

Product name	CLM920_AC3 Module Linux Integration User Manual
Number of pages	13
Version	V1.0
Date	2019/3/15

CLM920_AC3 Module Linux Integration User Manual

V1.0



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Contents

Chapter 1. Linux system load domain module USB driver.....	- 4 -
1.1 Add USB serial port drive system components.....	- 4 -
1.2 Add device drivers.....	- 4 -
Chapter 2. Interactive AT process under Linux system.....	- 6 -
Chapter 3. Dial-up Internet Process under Linux System.....	- 8 -
Chapter 4. Linux system loading Yuge module RNDIS dialing instructions.....	- 10 -
4.1 Load RNDIS driver.....	- 10 -
4.2 RNDIS Network card obtains IP.....	- 11 -
4.3 RNDIS dialing related commands.....	- 11 -
4.4 Network test.....	- 12 -
Chapter 5. Linux System FAQ.....	- 13 -
5.1 Q: How do I manually send AT commands via <i>echo cat</i> under Linux?.....	- 13 -



Revise history

Version	Date	Author	Description
V1.0	2019/03/13	Document group	Initial version



Chapter 1. Linux system load domain module USB driver

1.1 Add USB serial port drive system components

USB to serial port drivers are commonly used in Linux systems. Adding a driver requires configuring the Linux kernel as follows.:

```
cd kernel
```

```
make menuconfig
```

```
device drivers -> usb support -> usb serial converter support
```

Select the following components:

USB driver for GSM and CDMA modems

Save configuration when selected.

1.2 Add device drivers

Use *lsusb* to view the usb device and confirm the discovery device.

```
test@ubuntu:~$ lsusb
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 002 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
Bus 002 Device 002: ID 0e0f:0003 VMware, Inc. Virtual Mouse
Bus 002 Device 003: ID 0e0f:0002 VMware, Inc. Virtual USB Hub
Bus 001 Device 026: ID 1286:4e3c Marvell Semiconductor, Inc.
```

As shown above, the module's *VID* and *PID* default to *0x1286* and *0x4E3C*.

After the device confirms the connection, you can execute the command. : `sudo modprobe usbserial vendor=0x1286 product=0x4E3C`, Load the USB serial port driver. You can check the USB serial port loading status by querying the command: `ls /dev/ttyU*`.

Modify *drivers/usb/serial/option.c*. Refer to the following methods to add *VID*、*PID*.

```
#define YUGA_VENDOR_AC3          0x1286
#define YUGA_PRODUCT_AC3       0x4E3C

static const struct usb_device_id option_ids[] = {
    { USB_DEVICE(YUGA_VENDOR_AC3, YUGA_PRODUCT_AC3)},
```



```
static int option_probe(struct usb_serial *serial,
                       const struct usb_device_id *id)
{
    struct usb_wwan_intf_private *data;
    if (serial->dev->descriptor.idVendor == YUGA_VENDOR_AC3 &&
        serial->dev->descriptor.idProduct == YUGA_PRODUCT_AC3) {
        if (serial->interface->cur_altsetting->desc.bInterfaceNumber == 0
            || serial->interface->cur_altsetting->desc.bInterfaceNumber == 1)
            return -ENODEV;
    }
}
```

Add array elements After the modification is complete, recompile the kernel.

After the compilation is complete, you can check the USB serial port loading status by querying the command: `ls /dev/ttyU*`, as shown below..

```
test@ubuntu:~$
test@ubuntu:~$
test@ubuntu:~$
test@ubuntu:~$ ls /dev/ttyU*
/dev/ttyUSB0 /dev/ttyUSB1 /dev/ttyUSB2
test@ubuntu:~$ a
```



Chapter 2. Interactive AT process under Linux system

1) Insert the *USIM/SIM* card into the application terminal correctly and connect the 4G full-range antenna to the RF connector of the module. Module boot, load *USB* driver, get USB port: *ttyUSB0~ttyUSB4*.

```
ttyUSB0 -> RNDIS
ttyUSB1 -> CDC-DATA
ttyUSB2 -> DIAG ttyUSB3 -> AT
ttyUSB4 -> Modem
```

2) Start the Linux system serial application *minicom*, use the following command:

```
#minicom -s
```

In the *minicom* menu, select “*Serial port setup*”, configure “*Serial device*” to be */dev/ttyUSB1* (*AT* (*ttyUSB1*) in the serial port of the module, *Modem* (*ttyUSB2*) can send AT commands, others cannot send AT commands); Exit to the *minicom* menu, select “*Save setup as dfl*” to save the configuration and select “*exit*” to exit the *minicom* configuration.

3) System test by sending AT commands via *minicom*

```
#minicom
```

Will get the following return results:

```
Welcome to minicom 2.7
OPTIONS: I18n
Compiled on Jan 1 2014, 17:13:22.
Port /dev/ttyUSB1
Press CTRL-A Z for help on special keys
```

Enter the following command to open the echo:

```
AT
```

If the system works normally, you will get the following return results:



OK

Enter the following command to query product information.:

ATI

Will get the following information:

Manufacturer: Yuga Co.,Ltd.

Model: CLM920_AC3

Revision: CLM920_AC3-V1 [Mar 1 2 10:00:25]

IMEI:3520990017614823

+GCAP: +CGSM

Enter the following command to query the PIN information.:

AT+CPIN?

Will get the following information:

+CPIN: READY

Enter the following command to query the signal:

AT+CSQ

Will get the following signal strength and bit error rate information:

+CSQ: 24,0

Enter the following command to query the registration status.:

AT+CGREG?

Will get the following registration information:

+CGREG: 3,1,"5b1c","0b177d82",7

Enter the following command to query the network operator information.:

AT+COPS?

The following carrier information will be obtained (the information returned by different operators is different. The following is an example of China Telecom's USIM card.)

+COPS: 0,2,"46011",7



Chapter 3. Dial-up Internet Process under Linux System

- 1) Repeat the module's USB loading process and AT interaction process. Make sure the module is properly registered to the network, the signal strength *CSQ* returns the first parameter above 9;
- 2) Verify that the Linux system comes with the *pppd* and *chat* executables. If the system does not have *pppd*, install *kppp* with the *pppd* application (*pppd* 2.4.3, *pppd* 2.4.5 recommended);
- 3) There are two ways to dial up the Internet :
 - a) Directly use the dialing script we provided *yuga.lte-pppd* (the default APN is empty, can be set as needed),
Note the execution permission for the script;
 - b) Write *pppd* script and *chat* script separately:

(1) */etc/ppp/peers/lte* file, as follows:

```
# Usage: root>pppd call lte&
/dev/ttyUSB1
115200 crtscts
modem debug

nodetach
usepeerdns
noipdefault
defaultroute
usercard
passwordcard
connect '/usr/sbin/chat -s -v -f /etc/ppp/lte-connect-chat'
```

(2) */etc/ppp/lte-connect-chat* file, as follows:

```
#/etc/ppp/lte-connect-chat
```




```
#chat script for LTE.  
TIMEOUT 15  
ABORT "DELAYED"  
ABORT "BUSY"  
ABORT "ERROR"  
ABORT "NO DIALTONE"  
ABORT "NO CARRIER"  
"" AT  
OK ATE0  
OK ATD*99#  
CONNECT
```

After the two scripts are written, execute *pppd* call *lte&*, dial-up。

4) Test connection Internet

Test whether the Internet is connected, use the following command:

```
# ping 115.239.210.27
```

Test if you *ping* the IP address of *baidu*.

If the IP address can be *ping* and the *ping* domain name is unreachable, the following command:

```
# ping www.baidu.com
```

Then you need to add *DNS (114.114.114.114)* to */etc/resolv.conf*。

5) Disconnect from the Internet:

- a. Call the end script we provided *ppp-off*
- b. Use instruction: *# killall pppd*



Chapter 4. Linux system loading Yuge module RNDIS dialing instructions

4.1 Load RNDIS driver

To use RNDIS, you need to install the driver `rndis_host.ko`. The general distribution has been compiled and can be run directly. If the embedded development board can configure the kernel's `rndis_host` as a dynamic module, some kernels need to open the *EXPERIMENTAL* option.

```
.config - Linux Kernel v2.6.36 Configuration
-----
General setup
Arrow keys navigate the menu. <Enter> selects submenus --->.
Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes
<M> modularizes features. Press <Esc><Esc> to exit, <?> for Help, </>
for Search. Legend: [*] built-in [ ] excluded <M> module < >

[*] Prompt for development and/or incomplete code/drivers
() Cross-compiler tool prefix

.config - Linux Kernel v2.6.36 Configuration
-----
USB Network Adapters
Arrow keys navigate the menu. <Enter> selects submenus --->.
Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes,
<M> modularizes features. Press <Esc><Esc> to exit, <?> for Help, </>
for Search. Legend: [*] built-in [ ] excluded <M> module < >

< > USB CATC NetMate-based Ethernet device support (EXPERIMENTAL)
<M> USB KLSI KLSUSB101-based ethernet device support
<M> USB Pegasus/Pegasus-II based ethernet device support
< > USB RTL8150 based ethernet device support (EXPERIMENTAL)
<M> Multi-purpose USB Networking Framework
<M> ASIX AX88xxx Based USB 2.0 Ethernet Adapters
-M- CDC Ethernet support (smart devices such as cable modems)
< > CDC EEM support
<M> Davicom DM9601 based USB 1.1 10/100 ethernet devices
<M> SMSC LAN75XX based USB 2.0 gigabit ethernet devices
v(+)
```

<Select> < Exit > < Help >



```
.config - Linux Kernel v2.6.36.1 Configuration

                                USB Network Adapters
Arrow keys navigate the menu.  <Enter> selects submenus --->.  Highlighted letters
are hotkeys.  Pressing <Y> includes, <N> excludes, <M> modularizes features.  Press
<Esc><Esc> to exit, <?> for Help, </> for Search.  Legend: [*] built-in [ ] excluded
<M> module < > module capable

^(-)
<M> USB Pegasus/Pegasus-II based ethernet device support
<M> USB RTL8150 based ethernet device support (EXPERIMENTAL)
{M} Multi-purpose USB Networking Framework
<M> ASIX AX88xxx Based USB 2.0 Ethernet Adapters
-M- CDC Ethernet support (smart devices such as cable modems)
<M> CDC EEM support
<M> Davicom DM9601 based USB 1.1 10/100 ethernet devices
<M> SMSC LAN75XX based USB 2.0 gigabit ethernet devices
<M> SMSC LAN95XX based USB 2.0 10/100 ethernet devices
<M> GeneSys GL620USB-A based cables
<M> NetChip 1080 based cables (Laplink, ...)
<M> Prolific PL-2301/2302 based cables
<M> MosChip MCS7830 based Ethernet adapters
-M- Host for RNDIS and ActiveSync devices (EXPERIMENTAL)
<M> Simple USB Network Links (CDC Ethernet subset)
[*]  Ali M5632 based 'USB 2.0 Data Link' cables

v(+)

<Select>  < Exit >  < Help >
```

The driver is loaded. After the module is connected to USB, you can use the *ifconfig* command to view the network card information..

```
eth2      Link encap:Ethernet  HWaddr ac:df:d8:cc:8f:b3
          inet addr:192.168.0.100  Bcast:192.168.0.255  Mask:255.255.255.0
          inet6 addr: fe80::a:df:d8:ff:fe:cc:8f:b3/64  Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:3  errors:0  dropped:0  overruns:0  frame:0
          TX packets:50  errors:0  dropped:0  overruns:0  carrier:0
          collisions:0  txqueuelen:1000
          RX bytes:632 (632.0 B)  TX bytes:11669 (11.6 KB)
```

4.2 RNDIS Network card obtains IP

If the module obtains IP after 2 minutes of USB access, the rndis network card cannot obtain IP. When the rndis network card does not get IP, it can be solved by reconnecting the USB. When the USB is reconnected, the dhcp server will restart, but it will also need to get the IP within 2 minutes, otherwise it will time out.

4.3 RNDIS dialing related commands

1) Please check the following commands before dialing to confirm that the module is



successfully registered to the network. For details, refer to the *AT* manual.

AT+CPIN?

AT^SYSINFO

AT+CSQ

AT+CGREG?

2) After confirming that the module is registered on the network, the default is automatically dial-up Internet access, and the following commands are used to dial RNDIS and query the connection. ◦

AT+ RNDISCALL =1 //Initiate RNDIS dialing

AT+ RNDISCALL? //query

+RNDISCALL: 1 //0 means disconnected, 1 means connected

3) Disconnect dial command

AT+ RNDISCALL =0

4.4 Network test

Confirm that the rndis network card successfully obtains the IP address. After the dialing command is sent, you can test whether to connect to the Internet through ping.



Chapter 5. Linux System FAQ

5.1 Q: How do I manually send AT commands via *echo cat* under Linux?

A: In order to send the command AT to ttyUSB2 as an example, you can operate by the following command (by ctrl+c)

```
sudo echo -en "AT\r\n" > /dev/ttyUSB2;cat /dev/ttyUSB2
```

```
test@yuge-info:~$ sudo echo -en "ATE\r\n" > /dev/ttyUSB2;cat /dev/ttyUSB2
OK
^C
test@yuge-info:~$ sudo echo -en "AT\r\n" > /dev/ttyUSB2;cat /dev/ttyUSB2
AT
OK
```