

PS6-24 Digitizer

True 24-bit Resolution

140 dB Dynamic Range at 100 samples/sec

Three or six channels

Sample rates to 1000 samples/sec

Bi-directional RS232 Communication

Can be locked to GPS

Autocalibration

Extremely low drift

Full anti-alias protection

100dB CMRR

The PS6-24 is an ADC module providing three or six independent channels of extremely high dynamic range at rates of 1 to 1000 samples per second. A selectable conversion word size of up to 32-bits is available on RS232 for fully representing the high dynamic range. The RS232 is also used to select the operating modes.

A signal to noise ratio of better than 140 dB is achieved at a sample rate of 100 Hz falling to 130 dB at 1000 Hz using a 24-bit word. 150 dB is obtained below 10 samples/second when a 32-bit word size is selected.

The signal bandwidth is always d.c. to 0.4 of the selected sample rate (± 0.1 dB) with over 140 dB of rejection above the half sampling frequency negating any requirement for anti-alias filtering.

Inputs are fully differential with a common mode rejection better than 100 dB. There are two sensitivity settings, 1 μ V per bit and 100 nV per bit. About 4 dB of dynamic range is lost on the higher gain setting.

Input offset voltage and drifts are held to very low levels. Optionally the offset with temperature can be mapped during manufacture and used to correct the offset during operation. Calibration occurs automatically every time the unit is switched on.

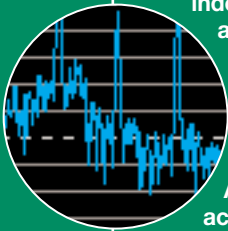
The converters use a 7th order Sigma Delta technique developed by Earth Data over a five year period. In addition to their high dynamic range they are also free from spurious tones and artefacts which affect competing designs.

The unit can be locked to GPS simply by operating the unit with an approved GPS receiver. Absolute time and global position is then included within the transmitted RS232 data and sample times can be tracked to UTC time. This is especially useful when it is necessary to correlate data from separate locations.

The unit is supplied with a 1 ppm TXVCO timing source that can maintain accurate timing without GPS.

Power supply voltage, current and internal temperatures are continuously monitored and included within the RS232 data. Four additional low-resolution ADC inputs are available to the user for general monitoring functions. Two digital outputs are available for driving external equipment.

The PS6-24 is available in a fully sealed extruded aluminium case or as a board level OEM product. Operating temperature range is -20°C to $+60^{\circ}\text{C}$.



Specification

GENERAL	
Number of channels	3 or 6
Type	Differential
Input impedance	1 Mohm $\pm 5\%$ to gnd, 2 Mohm differential
Input CMRR	Better than 100 dB
Input sensitivity	1 μ V per bit : 100 nV per bit (software selectable)
Common mode range	± 8 V
Gain accuracy	± 0.1 dB (after auto cal)
DC offset	$\pm 5\mu$ V low gain (after auto cal) $\pm 1\mu$ V high gain (after auto cal)
Offset voltage drift	$\pm 10\mu$ V/ $^{\circ}$ C ± 250 nV / $^{\circ}$ C (with optional temp comp)
Crosstalk	Better than -120 dB, any frequency within passband
A TO D	
Number	1, 2 or 3 (4, 5 or 6), (software selectable)
Type	Earth Data 7th order Sigma Delta
Sampling frequency	192 kHz
Filter type	FIR
Output sampling ratio	2.5:1 (all sampling frequencies)
Filter response	Linear phase ± 0.1 dB DC to 0.4 sample rate
Alias protection	Spurious in band signals better than -120 dB below full scale output as a result of any frequency above the pass-band and any amplitude up to full scale
Primary sample rates	1, 2, 3, 4, 5, 10, 12, 15, 20, 25, 30, 40, 50, 75, 100, 120, 125, 150, 200, 250, 300, 375, 500, 600, 750, 1000
rms to rms noise	150 dB below 10 samples /second 140 dB below 100 samples/second 130 dB @ 1000 samples / second
Spurious tones	Nothing above -144 dB (input short circuit)
Intermodulation products	Less than -120 dB for any two sine wave frequencies within the pass-band at half full scale amplitude
ADDITIONAL INPUT FUNCTIONS	
Sensor power	12V ± 0.2 V supply available for driving active sensors 100 mA capability
ADDITIONAL A TO D FEATURES	
Number	4
Type	Successive approximation.
Resolution	12 bits
Input range	± 10 volts
Sampling rate	1 sample/second
OUTPUT	
Formats	Earth Data 2 wire serial, sent back along power connection (Optional) RS232 bi-directional RS485 transmit only
RS232 baud rates	9600, 19200, 38400, 57600, 115200
RS485 baud rates	As above
ADDITIONAL FEATURES	
Serial number	All units transmit a unique serial number within the RS232 data
Digital outputs	One TTL level: One open collector to 50 volts
System monitoring	Supply current, volts and internal temperatures reported in RS232 data
ENVIRONMENTAL	
Housing	Extruded aluminium
Protection	IP67
Operating temperature	-20 to +60 $^{\circ}$ C
Storage temperature	-40 to +125 $^{\circ}$ C
Relative humidity	100% (cased versions only)
POWER	
Supply voltage	10.5 to 18 volts DC
Power Consumption (Without GPS)	3 Channel 1.5 Watts 6 Channel 2.0 Watts
DIMENSIONS	
Size	175 mm x 108mm x 45 mm
Weight	0.75 kg



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