Application

The output module is used to activate electronic inputs, relays and lamps.

It converts the serial and coded data arriving from the IO-bus to parallel 24 V binary signals which are output via module outputs A01 - A32, if module version R0100 and A01 - A16 of module version R0200.

The line for returning the signals to 0 V (Z) must be provided outside the module.

The outputs of the module can control the following loads:
- up to 50 standard loads PROCONTROL electronics inputs or
- one lamp with a rated current of 100 mA at a rated voltage of 24 V or
- one relay with 100 mA current consumption. The quenching diode required for this is already incorporated in the module.
- Other loads up to 100 mA current consumption.

The module is available in two different hardware versions:
- 81 AB10-E/R0100 for output of 32 binary signals
- 81 AB10-E/R0200 for output of 16 binary signals

Features

The module, which has a space requirement of 1 division, can be plugged into every multi-purpose processing station of the PROCONTROL bus system.

It incorporates a standard interface SEA to the IO-bus.

The module receives the binary signals to be output from the PROCONTROL bus system via the IO-bus and the bus coupling module in the form of telegrams.

The code switches for setting the module address can be set with the module withdrawn, and read through a cut-out on the module front.

The binary signal outputs have their own operating voltage supply to eliminate any interaction between the bus side and the process side. No potential isolation is provided.

Any disturbances in data input and data output as well as disturbances in the processing section are detected and signaled by a red light-emitting diode ST on the module front.

At the same time, disturbance annunciation signal SME is output via the IO-bus.

The module occupies two successive addresses in version 81 AB10/R0100, and one address in version 81 AB10/R0200 on the IO-bus.
Description

Basically, the module consists of three functional blocks:

- Bus adaption with detection and reception of the data telegrams intended to be output.
- Conversion of the received telegrams by a serial/parallel converter.
- Amplification and output of the binary signals via the corresponding binary value outputs.

DATA INPUT FROM 1G-BUS

The module receives all telegrams which are transferred under its address on the 1G-bus.

Transfer takes place serially, therefore, the processing section performs a serial/parallel conversion of the data. Reception of the telegrams is via the standard interface SEA which is incorporated in plug connector X1.

The voltage US required on the module and the zero potential Z are also supplied through connector X1.

After faultless reception of an address and data telegram, an acknowledgement signal is output via acknowledgement line QUT.

BINARY SIGNAL OUTPUT

The module transfers the signals of an incoming telegram to the binary signal outputs only when it

- has ascertained on the basis of parity bits in the data telegram that the data have been transferred and received without any error
- has ascertained by a comparison of addresses that the signal has been assigned to one of its outputs.

WIRING OF UNUSED FUNCTION UNITS

It is not necessary to wire unused function units.

Setting of the module

The settings on the module are performed using address switches S1, S2 and S3 and soldering jumpers 1001 to 1005.

SETTING OF ADDRESS

The module address is set on the module by means of address switches S2 and S3.

The address is set with the module withdrawn.

The 1st address switch is permanently wired in the module. The permanently wired position of the 1st address switch is marked by 0 imprinted on the front panel above the cutouts for switches S2 and S3.

- Possible setting of the hex. code address switches:

<table>
<thead>
<tr>
<th>1. Addr. switch S1 (not available)</th>
<th>2. Addr. switch S2</th>
<th>3. Addr. switch S3</th>
</tr>
</thead>
<tbody>
<tr>
<td>permanently wired to 0</td>
<td>adjustable 0 - F</td>
<td>adjustable 0/2/4/6/8/A/C/E</td>
</tr>
</tbody>
</table>

The address set on the address switches is the address of the 1st function unit of the module (module starting address). It can be read on the module front.

If the module is used in connection with a bus coupling module 88 QTO2, value 0 must be set on address switch S1 (is permanently set).

By setting the 1st address switch to position "0", the bus coupling module 88 QTO2 is notified that no specification telegrams are transferred by the module.
MEANING OF SOLDERING JUMPERS

The module has 5 soldering jumpers 1001 to 1005 which must be installed as shown for the module versions and the desired output values.

- For soldering jumpers 1001, 1002, 1003 the following applies:

<table>
<thead>
<tr>
<th></th>
<th>R0100</th>
<th>R0200</th>
</tr>
</thead>
<tbody>
<tr>
<td>1001</td>
<td>-</td>
<td>in place</td>
</tr>
<tr>
<td>1002</td>
<td>in place</td>
<td>-</td>
</tr>
<tr>
<td>1003</td>
<td>-</td>
<td>in place</td>
</tr>
</tbody>
</table>

- For soldering jumpers 1004 and 1005 the following applies:

With soldering jumpers 1004 and 1005 in place, the value 0 is output at the binary outputs of the module if the module is no longer called by the IO-bus.

With soldering jumpers 1004 and 1005 removed, the previous value is output at the binary outputs of the module if the module is no longer called by the IO-bus.

Soldering jumper 1004 is responsible for the binary values of module outputs A601 to A616, soldering jumper 1005 for the binary values of module outputs A617 and A632.

Data communication with the module

FORMATION OF ADDRESS

The bus control module transfers address telegrams of 16 bit length to call the individual modules of the IO-bus.

In the module, every incoming address is compared with its own module starting address.

This comparison takes place in serial mode.

The address transferred by the bus control module and required by the module for comparison is as follows:

```
15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
```

<table>
<thead>
<tr>
<th></th>
<th>0 0 0</th>
<th>P</th>
<th>Address switch S3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address switch S1 (always 0)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parity bit</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

always 000.

The module responds when in the address telegram
- bits 13, 14, 15 = logic "0".
- the transferred address agrees with the address set on the module.
- the sum of all bits set to logic "1" is odd (parity check).
Telegram conversion

Depending on the version, the module receives one or two successive data telegrams from the IO-bus and outputs them statically via binary value outputs.

Modules of version 81 AB10/RO100 receive two data telegrams, modules of version 81 AB10/RO200 one data telegram.

DATA TELEGRAMS 81 AB10/RO100

The binary values of the first 16 binary signals AB01 ... AB16 are transferred under the even-numbered first module address (module starting address), the binary values of the next 16 binary value transmitters AB17 ... AB32 are transferred under the subsequent odd module address.

The data telegrams have a length of 16 bits, the contents specified below, and are present statically until the next data telegrams intended for these outputs are received.

Data telegrams of the first 16 binary signals under the even-numbered first module address:

```
15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
```

```
AB16  AB01  AB02
```

Data telegram of the second 16 binary signals under the subsequent odd module address:

```
15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
```

```
AB32  AB17  AB18
```
Annunciation functions

Disturbances in the module and in the communication with the IO-bus are detected and signalled by the module.

Disturbances can be signalled by the module in the following three ways:

- Visual disturbance annunciation on the module by the light-emitting diode ST visible on the module front which emits a steady red light in the event of a disturbance.

- Annunciation via bus line SME of the IO-bus.

- Annunciation by the fact that no acknowledge-ment signal arrives after reception of an address and data telegram.

- If disturbances occur in the internal sequential cycle.

  Disturbance annunciation signal SME and light-emitting diode ST are set as long as the disturbances are present.

  After the disturbances have been removed, SME and ST are reset after 200 ms.

- After error-free reception of an address tele-gram and a data telegram, this is acknowledged via acknowledgement line QUT of the IO-bus.

- Jumpers 1004 and 1005 determine whether the previous value or value 0 is to be output in the event of a disturbance.

ANNUCIATION ON THE MODULE

The red light-emitting diode ST is connected with bus line SME.

It emits a steady light when a disturbance annunciation is transferred via bus line SME.

ANNUCIATIONS TO THE IO-BUS

A disturbance annunciation is output in the following cases:

- If the module fails to receive a valid address telegram and a valid data telegram at least every 7 seconds.

  Disturbance annunciation signal SME and light-emitting diode ST are set.

  If the module is called again by the bus control module, SME and ST are reset after 200 ms.

- If one or more of the bus connecting lines are interrupted or disturbed.

  Disturbance annunciation signal SME and light-emitting diode ST are set as long as the disturbances are present.

  After the disturbances have been removed, SME and ST are reset after 200 ms.
Functional diagrams

MODULE VERSION 81 AB10-E/R0100 (32fold)

The module consists of a printed circuit board (see "Mechanical design") which is equipped with two connectors X1 and X2, three address switches S1, S2 and S3 (S1 is permanently wired to 0), as well as jumpers 1001 to 1005.

Terminal designations:
Connector X1 incorporates the standard interface SEA and the operating voltage supply.
Connector X2 incorporates process outputs AB01 to AB32.
MODULE VERSION 81 AB10-E/R0200 (16fold)

The module consists of a printed circuit board (see "Mechanical design") with two connectors X1 and X2, three address switches S1, S2 and S3 (S1 is permanently wired to 0), and jumpers 1001 to 1005.

Terminal designations:
Connector X1 incorporates the standard interface SEA and the operating voltage supply.
Connector X2 incorporates process outputs AB01 to AB16.
Connection diagram

Module 81 AB10-E/R0100 has 32 binary value outputs, module 81 AB10-E/R0200 has 16 binary value outputs. The loading capacity of the outputs is the same for both module versions.

Mechanical design

The mechanical design of both module versions is the same.

Board size: 6 U, 1 T, 160 mm deep
Connector: to DIN 41 612
1 x for 10-bus connection
  48-pole, edge connector type F (connector X1)
1 x for process connection
  32-pole, edge connector type F (connector X2)
Weight: approx. 0.42 kg

The exact contact allocation of the individual connectors can be seen from operating principles description "Connectors of the IO-bus modules" GKWE 705 321 or from the functional diagram of the module.
POSITIONS OF THE ADJUSTABLE COMPONENTS AND VISUAL DISPLAYS ON THE FRONT

The front panels of module versions R0100 and R0200 as well as the functions of the components shown are the same.

Light-emitting diode for disturbance announcement ST

<table>
<thead>
<tr>
<th>Significance</th>
<th>Hexadecimal</th>
<th>Decimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>100</td>
<td>256</td>
</tr>
<tr>
<td>S2</td>
<td>10</td>
<td>16</td>
</tr>
<tr>
<td>S3</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Switch S1 is permanently wired to 0 and shown as imprint on the front of the module.
POSITIVE OF THE ADJUSTABLE COMPONENTS ON THE PRINTED CIRCUIT BOARD

The printed circuit board incorporates the two address switches S2 and S3 for setting the module starting address (address switch S1 is permanently wired to 0) as well as the two connectors X1 for I/O-bus connection and X2 for process connection.

Position of the jumpers on the printed circuit board:

<table>
<thead>
<tr>
<th>Version: Jumper</th>
<th>RO100</th>
<th>RO200</th>
</tr>
</thead>
<tbody>
<tr>
<td>1001</td>
<td>-</td>
<td>in place</td>
</tr>
<tr>
<td>1002</td>
<td>in place</td>
<td>-</td>
</tr>
<tr>
<td>1003</td>
<td>-</td>
<td>in place</td>
</tr>
<tr>
<td>1004</td>
<td>0 or previous value is output</td>
<td></td>
</tr>
<tr>
<td>1005</td>
<td>at the binary value outputs in the event of a disturbance</td>
<td></td>
</tr>
</tbody>
</table>
Technical data

In addition to the system data, the following values apply:

<table>
<thead>
<tr>
<th>MODULE VERSION:</th>
<th>RO100</th>
<th>RO200</th>
</tr>
</thead>
</table>

**POWER SUPPLY**

- Rated voltage: 19.5 V ... 30 V 19.5 V ... 30 V
- Operating voltage $U_o$: 24 V 24 V
- Current consumption $I_{Typ}$: 140 mA 70 mA
- Power dissipation $P_{Typ}$: 3.4 W 1.7 W

The values specified for $I_{Typ}$ and $P_{Typ}$ apply for unloaded outputs. To obtain an exact value, the output loads must be added.

Reference potential 10-bus $Z$: 0 V 0 V

**OUTPUTS**

- Number of binary outputs: 32 16
- Output designations: AB01 ... AB32 AB01 ... AB16

The binary outputs are short-circuit proof with respect to $U_o$ and $Z$, quenching diodes are installed in the module.

**OUTPUT VALUES PER OUTPUT**

- Output voltage for logic "0": 0 V ... 1 V 0 V ... 1 V
- Output voltage for logic "1": 14.4 V ... 30 V 14.4 V ... 30 V
- Maximum output current: 100 mA 100 mA

**INPUTS**

Input designation: SEA standard interface 10-bus

**PERMISSIBLE TEMPERATURE RANGES**

- Operating temperature: 0 °C ... 70 °C 0 °C ... 70 °C
- Storage temperature: -40 °C ... 85 °C -40 °C ... 85 °C

**ORDERING DATA**

Complete module:
- Type designation: 81 A810-E/RO100 81 A810-E/RO200
- Order number: GKWE850100R0100 GKWE850100R0200

Technical data are subject to change without notice.