

GEONET WIRELESS DATA HOSTING SYSTEM

GEOKON®

MODEL 8800 SERIES



The Model 8800 Series GeoNet Wireless Data Hosting System: a typical network configuration of Loggers, a Cellular Gateway and Cloud integration with secure data access

APPLICATIONS

Typical applications include:

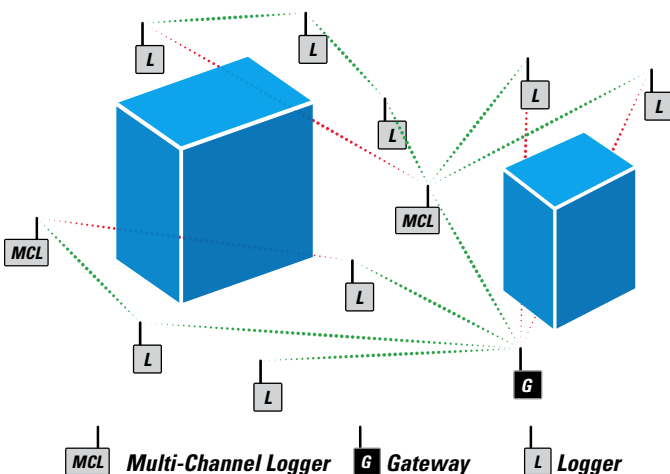
- Groundwater monitoring
- Tailings dams
- Mining/slope stability
- Structural monitoring of buildings, bridges, excavations and tunnels
- Historical structures

TOPOLOGY

The system topology takes the form of a star, mesh, or cluster tree, with a range dependent on the region.¹ Multi-Channel Loggers expand the capacity at each Logger, thereby allowing clusters of closely spaced

sensors to be added to the system, or to add vibrating wire load cells, multi-point borehole extensometers or multi-level piezometers.

¹For range information, refer to the Specifications Section



Model 8800 Mesh Topology

INTRODUCTION

The GeoNet system consists of a Cellular Gateway and subordinate Loggers that supply data collected from the sensors. The Gateway controls the network and is the aggregator of all the data from the Loggers. The Cellular Gateway transfers the collected data to a cloud-based storage platform, where it can be securely accessed for viewing or exporting. A local gateway is available for applications where the

data is to remain on site. Tilt loggers, which combine the functionality of a biaxial tiltmeter and a GEONET logger, are also available.

The system is compatible with all GEOKON Vibrating Wire instruments and addressable sensor strings (MEMS, VW, and thermistor).² Sensor cables are connected through cable glands or 10-pin bulkhead connectors.

²Other sensor types will be added in the future

OPERATING PRINCIPLE

The GeoNet network is self-healing and will reconfigure itself, if possible, to tolerate disturbances to the physical environment or changes to the network configuration. Up to 12 networks can exist within radio range of one another by setting each to a different operating channel.

The Loggers that comprise the network wake from sleep to communicate or

collect data, and then return to sleep when finished. Loggers separated from the network will continue to collect and store data autonomously as a datalogger. When network connectivity is re-established, the data collected is transmitted to the Gateway where it is stored. Each Logger retains a copy of its data.

COMMUNICATIONS

Configuration of the network and collection of data is accomplished via a PC client program by connecting to the Gateway through the GEOKON

open API, over RS-232 or USB, or network serial servers. Data collected by the network consists of instrument, Logger, and network status data.

ENVIRONMENT

GeoNet Loggers, Multi-Channel Loggers and Gateways are enclosed in die-cast aluminum enclosures, which are suitable for use in harsh environments. The conductive enclosures protect the internal components and signals from outside interference and offer protection from transient events caused by nearby lightning strikes.

POWER

The Cellular Gateway is powered by an AC adapter (provided), optional solar panel, or other external 12V source for ongoing usage.

Loggers and Local Gateways are powered by two D cell batteries, either Lithium or Alkaline, or by an external source up to 12V.

SOFTWARE

GEOKON Agent software³ is used for network configuration and data collection. For networks utilizing a Cellular Gateway, data is stored in a cloud-based platform that can be accessed remotely. Networks using a Local Gateway require a direct cable connection to download data onto the host computer. In both cases, GEOKON

Agent software manages the conversion of the raw data to engineering units. Data can be exported from GEOKON Agent for use in other data management applications; and configured to automatically expedite this process.

³GEOKON Agent software can be downloaded at www.geokon.com/software

GATEWAY SPECIFICATIONS

Data Memory	32 MB
Storage Capacity	> 1.04 M Arrays
Communication Type	USB, RS-232
Communication Speed	115.2 kBits/second
Communication Parameters	8, N, 1 (data bits, parity, stop bits)
Scan Interval	10–1440 Minutes
USB Driver	FTDI
Power Supply	Battery pack, or 9–24V External (Cellular Gateway) D Cell, Alkaline or Lithium (2x), or 12V External (Local Gateway)
Operating Time	Please contact GEOKON
Operating Temperature	–40° C to +85° C (range varies by power source)
(L × W × H)	160 × 260 × 91 mm (Cellular Gateway) 120 × 122 × 91 mm (Local Gateway)

LOGGER SPECIFICATIONS

Data memory	32 MB
Storage Capacity	Varies by model
Trueness	0.082 Hz
Frequency Precision	±0.146 Hz (99% CI)
Frequency Resolution	±0.002 Hz
Thermistor Accuracy	1% (0.5° C thermistor point match)
Thermistor Resolution	0.032° C
Scan Interval	10–1440 Minutes
Power Supply	2x D cell, Alkaline or Lithium, 12V Auxiliary
Operating Temperature	–40° C to +85° C (range varies by power source)
VW Frequency Range	400–5000 Hz
Battery Life	Please contact GEOKON
Dimensions (L × W × H)	120 × 122 × 91 mm (single-channel, addressable, tilt) 160 × 260 × 91 mm (four-channel) 180 × 280 × 101 mm (eight-channel)

TILT LOGGER SPECIFICATIONS

Precision	±26.9 Arcseconds (0.0075°)
Non-Linearity	±0.005° across ±30° range (±0.09 mm/m)
Temperature-Dependent Uncertainty	68.8 Arcseconds (0.019°)
Angle Resolution	0.9 Arcseconds (0.00025°)
Tilt Range ¹	±90°
Axis	2

¹Calibrated range: ±30°

NETWORK SPECIFICATIONS

Topology	Star/Mesh/Cluster Tree (Auto)
Radio Technology	FHSS
Radio Frequency, ISM Band	902–928 MHz (North America) 915–928 MHz (Australia/Chile/Peru) 902–906, 915–928 MHz (Brazil)
Channels	12
Range (Indoor/Urban) ¹	1.22 km (305 km x 4 hops)
Range (Outdoor) ¹	26 km (6.5 km x 4 hops)
Transmit Power	250 mW
Receiver Sensitivity	–101 dBm
Antenna (Half-Wave Dipole)	2.1 dBi

¹Line-of-sight, maximum 4 hops.

CELLULAR FREQUENCIES

	BAND	FREQUENCY (MHZ)	UPLINK (MHZ)	DOWNLINK (MHZ)
03G	5	850	824 – 849	869 – 894
	2	1900	1850 – 1910	1930 – 1990
LTM	2	1900	1850 – 1910	1930 – 1990
	4	1700	1710 – 1755	2110 – 2155
	8	900	880 – 915	925 – 960
	28	700	703 – 748	758 – 803

ORDERING INFORMATION

Example Part Number for a Logger: 8800-NA-01C-CBL

MODEL/ REGION	LOGGER TYPE	SENSOR CONNECTION
8800-NA: North America	01C: 1-Channel Mesh VW Logger	CBL: Cable Gland
8800-BZ: Brazil	ADR: Mesh Addressable Logger	10P: 10-Pin
8800-AU: Australia	04C: 4-Channel Mesh VW Logger	NAP: No Access Point
8800-CL: Chile	08C: 8-Channel Mesh VW Logger	
8800-PE: Peru	TLT: Mesh Tilt Logger	

Example Part Number for a Gateway: 8800-NA-LTM-USB

MODEL/ REGION	GATEWAY TYPE	PC CONNECTION
8800-NA: North America	LTM: Cellular Gateway for LTE-M	USB: USB cable
8800-BZ: Brazil	03G: Cellular Gateway for 3G	232: RS-232 cable
8800-AU: Australia	SUP: Local Gateway	
8800-CL: Chile		
8800-PE: Peru		

Note: Not all models available in all areas

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