OPERATION MANUAL

DCC-70HS

Digital Color Corrector

1st Edition - Rev.3

Precautions

Important Safety Warnings

[Power]

⚠️ Caution	Operate unit **only** on the specified supply voltage.
🔌	Disconnect power cord by connector only. **Do not** pull on cable portion.
🚫 Stop	**Do not** place or drop heavy or sharp-edged objects on power cord. A damaged cord can cause fire or electrical shock hazards. Regularly check power cord for excessive wear or damage to avoid possible fire / electrical hazards.

[Grounding]

❗ Caution	**Ensure** unit is properly grounded at all times to prevent electrical shock hazard.
⚠️ Hazard	**Do not** ground the unit to gas lines, units, or fixtures of an explosive or dangerous nature.

[Operation]

⚠️ Hazard	**Do not** operate unit in hazardous or potentially explosive atmospheres. Doing so could result in fire, explosion, or other dangerous results.
⚠️ Hazard	**Do not** allow liquids, metal pieces, or other foreign materials to enter the unit. Doing so could result in fire, other hazards, or unit malfunction.
🔌	If foreign material does enter the unit, turn power off and disconnect power cord **immediately**. Remove material and contact authorized service representative if damage has occurred.

[Circuitry Access]

	Do not remove covers, panels, casing, or access circuitry with power applied to the unit! Turn power off and disconnect power cord prior to removal. Internal servicing / adjustment of unit should only be performed by qualified personnel.
Stop	**Do not** touch any parts / circuitry with a high heat factor. Capacitors can retain enough electric charge to cause mild to serious shock, even after power is disconnected. Capacitors associated with the power supply are especially hazardous. Avoid contact with any capacitors.
Hazard	Unit **should not** be operated or stored with cover, panels, and / or casing removed. Operating unit with circuitry exposed could result in electric shock / fire hazards or unit malfunction.

[Potential Hazards]

Caution	If abnormal smells or noises are noticed coming from the unit, turn power off immediately and disconnect power cord to avoid potentially hazardous conditions. If problems similar to above occur, contact authorized service representative **before** attempting to again operate unit.

[Fuse]

Caution	If this product is equipped with a fuse, fuse replacement should only be performed by qualified personnel. **Power off** equipment and disconnect power cord prior to replacement. Replace **only** with fuse of same type, voltage rating, and current rating as specified for the unit.

[Backup Battery]

Caution	If this product contains a memory backup battery (either dry cell or rechargeable) and when it is necessary to replace the battery, have work done by the shop where you purchased the product.

General Considerations

Power Supply

Verify your unit has the correct voltage specifications for your power source prior to applying power by reading the voltage range on the rear panel near the AC connector. The DCC-70HS normally operates on 100-120VAC or 220-240VAC $\pm$10%; 50/60Hz. Do not attempt to operate the DCC-70HS using a source having different specifications.

Location

Avoid using the DCC-70HS in areas having high humidity, high temperature, or excessive dust. Adequate ventilation is also required for optimum performance. As a result of this consideration, ensure no other equipment is located, or installed, closer than 5cm to any unit.

Desk or Tabletop Use

Unit baseplate is fitted at the factory with rubber feet to allow immediate usage as a desk or tabletop unit.

Rack Mounting

The DCC-70HS can be either single unit or dual unit mounted to a 1RU space in EIA standard rack units. Racking mounting requires purchase of one of the two available rack mount kits. When single unit mounting the single mount kit with one extended rack ear must be used. When dual unit mounting the dual mount kit with standard size rack ears must be used. Consult your FOR-A supplier to order either of these options.

Upon Receipt

Unpacking

DCC-70HS units and their accessories are fully inspected and adjusted prior to shipment. Operation can be performed immediately upon completing all required connections and operational settings.

Check your received items against the packing lists below.

ITEM	QTY	REMARKS
DCC-70HS	1	
Control Cable	1	For MU - OU control connection, PC-2076-2, 10m
AC Cord	1	
Operation Manual	1	

Option

ITEM	QTY	REMARKS
Rack mount bracket set (type 1)	1 pr.	For single unit mount to a EIA 1RU rack space
Rack mount bracket set (type 2)	1 pr.	For mounting 2 units to a EIA 1RU rack space

Separate Purchase

ITEM	QTY	REMARKS
DCC-OUA	1	Operation Unit

(Note: OU is separate purchase item from MU. Both required for basic system.)

Check

Check to ensure no damage has occurred during shipment. If damage has occurred, or items are missing, inform your supplier immediately.

Table of Contents

1. Prior to Starting

1-1. Welcome

Congratulations! By purchasing the DCC-70HS you have entered the world of FOR.A and its many innovative products. Thank you for your patronage and we hope you will turn to FOR.A products again and again to satisfy your video and audio production needs.

FOR.A provides a wide range of products, from basic support units, to complex system controllers, which have been increasingly joined by products for computer video based systems. Whatever your needs, talk to your FOR.A representative. We will do our best to be of continuing service to you.
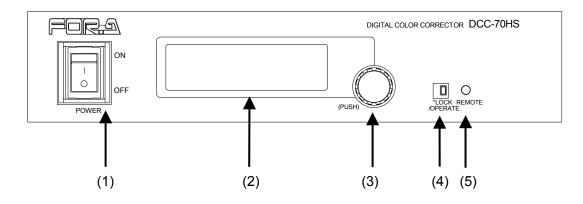
1-2. About the DCC-70HS

The DCC-70HS combines HDTV and SDTV color correction capability and signal processing with a cost conscious design.

- ➢ Accepts HD or SD SDI signal formats.
- ➢ 1 video input and 2 video outputs configured, one of them can also bypass the input signal when the unit power is OFF.
- ➢ In addition to the YCbCr Clip mode, clip adjustments for GBR and Composite modes are available.
- ➢ FAN alarm signal can be output using GPI connector.
- ➢ Firmware upgrading available through Flash memory.
- ➢ Compact EIA 1RU half width. Rack mountable with an optional rack mount bracket set.

1-3. About This Manual

Check to ensure no damage has occurred during shipment. If damage has occurred, or items are missing, inform your supplier immediately.

2. Panel Descriptions

2-1. Front Panel

(1) POWER switch
   Used to turn unit power OFF/ON.

(2) Menu Display
   Used to display menus and make operational settings.
   If fan operation fails, Fan alarm message will be shown in the menu display.

IMPORTANT
If a fan alarm indication continues to appear, it is recommended that you turn the unit power OFF immediately and contact your dealer regarding purchase of a replacement fan.

(3) Menu Control
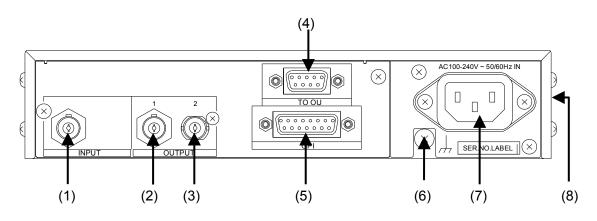   Used to menu select and change operational settings. (See sec.'4-3 Menu Operation' for details.)

(4) LOCK/OPERATE
   If set to OPERATE (to right, switch unlit), operational settings made using control (3) (menu selections) can be changed / adjusted at front panel.

   If set to LOCK (to left, switch lit orange), operational settings made using control (3) (menu selections) cannot be changed / adjusted at this panel and menu display will display LOCK.

(5) Remote Indicator
   Indicator lights green whenever connecting to the DCC-OUA. Indicator will be flashing when the connected OU power is OFF.

2-2. Rear Panel

(1) INPUT
   Used to input HD or SD SDI video signal for processing. Which signal will be accepted and processed is set at menu.

(2) OUTPUT 1
   Used to output processed and color corrected video signal.
   Also used to bypass the input signal when the unit power is OFF.

(3) OUTPUT 2
   Used to output processed and color corrected video signal.
   Any video signal does not output when the unit power is OFF.

(4) TO OU
   Used for connection to separate purchase processing control OU via COM cable supplied with MU. 9-pin D-sub, female.

(5) GPI
   Used to output a fan alarm signal when detecting fan malfunction. See sec. '5 GPI Tally Output' for more details.

(6) Ground terminal
   Used to ground unit and protect operators from electrical shock.

(7) AC IN
   Used for connection to AC power source via accessory power cord.
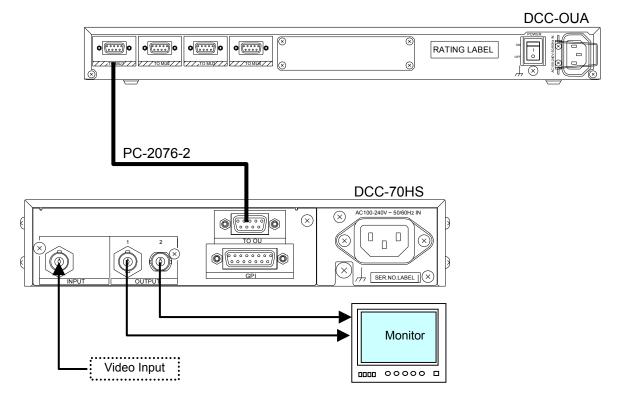
(8) Fans
   Used to air cool unit and protect against overheating. Do not block fan intakes with objects or other equipment.

3. Connection

Connect the DCC-70HS and DCC-OUA using the accessory cable.

◆ Connection example
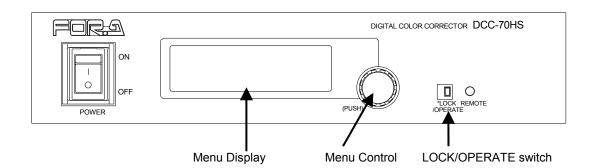
4. Operation

4-1. Power ON

1) Turn Power switch to ON after all system connections are complete. The menu display shown below will display current system version.

```
DCC-70HS F.W.
PM7773 'XX.XX
```

2) The menu display will show LOCK / OPERATE switch status (1) and video input status (2) as shown below.

(2) ⟶
```
DCC-70HS  Operate
   1080/59.94i
```
⟵ (1)

4-2. LOCK/OPERATE Setting

Menu Display   Menu Control   LOCK/OPERATE switch

DCC-70HS can disable the front panel menu settings for avoiding the accidental operation. This setting is done using LOCK/OPERATE switch on the front panel.

Switch Setting	Status	Description
OPERATE (right side)	Unlit	Operational menu settings made using control (menu selections) can be changed / adjusted at front panel.
LOCK (left side)	Lit	Operational menu settings made using control (menu selections) cannot be changed / adjusted at front panel.

When the LOCK/OPERATE switch is set to LOCK, the menu display will show the LOCK / OPERATE status as shown in the figure below.

```
DCC-70HS  Lock!
   1080/59.94i
```

In this case all menu control cannot be done. If you want to make menu settings, set the LOCK/OPERATE switch to right (light off). 'OPERATE' will be displayed in the menu display as shown in the figure below.

```
DCC-70HS  Operate
   1080/59.94i
```

4-3. Menu Operation

1) Push the control while the status information displayed on the menu display as shown below.

```
DCC-70HS  Operate
1080/59.94i
```

2) The first parameter will be displayed on the menu display as shown below.

```
Gamma Curve
    Center
```

The first line of the display blinks. While it is blinking, turn menu control to select the parameter for change. The selected parameter changes as follows:
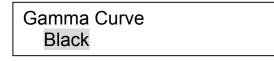
Gamma Curve -> Clip Mode -> Composite W.Clip ->

See sec. '4-6' following for more details about menu components.

3) When you find the parameter you want to change, push the control again.

```
Gamma Curve
    Center
```

An indicator at the end of the second line blinks, indicating that the parameter setting can be changed.

4) Turn the control to change the set value.

```
Gamma Curve
    Black
```

5) Push the control to apply the currently made setting.

```
Gamma Curve
    Black
```

IMPORTANT
Note that if the menu control is now held down for one second or longer, the set value will be returned to the factory default.

The second line on the display stops blinking, and the first line starts blinking again. The previously made setting is confirmed and the new setting will be available. Repeat the step (3) to (5) to complete the necessary settings.

6) Use either of the following procedures to exit menu settings.

◆ Menu timed out exit
If nothing is done while the first line of the menu display is blinking, a timeout will occur after the time set in the 'Menu Exit Time' parameter elapses (factory default: 5 seconds). When this timeout occurs, menu will automatically return to the status display. The next time the menu control is pushed to display the operational settings screen, the parameter displayed at the previous menu exit will appear first.

◆ Selecting the 'Exit Menu'
While the first line on the menu display is blinking, turn the menu control clockwise to select the 'Exit Menu'. With 'Exit Menu' displayed, push the control. Menu will automatically return to the status display. The next time the menu control is pushed to display the operational settings screen, the first parameter of the menu will be displayed.

4-4. Menu Parameter List

Parameter	Setting range			Factory default		Description
Gamma Curve	Center, Black, White			Center		Selects the Gamma Control Curve type.
Clip Mode	Clip off, YBR Clip, GBR Clip, Composite Clip			YBR Clip		Selects Clip Mode.
*Composite W.Clip	200 ~ 600			600		White Clip setting for Composite Clip.
*Composite B.Clip	-200 ~ 200			-200		Black Clip setting for Composite Clip.
* GBR White Clip	200 ~ 1200			1200		White Clip setting for GBR Clip.
* GBR Black Clip	-800 ~ 200			-800		Black Clip setting for GBR Clip.
Video Format	HD	1080/59.94i, 1080/50i, 720/60p, 720/59.94p		1080/59.94i		Select video signal format.
	SD	525/60, 625/50				
Output Delay	1080i	3000 – 32336	HD	3000		Sets the output delay. (A setting range varies according to signal formats.)
	720	3000 – 24921				
	525	10000 - 64370	SD	10000		
	625	10000 - 64814				
Display Contrast	100%, 75%, 50%, 25%			100%		Sets the contrast of the menu display.
Menu Exit Time	05sec – 99sec			05sec		Sets the menu timed out period.
Reset to Default	Yes, No			―		Returns to factory default. (See. sec '4-5'.)
Exit Menu	―			―		Exits from the menu.

* These clip settings should be made using the waveform monitor.

4-5. Clip Setting

Clip settings can be selected in following three types according to your system format; YpbPr clip, GBR clip and Composite clip.

YPbPr clip should be set on the DCC-OUA, where as GBR and Composite clip settings are made at the menu on the DCC-70HS front panel. If set to Clip off in the menu, a factory set default clip settings should be applied.

4-5-1. YPbPr Clip

When adjusting the YPbPr clip, select "YPbPr clip" for the Clip mode in the menu, then set the following parameters on DCC-OUA.

    Y WHITE CLIP
    Y BLACK CLIP
    C CLIP

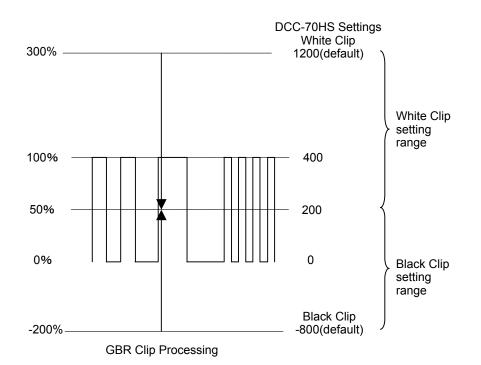See the DCC-OUA operation manual for more details.

4-5-2. GBR Clip

When adjusting the GBR clip, select "GBR clip" for the Clip mode in the menu, then set GBR White Clip and GBR Black Clip parameters respectively in the menu.

Once the "GBR clip" is selected, YPbPr input video signal is converted into GBR signal in the unit. The conberted GBR signal is processed so as not to exceed the GBR gamut range set at GBR White Clip and GBR Black Clip parameters in the menu.

Then the processed GBR signal is converted again to YPbPr format. This correction is used to eliminate out-of GBR gamut problems.
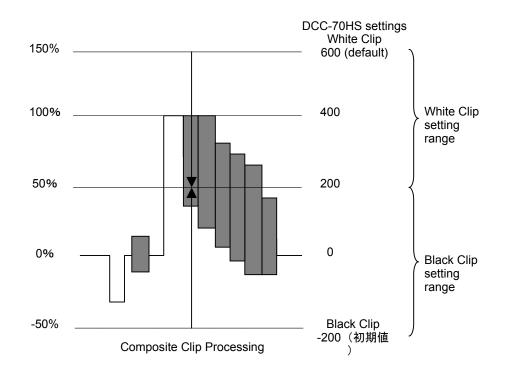
IMPORTANT
Video process controls for VIDEO LEVEL, Y LEVEL, CHROMA LEVEL and BLACK LEVEL are performed after a gamut correction.

GBR Clip Processing

4-5-3. Composite Clip

When adjusting the Compsite clip, select "Composite clip" for the Clip mode in the menu, then set Composite W Clip and Composite B Clip parameters respectively in the menu.
Once the "Composite clip" is selected, YPbPr input video signal is converted to composite signal in the unit. The converted composite signal is processed so as not to exceed the composite gamut range set at Composite W Clip and Composite B Clip parameters in the menu.
Then the processed composite signal is converted again to YPbPr format. This correction is is used to eliminate out-of composite gamut problems.
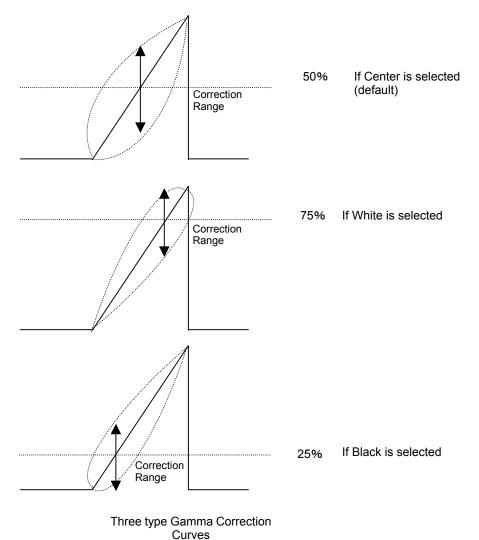

Composite Clip Processing

4-6. Gamma Curve

This Gamma Control gives you the possibility to adjust the gamma curve. You can select the suitable type for your system in the menu. When performing the gamma correction in the unit, following three type adjustments are available:

Center: Gamma curve is weighted toward the mid tones (near 50%).
White: Gamma curve is weighted toward Highlights (near 75%).
Black: Gamma curve is weighted toward Shadows (near 25%)

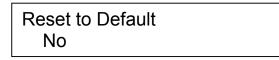Refer to the DCC-OUA operation manual for more details about gamma correction.

50%   If Center is selected
       (default)

Correction Range

75%   If White is selected

Correction Range

25%   If Black is selected

Correction Range

Three type Gamma Correction
Curves

4-7. Returning to Default

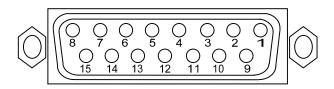To return all settings made at DCC-70HS to factory default, follow the procedure below.

1) Turn the control clockwise to select 'Reset to Default' at the menu.

2) With 'Reset to Default' displayed on the menu, push the control to display 'No'.

```
Reset to Default
    No
```

3) Turn the control to change the setting to 'Yes'.

4) Push the control again.

5) Set the unit power OFF. Then power on the unit again. All settings made at the MU return to factory default.

5. GPI Tally Output

DCC-70HS has a FAN alarm tally output.

◆ REMOTE connector pin assignments (15-pin D-sub, female, DA-15SF-N（JAE）)

Pin No.	Description
1	
2	
3	
4	
5	Relay contact X. Fan failure alarm.
6	Relay contact Y. Fan failure alarm. (Normally open or normally closed can be set at JP2 on the main board.)
7	
8	
9	VCC 5V for tally output, 300mA (max.)
10	GND
11	
12	VCC 5V for tally output, 300mA (max.)
13	GND
14	GND
15	GND

6. Internal Settings

CAUTION
Note that internal switch settings should not have to be changed from factory defaults in most operational cases. If you have accidentally changed the setting, refer to the MAIN board settings below to return to the factory default setting.
Do not access MU internal cards or make connections with unit power ON. Always power OFF all connected units / disconnect power cords prior to accessing interior.
Further note that adjustments and maintenance should be only be performed by qualified technical personnel familiar with FOR-A equipment.

◆ Jumper Switch Settings

Switch	Setting
JP1	Open
JP2	Tally relay output setting.
JP3	For normally closed contacts, 1-2 shorted. For normally open contacts, 2-3 shorted. (Factory default)
JP4	Open.
JP5	Internal Setting. IP_OFF
JP10	Internal Setting. Open.

◆ Dipswitch Settings

Switch	Setting
DS1	Internal Setting. All ON.

7. Specifications and Dimensions

7-1. Specifications

Standard

	HD SDI	1080/59.94i,1080/50i, 720/60p,720/59.94p
	SD SDI	525/60, 625/50

Signal Processing   4:4:4 digital component 10-bit

Sampling Frequency

	HD SDI	Y : 74.25/1.001MHz、C : 37.125/1.001MHz、 Y : 74.25MHz、C : 37.125MHz、
	SD SDI	Y : 13.5MHz、C : 6.75MHz、KEY : 13.5MHz

Quantization   Y : 10-bit、C : 10-bit

Video Input

	HD SDI	HD SDI 1.485/1.001Gbps or HD SDI 1.485Gbps
	SD SDI	270Mbps
		75Ω BNC 1 ea.

Video Output

	HD SDI	HD SDI 1.485/1.001Gbps or HD SDI 1.485Gbps
	SD SDI	270Mbps
		75Ω BNC 2 outputs
		(Only OUTPUT1 bypasses the input signal when the unit power is OFF.)

Clip Adjustment   YBR Clip (set at), GBR clip, Composite clip

Gamma Preference   Center, Black, White

Output Delay (A setting range varies according to signal formats.)

	HD SDI setting range:	1080i: 3000ns ~ 32336ns 720p: 3000ns ~ 24921ns
	SD SDI setting range:	10000ns ~ 64370ns 10000ns ~ 64814ns

Interfaces

GPI	15-pin D-sub, female, fan alarm tally relay output (Lock screw inch type)
TO OU	9-pin D-sub, female, 1 port (Lock screw inch type)

Temperature,	5°C - 40°C
Humidity	30% - 90% (no condemsation)
Power	100VAC-240VAC±10%, 50/60Hz
Consumption	100VAC: 31VA (30W), 220VAC:35VA (28W)
Weight	Approx. 3kg
Dimensions	212 (W) x 44 (H) × 350 (D) mm, EIA 1RU half

7-2. External Dimensions

7-2-1. Single Unit

(All dimensions in mm.)

7-2-2. 2 Units Combined

Warning

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

FOR.a®

FOR-A COMPANY LIMITED

Head Office	: 3-8-1 Ebisu, Shibuya-ku, Tokyo 150-0013, Japan
Overseas Division	Phone: +81 (0)3-3446-3936, Fax: +81 (0)3-3446-1470
Japan Branch Offices	: Osaka/Fukuoka/Hiroshima/Nagoya/Sendai/Sapporo
R&D/Production	: Sakura Center/Sapporo Center/Florida Center/Los Angeles Center

FOR-A America Corporate Office
11125 Knott Ave., Suite #A, Cypress, CA 90630, U.S.A.
Phone : +1 714-894-3311 Fax : +1 714-894-5399

FOR-A America East Coast Office
1065 Avenue of the Americas Suite #1701A New York,NY 10018, U.S.A.
Phone : +1 212-861-2758 Fax : +1 212-861-2793

FOR-A America Distribution & Service Center
2400 N.E. Waldo Road, Gainesville, FL 32609, U.S.A.
Phone: +1 352-371-1505 Fax : +1 352-378-5320

FOR-A Corporation of Canada
425 Queen Street West, Suite 211, Toronto, Ontario M5V 2A5, CANADA
Phone: +1 416-977-0343 Fax : +1 416-977-0657

FOR-A UK Limited
UNIT C71, Barwell Business Park, Leatherhead Road, Chessington Surrey, KT9 2NY, U.K.
Phone: +44 (0)20-8391-7979 Fax : +44 (0)20-8391-7978

FOR-A Italia S.r.l.
Viale Europa 50 20093, Cologno Monzese (MI), Milan, ITALY
Phone: +39 02-254-3635/6 Fax : +39 02-254-0477

FOR-A Corporation of Korea
801 Dangsan Bld., 53-1 Dangsan-Dong, Youngdeungpo-Gu, Seoul 150-800, Korea
Phone: +82 (0)2-2637-0761 Fax : +82 (0)2-2637-0760

*The contents of this manual are subject to change without notice.