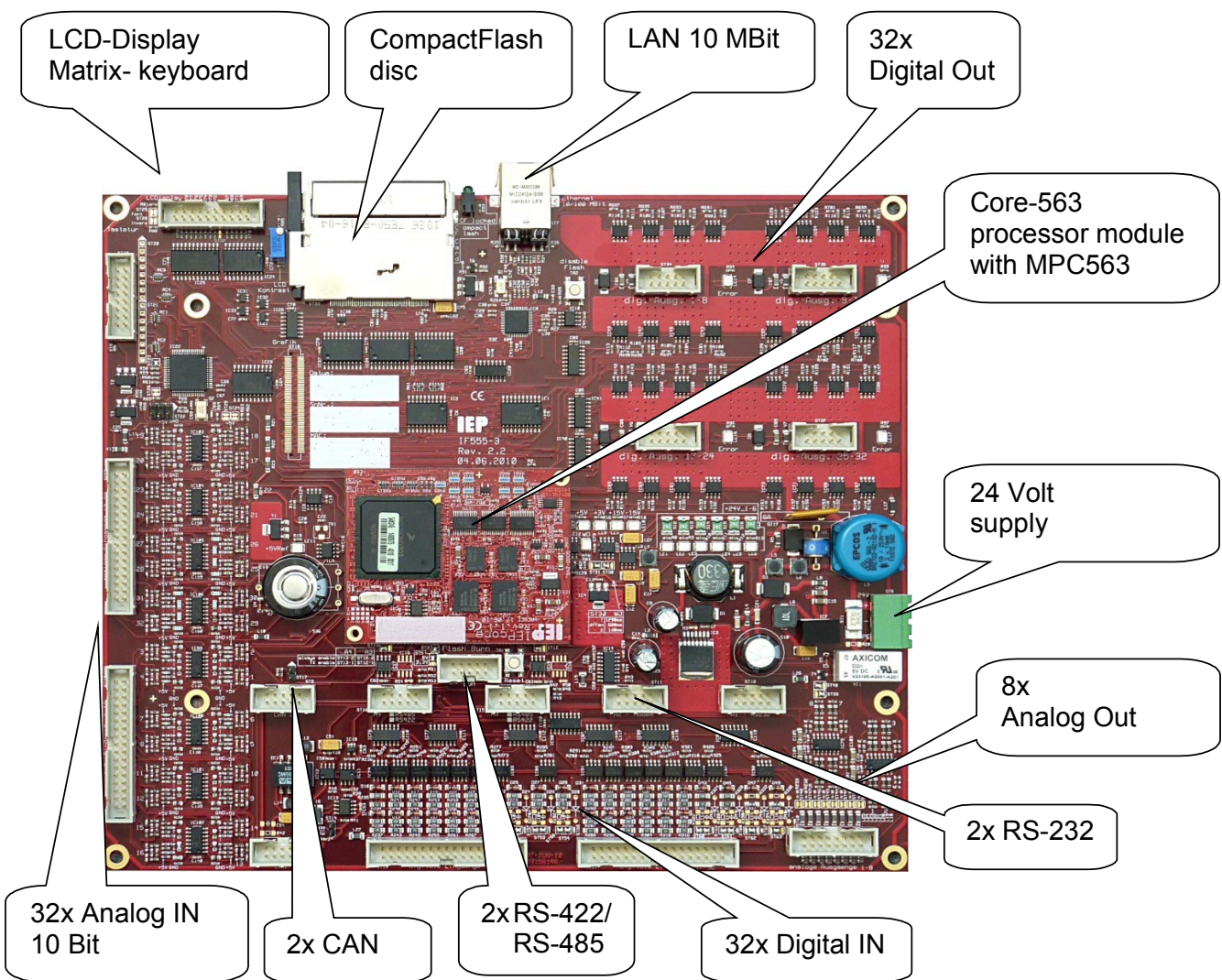


IF555-3

Interface board for the MPC563/MPC555



Industrial I/O and high computational power – the **IF555-3** with an automotive PowerPC MPC5xx-Controller, universal I/O and standard interfaces for operating and network is a ready-to-go package for demanding applications in measuring and control engineering.

IF555-3



Capabilities

The **IF555-3** gives access to all of the controllers core modules:

- MPC563 / 56 MHz or MPC555, 40 MHz with up to 8 MB RAM and also up to 8 MB FLASH
- 2 CAN channels, one of them galvanically isolated
- 32 differential analog inputs, 10 bit resolution, input range adaptable for measurements of temperature, current and voltage
- 32 digital inputs, 24 V, opto-isolated, 24 of them usable for external lowside switches
- 8 analog outputs, using PWM, 0-20 mA / 0-10 V, adaptable
- 32 digital outputs, 24 V / 0.4 A (max. 6 A altogether)
- Supply of 24 V_{DC}

Standard interfaces allow the operating of the system as well as the integration into complete control concepts:

- 4 serial interfaces (2 x RS-232, 2 x RS-422/485)
- 10/100 MBit Ethernet 100BaseT
- CompactFlash provides external, changeable memory
- Real-time clock
- Connectors for LCD and keyboard

PowerPC 5xx

The MPC5xx-controllers are developed by Freescale for automotive applications. By their high computational power – especially at floatingpoint calculations –, their small supply current and their extensive onchip periphery they are ideally suited for general controls.

On the **IF555-3**, either an Core-563 or a phyCORE-MPC555 (made by the Phytex company) processor module with up to 8 MB SRAM and FLASH is used. The realtime operating system RTOS-UH is stored in the internal FLASH of the MPC5xx – the external FLASH is usable for applications.

Serial Interfaces

To connect further devices with conventional interfaces, the additional 4 serial ports of the **IF555-3** can be used. One of the two RS-232 5-wire interfaces serves for programming and data exchange, the second is intended e.g. for a modem or other serial devices.

Two more serial interfaces are providing differential signal transmission according to RS-422 or RS-485.

Ethernet

The Ethernet interface of the **IF555-3** uses a 100BaseT connection to provide a problem-free integration in industrial networks.

The TCP/IP stack is in the standard scope of supply. FTP, Telnet, http are available. An optional OSI stack serves for the integration into control concepts based on e.g. SINEC-H1.

The status of the Ethernet interface is indicated by 3 LED's (link, transmit, collision).

One of the two CAN interfaces is galvanically isolated from the processor core and intended for long distance connections. The second interface is set aside for local I/O-expansion in the electrical cabinet. Both CAN interfaces support baudrates upto 1 MBaud according to the CAN specification Rev. 2.0B. 16 send / receive buffers allow for high data throughput with minimal processor load.

CAN interfaces

For the storage of e.g. logging data or recipes a socket for a removable CompactFlash card is provided. Type I and II cards can be used, thus also removable Microdrive CF+ discs are supported. A driver for the file system is in the standard scope of supply, data can be exchanged between the **IF555-3** and a standard PC with card reader.

CompactFlash

LCD displays based on the Toshiba T6936 controller can be connected via a 20 header post connector. Text based displays up to 16x40 characters and graphical displays up to 240x128 pixel are supported. A terminal driver as well as an extensive graphical library are in the standard scope of supply of the operating system RTOS-UH.

LCD

Matrix keyboards upto 7x8 keys are supported. The keyboard is integrated into the terminal emulation – even with matrix keyboards, no additional programming is necessary. Customizing of key codes is available on request.

Keyboard

The 32 differential, analog inputs of the MPC5xx have a resolution of 10 bits at a typical conversion time of 10 μ s. Each input of the **IF555-3** is amplified and optionally filtered by an external operational amplifier and then fed to the MPC5xx. Therefore, the measuring range of each channel can be configured separately.

Analog Inputs

The analog inputs are most simply usable by an automatic signal acquisition mode. A programmable sequencer, once initialised, samples all inputs and stores the input values in an own control store. The application can read the most recent sample values at any time.

8 analog outputs 0...20 mA / 0...10 V are provided to control external actuators. The **IF555-3** generates the desired output values using the PWM channels of the MPC5xx and on-board operational amplifiers to filter and normalize the resulting pulse train. The output frequency can be selected between 10 kHz and 20 MHz, PWM duty cycles of 0% ... 100% are possible. Accordingly, analog resolutions of 16 bit down to 1 bit can be achieved.

Analog Outputs

The analog outputs are addressed directly. No processor action is needed for the generation of the PWM pulse trains.

Digital Inputs

All 32 digital inputs are isolated by opto-couplers. 24 inputs can read external low-side switches, 8 inputs can be configured to read either low-side switches or active 24 V signals.

16 of the inputs are fed to the TPU of the MPC5xx. With its special timer functions, the TPU offers e.g. these operating modes without presenting an additional computational burden to the processor:

- Input – reading the actual signal state
- Counter –16-Bit-counter for leading and/or trailing edges
- Pulse width measurement – the time between signal slopes can be measured with a resolution of 100 ns.
- Position/angle measurement – two channels in combination can be configured to resolve quadrature signals as presented e.g. by incremental encoders. The resolved position is readable through a 16-bit-register.

The maximum incoming frequency is 75 kHz per channel.

Digital Outputs

The 32 digital high-side outputs are splitted in 4 groups. Each single output delivers up to 24 V / 0.4 A with a maximum current of 6 A altogether. Each output is protected from overcurrent and over-temperature; in case of overload, an error signal is raised. This signal is shown by a LED and can be read back by software. The outputs are capable of driving inductive loads, e.g. relays.

8 of the outputs are fed by the TPU of the MPC5xx offering e.g. the following operational modes:

- Output –direct setting of the output state
- PWM –automatic generation of a pulse-width modulated output signal
- Pulse control – time-controlled generation of pulse trails, also in connection with other in- or outputs of the TPU.

Power supply

The **IF555-3** requires a supply of 24 V_{DC} ±10%. The board is protected from power supply polarity reversal; an EMV protection circuit assures troublefree operation in an industrial environment.

Installation and Connections

The **IF555-3** is supplied as printed board assembly in the dimensions 222x257 mm. Voltage supply is made by a 3 pin pluggable screw terminal.

All signal connections are presented on header post connectors. The pinning is selected to allow flat-cable connections to standard connectors.

Programming

The realtime operating system RTOS-UH is in the standard scope of supply. Driver for all components of the board including software to program the internal FLASH of the processor are provided.

Crest-C, PEARL and IEC 61131-3 are available as programming languages.