

VAL70 –NFC and QR AFC Validator DatasheetV1.8



*Fig 1:VAL70

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1. Introduction

VAL70 is a state-of-the-art validator for automated fare collection (**AFC**) in public transport. It incorporates an **EMV Level 1 and Level 2 certified contactless (NFC)** card reader and a **QR scanner** that provides unmatched flexibility in public transport ticketing.

VAL70 is based on a **powerful processor and large memory**:

- CPU : 2.0 GHz ARMquad core
- RAM : 2GBytes RAM(option – 1GB)
- Flash Memory : 16GBytes eMMC(option – 32GB)
- Backup memory : Micro SD Flash Memory Slot
- RTC : real time clock with an integrated lithium battery
- UID : serial EEP (128 bytes) with unique serial number, integrated to the main board, allowing for uniquely differentiation of the products
- ONEWIRE UID : identification chip, attached to the external cable, allowing for automatic identification of the vehicle

VAL70 **communicates** through:

- Ethernet : 100 Mb/s
- Serial interfaces : 2 x UART RS-232(option: 1 x RS-232 and 1 x RS-485)
- WiFi & BT : 802.11n & BT5.0 (optional)
- Cellular : CAT.4 LTE modem 150Mbps (DL) Max 50Mbps (UL)
- USB : 1 x USB2.0 Host+ 1 x USB2.0 OTG (internal)
- Data security : 4 slots for SAM (secure access module support)(option – 2 SAM slots)

VAL70 **user interface** capabilities:

- Display : 7" 1024x600 24-bits color LCD, LED backlight, 400 nits
- LED : 4 x high brightness RGB LED
- Audio output : Speaker, 5W
- Keyboard : Multi-touch capacitive touch panel
- RFID and NFC reader : EMV Level 1 and Level 2 certified, fully compliant to NFC and ISO14443A/B, capable of communicating over NFC with smart phones.
- QR code scanner : Reads 1-D barcodes and QR codes, both on a paper and smart phones.

VAL70 **sensors**:

- GNSS (GPS+GLONASS) receiver (GPS, GLONASS, BeiDou/Compass, Galileo)
- Temperature Sensor
- Input Voltage and Current Sensor

VAL70 has the following **input/output** capabilities:

- 1 x optically isolated digital input
- 1 input from the ignition switch of the vehicle
- 2x digital outputs, high side, overcurrent protected at 200 mA

VAL70 incorporates an **EMV Level 1 and Level 2 (MASTERCARD, VISA, RuPay and Discover) certified contactless card reader**, fully **compliant** with the relevant ISO standards - ISO/IEC 14443A/B. VAL70 supports all ISO14443A/B compliant cards and smart phones. It also supports all types of Mifare Classic cards as well.

Besides its NFC interface, VAL70 is capable of reading with high performance even under bad light conditions all kinds of **QR codes** and barcodes on a paper or on a smart phone, either.



The AFC software suite runs under a high level OS – **Linux**, with special arrangements and **measures for unattended use**. Well documented **development environment and SDK** with reliable software libraries and modules are offered, allowing implementation of own software by the integrator companies. SDK is based on the object oriented language (C++) and the widely used Graphical User Interface (GUI) Qt.

VAL70 operates **reliably in the harsh electromagnetic and mechanical environments, essential to the automotive**.

- Special precautions have been taken to prevent the negative effects of vibrations. All **connectors are automotive type**, i.e. with a latch, preventing undesired accidental disconnections.
- Special attention is paid to the **wide temperature range** in public transport vehicles – automotive grade components have been chosen;
- The power supply blocks are based on highly efficient **DC-DC converters** that reduce dissipated heat energy.
- The front side is made of a **tempered 3mm thick glass**, avoiding inadvertent scratching of the front panel

VAL70 **incorporates a system management and ignition control MCU - high speed, deterministic microcontroller**, taking care about all high speed hardware events, which otherwise could not be kept under control with the means of the main application CPU. Because uninterrupted functionality is crucial to AFC systems, great emphasis is placed on early self-diagnosis and remote monitoring capabilities. In case of suspected malfunction (parameters out of range, signaling a possible future problem), the VAL70 generates two levels of alarm, warning and critical. All such events are logged in the local database and in the central control office, respectively.

The following **protections** are provided:

- Reverse polarization of the input supply
- Overvoltage of the input supply
- Overcurrent
- Transient voltage suppression
- ESD protection on all connectors for all signals
- Overheating