# AND Displays

# AND10C401S-HB-KIT
## 10.4" SVGA Color TFT LCD Module

## Features
• High luminance
• Single CCFL backlight
• Low reflection
• Clear 256K colors (K=1024)
• Thin and lightweight design
• 3.3Volt LVDS Operation
• SVGA (800 x 600 pixels color display)
• Fast response time
• Applications: Display Terminals, Scientific Instruments, Medical Instruments, Test and Measurement Instruments, Process Control/Factory Automation Equipment, Office Automation Equipment

## Mechanical Specifications

| Item | Specification | Unit |
|---|---|---|
| Outline Dimensions | 238.6 (H) x 171.0 (V) x 6.0 max (D) | mm |
| Number of Pixels | 800 (H) x 600 (V) | pixels |
| Active Area | 211.2 (H) x 158.4 (V) | mm |
| Pixel Pitch | 0.264 (H) x 0.264 (V) | mm |
| Weight (approx.) | 312 | gram |
| Backlight | CCFL, Side-light type | – |

## Absolute Maximum Ratings

| Item | Symbol | Min | Max | Unit |
|---|---|---|---|---|
| Supply Voltage | $V_{DD}$ | -0.3 | 4.0 | V |
| | $V_{FL}$ | 0 | 2000 | Vrms |
| FL Driving Frequency | $f_{FL}$ | 0 | 100 | kHz |
| Input Signal Voltage | $V_{IN}$ | -0.3 | $V_{DD} + 0.3$ | V |
| Operating Temperature | $T_{op}$ | 0 | 50 | °C |
| Storage Temperature | $T_{stg}$ | -20 | 60 | °C |
| Humidity (Max. Wet bulb temp = 29°C) | – | 10 | 90 | %RH |

Product specifications contained herein may be changed without prior notice. It is therefore advisable to contact Purdy Electronics before proceeding with the design of equipment incorporating this product.
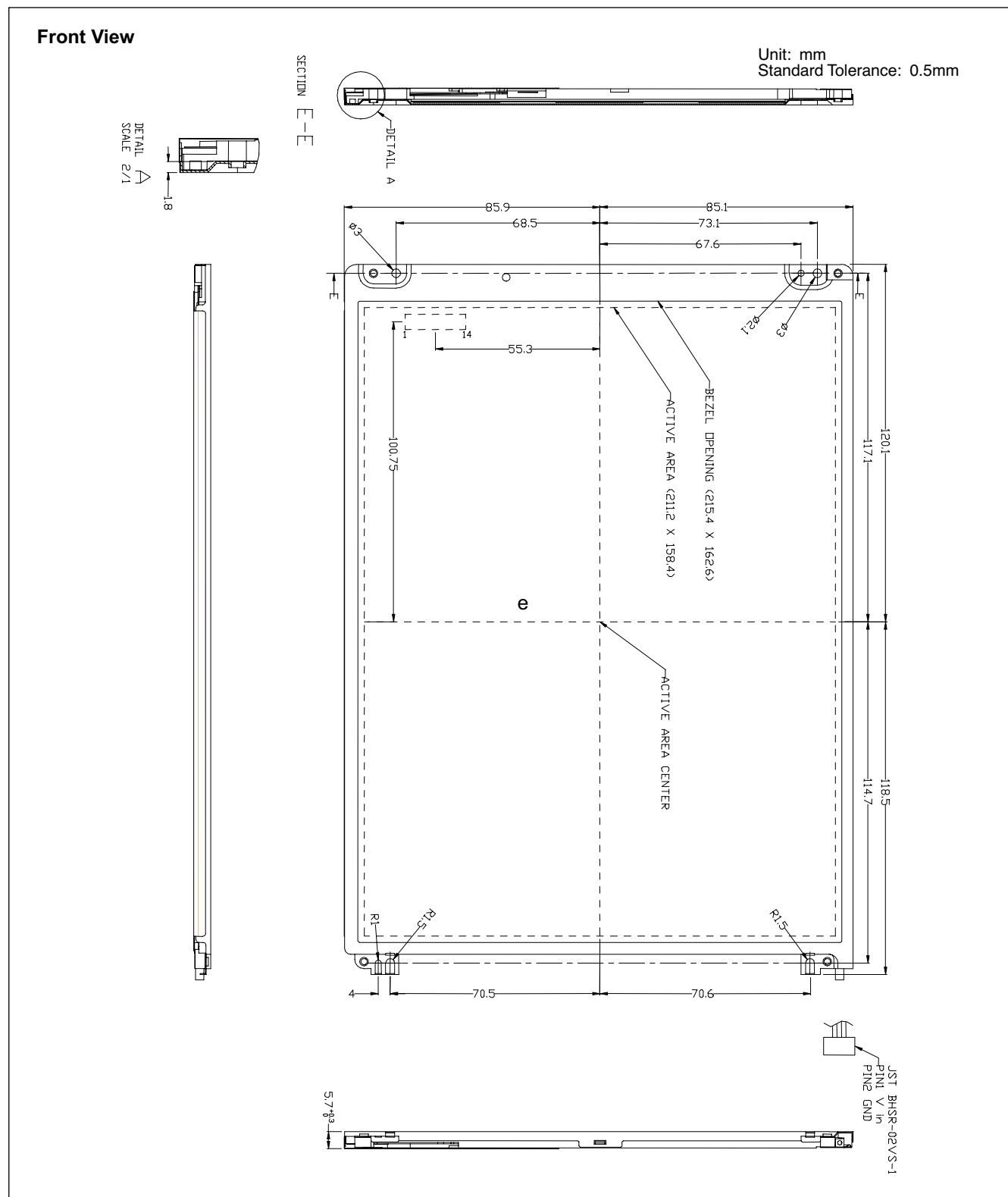
## Electrical Specifications (Ta = 25°C)

| Item | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Supply Voltage ($I_{FL}$=6mA) | $V_{DD}$ | 3.0 | 3.3 | 3.6 | V |
| | $V_{FL}$ | 500 | 550 | 600 | Vrms |
| FL Start Voltage (Ta = 0°C) | – | 1200 | – | – | Vrms |
| High Level Input Voltage | $V_{IH}$ | 3.5 | – | $V_{DD}$ | V |
| Low Level Input Voltage | $V_{IL}$ | 0 | – | 1.5 | V |
| LVDS Differential Input High Threshold | – | – | – | 100 | mV |
| LVDS Differential Input Low Threshold | – | 100 | – | – | mV |
| Current Consumption | $I_{DD}$ | – | 370 | – | mA |
| | $I_{FL}$ | 2.0 | 3.0 | 6.0 | mArms |
| Power Consumption (*1) | P | – | 2.9 | 4.5 | W |

*1: Before the efficiency loss of CCFL inverter

## Optical Specifications (Ta = 25°C)

| Item | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Contrast | CR | 100 | 180 | – | – |
| Response | $t_{on}$ | – | 15 | 50 | ms |
| | $t_{off}$ | – | 25 | 50 | ms |
| Luminance ($I_{FL}$ = 3mA) | L | 30 | 80 | – | cd/m$^2$ |
| Luminance ($I_{FL}$ = 6mA) | L | – | 170 | – | cd/m$^2$ |

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## Dimensional Outline

**Front View**

Unit: mm
Standard Tolerance: 0.5mm

SECTION E-E

DETAIL A

DETAIL SCALE 2/1

1.8

85.9

85.1

68.5

73.1

67.6

ø3

1.2

ø3

14

55.3

100.75

120.1

117.1

BEZEL OPENING (215.4 X 162.6)

ACTIVE AREA (211.2 X 158.4)

e

ACTIVE AREA CENTER

118.5

114.7

R1

R1.5

R1.5

4

70.5

70.6

5.7 +0.3 0

JST BHSR-02VS-1
PIN1 V in
PIN2 GND

**Timing Specifications**

| Item | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Frame Period | t1 | 604 x t3 – | 628 x t3 16.58 | 628 x t3 17.86 | – ms |
| Vertical Display Term | t2 | 600 x t3 | 600 x t3 | 600 x t3 | t2 = N •t3 |
| One Line Scanning Time | t3 | 844 x t5 (26.3) | 1024 x t5 26.4 | 1056 x t5 | – μs |
| Horizontal Display Period | t4 | 800 x t5 | 800 x t5 | 800 x t5 | – |
| Clock Period | t5 | 24.0 | 25.0 | _ | ns |
| Clock "L" Time | t6 | 9.0 | – | – | ns |
| Clock "H" Time | t7 | 9.0 | – | – | ns |
| Set Up Time | t8 | 4.0 | – | – | ns |
| Hold Time | t9 | 5.0 | – | – | ns |

**Timing Chart**



(A) Vertical Timing

(B) Horizontal Timing

800 Pixels

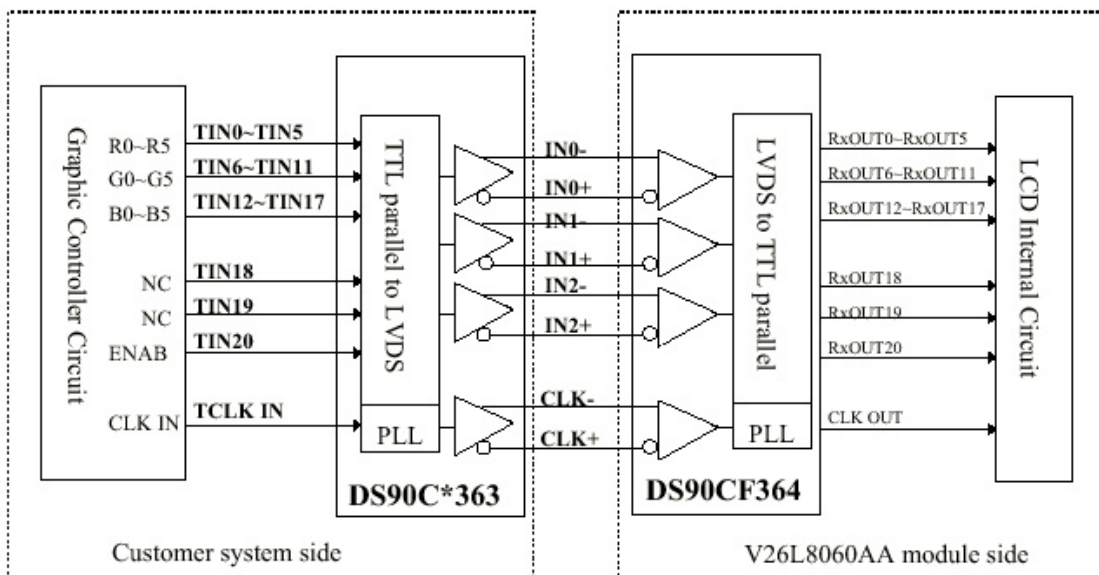| 1, 1 | 2, 1 | - - - - - - - - - - - - - - - - - - - - - - - - | 800, 1 |
| 1, 2 | 2, 2 | - - - - - - - - - - - - - - - - - - - - - - - - | 800, 2 |
| | | ⋮ | |
| 1, 599 | 2, 599 | - - - - - - - - - - - - - - - - - - - - - - - - | 800, 599 |
| 1, 600 | 2, 600 | - - - - - - - - - - - - - - - - - - - - - - - - | 800, 600 |

600 Lines
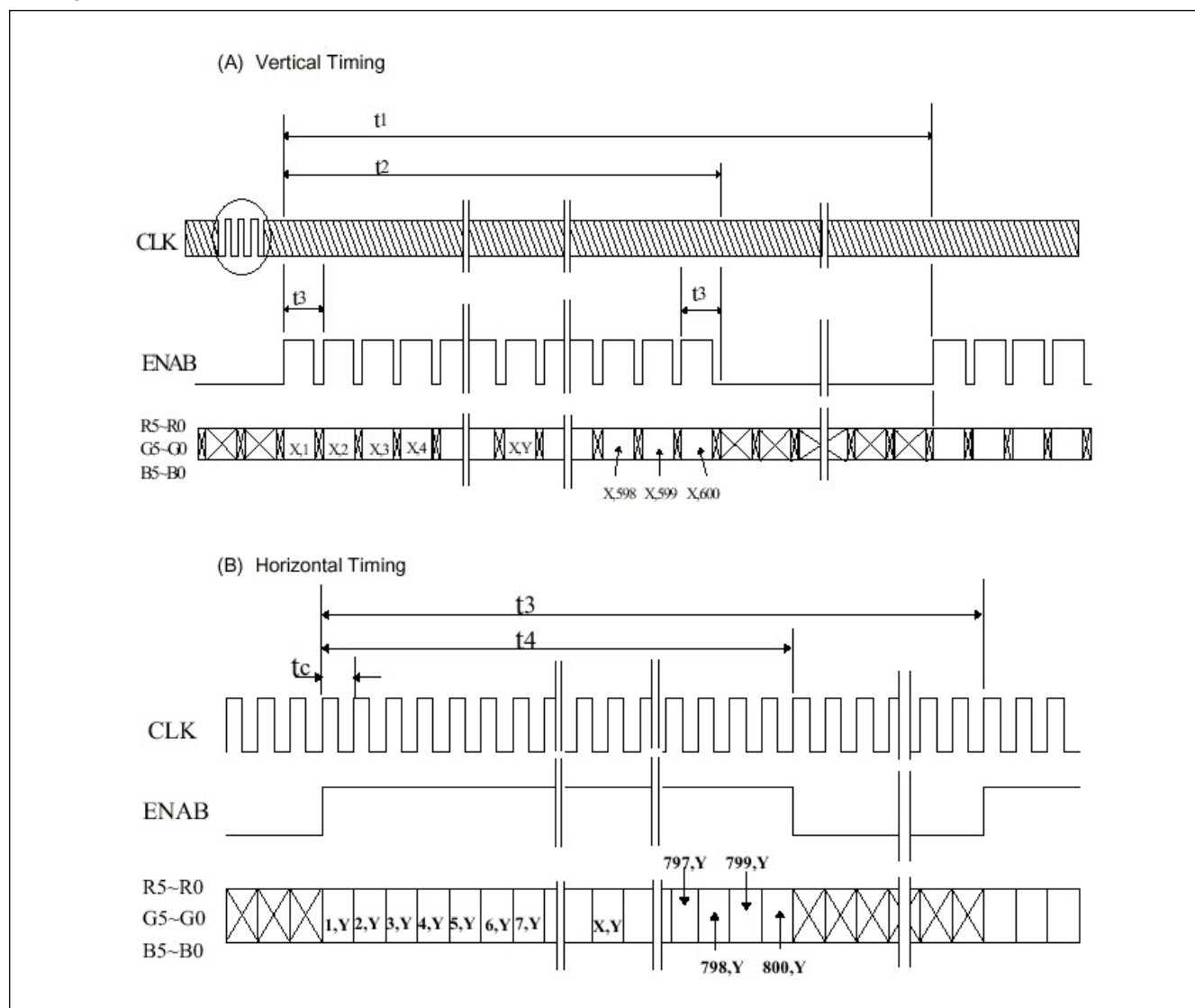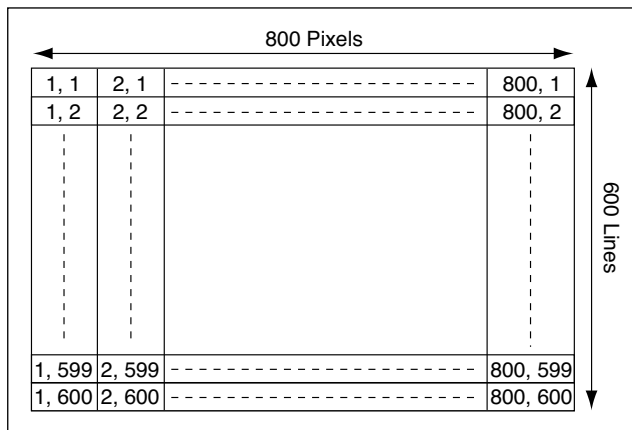
Recommended Inverter: TBD

## Block Diagram
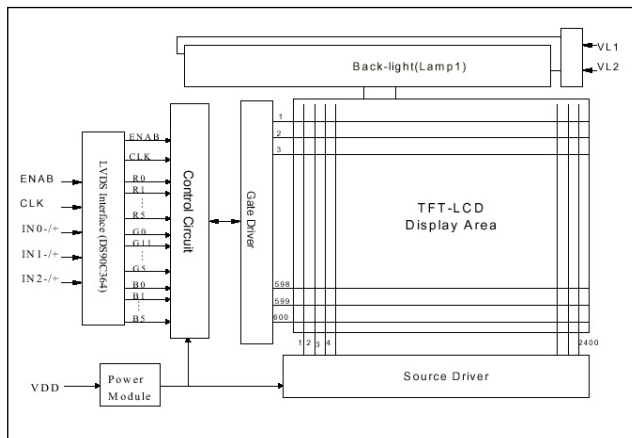


## LVDS Interface Block Diagram



## Connector Pin Assignment for Interface
## CN1 Input Signal (1)
## Molex - 55177-1491

| Terminal No. | | Symbol | Function |
|---|---|---|---|
| 1 | | VDD | Power Supply: =3.3V |
| | 2 | VDD | Power Supply: =3.3V |
| 3 | | GND | Ground |
| | 4 | GND | Ground |
| 5 | | IN0- | Pixel data Transmission pair 0 (negative -) |
| | 6 | IN0+ | Pixel data Transmission pair 0 (positive +) |
| 7 | | IN1- | Pixel data Transmission pair 1 (negative -) |
| | 8 | IN1+ | Pixel data Transmission pair 1 (positive +) |
| 9 | | IN2- | Pixel data Transmission pair 2 (negative -) |
| | 10 | IN2+ | Pixel data Transmission pair 2 (positive +) |
| 11 | | CLK- | Sampling Clock (negative -) |
| | 12 | CLK+ | Sampling Clock (positive +) |
| 13 | | GND | Ground |
| | 14 | GND | Ground |

## CN2 CCFL Power Source
## (BHR-02VS-1/Japan Solderless Terminal Mfg Co., Ltd.)

| Terminal No. | Symbol | Function |
|---|---|---|
| 1 | VL | CCFL Power Supply (High Voltage) |
| 2 | GL | CCFL Power Supply (GND Side) |

Note (1): NC terminal is open. (Don't use.)
Note (2): 256 colors are displayed by the combinations of 18 data bits.

| | Display | R5 | R4 | R3 | R2 | R1 | R0 | G5 | G4 | G3 | G2 | G1 | G0 | B5 | B4 | B3 | B2 | B1 | B0 | Gray Scale Level | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Basic Color | Black | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | – | |
| | Blue | L | L | L | L | L | L | L | L | L | L | L | L | H | H | H | H | H | H | – | |
| | Green | L | L | L | L | L | L | H | H | H | H | H | H | L | L | L | L | L | L | – | |
| | Lt. Blue | L | L | L | L | L | L | H | H | H | H | H | H | H | H | H | H | H | H | – | |
| | Red | H | H | H | H | H | H | L | L | L | L | L | L | L | L | L | L | L | L | – | |
| | Purple | H | H | H | H | H | H | L | L | L | L | L | L | H | H | H | H | H | H | – | |
| | Yellow | H | H | H | H | H | H | H | H | H | H | H | H | L | L | L | L | L | L | – | |
| | White | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | | – | |
| Gray Scale of Red | Black | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | | L0 |
| | Dark | L | L | L | L | L | H | L | L | L | L | L | L | L | L | L | L | L | L | | L1 |
| | | L | L | L | L | H | L | L | L | L | L | L | L | L | L | L | L | L | L | | L2 |
| | ↕ | : | | | | | | : | | | | | | : | | | | | | L3~L60 | |
| | | : | | | | | | : | | | | | | : | | | | | | | |
| | | H | H | H | H | L | H | L | L | L | L | L | L | L | L | L | L | L | L | | L61 |
| | Light | H | H | H | H | H | L | L | L | L | L | L | L | L | L | L | L | L | L | | L62 |
| | Red | H | H | H | H | H | H | L | L | L | L | L | L | L | L | L | L | L | L | Red | L63 |
| Gray Scale of Green | Black | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | | L0 |
| | Dark | L | L | L | L | L | L | L | L | L | L | L | H | L | L | L | L | L | L | | L1 |
| | | L | L | L | L | L | L | L | L | L | L | H | L | L | L | L | L | L | L | | L2 |
| | ↕ | : | | | | | | : | | | | | | : | | | | | | L3~L60 | |
| | | : | | | | | | : | | | | | | : | | | | | | | |
| | | L | L | L | L | L | L | H | H | H | H | L | H | L | L | L | L | L | L | | L61 |
| | Light | L | L | L | L | L | L | H | H | H | H | H | L | L | L | L | L | L | L | | L62 |
| | Green | L | L | L | L | L | L | H | H | H | H | H | H | L | L | L | L | L | L | Green | L63 |
| Gray Scale of Blue | Black | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | | L0 |
| | Dark | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | H | | L1 |
| | | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | H | L | | L2 |
| | ↕ | : | | | | | | : | | | | | | : | | | | | | L3~L60 | |
| | | : | | | | | | : | | | | | | : | | | | | | | |
| | | L | L | L | L | L | L | L | L | L | L | L | L | H | H | H | H | L | H | | L61 |
| | Light | L | L | L | L | L | L | L | L | L | L | L | L | H | H | H | H | H | L | | L62 |
| | Blue | L | L | L | L | L | L | L | L | L | L | L | L | H | H | H | H | H | H | Blue | L63 |
| Gray Scale of White & Black | Black | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | | L0 |
| | Dark | L | L | L | L | L | H | L | L | L | L | L | H | L | L | L | L | L | H | | L1 |
| | | L | L | L | L | H | L | L | L | L | L | H | L | L | L | L | L | H | L | | L2 |
| | ↕ | : | | | | | | : | | | | | | : | | | | | | L3~L60 | |
| | | : | | | | | | : | | | | | | : | | | | | | | |
| | | H | H | H | H | L | H | H | H | H | H | L | H | H | H | H | H | L | H | | L61 |
| | Light | H | H | H | H | H | L | H | H | H | H | H | L | H | H | H | H | H | L | | L62 |
| | White | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | White | L63 |