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You can read the recommendations in the user guide, the technical guide or the installation guide for RANE ECS. You'll find the answers to all your questions on the RANE ECS in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

- [User manual RANE ECS](#)
- [User guide RANE ECS](#)
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- [Instructions for use RANE ECS](#)
- [Instruction manual RANE ECS](#)


**RANEWARE OPERATORS MANUAL** **ECS**  
 ENGINEERED CONFERENCE SYSTEMS



**Overview**

ECS hardware is controlled by software. RaneWare® is the software, and the family of products that the software controls. RW 232™ describes the protocol and the DB-9 hardware used to communicate between units.

The ECB 62e Base is controlled through the RW 232 serial bus. This interface operates on any RS-232C serial port, allowing control system communication with up to 16 RW 232 products at a time, each with a unique address. The ECM 82e Mixers are controlled through the Base using a proprietary Expansion Interface cable. Rane RW 232 products can be controlled from remote locations with the optional **RPD 1 Programming & Diagnostics Unit** or the **Via 10 Ethernet Bridge** (see the respective data sheets).

Note: RaneWare is a 16-bit program written to run on Windows 95, 98SE and earlier OS's like Windows 3.1, though in some instances will not work on Windows NT, and most instances 2000, ME and XP are inconsistent. The crashing is caused by the WOW32.DLL in later OS versions not being compatible with RaneWare and other file issues. Officially we support only the Windows 98SE and earlier operating systems. The only solution is to run the earlier version: Windows 95 or 98SE. Other OS's might work but we can't guarantee or support all the variables.

Windows NT 4.0 seems fine, but you cannot print consistently with version 2.3. RaneWare version 2.2 does seem to print correctly under NT 4.0.

RaneWare does not work in any modes under Windows 2000. It "crashes and burns" if not immediately after startup, then soon after. WOW32.DLL is the most common problem witnessed under Windows 2000.

Under Windows ME, it seems "OK" in offline mode and fairly inconsistent in online (i.e. hardware connected) mode.

Under Windows XP, offline mode seems "OK" but online mode is anybody's guess. It varies wildly depending on if it's a desktop versus laptop machine and also what type of ports are on the unit. Machines sporting USB ports running XP are far more likely to experience issues when polling for our hardware.

**ECS RaneWare Manual**

This manual contains information on RaneWare software installation and ECS controls, device control language, system setup, applications and operation.

All software controls are printed here in **sans-serif type** to help distinguish between hardware and software.

ECS consists of software-driven hardware. Consult the **ECS Hardware Manual** for the ECB 62e Base and ECM 82e Mixer installation options, audio and data connections, control and indicator descriptions, and audio specifications.

This manual first begins with RaneWare installation, then describes all software controls, and those particular to ECS. Applications & Using Presets describes example systems that may be used as a starting point for your own customized application. A Checklist and Site Survey addresses questions that may arise during installation or operation. After the system is connected and installed in place, the Alignment Procedure may begin. For those using control systems such as AMX or Creston, the Device Control Language is provided.

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ECS is covered by US Patent 5,848,146  
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Windows is a registered trademark of Microsoft Corporation

RW Manual-1



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**Manual abstract:**

@@@Applications & Using Presets describes example systems that may be used as a starting point for your own customized application. A Checklist and Site Survey addresses questions that may arise during installation or operation. After the system is connected and installed in place, the Alignment Procedure may begin. For those using control systems such as AMX or Crestron, the Device Control Language is provided. Overview ECS is hardware controlled by software. RaneWare® is the software, and the family of products that the software controls. RW 232TM describes the protocol and the DB-9 hardware used to communicate between units. The ECB 62e Base is controlled through the RW 232 serial bus. This interface operates on any RS-232 serial port, allowing control system communication with up to 16 RW 232 products at a time, each with a unique address. The ECM 82e Mixers are controlled through the Base using a proprietary Expansion Interface cable.

Rane RW 232 products can be controlled from remote locations with the optional RPD 1 Programming & Diagnostics Unit or the Via 10 Ethernet Bridge (see the respective data sheets). Note: RaneWare is a 16-bit program written to run on Windows 95, 98SE and earlier OS's like Windows 3.1, though in some instances will not work on Windows NT, and most instances 2000, ME and XP are inconsistent. The crashing is caused by the WOW32.DLL in later OS versions not being compatible with RaneWare and other file issues.

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.. 24 ECS is covered by US Patent 5,848,146 RaneWare is a registered trademark of Rane Corporation Windows is a registered trademark of Microsoft Corporation RW Manual-1 INSTALLING RANEWARE For programming and setup of all of Rane's RW 232 products, Rane supplies a Windows® compatible software called RaneWare. This software is an easy-to-use graphical user interface and allows all Rane's RW 232 type products to be controlled in real time from the same executable. Starting RaneWare Once RaneWare is installed, a RaneWare program group is created.

When the software is first installed, Rane's Software License Agreement is displayed. Then, the Help screen appears. Here, any questions may be answered. Subsequent activations do not bring up the License Agreement or the Help screen unless they are asked for. Close the Help file, and welcome to RaneWare! If any question arises about a particular control on any software screen, position the pointer over the control and press F1 on your keyboard for Help. The System Setup screen asks to which Com port RW 232 is attached. If you don't have a unit connected, you can still use RaneWare Offline. Click OK, then Polling begins the first time the program is run. This process checks for units connected to the serial port. Polling may also be invoked by selecting Device > Select > Poll.

If a Device is found, you are in control! (If a device is hooked up and it is not found, read the Troubleshooting section of the Help file.) RaneWare polls addresses 1 thru 250. If the connected products are found, you may click the stop button at any time to end polling. System Requirements · RaneWare works under Microsoft Windows 95 or 98SE® on a PC or laptop with an unused serial port. · RW 232 needs a DB-9 cable less than 50' long, connecting from the

serial port of a computer to the RW 232 CONTROL INPUT port. This cable is wired straight through, not null modem. No interface boxes are required; just a cable and the computer. See the ECS Hardware Manual. · RaneWare can be fully demonstrated and operated without any unit attached (called 'offline'). · A RaneWare CD-ROM comes with each unit.

RaneWare is a single program with different windows capable of controlling not only the ECS units, but also the RPE 228d Equalizer, and the RPM 26v or RPM 26i Multifunction Processor, the RPD 1 Programming and Diagnostics Unit and the Via 10 Ethernet Bridge. Software can be obtained at Rane's web site, [www.rane.com](http://www.rane.com). Software Installation If you have the RaneWare CD-ROM, insert it in your drive.

The autorun should bring up a prompt asking to install RaneWare. If it does not, go to the Windows Start menu, select Run... > Browse. .. and navigate to your CD-ROM drive. Select the SETUP.EXE file and click OK. This starts installation. If you downloaded RaneWare from the web, locate the RW2\*\*.EXE file you downloaded and run it. Installation proceeds. System Setup Device Selection Menu RW Manual-2 Device Selection After Polling, the Device Selection window displays any connected RW 232 units, as well as Offline versions of all Rane RW 232 products.

The quickest way to get to the RW 232 Device Edit screen, if not already displayed, is to click the Device button on the far right side of the toolbar. When pressed, a list of the first fifteen connected devices appears. Click one of the devices--either an offline device or an actual device--and the selected device's edit screen appears. The selected device name is displayed at the top within the title bar. Alternatively, after Polling, the same device list appears in the Device Selection window. Select the connected or Offline device from the list and click OK. The connected unit's Device Address is displayed within brackets [ ] to the left of the device name. Double-clicking on the device name is equivalent to selecting the device and clicking OK. If the installation changes by adding more RW 232 units, choose Device > Select, and the Poll button to make the computer recognize currently connected units. (ECS Devices can also be given custom names, tailored to your installation.

Simply choose Device > Name Device, and the following screen appears.) Memory & Security ECS can be operated on a daily basis through a computer if a system controller is not installed.



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To preserve memory security with a computer operator, the software can be locked (under Device), and a system password can be assigned (under System > Change Password). The default password is "please". Memories can be customized with names, through System > Site Control Panel Setup. This Site Control Panel is all an operator needs to recall memories. If only a few presets are required, blanking an entry in the Site Control Panel Setup removes the screen button. A password is not required to use this screen. Memory names are stored in the computer, along with other installation-specific information. Select System > Save Job File to support multiple installations.

Returning to Device Edit from the Site Control panel requires a password. In Windows 3.1, closing the button box in the title bar gets the Password window. In Windows 95, right-click on the title bar to Select Device Edit (password required), or Exit the program. If more than 16 Memories are needed, they can be saved to disk and recalled later. Memory Selection Toolbar Memory Operation All of Rane's RW 232 products have 16 programmable Memories with one working Memory called Memory 0. The 16 Memories are stored within the units non-volatile Memory, and recalled by: · Selecting a Memory using RaneWare, or · Sending a Program Channel From Memory command, or · Sending a Program All Channels of all Devices From Memory command from the Room Controller. (See the ECS Device Control Language on page RW Manual-22.) Recalling a Memory replaces the working Memory with the selected Memory. The selected Memory is then displayed next to the Store button.

All control changes are made to working Memory, not to the selected Memory. The selected Memory flashes whenever working Memory does not match it. To save these settings in one of the 16 Memories, simply click Store, and the Memory number key. After Storing, clicking any Memory number instantly recalls it. Device and Port Names Window Saving & Printing From the Device menu, Memories can be saved and retrieved to and from a file. Names and settings may be stored separately. A printout report of device data, mic, port and system settings per Memory is available under Device > Print Device Report. RW Manual-3 ECS RANEWARE There are 4 sections to the ECS controlling software: Status (top screen section) Port (1st tab) Mixer (2nd tab) System (3rd tab) When the mouse pointer is on any of the tabs, the current settings for that page can be copied and pasted to any other page by clicking the right mouse button.

Metering and Status Metering Both front panel and RaneWare Meters show the selected Port level. Always adjust the Inputs for a 0 dB peak reading. Output levels are shown in dBu. Always remember, 0 dBu = 0.775 Vrms. In RaneWare, the Level Meter pull-down selects Port Inputs 1 through 6 or Port Outputs 1 or 3 for the Meter display. In the Port tab, double-clicking one of the Port Input selectors changes the Meter to this Port.

The example above shows ROOM (Port 1 Input). The displayed name can be changed so the Input or Output displayed on the Meter matches the device used on the given Input or Output. Use the Name button on the Port tab to change it. The front panel PORT STEP button can also change the LEVEL meter on the ECB 62e. Pressing this for 1 second causes the MASTER PORT STATUS LEDs to flash the currently monitored Input or Output of the LEVEL Meter. If this button is pressed and held for 5 seconds, the monitored Port can be changed by pressing the button in 1 second steps. The MASTER PORT STATUS LEDs will step through the Inputs for Port 1 to Port 6, then Outputs Port 1 and Port 3 and then back to Port 1's Input. Program Signal indicator (PGS LED on the ECB 62e) The Program indicator lights whenever audio is detected at the Port 1 (Program) Output, thus indicating that audio should be heard in the room. (If P3 Prog Contribute on the System tab is checked, both Port 1 and Port 3 Outputs are used to "sense" Program audio. Port Signal indicator (PTS LED on the ECB 62e) The Port indicator lights whenever audio is detected at any Port Input whose Signal Mode is set to Automatic. This includes mixer audio entering Port 1. Mic Signal indicator (MCS LED on the ECB 62e) This lights whenever audio is detected at any Active Mic whose Mic Mode is set to Automatic. Advanced auto power down example: Use the room controller to monitor the Port and Mic Signal status. When either is present, reset the power down timer that eventually shuts down the system thus saving the projector bulb, the associated power bill and actually save money! Master Port Identifies the current Master Port, which is the Port that most recently detected audio. Use Master Port Delay on the System tab for multipoint video applications.

Master Mic Identifies the current Master Mic, which is the Mic that most recently detected on the Meter, the Input attenuation is reduced to help prevent overload and reduce the dynamic range. Auto-Level: Use this on Ports containing speech and music content. Auto-Level performs both the Limiter and an Auto-Level function. Audio signals above 0 dB on the Meter are reduced by the Limiter. If the audio exceeds 0 dB for 1 second, the Auto-Level kicks in. The Auto-Level function calculates the average level and reduces the Input attenuation by the same amount. This attenuation slowly releases only when the Meter is between its set threshold level and -10 dB. Off: This disables both of the above limiters. Typical default value: Limiter radio button checked. Port Threshold Level Each Port has an independently adjustable Threshold Level.

The Port Threshold Level is used solely to illuminate the Port Signal indicator and tell system status of which Port contains audio. Once audio on a Port exceeds its Threshold Level, the Port Signal indicator is lit (when the Port's Signal Mode is set to Automatic). See Also: Port Signal indicator on page Manual-4 Typical default value: -20 dB Port Input Level Each Port has an independently adjustable Input Level. Proper setup of the Input Level, particularly for video CODECs, is perhaps the most important calibration procedure to achieve optimum performance. There are only a few (nominal) voltage reference levels commonly seen on products in ECS applications.

· Devices with RCA jacks are generally considered -10 dBV (0.316 Vrms) consumer-level devices. These include VCRs, CD players, DVD, laserdiscs, and cassette decks. · Many video codecs are rated at a nominal -10 dBm (0.245 Vrms into 600 ohms). These devices may require a 600 ohm resistor at the ECB 62e's Input. · Standard pro audio voltage reference levels equal +4 dBu (1.23 Vrms). Typical default value table: Connected Port Device Type ECB 62 front panel PAD switch RaneWare Port Input Attenuation Port Output indicators These six indicators are green when the Port's Output is On (enabled). They are gray when the Port is off (muted). The check box to the left of the Port name (just above the Port Output attenuation sliders) turn the Port Outputs on (checked) and off (unchecked).



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*Port Matrix check boxes* These 6 row by 6 column check boxes set the audio I/O matrix of the ECB 62e. Each Input has an associated column with the Input names shown from left to right across the top. Each Output has an associated row with the names listed on the right from top to bottom. Note: Only Port 5 allows its Input to feed its own Output.

This is useful for assisted listening applications. Other than Port 5, Inputs cannot feed their own Output to avoid feedback. See RaneNote 140, "Mix-Minus Speech Reinforcement with Conferencing" for room zoning applications using ECS. For each Output row (names on the right), check the corresponding Input box or boxes (columns) whose audio you wish to mix into the chosen Output. For example, to mix the room (mic) audio and a VCR on Port 5 and feed a mix of both to a video CODEC on Port 2, in the second row down check the first and fourth box from the left. [Note that the fourth check box is actually in the fifth column since the second column lacks a check box.] Port Output Attenuators Each Output has an independently adjustable Output Attenuator. With the Attenuator set to 0.0 dB and with audio producing a Meter reading of 0 dB, the Output will be 0 dBu (0.775 Vrms).

The checkbox to the left of the Output names turns the Port's Output on (unmuted) and off (muted). When the check box is checked, the Port Output "On" indicator is green. Typical default value: Set to 0 dB for +4 dBu (pro/ balanced) devices. Set to 10 dB for VCRs, codecs, hybrids and consumer level (RCA connector) devices. RCA (VCR, CD, DVD.

..) Video Codec Pro (+4 dBu balanced) "0" "0" "10" 2.0 dB 0.0 dB -4.

0 dB RW Manual-6 Mixer Mixer This selects one of six ECM 82e Mixers. Output button This toggles the ECM 82e's Mix Out between on (green indicator, depressed button, audio unmuted) or off (gray indicator, raised button, audio muted). This is useful to temporarily turn off all of the Mics on a certain Mixer(s). Echo Canceller Each Mixer may contain an optional Acoustic Echo Canceller. The Echo Canceller checkboxes control the operation of the Echo Canceller -- only if it is installed. Bypass: Checking only this box bypasses the Echo Canceller. It is best to bypass the Echo Canceller during setting the microphone level. If the ECA 2 is not installed, the Echo Canceller will automatically be bypassed. Suppression An echo canceller can only reduce the echo down to the background noise of the near end room. Suppression is used to further reduce the echo.

The three suppression choices give the installer some flexibility in matching the ECM 82e to the room's requirements. Moderate will be appropriate for most rooms. Soft offers less suppression and Strong offers more. Since suppression affects the subjective quality of a room, experimentation is the best method to determine which setting is best for a given room. NOMM Mode NOMM stands for Number of Open Mics (per Mixers). Most automatic mic mixers have a NOM operation mode. By keeping track of the Number of Open Mics, automatic mic mixers can automatically adjust the gains of the open mics to maintain the gain before feedback margin of a system. This NOM operation avoids the feedback that can occur as more and more mics are gated on by keeping the total gain of all gated mics constant. However, unlike other automatic mic mixers, the ECM 82e NOMM Mode operates differently. For example, in conferencing applications, when the chairman talks, she likes to be heard.

Most auto mic mixers would turn down the chairman's gain by 3 dB for each doubling of open Mics. The NOMM Mode of the ECM 82e Mixer keeps the loudest Mic at its current gain setting, while subsequently gated Mics do not gate fully on. This prevents the current talker's Mic from turning down as others talk, cough or burp. When NOMM Mode is checked, the loudest talker's Mic gain is left alone, while subsequent talkers' Mics gate on using the NOMM calculation which maintains unity gain. NOMM also performs limiting by reducing the gate-on level, if detected above 0 dB.

Typical default value: On (checked). NOMM must be off while setting the Mic gains. Mixer Page RW Manual-7 Mixer Max Mics On Since conferencing applications are rarely intelligible with multiple simultaneous talkers, Max Mics On sets the maximum number of Mics that are allowed to turn on per Mixer. This significantly improves the performance of the Acoustic Echo Canceller since fewer Mics -- and therefore fewer acoustic paths -- exist. Typical default value: 3 (Can you understand three simultaneous talkers over a loudspeaker?) Mic selectors Selects 1 of 8 Mics to be edited.

The box with the dark blue over-score indicates the Mic whose settings are visible or editable. Clicking anywhere inside the box selects the Mic for editing. The Mic spinner may also be used to select Mics for viewing or editing. Mic Active buttons The Mic Active buttons toggle between Active (enabled indicator lit) and off/muted (indicator gray). The indicator above each button has four states: Gray = Mic Muted Green = Mic Active (enabled, with no audio present) Red = Mic Gated (enabled, audio is present) Yellow = Master Mic Typical default value: Active button on (indicator not gray) if a Mic is connected to the given Input. Mic spinner Use the up and down arrows to display subsequent Mic's settings, or highlight the displayed number and type in the Mic number whose settings you wish to display or edit. Mic Name This button opens a dialog allowing the displayed Mic to be named, with eight characters maximum. The

Mic names are displayed on the software screen and are printed with the documentation. The Mic names can also be queried using the Global (RW 232) message if you wish to display them in the room controller. Mic Copy This button asks "Copy this Mic's settings to all following Mics?" This makes for faster setup in systems using many of the same Mics.

For example, if the Copy button is selected while Mic 2's settings are displayed, all of Mic 2's settings will be copied to Mics 3 through 48. The Mic clipboard copies and pastes the following settings: · Mic Active button status: Active (on green, yellow or red indicator) or Inactive (muted gray indicator) · Mic Mode (Automatic, Force On or Force Off) · Gate Mode (Last On or Gated) · Mic Threshold Level · Gate Depth · Gate Release · Automatic Threshold check box Mic Signal Detection Each Mic has an independently assignable Mic Mode. Threshold Detection -- When selected, audio detected above the Mic's Threshold Level gates the Mic on. This allows a speaker's voice to gate the Mics on rather than requiring manual selection of a speaker's Mic. Other mic mixers call this voice operation or vox mode. Force Detection -- When selected, this forces the Mic to Gate On. If Gate Mode is set to Last On, the Mic becomes the Master Mic after the Master Mic Delay time (set in the System tab).



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*For example: When your application requires chairman override -- enable chairman control (SPL 5) and Force Detect the chairman's Mic. No other Mics in the system will be able to Gate On. Detection Off -- When selected, the Mic will no longer be able to Gate On.*

*If this is the Master Mic it will remain on until there is a new Master Mic, otherwise the Mic is set to its Gate Depth. Only the turning the Active button off insures that the Mic is off. Typical default value: Threshold Detection. Gate Mode Unique among automatic mic mixers, in ECS each Mic can be independently set to Last On or Gated. A Mic assigned as Gated simply opens the Mic when the Input signal is above the Threshold Level, and returns to its Gate Depth when the signal drops below the Threshold Level and the Release Timer has expired.*

*A Mic assigned as Last On remains on once it becomes the Master. This is useful in boardrooms where the head table would require Last On Mics and the audience area requires Gated Mics. This way, the board members (and their background noise) are always heard, while the less-often used audience Mics (i.e., questions) gate off when not in use.*

*Rane has patented this concept the marketing buzz word being Smart Last On™. Having an open Mic also maintains the full duplex awareness of the conference. Last On: When selected, the given Mic is included in the Last On group of Mics and may become the Master Mic. Once a Mic becomes the Master Mic, it remains on until a new Last On Mic becomes the Master. See Master Mic Delay in the System tab on page RW-Manual 11. Note that Last On Mics do Gate On and Off. Gated: When selected, the given Mic Gates On when audio is detected above its Threshold Level. When the audio goes below the Threshold Level, the Mic Gates Off to its Gate Depth after the Gate Release time. Typical default value: Usually Last On. (read the above.*

*) RW Manual-8 Mic Threshold Level Each Mic has an independently adjustable Threshold Level. When audio is detected above this Threshold Level, the Mic Gates On. When the audio drops below the Threshold Level, the Mic Gates Off to its Gate Depth after the Gate Release timer has expired. To verify if Mics are inadvertently gating on when no one talks, watch the Mic Signal Status indicator in RaneWare or look at the MCS (MiC Signal) Status LED on the ECB 62e front panel. Neither of these indicators should be on when no one talks at a mic. During setup, to avoid Mics Gating On when no one talks at a mic, and if you find Mic Threshold Levels must be set above -20 dB (i.e., -19 or -15...*

*), investigate one of two things: 1. The first thing to verify is that the Mic LEVELs (the front panel screw driver pots on the ECM 82e) are set properly. Too much Mic gain makes it more difficult for the Echo Canceller(s) to adapt since too much loudspeaker and/or background noise is entering the Mics. 2. The background room noise should never gate Mics on.*

*If you find Mics Gating On unnecessarily, then either the Mics need to be moved away from the noise sources, or the sources of noise must be reduced acoustically. Not fun, and usually not inexpensive. As in any audio system, significant background noise greatly compromises the signal-to-noise of the system making speech less intelligible, music less pleasing -- and perhaps most importantly in conferencing applications -- makes the job of the Acoustic Echo Canceller more difficult. The best an Echo Canceller can do is cancel echos down to the noise floor. If your system has a poor noise floor, you are likely to also have poor echo cancelling and therefore, more echo.*

*In other words, physics works or perhaps, depending on your room, physics sucks. Typical default value: -25 dB for tabletop or goose neck Mics. About -22 dB for ceiling Mics. Mic Gate Depth Each Mic has an independently adjustable Gate Depth. When the audio drops below the Threshold Level and the Mic is not the Master Mic, the Mic Gates Off to the Gate Depth after the Gate Release time. For example, having independently adjustable Gate Depth is helpful in distance learning applications where one might want the teacher or lectern Mic(s) to have a small (or no) Gate Depth, thus they can always be heard.*

*Whereas other Mics may require a larger Gate Depth thus significantly improving the signal-to-noise of the system. Also, in systems requiring many Mics, having a deep and independently adjustable Gate Depth helps maintain the feedback stability margin. Other mic mixers have fixed or limited gate depths making certain system implementations difficult. Typical default value: 20 dB Setting the Gate Depth to 0 dB on the ECM 82eA disables the QuickAdapt algorithm for a Mic gate change.*

*To keep the QuickAdapt algorithm active and keep a Mic open, set the Gate Depth to -1 dB. Mic Gate Release Each Mic has an independently adjustable Gate Release time. When the audio drops below the Threshold Level, the Gate Release timer is activated. If audio is not detected before this timer elapses, and the Mic is not the Master Mic, the Mic will Gate Off. Typical default value: 0.3 seconds. Mixer Page RW Manual-9 System tab Prog Sig Thresh Program Signal Threshold adjusts the point at which audio is detected at the Port 1 Output, thus causing the Program Signal Status indicator to light. See also: Program Signal Offset and P3 Prog Contribute. Typical default value: -20 dB P3 Prog Contribute Systems requiring the use of ceiling speakers for far-end reinforcement, beyond that normally provided by the Program (Port 1) Output, should use Port 3's Output. Check this box only when Port 3's Output drives room loudspeakers with far-end audio.*

*Never check this box if Port 3's Output contains near end mic/speech audio since this causes shabby and unreliable Mic Gating. When P3 Prog Contribute is checked, the Port 3 Output contributes to the Program Signal indicator's on/off status i.e., Program audio (not near end speech) is heard in the room. Typical default value: Off (unchecked) unless far-end audio is fed from Port 3's Output.*

*Link Prog Signal When checked, the Program Signal Offset and Program Signal Threshold link to Port 1's Output level. This allows the Program Signal Threshold and Offset to track level changes as the user adjusts the room audio level (Port 1's Program Output). When Link Program Signal is checked: 1. If P3 Prog Contribute is not checked the Program Signal Offset and Program Signal Threshold track the Program (Port 1 Output) Level. 2.*

*If P3 Prog Contribute is checked the Program Signal Offset and Program Signal Threshold track the Port 3 Output Level. Note: This feature is not demonstrable using RaneWare's OFFLINE ECS device. Typical default value: On (checked) Suppression and level Check this box when poor room acoustics cause the farend to complain about echo. When checked, an adjustable amount of Suppression (attenuation) is added at Port 1's Input to help reduce echo. Suppression is active when the Program Status indicator is lit (i.*



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e., there is Program audio) and the Mic Status indicator is off (i.e., no one is talking at any of the Mics). Typical default value: Off (unchecked) Noise Gate activation and level This feature is useful in multipoint conferencing when you want the near end's Mic audio (room noise) to be reduced at the far-end(s).

The checkbox enables this feature. When checked, the Noise Gate Level attenuates Port 1's Input when the Mic Status indicator is off (i.e., no audio detected at any Mics). This is useful in noisy room situations. Typical default value: Off (unchecked) Master Port Delay This adjustable timer controls the speed at which a Port becomes the new Master Port. The Master Port indicates which of the ECB 62e Input Ports most recently detected audio. This is useful in multipoint videoconferencing when you need to know which one of multiple locations is talking. System Page RW Manual-10 Near Signal Offset signal flow Query the ECB 62e for the Master Port OPSTAT parameter to decide which video feed to switch to. (A preposition is the wrong thing to end a sentence with.) Typical default value: 0.35 seconds or more. Master Mic Delay This adjustable timer controls the speed at which a Mic becomes the new Master Mic. The Master Mic indicates which Last On Mic most recently detected audio -- thus indicating "who" is talking. There are two reasons this Smart Last OnTM Master Mic idea is patented by Rane: #1.

Unlike most auto mic mixers, Smart Last On uses the Master Mic Delay to avoid the problem of the current talker's Mic Gating Off when others answer or interrupt. For example, if the chairman is talking and someone else sneezes, Smart Last On allows the sneeze to be heard, but the chairman's Mic will not Gate Off. The chairman's Mic will remain the Last On Mic. Other mic mixer's "last on" may gate the chairman's Mic off (particularly if the chairman pauses) and the sneeze Mic will become the Last On Mic. This is bad because the chairman must re-gate his Mic on.

All the while, the acoustic echo canceller has been trying to readapt to the quickly changing Mic gates. Also, the camera may be switching between the sneezer and the chairman. Smart Last On avoids this problem by forcing the sneezer to exceed the (adjustable) Master Mic Delay time. Only then will the chairman's Mic Gate Off due to the sneezer's Mic becoming the Master Mic. Gesundheit! #2. (Cool stuff.) Master Mic is also extremely useful in video-follows-audio applications when you need to move the Program Signal Offset signal flow camera position to follow "who" is talking. The Master Mic Delay timer can be adjusted to times beyond the time required to reply "yes," or to cough, or shuffle papers. This avoids the problem of the camera switching over to someone who is blowing their schnoz. With the room controller, query the ECB 62e for the Master Mic OPSTAT parameter to switch to the correct camera position.

Typical default value: 0.35 seconds or more. Port Sig Release Once audio is no longer detected at any Port Input, the Port indicator shuts off after the Port Signal Release time has elapsed. This timer is useful in multipoint videoconferencing when you wish to switch the video back to a default video location/picture after conversation pauses. Typical default value: 0.35 seconds or more. @@@@A larger room may require a greater Program Signal Release time. Typical default value: 0.35 seconds or more. @@It also helps determine which Port has the current audio source.

@@@@@Let's use a Near Signal Offset of 20 dB. @@@@@@To verify if Mics are inadvertently Gating On due to playing an audio source, watch the Mic Signal and Program Signal Status indicators in RaneWare or look at the ECB 62e front panel MCS (MiC Signal) and PGS (ProGram Signal) Status LEDs. Neither Mic Signal indicators should be on when no one talks at a mic. During setup, if you find Program Signal Offset must be set above 24 dB (i.e.

, 25 or 28...) to avoid Mics Gating On when no one talks at a Mic and an audio source is playing into the room, one of three things should be investigated: 1. The first thing to verify is the power amplifier level.

You may need to reduce its level. 2. Check the Mic and loudspeaker placement. Verify that the Mics are not placed too close to loudspeakers, and that the Mics are not pointing toward loudspeakers. 3. Verify that Mic Levels and Mic Thresholds are set properly. Improper settings will cause Mic Gating problems. See also: Prog Sig Thresh and P3 Prog Contribute. Typical default value: 18 to 22 dB Noise Source When checked, inserts a pink Noise Source at any ECB 62e right channel Output that is on. This is useful during system setup to set Mic gains and maximum SPL for linelevel audio sources (CD, DVD, hybrid, codec, 8-track tape, 78 records.

..). The Noise Source can also be useful during side bar conferences when you want to mask conversations with a little bit of noise. It is also helpful to send this pink noise to the far-end so they can properly adjust their receive levels for unity gain. Isn't unification beautiful? Typical default value: Off (unchecked) RW Manual-12 APPLICATIONS & USING PRESETS Like all RaneWare products, ECS has a working Memory and 16 stored Memories. Working Memory is the operational Memory. An actual change to a level is made in working Memory. If a Memory is recalled, it is placed in working Memory. Any changes to working Memory will not affect the Memory it was recalled from.

One of the great features of ECS is its ability to recall a partial Memory using a Room Controller. ECS Memories are divided into five sections: 1. Program device (All Memory) 2. Program Port settings only 3. Program Mic settings only 4.

Program Mixer settings only 5. Program Mics and Mixer settings only Partial Memories are recalled using the CHNUM setting in the RW 232 command Program Channel from Memory. This feature is beneficial for initializing the system and setting presets for different room configurations without affecting audio levels. Partial Memories cannot be called from RaneWare. For more system examples, download "Distance Learning Applications for ECS" at <http://www.rane.com/ecs.htm>.

In this application, Port Inputs must be Selected by the Room Controller. The laptop is only used for the initial system setup. It is then removed and the Room Controller assumes operation. The Device Control Language for programming the Controller begins on page RW Manual-24. Preset Memories Memory 1 - Room Controller operational mode. In this mode all Port Outputs have their Input select checkboxes cleared and all Mic Inputs are Active and set to Automatic operation. This is performed by selecting the Port Memory settings from Preset Memory 1 at start-up, allowing the Room Controller to know the start-up condition of ECS.

Memory 2 - This connects the Conference Room (Port 1) to the ECM 64e (Port 6). Memory 3 - This connects the Conference Room (Port 1) to the Codec (Port 2).



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Memory 4 - This allows the VHS (Port 4 Input) to be heard at the program speakers (Port 1 Output). Memory 5 - This bridges the Conference Room (Port 1), Codec (Port 2) and ECM 64e (Port 6) together. Memory 16 - Preconditions the Port Inputs and the Mic Inputs for alignment. Room Controller In the Start-Up of the Room Controller, Preset 1 must be recalled to set the system defaults. If the Input and Output Levels need to be restored to their defaults, send the Program Channel From Memory command with CHNUM set to 0. If the Input and Output Levels are to be saved as they were last set, send the Program Channel From Memory command with CHNUM set to 1. If just the Mic settings need to be saved, send the same command with CHNUM set to 2. Chairman control is performed setting the Near Signal Offset to 101 and forcing a Mic On.

This prohibits other Mics from Gating On. See the ECB 62e Device Control Language on page RW Manual-24. System 1: Typical Video Conference Room As an introduction, this example illustrates a relatively simple ECS with 8 mics, a video codec, digital hybrid, 2 VCRs, and a telephone connection. The system block diagram is shown on the following page, the point-to-point wiring of the audio and control signals is following, and the corresponding RaneWare computer screens are on the following page. Rane Equipment 1 ECB 62e Base 1 ECM 82eA Mixer with Echo Canceller 1 ECM 64e Conference System with DH 1e Digital Hybrid 1 RPD 1 Programmable Diagnostics Unit RaneWare Setup RaneWare allows saving all system parameters to disk.

The file for this system is called APIV2.ECS, located on the RaneWare disk. This file has six preset Memories. The RaneWare windows on page RW Manual-16 show the saved parameters for Memory 1. Perform the Mic and Port setups on page RW Manual-21 before loading this file.

After loading, select Preset Memory 1 to set the system to its default. Loading this file into the ECB 62e is all that is required for most systems. To load a system file: Select Device > Restore Memories from File. Loading files into the ECB 62e causes it to restart. To load Port names: Select Device > Restore Names from File. RW Manual-13 This block diagram illustrates the Applications - System 1 example on the preceding page. RW Manual-14 This unit-to-unit wiring diagram illustrates the Applications - System 1 example on the preceding pages. RW Manual-15 RaneWare Folders for API.ECS Memory 2 RW Manual-16 System 2: Boardroom with Program Stereo The following illustrates an ECS with 16 mics, stereo program speakers, mono ceiling speakers, a digital hybrid, a video codec, 2 VCRs, and a telephone connection. Rane Equipment 1 ECB 62e Base with ECS 62 Stereo Module 1 ECM 82eA Mixer with Echo Canceller 1 ECM 82e Mixer 1 ECM 64e Conference System with DH 1e Digital Hybrid 1 RPD 1 Programmable Diagnostics Unit 1 MA 3 Multichannel Amplifier with TF 407 transformers RaneWare Setup The file for this application is called AP2V2.

ECS, located on the RaneWare disc. This file has six preset operational Memories. Memory 1 - Room Controller operational mode. In this mode all Port Outputs have their Input select checkboxes cleared and all Mic Inputs are Active and set to Automatic operation. This is performed by selecting the Port Memory settings from Preset Memory 1 at start-up, allowing the Room Controller to know the start-up condition of ECS. Memory 2 - Selecting this Memory connects the Conference Room (Port 1 In) to the ECM 64e (Port 6 Out) and Port 6 In to Port 3 Out. Memory 3 - Selecting this Memory connects the Conference Room (Port 1 In) to the Codec (Port 2 Out) and Port 2 In to Port 3 Out. Memory 4 - Selecting this Memory allows the VHS (Port 5 In) to be heard at the Program loudspeakers (Port 1 Out). Memory 5 - Selecting this Memory bridges the Conference Room (Port 1), Codec (Port 2) and ECM 64e (Port 6) together. Memory 16 - Preconditions the Port Inputs and the Mic Inputs for alignment.

RW Manual-17 System 3: Distance Learning This illustrates a distance learning application using broadband video that requires reinforcement of the teachers' Mics. There are 2 teacher Mics and 10 student Mics, a connection to 3 other classrooms using a video demodulator, a VCR and a video modulator. The mics are evenly spread between the ECM 82es. To reinforce the teachers, the Post Gate Outputs from these mics on the ECM 82eA #1 are tied together and connected to the Input of Port 6 on the ECB 62e. Port 6 is then routed to the Output of Port 3.

Since the Output impedance of the Post and Pre Gates are 300 ohms, tying these Outputs together creates a passive mixer. Do not use P3 Prog Contribute when local Mics are routed to Port 3. Rane Equipment 1 ECB 62e Base 1 ECM 82eA Mixer with Echo Canceller 1 ECM 82e Mixer 1 MA 3 Multichannel Amplifier with TF 407 transformers RaneWare Setup The file for this application is called AP3V2.ECS, located on the RaneWare disk. This file has 8 preset operational Memories.

Memory 1 - Room Controller operational mode. In this mode all Port Outputs have their Input select checkboxes cleared and all Mic Inputs are Active and set to Automatic operation. This is performed by selecting the Port Memory settings from Preset Memory 1 at start-up, allowing the Room Controller to know the start-up condition of ECS. Memory 2 - Selecting this Preset Memory connects the Conference Room (Port 1) to Video Network 1 (Port 2). Memory 3 - Selecting this Preset Memory connects the Conference Room (Port 1) to Video Network 2 (Port 3). Memory 4 - Selecting this Preset Memory connects the Conference Room (Port 1) to Video Network 3 (Port 4). Memory 5 - Selecting this Preset Memory bridges the Conference Room (Port 1), Video Network 1 (Port 2), Video Network 2 (Port 3) and Video Network 3 (Port 4) together. Memory 16 - Preconditions the Port Inputs and the Mic Inputs for alignment. RW Manual-18 System 4: Large Conference Center The following illustrates a large ECS with 40 Mics (16 ceiling and 24 table), stereo program and a six zone mixminus speech reinforcement. Audio sources include a video codec, CD with tape deck, a fiber video network, audio/video router and a digital hybrid.

Program stereo audio is sourced from Program Out on the ECB 62e, also the Program Mono fed is routed to the ceiling speakers through the SRM 66. Mixminus speech reinforcement is provided by connecting the Aux outputs of each of the ECM 82e Mixers to an SRM 66 Mixer. The SRM 66 then mixes and routes each of the Aux outputs to speaker zones that are not in the same area as the Mics. (See RaneNote 140 for more information on mixminus speech reinforcement.) Since this system has a combination of ceiling Mics and table Mics, two ECM 82eA mixers are used. This provides improved echo cancellation by placing the ceiling Mics on ECM 82eA #1 and the table Mics on ECM 82eA #2. Rane Equipment: 1 ECB 62e Base with ECS stereo module 2 ECM 82eA Mixers with ECA 2 Echo Cancellers 3 ECM 82e Mixers 4 RPE 228d EQ 2 MA 3 power Amp with 70 volt transformers 1 SRM 66 Matrix Mixer 1 ECM 64e Conference System with DH 1e Digital Hybrid RaneWare Setup The file for this application is called AP4V2.



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ECS, located on the RaneWare disc. This file has 7 preset Memories. Memory 1 - Room Controller operational mode.

In this mode all Port Outputs have their Input select checkboxes cleared and all Mic Inputs are Active and set to Automatic operation. This is performed by selecting the Port Memory settings from Preset Memory 1 at start-up, allowing the Room Controller to set the start-up condition of ECS. Memory 2 - Selecting this Preset Memory connects the Conference Room (Port 1) to the Codec (Port 2). Memory 3 - Selecting this Preset Memory connects the Conference Room (Port 1) to Video Network (Port 5). Memory 4 - Selecting this Preset Memory connects the Conference Room (Port 1) to the Digital Hybrid (Port 6).

Memory 5 - Selecting this Preset Memory bridges the Conference Room (Port 1), Video Codec (Port 2), Video Network 1 (Port 5) and Digital Hybrid (Port 6) together. Memory 16 - Preconditions the Port Inputs and the Mic Inputs for alignment. RW Manual-19 SITE SURVEY For ECS to operate properly the following must be closely observed: Ambient Noise Level - Air conditioning equipment (listen for rushing air from registers and rattling air ducts), fan noise from computer equipment, outside traffic noise, etc. Ideal is NC 25 - NC 30 (35 to 40 dBA). Room Absorption and reverberation time - For any conference system to operate properly the sound reflections must be held to a minimum.

Sound reflections can be held down by using sound absorption materials and non-parallel walls or geometrical diffusers. Ceilings should have an NRC (Noise Reduction Coefficient) rating of .75 to .80 and walls should have an NRC rating of .80 to .90. Microphone and Loudspeaker placement - It is best to use same boundary type microphones with each microphone 4 to 6 feet apart. These microphones can reject about 12 dB of audio from the rear. Never aim microphones directly at any loudspeaker. It is best to place loudspeakers at the front center of the room.

Ceiling speakers can be used if they are placed 1 foot or greater to the rear of the microphone or 4 feet or greater in front of the microphone. Angled ceiling speakers work best. Make certain that there is adequate rack space, ventilation and power outlets for the ECS equipment. Keep all ECS equipment in the same rack. Loudspeaker Audio Processing - If any processing is done, limiters, delays, etc., between the ECB 62e Base and the loudspeaker power amp, the ECM 82e's Echo Canceller Reference Input must be wired to the input of the power amp and not the Mono Output of the ECB 62e Base. Ceiling Microphones - These microphones are typically not recommended. If you must, the ceiling must be less than 10 feet in height and the room must have very low noise with a high NRC rating. Never place a microphone within 4 feet of an air conditioning register. Using techniques such as out of phase microphones or speakers may work in some rooms, but at best you will only gain about 6 dB of speaker to microphone cancellation.

MultiZone Echo Cancelling (MZECTM) - By dividing the room into zones with each zone consisting of 1 ECM 82eA mixer, improved echo canceller performance can be achieved. Full duplex operation can be improved by reducing the number of microphones on each mixer to 4. Telephone Line - The telephone line should be a direct line to the telephone company's central office. This line should not be shared by others, this may cause ground loops.

#### SYSTEM CHECKLIST 1.

Know the microphone type, placement and number of microphones. 2. Determine the operation (Last On or Gated) of each Mic in RaneWare. Use Last On Mics for the main participants. Use Gated Mics for gallery areas.

3. How good are the room acoustics? Poor room acoustics may require turning on Port 1 Suppression and/or the Noise Gate. The Near Signal Offset and Mic Signal Offset may need increasing. 4. Are Echo Cancellers required and how many? 5. Is telephone add-on required? 6. Is stereo audio required, and if so, which devices need mono audio? 7. How many audio sources are there (Codecs, VCR, etc.), and what are their audio output and input levels? 8. Is remote diagnostics required? (See the Rane RPD 1).

9. Is the system used for Multipoint? During a multipoint conference, enable the Noise Gate with at least 6 dB of depth. 10. Are there any non-linear devices (limiter, compressors, etc.) between the ECB 62e Output and the amplifiers? If so, use the output of these devices for the Echo Canceller Reference to the ECM 82e. RW Manual-20 ECS ALIGNMENT PROCEDURE QUICK OVERVIEW a. Set up the ECM 82e Mic levels. b. Set up the Input levels to the ECB 62e. c.

Set the Mic operation for each Input on the ECM 82e. d. Set the Program Signal Threshold and Offset on the ECB 62e, utilized to keep Mics from Gating On with audio at the loudspeakers. Typical settings with Port 1's Output set to 0 dB - Program Signal Threshold 20 dB, Program Signal Offset 20 dB. e. Set the Near Signal Offset, utilized to keep other Mics from Gating On when the Mic signal is Active. Typical setting 20 dB. f. Enabling Port 1 Suppression removes residual echo. Typical level is 6 to 12 dB.

The higher the level the more the system sounds like half duplex. g. The Port 1 Noise Gate is normally not needed, but may be during multipoint operation. Typical level is 6 to 12 dB. h. On the Mixer tab, the Echo Canceller has two operation selections Bypass and Suppression. Bypass is used during Mic setup and when an Echo Canceller is not installed. Suppression selects the amount of attenuation to be applied to the residual echo after echo cancellation. Moderate is appropriate for most rooms. Soft offers less suppression and Strong offers more.

Since suppression affects the subjective quality of a room, experimentation is the best method to determine which setting is best for a given room. i. Enabling Mixer Suppression adds suppression to the Mixer Output when there is a new gated Mic. Suppression is only performed once to remove residual echo caused by the readaptation of the Echo Canceller. This setting is typically on. j. Mixer Gate is only used when there are 2 or more ECM 82eAs. Do not use this function when connecting another mixer to the ECM 82e's Expansion Input. Typical settings are checked and 12 dB. Use the following procedures to adjust the Mic and Port Inputs.

Before proceeding, know the audio input and output levels required for the interfacing equipment. Also know the input and output type: balanced using transformer, active, or unbalanced. See RaneNote 110, "Sound System Interconnection" for cabling recommendations. MIC SETUP (see flow chart) The ECM 82e is shipped with its INPUT GAINS set to 10 dBu. When Gain is set to 40 dB, the Mic Inputs are calibrated to an Audio Technica AT 961R. (See Phantom Power in the ECS Hardware Manual if required.) To set Mic levels a Sound Level Meter is required, such as a Radio Shack 33-2050. 1.

Remove the security cover. 2.

Start with Mic 1 and only work with one Mic at a time. 3. Select the proper Input GAIN setting for the Mic (typically 40 dB) 4.



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Set all Mic Input LEVELS to 0 (fully CCW). 5. If front speakers are used, point the Mic towards them. 6. Place the Sound Level Meter next to the Mic and set it as follows: Range to 80 dB, A-Weighting, Slow Response. Mic Setup Load Application (see pages 10-15) Set all Mic Input Gain switches. Set all Mic Input Pots CCW (off) Start with Mic 1 Select Memory 16 Select this Mic as Active Place a sound level meter next to the Mic and aim both toward loudspeaker Turn on Noise Source, adjust system level for 80 dBA at SPL meter Raise Mic Level until 0 dB is displayed on the Base VU meter for Port 1's Input Next Mic no Are all Mics Set? yes Select Memory 1 to return back to room controller Mic Setup Flow Chart RW Manual-21 MIC THRESHOLD LEVEL SETUP Once all Mics have been adjusted, the Threshold Levels need to be set.

In most applications operating the Mics with a Threshold Level of -25 dB is sufficient. Automatic Threshold uses the first Mic of each Mixer to adapt to the background noise level. Set Mic Threshold Levels so they don't generate a Mic Signal from ambient room noise. PORT INPUT SETUP Ports 2 thru 6 have both a hardware PAD switch and a software programmable attenuation control. The ECB 62e is shipped with its Inputs set to 10 dBu, PADs set to 0 dB and Input Attenuation controls set to 4 dB. To properly adjust the Port's Input level: 1. Remove security cover. 2. Turn all Port Inputs Off. 3.

Select the Port under test from the Port tab. 4. Port Input: On 5. Auto Level: unchecked 6. Input Attenuation: 4 dB typical 7.

If a Port is connected to a Codec, the Codec may have an output test tone. Some Codecs have output transformers with output levels of -10 dBm. Since the Port Inputs have a 10k ohm impedance, a gain of approximately 6 dB is realized. (An optional 604 ohm or 620 ohm ¼ watt resistor may be placed across the + and Inputs for termination. See ECS Hardware, page HWManual-17.

) If the stereo module is installed, only use one termination resistor when connecting the Left and Right Inputs together. 8. If the stereo module is installed, only the Right (bottom) can be monitored for level. 9. Play an audio source connected to the Port under test. If the Input Clip OL LED lights, turn on the 10 dB PAD. Then adjust the Input Attenuation control for 0 dB peaks. 10. After completing, Auto-Level may be selected. 11.

Replace the security cover. PORT OUTPUT SETUP The ECB 62e output level is nominally 0 dBu when an input is at 0 dB VU. To properly adjust the Port's Output Attenuation level: 1. If the device is a Codec or the device requires a nominal level of -10 dBm, set Output Attenuation to -10 dB. 2. Set the Port 1 Output or Program to -6 dB, then adjust the room's power amplifier for an adequate listening level. PROGRAM SIGNAL SETUP Turn down the power amp, turn on the Noise Source, and set Port 1's Output (Program) to 0 dB. For most applications adjust the power amp for an 80 dB SPL. This level is determined by the mic/speaker placement and room acoustics. All Mics and Mixers must be set up first.

All Mics that are to operate using speech detection must be set with Active On and Signal Mode Automatic. To set the Program Signal Offset and Program Signal Threshold: 1. Link Prog Signal: unchecked 2. Set Prog Sig Offset: 0 dB 3. Set Port 1 Output Attenuation: 0 dB 4.

Play any source audio or use the Noise Source. 5. Set the Prog Sig Threshold to -20 dB. The Program Signal status LED lights. 6.

Increase the Prog Sig Offset until the Mic Signal status LED extinguishes, typically between 12 and 20 dB. 7. Link Prog Signal: checked 8. Set Port 1 Output Attenuation: -6 dB 9. Program audio should not light the Mic Signal status indicator. If it does, re-check Port Input Setup and repeat. The greater the Program Signal Offset, the more difficult it is to Gate a Mic On when there is program audio. When the Link Program Signal is On, the Program Signal Offset and the Program Signal Threshold will change in proportion to the Port 1 Output Attenuation. TROUBLESHOOTING No communication between the unit and computer: Set the DEVICE ADDRESS to a unique small number, and try polling for units in RaneWare (under Device > Poll). The unit should be found quickly.

Check that the COM port selected in RaneWare (under Setup > System Setup) is the one on your computer that is connected to the unit. Also check that the cable is a standard RS-232 cable (not a null modem type). If an adaptor is used, it must not be null modem. The cable must be connected to the RW 232 INPUT jack on the rear of the unit. See the ECS Hardware Manual. Audio hum or noise: Try Muting the unit. If this helps significantly, the problem may be with the Input connection, or the equipment driving the Input. If Muting has little effect, the problem is likely either the Output connection, or equipment driven by the Output. ECS is intended to connect to equipment with balanced audio I/O and chassis-grounded shield/common. Connecting equipment with signal grounded shields or unbalanced connections may result in hum or noise due to induced currents in the signal path.

It may be possible to reduce or eliminate these problems, although some experimentation may be required: Try disconnecting the audio cable shields at one end, particularly between chassis grounded and signal grounded equipment. Try combinations of lifting grounds on units supplied with ground lift switches (or links). Verify that all chassis are tied to a good earth ground. Some units with outboard power supplies do not ground the chassis through the line cord. Make sure these units are grounded by tying the Chassis Ground Point to a known earth ground.

A star washer guarantees proper contact. For more information on balanced interconnection and grounding, please refer to RaneNote 110, "Sound System Interconnection". RW Manual-22 ECB 62e DEVICE CONTROL LANGUAGE Data Structures Abbreviations \$: ADDR: CHNUM: COMSTAT: DCL: DT: ID: MEMNUM: OPSTAT: SPL: used: signifies hexadecimal number device address channel number code communications status code device control language Device-type code (predefined) Manufacturer's ID code (predefined) memory number code operational status code stored parameter list (product dependent) Definition: Two's Complement: The result obtained when all the data bits are inverted and 1 is added to the result. Used to represent negative numbers. The Two's Complement of 3 (i.

e. 0000 0011) is equal to 1111 1101 or \$FD. This represents '3'. Control Systems RW 232 devices use an addressable RS-232 protocol. Most commands to a device use the Send Data to channel command (\$81). This command uses a Stored Parameter List (SPL) which is like an array of Memory. In most situations only one command is sent at a time. Another useful command is the Program channel From Memory command (\$82) which recalls a Memory. With ECS products this Memory command is capable of partial Memory recalls that can be used to Mute groups of Mics.



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