Application Note

Version V1.0-20181229

Application Note of Setting up The Geobee Using TR600 as NTRIP Client/Server Modem

Author: Wen ©2019 Tersus GNSS Inc. All rights reserved.

Sales & Technical Support: sales@tersus-gnss.com & support@tersus-gnss.com More details, please visit www.tersus-gnss.com





Part 1 Setting up TR600 as Ntrip Server.

In this documentation I will explain how to setup the Tersus GeoBee. GeoBee Solution consists of one David GNSS Receiver and Tersus Ntrip Modem TR600.





Here is the Ntrip Modem TR600.

This is the Tersus GNSS Receiver.

Firstly we need to connect the David GNSS Receiver to the power and Ntrip Modem with the power supply.







As you can see, the Ntrip Modem power comes from David GNSS Receiver COMM1. It reduces one power adaptor.

There is split RS232 cable from the David, now you need to connect the RS232 port of the Ntrip Modem.







Now you can connect the 3G and WIFI antenna to the TR600 Modem

The next step is to install the SIM card, it's not necessary to use the mobile network. You can see what frequency or network the TR600 may support in the TR600 specs. But most countries support TR600, if you can have any question regarding the mobile network support in your country, just contact us.



I bought a Telstra 4G card, it works in Australia.

If you have local area network, such as Ethernet switch or router, its perfect to use wire line network. In my case, I use Ethernet, Wi-Fi, and 4G to do the test.



Here is the Ethernet cable connected:



The LAN1/WAN is used to connect to your home router/switch. The LAN2 is usually connect to your PC.

Once the PC is connected, you can see from the network settings of the local area network

Properties

| IPv4 address: | 192.168.2.20 |
|-------------------------|------------------------------------|
| IPv4 DNS servers: | 192.168.2.1 |
| Manufacturer: | Realtek |
| Description: | Realtek PCIe GBE Family Controller |
| Driver version: | 10.1.505.2015 |
| Physical address (MAC): | 44-A8-42-F4-23-28 |

192.168.2.20 is your PC address just get from the TR600, so now you can connect to the Web portal of TR600 through its IP address 192.168.2.1. In your web browser, input the ip address 192.168.2.1



Here is the web portal:

← → C ① Not secure | 192.168.2.1

| TR | -600 TERSUS | |
|--------------------|-------------|--|
| 用户名 (username): | root | |
| 用户密码 (passwd): | | |
| 语言 (language): | 中文 • | |
| | 登陆(login) | |

The initial username is root, the password is 1234, you can change it later on



The most part of NTRIP modem TR600 is very intuitive and straightforward. The first page is showing the status of the current connections.



Now we start the network settings.

| Network: | WAN&WIFI&MOB V |
|--------------------------|---|
| ICMP Host: | MOBILE(2G/3G/4G) |
| 10.11 1105 01 | WAN |
| Backup ICMP Host: | WIFI |
| Max Try: | WAN&MOBILE |
| External access: | WAN&WIFI |
| | WIFI&MOBILE |
| Note 1: ICMP Host should | l be se WAN&WIFI&MOBILE |
| Note 2: Wifi hotspot wil | l be closed when using wifi to connect to |
| Internet. | |

"Network select" we can use

It shows the WAN(Ethernet) priority is over WIFI, WIFI is over Mobile. So you can adjust your policy according to your needs.

Other options just leave there.

Now we come to the wireless basics, it's actually 2/3/4G configuration, I just changed the APN to Telstra.wap. You can consult your mobile carrier of their APN settings. Other options just left there, these options actually not used by most carriers.

| * Cratur | | |
|---|---|----------------------------|
| - Network Settings | Basic Cfg Get the params of mobile | operation before using it. |
| Network Select Vireless Basic Vireless Advanced VAN VIFI Client LAN VIFI Hotspot NAT Rule NTEIP CRG | AFN Hode AFN Hode Select Network Manually: FFP User Taue: FFP User Taue: FFP User Taue: FFP User Taue: Net Standard: | Auto Select Auto Select |
| • Wirhub • System Tools • Reboot System | Dial Mode: Idle Time/Duration(m): Wake Number: Wake Passwd: Note : Cenerally do not h can be. | Start_up |
| | Save Revert | |

Wireless advanced, we don't need to touch.



Now we come to the WAN configuration

| | | VAN | | | • Status |
|-------------------|----------------|---|-------|---|--|
| | WWW interface | Set up | | | - Network Settings |
| | who interface. | sec up | | | • Network Select |
| 10:9C:94:99:A0:91 | 1 | VAN MAC | | | • Wireless Basic |
| DHCP V | l. | Type: | | 1 | • Wireless Advanced |
| | unt: | PPPOE A | | | • VAN |
| | word: | PPPOE F | | | • WIFI Client |
| | | Static | | | * LAN |
| | | Nask: | | | • WIFI Hotspot |
| | | Catewas | | | * NAT Rule |
| | | DWS1 - | | | NTRIP CFG |
| | | DWD2 - | | | * Virhub |
| | L | DNDZ. | | | * System Tools |
| | | Note: | | | * Reboot System |
| | | | | | |
| | Revert | Save | | | |
| | | | Co Co | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | unt: | PPPOE A PPPOE F Static Nask: Gateway DNS1: DNS2: Note: Save | 12 | | VAR VIFI Client LAN VIFI Hotspot NAT Rule NTRIP CFG NTRIP CFG Virhub System Tools Reboot System |

Just use the default DHCP, because most the router supports DHCP. You connect the WAN to your router'LAN, then the router will assign an IP address to the TR600 modem.

In my situation, I got 192.168.1.117 from the router.

| 3 | | | | | |
|------------------------------------|----------|----------------------|------------------|-----------------------|--------------|
| • Status | VIFI | Client | | | |
| - Network Settings | | This Page: Set WIFI | parameters | | |
| Network Select | | | | | |
| • Wireless Basic | | WIFI MAC: | 20:32:33:13:7D:7 | F | |
| • Wireless Advanced | | SSID: | WiFi-832A | | |
| • VAN | | Security: | WPA2-PSK AE | S 🗸 | |
| • WIFI Client | | PSK pin: | | | |
| • LAN | | Type: | DHCP • | | |
| • WIFI Hotspot | | Static IP: | | | |
| * NAT Rule | | Mask: | | | |
| NTRIP CFG | | Gateway: | | | |
| • Virhub | | DNS1: | | | |
| * System Tools | | DNS2: | | | |
| • Reboot System | | | | | |
| | | | | | |
| | | Save Revert | | | |
| | | | | | |
| | | | WIET AD list | Defresh | |
| | Note | : If wifi is disable | d the first tim | e clicking "Refresh". | it need some |
| | | | time to output t | he result. | |
| | | SSII |) | Signal(0-100) | Security |
| | ۲ | WiFi-83 | 32A | 91 | [VPA2] |
| | 0 | DLink | c | 64 | [VPA2] |
| | <u> </u> | Upstairs Ex | rtender | 45 | [VPA2] |
| | 0 | WiFi-86 | 5D | 43 | [VPA2] |
| | | RigPondi | RAR | 72 | [ชคะว] |

Now we come to the WIFI client section

It's easy to configure, you can click refresh to find the hotspot. Then select it, and input the password in the PSK PIN area.



Now we come to the LAN configuration

| atus | LAN |
|---------------------|--|
| twork Settings N | Set up the router IP of LAM and set the DHCP function. |
| FI Hotspot | Gateway IP: 192.168.2.1 |
| IT Rule | Mask: 255.255.255.0 |
| TRIP CFG | DHCP Start IP: 192.168.2.20 |
| irhub | DHOP End IP: 192.168.2.254 |
| ystem Tools | IWS IP: |
| eboot System | DHCP Lease: 86400 Lease: (1~200000) |
| | DHCP Service: ON 🔻 |
| | Note : Gateway IP and DHCP Settings must be in the same network. |
| | Safa Rovert |
| | looks herer |

You can see the LAN configuration is ready, and IP address information is there.

<u>TIPs: you can configure the TR600 through web portal using wifi or LAN connection once you</u> have connected to it.

NAT rule we don't need to touch.

2

Ntrip CFG was pre-defined by Tersus, if you use Tersus GeoCaster service, it means you transmit all the RTCM to the Tersus server, then you pull from the server. That's the Ntrip caster service, then you don't need to touch it. Just left there.

| NTPID Tofa | |
|-----------------------|------------------------------------|
| WIKII IIIIO. | |
| NTRIP Info | 0 |
| NTRIP Caster Address: | geobeecaster2.tersus-gnss.c |
| NTRIP Caster Port: | 2101 (1 ^{~6} 5535) |
| NTRIP Type | server • |
| NTRIP Username: | |
| NTRIP Password: | geolog202026 (up total |
| Mount: | RTCM30_GG V |
| Selfdefined Mount: | 240305005050981 |
| Selfdefined Head1: | |
| Selfdefined Head2: | |
| Selfdefined Head3: | |
| Data Source: | COM1 🔹 |
| | 55555 41 41 |
| DC1 | R5232 of the Mi |
| DC IP or Dnsname: | mserver.tersus-gnss.com |
| DC Port: | 2180 (1 ^{~6} 5535) |
| Connect mServer: | YES V |



Virhub is used to remote control of the modem and David, but we don't need to touch it. We will introduce it in another document.

Now all the configuration of the modem is done. Now we move the David Part.



Now we connect the antenna. The antenna should be in open sky environment





Now connect the COMM2 USB for the PC USB port.



Open Tersus GNSS center software, the software can be download from the website of tersus-gnss.com

| Config | | | | × |
|---|-------------------------------|--------------|--------|---|
| Connection Save Option | | | | |
| Connection Type: Serial Setting Port: Baud Rate: Working Mode | Serial | Save Receive | d Data | |
| Base Station Rovel Statio Custom Mod | n Config Mode n Mode de | | | |
| Apply | Ok | Cano | cel | |

Once you plug the USB cable to the PC, there should be COM* displayed in the port area. In my case, it's port com3, then select the base station config mode.



| Lat | Lng | | Height(MSL) | Type |
|----------------|---------------|-----------|-------------|--------|
| -37.7909634 | 0 145.089 | 952404 | 79.7073 | Degree |
| 🔾 Use fix po | siton Po | s ave | | |
| IFFERENTIA | L GNSS Messag | es Output | | |
| COM1 O None | O RTCM2 | RTCM3 | | Detail |
| COM2 | h- | | | |
| None | ○ RTCM2 | O RTCM3 | | Detail |
| USB | | | | |
| None | ○ RTCM2 | ○ RTCM3 | | Detail |
| ata Recordin | g Mode | | | |
| O Auto | Manual | | | Detail |
| thers | | | | |
| Antenna Hei | abt 0.00000 | 0 Metre | | |

Position area can be left as blank, it will use the position average to start the base station.

Just select the com1 port of RTCM3, because we connect the COMM1 port to the Modem TR600, so we use COM1 in the Tersus GNSS Center. You can check Details, we just use the default settings.

It will broadcast the observations of GPS, GLONASS, and BeiDou.

| Station Info(Interval:second) | RTCM1005 optime 10 |
|--|------------------------|
| RTK Base Station ARP with Antenna Height | RTCM1005 OFF |
| Extended Antenna Descriptor | RTCM1007 OFF |
| Extended Antenna Descriptor | RTCM1007 OFF |
| Pacativer and antenna decembers | RTCM1008 OFF |
| Receiver and ancenna descriptors | RTCM1033 Undine 10 |
| GLUNASS L1 and L2 Code-Phase Blases Message | RTCM1230 Onume 10 |
| Ephem Info | |
| GPS Ephemerides | RTCM1019 OFF |
| GLONASS Ephemerides | RTCM1020 OFF |
| BDS Ephemerides | RTCM1042 OFF |
| Observables | |
| MSM4, GPS Code, Phase and CNR Measurements | RTCM1074 ontime 1 |
| MSM4, GLONASS Code, Phase and CNR Measurements | RTCM1084 ontime 1 |
| MSM4, BeiDou Code, Phase and CNR | RTCM1124 ontime 1 |
| RTCM1001 OFF V RTCM1012 OFF V | |
| RTCM1002 OFF V RTCM1071 OFF V RTCM1 | 081 OFF V RTCM1121 OFF |
| RTCM1003 OFF V RTCM1072 OFF V RTCM1 | 082 OFF V RTCM1122 OFF |
| RTCM1004 OFF ~ RTCM1073 OFF ~ RTCM1 | 083 OFF V RTCM1123 OFF |
| RTCM1009 OFF V RTCM1075 OFF V RTCM1 | 085 OFF V RTCM1125 OFF |
| RTCM1010 OFF V RTCM1076 OFF V RTCM1 | 086 OFF V RTCM1126 OFF |
| | PTCM1127 OFF |

Just leave there unless you know what you are doing.



There is a command line window, you can input command into the David GNSS receiver. You can refer to the Tersus documentation of log and command book for all the command explanation.



Now we input

log gpgga ontime 1 log gpgsv ontime 1 log rangeb ontime 1

then you can see the position and signal strength from the windows. Just look like this.



It means the David receiver now is tracking well.

Then we need to check the data are correctly pushed to the network or not.



Now we go back to the TR600 web portal status



We can see data amount is increasing every second. Now we check the geobee caster web portal

 $\leftarrow \rightarrow \ \ C \quad \ \ 0 \ \ \ Not \ secure \ | \ \ geobeecaster 2.tersus-gnss.com: 2101/Ntrip.html?usr=geobee 302&pwd=fx$ Current Time:18-12-29 03:15:26(-0000) Server/Client Current Status Data Bytes(KB) DataType lat/long/height S/C From IP MountPoint StartTime Server 210.185.123.190 240305005050981 18-12-29 03:06:54(-0000) 189.723 RTCM3 Statistics MountPoint First Start Time PAS Count/ideal total online rate(%) Error/Valid Package lat/long/height 240305005050981 18-12-24 02:02:47(-0000) 85/242 35.37 20114/505264 240305005050981 Hourly online rate from 12/27 to 12/29(-0000) $00\ 01\ 02\ 03\ 04\ 05\ 06\ 07\ 08\ 09\ 10\ 11\ 12\ 13\ 14\ 15\ 16\ 17\ 18\ 19\ 20\ 21\ 22\ 23$ 12/27 0 0 5 93 96 94 84 8 29 26 71 93 100 100 100 71 98 100 100 96 99 98 99 12/28 51 83 99 99 99 93 54 94 93 98 99 92 92 87 56 82 96 90 93 98 100 100 99 98 12/29 84 92 94 24.

The server is successfully showed in the web portal.

Now we just build a rover to test the base and caster function. We use another David and Nuwa software to test it. Here is the setup.







Open the Nuwa App. Connect to the Bluetooth of David.













Now we have the rover Fix. It's the good result for not so open sky rover setup: \Box



Part 2 Setting up TR600 Modem as Ntrip Client

First you have to get the NTRIP caster username, password, and also the mountpoint.

Here is I got from Australia government and input into the NTRIP CFG of Ntrip Modem.

| rensus | NTRIP Smart Device | | |
|---|--------------------|---|---|
| Status Network Settings LAN WIPI Hotspot NTRIP CFG Virhub System Tools Reboot System | NTRIP Smart Device | Basic Cfg NTRIP Info. NTRIP Info MTRIP Caster Address: MTRIP Caster Port: NTRIP Type MTRIP Username: MTRIP Password: Nount: Selfdefined Head1: Selfdefined Head2: Selfdefined Head3: | auscors.ga.gov.au 2101 (1°65535) client wen h1955256 RTCM32_GGB MOBS7 |
| | | Data Source: | COM1 • |

Connect the COM1 cable with the Ntrip Modem. And connect the COM2 USB cable to the PC, just as follows.









Now you can open the Tersus GNSS center, see the solution is FIX.

Now I have shown you all the information you need to setup the Ntrip Modem TR600 and David GNSS Receiver basics.

This document can serve as a quick startup of the system. Furthermore you can refer to the website of tersus-gnss.com, we will publish more application notes on the topic of remote control of David and TR600. Feel free to contact us with any problem, just drop us a line at support@tersus-gnss.com.

Thank you!

Author:Wen Tersus GNSS Inc.