



Integrated Device Technology

# PCI Express Solutions

Comprehensive Portfolio from the Leader in PCI Express Solutions

CLOCKS AND TIMING | INTERFACE AND CONNECTIVITY | MEMORY AND LOGIC | POWER MANAGEMENT | RF PRODUCTS

## PCI Express Signal Retimers and Repeaters

Active signal conditioning for applications up to 8 Gbps PCIe Gen 3

- Four, eight and sixteen channels
- Compensates for cable and PCB trace attenuation and ISI jitter
- Configurable receiver equalization
- Configurable transmitter de-emphasis
- On-chip diagnostics support
- Leading edge power minimization in active and shutdown modes

## PCI Express Switches

Industry's most comprehensive family of high-performance, scalable PCIe switching solutions

- Extensive Portfolio
- Up to 64 lane and 24 port devices
- Highly flexible port configurations
- Unprecedented 8 non-transparent bridging (NTB) functions to enable multi-root applications

## PCI Express Bridges

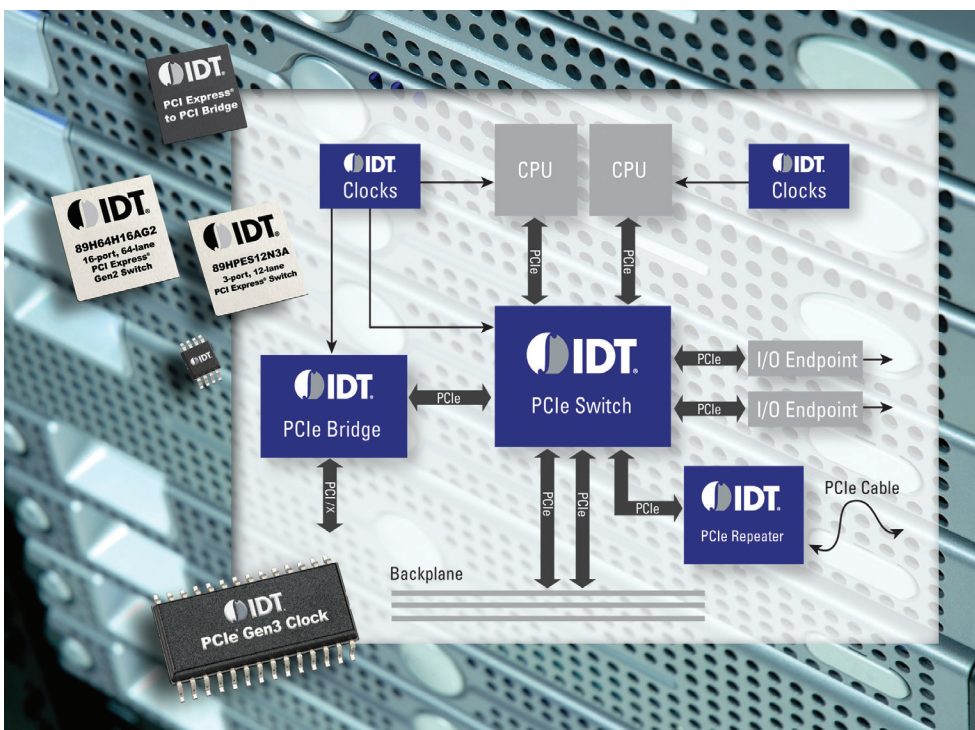
High performance PCIe bridging to legacy PCI and PCI-X protocols

- Ultra-low power version for consumer applications
- Forward mode buffer optimization
- The only PCI Express bridges with Short Term Caching for significant improvement in PCI Read performance
- Pin-compatible with competitive offerings for dual source solution

## PCI Express Timing Solutions

Industry's broadest offering of PCIe Gen1, Gen2 and Gen3 clock generation and buffering solutions

- World's first PCI Express Gen3 family of timing devices
- Clock generators
- Fanout buffers and multiplexers
- Zero delay buffers



PCI Express® (PCIe®) is globally recognized as the general purpose I/O that unifies the component interconnect across many applications including desktop computing, servers, workstations, storage, networking, enterprise router, industrial test and control equipment, defense, aerospace and many more.

IDT provides an extensive product portfolio that tackles design requirements needed to build an entire PCI Express network, including switches, bridges, signal integrity and timing solutions.

### Signal Integrity Products

- Retimers
- Repeaters

### Switches

- I/O expansion switches
- System interconnect switches

### Bridges

- PCIe to PCI / PCI-X Bridges
- PCI-X to PCI-X Bridges
- PCI to PCI Bridges

### Timing

- Clock synthesizers and spread spectrum clock generators
- PLL zero-delay buffers (ZDB)
- Non-PLL fanout buffers and multiplexers
- Jitter attenuators

**PCI Express signal integrity** is signal conditioning to remove signal noise and correct for trace/cable attenuation.

**PCI Express switches** provide the switching capacity for the entire PCI Express network.

**PCI Express bridges** provide connectivity between PCI Express and a different interconnect protocol.

**PCI Express timing** provides the reference-clock while maintaining tight jitter specifications for all components.



Learn more:  
[www.idt.com/go/PCIe](http://www.idt.com/go/PCIe)

## PCI Express Signal Integrity Products

*PCIe Gen 3 and Gen2 Standards*

With the increase of signal speeds in the computing, storage and communications applications, system designers increasingly face signal integrity challenges. Signal Integrity Product (SIP) components provide signal conditioning for applications up to 8 Gbps, PCI Express® 3.0, delivering signal quality over extended distances while offering simplified design by alleviating board layout constraints.

These devices incorporate advanced receive equalization and transmit de-emphasis capabilities, as well as diagnostic features that help IDT customers achieve a simplified design with faster time-to-market. Specifically, the devices drive long on-board traces, backplane traces and cables to external devices to ensure optimum system performance. The devices all offer power savings modes for the lowest-possible power consumption.

### FEATURES

- Extends trace over 60 inches, and cable over 10 meters
- Eliminates Deterministic Jitter (Dj), Random Jitter (Rj) and Inter-Symbol Interference (ISI)
- Optimizes system performance by reducing lost packets
- Better system reliability with increased signal voltage and timing margins
- Simplifies system design and time-to-market

| Part Number               | Channels | Pin Config | I <sup>2</sup> C Config | Package (mm) | Contact Pitch (mm) |
|---------------------------|----------|------------|-------------------------|--------------|--------------------|
| <b>PCIe 3.0 Retimers</b>  |          |            |                         |              |                    |
| 89HT0808P                 | 8        | N          | Y                       | 9 x 9 BGA    | 0.8                |
| 89HT0816P                 | 16       | N          | Y                       | 15 x 15 BGA  | 1.0                |
| 89HT0816AP                | 16       | N          | Y                       | 15 x 15 BGA  | 1.0                |
| 89HT0832P                 | 32       | N          | Y                       | 13 x 20 BGA  | 0.8                |
| 89HT0832P                 | 32       | N          | Y                       | 16 x 24 BGA  | 1.0                |
| <b>PCIe 2.1 Repeaters</b> |          |            |                         |              |                    |
| 89HP0504P                 | 4        | N          | Y                       | 4 x 7.5 QFN  | 0.5                |
| 89HP0504P                 | 4        | Y          | Y                       | 9 x 9 BGA    | 1.0                |
| 89HP0504PB                | 4        | Y          | N                       | 4 x 7.5 QFN  | 0.5                |
| 89HP0508P                 | 8        | N          | Y                       | 9 x 9 BGA    | 1.0                |

**Additional products and information available — [www.idt.com/go/PCleSIP](http://www.idt.com/go/PCleSIP)**

## PCI Express Switches

*Featuring Dual DMA, Multiple NTB, Multicast; Configurations 3 to 64 Lanes and 3 to 24 Ports*

IDT provides the industry's most comprehensive family of high performance, scalable PCI Express switching solutions. PCIe® switching solutions are optimized by application to maximize performance per watt for the most demanding applications.

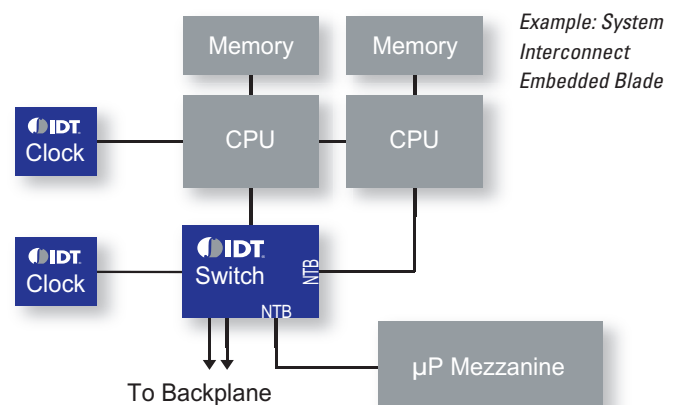
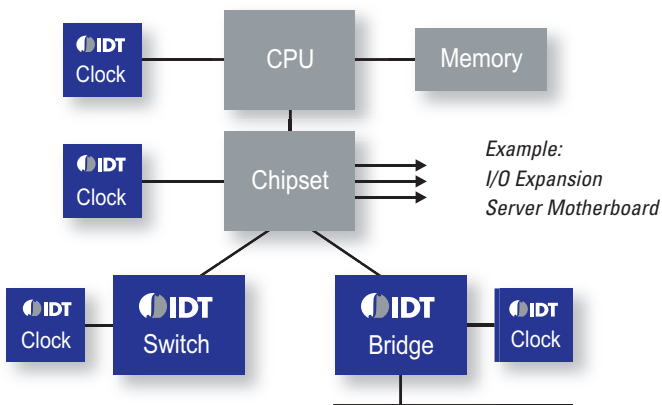
IDT "I/O Expansion PCIe Switches" are commonly used to connect a single Root Complex to I/O devices and add-in cards. In this usage

model, the majority of traffic flows between the Root Complex and the I/O devices.

The other primary usage model is using a PCIe switch as an embedded system fabric referred to as "System Interconnect Switch," which utilizes a high degree of peer-to-peer traffic. The System Interconnect Switch is capable of PCIe domain isolation, which may involve connecting multiple processing endpoints or simply providing a redundant backplane architecture.

### FEATURES

- Most advanced switching architecture available
  - Switch partitioning
  - Adaptive cut-through latency
  - Request metering
  - Large flow control credits and buffers
- Enables multi-domain communication in multi-root applications
  - Multiple non-transparent bridge functions
  - Multi-port timing domain and spread spectrum clock support
  - Multicast
  - Dual DMA controllers



## PCI Express® Switches

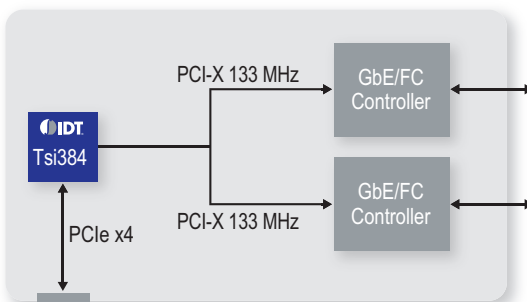
| Part Number   | PCIe Specification | Lanes | Ports | Switch Partitions (Multi-root) | NTB Ports | DMA Controllers | Multicast | Multi-Domain Clocking | Package Size (mm) |
|---------------|--------------------|-------|-------|--------------------------------|-----------|-----------------|-----------|-----------------------|-------------------|
| 89H32NT24AG2  | 2                  | 32    | 24    | 8                              | 8         | 2               | Yes       | 8                     | 23 x 23           |
| 89H32NT8AG2   | 2                  | 32    | 8     | 8                              | 8         | 2               |           | 8                     | 23 x 23           |
| 89H24NT6AG2   | 2                  | 24    | 6     | 6                              | 6         | 2               |           | 6                     | 23 x 23           |
| 89H24NT24G2   | 2                  | 24    | 24    | 8                              | 8         | 2               |           | 2                     | 23 x 23           |
| 89H16NT16G2   | 2                  | 16    | 16    | 4                              | 4         | 2               |           | 2                     | 19 x 19           |
| 89H12NT12G2   | 2                  | 12    | 12    | 3                              | 3         | 2               |           | 2                     | 19 x 19           |
| 89HPES64H16G2 | 2                  | 64    | 16    | 16                             | N/A       | N/A             | N/A       | N/A                   | 35 x 35           |
| 89HPES48H12G2 | 2                  | 48    | 12    | 12                             |           |                 |           |                       | 27 x 27           |
| 89HPES32T8G2  | 2                  | 32    | 8     | 8                              |           |                 |           |                       | 23 x 23           |
| 89HPES24T6G2  | 2                  | 24    | 6     | 6                              |           |                 |           |                       | 19 x 19           |
| 89HPES24T3G2  | 2                  | 24    | 3     | 3                              |           |                 |           |                       | 19 x 19           |
| 89HPES16T4G2  | 2                  | 16    | 4     | 4                              |           |                 |           |                       | 23 x 23           |
| 89HPES12T3G2  | 2                  | 12    | 3     | 3                              |           |                 |           |                       | 19 x 19           |
| 89HPES6T6G2   | 2                  | 6     | 6     | 6                              |           |                 |           |                       | 19 x 19           |
| 89HPES8T5A    | 1                  | 8     | 5     | 5                              |           |                 |           |                       | 15 x 15           |
| 89HPES5T5     | 1                  | 5     | 5     | 5                              |           |                 |           |                       | 15 x 15           |
| 89HPES4T4     | 1                  | 4     | 4     | 4                              |           |                 |           |                       | 15 x 15           |
| 89HPES3T3     | 1                  | 3     | 3     | 3                              |           |                 |           |                       | 10 x 10           |

Additional products and information available — [www.idt.com/go/PCleSwitches](http://www.idt.com/go/PCleSwitches)

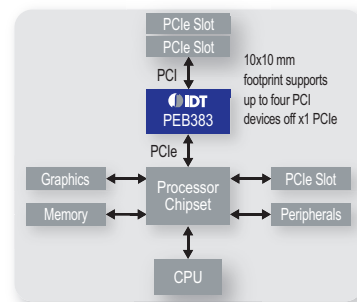
## PCI Express Bridges

### PCIe to PCI and PCI-X Bus Standards

To complement the switch products, IDT offers bridges to connect PCIe to the PCI and PCI-X bus standards. A PCIe bridge is used for bridging devices that use the PCI/X interface to provide a PCIe connection to a host processor or root complex. Applications include PCIe adapter cards, embedded computing, and motherboards to provide connection to PCI/X devices or additional PCI/X expansion slots.



Example: Storage HBA



Example: Motherboard Application

### FEATURES

- Compliant to PCIe 1.1 specification
- Low latency & high throughput features
- Proven interoperability
- Small footprint packages
- Simple power supply requirements
- Comprehensive design tools

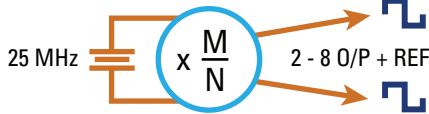
| Bridge        | Part Number | PCIe I/F | PCI Speed (MHz) | External Master Support | Power  | Package (mm)                |
|---------------|-------------|----------|-----------------|-------------------------|--------|-----------------------------|
| PCIe to PCI   | 89HPEB383   | x1 Gen1  | 32/66           | 4                       | 450 mW | 14 x 14 QFP<br>10 x 10 QFN  |
| PCIe to PCI   | Tsi381      | x1 Gen1  | 32/66           | 4                       | 700 mW | 13 x 13 PBGA                |
| PCIe to PCI   | Tsi382      | x1 Gen1  | 32/66           | 4                       | 700 mW | 20 x 20 QFP<br>10 x 10 PBGA |
| PCIe to PCI-X | Tsi384      | x4 Gen1  | 64/133          | 4                       | 1.3 W  | 17 x 17 PBGA                |
| PCI to PCI    | Tsi340      | N/A      | 32/66           | 4                       | 500 mW | 23 x 17 QFP                 |
| PCI to PCI    | Tsi350      |          | 32/66           | 9                       | 1.0 W  | 31 x 31 QFP<br>17 x 17 BGA  |
| PCI to PCI    | Tsi352      |          | 32/66           | 4                       | 500 mW | 32 x 32 QFP                 |

Contact an IDT representative for details on pin-compatibility with comparable solutions.

Additional products and information available — [www.idt.com/go/PCleBridges](http://www.idt.com/go/PCleBridges)

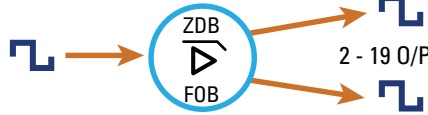
## PCI Express® Timing Solutions

### 9FG Clock (Frequency) Generators



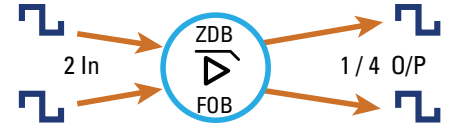
- Eliminate up to 32 resistors
- Save up to 55 mm<sup>2</sup> of area\*
- As small as 6.25 mm<sup>2</sup>
- 85 Ω and 100 Ω system support
- SSC generation

### 9DB and 9ZX Zero-delay and Fanout Buffers



- Eliminate up to 76 resistors
- Save up to 130 mm<sup>2</sup> of area\*
- As small as 16 mm<sup>2</sup>
- 85 Ω and 100 Ω system support
- SSC compatible

### 9DM and 9ZM Zero-delay and Fanout Multiplexers



- Eliminate up to 48 resistors
- Save up to 82 mm<sup>2</sup> of area\*
- As small as 9 mm<sup>2</sup>
- 85 Ω and 100 Ω system support
- SSC compatible

### PCIe Gen123 Clock Generators

| Part Number                      | Operating Voltage                            | Zout (Ω)                               | PCIe Outputs | Ref Output | Spread Spectrum Generation | Resistors Saved | Area Saved* (mm <sup>2</sup> ) | Package Area (mm <sup>2</sup> ) | Package Type | Typ. Idd (mA) | Typ. Gen 3 Jitter w/SSC (ps rms) |
|----------------------------------|--|--|--------------|------------|----------------------------|-----------------|--------------------------------|---------------------------------|--------------|---------------|----------------------------------|
| 9FGU0241/9FGV0241/9FGL0241/51/P1 | 9FGU = 1.5 V<br>9FGV = 1.8 V<br>9FGL = 3.3 V | xx41 = 100<br>xx51 = 85<br>xxP1 = Prog | 2            | Yes        | Yes                        | 8               | 14                             | 16                              | VFQFPN-24    | 28            | 0.3 - 0.4                        |
| 9FGV0242                         |  |  | 2            | No         |                            | 8               | 14                             | 6.25                            | VFQFPN-16    | 17            |                                  |
| 9FGU0441/9FGV0441/9FGL0441/51/P1 |  |  | 4            | Yes        |                            | 16              | 27                             | 25                              | VFQFPN-32    | 32            |                                  |
| 9FGU0641/9FGV0641/9FGL0641/51/P1 |  |  | 6            | Yes        |                            | 24              | 41                             | 25                              | VFQFPN-40    | 39            |                                  |
| 9FGU0841/9FGV0841/9FGL0841/51/P1 |  |  | 8            | Yes        |                            | 32              | 55                             | 36                              | VFQFPN-48    | 46            |                                  |

### PCIe Gen123 Clock Buffers

| Part Number       | Operating Voltage            | Zout (Ω)                               | PCIe Outputs | PLL/ZDB Mode | Spread Spectrum Compatible | Resistors Saved | Area Saved* (mm <sup>2</sup> ) | Package Area (mm <sup>2</sup> ) | Package Type | Typ. Idd (mA) | Typ. Gen 3 Jitter w/SSC (ps rms) |
|-------------------|------------------------------|--|--------------|--------------|----------------------------|-----------------|--------------------------------|---------------------------------|--------------|---------------|----------------------------------|
| 9DBU0241/9DBV0241 | 9DBU = 1.5 V<br>9DBV = 1.8 V | xx41 = 100<br>xx51 = 85<br>xxP1 = Prog | 2            | Yes          | Yes                        | 8               | 14                             | 16                              | VFQFPN-24    | 16            | 0.5                              |
| 9DBU0441/9DBV0441 |                              |  | 4            | Yes          |                            | 16              | 27                             | 25                              | VFQFPN-32    | 31            | 0.5                              |
| 9DBL411           |                              |  | 4            | No           |                            | 8               | 14                             | 16                              | VFQFPN-20    | 40            | <0.2 additive                    |
| 9DBU0541/9DBV0541 |                              |  | 5            | No           |                            | 20              | 34                             | 25                              | VFQFPN-32    | 25            | <0.1 additive                    |
| 9DBU0641/9DBV0641 |                              |  | 6            | Yes          |                            | 24              | 41                             | 25                              | VFQFPN-40    | 41            | 0.5                              |
| 9DBU0741/9DBV0741 |                              |  | 7            | No           |                            | 28              | 48                             | 25                              | VFQFPN-40    | 34            | <0.1 additive                    |
| 9DBU0841/9DBV0841 |                              |  | 8            | Yes          |                            | 32              | 55                             | 36                              | VFQFPN-48    | 46            | 0.5                              |
| 9DBU0941/9DBV0941 |                              |  | 9            | No           |                            | 36              | 62                             | 36                              | VFQFPN-48    | 44            | <0.1 additive                    |

### PCIe Gen1/2/3 + QPI Clock Buffers

| Part Number   | Operating Voltage | Zout (Ω)                 | PCIe Outputs | PLL/ZDB Mode | Spread Spectrum Compatible | Resistors Saved | Area Saved* (mm <sup>2</sup> ) | Package Area (mm <sup>2</sup> ) | Package Type | Typ. Idd (mA) | Typ. Gen 3 Jitter w/SSC (ps rms) |
|---------------|-------------------|--------------------------|--------------|--------------|----------------------------|-----------------|--------------------------------|---------------------------------|--------------|---------------|----------------------------------|
| 9ZXL0651      | 9ZXL = 3.3 V      | xx30/31=33<br>xx50/51=85 | 6            | Yes          | Yes                        | 24              | 41                             | 25                              | VFQFPN-40    | 62            | 0.6                              |
| 9ZXL0831/51   |                   |                          | 8            |              |                            | 32              | 55                             | 36                              | VFQFPN-48    | 78            | 0.5                              |
| 9ZXL1231/1251 |                   |                          | 12           |              |                            | 48              | 82                             | 16                              | VFQFPN-64    | 135           | 0.5                              |
| 9ZXL1530/50   |                   |                          | 15           |              |                            | 60              | 103                            | 25                              | VFQFPN-64    | 162           | 0.5                              |
| 9ZXL1930/50   |                   |                          | 19           |              |                            | 76              | 130                            | 25                              | VFQFPN-72    | 186           | 0.5                              |

### PCIe Gen1/2/3 Clock Multiplexers (2 Inputs)

| Part Number       | Operating Voltage            | Zout (Ω)                               | PCIe Outputs | Sync/Async Mode | Spread Spectrum Compatible | Resistors Saved | Area Saved* (mm <sup>2</sup> ) | Package Area (mm <sup>2</sup> ) | Package Type | Typ. Idd (mA) | Typ. Gen 3 Jitter w/SSC (ps rms) |
|-------------------|------------------------------|--|--------------|-----------------|----------------------------|-----------------|--------------------------------|---------------------------------|--------------|---------------|----------------------------------|
| 9DMU0141/9DMV0141 | 9DMU = 1.5 V<br>9DMV = 1.8 V | xx41 = 100<br>xx51 = 85<br>xxP1 = Prog | 1            | Yes             | Yes                        | 4               | 7                              | 9                               | VFQFPN-16    | 8             | <0.1 additive                    |
| 9DMU0441/9DMV0441 |                              |  | 4            |                 |                            | 16              | 27                             | 16                              | VFQFPN-24    | 20            | <0.1 additive                    |

\* Compared to traditional HCSL outputs.

## Данный компонент на территории Российской Федерации

### Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

### Офис по работе с юридическими лицами:

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