AEROMAGNETIC DATA ACQUISITION & LOGGING SYSTEM

Magnetometer interface and counter for 2 sensors

Magnetics and general-purpose data acquisition & recording

Embedded GPS receiver (optional)

Compact, light, low power –
133 x 133 x 216 mm
+28VDC, 3.5A (typical)
< 1.8 Kg

Cost-effective, ideal for UAV installations

- *Front-end sampling rates up to 1280 Hz*
- *Magnetometer processor: 0.32 pT resolution, < 0.1 pT system noise, ±10 ppb temp. stability*
- *User may customize Front End processing to specific installation requirements*
- *Interface for external GPS receiver – standard Embedded GPS receiver (typ. dual-frequency, L-band corrections) – optional*
- *Data recording & output, up to 160 Hz*
- *Gating of magnetometer readings for concurrent use with EM systems*
- *Two general-purpose analog inputs, two for embedded barometric-pressure & temperature sensors*
- *Data acquisition via Ethernet*
- *Real-time monitoring and user interface through any standard VGA display, and/or from any Windows device (via Ethernet)*
- *Features targeted to UAV applications*
- *State-of-the-art HW & FW architecture based on advanced 64/32-bit processors*
- *Real-time operating system (RTOS): QNX 6.5*

The RMS Instruments' DAS52 is a powerful, versatile and rugged data acquisition and logging system ideally suited to magnetometry applications that do not require compensation for platform effects. Designed for use in demanding airborne and mobile geophysical and environmental surveying, if is a perfect fit for Unmanned Aerial Vehicle (UAV) installations because of its light weight, compact package, and low power consumption.

The DAS52 has its roots in the (D)AARC5XX family of real-time aeromagnetic compensation systems, for more than a decade the *de facto* standard in the geophysical exploration industry throughout the world. The system is built on the foundation of state-of-the art, highly-reliable hardware, firmware, and signal processing which have been proven in a multitude of installations. Consistent with magnetometry, data acquisition from ancillary sensors is delivered with unparalleled performance, accuracy and reliability.

Magnetics
The DAS52 provides the interface and *counter* for two high-sensitivity self-oscillating cesium vapor magnetometers. Proprietary electronics and firmware ensure perfect synchronization, critical in gradiometer applications, and unparalleled performance. An embedded power/decoupler module decouples the Larmor signal from each magnetometer, while supplying power over the same cable.

General-purpose data acquisition
The DAS2 supports data acquisition via Gigabit-Ethernet, with up to 3 independent logical connections. With a suitable external converter/switch, the DAS52 can thus capture/record streaming data from various devices with either Ethernet or serial (RS232) output. The unit also supports two general-purpose differential, high-resolution analog inputs (e.g., radar/laser altimeter) and two dedicated to embedded barometric pressure and temperature sensors.

GPS receiver

An interface for an external GPS receiver is standard. The DAS52 supports also an embedded GPS receiver (optional). A variety of receivers are available to satisfy different requirements in accuracy. One port on the receiver is used internally; an additional two ports are accessible by the user (for example, to interface to a navigation system). GPS data are appended to recorded and transmitted magnetics data packets. Timing throughout the system is tied to the PPS trigger from the GPS receiver.

Remote control from Windows

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

The user interface of the DAS52 is seamlessly replicated in the Windows-based computer. The mouse and keyboard attached to the computer have the same effect as if they were directly connected to the unit.

Data exporting software

The data files recorded by the DAS52 have a structure optimized for efficiency and performance. *ExportDAARC* is a comprehensive support software package included with the DAS52 which allows exporting data files to industry-standard formats (flat-ASCII, Geosoft's GBN).

System architecture

The underlying technology is based on a powerful architecture with dual 64/32-bit processors, a proprietary magnetometer interface with outstanding performance, and top-quality industrial-grade electronics.

Front End sampling rates up to 1280 Hz and finely-tuned transfer functions deliver outstanding anti-aliasing characteristics, and may be customized by the user per the requirements of an installation.

The main program 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 highly reliable operating system tailored to mission-critical applications.

The software includes an easy-to-use graphical user interface, and a rich set of utilities to analyze data and troubleshoot installations.
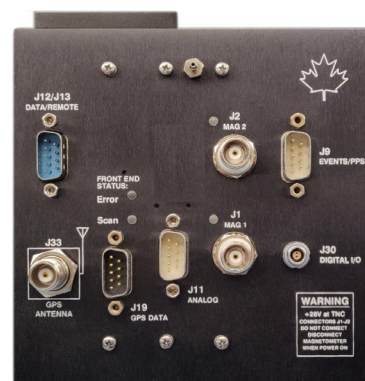
DAS52 SPECIFICATIONS

Magnetometer Inputs:
Two high-sensitivity magnetometers:
Cs: Typ. 70 kHz – 350 kHz
Magnetic Field Range:
Per the magnetometer's range; e.g.: [1]
CS-3, CS-L, CS-VL: 15,000–105,000 nT
G-822A, G-823A: 20,000–100,000 nT
Front End (FE):
Time base: > 100 MHz, OCXO
Resolution: 0.32 pT [2]
System noise: σ < 0.1 pT [3]
Temperature stability: ≈ ±10 ppb [4]
Sampling rate: 160, 640, 800 or 1280 Hz – user-selectable
Transfer function (bandwidth): 1.6 Hz, 3.25 Hz, 6.4 Hz, 9.8 Hz, 20 Hz, $0.16F_{SH}$, $0.13F_{SH}$ or Custom – user-selectable
Optional Filter (Host):
User-selectable, 0.4–3.0 Hz BW
Data Output & Recording:
F_{SH}: 10, 20, 40, 80, 160 Hz (GPS-PPS or internal synch.); external-trigger
Serial port: 115.2 kbps, ASCII/Binary
Ethernet: TCP/IP packets, ASCII/Binary
Recording media: embedded Flash SSD (≥ 32 GB), USB Flash disk
External display (VGA)
Event Inputs:
PPS trigger signal from external GPS
Two general-purpose latched event inputs
LS-TTL levels, edge-sensitive
Event tags included with output data
Accuracy: per Front End sampling rate

Embedded Baro. Pressure & Temp.:
Differential inputs, 16-bit ADC
600 to 1100-mbar; ±5 mbar total accuracy
–50 to +100°C range; ±1°C abs. error
EM Gating:
For concurrent use with EM systems
LS-TTL input with pull-up
FE-Sampled Analog:
Two differential inputs
16-bit resolution, self-calibrating ADC
Input range: ±5 Volts
Input resistance: 1 MΩ, typical
Data Acquisition via Ethernet:
10/100/1000Base-TX
Real-time, streaming data (TCP/IP)
Three independent logical connections
Sampling & recording: F_{SH} or submult.
Synch. to External Devices:
One pulse-train output
Rate: F_{SH}/x, with $1 \le x \le 255$
Low-going pulses, > 10-µsec width
Remote Control:
Optional: From any Windows-based computer, via Ethernet – full user I/F
Via serial (RS232) port – ASCII cmnds.
Indicators, General-Purpose I/O:
2 LEDs for mag. input status
2 LEDs for Front End status
Three USB 2.0
10/100/1000Base-TX Ethernet (RJ45)
VGA video (15-pin D-sub)

GPS Receiver:
Standard: Interface to any GPS receiver with NMEA GGA output via RS232 (115.2 kbps, ≤ 10 Hz), PPS (LS-TTL, 5V-tolerant LV-TTL)
Optional: Embedded receiver – dual-frequency, GPS+GLONASS+QZSS, L1/L2, SBAS L1, PPP+Single-Point+DGPS-PNT, L-Band corrections (Others: BeiDou, RTK posit., etc.)
Magnetics data tagged with GPS time, lat., long., altitude, and auxiliary data
Up to 10 Hz
Power:
+28VDC (Range: +19 to +36VDC)
2.5A plus, for each mag. sensor, 1–1.5A[5] during warm-up, 0.5A thereafter
Absolute maximum: +50VDC, < 100 msec
Environmental –
Operating Temperature: –10 to +50ºC
Storage Temperature: –20 to +55ºC
Relative Humidity: 0 to 99%, non-cond.
Altitude: 0–6,000 m (0–20,000 ft)
Size (W x H x D): 133 x 133 x 216 mm
Weight: < 1.8 Kg

Notes:
[1]   Per manufacturer's specs. at print time.
[2]   1.6-Hz BW, 625-ms integ.
[3]   Typical; 1.6-Hz BW, 625-ms integ., 10 Hz.
[4]   Within operating temperature range. Over –20 to +70°C, < ±35 ppb.
[5]   Dependent on type/model of magnetometer sensors.

Specifications per Host FW ≥ RMS11164-01-F, FE FW ≥ RMS1877-05-D, HW Rev. ≥ 3.20, and subject to change without notice – Jan 2025.
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