What Is ECS?

An ECS (Engineered Conference System) consists of one ECB 62 Base, plus at least one and up to six ECM 82 Automatic eight-channel Mic Mixers. The Mixer is called an ECM 82A when the optional Acoustic Echo Canceller is installed in the unit.

Since the majority of mixers sold are the ECM 82A, that is the model number that will be referred to throughout this introduction. With the exception of Acoustic Echo Cancelling, the ECM 82 operates the same as the ECM 82A.

• The ECB 62 Base has (6) Inputs and (6) Outputs, giving the user an extensive amount of routing flexibility. This Base can accommodate stereo audio by adding an optional ECS 62 plug-in module.

> The **ECB 62 Base** has 6 Ports. Each Port has an Input and an Output. So when we talk about a Port, if we don't specify Input or Output, we are referring to both its input and output.

• All of the ECM 82A Automatic Mic Mixers (mix outputs) are normally connected to Input 1 of the ECB 62 Base.

• The remaining Program Sources (videoconferencing codecs, VCRs, etc.) are connected to Inputs 2 – 6 of the ECB 62 Base.

• The result of the above is that up to (48) microphones and (5) mono or stereo Program Sources can be combined into a single system.

ECS Step-by-Step Setup

ECS SYSTEM GENERAL CONNECTIONS

1. Connect the provided power cables

2. Connect the **MIX OUT** of each ECM 82A to one of the **(6) PORT 1 INPUTS** on the ECB 62.

3. On the rear of the ECM 82A, select the Device Address. *This selects the Mixer number 1 thru 6. (See page 9 of the ECS v2 Hardware Manual for this procedure.)*

4. Connect the **ECS EXPANSION** of the ECB 62 to the **EXP IN** of the first ECM 82A. *A cable for this is included.*

5. For additional ECM 82As, connect the **EXP OUT** of each ECM 82A to the **EXP IN** of the next ECM 82A.

6. Connect the **MONO OUTPUT** of the ECB 62 to the **E/C REF** of each ECM 82A. *These can be parallel connections. Through these connections, each **Acoustic Echo Canceller** will monitor signal from the **PORT 1 OUPUT**. Note:* This connection is not needed when using an ECM 82 without Acoustic Echo Cancelling.

7. Connect the Port 1 (P1) output(s) of the ECB 62 to the Program Loudspeakers electronics. Program sources will be heard locally through the Port 1 output(s).

8. Connect your PC to the RS-232 in connector on the ECB 62.

STARTING RANEWARE

1. Install RaneWare (See installation instructions on RaneWare Operators Manual Page 2.)

2. After the newly installed software is up and running, click on the System menu at the top of the screen.

    A. Click on **System Setup**.

    B. Select the appropriate **Serial Port** and **Connection**, then click **OK**.

3.   Click on the **Device** menu (left side of screen).

    A. Click on **Select**.

    B. Click on **Poll**. When a device is found, its name is displayed in the Device Selection window. Click on **Stop** once the device(s) has been found.

    C. Click on the newly polled device(s), then click **OK**.

GETTING THE SYSTEM UP AND RUNNING

    There are four example systems that Rane has preprogrammed to get you up and running as quickly as possible. The only adjustments that have to be initially made to these system examples are **adjustments for each microphone** and **input adjustments for program sources**. The following explains how to do this:

1. Take a look at the (4) system examples on pages **10 – 16 in the RaneWare Operators Manual:**
    System 1: Typical Video Conference Room   (ap1v2.ecs)
    System 2: Boardroom with Program Stereo   (ap2v2.ecs)
    System 3: Distance Learning   (ap3v2.ecs)
    System 4: Large Conference Center   (ap4v2.ecs)

2. Decide on which example seems to be the closest to your system design. *Don't worry if the examples seem different from your own. This is just a starting point which will be fine tuned later.*

3. Click on the RaneWare **Device** menu.

    A. Click on **Restore Memories from File**. This is where you find the example systems.

    B. Notice that there are four files listed. Click on the **ap#v2.ecs** number that matches your example system (page 10 –16), then click **OK**.

4. Click on the **Device** menu again.

    A. Click on **Restore Names from File**. This matches up the correct Input/Output labeling for the above example.

    B. Notice the same four files listed as before. Click on the **ap#v2.ecs** number that matches your example system, then click **OK**.

5. You now have a system that is "almost" very workable. All that remains are **gain adjustments for each microphone, input level adjustments for program sources,** and **output level adjustments**. The next three sections explain how.

SETTING UP THE ECM 82 MIC LEVELS

All power amp gain controls must be at their lowest settings. Make sure that the preceding "Getting the System Up and Running" has been followed. ECM 82's are shipped with their Mic Input Gain switches set to +6 dB (line level), Mic Input Levels set for –10 dBu signal level and Phantom Power On.

1. Set all **Mic Input Gain switches** on the front panel of the ECM 82 mixer. The *40 dB position is a good place to start.*

2. Connect microphones to ECM 82.

3. Select **Memory 16** at the top of the RaneWare screen. This preconditions the Port Inputs and Mic Inputs for alignment.

4. In RaneWare, notice the (3) tabs labeled **Port**, **Mixer**, and **System**. Click on **Mixer**.

5. Click on the **Mic 1 Active** button. *When the Mic 1 Indicator is lit, the Mic is enabled.*

6. Place a **sound level meter** next to the **microphone** (that feeds Input 1) and aim both toward the **loudspeaker**(s). Don't worry, the mic won't feed back since it is not routed to the Port 1 Output - the output that feeds your Program power amps(s).

7. Double check this is the correct mic by tapping on it. The level meter should go about full scale. Most problems are caused by mic wiring and mislabeling.

8. Click on the RaneWare **Port** tab. Make sure that the **Program (Port 1) Output** box is checked.

9. Click on the **Noise Source** check box (located upper right of RaneWare).

10. Set all **Mic Input Level** trims on the front panel of the ECM 82 mixer to (0), fully counter clockwise.

11. Bring up the power amplifier level until the sound meter's SPL is at 80 dBA (A weighting – slow). This gives the microphone a consistent noise source to assist in its gain adjustment.

12. Raise the **Mic 1 level** (on the front panel of the ECM 82A mixer) until 0 dB is displayed on the RaneWare Meter (upper left of screen).

13. Make sure the meter's drop-down menu is set to **Room** (or **Port 1** if Restore Names have not been loaded). This is the Port 1 Input Level.

14. To adjust remaining mics:

   A. Turn off previously adjusted mic by clicking on the appropriate **Mic Active** button, causing its Indicator to be unlit (gray).

   B. Repeat steps 5 through 11, substituting the new Mic # for Mic 1. *Make sure to turn off the Noise after all of the mics have been adjusted.*

Note: To temporarily set the mic input levels without using a SPL meter, use the above procedure and talk into each mic at a typical real life distance. Adjust the input gain of each mic so that the RaneWare meter is peaking consistently at 0dB. *Make sure the meter's drop-down menu is set to **Room** (or **Port 1** if Restore Names have not been loaded). This will be the Port 1 Input Level. Setting the Mic Input Gain switches to 40 dB and leaving the Mic Input Levels at their factory position will work for most Boundary Layer type microphones.*

SETTING UP THE ECB 62 BASE INPUT LEVELS

Turn down all power amps. The ECB 62 is shipped with all Port Inputs set for –10 dBu signal levels (Pads set to 0 and Input Levels set to 4 dB).

1. Click on RaneWare Memory 16.

2. Connect the Program Sources (codecs, VCRs, etc.) to Port Inputs 2 – 6. Output connections can also be made at this time.

3. On the front panel of the ECB 62, set the pad for each Port Input. Generally**,** set the pad to **–10** for **pro-audio sources (XLRs)** and **0** for **consumer audio sources** (RCA).

Note: 0 and –10 are pad levels and should not be confused with –10 dBV and +4 dBu. When a Port Pad is placed in 0 dB and the Port Input Attenuation to 4 dB, the Port Input is set for –10 dBu signal levels. Likewise, when a Port Pad is placed in -10 dB and the Port Input Attenuation to 4 dB, the Port Input is set for 0 dBu signal levels. Most room-to-room type connections (Direct, Video Codecs and Hybrids) supply –10 dBm audio levels.

4. Click on the RaneWare **Port** tab.

5. Turn off all of the **Port Inputs,** *all indicators gray*. *The **On** button toggles between off (gray) and on (lit yellow).*

6. Click **On** the Port Input that you wish to adjust. Its Indicator will be lit.

7. The **Auto-Level** should be clicked to **Off**.

8. Click on the RaneWare Meter drop-down Menu so that the Program Source you are setting is displayed.

9. Play the selected Program Source Audio and adjust the Input Attenuation until the meter has an average peak of 0.
This is a good place to start and can be further adjusted as needed.

Note: To listen to the source that you are adjusting, check the appropriate input box (there are 5 of these) that is located directly to the left of the **Program Output** level control. Also, make sure that **Program Output** Box is checked. Turn up the power amp(s) as needed.

10. Repeat steps 5 - 9 for each Port Input.

SETTING UP THE ECB 62 BASE OUTPUT LEVELS

The ECB 62 is shipped with all Port Outputs set for 0 dBu signal levels. The maximum ECB 62 output setting is 0 dBu.

1. For **Program Out** use 0 dB for a maximum operating level. Typically set this level to 10 to 6 dB for normal operation.

2. For room-to-room type connections (Direct, Video Codecs and Hybrids) use the same level as the input level for the device. Always use the same level for the Port Output as what was used for the Port Input. Example, if the Port Input is set for a –10 dBm device, set the Port Output to 10 dB.

3. For consumer devices with RCA type connections set this level to 10 dB. For pro-audio devices using XLRs set this level to 0 dB.

NAMING THE DEVICE NAME, PORT INPUTS AND PORT OUTPUTS

1. Click on the RaneWare Port tab.

2. Click on Name.

3. Make the appropriate name changes and then click OK.

This would be a good time to save the adjustments that you have made so far. Click on the Store Button and then click on a Memory. (Let's use Memory 10)

If your system matches the example system that you have loaded, you may use Preprogrammed Memories 1 through 5 as a starting point.

IMPORTANT: The example System Memories (1 through 5) do not have the same Port Input Attenuation levels that you have just adjusted. If you are going to use these memories, make sure that you adjust the appropriate Port Input levels for each memory.

RANEWARE ECS PARAMETER ADJUSTMENTS

1. Setting the Mic operation for each channel.

   A.   Click on the RaneWare **Mixer** tab.

   B.   Click on the **Mic** number that needs adjusting. The dark blue line highlights the chosen mic channel.

        i. In the **Mic Mode** box, click on **Automatic** (**Voice Activated**) for most automated microphone situations.

   or

        ii. In the **Mic Mode** box, click on **Force On** to cause the mic to gate on. This generally is selected by the control system (AMX, Crestron, etc.).

   or

        iii. In the **Mic Mode** box, click on **Force Off** to cause the mic to gate off *at a time set by the **Gate Release**, and set its **Attenuation** by the **Gate Depth**. This generally is selected by the control system (AMX, Crestron, etc.).

        iv. In the **Gate Mode** box, click on **Last On** for most automatic microphone situations. The mic will stay on as long as it is the **Master Mic**. *This is normally the preferred setting.*

   or

        v. In the **Gate Mode** box, click on **Gated** to cause the mic to gate off *at a time set by the **Gate Release**, and set its **Attenuation** by the **Gate Depth** after audio is no longer detected.*

2. Echo Canceller (RaneWare **Mixer** tab)

    A. Click on **Bypass** to bypass the Acoustic Echo Canceller for this mixers.

    B. Click on **3kHz** to have the Acoustic Echo Canceller operate in low bandwidth mode. When this is **unselected**, the Acoustic Echo Canceller operates in the **7 kHz** mode. Only use 3kHz mode if the far-end room complains about echo.

    C. Click on **Enhanced** to increase the bandwidth to **20 kHz** by bypassing the Acoustic Echo Canceller when speech is detected. Reverts to 7 kHz mode when Program Signal is detected.

3. Suppression (RaneWare **Mixer** tab)
    Adds **12 dB of temporary suppression** to the **Mix Out** when there is a newly gated mic, the Program Signal is On, and the Mic Signal is Off. *Use this in most teleconferencing situations*.

4. NOMM Mode (RaneWare **Mixer** tab)
    When this is checked, the loudest mic gets normal gain, while additional mics gate on at a reduced level.

5. Mixer Gate and Attenuation Level (RaneWare Mixer tab)
    Only check this box if there are multiple ECM 82As. Typically set the Attenuation Level to 10.0 dB. When selected, each ECM 82 maintains its own Last On mic. The ECM 82 that has the Master Mic will not attenuate its Mix Out level. All other ECM 82s will set their Mix Out level to their set Attenuation Level. This allows each acoustic echo canceller to maintain its adaptation. Mixer Gate also functions as a noise gate.

6. Max Mics On (RaneWare Mixer tab)
    Sets the maximum number of mics that are allowed to gate on for this mixer.

7. Port Routing
    A. Click on the RaneWare **Port** tab.
    B. Click on appropriate sources for each Port Output.
    C. Make sure that the appropriate Port Inputs are turned on.

    When you are happy with your adjustments for the entire system, you are ready to save it to one or more of the (16) Memories. *Be careful not to save it to a Memory that is part of the application that you earlier loaded. (See page 2 of this document.)*

8. Backup Memories to File
    This saves all parameters and names to your hard drive.
    A. Click on the **Device** Menu (upper left of screen)
    B. Click on **Backup Memories to File**

TRY IT OUT
    The system is ready to go with the adjustments that you have just made. Of course, there is nothing stopping you from tweaking to your hearts content. And if your system requirements are somewhat different from our examples, the following adjustment procedures can be very useful to further optimize performance.

1. Mic Threshold Level Setup (adjust for each channel)

    A. In most applications operating the Mics with a **Threshold Level** of –25dB is sufficient. Leave **Auto Threshold** un-checked if you require a fixed Threshold setting for the Mics to be gated on.
    or
    B. Automatic Threshold uses a calculated background noise level for this mic. Clicking here will disable the previously set Threshold Level.

2. Program Signal Threshold and Offset Setup - *Very Important*
   These features keep the Mics from Gating on when audio is playing at the Room Loudspeakers.

   A. All Mics and Mixers must be set up.

   B. Click on the RaneWare **Mixer** tab.

   C. All Mics that are to operate automatically must be set **Active** (lit) and **Mic Mode Automatic**.

   D. Click on the RaneWare **System** tab.

   E. Make sure **Link Prog Signal** is unchecked.

   F. Set the **Program Signal Offset** to 0 dB.

   G. Click on the RaneWare **Port** tab.

   H. Set the **Port 1 Output** (Program) to **0 dB**.

   I. Click on **Noise Source**. *Program Output must also be checked*.

   J. Place a sound level meter in the main listening area of the room. Turn up the power amps till the meter reads **90 dBA**.

   K. Click again on the RaneWare **System** tab.

   L. Set the **Program Signal Threshold** to **–20 dB**. *The Prog Signal Status Indicator should be lit*.

   M. Increase the **Program Signal Offset** until the **Mic Signal Status** Indicator extinguishes, **typically** between **12 and 20 dB**. *If it takes over 24 dB of adjustment to cause the Indicator to extinguish, then the current room acoustics would require that the power amps be lowered to less than 90 dBA on the meter.*

   N. Click on the **Link Prog Signal** Box. *This links the above adjustments to the Program (Port 1 Output). In other words, as you change the Program Output level, the Program Signal Threshold and Program Signal Offset will track accordingly.*

   O. Click again on the RaneWare **Port** tab.

   P. Set **Port 1 Output** (Program) to **–6dB**.

   Q. Program audio should not cause the Mic Signal Status Indicator to light. If it does, repeat the above steps.

3. Near Signal Offset (RaneWare System tab)
      When a person is speaking into a mic, the other mics also pick up the voice at a lower level. To eliminate false gating of the other mics, adjust the Near Signal Offset. 18 to 20 dB is a good place to start.

4. Master Mic Delay (RaneWare System tab)
      Controls the speed at which a Mic becomes the new **Master Mic**. *This greatly enhances Acoustic Echo Cancelling performance and is used with "video follows audio" for camera switching* 0.35s to 0.50s is a good place to start. In the gate mode box (Mixer tab), Last on must be checked for this function.

5. Master Port Delay (RaneWare System tab)
      Controls the speed at which a Port becomes the new **Master Port**. *Used with "video follows audio" for multi-point videoconferencing*. 0.35 is a good place to start.

6. Port Signal Release (RaneWare System tab)
      Status info for unique control situations. Does not affect audio.

7. Mic Signal Release (RaneWare System tab)

This affects near signal offset and is very helpful in reverberant rooms. 0.35 s is a good place to start.

8. Prog Signal Release (RaneWare System tab)

Also very helpful in reverberant rooms. 0.35 s is a good place to start.

9. Port 1 Suppression (RaneWare System tab)

Sets an attenuation level for the **Port 1 input** when **Program Signal Status** is on and **Mic Signal Status** is off. *Use only if there is no Acoustic Echo Canceller or the acoustics of the room cause echo. 6 dB is a typical level.*

10. Port 1 Noise Gate (RaneWare System tab)

Use this feature in noisy room situation or during multi-point conferences.

11. P3 Prog Contribute (RaneWare System tab)

Use this when Port 3 drives room loudspeakers, as long as local speech reinforcement is not sent to this port *Contributes Port 3 Output signal to the Program Signal Status.*

CONCLUSION

OK, this should get you going in the right direction. For more in depth reading, take a look at the ECS v2 RaneWare Operators Manual and the ECS v2 Hardware Manual.