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TO: Mark 5 group

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SUBJECT: 1024/2048 MHz clock synthesizer for DBE

A synthesizer for the DBE has been constructed using a National semiconductor LMX2531LQ2080E.

The circuit is shown in Fig. 1

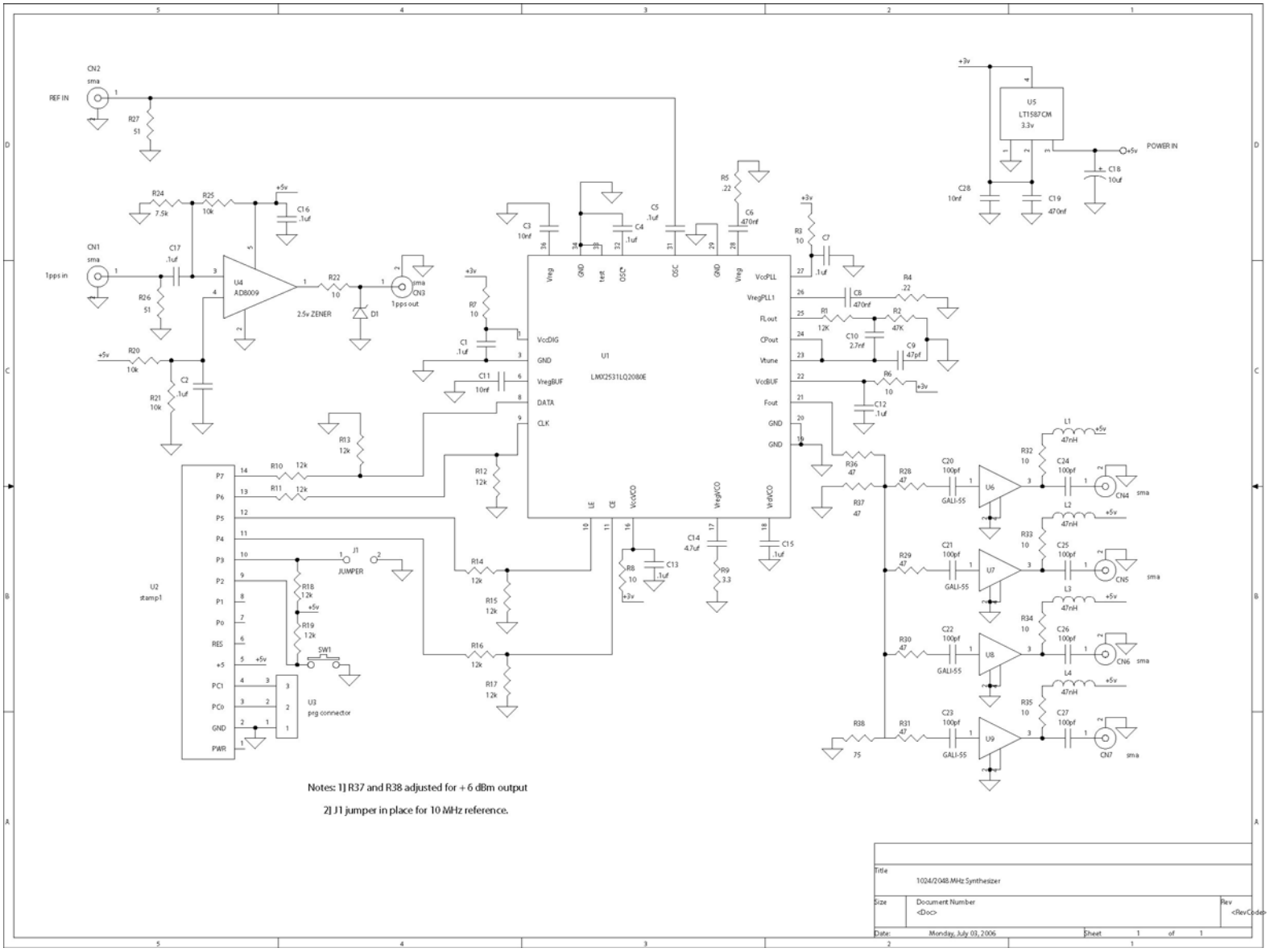
There are 2 jumpers. One selects 1024 and 2048 MHz SW1 and the other, J1, elects 5 or 10 MHz reference.

The performance is as follows:

Phase stability < 1ps/degC

Phase jitter < 1 ps rms

Buffered outputs +6dBm (needs 12 dB attenuators to drive ADC)


CN2
sma
REF IN
R27
51
R24
7.5k
R25
10k
+5v
C16
.1uf
CN1
sma
1pps in
C17
.1uf
R26
51
U4
AD8009
R22
10
2.5v ZENER
D1
sma
CN3
1pps out
R20
10k
R21
10k
C2
.1uf
U1
LMX2531LQ2080E
VccDIG
GND
VregBUF
DATA
CLK
VregPLL
VccPLL
FLout
CPout
Vtune
VccBUF
Fout
GND
GND
LE
CE
VccVCO
VregVCO
VrefVCO
C1
.1uf
C11
10nf
R7
10
R13
12k
R12
12k
R10
12k
R11
12k
R14
12k
R15
12k
R16
12k
R17
12k
R18
12k
R19
12k
SW1
J1
JUMPER
U2
stamp1
P7
P6
P5
P4
P3
P2
P1
P0
RES
+5
PC1
PC0
GND
PWR
U3
prg connector
C3
10nf
C4
.1uf
C5
.1uf
C6
.470nf
R5
.22
C14
4.7uf
C15
.1uf
R8
10
C13
.1uf
R9
3.3
R3
10
C7
.1uf
C8
.470nf
R4
.22
R1
12K
R2
47K
C10
2.7nf
C9
47pf
R6
10
C12
.1uf
R36
47
R37
47
U5
LT1587CM
3.3v
POWER IN
C18
10uf
C28
10nf
C19
470nf
R28
47
C20
100pf
GALI-55
U6
L1
47nH
R32
10
C24
100pf
CN4
sma
R29
47
C21
100pf
GALI-55
U7
L2
47nH
R33
10
C25
100pf
CN5
sma
R30
47
C22
100pf
GALI-55
U8
L3
47nH
R34
10
C26
100pf
CN6
sma
R38
75
R31
47
C23
100pf
GALI-55
U9
L4
47nH
R35
10
C27
100pf
CN7
sma
Notes: 1] R37 and R38 adjusted for + 6 dBm output
2] J1 jumper in place for 10 MHz reference.
Title
1024/2048 MHz Synthesizer
Size
Document Number
<Doc>
Rev
<RevCode>
Date:
Monday, July 03, 2006
Sheet
1
of
1

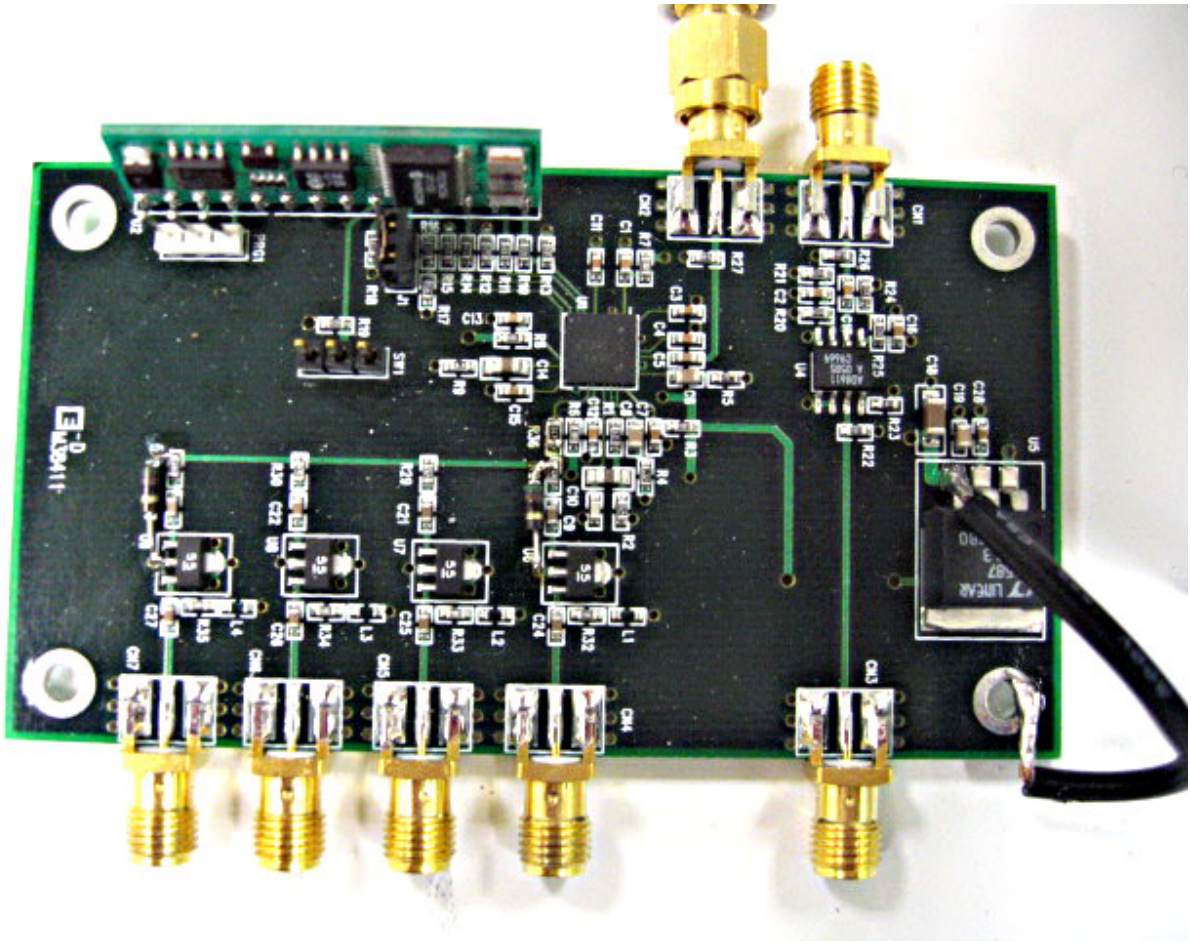


Fig. 2. 1024/2048 MHz Synthesizer

```
' {$STAMP BS1}
' pin0 = NC
' pin1 = NC
' pin2 = switch for 1024/2048
' pin3 = Switch for 5/10 MHz
' pin4 = Chip enable
' pin5 = LE
' pin6 = CLK
' pin7 = DATA

       DIRS=%11110000                                  'initial I/O
set
       PIN4=1                                          'enable chip
       PAUSE 1000
       PIN5=1                                          'disable cmd
       B0=%10000100: B3=%00000000: B4=%00000101:  GOSUB syn
'init1
       B0=%10000000: B3=%00000000: B4=%00000101:  GOSUB syn
'init2
start: B0=%10000000: B3=%00000111: B4=%11110101:  GOSUB syn  'R5
'      PAUSE 1000
       B0=%00000001: B3=%00000100: B4=%10001100:  GOSUB syn  'R12
       B0=%00000000: B3=%00010001: B4=%10101001:  GOSUB syn  'R9
       B0=%00000011: B3=%00000000: B4=%00001000:  GOSUB syn  'R8
       B0=%00000000: B3=%00010101: B4=%00000111:  GOSUB syn  'R7
       B0=%01001000: B3=%11100110: B4=%01010110:  GOSUB syn  'R6
       B0=%00000000: B3=%00000000: B4=%00000100:  GOSUB syn  'R4
       B0=%10111100: B3=%00000000: B4=%00000011
       IF PIN2=1 THEN nnxx
       B0=%00111100      ' 2048 MHz
nnxx:  GOSUB syn  'R3
       B0=%01000110: B3=%01000000: B4=%00010010             'R2
       IF PIN3=1 THEN nnxt
       B4=%00100010      ' 10 MHz ref
nnxt:  GOSUB syn  'R2
       B0=%00100000: B3=%01000000: B4=%00000001:  GOSUB syn  'R1
```

```
       B0=%10011001: B3=%00001111: B4=%00000000:  GOSUB syn  'R0
done:  PAUSE 60000
'infinite loop
       GOTO done
'       PAUSE 2000
'       GOTO start
syn:   PIN5=0
       FOR B6 = 1 TO 2
       FOR B5 = 1 TO 8                                  'loop for 8
bits
       PIN7=BIT7
'       DEBUG BIT7                                        'msb of b0
       PULSOUT 6,1                                      'pulse clock
line
       B0=B0*2                                          'left shift
one bit
       NEXT
       B0=B3
       NEXT
       B0=B4
       FOR B5 = 1 TO 8
       PIN7=BIT7
'       DEBUG B4
       PULSOUT 6,1
       B0=B0*2
       NEXT
       PIN5=1
'       PAUSE 1000
       RETURN
```