

UniMate USB PKCS 11 Manual

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PKCS#11 Manual

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CE Attestation of Conformity

UniMate is in conformity with the protection requirements of CE Directives 89/336/EEC Amending



Directive 92/31/EEC. UniMate satisfies the limits and verifying methods: EN55022/CISPR 22 Class B, EN55024: 1998.

FCC Standard



This device is in conformance with Part 15 of the FCC Rules and Regulation for Information Technology Equipment.

Operation of this product is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.



The equipment of UniMate is USBbased.

Conformity to ISO 9001:2000



The Quality System of SecuTech Solution Inc., including its implementation, meets the requirements of the standard ISO 9001:2000

ROHS



All UniMate products are environmentally friendly with ROHS certificates.

Introduction

PKCS#11 is a Public-Key Cryptography Standard (PKCS) for public key cryptography, developed by RSA Laboratories and includes both algorithm-specific and algorithm-independent implementation standards. It is an industry standard that defines a technology independent programming interface for cryptographic devices such as smart cards and PCMCIA cards. This standard specifies an application program interface (API) called Cryptoki (Cryptographic Token Interface), to devices, either physical or virtual, which hold cryptographic information (keys and other data) and perform cryptographic functions. This API is used across many platforms and is powerful enough for most security-related applications. SecuTech uses PKCS#11 as the main API for UniMate programming. UniMate supports PKCS#11 applications via UniMate middleware.

The following files are needed when developing UniMate PKCS#11 applications:

Files	Path
Cryptoki.h	Provided by RSA
pkcs11.h	Provided by RSA
Pkcs11f.h	Provided by RSA
Pkcs11t.h	Provided by RSA
UniMateP11.dll / UniMateP11.so	SDK\PKCS#11\Libraries\

The PKCS#11 module of UniMate supports the creation of the following objects:

Object Class	Description
CKO_DATA	For data structures defined by the application
CKO_SECRET_KEY	For symmetric keys
CKO_CERTIFICATE	For X.509 v3 certificates
CKO_PUBLIC_KEY	For RSA/DSA public key
CKO_PRIVATE_KEY	For RSA/DSA private key

All the objects listed in the above table can be created with UniMate. The secure storage in UniMate is limited, so objects can only be created in memory but can NOT be stored in the UniMate secure storage. Only encryption keys and permanently present data need to be saved in the UniMate.

Supported PKCS#11 Algorithms and API

Algorithm	Encrypt/Decrypt	Sign/Verify	Digest	Generate key/pair
CKM_RSA_PKCS_KEY_PAIR_GEN				✓
CKM_RSA_PKCS	✓	✓		
CKM_DSA_KEY_PAIR_GEN				
CKM_DSA				
CKM_RC2_KEY_GEN				
CKM_RC2_ECB				
CKM_RC2_CBC				
CKM_RC2_CBC_PAD				
CKM_RC4_KEY_GEN				
CKM_RC4				
CKM_DES_KEY_GEN				✓
CKM_DES_ECB	✓			
CKM_DES_CBC	✓			
CKM_DES3_KEY_GEN				✓
CKM_DES3_ECB	✓			
CKM_DES3_CBC	✓			
CKM_DES3_CBC_PAD	✓			
CKM_MD2				
CKM_MD5			✓	
CKM_SHA_1			✓	
CKM_DH_PKCS_KEY_PAIR_GEN				
CKM_AES_KEY_GEN				✓
CKM_AES_CBC	✓			
CKM_AES_ECB	✓			

The table below lists all of the key sizes in the UniMate PKCS#11 library:

Algorithms	Key Sizes
CKM_RSA_PKCS_KEY_PAIR_GEN	1024bits, 2048bits
CKM_DES_KEY_GEN	64 bits
CKM_DES3_KEY_GEN	192 bits
CKM_AES_KEY_GEN	128 ~ 256 bits

UniMate PKCS#11 Function Library

The UniMate PKCS#11 library only implements the standard PKCS#11 APIs. Any other APIs beyond PKCS#11 are not implemented. If such an API is called, an error return code such as CKR_FUNCTION_NO_SUPPORT will be returned.

Category	Function	Supported
General Purpose Function	C_Initialize	YES
	C_Finalize	YES
	C_GetInfo	YES
	C_GetFunctionList	YES
Slot and UniMate Management Function	C_GetSlotList	YES
	C_GetSlotInfo	YES
	C_GetUniMateInfo	YES
	C_WaitForSlotEvent	YES
	C_GetMechanismList	YES
	C_GetMechanismInfo	YES
	C_InitUniMate	YES
	C_InitPIN	YES
	C_SetPIN	YES
Session Management Function	C_OpenSession	YES
	C_CloseSession	YES
	C_CloseAllSessions	YES
	C_GetSessionInfo	YES
	C_GetOperationState	NO
	C_SetOperationState	NO
	C_Login	YES
	C_Logout	YES
Object Management Function	C_CreateObject	YES
	C_CopyObject	NO
	C_DestroyObject	YES
	C_GetObjectSize	YES
	C_GetAttributeValue	YES
	C_SetAttributeValue	YES
	C_FindObjectsInit	YES
	C_FindObjects	YES
	C_FindObjectsFinal	YES
Encryption Function	C_EncryptInit	YES
	C_Encrypt	YES
	C_EncryptUpdate	YES
	C_EncryptFinal	YES

Category	Function	Supported
Decryption Function	C_DecryptInit	YES
	C_Decrypt	YES
	C_DecryptUpdate	YES
	C_DecryptFinal	YES
Message Digesting Function	C_DigestInit	YES
	C_Digest	YES
	C_DigestUpdate	YES
	C_DigestKey	NO
	C_DigestFinal	YES
Signing and Hashing Function (MAC)	C_SignInit	YES
	C_Sign	YES
	C_SignUpdate	NO
	C_SignFinal	NO
	C_SignRecoverInit	NO
	C_SignRecover	NO
Functions for Verifying Signatures and Hashing (MAC)	C_VerifyInit	YES
	C_Verify	YES
	C_VerifyUpdate	NO
	C_VerifyFinal	NO
	C_VerifyRecoverInit	NO
	C_VerifyRecover	NO
Dual-Purpose Cryptographic Function	C_DigestEncryptUpdate	NO
	C_DecryptDigestUpdate	NO
	C_SignEncryptUpdate	NO
	C_DecryptVerifyUpdate	NO
Key Management Function	C_GenerateKey	YES
	C_GenerateKeyPair	YES
	C_WrapKey	YES
	C_UnwrapKey	YES
	C_DeriveKey	NO
Random Number Generation Function	C_SeedRandom	NO
	C_GenerateRandom	YES
Callback Function		YES

Samples


All the samples are implemented in C, and they all support PKCS#11 standard v.2.20. The samples are provided in:
SDK\PKCS#11\Sample

Function	Description
C_Initialize	Initialize the PKCS#11 library
C_GetSlotList	Get the slot list
C_OpenSession	Open a session
C_Login	Log in
C_InitPIN	Initialize user PIN
C_Logout	Log out
C_FindObjectsInit	Initialize the search for any object
C_FindObjects	Find the objects which match
C_FindObjectsFinal	Cleanup the search
C_CloseSession	Close a session
C_GetAttributeValue	Get the attribute value
C_Finalize	Close PKCS #11 library
C_GenerateKeyPair	Generate a new public/private key pair
C_GenerateKey	Generate a secret key
C_WrapKey	Wrap (encrypt) a key
C_UnwrapKey	Unwrap (decrypt) a key
C_DeriveKey	Derive a key from a base key
C_SetPIN	Modify the current users PIN
C_GetTokenInfo	Get the slot information
C_SignInit	Initialize a signature
C_Sign	Sign data
C_SignUpdate	Continue a multiple-part signature
C_SignFinal	Finish a multiple-part signature
C_SignRecoverInit	Initialize a signature
C_SignRecover	Sign data, where the data can be recovered from the signature
C_DestroyObject	Destroy an object


Function	Description
C_GetFunctionList	Return the function list
C_GetMechanismList	Obtain a list of mechanism types
C_GetMechanismInfo	Obtain information about a particular mechanism possibly supported by a token
C_InitToken	Initialize a token
C_GetSessionInfo	Obtain information about the session
C_GetOperationState	Obtain the cryptographic state of a session
C_SetOperationState	Restore the cryptographic state of a session
C_EncryptInit	Initialize an encryption operation
C_Encrypt	Encrypt single-part data
C_EncryptUpdate	Continue a multiple-part encryption
C_EncryptFinal	Finish a multiple-part encryption operation
C_DecryptInit	Initialize a decryption
C_Decrypt	Decrypt encrypted data in a single part
C_DecryptUpdate	Continue a multiple-part decryption
C_DecryptFinal	Finish a multiple-part decryption
C_DigestInit	Initialize a message-digesting operation.
C_Digest	Digest data in a single part
C_DigestUpdate	Continue a multiple-part message-digesting
C_DigestFinal	Finish a multiple-part message-digesting
C_VerifyInit	Initialize a verification
C_Verify	Verify a signature
C_VerifyUpdate	Continue a multiple-part verification
C_VerifyFinal	Finish a multiple-part verification
C_VerifyRecoverInit	Initialize a signature verification
C_VerifyRecover	Verify a signature, where the data is recovered from the signature
C_SeedRandom	Mix additional seed material into the token's random number generator
C_GenerateRandom	Generate random data
C_GetFunctionStatus	Obtain an updated status of a function running in parallel with an application
C_CancelFunction	Cancel a function
C_WaitForSlotEvent	Wait for a slot event to occur

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