CODEMASTERS' CHRIS JOJO

takes extra Zoom to the GRID

ZOOM F8n

Codemasters is synonymous with realistic, edge-of-the-seat racing video games - and at the end of 2019, one of its best loved franchises, GRID, made its comeback. At the end of GRID's two-year development cycle, we caught up with Chris Jojo, Codemasters' Senior Sound Designer and principal sound recording engineer, as he captured the audio assets of the Ferrari 365GTB/4 Competizione – with Zoom audio recorders.

GRID features new and exclusive car content with every iteration. This release adds some truly iconic Ferrari and Porsche GT Le Mans cars. With some pride, Chris states, "Over 90% of our car recordings are matched to the original works cars we've licensed, with the same heritage or calibre," adding, "We're just plugging gaps now with cars that have become available for recording at the tail end of GRID's development schedule."

With 69 cars for GRID's day one release and a significant number of cars scheduled for DLC release, Chris must source and record cars to meet the production milestones across a tight development schedule; no easy feat with such rare and historic motor cars as the legendary Ferrari 330 P4 or BMW M1 Procar.

"Authenticity of driving experience for the player is the ultimate goal of the games and the quality of the engine audio is a big contribution to their popularity," explains Chris.

For the onboard sound recording, Chris adopts a multi-microphone approach to capture every significant aspect of a given car's engine, induction, exhaust and transmission systems for a complete set of recorded assets for the in-game engine audio. He explains, "It's important to capture focussed recordings of induction systems, such as supercharger whine, carb intake, turbo dump valves and waste-gate chatter that's intrinsic to the sound of a specific car." The selection includes gear clunks, transmission whine and differential clatter: every distinction of the vehicle that represents it as authentically as possible in-game.

Every recording session is critical and Chris needs to trust his equipment, particularly when it needs to withstand the rigours of day-long track date recording. "With competition cars," Chris says, "I'm often allowed access to record at Shakedown testing by the good grace of a team. In these types of scenario, the selection and installation of equipment is determined in strict consultation with the team principal and lead engineer."

With weight and bulk often being an issue, these types of installation are streamlined. Chris continues, "On the Shakedown date it's a case of hitting record and just standing back. The kit can stay on the car for up to three days. I can't step in to tweak settings, I can't get in the way of the engineers. I just have to trust it all. Obviously, everything has to be robust… and fireproof, right down to the cable ties."

Chris Jojo relies on the Zoom F8, and more recently the F8n multitrack field recorders, to capture the eight channels of all-important, fully synchronised engine audio, along with in-cabin Ambisonic recordings from a timecode synced Zoom F4.

"I've been using the Zoom F8 since it launched back in 2015. Zoom products stand up to my needs: they're robust, lightweight and easy to use – and the F8n is even better now with improved gain on the headphone amplifier," enthuses Chris.

Chris is also impressed by the -10dB attenuation on the F8n, though as he states several times, "I don't use limiters!" The reasoning is that he wants the recording as pure as possible. "I need to preserve

dynamics, so I just dial that in and monitor on the fly when I'm conducting a session in-cab".

Chris adds: "I have used the F8n's limiters on Shakedown dates and in instances with single seat competition cars where I can't physically be onboard. I'm so comfortable with the F8n now, I'm pretty adept at judging input settings and I'll apply limiting as a safeguard to reign in any sharp transients from exhaust detonations and surges up to red line or on the limiter."

Chris feels similarly about the Zoom H6, which he uses with Zoom's SSH-6 stereo shotgun microphone to record pass-bys when he's travelling abroad. In the UK, the Zoom F8 fulfils that role. He makes full

"In the cabin, a Sennheiser AMBEO on an ARRI arm feeds into a Zoom F4 capturing 360-degree audio."

use of the H6's inbuilt 20dB selector switch to capture the external environment of the cars. As he says, "20dB is fine for externals so I never use the additional bandelier of 60dB pads I usually rely on, with the H6."
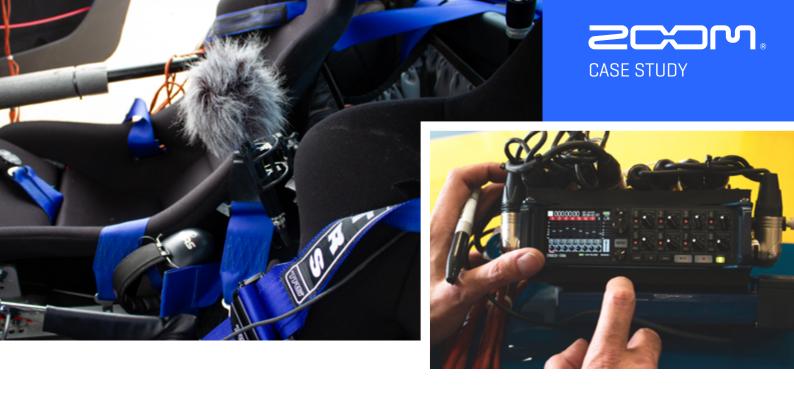
Capturing engine audio for Codemasters' games for over 10 years now, Chris is very clear about his requirements. "What I need are high quality pre-amps, low noise floor, clarity and gain in headphone monitoring, responsive lookahead limiters, dialable

high pass filtering, lightweight portability and intuitive operation. With Zoom, I've never had to bury my head in a manual. They're very intuitive and easy to use."

Chris has taken the Zoom F8 and F8n head-to-head with other pro recorders. "The difference in quality to me is negligible. Zoom Labs Japan have really outdone themselves with the F8n Pre-amp design". Purity of recording from the inputs is what Chris is looking for. "The mics are really important, but the recording itself, and the clarity of that without too much coloration, is critical. It's the two sides of the equation."

With the Ferrari 365 GTB4, just as with every other car he records, Chris runs step-by-step through the same recording run-plan to capture the required performance takes with which to build the in-game engine audio. With its normally aspirated 4.4-litre V12 engine, mic'ing is minimal. He uses DPA MMC4007 omnidirectional large capsule mics secured either side of the cylinder bank and a Shure Twin Plex lavalier focussed on the carb induction ports. On each of the car's side porting exhaust pipes, Chris uses a pair of DPA 4007s and Shure SM57 Dynamic cardioids. These inputs form the mainstay of the engine/exhaust capture. "The DPA MMC4007 is a phenomenal mic, pretty much a permanent fixture on both engine and exhaust re-cordings. It has exceptional clarity, excellent off axis response, and most importantly it can handle up to 165dB SPL". Chris protects all of his mics and cabling with bespoke windproofed enclosures and fire-retardant shrouds. "It's important to be mindful of airflow and heat sources when choosing where to position and secure the engine and exhaust mics".

Chris emphasises the importance of capturing the transmission harmonics of a car, particularly on rally and competition track cars that have straight cut gears or sequential transmission. "I've used the Sennheiser AMBEO across the entire slate of DiRT rally 2.0 and GRID recordings. It's a superb mic and pulls everything from the cabin space, from transmission to differential clatter of internal kick-up on a rally

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stage." Chris uses Magix Spectral Layers to extract and render the transmission whine harmonics, which are then edited and integrated into the in-game engine audio system.

The three to four inputs from the engine, and the same again from inputs secured to capture the exhaust, go into the master recorder: the Zoom F8n with its new firmware. Imperative for the car's audio profile within the game, the two sets of audio are synched with the greatest integrity by Zoom's TCXO (Temperature Compensated Crystal Oscillator) Time Code generating 0.2 ppm accuracy.

Currently, game audio memory footprint doesn't have the capacity to run synchronised ambisonic cabin audio - but when it does, Codemasters is ready. Whilst recording the Chevrolet Corvette C7-R GTE recently at Zandvoort Circuit, Chris set up a Zoom H3-VR compact recorder on the pit lane wall and "came back to some amazing sounds". He explains: "Zoom had kindly given me a unit to try out and it's a fantastic little Soundfield recorder. All those reflections bouncing off the pit straight wall and sur-rounding paddock when the 'Vette was raging past had so much depth, clarity and vivid detail."

With so many iconic racing car performance sounds now recorded, tracking down the rarest historics often leads to a dead end, as Chris explains. "Some cars just aren't attainable. They're either in private or heritage museum collections and often priceless." Given that scenario, Chris will try to source a prior or following iteration of that particular model to stay as close to the specification as possible. Honoured to have been a part of what is actually a very extensive archiving project, Chris reveals, "I've been fortunate to record a number of classic Formula One cars, which were some of the loudest cars I've ever had to record." As racing moves towards electric, Chris pre-dicts an increase in demand for classic motorsports content and engine sounds.

Meanwhile, Chris continues to plug the gaps, often flying out to where the cars are - in some instances without the luxury of a smooth racetrack. "There have been instances when I've had to resort to re-cording cars 'guerrilla' style on isolated B roads and dirt tracks. It's tricky when the length of straight falls short of requirements. Ideally, I need around 900m of straight unbroken tarmac, any major undulations, particulate, bumps and cracks in the surface can result in a loss of traction which will be heard in the recorded audio."

As well the performance capture of each car's transmission upshift and downshift modulations, he captures two other building blocks of audio: "An on-load sweep from the lowest achievable revs in each gear going right up to the limiter, just letting the gear do the work, and the same again with the offload component when the car is decelerating from limiter to base rpm."

With those same captures achieved and secured in his laptop, offloaded via USB-3, Chris re-packs his essential basic kit: "Toothbrush, Kindle, mics, cabling and Zoom" and flies off to the next car.

F4

F8n

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