

DATA ACQUISITION SYSTEM



General-Purpose –

- **Comprehensive, flexible data acquisition**
- **Embedded GPS receiver option (single-, dual- or triple-frequency)**
- **Eight isolated RS232 serial ports (115.2 kbps), two Ethernet (10/100/1000 Mbps)**
- **Flexible ASCII, binary and raw-data protocols, with large buffers**
- **16 differential/32 single-ended analog inputs, 16-bit resolution**
- **Fully compatible with all leading sensors and instrumentation in airborne geophysics: spectrometers (RSI), navigation systems, etc.**
- **All data synchronized to magnetics and GPS, with time & event tags**
- **Flexible and simple user interface via built-in TFT LCD and external display**
- **Full monitoring/control from any Windows device (via Ethernet, or through the Internet)**
- **Real-time graphical output to built-in display, external display and chart recorder**
- **Rugged and reliable embedded storage: on-board Flash (≥ 16 GB), and hard-disk / solid-state drive (≥ 160 GB)**

Magnetics –

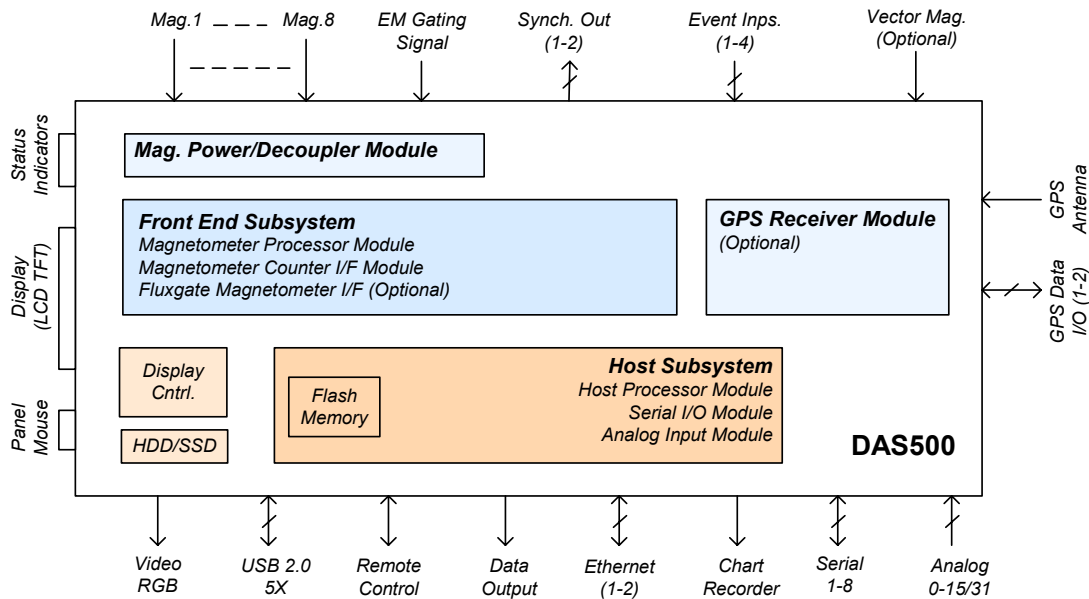
- **Magnetometer interface for up to 8 high-sensitivity sensors (Cs, He or K)**
- **Front-end sampling rates up to 1280 Hz**
- **Magnetometer processor: 0.32 pT resolution, < 0.1 pT system noise, ± 10 ppb temperature stability**
- **User may customize Front End processing to specific installation requirements**
- **Real-time data recording & output: up to 160 Hz**
- **Gating of magnetometer readings for concurrent use with EM systems**
- **Optional fluxgate (vector) magnetometer and interface for post-flight compensation**

System –

- **Real-time operating system (RTOS): QNX 6.5**
- **State-of-the-art HW & FW architecture based on advanced 64/32-bit processors**
- **Compact and light: 19"-rack mountable, 5.25" height, 19 lb.**

The RMS Instruments' DAS500 offers outstanding performance in aeromagnetic data acquisition and recording. Powerful, versatile and rugged, yet compact and light, the DAS500 is ideally suited to airborne and mobile geophysical and environmental survey/monitoring applications.

The system is built on the foundation of state-of-the-art hardware and firmware architectures, using a deterministic, real-time operating system. The proprietary magnetometer counter technology, highly-advanced and robust, has been proven in a multitude of installations. Consistent with the magnetics, data from practically any sensor/device used in airborne geophysical applications, are delivered with unparalleled performance, accuracy and reliability.



Magnetics

The Front End in the system handles all magnetics data acquisition and processing, and provides accurate synchronization to GPS. The magnetometer interface, most critical for high performance and data quality, uses the latest in analog and digital electronics to achieve excellent accuracy and synchronization for up to eight high-sensitivity magnetometer sensors.

In its standard form the DAS500 accepts decoupled Larmor signals from the magnetometers. An optional embedded power/decoupler module is available for four or eight inputs. The decoupler separates the Larmor outputs of the magnetometers from 28-Volt power, and monitors the quality of magnetometer input signals.

The magnetometer interface uses a highly stable and reliable time base (OCXO). The proprietary counter and synchronization hardware deliver outstanding performance with negligible noise and temperature drift.

Front End sampling rates are user-selectable, up to 1280 Hz. Finely tuned, user-selectable transfer functions deliver outstanding anti-aliasing characteristics. The user may also customize Front End processing to the specific requirements of an installation (e.g., minimize effects from the rotor system in a helicopter).

For concurrent use with EM systems a gating signal may be used to qualify magnetometer readings.

Optional fluxgate magnetometer and interface

A three-axis fluxgate (vector) magnetometer and interface are available as an option. The data is perfectly synchronized to all total-field data, thus allowing optimum post-flight compensation of aircraft interference.

General-Purpose Data Acquisition

The DAS500 offers comprehensive and flexible general-purpose data acquisition and recording capabilities.

External devices with digital (serial) and analog outputs can be connected directly to the DAS500. The system provides 8 high-speed, isolated, serial (RS232) inputs and outputs, 16 differential (or 32 single-ended) analog inputs, and two 10/100/1000Base-TX Ethernet interfaces (one dedicated to data acquisition).

Flexible serial protocols and practically unlimited buffering space, allow easy interfacing to most devices.

All data sampling is at rates based on the same time base (up to 160 Hz). All data streams are perfectly synchronized and are recorded with time and event tags that allow accurate reference to GPS time and position.

The application software and real-time operating system (RTOS) reside in (solid-state) Flash memory. The RTOS is QNX 6.5 (or later). This is a deterministic and extremely reliable operating system tailored to mission-critical applications, that guarantees compliance with the strict timing constraints of all critical tasks.

The system includes extensive software utilities, including spectral analysis, graphical and/or numerical real-time monitoring of input signals, file management, and many others. Configuration and control is through an easy-to-use graphical user interface.

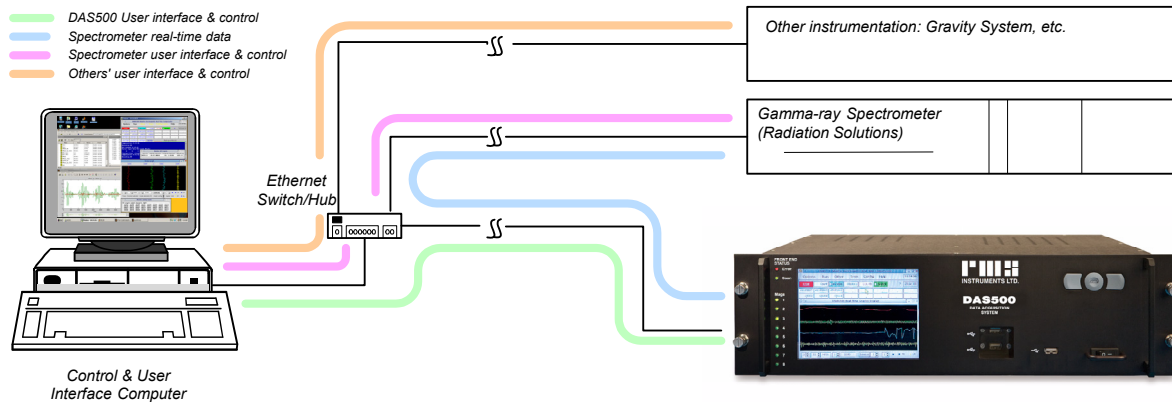
Embedded recording options include on-board Flash (≥ 16 GB), and a mass-storage device (HDD or SSD, ≥ 160 GB). Direct recording on a Flash disk connected to one of the USB ports is also available.

The integrated graphics controller allows simultaneous output to the built-in display and to any external display (via a standard VGA port). Other functionality includes remote control via a serial (COM) port, and extensive general-purpose I/O (one 1-Gbps Ethernet interface, independent of the one used for data acquisition, and five USB 2.0 ports).

Remote control from Windows

A remote connectivity tool for the DAS500 allows users full control and operation of the unit from a remote Windows-based system, across an IP network.

The user interface of the DAS500 is seamlessly replicated in the Windows-based computer. The mouse and keyboard attached to the computer have the same effect as if they were connected to the DAS500. The figure below shows typical connections and data flow.



This technology facilitates flexible architectures for complex systems that incorporate the DAS500. A single computer/laptop can be used to control and operate the DAS500 and other instruments (e.g., gamma-ray spectrometer, gravity system, etc.). Naturally, any other Windows applications can also be running simultaneously (e.g., navigation software). This remote connectivity is also very useful for training and remote support (from any location, via Internet).

GPS receiver

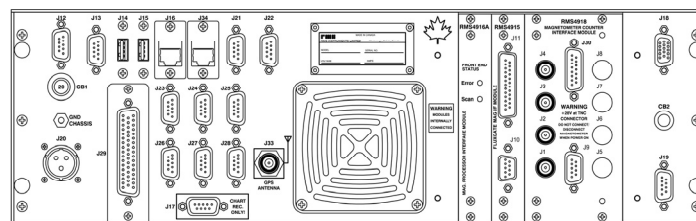
The system is available with an embedded (typically dual-frequency) GPS receiver. All magnetics and ancillary data are referenced to GPS time and position. A variety of receivers are available to satisfy different requirements in accuracy. The DAS500 gives users direct access to two ports on the receiver. This provides, for example, the interface to a navigation system. The system can also be used with an external (user-supplied) receiver.

Data exporting software

The data files recorded by the DAS500 have a structure optimized for efficiency and performance. *Export-DAARC* is a comprehensive support software package included with the DAS500 which allows exporting data files to industry-standard formats (e.g., flat-ASCII, 'XYZ', Geosoft 'GBN').

ORDERING INFORMATION

- **DAS500-x:** Data Acquisition System. [x = # of magnetometer inputs; 2 ... 8]
Includes: – License/Key for QNX (RTOS) & Phindows (remote control from any Windows computer via IP network over Ethernet).
- **Advanced Functions:** Multiple FE smpl. rates & transf. funcs., raw FE logging, in-field FW updating, mag. gating for concurrent use with EM.
- **RMS4880A Magnetometer Power/Decoupler Module:** RMS4880A-1 (up to 4 inputs), RMS4880A-2 (up to 8 inputs).
- **RMS2938-1:** 32 single-ended analog channels (instead of the standard 16 differential channels).
- **GPS Receiver Option:** Internal (consult RMS Instruments for list of receivers available) or External.
- **RMS4915 Fluxgate Magnetometer I/F Module, and 3-Axis Vector (Fluxgate) Magnetometer.**



DAS500 SPECIFICATIONS

Magnetometer Inputs:

Up to 8 high-sensitivity magnetometers; any combination of:

Cs: Typ. 70 kHz – 350 kHz

K-41, K-39: Typ. 140 kHz – 700 kHz

He: Typ. 560 kHz – 2.8 MHz

Magnetic Field Range:

Per the magnetometer's range; e.g.: ^[1]

G-822A, G-823A: 20,000 – 100,000 nT

CS-3, CS-L, CS-VL: 15,000 – 105,000 nT

GSMP-30A: 20,000 – 100,000 nT

Front End (FE):

Time base: > 100 MHz, OCXO

Resolution: 0.32 pT ^[2]

System noise: $\sigma < 0.1$ pT ^[3]

Temperature stability: $\approx \pm 10$ ppb ^[4]

Sampling rate: 160, 640, 800 or 1280 Hz – user-selectable ^[5]

Transfer function (bandwidth): 1.6 Hz,

3.25 Hz, 6.4 Hz, 9.8 Hz, 20 Hz, $0.16F_{SH}$ or Custom Transf. Funct.–user-select. ^[5]

Optional Filter (Host):

User-selectable, 0.4 – 3.0 Hz BW

Vector Magnetometer:

Optional, with RMS4915 Fluxgate Magnetometer I/F Module

3-axis fluxgate

Oversampling, 16-bit, self-calibrating ADC

Data Output & Recording:

F_{SH} : 10, 20, 40, 80, 160 ^[6] Hz (GPS-PPS or internal synch.); external-trigger

Serial port: to 115.2 kbps, ASCII/Binary

Recording media: internal Flash (≥ 16 GB), internal HDD or SSD (≥ 160 GB), USB-Flash disk

Chart recorder

Display (built-in and external)

Event Inputs/GPS Synch.:

Four latched event inputs

LS-TTL levels, edge-sensitive

Event tags included with output data

Accuracy: per Front End sampling rate

Raw Data Logging: ^[5]

At Front End sampling rate

1-MB buffer

Ex.: 41666 records for 4 mag. inputs

Display:

6.5" colour TFT digital LCD

VGA resolution (640 x 480)

Antiglare surface treatment

Backlight: LED (white)

Luminance: 1000 nits

Mouse:

Silicone-rubber actuators

Pressure-controlled operation

No moving parts

Remote Control:

From any Windows-based computer, via IP ntwk. over Ethernet – replica of DAS500's user I/F on computer.

Via serial (RS232) port – ASCII cmdns.

Data Acquisition – Analog:

16-bit, self-calibrating A/D converter

RMS2938: (standard)

16 differential, 20-Hz AA

RMS2938-1: (optional)

32 single-ended, 20-Hz AA

Input range: ± 10 Volts (standard), ± 5 Volts

Input over-voltage protection:

–20 Volts to +52 Volts, power ON

–35 Volts to +55 Volts, power OFF

Sampling & recording: F_{SH} or submult.

Input resistance: 1 M Ω , typical

CMRR (60 Hz): 96 dB, typical

Data Acquisition – Serial:

8 isolated RS232 channels

Up to 115.2 kbps, HW handshaking

Input:

ASCII, Binary and Raw protocols

Sampling & recording: F_{SH} or submult.

Output:

User-defined packets synch. to F_{SH}

Data Acquisition – Ethernet:

10/100/1000Base-TX

TCP/IP

Sampling & recording: F_{SH} or submult.

Synch. to External Devices:

Two independent pulse outputs

Rate: F_{SH}/x , with $1 \leq x \leq 255$

Low-going pulses, > 10- μ sec width

Indicators, General-Purpose I/O:

8 LEDs for mag. input status

2 LEDs for Front End status

Five USB 2.0

Data output (RS232, 9-pin D-sub)

Remote control (RS232, 9-pin D-sub)

Two 10/100/1000Base-TX Ethernet, one for data acquisition (RJ45)

Analog RGB (15-pin D-sub)

Chart recorder I/F (9-pin D-sub)

GPS Receiver Option:

Magnetics data tagged with GPS time,

lat., long., altitude and auxiliary data

Up to 10 Hz

Internal (embedded) configuration –

Single-, dual- or triple-frequency receiver from Novatel's OEMV-1, OEMV-2, OEM6 or OEM7 series

External configuration –

Any GPS receiver with standard NMEA GGA output via serial (RS232) port (up to 10 Hz), and PPS trigger

Power:

+28 VDC (± 6 VDC), 3.75 A

For each mag. input connected through

the RMS4880A Magnetometer

Power/Decoupler Module: 0.5 A typical; up to 1.0 A at turn-on ^[7]

Environmental:

Operating Temperature: 0 to +50°C

Storage Temperature: –20 to +55°C

Relative Humidity: 0 to 99%, non-cond.

Altitude: 0–3,000 m (0–10,000 ft); HDD

0–6,000 m (0–20,000 ft); SSD

Size (W x H x D): 483 x 133 x 381 mm, (19 x 5.25 x 15 in)

Weight: 8.6Kg (19lb)

Notes:

[1] Per manufacturer's specs. at print time: G-822A, G-823A (Geometrics), CS-3, CS-L, CS-VL (Scintrex), GSMP-30A (GEM Sys.).

[2] 1.6-Hz BW, 625-ms integ.

[3] Typical; 1.6-Hz BW, 625-ms integ., 10 Hz.

[4] Within operating temp. range. Over –20 to +70°C, < ± 35 ppb.

[5] With DAS500 Advanced Functions Option. Defaults: 640-Hz, 1.6-Hz BW.

[6] Some restrictions apply for 5–8 mag. inputs.

[7] Per Geometrics G822A-type sensors. May vary for other sensors.

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Specifications subject to change without notice
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