

iCSL-2

Dual Output Compact Synthesizer



3525

Description

The *iCSL-2* is a compact programmable frequency source designed around a dual output direct digital synthesizer (DDS). These modules offer a wide variety of frequency generation and signal control options at output powers up to ~1mW. Further, when fitted with integral power amplifiers, the same module provides a highly stable tuneable frequency driver with powers up to ~4W. (see iCSA- range). Applications include beam-steered deflectors, frequency shifters and tuneable filters. Also available integrated into high power amplifiers providing up to 200W RF output.

The iCSL- functions are controlled via high-speed USB-II, (RS485 option available). MS Windows10/11 GUI, Python support and a comprehensive C++ SDK are all provided.

DIRECT Mode

The iCSL-2 outputs are controlled directly from the host PC.

All output parameters can be set independently. The tuning rate is limited by the host PC interface.

Available Functions:

- Single tone (static frequency) output.
- Zero to Max Amplitude control.
- 0-360° phase shift between outputs
- Differential frequency offset between the outputs

EXTENDED TONE (Sweep) Mode

Frequency sweep parameters are configured at the host PC and downloaded directly to the DDS chip. A single trigger (via PC or external input) initiates the sweep. The increment step value and step duration are user programmable.

Available Functions:

- Up or Down
- Dwell or No dwell at completion

The sweep mode offers the fastest frequency scan capability, with a minimum dwell time of 8nsec per frequency increment. In contrast to IMAGE mode, the amplitude and phase values remain constant.

IMAGE Mode

The iCSL-2 outputs are controlled from "Image" data programmed into 32Mx8 internal memory. This memory can store a single image >100K frequency points with different frequency/amplitude at each output.

The stored image points each comprise of 16-bit Frequency, 10-bit Amplitude, 14-bit Phase and 2-bit synchronous IO. Output data is addressed in sequence under the control of external or internally generated trigger and clock signals. The RF signal responds to a new data set at each valid update clock. The minimum dwell time per frequency point is 0.2usec. The user can specify trigger, clock, repeat, and output delay functions. The IO bits are user programmable and output synchronously with the frequency points.

The image mode is highly flexible and allows fast continuous data throughput. A key advantage of this mode is that each frequency point may be modified by preloaded compensation data (LUT). This provides an efficient method of applying phase control and/or amplitude calibration to the downloaded image data. Active phase steering across the multiple RF outputs is the basis for Isomet (acoustic) beam steered AO deflectors. Amplitude compensation enhances uniformity of the scan pattern intensity.

Local Tone Buffer

Similar to the Image mode except the data is limited to 256 separately programmable frequency, amplitude and phase points. All points may be addressed randomly from software control or hardware via 8-bit external port. Data addressing is not clocked. Outputs change value immediately after a new buffer address is applied. Maximum update rate in this mode is 90KHz.

ALL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

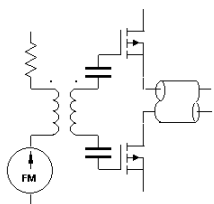
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Quality Assured.

**In-house: RF & Digital design
Software Development
OEM manufacture**



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Specification

Synthesizer maximum frequency range:	10 - 210MHz
Outputs, iCSL-2:	Dual independent outputs, phase continuous
Maximum frequency resolution:	32bit fundamental, 16bit SDK limit
Frequency settling (Image mode):	< 100nsec
Max. output rate (Image mode):	Configuration dependent, 3MHz - 5MHz
Frequency stability (internal reference clock):	+/- 2.5ppm
Phase control:	+/- 180deg differential between outputs
Maximum Power per output:	> 0dBm, 1mW at 100MHz
Output power flatness:	< +/- 1dB per octave, with no amplitude programming
Harmonics:	> 25dBc
RF On:Off contrast ratio:	> 40dBc (using external analog modulation inputs) > 60dBc (using data control)
Peak power adjustment range:	>35dB via digital potentiometers
Amplitude resolution (Image/Tone data):	10bit full range, zero to set peak power level.
External asynchronous modulation input(s):	0-5V or 0-1V (option), full range, zero to set peak power level. <i>Configurable: common or channel scoped, override or disable control.</i>
DC Supply:	+15V nominal @ <0.5A, (Input voltage range +12V to +24V)
Communications:	USB II, RS485 (option).
External Clock, Trigger Inputs:	5V tolerant LVTTTL compatible. SMB connectors
Memory capacity:	>100K frequency data points, single 'Image'
Auxiliary I/O - Synchronous:	2bits SDIO, 2x DAC outputs
- Asynchronous:	4bits GPIO

Optional Features

RS485 serial
0-1V external modulation

Model:

iCSL-2
iCSL-2

Associated models:

With integrated power amplifier(s):
Dual Output 'Pro', 128Mx16 memory, multi-image:
Quad Output 'Pro', 128Mx16 memory, multi-image:
Higher Frequency, dual output, 40-400MHz:

see separate data sheet: iCSA-...
see separate data sheet: iMS2-P
see separate data sheet: iMS4-P
see separate data sheet: iMS2-HF

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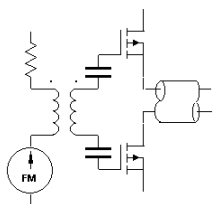
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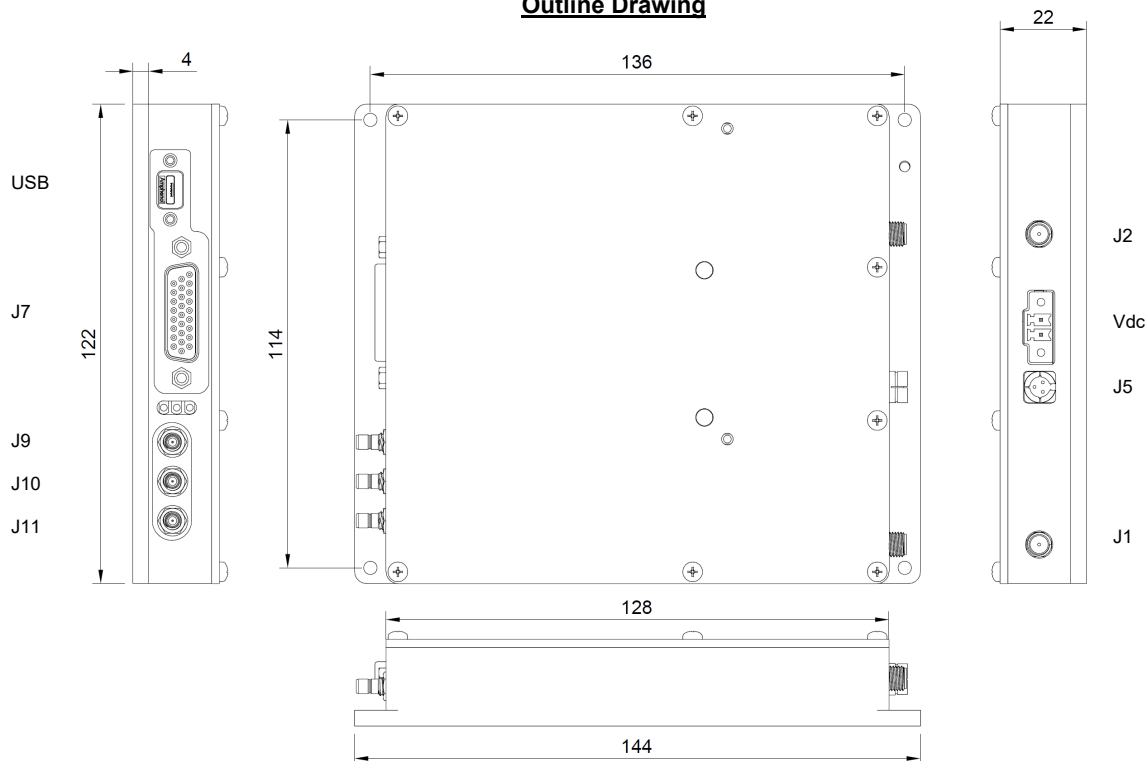
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Outline Drawing



Connector Summary

All digital I/O signals are ESD protected to IEC6100-4-2 and include EMI suppression.

Ident	Type	Description
J1, J2	SMA	RF outputs
J5	3-way Binder 719 series	Interlock
J7	26-way High density female D-type	Control
J9	SMB	Gate input
J10	SMB	Trigger input / output
J11	SMB	Clock input / output
USB	mini-B	USB II/III
Vdc	3.81mm Pheonix	12-24Vdc voltage input

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