DELTA
ELECTRONICS

MANUALE TECNICO

PROTOCOLLO PER SOFTWARE SFDAN

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DATI DI DEFAULT PER SOFTWARE SFDAN:

I settaggi del display sono i seguenti:

Indirizzo esadecimale display, campo NUM:	00
Canale usato, campo CHA:	1
Numero di linee, campo LIN:	1
Partenza stringhe, campo POS:	11
Default Baud Rates:	9600 bauds
Default Unit Type:	FDS 25
Default unit size horizontal:	1
Default unit size vertical:	1

ATTENZIONE:

Il display è cosi composto:

E' realizzato con 4 schede display da 5 caratteri, Collegate al canale 1 della scheda CPU.
Da notare che ogni canale della CPU può controllare righe da 20 caratteri.

Byte Definitions

```
COMMUNIC: SOT = $01
          STX = $02
          ETX = $03
          EOT = $04

COMMANDS: $05  = Inquiry command (No TEXT field in packet).
                 An ACK or NACK is send back.
          $06  = Send Text. Clear screen first.
          $07  = Send Text. Do not clear screen first.

OPTIONS:  $0F  = AUX command. Must be followed by two ascii
          HEX representation of byte to be written
          to auxiliairy output port U3 on the MCB.

FEATURES: BOLD quote        = $F0  (or $5F v0.01)
          Flash begin quote = $F1  (    >= v0.02)
          Flash end   quote = $F2  (    >= v0.02)

ACK/NACK: ACK   = $C0 : packet received OK
          NACK1 = $C1 : time out (max 100 ms between bytes of
                        a packet)
          NACK2 = $C2 : invalid ascii decimal or hex value
          NACK3 = $C3 : invalid text byte
          NACK4 = $C4 : format error.
```

Hardware requirements
- EPROM specfdan
- 32k SRAM (U29)

Configuration of the hardware

The hardware configuration must be exactly known to the programmer, in order to place characters at the correct position on the screen.

When multiple boards are connected to one display channel of the MCB (linked trough, not for Fds23), then the display boards nearest to the MCB must be placed on the right hand of the others, in that order. If the maximum amount of boards is connected, then the most left board starts with position 1.
If less boards are connected, the most left position must be increased according to the total amount of missing positions.

In case of Fds25 / Fds18, when 2 boards are connected to one channel (linked), these boards may be considered as one board of 2 lines, with 20 characters. When only one board is connected, then the first character is on position 11.

In case of Fds28 / Fds15, when 4 boards are connected to one channel (linked), these boards may be considered as one board of 1 line, 20 characters. When only one board is connected, then the first character is on postion 16 (1+3x5).

If a bold character is programmed just on the border of two inter-linked display boards, then the right half will automaticly be continued on the next board.
In all other cases when a bold character is positioned at the end of a line, the right part does not continue on another board: the bold character must be programmed again on position 0 of the next right-hand board.

Besides this, there are no restrictions in positioning the dipslay boards.

Spectrum FDAN technical manual
Haarlem, 25/06/92 MvD

```
    19-09-1990  v0.00 : 1st release
upd 05-06-1991  v0.01 : AUX port command
upd 10-12-1991  v0.02 : Flash implemented (+bug until v0.31)
upd 25-06-1992  v0.10 : Fds28/15 included.
upd    ??-1992  v0.20 : 180° rotation (dipsw2-5 Fds15/18 only)
upd 24-09-1992  v0.30 : 180° option removed, faster text setup
upd 19-12-1992  v0.31 : Flash bug solved.
```

The Spectrum FDAN protocol is a simplified protocol, designed for industrial applications (PLC's etc.) where fast and easy control of one screen infomation is required. The FDAN protocol supports single end or RS-485 network control of max 255 master control boards (MCB's), each controlling at least 8 display boards (DB's):

```
Fds23   : 3 lines x 15 chars. Max  8 DB's/MBC. (1 per channel)
Fds25/18: 2 lines x 10 chars. Max 16 DB's/MCB. (2 per channel)
Fds28/15: 1 line  x  5 chars. Max 32 DB's/MCB. (4 per channel)
```

Character features are included (flash/bold) but no screen features: One screen of text remains displayed until it is overwritten or cleared by the next transmission.

The serial data format is: 1 start-, 8 data- and 1 stopbit, no parity. The baudrate can be set to 1200,2400,4800 or 9600 bps.

Dipswitches on MCB

```
dipsw1:   sw1..sw8: 8 bits network number. sw1=LSB. On=0.
                    see also appendix 'Network numbers'.

dipsw2:   sw1- sw2: Baudrate
          On - On : 9600
          Off- On : 4800
          On - Off: 2400
          Off- Off: 1200

          sw3- sw4: Display type
          On - On : Fds23
          Off- On : Fds25/Fds18
          On - Off: Fds28/Fds15
          Off- Off: undefined

               sw5: undefined (v.0.11/0.20: 180° rotate 18/25)
               sw6: On = clear, Off = backup info on reset

          sw7- sw8: Display test
          On - On : Normal operation
          Off -On : Running stripes test
          On  -Off: Full screen LED test
          Off -Off: Info: baudrate, netw number, Eprom version
                          channel number, display type
```

Serial communication protocol

Communication takes place using packets of the following form:

packet = SOT-NUM-CMD-<OPT>-TEXT-<TEXT>-<TEXT>-EOT.

SOT = 1 byte start-of-transmission. More may be used as sync.
NUM = 2 byte Hex representation of the MCB network number = '00'..'FF'.
CMD = 1 byte command (see below).
OPT = optional 1 or more byte(s) extra command(s).
TEXT = one or more text records as explained below.
EOT = 1 byte end-of-transmission.

textrecord:

TEXT = STX-CHA-LIN-POS-STR-ETX

STX = 1 byte start-of-text
CHA = 1 byte ascii decimal channel number ('1'..'8')
LIN = 1 byte ascii decimal line number
POS = 2 byte ascii decimal string start position
STR = Any number of text bytes ($20..$AF, IBM set) Characters may be preceeded by bold quotes (double width), and mixed with flash on/off quotes.
ETX = 1 byte end-of-text

If a No-Clear-Screen command is used, only the transmitted characters will overwrite the previous screen. To change characters on different positions on one screen, more textrecord must be send in one packet.

One character postion takes 6 dots. If a bold quote is used, the character takes 12 dots. Postion 0 is a 'hidden' position and can be used to continue with the right part of a BOLD character on the next display board, if not on the same MCB channel.

Upon sending a packet to a MCB, a one byte ACK or NACK is send back after the unit has converted the packet into a screen image, which takes approx. 1 ms per textbyte. After the ACK has been sent, unit is ready to receive next packet.
When all boards are selected (adress $00), no ACK or NACK is sent back. A board with adress $00 will receive all messages but will send no ACK or NACK back.

Network number settings with dipswitches
25-06-1992, MvD

dipswitch 1:

NETNO	sw5	sw4	sw3	sw2	sw1
0	ON	ON	ON	ON	ON
1	ON	ON	ON	ON	OFF
2	ON	ON	ON	OFF	ON
3	ON	ON	ON	OFF	OFF
4	ON	ON	OFF	ON	ON
5	ON	ON	OFF	ON	OFF
6	ON	ON	OFF	OFF	ON
7	ON	ON	OFF	OFF	OFF
8	ON	OFF	ON	ON	ON
9	ON	OFF	ON	ON	OFF
10	ON	OFF	ON	OFF	ON
11	ON	OFF	ON	OFF	OFF
12	ON	OFF	OFF	ON	ON
13	ON	OFF	OFF	ON	OFF
14	ON	OFF	OFF	OFF	ON
15	ON	OFF	OFF	OFF	OFF
16	OFF	ON	ON	ON	ON
17	OFF	ON	ON	ON	OFF
18	OFF	ON	ON	OFF	ON
19	OFF	ON	ON	OFF	OFF
20	OFF	ON	OFF	ON	ON
21	OFF	ON	OFF	ON	OFF
22	OFF	ON	OFF	OFF	ON
23	OFF	ON	OFF	OFF	OFF
24	OFF	OFF	ON	ON	ON
25	OFF	OFF	ON	ON	OFF
26	OFF	OFF	ON	OFF	ON
27	OFF	OFF	ON	OFF	OFF
28	OFF	OFF	OFF	ON	ON
29	OFF	OFF	OFF	ON	OFF
30	OFF	OFF	OFF	OFF	ON
31	OFF	OFF	OFF	OFF	OFF

Haarlem, 24/09/92
MvD

Spectrum FDAN software update v0.30

The text image setup time has been decreased; image calculation starts immediately after receiving the first text byte. Other improvements: flash/bold combination is now possible.

The minimum delay time between serial packets is 5 mS, which can also be achieved by using 5 extra SOT bytes (on 9600 bd). After a clear screen command, a delay time of 15 ms is required. No extra delay time is required per text character.

(In previous versions, the minimum delay time was 50 mS, plus ± 1 ms per text character)

This version is 100% upward compatible with earlier versions.