



RPM 22

PROGRAMMABLE MULTIPROCESSOR



IMPORTANT SAFETY INSTRUCTIONS



1. Read these instructions.
 2. Keep these instructions.
 3. Heed all warnings.
 4. Follow all instructions.
 5. Do not use this apparatus near water.
 6. Clean only with a dry cloth.
 7. Do not block any ventilation openings. Install in accordance with manufacturer's instructions.
 8. Do not install near any heat sources such as radiators, registers, stoves, or other apparatus (including amplifiers) that produce heat.
 9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
 10. Protect the power cord and plug from being walked on or pinched particularly at plugs, convenience receptacles, and the point where it exits from the apparatus.
 11. Only use attachments and accessories specified by Rane.
 12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
 13. Unplug this apparatus during lightning storms or when unused for long periods of time.
 14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
 15. The plug on the power cord is the AC mains disconnect device and must remain readily operable. To completely disconnect this apparatus from the AC mains, disconnect the power supply cord plug from the AC receptacle.
 16. This apparatus shall be connected to a mains socket outlet with a protective earthing connection.
 17. When permanently connected, an all-pole mains switch with a contact separation of at least 3 mm in each pole shall be incorporated in the electrical installation of the building.
 18. If rackmounting, provide adequate ventilation. Equipment may be located above or below this apparatus, but some equipment (like large power amplifiers) may cause an unacceptable amount of hum or may generate too much heat and degrade the performance of this apparatus.
 19. This apparatus may be installed in an industry standard equipment rack. Use screws through all mounting holes to provide the best support.
- WARNING:** To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture. Apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, such as vases, shall be placed on the apparatus.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

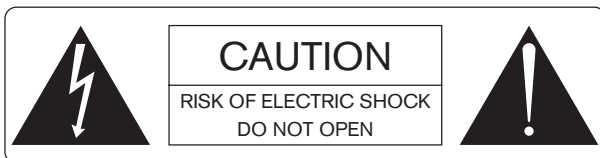
CAUTION: Changes or modifications not expressly approved by Rane Corporation could void the user's authority to operate the equipment.

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Shielded CAT5e or better cables are required in order to comply with the FCC Rules part 15 limits for a Class B digital device.

WARNING



To reduce the risk of electrical shock, do not open the unit. No user serviceable parts inside. Refer servicing to qualified service personnel.

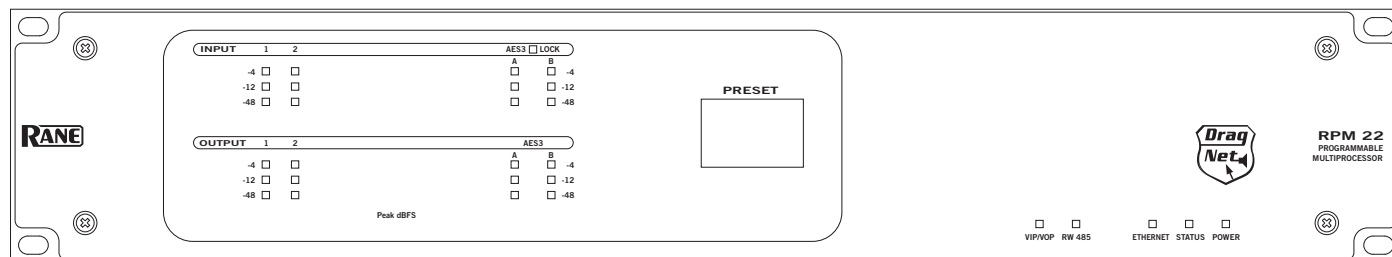
The symbols shown below are internationally accepted symbols that warn of potential hazards with electrical products.



This symbol indicates that a dangerous voltage constituting a risk of electric shock is present within this unit.



This symbol indicates that there are important operating and maintenance instructions in the literature accompanying this unit.



QUICK START

This section is intended to help you make the physical connections and software manipulations necessary to get up and running with your sleek new RPM 22. If you don't read the entire Hardware Manual, at least read this section. It is also recommended that you read the Quick Start section of the Drag Net Software Manual. If the Drag Net software is not yet installed on your computer, please install it now.

To be safe, leave the audio connections until last. Begin by connecting the IEC power cord. Observe that the **POWER** LED on the front panel illuminates. After a few seconds, the **STATUS** LED should turn from red to yellow to green, and the **PRESET** display should have a number in it (00, if it's the first time you've powered the device). If the **POWER** comes on, but the **STATUS** LED does not turn green, contact the factory.

Connect one end of the Ethernet crossover cable (supplied with the unit) to the **10Base-T** jack on the rear panel. Connect the other end of the cable to an Ethernet port on your computer. The **LINK** LED on the rear panel should be lit. If it is not, verify that you are indeed using a crossover cable, not a standard Ethernet cable. A standard Ethernet cable should only be used if you are connecting the RPM 22 and a computer indirectly using an Ethernet switch. Launch the **Drag Net** application and follow the steps to create a new project and new RPM 22 device configuration. The **Project** window then appears. Click the **Configure Hardware IP** shortcut to set the unit's IP address to be compatible with your computer's Network settings. *Tip: If you aren't sure what IP to use, try the address 192.168.69.69 and subnet 255.255.255.0. This finds the default factory address without manually setting it.*

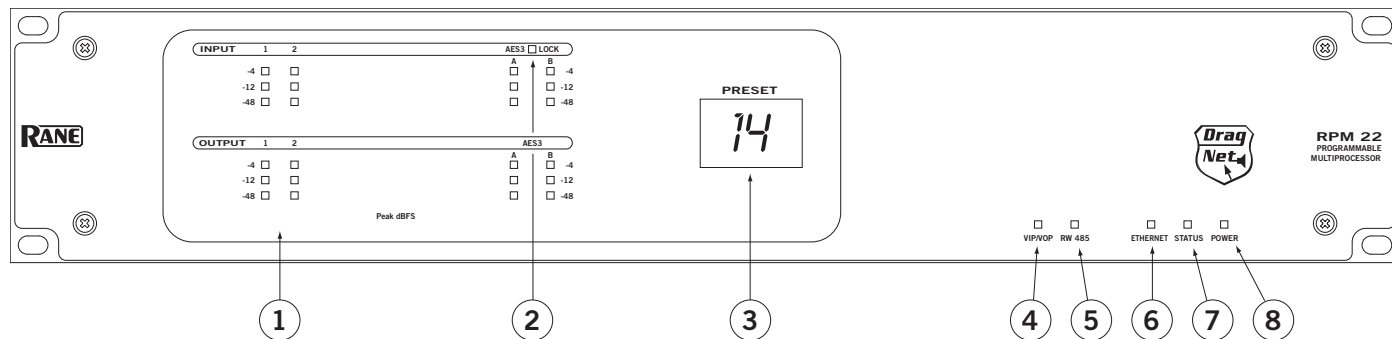
Now click on the **Poll** button in the toolbar. A device name and IP address should appear under the **Live** folder in the **Project** window. If a device does not appear, consult Drag Net's online **Help** for instructions on configuring and verifying your computer's Network settings.

The audio path within the RPM 22 is displayed in Drag Net's **Device Configuration** window as a collection of blocks wired together to form a **Processing Map**. These maps are created offline as **Storage** configurations, which are then transferred to a **Live** unit. Drag blocks from the **Palette** onto the **Processing Map** and wire them together to create the audio path. Save this file frequently using the **File > Save** command. Transfer the selected **Storage** configuration to a **Live** unit using the **Transfer Config** button in the **Project** window. A new, minty green **Device Configuration** window opens once the transfer is complete, indicating you are now online with a **Live** device. Double-click a processing block to display and adjust its **Properties** (parameters) in real time on a **Live** device – there is no need to go offline to make parameter changes.

Once you have a useful configuration in the unit, connect balanced audio **INPUTS** and **OUTPUTS** to the Euroblocks on the rear panel, then turn on the amplifier. As a precautionary measure, all outputs are muted during *and* after a configuration transfer. Unmute each output individually, or use the handy **Mute Outputs** button in the toolbar. Once all outputs are unmuted, audio passes through the unit along the connections you defined.

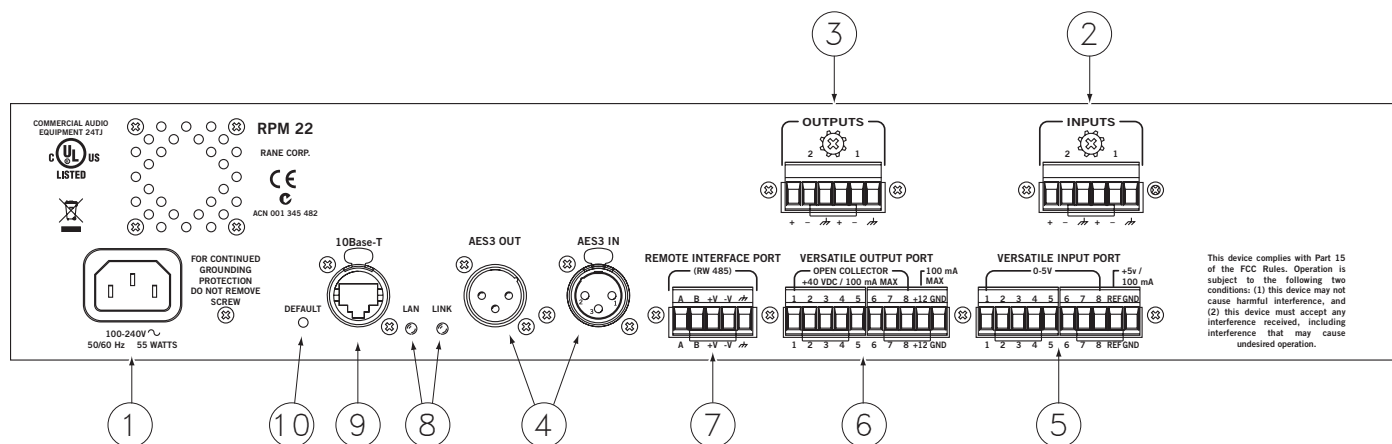
For any questions not covered in this manual, plus lots of tips, tutorials and applications, visit www.rane.com/dragnet.

Front Panel Description



- ① **Signal/Overload LED meters** indicate the presence of significant audio signal or overload. These 3-segment meters indicate the available headroom once the analog signal has been converted to digital: -4 dBFS (red, near clipping), -12 dBFS (yellow, high normal level), and -48 dBFS (green, low level). The analog signal level depends on the input and output settings and is displayed in Drag Net's Meter window.
- ② **AES3 LOCK LED** lights solidly when a valid AES3 digital signal is detected on the AES3 input jack. There does not need to be an audio signal present at the input, only the "carrier" signal.
- ③ **PRESET LED** displays the number of the most recently recalled Preset, numbered 0 through 24.
- ④ **VIP/VOP LED** flashes when a change is detected on the Versatile Input Port (VIP) or Versatile Output Port (VOP). These ports are used for direct electrical connections to potentiometers, switches or other logic ports. The Versatile Input Port accepts up to eight contact closures or voltages; the Versatile Output Port drives eight loads (logic on/off).
- ⑤ **RW 485 LED** flashes when a change in setting is detected on the RW 485 Remote Interface Port. RW 485 is a serial communications protocol primarily used for Rane's Smart Remotes.
- ⑥ **ETHERNET LED** flashes when an Ethernet data packet for this device is received.
- ⑦ **STATUS LED** reflects the overall status of the unit:
 Red - initializing (briefly) or possible internal error.
 Yellow - working, but not currently processing audio.
 Green - processing audio.
- ⑧ **POWER LED** lights solidly when the unit is powered on.

Rear Panel Description



- ① **POWER IEC jack** connects to AC line voltage, 100-240 VAC $\pm 10\%$.
- ② **Balanced analog audio Inputs 1 through 8.** Euroblock connectors.
- ③ **Balanced analog audio Outputs 1 through 8.** Euroblock connectors.
- ④ **AES3 digital audio Input and Output.** XLR female (input) and male (output) connectors.
- ⑤ **Versatile Input Port** provides 8 logic or voltage inputs for remote level control and Preset recall. Euroblock connector.
- ⑥ **Versatile Output Port** provides 8 logic outputs capable of driving small relays, LEDs or other logic inputs. Euroblock connector.
- ⑦ **RW 485 Port** communicates with Rane's Smart Remotes. A maximum of 280 mA of current is available for powering remotes. Euroblock connector.
- ⑧ **LAN and LINK** reflect the state of the Ethernet connection. LINK lights solidly when a valid connection to another Ethernet device (e.g., a PC) is detected. LAN flashes when communicating with another Ethernet device.
- ⑨ **10Base-T jack** accepts a standard Ethernet cable. RJ-45 connector.
- ⑩ **DEFAULT button** recalls Preset 1 when pressed. Holding this button while applying power puts the unit into a special codeload mode for updating firmware. The letters "CL" appear on the PRESET LED display when the device is in codeload mode.

Audio Connections

As a safety precaution, turn all devices (especially power amplifiers) OFF when making connections. Doing so gives you a chance to find and correct wiring mistakes and prevent damage to your amplifiers, speakers, ears, remotes, etc.

Analog Inputs and Outputs

The RPM 22 has two balanced analog Inputs and two balanced analog Outputs.

For each Input or Output Euroblock connector:

- Connect the (positive) audio line to the '+' terminal.
- Connect the (negative) audio line to the '-' terminal.
- Connect the cable shield to the ground terminal.

For those installations where the RPM 22's internal shield-to-chassis connection causes interference, connect each shield directly to the chassis PEM nut located above each Euroblock connector, keeping the shield wrapped around the audio conductors as much as possible.

For optimum Electromagnetic Interference (EMI) immunity, connect the shields at both ends of the cable. See the RaneNote "Sound System Interconnection" for more information on system connections and proper grounding practices.

Analog Input Stage

Each analog input uses a two-stage gain approach. The first stage contains a software controlled analog line/mic pad and switchable-gain preamp. The second stage contains a Digital Trim control located immediately after the A/D converter.

Input Clipping

If you've set the Analog Gain so the input stage is not clipping, it is not possible to clip the A/D converter, since there is no additional gain between the initial input stage and the A/D converter. The Digital Trim control, located after the A/D converter, can be set to clip the signal to your heart's content, so adjusting this trim to provide the hottest signal to the DSPs *without* clipping is the most important step when setting up gain structure. For this reason, a dedicated meter displaying the signal level being passed to the DSPs is provided in each Analog Input block.

If the DSPs are working with a clipped signal, the audio is (as expected) distorted, but it is not a drastic, damaging sound. And while it's technically possible to write a DSP algorithm to emulate the glorious clipping distortion of vacuum tubes, it's not particularly useful for an installed sound system, where DSP power could be put to better use removing that annoying 500 Hz feedback from the Pope's podium mic.

Analog Output Stage

Each analog output also uses a two-stage gain approach, which differs slightly from that of the analog input stage. The first stage is a Digital Trim control located immediately *before* the D/A converter. The second stage is an analog trim control located immediately *after* the D/A converter. Attenuation is handled in the analog domain, while boosting (when the incoming digital signal is low) is handled in the digital domain. Boosting and attenuating using this two-stage approach helps maintain the RPM 22's excellent noise performance.

Digital (AES3) Input and Output

AES3 is a popular 2-channel (stereo) digital audio interface commonly found on professional digital audio equipment (digital mixers, DAT machines, etc.). Each channel of the AES3 digital stream is treated independently within the RPM 22.

See the RaneNote "Interfacing AES3 and S/PDIF", available from Rane's web site (www.rane.com/library.html), for more information about interfacing consumer S/PDIF gear to the professional AES3 standard.

Use the AES3 I/O to:

- Connect multiple RPM 88/44/22/26z/2m's together to create a 2-channel digital "bus" between devices.
- Connect directly to the AES3 output of a digital mixing console.
- Connect directly to the AES3 input of a digital recorder.
- Connect to an external A/D or D/A converter, effectively adding two more analog inputs or outputs.

Incoming Sample Rate and Word Length

The AES3 input has a built-in sample rate converter capable of accepting incoming sample rates up to 96 kHz. Sample rates exceeding the RPM 22's internal 48 kHz sample rate are automatically downsampled. Word lengths up to 24-bits are accepted.

Outgoing Sample Rate and Word Length

The AES3 output uses a fixed 48 kHz sample rate and 24-bit word length.

Control Connections

Versatile Input Port (VIP)

Eight logic input pins are provided, each capable of accepting DC voltage between 0-5 VDC. VIP pins are used with contact closure switches for Preset recall, or with potentiometers for remote Level control. The functionality (Preset recall versus control) of each pin is assignable as part of the Device Configuration.

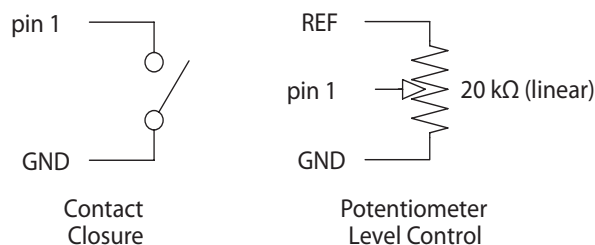
The maximum allowable voltage on any VIP pin is 5.3 VDC.

Use of twisted pair cable is recommended for better noise immunity.

If an external device is used to generate a 0 to 5 volt signal, connect the ground of the external device to the GND pin of the VIP.

VIP CONNECTION

(examples for VIP pin 1)



Preset Recall Using Contact Closure Switches

The minimum “low” voltage required to detect a contact closure and change Presets is 2.5 V. Since the internal pull up is 100 kΩ to +5 V, it is possible to calculate the maximum allowable cable length, provided the wire resistance per foot (or meter) is known.

Example:

To be safe, allow a maximum of 80 kΩ cable resistance. This value keeps the voltage divider formed by the 100 kΩ internal resistance and 80 kΩ cable resistance from dropping below 2.5 V.

$$(5 \text{ V} * 100 \text{ k}\Omega) / (100 \text{ k}\Omega + 80 \text{ k}\Omega) = 2.777 \text{ V}$$

If the cable resistance is 30 Ω per 1,000 feet

$$(1,000 \text{ feet} / 30 \text{ }\Omega) * 80,000 \text{ }\Omega = 2,666,666 \text{ feet.}$$

Thus, you can only use 2,666,666 feet (505 miles) of twisted pair cable before the Preset recall functionality becomes intermittent (assuming the cable is properly twisted and not run through excessive magnetic or electric fields).

MRS 4 Memory Recall Switch

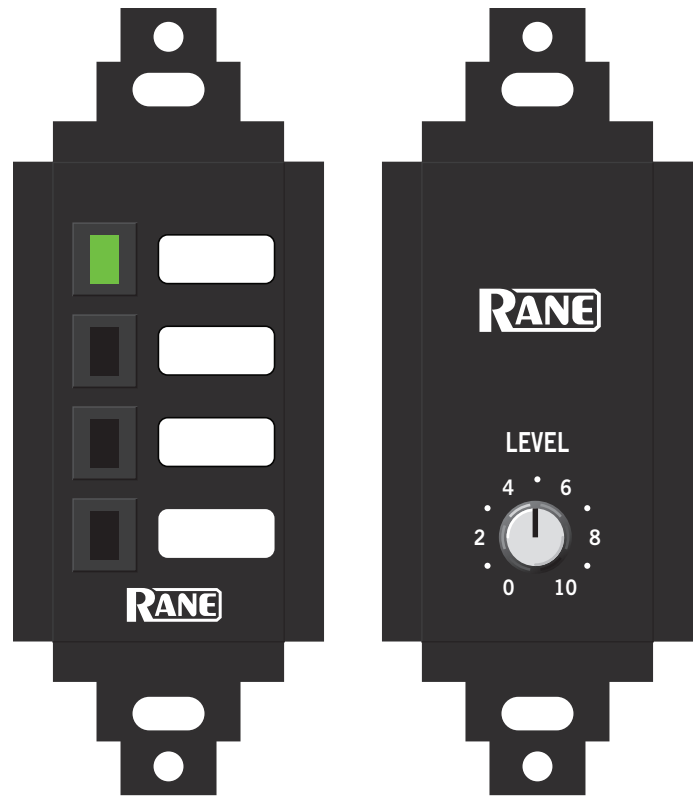
The MRS 4 provides a simple solution to recalling Memories from a remote location using the VIP (Versatile Input Port). The MRS 4 allows up to four Memories to be recalled. These are radio buttons: engaging one button (*in, changing to green*) causes any of the other three to disengage (*out, changing to black*). Space is provided next to each button for labelling.

Remote Level Control Using Potentiometers

The VIP inherently prefers linear taper 10 kΩ potentiometers, which provide a nice audio taper “feel” for the end user. When used with suitable twisted pair wiring, the 10 kΩ value also offers acceptable noise immunity and very long cable lengths.

VR 2 Volume Remote

The Rane VR 2 Volume Remote or LRS 4 Level Recall Switch accessories are suitable candidates for a remote volume control. Connect the remote’s control voltage Vc (wiper) connection(s) first. Then connect the voltage reference “Vr” on the VR 2 to the “REF” terminal on the RPM 22. Connect the GND (ground) terminal last. Double check your wiring before applying power to the RPM 22 since improper wiring can and will cause permanent, irreparable damage to the remote, requiring replacement.

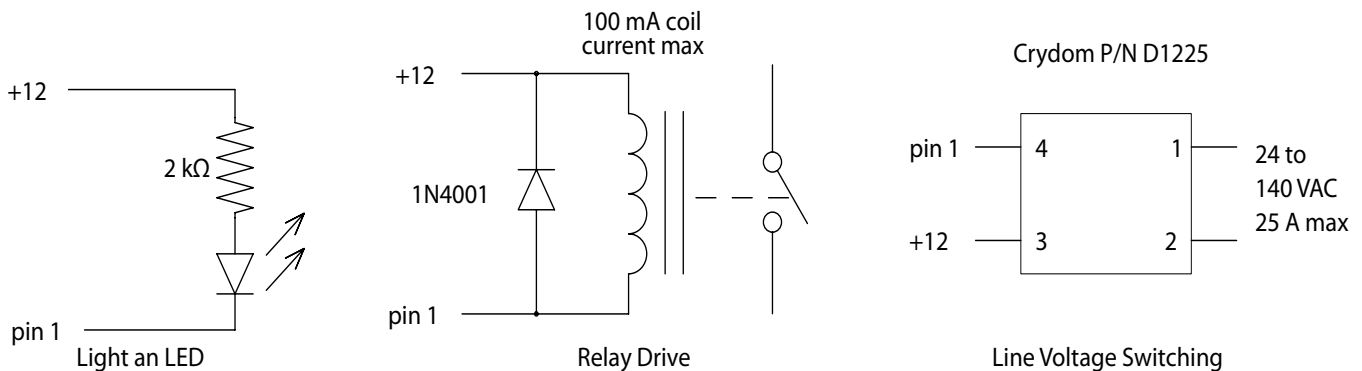


Rane MRS 4 Memory Recall Switch and VR 2 Volume Remote.

Versatile Output Port (VOP)

Eight open collector logic output pins are provided, each capable of sinking 100 mA of current. The on-board REF voltage of 12 VDC provides a maximum of 200 mA of current. Use an external power supply (40 VDC maximum) if more current is required, but be sure to connect the external supply’s ground to the GND pin on the VOP.

VOP CONNECTION (examples for VOP pin 1)



NOTE: +12 VDC is available on the VOP. An external supply may be used as long as any VOP pin voltage never exceeds 40 VDC.

Examples shown are for 12 VDC only.

RW 485 Port

The RW 485 port uses a simple, proprietary protocol to communicate with Rane's optional Smart Remotes (SR 2, SR 3, SR 4). The details of this protocol are found in their manuals, available from Rane's web site (on each product page).

This port follows the electrical specification found in the TIA/EIA-485 standard, with one exception: the recommended termination impedance is neither implemented nor required, since RW 485 uses a relatively slow baud rate (38,400 bps). In fact, including the termination has proven to hinder the performance of the RW 485 bus.

Five connection terminals are provided: a balanced pair of data lines (A and B), a pair of power lines ($\pm V$), and a chassis ground. All terminals should be connected to the corresponding terminals of the Smart Remotes.

Up to eight Smart Remotes, each with a unique address, can be connected to the RPM 22. Use any mix of SR 2, SR 3 and SR 4 remotes with any combination of star or daisy chain wiring.

The cable length limitations and the maximum number of remotes that can be powered from the RPM 22 is limited by the mix of remote types used, cable type used, distance to each Remote, and the wiring configuration. Detailed wiring and cabling tables and several examples are discussed in the SR Manuals.

The RW 485 port is intended for Rane's Smart Remotes only; we do not recommend directly interfacing the RW 485 port with devices that are not compliant with the TIA/EIA-485 standard, such as the "485" ports found on AMX and Crestron devices.

AMX and Crestron Control

There are two ways to control a RPM unit from an AMX or Crestron system. Use either Ethernet or use the rear panel Versatile Input Port (VIP). Each of the eight VIP pins supports either switch closure Preset recall or zero-to-five volt control of Level.

The RW 485 ports found on some Drag Net devices **do not** communicate with AMX or Crestron systems. They are solely for communicating with Rane's RW 485 remotes.

Many AMX/Crestron applications require simple Level control and/or Preset recall. This is most easily accomplished using the VIP (Versatile Input Port) found on all RPM units.

VIP Preset Recall

Connect a switch closure or relay to a VIP pin and short it to the ground (GND) pin to recall the corresponding Preset. For example, shorting VIP pin 1 to the GND terminal recalls Preset 1; pin 2 recalls Preset 2, etc. There are more details about this functionality in the Drag Net Help file and on our Drag Net Applications page. Be certain to appropriately set the VIP Allocation in Drag Net's Parameter Window.

If GND contention of two or more pins simultaneously occurs, the highest-numbered VIP pin takes precedence. For example, if pin 3 is shorted to GND and pin 6 is then shorted to GND, Preset 6 is recalled. If pin 3 is closed and then pin 2, nothing happens -- Preset 2 is **not** recalled. This permits a hierarchy of Presets when using VIP pin closures for tiered priority paging. Since there are only eight VIP pins, you can only recall up to eight Presets using switch closures.

There are four ways to recall more than eight presets.

1. Use the Drag Net software Recall button which is only intended for the system installer/designer.
2. Use the Rane SR 4 remote to recall any eight Presets.
3. Use a Rane SR 3 remote which can recall any 16 of the available 24 Presets.
4. Use an Ethernet command from an AMX or Crestron Ethernet-equipped product.

When using Drag Net's Auto Mixer/Ducker block, you have the ability to link a VIP pin closure to a push-to-talk switch in a paging or boardroom application. When using the Ducker block in these applications, the VIP pins act independently provided you Group the appropriate VIP pin with the Auto Mixer/Ducker's Input in Drag Net's Remote Map. Again, see our Drag Net Applications for examples.

VIP Level control

Connect a zero to five volt DC voltage to a VIP pin from an AMX or Crestron card to adjust any or all Level blocks placed in the Processing Map. Use Groups in Drag Net's Remote Map to link one or more Level blocks so they track each other when using a VIP pin. Be certain to appropriately set the VIP Allocation in Drag Net's Parameter Window. When using VIP pins with Level blocks, set the minimum and maximum for each Level block by double-clicking it while it's in a Remote Map Group. This keeps the max and min burdens within the Drag Net device — but only when using the VIP pin to control Levels, not when adjusting Levels from Ethernet commands.

You can use up to eight voltage control inputs linked to Level(s) using the rear panel VIP pins. Combinations of Preset switches & voltage Level "pots" are possible as long as combined, they do not exceed the eight pins provided.

Since you can Group any or all Level blocks in Drag Net's Remote Map, it's much easier to implement a stereo level control since the Drag Net device is burdened with the task of tracking many Levels. You can use this to your advantage when using VIP pins to adjust multiple zones or levels. Since you can place the Level block anywhere within the Drag Net Processing Map, you can Group Level blocks at the input, at the output or anywhere in-between — just place the Level block where you want it.

Ethernet control

Download the AMX or Crestron control code and documentation from the Drag Net web page: www.rane.com/dragnet

Ethernet Port

The Ethernet port is used to configure, monitor, and control the RPM 22 via standard 10Base-T Ethernet communication. Use an Ethernet crossover cable (one is included with each unit) to connect the RPM 22 directly to a computer. Use a standard (non-crossover) Ethernet cable if the RPM 22 and computer are connected indirectly using an Ethernet repeater hub or switch.

All devices connected to the Ethernet port, including repeater hubs, switches, and the computer's Network Interface Card (NIC) must support 10Base-T communication.

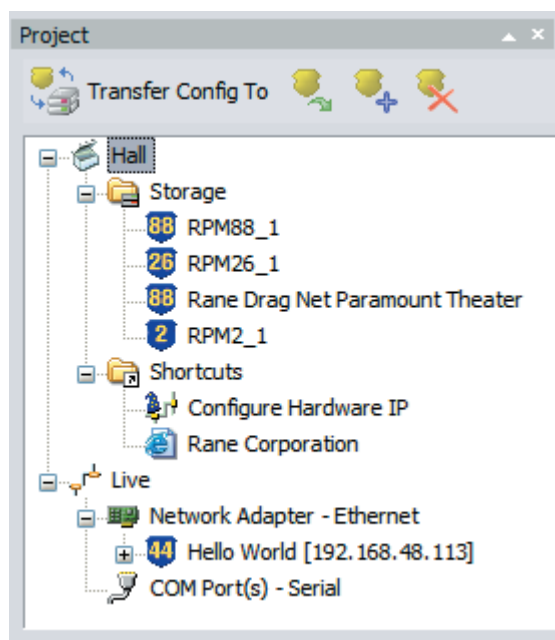
Drag Net Quick Start

Rane's tradition of writing a one page Quick Start section in our manuals has been revamped. Since this section is four pages, it's called the *Mostly* Quick Start section.

Drag Net software installation is straight forward — just run the **setup.exe** file included on the CD-ROM or downloaded from Rane's website (www.rane.com/dragnet) and follow the on-screen instructions.

You are prompted to create a new project and device configuration the first time Drag Net is launched. Enter the project name and file storage location on your hard drive. A second dialog allows you to create a new device configuration. Select a device type, RPM 26z for example, and specify a hard drive storage location to create a new configuration.

Once a new project and configuration have been created, a collection of windows is displayed within the Drag Net interface. These windows can be independently resized, opened, closed, docked and floated as you prefer.



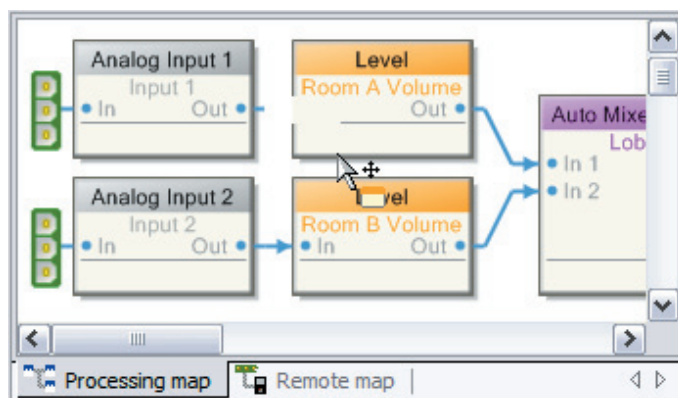
The **Project Window** is comprised of three folders and provides links to Storage configurations, Shortcut links to other files or applications, and a list of Live devices. Think of a Project as an editable database of links — only the *links* to files are contained in the Project file (*.prj file extension). The Project file neither stores nor contains any of the settings for a particular device configuration, it just consolidates and manages links to the relevant files (for examples, the RPM 26z configurations are stored with a .r26 file extension, and the RPM 88 configurations have a .r88 extension). Changes to a Project's contents are automatically saved. Only one Project at a time can be viewed in the Project window.

- The Storage folder displays a list of “offline” or Storage configurations residing on the local hard drive. Add links to new or existing configurations to the Storage folder by right-clicking within the Project window and selecting either New or Add file(s).

- The Shortcuts folder displays a list of links to non-Drag Net files or applications (e.g. project spreadsheets, proposal documents), URLs, and even email recipients. Double-click on a Shortcut to open it using the associated application. Add additional links to the Shortcuts folder by right-clicking within the Project window and selecting New.
- The Live folder displays a list of “online” Drag Net devices. Click on the **Poll** icon or right-click in the Project window and select **Poll for devices**, then choose one of the polling options. The Live folder is populated as the polling operation progresses.

*Transfer configurations between Storage and Live by dragging and dropping configurations from one folder to another, or by using the **Transfer** menu.*

*All outputs are intentionally muted each time a new configuration is transferred to a Live device. Unmute each output individually or use the **Mute Outputs** button in the toolbar to toggle the mute status of all outputs (after carefully pondering the consequences, of course).*



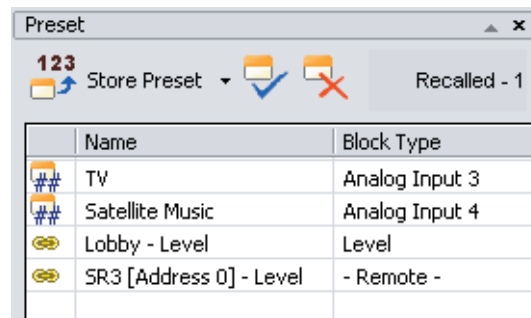
The **Device Configuration Window** displays the current device configuration, activated by double-clicking a Storage or Live configuration (or alternately by right-clicking and selecting Open Item). It is comprised of two distinct views: the Processing Map and the Remote Map. Toggle between views using the tabs at the bottom of the window. The **Processing Map** serves two basic functions:

- It allows drag and drop techniques to assemble and connect any combination of signal processing blocks between the inputs and outputs of a Storage configuration. It is not possible to add or delete signal processing blocks or connections on a Live configuration.
- It allows you to view and edit, in real-time, all signal processing parameters for Storage or Live configurations. Double-click the processing block or right-click and select Properties to display a Properties (parameters) dialog. Changes made to a Live configuration are automatically transferred to and saved in the Live device. Changes made to a Storage configuration must be saved using the Save command.



The **Remote Map** is used to configure the Versatile Input Port (VIP) and the RW-485 Remote Interface Port, if the RPM unit is so equipped. The VIP accepts either contact closure switches for Preset recall, or 0-5V potentiometer-on-a-wall devices for Level control. Double-click Edit VIP Properties in the Parameter Window to allocate multi-pin or single-pin control. Multi-pin control is used with contact closure switches to recall Presets, or to select inputs in a Source Selector, for example. Single-pin control is used for independent parameter control: to adjust levels using a potentiometer, or to engage the Push-to-Talk function of an Auto-Mixer input, as examples. See the “Using the Remote Map” section of Drag Net’s Help (Help > Help Topics) for the full scoop.

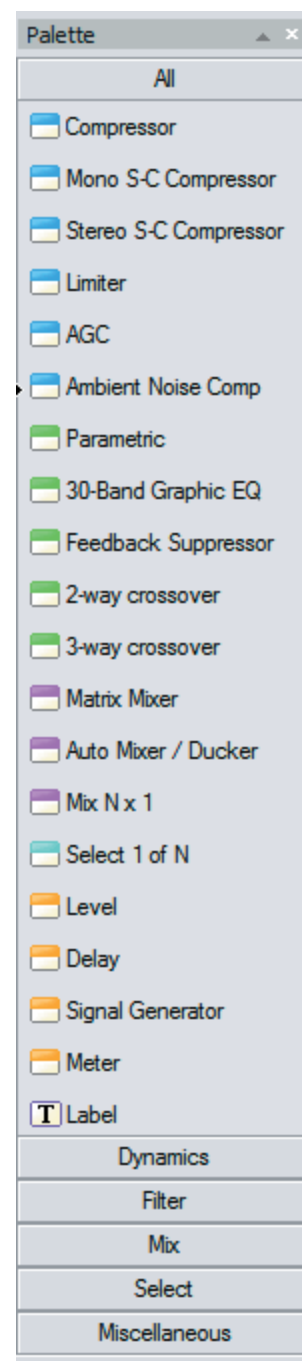
The Remote Interface Port uses Rane’s RW 485 protocol to communicate with our SR series of Smart Remotes. Double-click Add/Edit Remotes in the Parameter window and follow the on-screen instructions to add new Remotes or edit existing Remotes. Smart Remotes can perform many functions including Preset Recall, Source Selection, and Level control. See the “Using the Remote Map” section of Drag Net’s Help (Help > Help Topics) for more information.

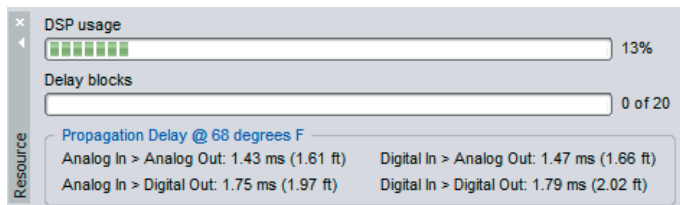


The **Preset Window** manages the creation and storage of Presets. A Preset may contain any or all of the processing and control blocks displayed in the Device Configuration window. Add blocks to the Preset block list by dragging and dropping them from the Device Configuration window to the Preset window, or by right-clicking the block and selecting Add to preset. Remove blocks from the Preset window by selecting one or more blocks from the list, then using the Delete key or the Remove Selected Block(s) button. Click the Store button and select a Preset number to store the current settings of all blocks contained in the Preset block list.

Presets are recalled using the Recall Presets button in the toolbar at the top of the screen. When a Preset is recalled, only the parameters or Remote Map associations of the blocks contained in the Preset change; all other blocks maintain their current settings, thereby creating a parameter overlay effect. The Preset window does not have to be visible in order to recall Presets.

The **Palette Window** displays the audio processing blocks used to create Storage configurations. Drag and drop blocks from the Palette to the Device Configuration window to develop your audio system. The various tabs (Dynamics, Mix, etc.) are used to sort the Palette window by block class. Select the **All** tab to display all available blocks.





The **Resource Window** displays usage information specific to the hardware device you're working with. The DSP usage meter indicates the amount of DSP "horsepower" used by the current configuration, and is always accurate. There is no need to hit a "compile" button, since Drag Net automatically compiles on the fly as you work. It is possible to exceed 100% DSP usage when developing Storage configurations, but it is not possible to transfer the Storage configuration to a Live device. The Delay blocks meter indicates the amount of audio delay memory used in the current configuration. Audio delay memory differs from memory used by other signal processing functions; thus, it is given its own meter.

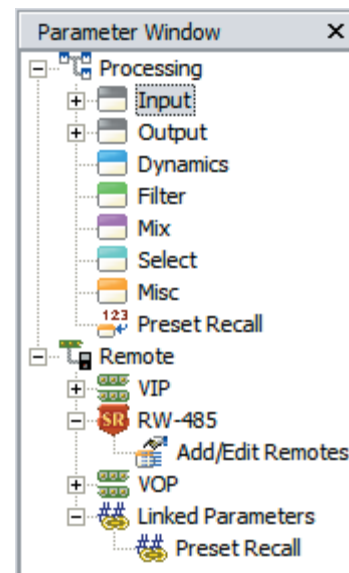
Propagation delay (latency) statistics for both the analog I/O and the AES3 digital Input are also displayed in the Resource window. The propagation delay varies slightly with the quantity of signal processing blocks used in the configuration. Importantly, the propagation delay for all analog I/O is forced to be the same (referred to as "Delay Compensation"), in order to maintain the relative timing between input signals (unless you add a Delay block to the signal path, of course).



The **Converters** tab displays the dB Full Scale (dBFS) reading immediately after the input A/D converters and immediately before the output D/A converters. The AES3 digital input meter (dBFS) is displayed in both views.

The number of meters provided varies with device type. Meters are only active when working with a Live device.

The number of meters provided varies with device type. Meters are only active when working with a Live device.



Individual parameters within a block are prefaced with "#". The Parameter window is primarily used to set up associations between parameters and remote control devices (VIP pins, Smart Remotes).

Other things you can do with the Parameter window:

- Double-click any entry to view its Properties dialog.
- Drag-and drop entries from the Parameter window into the Preset window to quickly build Presets.
- Edit VIP Properties.
- Add or Edit RW 485 Smart Remotes.
- Edit VOP Properties.

Handy tip: The Parameter window supports multi-select operations. Simply ctrl-click or shift-click multiple entries to perform the same action for the entire selection – add a range of blocks to the Preset window, for example. Alternately, you can select a top level block – the Input block, for example – and perform actions on all related sub-entries.

Big Picture Concepts

Storage Mode versus Live Mode

When you first create a Drag Net device configuration, it is stored and appears under the Storage folder of the Project Window. Think of this as *offline* mode. Any changes made to Storage configuration are saved to your computer only; they are not updated automatically on the Live device.

Storage configurations are transferred to a Live device, which appears under the Live folder of the Project window after successfully polling for devices.

After transferring the configuration from Storage to Live you can adjust parameters, build Presets, and set up Remote Map associations in real time on the Live device. You can not add/delete blocks or wires. Think of this as *online* mode. All changes are automatically saved to the Live device; however, periodically transfer the Live device settings back to a new or existing Storage configuration in order to maintain an offline (backup) copy of system settings. Live device settings are not automatically kept in synch with Storage configurations.

File Concepts

A Storage configuration consists of:

- The Processing Map (schematic/audio signal flow).
- Parameter settings (gains, delay, EQ, etc.) and Preset info.
- Remote Map link info.

In Drag Net 4.2 and higher, these items are stored in a single configuration file (see Project Window on page 1). This makes it easier to track, transfer between computers or email your Drag Net configurations. Previous to 4.2, this data was in three independent files.

Dragging Tips (Storage mode)

Audio flow: Drag and drop blocks from the Palette window to the Processing Map to build the audio portion of a Device Configuration.

Control: Drag and drop items from the Parameter window to the Remote Map to build the control portion of a Device Configuration.

Move blocks around the Device Configuration window by left-clicking the block to select it, then dragging the block to a new location while continuing to hold down the mouse button. Alternately, left-click the block to select it, hold down the CTRL key, then use the arrow keys to reposition the block.

Drag and drop blocks from the Device Configuration window to the Preset window to add blocks to the Preset block list.

Drag and drop configurations between the Storage and Live folders in the Project window to transfer configurations between the PC and a Live unit.

Wiring Tips (Storage mode)

Wires can be dragged from Out pins to In pins found on each processing block. A couple tips:

- You must wire from an Out pin to an In pin.
- Any Out pin can be wired to as many In pins as desired — a dedicated split block is not required. It is not possible, however, to connect multiple Out pins to a single In pin. Use mixers or selectors for this purpose.

Presets

The current settings of a device (all Properties, or parameters) are always stored in working memory and displayed in the Device Configuration window, making for a true WYSIWYG (What You See Is What You Get) interface. Each user-definable Preset can store processing block Properties and Remote Map settings for subsequent recall. A Preset can be comprised of any or all processing or control elements displayed in the Device Configuration window.

Only the processing parameters and the Remote Map settings are stored in Presets — it is not possible to change the wire routing or signal flow using Presets. If you require a completely new signal flow, you must either draw all required parts of the system in the Processing Map and then toggle Presets to route the audio between the various system blocks using selectors or mixers, or transfer a new Storage configuration from the PC to the Live device.

Storing to Presets

Click the **Add All Blocks** button, located next to the Store Preset button in the Preset window, to populate the Preset block list (Name/Type) with all blocks on the Processing Map. Store a Preset by clicking the **Store Preset** button and selecting a Preset number. The current settings of each block in the list are stored, the device configuration is automatically saved, and the stored Preset is automatically recalled.

It is also possible to store and recall a subset of processing and control blocks. Drag and drop (or alternately right-click a block and choose **Add to Preset**) only the blocks you want stored in the Preset from the Device Configuration window to the Preset window. When the Preset is recalled, only the settings of the blocks contained in the Preset are modified; all other blocks remain unchanged from their current state. Thus, recalling the Preset “overlays” the current settings with a subset of new parameters.

Recalling Presets

The **Recall Preset** button in the toolbar at the top of the screen recalls previously stored Presets. When a Preset is recalled, its number is displayed in the upper right corner of the Preset window, the block list in the Preset window is populated, and small numbered tags appear in the lower right corner of each processing or control block comprising the recalled Preset. Clear these tags by right-clicking within the Device Configuration window and selecting **Clear all preset tags**.