TECHNICAL NOTE

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SD SERIES CONSOLES

WORD CLOCKING / AUDIO SYNC OPERATION OF OPTOCORE ® SYSTEMS

Optocore includes an innovative distributed sync system. If operated correctly, this is very simple to use, extremely stable and reliable and has fully redundant operation as used in Digico mixer systems.

Internal audio sync

The correct way to operate an optically connected system, where there is no external sync requirement due to video etc. is to set all engines in use to "Optocore". This is the same as D-series systems. Do NOT use "master" or internal. This is the case whether using multiple single mixers for a FOH/Monitor or SD7 system with 4 engines and even larger systems.

Set the engine sync to Optocore. This is intentionally a very simple setup. Externally clocked systems are noted below. Anything else may (or not) produce random clock errors and should not be attempted as this has no value. The only reason to use "master" is in madi only connected mixers. All optically equipped mixers should be set to Optocore as sync source.

The Optocore distributed sync system works on the lowest ID engine being in charge of sync. Usually this will be engine ID 1 (SD7 FOH engine A for example). By selecting Optocore as sync, the master crystal for the whole system is that on the Optocore PCB in engine ID 1.

Should this engine ID1 fail (i.e. is no longer detected on the optical network) the Optocore software will allow engine ID 2 to take over, automatically. If ID 2 fails or is not present, as when using 2 x single engine consoles, then ID 3 will take over etc. This is irrespective of audio mastership. The Optocore system always clocks to the lowest available ID number, usually ID 1

External audio sync to the mixer

If a particular application requires an external clock, such as required by video systems, then by selecting the external clock (from whatever source) on a particular engine, the Optocore card on that engine will slave to that clock, not run from its own crystal. However this does not override the Optocore redundancy system.

If you require to externally clock, to a house video clock for example, then you can apply this to engine ID 1 (or the lowest present on the system) and the Optocore clock will distribute this to other engines present. However there is no redundant operation here (should ID 1 fail, then ID 2 clock would take over, no longer the house clock). Therefore it is normal to apply the clock to both engines (ID1 and ID 2) in an SD7 or other twin redundant mirrored system (but not FOH-MON systems) for redundant operation.

External audio sync to the rack

It should be noted there is a specific feature included in the Optocore system making connection to an external word clock easier.

If you apply a clock to any one rack, using the default clock menu settings, then this will become the clock master for the whole system, so long as Optocore is selected as the clock source for all engines. This is the same system in the D-series Optocore. (Note this does NOT work if using DigiRacks with SD-series mixers).

This is really convenient and simple, especially in locations where, for example, an OB truck is nearer to the stage racks, than to the FOH mixer. Note this feature can be manually overridden in the rack menu.

General Notes

As all clocks in the Digico system (both engines and racks) are recovered by NCO's this is still able to provide accurate and very stable, low jitter clocks (typically <2 pS) therefore the use of external clocks will have no effect on accuracy or jitter.

It may be observed some mixers (but not all) may show a 1 Hz difference between the Optocore and master clock frequency. This is not a fault but an illustration that the FPGA crystal (used to reference the frequency counter) is different to the Optocore crystal. (There is no way to tell which is nearer in absolute terms).