App Note: 2021-03-23

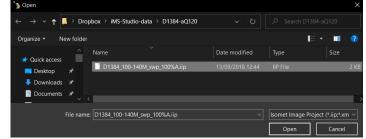
Running the example Isomet iMS Studio Projects

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.



In this case we select the file; D1384_100-140M_swp_100%A.iip

This IMAGE file generates a linear frequency ramp followed by an OFF period. It comprises of 120 image points with the same data on all four iMS4 channels. Points 1-100 are programmed with the 100-140MHz sweep at 100% amplitude. Points 101-119 are at an arbitrary frequency (131MHz) and 0% amplitude.

The **Sync Data (Dig)** field, is programmed with 0x0001 expect for 5 point around the mid-scan frequency (120 – 121 MHz). 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

The GUI w	vin	do	w should	look like	this:							
"> Isomet iMS Studio v1.3.0.1054 [C:\Usi	ers\mil	keH\D	ropbox\iMS-Studio-dat	a\D1384-aQ120\D1384	4_100-140M_swp_100%A	.iip]						- 🗆 ×
File Edit Window Tools Help												
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Project Explorer	ф ×		140M swp × Enhanced								Ŧ	Signal Path 👻 🕮 🗙 Power Settings
100-140M swp (120 entries)	*		Ch1 Frequency (MHz)	Ch1 Amplitude (%)	Ch1 Phase (deg)	Ch2 Frequency (MHz)	Ch2 Amplitude (%)	Ch2 Phase (deg)	Ch3 Frequency (MHz)	Ch3 Amplitude (%)	Ch3 P ^	25. 50. 50. 50. 50.
	-	•	100.0000	100.0000	0.0000	100.0000	100.0000	0.0000	100.0000	100.0000		
	0	1	100.4000	100.0000	0.0000	100.4000	100.0000	0.0000	100.4000	100.0000		
		2	100.8000	100.0000	0.0000	100.8000	100.0000	0.0000	100.8000	100.0000	_	
		3	101.2000	100.0000	0.0000	101.2000	100.0000	0.0000	101.2000	100.0000		
		4	101.6000	100.0000	0.0000	101.6000	100.0000	0.0000	101.6000	100.0000	_	
		5	102.0000	100.0000	0.0000	102.0000	100.0000	0.0000	102.0000	100.0000	-	Ch1 Ch2 Ch3 Ch4
		6	102.4000	100.0000	0.0000	102.4000	100.0000	0.0000	102.4000	100.0000		
		7	102.8000	100.0000	0.0000	102.8000	100.0000	0.0000	102.8000	100.0000		DDS Int Int Int Int
		8	103.2000	100.0000	0.0000	103.2000	100.0000	0.0000	103.2000	100.0000		_
		9	103.6000	100.0000	0.0000	103.6000	100.0000	0.0000	103.6000	100.0000		Amplifier Enable
		10	104.0000	100.0000	0.0000	104.0000	100.0000	0.0000	104.0000	100.0000		RF Channels 1+2 Enable
		11	104.4000	100.0000	0.0000	104.4000	100.0000	0.0000	104.4000	100.0000		RF Channels 3+4 Enable
		12	104.8000	100.0000	0.0000	104.8000	100.0000	0.0000	104.8000	100.0000		_
		13	105.2000	100.0000	0.0000	105.2000	100.0000	0.0000	105.2000	100.0000	_	Sync Data Settings
Compensation Functions	+	14	105.6000	100.0000	0.0000	105.6000	100.0000	0.0000	105.6000	100.0000		Analog Sync Output Source A ImageAnalogA
Name Entries	-	15	106.0000	100.0000	0.0000	106.0000	100.0000	0.0000	106.0000	100.0000		ImageAnalogA
	D	16	106.4000	100.0000	0.0000	106.4000	100.0000	0.0000	106.4000	100.0000		Analog Sync Output Source B
		17	106.8000	100.0000	0.0000	106.8000	100.0000	0.0000	106.8000	100.0000	-	ImageAnalogB
		18	107.2000	100.0000	0.0000	107.2000	100.0000	0.0000	107.2000	100.0000	_	
		19	107.6000	100.0000	0.0000	107.6000	100.0000	0.0000	107.6000	100.0000		Digital Sync Output Source
		20	108.0000	100.0000	0.0000	108.0000	100.0000	0.0000	108.0000	100.0000		ImageDigital ~
		21	108.4000	100.0000	0.0000	108.4000	100.0000	0.0000	108.4000	100.0000		
Tone Buffers	+	22	108.8000	100.0000	0.0000	108.8000	100.0000	0.0000	108.8000	100.0000		Digital Sync Output Delay
Name	-	23	109.2000	100.0000	0.0000	109.2000	100.0000	0.0000	109.2000	100.0000		
	Ð	24	109.6000	100.0000	0.0000	109.6000	100.0000	0.0000	109.6000	100.0000	-	0.00 🌩 µs
		25	110.0000	100.0000	0.0000	110.0000	100.0000	0.0000	110.0000	100.0000		Digital Sync Pulse Length
		26	110.4000	100.0000	0.0000	110.4000	100.0000	0.0000	110.4000	100.0000	~ ~	Enabled
		<									>	0.01 🖨 💷
		Nu	mber of Image Points:	120 🗢 Default Inter	rnal Clock Rate (kHz):	166.000 🗘 Default	External Clock Divider:	1				Sig Cal Pla Co
Hardware Console			Internal C	lock rate				Tabs: Si	gnal Path		Play	/er
									Calibra	ation (Comp	ensation

2. Select Compensation Tab

Click on Import Button Open the required *.LUT files

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e∓ N	ew fo	lder					• • •		?
ick access	Í	^	Name	Date modified	Туре	Size			
esktop	*		20-220M_100%A_0ph.lut	05/05/2020 11:41	LUT File	57 KB			
ownloads	*		RvC 374nm100-140M-D90Ch50-A.LUT	25/01/2021 16:26	LUT File	225 KB			
ocuments	*								
File nam			RvC 374nm100-140M-D90Ch50-A.LUT	Isomet Compensation File (*.lut $ \smallsetminus $					
						Open		Cancel	I

LUT file size = 57KB is a *Global* compensation file that applies the same data to ALL outputs of the iMS4. (This is the only option for older Rev-A and Rev-B of the iMS4 Synthesizers).

LUT file size = 225KB is a Channel scoped (channel specific) compensation file that can apply unique values to each channel. This is the recommended LUT option for X-Y deflector use.

In this example we will open:

RvC 374nm100-140M-D90Ch50-A.LUT

[This Compensation file generated for a D1384 at 374nm. 100-140MHz freq' range using a RFA0120-4-15 amp. iMS4 Power Settings DDS=90% , Chn=50% (See Signal tab)]

The graphic will show a plot of the compensation response

Make sure Global box is unchecked

Click Download

Sume Data (Dia)	Curra Data (A	Amplitude Compensation				
Sync Data (Dig)	Sync Data (Ar	100				
0x0001	0.00	100-1 / Ch1				
0x0001	0.00	90				
0x0001	0.00	- Ch3				
0x0001	0.00	80-1 - Ch4				
0x0001	0.00	70-				
0x0001	0.00					
0x0001	0.00	⊗ 60				
0x0001	0.00	e de la composición de				
0x0001	0.00	(%) 60				
0x0001	0.00	₩ 40				
0x0001	0.00					
0x0001	0.00	30				
0x0001	0.00	20-				
0x0001	0.00					
0x0001	0.00	10-				
0x0001	0.00					
0x0001	0.00	<u> </u>				
0x0001	0.00	50 100 150 200				
0x0001	0.00	Frequency (MHz)				
0x0001	0.00	Plot:				
0x0001	0.00	Amplitude Phase				
0x0001	0.00	O Analog LUT O Digital LUT				
0x0001	0.00					
0x0001	0.00	Channel Scope X/Y AOD				
0x0001	0.00	Global Synch Phase Pair				
0x0001	0.00	Import / Export				
0x0001	0.00					
	>	Import Export 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 J5 connector of the iMS4 apply:

- Gate input to J9

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.

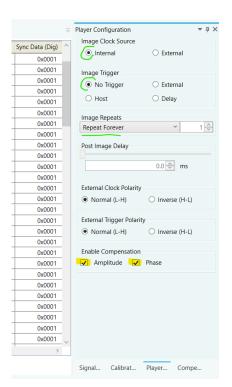
Typical settings when used with RFA0110-2-15 are: DDS = 70% - 90% Ch1 = Ch2 = 40% - 60% Ch3 = Ch4 = 40% - 60%

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

iMS4 RF output connectors. Terminate onto a 50ohm input or load.

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

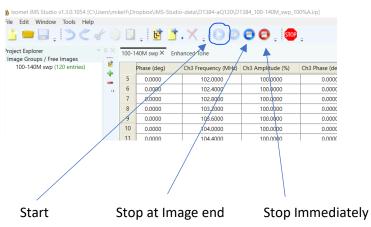
To enable the RF amplifier output, toggle the Amplifier Enable button (-> Green)



Signal Path				- ↓ ×					
Power Se	ttings								
81.2 %	50.0 %	50.0 %	50.0 %	50.0 %					
-									
	Ch1	Ch2	Ch3	Ch4					
DDS	Int	Int	Int	Int					
📕 Amp	lifier Enable	2							
RF C	RF Channels 1+2 Enable								
RF C	RF Channels 3+4 Enable								
Sync Data Analog Syr	a Settings ic Output S	ource A							
ImageAn	alogA			~					
Analog Syr	nc Output S	ource B							
ImageAn	alogB			~					
Digital Syn	c Output So	ource							
ImageDigital ~									
Digital Sync Output Delay									
		0.	00 🗢 \mu	5					
Digital Syn	c Pulse Len		•						
			Enabled						
		0.	01 🚔 🕕						
Signal	Calibrat	Playe	er Co	mpe					

5. Start Image Play

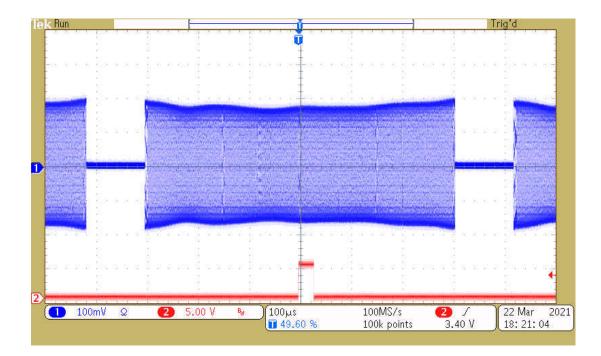
Click the *Play Button* to start Image play. (It will 'grey' out).



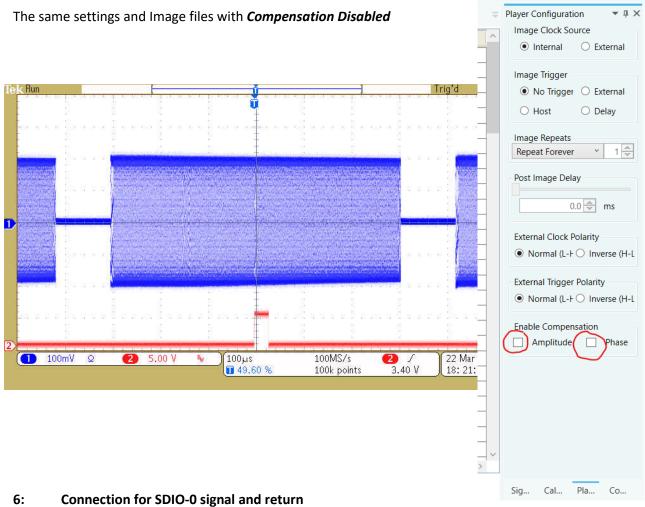
Typical output waveforms on oscilloscope for the files and signal levels described above. Internal Clock rate 166KHz

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

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

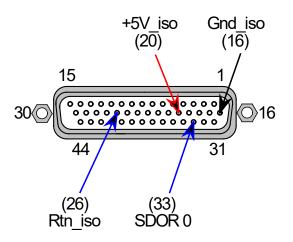


App Note: 2021-03-23



View into iMS4 connector J7

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



App Note: 2021-03-23

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).

