



### PE2SFC293/A

#### Security Protocol Processor PCI Express Server Adapter / Freescale C293 Freescale® Based

##### Product Description

Silicom protocol processor PCI-Express x4 security card based on the Freescale C293 Crypto CoProcessor.

The C293 crypto coprocessor family initially consists of 3 high performance crypto coprocessors, optimized for public key operations. Public key algorithms such as RSA, Diffie Hellman, and Elliptic Curve Cryptography (ECC) are the basis of digital signature and key exchange protocols that make electronic commerce possible.

The C29x product line employs C291, 2 and 3 Crypto CoProcessors. The C293 offers high-performance support for a wide range of protocols, such as: IPSEC, SSL/TLS and IPsec bulk encryption.

##### C293 performs the following functions:

- Modular exponentiation
- Random number generation
- Hash processing
- Bulk encryption/decryption
- Executes protocol-specific complex instructions to support SSL/TLS or IPsec security protocols

The heart of the C293 is its 3 SEC – security engines. Each engine provides design flexibility by simultaneously supporting cryptographic operations and accelerating protocol functions.

The Silicom Protocol Processor PCI Express adapter is the ideal solution for high-end and mid-end virtual private networking (VPN), firewall appliances and SSL-based appliances.

##### Key Features

- Single C293 Crypto CoProcessor
- Compression: See ordering information
- PCI Express Gen-2 x4 connector supporting x4, x2 and x1 links
- Dimensions: PCIe Low Profile, 64.4mm x 167.6mm
- No external power needed
- High scalability with both hardware and software scalability
  - Bulk encryption/decryption

- data compression/decompression
- 3 SEC(Security Engines), each engine supports the following functionalities
  - DMA for bus master operation
  - Job Queue Controller with two Job Rings
  - (15) Descriptor Controllers (DECOs)
- -Responsible for executing Descriptors and managing sequencing of keys, context, and data through the various CHAs
- -Performs header and trailer processing as defined by the descriptor
- Crypto Hardware Accelerators (CHAs)
  - (15) Public Key Hardware Accelerators (PKHA) supporting the following key lengths and routines
    - Modular Arithmetic in support of RSA and Diffie-Hellman (to 4096b)
    - Elliptic curve cryptography (to 1024b)
    - Point math over a prime field (Fp)
    - Point math over a binary field (F2m)
    - Montgomery Radix Constant R2 mod N
    - Greatest Common Divisor GCD(A,N)
    - Primality Test Miller-Rabin
    - DSA Sign
    - DSA Verify
    - All routines with timing equalization to defeat side channel timing attacks
  - (1) Random Number Generator
    - -NIST-compliant DRBG and SHS implementation
  - (3) Advanced Encryption Standard Accelerators (AESAs)
    - -Key lengths of 128-, 192-, and 256-bit
    - -ECB, CBC, CTR, CCM, GCM, CMAC, OFB, CFB, and XTS
    - -Differential Power Analysis Resistant design
  - (3) Message Digest Hardware Accelerators (MDHA)
    - -SHA-1, SHA-2 256, 384, 512-bit digests
    - -MD5 128-bit digest
    - -HMAC with all algorithms
- High performance Public Key Processor
  - Up to 32K 2048-bit RSA operations/second
  - Up to 115.4K 1024-bit RSA operations/second

**Applications:**

- VPN appliances
- VPN firewalls, routers and switches
- Secure WEB Servers and storage
- Secure Access devices

**Technical Specifications**

<b>System Throughput</b>	
System Throughput values are shown below. System values represent measured, memory-to-memory, in-system throughput on an optional platform using large buffer sizes and maximum pipelining	
Function	<b>C293</b>
Full Ipsec Processing Throughput (w/AES+SHA2)	12Gb/s
RSA 2048 bit Exponent	32Kops/s
RSA 1024 bit Exponent	115.4Kops/s
<b>Operating Systems Support</b>	
Operating system support:	Linux
<b>General Technical Specifications</b>	
Interface Standard:	PCI-Express Base Specification Revision 2.0 ( 5 GTs)
Board Size:	Low profile 167.6mm x 64.4mm
PCI Express Card Type:	X4 Lane
PCI Express Voltage:	+12V +- 8%
PCI Connector:	X4 Lane
Controller:	Freescale C293
Holder:	Metal Bracket
Operating Humidity:	0°C – 55°C (32°F – 131°F)

<b>Operating Temperature:</b>	0°C – 45°C (32°F – 113°F) Air flow requirement for this adapter is 200 LFM
<b>Storage:</b>	-40°C–65°C (-40°F–149°F)
<b>EMC Certifications:</b>	<p>FCC Part 15, Subpart B Class A</p> <p>Conducted Emissions</p> <p>Radiated Emissions</p> <p>CE EN 55022: 1998 Class A Amendments A1: 2000; A2: 2003</p> <p>Conducted Emissions</p> <p>Radiated Emissions</p> <p>CE EN 55024: 1998 Amendments A1: 2000; A2: 2003</p> <p>Immunity for ITE Amendment A1: 2001</p> <p>CE EN 61000-3-2 2000, Class A</p> <p>Harmonic Current Emissions</p> <p>CE EN 61000 3-3 1995, Amendment A1: 2001</p> <p>Voltage Fluctuations and Flicker</p> <p>CE IEC 6100-4-2: 1995</p> <p>ESD Air Discharge 8kV. Contact Discharge 4kV.</p> <p>CE IEC 6100-4-3:1995</p> <p>Radiated Immunity (80-1000Mhz), 3V/m 80% A.M. by 1kHz</p> <p>CE IEC 6100-4-4:1995</p> <p>EFT/B: Immunity to electrical fast transients 1kV Power Leads, 0.5Kv Signals Leads</p> <p>CE IEC 6100-4-5:1995</p> <p>Immunity to conductive surges COM Mode; 2kV, Dif. Mode 1kV</p> <p>CE IEC 6100-4-6:1996</p> <p>Conducted immunity (0.15-80 MHz) 3VRMS 80% A.M. By 1kHz</p> <p>CE IEC 6100-4-11:1994</p> <p>Voltage Dips and Short Interruptions</p> <p>V reduc &gt;95%, 30% &gt;95% Duration 0.5per, 25per, 250per</p>

## Order Information

P/N	Description
<b>PE2SFC293</b>	Security Protocol Processor PCI Express Adapter / C293 – PKCAL Mode
<b>PE2SFC293A</b>	Security Protocol Processor PCI Express Adapter / C293 – SKMM Mode