

# User Manual Onboard Unit Programming Station OPS-9955

**This device is based on the IEEE WAVE Standards**

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# Information about this document

**Audience**

This document is for professionals setting up and maintaining the equipment.

Professionals are persons, who have basic knowledge on software installation and computer networks.

**Preparations**

This User Manual shall be carefully read before installation.

## Text conventions

Visual aids and standard text formats in this manual help the reader to locate and identify information easily.

Typographical formats:

Table 1  
Text formats and their meaning

Style	Used for
<b>bold</b>	Accentuations
<i>italics</i>	Labelling and cross-references
CAPITAL LETTERS	Acronyms

**Note:** Contains additional information on the topic.

## Important text elements

This manual contains specific Caution and Warning statements. These shall be interpreted as follows:

**Attention**



**Attention:** This warning indicates that the device may be affected by Electrostatic Discharge. Appropriate precautions must be made to avoid damage to the device.

**Caution**



**Caution:** Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

**Warning**



**Warning:** Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

## Abbreviations

*Table 1*  
*Abbreviations and definitions*

DSRC	Dedicated Short Range Communication
GUI	Graphical User Interface
OBU	Onboard Unit (adjustable by user)
OPS	Onboard Unit Programming Station
RF	Radio frequency
WAVE	Wireless Access in Vehicular Environments

## Regulatory Information

### Notice

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.

### Notice

Changes or modifications made to this equipment not expressly approved by Kapsch may void the FCC authorization to operate this equipment.

### Class B digital device

**Note:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable 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 accordance 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 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 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.

### Radio frequency radiation exposure Information

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm (8 inches) between the radiator and a human body. Failure to do so could result in bodily injury or death.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

## Software Licenses

This product may contain software portions including technologies used under third party license, and are copyrighted. Notices, Terms and Conditions pertaining to third party software are located at

[http://www.kapsch.net/us/en/ktc/portfolio/products\\_and\\_components/Pages/default.aspx](http://www.kapsch.net/us/en/ktc/portfolio/products_and_components/Pages/default.aspx)

## Safety Instructions



**Warning:** This device is used with an external power supply, which is connected to 110-230V AC power. Always check the cables for damage before connecting the power supply to AC.

## Environmental Information

### Recycling

Your equipment set consists of material that can be recycled. Please follow the local regulations regarding the disposal of packaging material and waste electronics equipment.

### Environmental requirements

This device is designed for office use only and must not be used outdoors.

## Visual Inspection

After unpacking please check the equipment for possible damage. If the content is incomplete or damaged please contact your local Kapsch office.

## Maintenance Instructions



**Warning:** Regular inspection of installed equipment is mandatory and shall be in accordance with local safety regulations. Cables shall be checked for damage and plugs for correct fit in the outlet to prevent electrical shock to humans or damage to the device.



## General Information

### Definitions

**Integrator**

The integrator is responsible for technical integration of the OPS-9955 into a point-of-sale infrastructure defined by the operator.

**Operator**

The operator defines the process of handling OBUs in the point-of-sale infrastructure and the use in the particular system configuration.

**Customer**

The customer has a commercial contract for the offered services.

**Point-of-Sale Terminal**

The Point-of-Sale Terminal runs application and driver software to control the OPS-9955.

**Personalization Process**

During personalization process customer specific data may be stored on the OBU and/or the OBU is enabled in the system. The data stored on the OBU, may depend on the particular system, operator and/or application.

### Cleaning the OPS



**Note:** The housing of the OPS may be cleaned only with a clean, damp, lint free cloth. Do not use liquids to clean the OPS. This may damage the product and can result in injury.

## System Overview

A typical point-of-sale installation consists of the OPS-9955, a Point-of-Sale Terminal and auxiliary equipment which depends on the needs of the operator. The Point-of-Sale Terminal is a PC which is connected to a network infrastructure in most system configurations.

The OPS-9955 is a communications device for data exchange between the Point-of-Sale Terminal and the OBU according to the WAVE standards.

### Hardware

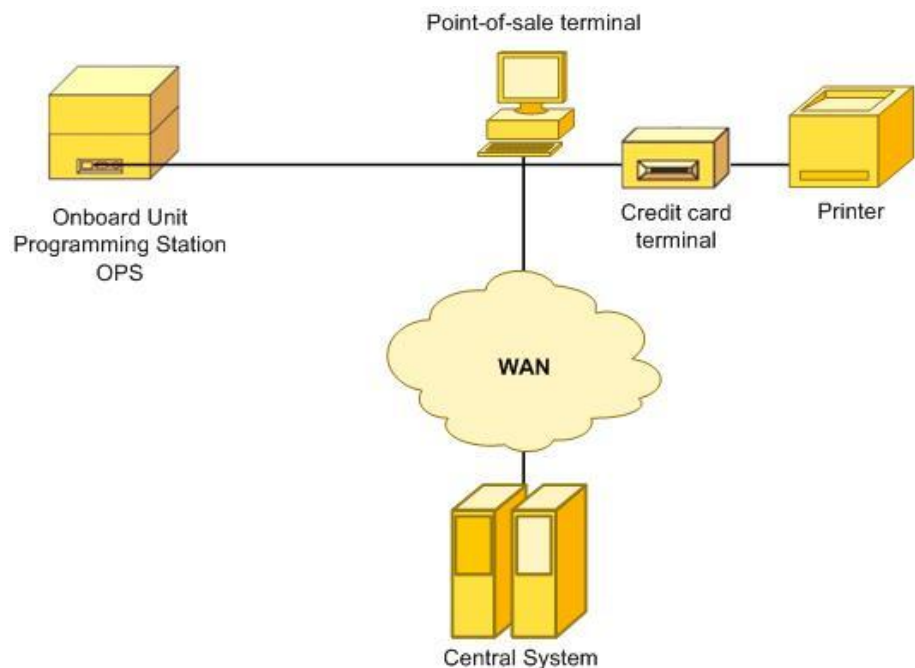
The OPS is designed for office use. It will be powered by an external power supply, which is connected to AC power. Ethernet is used for data exchange between OPS-9955 and the Point-of-Sale Terminal.

### Software

The software package delivered by KAPSCH includes driver software for the OPS-9955 to integrate the device with a Point-of-Sale Terminal. See Programmer's Manual for details.

**Note:** The OPS-9955 cannot be used without installing the KAPSCH software package on the user terminal.

Figure 1  
System overview



### OPS features

- Generic Programming Interface for Integrators
- Intuitive Operation
- Personalization of Packed and Unpacked OBUs without the need of exact positioning
- Maximum size of programmable OBUs up to 40x155x110mm (1.5in x 6.1in x 4.3in) (HxLxW)

- Anti-slip protection
- Easy to clean

## Functional details

The generic programming capability gives the integrator the flexibility to have nearly full access to all information stored on the OBU.

Key features:

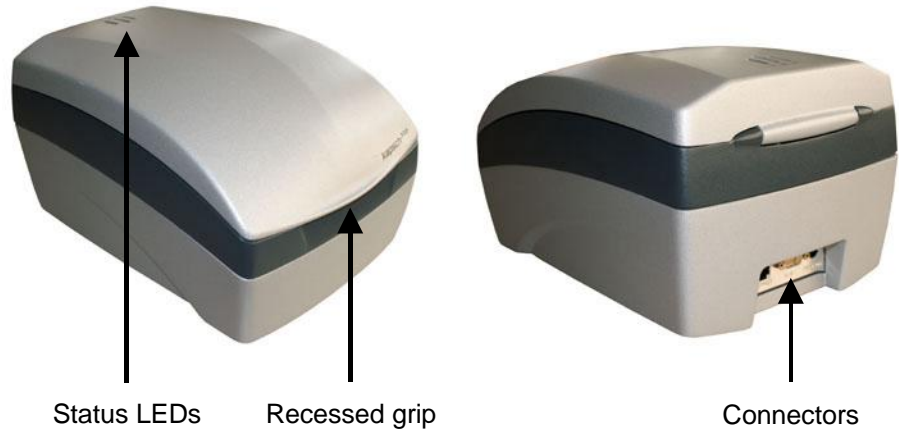
- Personalize OBUs with customer data
- Modify customer data on the OBU
- Read out customer data stored on the OBU
- Set the operating state of the OBU
- Test the OBU for basic operation

## Modes of Operation

- **Passive Mode:**  
In this mode the radio of the OPS-9955 is not transmitting and it is waiting for a personalization request. The Ethernet interface is enabled and the current state of the device is signaled via the HMI interface.
- **Active Mode:**  
The radio of the OPS-9955 will transmit during the communication process with the OBU and will automatically enter Passive Mode after completing the steps needed for personalization. If the lid of the OPS-9955 is opened during transmission, the transmission of the OPS-9955 radio will be stopped immediately.

# Installation and Operation

Figure 2  
Onboard Unit Programming Station OPS



## 1. Mounting

## 2. Connecting

- Place the OPS on a desk or other flat surface in a horizontal position.
- Connect the OPS to the Point-of-Sale by using a RJ45 cable.
- Connect the external power supply to the OPS.
- Connect the external power supply to the 110VAC - 230VAC outlet.
- The green Power LED is illuminated continuously.

Figure 3  
Connectors on the OPS



Table 2  
Connectors on the OPS

No.	Name	Description
1	RJ45 Ethernet Connector (female)	RJ45 connector to connect the Ethernet cable to the Point-of-Sale Terminal
2	RS232 Connector (male)	D-Sub 9-pin RS232 connector for service purposes only.
3	Power Supply Connector (male)	Power Supply connector 12 – 24VDC for connecting the external Power supply.

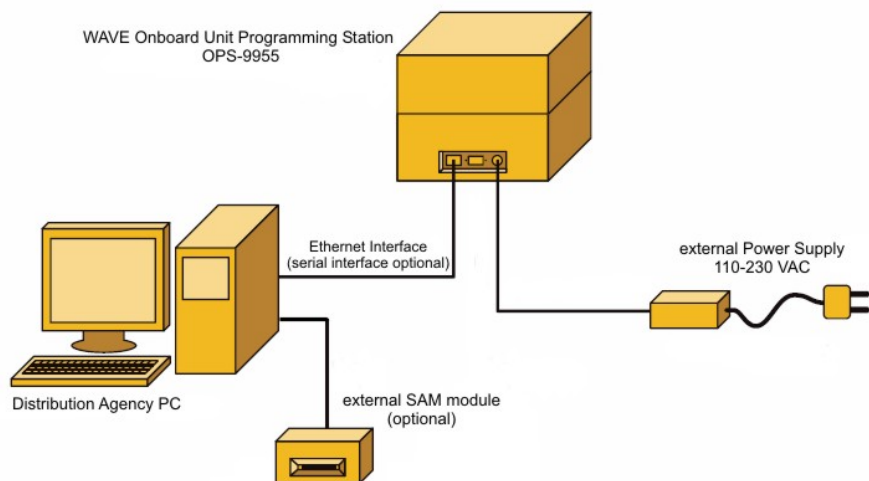
Figure 4  
HMI Interface on the OPS



Table 3  
HMI Interface

No.	Name	Description
1	Power LED (green)	After connecting the power supply of the OPS to AC power, the Power LED is illuminated GREEN continuously.
2	Programming LED (orange)	After the OPS is initialized and the lid is closed the Programming LED is illuminated continuously ORANGE. After successful personalization of the OBU the Programming LED flashes until the lid is opened.
3	Error LED (red)	In case of an error the Error LED flashes RED.

Figure 5  
OPS connecting scheme



### 3. Network configuration

By default the OPS gets its network configuration via DHCP.

**Note:** A DHCP Server must be installed on the Point-of-Sale Terminal before connecting the OPS.

#### 4. Start-up

- The OPS is ready for personalization, if the orange LED lights continuously. (If not see section *Fault Diagnosis*, page 16).

**Note:** The lid of the OPS must be closed.

#### 5. OBU Positioning

- Open the lid by pushing the lid slightly at the grip in front of the OPS.
- Place a packed or unpacked OBU as shown in *Figures 7– 10 in the OPS*.

Figure 6

Correct positions of packed OBUs



Figure 7

Incorrect positions of packed OBUs



Figure 8

Correct positions of unpacked OBUs



Figure 9  
Incorrect positions of unpacked  
OBUs



- Close the lid of the OPS and start the personalization procedure.

**Note:** Do not open the lid during personalization procedure or the personalization will be canceled.

## 6. End of personalization

- After a successful personalization the orange LED starts flashing.
- Open the lid of the OPS and remove the OBU
- Close the lid of the OPS. The orange LED stops flashing and is illuminated continuously again.

## Fault Diagnosis

Problem	Cause	Repair
Power LED (green) isn't illuminated	Power supply plug from the external power supply is not connected to a live AC outlet	Connect the power supply plug from the external power supply to a live AC outlet.
	Power supply cable from the external power supply is not connected to the OPS	Connect the power supply cable from the external power supply to the power connector on the OPS
	Fuse is blown	Contact the Sales or Service Organization of Kapsch TrafficCom
Programming LED (orange) isn't illuminated	Lid of the OPS is open	Close the lid of the OPS
Programming LED (orange) isn't illuminated	OPS software driver is not installed correctly	Install or reinstall the KAPSCH software package
OPS doesn't communicate with the Point-of-Sale Terminal	Ethernet cable is not connected properly or Ethernet cable is defect	Connect the Ethernet cable correctly
OPS doesn't communicate with the Point-of-Sale Terminal	OPS software driver is not installed correctly	Install or reinstall the KAPSCH software package
Error LED (red) flashes	General error	Contact the Sales or Service Organization of Kapsch TrafficCom



## Product Specifications

<b>Mechanical data</b>	Dimensions [LxWxH]	11.8 in x 7.8 in x 6.3 in (300 mm x 200 mm x 160 mm)
	Weight	10.4 pounds (4.7 kg)
<b>Electrical data</b>	Power supply	External power supply 12VDC / 2A
	Power consumption (operating mode)	max. 24W typ. 2.7W
<b>Environmental conditions</b>	Temperature (operation)	-5°C ... +50°C 23°F ... +122°F
	Storage temperature	-20°C ... +70°C -4°F ... +158°F
	Ambient humidity	5 to 95% non condensing
<b>Ethernet Interface</b>	100Base-TX RJ45 connector	Connector for a Ethernet connection to Point-of-Sale Terminal
	Network configuration	DHCP
<b>RS232 Interface</b>	D-Sub 9-pin male	RS232 connector for service issues
<b>RF Interfaces</b>	Frequency range	5.850GHz - 5.925GHz
	Channels	172,174,176,178,180,182,184
	Data Rates	3MBit/s – 27MBit/s
<b>Compliance</b>		47 CFR Part 95 L
		47 CFR Part 15 B
		UL-60950-1, 2 <sup>nd</sup> edition
		UL-60950-22, 2 <sup>nd</sup> edition
		CSA C22.2 No. 60950-1-07, 2 <sup>nd</sup> edition
		UL: E323290



# Conformity

## Standards

Table 4  
Standards

Ref.	Standard	Description
[1]	ASTM E2213 – 03	Standard Specification for Telecommunications and Information Exchange Between Roadside and Vehicle Systems — 5 GHz Band Dedicated Short Range Communications (DSRC) Medium Access Control (MAC) and Physical Layer (PHY) Specifications
[2]	IEEE 802.11™a-2007	IEEE Standard for Information technology— Telecommunications and information exchange between systems— Local and metropolitan area networks— Specific requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications
[3]	IEEE 802.11™p	IEEE Standard for Information technology— Telecommunications and information exchange between systems— Local and metropolitan area networks— Specific requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications Amendment 7: Wireless Access in Vehicular Environments
[4]	IEEE 1609.4™	Draft Standard for Wireless Access in Vehicular Environments (WAVE) - Multi-channel Operation
[5]	IEEE 1609.3™	Draft Standard for Wireless Access in Vehicular Environments (WAVE) – Networking Services

**Address**

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