MCS9901
Linux Driver User Manual

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1. Introduction

This document describes the software driver installation / Un-installation procedure for MosChip MCS9901 PCIe to Serial / Parallel / USB products or other manufacturer's product based on MosChip MCS9901 series on Linux OS.

2. Drivers Location

MCS9901 Linux source code can be downloadable from www.moschip.com.

3. Serial Port Installation

- Copy the downloaded driver disk to the desktop.
- Shutdown the PC, insert the MCS9901 based PCI express card into PCIe Slot and then Switch ON the PC.
- Check for the MCS9901 PCIe Card detection by typing the following command in terminal window. "**lspci –v** ". This will show the list of all PCIe ports. Check for the Product ID 9901 as shown below.
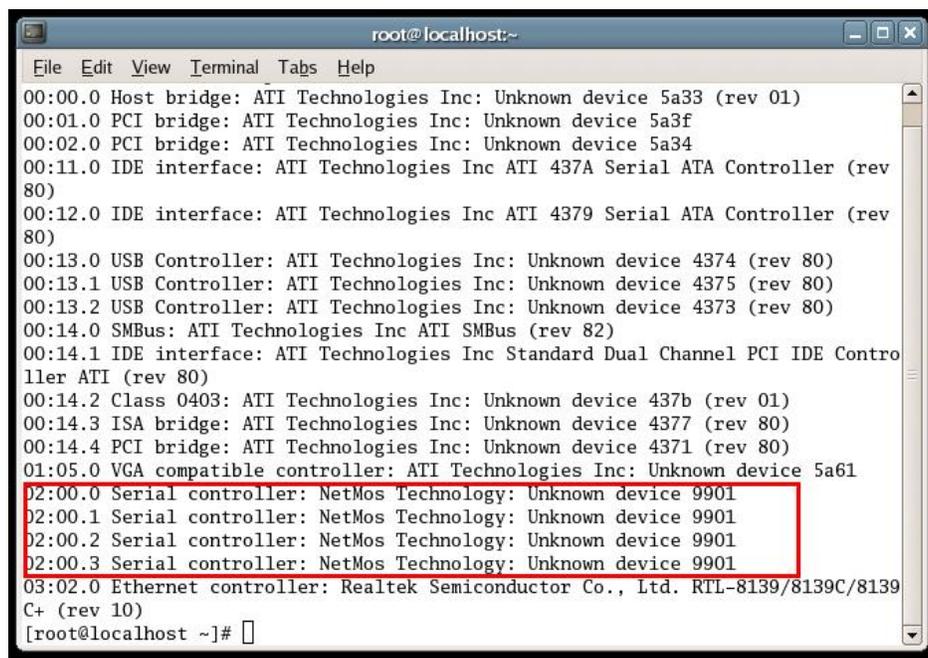
```
root@localhost:~
File  Edit  View  Terminal  Tabs  Help
00:00.0 Host bridge: ATI Technologies Inc: Unknown device 5a33 (rev 01)
00:01.0 PCI bridge: ATI Technologies Inc: Unknown device 5a3f
00:02.0 PCI bridge: ATI Technologies Inc: Unknown device 5a34
00:11.0 IDE interface: ATI Technologies Inc ATI 437A Serial ATA Controller (rev
80)
00:12.0 IDE interface: ATI Technologies Inc ATI 4379 Serial ATA Controller (rev
80)
00:13.0 USB Controller: ATI Technologies Inc: Unknown device 4374 (rev 80)
00:13.1 USB Controller: ATI Technologies Inc: Unknown device 4375 (rev 80)
00:13.2 USB Controller: ATI Technologies Inc: Unknown device 4373 (rev 80)
00:14.0 SMBus: ATI Technologies Inc ATI SMBus (rev 82)
00:14.1 IDE interface: ATI Technologies Inc Standard Dual Channel PCI IDE Contro
ller ATI (rev 80)
00:14.2 Class 0403: ATI Technologies Inc: Unknown device 437b (rev 01)
00:14.3 ISA bridge: ATI Technologies Inc: Unknown device 4377 (rev 80)
00:14.4 PCI bridge: ATI Technologies Inc: Unknown device 4371 (rev 80)
01:05.0 VGA compatible controller: ATI Technologies Inc: Unknown device 5a61
02:00.0 Serial controller: NetMos Technology: Unknown device 9901
02:00.1 Serial controller: NetMos Technology: Unknown device 9901
02:00.2 Serial controller: NetMos Technology: Unknown device 9901
02:00.3 Serial controller: NetMos Technology: Unknown device 9901
03:02.0 Ethernet controller: Realtek Semiconductor Co., Ltd. RTL-8139/8139C/8139
C+ (rev 10)
[root@localhost ~]#
```

- Untar (Uncompress) the driver disk copied to the desktop by using following command. Make sure that you change the path of terminal on to the desktop.

$ tar -xzvf starex.tar.gz


```
root@localhost:~/Desktop/version1.4
File  Edit  View  Terminal  Tabs  Help
[root@localhost ~]# cd Desktop
[root@localhost Desktop]# dir
burnintest   mcs9900-isa                Send      version1.4
Kernels      redhat-printconf-gui.desktop  ss1.jpeg
[root@localhost Desktop]# cd version1.4/
[root@localhost version1.4]# dir
ReleaseNotes  starex.tar.gz
[root@localhost version1.4]# tar -xzvf starex.tar.gz
starex/
starex/9900.c
starex/9900.h
starex/Makefile
[root@localhost version1.4]#
```

- Change the path of the terminal to the path of extracted files.

  $ cd /Version1.5/starex

- Compile the driver using the command "**make**". No errors should be displayed.


```
root@localhost:~/Desktop/version1.4/starex
File  Edit  View  Terminal  Tabs  Help
[root@localhost starex]# ls
9900.c  9900.h  Makefile
[root@localhost starex]# make
rm -f *.mod.c *.o *.ko .*.cmd *.symvers
make -C /lib/modules/2.6.11-1.1369_FC4smp/build/  SUBDIRS=/root/Desktop/version1
.4/starex modules
make[1]: Entering directory `/usr/src/kernels/2.6.11-1.1369_FC4-smp-i686'
  CC [M]  /root/Desktop/version1.4/starex/9900.o
/root/Desktop/version1.4/starex/9900.c:752: warning: 'transmit_chars_dma_stop_do
ne' defined but not used
  Building modules, stage 2.
  MODPOST
  CC      /root/Desktop/version1.4/starex/9900.mod.o
  LD [M]  /root/Desktop/version1.4/starex/9900.ko
make[1]: Leaving directory `/usr/src/kernels/2.6.11-1.1369_FC4-smp-i686'
[root@localhost starex]#
```

- Install the driver using the following command

  $ **make install**
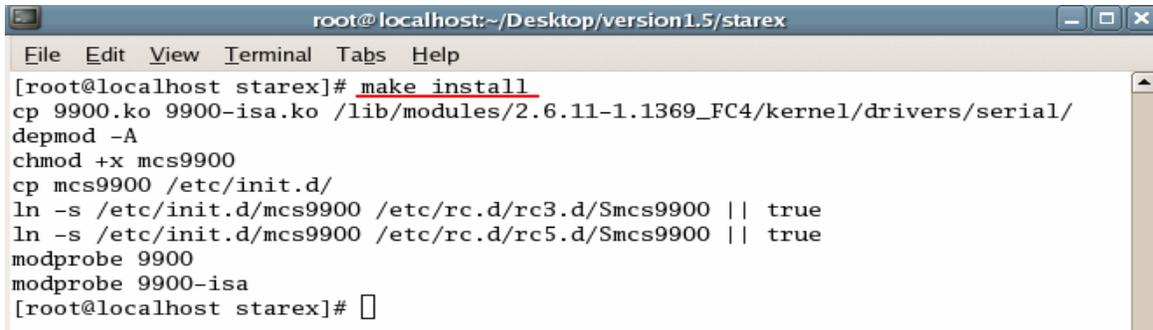
- MCS9901 PCIe Card installation is complete and the device is ready to use.
- Type "**ls /dev/ttyD**" command in the terminal window and press "**Tab**" key twice to see the MCS9901 serial ports installed on the machine.

4. Serial Port Settings

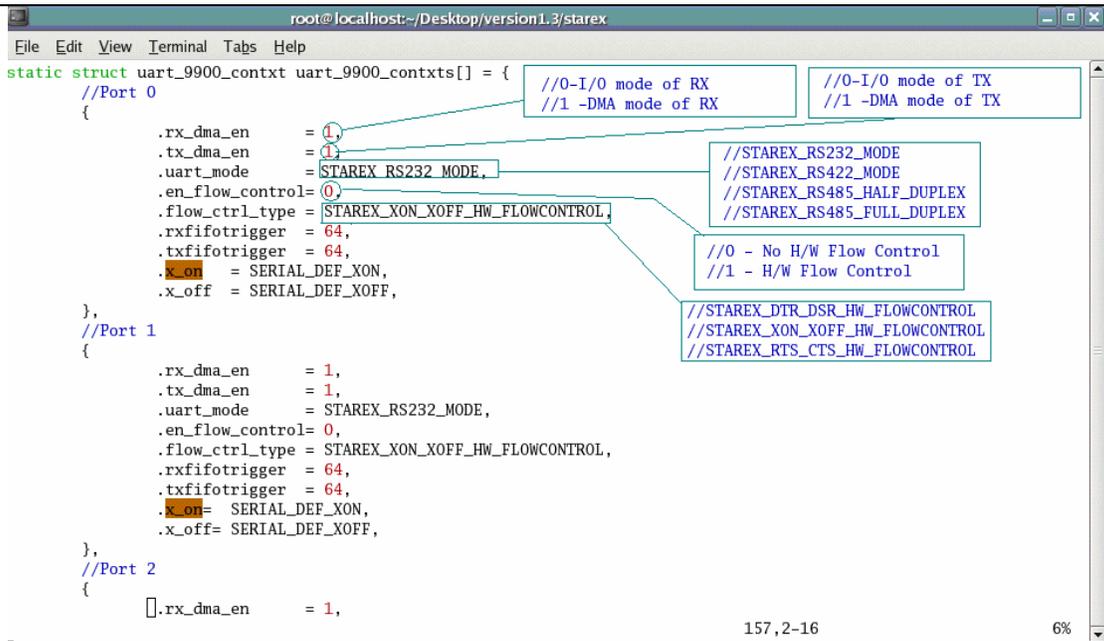The serial port settings can be changed by editing the "**9900.c**" file. To edit the file use the command:

$ **vim** 9900.c

Note: Make sure that the path of the terminal points to the same folder where **9900.c** file is present.

MCS9901 Serial Ports supports following configurable serial features like:

- Serial port mode
- DMA in RX
- DMA in TX
- Enable/Disable Flow control
- Flow control type

```
root@localhost:~/Desktop/version1.3/starex
File  Edit  View  Terminal  Tabs  Help
static struct uart_9900_contxt uart_9900_contxts[] = {
        //Port 0                              //0-I/O mode of RX        //0-I/O mode of TX
        {                                     //1 -DMA mode of RX       //1 -DMA mode of TX
                .rx_dma_en      = 1,
                .tx_dma_en      = 1,                      //STAREX_RS232_MODE
                .uart_mode      = STAREX_RS232_MODE,      //STAREX_RS422_MODE
                .en_flow_control= 0,                      //STAREX_RS485_HALF_DUPLEX
                .flow_ctrl_type = STAREX_XON_XOFF_HW_FLOWCONTROL,  //STAREX_RS485_FULL_DUPLEX
                .rxfifotrigger  = 64,
                .txfifotrigger  = 64,                     //0 - No H/W Flow Control
                .x_on   = SERIAL_DEF_XON,                 //1 - H/W Flow Control
                .x_off  = SERIAL_DEF_XOFF,
        },                                        //STAREX_DTR_DSR_HW_FLOWCONTROL
        //Port 1                                  //STAREX_XON_XOFF_HW_FLOWCONTROL
        {                                         //STAREX_RTS_CTS_HW_FLOWCONTROL
                .rx_dma_en      = 1,
                .tx_dma_en      = 1,
                .uart_mode      = STAREX_RS232_MODE,
                .en_flow_control= 0,
                .flow_ctrl_type = STAREX_XON_XOFF_HW_FLOWCONTROL,
                .rxfifotrigger  = 64,
                .txfifotrigger  = 64,
                .x_on=  SERIAL_DEF_XON,
                .x_off= SERIAL_DEF_XOFF,
        },
        //Port 2
        {
                [].rx_dma_en     = 1,
                                                                157,2-16              6%
```

By default MCS9901 Serial port properties will be set to RS-232 mode, DMA enabled and Hardware Flow Control disabled.

To change the Serial port settings the values must be edited accordingly as Follows:

To enable Receive DMA of the selected serial port replace 0 with 1 against "r**x_dma_en"** field.

To enable Transmit DMA of the selected serial port replace 0 with 1 against "t**x_dma_en"** field.

To configure the Serial in different Modes change the entire string "**STAREX_RS232_MODE**" as follows:

- For RS 232 Mode: **STAREX_RS232_MODE**
- For RS 422 Mode: **STAREX_RS422_HALFDUPLEX** (For Half duplex Functionality)
- For RS 485 Mode: **STAREX_RS485_FULLDUPLEX** (For Full duplex Functionality)

The values can be seen in the same document. The first screen shot displays the setting modes.

For example: RX DMA can be disabled by replacing 0 with 1. All other values can be changed in the same way.

Port 0 in the above picture represents the settings for the first port and similarly other numbers represent the same for other ports.

After editing this file save and exit the file by using the command:

Press "**Esc**" key and type **:wq!** and press enter.

Note: The present Linux serial driver supports only up to 2x baud rate.
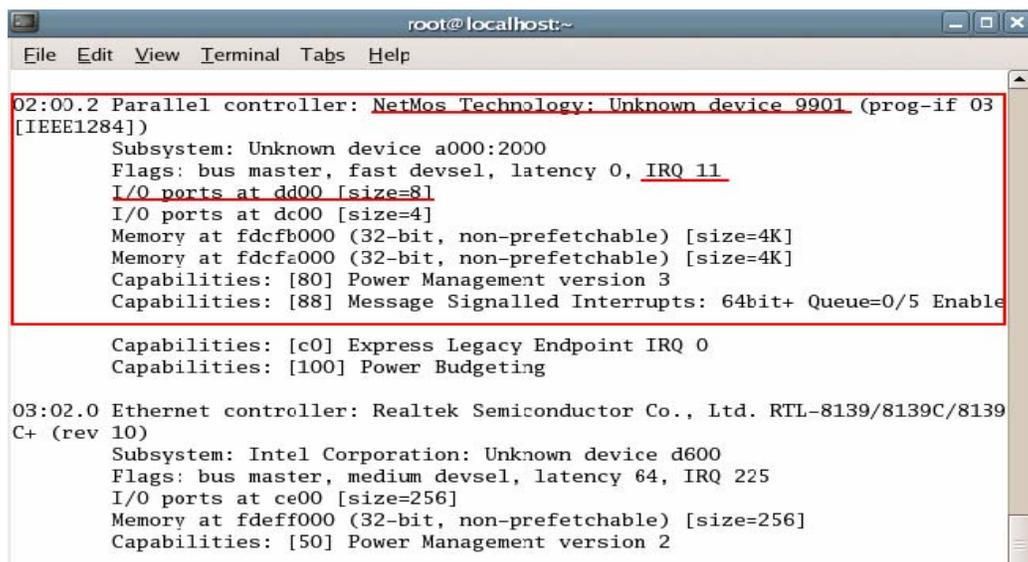
5. Parallel port installation

To install the parallel port use the following command

modprobe parport_pc io=0x378, 0xdd00 irq =4,11

The first io address 0x378 and the first irq address points the standard parallel port and the second io and irq addresses points the MCS9901 io and irq values.

To check the "**io**" and "**irq**" addresses use the command **"lspci -v"**.

MCS9901 parallel port supports SPP/CBFIFO/ECP/EPP modes. Parallel port will automatically move into the device mode (SPP/CBFIFO/ECP/EPP) by handshaking.

6. ISA ports installation.

ISA serial and parallel port installation follows the same procedure as serial port and parallel port installation. ISA serial port uses standard drivers and there are no properties like DMA and Flow Control mechanisms also has no support of RS422/RS485 on ISA serial ports. ISA based serial ports has support of 1X speed only.

Note: The serial ports using ISA will get detected as ttyS(*x*), where x indicates the port number.

7. USB Driver Installation.

No special drivers are required for MCS9901. USB Host works with standard drivers for MCS9901. Shutdown the PC, insert the MCS9901 PCIe card into any PCIe slot and restart the system. USB drivers will be installed automatically.

8. Un-installation of the Drivers

To un-install the driver use the command

$ make uninstall

$ Symbol represents the shell prompt in linux.
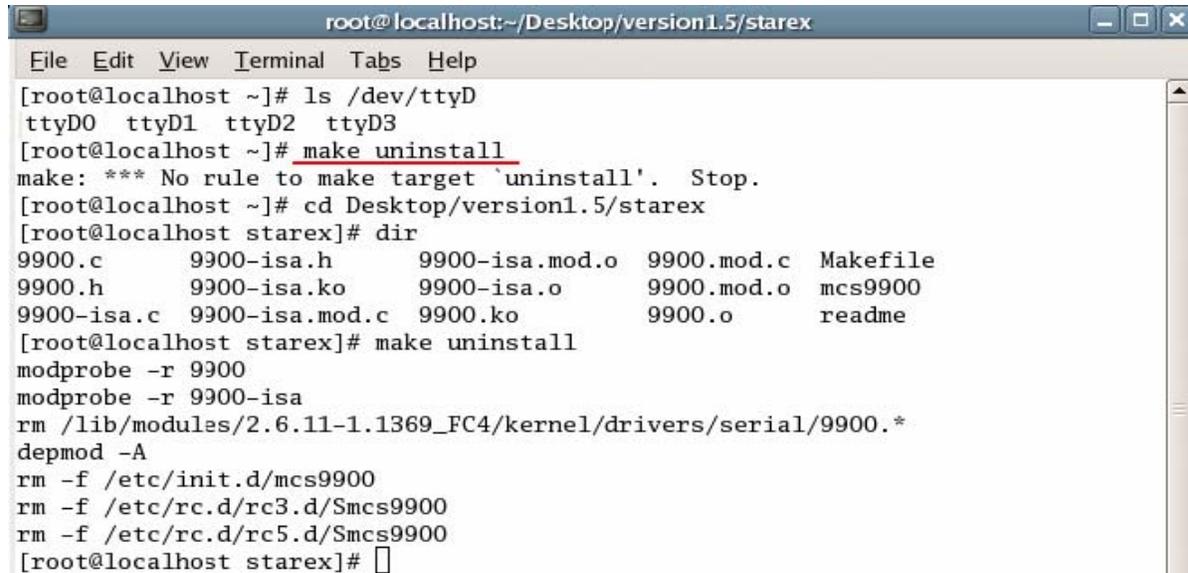
```
root@localhost:~/Desktop/version1.5/starex

File  Edit  View  Terminal  Tabs  Help

[root@localhost ~]# ls /dev/ttyD
ttyD0   ttyD1   ttyD2   ttyD3
[root@localhost ~]# make uninstall
make: *** No rule to make target `uninstall'.  Stop.
[root@localhost ~]# cd Desktop/version1.5/starex
[root@localhost starex]# dir
9900.c        9900-isa.h       9900-isa.mod.o   9900.mod.c   Makefile
9900.h        9900-isa.ko      9900-isa.o       9900.mod.o   mcs9900
9900-isa.c    9900-isa.mod.c   9900.ko          9900.o       readme
[root@localhost starex]# make uninstall
modprobe -r 9900
modprobe -r 9900-isa
rm /lib/modules/2.6.11-1.1369_FC4/kernel/drivers/serial/9900.*
depmod -A
rm -f /etc/init.d/mcs9900
rm -f /etc/rc.d/rc3.d/Smcs9900
rm -f /etc/rc.d/rc5.d/Smcs9900
[root@localhost starex]#
```

Note: Use **"make clean"** command before changing the serial property page.

9. Technical Support

For queries and support contact techsupport@moschip.com.

Revision history

Date	Reason for change	Version
1st Nov 2007	First cut document	0.1
8th Nov 2007	Aesthetic changes made for first release	0.2
24th Jan 2008	Internal inputs updated	0.3
1st Feb 2008	Added the installation procedure for USB & ISA	0.4

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