

5806 & 5906 Series Seos® 8K Cards with MIFARE Classic or DESFire EV2 Implementation

Application Note and Order Form

PLT-04003, Rev A.1
September 2024

Copyright

© 2018 - 2024 HID Global Corporation/ASSA ABLOY AB. All rights reserved.

This document may not be reproduced, disseminated or republished in any form without the prior written permission of HID Global Corporation.

Trademarks

HID GLOBAL, HID, the HID Brick logo, HID Elite, iCLASS, iCLASS SE, multiCLASS SE, OMNIKEY, SEOS, HID Signo, SIO, and SmartID are the trademarks or registered trademarks of HID Global, ASSA ABLOY AB, or its affiliate(s) in the US and other countries and may not be used without permission. All other trademarks, service marks, and product or service names are trademarks or registered trademarks of their respective owners.

MIFARE, MIFARE Classic, MIFARE DESFire, and MIFARE DESFire EV1, EV2, and MIFARE Crypto are registered trademarks of NXP B.V. and are used under license.

Contacts

For technical support, please visit: <https://support.hidglobal.com>.

What's new

Date	Description	Revision
September 2024	Updated to reflect DESFire EV2 support.	A.1

A complete list of revisions is available in [Revision history](#).

Contents

1. Introduction	4
1.1 5906 iCLASS SE reader compatibility	4
1.2 Part activation process	4
2. 5806 Seos 8K + MIFARE Classic 4K implementation	5
2.1 Specification	5
2.2 5806 HID Global product compatibility	7
2.3 iCLASS SE reader ISO14443A-4 UID configuration	7
2.4 iCLASS HF Migration / iCLASS SE Custom Programming reader configuration.	8
2.5 5806 series MIFARE Classic third-party device compatibility	8
SAK coding	8
2.6 MIFARE Classic implementation comparison	9
2.7 5806 series test card	9
5806 Seos 8K + MIFARE Classic 4K - Activation Form	10
5806 Seos 8K + MIFARE Classic 4K - Advanced Order Form	12
3. 5906 Seos 8K + MIFARE DESFire EV2 8K implementation	14
3.1 Specification	14
3.2 5906 HID Global product compatibility	16
3.3 iCLASS SE reader 5906 Seos configuration	16
3.4 iCLASS SE reader ISO14443A-4 UID configuration	16
3.5 5906 MIFARE DESFire EV2 third-party device compatibility	17
SAK coding	17
ATQA coding	17
3.6 5906 MIFARE DESFire EV2 implementation comparison	18
3.7 5906 test card	18
5906 Seos + MIFARE DESFire EV2- Activation Form.	19
Seos 8K + MIFARE DESFire 8K - Order Form	20
5906 Seos 8K + MIFARE DESFire EV2 8K - Advanced Order Form	21
Appendix A. How to complete programming information	22
Example 2: 5906PNGGANN7 (500 cards)	22
Appendix B. UID specification	23
7 Byte UID	23
4 Byte NUID	23
Appendix C. Product lead times	24

1. Introduction

The Seos 5x06 series multi-function cards deliver full Seos 8K functionality, with the addition of MIFARE Classic 4K (5806) or MIFARE DESFire EV2 (5906) implementation.

In September 2023 the platform was updated to offer support for EV2 implementation functionality, EV1 applications are fully supported.

This application note provides the necessary guidance to ensure successful integration with, or migration from, existing MIFARE Classic 4K, or MIFARE DESFire EV1, or EV2 applications. Test cards are available to order for the purpose of evaluation and qualification. Please contact your local pre-sales representative for guidance.

MIFARE Classic environments and/or devices designed for native implementation are unlikely to support the 58xx series card without modification. It is more likely however, that MIFARE Classic applications designed to operate with multiple ISO14443A layer cards (for example, NXP JCOP or SmartMX platform) are likely to support the 58xx series card with little or no modification.

The 59xx series card with MIFARE DESFire EV2 implementation is highly likely to operate within both DESFire EV1 and EV2 native environments with little or no modification to the application.

1.1 5906 iCLASS SE reader compatibility

Depending on the model and date of production, a configuration card may be required to enable Seos functionality. If you encounter this issue during testing, please contact your local pre-sales representative.

1.2 Part activation process

For the reasons described above, customers are required to demonstrate that they have qualified test cards within the target environment, using the activation form on page 12 or 20. Upon submission of the request form, HID Global® will activate requested part numbers; please allow 3-5 working days to process. It is the responsibility of the partner to ensure activated parts are qualified for subsequent projects.

New project



Future project (using activated part numbers)



2. 5806 Seos 8K + MIFARE Classic 4K implementation

2.1 Specification

	Seos	MIFARE Classic implementation
Operating frequency	13.56 MHz	13.56 MHz
Communication protocol compliance	ISO14443A-4	ISO14443A-3
SAK	0x38	
ATQA	0x0200	
Communication speed	Up to 848 kbps	106 kbps
Memory type	EEPROM	EEPROM
Memory size	8 Kbytes	4 Kbytes
Multiple applications support	Yes (using Open Data Profile)	Yes
SIO® Data Object support	Yes, default	No
HID Data Format support	Yes (wrapped in SIO)	Yes, optional using HID MIFARE application
HID MIFARE application	N/A	Yes, optional (SmartID ¹ and specific iCLASS® SE™ reader models only)
Write endurance / data retention	Min 100,000 cycles / 10 years	Min 100,000 cycles / 10 years
Typical transaction time	Data size dependent	Data size dependent
Extended privacy support	No	No
Security features	Mutual authentication, diversified keys and secure messaging based on AES128	MIFARE Crypto
Security certification	Common Criteria (CC) EAL 5+ HW certified platform	
UID	Global 4 byte static UID	
	Note: From Q4 of 2024 onwards, the UID contained within block 0 shall be 7 bytes, if 4 byte UID is required, this can be obtained during anti-collision.	

¹ Discontinued

	Seos		MIFARE Classic implementation	
	Typical read range			
Reader environment	Standard ¹	On-Metal ²	Standard ¹	On-Metal ²
Signo™ 20/20K/40/40K	Up to 2" (5 cm)	Up to 1.6" (4 cm)	Up to 2" (5 cm) (UID Only)	Up to 1.6" (4 cm) (UID Only)
iCLASS SE R10/R15 (including BLE)	Up to 1.6" (4 cm)	Up to 1.1" (3 cm)	Up to 1.6" (4 cm) (UID Only)	Up to 1.1" (3 cm) (UID Only)
iCLASS SE R40/RK40 (including BLE)	Up to 2" (5 cm)	Use a 1" spacer Up to 1.6" (4 cm)	Up to 2" (5 cm) (UID Only)	Use a 1" spacer Up to 1.6" (4 cm) (UID Only)
iCLASS SE RP10/RP15 (including BLE)	Up to 1.1" (3 cm)	Use a 0.5" spacer Up to 1.1" (3 cm)	Up to 1.1" (3 cm)	Use a 0.5" spacer Up to 1.1" (3 cm) (UID Only)
iCLASS SE RP40/RPK40 (including BLE)	Up to 1.6" (4 cm)	Use a 1" spacer Up to 1.6" (4 cm)	Up to 1.6" (4 cm)	Use a 1" spacer Up to 1.6" (4 cm) (UID Only)
iCLASS R10/R40 HF Migration Reader (custom MIFARE Classic data)	Up to 2" (5 cm)	Use a 1" spacer Up to 1.6" (4 cm)	0.8-2" (2-5 cm)	Use a 1" spacer Up to 1.6" (4 cm) (UID Only)
Dimensions	2.12" x 3.35" x 0.315" (54 mm x 85 mm x 0.8 mm)			
Card construction	Composite with 60% PVC / 40% PET, laminated card			
Weight	About 5.5 g			
Operating temperature	-40°F to +158°F (-40°C to +70°C)			
Storage temperature	-31°F to +122°F (-35°C to +50°C) for 1000 h			
Thermal shock	-31°F to +176°F (-35°C to +80°C), 50 cycles of 5 minutes, 30 s transition time			
Chemical resistance	The card can withstand exposure to salt water (5%), salt mist, acetic acid water (5%), carbonated sodium water (5%), sugared water (10%), fuel B and ethylene glycol (50%) for at least 24 hours			
Card marking	©HID Seos® JMC4 J4P (from Q2 2024 onwards) ©HID Seos® JMC4 J1P XT			
Printable	Yes (glossy white front /glossy white back) for best results use an HDP printer. Direct-to-card printing is not recommended. Contact your HID sales representative or find more information about FARGO® printers on the HID Global website.			
Slot punch	Not available – do not slot punch			
Other options	Custom graphics and magstripe			
Standards compliance	ISO/IEC7810, ISO14443-4 (Seos), ISO14443-3 (MIFARE Classic), ISO10373, ISO60529, ISO7816, RoHS			
Warranty	Lifetime warranty			

¹ Based on dry wall mount with no ferrous material within close proximity.

² Based on metal surface or metal back-box mount.

2.2 5806 HID Global product compatibility

Not all HID Global products currently support MIFARE Classic implementation. The following table describes supported products and their functionality:

Signo and iCLASS SE readers	Seos support	MIFARE Classic support
Signo 20/20K/40/40K	Read PACS SIO	Read UID
iCLASS SE Rev E (R10/R15/R30/R40/RK40)	Read PACS SIO	Read UID
MultiCLASS® SE™ Rev E (RP10/RP15/RP30/RP40/RPK40)	Read PACS SIO	Read UID
iCLASS SE Rev D (discontinued) (R10/R15/R30/R40/RK40)	Read PACS SIO	Read UID
MultiCLASS SE Rev D (discontinued) (RP10/RP15/RP30/RP40/RPK40)	Read PACS SIO	Read UID
iCLASS HF Migration Series Rev C (discontinued)	N/A	Read UID Read custom data (requires specific data-mapper configuration).
iCLASS SE Custom Programming Series (Rev E)	Read PACS SIO (may require a configuration update)	Read UID Read custom data (requires specific data-mapper configuration).
SE Bio	Read/write templates	N/A
SmartID readers		
SmartID (discontinued) (HID MIFARE application and custom series)	N/A	Read HID MIFARE Read custom data
Field encoders		
CP1000 SE Encoder	Read/write PACS SIO and custom ADF (use part option "V")	Read/write (HID MIFARE) Read/write (custom)
Embedded reader boards		
SE Reader Module SE3200Ax	Read PACS SIO	Read UID
SE Reader Module SE3200BS0 (datamapper)	Read PACS SIO	Read UID or custom data
SE Reader Module SE3210BS0 (datamapper)	Read PACS SIO	Read UID or custom data
OMNIKEY® CK Mini Board R51270010	Read PACS SIO and custom data	Read UID or custom data
OMNIKEY CK Mini Board R51270001-1	Read PACS SIO	Read UID
OMNIKEY desktop readers		
OMNIKEY 5427CK Gen 2 R54270101	Read PACS SIO and custom data	Read UID or custom data
OMNIKEY R5427 Gen 2 BLE R54270111	Read PACS SIO and custom data	Read UID or custom data
OMNIKEY 5022	Read PACS SIO	Read UID
OMNIKEY 5033	Read PACS SIO	Read UID or custom data

2.3 iCLASS SE reader ISO14443A-4 UID configuration

The iCLASS SE reader will attempt to prioritize Seos payload over ISO14443A UID read. However, under certain conditions the static UID of the 58xx series card will be read. Disable ISO14443A to avoid invalid card reads. If ISO14443A UID mode is required for other card types, HID recommends using host-controlled reader audio/visual aids to encourage the user to re-present the card in the case of a UID read.

2.4 iCLASS HF Migration / iCLASS SE Custom Programming reader configuration

The iCLASS SE HF Migration / iCLASS SE Custom Programming reader series are likely to require a configuration change to support MIFARE Classic implementation. The data map must be configured as an ISO14443A3 object. Use test cards to determine the compatibility of currently installed SE readers. Should you encounter this issue, please contact your local pre-sales representative for assistance.

2.5 5806 series MIFARE Classic third-party device compatibility

The 58xx series is an ISO14443A-4 compliant card supporting both Seos and MIFARE Classic 4K implementation at ISO14443A-3. HID Global Seos compatible products, with the exception of HF Migration readers, support Seos functionality transparently without the need for updates to device firmware or changes to configuration. HF Migration readers may require a configuration update.

Third-party MIFARE Classic readers and systems (for example, other brands of physical access control readers or applications such as vending, printing and biometric devices) are likely to require a software update to identify the card as MIFARE Classic compliant. Applications designed to operate with NXP JCOP or Smart MX MIFARE Classic implementation are likely to support the card with little or no modification. This is due to the need to represent a dual ISO14443-4 and ISO14443-3 compliant card via the Select Acknowledge response of the card (SAK), and in some cases devices may halt at the ISO14443A-4 level. Check the specification of the application and/or devices in advance, or use test cards to determine compatibility.

From Q2 2024 onwards, the UID value stored in block 0 shall be 7 bytes. A 4 byte UID value can be obtained from anti-collision.

SAK coding

A native “standard” MIFARE Classic 4K card has a SAK value of 0x08. In order for Seos to operate alongside MIFARE Classic implementation, the ISO14443-4 flag must be set, resulting in a different overall SAK as shown in the following table. The host application may need modification to recognize and handle the resultant SAK correctly, and switch to ISO14443A-3 layer.

Coding of 58xx Series Seos with MIFARE Classic 4K

	MIFARE Classic 1KB SAK = 0x08 (b4 is set)	MIFARE Classic 4KB SAK = 0x18 (b5, b4 are set)	Standard ISO1443-4 (b6 is set)	Resultant SAK
Native MIFARE Classic 4K	-	X	-	0x18
58xx Series	-	X	X (Seos)	0x38

ATQA coding

ATQA should not be used to identify the card. However, for reference, it should be noted that the ATQA of the 58xx series card is 0x02. See NXP application note MIFARE Type Identification Procedure (AN10833) available from <https://www.nxp.com>.

2.6 MIFARE Classic implementation comparison

MIFARE Classic 1K Native	MIFARE Classic 4K Native	58xx series MIFARE Classic 4K Implementation
ATQA: 0x0400	ATQA: 0x0200	ATQA: 0x0200
4-Byte Static NUID (MF1S503yX) 7-Byte/Random UID option available (MF1S500yX)	4-Byte Static NUID (MF1S503yX) 7-Byte/Random ID option available (MF1S500yX)	4-Byte Static NUID or 4 Byte Random UID (7-Byte/Random ID is not supported)
SAK: 0x08	SAK: 0x18	SAK: 0x38
Default A Key: 0xFFFFFFFFFFFF	Default A Key: 0xFFFFFFFFFFFF	Default A Key: 0xFFFFFFFFFFFF
Default B Key: FFFFFFFFFFFFFF (set as data and not key)	Default B Key: 0xFFFFFFFFFFFF (set as data and not key)	Default B Key: 0xFFFFFFFFFFFF (set as data and not key)
Access Conditions FF078069 (all except last block) FF0780BC (last block 63)	Access Conditions FF078069 (all except last block) FF0780BC (last block 135)	Access Conditions FF078069 (all except last block) FF0780BC (last block 135)
Sector 0 Requires authentication to read	Sector 0 Requires authentication to read	Sector 0 Requires authentication to read
Sector 0 UID = 4 bytes	Sector 0 UID = 4 bytes	Sector 0 UID = 7 bytes, if 4 byte UID value is required, obtain from anti-collision

2.7 5806 series test card

Test cards are available to purchase for the purpose of test and qualification. The two part numbers below represent the two core programming profiles. MIFARE Classic is either un-programmed, or programmed with the HID MIFARE application supported by SmartID “HM” model readers.

Part number	Description
5806PNGGANN4-TEST	• Programmed Seos 8K with matching external # • Non-programmed MIFARE Classic 4K implementation • 4 byte NUID Include the desired Seos programming information with your order: format number, facility code and ID range.
5806PMGGAAN4-TEST	• Programmed Seos 8K with matching external # • Programmed HID MIFARE Classic 4K implementation • 4 byte NUID Include the desired Seos and HID MIFARE Classic programming information with your order: format number, facility code and ID range.



5806 Seos 8K + MIFARE Classic 4K - Activation Form

Submit this order form to your local HID Global customer service team for processing. HID Global requires all customers to confirm full approval of test part numbers before an order for the final part number is processed.

Use the order form to determine the required part numbers.

Upon receipt of this form, HID Global will activate the requested part numbers (please allow 3 working days). As soon as part activation is complete, you may submit your purchase order for processing using the order form.

☐ I confirm that I have read and understand this application note. Test cards have been issued and fully tested within the target MIFARE Classic and iCLASS SE reader environment. I understand that it is my responsibility to test and qualify all future projects using the below part numbers once activated.

Name	
Title	
Company	
HID Account #	
Date	

Please activate the following part number(s):

Part Number(s)

5806 Seos 8K + MIFARE Classic 4K - Order Form

Select a part number from the options below and submit within, or alongside, your completed purchase order. Please activate the requested part number in advance or alongside your purchase order (see *5806 Seos 8K + MIFARE Classic 4K - Activation Form*). Please refer to your HID Global price book for pricing. Programming information is mandatory for all programmed part options (e.g. 5806PN or 5806PM). See *5806 Seos 8K + MIFARE Classic 4K - Advanced Order Form* for additional options.

Select common part number		
5806PNGGANN4	• Programmed (SIO) Seos 8K • Matching external Seos # • Non-programmed MIFARE Classic 4K implementation • 4 byte UID	Select: ☐
5806PNGGBNN4	• Programmed (SIO) Seos 8K • Non-matching external Seos # • Non-programmed MIFARE Classic 4K implementation • 4 byte UID	Select: ☐
5806PNGGNNN4	• Programmed Seos 8K • No external Seos # (sales order # only) • Non-programmed MIFARE Classic 4K implementation • 4 byte UID	Select: ☐
5806VNGGNNN4	• Field encoder ready Seos 8K (for CP1000 programmer) • No matching external Seos # • Non-programmed MIFARE Classic 4K implementation • 4 byte UID	Select: ☐
5806PMGGAAN4	• Programmed (SIO) Seos 8K • Matching external Seos # • Programmed HID MIFARE Classic 4K implementation • Matching external MIFARE # • 4 byte UID	Select: ☐

Seos programming information: required for all 5806PN and 5806PM part numbers					
Format #	Field name(s) e.g. facility code	Value	Qty	Encoded start #	Encoded stop #
HID Elite ICE #				Printed start #	Printed stop #

HID MIFARE Classic programming information: required for all 5806PM or 5806VM part numbers					
Format #	Field name(s) e.g. facility code	Value	Qty	Encoded start #	Encoded stop #
HID Elite ICE #				Printed start #	Printed stop #

5806 Seos 8K + MIFARE Classic 4K - Advanced Order Form

Submit this order form to your local HID Global customer service team for processing. Please ensure you activate part numbers using the part activation form, otherwise the order cannot be processed. Please allow extra time for activation of advanced part options.

Seos Memory Size

- ☒ 6 - 8 Kbytes

Seos Programming (select one option)

- ☐ **P** - Programmed with Security Identity Object (SIO):
Provide full programming information.
- ☐ **V** - Encoder Ready, for use with iCLASS SE Encoder

MIFARE Classic 4K Programming (select one option)

- ☐ **N** - Non-programmed with native MIFARE Classic access conditions
- ☐ **M** - HID MIFARE Classic application (compatible with SmartID HID MIFARE enabled readers). Provide full programming information.
- ☐ **S** - Custom programmed MIFARE Classic. This option requires a custom part number with suffix to be set up – contact pre-sales.

Front Packaging (select one option)

- ☐ **G** - Plain White with Gloss Finish
- ☐ **C** - Custom Artwork with Gloss Finish. Specify custom artwork number.

Back Packaging (select one option)

- ☐ **G** - Plain White with Gloss Finish
- ☐ **C** - Custom Artwork with Gloss Finish. Specify custom artwork number.
- ☐ **1** - Plain White with Gloss Finish with 4000 Oe Magnetic Stripe
- ☐ **3** - Custom Artwork with Gloss Finish with Magnetic Stripe.
Specify custom artwork number.

Seos Card Numbering (select one option)

- ☐ **N** - No Printed Card Numbering. The card will be marked with Sales Order Number and relevant programming identification markings.
- ☐ **A** - Sequential Matching Encoded/Printed (Laser Engraved)
- ☐ **B** - Sequential Encoded/Sequential Non-Matching Printed (Laser Engraved)
- ☐ **C** - Random Encoded/Non-Matching Sequential Printed (Laser Engraved)

MIFARE Classic Card Numbering (select one option)

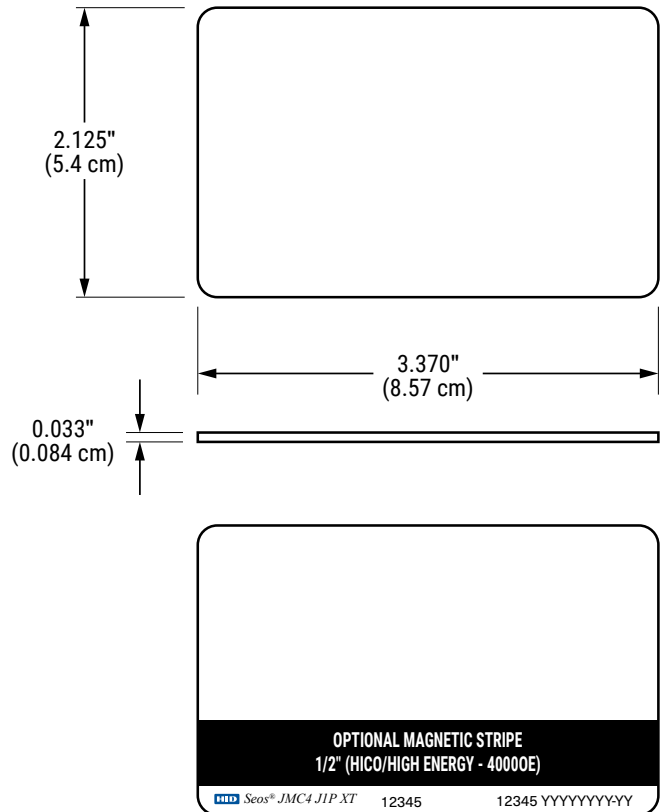
- ☐ **N** - No Printed Card Numbering. The card will be marked with Sales Order Number and relevant programming identification markings.
- ☐ **A** - Sequential Matching Encoded/Printed (Laser Engraved)
- ☐ **B** - Sequential Encoded/Sequential Non-Matching Printed (Laser Engraved)
- ☐ **C** - Random Encoded/Non-Matching Sequential Printed (Laser Engraved)

Slot Punch (select one option)

- ☒ **N** - No slot punch. **Do not slot punch this card.**

UID

- ☒ 4 Byte Static Non-Unique UID (NUID)





		Enter Required Part Option									
Part Number	5806							N	4	-	_____(Options #)

Seos Programming Information: required for all 5806Px part numbers							
Format #	Field name(s) e.g. facility code			Value	Qty	Encoded start #	Encoded stop #
HID Elite ICE #						Printed start #	Printed stop #

HID MIFARE Classic Programming Information: required for all 5806xM or 5806xS part numbers							
Format #	Field name(s) e.g. facility code			Value	Qty	Encoded start #	Encoded stop #
HID Elite ICE #						Printed start #	Printed stop #

3. 5906 Seos 8K + MIFARE DESFire EV2 8K implementation

3.1 Specification

	Seos	MIFARE DESFire EV2 implementation
Operating frequency	13.56 MHz	13.56 MHz
Communication protocol compliance	ISO14443A-4	ISO14443A-4
SAK	0x20	
ATQA	0x4403	
Communication speed	Up to 848 kbps	Up to 848 kbps
Memory type	EEPROM	EEPROM
Memory size	8 Kbytes	8 Kbytes
Multiple applications support	Yes (using Open Data Profile)	Yes (unlimited)
SIO Data Object support	Yes, default	No
HID Data Format support	Yes (wrapped in SIO)	No
Write endurance / data retention	Min 100,000 cycles / 10 years	Min 100,000 cycles / 10 years
Typical transaction time	Data size dependent	Data size dependent
Extended privacy support	No	No
Security features	Mutual authentication compliant to ISO/IEC 24727-3:2008, using NIST SP800-108 key diversification based on AES128. Secure messaging compliant to EN 14890-1:2009 and session key derivation based on NIST SP 800-56A.	3-pass mutual authentication based on 3DES or AES128, CRC16 and 4-byte MAC (TDES) or CRC32 and 8-byte CMAC (TDES or AES128) EV2 Secure Messaging Proximity Check Multiple Keysets
EV1 & EV2 Native Compatibility	N/A	Backward compatible with EV1 and EV2 native applications. Applications may need minor updates – see 3.6.
Security certification	Common Criteria (CC) EAL 5+ HW certified platform	
UID	Global 7 byte static NUID (random 4 byte UID option available via special request)	

	Seos		MIFARE DESFire EV2 implementation	
	Typical read range			
Reader environment	Standard ¹	On-Metal ²	Standard ¹	On-Metal ²
Signo 20/20K	Up to 2.4" (6 cm)	Up to 2" (5 cm)	Up to 2.4" (6 cm) (UID Only)	Up to 2" (5 cm) (UID Only)
Signo 40/40K	Up to 3.2" (8 cm)	Up to 2.4" (6 cm)	Up to 3.2" (8 cm) (UID Only)	Up to 2.4" (6 cm) (UID Only)
iCLASS SE R10/R15 (including BLE)	Up to 2.4" (6 cm)	Up to 2" (5 cm)	Up to 2.4" (6 cm) (UID Only)	Up to 2" (5 cm) (UID Only)
iCLASS SE R40/RK40 (including BLE)	Up to 3.2" (8 cm)	Up to 0.8" (2 cm)	Up to 3.2" (8 cm) (UID Only)	Up to 0.8" (2 cm) (UID Only)
iCLASS SE RP10/RP15 (including BLE)	Up to 1.4" (3.5 cm)	Up to 1.2" (3 cm)	Up to 1.4" (3.5 cm) (UID Only)	Up to 1.2" (3 cm) (UID Only)
iCLASS SE RP40/RPK40 (including BLE)	Up to 1.6" (4 cm)	Up to 0.4" (1 cm)	Up to 1.6" (4 cm) (UID Only)	Up to 0.4" (1 cm) (UID Only)
iCLASS Rev E R10/R40 HF Migration Reader	Up to 3.2" (8 cm)	Up to 0.8" (2 cm)	Up to 3.2" (8 cm)	Up to 0.8" (2 cm)
Dimensions	2.12" x 3.35" x 0.315" (54 mm x 85 mm x 0.8 mm)			
Card construction	Composite with 60% PVC / 40% PET, laminated card			
Weight	About 5.5 g			
Operating temperature	-40°F to +158°F (-40°C to +70°C)			
Storage temperature	-31°F to +122°F (-35°C to +50°C) for 1000 h			
Thermal shock	-31°F to +176°F (-35°C to +80°C), 50 cycles of 5 minutes, 30 s transition time			
Chemical resistance	The card can withstand exposure to salt water (5%), salt mist, acetic acid water (5%), carbonated sodium water (5%), sugared water (10%), fuel B and ethylene glycol (50%) for at least 24 hours			
Card marking	©HID Seos® JMD8 J4P (from Q4 2023 onwards) version with EV2 ©HID Seos® JMD8 J2P XT			
Printable	Yes (glossy white front /glossy white back) for best results use an HDP printer. Direct-to-card printing is not recommended. Contact your HID sales representative or find more information about FARGO® printers on the HID Global website.			
Slot punch	Not available – <u>do not slot punch</u>			
Other options	Custom graphics and magstripe			
Standards compliance	ISO/IEC7810, ISO14443-4 (Seos), ISO14443-3 (MIFARE Classic), ISO10373, ISO60529, ISO7816, RoHS			
Warranty	Lifetime warranty			

¹ Based on dry wall mount with no ferrous material within close proximity.

² Based on metal surface or metal back-box mount, use a spacer to improve read range.

3.2 5906 HID Global product compatibility

Not all HID Global products currently support MIFARE DESFire implementation. The following table describes supported products and their functionality:

iCLASS SE readers	Seos support	DESFire EV2 support
iCLASS SE Rev E (R10/R15/R30/R40/RK40)	Read PACS SIO (a configuration card may be required)	Read UID
MultiCLASS SE Rev E (RP10/RP15/RP30/RP40/RPK40)	Read PACS SIO (a configuration card may be required)	Read UID
iCLASS SE Rev D (discontinued) (R10/R15/R30/R40/RK40)	Read PACS SIO (a configuration card may be required)	Read UID
MultiCLASS SE Rev D (discontinued) (RP10/RP15/RP30/RP40/RPK40)	Read PACS SIO (a configuration card may be required)	Read UID
iCLASS HF Migration Series Rev C (discontinued)	N/A	Read UID Read custom data
iCLASS SE Custom Programming Series (Rev E)	Read PACS SIO (a configuration card will be required)	Read UID Read custom data
Field encoders		
CP1000 SE Encoder	Read/write PACS SIO (use part option "V")	Read/write custom data
Embedded reader boards		
SE Reader Module SE3200Ax	Read PACS SIO	Read UID
SE Reader Module SE3200BS0 (datamapper)	Read PACS SIO	Read UID or custom data
SE Reader Module SE3210BS0 (datamapper)	Read PACS SIO	Read UID or custom data
OMNIKEY CK Mini Board R51270010	Read PACS SIO and custom data	Read UID
OMNIKEY CK Mini Board R51270001-1	Read PACS SIO	Read UID
OMNIKEY desktop readers		
OMNIKEY 5427CK Gen 2 R54270101	Read PACS SIO and custom data	Read UID
OMNIKEY R5427 Gen 2 BLE R54270111	Read PACS SIO and custom data	Read UID
OMNIKEY 5022	Read PACS SIO	Read UID
OMNIKEY 5033	Read PACS SIO	Read UID

3.3 iCLASS SE reader 5906 Seos configuration

iCLASS SE readers produced before May 2016 and iCLASS SE Custom Programming reader configurations may not support the Seos 5906 series (Seos read) without a configuration update. Use test cards to determine the compatibility of the current iCLASS SE reader installation. Should you encounter this issue, please contact your local pre-sales representative for assistance.

3.4 iCLASS SE reader ISO14443A-4 UID configuration

The iCLASS SE reader will attempt to prioritize Seos payload over ISO14443A UID read. However, under certain conditions the static UID of the 59xx series card will be read. Disable ISO14443A to avoid invalid card reads. If ISO14443A UID mode is required for other card types, HID recommends using host-controlled reader audio/visual aids to encourage the user to re-present the card in the case of a UID read.

3.5 5906 MIFARE DESFire EV2 third-party device compatibility

Third-party native MIFARE DESFire EV2 devices and systems (for example, other brands of physical access control readers or applications such as vending, printing and biometric devices) are likely to support the MIFARE DESFire EV2 implementation with little or no update. Use test cards to determine compatibility of the existing installation base.

SAK coding

The 59xx series Seos with MIFARE DESFire EV2 uses the same SAK value as a native “standard” MIFARE DESFire card (0x20).

Coding of 59xx Series Seos with MIFARE DESFire EV2

	MIFARE Classic 1KB SAK = 0x08 (b4 is set)	MIFARE Classic 4KB SAK = 0x18 (b5, b4 are set)	MIFARE DESFire / ISO14443-4 SAK = 0x20 (b6 is set)	Resultant SAK
59xx Series	-	-	X	0x20

ATQA coding

Do not use the ATQA alone to identify the card. The ATQA of the 59xx series card is 0x4403. See *NXP application note MIFARE Type Identification Procedure* (AN10833) available from <https://www.NXP.com>.

3.6 5906 MIFARE DESFire EV2 implementation comparison

MIFARE DESFire EV1 Native	59xx Series MIFARE DESFire EV1 Implementation	59xx Series MIFARE DESFire EV2 Implementation
ATQA: 0x4403	ATQA: 0x4403	ATQA: 0x4403
7-Byte UID Switch to Random UID supported.	7-Byte UID Switch to Random UID not supported.	7-Byte UID Switch to Random UID not supported.
SAK: 0x20	SAK: 0x20	SAK: 0x20
ATS:0x067577810280	ATS:0x0578F7A102	ATS: 0x0578F7A102
Set User Defined ATS = YES	Set User Defined ATS = NO	Set User Defined ATS = NO
Command variations		
Get Version (native) 0x (AF)04010101001A05 (AF)04010101041A05 000000000000000B90C1651404416 HW Info: Vendor=0x04; Type=0x0101; Ver=0x0100; Storage=0x1A; Comm=0x05 SW Info: Vendor=0x04; Type=0x0101; Ver: 0x0104; Storage: 0x1A; Comm=0x05	Get Version (native) 0x (AF)04810101001A05 (AF)04810101011A05 00000000000000BA551093704014 HW Info: Vendor=0x04; Type=0x8101; Ver=0x0100; Storage=0x1A; Comm=0x05 SW Info: Vendor=0x04; Type=0x8101; Ver=0x0101; Storage=0x1A; Comm=0x05	Get Version (native): 0x (AF)04810042001A05 (AF)04810602001A05 (00) uuuuuuuuuuuuubbbbbbbbbbwwwyy u= UID b= batch info ww=production week, yy=production year HW Info: Vendor=0x04; Type=0x8100; Ver=0x4200; Storage=0x1A; Comm=0x05 SW Info: Vendor=0x04; Type=0x8106; Ver=0x0200; Storage=0x1A; Comm=0x05
Get Version (wrap) 0x 04010101001A05 91(AF) 04010101041A05 91(AF) 00000000000000B90C1651404416 9100	Get Version (wrap) 0x 04810101001A05 91(AF) 04810101011A05 91(AF) 00000000000000BA551093704014 9100	0x 04810042001A05(91AF) 04810602001A05(91AF) uuuuuuuuuuuuubbbbbbbbbbwwwyy(9100)
Select DF ID "0001" (ISO) 0x9000	Select DF ID "0001" (ISO) 0x6A82	Select DF ID "0001" (ISO) If ID present: 0x9000 If ID not present: 0x6A82
Select DF Name >= 5Bytes "0102030405" (ISO) 0x9000	Select DF Name >= 5Bytes "0102030405" (ISO) 0x6A82	Select DF Name >= 5Bytes "0102030405" (ISO) If DFName present: 0x9000 If DFName not present: 0x6A82
Select DF Name >= 5Bytes "012203440566" (ISO) 0x9000	Select DF Name >= 5Bytes "012203440566" (ISO) 0x6A82	Select DF Name >= 5Bytes "012203440566" (ISO) If DFName present: 0x9000 If DFName not present: 0x6A82
Select DF Name >= 5Bytes "11223344556677" (ISO) 0x9000	Select DF Name >= 5Bytes "11223344556677" (ISO) 0x6A82	Select DF Name >= 5Bytes "11223344556677" (ISO) If DFName present: 0x9000 If DFName not present: 0x6A82

3.7 5906 test card

Test cards are available to purchase for the purpose of test and qualification. The part number below represents the core programming profile (Seos programmed, MIFARE DESFire EV2 un-programmed).

Part number	Description
5906PNGGANN7-TEST	• Programmed Seos 8K with matching external # • Non-programmed MIFARE DESFire EV2 implementation • 7 byte NUID Include the desired Seos programming information with your order: format number, facility code and ID range.



5906 Seos + MIFARE DESFire EV2- Activation Form

Submit this order form to your local HID Global customer service team for processing. HID Global requires all customers to confirm full approval of test part numbers before an order for the final part number is processed.

User the order form to determine the required part numbers.

Upon receipt of this form, HID Global will activate the requested part numbers (please allow 3 working days). As soon as part activation is complete, you may submit your purchase order for processing using the order form.

I confirm that I have read and understand this application note. Test cards have been issued and fully tested within the target MIFARE DESFire EV2 and iCLASS SE reader environment. I understand that it is my responsibility to test and qualify all future projects using the below part numbers once activated.

Name	
Title	
Company	
HID Account #	
Date	

Please activate the following part number(s):

Part Number(s)

Seos 8K + MIFARE DESFire 8K - Order Form

Determine the required part number from the options below and submit within, or alongside, your completed purchase order. Please refer to your HID Global price book for pricing. Please activate the requested part number in advance (see *5906 Seos + MIFARE DESFire EV2 - Activation Form*). Programming information is mandatory for all programmed part options (e.g. 5906PN). See *5906 Seos 8K + MIFARE DESFire EV2 advanced Order Form* for additional options.

Select common part number		
5906PNGGANN7	• Programmed (SIO) Seos 8K • Matching external Seos # • Non-programmed MIFARE DESFire EV2 8K implementation • 7 byte UID	Select: ☐
5906PNGGBNN7	• Programmed (SIO) Seos 8K • Non-matching external Seos # • Non-programmed MIFARE DESFire EV2 8K implementation • 7 byte UID	Select: ☐
5906PNGGNNN7	• Programmed Seos 8K • No external Seos # (sales order # only) • Non-programmed MIFARE DESFire EV2 8K implementation • 7 byte UID	Select: ☐
5906VNGGNNN7	• Field encoder ready Seos 8K (for CP1000 programmer) • No external Seos # • Non-programmed MIFARE DESFire EV2 8K implementation • 7 byte UID	Select: ☐

Seos programming information: required for all 5906PN part numbers					
Format #	Field name(s) e.g. facility code	Value	Qty	Encoded start #	Encoded stop #
HID Elite ICE #				Printed start #	Printed stop #

5906 Seos 8K + MIFARE DESFire EV2 8K - Advanced Order Form

Submit this order form to your local HID Global customer service team for processing. Please ensure you activate part numbers using the part activation form, otherwise the order cannot be processed.

Seos Memory Size

- ☒ 6 - 8 Kbytes

Seos Programming (select one option)

- ☐ **P** - Programmed with Security Identity Object (SIO)
☐ **V** - Encoder Ready, for use with iCLASS SE Encoder

MIFARE DESFire EV2 8K Programming (select one option)

- ☐ **N** - Non-programmed
☐ **S** - Custom programmed. This option requires a custom part number with suffix to be set up – contact pre-sales.

Front Packaging (select one option)

- ☐ **G** - Plain White with Gloss Finish
☐ **C** - Custom Artwork with Gloss Finish. Specify custom artwork number.

Back Packaging (select one option)

- ☐ **G** - Plain White with Gloss Finish
☐ **C** - Custom Artwork with Gloss Finish. Specify custom artwork number.
☐ **1** - Plain White with Gloss Finish with Magnetic Stripe
☐ **3** - Custom Artwork with Gloss Finish with Magnetic Stripe. Specify custom artwork number.

Seos Card Numbering (select one option)

- ☐ **N** - No Printed Card Numbering. The card will be marked with Sales Order Number and relevant programming identification markings.
☐ **A** - Sequential Matching Encoded/Printed (Laser Engraved)
☐ **B** - Sequential Encoded/Sequential Non-Matching Printed (Laser Engraved)
☐ **C** - Random Encoded/Non-Matching Sequential Printed (Laser Engraved)

MIFARE DESFire Card Numbering (select one option)

- ☐ **N** - No Printed Card Numbering. The card will be marked with Sales Order Number and relevant programming identification markings.
☐ **A** - Sequential Matching Encoded/Printed (Laser Engraved)
☐ **B** - Sequential Encoded/Sequential Non-Matching Printed (Laser Engraved)
☐ **C** - Random Encoded/Non-Matching Sequential Printed (Laser Engraved)

Slot Punch (select one option)

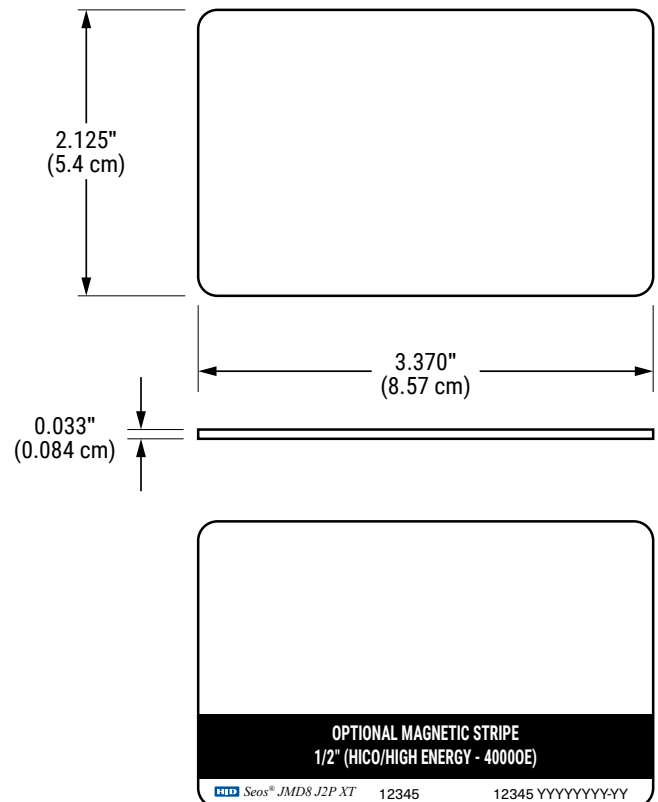
- ☒ **N** - No slot punch. **Do not slot punch this card.**

UID

- ☒ 7 Byte Non-Unique UID (NUID)

Option - Custom Artwork

- ☐ Specify Artwork Number. Refer to the Custom Artwork Forms for new artwork.



Appendix A. How to complete programming information

Programming information is mandatory if you select a programmed option. There are only two programming options that will require a format and programming information:

- Seos Programmed option (5806 and 5906) series
- HID MIFARE Classic Programming option (5806 series), compatible with SmartID® “HM” option readers.

Note: If custom MIFARE Classic or MIFARE DESFire EV2 programming is required, contact your local pre-sales representative for assistance; a custom part number will be required.

Example 1: 5806PMGGAAN4 (100 cards)

Part Number	5806	P	M	G	G	A	A	N	4	-	(Options #)
-------------	------	---	---	---	---	---	---	---	---	---	-------------

Seos Programming Information (required for all 5806Px part numbers)

Format #	Field name(s) e.g. facility code	Value	Qty	Encoded start #	Encoded stop #
H10301	Facility Code	99	100	101	200
HID Elite ICE #				Printed start #	Printed stop #
N/A				101	200

MIFARE Classic Programming Information (required for all 5806xM part numbers)

Format #	Field name(s) e.g. facility code	Value	Qty	Encoded start #	Encoded stop #
H10301	Facility Code	105	100	501	600
HID Elite ICE #				Printed start #	Printed stop #
				501	600

Example 2: 5906PNGGANN7 (500 cards)

Part Number	5906	P	N	G	G	A	N	N	7	-	(Options #)
-------------	------	---	---	---	---	---	---	---	---	---	-------------

Seos Programming Information (required for all 5906Px part numbers)

Format #	Field name(s) e.g. facility code	Value	Qty	Encoded start #	Encoded stop #
H10301	Facility Code	99	500	101	600
HID Elite ICE #				Printed start #	Printed stop #
N/A				101	600

MIFARE DESFire EV2 Programming Information (custom part numbers only)

Format #	Field name(s) e.g. facility code	Value	Qty	Encoded start #	Encoded stop #
HID Elite ICE #				Printed start #	Printed stop #

Appendix B. UID specification

7 Byte UID

Standard: ISO14443A

Length: 7 bytes (56-bits) cascade level 2 (59xx series)

Cascade Level 1

CT	UID0	UID1	UID2	BCC
----	------	------	------	-----

Cascade Level 2

UID3	UID4	UID5	UID6	BCC
------	------	------	------	-----

BCC = Block

Check Character CT = Cascade Tag

UID0-UID6 = 7 byte UID

The target system should support the **full 56-bit UID** value. A truncated UID will result in duplicate values. It is important to note that ISO14443A UID reader devices may reverse the bit or byte order of the UID resulting in a different ID if used with different readers or systems.

Example 7 Byte UID:

Hex: 0x3D4C0112146578

Decimal: 17253541061354872

4 Byte NUID

Standard: ISO14443A

Length: 4 bytes (32-bits) cascade level 1 (58xx series)

Cascade Level 1

UID0	UID1	UID2	UID3	BCC
------	------	------	------	-----

BCC = Block Check Character

UID0-UID3 = 4 byte UID

The target system should support the **full 56-bit UID** value. A truncated UID will result in duplicate values. It is important to note that ISO14443A UID reader devices may reverse the bit or byte order of the UID resulting in a different ID if used with different readers or systems.

Example 7 Byte UID:

Hex: 0xC0BFADC9

Decimal: 3233787337

Appendix C. Product lead times

Production lead time (where stock is available) is as follows:

- < 1,000 units: 3-5 days + shipping time
- > 1,000 units: Lead time determined at time of order

All magstripe and custom graphics orders are processed on a make-to-order basis and will incur a longer lead time.

If stock is not available and depending on order quantity, please allow for an 8-18 week delivery period during the first six months post launch. We anticipate a reduction in general lead times thereafter.

Please contact your local sales representative to discuss quantities greater than 5,000 units in advance to help reduce overall lead time.

Revision history

Date	Description	Revision
September 2024	Updated to reflect DESFire EV2 support.	A.1
November 2018	Initial release.	A.0



hidglobal.com

For technical support, please visit: <https://support.hidglobal.com>

© 2024 HID Global Corporation/ASSA ABLOY AB.
All rights reserved.
PLT-04003, Rev. A.1

Part of ASSA ABLOY