

PROTOCOL USED FOR 2081N COMMUNICATION (RS-232)

Communication with the 2081N is done using two bytes of information as defined below. The rate of data is 9600 baud, with no parity, 8 data bits and one stop bit.

1st byte

| | | | | | | | | | | |
|---|---|---|---|---|---------|---|---|--|--|--|
| | | | | | ADDRESS | | | | | |
| 0 | X | 0 | 0 | X | X | X | X | | | |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | | | |

2nd byte

| | | | | | | | | | | | |
|---|---|---|---|---|---------|---|------|--|--|--|--|
| | | | | | COMMAND | | DATA | | | | |
| 1 | X | X | X | 0 | X | X | X | | | | |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | | | | |

DETAILED DESCRIPTION

1st byte

1st byte - bits 0..3 - ADDRESS.
 These bits describe the number of the target machine.

| Machine number | 1st byte, bits | | | | |
|----------------|----------------|---|---|---|--------|
| | 3 | 2 | 1 | 0 | |
| 1 | 0 | 0 | 0 | 0 | MASTER |
| 2 | 0 | 0 | 0 | 1 | |
| 3 | 0 | 0 | 1 | 0 | |
| 4 | 0 | 0 | 1 | 1 | |
| 5 | 0 | 1 | 0 | 0 | SLAVES |
| 6 | 0 | 1 | 0 | 1 | |
| 7 | 0 | 1 | 1 | 0 | |
| 8 | 0 | 1 | 1 | 1 | |
| 9 | 1 | 0 | 0 | 0 | |
| 10 | 1 | 0 | 0 | 1 | |
| 11 | 1 | 0 | 1 | 0 | |
| 12 | 1 | 0 | 1 | 1 | |
| 13 | 1 | 1 | 0 | 0 | |
| 14 | 1 | 1 | 0 | 1 | |
| 15 | 1 | 1 | 1 | 0 | |
| 16 | 1 | 1 | 1 | 1 | |

1st byte - bit 6 - destination bit.
 When sending a message from the PC (ie. to machine) this bit must be 0.
 When the machine sends a message to the PC this bit must be 1.

1st byte - bits 4,5,7 - must be 0.

2nd byte

2nd byte - bits 0..2 - DATA.

These bits describe the input number that is to be connected to the output.

| Input to be connected | 2nd byte, bits | | |
|--------------------------|----------------|---|---|
| | 2 | 1 | 0 |
| 1 | 0 | 0 | 0 |
| 2 | 0 | 0 | 1 |
| 3 | 0 | 1 | 0 |
| 4 | 0 | 1 | 1 |
| 5 | 1 | 0 | 0 |
| 6 | 1 | 0 | 1 |
| 7 | 1 | 1 | 0 |
| 8 | 1 | 1 | 1 |

2nd byte - bits 4..6 - COMMAND.

| COMMAND | 2nd byte, bits | | |
|---------------------|----------------|---|---|
| | 6 | 5 | 4 |
| Set input to output | 0 | 0 | 0 |
| Set output off | 0 | 0 | 1 |
| Get status | 0 | 1 | 0 |
| Get machine type | 0 | 1 | 1 |

2st byte - bit 3 - must be 0.

How to use the protocol:

- 1) To change the input that is connected to the output, set the bits as below:
*1st byte
ADDRESS - Set the number of the target machine (machine number 1 - 16).

*2nd byte
DATA - Set the new input number which is to be connected to the output.
COMMAND - Set the bits of COMMAND "Set input to output"(000).

REPLY - The reply to this command is identical to the two bytes which were sent, except that bit 6 of the 1st byte = 1 (destination bit).
- 2) If you want to disconnect all inputs from the output, set the bits as below:
*1st byte
ADDRESS - Set the number of the target machine (machine number 1 - 16).

*2nd byte
DATA - don't care.
COMMAND - Set the bits of COMMAND "Set output off"(001).

REPLY - The reply to the COMMAND "Set output off" is identical to the two bytes which were sent, except that bit 6 of the 1st byte = 1 (destination bit).
- 3) To get the status of a machine, ie. which input is connected to which output, or if the output is disconnect from the inputs, set the bits as below:

*1st byte

ADDRESS - Set the number of the target machine (machine number 1 - 16).

*2nd byte

DATA - don't care.

COMMAND - Set the bits of COMMAND "Get status"(010).

REPLY - There are two groups of reply for the command "Get status":

1st if one input is connected to an output.

the reply is the same as the reply of COMMAND -

"Set input to output". that the DATA location contain

the number of input connected to an output.

2nd if all inputs are disconnect from the output.

the reply is the same as the reply of COMMAND -

"Set output off".

- 4) To get the machine type(number of machine type),
set the bits as below:

*1st byte

ADDRESS - Set the number of the target machine (machine number 1 - 16).

*2nd byte

DATA - don't care.

COMMAND - Set the bits of the COMMAND "Get machine type"(011).

REPLY - The reply of the command "Get machine type" is identical to

the two bytes which were sent, except that bit 6 of the

1st byte = 1(destination bit), and the machine type is

present in the 2nd byte at the DATA location.

For the machine 2081N, the machine type is 0B (hex).

Note:

If a button on the machine is pressed, and the "reply switch" is off
(dip switch BANK 2 switch 4), the machine does not send information
to the PC .

Examples how to use the protocol:

- 1) To connect input 8 in machine 2 to output, set the bytes as below:

(The message sent from the PC)

First byte - 00(hex) + ADDRESS (hex) = 00 + 02 = 02(hex).

Second byte - 80(hex) + COMMAND + DATA = 80 + 00 + 08 = 88(hex).