

The RX6 Multifunction Processor

System 3

Overview. The Multifunction Processor [RX6] is a high performance multiple DSP device for researchers who need to acquire or produce high quality, wideband audio signals. It also supports high sample rate, multimodal, and complex experimental paradigms.

The RX6 can be equipped with either two or five 100 MHz, 600 MFLOPS Sharc DSPs and includes two channels of analog output and two channels of analog input. Superior input/output and a novel multi-DSP architecture combine to provide exceptional processing power, fast data transfer rates, and a broad bandwidth.

This processor connects to a complete line of audio signal processing accessories, and can be used with TDT electrostatic speakers to generate ultrasonic acoustic stimuli for animal studies. Used with our headtracker interface, the RX6 becomes a powerful 3-D platform for complex real-time audio presentation, HRTF filtering, multiple virtual sound and many tap FIRs. Optionally, the RX6 can be equipped with a fiber optic input.

Power and Communication. The RX6 mounts in a UL compliant System 3 zBus Powered [25 Watt] Device Chassis [ZB1PS] and communicates with the PC using the Optibit [PO5e/F05] 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 BioSigRP and OpenEx, or using custom applications via ActiveX controls.



Shown with ZB1PS Device Chassis

Fiber Optic Port - Optional. The RX6 can include a fiber optic port to be used with the Head Tracker Interface or a Medusa preamplifier. A fiber optic cable provides loss-less signal acquisition between the amplifier and the base station. The port can input up to 16 channels and can be used with the RA16PA, RA4PA, or RA8GA. When the port is in use the RX6 can be used at standard available sampling rates up to a maximum ~100 kHz.

Analog Input/Output. The RX6 has two channels of 24-bit sigma-delta D/A and two channels of 24-bit sigma-delta A/D, each accessible through BNC connectors. This device has a dynamic range of 105dB and can sample at rates up to ~260 kHz for a realizable bandwidth of ~109 kHz. For specific information on the actual sampling rates see reverse.

Digital Input/Output. The RX6 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. The first four bits of digital I/O can also be used for submicrosecond event timing.

RX6 Multifunction Processor

RX6 Multifunction Processor Part Numbers:

- RX6-A2, Two DSPs
- RX6-2, Two DSPs and one fiber optic input
- RX6-A5, Five DSPs
- RX6-5, Five DSPs with one fiber optic input

Technical Specifications for the RX6 Multifunction Processor

The RX6 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
D/A	2 channels, 24-bit sigma-delta
Sample Rate	Up to 260.4166 kHz
Frequency Response	DC - 109 kHz
Voltage Out	+/- 10.0 Volts
S/N [typical]	105 dB [20 Hz - 20 kHz at 10 V]
THD [typical]	-92 dB [1 kHz output at 5 Vrms]
Sample Delay	43 samples
A/D	2 channels, 24-bit sigma-delta
Sample Rate	Up to 260.4166 kHz
Frequency Response	DC - 109 kHz
Voltage In	+/- 10.0 Volts
S/N [typical]	105 dB [20 Hz - 20 kHz at 10 V]
THD [typical]	-95 dB [1 kHz input at 5 Vrms]
Sample Delay	70 samples
Fiber Optic Ports	Optional Input [Medusa]
Digital I/O	24 bits programmable [8 bits addressable and a 16 bit word, addressable as 2 bytes]
Input Impedance	10 kOhms
Output Impedance	10 Ohms

Important! zBus chassis [ZB1PS] required for power and communication.

Supported Arbitrary Sample Rates for Sigma-Delta Converters

Standard Rate	Actual/Arbitrary Rate [Hz]
6 kHz*	6103.52
	6975.45
	8138.025
12 kHz*	9765.63
	12207.03
	13950.89
	16276.04
	19531.25
	24414.06
25 kHz*	27901.79
	32552.08
	39062.50
50 kHz*	48828.13
	55803.57
	65104.17
	78125.00
	97656.25
	111607.14
100 kHz*	130208.33
	156250.00
	195312.50
200 kHz*	223214.29
	260416.67

* Fiber Optic Port Compatible Standard Rates

