GemTAG - x501U

Contactless Smart Card Reader

PRODUCT SPECIFICATION
and DATA SHEET

Gemini 2000 Ltd.

www.gemini2000.com
info@gemini2000.com

GemTAG - x501U

Contactless Smart Card Reader

Table of Contents

1. General Information

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Scope

This document describes the basic functionality and the electric specifications of the GemTAG - x501U reader.

This contactless reader is designed for an easy reader adaptation to a PC to use this device for test and application purpose.

General Description

The Gemini 2000 reader GemTAG - 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.

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GemTAG - x501
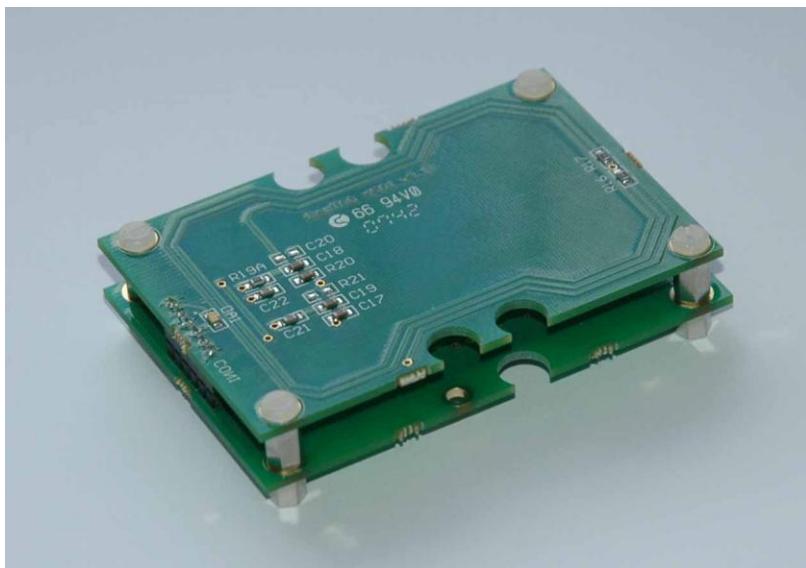
Picture 2 - x501U – OEM – top view

Picture 3- x501U – OEM – bottom view

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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 (optional)
- Supports Philips ICODE® - 1 (optional)
- Typical Operating Distance: 60 – 80 mm
- CE and FCC compliant
- USB 1.1 interface
- Power supply via the USB (5 VDC)
- 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, Mac OS
- Supported cards - Mifare Classic, Mifare Ultralight, Mifare 4K, Mifare Pro and Pro X, JCOP 30, JCOP 31, DESFire and more.

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2. Functional Units

Gemini 2000 GemTAG - x501U contactless smart card reader parts

The Gemini 2000 GemTAG - x501U contactless smartcard reader is two PCB design – reader module and antenna.

The unit uses USB cable to communicate to the host as well to supply the 5V DCC voltage. The device does not need external power supply.


x501U block diagram
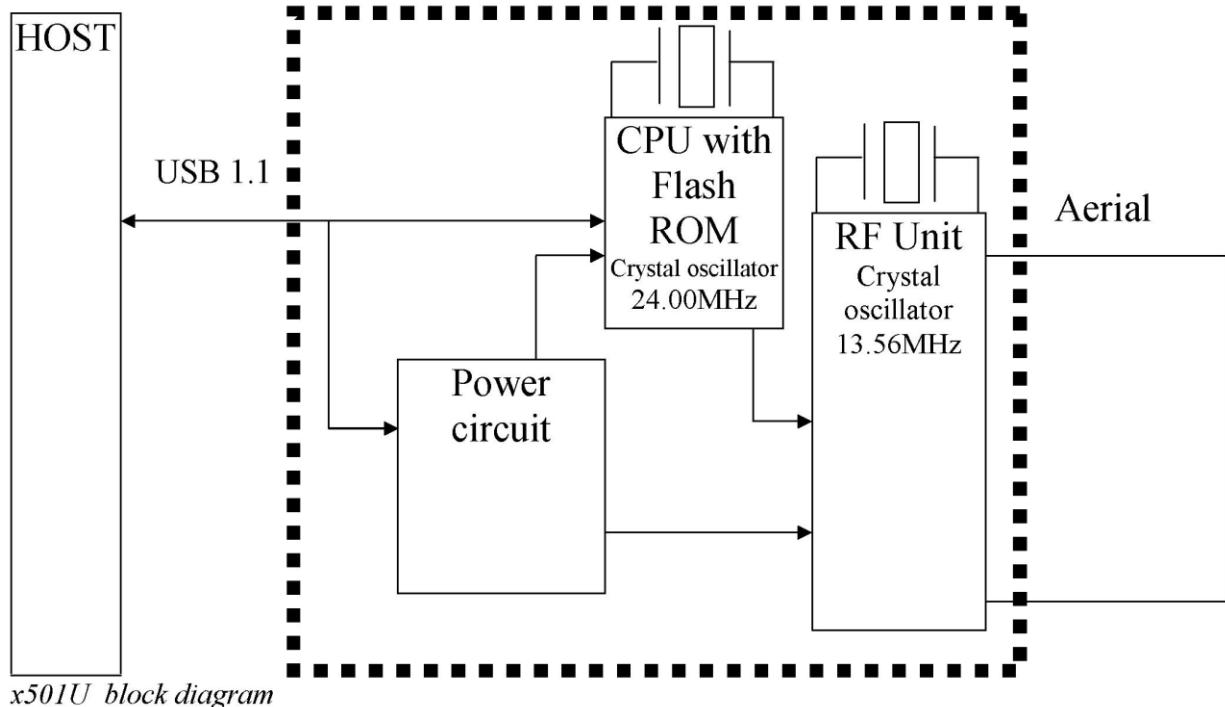
Power Supply

The GemTAG - x501U reader is a bus powered 5V USB device. No external power supply needs to be connected to start the reader.

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Reader to Host interface pinout.

This interface is indicated as CON1 on the PCB and is valid for GemTAG-x501U reader model. Pin assignment is described in Table 1.

Table 1 – CON1 Pinout

Pin number	Function	Description
1	GND	Signal ground
2	NC	
3	PRG	Program device
4	D-	USB D- line
5	D+	USB D+ line
6	Vcc	Power supply

Pin 6   Pin 4

Pin 1   Pin 3
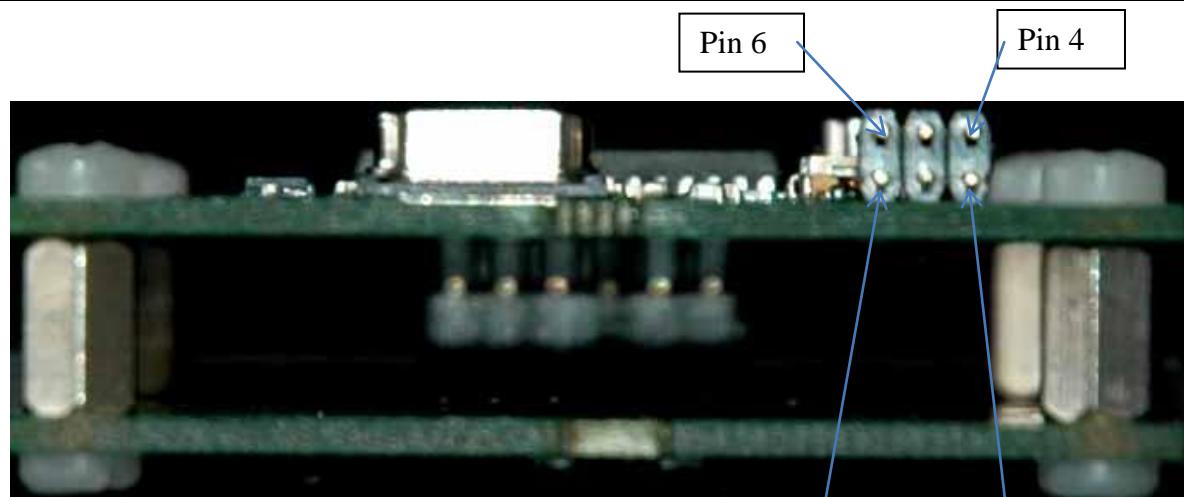
Picture 4 - x501U – OEM connector pinout

3.   Electrical Characteristics

Operating Condition Range Relative humidity: up to 90%

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{amb}	Ambient Temperature	-	-25	25	75	C
VDD	DC Supply Voltage	DVSS = 0V	4.5	5	5.5	V

Table 1 - Operating Condition Range

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Current Consumption

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{DVDD}	Supply Current	StandBy	-	100	-	mA

Table 2 - Current Consumption

Operating Distance

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

Table 3 - Operating Distance

Interface Characteristics

3.4.1 USB Interface

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

Table 4 - USB 1.1 Interface

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4. Operating Conditions and Standards

The GemTAG - x501U fulfills the following requirements for electromagnetic compatibility:

- FCC part 15

- CE

FCC Compliance Statement

"This device complies with Part 15 of the FCC Rules. Operation 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"

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 inference 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.

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Compliance Information According to 46CFR 2.1077

We,

Gemini 2000 Ltd.

Peartree Business Centre

Cobham Road

Ferndown Industrial Estate

Wimborne

Post Code: BH21 7PT

UK

Tel: +44 (0) 1202 850 815

declare that the product GemTAG - x501U is in conformity with Part 15 of the FCC rules.

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: Peartree Business Centre, Ferndown Ind Est, Dorset, UK, BH21 7PT

Type of equipment: Contactless Smart Card Reader

Model No.: GemTAG - 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 harmonized standards as mentioned above.

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Mechanical Specifications

All dimensions are in mm

OEM module

Bottom view

77

68

29

3.5

φ3.2

2.5

53

45

USB connector

BOOT jumper

Component side view

3.5

Component side

5

Side view

11.2

Ferrite plate
(if fitted)

Antenna side

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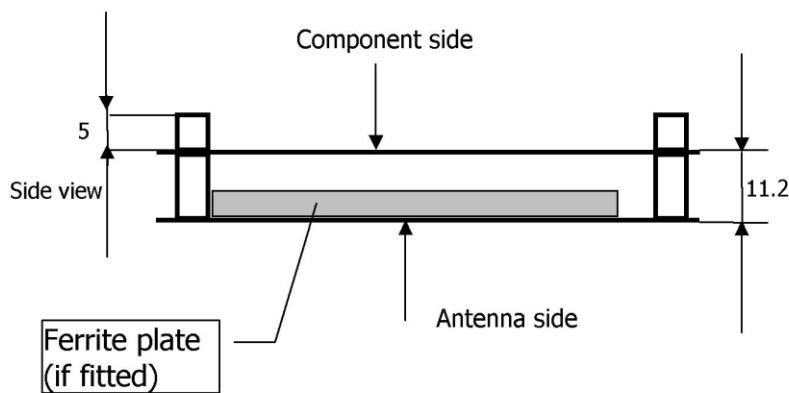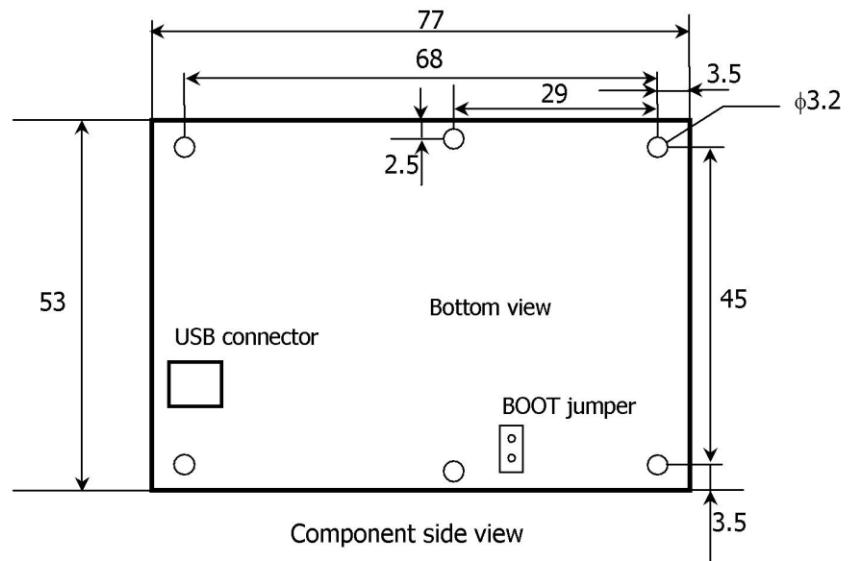
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Desktop unit

- Size:

    - length - 105 mm

    - width - 66 mm

    - height – 24 mm

- Total length of the cable up to - 1.5 m

- Weigth: 275 g

Operating Standards

Operating temperature range and maximum humidity
Temperature range for the operation of GEMTAG x501U: -10...+70 °C

Maximum humidity: 98% r.h. (not condensing)

Referred standards:
IEC 68-2-1, Part 2, Test Ad   -10 °C
IEC 68-2-2, Part 2, Test Bd   +70 °C
IEC 68-2-3, Part 2, Test Ca   98% r.h. at 40 °C

Shock, Bump and Vibration Immunity

Referred standards:
IEC 68-2-27, Part 2, Test Ea   Shock
IEC 68-2-29, Part 2, Test Eb   Bump

Electromagnetic compatibility
GEMTAG x501U complies with the following requirements of electromagnetic compatibility:
- Immunity:
    IEC 801-4   Electrical fast transient/burst requirements
    EN 61000-4-2   Electrostatic discharge requirements
    ENV 50140   Immunity against radiated, radio-frequency (excluding carrier frequency) electromagnetic field
    ENV 50141   Immunity against conducted disturbances induced by radio-frequency (excluding carrier frequency) electromagnetic field.

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- Spurious emissions

  IETS 300330   Radio equipment and Systems, Short range devices: Technical characteristics and test methods for radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz

2. Contact and Ordering Information

Product No:	GemTAG-x501U
OEM version:	GemTAG-x501U-OEM-v3.1
Desktop version:	GemTAG-x501U-v3.1

Gemini 2000 Ltd.   Tel: +44 1202 850 815
Peartree Business Centre   Fax: +441202 855 766
Cobham Road   email: info@gemini2000.com

Ferndown Industrial Estate   www: www.gemini2000.com
Wimborne
BH21 7PP
UK

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

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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.

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