Communication with the VS-120 is done using three bytes of information as
defined below. The rate of data is 9600 baud, with no parity,
8 data bits and one stop bit.

first byte

```
              |        COMMAND        |
  +----+----+----+----+----+----+----+----+
  | 0  | X  | X  | X  | X  | X  | X  | X  |
  +----+----+----+----+----+----+----+----+
    7    6    5    4    3    2    1    0
```

second byte

```
         |            ADDRESS          |
  +----+----+----+----+----+----+----+----+
  | 1  | X  | X  | X  | X  | X  | X  | X  |
  +----+----+----+----+----+----+----+----+
    7    6    5    4    3    2    1    0
```

third byte

```
         |             DATA            |
  +----+----+----+----+----+----+----+----+
  | 1  | X  | X  | X  | X  | X  | X  | X  |
  +----+----+----+----+----+----+----+----+
    7    6    5    4    3    2    1    0
```
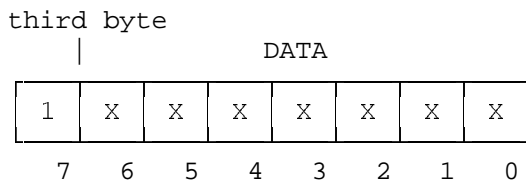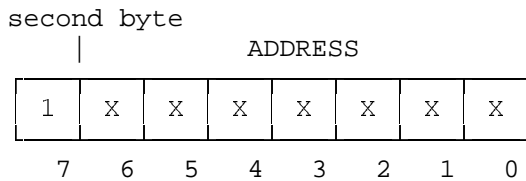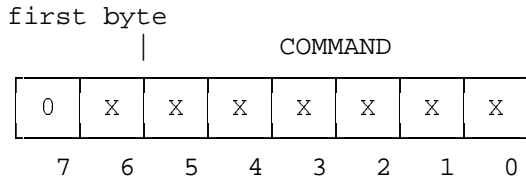
DETAILED DESCRIPTION

First byte

First byte - bits 0..5 - COMMAND.
These bits describe the COMMAND number - "CODE".
The list of "COMMAND" and "CODE" appear below.

first byte - bit 6 - destination bit.
- When sending a message from the PC (ie. to machine) this bit
  must be 1.
- When the machine sends a message to the PC this bit must be 1.
  if this bit 0, This message is not destined to PC.
last bit - bit 7 mast be 0.

Second byte

Second byte - bits 0..6 - ADDRESS.
These bits describe the Machine number that is influenced by COMMAND.
The number of machine can be 1(master) to 99(hex).
last bit - bit 7 mast be 1.

Third byte

Third byte - bits 0..6 - DATA.
These bits describe the DATA that is influenced by COMMAND.
For exampel to connect input 17 to output the DATA should be 17(hex).
last bit - bit 7 mast be 1.

List of commands

CODE (hex)	COMMAND	ADDRESS	DATA	REPLAY
00	Connect input to output	Machine number	input number	nonessential.
01	Get stutuse which input connect to output	0	0	COMMAND - As send(01). ADDRESS - Machine conected. DATE - input number.
02	Set all machines to "Auto" or "Nenual" mode	0	1 - Auto 0- Manual	nonessential.
03	Get the status of machines "Auto" or "Nenual" mode	0	0	COMMAND - As send(03). ADDRESS - As send. DATE - 1 for "Auto" mode. - 0 for "Manual" mode.
04	Set Dwell time of scanning	0	2 - 99 (hex)	nonessential.
05	Get Dwell time of scanning	0	0	COMMAND & ADDRESS - As send. DATA - Dwell time(hex).
06	Start scanning	0	0	nonessential.
08	Stop scanning	0	0	nonessential.
09	Continue scanning	0	0	nonessential.
0A	Enable input for scanning	Machine number	input number	nonessential.
0B	Disable input for scanning	Machine number	input number	nonessential.
0C	Get the status of input Enable or Disable scanning	Machine number	input number	COMMAND - 0A(hex) for Enable. 0B(hex) for Disable. ADDRESS & DATA - As send.
16	Save the status of inputs, Enable or Disable scanning	Machine number	0	nonessential.
0D	Set Error status Skip, Stop or Ignore	0	0 - Skip 1 - stop 2-Ignore	nonessential.
0E	Get Error status Skip, Stop or Ignore	0	0	COMMAND & DATA - As send. DATA - 0 for Skip. 1 for stop and 2 for Ignore.
0F	Get the number of "List" of Error	0	0	COMMAND & ADRRESS - As send. DATA - Number of Errors
10	Get Error number X (0 - Last error)	0	Error number	COMMAND - As send. ADRRESS - Machine number. DATA - Input number of error.
12	Delete all errors	0	0	nonessential.

<u>Examples how to use the protocol:</u>

1) To connect input 8 in machine 2 to the output set the byte as below:
   First byte - 40(hex) + COMMAND   = 40 + 00 = 40(hex).
   Second byte - 80(hex) + ADDRESS(hex) = 80 + 02 = 82(hex).
   Third byte - 80(hex) + DATA(hex)   = 80 + 08 = 88(hex).

2) To change the machines status to "Auto" mode set the byte as below:
   First byte - 40(hex) + COMMAND   = 40 + 02 = 42(hex).
   Second byte - 80(hex) + ADDRESS(hex) = 80 + 00 = 80(hex).
   Third byte - 80(hex) + DATA(hex)   = 80 + 01 = 81(hex).

3) To get the Dwell time of scanning set the byte as below:
   First byte - 40(hex) + COMMAND   = 40 + 05 = 45(hex).
   Second byte - 80(hex) + ADDRESS(hex) = 80 + 00 = 80(hex).
   Third byte - 80(hex) + DATA(hex)   = 80 + 00 = 80(hex).

   <u>REPLY</u>

   The reply to this command is identical to the three bytes
   which were sent.
   For example:
   First byte - 45(hex).
   Second byte - 80(hex).
   Third byte - 94(hex).
   Therefore the Dwell time = 94(hex) - 80(hex) = 14(hex) = 20(dec).

4) To start scanning set the byte as below:
   First byte - 40(hex) + COMMAND   = 40 + 06 = 46(hex).
   Second byte - 80(hex) + ADDRESS(hex) = 80 + 00 = 80(hex).
   Third byte - 80(hex) + DATA(hex)   = 80 + 00 = 80(hex).

Notes
1) Operation of COMMAND "Connect input to Output" while do only in
   "Manual" mode.
2) Operation of COMMAND "Start scanning" or "Continue scanning"
   while do only in "Auto" mode.
3) The two leds of "Auto" and "Manual" while go out when using the
   COMMAND "Enable input for scanning" or "Disable input for scanning"
   till using the COMMAND "Save the status of inputs, Enable or
                          Disable scanning"
3) Use the COMMAND "Save the status of inputs, Enable or Disable scanning"
   after using the COMMANDs "Enable input for scanning" and
   "Disable input for scanning".