Quick Start

Typically, a complete ECS system is comprised of one ECB 62 Base and one or more ECM 82 Mixers, with ECS 62 Stereo Expansion Modules as required, and usually one or more ECS 1 Echo Canceller Modules. [Performing Plain Old Telephone Service (POTS) type teleconferencing requires an additional Digital Hybrid, found in the Rane ECM 64 AD.] If remote diagnostics and programming are desired, then add a Rane RPD 1 Programming & Diagnostics unit.

The ECS Operating Manuals for these units are split into two booklets — one for ECS hardware and one for RaneWare® software. Neither booklet includes service information. Should any unit require repair, contact the Rane factory. Telephone, fax and web info is on the rear of this manual.

Since ECS is a programmable audio system, it must first be programmed before it can pass any audio. To simplify this process, there are four system applications in the RaneWare Operators Manual. Before you begin, look at these applications and choose the one that most closely resembles your system. By loading these files into the ECB 62, a starting template is created that enhances the setup procedure. Each of these application files use Memory 16 for alignment.

Most echo problems are caused by improper microphone placement and gain. To achieve good echo canceller performance, the microphones must be properly set up, as shown on page RW Manual-19 (in the ECS RaneWare Manual).

ECS Hardware Manual

This manual begins by explaining the options and internal settings for each unit, since all optional accessories must be installed and all internal jumpers set before installation of the units into equipment racks. Next are detailed descriptions of the front and rear panel features, followed by detailed block diagrams and discussions, as well as diagrams showing the signal flow making up the critical “offsets,” or thresholds used by ECS. Then comes instructions on Power, Audio & Data Connections, as well as how to set each unit’s Device Address. Complete electronic and mechanical specifications are found in the Data Sheet.

Information on installing and running the control software is found in the second booklet: ECS RaneWare Operators Manual.

Contents

CUSTOMIZING ECS ......................................................... 2
ECB 62 BASE ............................................................. 3
ECS 62 STEREO EXPANSION MODULE .............. 6
ECM 82 MIXER .......................................................... 7
ECA 1 ECHO CANCELLER MODULE ............... 10
POWER, AUDIO, AND DATA CONNECTIONS .. 11
SETTING THE DEVICE ADDRESS .................... 13

U.S. Patent 5,848,146 on all Rane ECS products
Windows is a registered trademark of Microsoft Corporation
RaneWare is a registered trademark of Rane Corporation

WEAR PARTS: This product contains no wear parts.
CUSTOMIZING ECS

Before installing ECS components, there are a few options that need to be determined first. All but one of these require removing the top covers before installation.

ECS 62 STEREO EXPANSION MODULE

See the description and installation diagram of the ECS 62 Stereo Expansion module into the ECB 62 Base on page HW Manual-6. The ECS 62 installs by seating the card onto factory installed standoffs on the motherboard.

ECB 62 BASE WITH BOTH STEREO & MONO PORTS

The ECB 62 Base and ECS 62 Stereo Expansion module are shipped with jumpers in the stereo position. Both mono and stereo sources may be used by changing the Mono Jumper blocks as described on page HW Manual-6.

Mono Input signals must be wired to both the Left and Right Inputs of the Base. Both Left and Right Port Outputs produce the same mono signal. See the Figure below for an example, and page HW Manual-12 for mono source cable wiring.

Only the bottom ports (Right Channel) are monitored by the Base unit. Therefore, threshold detection and metering are not operational from the ECS 62.

ECM 82 MIXERS WITH ECA 1 ECHO CANCELLERS

Mixers may or may not require Echo Cancellers installed in each one. Placing the Echo Canceller in each mixer reduces the number of acoustical echo paths for a multi-microphone system, thereby improving the audio quality of the system. This method of echo cancelling is called MZEC™ MultiZone Echo Cancelling (see ECS Data Sheet).

An Echo Canceller is recommended for each Mixer when being used for teleconferencing.

The ECA 1 installs by seating the module onto factory installed standoffs on the motherboard as shown on page HW Manual-10.

The ECM 82 may be purchased with the ECA 1 already installed by ordering model ECM 82A.

ECM 82 MIXER PHANTOM POWER

The ECM 82 Mixer is shipped with internal Phantom Power switches in the “on” position. To change, remove the top cover and look for the switches in the middle left of the circuit board, as shown on page HW Manual-10.

ECM 82 MIXER POST-GATE/PRE-GATE SWITCH

When installing a sound system with zones, it is best to use a Post-Gate mix of the Mics to create a Zone from the AUX Output. This maintains the NOMM level for the Mixer. See Applications - System 4 in the RaneWare Operators Manual.

RaneWare note: the AUX Output is not turned On or Off from the Mixer Output control.

This switch is set to Post-Gate at the factory. For installations requiring recording, place this switch in the Pre-Gate position. This provides a more natural sounding recording.

This switch is located inside the ECM 82 Mixer. See the diagram on page HW Manual-10.

ECM 82 MIXER TERMINATION SWITCH

ECS termination is optional and is only required if there are more than four ECM 82s. To set the ECS termination remove the top cover of the last ECM 82. On the ECS data interface, move the ECS TERM jumper to its left position.

---

Figure 1. ECB 62 Base with both Stereo and Mono Ports
THE BASE

The ECB 62 Base is the master controller of the ECM 82 Mixers. The Base consists of a six port audio bridge, with an optional internal ECS 62 Stereo Expansion module. The Base can be used by itself as a six-by-six Port line-level audio mixer and router. Bridging bases together creates more Ports.

All functionality is controlled through RaneWare. Software controls are printed in bold san-serif type like this. See the RaneWare Operators Manual for complete details.

AUDIO BRIDGE

The audio bridge allows the connection of six full-duplex audio devices—thus the term six Port audio bridge. See Figure 2 above. Each Input Port has both a hardware 10 dB PAD switch on the front panel and software programmable Input Attenuation controls. Each Output Port, except Port 5, consists of a program selectable five input Audio Mixer/Router and programmable Output Attenuation controls, as shown in Figure 3. Port 5 has a program selectable six input Audio Mixer/Router. This type of configuration for Ports 1-4 and 6 prevents the connection of an Input to its Output, avoiding a possible feedback condition.

PORT 1

The Port 1 Input is different from all other Ports. This Port contains a six input line summer, connecting up to six Mixers. All mics in the room are connected to this Port through the ECM 82 Mixers. This Port contains a six input line mixer, connecting up to six ECM 82 Mixers. See Figure 3.

The Output of Port 1 is also different from all other Ports. It is designated as the Program Port, delivering audio to the room sound system. It has both a balanced Right channel and a summed Mono Output of Right and Left. An installed ECS 62 Stereo Expansion Module delivers the balanced Left channel. The Mono Output connects to the Echo Canceller Reference on all ECM 82 Mixers.

STATUS SIGNALS

The top center of the ECS software screen (and the ECB 62 front panel) contains the following Status indicators—all of which can be obtained via RS-232 based room control devices. (In the ECB 62 Device Control Language of the RaneWare Operators Manual-29 refer to the RW 232 Command Get OPSTAT.)

The three Signal indicators—Program, Port and Mic—are used within ECS to identify the current audio state of the system, i.e., where audio is present or absent. The patented performance advantages and much of ECS’s automatic functionality is derived from the system being aware of these indicators’ current state.

Program Signal indicator (PGS LED on the ECB 62)

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 62)

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 62)

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 indicators. 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 audio. A Master Mic is a status signal generated when audio is detected at a Mic Input for a period of time longer than the Master Mic Delay timer setting. If an Input is assigned as Last On, and audio is detected for a period longer than the Master Mic Delay timer, that Input becomes the Master and remains on until a new Input takes over. The old Master Mic then releases and returns to its set Gate Depth. Use Master Mic Delay on the System tab for video-follows-audio applications.
**ECB 62 Base - Front Panel Description**

1. **INPUT SIG level indicator:** Lights when the Input signal on any Port, before trim, is above -25 dBu. Use this to check signal flow.

2. **INPUT OL level indicator:** Lights when the Input signal on any Port, before trim, is within 2 dB of clipping.

3. **OUTPUT SIG level indicator:** Lights when the Output signal on any Port is above -25 dBu. Use this to check signal flow.

4. **OUTPUT OL level indicator:** Lights when the Output signal on any Port is above 6 dBu.

5. **INPUT PADs:** Ports 2 through 6 have switch selectable 0 or –10 dB attenuation. Use –10 dB for pro audio devices with 0 dBu or greater output levels.

6. **SYSTEM STATUS INDICATOR—MASTER PORTS:** Displays the current Master Port. It is also used by the PORT STEP button (see 12) to display the current Port monitored by the LEVEL Meter.

7. **EXP status indicator:** EXPansion port data - Lights when receiving data from the ECM 82 Mixers.

8. **PTS status indicator:** PorT Signal - Lights when audio is detected at any Port.

9. **MCS status indicator:** MiC Signal - Lights when audio is detected at any Mic Input from any ECM 82 Mixer.

10. **PGS status indicator:** ProGram Signal - Lights when audio is detected at any Port Output.

11. **LEVEL:** VU meter Selectively displays all Port Inputs and Port 1 and 3 Outputs by using the PORT STEP (see 12). This is also an error display:
   - -3 by itself indicates an RW 232 receive parity error.
   - 0 by itself indicates an Expansion Network overflow.
   - +6 by itself indicates an RW 232 overflow. During power-up initialization, this flashes until the system is ready. If this keeps flashing longer than 10 seconds, RAM may be damaged. The ECB 62 needs servicing.
   - If this illuminates steadily, the system has overflowed. To remedy, cycle the power off, then back on.

12. **PORT STEP button:** Pressing this for 1 second causes the MASTER PORT STATUS LED to flash the currently monitored port for the LEVEL meter. If this button is pressed and held for 5 seconds, the monitored Port can be incremented by pressing the button in 1 second steps. The MASTER PORT STATUS LEDs will step Port 1 thru Port 6 Inputs (LED 1-6), then back for the Port 1 Output (LED 1), then the Port 3 Output (LED 3), and then returning back to Port 1’s Input (LED 1).

13. **COM indicator:** flashes randomly when receiving valid data from the control system or PC. *If the DEVICE ADDRESS is not within a valid range (1-250), this LED flashes steadily at ½ second intervals.*

14. **POWER indicator:** Lights when the Base’s operating system is running.
**ECB 62 Base - Rear Panel Description**

1. **PORT 1 MIXER INPUTS**: MIX 1 thru MIX 6 connect to the MIX OUTs of the ECM 82 Mixers via the 12-pin Euroblock.

2. **PORT INPUTS**: P2 thru P6 connect to balanced line sources via this 15-pin Euroblock. When the ECS 62 Stereo Option card is installed, these are the Right channel Inputs. See page HW Manual-6.


4. **PORT OUTPUTS**: This 8-pin Euroblock provides P1, P1 MONO and P2 Outputs, and the 12-pin Euroblock provides P3 thru P6. (P1 MONO is used for the ECM 82 Echo Canceller Reference.) When the ECS 62 Stereo Option card is installed, these are the Right channel Outputs.

5. **ECS 62 PORT OUTPUTS**: Connect the Left channel P1 and P2 Outputs from the 8-pin Euroblock, while P3 thru P6 are delivered from the 12-pin Euroblock. (P1 Mono Not Applicable—available at 4.)

6. **ECS EXPANSION port**: This RJ12 mod jack and cable (included) is an Expansion data interface to control and communicate with the ECM 82 Mixers. This proprietary high speed data interface cannot be used with non-ECS products. During power-up of the Base, all connected Mixers are polled, then sent their respective data, from the Base’s non-volatile memory. The Base then polls the Mixers at one minute intervals checking for dropped or added mixers. If found, the Base resets.

7. **RW 232 CONTROL - DEVICE ADDRESS**: Sets the RW 232 address for the ECB 62. Each RW 232 unit requires a different address. If the RW 232 Control Device Address is set to an invalid address, the COM LED continually flashes. The Device Address can be changed without power cycling the unit. See page HW Manual-13.

8. **RW 232 CONTROL - INPUT**: This DB-9 female connects to the RS-232 output of the controller (or PC), or the OUTPUT of another RW 232 unit connected to the controller. Rane uses a standard RS-232 interface using Rane’s RW 232 protocol operating at 19.2 kb. Units connect by daisy-chaining the products on a serial bus, OUTPUT to INPUT.

9. **RW 232 CONTROL - OUTPUT**: This DB-9 male connects to downstream RW 232 units.

10. **POWER input jack**: This 5-pin DIN connects to the included RS 3 power supply, or daisychained with the Power Loop cable from the ECM 82 connected to the RS 3 power supply. Warning! Connect the power supply DIN connector to the Base BEFORE connecting to AC power, otherwise damage may occur. See page HW Manual-11.

**ECB 62 Installation Notes**

If an ECS 62 Stereo card is to be installed in the ECB 62, install the required mono jumper on the ECB 62 motherboard before installing the ECS 62 (see page HW Manual-6).

The ECS Expansion port is the control between the ECB 62 and the ECM 82s. Using the supplied RJ12 cable connect the ECM 82s to the ECB 62. Note: The ECM 82s do not use RW 232 addressing. The ECS address for the ECM 82s determines the Mic number on the ECM 82. ECS address 1 is Mixer 1, Mics 1 thru 8. ECS address 6 is Mixer 6, Mics 41 thru 48. Only use termination on the last Mixer when using four or more Mixers. ECS termination is located inside the ECM 82.

**HW Manual-5**
ECS 62 STEREO EXPANSION MODULE

DESCRIPTION
The ECS 62 is a plug-in module for the ECB 62 Base. Once installed, the Base can accommodate both stereo and mono audio. Included on the module is a duplicate of the Base’s Audio Bridge, with the exception that Port 1 has no external input connection, and the Mono Program Output is eliminated. The stereo module mounts on top of the ECB 62 motherboard and is designated as the Left channel.

The ECS 62 installs by temporarily removing the top cover of the ECB 62 and seating the card onto factory installed standoffs on the motherboard. See Figure 8 below.

Warning: Proper static discharge measures must be followed when installing or configuring this card.

ECS 62 LEFT CHANNEL FEATURES
- Six Port Selective Audio Bridge, control is combined with the ECB 62 Right channel Audio Bridge.
- Hardware Pad switches set Input attenuation on Ports 2-6.
- Software Programmable Level controls on all Inputs and Outputs combined with the Base’s Right channel Levels.
- Port 1’s mono inputs deliver signal to both Right and Left channels of Port 1.
- Internal hardware jumpers provide mono Outputs.

STEREO & MONO OPERATION
Both mono and stereo equipment are accommodated by installing the ECS 62 into the ECB 62 and placing the internal Mono Output jumpers to their “mono” positions for mono equipment. Mono Input signals must be wired to both the Left and Right Inputs of the Base. Both Left and Right Port Outputs produce the same mono signal. See page Manual-12 for mono source cable wiring.

Since Port 1 is designated as the Program Output, it does not have a Mono jumper. Both mono and stereo Outputs are provided simultaneously from Port 1.

Note: Audio levels from the ECS 62 are not monitored by the ECB 62 Base.

Figure 7. ECS 62 Stereo Expansion Card installation with Mono Jumper locations

HARDWARE LIST:
1. = (2) MACHINE SCREW 4-40 X 3/16" BLK ZINC
2. = (2) MACHINE SCREW 6-32 X 3/16" ZINC W/STAR WASHER
**ECM 82 MIXER**

The ECM 82 Mixer is a digitally-controlled-analog eight channel Mic/Line auto-mixer. An optional internal DSP Echo Canceller module is available either separately (model ECA 1) or included (model ECM 82A). Each Base supports up to 6 Mixers, allowing 48 Inputs. All system parameters of the Base and Mixers are stored within the Base using non-volatile memory (no batteries). The ECM 82 Mixer is not a stand-alone device and will not operate without a Base connected.

All functionality is controlled through RaneWare. Software controls are printed in san-serif type like this. See the RaneWare Operators Manual for complete details.

**LAST-ON or GATED MODES**

Unique among automatic mic mixers, 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 Mic.

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 (i.e., questions) mics, 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.

**MIC THRESHOLD**

Each Mic can operate in either Automatic or Manual Threshold mode. With Automatic Threshold checked, each Input determines its own background noise level. This calculated level is added to the set Threshold Level for this Mic.

**MZEC™ (em-zeck)**

Using large auto mixers with an echo canceller can cause echo problems when several microphones gate-on at the same time. If a single Echo Canceller is adapting to all Mic signals, and more than three Mics are on at the same time, the acoustic model for the room may become too complex. This causes Echo Canceller divergence, resulting in more suppression or return echo. To eliminate this problem, each ECM 82 Mixer allows the addition of an internal Acoustic Echo Canceller. Placing an Echo Canceller in each mixer reduces the number of acoustical echo paths for a multi-microphone system, improving the system audio quality. (See the ECA 1 Acoustic Echo Canceller module on page HW Manual-10.)

This method is called MultiZone Echo Cancelling (MZEC™).

**Important:** When using an Echo Canceller in each Mixer, at least one Mic must be open on each Mixer to allow the Echo Canceller(s) to adapt. ECS maintains an open Mic for each Mixer when Mixer Gate is checked and each Mixer has at least one Last On Mic. Setting the Gate Depth of a gated Mic to 0 dB is another way to maintain Echo Canceller adaption. The ECB 62 PORT 1 MONO OUTPUT must be connected to all the E/C REF Inputs of the ECM 82 Mixers.

**PHANTOM POWER**

The ECM 82 Mixers are shipped with internal Phantom Power switches in the “on” position. To change, remove the top cover and look for the switches in the middle left of the circuit board, as shown on page HW Manual-10.

**REDUCING NOISE AND ACOUSTIC GAIN**

Three methods are available to reduce noise and acoustic gain due to the mixing of multiple microphones and multiple Echo Cancellers.

The first method is a special NOMM Mode (Number of Mics & Mixers open). This function maintains full level at the Master Mic Input that has detected audio, while reducing Gains of the other Mics in order to maintain unity gain.

The second method is a Mixer Gate. This function reduces the Output Level of the Mixers that are not detecting audio and do not have a current Master Mic. When using the ECM 82 Expansion Input, deselect Mixer Gate.

The third method, Mixer Suppression, utilizes a one shot suppression technique. This is only active when a new Mic is Gated and audio is no longer detected at the previous Mic. The added Suppression is 12 dB. Activating Suppression removes echo caused by the Echo Canceller re-adapting to a new Gated Mic.

**An example of Mixer Suppression:**

1. Someone talks at local Mic 1. (New Input = false)
2. The person at local Mic 1 stops talking and someone at the remote location talks. (No Mixer Suppression is added.)
3. Someone at local Mic 2 starts to talk. (Mixer Suppression is added.)
4. The person at local Mic 2 stops talking and someone at the remote location talks. (Mixer Suppression is added.)
5. Someone at local Mic 2 starts to talk again. (New Input = false) (No Mixer Suppression is added.)

**DEVICE ADDRESS**

The Mixer’s rear panel ECS INTERFACE DEVICE ADDRESS determines its Mixer number and Mic Input numbers. For example, Device Address 1 is Mixer 1 including Mics 1-8, and Device Address 2 is Mixer 2 including Mics 9-16. Only Device Addresses 1 through 6 are allowed, since this is the maximum Mixers per Base. When a Mixer is first powered up and has not received data from the Base, the Mic Status LEDs display the Mixer Device Address.

An invalid Device Address set on the Mixer causes its COM LED to continually flash. The ECM 82’s power must be cycled after changing the Device Address. **Unplug from the wall, not the unit!**

**TERMINATION**

ECS termination is optional and may only be needed if there are more than four ECM 82s. To set ECS termination, remove the top cover of the last ECM 82 and move the ECS TERM jumper to its left position on the ECS data interface.
ECM 82 Installation Notes

If Phantom Power is not required remove the top cover to the ECM 82 and disable it. See page HW Manual-10.

Always leave the RS 3 power supplies for last. Once all the wiring is completed, connect the loop thru power cables between the ECM 82s ending at the ECB 62. Before connecting the RS 3 make certain that it is not connected to the AC power. See page HW Manual-11.

The ECS Expansion port is the control between the ECB 62 and the ECM 82s. Using the supplied RJ12 cable connect the ECM 82s to the ECB 62. Note: The ECM 82s do not use RW 232 addressing. The ECS address for the ECM 82s determines the Mic number on the ECM 82. ECS address 1 is Mixer 1, Mics 1 thru 8. ECS address 6 is Mixer 6, Mics 41 thru 48. Only use termination on the last Mixer when using four or more Mixers. ECS termination is located inside the ECM 82. See page HW Manual-2.
**ECM 82 Mixer - Rear Panel Description**

1. **MIC INPUTS:** These balanced inputs connect MIC 1-MIC 4 on one 12-pin Euroblock, and MIC 5-MIC 8 on another 12-pin Euroblock. See page HW Manual-12 for cable wiring.

2. **POST-GATE OUTPUTS:** One 8-pin Euroblock delivers MIC 1-MIC 4; the other 8-pin Euroblock delivers MIC 5-MIC 8.

3. **PRE-GATE OUTPUTS:** One 8-pin Euroblock delivers MIC 1-MIC 4; the other 8-pin Euroblock delivers MIC 5-MIC 8.

4. **MIX IN:** This input allows Mixers to be daisy-chained together by connecting MIX OUT to MIX IN (see 5).

5. **MIX OUT:** This post-gate output is program selectable as either a pre-echo-canceller or post-echo-canceller, and is typically connected to one of the MIX INPUTs on the ECB 62 Base. For pre-echo cancellation, select Bypass in the Echo Canceller box on the Mixer’s page in RaneWare.

6. **AUX OUT:** This output is switch selectable as either a post-gate or pre-gate before the echo canceller. This switch is set to “post-gate” at the factory. If required, remove the top cover and look for the switch marked “S1” in the middle toward the back of the circuit board. Set the switch according to the silkscreen and replace the cover and screws.

7. **E/C REF:** Echo Cancellers Reference—This input typically connects to the Port 1 MONO output of the ECB 62 Base when an ECA 1 Echo Cancellers is used within this Mixer. The average signal level at this input must be between -10 and 0 dBu.

8. **ECS INTERFACE—EXP OUT:** This RJ12 mod jack (and supplied cable) sends Expansion data, connecting to the EXP IN jacks on subsequent ECM 82 Mixers.

9. **ECS INTERFACE—EXP IN:** This RJ12 mod jack (and supplied cable) receives Expansion data, connecting to the ECS EXPANSION jack on the ECB 62 Base or the EXP OUT jacks on upstream ECM 82 Mixers.

10. **ECS INTERFACE—DEVICE ADDRESS:** Selects the Mixer number 1 thru 6. The Device Address is set using a binary code determined using the following table. For example, turning ON the switches labeled ‘1’ and ‘2’ on the chassis yields address ‘3’. In the following table, 0 means switch down (OFF), 1 means switch up (ON).

<table>
<thead>
<tr>
<th>SWITCH #s</th>
<th>1234</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0001</td>
</tr>
<tr>
<td>2</td>
<td>0010</td>
</tr>
<tr>
<td>DEVICE</td>
<td>0011</td>
</tr>
<tr>
<td>ADDRESS</td>
<td>0100</td>
</tr>
<tr>
<td>5</td>
<td>0101</td>
</tr>
<tr>
<td>6</td>
<td>0110</td>
</tr>
<tr>
<td>SILKSCREEN #s</td>
<td>8421</td>
</tr>
</tbody>
</table>

An invalid Device Address set on the Mixer causes its COM LED to continually flash. The ECM 82’s power must be cycled after changing the Device Address. Unplug from the wall, not the unit!

11. **MIC STATUS:** This DB-9 female jack is an open collector output reflecting the current Master or Gated Mic. A new Master or Gated Mic causes its corresponding pin to go low for 50 milliseconds. Pin 1 is Mic 1, pin 2 is Mic 2, pin 3 is Mic 3… and pin 9 is ground. This connector can provide status information for video-follows-audio.

12. **POWER LOOP:** A DIN cable (included) connects up to three ECM 82 Mixers and one ECB 62 Base, powered from one RS 3 Power Supply. Connect only a Rane RS 3 power supply to either of these DIN jacks or an attached unit with an RS 3. Do not connect two RS 3 units to the same unit or loop. Warning! Connect the DIN power supply connectors to the units before connecting to AC power, otherwise damage may occur. See POWER on page HW Manual-11.
ECA 1 ECHO CANCELLER MODULE

DESCRIPTION

The ECA 1 is a continually adaptive acoustic Echo Canceller module for the ECM 82 Mixer using DSP technology. Each ECM 82 Mixer allows the addition of an internal acoustic Echo Canceller. Placing the Echo Canceller in each Mixer reduces the number of acoustical echo paths for a multi-microphone system, thereby improving the audio quality of the system. This method of echo cancelling is called MZECD™ MultiZone Echo Cancelling. See page HW Manual-7.

Since the Echo Canceller automatically adapts to the room, training is not required.

The ECA 1 installs by temporarily removing the top cover of the ECM 82 and seating the module onto factory installed standoffs on the motherboard.

After installing the Echo Canceller, disable Echo Canceller Bypass in RaneWare (see the RaneWare Operators Manual).

Warning: Proper static discharge measures must be followed when installing or configuring this card.

Figure 10. ECA 1 Block Diagram (detail from Data Sheet Block Diagram).

Figure 11. ECA 1 Installation with ECM 82 Phantom Power and network termination jumper locations

HARDWARE LIST:

1 - (2) MACHINE SCREW 4-40 X 3/16" BLK ZINC

AUX OUT PRE/POST GATE
POWER

The Rane RS 3 Power Supply is provided with each ECB 62 Base, and required for operation of the ECM 82 Mixer. Daisy chaining is possible with the DIN cables (included with the ECM 82). One RS 3 will power any one of the following:

- (1) Base and (3) Mixers
- (4) Mixers

When connecting the ECS units to other components in your system for the first time, leave the power supplies for last, and then connect the DIN power cable to the unit BEFORE connecting AC power. This gives you a chance to correct any mistakes before any damage is done to your units, speakers, computer, ears, etc.

AUDIO

ECS units have both balanced and unbalanced Inputs and Outputs, with chassis-grounded shields. Chassis ground is to be connected to a known earth ground. Refer to Figure 13 on the following page.

DATA

To control the units from a computer, use nine-pin RS-232 cables 50 feet or shorter. The cable must not be a null-modem type. A short cable is supplied for connecting adjacent units. Daisy chain up to 16 units by connecting the COM port on the computer to the INPUT connector on the first unit, and the OUTPUT connector of each unit to the next unit’s INPUT. Since RS-232 can pass through RW 232, additional RS-232 devices may be attached at the end of the RW 232 chain. See the pin-outs in Figure 13 on the following page.

DETAILS

Large racks of equipment such as ECS may generate excess heat, requiring extra space between units, and/or forced air ventilation to reduce the ambient temperature in the rack.

Before powering the units, set the DEVICE ADDRESS switches as shown on page HW Manual-13.

OK, now for the AC line cord.
Unbalanced source to balanced ECB 62 Input, 2-conductor cable with shield

Unbalanced source to balanced ECB 62 Input, 1-conductor cable with shield

Balanced ECB 62 Output to an unbalanced unit

Balanced mono source to a stereo ECB 62

Balanced mono source to a stereo ECB 62 with transformer type termination

PC to ECB 62 - DB-9 female to DB-9 male

PC to ECB 62 - DB-25 female to DB-9 male

AMX AX 232 to ECB 62 - Euroblock to DB-9 male

Figure 13. ECS cable wiring
SETTING THE DEVICE ADDRESS

The Device Address is set using a binary code which may be determined using the following table, our Windows Address Calculator program, or by adding the place values (1-128) silkscreened on the chassis. Ignore all numbers printed directly on the switch. For example, turning ON the switches labeled ‘1’ and ‘2’ yields address ‘3’. In the following table, 0 means switch down (OFF), 1 means switch up (ON), and the left-most digit corresponds to the switch labeled ‘128’.

Rane also provides a special calculator to assist in setting the dip switches. After installing the software, in the RaneWare program group, launch the RaneWare 232 Address Calculator. This binary calculator converts decimal numbers into corresponding dipswitch settings.

<table>
<thead>
<tr>
<th>Switches</th>
<th>Binary Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>128</td>
<td>0000000001</td>
</tr>
<tr>
<td>127</td>
<td>0000000010</td>
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Figure 14. Device Address Calculator
**FCC NOTICE**

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 when the equipment is operated 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:
1. Re-orient or relocate the receiving antenna.
2. Increase the separation between the equipment and the receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/TV technician.

**CANADIAN EMC NOTICE**

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet Appareil numérique de la classe B respecte toutes les exigences du Reglement sur le material broilleur du Canada.

**CHASSIS GROUNDING**

If after hooking up your system it exhibits excessive hum or buzzing, there is an incompatibility in the grounding configuration between units. Here are some things to try:
1. Try combinations of lifting grounds on units supplied with ground lift switches (or links).
2. Verify all chassis are tied to a good earth ground.
3. Some units with outboard power supplies do not ground the chassis through the line cord. Make sure these units are solidly grounded by tying the Chassis Ground Point to known earth ground. Use a star washer to guarantee proper contact.