IDT SYSTEM SOLUTIONS: Highly-differentiated RF products from IDT offer significant improvement in RF reliability and data throughput and enable green networks with minimal power consumption. They scale easily from Macros to small cells, and industrial applications.

IDT best-in-class advanced timing products have very low phase-noise, low-spurious jitter attenuating frequency generators with support for one or multiple RF clock frequencies. They support input clock redundancy, mid to high clock fanout and optional synchronization signals, such as used in JESD204B.

IDT is the industry leader in serial switching devices that include advanced PCI Express® and Serial RapidIO® switches optimized for the most demanding applications. IDT is the only “one stop” source with PCIe solutions for Switches, Bridges, Signal Integrity, and Timing.
RF SYNTHESIZER / PLL / LOCAL OSCILLATOR

- Best-in-class combination of phase noise, spurious performance, frequency range and power
- Large tuning range to address a wide range of applications in Communications, Industrial, and Instrumentation
- Multiband local oscillator (LO) frequency synthesis in multi-mode base stations
- Eliminates the use of multiple narrow band RF Synthesizers
- Reduces BOM complexity and cost

8V97051
A high performance Wideband RF Synthesizer / PLL optimized for use as the local oscillator

8V19N486I-02
8V19N476I-01
8V79S680

Providing clock generation, frequency generation and jitter attenuation in JESD204B-Compliant wireless base station radio clock equipment

RF CONVERTER PLL

8V97051
A high performance Wideband RF Synthesizer / PLL optimized for use as the local oscillator

8V19N486I-02
8V19N476I-01
8V79S680

Providing clock generation, frequency generation and jitter attenuation in JESD204B-Compliant wireless base station radio clock equipment

CHIP SET BENEFITS
- Synchronization between clock and system reference signals
- Phase delay capabilities for alignment/delay of individual system reference signals
- Dedicated power-down features for reducing power consumption
- Input clock monitoring, manual and auto-switch over
- Holdover for temporary loss of input signal scenarios
- SPI controlled system reference signal (SYSREF) generation
- Status conditions with programmable functionality for loss-of-lock and loss of reference indication
- LVCMOS/LVTTL compatible SPI serial interface
## Timing Products for Radio Cards

### HIGH PERFORMANCE CLOCK BUFFERS

Differential, SiGe Buffer Families. All devices support a differential architecture and frequencies in the high-MHz and GHz range.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>8SLVP</th>
<th>8SLVD</th>
<th>8P34S</th>
<th>8T39S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple and low noise</td>
<td></td>
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<td></td>
<td>Flexible</td>
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<tr>
<td>TI drop-in compatible</td>
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<tr>
<td>Low power</td>
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<tr>
<td>TI pin-to-pin</td>
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<tr>
<td>Characteristics</td>
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<td>I / O</td>
<td>LVPECL</td>
<td>LVDS</td>
<td>LVDS</td>
<td>Universal</td>
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<td>Characteristics</td>
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<td>Features</td>
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<tr>
<td>Single and dual functions</td>
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<td>and matched pinout</td>
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<tr>
<td>Characteristics</td>
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<tr>
<td>f&lt;sub&gt;max&lt;/sub&gt;</td>
<td>2 GHz</td>
<td>2 GHz</td>
<td>1.2 GHz</td>
<td>2 GHz</td>
</tr>
<tr>
<td>Characteristics</td>
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</tr>
<tr>
<td>Supply</td>
<td>2.5 - 3.3 V</td>
<td>2.5 V</td>
<td>1.8 V</td>
<td>2.5 V, 3.3 V, Mixed</td>
</tr>
</tbody>
</table>

### BENEFITS

- Very low additive phase jitter
- Multiple low-skew outputs
- Optional frequency dividers

### CLOCK GENERATION PRODUCT POSITIONING

These featured products are a select sample of the extensive IDT clock generation portfolio. For the complete product listing, please visit [idt.com/go/clocks](http://idt.com/go/clocks).

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Jitter*</th>
</tr>
</thead>
<tbody>
<tr>
<td>8V19N4xx</td>
<td>RF PLL</td>
<td>&lt; 50fs</td>
</tr>
<tr>
<td></td>
<td>WAN</td>
<td>Long Haul</td>
</tr>
<tr>
<td>8T49N285</td>
<td>UFT, FemtoClock Programmable Clock Generators</td>
<td>&lt; 300fs</td>
</tr>
<tr>
<td></td>
<td>Frequency Translators</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jitter Attenuators</td>
<td></td>
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<tr>
<td></td>
<td>MAN (40GigE, 100Gbe)</td>
<td>Fibre Channel (32G)</td>
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<tr>
<td></td>
<td>SONET (OC-192)</td>
<td>Storage (12G) SAS/SATA</td>
</tr>
<tr>
<td>5P49V5901</td>
<td>Versaclock 5 (Low Power) Programmable Clock Gen</td>
<td>&lt; 700fs</td>
</tr>
<tr>
<td>5P49V5935</td>
<td>Versaclock 5 (Low Power) Programmable Clock Gen</td>
<td>&gt; 1 ps *</td>
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<tr>
<td></td>
<td>Fibre Channel (16G)</td>
<td>LAN (10Gbe)</td>
</tr>
<tr>
<td></td>
<td>SONET (OC-48)</td>
<td>Storage (6G) SAS/SATA</td>
</tr>
<tr>
<td>General Purpose Clock Generators and Synthesizers Versaclock 3 Programmable Clock Gen</td>
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<tr>
<td></td>
<td>SONET (OC-12)</td>
<td>Fibre Channel (2G, 4G, 8G)</td>
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<tr>
<td></td>
<td>Storage (1.5G, 2G, 3G) SAS/SATA Industrial</td>
<td>Military</td>
</tr>
<tr>
<td></td>
<td>Hand Held</td>
<td>Mobile</td>
</tr>
</tbody>
</table>

* RMS Phase Noise (12kHz to 20MHz)
RF TECHNICAL INNOVATIONS

IDT’s patented Glitch-Free technology eliminates attenuation setting overshoot (glitches) from the transmit and or receive paths by reducing transient “glitches” by up to 95 percent during most significant bit (MSB) transitions.

FlatNoise™ technology is an innovative technology where noise does not degrade as gain is reduced. IDT’s low-noise devices improve quality-of-service (QoS) and ease the signal-to-noise ratio (SNR) requirements of the downstream data converter to reduce system cost.

Zero-Distortion™ technology offers the world’s lowest power consumption and world’s lowest IM3 distortion. IDT’s mixers reduce distortion for improved SNR while simultaneously reducing power consumption.

Silicon Technology

IDT silicon technology offers advantages over other technologies such as GaAs, for example: manufacturing robustness in terms of higher electrostatic discharge (ESD) immunity and MSL1 moisture sensitivity-level performance. In addition, it enables excellent RF performance over temperature with low current drain, higher reliability versus GaAs, and higher levels of integration with simpler packaging assemblies that improve thermal performance and lower total cost.

RF TECHNICAL INNOVATIONS MAPPED TO TARGET MARKETS

<table>
<thead>
<tr>
<th>Product Innovation</th>
<th>Industrial</th>
<th>Microwave</th>
<th>Broadband CATV</th>
<th>Test and Measurement</th>
<th>Wireless Infrastructure and DAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>GlitchFree™</td>
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<tr>
<td>FlatNoise™</td>
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<tr>
<td>Zero Distortion™</td>
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</tr>
<tr>
<td>Silicon Technology</td>
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</tbody>
</table>

Many IDT RF products are pin-to-pin compatible with existing products in the market. Check with your IDT contact to learn how to get the innovation of IDT in the footprint you already have.

DOWNCONVERTING MIXER PRODUCT FAMILY: F11xx

Takes a high frequency RF input signal and converts it to a lower intermediate frequency (IF)

The IDT Advantage: Market-leading linearity, lowest power consumption and patented innovations like Zero-Distortion™

KEY BENEFITS
- High Linearity (IP3)
- Low Noise figure
- Power consumption
- Spur performance

TYPICAL APPLICATIONS INCLUDE
- Base stations
- DAS and repeaters
- Microwave backhaul
- Broadband (CATV)
- Industrial / military
IDT Products for Radio Applications

RF Products for Radio Cards

Significant improvement in RF performance!

RF VGA FAMILY – DIGITAL VARIABLE GAIN AMPLIFIERS & ANALOG VARIABLE GAIN AMPLIFIER: F12xx

Provides amplification and level control of RF signals coming from the antenna. The IDT Advantage: Key innovations such as Glitch-Free™, Zero-Distortion and others that improve linearity over the control range.

KEY BENEFITS
- Insertion loss
- Attenuation Range
- High Linearity (IP3)
- Accuracy
- Overshoot

TYPICAL APPLICATIONS
- Base stations
- Repeaters and DAS
- Microwave backhaul
- Broadband (CATV)
- Industrial, military and public safety

RF DSA FAMILY – DIGITAL STEP ATTENUATORS (DSA): F19xx

Reduces the power of a signal without appreciably distorting its waveform. The IDT Advantage: Silicon-based Technology and patented innovations like Glitch-Free™

KEY BENEFITS
- Insertion loss
- Attenuation Range
- High Linearity (IP3)
- Accuracy
- Overshoot

TYPICAL APPLICATIONS
- RF signal path level control
- Base stations
- Test and measurement
- DAS and repeaters
- CATV, SATCOM

VVA FAMILY – VOLTAGE VARIABLE ATTENUATOR: F2250

Reduces the power of a signal without appreciably distorting its waveform. The IDT Advantage: Ultra-precision high linearity level control

KEY BENEFITS
- Positive or negative slope
- 3 or 5 V supply
- Wide operating temperature range -40 to 105˚C
- Pin-compatible with competitors

TYPICAL APPLICATIONS
- RF signal path level control
- Base stations
- Test and measurement
- DAS and repeaters
- CATV, SATCOM

RF SWITCH PRODUCT FAMILY: F29xx

Routes high frequency signal through transmission paths. The IDT Advantage: Silicon technology and key innovations that improve dynamic switching performance

KEY BENEFITS
- Insertion loss
- Isolation
- High linearity (IP3)
- Return loss
- Switching time

OVERVIEW
- Routes input signal to selected output
- Poles – Number of inputs
- Throws – Number of outputs
- SP2T = Single pole, 2 throws - and more coming!
Interconnect Solutions for Radio Applications

**RapidIO® PRODUCTS**

RapidIO switches are the backbone of 3G and 4G wireless base stations for chip-to-chip, board-to-board and chassis-to-chassis links including secure encryption/decryption of the S-RIO protocol for out-of-the-box cabling. This overall offering makes pervasive mobile broadband a reality. In military and embedded computing, the reliability and robustness of IDT RapidIO is battlefield proven, making missions safer and making it possible for OEMs to deploy complex multi-processor systems in everything from fighter aircraft to shipborne electronics.

**KEY BENEFITS**

- True Real time switching, Latency and QOS guaranteed by design
- Low power, low-latency
- Ideal for peer-to-peer multiprocessor embedded systems up to 6.25 Gbaud per serial link

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**PCI EXPRESS® PRODUCTS**

IDT offers the industry’s most comprehensive family of PCIe switching solutions optimized for the most demanding applications - including server, embedded, networking, storage, and communications. IDT leads the industry in introducing advanced switch features such as multicast, multi-root partitioning, and multiple non-transparent bridges.

**KEY BENEFITS**

- First supplier of a standards-compatible PCIe Gen3 Retimer
- Signal integrity product portfolio for PCIe applications that enhance performance and reliability
- Product and technology leaders in PCIe switching
- Product and technology leaders in PCIe bridging
- Product and technology leaders in PCIe clocking solutions

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**SIGNAL INTEGRITY PRODUCTS**

With the increase of signal speeds in the computing, storage and communications applications, system designers face greater signal integrity challenges. The signal integrity product portfolio from IDT provides signal conditioning devices for popular multi-gigabit per second IO protocols delivering signal quality over extended distances and offering simplified design by alleviating layout constraints.

**KEY BENEFITS**

- Extend maximum cable length to over 10 meters and trace length over 65 inches in cabled applications
- Speeds up system design time by allowing usage of longer trace and cable lengths
- Minimizes bit error rate (BER)
- Supports: SAS, SATA, USB3, XAUI, sRIO, PCIe and Legacy Link

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**IQ DATA COMPRESSION TECHNOLOGY**

Compression IP is used to put more data into a given fiber or microwave “link” in wireless systems. Using Compression a higher data rate can be transmitted on lower speed links which are generally cheaper. This is a goal across the industry but few have achieved. When compressing data, some signal quality is lost. Based on its patented technology, IDT has proven that it can do compression with very little loss of signal quality.

**KEY BENEFITS**

- IP can be deployed in ASIC or FPGA (Altera and Xilinx)
- Based on multiple protected patents worldwide
- GSM, WCDMA and LTE support
- Small FPGA footprint
- Compression ratios 1.5:1 to 3:1 range
- EVM Performance 0.5% to 3% for typical 3G and 4G wireless signals
- Microsecond level latency @ 307.2 MHz
- High Performance IP core supporting uncompressed data rate up to 9.8304 Gbps
- Common clock rates of 61.44 MHz and 153.6 MHz for FPGA and 61.44 MHz, 153.6 MHz, and 307.2 MHz for ASIC

For more information about IDT Interconnect solutions, visit idt.com/products/interface-connectivity
Remote radio heads have become one of the most important subsystems of today’s new distributed base stations – containing the base station’s RF circuitry plus analog-to-digital/digital-to-analog converters and up/down converters. They have operation and management processing capabilities and a standardized optical interface to connect to the rest of the base station. Making MIMO operation easier, they increase a base station’s efficiency and facilitate easier physical location for gap coverage problems.

**Highly-differentiated RF products** from IDT offer up to 10x improvement in RF performance and enable green networks with minimal power consumption. They scale easily from Macros to small cells, improve reliability and data throughput.

IDT best-in-class **advanced timing products** have very low phase-noise, low-spurious jitter attenuating frequency generators with support for one or multiple RF clock frequencies. They support input clock redundancy, mid to high clock fanout and optional synchronization signals, such as used in JESD204B.
Test & Measurement Market: The smart phone roadmap will drive the need for improved test hardware and better product performance – elimination of GaAs pHEMT semiconductors and mechanical switches is a priority. Every semiconductor shipped globally must be tested and the tester must be better than the thing it’s testing.

Industrial Radio Market: Radio replacement increase driven by deployment of LTE data enabled radios using LTE modems. Increasing need for first responder organizations to have a common communication platform. Military/Tactical Radios must support new and legacy frequency bands driving switch content up.

SYNERGY WITH IDT PRODUCTS

TEST AND MEASUREMENT
• Technology innovations by IDT add tremendous value
• Demand high performance products

Product requirements:
• Broadband – near DC to GHz
• RF power – 1W to 4W
• High linearity

INDUSTRIAL RADIO
• Technology innovations by IDT are sought after in this market
• Mixers and switches cannot be integrated!

Product requirements:
• Broadband - 30M to 2.7GHz
• RF power - 1W/5W/10W
• High linearity

For more information about all IDT products for radio applications, please contact your local IDT contact or visit idt.com