

# GemTAG SDK Toolkit

GemTAG SDK Toolkit

**PRODUCT SPECIFICATION  
and DATA SHEET**

**Gemini 2000 Ltd.**

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# 1. General Information

## 1.1 Scope

This document describes the basic functionality of all the items in the GemTAG SDK Toolkit.

## 1.2 General Description

The GemTAG SDK Toolkit is designed to be a helpful tool for software developers in the area of the smart cards applications and contains everything needed to to start programming right away.

The toolkit contains:

- GemTAG Reader x501U (optional GemTAG x501S)
- GemTAG SDK CD
- Blank Mifare 1k Smart Cards (3 pieces)

## 1.3 Features

- Contactless smart card reader
- Based on CL RC632 reader IC
- Contactless operating frequency 13.56 MHz
- Supports MIFARE® Dual Interface Card ICs and ISO 14443A part 1-4
- Supports ISO 14443B - optional
- Supports MIFARE® Classic crypto
- Supports ISO 15693
- Supports Philips ICODE® - 1
- Typical Operating Instance: 60 – 80 mm
- CE and FCC compliant
- USB 1.1 or RS232 serial interface (with the x501S model) up to 115200 baud rate
- Power supply via the USB interface or PS2 port (5 VDC) (PS2 power supply with x501S)
- Watchdog timer
- 1 LED indicator (software controlled)
- In-system firmware upload
- Unique serial number on each device
- Supported on Windows 98 OSR2, ME, 2000, XP and Linux (experimental)
- Supported cards - Mifare Classic, Mifare Light, Mifare Ultralight, Mifare 4K, Mifare Pro and Pro X, JCOP 30, JCOP 31 and more.
- 3 blank Mifare 1k smart cards
- CD with software, sample code, DLLs, ActiveX and developer tutorials

## 1.4 Ordering Information

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Ferndown Industrial Estate	e-mail:	info@gemini2k.com
Wimborne	www:	www.gemini2k.com
BH21 7PP		
UK		

## 2. The toolkit contents

The Gemini 2000 GemTAG SDK Toolkit contains reader, CD with software and 3 blank Mifare 1k cards.



### 2.1 The reader

The GemTAG reader x501U is contactless reader based on the CL RC632 reader IC. The CL RC632 is a member of the family of highly integrated reader ICs for contactless communications over frequency 13.56 MHz. All layers of ISO 14443A+B, ISO 15693 as well as MIFARE® are supported.

Optionally a GemTAG x501S reader could be supplied (upon request).

## 2.2 The CD

The CD contains DLLs, ActiveX, applications, sample code and developer guides needed from the programmers to start developing.

*Contents of the CD:*

### **Documentation**

*G2KMACTX.chm* - Mifare ActiveX developer guide

*G2KCSAPI.chm* - Mifare Sector API dll developer guide, describes G2KCAPI.dll.

*ISO 14443-4 APDUManager.doc* - ISO 14443-4 ActiveX developer guide, describes GemTagTCL.dll

*using custom commands.doc* - Description on how to send custom commands to the reader

### **APIs and DLLs**

*GemTagTCL.dll* - itso part 4 ActiveX – must be registered

*G2KCSAPI.dll* - Gemini Sector oriented API

*G2KCAPI.dll* - most powerful Gemini API needed by GemTagTCL.dll

*G2KMifareCOM.dll* - Mifare oriented ActiveX – must be registered

Other Headers and libraries for Mifare Sector API DLL

### **Samples and test programs**

*SECTOR API SAMPLE* – Gemini Sector Oriented

*VB6 G2K ActiveX for Mifare Test* - VB 6 sample using G2KMifareCOM

*VOPTestingT* - VB.Net Sample using GemTagTCL

*G2KCAPITester.exe* - small test program for all GemTag readers, depends on G2KCSAPI.dll

**Linux** – pre-release of the GemTag readers software for Linux

### **Products**

*CardExplorer* – stand alone program that allows viewing of the card content on per sector basis - must be registered

## 2.3 The cards

The supplied smart cards are of type Mifare 1k but the reader supports also Mifare Classic, Mifare Light, Mifare Ultralight, Mifare 4K, Mifare Pro and Pro X, JCOP 30, JCOP 31, Philips I-CODE, Texas Instrument HF-I and many more.

NOTE: The cards supplied might look different from the ones shown at the picture.

### 3. Electrical Characteristics of the Reader

#### 3.1 Operating Condition Range

Relative humidity: up to 90%

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T <sub>amb</sub>	Ambient Temperature	-	-15	25	70	C
VDD	DC Supply Voltage	DVSS = 0V	4.5	5	5.5	V

#### 3.2 Current Consumption

##### 3.2.1 x501U

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I <sub>DVDD</sub>	Supply Current	StandBy	-	200	-	mA
I <sub>DVDD</sub>	Supply Current	Reading started but no cards in the reader range	-	185	-	mA
I <sub>DVDD</sub>	Supply Current	Reading started, 1 card in the reader range	-	140	-	mA
I <sub>DVDD</sub>	Supply Current	Reading started, 3 cards in the reader range	-	130	-	mA

##### 3.2.2 x501S

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I <sub>DVDD</sub>	Supply Current	StandBy	-	140	-	mA
I <sub>DVDD</sub>	Supply Current	Reading started but no cards in the reader range	-	130	-	mA
I <sub>DVDD</sub>	Supply Current	Reading started, 1 card in the reader range	-	110	-	mA
I <sub>DVDD</sub>	Supply Current	Reading started, 3 cards in the reader range	-	90	-	mA

### 3.3 Operating Distance

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
OD	Operating Distance	Measured from the middle of the reader surface	-	0-80	-	mm

### 3.4 Interface Characteristics

#### 3.4.1 USB Interface (when the kit is supplied with GemTAG x501U reader)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
USB - baud	USB – baud rate	Cable length max. 1.5 m	-	12	-	Mbaud

#### 3.4.2 RS232 Interface (x501S)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
RS232 baud	RS232 baud rate	-	-	115200	-	baud

## 4. Electromagnetic Compatibility

The reader packaged with the GemTAG SDK Toolkit fulfills the following requirements for electromagnetic compatibility:

- FCC part 15
- CE

### 4.1 FCC Compliance Statement

NOTE:

This equipment has been tested and found to comply with the limits of a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference with radio communications. However, there is no guarantee that interference will occur in particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

#### **CAUTION!**

The Federal Communications Commission warns the users that changes or modifications to the unit not expressly approved by the party responsible for compliance could void the users authority to operate the equipment.

Accessories: This equipment has been tested and found to comply to the limits of Class A digital device. The accessories associated with the equipment are as follows:

- Shielded video cable

These accessories are required to be used in order to ensure compliance with FCC rules.

## 4.2 Compliance Information According to 46CFR 2.1077

We,

Gemini 2000 Ltd.  
1, Cobham Road  
Ferndown Industrial Estate  
Wimborne  
Post Code: BH21 7PP  
UK  
Tel: +44 (0) 1202 850 820

declare that the product GemTAG - x501S is in conformity with Part 15 of the FCC rules.

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

## 4.3 CE Declaration of Conformity

This Information Technology Equipment has been tested and found to comply with the following European directives:

Harmonised Standards applied	Description
EN 300 300: (2001-06)	Air interface of the radio systems pursuant to § 3(2) (Article 3(2))
EN 60950:1992	Health and safety requirements pursuant to § 3(1) 1. (Article 3(1) a)
EN 301 489-9:(2000-09)	Protection requirements concerning electromagnetic compatibility § 3(1) 2. (Article 3(1) b)

Manufacturer's name: Gemini 2000 Ltd.

Manufacturer's address: 37, Roman Road, Broadstone, Dorset, UK, BH18 9DG

Type of equipment: Contactless Smart Card Reader

Model No.: x501S, x501U

Gemini 2000 Ltd. hereby declares that the equipment specified above confirms to the above Directive(s) and Standard(s), and said equipment is in conformity with the relevant harmonised standards as mentioned above.

## 4.4 Mechanical Specifications

### 4.4.1 Model x501S



Picture 1 - x501S External View

- Size:
  - length - 105 mm
  - width - 66 mm
  - height - 24 mm
- Total length of the cable up to - 1.5 m
- Weight: 275 g

#### 4.4.2 Model x501U



Picture 2 - x501U External View

- Size:
  - length - 105 mm
  - width - 66 mm
  - height - 24 mm
- Total length of the cable up to - 1.5 m
- Weight: 275 g

## • 5. Revision History

Revision : 0.9  
Date : 27/10/2004

First published edition

## 6. Contact Information

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### Definition

#### Data sheet status

- Objective specifications :        This data sheet contains target or goal specifications for product development.
- Preliminary specifications :    This data sheet contains preliminary specifications; supplementary data may be published later.
- Product specifications :         This data sheet contains final product specifications

#### Limiting values

Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress rates only and operation of the device at these or at any other conditions above those given in the Characteristics section of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

#### Application information

Where application information is given, it is advisory and does not form a part of the specifications.

### Life Support Application

These products are not designed for use in life support appliances, devices or systems where malfunction of these products can reasonably be expected to result in personal injury. Gemini 2000 customers using or selling these products for use in such applications do so on their own risk and agree to fully indemnify Gemini 2000 for any damages resulting from such improper use or sale.