



# Lightning II

## 8 Channel, 14-bit, 3 GSPS Analog-to-Digital Converter

Model Number: 3DR-A10-ADC-3GSPS



### 3D COMPUTING OVERVIEW

3DR Computing technology brings together high performance computing, ease of programmability, low-cost, and commercial I/O flexibility in a modular, open systems and standards architecture to realize uniquely scalable and widely configurable, high speed embedded processing solutions for the development of radar, EW, SIGINT, and communication systems.

3DR Computing possesses the unique ability to morph in size, shape, and processing capacity. This flexibility provides a low cost, standard solution capable of rapidly conforming to the vastly different power, space, and environmental requirements found aboard any surface, sub-surface, or airborne system or platform.

### PRODUCT DESCRIPTION

The 3DR-A10-ADC-3GSPS, known as Lightning II, is an 8 channel, 14-bit, 3 GSPS Analog to Digital converter board for digitizing and processing analog inputs. High performance, low latency processing can be implemented via the on-board Altera Arria 10 FPGA (10AX115U2F45I2SG).

As with all 3DR Computing modules, Lightning II supports 3 dimensional connectivity, allowing the user to stack and/or tile modules to address a wide variety of processing, I/O, size, weight, and power requirements. Lightning II provides PCIe and LVDS interfaces via the Y and Z connectors to other modules in the 3DR Computing family. It also offers additional external interfaces including SMA connections for clocking and triggering flexibility along with Time of Day (ToD).

### FEATURES OVERVIEW

#### Processing

- Altera Arria 10 FPGA 10AX115U2F45I2SG
- 4GB DDR3
- Variable ENOB: 8.8 - 9.2

#### Analog-to-Digital (ADC)

- AD9208
- Configurable Sample Rate up to 3GSPS
- Resolution: Up to 14-bits

#### External I/O Support available via

- Y-Connector (2x)
- Z-Connector (1x)
- UART

#### Tailored Clocking and Triggering Flexibility

- 100 MHz External Input Clock
- 2x SMA Input for use as Trigger/Gate
- Clock Inputs (SMA)

#### Physical

- Dimensions: 6.25" L x 6.25" W
- Distance Between Board: 1.1" (Stacked, Board-to-Board)

#### Additional Functionality

- Microcontroller Interface via K61  $\mu$  controller
- Controls power-on and power-down Sequencing
- Monitors voltages and reports faults over I2C bus
- Monitors current, e-fuse shut-down, and reports over I2C bus
- Monitors board temperature over I2C bus (external sensor available)
- On board EEPROM for Data Storage and logging (write protect available)
- FPGAs and CPLDs programmable over JTAG Bus (for applicable modules with FPGAs and CPLDs),

### APPLICATIONS

- Digital Signal Processing/Data Acquisition
- Radar Receiver (Digital Receiver)
- Digital Array Processing & Beam-forming
- Electronic Warfare/Attack Systems

### BENEFITS

- On board circuitry fuse and temperature monitoring for board protection
- Standard 4-pin power connector

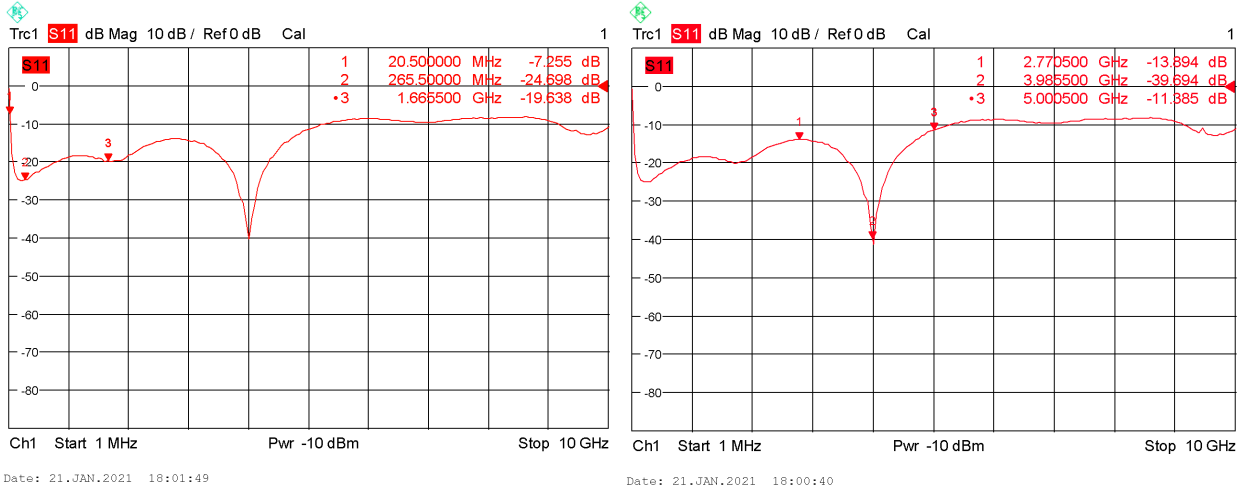


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<b>Product Specifications</b>	<b>ADC</b>	14 bit
		Sampling Rate up to 3GSPS
	<b>Memory—DDR</b>	4GB Unbuffered
	<b>Clocking Options</b>	Onboard Oscillator
		Offboard SMA
	<b>Health Monitoring</b>	Board Voltages
		Two External Temp Sensors: Board Temp, FPGA and Pex Temp
Smoke/Impact Detection Sensor		
Humidity Sensor		
<b>Power</b>	Power Consumption: 12V @15.5 Amps (subject to FPGA loading)	
	Supply Options: 12V Power Cable	
	Additional Power Features: E-fuse/Continuous Power Monitoring	
<b>External Interfaces</b>	Y1, Connectors : PCIe & LVDS (FPGA)	
	Y2, Z2 Connectors: LVDS (FPGA)	
	PCIe, SMA TRIGGER, Clock	
<b>ADC Performance Specs</b>	<b>Fundamental Frequency (MHz)</b>	907.9 MHz
	<b>Fundamental Amplitude (dBFS)</b>	-2.0 dBFS
	<b>SNR (dBFS)</b>	55.8 dBFS
	<b>SFDR (dBFS)</b>	66.9 dBFS
	<b>Top Spurs and Harmonics</b>	-66.9 dBFS in bin 1024, at 312.50 MHz
		-69.5 dBFS in bin 1121, at 342.10 MHz
		-74.9 dBFS in bin 1951, at 595.40 MHz
		-75.8 dBFS in bin 3072, at 937.50 MHz
		-76.1 dBFS in bin 3999, at 1220.40 MHz
		-76.4 dBFS in bin 1509, at 460.51 MHz
-76.4 dBFS in bin 2988, at 911.87 MHz		
-78.0 dBFS in bin 2962, at 903.93 MHz		
-78.0 dBFS in bin 733, at 223.69 MHz		
-78.4 dBFS in bin 3708, at 1131.59 MHz		
<b>Insertion Loss</b>	<b>Frequency GHz</b>	<b>Insertion Loss (dB)</b>
	0.056	17.49
	0.12	17.40
	0.27	17.15
	0.34	17.08
	0.47	16.98
	0.67	16.70
	0.72	16.19
	0.85	15.83
	0.907	15.72
	1.4	15.12
	2.7	19.65

# REFLECTION



# CONFIGURATIONS

Model Number	Configuration
3DR-A10-ADC-3GSPS-4-C	8 Channel @ 3 GSPS Each, Commercial Temp 0°C - 45°C

# BLOCK DIAGRAM

