

## iCSA-100T-2-1

### Dual Output Synthesizer and Amplifier (Preliminary)



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#### Description

The iCSA- programmable frequency source and amplifier module is based on a dual output direct digital synthesizer (DDS) offering the user a wide variety of frequency generation and signal control options. The module includes a pair of class A amplifiers providing up to 1W RF drive power suitable for a wide range of Isomet AO devices including dual axis and beam-steered deflectors .

The iCSA- functions are controlled via high speed USB-II, (RS485 option available). Windows 7 & 10 GUI software and a comprehensive C++ SDK are both provided. The SDK defines all the function calls that are possible on the iCSA- module and allows the system integrator to quickly and efficiently develop application software at a high level of abstraction. All low level protocol communication is handled by the library functions. (DLL call functions).

#### **DIRECT Mode**

The iCSA- 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 iCSA- outputs are controlled from "Image" data programmed into internal memory. This memory can store a single image of up to 10K 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 0.2u sec. 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. These points may be addressed randomly from software control or a subset of 8 via 3-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**

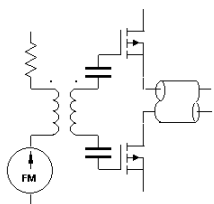
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#### **Quality Assured.**

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



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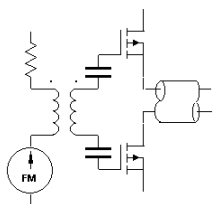
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#### Specification

Output 3dB bandwidth frequency range:	60 - 130MHz
(Synthesizer maximum frequency range:	10 - 210MHz)
Outputs:	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:	> 500mW at 100MHz, 12Vdc supply > 1100mW at 100MHz, 24Vdc supply
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 @ <1A, (Input voltage range +12V to +24V)
Communications:	USB II, RS485 (option).
External Clock, Trigger Inputs:	5V tolerant LVTTTL compatible. SMB connectors
Memory capacity:	10K frequency data points, single 'Image'
Auxiliary I/O	- Synchronous: 2bits SDIO, 2x DAC outputs or - Asynchronous: 2bits GPIO
<u>Optional Features</u>	<u>Model:</u>
RS485 serial	iCSA-100T-2-1-R
0-1V external modulation	iCSA-100T-2-1-V
<u>Associated models:</u>	
Controller 'Pro', 10MB memory, multi-image:	see separate data sheet: iMS4-P
Higher Frequency, dual output, 40-400MHz:	see separate data sheet: iMS2-HF

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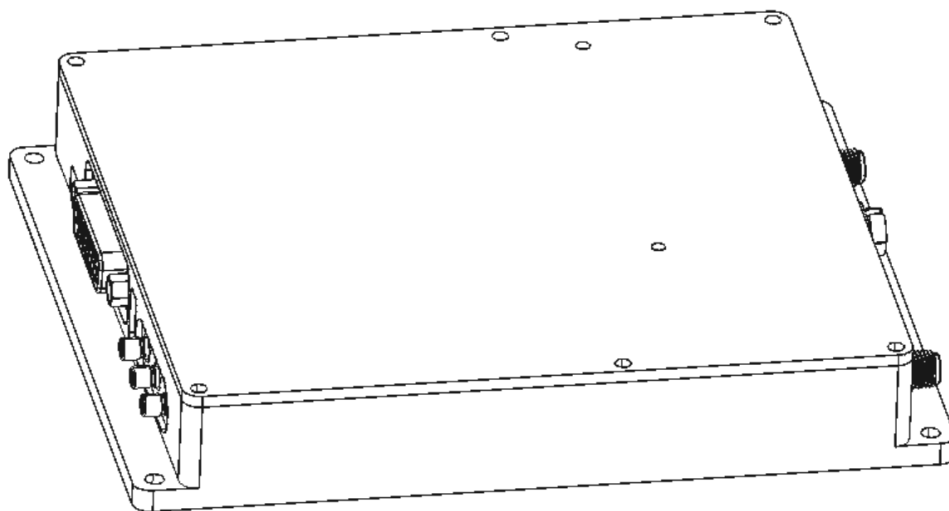
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#### Outline Drawing



122mmW x 144mmL x 22mmH

#### Connector Summary

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

<u>Ident</u>	<u>Type</u>	<u>Description</u>
J1, J2	SMA	RF outputs
J4	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 Phoenix	12-24Vdc voltage input

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