

The Introduction of CM25+ 21" 201P Monitor

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1. GENERAL DESCRIPTION

The 201P10 is a Digital Controlled Auto-scan Color Display Monitor with high resolution. This monitor can operate at horizontal scan frequencies from 30 to 120K Hz. and vertical scan frequencies from 50 to 160 Hz.

This monitor is equipped with an embedded micro-controller, which can preset the required modes. The CM25+ provides many functions, such as digital adjustable picture, DDC1/2B, power management, low emission, high immunity, etc.

This monitor complies with TCO low emission standard and also fulfills TCO'99 automatic power saving requirements. To reduce power consumption less than 8 watts in standby or suspend mode and less than 3 watts in off mod, the monitor also complies with energy star computer program initiated by the EPA.

1. DESCRIPTION OF CIRCUIT DIAGRAM

This description mainly introduces the functions, including power supply / power saving management, horizontal / vertical deflection, video amplifier, micro-controller, etc.

A. POWER SUPPLY / POWER SAVING MANAGEMENT

POWER SUPPLY:

The monitor is designed as switch mode power supply which can operate mains input from 90VAC to 264VAC. The power supply uses an IC (STR-F6656) for QUASI-RESONANT MODE. The control scheme transforms a switching converter from a voltage source into a multi-output voltage. The control concept is exhibited many desirable properties such as inherent over-load protection, stable and fast system response.

The maximum power consumption is up to 150 watts. A power limiting circuit is added for safety reason.

On main power supply circuit, secondary feedback via a photo-coupler is used to obtain a stable output voltage. The secondary feedback supplies all necessary voltages for deflection and video.

POWER SAVING MANAGEMENT:

This monitor can save power consumption while no sync pulses are detected by micro-controller and automatically recover to normal power when sync signals are detected by micro-controller.

During the Stby mode operation all the output voltages are reduced to around 10% of the nominal value and only the heater voltage and the 5V to supply the up are sustained. In this condition the heater voltage is less then the nominal value and it is around 5.5V.

During Off mode operation all the output voltages are reduced to around 10% of the nominal value like in Stby mode and the heater voltage is removed. Only the up is supplied.

The power consumption is less than 8 watts during standby / suspend modes, and less than 3 watts during off mode.

B. HORIZONTAL / VERTICAL DEFLECTION

HORIZONTAL DEFLECTION:

The heart of horizontal/vertical deflection controller is TDA4856, which can offer a complete and efficient small signal sync processing for auto-sync monitors. All functions are controlled by I2C bus.

This controller provides sync processing, which can accept separate and composite (H+V) input signals. A very short setting time after mode change for protection of external power components has been taken.

The TDA4856 provides extensive functions like a flexible SMPS block and a geometry control with facilities, leading to excellent picture quality. This device also can directly drive the vertical deflection output stage, the line driver stage, the E/W output stage and the EHT stage. All controls are DC and tracked with the incoming frequencies.

Raster can be adjusted along horizontal direction by OSD R-shift control

Transformer (LOT) generates the required 27kV anode voltage.

The adjustable focus (G3) and screen (G2) voltages are internally derived from the anode

voltage.

Other secondary windings are used to generate the voltages for G1. For 21 inch monitor also provides dynamic focus on G4 to get a good focus performance. (G4 is also adjustable).

The horizontal size and east/west corrections are obtained by varying the voltage of buck converter of the lower deflection a circuit.

Five capacitors switch and DC controlled linearity coil are designed for optimal screen linearity.

For safety reasons, x-ray protection circuit is included. L4990A will shut down EHT generator if the anode voltage exceeds a certain value (29kV).

This circuit is also used for beam current overload protection. Shut down EHT in case the total beam current exceeds a certain limit to protect both CRT and LOT.

VERTICAL DEFLECTION:

The majority of vertical deflection function is integrated by two ICs : TDA4856 and TDA9379.

The TDA4856 takes care of sync polarity correction, automatic catching and holding of the vertical oscillator, generation of saw-tooth drive current for vertical output and vertical s-correction, and generation of a correct V-blanking pulse for video blanking during vertical retrace lines.

The TDA9379 is a DC-coupled vertical deflection booster with differential input signals is suitable for color monitor. The output stage has thermal and soar protection, and high linear saw-tooth signal amplification to obtain the required vertical deflection current.

C. VIDEO AMPLIFIER & DDC1/2B

VIDEO AMPLIFIER:

The heart of video circuit is M52742SP. This controller can drive the monolithic post-amp CR6927 by buffer stage. The video DC level and gain at cathode are controlled by software.

The red, green and blue video signals are amplified and inverted by the post-amplifier to output stage and AC coupled to the CRT cathodes.

Three cut-off adjustments are provided to set the video black level at cathode for all three guns. Also three individual gain adjustments are provided to adjust the white point at maximum swing. Both cut-off and gain controls are digit type control by microprocessor.

For limiting the beam current and preventing the local doming, the beam current limit will automatically reduce the video swing in case the maximum beam current is exceeded.

A spot-killer circuit is also added to prevent the CRT spot burn-in when the set is switched off.

DDC 1/2B:.

Via SDA, the data about the information of the monitor, including the serial number, production Codes, CRT type and applicable timings are stored in the EEPROM (24LC21). To avoid picture interference, the reading and writing processes are executed during vertical blanking which is informed by the vertical SYNC.

D. MICRO-CONTROLLER

GENERAL DESCRIPTION:

The Philips P87C380 u-processor is used to control the monitor. The preset data are stored in EEPROM ST24W16.

HARDWARE DEFINITION:

a) KEY BOARD

There are five keypads at the front of monitor for the OSD control.

- OSD function key:

- Enter

Push it, to confirm the entrance or exit from the OSD window

- UP

To select the parameters which are chosen from OSD.

- DOWN

To select the parameters which are chosen from OSD.

- RIGHT

To adjust the parameter which are chosen from OSD to right side

- LEFT

To adjust the parameter which are chosen from OSD to left side

b) OSD will disappear and SAVE AUTOMATICALLY after non-operation.

c) Software will control the DPMS according to the SYNC status.

2. VIDEO PRESET MOSES

Pre-set Video Resolution and Sync Polarities

Resolution	H. Frequency	V. Frequency	H. Sync.	V. Sync.
1024 x 768	60.0KHz	75Hz	+	+
1024 x 768	68.7KHz	85Hz	+	+
1280 x 1024	80.0KHz	75Hz	+	+
1280 x 1024	91.0KHz	85Hz	+	+
1600 x 1200	93.0KHz	75Hz	+	+
1600 x 1200	106.3KHz	85Hz	+	+
1600 x 1200	120.0KHz	95Hz	+	+
1792 x 1344	106.3KHz	75Hz	x	x
2048 x 1536	106.3KHz	60Hz	x	x