Tucker-Davis Technologies

The RX8 Multi I/O Processor

System 3

Overview. The Multi I/O Processor (RX8) is a high channel count analog input/output system. Available with either 12 or 24 analog channels, the RX8 can be configured at the factory to meet user requirements for converter type and direction for each channel. The 24 channel version can be configured with a mix of input/output (maximum of 16 channels can be analog input).

The RX8 is equipped with either two or five 100 MHz, 600 MFLOPS Sharc DSPs and can control audio feedback systems or motor controls in real-time. Built in digital filters, waveform generators, and logic control components give end users the ability to design and control virtually any presentation system. Users can also combine the RX8 with an RZ processor for a complete physiology workstation. A complete line of transducers and amplifiers are available to round out the system.

Power and Communication. The RX8 mounts in a UL compliant System 3 zBus Powered (25 Watt) Device Chassis (ZB1PS) and communicates with the PC using the Optibit (PO5e/FO5) PC interface.

Software Control. Software control is implemented with circuit files developed using TDT's RP Visual Design Studio (RPvdsEx). Circuits are loaded to the processor through TDT run-time applications, such as OpenEx, or custom applications via ActiveX controls.

Analog Input/Output. Users can combine PCM or Sigma-Delta A/Ds and D/As to create a system matched to their application. All 24 channels of analog I/O are accessed via the 25-pin connector on the front panel. Analog I/O converters support a broad range of sampling rates, up to a maximum of ~100 kHz

Shown with ZB1PS Device Chassis

Sigma-Delta converters are ideal for audio outputs or signals that require a large dynamic range. Users have the option of variable sampling rates (*see reverse for rates*).

PCM converters have almost no group delay and are excellent for controlling external devices, such as microstimulators or motors, for very tight closed loop ignal control.

The analog I/O is organized in three blocks, each block housing up to eight channels. Blocks can only be filled by analog I/O modules of the same type. **Note:** Block C can only be configured with outputs.

Digital Input/Output. The RX8 processor includes 24 bits of programmable I/O in two eight bit word-addressable bytes and eight bit-addressable bits. Digital I/O lines are accessed via the front panel 25-pin connector and can be configured as inputs or outputs.

RX8 Multi I/O Processor Part Numbers:
RX8-2, Two DSPs and 12 analog I/O
RX8-2-24, Two DSPs and 24 analog I/O
RX8-5, Five DSPs and 24 analog I/O
RX8-5-12, Five DSPs and 12 analog I/O

Technical Specifications for the RX8 Multi I/O Processor

The RX8 is rack mountable in a standard 19" rack and is 1 U (1 3/4") tall.

DSPs:		two or five 100 MHz Sharc ADSP 21161
Memory:		128 MB SDRAM
Sample Rate:		Up to 97.65625 kHz*+
D/A:		up to 24 channels
	Frequency Response:	DC-Nyquist (~1/2 sample rate)
	Voltage Out:	+/- 10 V
PCM: 16-bit		
	S/N (typical):	80 dB (20 Hz to 20 kHz at 9.9 V)
	THD (typical):	- 70 dB for 1 kHz output at 5 Vrms
	Sample Delay:	4 samples
Sigma-Delta: 24-bit		
	S/N (typical):	97 dB (20 Hz - 20 kHz at 9.9 V)
	THD (typical):	- 84 dB for 1 kHz output at 5 Vrms
	Sample Delay:	23 samples
A/D:		up to 16 channels
	Voltage Out:	+/- 10 V
PCM: 16-bit		
	Frequency Response:	DC-7.5 kHz (3 dB corner, 2nd order, 12 dB per octave)
	S/N (typical):	80 dB (20 Hz - 7.5 kHz at 9.9 V)
	Sample delay:	4 samples
Sigma-Delta: 24-bit		
	Frequency Response:	DC-Nyquist (~1/2 sample rate)
	S/N (typical):	97 dB (20 Hz - 20 kHz at 9.9 V)
	THD (typical):	- 84 dB for 1 kHz input at 5 Vrms
	Sample Delay:	47 samples
Digital I/O:		24 bits programmable
Input Impedance:		10 kOhms
Output Impedance:		10 Ohms

Supported Arbitrary Sample Rates for Sigma-Delta Converters

Standard Rate	Actual/Arbitrary Rate (Hz)
6 kHz	6103.52
	6975.45
	8138.025
	9765.63
12 kHz	12207.03
	13950.89
	16276.04
	19531.25
25 kHz	24414.06
	27901.79
	32552.08
	39062.50
50 kHz	48828.13
	55803.57
	65104.17
	78125.00
100 kHz	97656.25*

* When operating at ~100 kHz (Sigma-Delta or PCM), only the first 23 channels of analog I/O are processed.

+ PCM sample rates increment in 40 nS steps.

Important! zBus chasis (ZB1PS) required for power and communication.