ALL-IN-ONE BUS NODE
UNIGATE® FC

- Norm compliant
- Certified
- Programmable
- Designed & manufactured in Germany

CONNECTABLE
MULTI-PROTOCOL-MODULE

READY-TO-INSTALL FOR

Cam Controls | Fieldbus Gateways | Industrial Ethernet Products
**UNIGATE® FC – Integrate without much development effort**

The ready-to-install UNIGATE® FC combines all components of a 2-Port Industrial Ethernet interface in one module. The enormous reduction of the development effort up to 70-80% holds a significant advantage in time-to-market.

Covering an area of only 47-52 mm x 56 mm, the module includes all necessary components such as microcontroller, Flash, RAM, Ethernet switch and passive components, such as LEDs and Ethernet jacks. It can be connected to the microcontroller of the terminal device, or can operate as stand-alone.

The module handles the entire bus or Ethernet traffic and relieves the terminal device processor of this non-trivial task. The protocol of the terminal device will be implemented with a script. The free of cost PC-tool “PROTOCOL DEVELOPER” generates the script and adapts it perfectly to the final product and the requirements of the bus. Changes to the firmware of the terminal are not necessary.

The hardware and software interfaces of the Deutschmann UNIGATE® FC series are standardized and functionally the same, a guarantee for the interchangeability between the different bus versions.

**Design-In**

Deutschmann also offers UNIGATE® FC variants as a design-in solution. Design-in allows the customer to fit the design of the module to their needs and optimize for their own system. You will be using our well kept and continuously developed firmware.

---

**Advantage Deutschmann – Ready-to-install**

- 70-80% reduced development effort
- Time-to-Market gain
- Assembly consists of standard components
- Connection to the host processor via UART interface
- Expandable via the synchronous serial interface e.g. for ‘Stand-alone’-mode (without processor applications)
- Shift-register connection (e.g. LED activation, read-in of switch positions)
- Analog/digital converter (e.g. analog sensor, 4-20mA current loop)
- Easy integration into your electronics
- Adaptation of the terminal device firmware is dropped
- All active components are incorporated, including Ethernet jacks and LEDs
- Integrated isolation
- Coverage of multiple industrial Ethernet protocols with just one development
The Deutschmann UNIGATE® FC provides a complete Industrial Ethernet interface (Slave). The integrated 2Port-Switch allows you to connect the networks in a linear structure. The line topology reduces cabling costs and the number of additional required components.

The functionality of the firmware also includes a FTP- and a Web Server. Which allows the design of customer specific device Webpages for example for visualization or input of process data.

A key benefit of the UNIGATE® FC series is the scripting ability. As a result, changes on the terminal device are no longer required. The flexibility of the script language provides the user freedom and opportunities; from a simple transparent data transfer, through generating complex protocols up to preparation of the data. Standard protocols such as Modbus RTU (Master/Slave), Modbus ASCII are included as complete script commands.
Hardware overview

Stand-alone operation
The connection to terminal devices without a processor can be done via the clocked shift-register interface (synchronous serial interface/SPI). It allows the extension of the FC for digital and analog inputs and outputs through the port of shift registers, DA- or AD-converters. This way LEDs can be accessed, switch positions queried or analog signals read-in or read-out. The maximum input and output register width is each 256 bits.

Processor-connection
For the use in systems with its own microprocessor, the UNIGATE® FC is connected via a UART or a SPI-interface with the processor of the final product. The communication between the device processor and the UNIGATE® FC is controlled by the script. With script technology it is possible to simulate complex protocols and data can be processed and cached.

The key advantage: The firmware of the terminal device does not need to be touched!

Debug interface
The debug interface of the UNIGATE® FC can be used to test a script, or for diagnostic purposes.
Flexible solutions are needed. With the usual configuration tools for protocol converters and gateways, the user has to work with the specifications of the manufacturer. To change this unfortunate condition Deutschmann developed its own script language as early as in 1999.

The user only needs to process the data of the bus and barely has to look after the special characteristics of the fieldbus.

The PROTOCOL DEVELOPER supports a variety of functions to fit the received or to send data into the right “form”. Mathematics- or memory processing commands are known from other Script languages and are easy to understand implemented, even for laymen.

Also the neatly arranged selection of examples enables a quick introduction to laymen.

Another highlight is the included debug functionality. The common functionalities such as Single-step, running and stopping on breakpoint are available.

Great emphasis is put on data security. You can activate special error detection routines on request.

**What exactly is a script?**

A script is a sequence of commands executed in a given order. A command is always a small, firmly outlined task. The script language also knows commands that control the program flow in the script, which is why you can assemble even complex processes with these simple commands.

**Command groups overview**

<table>
<thead>
<tr>
<th>Command groups</th>
<th>Subfunction calls, jumps, branches</th>
<th>Mathematical functions, data conversions</th>
<th>Send and receive data</th>
<th>Set and read parameters. For example the baud rate for the serial interface.</th>
<th>bus-specific values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Declarations</td>
<td>variable declaration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Math</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bus Specific</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The amount of tasks which can be handled with a script is infinite.

Scripts are imaginable which
- automatically determine a participant’s data at the serial interface, edit this data and then outline it in the bus
- only carry out action if the bus data is altered
- carry out timed actions
- share communication states
- exchange the data between 2 serial participants (RS485) and present the state in the bus

The script programming gives you a flexible possibility to solve your communication task. On both sides, i.e., on the RS-side and on the bus side, data can be edited, converted and arranged.

The 1x1 of the PROTOCOL DEVELOPER

Picture one shows you an example script in the editor surface and the tree view of all available commands (Command-Tree). It is the tool for easy script generating for our script gateways, its operation is aimed on it.

In addition to programming via text commands, the Command-Tree also offers dialogue-based programming. If defined, and necessary for the correlating command, a dialogue goes through the command parameters (picture 2) and inserts the resulting command into the script.

Picture 1: script example in the PROTOCOL DEVELOPER

Picture 2
Compile

Before a script can be loaded into a UNIGATE®, it has to be compiled. The resulting code is very storage efficient. So even extensive a script fits comfortably in the internal memory of the UNIGATE®.

The loading of a script into the device can be done directly from the PROTOCOL DEVELOPER. For serial programming a script-download tool is available.

Debuggen

All UNIGATE® devices have a built-in debugging interface. A special debug software is not needed. To test even extensive scripts quickly you’ll find many functions for comfortable debugging, such as

- Breakpoints
- Single-step
- Display of the variables and their values
- Error display
Support

The PROTOCOL DEVELOPER contains a context-sensitive help function, in which a detailed description of all script commands is included.

Templates for different tasks and bus variants can be transferred directly and adapted to your own needs.

Sample scripts

The free of cost PROTOCOL DEVELOPER includes commented script examples for every script command.

In addition to our free hotline, you’ll find further support in form of the latest versions of manuals and software tools available for free on our web page.

(www.deutschmann.com)
The developer board was developed to ensure the quick implementation of the Deutschmann All-In-One bus node UNIGATE® FC into your own electronics. The unified interface supports all UNIGATE® FC models.

For the connection to a PC (with the DEBUG interface) there is both, an RS232 port and a USB port available.

The application can be connected either via RS232, RS485, RS422, or USB.

The board also provides shift register, switches and LEDs. The Synchronous Serial Interface of the UNIGATE® FC can thus read 32 digital inputs, and set 16 digital outputs. Part of these digital IOs, as well as the signals of the synchronous serial-, the application- and the debugging interfaces can be taken from the pin strip.

**Advantage Deutschmann – Flexibility**

- No changes in your own firmware necessary
- Flexible and powerful script language, specifically created for the bus communication
- Easy to handle
- Customized commands on demand. For example if functions are missing or an optimization for time critical application is needed.
- You can create your own script, or Deutschmann creates your script for you
- Extensive support through help function, templates, examples, hotline and Workshops
- Devices can also be factory fitted with your script
- Scripts run on the UNIGATE® CL, UNIGATE® IC and UNIGATE® FC series
- Easy adaption for existing scripts to more fieldbuses and industrial Ethernet.

**UNIGATE® FC Developer-Board**

The developer board was developed to ensure the quick implementation of the Deutschmann All-In-One bus node UNIGATE® FC into your own electronics. The unified interface supports all UNIGATE® FC models.

For the connection to a PC (with the DEBUG interface) there is both, an RS232 port and a USB port available.

The application can be connected either via RS232, RS485, RS422, or USB.

The board also provides shift register, switches and LEDs. The Synchronous Serial Interface of the UNIGATE® FC can thus read 32 digital inputs, and set 16 digital outputs. Part of these digital IOs, as well as the signals of the synchronous serial-, the application- and the debugging interfaces can be taken from the pin strip.
### Technical overview

<table>
<thead>
<tr>
<th><strong>BACnet/IP</strong></th>
<th>from II / 2013</th>
<th>Article-No.: V3935</th>
</tr>
</thead>
</table>
| ![BACnet/IP](image) | › BACnet/IP interface (Server)  
› 2x RJ45 (integrated Switch)  
› 100 Mbit Full-Duplex-transmission  
› 32-Bit micro processor | |

<table>
<thead>
<tr>
<th><strong>EtherNet/IP 2Port</strong></th>
<th></th>
<th>Article-No.: V3897</th>
</tr>
</thead>
</table>
| ![EtherNet/IP 2Port](image) | › EtherNet/IP-Adapter function  
› max. 500 Byte input- and 500 Byte output data  
› Baud rate up to 100 Mbit/s Baudrate  
› isolated Ethernet interface with 2x RJ45 connector  
› IT-Funktionen: Webserver, FTP Server  
› generic EDS-file | |

<table>
<thead>
<tr>
<th><strong>Fast Ethernet</strong></th>
<th></th>
<th>Article-No.: V3933</th>
</tr>
</thead>
</table>
| ![Fast Ethernet](image) | › max. 1024 Byte input- und 1024 Byte output data  
› Baud rate 10/100 Mbit/s  
› isolated Fast Ethernet interface for 2x RJ45 connector  
› IT-functions: Webserver, FTP Server | |

<table>
<thead>
<tr>
<th><strong>Developerboard for all offered UNIGATE® FC variants</strong></th>
<th></th>
<th>Article-No.: V3852</th>
</tr>
</thead>
</table>
| ![Developerboard](image) | › suitable for all bus variants  
› Serial ports to the application side  
› Debug interface  
› different measuring points | |
### Modbus TCP

<table>
<thead>
<tr>
<th>Art.-No.: V3934</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Modbus TCP" /></td>
</tr>
<tr>
<td>- complete Modbus-TCP slave-interface</td>
</tr>
<tr>
<td>- max. 252 Byte input- and 252 Byte output data</td>
</tr>
<tr>
<td>- isolated Ethernet interface</td>
</tr>
</tbody>
</table>

### PROFINET 2Port

<table>
<thead>
<tr>
<th>Art.-No.: V3851</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="PROFINET 2Port" /></td>
</tr>
<tr>
<td>- complete PROFINET IO-Device-interface (Slave)</td>
</tr>
<tr>
<td>- Max. 1440 Byte input/output data</td>
</tr>
<tr>
<td>- 2x RJ45-Anschluss (integrated Switch)</td>
</tr>
<tr>
<td>- 100 Mbit Full-Duplex-Transmission</td>
</tr>
<tr>
<td>- 32-Bit Microprocessor for fast response time</td>
</tr>
<tr>
<td>- Generic GSD file</td>
</tr>
</tbody>
</table>

---

### General specifications

- **serial interfaces**: 2x UART, 1x SPI or 1x shift register
- **Baud rates**: 50 Baud to 520 Kbaud
- **Debug interface**
- **16K Script memory**
- **Dimensions**: 47-52 x 56 x 18 mm (W x D x H)
- **Weight approx.**: 25 g
- **Operating temperature**: -40°C to +85°C, RJ45 variants: -25°C to +85°C
- **CE and bus-specific certifications**
- **RoHS**
- **Reach**
Deutschmann Automation, a German company based in Bad Camberg, has been working in the automation technology since 1976 and became known with cam controls in the 1980s.

In 1989 Deutschmann Automation started operating in the fieldbus technology. The development of one's first own bus system DICNET was an essential step. Since 1996 different fieldbus and Industrial Ethernet products are offered under the brand name UNIGATE®.

Thanks to a competent quality management and continuous enhancement Deutschmann became one of the leading suppliers in the automation industry. The entire development and manufacturing take place in Germany.

We offer workshops for our All-In-One Bus nodes of the UNIGATE® IC series. In these workshops, you will learn everything you need to know about our products and how you can easily realize your projects with Deutschmann.

For all products, the necessary documents and tools can be found, free of cost, on www.deutschmann.com. The FAQ section summarizes frequently asked questions about our products.

Our experts in development, sales, and support have the right solution for your demands.