

# Engineering Specification

**Model No. EFL-1903X**

**19inches High resolution LCD Monitor**

*Customer's logo display  
on Booting is available*



- **Samsung TFT LCD Panel**
- **High performance up-Scaling characteristic**
- **Automatic Scanning**
- **Wide Viewing Angle, High Speed Response**
- **Enhanced Video Quality**
- **Power Supply with enhanced Design Margin**
- **Test Pattern for Burn-in & Self Check**
- **Option**
  - **3 Input (RGB, AV, SVHS)**
  - **DVI Input**
  - **Touch Screen(3M, ... )**
  - **Stereo Audio Amplifier**

|                         |                                  |                           |
|-------------------------|----------------------------------|---------------------------|
| Model No. : EFL-1903X   | <b>Engineering Specification</b> |                           |
| Approval No.: 19-SS-STD | Revision No.: 2.2                | Issue Date: Aug. 03. 2004 |

## FCC RF INTERFERENCE STATEMENT

### NOTE :

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 harmful 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 the dealer or an experienced radio, TV technical for help.
- Only shielded interface cable should be used.

Finally, any changes or modifications to the equipment by the user not expressly approved by the grantee or manufacturer could void the users authority to operate such equipment.

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## 1. GENERAL DESCRIPTION

### 1-1. Overview

Effinet open frame LCD Monitor EFL-1903X is a high performance TFT LCD monitor providing high quality image from the analog RGB input.

This monitor supports wide range signal input from VGA to SXGA resolution at vertical refresh rate of 60 to 75Hz. It includes integrated signal processing unit, named LSP (LCD Signal Processor), which had all electronic function for user application.

It is designed for industrial use with Auto power on, up scaling performance adequate for low-resolution application and enhanced design margin for reliability

It also gives versatile optional features like, DVI input, Video input, Touch Screen, Stereo Audio amplifier, Boot up custom logo and custom designed frame.

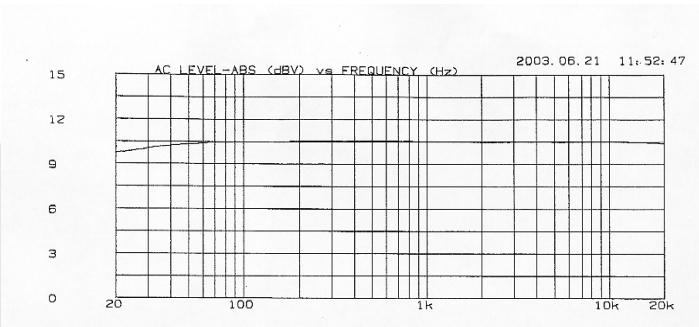
### 1-2. Quick reference table of Characteristics

|             |                          |                                                                                                              |
|-------------|--------------------------|--------------------------------------------------------------------------------------------------------------|
| Panel (S/S) | Size                     | 19" Diagonal                                                                                                 |
|             | Active Display Area      | 376.32 x 301.056 mm                                                                                          |
|             | Type No.                 | Samsung, LTM190E1-L01                                                                                        |
|             | Number of Pixels         | 1280 (H) x 1024 (V)                                                                                          |
|             | Pixel Arrangement        | RGB Vertical Stripe                                                                                          |
|             | Pixel Pitch              | 0.294 mm x 0.294 mm                                                                                          |
|             | Color Depth              | 16.7M True Color                                                                                             |
|             | Surface Treatments       | Hard Coating (3H), Haze 44%                                                                                  |
|             | Viewing Angle<br>(CR≥10) | Horizontal :   Θ L   85 degrees<br>Θ R   85 degrees<br>Vertical :       Φ H   85 degrees<br>Φ L   85 degrees |
|             | Contrast Ratio           | Typ. 500 : 1                                                                                                 |
|             | Response Time            | Rise time(tr) : 15ms(Typ.)<br>Fall time(tf) : 10ms(Typ.)                                                     |
|             | Average Brightness       | Typ. 250 cd/ m <sup>2</sup>                                                                                  |
|             | Frame Rate               | Typ. 60Hz, Max. 75Hz                                                                                         |
|             | Panel Dimension          | (WHD) 404.2 x 330.0 x 20.0 mm                                                                                |
|             | CCFT                     | 4 Lamps (2 Dual)                                                                                             |

|                         |                                  |                           |
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|                                      |                        |                                                                                                                      |
|--------------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------|
| Scanning Frequency                   | Horizontal             | 30 ~ 80 KHz                                                                                                          |
|                                      | Vertical               | 50 ~ 75 Hz                                                                                                           |
| Resolution                           | Prime                  | 1280 x 1024 @ 60 Hz                                                                                                  |
|                                      | Standard               | 720x400 @70 Hz<br>640x480 @60/67/72/75 Hz<br>800x600 @56/60/72/75 Hz<br>1024x768 @60/70/75 Hz<br>1280x1024 @60/75 Hz |
| Input Signal                         | RGB (Video / Sync)     | RGB Analog (0.7Vp-p, 75ohms) / H/V Separate (TTL)                                                                    |
|                                      | CVBS                   | Composite Video 1Vp-p, 75ohms                                                                                        |
| Sync                                 | Type                   | Separate H/V sync, Composite, SOG (Sync-On-Green)                                                                    |
|                                      | Level                  | TTL level (V high $\geq$ 2.0V, V low $\leq$ 0.8V)                                                                    |
|                                      | Polarity               | Positive or Negative                                                                                                 |
| Input Signal Interface               | RGB                    | 15pin D-Sub                                                                                                          |
|                                      | Video                  | RCA Jack - 1 ea.                                                                                                     |
|                                      | S-Video                | SVHS Jack - 1 ea.                                                                                                    |
| Compatible Color System              |                        | NTSC M / NTSC 4.43 / PAL M / PAL N / SECAM                                                                           |
| Power                                | AC Input               | AC 90 ~ 265V @60/50Hz                                                                                                |
|                                      | max. power dissipation | 35Watts                                                                                                              |
|                                      | Adapter Rating         | 12V 5A                                                                                                               |
| Regulation(Safety , Ergonomics, EMC) |                        | CUL (UL+CSA), CE, FCC                                                                                                |
| Environmental Conditions             | Operating              | Temperature: 10 to 50°C / Humidity: 8 to 80%                                                                         |
|                                      | Storage                | Temperature: -20 to 70°C / Humidity: 5 to 90%                                                                        |
| White Color Temperature              |                        | 9300°K: CIE $x=0.281\pm0.015$ / $y=0.311\pm0.015$<br>6500°K : CIE $x=0.313\pm0.015$ / $y=0.329\pm0.015$              |
| Demonstrated MTBF                    |                        | More than 20,000 hours                                                                                               |
| Touch Screen<br>(Optional)           | Touch Panel            | 3M Touch / 13-5471-01MA                                                                                              |
|                                      | Controller             | EXII-1060SC (Serial) or EXII-5050UC (USB)                                                                            |
|                                      | Controller Interface   | Serial or USB Interface                                                                                              |
| Audio<br>(Optional)                  | Mono / Stereo          | Stereo                                                                                                               |
|                                      | Input Audio Jack       | 3.5mm mini jack                                                                                                      |
|                                      | Audio Output           | Nominal 1.3 Wrms at 8 ohms<br><i>* No external power for audio operation is needed</i>                               |

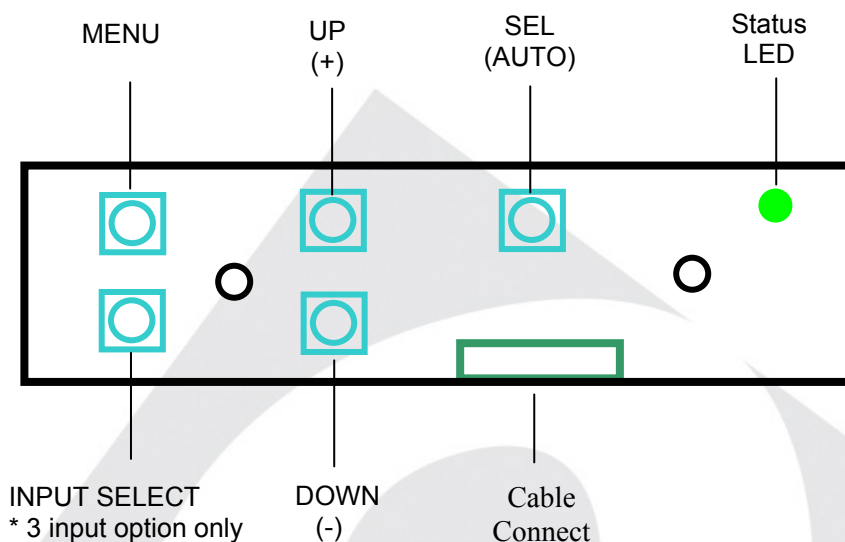
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|                     |                    |                                                                                    |
|---------------------|--------------------|------------------------------------------------------------------------------------|
| Aidio<br>(Optional) | Speaker Connector  | Molex 5240 : 2p(Left), 3p(Right) ;<br>* <i>Speaker side : Molex 5102</i>           |
|                     | S/N Ratio          | Over than 80dB                                                                     |
|                     | THD                | Under 10% (THD : Total Harmonic Distortion)                                        |
|                     | Frequency Response |  |

|                         |                                  |                           |
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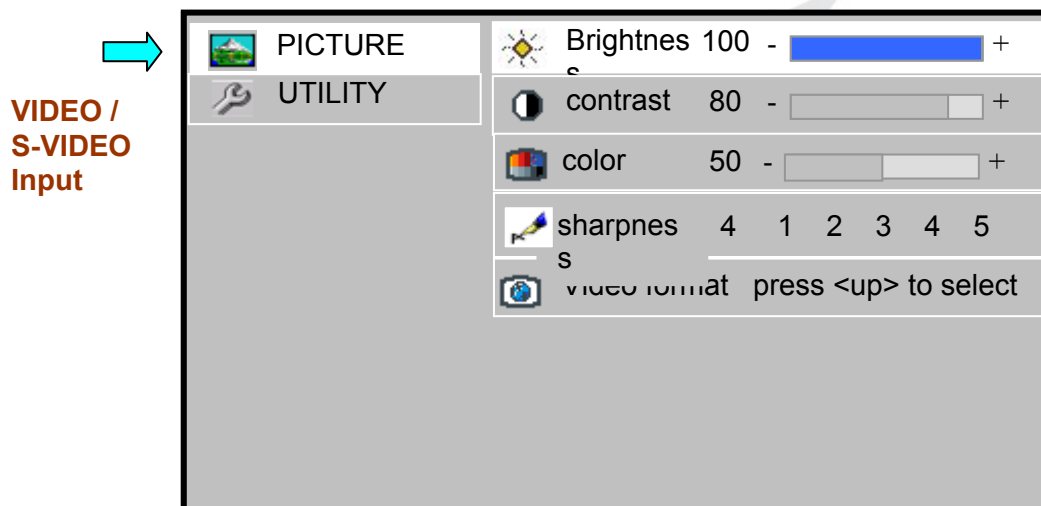
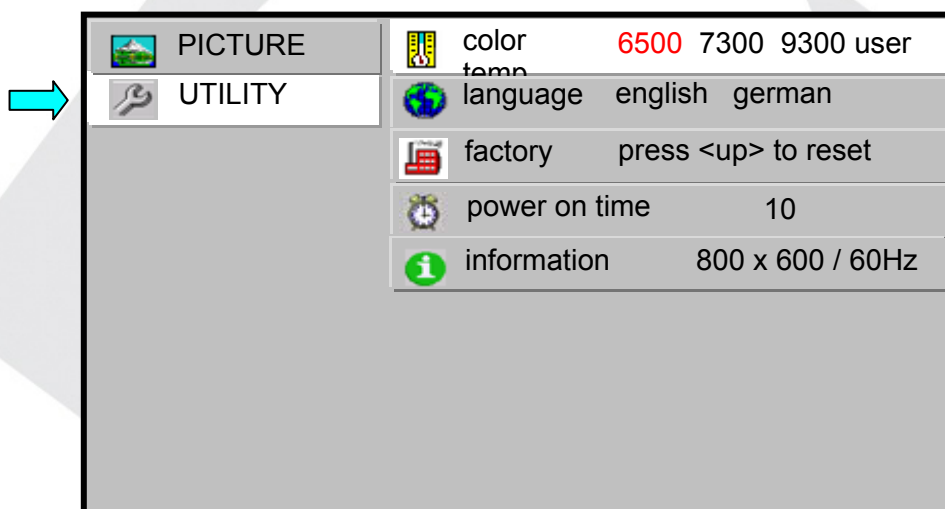
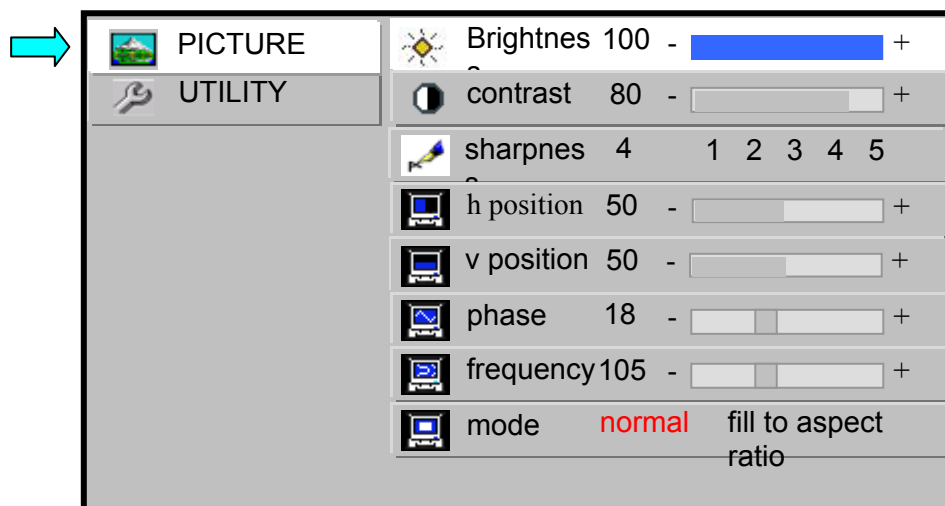
## 2. USER CONTROL & OSD

### 2-1. Description of Control Key



| SWITCH NAME  | SWITCH FUNCTIONS                                                                                                                                                                                                                 |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MENU         | <ul style="list-style-type: none"> <li>▪ Activate / Deactivate the OSD Menu Window.</li> <li>▪ Move cursor to Main Menu from sub-menu.</li> </ul>                                                                                |
| SEL (AUTO)   | <ul style="list-style-type: none"> <li>▪ Move cursor in the Sub-Menu(Brightness ↔ Mode)</li> <li>▪ <b>Auto Tracking</b> (Pressing "SEL" key)</li> </ul>                                                                          |
| UP(+)        | <ul style="list-style-type: none"> <li>▪ Move cursor at Main Menu(Picture / Utility)</li> <li>▪ Increase the value of the selected function</li> </ul>                                                                           |
| DOWN(-)      | <ul style="list-style-type: none"> <li>▪ Move cursor at Main Menu(Picture / Utility)</li> <li>▪ Decrease the value of the selected function.</li> </ul>                                                                          |
| INPUT SELECT | <ul style="list-style-type: none"> <li>▪ Select the input signal( RGB → Video → S-Video → RGB...)</li> <li>▪ When power off / on, the last memoried input mode will be displayed.</li> <li>▪ Apply for 3 input model.</li> </ul> |

## 2-2. OSD MENU SCREEN



|                         |                           |                           |
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## 2-3. OSD Control Functions

| CONTROL                | FUNCTION                                                                                                                                                                                                                                                  |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Auto Tracking</b>   | Automatic screen adjustment process.<br><b>If there is any noise on the screen or screen shift, just press “SEL” button.</b><br><b>Since this monitor is equipped with “Auto Tracking” function, it will automatically configure the monitor setting.</b> |
| Brightness             | Adjust the brightness level of the Display                                                                                                                                                                                                                |
| Contrast               | Adjust the contrast level of the Display.                                                                                                                                                                                                                 |
| Sharpness              | Adjust the sharpness level of the Display                                                                                                                                                                                                                 |
| H position             | Adjust the position of the display horizontally.                                                                                                                                                                                                          |
| V position             | Adjust the position of the display vertically.                                                                                                                                                                                                            |
| Phase                  | Adjust the clock phase of the display.                                                                                                                                                                                                                    |
| Frequency              | Adjust the clock frequency of the display                                                                                                                                                                                                                 |
| Mode                   | Select the video aspect ratio. It depends on the input video format.                                                                                                                                                                                      |
| COLOR TEMP             | Choose different preset color temperatures (6500/7300/9300) or set your own customized color parameters.                                                                                                                                                  |
| Red /Green / Blue GAIN | Adjust the Red/ Green / Blue Gain                                                                                                                                                                                                                         |
| Language               | Select the OSD language                                                                                                                                                                                                                                   |
| Factory recall         | Recall the factory setting value.                                                                                                                                                                                                                         |
| Power On time          | Displayed the total power on time.                                                                                                                                                                                                                        |
| Information            | Displayed the resolution of input signal                                                                                                                                                                                                                  |
| Color                  | Set the color (saturation) level                                                                                                                                                                                                                          |
| Tint(Hue)              | Set the hue level. Only for the “NTSC” system                                                                                                                                                                                                             |
| Video Format           | Select the corresponding input video system.<br>“Auto” setting means monitor automatically recognize the input video system. – Default setting<br>AUTO, NTSC M, NTSC 4.43, PAL M, PAL BGDHI, PAL N SECAM                                                  |
| Self Test Pattern      | To enter auto burn-in mode, press “Up” key first and then “Sel” key simultaneously for 3 seconds.<br>On this mode, Red – Green – Blue – White – Black test pattern will be displayed. Press Menu key for returning normal display mode.                   |

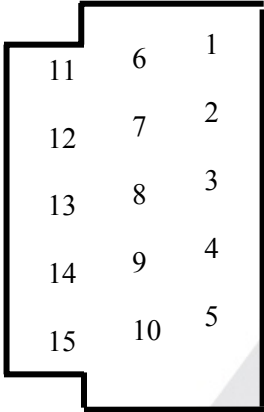
\* Brightness and Contrast value can be set individually for each input mode.

\* Color Temperature can be set individually for RGB and Video (S-Video).

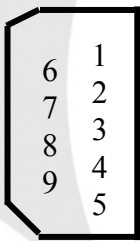
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### 3. CONNECTOR PIN DESCRIPTIONS

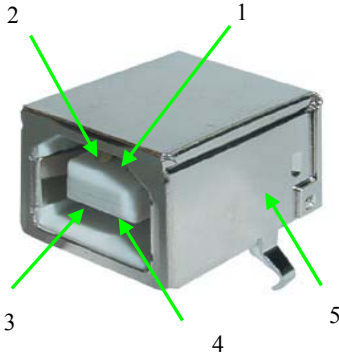
#### 3-1. 15 Pin D-SUB Connector

| Shape and pin number                                                              | Pin | Description    | Pin | Description     |
|-----------------------------------------------------------------------------------|-----|----------------|-----|-----------------|
|  | 1   | Red            | 9   | No Connection   |
|                                                                                   | 2   | Green          | 10  | Ground - Sync   |
|                                                                                   | 3   | Blue           | 11  | No Connection   |
|                                                                                   | 4   | Ground         | 12  | No Connection   |
|                                                                                   | 5   | Ground         | 13  | Horizontal Sync |
|                                                                                   | 6   | Ground - Red   | 14  | Vertical Sync   |
|                                                                                   | 7   | Ground - Green | 15  | No Connection   |
|                                                                                   | 8   | Ground - Blue  |     |                 |

#### 3-2. Serial(RS-232C) Connector

| Shape and pin number                                                                | Pin | Description | Pin | Description |
|-------------------------------------------------------------------------------------|-----|-------------|-----|-------------|
|  | 1   | DCD         | 6   | DSR         |
|                                                                                     | 2   | RXD         | 7   | RTS         |
|                                                                                     | 3   | TXD         | 8   | CTS         |
|                                                                                     | 4   | DTR         | 9   | N/A         |
|                                                                                     | 5   | Ground      |     |             |

#### 3-3. USB Connector

| Shape and pin number                                                                | Pin | Description        |
|-------------------------------------------------------------------------------------|-----|--------------------|
|  | 1   | +5V                |
|                                                                                     | 2   | DATA (DN)          |
|                                                                                     | 3   | DATA (DP)          |
|                                                                                     | 4   | 0V                 |
|                                                                                     | 5   | Cable Shield Shell |

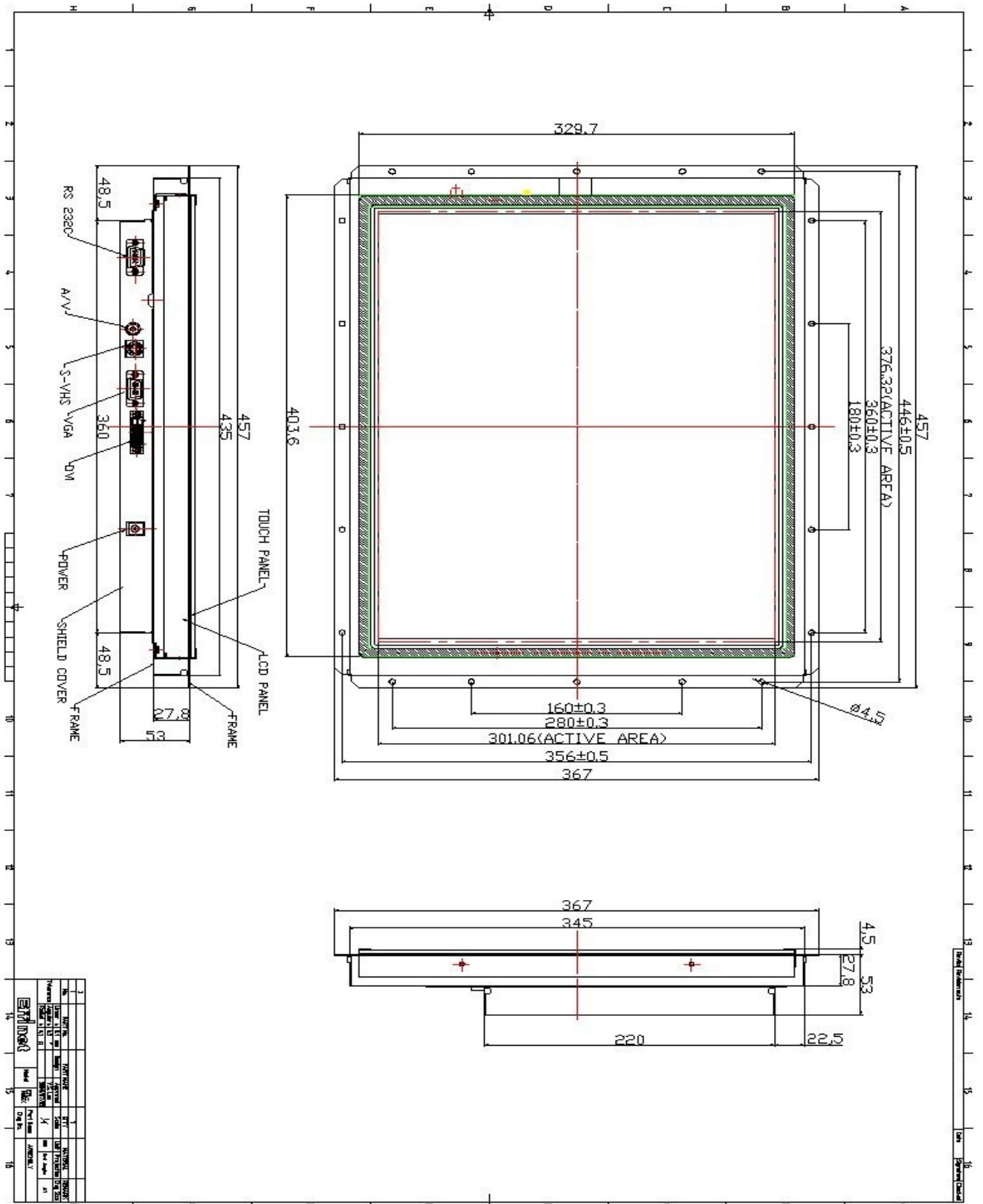
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#### 4. STANDARD DISPLAY MODE

| No. | Mode | Resolution  | Horizontal |          | Vertical  |          | Pixel clock |
|-----|------|-------------|------------|----------|-----------|----------|-------------|
|     |      |             | Frequency  | Polarity | Frequency | Polarity |             |
| 1   | VGA  | 720 x 400   | 31.47 KHz  | N        | 70.0 Hz   | P        | 28.322 MHz  |
| 2   |      | 640 x 480   | 31.47 KHz  | N        | 60.0 Hz   | N        | 25.175 MHz  |
| 3   |      | 640 x 480   | 35.00 KHz  | N        | 66.7 Hz   | N        | 30.240 MHz  |
| 4   |      | 640 x 480   | 37.86 KHz  | N        | 72.8 Hz   | N        | 31.500 MHz  |
| 5   |      | 640 x 480   | 37.50 KHz  | N        | 75.0 Hz   | N        | 31.500 MHz  |
| 6   | SVGA | 800 X 600   | 35.16 KHz  | N / P    | 56.3 Hz   | N / P    | 36.000 MHz  |
| 7   |      | 800 X 600   | 37.88 KHz  | P        | 60.3 Hz   | P        | 40.000 MHz  |
| 8   |      | 800 X 600   | 48.08 KHz  | P        | 72.2 Hz   | P        | 50.000 MHz  |
| 9   |      | 800 X 600   | 46.87 KHz  | P        | 75.0 Hz   | P        | 49.500 MHz  |
| 10  |      | 832 X 624   | 49.73 KHz  | N        | 74.6 HZ   | N        | 57.284 MHz  |
| 11  | XGA  | 1024 X 768  | 48.36 KHz  | N        | 60.0 Hz   | N        | 65.000 MHz  |
| 12  |      | 1024 X 768  | 56.49 KHz  | N        | 70.1 Hz   | N        | 75.000 MHz  |
| 13  |      | 1024 X 768  | 60.02 KHz  | P        | 75.0 Hz   | P        | 78.750 MHz  |
| 14  | SXGA | 1280 X 1024 | 63.98 KHz  | P        | 60.0 Hz   | P        | 108.00 MHz  |
| 15  |      | 1280 X 1024 | 79.98 KHz  | P        | 75.0 Hz   | P        | 135.00 MHz  |

|                         |                                  |                           |
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## 5. MECHANICAL STRUCTURE



|                         |                           |                           |
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