



Pager inSecurity v1.1

Retro (Legacy) Action

~~© 1995~~ 2014, Andrew Horton

Agenda

- What's a pager?
- Who is using pagers?
- There is no pager security
- What pager messages look like
- Who is intercepting pager messages?
- Pager protocols (POCSAG & FLEX)
- Receiving pager frequencies (Modifying pagers, Radio Scanning, Software Defined Radio)
- Software to decode pager messages
- Pager frequencies in Australia (how to find them)
- Legal issues
- Online pager databases
- Security issues
- How to decode pager messages

Pagers

Tone/Vibrate Only



Numeric Pagers



AlphaNumeric Pagers



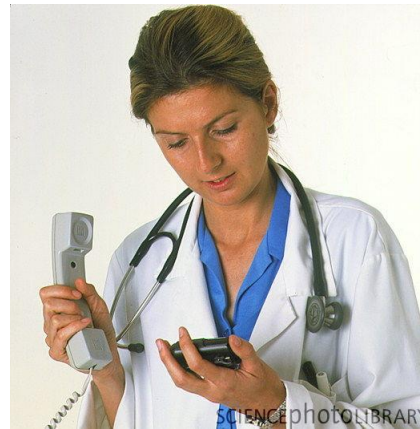
Restaurant Pagers are a different technology



Pager users before



Pager users now



- Healthcare workers
- Emergency vehicles
- Security patrols
- Courier drivers
- System administrators
- ~~Gangstas~~
- ~~Businessmen~~

Why are they *still* using pagers?

TXT messages aren't reliable enough

TXTs can take hours to deliver, or are never delivered.

Advantages of pagers over TXT messages

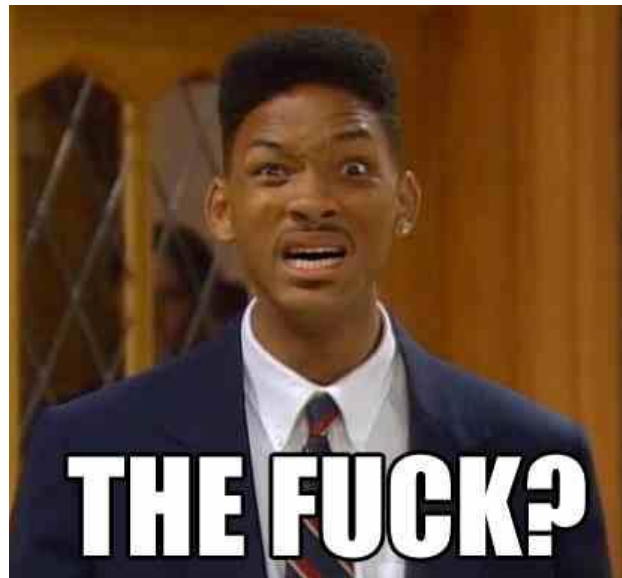
- Longer battery life
- Larger coverage area
- Higher availability
- Immediate delivery
- Can set up your own internal pager service



Pager security

There is no pager security

Messages are sent one-way in plaintext across a large geographic area.



Pager messages

Address	Time	Date	Protocol	Type	BPS
0362617	23:50:00	28-01-12	POCSAG-3	ALPHA	1200
KINGSTON 57 CODE 9 13 CASUALTIES 1 TRANSPORT ETA 20 MINS TO DEPOT JULIE 0421-118-962					
0416465	23:49:45	28-01-12	POCSAG-3	ALPHA	1200
2012-01-28 23:49:34 UP hbs-syd09-fw02b :Ack: - :Info:PING OK - Packet loss = 0%, RTA = 11.15 ms :Name:hbs-syd09-fw02b (10.5.44.218) Lloyds - Treasury External					


Who is listening?

Hobbyists who like HAM radio, tracking trains, fire, etc
People monitoring emergency broadcasts



There is a thriving community at
www.aussiescanners.com/forum/

[Register](#) [Forum Tools](#) [Search](#) [Login](#)








AUSSIE SCANNERS

Welcome to the

[Board index](#) [vA^](#)

It is currently Sun Mar 23, 2014 1:42 pm

AUSSIE SCANNERS		TOPICS	POSTS	LAST POST
	 <h3>Website Updates</h3> <p>The place to get the latest website updates, to share your suggestions and to introduce yourself to the community</p>	54	308	by Phantom  Tue Dec 24, 2013 9:51 pm
	 <h3>Feedback & Suggestions</h3> <p>By providing us with your feedback and suggestions so that we can improve the website to make it more enjoyable for you</p>	82	487	by Control Unit 1  Fri Dec 13, 2013 10:14 pm
	 <h3>Member Introductions</h3> <p>A place for all new members to the forum to introduce themselves, tell us a little about you, your radio experiences, and anything else relevant</p>	308	1630	by wgnboy  Sat Feb 22, 2014 10:36 pm

Who else is listening?

- Stalkers?
- Towing companies (illegal)
- Private investigators / Journalists
- BlackHat hackers
 - Appeared in Phrack in 1994
- Security consultants



Pager protocols

The main pager protocols are

POCSAG

FLEX

ERMES

- **POCSAG Protocol**

- Most common in Australia
- Developed by the British Post Office in 1981
- TONE Only, Numeric, Alphanumeric
- Speeds: 512, 1200, 2400 bps
- FSK Modulation with a ± 4.5 kHz shift on the carrier.
- Alphanumeric messages are encoded in 7 bit ASCII.



Pager protocols

- **FLEX protocol**

- Commonly used in Australia
- Developed by Motorola in 1993
- Only AlphaNumeric
- Speeds: 1600, 3200, 6400 bps
- 2 Level FSK (1600, 3200)
- 4 Level FSK (3200, 6400)
- Believed (erroneously) to be more secure than POCSAG



MOTOROLA

- **ERMES protocol**

- European Radio Messaging System
- 4 Level FSK



Receiving pager radio frequencies

Software Defined Radio



Costs under \$20 on ebay
Very large frequency range
100KHz to 1.5GHz

Radio scanner



Costs about \$100-\$300
Gaps in frequency ranges
Optional discriminator mod,
and data slicer

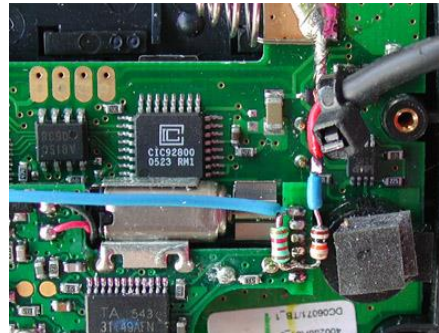
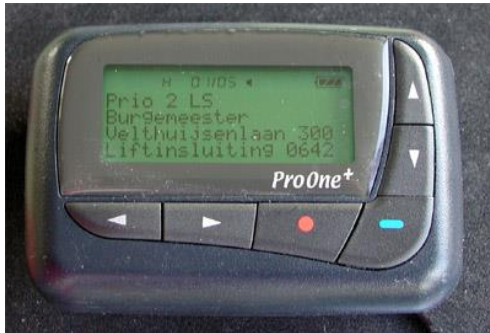
Modified pager



Costs about \$20-\$100
Fixed frequency
Output to serial

Hack a pager

- Costs about \$20-\$100
- Audio or serial RS232 output
- Decode with software
- Requires soldering
- Fixed frequency



- Instructions for Motorola Bravo, Apollo, and many others

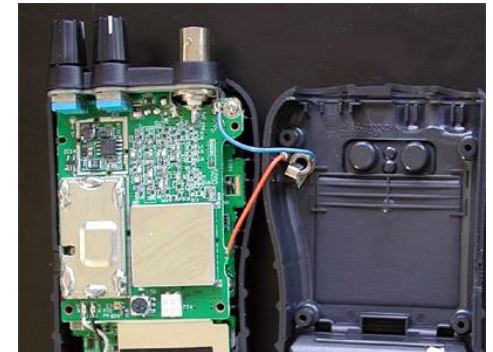
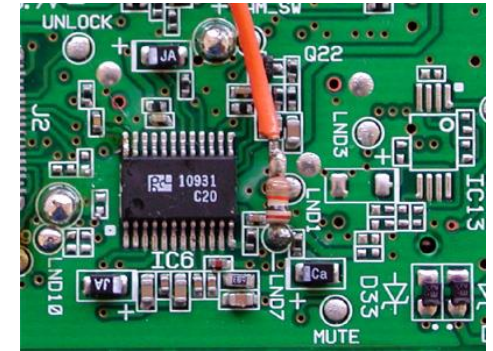
Decoding pager messages with a radio scanner

- Costs about \$100-\$300
- Radio scanner with headphone jack connected to sound card with line-in
- Use software to decode pager messages
- Scanners have gaps in frequencies ranges (not a problem for pagers)
- Unmodified radio scanner
 - Turn squelch off
 - Carefully find best volume for decoding
 - Can't decode FLEX messages (2400 BPS+)



Discriminator taps for radio scanners

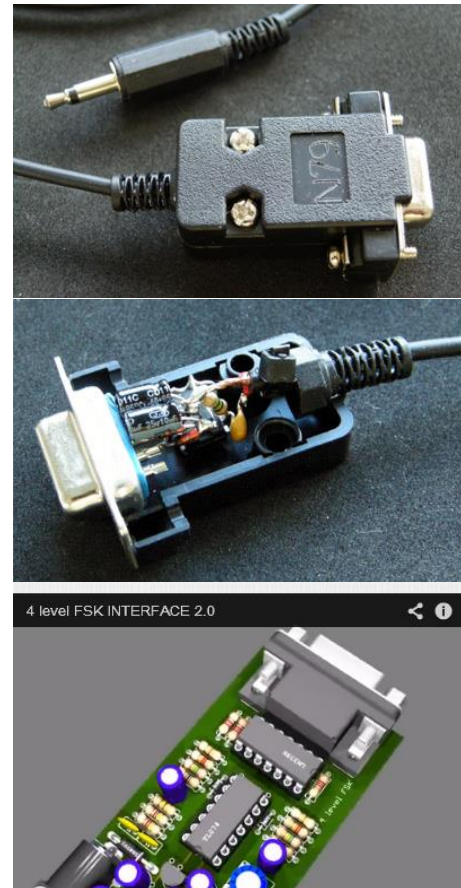
- A discriminator tap provides an unfiltered audio jack
- Bypass squelch and audio filters
- Decode higher data rates (2400 BPS)
- More reliable decoding
- Discriminator.nl has instructions for
 - Uniden Bearcat
 - Realistic
 - Commtel
 - Albercht
 - AOR
 - Atron
 - GRE
 - And many more



<http://www.discriminator.nl/index-en.html>

Data slicers for radio scanners

- Audio input from radio scanner
- Serial RS232 output
- Better with discriminator tap
- 2 Level FSK data slicer
 - Hamcomm modem
- 4 Level FSK data slicer
 - Faster protocols like FLEX & ERMES
- Instructions at <http://discriminator.nl/2-level/index-en.html>
- Buy a 4 level FSK for EUR 50.00



SDR (Software Defined Radio)

Costs under \$20 on eBay
Cheap SDR units designed for TV

Very large frequency range
– 100KHz to 1.5GHz

Look for the RTL2832 chipset
Windows and Linux drivers

Thriving open-source community

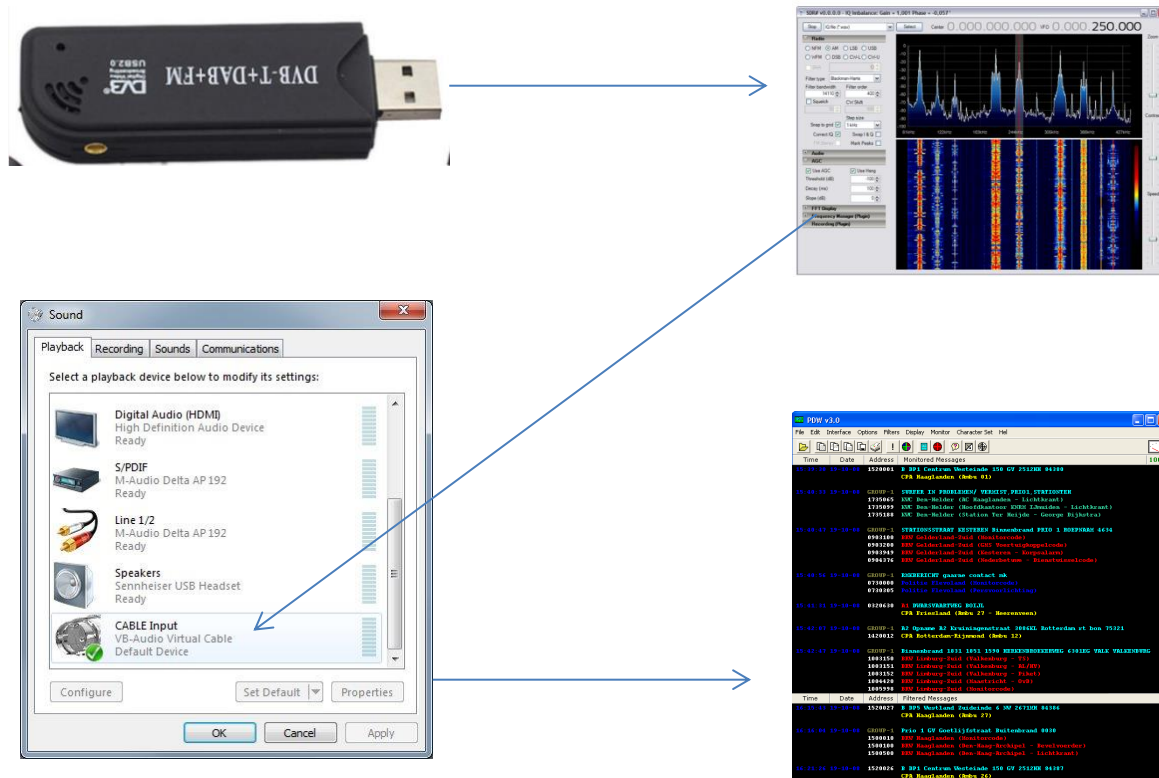
Can be used for

- Decoding pagers
- Watching TV (HD)
- Listening to the radio
- Satellite TV finder (with dish)
- Radio Astronomy (with dish)
- Passive RADAR



Software and articles at
www.rtl-sdr.com

Pager decoding with SDR



Make audio available to other apps
using virtual audio cables

Configuring SDR Sharp

Select Frequency

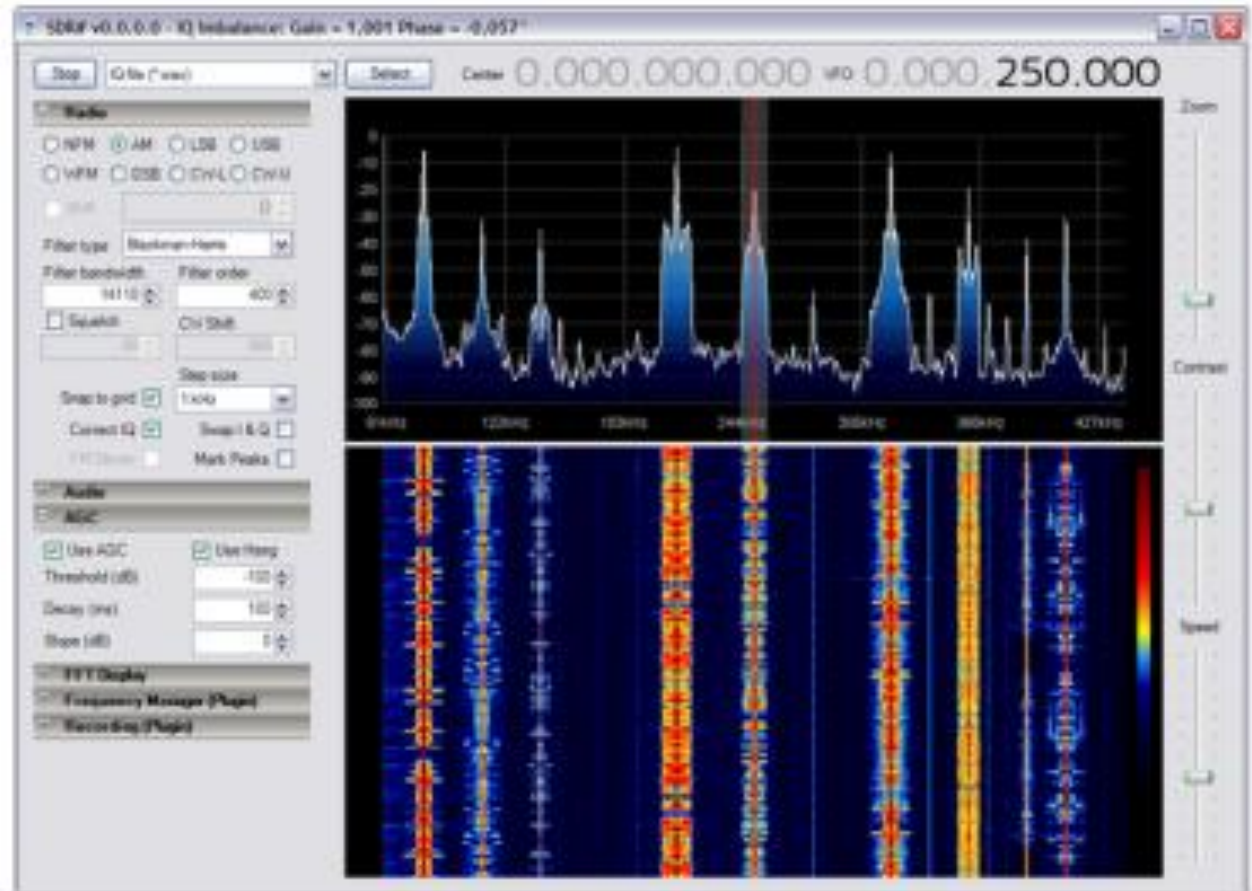
Narrow band FM

Turn off squelch

Set sample rate 48000

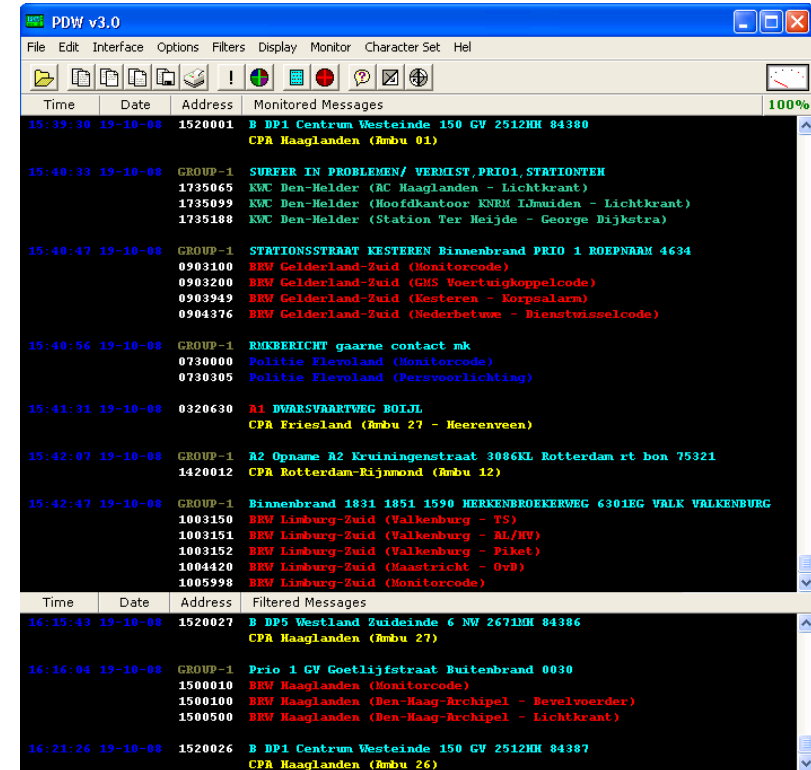
Set AF Gain (high)

Select output audio
device (virtual cable)



Pager Decoding Software

- PDW
 - Best
 - Windows
 - Open source since 2013
 - Works with audio, data slicers, serial, etc
 - POCSAG, FLEX, ERMES, ACARS
 - <http://www.gsm-antennes.nl/PDW/>
- Multimon
 - Linux
 - POCSAG, AX.25, DTMF and ZVEI
 - <http://www.baycom.org/~tom/ham/linux/multimon.html>



Finding pager frequencies

Frequencies commonly used

43 MHz 148 MHz 450 MHz

Australian Government Frequency Allocation



Search Assignments by Post Code and/or Frequency Range

Low Postcode High Postcode

Low Frequency High Frequency

[\[New Search \]](#)



Assignments found

Results 1 - 50 of 2941 assignments.

ID	Frequency	Emission Designator	Client	Licence Number
10379-43568	154.35 MHz	16K0F3E	Essential Energy (1214220)	40840
10385-34950	157.66 MHz	16K0F3E	Essential Energy (1214220)	40852
1100600-1100641	158.225 MHz	10K1F3E	Amalgamated Taxis Wodonga (124859)	180012
1101889-1102114	148.5625 MHz	16K0F2D	Vodafone Hutchison Australia Pty Limited (20012076)	1104290
1101890-1102115	148.6375 MHz	16K0F2D	Vodafone Hutchison Australia Pty Limited (20012076)	1104291
1101891-1102116	148.5625 MHz	16K0F2D	Vodafone Hutchison Australia Pty Limited (20012076)	1104292
1101892-1102117	148.6375 MHz	16K0F2D	Vodafone Hutchison Australia Pty Limited (20012076)	1104293

Client Details

Client Number	20012076
Organisation Name	Vodafone Hutchison Australia Pty Limited
Trading Name	Attention : Justin Nelson
Postal Address	PO Box 1113 NORTH SYDNEY NSW 2060
ACN	096304620
ABN	76096304620
Fee Status	Normal
[New Client Search]	
[400MHz Licences]	

Licences Held

Results 1 - 50 of 455 licences.

Licence No	Licence Type	Licence Category	Callsign	Ship name	Status
1943608	Fixed	Point to Point	VMH960		Issued
1943607	Fixed	Point to Point	VMH959		Issued
1947526	Fixed	Point to Point	VZT823		Issued
1901200	Fixed	Point to Point	VLB229		Issued
1142402	Fixed	Point to Point	AXF287		Issued
1433222	Fixed	Point to Point	VL2HUT		Issued
1143221	Land Mobile	Paging System - Exterior	VNG455		Issued
1143219	Land Mobile	Paging System - Exterior	VNG453		Issued
1143218	Land Mobile	Paging System - Exterior	VNG452		Issued

Licence Details

Licence Number	1143221
Client	Vodafone Hutchison Australia Pty Limited
Status	Issued
Licence Type	Land Mobile
Licence Category	Paging System - Exterior
Callsign	VNG455
Date of Effect	19-APR-13
Date of Expiry	18-APR-14
Advisory Notes	Conditions applicable to the operation of Paging System station(s) authorised under this licence can be found in the Radiocommunications Licence Conditions (Apparatus Licence) Determination and the Radiocommunications Licence Conditions (Land Mobile Licence) Determination. Copies of these determinations are available from the ACMA and from the ACMA home page (www.acma.gov.au).

NOTE: There may be additional text attached to the assignment associated with this licence.

[\[New Licence Search \]](#)

Assignments for this Licence

Results 1 - 1 of 1 assignments

ID	Frequency	Emission Designator	Site Name
8163797-8157761	148.6375 MHz	16K0F2D	Fire Station Taloom St YELARBON (9000161)

Licence Details

Licence Number	1310372
Client	Crown Melbourne Limited
Status	Issued
Licence Type	Land Mobile
Licence Category	Paging System - Interior
Callsign	VJF649
Date of Effect	18-SEP-13
Date of Expiry	17-SEP-14
Advisory Notes	<p>Conditions applicable to the operation of Paging System station(s) authorised under this licence can be found in the Radiocommunications Licence Conditions (Apparatus Licence) Determination and the Radiocommunications Licence Conditions (Land Mobile Licence) Determination. Copies of these determinations are available from the ACMA and from the ACMA home page (www.acma.gov.au).</p> <p>NOTE: There may be additional text attached to the assignment associated with this licence.</p> <p>[New Licence Search]</p>

Assignments for this Licence

Results 1 - 1 of 1 assignments.

ID	Frequency	Emission Designator	Site Name
1308222-1306378	148.3375 MHz	16K0F3E	Crown Casino Site SOUTHBANK (100126)

Pager Frequencies in Victoria

- Orange / Hutchison
 - 148.5625 - F1
 - 148.6375 - F2 (Best)
- SAGRN
 - 148.8125 - FLEX 1600
- Hospital Paging (Local)
 - 148.3375
- Emergency Altering System
 - 148.9125Mhz



Sending pager messages

This varies between countries

- Vodafone paging 24 hour call centre
- SMS to pager gateway
- E-mail to pager
- Web to pager
- Via modem and X25

Legal issues

- Each country has it's own rules regarding pager decoding.
- In Australia and New Zealand you cannot act on the data you decode.
- Illegal 'acting on information' includes tow-truck companies that monitor pagers to locate car crashes.

Online pager message databases

- Australia
 - Provided by the South Australian Country Fire Service
 - Live feed, includes Fire, Emergency, Security Patrols
 - paging1.sacfs.org
- Wikileaks
 - 573,000 pager messages from 9/11/2001
 - 911.wikileaks.org



Security issues

- No encryption / messages are in clear-text
- No assurance of message receipt
- No message sender identity assurance
- Message contents can be sensitive
 - Passwords and PIN codes
 - Locations of physical keys
 - Disclosure of names, usernames, IP addresses, hostnames, IT systems used
- Privacy compliance problems
 - Hospitals send personally identifiable information (PII) including names, addresses, and medical details
- Pager messages often fall outside the scope of penetration testing and security assessments.

Live Demo

PDW v3.1							
File Edit Interface Options Filters Display Monitor Character Set Help							
Address	Time	Date	Mode	Type	Bitrate	Monitored Messages	
0880692	15:01:15	23-03-12	POCSAG-3	ALPHA	512	AUTOMATED TEST PAGE	
0003461	15:01:16	23-03-12	POCSAG-1	NUMERIC	512	TONE ONLY	
0880692	15:01:36	23-03-12	POCSAG-3	ALPHA	512	TEST MESSAGE FROM 3 MESSAGING	
0544721	15:01:42	23-03-12	POCSAG-3	ALPHA	1200	15:01 Southwharf 03 9099 1208 BEN W. - HARDWARE/OTHER - Please call southwharf store regarding moving computer.Ben	
0425583	15:01:43	23-03-12	POCSAG-3	ALPHA	1200	At 15:01:28. The Point UCA04F is in Alarm. Informational Text: Compressed Air Unit No4 has Faulted #####	
0390909	15:01:44	23-03-12	POCSAG-3	ALPHA	1200	RE: EVENT: F120308366 - STOP MESSAGE RECEIVED	
0407110	15:01:45	23-03-12	POCSAG-3	ALPHA	1200	15:07 23/3 colemae: Recourt's CTPA report ready? Celina	
0446719	15:01:46	23-03-12	POCSAG-3	ALPHA	1200	Hi Martina, r u still around? 4 admissions coming, one already here. PAW 51433	
0410905	15:01:46	23-03-12	POCSAG-3	ALPHA	1200	stella borland 0404 978896 non urg	
0407092	15:01:48	23-03-12	POCSAG-3	ALPHA	1200	15:07 23/3 matthei: Chris. p446 x4201. Re Cursio 618406 referral re venous/arterial ulcers.	
0390909	15:01:48	23-03-12	POCSAG-3	ALPHA	1200	RE: EVENT: F120308366 - STOP MESSAGE RECEIVED	
0003461	15:01:52	23-03-12	POCSAG-1	NUMERIC	512	TONE ONLY	
0003461	15:02:18	23-03-12	POCSAG-1	NUMERIC	512	TONE ONLY	
0003461	15:02:42	23-03-12	POCSAG-3	NUMERIC	512	TONE ONLY	
0003461	15:02:53	23-03-12	POCSAG-1	NUMERIC	512	TONE ONLY	
Address	Time	Date	Mode	Type	Bitrate	Filtered Messages	

Getting set up

- Search eBay for a SDR RTL

G'day! [Sign in](#) or [register](#) | [eBay Deals](#)  **WIN \$1,000** [Enter](#) [My eBay](#) [Sell](#) [Community](#) [C](#)

 [Shop by category](#) [sdr rtl2832](#) [All Categories](#)

[Refine your search for sdr rtl2832](#)

Categories
[Computers \(91\)](#)
Computer Components & Parts (83)
[Input Peripherals \(4\)](#)
[Enterprise Networking, Servers \(2\)](#)
[Other \(1\)](#)
[Laptop & Desktop Accessories \(1\)](#)
[Clothing, Shoes, Accessories \(27\)](#)
[Men's Accessories \(27\)](#)
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☒ All Listings
☐ Auction
☐ Buy It Now

Product Type [see all](#)
Connection Type [see all](#)

All Listings **Auction** **Buy It Now** Sort: **Best Match** View:  Your location: 3000

124 results for **sdr rtl2832** [★ Save search](#)



3 Photos

★USB Digital TV & Radio for PC - DVB-T, DAB+, FM, SDR Receiver Dongle - RTL2832U

Listen to 27MHz & UHF CB, 12m - 23cm HAM Bands & More!

AU \$18.95
[Buy It Now](#)
+AU \$6.95 postage








USB Digital TV & Radio for PC - DVB-T, DAB+, FM, SDR Receiver Dongle - RTL2832U


2d 4h left
Friday, 14:55

AU \$12.99
0 bids
+AU \$6.99 postage

Setup: Get PDW

 PDW Paging Decoder

  www.discriminator.nl/pdw/index-en.html  

 Nederlands homepage | news

Receivers

Uniden Bearcat

Realistic

Commtel

Albrecht

AOR

Atron

GRE

Handic

Icom

Maycom

Netset

Regency

Scooper

Yupiteru

Marine VHF

Pagers

Other

Receiver IC's

Software

PDW Paging Decoder

PDW LogBrowser

PDW Support Forum

PDW Paging Decoder Software


Introduction

Since 2003, Peter Hunt has developed PDW to the most important (free!) application to m FLEX. PDW has many users worldwide, from radio enthusiasts to professionals. After 10 ye PDW as finished and he has stopped development. Peter, thank you for all your efforts! Me Open Source. You can read more about that below.

As of March 2013, this site is the official host for PDW.

Download

The latest PDW version can be found here:



- [PDW v3.12 \(zip\)](#) - Current Open Source release
- [PDW v3.1 \(zip\)](#) - Final version developed by Peter Hunt
- [PDW Manual \(pdf\)](#)
- [LogBrowser \(zip\)](#) - [description](#)

Setup: VB-CABLE

The image is a composite showing the VB-CABLE website and a Windows Sound settings window. The website, viewed in a browser, has a dark theme and is titled 'VB-Audio Virtual Cable'. It features three main columns: 'VB-CABLE TECHNOLOGY', 'VB-CABLE APPLICATIONS', and 'NEW'. The 'TECHNOLOGY' section explains that VB-Audio CABLE is a Windows Audio Driver working as a Virtual Audio Cable, and that after installation, a new playback device appears in the audio device list. The 'APPLICATIONS' section describes how VB-CABLE allows routing signal from one application to another, with typical uses like recording and analysis. It includes icons for various audio sources and software. The 'NEW' section on the right mentions 'VB-Audio Standalone' and 'Voic...'. Below the website content, a Windows 'Sound' window is shown with the 'Playback' tab selected. It lists several audio devices, with 'CABLE Input' (VB-Audio Virtual Cable) highlighted as the 'Default Device'. The website also provides a download link for the 'VB-CABLE Driver' (Donationware), specifying it's a Virtual Audio MME, DX, WDM Device Driver for XP, Vista, Win7, and Win8 32/64 bits, with a file named 'VBCABLEDriver_Pack42b.zip' (1.01 MB - JUL 2013). A 'Download' button is present, with a note that the setup program must run in administrative mode.

VB-CABLE TECHNOLOGY

VB-Audio CABLE is a Windows Audio Driver working as Virtual Audio Cable.

After installing the VB-CABLE driver, a new playback device appears in the audio device list and can be set as default device.

VB-CABLE APPLICATIONS

VB-CABLE allows routing signal from an application to another one.

Typical application for the Virtual Audio Cable is to route your sound to an audio software in order to record and analyze it...

From whatever audio sources...

To whatever audio software...

...supporting MME, DX or WDM Audio Device Drivers...

NEW

VB-Audio Standalone get 5.1 surround sound (new kind of VB-Audio Driver 2012).

Download

Voic...

VB-CABLE Virtual M...

Sound

Playback Recording Sounds Communications

Select a playback device below to modify its settings:

- Digital Audio (HDMI) High Definition Audio Device Ready
- S/PDIF M-Audio Delta AP192 Ready
- Line 1/2 M-Audio Delta AP192 Ready
- Speakers Sennheiser USB Headset Ready
- CABLE Input VB-Audio Virtual Cable Default Device**


Configure Set Default Properties




OK Cancel Apply


VB-CABLE can be set as default device, as any regular audio device. The Configure and Properties buttons allow to setup multi channel features and device sound quality.


VB-CABLE Driver (Donationware)
Virtual Audio MME, DX, WDM Device Driver (XP, VISTA, WIN7, WIN8 32/64 bits).
VBCABLEDriver_Pack42b.zip (1.01 MB - JUL 2013).
Download
(setup program must run in administrative mode)


Setup: Get SDRSharp

 sdrsharp.com/index.php/downloads











SDR# BLOG DOWNLOADS

Search 

COT THE AIRSPY?

Click [here](#) to register your interest!



SUPPORT

If you like this software, please support it by donating money, hardware (preferred) or simply write a good documentation and spread the word.

[Donate](#)

RECENT POSTS

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[Contributors](#)

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[zabex on Welcome](#)

[lu3aec on Welcome](#)

[Annunski on Welcome](#)

[jvd1 on Welcome](#)

META

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This page is updated every time a version is available. So, stay tuned!

- [SDR# Stable](#) (Revision 1000, Stable)
- [SDR# Dev](#) (Continuous Integration, Last Changed Rev: 1193)
- [SDR# RTLSDR Plugin](#) (Continuous Integration, Last Changed Rev: 1193)
- [ADSB# v1.0.11.1](#), a SDR ADS-B Receiver in C# and its documentation
- [Source code](#) (SVN)
- [Changesets](#)

Licensing

SDR# (SDRSharp) is released under the MIT license for the GUI and the plugin parts, and under the MS-RSL for the DSP.

As such, **you can:**

- Create, Modify and Redistribute plugins
- Create, Modify and Redistribute the GUI in both its binary and source code forms under a different name (it's no longer SDR#!) preserving the original copyrights and licenses

But you cannot:

- Modify or Redistribute the DSP (SDRSharp.Radio.dll and its corresponding code)

Important note for RTL-SDR users

You can use this quick installation script to test the latest development version:

<http://sdrsharp.com/downloads/sdr-install.zip>

A step by step installation instructions can be found in the community website:

<http://rtlsdr.org/software/windows>

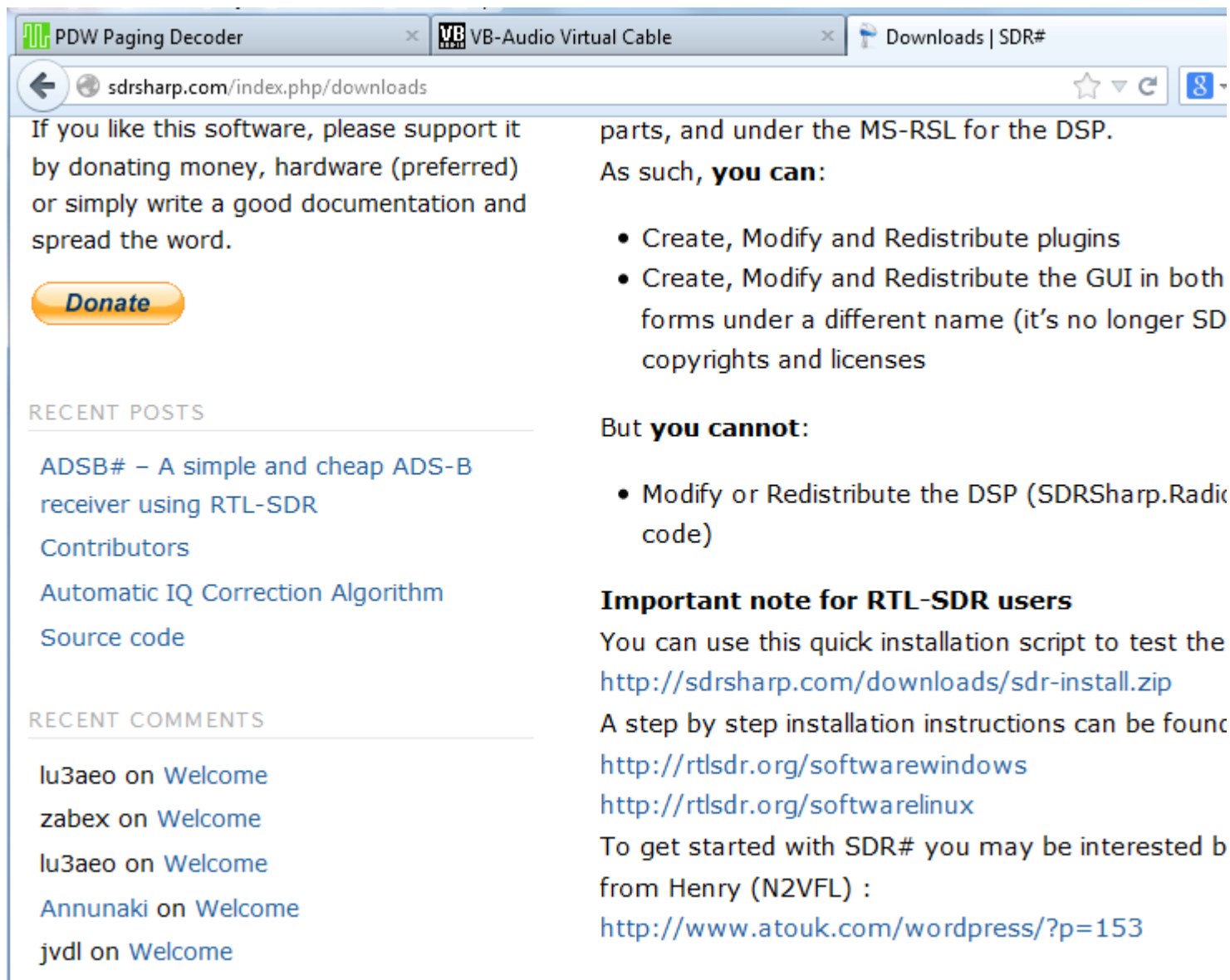
<http://rtlsdr.org/software/linux>

To get started with SDR# you may be interested by the excellent document from Henry (N2VFL) :

<http://www.stouk.com/wordpress/?p=153>

Support

Setup: The latest SDRSharp ZIP



The screenshot shows a web browser window with three tabs: 'PDW Paging Decoder', 'VB-Audio Virtual Cable', and 'Downloads | SDR#'. The address bar shows 'sdrsharp.com/index.php/downloads'. The page content is divided into two main columns. The left column contains a donation request, a 'Donate' button, and sections for 'RECENT POSTS' and 'RECENT COMMENTS'. The right column contains instructions on what users can and cannot do with the software, and an important note for RTL-SDR users.

If you like this software, please support it by donating money, hardware (preferred) or simply write a good documentation and spread the word.

[Donate](#)

RECENT POSTS

- [ADSB# – A simple and cheap ADS-B receiver using RTL-SDR](#)
- [Contributors](#)
- [Automatic IQ Correction Algorithm](#)
- [Source code](#)

RECENT COMMENTS

- [lu3aeo on Welcome](#)
- [zabex on Welcome](#)
- [lu3aeo on Welcome](#)
- [Annunaki on Welcome](#)
- [jvdl on Welcome](#)

parts, and under the MS-RSL for the DSP.
As such, **you can**:

- Create, Modify and Redistribute plugins
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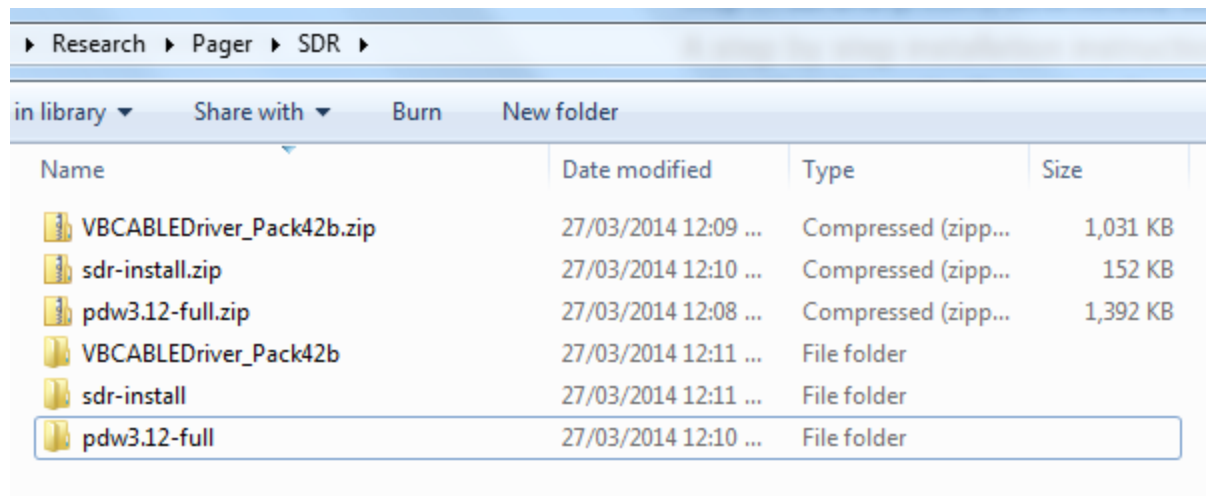
But **you cannot**:

- Modify or Redistribute the DSP (SDRSharp.Radio code)

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You can use this quick installation script to test the <http://sdrsharp.com/downloads/sdr-install.zip>
A step by step installation instructions can be found <http://rtlsdr.org/softwarewindows>
<http://rtlsdr.org/softwarelinux>
To get started with SDR# you may be interested by from Henry (N2VFL) :
<http://www.atouk.com/wordpress/?p=153>

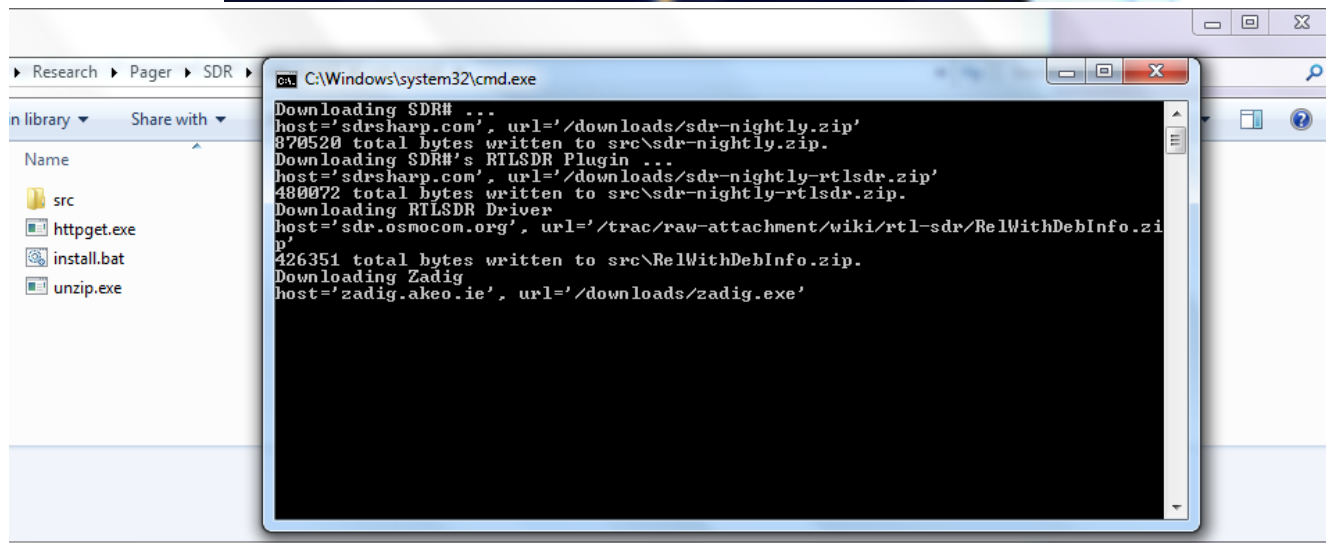
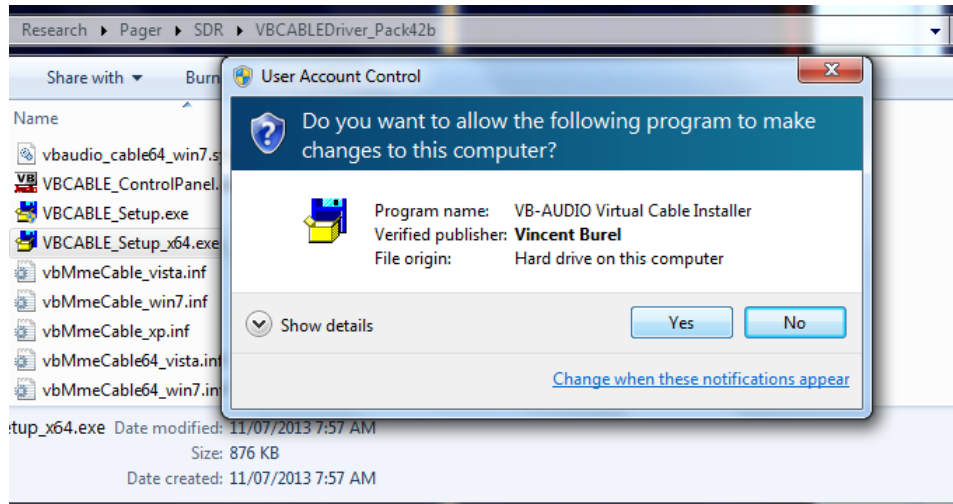
Setup: Unpack



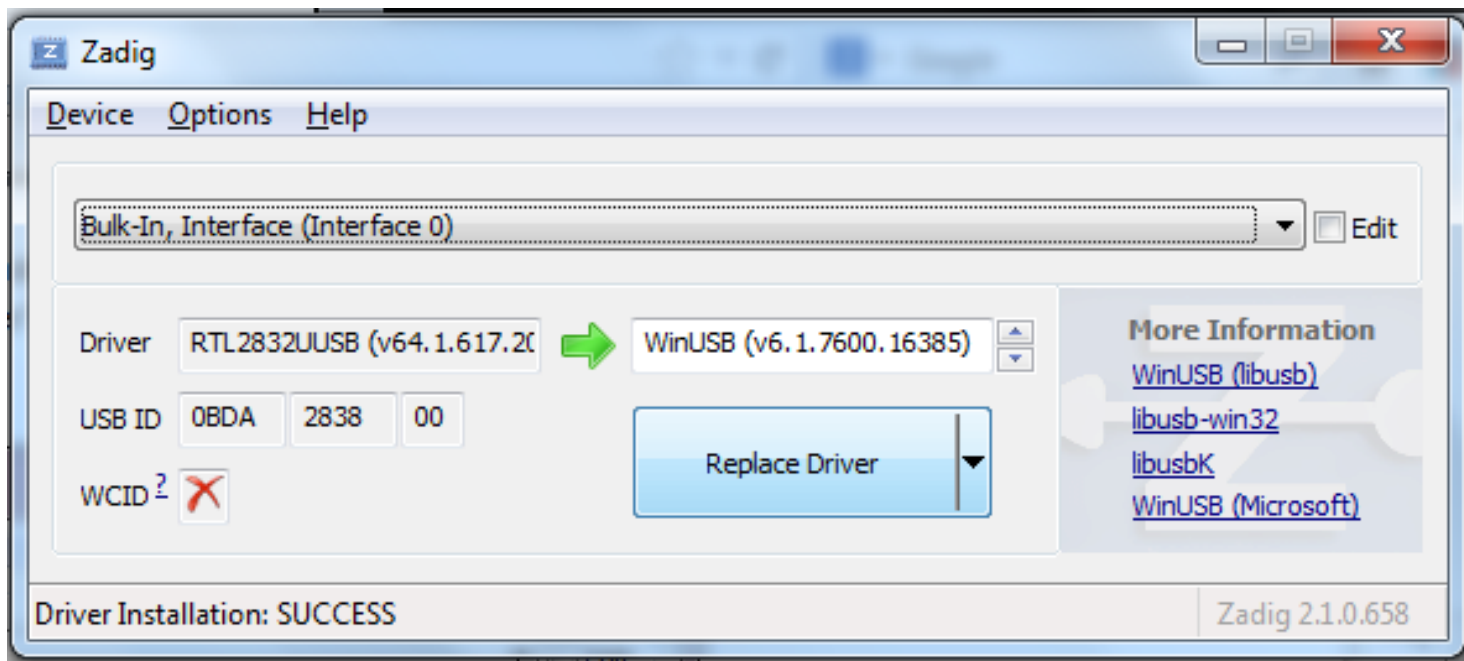
The screenshot shows a Windows File Explorer window with the address bar displaying the path: Research > Pager > SDR. The window has a menu bar with options: 'in library', 'Share with', 'Burn', and 'New folder'. Below the menu bar is a table listing the contents of the 'SDR' folder. The table has four columns: 'Name', 'Date modified', 'Type', and 'Size'. The contents include three zip files and three folders. The folder 'pdw3.12-full' is currently selected, indicated by a blue highlight.

Name	Date modified	Type	Size
VBCABLEDriver_Pack42b.zip	27/03/2014 12:09 ...	Compressed (zipp...	1,031 KB
sdr-install.zip	27/03/2014 12:10 ...	Compressed (zipp...	152 KB
pdw3.12-full.zip	27/03/2014 12:08 ...	Compressed (zipp...	1,392 KB
VBCABLEDriver_Pack42b	27/03/2014 12:11 ...	File folder	
sdr-install	27/03/2014 12:11 ...	File folder	
pdw3.12-full	27/03/2014 12:10 ...	File folder	

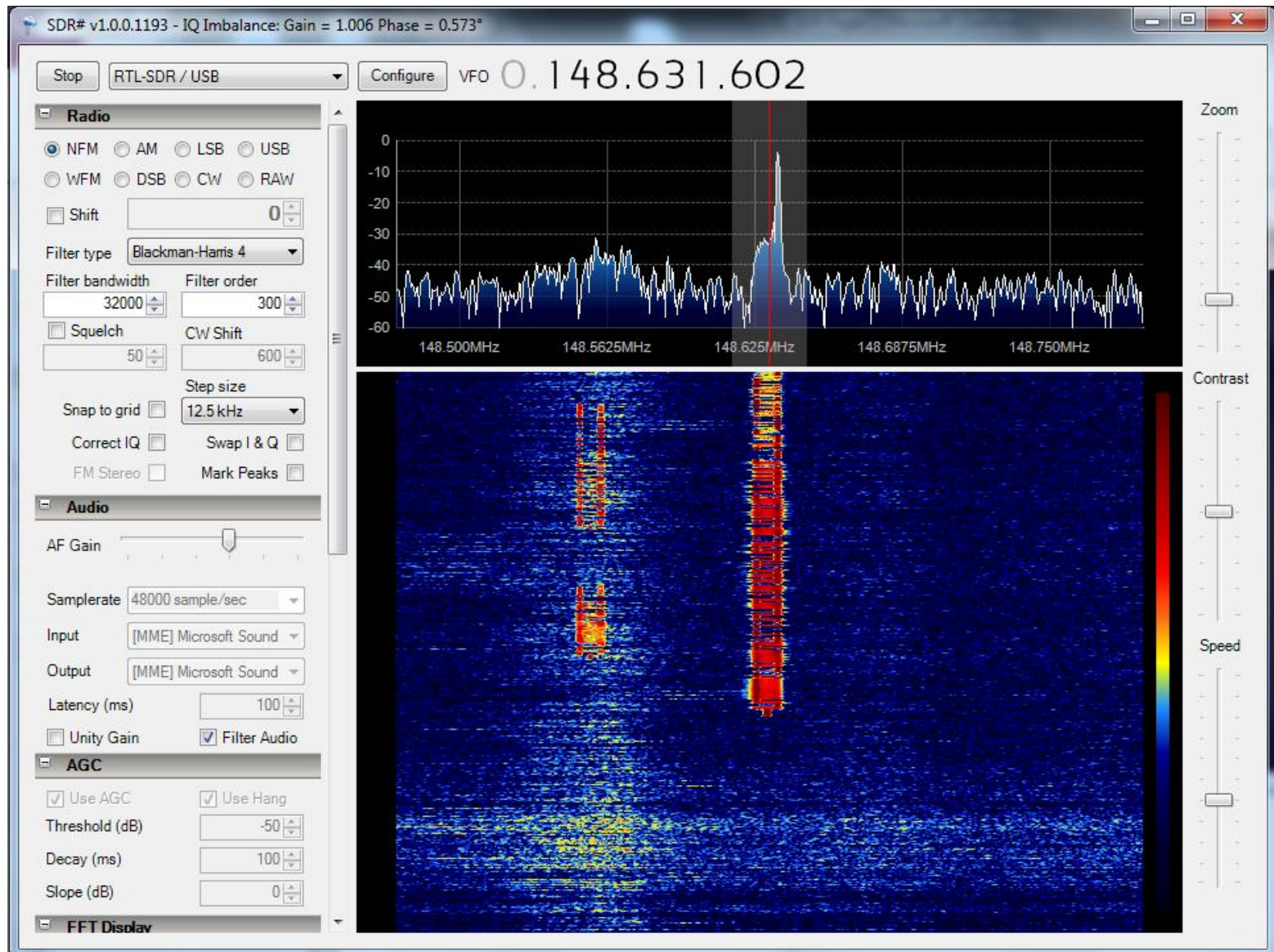
Setup: Install VB Cable



Setup: Zadig



Setup: SDRSharp



Setup: SDRSharp Output

SDR# v1.0.0.1193 - IQ Imbalance: Gain = 1.000 Phase = 0.000°

Play RTL-SDR / USB Configure VFO 0.131.568.000

Radio

☐ NFM ☒ AM ☐ LSB ☐ USB
☐ WFM ☐ DSB ☐ CW ☐ RAW

☐ Shift 0

Filter type Blackman-Harris 4

Filter bandwidth 18460 Filter order 450

☐ Squelch 50 CW Shift 600

Step size 1 kHz

☒ Snap to grid ☐ Correct IQ ☐ Swap I & Q ☐ FM Stereo ☐ Mark Peaks

Audio

AF Gain

Samplerate 48000 sample/sec

Input [MME] Microsoft Sound

Output [MME] Microsoft Sound

Latency (ms)

☐ Unity Gain

AGC

☒ Use AGC

Threshold (dB) -50

Decay (ms) 100

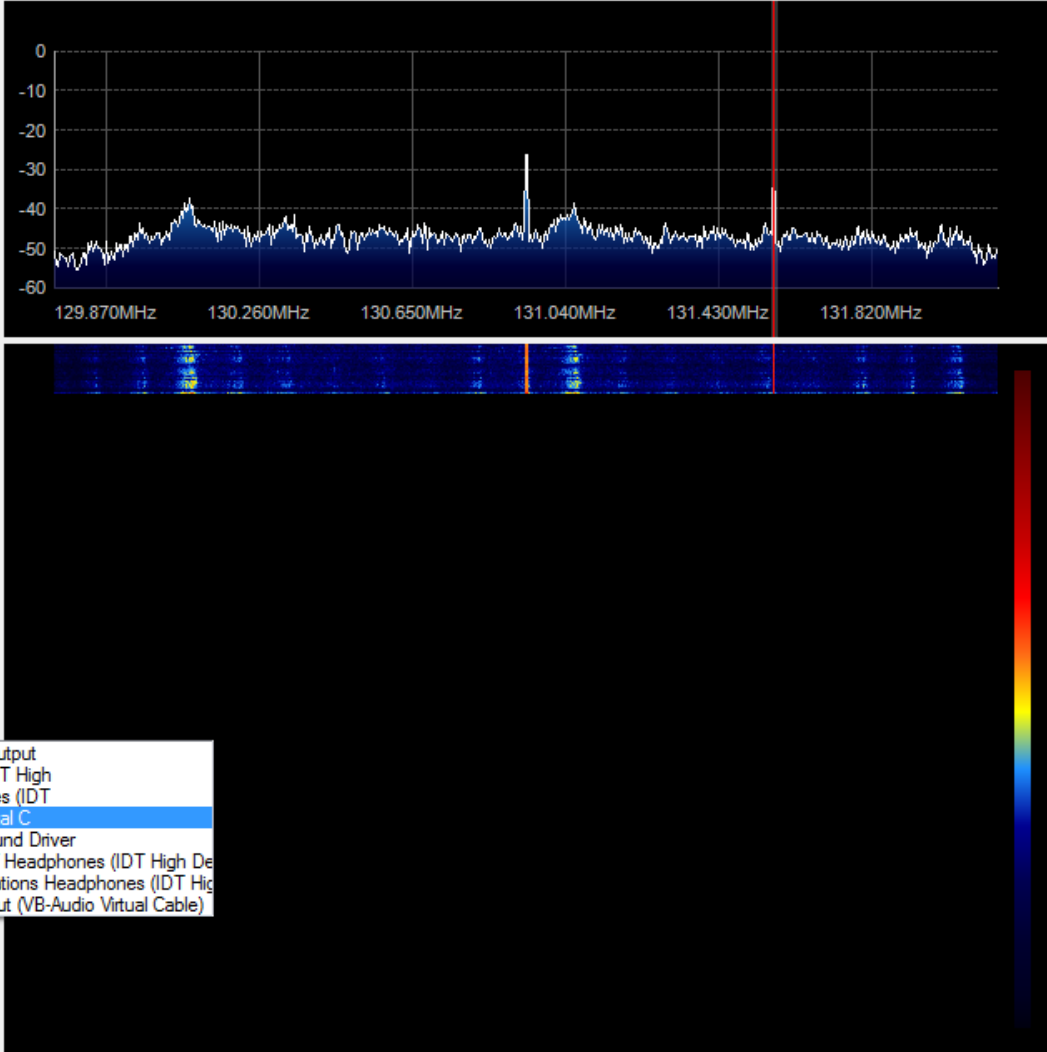
Slope (dB) 0

FFT Display

Zoom

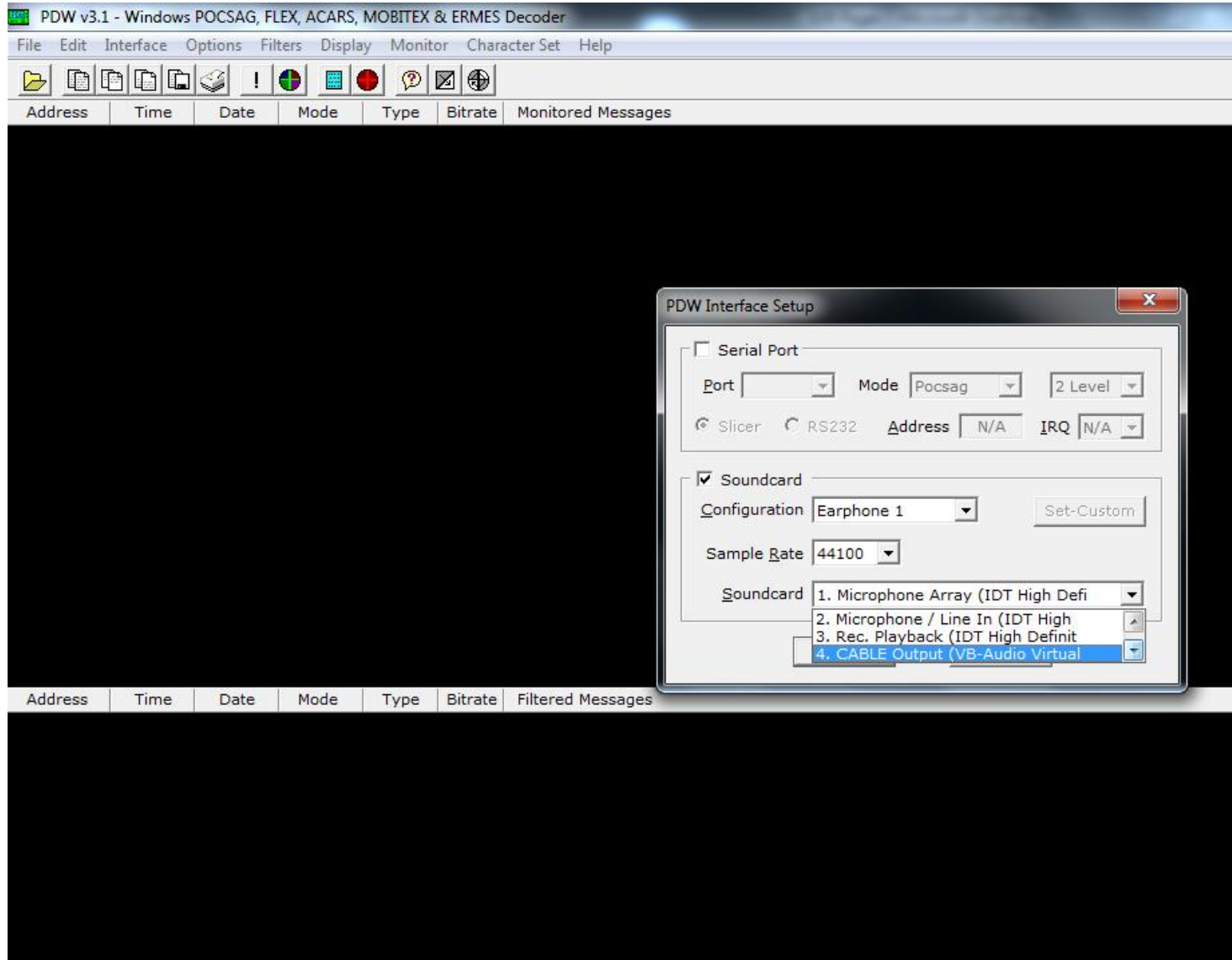
Contrast

Speed

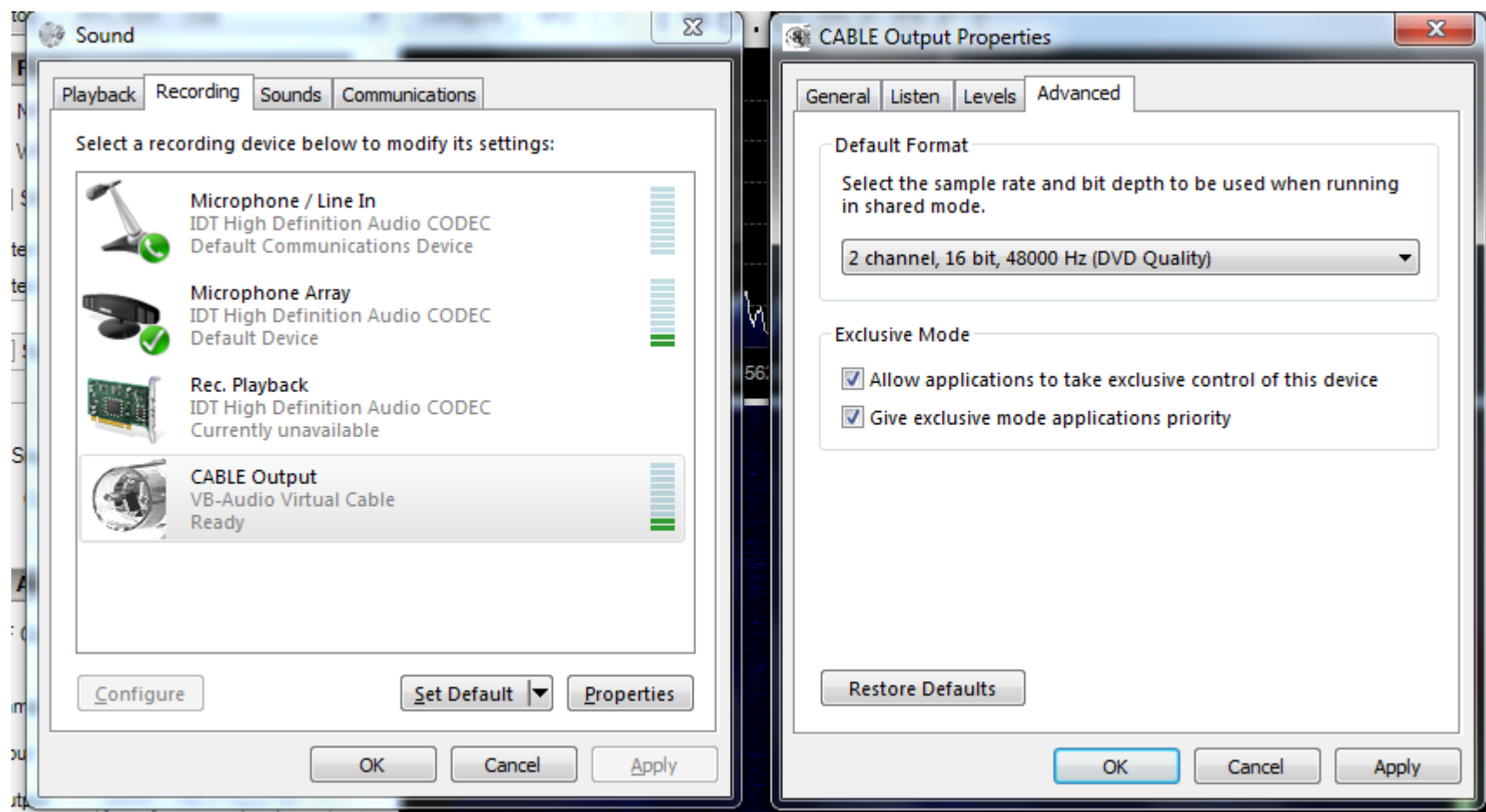


The screenshot displays the SDRSharp software interface. The top bar shows the version (v1.0.0.1193) and IQ imbalance settings (Gain = 1.000, Phase = 0.000°). The main window is divided into several sections. On the left, the 'Radio' section contains mode selection (AM is selected), filter settings (Blackman-Harris 4, 18460 bandwidth, 450 order), and various checkboxes like 'Snap to grid' and 'Mark Peaks'. Below this is the 'Audio' section with a volume slider, samplerate (48000), and input/output device selection. The 'AGC' (Automatic Gain Control) section is also visible with checkboxes and numerical settings. The central area features a spectrum plot with a frequency range from 129.870 MHz to 131.820 MHz, showing a prominent signal at 131.040 MHz. Below the spectrum plot is a waterfall display. On the right side, there are vertical sliders for 'Zoom', 'Contrast', and 'Speed'. A color calibration bar is also present.

Setup: PDW Input



Setup: VB Cables



Thank you for listening (in)



Learn more

Buy an SDR

- Search ebay for **sdr**. Look for the RTL2832U chip

Pager Decoding Software

- **www.gsm-antennes.nl/PDW/**

SDR Sharp

- **sdrsharp.com**

RTL SDR

- Blog about SDR

Pagers and FLEX

- **www.nettwerked.net**

The Wonderful World of Pagers by Erik Bloodaxe

- Phrack Issue Forty-Six

Radio Scanner Discriminator Mods

www.discriminator.nl

Australian Frequency Allocation

- **web.acma.gov.au**

Database of Australian SAGRN Pager Messages

- **www.sascan.net.au**

Live pager messages in NSW

- **paging1.sacfs.org**

Wikileaks pager messages from 9/11/2001

- **911.wikileaks.org**