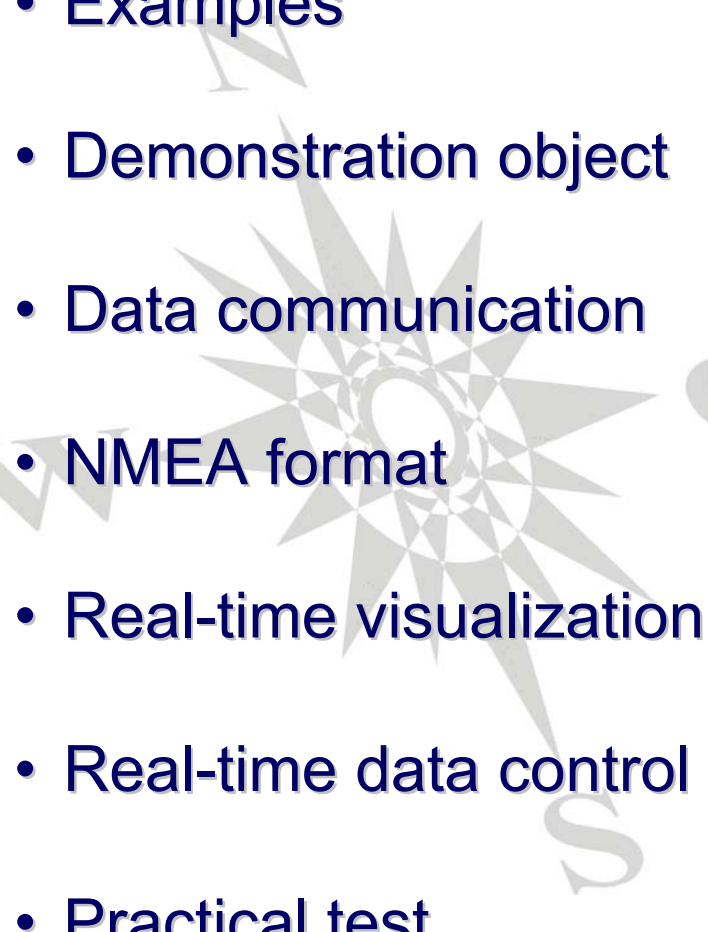






Handheld GPS receivers

Contents

- 
- A large, faint, grey compass rose is centered in the background of the slide. It has multiple points and is partially obscured by the text of the list.
- Examples
 - Demonstration object
 - Data communication
 - NMEA format
 - Real-time visualization
 - Real-time data control
 - Practical test

Handheld GPS receivers (1)

- Examples



Handheld GPS receivers (2)

- Demonstration object: **Garmin GPS II+**



Handheld GPS receivers (3)

- Some technical data

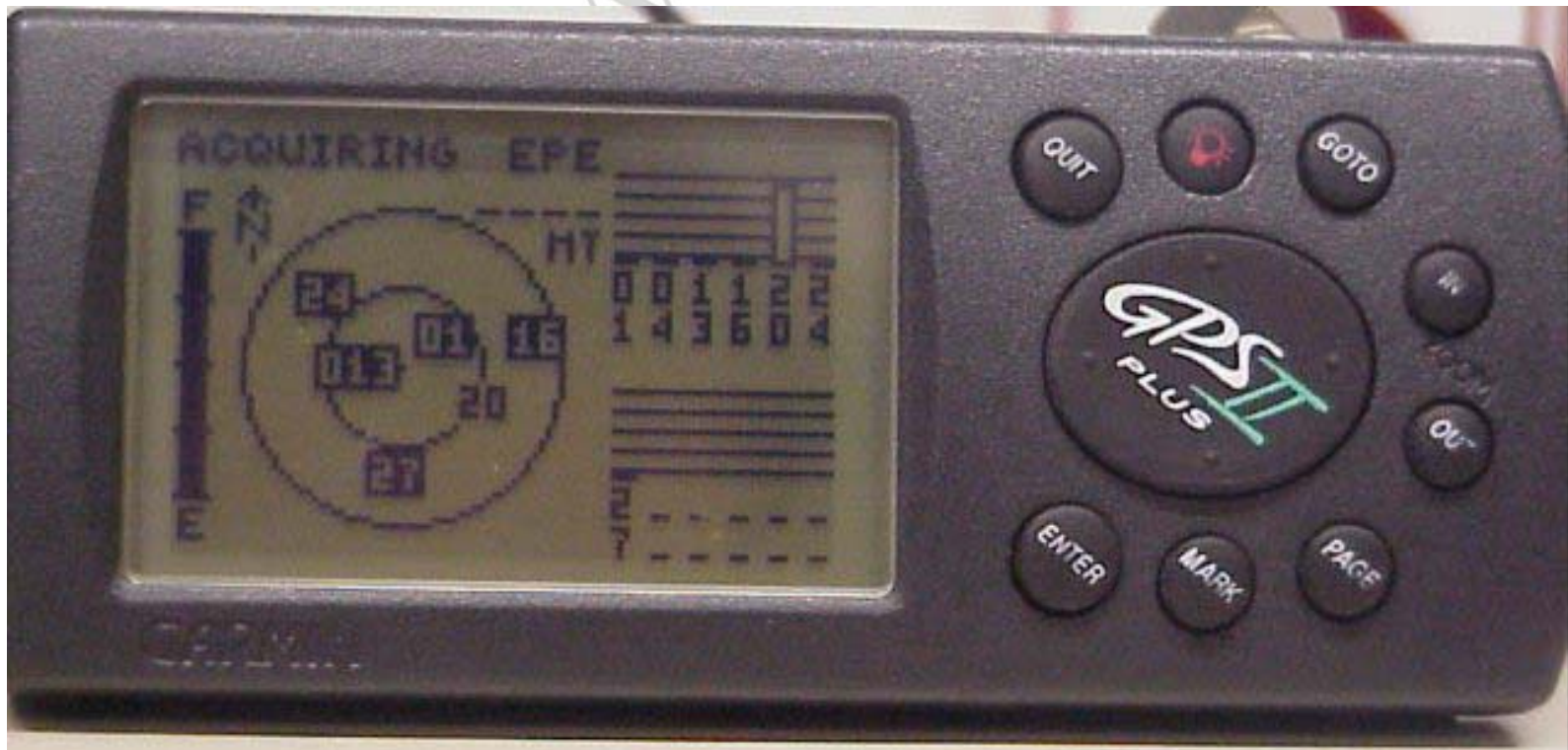
	Garmin GPS II+
Channels	12
Waypoint support	yes
Map support	no
External antenna connector	yes
NMEA output	yes
RTCM input	yes
Usage time	~12 h
Control	keyboard
Mass (with batteries)	~270 g
Production year	1996

Handheld GPS receivers (4)



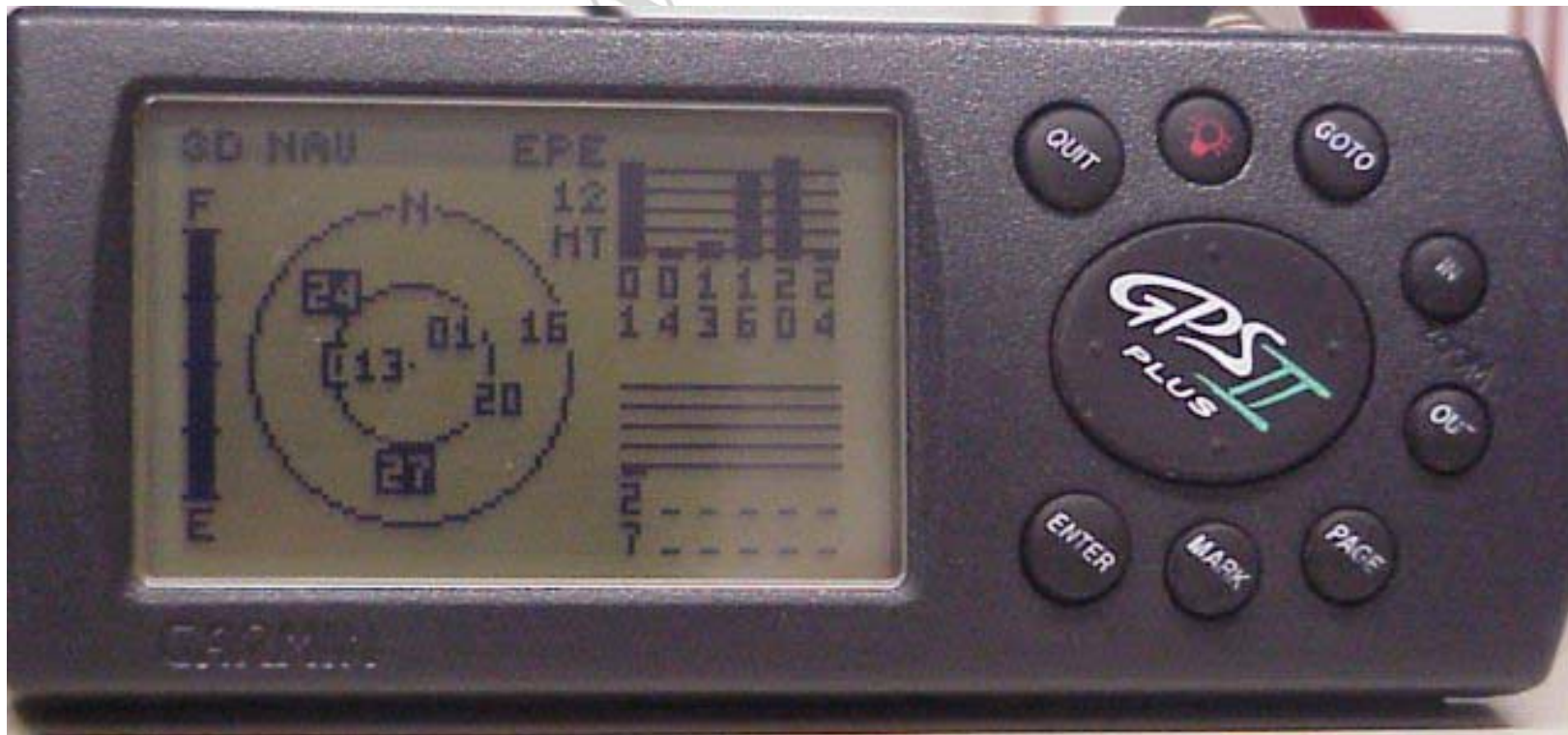
Handheld GPS receivers (5)

Acquiring ephemerides



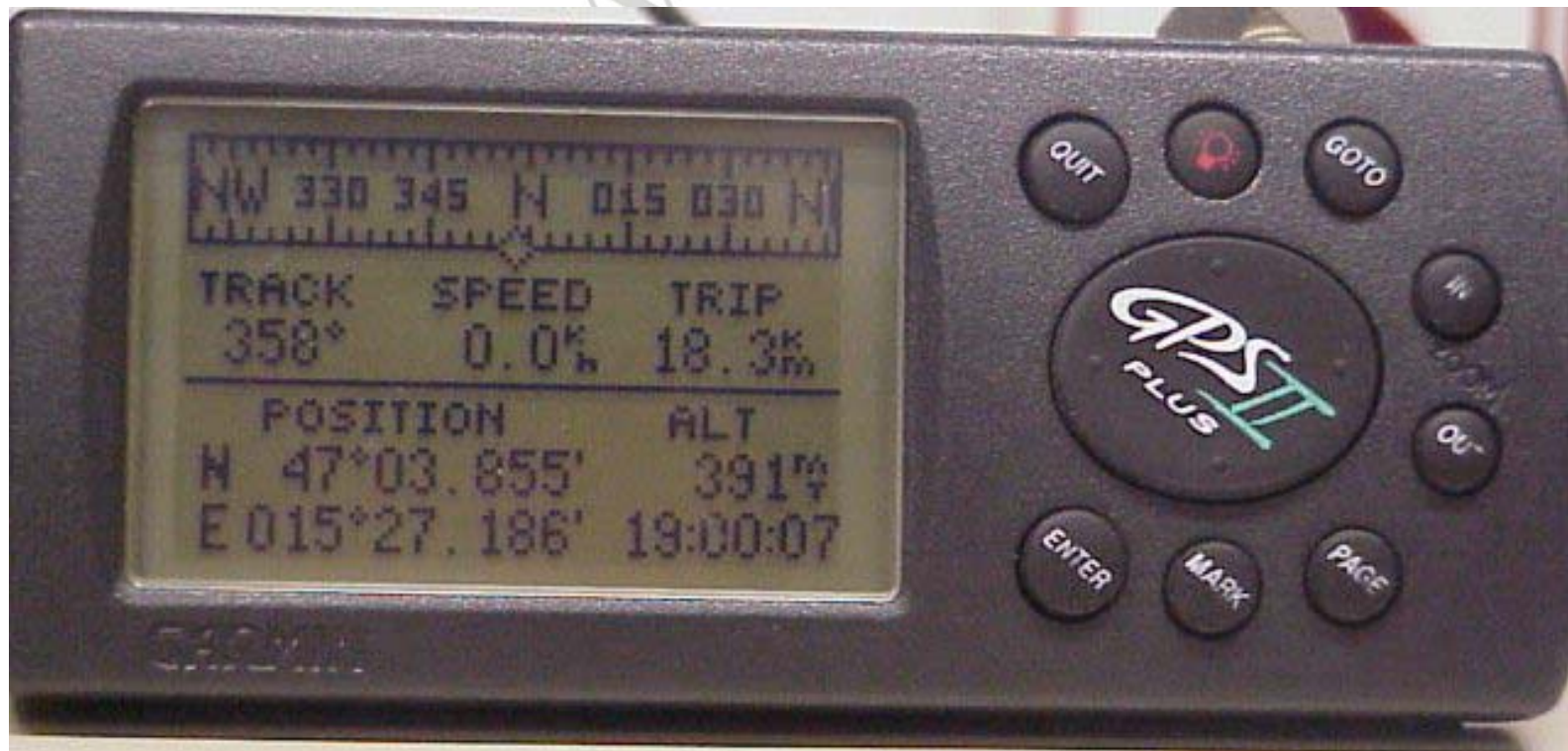
Handheld GPS receivers (6)

Ready for navigation (3D)



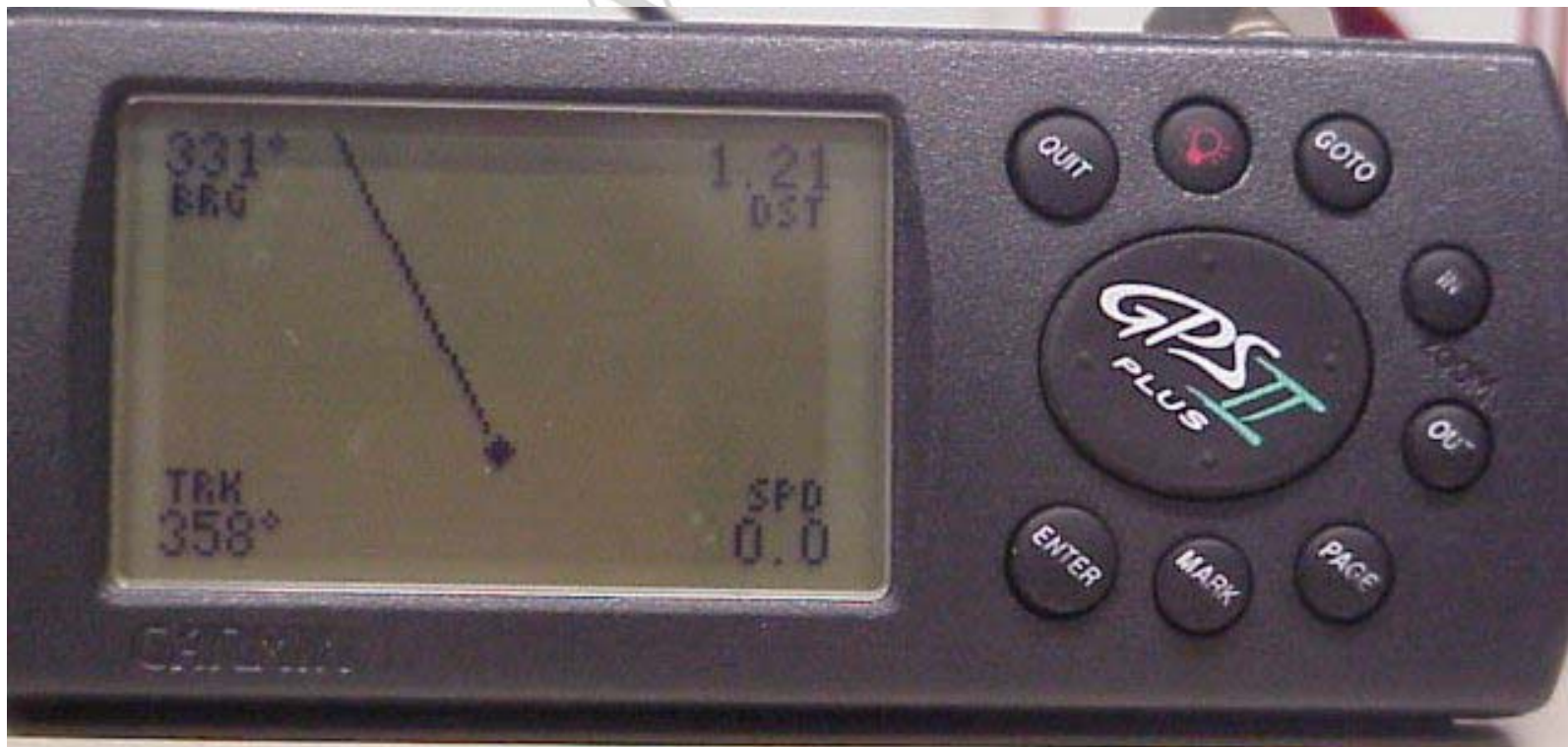
Handheld GPS receivers (7)

Numerical data



Handheld GPS receivers (8)

Map display



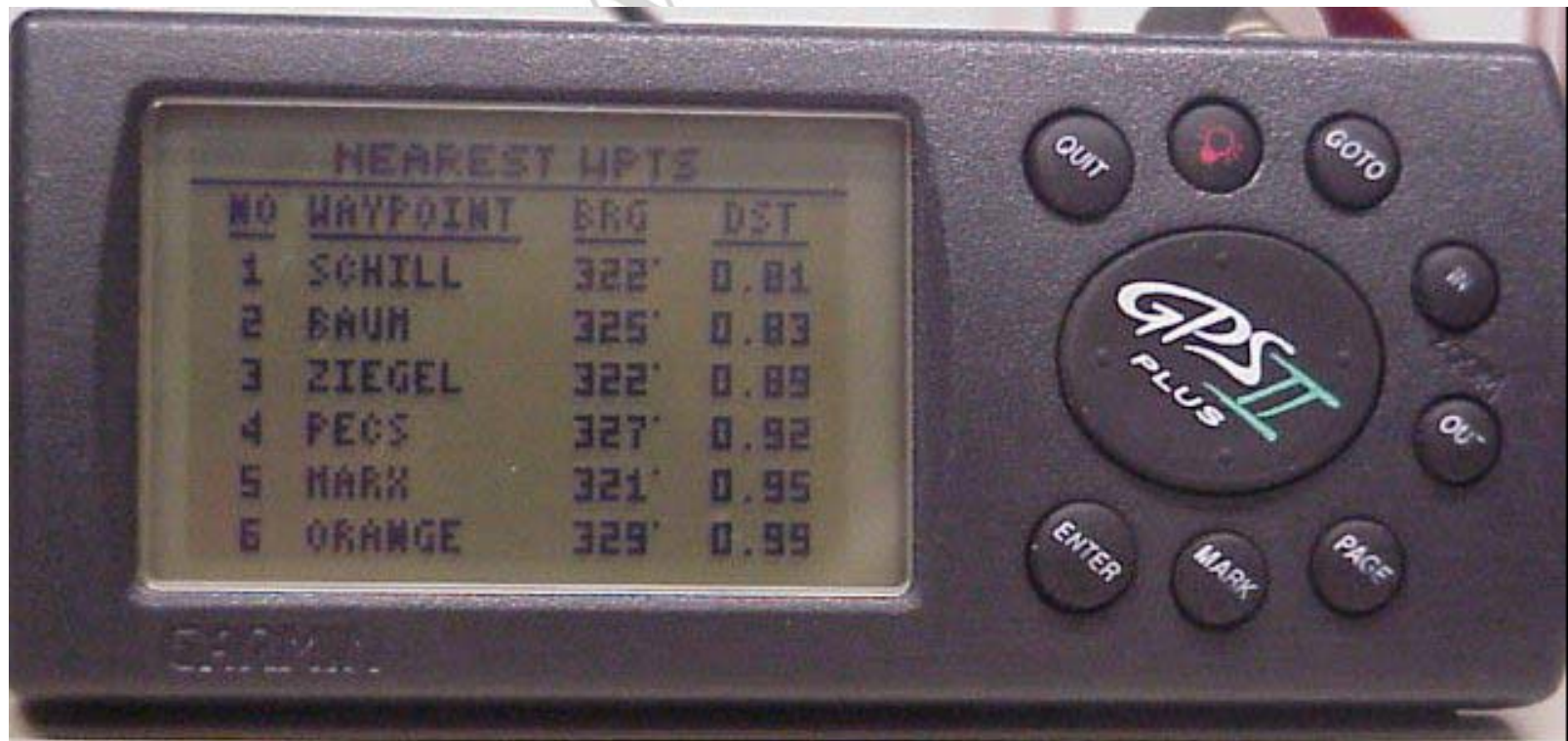
Handheld GPS receivers (9)

Complete list of waypoints (→ scroll)



Handheld GPS receivers (10)

Nearest waypoints (→ scroll)



Handheld GPS receivers (11)

Specific waypoint



Handheld GPS receivers (12)

Navigation using the compass rose



Handheld GPS receivers (13)

Navigation using the “highway display”



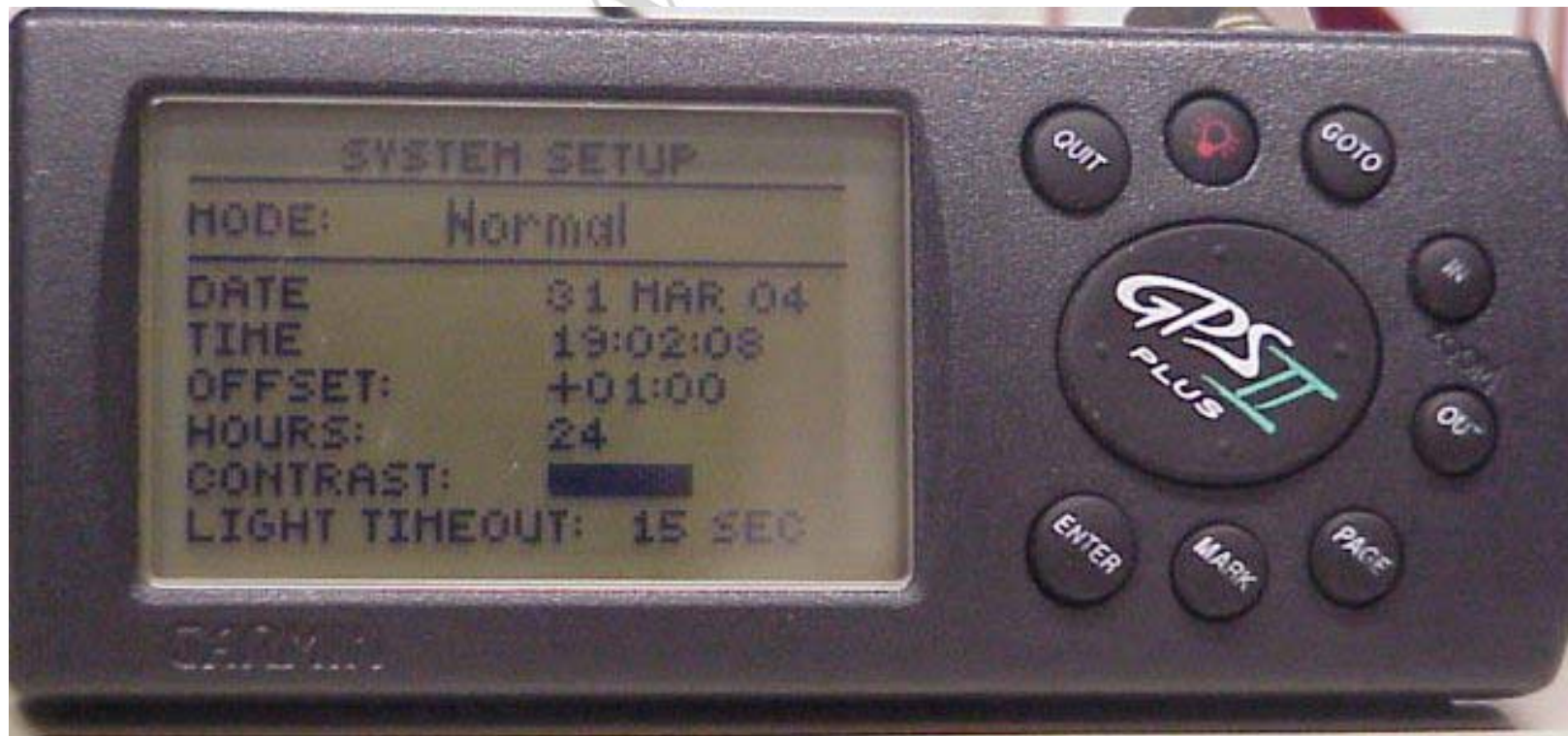
Handheld GPS receivers (14)

Navigation setup



Handheld GPS receivers (15)

System setup



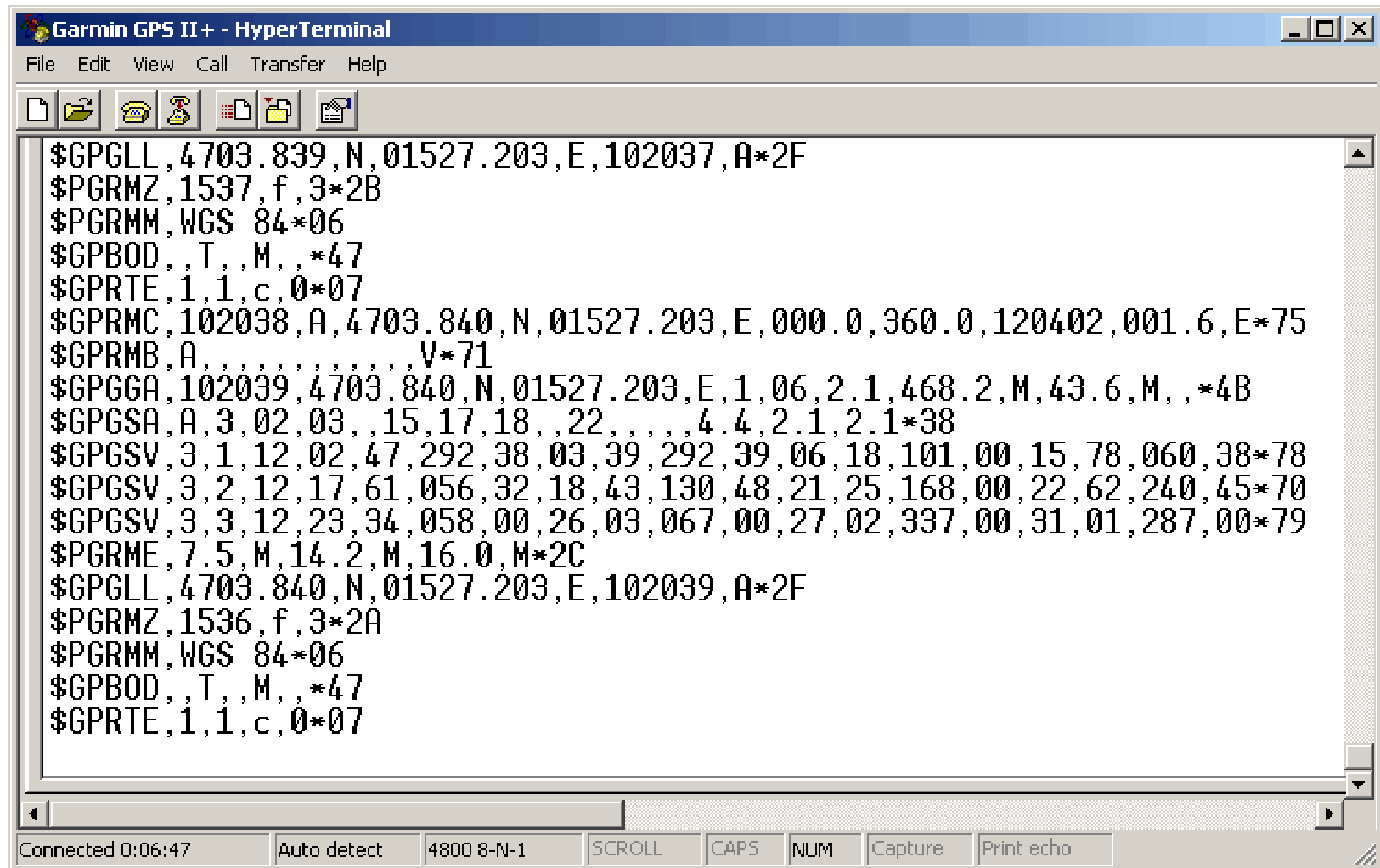
Handheld GPS receivers (16)

External interface



Handheld GPS receivers (17)

- Data communication: e.g. using **Hyperterminal**



```
$GPGLL,4703.839,N,01527.203,E,102037,A*2F
$PGRMZ,1537,f,3*2B
$PGRMM,WGS 84*06
$GPBOD,,T,,M,,*47
$GPRTE,1,1,c,0*07
$GPRMC,102038,A,4703.840,N,01527.203,E,000.0,360.0,120402,001.6,E*75
$GPRMB,A,,,,,,,,,V*71
$GPGGA,102039,4703.840,N,01527.203,E,1,06,2.1,468.2,M,43.6,M,,*4B
$GPGSA,A,3,02,03,,15,17,18,,22,,,,,4.4,2.1,2.1*38
$GPGSV,3,1,12,02,47,292,38,03,39,292,39,06,18,101,00,15,78,060,38*78
$GPGSV,3,2,12,17,61,056,32,18,43,130,48,21,25,168,00,22,62,240,45*70
$GPGSV,3,3,12,23,34,058,00,26,03,067,00,27,02,337,00,31,01,287,00*79
$PGRME,7.5,M,14.2,M,16.0,M*2C
$GPGLL,4703.840,N,01527.203,E,102039,A*2F
$PGRMZ,1536,f,3*2A
$PGRMM,WGS 84*06
$GPBOD,,T,,M,,*47
$GPRTE,1,1,c,0*07
```

Connected 0:06:47 Auto detect 4800 8-N-1 SCROLL CAPS NUM Capture Print echo

- **NMEA 0183**

- **NMEA** = National Maritime Electronics Association (USA)
- Standardized ASCII format for data exchange
- Support of various navigation systems

- Important message

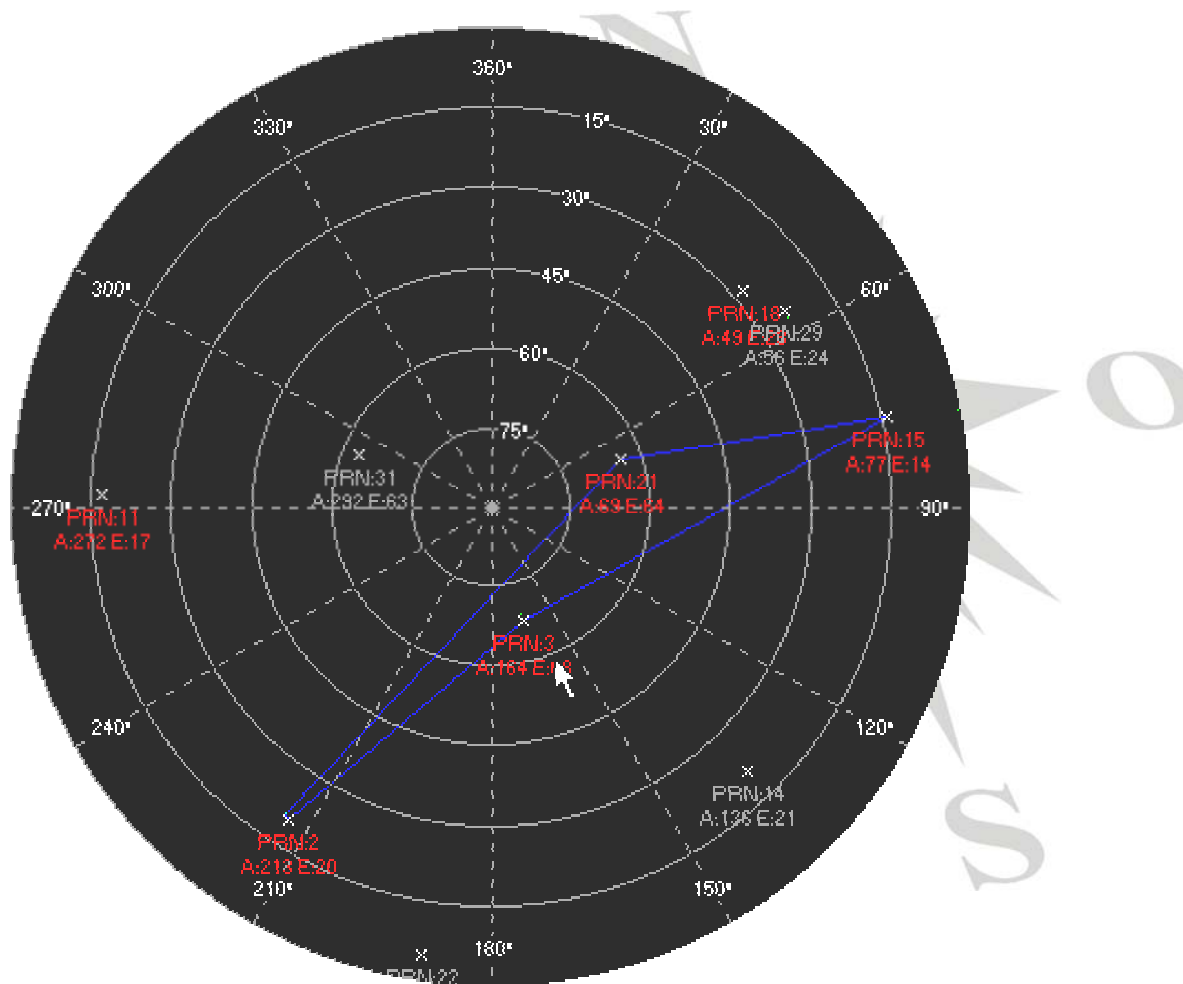
- **GPGGA** = GPS Geographic position and altitude

\$GPGGA,102039,4703.840,N,01527.203,E,1,06,2.1,468.2,M,43.6,M,,*4B

Code, Time, Lat., Long., DGPS, #SV, DOP, Height, Geoid, Check

Handheld GPS receivers (19)

- Real-time data control: e.g. using **VisualGPS**



Handheld GPS receivers (20)

- Real-time visualization: e.g. using **Austrian MAP**

