Halflinger. Those plans soon (in about 90 seconds) became very vague in their context with a couple in-consistencies, but I decided to "rough it out" using those plans (based on the Exar 2207 VCO) and build the Blue Box using that as my guide. During the construction of the Blue Box, I decided to type-up a "more complete and clear" set of Blue Box schematics than the file that I based mine on, in order to help others who may be trying/thinking of building a Blue Box. I hope these help.

Note: You should get a copy of the Mr. America/Nickie Halflinger Blue Box plans. Those plans may be of help to anyone who may have difficulty understanding these plans. Also, these plans currently do not support CCITT.

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| Why should I build a Blue Box ? |
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Many of you may have that question, and here's my answer. Blue Boxing was the origin of phreaking (excluding whistling). Without the advent of Blue Boxes, I feel that some of the advances in the telecommunications industry would've taken longer to develop (The need to stop the phone phreaks forced AT&T Bell Laboratories to "step up" their development to stop those thieves!). There is no harm in building a Blue Box (except the knowledge you will gain in the field of electronics). Although there are software programs (Soft Blue Boxes) available for many micro's that will produce the Blue Box Multi-Frequency (MF) tones, they are not as portable as an actual Blue Box (you can't carry your computer to a telephone, so you must use it from home which could possibly lead to danger). Many phreaks are announcing the end of the Blue Box Era, but due to discoveries I have made (even on ESS 1A and possibly ESS 5), I do not believe this to be true. Although many people consider Blue Boxing "a pain in the

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ass", I consider Blue Boxing to be "phreaking in its' purest form". There is much to learn on the current fone network that has not been written about, and Blue Boxes are necessary for some of these discoveries. The gift of free fone calls tends to be a bonus.

Note: Blue Boxes also make great Christmas gifts!

+-----+
| Items needed to construct a Blue Box. |
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Here is the list of items you will need and where you can get them. It may be a good idea to gather some of the key parts (the chips, and especially the potentiometers, they took about 6 months to back order through Digi-key. A whole 6 fucking months!) before you start this project. Also, basic electronics tools will be necessary, and you might want to test the circuit on a bread board, then wire-wrap the final project. Also, you will need a box of some sort to put it in (like the blue plastic kind at Radio Shack that cost around \$5.00).

Note: An oscilloscope should be used when tuning in the potentiometers because the Bell system allows only a 7-10% tolerance in the precision of the frequencies.

Qty. ItemPart No.Place

1 | 4 x 4 Keypad|| Digi-Key
6 | Inverter Chip| 74C04|
32 | Potentiometer||
1 | 4-16 Converter Chip| 74LS154|
1 | 16 Key Decoder| 74C922|
2 | 2207 VCO| XR2207CP | Exar Corp.
3 | .01 uf Capacitor | 272-1051 | Radio Shack
5 | .1 uf Capacitor | 272-135| Radio Shack
2 | 1.5K Ohm Resistor || Radio Shack
2 | 1.0K Ohm Resistor || Radio Shack
1 | Speaker|| From an old Autovon fone.
1 | 9 Volt Battery|| Anywhere

The resistors should be a +/- 5% tolerance.

The speaker can be from a regular telephone (mine just happened to be from an old Autovon phone). But make sure that you remove the diode.

The Potentiometers should have a 100K Ohm range (but you may want to make the calculations yourself to double check).

The 9-volt battery can be obtained for free if you use your Radio Shack Free Battery Club card.

The Exar 2207 VCO can be found if you call the Exar Corp. located in Sunnyvale, California. Call them, and tell them the state you live in, and

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they'll give the name and phone number to the distributor that is located closest to you. The 2207 will vary from about \$3.00 for the silicon-grade (which is the one you'll want to use) to about \$12.00 for the high-grade Military chip.

Note: When you call Exar, you may want to ask them to send you the spec-sheets that gives greater detail as to the operation and construction of the chip.

+-----+
| Schematic Diagram |
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+-----+
| 1 2 3 A | | Figure #1 |
| 4 5 6 B | +-----+
| 7 8 9 C | | Logic Side |
| * 0 # D | +-----+

+-----+
1 | 3 | 5 | 7 | (VCC)
| 2 | 4 | 6 | 8 (+5 Volts) +-----+
| | | < u | | | [+]| _|_
| | | | | | | | _/GND
+-----+
| 2 | 11 | 10 | 7 | | 147 |
(.01C) | | 3 | 4 | 8 | 1 12 +-----+1 |
+---| | ---+513 +-----+2 (*74C04*) |
_||| |
_/GND | (*74C922*) | +-----+
+---| | -+6 |
| (.1C) | |
_|| |
_/GND | | 9 17 16 15 14 18 |
+-----+
| | | | | | |
_|| A B C D |
GND _/ | | | | | [+ (VCC) [+ (VCC)
| | | | | (+5 volts) | (+5 volts)
| | | | |
+-----+
| 23 22 21 20 24 18 +---+
+-----+12 | +---+
| | (*74LS154*) 19 +---+ _|_
_|| | | _/ |
_/GND | 1 2 3 4 5 6 7 8 9 10 11 13 14 15 16 17 | GND
+-----+
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
| | | | | | | | | | | | | | | |
| (Connects)

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| +----->
+-----+ | (Figure 2)
|+---+-----+
||  ||
+-----+-----+
| 3--|>o--4 5--|>o--6 |
| (Invtr.) (Invtr.) |
+-----+7|
_|_|(*74C04*)|
GND\_/ (VCC) [+]-+14|
(+5 volts)  ||
+-----+

```

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+-----+
| Figure #2 |/_|
+-----+-----+
| Tone Generation Side |_|_| | SPKR
+-----+GND\_/ +-----+
| |_|_|
| |_|_|
| |_|_| +-----+
+-----+| |_|_|
|_|_| +--+14| | |
|_|_|/GND|| (Repeat of) |
||| (First) |
----- (.1C)|| (Circuit) |
-----|||
||| (*XR2207CP*) | | |
|+-----+ | +--+6|
||| | | |
[+]-----+114+--+ | +-----+
(VCC)||+-----+
(+9 Volts) +-----+2||
| |12+-----+
(.01C) ----- ||_|_|
----- | (*XR2207CP*) | \_/GND |
| |1.5K Ohms|
+-----+311+-----\/\Rx/\/-+-----+
|| | |_|_|
|| +---\/\Rx/\/-+ \_/GND |
|1.0K Ohms|
|10+-----+
+-----+69+-----+
|8+-----+ ||
|||----- (.1C)|
|+-----+

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+-----+_|+-----+
|| Pot.GND\_/ Pot. ||
|\|\|\/\|-----\|\|\/\|
|1400 Hz. |1600 Hz.|
+-----+|+-----+
|| Pot.   |Pot.  ||
|\|\|\/\|-----+-----\|\|\/\|
|1500 Hz. ||900 Hz.|
||||
|14 more||14 More|
|  Potentiometers ||Potentiometers   |
|in this||in this|
|  area left out  ||area left out|
|  for simplicity ||for simplicity   |
||||
||||
|
(Connects) |
<-----+
(Figure 1)

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+-----+
| Multiplex Keypad System |
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First, the multiplex pattern used in the 4x4 keypad layout. I suggest that keys 0-9 be used as the Blue Box's 0-9 keys, and then you can assign A-D, *, # keys to your comfort (ie. * = Kp, # = St, D = 2600, and A-C as Kp1, Kp2 or however you want).

Note: On your 2600 Hz. key (The D key in example above) it may be a good idea to tune in a second potentiometer to 3700 Hz. (Pink Noise).

KeypadKey Assignments				Multiplex Pattern			
+-----+				+-----+			
1 2 3 A	1 2 3 4	1 2 3 A	----Y1=8	X1=3			
4 5 6 B	5 6 7 8	4 5 6 B	----Y2=1	X2=5			
7 8 9 C	9 10 11 12	7 8 9 C	----Y3=2	X3=6			
* 0 # D	13 14 15 16	* 0 # D	----Y4=4	X4=7			
+-----+				+-----+			
X1	X2	X3	X4				

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+-----+
| Blue Box Frequencies |
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This section is taken directly from Mark Tabas's "Better Homes and Blue Boxing" file Part 1.

Frequencies (Hz) Domestic Int'l

700+90011
700+110022
900+110033
700+130044
900+130055
1100+130066
700+150077
900+150088
1100+150099
1300+150000

700+1700ST3pCode 11
900+1700STpCode 12
1100+1700KPKP1
1300+1700ST2pKP2
1500+1700STST
2600+3700*Trunking Frequency*

Note: For any further information about the uses or duration of the frequencies, read the Mark Tabas files.

+-----+
| Schematic Help |
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This is the Key to the diagrams in the schematic. I hope that they help more then they might hurt.

┌┐
└┘/GND is the Ground symbol

| |
---| |-- is the Capacitor symbol
| |(.1C) stands for a .1 uf Capacitor
(.01C) stands for a .01 uf Capacitor
|

-----is another Capacitor symbol

--\\Rx\\/-- is the Resistor symbol (The 1.5K Ohm and 1.0K Ohm Resistors are at +/- 5%)

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|
\\/\//\//-- is the Potentiometer symbol (The frequencies I supplied
above are just examples.)
--|>o--is the Inverter symbol

+-----+
| Conclusion |
+-----+

This is just one way to build a Blue Box. If you choose this way, then I hope this file is adequate enough to aid you in the construction. Although these are not the best plans, they do work. This file does not tell you how to use it or what to do once it's built. For that information I mention that you read Mark Tabas's "Better Homes and Blue Boxing" files, or any other files/BBS subboards that deal with that realm.

If you need help, I suggest (thanks for that one Taran) that you ask a close friend, possibly an electronics teacher, or a phreak friend to help you. Also, if you need help or have questions or comments about this file, you can address them to me. I can be contacted through the LOD/H Technical Journal Staff account on the boards listed in the Intro, or on the few boards I call.

+-----+
! Credentials !
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At last, this article would not be possible without the help of the following people/places whom contributed to it in one way or another (it may not be apparent to them, but every minute bit helps).

Deserted Surfer (Who helped immensely from Day 1 of this project.)
(Without his help this file would not be.)
Mark Tabas(For the BHBB files which inspired my interests.)
Nickie Halflinger (For the original Blue Box plans I used.)
Mr. America(For the original Blue Box plans I used.)
Lex Luthor
Cheap Shades
Exar Corp.

Lastly, I would like to thank the United States government for furnishing federal grants to this project. Without their financial help, I would have had to dish out the money from my own pocket (Approximately \$80.00. Egads!)

Jester Sluggo

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```
//////////////////////////////////////////  
//The PIRATES' HOLLOW//  
//415-236-2371//  
//over 12 Megs of Elite Text Files//  
//ROR-ALUCARD//  
//Sysop: Doctor Murdock//  
// C0-Sysops: That One, Sir Death, Sid Gnarly & Finn //  
////  
// "The Gates of Hell are open night and day;//  
//Smooth is the Descent, and Easy is the way.." //  
//////////////////////////////////////////
```

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