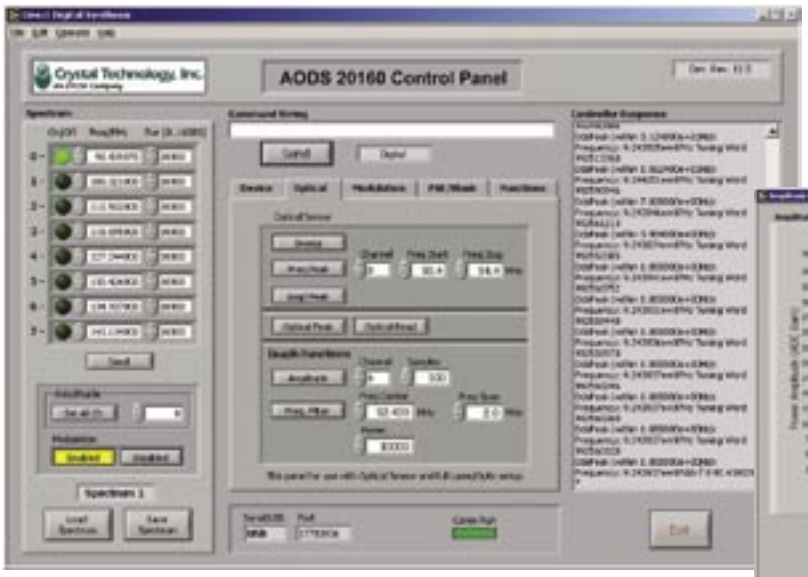
Crystal Technology, Inc.

An EPCOS Company

DDS

AODS 20160

Direct Digital Synthesizers



Control panel with easy-to-use graphic user interface allows for quick selection of parameters such as channel, frequency, and amplitude.

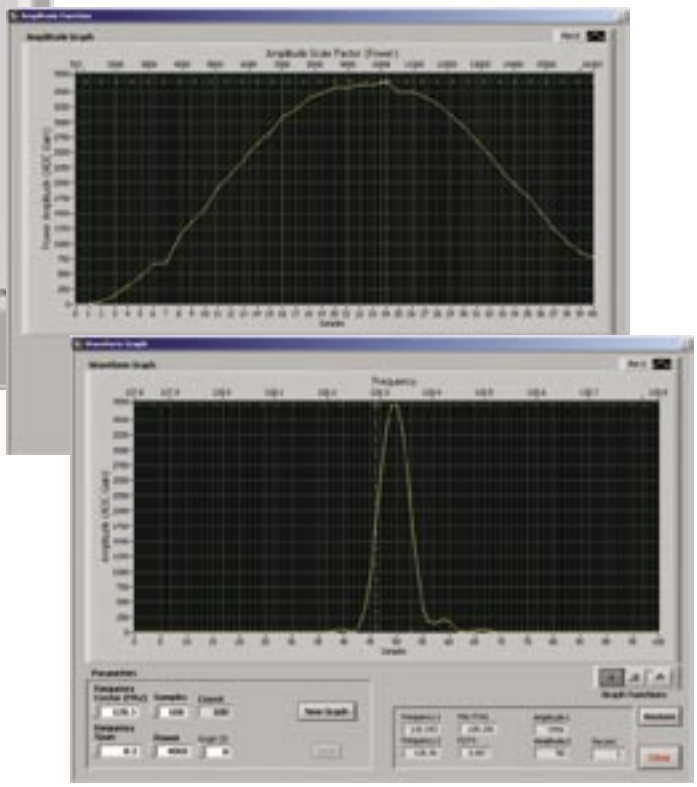


Chart amplitude and filter function quickly through built-in plotting features.

Direct Digital Synthesizers

Crystal Technology, Inc. offers a line of direct digital synthesizers targeted to laser applications that require precise frequency tuning and agile control: ■ microscopy ■ spectroscopy ■ flow cytometry ■ laser projections/shows

Our synthesizers incorporate an embedded controller to manage bi-directional data between the computer and the acousto-optic device. Its operating system features a robust command set delivering state of the art functionality. Connecting through the RS232 or USB interface, the supplied LabVIEW control panel quickly gives the user the "feel" of the instrument. Queries, diagnostics and control are all at the user's finger tips.

Offerings include both single- and multi-channel direct digital synthesizers. The internal architecture is flexible so it is possible to customize the interface to meet your specific requirements.

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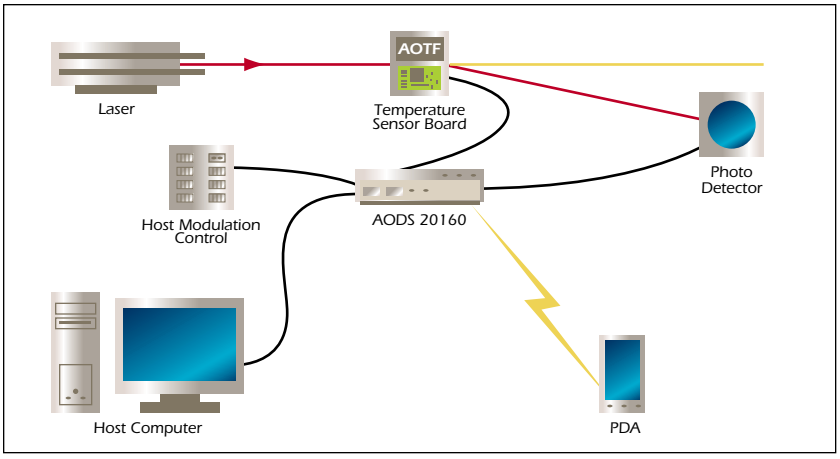
Feature Highlights

- Multiple communication ports available — RS232, USB, I²C, wireless
- Up to 8 channels (24 virtual channels) — simultaneous and independent
- On-board composite output power measurement
- Independent modulation per channel — analog or high speed digital
- Common blanking signal for all channels
- Flexible architecture — customizable modulation interface
- Fast frequency scanning — includes chirp and custom profiles
- Wavelength locking
- Temperature compensation
- RoHs compliant

DDS Block Diagram



To simplify initialization and setup, parameters such as frequencies, amplitudes and others are retrieved from the enabled acousto-optic (AO) device. For example the enabled AO-device stores personality traits such as temperature correction that can be retrieved to adjust the frequency to wavelength dependence for an acousto-optic tunable filter. Date codes, serial numbers, and lot tracking data are stored internally for product traceability.

Integrated sensor functions provide for real-time closed-loop operation. Optical power, RF power, and temperature can be simultaneously monitored to insure optimum device performance. Utilities are built into the operating system to control feedback, diagnostics, sensor gain, modulation, and much more.

Communication is handled through RS232, USB, I2C and wireless. For wireless communications, a Network Protocol is implemented providing a robust mechanism built on standard network protocols i.e.; HTTP, Telnet, and TCP just to mention a few.

For the AOTF, several aspects of the synthesizer's architecture provide unique functions to maximize its output. At its heart are up to 8 integrated circuit DDS chips, each with 1024 x 32 SRAM for storing preset frequency profiles. Four of the registers have direct hardware control for rapid frequency selection. This hardware functionality is for frequency-shift-keying (FSK) which can randomly select from one of the four presets frequencies in nanoseconds. The Blanking function, completely suppressing the RF output from the controller, is embedded as an FSK function. The DDS chips are set to zero frequency and the output of the controller is suppressed. Although simultaneous broadcasting allows up to 8 frequencies (one per DDS chip), users implementing FSK have access to 3 times more frequencies than DDS chips thus leveraging the controller's utility to address up to 24 wavelengths.


Single Channel DDS

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Multi-Channel Direct Digital Synthesizer (DDS)

Applications

- Spectroscopy
- Fluorescence
- Microscopy
- Flow Cytometry
- Laser Projection/Light Show
- Supercontinuous Laser Wavelength Selection

Our synthesizers offer solutions for laser applications requiring precise frequency tuning and agile control. We offer both single and multi-channel models with an embedded controller that manages bi-directional data between a computer and an acousto-optic device. Our models have multiple communication ports and firmware allowing frequency scanning, wavelength locking and temperature compensation.

Frequency Specifications	Units	1-Channel	4-Channel	8-Channel	8-Channel HP
Range	MHz	25-160	25-160	25-160	25-160
Resolution	Hz	0.1	0.1	0.1	0.1
Stability	ppm/°C	±2	±2	±2	±2
Preload Time	µs	<10	<10	<10	<10
Toggle Time	ns	<20	<20	<20	<20

Amplitude Specifications	Units	1-Channel	4-Channel	8-Channel	8-Channel HP
Output Power, nominal for all channels on	Watt	0.2	0.4	0.125	0.4
Output Power, per channel	Watt	0.2	1.60	1.0	3.2
Modulation Bandwidth	MHz	>2	>2	>2	>2
Dynamic Range	dB	>40	>40	>30	>30
Intermodulation and Spurious	dBc	>-45	>-45	>-45	>-45
Signal to Noise Ratio	dB	>90	>65	>65	>65

Power Input	Units	1-Channel	4-Channel	8-Channel	8-Channel HP
AC powered, 19-inch Rack Model	Vac	NA	NA	100-240 @ 50-60Hz	NA
DC powered, OEM Configuration	Vdc	—	24 @ 2A	24 @ 2A	24 @ 2A

Environmental	Units	1-Channel	4-Channel	8-Channel	8-Channel HP
Operating temperature	°C	10-40	10-40	10-40	10-40
Size	mm	—	250 x 200 x 44	250 x 200 x 44	250 x 200 x 44

Interfaces	Units	1-Channel	4-Channel	8-Channel	8-Channel HP
RF Output Impedance	ohms	50	50	50	50
Amplitude Modulation, input level	V	0–10	0–10	0–10	0–10
Amplitude Modulation, input impedance	kohm	4.3	4.3	4.3	4.3
FSK Modulation, input level	V	3.3	3.3	3.3	3.3
Blanking, input level	V	3.3	3.3	3.3	3.3
Digital Controls	—	ASCII	ASCII	ASCII	ASCII
RS232	—	—	—	—	—
Bluetooth	—	—	—	—	—
Sensor Input	V	±3.3	±3.3	±3.3	±3.3

US PATENT Patent Pending

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