SDR Transceivers

Disclaimer

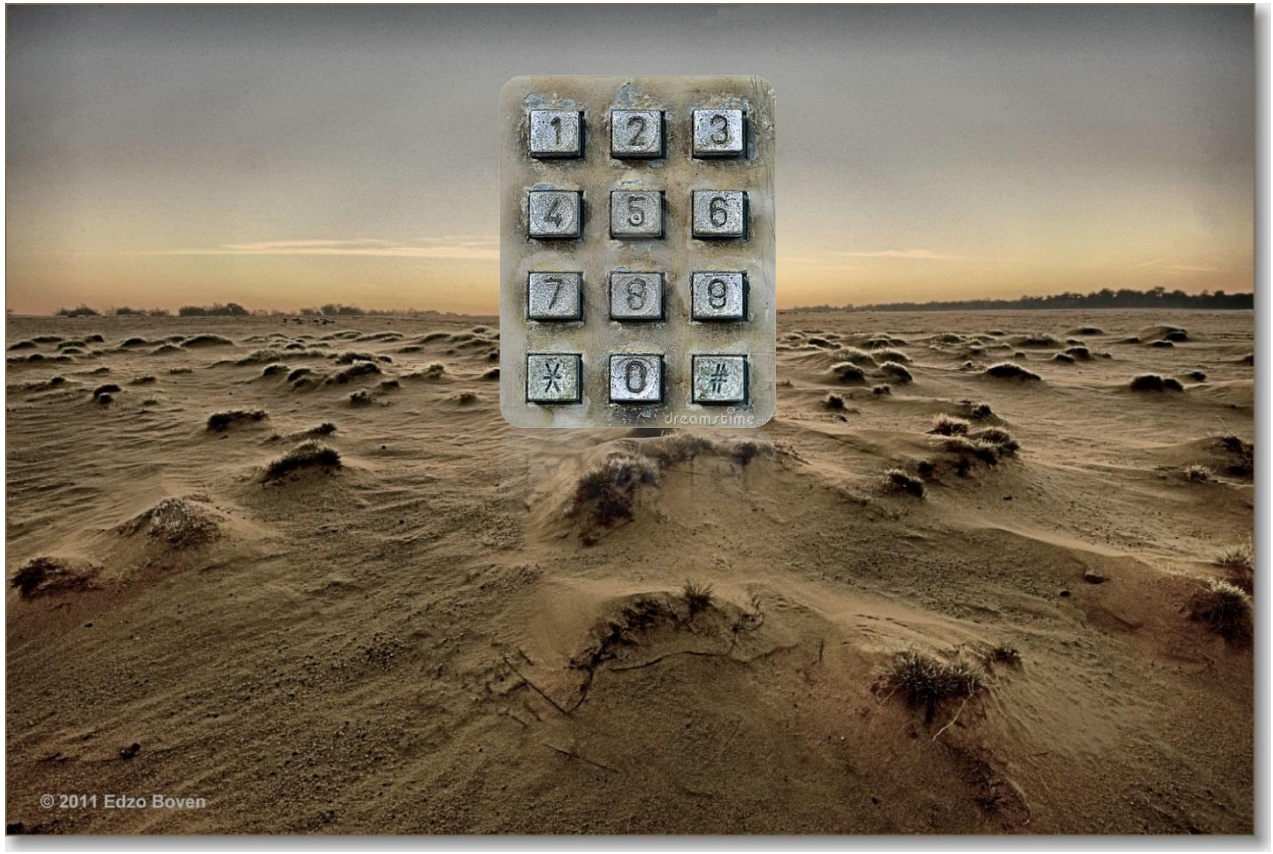
Will **not** cover all transceivers

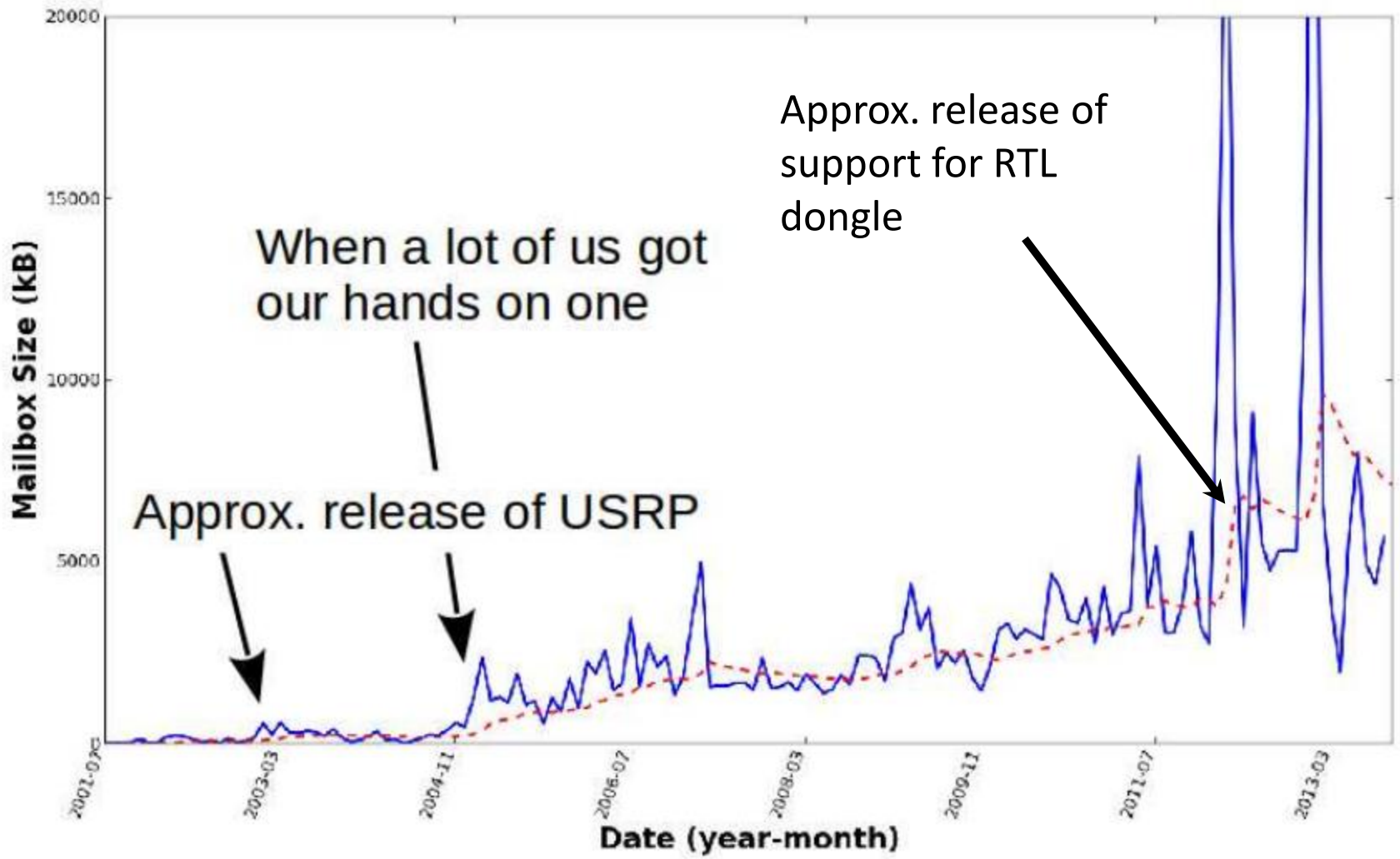
Not endorsing anything

Not endorsing anything

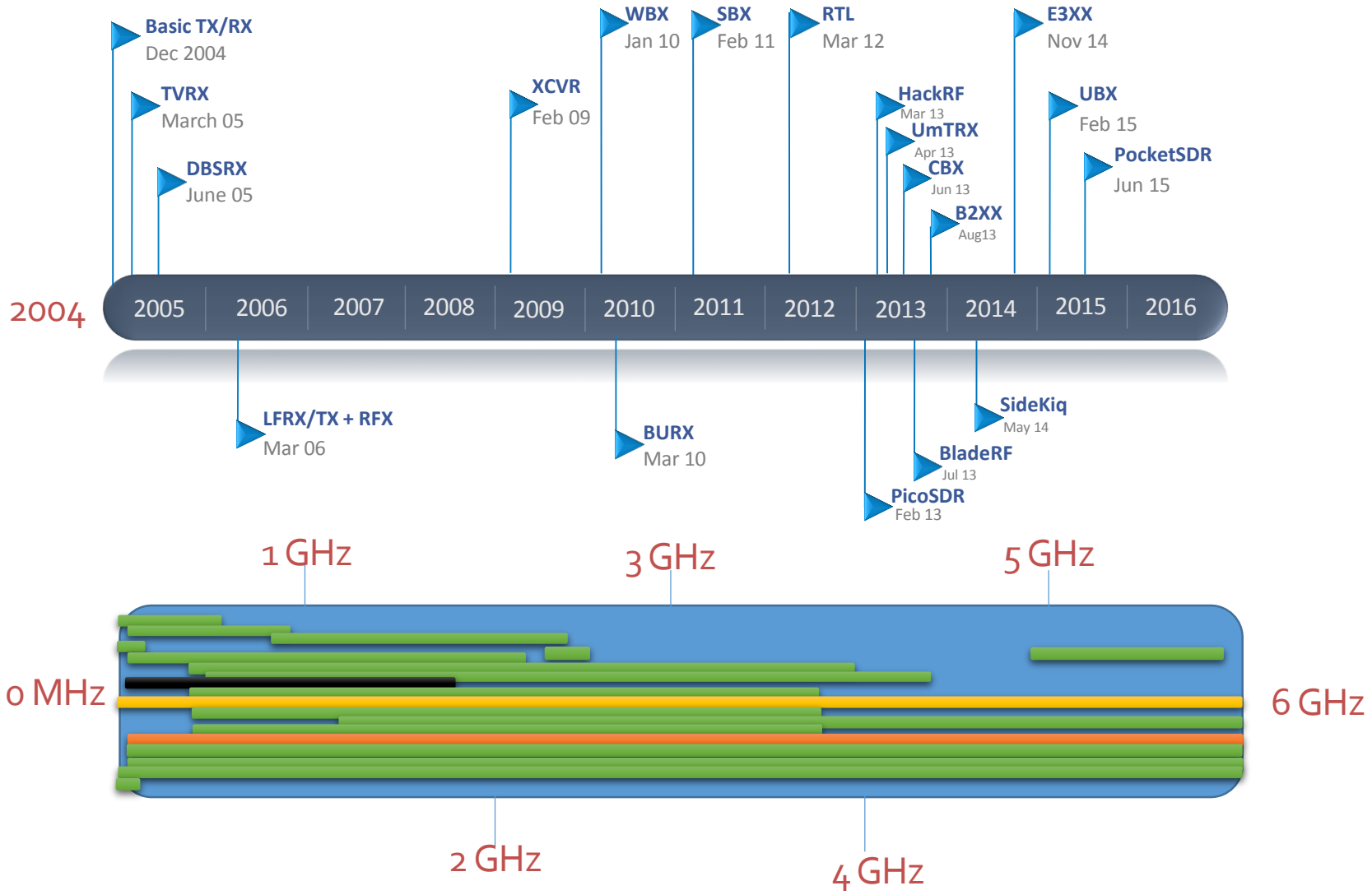
GNURadio without Transceivers

What would GR today be without accessible transceivers?




20000
15000
10000
5000
Mailbox Size (kB)
When a lot of us got our hands on one
Approx. release of USRP
Approx. release of support for RTL dongle
2003-03
2004-11
2006-07
2008-03
2009-11
2011-07
2013-03
Date (year-month)

Evolution!


Basic TX/RX
Dec 2004
TVRX
March 05
DBSRX
June 05
XCVR
Feb 09
WBX
Jan 10
SBX
Feb 11
RTL
Mar 12
HackRF
Mar 13
UmTRX
Apr 13
CBX
Jun 13
B2XX
Aug13
E3XX
Nov 14
UBX
Feb 15
PocketSDR
Jun 15
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
LFRX/TX + RFX
Mar 06
BURX
Mar 10
PicoSDR
Feb 13
BladeRF
Jul 13
SideKiq
May 14
1 GHz
3 GHz
5 GHz
0 MHz
6 GHz
2 GHz
4 GHz

Evolution of moving samples

USB 2.0 – 8 MHz

1 Gig Ethernet – 25 MHz

PCIe (v2) – 100 Mhz per lane *

USB 3.0 – 125 MHz *

10 Gig Ethernet – 250 MHz *

Thunderbolt – 500 MHz *

Transceivers w/ GNURadio Source/Sink Support

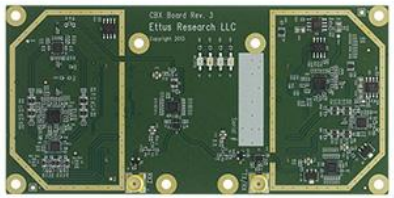
Ettus UHD Devices

- B2XX
  - Freq: 70 MHz – 6 GHz
  - Resolution: 12-bit
  - **2 Channels**
  - USB 3.0
- E3XX
  - Freq: 70 MHz – 6 GHz
  - Resolution: 12-bit
  - **2 Channels**
  - Embedded Xilinx Zynq
- X3XX
  - Freq: Daughtercard
  - Resolution: 14-bit ADC, 16-bit DAC
  - Bandwidth: 120 MHz
  - **2 Channels**
  - PCIex4, ExpressCard, or 10 GigE
- N2XX
  - Freq: Daughtercard
  - Resolution: 14-bit ADC, 16-bit DAC
  - Bandwidth: 25 MHz
  - Gigabit Ethernet

Transceivers w/ GNURadio Source/Sink Support

Ettus UHD Daughtercards

- UBX
  - Freq: 10 MHz – 6 GHz
  - RF shielding
- CBX
  - Freq: 1.2 GHz – 6 GHz
- SBX
  - Freq: 400 MHz – 4.4 GHz
- WBX
  - Freq: 50 MHz – 2.2 GHz
  - Granddaughter card



All have 120 MHz X-series options

Transceivers w/ GNURadio Source/Sink Support

DRS PicoFlexor

- Freq range:
  - 2 MHz – 3 GHz
  - 2 MHz – 12.4 GHz with option
- Resolution: 8 bits
- Dynamic Range: not provided
- Instantaneous bandwidth: 6 or 25 MHz
- Receive only
- **2 Channels**
- OMAP DM3730 onboard
- USB 2.0

- gr-dsp – OMAP DSP blocks for GNU Radio provided

Transceivers w/ GNURadio Source/Sink Support

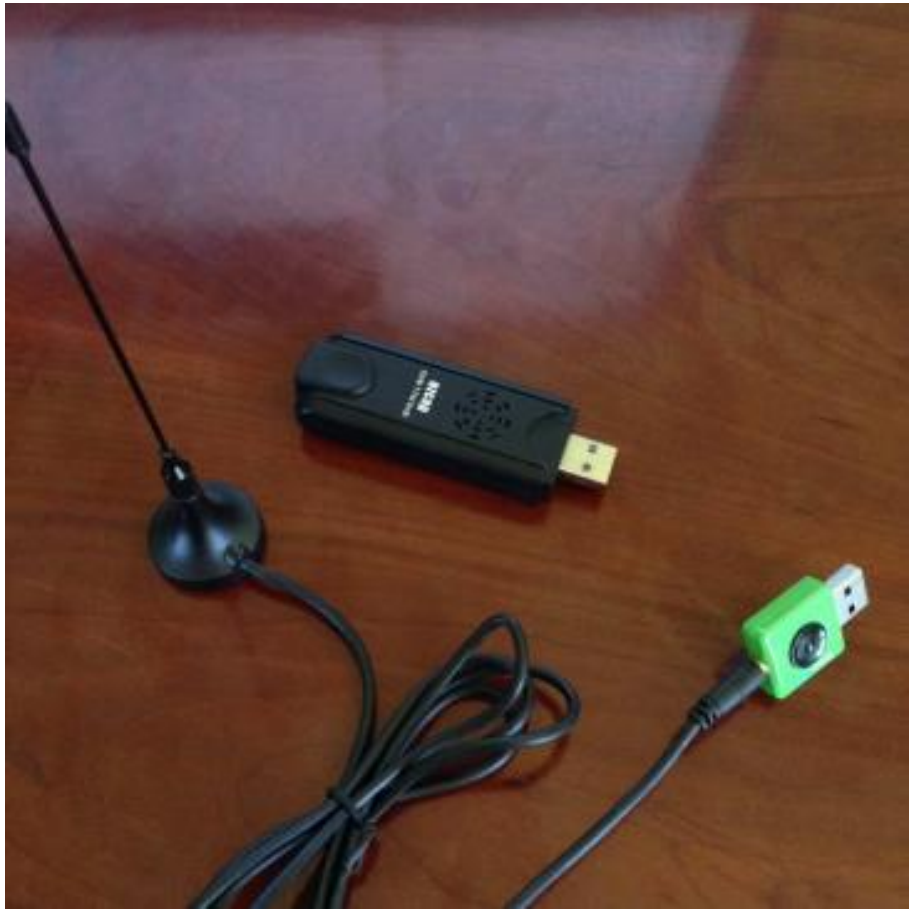
Epiq Sidekiq

- Freq range: 70 MHz – 6 GHz
- Resolution: 12-bit
- Instantaneous bandwidth: 50 MHz
- TX/RX full duplex
- **2 Channels – phase coherent**
- MiniPCIe x1 or USB 2.0

Transceivers w/ GNURadio Source/Sink Support

RTL-SDR

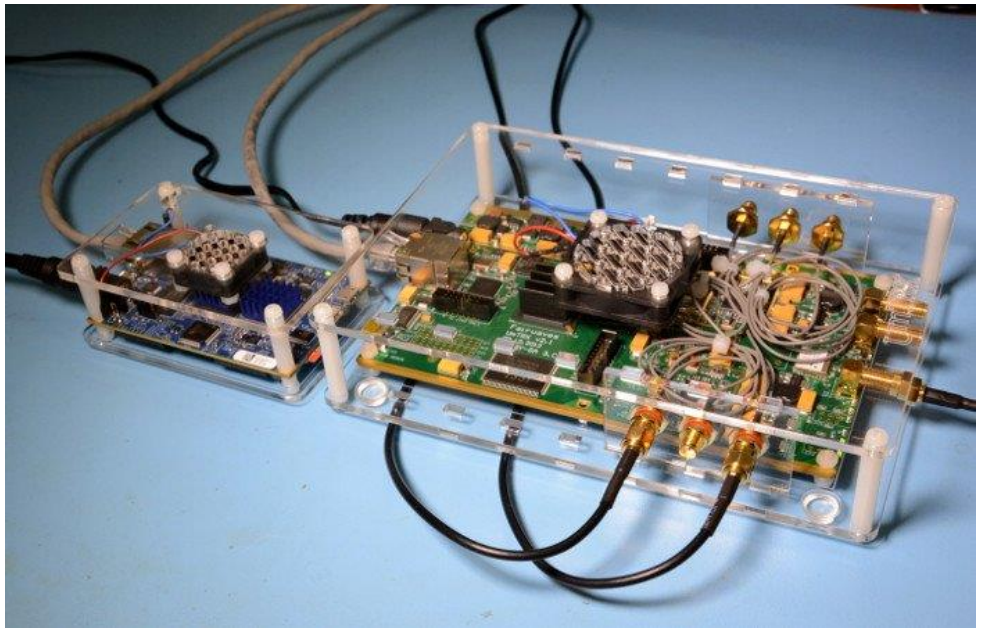
- Parameters vary depending on the part
- Freq range: ~25 MHz – 2100 MHz
- Resolution: 8 bits
- Dynamic Range: not provided
- Instantaneous bandwidth: 2.56 MHz
- Receive only
- USB 2.0



Transceivers w/ GNURadio Source/Sink Support

UmTRX

- Freq range: 300 MHz – 3.8 GHz
- Resolution: 12-bit
- Instantaneous bandwidth: 13 MHz
- TX/RX full duplex
- **2 Channels**
- Gigabit Ethernet



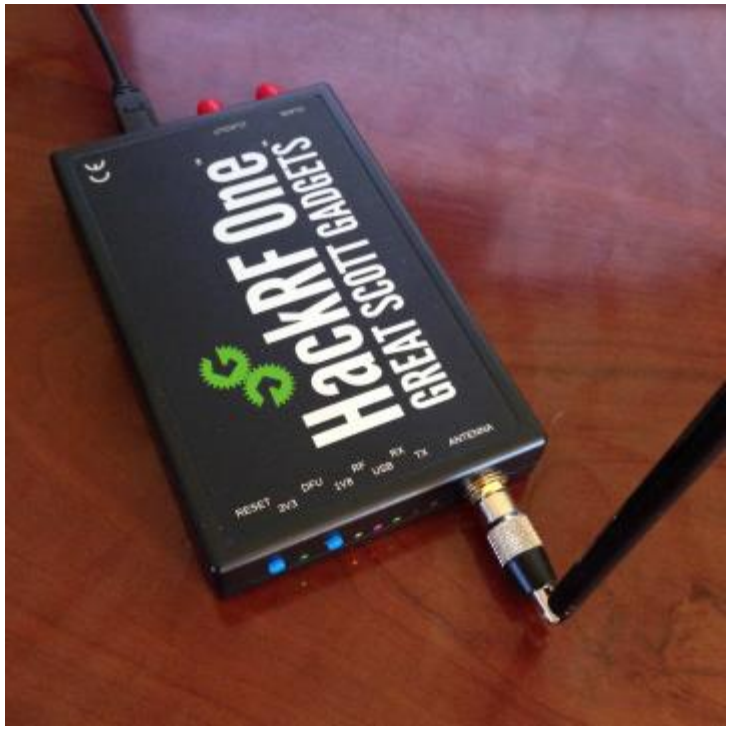
Kickstarted Transceivers

KICK STARTER

$602,960

HackRF

- Freq range: 10 MHz – 6 GHz
- Resolution: 8-bit
- Instantaneous bandwidth: 8-20 MHz
- TX/RX half duplex
- **2 Channels**
- USB 2.0



Kickstarted Transceivers

KICK STARTER

$191,422

BladeRF

- Freq range: 300 MHz – 3.8 GHz
- Resolution: 12-bit
- Instantaneous bandwidth: 28 MHz
- TX/RX full duplex
- **2 Channels**
- USB 3.0

Kickstarted Transceivers

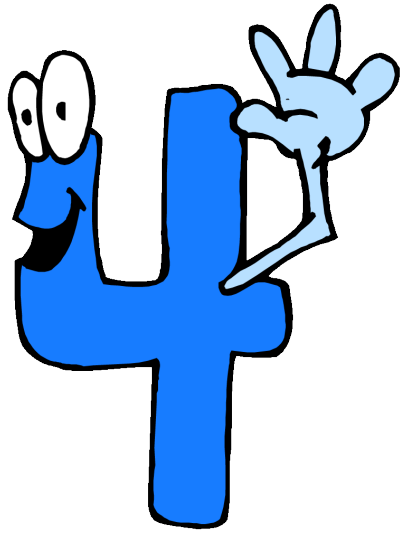
KICK STARTER

$66,197

PortableSDR – HF/Shortwave

- Freq range: 0 MHz – 35 MHz
- Instantaneous bandwidth: ? Hz
- ARM Processor - ARM Cortex-M4
- TX/RX full duplex
- GPS onboard
- Sweet color LCD screen
- USB 2.0

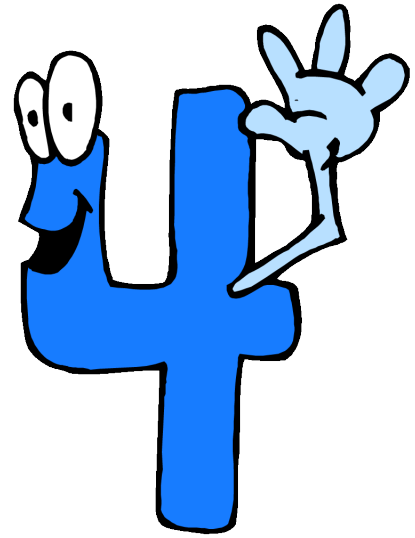
Four Channels!!



Ettus QuadRadio

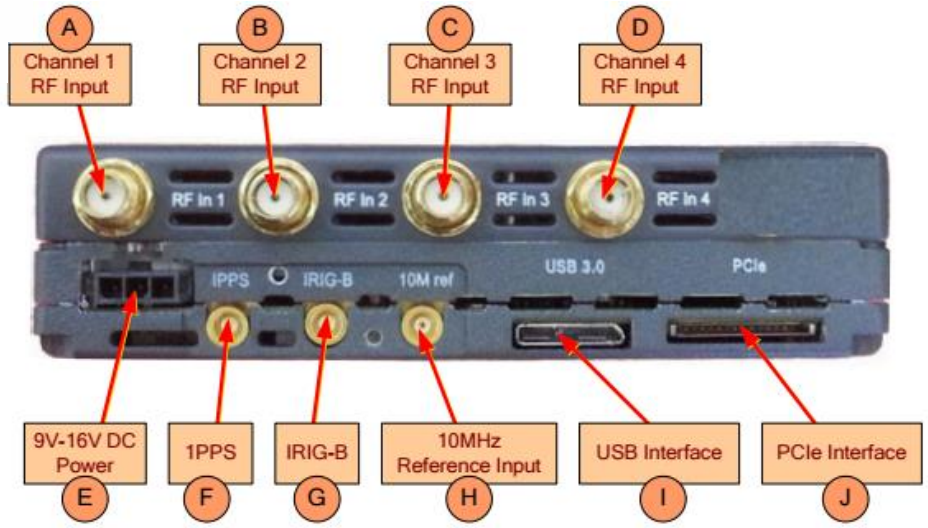
- Freq range: 700 MHz – 4 GHz
- Resolution: 16-bit
- Instantaneous bandwidth: 60MHz
- **1,2,3 or 4 RX Channels – Phase coherent**
  - “Stackable” up to 32-channels
- 2 x 10 GigE

Four Channels!!

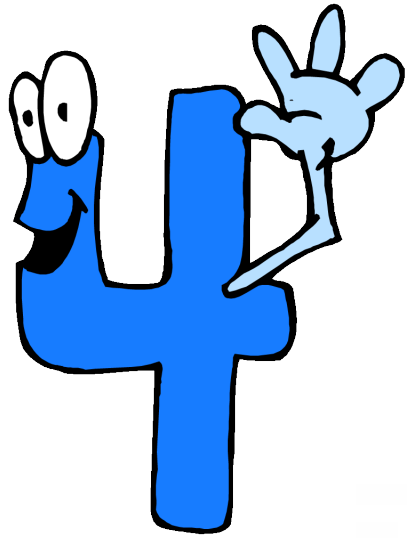


SilverPalm SP-830X

- Freq range: 300 MHz – 4 GHz
- Resolution: 16-bit
- Instantaneous bandwidth: 20MHz
- TX/RX full duplex
- **1,2,3 or 4 RX Channels and 1 TX**
- USB 3.0, PCIe x2, 10GE,
  or **Thunderbolt**



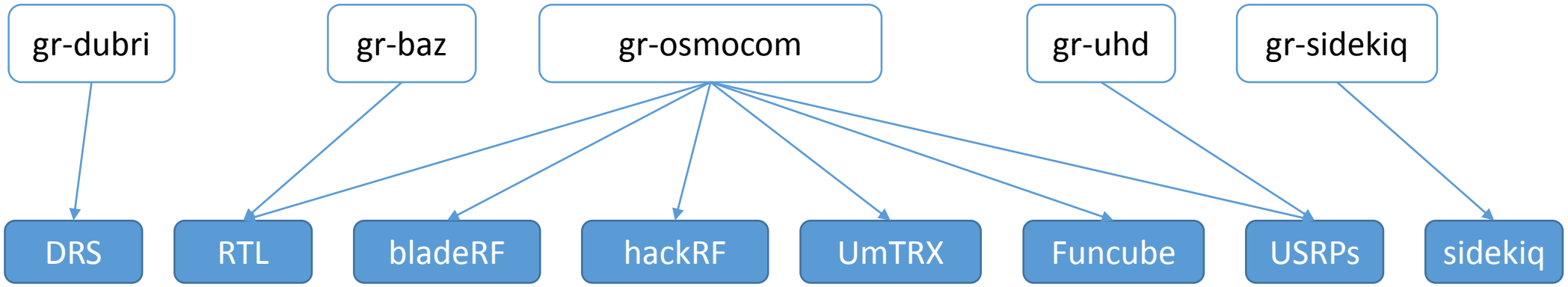
Four Channels!!



Nutaq PicoSDR

- Freq range: 300 MHz – 3.8 GHz
- Resolution: 12-bit
- Instantaneous bandwidth: 1.5 – 28 MHz
- TX/RX full duplex
- **2 or 4 Channels**
- 1 GigE and/or PCIe x4

Interfacing with GNURadio



Questions?