KRAMER ELECTRONICS Ltd.

PROTOCOL USED FOR VS-2053 (BC-2053) COMMUNICATION (RS-232)

Communication with the VS-2053 is done using two bytes of information as defined below. Data rate 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	5	5	4	3	2	1	0

2nd byte

	COMMAND			DATA			
1	X	X	X	X	X	X	X
7	5	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.

	1st byte, bits				
Machine number	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	
6	0	1	0	1	
7	0	1	1	0	
8	0	1	1	1	SLAVES
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 (i.e. to machine) this bit must be 0. When the machine sends a message to the PC this bit is set as 1.
1st byte- bits 4,5,7 - set as 0.

2nd byte
2nd byte - bits 0..3 - DATA. These bits describe the data, which is defined according to the command with which it is sent.
2nd byte - bits 4..6 – COMMAND. These bits describe the command (the # column in the table below).

COMMAND		DATA
#	DESCRIPTION	
0	Connect input to output	DATA = input number -1
I	Set system	Set as described below
2	Get status	Machine replies by sending DATA = input connected - 1
3	Get system	Machine replies by sending DATA = system settings (described below)
4	Set delay time	Set as seconds, or tenths of seconds
5	Get delay time	Machine replies by sending DATA = delay time (seconds or tenths)
6	Increase delay time	Don't care
7	Decrease delay time	Don't care

Definition of DATA when used for *system settings* (commands 1 and 3):

Bit 0   0 for switching as per **G** input (**G** switch on front panel)
                        1 for switching as per **V** input (**V** switch on front panel)

Bit 1   0 for switching without delay (**DELAY** switch off)
                        1 for switching with delay (**DELAY** switch on front panel)

Bit 2   0 if delay time is measured in seconds
                        1 if delay time is measured in tenths of seconds

EXAMPLES of use of the protocol:

(NOTE - all bytes described below are in hexadecimal).

Instruction 0 -   to instruct the master to switch input 1 to the output set the first byte as 00, and the second byte as 80.
For input 2 - 00, 81.
For input 3 - 00, 82.

to instruct machine number 6 to switch input 2 to the output, set the first byte as 05, and the second byte as 81.

if a front-panel switch was pressed on the master to connect input 2 to the output, the first byte sent to the PC would be 40, and the second byte, 81.

Instruction 1 -   to set the master to switch with no delay, sync from the **V** input: - set the first byte as 00, and the second as 91 or 95.

to set machine 7 to switch with no delay, sync from the **V** input: - set the first byte as 06, and the second as 91 or 95.

if the **V** button is pressed on the master, which has a 0.8 second delay setting, the first byte sent to the PC would be 40, and the second byte would be 95.

Instruction 2 -   to get the master to send its present status to the PC, (i.e. which input is connected to the output), send 00, A0. The reply would be:
                     40, 80 (input I connected to output);
                     40, 81 (input 2 connected to output);
                     40, 82 (input 3 connected to output);

to get machine 2 to send its present status to the PC, send (01, A0). If input 3 is connected the reply would be (41, 82).

Instruction 3 - if the master is shows a 2 second switching time, and the **delay** and **V** LEDs are lit on the front panel, then the reply to (00, B0) would be (40, B3).

if the master is shows a 0.2 second switching time, and the **delay** and **G** LEDs are lit on the front panel, then the reply to (00, B0) would be (40, B6) .

Instruction 4 - to set the master with a delay time of 6 (or 0.6) seconds, send (00, C6). (Note: the system setting bit [2nd byte, bit 2] determines whether the delay is 0.6 or 6 seconds).

Instruction 5 - if the PC sends (00, D0) to the machine in the above example, the reply would be (00, D6).

Instruction 6 - if the master has a delay of 4 seconds, then sending (00, E0) would set the master with a delay time of 5 seconds.

Instruction 7 - if the master has a delay of 4 seconds, then sending (00, F0) would set the master with a delay.

DIP-SWITCH Setting for VS-2053

Machine Number	1	2	3	4	5	6	7	8
1. (Master)	OFF	OFF	OFF	OFF	ON	ON	ON	ON
2. (Slave)	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF
3. (Slave)	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF
4. (Slave)	ON	ON	OFF	OFF	ON	OFF	OFF	OFF
5. (Slave)	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF
6. (Slave)	ON	OFF	ON	OFF	ON	OFF	OFF	OFF
7. (Slave)	OFF	ON	ON	OFF	ON	OFF	OFF	OFF
8. (Slave)	ON	ON	ON	OFF	ON	OFF	OFF	OFF
9. (Slave)	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF
10. (Slave)	ON	OFF	OFF	ON	ON	OFF	OFF	OFF
11. (Slave)	OFF	ON	OFF	ON	ON	OFF	OFF	OFF
12. (Slave)	ON	ON	OFF	ON	ON	OFF	OFF	OFF
13. (Slave)	OFF	OFF	ON	ON	ON	OFF	OFF	OFF
14. (Slave)	ON	OFF	ON	ON	ON	OFF	OFF	OFF
15. (Slave)	OFF	ON	ON	ON	ON	OFF	OFF	OFF
16. (Slave)	ON	ON	ON	ON	ON	OFF	OFF	OFF

Switch#5	Reply ON/OFF
Switch#6, Switch#7	RS232 hardware control to PC
Switch#8	Vertical sync (distributed from **Master** to all **Slaves**).