Satellite Signal Conversion Systems

BeiDou to GPS BTG216

Application Background

Many existing GPS receiving systems, especially clock synchronisation systems, have some systems that do not support BeiDou's satellite timing and do not support BeiDou satellite signals. BeiDou and GPS are two different satellite positioning systems, whose signal standards and technical specifications are completely incompatible, so special signal converters are needed to realise the conversion between satellite systems. The main function of Starfire's BeiDou GPS signal converter is to convert the BeiDou satellite signal to a single GPS L1 signal.

If there is no GPS satellite signal in the sky, only a BeiDou satellite signal, then you can use the BTG216 to continue to provide a valid GPS signal to your GPS receiver. Applications that enable positioning and clock synchronisation timing will not be interrupted.

Basic Properties

- Received satellite signals： Beidou3 B1i and GPS L1;
- Output satellite signals： GPS L1;
- Number of output satellites： GPS L1 8;
- Timing accuracy that can be achieved by the timing system： higher than 500ns;
- 8/12/16 output ports.
- Dual -48V isolated power supplies;
- Dry contact alarm output;
- RF output power： -50dBm（customizable）;
- RF output power adjustable: -50dBm~ -110dbm（optional）.

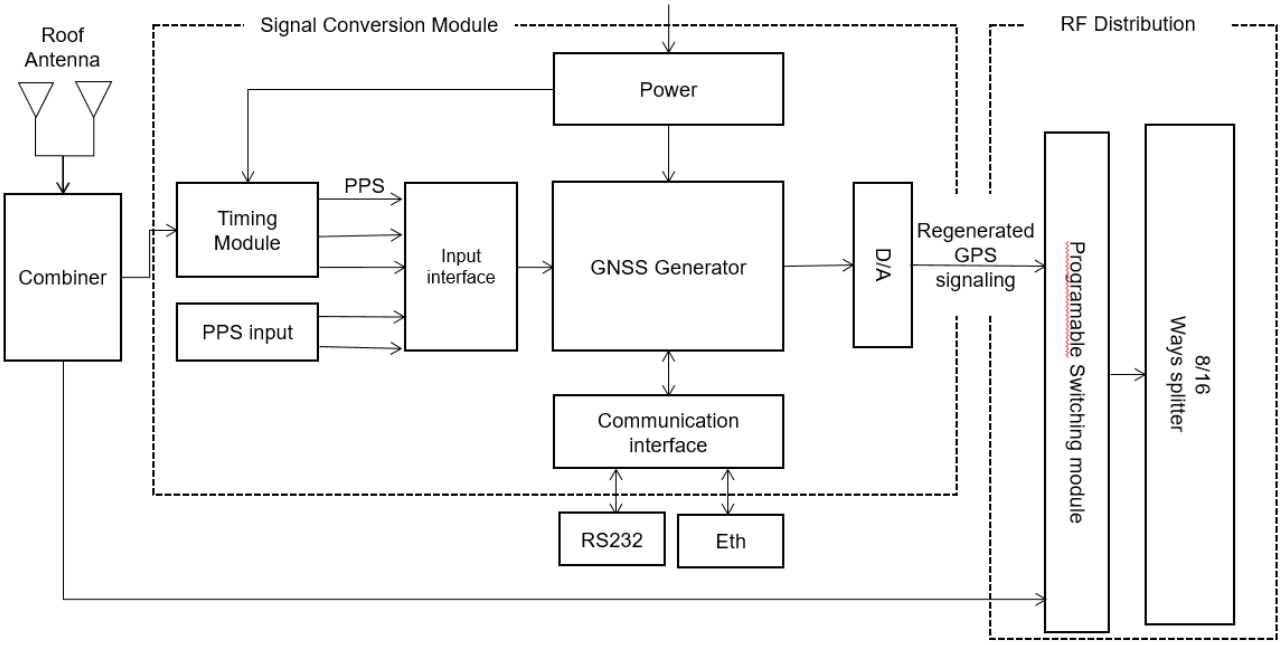
Product Description

BTG216 satellite signal conversion system is a device with one input and 8/12/16 outputs. The input port is connected to GNSS receiving antenna, and the output port provides converted GPS L1 signals to 8/12/16 ports at the same time.

Electrical Specifications

Parameter	Conditions	Min	Typ	Max	Units
Freq Range	Antenna - Either Port	1575.42		1561.098	MHz
In & Out Impedance	Input, All Output Ports		50		Ω
Input Voltage VSWR	All Ports - 50Ω Load			1.5:1	-
OutputVoltage VSWR	All Ports - 50Ω Load			1.5:1	-
Noise Factor				5.5	dB
In-Band Fluctuations				3	dB
Output Power		-110	-50		dBm
Reference System For Input	Beidou B1 and GPS L1		Beidou		System
Output System	GPS L1		GPS		System
Timing Accuracy Of The Output		500			ns
Output Positioning Accuracy	When the received GPS or BeiDou signal is online	3		10	m
Antenna Port Voltage	Powering The Antenna		5		VDC
Antenna Port Current	Powering The Antenna			120	mA
Power Supply	Dual DC 48V Isolated Power Supply		48		VDC

System schematic



Working mode Of the System

- Automatic, Priority is given to the signal of the antenna, and the signal of the GPS signal generator is used in the case of GPS loss.
- Forced use of antenna
- Forced use of regenerative signal;

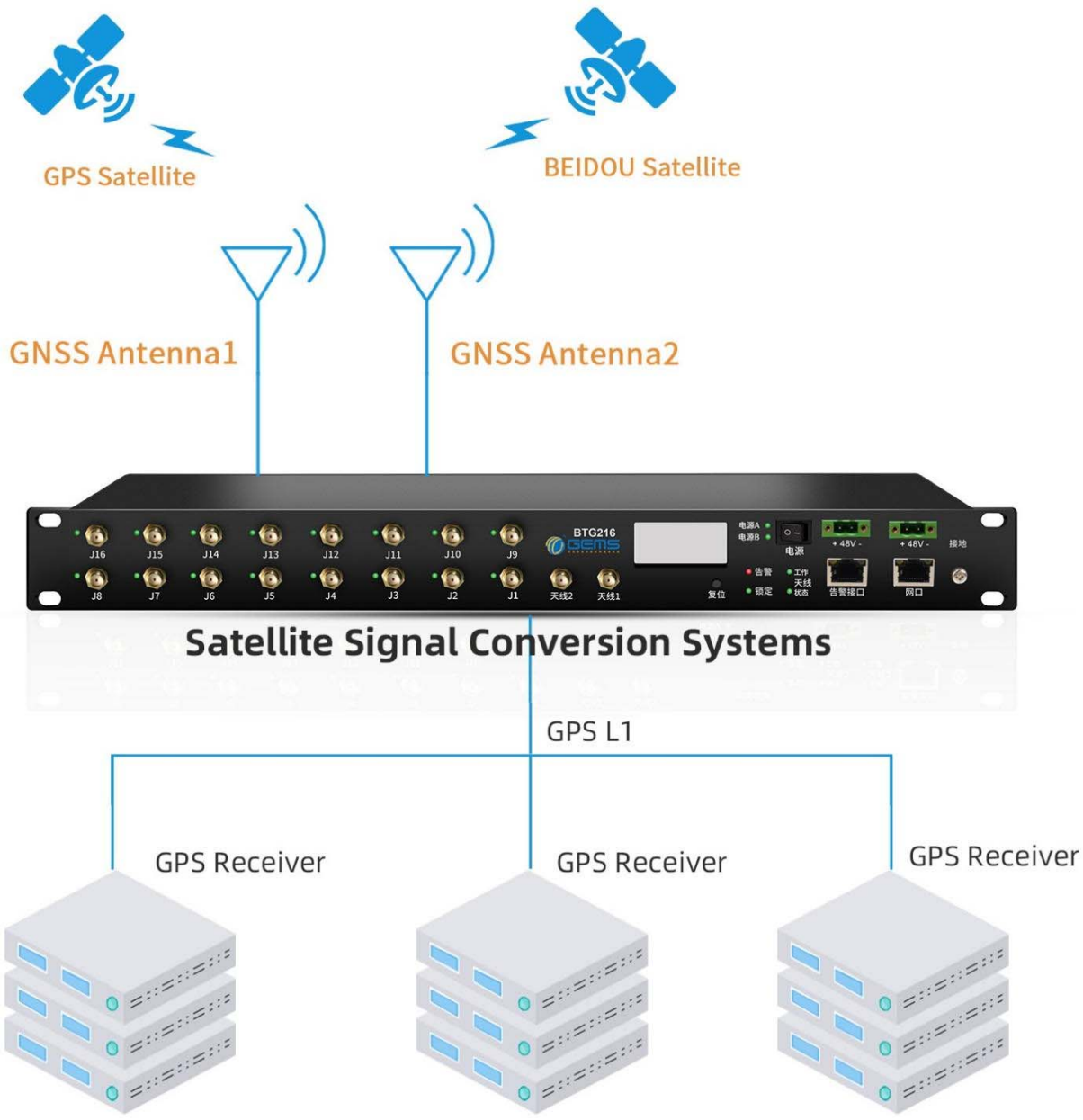
  Setting via the reset button.

Working mode Of the GPS Generator

- GPS L1 signal output；
- Beidou B1 signal output；

Setting via the RS232 port.

Typical Applications



Timing devices that do not support BeiDou satellite signals, such as some of the early construction of BBU or other timing systems.

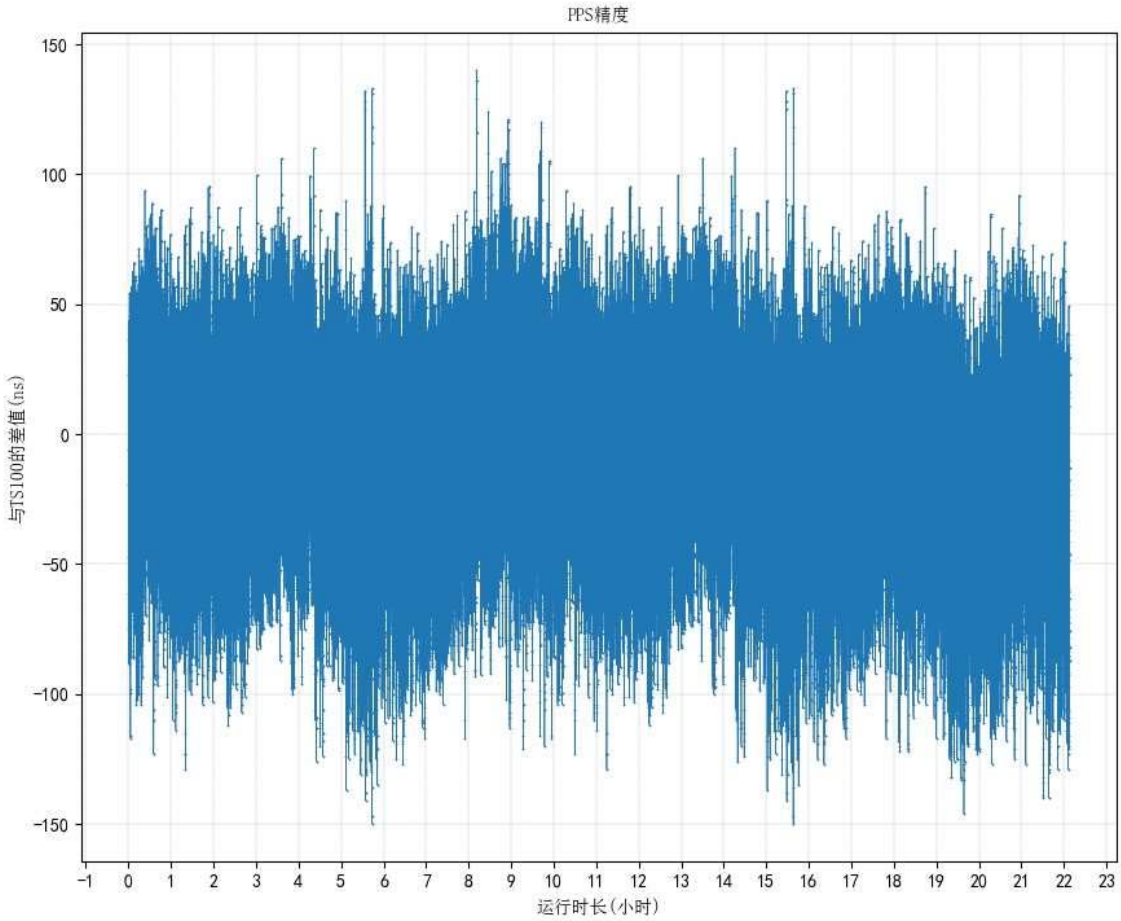
Converting BeiDou and GPS signals to GPS signals

Conversion of BeiDou and GPS signals to BeiDou signals

Performance

Timing Accuracy Test

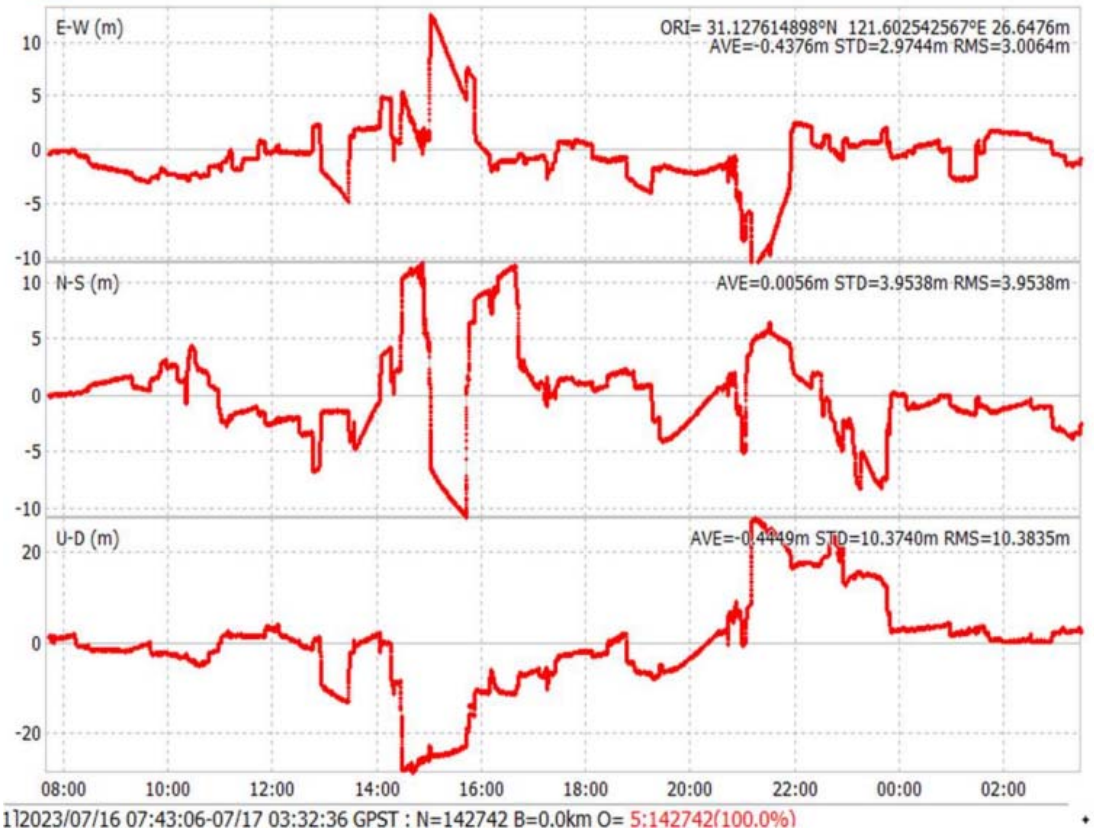
The system runs continuously for 22 hours, and the PPS generated by the GPS receiver receiving the signal generated by the BTG101 jitter range relative to the PPS output by the standard receiver: ±150ns



Positioning Accuracy Test

The system runs continuously for 22 hours, Horizontal error RMS: 9.93m


ORI= 31.127614898°N 121.602542567°E 26.6476m
AVE=E:-0.4376m N: 0.0056m U:-0.4449m
STD=E: 2.9744m N: 3.9538m U:10.3740m
RMS=E: 3.0064m N: 3.9538m U:10.3835m 2D: 9.9340m
5 m
[1]2023/07/16 07:43:06-07/17 03:32:36 GPST : N=142742 B=0.0km Q= 5:142742(100.0%)


E-W (m)
ORI= 31.127614898°N 121.602542567°E 26.6476m
AVE=-0.4376m STD=2.9744m RMS=3.0064m
N-S (m)
AVE=0.0056m STD=3.9538m RMS=3.9538m
U-D (m)
AVE=-0.4449m STD=10.3740m RMS=10.3835m
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
02:00
1]2023/07/16 07:43:06-07/17 03:32:36 GPST : N=142742 B=0.0km O= 5:142742(100.0%)

Product Size

Product Size： 482.6mm ×195mm × 44 mm (D * W * H)