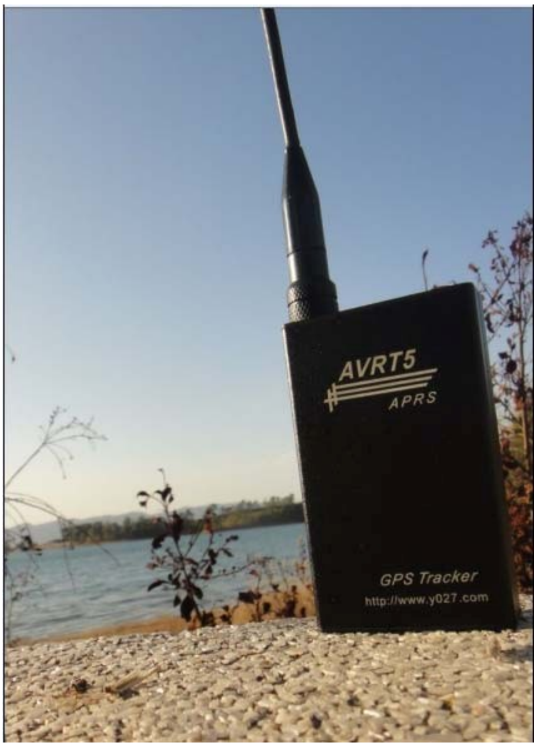
AVRT5
APRS
GPS Tracker
http://www.y027.com

AVRT5 1W VHF user manual
V1.1 (for reference)

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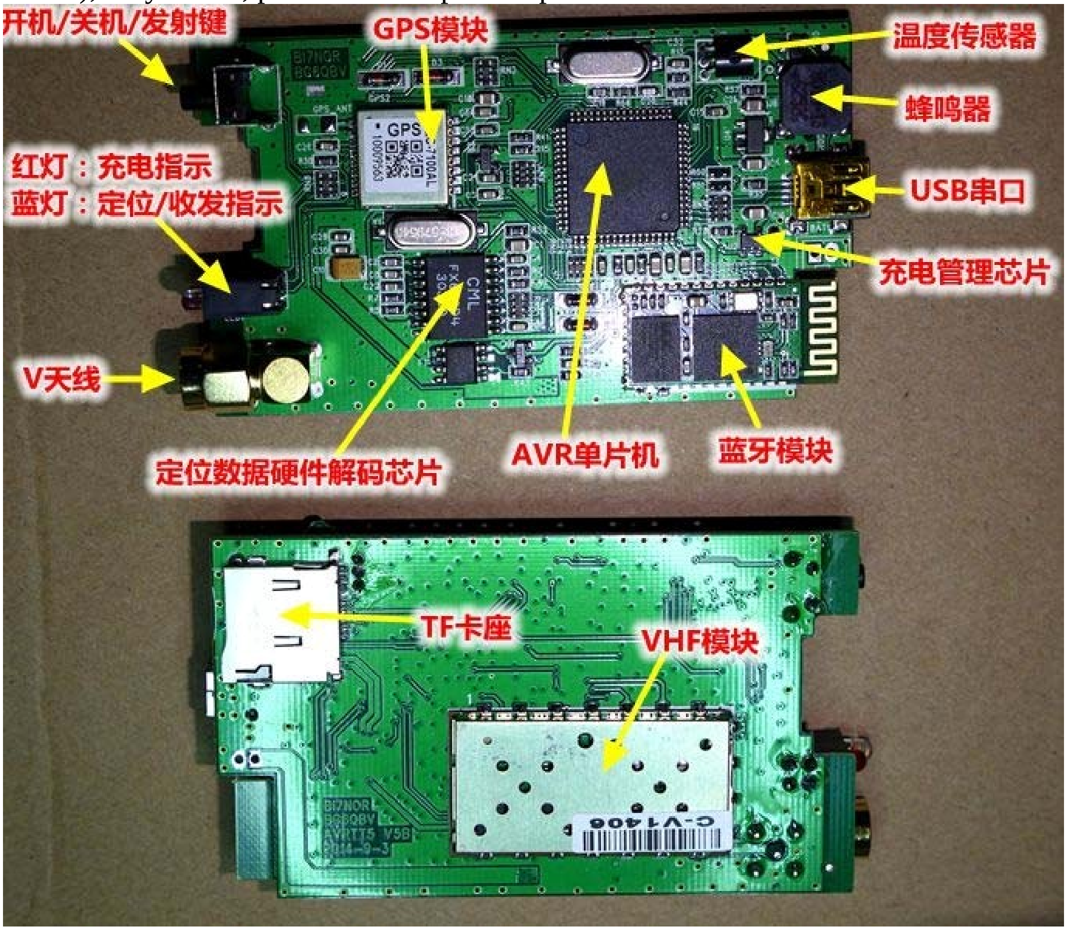
I. Overview

AVRT5 launch is developed on the basis of the above aprs AVRTT-AVRT4 set
Preparation of main function is to transmit aprs data integration. Built-in GPS antenna and module
+ VHF radio transceiver module to complete solutions TNC codec. Simply turn it on decoding,
Location can be issued after standard with parity aprs packets compatible common business aprs
Equipment and various aprsDIGI relay and IGATE, is a true aprs received at home and abroad
And launch the product.
Features: a key switch, for easy use. (Typically located 1-20 minutes when needed
Room), easy to use, pocket or backpack to put the boot.

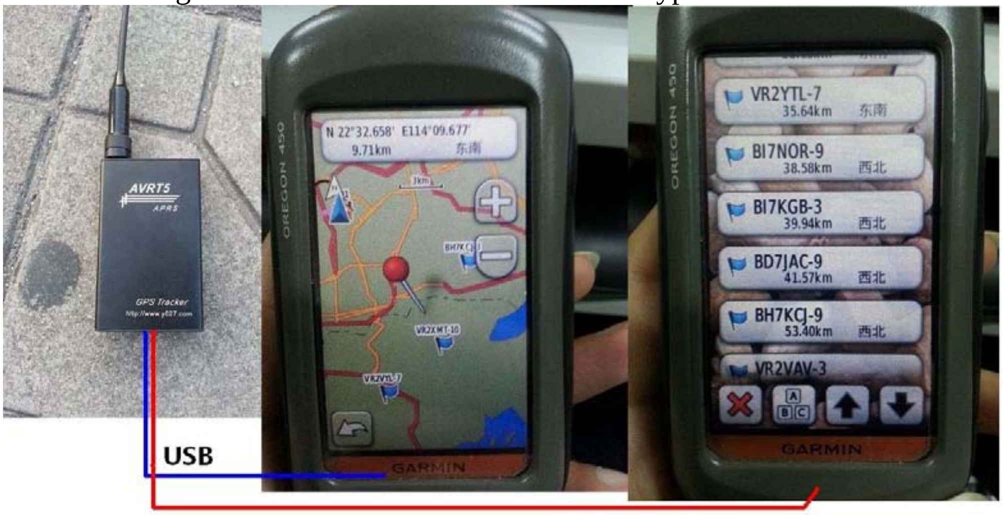

开机/关机/发射键
GPS模块
温度传感器
蜂鸣器
红灯：充电指示
蓝灯：定位/收发指示
USB串口
充电管理芯片
V天线
定位数据硬件解码芯片
AVR单片机
蓝牙模块
TF卡座
VHF模块

Hardware integrated: GPS module, antenna, MCU MCU, VHF transceiver modules, built-in power
Pool, charging IC, a temperature sensor, TF card, buzzer, wireless Bluetooth module

1. GPS module:
Ublox-7 module, high sensitivity, fast positioning, stability, power, support for 50,000 meters High Altitude mode.
2. GPS antenna:
18mmX18mm active GPS antenna, built-in LNA amplifies, Star Search, locate quickly.
3. AVR Microcontroller:
The atmega64 AVR microcontroller, stable and reliable.
4. VHF module (1W):
Latest 1W VHF transceiver modules are small, high stability for all types of wireless data transmission
Lose.
5. VHF antenna:
VHF antenna is sent to plant a separate match, to ensure the standing wave emission and emission efficiency.
6. 2800mA battery: High quality lithium batteries, the IMAX B6 0.6A charge and discharge, both in
2600--3000mA around. Power 30-second intervals continuously emitted about working 18-24 hours.
If the low-power or to extend the transmission interval can work longer.
7. Built-in rechargeable management IC (Input 5V)
Built-in lithium red power management IC, avoid battery overshoot and over-discharge, close protection battery,
Use of mind. Charging current <800mA, when the battery voltage is lower than 3.4V, low power automatic protection
Protection shutdown.
8. LED status display (charging and receiving LCD)
Dual LED display, red is charging indicator, charging red, full extinguished or dimmed.
Blue is the GPS indicator: blinking unlocated, Always indicate positioning (Blue LED can Setting).
9. A single button (switch and manual emission)
Press the button on, the boot Press - launch, press - off. Accompanied by a beep
Prompt.

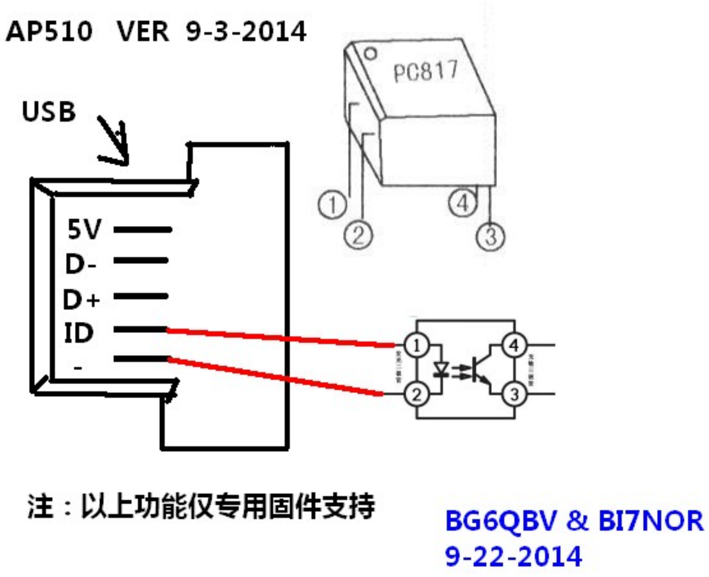
10. 18B20 temperature sensor (-40C + 99C)
Temperature sensor, IC precision 0.0625 degrees, the temperature inside the real-time transmission of the board and. (Need
To measure the external temperature can lead)
11, the buzzer (beep)
Switch and transmit when there is a beep prompt, convenient determine the working status and settings machine
Device.
12, TF deck (recording coordinates)
The following support 8G TF card, support FAT16 FAT32 partition format, named according to the time
File name is automatically saved to KML format. For example, at 18:20 on December 10, 2013 to separate
Start positioning work. File name: 12101020.KML, month, day, hour format GMT.
(KML file containing a header, data recording and data end, if unexpected data errors can be
In deleting the wrong character or supplementary data end to end repair file, save the file detailed data see
Member.)
13, the Bluetooth module (connected mobile phone or connected to the computer running APRS map _ Software)
Built-in Bluetooth module, rate 4800bps, one can real-time output aprs decoded signal.
Second, Android phones can be connected to the signal input KISS, emission control T5. See specific functions
aprsdroid. Third, you can use Android phones serial commands to configure settings VHF call sign and mold
Frequency blocks.
For example: Set Callsign: AT + CALL = BG6QBV7
Set the frequency: AT + FREQ = 144.6400
Setting the Beeper AT + BEEP = 1 open
AT + BEEP = 0 OFF
More Bluetooth configuration commands escalating.
14, USB Interface Extension 1 (connection Derek handheld GPS)
USB expansion interface, all pass through the 5-pin USB cable, you can directly connect garmin
Handheld GPS, or directly from the real-time map display location, currently support direct connections to display
Models are as follows:
garmin 400, garmin 450, garmin 550, garmin 650 and so on. . .

Theoretically support the WPL input (TTL level) Jia Ming handheld GPS support connection was
Show.
Connection display conditions:
AVRT5 configuration software should be set to: Waypoint Out


AVRT5
APRS
GPS Tracker
USB
OREGON 450
N 22°32.658' E114°09.677'
9.71km 东南
VR2XMT-10
VR2YTL-7
GARMIN
VR2YTL-7 35.64km 东南
BI7NOR-9 38.58km 西北
BI7KGB-3 39.94km 西北
BD7JAC-9 41.57km 西北
BH7KCJ-9 53.40km 西北
VR2VAV-3
GARMIN

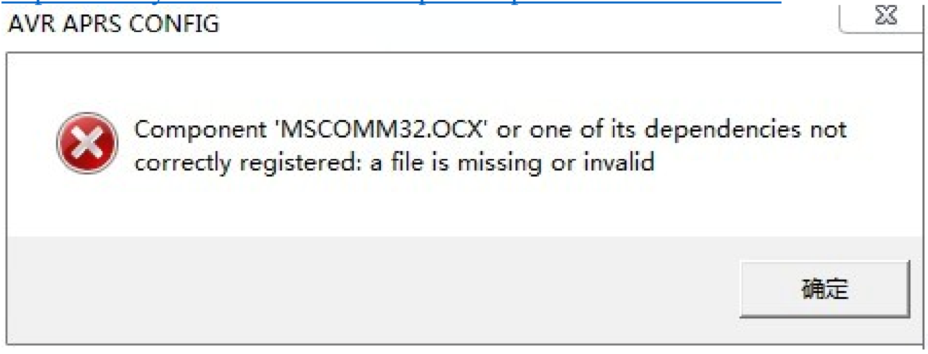
Garmin the need to:
NMEA transfer mode, NMEA sentence open, WPL input open, the speed with 4800
14, USB Interface Extension 2 (external control)
USB port to connect an external optocoupler, AVRT5 command control by turning on and off the optocoupler
Open, pull the control relay to control power other devices. For example, high-altitude balloons
You need to be recovered, by the control circuit is energized hot melt wire, the balloon leaks and perforations
Landing.

Note: This function requires the production of machines in September 2014 after only support, but also need to be upgraded
Dedicated firmware.



14, USB interface function Extensions 3 (connected to the computer running APRS map management software)
Can be used to upgrade the line of random distribution, connected to the computer, run APRS map management software,
Upgrade line driver to be installed and specify the COM and rate, the rate is set to 4800 (with Bluetooth connectivity
Can the same)
APRS most commonly used software:
China usually use the "clouds track"; foreign usually AGWTracker
You can directly see the trajectory and parameters server URL:
Domestic http://aprs.hellocq.net/
Foreign http://aprs.fi/
II. Turned the course
Press and hold the switch for a few seconds, release the button at the prompt beeping sound, AVRT5 will be accompanied by
LED flashes on power up, flashing about 3 seconds to check whether the connection configuration cable or TF card
Configuration files, if you keep the LED flash to enter configuration mode (separate description later).
If not choose to enter the normal operating mode, a self-test launch 1 into normal working condition.

The blue color (green) LED to indicate the operating status:
(1) 1 second flashing 1: GPS did not locate.
After (2) GPS Location: If you choose the configuration menu Blue LED LED will often Bright, otherwise it will go out.
(3) If the VHF signal is received, LED will flash.
(4) If you receive APRS data will blink several times faster.
Three, AVRT5 software downloads and connection
1. Software Downloads:
http://www.y027.com/dvbbs8/dispbbs.asp?boardid=5&Id=829
2. Configuration:
Note: 1. If your computer prompts MSComm32.ocx problem, see here:
http://www.y027.com/dvbbs8/dispbbs.asp?boardid=5&id=790



Component 'MSCOMM32.OCX' or one of its dependencies not correctly registered: a file is missing or invalid

2. Configure software Invalid picture appears an error in WIN7 64 Please follow party France resolved.
http://www.y027.com/dvbbs8/dispbbs.asp?boardid=5&id=841&page=1&star=1
?? ??

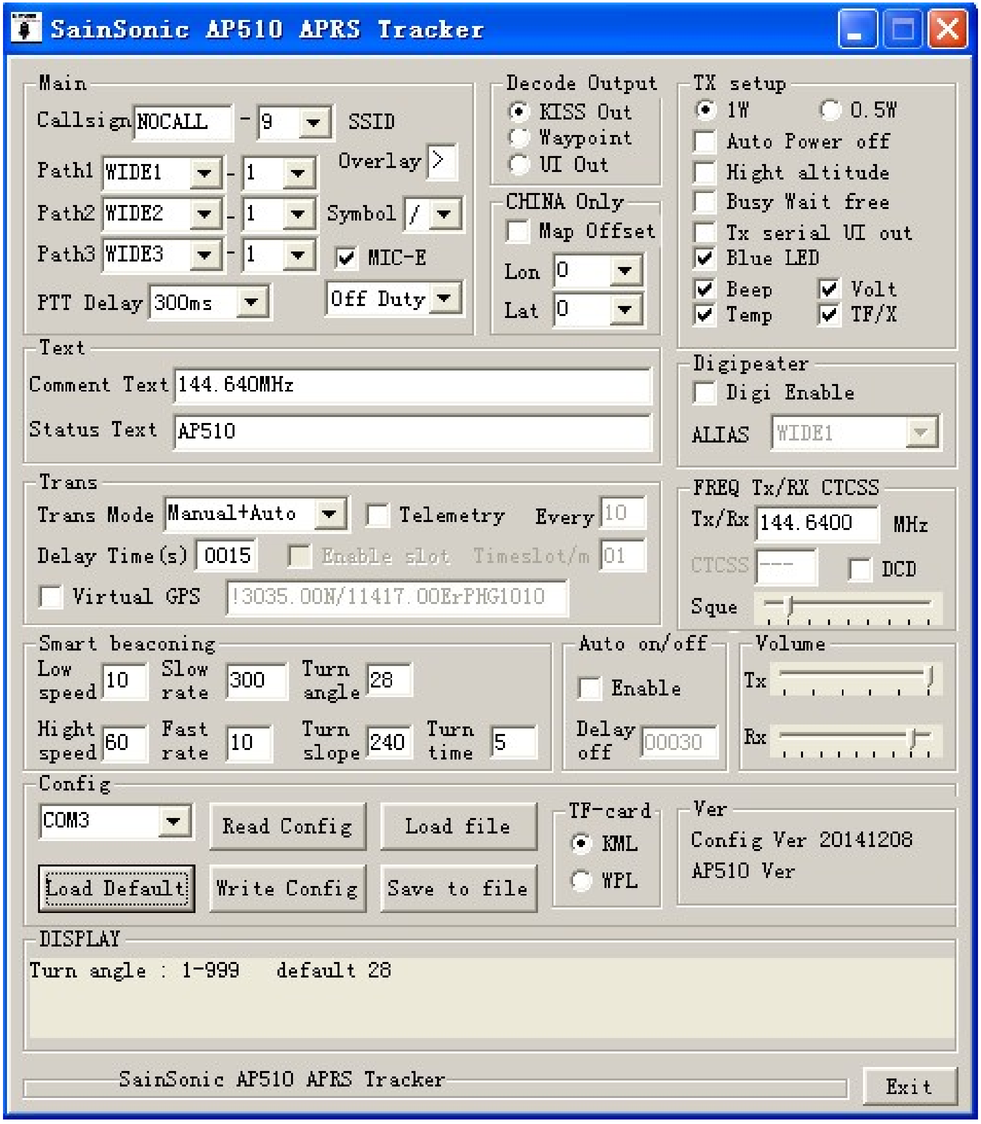
3.AVRT5 configure the connection method steps:
. a random distribution of installed cable PL2303 USB drive;
. b equipment to shut down;
c. Open the T5 configuration software, COM port selection data line, click on Read Configuration (Read

Config) button;

d. Press immediately T5 power equipment (power to hear the beep sound to let go), indicating a successful read

You can configure;

e. When modified, write to (Write Config)



SainSonic AP510 APRS Tracker

Main

Callsign NOCALL - 9 SSID

Path1 WIDE1 - 1 Overlay >

Path2 WIDE2 - 1 Symbol /

Path3 WIDE3 - 1 ☑ MIC-E

PTT Delay 300ms Off Duty

Decode Output

● KISS Out

○ Waypoint

○ UI Out

CHINA Only

☐ Map Offset

Lon 0

Lat 0

TX setup

● 1W ○ 0.5W

☐ Auto Power off

☐ Hight altitude

☐ Busy Wait free

☐ Tx serial UI out

☑ Blue LED

☑ Beep ☑ Volt

☑ Temp ☑ TF/X

Text

Comment Text 144.640MHz

Status Text AP510

Digipeater

☐ Digi Enable

ALIAS WIDE1

Trans

Trans Mode Manual+Auto ☐ Telemetry Every 10

Delay Time(s) 0015 ☐ Enable slot Timeslot/m 01

☐ Virtual GPS !3035.00N/11417.00ErPHG1010

FREQ Tx/RX CTCSS

Tx/Rx 144.6400 MHz

CTCSS --- ☐ DCD

Sque

Smart beaconing

Low speed 10 Slow rate 300 Turn angle 28

Hight speed 60 Fast rate 10 Turn slope 240 Turn time 5

Auto on/off

☐ Enable

Delay off 00030

Volume

Tx

Rx

Config

COM3

TF-card

● KML

○ WPL

Ver

Config Ver 20141208

AP510 Ver

DISPLAY

Turn angle : 1-999 default 28

SainSonic AP510 APRS Tracker

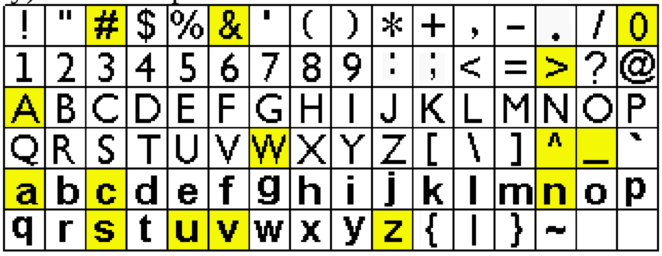
Four. AVRT5 configuration parameters

Note: Use the included USB cable, containing USB-TTL circuit, can not use an ordinary USB Line charging or upgrade, configuration software.

First, the main setting options (main)

Callsign (Callsign): Set callsign (4-6 capital letters). For example: BG6QBV

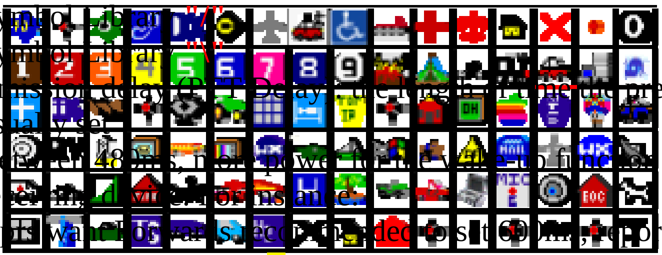
Suffix (SSID): call sign suffix to distinguish between different mobile terminals. For example: 9
Path (PATH1-3): path 1-3 for setting propagation allowed relaying the scope and
Times (can be customized). For example: PATH1: WIDE1; SSID: 1 or Non (Table
Showed no path)
Symbol (symbol): "/" and "\." For instance:
! 3012.34N / 11418.95E>
The mobile terminal (overlay): For example: "

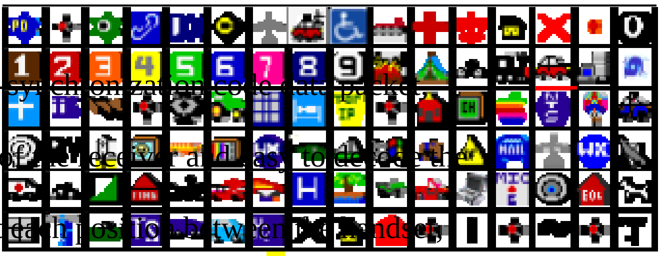


!	"	#	$	%	&	'	(	)	*	+	,	-	.	/	0
1	2	3	4	5	6	7	8	9	:	;	<	=	>	?	@
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_	`
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p
q	r	s	t	u	v	w	x	y	z	{	|	}	~		

➢

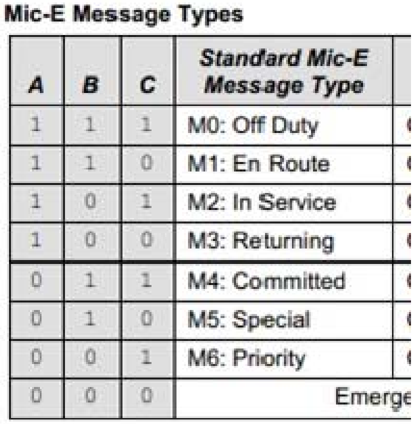
. "Detail Settings as shown below.





Symbol Library "/"
Symbol Library "\"
Emission delay (PTT Delay): the length of time the pre-synchronization code data packet,
usually set
Between 480ms, more power for the wake-up function of the receiver and easy to decode the
receiving device. For instance:
Aprs want forwards recommended to set 600ms, report each position between the handset;
We recommend 300ms or 480ms.
Compression format launch (MIC-E format): aprs common compression format, decoded
Hexadecimal digits coordinate data may be non-normal data display, the compressed data packet
word
Section less, help to improve communication efficiency.

MIC-E compression format 8 states:



Mic-E Message Types

A	B	C	Standard Mic-E Message Type
1	1	1	M0: Off Duty
1	1	0	M1: En Route
1	0	1	M2: In Service
1	0	0	M3: Returning
0	1	1	M4: Committed
0	1	0	M5: Special
0	0	1	M6: Priority
0	0	0	Emerge

Second, decoding the serial output option (Decoder output)

When AVRT5 receives a data decoding, data from the serial output of the decoding, the output has

Three common formats to choose from.

1. The raw data output (KISS out): a raw data output, for example: Since the number of According to the former part of the package was a shift, so it looks like the front of the data is messy.
2. waypoint data output (Waypoint out): will only receive a position coordinate output Airlines Point data. For example: @ GPWPT, ...
3. UI frame output (UI out): a format generally shown online, the various compression format Restores into readable data. For example: MIC-E compression format decoded output: (BG6QBV-6> SPSVP4, WIDE1-1: `* -_ l" 7> / "6d} 144.640MHz)

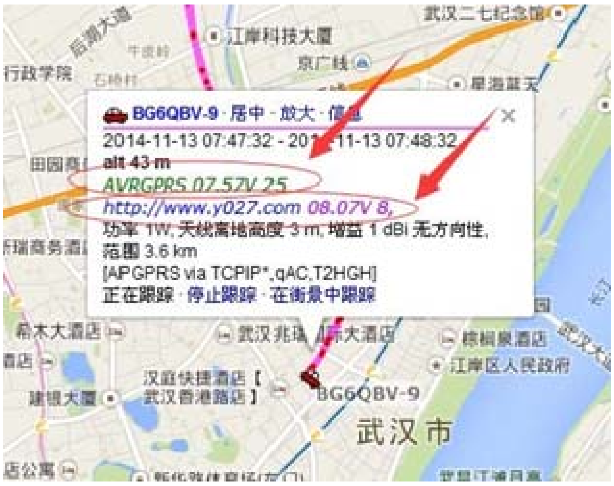
Map deskew (Map offset)

Well-known reasons, CHINA the google map are biased in some applications

, In order to correct GPS data points can be displayed on a map using GPS raw data on partial Shift certain value way to display correctly on the map to offset. (Usually China google Map required)

Third, the text display options

1. Notes Text (Comment text): Text annotation after data usually included with the positioning After the data coordinates. (AVRT5 supports English characters 0-40 transmission)
2. Status text (Status text): Status text data, which often show the device status and frequency Rates and other information. Sent when the device is not positioned. (Supports 0-40 characters sent)


后湖大道
江岸科技大厦
武汉二七纪念馆
牛皮岭
行政学院
石椅村
京广线
星海蓝天
田园商
新瑞商务酒店
希木大酒店
酒店
武汉兆瑞大酒店
棕榈泉酒店
江岸区人民政府
汉庭快捷酒店【武汉香港路店】
建银大厦
BG6QBV-9
武汉市
店公寓
新华路体育场(东门)
长江大道

BG6QBV-9 · 居中 · 放大 · 信[illegible]

2014-11-13 07:47:32 - 20[illegible]11-13 07:48:32

alt 43 m

AVRGPRS 07.57V 25

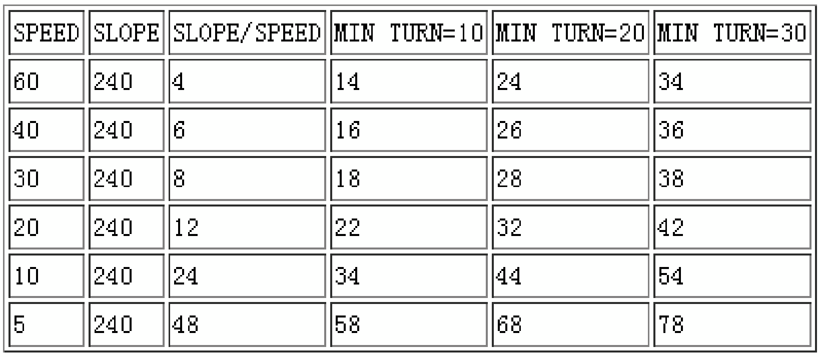
http://www.y027.com 08.07V 8,

功率 1W, 天线离地高度 3 m, 增益 1 dBi 无方向性, 范围 3.6 km

[APGPRS via TCPIP*,qAC,T2HGH]

正在跟踪 · 停止跟踪 · 在街景中跟踪

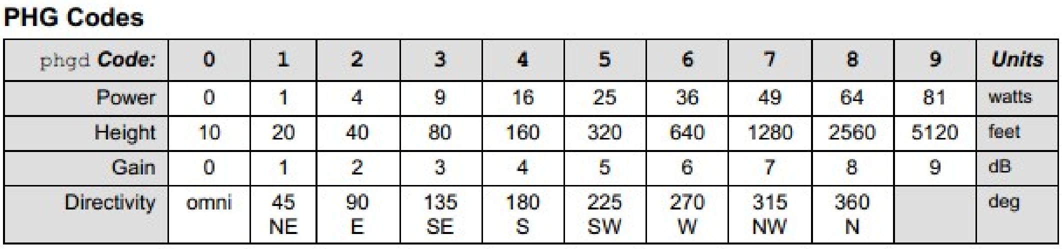
Fourth, the transmission mode options
Send mode options, a total of five modes can be selected:
1. Manual send (Manual): supports only manual trigger button AVRT5 sent once.
2. automatically sent (Auto): According to the delay time (Delay time) set-up time from
Move sent once. For example Delay time = 30 seconds, and then every 30 seconds after positioning device
Automatically sent once. (Delay time in seconds). Note: APRS server receives the number
According to the package required intervals recommended transmission interval of 20 seconds or more, avoid server
Reject packets.
3. Manual Automatic mixed-mode (Manual + Auto): both can manually send, also can be customized
Sending a move.
4. Intelligent beacon mode (Smart): Intelligent beacon activation parameters in this mode can be selected.
Equipment will be based on speed, direction, time to make a judgment, as far as possible with the least number of transmissions
To outline the perfect corner route.
5. Smart + manual mode (Smart + manual): support smart beacons and manual modes.
For more information about the Smart Beacon:
http://info.aprs.net/index.php?title=SmartBeaconing



SPEED	SLOPE	SLOPE/SPEED	MIN TURN=10	MIN TURN=20	MIN TURN=30
60	240	4	14	24	34
40	240	6	16	26	36
30	240	8	18	28	38
20	240	12	22	32	42
10	240	24	34	44	54
5	240	48	58	68	78

6. The virtual coordinate send (Virtual GPS): You can set a fixed virtual coordinates, through
Often set up relay stations or fixed stations. For example format:
! 3035.00N / 11417.00ErPHG1010

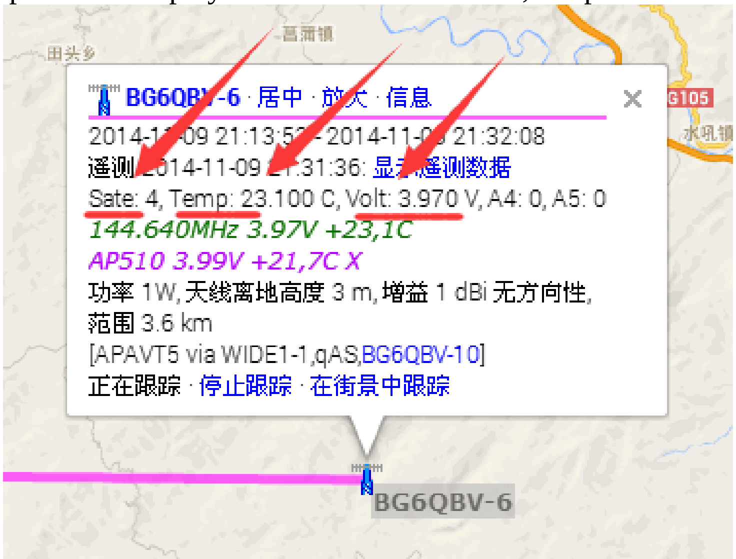
About PHGD settings:



PHG Codes

phgd **Code:**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	***Units***
Power	0	1	4	9	16	25	36	49	64	81	watts
Height	10	20	40	80	160	320	640	1280	2560	5120	feet
Gain	0	1	2	3	4	5	6	7	8	9	dB
Directivity	omni	45 NE	90 E	135 SE	180 S	225 SW	270 W	315 NW	360 N		deg

7. telemetry (Telemetry): Allows telemetry.
Frequency interval (Every): data sent once every few telemetry data. For example Every = 5, Then every five packets sent once telemetry data.
Telemetry data in two formats, a non-compressed format, one is compressed format. In aprs.fi can display the number of satellites, temperature and voltage AVRT5 sending acquisition.



BG6QBV-6 · 居中 · 放大 · 信息

2014-11-09 21:13:5[illegible] - 2014-11-09 21:32:08

遥测 2014-11-09 21:31:36: 显示遥测数据

Sate: 4, Temp: 23.100 C, Volt: 3.970 V, A4: 0, A5: 0

144.640MHz 3.97V +23,1C

AP510 3.99V +21,7C X

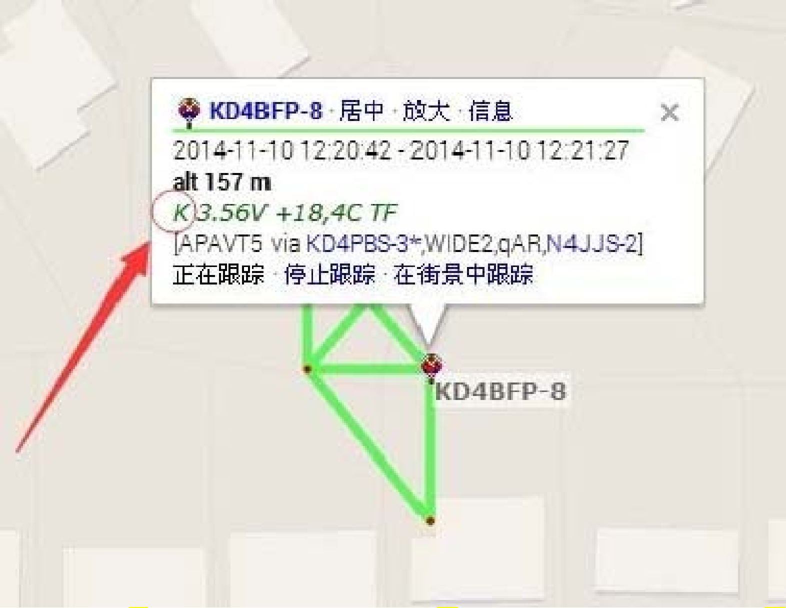
功率 1W, 天线离地高度 3 m, 增益 1 dBi 无方向性,
范围 3.6 km

[APAVT5 via WIDE1-1,qAS,BG6QBV-10]

正在跟踪 · 停止跟踪 · 在街景中跟踪

8. Time synchronization transmitter function (Time slot): usually need to team work, a plurality Device according to the time number, and then the time to stagger the satellite transmission time. For example: There is
60 apparatus, every one minute each terminal transmit time. 0 12:00:00 seconds machine launch, No. 1 12:00:01 second emission ... .. (to be upgraded)

V. transmission parameter selection (TX setup)
1. Power Select (1W, 0.5W): power options, default 1W, if the choice of 0.5W, need VHF modules internally connected to H / L pins and atmega64 of 32 feet.
2. The automatic power saving feature (Auto power off): 90 minute auto power off.
3. High Altitude Mode (Hight altitude): Support 50,000 meters altitude.
Stateful packet display:



KD4BFP-8 · 居中 · 放大 · 信息
2014-11-10 12:20:42 - 2014-11-10 12:21:27
alt 157 m
K 3.56V +18,4C TF
[APAVT5 via KD4PBS-3*,WIDE2,qAR,N4JJS-2]
正在跟踪 · 停止跟踪 · 在街景中跟踪

The first comment characters: "K" indicates the state OK, "F" indicates the state failed, "E" indicates shape
State error.
4. Busy waiting (Busy wait free): automatic launch if detected before the channel is idle, such as
If the channel is occupied, then wait until launching idle.
5. transmit serial data output (Tx serual UI OUT): When a VHF transmit data packets,
UI can simultaneously transmit data from the serial output of the machine, for some mapping software can
View your current location)
6. Blue LED status display (Blue led): If you choose to allow, then when the GPS positioning
After the LED will be lit, otherwise the LED goes out after positioning.
7. Beep (Beep): launch beep selectable switch, the switch can not turn off the machine beeps
Closed.
8. The voltage display (Volt): Comment increasing the voltage display data packet transmissions. For example: "3.56V"

9. Temperature Display (Temp): launch annotation data packets increasing temperature display. For instance:

"+ 18,4C"

10. The memory card status display (TF / X): Comment packets increased emission TF card status display.

Example: Display "TF" indicates TF card is inserted or recorded properly. "X": that there is no plug

Card or record failed.

VI. Relay function settings (Digiperter)

You can set aprs forward received data signal. You can set the forwarding conditions, such as "WIDE1" can be transmitted contains "WIDE1-1" route packets. Do not forward their own hair

A packet or packets have been forwarded.

VII. Frequency setting and squelch adjustment (Freq Tx / Rx)

1. Frequency setting (Freq): Set VHF module transmit and receive frequencies, you must step is 5Khz or 6.25Khz. For example: 144.6400 (MHz)

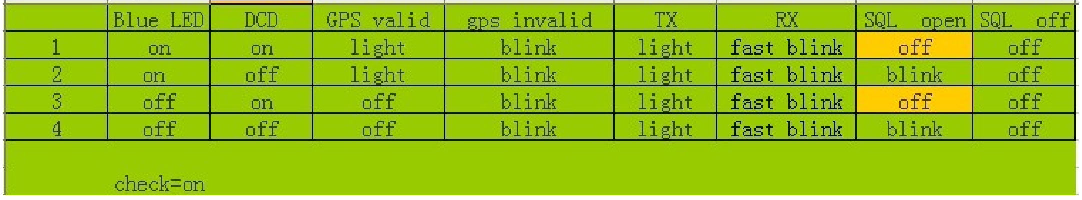
2. Tone frequency (CTCSS) :(if customers need, you can upgrade soon)

3. squelch adjustment (Sque): Squelch level adjustment range 0-8,0 = open squelch, Mo

Recognize the value of 1.

4. Soft Squelch (DCD): LED control switch, when permitted, only the GPS is not

Positioning and acceptance transmit time flashes, other times and manner does not light.



	Blue LED	DCD	GPS valid	gps invalid	TX	RX	SQL open	SQL off
1	on	on	light	blink	light	fast blink	off	off
2	on	off	light	blink	light	fast blink	blink	off
3	off	on	off	blink	light	fast blink	off	off
4	off	off	off	blink	light	fast blink	blink	off
	check=on							

Eight transceiver modulation (Tx Volume Rx Volume)

Modulation transmitter (Tx Volume): range 1-6, default 6.

Receive audio output amplitude (Rx Volume): range 1-9, default 8.

IX. Configuration settings (config)

1. Select the serial (com): You can select the cable input serial number or the serial number (required
To install the PL2303 USB-TTL line driver).
2. Remove the default value (Load default): read the recommended default parameters.
3. Read the device configuration parameters (Read config): reads the configuration stored in the internal device
Parameters. (Need to enter configuration mode)
4. Write the current configuration parameters (Write config): write the current configuration parameters. (Need
Read ahead parameters or remove the default parameter write)
5. Read the configuration file (load file): reads the configuration ini file is stored on your computer.
6. Save the configuration file (Save to file): Save the current parameters to a computer file.

Note: The configuration to support IOS users, the saved configuration file named
T5config.ini, copy it to TF card, insert AVRT5, then power, AVRT5 automatically
TF reads the configuration file, update settings for the machine. (After the configuration suggested deleting the TF card
The T5config.ini files or change the name of the other, such as T5.ini)

X. Other options

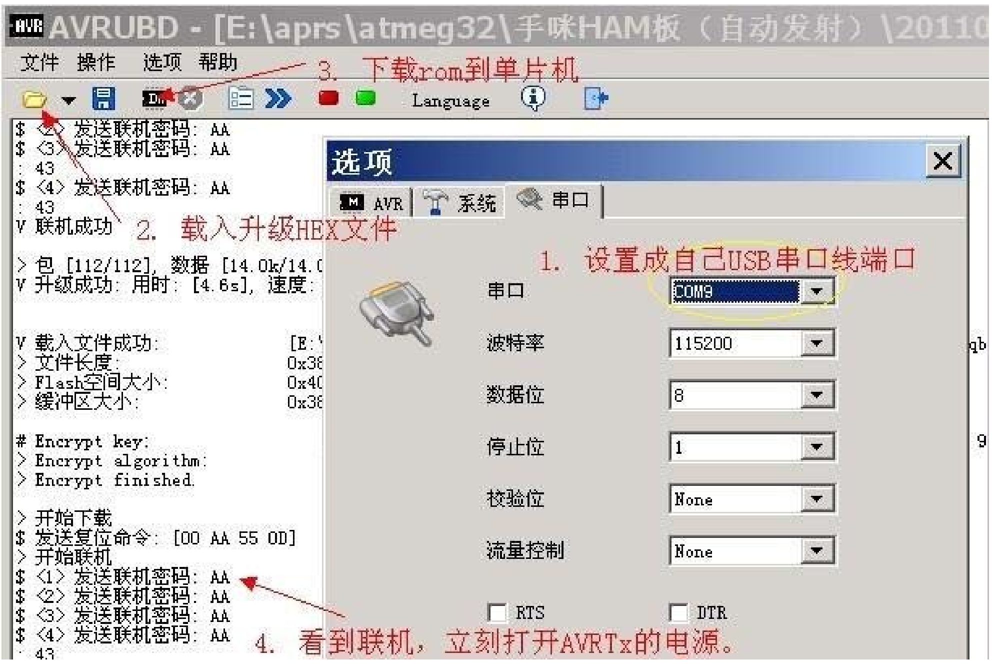
TF card recording format (TF-card): TF card memory in two ways, one is the KML file
Support google earth software, one is Waypoint text format (.TXT), support
A variety of mapping software.

Message (DISPLAY): prompt window prompted configuration parameters for use
Household reference, detailed information, see the instructions for use.

Exit button (EXIT): Exit the software configuration mode, while the output of the command to make AVRT5 exit
Configuration Mode.

Five .ROM upgrade method:

Note: Use the included USB cable, containing USB-TTL circuit, can not use an ordinary USB
Line charging or upgrade, configuration software.


AVRUBD - [E:\aprs\atmeg32\手咪HAM板（自动发射）\20110
文件
操作
选项
帮助
Language
选项
AVR
系统
串口

```
$ <2> 发送联机密码: AA
$ <3> 发送联机密码: AA
: 43
$ <4> 发送联机密码: AA
: 43
V 联机成功

> 包 [112/112], 数据 [14.0k/14.0
V 升级成功: 用时: [4.6s], 速度:


V 载入文件成功:                    [E:\
> 文件长度:                        0x38
> Flash空间大小:                   0x40
> 缓冲区大小:                      0x38

# Encrypt key:
> Encrypt algorithm:
> Encrypt finished.

> 开始下载
$ 发送复位命令: [00 AA 55 0D]
> 开始联机
$ <1> 发送联机密码: AA
$ <2> 发送联机密码: AA
$ <3> 发送联机密码: AA
$ <4> 发送联机密码: AA
: 43
```

串口: COM9

波特率: 115200

数据位: 8

停止位: 1

校验位: None

流量控制: None

☐ RTS　☐ DTR

1. 设置成自己USB串口线端口

2. 载入升级HEX文件

3. 下载rom到单片机

4. 看到联机，立刻打开AVRTx的电源。

AVRT5 ROM upgrade software methods :(will be written to the device)

1. Download the brush machine software ARUBD, set up the software serial number, the default rate is
Do not modify 115200bps; flash space, set to 64K.
2. Load to upgrade HEX;
3. Turn off AVRT5 machine, and then click on the upgrade software in "Operation" menu "download";
4. When the password to connect immediately press and hold the power button AVRTT5 (do not let go) until the rise
Stage process is complete;
5. If the upgrade fails, the machine can not boot or green LED flashing, please try
Re the above steps;
6. If you choose the wrong choice ROM upgrade, the machine keeps flashing and will not shut down, disconnect the machine
Battery, after the upgrade, and then restore the battery connections. (Operation caution)

?? ??

AVRT5 Caution:

1, safe charging power supply voltage is 4.5V-5.5V, some cottage (inferior) charger output
Voltage higher than 5.5V fragile charge management chip, no time to make recommendations
(Inferior) charger powered by the cottage.

2, the internal GPS antenna is located at the top of the indicator to switch button area, normal use It is recommended that an upright position, preferably no other objects cover the GPS antenna area. This
GPS positioning to achieve the best results.
3, a quarter-wave antenna distribution VHF transceiver antenna SMA-K connectors, if you want Send and receive better results, longer and more efficient replaceable antenna.
4. If you need to use the car antenna connection, please note that try to avoid blocking the antenna extension cable
GPS antenna area of the possible, and to add to the network of car antenna (recommended attracted large
The area of metal), such as adsorption on the roof.
5, the machine is not waterproof shockproof, if used in the harsh world, it proposed to consider the installation of waterproofing
Protective measures.
6, built-in temperature sensor, because PCB circuit board thermal transfer quickly, sensors are Detecting the internal temperature is higher than a certain temperature, it will automatically shut down to protect the battery.
Typically the internal temperature and external temperature a few degrees difference. If you need to get accurate external
Temperature, your own temperature sensor leads are connected to the outer machine.
7, using more than 8GB TF card recording track and, maybe there is compatibility issues, capacity
Less than the 4GB TF card compatibility problems yet found. It is recommended to use 256MB-4G TF card. In addition, TF card capacity is smaller, the smaller the power consumption, please note.
8, the charge distribution upgrade data lines, is custom USB to serial cable. (Includes USB-TTL Circuit, can not charge or upgrade with an ordinary USB cable, configuration software.)
Because of cultural differences, there may be insufficient description method, if in doubt, please add group exchanges,
QQ group number 30531489; or to the site www.y027.com exchange; also can Baidu "APRS", to see views of other HAM lovers!
BG6QBV & BI7NOR
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