P-HAB (High-Altitude Balloon) 5V User Manual



DC input use DC $9V \sim 12V$

1. Enable serial Port

Raspberry Pi Serial Port Usage

The serial port on the Raspberry Pi is configured as default for console input/output. This allows you to login and interact with the Raspberry Pi via the serial port but you cannot use the serial port with your programs. To use the serial port with other programs and hardware such as modems, arduino boards etc you need to disable the console login.

To Disable Serial Port Login

You need to edit two files in order to use the serial port with your own programs.

When the Raspberry Pi boots, the bootup information is sent to the serial port. You can disable this by editing the/**boot/cmdline.txt** file The contents of the file look like this dwc_otg.lpm_enable=0 console=ttvAMA0.115200 kgdboc=ttyAMA0.115200 console=tty1 root=/dev/mmcblk0p2 rootfstype=ext4 elevator=deadline rootwait Remove all references to ttyAMA0 so the file looks like this: dwc otg.lpm enable=0 console=tty1 root=/dev/mmcblk0p2 rootfstype=ext4 elevator=deadline rootwait Save the file to save your changes. The second file to edit is /etc/inittab Edit using: sudo nano /etc/inittab The /etc/ inittab file has the command which enables the login prompt which needs to be disabled. Near the end of the file will be a line similar to this: respawn:/sbin/getty -L ttyAMA0 115200 vt100 Disable this line by adding a # character to the beginning. #respawn:/sbin/getty -L ttvAMA0 115200 vt100 Save the file. You should then reboot your raspberry pi with the following command

sudo shutdown -r now

Serial port setting detail in our web site

http://www.pridopia.co.uk/rs-pi-set-serial.html

1.Make sure your I2C driver are enable To enable it all you need to do is comment out a line by putting # in front

sudo nano /etc/modprobe.d/raspi-blacklist.conf



2. Add i2c-dev in /etc/modules by use

sudo nano /etc/modules



3. Next install the python-smbus python module: sudo apt-get install python-smbus sudo apt-get install i2c-tools

Now you are ready to use the i2c with python.

If you already install I2c driver,

i2cdetect -y 1 - for Raspberry Pi V2 Board



i2cdetect -y 0 - for Raspberry Pi V1 Board



Download HAB software

wget <u>http://pridopia.co.uk/pi-pgm/Installer-hab.tar</u> tar xf Installer-hab.tar python Install.py ---- install necessary software for HAB python Install-Edu.py -- install eduhab auto-login-autorun

The eduhab.py send GPS location, tmp102, DS18B20, BMP085, DHT22 information through FM UHF Transmitter, the eduhab.py have 3 commands

eduhap.py -s short data stream mode send GPS location and BMP085 Temp only ,

but all logs save to SD card

eduhab.py -p	send data also take photos every 30sec
eduhab.py -c prid	change the data stream "twick" to "prid"

- 18B20 1-wire Temp sensor have problem when working together with camera, if you don't use camera you can use 18b20 Temp sensor.
- DHT22 use GPIO 17, we change to i2c base HTU21D Digital Temp & Humidity Sensor

If you don't have "BMP085", & "HTU21D" sensors setting to False in eduhab.py



Test & Monitor program

Win xp sdr-inatll.zip dl-fldigi-dl3.1 VBCABLEDriver PAck42b



Install VBCable Audio Driver

Software will auto detect your OS -- WinXP Click "Install Driver"

Volume	Sounds Audio	Voice	Hardware
Sound	playback Default device: VB-Audio Point	۲	~
	Volume	Ad	vanced
Sound	Default device:		vanced
MIDI m	usic playback		vancea
1	Default device:		
<u>nin</u>	Microsoft GS Wavetable	SW Synth	*
	Volume		About
Use o	nly default devices		

In Setting-> control panel -> Sounds and Audio Devices Audio -> Sound playback -> VB-Audio Point Audio -> Sound recording -> VB-Audio Point

Zadig	
Device Options Help	- Edit
Driver WinUSB (v6.1.7600.16385) WinUSB (v6.1.7600.16385) Image: Control of the second sec	More Information WinUSB (libusb) libusb-win32 libusbK WinUSB (Microsoft)
No new version of Zadig was found	Zadig 2.1.0.658

In options choose List all Devices -> Choose Bulk-In, Interface (Interface0) (Interface0) Click "Install Driver"



Choose RTL-SDR /USB \rightarrow radio choose USB -> Click "Play"



Adjust the wide and Contrast

dl-f	ldigi - d	l-fldigi for High Al	titude Balloon T	racking			
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In configure -> Sound card → PortAudio Capture : choose VB-Audio Point Playback: choose VB-audio Point

📕 dl-fldigi - dl-fl	digi for High Altitude Balloon Tracking
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MT63 Olivia SSSS SSSS SSSS SSSS SSSS SSSS SSSS	 USB < \$\$TWICK,08:07:41,23,52.962035,-1.173038,07,1,57.2,0,0,25 39,20,52.962066,-1.173068,07,1,56.0,0,0,25.30,1009.7,29 00,21,52.96204,-1.173016,05,1,55.7,0,0,25.30,1009.7,29 20.22.52.962041,-1.173018,05,1,57.6,0,0,25.40,1009.6,29 RTTY-45 \$2035,-1.173038,07,1,57.2,0,0,25.40,1009.6,29
SSSS THOR Throb WEFAX	RTTY-50 RTTY-HAB-50 RTTY-75N 1000 1500 2000
Navtex/SitorB NBEMS modes NULL SSB WWV	RTTY-75W Custom
RTTY	50 / 462 s/n 24 dB WARNING! Can't upload! Either in offline m

Choose RTTY -> RTTY HAB-50-> & Custom

dl-f	ldigi - dl-fldigi for High Altitude Balloon 1	Tracking	
<u>E</u> ile C	Dp Mode ⊆onfigure ⊻iew Help DL Client		
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C TWICK	allsign Time Latitude	Longitude Alt	itude Checksum GOOD :-)
	0.000 USB 💌 \$\$TWICK,08:12:3	1,37,52.962086,-1.17296	3,06,1,76.0,0,0,26.10,1009.
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	Restore defaults Apply (dl)	Save	Close <-

Change shift to about $455 \sim 460$

📕 dl-fldigi - dl-fldigi for High Altitude Balloon Tra	icking
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Flight	Payload Multi mode
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Callsign Time Latitude	Longitude Altitude Checksum Bearing Distar
тилск	GOOD :-)
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\$\$\$\$\$\$\$TWICK_08:27:06.79.52.9622011.172935.	06.1.93.0.0.0.29.90.1009.4.31.7.0.0.0**078
\$\$\$\$\$\$TWICK,08:27:28,80,52.96213,-1.172953,0	6,1,76.2,0,0,30.00,1009.4,32.3,0,0,0*EED2
\$\$\$\$\$\$TWICK,08:27:48,81,52.962031,-1.172981,	05,1,80.7,0,0,29.70,1009.5,30.7,0,0,0*1150
\$\$\$\$\$TWICK,08:28:10,82,52.96207,-1.17307,06	,1,42.1,0,0,29.50,1009.5,31.0,0,0,0*1347
\$\$\$\$\$\$TWICK,08:28:30,83,52.962067 -1.173111,	06,1,50.6,0,0,29.50,1009.6,30.7,0,0,0*
500 1000	1500 2000 2500
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WF 4 -20 F 4 70 F x1 4	■ ► NORM ◀ ◀ 1244 ► ►
RTTY 50 / 460 s/n 23 dB	

Win7 Setting

Install Zadig



In options choose List all Devices -> Choose Bulk-In, Interface (Interface0) (Interface0) Click "Install Driver"

Install VBCable Audio Driver Software will auto detect your OS -- Win7 Click "Install Driver"



ayback Recording Sounds Communications	Playback Recording Sounds Communications Select a recording device below to modify its settings:
Speakers High Definition Audio Device Ready CABLE Input	Microphone High Definition Audio Device Ready Microphone
VB-Audio Virtuai cable Defauit Device	SDR VB-Audio Virtual Cable Default Device

Setting Cable Input as default & SDR as default in "Recording"





In Listen choose playback through this device as "CABLE Input (VB-Audio Vistual Cable)

Adjust Frequency correction(ppm) as the label in NTX2B-FA 434.xxx



🗉 log - WordPad	
File Edit View Insert Format Help	
EDUHAB1,00:31:33,247,52.472713,-1.909665,11,1,164.6,-24.3,57.8,-23.2,990.8,188.9,1.0	,22.8 🔷
EDUHAB1,00:31:51,248,52.472715,-1.909626,10,1,155.7,-24.3,57.6,-23.2,990.8,188.7,1.0	,22.7
EDUHAB1,00:32:11,249,52.472693,-1.90957,10,1,142.9,-24.3,57.6,-23.2,990.8,188.4,1.0,	22.7
EDUHAB1,00:32:31,250,52.472701,-1.909555,11,1,141.9,-24.3,57.6,-23.3,990.8,188.5,1.0	,22.7
EDUHAB1,00:32:51,251,52.472725,-1.909566,11,1,147.4,-24.3,57.6,-23.2,990.8,188.3,1.0	,22.8
EDUHAB1,00:33:09,252,52.472748,-1.909563,11,1,148.1,-24.3,57.8,-23.3,990.8,190.0,1.0	,22.7
EDUHAB1,00:33:27,253,52.472775,-1.90956,11,1,149.5,-24.3,57.6,-23.2,990.8,188.4,1.0,	22.8
EDUHAB1,00:33:47,254,52.472706,-1.909581,09,1,145.1,-24.3,57.7,-23.2,990.8,188.7,1.0	,22.7
	2

GPS antenna & FM antenna &

USB SDR Encoder (RTL2832U-based DVB-T devices (RTL-SDR)

the eduhab.py send GPS location, tmp102, DS18B20, BMP085, DHT22 information through FM UHF Transmitter, the eduhab.py have 3 commands

eduhap.py -s short data stream mode send GPS location and BMP085 Temp only , but all logs save to SD card

eduhab.py -p send data also take photos every 30sec

eduhab.py -c prid change the data stream "twick" to "prid"

🗬 192.168.0.28 - PuTTY

root@raspberrypi:~# cd .. root@raspberrypi:/# cd /home/pi root@raspberrypi:/home/pi# cd edu-hab root@raspberrypi:/home/pi# cd edu-hab root@raspberrypi:/home/pi# cd edu-hab # root@raspberrypi:/home/pi# cd edu-hab# sudo python eduhab.py Acquired this data string from serial: \$GPGGA,091711.00,5257.72105,N,00110.38025 , W,2,11,0.86,66.8,M,47.2,M,0000*7D 181 98 5 5 1 1 2 0 6 5 5 5 91 \$GPGGA,091711.00,5257.72105,N,00110.38025,W,2,11,0.86,66.8,M,47.2,M,0000*7D Thu Mar 27 09:17:00 GMT 2014 now sending the following: \$\$TWICK,09:17:11,0,52.962016,-1.173003,11,1,66.8,21.7 ,29.9,21.2,1008.0,44.1,24.0,21,9*D6F2 Acquired this data string from serial: \$GPGGA,091723.00,5257.72169,N,00110.38014 ,W,2,11,0.86,66.3,M,47.2,M,0000*7F

data format EDUHAB1,00:33:27,253,52.472775,-1.90956,11,1,149.5,-24.3,57.6,-23.2,990.8,188.4,1.0,22.8

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		00:33:27	TIME	
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5	2.472775,-1.9	0956 latitu	ide, longitude	GPS location
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	-	Гетр Extern	al GPIO17	
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990. 8	pressures	2 BMP085	- Pressure	i2c adress 77
188.4	alt2	BMP085	- altitude	i2c adress 77
1.0	temp3	TMP102 -	on board Ten	np i2c address 49
22.8	temp4	DS18B20	- Temp Extern	nal 1-Wire GPIO 4

Tracking using a SDR software-defined radio (SDR)

Run sdrsharp.exe and you will see the following window

SDR# v1.0.0.1179 - IQ Imbalance: Gain =	1.000 Phase = 0.000"	
Stop RTL-SDR / USB	Configure VF0 ○, 434, 322,973 Configure VF0 ○, 434, 322, 973 Configure VF0 ○, 434, 324, 324, 324 Configure VF0 ○, 434, 344, 344, 344 Configure VF0 ○, 434, 344, 344, 344, 344 Configure VF0 ○, 434, 344, 344, 344, 344, 344, 344, 3	
Radio		Zoo
⊙NFM ⊙AM ⊙LSB @USB		
🖯 WFM 🔘 DSB 🔘 CW 🔘 RAW	-10	
Shift 0		
Filter type Blackman-Harris 4 •		
Filter bandwidth Filter order		
4000 🚔 800 🜩		.
Squeich CW Shift		-
Step size	-110	Con
Snap to grid 📃 10 Hz 🔹	-120	1
Correct IQ Swap I & Q	434.3212/MHz 434.3221/MHz 434.328MHz 434.3239MHz 434.3248MHz 434.3267MHz 434.3268MHz 434.3276MHz 434.3276MHz 434.3276MHz	
FM Stereo 🗌 Mark Peaks 🕅		
Audio		- C
AF Gain		
		1.1
Samplerate 48000 sample/sec 👻		
nput [MME] Microsoft Sound *		
Output [MME] Microsoft Sound ~		
atency (ms) 100		
Unity Gain Filter Audio		
AGC		1.1
FFT Display		
Frequency Manager (Plugin)		
Recording (Plugin)		
LIGHT POISE PRODUCTION (PLKIN)		

open DL-Fldigi, click Configure \rightarrow Sound Card Click Capture \rightarrow SDR(Virtual Audio Cable)

You should now be able to click on the payload as normal and decode :



received data with checksum error

🚺 dl-fldigi - dl-fldigi for Hig	gh Altitude Balloon Tr	acking									•
Ele Op Mode Configure	Yew Help DL Cli	ent							í Spot í	RxID	TUN
	Flight		Browse all	Payload	Multi mo	de \$	Auto-configure	Auto-mode-switch			
Callsign	Time	Latitude	Longitude	Altitude	Checksum BAD :-{	Bearing D	Distance Elevation	Time since Rx 3s			
0.0		* \$\$TWICK, 10: 14:08, 1-8	1,52.962046,-1.1731,12,1,6	1.5,22¶^₽,21.1,1000.	1,~*#\$5.^9,21.9*082>						
\$\$TWICK, 10:11:40, 172, \$\$WICK, 10:12:03, 173, 5 \$\$TWICK, 10:12:52, 175, \$\$TWICK, 10:12:52, 175, \$\$TWICK, 10:13:22, 176, \$\$TWICK, 10:14:31, 179, 5	52.962023,-1.173 2.962013,-1.1730 52.96203,-1.1730 52.962023,-1.1730 52.962023,-1.1730 2.962033,-1.1730	1,10,1,73.5,22.1,30 63,11,1,71.5,2.1,30 55,12,1,63.9,22.2,3 065,09,1,60.6,22.2, 65,[.6,21.1,1000.1,109.1 .6,21.1,1000.1,110. 0.6,21.1,1000.1,110 302-2V4+*4966TWICK,	8,25.0,21.8*1E0D #46p\$\$TWICK,10:1: 1,25.0,21.9*222 10:13:45,`*3#f#6	2:26,174,52.9620; 4 t-v663Y 1.1,	21,-1.173046,11 109.6,26-üpssT	,1,68.4,22.r≢⊄€1 WICK,10:14:08,18,	,109.6,25.0,21.9*621 52.962046,-1.1731,1	05 2,1,61.5,22,21.1	,1000.1,5.,	21.9*0
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0.00	0 US8 -	\$\$PRID, 10:20:04,80,5	52.96209,-1.172991,08,1,20	5.7*AACF	~			A		/ 		
SENGEFEID, 10:19:20, 77, 53 SENGEFEID, 10:19:33, 79, 53 SENGEFEID, 10:19:33, 79, 53 SENGEFEID, 10:19:48, 79, 53 SENGEFEID, 10:20:40, 60, 52; 53 SENGEFEID, 10:20:48, 54 SENGEFEID, 10:20, 54	2.961996,-1.173 2.962018,-1.173 2.96203,-1.1730 96209,-1.172991 2.962098,-1.1739 1.0 1.0	011,08,1,26.7*86 016,08,1,26.7*05 5,07,1,26.7*05 ,08,1,26.7*AACF 003,06,1,26.6*EA			5 	3.0 2154	<u>3.5</u>	Y 50	<mark>4.0</mark> xe [Fik	4.5	с., ⁵	.0, ,
RTTY 50 / 425	s/n 27 dB		_		_						•	AFC
SDR# v1.0.0.1179 - IQ Imbal	lance: Gain = 1.000	Phase = 0.000*	1000								(
Stop RTL-SDR / USB	•	Configure VFO	.434.322	2.805								
Radio NFM AM LSB WFM DSB CW Shift Shift	● USB ○ RAW O ☆ E											2
Filter bandwidth Filter ord 4000 (*) Squelch CW Shift Step size	5er 800 -	434-296/10-12 43	4.307444142 434.3082444	2 434.3139MHz	434,3196/042	434.3253MH2	434331MH2		434.3425MHz	434,3482MHz	434.3539M	

full data stream mode										
dl-fldigi - dl-fldigi for l	High Altitude Balloon Tracl	ing								- 0 -X
Ele Op Mode Configur	e View Help DL Client								⊂ Spot	FRXID FTXID FTUNE
	Flight			Payload	Multimo	ide				
		•	Browse all		÷	÷	Auto-configure	Auto-mode-swite	:h	
Callsign	Time	Latitude	Longitude	Altitude	Checksum	Bearing	Distance Elev	vation Time since Rx		
1.0			25 1 17205 07 1 74 9 26	6 20 7 26 2 101	40.6040.042.02000			Jewennen J		
		550 10, 14, 11, 35, 16, 32, 5015		510,2017,2012,101	10,10,2,12,0,10,2,2230					
SEND##prid, 14:10:13, SEND##prid, 14:10:36, SEND##prid, 14:11:04, SEND##prid, 14:11:27, SEND##prid, 14:11:53,	,14,52.961963,-1.1730 ,15,52.961973,-1.1720 ,16,52.961963,-1.1720 ,17,52.961841,-1.1720 ,18,52.961935,-1.1720	118,06,1,61.7,26.6,26 175,07,1,61.8,26.6,28 15,06,1,59.4,26.6,28 131,07,1,82.2,26.6,28 16,07,1,74.8,26.6,28	2.6,26.2,1014.0,-6. 2.6,26.2,1014.0,-6. 7,26.2,1014.1,-6.8 2.7,26.2,1014.0,-5. 7,26.2,1014.0,-6.2	0,42.0,43.5* 3,42.0,43.3* 9,42.0,43.2*0 9,42.0,43.5* 2,42.0,43.2*2	1E5D 6788 88E 6F45 29D					L. C
500	0 1000	1500	2000	250	30 30	00	3500	4000	4500	5000
WF 4 -2	10 🕨 🖣 70	▶ x1 ◀		NORM	4 2 37	6 [🕨]	QSY QSY	Store Ck	Rv	[T/R
RTTY 50 /-	440 s/n 30 dB	ļ			_	_				∳ FAFC FSQL
SDR# v1.0.0.1179 - IQ1	Imbalance: Gain = 1.000 Pr	ase = 0.000*	_		-					
Stop RTL-SDR / US	SB 🔹 Co	ifigure VFO () . 4 3	34.322.3	339						
Radio NFM O AM O L WFM O DS8 O C	SB USB USB W RAW E				Δ					Zoom
Filter type Blackman-H Filter bandwidth Filt 5010 -	larris 4 • ter order 200 ÷	414 28538++	434.2085344+ 434.32	084541+ 454.5	1184MH+ 434 3283M	H+ 4% 335	NH+ 434 348204	- 434 3581381+ 434 35	MMH+ 434 3786	
Snap to grid 10	V Shift 600 - Posize Hz Swap I & Q									Contrast

Track balloon online

