

TCPSER v1.0rc12-ssv6 ***Modem Emulator Software***

User Manual

SSV Embedded Systems

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1 INTRODUCTION

TCPSER turns a serial port into an emulated Hayes compatible modem that uses TCP/IP for incoming and outgoing connections.

It can be used to allow older applications and systems designed for modem use to operate on the Internet. TCPSER supports all standard Hayes commands, and understands extended and vendor proprietary commands (though it does not implement many of them).

TCPSER can be used for both inbound and outbound connections.

1.1 License

TCPSER is distributed under the GPL 2.0 or later

1.2 Conventions

| Convention | Usage |
|-------------|--|
| bold | Important terms |
| monospace | Pathnames, Filenames, URLs, command lines and program code |

Table 1: Conventions used in this Document

2 AT MODEM EMULATOR SOFTWARE

2.1 AT Commands

| Command | Description |
|----------------|--|
| + | Overlook all following commands in this line |
| A | Answer incoming call, ring |
| O | Return online, answer ring |
| Bn | Select CCITT or Bell (n<1), dummy |
| Dn | Dial, followed by T = Touch Tone Dial, P =Pulse Dial, L = Dial last number |
| En | Echo commands to the computer (n = 0 off, n = 1 on) |
| Hn | Hook status (n = 0 hook, n = 1 unchanged) |
| In | Identification, (n = 0 product code, n = 3 software version) |
| Ln | Speaker loudness (1 <= n <= 3), dummy |
| Mn | Speaker control (0 <= n <= 3), dummy |
| Nn | Activate automode (automatic recognition of connection speed) |
| P | Set Pulse Dial as standard, dummy |
| Qn | Quiet mode (n = 0 off, n = 1 on) |
| Sn | Select register <i>n</i> as the current register |
| Sn? | Select register <i>n</i> as the current register, and query its value. |
| T | Set Touch Tone Dial as standard, dummy |
| Vn | Format result codes (n = 0 numeric, n = 1 text like "CONNECT" or "BUSY") |
| Xn | Extended result code |
| Yn | Inactivity disconnect timer, dummy (also refer to register S30) |
| Zn | Reset modem, dummy |
| &Cn | DCD control (&C0 = permanent on, default, &C1 = at connection on) |
| &Kn | Data flow control (&K0 = none, default, &K3 = RTS/CTS, &K4 = XON/XOFF, &K5 = XON/XOFF+RTS/CTS) |
| &Dn | DTR option, identically with S21 (&D0 = ignores DTR, default, &D2 = connection only when DTR) |

Table 2: AT commands

Please note:

All unknown commands will be overlooked and answered with "OK".

2.2 Default Settings of S Register

| Register | Default value | Description |
|----------|---------------|---|
| S0 | 0 | Number of rings before auto-answer |
| S2 | 43 ('+') | Escape character |
| S3 | 13 (CR) | Carriage return character (for all response messages and End of Command line) |
| S4 | 10 (LF) | Line feed character (for all response messages) |
| S5 | 8 (BS) | Backspace character (for deleting characters) |
| S6 | 2 | Unused |
| S7 | 50 | Unused |
| S8 | 2 | Unused |
| S9 | 6 | Unused |
| S10 | 14 | Unused |
| S11 | 95 | Unused |
| S12 | 50 | Escape code guard time (fiftieths of a second, 50 = 1 second) |
| S21 | 0 | Like &D0, with 0 DTR is ignored, with 2 calls are only answered when DTR is on. |
| S22 | 0 | RI delay (n*10 Sec). If > 0, the output for CTS is also used as RI signal |
| S24 | 0 | Delay between DCD and CONNECT message (n*10 milliseconds). |
| S30 | 0 | Inactivity delay (n*10 seconds) |

Table 3: S register definitions

Please note:
Only the used S registers are listed.

2.3 Program Parameters

| Parameter | Description |
|-----------|---|
| -d | Serial device (e.g. /dev/ttyS0). Cannot be used with -v |
| -s | Serial port speed (default 38400) |
| -p | Port to listen on (default 6400) |
| -l | Loglevel (0 = NONE, 1 = Fatal, 2 = Error, 3 = Warn, 4 = Info, 5 = Debug, 6 = Enter/Exit, 7 = all) |
| -t | trace flags: (can be combined) 's' = modem input 'S' = modem output 'i' = IP input 'I' = IP output 'Y' = No Timestamp for syslog |
| -n | Add phone entry (number = replacement) |
| -i | Modem init string (defaults to "", leave off 'at' prefix when specifying) e0 Modem echo off (required for RCM and Linux prompt) s0 = 1 Answer incoming call after first RING s30 = 6 Hook connection automatically after 60 seconds of idle time |
| -P | Modem product code, String for response ATl |

Table 4: Program parameters

2.4 Program Call

The program is called within the Linux start scripts and the parameters from the Web ConfigTool are added.

Example:

```
tcpser -d /dev/ttyAT0 -s 38400 -p 12345 -l 7 -tsSiIY \  
-n "0,0049999911111111=10.3.0.8:6400" \  
-i "e0s0=1s30=6" -P "SSV GATEWAY"
```

3 CONNECTION CABLE

To connect the modem emulator with a terminal system a **crossed null-modem cable** must be used.

The numbers in the brackets are the pins of a 9-pole Sub-D connector.

Minimal version:

```
(8) CTS ----- RTS (7)
(7) RTS ----- CTS (8)
(3) SND ----- RCV (2)
(2) RCV ----- SND (3)
(4) DTR ----- DCD (1)
(1) DCD ----- DTR (4)
(5) GND ----- GND (5)
```

If the modem software needs DSR, it can be taken from DTR.

```
(8) CTS ----- RTS (7)
(7) RTS ----- CTS (8)
(3) SND ----- RCV (2)
(2) RCV ----- SND (3)
(4) DTR -----+- DCD (1)
(1) DCD -+    |
           |    +- DSR (6)
(6) DSR -+----- DTR (4)
(5) GND ----- GND (5)
```

Alternatively a single DTR can provide both sides with DSR.

```
(8) CTS ----- RTS (7)
(7) RTS ----- CTS (8)
(3) SND ----- RCV (2)
(2) RCV ----- SND (3)
(4) DTR ----- DCD (1)
(1) DCD -+-----+- DTR (4)
           |       |
(6) DSR -+    +- DSR (6)
(5) GND ----- GND (5)
```

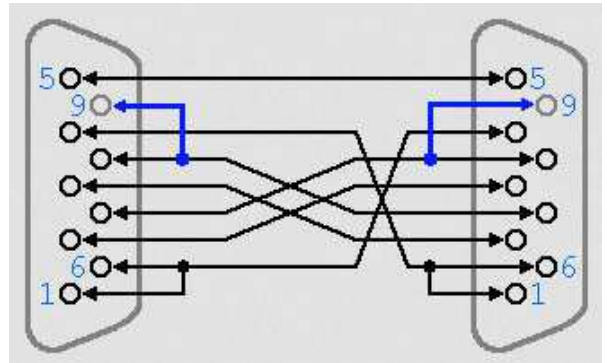
IMPORTANT!
This cable is not symmetrical.

If RI is needed, CTS must be bridged with RI.

For this cable configuration the modem register S22 must be set to a value greater than 0.

```

(8) CTS  +------ RTS  (7)
          |    +- RI   (9)
(9) RI   -+    |
(7) RTS  -----+- CTS  (8)
(3) SND  ----- RCV  (2)
(2) RCV  ----- SND  (3)
(4) DTR  -----+- DCD  (1)
(1) DCD  -+    |
          |    +- DSR  (6)
(6) DSR  +------ DTR  (4)
(5) GND  ----- GND  (5)
    
```



4 PROGRAM VERSIONS

1.0rc12-ssv1:

Add option -P Name for modem product code response after "ati".
 Add option -t.Y to suppressing timestamp in syslog.
 Skip all AT+ sequences.
 Add register S24 for DCD-CONNECT delay.
 Handle &Dn mode set, store state in S21 (internal register), default &D0.
 Connect incoming calls only if DTR is high, based on &D2.
 Limit rings for S0 = 2.

1.0rc12-ssv2:

Use Toggle RI while sending RING via RTS/CTS, if enabled with register S22.

1.0rc12-ssv3:

Trim spaces from phone book.

1.0rc12-ssv4:

Do not send <LF> after <CR>, if in numeric mode (ATV0).
 Do not send <CR><LF> before "OK", if echo is disabled (ATE0).

1.0rc12-ssv5:

Translate phone number "ATD99aaabbbcccd" into IP address aaa.bbb.ccc.ddd:6400 or
 "ATD*a+b+c+d+p" into a.b.c.d:p.

1.0rc12-ssv6:

"AT&K3" has set RTSCTS+XON/XOFF, instead RTSCTS only. To use RTSCTS in older versions please do not send "&K3".
 Simple do not change, because handshake RTSCTS is default.
 "ATI3" answers software version, "1.0rc12-ssv6" in this case.

5 HELPFUL LITERATURE

- http://en.wikipedia.org/wiki/Hayes_command_set (Hayes command set)
- http://www.messagestick.net/modem/Hayes_Ch1-3.html (S register listing)
- <http://support.microsoft.com/kb/164660> (AT command overview)

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|----------|------------|---------------|------|--------|
| 1.0 | 2016-03-03 | first version | WBU | HNE |

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