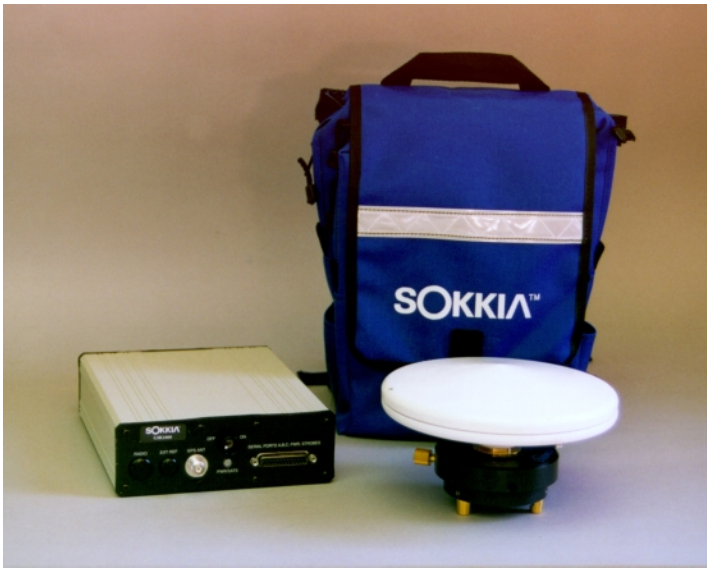
SOKKIA™

GSR2400

GPS+GLONASS SURVEYING SYSTEM



Sokkia's new GSR2400 GPS+GLONASS System uses both GPS *and* GLONASS satellites to determine precise measurements with short observations. The addition of GLONASS helps the GSR2400 overcome many of the limitations of GPS, providing unprecedented accuracy and performance.

The addition of GLONASS, the Russian equivalent of GPS, doubles the number of satellites available for precision positioning with Sokkia's GSR2400. The resulting 48 satellite constellation provides numerous advantages over traditional GPS-only systems:

- Observing more satellites allows a single frequency GPS+GLONASS system to utilize surveying modes such as rapid static and realtime kinematic (RTK) that are normally reserved for larger, more expensive dual-frequency systems.
- More satellite observations increase the integrity of position solutions. The possibility of reporting an incorrect position drops significantly as the number of observed satellites increases.
- With 48 satellites available, you can survey in areas where GPS-only systems could not operate due to overhead obstructions including in open pit mines, on city streets and under forest canopy

GPS+GLONASS for Greater Productivity

The GSR2400 treats the two satellite constellations as one, using all available satellites from both systems; the receiver utilizes the best combination of GPS and GLONASS satellite data to provide one solution. GPS and GLONASS are seamlessly integrated.

With the GSR2400, you can survey almost anywhere, at any time. It's ideal for control and boundary work—one person can quickly and easily establish a local network, which can free up crew members for other projects, making your business even more efficient.

Dual-Frequency Performance in a Single Frequency System

Until now, advanced GPS surveying techniques such as rapid static and real-time kinematic (RTK) could only be done efficiently with dual-frequency systems. But with the GSR2400's increased observations, you can accomplish fast measurements and conduct real-time kinematic surveys with performance similar to dual-frequency systems.

The GSR2400 can be configured to support static, rapid static and pseudo-kinematic modes of surveying. Postprocessed kinematic and real-time kinematic will be supported later in 1997.

To take advantage of the increased satellite availability the GSR2400 has 12 channels for L1 GPS and 12 channels for L1 GLONASS, providing all-in-view tracking for both constellations.

Upgradeable to Real-Time Operation

The GSR2400's receiver can be upgraded for real-time differential by adding optional RTCM input or output—so it can be used either as a real-time DGPS base station or field rover. The new SSRadio provides real-time data communication, whether it's integrated into your receiver or purchased as an external transceiver.

Powerful, Intuitive Software

The optional GSPRO2000 software is designed to be easy to use. Running under Windows, it’s simple, graphical interface guides you through each step of a successful survey. Modules include mission planning, PC data transfer and data processing (to process baselines and station positions), least-squares adjustment, and a CAD module for analysis and plotting.

GSR2400 Specifications

Accuracy

Static Surveys (95%)

Horizontal	0.5cm + 1ppm
Vertical	1cm + 2ppm
Azimuth (arc sec.)	0.15 + 1.5/baseline length in km

Real-Time Accuracy

Autonomous	CEP (50%)	95%
GPS+GLONASS	7m	16m
GPS only	25m	100m
GLONASS only	8m	20
Differential	**CEP(50%)**	**95%**
GPS+GLONASS	35cm	75cm
GPS only	40cm	90cm
GLONASS only	50cm	1 m

Velocity Accuracy (knots)

Autonomous	Mean	95%
GPS+GLONASS	0.15	0.30
GPS only	1	4
GLONASS only	0.03	0.0
Differential	**Mean**	**95%**
GPS+GLONASS	0.04	0.10
GPS only	0.05	0.10
GLONASS only	0.02	0.05

Communications

- 3 bi-directional RS232 serial ports
- TI TMS-C31 bi-directional synchronous port

Standard Features

- 12 channels L1 GPS code and carrier
- 12 channels L1 GLONASS code and carrier
- 30-second warm start (typical)
- 40-second cold start (typical)
- 2-second re-acquisition time (dynamic independent)
- Magnetic Variation models
- Standard NMEA-0183 V2.01 output
- User-selectable standard datums
- User-definable datum
- Raw data output (code and carrier)
- 2mb memory (upgradeable to 8 or 20MB) capable of storing up to 15 hours of satellite data at 20-second recording intervals with an average of 15 GPS or GLONASS satellites

Standard Accessories

- Compact GPS+GLONASS antenna
- Rechargeable battery and battery charger
- 3.5m antenna cable
- Power/PC download cable
- Rugged backpack carrying system
- Tribrach adapter and HI rod
- System manuals

Antenna

Each GSR2400 receiver uses one antenna to receive both GPS and GLONASS signals. The antenna connects through a single antenna cable and port on the receiver.

Physical & Environmental

Operating Temp.	-22°F to +131°F (-30°C to +55°C)
Storage Temp.	-40°F to +185°F(-40°C to +85°C)
Power Consumption	3 Watts
Input Voltage	6-15 ±5%
Weight	3.5 lbs. (1.6kg)
Dimensions	6.76x2.28x8.59”(172x58x218mm)

Meets MILSPEC 810E for wind-driven rain and dust

Speed (max.)	1,000 knots*
Altitude (max.)	60,000 ft.*

* Higher altitude and faster speed options are available with a validated export license.

Optional Accessories

- Internal spread-spectrum radio data link for real-time operation (available in the U.S. and some other countries without a license)
- HP-1000 hand-held computer w/ Survey Control software
- RTCM SC-104 input and output
- Husky FS/2 hand-held computer w/ Survey Control software
- Survey Control software for PC
- External UHF and spread-spectrum radio links for realtime operation
- Tripod, tribrach, kinematic bipod and pole GSPRO2000 Software Capabilities
- Mission planning for satellite availability
- Robust static processing algorithms for processing GPS+GLONASS data
- Least-squares adjustment to facilitate blunder detection and improve position accuracy

SOKKIA CORPORATION
9111 Barton, Box 2934
Overland Park, KS 66201 USA
Tel: 1-800-4-SOKKIA or (913) 492-4900
Fax: (913) 492-0188 Internet: http://www.sokkia.com

SOKKIA CORPORATION (CANADA)
1050 Stacey Ct.
Mississauga, Ontario L4W 2X8 CANADA
Tel: 1-800-476-5542 or (905) 238-5810
Fax: (905) 238-9383