



TROUBLE-SHOOTING RS-232 COMMUNICATION PROBLEMS

The following are steps which may help trouble-shoot problem(s) when attempting to communicate with a Kramer RS-232 controlled device.

1. Ensure that there is a **null-modem** connection between the machine (eg. switcher, or router) and the communication device (eg. the PC).

The simplest method, when working with a 25-pin port on the PC, is to use the null-modem adaptor provided with the machine. Plug the 25-pin end of the adaptor into the serial port of the PC, and use a flat-cable - ie. a one-to-one connection - from the 9-pin end of the adaptor to the serial port of the machine. (If using the adaptor without a flat-cable, then the *minimum* connections required between the 9-pin end of the adaptor and the machine's 9-pin port are: pin **2** to pin **2**, pin **3** to pin **3**, and pins **5** to pin **5**).

If connecting directly from the **25-pin** port of the PC to the 9-pin port of the machine (ie. without the null-modem adaptor provided with the machine), then connect as follows:

- Connect pin **2** of the 25-pin to pin **2** of the 9-pin
- Connect pin **3** of the 25-pin to pin **3** of the 9-pin
- Connect pin **7** of the 25-pin to pin **5** of the 9-pin
- Short pins **6** and **20** on the **25-pin** side
- Short pins **4**, **5** and **8** on the **25-pin** side

If connecting directly from the **9-pin** port of the PC to the 9-pin port of the machine, then connect as follows:

- Connect pin **2** of the PC port to pin **3** on the machine port
- Connect pin **3** of the PC port to pin **2** on the machine port
- Connect pin **5** of the PC port to pin **5** on the machine port
- Short pins **4** and **6** on the PC's port
- Short pins **1**, **7** and **8** on the PC's port

2. Ensure that all the DIP-switches on the machine have been set correctly.
3. Ensure that the PC's baud-rate setting is the same as the machine's setting, and that you have selected the correct comm port on the PC.
4. If several machines are used together, then ensure that all the machines are turned on. If **any** machine is turned off in a system using a "master / slave" setup, then all communication within the system is unreliable.
5. If the machine has a "DISABLE TXD" function, make sure that it is **not** set; similarly, if a DIP-switch may be used to "disable reply", then ensure that the reply is **enabled**.
6. On pin 3 of the machine's RS-232 plug, it transmits to the PC (ie. machine's TXD; PC's RXD). On pin 2 of the machine's RS-232 plug, information from the PC is received (ie. machine's RXD; PC's TXD). It may be useful to use a digital

storage oscilloscope to see if the machine transmits / receives data on these pins.

7. Most of the machines use a "bi-directional" protocol. This means that the same code is used to command the machine to perform an action, as the code which the machine sends (to the PC) if a *front-panel switch* was pressed to perform this action. For example, if the user pressed the front-panel switches to connect input 4 to output 5, and this resulted in the machine sending hex code 7B, then this implies that if the machine *receives* hex code 7B, it would implement a connection of input 4 to output 5. This being the case, it may be useful to monitor the codes sent by the machine when the front-panel buttons are pressed, in order to help understand the machine's protocol.
8. When trouble-shooting, it may be a good idea to use a communications program such as Procomm, or Viewcom, to first monitor the codes which the machine sends. Then try sending same codes back (see paragraph 7. above) and check if the machine corresponds appropriately. Lastly, send the code to instruct the machine to download its status.
9. If a user-written program is to be used, then, if possible, first use the factory-written program to check if the communication between the PC and the machine is OK.
10. For our equipment in which RS-232 control is an optional feature, and is installed in the machine as additional hardware, check that the board is inserted correctly (as described in the user manual). In particular, for the X02 series of switchers, inspect the flat cables to the module, and ensure that none of the pins on these connectors are bent.
11. Some of our equipment may be controlled via other pieces of equipment in the range, and may be configured for communication with the other equipment rather than communication with a PC via RS-232. In this case, it is necessary to set up the machine correctly. For example, our BC-2216 and BC-2616 (16X16 audio matrix switchers) have been set (factory-default) for use with a BC-2516 (16X16 video matrix switcher). In this case, the audio matrix would communicate with the PC *via* the video matrix. If the audio matrix is to be used independantly, it must be set up accordingly (in this case as an "audio only" unit).
12. If several commands are to be sent, then, before sending an additional command, the sender must ensure that the machine has finished processing previous commands. Wait for the machine's reply from the previous instruction before sending the next command in order to ensure this.
13. Ensure that the device communicating with the machine is true RS-232C! Some peripheral equipment (such as the standard Macintosh serial port) - although similar to RS-232 - use other modes of communication.
14. Take care if intending to use a PC with Windows NT4.0 (and lower versions). This operating system does not have "plug and play" features, and it is no simple task to configure the computer's ports. Consult your Windows NT documentation! Check if your system works on a "non-NT" system - if so, chances are that the port on the NT system has not been set up correctly.
15. Note that RS-232 (by definition) is limited in range to only 30 feet! Our VP-43 "range extender" could be used if a greater distance is required.
16. RS-232 (by definition), is for communication between 2 ports only (in our case, the PC and the switcher). The VP-14 may be used if several pieces of RS-232 equipment are to be hooked together, (for example, if the switcher is to be controlled by 2 PC's and a BC-2000 controller).

(NOTE: In several machines in our line, we allow control of a number of units by daisy-chaining them on a flat-cable - which seems illegal, given the above statement! What we actually do, is configure the machines in a "master / slave" setup, wherein only the master communicates with the PC via the RS-232 link. The communication between the master and the slaves is not via RS-232. In this way, the *master* passes information to and from the PC and the slaves, and the RS-232 communicates between two devices only).

Additional trouble-shooting tips would be welcomed!