



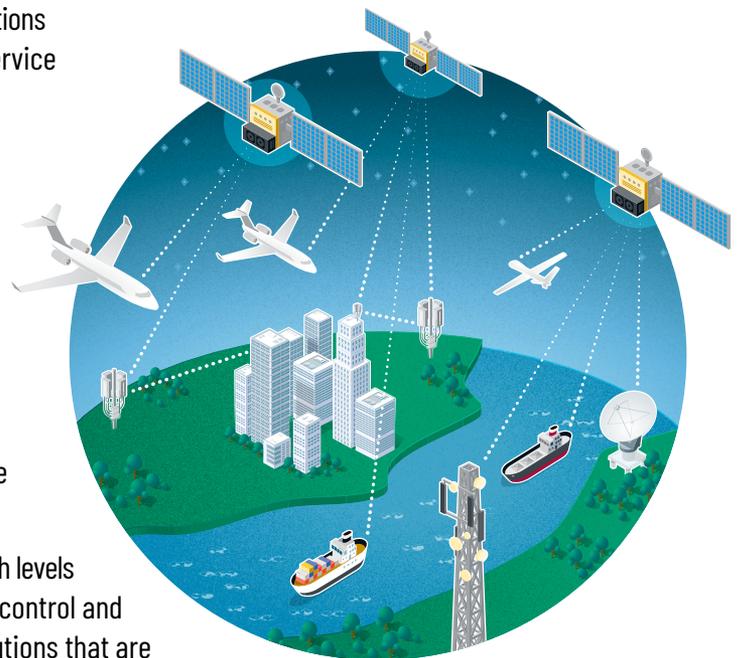
Beamforming

Providing High Speed Data Where You Need It and When You Need It

The insatiable demand for data is revolutionizing the communications industry. It is putting increased bandwidth requirements on service providers to deliver high speed content anytime, anywhere.

In order to address this demand, new technologies need to be developed to maximize data throughput. In the cellular industry, 5G is quickly being adopted to provide high speed content to the user. This addresses people who have cellular connectivity—however, there are millions of people in rural areas that cannot get high speed internet. This is driving the space industry to deploy low Earth orbit (LEO) satellites to provide high speed content anywhere. In both applications, Analog Devices is leading the way with innovative beamforming solutions to deliver data anytime, anywhere.

By focusing on the key requirements for the beamforming IC—high levels of integration, low power dissipation, and sophisticated digital control and memory—ADI has developed 5G and satcom beamforming solutions that are being adopted in the industry.



Beamforming Integrated Circuits

ADMV4801: 24 GHz to 29.5 GHz, Transmit/Receive Single Polarization Beamformer

ADMV4821: 24 GHz to 29.5 GHz, Transmit/Receive Dual Polarization Beamformer

High performance BFICs targeted for 5G mmW and other such communications applications.

Options include single and dual polarization ICs.



Key Features

- ▶ RF frequency range: 24 GHz to 29.5 GHz, addressing n257, n258, n261 bands in one footprint
- ▶ 16 selectable transmit channels
- ▶ 16 selectable receive channels
- ▶ Horizontal and vertical polarization (ADMV4828 only)
- ▶ Matched 50 Ω single-ended RF inputs and outputs
- ▶ High resolution vector modulators for phase control
- ▶ High resolution DGAs for amplitude control
- ▶ Temperature compensation
- ▶ Memory for transmit and receive beam positions
- ▶ 3 GPP specification compliant
- ▶ Operation up to 95°C

Applications

- ▶ 5G millimeter wave and broadband communication

ADAR3000: 17 GHz to 22 GHz Frequency Range

ADAR3001: 27.5 GHz to 31 GHz Frequency Range

Highly integrated beamformers with advanced digital functionality to support satcom applications.



Key Features

- ▶ Low power dissipation (<12 mW per channel)
- ▶ 4 beam/16 channel beamforming IC
- ▶ Configurable for transmit or receive operation
- ▶ Programmable time delay and step attenuator for beam steering
- ▶ Internal memory for storing beam positions
 - User programmable sequencer for quick and efficient beam state selection
 - Update, reset, and mute beam commands issued via pins or SPI
- ▶ Supports beam hopping and raster scanning
- ▶ Programmable bias modes
- ▶ Integrated ADC for:
 - Temperature sensors
 - General analog inputs
- ▶ 16 chip parallel addressability over 4-wire SPI interface
- ▶ Easy to use BGA package

Applications

- ▶ GEO HTS
- ▶ LEO constellations
- ▶ Mobile terminals (land, air, sea)
- ▶ Terrestrial/airborne/sat

ADAR1000: 8 GHz to 16 GHz Frequency Range

Broadband half-duplex beamforming IC with superior functionality for radar and Ku-band satcom applications.



Key Features

- ▶ Half-duplex for transmit and receive modes
- ▶ Single-pin transmit and receive control
- ▶ 360° phase adjustment range
- ▶ 2.8° phase resolution
- ▶ ≥ 31 dB gain adjustment range
- ▶ ≤ 0.5 dB gain resolution
- ▶ Bias and control for external transmit and receive modules
- ▶ Memory for 121 prestored beam positions
- ▶ Four -20 dBm to +10 dBm power detectors
- ▶ Integrated temperature sensor
- ▶ Integrated 8-bit ADC for power detectors and temperature sensor
- ▶ Programmable bias modes
- ▶ 4-wire SPI interface

Applications

- ▶ Phased array radar
- ▶ Satellite communication systems

Transmit/receive modules available that are designed to operate with the ADAR1000.