

# FPD Visual Test System

## FVT-12T

### High-speed Inspection!



FPD Visual Test System

**FVT-12T**

**F** VT-12T is a system to evaluate flat display panels (QVGA) typically used for cellular phones and PDAs by detecting dot/line defects with programmable test limits. The system taking advantage of a 10M-pixel CCD camera that can capture an entire panel image at once enables high-speed measurement for inspections used a line scan camera. It detects the number of pixels, array information and edge (effective emission of light area) automatically, users can set panel easily. In addition, judgements are not personal uneven, it improves inspection result of reliability.

### Major Features

- Measurement time is less than 10 seconds (from start measuring to displaying result, it does not include time of exchange cameras, 10M-pixel CCD camera enables capturing an entire image of a panel screen)
- This system detect slight signal by wide dynamic range, because camera output uses ADC (high-tone 14bit).
- Flexible inspection in conformity to panels is possible.
- Test limits can be programmed for each RGB. (Bright spot / Dark spot / Bright line / Dark line)
- Area size of test and permissible defect number of GO/NG test also can be preprogrammed.
- It is easy to confirm errors, because error point of panel is displayed as image view after inspection.
- Time crunch of setting panel is possible by using edge (area of luminous), automatic detection of edge of a panel, the number of pixel and automatic setting exposure time.
- Position and focus adjustment is easily, because all screen and focus one (center) are displayed at the same time.
- It does not need adjustment of position by automatic correction of positional relation of panel and camera when inspector exchange panels
- Accurate test is possible, because dispersion of CCD pixel and brightness caused by characteristic of lens is corrected based on correction data of optical characteristic which is acquired in advance.
- Select drivers which meet with panel, because LCD driver is controlled via RS232C.  
(We need meeting about inspection of LCD Drive)

|  |   |                                     |
|--|---|-------------------------------------|
| <b>◆ GENERAL SPECIFICATIONS</b>  |   |                                     |
| <b>◆ Objection and panel specification</b>   |   |                                     |
| Panel Size   | Standard specification : 2 to 3 inch  |                                     |
| Standard display dot number  | QVGA : 320(R/G/B) X 240, W-QVGA : 320(R/G/B) X 480  |                                     |
|  | *VGA class might not be able to measured due to the difference of such panel specifications as length and width ratio, etc.   |                                     |
| Pixel array  | Stripe and delta array  |                                     |
| <b>◆ Measurement time</b>  |   |                                     |
| Item   | Measurement time  |                                     |
| Capture panel  | About 1.5 sec x 5   |                                     |
| Luminance inspection   | About 1.5 sec   |                                     |
| Total  | About 10.0 sec  |                                     |
| <p>For CPU:Pentium4 1.7GHz or more, and Memory:600Mbyte, 5 patterns (R, G, B, W, BK) are required for the image capturing.<br/>                     Time to capture images can be increased or reduced by the communication time with the drivers.</p> |   |                                     |
| <b>◆ Sensor</b>  |   |                                     |
| 10M-pixel digital CCD camera   |   |                                     |
| 1. Image pickup device   | Number of valid pixel   | 4008 (H) x 2627 (V) about 11M-pixel |
|  | CCD pixel size  | 9.0 μm x 9.0 μm                     |
| 2. Built-in A/D converter  | 14bit   |                                     |
| 3. Monochrome / Color  | Monochrome  |                                     |
| 4. Shutter speed   | 10ms to 1h ( control from PC)   |                                     |
| 5. Lens  | Nikon 105mm f/2.8 F mount<br>Auto-extension ring PK-12  |                                     |
| 6. Communication cable   | Between camera and capture board for communication  |                                     |
| 7. Focus   | Manual  |                                     |
| <b>◆ FVT software</b>  |   |                                     |
| Standard software  |   |                                     |
| (1) Pixel defect detection   | 1. Spot defects (bright and dark spots) : number of defects, address and color.<br>2. Line defects (bright and dark lines) : number of defects, color<br>3. Bright dots of different color : number of defects, color |                                     |
| (2) Standards for panel judgment of GO/NG<br>Programming of standards for panel judgment of GO/NG.   |   |                                     |
| 1. Judgment zone   | Panel is divided into nine areas/three groups and judged. Standards for judgment of GO/NG is regarded by programming the number of permissible range of maximum defects. Areas can be divided at arbitrary positions. |                                     |
| 2. Defects of distance   | Standards is regarded by programming permissible defects of distance for each defects of links (bright-bright spot, dark-dark spot, bright-dark spot)   |                                     |