

RCKskimmer

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N2QT

Skimming goes Digital!

What is a Skimmer?

- An automated way of finding and reporting stations on the air
- CW Skimmer by VE3NEA was first introduced in 2008
- Had provisions for integration into packet cluster network
- The Reverse Beacon Network (**RBN**) soon followed, integrating many CW Skimmers world-wide
- CW contesting was changed forever!

But then only rumors of a RTTY version

RCKskimmer Announced

- With a short announcement before 2012 SARTG, Walter DL4RCK announced a beta test for RCKskimmer
- Based on JE3HHT's MMVARI engine, multi-mode, (RTTY, PSK31, PSK63 etc.) Skimming was now possible!
- Could connect to the RBN as well as to the new RCK Digital Cluster System
- Upwards of a couple dozen Skimmers are now providing digital spots!
- RBN enhanced to better handle these new spots

RCK Digital Cluster System

- Besides RCKskimmer spots, also includes 'human spots' gleaned from the World Wide DX Cluster system
- Digital modes only
- Easily integrates with contesting or logging software
- Telnet address is :
dl4rck.ham-radio-op.net on Port 8000
- Type help for commands

RCK Digital Cluster System

```
Telnet dl4rck.ham-radio-op.net

Welcome at the RCKserver Digital Skimmer Cluster!
RCKserver V1.4 Build 193 is operated by DL4RCK
Please enter your callsign:
n2qt

Hello YL/OM N2QT, this is RCK - Digital-Cluster-Server!

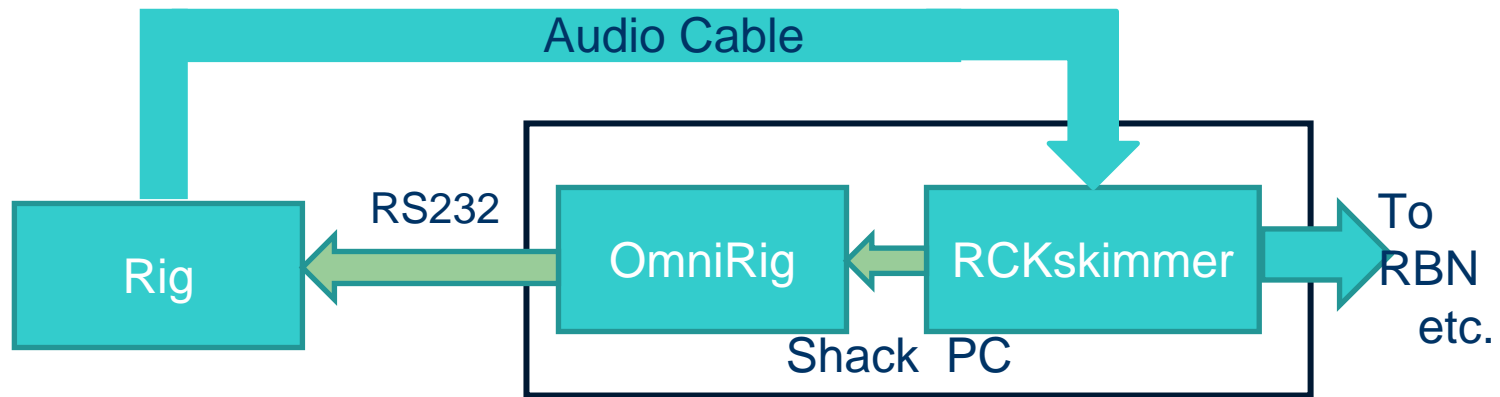
*****
*   Welcome to DL4RCK's Digital Skimmer-Cluster   *
*   dl4rck.ham-radio-op.net   Port:8000           *
*   more Information at www.dl4rck.de             *
*   Located in JN69BB, Wenzenbach, Germany       *
*   Your Support, send email to support@dl4rck.de *
*****

N2QT de RCK-DCS>
Cluster: 26 User and 13 Digital-Skimmer online

To see your spot filters type SH/FILTER
To get help type HELP or ? or HELP <cmd>
N2QT de RCK-DCS>
sh/dx

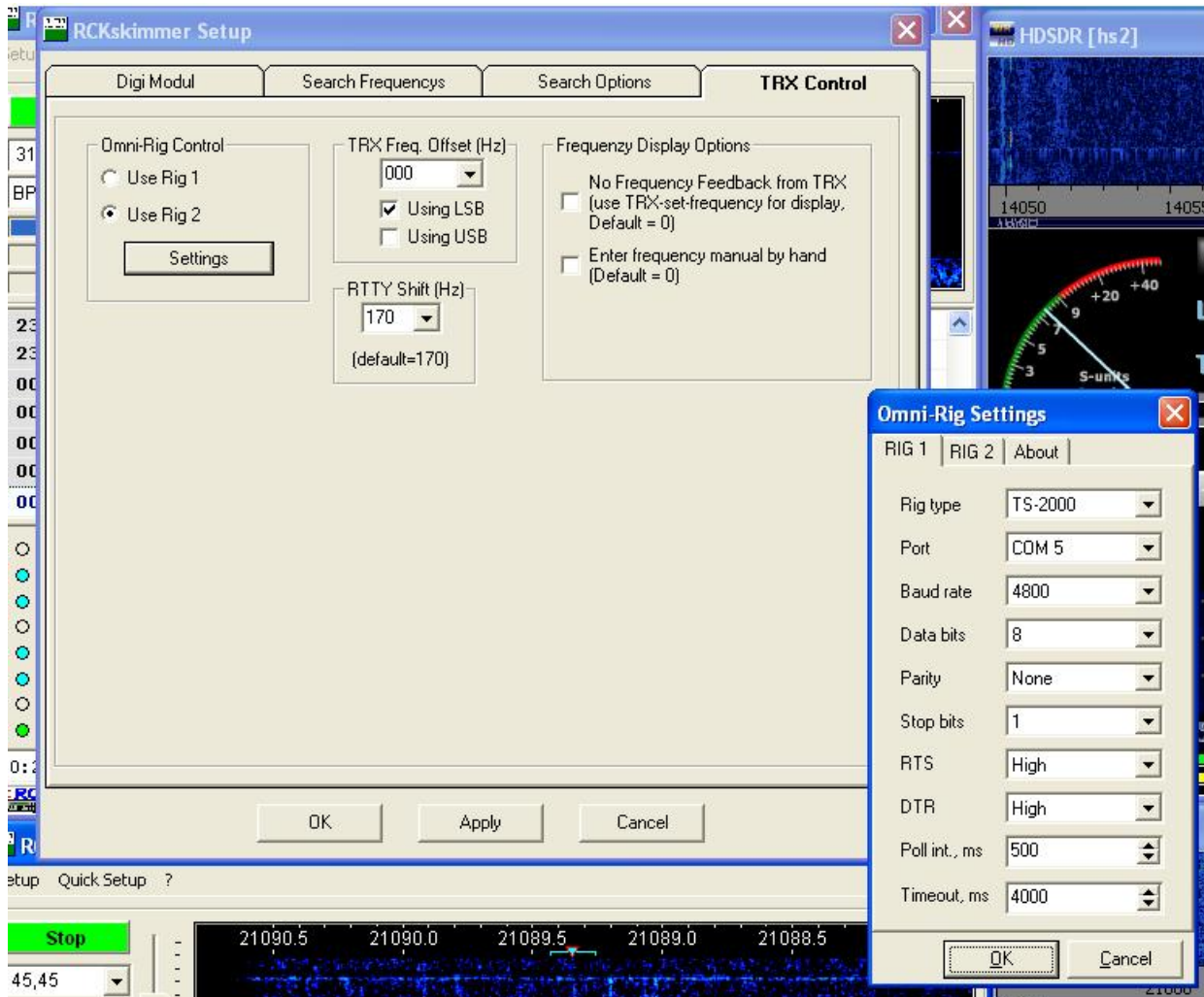
Command: sh/dx
14071.4  TG9AHM      2013.05.07  0048Z  CQ  BPSK31  S/N:30dB      <N2QT-#>
14070.9  CT4RC       2013.05.07  0047Z  CQ  BPSK31  S/N:31dB      <VE2WU-#>
14073.6  SU5AZK     2013.05.07  0047Z  CQ  BPSK31  S/N:14dB      <NN3RP-#>
14072.0  SU5AZK     2013.05.07  0047Z  CQ  BPSK31  S/N:19dB      <VE2WU-#>
14071.7  W1RET      2013.05.07  0047Z  DE  BPSK31  S/N:22dB      <VE2WU-#>
14072.6  W1HQL     2013.05.07  0046Z  DE  BPSK31  S/N:31dB      <VE2WU-#>
14081.4  EY7AD     2013.05.07  0045Z  CQ  RTTY     S/N:14dB      <SV8RU-#>
14081.4  EY7AD     2013.05.07  0045Z  DE  RTTY     S/N:18dB      <SV8RU-#>
14072.3  AB0C      2013.05.07  0045Z  DE  BPSK31  S/N:14dB      <VE2WU-#>
14071.5  HK3DC     2013.05.07  0045Z  CQ  BPSK31  S/N:16dB      <VE2WU-#>
14083.5  WM5H     2013.05.07  0045Z  CQ  RTTY     S/N:23dB      <WZ7I-#>
14070.7  HK3DC     2013.05.07  0045Z  CQ  BPSK31  S/N:16dB      <NN3RP-#>
14072.0  SU5AZK     2013.05.07  0044Z  DE  BPSK31  S/N:21dB      <VE2WU-#>
14070.7  ZP6DYA    2013.05.07  0044Z  DE  BPSK31  S/N:13dB      <VE2WU-#>
```

So How Does It Work?



- At the most basic level, only a RS232 controlled radio, providing RX audio to a soundcard is needed.
- No SDR I/Q or high capability sound card needed.
- Decodes ~2.5 Khz of spectrum at a time, and moves on

Some Setup Required



Pick a Rig
Data Rate
Etc.

Some Setup Required

RCKskimmer Setup

Digi Modul | Search Frequencies | Frequency Search Options

Callsign: N2QT-1 Password:
Firstname: Locator: FM07II
Homepage: Location (City): VA
Station Info:

Sound Card Device ID: -1
Channel: Mono Left Right

RTTY Shift (Hz): 170 (default=170)
TRX Freq. Offset (Hz): 1275
1200
1445
1500
1750
2000
2125
2210

Additional use Master Call data for detection
 Save Log to File

+4 Time difference PC-Time to UTC [h]

Telnet
 Enable Telnet Server
Port (7300): 7300

RCK-Cluster System
 Send your received spots to RCK-Cluster
URL: dl4rck.ham-radio-op.net
Port (8001): 8001

"CQ" detection Contest style detection
 "DE" detection
 "TEST" detection
 "QRZ" detection
 Special Word detection e.g. CQWW

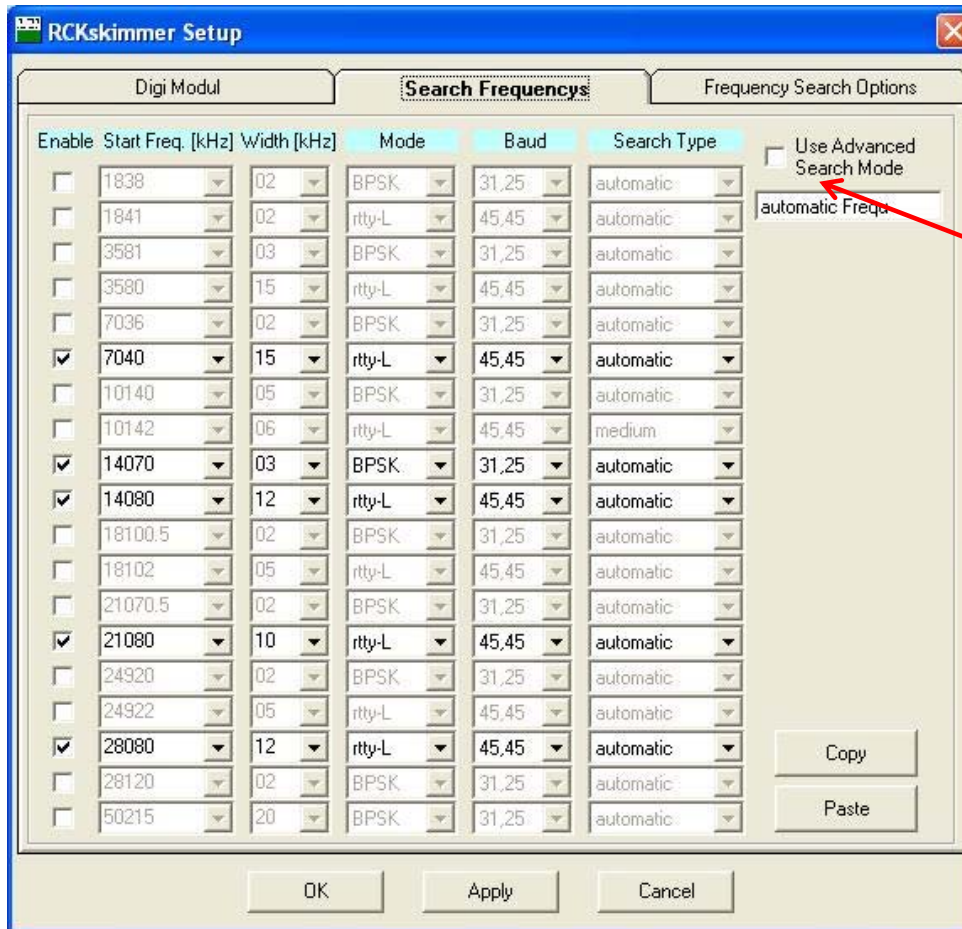
OK Apply Cancel

Split Left/Right Audio
for two rigs

Verify your spots are
on frequency
Please!

External Connections

Some Setup Required



Search Frequencies can be specified by mode, frequency range and time of day

Important to get this right for best performance

So How's It Look?

The screenshot displays the RCKskimmer V1.1 software interface. At the top, the title bar reads "RCKskimmer V1.1 by DL4RCK". Below the title bar, there are menu options: "Setup", "Quick Setup", and "?".

The main interface is divided into several sections:

- Control Panel:** Located on the left, it includes a green "Stop" button, a frequency selection dropdown set to "31.25", a modulation type dropdown set to "BPSK", a volume slider, and a sensitivity setting of "47dB".
- Waterfall Plot:** A central spectrogram showing frequency activity over time. The x-axis represents frequency in kHz, with labels at 14072.5, 14071.7, 14071.3, 14071.0, and 14070.5. The y-axis represents time. A red label "Waterfall" is overlaid on the plot.
- Reported Calls Table:** A table listing detected calls with columns for time, frequency, modulation, bandwidth, call type, call sign, and signal strength. The last entry is highlighted in cyan.
- Current Decoding Results:** A text area showing the decoded content of the selected call, with a red label "Current Decoding Results" overlaid.
- Status Bar:** At the bottom, it shows the current frequency "14073.1", a search range "14065-14075", the mode "automatic", the search method "DefaultFreqSearch", the user "RCK/RBN", and the time "20:30 (0:30z)".

Time	Freq (kHz)	Modulation	Bandwidth (kHz)	Call Type	Call Sign	Signal Strength
23:58:20	14072.1	BPSK	31	CQ	KB9LUK	31db *
00:06:33	14082.5	RTTY	45	CQ	Y03VU	20db *
00:12:18	14071.3	BPSK	31	CQ	KP4PR	19db *
00:15:27	14072.7	BPSK	31	CQ	WSOL	25db *
00:17:04	14070.9	BPSK	31	CQ	EA8GP	20db *
00:21:48	14071.1	BPSK	31	CQ	IK6CVI	19db *
00:25:34	14072.0	BPSK	31	CQ	KB0WIZ	20db *

Current Decoding Results:

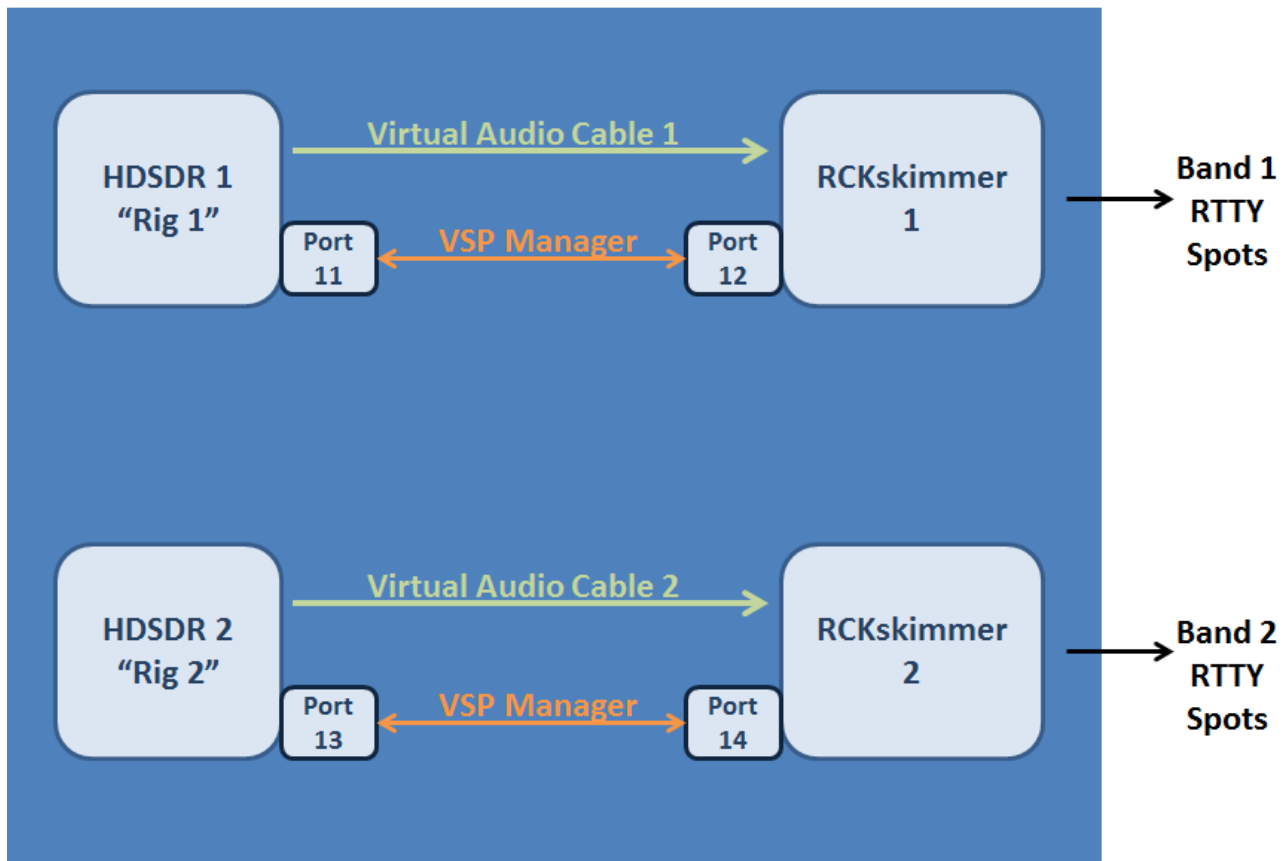
```
C O 14070.86 o fInn eohThuTz e
1 14072.43 ope to meet again, bye bye. sk w2sfd de kdosdj KCeoxl de IT9Yit9ydy it
2 14072.07 s p n oeoVe3E u < n d,toWIZ ioE. Kansatn Oe center o
3 14071.52 5E Coi CQ de EA5HRE EA5HRE PSE K ot>nsoomo
4 14071.13 y DE C02VE C02VE K a a_ae Sre te
5 14072.75 3. = ke these last few years
6 14070.68 t Dnpppei d snpw$ pse kn
```

Enhancing Performance

- Using multiple receivers, even on the same band gives better coverage (helps overcome the narrow decode window)
- Dedicated hardware for RCKskimmer is better than trying to share the main rig
- One PC with two instances of RCKskimmer can control two radios, either hardware or SDR type
 - Doesn't take much computing power ~Single Core P4
 - Long list of compatible rigs (any that OmniRig can control)
 - Can use low cost SDRs running HDSDR (but be careful)

Using HSDR

PC



Using HDSDR

- Needs one 'reasonable' quality sound card in addition to what may be needed for the SDR(s).
- Can use copper audio cables if you don't have VAC
- VSP for control
- Beware of images and spurs
 - Especially with low end SDR's like Softrock Ensembles and FiFi SDR
 - LO Radiation can be an issue on harmonically related bands

Using HDSDR

The image displays two instances of the RCKskimmer V1.1 software, which is used for monitoring and logging radio signals. Each instance is paired with an HDSDR (High Definition Software Defined Radio) interface for real-time signal processing.

Top Instance (hs2):

- RCKskimmer:** Shows a list of detected signals. The current signal is 14071.1 BPSK 31 CQ IK6CVI 19db.
- HDSDR [hs2]:** Tuned to 14,073,100 Hz. The CPU usage is 5% HDSDR and 15% Total. A red circle highlights the CPU usage statistics.

Bottom Instance (hs1):

- RCKskimmer:** Shows a list of detected signals. The current signal is 21070.7 BPSK 31 CQ CO2VE 14db.
- HDSDR [hs1]:** Tuned to 21,070,400 Hz. The CPU usage is 21% HDSDR and 16% Total.

The HDSDR interfaces include a waterfall display, a spectrum analyzer, and various control knobs for volume, squelch, and AGC. The RCKskimmer interfaces provide a log of signal activity with details such as time, frequency, mode, and signal strength.

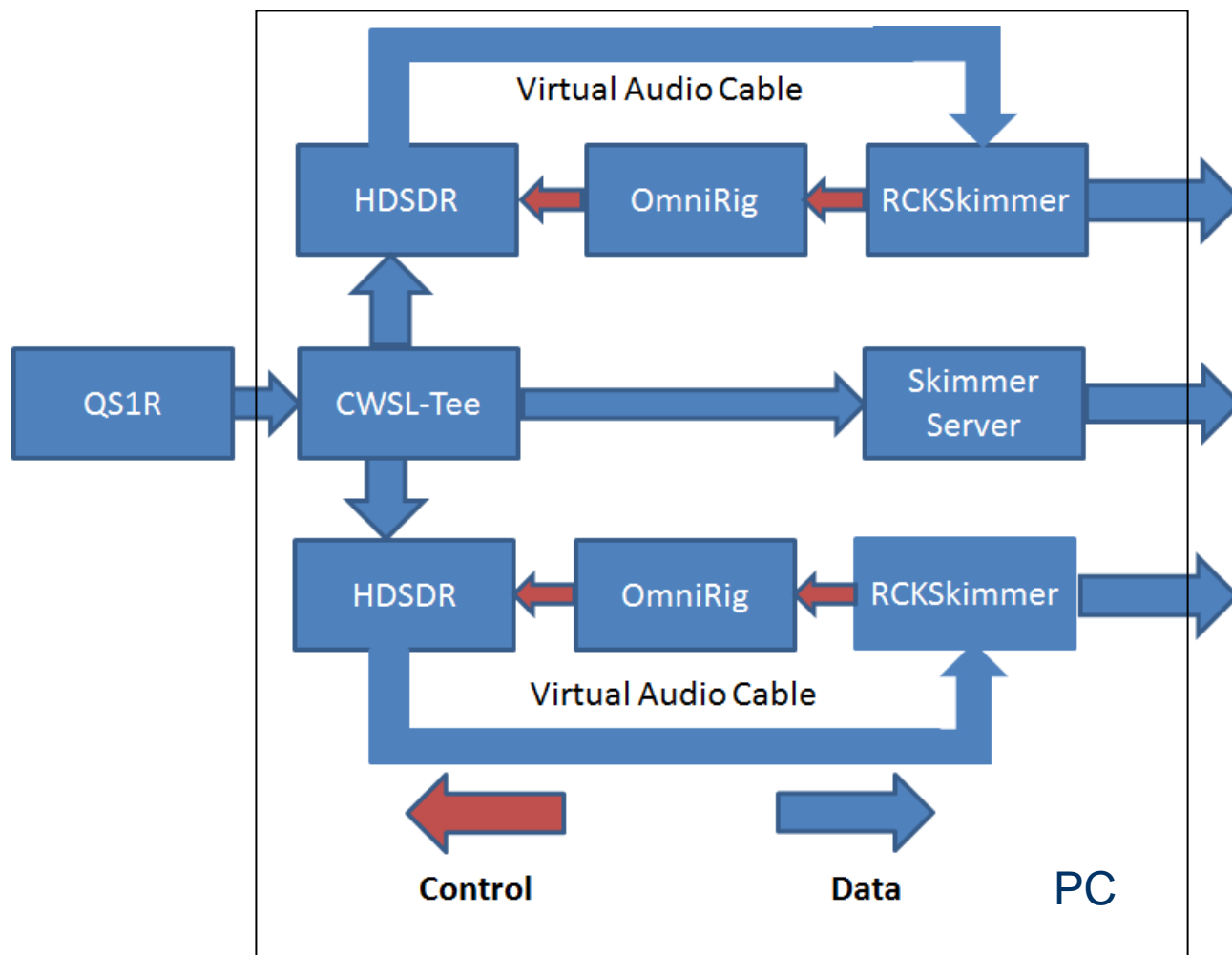
Enhancing Performance

- The ultimate is to integrate with an existing CW Skimmer Server operating on a QS1R
- A QS1R uses direct digital down conversion and avoids the image and spurious responses of simple SDRs
- In addition to decoding CW on up to 7 bands, can add 2 bands of digital mode decoding!
- Pioneered by Wes, WZ7I
- Great way to leverage the existing hardware investment made for CW Skimmer Server

CW Skimmer Server Integration

- Uses CWSL_TEE and HDSDR to create the audio streams needed by RCKskimmer, without impacting CW Skimmer operation
- Basically creates two virtual radios running with HDSDR and RCKskimmer
- Needs more computing power, especially during contests
 - Driven mainly by the CW decode bandwidth
 - Intel i7 Quad Core for 192Khz CW decode
 - Better Core™2 Duo for 96 Khz CW decode

CW Skimmer Server Integration



What's Next?

- Continue to expand with more RCKskimmers
- New features from DL4RCK
- Better on-frequency performance than typical 'human' spotting
- There are still rumors of a wide band many channel digital decoder (anybody here working on one?)
- Remember to use the correct entry class for any contest (although many digital contests allow assistance in all categories)

Resources

- DL4RCK Software including RCKskimmer
<http://www.walter-dallmeier.de/>
- Reverse Beacon Network (check the blog for how-to info on CW Skimmer/RCKskimmer integration)
<http://www.reversebeacon.net>
- CWSL_TEE
<http://ol5q.nagano.cz/soft.php?page=Software>
- WZ7I Skimmer Information
<http://wz7i.com/cw-skimmer/rtty-skimmer.html>
- AC0C's multi-band Softrock CW Skimmer Array
http://ac0c.com/main/page_homebrew_cwskimmer_array.html