Controlling the Z-Systems z-64.64r Digital Detangler Pro Router

Inputs to are designated as sources and outputs are designated as destinations. The routers have a 9-pin connector for RS422 control input and a 9-pin connector for looping the control through to multiple units. The only pins used are RXD+, RXD-, TXD+, TXD-, and GND; no ACK signals are used. The communication rate is 9600 baud, no parity, 8 data bits, 1 stop bit.

Protocol for z-64.64r

R = 4-bit router number (up to 16 routers may be controlled from a single controller. It is important to note that routers are numbered internally from 0 to 15. If you purchased a single router, its router number is 00)

X = 6-bit source address
Y = 6-bit destination address

Each router's configuration is defined by 64 pairs of settings (X and Y pairs). Settings are changed a single pair at a time. Therefore, changing a router's settings consists of sending it X and Y pairs. Querying the router as to its settings consists of sending it Y and asking for X. It is important to note that channels are numbered internally from 0 to 63. Input 1 is addressed as input 0, 2 as 1, etc.

ffh: Controller begins sequence of commands
eeh: Controller ends sequence of commands
RRh: Controller tells router #R it will be receiving commands

40h: Controller is about to send a new X,Y pair (6 bits for X, 6 bits for Y)
00yyyyyyh: Controller sends Y value
00xxxxxxh: Controller sends X value

80h: Controller is about to query router for setting
00yyyyyyh: Controller gives router Y address
00xxxxxxh: Router gives back X address

c0h: Controller asks router if it is alive
FFh: Router responds it is alive

When sending command 80h, router should respond with 00xxxxxxh within 2 milliseconds afer receiving 00yyyyyyh data from controller. When sending command c0h, router should respond within 1 millisecond.

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Here is an example communications transaction:

Suppose we wish to tell router #4 to send source #6 to destination # 64 and source #10 to destination #3. This is the chain of events.

```
ffh    ; begin communication
33h    ; talk to router #4
40h    ; controller is about to send a new X   ,Y pair
3fh    ;  destination  address  is  sent  first  (3f  hex  =  00111111  binary  =  63
decimal)
05h    ; source address is sent next
40h    ; controller is about to sen  d a new X ,Y pair
02h    ; destination address is sent first
09h    ; sources address is sent next
eeh    ; end communication
```

Notice that ffh and eeh "bracket" the communications and must be issued by the controller before addressing a different router. For example, suppose we wish to tell router #1 to send source #9 to destination #11 and then ask router #2 which source is connected to destination #4:

```
ffh
00h    (router 1)
40h
0Ah    (destination 11)
08h    (source 9)
eeh
ffh
11h    (router 2)
80h
03h
router #2 sends back result as 00xxxxxh
eeh
```

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