The quality of animation was vital to the success of *Dance Central*.... After creating and testing our character rig in 3ds Max, we used Story mode in MotionBuilder to make everything very clear and understandable for the players.

—Riseon Kim
  Lead Animator
  Harmonix

Poetry in motion.

Harmonix uses Autodesk software to create the sweet moves of *Dance Central.*

Dance Central™. Image courtesy of Harmonix Music Systems, Inc.

Summary

It was 2005 when Harmonix Music Systems burst onto the video game scene with *Guitar Hero*, the now-legendary (and addictive) video game in which players simulate playing lead guitar on their favorite rock songs. The Cambridge, Massachusetts–based company upped the ante in 2007 when it released *Rock Band*, which allowed individuals or teams to play guitar, drums, or sing songs from bands including The Beatles, Green Day, and a host of others. Now, Harmonix is encouraging people to get up and dance with *Dance Central™*, an extraordinarily ambitious new title that coincided with the release of the Kinect™ for Xbox 360®, which enables players to control and interact with the Xbox 360 video game and entertainment system from Microsoft through natural gestures and spoken commands.

Dance Central lets the players choose one of the eight characters whose movements they mirror and, by learning various dance moves and routines, perform, work out, or compete against other players, all without a handheld controller. Using a combination of Autodesk® 3ds Max® and Autodesk® MotionBuilder® software, Harmonix has created a strikingly realistic new game.

The Challenge

While rapid advancements in motion capture technology have already enabled video game enthusiasts to closely mirror the action of animated characters, the creators of *Dance Central* clearly wanted to take things to a whole new level.

"We wanted *Dance Central* to be an absolutely full-motion dance experience," says Dare Matheson, lead artist on the game. "Our vision for the game was not just tracking individual positions of the player's body at different points in time, but clearly and precisely tracking full-body motions through time, while scoring them on the complete dance moves they are executing."

Working closely with a team of choreographers and dancers, Harmonix would eventually develop 90 dance routines and over 650 dance moves for *Dance Central*. Matheson continues: "We wanted people, even if they'd never danced before, to be able to learn and perform the routines while receiving feedback and correction. To do that, we built a system that would enable Kinect to not only track their motions, but also apply and compare their routines to our choreographed routines. Obviously, that is an extremely organic and open-ended task for a computer to handle well, but we were determined to see it come to life."

Autodesk®

The Solution

While the avatar characters in the *Rock Band* series are compelling in their own right, they are also typically customized by the players who will inhabit them. For *Dance Central*, however, the Harmonix team wanted to exhibit the kind of personalities that only dance can bring out.

"For *Dance Central*, the characters are not just tools; they are the interface," says Matheson. "We were super-psyched about creating a limited set of distinctive personalities from start to finish. We wanted our characters and animations to look mind-blowingly smooth and gorgeous. Autodesk 3ds Max and MotionBuilder were absolutely crucial to that achieving our vision."

"The quality of animation was vital to the success of *Dance Central*," agrees Riseon Kim, lead animator at Harmonix. "We used motion capture for every song and routine, as well as for unique introductions for each character. We spent a good amount of time building and testing our character rig in 3ds Max and coming up with some tricks to make things work. After creating and testing our character rig in 3ds Max, we used MotionBuilder to continue working on motion captured data. It was crucial for the animators to make everything look very clear and understandable for the players. The animation had to be exaggerated and every dance move had to be absolutely accurate. We found the Story mode in Motion Builder very useful when we needed to blend two different clips and merge animations on different characters easily. The simple import and export capabilities between 3ds Max and MotionBuilder were also helpful when we were working on our character rigs which involved a lot of going back and forth between the two software."

The Results

In addition to the larger character rig created in 3ds Max, the Harmonix team was able to create a multitude of custom rigs for various body parts.

"Achieving a full and believable range of motion in dancing characters can be a big challenge," says Matheson. "Using 3ds Max, we were able to develop techniques to help keep body parts from collapsing from extreme limb positions. We discovered, for example, that when a character's leg kicked high, the butt would completely flatten out. With 3ds Max, we were able to create a 'booty rig' to prevent that problem. We then used MotionBuilder to smooth and polish the animations until they were seamless."

To learn more about Autodesk 3ds Max software products, visit **www.autodesk.com/3dsmax**.

To learn more about Autodesk MotionBuilder real-time 3D character animation software, visit **www.autodesk.com/motionbuilder**.

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