# DATA SHEET

# RPM 2m

## PROGRAMMABLE MULTIPROCESSOR


## General Description

The RPM 2m is a *100% drag and drop configurable* DSP-based device, set up and controlled using Rane's Drag Net™ software. Industry standard 10Base-T Ethernet is used to communicate between Drag Net devices and any Ethernet-equipped PC running Microsoft Windows®. See the Drag Net data sheet for the current software features and specifications.

Drag Net offers the ultimate in signal processing flexibility, allowing you to draw the system you need without signal flow restrictions. Familiar Windows file management tools and Shortcuts are incorporated into Drag Net, allowing complete project management within a single interface.

The RPM 2m provides two balanced, mic/line level analog inputs, two balanced analog outputs and a stereo AES3 digital output. Each input and output has its own 100% user-defined signal processing path.

Cost-effective end user control is possible using optional Rane accessories in conjunction with the Versatile Input Port. Whether your application requires contact closure preset recall or remote level control using a potentiometer on a wall, the RPM 2m keeps the user interface easy *and* inexpensive.

Euroblock and XLR connectors are provided for audio input and output. The rear panel has an RJ-45 Ethernet connector for computer control, and an IEC AC power input.

All DSP algorithms are not created equally, and textbook DSP algorithms miss the mark where the rubber meets the road. Rane's team of audio-savvy DSP mathematicians — a rare breed itself — in conjunction with our industry-leading analog signal processing gurus have combined forces to offer superlative digital *and* analog audio performance. With 24-bit converters, greater than 108 dB throughput dynamic range and double-precision 48-bit internal DSP "math," the RPM 2m offers the best DSP algorithms and audio performance available.

*This ain't no Internet appliance!* For example, the RPM's 215 MIPs translate into 150 fully parametric EQ filters, should you need multiple channels of 15 band parametrics and nothing else.

Multiple units are controlled from a single computer using low-cost Ethernet switches. The recessed Default button on the rear panel recalls Preset 1 in case of communications failure. The front panel has three-color LED meters for each input and output, allowing fast and intuitive signal flow verification without a computer. Current Preset, Control Port, Power, Ethernet and Status indicators are also on the front panel. Powered from an internal power supply and certified as UL, CSA and CE compliant, the RPM 2m is compatible with any installation mandating agency compliance.

## Software Features

- Drag Net™ setup & control software for Windows®
- Signal flow and critical settings in plain view on one screen
- 24 Fully programmable processing configurations
- Expandable collection of processing blocks
- Firmware upgrades via Ethernet connection
- Download and try Drag Net now at www.rane.com/dragnet

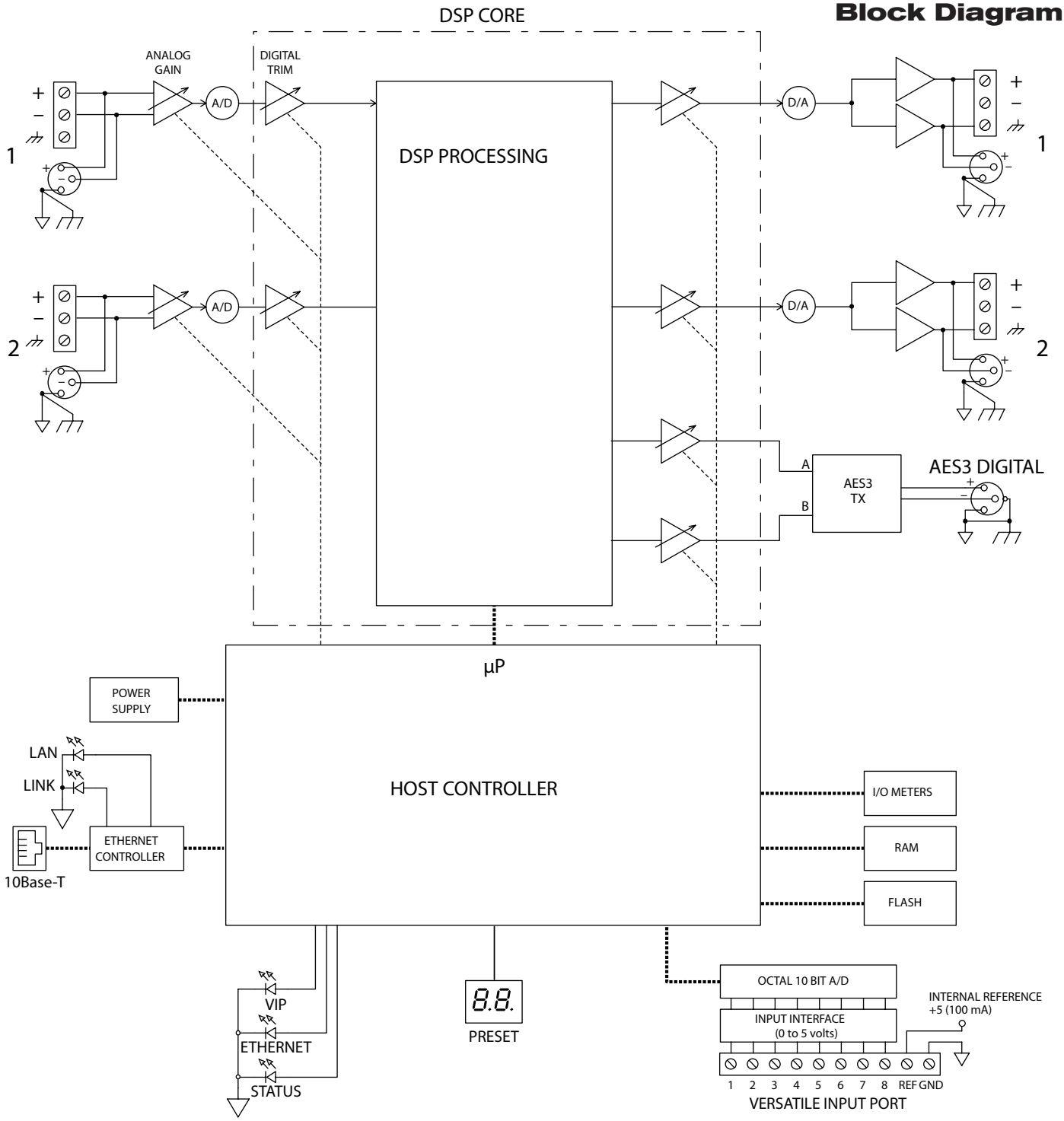
## Hardware Features

- 2 balanced analog Inputs and Outputs
- AES3 Output
- Microphone preamp with 48V Phantom Power
- Powerful DSP, up to 48-bit precision processing
- 108 dB dynamic range
- Preset recall via contact closures
- Versatile Input Port for remote control via voltage
- 10Base-T Ethernet control
- UL/CSA/CE internal power supply (100-240 VAC)

*Drag Net runs with Windows XP, Vista and 7.*
*Windows is a registered trademark of Microsoft Corporation*
*Drag Net is a trademark of Rane Corporation*

| Parameter | Specification | Limit | Units | Conditions/Comments |
|---|---|---|---|---|
| **Analog I/O** | Active Balanced | | | Euroblock and XLR connectors |
| Input Trim range | +16 to -20 (plus mute) | | dB | 1 dB steps |
| Mic Gain Settings | +15 to +60 | 1 | dB | 1 dB steps |
| .....Input Impedance | 4.05k | 2% | Ω | @ 1 kHz, each leg to ground |
| .....Phantom Power | +48 | 4% | VDC | 10 mA max / channel |
| .....Equivalent Input Noise | -128 | typ | dBu | 20-20 kHz, 150 Ω source, 60 dB gain |
| .....THD+N | 0.008 | typ | % | +4 dBu, 1 kHz, 20 kHz bandwidth @ 15 dB gain |
| .....Maximum Input | +7 | | dBu | gain at +15 dB |
| Line Gain Settings | 0, +12 | 1 | dB | |
| .....Input Impedance | 10.85k | 1% | Ω | @ 1 kHz, each leg to ground |
| .....THD+N | 0.005 | typ | % | +4 dBu, 1 kHz, 20 kHz bandwidth @ 15 dB gain |
| .....Maximum Input | +24 | typ | dBu | gain at 0 dB |
| Output Trim range | +16 to -30 (plus mute & invert) | | dB | ½ dB steps; gain > unity = digital, att. < unity = analog |
| .....Impedance | 100 | typ | Ω | Each leg to ground |
| .....Maximum Level | +23 (+24 unloaded) | typ | dBu | @ 1 kHz, 2 kΩ load |
| Frequency Response | 10 Hz to 20 kHz | +0/-1 | dB | |
| Dynamic Range | 108 | min | dB | Input Gain at 0 dB, A-weighted |
| IM Distortion (SMPTE) | <0.01 | 0.01 | % | 60 Hz / 7 kHz, 4:1, +4 dBu |
| Crosstalk | 100 | typ | dB | 1 kHz bandpass, any channel |
| Input & Output RFI Filters | Yes | | | |
| **Audio Converters** | 24 bit | | | 48 kHz sample rate |
| Audio Processing | 24 bit and higher | | | 48 kHz sample rate |
| Propagation Delay | 1.58 | min | ms | Analog I/O, no processing blocks |
| Internal Memory | Non-volatile | | | Flash and NOVRAM or FRAM |
| DSP MIPs | 215 | 2% | MIPs | MIPs = Millions of Instructions Per Second |
| **AES3 digital Output** | | | | 2 channels, balanced |
| Connector | XLR-type, male | | | ANSI S4.40-192; IEC 60958-4 standards |
| Max cable length | 328 feet / 100 meters | | | See RaneNote "Interfacing AES3 to S/PDIF" |
| Level range | +16 to -30 (plus mute & invert) | | dB | ½ dB steps |
| Sample rate | 48 kHz | | | |
| Word length | 24 bit | | | |
| **Communications Interface** | | | | 8 bit A/D Converter ½ LSB |
| Ethernet | 10Base-T | | | 10 megabit/sec; RJ-45 connector |
| Max cable length | 328 feet / 100 meters | | | Standard Ethernet CAT 5 cable length limits |
| VIP (Versatile Input Port) | 10-pin Euroblock | | | 8 Inputs, plus REF voltage & ground |
| Input Range | Vref + 0.3, GND - 0.3 V | | | |
| .....Filter | 15 | 5% | Hz | Low-pass 2nd-order Butterworth |
| .....Passive Pull-up | 100k | 1% | Ω | To Vref |
| Vref | 5 | 4% | VDC | 100 mA maximum |
| Preset recall time | 500 | typ | ms | Via software or contact closure. The unit recalls quickly, software display may take longer. |
| Meter Range | 60 | | dB | Peak Response |
| **Unit**: Power Requirement | 100 to 240 | ±10% | VAC | 50/60 Hz, 1.25 to 0.9 Amp |
| Ambient Temperature | 50 | max | °C | |
| Agency Listing | Safety | | | |
| .....UL | UL6500 | | | File E193164 |
| .....cUL (Canada) | CAN/CSAE60065-00 | | | |
| .....CE | LVD 73/23/EEC | | | EN60065 |
| EMI: CE | | | | EMC directive 89/336/EEC |
| .....FCC | Part 15B | | | Class B Device |
| Construction | All Steel | | | |
| .....Size | 1.75"H x 19"W x 8.25"D | | 1U | (4.4 cm x 48.3 cm x 20.9 cm) |
| .....Weight: | 5 lb | | | (2.3 kg) |
| Shipping: Size | 4.5" x 20.3" x 13.75" | | | (11.5 cm x 52 cm x 35 cm) |
| .....Weight: | 8 lb | | | (3.6 kg) |

## Block Diagram




## RPM Family Comparison

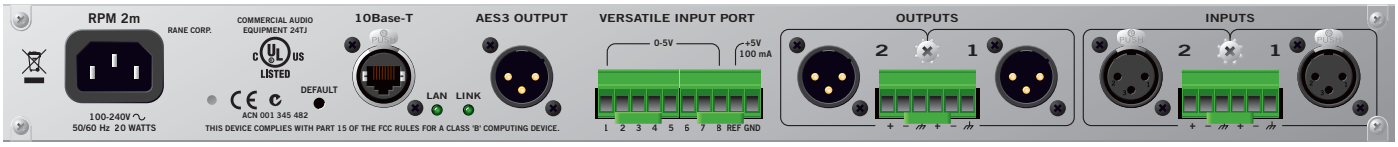
| Model | Analog Inputs | Analog Outputs | AES3 Input | AES3 Output | Total Inputs | Total Outputs |
|---|---|---|---|---|---|---|
| RPM 2 | 2† | 2 | no | no | 2 | 2 |
| RPM 2m | 2* | 2 | no | yes | 2 | 4 |
| RPM 26z | 2† | 6 | yes | no | 4 | 6 |
| RPM 22 | 2* | 2 | yes | yes | 4 | 4 |
| RPM 44 | 4* | 4 | yes | yes | 6 | 6 |
| RPM 88 | 8* | 8 | yes | yes | 10 | 10 |

†line-level inputs *mic/line inputs

# RPM 2m

PROGRAMMABLE MULTIPROCESSOR

## Rear Panel




## Accessories


MRS 4 Memory Recall Switch


LRS 4 Level Recall Switch


VR 2 Volume Remote

**See the Data Sheet of each Remote for details.**

## Architectural Specifications

The device shall provide two balanced mic/line inputs and two balanced line-level outputs. The microphone inputs shall provide -128 dBu equivalent input noise and shall be 100% controllable via software, including gains and phantom power selection.

Analog audio inputs and outputs shall be accessible via rear panel XLR and Euroblock terminals. An industry-standard, two channel AES3 digital output shall be provided via an XLR-type connector. A standard, low-cost Ethernet switch shall be used to network and control multiple units via 10Base-T.

The signal processing configuration shall be 100% user programmable under the Windows® XP operating system. The control software shall provide complete display and control, in graphical form, of all signal processing configurations and functions. Downloadable via a rear panel, industry-standard, Ethernet 10Base-T control port, the signal processing configurations shall be 100% drag and drop configurable (not fill in the blanks) utilizing a variety of digital signal processing algorithms, including but not limited to:

- Input & output gains with meters.
- Parametric, bandpass, all-pass, high & low shelf & cut filters.
- Feedback suppression.
- Graphic equalization with Perfect-Q™ response.
- Linkwitz-Riley, Butterworth, Bessel crossovers.
- Compression (with side-chain), limiting, Automatic Gain Control (AGC), auto mixer/ducker, ambient noise compensation.
- Mix, select, level control, delay.
- Pink noise and sine wave generators.

Control ports shall include eight logic inputs for contact closure preset recall or potentiometer level control. There shall be 24 internal, non-volatile Presets to store settings for later recall using a dedicated on-site computer or via external contact closure, making the computer optional once the unit is programmed. Contact closure ports shall be able to be paralleled for recalling the same Preset across multiple units. A recessed, rear panel default switch shall provide recall of Preset 1 to restore the unit to a known state in the event of communications failure.

All processing settings shall always be stored in nonvolatile memory within the unit, thus allowing for power or computer failure without loss of settings.

Data conversion shall be 24-bit, 48 kHz sampling rate using up to 48-bit internal DSP processing with a minimum 108 dB dynamic range.

The unit shall have no front panel controls, but shall provide three-color LED meters for each input and output level. There shall be front panel Power, Status, Ethernet, and control logic port communications indicators, and an illuminated display of the most recently recalled preset. The rear panel shall provide Ethernet Link and LAN indicators.

The device shall have certified compliance with FCC Part 15J for a Class B computing device and EMCD 89/336/EEC (CE certified). The device shall feature a built-in universal voltage power supply capable of operating from 100 to 240 VAC, 50-60 Hz. The unit shall feature an IEC socket line cord. The unit shall meet UL/CSA and CE safety requirements. The unit shall be constructed of cold-rolled steel and mount into a standard 19" 1U EIA rack. The unit shall comply with the AES48 Grounding Standard.

*The unit shall be a Rane RPM 2m Programmable Multiprocessor.*