



VU1 and VU2 - version V3.34

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VU1 and VU2

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Table of contents

Introduction	1
The keypad functions	3
The monitoring interface for setup	4
Stepwise setup	7
Set the general parameters	7
Set the camera-related parameters	9
Place the presence zones	11
<i>Edit the default zone</i>	12
<i>Add, select or delete a zone</i>	13
<i>Guidelines to edit the zones</i>	14
Assign phases	15
Save and load the setup parameters	16
Setup of the data collection function	17
Calibrate the board	17
Place the data zones	18
<i>Edit the default zone</i>	19
<i>Add, select or delete a zone</i>	19
Traffic data via PC or monitor	21
Advanced settings	22
<i>The failsafe function</i>	22
<i>Advanced settings related to the presence function</i>	23
<i>Advanced settings related to the data function</i>	24
Optional functions	25
Define a configuration schedule	25
Set the delay and extend time of the presence zones	26
Configure the queue length measurement function	28
<i>Place the queue length measurement zones</i>	28
<i>Set the queue length parameters</i>	29

Assign outputs by combining presence zones and/or external inputs	30
<i>Combine presence zones to one output</i>	31
<i>Combine presence zones and external inputs to one output.</i>	31
Assign a hardware output to image quality	32
Set the pulse generation function	32
Optional setup related to the data function	33
<i>Traffic flow monitoring</i>	33
<i>Vehicle classification</i>	34
<i>Loop emulation (for TS1 mode only)</i>	35
<i>Assign data outputs</i>	35
<i>Force alarms</i>	35
Other board features	36
Firmware upgrade	36
Password protection	36
<i>Insert a password</i>	36
<i>Define a password to a supervisor or user</i>	37
<i>Log on to a password protected board</i>	37
<i>Deactivate the password protection.</i>	37
Set the display properties	38
The board database	39
<i>Storage capacity of the database</i>	39
<i>Download the database to a PC</i>	39
<i>Erase the database</i>	40
Appendix: menustucture of VU1	41
Index	43

About this manual

This document describes the setup of **VU1** and **VU2**. VU1 monitors one camera, VU2 monitors two cameras. The setup of both products is completely similar, the document illustrates **VU1**.

The manual aims at providing you with the necessary background and procedural information to help you set up and use VU1 and VU2.

The manual has the following chapters:

Introduction

gives an overview of the functional characteristics of VU1 and VU2.

The keypad functions

lists the functions of all keypad keys.

The monitoring interface for setup

describes the setup mode and the main keypad functions.

Stepwise setup of the VU board

guides you through the setup of the VU board as a 5-step process.

This chapter describes how to set the general and camera-related parameters, place the presence zones (including guidelines to edit the zones), assign the phases and finally save and load the configuration.

Setup the data collection function

describes the setup of the data function of the VU1 and VU2 board.

Advanced settings

describes the advanced settings of the VU1 and VU 2 board.

Optional functions

covers all optional functions of the board; configuration scheduling, queue length measurement, optional output settings, the pulse generation function, flow monitoring, vehicle classification and loop emulation.

Other board features

describes firmware upgrade, the password protection function, the display settings and the board database setup.

Appendix

gives an overview of the VU1 menu-structure.

Index

You set up the board via the keypad and a monitor after installation of all materials at the intersection. The hardware and installation of the boards is described in a separate manual.

1. Introduction

VU1 or VU2 has the following functional characteristics:

- Presence detection at the stop bar on intersections
- Advance detection of vehicles approaching the intersection
- Traffic data collection (flow data, individual or integrated data per lane)

over different lanes.

VU1 up to 24 presence detection zones and up to 8 data zones

VU2 up to 20 presence detection zones and up to 4 data zones per camera

The user can make the zones direction sensitive.

Via the board outputs, VU1 or VU2 provides an input to the traffic controller upon presence detection.



Figure 1: Video image with VU1 overlay

Optional / Advanced Functions

- Setting of delay and extend time for presence zones (in combination with an external input)
- Queue length measurement (on maximum 6 zones)
- Output assignment to combined zones and/or inputs with Boolean logic
- Configuration scheduling (2 different configurations)
- Pulse generation function
- Fail-safe function (start-up, detection or image quality recall)
- Traffic flow monitoring, vehicle classification and loop emulation

Board features

- Firmware upgrade
- Password protection
- Display setup
- Database setup

VU1 or VU2 can be used in 2 configurations: TS1 and TS2 mode.

In **TS2** mode, the VU COM board communicates the status change of the outputs (upon presence detection) to the BIU module which interfaces with the TS2 controller using SDLC.

In **TS1** mode, presence detection causes the hardware outputs of the detector board to change status as an input to the controller.

2. The keypad functions

The following table gives an overview of all keypad keys and their function.


	Keys	Upon clicking
	Next (F1)	Go to the next zone.
	Prev (F2)	Go to the previous zone.
	Add (F3)	Add a zone.
	Delete (F4)	Delete a zone.
	Arrow keys	Scroll through a menu. Or Scroll through the selection or range of a parameter. Or Select a submenu Or Make a presence zone direction sensitive.
	Escape	Exit a menu or submenu. When you exit the main menu, the setup is saved.
	Enter	Enter a menu or submenu. Or Confirm the selected value for a parameter and close the (sub)menu.
Help	Display the help text for a (sub)menu item.	
Dir	Make a data zone direction sensitive.	
No	Assign an output to a presence zone <i>or</i> assign a number to a data zone.	
<p>For communication boards only:</p> <p>Modify or Operate Edit Start the setup mode. <i>Not functional</i></p>		

Figure 2: The functions of the keypad keys

3. The monitoring interface for setup

At initial startup the monitor displays the product serial number, the hardware revision and the firmware version.

Note: The product information will appear also after you reset the board.



Figure 3: Product information on the monitor

To enter the setup mode:

- **Press a key** on the keypad (any key except Escape).

As a result, the VU1 or VU2 menubar appears. Also general board information and a default presence detection and data zone are displayed.



Figure 4: The board in setup mode

The table below gives an overview of the main functions in the setup mode.

How to...	Description
Enter the setup mode	Press any key on the keypad, except Escape.
Select a (sub)menu.	Press the Enter key.
Exit a (sub)menu.	Press the Escape key.
Set a parameter from a selection or range	Use the Arrow keys.
Zone Editing: <ul style="list-style-type: none"> • Add a zone • Select a zone • Delete a zone • Give a direction to the zone • Assign an output to the zone 	Press the Add (F3) key. Press the Next (F1) or Prev (F2) key. Select the zone and press the Delete (F4) key. Select the zone and use the Arrow keys (Presence zone). Select the zone and press the Dir key (Data zone). Select the zone and press the No key (Presence zone only).
Exit the setup mode and start the operational mode	Press the Escape key from the main menu. <i>The board saves the setup, starts learning and becomes operational.</i>

Figure 5: Main use of the keypad in the setup mode

VU1 and VU2

The setup of the VU1 or VU2 board is a 5-step process.

- STEP 1 Set the general parameters**
- Verify the default settings of language, system of units, date and time
 - Set the configuration mode
 - Set the number of inputs and outputs of the system
- STEP 2 Set the camera-related parameters**
- Assign a name to the board
 - Assign the address to the board
 - Set the video level
 - Verify the default quality settings
- STEP 3 Place the presence zones**
- Edit the default presence zone + assign an output to the zone
 - Add and edit the other presence zones
- STEP 4 Assign phases**
- Assign the outputs to the intersection phases
- STEP 5 Save and load the setup parameters**

Note: The data collection function, board features, optional and advanced functions are described in separate chapters.

4. Stepwise setup

4.1. Set the general parameters

You set the general parameters via the menu **General**.



Figure 6: The general menu opened

Language	Set the language for menus and submenus. Default: English {Selection: English, French, Dutch, German, Italian, Spanish}
Units	Set the system of units. Default: Imperial {Selection: Imperial, Metric}
Date & Time	Change date and/or time. - Date format: MMM DD YYYY - Time format: 24-h (hh:mm) <i>Daylight saving time</i> Both daylight saving time systems in the USA are supported. Default: Off {Selection: Off, USA<2007, USA>2007, Europe} USA < 2007: start first Sunday in April, end last Sunday in October USA > 2007: start second Sunday in March, end first Sunday in November
Output Mode	Set the output mode according to the configuration of the board. TS1: use the hardware outputs of the board TS2: use serial communication (via VU COM and BIU interface) to transfer presence detection information to the controller

In the general menu, you also set the number of inputs and outputs of the system. The status of the unassigned outputs applies to TS1 mode only.

Nr of Inputs	Default: 0	{Range: 0 to 20}
Nr of Outputs	Default: 4	{Range: 0 to 24 for TS1, 0 to 128 for TS2}
Unassigned Outputs	Default: Normal open	{Selection: Normal open, Normal closed}

Note: A '>' symbol next to a menu item indicates there is a submenu for this item.

4.2. Set the camera-related parameters

You set the camera-related parameters in the menu **C1 Par**.



Figure 7: The parameter menu opened

Camera Name Assign a name to the board. The name serves as the identification of the board.

Default: NAZTEC

{Camera name can have up to 15 alphanumeric characters}

Address Assign an address to the board. The address identifies the board in the rack.

Default: 99

{Selection: 00 (most left position in the rack) to 05 (most right position)}

VIP 3.x	VIP 3.x	VIP 3.x	VIP 3.x	VIP 3.x	VIP 3.x	COM
Pos 00	Pos 01	Pos 02	Pos 03	Pos 04	Pos 05	board

Video Level Set the video level of the board.

The video level should be set only during daytime situations with moving traffic. Adjust the video level so half of the video level bar is black and half of it is white.



Default: 51 %

{Range: 33,3 to 99,9 %}

If you cannot set the video level between 45 % and 65 %, check the termination of the video signal.

Quality Set the threshold and timeout parameter for image quality.

When the image quality remains below the quality threshold for a time set by the timeout parameter, the board goes into recall.

(See [The failsafe function](#))

Quality Alarm Threshold

Default: 4 {Range: 0 to 10}

With a higher threshold the system is more sensitive for image quality deterioration.

Quality Alarm Timeout

Default: 2 min {Range: 1 to 99 min}

Detection Recall (= advanced parameter, see [The failsafe function](#))

Note: The parameter menu also contains items for display settings (to define what information appears on the monitor as overlay on the video image) and parameters related to the configuration scheduling function.

These are described in [Set the display properties and Optional functions](#).

4.3. Place the presence zones

You place the presence detection zones in the menu **C1 Pres**.



Figure 8: The presence menu opened

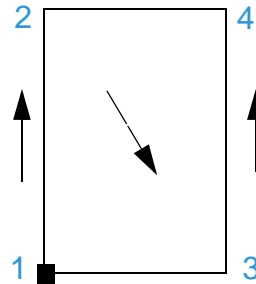
Change Zones Open this menu to place the presence zones.

Note: The presence menu also contains parameters for setting delay and extend time, queue length measurement (See Optional functions) and advanced settings (See Advanced settings related to the presence functionn).

Edit the default zone

When you open the **Change Zones** menu, the default presence zone is highlighted. You customise the **position** of the zone via its corners using the arrow keys.

- Press the Enter key and place the bottom left corner. A square cursor indicates the corner you adjust.
- Press the Enter key to move to the next corner. Continue until you have positioned the zone via its four corners and press the Enter key.



In certain situations vehicles in the opposite direction pass through the detection zone. To avoid unwanted detection caused by these wrong-way drivers you should make the presence zone direction sensitive.

- Give a **direction** to the zone via the arrow keys. Press the Dir key if you wish to delete the zone direction.
- Assign an **output** to the zone via the number key.



Figure 9: The default zone edited as a presence detection zone

VU1 and VU2

Add, select or delete a zone

Add a zone	Use the Add key (F3)
Select a zone	Use the Next (F1) or Previous (F2) key
Delete a zone	Use the Del key (F4)

You can place **up to 24 presence detection zones** for a VU1 and **up to 20 presence detection zones** for a VU2 board (per camera).



Figure 10: The presence zones

Guidelines to edit the zones



THE SIZE OF THE ZONE

The zone should have the length and the width of a regular vehicle.

The zone should be somewhat smaller than the width of the traffic lane.

You should keep a fair distance between the zones in adjacent lanes.

THE POSITION OF THE ZONE

Place the zone as such that the vehicle will stop in the middle of the zone.

Take into account that vehicles may stop well in front of or over the stop line.



The zones should cover a uniform background. Avoid that the zones cross over distinct road marks. Possibly, zones can completely enclose such markings.

The position of the zone should be as such that the vehicle and both headlights pass through the zone (related to the detection at night).

OVERLAPPING ZONES

To minimize the chance that a vehicle stops well in front or behind a zone, two overlapping zones may be used. These zones are assigned to the same output.



DIRECTION SENSITIVITY

Make the zone direction sensitive in situations where vehicles in the opposite direction may cause unwanted detection.

4.4. Assign phases

You assign the outputs to the intersection phases in the menu **C1 Outp**.

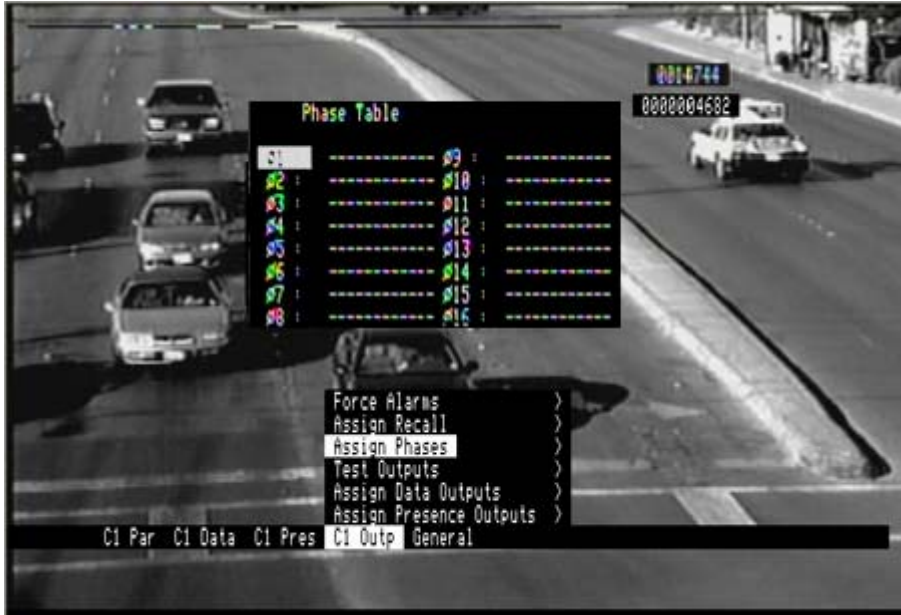


Figure 11: The outputs (assign phases) menu opened

Assign Phases Assign the outputs to the phases with the arrow keys.

You can assign maximum 4 outputs to one phase.
An output can be assigned to one phase only.

Note: The outputs menu also contains parameters for advanced data and presences outputs assignment (See Optional functions).

4.5. Save and load the setup parameters

The final step during the setup is to save the setup parameters and switch to the operational mode.

Note: You may wish to change the default display settings before switching to the operational mode. For details, see [Set the display properties](#).

- Press the Escape key to exit all menus.
The board saves the setup parameters. The monitor displays the saving message.



The board is operational when this message has disappeared.



Figure 12: The board in operational mode

5. Setup of the data collection function

You set up the data collection function in the menu **C1 Data**.

5.1. Calibrate the board

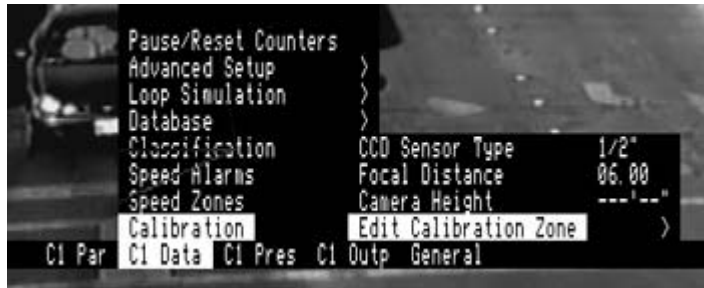


Figure 13: The data menu with the calibration submenu

- Open the **Calibration** menu.
- Enter the **focal distance** and the **CCD sensor type** of the camera.
Default: 1/2 " {Selection: 1/4", 1/3", 1/2", 2/3"}
Default: 06.00 {Range: 02.00 to 60.00 mm}
- Open the **Edit Calibration Zone** menu.
 The default calibration zone is displayed.
- Place the calibration points (+) on the image so that the zone forms a **rectangle on the road**.
 The wider apart the calibration points are placed the more accurate is the calibration.
 - *Start with the bottom left corner (calibration point 1).*
 - *Press the Enter key to move to the next corner.*
Continue until you have positioned the zone via its 4 corner points.
- Press the Enter key and **set the length** of the calibration zone.
 The board calculates the width (distance between calibration points 1 and 3).
- Press the Escape key to exit.
 A window with calculated camera height, camera focus and video norm is displayed.
- Finally check the calculated height of the camera to **verify the accuracy** of the calibration.
 A margin of 5 % between calculated and mounted height of the camera is acceptable. If the difference is higher, you should adapt the calibration zone.

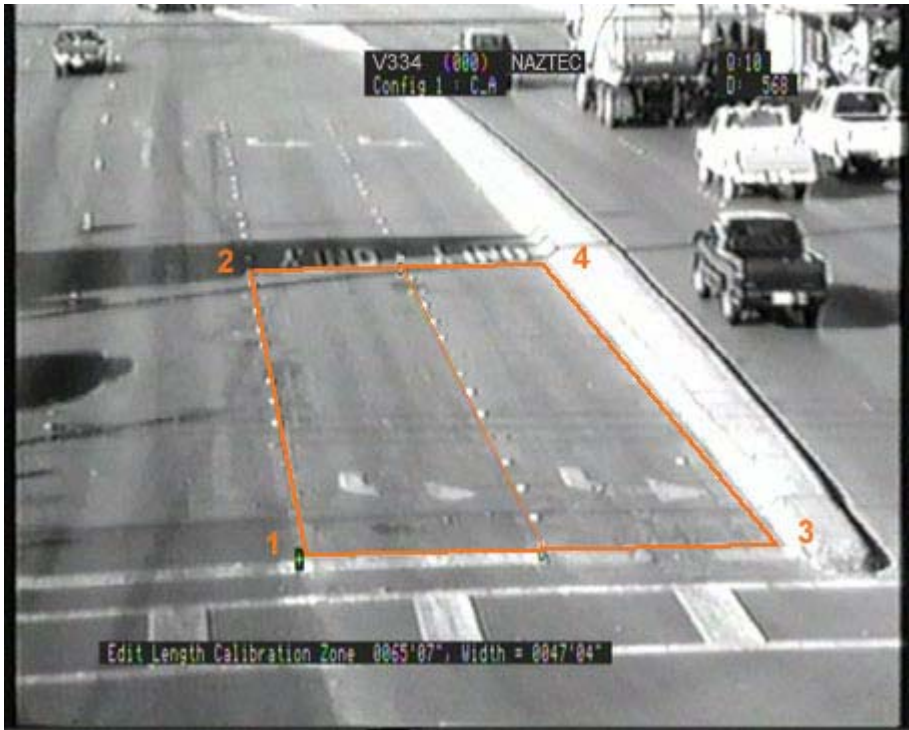


Figure 14: The calibration zone

5.2. Place the data zones

Speed Zones Open this menu to place the data zones.

Note: The data menu also contains parameters for setting speed alarms, vehicle classification, database settings, loop simulation (See Optional setup related to the data function) and advanced settings (See Advanced settings related to the data function).

The default settings for speed alarms, vehicle classification and database parameters enable data collection.

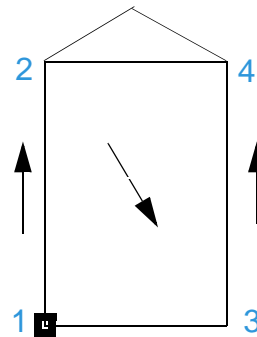
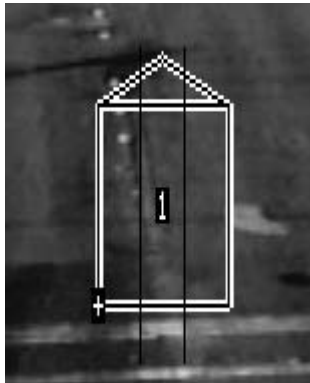
Edit the default zone

When you open the **Speed Zones** menu, the default data zone is highlighted. You customise the position of the zone via its corners using the arrow keys.

- Place the bottom left corner.
A square cursor indicates the corner you adjust.
- Press the Enter key to move to the next corner.
Continue until you have positioned the zone via its four corners and press the Enter key.

Advised length of the zone is 32' to 39' and for zone width, you should take at least the width of a regular vehicle.

The calculated length of the zone is displayed when editing the zone. After positioning the last corner you can change the length of the zone.



- Change the default **direction** of the zone via the Dir key.
- Give a **number** to the zone via the No key.
This number is used as reference to the lane.

Flow lines (used to measure flow speed and zone occupancy, see [Traffic flow monitoring](#)) are inserted automatically in the data zone.

Add, select or delete a zone

Add a zone	Use the Add key (F3)
Select a zone	Use the Next (F1) or Previous (F2) key
Delete a zone	Use the Del key (F4)

VU1 and VU2

You can place **up to 8 data zones** for a VU1 or VU2 and **up to 4 data zones** for a VU1 or VU2 board (per camera).



Figure 15: The data zones

5.3. Traffic data via PC or monitor

VU1 or VU2 provides traffic data as illustrated in the table below.

<i>Data type</i>	<i>Data per zone (lane)</i>	<i>Available via</i>
Flow data	<ul style="list-style-type: none"> • <i>Flow speed</i> • <i>Zone occupancy</i> 	<ul style="list-style-type: none"> - PC (See Download the database to a PC) (via VIPLINK PC software or via Windows hyperterminal program) - Monitor (See Set the display properties)
Integrated data (time average)	<ul style="list-style-type: none"> • <i>Volume, average speed and gap time per vehicle class</i> • <i>Headway</i> • <i>Occupancy, density and vehicle length</i> 	<ul style="list-style-type: none"> - PC (See Download the database to a PC) (via VIPLINK PC software or via Windows hyperterminal program) - Monitor (See Set the display properties)
Individual data	<ul style="list-style-type: none"> • <i>Speed</i> • <i>Gap time</i> • <i>vehicle class</i> 	PC (download via VIPLINK PC software).

Figure 16: Traffic data overview

Note: More information on downloading the board database via VIPLINK PC software is available from the VIPLINK manual.

6. Advanced settings

Several menus have advanced setup parameters. These parameters are not activated or a default value is assigned. Depending on specific local situations, modifications may be useful.

The failsafe function

You can assign outputs to the recall status or failsafe function of VU1 or VU2.

The failsafe function may be activated for

- **Startup** the presence zones have been modified (zones are “learning”)
- **Detection** there is no presence detection for a period of time
- **Image quality** the image quality remains below a threshold for a period of time

<i>Parameter</i>	<i>Description</i>
Detection Recall (Parameters menu, Quality)	Set the delay for activation of detection recall. Default: -- (not active) {Range: 1 to 999 min}
Startup Recall (Presence menu)	Deactivate the startup recall function. [Default: On] {Selection: On, Off} On: a presence zone remains active for at least the startup recall timeout (see below) after the zone was edited. Off: detection starts immediately but with lower reliability during the learning phase.
Startup Recall Timeout (Presence menu)	Default: 60 s {Range: 60 to 600 s}
Assign Recall (Outputs menu)	Assign outputs to the recall state. Default: Rxx (R=assigned) {Selection: assigned, not assigned}

Advanced settings related to the presence function
(Presence menu)

Parameter	Description
Camera movement suppression	This function applies to a situation where the camera is moving (mounted on a pole that may be swinging because of the wind).
- Mode	Activate the camera movement suppression. [Default: Off] {Selection: On, Off, Day, Night}
- Suppression	Set the level of suppression. A high level of suppression may reduce the detection sensitivity. [Default: Low] {Selection: Low, Medium, High}
Tree shadow suppression	Activate this parameter to avoid unwanted detection caused by continuously moving shadows over the image. [Default: Disabled] {Selection: Disabled, Enabled}
Detection hold time	Change when the cycle length at the intersection is not standard. Default: 240 s {Range: 10 to 600 s}
	The detection hold time defines the maximum delay time for deactivation of the detection. By default it is set to 4 minutes since intersection cycle lengths rarely exceed this time.
	Upon presence detection for longer than the detection hold time, the zone will relearn.
Wrong way sensitivity	Set this parameter to avoid wrong- or side-way traffic causing unwanted detection. Default: Medium {Selection: low, medium, high}
Wrong way suppression delay	Set the delay time for the activation of the output on detection of a wrong-way vehicle. Default: 10 s {Range: 1 to 30 s}

Advanced settings related to the data function

(Data menu)

<i>Parameter</i>	<i>Description</i>
Flow line length	Set this parameter to adjust the length of the flow lines to the individual camera view. Longer flow lines give higher zone occupancy and are more sensitive to queue situations. Default: 82' {Range: 4' to 164'}
Flow integration interval	Set the interval to calculate the traffic flow data. Set higher to avoid speed fluctuations that do not reflect the actual traffic situation. Default: 25 {Range: 10 to 50}
Speed sensitivity factor	Set this parameter to change detection sensitivity. A higher value increases the sensitivity but also noise effects will occur. Default: 300 {Range: 10 to 999}
Disable inverse direction at alarm level	Activate this parameter to avoid unwanted events caused by vehicles that drive slowly backwards in a queue. Indicate a level of service at which to disable an inverse direction event. [Default: 3] {Selection: Level of service 0 to 4 or not activated}
Disable speed drop at alarm level	See above but now related to speed drop events.
Select data length type	Select the length data (queue length or vehicle length) for storage in the database. [Default: Vehicle] {Selection: Queue, Vehicle}
Select data speed type	Select the type of data for storage in the database. [Default: Integrated (time average)] {Selection: flow, integrated (time average), integrated (harmonic mean)}
Deactivation timer	Set the period during which detection of inverse direction is disabled. Default: 15 min {Range: 10 to 30 min, or not active}
Individual data mode	Activate this option to send individual data over the serial port to the PC. [Default: Not activated] {Selection: Activated, not activated}
Headlight detection	Activate this parameter in a situation with low camera position and upcoming traffic. [Default: Not activated] {Selection: Activated, not activated}
Occlusion mode	Activate this parameter to suppress counts caused by occlusion. [Default: Not activated] {Selection: Activated, not activated}

7. Optional functions

7.1. Define a configuration schedule

Configuration refers to the complete setup of the board.

A VU1 or VU2 board can have two different configurations programmed to load automatically by time of day or to be activated on request.

Example

Traffic comes into town in the morning and goes out in the evening.

You need one setup in the morning. A second setup with adapted settings needs to load for the evening situation. These two configurations are stored on the board. The user assigns a name to each setup and defines the start time.

When operational, the board will load the programmed configuration at the set time of the day.

Config Schedule	Define the start time for each configuration.
Save as...	Assign a name and save the configuration.
Load	Select the configuration you wish to activate.
Erase	Select the configuration you wish to erase. After erasing all configurations the default settings are restored.

(Parameters menu)

Note: When you reset the board, the board always returns to the configuration scheduled to be loaded at that time.

7.2. Set the delay and extend time of the presence zones

Parameters to delay and/or extend the vehicle presence detection (or call) can be defined and the output call can be combined with an input from an external device (traffic controller, switch). This enables to inhibit a call dependant on the external device.

The **delay time** is defined as the time between a presence detection (= call) and the status change of the output. When a vehicle enters the zone, the output is delayed until the delay time expires.

The **extend time** is defined as the time between the moment when the vehicle leaves the zone and the moment when the output from that zone changes status.

If another vehicle enters the detection area before the extend timer times out, the call is held and the extend timer is reset. When the extend timer times out, the delay timer has to expire before another vehicle call can be received.

You set the delay and extend time via the zone info menu (presence menu). When you open this menu, a zone info window appears.



Figure 17: The zone info window

The info window applies to the selected presence zone.

VU1 and VU2

Detection Mode	Presence	
Lane Nr	1	A
Delay(s)	00.0	B
Extend (s)	00.0	
Input	-	C
Pulse	None -	

Delay and/or extend time are set in (A).

Default: 0 s {Range: 0 to 99,9 s}

Parameters for delaying and/or extending vehicle presence detection (or call) in combination with an external input are set via (B).

Note: Pulse (C) applies to the pulse generation function, see [Set the pulse generation function](#).

7.3. Configure the queue length measurement function

Up to 6 presence zones can be configured for queue length measurement.

This function requires calibration of the board (as described in [Calibrate the board](#)).

Place the queue length measurement zones

- Place the queue length zone(s) via the presence menu. To place a zone, see [Edit the default zone](#).

*Note: The **length of the zone** depends on the length of the queue that needs to be monitored. A queue zone is not direction sensitive.*

- Open the zone info menu and set queue as the detection mode for the queue length measurement zone. Other parameters in the zone Info window do not apply.



Figure 18: The zone for queue length measurement

Set the queue length parameters

- Queue Extend Time** Set the language for menus and submenus.
Default: 3 s {Range: 1 to 10 s}
- Queue Delay Time** Set the time a vehicle should be stationary on a queue zone before the queue alarm becomes active.
Default: 4 s {Range: 1 to 10 s}
- Queue Threshold** Set the threshold value for the length of the queue before the queue alarm becomes active.
Default: 32' {Range: 0 to 655'}

(Presence Menu)



Figure 19: Queue zone and queue length information

7.4. Assign outputs by combining presence zones and/or external inputs

The user can combine presence zones to one output or combine presence zones and external inputs to one output.

When presence zones and/or external inputs are combined to one output, the user should define the relationship between the different presence zones and/or inputs:

an **OR relationship (+)**

The output changes status when presence is detected on one of the zones or when an input is activated.

an **AND relationship (x)**

The output changes status when presence is detected on all zones and all inputs are activated.

In addition, the user can select the status of the presence zone to activate the output:

NORMAL the output closes when the zone is active

NOT the output closes when the zone is not active



Figure 20: The presence outputs menu opened with outputs (A) and inputs (B)

Combine presence zones to one output

- Open the **Assign Presence Outputs** (Outputs) menu.
- Select the output with the left/right arrow keys.
- Set the relationship using the up/down arrow keys.
Default: Or (+) {Selection: And (x), Or (+)}
- Press the Enter key.
- Select the zones to assign to the output using the Prev/Next keys.
- Press the Enter key to confirm.
Note: Press the Enter key a second time to select the NOT status, visualised with a dash above the output number.
- Press the Escape key.

Combine presence zones and external inputs to one output

First, you assign the zone(s) as described above. In addition,

- Select an input via the arrow keys.
- Press the Enter key to confirm.
Note: Press the Enter key a second time to select the NOT status, visualised as an 'N' next to the input number.
- Press the Escape key.

Example

A phase red output from the controller is combined with a zone output with the logical relationship 'AND'. Vehicle presence will be output to the controller during the red phase, but the vehicle presence output will be disabled during the green and yellow phase.

If the phase red output is inverted (NOT), the presence output will be active during the yellow and green phase and it will be disabled during the red phase.

Note: You can test the hardware outputs via the outputs menu. When you select an output, the LED on the board front panel lights up and the output status changes. When you exit the Test Outputs menu, the outputs react normal again.

7.5. Assign a hardware output to image quality

- Open the **Assign Data Outputs** (Outputs) menu.
- Select the output for video quality with the left/right arrow keys.
- Press the Escape key.

7.6. Set the pulse generation function

Presence zones can be configured to generate a pulse to the controller.

In the zone info menu for the presence zone (See Combine presence zones and external inputs to one output), the user can set the following parameters.

Pulse	Select whether the pulse is generated on the entry line or the exit line. Default: none (not activated) {Selection: Entry, Exit}
Pulse length	Set the pulse duration as 'X' times a pulse length. Default: 1 {Selection: 1 to 5}
	The pulse length depends upon the video standard the user is working with. For NTSC, the pulse length is 33.33 ms. If PAL is used, the pulse length is 40 ms.

7.7. Optional setup related to the data function

Traffic flow monitoring

VU1 or VU2 distinguishes between 5 levels of service based on flow speed and zone occupancy.

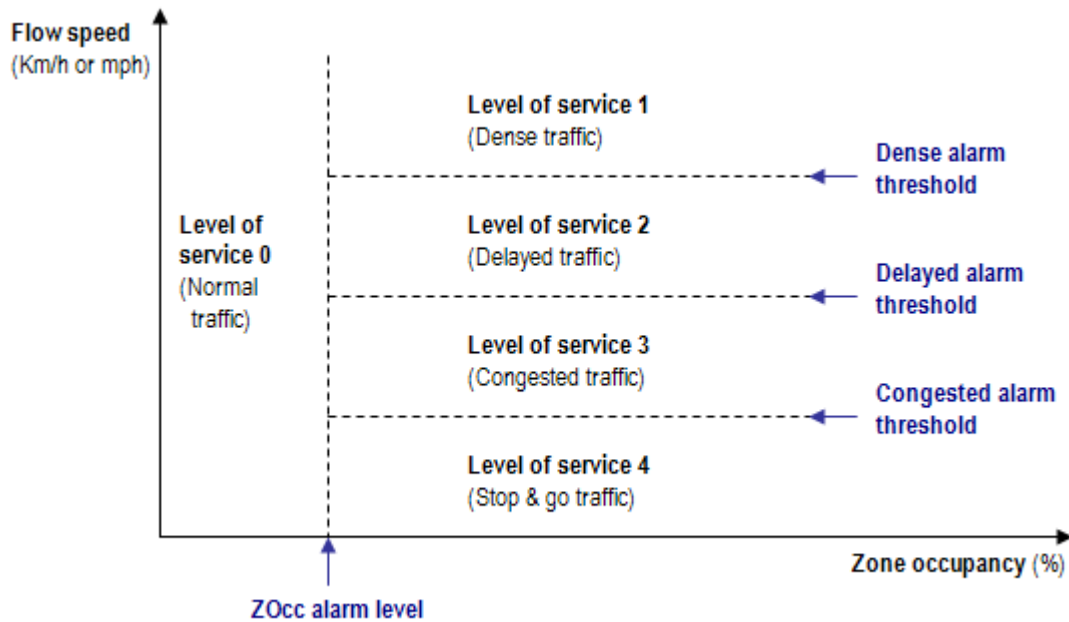


Figure 21: Levels of service based on zone occupancy and flow speed

The user sets the traffic flow parameters via the data menu, submenu speed alarms.

ZOcc alarm level	Set the zone occupancy alarm level. Default: 20 % {Range: 0 to 99 %}
Dense alarm threshold	Set the threshold for dense traffic. Default: 37 mph {Range: 1 to 93 mph}
Delayed alarm threshold	Set the threshold for delayed traffic. Default: 25 mph {Range: 1 to 93 mph}
Congested alarm threshold	Set the threshold for congested traffic. Default: 12 mph {Range: 1 to 93 mph}

VU1 and VU2

Delay alarm on	Set the delay time for activation of an event related to changing traffic flow. Default: 10 s {Range: 1 to 300 s}
Alarm hold time	Set the delay time for deactivation of the traffic flow event. Default: 60 s {Range: 1 to 300 s}
Speed drop alarm	Set the relative deceleration of speed over 10 seconds that will generate a speed drop event. Default: 60 % {Range: 5 to 99 %}

By default, the above parameters apply to all zones. It is possible however to set the parameters per zone.

Individual lane thresholds Activate this option to set traffic flow parameters per zone.
[Default: Not activated] {Selection: Activated, not activated}

Assign lane threshold Open this submenu to enter the zone-specific settings in the table.

Vehicle classification

VU1 or VU2 distinguishes between 5 classes of vehicles based on the optical length of the vehicles.

The user sets the vehicle classification function via the data menu, submenu classification.

Class 1 to 4 length Set the thresholds for the different vehicle classes.
Class 'x' length is defined as the maximum length for class 'x' vehicles and the minimum length for class 'x+1' vehicles.
Default: 3 classes with class 1 length= 23' and class 2 length = 39'04"
{Range for the lengths: 3'03" to 98'04"}

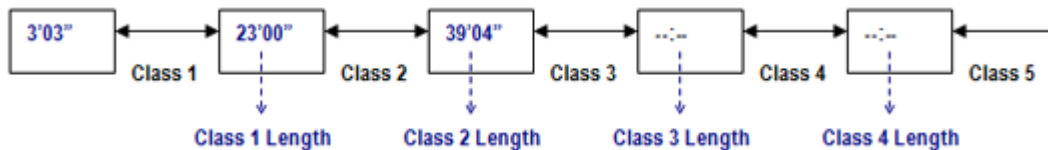


Figure 22: Vehicle classification scheme

VU1 and VU2

Loop emulation (for TS1 mode only)

VU1 or VU2 can emulate single or double loop detectors.

The user sets the loop emulation function via the data menu, submenu loop simulation.

Double loop emulation

The board calculates the pulse length based on the vehicle speed and the vehicle length. 2 identical pulses are generated - shifted in time - via status change of the zone outputs.

Single loop emulation

The pulse length is calculated via a fixed vehicle length (= setup parameter).

Loop length	Set the length of the loops. Default: 6'07" {Range: 11" to 32'09"}
Loop separation	Set the distance between the loops. Default: 9'10" {Range: 11" to 32'09"}
Vehicle length	Set the vehicle length (for single loop emulation only). Default: -'-" {Range: 0 to 98'05"}

Assign data outputs

- Open the **Assign Data Outputs** menu (Outputs).
- Select the output with the left/right arrow keys.
Default: -- (not assigned)
- Press the Escape key.

Note: Output settings related to double loop simulation have the format "x-y". Output x refers to loop 1 and output y refers to loop 2.

Force alarms

To test the hardware outputs, it is possible to activate an event or alarm.

- Open the **Force Alarms** menu (Outputs).
- Check the box next to the event or alarm to activate.
- Press the Escape key.

Note: A forced event or alarm is not shown as overlay on the monitor.

8. Other board features

8.1. Firmware upgrade

You can load a new firmware version into the board via the VIPLINK PC Software. Detailed information on how to proceed is found in the VIPLINK manual.

8.2. Password protection

It is possible to insert a password for authentication. This is done in the general menu. By default password protection is disabled and does not occur in the setup menu.

To activate the password protection function, press the reset button together with the Del key (F4) on the keypad.

Administrator	<ul style="list-style-type: none">• has the highest level of authority• has full access to the board menu & can change every parameter• activates the password option• defines the passwords of each user
Supervisor	<ul style="list-style-type: none">• has the second highest level of authority• has same permissions as the administrator, except he cannot change passwords
User	<ul style="list-style-type: none">• has limited permissions to change setup parameters of the board
Guest	<ul style="list-style-type: none">• can only change the display settings <p>A guest does not require a password to log on to the board.</p>

Figure 23: Levels of authorisation

Insert a password

- Select **Administrator** in the password menu.
- Enter the default password via the functional keys of the keypad (F1 F2 F3 F4 F3 F2 F1).
- Enter your password using the **functional** keys of the keypad (4 to 10 characters).
- Confirm your password.

Now you are logged on as 'Administrator' and you are able to give a password to the other users.

Define a password to a supervisor or user

- Log on as **Administrator**.
- Select a **Supervisor** in the password menu.
- Enter the supervisor password and confirm the password.

Log on to a password protected board

- Select your **level of authorisation** in the pop-up menu.
- Enter the password.

Note: If you do not use the keypad for more than 5 minutes, you log off automatically. After entering a wrong password 3 times, you need to wait for 2 minutes before you log on again.

Deactivate the password protection

- Log on as **Administrator**.
- Open the password menu.
- Delete the Administrator password with the left arrow key.
- Press the Enter key and confirm by pressing Enter again.
- Reset the board.

The board functions without password protection when the administrator password is deleted. Other passwords are ignored but not deleted.

Note: To delete the password of a supervisor or user, select the supervisor or user and delete the password.

8.3. Set the display properties

The user defines what information will appear as overlay on the video image via the Parameters menu.

General	Camera name, configuration name, address of the board, product name, firmware version, quality level, date and time, log-on name
Flow lines	
Data zones	
Data type	Traffic flow data, integrated data or data related to the presence function
Presence zones	
Outputs	
Phases	Assigned phases <i>Phase numbers are displayed next to the output number.</i>
I/O Status	Infobar on the status of the inputs and outputs The user can define where this information will be shown. Pos Y Default: 20 {Range: 03 (top) to 20 (bottom)}
Real-time Data	Table with presence or data information The user can define where this information will be shown. Pos X, Y Default: 78 {Range: 03 (left) to 78 (right)} Default: 03 {Range: 03 (top) to 20 (bottom)}
Database	Number of records in the database
Detection Mode	Detection mode of the board
Advanced Info	Advanced detection information (disappears automatically after 5 minutes)
Default: On	{Selection: On, Off, Front, Back}

Back: overlay only on the video output via the backplane of the rack
 Front: overlay only on the video output via the board frontpanel
 On: overlay on the front and on the back
 Off: no overlay

Note: To pause and reset the real-time data information that is displayed, open **Pause/Reset Counters** in the Data menu and press the Enter key.

8.4. The board database

VU1 or VU2 stores traffic information on-board. The on-board memory is circular: when the memory is full, the oldest data are deleted and replaced by the most recent data.

The user sets the database integration interval (Data menu, submenu Database).

Default: 1 min {Range: 1, 2, 3, 5, 6, 10, 15, 30, 60 min or Off (= no use of the database)}

Storage capacity of the database

Storage time depends on the integration interval and the setup of vehicle classification function.

Number of classes	Number of records	
	VU1	VU2
1	4544	8313
2	3369	6305
3	2681	5081
4	2217	4249
5	1897	3657

Storage time for VU1 is illustrated in the table below.

Integration interval	Storage Time
1 min	1 day, 20 hours and 41 min
5 min	9 days, 7 hours and 25 min
10 min	18 days, 14 hours and 50 min

Download the database to a PC

You can download the database to a PC via the VIPLINK PC software (for details, see user manual of the VIPLINK).

The database on the PC has the following structure.

Date	Time	Interval	Nr Class	Lane Nr	Headw X	Con X	Num y_X	Gap y_X	Spd y_X	len X	Occ X	Confi X
------	------	----------	----------	---------	---------	-------	---------	---------	---------	-------	-------	---------

Date: Day/Month/Year
 Time: Hour/Minute/Second
 Interval: Interval time (s)
 Nr Class: Vehicle class (1 to 5)
 Lane nr: Lane number (queue zone: 1 to 6 or data zone: 1 to 8)

VU1 and VU2

HeadwX:	Average headway on lane x (m)
ConX:	Concentration on lane x (absolute number/km)
Numy_X:	Number of vehicles of class x on lane y
Gapy_X:	Average gap time of class x on lane y (0,1 s)
Spdy_X:	Average speed of class x on lane y (mph or km/h)
LenX:	Average length of the vehicles or queue length on lane x (m)
OccX:	Occupancy of lane x (%)
ConfiX:	Quality of the image (0= min; 10 = max)

Erase the database

- Select **Erase Database** from the Database menu.
- Press the Enter key.
Traficon® advises to download the database to a PC before erasing the database.

Appendix: menustructure of VU1

Menu	Level 1	Level 2
C1 PAR		
	Camera Name	
	Address	
	Video Level	
	Display	
	Quality	Detection Recall
		Quality Alarm Threshold
		Quality Alarm Timeout
	Config Schedule	
	Save as...	
	Load	
	Erase	
C1 DATA		
	Calibration	
	Speed Zones	
	Speed Alarms	Delay Alarm On
		Alarm Hold Time
		ZOcc Alarm Level
		Dense Alarm Threshold
		Delayed Alarm Threshold
		Congested Alarm Threshold
		Speed Drop Alarm
		Indiv. Lane Thresholds
		Assign Lane Thresholds
	Classification	Class 1 to 4 Length
	Database	Integration Interval
		Erase Database
	Loop Simulation	Loop Length
		Loop Separation
		Vehicle Length
	Advanced Setup	
	Pause/Reset Counters	
C1 PRES		
	Change Zones	
	Zone Info	Detect Mode
		Lane Nr
		Delay
		Extend
		Input
		Pulse
	Queue Length	Queue Extend Time
		Queue Delay Time

Menu	Level 1	Level 2
		Queue Threshold
	Startup Recall	
	Advanced Setup	Camera Movement Suppression
		Tree Shadow Suppression
		Startup Recall Timeout
		Detection Hold Time
		Wrong Way Sensitivity
		Wrong Way Suppression Delay
C1 OUTP		
	Assign Presence Outputs	
	Assign Data Outputs	
	Test Outputs	
	Assign Phases	
	Assign Recall	
	Force Alarms	
GENERAL		
	Language	
	Unassigned Outputs	
	Nr of Outputs	
	Nr of Inputs	
	Output Mode	
	Units	
	Date/Time	Current Time
		Current Date
		Daylight Saving Time
	Password	

Index

A

Advanced settings 23
 data 24
 presence 23

B

Board address 10
Board database
 download to PC 39
 storage capacity 39

C

Calibration of the board 17
Camera movement suppression 23
Camera name 10
Configuration scheduling 25

D

Data zone
 add, delete or select a zone 19
 edit the standard zone 19
 give a direction to the zone 19
 give a number to the zone 19

Date and time 8

Delay time 26

Display settings 38

E

Extend time 26

F

Fail-safe function
 assign an output to the recall status 22
 detection recall 22
 startup recall 22

Firmware upgrade 36

I

Image quality
 assign an output 32
 set the quality parameters 10

Inputs, set the number 8

K

Keypad - functional overview 3

Keypad functions for board setup 5

L

Language 8

Loop emulation 35

M

Menustructure of the board 41

O

Outputs

 AND, OR relationship 30
 assign data outputs 35
 combine presence zones 31
 combine presence zones & external inputs 31
 NORMAL, NOT state 30
 set the number of outputs 8
 test by forcing an event 35
 test output LED 31

P

Passwords

 enable the password function 36
 levels of authorisation 36

Presence detection hold time 23

Presence zones

 add, delete or select a zone 13
 assign an output 12
 edit the standard zone 12
 give a direction to the zone 12
 guidelines to edit the zones 14
 overlapping zones 14

VU1 and VU2

Product information display 4

Pulse generation 32

Q

Queue length measurement 28

 edit a queue length zone 28

 set the queue length parameters 29

S

Stepwise configuration 6

Stepwise setup

 assign the phases 15

 place the presence zones 11

 save and load the configuration 16

 set the camera-related parameters 9

 set the general parameters 7

System of units 8

T

Traffic flow monitoring 33

Tree shadow suppression 23

U

Unassigned outputs 8

V

Vehicle classification 34

Video level 10