

FEATURES

- DSP Technology
- Compact and modular design
- Scan Rates up to 625 Hz/Channel
- Accepts up to eight analog-to-digital modules
- Max Channel Count of 512 Channels
- Ethernet 100BaseT
- Data Transfers TCP, UDP, or FTP
- Digital Input and Output capability

GENERAL DESCRIPTION

The state-of-the-art DSP technology is at the heart of our new ERAD4000 pressure measurement system. Located inside the RADBASE is a programmable device (Digital Signal Processor or DSP) capable of extremely fast math functions that operate on the data stream in real time. All measurements are converted into Engineering units.

Advantages of DSP technology:

- Boots up quickly
- Real Time Operating System
- Low Data Latency

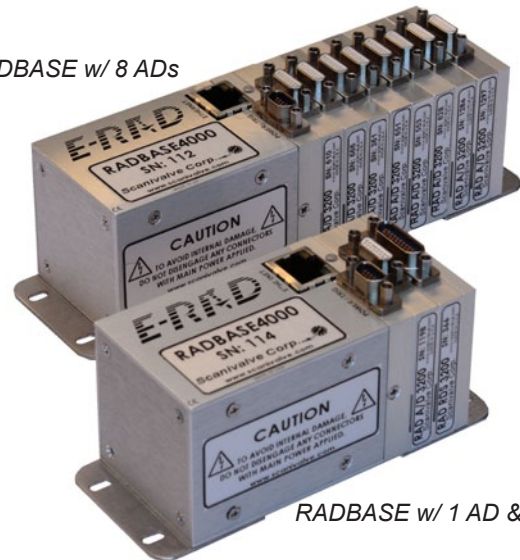
The RADBASE DSP processor utilizes a pressure temperature look-up table which provides temperature compensation for the pressure sensors, thus reducing thermal errors. It also can control the actuation of an external calibration valve via the RDS3200 module to perform on-line zero offset corrections or purge functions. Long term accuracy is achieved for up to 6 months before recalibration is required.

This new Ethernet remote A/D system is a turnkey pressure measurement system that combines the field proven RAD3200 with Ethernet TCP/IP communications. The ERAD4000 system is capable of maintaining its performance even as computer technology and operating systems upgrade. ERAD will work on any hardware platform that has an Ethernet port, minimizing the user's future interface risks.

The ERAD system is compact and modular, allowing for the installation of up to 8 each A/D (16 bit) modules on a single RADBASE. Each A/D supports one 16, 32, or 64 channel ZOC or 64 channel MPS analog pressure scanner, or one ZOCEIM.

The output of the RADBASE is Engineering units via Ethernet connection using TCP, UDP or FTP protocol. The RADBASE stores the pressure sensor calibration data in memory and converts the digital data to temperature compensated Engineering units.

RADBASE w/ 8 ADs



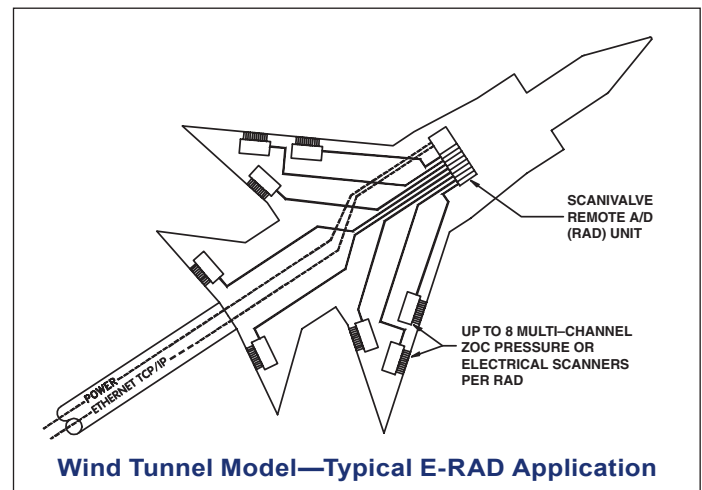
RADBASE w/ 1 AD & 1 RDS

APPLICATIONS

Due to the compact nature of the ERAD4000 system, the ERAD can be located inside a wind tunnel model or other space limited location in close proximity to the ZOC or MPS analog pressure scanners.

For small models with low number of pressure channel requirements, the RADBASE can be minimal size to fit into the model. For large systems the E-RAD system can be expanded with modular A/D modules or multiple RADBASEs for up to 2048 pressure channel system.

A feature of the system is that each A/D and each connected analog pressure scanner has an ID chip installed. During power up or on demand, the RAD can read the ZOC ID chip information which includes: model, valve type, pressure range, serial number, number of channels, date of manufacture and calibration date.



Wind Tunnel Model—Typical E-RAD Application

ERAD4000 SYSTEM COMPONENTS

The ERAD4000 is a Ethernet based pressure measurement system consisting of a RADBASE4000 base unit, up to 8 A/D's, up to 8 RDSs. The installation of A/D's allows for the connection of Scanivalve analog pressure scanners to be connected (MPS and ZOC series). The compact design of the ERAD system allows the data system to be installed inside or in close proximity to a wind tunnel model, or installed in a place where space is limited. By digitizing the transducer analog signals as close to the source as possible, potential noise errors due to long analog cable lengths are eliminated.

1) RADBASE4000 is the base unit that incorporates the communication and power connectors, and real time DSP operating system. Communication and data throughput are via Ethernet 100Base-T. Power required to power the RADBASE (and attached A/D and RDS modules) is +/-15Vdc and +5Vdc. Scanivalve has dedicated power supplies specifically for the ERAD4000 which can be purchased separately (see the Scanivalve Module Accessory Catalog).



RADBASE4000 with 1 RAD A/D3200

2) RAD A/D 3200 is the modular A/D portion of the ERAD4000 system. The RAD A/D's are temperature compensated. Each 16-bit A/D module supports one analog pressure scanner (MPS or ZOC series, 16, 32 or 64 channels) or one Electrical Input Module (ZOCEIM). Additional A/D modules can be connected to the RADBASE to easily expand the system from 1 to 8 A/D's (up to a 512 pressure channel system).

Each A/D has an ID chip to identify itself with its serial number, date of manufacture, date of last calibration, and temperature coefficients. There is also a dipswitch that allows setting the A/D to be connected at any position (module 1 through 8).

An analog cable is required to connect an analog pressure scanner to the RAD A/D. Typically, this cable can be a length up to 15 feet (4.61m) maximum in order to maintain maximum scanning speed and minimal noise. Longer cable lengths can be supplied. Please contact Scanivalve or review the Scanivalve Module Accessory Catalog for more details.



RAD A/D 3200 MODULE

3) The RDS3200 (Remote Digital Switch) is a plug in module that incorporates 8 software controlled switches. These switches can open or close relays that operate solenoid valves or other devices. Scanivalve's model MSCP3200 miniature solenoid control pack contains 3 solenoid valves. It can be operated by the RDS3200 and is small enough to fit inside a wind tunnel model (24Vdc required. Optional 5 & 12Vdc and must be specified at time of order). This combination of products is typically used to pneumatically change the valve state of analog pressure scanners from Measurement mode, to Calibrate or Purge mode. Up to 8 RDS modules can be used on one RADBASE.



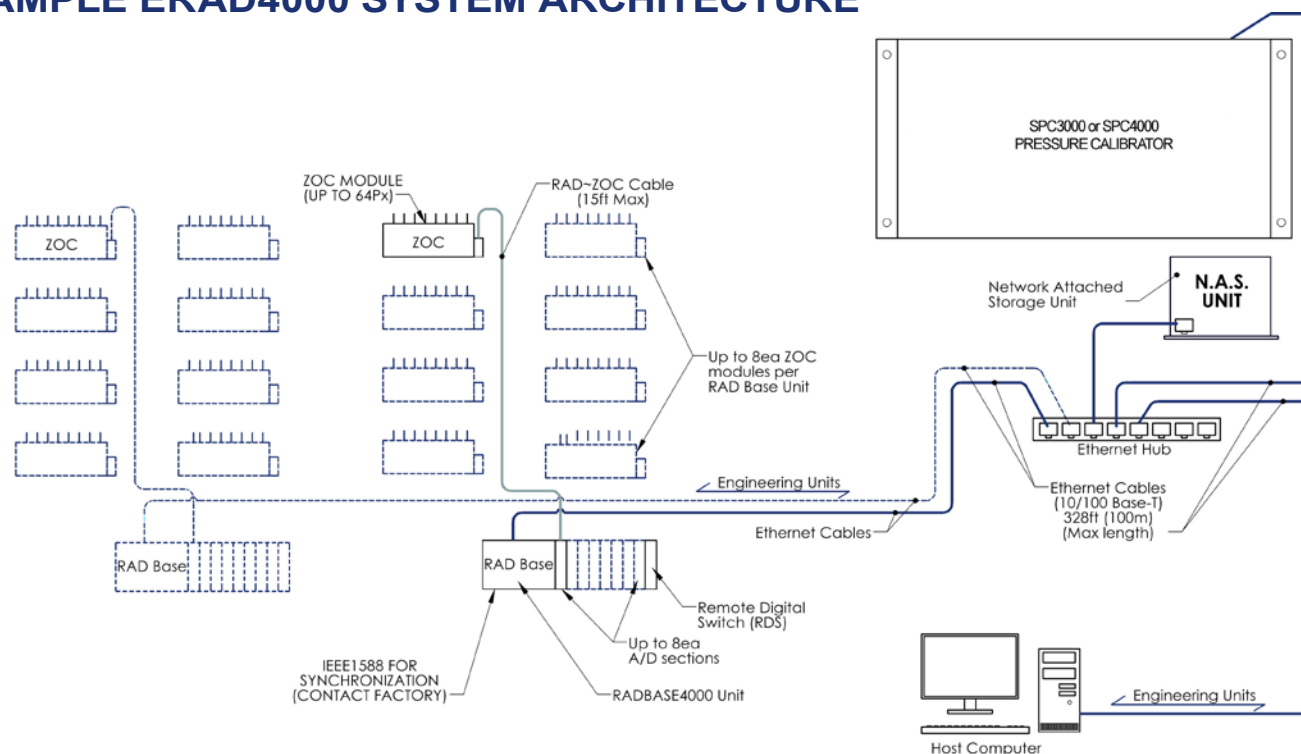
RDS3200 MODULE

4) Scanivalve has several options for analog pressure scanners. The ERAD4000 system can connect to these modules to provide excitation voltages, addressing, read the scanners internal temperature, and read the analog voltage of each pressure sensor in the scanner.

Currently available modules include: ZOC17 (16 channel, 0-750PSI), MPS4164 (64 channel, 0-50PSID), and ZOCEIM (Electric input module). Legacy Scanivalve modules supported: ZOC22/23B (32 channel) and ZOC33 (64 channel).

See separate data sheets for more information on Scanivalve analog pressure scanners.

EXAMPLE ERAD4000 SYSTEM ARCHITECTURE



ERAD4000 CONFIGURATION

The ERAD4000 Ethernet pressure measuring system consists of:

- 1 RADBASE4000 (for each 512Px)
- 1 to 8 each RAD A/D 3200 per RADBASE
- 1 Analog pressure scanner per A/D (MPS or ZOC)
- Cables, power supplies, & accessories
- Ethernet Switch (user supplied)
- Optional SPC pressure calibrator(s)
- Optional NAS network data storage (user supplied)

The ERAD robust turnkey pressure measurement system will operate with any hardware platform that can communicate Ethernet TCP/IP. This would include PC's, MAC's, VXI or NI systems, or any user host or network.

ERAD4000 COMMUNICATIONS

The ERAD4000 firmware acts as a Telnet server. Communications and data are transmitted via Ethernet TCP/IP. Data can be returned via the same Ethernet connection using TCP, UDP or FTP data transfer. This integrated Ethernet architecture off-loads the host computers needs for calculations and processing.

The RADBASE4000 firmware allows for several variables to be configured and saved, providing quick setup and turn-over. Several additional commands permit a user to control all functions of the RAD, including control of external devices when the RDS3200 digital

switch is connected. The configuration variables permit a user to define communications, RAD module setup, identification, scanning EU conversion, and data output. Because the pressure calibration files for the ZOC pressure scanners are stored in memory, all Engineering Unit conversion and temperature compensation occurs in the RADBASE4000.

A LabVIEW® Configuration utility (includes 2009 runtime engine) and a Scanivalve Software Development Kit for LabVIEW® can be downloaded from the Scanivalve website for users who want to write their own detailed data acquisition program in LabVIEW®.

Several additional software programs are provided, such as ScanTel for communications and PressCal for performing on-line calibration of analog pressure scanners. These programs can be downloaded from the Scanivalve website.

ERAD4000 ORDER INFORMATION

Part Numbers:

- RADBASE4000 (21355)
- RAD A/D 3200 (21140)
- RDS3200 (21145)

Each RADBASE4000 is shipped with a mating power connector with flying leads, mounting plates, a RAD-BASE serial adaptor, and a 10ft null modem (DB9) cable.

Cables, power supplies, and accessories for the ERAD400 system can be found in the Scanivalve Module Accessory Catalog.

ERAD4000

SPECIFICATIONS

Dimensions:

RADBASE4000:	1.75 in. x 1.75 in. x 2.68 in. (44.45mm x 44.45mm x 68.07mm)
RAD A/D 3200:	1.75 in. x 1.75 in. x 0.31 in. (44.45mm x 44.45mm x 7.87mm)
RDS3200:	1.75 in. x 1.75 in. x .45 in. (44.45mm x 44.45mm x 11.43mm)

Weight:

RADBASE4000:	0.31 lbs. (141gms)
RAD A/D3200:	0.05 lbs. (23gms)
RDS3200	0.05 lbs. (23gms)

Power

Requirements:

ERAD4000:	+15Vdc @ 41mA - 15Vdc @ 4mA + 5Vdc @ 610mA
A/D (each):	+15Vdc @ 105mA - 15Vdc @ 5.5mA

ERAD4000 Operating Temperature Range:

5°C to 60°C

Humidity:

Up to 95% non-condensing

No. of RAD A/D Modules Supported on one RADBASE:

1 to 8

No. of ZOC or MPS Modules Supported by one RABASE:

1 to 8

Type of Analog Modules Supported:

MPS4164, ZOC17
ZOC22B, ZOC33, ZOCEIM

Power Mating Connector:

Cannon 9 pin MDM-9PH003L

A/D Module Mating Connector:

Cannon 15 pin MDM-15SL2P

RDS Module Mating Connector:

Cannon 21 pin MDM-21PH003L

Ethernet Connector:

RJ-45

A/D Resolution:

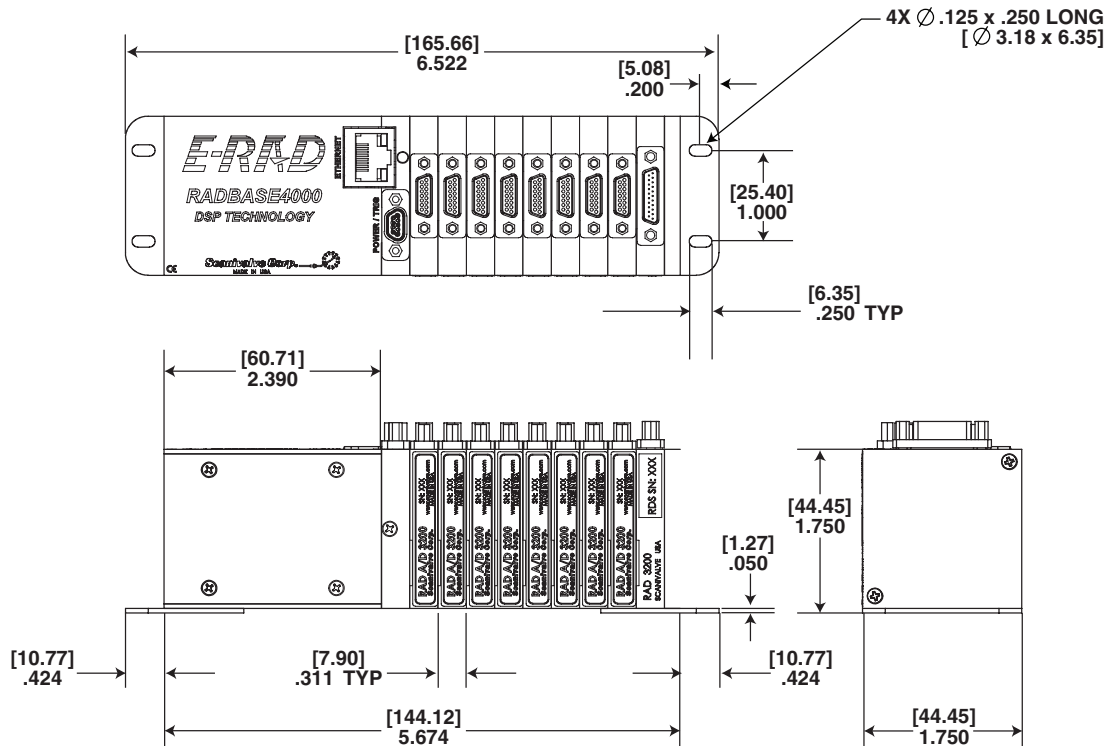
16 bits

Max Scan Rates*:

50Hz - ASCII
625Hz - Binary

* Data rates may be limited due to network restrictions

DIMENSIONS - inches [mm]



* Total length is determined by number of A/D modules (8 A/D's shown)

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