NEOS TECHNOLOGIES
A Gooch & Housego Company

MODEL NUMBER:

64020-200-10ADSDFS-A-2

SPECIFICATIONS

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Dual Digital Frequency Synthesizers in a rack mountable box with independent analog and digital modulation inputs with each synthesizer having a 10 watt RF output.

PARAMETER	SPECIFICATION
Number of Frequency Synthesizer per box:	2 - Each synthesizer having an independent clock
Bandwidth:	20 – 200 MHz typical
Clock Frequency:	1000 MHz
Step Size:	< 1 Hz with 30 Bits input
Frequency Settling Time:	250 ns maximum
Power Out: (2x)	10 watts typical
Harmonic Distortion: 2nd:	-20 dBc maximum
3rd:	-15 dBc maximum
Analog Modulation: (2x)	0 to +1 volt Analog, +1volt = Full RF power output.
Digital Modulation: (2x)	TTL levels TTL High = Full RF output power TTL Low = Minimum RF output power No Signal = Full RF output power (pulled high internally)
Rise and Fall Time:	20 ns
Extinction Ratio:	
Digital:	30 dB minimum
Analog:	40 dB minimum
Applied Power:	100 TO 240 VAC 50 to 60 Hz @ 3 Amps Maximum
Outline Drawing	53D4315
MAXIMUM RATINGS:	
Ambient Temperature:	40^0 C
RF Output:	No DC Feedback
INPUT / OUTPUT CONNECTIONS:	
"Frequency Select" Control: (2X)	TTL 30 bit binary word, Digital Modulation Input, Reset, and a Latch control input through the 37 pin D sub connector. See page 2 for pinout.
Digital Modulation Input: (2X)	Pin 35 of the 37 pin sub D female connector
Analog Modulation Input: (2X)	BNC Female
Reference Output: (2X)	SMB Male
RF Output: (2X)	SMA Female connector
Power Input:	EAC309 Receptacle

CONTROLS:

"ON / OFF" Switch	Applies AC Power to the unit.
"CW / NORMAL" Switch	CW = RF on at set power level NORMAL = RF controlled from "MOD IN" port 0 to 1 volt Analog, 1 volt = Full RF output.
"MANUAL / AUTO" Switch	MANUAL = frequency set from HEX switches AUTO = frequency set from "FREQUENCY SELECT" 37 pin D sub connector.
Manual Mode "FREQUENCY SELECT" (2X)	8 "Hex" selector switches: LSB to MSB - Right To Left.

PIN OUT: 37-PIN MALE D-SUB CONNECTOR:

PIN		PIN	
1	FS_0 LSB	20	FS_1
2	FS_2	21	FS_3
3	FS_4	22	FS_5
4	FS_6	23	FS_7
5	FS_8	24	FS_9
6	FS_{10}	25	FS_{11}
7	FS_{12}	26	FS_{13}
8	FS_{14}	27	FS_{15}
9	FS_{16}	28	FS_{17}
10	FS_{18}	29	FS_{19}
11	FS_{20}	30	FS_{21}
12	FS_{22}	31	FS_{23}
13	FS_{24}	32	FS_{25}
14	FS_{26}	33	FS_{27}
15	FS_{28}	34	FS_{29} MSB
16	Latch (Active High)	35	Digital Modulation Input (Active High)
17	Master Reset (Active High)	36	N/C
18	N/C	37	N/C
19	Ground		

$$\text{Control Word } K_{10} = \frac{F_{OUT\,(Hz)}(2^{31})}{F_{OSC\,(Hz)}} \text{ in Decimal notation}$$

CONTROL WORD CALCULATIONS

The output frequency and step size is a function of the clock rate and the "FREQUENCY SELECT" data. The output frequency can be calculated from the formula:

$$f_{out} = \frac{(f_c)\,(k_{10})}{2^n}$$

Where: f_c = clock frequency in Hz
k_{10} = input word in decimal notation
n = 31 *See note below.

The minimum output frequency and step size are given by:

$$f_{min} = \frac{f_c}{2^n}$$

An example of setting the frequency:
Clock frequency = 1000×10^6 Hz
Desired output frequency = 30.00×10^6 Hz

$$K_{10} = \frac{f_{OUT\,(Hz)}(2^{31})}{f_{OSC\,(Hz)}}$$

$$K_{10} = \frac{30 \times 10^6\,(2^{31})}{(1000 \times 10^6)}$$

K_{10} = 64424509.44 Decimal

Convert K_{10} to HEX \/- MSB \/ - LSB

K_{HEX} = 3D70A3D → 03D70A3D -Setting for front panel "HEX" switches
NOTE: The switches on the front panel of the driver are LSB to MSB - right to left.

Convert K_{HEX} to Binary \/ LSB - pin1

K_B = 0000111101011100001010001111 01 -Setting for binary word input to back panel "FREQUENCY SELECT" 37 pin D-sub connector
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These 4 bits are added to complete the 30 bit word

*Note: This system only uses 30 bits to set the frequency output from the driver. The accumulator inside the chip is 31 bit, so use 2^{31} in your calculations for precision.

The LATCH function is TTL active HIGH and is located on pin 16. The LATCH will hold the frequency at the last word sent to the driver prior to setting the latch high.

Master RESET is a TTL active HIGH and resets the accumulator to zero, ie, no frequency output, when a TTL HIGH is applied to pin 17. This is pulled LOW via. a 1 KΩ resistor.