HAUPTWERK V: CONVOLUTION REVERB REFERENCE SHEET

Dr. Matthew J. Reese

Reverb:

- Reverb in a general sense is the conservation of sound energy, as perceived by a listener in a given environment.
- In the context of Hauptwerk, reverb refers to computer-generated convolution reverb applied to samples.
- Convolution reverb uses digital models to recreate the acoustical sound environment of a given physical space.
- These models create the perception of hearing the virtual instrument as it might sound in the virtual space from the perspective of player/listener.

Impulse Reverbs (IRs)

- Impulse Reverbs are virtual reverberation models, created using software that measures the time delay and sound levels of an impulse from a source to a set of microphones.
- Sound samples taken onsite are used to create a digital impression of that acoustic space.
- These IR virtual models can be imported by software, and applied to an input signal.
- The result provide the musician and/or listener with the impression of a sound produced within that space.

Reverb Terminology

- Reverberation Time (RT, T20, T30): Total length of sustained reverb
- Early Decay Time (EDT): Initial falloff of sound. Shorter = clarity
- Clarity (C50, C80): Ratio of early sound to sustained reverb

Microphone Placement

The placement and types of microphones during the sampling process can create a vastly different impression within a given space. A variety of techniques used result in a different reverb, stereo and surround effects:

Cardio/ORTF: Front/direct mics (close/dry)
IRTf: Stereo cross (audience perspective)
Rear/IRTr: Rear-facing mics (bounce)
Omni: Separated pairs of omnidirectional mics (stereo separation)
Omni-W: Widely-separated pairs of omnidirectional mics (enhanced stereo separation)

Hauptwerk V: IR Naming Convention

Sonus Paradisi, Church, St. Maximin, omni 25m LR (5.7s)

1. Producer of IR
2. Name/type/geographic location of church sampled
3. Microphone technique used
4. Distance of microphone to sound source (in meters)
5. Position of sound source
6. Approximate RT in seconds

Hauptwerk V: Choosing Appropriate Convolution Reverb IRs

- As a general rule, smaller organs are usually in smaller spaces, with shorter reverb time
- Larger organs require larger virtual spaces with correspondingly longer reverb times
- Style of the organ and the church also matters: Baroque vs. Gothic or Modern Architecture

Sonus Paradisi Hauptwerk IR Models

Model Type	*Church Modelled*	*ID*	*RT*
Small Church	Rabštejn nad Stelou (CZ)	Rab43	4 sec
PE: Pedal, HW: Hauptwerk, RP: Ruckpositiv			
Medium Baroque Church (High Dome)	St. Zedislava, Jablonné (CZ)	Jab57	5.7 sec
Echo: Surround (bounce) of dome			
Medium Gothic Church	St. Mary Magdalene Church, St. Maximin (FR)	StMax57	5.7 sec
LR: Positif, LRw: GO/Pedale			
Large Romanesque Church (High Clarity)	St. Etienne, Caen (FR)	CN55	6.0 sec
PO: Positif, PE: Pedale, GO: Grande Orgue, RE: Recit, GA: Organ Gallery, NA: Nave			
Large Gothic Church (High Clarity)	St. Barbara, Kutná Hora (CZ)	Bhk58	6.0 Sec
Huge open space, but with reverb dampened and high clarity			
Gothic Cathedral (w/Transept)	Sedlec Abbey, Kutná Hora (CZ)	Khs80	8.0 Sec
Long reverb time, Strong bass response			