

DEUTERIUM ARRAY MEMO #050

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Subject: Mechanism for low level apparent "DC" in digital down converter

Long integrations of the D1 array data show an internal signal at the frequency which corresponds to DC in the output of the GrayChip digital down converter (DDC).. The symptoms of the signal that it remains in the center of the band at apparent DC independent of the setting of the digital local oscillator in the GC4016 DDC. It appears at a constant level of about 100 ppm for normal signal levels in the receiver and can be observed at relatively stronger fractional levels by disconnecting the input to the A/D converters from the analog module.

A thorough investigation of the mechanism shows that it results from the interaction of the digital local oscillator in the GC4016 DDC with the A/D converter. The cyclic repetition of the digital L.O. is present at a low level in the lines which connect to the A/D converter and have a slight influence in the low level decisions made by the A/D converter. It may be possible, in future designs, to reduce the magnitude of the signal by adding buffers between the A/D converter and the DDC.

Since there is no simple way of fixing this problem in the D1 array receivers it may be necessary to exclude the central frequency (frequency channel 512) from long integrations.