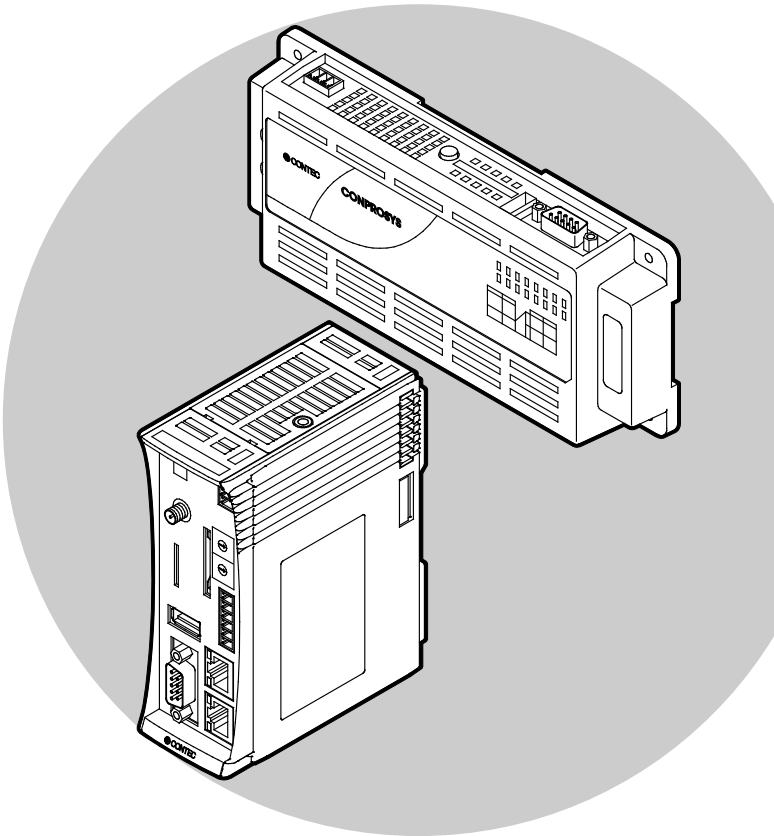
CONTEC

CONPROSYS

User's Manual

(Self-Build Edition)

CONPROSYS Linux SDK Ver. 1.5.0



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CONTEC CO., LTD.

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Introduction

1.Outline

CONPROSYS Linux SDK (Software Development Kit) is for creating software development environment to generate modules that operate on the CONPROSYS.

Ubuntu will be run on CONPROSYS in the self-build edition, and the software can be developed in its CONPROSYS.

2.CONPROSYS products

M2M Controller Series Integrated type

CPS-MC341-ADSCx series	Multi Input and Output Model
CPS-MC341G-ADSC1 series	Multi Input and Output + 3G WAN (Japan domestic/Global) Model
CPS-MC341Q-ADSC1	Multi Input and Output + 920HMz LAN (Japan only) Model
CPS-MC341-A1 series	Analog Input and Output Model
CPS-MC341-DSx series	Digital Input and Output Model
CPS-MC341-DS11	Digital Input and Output Model

M2M Gateway Series Integrated type

CPS-MG341-ADSC1 series	Multi Input and Output Model
CPS-MG341G-ADSC1 series	Multi Input and Output + 3G WAN (Japan only) Model
CPS-MG341G5-ADSC1	Multi Input and Output + LTE Model

M2M Controller Series Configurable type

CPS-MCS341-DS1 series	Controller
CPS-MCS341G-DS1	Controller+ 3G WAN (Japan only) Model
CPS-MCS341G5-DS1	Controller+ LTE Model
CPS-MCS341Q-DS1	Controller+ 920HMz LAN (Japan only) Model

M2M Gateway Series Configurable type

CPS-MGS341-DS1	Controller
CPS-MGS341G5-DS1	Controller+ LTE Model

* The functions such as HMI, VTC, OPC-UA, and Modbus that are installed in the M2M controller series are not provided in the CONPROSYS Linux SDK. The additional software is necessary for these functions.

* The functions such as HM, VTC, OPC-UA, Modbus, PLC, and CNC that are installed in the M2M Gateway series are not provided in the CONPROSYS Linux SDK. The additional software is necessary for these functions.

* The PAC system series and the nano series do not support the CONPROSYS Linux SDK.

3.SDK specification

Kernel version: 3.2.0
Distribution: arm edition Ubuntu 14.04
GCC version: gcc 4.9.4

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   (3) Any country, region, individual or entity designated by the government of Japan, the U.S. or any other relevant country.

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Upon the occurrence of any dispute in relation to the Agreement or the Software, if any legal procedures are required, such as the filing of a petition for a lawsuit, the Osaka District Court shall have the exclusive jurisdiction over such dispute.

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Safety Precautions

1. Safety Information

This document provides safety information using the following symbols to prevent accidents resulting in injury or death and the destruction of equipment and resources.

Understand the meanings of these labels to operate the equipment safely.

⚠DANGER	Signal word used to indicate an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠WARNING	Signal word used to indicate a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠CAUTION	Signal word used to indicate a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

2. Handling Precautions

⚠ CAUTION

The specifications of the product are subject to change without notice for enhancement and quality improvement. Even when using the product continuously, be sure to read the manual in the CONTEC's website and understand the contents.

Do not modify the software.

CONTEC will bear no responsibility for any problems, etc., resulting from modifying the software.

Regardless of the foregoing statement, CONTEC assumes no responsibility for any errors that may appear in this document or for results obtained by the user as a result of using the software.

3. Security Warning

When connecting to the network, be aware of security-related problems. See the examples of Security measures below and set up the product properly along with the network devices.

1. Information security risks

Unauthorized access from the outside through a network could cause the system halt, data damage, or exposure to malware. *1

Invaded and used as a stepping stone, a device might attack the others through networks. (a victim becomes an assailant)

Information might leak without realizing due to the connection to the network.

Secondary damages such as harmful rumors, liability in damages, social credibility fall, and opportunity loss are expected led by the troubles described above.

*1: Malware (Malicious Software) is software that brings harm to a computer system and performs unintended operations.

2. Security measures – e.g.

Do not keep using the default password. (Refer to the product manual for the password setting).

Set a strong password.

> Combined with upper and lowercase letters, and numbers so that it cannot be easily analogized by others.

Change the password periodically.

Disable unnecessary network services and functions.

Restrict access to the network with network devices. *2

Restrict ports to be released on the network with network devices. *2

Create a closed network connection using such as dedicated network or VPN*3

*2: Inquire for setting procedure to manufacturers.

*3: VPN (Virtual Private Network) a secured network that wards off unauthorized access by protecting the communication path with authentication and encryption.

> Unfortunately, there are no perfect ways to avert unauthorized access or close a security hole that are endlessly found day and night.
>
> Please understand that risks are always involved with the Internet connection, and we strongly recommend a user should constantly update information security measures.

SDK preparation

1. Required items for development

CONPROSYS
SDHC card (2Gbyte or larger, non-SDXC-compliant)
Cable for serial monitor (Recommended cable: TTL-232R-3V3-AJ by FTDI)
LAN Cable
PC

2.Creating a booting SD card for CONPROSYS

1. Preparation for the SD card image file

Download the SD image file from the CONTEC website. The image file is common to all models.

When starting up, the system software recognizes the model type and configures the settings according to its hardware. The SD image file can also be created by using "CONPROSYS Linux SDK Cross building edition" on Ubuntu of the host PC for development. Please refer to the "Cross building" User's Manual.

2. Tool chain installation necessary for SDK

Write the image file that was either by downloaded or created with "CONPROSYS Linux SDK Cross building edition" into the SD card.

The downloaded image file is a zip file. Decompress it into img file before start writing it in the SD card. Please use the SD card larger than the img file size.

[For Windows]

The following example demonstrates writing procedure with Win32 Disk Imager.

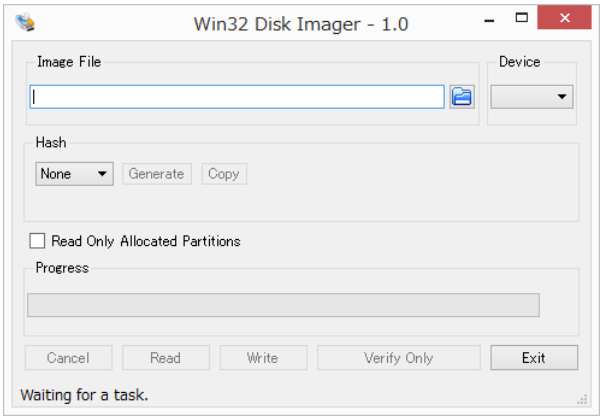
Before you start, download the installer of the Win32 Disk Imager from the website (see below) and install it in the Windows PC.

https://sourceforge.net/projects/win32diskimager/

1 Insert the SD card into Windows PC.

2 Start Win32 Disk Imager.

Win32 Disk Imager



3 Select an image file to write
Check whether the SD card is selected for writing destination in the Device field.
Click "Write" button.

4 Pop-up message appears to notify of the writing completion.
Click "Write" button and remove the SD card.

[With Linux]

1 Unmount the SD card if it is mounted.

```
sudo umount /dev/sdb
```

2 Write the image file into the SD card by dd command.

```
sudo dd if=sd.img of=/dev/sdb bs=1M
```

3 Synchronize the file by sync command.

```
sync
```

4 Remove the SD card when the synchronizing is completed.

Starting CONPROSYS

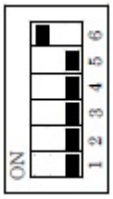
1. Preparation

Check DIP SW of each CONPROSYS product and make sure SD boot mode is enabled.

◆ Integrated type (e.g., CPS-Mx341-xxx) (Including Gateway Series)

No.6 of DIP SW1 is ON. (SD boot mode enabled)

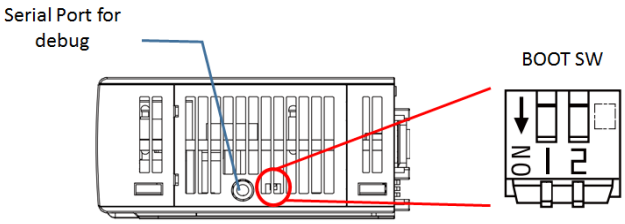
Integrated type BOOT SW setting



◆ Configurable type (e.g., CPS-MxS341-xxx)

No.2 PIN of BOOT SW (inside of the case) next to the debagging serial port (3.5Φ MINI-JACK) is ON. (SD boot enabled)

Configurable type BOOT SW setting



By connecting a serial cable from the host PC to CONPROSYS through the serial port (3.5Φ MINI-JACK), you can login from the console to the product. See the setting details below.

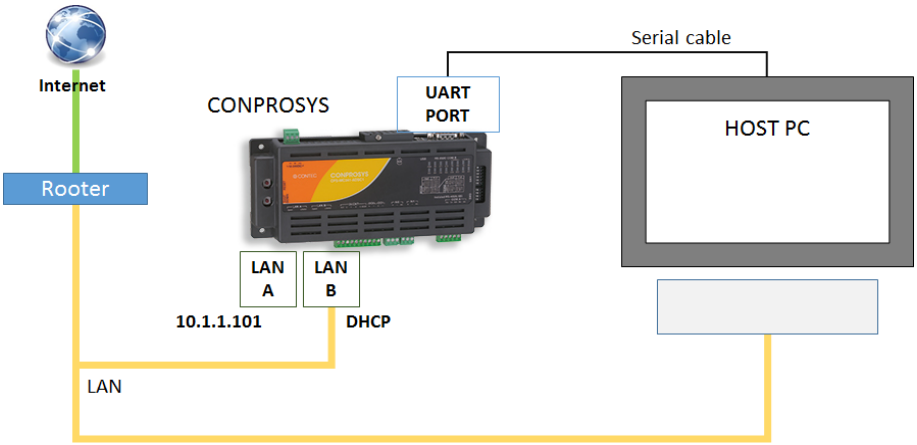
Baud rate:	115200 bps
Data bit:	8 bit
Parity:	none
Stop bit:	1 bit
Hardware flow:	none

We recommend the following serial cable for connecting the host PC to CONPROSYS.
Download appropriate driver software to match OS of PC for serial monitoring.

TTL-232R-3V3-AJ by FTDI
URL for driver: http://www.ftdichip.com/Drivers/VCP.htm

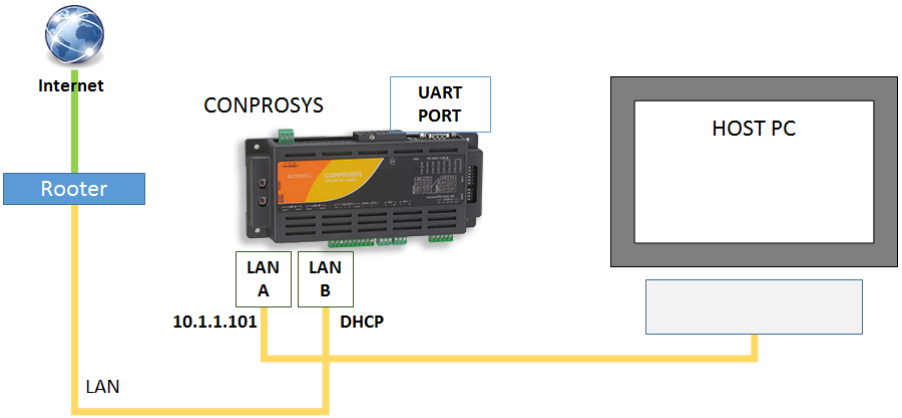
Connect LAN B to a Rooter connected to Internet so that the Ubuntu software package can be upgraded.

A connecting example of CONPROSYS and PC (Serial monitor)



In the default setting, 10.1.1.101 is set in LAN A port (I/F on Linux is eth0), and DHCP network is set in LAN B port (I/F on Linux is eth1). Also, you can connect LAN cable to CONPROSYS directly from the host PC to access 10.1.1.101- IP address via network.

A connecting example of CONPROSYS and PC (Ether connection)



2.Start up

Insert the created SD card and turn on the power of the product.

The Ubuntu starts on the CONPROSYS. The LED of the PWR is lit when booting is completed.

After Ubuntu booting, the product becomes the log-in prompt status in a serial console.

Log in with the following account.

Login: conprosys
Password: contec

You can also log in by ssh when connected through network.

The license agreement appears upon the initial log-in and ask you to assent to all terms.

Enter "Yes" or "No".

With entering "Yes", the contents of agreement no longer appears when you log in from the next time and allow you to write into the SD card.

With entering "No", you are not permitted to write in the SD card and asked to display the contents and assent to them.

3.About File System

To prevent the system from crashing, the root file system (SD card) of CONPROSYS Linux SDK starts up in Read Only mode. By assenting with the software license agreement to log in, you are permitted to write into root file system. Once logging out, the system returns to Read Only mode. (Directory on ramdisk such as /tmp is writable without logging in).

See the followings to write a file into SD card when you are not logged in.

Change two files where Read Only is set.

Edit uEnv.txt file in fat partition.

Before change:

bootargs=console=ttyO0,115200n8 root=/dev/mmcblk0p2 ro rootfstype=ext3 rootwait

After change:

bootargs=console=ttyO0,115200n8 root=/dev/mmcblk0p2 rw rootfstype=ext3 rootwait

Edit /etc/fstab file of rootfs partition.

Before change:

rootfs / rootfs ro,noatime 0 0

After change:

rootfs / rootfs rw,noatime 0 0

Other than rootfs ext3 partition, create a new partition by fdisk and mount it to write a file.

See "**Create a new partition in the blank area of the memory. (page 38)**" in "**Expand the size of the SD card memory. (page 38)**".

Run environment setting

1. Web Setup function

CONPROSYS Linux contains the web server function. As standard functions of Self-Build edition SDK, settings of network, date & time, as well as displays of system information, network are supplied.

To display the setup page, access directly the IP address of CONPROSYS from Web browser on PC.

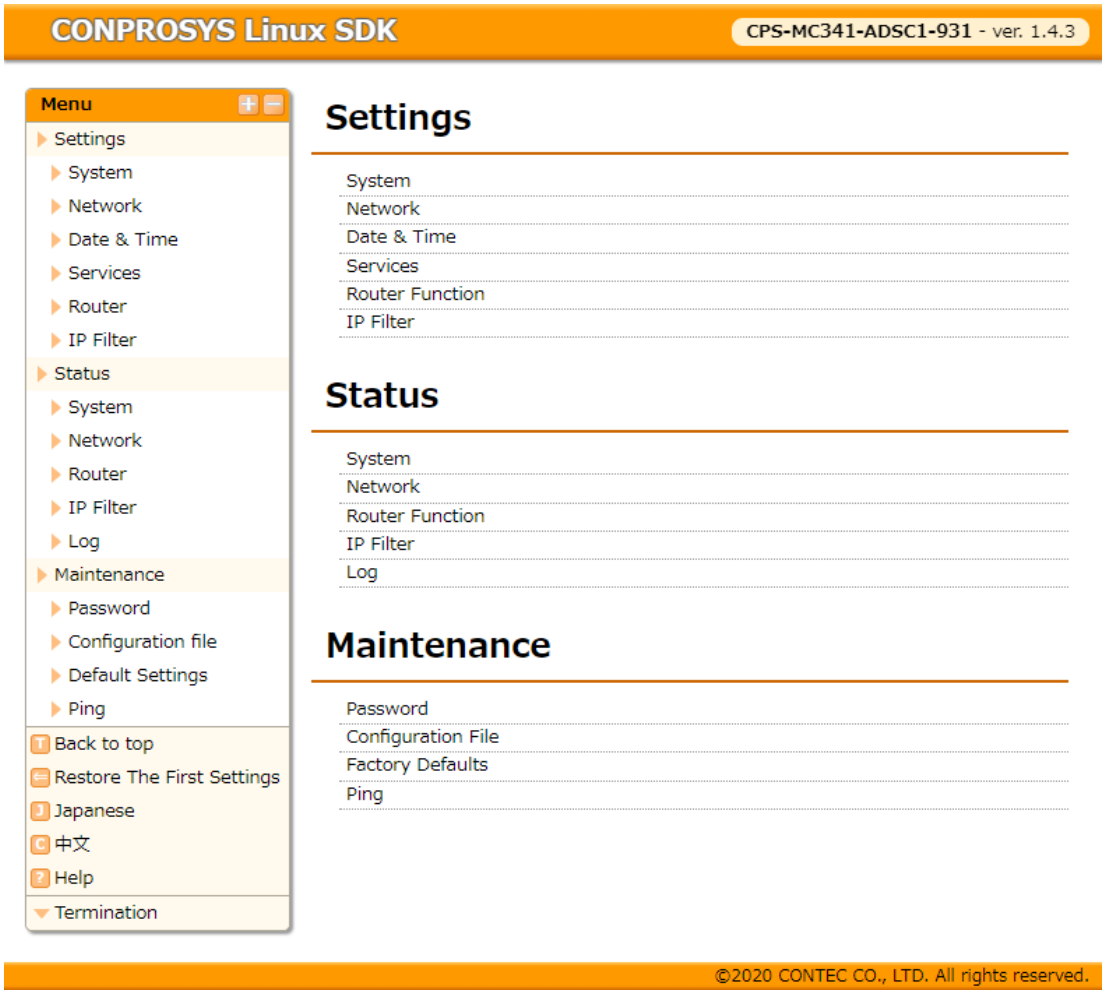
An example: Connect the PC to the LAN A port at the time of initial setting, and see whether the page can be brought in.

http://10.1.1.101/

Login: admin

Password: password

Web setup page



Web Setup features following functions.

1. Setting

Each setting below can be set.

Setting menu

Setting type	Content	Default value	Note
System	Host name	(Blank)	Use the following host name when there is no item in the setting The model name + the lower 3 bytes of MAC address
Network	Wired LAN A	10.1.1.101(fixed IP)	
	Wired LAN B	DHCP	
	3G/LTE network		3G/LTE model exclusively
	Wireless LAN	DHCP	Only when connecting with supported USB wireless adopter
Data & Time	NTP server	(Blank)	
	Manual setting		
Service	SSH server	Upon system booting: enabled	
	FTP server	Upon system booting: disabled	
	SAMBA server	Upon system booting: disabled	
Rooter function	Rooter function	Upon system booting: disabled	
	WAN interface		
	DHCP server function	Upon system booting: disabled	
	Static routing setting	Upon system booting: disabled	The maximum number of settings:32
	Port forwarding setting	Upon system booting: disabled	The maximum number of settings:32
IP filter	IP filter setting	Upon system booting: disabled	The maximum number of settings:64

2. Status

Each status below can be checked.

Status menu

Item	Description
System	This displays the host name, serial number, distribution/kernel information, a disk/memory usage, and so on.
Network	This displays such as IP address, MAC address, and RX/TX bytes.
Router Function	This displays is routing information.
IP Filter	This displays is IP filtering information.
Log	This displays such as syslog, other logs.

3. Maintenance

Each maintenance menu is described below.

Maintenance menu

Item	Description
Password	Password to access WEB setting page of the device can be changed.
Configuration File	The configuration file can be backed up and restored.
Default Setting	This restores the factory default setting.
Ping	Ping can be executed on the device to check network conduction.

4. Termination

Each termination menus is described below.

Termination menu

Item	Description
Save and Reboot	This saves the settings and reboots the device.
Save and Shutdown	This saves the settings and shuts down the system.
Save	This saves the settings.
Reboot	This reboots the device. If the settings are not saved before rebooting, settings return to the previous ones prior to the setting.
Shutdown	This shuts down the system. If the settings are not saved before shutting down, settings return to the previous ones prior to the setting.

For further details of each web setup function, refer to "Help" in Web menu.

Setting items are managed in the files below.

Configuration File:

/etc/conprosys/config.ini

Factory default setting file:

/etc/conprosys/config_def.ini

Web file is managed in the directory below.
Web content directory:

/var/www/html/

2. Network setting

Default network setting is set as follows:

[Default setting]
LAN A (eth0): 10.1.1.101
LAN B (eth1): DHCP

* When executing a kernel generated with 1lan (SINGLE EtherMAC), the setting of LAN B is invalid (operated by HUB mode).

The network can be set by connecting to CONPROSYS through LAN from Web browser on PC.
For details, refer to "**Web Setup function (page 25)**".
If you would like to change the network setting by command prompt, edit the file below on the target with root privileges. The settings can be enabled by rebooting this file.

/etc/conprosys/config.ini

LAN Configuration

Item name	Description
eth0_dhcp	Set DHCP enabled or disabled of LAN A (eth0). enabled disabled
eth0_ipaddr	Set IP address of LAN A (eth0).
eth0_netmask	Set a netmask of LAN A (eth0).
eth0_gateway	Set a gateway address of LAN A (eth0).
eth0_dns1	Set DNS server address of LAN A (eth0).
eth1_dhcp	Set DHCP enabled or disabled of LAN B (eth1). enabled disabled
eth1_ipaddr	Set IP address of LAN B (eth1).
eth1_netmask	Set a netmask of LAN B (eth1).
eth1_gateway	Set a gateway address of LAN B (eth1).
eth1_dns1	Set DNS server address of LAN B (eth1).
ntp_addr	Set NTP server.
host_name	Set a host name. The following name is used as the default host name since there is no item in the setting. The model name + the lower 3 bytes of MAC address

3G/LTE network configuration

Item name	Description
m3g_connect	Set 3G/LTE connection enabled or disabled. enabled disabled
m3g_apn	Set APN supplied by network service provider.
m3g_user	Set User ID supplied by network service provider.
m3g_passwd	Set password supplied by network service provider.
m3g_auth	Set the following encryption supplied by network service provider. None PAP CHAP

Wireless LAN configuration

Item name	Description
wlan_dhcp	Set DHCP enabled or disabled of wireless LAN (wlan0). enabled disabled
wlan_ipaddr	Set IP address of wireless LAN (wlan0).
wlan_netmask	Set a netmask of wireless LAN (wlan0).
wlan_gateway	Set a gateway address of wireless LAN (wlan0).
wlan_dns1	Set DNS server address of wireless LAN (wlan0).
wlan_essid	Set SSID of wireless LAN (wlan0).
wlan_encrypt	Set a cipher for wireless LAN (wlan0) by choosing one listed below [Setting items] No cipher:: none WEP: wep WPA-PSK AES: wpapsk-aes WPA-PSK TKIP: wpapsk-tkip WPA2-PSK AES: wpa2psk-aes WPA2-PSK TKIP: wpa2psk-tkip WPA/WPA2-PSK automatic: wpawpa2psk-auto
wlan_key	Set a cipher key for wireless LAN (wlan0).

Service startup setting

Item name	Description
srv_ssh	Set SSH server startup. enabled disabled
srv_ftp	Set FTP server startup. enabled disabled
srv_samba	Set Samba server startup. enabled disabled

Rooter function setting

Item name	Description
router	Set rooter function enabled disabled
wan_if	Set WAN interface 3G: eth2 LTE: ppp0 Wireless LAN: wlan0 LAN A: eth0 LAN B: eth1

DHCP server function setting

Item name	Description
dhcp_server	Set DHCP server startup. enabled disabled
dhcp_server_lan_if	Set LAN interface of DHCP server. Wireless LAN: wlan0 LAN A: eth0 LAN B: eth1
dhcp_server_top_addr	Set DHCP initial address.
dhcp_server_alloc_num	Set the number of DHCP address allocations.

PPPoE function setting

Item name	Description
pppoek *1	Set PPPoE function. enabled disabled
pppoe_connect	Set PPPoE enabled or disabled. enabled disabled
pppoe_if	Set PPPoE interface. LAN A: eth0 LAN B: eth1
pppoe_user	Set the user name of PPPoE.
pppoe_password	Set the password of PPPoE.
pppoe_dns	Set the DNS server of PPPoE.
pppoe_firewall	Set firewall of PPPoE NONE: 0 STANDALONE: 1 MASQUERADE: 2

*1 PPPoE function setting (pppoe) cannot be set in the Web Setup.
The web setup of PPPoE can be done when only pppoe setting is enabled.

Static routing function setting

Item name	Description
static_route	Set static routing function. enabled disabled
st_route_addr_1	Set the destination IP address of static routing.
st_route_gw_1	Set the gateway address of static routing.
st_route_mask_1	Set the net mask of static routing.
st_route_if_1	Set the interface of static routing.
:	
st_route_addr_32	Set the destination IP address of static routing.
st_route_gw_32	Set the gateway address of static routing.
st_route_mask_32	Set the net mask of static routing.
st_route_if_32	Set the interface of static routing.

* The number in the item names indicates setting number (up to 32).

Port forwarding function setting

Item name	Description
port_forward	Set port forwarding function. enabled disabled
port_fw_sif_1	Set port forwarding input interface.
port_fw_sport_1	Set port forwarding input port.
port_fw_daddr_1	Set port forwarding destination IP address.
port_fw_dport_1	Set port forwarding destination port.
⋮	
port_fw_sif_32	Set port forwarding input interface.
port_fw_sport_32	Set port forwarding input port.
port_fw_daddr_32	Set port forwarding destination IP address.
port_fw_dport_32	Set port forwarding destination port.

* The number in the item names indicates setting number (up to 32).

IP filter function setting

Item name	Description
ipfilter	Set IP filter function. enabled disabled
ipfilter_kind_1	Set filter type. ACCEPT DROP
ipfilter_proto_1	Set protocol. tcp, udp, icmp, all
ipfilter_saddr_1	Set the source IP address.
ipfilter_sport_1	Set the source port.
ipfilter_daddr_1	Set the destination IP address.
ipfilter_dport_1	Set the destination port.
⋮	
ipfilter_kind_64	Set filter type. ACCEPT DROP
ipfilter_proto_64	Set protocol. tcp, udp, icmp, all
ipfilter_saddr_64	Set the source IP address.
ipfilter_sport_64	Set the source port.
ipfilter_daddr_64	Set the destination IP address.
ipfilter_dport_64	Set the destination port.

* The number in the item names indicates setting number (up to 64).

Reboot the system after editing the configuration file.

```
sudo reboot
```

Example 1) set "eth0" to "DHCP"

eth0_dhcp= enabled
eth0_ipaddr=
eth0_netmask=
eth0_gateway=
eth0_dns1=

Example 2) set "eth0" to other fixed IP (192.168.30.11)

eth0_dhcp=disabled
eth0_ipaddr=192.168.30.11
eth0_netmask=255.255.255.0
eth0_gateway=192.168.30.1 (arbitrary)
eth0_dns1=192.168.30.255 (arbitrary)

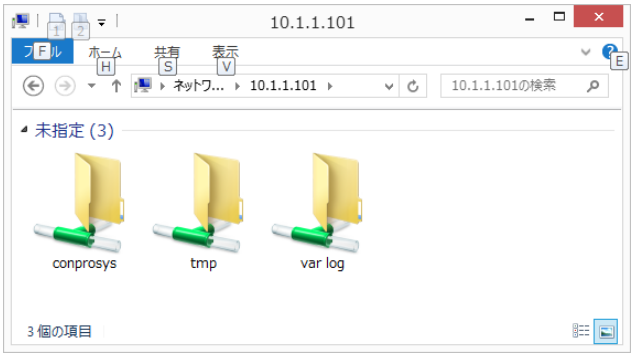
Execute the command below to check the network setting.

```
Ifconfig
```

3. Samba Setting

CONPROSYS Linux contains the web server function. As standard functions of Self-Build edition SDK, settings of network, date & time, as well as displays of system information, network are supplied.

To display the setup page, access directly the IP address of CONPROSYS from Web browser on PC.



[Access folder]

Windows side	Linux side directory	Note
conprosys	/home/conprosys	Read/Write available upon login once getting the approval of the license agreement.
tmp	tmp	Read/Write available
var log	/var/log	Reading solely (Writing is not available)

Accessing CONPROSYS by Explorer of Windows PC enables you to directly open the files such as program source code with Windows application.

[Samba startup procedure]

The network can be set by connecting to CONPROSYS through LAN from Web browser on PC.

For details, refer to "**Web Setup function (page 25)**".

If you would like to start up by command prompt, execute the command listed below.

```
sudo service smbd start
sudo service nmbd start
```

Edit the following file to set the Samba access folder and/or the authorization.

/etc/samba/smb.conf

After the file edit, the settings are enabled by rebooting Samba service. If you would like to know more details, please refer to Samba website. (www.samba.org)

[Samba reboot procedure by command prompt]

```
sudo service smbd restart
```

```
sudo service nmbd restart
```

4. Install the software package for Ubuntu

Connecting CONPROSYS to the internet enables you to install the software package of Ubuntu by apt-get command.

◆ Preparation

Before installing the software, update apt repository information by the command listed below.

```
sudo apt-get update
```

◆ Upgrade the software package.

To upgrade the version of software that is already installed, execute the command listed below. The software can be upgraded if its version is the latest.

```
sudo apt-get upgrade
```

◆ Install the software package

Execute the command listed below to install the software package you wish

```
sudo apt-get install <The name of the software>
```

An example : Installation of MySQL Client

```
sudo apt-get install mysql-client
```

If you are uncertain of the name of the software, you can try a keyword search with the command listed below.

```
sudo apt-cache search <keyword>
```

An example : Searching the package of mosquitto client

```
sudo apt-cache search mosquitto
```

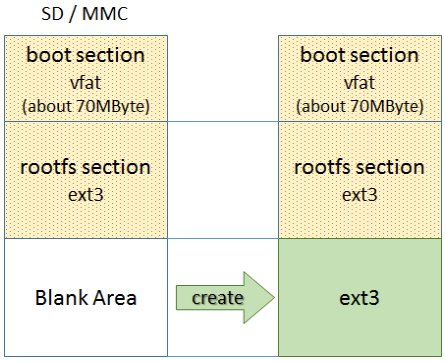
5. Expand the size of the SD card memory.

When a SD card image file is written into the SD card, and even the memory size of the SD card is larger than the image file, the whole memory size cannot be used.

To use the memory size fully, use one of the methods described below.

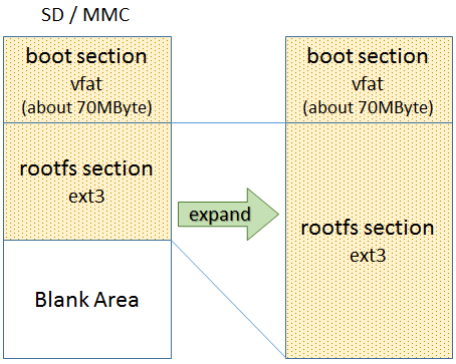
◆ Create a new partition in the blank area of the memory.

Create a new partition in the blank area of the memory



◆ Expand the rootfs partition (ext3) of Linux to the maximum memory size in the SD card.

Expand rootfs partition



[Create a new partition in the blank area of the memory.]

1 Start the CONPROSYS.

2 Open the SD card device by fdisk to add a new Linux partition.

```
sudo fdisk /dev/mmcblk0
```

i) Add a new Linux partition by n command. Parameter is set as follows:

<Parameter>

Command (m for help): <n>

Partition type: <p>

Partition number : <3>

Last sector: <default value>

ii) Write the partition information by w command.

Command (m for help): w

3 Reboot CONPROSYS with the command below.

```
sudo reboot
```

4 Confirm the device of /dev/mmcblkk0p3 is available. Format the new created partition.

```
sudo mkfs -t ext3 /dev/mmcblk0p3
```

5 Create the destination for the new partition and mount it.
An example: mounting directory /mnt/ext_mmc

```
sudo mkdir /mnt/ext_mmc
```

```
sudo mount /dev/mmcblk0p3 /mnt/ext_mmc
```

6 Add the setting in /etc/fstab to mount automatically upon booting for the next time succeeding.

An example: mounting directory /mnt/ext_mmc

/dev/mmcblk0p3 /mnt/ext_mmc ext3 defaults 0 0

[Expand the rootfs partition of Linux to the maximum memory size in the SD card]

1 Start the CONPROSYS.

2 Open the SD card device by fdisk to change a Linux partition.

```
sudo fdisk /dev/mmcblk0
```

i) Display the present partition information by p command.

Take a note of the information displayed.

*Especially the Start / End address of /dev/mmcblk0p2.

[A display example: a SD card with 4GByte is run by Ubuntu14.04]

```
Command (m for help): p
Disk /dev/mmcblk0: 7746 MB, 7746879488 bytes
255 heads, 63 sectors/track, 941 cylinders, total 15130624 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000
```

Device	Boot	Start	End	Blocks	Id	System
/dev/mmcblk0p1	*	63	144584	72261	c	W95 FAT32(LBA)
/dev/mmcblk0p2		144585	7855784	3847567+	83	Linux

ii) Delete Linux partition (Partition number: 2) by d command.

```
Command (m for help): d
Partition number (1-4): 2
```

iii) Add the Linux partition by n command.

For this, set the parameter as described below.

<Parameter>

```
Command (m for help): n
Partition type: p
Partition number : 2
```

First sector: <default value> (the Start address of /dev/mmcblk0p2 which you took a note by p command)

Last sector: <default value > (the End address of /dev/mmcblk0p2 which you took a note by p command)

iv) Display the changed partition information by p command.

Check whether the End address and Blocks of /dev/mmcblk0p2 are changed.

A display example: a SD card with 4GByte is run by Ubuntu14.04]

Command (m for help): p

Disk /dev/mmcblk0: 7746 MB, 7746879488 bytes

255 heads, 63 sectors/track, 941 cylinders, total 15130624 sectors

Units = sectors of 1 * 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes

I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk identifier: 0x00000000

Device	Boot	Start	End	Blocks	Id	System
/dev/mmcblk0p1	*	63	144584	72261	c	W95 FAT32 (LBA)
/dev/mmcblk0p2		144585	15130623	7484987	83	Linux

v) Write the partition information by w command.

Command (m for help): w

3 Reboot CONPROSYS with the command below.

```
sudo reboot
```

4 Resize the partition that was changed by resize2fs command.

```
sudo resize2fs /dev/mmcblk0p2
```

*It may take quite a long time to complete the resizing.

(several to several dozen minutes depending on the memory size)

After resize2fs command is completed, confirm whether the memory size is expanded by df command.

```
df
```

6. Swap memory setting

CONPROSYS memory may not be enough for building large source code. You can expand the memory by creating a swap file on the disk.

◆ An example: Creating 512Mbyte of SWAP memory

1 Create a SWAP file.

```
dd if=/dev/zero of=/home/swapfile bs=1024 count=512000
mkswap /home/swapfile
```

2 Set the SWAP file.

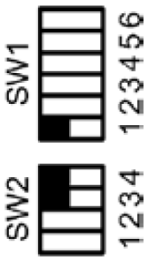
```
sudo swapon /home/swapfile
```

Once you create the SWAP file, you only need to set the file after next time.

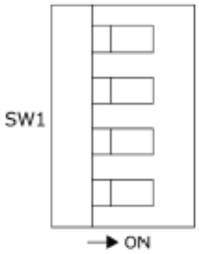
7. Initialization setting with DIP SW

With the DIP SW, restoring the factory settings of LAN A or only initializing LAN A in IP address can be implemented when the power is turned on.

Integrated type



Configurable type



DIP SW Setting Contents

SW settings	Description
Turn on SW1-2 only	Starts up IP address with the factory settings when the power is on. As for User/Password and Group settings, the system starts up with the previous settings. The present settings of IP address and User/Password can be viewed on Web setup page.
Turn on SW1-2 and SW1-3	Restores the factory settings of individual settings when the power is on. When the restoring has finished, PWR and ST1 of LED start flashing. After confirming the flashing, turn off SW2 and SW3, then restart the system.

8. Sample programs

CONPROSYS Linux SDK contains the sample programs of C language available per model.
("Available Sample programs")
These sample programs can be self-built by gcc on CONPROSYS.

Available Sample programs

Sample program	Directory ~/sample/	CPS-MC341-ADSCx CPS-MC341G-ADSC1 CPS-MG341G5-ADSC1	CPS-MC341Q-ADSC1	CPS-MC341-Ax	CPS-MC341-DSx	CPS-MC341-DS1x	CPS-MCS341-DSx CPS-MCS341G-DS1 CPS-MCS341G5-DS1 CPS-MGS341-DS1 CPS-MGS341G5-DS1	CPS-MCS341Q-DS1
TCP/IP server/client	socket	○	○	○	○	○	○	○
Timer	timer	○	○	○	○	○	○	○
EEPROM data read	getEepromData	○	○	○	○	○	○	○
CAN transmission/reception test	can			Δ	Δ			
RS-485 communication (Integrated type)	RS485	○	○	Δ	○	○		
DI/DO, AI control (Multi-function model)	mc341_io	○	○					
AI/AO control (Integrated type)	mc341-ax_aio			○				
AI/AO control (Configurable Type)	mcs341_aio						○	○
DI/DO control (Integrated type)	spitest	○	○		○	○		
http control (DIO) (Integrated type)	http_post	○	○		○	○		
DI/DO control (Configurable Type)	mcs341_dio						○	○
SSI control (Configurable Type)	mcs341_ssi						○	○
COM control (Configurable Type)	mcs341_com						○	○
CNT control (Configurable Type)	mcs341_cnt						○	○
System control (Configurable Type)	mcs341_system						○	○
iolib control (Configurable Type)	mcs341_iolib						○	
920MHz transmission/reception test	conexio_CMM920		○					○

○: Available,Δ: Available with specific models, Blank: not available

To self-build a sample program, execute a make command in the directory of the sample program.
This generates the executable files.

An example: a sample program of timer.

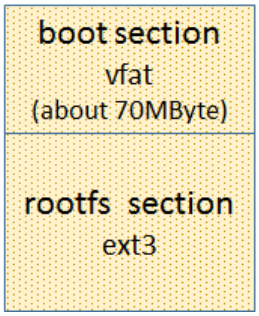
```
cd ~/sample/timer
make
```

Appendix

1. File system structure

◆ SD / MMC card image structure

SD / MMC card image structure



boot section: u-boot, kernel etc.

rootfs section: Ubuntu

[SD card disk storage usage]

boot section: approx. 3.6Mbyte used

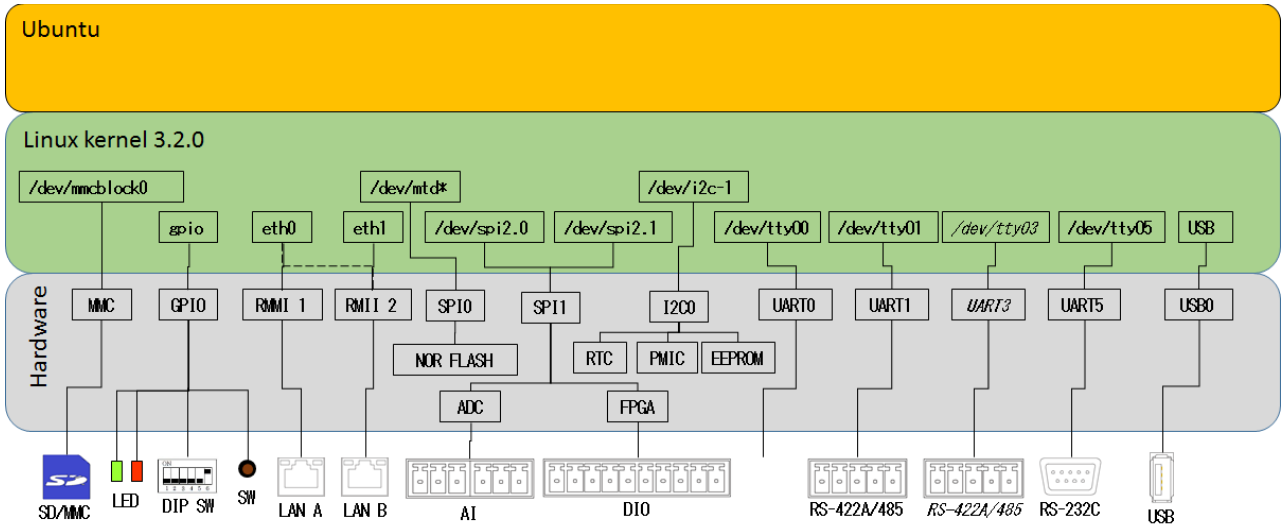
rootfs section: approx. 750Mbyte used

[Ubuntu boot 14.04 file system]

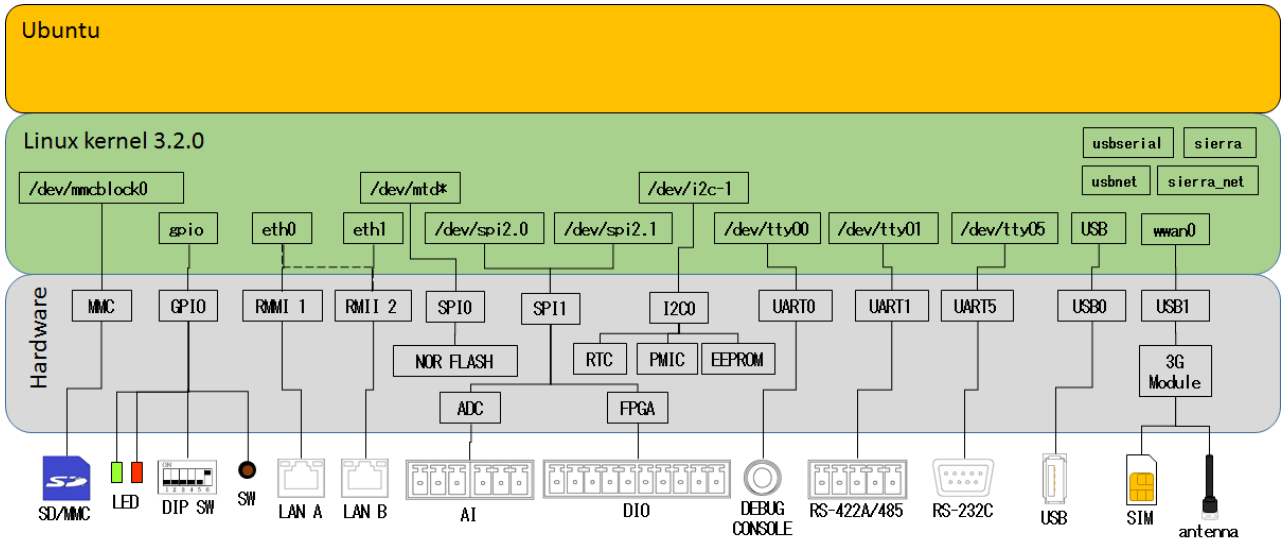
Filesystem	Mounted on	type
/dev/root	/	ext3
devtmpfs	/dev	devtmpfs
tmpfs	/tmp	tmpfs
tmpfs	/run	tmpfs
tmpfs	/var/log	tmpfs
tmpfs	/var/tmp	tmpfs
tmpfs	/var/spool	tmpfs
tmpfs	/var/opt	tmpfs
tmpfs	/var/mail	tmpfs
tmpfs	/var/local	tmpfs
tmpfs	/var/lib/dhcp	tmpfs
tmpfs	/var/lib/dhcp3	tmpfs
tmpfs	/var/lib/urandom	tmpfs
tmpfs	/var/lib/ntpdate	tmpfs
tmpfs	/var/lib/plymouth	tmpfs
tmpfs	/var/lib/upstart	tmpfs
tmpfs	/var/lib/samba	tmpfs
tmpfs	/var/cache/apt	tmpfs
tmpfs	/var/cache/samba	tmpfs
none	run/lock	tmpfs
none	run/shm	tmpfs
none	/run/user	tmpfs
tmpfs	/var/log/news	tmpfs
tmpfs	/var/log/apache2	tmpfs
tmpfs	/var/log/upstart	tmpfs
tmpfs	/var/log/plymouth	tmpfs
tmpfs	/var/log/samba	tmpfs
tmpfs	/var/lib/samba/private	tmpfs

2. Block diagram

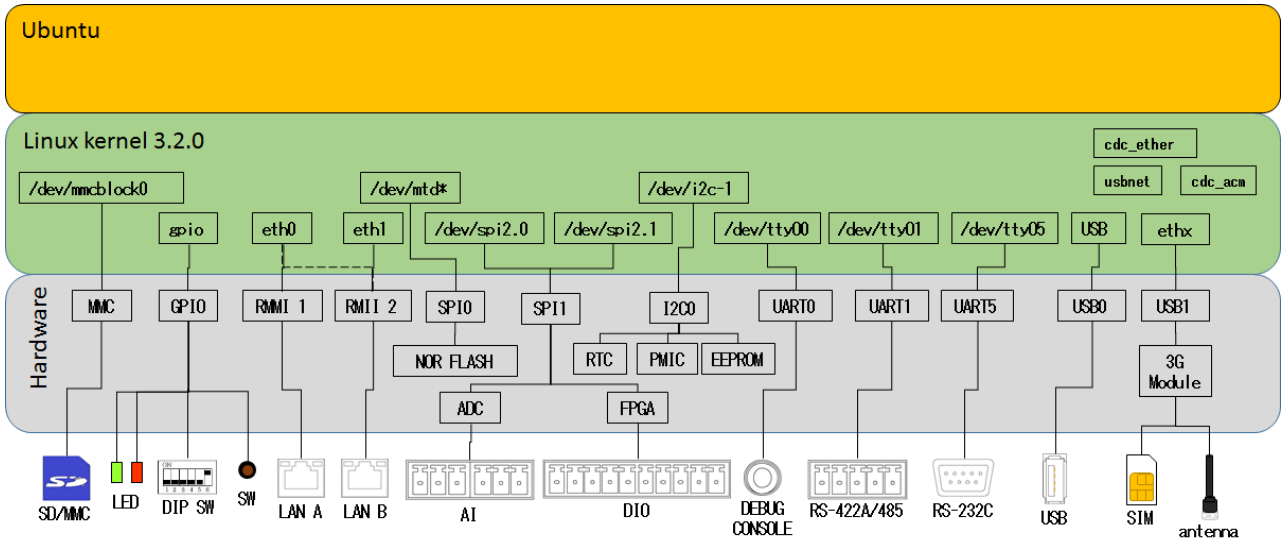
CPS-Mx341-ADSCx series block diagram *(Italic font means optional choices)*



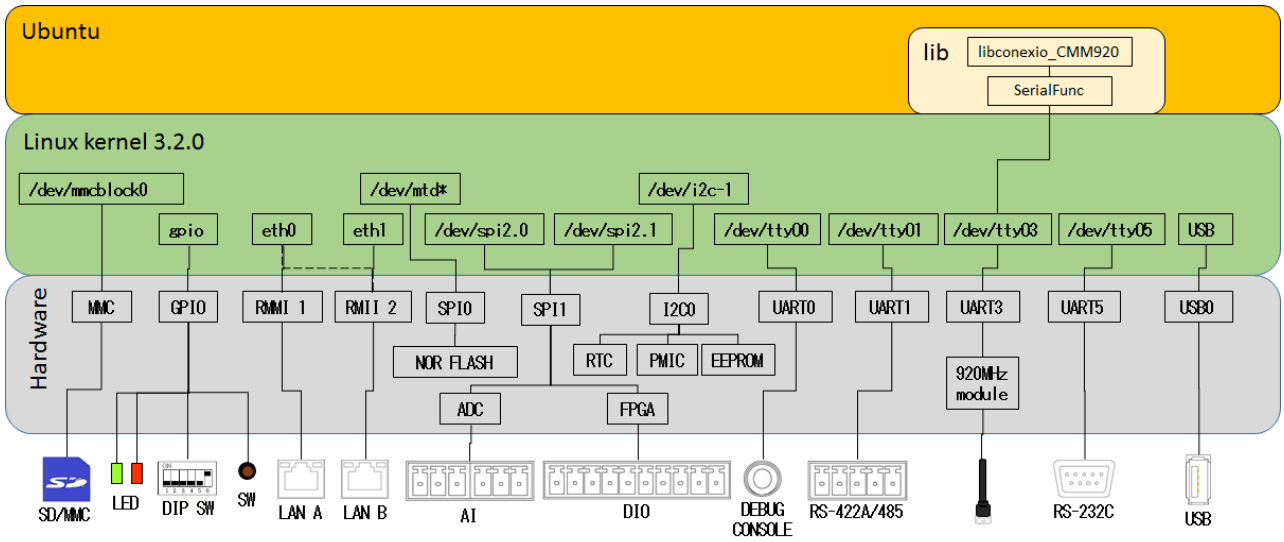
CPS-Mx341G-ADSC1 (Japan Domestic model) block diagram



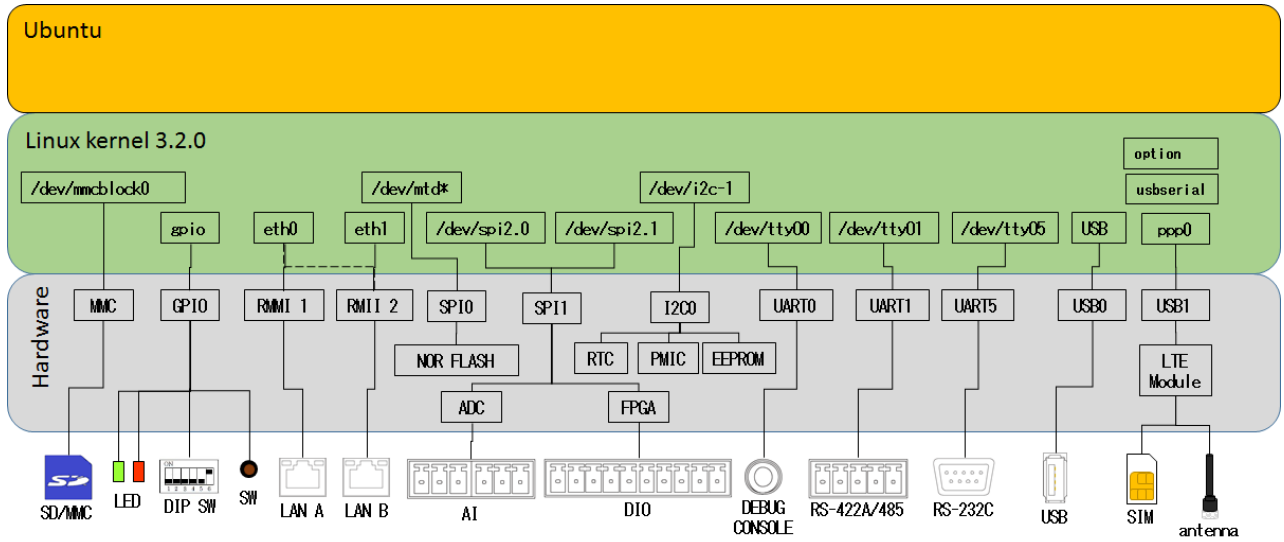
CPS-Mx341G-ADSC1 (Global model) block diagram



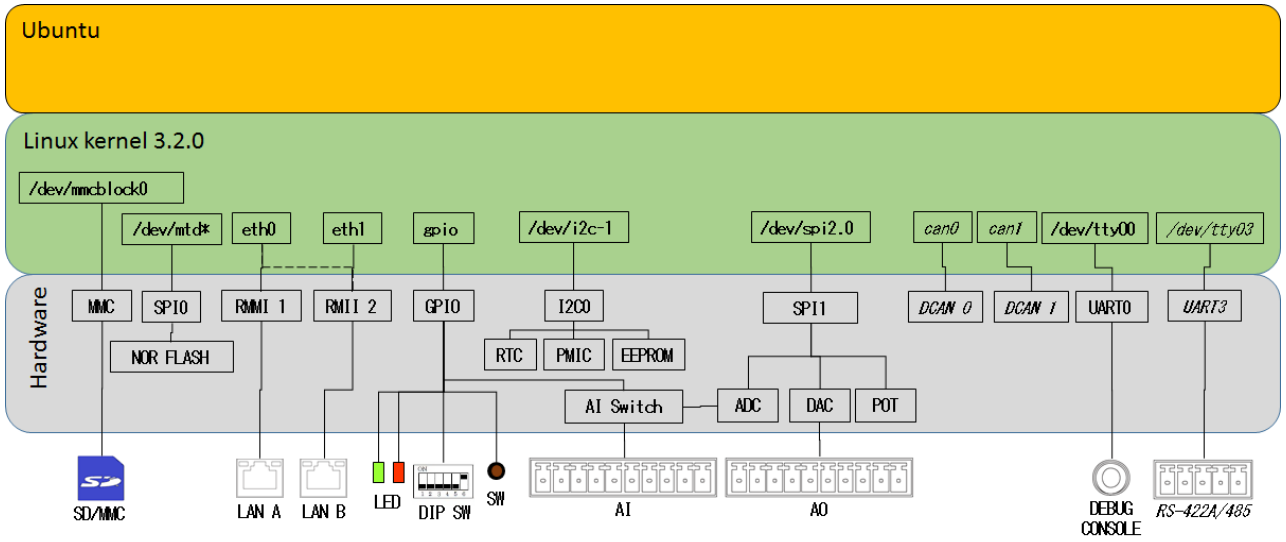
CPS-MC341Q-ADSC1 block diagram



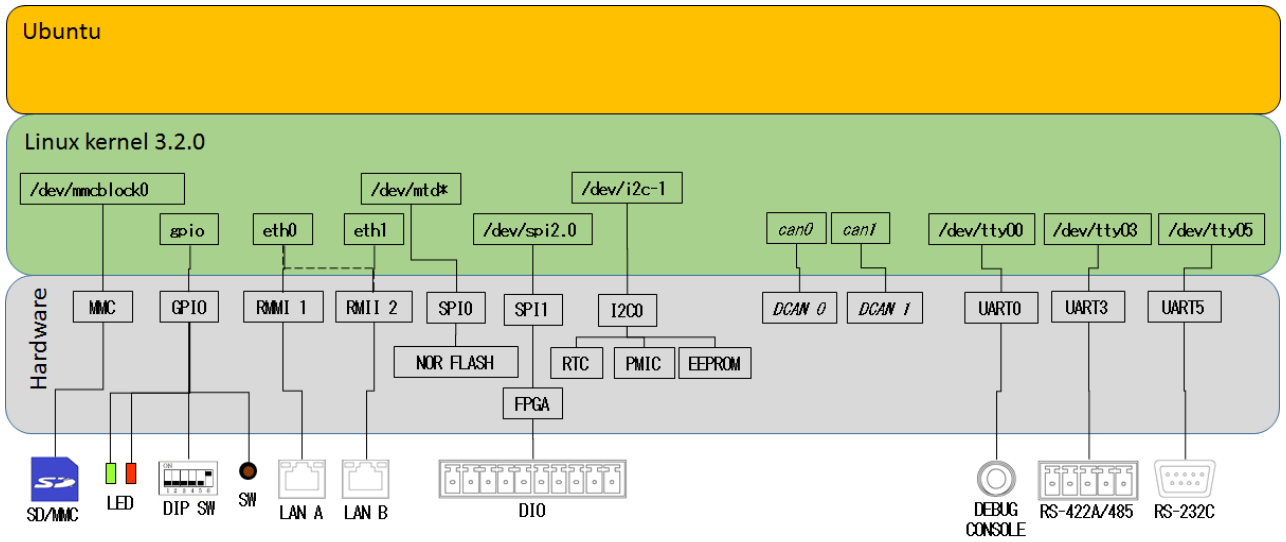
CPS-MG341G5-ADSC1 block diagram



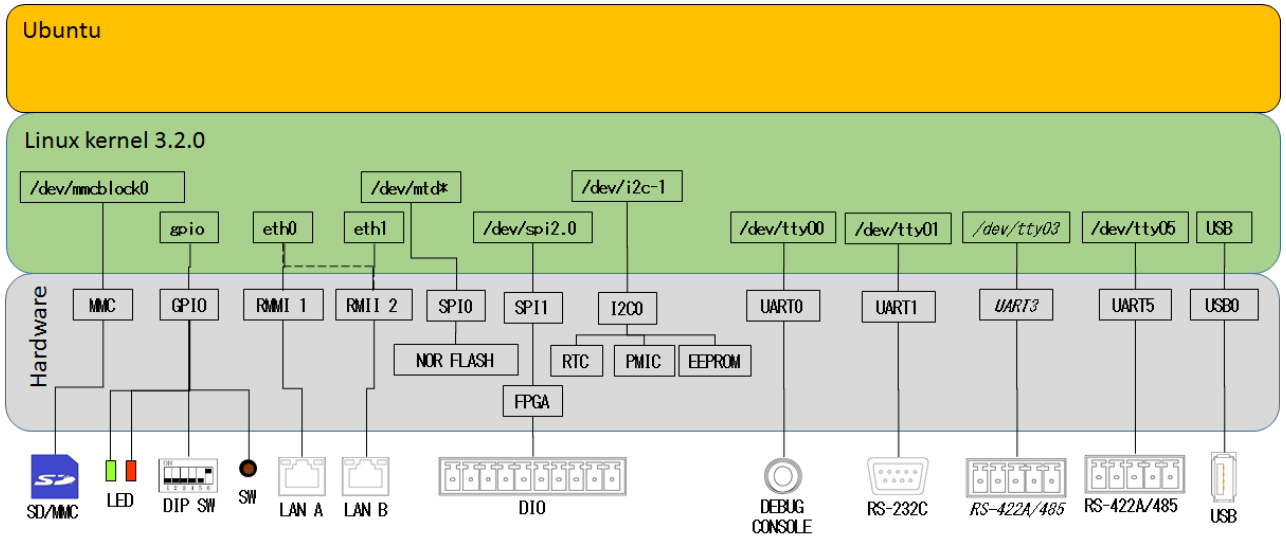
CPS-MC341-Ax series block diagram *(Italic font means optional choices)*



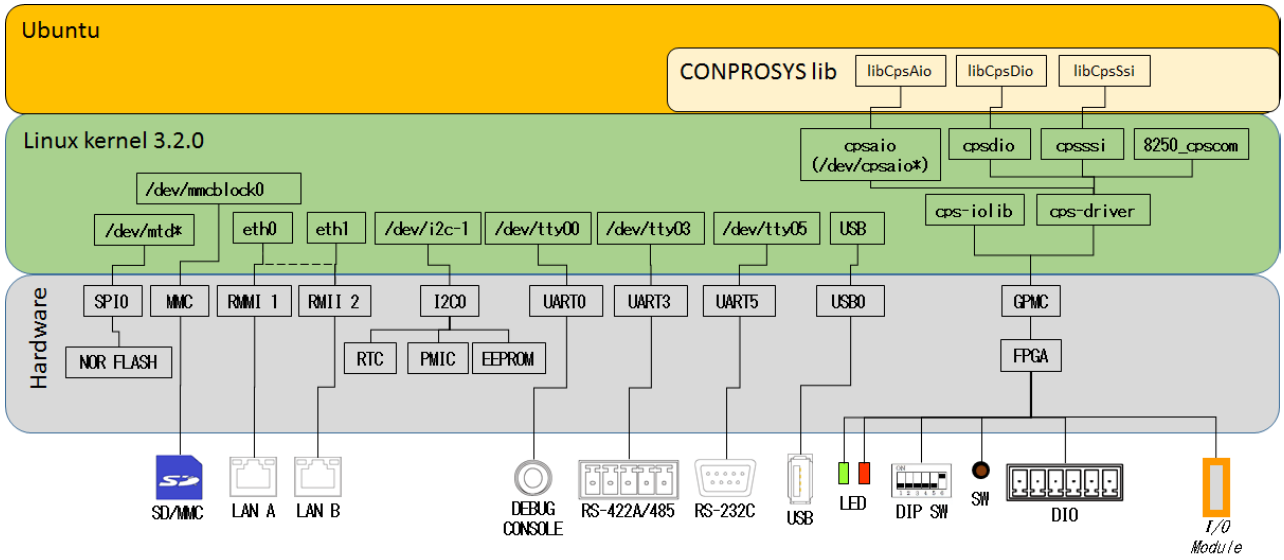
CPS-MC341-DSx series block diagram *(Italic font means optional choices)*



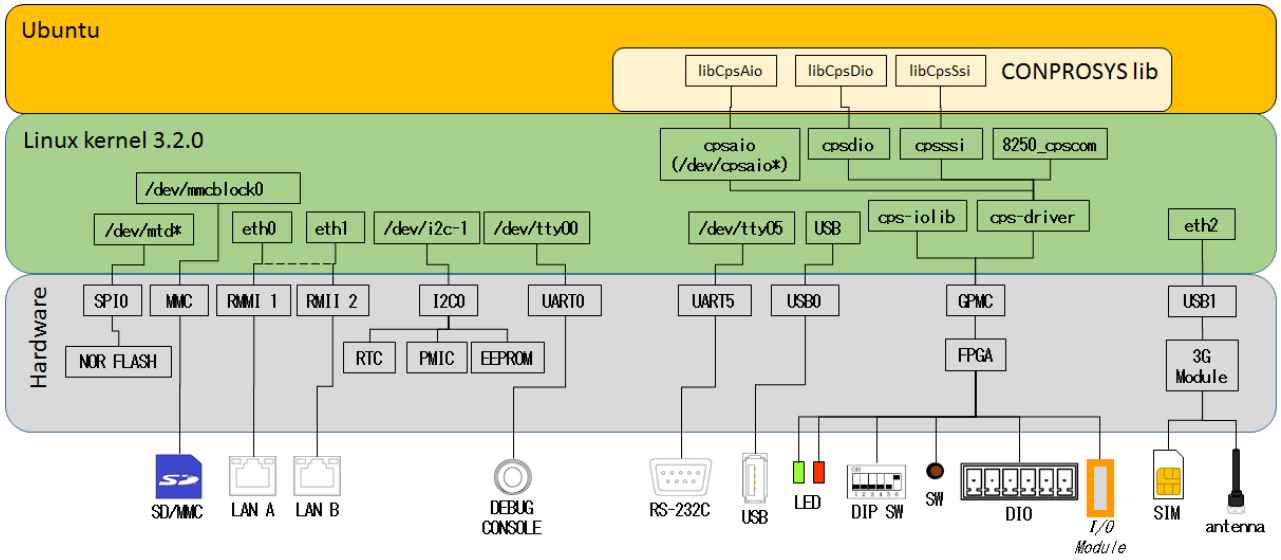
CPS-MC341-DS1x series block diagram *(Italic font means optional choices)*



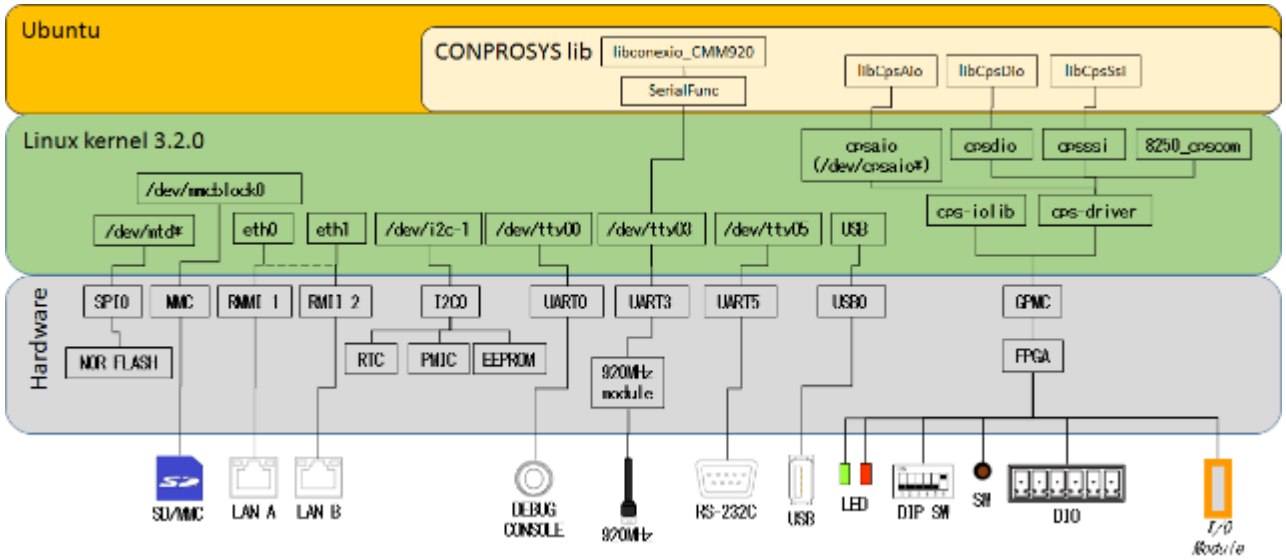
CPS-MxS341-DSx series block diagram



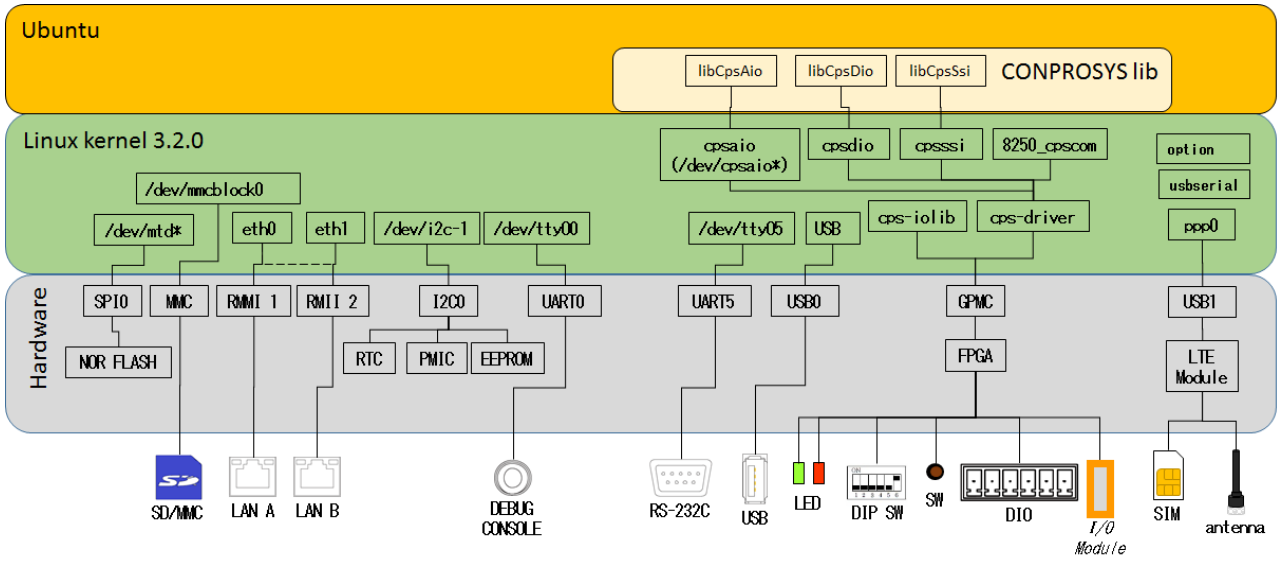
CPS-MCS341G-DS1 series block diagram *(Italic font means optional choices)*



CPS-MCS341Q-DS1 series block diagram *(Italic font means optional choices)*



CPS-MxS341G5-DS1 series block diagram *(Italic font means optional choices)*



3.Device I/F

The distinctive device I/F of CONPROSYS can be accessed on Linux as shown in the table below.
Ports are vary depending on the models.

UART control device

Model	/dev/ttyO1	/dev/ttyO2	/dev/ttyO3	/dev/ttyO4	/dev/ttyO5
CPS-MC341-ADSC1	RS-422A/485 (COM A)	-	-	-	RS-232C (COM B)
CPS-MC341-ADSC2	RS-422A/485 (COM A)	-	RS-422A/485 (COM C)	-	RS-232C (COM B)
CPS-MC341G-ADSC1 CPS-MG341G5-ADSC1	RS-422A/485 (COM A)	-	-	-	RS-232C (COM B)
CPS-MC341Q-ADSC1	RS-422A/485 (COM A)	-	920MHz module	-	RS-232C (COM B)
CPS-MC341-A1	-	-	-	-	-
CPS-MC341-DS1	-	-	-	-	RS-422A/485 (COM A)
CPS-MC341-DS2	(for CAN)*1	-	-	-	RS-422A/485 (COM A)
CPS-MC341-DS11	RS-232C (COM A)	-	-	-	RS-422A/485 (COM B)
CPS-MCS341-DS1 CPS-MGS341-DS1	-	-	-	-	RS-232C
CPS-MCS341G-DS1 CPS-MCS341G5-DS1 CPS-MGS341G5-DS1	-	-	-	-	RS-232C
CPS-MCS341Q-DS1	-	-	920MHz module	-	RS-232C

*1 Reserved for CAN port.　Controlling should be operated with Network devices.

GPIO control device (LED control)

Model	GPIO 26	GPIO 27	GPIO 67	GPIO 128	GPIO 129
CPS-MC341-ADSCx CPS-MC341G-ADSC1 CPS-MC341Q-ADSC1	ST1 Green (Out)	ST2 Red (Out)	Power (Out)	-	-
CPS-MG341G5-ADSC1	ST1 Green (Out)	ST2 Red (Out)	Power (Out)	LTE Green (Out)	LTE Red (Out)
CPS-MC341-A1	ST1 Green (Out)	ST2 Red (Out)	Power (Out)	-	-
CPS-MC341-DSx	ST1 Green (Out)	ST2 Red (Out)	Power (Out)	-	-
CPS-MC341-DS11	ST1 Green (Out)	ST2 Red (Out)	Power (Out)	-	-
CPS-MCS341-DS1 CPS-MGS341-DS1 CPS-MCS341G-DS1 CPS-MCS341Q-DS1	-	-	-	-	-
CPS-MCS341G5-DS1 CPS-MGS341G5-DS1	-	-	-	LTE Green (Out)	LTE Red (Out)

Directions of I/O are listed in the parentheses.

GPIO control device (Switch control)

Model	GPIO 32	GPIO 33	GPIO 34	GPIO 35	GPIO 87
CPS-MC341-ADSCx CPS-MC341G-ADSC1 CPS-MG341G5-ADSC1 CPS-MC341Q-ADSC1	DIP SW1-2 (In)	DIP SW1-3 (In)	DIP SW1-4 (In)	Shutdown SW (In)	-
CPS-MC341-A1	DIP SW1-2 (In)	DIP SW1-3 (In)	DIP SW1-4 (In)	Shutdown SW (In)	-
CPS-MC341-DSx	DIP SW1-2 (In)	DIP SW1-3 (In)	DIP SW1-4 (In)	Shutdown SW (In)	-
CPS-MC341-DS11	DIP SW1-2 (In)	DIP SW1-3 (In)	DIP SW1-4 (In)	Shutdown SW (In)	-
CPS-MCS341-DS1 CPS-MGS341-DS1 CPS-MCS341G-DS1 CPS-MCS341G5-DS1 CPS-MGS341G5-DS1 CPS-MCS341Q-DS1	-	-	-	-	Shutdown SW (In)

Directions of I/O are listed in the parentheses.

GPIO control device (Input Switch control)

Model	GPIO 39	GPIO 44	GPIO 45	GPIO 46	GPIO 47	GPIO 100
CPS-MC341-ADSCx CPS-MC341G-ADSC1 CPS-MG341G5-ADSC1 CPS-MC341Q-ADSC1	-	-	-	-	-	-
CPS-MC341-A1	DAC LDACB (Out)	AI switches A0 (Out)	AI switches A1 (Out)	AI switches A2 (Out)	AO Switch (Out)	Potentiometers $\overline{CS}$ (Out)
CPS-MC341-DSx	-	-	-	-	-	-
CPS-MC341-DS11	-	-	-	--	-	-
CPS-MCS341-DS1 CPS-MGS341-DS1 CPS-MCS341G-DS1 CPS-MCS341G5-DS1 CPS-MGS341G5-DS1 CPS-MCS341Q-DS1	-	-	-		-	-

Directions of I/O are listed in the parentheses.

GPIO control device (Board control)

Model	GPIO 22	GPIO 23	GPIO 36	GPIO 37	GPIO 105
CPS-MC341-ADSC1	-	-	-	-	Power RESET (Out)
CPS-MC341-ADSC2	-	-	RS485 Power (Out)	-	Power RESET (Out)
CPS-MC341G-ADSC1	-	LDO_SHUTDOWN (Out)	3G Power (Out)	3G Reset (Out)	Power RESET (Out)
CPS-MG341G5-ADSC1	PWR_ON_N_3V3 (Out)	PWRKEY (Out)	LTE Power (Out)	LTE Reset (Out)	Power RESET (Out)
CPS-MC341Q-ADSC1	-	-	920M Power (Out)	920M Reset (Out)	Power RESET (Out)
CPS-MC341-A1	-	-	-	-	Power RESET (Out)
CPS-MC341-DSx	-	-	-	-	Power RESET (Out)
CPS-MC341-DS11	-	-	-	-	Power RESET (Out)
CPS-MCS341-DS1 CPS-MGS341-DS1 CPS-MCS341G-DS1 CPS-MCS341G5-DS1 CPS-MGS341G5-DS1 CPS-MCS341Q-DS1	-	-	-	-	Power RESET (Out)

Directions of I/O are listed in the parentheses.

GPIO can be controlled by the shell command listed below.

Read: gpio_in.sh <GPIO number>

Output: gpio_out.sh <GPIO number> value (0 or 1)

USB-Serial control device

Model	/dev/ttyUSB0	/dev/ttyUSB1	/dev/ttyUSB2	/dev/ttyUSB3	/dev/ttyUSB4
CPS-MC341-ADSCx	Optional Device				
CPS-MC341G-ADSC1 (Japan domestic model)	Sierra USB modem	Sierra USB modem	Sierra USB modem	Sierra USB modem	Optional Serial device
CPS-MC341G-ADSC1 (Global model)	Optional Serial device				
CPS-MG341G5-ADSC1	Quectel USB modem	Quectel USB modem	Quectel USB modem	Quectel USB modem	Optional Serial device
CPS-MC341-A1					
CPS-MC341-DSx					
CPS-MC341-DS11	Optional Serial device				
CPS-MCS341-DS1 CPS-MGS341-DS1 CPS-MCS341G-DS1 CPS-MCS341Q-DS1	Optional Serial device				
CPS-MCS341G5-DS1 CPS-MGS341G5-DS1	Quectel USB modem	Quectel USB modem	Quectel USB modem	Quectel USB modem	Optional Serial device

Configurable type FPGA devices

Model	Device	Maker	Device model number	Control port
CPS-MCS341-DS1 CPS-MGS341-DS1 CPS-MCS341G-DS1 CPS-MCS341Q-DS1 CPS-MCS341G5-DS1 CPS-MGS341G5-DS1	FPGA	Lattice Semiconductor	LCMXO2-7000HC-4FTG256I	GPMC

As for device control (FPGA), please refer to the section "**FPGA I/O map (page 57)**" In Appendix.

Configurable type COM device

Model	/dev/ttyCPS0	/dev/ttyCPS1	/dev/ttyCPS2	/dev/ttyCPS3	…	/dev/ttyCPS62	/dev/ttyCPS63
CPS-COM-1PC	RS-232C	-	RS-232C	-	…	RS-232C	-
CPS-COM-2PC	RS-232C	RS-232C	RS-232C	RS-232C	…	RS-232C	RS-232C
CPS-COM-1PD	RS-422A/485	-	RS-422A/485	-	…	RS-422A/485	-
CPS-COM-2PD	RS-422A/485	RS-422A/485	RS-422A/485	RS-422A/485	…	RS-422A/485	RS-422A/485

Configurable type AIO control device

Model	/dev/cpsaio0	/dev/cpsaio1	…	/dev/cpsaio30	/dev/cpsaio31
CPS-AI-1608LI/ CPS-AI-1608ALI	AI	AI	…	AI	AI
CPS-AO-1604LI CPS-AO-1604ALI	AO	AO	…	AO	AO

Configurable type DIO control device

Model	/dev/cpsdio0	/dev/cpsdio1	…	/dev/cpsdio30	/dev/cpsdio31
CPS-DIO-0808L/ CPS-DIO-0808BL	DIO	DIO	…	DIO	DIO
CPS-DI-16L/ CPS-DI-16RL	DI	DI	…	DI	DI
CPS-DO-16L/ CPS-DO-16RL/ CPS-RRY-4PCC	DO	DO	…	DO	DO

Configurable type SSI control device

Model	/dev/cpsssi0	/dev/cpsssi1	…	/dev/cpsssi30	/dev/cpsssi31
CPS-SSI-4P/ CPS-SSI-4C	SSI	SSI		SSI	SSI

Network device

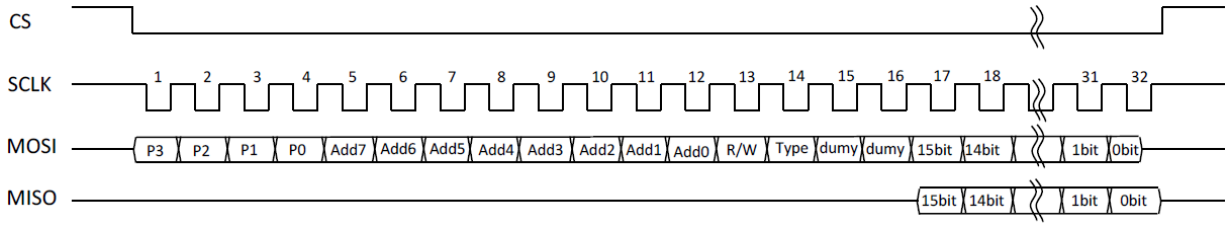
Network Category	eth0	eth1	eth2	can0	can1	wwan0	ppp0
1 LAN(Hub Mode) Type	LAN A/B	-	-	-	-	-	-
2 LAN Type	LAN A	LAN B	-	-	-	-	-
CAN on-board type 1 LAN(Hub Mode) Type	LAN A/B	-	-	CAN*	CAN*	-	-
CAN on-board type 2 LAN(Hub Mode) Type	LAN A	LAN B	-	CAN*	CAN*	-	-
3G on-board type (Japan domestic model) 1 LAN(Hub Mode) Type	LAN A/B	-	-	-	-	3G	-
3G on-board type (Japan domestic model) 2 LAN Type	LAN A	LAN B	-	-	-	3G	-
3G on-board type (Global model) 1 LAN(Hub Mode) Type	LAN A/B	3G	-	-	-	-	-
3G on-board type (Global model) 2 LAN Type	LAN A	LAN B	3G	-	-	-	-
LTE on-board type 1 LAN Type	LAN A/B	-	-	-	-	-	LTE
LTE on-board type 2 LAN Type	LAN A	LAN B	-	-	-	-	LTE

4. FPGA I/O map

1. Integrated type CPS-Mx341-ADSCx / DSx Series

Maker: Lattice Semiconductor
Device model number: LCMXO2-640HC-4TG100I
Interface: SPI

SPI signal timing



MOSI: Slave latches the signal with a fall of SCLK

MISO: Output slave signals with a rise of SCLK. Master latches the signal with a fall of SCLK.

SPI signal format

Register Page	Address	R/W	Access Type	Dummy	Data
4bit	8bit	1bit	1bit	2bit	16bit

R/W: 0 = Read, 1 = Write
Access Type: 0 = Byte Access, 1 = Word Access
Dummy: Always 0

Upon Byte accessing, data are LSB justified and converted into 16 bit for transmission and reception.

Example: Write 00AAh to Page = 0h, Address=12h.
0x0 12 C 00AA

Products Category

Products Category	Function	Register Page	Product
01h	Digital I/O unit	0h	CPS-MC341-ADSCx, CPS-MC341-DSx
02h	Analog input unit	1h	CPS-MC341-ADSCx
03h	Counter unit	2h	CPS-MC341-ADSCx

Digital I/O unit port map (Page 0h)

Address	Read/Write	Meaning
00h – 01h	R	System reservation area
02h – 03h	R	System reservation area
04h – 0Ch	R	Not used
0Eh – 0Fh	R	System reservation area
10h – 11h	R	Digital input port
12h – 13h	R/W	Digital output port
14h – 17h	R	Not used
18h – 19h	R/W	Digital filter setting time
1Ah – 1Fh	R	Not used
1Ch – 1Dh	R/W	Internal power ON/OFF*
1Eh – 1Fh	R	Not used
20h – 21h	R/W	System reservation area
22h – 23h	R	Not used
24h – 25h	R/W	System reservation area
26h - FFh	R	Not used

*For CPS-MC341-ADSC1-931 exclusively

Analog input unit port map (Page 1h)

Address	Read/Write	Meaning
00h – 01h	R	System reservation area
02h – 03h	R	System reservation area
04h – 27h	R	Not used
28h – 29h	R/W	Analog input unit
2Ah - FFh	R	Not used

Counter I/O unit port map (Page 2h

Address	Read/Write	Meaning
00h – 01h	R	System reservation area
02h – 03h	R	System reservation area
04h – 0Fh	R	Not used
10h – 11h	R/W	Direct Counter Data lower (R) / Read Channel Select (W)
12h – 13h	R/W	Direct Counter Data higher (R) / Direct Counter Latch Select (W)
14h – 15h	R/W	Counter Select Enable Status
16h – 17h	R	Not used
18h – 19h	R/W	Command Select
1Ah – 1Bh	R	Not used
1Ch – 1Dh	R/W	Counter Input / Output data lower data
1Eh – 1Fh	R/W	Counter Input / Output data higher data
20h – 21h	W	System reservation area
22h – 23h	W	System reservation area
24h – 25h	R/W	System reservation area
26h – 27h	R/W	System reservation area
2Ah - FFh	R	Not used

Digital input port (Page 0h / Address 10h - 11h)　R

D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
0	0	0	0	0	0	0	0	DI7	DI6	DI5	DI4	DI3	DI2	DI1	DI0

This port gets a value of digital input terminal.

When digital filter is set, a value after passing through the filter is taken.

*This function is only available with DI0 – DI3 in CPS-MC341-ADSCx series.

Digital output port (Page 0h / Address 12h -13h)　R/W

D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D05	D4	D3	D2	D1	D0
0	0	0	0	0	0	0	0	DO7	DO6	DO5	DO4	DO3	DO2	DO1	DO0

This port sets a value of digital output terminal or gets a setting value.

*This function is only available with DO0 – DO1 in CPS-MC341-ADSCx series.

Digital filter setting time (Page 0h / Address 18h – 19h)　R/W

D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
0	0	0	ST4	ST3	ST2	ST1	ST0	0	0	0	0	0	0	0	0

This port sets a digital filter value applicable to digital input terminal or gets a setting value.

The setting value applies to all input terminals.　See "**Digital filter settings(page 60)**" for the setting value.

Digital filter settings

Set	Name	Meaning	Set item	Initial value
ST4 - 0	Digital filter setting time	Set the digital filter time	0: filter function not used	0 [filter function not used]
			1: 0.25µsec	
			2: 0.5µsec	
			3: 1µsec	
			4: 2µsec	
			5: 4µsec	
			6: 8µsec	
			7: 16µsec	
			8: 32µsec	
			9: 64µsec	
			10: 128µsec	
			11: 256µsec	
			12: 512µsec	
			13: 1.024msec	
			14: 2.048msec	
			15: 4.096msec	
			16: 8.192msec	
			17: 16.384msec	
			18: 32.768msec	
			19: 65.536msec	
			20: 131.072msec	
			21 - 31: Reserve	

Internal power ON/OFF setting port (Page 0h / Address 1Ch – 1Dh) R/W

D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	PWEn

This ports sets enabled(ON) or disabled(OFF) of internal power for digital input port.

Read this port to check the setting status. See "**Internal power ON/OFF setting (page 60)**" for setting value.

Internal power ON/OFF setting

Set	Name	Meaning	Set item	Initial value
PWEn	Internal power enabled	Set the internal power enabled (ON).	0: disabled (OFF) 1: enabled (ON)	0 [disabled]

Analog input port (Page 1h / Address 28h - 29h) R/W

D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	03	D2	D1	00
0	0	0	0	0	0	0	0	0	0	0	0	0	0	AT1	AT0

This port obtains a value of analog input channel. When an isolation between channels is needed, do not turn on both switches simultaneously. It disables an isolation function.

Counter data read port (Page 2h / Address 10h - 13h) R

Addr	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
10h	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
12h	0	0	0	0	0	0	0	0	D23	D22	D21	D20	D19	D18	D17	D16

This port reads latched counter data.

Set "**Counter read channel setting port (Page 2h / Address 10h) W**" to read data.

Counter read channel setting port (Page 2h / Address 10h) W

D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Sel0

This port selects a channel to read from Counter data read port.

See the instruction "**Counter data read port (Page 2h / Address 10h - 13h) R**" to read counter data.

Counter read setting

Set	Name	Meaning	Set item	Initial value
Sel0	Counter read channel	Set the cannel to read from counter data read port	0: Channel 0 1: Channel 1	0 [Channel 0]

Counter data latch setting port (Page 2h / Address 12h) W

D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	Ch01	Ch00

Write "1" into this port to latch counter data. The latched count values in this section are read from the Counter data read port.

Counter valid channel setting port (Page 2h / Address 14h) R/W

D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	Ch01	Ch00

This port sets counter valid channels and reads the status of the setting.

Counter command port (Page 2h / Address 18h) W

D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
0	0	0	0	0	0	0	0	0	Cmd06 - 00						

This port is an operation command port to execute the following command codes.

Command code list:

08h: Ch0 counter mode (Write)

09h: Ch1 counter mode (Write)

18h: Ch0 comparison register 0 (Write)

19h: Ch1 comparison register 0 (Write)

20h: Ch0 comparison register 1 (Write)

21h: Ch1 comparison register 1 (Write)

38h: Count match status check / clear (Read/Write)

3Ah: Carry status check / clear (Read/Write)

3Dh: Zero clear (Write)

When executing the command to write, the data are set into data address port (Page 2h / Address 1Ch – 1Fh). When executing the command to read, the data are read from data address port (Page 2h / Address 1Ch – 1Fh).

Control data address port after controlling the command port.

Refer to "**Counter I/O unit port map (Page 2h (page 59)**" to "**Internal power ON/OFF setting port (Page 0h / Address 1Ch – 1Dh) R/W (page 60)**" regarding the format of the data address port for each command code.

Ch0 / Ch1 counter mode (counter command code: 08h / 09h) W

Addr	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
1Ch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1Eh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

This sets operation modes of the counter. Each mode can be set per input channel.

Ch0 / Ch1 comparison register 0 (counter command code: 18h / 19h) W

Addr	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
1Ch	Data00 – 15															
1Eh	0	0	0	0	0	0	0	0	Data16 - 25							

This sets data into Ch0 – Ch1 count value comparison register 0.

Ch0 / Ch1 comparison register 1 (counter command code: 20h / 21h) W

Addr	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
1Ch	Data00 – 15															
1Eh	0	0	0	0	0	0	0	0	Data16 - 25							

This sets data into Ch0 – Ch1 count value comparison register 1.

Count match status check / clear (counter command code: 38h) R/W

Addr	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
1Ch	0	0	0	0	0	0	Cmp1_Ch1	Cmp1_Ch0	0	0	0	0	0	0	Cmp0_Ch1	Cmp0_Ch0
1Eh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Upon reading, the bit becomes 1 if the condition is satisfied.

Upon writing, set 1 into the corresponding bit to reset.

Carry status check / clear (counter command code: 3Ah) R/W

Addr	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
1Ch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Carry Ch1	Carry Ch0

Upon reading, the bit becomes 1 if the condition is satisfied.

Upon writing, set 1 into the corresponding bit to reset.

Zero clear (3Dh) W

Addr	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
1Ch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Ch1	Ch0

Upon writing, set 1 into the corresponding bit to reset.

2. Configurable type CPS-MxS341-DSx Series

Maker: Lattice Semiconductor
Device model number: LCMXO2-7000HC-4FTG256I
Interface: GPMC

Port map

Address	Read/Write	Meaning
0000h – 0001h	R	System reservation area
0002h	R	Rotary switch
0003h	R	DIP SW
0004h	R	The number of device connections
0005h	R/W	System reservation area
0006h – 0007h	R/W	LED control
0008h – 000Bh	R/W	System reservation area
000Ch – 000Dh	R/W	System reservation area
000Eh – 000Fh	R	Not used
0010h – 005Fh	R	Information of configurable type product
0060h – 0063h	R/W	DIO control register
0064h – 0065h	R/W	UART control register
0066h – 00FFh	R/W	Not used
0100h – 01FFh	R	Device 0
0200h – 02FFh	R	Device 1
: :		: :
1F00h – 1FFFh	R	Device 30
2000h – 20FFh	R	Device 31

5. Integrated type products LED / DIP Switch / Switch control

LEDs of Integrated types listed below can be controlled by GPIO port.

LED control for integrated type

LED	Control device	Port No	Port attribute	Control method (Linux shell)
Power	GPIO	67	Out	On : /usr/local/bin/gpio_out.sh 67 0 Off : /usr/local/bin/gpio_out.sh 67 1
ST1	GPIO	26	Out	On : /usr/local/bin/gpio_out.sh 26 0 Off : /usr/local/bin/gpio_out.sh 26 1
ST2	GPIO	27	Out	On : /usr/local/bin/gpio_out.sh 27 0 Off : /usr/local/bin/gpio_out.sh 27 1

Switches of integrated types listed below can be read by GPIO port.

Switch control for integrated type

LED	Control device	Port No	Port attribute	Control method (Linux shell)
DIP SW1-2	GPIO	32	In	/usr/local/bin/gpio_in.sh 32 On=0, Off=1
DIP SW1-3	GPIO	33	In	/usr/local/bin/gpio_in.sh 33 On=0, Off=1
DIP SW1-4	GPIO	34	In	/usr/local/bin/gpio_in.sh 34 On=0, Off=1
Shutdown SW	GPIO	35	In	/usr/local/bin/gpio_in.sh 35 Press(On)=0, Release(Off)=1

6. Configurable type products DIO / LED / DIP Switch / Switch control

DIO / LED / DIP Switch / Switch of configurable types can be controlled by file under the directly on CONPROSYS listed below.

/sys/bus/platform/drivers/cps-driver

See the function and usage of each file in "**Configurable type DIO / LED / DIP Switch / Switch control (page 67)**".

Configurable type DIO / LED / DIP Switch / Switch control

File	Control device	Function
	How to use	
dio0_direction	DIO	DI/DO switch setting
	Set DI when b0(DIO0) – b3(DIO3) are 0, set DO when b0(DIO0) – b3(DIO3) are 1. Setting example: Set DIO0 and DIO1 to DI, DIO2 and DIO3 to DO. b3:1, b2:1, b1:0, b0:0 → cH <Command> echo 0xc > /sys/bus/platform/drivers/cps-driver/dio0_direction Setting reading example: <Command> cat /sys/bus/platform/drivers/cps-driver/dio0_direction	
dio0_do_value	DO	DO value setting
	Setting example: Set DO0 and DO2 to 1, DO1 and DO3 to 0. b3:0, b2:1, b1:0, b0:1 → 5H <Command> echo 0x5 > /sys/bus/platform/drivers/cps-driver/dio0_do_value Setting reading example: <Command> cat /sys/bus/platform/drivers/cps-driver/dio0_do_value	
dio0_di_value	DI	DI value reading
	<Command> cat /sys/bus/platform/drivers/cps-driver/dio0_di_value	
id	Rotary switch	Rotary switch value reading
	<Command> cat /sys/bus/platform/drivers/cps-driver/id	
led_status1	Status1 LED	Status1 LED On/Off setting
	Setting example: Turn on the light of Status 1LED. <Command> echo 1 > /sys/bus/platform/drivers/cps-driver/led_status1 Setting reading example: <Command> cat /sys/bus/platform/drivers/cps-driver/led_status1	
led_status2	Status2 LED	Status2 LED On/Off setting
	Setting example: Turn off the light of Status 2 LED. <Command> echo 0 > /sys/bus/platform/drivers/cps-driver/led_status2 Setting reading example: <Command> cat /sys/bus/platform/drivers/cps-driver/led_status2	
led_error	Error LED	Error LED On/Off setting
	Setting example: Turn on the light of Error LED. <Command> echo 1 > /sys/bus/platform/drivers/cps-driver/led_error Setting reading example: <Command> cat /sys/bus/platform/drivers/cps-driver/ switch	
switch	DIP Switch	DIP Switch value reading
	<Command> cat /sys/bus/platform/drivers/cps-driver/switch	

You can access the LED/Switch of the configurable type using iolib control sample program for the CPS-MxS341-DSx series included in the sample applications.

Through GPMC port, LEDs of configurable type can be controlled by FPGA I/O map addresses listed below.

LED control for configurable type

Register	D7	D6	D5	D4	D3	D2	D1	D0
0006h	-	-	-	-	ERR	ST2	ST1	Power
					R/W	R/W	R/W	R/W
					On: 1 Off: 0	On: 1 Off: 0	On: 1 Off: 0	On: 1 Off: 0

Command example: Turn on the lights of Power, ST1, and ST2.

```
gpmc_testd –w1 0006 06
```

Command example: Obtain the status of LED.

```
gpmc_testd –r1 0006
```

Through GPMC port, the switches of configurable type can be read by FPGA I/O map addresses listed below.

Switch control for configurable type

Register	D7	D6	D5	D4	D3	D2	D1	D0
0002h	Rotary switch H				Rotary switch L			
0003h	DIP SW1-4	DIP SW1-3	DIP SW1-2	DIP SW1-1	-	-	-	-
	On: 1 Off: 0	On: 1 Off: 0	On: 1 Off: 0	On: 1 Off: 0	-	-	-	-

Command example: Obtain the status of rotary switch

```
gpmc_testd –r1 0002
```

7. Option Board control

The models listed below contain an option board of 3G/LTE/920Hz communication.

[Integrated type products M2M Controller Series]

CPS-MC341G-ADSC1 Series　Multi-I/O + 3G WAN (Japan domestic / Global) Model
CPS-MC341Q-ADSC1　Multi-I/O + 920MHz (Japan only) Model

[Integrated type products M2M Gateway Series]

CPS-MG341G-ADSC1 Series　Multi-I/O + 3G WAN (Japan only) Model
CPS-MG341G5-ADSC1　Multi-I/O + LTE Model

[Configurable type products M2M Controller Series]

CPS-MCS341G-DS1　Controller + 3G WAN (Japan only) Model
CPS-MCS341G5-DS1　Controller + LTE Model
CPS-MCS341Q-DS1　Controller + 920MHz (Japan only) Model

[Configurable type products M2M Gateway Series]

CPS-MGS341G5-DS1　Controller + LTE Model

These models can control the power of the option board.

Option board control

Function	How to control (Linux shell)
Option board power On*	/usr/local/cps-board/PowerOnOptionBoard.sh
Option board power Off*	/usr/local/cps-board/PowerOffOptionBoard.sh
Option board detection	/usr/local/cps-board/DetectOptionBoard.sh [End Status] 0: Option board activated 1: Option board no detection

*root privileges is requested. Use the sudo command when controlling the power in the console.

The models with 3G/LTE can control such as connection/disconnection, SIM check, and RSSI acquisition.

3G/LTE control

Function	How to control (Linux shell)
Connection *1	/usr/local/cps-board/mobile/start_mobile.sh
Disconnection *1	/usr/local/cps-board/mobile/stop_mobile.sh
3G/LTE module reset *1	/usr/local/cps-board/mobile/reset_mobile.sh
SIM check	/usr/local/cps-board/mobile/checkSIM_mobile.sh [End status] 0: When SIM is detected, this displays the "Detect SIM" 1: When SIM is not detected, this displays the "Not Detect"
RSSI acquisition	/usr/local/cps-board/mobile/checkSIM_mobile.sh [End status] 0: Succeed displays RSSI value (dbm) 1: Fail
RSRP acquisition (only for the models with LTE)	/usr/local/cps-board/mobile/getRSRP.sh [End status] 0: Succeed displays RSRP value (dbm) 1: Fail
Option board LED control *2	/usr/local/cps-board/mobile/ctrl_LED.sh param [param] 0: All off 1: Green On Red Off 2: Green Off Red On 3: Green On Red On [End status] 0: Succeed 1: Fail

*1. *root privileges is requested. Use the sudo command when controlling the power in the console.

*2. As for the CPS-MC341G-ADSC1-111 and CPS-MG341G-ADSC1-111 models, LED control is not available since 3G module control is used in these products.

8. Installed packages

Ubuntu14.04

Name	Version	Architecture	Description
acpid	1:2.0.21-1ubuntu2	armhf	Advanced Configuration and Power Interface event daemon
adduser	3.113+nmu3ubuntu3	all	add and remove users and groups
apache2	2.4.7-1ubuntu4.22	armhf	Apache HTTP Server
apache2-bin	2.4.7-1ubuntu4.22	armhf	Apache HTTP Server (binary files and modules)
apache2-data	2.4.7-1ubuntu4.22	all	Apache HTTP Server (common files)
apache2-utils	2.4.7-1ubuntu4.22	armhf	Apache HTTP Server (utility programs for web servers)
apt-transport-https	1.0.1ubuntu2.24	armhf	https download transport for APT
apt-utils	1.0.1ubuntu2.24	armhf	package management related utility programs
attr	1:2.4.47-1ubuntu1	armhf	Utilities for manipulating filesystem extended attributes
autoconf	2.69-6	all	automatic configure script builder
automake	1:1.14.1-2ubuntu1	all	Tool for generating GNU Standards-compliant Makefiles
autotools-dev	20130810.1	all	Update infrastructure for config.{guess,sub} files
base-files	7.2ubuntu5.6	armhf	Debian base system miscellaneous files
base-passwd	3.5.33	armhf	Debian base system master password and group files
bash	4.3-7ubuntu1.7	armhf	GNU Bourne Again SHell
binutils	2.24-5ubuntu14.2	armhf	GNU assembler, linker and binary utilities
bsdmainutils	9.0.5ubuntu1	armhf	collection of more utilities from FreeBSD
bsdutils	1:2.20.1-5.1ubuntu20.9	armhf	Basic utilities from 4.4BSD-Lite
btrfs-tools	3.12-1ubuntu0.2	armhf	Checksumming Copy on Write Filesystem utilities
Busybox	1:1.21.0-1ubuntu1.4	Armhf	Tiny utilities for small and embedded systems
busybox-initramfs	1:1.21.0-1ubuntu1.4	armhf	Standalone shell setup for initramfs
bzip2	1.0.6-5	armhf	high-quality block-sorting file compressor - utilities
ca-certificates	20170717~14.04.2	all	Common CA certificates
cmake	3.2.2-2~ubuntu14.04.1~ppa1	armhf	cross-platform, open-source make system
cmake-data	3.2.2-2~ubuntu14.04.1~ppa1	all	CMake data files (modules, templates and documentation)
console-setup	1.70ubuntu8	all	console font and keymap setup program
coreutils	8.21-1ubuntu5.4	armhf	GNU core utilities
cpio	2.11+dfsg-1ubuntu1.2	armhf	GNU cpio -- a program to manage archives of files
cpp	4:4.8.2-1ubuntu6	armhf	GNU C preprocessor (cpp)
cpp-4.8	4.8.5-4ubuntu8~14.04.2	armhf	GNU C preprocessor
cpp-4.9	4.9.4-2ubuntu1~14.04.1	armhf	GNU C preprocessor
cpufrequtils	008-1	Armhf	utilities to deal with the cpufreq Linux kernel feature
cron	3.0pl1-124ubuntu2	armhf	process scheduling daemon
curl	7.35.0-1ubuntu2.20	armhf	command line tool for transferring data with URL syntax
dash	0.5.7-4ubuntu1	armhf	POSIX-compliant shell
dbus	1.6.18-0ubuntu4.5	armhf	simple interprocess messaging system (daemon and utilities)
debconf	1.5.51ubuntu2	all	Debian configuration management system
debconf-i18n	1.5.51ubuntu2	all	full internationalization support for debconf
debianutils	4.4	armhf	Miscellaneous utilities specific to Debian
devmem2	0.0-0ubuntu1	armhf	simple program to read/write from/to any location in memory
dh-python	1.20140128-1ubuntu8.2	all	Debian helper tools for packaging Python libraries and applications
diffutils	1:3.3-1	armhf	File comparison utilities
dmsetup	2:1.02.77-6ubuntu2	armhf	Linux Kernel Device Mapper userspace library
dosfstools	3.0.26-1ubuntu0.1	armhf	utilities for making and checking MS-DOS FAT filesystems
dpkg	1.17.5ubuntu5.8	armhf	Debian package management system
e2fslibs:armhf	1.42.9-3ubuntu1.3	armhf	ext2/ext3/ext4 file system libraries
e2fsprogs	1.42.9-3ubuntu1.3	armhf	ext2/ext3/ext4 file system utilities
eject	2.1.5+deb1+cvs20081104-13.1ubuntu0.14.04.1	armhf	ejects CDs and operates CD-Changers under Linux
fbset	2.1-27	armhf	framebuffer device maintenance program
file	1:5.14-2ubuntu3.4	armhf	Determines file type using "magic" numbers
findutils	4.4.2-7	armhf	utilities for finding files--find, xargs
ftp	0.17-28	armhf	classical file transfer client
g++-4.9	4.9.4-2ubuntu1~14.04.1	armhf	GNU C++ compiler
gcc	4:4.8.2-1ubuntu6	armhf	GNU C compiler
gcc-4.8	4.8.5-4ubuntu8~14.04.2	armhf	GNU C compiler
gcc-4.8-base:armhf	4.8.5-2ubuntu1~14.04.2	armhf	GCC, the GNU Compiler Collection (base package)
gcc-4.9	4.9.4-2ubuntu1~14.04.1	armhf	GNU C compiler
gcc-4.9-base:armhf	4.9.4-2ubuntu1~14.04.1	armhf	GCC, the GNU Compiler Collection (base package)
gcc-7-base:armhf	7.5.0.-38ubuntu2~14.04.1	armhf	GCC, the GNU Compiler Collection (base package)
gcc-9-base:armhf	9.3.0-1ubuntu1~14.04	armhf	GCC, the GNU Compiler Collection (base package)
gdb	8.2-0ubuntu1~14.04.1	armhf	GNU Debugger
gdbserver	8.2-0ubuntu1~14.04.1	armhf	GNU Debugger (remote server)
gir1.2-glib-2.0	1.40.0-1ubuntu0.2	armhf	Introspection data for GLib, GObject, Gio and GModule
git	1:1.9.1-1ubuntu0.10	armhf	fast, scalable, distributed revision control system
git-core	1:1.9.1-1ubuntu0.10	all	fast, scalable, distributed revision control system (obsolete)
git-man	1:1.9.1-1ubuntu0.10	all	fast, scalable, distributed revision control system (manual pages)
gnupg	1.4.16-1ubuntu2.6	armhf	GNU privacy guard - a free PGP replacement
gpgv	1.4.16-1ubuntu2.6	armhf	GNU privacy guard - signature verification tool
grep	2.16-1	armhf	GNU grep, egrep and fgrep
gzip	1.6-3ubuntu1	armhf	GNU compression utilities
Hdparm	9.43-1ubuntu3	armhf	tune hard disk parameters for high performance
hexedit	1.2.13-1	armhf	view and edit files in hexadecimal or in ASCII
hostapd	1:2.1-0ubuntu1.7	armhf	user space IEEE 802.11 AP and IEEE 802.1X/WPA/WPA2/EAP Authenticator
hostname	3.15ubuntu1	armhf	utility to set/show the host name or domain name
i2c-tools	3.1.0-2	armhf	heterogeneous set of I2C tools for Linux
ifupdown	0.7.47.2ubuntu4.5	armhf	high level tools to configure network interfaces
init-system-helpers	1.14ubuntu1	all	helper tools for all init systems

Name	Version	Architecture	Description
initramfs-tools	0.103ubuntu4.11	all	tools for generating an initramfs
initramfs-tools-bin	0.103ubuntu4.11	armhf	binaries used by initramfs-tools
initscripts	2.88dsf-41ubuntu6.3	armhf	scripts for initializing and shutting down the system
insserv	1.14.0-5ubuntu2	armhf	boot sequence organizer using LSB init.d script dependency information
iproute2	3.12.0-2ubuntu1.2	armhf	networking and traffic control tools
iptables	1.4.21-1ubuntu1	armhf	administration tools for packet filtering and NAT
iputils-ping	3:20121221-4ubuntu1.1	armhf	Tools to test the reachability of network hosts
isc-dhcp-client	4.2.4-7ubuntu12.13	armhf	ISC DHCP client
isc-dhcp-common	4.2.4-7ubuntu12.13	armhf	common files used by all the isc-dhcp* packages
isc-dhcp-server	4.2.4-7ubuntu12.13	armhf	ISC DHCP server for automatic IP address assignment
iso-codes	3.52-1	all	ISO language, territory, currency, script codes and their translations
kbd	1.15.5-1ubuntu1	armhf	Linux console font and keytable utilities
keyboard-configuration	1.70ubuntu8	all	system-wide keyboard preferences
klibc-utils	2.0.3-0ubuntu1.14.04.3	armhf	small utilities built with klibc for early boot
kmod	15-0ubuntu7	armhf	tools for managing Linux kernel modules
less	458-2	armhf	pager program similar to more
libacl1:armhf	2.2.52-1	armhf	Access control list shared library
libaio1:armhf	0.3.109-4	armhf	Linux kernel AIO access library - shared library
libapache2-mod-php5	5.5.9+dfsg-1ubuntu4.29	armhf	server-side, HTML-embedded scripting language (Apache 2 module)
libapparmor1:armhf	2.10.95-0ubuntu2.6~14.04.4	armhf	changehat AppArmor library
libapr1:armhf	1.5.0-1	armhf	Apache Portable Runtime Library
libaprutil1:armhf	1.5.3-1	armhf	Apache Portable Runtime Utility Library
libaprutil1-dbd-sqlite3:armhf	1.5.3-1	armhf	Apache Portable Runtime Utility Library - SQLite3 Driver
libaprutil1-ldap:armhf	1.5.3-1	armhf	Apache Portable Runtime Utility Library - LDAP Driver
libapt-inst1.5:armhf	1.0.1ubuntu2.24	armhf	deb package format runtime library
libapt-pkg4.12:armhf	1.0.1ubuntu2.24	armhf	package management runtime library
libarchive-extract-perl	0.70-1	all	generic archive extracting module
libarchive13:armhf	3.1.2-7ubuntu2.8	armhf	Multi-format archive and compression library (shared library)
libasan0:armhf	4.8.5-4ubuntu8~14.04.2	armhf	AddressSanitizer -- a fast memory error detector
libasan1:armhf	4.9.4-2ubuntu1~14.04.1	armhf	AddressSanitizer -- a fast memory error detector
libasn1-8-heimdal:armhf	1.6~git20131207+dfsg-1ubuntu1.2	armhf	Heimdal Kerberos - ASN.1 library
libatomic1:armhf	7.2.0-1ubuntu1~14.04	armhf	support library providing __atomic built-in functions
libattr1:armhf	1:2.4.47-1ubuntu1	armhf	Extended attribute shared library
libaudit-common	1:2.3.2-2ubuntu1	all	Dynamic library for security auditing - common files
libaudit1:armhf	1:2.3.2-2ubuntu1	armhf	Dynamic library for security auditing
libavahi-client3:armhf	0.6.31-4ubuntu1.3	armhf	Avahi client library
libavahi-common-data:armhf	0.6.31-4ubuntu1.3	armhf	Avahi common data files
libavahi-common3:armhf	0.6.31-4ubuntu1.3	armhf	Avahi common library
libavahi-core7:armhf	0.6.31-4ubuntu1.3	armhf	Avahi's embeddable mDNS/DNS-SD library
libbabeltrace-ctf1:armhf	1.2.1-2	armhf	Common Trace Format (CTF) library
libbabeltrace1:armhf	1.2.1-2	armhf	Babeltrace conversion libraries
libbind9-90	1:9.9.5.dfsg-3ubuntu0.19	armhf	BIND9 Shared Library used by BIND
libblkid1:armhf	2.20.1-5.1ubuntu20.9	armhf	block device id library
libbsd0:armhf	0.6.0-2ubuntu1	armhf	utility functions from BSD systems - shared library
libbz2-1.0:armhf	1.0.6-5	armhf	high-quality block-sorting file compressor library - runtime
libc-bin	2.19-0ubuntu6.15	armhf	Embedded GNU C Library: Binaries
libc-dev-bin	2.19-0ubuntu6.15	armhf	Embedded GNU C Library: Development binaries
libc6:armhf	2.19-0ubuntu6.15	armhf	Embedded GNU C Library: Shared libraries
libc6-armel	2.19-0ubuntu6.15	armhf	Embedded GNU C Library: ARM softfp shared libraries for armhf
libc6-dbg:armhf	2.19-0ubuntu6.15	armhf	Embedded GNU C Library: detached debugging symbols
libc6-dev:armhf	2.19-0ubuntu6.15	armhf	Embedded GNU C Library: Development Libraries and Header Files
libcap2:armhf	1:2.24-0ubuntu2	armhf	support for getting/setting POSIX.1e capabilities
libcap2-bin	1:2.24-0ubuntu2	armhf	basic utility programs for using capabilities
libcc1-0:armhf	9.3.0-11ubuntu0~14.04	armhf	GCC cc1 plugin for GDB
libcgmanager0:armhf	0.24-0ubuntu7.5	armhf	Central cgroup manager daemon (client library)
libck-connector0:armhf	0.4.5-3.1ubuntu2	armhf	ConsoleKit libraries
libcloog-isl4:armhf	0.18.4-1~14.04	armhf	Chunky Loop Generator (runtime library)
libcomerr2:armhf	1.42.9-3ubuntu1.3	armhf	common error description library
libcpufreq0	008-1	armhf	shared library to deal with the cpufreq Linux kernel feature
libcups2:armhf	1.7.2-0ubuntu1.11	armhf	Common UNIX Printing System(tm) - Core library
libcurl3:armhf	7.35.0-1ubuntu2.20	armhf	easy-to-use client-side URL transfer library (OpenSSL flavour)
libcurl3-gnutls:armhf	7.35.0-1ubuntu2.20	armhf	easy-to-use client-side URL transfer library (GnuTLS flavour)
libdaemon0	0.14-2ubuntu1	armhf	lightweight C library for daemons - runtime library
libdb5.3:armhf	5.3.28-3ubuntu3.1	armhf	Berkeley v5.3 Database Libraries [runtime]
libdbus-1-3:armhf	1.6.18-0ubuntu4.5	armhf	simple interprocess messaging system (library)
libdbus-glib-1-2:armhf	0.100.2-1	armhf	simple interprocess messaging system (GLib-based shared library)
libdebconfclient0:armhf	0.187ubuntu1	armhf	Debian Configuration Management System (C-implementation library)
libdevmapper1.02.1:armhf	2:1.02.77-6ubuntu2	armhf	Linux Kernel Device Mapper userspace library
libdns100	1:9.9.5.dfsg-3ubuntu0.19	armhf	DNS Shared Library used by BIND
libdrm2:armhf	2.4.67-1ubuntu0.14.04.2	armhf	Userspace interface to kernel DRM services -- runtime
libedit2:armhf	3.1-20130712-2	armhf	BSD editline and history libraries
liberror-perl	0.17-1.1	all	Perl module for error/exception handling in an OO-ish way
libestr0	0.1.9-0ubuntu2	armhf	Helper functions for handling strings (lib)
libexpat1:armhf	2.1.0-4ubuntu1.4	armhf	XML parsing C library - runtime library
libffi6:armhf	3.1~rc1+r3.0.13-12ubuntu0.2	armhf	Foreign Function Interface library runtime
libffi6:armhf	3.1~rc1+r3.0.13-12ubuntu0.2	armhf	Foreign Function Interface library runtime
libfile-copy-recursive-perl	0.38-1	all	Perl extension for recursively copying files and directories
libfribidi0:armhf	0.19.6-1	armhf	Free Implementation of the Unicode BiDi algorithm
libgcc-4.8-dev:armhf	4.8.5-4ubuntu8~14.04.2	armhf	GCC support library (development files)
libgcc-4.9-dev:armhf	4.9.4-2ubuntu1~14.04.1	armhf	GCC support library (development files)
libgcc1:armhf	1:7.2.0-1ubuntu1~14.04	armhf	GCC support library
libgcrypt11:armhf	1.5.3-2ubuntu4.6	armhf	LGPL Crypto library - runtime library
libgdbm3:armhf	1.8.3-12build1	armhf	GNU dbm database routines (runtime version)
libgeoip1:armhf	1.6.0-1	armhf	non-DNS IP-to-country resolver library
libgirepository-1.0-1	1.40.0-1ubuntu0.2	armhf	Library for handling GObject introspection data (runtime library)
libglib2.0-0:armhf	2.40.2-0ubuntu1.1	armhf	GLib library of C routines

Name	Version	Architecture	Description
libglib2.0-data	2.40.2-0ubuntu1.1	all	Common files for GLib library
libgmp10:armhf	2:5.1.3+dfsg-1ubuntu1	armhf	Multiprecision arithmetic library
libgnutls-openssl27:armhf	2.12.23-12ubuntu2.8	armhf	GNU TLS library - OpenSSL wrapper
libgnutls26:armhf	2.12.23-12ubuntu2.8	armhf	GNU TLS library - runtime library
libgomp1:armhf	9.3.0-11ubuntu0~14.04	armhf	GCC OpenMP (GOMP) support library
libgpg-error0:armhf	1.12-0.2ubuntu1	armhf	library for common error values and messages in GnuPG components
libgssapi-krb5-2:armhf	1.12+dfsg-2ubuntu5.4	armhf	MIT Kerberos runtime libraries - krb5 GSS-API Mechanism
libgssapi3-heimdal:armhf	1.6~git20131207+dfsg-1ubuntu1.2	armhf	Heimdal Kerberos - GSSAPI support library
libhcrypto4-heimdal:armhf	1.6~git20131207+dfsg-1ubuntu1.2	armhf	Heimdal Kerberos - crypto library
libheimbase1-heimdal:armhf	1.6~git20131207+dfsg-1ubuntu1.2	armhf	Heimdal Kerberos - Base library
libheimntlm0-heimdal:armhf	1.6~git20131207+dfsg-1ubuntu1.2	armhf	Heimdal Kerberos - NTLM support library
libhx509-5-heimdal:armhf	1.6~git20131207+dfsg-1ubuntu1.2	armhf	Heimdal Kerberos - X509 support library
libidn11:armhf	1.28-1ubuntu2.2	armhf	GNU Libidn library, implementation of IETF IDN specifications
libisc95	1:9.9.5.dfsg-3ubuntu0.19	armhf	ISC Shared Library used by BIND
libisccc90	1:9.9.5.dfsg-3ubuntu0.19	armhf	Command Channel Library used by BIND
libisccfg90	1:9.9.5.dfsg-3ubuntu0.19	armhf	Config File Handling Library used by BIND
libisl15:armhf	0.15-3~14.04	armhf	manipulating sets and relations of integer points bounded by linear constraints
libiw30:armhf	30~pre9-8ubuntu1	armhf	Wireless tools - library
libjson-c2:armhf	0.11-3ubuntu1.2	armhf	JSON manipulation library - shared library
libjson0:armhf	0.11-3ubuntu1.2	armhf	JSON manipulation library (transitional package)
libjsoncpp0:armhf	0.6.0~rc2-3ubuntu1	armhf	Library for reading and writing JSON for C++
libk5crypto3:armhf	1.12+dfsg-2ubuntu5.4	armhf	MIT Kerberos runtime libraries - Crypto Library
libkeyutils1:armhf	1.5.6-1	armhf	Linux Key Management Utilities (library)
libklibc	2.0.3-0ubuntu1.14.04.3	armhf	minimal libc subset for use with initramfs
libkmod2:armhf	15-0ubuntu7	armhf	libkmod shared library
libkrb5-26-heimdal:armhf	1.6~git20131207+dfsg-1ubuntu1.2	armhf	Heimdal Kerberos - libraries
libkrb5-3:armhf	1.12+dfsg-2ubuntu5.4	armhf	MIT Kerberos runtime libraries
libkrb5support0:armhf	1.12+dfsg-2ubuntu5.4	armhf	MIT Kerberos runtime libraries - Support library
libldap-2.4-2:armhf	2.4.31-1+nmu2ubuntu8.5	armhf	OpenLDAP libraries
libldb1:armhf	1:1.1.24-0ubuntu0.14.04.2	armhf	LDAP-like embedded database - shared library
liblocale-gettext-perl	1.05-7build3	armhf	module using libc functions for internationalization in Perl
liblockfile-bin	1.09-6ubuntu1	armhf	support binaries for and cli utilities based on liblockfile
liblockfile1:armhf	1.09-6ubuntu1	armhf	NFS-safe locking library
liblog-message-simple-perl	0.10-1	all	simplified interface to Log::Message
liblwres90	1:9.9.5.dfsg-3ubuntu0.19	armhf	Lightweight Resolver Library used by BIND
liblzma5:armhf	5.1.1alpha+20120614-2ubuntu2	armhf	XZ-format compression library
liblzo2-2:armhf	2.06-1.2ubuntu1.1	armhf	data compression library
libmagic1:armhf	1:5.14-2ubuntu3.3	armhf	File type determination library using "magic" numbers
libmodule-pluggable-perl	5.1-1	all	module for giving modules the ability to have plugins
libmount1:armhf	2.20.1-5.1ubuntu20.9	armhf	block device id library
libmpc3:armhf	1.0.1-1ubuntu1	armhf	multiple precision complex floating-point library
libmpdec2:armhf	2.4.0-6	armhf	library for decimal floating point arithmetic (runtime library)
libmpfr4:armhf	3.1.3-1~14.04	armhf	multiple precision floating-point computation
libncurses5:armhf	5.9+20140118-1ubuntu1	armhf	shared libraries for terminal handling
libncursesw5:armhf	5.9+20140118-1ubuntu1	armhf	shared libraries for terminal handling (wide character support)
libnettle4:armhf	2.7.1-1ubuntu0.2	armhf	low level cryptographic library (symmetric and one-way cryptos)
libnewt0.52:armhf	0.52.15-2ubuntu5	armhf	Not Erik's Windowing Toolkit - text mode windowing with slang
libnfnetlink0:armhf	1.0.1-2	armhf	Netfilter netlink library
libnih-dbus1:armhf	1.0.3-4ubuntu25	armhf	NIH D-Bus Bindings Library
libnih1:armhf	1.0.3-4ubuntu25	armhf	NIH Utility Library
libnl-3-200:armhf	3.2.21-1ubuntu4.1	armhf	library for dealing with netlink sockets
libnl-genl-3-200:armhf	3.2.21-1ubuntu4.1	armhf	library for dealing with netlink sockets - generic netlink
libp11-kit0:armhf	0.20.2-2ubuntu2	armhf	Library for loading and coordinating access to PKCS#11 modules - runtime
libpam-cap:armhf	1:2.24-0ubuntu2	armhf	PAM module for implementing capabilities
libpam-modules:armhf	1.1.8-1ubuntu2.2	armhf	Pluggable Authentication Modules for PAM
libpam-modules-bin	1.1.8-1ubuntu2.2	armhf	Pluggable Authentication Modules for PAM - helper binaries
libpam-runtime	1.1.8-1ubuntu2.2	all	Runtime support for the PAM library
libpam0g:armhf	1.1.8-1ubuntu2.2	armhf	Pluggable Authentication Modules library
libpcap0.8:armhf	1.5.3-2	armhf	system interface for user-level packet capture
libpcre3:armhf	1:8.31-2ubuntu2.3	armhf	Perl 5 Compatible Regular Expression Library - runtime files
libpcsclite1:armhf	1.8.10-1ubuntu1.1	armhf	Middleware to access a smart card using PC/SC (library)
libplymouth2:armhf	0.8.8-0ubuntu17.1	armhf	graphical boot animation and logger - shared libraries
libpng12-0:armhf	1.2.50-1ubuntu2.14.04.2	armhf	PNG library - runtime
libpod-latex-perl	0.61-1	all	module to convert Pod data to formatted LaTeX
libpopt0:armhf	1.16-8ubuntu1	armhf	lib for parsing cmdline parameters
libprocps3:armhf	1:3.3.9-1ubuntu2.3	armhf	library for accessing process information from /proc
libpython-stdlib:armhf	2.7.5-5ubuntu3	armhf	interactive high-level object-oriented language (default python version)
libpython2.7:armhf	2.7.6-8ubuntu0.5	armhf	Shared Python runtime library (version 2.7)
libpython2.7-minimal:armhf	2.7.6-8ubuntu0.5	armhf	Minimal subset of the Python language (version 2.7)
libpython2.7-stdlib:armhf	2.7.6-8ubuntu0.5	armhf	Interactive high-level object-oriented language (standard library, version 2.7)
libpython3-stdlib:armhf	3.4.0-0ubuntu2	armhf	interactive high-level object-oriented language (default python3 version)
libpython3.4-minimal:armhf	3.4.3-1ubuntu1~14.04.7	armhf	Minimal subset of the Python language (version 3.4)
libpython3.4-stdlib:armhf	3.4.3-1ubuntu1~14.04.7	armhf	Interactive high-level object-oriented language (standard library, version 3.4)
libpython3.4-stdlib:armhf	3.4.3-1ubuntu1~14.04.7	armhf	Interactive high-level object-oriented language (standard library, version 3.4)
libreadline5:armhf	5.2+dfsg-2	armhf	GNU readline and history libraries, run-time libraries
libreadline6:armhf	6.3-4ubuntu2	armhf	GNU readline and history libraries, run-time libraries
libroken18-heimdal:armhf	1.6~git20131207+dfsg-1ubuntu1.2	armhf	Heimdal Kerberos - roken support library
librtmp0:armhf	2.4+20121230.gitdf6c518-1ubuntu0.1	armhf	toolkit for RTMP streams (shared library)
libsasl2-2:armhf	2.1.25.dfsg1-17build1	armhf	Cyrus SASL - authentication abstraction library
libsasl2-modules-db:armhf	2.1.25.dfsg1-17build1	armhf	Cyrus SASL - pluggable authentication modules (DB)
libselinux1:armhf	2.2.2-1ubuntu0.1	armhf	SELinux runtime shared libraries
libsemanage-common	2.2-1	all	Common files for SELinux policy management libraries
libsemanage1:armhf	2.2-1	armhf	SELinux policy management library
libsepol1:armhf	2.2-1ubuntu0.1	armhf	SELinux library for manipulating binary security policies
libsigsegv2:armhf	2.10-2	armhf	Library for handling page faults in a portable way
libslang2:armhf	2.2.4-15ubuntu1	armhf	S-Lang programming library - runtime version

Name	Version	Architecture	Description
libsqlite3-0:armhf	3.8.2-1ubuntu2.2	armhf	SQLite 3 shared library
libss2:armhf	1.42.9-3ubuntu1.3	armhf	command-line interface parsing library
libssl1.0.0:armhf	1.0.1f-1ubuntu2.27	armhf	Secure Sockets Layer toolkit - shared libraries
libstdc++-4.9-dev:armhf	4.9.4-2ubuntu1~14.04.1	armhf	GNU Standard C++ Library v3 (development files)
libstdc++6:armhf	9.3.0-11ubuntu0~14.04	armhf	GNU Standard C++ Library v3
libsystemd-login0:armhf	204-5ubuntu20.31	armhf	systemd login utility library
libtalloc2:armhf	2.1.5-0ubuntu0.14.04.1	armhf	hierarchical pool based memory allocator
libtasn1-6:armhf	3.4-3ubuntu0.6	armhf	Manage ASN.1 structures (runtime)
libtdb1:armhf	1.3.8-0ubuntu0.14.04.1	armhf	Trivial Database - shared library
libterm-ui-perl	0.42-1	all	Term::ReadLine UI made easy
libtevent0:armhf	0.9.28-0ubuntu0.14.04.1	armhf	talloc-based event loop library - shared library
libtext-charwidth-perl	0.04-7build3	armhf	get display widths of characters on the terminal
libtext-iconv-perl	1.7-5build2	armhf	converts between character sets in Perl
libtext-soundex-perl	3.4-1build1	armhf	implementation of the soundex algorithm
libtext-wrapi18n-perl	0.06-7	all	internationalized substitute of Text::Wrap
libtinfo5:armhf	5.9+20140118-1ubuntu1	armhf	shared low-level terminfo library for terminal handling
libubsan0:armhf	7.2.0-1ubuntu1~14.04.1	armhf	UBSan -- undefined behaviour sanitizer (runtime)
libudev1:armhf	204-5ubuntu20.31	armhf	libudev shared library
libuniconf4.6	4.6.1-7	armhf	C++ network libraries for rapid application development
libusb-0.1-4:armhf	2:0.1.12-23.3ubuntu1	armhf	userspace USB programming library
libusb-1.0-0:armhf	2:1.0.17-1ubuntu2	armhf	userspace USB programming library
libustr-1.0-1:armhf	1.0.4-3ubuntu2	armhf	Micro string library: shared library
libuuid1:armhf	2.20.1-5.1ubuntu20.9	armhf	Universally Unique ID library
libwbclient0:armhf	2:4.3.11+dfsg-0ubuntu0.14.04.20	armhf	Samba winbind client library
libwind0-heimdal:armhf	1.6~git20131207+dfsg-1ubuntu1.2	armhf	Heimdal Kerberos - stringprep implementation
libwrap0:armhf	7.6.q-25	armhf	Wietse Venema's TCP wrappers library
libwvstreams4.6-base	4.6.1-7	armhf	C++ network libraries for rapid application development
libwvstreams4.6-extras	4.6.1-7	armhf	C++ network libraries for rapid application development
libxml2:armhf	2.9.1+dfsg1-3ubuntu4.13	armhf	GNOME XML library
libxtables10	1.4.21-1ubuntu1	armhf	netfilter xtables library
libyaml-0-2:armhf	0.1.4-3ubuntu3.1	armhf	Fast YAML 1.1 parser and emitter library
linux-firmware	1.127.24	all	Firmware for Linux kernel drivers
linux-libc-dev:armhf	3.13.0-170.220	armhf	Linux Kernel Headers for development
locales	2.13+git20120306-12.1	all	common files for locale support
lockfile-progs	0.1.17	armhf	Programs for locking and unlocking files and mailboxes
login	1:4.1.5.1-1ubuntu9.5	armhf	system login tools
logrotate	3.8.7-1ubuntu1.2	armhf	Log rotation utility
lowpan-tools	0.3-1	armhf	Base programs for LoWPAN in Linux, the net-tools for LoWPAN
lsb-base	4.1+Debian11ubuntu6.2	all	Linux Standard Base 4.1 init script functionality
lsb-release	4.1+Debian11ubuntu6.2	all	Linux Standard Base version reporting utility
lshw	02.16-2ubuntu1.4	armhf	information about hardware configuration
lsof	4.86+dfsg-1ubuntu2	armhf	Utility to list open files
m4	1.4.17-2ubuntu1	armhf	a macro processing language
make	3.81-8.2ubuntu3	armhf	An utility for Directing compilation.
makedev	2.3.1-93ubuntu2~ubuntu14.04.1	all	creates device files in /dev
manpages	3.54-1ubuntu1	all	Manual pages about using a GNU/Linux system
manpages-dev	3.54-1ubuntu1	all	Manual pages about using GNU/Linux for development
mawk	1.3.3-17ubuntu2	armhf	a pattern scanning and text processing language
memtester	4.3.0-3	armhf	Utility for testing the memory subsystem
mime-support	3.54ubuntu1.1	all	MIME files 'mime.types' & 'mailcap', and support programs
module-init-tools	15-0ubuntu7	all	transitional dummy package (module-init-tools to kmod)
mount	2.20.1-5.1ubuntu20.9	armhf	Tools for mounting and manipulating filesystems
mountall	2.53ubuntu1	armhf	filesystem mounting tool
mtd-utils	1:1.5.0-1	armhf	Memory Technology Device Utilities
multiarch-support	2.19-0ubuntu6.15	armhf	Transitional package to ensure multiarch compatibility
nano	2.2.6-1ubuntu1	armhf	small, friendly text editor inspired by Pico
ncurses-base	5.9+20140118-1ubuntu1	all	basic terminal type definitions
ncurses-bin	5.9+20140118-1ubuntu1	armhf	terminal-related programs and man pages
net-tools	1.60-25ubuntu2.1	armhf	The NET-3 networking toolkit
netbase	5.2	all	Basic TCP/IP networking system
netcat-openbsd	1.105-7ubuntu1	armhf	TCP/IP swiss army knife
ntpdate	1:4.2.6.p5+dfsg-3ubuntu2.14.04.13	armhf	client for setting system time from NTP servers
openssh-client	1:6.6p1-2ubuntu2.13	armhf	secure shell (SSH) client, for secure access to remote machines
openssh-server	1:6.6p1-2ubuntu2.13	armhf	secure shell (SSH) server, for secure access from remote machines
openssh-sftp-server	1:6.6p1-2ubuntu2.13	armhf	secure shell (SSH) sftp server module, for SFTP access from remote machines
openssl	1.0.1f-1ubuntu2.27	armhf	Secure Sockets Layer toolkit - cryptographic utility
passwd	1:4.1.5.1-1ubuntu9.5	armhf	change and administer password and group data
pastebinit	1.5-1~bpo1404+20160303+1	all	command-line pastebin client
perl	5.18.2-2ubuntu1.7	armhf	Larry Wall's Practical Extraction and Report Language
perl-base	5.18.2-2ubuntu1.7	armhf	minimal Perl system
perl-modules	5.18.2-2ubuntu1.7	all	Core Perl modules
php5	5.5.9+dfsg-1ubuntu4.29	all	server-side, HTML-embedded scripting language (metapackage)
php5-cli	5.5.9+dfsg-1ubuntu4.29	armhf	command-line interpreter for the php5 scripting language
php5-common	5.5.9+dfsg-1ubuntu4.29	armhf	Common files for packages built from the php5 source
php5-json	1.3.2-2build1	armhf	JSON module for php5
php5-readline	5.5.9+dfsg-1ubuntu4.29	armhf	Readline module for php5
plymouth	0.8.8-0ubuntu17.2	armhf	graphical boot animation and logger - main package
pmount	0.9.23-2	armhf	mount removable devices as normal user
ppp	2.4.5-5.1ubuntu2.3	armhf	Point-to-Point Protocol (PPP) - daemon
pppoe	3.8-3ubuntu1	armhf	PPP over Ethernet driver
procps	1:3.3.9-1ubuntu2.3	armhf	/proc file system utilities
psmisc	22.20-1ubuntu2	armhf	utilities that use the proc file system
python	2.7.5-5ubuntu3	armhf	interactive high-level object-oriented language (default version)
python-apt-common	0.9.3.5ubuntu3	all	Python interface to libapt-pkg (locales)
python-chardet	2.0.1-2build2	all	universal character encoding detector
python-crypto	2.6.1-4ubuntu0.3	armhf	cryptographic algorithms and protocols for Python

Name	Version	Architecture	Description
python-dnspython	1.11.1-1build1	all	DNS toolkit for Python
python-ldb	1:1.1.24-0ubuntu0.14.04.2	armhf	Python bindings for LDB
python-minimal	2.7.5-5ubuntu3	armhf	minimal subset of the Python language (default version)
python-pycurl	7.19.3-0ubuntu3	armhf	Python bindings to libcurl
python-requests	2.2.1-1ubuntu0.4	all	elegant and simple HTTP library for Python, built for human beings
python-samba	2:4.3.11+dfsg-0ubuntu0.14.04.20	armhf	Python bindings for Samba
python-six	1.5.2-1ubuntu1	all	Python 2 and 3 compatibility library (Python 2 interface)
python-software-properties	0.92.37.8	all	manage the repositories that you install software from
python-talloc	2.1.5-0ubuntu0.14.04.1	armhf	hierarchical pool based memory allocator - Python bindings
python-tdb	1.3.8-0ubuntu0.14.04.1	armhf	Python bindings for TDB
python-urllib3	1.7.1-1ubuntu4.1	all	HTTP library with thread-safe connection pooling for Python
python2.7	2.7.6-8ubuntu0.5	armhf	Interactive high-level object-oriented language (version 2.7)
python2.7-minimal	2.7.6-8ubuntu0.5	armhf	Minimal subset of the Python language (version 2.7)
python3	3.4.0-0ubuntu2	armhf	interactive high-level object-oriented language (default python3 version)
python3-apt	0.9.3.5ubuntu3	armhf	Python 3 interface to libapt-pkg
python3-dbus	1.2.0-2build2	armhf	simple interprocess messaging system (Python 3 interface)
python3-gi	3.12.0-1ubuntu1	armhf	Python 3 bindings for gobject-introspection libraries
python3-minimal	3.4.0-0ubuntu2	armhf	minimal subset of the Python language (default python3 version)
python3-pkg-resources	3.3-1ubuntu2	all	Package Discovery and Resource Access using pkg_resources
python3-pycurl	7.19.3-0ubuntu3	armhf	Python 3 bindings to libcurl
python3-software-properties	0.92.37.8	all	manage the repositories that you install software from
python3-yaml	3.10-4ubuntu0.1	armhf	YAML parser and emitter for Python3
python3.4	3.4.3-1ubuntu1~14.04.7	armhf	Interactive high-level object-oriented language (version 3.4)
python3.4-minimal	3.4.3-1ubuntu1~14.04.7	armhf	Minimal subset of the Python language (version 3.4)
rcn-ee-archive-keyring	2016.04.24~bpo1404+20160424+1	all	GnuPG archive keys of the rcn-ee archive
read-edid	3.0.1-2	armhf	hardware information-gathering tool for VESA PnP monitors
readline-common	6.3-4ubuntu2	all	GNU readline and history libraries, common files
resolvconf	1.69ubuntu1.4	all	name server information handler
rsync	3.1.0-2ubuntu0.4	armhf	fast, versatile, remote (and local) file-copying tool
rsyslog	7.4.4-1ubuntu2.7	armhf	reliable system and kernel logging daemon
samba	2:4.3.11+dfsg-0ubuntu0.14.04.20	armhf	SMB/CIFS file, print, and login server for Unix
samba-common	2:4.3.11+dfsg-0ubuntu0.14.04.20	all	common files used by both the Samba server and client
samba-common-bin	2:4.3.11+dfsg-0ubuntu0.14.04.20	armhf	Samba common files used by both the server and the client
samba-dsdb-modules	2:4.3.11+dfsg-0ubuntu0.14.04.20	armhf	Samba Directory Services Database
samba-libs:armhf	2:4.3.11+dfsg-0ubuntu0.14.04.20	armhf	Samba core libraries
samba-vfs-modules	2:4.3.11+dfsg-0ubuntu0.14.04.20	armhf	Samba Virtual FileSystem plugins
sed	4.2.2-4ubuntu1	armhf	The GNU sed stream editor
sensible-utils	0.0.9ubuntu0.14.04.1	all	Utilities for sensible alternative selection
shared-mime-info	1.2-0ubuntu3	armhf	FreeDesktop.org shared MIME database and spec
software-properties-common	0.92.37.8	all	manage the repositories that you install software from (common)
ssh	1:6.6p1-2ubuntu2.13	all	secure shell client and server (metapackage)
ssh-import-id	3.21-0ubuntu1	all	securely retrieve an SSH public key and install it locally
sudo	1.8.9p5-1ubuntu1.4	armhf	Provide limited super user privileges to specific users
sysv-rc	2.88dsf-41ubuntu6.3	all	System-V-like runlevel change mechanism
sysvinit-utils	2.88dsf-41ubuntu6.3	armhf	System-V-like utilities
tar	1.27.1-1ubuntu0.1	armhf	GNU version of the tar archiving utility
tdb-tools	1.3.8-0ubuntu0.14.04.1	armhf	Trivial Database - bundled binaries
traceroute	1:2.0.20-0ubuntu0.1	armhf	Traces the route taken by packets over an IPv4/IPv6 network
tzdata	2017c-0ubuntu0.14.04	all	time zone and daylight-saving time data
u-boot-tools	2013.10-3	armhf	companion tools for Das U-Boot bootloader
ubuntu-advantage-tools	19.6~ubuntu14.04.4	armhf	management tools for Ubuntu Advantage
ubuntu-keyring	2012.05.19	all	GnuPG keys of the Ubuntu archive
ubuntu-minimal	1.325.1	armhf	Minimal core of Ubuntu
ucf	3.0027+nmu1	all	Update Configuration File(s): preserve user changes to config files
udev	204-5ubuntu20.31	armhf	/dev/ and hotplug management daemon
udhcpd	1:1.21.0-1ubuntu1.4	armhf	Provides the busybox DHCP server implementation
unattended-upgrades	0.82.1ubuntu2.5	all	automatic installation of security upgrades
update-inetd	4.43	all	inetd configuration file updater
upstart	1.12.1-0ubuntu4.2	armhf	event-based init daemon
ureadahead	0.100.0-16	armhf	Read required files in advance
usbmount	0.0.22	all	automatically mount and unmount USB mass storage devices
usbutils	1:007-2ubuntu1.1	armhf	Linux USB utilities
util-linux	2.20.1-5.1ubuntu20.9	armhf	Miscellaneous system utilities
uuid-dev	2.20.1-5.1ubuntu20.9	armhf	universally unique id library - headers and static libraries
vim-common	2:7.4.052-1ubuntu3.1	armhf	Vi IMproved - Common files
vim-tiny	2:7.4.052-1ubuntu3.1	armhf	Vi IMproved - enhanced vi editor - compact version
vsftpd	3.0.2-1ubuntu2.14.04.1	armhf	lightweight, efficient FTP server written for security
wget	1.15-1ubuntu1.14.04.3	armhf	retrieves files from the web
whiptail	0.52.15-2ubuntu5	armhf	Displays user-friendly dialog boxes from shell scripts
wireless-tools	30~pre9-8ubuntu1	armhf	Tools for manipulating Linux Wireless Extensions
wpasupplicant	2.1-0ubuntu1.7	armhf	client support for WPA and WPA2 (IEEE 802.11i)
wvdial	1.61-4.1	armhf	intelligent Point-to-Point Protocol dialer
xkb-data	2.10.1-1ubuntu1	all	X Keyboard Extension (XKB) configuration data
xz-utils	5.1.1alpha+20120614-2ubuntu2	armhf	XZ-format compression utilities
zlib1g:armhf	1:1.2.8.dfsg-1ubuntu1.1	armhf	compression library - runtime

Revision History

MONTH YEAR	Summary of Changes
October 2016	1st edition
October 2017	Ver 1.2.0 - Added new models CPS-MCS341G-DSx series, CPS-MCS341Q-DSx series - Added Web Setup function - Changed how to set the network - Combined 3G model settings into [4.2. Network setting] - Added the packages below pppoe, vsftpd, iptables, iptables-persistent, apache2-utils - Added the section [3.3 For File System]
March 2018	Ver 1.3.0 - Added new function items in Network setting 3G connection enabled or disabled setting DHCP server function setting PPPoE function setting Static routing function setting Port forwarding function setting IP filter function setting - Added the following sections in Chapter 5 "FPGA I/O map", "Integrate type controller series LED / DIP Switch / Switch control", "Configurable type controller series DIO / LED / DIP Switch / Switch control" - Updated pre-installed package
August 2020	Ver 1.4.0 - Change the User's Manual into a new layout - Communized the image file to all models - Added the Gateway supported model and the LTE supported model - Updated the model names of the [List of CONPROSYS products that support SDK] - Added the Host name and its details in the [Wet Setup function - System] - Updated the list of the tables in the [Appendix – 3. Device I/F] - Added the new section of the [Appendix – 7. Option Board control - Updated the list of tables in the [Appendix 8. Installed packages]
February 2022	Ver 1.4.3 - Added the new section of the [Target operation check - 7.Web Setup - 2.Status menu] rooter function, IP filter, Log - Added the following devices of the [Appendix - 3.Device I/F] Configurable type COM device Configurable type AIO control device Configurable type DIO control device Configurable type SSI control device

MONTH YEAR	Summary of Changes
November 2024	Ver 1.5.0 - Added new models CPS-MGS341-DS1 CPS-MGS341G5-DS1 - Added I/O support for the following modules CPS-SSI-4C

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