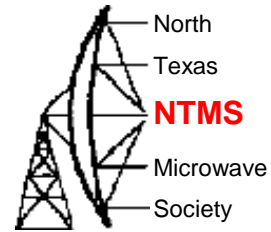


ZL2BKC PLLs

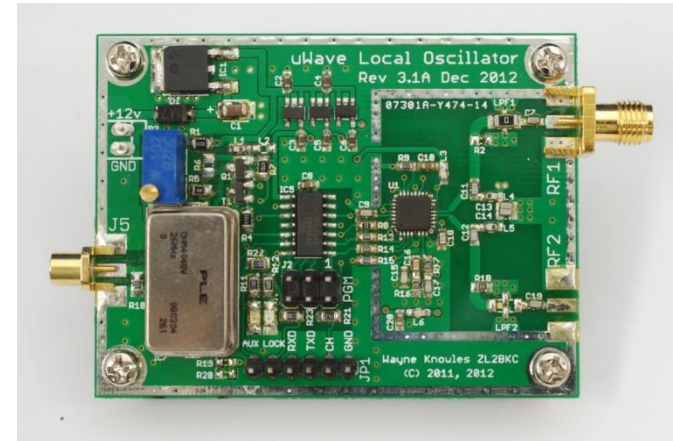
W5LUA

March 2, 2019

ZLPLL based on the ADF4351

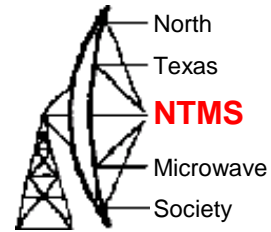


- **Specifications:**
- 31MHz to 4400MHz
- Fractional-N synthesizer capable of 1KHz (or better) frequency resolution
- 2 x RF outputs +7dBm from 500MHz to 2GHz
- 4 software programmable output levels at 2dB increments
- No Tuning required
- Frequency selection to one of 16 preset values (optional)
- RS232 interface for programming of frequency and power levels
- Frequency offset for TX (optional)
- Several reference frequency options:
 - Internal OCXO or VCXO reference
 - External Reference up to 100MHz
- Automatically switch from internal to external frequency reference
- CW Beacon firmware available
- Having 2 high level outputs is useful for applications sharing the same LO module between 2 transverters, or driving separate RX and TX stages.



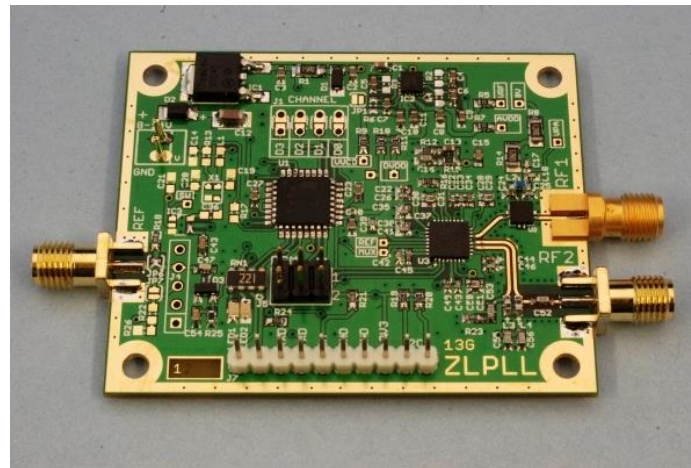
115 USD

ZLPLL 14 GHz based on the ADF5355

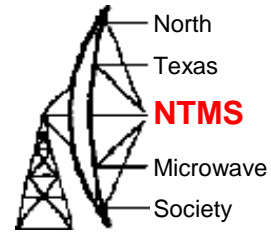


- **Specifications:**
- 54MHz to 13600MHz
- 2 x RF outputs 14G and 6.8G
- 4 software programmable output levels at 2dB increments
- No Tuning required
- RS232 interface for programing of frequency and power levels
- Requires external 10 MHz or higher reference
- CW Beacon firmware available
- +14 dBm Typical

190 USD



Other items from ZL2BKC



- Standalone 10 MHz OCXO
– 10USD



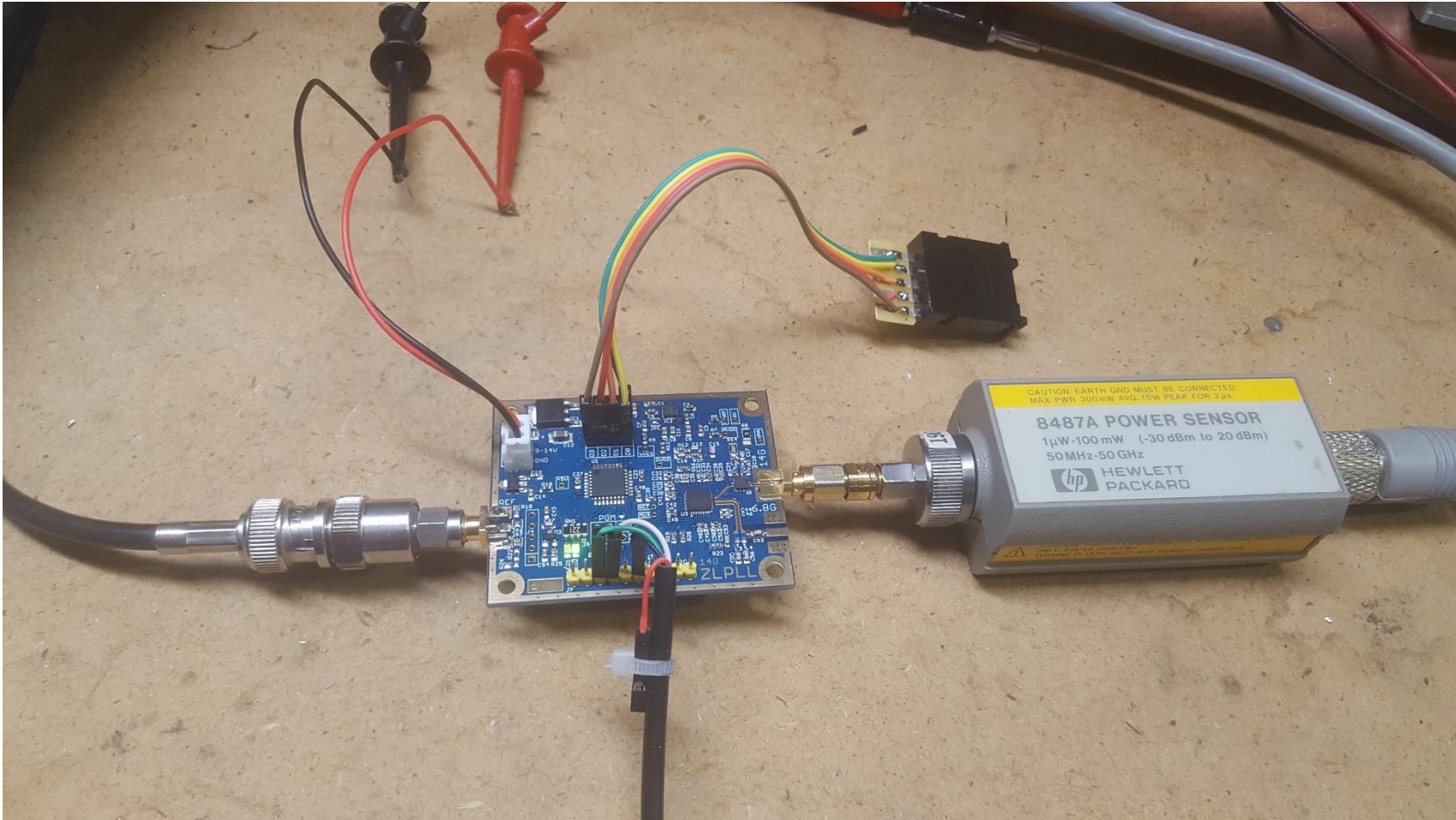
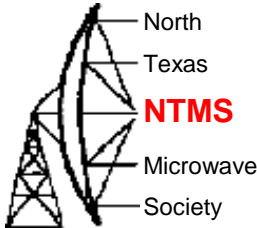
- BCD Switch Option to toggle frequencies – 4USD



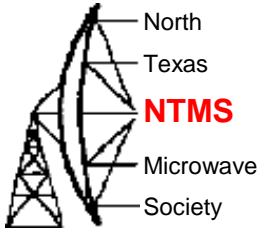
- Programming Cable – 5USD



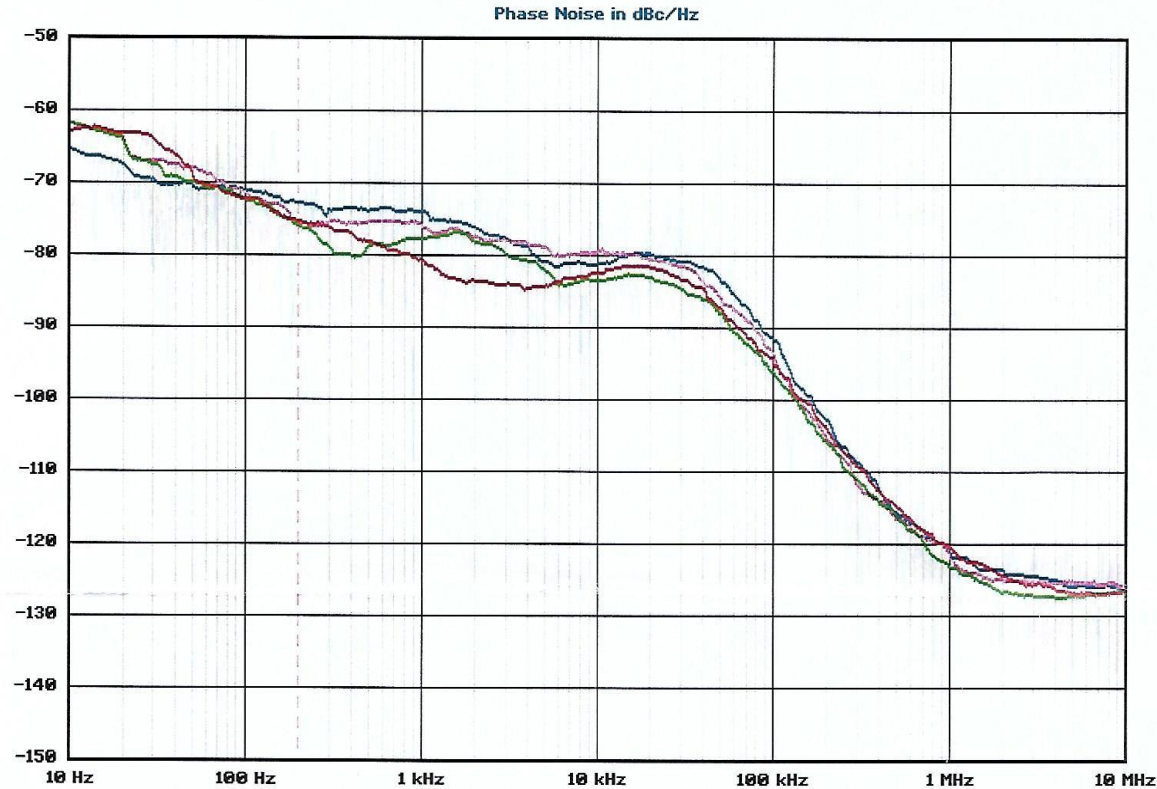
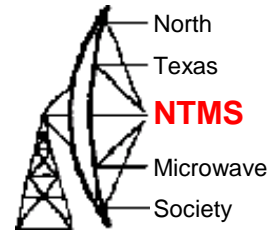
Testing & Programming the 14 G PLL



13.75 dBm at 12024 MHz

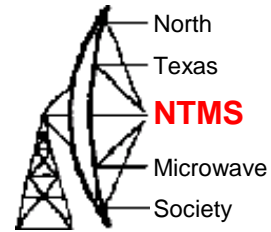


ZL 13 GHz PLL



Trace	Carrier Hz	Carrier dBm	dBc/Hz at 200 Hz	RF Atten dB	Instrument
1L A046 cp=2 bleed=20	10 224 000 000	-4.83	-72.7	10	HP8563E,005,007,008,
1L A048 cp=2 bleed=20	10 224 000 000	-3.87	-75.5	10	HP8563E,005,007,008,
1L A046 cp=2 bleed=20	12 024 000 000	-2.67	-75.9	10	HP8563E,005,007,008,
1L A046 cp=2 bleed=20 Ref=TBolt	12 024 001 380	-2.50	-75.3	10	HP8563E,005,007,008,

“show” Command Reveals Frequencies



```

COM3 - Tera Term VT
File Edit Setup Control Window Help
> show
Frequency: 12024.000
Level: 3
Step Size: 25000.00 Hz

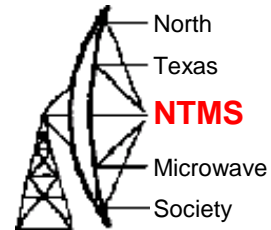
Internal Ref: 10.000 MHz
External Ref: 10.000 MHz <level >= 20
Doubler Max: 50 MHz
Config: cp=2, bleed=10
Config: mtld=1, csr=0, gcd=1, spur=0
I2C Addr: 0x00

CW Text=__ZLPLL__
CW Speed=12 WPM Gap=0 T1=0ms T2=5ms

0: Freq 12024.000 level=3 mode=1 <LO, RFON>
1: Freq 11952.000 level=3 mode=1 <LO, RFON>
2: Freq 11736.000 level=3 mode=1 <LO, RFON>
3: Freq 12648.000 level=3 mode=1 <LO, RFON>
4: Freq 9936.000 level=3 mode=1 <LO, RFON>
5: Freq 11808.000 level=3 mode=1 <LO, RFON>
6: Freq 5616.000 level=3 mode=1 <LO, RFON>
7: Freq 5328.000 level=3 mode=1 <LO, RFON>
8: Freq 0.000 level=0 mode=0 <LO, RFOFF>
9: Freq 0.000 level=0 mode=0 <LO, RFOFF>
10: Freq 0.000 level=0 mode=0 <LO, RFOFF>
11: Freq 0.000 level=0 mode=0 <LO, RFOFF>
12: Freq 0.000 level=0 mode=0 <LO, RFOFF>
13: Freq 0.000 level=0 mode=0 <LO, RFOFF>
14: Freq 0.000 level=0 mode=0 <LO, RFOFF>
15: Freq 0.000 level=0 mode=0 <LO, RFOFF>
>

```


“help” Shows Commands

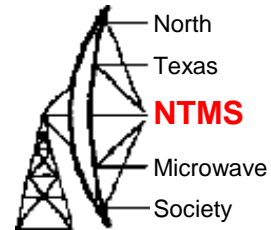


```

COM3 - Tera Term VT
File Edit Setup Control Window Help
CW Speed=12 WPM Gap=0 T1=0ms T2=5ms
0: Freq 12024.000 level=3 mode=1 <LO, RFON>
1: Freq 11952.000 level=3 mode=1 <LO, RFON>
2: Freq 11736.000 level=3 mode=1 <LO, RFON>
3: Freq 12648.000 level=3 mode=1 <LO, RFON>
4: Freq 9936.000 level=3 mode=1 <LO, RFON>
5: Freq 11808.000 level=3 mode=1 <LO, RFON>
6: Freq 5616.000 level=3 mode=1 <LO, RFON>
7: Freq 5328.000 level=3 mode=1 <LO, RFON>
8: Freq 0.000 level=0 mode=0 <LO, RFOFF>
9: Freq 0.000 level=0 mode=0 <LO, RFOFF>
10: Freq 0.000 level=0 mode=0 <LO, RFOFF>
11: Freq 0.000 level=0 mode=0 <LO, RFOFF>
12: Freq 0.000 level=0 mode=0 <LO, RFOFF>
13: Freq 0.000 level=0 mode=0 <LO, RFOFF>
14: Freq 0.000 level=0 mode=0 <LO, RFOFF>
15: Freq 0.000 level=0 mode=0 <LO, RFOFF>
> help
Command      Description
cw speed #   Set the CW Speed in WPM
cw text      Update CW message text
channel #    Load channel for reconfiguration
save #       Save channel
freq #.###   Set RF frequency
level #      Set RF Level (0=0ff to 4=High)
multiplier # Set external multiplier factor
config param # Setup PLL Parameters
ref_int #.### Reference frequency - Internal
ref_ext #.### Reference frequency - External
diag         Display PLL data for channel
debug # #    Display debugging information
test         Enter RF Test mode
init         Reload PLL Setup
i2c_addr     Set I2C Slave address
show         Display current config
>

```

Added 10224 MHz



```

COM3 - Tera Term VT
File Edit Setup Control Window Help
> save 8
> show
Frequency: 10224.000
Level: 3
Step Size: 25000.00 Hz

Internal Ref: 10.000 MHz
External Ref: 10.000 MHz (level >= 20)
Doubler Max: 50 MHz
Config: cp=2, bleed=10
Config: mtld=1, csr=0, gcd=1, spur=0
I2C Addr: 0x00

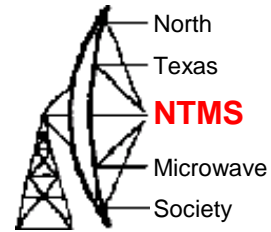
CW Text= ZLPLL
CW Speed=12 WPM Gap=0 T1=0ms T2=5ms

0: Freq 12024.000 level=3 mode=1 <LO, RFON>
1: Freq 11952.000 level=3 mode=1 <LO, RFON>
2: Freq 11736.000 level=3 mode=1 <LO, RFON>
3: Freq 12648.000 level=3 mode=1 <LO, RFON>
4: Freq 9936.000 level=3 mode=1 <LO, RFON>
5: Freq 11808.000 level=3 mode=1 <LO, RFON>
6: Freq 5616.000 level=3 mode=1 <LO, RFON>
7: Freq 5328.000 level=3 mode=1 <LO, RFON>
8: Freq 10224.000 level=3 mode=1 <LO, RFON>
9: Freq 0.000 level=0 mode=0 <LO, RFOFF>
10: Freq 0.000 level=0 mode=0 <LO, RFOFF>
11: Freq 0.000 level=0 mode=0 <LO, RFOFF>
12: Freq 0.000 level=0 mode=0 <LO, RFOFF>
13: Freq 0.000 level=0 mode=0 <LO, RFOFF>
14: Freq 0.000 level=0 mode=0 <LO, RFOFF>
15: Freq 0.000 level=0 mode=0 <LO, RFOFF>
> ZLPLL Local Oscillator Rev 4.1H
<C>2012 W.Knowles ZL2BKC

ADF5355 Test...OK
>

```

Summary



- Decent power levels without the need for a buffer amplifier
- Easy to program using “Tera Term” and serial to USB adapter cable
- Easy to set up in beacon mode
- Wayne ZL2BKC is easy to work with
- <https://zl2bkc.com/store/>