

Annex C:
Approved Random Number Generators
for FIPS PUB 140-2,
*Security Requirements for
Cryptographic Modules*

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1. Introduction

Federal Information Processing Standards Publication (FIPS PUB) 140-2, Security Requirements for Cryptographic Modules, specifies the security requirements that are to be satisfied by the cryptographic module utilized within a security system protecting sensitive information within computer and telecommunications systems (including voice systems). The standard provides four increasing, qualitative levels of security: Level 1, Level 2, Level 3, and Level 4. These levels are intended to cover the wide range of potential applications and environments in which cryptographic modules may be employed. The security requirements cover eleven areas related to the secure design and implementation of the cryptographic module. These areas include the following:

1. Cryptographic Module Specification
2. Cryptographic Module Ports and Interfaces
3. Roles, Services, and Authentication
4. Finite State Model
5. Physical Security
6. Operational Environment
7. Cryptographic Key Management
8. Electromagnetic Interference/Electromagnetic Compatibility (EMI/EMC)
9. Self Tests
10. Design Assurance
11. Mitigation of Other Attacks

The Cryptographic Module Validation Program (CMVP - www.nist.gov/cmvp) validates cryptographic modules to FIPS PUB 140-2 and other cryptography based standards. The CMVP is a joint effort between NIST and the Communications Security Establishment Canada (CSEC - www.cse-cst.gc.ca). Modules validated as conforming to FIPS PUB 140-2 are accepted by the Federal agencies of both countries for the protection of sensitive information (United States) or Designated information (Canada).

In the CMVP, vendors of cryptographic modules use independent, accredited testing laboratories to have their modules tested. Organizations wishing to have validations performed would contract with the laboratories for the required services.

2. Purpose

The purpose of this document is to provide a list of Approved random number generators applicable to FIPS PUB 140-2.

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ANNEX C: APPROVED RANDOM NUMBER GENERATORS

Annex C provides a list of Approved random number generators applicable to FIPS PUB 140-2. There are two basic classes: deterministic and nondeterministic. A deterministic RNG consists of an algorithm that produces a sequence of bits from an initial value called a seed. A nondeterministic RNG produces output that is dependent on some unpredictable physical source that is outside human control.

Deterministic Random Number Generators

1. National Institute of Standards and Technology, [Digital Signature Standard \(DSS\)](#), Federal Information Processing Standards Publication 186-2, January 27, 2000 with Change Notice – Appendix 3.1.
2. National Institute of Standards and Technology, [Digital Signature Standard \(DSS\)](#), Federal Information Processing Standards Publication 186-2, January 27, 2000 with Change Notice – Appendix 3.2.

Note: Please review National Institute of Standards and Technology, [Implementation Guidance for FIPS PUB 140-1 and the Cryptographic Module Validation Program](#), Sections 8.1, 8.7 and 8.9 for additional guidance.

3. American Bankers Association, *Digital Signatures Using Reversible Public Key Cryptography for the Financial Services Industry (rDSA)*, ANSI X9.31-1998 - Appendix A.2.4.
4. American Bankers Association, *Public Key Cryptography for the Financial Services Industry: The Elliptic Curve Digital Signature Algorithm (ECDSA)*, ANSI X9.62-1998 – Annex A.4.
5. National Institute of Standards and Technology, [NIST-Recommended Random Number Generator Based on ANSI X9.31 Appendix A.2.4 Using the 3-Key Triple DES and AES Algorithms](#), January 31, 2005.
6. National Institute of Standards and Technology, [Recommendation for Random Number Generation Using Deterministic Random Bit Generators \(Revised\)](#), Special Publication 800-90, March 2007.

Nondeterministic Random Number Generators

There are no FIPS Approved nondeterministic random number generators.

Document Revisions

Date	Change
03-17-2003	Deterministic Random Number Generators , Number 3: <i>Digital Signatures Using Reversible Public Key Cryptography for the Financial Services Industry (rDSA)</i> – corrected reference to Appendix A.2.4
01-31-2005	Deterministic Random Number Generators , Number 5: <i>NIST-Recommended Random Number Generator Based on ANSI X9.31 Appendix A.2.4 Using the 3-Key Triple DES and AES Algorithms</i> - Added
01-24-2007	Deterministic Random Number Generators , Number 6: <i>Recommendation for Random Number Generation Using Deterministic Random Bit Generators</i> - Added
03-19-2007	Deterministic Random Number Generators , Number 6: <i>Recommendation for Random Number Generation Using Deterministic Random Bit Generators (Revised)</i> – Updated to revised document
10/18/2007	Updated links
07/21/2009	Updated links to archived FIPS 186-2.

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End of Document

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