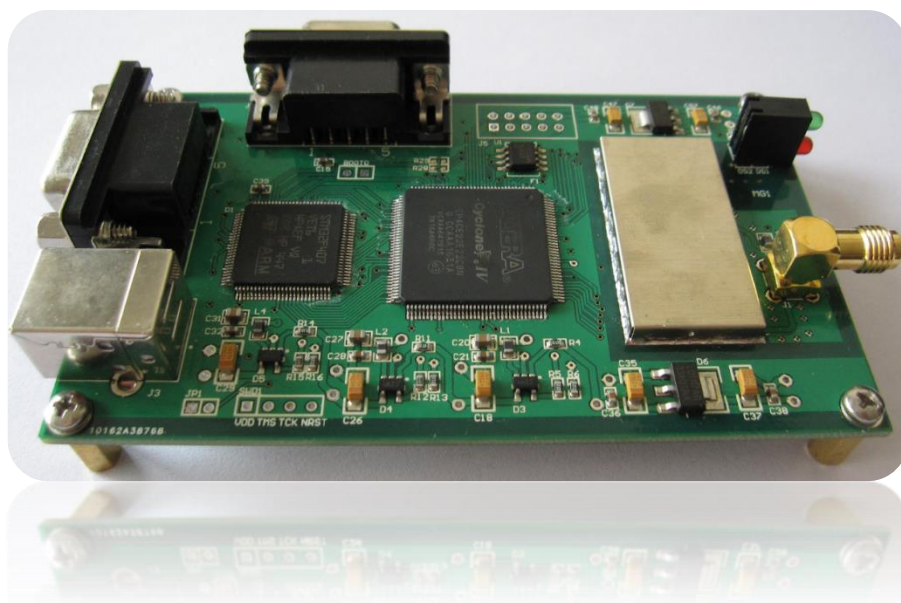


HG-TG04 双系统 GNSS 接收机

支持 GPS L1 和 BD2 B1 联合定位

输出 5 种原始数据信息



北京星源北斗导航技术有限责任公司

2017 年 3 月 29 日

表 A 文档信息表

Item	Context
Author	hg
Last Update	2017-3-29
Version	1.1
Copyright©	北京星源北斗导航技术有限责任公司
密级	对外交流

更新信息：

V1.1, 2017-3-29

增加数据文件格式介绍，改进定位稳定性和精度，在开阔处静态定位，无 Kalman 的情况下，稳定工作最长时间可达 1 个月，定位精度 3~5 米。

V1.0, 2016-9-22

HG-TG04 第一版发布。

更多详细信息请致电星源北斗咨询！

公司地址：北京市海淀区温泉镇显龙山路 19 号北辰香麓雅庭 1 座 218 室

电话及传真：13683239930, 010-82484062

QQ：5024141

邮箱：liuwsat@126.com



1 产品概述

表 1 产品价格表

产品	价格
HG-TG04 双系统高精度 GNSS 接收机	
HG-TG04	1800 元
可选配配件	
GPS 天线	40 元
BD2 B1 专用天线	150 元
测量型多系统天线	1200 元
定制外壳（HG-TG04 设计时考虑以后添加外壳）	1000 元

HG-TG04 是北京星源北斗导航技术有限责任公司面向高精度和双模联合定位应用设计的一款接收机，支持导航电文和原始测量值输出，支持 BD2 B1/GPS L1 切换，有快速捕获能力。主要面向以下应用：

- 1、BD2 B1、GPS L1 导航电文提取。
- 2、BD2 B1、GPS L1 原始测量值提取。
- 3、单频差分原始测量值输出。
- 4、高精度单点定位。
- 5、高精度定时。
- 6、为高动态接收机或者信号模拟器提供提供注入星历数据的输出。

HG-TG04 是 HG-TG02 的升级产品，为了方便使用，对外接口不再单独做底板，接收机接电源即可使用。HG-TG04 采用双射频设计，支持 GPS L1 和 BD B1 联合定位。HG-TG04 经过严格长期稳定性测试，适合用在定时、定位场合。HG-TG04 采用三阶环路，卫星跟踪效果得到更好的保证。



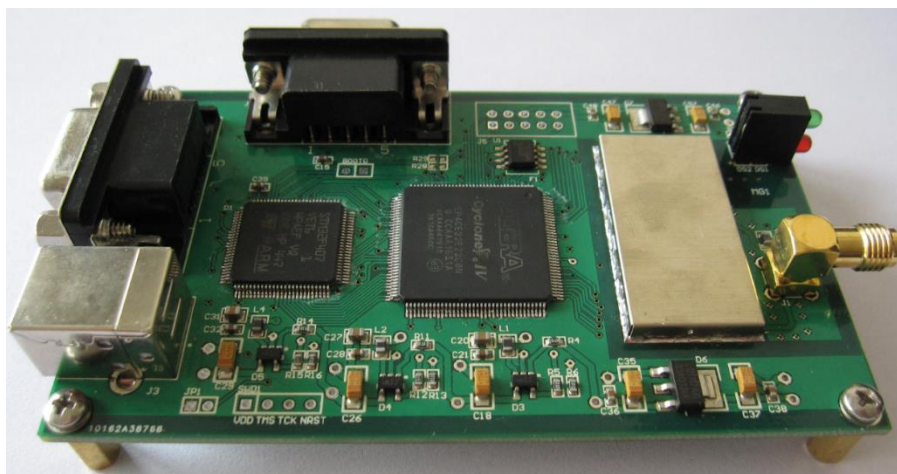


图 1 HG-TG04 接收机

2 主要参数

HG-TG04 基本特性如下：

- 1.射频芯片：MAX2769×2
- 2.支持系统：GPS L1 和 BD2 B1，联合定位模式。
- 3.供电方式：外部提供 5V 供电(USB)
- 4.对外接口：
 - 射频：SMA×1，有源 3.3V 馈电
 - 串口：UART×1，默认波特率 115200bps，最高 460800bps。
 - 安装孔：2.5mm 内径安装孔×4
- 5.跟踪通道数：GPS L1 14 通道，BD B1 14 通道，各通道具有快速捕获能力。
- 6.定位精度：3~5m
- 7.速度精度：0.1m/s
- 8.冷启动速度：45s
- 9.跟踪灵敏度：-147dBm
- 10.定位输出率：1Hz
- 11.输出协议：HG-TEST2016 串口协议，可通过该协议提取 NMEA 数据。

3 测试结果

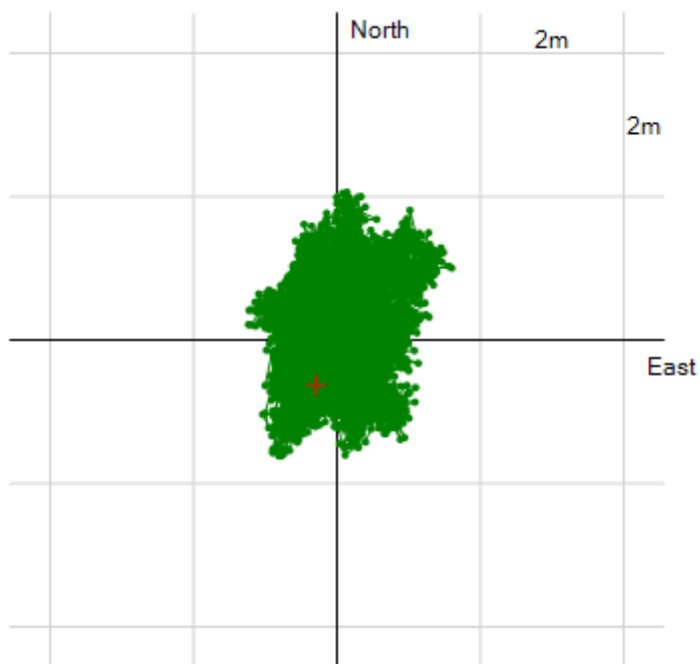


图 2 HG-TG04 在开阔处定位测试结果



图 3 HG-2016 测试软件

4 接收机输出文件

HG-TG04 基于 HG-TEST2016 可同时保存 5 种数据文件。

4.1 类似于 NMEA 中间文件

343330

GPXGA,232153.00,4002.8389,N,11610.3652,E,1,12,3.6,56.3,M,,,,,0000

GPRMC,232153.00,A,4002.8389,N,11610.3652,E,0.04,-56.74,210916,,,

GPXSA,A,3,11,01,07,65,66,67,68,72,76,71,79,74,3.6,3.4,1.2

GPXSV,3,1,12,11,67,175,55,01,44,168,52,07,65,238,55,65,38,144,47

GPXSV,3,2,12,66,32,224,43,67,44,189,50,68,26,123,48,72,74,223,54

GPXSV,3,3,12,76,46,241,46,71,62,150,44,79,45,224,47,74,82,238,48

GPZDA,232153,21,09,2016,07

每个数据块第一行是 GPS 时，后面几行是 NMEA 原始数据。

4.2 原始导航电文

336582

0,9,22C37B0F,DB642A60,1181694E,8C8E8988,21DA496A,8127C033,D1FCE60B,C607285B,C3922ED0,14A79F58

0,23,E2C37B30,1B642A5F,C60174A1,4D55FCBB,FDC48BF3,C13A0178,2D6EDE57,C5B3E854,33C0328,14A79A7F

0,8,22C37B0F,DB642A60,8BDB27C,B605203,C1368EE3,FE07C003,F93FEA9E,85796846,83845CBF,D4A79F34

1,1,B8902529,5232DF5A,BBAAAABE,80000000,0,0,1541,44015055,40BD150B,DFD4FFEC

1,1,38903526,9227DF1A,BAAAAAEB,D5BDBD4C,1BDBDBF6,BDBDBD6C,1E8A8AB2,802A810F,EA05458B,F6F6F6BC

1,2,B8902529,5232DF5A,BBAAAABE,80000000,0,0,1541,44015055,40BD150B,DFD4FFEC

1,2,38903526,9227DF1A,BAAAAAEB,D5BDBD4C,1BDBDBF6,BDBDBD6C,1E8A8AB2,802A810F,EA05458B,F6F6F6BC

1,3,B8902529,5232DF5A,BBAAAABE,80000000,0,0,1541,44015055,40BD150B,DFD4FFEC

1,3,38903526,9227DF1A,BAAAAAEB,D5BDBD4C,1BDBDBF6,BDBDBD6C,1E8A8AB2,802A810F,EA05458B,F6F6F6BC

1,4,B8902529,5232DF5A,BBAAAABE,80000000,0,0,1541,44015055,40BD150B,DFD4FFEC

1,4,38903526,9227DF1A,BAAAAAEB,D5BDBD4C,1BDBDBF6,BDBDBD6C,1E8A8AB2,802A810F,EA05458B,F6F6F6BC

336583

1,1,3890452D,5373DB5E,ACE6663A,A776228B,D0002AC3,C0AA012D,59999965,59999965,59999965,59999965

1,2,3890452D,5373DB5E,ACE6663A,A776228B,D0002AC3,C0AA012D,59999965,59999965,59999965,59999965

1,3,3890452D,5373DB5E,ACE6663A,A776228B,D0002AC3,C0AA012D,59999965,59999965,59999965,59999965

1,4,3890452D,5373DB5E,ACE6663A,A776228B,D0002AC3,C0AA012D,59999965,59999965,59999965,59999965

336584

1,1,78905522,9367CB5F,D9999965,59999965,59999965,59999965,59999965,59999965,59999965,59999965

1,1,7890152B,C232A297,D154C4CA,82CAF6DD,6A0B1164,19999965,59999965,59999965,59999965,59999965

1,2,78905522,9367CA5A,80000000,0,0,0,0,0,0,0

1,2,3890152B,C232A297,D154C4CA,828FA3D8,28A939E6,99999965,59999965,59999965,59999965,59999965

1,3,78905522,9367CA5A,80000000,0,0,0,0,0,0,0

1,3,3890152B,C232A297,D154C4CA,829AA78C,2A2119CC,19999965,59999965,59999965,59999965,59999965

1,4,78905522,9367CA5A,80000000,0,0,0,0,0,0,0

1,4,3890152B,C232A297,D154C4CA,828FE39D,6A23B9C4,19999965,59999965,59999965,59999965,59999965



1,8,F8905522,8226D851,40000000,0,0,0,0,0,0

1,15,F8905522,8226D851,40000000,0,0,0,0,0,0

336585

1,1,78902529,4236F7D7,FBAAAABE,80000000,0,0,1541,44015055,40BD150B,DFD66E11

1,1,78903526,8226A2C6,855DD516,9DBDBDEE,9BDBDBF6,BDBDBD6C,1E8A8AB2,802A810F,EA05458B,F6F6F6BC

1,2,78902529,4236F7D7,FBAAAABE,80000000,0,0,1541,44015055,40BD150B,DFD66E11

1,2,78903526,8226A2C6,855DD516,9DBDBDEE,9BDBDBF6,BDBDBD6C,1E8A8AB2,802A810F,EA05458B,F6F6F6BC

1,3,78902529,4236F7D7,FBAAAABE,80000000,0,0,1541,44015055,40BD150B,DFD66E11

1,3,78903526,8226A2C6,855DD516,9DBDBDEE,9BDBDBF6,BDBDBD6C,1E8A8AB2,802A810F,EA05458B,F6F6F6BC

1,4,78902529,4236F7D7,FBAAAABE,80000000,0,0,1541,44015055,40BD150B,DFD66E11

1,4,78903526,8226A2C6,855DD516,9DBDBDEE,9BDBDBF6,BDBDBD6C,1E8A8AB2,802A810F,EA05458B,F6F6F6BC

336586

1,1,3890452D,4373F397,ECE6663A,A776228B,D0002AC3,C0AA012D,59999965,59999965,59999965,59999965

1,2,3890452D,4373F397,ECE6663A,A776228B,D0002AC3,C0AA012D,59999965,59999965,59999965,59999965

1,3,3890452D,4373F397,ECE6663A,A776228B,D0002AC3,C0AA012D,59999965,59999965,59999965,59999965

1,4,3890452D,4373F397,ECE6663A,A776228B,D0002AC3,C0AA012D,59999965,59999965,59999965,59999965

336587

1,1,78905522,8367F3C6,99999965,59999965,59999965,59999965,59999965,59999965,59999965,59999965

1,1,7890152B,D262B8E5,594E9AF4,3D9D135A,91933B4D,59999965,59999965,59999965,59999965,59999965

1,2,78905522,8367F2C3,C0000000,0,0,0,0,0,0,0

1,2,3890152B,D262B8E5,594E9AF4,3D9D135A,91933B4D,59999965,59999965,59999965,59999965,59999965

1,3,78905522,8367F2C3,C0000000,0,0,0,0,0,0,0

1,3,3890152B,D262B8E5,594E9AF4,3D9D135A,91933B4D,59999965,59999965,59999965,59999965,59999965

1,4,78905522,8367F2C3,C0000000,0,0,0,0,0,0,0

1,4,3890152B,D262B8E5,594E9AF4,3D9D135A,91933B4D,59999965,59999965,59999965,59999965,59999965

包含 GPS 卫星，BD GEO 卫星，BD IGSO/MEO 卫星发射的原始导航电文

4.3 原始测量值

-12,0,330476,0

0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0

1,0,0,27,858,15042,32012,8,46,3999872,330475,1016513

1,0,0,23,939,61652,32619,8,46,3997966,330475,516654



0,0,0,0,0,0,0,0,0,0,0,0

1,0,1,1,1874,28465,41354,13,43,3998045,330461,243821

1,0,1,2,1520,14944,62107,12,43,3998040,330461,242445

1,0,1,3,2006,7809,2924,14,43,3998057,330461,246715

1,0,1,4,36,22466,21948,10,43,3998060,330461,247589

1,0,1,8,822,18152,38766,9,43,3999934,330461,739310

0,0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0,0

1,0,1,9,611,39586,33325,10,43,3996077,330461,-272663

0,0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0,0

0,0,0,0,0,0,0,0,0,0,0,0

包含所有通道的原始数据测量值。

4.4 解方程之前使用的观测量

346689

30,0,21017676.893330,832314.345907,23647213.580626,11949899.502957,-76.039596,-754.731170,1350.949182,-2632.243384,9740395.70

1,0,20327027.495807,-14027765.595577,18780526.012527,12152317.299191,-393.185265,190.422536,-1574.483585,2654.993219,9828948.69

17,0,24118618.863404,14541928.568443,21730034.774732,5542620.666358,-694.587159,-588.747610,-352.342238,3097.694962,8584930.04

7,0,21511940.876044,-5620690.328757,25582811.883229,2834769.256588,266.002652,-388.497120,243.615904,-3184.972003,9581335.75

65,1,37886209.717599,-32290662.897362,27098289.837227,683445.005319,-216.091019,0.221880,-0.674106,-63.608517,9342406.98

67,1,37438461.520137,-14717881.962480,39519543.790031,978315.009515,-220.245042,1.494675,1.376852,-2.097755,9502866.10

68,1,38905379.727525,-39559859.230855,14517447.089409,614738.187260,-221.253262,0.836097,-3.766825,-19.538161,9074918.42

72,1,35995423.413594,-7210628.863447,31311648.949924,27432623.148132,-220.738096,485.136408,-1336.725268,1646.984358,5020939.23

76,1,22125117.802294,237050.502898,21860530.385094,17442631.158514,-391.266504,-1121.923952,-1634.194070,2056.562702,9654595.10

71,1,36803661.839377,-22625434.897255,34936875.133694,5601172.034386,-20.941083,816.859675,910.284638,-2446.719643,9571547.68

79,1,37100704.989265,3749291.758416,39435381.456296,14724866.456171,-311.609694,933.581232,-944.621187,2277.551112,9596044.20

74,1,35974733.729923,-10867729.046898,36126683.479230,18606477.332603,-119.069775,387.795614,1171.954748,-2075.361502,9813886.56

4.5 定位结果

337668,0.030589822355176,-27.4810844538106,116.172743856826,40.0473550160653,62.51777967376

337669,0.0283430216275448,-19.4275045522411,116.172749818852,40.0473554980729,63.4532832530242

337670,0.0389157980414053,-20.5215428618496,116.172753735877,40.0473507774666,64.2109284369662

337671,0.0356747403565524,-19.1677228008556,116.172749309267,40.0473479746202,64.2487590635041

337672,0.0294712539182181,-6.16290454984028,116.172747128513,40.0473574733146,63.9481535088435

337673,0.0278882645499156,-13.6585989786037,116.172750239387,40.0473527268241,64.9394023072714

337674,0.0283566244262372,-26.0673721728733,116.172751492545,40.0473509426197,64.5533355869035



337675,0.0380303493945372,-16.6070945814793,116.172744996693,40.0473587144252,63.463164607659
337676,0.0264366358086706,-18.5651314074948,116.172743507627,40.0473582031592,62.9499859696564
337677,0.0297224188620201,-20.1374260627944,116.172744925488,40.0473549754419,62.6660086713929
337678,0.0325374430256433,-15.7775345000042,116.172743082126,40.0473598993122,61.4759884458814
337679,0.0318160177010432,-22.9727792407827,116.172737526259,40.0473659324044,59.9941981630178
337680,0.0291044765294961,-28.4639130291277,116.172738243245,40.0473644425132,59.4116402333983

含速度、航向角，位置信息。

5 机械尺寸

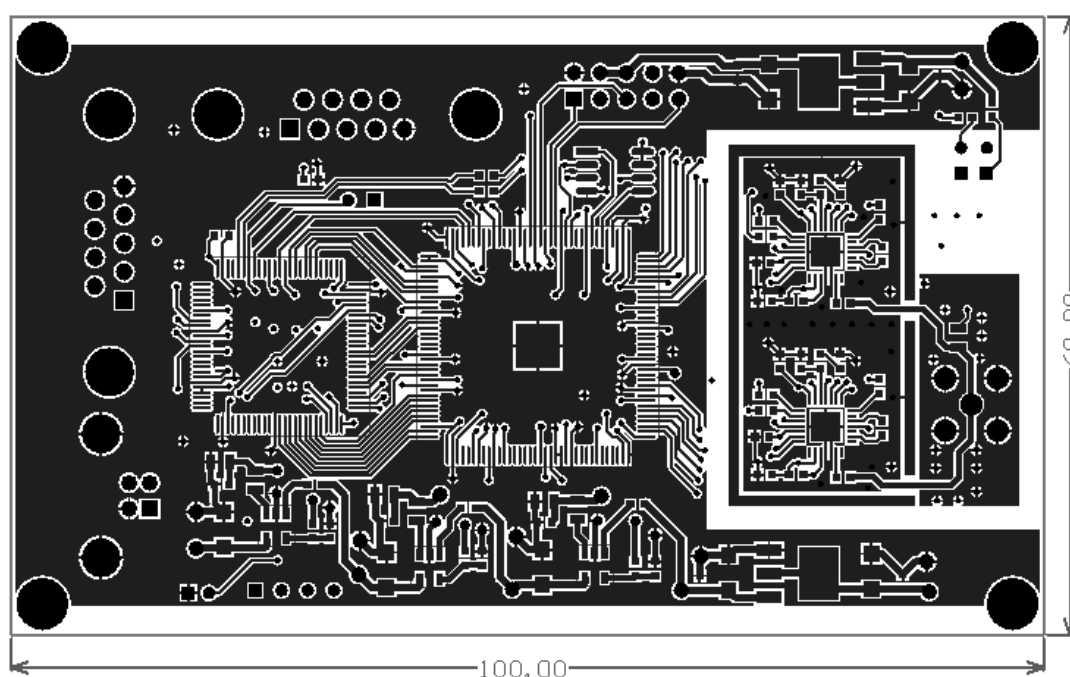


图 4 HG-TG04 尺寸图（默认单位为 mm）

6 装箱清单

- 1、HG-TG04 接收机板一块；
- 2、配套文档：HG-TG04 使用说明书 V1.1；
- 3、配套软件：HG-TEST2016 测试软件、NMEA 测试软件。

7 服务条款

- 1、半月内如产品硬件有质量问题可免费更换；
- 2、提供 2 个月的 QQ 技术支持；