



# Octave and LimeSDR

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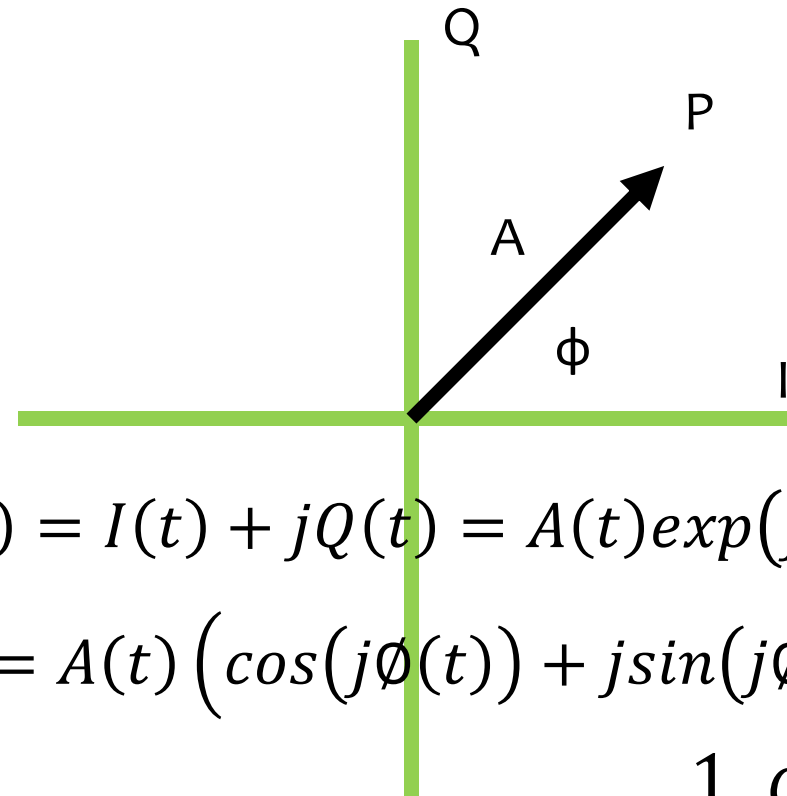
# Getting started with Octave

- **Linux 4.0.0**
- **Dependencies**
  - Liboctave-dev
  - General, Control, Communications
  - Signal
- **Lime Packages**
  - Limesdr-1.0.0.tar.gz
  - Limesp-1.0.0.tar.gz
  - Copy to ~/octave
  - Octave
  - Pkg install Limesdr-1.0.0.tar.gz
  - Pkg install Limesp-1.0.0.tar.gz
- **Windows 4.0.3**
- **Command/System**
  - Cd %USERPROFILE%
  - Mkdir octave
  - Add to PATH
- **Lime Packages**
  - Limesdr-1.0.0.tar.gz
  - Limesp-1.0.0.tar.gz
  - Copy to UserName\octave
  - Extract dll into this directory
  - Octave
  - Pkg install ~/octave/Limesdr-1.0.0.tar.gz
  - Pkg install ~/octave/Limesp-1.0.0.tar.gz



# Representing Modulation in Octave

- AM, FM and PM can be represented by
- Cartesian co-ordinates {x,y}
  - In Radio, called Inphase and Quadrature
  - Real, Imaginary (Complex Numbers).
  - Programming real() imag()
  - Note i and j mean the same.
- Polar co-ordinates (Vector Modulation)
  - Natural language for describing Amplitude and Phase modulation.
  - Amplitude A, Phase  $\varphi$
  - Phase is usually in radians not degrees.
  - Programming abs() arg() exp(i\*)
  - Frequency is a phase that changes at a constant rate.

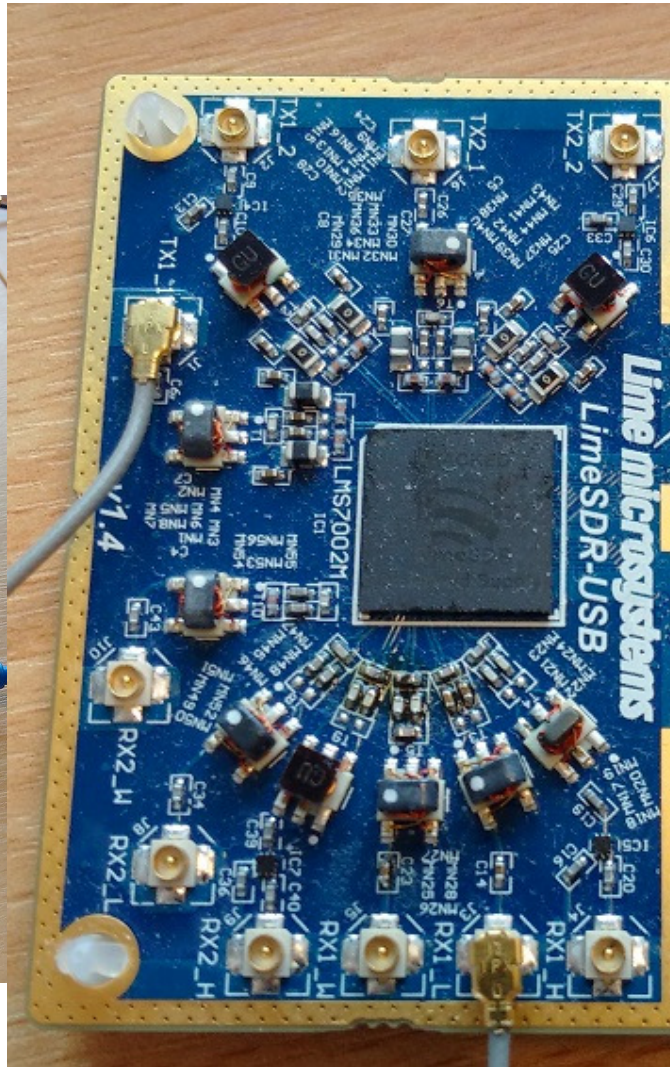


$$P(t) = I(t) + jQ(t) = A(t)\exp(j\phi(t))$$

$$P(t) = A(t) \left( \cos(j\phi(t)) + j\sin(j\phi(t)) \right)$$

$$f = \frac{1}{2\pi} \frac{d\phi(t)}{dt}$$

# Suggested Connections for Examples



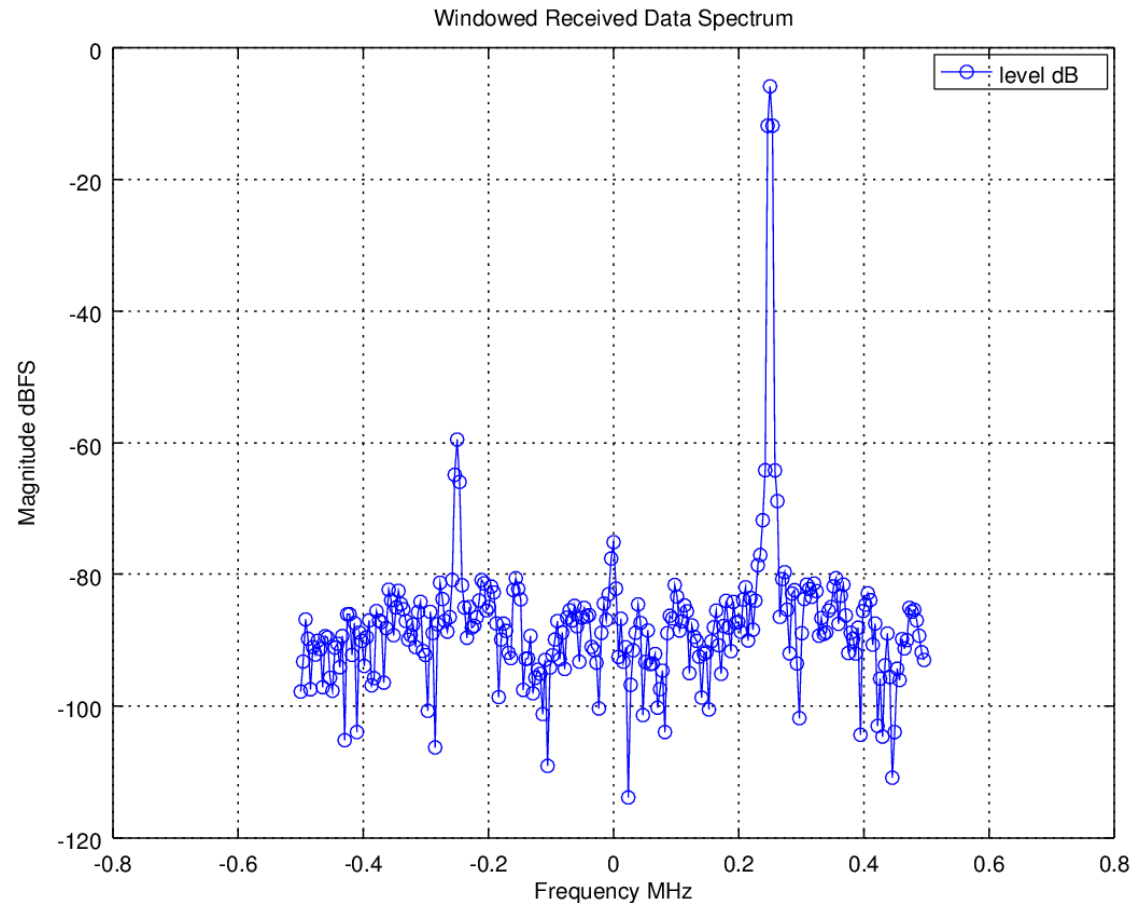
Use external RF loop back  
To avoid interference.  
E.g. SMA adapter

Connect to TX1\_1 and RX1\_L  
For compatibility with  
Code examples.



# Single Sideband Demo

- **SSB.m**
- **Demonstrates**
  - Octave link with LimeSDR
  - SSB Generation
  - FFT with Hanning Window
- **Settings File**
  - .ini generated in LimeSuite
  - 866MHz -50dBm for table top license exempt transmission.



# Frequency Shift Keying Demo

- **FSK.m**

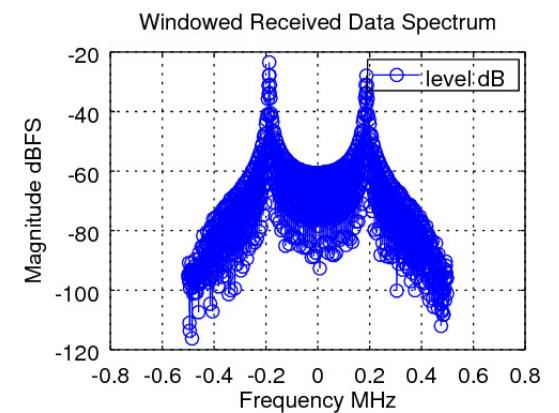
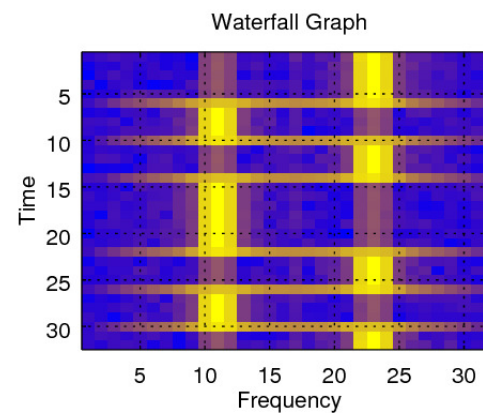
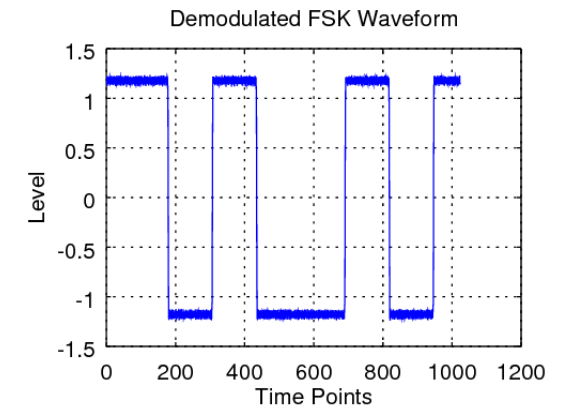
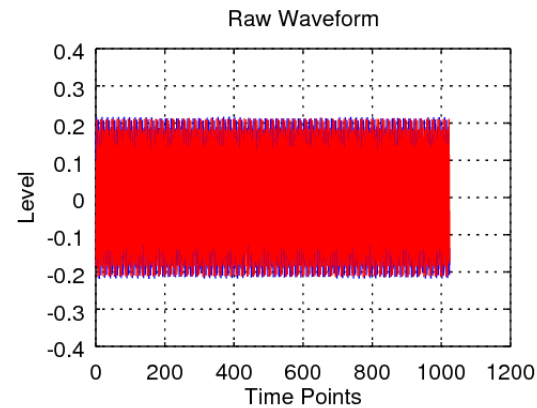
- Fir=0

- **Demonstrates**

- Octave link with LimeSDR
- FSK generation
- FM/FSK demodulation.
- Waterfall type graphs

- **Settings File**

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# Frequency Shift Keying Demo

- **FSK.m**

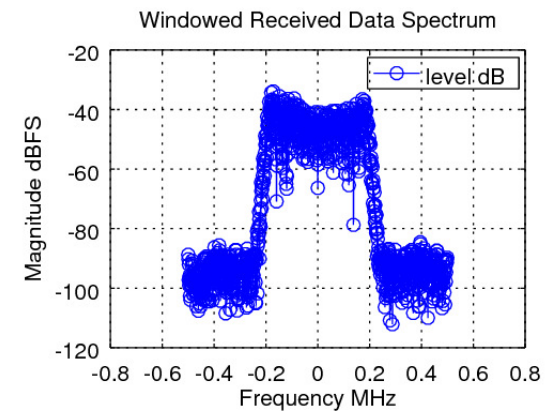
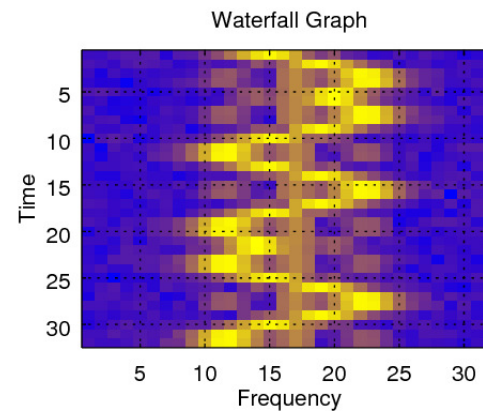
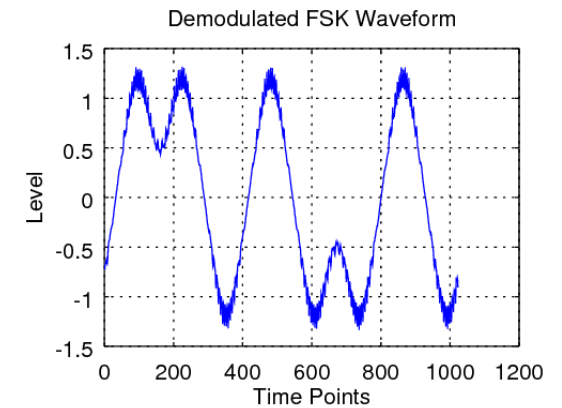
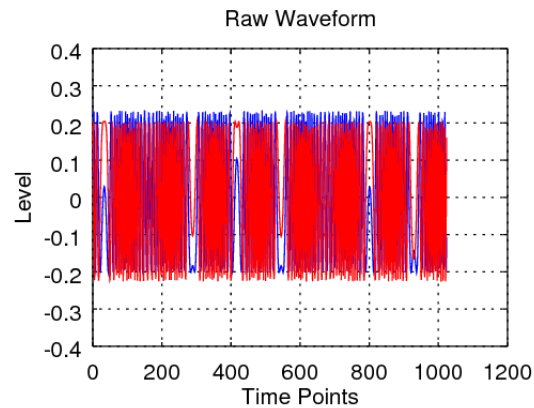
- Fir=1

- **Demonstrates**

- FIR filtering
- Bandwidth limiting

- **Settings File**

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# Amplitude Shift Keying Demo

- **ASK.m**

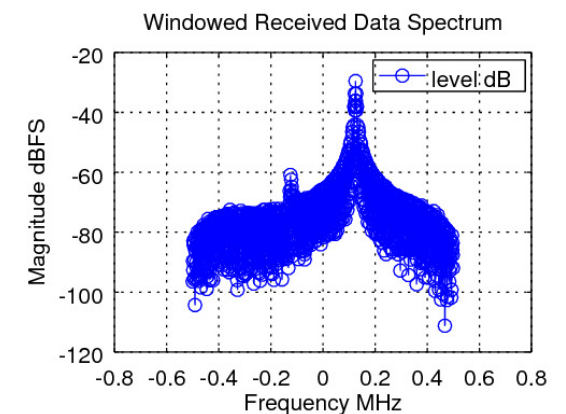
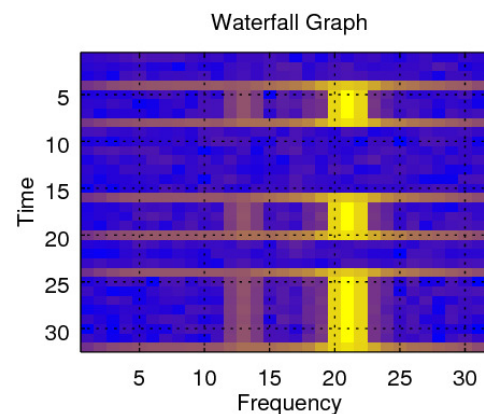
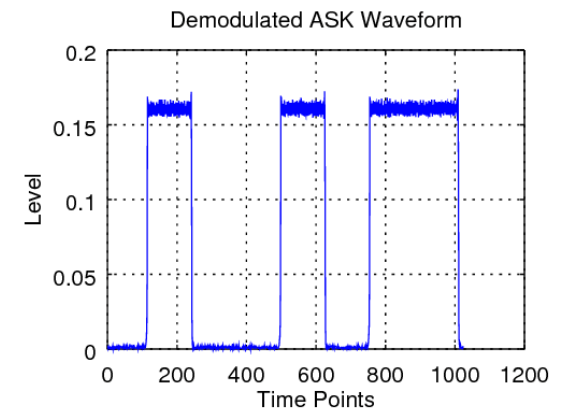
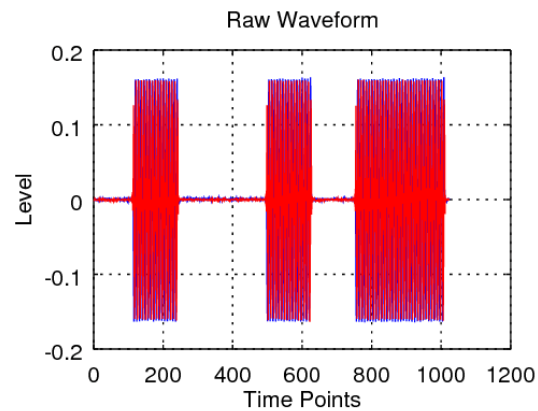
- Fir=0

- **Demonstrates**

- Octave link with LimeSDR
- ASK generation
- AM/ASK demodulation.
- Waterfall type graphs

- **Settings File**

- .ini generated in LimeSuite
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# Amplitude Shift Keying Demo

- **ASK.m**

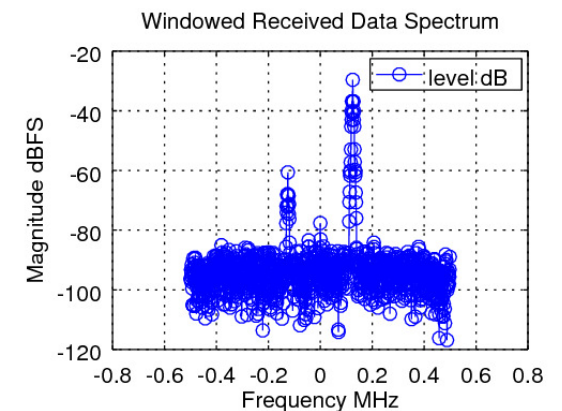
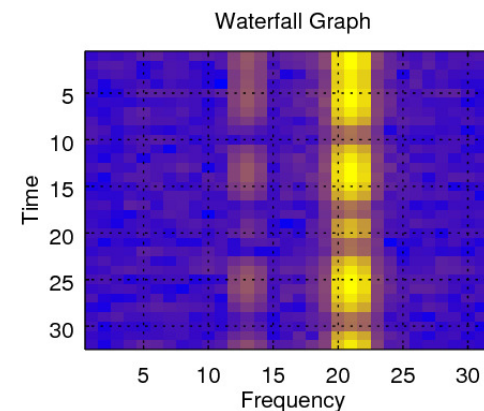
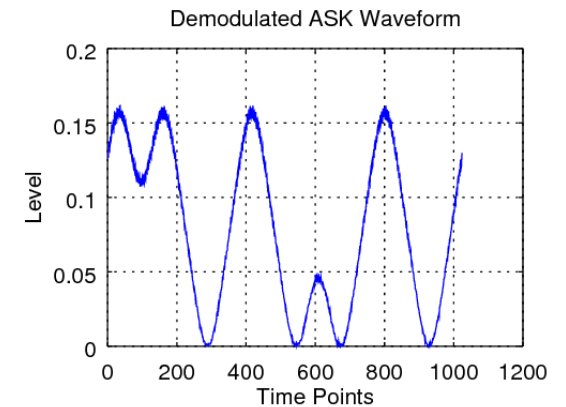
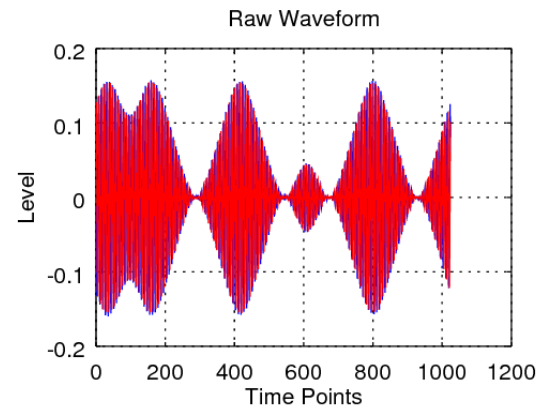
- Fir=0

- **Demonstrates**

- FIR filtering
- Bandwidth limiting

- **Settings File**

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# Phase Shift Keying Demo

- **PSK.m**

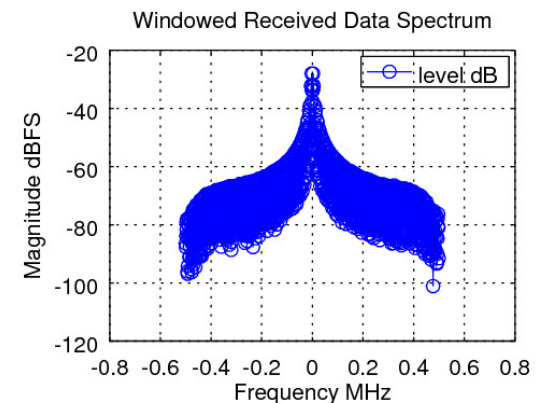
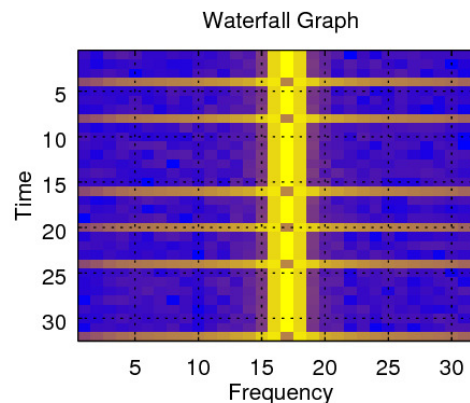
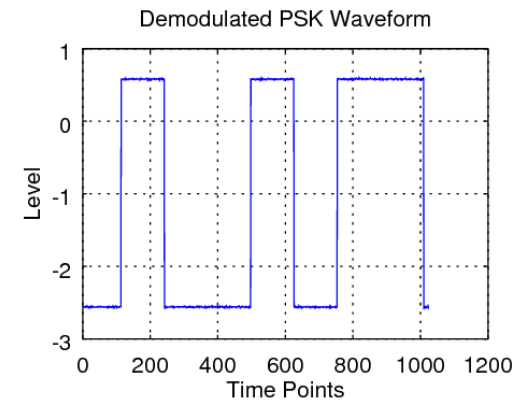
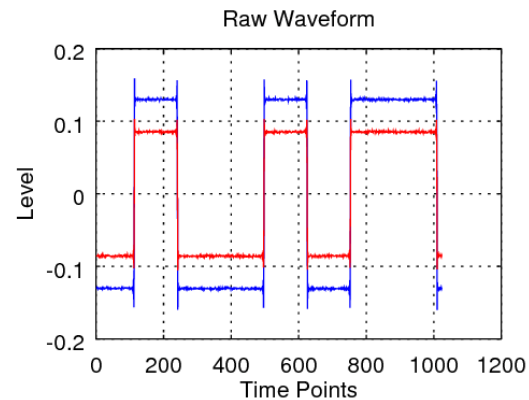
- Fir=0

- **Demonstrates**

- Octave link with LimeSDR
- PSK generation
- PM/PSK demodulation.
- Waterfall type graphs

- **Settings File**

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# Phase Shift Keying Demo

- **PSK.m**

- Fir=0

- **Demonstrates**

- FIR filtering
- Bandwidth limiting

- **Settings File**

- .ini generated in LimeSuite
- 866MHz -50dBm for table top license exempt transmission.

