

Coherent Sampling Calculator (CSC)

Mathematically, coherent sampling is expressed as:

$$\frac{f_{IN}}{f_{SAMPLE}} = \frac{N_{WINDOW}}{N_{RECORD}}$$

where: N_{WINDOW} is the integer number of cycles within the sampling window (This value must be an odd or prime number)

The CSC includes a macro that allows the user to view the detailed intermediate steps of the calculation process. By default, the spreadsheet is set to hide these detailed calculations, however by clicking the "Show_Detailed_Calculations" button the user can get additional information such as the size of the coherent sampling window ($t_{CWINDOW}$) and the number of input cycles in the coherent sampling window ($N_{CWINDOW}$).

An **Excel spreadsheet** titled "[Coherent Sampling Calculator](#)" is available for download to simplify the process.

LEGEND					
Symbol	Description				
$f_{DSAMPLE}$	Desired sampling frequency				
f_{DIN}	Desired input frequency				
N_{RECORD}	Number of data points used in your FFT record				
SIGFIG	Signal generator resolution in decimal places after MHz				
$f_{CSAMPLE}$	Calculated, coherent sampling frequency				
f_{CIN}	Calculated, coherent input frequency				

	ENTER $f_{DSAMPLE}$ (MHz):	ENTER f_{DIN} (MHz):	ENTER N_{RECORD} :	ENTER SIGFIG:	CALCULATED $f_{CSAMPLE}$ (MHz):	CALCULATED f_{CIN} (MHz):
CASE 1	65	32.1	8192	4	64.7168	32.1135
CASE 2	65	32.1	8192	5	64.96256	32.10857
CASE 3	65	32.1	8192	6	65.003520	32.112945
CASE 4	65	32.1	8192	7	65.0002432	32.1113262
CASE 5	65	32.1	8192	8	64.99999744	32.11120479
CASE 6	65	32.1	1024	8	64.99999744	32.18261592
CASE 7	65	32.1	2048	8	64.99999744	32.15087764
CASE 8	65	32.1	4096	8	64.99999744	32.10327022
CASE 9	65	32.1	8192	8	64.99999744	32.11120479
CASE 10	65	32.1	16384	8	65.00007936	32.10727797
CASE 11	65	32.1	32768	8	64.99991552	32.10124612
CASE 12	65	32.1	65536	8	64.99991552	32.10025430
CASE 13	65	5	8192	6	65.003520	5.006985
CASE 14	65	10	8192	6	65.003520	10.006035
CASE 15	65	15	8192	6	65.003520	15.005085
CASE 16	65	20	4096	6	64.999424	20.010809
CASE 17	65	25	8192	6	65.003520	25.003185
CASE 18	65	30	8192	6	65.003520	30.002235
CASE 19	65	35	8192	6	65.003520	35.001285