App Note: 2022-07-05

Running the example Isomet iMS Studio Projects

Run the Isomet iMS Studio, e.g. from the desktop icon

1. Load Example Project

Go to **Tool bar > File > Open** Select example project file *.ipp and open.

> iMS-Studio-data > D1312-T80L		~ U	
			1
^ Name	Date modified	Туре	Size
D1312-1um-30MHzSweep.iip	01/12/2021 17:47	IIP File	4 KB

In this case we select the file; **D1312-1um-30MHzSweep.iip** This file contains one IMAGE that generates a linear frequency ramp followed by an OFF period.

- **65-95M-** sweeps all outputs simultaneously.

The image comprises of 121 image points with the same data on channel pairs. Points 0-99 are programmed with the 65-95MHz sweep at 100% amplitude. Points 100-120 are at an arbitrary frequency and 0% amplitude.

The **Sync Data (Dig)** field, is programmed with 0x0001 expect for 5 points around the mid-scan frequency (80MHz). These are set to 0x0000. Use the L<-> R slider bar to display. The Sync Data outputs are inverted at the output J7. This data will give a logic high signal to indicate the mid-scan position

npensation Functions me Entries	Ch112-T80L-6 WL=1.064um Ch1 Frequency (MHz) 0 65.0001 1 65.3030 2 65.6061 3 65.9091 4 66.2121 5 666.8182 7 67.1212 8 67.4242 9 67.7273 10 68.0303 11 68.3333 12 68.6364 3 65.9394	New Tone Buffer	55-95M × Ch1 Phase (deg) 0.0000	Ch2 Frequency (MHz) Ch2 Frequency (MHz) 100.000 100.4000 101.000 101.000 101.000 102.4000 102.4000 102.4000 102.8000 103.6000 104.400 104.40 104.40 104.400 104.400 104.400 104.40	Ch2 Amplitude (%) 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000	Ch2 Phase (deg) 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	Ch3 Frequency (MHz) 100.0000 100.8000 101.2000 101.2000 102.8000 102.8000 103.3000 103.3000 104.6000	100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000	Signal Path Power Settings 3 F 25. 50. 50. 50. Ch1 Ch2 Ch3 DOS Int Int Int Amplifier Enable Amplifier Enable
npensation Functions	0 65.0000 1 655.030 2 655.061 3 65.9091 4 662.121 5 665.152 6 66.8182 7 67.1212 8 67.4242 9 67.7273 10 68.0303 11 68.3333 12 68.6364	100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000	Ch1 Phase (deg) 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	Ch2 Frequency (MH2) 100,0000 100,4000 101,2000 101,2000 102,4000 102,4000 102,2000 102,2000 102,2000 103,6000 103,6000 104,0000	100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	100.0000 100.4000 101.2000 101.6000 102.4000 102.4000 103.2000 103.2000	100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000	Signal Path Power Settings 25. 50. 50. 50. Ch1 Ch2 Ch3 DDS Int Int Int Amplifier Enable
npensation Functions	0 65.0000 1 655.030 2 655.061 3 65.9091 4 662.121 5 665.152 6 66.8182 7 67.1212 8 67.4242 9 67.7273 10 68.0303 11 68.3333 12 68.6364	100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	100.0000 100.4000 101.2000 101.2000 102.0000 102.4000 102.4000 103.2000 103.2000 103.6000 104.0000	100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	100.0000 100.4000 101.2000 101.6000 102.4000 102.4000 103.2000 103.2000	100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000	Power Settings 25 50 50 50 Ch1 Ch2 Ch3 Ch3<
npensation Functions	1 65.0030 2 65.0051 3 65.9091 4 666.2121 5 66.5152 6 66.8182 7 67.1212 8 67.4242 9 67.7273 10 68.0303 11 68.3333 12 68.6364	100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	100.0000 100.4000 101.2000 101.2000 102.0000 102.4000 102.4000 103.2000 103.2000 103.6000 104.0000	100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	100.0000 100.4000 101.2000 101.6000 102.4000 102.4000 103.2000 103.2000	100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000	Power Settings 25 50 50 50 Ch1 Ch2 Ch3 Ch3<
npensation Functions	2 65.0061 3 65.0061 4 66.2121 5 66.5152 6 66.8182 7 67.1212 9 67.7273 10 68.0303 11 68.3333 12 68.6364	100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	100.0000 100.4000 101.2000 101.2000 102.0000 102.4000 102.4000 103.2000 103.2000 103.6000 104.0000	100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	100.0000 100.4000 101.2000 101.6000 102.4000 102.4000 103.2000 103.2000	100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000	Power Settings 25 50 50 50 Ch1 Ch2 Ch3 Ch3<
npensation Functions	3 65.9091 4 66.2121 5 66.5152 6 66.8182 7 67.1212 8 67.4242 9 67.7273 10 68.0303 11 68.8333 12 68.6364	100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	100.0000 100.4000 101.2000 101.2000 102.0000 102.4000 102.4000 103.2000 103.2000 103.6000 104.0000	100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	100.0000 100.4000 101.2000 101.6000 102.4000 102.4000 103.2000 103.2000	100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000	25. 50. 50. 50. Ch1 Ch2 Ch3 DDS Int Int Int Int Amplifier Enable
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npensation Functions	66.8182 7 67.1212 8 67.4242 9 67.7273 10 68.0303 11 68.3333 12 68.6364	100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	101.2000 101.6000 102.0000 102.4000 103.2000 103.2000 103.6000 104.0000	100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	101.2000 101.6000 102.0000 102.4000 102.8000 103.2000 103.6000	100.0000 100.0000 100.0000 100.0000 100.0000 100.0000 100.0000	Ch1 Ch2 Ch3 DDS Int Int Int Amplifier Enable
npensation Functions	67.1212 8 67.4242 9 67.7273 10 68.0303 11 68.3333 12 68.6364	100.0000 100.0000 100.0000 100.0000 100.0000 100.0000	0.0000 0.0000 0.0000 0.0000 0.0000	101.6000 102.0000 102.4000 102.8000 103.2000 103.6000 104.0000	100.0000 100.0000 100.0000 100.0000 100.0000 100.0000	0.0000 0.0000 0.0000 0.0000 0.0000	101.6000 102.0000 102.4000 102.8000 103.2000 103.6000	100.0000 100.0000 100.0000 100.0000 100.0000 100.0000	DDS Amplifier Enable
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mpensation Functions	9 67.7273 10 68.0303 11 68.3333 12 68.6364	100.0000 100.0000 100.0000 100.0000	0.0000 0.0000 0.0000 0.0000	102.8000 103.2000 103.6000 104.0000	100.0000 100.0000 100.0000 100.0000	0.0000 0.0000 0.0000	102.8000 103.2000 103.6000	100.0000 100.0000 100.0000 100.0000	DDS Amplifier Enable
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mpensation Functions	10 68.0303 11 68.3333 12 68.6364	100.0000 100.0000	0.0000	103.6000 104.0000	100.0000	0.0000	103.6000	100.0000 100.0000	Amplifier Enable
mpensation Functions	11 68.3333 12 68.6364	100.0000 100.0000	0.0000	104.0000	100.0000			100.0000	
me Entries	12 68.6364	100.0000	0.0000			0.0000	104.0000		RF Channels 1+2 Enabl
me Entries				104.4000	100,0000				
1312-T80L-6 WI -: 23	13 68.9394	100.0000				0.0000	104.4000	100.0000	RF Channels 3+4 Enabl
1312-T80L-6 WL= 23			0.0000	104.8000	100.0000	0.0000	104.8000	100.0000	RF Channels 5+4 Enabl
1512 1002 0 WE- 25	14 69.2424	100.0000	0.0000	105.2000	100.0000	0.0000	105.2000	100.0000	Sync Data Settings
	15 69.5455	100.0000	0.0000	105.6000	100.0000	0.0000	105.6000	100.0000	Analog Sync Output Source A ImageAnalogA
	16 69.8485	100.0000	0.0000	106.0000	100.0000	0.0000	106.0000	100.0000	inagenialoga
	17 70.1515	100.0000	0.0000	106.4000	100.0000	0.0000	106.4000	100.0000	Analog Sync Output Source B
				107.2000	100.0000	0.0000	107.2000	100.0000	ImageAnalogB
	18 70.4545	100.0000	0.0000	107.6000	100.0000	0.0000	107.6000	100.0000	
e Butters	19 70.7576	100.0000	0.0000 -	108.0000	100.0000	0.0000	108.0000	100.0000	Digital Sync Output Source
me	20 71.0606	100.0000	0.0000	108.4000	100.0000	0.0000	108.4000	100.0000	ImageDigital
	21 71.3636	100.0000	0.0000	108.8000	100.0000	0.0000	108.8000	100.0000	_
	22 71.6667	100.0000	0.0000	109.2000	100.0000	0.0000	109.2000	100.0000	Digital Sync Output Delay
4	110007	100.0000	0.0000	109.6000	100.0000	0.0000	109.6000	100.0000	0.00 🌩 μ
				110.0000	100.0000	0.0000	110.0000	100.0000	Digital Sync Pulse Length
	Number of Image Points:	200 🗘 Default Intern	al Clock Rate (kHz	110.4000	100.0000	0.0000	110.4000	100.0000	Enabl
	<					1	1		> 0.01 🖨 🖉
	Number of Image Pe		ternal Clock Rate (kH	z): 166.000 🗘 Default	External Clock Divider:	1 👟			
	Number of Image Pe	oints: 120 Default Int	ternal Clock Rate (kH	z): 166.000 🔽 Default	External Clock Divider:	v			Sig Cal Pla
Hardware Console								/	
				-					
									/ / /
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					<u>.</u>			· / .	
		Inte	ernal Clo	ck rate	Tabs	: Signa	al Path	Play	er /

The GUI window should look similar to this:

deflector use.

2. Select Compensation Tab

Click on Import Button Open the required *.LUT files Name Date modified Type Size D1312_1um_60-100M_D90-Ch100.LUT 01/12/2021 17:32 LUT File 57 KB

Import / Export

Import

Channel Scope

Import / Export

Import

Global

XN V

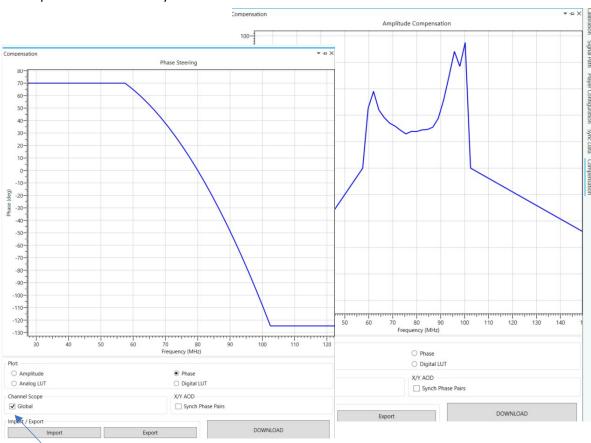
Export

LUT file size = **225KB** is a Channel scoped (channel specific) compensation file that can apply unique values to each channel.

In this example we will open file: D1312_1um 60-100M_D90Ch80.LUT

This compensation file is generated for a D1312 at 1um, 60-100MHz freq' range using the **AF0-80T-4** amplifiers. The iMS4 Power Settings are : DDS=90% , Ch(n)=80% (See Signal tab).

The graphics will show a plot of the compensation response, Phase or Amplitude as selected by the radio buttons



Make sure **Global** box is checked

Click Download

3. Select Player Tab

This example will use the *Internal* clock source and *No Trigger* with repeated image play (*Repeat Forever*). Internal clock rate is set on the lower tool bar, main window

For external signals, check **External** buttons and apply:

- Trigger input to J10
- Clock input to J11

And when using with an RF amplifier with control through connector J5 of the iMS4 apply:

- Gate input to J9 (High = ON)

Note: If you do not want to use a compensation *.LUT file (see previous section), then uncheck the highlighted boxes to disable compensation.

The RF output will be zero unless a *.LUT file is downloaded into the iMS4 <u>or</u> these boxes are unchecked.

4. Select Signal Tab

Two *Power Settings* control the RF output level:

- **DDS** is common to all four outputs.
- Ch1, Ch2, Ch3, Ch4 sliders set the power for each output channel independently.

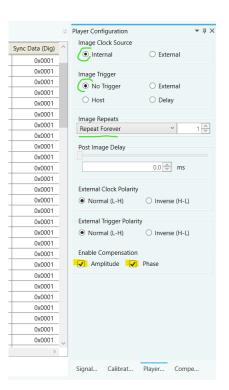
Typical settings when used with AF0-80T-4 are: DDS = 90 - 95% Ch1 = Ch2 = 80% - 85% (Ch3 = Ch4 = 80% - 85%)

For XY AOD applications, Ch1 = Ch2 and Ch3 = Ch4

iMS4 RF output connectors. Terminate onto a 500hm input or load.

J1 = Ch1, J2 = Ch2, J3 = Ch3, J4 = Ch4

NOT NECESSARY FOR AF0-80T-4



5	Signal Path				- ↓ ×			
	Power Settings							
	81.2 %	50.0 %	50.0 %	50.0 %	50.0 %			
	\smile (
		Ch1	Ch2	Ch3	Ch4			
			CILE					
		Int	Int	Int	Int			
	DDS	inc			inc			
	Amplifier Enable							
/	RF Channels 1+2 Enable							
	RF Channels 3+4 Enable							
	Sync Data Settings Analog Sync Output Source A							
	ImageAnalogA ~							
	Analog Sync Output Source B							
	ImageAnalogB							
	Digital Sync Output Source							
	ImageDigital ~							
	Digital Sync Output Delay							
	0.00 🌨 µs							
	Digital Syn	c Pulse Len						
				Enabled				
L			0.	115				
	Signal	Calibrat	Playe	er Cor	npe			

5. Start Image Play

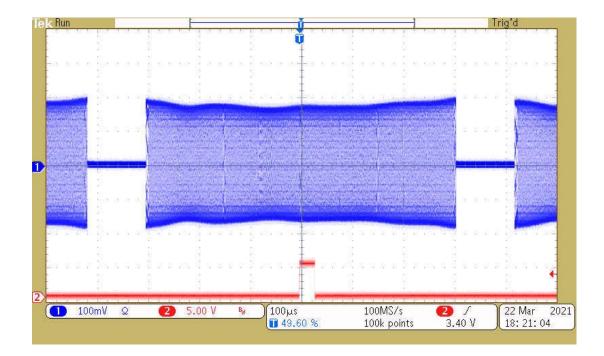
Click the *Play Button* to start Image play.

```
(It will 'grey' out).
                                                iMS Studio v1.3.0.1054 [C:\
                                                                                   pbox\iMS-Studio-data\D1384-aQ120\D1384_100-140M_swp_100%A.iip]
                                         ile Edit Window Tools Help
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                                        Project Explorer
Image Groups / Free Images
100-140M swp (120 entries)
                                                                                                    ed Ione
                                                                             100-140M swp × Enha
                                                                                                                          1
1
1
                                                                                                 Ch3 Frequency (MHz) Ch3 Amplitude (%)
                                                                                  Phase (deg)
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                                                                                    0.0000
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6
7
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100.0000
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                                                                                                      102.4000
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                                                                                    0.0000
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                                                                                                                                            0.0000
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                                                                                    0.0000
                                                                                                       103.2000
                                                                                                                         100.0000
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                                                                                    0.0000
                                                                                                       108.6000
                                                                                                                         100.0000
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                                                                              10
                                                                                                       104.0000
                                                                                                                         100.0000
                                                                                    0.0000
                                                                                                                                            0.0000
                                                                             11 0.0000
                                                                                                       104.4000
                                                                                                                         100.000
                                                                                                                                            0.0000
                                             Start
                                                                            Stop at Image end
                                                                                                                          Stop Immediately
```

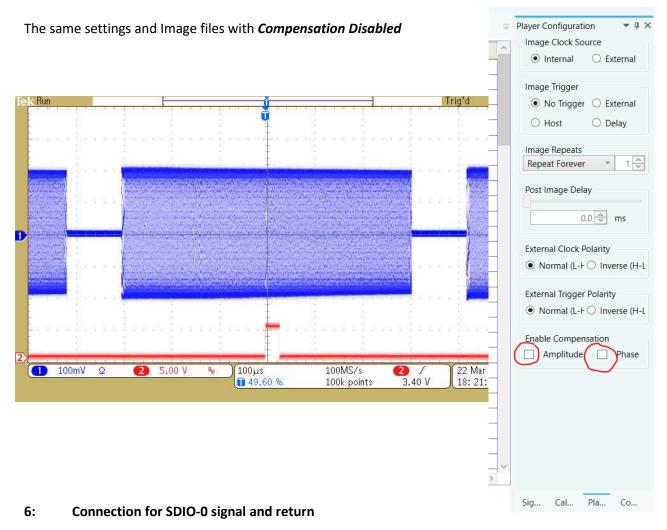
Typical **iMS4** output waveforms on oscilloscope for the files and signal levels described above. Internal Clock rate 166KHz

Trace 1 = RF output (50ohm terminated); J1, J2

Trace 2 = SDIO-0; J7 pin 33, (rtn pin 26)

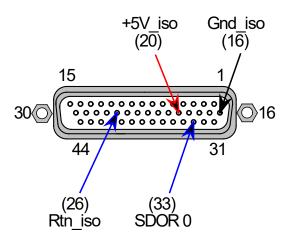


App Note: 2022-07-05



View into iMS4 connector J7

SDIO outputs are opto- isolated and require a separate +5V supply to operate



App Note: 2022-07-05

7: Does my iMS4 work ?

Single Tone mode provides a basic functional and communication check with the Host PC. This will generate a constant RF signal on the output channels, J1...J4 There is no SDIO sync output in this mode.

Select Calibration Tab

Select the **DISABLED** button. It will change to **ENABLED** and the RF outputs will be active. Adjust the Frequency and Amplitude sliders as required.

Note: This mode will prevent Image Play. <u>Return to DISABLED</u> when finished.

At 100 % amplitude, the RF output on J1, J2, J3 or J4 will be 100-650mV peak to peak into 50 ohms, depending on the power level settings in the **Signal tab** (See Section 4 above).

