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## USR-TCP232-XX setting protocol

version update information

V1: to build new version

V4.3: simplify

## 1. New protocol (for the firmware v4.2 and above)

Modified on 19 October, 2012.

VR command (the example of serial port reading firmware version: send character VR, reply VR4. It means the firmware version is 4.10. Here the 10 is: ascii code value minus 0x30)

Through VR command, serial port read version shows v4.2 and above version will support the following protocol

### 1.1. Network command (for T24 series only)

Network configuration is done by UDP broadcast packets. Here must not connect CFG to GND, if connected, net config will fail.

Note: destination IP address and port as follows:

UDP broadcast destination IP 255.255.255.255, UDP local port 1500, UDP remote port 1500.

#### 1.1.1 Search device

40 bytes new protocol:

Search device: Broadcast a 40 bytes data package to network through UDP. The behind of the 28 bytes added 3 independent ID function control bit on the basis of old protocol, 4 bits subnet mask (low in the front)

Note:

1) Physically, modules in the same LAN(module IP and pc IP can in different network segment) will respond.

As follows:

| Name | length  | Instruction            | Example           |
|------|---------|------------------------|-------------------|
| MAC  | 6 Bytes | Net module MAC address | 00 CE 83 25 4D 60 |

|                         |         |  |   |
|-------------------------|---------|--|---|
| Status word             | 1Bytes  | Version, BCD code mean major and minor version number. Example: 4.2 expressed as 0x42  | 42  |
| Configuration parameter | 21Bytes | These 21 bytes is configuration parameter. All the contents are the same with <b>serial settings part in the table</b> , except the packet head and parity bit | C9 00 A8 C0 2A 20<br>07 00 A8 C0 8C 4E<br>C9 00 A8 C0 01 00<br>C2 01 03 |
| Independent ID          | 3Bytes  | ID-H,ID-L,ID-type. Fill 0 if don't use   | 00 00 00  |
| Subnet mask             | 4Bytes  | Subnet mask, low in the front, eg. 255.255.255.0   | 00 FF FF FF   |

### 1.1.2 Setting parameters

Send setup command, also 40 bytes

Command as follows:

| Name                    | length | Instruction  | Example ( Hex)  |
|-------------------------|--------|--|---|
| MAC                     | 6      | MAC address of module which need config  | 00 CE 83 25 4D<br>60  |
| Old password            | 6      | The config password of module.<br>110415 is universal password.  | 31 31 30 34 31<br>35  |
| Configuration parameter | 21     | This 21 bytes as module configuration parameter. All contents are the same with <b>serial settings part in table</b> except the packet head and parity bit | c9 00 a8 c0 2a 20<br>07 00 a8 c0 8c 4e<br>c9 00 a8 c0 01 00<br>c2 01 03 |
| Independent ID          | 3      | ID-H,ID-L,ID-type. Fill 0 if don't use   | 00 00 00  |
| Subnet mask             | 4      | Subnet mask, low in the front, eg. 255.255.255.0   | 00 FF FF FF   |

## 1.2. COM command

Get access to serial config mode, first, connect CFG to GND.

Module config command format as following table, you can also use our setup software to generate and test config word, baud rate 9600, no odd-even parity, 8 data, 1 stop: 9600,n,8, 1

No matter which baud is in previous, module will switch to 9600 in config mode, and send character U to com, to indicate module do in config mode. After receiving complete data package and check correctly, will reply K, if check incorrect, will reply E and module calculate parity bit, this bit is quite useful when test to send command manually. For other errors, for example incorrect package header or bit number, will reply only E.

**Note:** Need to release CFG to vacant or connect to VCC, to make module back to working mode ( for E45 series, release cfg (Reload) will make module saving parameters and restart)

Command package head (support E45 series serial config)

UART configuration command

55 BA - write Port 0 configuration, 55 BC -read Port 0 configuration

55 C1 - write Port 1 configuration, 55 C3-read Port 1 configuration

55 C2- write Port 2 configuration, 55 C4 -read Port 2 configuration

(The operation of port 1 and port2 is intended to -E, -400, -500)

When write port config, all data bit according to the following table; when read port config, send package header is enough. Example: send 55 BC, will read port 0 config parameters.

Data bit meaning as listed below:

| Function   | Bit | Instruction  | Example       | Hex, low in front |
|--|-----|--|---------------|-------------------|
| Packet head  | 2   | 55 BA/55 C1/55 C2/   | Packet head   | 55 BA             |
| Destination IP   | 4   | Connected target IP  | 192.168.0.201 | C9 00 A8 C0       |
| Destination port   | 2   | Connected target Port  | 8234          | 2A 20             |
| Module IP  | 4   | Module IP  | 192.168.0.7   | 07 00 A8 C0       |
| Module Port  | 2   | Module port  | 20108         | 8C 4E             |
| Gateway  | 4   | The IP address of gateway                                    | 192.168.0.201 | C9 00 A8 C0       |
| Work Mode  | 1   | 1-TCP client, 0-UOP<br>2-UDP Server,<br>3-TCP Server         | TCP Client    | 01                |
| Baud Rate  | 3   | serial port working baud rate                                | 115200        | 00 C2 01          |
| Serial parameter   | 1   | Data/ Stop/ parity bit                                       | N,8,1         | 03                |
| Independent ID   | 3   | ID-H,ID-L,ID-type<br>Please fill 0 if don't use              | Do not use    | 00 00 00          |
| Subnet Mask  | 4   | Subnet mask, low in front                                    | 255.255.255.0 | 00 FF FF FF       |
| Sum parity   | 1   | Sum check, from the destination IP to sum parity (including) | Sum check     | B9                |
| Complete command string : 55 BA C9 00 A8 C0 2A 20 07 00 A8 C0 8C 4E C9 00 A8 C0 01 00 C2 01 03 00 00 00 00 FF FF FF B9 |     |  |               |                   |

Note: Writing in 28 bits but read as 29 bits .The last bit is version number, but it can't write

Note:

1. 28 bytes when write, 29 bytes when read. The last byte is firmware version, not writable
2. TCP232-E45 series products, after serial configuration (reload pin back to high level), module will reset automatically, restart after 4s, do not pull down the Reset pin, or module will restore to factory defaults

## 2. Old Protocol

### 2.1. Serial config protocol

Get access to serial config mode, first, connect CFG to GND.

Module config command format as following table, you can also use our setup software to generate and test config word, baud rate 9600, no odd-even parity, 8 data, 1 stop: 9600,n,8,1

| Function  | Bit | Instruction  | Example       | Hex, low in front |
|---|-----|--|---------------|-------------------|
| Packet head   | 2   | 55 AA  | Packet head   | 55 AA             |
| Destination IP  | 4   | Connected target IP  | 192.168.0.201 | C9 00 A8 C0       |
| Destination port  | 2   | Connected target Port  | 8234          | 2A 20             |
| Module IP   | 4   | Module IP  | 192.168.0.7   | 07 00 A8 C0       |
| Module Port   | 2   | Module port  | 20108         | 8C 4E             |
| Gateway   | 4   | The IP address of gateway                                    | 192.168.0.201 | C9 00 A8 C0       |
| Work Mode   | 1   | 1-TCP client, 0-UOP<br>2-UDP Server,<br>3-TCP Server         | TCP Client    | 01                |
| Baud Rate   | 3   | COM working baud rate  | 115200        | 00 C2 01          |
| Serial parameter  | 1   | Data/ Stop/ Parity bit                                       | N,8,1         | 03                |
| Sum Parity  | 1   | Sum check, from the destination IP to sum parity (including) | Sum check     | BC                |
| Complete command string : 55 AA C9 00 A8 C0 2A 20 07 00 A8 C0 8C 4E C9 00 A8 C0 01 00 C2 01 03 BC |     |  |               |                   |

No matter which baud is in previous, module will switch to 9600 in config mode, and send character U to com, to indicate module do in config mode. After receiving complete data

package and check correctly, will reply K, if check incorrect, will reply E and module calculate parity bit, this bit is quite useful when test to send command manually. For other errors, for example incorrect package header or bit number, will reply only E.

#### COM read settings

In configuration mode, with the setting of 9600,n,8,1, send 2 Hex 0x55 0xBB through serial port, module will reply according to the order of setting protocol, example:

```
55 BB C9 00 A8 C0 2A 20 07 00 A8 C0 8C 4E C9 00 A8 C0 01 00 C2 01 03 BC
```

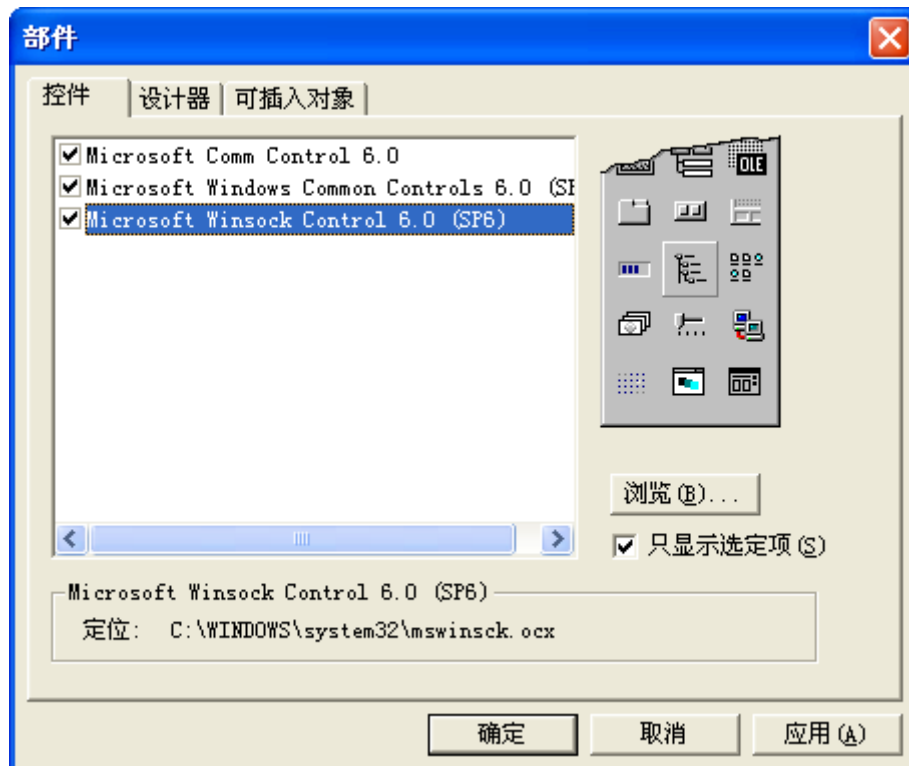
Note: Need to release CFG to vacant or connect to VCC, to make module back to working mode ( for E45 series, release cfg (Reload) will make module saving parameters and restart)

## 2.2. Net setting protocol

Network configuration is done by UDP broadcast packets. Here must not connect CFG to GND, if connected, net config will fail.



Here with the VB as an example, assume that has joined the Microsoft Win sock Control named as Win sock.



UDP setting: UDP broadcast destination IP 255.255.255.255, UDP local port 1500, UDP remote port 1500. Can use following code in Vb:

```
Winsock.Close
Winsock.RemoteHost = "255.255.255.255"
Winsock.RemotePort = "1500"
Winsock.LocalPort = "1500"
Winsock.Protocol = sckUDPProtocol
```

Search device: Broadcast a 39 bytes data package to to network through UDP. Physically, modules in the same LAN(module IP and pc IP can in different network segment) will respond.

Send data with VB:

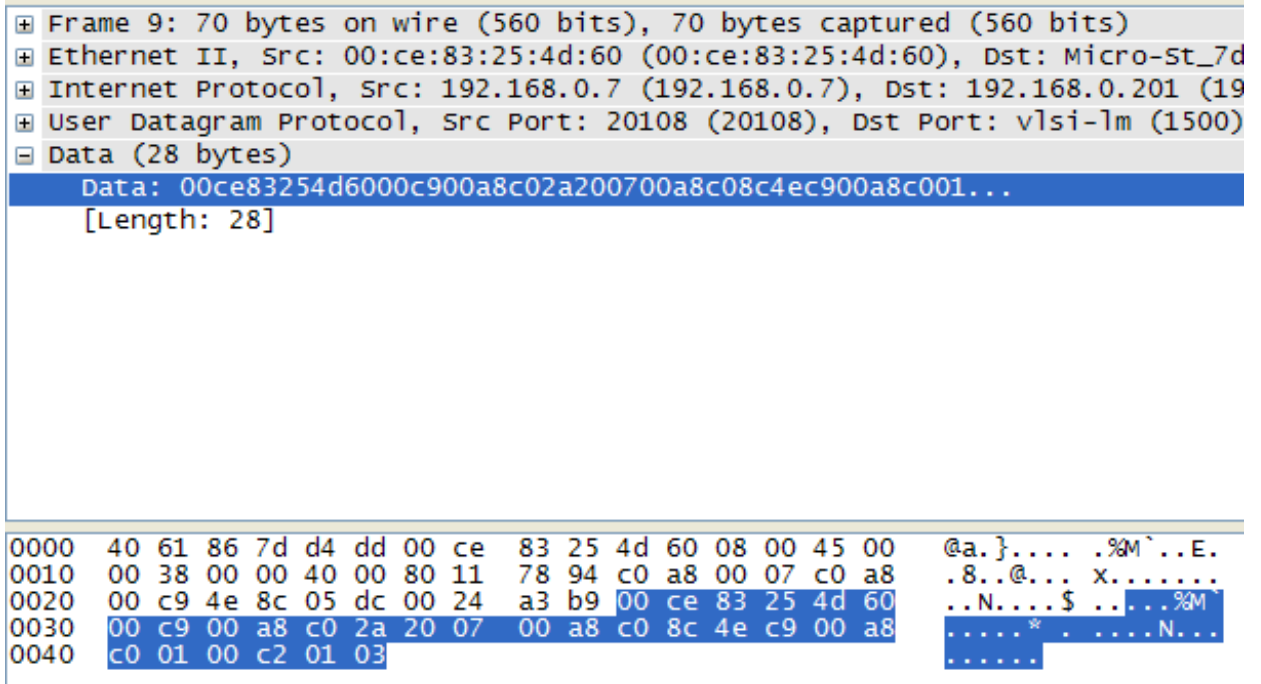
```
Win sock.Senator "123456789012345678901234567890123456789"
```

Process data: after receive 39 bytes broadcast packet, will reply 28 bytes data

| Name        | Length | Description        | Example              |
|-------------|--------|--------------------|----------------------|
| MAC         | 6      | Module MAC address | 00 CE 83 25 4D<br>60 |
| Status word | 1      | Default 0          | 00                   |

|            |    |  |  |
|------------|----|--|--|
| Parameters | 21 | Module parameters, same as serial setting table, except packet header and parity | C9 00 A8 C0 2A<br>20 07 00 A8 C0<br>8C 4E C9 00 A8<br>C0 01 00 C2 01<br>03 |
|------------|----|--|--|

Below is the Wire shark software capture packet screen shot for reference



```

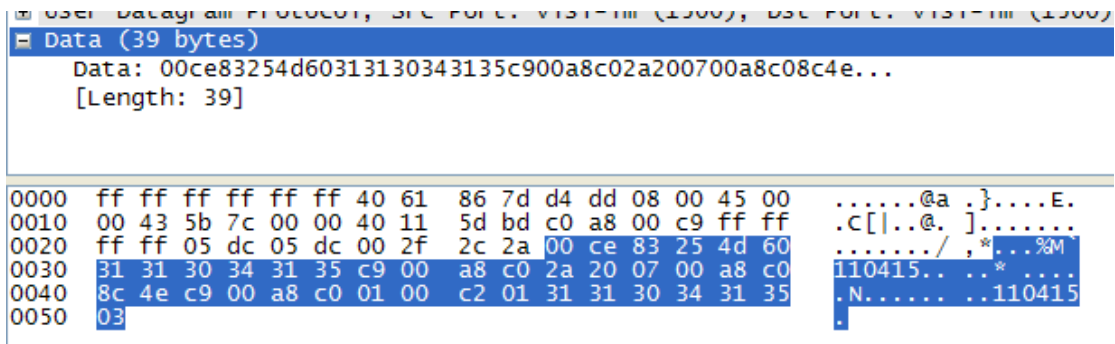
0000  40 61 86 7d d4 dd 00 ce 83 25 4d 60 08 00 45 00  @a.}. . . . .%M`..E.
0010  00 38 00 00 40 00 80 11 78 94 c0 a8 00 07 c0 a8  .8..@... x.....
0020  00 c9 4e 8c 05 dc 00 24 a3 b9 00 ce 83 25 4d 60  ..N....$ .. .%M
0030  00 c9 00 a8 c0 2a 20 07 00 a8 c0 8c 4e c9 00 a8  .....* .....N...
0040  c0 01 00 c2 01 03
    
```

Config module: with the broadcast packet with specific module MAC address, we can config module. Config data packet 39 bytes in total.

Config packet data format:

| Name               | Length | Description  | Example(Hex)  |
|--------------------|--------|--|---|
| MAC                | 6      | Module MAC address   | 00 CE 83 25 4D 60   |
| Old password       | 6      | Module config password, 110415 is universal password                                 | 31 31 30 34 31 35   |
| Parameters         | 20     | The same as COM config protocol table, except the first two bytes and last two bytes | c9 00 a8 c0 2a 20 07 00 a8 c0 8c 4e c9 00 a8 c0 01 00 c2 01 |
| New password       | 6      | If need change password, make it different with old one                              | 31 31 30 34 31 35   |
| COM parameter byte | 1      | Data/stop/parity(see enclose)  | 03  |

Following is the capture package screenshot of Wire shark for reference



```

    Data (39 bytes)
    Data: 00ce83254d60313130343135c900a8c02a200700a8c08c4e...
    [Length: 39]

    0000 ff ff ff ff ff ff 40 61 86 7d d4 dd 08 00 45 00 .....@a }....E.
    0010 00 43 5b 7c 00 00 40 11 5d bd c0 a8 00 c9 ff ff .C[!..@. ]:.....
    0020 ff ff 05 dc 05 dc 00 2f 2c 2a 00 ce 83 25 4d 60 ...../,*...%M
    0030 31 31 30 34 31 35 c9 00 a8 c0 2a 20 07 00 a8 c0 110415..*....
    0040 8c 4e c9 00 a8 c0 01 00 c2 01 31 31 30 34 31 35 .N.....110415
    0050 03 .
    
```

### Enclose: COM parameter bit description

| Bit | Instruction        | Value | Description    |
|-----|--------------------|-------|----------------|
| 1:0 | Data bit selection | 00    | 5 data bit     |
|     |                    | 01    | 6 data bit     |
|     |                    | 10    | 7 data bit     |
|     |                    | 11    | 8 data bit     |
| 2   | Stop bit           | 0     | 1 stop bit     |
|     |                    | 1     | 2 stop bit     |
| 3   | Parity enable      | 0     | Disable parity |
|     |                    | 1     | Enable parity  |
| 5:4 | Parity type        | 00    | ODD            |
|     |                    | 01    | EVEN           |
|     |                    | 10    | Mark           |
|     |                    | 11    | Clear          |
| 8:6 | No definition      | 000   | Pls write 0    |