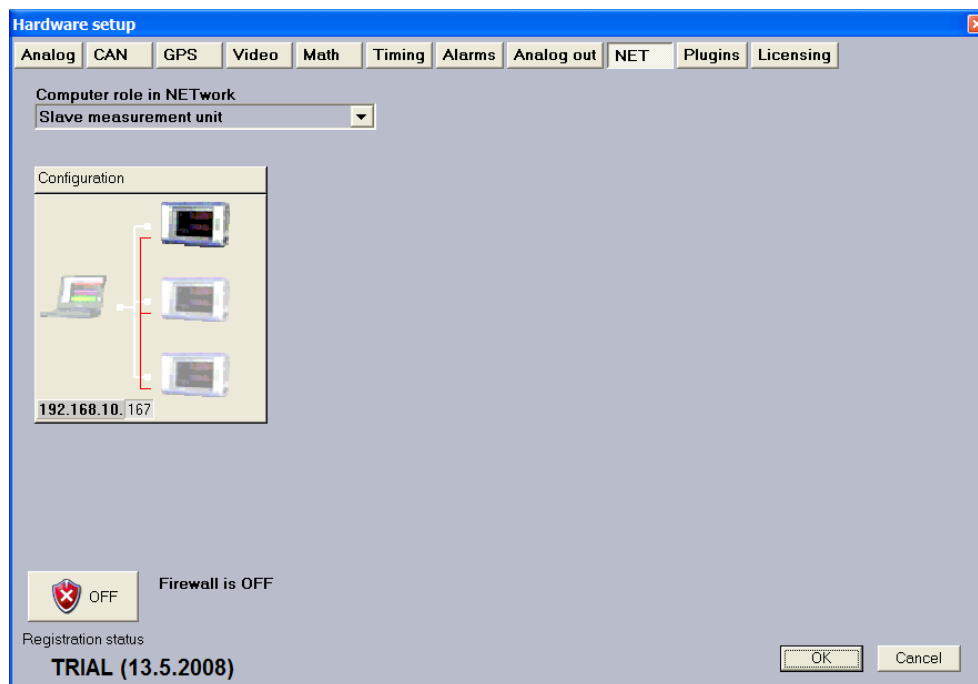


## DEWESoft NET interface

DEWESoft NET interface uses standard TCP/IP sockets for communication between measurement unit and client. DEWESoft on measurement unit needs to be preconfigured before client can connect to it.

### Measurement unit configuration

When DEWESoft measurement unit is set to »Slave measurement unit« mode, it starts to listen for incoming connections on TCP port number 8999. This needs to be done only the first time dewesoft is started. After that DEWESoft will remember »Slave measurement mode« every time it is started.



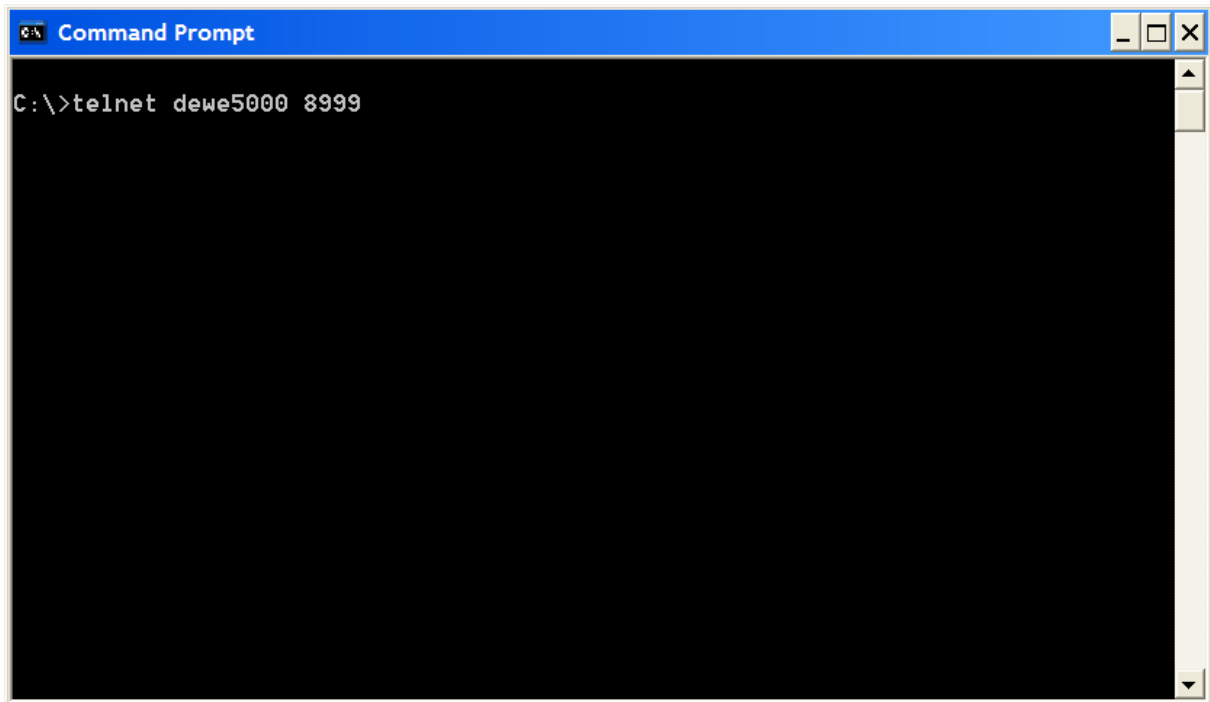
Picture 1: Hardware setup of measurement unit set to »Slave measurement unit«

If firewall is used on measurement unit it is important to either open port number 8999 for incoming connections or simply disable the firewall. If client software communicates with measurement unit through a router then firewall on the router also needs to be properly configured.

### Client configuration

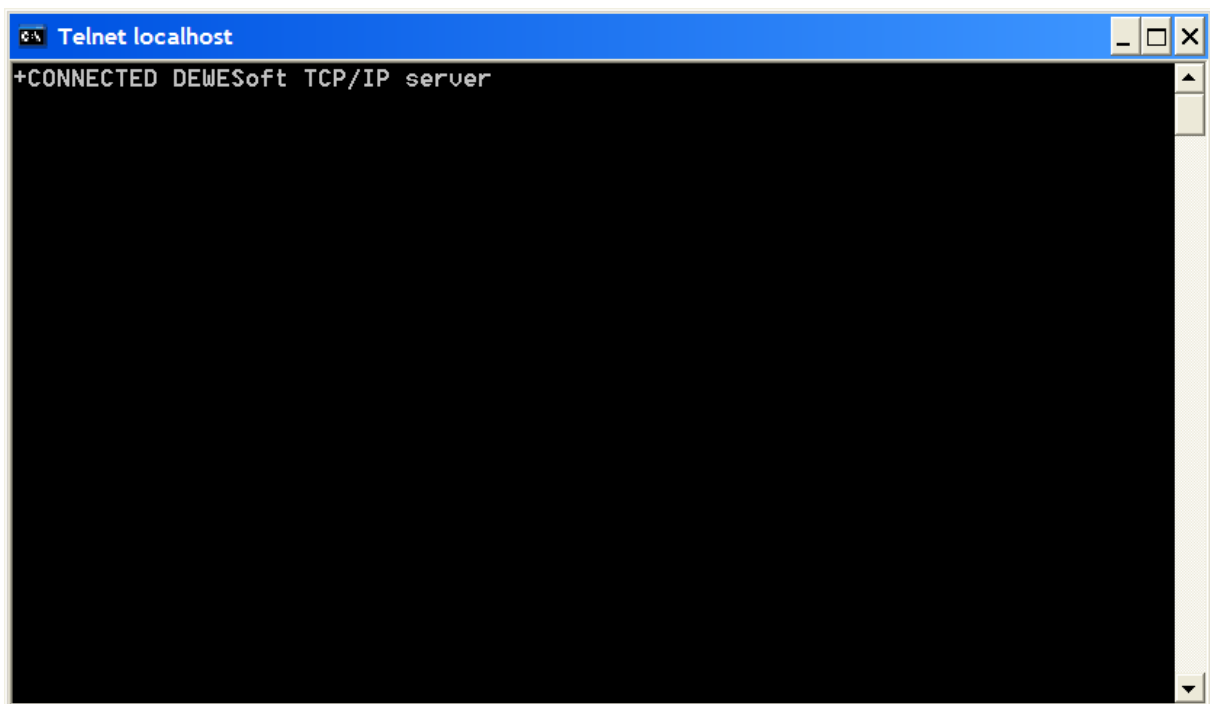
The thinnest possible client is a simple telnet software which comes with most Operating systems (Windows, Linux, etc...).

To connect to DEWESoft on measurement unit in MS Windows simply enter »telnet computername 8999« in command prompt. »Computername« is either DNS name or IP address. In Windows you can also use NETBIOS computer names, since NETBIOS names are resolved to DNS/IP names (only inside LAN).



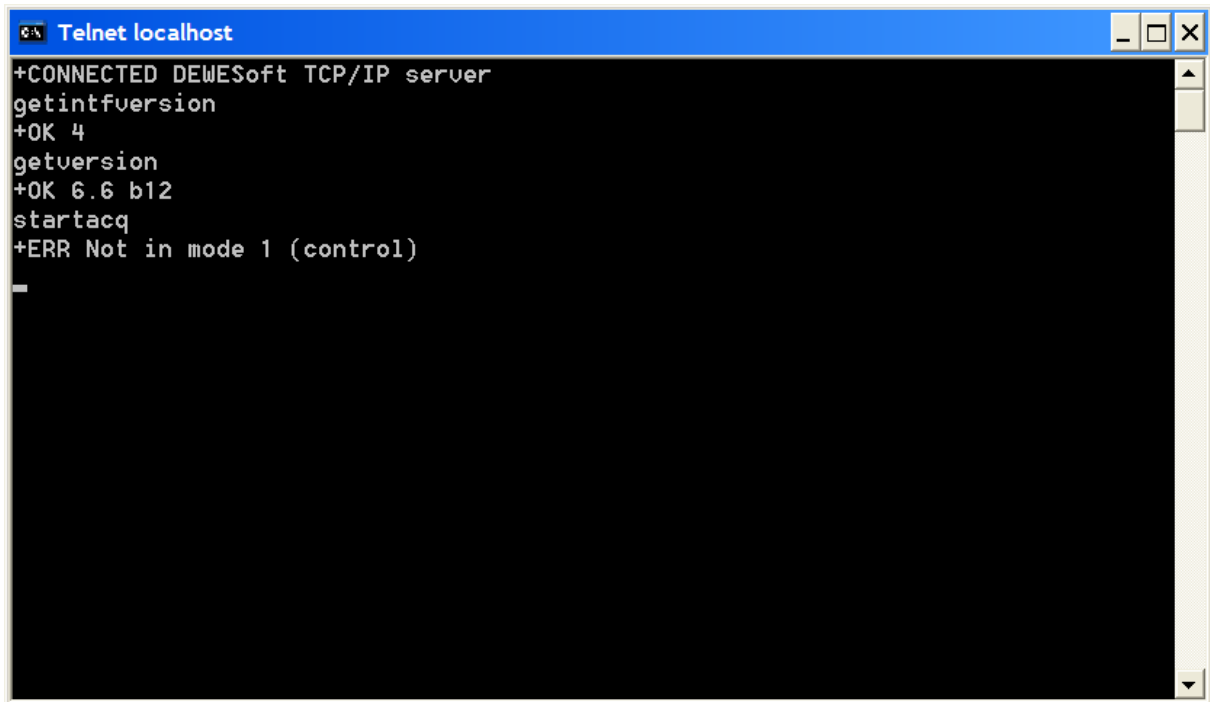
*Picture 2: Connecting with telnet to Dewesoft on measurement unit DEWE5000*

If connection is successful, DEWESoft will respond with a welcome message.



*Picture 3: Welcome message after successful connect*

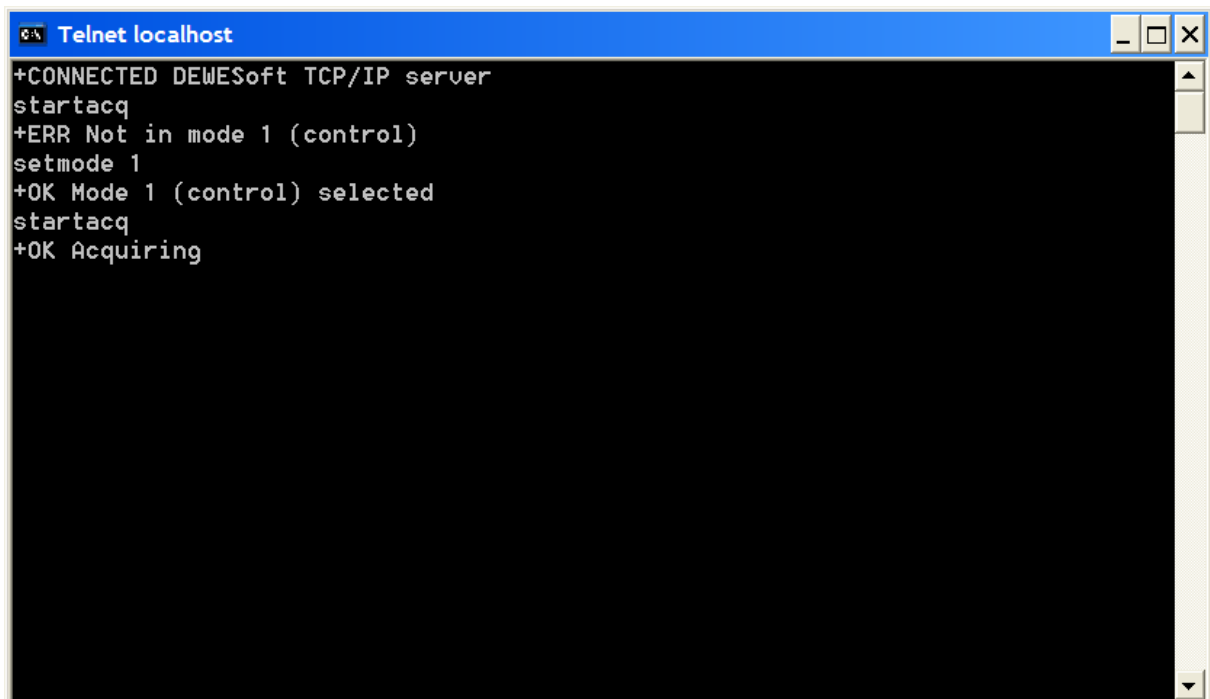
A client application can check if it is really connected to DEWESoft if a welcome message starts with »+CONNECTED«. After that client software can send requests to DEWESoft. DEWESoft will respond to most requests with either »+OK message« meaning request accepted or »+ERR message« meaning request denied.



```
Telnet localhost
+CONNECTED DEWESoft TCP/IP server
getintfversion
+OK 4
getversion
+OK 6.6 b12
startacq
+ERR Not in mode 1 (control)
-
```

Picture 4: Example of request and response

DEWESoft NET client operates in either of two modes: CONTROL mode or VIEW mode. When client connects to measurement unit it is set to VIEW mode. When operating in view mode, client can only issue request which do not alter the state of DEWESoft on measurement unit, e.g., it cannot start or stop acquisition, load a setup, etc. However, it can issue requests which only return the state of DEWESoft and it can also capture live data measurement unit (only if acquisition is already running).



```
Telnet localhost
+CONNECTED DEWESoft TCP/IP server
startacq
+ERR Not in mode 1 (control)
setmode 1
+OK Mode 1 (control) selected
startacq
+OK Acquiring
```

Picture 5: starting DEWESoft acquisition on measurement unit. When in view mode it is not possible to start acquisition. Client needs to switch to CONTROL mode first.

If client software needs full control of Dewesoft, it needs to switch to CONTROL mode. It does this with sending »SETMODE 1« request. Only one client at a time can operate in CONTROL mode. If a another client is already connected to DEWESoft in CONTROL mode, »SETMODE 1« request will fail. Client can switch back to VIEW mode with »SETMODE 0« command. Unlimited number of clients can be connected in VIEW mode.

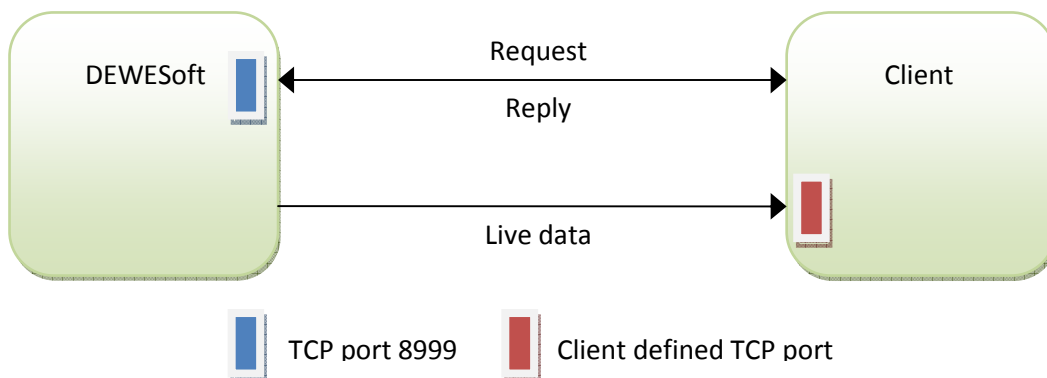
## Capturing live data from measurement unit

The first thing to do is to send a list channels to DEWESoft which will be transferred over network. Client can read a list of available channels with »LISTUSEDCHS« command. Multiline response from DEWESoft is always enclosed inside »+STX« and »+ETX«.

```

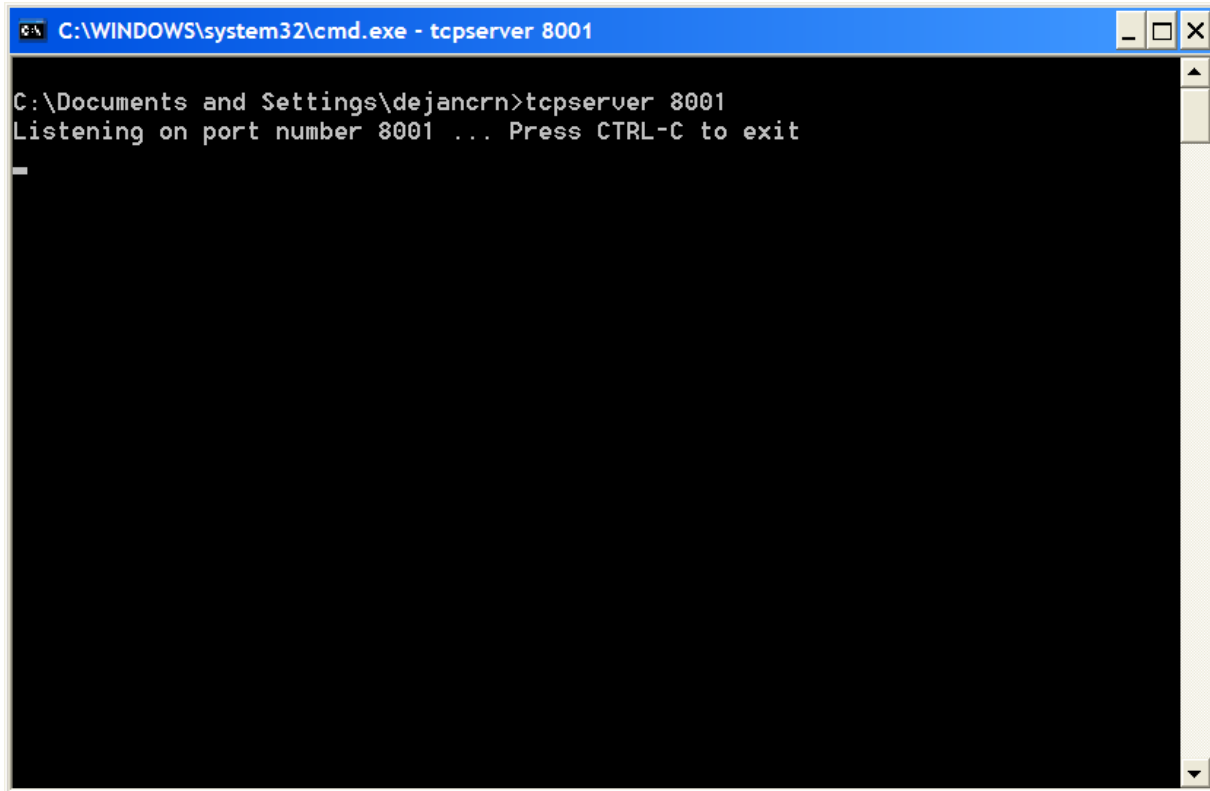
Telnet localhost
+CONNECTED DEWESoft TCP/IP server
listusw
+ERR Unknown command
listusedchs
+STX listing channels
CH    0      AI 0    -      1      0      2      200000  1      0
0,000152587890625    0      AI 0    Direct ()    -5      5      0
-4,10187      4,23813  0,0601337
CH    1      AI 1    -      1      0      2      200000  1      0
0,000152587890625    0      AI 1    Direct ()    -5      5      0
-4,81873      4,9379   0,062616
CH    2      AI 2    -      1      0      2      200000  1      0
0,000152587890625    0      AI 2    Direct ()    -5      5      0
-4,70978      4,81567  0,0589279
CH    3      AI 3    -      1      0      2      200000  1      0
0,000152587890625    0      AI 3    Direct ()    -5      5      0
-1,88736      2,02682  0,0602664
CH    4      Formula 0    -      1      0      5      200000  1
0      1      0      Math 0 (Formula)    'AI 0' -5      5      0
-4,10187      4,23813  0,0601337
+ETX end list
  
```

Picture 6: listing of available channels. 5 channels are available for transfer



Picture 7: request/reply and data communication

When capturing data from unit, additional TCP data port is needed. However, it is clients responsibility to open the data port. Before live capture starts, client should open one data port which will be used for data transfer. After that, client sends request »STARTTRANSFER portnumber« and DEWESoft measurement unit will try to connect to data port on client computer. If connection is successfull and DEWESoft is in acquisition mode, it will burst data to client through binary data port. The format of binary data is described later in this document. TCPServer.Exe attached with document is an example of TCP/IP server which dumps incoming data to console. It is started with »TCPServer portnumber« in command line.



```
C:\WINDOWS\system32\cmd.exe - tcpserver 8001
C:\Documents and Settings\dejancrn>tcpserver 8001
Listening on port number 8001 ... Press CTRL-C to exit
```

*Picture 8: starting TCP server on port 8001 on client computer. Port num. can be different than 8001*

After that client should send a request »PREPARETRANSFER« with a list of channels it wants to capture. Multiline input should be enclosed in »/STX« and »/ETX«



## Command reference (DEWESoft NET protocol version 4)

Each command has to have New line suffix (0x13 + 0x10). Commands in **red color** only can only be sent in control mode.

### GETVERSION

returns DEWESoft version

### GETINTFVERSION

returns DEWESoft NET protocol version

### GETDATETIME

returns current time on measurement unit

### GETMODE

returns current operation mode (control or view)

### SETMODE mode

sets operation mode

mode parameter

0 – view mode

1 – control mode

### **SETSAMPLERATE samplerate**

sets sampling rate

samplerate parameter

sample rate in Hz

### GETSAMPLERATE

reads current sample rate

### LISTUSEDCHS

lists all used channels

### PREPARETRANSFER

sends a list of channels for live capture. Channels can only be selected from used channel

syntax:

/stx preparetransfer

ch 0

.

.

ch x

/etx

### STARTTRANSFER portno

requests DEWESoft to connect to port »portno« and feed data to client

portno parameter  
TCP port number on client computer

#### **STOPTRANSFER**

stops transfer

#### **STARTACQ**

start acquisition – measure (more suitable name would be STARTMEASURE)

#### **STOP**

stop acquisition / leave setup mode and go to start screen

#### **STARTSTORE**

starts storing, also starts acquisition if not yet started

#### **ENTERSETUP**

enter setup mode / start acquisition in setup mode

#### **ISACQUIRING**

returns »Yes« if acquisition is in progress (measure or setup), otherwise »No«

#### **ISSETUPMODE**

returns »Yes« if in setup mode, otherwise »No«

#### **ISSTORING**

returns »Yes« if in storing is in progress, otherwise »No«

#### **ISMEASURING**

returns »Yes« if acquisition is in progress (measure), otherwise »No«

#### **GETSTATUS**

returns DEWESoft status (measure/analyse mode, clock mode)

#### **SETFULLSCREEN status**

sets or clears full screen mode of DEWESoft

status parameter

1 – full screen on

0 – full screen off

#### **SETUP CONNECT**

sets DEWESoft to full screen setup mode. Suitable for VNC remote setup of DEWESoft

#### **SETUP DISCONNECT**

Cancels setup full screen mode

#### **DISPLAY START**

sets DEWESoft to full screen display setup mode. Suitable for VNC remote setup of DEWESoft  
displays

**DISPLAY STOP**

          cancels display setup mode

**LOADSETUP filename**

          loads a setup

          filename parameter

                  setup file stored on measurement unit

**SAVESETUP filename**

          saves a setup

          filename parameter

                  setup file to be stored on measurement unit

**NEWSETUP**

          clears current DEWESoft setup

**SETSCREENSIZE screensize**

          sets DEWESoft window size in pixels

          screensize parameter

                  XsizeYSize – sets window size to Xsize x Ysize (i.e. 640x480)

                  max – maximizes window size

## Channel information

Binary data delivered to client are always raw binary data. To get information about sample data type, scaling and other important info of every channel client should send »LISTUSEDCHS« command. Response contains following info for each channel separated by tab character

Data	Description	Data type
CH	Fixed string	
Number	Consequent channel number	Integer number
Name	Channel name	Text
Unit	Measure unit	Text
Samplerate divider	Divider for sync channel, »Async« for async channels, »SingleValue« for single value channels	Integer number / text
Measurement type	Defines channel meaning	Integer number
Sample data type	0 – 8 bit unsigned integer 1 – 8 bit signed integer 2 – 16 bit signed integer 3 – 16 bit unsigned integer 4 – 32 bit signed integer 5 – Single floating point (32bit) 6 – 64 bit signed integer 7 – Double floating point (64 bit)	
Buffer size	Buffer size for data	Integer number
Custom scale	Custom scale after amplifier	Float number
Custom offset	Custom offset after amplifier	Float number
Scale raw data	Scale for raw data	Float number
Offset raw data	Offset for raw data	Float number
Description	Channel description	Text
Settings	Channel settings	Text
Range max	Range max in scaled units	Float number
Range min	Range min in scaled units	Float number

To get real scaled value, client has to apply the following formula:

$$\text{ScaledValue} = \text{ScaleRawData} * \text{RawValue} + \text{OffsetRawData}$$

Channels in data packet are delivered in the same order they are included in »PREPARE TRANSFER« command.

## Binary data format

Offset (bytes)	Length (bytes)	Data type	Description	Comment
0	8		Start packet string	0x00 0x01 0x02 0x03 0x04 0x05 0x06 0x07
8	4	Integer 32 bit	Packet size	Size in bytes without stop and start string
12	4	Integer 32 bit	Packet type	Always 0 for data packets
16	4	Integer 32 bit	Samples in packet	Number of synchronous samples per ch.
20	8	Integer 64 bit	Samples acquired so far	
28	8	Double floating point	Absolute/relative time	Number of days since 12/30/1899 Number of days since start of acq.

Off = 36 bytes,

### Repeat for each channel

If Channel is asynchronous

Offset (bytes)	Length (bytes)	Data type	Description	Comment
Off	4	4	Number of samples	= X
Off + 4	X * SampleSize	Sample data type	Data samples	
Off + 4 + X * SampleSize	X * 8	Integer 64 bit	Timestamp samples	Timestamps for samples in samples since start of acquisition

Off = Off + 4 + X \* (SampleSize + 8)

If Channel is synchronous

Offset (bytes)	Length (bytes)	Data type	Description	Comment
Off	4	4	Number of samples	= X = SamplesInPacket div Channel SR divider
Off + 4	X * SampleSize	Sample data type	Data samples	

Off = Off + 4 + X \* SampleSize

If Channel is single value

Offset (bytes)	Length (bytes)	Data type	Description	Comment
Off	4	4	Number of samples	Always 1
Off + 4	8	Double floating point	Data sample	

Off = Off + 12

### End repeat

Offset (bytes)	Length (bytes)	Data type	Description	Comment
Off	8		Stop packet string	0x07 0x06 0x05 0x04 0x03 0x02 0x01 0x00

