Technical Specification
DESKO NEPTUN chrom®

DESKO GmbH

Gottlieb-Keim-Str. 56
95448 Bayreuth
GERMANY

Phone: +49 (0)921/79279-0
Fax: +49 (0)921/79279-14
E-mail: info@desko.com
Web: www.desko.com

Technical Support:
E-mail: support@desko.com | Phone: +49 (0) 921 79279-69 | Website: www.desko.com/support

Table of Contents

DESKO Official Explanation of Abbreviations

1D Code	Linear or one-dimensional Barcode
2D Code	Two-dimensional Barcode
API	Application Programming Interface
BC	Barcode
BCR	Barcode Reader
DLL	Dynamic Link Library
DPI	Dots Per Inch
DUKPT	Derived Unique Key per Transaction
ICAO	International Civil Aviation Organization
IP	Ingress Protection
IR	Infrared
ISO	International Organization for Standardization
LED	Light Emitting Diode
MRZ	Machine-Readable Zone
MSR	Magnetic Stripe Reader
NFC	Near Field Communication
OCR	Optical Character Recognition
PCB	Printed Circuit Board
QIG	Quick Installation Guide
RFID	Radio Frequency Identification
RS232	Serial Interface
RTC	Real Time Clock
USB	Universal Serial Bus
SDK	Software Development Kit
UV	Ultraviolet Light
VCOM	Virtual COM Interface
VIS	Visible Light
VIZ	Visual Inspection Zone
WLAN	Wireless Local Area Network

1 Handling Rules & Package Content

1.1 Handling of the NEPTUN chrom

The NEPTUN chrom is designed to work in a rough environment and withstand light shocks. Nevertheless, the device contains a precise opto-mechanical part.

Therefore, DESKO recommends the following handling rules:

- Do not drop the device.
- Prevent the device from heavy vibrations.
- The device is not waterproof, prevent the device from getting wet.
- Prevent the device from heavy dust.

1.2 Package Content

- NEPTUN chrom
- Quick Installation Guide with the log-in data for the NEPTUN chrom download area. Within the download area you will find all relevant documents for the NEPTUN chrom and necessary tools and drivers.

2 Introduction

This guide describes the usage of the NEPTUN chrom *keyboard. Detailed information on the respective configuration can be found in the Quick Installation Guide, which is shipped with the device.*

Please contact support@desko.com should you have not received a Quick Installation Guide or need access to our download area.

The NEPTUN chrom is ideal for data gathering applications of OCR documents with a machine-readable zone and magnetic stripe documents. Such applications are usually found in the airline and airport environment, ticket- and border control or public authority environment and many more.

Depending on the hardware configuration, the NEPTUN chrom is equipped with the following standard features:

- Keyboard with 104/105 keys (keyboard layout available in various sorts of country versions).
- 3-track magnetic stripe reader to read customer loyalty cards, employee cards or credit cards.
- OCR passport reader with infrared light illumination, mounted in the same slot as the magnetic reader.
- Protection against dust and water according to IP54 regulations.

Optionally the NEPTUN chrom can be equipped with the following features:

- Chip card reader for reading of contact-based chip cards
- RFID reader
- 2x USB AUX Ports (full speed)
- Pointing device (integrated mouse module)
- 3-track MSR module with encryption functionality and DUKPT key management

Should you not know the exact hardware configuration of your device or should you need further information on the NEPTUN chrom, please contact our sales team at sales@desko.com. Please always state the serial number of the device in your email.

3 Features of the NEPTUN chrom

3.1 Ingress Protection 54 (IP54)

The NEPTUN chrom is protected against dust and water according to IP54 regulations.

IP stands for ingress protection and is a rating code commonly used for security equipment. It consists of two digits, which show the level of protection a device has against dust and water.

The IP rating normally has two numbers:

- First digit: protection from solid objects or materials (dust)
- Second digit: protection from liquids (water)

The NEPTUN chrom keyboard has the following rating:

First digit = 5 : Protected against dust (no harmful deposit)
Second digit = 4 : Protection against splashing of water from any directions

Please note: The IP54 rating only applies to the standard version of the NEPTUN chrom. If the keyboard is equipped with the following features, it is not protected against water and dust:

- Chip card module
- Pointing device
- USB AUX port

3.2 Optical Character Recognition (OCR) Reader

The built-in OCR reader is able to scan and decode MRZ data of various documents. The reader is equipped with an infrared illumination for reading ID cards and passport documents.

Light Source	Description	Wavelength	Comment
IR	infrared light	850 nm	

The OCR reader can by default read and decode OCR data from the following documents:

- Passport data from machine-readable passports, ID cards and driver licenses according to ISO/IEC 7501-1, ICAO 9303 and ISO 18013
- Personal OCR encoded travel documents e.g. visa, crew member cards according to ICAO 9303

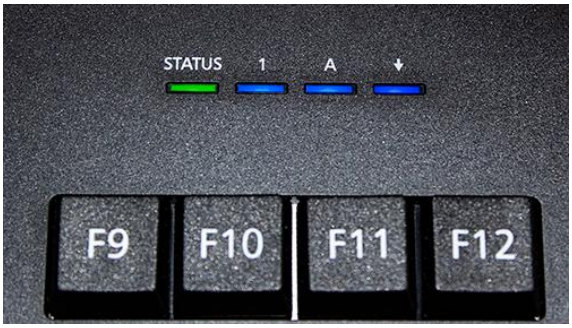
The standard OCR read rate is higher than 99%.

3.3 Magnetic Stripe Reader (MSR)

The integrated 3-track magnetic stripe reader is able to read and decode all magnetic documents encoded according to ISO 7811/2-5. This functionality allows the handling of documents such as CUTE sign-on cards, credit cards, frequent flyer cards, employee cards and many more.
The device automatically recognizes each document type and decodes the information accordingly.

3.4 Multicolor LED

Next to the standard keyboard LEDs (Num-, Scroll- and Caps-Lock), the NEPTUN chrom is equipped with a multicolor status LED for user feedback (see picture below).



Picture 1: blue colored keyboard LEDs and multicolor status LED

The status LED displays the OCR and MSR scanner result with the following indications:

Turned off	=	idle mode
Green	=	good read result (2 seconds)
Red	=	bad read result (blinking, 2 times)

3.5 Buzzer

The NEPTUN chrom is equipped with an internal buzzer for audible user feedback. The buzzer volume can be adjusted by device configuration. See chapter 7 for further details regarding firmware and device configuration.

The Buzzer has by default the following functionality:

Good read result: one short buzzer sound

Bad read result: three short buzzer sounds

3.6 Optional Features

3.6.1 Chip Card Module

The NEPTUN chrom can be equipped with an ISO 7816 compliant chip card reader. The card reader module is designed for reading synchronous and asynchronous chip cards with the following standards:

ISO 7816, 2-wire SLE 4432/42, 3-wire SLE 4418/28, I2C, SLE 4404.

3.6.2 NFC/RFID Reader

The NEPTUN chrom is available with an integrated NFC/RFID module. This module can read RFID documents according to ISO 14443(A/B), e.g. RFID chip of a biometric passport.

3.6.3 China ID Reader

The NEPTUN chrom can be extended by an optionally available integrated RFID module specifically designed for reading personal information stored on the chip of the China national ID card.

More information on how to use the China ID Reader can be found in chapter 7.4 Using the China ID Reader.

3.6.4 USB AUX Ports

The NEPTUN chrom can be equipped with two additional USB ports (full speed) realized in USB-A connectors.
It has to be considered that, in case of USB bus powered devices, these two USB AUX ports and the NEPTUN chrom have to share the power that is provided by the USB port of the workstation. According to the USB 2.0 specification, one USB port has to provide 500 mA. In chapter 11 the power consumption of the NEPTUN chrom is listed.

3.6.5 Integrated Pointing Device (optional)

The NEPTUN chrom can be equipped with an integrated pointing device. It consists of a trackpoint and two mouse buttons, located below the space key.

4 Installation and Setup

4.1 Software Setup

Information about the software (including documentation), driver and SDK can be found in the DESKO download area. The link and login data for the download area can be found in the Quick Installation Guide, which is shipped with the device, or contact support@desko.com.

4.2 Hardware Setup

Connect the NEPTUN chrom via USB cable with your PC. The NEPTUN chrom is executing a self-test. A short buzzer sound indicates that the device completely booted and is ready for use.

5 Software Integration

Software integration of the NEPTUN chrom is done via the host connection. Usually this is established by a virtual COM port connection via the USB host port. Alternatively, a DESKO swipe reader API (HIDAPI) or a keyboard emulation is also available.
DESKO is able to provide appropriate software packages for the operating systems Microsoft Windows, Linux and Android.

Please contact support@desko.com for further information.

5.1 Virtual Serial Connection

For using the DESKO NEPTUN chrom via a virtual serial port, it is necessary to install the DESKO VCOM software package. Please refer to the Quick Installation Guide, which is shipped with the device, for more information.

This software generates a virtual COM port on the system, which can be used as a standard COM port. As soon as the generated virtual COM port is opened by an application, the NEPTUN chrom is ready for operation. In this status, the OCR and MSR data will be sent to the generated virtual COM port. Please refer to the Quick Installation Guide for the protocol description.

5.2 Connecting via HIDAPI

To get access to all features of the NEPTUN chrom (besides the standard keyboard features) it needs to be addressed via the HIDAPI. This HIDAPI is included in the device SDK, which provides drivers for several operating systems as well as libraries and sample applications for C/C++, Java and .Net.

5.3 Keyboard Emulation

Optionally the scanned OCR and MSR data can be sent as keyboard data to the system. In this case, no additional software has to be installed on the system.

6 Hardware Integration

The standard host connection is established via the USB interface. The NEPTUN chrom is USB-bus powered and does not need an additional power supply.

7 Usage of the NEPTUN chrom

The following chapters explain how to read different kinds of document with the NEPTUN chrom. All possible features of the keyboard are explained below.

More detailed information can be found on the DESKO YouTube channel https://www.youtube.com/user/Deskovideo.

7.1 Usage of the OCR / MSR Reader

As soon as the NEPTUN chrom is connected to a PC, the device is ready to read OCR and MSR data from various documents. The NEPTUN chrom provides the OCR and MSR scan functionality in only one slot.
To read a document, the medium (e.g. credit card) should be pulled through the swipe slot with moderate and constant speed. It is possible to swipe in both directions.

7.1.1 Reading an OCR Document

The implemented OCR scanner supports a bidirectional swipe. To read an OCR document, the medium (e.g. passport) should be pulled through the swipe slot with moderate and constant speed.

Please note that the OCR information always has to face towards you in order to be read.

Picture 2: position of machine-readable zone

Depending on the read result, the buzzer and the multicolor LED give a respective feedback (see chapters 3.4 and 3.5).

7.1.2 Reading an MSR Document

The integrated 3-track bidirectional magnetic stripe reader is able to read all magnetic stripe data encoded according to ISO 7811/2-5. This functionality allows the handling of documents such as CUTE sign-on cards and all credit, frequent flyer and employee travel cards.

Please note that the magnetic stripe always has to face towards you in order to be read.

Picture 3: position of magnetic stripe card

Depending on the read result, the buzzer and the multicolor LED give a respective feedback (see chapters 3.4 and 3.5).

7.2 Reading an RFID Document

The integrated NFC/RFID module can read RFID documents according to ISO 14443(A/B), e.g. RFID chip of a biometric passport. The RFID module is located within the right-hand part of the keyboard.

To get access to the RFID chip of a document, the MRZ data of the document is needed. To start an RFID read, open the document and pull the data page through the swipe slot. Now the document needs to be put near the integrated RFID reader.

There are two possibilities where to put the document with regard to reading RFID:

1. Place the document below the right wing of the keyboard.

2. Place document on top of the right wing of the keyboard.

7.3 Reading a Chip Card

The chip card reader module of the NEPTUN chrom is able to read ISO 7816 compliant chip cards. For using the chip card reader it is necessary to install an appropriate software package. Please refer to the Quick Installation Guide, which is shipped with the hardware or contact our support team at support@desko.com or online via www.desko.com/support.

Picture 4: location of the chip card reader

To read a chip card, the card needs to be inserted in the provided card slot on the upper left side of the device. Please note that the contact on the chip card needs to face towards the user, as shown in the picture below.

Picture 5: direction of chip card contact

7.4 Using the China ID Reader

The China ID reader is a single antenna design located within the right-hand part of the keyboard. To start an ID read, please place the ID card on top of the red highlighted area indicated in the picture below.

China ID reading: red highlighted area, single antenna design

8 Service and Maintenance

In general, DESKO products are maintenance free. However, should you require any technical assistance, please contact our support team at support@desko.com.

For maintenance regarding firmware upgrade, it is required to install a dedicated DESKO software package. This can be obtained upon request and contains all necessary drivers, tools and documentation to perform following actions:

- Display detailed information about firmware version and device configuration
- Update firmware and device configuration

Please contact our support team, should you require the DESKO software package.

9 Warranty

Please note that due to improper usage (see section 1.1) or after opening the device, warranty cannot be claimed anymore. Warranty excludes normal wear and tear.

10 Support

Please check if the NEPTUN chrom is properly connected to your PC and, if needed, the software is installed. If this is the case and the device still does not work, please contact our support team:

Technical Support
E-mail: support@desko.com
Website: www.desko.com/support

Phone: +49 (0) 921 79279-69
(available during German office hours)

In order to give you an immediate and reliable support please always include the following information within your support inquiry:

- ✓ Name of the product
- ✓ Serial number of the product *(The serial number can be found on the backside of the device. It is an eleven-digit number, always starting with 20. Example: 201546 00589)*
- ✓ Used firmware, configuration and software version
- ✓ Detailed issue description
- ✓ Corresponding logfiles (VCOM with log level 4: C:\hid2ser.log and C:\Windows\hid2ser.ini (see also VCOM manual). Device updater: C:\%userprofile%\AppData\Roaming\DESKO GmbH\DeviceUpdater)

- ✓ Contact details of the person responsible at your company

11 Technical Overview

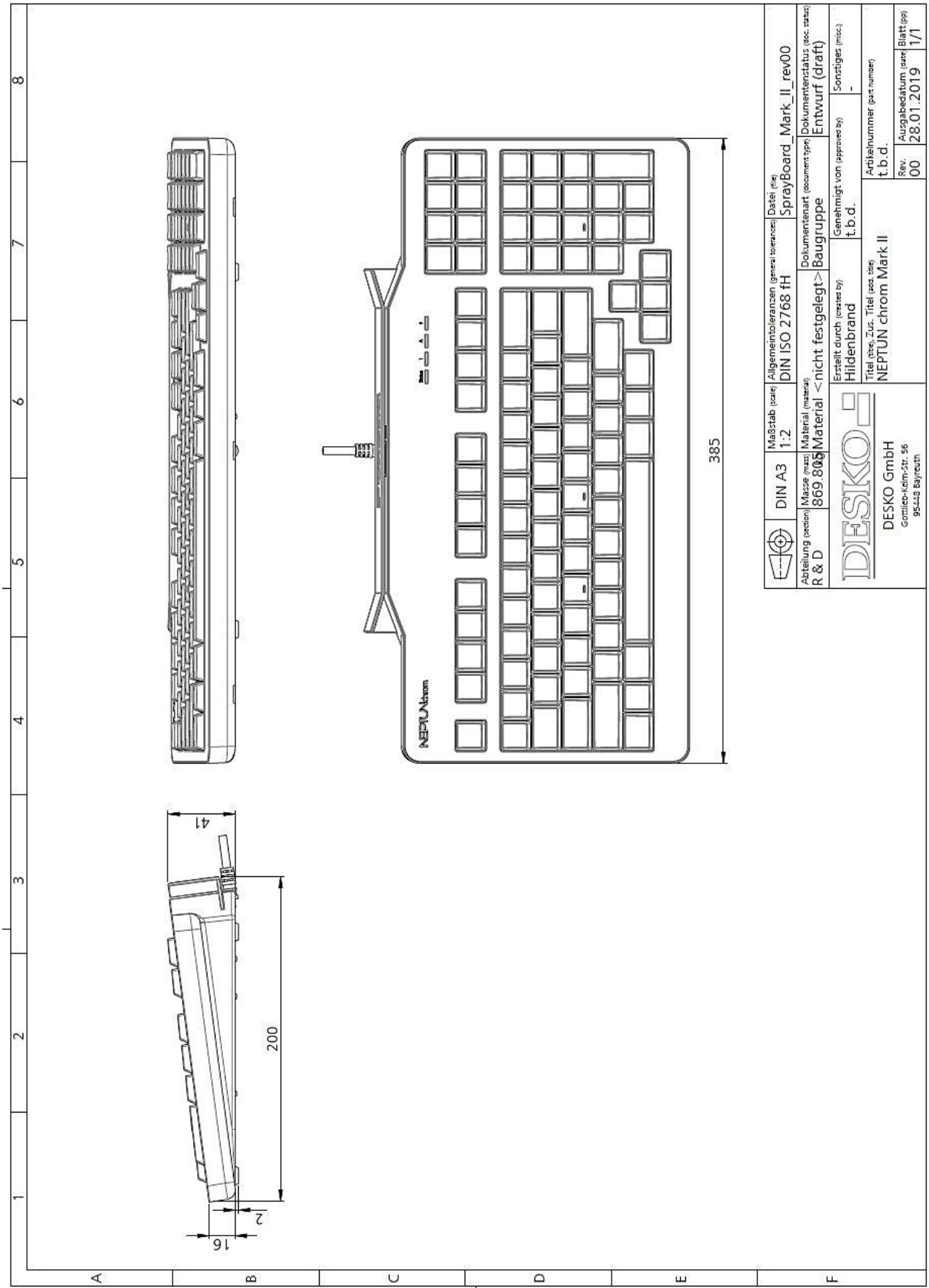
11.1 Technical Data

Supply Voltage:	5 V DC +/- 5 % (USB bus-powered)
Supply Current:	Icc = max. 400mA
Data Output:	USB (full speed)
Storage Temperature:	-10 °C - +60 °C
Operating Temperature:	0 °C - +50 °C
Ingress Protection:	IP54
Humidity:	<80 % (R.H. non condensing)
Reliability	MTBF = 180.000 hours
Cable Length:	2.20 m (86.61 inch)
RF / EMI Compliance:	CE and FCC

11.2 Dimensions

Weight:	Approx. 1400 g (3 lb)
Width:	200 mm (7.87 inches)
Length:	385 mm (15.16 inches)
Height:	Back 43 mm (1.69 inches) Front 18 mm (0.71 inches)

11.3 Technical Drawing



12 Regulation Information

Note: This equipment has been tested and found to comply with the limits for a Class B digi-tal device, pursuant to part 15 of the FCC Rules. These limits are designed to provide rea-son-able protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in ac-cordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be deter-mined 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 receiver.
- Connect the equipment into an outlet on a circuit different from that to which the Re-ceiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The Federal Communications Commission (FCC) warns the users that changes or modifica-tions to the unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with the RF exposure requirements for mobile and fixed devices. How-ever, the device shall be used in such a manner that the potential for human contact during normal operation is minimized.

This device complies with Industry Canada license-exempt RSS standard(s).
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.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :
(1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

CAUTION: Any changes or modifications not expressly approved by DESKO GmbH could void the user's authority to operate the equipment.