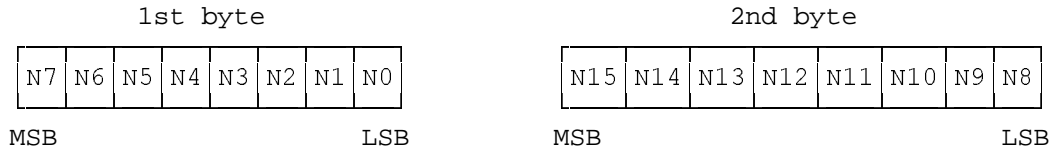# PROTOCOL USED FOR VIS-4X4 COMMUNICATION (RS-232)

Communication with the VIS-4X4 is done using two bytes of information, as defined below. The rate of data transfer is 1200 baud, with no parity, 8 data bits and one stop bit.

```
          1st byte                              2nd byte

  | N7 | N6 | N5 | N4 | N3 | N2 | N1 | N0 |      | N15 | N14 | N13 | N12 | N11 | N10 | N9 | N8 |

  MSB                              LSB          MSB                                      LSB
```

where

 $N7 = 0$ (continue bit).
 $N6 = 1$
 $N5 = 0$
 $N4 = 0$
 $N3 = 0$ ($N6N5N4N3$ are transmitted by the machine (to the PC), but are not
          necessary when transmitting to the machine).

 $N2N1N0$ is the binary value of the machine being addressed (or of the machine
          sending its data) minus one, eg. $N2N1N0=000$ to address machine #1
          (the master); $N2N1N0=101$ to address machine #6.

 $N15 = 1$ (continue bit).
 $N14 = 0$ for all communication to and from the PC.

 $N13$ is high if $N12N11N10N9N8$ is an opcode. The opcodes are defined as:
     $N12N11N10N9N8 = 00001$ instructs a machine to send its present status.
     $N12N11N10N9N8 = 00010$ success code (change in status was performed).
     $N12N11N10N9N8 = 00011$ non-success (change in status not was performed).
  NB:- The success/non-success codes are only used when instructing a machine
       which is present to change its status. The code returned depends on
       whether or not the requested operation is valid.

 $N13$ is low when a change in the machine's status is made (via the front
     panel switches), or when a change in the status is requested (by
     RS-232). $N13$ is also low when the machine sends its present status
     (when answering to opcode 00001, and when the machine is turned on).
     When $N13$ is low, the value of $N12N11N10N9N8$ corresponds to the status
     (or the required change in status) of the machine, and is related to the
     front panel switches as shown in the sketch below.

```
  | 1  | 5  |        | 2  | 6  |        | 3  | 7  |        | 4  | 8  |
  | 9  | 13 |        | 10 | 14 |        | 11 | 15 |        | 12 | 16 |
```

     For example, to connect input D to output 2, $N12N11N10N9N8$ should be set
     up as 01110 (=14). Similiarly, if the front panel switch was pressed to
     connect input B to output 3, then $N12N11N10N9N8$ would be transmitted as
     00111 (=7).