EC900 User Manual

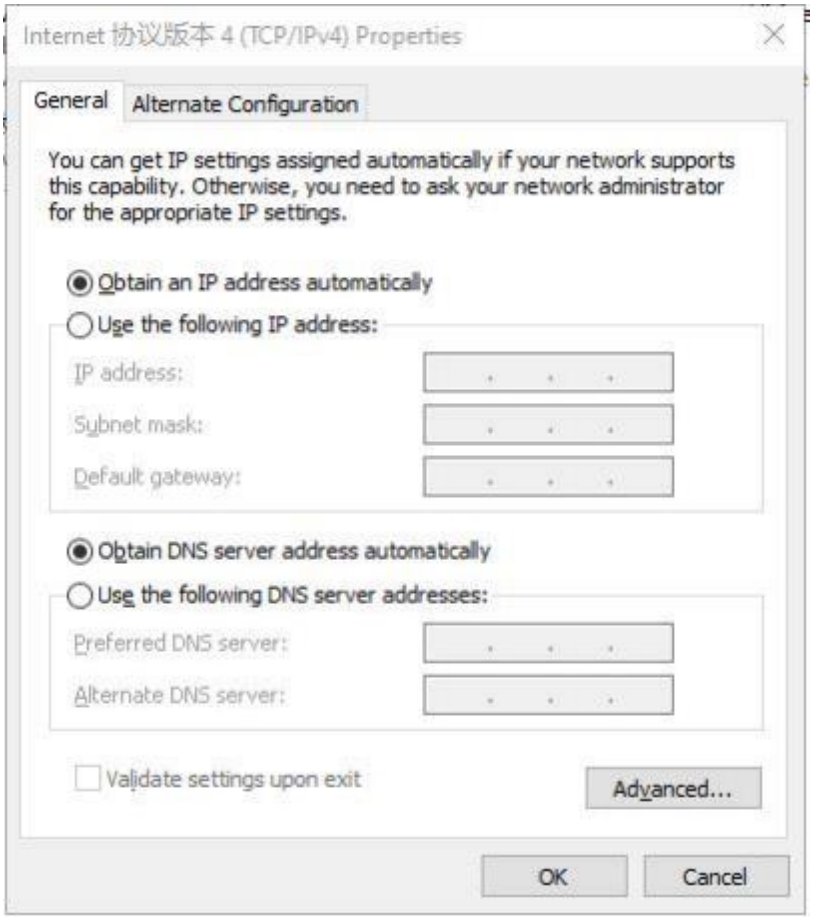
1. Production Introduction

The EC900 series edge computer(EC900) is a high performance edge computer developed for industrial IoT applications. With powerful edge computing capabilities, comprehensive security protection and wireless services, EC900 can support device networking of up to 10,000 levels, providing high-speed data channels in the true sense of device informatization. EThe EC900 is providing a powerful computing platform with an ARM Cortex-A55@2.0GHz quad-core processor and 2GB of RAM and 16GB of eMMC FLASH. Based on Debian, the EC900 provides a secondary development platform with support for C/C++/Java/Python/.Net/JavaScript,etc, which is easy for users to develop and port applications.The EC900 supports Secure Boot, TPM,etc, to ensure the security of user software and data. In addition, the EC900 provides uninterrupted Internet access for machines over ubiquitous the globally deployed LTE wireless network and a variety of broadband services.

2. Device Configuration

2.1 Access the Gateway

The default IP address of LAN1 port of EC900 is 192.168.3.100, and the default IP address of LAN2 port is 192. 168.4. 100. Set the IP address of PC in the same network segment with LAN1 port, select "Use the following IP address", enter the IP address (default is 192. 168.3.2 - 192. 168.3.254 in any value); subnet mask (default 255.255.255.0); default gateway (default 192.168.3.100) and DNS server address, click <OK>.



Using SSH commands to access the EC900 (Port 22)

```
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1  ssh edge@192 .168 .3 .100
```
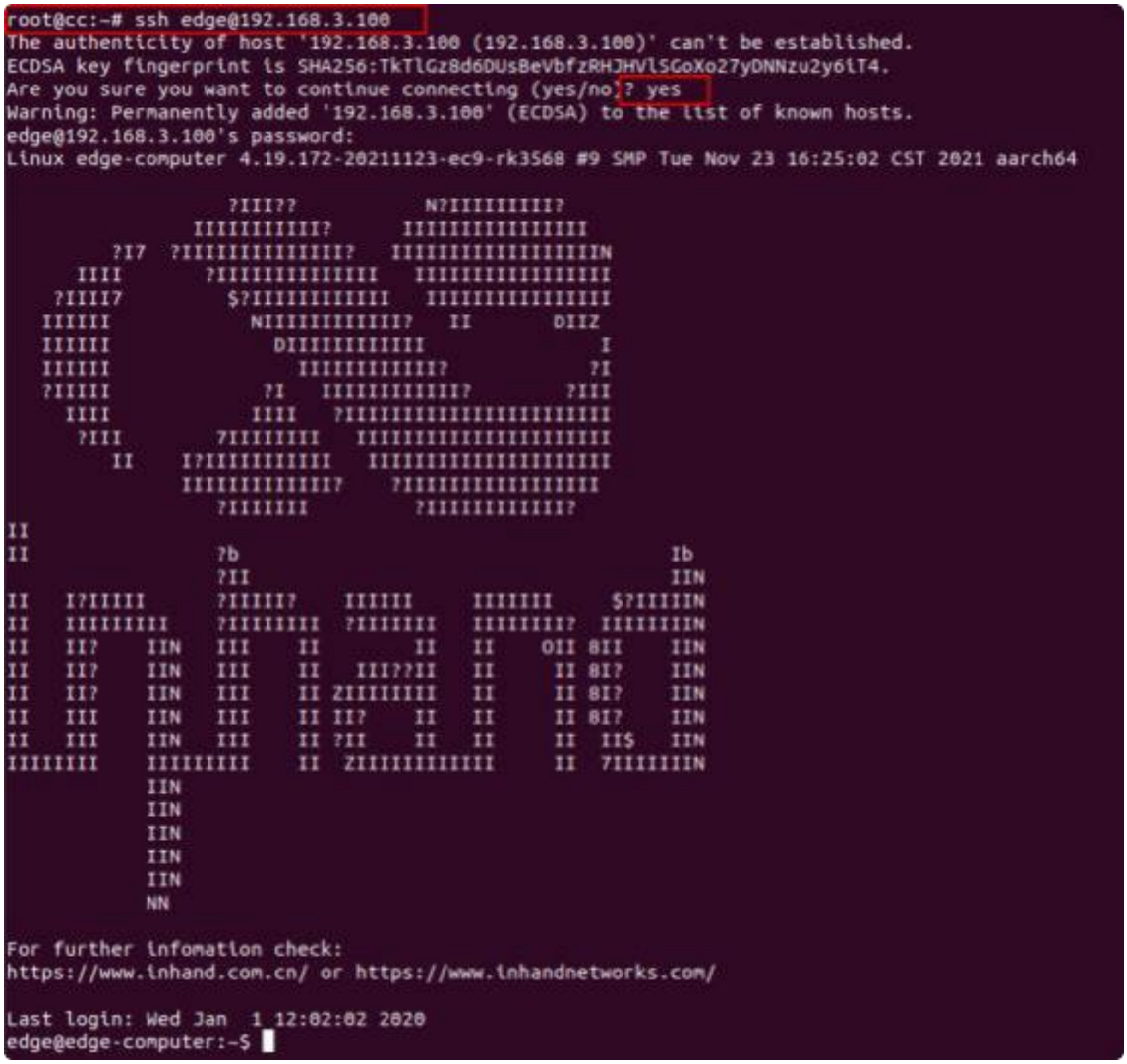

Enter the SSH password. The default factory username is **edge**, and the password is **security@edge**.



The factory setting of EC900 has created root by default, but it is not available to log in. If you need to use the root account, please modify the system configuration manually. The edge user is in the sudo user group, so you can use the sudo command to execute system-level commands.

Note: For security reasons, it is strongly recommended that you disable the default user and create your own user account.

2.2 User Account Management

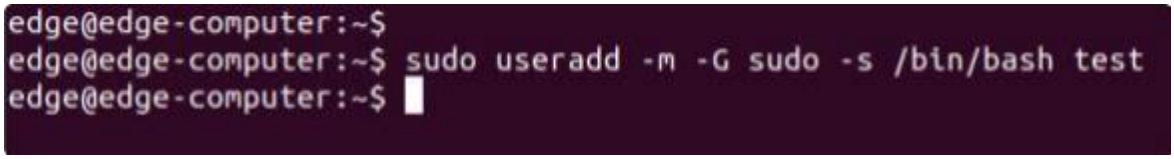
Use sudo -i (or sudo su) command to switch to the root account. For security reasons, do not operate all commands under the root account (More about sudo commands, please visit https://wiki.debian.org/sudo).

2.2.1 Registered and delete account

You can use the useradd and userdel commands to create and delete user accounts. Please refer to the main page of these commands to set the access rights for the account. The following example shows

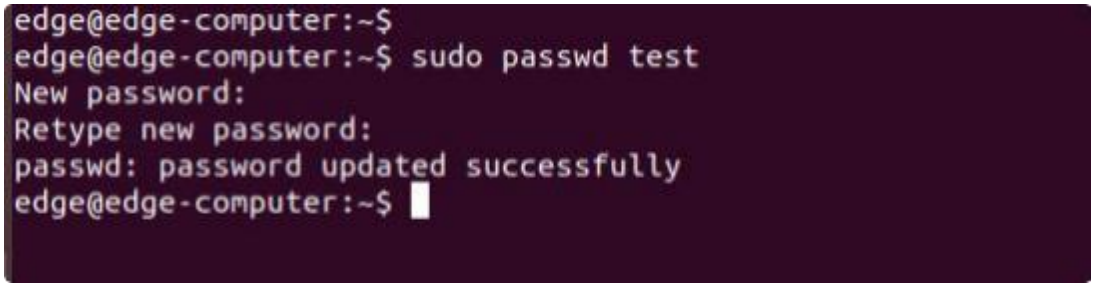
how to create a test user in a sudo group with a default login shell of bash and a home entry of /home/test.

```
sudo useradd -m -G sudo -s /bin/bash test
```



To change the password for the user name(test), use the passwd command and enter the new password, then confirm the change by re-entering the password as shown below.

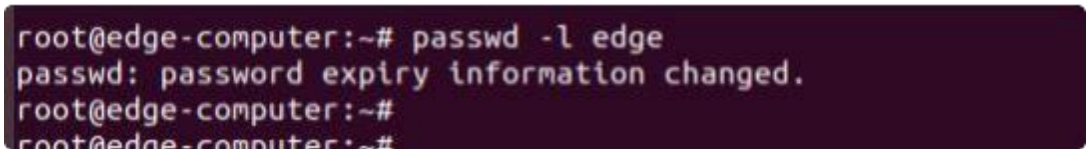
```
sudo passwd test
```



2.2.1 Disable default account

Use the passwd command to lock the default user account so that users edge cannot log in.

```
sudo -i
passwd -l edge
```



Unlock user edge:

```
passwd -u edge
```

2.3 Network Management

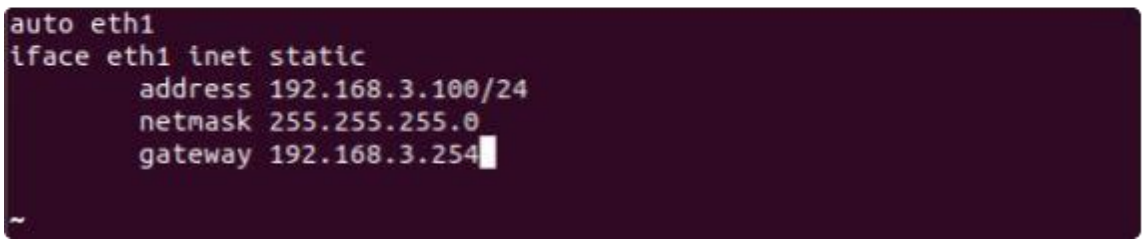
Input `cd /etc/network/interfaces .d` command to change destination .

```
cd /etc/network/interfaces.d
```

Input `sudo vim eth1` or `sudo vim eth2` to edit the network configuration file. You can configure the Ethernet port of the EC900 to use a static IP address or to obtain an IP address dynamically(DHCP).

2.3.1 Static IP address setting

To set a static IP address for the eth1 port of the EC900, use the iface command to modify the default grid gate, address, and network mask of the Ethernet port, as shown in the following figure.



2.3.2 Dynamic IP address setting

To configure one or two ports to request IP addresses dynamically, please use the dhcp option instead of the static option in the iface command, as shown below.

2.4 System Management

2.4.1 Time setting

There are two kind of time of EC900 that can be set. One is the system time, the other is the RTC (RealTime Clock) time saved by the EC900 hardware. Use the date command to query the current system time or set a new time. Use the hwclock command to query the current RTC time or set a new RTC time.

Use `date MMDDhhmmYYYY` command to set system time.

MM = Month

DD = Day

hhmm = Hour, minute. For example.

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```
date
sudo date 112515192021
```

```
edge@edge-computer:~$
edge@edge-computer:~$ date
Wed Jan  1 13:12:55 UTC 2020
edge@edge-computer:~$
edge@edge-computer:~$ sudo date 112515192021
Thu Nov 25 15:19:00 UTC 2021
edge@edge-computer:~$
```

Set the RTC time to system time using the following command .

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```
sudo hwclock
sudo hwclock -w
```

```
edge@edge-computer:~$ sudo hwclock
2020-01-01 12:02:45.685924+00:00
edge@edge-computer:~$
edge@edge-computer:~$
edge@edge-computer:~$
edge@edge-computer:~$
edge@edge-computer:~$ sudo hwclock -w
edge@edge-computer:~$
```

More about time setting, please visit

https://www.debian.org/doc/manuals/system-administrator/ch-sysadmin-time.html

https://wiki.debian.org/DateTime

2.4.2 Time zone setting

There are two ways to configure the time zone of the EC900. One is to use the TZ environment variable, the other is to use the /etc/localtime configuration file.

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- **Use the TZ environment variable**

  TZ=<Value>HH[:MM[:SS]][daylight[HH[:MM[:SS]]][,start date[/starttime], enddate[/endtime]]] e.g.

  Possible settings for the Eastern Time Zone in North America

  a . TZ=EST5EDT

  b . TZ=EST0EDT

  c . TZ=EST0

In the case a, the reference time is GMT, and the stored time values are correct worldwide. The simple change in the TZ variable allows the local time to be printed correctly in any time zone.
In the case b, the reference time is Eastern Standard Time, and the only conversion performed is daylight saving time(DST). Therefore, it is not necessary to adjust the hardware clock for daylight saving time(DST) twice a year.
In the case c, the reference time is always the reported time. You can use this option if the hardware clock on your machine automatically adjusts for daylight saving time(DST), or you want to manually adjust the hardware time twice a year.

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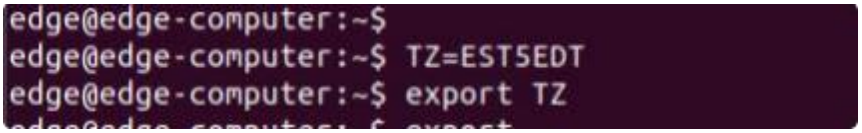
```
TZ=EST5EDT
export TZ
```



If you want the time zone setting to be valid after rebooting the EC900, please ensure including the TZ setting in the /etc/rc.local file. The following table lists other possible values for the TZ environment variable.

Hours From Greenwich Mean Time (GMT)	Value	Description
0	GMT	Greenwich Mean Time
+1	ECT	European Central Time
+2	EET	European Eastern Time
+2	ART	
+3	EAT	Saudi Arabia
+3.5	MET	Iran
+4	NET	
+5	PLT	West Asia
+5.5	IST	India
+6	BST	Central Asia
+7	VST	Bangkok
+8	CTT	China
+9	JST	Japan
+9.5	ACT	Central Australia
+10	AET	Eastern Australia
+11	SST	Central Pacific
+12	NST	New Zealand
-11	MIT	Samoa
-10	HST	Hawaii
-9	AST	Alaska
-8	PST	Pacific Standard Time
-7	PNT	Arizona

Hours From Greenwich Mean Time (GMT)	Value	Description
-7	MST	Mountain Standard Time
-6	CST	Central Standard Time
-5	EST	Eastern Standard Time
-5	IET	Indiana East
-4	PRT	Atlantic Standard Time
-3.5	CNT	Newfoundland
-3	AGT	Eastern South America
-3	BET	Eastern South America
-1	CAT	Azores

- **Use the /etc/localtime**

  The local time zone is stored in the /etc/localtime file.

  If the "TZ" environment variable is not set, the Glibc library will use the time zone configuration in the /etc/localtime file.This file is a symbolic link to the /usr/share/zoneinfo/ file, please find a suitable time zone information file and overwrite the original /etc/localtime file in the EC900, as shown in the following figure.

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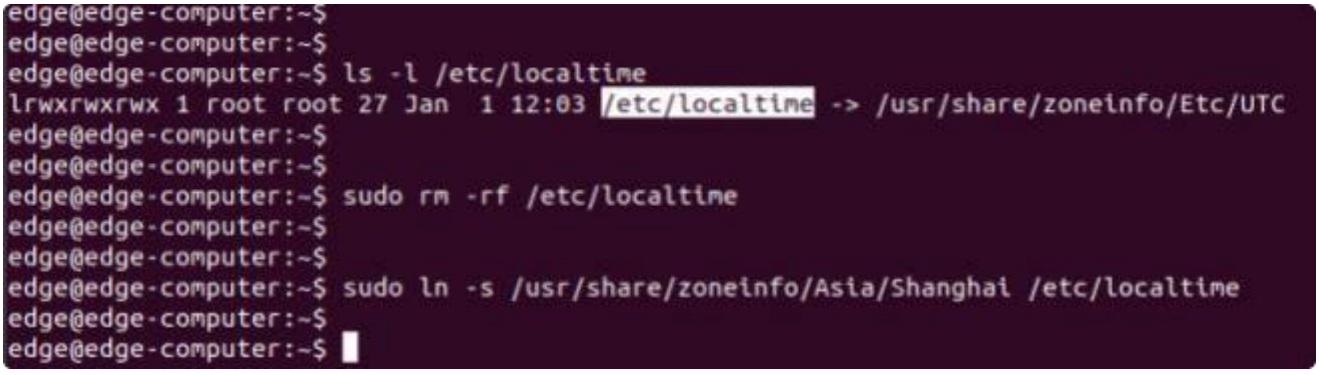
```
ls -l /etc/localtime
sudo rm -rf /etc/localtime
sudo ln -s /usr/share/zoneinfo/Asia/Shanghai /etc/localtime
```

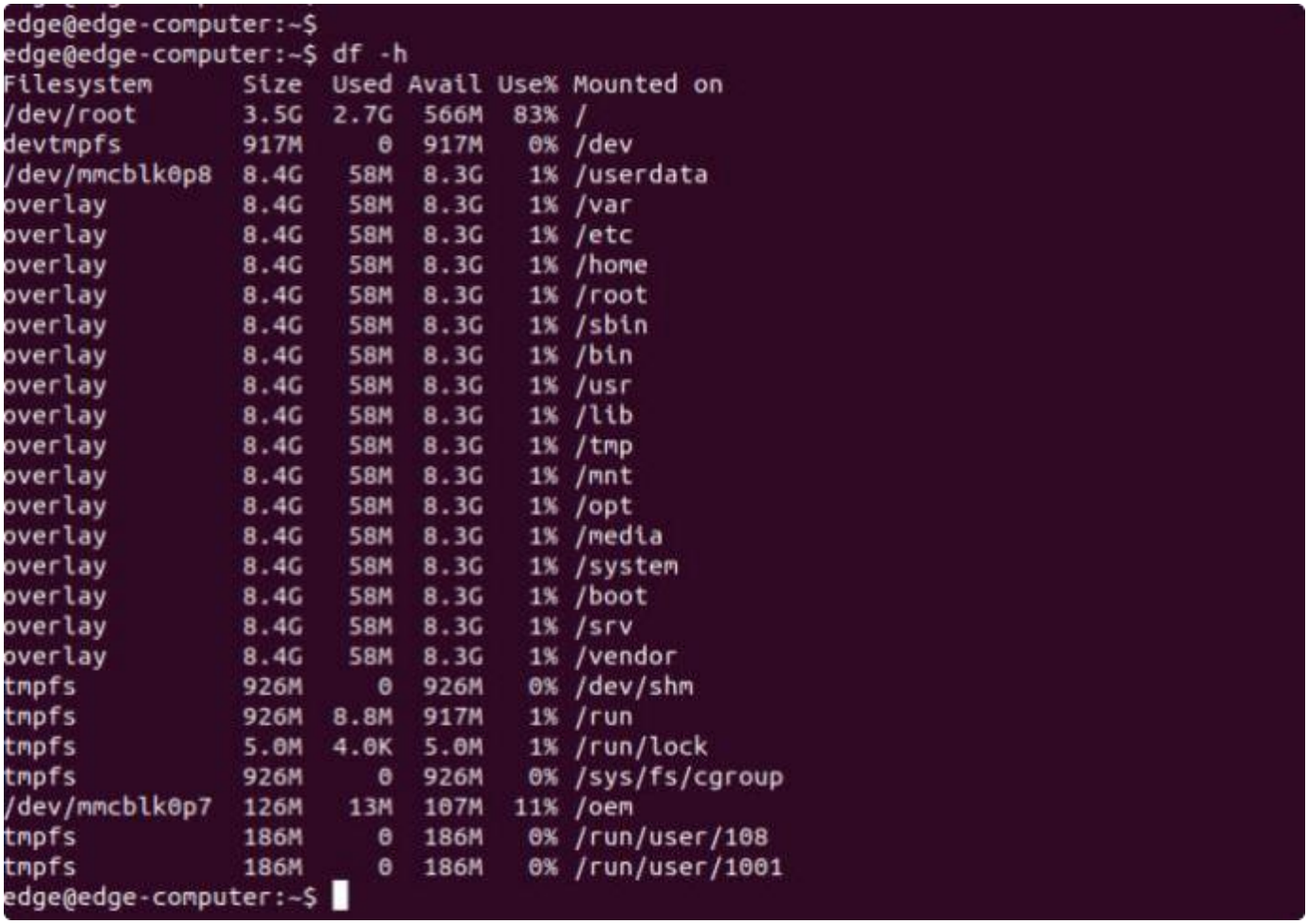


2.5 View Free Disk Space

To view the free disk drive space, use the df command with the - h option. The system will return the amount of disk space by file system divided.

Plain Text copy

```
df -h
```



2.6 Shut Down

You can shut down all software running on the device and stop the system by using the Linux command "shutdown" or by pressing the power button. However, after running this command, major components such as the CPU, RAM, and storage devices will continue to be powered, as shown in the following figure.

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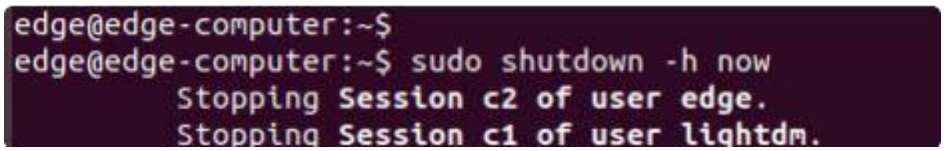
```
sudo shutdown -h now
```



Pressing the power button:

For the full shut down of the EC900, please disconnect the power to the EC900. When the EC900 is powered off, major components such as the CPU, RAM and memory devices will be shut down, but the internal clock may retain battery power.

2.7 View Firmware Version

The ecversion command is used to query the firmware version number, and the parameter "-a" can be used to view the version details.

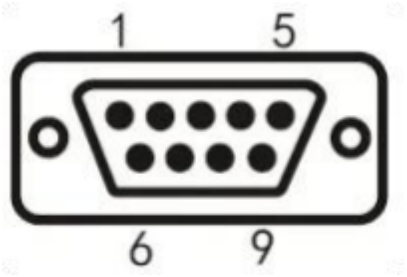
Shell | copy

```
root@edge-computer :~# ecversion
EC902 version 1.0 .1
root@edge-computer :~# ecversion -a
EC902 version 1.0 .1 Build 2022223
```

3. Development and Debugging

3.1 Serial Port

The EC900 provides two serial ports, both of which support RS232 or RS485 or RS422 communication (only one of the three can be used at any one time).



PIN	Definition	Description
1		
2	232 Rx D/422 TxD +	232 receive/422 send+
3	232 Tx D/485 B/422 Rx D-	232 send/485 signal B/422 receive-
4		
5	GND	232 signal ground
6		
7	A/RxD +	485 signal A/422 receive+
8	Tx D -	422 send-
9		

The commands to set the COM port are as follows:

Plain Text | copy

```
ih-uart-ctl -p 0 -m 0
```

The parameter 0 after -p indicates COM1, parameter 1 indicates COM2. The serial port name of COM1 is ttyS3, and the serial port name of COM1 is ttyS4. The parameter 0 after -m indicates RS232, 1 indicates RS485, 2 indicates RS422, and the default baud rate is 9600.

The stty command can be used to view and modify the configuration of the serial port. More about stty command, please visit https://www.gnu.org/software/coreutils/manual/coreutils.html#stty-invocation

I. View serial port configuration

Plain Text copy

```
stty -a -F /dev/ttyS3
```

II. Modify the serial port configuration

Plain Text copy

```
stty -F /dev/ttyS3 ispeed 115200 ospeed 115200 cs8
```

3.2 USB

Currently, USB only supports mounting USB flash drives. After the USB drive is successfully mounted, you can view the drive files in /mnt/sd destination.

3.3 HDMI

After connecting the display with the HDMI cable, the Linux login screen is displayed and the login is completed by entering the user name and password.

3.4 Cellular Network

I. Enable/disable redial

```shell
systemctl enable redial
systemctl start redial
systemctl restart redial
systemctl stop redial // If need to enable redial , automatic redial will occur after rebooting the device .
systemctl disable redial
```

II. Check if the redial is successful

```shell
sudo ifconfig
```

If ppp0 is connected in the output, then the dial-up is successful.

```
ppp0: flags=4305<UP,POINTOPOINT,RUNNING,NOARP,MULTICAST>  mtu 1500
        inet 10.153.177.212  netmask 255.255.255.255  destination 10.64.64.64
        ppp  txqueuelen 3  (Point-to-Point Protocol)
        RX packets 27392  bytes 33474206 (31.9 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 8801  bytes 588647 (574.8 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

III. Check signal quality, grid status, etc.

```shell
```

```
sudo nvram show
```

IV. Switching sim cards

Default sim card 1

Shell copy

```
sudo nvram set  cur sim=0
sudo nvram set wan1_ppp_apn=sim1_apn // If need to set an apn , execute this command and replace sim1 _ apn with the actual apn . Do not execute this command if there is no apn .
sudo systemctl restart redial
```

If switching sim card 2, need to open the dual card function.

Shell copy

```
sudo nvram set  cur sim=1
sudo nvram set wan1_ppp_sim2_apn=sim2_apn // If need to set an apn, execute this command and replace sim2_apn with the actual apn. Do not execute this command if there is no apn.
sudo nvram set dual_sim_enable=1
sudo systemctl restart redial
```

V. Enable/disable redial log

Shell copy

```
Enable redial log:
touch /tmp/ .debug_systools
systemctl restart redial
tail -f /var/log/messages

Disable redial log:
rm -f /tmp/ .debug_systools
systemctl restart redial
tail -f /var/log/messages
```

FCC STATEMENT

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE 1: This equipment has been tested and found to comply with the limits for a Class B digital device , pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

NOTE 2: Any changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

RF Exposure

The equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This device should be installed and operated with minimum distance 20cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. The availability of some specific channels and/or operational frequency bands is country dependent and firmware programmed at the factory to match the intended destination. The firmware setting is not accessible by the end user.

IC STATEMENT

This device complies with Industry Canada license-exempt RSS standard(s): Operation is subject to the following Two conditions:

(1) this device may not cause interference, and

(2) This device must accept any interference, including interference that may cause undesired operation

of the device.

Le present appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) l'appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l'appareildoit accepter tout brouillage radioélectrique subi, même si le brouillage est

susceptible d'en compromettre le fonctionnement.

CAN ICES-3 (B)

Avis d’Industrie Canada

Le présent appareil est conforme aux CNR d'industrie Canada applicables aux appareils radio exem pts de licence L'exploitation est autorisée aux deux conditions suivantes:

1) l'appareil ne doit pas produire de brouillage; et

2) l'utillsateur de l'appareil doit accepterbrouillage radioélectrique subi meme si le brouillage est susceptible d'encompromettre le fonctionnement. mauvais fonctionnement de l'appareil.

Cet appareil numériquie de la classe B est conforme à la norme NMB-003 du Canada.

CAN NMB-3 (B)

Radiation Exposure Statement:

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20cm de distance entre la source de rayonnement et votre corps.