

SDR's and CW Skimmer

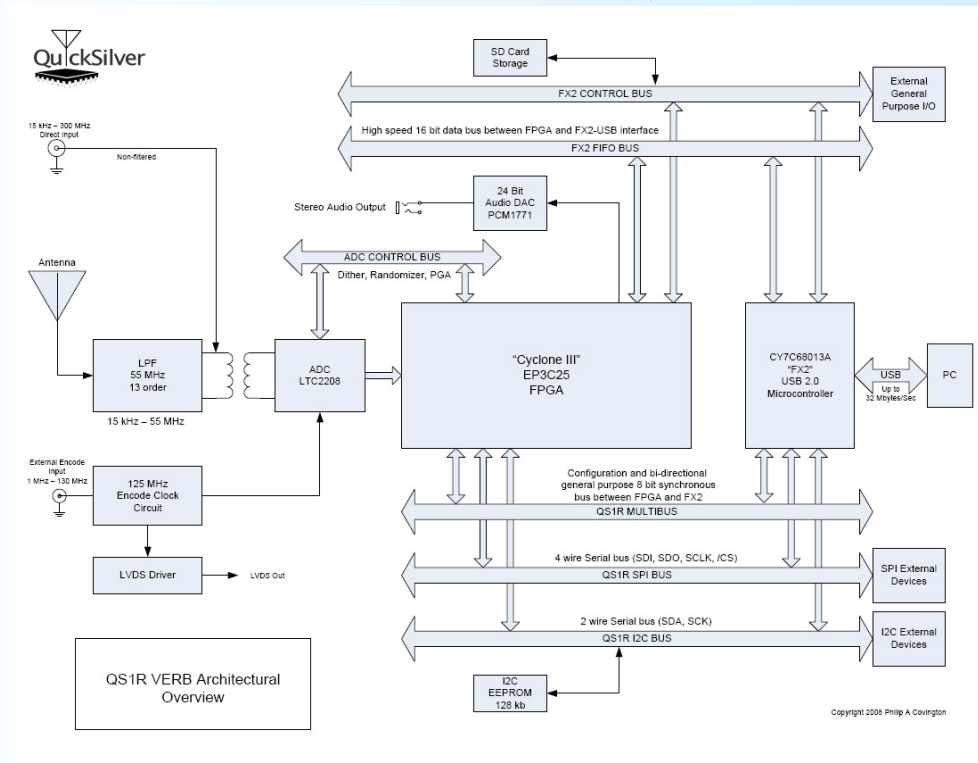
Jari Ojala OH8LQ

Introduction

- Different SDR's
- CW Skimmer software
- Integrating Skimmer at your station (PAN-Adapter+K3 and QS1R)
- Using skimmers with logger (N1MM)

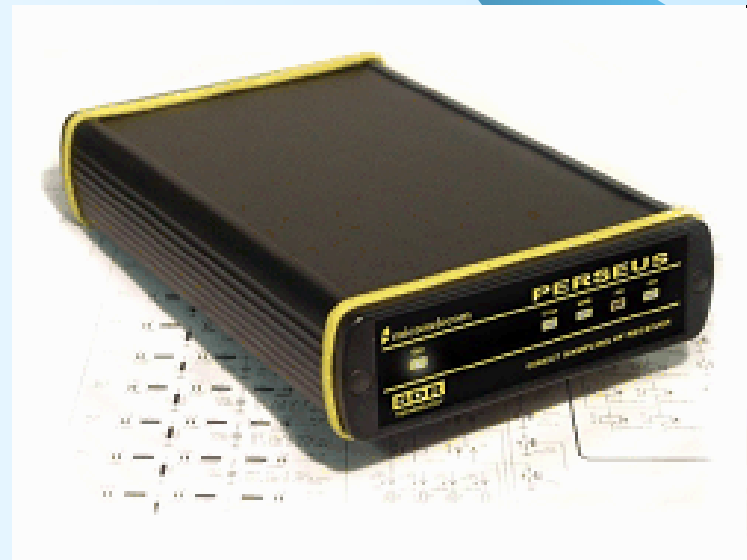
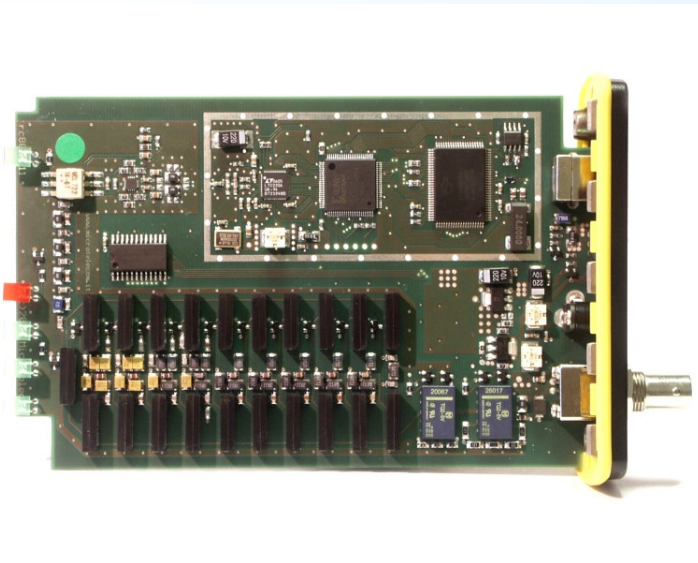
What is a SDR?

- "Radio in which some or all of the physical layer functions are software defined"



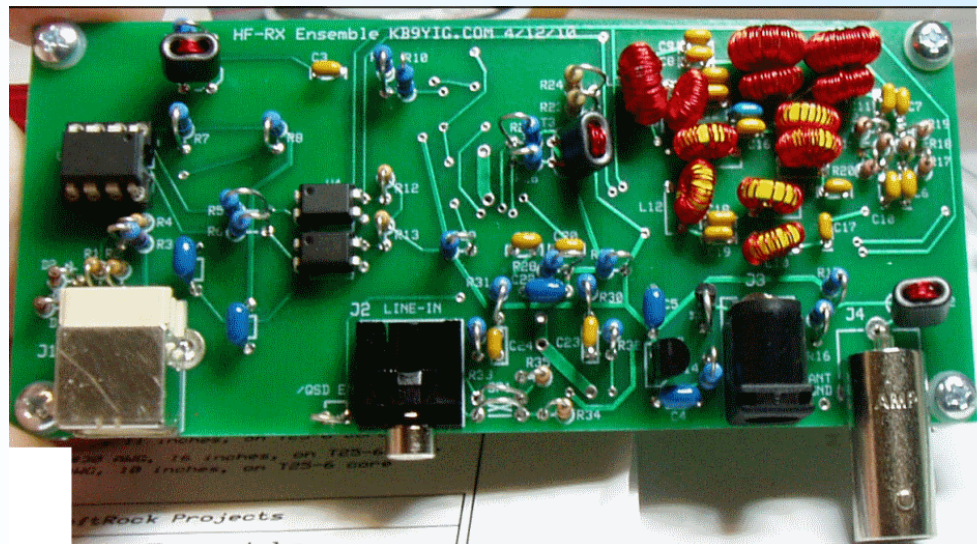
Perseus

- Price abt. 850€



SoftRock

- Price abt. 50€ +100-200€ (sound card)
- Need external sound card.
- Many variation one band to multiband



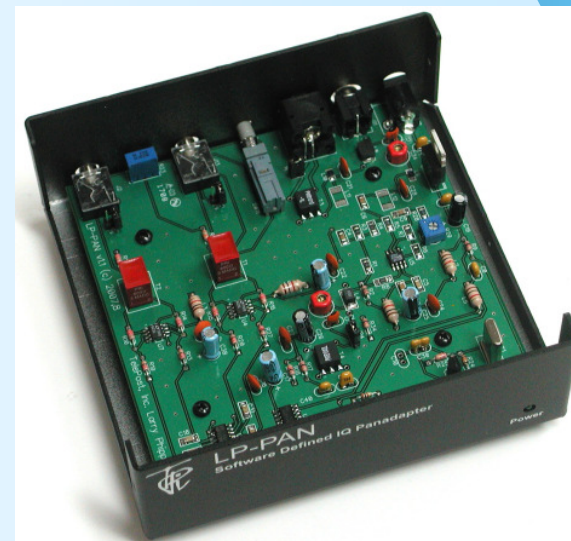
QS1R

- Open source code (FPGA and PC)
- Price abt. 950€



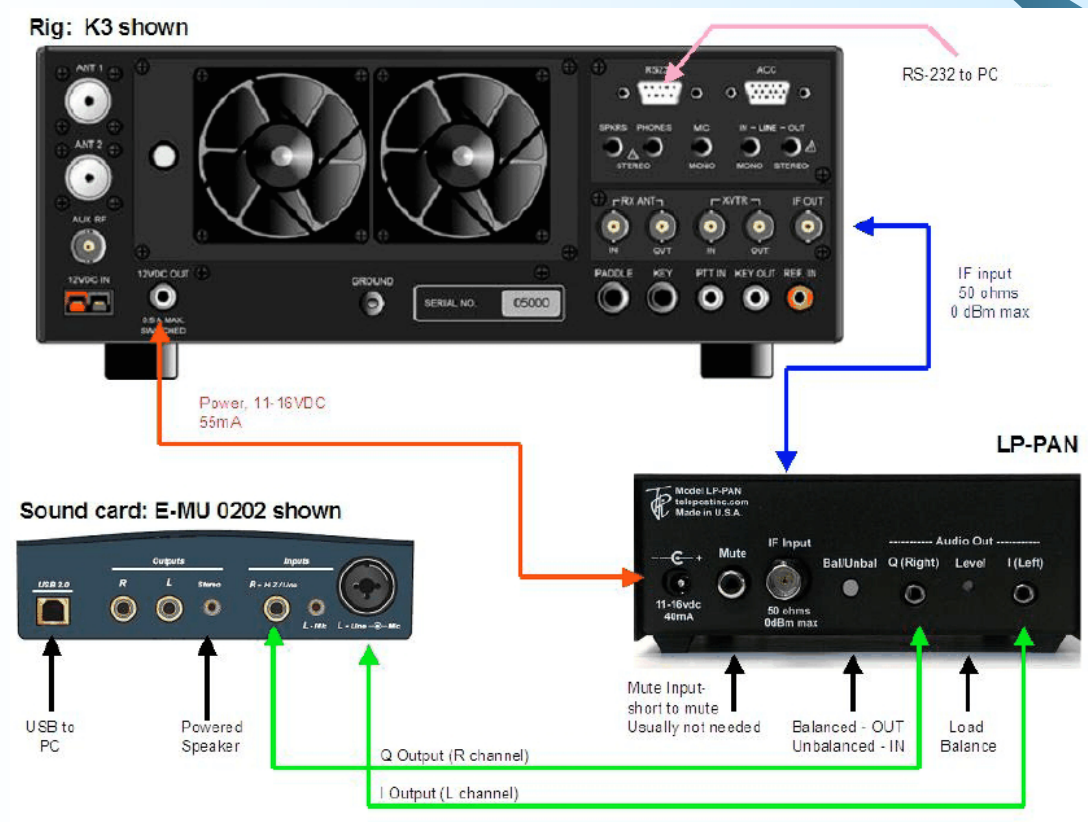
LP-Pan adapter

- A direct conversion receiver with quadrature detector
- Used like adapter between IF and SDR software
- Need external high quality sound card
- Price abt. 170€



LP-Pan adapter

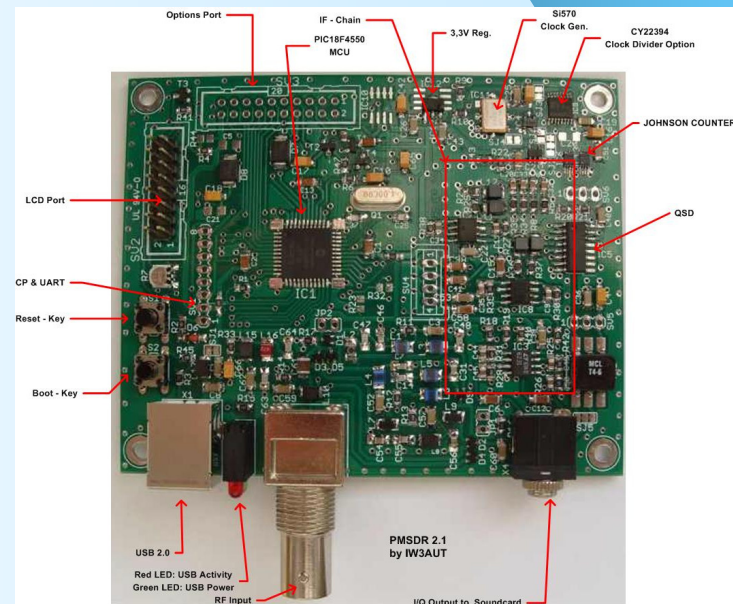
- Connections with K3



Drawing by N8LP

PM-SDR

- Abt. 250€
- Need external sound card
- Switch board handling 100 W



And so many other SDR projects

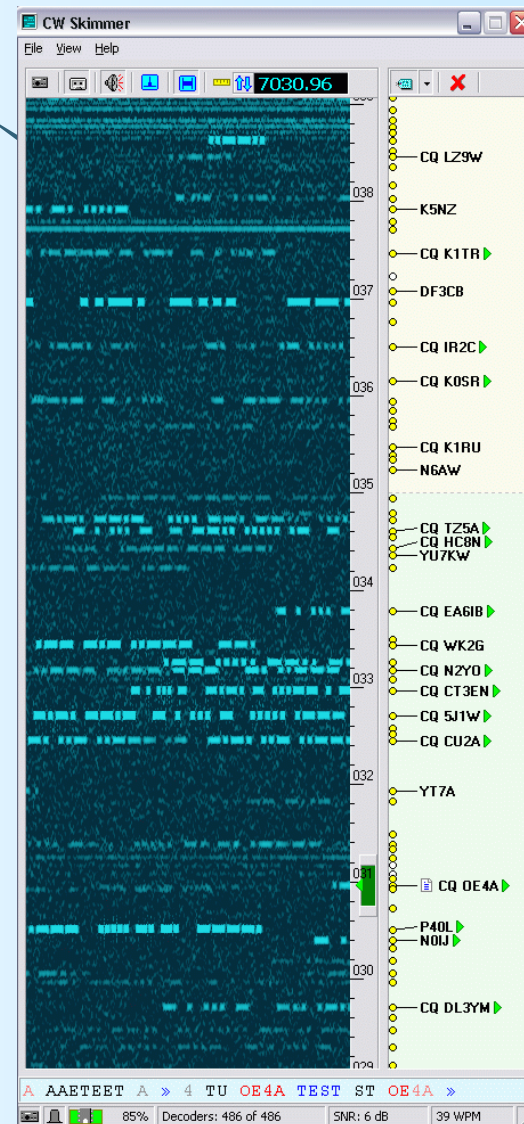
- HPSDR Mercury
- Flex radio
- SDR-IQ
- SDR-Cube
- Etc. Etc...

CW Skimmer ?

- Skimmer is multi-channel CW decoder and analyzer. Programmed by Alex VE3NEA
- Decoding all CW signals on receiver pass-band – up to 700 signal parallel
- Help finding stations on the band
- Only one band at the time
- Use almost every receiver and PAN-adapters
- Waterfall display

CW Skimmer

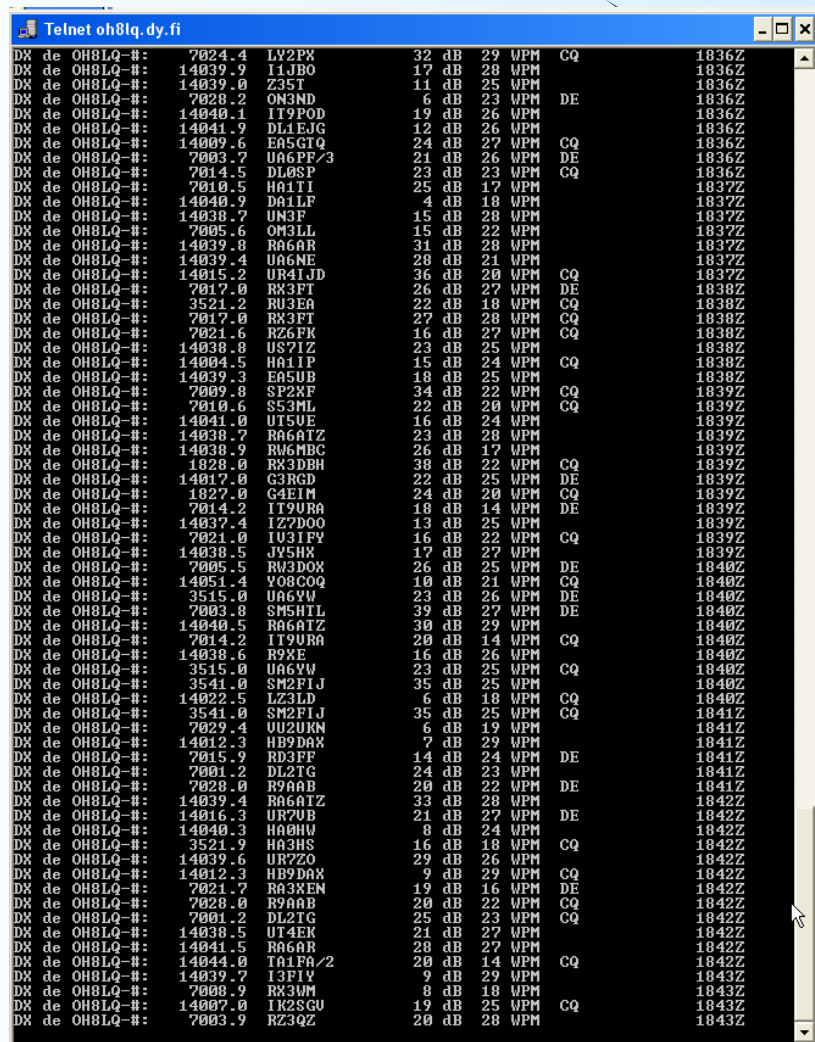
- Skimmer looks like that



CW Skimmer Server

- Decoding simultaneous of all CW signals on band, coverage up to 192 kHz on each band
- QS1R Receiver 7 band
- USRP Receiver 4 band
- Skimmer Server based to Skimmer software, lives in the system, no waterfall display
- User interface with Telnet as DX-clusters
- Selectable only CQ calls or all calls
- Possibilities use master.dat call database

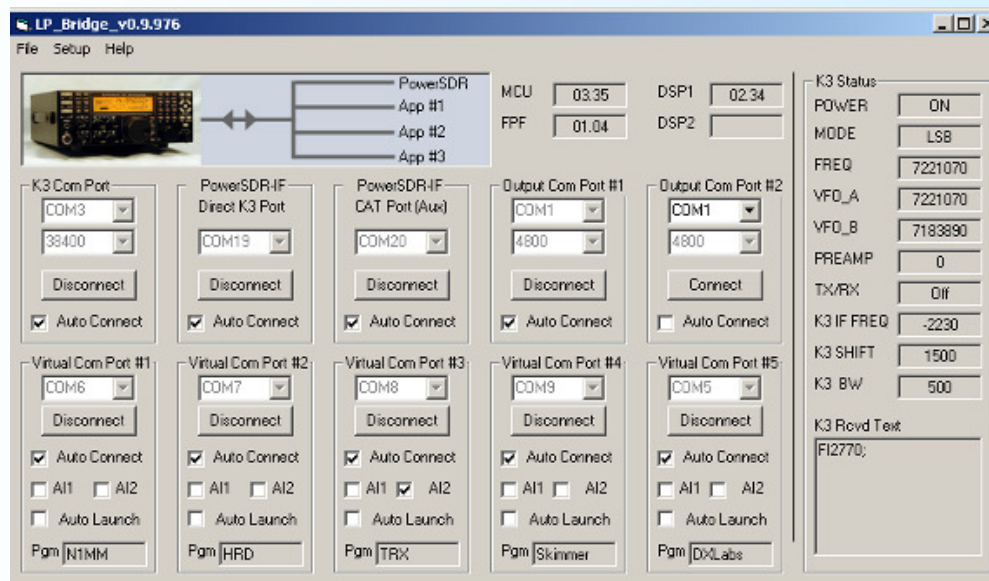
Skimmer spots example



Call Sign	Freq (MHz)	Power (dB)	Mode	Other	Spot (MHz)
DK de OH8LQ-#:	7024.4	32 dB	29 WPM	CQ	1836Z
DK de OH8LQ-#:	14039.9	17 dB	28 WPM		1836Z
DK de OH8LQ-#:	14039.0	11 dB	25 WPM		1836Z
DK de OH8LQ-#:	7020.2	6 dB	23 WPM	DE	1836Z
DK de OH8LQ-#:	14040.1	19 dB	26 WPM		1836Z
DK de OH8LQ-#:	14041.9	12 dB	26 WPM		1836Z
DK de OH8LQ-#:	14009.6	24 dB	27 WPM	CQ	1836Z
DK de OH8LQ-#:	7003.7	21 dB	26 WPM	DE	1836Z
DK de OH8LQ-#:	7014.5	23 dB	23 WPM	CQ	1836Z
DK de OH8LQ-#:	7010.5	25 dB	17 WPM		1837Z
DK de OH8LQ-#:	14040.9	4 dB	18 WPM		1837Z
DK de OH8LQ-#:	14038.7	15 dB	28 WPM		1837Z
DK de OH8LQ-#:	7005.6	15 dB	22 WPM		1837Z
DK de OH8LQ-#:	14039.8	31 dB	28 WPM		1837Z
DK de OH8LQ-#:	14039.4	28 dB	24 WPM		1837Z
DK de OH8LQ-#:	14015.2	36 dB	29 WPM		1837Z
DK de OH8LQ-#:	7017.0	26 dB	27 WPM	DE	1838Z
DK de OH8LQ-#:	3521.2	22 dB	18 WPM	CQ	1838Z
DK de OH8LQ-#:	7017.0	27 dB	28 WPM	CQ	1838Z
DK de OH8LQ-#:	7021.6	16 dB	27 WPM	CQ	1838Z
DK de OH8LQ-#:	14038.8	23 dB	25 WPM		1838Z
DK de OH8LQ-#:	14004.5	15 dB	24 WPM	CQ	1838Z
DK de OH8LQ-#:	14039.3	18 dB	25 WPM		1838Z
DK de OH8LQ-#:	7009.8	34 dB	22 WPM	CQ	1839Z
DK de OH8LQ-#:	7010.6	22 dB	20 WPM	CQ	1839Z
DK de OH8LQ-#:	14041.0	16 dB	24 WPM		1839Z
DK de OH8LQ-#:	14038.7	23 dB	28 WPM		1839Z
DK de OH8LQ-#:	14030.9	26 dB	17 WPM		1839Z
DK de OH8LQ-#:	1820.0	30 dB	22 WPM		1839Z
DK de OH8LQ-#:	14017.0	22 dB	25 WPM	DE	1839Z
DK de OH8LQ-#:	1827.0	24 dB	20 WPM	CQ	1839Z
DK de OH8LQ-#:	7014.2	18 dB	14 WPM	DE	1839Z
DK de OH8LQ-#:	14037.4	13 dB	25 WPM		1839Z
DK de OH8LQ-#:	7021.0	16 dB	22 WPM	CQ	1839Z
DK de OH8LQ-#:	14038.5	17 dB	27 WPM		1839Z
DK de OH8LQ-#:	7005.5	26 dB	25 WPM	DE	1840Z
DK de OH8LQ-#:	14051.4	10 dB	21 WPM	CQ	1840Z
DK de OH8LQ-#:	3515.0	23 dB	26 WPM	DE	1840Z
DK de OH8LQ-#:	7003.8	39 dB	27 WPM	DE	1840Z
DK de OH8LQ-#:	14040.5	30 dB	29 WPM		1840Z
DK de OH8LQ-#:	7014.2	20 dB	14 WPM	CQ	1840Z
DK de OH8LQ-#:	14030.6	16 dB	26 WPM		1840Z
DK de OH8LQ-#:	3515.0	23 dB	25 WPM	CQ	1840Z
DK de OH8LQ-#:	3541.0	35 dB	25 WPM		1840Z
DK de OH8LQ-#:	14022.5	6 dB	18 WPM	CQ	1840Z
DK de OH8LQ-#:	3541.0	35 dB	25 WPM	CQ	1841Z
DK de OH8LQ-#:	7029.4	6 dB	19 WPM		1841Z
DK de OH8LQ-#:	14012.3	7 dB	29 WPM		1841Z
DK de OH8LQ-#:	7015.9	14 dB	24 WPM	DE	1841Z
DK de OH8LQ-#:	7001.2	24 dB	23 WPM		1841Z
DK de OH8LQ-#:	7020.0	20 dB	22 WPM	DE	1841Z
DK de OH8LQ-#:	14039.4	33 dB	28 WPM		1842Z
DK de OH8LQ-#:	14016.3	21 dB	27 WPM	DE	1842Z
DK de OH8LQ-#:	14040.3	8 dB	24 WPM		1842Z
DK de OH8LQ-#:	3521.9	16 dB	18 WPM	CQ	1842Z
DK de OH8LQ-#:	14039.6	29 dB	26 WPM		1842Z
DK de OH8LQ-#:	14012.3	9 dB	29 WPM	CQ	1842Z
DK de OH8LQ-#:	7021.7	19 dB	16 WPM	DE	1842Z
DK de OH8LQ-#:	7020.0	20 dB	22 WPM	CQ	1842Z
DK de OH8LQ-#:	7001.2	25 dB	23 WPM	CQ	1842Z
DK de OH8LQ-#:	14038.5	21 dB	27 WPM		1842Z
DK de OH8LQ-#:	14041.5	28 dB	27 WPM		1842Z
DK de OH8LQ-#:	14044.0	20 dB	14 WPM	CQ	1842Z
DK de OH8LQ-#:	14039.7	9 dB	29 WPM		1842Z
DK de OH8LQ-#:	7008.9	8 dB	18 WPM		1843Z
DK de OH8LQ-#:	14007.0	19 dB	25 WPM	CQ	1843Z
DK de OH8LQ-#:	7003.9	20 dB	28 WPM		1843Z

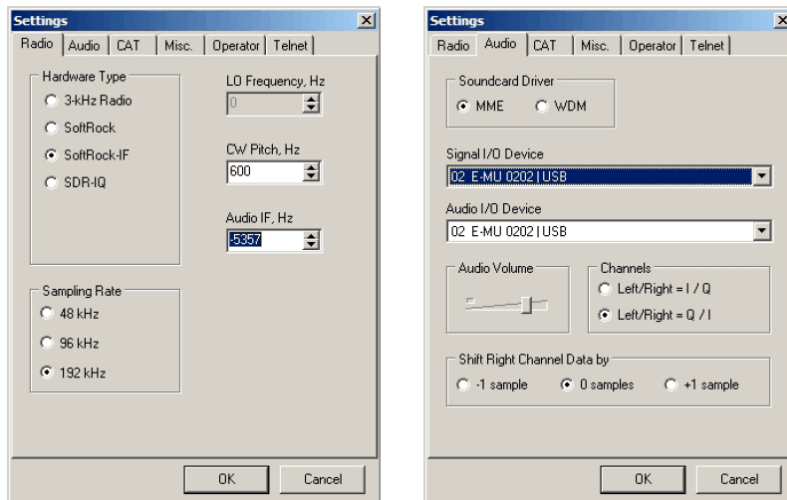
Skimmer with PAN-adapter+K3

- PowerSDR™ software for bandscope
- LP-Bridge for handling communication ports



Skimmer with PAN-adapter+K3

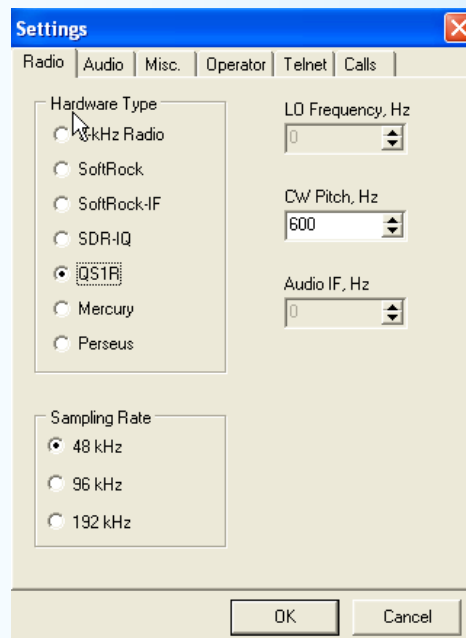
- CW Skimmer software



- Working at same band as the K3 or other transceiver

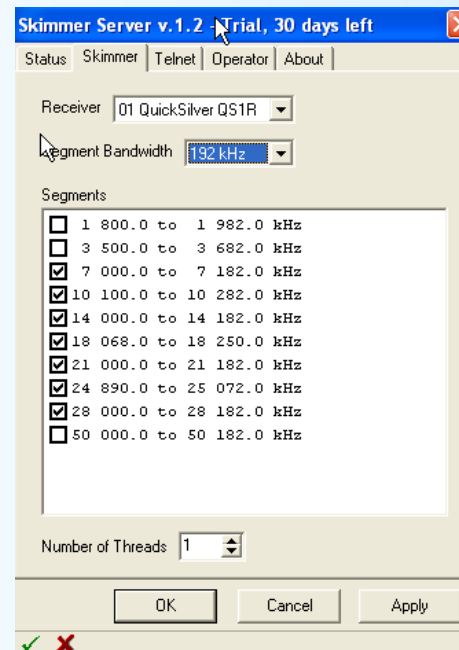
Skimmer and the QS1R

- Easy to connect by USB
- No need extra audio or communication cables



Skimmer server and the QS1R

- Needs USB and antenna cable
- Setup by crossing QS1R's parameters

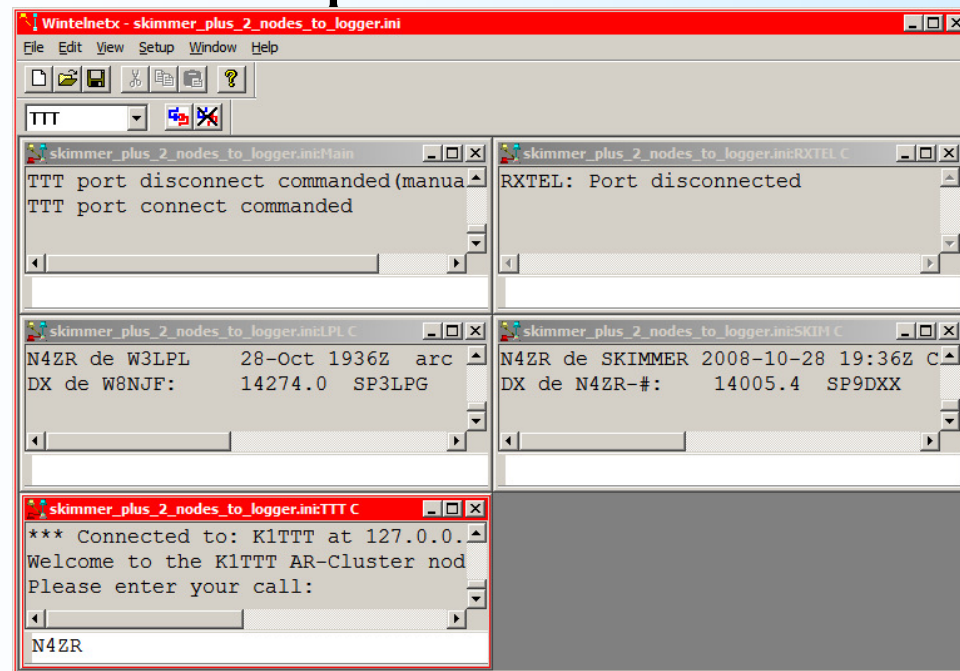


Logger software and Skimmer

- Connected by Telnet
- Set skimmer IP address and port a logging software as remote cluster
- Skimmer send "spots" as DX-cluster
- Several Skimmers and clusters can be connected same time by using WinTelnetX software by K1TTT
- Possibility remote use over the internet

WinTelnetX

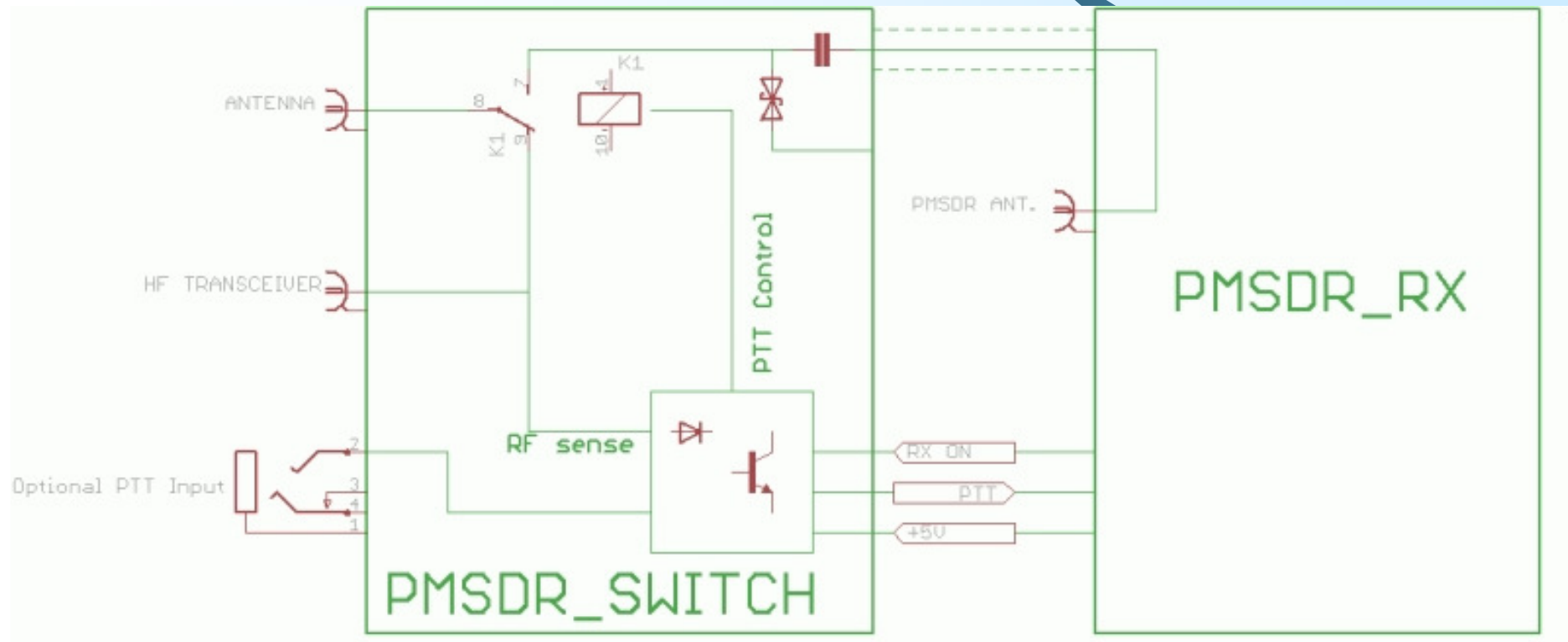
- Example: two cluster and skimmer
- Mix several Telnet connections to same local Telnet port



Connecting to an antenna

- Keep mind SDR protection
- SDR connected off line during sending or protect some other way
- Some SDR projects including switching unit, rated 100W
- Skimmer heard stations from other bands regardless of your antenna selection

PM_SDR Switching board

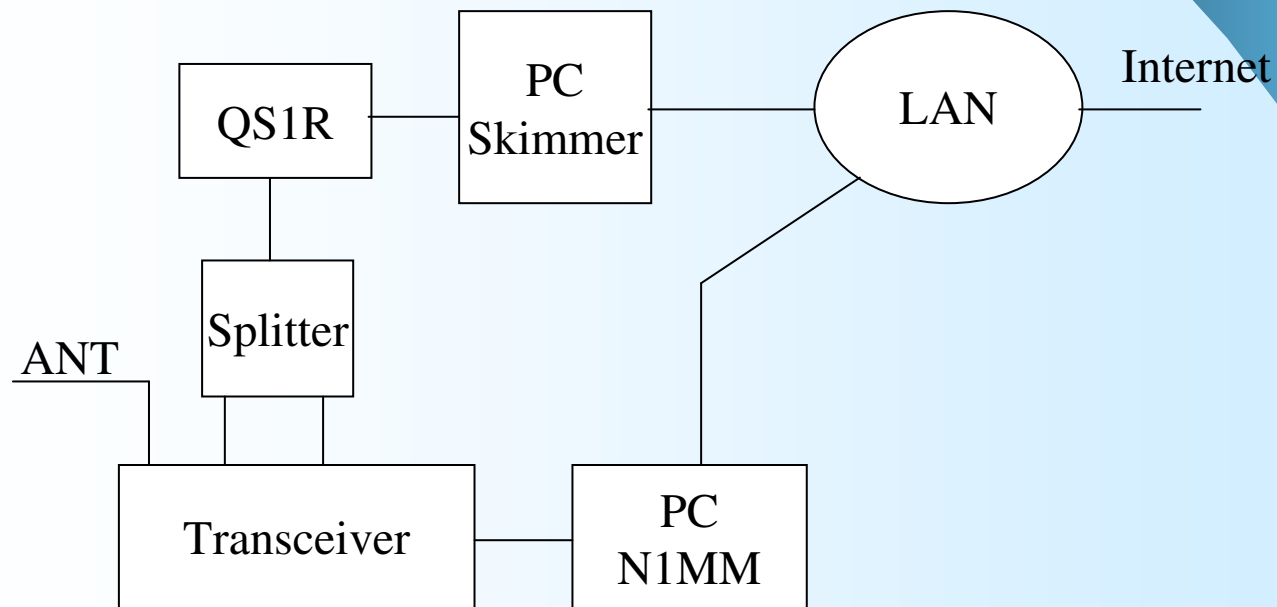


Skimmer at OH8LQ

- QS1R SDR receiver
- Skimmer Server software
- PC 2,66 GHz dual processor laptop (needs over 80% processor time)
- Transceiver FT-1000MP Mark V
- No separate Skimmer antenna
- Using FT-1000mp's antenna relays protecting SDR frontend
- Splitter caused 3 dB loss at transceivers antenna line

Skimmer system block diagram

- QS1R and Skimmer Server OH8LQ



Skimmer and the contest

- CQWW CW 2010 SO(A)20 m OH8L
- Mainly use skimmer, not clusters
- Make over 2600 Q
- More S&P Q's
- Lot of the S&P multipliers
- Spots was "fresh" and really heard at the own station
- Skimmer server made abt. 7 MB log file. (six band and only CQ calls)

Skimmer and DX hunting

- You will find easy latest DX's listening frequency
- Help to find DX stations
- Checking propagations from log file or real time

Reverse Beacon Network

- www.reversebeacon.net
- Collect skimmer spots to one internet site
- Nice way compare own and others signals around of the world
- Checking propagations
- Looking DX-calls
- Send your own skimmer spot with aggregator software

More information

- <http://www.sdrforum.org>
- <http://www.srl-llc.com> (QS1R)
- <http://www.dxatlas.com/CwSkimmer/> (skimmer)
- <http://www.microtelecom.it/perseus/>
- http://www.k1ttt.net/software/wintelnetx_w0yk.pdf
- <http://www.telepostinc.com> (LP-Pan)
- <http://www.iw3aut.altervista.org/> (**PM-SDR**)