REVERB TWENTYFOUR

High-Definition 19 Rack Unit with
24 Channels of Simultaneous Uncorrelated
Reverb Supporting Extreme Surround Formats

Reverb TwentyFour Acoustics Enhancement

The state of the art Reverb TwentyFour is a high-definition multichannel reverb that lets you create and manipulate reverb for up to 24 channels simultanously, so you can deliver powerful content for even the most extreme surround formats.

The Reverb TwentyFour features a high degree of de-correlation between the reverb channels, in addition to the amazing sonic detail and flexibility of its first-class algorithm. This makes the Reverb TwentyFour an excellent choice for changing the acoustics in a multi-purpose venue.

Typical Venues for the Reverb TwentyFour

Here are some typical venues where you might use the Reverb TwentyFour to electrically change the acoustics to suit the performance type:

House of Worship
Here the acoustics can be changed to suit various aspects of church life and services, such as concerts of various genres, singing, choir music, in addition to the spoken word and readings. Wooden churches and small chapels can benefit by sounding more like classical stone churches and for concerts, performances and speech.

Concert Halls
Those that are intended for a wide variety of uses, such as rock, theatre, jazz, opera, and classical music.

Outdoor Concerts
Here you may want to add the sound of a concert hall for example, or other acoustical enhancements in an outdoor environment.

Museums
Here you can add all sorts of sound changes to the exhibit environment, and enhance the museum experience for visitors.

Cruise ships
Here the acoustics can be changed to suit a wide range of indoor and on-deck entertainment including song, dance, concerts, lectures, children's shows, and musicals.

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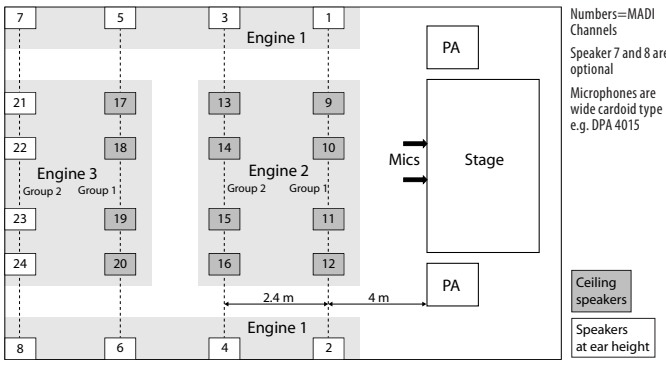
Acoustics Enhancement Presets

The Reverb TwentyFour supports acoustics enhancement with a Presets group called "**F5: Acoustics, RT60.**" This group contains 6 presets for different decay times: 0.6, 0.8, 1.2, 1.8, 2.2 and 2.7 sec RT60. (RT60 is the time it takes for the sound to decay by 60 dB after the sound source stops.)

As an example, using the Reverb TwentyFour, you may be able to extend the decay time (RT60) of a venue by a factor of 2 from its original time.

The reverb field made by the Reverb TwentyFour and received at the audience seats, is extremely even and it is difficult to point out the individual speakers. The lack of any comb-filtering and phasing issues between the reverbing speakers also results in maximum headroom before there is any acoustical feedback to the stage microphones. This gives the opportunity to use less-directive microphones over the stage.



A Typical Acoustics Enhancement System

- The audience receives the direct sound from the performance either acoustically or through a PA system.
- The audience receives the reverb field from reverb speakers mounted above, behind, and to the sides of the audience, as shown in the diagram below.
- An acoustics enhancement system used in a multi-purpose venue, often consists of the following:
  - Microphones picking up the sound signals over the stage. (For example, a wide cardoid type such as the 4015 manufactured by DPA Microphones.)
  - Good-quality microphone preamplifiers.
  - The use of soft multi-band compression can give great results when added to the chain.
  - MADI equipment to convert to and from MADI.
  - The signals are sent via MADI to the Reverb TwentyFour and from there, MADI out to the multi-channel amplification system and the individual speakers – one per reverb channel.
  - By using two Reverb TwentyFour units, up to 48 fully de-correlated channels are possible.

Assumptions for an Acoustics Enhancement System

- All reverb speakers are calibrated to play identical levels.
- The speakers should be able to reproduce signals well down to 100 Hz.
- The input to the system is stereo. Different input routing in the Reverb TwentyFour can accommodate input formats such as 5.1 and 7.1.
- All reverb speakers are playing the reverb 100% wet.
- The speakers are mounted in the venue ceiling and at the sides and rear of the venue at ear height. The distance between the speakers is often between 3 to 6 meters, but it depends on the distance from the audience to the speakers.

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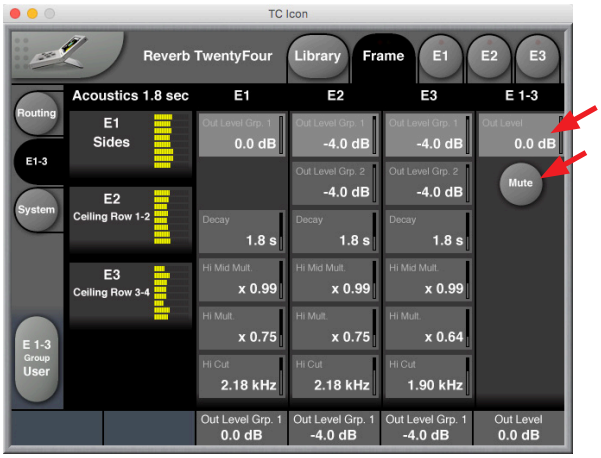
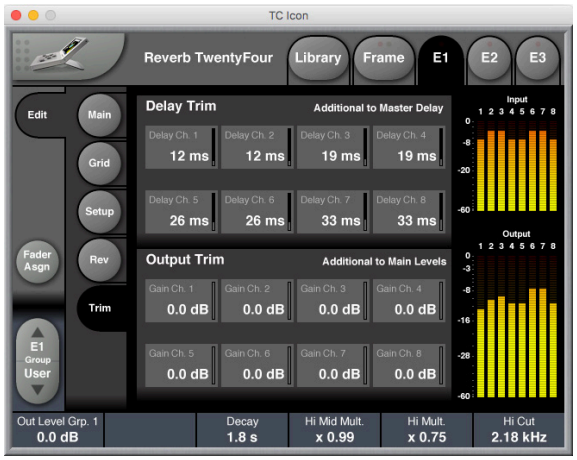
The Reverb Preset Settings:

- Reverb level is important and it should be adjusted individually for each installation. There is a fine balance between "hearing" the reverb and making it "fit" the venue and music genre.
- Engine 1 (E1) handles the side speakers, E2 handles the 2 rows of ceiling speakers closest to the stage, and E3 handles the rear 2 rows (see the speaker layout diagram on page 2).
- Using the Frame - E1-3 page, the Output Level parameter can be used for fast adjustment of the audience speaker level. Use the Mute button to switch the reverb off for comparison (it turns off the Wet signals only).



- The Frame - E1-3 page shows a fast overview of each engine. The parameters shown here are chosen in each engine so you have fast access to the most commonly used parameters in an acoustics controlling installation.
- Trim delays are adjusted for all speakers to compensate for the physical distance from PA front to the 4 speaker rows.



- Predelay is not included in the factory presets, but may be added to include the Haas effect, for example 20 ms. This could enhance the details coming directly from the stage and give the ability to increase the overall reverb level without muddying the sound image.
- Ceiling speakers are reduced by 4 dB to help prevent a "reverb raining effect."
- Row 3 and 4 (including the side speakers) are adjusted for slightly shorter Hi-frequency decay time and lower Hi-Cut, to create a slightly darker-sounding rear venue.
- The overall reverb sound and coloring is carefully tuned in existing venue installations where different decay time for classical music (typically 2.2s), opera and piano (typically 1.8s), bigband and jazz (typically 1.2s), 0.8 and 2.7s are included. The sound of the venue itself, the microphones picking up the sound over the stage, plus the speakers themselves, makes a difference to the combined sound of the system. Therefore, individual system and reverb adjustments may be needed to make the reverb "fit" the venue.

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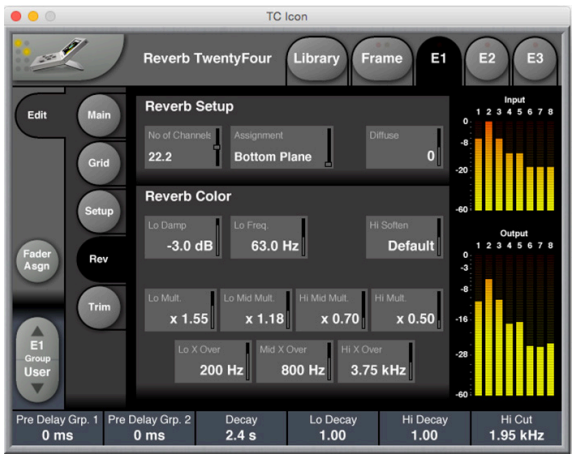
- In order to ensure maximum de-correlation of the audience speakers, use the E1, E2, and E3 - REV pages and adjust the No of Channels and Assignment parameters so they are set differently in all 3 engines.

  Note: the E1, E2, and E3 engines have "Bottom," "Mid," and "Top" settings respectively, in order to have the de-correlation set to "max". This may not fully reflect the physical setup, as this will vary between venues, and therefore other settings for the "No of Channels" may be better in some cases, (see the manual for more details).



- This means that the reverb field at the audience seats is extremely even and it is difficult to point out the individual speakers. As mentioned before, the lack of any comb filtering and phasing issues between the reverbing speakers also results in maximum headroom before acoustical feedback to the stage microphones, which also gives the ability to use less directive microphones over the stage.
- The stereo inputs are randomly but statically routed across the 24 reverb channel inputs. This is done to ensure there is an even reverb field, with very little Left/Right-specific information at the audience seats. Different input routing in the Reverb TwentyFour can also accommodate input formats such as 5.1 and 7.1.
- A venue might not always be full at every show. Therefore it may be a good idea to make more presets for a full venue, and a ⅔-full venue etc. The rear speakers could be turned down or off with a ⅔-full venue, and the decay time could also be set shorter, and the coloring set a bit darker in this case.

General Notes About Changing Acoustics

- As a rule of thumb, you may be able to extend/prolong the decay time of a venue by a factor of 2 from its original time using the Reverb TwentyFour.
- An A-B microphone setup using wide cardioid microphones like the DPA 4015 is a good solution for picking up stage sound.
- Often you may need to introduce a multiband compressor with soft settings prior to the reverb channels, to catch fast transients from the stage that may sound slightly artificial by the time they reach the audience.

GPI Control

- The GPI input of the Reverb TwentyFour may be used to select the preset so it does not take a highly-educated engineer to set up the suitable decay time for a specific show. A custom made push-button GPI box may be made for the specific installation to easily change the presets.

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