

Come together

1960s recordings meet 21st Century technology as the legendary Abbey Road Studio remasters The Beatles' classics for possible reissue.
By **Chris Shaw.**

Cited as the most popular album of all time, *Sgt Pepper's Lonely Hearts Club Band* is possibly producer Sir George Martin's finest achievement. When recording sessions commenced at EMI's Abbey Road studio in the winter of 1966, Sir George was expected to fulfil the psychedelic sonic demands of an increasingly experimental group of musicians.

Studio 2 was the setting for this groundbreaking recording and, remarkably, the album was recorded on a four track recording console.

However, Kevin Ryan, co author of *Recording the Beatles* (2006), revealed that technical limitations were overcome by innovative recording techniques. "It was common at EMI to fill up all four tracks of one four track tape machine," he explained, "and then mix these four tracks down to one or two tracks on a second four track tape machine. This was called a reduction mix, as it 'reduced' the number of tracks the material occupied. They would then have two or three free tracks on this new tape, onto which they could continue to record additions to the song. They

even sometimes recorded new parts live during the reduction mix, bouncing the new live additions down with the previously recorded material. In this way, they could add new parts without taking up one of their precious new free tracks."

To synchronise two tape machines, a 50Hz tone would be recorded onto one track on one machine and used to control the speed of a second machine. The start position of the tape was marked with a wax pencil and the tape operator had to align the tapes by eye, while attempting to press 'play' and 'record' simultaneously for each take. While this technique meant that synchronisation was often lost if the tapes were used on another machine, it was a frequently used system.

"Abbey Road engineers were not averse to mixing four instrumental tracks on one four track tape down to a single track on another four track tape," continued Ryan. "Since the song was intended to be heard in mono, it didn't matter that four instrumental tracks had been mixed down into one mono track. They then had three free tracks on which





to add new material.”

EMI electronics design engineer Alan Dower Blumlein first patented his idea for stereo (or ‘binaural sound’) recording in 1931. Binaural experiments began in early 1933 and the first stereo test discs were cut later the same year. However, it wasn’t until 1958 that the first stereo vinyl records were issued. With stereo still regarded as an experimental medium in the mid 1960s, mono mixes were given priority.

Most of The Beatles’ early songs were recorded onto Record Engineering Development Division (REDD) 37 Stereosonic consoles. The REDD 37 used 40dB amplifiers and had eight microphone inputs, four auxiliary inputs, four buss outputs and a four track monitor section. The valve mic and line amplifiers were made by Siemens. At the beginning of the 1960s, the only equalisation (EQ) options available to sound engineers were two modules labelled ‘pop’ or ‘classical’, which were plugged into the console.

“REDD 37 was used for The Beatles’ first two albums,” added Ryan, “but from *A Hard Day’s Night* onward, most of their recordings were made on the REDD 51. It was virtually identical to REDD 37, but used an EMI designed amplifier, rather than the expensive German design found in the REDD 37. Because of the amp difference, the REDD 51 had a slightly more aggressive sound.”

TG series

In 1968, the EMI TG series of mixing consoles was introduced to Abbey Road. The transistorised or ‘solid state’ multichannel mixing console replaced the valve mixers which had been in use since the 1950s. The console was of a ‘split’ design, with separate faders for microphone gain and group output level, along with separate rotary monitor level controls for each track.

“The TG was used on The Beatles’ final album, *Abbey Road*,” commented Ryan. “It sounds more modern than previous albums. It’s more pristine, with a little more clarity. From a sound quality perspective, it sounds a bit more 1970s than 1960s. This is largely due to the fact that the TG console was transistorised. Previous Beatles albums had been recorded on valve based recording desks. Valve equipment has a warmer sound and it was impossible to get the same thick, punchy bass drum sound on the TG. It just reacted differently to the REDD desks. The TG did, however, have more extensive controls, with built in limiters and compressors and extensive EQ options.”

Beatles expert and author of *Tell Me Why: A Beatles Commentary* (1988), Tim Riley, explained

EMI’s reason for designing equipment in house.

“When Sir George’s assistant, Ken Townshend joined Abbey Road in 1950, the studios only had three or four pieces of equipment, so engineers had to make their own, such as BTR2 reel to reel machines.”

Mono and twin track BTR2 reel to reel recording machines were used in the creation of the first two Beatles albums. Mono and stereo BTR2 machines were used to mix down the four and eight track masters of later albums recorded on Telefunken, Studer and 3M multi track machines.

Riley revealed that recording Paul McCartney’s

Below:

A recent revamp of Studio 2, Abbey Road, saw the installation of a standard pair of Quedest Q210 monitors in a custom Turkish marble paint finish.



bass produced a number of challenges. “The problem of capturing a strong bass signal was more complicated than the engineers could figure out,” he commented. “There was a limit to how high the bass could be mixed before the stylus would skip and bounce off a vinyl disc. The predicament was how to get a good bass tone, rather than just mix the bass louder.

“However, Townshend had an idea. Before the widespread use of headphones, recordings were monitored on a 6ft white playback speaker nicknamed ‘the white elephant’. Ken turned it ‘inside out’ and used it as a microphone because of its strong bass response. It was similar to turning round a telescope to make it into a microscope.”

The digital age

The Beatles made their first appearance on cd back in 1987, when the master tapes were transferred from analogue to digital without altering the original mixes. The first four Beatles’ albums were rereleased in mono as the early stereo mixes were not



Above:

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UNDER NEW OWNERSHIP



The original Abbey Road REDD 37 is now owned by Lenny Kravitz. However, when he purchased the equipment, it was beset with ground noise and rf problems.

Technical services specialist Studio Electronics was called in to resolve the problem. Company founder David Kulka explained the dilemma: "There was a stubborn rf problem, as audio from a nearby fm transmitter was leaking into the output buses. We switched on the console and, after bringing

a few faders up and figuring out how to route audio through the monitor section, brought up the volume pot. There it was – a filtered high frequency sound – the top end of a tune the station was playing. RF energy was finding its way into the REDD 37 and being converted to audio by something in the console's electronics."

The historical importance of the REDD 37 imposed a condition. "With any other console, a minor circuitry change would not raise eyebrows," noted Kulka, "but, in this case, it was out of the question. If a component had failed, I would replace it, preferably with exactly the same part, which we would somehow locate. But modify a Beatles console? No way!"

In this instance, the problem was the microphone and echo send cables. "I built a short version of the mic cable, with the two signal wires at the male end wrapped around ferrite beads," Kulka revealed. "The female end of the adaptor plugged into the real mic and the male side plugged into the REDD 37. The filter chokes did the trick and the rf interference was gone."

considered to be good enough.

Following news that The Beatles' catalogue has undergone extensive remastering at Abbey Road, it is rumoured that the entire canon of music will be rereleased in 2009 and, for the first time, will be available on iTunes in both the original mono mixes along with the remastered stereo versions.

The mastering techniques for these recordings have been more intense than the early 1990s cd mixes, with engineers going back another generation in the recording process.

Instead of using the final mix, engineers have sourced 'pre bounced' tracks, freeing individual instruments and vocals that would previously have been combined on one mono track. This has allowed for greater sonic reproduction and, according to those lucky enough to hear some samples, stunning audio quality.



Above: "Abbey Road engineers were not averse to mixing four instrumental tracks on one four track tape down to a single track on another four track tape." Kevin Ryan, co author of *Recording the Beatles*.

Current technology

Today, the archaic technology of Studio 2 has been replaced by state of the art equipment. The control room features a 60 channel Neve VRP Legend console with Flying Fader automation and Quessted monitoring.

The Neve console uses analogue circuitry and every function on every channel has its own dedicated control. Neve super conductive 'oxygen free' copper cable is used for all screen wiring as, unlike conventional copper wiring, it improves signal

transmissions.

The mic amp design ensures low noise/distortion at all signal levels. Mic gain is variable between -10 and 70dB, using the switchable -30dB pad, and phantom power can be selected on or off on individual channels. The line input has a ±10dB trim control with centre detent.

The Flying Faders console automation system's motorised faders offer audio quality identical to that of manually operated faders. With 4096 steps, levels can be recorded to an accuracy of one tenth of a decibel. Moves are replicated by high torque servo motors driving conductive plastic faders.

At any time, engineers can call up a logical diagram of each mix on the monitor so that any previous pass can be quickly recalled. Mix editing and merging can be carried out with reference to the high definition monitor display.

At the end of the 1980s, Roger Quessted installed a retrofit Quessted Q312 monitor system into Studio 2's existing UREI 813 monitors. A later revamp of studio 2 in January 1996 saw the installation of a custom pair of Quessted Q210s, followed by a further installation of a standard pair of Q210s in a custom Turkish marble paint finish.

The combination of Abbey Road engineers' knowledge and expertise with modern technological advances in electronics, means an historic set of recordings may soon be unleashed on a 21st Century audience. ■