Beta Version

OpenBlocks A Family
User Guide
(Manual)

Java
COMPATIBLE

Ver0.0.1

Plat'Home

http://openblocks.plathome.com/

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■ Important notice

Contents

Chapter 1: Product Summary

1-1. Names and Functions [AX3]

1000BASE-T(GbE) x 4 ports type.
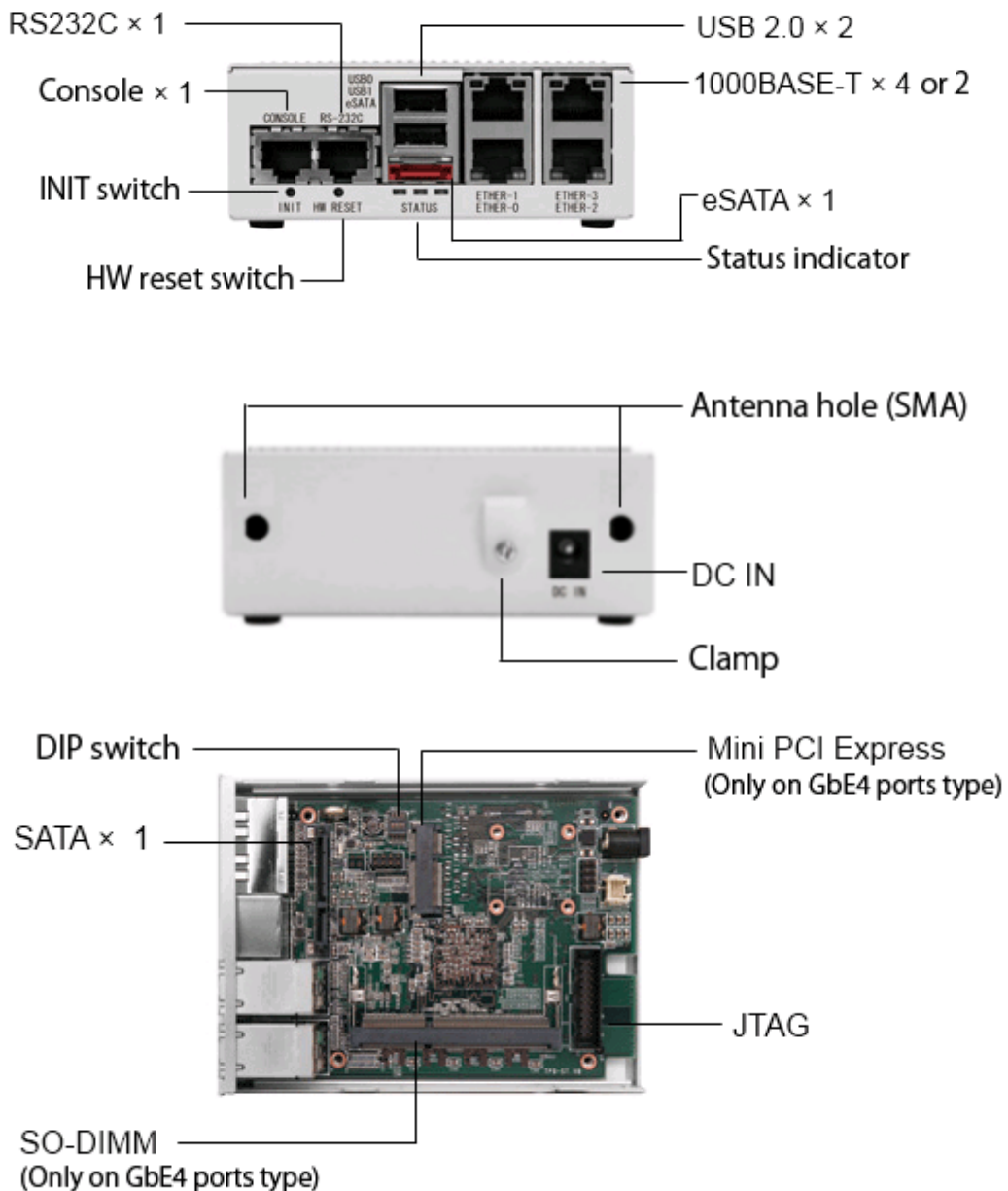
✓ To open and close the cover, use right screwderiver for those screws and do not over-tighten them

1-2. Names and Functions [A6]
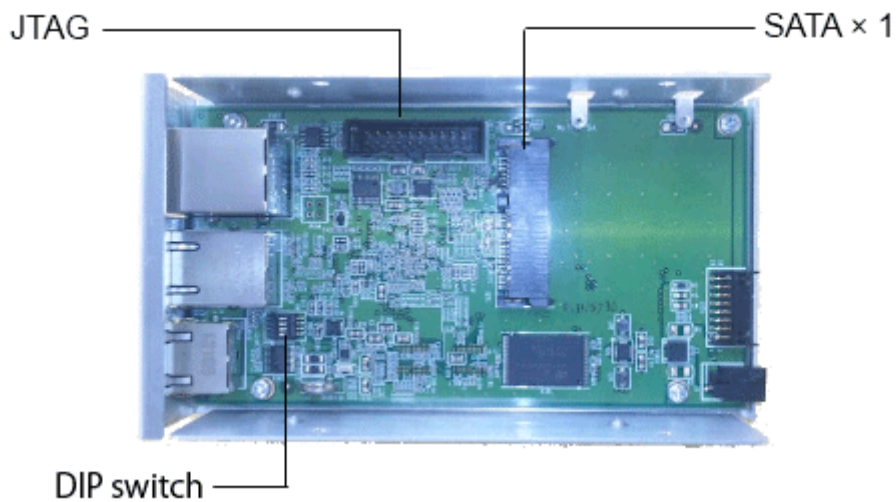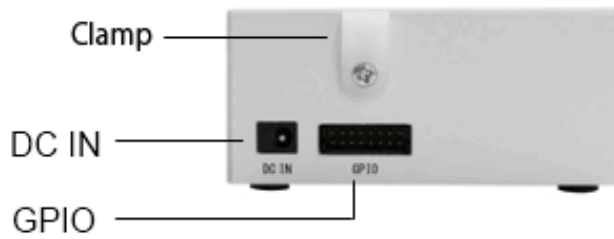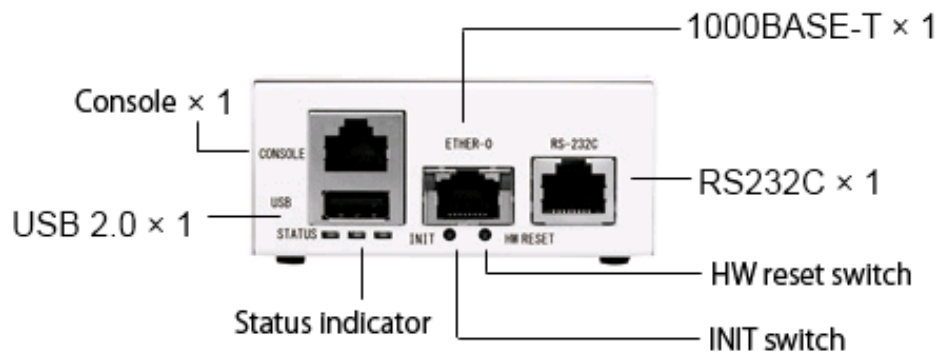
Console × 1
1000BASE-T × 1
USB 2.0 × 1
RS232C × 1
Status indicator
HW reset switch
INIT switch

Clamp
DC IN
GPIO

JTAG
SATA × 1
DIP switch

✓ To open and close the cover, use right screwderiver for those screws and do not over-tighten them

1-3. Specifications [AX3]

型番		OBSAX3/4/x *1	OBSAX3/2/x *1
CPU	Model	Armada XP (MV78260)	
	Clock speed	1.33GHz　Dual-Core	
	L1 Cache	32KB	
	L2 Cache	1MB	
	FPU	Hardware Supported	
Main Memory	Onboard	1GB (DDR3 SDRAM)	
	204pin SO-DIMM	1 / 2GB（Max）	N/A
FLASH ROM		128MB (NOR)	
Storage *2	SATAⅡ	Not included dedicated mount kit is required to install	
Internal I/O *2	Mini PCI Expres (PCIe2.0)	1	N/A
	JTAG	1x (2.54mm pin headers, 2x20-pin)	
External I/O *2	10/100/1000Base-T *3	4	2
	eSATA（SATAⅡ）	1	
	USB2.0 (Type-A)	2	
	RS-232C (RJ-45)	2 (5-pin (for RxD, TxD, RTS, CTS, GND), 1 port is unable when a Console Port is used)	
	GPIO	N/A	
Dimensions (mm)		101(W) x 142.1(D) x 41(H) (w/o rubber feet)	
Weight (g) ca.		370	350
Ambient Conditions	Running Time	Temperature: 0 - 45℃, Humidity: 20 - 80% Rh	
	In Storage	Temperature: -20 - 70℃, Humidity: 20 – 95% Rh	
Power supply		12V AC adapter	
Power Consumption	Idle Time	10W (16.5VA)	9W (15.0VA)
	Under high load *4	13W (20.5VA)	12W (19.5VA)
Standards Compliances	Electricity	IEC60950, UL60950-1, CSA C22.2, CE EN60950, PSE	
	EMC	FCC Part15, Class-A, VCCI Class-A Compliant, CE	
	Environmental Protection	RoHS Directive, PFOS regulation, Energy-Saving Laws	

*1. ” x” is replaced with the package model number. *2. It is not guaranteed the compatibility and/or connection of other company products. *3. Support Auto MDI/MDI-X. *4. Measured at CPU100% by stress command with linked up all Ethernet port. Not in use of additional devices such as SSD/SO-DIMM etc.

<Caution>

・ Use inappropriate battery may cause explosion. Please do not remove or replace battery.

・ When disposing the battery after finish using the product, please do not charge, disassemble or thrown into the fire the battery. Batteries should be disposed of in accordance with the instructions of local authorities.

1-4. Specifications [A6]

型番		OBSA6/x *1
CPU	Model	Armada 310 (88F6283)
	Clock speed	600MHz
	L1 Cache	16KB
	L2 Cache	256MB
Main Memory	Onboard	512MB (DDR2 SDRAM)
FLASH ROM		64MB (NAND)
Storage *2	SATA Ⅱ	2.5 inch or Half-Slim (Not Included)
Internal I/O *2	JTAG	1x (2.54 mm pin headers, 2x20-pin)
External I/O *2	10/100/1000Base-T *3	1
	USB2.0 (Type-A)	1
	RS-232C (RJ-45)	2 (5-pin (for RxD, TxD, RTS, CTS, GND),1 port is unable when a Console Port is used)
	GPIO	8-bit (2 mm pin headers, 2x16pin)
Dimensions (mm)		81 (W) x 114.5 (D) x 38 (H) (w/o rubber feet)
Weight (g) ca.		205
Ambient Conditions	Running Time	Temperature: 0 - 45C, Humidity: 20 - 80% Rh
	In Storage	Temperature: -20 - 70C, Humidity: 20 - 95% Rh
Power supply		5V AC adapter
Power Consumption	Idle Time	4.5W (7.0VA)
	Under high load *4	5.5W (8.5VA)
Standards Compliances	Electricity	IEC60950, UL60950-1, CSA C22.2, CE EN60950, PSE
	EMC	FCC Part15, Class-A VCCI Class-A Compliant, CE
	Environmental Protection	RoHS Directive, PFOS regulation, Energy-Saving Laws

*1. ” x” is replaced with the package model number. *2. It is not guaranteed the compatibility and/or connection of other company products. *3. Support Auto MDI/MDI-X *4. Measured at CPU100% by stress command with linked up all Ethernet port. Not in use of additional devices such as SSD/SO-DIMM etc.

<Caution>

・ Use inappropriate battery may cause explosion. Please do not remove or replace battery.

・ When disposing the battery after finish using the product, please do not charge, disassemble or thrown into the fire the battery. Batteries should be disposed of in accordance with the instructions of local authorities.

1-5. Factory Settings

■ Administrator for Serial Console / SSH access (AX3/A6)

ID:	root
Password:	root

■ Host Name

	AX3	A6
Host Name	obsax3	obsa6
Domain Name	N/A	

■ IP addresses

		AX3	A6
Ether-0 (eth0)	IP address:	192.168.254.254	192.168.254.254
	Netmask:	255.255.255.0	255.255.255.0
Ether-1 (eth1)	IP address:	192.168.253.254	No I/F
	Netmask:	255.255.255.0	
Ether-2 (eth2)	IP address:	AX3/4: N/A AX3/2: No I/F	
	Netmask:		
Ether-3 (eth3)	IP address:		
	Netmask:		

1-6. Reset of Configuration

While pressing the INIT switch (about 5 seconds) and turn on the OpenBlocks A Family, it will boot in the reset mode temporarily. Depend on the mode of operation, execute the command to remove and/or not utilize the existing configuration and reboot it.

■ RAM disk mode (standard and unused storage)
flashcfg –e
or
flashcfg –E
 For more information about commands, see the section "3.3 dedicated command".

■ Storage combination mode
e2label /dev/sda1 ""
 Please replace the device name appropriately.
 Delete the label which set for storage combination mode. The data is not erased by the operation in the storage.

1-7. Operation of INIT Switch

By pressing the INIT switch, it is possible to boot in the reset mode and run stopping and rebooting at the time of startup the OS.

Boot in the reset mode
    While pressing the INIT switch (about 5 seconds) turn on the OpenBlocks A Family.

Reboot at the startup of OS
    After pressing the INIT switch for 0 to 4 seconds (lights amber till 2 seconds and green till 4 seconds), release the switch and the rebooting process is started.

Stop at the startup of OS
    After pressing the INIT switch for 5 seconds (lights red), release the switch and the stopping process is started.

1-8. Changing DIP Switch

Not necessary to operate normally. If technical supports instruct to do so, refer the table.

Operation	SW1	SW2	SW3	SW4
Standard	OFF	OFF	OFF	OFF
Stop by U-Boot prompt	ON	OFF	OFF	OFF
Test program execution	ON	ON	OFF	OFF
Run TFTP update	OFF	ON	OFF	OFF
Launch SATA (Load uImage from SATA storage)	OFF	OFF	ON	OFF
Use console port as RS232C *	OFF	OFF	OFF	ON

* Unable to stop a few massages after start booting. To stop the Linux login prompt, comment out the line starting with T0 by /etc/inittab.

1-9. Oracle Java Based Model

Oracle Java based model has been installed associated files in FlashROM or attached SSD. We recommend to getting their backup before starting use.

◆ Intended package
・ OpenBlocks AX3 DP package (Both GbE2 port and 4 port)
・ OpenBlocks AX3 J package (Both GbE2port and 4 port)
・ OpenBlocks A6 DP package

◆ Installed file
・ /usr/lib/jre and all the below (Java main body)
・ /etc/profile.d/java.sh (environment variables setting script)

◆ AX3
Archives of related files are written on the FlashROM (/dev/mtd6). In RAM disc mode, deploying the files whenever booting, and in storage combination mode, deploying the files at the first time of stating. Thus, if erasing the files on the file

system, restore is possible. The area in FlashROM is read-only and prohibited to change and erase from OS.

◆ A6

Files are written in the mentioned installation path on the storage. It is not written on the FlashROM because of its size. If erasing the files on the file system, therefore restore is impossible. We recommend to getting the backup before starting use.

Chapter 2: Overview

2-1. OpenBlocks A family

OpenBlocks A family is an alll-purpose server with Debian GNU/Linux as OS. Although it has been some customization in order to take advantage of hardware characteristics (see 2-2. RAM Disk Mode / 2-3. Storage Combination Mode / 2-4. Changing Debian GNU/Linux), the operation is general one of Debian and other Linux except the customizable part.

2-2. RAM Disk Mode

The combination of the RAM disk created on the main memory and FlashROM on the main board realizes the system construction and operation without storage. It is possible to realize a robust system in case accumulation of data is not required.

- Partitioning of "/" as 128MB RAM disk (initrd).
- Partitioning of "/.rw" as 384MB RAM disk (tmpfs).
- Creating directory of "/usr" or "/etc" under " /.rw".
- Overlay "/.rw/usr" on "/usr" with using Unionfs. *Operate other directory in same way.
- Save all changed differencial aggregated below "/.rw" in the user area in FlashROM using dedicated command of flashcfg.
- Whenever boot, write back from FlashROM to RAM disk and restore the environment at the time of storage.

    Result of executing mount
    root@obsax3:~# mount
    /dev/ram0 on / type ext2 (rw)
    proc on /proc type proc (rw,noexec,nosuid,nodev)
    sysfs on /sys type sysfs (rw,noexec,nosuid,nodev)
    udev on /dev type tmpfs (rw,mode=0755)
    tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev,size=64m)
    devpts on /dev/pts type devpts (rw,noexec,nosuid,gid=5,mode=620)

```
tmpfs    on    /.rw    type    tmpfs    (rw,size=393216k)unionfs    on    /etc    type    unionfs
(rw,relatime,dirs=/.rw/etc=rw:/etc=ro)
unionfs on /bin type unionfs (rw,relatime,dirs=/.rw/bin=rw:/bin=ro)
unionfs on /home type unionfs (rw,relatime,dirs=/.rw/home=rw:/home=ro)
unionfs on /lib type unionfs (rw,relatime,dirs=/.rw/lib=rw:/lib=ro)
unionfs on /sbin type unionfs (rw,relatime,dirs=/.rw/sbin=rw:/sbin=ro)
unionfs on /usr type unionfs (rw,relatime,dirs=/.rw/usr=rw:/usr=ro)
unionfs on /var type unionfs (rw,relatime,dirs=/.rw/var=rw:/var=ro)
unionfs on /root type unionfs (rw,relatime,dirs=/.rw/root=rw:/root=ro)
unionfs on /opt type unionfs (rw,relatime,dirs=/.rw/opt=rw:/opt=ro)
unionfs on /srv type unionfs (rw,relatime,dirs=/.rw/srv=rw:/srv=ro)
unionfs on /media type unionfs (rw,relatime,dirs=/.rw/media=rw:/media=ro)
```

Restriction of RAM Disk mode

・ The amount of data which can be stored in the Flash ROM is up to 50MB for AX3 and 30MB for A6. Compressing and saving the data below "/.rw'.
The amount of AX3 is for J package.

・ Repository information obtained in "aptitude update does not store. Before installing or updating additionally, need always the update.

2-3. Storage Combination Mode

Operating mode which changed "/.rw" RAM disk space to storage such as SATA SSD in RAM disk mode.

・ Turn on the power with setting the "DEBIAN" in the label and mounting the storage formatted by "ext2/ext3/ext4", it will shift to the storage combination mode.
・ Back to RAM disk mode by dismount the label and storage.
・ Unnecessary to save to the FlashROM by flashcfg in the storage combination mode.

2-4. Changing to Debian GNU/Linux

■ *Addition*

- /etc/init.d/openblocks-setup

  Perform reserving the RAM disk and/or re-setting of mounting SSD.

- /usr/sbin/flashcfg

  Operate saving to the FlashROM and reset of FlashROM and so on.

- /usr/sbin/flashcfg-debian

  External command handling some function in the above script.

- /etc/default/openblocks

  Configuration file which is referred by "/etc/init.d/openblocks-setup" and "/usr/sbin/flashcfg".

- /usr/sbin/runled

  Boot as a daemon in order to control the LED display of the surface. The displayed speed changes in three steps by the loading status.

- /usr/sbin/pshd

  Boot as a daemon to control when the INIT button in the surface is pressed.

■ *Change*

- /etc/init.d/umountfs

  Set "hold" the initscripts package including this file.

  When the package is updated, update the firmware (Kernel package)

■ *Delite*

- Locale data from "/usr/share/locale" except "ja".(for increasing the capacity)
- Document from "/usr/share/doc". (same as above)
- /etc/udev/rules.d/70-persistent-net.rules

  (Boot in "/etc/init.d/openblocks-setup" and delete every time)

  Process to prevent changing interface (eth0 and eth1 to eth2and eth3) when mounted a configured storage to another individual.

Chapter 3: Getting Started

3-1. Connection by Serial Console

As following graphic, connect OpenBlocks A Family with the serial port directly on your PC and configure using serial console software (PuTTY or TeraTerm for windows). If the PC has no serial port, use a serial-port-USB adapter (not included).

*Continued use of a serial-port-USB may cause disorder of display depend on the combination with the software of serial console. Please change the software and/or setting in this case.
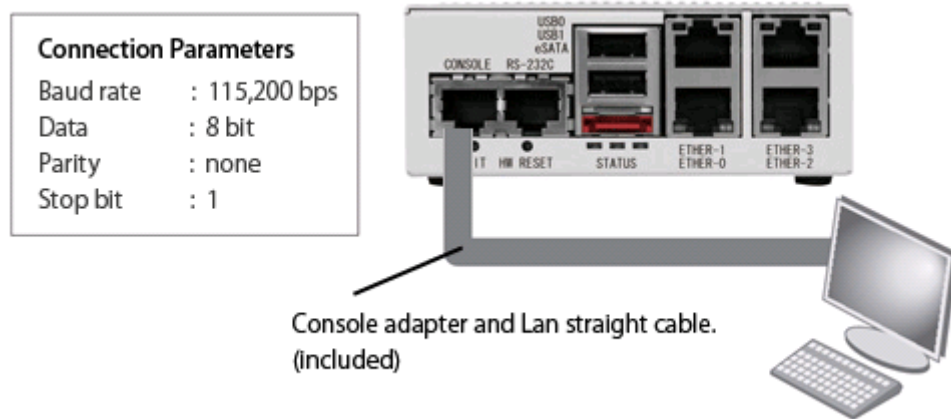
3-2. Connection by SSH

Operate using SSH client software (PuTTY, TeraTerm and etc.) for the IP address of this system. Please refer "1-5. Factory Settings" to find IP address and password from factory.

Create a host key of SSH server when booting up the device first time. Please remind that re-create of the host key will be required whenever boot it until saving the host key in case using RAM disk mode and did not save it. In storage combined mode, a host key is not re-created once created and as long as existing the key.

3-3. Dedicated Command (RAM disk mode)

Use the dedicated command "flashcfg" for setting to an operation of the device. In RAM disk mode, use it for saving the added software and configuration changes. In SSD combined mode, not necessary to use it within the basic operation.

In case running it without setting any options, it shows help of executable commands.

■ Save settings in FlashROM – all settings

Use an option, "-S (upper case)" to save all changes. Save all below "/.rw" to Flash ROM. Also call "-s (lower case)" internally. Use "-S (upper case)" unless having a particular reason.

　　# **flashcfg -S**

　　FlashROM overwrites the current data.
　　Are you ok? [y|N] **y**

　　Archiving userland files... done (Approximately 0 MBytes)
　　Save files to FlashROM
　　*
　　done

　　Archiving /etc config files... done (Approximately 4 KBytes)
　　Save files to FlashROM
　　*
　　done

■ Save settings in FlashROM – only "/etc"

Use an option, "-s (lower case)" to save below "/etc". Save only below "/.rw/etc" to Flash ROM. It completes in a short time since it is only below "/etc". However it may happen inconsistencies to other regions, use "-S (upper case)" unless having a particular reason.

> # **flashcfg -s**
>
> FlashROM overwrites the current data.
> Are you ok? [y|N] **y**
>
> Archiving /etc config files... done (Approximately 4 KBytes)
> Save files to FlashROM
> *
> done

■ Delete setting saved in the FlashROM

Delete the saved settings and reset the devices, use an option "-e". Clearing the data in the header part of the user area in the FlashROM makes unable to recover the data at booting. Use an option "-E" to remove in all area,.

> # **flashcfg -e**
>
> Erase FlashROM (header only).
> Are you ok? [y|N] **y**
>
> Eraing FlashROM... done

■ Display the size previously saved

Display the size which previously saved in order to judge addition of software in RAM disk mode.

> # **flashcfg -l**
> Show FlashROM last saved size
>
> Use userland(-S)   : 8 KBytes (MAX: 80 MBytes)
> Use /etc config(-s) : 4 KBytes (MAX: 6 MBytes)

Chapter 4: First Steps

The operation is the same as a normal Debian except dedicated command "flashcfg". It is possible to add, delete and update software by "aptitude / apt-get" freely as long as storage space is available.

Please make sure to save the setting changes using "flashcfg –S".

What to do

- Reset (only if necessary)
- Changing to the CF combined mode (only if necessary)
- Network Configuration
- Setting of HTTP Proxy (Only if necessary)
- Preparing of package install
- Update of installed package
- Preparing SSH server
- Setting timezone
- Creating locale data
- Changing the password of root user
- Addition of normal users
- Preparation for normal users to elevate privileges to root
- Install a set of tools frequently used

Reset

Reset by the following step to clear the configured information and added software,

1. Boot pressing INIT button
   With pressing the button, it boots with standard settings of firmware and RAM disc mode. Also in case the storage combined mode is setting, it boots with RAM disk mode. Data does not be deleted without running the following steps and it boots with pre-configured contents unless pressing INIT button.

2. Delete date in the user area in the FlashROM

    Run the following command.

    # flashcfg -e

    *The command is only delete the header information. Use "flashcfg-E" to delete all.

3. Delete the storage label (in case set the storage combined mode)

    Run the following command.

    # e2label /dev/sda1 ""

    *Please replace the device name appropriately.

4. Reboot

    Run the following command.

    # reboot

    After the reboot, it restarts automatically with initialized RAM disk mode without pressing INIT button.

Changing to the CF combined mode (only if necessary)

1. Mount the storage

    Remove the cover and mount the storage.

2. Create partition

    Run the following command.

    >   # fdisk /dev/sda
    >   fdisk> o [enter] (Delete all of the existing partition)
    >   fdisk> n [enter] (Create new partition)
    >   fdisk> p [enter] (Select "Primary" as a type of partition)
    >   fdisk> 1 [enter] (Select "1" as a partition number)
    >   fdisk> [enter] (Select the address in head line as the starting address)
    >   fdisk> [enter] (Select the address in bottom like as the ending address)
    >   fdisk> w (Write the changes and exit)

3. Format

   Run the following command.

   # mke2fs -j -L DEBIAN /dev/sda1

   Format using "ext3" with selecting the "DEBIAN" on the label.

   Also enable to use "ext3" and "ext4".

   *Please replace the device name appropriately.

Network Configuration

Network-related configuration files are as follows. Please change to the appropriate content when use them.

- ・ /etc/hosts
- ・ /etc/hostname
- ・ /etc/network/interfaces
- ・ /etc/resolv.conf

Verify network configuration information (example)

Hostname : openblocks
domain : example.jp
IP address (Ether-0) : 192.168.0.10/255.255.255.0
IP address (Ether-1) : 192.168.1.10/255.255.255.0
default gateway : 192.168.0.1
DNS server :   192.168.0.2, 192.168.0.3

・/etc/hosts

```
127.0.0.1          localhost
127.0.1.1          openblocks openblocks.example.jp
::1       ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
ff02::3 ip6-allhosts
```

・/etc/hostname

openblocks

・/etc/network/interfaces

auto lo

iface lo inet loopback

auto eth0

iface eth0 inet static

address 192.168.0.10

network 192.168.0.0

netmask 255.255.255.0

broadcast 192.168.0.255

gateway 192.168.0.1

auto eth1

iface eth1 inet static

address 192.168.1.10

network 192.168.1.0

netmask 255.255.255.0

broadcast 192.168.1.255

・/etc/resolv.conf

domain example.jp

nameserver 192.168.0.2, 192.168.0.3

Setting of the HTTP Proxy (Only if necessary)

Set in the following file in the environment with HTTP Proxy.

・/etc/profile.d/proxy.sh

http_proxy=http://proxy.example.jp:8080

ftp_proxy=http://proxy.example.jp:8080

no_proxy=.example.jp

export http_proxy ftp_proxy no_proxy

・/etc/apt/apt.conf.d/99proxy

Acquire::http::Proxy "http://proxy.example.jp:8080";

Acquire::ftp::Proxy "http://proxy.example.jp:8080";

Preparing of package install

Run the following command.

aptitude update

Change the location to download by editing the "/etc/apt/sources.list" if necessary.

Update of installed package

Run the following command.

aptitude safe-upgrade

Setting Timezone

Run the following command.

dpkg-reconfigure tzdata

Creating locale data

Run the following command.

aptitude install locales

dpkg-reconfigure locales

Select a required locale such as "ja_JP.UTF-8".

Changing the password of root user

Run the following command.

passwd root

Addition of normal users

Run the following command.

```
# useradd -m user01
# passwd user01
```

*Please replace the user name appropriately.

Preparation for normal users to elevate privileges to root

```
# aptitude install sudo
# vi /etc/sudoers.d/root
user01 ALL=(ALL) ALL
# usermod -G root user01
```

"user01" in the above example can be elevated the privilege to root by using the "sudo – s" and also be able to run the various commands as root using "sudo fdisk /dev/sda".
*Please replace the user name appropriately.

Install a set of tools frequently used

OpenBlocks A Family is set in the minimum required environment to operate in the initial state. Use the following command to install a set of tools frequently used.

```
# tasksel install standard
```

Saving to the space used in the FlashROM in RAM disk mode, install by each individual package.

Increase the space of /tmp (only for RAM disk mode)

It has 128MB free space on a RAM disk for "/tmp" in RAM disk mode. To increase the space, delete the "#" in the head line of the following setting described in "/etc/fstab"/ and enable it.

```
none            /tmp            tmpfs    size=64m        0 0
```

Chapter 5: Backup and Restore

5-1. Backup

Enable to backup the environment using the following command with connecting storage which set "DEB_CONFIG" on the volume label (such as USB memory with "etx2/etx3/vfat")

> # **flashcfg -B**

Create "userland.tgz" which archived "/.rw" and below in the connected storage.

5-2. Restore

Extract automatically with connecting the storage which back-upped by the described way in 5-1. Backup and turned on the power.

5-3. Application

Aside from the backup file (userland.tgz), enable to run the script files with providing the given name. List the files in the execution sequence below. It is enabled only if the files exist in both cases.

- FORCE file (the contents is empty)
  Do not extract the user area in RAM disk mode.
  Reset the storage in storage combine mode.
- userland.tgz (archived "/.rw" and below by "tar+gzip")
  Extract to "/.rw" before using the "unionfs" (see 5-2. Restore)
- init.sh (sh script. For line feed code, only "LF" is available.)
  Run before using "unionfs".
- post-init.sh (sh script. For line feed code, only "LF" is available.)
- Run after using "unionfs"

Chapter 6: Firmware Update

6-1. Online update

OpenBlocks AX3 and A6 read and run the firmware (combined Kernel and Userland) written in the FlashROM on the main board when turn on the power.

For Kernel, it becomes the latest one by updating the firmware. As with the Userland packages, enable to update the repository information by "aptitude update" and make latest version by "aptitude safe-upgrade".

> **# aptitude update**
> **# aptitude safe-upgrade**

6-2. Offline update

In case failed the online update, write the downloaded firmware file using the following command.

> # flashcfg –f uImage.initrd.obsax3

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OpenBlockS AX3/A6 User guide

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