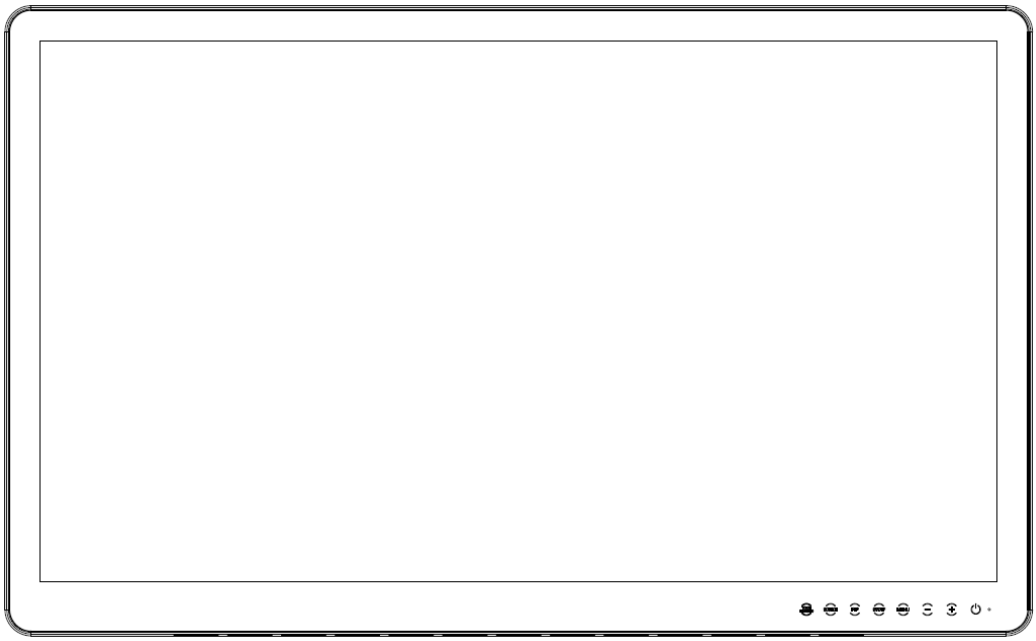
Display User's Manual

Medical Grade Monitor

32” High Brightness Color LCD Display



Model Name: 32" 4K Medical Grade Monitor (Plastic)
Model No.: 0002269

32" RTOP/HB/ALS 4K2K monitor, plastic housing RAL9003, AR Glass, 24V

Revision History

The revision letter changes with related comments each time the document is updated.

Revision	Revision Comment	Release date
A	Initial	2025/10/21

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1. Information

Safety Precautions

CAUTION

Symbol Description

Caution! -This symbol alerts you to important operating considerations or a potential operating condition that could damage equipment. Refer to user's manual or operation's manual for precautionary instructions.

Consignes de sécurité

ATTENTION

Description des symboles

Attention ! - Ce symbole vous avertit sur les considérations d'utilisation importantes ou d'une condition de fonctionnement potentiellement dangereuse pour l'équipement. Reportez-vous au manuel de l'utilisateur ou au manuel d'utilisation pour les consignes de sécurité.

External Equipment

External equipment intended for connection to signal input / output or other connectors, shall Comply with IEC60601-1 for medical electrical equipment. In addition, all such combination system shall comply with the standard IEC60601-1-1, Safety requirements for medical electrical systems. Equipment not complying with IEC60601-1 shall be kept outside the patient environment, as defined on the systems standard.

Intended Use

The Medical Monitor is intended to be used in displaying and viewing digital images by trained medical practitioner.

CE Declaration of Conformity

We declare under our own responsibility that the product satisfies all the technical relations application to the product within the scope of council:

Medical Device Regulation (EU) 2017/745

with applicable standards listed below.

EN60601-1

EN60601-1-2

FCC Information

FCC (U. S. Federal Communications Commission)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause unacceptable interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult your dealer or an experienced radio/TV technician for help.

FCC Warning:

To assure continued FCC compliance, the user must use a grounded power supply cord and the provided shielded video interface with bonded ferrite cores. Also, any unauthorized changes or modifications to this monitor would void the user's authority to operate this device.

General recommendations

- Make sure to carefully read the Operating Manual prior to using the monitor in order to properly use the monitor.
- Note that, excluding those cases where a responsibility for legal compensation is recognized, the manufacturer shall bear absolutely no responsibility for damage to this product by a customer or a third party that results from the ignoring of contents entered in this Operating Manual and mistaken use.
- Follow the instructions below for safety use of the LCD Monitor.
- To avoid electric shock, do not attempt to remove any cover or touch the inside of the monitor. Only a qualified service technician should open the monitor case.
- Do not insert metal objects or spill liquid into the LCD monitor through cabinet slots. They may cause accident fire, electric shock or failure. If a foreign object inserted or water penetrated, unplug the AC cable and have the monitor serviced.
- Do not cover or block the vent holes in the case.
- Disconnect the power plug from the AC outlet if you will not use it for an indefinite period of time.
- Do not touch the screen directly with your fingers. You may damage the screen, and oil from your skin is difficult to move.
- Do not apply pressure to the screen. The LCD is very delicate.
- If your LCD monitor uses an AC/DC Adapter: Only use the Adapter, which accompanied with this device. Use of another AC/DC Adapter may cause a malfunction or danger.
- If your LCD monitor does not operate normally-in particular, if there are any unusual sounds or smells coming from it-unplug the AC cable immediately and contact the manufacturer, authorized or service center.
- Warning – Do not modify this equipment without authorization of the manufacturer.

Recommandations générales

- Lisez les consignes de sécurité et de fonctionnement avant d'utiliser l'appareil.
- Notez que, sauf dans les cas où la responsabilité de la compensation légale est reconnue, le fabricant n'endossera absolument aucune responsabilité pour les dommages occasionnés à ce produit par un client ou un tiers, résultant de l'ignorance du contenu de ce manuel d'utilisation et d'une erreur d'utilisation.
- Suivez les instructions ci-dessous pour utiliser l'écran LCD en toute sécurité.
- Pour éviter un choc électrique, ne tentez pas de retirer un couvercle ou de toucher l'intérieur du moniteur. Seul un technicien qualifié peut ouvrir le boîtier du moniteur.
- N'insérez pas d'objets métalliques ou ne renversez pas de liquide dans le moniteur LCD par les fentes du boîtier. Cela pourrait provoquer un incendie, un choc électrique ou une panne. Si un corps étranger est inséré ou si de l'eau a pénétré, débranchez le câble secteur et faites réparer le moniteur.
- Ne couvrez ni n'obstruez les trous de ventilation du boîtier.
- Débranchez le cordon d'alimentation de la prise secteur si vous ne l'utilisez pas pendant une période indéfinie.
- Ne touchez pas l'écran directement avec vos doigts. Vous risquez d'endommager l'écran, et l'huile de votre peau est difficile à retirer.
- N'appliquez pas de pression sur l'écran. L'écran LCD est très délicat.
- Si votre moniteur LCD ne fonctionne pas normalement en particulier, s'il produit des bruits inhabituels ou des odeurs, débranchez le câble secteur immédiatement et contacter le fabricant, ou un centre de réparation agréé.
- Ne touchez pas d'autre patient et cet appareil médical en même temps.
- Avertissement - Ne modifiez pas cet équipement sans l'autorisation du fabricant.

General warnings

- All devices and complete setup must be tested and validated before taking into operation.
- The installer needs to foresee a backup system in case the video falls away.
- This equipment shall not be serviced or maintained while in use with the patient.
- WARNING: To avoid the risk of electric shock, this equipment must only be connected to a supply main with protective earth.
- The plug is used as disconnect to the mains supply, do not to position the ME EQUIPMENT so that it is difficult to operate the disconnection device.
- When replacing parts or check refer servicing to qualified service personnel.

Avertissements généraux

- Tous les appareils et l'installation complète doivent être testés et validés avant la mise en service.
- L'installateur doit prévoir un système de sauvegarde en cas de chute de la vidéo.
- Cet équipement ne doit pas être réparé ou entretenu pendant son utilisation avec le patient.
- ATTENTION: Pour éviter le risque de choc électrique, cet équipement doit être raccordé à un réseau électrique protégé par une mise à la terre.
- La fiche est utilisée pour la déconnexion du réseau électrique, ne placez pas l'ÉQUIPEMENT ME de telle sorte qu'il soit difficile d'utiliser le dispositif de déconnexion.
- Faites appel à un personnel qualifié pour le remplacement de pièces ou la vérification de l'appareil.

Installation

- Place the equipment on a flat, solid and stable surface. Do not used on the floor.
  If you use an unstable cart or stand, the equipment may fall, causing serious injury to a child and adult, and serious damage to the equipment.
- Do not allow to climb, rest, sitting or stepping on the equipment.
- When adjusting the angle of the equipment, move it slowly so as to prevent the equipment from moving or slipping off from its stand or arm.
- When the equipment is attached to an arm, do not use the equipment as a handle or grip in order to move the equipment. Please refer to the instruction manual of the arm for instructions on how to move the arm with the equipment.
- Provide full attention to safety during installation, periodic maintenance and examination of this equipment.
- Sufficient expertise is required for installing this equipment, especially to determine the strength of the wall for withstanding the display's weight.
- Do not cover or block any ventilation openings in the cover of the set. When installing the device in a cupboard or another closed location, heed the necessary space between the set and the sides of the cupboard.
- Power on after rear cover installed while remove the rear cover after power off.
- The display panel, standard attached to a stand, is compatible with the VESA 100 mm standard.

1). Put the display face down on a clean and soft surface. Be careful not to damage the panel screen.
2). Unscrew the four fixation screws to detach the panel from the stand.
3). Use 4 M4 screws to attach the panel to a VESA approved arm

Users to be considered

- Maintenance/repair personnel – only by manufacturer trained and authorized technician.
- Operating personnel – not in consideration for the graphical images at this stage as there are none to consider, however user interfaces such as OSD and control buttons shall be considered. Installation and OSD adjusting should only be carried by manufacturer trained and authorized personnel.

Technical data

The monitor is intended for indoor use

Operating Temperature:	0 ~ 40°C
Operating Humidity:	10% ~ 90% RH (non-condensing)
Operating Pressure:	70 kPa ~ 106 kPa
Storage/Transport Temperature:	-20 ~ +60°C
Storage/Transport Humidity:	10% ~ 90% RH (non-condensing)
Storage/Transport Pressure:	50 kPa ~ 106 kPa
DC Rating:	24V/5.5A

Operating Principle

The scaler is configured with a high-speed integrated ADC (VGA), an integrated DVI/HDMI/DP receiver, a high-quality display processing engine, an integrated micro-controller and output 8 lane V by 1 panel interface format.

The user can select the signal ports by front key of monitor then the scaler processing these signals as zoom in or out action to fit the panel resolution. Then through the cable line transmission 8 lane V by 1 signal to one of the LCD modules.

The last by the clock controller (Timing Controller, TCON), the clock signal is transmitted to the drive IC on the panel and turn on Backlight for LCD module light source by Scaler control.

2. Equipment Symbols

Electrical and Electronic Equipment Symbols

In addition to the equipment symbols described in your user's manual, the following symbols may be appeared on the monitor.

Alternating current.

Equipotentiality. Connect device to a potential equalization conductor.

European Union Declaration of Conformity.

UK Conformity Assessed Marking.

FCC. USA only. Complies with applicable US government (Federal Communications Commission) radio-frequency interference regulations.

Caution: Consult accompanying documents.

Dangerous voltage. To reduce the risk of electric shock, do not remove cover. Refer servicing to qualified service personnel.

Indicates front.

Consult the operating instructions

Standby or power indicator.

This symbol indicates that the waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment

Manufacturer & After – sale Service
Medical Illumination Intl.
19749 Dearborn Street
Chatsworth, CA 91311
USA

Indicates the manufacturing date

3. Cleaning Instructions

- Be sure to unplug the power cord from the mains when cleaning your LCD monitor.
- Take care not to scratch the front surface with any hard or abrasive material.
- Dust, finger marks, grease etc. can be removed with a soft damp cloth (a small amount of mild detergent can be used on the damp cloth).
- Wipe off water drop immediately.
- Wipe the unit with a clean cloth that has been moistened in the pure water.
- Using a spray applicator, apply 95% Alcohol and use a soft lint free cloth to clean the screen.

4. Disposal of the Unit

- Do not dispose of this product with general wastes.
- Follow your local regulations or rules upon dispose of this product.

5. Package Contents

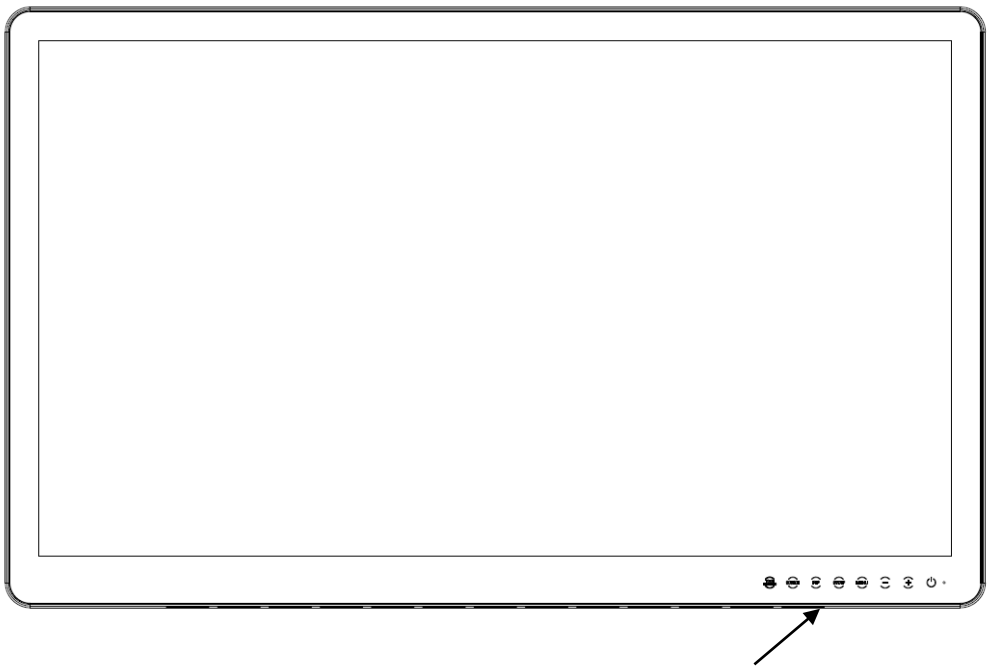
Your monitor ships with the components shown below. Ensure that you have received all the components.

- LCD monitor *1
- 150W Adapter *1
- DP cable 1.8 meter *1
- DVI cable 1.8 meter *1
- EU power cable 1.8 meter *1
- HDMI cable 1.8 meter*1
- User manual as English A5 paper printing

6. Outline

Front view

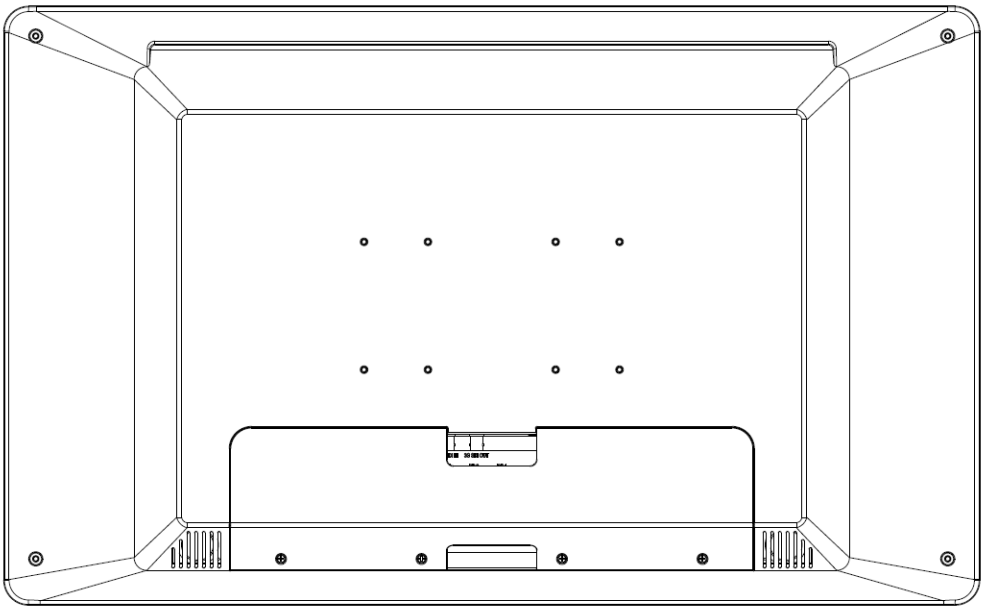
Overview



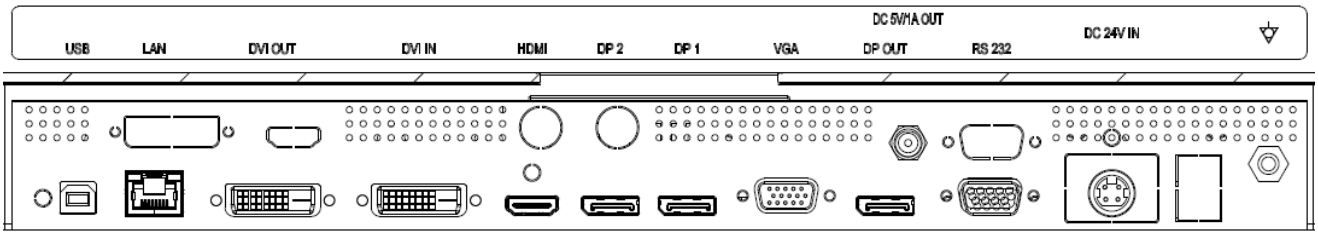
8-key touch keypad is located on the front of the display.

Rear view

Overview



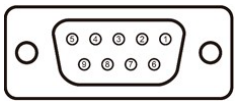
Connector view (RTOP3213AMC)



Ground	Potential Equalization Bolt.
DC in	DC 24V in.
D-Sub 9pin	RS232 (D-Sub), for RS232 commands, for calibration mode.
DP out	DP out, Clone for DP and HDMI; SST and MST for DP only.
VGA	DSUB 15 pin connector, Use VGA cable to connect the VGA connector of the monitor and the VGA output connector from source device. (or DVI-I connector from source device via adapter DVI to VGA) *Service for upgrade firmware via external ISP board. *
DP 1	Display port 1.2, up to 3840*2160 60Hz.
DP 2	Display port 1.2, up to 3840*2160 60Hz.
HDMI	HDMI 2.0, up to 3840*2160 60Hz.
DVI	HDMI 1.4, up to 3840*2160 30Hz.
DVI out	Loop out for DVI.
LAN	Rj45 connector, Ethernet communication,10/100 Base-T.
USB	USB B type connector, link to PC, for USB command control monitor.

IO connector pin defines

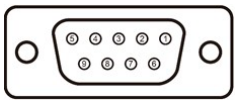
D-Sub 9pin Female



D-SUB 9 pin female connector			
Pin No.	Signal Assignment	Pin No.	Signal Assignment
1	NC	6	NC
2	TX	7	NC
3	RX	8	NC
4	NC	9	NC
5	GND		

RS232 (D-Sub 9 pin) calibration connector, for RS232 communication.

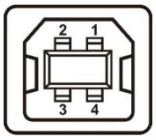
D-Sub 9pin Female



D-SUB 9 pin female connector			
Pin No.	Signal Assignment	Pin No.	Signal Assignment
1	NC	6	NC
2	TX	7	NC
3	RX	8	NC
4	NC	9	NC
5	GND		

D-sub 9 pin, for P-cap touch(optional)

USB in



USB B-type connector	
Pin No.	Signal Assignment
1	5V
2	D-
3	D+
4	GND

Upstream port source：5V 500mA power

Differential input sensitivity: 250mV

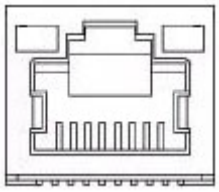
Input Impedance: 90 Ohms

For USB communication

For HID USB use for PCAP touch (touch model only)

For EPG026 MCU firmware ISP (for DVI out)

LAN in



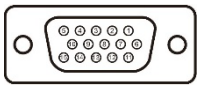
RJ45 12 pin			
Pin No.	Signal Assignment	Pin No.	Signal Assignment
R1	TD+	R7	NC
R2	TD-	R8	GND
R3	RD+	L1	Yellow LED-
R4	TCT	L2	Yellow LED+
R5	RCT	L3	Green LED-
R6	RD-	L4	Green LED+

Ethernet communication

RJ45 1x1 Tab up Through Hole 10/100 Base-T LED: L-G; R-Y

*Service for upgrade firmware via Lan for ethernet MCU and Scaler (under developing)

VGA in



D-SUB 15 pin male connector				
	Pin No.	Signal Assignment	Pin No.	Signal Assignment
	1	RED SIGNAL	9	DSUB_5V
	2	GREEN SIGNAL	10	GND
	3	BLUE SIGNAL	11	NC
	4	NC	12	DDC DATA
	5	CABLE DET	13	Hor. SYNC
	6	GND	14	Ver. SYNC
	7	GND	15	DDC CLOCK
	8	GND		

D-sub 15pin (VGA)connector

Analog video RGB: 0.7Vp-p 75 Ohms.

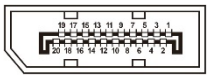
(When G channel is sync negative, the internal sync can be used 0.3Vp-p)

Sync level: low = 0V min.- 0.8V max. High=2.0V min.-5.5Vmax.

Positive / negative. 1K Ohms. (H/V separate and composite sync)

*Service for upgrade Scaler firmware via external ISP board(ready)

Display port in x 2

Display port 20pin connector				
	Pin No.	Signal Assignment	Pin No.	Signal Assignment
	1	Lane 3 (negative)	11	GND
	2	GND	12	Lane 0 (positive)
	3	Lane 3 (positive)	13	GND
	4	Lane 2 (negative)	14	GND
	5	GND	15	Aux Channel +
	6	Lane 2 (positive)	16	CABLE DET
	7	Lane 1 (negative)	17	Aux Channel -
	8	GND	18	Hot Plug Detect
	9	Lane 1 (positive)	19	DP Power Return
	10	Lane 0 (negative)	20	+3.3V Power

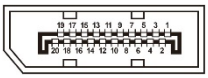
Differential peak to peak output voltage: Max=1.38V / Min=0.34V)

Input Impedance: 100 Ohm

DisplayPort 1.2a compliant

Supports 5.4Gbps, 2.7Gbps and 1.62Gbps per lane, receiver offering 21.6 Gbps bandwidth over 4 lanes Bi-directional auxiliary channel to flexibly deliver control and status information Up to 3840*2160p@60HZ

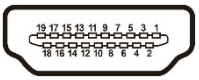
Display port out

Display port 20pin connector				
	Pin No.	Signal Assignment	Pin No.	Signal Assignment
	1	Lane 0 (positive)	11	GND
	2	GND	12	Lane 3 (negative)
	3	Lane 0 (negative)	13	GND
	4	Lane 1 (positive)	14	GND
	5	GND	15	Aux Channel +
	6	Lane 1 (negative)	16	GND
	7	Lane 2 (positive)	17	Aux Channel -
	8	GND	18	Hot Plug Detect
	9	Lane 2 (negative)	19	DP Power Return
	10	Lane 3 (positive)	20	+3.3V Power

Support DisplayPort 1.2 MST and SST daisy-chaining

(Clone for DP and HDMI; SST and MST for DP only)

HDMI in

HDMI A type 19 pin connector				
	Pin No.	Signal Assignment	Pin No.	Signal Assignment
	1	Data2+	11	CABLE DET
	2	Data2 Shield	12	CK-
	3	Data2-	13	NC
	4	Data1+	14	NC
	5	Data1 Shield	15	DDC_CLK
	6	Data1-	16	DDC_DATA
	7	Data0+	17	GND
	8	Data0 Shield	18	+5V
	9	Data0-	19	HPD
	10	CK+		

Differential Signal Level Range: TMDS (Max=1560mVp-p / Min=150mVp-p)

Input Impedance: 100 Ohms

HDMI 2.0 compliant

HDMI supports up to 600MHz

Up to 3840*2160p@60HZ

DVI in and DVI out

DVI 24 pin connector				
	Pin No.	Signal Assignment	Pin No.	Signal Assignment
	1	T.M.D.S. Data2-	16	Hot Plug Detect
	2	T.M.D.S. Data2+	17	T.M.D.S. Data0-
	3	GND	18	T.M.D.S. Data0+
	4	NC	19	GND
	5	NC	20	NC
	6	DDC Clock	21	NC
	7	DDC Data	22	GND
	8	NC	23	T.M.D.S. Clock +
	9	T.M.D.S. Data1-	24	T.M.D.S. Clock -
	10	T.M.D.S. Data1+	C1	NC
	11	GND	C2	NC
	12	NC	C3	NC
	13	NC	C4	NC
	14	+5V Power	C5	GND
	15	GND		

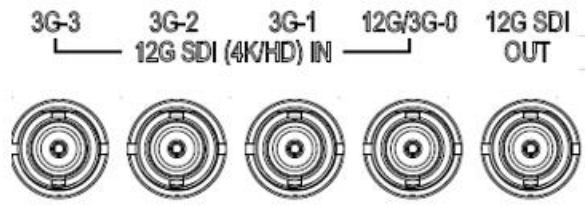
Differential Signal Level Range: TMDS (Max=1560mVp-p / Min=150mVp-p)
Input Impedance: 100 Ohm
HDMI 1.4 compliant
HDMI supports up to 300MHz (Via DVI to HDMI adapter)
Up to 3840*2160p@30HZ
DVI out only loop out with DVI in

BNC IN/OUT for 3G SDI (Option)

	BNC connector	
SDI IN SDI OUT	Pin No.	Signal Assignment
	1	SDI signal
	2	GND
	3	GND
	4	GND
	5	GND

3G SDI input/output (optional): Support SMPTE ST 425-1
BNC in
SDI input, 3Gb/s, HD, SD SDI Receiver, with Integrated Adaptive Cable Equalizer complete with SMPTE video Processing. The IO will be there when SDI module exist.
BNC out
Loop through SDI in, use for SDI output. The IO will be there when SDI module exist.

BNC IN *4 and BNC OUT *1 for 12G SDI (Option)



BNC connector	
Pin No.	Signal Assignment
1	SDI signal
2	GND
3	GND
4	GND
5	GND

12G SDI input/output (optional): Support SMPTE ST 2082-10 single link 12G and SMPTE ST 425-5 Quad Link 3G

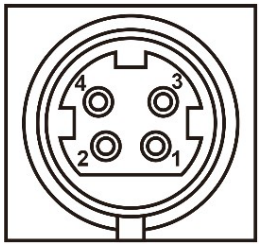
BNC in

SDI input, 12 Gb/s, HD, SD SDI Receiver, with Integrated Adaptive Cable Equalizer complete with SMPTE video Processing. The IO will be there when SDI module exist.

BNC out

Loop through SDI in, use for SDI output. The IO will be there when SDI module exist. Support 12G SMPTE-2082-10(SL 12G) and ST425-5(QL 3G)

DC 24V in



DC 24V Power connector	
Pin No.	Signal Assignment
1	GND
2	GND
3	+24V
4	+24V

7. Operation

Touch Type 8 key:

The standard key is

Touch disabled/Source/PIP/SWAP/MENU/DOWN/UP/POWER

Press first time all LED will light but no action, it works with pressing second time.

POWER Key with indicator LED

Press this button turn the monitor on.

When the monitor is on, press this button “HOLD UNTIL POWER OFF” will appear on the screen. Press for more than 4 seconds turn the monitor off. When the monitor is off, the LED goes off.

When the monitor is off, the green LED goes to off, but Power key blue LED will light.

You can press power key to turn on Monitor. (DC on)

Down (-) and UP (+) key

Use these two keys to control OSD go up or go down when Menu OSD appear.

Press ‘’+’’ to increase brightness 0 →100

Press ‘’-’’ to decrease brightness 100 →0

MENU

Press this button to open and close OSD menu.

For OSD 8 key, the ‘’Menu’’ key also will be ‘’Enter’’ function.

PIP

Press this bottom, the monitor will show Display Mode menu then can switch the display mode to 1P, 2P LR, 2P TB, 2P PIP or 4P

SWAP

Press this button, swap input1 and input2 when display mode is 2P LR, 2P TB or 2P PIP

Source key

Press this bottom is used to select which Input should be displayed on the monitor. Press ‘’SOURCE’’ until your desired Input selection is displayed.
You can press this bottom to wake up the monitor and select source between all inputs.

Touch Disabled

Press this button to on/off touch screen function and Key lock (OSD key)
when someone clear the screen surface.
OSD will show ‘’touch enabled’’ or ‘’touch disabled’’.
Press this button over 3 seconds, the monitor will go into touch disabled mode.
Press again for this button over 3 seconds, the monitor will go into touch enabled mode.

If with Glass, the key is only Key lock (OSD key) when press ‘’touch disabled’’ over 3 seconds.

LED indication

Green: Monitor on
Orange: Power saving or no signal
No lighting: Monitor off

OSD Tree

Charts of OSD Adjustment Functions

The charts display the function tree and brief explanations of the functions and other adjustments have sub-menus under each tree.

● OSD display

Main menu display

Info/Exit

Input

Picture

PIP/PBP

Color

OSD

System

Info/Exit

- Exit ..... Close the OSD screen
- Info ..... Show four inputs with what source/resolution/H Freq/V Freq

Input(1P)

- VGA ..... Select VGA analog input for display
- DP1 ..... Select Display Port 1 digital input for display
- DP2 ..... Select Display Port 2 digital input for display
- HDMI ..... Select HDMI digital input for display
- 12G/HDMI ..... Select 12G SDI digital input by optional 12G SDI board or select HDMI digital input by optional HDMI board for display
- DVI ..... Select DVI digital input for display
- 3G/DVI ..... Select 3G SDI digital input by optional 3G SDI board or select DVI digital input by optional DVI board for display
- Auto Select ..... Select the auto search next valid sync when main source no signal.

Input (2P LR)

- **Left** ..... Select the left source when PIP/PBP select to 2P LR
  - VGA ..... Select VGA analog input for left display
  - DP1 ..... Select Display Port 1 digital input for left display
  - DP2 ..... Select Display Port 2 digital input for left display
  - HDMI ..... Select HDMI digital input for left display
  - 12G/HDMI ..... Select 12G SDI digital input by optional 12G SDI board or select HDMI digital input by optional HDMI board for left display
  - DVI ..... Select DVI digital input for left display
  - 3G/DVI ..... Select 3G SDI digital input by optional 3G SDI board or select DVI digital input by optional DVI board for left display
  - Auto Select ..... Select the auto search next valid sync when left source no signal and the right source is not in “Auto Select”
- **Right** ..... Select the right source when PIP/PBP select to 2P LR
  - VGA ..... Select VGA analog input for right display

DP1 ..... Select Display Port 1 digital input for right display
DP2 ..... Select Display Port 2 digital input for right display
HDMI ..... Select HDMI digital input for right display
12G/HDMI ..... Select 12G SDI digital input by optional 12G SDI board or select HDMI digital input by optional HDMI board for right display
DVI ..... Select DVI digital input for right display
3G/DVI ..... Select 3G SDI digital input by optional 3G SDI board or select DVI digital input by optional DVI board for right display
Auto Select ..... Select the auto search next valid sync when right source no signal and the left source is not in “Auto Select”
Back ..... Return to main menu

Input (2P TB)

TOP ..... Select the top source when PIP/PBP select to 2P TB
VGA..... Select VGA analog input for top display
DP1 ..... Select Display Port 1 digital input for top display
DP2 ..... Select Display Port 2 digital input for top display
HDMI ..... Select HDMI digital input for top display
12G/HDMI ..... Select 12G SDI digital input by optional 12G SDI board or select HDMI digital input by optional HDMI board for top display
DVI ..... Select DVI digital input for top display
3G/DVI ..... Select 3G SDI digital input by optional 3G SDI board or select DVI digital input by optional DVI board for top display
Auto Select ..... Select the auto search next valid sync when top source no signal and the bottom source is not in “Auto Select”
Bottom ..... Select the bottom source when PIP/PBP select to 2P TB
VGA..... Select VGA analog input for bottom display
DP1 ..... Select Display Port 1 digital input for bottom display
DP2 ..... Select Display Port 2 digital input for bottom display
HDMI ..... Select HDMI digital input for bottom display
12G/HDMI ..... Select 12G SDI digital input by optional 12G SDI board or select HDMI digital input by optional HDMI board for bottom display
DVI ..... Select DVI digital input for bottom display
3G/DVI ..... Select 3G SDI digital input by optional 3G SDI board or select DVI digital input by optional DVI board for bottom display
Auto Select ..... Select the auto search next valid sync when bottom source no signal and the top source is not in “Auto Select”.
Back ..... Return to main menu

Input (2P PIP)

Main..... Select the main source when PIP/PBP select to 2P PIP
VGA..... Select VGA analog input for main display
DP1 ..... Select Display Port 1 digital input for main display
DP2 ..... Select Display Port 2 digital input for main display
HDMI ..... Select HDMI digital input for main display
12G/HDMI ..... Select 12G SDI digital input by optional 12G SDI board or select HDMI digital input by optional HDMI board for main display
DVI ..... Select DVI digital input for main display

3G/DVI ..... Select 3G SDI digital input by optional 3G SDI board or select DVI digital input by optional DVI board for main display

Auto Select ..... Select the auto search next valid sync when main source no signal and the pip source is not in “Auto Select”

PIP ..... Select the PIP source when PIP/PBP select to 2P PIP

VGA..... Select VGA analog input for PIP display

DP1 ..... Select Display Port 1 digital input for PIP display

DP2 ..... Select Display Port 2 digital input for PIP display

HDMI ..... Select HDMI digital input for PIP display

12G/HDMI ..... Select 12G SDI digital input by optional 12G SDI board or select HDMI digital input by optional HDMI board for PIP display

DVI ..... Select DVI digital input for PIP display

3G/DVI ..... Select 3G SDI digital input by optional 3G SDI board or select DVI digital input by optional DVI board for PIP display

Auto Select ..... Select the auto search next valid sync when pip source no signal and the main source is not in “Auto Select”

Back ..... Return to main menu

Input (4P)

1P In ..... Select the top-left source when PIP/PBP select to 4P

VGA..... Select VGA analog input for top-left display

DP1 ..... Select Display Port 1 digital input for top-left display

DP2 ..... Select Display Port 2 digital input for top-left display

HDMI ..... Select HDMI digital input for top-left display

12G/HDMI ..... Select 12G SDI digital input by optional 12G SDI board or select HDMI digital input by optional HDMI board for top-left display

DVI ..... Select DVI digital input for top-left display

3G/DVI ..... Select 3G SDI digital input by optional 3G SDI board or select DVI digital input by optional DVI board for top-left display

Auto Select…… .. Select the auto search next valid sync when top-left source no signal and the 2P, 3P and 4P input is not in “Auto Select”.

2P In..... Select the bottom-left source when PIP/PBP select to 4P

VGA..... Select VGA analog input for bottom-left display

DP1 ..... Select Display Port 1 digital input for bottom-left display

DP2 ..... Select Display Port 2 digital input for bottom-left display

HDMI ..... Select HDMI digital input for bottom-left display

12G/HDMI ..... Select 12G SDI digital input by optional 12G SDI board or select HDMI digital input by optional HDMI board for bottom-left display

DVI ..... Select DVI digital input for bottom-left display

3G/DVI ..... Select 3G SDI digital input by optional 3G SDI board or select DVI digital input by optional DVI board for bottom-left display

Auto Select…… .. Select the auto search next valid sync when bottom-left source no signal and the 1P, 3P and 4P input is not in “Auto Select”.

3P In ..... Select the top-right source when PIP/PBP select to 4P

VGA..... Select VGA analog input for top-right display

DP1 ..... Select Display Port 1 digital input for top-right display

DP2 ..... Select Display Port 2 digital input for top-right display

HDMI1 ..... Select HDMI1 digital input for top-right display
12G/HDMI ..... Select 12G SDI digital input by optional 12G SDI board or select HDMI digital input by optional HDMI board for top-right display
DVI ..... Select DVI digital input for top-right display
3G/DVI ..... Select 3G SDI digital input by optional 3G SDI board or select DVI digital input by optional DVI board for top-right display
Auto Select..... Select the auto search next valid sync when top-right source no signal and the 1P, 2P and 4P input is not in “Auto Select”.

4P In ..... Select the bottom-right source when PIP/PBP select to 4P
VGA..... Select VGA analog input for bottom-right display
DP1 ..... Select Display Port 1 digital input for bottom-right display
DP2 ..... Select Display Port 2 digital input for bottom-right display
HDMI ..... Select HDMI digital input for bottom-right display
12G/HDMI ..... Select 12G SDI digital input by optional 12G SDI board or select HDMI digital input by optional HDMI board for bottom-right display
DVI ..... Select DVI digital input for bottom-right display
3G/DVI ..... Select 3G SDI digital input by optional 3G SDI board or select DVI digital input by optional DVI board for bottom-right display
Auto Select..... Select the auto search next valid sync when bottom-right source no signal and the 1P, 2P and 3P input is not in “Auto Select”.

Back ..... Return to main menu

Picture

Brightness ..... Adjust the backlight of the full screen by the range from 0 to 100
Black Level ..... Adjust the Black level for the display image by the range from 0 to 100
Contrast ..... Adjust the contrast for the display image by the range from 0 to 100
Sharpness..... Adjust the Sharpness for the display image by the range from 0 to 4
Analog..... Only active for VGA input
Auto Adjust ..... Automatic screen size/position adjustment, for VGA input
H Position..... Adjust horizontal screen position for display image by the range from 0 to 100
V Position ..... Adjust vertical screen position for display image by the range from 0 to 100
Clock ..... Adjust the clock for the video signals for display image from 0 to 100
Phase ..... Adjust the phase for the video signals for display image from 0 to 100
Back ..... Return to Picture menu
ALS..... Auto Luminance System
OFF ..... Set OFF for disable Function.
ON..... Set ON for enable Function.
Back ..... Return to Main menu

PIP/PBP

Display Mode
1P..... Set Main input1 to Full Screen
2P LR ..... Set screen split to two screens in left and right (Picture by Picture)
2P TB ..... Set screen split to two screens in top and bottom (Picture by Picture)
2P PIP ..... Set screen split to two screens (Picture in Picture)
4P..... Set screen split to four screens (Picture by Picture)

Display Function (1P)

Disp Rotate.....Select the display can rotate by four type when display mode set 1P

0…… .....Set screen no rotate

90……Set screen rotate to 90 degree

180……..Set screen rotate to 180 degree

270……..…Set screen rotate to 270 degree

LR Mirror…… Set screen to horizontal mirror setup

UD Mirror……Set screen to vertical mirror setup

Back…… Return to PIP/PBP menu

Display Function (2P LR)

Disp LR Ratio .....Set the screen left display and right ratio by the range from 0 to 4

Input Swap .....Swap input between Main input1 and Sub input2
It is active when set to 2P LR , 2P TP and PIP 2Win mode

Back .....Return to PIP/PBP menu

Display Function (2P TB)

Input Swap……Swap input between Main input1 and Sub input2
It is active when set to 2P LR , 2P TP and PIP 2Win mode

Back……..Return to PIP/PBP menu

Display Function (2P PIP)

PIP Position .....It is active when set to 2P PIP mode

LT .....Set Sub input2 position as Top-Left

RT .....Set Sub input2 position as Top-Right

LB .....Set Sub input2 position as Bottom-Left

RB.....Set Sub input2 position as Bottom-Right

Center .....Set Sub input2 position as Center

User .....Set Sub input2 position by user setup

PIP H-Position....Adjust horizontal screen position for sub input display by the range from 0 to 100

PIP V-Position ....Adjust vertical screen position for sub input display by the range from 0 to 100

Back.....Return to PIP Position Menu

PIPSize.....Adjust size for sub input display by the range from 0 to 10

Input Swap .....Swap input between Main input1 and Sub input2
It is active when set to 2P LR, 2P TP and PIP 2Win mode

Back .....Return to PIP/PBP menu

Select Region (2P LR)

Left Side .....Set the display control function for left display

Right Side.....Set the display control function for right display

Full .....Set the display control function for all display

Select Region (2P TB)

Top Side .....Set the display control function for top display

Bottom Side.....Set the display control function for bottom display

Full .....Set the display control function for all display

Select Region (2P PIP)

Main ..... Set the display control function for main display
Sub ..... Set the display control function for sub display
Full ..... Set the display control function for all display

Select Region (4P)

1P In ..... Set the display control function only for top-left display
1P Out ..... Set the display control function except for top-left display
2P In ..... Set the display control function only for bottom-left display
2P Out ..... Set the display control function except for bottom-left display
3P In ..... Set the display control function only for top-right display
3P Out ..... Set the display control function except for top-right display
4P In ..... Set the display control function only for bottom-right display
4P Out ..... Set the display control function except for bottom-right display
4P Full ..... Set the display control function only for all display

Back ..... Return to main menu

Color

Normal

Gamma

OFF ..... Set Gamma curve to panel original
1.8 ..... Set Gamma curve to curve 1.8
2.0 ..... Set Gamma curve to curve 2.0
2.2 ..... Set Gamma curve to curve 2.2
2.4 ..... Set Gamma curve to curve 2.4

Temperature

Cool ..... Blueish white used for general use
Neutral ..... White close to natural light mainly used for publishing trade
Warm ..... Reddish white suitable mainly for photo modifications
User

R ..... User adjusts the gain of Red by the range from 0 to 100
G ..... User adjusts the gain of Green by the range from 0 to 100
B ..... User adjusts the gain of Blue by the range from 0 to 100

DICOM ..... Set Gamma curve to DICOM curve

AL 0.0 ..... Set Gamma curve to DICOM curve, ambient light is 0
AL 0.5 ..... Set Gamma curve to DICOM curve, ambient light is 0.5
AL 1.0 ..... Set Gamma curve to DICOM curve, ambient light is 1.0
AL 1.5 ..... Set Gamma curve to DICOM curve, ambient light is 1.5
AL 2.0 ..... Set Gamma curve to DICOM curve, ambient light is 2.0
AL 2.5 ..... Set Gamma curve to DICOM curve, ambient light is 2.5
AL 3.0 ..... Gamma curve to DICOM curve, ambient light is 3.0

BT.709 ..... Set color gamut to ITU-REC.709
DCI-P3 ..... Set color gamut to DCI-P3
BT.2020 ..... Set color gamut to BT.2020
HDR ..... Set High Dynamic Range

HLG ..... Set Hybrid Log-Gamma
PQ ..... Set Perceptual Quantization

Calibration ..... Calibrate monitor setting by using external device

ALS always on, user can adjust below functions by Calibration software, like brightness/gamma/color temperature/contrast/RGB gain……..etc.

Back .....Return to main menu

OSD

H.Position .....Adjust the H position for OSD by the range from 0 to 100

V.Position.....Adjust the V position for OSD by the range from 0 to 100

Transparency.....Adjust the Transparency for OSD by the range from 0 to 255

Timeout.....Set OSD will disappear time by the range from 10 to 60

Language

English .....OSD in English

Deutsch .....Display OSD in German

Français.....Display OSD in French

Italiano.....Display OSD in Italian

Español .....Display OSD in Spanish

日本語 .....Display OSD in Japanese

简体中文.....Display OSD in Simplified Chinese

Rotate

0 .....Set the OSD no rotate

90 .....Set the OSD rotate to 90 degree

180 .....Set the OSD rotate to 180 degree

270 .....Set the OSD rotate to 270 degree

Back .....Return to main menu

System

Reset .....All OSD settings reset to the default settings

Aspect Ratio

Full……Set display screen size same as panel size

Zoom…….. when the latency set to on and aspect set to full then can adjust horizontal and vertical zoom same time,the adjust value from 0 to 100,the value big then 50 will scaling up and small then 50 will scaling down.

H-Zoom…….. when the latency set to on and aspect set to full then can adjust horizontal zoom,the adjust value from 0 to 100,the value big then 50 will scaling up and small then 50 will scaling down.

V-Zoom……..when the latency set to on and aspect set to full then can adjust vertical zoom,the adjust value from 0 to 100,the value big then 50 will scaling up and small then 50 will scaling down.

16:10 .....Set the display screen size aspect to 16:10

16:9 .....Set the display screen size aspect to 16:9

4:3 .....Set the display screen size aspect to 4:3

5:4 .....Set the display screen size aspect to 5:4

1:1 .....Set the display screen size same as the input signal resolution if big then panel will be set display screen size same as the panel size

Auto……Set display screen size aspect follow input aspect size, if big then

panel will set display screen size same as panel size

DP Option .....Set the display port input version

DP1

1.1.....Set the display port 1 input version to 1.1

1.2.....Set the display port 1 input version to 1.2

DP2

1.1.....Set the display port 2 input version to 1.1

1.2.....Set the display port 2 input version to 1.2

Back… .....Return to SYSTEM meu

DP MST (Only in 1P)

OFF .....Turn off the DP MST control

DP1 .....Turn on the Display port 1 MST function

DP2 .....Turn on the Display port 2 MST function

DP Resolution

DP1

1080P.....set the Display port 1 max resolution is 1080P

2560x1440 .....set the Display port 1 max resolution is 2560x1440

4K2K@60Hz .....set the Display port 1 max resolution is 4K2K@60Hz

DP2

1080P .....set the Display port 2 max resolution is 1080P

2560x1440 .....set the Display port 2 max resolution is 2560x1440

4K2K@60Hz .....set the Display port 2 max resolution is 4K2K@60Hz

Back .....Return to SYSTEM meu

Clone Mode

OFF .....Turn off the Clone control

ON .....Turn on the Clone control

Communication

RS232.

9600.....Set RS232 baud rate is 9600

19200.....Set RS232 baud rate is 19200

38400.....Set RS232 baud rate is 38400

115200 .....Set RS232 baud rate is 115200

Ethernet

IP:XXX.XXX.XXX.XXX Show the Ethernet IP address

Back ....Return to SYSTEM meu

Ultra Vivid

OFF……Turn off Ultra vivid mode

L…… Set the Ultra vivid to Low mode

M……..Set the Ultra vivid to medium mode

H……..Set the Ultra vivid to High mode

Back .....Return to Main meu

8. Display Timing Modes

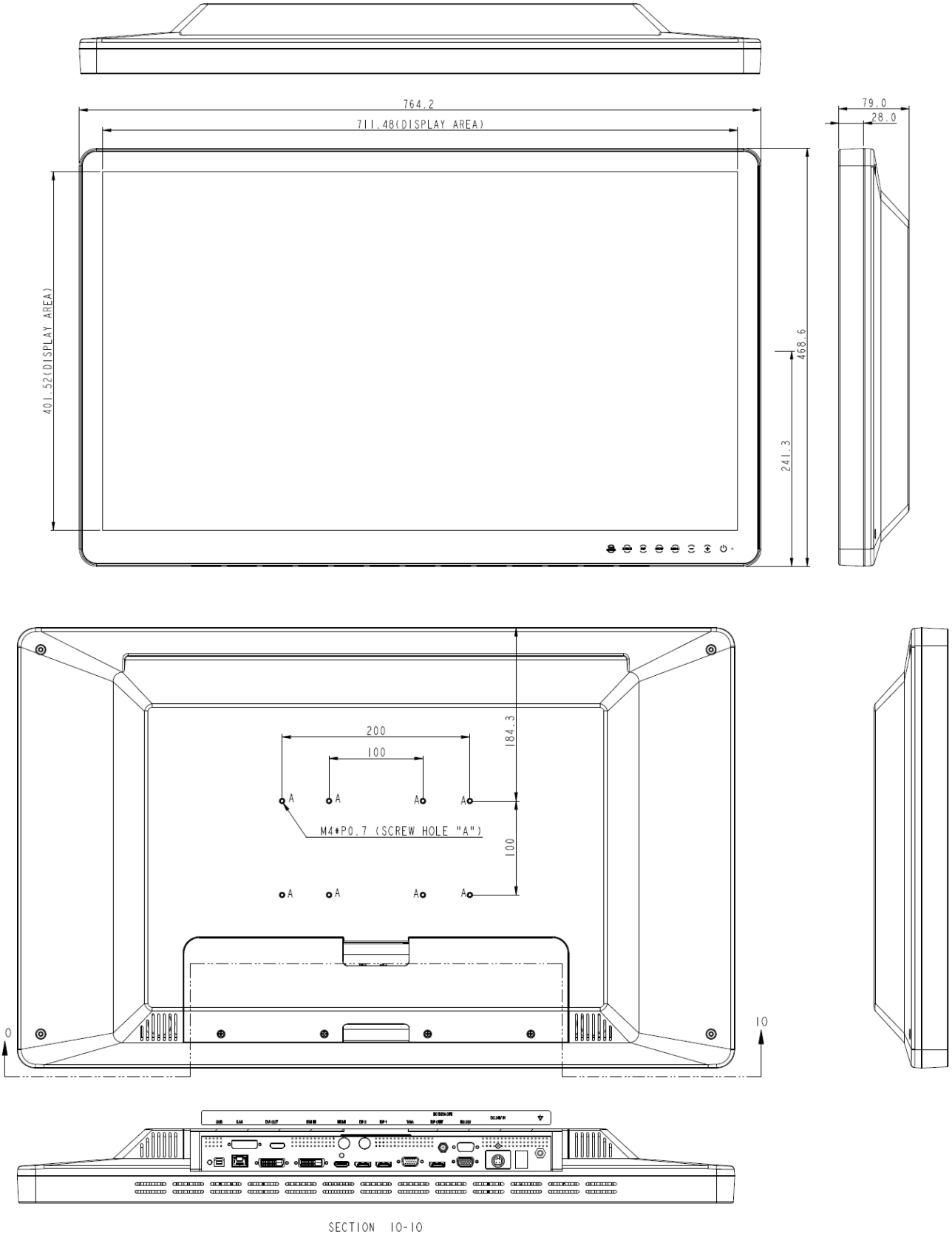
Pixel Format	Pixel Frequency	Frequency		Standard	Input Signal	Input Signal	Input Signal	Input Signal	Input Signal	Input Signal
	CLK(MHZ)	H(Hz)	V(Hz)	Type	VGA	DVI	DP	HDMI	3G SDI	12G SDI
800*600	36	35.2K	56	VESA	V	V	V	V		
	40	37.9K	60	VESA	V	V	V	V		
	50	48.1K	72	VESA	V	V	V	V		
	49.5	46.9K	75	VESA	V	V	V	V		
1024*768	65	48.4K	60	VESA	V	V	V	V		
	75	56.5K	70	VESA	V	V	V	V		
	78.75	60K	75	VESA	V	V	V	V		
1280*1024	108	64K	60	VESA	V	V	V	V		
	135	80K	75	VESA	V	V	V	V		
1600*900	108	60K	60	VESA			V	V		
1680*1050	146.25	65.3K	60	VESA	V	V	V	V		
1600*1200	162	75K	60	VESA	V	V				
1920*1080P	148.5	67.5K	60	CEA-861	V	V	V	V		
	148.5	56.3K	50	CEA-861		V	V	V		
	74.3	28.1K	25	CEA-861		V	V	V		
	368.8	139K	120	CEA-861			V	V		
1920*1200	193.25	74.6K	60	VESA			V	V		
2560*1440	241.6	88.9K	60	VESA			V	V		
3840*2160	297	67.5K	30	VESA		V	V	V		
	594	112.5K	50	VESA			V	V		
	533.6	133.5K	60	VESA			V	V		
	594	135K	60	VESA			V	V		
4096*2160	297	54.1K	24	VESA			V	V		
	297	56.3K	25	VESA			V	V		
	297	67.5k	30	VESA			V	V		
	594	112.5K	50	VESA				V		
	594	135K	60	VESA				V		
SDI 1920x1080@60	148.500	67.50	60.00	CEA					V	V
SDI 1920x1080@59.94	148.352	67.43	59.94	CEA					V	V
SDI 1920x1080@50	148.500	56.25	50.00	CEA					V	V
HD-SDI 1280x720@60p	74.250	45.00	60.00	CEA					V	V
HD-SDI 1280x720@59.94p	74.176	44.96	59.94	CEA					V	V
HD-SDI 1280x720@24p	74.250	18.00	24.00	CEA					V	V
HD-SDI 1280x720@23.98p	74.176	17.98	23.98	CEA					V	V
HD-SDI 1280x720@50p	74.250	37.50	50.00	CEA					V	V
HD-SDI 1280x720@30p	74.250	22.50	30.00	CEA					V	V
HD-SDI 1280x720@29.97p	74.176	22.48	29.97	CEA					V	V
HD-SDI 1280x720@25p	74.250	18.75	25.00	CEA					V	V
SI_3GA_3840x2160@60p	594	135K	60	SMPTE ST 425-5 Quad Link						V
SI_3GA_3840x2160@50p	594	112.5K	50							V
SI_3GA_4096x2160@60p	594	135K	60							V
SI_3GA_4096x2160@50p	594	112.5K	50							V
SL 12G-3840x2160@60p	594	135K	60	SMPTE-2082-1						V
SL 12G-3840x2160@50p	594	112.5K	50							V
SL 12G-4096x2160@60p	594	135K	60							V
SL 12G-4096x2160@50p	594	112.5K	50							V

9. Specifications

Product name: 32" 4K Medical Grade Monitor (Plastic) (0002269)

Screen technology:	TFT active matrix type liquid crystal panel
Active screen size:	(diagonal) 32”
Active screen size:	711.48 (L) x 401.52 (W) mm
Aspect ratio (H:V):	16:9
Resolution:	3840 x 2160
Pixel pitch:	0.1845 mm x 0.1845 mm
Color support:	1.07G colors (8bit+2FRC)
Viewing angle (H, V):	178°
Maximum luminance:	850 cd/m² Typ. for Panel,
Contrast ratio:	1500:1 Typ. for Panel
Response time (Rising + Falling):	20ms
Power consumption:	<130 W
Power save mode:	Yes
Outline dimensions w/o stand (W x H x D):	764.2*468.6*79 mm
Dimensions packaged (W x H x D):	917*657*211 mm
Dimensions packaged (W x H x D):	935*687*235 mm (Double carton)
Net weight display w/o stand:	11.9 kg
Net weight packaged w/o stand:	17.1 kg (Double carton packing)
Mounting standard VESA:	100*100,100*200 mm
Surface Treatment:	AR+AS coating with True Flat Front
Transparency:	>=93% (Anti-Reflective)
Broder Printing:	Black
Anti-Sludge:	>95(angle)

External Dimensions



10. EMC Table

Electromagnetic emissions		
The RTOP3213AMC series is intended for use in the electromagnetic environment specified below. The customer or the user of the RTOP3213AMC series should assure that it is used in such an environment.		
Emission test	**Compliance**	**Electromagnetic environment - Guidance**
RF emissions CISPR11 / EN55011	Group 1	The RTOP3213AMC series uses RF energy only for its internal function. Therefore, its RF emission are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR11 / EN55011	Class B	The RTOP3213AMC series is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC / EN61000-3-2	Class D	
Voltage fluctuations / flicker emissions IEC / EN61000-3-3	Complies	

Electromagnetic immunity			
The RTOP3213AMC series has been tested at the following compliance levels according to the testing requirements for professional healthcare facility environments defined in IEC / EN60601-1-2. Customers and users of the RTOP3213AMC series must ensure that the RTOP3213AMC series is used in the following environments:			
Immunity test	**Test level for professional healthcare facility environments**	**Compliance level**	**Electromagnetic environment - Guidance**
Electrostatic discharge (ESD) IEC / EN61000-4-2	±8 kV contact discharge ±15 kV air discharge	±8 kV contact discharge ±15 kV air discharge	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transients / bursts IEC / EN61000-4-4	±2 kV power lines ±1 kV input / output lines	±2 kV power lines ±1 kV input / output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surges IEC / EN61000-4-5	±1 kV line to line ±2 kV line to ground	±1 kV line to line ±2 kV line to ground	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC / EN61000-4-11	0 % UT (100 % dip in UT) 0.5 cycles and 1 cycle 70 % UT (30 % dip in UT) 25 cycles 0 % UT (100 % dip in UT) 5 sec	0 % UT (100 % dip in UT) 0.5 cycles and 1 cycle 70 % UT (30 % dip in UT) 25 cycles 0 % UT (100 % dip in UT) 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the RTOP3213AMC series requires continued operation during power mains interruptions, it is recommended that the RTOP3213AMC series be powered from an uninterruptible power supply or a battery.

Power frequency magnetic fields IEC / EN61000-4-8	30 A/m (50 / 60 Hz)	30 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment. The product should be kept at least 15 cm away from the source of power frequency magnetic fields during use.

Electromagnetic immunity

The RTOP3213AMC series has been tested at the following compliance levels according to the testing requirements for professional healthcare facility environments defined in IEC / EN60601-1-2.
Customers and users of the RTOP3213AMC series must ensure that the RTOP3213AMC series is used in the following environments:

Immunity test	**Test level for professional healthcare facility environments**	**Compliance level**	**Electromagnetic environment - Guidance**
Conducted disturbances induced by RF fields IEC / EN61000-4-6	3 Vrms 150 kHz - 80 MHz	3 Vrms	Portable and mobile RF communications equipment should be used no closer to any part of the RTOP3213AMC series, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance d = 1.2√P
	6 Vrms ISM bands between 150 kHz and 80 MHz	6 Vrms	
Radiated RF fields IEC / EN61000-4-3	3 V/m 80 MHz - 2.7 GHz	3 V/m	d = 1.2√P, 80 MHz - 800 MHz d = 2.3√P, 800 MHz - 2.7 GHz Where “P” is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and “d” is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey a), should be less than the compliance level in each frequency range b). Interference may occur in the vicinity of equipment marked with the following symbol.

Note 1	UT is the a.c. mains voltage prior to application of the test level.

Note 2	At 80 MHz and 800 MHz, the higher frequency range applies.
Note 3	Guidelines regarding conducted disturbances induced by RF fields or radiated RF fields may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.
Note 4	The ISM bands between 150 kHz and 80 MHz are 6.765 MHz to 6.795 MHz, 13.553 MHz to 13.567 MHz, 26.957 MHz to 27.283 MHz, and 40.66 MHz to 40.70 MHz.
a)	Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the RTOP3213AMC series is used exceeds the applicable RF compliance level above, the RTOP3213AMC series should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the RTOP3213AMC series.
b)	Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

Recommended separation distances between portable or mobile RF communication equipment and the RTOP3213AMC Series

The RTOP3213AMC series is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the RTOP3213AMC series can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the RTOP3213AMC series.

Immunity to proximity fields from following RF wireless communication equipments has been confirmed:

Test frequency (MHz)	**Bandwidth a) (MHz)**	**Service a)**	**Modulation b)**	**Maximum power (W)**	**Minimum separation distance (m)**	**IEC / EN60601 test level (V/m)**	**Compliance level (V/m)**
385	380 - 390	TETRA 400	Pulse modulation b) 18 Hz	1.8	0.3	27	27
450	430 - 470	GMRS 460, FRS 460	FM ±5 kHz deviation 1 kHz sine	2	0.3	28	28
710 745 780	704 - 787	LTE Band 13, 17	Pulse modulation b) 217 Hz	0.2	0.3	9	9
810 870 930	800 - 960	GSM 800 / 900, TETRA 800, iDEN 820 CDMA 850, LTE Band 5	Pulse modulation b) 18 Hz	2	0.3	28	28
1720 1845 1970	1700 - 1990	GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS	Pulse modulation b) 217 Hz	2	0.3	28	28

2450	2400 - 2570	Bluetooth, WLAN, 802.11 b/g/n, RFID 2450, LTE Band 7	Pulse modulation b) 217 Hz	2	0.3	28	28
5240 5500 5785	5100 - 5800	WLAN 802.11 a/n	Pulse modulation b) 217 Hz	0.2	0.3	9	9
a)	For some services, only the uplink frequencies are included.						
b)	Carrier waves are modulated using a 50 % duty cycle square wave signal.						

The RTOP3213AMC series is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. For other portable and mobile RF communication equipments (transmitters), minimum distance between portable and mobile RF communications equipment (transmitters) and the RTOP3213AMC series as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter (W)	**Separation distance according to frequency of transmitter (m)**		
	150 kHz to 80 MHz d = 1.2√P	**80 MHz to 800 MHz d = 1.2√P**	**800 MHz to 2.7 GHz d = 2.3√P**
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance “d” in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where “P” is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

Note 1	At 80 MHz and 800 MHz, the separation distance for a higher frequency range applies.
Note 2	These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

11. Contact Information

Legal information and responsibility

Medical Illumination Intl.

19749 Dearborn Street
Chatsworth, CA 91311
United States of America

www.medillum.com

Technical Support / Service contact

For USA

Medical Illumination Intl.
19749 Dearborn Street
Chatsworth, CA 91311
USA

Phone: +1 (818)-838-3025 ext. 104
Toll Free: +1 (800)-831-1222 ext. 104
E-Mail: info@medillum.com
www.medillum.com

Please use following link for the registration of service issues: https://www.medillum.com/technical-support/