



gomspace.com

NanoCom MS100

Datasheet

Ground station computer with satellite control software

Product name: NanoCom MS100

Document No.: 1018302

Revision: 1.3

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Approved by: TOKR

Approval date: 16 February 2021

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2 Overview

The GomSpace NanoCom MS100 is a 19" rack mounted PC with software. It is designed to work as part of a ground station setup, together with a radio and a roof top antenna.

3 Hardware

The MS100 is a 1U 19" rack computer with an Intel Xeon E3-1220 3 GHZ processor, 500 GB SSD, 4 GB RAM.

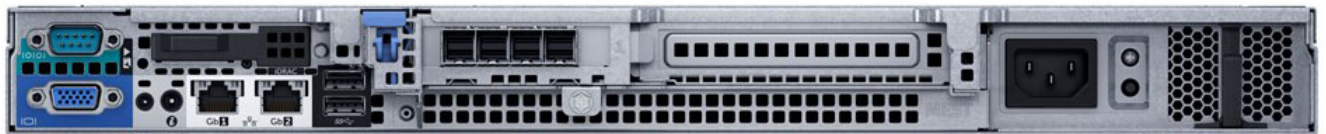
It weights approx. 6 kg and is 4.3 x 43.4 x 48.2 cm (H x B x D).

Front



Two USB ports, DVD.

Back



Two 1 Gbps transfer rate ethernet ports for network access. VGA screen connector. Supply voltage is 220 V AC (50-60 Hz).

3.1 Absolute Maximum Values

Description	Min.	Max.	Unit
Temperature range	20	35	°C
Humidity (None condensing)	0	90	%

3.2 UPS Recommendation

GomSpace recommends acquiring a UPS with enough extra run time for a single satellite pass.

4 Software

The MS100 has several software applications pre-installed. Some of the software is included as default, whereas others are optional. Below is a brief description of the software. For a more detailed description, see the MS100 manual.

4.1 Included Software

The following software is included as default:

- Linux OS.
- Rotor Controller Daemon.
- Csp-doppler.
- Csp-term.
- Beacon Parser Service.
- ZMQProxy and ZMQBridge.
- MongoDB.

4.1.1 Linux OS

The operating system of the MS100 is Linux Ubuntu version 16.04.

4.1.2 Rotor Controller Daemon

The MS100 can be connected to a controller box which interfaces with the azimuth and elevator controller using a RS-232 interface. Together with satellite pass prediction software the complete ground system can be made to track a satellite each time it comes above the horizon.

The control application is based on 'rotctld' from hamlib (<https://github.com/N0NB/hamlib>) with some GomSpace modifications.

4.1.3 Csp-doppler

By using csp-doppler it is possible to:

- Compensate for Doppler effects frequency shift to get a better signal
- Track satellite via csp-term/make satellite pass prediction

The doppler compensation configures the radios in GS100. The tracking is done via the Rotor Controller.

4.1.4 Csp-term

GomSpace has developed a console application called csp-term. By running csp-term, one gain access to the GomSpace Shell (GOSH).

Csp-term is the main operation software for GomSpace satellites. The use of GOSH and csp-term is described in the GOSH manual.

4.1.5 MS100 Command & Management SDK

The MS100 Command & Management SDK has in previous documentation been named 'SDK for Linux'.

The SDK includes a set of advanced and feature rich modules that enable fast and efficient development of Linux applications for either Ground Station. It can also be used as an example of how to develop GomSpace compatible applications for Linux.

It is delivered as a standard archived file (tarball) and easily installed via an executable build script – see the MS100 Command & Management SDK manual.

Some of the modules included are shown below:

libgscsp	:	Network library
libftp	:	File transfer
libgosh	:	Shell interface
libparam	:	Parameter system
liblog	:	Logging systems
libutil	:	Various utilities
libhk_client	:	Housekeeping client
libfp_client	:	Flight Planner client

4.1.6 Beacon Parser Service

The Beacon Parser Service receives and handles telemetry beacons both as files and as CSP packets. The telemetry data in the beacons is inserted into the MongoDB.

4.1.7 ZMQProxy and ZMQBridge

The ZMQ services are used to create a CSP network between groundstation services and the satellite subsystems.

The ZMQProxy also makes it easy to connect custom CSP applications to this network.

4.1.8 MongoDB

The MS100 comes with a MongoDB database, pre-installed. It is a free, open-source cross-platform document-oriented database application using JSON-like documents – see www.mongodb.com.

The MongoDB database is used to store telemetry, GSWeb configuration, among other documents.

4.2 Optional Software

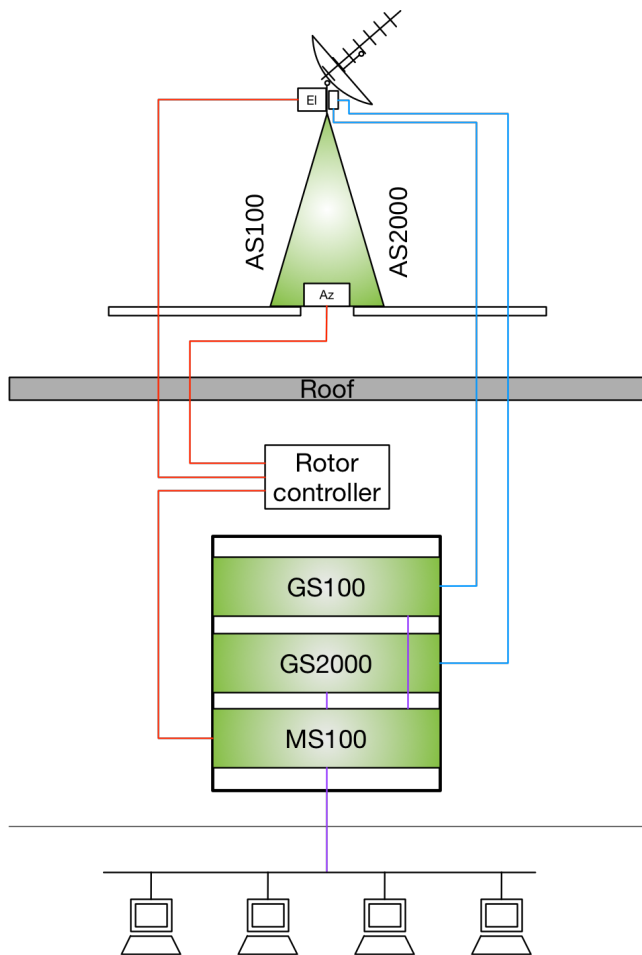
The following software is optional.

4.2.1 GSWeb

GSWeb is a webservice based telemetry viewer that can be extensively customized to suit customer requirement and mission.

5 MS100 with other GomSpace Products

GomSpace offers a complete ground station system. The MS100 combined with a radio rack unit NanoCom GS100/GS2000 and a rooftop antenna system AS100/AS2000 is everything you need to connect and control your LEO satellite.



NanoCom AS100

Rooftop antenna that can receive VHF and UHF. It includes a tower and two rotors and a controller to point the antenna in any direction.

NanoCom AS2000

A rooftop S-Band antenna. It includes a tower and two rotors and a controller to point the antenna in any direction. As an option a UHF antenna can be added.

NanoCom GS100

A radio rack unit that can receive VHF and UHF.

NanoCom GS2000

A radio rack unit that can receive S-Band.