VScom NetCom Protocol Description

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1. Definition

Server:
Through out the scope of this document: remote computer, that provides serial communication ports to the outside world. This computer is unambiguously identified by its IP address and TCP or UDP port numbers.

Client:

Local computer, that accesses communication ports served by “Server”.
This computer is identified by its IP address and outbound port number.

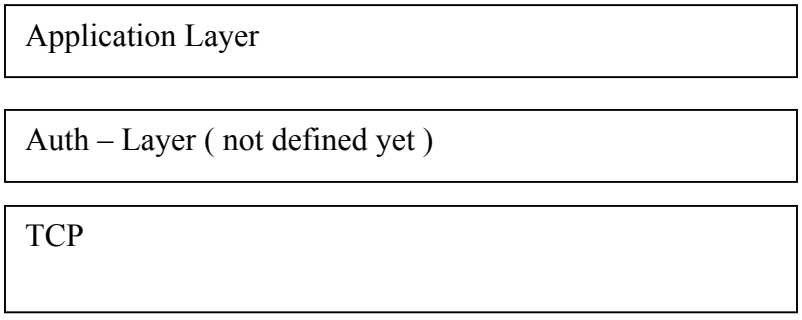
Packet:
An entity, that is send or received by communication peer. It can be split in one or many TCP/UDP packets.

Data types:

- U – Unsigned
- S - Signed
- N – Byte Stream
- R – Record
- A - Array

2. Protocol Basics

2.1 TCP Communication

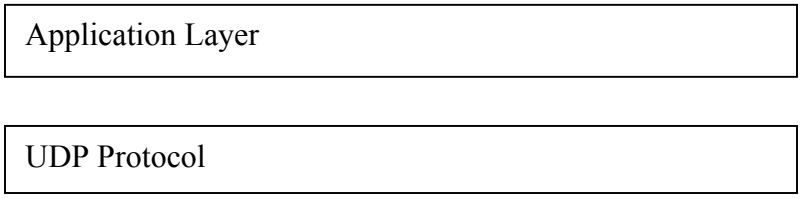


Application data is an octet stream, containing data to be sent to serial port, data received on serial port as well as commands controlling functions of client and server. The format of command will be explained later.

The server provides two TCP ports. The first one will be called “Data Port” the second “Control Port”. At the start of a session at least the data port has to be opened (“Raw Mode”). When both port are in use, the server is in “Driver Mode”. To use control commands the server must be in “Driver Mode”. In general:

1. To enter driver mode of operation the control port must be opened first.
2. Data should be send only to data port.
3. When a command was received on data port, the response must be sent also to this port, except sync command, this response should be sent to control port.
4. When a command was received on control port, the response should be sent also to this port, without exceptions.

2.2 UDP



UDP Data is sent in a frame, which is defined by the application. The definition of this frame is out of scope of this document.

2.3 Command format

General Format

Field	Length (Bytes)	Type	Value Range	Description
Escape	1	U	15	Fixed escape
Command	1	U	0-255	Command tag Bits 4 – 7 are 0000 for simple commands 0001 for auth. commands 1xxx for IOCTL command
Data	0-N	U	0-255	Command data

All numbers must be in big-endian format. Exceptions will be explicitly marked.

2.3.1 Command : Escape in Data

Data format:

Fiels	Length (Bytes)	Type	Value Range	Description
Escape	1	U	15	Fixed escape
Command	1	U	0	Escape in Data

2.3.2 Compressed Data

Data format:

Field	Length (Bytes)	Type	Value range	Description
Escape	1	U	15	Fixed escape
Command	1	U	1	Compressed Data
Reps	1	U	0-255	Repeats: 0 means 256
Datum	1	U	0-255	Data to repeat

2.3.3 Multiple Escape in Data

Data format:

Field	Length (Bytes)	Type	Value Range	Description
Escape	1	U	15	Fixed escape
Command	1	U	2	Multiple escape in Data
Reps	1	U	0-255	Repeats: 0 means 256.

2.3.4 IOCTL Packets

IOCTL packets have following general format:

Field	Length (Bytes)	Type	Value range	Description
Escape	1	U	15	Escape
Command	1	U	128-255	Bit 7 set

				Bit 6 cleared for REQ Bit 6 set for RESP Bit 0-5 IOCTL
Data	0..N	U		Command specific

Following description contain only data part of IOCTL command. If no data follows name of the command, no data was defined for this command.

IOCTL_MI_SRV_RESET_PORT 0

IOCTL_MI_SRV_GETMODEL_INFO 1

IOCTL_MI_SRV_GETMODEL_INFO_ACK 65
(for data description see SET_MODEL_INFO)

IOCTL_MI_SRV_SETMODEL_INFO 2
Data :

Field	Length (Bytes)	Type	Value range	Description
Version	2	U	1-65535	Version of info
Model	2	U		Model tag: 0 - unknown 1 – UART 8250 2 – 16450 3 – 16550 4 – 16650 5 – 16750 6 – 16850 7 – 16C950 0x400 – SPP 0x401 – PS2 0x402 – EPP 0x403 – ECP 0x800 – Use Memory IO (hier irrelevant)
Info	See below			Additional model specific data

Info for serial ports:

Feield	Length	Type	Value range	Description
RxFifoLength	2	U	1-65535	Length of receive FIFO

RxTriggerLevel	2	U	1-65535	Trigger Level
TxFifoLength	2	U	1-65535	Max. Length of data being send in one packet.
TxTriggerLevel	2	U	1-65535	Hardware dependant.
AutoFunc	2	U	Bit field	Bit 0- Auto CTS Bit 1 – Auto RTS Bit 2 – Auto DSR Bit 3-4 Auto DTR Kind : 0 none 1 Triggered 2 RS485 low 3 RS485 high Bit 5 Tx XON/XOFF Bit 6 Rx XON/XOFF
XON Level	2	U	1-65535	XON: when the number of bytes queued falls below this number, allow receiver again.
XOFF Level	2	U	1-65535	XOFF when this number of byte queued is above this number, stop receiver
RTS on Level	2	U	1-65535	RTS meaning similar to XON/XOFF
RTS off level	2	U	1-65535	RTS meaning similar to XON/XOFF
DTR on Level	2	U	1-65535	DTR meaning similar to XON/XOFF
DTR off Level	2	U	1-65535	DTR meaning similar to XON/XOFF
TxXON	1	U	0-255	XON character to be sent, to re-enable peer's output
TxXOFF	1	U	0-255	XOFF character to be sent to stop the peer's output
RxXON	1	U	0-255	XON character sent by the peer to re-enable out output
RxXOFF	1	U	0-255	XOFF character sent by the peer to stop out output

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IOCTL_MI_SRV_GET_FIFO_GEOMETRY 3
IOCTL_MI_SRV_GET_FIFO_GEOMETRY (RESP) 67
(see IOCTL_MI_SRV_SET_FIFO_GEOMETRY)
IOCTL_MI_SRV_SET_FIFO_GEOMETRY 4

Field	Length (Bytes)	Type	Value	Description
RxFifoLength	2	U	1-65535	Receive FIFO length
RxFifoWidth	2	U	1-65535	Receive FIFO width
TxFifoLength	2	U	1-65535	Transmit FIFO length
TxFifoWidth	2	U	1-65535	Transmit FIFO width

IOCTL_MI_DEV_GETSTATUS_WORD 5
IOCTL_MI_DEV_GETSTATUS_WORD(RESP) 69

Field	Length	Type	Value range	Description
Bytes sent	4	U	0-0xffffffff	Total bytes sent
LSR	1	U	Bit field	Value in line status register , refer to description of 16550
MSR	1	U	Bit field	Value in modem status register, see 16550

IOCTL_MI_DEV_MODEM_CONTROL 6

Field	Length	Type	Value Range	Description
WhatBit	1	U	0-255	Mask telling witch bits in State field should be used: Bit 0 DTR Bit 1 RTS Bit 2 Break signal
State	1	U	0-255	State to be used Bit 0 – DTR Bit 1 – DSR Bit 2 – BRK

IOCTL_MI_DEV_SET_LINECONTROL 7
(see GET_LINE_CONTROL_RESP for data)

IOCTL_MI_DEV_GET_LINECONTROL 8
IOCTL_MI_DEV_GET_LINECONTROL(RESP) 72

Field	Length	Type	Value	Description
Baud rate	4	U	0-0xffffffff	Numerical value of used baud rate in bps
DataBits	1	U	5-8	Valid data bits
StopBits	1	U	0-2	Valid stop bits 0 – 1 1 – 1.5 2 – 2
Parity	1	U	0-4	0 – Parity none 1 – Odd 2 – Even 3 – Mark

				4 – Space

IOCTL_MI_DEV_SYNC 9

Field	Length	Type	Value	Description
Sync mark	1	U	0-255	Opaque

IOCTL_MI_DEV_SYNC(RESP) 73

Field	Length	Type	Value	Description
Sync mark	1	U	0-255	Copied from sync. request

IOCTL_MI_DEV_FINISH 74

Sent as an event from server to client, after all changes on the interface were reported. The application can use this to report combined event to it clients.

IOCTL_MI_DEV_LINESTATUS 75

Field	Length	Type	Value	Description
Status	1	U	0-255	Line status as for 16550

IOCTL_MI_DEV_MODEMSTATUS 76

Field	Length	Type	Value	Description
Status	1	U	0-255	Modem status as for 16550

IOCTL_MI_DEV_EXTENDED 77

Extended event.

Field	Length	Type	Values	Description
Extended Status		U	0-0xffffffff	See Microsoft VComm definition

IOCTL_MI_SRV_GET_PROTOCOL_INFO 30
IOCTL_MI_SRV_GET_PROTOCOL_INFO (RESP) 94

Field	Length	Type	Value	Description
Major	1	U	0-255	Major protocol version
Minor	1	U	0-255	Minor protocol version
Len	1	U	0-59	Length of additional data following this byte. Currently 0 or 1.
Data	0-59	U	0-255	Optional data

Optional data:
Byte 1 : Bit 0 – Remote Flow Control possible
Bit 1-6 Limits counter as in GetModelInfo
Xon, Xoff, RTSon, RTSoff, DTRon,DTRoff.

IOCTL_MI_DEV_FLOW_STATE 31
IOCTL_MI_DEV_FLOW_STATE(RESP) 95

Field	Length	Type	Values	Description
Status	1	U	0-0xff	Bit mask : 0 : Xout – on/off 1 : Cts hold on/off 2: Dsr hold on/off 3: DCD hold on/off 4 : Xin – on/off 5 : Rts hold on/off 6: Dtr hold on/off 7: Write bit

This command is defined only for protocol version higher than 1.00

If bit 7 is 0:
If bits 0-3 are some ones, it means : “I don’t send because the peer signalled condition explained by this bit”. For bits 4 through 6 means “I don’t like to receive anything, because of what the bit explains”
Bit 7 set to one, means a “simulated condition”:
If one of 0-3 is set means: simulate appropriate signal as if it would be sent by the peer
If one of 4-6 is set, force an appropriate action.
If the bit 7 is 0, the bits in a request, bits 0-6 are ignored and a response of the form described before is generated. A response packed can be also sent (event packet) if the server takes an action due to its internal settings.

IOCTL_REJECT 127

Field	Length	Type	Value	Description
What	1	U	0-255	Rejected command

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3. Server Query

Server query is used to collect information about target server. It is accomplished using SNMP packets sent via UDP. The UDP packet can be a unicast or broadcast packet. SNMP managed objects are described in MIB data file and are not subject of this document.

4. Open problems

A possible problem is caused by following commands order:
GetStatusWord
ModemControl

The problem is caused by modem lines, that have changed after the first packet was sent and the answer to the packet arrived. The msr status arrives vie data channel, and the response for GetStatusWord via control port. Therefore the response contains information that was recorded before ModemControl but will be read by the client probably after events from modem were received. Therefore it is possible that the current status will be overwritten by the old one. A work around can be realized by following command ordering:

GetStatusWord
ModemControl
GetStatusWord