# RS232 control of the P10

**A) Direct control via the RS232 interface of the P10**
P10 pre-amplifiers can be controlled by any control device having a RS232 serial output port (PC, CRESTRON home automation system etc.) through the RS232 input on their rear side.

**B) Control of a T+A system with P10 and source devices**
To control a complete system consisting of the P10 and one or more T+A R-Link source devices (like D10), use the T+A RS232 interface adaptor **MRA-CK.**
Control codes for the source devices are given in separate documents.
For details about connecting and operating the adaptor see the user manual of the adapter "UM_RS232_Adapt.doc".

## Settings for the system controller

The RS232 port of the control device should be set as follows:

| | |
|---|---|
| Baud rate: | 115.200 |
| Data bits: | 8 |
| Stop bits: | 1 |
| Parity: | none |
| Flow Control: | none |

## T+A RS_232 Protocol

The P10 uses the standard T+A RS232 command protocol as described in detail in the documents "TA_RS232_protocol.doc" and "RS_232_Command_Codes.doc".

### Format of the command telegrams

A command telegram to the P10 consists of 6 bytes. The complete telegram should be sent without pauses between the bytes.

Example: SYSTEM_ON command

| Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 |
|---|---|---|---|---|---|
| RS232 adapter Address | Telegram length | R-Link Address | R-Link command (here: SystemON = 0x57) | R-Link flag byte | Check sum |
| (always 0x01) | (R-Link address + R-Link command + R-Link flag byte = 0x03) | (0xC8=P10 → see also note below) | → see table "P10 commands" | (always 0x02) | = sum of bytes 1..5 mod. 0x100 |
| **0x01** | **0x03** | **0xC8** | **0x57** | **0x02** | **0x25** |

**Byte 1, 2, 3, 5** : for the P10 these bytes have the fixed values as shown in the table above

**Byte 4**　　　　 : R-Link command according to the table of RCII commands
　　　　　　　　　 (see "RS_232_Command_Codes.doc")

**Byte 6**　　　　 : check sum == (byte1+byte2+byte3+byte4+byte5) modulo 0x100

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**Note:**
The R-Link address **0xC8** is used for all standard P10 commands.

There exist a few additional commands (system commands) for some special functions. For these commands the address **0xC4** has to be used.　　A list of these commands is given in appendix 1.

## Format of the acknowledge (ACK) telegrams

The P10 will process each received command telegram and it will send an acknowledge telegram approx. 25...35 ms after receiving the command.

The ACK telegram consists of 2 bytes:
**Byte_1** is the RS232 address of the command telegram received before (=byte 1 of the command telegram = 0x01).
**Byte_2** is the acknowledge byte. If this byte is equal to the check sum of the command telegram (byte6 of the command) then the command was received correctly.
If byte 2 has a value different from the check sum of the command, an error has occurred (see table below).

**Format of the ACK telegram:**

| Byte 1 | Byte 2 | |
|---|---|---|
| **RS232 address** | **ACK byte** | |
| **0x01** | = check sum of command: | command correctly received |
| | = check sum –1: | command ignored (system busy) |
| | = check sum –2: | command not executed |
| | Note: If no ACK telegram is received within 35 milli-seconds after sending a command, there is either a hardware problem (cable etc.) or the telegram is erroneous (wrong address, wrong check sum ....) | |

After the ACK telegram, the P10 is ready for the next command.

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## List of P10 commands (Address $C8)

| Command | Command Code (HEX) | toggle | Remark | |
|---|---|---|---|---|
| **System ON** | 0x57 | | Switch the P10 ON to the "HV" position (from STANDBY) | |
| **System Standby** | 0x77 | | Switch the system (P10 and source devices) to STANDBY | |
| **System OFF** | 0x7A | | Switch the system completely OFF<br><br>**Note:** From this position the P10 can only be switched ON again by the **rotary switch** on its **front panel**.<br>If P10 shall be switched ON again by the remote control or by the RS232 interface, switch to STANDBY ! | |
| **PRE1 ON** | 0x6B | | | |
| **PRE1 OFF** | 0x4F | | Pre-amp outputs ON/OFF commands | |
| **PRE2 ON** | 0x50 | | | |
| **PRE2 OFF** | 0x51 | | | |
| **Speaker_A ON** | 0x68 | | Speaker output ON | These commands control a **T+A** R-Link power-amplifier connected to the P10. |
| **Speaker_A OFF** | 0x48 | | Speaker output OFF | |
| **Volume +** | 0x00 | | Performs 1 volume step. | |
| **Volume -** | 0x20 | | **Hint**: Repeat these commands for continuous volume increase/decrease<br>(command repetition rate = 100...110 ms) | |
| **Disc** | 0x23 | x (1) | select source DISC | |
| **Tuner** | 0x17 | x (1) | select source Tuner | |
| **AUX1** | 0x07 | x (1) | select source AUX1 | |
| **AUX2** | 0x15 | x (1) | select source AUX2 | |
| **AUX/PH** | 0x3D | x (1) | select source AUX/PH | |
| **Recorder** | 0x35 | x (1) | select source Recorder | |
| **Disc** | 0x45 | | select source DISC | |
| **Tuner** | 0x46 | | select source Tuner | |
| **AUX1** | 0x5E | | select source AUX1 | |
| **AUX2** | 0x65 | | select source AUX2 | |
| **AUX/PH** | 0x61 | | select source AUX/PH | |
| **Recorder** | 0x49 | | select source Recorder | |
| **LOUDNESS ON** | 0x75 | | switch loudness on | |
| **LOUDNESS OFF** | 0x55 | | switch loudness off | |

(1): In conjunction with a **T+A** surroundecoder (DD1535) this key will toggle between the P10 source and the appropriate DD 1535 sources

## History

V1.0  initial version                    (29/11/06)
V1.1  direct source commands added       (14/02/08)
V1.11 Checksum computation corrected (mod 0x100)(20/11/2012)