Ham Radio Deluxe

# **User Guide**

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# Introduction

## How It All Began

In early 2003 Peter PHP1PH and myself Simon HB9DRV talked about developing a simple program to control the soon to be released ICOM IC-703.

We had previously developed the FT-817 Commander, which proved to be very popular, the main lesson being learnt that future programs must not be tied to a single radio or a single manufacturer; rather they must be designed to support all current and future radios.

Maybe it was the beer, maybe the desire to give something back to the radio amateur community, however on June  $6^{th}$ , 2003 the first line of code was written, Ham Radio Deluxe (HRD) was born.

The inspiration for the design came from a variety of sources: Internet Explorer (especially the Favourites), my old Eddystone EA12 and a desire to prove that Peter and myself could develop something better than the current 'not quite so free and fantastic' products being peddled to radio amateurs.

On December 23<sup>rd</sup>, 2005 the number of registered users stood at 20,006 – quite an achievement in such a short time.

Very sadly Peter passed away on June 8<sup>th</sup>, 2005. His contribution to Ham Radio Deluxe will never be forgotten.



# This Guide

Kevin Crockett, VK3CKC, wrote the original user guide. Now that HRD is a more mature product the time has come to write the document you are currently reading.

Thank-you for reading this guide - and before you ask it's written in British English, plenty of my favourite colours despite Word's attempts to change the spelling O.

## **Sponsors**

To help keep HRD free for all Amateurs and SWL's several companies have helped by sponsoring the HRD development. If I have missed your company please let me know.



# Requirements

## Computer

You can run HRD on any Windows 98 or NT/2K/XP computer.

There will never be a LINUX or Macintosh native version, HRD is known to run under Wine for LINUX and PC emulators for the Macintosh.

I may be crazy undertaking a project like this in my spare time<sup>1</sup>; I am not 'deep stir-fry serve in a bun with extra chilies' crazy<sup>2</sup>!

The code is not open source; it cannot be ported to Linux and will never be released as some of the code is protected under copyright and if released will land the author with a nice big legal 'fee'.

## Supported Radios

You don't need a radio – HRD comes with built-in Dem-o-matic radio support (K2, TS-480, TS-2000 and Orion).

HRD currently supports these 'real' radios:

- Elecraft: K2
- FlexRadio: SDR-1000
- *ICOM*: IC-7000, IC-703, IC-706, IC-706MkII, IC-706MkIIG, IC-707, IC-718, IC-725, IC-726, IC-728, IC-729, IC-735, IC-736, IC-737, IC-738, IC-7400, IC-746, IC-746Pro, IC-751A, IC-751A (Piexx), IC-756, IC-756Pro, IC-756ProII, IC-756ProIII, IC-761, IC-765, IC-775DSP, IC-7800, IC-781, IC-821H, IC-910H, IC-R10, IC-R20, IC-R75, IC-R8500, PCR-1000
- *Kenwood*: R-5000, TS-140S, TS-2000, TS-440S, TS-450S, TS-480, TS-50S, TS-570, TS-60S, TS-680S, TS-690S, TS-790, TS-850, TS-870, TS-940S, TS-950, TS-B2000
- Ten-Tec: Argonaut, Jupiter, Orion, RX-350
- Yaesu: FT-100, FT-1000D, FT-1000MP MkV, FT-600, FT-817, FT-840, FT-847, FT-857, FT-890, FT-897, FT-900, FT-920, FT-990

<sup>&</sup>lt;sup>1</sup> It was the voices in my head that made me do it

<sup>&</sup>lt;sup>2</sup> Medical opinion may differ here

 Yaesu: FT-100, FT-1000D, FT-1000MP MkV, FT-600, FT-817, FT-840, FT-847, FT-857, FT-890, FT-897, FT-900, FT-920, FT-990

## Interfacing

You will need a cable to connect your radio to the computer's serial (COM) port. If you don't have a serial port all is not lost – USB  $\Leftrightarrow$  serial converters are widely available.

For more information refer to:

- The HRD Interface guide, and
- CATbox, a Modular Computer Interface by Bas Helman G4TIC.

Check out the cable solutions from G4ZLP http://g4zlp.ham-radio.ch/ and West Mountain Radio http://www.westmountainradio.com/.

# Installation

## Introduction

The Ham Radio Deluxe kit is a standard Windows kit – it supports Windows 98, Windows 2000 and more recent releases.

The Logbook requires DAO (Data Access Objects) 3.5 or higher. If you do not have DAO 3.5 installed you will get error messages when you start the logbook.

## Ham Radio Deluxe

Ham Radio Deluxe can be installed in under a minute. Special knowledge is not needed – the kit does everything for you!



When you start the installation the first screen shows the release and build you are installing.

Ham Radio Deluxe - InstallShield Wizard	X
License Agreement Please read the following license agreement carefully.	HH
<ul> <li>IMPORTANT: Before commencing using this Product, carefully read the following terms and conditions which have been accepted by your company ("Licensee").</li> <li>I. DISTRIBUTION. This Product may be distributed for use by Radio Amateurs, but it may not be sold. The maximum charge allowed for the distribution medium is 10 euro or \$10.</li> <li>GRANT OF LICENSE. Simon Brown HB9DRV hereby grants to Licensee ("You") and You accept a nonexclusive license ("License") to use the this Product delivered pursuant and subject to this Agreement.</li> <li>You agree that You will not assign, sublicense or otherwise transfer your right under this Agreement without the prior written consent of Simon Brown.</li> <li>I accept the terms of the license agreement</li> <li>I do not accept the terms of the license agreement</li> </ul>	
InstallShield <back next=""> Cancel</back>	]

You must accept the licencing conditions. Ham Radio Deluxe is free for radio amateurs and shortwave listeners, commercial use requires a licence.

Ham Radio Deluxe - InstallShield Wizard		
Choose Destination Location Select folder where setup will install files.		
Setup will install Ham Radio Deluxe in the following folder. To install to this folder, click Next. To install to a different folder, click Browse and select another folder.		
Destination Folder         C:\Program Files\Amateur Radio\Ham Radio Deluxe		
InstallShield Cancel		

Select the folder where Ham Radio Deluxe will be installed, the suggested default is usually sufficient.

Ham Radio Deluxe - InstallShield Wizard
Select Program Folder
Setup will add program icons to the Program Folder listed below. You may type a new folder name, or select one from the existing folders list. Click Next to continue.
Program Folder:
Ham Radio Deluxe
Existing Folders:
ArcSoft ShowBiz 2
Canon CD (DVD) Recorder
Codejock Software
Core ETP
Creative
CyberLink PowerDVD
Ham Radio Deluxe
InstallShield
▲ Back Next > Cancel

Select the folder in the Start menu where the Ham Radio Deluxe entries will be added, the suggested default is usually sufficient.

Ham Radio Deluxe - InstallShield Wizard	R	
Ready to Install the Program		
The wizard is ready to begin installation.		
Click Install to begin the installation.		
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.		
InstallShield Cancel		

Click Install to start the installation.

Ham Radio Deluxe - InstallShield Wizard	
Setup Status	0111
Ham Radio Deluxe is configuring your new software installation.	
Installing	
C:\Program Files\Amateur Radio\Ham Radio Deluxe\lame_enc.dll	
	]
InstallShieldCancel	

The progress of the installation is shown while the software is being installed.



When the software has been installed select the programs to be started, then press *Finish*.

# **First Steps**

## Connection

Now that you have installed HRD you can try it out using a *Dem-o-matic* radio. This is a reasonable accurate simulation of the real thing, designed for use during presentations and while developing HRD when a radio is not available (on the train, in a plane, in an airport, stuck in a hotel room in Finland etc.).

From the *Start* menu select *Programs* > *Ham Radio Deluxe*. Once the splash screen has closes you see the *Connect* window.

🗖 Connect	: HB9DRV in Switzerla	nd	×
Company:	ІСОМ	Visit <u>http://hrd.ham-</u>	^
Radio:	IC-7800	radio.ch/downloads.html for 'A basic guide	
		contains many designs for both CAT and	
COM Port:	Remote 💌	audio interfaces for use with Ham Radio Deluxe.	
Speed:	19200 💌	Company	
CI-V Add:	6A	Select your radio manufacturer from the	
- Flow contro		drop-down list. The Dem-o-Matic radios do not require a COM port, they are for	
		demonstrating HRD when you do not have	
Conn.		PlexRadio: you must install the virtual serial port drivers from Philip Covington (N8VB).	
Conni		These are used to provide the connection	×

## **Dem-o-matic**

The *Dem-o-matic* radios do not need cables – simply select *Dem-o-matic* in the Company dropdown, select an option in the Radio dropdown, and then press *Connect*.

They are ideal for demonstrating HRD when you do not have a suitable radio available.

## **Options**

### Company

Select your radio manufacturer from the drop-down list.

*FlexRadio:* you must install the virtual serial port drivers from Philip Covington (N8VB). These are used to provide the connection between HRD and the PowerSDR sofware which must be running before you try to create the connection with HRD. More information is available from <u>http://www.flex-radio.com/</u>.

ICOM: disable the CI-V Transceive option for best performance.

*Kenwood:* make sure Packet communication mode is switched OFF (if supported). Most Kenwood radios require CTS and RTS to be ON for flow control.

#### Radio

Select your radio model from the drop-down list.

#### **COM Port**

The COM port on this computer where you have connected the radio interface cable.

Make sure that you do not have other programs using the same port, for example mobile phones and personal organisers.

Select 'Auto-detect' to try all available ports.

#### Speed

The speed used for communicating with the radio, check the speed setting via the radio's configuration menu.

Select 'Auto-detect' to try all available speeds.

### **CI-V Address**

*ICOM only:* the address assigned to the radio, consult the radio's handbook for the default address. This can also be configured via the radio's configuration menu.

#### CTS

Enables the CTS flow control, required for Kenwood radios.

#### DTR

Enables the DTR line when the COM Port is opened and leaves it on, usually to provide power for an interface cable. For Yaesu CT-62 and ICOM CT-17 interfaces this can be left unchecked (off).

#### RTS

Enables the RTS line when the COM Port is opened and leaves it on, usually to provide power for an interface cable. For Yaesu CT-62 and ICOM CT-17 interfaces this can be left unchecked (off).

## Connecting

Press *Start* to connect to the radio. If you see the error below then the COM port is currently held open by another program.

Error	👗 🕹
8	IC-7800, COM1, 19200, Access is denied.
	Make sure your radio is switched on and not in memory mode. If you are using a homemade/non-standard cable you may need to select RTS and/or DTR.
	ок

Check that you have not started another radio control program. Other culprits are PDA and mobile phone connections. Even if you have disconnected a device from a COM port you must make sure that the software is no longer running.

One connected HRD reads the radio's frequency to ensure that the options you selected are correct. If you see the error below then HRD failed to read the radio's frequency:



If HRD can read the frequency the Connect window is replaced with the main radio display – you are now using HRD!

## What's Next

A taste of what's to come later in this guide...

### Appearance

Set the appearance:

- From the *View* menu select *Colour Schemes*,
- Select *Customise Layout* and *Program Options* from the *Tools* menu.

# **Radio Display**

## Introduction

The HRD radio display has many, many features. This section attempts to describe everything you can do in this display.

To aid in the clarity of the screenshots the LCD Scheme is used.

Busys	ignal	VFOA	Mod	e: USB AGC: Fast	DNL: Level 1	FL: Normal	uick Mem: Ch 5		ATT	CTCSS	NR 2	TX tone
Scenni Split	ing	VFO B			- - -	~~	•		ATU	Fine	Pre	Tone
Memo Ouick	ry: 23 Mem: 5	TX - A		14.	235	.00	0		Ant 1	Menu A	Proc	Tune
CTCS: Tone:	5: 131.8 Hz 131.8 Hz	TX - B			_		•		Ant 2	Menu B	RX tone	VOX
		A = B				3	280 000	<b>`</b>	BC 1	NB	TF set	Zero
		MEM S4				3.1	00.000	,	BC 2	NR 1	TX	
¢		23 Dec	ember 2005		160m - 10m (F	tegion 1)		19:38:5	0			\$
Fine	14.233.8	14.234.0 1	4.234.2 14.234	14 14.234.6	14.234.8 14.235	0 14.235.2	14,235,4	14.235.6 14.235	8 14	236.0	14.236.2	# <sup>Fine</sup>
			ALT BS	P 160m 80m	60m 40m 3	0m 20m 1	17m 15m 1	12m - 10m				
15m										1		15m
	21.000	21.050	21.100	21.150	21.200	21.250	21.300	21.350	21	400	21.4	50
17m					+++++		1 1 1 1 1	<u> </u>				17m
	18.070	18.080	18.090	18:100	18.110 18	120 10	3.130 10	5.140 18.15	50	18.160		.
20m		<u> </u>	<u></u>	<u>   </u>	<u></u>	· · · · · · · ·		<u>   </u>				20m
	14.000 1-	4.025 14.050	14.075 14	1.100 14.125	14.150 14.175	14.200	14.225 14	250 14.275	14.300	14.325	5 14.3	50
30m												30m
	10.100	10.105	10.110	10.115 10	120 10.125	10.13	7 10.13	5 10.140		10.145	10.1	00
40m	7.000	7.025	7.464	7.026	7100		7126	7160	7.7	*		4015
	2.000	7.025	2.000	7.075	7.100		1	7.150		5	7.20	~
60m	5.250	5.275	5 300	6 325	5 350		5 3 7 5	5400	5.42	5	5.4	60m 50
	0.200			0.720	0.000			0.740	10. PK	-		·
_		nie 3)		PE min-0			pressor 1 W			Mir min	0	
	Noine	blanker 1		Noice reduction: (			/CXI gain: 0			COX delays 7	50 mo	Bull
	Sa	wich: 0		IF shift: +600 Hz		Keyer	opeed: 10 WPM		Br	vak-in delay	0 ms	F4

# **Frequency Display**



#### Configuration

See Frequency on page 27.

#### Dropdowns

If you have enabled dropdowns as part of the configuration just click on a dropdown and make a new selection.

### **Mouse Wheel**

When you rotate the mouse wheel in the frequency display the currently active digit is incremented / decremented depending on the scroll direction.

If you rotate while the cursor is over an inactive digit then the digit is activated.

#### Up/Down

The up-arrow, down-arrow, - and + keys increment / decrement the active digit.

#### **Mouse-click**

Select a digital by clicking over the digit. To increment / decrement click above / below the center of the digit and keep the mouse button pressed.

#### **Direct Entry**

To enter values just press a numeric key (0-9). The active digital is updated and the next digit to the right is made active.

Press Enter to display the Enter Frequency window.

📰 E	nter Frequency 🛛 🛛 🛽 🛛	
A:	13.231.000 MHz	
B:	3.780.000 MHz	
	Auto-apply	
	Apply Cancel	

Enter the new frequency, and then press Apply.

If you check *Auto-apply* then the new frequency is applied every time you make a change.

If you check *Track* this window is updated with changes made to the frequency display – for example when you tune the radio manually.

#### Griffin etc.

Support for third-party devices such as the Griffin Powermate is available – see Accelerators on page 31.

# **Tuning Dial**

### **Fine Tuning**

14.000 14.025

14.075 14.100 14.125 14.150 14.175 14.200 14.225 14.250



14.275 14.300 14.325

## **Band Selection**

The Band Section buttons are shown between the Fine and Main layouts.

ALT BSP 160m 80m 60m 40m 30m 20m 17m 15m 12m 10m

The buttons are:

- ALT,
- BSP,
- 160m, 80, ... 10m.

# **Display Scroll**



## **Band Selection**

160m - 10m (Region 1)

## Date & Time

25 December 2005 11:40

## **Buttons**



## Dropdowns



## Sliders



# **Customise Layout**

## Introduction

Used to define the appearance of the radio display, *Customise Layout* is selected from the *Tools* menu, or by pressing the *Customise* button.



## Schemes

Customise Layou	t								
Schemes Layout Bu	uttons Faceplate	Frequency Meters	Sliders: App	earance	Sliders: Lay	out Tuning	Dial		
Your Ham Radio De C\Documents and S Defaults	luxe schemes and ettings\Simon\App	settings are stored in: plication Data\Simon E Schemes	rown, HB9DR	\\Ham Rə	dio Deluxe <sup>t</sup>	N.			
Cabana d		AK9G	P	eter's Pers	uasion				
Scheme #		AK9G TS-480 Army Sumlus	P	Nastic Blue Nastic Gree	n				
Scheme #	2	Danielle's Amberglo	N P	lastic Kahl	i				
Scheme #	3	Danielle's Blues	н Т	nastic Urar Traditional	ge				
System Defit	ault	Danielle's Liquorice Danielle's Redeye Danielle's ts-2000 Danielle's ts-480	Ŷ	V9ZO V9ZO-LC V9ZO-LCD					
Save to Fil		Danielle's uv Dark Default Ginger							
Load from H	<u>-ile</u>	Grey Scale Grey friars Igor'th Thpethial LCD Light Matt, N&OQF N&FVZ's HRD Colou Night Vision Nowt Oranges and Lemon PD5DP Blues PG5S Icom	r Scheme						
		Save Rena	ame Sel	ect	Delete				
						ОК		Cancel	Apply

Schemes are pre-defined customizations created by author and by other HRD users.

There are four default schemes shipped with HRD: Scheme #1 - #3 and the System Default.

The HRD team and the HRD users have created the other schemes. Special thanks to Danielle in Northallerton, UK.

Select a default scheme by pressing the scheme button (or select an entry and press *Select*); select one of the other schemes by double-clicking on the entry in the *Schemes* list.

To save the current layout press *Save* – you will be prompted for a Scheme name.

Use Rename and Delete to organise the available schemes.

## Layout





# **Buttons**

ulemes	Layout	Buttons	Faceplate	Frequency	Meters	Sliders: Appe	earance	Sliders: Layou	t Tuning Dial	
		Defines	s the appea	arance of butto	ons on the	e radio display.				
	Default	Fe	ace T	ext	<b>C</b>	)efault	Face	Text		
	Style 1	Fe	ace T	ext	S	Style 1	Face	Text		
	Style 2	Fe	ace T	ext .	, ( s	Style 2	Face	Text		
	Style 3	Fe	ace T	ext t	5 ( S	ityle 3	Face	Text		
í 🗖	Style 4	Fe	ace T	ext 0	<sup>o</sup> (s	ityle 4	Face	Text		
	Style 5	Fε	ace T	ext	S	Style 5	Face	Text		
	Style 6	Fa	ace T	<sup>-</sup> ext	S	Style 6	Face	Text		
Butt	on size:	Small	O Med	ium 🔾 La	rge 🔾	X Large				

Define:

- Seven button colour combinations,
- The font, and
- The button size.

The default button size is small; this is so that users with low resolutions such as  $800 \times 600$  still have a usable configuration.

There are no rules when using the button size; select the size which pleases you most.

For the technical readers the button size is tied to the font size of the radio display form (font is Microsoft Sans Serif, size is 8, 9, 10 or 12 point).

Changing the font size simply changes the font assigned to the form.

## Faceplate



### Background

These colours are applied to the background area of the display and to the transmit meters (if any) such as PWR, SWR and ALC.

### **Status Window**

The status window displays information which you cannot normally change using buttons or sliders in HRD.

Typical examples are Scanning status, Split mode and Memory channels.

#### **Clock Position**

The clock is displayed to the left, right or both sides of the band title.

# Frequency



If your radio supports simultaneous access to two VFO's (Kenwood, some Yaesu) then HRD will display two VFO's, otherwise just one VFO is displayed.

First select the VFO you are updating – main or sub.

The colours you can set are:

- Background,
- Frequency the digits,
- Active Posn the bar above and below the current digit,
- Inactive posn the bar above and below the other digit,

The Font can also be set, use the Main > Sub and Sub > Main buttons to copy settings between VFO's.

### Dropdowns

The dropdown buttons (Mode, Filter...) can be displayed at the top of the main frequency display.

Select:

- None (no dropdowns),
- Mode (only the mode dropdown) or
- All (all dropdowns).

If *Mode* or *All* is selected you can check *Add Border* to add a border around the text.

If *All* is selected you can check *Include Title* to add the Dropdown button's title (if there is room).

## Meters

🖈 Customise Layout	8
Schemes Layout Buttons Faceplate Frequency Meters	Sliders: Appearance Sliders: Layout Tuning Dial
Defines the appe	earance of the bar meters on the radio display.
S6 IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Show peak reading
S+20	
S+60	S Meter - TX mode
High Position	Main: PWR  The value must be supported by the radio.
	Sub: PEF  Kenwood radios display the value selected with the Meter slider (TS-480, TS-2000) or the SWR / Comp / ALC / dB buttons.
Colours	S-Meter - Updates
Background Iext	Always update when changing frequency (slower performance)
Bars: Low Bars: High Bars: Eree	
	OK Cancel Apply

The design aim of the bar meters was heavily influenced by my fine Sony stereo, still giving fine service here in the HRD R&R suite after some 15 years of abuse.

The Background and Text colours should be obvious.

There are three graduation colours:

- Bars: Low the first bar colour,
- Bars: High the colour at the position set by the High Position slider, and
- Bars: Free the colour for the free (empty) bars.

If you check Show peak reading the recent peak value is displayed.

When HRD is in TX mode the S Meter value is replaced by the value selected in the *Main* and *Sub* dropdowns, the value you select *must be displayed by HRD in the upper right hand corner of the display.* For Kenwood radios the value to be displayed is selected with the meter slider or the individual buttons (SWR / Comp / ALC / dB).

If you check the *Always update*... option then the S Meter is updated when you change frequency – this results in slower performance.

# **Sliders: Appearance**



If supported by your radio, sliders are displayed at the bottom of the display. Here you define the appearance of the sliders.

These colours are optionally applied to the sliders in the *Advanced* selection windows (select *Advanced* from the *View* menu).

## **Sliders: Layout**

Customise Layo	out Buttons	Faceplate Frequency	Z	feters Sliders: App	earance	Sliders: Layout	Tunina Dial	p	
		Defines the layout of slic	der c	controls on the radio	display.				
Radio: TS-480 Layout:	ılt 🔘,	(If your radio is	noti : <u>3</u>	n the list then no slide	ers are i	available)			
AF gain	~	RF gain	~	RFpower	*	Mic gain	~		
Noise blanker	~	Noise reduction	~	VOX gain	~	VOX delay	~		
Squelch	~	IF shift	~	Keyer speed	*	Break-in delay	~		
	*		*		*		*		
	*		~		*		~		
	*		*		*		*		
Notes Changes are sav Empty rows are n Show / hide slider	red imme ot disple rs - use '	ediately ayed View' menu		Qlear All	\$				
							ОК	Cancel	spply

Here you select the sliders to be displayed. Define up to 6 layouts, for example one layout for SSB and another for CW

# **Tuning Dial**

chemes Layout Buttons F	Faceplate Frequency Meters Sliders: Appearance Sliders: Layout Tuning Dial
Calaura	
Background	24 December 2005 Options 08:51:20
—	
Title: "Options"	Fine
Title: Clock, Frequency	7.048.8 7.049.2 7.049.6 7.050.0 7.050.4 7.050.8 7.051.2
Band Button: Text	BSP 10m 15m 20m 40m 80m
Band Button: Face	
— Fine Line	la contractione francisco francisco de contractione de contraction 👖
Fine Text	80m
Fine Inside	3.500 3.525 3.550 3.575 3.600 3.625 3.650 3.675 3.700 3.725 3.750 3.775 3.800
- Hotspot	linitari meterritari bandan dan dan bandara 🗖
Normal (80m) Line	40m
Normal (80m) Text	7.000 7.025 7.050 7.075 7.100 7.125 7.150 7.175 7.200 7.225 7.250 7.275 7.300
Normal (80m) Inside	
Active (40m) Line	
Active (40m) Text	14.000 14.000 14.100 14.100 14.200 14.200 14.200 14.300
Active (40m) Inside Active (40m) Hotspot	15m
	21.000 21.050 21.100 21.150 21.200 21.250 21.300 21.350 21.400 21.450
	10m
Fonts	28.000 28.250 28.500 28.750 29.000 29.250 29.500
Title: "Options"	
Title: Clock, Frequency Band Buttons	
Band Titles	
Band Frequency	
	Align band buttons Horz: Centre 🔽 Vert. Centre 🔽

Here you define the colours, fonts and band button positions.

# **Program Options**

## Introduction

Used to define various HRD features, *Program Options* is selected from the *Tools* menu, or by pressing the *Options* button.



## Accelerators



Define accelerators for use with the Keyboard or with programmable interfaces such as the Griffin Powermate.

When you press Add the definition window is displayed.

Define a key	board combination	
Keyboard Combination         Key:       W       Alt       Qtl         = Ham Radio Deluxe Option	Atsigned Att + N Ctrl + Alt + O Ctrl + C Ctrl + C Ctrl + X space	Alt+A Alt+Ctrl+D Alt+Ctrl+D Alt+Ctrl+F1 Alt+Ctrl+F2 Alt+Ctrl+U Alt+K Ctrl+A Ctrl+B Ctrl+F5 Ctrl+F5 Ctrl+F6 Ctrl+F8 Ctrl+F8 Ctrl+M

Here Ctrl+Alt+W is assigned to the *Tune* button. Keyboard combinations are assigned to display buttons and arrow keys.

The HRD menu has pre-assigned accelerators; these cannot be redefined.

## Comms

Comms 🔗	Info: Options	Internet	Out Of Band	Mouse V	Vheel	Select	ion Window	Toolbar	s Update
Dual VFO Tracking RX Timeout	Accelerators	Comms	COM Por	tTX Do	ocking P	Panes	ICOM Calik	oration	Info: Modes
Switch Off Polling OM Port TX		Co	mmunication	s options,	restart t	to apply	new values.		
RTS/DTR/Both/None Jocking Panes Appearance COM Calibration S-Meter nfo: Modes	Read Time	out fault (500 m V	Ð	Specifies elapse b communi	the ma etween ications	aximum t I the arriv I line.	ime, in millis val of two cha	econds, a tracters or	lowed to 1 the
Mapping fa:Options Supported termet Enable ut Of Band Enable In band Out of band	- Switch Off Prompt radio w support	to switch of hen closing ed by the ra	the (if udio)	- Dual VF Tran slov sate	O Trac ck dual v comm ellite tra	king VFOse nsconn∈ cking.	very refresh ction). Reco	(not suitab mmendec	le for for
touse Wheel CW Fine CW Hot Other Fine Other Hot election Window Advanced values	Polling Only po the acti	II radio if HF /e program	RD is	Refresh interval (milliseconds)           ○ 100         ③ 300         ○ 500           ○ 200         ○ 400         ○ 1,000					

Normally you will not have to change the default settings.

- Read timeout serial port timeout.
- Switch off some radios such as the FT-817 can be powered down using a CAT command. If this option is selected you are prompted to switch off the radio.
- Polling to reduce CPU load for slower systems.
- Dual VFO tracking if selected both VFO's are tracked on every refresh. Only of use with Satellite Tracking (page 67).
- Refresh interval the interval between consecutive refreshes of the display.

# **COM Port TX**



Some early ICOM radios do not support switching between TX and RX using CAT commands. The only way to enable computer controlled TX/RX this is by toggling a COM port pin.

You require a special CAT cable if you select this option.

## **Docking Panes**



HRD uses the excellent programming library from <u>Codejock Software</u> to support an advanced docking pane option.

Docking panes are used for optional windows such as: *Bandscope*, *Calendar*, *DX Cluster*, *Logbook*, *Selection*, *Shortwave Database* and *WinKey*.

Select whichever visual theme you want – XP is an acceptable default.

You can also use this theme when a docking frame is floating (not docked).

# **ICOM** Calibration

COM Port TX	~	Info: Options	Internet	Out Of Band	Mouse Wheel		Selection Window Toolbars Up			Updates
RTS/DTR/Both/None locking Panes	Ē	Accelerators	Comm	s COM Por	tTX	Docking F	Panes	ICOM Calib	oration	nfo: Modes
Appearance OM Calibration S-Meter fo: Modes		S-Meter cali be calibrate	bration - IC d for the ra	OM only. The idio model sele	value re ected be	ead from the	he radio	is between O	and 255, t	nis must
vtapping o: Options Supported emet		S III								
Enable ut Of Band		Radio:	C-703	~	]					
Enable n band		Offset 0	*							
ouse Wheel CW Fine		Scale: 1	2	per s-meter	r unit (6c	lb)				
CW Hot Other Fine Other Hot		Test ,	0	1.1.1.1.1.1	1 1 1	- F F F T	1	6		
election Window Advanced values Tree expand		ŧ	B B	estore Default						
oolbars Font odates		N	ote: Cha The	nges are appli IC-706 and IC-	ed imm 706Mkll	ediately. do not su	pport the	s-meter.		

ICOM radios return a S Meter value between 0 and 255, normally 0 is S0, 12 is S1 and so on.

As a S Meter unit is 6 dB the algorithm applied is to divide the returned value by two to get dB, then divide dB by 6 to get S units.

Some radios such as the IC-706 have a different logic – use the Offset and Scale values to adjust the returned values so that the S Meter in HRD corresponds to the S Meter on your radio.

# Info: Modes

COM Port TX	^	Info: Options	o: Options Internet		Out Of Band Mous		se Wheel Selecti		ion Window   Toolb		s Updates	
RTS/DTR/Both/None Docking Panes Appearance COM Calibration S-Meter		Accelerators Mapping bet Ham Radio (	Comm ween the Deluxe de	s COM internal H evelopers	1 Port TX am Radio I to list mode	Dor Delux e sup	cking Pai e (Progra port.	nes am) m	ICOM Calib odes and a r	ration adio. For	Info: Modes use by	
nfo: Modes Mapping nfo: Options Supported		IC-R20 IC-R75	^	Status	Program		TS-48	0	CAT Com	mand	^	
nternet Enable JUI Of Band Enable In band Out of band Aouse Wheel CW Fine CW Hot Other Fine Other Hot Selection Window Advanced values Tree expand			IC-R8500 Jupiter K2 K2: Demo NRD-535 Orion Orion: Demo PCR-1000 R-5000 R-5000 R-5000 R-5000 TS-1000 TS-140S TS-2000 Der		<ul> <li>OK</li> </ul>	AM AM(N) CW CW(N) CW-R CW-R(N) DIG FM FM(N) FSK FSK-R LSB PKT	<ul> <li>→</li> <li>→</li></ul>	AM AM CW CW-R CW-R USB FM FM FSK FSK-R LSB USB	$\begin{array}{c} \Rightarrow\\ $	MD5 MD5 MD3 MD7 MD7 MD2 MD4 MD4 MD4 MD4 MD6 MD9 MD1 MD2		12
Foolbars Font Jpdates Reminder	~	TS-440S TS-450S TS-480	<b>.</b>	✓ OK     PSK     →     USB     →     MD2       ● Program → radio     ○ Radio → program     [							⊻ ∕iewer	

Mainly for use by the HRD programming team, all modes for each radio are listed. For each mode the mapping to the internal HRD mode is shown.

# Info: Options

COM Port TX 🛛 🔼	Accelerators	Comm	is COM Port	TX D	ocking Panes	ICOM Ca	libration Ir	nfo: Modes
RTS/DTR/Both/None	Info: Options	Internet	Out Of Band	Mouse'	Wheel Sele	ection Windov	v Toolbars	Updates
)ocking Panes								1 - F
Appearance	The ontions	currently i	implemented fo	r each ra	dio Foruse h	v Ham Badio	Deluxe deve	loners to
COM Calibration	list the imple	mented o	ommands		410.1 01 400 0	y		noporo to
S-Meter								
IU. Modes								
fo: Options	IC-R20	~	Cotogon		Ontion	6		a 🔨
Supported	IC-R75	-	Calegory		Option		LAT Comman	
ternet	IC-R8500		Advanced: E	lasic	AF gain	L	md = AG0-03	, Mir📃
Enable	Jupiter		Advanced: E	lasic	Break-in c	delay C	md = SD-04,	Min
ut Of Band	K2		Advanced: E	lasic	DSP high	cut C	md = SH-02,	Min
Enable	K2: Demo		Advanced: E	lasic	DSP low o	out C	md = SL-02,	Min
In band	NRD-535		Advanced: E	lasic	IF shift	C	omd = IS-04,	Min =
Out of band	Orion		Advanced: E	lasic	Keyer spe	eed C	md = KS-03,	Min
touse Wheel 📃	Orion: Demo		Advanced: E	lasic	Meter	C	md = RM-01-I	00-01, 1
CW Fine	PCR-1000		Advanced: E	lasic	Mic gain	C	md = MG-03,	Min
CW Hot	R-5000		Advanced: E	lasic	Noise bla	inker C	md = NL-03,	Min
Other Fine	RX-350		Advanced: E	lasic	Noise red	luction C	md = RL-02,	Min
Other Hot	SDR-1000		Advanced: E	lasic	RF gain	Ċ	md = RG-03,	Min
election Window	TS-140S		Advanced: E	lasic	RFpower	· c	md = PC-03.	Min
Advanced values	TS-2000		Advanced: F	lasic	Speechin	roc in C	md = PI -03-0	0-03 M 🚃
Tree expand	TS-2000: Der	no	11 17					<sup>-</sup>
oolbars	TS-440S		< .					2
Font	TS-450S	_				DI		
Ipdates 📃	TS-480	~				Radio:	sj⊑⊻i	ewer

Mainly for use by the HRD programming team, all commands are listed for each radio.

Press Radio for a list of all supported radios.

To display the commands:

- 1. Select a radio,
- 2. Press Viewer.

🖡 IC-703 - Supported Commands. tx	- Notepad		
Eile Edit Format <u>V</u> iew <u>H</u> elp			
+   Category +	Option	CAT Command	· <b>^</b>
<pre>  Category Advanced: Basic   Advanced: CW   Advanced: CW</pre>	OptionAF gainCompressionIF shiftMeterMic gainNB levelNR levelRF gainRF powerSquelchBreak-in delayCarrier pointContact no. styleKey typeKeyer ./- ratioKeyer tx ind.Keying polarityPitchSide tone levelSide tone limit9600 bpsMarker freqShift widthAnti-V0X gain	CAT Command CAT Command Cmd = 14-01, Min Cmd = 14-0E, Min Cmd = 14-0E, Min Cmd = 1A-03-12, Min Cmd = 1A-03-17, Min Cmd = 14-06, Min Cmd = 14-02, Min Cmd = 14-03, Min Cmd = 14-03, Min Cmd = 14-05, Min Cmd = 14-05, Min Cmd = 1A-03-05, Min Cmd = 1A-03-20, Min Cmd = 1A-03-18, Min Cmd = 1A-03-18, Min Cmd = 1A-03-20, Min Cmd = 1A-03-6, Min Cmd = 1A-03-6, Min Cmd = 1A-03-07, Min Cmd = 1A-03-07, Min Cmd = 1A-03-07, Min Cmd = 1A-03-14, Min Cmd = 1A-03-15, Min Cmd = 1A-03-10, Min	= 0.00, = 0.00, = 0.00, = 0.00, = 0.00, = 0.00, = 0.00, = 0.00, = 0.00, = 0.00, = 0.00, = 0.00, = 0.00, = 0.00, = 0.00, = 0.00, = 0.00, = 0.00, = 2.00, = 2.00, = 0.
Advanced: Various   Advanced: Various   Advanced: Various   Advanced: Various   Advanced: Various	Beep band Beep enable Beep level Beep limit	Cmd = 1A-03-02, Min     Cmd = 1A-03-01, Min     Cmd = 1A-03-03, Min     Cmd = 1A-03-03, Min     Cmd = 1A-03-04, Min	= 0.00, = 0.00, = 0.00, = 0.00, = 0.00,
<			<b>&gt;</b>

# Internet

COM Port TX	~	Accelerators	Comm	COM Port	COM Port TX		Panes	ICOM Calib	pration In	fo: Modes	
RTS/DTR/Both/None		Info: Options	Internet	Out Of Band	Μοι	ise Wheel	Select	ion Window	Toolbars	Updates	
Appearance COM Calibration S-Meter		Internet Access Options									
nto: Modes Mapping nfo: Options Supported		🗹 Enable int	ernet acce	ess (DX Cluster	Che	ck for Upda	ites, etc.)				
itemet Enable Jut Of Band											
Enable In band											
Out of band fouse Wheel CW Fine											
CW Hot Other Fine											
Other Hot Selection Window Advanced values											
Toolbars Font Indates											
Reminder	~										

HRD is able to detect whether you have an Internet connection with InternetGetConnectedState(). Uncheck this option if you do not want Internet access.

# Out Of Band

🛪 Options										
Controns     COM PortTX     RTS/DTR/Botty/None     Docking Panes     Appearance     IcOM Calibration     S-Meter     Info: Modes     Mapping     Info: Options     Supported     Internet     Enable     In band     Out of band     Mouse Wheel     CW Fine     CW Fine     CW Hot     Other Fine     Other Fine     Other Hot		Accelerators Info: Options Enable In band wave ding.wav Change Out of band w chord.wav Change	Comm Internet	s COM Por Out Of Band Define Play	Mous	Docking se Wheel Dut Of Bar	Panes Select	COM Calibi	ration Ir Toolbars	fo: Modes Updates
Selection Window Advanced values Tree expand Toolbars Font Updates Reminder	*						ЭК	Cance	1	Apply

Configure the optional sound files played when you tune in / out of band.
## **Mouse Wheel**



Define the tuning step when rotating the mouse wheel over the active tuning bar.

## **Selection Window**

⊀ Options									X
COM Port TX RTS/DTPK8ottyNone Dacking Panes Appearance ICOM Calibration S-Meter Into: Modes Mapping Into: Options Supported Internet Enable Internet Enable Out of Band Out of Band Out of Band Mouse Wheel CW Fine CW Hot Other Fine Other F	Accelerators Info: Options Defir Single-clic Show gum Show the t	Comms Internet ues options k expand// k expand// ue ic value i Qptions ico	COM Port Out Of Band affecting the <i>a</i> collapse in Fa n Advanced n in Advanced	TX Mou appea vourit	Docking use Wheel arance and tes tree is (restart to s	Panes Selec operation	ICOM Calik	ction winds	Info: Modes S Updates
					C	)K	Cance	el 🛛	Apply

The appearance and operation of the selection window.

Single-click – normally the Favourites tree folders are opened / closed with a double-click. Check this option to enable single-click operation.

Show numeric value – the Select Windows's Advanced slider values are optionally superimposed on the slider.

Show the Options icon – historical support for the version 2 Advanced slider look and feel.

## Toolbars

🔺 Options									X
Coptions     Switch Off     Polling     COM Port TX     RTS/DTR/Both/None     Docking Panes     Appearance     ICOM Calibration     S-Meter     Info: Modes     Mapping     COM Calibration     Supported     Inband     Out of Band     Enable     In band     Out of band     Cw Fine     CW Fine     CW Hot     Other Fine     Other Hot     Selection Windraw	Accelerators Info: Options Font Connect Selec	Comm Internet Selection t	s COM Por Out Of Band Define: on Favouri Default	TX Mot	Docking I use Wheel appearance Quick Sav	Panes Select e of toolb	ICOM Calif. ion Window aars ull Screen	ration In Toolbars	fo: Modes Updates
Advanced values Tree expand Toolbars Font						к Х	Canco		Annly

Select the toolbar font and whether text is displayed in toolbars.

The default (suggest) font is Lucida Sans 7 point.

## Updates

COM Port TX 🛛 🔼 🔼	Accelerators	Comm	s COM Port	TX	Docking R	anes	ICOM Calib	ration In	io: Modes	
RTS/DTR/Both/None Docking Panes	Info: Options	Internet	Out Of Band	Mou	se Wheel	Selecti	ion Window	Toolbars	Updates	
COM Calibration S-Meter		How often you are reminded to check for Ham Radio Deluxe updates.								
Mapping 1fo: Options Supported	Remind me to	o check foi	r updates ever	y.						
Enable										
Enable In band	<u><u>O</u>Month</u> <u>Check</u>	Now								
ouse Wheel										
Other Fine Other Hot										
election Window Advanced values Tree expand										
oolbars Font pdates										
Reminder 👱										

Select how frequently HRD reminds you to check for new updates.

## **Band Layouts**

## Introduction

A necessary feature of a fully customizable radio program such as HRD is the definition of custom band layouts.

The IARU regions have own band plans; there is no doubt that these will change in the future.

Consider also the traditionalist who has never owned a microphone in his life and is only interested in the CW portions of the bands – he wants his own band layouts.

### Manager

To start the Manager select *Manager* from the *Bands* menu.

🕮 Band Layouts	🗄 Band Layouts 🛛 🔀				
<u> Eile E</u> dit <u>S</u> tatus	<u>File Edit Status</u>				
🖙 🖬 🥹 🎦 🖻 🖀 🖉 🗶					
	Define your own band layouts				
Each layout contains one or	more frequency ranges, example:				
1.8 MHz - 2.0 MHz 3.5 MHz - 3.8 MHz 7.0 MHz - 7.1 MHz					
Status Layout	Ranges				
<ul> <li>✓ - OK- 160m - 10m (Regi</li> <li>✓ - OK- 160m - 10m (Regi</li> <li>✓ - OK- 160m - 10m (Regi</li> <li>✓ - OK- 160m - 70cm</li> <li>✓ - OK- 60m (5 MHz)</li> <li>✓ - OK- 6m (Detail)</li> <li>✓ - OK- Broadcast</li> <li>✓ - OK- Low Freq</li> <li>✓ - OK- Shortwave</li> <li>✓ - OK- VHF-UHF</li> </ul>	on 1) 10 on 2) 10 on 3) 10 13 1 1 3 16 1 1 10 13				
OK Cancel	Defaults				

Here you see the existing definitions. In the *Edit* menu you have the expected *New*, *Copy*, *Modify* and *Delete* options.

## **Adding A Definition**

In this example a band layout is created for our CW enthusiast. Select *New* from the *Edit* menu to create a new definition using the *Band Layout Editor*.

🚟 Band Layout Editor 🛛 🔀		
<u>File E</u> dit <u>M</u> ove		
1 ha main * ナ *		
Add at least one frequency range to the list below, example: 7.000.000 MHz to 7.100.000 MHz.		
Title: CW Only		
Enabled: 🔽		
Frequency Ranges		
Status Band From MHz To MHz		
OK Cancel		

In the *Title* field enter *CW Only*.

From the *Edit* menu select New to define a new frequency range.

- In the *Band* field enter *160m*
- In the *From* field enter 1.800.000
- In the *To* field enter 1.830.000
- Ensure *Enable* is checked
- Press OK

Define	Define Frequency Range 🛛 🛛					
<u>B</u> and:	160m					
<u>F</u> rom:	1.800.000 MHz					
<u>T</u> o:	<u>r</u> o:1.830.000 MHz					
✓ Enable						
OK Cancel						

When you press OK the frequency range is added to the band layout. Repeat for 80m and 40m:

- 80m, 3.5MHz to 3.55MHz,
- 40m, 7.0MHz to 7.05MHz.

The band layout now looks like this:

🕮 Band Lay	out Edi	itor			
<u>F</u> ile <u>E</u> dit <u>M</u>	love				
쒑 🖻 🗹	×	÷			
Add at least 7.000.000 MH	Add at least one frequency range to the list below, example: 7.000.000 MHz to 7.100.000 MHz.				
<u>T</u> itle: C	Title: CW Only				
<u>E</u> nabled: 🔽	]				
		- Frequenc	y Ranges –		
Status	Band	From MHz	To MHz		
<ul> <li>✓ Enabled 160m 1.800.000 1.830.000</li> <li>✓ Enabled 80m 3.500.000 3.550.000</li> <li>✓ Enabled 40m 7.000.000 7.050.000</li> </ul>					
OK Cancel					

To rearrange the order of the frequency ranges just select a range and use the *Move* menu options or the Move buttons  $\uparrow$   $\bullet$ .

When you have finished your new layout press *OK*. The *CW Only* definition is added to the band layouts. In the Band Layouts window press *OK* to save the definitions and close the window.

## **Copying A Definition**

To copy an existing band layout:

- Start the Manager,
- Select the entry to be copied,
- Select *Copy* from the *Edit* menu,
- Enter the new title,
- Change the frequency ranges are appropriate,
- Press OK.

## Selecting

To select a band layout either:

- 1. Open the *Bands* pane in the Selection window (select *Display* from the *Bands* menu) and select an entry in the list, or
- 2. Click on the Band Title 160m 10m (*Region 1*) in the radio display and select a new layout from the popup window.

<pre>x</pre>	160m - 10m (Region 1)	
2	Bands 🛛 🛛 🛛	2
	160m - 10m (Region 1) 160m - 10m (Region 2) 160m - 10m (Region 3) 160m - 70cm 60m (5 MHz) 6m (Detail) Broadcast Low Freq Shortwave VHF - UHF CW Only	40.2 
24.930		24.950 5
2	Manager	2
5		S
2	21.200 21.250	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

## **Favourites**

## Inspiration

Obviously Internet Explorer had an influence here – as most computer users have experience with web browsers a conscious decision was made to use familiar concepts.

Favourite definitions are selected from the *Favourites* pane in the Selection window.

## Manager

Start the manager from the Favourites menu or the Favourites pane in the Selection window. It is designed to be easy to use - let's see.

🥙 Manage Favourites (85 entries)	
Manage Favourites (85 entries)          To create a new top-level (root) folder press New Root.         To create a new child folder press New Folder         .         To copy, delete, edit or move an entry:         [1] select the entry.         [2] press Copy, Del, Edit or Move.         New Boot       Add         Copy         New Boot       Add         Copy         New Folder       Del         Edit         Sort Folder       Move	Image: Second system         Image: Second system
2 Load Defaults	
Merge	🛛 🦲 Satellites
OK Cancel	

New Root – create a new top-level (root) folder. Folders are not saved if they are empty (no child folders or definitions).

New Folder – create a new folder as a child of the currently selected folder.

Sort Folder – sort the entries in the currently selected folder:

- By title,
- By ascending frequency, or
- By descending frequency.

Add – add a new definition.

🦻 Edit 🛛 🔀				
Enter new ∨al Repeater offs	ues in the fields below, then click OK. sets are not yet supported.			
Title:	160m Ragchew			
Frequency:	1.935.000 MHz			
Mode:	LSB 💌			
Repeater:	Enable E <u>d</u> it			
ОК	Cancel			

Enter the title, frequency and mode, and then press *OK*. The new definition is added to the current folder.

You can also select *Add* from the *Favourites* menu to add a new definition.

Del – delete the current folder or definition (depending on which you have selected).

Move – move an entry to another folder (alternatively drag entries between folders with your mouse).

🕮 Browse for Folder	×
Click the folder that you want to move the selected entry to.	
<ul> <li>☐ Favourites</li> <li>☐ 160m</li> <li>☐ 80m</li> <li>☐ 60m</li> <li>☐ 00m</li> <li>☐ 10m</li> <li>☐ 10m</li> <li>☐ 10m</li> <li>☐ 20m</li> <li>☐ 10m</li> <li>☐ 20m</li> <li>☐ 10m</li> <li>☐ 20m</li> <li>☐ 20m</li> <li>☐ 10m</li> <li>☐ 20m</li> </ul>	
OK Cancel	

Select the new folder, then press OK.

Copy – make a copy of an existing definition.

Edit - edit the selected folder / definition.

Arrows – rearrange the selected folder / definition.

Load – load a new set of definitions from a file previously created using HRD; all current definitions are discarded.

Merge - merge definitions from a file previously created using HRD.

Defaults - restore the default list (hard-coded into HRD).

## **Markers**

To display markers in the HRD display select *Show Markers* from the *Favourites* menu. The marker size is selected from the *Marker Size* option in the *Favourites* menu.



The popup text is displayed as you move the mouse pointer over a marker. The text is constructed from the favourite title and frequency.

## **Quick Save**

## Introduction

This is a simple way of marking a frequency as being interesting – you are monitoring three QSO's with a single radio and you want to quickly switch between the frequencies – for example during a 6m sporadic-E opening.

Each definition consists of the frequency in Hertz and mode; definitions are saved in the registry.

To switch between Quick Save definitions use the accelerator key combinations for the *Quick Save* menu options *Next* (Ctrl+F5) and *Previous* (Ctrl+F6).

## **Add Entry**

Select Add from the Quick Save menu or just click the Quick Save button.

Quick Save

An entry is added to the Quick Save pane in the Selection window.

## **Markers**

To display markers in the HRD display select *Show Markers* from the *Quick Save* menu. The marker size is selected from the *Marker Size* option in the *Quck Save* menu.



The popup text is displayed as you move the mouse pointer over a marker. The text is constructed from the frequency and mode.

# **DDE Support**

## Introduction

HRD uses dynamic data exchange (DDE) for inter-process communication.

DDE allows two or more applications running simultaneously to exchange data and commands.

## **Available Support**

Select DDE Monitor from the Tools menu to display the supported DDE items.

🕮 DDE Monitor	
All currently suppo	rted DDE items (for software developers)
Service: HRD_RADIO Topic: HRD_CAT	⊻iewer
Item	Value
HRD_BAND HRD_BUTTON_STATUS HRD_DOPPLER_DOWNLINK HRD_DOPPLER_UPLINK HRD_DOPPDOWN_LIST HRD_EXEC_RESULT HRD_FREQUENCY HRD_HERTZ HRD_MODE HRD_PRODUCT HRD_RADIO HRD_SAT_DOWNLINK HRD_SAT_DOWNLINK_MODE HRD_SAT_UPLINK HRD_SAT_UPLINK HRD_SAT_UPLINK_RADIO HRD_SAT_UPLINK_RADIO HRD_SMETER HRD_SMETER_RAW HRD_TRANSVERTER HRD_TX_METERS	-2705.9 -8079.6 145.802.705 145802705 USB Ham Radio Deluxe v3.3 Beta TS-480: Demo 145800000 USB 145802705 435350000 LSB 435341920 S6 8 20 Off

## Commands

The commands below are supported by HRD.

#### Add ADIF Record

ADIF <data>

Adds a record to the logbook; the record is supplied in ADIF format. Used by PSK31 Deluxe.

#### Refresh

REFR button\_status

Refreshes all buttons.

REFR dropdown\_list

Refreshes all dropdown.

#### Set Button

BUTN button\_title=value

Sets a button state. For normal buttons the value is either *on* or *off*. If title starts with @ then it's a dropdown, the value must be a dropdown value.

#### Set Dropdown

DROP button \_title=value

Selects a dropdown value.

#### **Set Frequency**

FREQ <hertz> Sets the frequency to the value supplied in Hertz.

#### Set Mode

MODE <mode>

Sets the mode to the supplied value.

#### **Top Window**

TOPW

Makes the HRD the top-most window in the Z-order, in other words brings HRD to the front of your monitor.

# **DX Cluster**

## Introduction

A DX Cluster is a means for Amateur (Ham) Radio operators to tell each other, in real-time, about DX stations (other interesting or rare Amateur Radio stations all over the world).

(From <a href="http://www.dxcluster.org/">http://www.dxcluster.org/</a> by Dirk Koopman G1TLH)

One station is set up with Packet Cluster and is linked to one or more other stations who have installed the software. These nodes when connected are called a cluster. Clusters are connected to clusters, expanding the network. Individual users connect to the nodes on a frequency different from what the node stations are linked on. Users are capable of announcing DX spots and related announcements, send personal talk messages, send and receive mail messages, search and retrieve archived data, and access data from information databases among its many features.

(From <a href="http://www.dxcluster.org/">http://www.dxcluster.org/</a> by Chuck K6PBT)

HRD supports:

- <u>OH2AQ</u> web-based cluster (the original and most widely used),
- <u>HRD's</u> own web-based cluster,
- Direct connections to a DX Spider node using a DX cluster client (which in turn uses the telnet protocol).

The OH2AQ and HRD clusters are available using just your web browser.

#### OH2AQ

DX Summit - Microsoft Intern	et Explorer			
Elle Edit View Favorites Tools	Help			<b>A</b> *
<u>NO FRAMES</u> Suot Database Search	<b>₹</b>	X		Ť
DX-SPOTS 25, 50 HF, 50 VHF HF/CW, HF/PHONE	W9CA 24895.0 N9IW 24895.1 N09Z 24895.0 N9IW 24950.0	PJ2/WB92 PJ2/WB92 PJ2/WB92 PJ2/WB92	Still here Jerry? calling cq jerry tnx for 12m	2042 22 Dec 2009 22 Dec 2001 22 Dec 1956 22 Dec
<u>VHF/CW, VHF/PHONE</u> <u>250, 1.000</u> or 10.000 pieces.	K7JE 24950.0 W6VA 24950.0 K5ZG 24895.0	PJ2/WB9Z PJ2/WB9Z TI8CBT	95 plus 10 into AZ	1956 22 Dec 1954 22 Dec 1951 22 Dec
Most Wanted SEND your own!	DF4PL 24967.0 W6TA 24950.0 SP3DSC-@ 24895.1	EA8/025BF N7OD RN6HZ	TEST!! CQ BIG SIGNAL	1212 22 Dec 1857 21 Dec 0853 21 Dec
ANNOUNCEMENTS 25, 250, 1.000	RN6HZ 24895.0 WP4NIX 24935.0 WP4NIX 24935.0	RN6HZ VE7NS VE7NS	CQ test prop 59 na-036 59 NA-036	0836 21 Dec 2136 20 Dec 2012 20 Dec
or <u>10.000</u> pieces SEND your own!	K4KAL-0 24935.0 W5RY 24935.0 KA2FIR 24930.0	VE7NS VE7NS YV5B/B ZS6DN/B	Strong in GA.	2019 20 Dec 2006 20 Dec 1912 20 Dec 1910 20 Dec
<u>25, 250, 1.000</u> or <u>10.000</u> pieces	DL7YS 24940.0 IZ5EKV 24930.0 LU3HY 24950.0 TW10N 24950.0	DL7JRD ZS6DN/B ZD7VC ZD7VC	cq on beacon, fb idea 599 59 in LU 88+ on my R8. strong and Easy	1008 19 Dec 1006 19 Dec 1418 18 Dec 1415 18 Dec
CUSTOM SPOTS <u>137kHz</u> , <u>1.8MHz</u> , <u>3.5MHz</u> , 7MHz, <u>10MHz</u> , 14MHz, 18MHz.	DL9NDC 24950.0 DL5FU 24895.0 W1ZT 24895.1 TI8CBT 24895.2	ZD7VC Z2/UA4WHX Z2/UA4WHX Z2/UA4WHX	H174 55 - 59 Bruce in JN59 fb sigs nw Pse Beam To Costa Rica	1406 18 Dec 1406 18 Dec 1404 18 Dec 1403 18 Dec
21MHz, 24MHz, 28MHz, 50MHz, 70MHz, 144MHz, 430MHz, 1.2GHz,		OH2AQ CUint	- OHOAAQ the Contest!	us
<u>10GHz</u> Beacon, Digital, IOTA, <u>QRP</u> , <u>Satellite</u> , <u>Mobile</u>	27 Aug ja3qgi (15 27 Aug k3ske (12) 27 Aug d17afv (11 26 Aug ja3qgi (21	) I= 93, A= I= 93, A= ) I= 93, A= ) I= 93, A=	12, K= 2, R= 57 No storms=)No 12, K= 2, NO STORMS ; NO STORM 12, K= 2, NO STORMS=) NO STORM 12, K= 2, R= 76 No storms=)No	storms
	26 Bug ja2ggi (11	T= 02 T=	21 V= 2 D= 26 Mo ctormc=1Mo	atorna 🗹

### HRD

http://dxcluste	r.ham-radio.cl	h - Ha	am Radio Deluxe	e - DX Cluste	r Analysis - Microso	ft Internet	Explorer 🗖 🗖 🛛
Elle Edit View	Favorites Tools	Help	)				At
	2 7 nacom 3	<	Top 50 P32/W892	24 MHz 24895.0 24895.1 24895.0 24950.0 24950.0 24950.0 24895.0	UTC 22 Dec 20:42 22 Dec 20:09 22 Dec 20:01 22 Dec 19:56 22 Dec 19:56 22 Dec 19:51	Spotter <u>W9CA</u> N9TW N09Z N9TW K7JE <u>W6VA</u> K5ZG	Comment Still here Jerry? calling cq jerry tnx for 12m 95 plus 10 into AZ
Top 50 * 30s refresh * <u>ALL</u>	Top 250 * 180s refresh * <u>ALL</u>		EA8/0Z5BF N70D RN6HZ VE7NS	24967.0 24950.0 24895.0 24935.0	22 Dec 12:12 21 Dec 18:57 21 Dec 08:36 20 Dec 21:36	DF4PL W6TA RN6HZ WP4NIX	TESTI! CQ test prop 59 na-036
<u>HF</u> <u>137 kHz</u> <u>1.8 MHz</u> <u>3.5 MHz</u> 7 MHz	<u>HF</u> <u>137 kHz</u> <u>1.8 MHz</u> <u>3.5 MHz</u> <u>7 MHz</u>		VE7NS VE7NS VE7NS YV5B/B ZS6DN/B	24935.0 24935.0 24935.0 24930.0 24930.0	20 Dec 20:12 20 Dec 20:19 20 Dec 20:06 20 Dec 19:12 20 Dec 19:10	WP4NIX K4KAL W5RY KA2FIR KA2FIR	59 NA-036 Strong in GA.
10 MH2 14 MH2 18 MH2 21 MH2 24 MH2 28 MH2	10 MHZ 14 MHZ 18 MHZ 21 MHZ 24 MHZ 28 MHZ		DL73RD 256DN/B 2D7VC 2D7VC 2D7VC 2D7VC 2D7VC	24940.0 24930.0 24950.0 24950.0 24950.0 24950.0	19 Dec 10:08 19 Dec 10:06 18 Dec 14:18 18 Dec 14:15 18 Dec 14:06 18 Dec 14:06	DL7YS IZ5EKV LU3HY IW1QN DL9NDC DL5EU	cq on beacon, fb idea 599 59 in LU 59+ on my R8, strong and Easy IH74 55 - 59 Bruce in JN59 fb sigs nw
<u>VHF</u> 50 MHz 70 MHz 144 MHz 220 MHz	<u>VHE</u> 50 MHz 70 MHz 144 MHz 220 MHz		22/UA4WHX 22/UA4WHX 22/UA4WHX 22/UA4WHX UA4WHX	24895.1 24895.2 24895.2 24895.2 24894.9 24895.0	18 Dec 14:04 18 Dec 14:03 18 Dec 14:03 18 Dec 14:01 18 Dec 14:10 18 Dec 14:10	W1ZT TI8CBT YU1JF EA5DYB EA5DYB	Pse Beam To Costa Rica simplex
430 MHz 1.2 GHz 2.3 GHz 3.4 GHz 5.6 GHz 10 GHz	430 MHZ 1.2 GHZ 2.3 GHZ 3.4 GHZ 5.6 GHZ 10 GHZ		Z2/UA4WHX Z2/UA4WHX ZD7VC Z2/UA4WHX Z2/UA4WHX Z2/UA4WHX	24895.0 24895.0 24950.0 24894.9 24940.0	18 Dec 13:59 18 Dec 13:56 18 Dec 13:56 18 Dec 13:55 18 Dec 13:54 18 Dec 13:49	IZSEKV ONSJY HAIRW OK2PAY IT9FGA	WKD ISO pse Vlad 17m cw rare opening but chatting style BACK CW CQ CQ
24 GHz 47 GHz Announce WCY WWV	24 GHz 47 GHz Announce WCY WWV		Z2 ZD7VC Z2/UA4WHX Z2/UA4WHX Z2/UA4WHX	24940.0 24950.0 24940.0 24940.0 24940.1	18 Dec 13:50 18 Dec 13:48 18 Dec 13:48 18 Dec 13:46 18 Dec 13:41	SP4Z DF2UU IZŠEKV OEIDWC GB7CGL	heavy QSB on 12m from NEofEU Cq ISO Few Takers CQ now vy easy

## Starting

Select DX Cluster from the Tools menu.

HRD: T	op 50	DX spots on ALL	(Refre	sh = 5 seconds)					- 🙂 🛛
	æ	ALL	^	DX	Freq	UTC		Spotter	Comment 🛆
aA M	QRZ	HF VHF 3.5 MHz 7 MHz 10 MHz 14 MHz 18 MHz 21 MHz		A71EX/P GOCGL GW3YDX EA1VHF/B GW3YDX VR2MY XU7TZG A420YV	14022.0 10109.6 10106.5 144404.4 10106.3 18132.0 18132.0 14025.4	23 Dec 23 Dec 23 Dec 23 Dec 23 Dec 23 Dec 23 Dec 23 Dec 23 Dec	09:47 09:47 09:43 09:44 09:42 09:42 09:42 09:40	4Z5ML JJ2LPV DC9ZP G4RRA JJ2LPV LX1AX DC9ZP F8PGY	Qatar: CQ England: Wales: Spain: IN53RE <tr>IC Wales: Hong Kong: 58-9 Cambodia: Sri Call</tr>
		21 MHZ 24 MHZ	~	ELOOD (ELO	7067.0	23 Dec	00.00	ENTIO	

When you click on an entry the frequency is sent to the HRD display.

## Configuration

Press I to open the Configuration window.

### **Cluster Source**

There are three possible sources for DX spots:

- OH2AQ the original and most widely used web-based cluster. The spots are read by parsing data from the pages on the OH2AQ site at <u>http://oh2aq.kolumbus.com/dxs/</u>.
- 4. Ham Radio Deluxe a web-based cluster with data downloadable in CSV format from <u>http://dxcluster.ham-radio.ch/</u>. These web pages were made available by the HRD team as the OH2AQ cluster can be overloaded at times, especially at the weekend and during contests.
- 5. Custom using the DX Cluster Client built into HRD. Here you connect to any DX cluster node.

### OH2AQ / Ham Radio Deluxe

Using these web-based clusters is the easiest way to get started. All you need is an Internet connection.

OH2AQ supports the *Spot* option; the Ham Radio Deluxe cluster offers a faster response when OH2AQ is overloaded.

### **Custom – DX Cluster Client**

This option is only supported on Windows NT/2K/XP. It is not supported in Windows 98/ME/SE.

In the DX Cluster Client pane you connect to a DX Spider cluster, for example GB7MBC in sunny Morecambe or HB9DRV in snowy Laax.

Connecting to gb7mbc.spoo.org port Connected	8000	
+ Warning: Computer Misus + This system may only be accessed + callsigns and in accordance with	se Act (1990) UK applies by Radio Amateurs using their real their jurisdiction's licensing	·-+ + . +
+ conditions. All connections + login: gd4eli	to this system are recorded.	+ +
*** Connected to GB7MBC Hello Simon, this is GB7MBC in More running DXSpider V1.52 build 58.404	ecambe, Lancashire 1	
<pre># Welcome to GB7MBC, the North West # Your SysOps are Ian, GOVGS and Li # "</pre>	: DX-Cluster in IO84NB nda GOYLM - 01524 421164	
# Io get more information please ty # To read our usage policy please t Linda and Ian would like to wish al and a Happy and Peaceful New Year. this year.	rpe MOID :ype POLICY l of you a very Merry Christmas Many thanks for your support	
Cluster: 306 nodes, 18 local / 2574 GD4ELI de GB7MBC 23-Dec-2005 1008Z	4 total users Max users 2574 Upti dxspider >	me O O2:03
DX de IK1XVO: 14202.9 A43XA DX de F8CKS: 7086.0 F5PRR/P DX de 9A2F: 18160.0 HZ1IK DX de DM2AUO: 18083.1 4S7NE DX de VE1TK: 3799.7 LA6WEA	special call dmf55012 moulin de VILLI Manfred cq nelson cqdx	1009Z JN35 1007Z 1009Z JN86 1011Z 1009Z

Here GD4ELI has logged on to GB7MBC. DX spots are displayed in this window as they are received and are sent to the DX Cluster window for immediate display.

Custom: Top :	9 DX spots on ALI	_					- C 🗵
• •	ALL.	^	DX	Freq	UTC	Spotter	Comment
	HF		A43XA	14202.9	1009	IK1XV0	Oman: special call
	127 Inter		F5PRR/P	7086.0	1007	F8CKS	France: dmf55012 moulin de V
0.007	1 8 MH-		HZ1IK	18160.0	1009	9A2F	Saudi Arabia: Manfred cq
an gas	3 5 MHz		4S7NE	18083.1	1011	DM2AU0	Sri Lanka: nelson
<b>1</b>	7 MHz		LA6WEA	3799.7	1009	VE1TK	Norway: cqdx
	10 MHz		007UZ	10138.5	1011	007UZ	Belgium: CQ OLIVIA
	14 MHz		UA9FGR/MM	14177.0	1011	G6IQL	Asiatic Russia: Ken, rough S
	18 MHz	1000	HABUU	144370.0	1011	<b>OE3DXA</b>	Hungary: cq 1st 🚽
	21 MH→	<u> </u>	<	10100 0	1000	DICID	Dilation OF POPOTETNOLLIDAD

The advantage here is that you can apply any filtering supported by the DX Spider node you connect to. If your interest is European 144MHz then you don't want to see 144MHz spots from the rest of the world.

## **Options**

Press  $\blacktriangleright$  to enable regular updates; the update interval is set by pressing  $\mathbb{Z}$  (not applicable is using a custom DX cluster). Press P to refresh the display.

Refresh Interval	<
Enter the refresh interval (a value between 10 and 999 seconds), then press 'OK'.	
Interval: 25 🛟 seconds	
OK Cancel	

Press aA to change the font size.

Select an entry in the display, then press QRZ to perform a lookup of the station from the <u>QRZ website</u>.

QRZ Lookup		×
Field	Value	
Callsign Name Address QTH Country Locator Home Page QSL Via	HI8RV RAFAEL "CHI P:0:BOX 3054 SANTO DOM DOMINICAN F	KIN'' VIGUERA 1, SANTO DOMING INGO REPUBLIC
<		>
Home Pa	ige	<u>Q</u> RZ Page
		Close

Press **d** to display the homepage for the selected source (not available if using a custom DX cluster).

Press to submit a spot (not available is using the HRD source).

🧱 Submit a D	X-Spot	
<u>M</u> y call: *	HB9DRV	* = Input required
<u>D</u> X call: *	GD4ELI	
<u>F</u> requency:*	7.0201 MHz	<
Information:	Rare as hen's teeth	
	<u>C</u> lear	View <u>R</u> eply

# **Auxiliary Switching**

## Introduction

A standard PC comes equipped with an 8-bit parallel port that can be used to switch auxiliary equipment such as antennas, bandpass filters and power amplifiers.

Ham Radio Deluxe supports the parallel port via fully configurable manager and monitor displays.

Typical uses of this option are to switch antennas, either automatically as the frequency changes, or by selecting an option from the Parallel Port pane of the selection window.

## Technology

The parallel port sends 8 bits at a time. The layout of the parallel port pins is shown below.



The data pins are shown in red; D0 is pin 2, D7 is pin 9.

To indicate that a bit has a value of 1, a charge of 5 volts is sent through the correct pin. No charge on a pin indicates a value of 0. This is a simple but highly effective way to transmit digital information over an analog cable in real-time.

## Manager

The manager window is invoked from the *Tools > Parallel Port* menu.

#### Definitions

Each definition consists of:

- [X] Enabled selection if not checked then the definition is ignored when Ham Radio Deluxe detects a new frequency. The definition is still shown in the selection window if this option is enabled.
- Title a description of the antenna or component that will be switched when the entry is selected.

- From the lower end of the frequency range.
- To the upper end of the frequency range.
- Port the LPT port to be switched by the definition.
- D0-D7 the parallel port data bit settings, each bit is either 1 (on) or 0 (off). D0 is pin 2, D7 is pin 9.

#### **Port Address**

The default port addresses for LPT1, LPT2 and LPT3 are 0378, 0278 and 03BC respectively. If your computer has a different configuration just select the address that corresponds to the port.

You will find the port address via the *Device Manager* settings display located in the *System* control panel applet.

System Properties			2 🛛
General Computer Name	Hardware Advanc	ed Automatic Updates Remot	e
Device Manager The Device I your compute of any device	Manager lists all the h er. Use the Device Ma	ardware devices installed on anager to change the properties	
		Device Manager	
Bovice Manager			
File Action View Help ← → 📧 🖀 🚭 😫 📚	× 2		
	ECP Printer Port	(LPT1) Properties	? 🛛
Floppy disk controllers     Floppy disk drives     Hoppy disk drives     Human Interface Devices     DE ATA/ATAPI controllers	General Port Set	tings Driver Details Resource rrinter Port (LPT1)	35
	Resource setting	js:	
<ul> <li>B Mice and other pointing de</li> <li>B Monitors</li> <li>B Multi-port serial adapters</li> <li>B Network adapters</li> <li>B Network adapters</li> </ul>	Resource type I/O Range I/O Range DMA	<ul> <li>Setting</li> <li>0378 - 037F</li> <li>0778 - 077B</li> <li>03</li> </ul>	
B Ports (COM & LPT) J Communications Port ( E CP Printer Port (LPT1)	Setting based or	Current configuration	<u>.</u>
<ul> <li>➡ Processors</li> <li>➡ SBP2 IEEE 1394 Devices</li> <li>➡ SCSI and RAID controllers</li> </ul>	Conflicting devic	Use automatic settings	Change Setting
<ul> <li>B Sound, video and game co</li> <li>B Storage volumes</li> </ul>	No conflicts.		
			<u>×</u>
			OK Cancel

In the Windows XP example below the base address is 0378.

#### Various

The options are:

• Auto-switch: as the frequency displayed by Ham Radio Deluxe changes a lookup is made against the parallel port definitions and the parallel port switched to the configuration for the first definition in the list that matches the new frequency.

• Selection window: displays a Parallel Port pane in the main HRD selection window. See Selection Window on page 59.

## Monitor

The monitor window is started from the *Tools* > *Parallel Port* menu. The monitor:

- shows the current state of the data pins for a selected parallel port,
- allows you to select a definition, and
- toggle the data pins directly.

The Definition field shows the definition that matches the current pin selection (if any).

## **Selection Window**

To display the selection window select the selection window option in the Parallel Port Manager.



The options are:

- Manager starts the Parallel Port Manager.
- Monitor starts the Parallel Port Monitor.
- Auto-switch if enabled (tick) then a match is made with the first enabled definition when the frequency changes. If not enabled (cross) then a match is not made.
- Definitions click on a definition to apply the definition to the port.

The icon indicates whether a definition that has been enabled or disabled. Disabled definitions can be selected in this window; they are only ignored when matching a new frequency against the list of definitions.

## **Remote Server**

## Introduction

The HRD Remote Server enables a connection between Ham Radio Deluxe and a radio connected to a remote computer that can be contacted via TCP/IP.

#### Requirements

The remote computer must be running Windows NT – that is NT 4.0, 2000, 2003 or XP. Windows 95, 98 and various flavours thereof are not supported.

#### Technology

A Windows service is installed on the remote service. This listens on a port (usually 7805) for incoming connections from Ham Radio Deluxe (the client).

For more technical information see Annex: Remote Server on page 99.

## Installing

The HRD Remote Server files are:

- HRDRemoteSvr.exe the executable,
- HRDRemoteSvr.cfg configuration file, and
- HRDRemoteSvr README.txt essential reading.

To install the service select Remote Service from the Tools> Programs menu.

🕮 Remote Serv	er Configuration						
	Help						
The status of the started for norm	e HRD Remote Server on this computer. The service must be al operation.						
Service name:	HRD RemoteSvr						
Display name:	Ham Radio Deluxe Remote Server						
Configuration:	D:\Ham Radio\Debug\HRDRemoteSvr.cfg						
Logfile:	D:\Ham Radio\Release\HRD-RemoteSvr-0511-November-2005.txt						
Last started:	2005-11-11 03:08:08						
Status:	Stopped						
Install	Bernove     Start       View Log     Help						
1.0 Introduction							
The HRD Remote Server enables a connection between Ham Radio Deluxe and a radio connected to a remote computer which can be contacted via TCP/IP.							
1.1 Requiren	1.1 Requirements						
The remote c 2000, 2003 o are not suppo	omputer must be running Windows NT - that is NT 4.0, r XP. Windows 95, 98 and various flavours thereof orfed						

Press Install to install the service, and then press Start to start the service.

You can start the Windows *Services* applet (Start – Settings – Control Panel – Administrative Tools – Services) to modify the properties of the service, for example disabling automatic startup.

Ham Radio Deluxe	Remote Server Properties (Local Computer)	? 🗙				
General Log On F	Recovery Dependencies					
Service name:	HRD RemoteSvr					
Display <u>n</u> ame:	Ham Radio Deluxe Remote Server	-				
<u>D</u> escription:	The Ham Radio Deluxe remote server, www.ham- radio.ch	* *				
Pat <u>h</u> to executable "C\Program Files\	: Amateur Radio\Ham Radio Deluxe\HRDRemoteSvr.exe"	_				
Startup typ <u>e</u> :	Automatic	~				
Service status:	Stopped	_				
<u>S</u> tart	Stop <u>P</u> ause <u>R</u> esume					
You can specify the here.	e start parameters that apply when you start the service from	ו				
Start para <u>m</u> eters:						
	OK Cancel App	ily				

## Configuring

Press *Configure* to edit *HRDRemoteSvr.cfg* which contains the service configuration.

```
#####################
      Ham Radio Deluxe Remote Access Server
      Copright (c) 2004 by Simon Brown, HB9DRV.
      Note: this only runs on Windows NT/2K/XP. It does not run on Windows 95/98/ME/SE.
      This file defines the configuration of the Remote Access Server.
The format of each entry is TOKEN = VALUE.
      Supported tokens
      COM
      PORT
      USER1 to USER20
WELCOME
# # # #
      A comma-separated list of COM ports that are returned. If not defined then the server returns a list of all COM ports available on the computer.
#COM = COM1,COM2,COM3,COM4
#COM = COM1
####
      The TCP/IP port on which the server listens for connections. If not defined then the default value of 7805 is used. Select any port number you want which is not in use by other programs.
#
PORT = 7805
      Username/passwords, these are case-insensitive. Spaces are removed from the beginning and end of the username and password.
     The format is USERx = username, password
#
USER1 = Simon,SnowTime
USER2 = Peter,Uberwald
USER20 = Donald,California
      Welcome text, displayed on the remote user's computer. Note that \n is replaced with a newline. Enter up to 511 characters on a single line.
#
WELCOME = Welcome to the HRD Remote Access Server.\n\nPlease don't break anything!
```

The contents of this file should be obvious. After changing the configuration you should restart the service.

## Connecting

To connect to the remote server enter values as normal when starting HRD but select the Remote port, then press Connect.



When you press Connect the Remote Connection window is displayed.

Cor	nnect to a computer running the HRE	) Remote Access Program
-[1] Remote Compi	uter Connection	[2] Remote COM Port
Address:	www.simon-home.ch	
Port:	7805 Default = 7805	
Username:	Wombat	
Password:	•••••	
Connect	✓ Save settings	
Enter the remote co	imputer connection information, then	press 'Connect'.

Enter connection information:

- Address: the remote computer address in either numeric or alphabetic form for example 195.154.179.101 or www.simon-home.ch .
- Port: the port assigned to the remote service, usually 7805.
- Username: a valid username defined in the configuration file. This is case-insensitive.
- Password: the password corresponding to the username. This is caseinsensitive.
- To save these values make sure the *Save settings* option is checked X.

Press Connect. If the connection is successful the text

*Username/password authenticated. Select a remote COM port, then press 'OK'* is displayed.

🗖 Remote Connec	tion	X
Conne	ect to a computer running the HRD F	Remote Access Program
[1] Remote Compute	r Connection	[2] Remote COM Port
Address:	201.42.12.114	СОМ7
Port.	7805 Default = 7805	
Username:	Simon	
Password:	•••••	
Connect	✓ Save settings	
Connected to 201.42.1	2.114:7805, username/password a	uthenticated.
Select a remote COM	Port, then press 'OK'.	
✓ ОК	Cancel	Service 🥑 Help

Now select the COM port, and then press OK to connect to the remote COM port and start the HRD radio display.

When the connection with the radio has been confirmed a *Remote Connection* display window shows you the data throughput and average round-trip time.

ko Remo	ote Connection	
Send: Recv:	0.34 KB/s 0.55 KB/s	>>

## **Remote Connection**



Use the *Remote Connection* window to show the status of the remote connection.

- Round-trip time: the time required to send a message from HRD to the remote server and get a response. This will be very similar to the value shown when you use Ping to interrogate a remote host. Typically values of 50 milliseconds or less are very usable.
- Refresh interval: the interval between refreshes of the selected Regularly Read options.
- Send frequency: when the frequency is updated over a link with a high round trip time (> 100ms) the performance will be less than optimal with Sync selected so if the round trip is high select Async, otherwise just select Sync. The disadvantage of using Async is an 'elastic band' effect while tuning by dragging HRD's small tuning marker.
- Regularly Read: the options that are regularly updated. If you are using a fast link for example to a local station with a low round-trip time then you can safely select all options. The disadvantage of selecting options such as Buttons, Dropdowns, Sliders and Status Texts is that it may take a second or two before HRD detects that you are changing the frequency by dragging the tuning marker and the current refresh operation cannot be interrupted.

#### **Slow Link**

If you have a slow link - a round-trip time > 100 ms - then select only Meters. As this is a remote station it is unlikely that anyone else will be adjusting the radio's controls so you will not need to refresh buttons and dropdowns as you would with a locally connected radio.

The disadvantage of not selecting Buttons and Dropdowns is that inter-button dependencies will not be shown - for example you may have 4 AGC buttons Off, Fast, Medium and Slow, only one of which will be active at any one time. If Buttons is not enabled for regular refreshes then pressing Fast will not update the

other AGC buttons. In this case you must press the small refresh button to the right of the Buttons check box.

To refresh all display options click Refresh All.

# **Satellite Tracking**

## Introduction

If you are new to satellite tracking visit <u>http://www.amsat.org/</u> maintained by The Radio Amateur Satellite Corporation (AMSAT) for excellent articles written for new satellite users.

HRD's Satellite Tracking support would not be possible without the help of <u>David Taylor</u> and his open source satellite-tracking library.

After using David's code to get started I wrote my won library, shipped as a DLL with HRD and based on NORAD SGP4/SDP4 Implementations by Michael F. Henry. Full source is available on request.

The most important rule: it's the frequency on the satellite that is important, not the frequency on your radio. This is the most common mistake made when using a satellite.

If you are using two radios for satellite tracking – one for transmit, the other for receive – read this section first, then refer to Dual Radio Satellite Tracking on page 82.

Dual radio support is arguably the most flexible way to work with satellites.

## **Satellites**

The software requires information about the satellites you will be tracking, this information is known as Keplerian elements. Johannes Kepler (1571 - 1630) discovered the three laws of planetary motion in 1609 and 1619 – a remarkable feat!

Satellite Tracking: Local - JN Satellites 🔮 Observer 🧶 Groun	45AT - RS-22 - Uplink OFF - Downlink ON
	Select a maximum of 100 satellites from the Available list
Available N0AA-14 N0AA-15 N0AA-15 N0AA-15 N0AA-17 N0AA-18 N0AA-18 N0AA-17 N0AA-18 N0A-18 N0A	Selected
AMSAT Operational >	Last download: 21/12/2005 20.0422 >

The satellites window lists the files containing the Keplerian elements used to plot the position of satellites and compute the correct frequencies for the uplink and downlink.

The default folder is *Satellites* located below the folder where you have installed HRD - for example:

C:\Program Files\Amateur Radio\Ham Radio Deluxe\Satellites.

To change the folder just press Select.

It is recommended that you update the data files in the *Satellites* folder when you start using Ham Radio Deluxe as the files shipped in the kits will be out of date by the time you start to use them. These files should ideally be refreshed every few days.

If you check the 'Download when Satellite Tracking starts' option then the files are downloaded every time you start satellite tracking.

To download the latest Kepler data files press *Download*. The files are downloaded to the folder containing your satellite data.

To edit the list of files press *Edit List*. The file is *HRD Satellite List.txt* in the folder *Satellites* folder.

Example:

The entries below are downloaded using the Satellites page in the Satellites data option. Data is saved in .txt files. Entries must start with http:// Ham Radio Deluxe only supports the two-line format, for example: A0-40 1 26609U 00072B 2 26609 9.9303 00072B 03309.95521145 -.00000007 00000-0 0000+0 0 3675 9.9303 22.9678 7977178 228.8131 28.6254 1.25597973 13867 \*\*\*\*\*\*\*\* **\***#### When you change this list you should delete old files which are no longer being used. ## From AMSAT (recommended for Amateur radio satellites). # # http://www.amsat.org/amsat/ftp/keps/current/nasabare.txt #### From Celestrak Remove the # comment to add these. "http://www.celestrak.com/NORAD/elements/amateur.txt http://www.celestrak.com/NORAD/elements/smallelulitkt http://www.celestrak.com/NORAD/elements/stations.txt http://www.celestrak.com/NORAD/elements/visual.txt http://www.celestrak.com/NORAD/elements/weather.txt #### New satellite data files can be downloaded from the Internet, for example from

New satellite data files can be downloaded from the Internet, for example from <u>http://www.amsat.org/</u> or from <u>http://www.celestrak.com/</u> maintained by T.S. Kelso.

The only supported file format is two-line element sets, for example:

A0-7 1 07530U 74089B 03265.96753648 -.00000029 00000-0 10000-3 0 2356 2 07530 101.7328 311.4393 0012255 21.1784 338.9793 12.53565904320301 A0-10 1 14129U 83058B 03265.06525444 -.00000148 00000-0 10000-3 0 9658 2 14129 26.3223 129.7582 5974698 27.0721 354.5394 2.05868478124501

The verbose format is not supported.

The bare NASA format elements from <u>http://www.amsat.org/</u> contain all satellites of interest to radio amateurs.

Alternatively if you look at <u>http://www.celestrak.com/NORAD/elements/</u> you will see many files that can be downloaded. Just download these files and save them in the Satellites folder selected previously. For more information about the contents of these files browse <u>http://www.celestrak.com/</u>.

All text files in the Data Folder are loaded into Ham Radio Deluxe, so you should delete old files if you no longer need them.

Select up to 100 entries from the *Available* list by either double-clicking on individual entries or by highlighting one or more entries and pressing > . By pressing >> all entries (up to a maximum of 100) are moved to the *Selected* list.

### Observer

Satellites Schedule Ground Control Schedule	Current Data Mutual Visibility Visibility Next Passes Single Pass Plot DDE .
Enteryour location	on and height above sea level and any other stations to be plotted
Construction Locator: IN46AT Convert >> Losthude: 6 40 m 45 6 N V Longitude: 8 4 m 1 5 E V Height Motors: 1035 Feet 3395 Convert Anno Anno Anno Anno Anno Anno Anno Ann	Stelions To Flot Stelions To Flot GCHELI 5431250000 437500000 Add Modily Berrove

In the *Observer* window you enter your location and height above sea level in meters or feet (for users more familiar with imperial measurements: 1 metre is 3.3 feet). You also enter an optional list of stations that are plotted on the world maps. Only the checked [X] entries are plotted.

Enter your location either:

- 6. By entering your Maidenhead Locator in the Locator field and the pressing *Convert* >> or
- 7. By entering the Latitude and Longitude directly.

You also select the preferred time format; either Local (default) or UTC. Distance is displayed in either kilometers or miles.

You must press *Apply* to update the satellite settings.

## **Ground Control**



This window is used to adjust your radio's TX (uplink) and RX (downlink) frequency to compensate for the Doppler effect, which is the apparent shift in frequency of a wave due to the relative motion of source and observer. Doppler shift is calculated in accordance with Kepler's laws.

- Enter the satellite uplink (your TX) frequency in the Satellite TX field.
- Enter the satellite downlink (your RX) frequency in the Satellite RX field.
- Select the VFO you will use for TX and RX (see rest of this section).
- If you are using a transverter enter the transverter offsets.

When you are tuning remember that the important frequency is the satellite frequency, not the frequency on your radio. The frequency on your radio is the satellite frequency corrected for Doppler shift.

#### Kenwood TS-2000

The computer can only update both main and sub frequencies either:

- In receive mode, or
- In transmit mode with SAT selected.

A special solution is required when the uplink (TX) and downlink (RX) frequencies are in the same band. When you start the TS-2000 you have an extra TX VFO option Sub+XIT which is only used for same band split operation (see below). When selected the Sub VFO is used for transmitting, Doppler correction is applied by adjusting the XIT value.

#### **Cross Band**

In normal cross-band satellite mode (for example transmit on 70cms and receive on 2m) select:

- TX VFO B/Sub (the TS-2000 always uses the Sub VFO for TX),
- RX VFO A/Main,
- SAT on,
- Split off.

The TS-2000 must be in satellite mode so that the computer can update the TX frequency.

Be careful with the TS-2000's *TF SET* button, each time you press *TF-SET* the uplink (TX) frequency and the downlink (RX) frequency are swapped. So if the frequencies in HRD are the opposite of those shown on the radio just press *TF SET* once.

#### Same Band (Split)

An example is talking to the astronauts on the ISS where the TX frequency is 145.200.000 MHz and the RX frequency is 145.800.00 MHz. You cannot use SAT mode as this is only used for cross-band operation, so you use *Split* mode.

- TX VFO Sub+XIT,
- RX VFO Main,
- SAT off,
- Split on.

XIT will be switched on as soon as you check TX [X] updates. If you switch it off then HRD will switch it on again.

The RX (main) frequency on the TS-2000 is set to the correct RX frequency (satellite + Doppler correction).

The TX (sub) frequency on the TS-2000 is set to the TX satellite frequency; the Doppler correction is applied by adjusting the XIT value. When you transmit the TS-2000 displays the TX (sub) frequency +/- XIT so the frequency displayed on the TS-2000 is the correct frequency (satellite + Doppler correction).

When you start transmitting you may hear beeps from the radio - it takes HRD a few seconds before it detects that you are transmitting. When HRD detects transmit mode it stops updating the RX (main) frequency intil you return to receive as the frequency cannot be updated by the computer while transmitting with SAT off.

#### Yaesu

#### FT-847

You must select *SAT* mode on the FT-847 so that Ham Radio Deluxe can read and set both the TX and RX frequencies. It is not possible to determine the state of the FT-847's *SAT* button so you must press the *SAT* button in HRD so that it shows SAT as being enabled.

In normal cross-band satellite mode (for example transmit on 70cms and receive on 2m) select:

- TX VFO B/Sub,
- RX VFO A/Main,
- SAT on,
- Split off,
• Tracking off (you do not need to enable tracking, the computer does everything for you, also the tuning response with HRD is much faster with tracking off). To switch tracking off press the A > B button underneath Track.

The FT-847 must be in satellite mode so that the computer can update the TX frequency.

When in SAT mode the FT-847 takes a long time to respond to 'Read Frequency' requests - especially if tracking is on, as a result when you tune the FT-847 with the radio's tuning dial the displayed frequency will not update very quickly.

#### Other

The transmit frequency of some Yaesu radios such as the FT-817 and FT-857 cannot be changed while in transmit mode, so it is not possible to apply Doppler correction while transmitting. If you think your Yaesu radio can be updated while transmitting please contact the author.

## ICOM

#### IC-910H

In normal cross-band satellite mode (for example transmit on 70cms and receive on 2m) select:

- TX VFO Sub,
- RX VFO Main,
- SAT on.

The IC-910H must be in satellite mode so that the TX uses the Sub frequency. If the bands on the radio are the same as HRD but reversed press M/S to switch the Main and Sub frequencies.

Because the IC-910H cannot display the same band on both Main and Sub HRD cannot update the frequencies unless the correct bands are select using the radio controls.

In same-band mode:

- TX VFO Main,
- RX VFO Main,
- SAT off.

A few notes:

- 1. The TX mode is not updated from the radio.
- The software has to switch between Main and Sub so that the Sub VFO is updated, it is not possible to detect the radio's current Main / Sub selection so the radio operates in main mode all the time. If you press Sub on the radio you will see that radio switch back to Main as soon as the Sub frequency is updated.

## **Single VFO Radios**

If you are using a single VFO radio such as the FT-817 then you use the same VFO for TX and RX. Use the TX (F1) button to switch between TX and RX. When you switch to TX the transmit frequency is loaded into the radio before it switches to transmit, when you return to receive the receive frequency is loaded into the radio after it switches to receive.

So the rule is: always use the TX (F1) button to switch between transmit and receive.

#### Linear Transponders

Check [X] the Linear Transponder Tracking option if you are using a linear transponder such as HAMSAT / VUSAT / VO-52. These satellites receive a specific range of frequencies (typically 40 - 100 kHz) in one band, convert them to another band and amplify the converted signal for transmission back to your planet. The converted signal is inverted - LSB becomes USB etc. - this is known as an inverting transponder.

Do not use the satellite tracking built into your radio - let HRD do the work for you (for example on the FT-847 this is the Tracking option). To set up the linear transponder frequencies:

- TX center The center frequency of the uplink (TX) band. For example on VO-52 the uplink band is 435.220-435.280 MHz (LSB/CW) so the center frequency is 435.250.000 MHz.
- RX center The center frequency of the downlink (RX) band. For example on VO-52 the downlink band is 145.870-145.930 MHz (USB/CW) so the center frequency is 145.900.000 MHz.

As you tune your RX frequency the TX frequency will be correctly adjusted by applying [1] offsets from the center frequencies and then [2] Doppler correction.

To adjust your transmit signal so that it matches the receive frequency use the spin button to the right of the TX center field. It will be necessary to adjust the transmit signal as your radio(s) may not be correctly aligned, also the linear transponder in the satellite may also not be correctly aligned.

The tracking option in a radio cannot correctly compensate for Doppler, this is one reason why many QSO's drift gently across the linear transponder's available bandwidth. Only correct computer control will ensure that two or more stations stay on the same frequency while the satellite passes overhead. When using the linear transponder option HRD will correctly control your radio's frequencies so that are they are both compensated for Doppler shift.

## **Frequency Resolution**

The frequency resolution is set the 1 Hz for:

- All ICOM,
- All Elecraft,
- All FlexRadio,
- All Kenwood .

All other radios are set to 10 Hz. If you have a radio that supports 1 Hz resolution and is not in the above list please contact the author.

#### Options

Option	Description
VFO	The VFO used for the uplink (TX) and downlink (RX). If checked [X] the selected VFO is updated regularly as the satellite frequency is corrected for Doppler shift.
Satellite	The satellite frequency. Click the Open button to select a new frequency from a popup window containing the Favourites definitions or enter the new frequency.
Transverter	If you are using a transverter enter your transverter's intermediate

	either leave this field empty or do not check the $[X]$ box. The radio frequency is calculated as: Satellite - Transverter + Doppler shift.
Radio	The radio frequency as computed by HRD taking Doppler shift into account.
Satellite	Select the current satellite from a dropdown list that contains the entries selected earlier in the Satellites window.
Plot for	Determines the amount of information that is plotted over the surface of the planet for the current satellite.
TX > RX	Copy the Uplink satellite frequency to the Downlink satellite frequency.
RX > TX	Copy the Downlink satellite frequency to the Uplink satellite frequency.
$TX \diamondsuit RX$	Exchange the Uplink and Downlink satellite frequencies.

have and should the [V] have If some and some

# Schedule



This window shows the pass schedule for the satellites selected in the Satellites window.

# **Current Data**

Satellite Tracking: Lo	cal - JN46AT - VO-52 - Uplink ON - Downlink ON
Satellites     Observer	🖲 Ground Control 🗧 Schedule 🍧 Current Data 💿 Mutual Visibility 🗣 Visibility 🗣 Next Passes 🍨 Single Pass 🔍 Plot 🔍 DDE 🗣 🕶
	Current satellite data, used for Ground Control and DDE
Vis         Satellites           X         AO-27           X         AO-51           X         FO-29           X         GO-32           X         ISS           X         RS-22           ✓         SO-50           X         VO-52	Field     Value       Stellite     W0-52       Visible     No       Direction     Southbound       Aximuth *     319.64       Elevation *     -52.11       Longitude     132.16 W       Latitude     15.53 N       Range fm     10.642.32       Altitude km     617.22       Range rate     4.09450270       AOS     1:00:08       LOS     1:112:40

This window shows all computed information for a selected satellite. This window provides the data for the *Ground Control* and *DDE* windows.

Press *Viewer* to display the data with the default text file viewer, usually Notepad.

# **Mutual Visibility**

		Satellite mutual visib	ility (satellite is in range of two o	r more locations)
stellite:	A0-27 💙	AOS	LOS	Duration
iture:	7 🚊 days	22/12/2005 05:54:26	22/12/2005 06:03:26	9:00
		22/12/2005 07:36:24	22/12/2005 07:40:24	4:00
evation:	10 🗧 minimum	22/12/2005 15:40:35	22/12/2005 15:46:35	6:00
		22/12/2005 17:10:32	22/12/2005 17:26:32	8:00
Nation	Locator	23/12/2005 05:20:14	23/12/2005 07:14:54	8-00
Observe	er JN46AT	23/12/2005 07:00:34	23/12/2005 15:17:42	4:00
GD4EU	1074TH	23/12/2005 16:50:24	23/12/2005 16:58:24	8:00
		24/12/2005 04:58:15	24/12/2005 05:04:15	6:00
		24/12/2005 06:38:06	24/12/2005 06:47:06	9:00
		24/12/2005 14:47:38	24/12/2005 14:48:38	1:00
		24/12/2005 16:22:36	24/12/2005 16:30:36	8:00
		24/12/2005 18:02:24	24/12/2005 18:08:24	6:00
		25/12/2005 06:09:35	25/12/2005 06:18:35	9:00
		25/12/2005 15:55:07	25/12/2005 16:02:07	7:00
		25/12/2005 17:33:43	25/12/2005 17:41:43	8:00
		26/12/2005 05:41:17	26/12/2005 05:50:17	9:00
		26/12/2005 07:22:32	26/12/2005 07:28:32	6:00
		26/12/2005 15:27:59	26/12/2005 15:33:59	6:00
		26/12/2005 17:05:24	26/12/2005 17:13:24	8:00
		27/12/2005 05:13:10	27/12/2005 05:21:10	8:00
		27/12/2005 06:53:27	27/12/2005 07:02:27	2:00
		27/12/2005 15:01:22	27/12/2005 15:04:22	3:00
		27/12/2005 10:57:25	27/12/2005 18:45:25	4-00
		28/12/2005 04:45:24	28/12/2005 04:50:24	5:00
		28/12/2005 06:24:48	28/12/2005 06:33:48	9.00
		28/12/2005 16:09:45	28/12/2005 16:17:45	8:00
		28/12/2005 17:49:01	28/12/2005 17:56:01	7:00

The mutual visibility window answers the question 'when is a satellite simultaneously visible from two or more locations'.

The information is determined up to 99 days in the future for any stations from the list defined in the *Observer* page.

The satellite is considered to be visible if the elevation is the same as or greater than the selected value.

Use the Viewer option to display the data in Notepad, for example:

Satellite: A0-27 Future
++   Station   Locator

| Observer | JN46AT |

GD4EL1	10/41H			
AOS	I	LOS		Duration
A05 +	05:54:26 07:36:24 15:40:35 17:18:32 05:26:14 07:06:54 15:13:42 06:58:15 06:38:06 14:47:38 16:22:36 18:02:24 06:09:35	L0S 22/12/2005 22/12/2005 22/12/2005 22/12/2005 23/12/2005 23/12/2005 23/12/2005 23/12/2005 24/12/2005 24/12/2005 24/12/2005 24/12/2005 24/12/2005 24/12/2005 25/12/2005	$\begin{array}{c} 06:03:26\\ 07:40:24\\ 15:46:35\\ 17:26:32\\ 05:34:14\\ 07:14:54\\ 15:17:42\\ 05:04:15\\ 06:47:06\\ 14:48:38\\ 16:30:36\\ 18:08:24\\ 06:18:35\\ \end{array}$	Duration   9:00   4:00   8:00   8:00   8:00   8:00   4:00   9:00   1:00   8:00   1:00   9:00   9:00   9:00   9:00
25/12/2005 25/12/2005 26/12/2005 26/12/2005 26/12/2005 27/12/2005 27/12/2005 27/12/2005 27/12/2005 27/12/2005 27/12/2005 28/12/2005 28/12/2005 28/12/2005	$\begin{array}{c} 15:55:07\\ 17:33:43\\ 05:41:17\\ 07:22:32\\ 15:27:59\\ 17:05:24\\ 05:13:10\\ 06:53:27\\ 15:01:22\\ 16:37:25\\ 18:18:40\\ 04:45:24\\ 06:24:48\\ 16:09:45\\ 17:49:01 \end{array}$	25/12/2005 25/12/2005 26/12/2005 26/12/2005 26/12/2005 27/12/2005 27/12/2005 27/12/2005 27/12/2005 27/12/2005 28/12/2005 28/12/2005 28/12/2005 28/12/2005	$\begin{array}{c} 16:02:07\\ 17:41:43\\ 05:50:17\\ 07:28:32\\ 15:33:59\\ 17:13:24\\ 05:21:10\\ 07:02:27\\ 15:04:22\\ 16:45:25\\ 18:22:40\\ 04:50:24\\ 06:33:48\\ 16:17:45\\ 17:56:01 \end{array}$	$\begin{array}{c} 7 : 00 \\ 8 : 00 \\ 6 : 00 \\ 6 : 00 \\ 8 : 00 \\ 8 : 00 \\ 3 : 00 \\ 3 : 00 \\ 3 : 00 \\ 4 : 00 \\ 5 : 00 \\ 5 : 00 \\ 8 : 00 \\ 7 : 00 \\ \end{array}$

Visibility

	Satellite visibility (satellite is in range)										
haw:		ible now 🤇	Visible in <u>n</u> ext	30 🗘	minutes	⊻iewer					
Vis	Satellite	Azimuth	Elevation	d AOS	d LOS	Lon	Lat	Range	Altitude	Range Rate	
×	A0-27	126.80	-70.04	7:48:54	8:01:53	127.35 E	56.15 S	12,826.37	822.27	-0.19481537	
×	A0-51	154.42	-26.63	10:11	23:51	31.26 E	12.88 S	7,056.20	714.95	-6.11760712	
5	F0-29	158.29	-73.39	39:12	49:49	150.92 E	72.10 S	13,557.11	1,325.30	-1.65916760	
5 -	GO-32	136.73	-1.67	0:31	14:58	29.41 E	23.04 N	3,518.51	817.68	-6.35537886	
÷.	100	132 69	-19.12	1.21.50	1,33,32	42 74 F	6 02 N	5 747 98	676 69	4 79986937	
2	S0-50	8.30	9.02	Vicible	5:01	13.75 F	64.05 N	2.146.57	664.28	0.02066673	
ý.	V0-52	318.42	-54.29	59:00	1:11:32	133.05 W	11.36 N	11,112,16	616.10	3.88572984	

The visibility window gives you an overview of the satellites you have selected in the Satellites window.

Select the satellites that are displayed:

• All - displays all satellites,

- Visible now displays only the satellites which are currently • visible,
- Visible in next displays the satellites visible at any time in the

•	time period you select, for example the next 60 minutes.
For each e	entry in this display the columns are:
Column	Description
Vis	Whether the satellite is currently visible.
Satellite	The name of the satellite.
Azimuth	The azimuth of a satellite is the angle between the vertical plane containing it and the plane of the meridian. It is customary to reckon the azimuth of a line from the south point of the horizon around by the west from 0[deg] to 360[deg].
Elevation	The angular distance above the horizon.
AOS	Acquisition of signal is the elapsed time at which the satellite becomes visible and a signal can theoretically be heard. If empty then the satellite is already visible.
LOS	Loss of signal is the elapsed time after which the satellite is no longer visible and the signal can theoretically no longer be heard.
Lon	The satellite's current longitude.
Lat	The satellite's current latitude.
Range	The distance of the satellite from the observer's location measured in kilometers. (A mile is 1.6 kilometers; a kilometer is 0.62 miles.)
Altitude	The altitude of the satellite above sea level measured in meters.

#### The value required to calculate Doppler frequency adjustment. Range

# **Next Passes**

Rate

Satellites 😑 Observer	🔶 Ground Control 🤌 Schedule 🔮 Cur	ent Data 🗢 Mutual Visibility	🗢 Visibility 🗢 Next Pass	es 🔮 Single Pass 🔍	Plot   DDE
		Next passes for a selected s	atellite		
ris Satellites	V0-52: AOS	AOS Azi LOS	Max Elev/Azimuth	Duration	
AO-27	Wed 21-Dec-2005 21:23:0	4 137.22° 21:35:36	29.82° 66.45°	12:32	
AO-51	Wed 21-Dec-2005 22:59:0	7 190.48° 23:11:54	31.44° 264.30°	12:47	
FO-29	Thu 22-Dec-2005 00:41:4	3 270.60° 00:44:25	0.46° 282.48°	2:42	
GO-32	Thu 22-Dec-2005 09:10:2	3 56.00* 09:15:22	1.65* 83.65*	4:59	
155	Thu 22-Dec-2005 10:43:5	4 19.96° 10:56:39	31.15* 133.57*	12:45	
H3-22	Thu 22-Dec-2005 12:20:2	1 1.09* 12:32:20	21.54* 2/1.41*	11:59	
30-50 VO-52	Thu 22-Dec-2005 13:55:0	9 89 92* 20.17.10	5 90° 49 66°	9:00	
10.05	Thu 22-Dec-2005 20:05:0	2 147.80° 21:54:52	44.51° 70.48°	13:00	
	Thu 22-Dec-2005 23:18:4	5 201.93* 23:30:52	20.89* 267.56*	12:07	
	Fri 23-Dec-2005 09:28:1	7 43.28° 09:36:27	5.22* 91.59*	8:10	
	Fri 23-Dec-2005 11:02:5	9 16.08° 11:16:00	41.80° 158.49°	13:01	
	Fri 23-Dec-2005 12:39:4	2 358.21° 12:50:53	15.36° 281.41°	11:11	
	Fri 23-Dec-2005 20:27:1	1 102.99° 20:36:54	8.92° 43.36°	9:43	
	Fri 23-Dec-2005 22:00:4	9 158.26° 22:14:05	69.10° 74.28°	13:16	
	Fri 23-Dec-2005 23:38:3	6 214.21° 23:49:42	13.71° 271.13°	11:06	
	Sat 24-Dec-2005 09:46:4	7 35.43° 09:56:49	9.49° 99.22°	10:02	
	Sat 24-Dec-2005 11:22:0	7 12.44° 11:35:11	46.76* 198.18*	13:04	
	Sat 24-Dec-2005 12:59:0	0 114 004 20.E6.22	12 00* 42 16*	10:07	
	Sat 24-Dec-2005 20:45:2	6 114.00° 20156122	77 20* 264 22*	12:54	
	Sat 24-Dec-2005 22:15:5	5 227 94° 00-08-22	8 35° 274 86°	9.37	
	Sun 25-Dec-2005 10:05:3	2 29.46* 10:16:49	14.77* 107.71*	11:17	
	Sun 25-Dec-2005 11:41:1	9 8.92° 11:54:12	40.16* 235.33*	12:53	
	Sun 25-Dec-2005 13:18:4	1 349.29° 13:27:25	6.83° 296.67°	8:44	
	Sun 25-Dec-2005 19:34:2	1 51.15° 19:36:11	0.23* 42.72*	1:50	
	Sun 25-Dec-2005 21:03:5	6 126.15° 21:15:45	5 18.41° 41.61°	11:49	
	Sun 25-Dec-2005 22:39:1	1 179.32° 22:52:21	49.00° 260.30°	13:10	
	Mon 26-Dec-2005 00:19:2	0 244.27° 00:26:42	4.09° 278.52°	7:22	
	Mon 26-Dec-2005 10:24:2	5 24.45° 10:36:33	21.70° 117.85°	12:08	
	Mon 26-Dec-2005 12:00:3	3 5.46* 12:13:05	29.82* 257.27*	12:32	
	Mon 26-Dec-2005 13:38:2	3 343.29 13:45:17	3.76° 303.79°	6:54	
	Mon 26-Dec-2005 19:51:0	4 127 009 21.25.05	2./1 4/.29	5:55	
	Mon 26-Dec-2005 21:22:3	4 137.00' 21:35:05 7 100 22° 23.11.23	23.4/ 66.91	12:31	
		·	. 31.70 204.23	12.40	

This window shows up to 1,000 passes for a selected satellite. Note: do not select more than 100 passes unless you have a very powerful computer, minimum CPU frequency of 2 GHz is recommended.

Press Alarm to add an audio alarm when a satellite is about to pass overhead.

Press Plot to plot a selected pass in the Single Pass window.

Press *Viewer* to display the data with the default text file viewer, usually Notepad.



## **Single Pass**

This window plots a single pass for the satellite selected in the Next Passes window. The elevation is plotted on the left y-axis; time is on the x-axis. Select Azimuth, Altitude or Range to be plotted on the right y-axis.

If Popup info is checked a vertical dashed marker line is displayed which either tracks the current time or is positioned by clicking on the chart with the left mouse button.

As the marker position changes, the azimuth, elevation, altitude and range are displayed in the marker fields.

# Plot





# DDE



This window controls the DDE server. If you want to use HRD's data with another program you must start HRD's DDE Server. Select the DDE format: currently only Nova is supported. Press *Start* to start the DDE server.

# Synchroniser

## Introduction

The synchronizer is used to control two or more radios where a common frequency is shared by using the Dynamic Data Exchange (DDE) mechanism.

For each radio you are using you start an instance of HRD, one instance is the *Master*, the rest are the *Slaves*, the slaves receive frequency and mode information from the master.

# Starting

Start the Synchroniser from the Tools> Programs menu, then press Scan to find the active HRD instances.

🖲 HRD Synchr	roniser	
_Active HRD Ins	stances	
0 1 2		3c <u>a</u> n
HRD Master		
Master:	0: TS-480: Demo	<u>S</u> tart
Frequency:	Radio	
Mode:	Radio	
HRD Slaves-	Г 2 Г 3 Г 4 Г 5 Г 6 Г 7 Г resh <u>Clear H</u> elp	8 🗖 9 Close
Slave Co Ra Fi Mo	req: 145.798.879 ode: USB onnected to instance 1 adio: K2: Demo req: 145.798.879 ode: USB onnected to instance 2	
Ra Fi Master - Di	adio: TS-2000: Demo req: 145.798.879 ode: USB isconnected from instance O	

Select the master instance (supplied the frequency and mode), and then press *Start*.

HRD Synchr	oniser						
- Active HRD Ins	stances						
0 1 2		Sc <u>a</u> n					
HRD Master: T	'S-480: Demo						
Master:	0: TS-480: Demo 🔽 🛛 🖉	<u>S</u> top					
Frequency:	Radio 💌	145.798.695					
Mode:	Radio	USB					
<u>–––––––––––––––––––––––––––––––––––––</u>							
Ra Fi Slave Co Ra Fi Slave Co Ra Fi Mo	adio: TS-480: Demo req: 145.798.879 ode: USB onnected to instance 1 adio: K2: Demo req: 145.798.879 ode: USB onnected to instance 2 adio: TS-2000: Demo req: 145.798.879 ode: USB						



- Radio as seen on the main HRD display,
- Transverter frequency is taken from the Transverter window (selected from the Tools menu).
- Satellite uplink the uplink frequency and mode (see Ground Control on page 71).
- Satellite downlink the downlink frequency and mode (see Ground Control on page 71).

In the HRD Slaves group box check the instances to be controlled by the Synchroniser.

As soon as you check a slave the slave's frequency and mode are updated with the current values from the master; every time the master frequency and / or mode change they are sent to the slave for so long as the slave option remains checked.

## **Dual Radio Satellite Tracking**

For more information about satellite see Satellite Tracking on page 15, specifically Ground Control on page 71.

If you are using two radios for satellite tracking (for example two FT-817 or IC-7000):

- 1. Start an instance of HRD for each radio; connect to the radios.
- 2. Select an instance to use as the master, in this example the radio used for receive.
- 3. In the master (receive) instance:

- Start the display.
- Enter transmit *and* receive frequency information for the satellite you are tracking.
- Check the RX VFO, do not check a TX VFO as this instance will not be used for transmit.
- 4. Start the Synchroniser:
  - Master is the receive instance,
  - Slave is the transmit instance,
  - Select the *Satellite uplink* option for Frequency and Mode so that the slave receives the frequency and mode used for transmit as computer by the Master instance.

The slave will now be updated with the transmit frequency and mode for transmit every time it changes in the master instance.

# **K1EL WinKey**

## Introduction

"WinKey brings high functionality, fully featured Morse keying to logging applications. Although designed for Windows-based software implementation, WinKey can add value to all logging programs regardless of operating system or platform. Can also be used as a stand-alone keyer."

Source: http://www.k1el.com/



(Photos from http://www.k1el.com/)

K1EL's WinKey is an excellent computer controllable keyer solution. It supports everything a CW enthusiast could want. Many computer programs support WinKey; here is a description of the HRD support.

You will need a standard 9-pin serial cable (not NULL-modem).

## **Main Window**

Select K1EL WinKey from the Tools menu, the WinKey window is displayed.

WinKey					C 🔀
-û Repeat:	12 wpm 5 s 😂	# 1 2	# Macro (Ctrl+#) CQ Weather	HI BARRY THANKS FOR COMING BACK TO MY UR RST 599 599 IN SUNNY LAAX	CALL
10 F1	► F2				

Here the user is sending text at 12 wpm – the speed is adjusted with the slider in the top-left.

Text is entered using the keyboard; only the allowable CW characters can be entered.

Macros are selected by double-clicking on an entry in the macros list or by using an accelerator key combination such as Ctrl+1.

Press F2 to start sending, F1 to mark sent text as unsent.

## **Options**

Press the *Options* button (F8) to display the *Options* window. As an intelligent owner of the WinKey you will have studied the available literature, so some of the information here should be obvious. But in case you have forgotten something...

#### Keyer

WinKey 🛛 🛛 🛛			
Keyer Speeds Options Pin Config Macros Logfile Help			
C Keyer Mode			
Iambic A	— Ultimatic —	Autospace	
O lambic B	💿 Normal	Contest spacing	
OUltimatic	🔵 Dah priority	Paddle echoback	
OBug	🔵 Dit priority	Paddle watchdog	
		Swap paddles	
Port: COM1 🔽	Connect	Serial echoback	
		`	

Select the type of keyer and the COM port to which the keyer is connected. When you press *Connect* the keyer is initialized and an echo-back test performed. The test must succeed for the connection to stay open. This ensures that you have not accidentally connected to another device such as a rotator, which may have a fit if driven by the WinKey protocol!

#### Speeds

X
Options Pin Config Macros Logfile Help
10 wpm
40 wpm
10 wpm
10 wpm

With Keyer min and Keyer max you set the range available in the WinKey main window.

Similarly with Speed pot min and Speed pot max you set the range available with the potentiometer mounted on the top of the WinKey enclosure.

Farnsworth speed is the speed at which characters are actually sent.

## Options

Keyer       Speeds       Options       Pin Config       Macros       Logfile       Help         1st extension:       0 ms
1st extension:       0 ms       Weighting:       50 %         Compensation:       0 ms       PTT Lead:       0 ms         Switchpoint:       50 %       PTT Tail:       0 ms         Dit : Dah ratio:       1 : 3.00       Sector       Hang Time
Compensation:       0 ms       PTT Lead:       0 ms         Switchpoint:       50 %       PTT Tail:       0 ms         Dit:       Dah ratio:       1:3.00       Hang Time
Switchpoint: 50 % 🗘 PTT Tail: Oms Dit : Dah ratio: 1 : 3.00 🗘
Dit : Dah ratio: 1 : 3.00
Thong time
Sidetone: 752 Hz
(Pin 5 must be set to sidetone) wordspace before ending paddle insertion

These options define the shape of the transmitted signal.

## **Pin Config**

WinKey 🛛
Keyer       Speeds       Options       Pin Config       Macros       Logfile       Help         Output Pin       •

Determines how the output pins are mapped.

## Macros



Define an unlimited number of macros that can be selected in the WinKey main window.

## Logfile

W	WinKey 🛛 🛛 🔀		
ſ	Keyer Speeds Options Pin Config Macros Logfile Help		
	Time Text		
	✓ 21:17:10 Connecting to COM1		
	✓ 21:17:10 Setting buffer sizes to 2048, 2048		
	21:17:10 Setting speed to 1200,n,8,1		
	✓ 21:17:10 Setting timeouts		
	🗸 21:17:10 Setting DTR, clearing RTS 🧮		
	🗶 21:17:13 Echoback test, sent HRD BY HB9DRV, receive		
	Erase Viewer Irace		

To help diagnose problems use the Logfile window. The Viewer option displays the contents of the window in your default text file (.txt) editor. If you check Trace then all traffic over the COM port is logged.

### Help



Some basic help text; specifically the Prosign key assignments.

#### **Prosign Assignments**

"	RR	/	DN
\$	SX	:	KN
'	WG	;	AA
(	KN	<	AR
)	KK	=	ΒT
+	AR	>	SK
_	DU	Q	AC

# **Annex: Command Tester**

## Introduction

## **Too Many Radios**

In a project like Ham Radio Deluxe it is not always possible for the developers to have every radio available for their own use: it's very expensive and takes up too much room.

This is where the user community helps - by using the Command Tester individual commands are tested by the users of Ham Radio Deluxe and the results sent to the developers as a text file in a standard format.

Very often the problem is either determining the data returned for the various mode / filter / frequency combinations supported by a rig or working out how to set a rig option.

The handbooks supplied by manufacturers can be wrong or just not contain enough information to successfully implement a command.

## **Data Formats**

There are major differences in the formats selected by the manufacturers whose radios are supported by Ham Radio Deluxe.

The Command Tester supports all necessary formats for the radio manufacturers supported by Ham Radio Deluxe.

## **Command Types**

There are two types of command - Get and Set.

A *Get* command returns an item of information, for example the VFO frequency or mode. A *Set* command changes a rig setting, typically the frequency or mode.

Command Tester supports both Get and Set commands.

## Starting

To start the Command Tester:

• Make sure you have not connected to a radio with Ham Radio Deluxe if you will be using the same COM port for the Command Tester. If you have a radio connection then you must disconnect using the Disconnect option in the File menu.

• Select *Command Tester* from the *Tools* menu.



### Connect

To connect to your radio you must select:

- COM port where you have connected the interface cable to the radio,
- The baud rate (COM port speed). If you are not sure of the correct speed consult your radio manual.
- CTS used for flow control, specifies whether the CTS (clear-tosend) signal is monitored for output flow control. Used by Kenwood.
- DTR used either for flow control or to provide power for the CAT interface. This depends on the manufacturer's protocol and your CAT interface.
- RTS used either for flow control or to provide power for the CAT interface. This depends on the manufacturer's protocol and your CAT interface.

Then press Connect.

When you press Connect a warning message is displayed. Using incorrect commands can confuse some radios, so if you are not sure what you are doing now is the time to leave Command Tester.

<u>^</u>	Sending invalid commands can result in loss of stored data and / or require you to reset your radio. Use this display at your own risk, Simon Brown is not liable for any damage caused.
	Continue ?
	Yes

Press Yes to continue.

## **General Options**

These options are common to all formats.

- Send sends a command to the radio.
- Erase clears the contents of the results window.
- Save saves the contents of the results to a file in ASCII format. You can send the contents of this file by email to help the developers of ham Radio Deluxe.
- Help pressing help displays the contents of the small help window as a text file using Notepad.
- Close closes the Command Tester. If there are entries in the results window you are prompted to save them first.

## Results

The results are shown in the bottom half of the Command Tester window.

- Title as entered in the Title: field.
- Send the command sent to the rig, shown in ASCII and/or Hex as appropriate.
- Received the received data, shown in ASCII and/or Hex as appropriate.

## **Platforms**

Examples of HRD use with various platforms is shown here.

### Elecraft

The Elecraft protocol uses ASCII characters; it appears to be based more-or-less on the Kenwood protocol. Refer to the 'Elecraft KIO2 Programmer's Reference' for full information.

The data sent and received is always shown in ASCII (text) that makes debugging relatively easy.

If you select *Show hex output* the returned data is also shown in hexadecimal (see the *Change mode to RTTY* below).

When a Set command is sent – for example MD6; to set the mode to RTTY there is no response from the rig, so instead MD6;MD; is sent – set the mode to RTTY (MD6;) and then read the mode (MD;) – this way there is always returned data.

🖽 CAT Command Tester	
	nect USE THIS DISPLAY AT YOUR OWN
Company: Kenwood Title: Change mode to RTTY, read mode Cmd: MD6 ; MD ; + none Wait for rx terminator: ; Send Erase Save Help	This display is used to test CAT commands outside of the main Ham Radio Deluxe framework. The results can be saved to a text file for later analysis. Connection The logic and fields are the same as those in the main HRD Connect window.
Title	nt Received
Read VFO A [Of Read mode [Of Read S-matter [Of Change mode to RTTY, read mode [Of Change mode to RTTY, read mode (hex) [Of	<pre>(] FA; [OK] FA00007035000; () MD; [OK] MD1; () SM; [OK] SM0000; () MD6;MD; [OK] MD6; () MD6;MD; [OK] &lt;0x4D&gt;&lt;0x44&gt;&lt;0x36&gt;&lt;0x3B&gt;</pre>

In the *Change mode to RTTY* example above the returned string is shown in both ASCII and hexadecimal because the *Show hex output* option was selected for this command.

#### Fields

- Title a description of the command you are testing, for example 'Read Frequency' or 'read Mode'. Mandatory
- Cmd the ASCII string sent to the rig. Elecraft strings are terminated with a ;
- Wait for rx terminator when reading the response read characters from the rig until this character is returned or a timeout occurs.

Examples	
Test	Description
Read Frequency	Command is FA; returned data format is FA + 11 digits + ;.
	• FA00007035000;
	Frequency is 7.035.000 MHz.
Read Mode	Command is MD; returned data format is MD + 1 digit + ;.
	• MD1;
	(1=LSB, 2=USB, 3=CW, 6=RTTY, 7=CW-REV, 9=RTTY-REV)
Read S-Meter	Command is SM; returned data format is SM + 4 digits + ;.
	• SM0000;
	Returned value is in the range 0000 to 0015.

#### **ICOM CI-V**

The example below is uses an IC-7800 with:

- From: (controller address) E0 (personal computer, the default value),
- To: (CI-V address) 6A (the default for the IC-703). Refer to your ICOM radio manual for the correct CI-V address for your rig.

The data received from the radio is always shown in hexadecimal.

🖽 CAT Command Tester 🛛 🔀			
Connection	USE THIS DISPLAY AT YOUR OWN RISK This display is used to test CAT commands outside of the main Ham Radio Deluxe framework. The results can be saved to a text file for later analysis.		
From: E0 To: 6A Cmd: 15 Sub: 02 Data:	Connection Select the type of command to be sent, Elecraft, ICOM CI-V, Kenwood, Ten Tec or Yaesu.		
Title Sent Received			
Connected Read Frequency [OK] FE FE EO 6A 03 [OK] FE FE EO 6 Read Mode [OK] FE FE EO 6A 04 [OK] FE FE EO 6 Read S-Meter [OK] FE FE EO 6A 15 02 [OK] FE FE EO 6	A 03 90 66 01 14 00 FD A 04 03 01 FD A 15 02 00 02 FD		

#### Fields

- Title a description of the command you are testing, for example 'Read Frequency' or 'read Mode'. Mandatory
- From controller's default address. Enter E0 (Personal Computer). Mandatory

- To transceiver's default address, the IC-703 uses 68. The address used by your radio is found in the user manual. Mandatory
- Cmd command number (refer to the radio handbook). Mandatory
- Sub sub command number (refer to the radio handbook). If there is no sub command then this field must be left empty. Optional
- Data if the command supplies data (for example setting a new frequency or mode) then enter the values in these fields. If there is no data for the command then these fields must be left empty.

#### Examples

These examples show a CI-V address of 6A, the default for the IC-7800. Change this to the CI-V address assigned to your radio.

this to the CI-V	address assigned to your radio.	
Test	Description	
Read frequency	Command is 03, no sub command or data; these fields must be left empty.	
	The returned data is:	
	• FE FE (preamble)	
	• E0 (Controller address)	
	• 6A (IC-7800 CI-V address)	
	• 03 (Command number)	
	• 89 38 06 07 00 (frequency in BCD format)	
Read Mode	• FD (end of message) Command is 04, no sub command or data; these fields must be left empty.	
	The returned data is:	
	• FE FE (preamble)	
	• E0 (Controller address)	
	• 6A (IC-7800 CI-V address)	
	• 04 (Command number)	
	• 00 01 (mode)	
Read S-Meter	• FD (end of message) Command is 15, sub command is 02. There is no data; these fields must be left empty. The returned data is:	
	• FE FE (preamble)	
	• F0 (Controller address)	
	<ul> <li>6A (IC-7800 CL-V address)</li> </ul>	
	• 15 (Command number)	
	• 02 (Sub command number)	
	of (our commune number)	

- 01 09 (s-meter value)
- FD (end of message)

#### Mode / Filter

A common problem is determining the data returned for the possible mode and filter combinations.

To list all combinations follow the following steps for each mode and filter combination:

- Select the Mode and Filter on your rig using the rig buttons and controls.
- Enter a value in the Command Tester Title field which corresponds to the mode and filter selected in 1 above, for example Mode = USB, Filter = Wide.
- Enter a command of 04; clear the sub command and data fields.
- Press Send .

When you have finished press *Save* to save the contents of the Results window to a file which you can forward to the Ham Radio Deluxe development team.

#### Other

Follow the logic in Mode / Filter above for other commands which you want to investigate:

- Select the option on your rig using the rig buttons and controls.
- Enter a value in the Command Tester Title field that corresponds to the option you are investigating.
- Referring to your rig's handbook enter the command, sub command and data value as appropriate to read the rig's current value or set a new value. If there is no sub command or data then these fields must be left empty.
- Press Send.

#### Yaesu

The example below uses the FT-817. The data received from the radio is always shown in hexadecimal. The overall format of Yaesu commands is always P1 - P4 + OpCode, the actual commands and the data returned from the rig depends on the model and also on the EPROM revision level.

Some commands do not require specific values for P1 - P4, it is recommended that is a value is not specified in the radio handbook then you enter 00, this is the approach taken in Ham Radio Deluxe.

Be aware that there are many errors in the Yaesu documentation, so the data returned may not agree with the handbook and the radio's current settings.

📅 CAT Command Tester	×		
Connection	USE THIS DISPLAY AT AUXIN OWN RISK		
Company: Yaesu Y Title: Read TX Status			
P1: 00 P2: 00 P3: 00 P4: 00 Opcode: F7 framework. The results can be saved to a text file for later analysis.			
Send     Erase     Save     Help     Connection			
Title Sent Received			
Connected Read Frequency & Mode [OK] 00 00 00 00 03 0K] 00 35 7 Read RX Status [OK] 00 00 00 00 E7 [OK] 00 Read TX Status [OK] 00 00 00 00 F7 [OK] FF	78 15 00		

- Title a description of the command you are testing, for example 'Read Frequency' or 'read Mode'. Mandatory
- P1 P4 the command parameters. Not all commands require parameters; it is recommended that parameters that can be set to any value be set to 00. Fields left empty are set to 00.
- OpCode the instruction OpCode. Mandatory.

#### Examples

Test	Description
Read frequency and mode	The OpCode is 03, P1-P4 can have any value, in this example they are set to 00.
	• P1: 00 P2: 00 P3: 00 P4: 00 OpCode: 03
	The format of the returned data is 5 bytes, the first four containing the frequency in binary coded decimal followed by the mode.
	The returned value is 00 35 78 15 00 which corresponds to a frequency (00 35 78 15) of 51.875.300 and a mode (00) of LSB.
Read RX status	The opcode is E7, P1-P4 can have any value, in this example they are set to 00.
	• P1: 00 P2: 00 P3: 00 P4: 00 OpCode: E7
	The format of the returned data is 1 byte.
	The returned value is 00.
Read TX status	The OpCode is F7, P1-P4 can have any value, in this example they are set to 00.
	• P1: 00 P2: 00 P3: 00 P4: 00 OpCode: F7
	The format of the returned data is 1 byte.
	The returned value is FF (not in TX mode).

#### **Other Commands**

For the commands you want to investigate:

- Select the option on your rig using the rig buttons and controls.
- Enter a value in the Command Tester Title field that corresponds to the option you are investigating.
- Referring to your rig's handbook enter the P1 P4 parameters and OpCode as appropriate to read the rig's current value or set a new value. If there are no values specified for P1 – P4 then enter 00 in these fields.
- Press Send.

# **Annex: Portmon**

## Introduction

This excellent utility for monitoring COM port activity can be downloaded from <a href="http://www.sysinternals.com/">http://www.sysinternals.com/</a>.

Quoting the *Sysinternals* website: "Portmon is a utility that monitors and displays all serial and parallel port activity on a system. It has advanced filtering and search capabilities that make it a powerful tool for exploring the way Windows works, seeing how applications use ports, or tracking down problems in system or application configurations.

Portmon works on NT 4.0, Win2K, XP and Server 2003, Windows 95 and Windows 98."

It is often useful to run Portmon when unexpected results are returned from a radio (or other device such as a rotator or keyer).

The Steps:

- Close any programs connected to your radio or device being interrogated.
- Start Portmon.exe
- Make sure these options are set:

Menu	Option	State / Comment
Options	Show Time	ON
Options	Show HEX	ON if ICOM, Yaesu or TenTec OFF if Elecraft, Kenwood ON if you are not sure (I read hex)
Options	Clock Time	OFF
Computer	Select your local computer	
Capture	Ports	The COM port where you have connected the interface to your radio, select only one COM port to avoid confusion.
Capture	Capture Events	ON

- Start HRD then connect to your radio.
- Let HRD run for about 60 seconds while you perform your tests.
- Stop HRD (File menu: Disconnect).

- In Portmon set the Capture: Capture Events option to OFF.
- Save the logfile to disk, put into a zip file if possible and send to <u>mailto:simon@hb9drv.ch</u>.

# Sample Log

For this example the *Process* and *Port* columns are not shown to save space. The log shows the startup for an IC-78000, results are in Hex. The *Time* for each command is shown which helps detect timeouts.

#	Time	Request	Result	Other
0	0.00005929	IRP_MJ_CREATE	SUCCESS	Options: Open
1	0.00000167	IOCTL_SERIAL_SET_QUEUE_SIZE	SUCCESS	InSize: 1024 OutSize: 1024
2	0.00000341	IOCTL_SERIAL_PURGE	SUCCESS	Purge: TXABORT RXABORT TXCLEAR RXCLEAR
3	0.00000261	IOCTL_SERIAL_GET_BAUD_RATE	SUCCESS	•
4	0.00000123	IOCTL_SERIAL_GET_LINE_CONTROL	SUCCESS	
5	0.00000092	IOCTL_SERIAL_GET_CHARS	SUCCESS	
6	0.00000088	IOCTL_SERIAL_GET_HANDFLOW	SUCCESS	
7	0.00000903	IOCTL_SERIAL_SET_BAUD_RATE	SUCCESS	Rate: 19200
8	0.00000479	IOCTL_SERIAL_SET_RTS	SUCCESS	
9	0.00000371	IOCTL_SERIAL_SET_DTR	SUCCESS	
10	0.00000278	IOCTL_SERIAL_SET_LINE_CONTROL	SUCCESS	StopBits: 1 Parity: NONE WordLength: 8
11	0.00000118	IOCTL SERIAL SET CHAR	SUCCESS	EOF:0 ERR:3f BRK:3f EVT:0 XON:11 XOFF:13
12	0.00000257	IOCTL_SERIAL_SET_HANDFLOW	SUCCESS	Shake:1 Replace:40 XonLimit:341 XoffLimit:341
13	0.00000085	IOCTL_SERIAL_SET_TIMEOUTS	SUCCESS	RI:500 RM:250 RC:250 WM:250 WC:250
14	0.00000421	IOCTL_SERIAL_SET_DTR	SUCCESS	
15	0.00000396	IOCTL_SERIAL_SET_RTS	SUCCESS	
16	0.00000200	IOCTL_SERIAL_SET_WAIT_MASK	SUCCESS	Mask: RXCHAR TXEMPTY CTS DSR RLSD BRK RING
17	0.00000270	IOCTL_SERIAL_PURGE	SUCCESS	Purge: TXABORT RXABORT TXCLEAR RXCLEAR
18	0.00002902	IRP_MJ_WRITE	SUCCESS	Length 7: FE FE 6A EO 19 00 FD
19	0.00576019	IRP_MJ_READ	SUCCESS	Length 1: FE
20	0.00000294	IRP_MJ_READ	SUCCESS	Length 1: FE
21	0.00000237	IRP_MJ_READ	SUCCESS	Length 1: 6A
22	0.00000230	IRP_MJ_READ	SUCCESS	Length 1: EO
23	0.00000228	IRP_MJ_READ	SUCCESS	Length 1: 19
24	0.00000231	IRP_MJ_READ	SUCCESS	Length 1: 00
25	0.00000229	IRP_MJ_READ	SUCCESS	Length 1: FD
26	0.01237115	IRP_MJ_READ	SUCCESS	Length 1: FE
27	0.00000319	IRP_MJ_READ	SUCCESS	Length 1: FE
28	0.00000233	IRP_MJ_READ	SUCCESS	Length 1: EO
29	0.00000226	IRP_MJ_READ	SUCCESS	Length 1: 6A
30	0.00000232	IRP_MJ_READ	SUCCESS	Length 1: 19
31	0.00000229	IRP_MJ_READ	SUCCESS	Length 1: 00
32	0.00000229	IRP_MJ_READ	SUCCESS	Length 1: 6A
33	0.00000231	IRP_MJ_READ	SUCCESS	Length 1: FD
34	0.00002705	IRP_MJ_WRITE	SUCCESS	Length 6: FE FE 6A EO 03 FD
35	0.00524006	IRP_MJ_READ	SUCCESS	Length 1: FE
36	0.00000282	IRP_MJ_READ	SUCCESS	Length 1: FE
37	0.00000228	IRP_MJ_READ	SUCCESS	Length 1: 6A
38	0.00000234	IRP_MJ_READ	SUCCESS	Length 1: EO
39	0.00000228	IRP_MJ_READ	SUCCESS	Length 1: 03
40	0.00000237	IRP_MJ_READ	SUCCESS	Length 1: FD
41	0.01239791	IRP_MJ_READ	SUCCESS	Length 1: FE
42	0.00000308	IRP_MJ_READ	SUCCESS	Length 1: FE
43	0.00000231	IRP_MJ_READ	SUCCESS	Length 1: EO
44	0.00000231	IRP_MJ_READ	SUCCESS	Length 1: 6A
45	0.00000229	IRP_MJ_READ	SUCCESS	Length 1: 03
46	0.00000230	IRP_MJ_READ	SUCCESS	Length 1: 00
147	0.00000237	IRP M.I READ	SUCCESS	Length 1: 00

# **Annex: Remote Server**

# **Technical Information**

Remember that the software is designed for Windows NT but it should be possible to map all these commands to Linux and other UNIX derivatives.

The source code for the main processing thread is available; the rest is highly-Windows oriented and is of no use for other platforms.

#### Commands

The supported commands are:

Command	Description
MSG_CMD_AUTHENTICATE	Authenticate username/password
MSG_CMD_CLOSE_HANDLE	Close COM port.
MSG_CMD_CREATE_FILE	Open a COM port
MSG_CMD_DEVICE_IO_CONTROL	Send control code to COM port driver
MSG_CMD_GET_COM_PORTS	Return a list of COM ports
MSG_CMD_PURGE_COMM	Discards all characters from the input buffer of the COM port. Terminates pending read or write operations on the resource
MSG_CMD_READ_FILE	Read the COM port
MSG_CMD_READ_FILE_EX	Read the COM port (extended read)
MSG_CMD_SET_COMM_MASK	Specify events to be monitored.
MSG_CMD_SET_COMM_STATE	Configure COM port.
$MSG\_CMD\_SET\_COMM\_TIMEOUTS$	SET timeouts.
MSG_CMD_WRITE_FILE_ASYNC	Asynchronous write, no reply expected
MSG_CMD_WRITE_FILE_SYNC	Synchronous write (reply expected)

All commands expect a reply except for MSG\_CMD\_WRITE\_FILE\_ASYNC.

The command values are:

```
enum RemoteSvrMessages
{
    MSG_CMD_AUTHENTICATE = 0,
    MSG_CMD_GET_COM_PORTS = 1,
    MSG_CMD_CREATE_FILE = 2,
    MSG_CMD_DEVICE_IO_CONTROL = 3,
    MSG_CMD_SET_COMM_MASK = 4,
```

```
MSG_CMD_PURGE_COMM = 5,
MSG_CMD_SET_COMM_STATE = 6,
MSG_CMD_SET_COMM_TIMEOUTS = 7,
MSG_CMD_READ_FILE = 8,
MSG_CMD_READ_FILE_EX = 9,
MSG_CMD_WRITE_FILE_SYNC = 10,
MSG_CMD_CLOSE_HANDLE = 11,
MSG_CMD_WRITE_FILE_ASYNC = 12,
};
```

#### Structures

The structures used are shown below. All members are byte-aligned. All commands start with the structure

```
typedef struct {
    UINT nSize; // Total command size
    UINT nHead; // 4 bytes, 'HRD*'
    UINT nCmd; // Command index
} MSG_HEADER;
```

- nSize the total size in bytes of the message being sent.
- nHead 4 bytes of sanity– 'HRD\*'.
- nCmd a command from the table below.

Command	Structure
MSG_CMD_AUTHENTICATE	MSG_AUTHENTICATE
MSG_CMD_CLOSE_HANDLE	MSG_COM_PORT
MSG_CMD_CREATE_FILE	MSG_COM_PORT
MSG_CMD_DEVICE_IO_CONTROL	MSG_COM_PORT
MSG_CMD_GET_COM_PORTS	MSG_GENERAL
MSG_CMD_PURGE_COMM	MSG_COM_PORT
MSG_CMD_READ_FILE	MSG_COM_READ
MSG_CMD_READ_FILE_EX	MSG_COM_READ
MSG_CMD_SET_COMM_MASK	MSG_COM_PORT
MSG_CMD_SET_COMM_STATE	MSG_COM_PORT
MSG_CMD_SET_COMM_TIMEOUTS	MSG_COM_PORT
MSG_CMD_WRITE_FILE_ASYNC	MSG_COM_WRITE
MSG_CMD_WRITE_FILE_SYNC	MSG_COM_WRITE

#### MSG\_AUTHENTICATE

typedef struct	{
MSG_HEADER	header;
BOOL	bAuthenticated;
char	<pre>szUsername[64];</pre>
char	<pre>szPassword[64];</pre>
char	<pre>szStatus[512];</pre>
} MSG_AUTHENTIC	CATE;

#### MSG\_COM\_PORT

typedef struct {

MSG_HEADER	header;
char	lpFileName[32];
DWORD	dwDesiredAccess;
DWORD	dwCreationDisposition;
DWORD	<pre>dwIoControlCode;</pre>
BYTE	byInBuffer[64];
DWORD	dwInBufferSize;
BYTE	byOutBuffer[64];
DWORD	dwOutBufferSize;
DWORD	dwBytesReturned;
DWORD	dwFlags;
DWORD	dwEvtMask;
DCB	dcb;
COMMTIMEOUTS	timeouts;
HANDLE BOOL char } MSG_COM_PORT;	hHandle; bStatus; szStatus[256];

#### MSG\_GENERAL

typedef struct	{
MSG_HEADER	header;
BOOL	bStatus;
BYTE	<pre>byData[4096];</pre>
<pre>} MSG_GENERAL;</pre>	

### MSG\_COM\_READ

typedef struct	{
MSG_HEADER	header;
HANDLE	hHandle;
DWORD	dwNumberOfBytesToRead;
BYTE	byTermChar;
DWORD	dwNumberOfBytesRead;
BOOL	bStatus;
OVERLAPPED	overlapped;
BYTE	byData[4096];
<pre>} MSG_COM_READ;</pre>	

### MSG\_COM\_WRITE

typedef struct {	
MSG_HEADER	header;
HANDLE	hHandle;
DWORD	dwNumberOfBytesToWrite;
DWORD	dwNumberOfBytesWritten;
OVERLAPPED	overlapped;
BOOL	bStatus;
BYTE	byData[4096];
<pre>} MSG_COM_WRITE;</pre>	