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Telnet Remote Serial Port (RSP) Option

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Abstract

Many (if not all) terminal servers support the ability to set up a telnet listener on a serial port. This allows a connection to a port to be made via the network, however only (two way) data can be transferred between the client and the port.

By using the Remote Serial Port (RSP) telnet option, the client is able to control non-data aspects of the port such as baud rate and modem signals. This is especially important where the port is attached to a modem and modem signals are required to hangup the modem.

This document defines a simple protocol which allows terminal servers (and other systems which provide access to serial ports via a network connection) to provide access to these features.

1. Command Name and Code

RSP 43

2. Command Meanings

IAC WILL RSP

Sender is willing to send RSP information in a subsequent sub-negotiation.

IAC WON'T RSP

Sender refuses to send RSP information.

IAC DO RSP

Sender is willing to receive RSP information in a subsequent sub-negotiation.

IAC DON'T RSP

Sender refuses to accept RSP information.

IAC SB RSP SEND IAC SE IAC SB RSP SEND item1 item2 ... IAC SE

Client requests server to transmit the current state of the given item(s). The code for SEND is 1. If no items are given, the server is requested to return all known items.
(See below for valid 'item's')

IAC SB RSP IS item1 value1 item2 value2 ... IAC SE

Server states the current value of the given items. May be in response to SEND, or may be due to a change in the value of the items. The code for IS is 0.
(See below for valid 'item's')

IAC SB RSP SET item1 value1 item2 value2 IAC SE

Client requests that the server sets the value of 'item1' to 'value1' etc. The code for SET is 2.
(See below for valid 'item's')

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2.1. Valid RSP items

MSR 0

8250-compatible modem status register

Value is 32 bit value in network byte order, with msr in the least significant 8 bits.

Bit 0 Delta Clear to Send
Indicates the -CTS input signal has changed state since the last time it was read.

Bit 1 Delta Data Set Ready
Indicates the -DSR input signal has changed state since the last time it was read.

Bit 2 Trailing Edge Ring Indicator
Indicates the -RI input signal has changed from an active condition to an inactive condition.

Bit 3 Delta Data Carrier Detect
Indicates the -DCD input signal has changed state since the last time it was read.

Bit 4 Clear to Send
Current state of the CTS input signal.

Bit 5 Data Set Ready
Current state of the DSR input signal.

Bit 6 Ring Indicator
Current state of the RI input signal.

Bit 7 Data Carrier Detect
Current state of the DCD input signal.

BAUD-RATE 1

Baud rate Value is 32 bit number in network byte order. The value 0 is used to represent "unknown".

STOP-BITS 2

Stop bits

Value is 32 bit number in network byte order, where 0 represents 1 1/2.

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DATA-BITS 3

Data bits in a character

Value is 32 bit number in network byte order.

PARITY 4

Parity of characters

Value is 32 bit number in network byte order with one of the following values.

NONE 0

ODD 1

EVEN 2

MARK 3

SPACE 4

DTR 5

State of DTR

Value is a 32 bit number in network byte order with one of the following values.

OFF 0

ON 1

RTS 6

State of RTS

Value is a 32 bit number in network byte order with one of the following values.

OFF 0

ON 1

TXBUFFER 7

Characters in the the transmit buffer

Value is a 32 bit number in network byte order which is the current number of characters in the transmit buffer, 0 implies the buffer is empty.

FLOW-CONTROL 8

Input and output flow control setting.

Value is a 32 bit number in network byte order which represents a bit mask. The bitmask may contain any combination of the following values.

RTSFLOW 1 (Input flow control - drop RTS to stop receiving)

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CTSFLOW	2	(Output flow control - stop transmitting when CTS drops)
IXON	4	(Output flow control - start/stop sending on XON/XOFF)
IXOFF	8	(Input flow control - send XON/XOFF to start/stop receiving)
DCDFLOW	16	(Output flow control - stop transmitting when DCD drops)
DTRFLOW	32	(Input flow control - drop DTR to stop receiving)
DSRFLOW	64	(Output flow control - stop transmitting when DSR drops)

TXBREAK 9

State of TX Break

Value is a 32 bit number in network byte order with one of the following values.

OFF	0	(Normal state)
ON	1	(Transmit Break)

RXBREAK 10

State of RX Break

Value is a 32 bit number in network byte order with one of the following values.

OFF	0	(Normal state - not receiving break)
ON	1	(Currently receiving Break)

SEND-CHANGED 32

Specifies which items, if any, for which the server should send values when the value of the item changes.

Value is a 32 bit number in network byte order which represents a bit mask. If a bit is 1, then the server should send the value for that item immediately and any time it subsequently changes, and if it is a 0, it should send the value only upon request. For example, if 0x00000001 is set as a value for SEND-CHANGED, then the server should send the value for MSR immediately and then whenever that value changes.

PURGE 33

Purges receive and/or transmit queues.

Value is a 32 bit number in network byte order with one of the following values.

RX-QUEUE	1
TX-QUEUE	2

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RXTX-QUEUE 3 (Purge both the RX and TX queues)

3. Default Specification

WON'T RSP
DON'T RSP

RSP information will not be exchanged.

SEND-CHANGED 0

Server only sends updated information as requested.

4. Motivation

The Remote Serial Port telnet option allows a telnet client of a physical serial port to control non-data attributes of the port, such as baud rate, parity and output modem signal state.

5. Description of the Option

Willingness to exchange RSP information is agreed upon via conventional Telnet option negotiation. WILL and DO are used only to obtain and grant permission for future discussion. The actual exchange of status information occurs within option subcommands (IAC SB RSP...).

Once the two hosts have exchanged a WILL and a DO, the sender of the DO RSP (the client) is free to request and set RSP information. A successful DO RSP is required before SEND and SET requests can be used by the client and IS responses can be sent by the server. The negotiation indicates acceptance in one direction only. (It would generally not be appropriate to negotiate the RSP option in both directions).

All RSP items are 1 octet in length and all RSP values are 32 bit values in network byte order. This allows multiple items or multiple {item, value} pairs to be specified in a single request or response without requiring that all items be understood by the recipient.

Note that any occurrence of the octet IAC within an RSP item must be escaped.

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6. Implementation Issues

This specification allows for various items to be set or requested by a client. Support for all items is optional. Also it may be inappropriate to set or send a given item at any time. Thus, a server responds to requests as follows.

When a server receives a SET request, it should immediately make the change for each item in the list. If any item is not supported, not understood or not appropriate (doesn't make sense or the value is inappropriate), that item is ignored. All items in a request are independent. That is, if one item fails, then the remaining items in the request should continue to be processed.

Similarly, when a server receives a SEND request, it should respond with an IS request for each item in the SEND request which is understood and makes sense. Other items are ignored.

No response is sent by the server as a result of a SET request. It is the responsibility of the client to issue a SEND request if it wishes to determine whether a SET request has succeeded.

SEND-CHANGED is an item like any other including the fact that support for it is optional. If it is supported, an IS request is sent by the server to the client whenever the value for an item changes value spontaneously (that is, other than in response to a SET request) for which a 1 bit is set in the SEND-CHANGED value.

Note: No requirements are placed on the server in determining how soon after the change occurs that the IS request should be sent. This allows a server to combine multiple changes into a single request if multiple changes occur within a short time of one another. Also, a server may choose to delay sending of an IS request if the value of an item changes very quickly to avoid flooding the connection. Every change of an item need not be (and should not be) sent in these circumstances. Rather, only the "last" change should be sent.

Note: Only changes to the first 32 RSP items are supported by SEND-CHANGED. This should be sufficient for all realistic implementations of remote serial ports.

7. Examples

Note: In these examples, the C notation, 0x, is used to denote a hexadecimal number.

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In this example, the client gets the current values for all items known by the server.

Client: IAC DO RSP

Server: IAC WILL RSP

(Client may now request or set RSP information at any time.
Server is SEND-CHANGED 0)

Client: IAC SB RSP SEND IAC SE

Server: IAC SB RSP IS SEND-CHANGED 0 MSR 0x00 DTR ON BAUD-RATE
9600 IAC SE

In this example, the client turns on SEND-CHANGED and checks to see if it is supported by the server. The server sends change notifications.

Client: IAC DO RSP

Server: IAC WILL RSP

Client: IAC SB RSP SET SEND-CHANGED 0x0000000F IAC SE

Client: IAC SB RSP SEND SEND-CHANGED IAC SE

Server: IAC SB RSP IS SEND-CHANGED 0x0000000F IAC SE

Server: IAC SB RSP IS MSR 0x33 IAC SE

Server: IAC SB RSP IS MSR 0x03 BAUD-RATE 38400 IAC SE

Security Considerations

Security issues are not discussed in this document.

References

- [1] Reynolds, J., and J. Postel, "Assigned Numbers", STD 2, [RFC 1700](#), USC/Information Sciences Institute, October 1994.

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