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# Concept-Systems Technologies scores top marks at Dunman High School

**SINGAPORE:** Built in 2010, the Performing Arts Centre (PAC) at Dunman High School is an 848-seat venue for hosting a range of academic and private hire events. The school's 300-member Singapore Chinese Orchestra practices and performs here whilst other booked events including

choral, drama and dance activities keep PAC supervisor Jimmy Yeo busy. Having organised and overseen acoustic treatment surrounding the 9m deep by 15m wide stage that can accommodate up to 90 performers, Jimmy Yeo turned his attention to the audio system.



The under balcony seats are now covered by six NF8 loudspeakers



Three ND2 amplifiers power the L-R i1212W and six NF8 under balcony speakers

'The audience, particularly in the under balcony seats, had always been commenting on the inconsistent sound levels,' Jimmy Yeo revealed. A three cabinet L-R line array solution installed following the construction of the PAC could no longer be serviced and was in need of replacing.

Concept-Systems Technologies project engineer Luke Yeo and his team oversaw the installation of a



One of the L-R i1212W speakers affixed to reinforced concrete beyond the fire rated wall

Norton Audio point source system consisting of L-R i1212W dual 12-inch speakers. Wall mounted at a height of 5m, the two speakers provide even coverage to all the downstairs seating not covered by the balcony, in addition to the 274 gallery seats above.

'The perfect hanging point was obscured by a fire-rated wall and so extended arms had to be fixed into the reinforced concrete through open panels,' explained Luke Yeo. 'Cabling was then run in conduits in adjacent hallway ceiling voids to the rear control room and the Yamaha

MGP32X analogue console.'

The under balcony seats have been provided with even coverage courtesy of six ceiling-suspended NF8 mono speakers. 'Being a retro fit, installing these speakers was tricky as we could not create access panels,' furthered Luke Yeo. 'We had to sensitively connect speaker points to the ceiling in restricted locations and delicately route the speaker cabling from the lateral walls.'

The speaker system is powered by three Norton Audio ND2 amplifiers and includes internal DSP settings. 'The i1212W models are very impressive as they provide 90-degrees coverage courtesy of the dual 12-inch coaxial speakers,' explained Jimmy Yeo. 'They have been fixed at an angle so as not to exert their energy on the walls and in doing so cover the centre seats as well. They perform down to 40Hz, which is more than low enough for the performances here and so subwoofers weren't required.'

A further two NF8 speakers have been added to the inventory for use as stage monitors.

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# PUMPING IRON AND PLAYING ROCK AT CELEBRITY FITNESS

**SINGAPORE:** Getting in shape has always required discipline and dedication but today's Celebrity Fitness gym in Singapore has added controlled SPLs to the regime. The franchise has grown in recent months and the latest addition to the family is an outlet in Bukit Panjang's Junction 10 mall. Upon entering the reception and meeting area of the high-octane environment, located on level two, the decibels don't immediately make an impact. Entering deeper, however, into the facility, a mixture of sweat and higher SPLs combines to provide those working out with an adrenalin rush.

Concept Systems Technologies installed an EV loudspeaker system into the 3m height facility, ranging from Evid C4.2 ceiling suspended pendant speakers in the locker rooms, powered by an EV PA1250T amplifier, to wall mounted ZX1i models in general workout rooms. Powered by Q99 amplifiers over a 100V line system, the 200W RMS-rated speakers are connected to various iOS devices and more traditional sources. Four zones have had DSP settings stored in a single Sabine Navigator 840S processor, which can be over-ridden when required.

Two glazed isolated studios host spinning and aerobics sessions and these have been deemed to require the highest SPLs of all. The strenuous workouts in these self-contained rooms benefit from standalone PA systems. The aerobics room flexes its muscles courtesy of four wall-mounted TX1152 15-inch



**An EV ZX1i speaker amongst the weight machines**



**Four EV TX1152 speakers are powered by dual Q1212 amplifiers**



**The aerobics studio is outfitted with four EV TX1152 speakers**

two-way speakers powered by two Q1212 amplifiers. Shure SLX4 wireless systems have been added to the source inputs for the benefit of the instructors via a Yamaha

MG10 mixer, whilst DSP presets have been stored in a Sabine NAV240 processor. 'We tested many microphones and in addition to being reliable found Shure to be the best

fit for the instructors as they didn't fall off during a workout,' explained Concept Systems Technologies project manager Yohannes Wiguna.

The cycling studio was deemed to require slightly lower SPLs and as such contains dual TX1122 speakers powered by a single Q1212 amplifier, whilst a head-worn Shure SM35 microphone provides stability during a workout and clarity for the on-stage instructor. Just as importantly, they create no feedback when the instructor gets close to the speakers. An equipment rack has been placed adjacent to the instructor's bike where one touch power on and off control is provided.

'We needed to add the Sabine NAV240 processors owing to the harsh acoustics,' explained Mr Wiguna. 'The glazed walls and the wooden surfaces promote splash-back and reverb, so this has to be minimised. It's a simple system to use and configure for the benefit of the gym instructors. We've added limiters just in case the speaker levels are pushed too much and for added security, we've added a four digit password should it need to be over-ridden.' With a school as a neighbour, Celebrity Fitness has minimised spillage by dampening the ceiling and lowering the dB levels of the speakers in the reception area, which is outfitted with a Shure microphone for announcements.

[www.celebrityfitness.com.sg](http://www.celebrityfitness.com.sg)  
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