

VCP-01B

IQVCP Visual Control Panel with Ethernet

HW version 1.01

User's Guide



Description

VCP-01B is a visual control panel with touchscreen, Ethernet and wireless connectivity and other features.

It is a generic equipment, i.e. the hardware is fixed and the user can realize specific functionality by software only.

VCP-01B is intended for final production while the DS-VCP-01B should be used for application development.



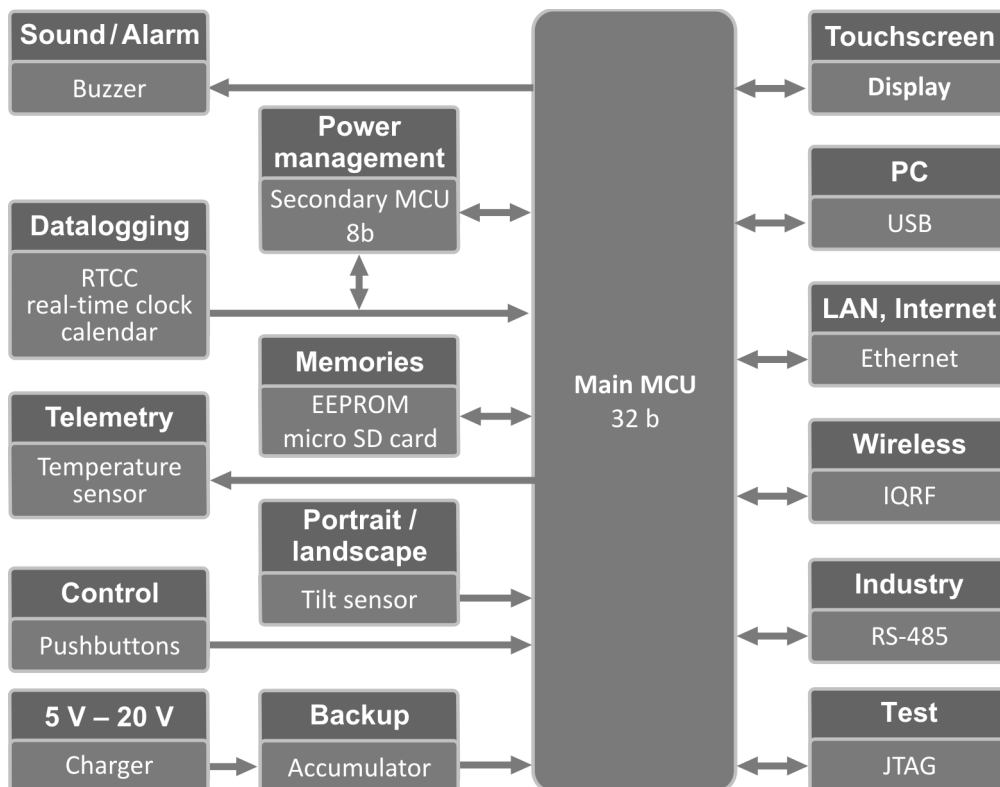
Applications

- Solutions tailored to user's needs
- Control panel for arbitrary use (not for IQRF only)
- Home automation
- Access control
- Security systems
- Heating systems
- Wireless control panel

Key features

- Display/touchscreen 3.2", 320 x 240 pixels, 65535 colors
- RTCC (real time clock/calendar)
- Main MCU PIC32MX7
- Secondary MCU for power management
- Micro SD card interface
- Ethernet, USB and RS485 interface
- Backup accumulator
- Internal antenna
- Very low power consumption in Sleep mode
- Wall assembly option

Block schematics



Device differences

VCP-01B differs from VCP-01 in the following:

- RS-485 interface added, 3.3V or 5V levels selectable
- Graphic library extended by a set of MICRORISC functions
- Console CCP command interpreter added
- Tilt sensor LIS33DE and LIS2DH can alternatively be used

Electrical specifications

(typical values unless otherwise stated)

Power supply	7 – 20V DC (terminal clamp) / 5.0 ± 0.35 V DC (micro USB)
Accumulator	LI14500-700-1L, 3.7 V, 700 mAh, Li-Ion, AA
Display	DI-QVGA-3.2-03 TFT LCD 3.2", 320 x 240 pixels, 256K colors
Supply current	
operational	160 mA ¹ (display backlight off) 280 mA ¹ (display backlight on)
sleep mode	80 µA to 110 µA ²
power-down mode	8 µA ²
accumulator charging	450 mA max.
Temperature range	
operational	0 °C to +60 °C
accumulator charging	0 °C to +45 °C
Frequency range	868 MHz or 916 MHz (according to the TR module)
RF output power	3.5 mW
Supported TR modules	TR-52BA (with on-board PCB antenna)
Temperature sensor accuracy	±0.5 °C typ., ±3 °C max.
Dimensions	120 mm x 80 mm x 28 mm
Display size	8.1 mm (diagonal)
Weight:	143 g ³

Note 1: This current is increased due to charging in case of external supply (depended on the accumulator state).

Note 2: All peripherals shut down.

Note 3: Including accumulator and TR module, without micro SD card.

Absolute maximum ratings

Stresses above those values may cause permanent damage to the device. Exposure to maximum rating conditions for extended periods may affect device reliability.

Supply voltage (VCC):	20.5 V DC (terminal clamp) / 5.5 V DC (micro USB)
Storage temperature:	-30 °C to +80 °C

Hardware

VCP-01B is a generic equipment, i.e. the hardware is fixed and the user can realize specific functionality by software only.

Power supply

VCP-01B is intended to be supplied by external stabilized 7-20 V DC connected to clamp or 5 V DC to micro USB connector. If both are connected, the internal logic gives priority to the supply from the clamp. Accumulator serves as a backup for external power source and should be charged from it. Input of external power (5V or up to 20V) is configured by jumpers. See DS-VCP-01 User's guide for settings. VCP-01B power is not switched off, deactivation is realized by Sleep or Power-down mode instead (see below).

MCUs

VCP-01B is controlled by main 32b microcontroller PIC32MX695F512L, up to 80 MHz, 121 pins. For power management the 8b secondary microcontroller PIC12F615MF, 4 MHz, 8 pins is added.

Reset

VCP-01B reset (initialization/starting-up) can be invoked by the pushbutton on the side of the case or by software. Software has no influence upon the functionality of the pushbutton. However the secondary MCU might disconnect the main MCU from its power source completely and thus preventing of normal functionality of the pushbutton.

Sleep mode

This is intended for current consumption minimizing, especially in idle or while supplied from the accumulator. It is possible to switch off all functions and peripherals by software. Sleep can be invoked by the program and terminated e.g. by the reset pushbutton.

Power-down mode

This is intended to further minimize current consumption by disconnecting main MCU completely. It is possible to instruct secondary MCU to cut main MCU from its power source. If the main MCU is disconnected it is possible to connect back main MCU power source by pressing user pushbutton. Then the main MCU is powered up and follows usual reset procedure (initialization/starting-up).

The secondary MCU also periodically checks the battery voltage level and cuts the main MCU from its power source if the voltage level drops below a threshold of 3.00 V. The main MCU power source is connected back once the voltage level rises above the specified threshold.

QVGA display

Display / touchscreen 3.2" diagonal, 320x240 pixels RGB, 262144 colors (graphic library uses 65535 colors only), QVGA TFT LCD, transmissive, with LED backlight and 16b data bus.

Proper display functionality requires a calibration (setting the touch sensors in accordance to display pixels) to compensate variations in parameters due to temperature, tolerance of parts and so on. VCP-01 has the display factory calibrated and this can also be done in application software whenever needed (3x3 touches in places indicated by an arrow). The calibration is stored to the EEPROM.

LED backlight can be switched on/off by the software.

EEPROM memory

Capacity: 64 kb, serial interface SPI (shared with the TR module) 1 000 000 erase/write cycles (typ.).

Micro SD interface

VCP-01B has the SPI interface to standard Flash memory micro SD card. The memory can be put to the standby mode (by the PWR_SD signal). VCP-01B is delivered without an SD card.

RS-485 interface

The RS-485 circuitry is supplied directly from external source. Thus, it works with external supply only. Default voltage level is 5 V, alternatively 3.3 V is available on request.

Temperature sensor

Temperature can be measured by external sensor MCP9802 with I2C interface. It is not assembled in standard delivery.

Tilt sensor

3-axis linear accelerometer can be used e.g. for portrait/landscape view switching.

User pushbutton

The pushbutton functionality is fully under the user's control.

User LED

Dual color (red/green) inside the case. It is fully under the user's control, especially intended for service and debug.

Beeper

Beeper can be driven from the PWM module output or by software. The functionality is fully under the user's control.

TR module and antenna

Wireless IQRF transceiver module in SIM card format with built-in PCB antenna, e.g. TR-52DA. Optional.

Ethernet

The ENC424J600-I/ML Ethernet controller by Microchip is used. The ENC424J600 is stand-alone 10/100 Base-T Ethernet interface controller with integrated MAC & PHY, hardware cryptographic security engines and factory preprogrammed unique MAC address. A 24-Kbyte on-chip RAM buffer is available for TX and RX operations. The ENC424J600 have an industry standard Serial Peripheral Interface .

CAN

Either 5 V level MCP2551 or 3.3 V level SN65HVD231 can be used.

The MCP2551 is a high-speed CAN transceiver, fault-tolerant device that serves as the interface between a CAN protocol controller and the physical bus. The MCP2551 provides differential transmit and receive capability for the CAN protocol controller and is fully compatible with the ISO-11898 standard, including 24V requirements. It will operate at speeds of up to 1 Mb/s.

The SN65HVD231 with sleep mode is intended for use in applications employing the CAN serial communication physical layer in accordance with the ISO 11898 standard. The CAN controlled is designed to provide differential transmit capability to the bus and differential receive capability at speeds up to 1 Mbps.

The CAN circuitry is assembled on request only.

Connections

Connection	Pins	Type
External power	2	Micro USB connector or alternatively Clamp connector
Accumulator	2	Soldering stripes
TR module	8 + 1	SIM connector + through hole soldering for possible mechanical fixation
RS-485	2	Clamp connector
USB	5	Micro USB connector
MCU programming (ICSP) and debugging (ICD)	5	Cable connector (assembled in DS-VCP-01B only)
Micro SD card		DM3AT-SF-PEJ (Hirose) connector
Temperature	5	Cable connector
Ethernet	8	RJ45 Hirose connector
JTAG	6	Soldering holes

The cable to the clamp connector can be connected after breaking the molded cover at the bottom of the case.

Software

Demo application

Sample programs for the main MCU inside the VCP-01B, for TR modules to demonstrate wireless connectivity and PC demo for USB communication are available in the DS-VCP-01B development set. Firmware of the secondary MCU is fixed.

Product information

Pack list

- VCP-01B without CAN circuitry and temperature sensor, with Demo application programmed, in Power-down mode
- No TR module included
- Accumulator (soldered)
- Power source TY-A6-microUSB (5V DC, 500 mA, stabilized, with micro USB connector)

Ordering codes

- VCP-01B Visual control panel
- DS-VCP-01B Developemnt set for VCP-01B

Recommended options

- CAN circuitry Assembled on request only
- TR-52BA TR module with integrated antenna (other suitable types are also supported)
- Micro SD card
- CABUSBABMICRO-100 Micro USB cable

Document history

- 180118 Bugs in operational supply current and MCU type fixed. Page *Sales and service* updated.
- 150219 Updated for VCP-01B.
- 120328 Renamed from from GW-QVGE-01A to VCP-01 and DS-QVGA-03 to DS-VCP-01.
- 111010 Device differences added (page 3).
- 110916 First release (for VCP-01 with secondary MCU).

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