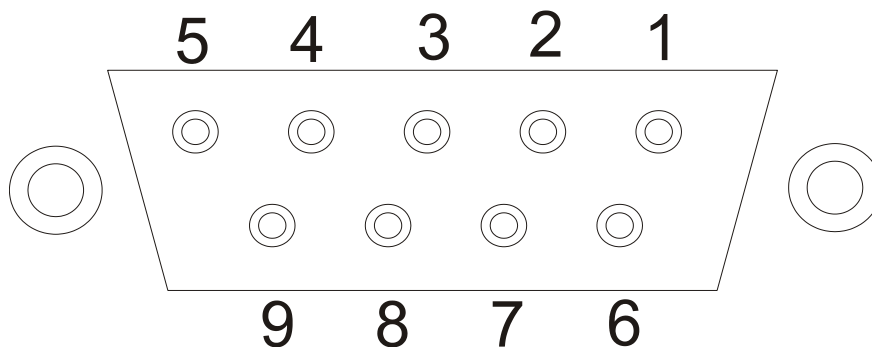


RS-232 Protocol for Xoceco TV engineering service

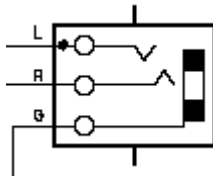
1 Physical Definition

Type A : Female D-Sub 9 pin

1. NC
2. TXD (To the Computer)
3. RXD (From the Computer)
4. NC
5. Ground
6. NC
7. NC
8. NC
9. NC



Type B: Mini earphone Jack



L : TXD (To the Computer)

R : RXD (From the Computer)

G : Ground

2 Electrical Definition:

| | |
|------------------------|----------------------|
| Signal Level | RS-232 Compliant |
| Synchronization Method | Asynchronous |
| Baud Rate | 9600Bps(Recommended) |
| Parity | None |
| Character Length | 8 Bits |
| Flow control | None |
| Start Bits | 1Bit |
| Stop Bits | 1Bit |

3 Basic format for control

The Transmission of data from the Control (Computer or AV Controller) starts with an STX signal, followed by the command, then the parameters, and lastly an ETX signal. If there are no parameters, then the parameter does not need to be sent. There is a Colon that separates the commands from the parameters.

All Commands start with STX (02h) and end with ETX(03h). There is Data outside the STX and ETX that should be ignored.

Option ID number three ASCII digits ranging from 000-999
A Semicolon separates the ID number from the Command.
The ID number can be set for the TV in the Service Menu.

Each command is 3 ASCII character plus a Parameter
A Colon separates the Command from the Parameter.

The Parameter is 1 to 7 ASCII characters long.

After each command is received, the TV shall send back an acknowledgment.
For most commands, this should be a simple STX , the letters “OK”, and an ETX.

If there is an error, the TV shall return STX, the letters “ER”, and ETX. There could be parameters added after a Colon if more details are possible.

Examples:

All commands are ASCII. Hex has been included is just for clarification.

Example of a Power ON for Unit 001:

| | |
|-------|--|
| ASCII | (STX)001;KEY:100(ETX) |
| Hex | 02 30 30 31 3B 4B 45 59 3A 31 30 30 03 |

TV ASCII Returns: (STX)OK(ETX)
 Hex 02 4F 4B 03

Example of a Power ON with No Unit Number:

ASCII (STX)KEY:100(ETX)
 Hex 02 4B 45 59 3A 31 30 30 03
 TV Returns: (STX) OK (ETX)
 Hex 02 4F 4B 03

Query Examples:

Use a “?” as the parameter and the TV will return the current Value for that command.
 There is no “OK” sent after a query.

(STX)PWD:?(ETX)

Would return to this status if the TV is ON:

(STX)1(ETX)

Or, this status if TV is OFF:

(STX)0(ETX)

Example of a Volume Query with No Unit Number assumes that the Volume is set at 50.

(STX)VOL:?(ETX)

TV Returns: (STX)50(ETX)

- Note: 1) ID number is an optional field. If ID number is supported, TV factory setting menu must include ID number item, the default setting is 000.
 2) ID number 000 is a broadcast address. All device receive command with this address must respond it, even this device does not support ID number.

4 Commands

1) IR KEYS

| | | |
|--------------|--------------------|--------------|
| Command | KEY | |
| Return Code | OK | |
| Query Result | Not support | |
| Parameter | <i>Common Keys</i> | |
| | 0~9 | Numeric Keys |
| | 10 | Channel up |
| | 11 | Channel down |
| | 12 | Volume up |
| | 13 | Volume down |

| | |
|-------------------|----------------------------------|
| 14 | Menu |
| 15 | Enter |
| 16 | Return |
| 17 | Up |
| 18 | Down |
| 19 | Left |
| 20 | Right |
| 21 | Power |
| 22 | Input(Source select) |
| 23 | Mute |
| 24 | Dsp(display channel information) |
| <i>Other keys</i> | |
| 25 | Picture Mode |
| 26 | Sound mode |
| 27 | -/-- |
| 28 | Sleep |
| 29 | Audio effect (BBE/SRS on/off) |
| 30 | Aspect(Display mode) |
| 31 | Previous channel |
| 32 | CCD |
| 33 | MST(mono/stereo/sap) |
| 34 | Favorite |
| 35 | Picture freeze |
| 36 | Cable |
| 37 | Red |
| 38 | Green |
| 39 | Blue |
| 40 | Yellow |
| 41 | Teletext on/ff |
| 42 | Teletext mode |
| 43 | Update |
| 44 | Reveal |
| 45 | Hold |

| | |
|-----------------------------------|--|
| 46 | Index |
| 47 | Size |
| 48~49 | Reserved |
| <i>DTV Keys</i> | |
| 70 | EPG |
| 71 | '-'Dash(Separate symbol between major channel number and minor number: 21-2) |
| 72 | List((Available program list) |
| 73 | Audio List |
| 74 | TV/Radio |
| <i>Discrete code function key</i> | |
| 100 | Power on |
| 101 | Powr off |
| 102 | TV(RF) |
| 103 | Video-1 |
| 104 | Video-2 |
| 105 | Video-3 |
| 106 | Component-1 |
| 107 | Component-2 |
| 108 | Component-3 |
| 109 | VGA |
| 110 | HDMI-1 |
| 111 | HDMI-2 |
| 112 | HDMI-3 |
| 113 | 16:9 |
| 114 | 4:3 |
| 115 | ZOOM |
| 116 | Panaroma |
| 117~130 | Reserved |

2) Power

| | |
|---------|------------|
| Command | PWD |
|---------|------------|

| | | |
|--------------|-----------|------------------|
| Return Code | OK | |
| Query Result | 0 | Power Off |
| | 1 | Power On |
| Parameter | 0 | Power Off |
| | 1 | Power On |
| | 3 | Power (Toggle) |
| | 4 | Audio Mute |
| | 5 | Audio Un-Mute |

3) Channel

| | | |
|--------------|--|--|
| Command | CHA | |
| Return Code | OK | |
| Query Result | Return current channel number | |
| Parameter | <i>Format 1 (For analog TV)</i> | |
| | 0~999 | |
| | <i>Format 2 (For ATSC Digital TV)</i> | |
| | 0-0~999-999 | |
| Note | <p>1) For an analog Tv, when a command of format 2 is received, all parameters after “-“ should be ignored.</p> <p>2) For a ATSC TV, both format 1 and format 2 should be supported.</p> | |

4) INPUT

| | | |
|--------------|----------------------------|-------------------|
| Command | INP | |
| Return Code | OK | |
| Query Result | Return current input code. | |
| Parameter | 0 | TV(RF) |
| | 1 | VGA |
| | 2 | Componet-1 |
| | 3 | Componet-2 |
| | 4 | Componet-3 |
| | 5 | HDMI-1 |

| | | |
|--|----|-------------|
| | 6 | HDMI-2 |
| | 7 | HDMI-3 |
| | 8 | VIDEO-1 |
| | 9 | VIDEO-2 |
| | 10 | VIDEO-3 |
| | 11 | Scart-1 |
| | 12 | Scart-2 |
| | 13 | Scart-CVBS |
| | 14 | Scart-Y/C |
| | 15 | Card-reader |
| | 16 | DTV |

5)VOLUME

| | | |
|--------------|--------------------------------|--|
| Command | VOL | |
| Return Code | OK | |
| Query Result | Return current volume setting. | |
| Parameter | 0 ~ 100 | |

6)Format

| | | |
|--------------|----------------------------|--------------|
| Command | FOR | |
| Return Code | OK | |
| Query Result | Return current format code | |
| Parameter | 0 | 16 : 9 |
| | 1 | 4 : 3 |
| | 2 | Panarama |
| | 3 | Zoom |
| | 4~ | Other format |

7)CONTRAST

| | | |
|-------------|-----------|--|
| Command | CON | |
| Return Code | OK | |

| | |
|--------------|---------------------------------|
| Query Result | Return current contrast setting |
| Parameter | 0 ~ 100 |

8)BRIGHTNESS

| | |
|--------------|-----------------------------------|
| Command | BRT |
| Return Code | OK |
| Query Result | Return current brightness setting |
| Parameter | 0 ~ 100 |

9)SATURATION

| | |
|--------------|-----------------------------------|
| Command | SAT |
| Return Code | OK |
| Query Result | Return current saturation setting |
| Parameter | 0 ~ 100 |

10)TINT

| | |
|--------------|-----------------------------|
| Command | TIN |
| Return Code | OK |
| Query Result | Return current Tint setting |
| Parameter | 0 ~ 100 |

10)Minimax Volume

| | |
|--------------|---------------------------------------|
| Command | MIV |
| Return Code | OK |
| Query Result | Return current minimax volume setting |
| Parameter | 0 ~ 100 |

11) Maximal Volume

| | |
|-------------|-----------|
| Command | MAV |
| Return Code | OK |

| | |
|--------------|---------------------------------------|
| Query Result | Return current maximal volume setting |
| Parameter | 0 ~ 100 |

12)POWER ON SOURCE

| | |
|--------------|--|
| Command | POC |
| Return Code | OK |
| Query Result | Return current power on source setting |
| Parameter | Same as parameter of command INPUT |

13)RF SELECT

| | | |
|--------------|-----------------------------|-----|
| Command | RFS | |
| Return Code | OK | |
| Query Result | Return current RF selection | |
| Parameter | 0 | RF1 |
| | 1 | RF2 |
| | 2 | RF3 |