

# Automatic Number Plate Recognition (ANPR) Camera System Coding Manual



# Table of Contents

<b>Purpose</b>	<b>3</b>
<b>Tolling Points, Tolling Points IDs and Data Blocks</b>	<b>4</b>
<b>Assets</b>	<b>5</b>
1. Airport Link	5
2. Legacy Way	7
3. Clem Jones	8
<b>Glossary</b>	<b>9</b>
<b>ANPR camera system details</b>	<b>10</b>
1. Legacy Way	10
2. Airport Link and Clem Jones	10
<b>Appendix – Product sheets</b>	<b>11</b>
1. Legacy Way	11
2. Airport Link and Clem Jones	12

# Revision History

Date	Version	Nature of change (including review history)
5 October 2023	1	Moved into PUBLIC report template and updated following review by TMR.

# Purpose

The purpose of this ANPR Camera System Coding Manual (**Manual**) is to define the Data blocks for the ANPR camera systems for each of Transurban Queensland's tunnel assets, being Airport Link, Clem Jones and Legacy Way.

# Tolling Points, Tolling Points IDs and Data Blocks

The ANPR camera systems installed at the Tolling Points in Table 1 below produce images which include Data blocks. The Data blocks for those Tolling Points are in the scope of this Manual.

Table 1 below provides a summary description of the Tolling Points in scope of this Manual.

Table 1: Description of Tolling Points, Tolling Point IDs and Data blocks

	Asset	Tolling Point ID	Location	Lane(s)	Travel Direction
<b>Tolling Point</b>	Airport Link	TP01A	Kalinga – prior to EWA and Sandgate Roads exit ramp diverge	3	Eastbound
<b>Tolling Point</b>	Airport Link	TP01B	Kalinga – after EWA and Sandgate Roads entry ramp merge	2	Westbound
<b>Tolling Point</b>	Airport Link	TP02A	Bowen Hills – after Clem Jones, Inner City Bypass (ICB), Bowen Bridge Road and Campbell Street entry ramp merge	4	Northbound
<b>Tolling Point</b>	Airport Link	TP02B	Bowen Hills – prior to portal exit to Clem Jones exit ramp from Airport Link	2	Southbound
<b>Tolling Point</b>	Airport Link	TP02C	Bowen Hills – prior to portal exit to Inner City Bypass (ICB) and Campbell Street exit ramps from Airport Link	2	Southbound
<b>Tolling Point</b>	Airport Link	TP02D	Bowen Hills – prior to portal exit to Lutwyche Road - exit ramp from Airport Link	1	Southbound
<b>Tolling Point</b>	Clem Jones	CLM01	Bowen Hills – prior to portal exit of Clem Jones	2	Northbound
<b>Tolling Point</b>	Clem Jones	CLM02	Bowen Hills – prior to portal entry of Clem Jones	2	Southbound
<b>Tolling Point</b>	Legacy Way	LGW03	Toowong – prior to portal entry of Legacy Way	2	Eastbound
<b>Tolling Point</b>	Legacy Way	LGW04	Toowong – prior to portal exit of Legacy Way	2	Westbound

# Assets

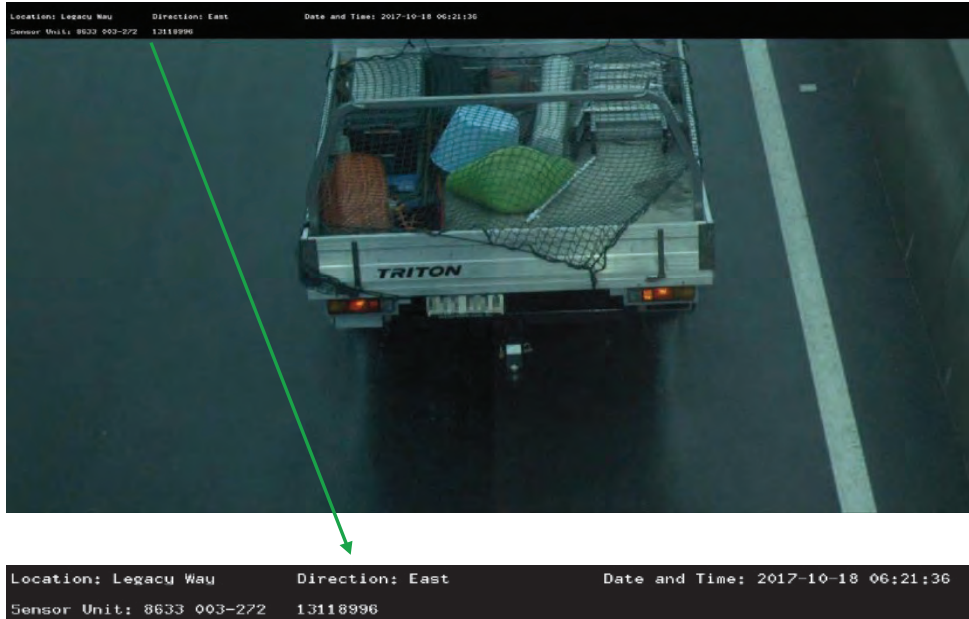
## 1. Airport Link



Text field / Parameter Meaning	Explanation
Location	Image was taken for vehicle travelling through Airport Link
Toll Point	Image was captured by one of the cameras located on the gantries at <ul style="list-style-type: none"> <li>• Toll Point 3</li> <li>• TP02A tolling point</li> </ul>
Direction	Direction of travel within Airport Link
Date and Time	Date and time of image capture in HH24:MI:SS format
Camera	This is an identifier code for the ANPR camera system used to capture the image: <ul style="list-style-type: none"> <li>• <b>au12</b> – Australia (12 = Brisbane)</li> <li>• <b>x</b> - Physical</li> <li>• <b>003</b> – Toll point number</li> <li>• <b>rur</b> – Rear registration unit (Rear ANPR)</li> <li>• <b>131</b> – Lane number</li> <li>• <b>111</b> – Lane 1</li> <li>• <b>121</b> – Lane 2</li> <li>• <b>131</b> – Lane 3</li> <li>• <b>141</b> – Lane 4</li> </ul>
Controller	As per above for the Camera field this is an identifier <ul style="list-style-type: none"> <li>• <b>au12</b> – Australia (12 = Brisbane)</li> <li>• <b>v</b> - Virtual</li> <li>• <b>003</b> – Toll point number</li> <li>• <b>srv</b> – Server (data gathering server)</li> <li>• <b>012</b> – Brisbane (location of server)</li> </ul>
Camera Model	Model number of ANPR camera system used to capture the image
Security Indicator	Image security checksum. The block of data used to determine camera accuracy.

Table 2: Airport Link Data block

## 2. Legacy Way



Text field / Parameter Meaning	Explanation
Location	Image was taken for vehicle travelling through Legacy Way
Direction	Direction of travel within the Legacy Way.
Date and Time	Date and time of image capture in YYYY-MM-DD HH24:MI:SS format
Sensor Unit	8633 003-272 is the Sensor Unit part number and 13118996 is the Sensor Unit serial number of the ANPR camera system capturing the image.

Table 3: Legacy Way Data block

### 3. Clem Jones



Text field / Parameter Meaning	Explanation
Location	Image was taken for vehicle travelling through Clem Jones
Toll Point	Image was captured by one of the cameras located on the gantries at: <ul style="list-style-type: none"> <li>• Toll Point 8</li> <li>• CM02 tolling point</li> </ul>
Direction	Southbound
Date and Time	Date and time of image capture in HH24:MI:SS format
Camera	This is an identifier code: <ul style="list-style-type: none"> <li>• <b>au12</b> – Australia (12 = Brisbane)</li> <li>• <b>x</b> – Physical</li> <li>• <b>008</b> – Toll point number</li> <li>• <b>rur</b> – Rear registration unit (Rear ANPR)</li> <li>• <b>121</b> – Lane number</li> <li>• <b>111</b> – Lane 1</li> <li>• <b>121</b> – Lane 2</li> <li>• <b>131</b> – Lane 3</li> <li>• <b>141</b> – Lane 4</li> </ul>
Controller	As per above Camera field this is an identifier: <ul style="list-style-type: none"> <li>• <b>au12</b> – Australia (12 = Brisbane)</li> <li>• <b>v</b> – Virtual</li> <li>• <b>008</b> – Toll point number</li> <li>• <b>srv</b> – Server (data gathering server)</li> <li>• <b>012</b> – Brisbane (location of server)</li> </ul>
Camera Model	Model number of the ANPR camera system used for image
Security Indicator	Image security checksum. The block of data used to determine camera accuracy.

Table 4: Clem Jones Data block



# Glossary

Text field / Parameter Meaning	Explanation
Data block	Black strip text overlayed in the image (above the actual image). This will contain information specific to the image to which the black strip is appended to. An example of a Data block and further description of field meanings can be found prior in this Manual.

---

Table 5: Glossary

# ANPR camera system details

## 1. Legacy Way

The products details for the Kapsch camera system used in Legacy Way are as follows:

**Product Type:** Kapsch VR Sensor Unit (VR SU)

Product Number	Part Number
VR SU Colour FX/970	8633 003-272
VR SU LPN FX-967	8633 003-492

Table 6: Kapsch Product Numbers

A copy of the product sheet for the Kapsch VR Sensor Unit (ATUVR\_VDR-00-014) is included in Part A of the Appendix to this Manual.

## 2. Airport Link and Clem Jones

The product details for the Q-Free camera system used in Airport Link and Clem Jones are as follows:

**Product Type:** Q-Free VRE690 Video Registration Unit

A copy of the product sheet for the Q-Free VRE690 Video Registration Unit is included in Part B to the Appendix to this Manual.

# Appendix – Product sheets

## 1. Legacy Way

Product sheet for Kapsch VR Sensor Unit (ATUVR\_VDR-00-014)

Godkänd/Approved by	Dokumentslag/Type of document	Arkiveringsdata/File	Reg-nr/Reg No	Infoklass/Info class
	Datasheet	ATUVR_VDR-00-014	ATUVR_VDR-00-014	I
Utfärdare (tj-st-bet, namn)/Issued by	Telefon/Phone	Datum/Date	Utgåva/Issue	Sida/Page
KTC-AB-TLI, Torbjörn Liew	+46 36 290 1506	2016-01-19	D	1 (2)
Fördelning/To		För kännedom/For information		

## Kapsch VR Sensor Unit (VR SU)

The VR SU is a self contained Automatic Number Plate Recognition (ANPR) Camera. It is used as a system component in the Kapsch MLFF Systems to provide a vehicle image for enforcement and ANPR.



The VR SU is designed to register vehicles in real time and allow Automatic Number Plate Recognition to be performed. VR SU is a fully integrated camera, typically with built in IR-illumination tuned to provide the best possible performance with regards to image quality and automatic licence plate reading accuracy. The imaging platform contains the hardware and software needed to form a complete self contained unit that is able to perform all needed operations such as image capture, image compression, security processing and host communication. The high-resolution camera provides a wide field-of-view that enables one VR SU per traffic lane, still providing full road coverage with overlapping fields of view.

The high quality and high resolution images together with the tuned illumination give the highest possible ANPR accuracy.

The images and data produced by the VR SU meet evidential enforcement requirements in multiple countries and can further be adapted to meet specific local legal requirements.

The VR SU is supported by an extensive library of cryptographic and image processing capabilities. Physical security includes internal tamper detection.

The data collected by the VR SU for each vehicle passage is sent in real time over a TCP/IP network. The data includes vehicle image, time stamp and ANPR result. All data can be signed and encrypted using AES (Advanced Encryption Standard). The VR SU can also be configured to provide streaming video (M-JPEG).

The VR SU is designed to fit in the traffic environment with a low visual impact. The VR SU is designed for high reliability providing the operator with a long equipment operational life with high availability and low maintenance costs.

The VR SU is available in a wide angle overview version, VR SU OVW, which operates integrated with the VR SU LPN. In this configuration, the VR SU captures an overview image which identifies the vehicle and enables the location of the vehicle to be determined in the enforcement image.

## Technical Features

### Components

- VR SU LPN: License Plate camera
- VR SU OVW: Contextual overview camera

### VR SU LPN

- High-performance, self-contained ANPR camera.
- Camera sensor: 1344x1024 pixels, 12 bits per pixel dynamic range; 1920x1080 (HD version), monochrome or colour (other camera sensors available on request)
- Field of view: 4m at 11m object distance (other lenses available on request).
- Standalone buffering: 20.000 images (optionally higher)
- Integrated IR illumination: 870nm, FWHM  $\pm 10^\circ$ , 40W (optical)

### VR SU OVW

- High-quality contextual overview / scene camera synchronised with VR SU
- Camera sensor: 1344x1024 pixels, 12 bits per pixel dynamic range; 1920x1080 (HD version), monochrome or colour (other camera sensors available on request)
- Field of view: 12m at 11m object distance (other lenses available on request)
- Standalone buffering: 20.000 images (optionally higher)
- One VR SU OVW for up to three VR SU

### Technical data

- Linux based operating system
- Image compression (JPEG)
- Real-time full-resolution streaming
- Host system interface: TCP/IP 100Base-T / 100Base-FX
- Real-time data or file transfer
- Real-time status information to host system
- QFD (Quick Fastening Device), memory bracket
- Available in light grey colour or black
- Dimensions (W x H x L): 160 x 182 x 540mm
- Weight: < 7kg
- Power supply: 230VAC, typically 40W
- MTBF: > 50.000h

### Security Functions

- Image encryption and signature
- DES, Triple DES or AES encryption and MACs, SHA-256 hash
- Kapsch Secure Application Module SAM 4000:
  - Secure remote key distribution and key storage
  - ISO 7816
- Physical tamper alarm
- Data-bar / black strip in the image

### Environmental

- IEC protection rating: IP66
- Enclosure: Extruded aluminium alloy, corrosion resistant.
- Ambient temperature (operating): -40°C to +55°C
- Ambient temperature (non-operating): -25°C to +55°C
- Relative humidity (operating): 5% to 100%
- Vibration: 2-9Hz 3mm, 9-200Hz 10m/s<sup>2</sup>
- Shock: 100m/s<sup>2</sup>, 11ms
- EMC: 2004/108/EC LVD: 2006/95/EC

## 2. Airport Link and Clem Jones

Product sheet for Q-Free VRE690 Video Registration Unit

# Q-FREE VRE690 VIDEO REGISTRATION UNIT

- All-in-one unit: flash, camera, video triggering and ALPR
- Vehicle tracking for single-gantry operation
- Industry-leading ANPR imaging quality in all light conditions
- Optimised for multi-lane free-flow/open road tolling



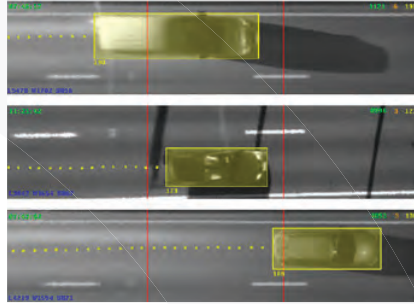
## OVERVIEW

The Q-Free VRE690 Vehicle Registration Unit is designed for use in single-gantry installations. It offers excellent performance in both single and multi-lane configurations. The VRE690 is designed for Automatic License Plate Recognition (ALPR) and tracking of vehicles passing through the charging point.

High-resolution digital cameras with an integrated illumination source track vehicles as they pass through the single-gantry charging point, allowing the optimum combination of front and rear licence plate information with other metadata from sensors such as On-Board Unit (OBU) readers and laser scanners.



# PRODUCT SHEET



## FEATURES

- High-resolution digital ALPR and tracking cameras
- Monochrome imaging with options of invisible infrared illumination or white-light illumination
- Tracking camera for single-gantry operation
- Reliable capture of both reflective and non-reflective plates
- High-quality images of vehicles travelling at up to 250km/h
- Integrated high-performance LED flash with 10 times the lifetime of conventional support light
- High-speed communication over gigabit Ethernet
- Mounting brackets specifically designed for quick mounting and installation
- 2.2Mp front or rear images of vehicles
- Full remote configuration and health monitoring
- Build-in pan, tilt and roll – fine adjustment for quick installation allows adjustment of internal cameras without road closure

## OPTIONS

- License plate localisation
- Information insertion
- Digital signature
- External trigger
- Infrared or white light LED flash

## TECHNICAL SPECIFICATIONS

### MOUNTING SPECIFICATIONS

Installation height (typical):	5.5-6.5m
Lane width:	3-4m

### ALPR CAMERA SPECIFICATIONS

Image size (pixels):	1,936 x 1,132
Grey levels:	256 (8 bit)
CCD size:	8.8 x 6.6mm

### TRACKING CAMERA SPECIFICATIONS

Image size (pixels):	1,292 x 964
Grey levels:	256 (8 bit)
CCD size:	4.8 x 3.6mm

### DIMENSIONS

Size enclosure:	487 x 487 x 366mm (W x D x H)
Size of system:	1,138 x 487 x 366mm (W x D x H)

### WEIGHT

Acquisition enclosure:	23kg
Flash enclosure:	21kg
Bracket/fixings:	12kg

### ENVIRONMENT/EMC/SAFETY SPECIFICATIONS

Operating temperature range:	IEC 721-3-4 Class 4K2 (-20°C to +55°C)
Storage temperature range:	-25°C to +65°C
Humidity:	IEC 721-3-4 Class 4K2 (93%)
Vibration:	IEC 721-3-4 Class 4M4 (5-500Hz)
Shock:	IEC 721-3-4 Class 4M4 (10g)
Ingress protection:	IP60529 (IP65)
Safety/LVD directive:	73/237/EEC and EN60950
MTBF:	>10,000 hours

[www.q-free.com](http://www.q-free.com)

For more information contact [marketing@q-free.com](mailto:marketing@q-free.com)

Specifications are subject to change without prior notice.  
Copyright © Q-Free 2018. All rights reserved.



VS 16.01.18

LEADING THE WAY