

Linux-based Automation Controller UFK080808



1. Introduction

This six DIN-rail modules wide programmable controller is designed to be interfaced with a variety of sensors and actuators. The device has been designed with versatility, reliability and flexibility in mind.

The operating system of the controller's internal computer is Ubuntu Linux, which can be freely managed, upgraded and even changed by the user if desired. The control computer with 4-core ARM-processor has 2GB of RAM and uses 8 GB of eMMC non-volatile memory. There are no restrictions on programming languages or application software.

Manufacturer: Uniflex Systems OÜ, www.uniflex.ee, +3725010066, info@uniflex.ee

2. Technical data

Mounting: 35 mm DIN-rail, width 6 modules (106 mm)

Power supply:

Main supply voltage: 7..28 V 2W

Output supply voltage: 12..35 V DC, power depends on load, 1A per channel max

Discrete inputs (DI): 8, voltage (max 27V) or pull-down (dry contact) signal

Every discrete input is equipped with a 32-bit counter

DI channels DI5..DI8 are usable for interfacing with up to two Wiegand-readers

Analog inputs (AI): 8, range 0..2V, 0..4V, 0..10V or 0..20mA; 12 bit ADC.

The analog inputs are equipped with comparators with 3 threshold values, to convert the value on the input into 2-bit digital code.

Discrete outputs (DO): 8, sourcing 0.7A max per channel, protected.

Output voltage depends on output supply voltage.

Output on every channel is available at steady level or as pulses with defined length.

Pulse output can be in monovibrator or multivibrator mode (with defined period)

Main processor: S905x ARM, 4 core, 1.5GHz

RAM: 2 GB

Flash: 8 GB

Op-system installed: Ubuntu

Video: HDMI, monitor pole tõesks vajalik

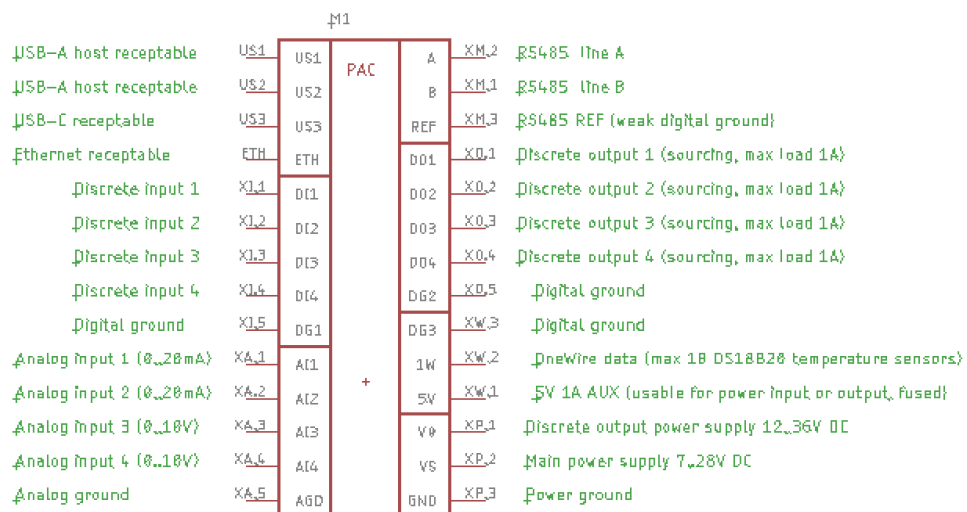
USB-interfaces: 2 x USB-A + 1 x USB-C

Internet connectivity: WiFi, wired LAN or GSM dongle

I/O extensibility: via RS485 / ModbusRTU or Ethernet / ModbusTCP,

RS485 side communication parameters 9k6..115k2, parity None or Even

Temperature sensor support: Dallas onewire, for up to 18 sensors DS18B20



For detailed information about the I/O-capabilities, check the user manual for the I/O-module UF080808.

3. Usage examples

Monitoring of technical infrastructure sites

Various states and (DC-)voltage signals can be monitored using either voltage-free contacts and 12/24V voltages or 230V intermediate relays. Suitable analog signals include voltage (metering range from 0...2V to 0...10V) and current (0...20mA range).

Signals from sensors with analog outputs (voltage or current representing values of flow rate, pressure, temperature, etc.) can be digitised with a relative accuracy of approximately 0.1%.

Integration with energy consumption metering devices is possible through both pulse counting and digital communication using the Modbus protocol. One digital input channel needs to be allocated for each pulse signal (more details in the next chapter).

When there is no internet connection (LAN or WiFi) available at the site, the mobile internet should be used. An industrial DIN rail-mounted mobile broadband router is one option for ensuring communication. The controller also accepts USB tethering, from a USB router dongle or from a mobile phone via USB cable.

The controller can be equipped with any monitoring system that supports collaboration, ensuring compatibility with the software. Those interested can have all the necessary components installed for connecting to the web-based UniSCADA monitoring system free of charge. UniSCADA is a universal and affordable cloud service that is continuously evolving. It is based on open-source components (Nagios, Nagvis, PNP4Nagios) and has been in commercial use since 2007.

Collecting consumption readings

Metering devices with pulse outputs can be directly connected to the discrete inputs of the device. In this case, each metering device occupies one DI channel. The active pulse front can be selected if needed.

Metering devices with Modbus RTU interface can all be connected to a RS485 interface, selecting communication parameters supported by all devices connected to the line.

Devices with Modbus TCP interface (PV inverters, ventilation systems, heating control centres) are connected to the controller via the local network (LAN) interface, assigning a static IP address to each slave device. The monitoring controller itself can have multiple IP addresses, allowing simultaneous use of dynamic and static addresses.

Water or heat metres with an M-Bus interface need to be connected to the controller via a USB-M-Bus converter (also available in our product lineup). Multiple M-Bus devices can be connected to the same line.

Control tasks

In addition to monitoring, automatic control operations can also be performed on the monitored object.

Once the control task is described, the necessary control software module can be created and implemented on the controller along with the monitoring modules. Since control tasks vary, the implementation of required control functions is carried out as separate custom work. The management of the object does not increase the cost of the cloud service required for monitoring.

Control signals are output either digitally or through DO channels (typically as 12V or 24V DC, steady or pulsed voltages). In addition to ON/OFF type discrete steady signals, DO channels can also output pulse signals with variable period and duration (pulse-width modulated or PWM signals), and averaging these signals generates variable DC voltage (analog output). Each DO channel can handle a load of up to 700mA, making it suitable for direct control of 24V heating valves, among other applications.

In addition to controlling individual systems (ventilation, heating, lighting, locks, etc.), we offer integrated solutions where different system sensors and actuators are connected to a single object-based cloud. This approach allows for the reuse of information obtained from sensors for different purposes and opens up various optimization possibilities. Among other things, such integration can eliminate possibilities of sub-systems working against each other (e.g., simultaneous heating and cooling).