

HN100E





Approval

Rev. 01

Issue Date. 2017. 12. 21

Doc No. HN100E V1.0

Note | Specification is subject to change without notice.
Consequently it is better to contact to our company before proceeding with the design of your product incorporating this board

| Prepared | Checked I | CheckedII | Approved |
|---|---|---|---|
|  |  |  |  |
| KB.PARK | | | YH. HAN |

Revision History

| Rev. | ECN No. | Description of Changes | Date | Prepared |
|------|---------|------------------------|--------------|----------|
| V1.0 | | Initial Release | 2017. 12. 21 | KB.PARK |
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1. General Specification

| No. | Item | Description | | |
|-----|--------------------|------------------------------------|------------------------------------|------------|
| 1 | Model Name | HN100E | | |
| 2 | LCD Module | eDP 1920X1080 60Hz 8bit | | |
| 3 | Input | HDMI 1.4*1(TMDS), RGB Support, DVI | | |
| 4 | Resolution Support | H: 31 ~ 135kH | | |
| | | V: 55 ~ 76Hz | | |
| 5 | OSD Control | Menu, Select, Down, Up, Power | | 5 key |
| | Plug & Play | VESA DDC 2B Ver1.4 | | |
| 6 | | Supply Voltage | 12Vdc | |
| | | Power | - | Board Only |
| 7 | Power Consumption | Digital | HDMI 1.4(TMDS), Display Port | |
| | | | HDCP Ver1.1 | |
| | | Analog | DVI , (R, G, B Separate H, V Sync) | |
| | | Audio | 3W x 3W | |
| 8 | Board Size | W x H x D(mm) | 135 x 75 x 17 | |



2. ELECTRICAL SPECIFICATION

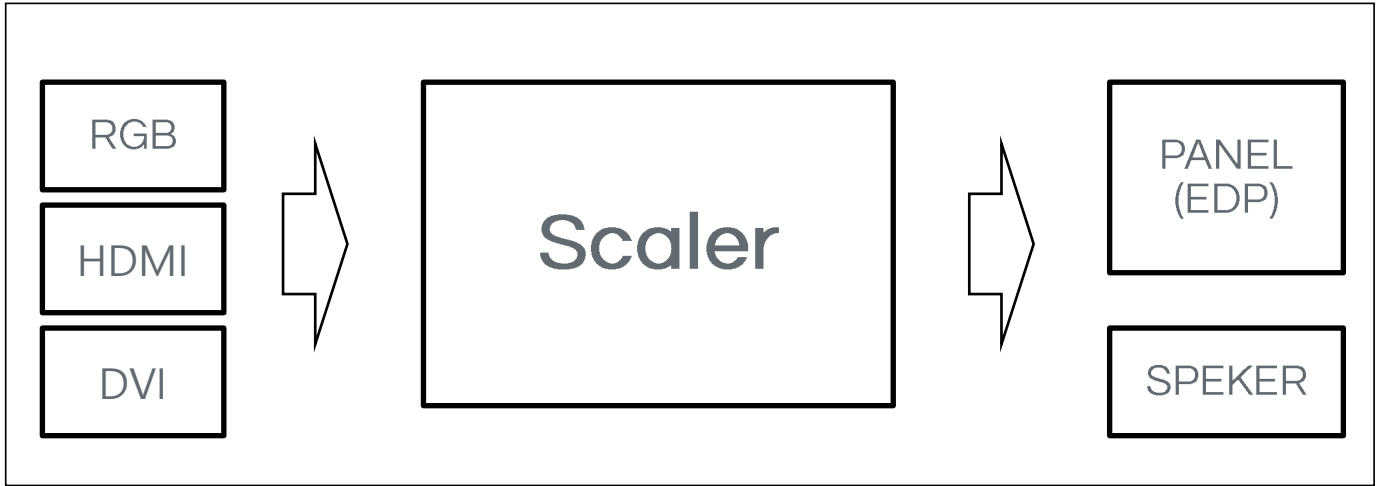
2.1. Input characteristic

| Description | Signal | Unit | Min | Typical | Max | Remarks |
|------------------|-------------|-------|------|---------|------|-----------------|
| Power In (12Vdc) | | | | | | |
| | Input | 12VDC | 11.4 | 12 | 12.6 | |
| | Consumption | Watt | | | | |
| HDMI Input | | | | | | |
| | TMDS | mVp-p | 450 | | 900 | |
| DVI Input | | | | | | |
| | TMDS | mVp-p | 450 | 500 | 900 | |
| RGB Input | | | | | | |
| | Analog RGB | VPP | 0 | 0.7 | - | |
| | Sync | VDC | 0 | 5 | 5.5 | |
| | H Frequency | KHz | 31 | | 80 | Depends on Mode |
| | V Frequency | Hz | 55 | 75 | 77 | Depends on Mode |

2.2. Output characteristic

| Description | Signal | Unit | Min | Typical | Max | Remarks |
|--------------------|--------------------|-----------------------------|------|---------|-------|------------------|
| Panel Power | | | | | | |
| | LCD Power(12V) | VDC | 11.4 | 12 | 12.6 | |
| | LCD Power(5V) | VDC | 4.5 | 5 | 5.5 | |
| | LCD Power(3.3V) | VDC | 3.16 | 3.3 | 3.5 | |
| AUDIO Interface | | | | | | |
| | Output | Watt | | 3 | | |
| | Frecuence | Hz | 20Hz | | 20KHz | |
| | THD | POUT=3W@ 4Ω, THD 10%(at 5V) | | | | |
| Inverter Interface | | | | | | |
| | Power | V | 11.4 | 12 | 12.6 | Depends on Power |
| | On/Off control | V | 0 | | 3.3 | L=off, H=on |
| | Brightness control | V | 3.3 | | 0 | Option |
| | | | 0 | | 4.0 | Option |

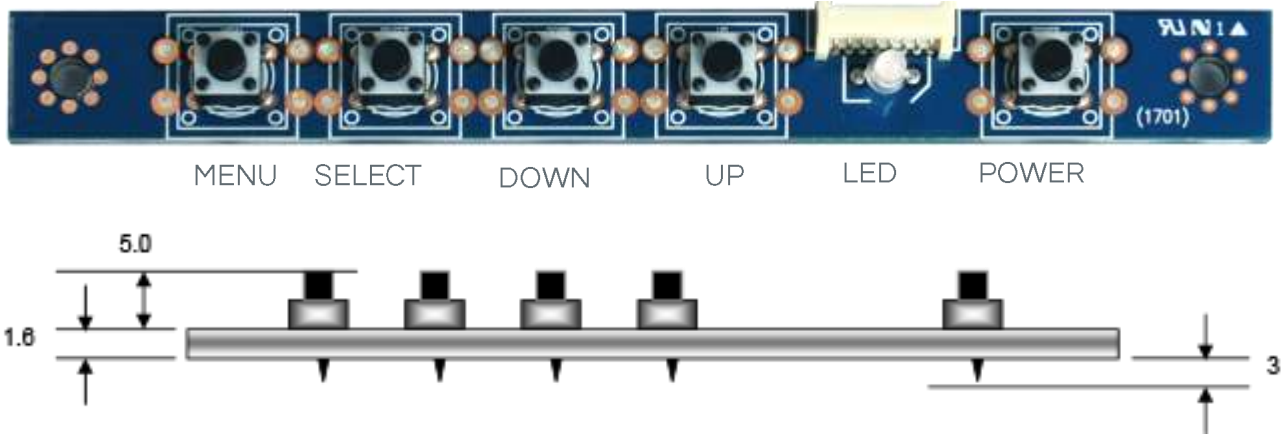
3. FUNCTIONAL BLOCK DIAGRAM



4. OSD Control Board

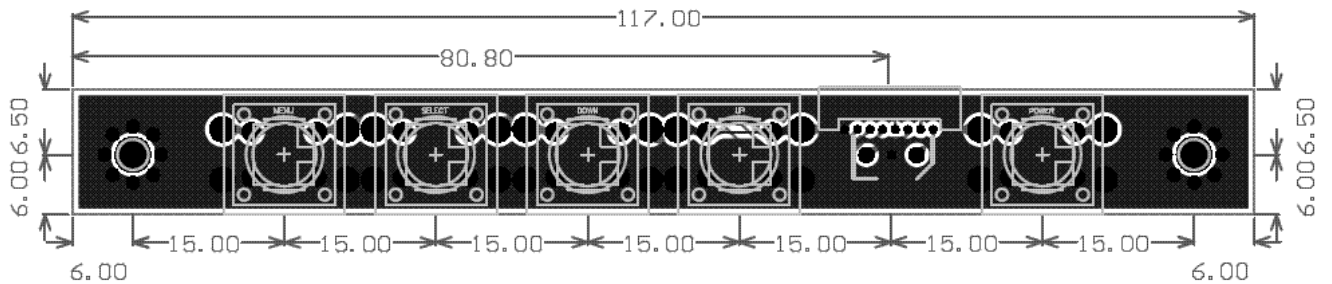
The OSD (On Screen Display) provides certain functions to have clear image and others. This board supports 5 buttons OSD operation as a standard. The control functions defined on OSD operation are as below. (Unit: mm)

Appearance



Board Size (W x H x D) : 112 x 12.5 x 6.6 mm

| Button | Function | Status | HOT Key |
|--------|-----------------------------------|------------|-----------------------|
| LED | Indicates operation status | Green/ Red | On: Green Off: Red |
| POWER | Power on/off | On/Off | |
| MENU | Activate menu / Exit Menu | | |
| SELECT | Input Select / Source | | |
| DOWN | Cursor control Down | | |
| UP | Cursor control Up / Volume Select | | |



5-1. OSD FUNCTION



Luminance page

| OSD Menu | | | |
|----------------------------------|------------------------------|--------|-----|
| Brightness | Brightness level Control | | |
| | Range of Value | MIN | 0 |
| | | MAX | 100 |
| Contrast | Contrast level Control | | |
| | Range of Value | MIN | 0 |
| | | MAX | 100 |
| Gamma | Gamma value Select | | |
| | Mode | ON | |
| | | OFF | |
| DCR (Dynamic Contrast Ration) | DCR mode Select | | |
| | Mode | OFF | |
| | | DBC | |
| | | DCR | |
| Super Resolution | Super Resolution mode Select | | |
| | Mode | OFF | |
| | | Weak | |
| | | Median | |
| | | Strong | |
| Strongest | | | |

5-2. OSD FUNCTION



Color page

| OSD Menu | | | |
|--------------------|-------------------------------|-----|-------------|
| Color Temperature | Color Temperature mode Select | | |
| | Mode | | 5000K |
| | | | 6500K |
| | | | 7500K |
| | | | 8200K |
| | | | 9200K |
| | | | 9300K |
| | | | 11500K |
| | | | SRGB |
| | | | User Define |
| Color Value Select | | | |
| Red,Green,Blue | Range of Value | MIN | 0 |
| | | MAX | 100 |

5-3. OSD FUNCTION



OSD Settings page

| OSD Menu | | | |
|--------------|---------------------------------|-----|-----|
| Horizontal | OSD Horizontal position Control | | |
| | Range of Value | MIN | 0 |
| | | MAX | 100 |
| Vertical | OSD Vertical position Control | | |
| | Range of Value | MIN | 0 |
| | | MAX | 100 |
| Transparency | Transparency level Control | | |
| | Range of Value | MIN | 0 |
| | | MAX | 4 |
| OSD Time Out | OSD Time Out level Control | | |
| | Range of Value | MIN | 0 |
| | | MAX | 60 |

5-4. OSD FUNCTION

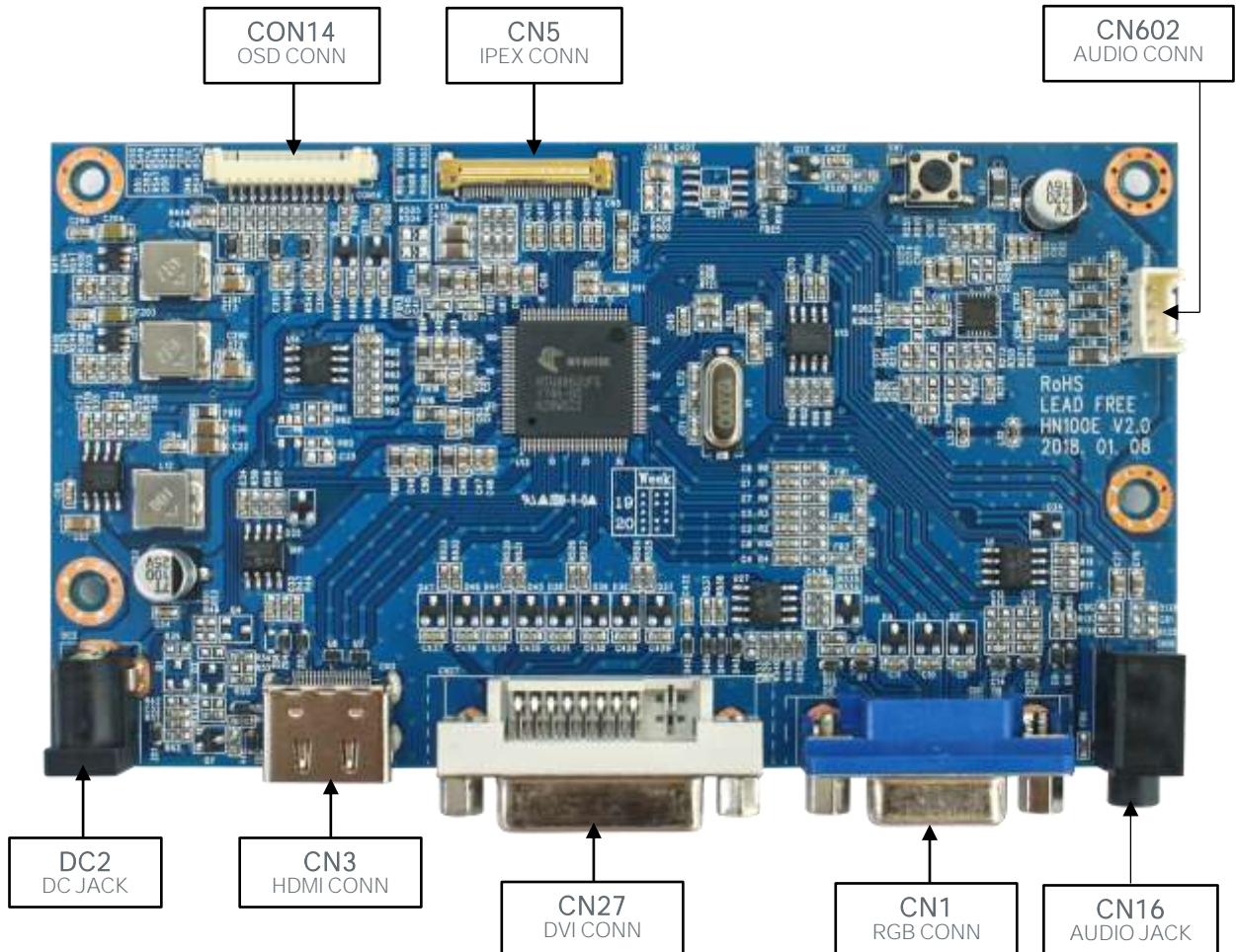


Setup page

| OSD Menu | | | | |
|--------------|--------------------------|-------------|---------|-----------|
| Language | Aspect Ratio Mode Select | | | |
| | English | Spanish | French | German |
| | Italian | Portuguese | Russian | Chinese |
| Mute | Audio Mute Select | | | |
| | Mode | ON | | |
| | | OFF | | |
| Input | Input signal Select | | | |
| | Mode | RGB | | |
| | | DVI | | |
| | | HDMI | | |
| Display Size | Display Size Select | | | |
| | Mode | Full Screen | | Smart Fit |
| | | 4:3 | | Smart 4:3 |
| | | | | |
| Over Scan | Over Scan Mode Select | | | |
| | Mode | ON | | |
| | | OFF | | |
| Over Driver | Over Driver Mode Select | | | |
| | Mode | ON | | |
| | | OFF | | |
| Reset | Restore to default Value | | | |
| | Mode | ON | | |
| | | OFF | | |

6. CONNECTOR, PINOUT & JUMPERS

The various connector are:



Summary:

| Reference | Item | Description | Type | Manufacture |
|-----------|-----------|--------------------|----------------------|-------------|
| CON14 | Connector | OSD CONNECTOR | 12505WR-12P | YEONHO |
| CN5 | Connector | IPEX CONNECTOR | IPEX-20455-030E-02 | IPEX |
| CN602 | Connector | AUDIO CONNECTOR | SMW200-04P | YEONHO |
| CN16 | JACK | AUDIO JACK | PJ-325D | LONGFA |
| CN1 | Connector | RGB CONNECTOR | D-SUB DSH-15FR | YENDA |
| CN27 | Connector | DVI CONNECTOR | DVI 25PIN 3LAYER | CFD |
| CN3 | Connector | HDMI CONNECTOR | 51U019S-30SIN-A4R-SD | CFD ELEC |
| DC2 | JACK | 12V DC Power Input | 2.5ø DC Jack | CFD |

CON14: OSD Connector

| Pin No. | Symbol | Description |
|---------|-----------|------------------------|
| 1 | LED-Red | Red Color |
| 2 | LED-Green | Green Color |
| 3 | GND | Ground |
| 4 | INPUT | For INPUT Switch |
| 5 | MENU | For Menu Switch |
| 6 | VOL+ | For Volume Up Switch |
| 7 | VOL- | For Volume Down Switch |
| 8 | CH- | For Up Switch |
| 9 | CH+ | For Down Switch |
| 10 | POWER | For Power Switch |
| 11 | IR_OUT | IR DATA |
| 12 | +3V3 | IR Power 3.3V |

CON5: IPEX Connector

| Pin No. | Symbol | Description |
|---------|----------|----------------|
| 1 | - | NC |
| 2 | GND | Ground |
| 3 | EDP_TX1N | LANE1_N |
| 4 | EDP_TX1P | LANE1_P |
| 5 | GND | Ground |
| 6 | EDP_TX0N | LANE0_N |
| 7 | EDP_TX0P | LANE0_P |
| 8 | GND | Ground |
| 9 | TX_AUXP | AUX_P |
| 10 | TX_AUXN | AUX_N |
| 11 | GND | Ground |
| 12 | VCC | VCC |
| 13 | VCC | VCC |
| 14 | - | NC |
| 15 | GND | Ground |
| 16 | GND | Ground |
| 17 | HPD | Hot Plug |
| 18 | GND | Ground |
| 19 | GND | Ground |
| 20 | GND | Ground |
| 21 | GND | Ground |
| 22 | LED_EN | LED Enable Pin |
| 23 | PWM | LED_PWM |
| 24~26 | - | NC |
| 27~29 | LED VCC | LED VCC |
| 30 | - | NC |

CN602: AUDIO Connector

| Pin No. | Symbol | Description |
|---------|--------|-----------------|
| 1 | R- | Speaker Right - |
| 2 | R+ | Speaker Right + |
| 3 | L+ | Speaker Left + |
| 4 | L- | Speaker Left - |

CN16: AUDIO Jack

| Pin No. | Symbol | Description |
|---------|--------|-------------|
| 1 | GND | Ground |
| 2 | - | NC |
| 3 | L_IN1 | AIN_L |
| 4 | - | NC |
| 5 | R_IN1 | AIN_R |

CN1: ANALOG RGB INPUT (D-Sub 15P)

| Pin No. | Symbol | Description |
|---------|--------|--------------------|
| 1 | Red1 | Red analog input |
| 2 | Green1 | Green analog input |
| 3 | Blue1 | Blue analog input |
| 4 | GND | Ground |
| 5 | GND | Ground |
| 6 | GND | Ground |
| 7 | GND | Ground |
| 8 | GND | Ground |
| 9 | NC | Not connected |
| 10 | GND | Ground |
| 11 | GND | Ground |
| 12 | DSDA | DDC-SDA |
| 13 | HSYNC | Horizontal Sync |
| 14 | VSNC | Vertical Sync |
| 15 | DSCL | Serial Clock Input |

CN27: DVI-D Input Connector

| Pin No. | Symbol | Description |
|---------|-------------------|--|
| 1 | TMDS DATA2- | TMDS DATA2 Differential Negative Signal |
| 2 | TMDS DATA2+ | TMDS DATA2 Differential Positive Signal |
| 3 | TMDS DATA2 Shield | Shield for TMDS Channel #2 |
| 4 | NC | No Connection |
| 5 | NC | No Connection |
| 6 | DDC Clock | The Data Line for the DDC Interface |
| 7 | DDC Data | The Clock Line for the DDC Interface |
| 8 | NC | No Connection |
| 9 | TMDS DATA1- | TMDS DATA1 Differential Negative Signal |
| 10 | TMDS DATA1+ | TMDS DATA1 Differential Positive Signal |
| 11 | TMDS DATA1 Shield | Shield for TMDS Channel #1 |
| 12 | NC | No Connection |
| 13 | NC | No Connection |
| 14 | +5V Power | +5 Volt signal for EDID (Un-powered Monitor) |
| 15 | GND(for +5V) | Ground for +5 Volt Power pin, Sync return |
| 16 | HPD | Identify the presence of a monitor |
| 17 | TMDS DATA0- | TMDS DATA0 Differential Negative Signal |
| 18 | TMDS DATA0+ | TMDS DATA0 Differential Positive Signal |
| 19 | TMDS DATA0 Shield | Shield for TMDS Channel #0 |
| 20 | NC | No Connection |
| 21 | NC | No Connection |
| 22 | TMDS CLOCK Shield | Shield for TMDS Clock differential Pair |
| 23 | TMDS CLOCK+ | TMDS DATA0 Differential Positive Signal |
| 24 | MDS CLOCK- | TMDS DATA0 Differential Negative Signal |

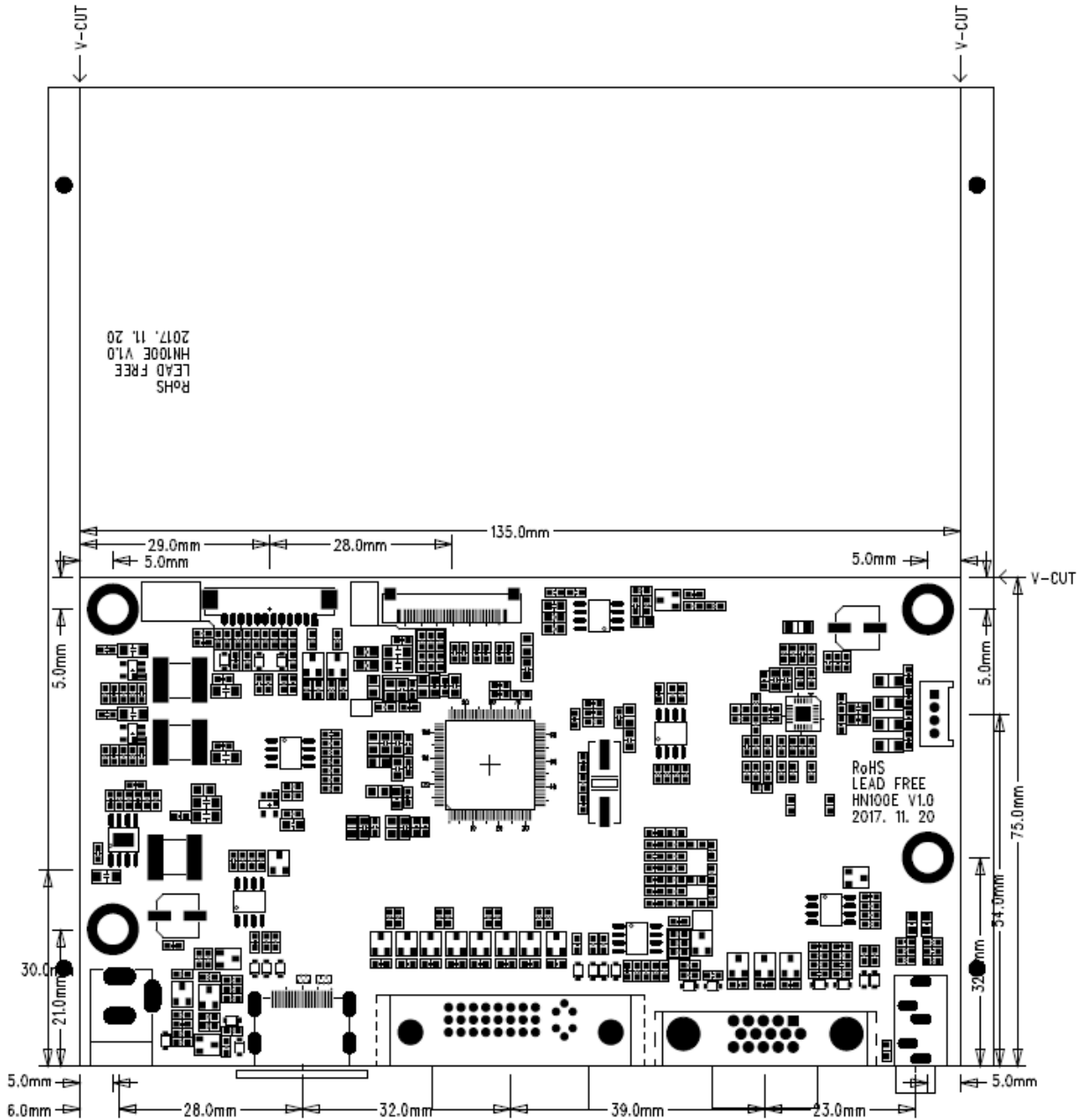
DC2: DC power Input Jack(12V)

| Pin No. | Symbol | Description | Pin No. | Symbol | Description |
|---------|--------|-------------|---------|--------|-------------|
| Center | Vcc | 12V | Shell | GND | Ground |

CN3: HDMI Connector

| Pin No. | Symbol | Description |
|---------|---------------|--------------------|
| 1 | HDMI0-RX2P | HDMI 2line 2data + |
| 2 | GND | Ground |
| 3 | HDMI0-RX2N | HDMI 2line 2data - |
| 4 | HDMI0-RX1P | HDMI 2line 1data + |
| 5 | GND | Ground |
| 6 | HDMI0-RX1N | HDMI 2line 1data - |
| 7 | HDMI0-RX0P | HDMI 2line 0data + |
| 8 | GND | Ground |
| 9 | HDMI0-RX0N | HDMI 2line 0data - |
| 10 | HDMI0-CLKP | HDMI 2line CLK+ |
| 11 | GND | Ground |
| 12 | HDMI0-CLKN | HDMI 2line CLK- |
| 13 | CEC | HDMI CEC |
| 14 | HDMI_ARC | Opt |
| 15 | HDMI0-DDC-SCL | HDMI DDC SCL |
| 16 | HDMI0-DDC-SDA | HDMI DDC SDA |
| 17 | GND | Ground |
| 18 | HDMI0/5V | HDMI POWER SIGNAL |
| 19 | HDMI0-HPD | HPD pin |

7. CONTROLLER DIMENSIONS



| | |
|----------------|-------------------|
| HN100E | SIZE: 135 X 75mm |
| COMPONENT SIDE | DATE:2017. 11. 20 |
| | Rev: L0 1.6T |

[DIMENSION DOWNLOAD](#)

9. APPLICATION NOTES

A. USING THE CONTROLLER WITHOUT BOTTONS ATTACHED:

This is very straightforward:

- ▷ Firstly setup the controller/display system with the buttons. With the attached controllers and display system active make any settings for color, contrast and image position as required then switch everything off.
- ▷ Remove the control switches, the 7-way cable.
- ▷ Refer to inverter specifications for details as to fixing brightness to a desired level, this may require a resistor, an open circuit or closed circuit depending on inverter

B. INVERTER CONNECTION:

There are 3 potential issues to consider with inverter connection:

- ▷ Power
- ▷ ON/OFF
- ▷ Brightness (DIM-ADJ)

Inverter power : This should be matched with the inverter specification.

Inverter ON/OFF : This is a pin provided on some inverter for ON/OFF function and is used by this panel controller for VESA DPMS compliance. If the inverter does not have on/off pin or the on/off pin is not used DPMS will not operate. Pin5 should be matched to the inverter specification for the ON/OFF pin.

Brightness Dimming control : This controller boards are supported analog dimming and PWM dimming control method too. And it is important to consider the specifications for the inverter to be used.

9. APPLICABLE GRAPHIC MODE

The microprocessor measures the, H – sync V – sync and polarity for RGB Inputs, and uses this timing information to control all of the display operation to get the proper image on a screen. This board can detect all VESA standard Graphic modes shown on the table below and Provide more clear and stable image on a screen

RGB input format

| Mode \ Spec | Pixel Freq. | Horizontal Timing | | | Vertical Timing | | |
|----------------|-------------|-------------------|--------|--------|-----------------|--------|--------|
| | | Sync Polar | Freq. | Active | Sync Polar | Freq. | Active |
| | MHz | | KHz | Pixel | | Hz | Lind |
| 640*480@60Hz | 28.175 | N | 31.469 | 640 | N | 59.940 | 480 |
| 640*480@72Hz | 31.500 | N | 37.861 | 640 | N | 72.809 | 480 |
| 640*480@75Hz | 31.500 | N | 37.500 | 640 | N | 75.000 | 480 |
| 800*600@60Hz | 40.000 | P | 37.879 | 800 | P | 60.317 | 600 |
| 800*600@72Hz | 50.000 | P | 48.077 | 800 | P | 72.188 | 600 |
| 800*600@75Hz | 49.500 | P | 46.875 | 800 | P | 75.000 | 600 |
| 1024*768@60Hz | 65.000 | N | 48.363 | 1024 | N | 60.005 | 768 |
| 1024*768@75Hz | 75.000 | N | 56.476 | 1024 | P | 70.070 | 768 |
| 1280*720@60Hz | 74.500 | P | 44.772 | 1280 | P | 59.855 | 720 |
| 1360*768@60Hz | 84.75 | P | 47.72 | 1360 | P | 59.799 | 768 |
| 1440*900@60Hz | 106.500 | N | 55.935 | 1440 | P | 59.887 | 900 |
| 1280*1024@60Hz | 108.000 | P | 63.981 | 1280 | P | 60.020 | 1024 |
| 1280*1024@75Hz | 135.000 | P | 79.976 | 1280 | P | 75.035 | 1024 |
| 1600*1200@60Hz | 162.000 | P | 75.000 | 1600 | p | 60.000 | 1200 |
| 1680*1050@60Hz | 119.000 | P | 64.674 | 1680 | N | 59.883 | 1050 |
| 1920*1080@60Hz | 138.500 | P | 66.587 | 1920 | N | 59.934 | 1080 |
| 1920*1200@60Hz | 154.000 | P | 74.038 | 1920 | N | 59.950 | 1200 |

HDMI input format

| Mode \ Spec | Horizontal Timing | | Vertical Timing | |
|--------------|-------------------|--------|-----------------|--------|
| | Freq. | Active | Freq. | Active |
| | KHz | Pixel | Hz | Lind |
| 720X480(P) | 31.469 | 720 | 59.94 | 480 |
| 1280X720(P) | 45 | 1280 | 60 | 720 |
| 1920X540(P) | 33.75 | 1920 | 60 | 540 |
| 720X576(P) | 31.25 | 720 | 50 | 576 |
| 1280X720(P) | 37.50 | 720 | 50 | 720 |
| 1920X1080(P) | 67.432 | 1920 | 59.940 | 1080 |
| 1920X1080(P) | 56.250 | 1920 | 50 | 1080 |