

# Operating Systems

## Card operating systems for public transport

HID's SOMA Atlas® chip operating system platform is designed to address a diverse set of applications and solve multiple access control use cases, especially for transport operators. Innovative architecture allows users to combine secure access functionality across transportation, events and tourism venues. Additionally, e-purse and other applications can be integrated into the OS.



### A MODULAR OFFERING FOR MANY APPLICATIONS:

**SOMA Atlas® KIAT®** is a specialized multi-application operating system developed by HID Global. Due to vast experience in smart card and application development like the MIT® operating system in Italy, KIAT is flexible and customizable to solve typical Smarty City user requirements.

A light version of the KIAT operating system is also available in our portfolio. **SOMA Atlas KIAT Light** is a shrunk version of the original OS ported on a smaller and thinner microprocessor tailored for middle range paper ticket use.

**SOMA Atlas**, combines the **multi-application capabilities** of KIAT with the advantages of the **international Calypso Prime Rev 3 (3.1, 3.2)** standard for ticketing and is the ideal choice for transportation and secure multi-application smart cards.

The **Calypso Light Application (CLAP)** helps public transport operators trying to reduce their costs. Our solution offers the same security of a full Calypso product, but at a very competitive price. The CLAP solution in form of a paper ticket is designed to replace traditional memory-only offerings adding advanced security features. HID Global has been awarded for developing the first certified CLAP implementation worldwide.

**SOMA Atlas 4Digital SDK** is the world's first Calypso certified software development kit to enable implementing secure and convenient transport tickets on mobile phones that support Host card emulation (HCE) via their NFC function.

The **Cipurse** operating system is developed for automatic fare collection using advanced smart card payment security measures. To address the needs of local and regional transit authorities, Cipurse is based on the security standard established by the Open Standard for Public Transportation Alliance (OSPT).

All operating systems can be embedded in various, optionally customized and/or personalized, form factors like: Paper tickets, smart cards and key fobs. The SOMA Atlas 4Digital SDK enables virtual tickets on HCE supporting phones (Android).



### KEY BENEFITS

- **Reliable Performance** – Innovative development, integration and quality testing
- **Versatile** – Addresses multiple markets and applications
- **Scalable** – Seamless operation, concurrent applications
- **Mobile ready** – SDK supporting mobile credentials via Host Card Emulation (HCE)

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## KEY TECHNOLOGY HIGHLIGHTS

- ISO 7816-4 compliant data structure
- Active authentication / PIN
- Transaction Management (KIAT, Calypso and Cipurse)
- Secure messaging
- Secure proprietary e-purse
- Roll back functionality
- SOMA Atlas 4Digital SDK enabling virtual Calypso tickets by HCE

## TYPICAL APPLICATION AREAS

Fast, small and secure multi-application operating systems for:

- Transportation
- Loyalty
- Access Control

Platform	Operating System				
	Soma™ Atlas™				Soma™ Helios™
Operating System	KIAT™	KIAT™ Lite	Calypso™	CLAP™	CIPURSE™
<b>SECURE MICRO-CONTROLLER</b>					
<b>Security</b>	SOLID FLASH™ with full E²PROM functionality				
<b>Memory</b>	16-bit CPU with 6KB of RAM				
<b>Non-Volatile Memory</b>	Flexible secure NVM size to choose from	Flexible secure NVM size to choose from	Flexible secure NVM size to choose from	60 KB or 100 KB	240 KB
<b>Symmetric cryptographic engine</b>	DES, AES	DES	DES, AES	DES	DES, AES
<b>Asymmetric cryptographic engine</b>	RSA, ECC	N/A	RSA, ECC	N/A	RSA, ECC
<b>Side channel attacks</b>	Resistant				
<b>Memory management &amp; protection (MMU)</b>	Yes				
<b>Unique chip identification</b>	Yes				
<b>Environment sensors</b>	Yes				
<b>CHIP CERTIFICATION</b>					
<b>Common Criteria certification</b>	EAL5+ high				
<b>EMVCo</b>	Yes		Yes	No	Yes
<b>COMMUNICATION PROTOCOLS</b>					
<b>Contact</b>	ISO 7816 up to 192 kbps (T=0, T=1)	N/A	ISO 7816 up to 192 kbps (T=0, T=1)	N/A	ISO 7816 up to 192 kbps (T=0, T=1)
<b>Contactless</b>	Contactless ISO 14443 type A & B up to 848 kbps; CEN/TS 16794 A&B				
<b>NFC Forum Tag Type 4</b>	Yes				
<b>OPERATING SYSTEM FEATURES</b>					
<b>User Memory</b>	5 KB, 20 KB, 64KB	20 KB	5 KB, 20 KB, 64KB	2 KB, 4 KB	64KB
<b>Multi Application</b>	Yes			No	Yes
<b>CRYPTOGRAPHIC ALGORITHMS</b>					
<b>Cipher</b>	DES (TDES, DESX) ECB-CBC		DES (TDES, DESX) ECB-CBC; AES	DES (TDES) ECB-CBC	AES
<b>Signature</b>	DES MAC8				AES MAC
<b>MAC</b>	ISO 9797, ISO 10118		Calypso™ MAC based on ISO 9797		ISO 9797
<b>Checksum</b>	CRC16/CRC32				
<b>Random number</b>	Secure Random				
<b>DES Key sizes</b>	up to 120-bit				N/A
<b>AES Key sizes</b>	128 bit			N/A	128 bit
<b>DELIVERY FORMATS</b>					
<b>Modules</b>	Contactless, Contact & Dual-Interface			Contactless	Contactless, Contact & Dual-Interface
<b>Contactless prelamates for cards</b>	Polycarbonate, PVC & PET-G, other materials on request				
<b>ISO Smart cards</b>	PVC, PET and PC				
<b>Paper ticket</b>	Yes		No	Yes	No
<b>Other form factors</b>	Yes e.g. Key fobs, wristbands				



Calypso  
Networks Association

cipurse



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