

# Connecting SDRplay to a Kenwood TS-830S

Alan K2QU

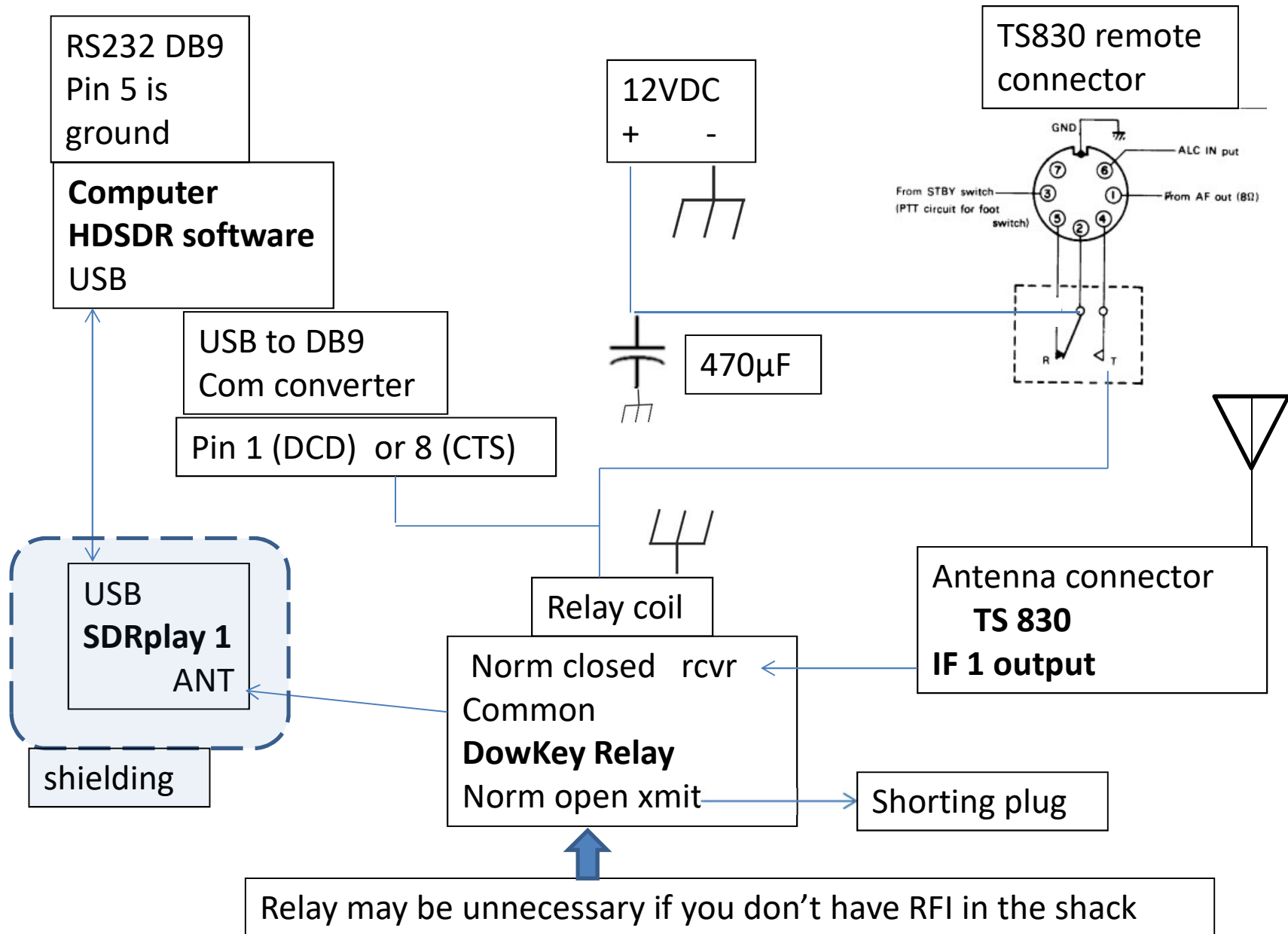
August, 2017

Please advise K2QU of improvements!

# Summary

- Hardware
  - TS-830S
  - SDRplay RSP1 (and optional shielding)
  - Optional
    - DowKey Relay & COM port (RS232)
      - I used a FTDI-A36 USB to DB9 COM converter
    - 12VDC supply & 470 $\mu$ F capacitor (may not be needed)
    - TS-830 aux relay shorts SDRplay input and mutes HDSDR audio on transmit
    - Shielding mitigates xmit RF at SDRplay
- Software
  - HDSDR V2.76

# Hardware Connections



# Software Set-up to Activate T/R in HSDR via COM port

The screenshot displays the HSDR software interface. On the left, a settings menu is open, with 'CAT to HSDR' selected. A sub-menu is visible for 'PTT activation pin', showing 'activated' as the selected option. A red box with the text 'Either pin will work' is overlaid on the sub-menu, pointing to the 'CTS (DB-9 Pin8) on high' and 'DCD (DB-9 Pin1) on high' options. The main interface shows a 'Waterfall' plot with a frequency range of 500 and a volume level of -60. The status bar at the bottom indicates the date and time as '2017-08-07 22:14:05 UTC' and shows CPU usage for HSDR (19%) and Total (32%).

Select Input >  
Visualization >  
Input Channel Mode for RX >  
Output Channel Mode for RX >  
RF Front-End Configuration  
Calibration Settings  
Recording Settings+ Scheduler  
Misc Options >  
Mouse Wheel >  
DDE to HSDR  
CAT to Radio (Omni-Rig) >  
**CAT to HSDR >**  
TX >

What's this?  
Port >  
Baudrate (bps) >  
**PTT activation pin >**  
activated ✓

none (CAT only)  
 CTS (DB-9 Pin8) on high  
 DCD (DB-9 Pin1) on high

**Either pin will work**

Waterfall  
500  
-60  
-70  
-80  
-90

2017-08-07 22:14:05 UTC  
CPU HSDR: 19%  
CPU Total: 32%

# Software Set-up to Activate T/R in HSDR via COM port

About 'CAT to HSDR'

From options menu

HSDR can get controlled over a serial/CAT interface.  
HSDR understands a small subset of Kenwood's CAT protocol:

```
FA00000000000; // set tune frequency [Hz]
MD1; ... MD5; // change mode [ 1=LSB, 2=USB, 3=CW, 4=FM, 5=AM ]
TX; and RX; // switch RX/TX - only if the active ExtIO supports TX
```

For controlling HSDR from another software with CAT support (f.e. WSJT, Fldigi, MultiPSK, MixW amongst others), you can use serial port emulator like 'com0com' or 'VSPE'.

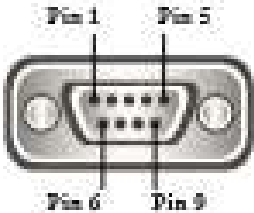
For RX/TX switching you can also use 'high level' on CTS or DCD pin. In the controlling software you have to configure RTS (instead CTS) or DTR (instead DCD) for PTT control when you are using a Null-modem cable. com0com uses such a Null-modem wiring as default. Prefer using 'CAT' as 'PTT method' when available.

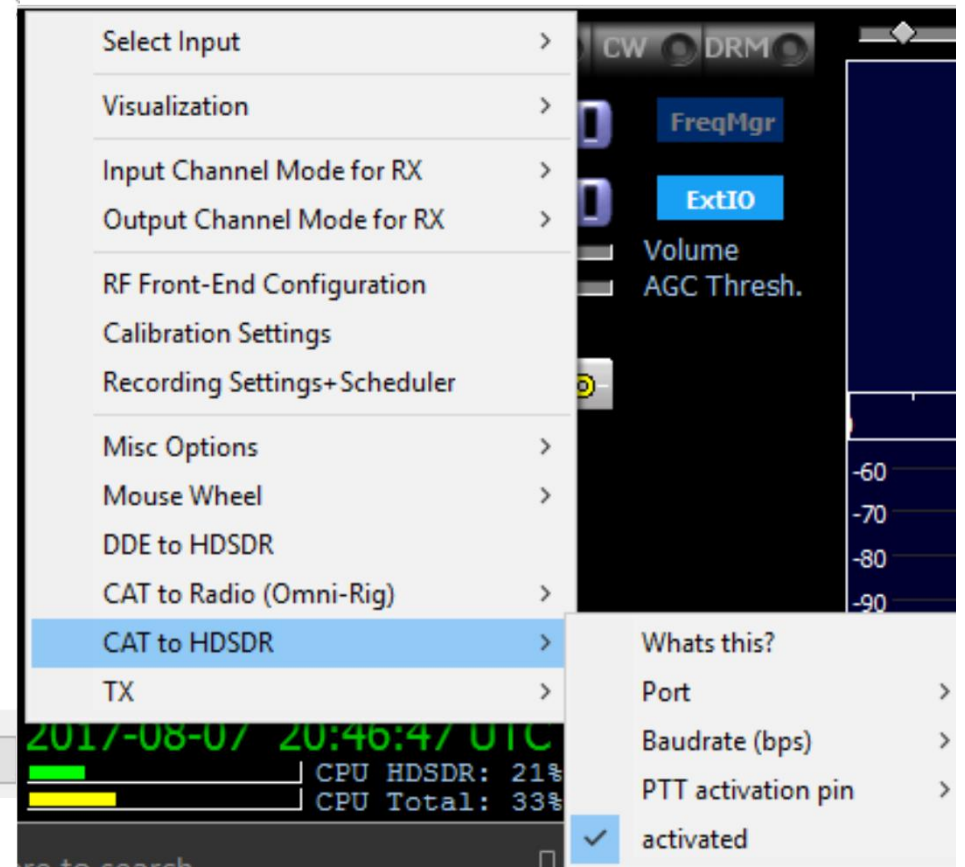
Configure '8 Data Bits', 'No Parity', '1 Stopbit' and 'No Handshake' in controlling software.

**Port Male**

Pin	Signal
Pin 1	DCD
Pin 2	RXD
Pin 3	TXD
Pin 4	DTR
Pin 5	GND
Pin 6	DSR
Pin 7	RTS
Pin 8	CTS
Pin 9	RI

RS232 Pinout (9 Pin Male)





The screenshot shows the HSDR software interface. A menu is open with the following items:

- Select Input >
- Visualization >
- Input Channel Mode for RX >
- Output Channel Mode for RX >
- RF Front-End Configuration
- Calibration Settings
- Recording Settings+Scheduler
- Misc Options >
- Mouse Wheel >
- DDE to HSDR
- CAT to Radio (Omni-Rig) >
- CAT to HSDR >**
- TX >

The 'CAT to HSDR' sub-menu is open, showing:

- Whats this? >
- Port >
- Baudrate (bps) >
- PTT activation pin >
- activated

At the bottom of the screen, a status bar shows: 2017-08-07 20:46:47 UTC, CPU HSDR: 21%, CPU Total: 33%.

# Software Set-up to Activate T/R in HSDR via COM port

From options menu

- Select Input >
- Visualization >
- Input Channel Mode for RX >
- Output Channel Mode for RX >
- RF Front-End Configuration
- Calibration Settings
- Recording Settings+ Scheduler
- Misc Options >
- Mouse Wheel >
- DDE to HSDR
- CAT to Radio (Omni-Rig) >
- CAT to HSDR >
- TX >**
  - Enable TX Button for Omni-Rig1
  - Enable TX Button for Omni-Rig2
  - Enable TX Button for 'CAT to HSDR'
  - Enable TX Button for HRD (DDE)
  - mute RX audio on TX

Peak

AM ECSS FM **LSB** USB CW DRM

LO B **0007.100.000** FreqMgr

Tune **0007.183.000** ExtIO

S-units Squelch

S9 +2 dB

Volume AGC Thresh.

Soundcard [F5] Bandwidth [F6] Options [F7] Help / Update [F1] Full Screen [F11] Stop [F2] Minimize [F3] Exit [F4]

NR NB RF NB IF AFC Mute AGC Fast Notch ANotch

2017-08-07 22:29:34 UTC

CPU HSDR: 20% CPU Total: 32%

**TX**

Confirms TX button is active

# Software Set-up for Synchronized Kenwood and SDRplay Tuning

Options Menu: RF Front-end configuration

RF front-end frequency options

**SDR hardware coupling**

SDR hardware connected to antenna (default)

SDR on IF output, which is controlled

Sync Mode

Full sync in both directions

Independent Tune in HDSDR

Independent Tune, but sync on external change

Full sync, except LO

IF-frequency:  [Hz]      Global Offset:  [Hz]

Additional Offset per Mode in Hz

AM	FM	LSB	USB	CW_U	CW_L	DIG_U	DIG_L
0	0	1500	-1500	-1000	0	0	0

Mirror RF Spectrum in general

Mirror RF Spectrum for Tune >=  kHz

operate CW in lower sideband (LSB)

Swap CW and CWR for Omni-Rig

SDR hardware on Down/Up-Converter  
LO Frequency of Down/Up-Converter in Hz:

SDR hardware in undersampling mode  
Samplerate of Analog-Digital Converter in Hz:

- The 1500 Hz SSB offsets are consistent with the TS830 IFshifts – slight adjustments will fix any TX/RX offset
- The 1000Hz CW offset enables a pitch of about 700Hz



# Software Set-up for Independent Kenwood and SDRplay tuning

RF front-end frequency options

**SDR hardware coupling**

SDR hardware connected to antenna (default)

SDR on IF output, which is controlled

Sync Mode

Full sync in both directions

Independent Tune in HDSDR

Independent Tune, but sync on external change

Full sync, except LO

IF-frequency:  [Hz]      Global Offset:  [Hz]

Additional Offset per Mode in Hz

AM	FM	LSB	USB	CW_U	CW_L	DIG_U	DIG_L
0	0	1500	-1500	-1000	0	0	0

Mirror RF Spectrum in general

Mirror RF Spectrum for Tune >=  kHz

operate CW in lower sideband (LSB)

Swap CW and CWR for Omni-Rig

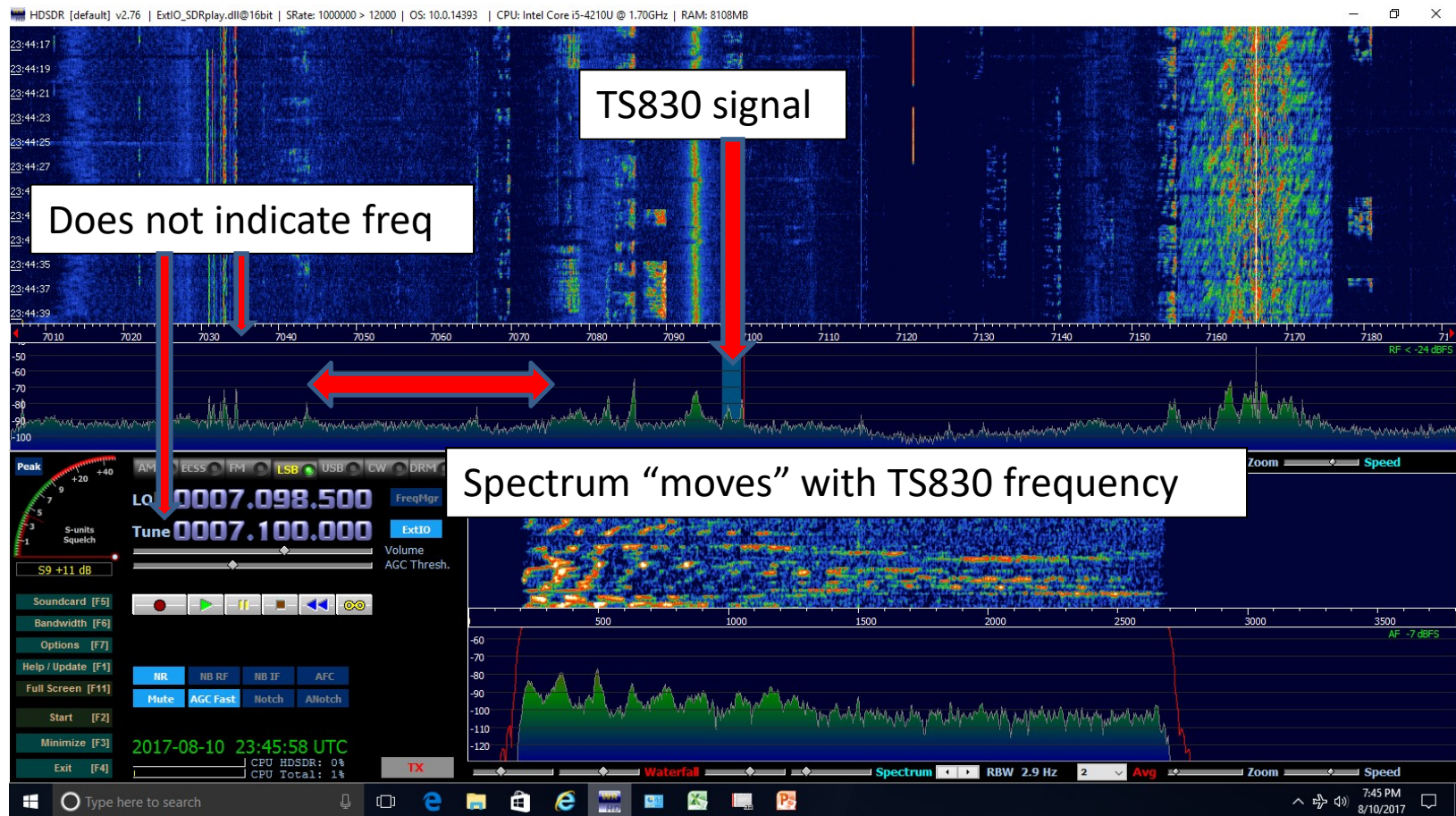
SDR hardware on Down/Up-Converter  
LO Frequency of Down/Up-Converter in Hz:

SDR hardware in undersampling mode  
Samplerate of Analog-Digital Converter in Hz:

- With this option checked, none of the other settings are relevant.
- The “Full sync” , IF and Offsets have no impact.
- The SDRplay operates as it normally would with an antenna connected directly to it. However, the SDRplay will also work in this mode with the TS830 IF1 output connected to the SDRplay antenna input.



# HDSDR with Sync to TS830



Only method to know frequency is by TS830 VFO readout

# Relay Connections to SDRplay

