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	DRAWN	R. KRILL	08/18/04	CONSUMER CURVED, COMPAQ MV7540 AND HP v75, 17" MONITOR SPECIFICATION (BROOME)		
	CHECKED	J. WARREN	08/18/04			
	DSGN ENGR	R. KRILL	08/20/04			
	ENG					
	MFG					
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1. **SCOPE**

1.1 **PHILOSOPHY**

This document embodies a set of Marketing goals for the HP Consumer value HP v75 and Compaq MV7540 17" CRT monitors. Its contents are further intended to form part of a business relationship between Hewlett-Packard and the monitor vendor, and as such, the product specifications and characteristics described herein are of a detailed engineering nature.

1.2 **INTRODUCTION**

This document defines the design and performance requirements for the HP v75 and Compaq MV7540 17" CRT color monitor with HP specific industrial design and a detachable tilt/swivel base. The MV7540 has Carbonite colored plastics bucket and base; whereas the v75 has OOV Gray#4 bucket and base. This monitor has diagonal 0.28 mm dot pitch CRT and is capable of maximum resolution of 1280x1024-60Hz non-interlaced mode. This monitor is capable of vertical frequencies between 50 and 160 Hz, horizontal frequencies between 30 KHz and 70 KHz, and a maximum pixel clock of 110 MHz. The monitor will be compliant with VESA E-DDC, E-EDID, VSIS, and DMT standards. The monitor will be WHQL compliant and will have Windows 2000 and XP certification. The monitor shall use a HP defined icon based OSD. This monitor will have an attached signal cable and detachable power cord. The monitor will only support Separate-Syncs. Sync-On-Green (SOG) and Composite sync will not be supported. The monitor will support attachable speaker base. The monitor will NOT support a microphone. World Wide agency approval is required for all suppliers. The Compaq MV7540 monitor shall have Silver painted bezel with Compaq 7540 model name. The HP v75 monitor shall have Alloy Metallic painted bezel with HP v75 model name.

1.3 **METHODOLOGY**

To the extent possible, the monitor shall be characterized as an entity, with specified AC, video and sync inputs and specifications applied to front of screen (FOS) measurements. In the event that equipment availability does not permit measurement of the appropriate FOS parameter, an equivalent measurement may be taken internal to the monitor if approved by HP. Every parameter specified does not need to be 100% tested in a production environment. Alternate measurement techniques may be used if equivalent to criteria specified herein. Appropriate manufacturing guard bands must be applied to ensure specification compliance.

1.4 **CONFIGURATIONS**

The configuration information in this section is provided for reference only. Consult the bill of materials located in the Sku Matrix for each kit (typically a boxed monitor assembly with cushions, power cord, signal cable and user guide) to determine its exact content.

Dash Number Reference: 371237-xxx will be the only reference. See the SKU Matrix for the exact dash number applicable for your build. All dash numbers are to be released without a spec reference.



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**TABLE 1
MONITOR CONFIGURATIONS**

MODEL	BRANDING	COLORS	SPEAKERS	TCO	BEZEL	EDID #
COMPAQ MV7540	HP Consumer	HP Silver bezel and Carbonite bucket	Yes	No	COMPAQ 7540	HWP2632
HP v75	HP Consumer	Alloy Metallic bezel and OOV Gray #4 bucket/base	Yes	No	HP v75	HWP2634

PROJECT MANAGER: JACKIE WANG
PROJECT COORDINATOR: CYNDI AID
MRKT: DONNA LAVIN

Project Name: BRO PROJECT: 13098
SUPPLIER: AOC
Vendor Code: 10156643

Rev 1.0

CPQ BRANDED		CONSUMER	CARBONITE/SILVER											
KIT P/N	COUNTRY/REGION	INBOUND OPTION KIT	KIT DESCRIPTION:	ASSY P/N	GLARE - POLISHED	MPR II	EURO Power Cord P/N 8121-0731	DOCS - EURO (SEE BELOW)	SPEAKER POWER ADAPTER P/N 5187-2556	World Wide Box Artwork (special) P/N 371237-00A	LABEL LETTER FORM T/SERIAL FORM T P/N 308097	MDL # AGENCY PROPERTIES	EDID: HWP2632	UPC/JAN CODE
17" CRT			70kHz											
P8716AA#ABA	NA	P8716-60001	MV7540 2T POL,NH-NA	371237-001	X				X	X	Z	HSTND-1A02-P	X	829160475882



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PROJECT COORDINATOR: CYNDI AID
MRKT: LAURENT MICHOUX

Project Name: BROOME

Rev 0.9

PROJECT: 13098
SUPPLIER: LiteON
Vendor Code: 00101

CPQ-BRANDED			CONSUMER.		CARBONITE/SILVER									
KIT P/N	COUNTRY/REGION	INBOUND OPTION KIT	KIT DESCRIPTION:	ASSY P/N	GLARE - POLISHED	MPR II	EURO Power Cord P/N 8121-0731	DOCS - EURO (SEE BELOW)	SPEAKER POWER ADAPTER P/N 5187-2556	World Wide Box Artwork (special) P/N 371237-00A	LABEL LETTER FORM T/SERIAL FORM T P/N 308097	MDL # AGENCY PROPERTIES	EDID: HWP2632	UPC/JAN CODE
17" CRT			70kHz											
P8716AA#ABA	NA	P8716-60001	MV7540 2T POL,NH-NA	371237-101	X				X	X	Z	HSTND-1L02-P	X	829160475882

2. REFERENCE DOCUMENTS

2.1 APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the document is of the issue in effect on the date of invitation to bid or request for proposal.

100613	"Cord, AC Line, UK."
100661	"Cord, AC Line, ANZ."
106128	"Label, Blank, Thermal Print."
106413	"Cosmetic Requirements, Plastics."
106584	"Procedure, Printing, Carton Label."
109291	"Test Specification, Packaging of HP Named Products."
109893	"Specification, Raw Material Supplier Packaging and Material Handling."
114047	"Specification, Color Measurement, Paint/Plastic."
121565	"Cord, AC Line, Dom."
131296	"ESD Test Procedures."
133722	"Conn, Adapter, AC/Con, Jpn."
137062	"Pallet, 48 X 42, 4 Way"
139867	"Cord, AC Line, Japan."
140685	"Cord, AC Line, Chile."



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231216	"Cord, AC Line, Kor."
257877	"Specification, Wooden Products, Infest Mark"
259139	"Speakers, Premium Audio."
268246	"Cord, AC Line, Eurocord."
286496	"Cord, AC Line, PRC"
298640	"Specification, Monitors, Packaging" HP Document
387768	"Adapter, 12VCD,1A, Univ." HP Document
387808	"Adapter, 12VDC, 1A."
401328	"Cord, AC Line, Argentina."
A-5951-1745-1	"General Specification for Environment."
ANSI 268-82	"Metric Practices." American National Standards Institute. (ANSI).
ANSI C63.4 – 1992	"American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz." American National Standards Institute (ANSI), 1992.
ANSI C63.4 – 2001	"American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz." American National Standards Institute (ANSI), 2001.
ANSI X31.82-1990	"Data Transmission Synchronous Signaling Rates." American National Standards Institute (ANSI).
Australian Communications Authority	"Electromagnetic Compatibility Framework - Information for Suppliers – Residential, Commercial and Light Industry"(and amendments), July 1995, URL: http://www.aca.gov.au .
C.I.S.P.R. Pub. 22	"Limits and methods of measurement of radio interference characteristics of information technology equipment." International Special Committee on Radio Interference (C.I.S.P.R.), Third Edition, 1997.
C.R.C.,c. 1370	"Radiation Emitting Devices Regulations" Consolidated Regulations of Canada, 1994 revised 12/10/97.
CAN/CSA-C22.2 No. 60950-00	"Safety of Information Technology Equipment including Electrical Business Equipment, Third Edition." Canadian Standards Association, 2000.
CB Bulletin	"Adherence to IEC Standards." IEC System for Conformity Testing to Standards for Safety of Electrical Equipment (IECEE), Latest published by IECEE.
CFR 47, Part 15	"Unintentional Radiators". Title 47 of the Code of Federal Regulations, Part 15, FCC Rules, Radio Frequency Devices, Subpart B.
EK1-ITB2000	"Basic requirements for the GS-testing of IT equipment in conjunction with display equipment." Issued 6: 2000, revised 5:2003.



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EN 55022	"Limits and methods of measurement of radio interference characteristics of information technology equipment." European Committee for Electrotechnical Standardization (CENELEC), Third Edition, 1998.
EN 55024	"Information technology equipment - Immunity characteristics - Limits and methods of measurement." European Committee for Electrotechnical Standardization (CENELEC), 1998.
EN 60950: 2000	"Safety of Information Technology Equipment" European Committee for Electrotechnical Standardization (CENELEC), 2000 (IEC 60950, Third Edition (1999) including Corrigendum 2:2000)
EN 61000-3-2:2000	"Electromagnetic Compatibility (EMC) Part 3: Limits, Section 2: Limits for Harmonics Current Emissions (Equipment input current $\leq 16A$ per phase)." European Committee for Electrotechnical Standardization (CENELEC), 2000.
EN 61000-3-3/A1:2001	"Electromagnetic compatibility (EMC) - Part 3: Limits - Section 3: Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current $\leq 16 A$ " European Committee for Electrotechnical Standardization (CENELEC), 1995.
GB4943-95	"Safety of Information Technology Equipment including Electrical Business Equipment," Issued 1990-12-28, Effective 1991-10-1.
HP GSE	"Hewlett-Packard General Specification for the Environment (GSE), Revision F, November 25, 2003."
ICES-003	"Interference-Causing Equipment Standard: Digital Apparatus" Industry Canada - Issue 4, 2004.
IEC 60950:1999-04	"Safety of information technology equipment," Third Edition, International Electrotechnical Commission, 1999.
IEC 61000-4 Sections 2 – 6, 8, 11	"Electromagnetic Compatibility (EMC) – Part 4: Testing and measurement techniques." International Electrotechnical Commission (IEC).
ISO 9241-3	ISO 9241-3:1992 Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 3: "Visual display requirements," International Standards Organization, 1998.
ISO 9241-7	ISO 9241-7:1998 Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 7: "Requirements for display with reflections," International Standards Organization, 1998.
ISO 9241-8	ISO 9241-8:1998 Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 8: "Requirements for displayed colors," International Standards Organization, 1998.
Korea MIC Approval	"EMC Registration Regulation," URL: http://www.rri.go.kr/ .
MPR 1990:10 1990-12-31	"User's Handbook for Evaluating Display Units," Statens mät-och provstyrelse, Swedish National Board for Measurement and Testing, December 31, 1990.



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MPR 1990:8 1990-12-01	"Test Methods for Visual Display Units: visual Ergonomics, Emission Characteristics." Statens mät-och provstyrelse, Swedish National Board for Measurement and Testing, December 1, 1990.
NOM-019-SCFI-1993	"Safety of Data-Processing Equipment" Norma Oficial Mexicana, 1993.
RÖV 08.01.87	"Germany's X-Ray Regulations for Video Terminals".
SDP Handbook	"HP SDP Handbook."
Taiwan EMC Law	"Commodity EMC Regulation" (Taiwan EMC Law), Bureau of Standards, Metrology, and Inspection under auspices of the Ministry of Economic Affairs, URL: http://www.bsmi.gov.tw .
TCO'03	"TCO'03 Displays – CRT Displays, TCOD1023 Ver 1.1." The Swedish Confederation of Professional Employees. Published October 12, 2002.
TCO'99	"TCO'99 Certification - Requirements and Test Methods for Environmental Labeling of Displays (CRT). Report No. 1." The Swedish Confederation of Professional Employees. Published July 20, 1998.
TCO'99	"TCO'99 Certification – Ecology for Displays, System units and Keyboards. Report No. 5." The Swedish Confederation of Professional Employees. Published July 20, 1998.
U.S. CFR 21	"Radiation Limits," United States CFR 21 subchapter J, U.S. Food and Drug Administration's (FDA), Center for Devices and Radiological Health, Department of Health and Human Services.
UL 1418	"Implosion Protected CRTs for TV Type Appliances." 4th Edition. Underwriters Laboratories, Inc.
UL 1418	"Implosion Protected CRTs for TV Type Appliances." 4th Edition. Underwriters Laboratories, Inc.
UL 60950	"Safety of Information Technology Equipment including Electrical Business Equipment, Third Edition." Underwriters Laboratories, Inc., 2000.
UL 60950-1	"Safety of Information Technology Equipment including Electrical Business Equipment, Third Edition." Underwriters Laboratories, Inc., 2003.
UL 94	"Standard for Safety, Tests for Flammability of Plastic Material for Parts in Devices and Appliances." Underwriters Laboratory, Inc. 1993.
VCCI: V-3/03.04	"Agreement of Voluntary Control Council for Interference by Information Technology Equipment: Normative Annex - Technical Requirements", April 2003, URL: http://www.vcci.or.jp/ .
VESA DMT	"VESA and Industry Standards and Guidelines for Computer Display Monitor Timing, Version 1.0, Revision 0.8." Video Electronics Standard Association, September 17, 1998.
VESA E-DDC	"VESA Enhanced Display Data Channel Standard, Version 1.0." Video Electronics Standards Association, September 2, 1999.



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VESA E-EDID	"VESA Enhanced Extended Display Identification Data Standard, Release A, Revision 1." Video Electronics Standards Association, February 9, 2000.
VESA VSIS	"Video Signal Standard, Version 1.0, Revision 1." Video Electronics Standard Association, March 29, 2000.

2.2 ORDER OF PRECEDENCE

In case of a conflict between this specification and references cited herein, this specification shall take precedence.

NOTE:

All materials contained within the product must meet limits contained within the General Specification for Environment Document A-5951-1745-1.

3. **GENERAL REQUIREMENTS**

3.1 **SPECIFICATION PARAMETER MEASUREMENTS**

This section covers the procedures, conditions, equipment and data formats for evaluating a monitor relative to the requirements of this document.

3.1.1 Test Equipment

The reference signal source is a calibrated Quantum Data 801. The use of other signal generators during production is acceptable provided the product complies with this specification.

3.1.2 Test Applicability


Unless otherwise specified, incoming inspection, evaluation and qualification will be performed by HP for each specified parameter in each of the factory preset modes of operation, which are defined in Section 6.1.2. For example, the image size is specified in Section 7.8 for each preset. Therefore, the size for each preset mode must be verified for qualification of the design and manufacturing process. However, the evaluation of production units may be limited, at HP's discretion, to some key parameters in a smaller number of preset modes.

3.1.3 Warm-up Time

The monitor should be warmed up for at least thirty (30) minutes prior to making any measurements of the following parameters. The monitor must be connected to a signal source with active video during the warm-up period.

3.1.4 Measurement Systems

The units of measure that are stated in this document are those established as United States Customary System engineering units unless otherwise noted. If the user needs metric conversions, the user shall make them using the factors and methods in accordance with ANSI 268-82. Conversion factors used in this document are listed in Table 2. If limits are given in more than one system of measurement, such as both Metric and English, only one system shall be used for all related measurements. Therefore, luminance measurements made relative to this specification must be all in Foot-Lamberts **or** all in Candelas/M².

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**TABLE 2
CONVERSION FACTORS**

MAGNETIC FIELD	LENGTH & WEIGHT	LUMINANCE	TEMPERATURE
1 milligauss = 10^{-3} gauss 1 tesla = 10^4 gauss 1 gamma = 10^{-9} tesla	cm = in * 2.54 lb = kg * 2.2	nits = $\text{cd}/(\text{m}^2)$ $\text{cd}/(\text{m}^2) = \text{Ft-L} * 3.426$ lux = foot-candle * 10.76	$^{\circ}\text{F} = [^{\circ}\text{C} * 1.8] + 32$ $^{\circ}\text{C} = [^{\circ}\text{F} - 32]/1.8$

3.1.5 Measurement Precision

All performance data taken relative to this specification shall be rounded off to the number of significant digits (precision) of the given limits. For example, horizontal size is given to the nearest millimeter, so an estimated measurement of 360.4 mm must be rounded off to 360 mm before applying a pass/fail criterion.

3.1.6 Magnetic Environment

All optical measurements, image performance tests, process adjustments and statistical inspections are to be performed in a controlled magnetic environment (Triaxial Helmholtz chamber). All measured parameters should meet the specification in a non-controlled magnetic environment regardless of orientation (north, south, east, west). The parameters obtained in a non-controlled environment may measure closer to the monitor's specification limits. The magnitude of the horizontal and vertical magnetic field components is defined in the following table.

**TABLE 3
MAGNETIC ENVIRONMENTS**

SKU	HORIZONTAL FIELD	VERTICAL FIELD	FIELD DIRECTION
NH	0 to ± 20 milligauss maximum	0 to 600 milligauss	Top to Bottom
SH	0 to ± 20 milligauss maximum	-600 to 0 milligauss	Bottom to Top

3.1.7 Video Test Patterns

The video test patterns used for the measurements described in this document appear in capital letters and are defined in Appendix B.

3.1.8 Chromaticity and Luminance

All chromaticity and luminance measurements shall be made with a Microvision SS230 test instrument (or equivalent). The calibration of the test instrument used shall be traceable to an NBS source. The use of other equipment for production is acceptable provided appropriate correlation factors are used. Luminance values are given in Foot-Lamberts with Candelas per square meter (nits) in parentheses. To convert readings between the two systems, refer to Table 3. Input signals should be as defined in Section 4.2.



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3.2 DOCUMENTATION

3.2.1 Schematics

Schematics shall be provided to HP which contain enough detail for all necessary performance, Safety and Agency design audits. In the development cycle, updated schematics shall be provided whenever a change occurs in the design.

3.2.2 Firmware

A state diagram and a flowchart of the firmware operation shall be provided to HP as soon as practical in the development cycle. This will be used to verify user interface functions and determine whether HP Marketing goals have been properly implemented. Updates will be provided as changes are made to fix bugs and accommodate HP Marketing requirements.

3.2.3 User Guides and Manuals

HP will develop the documentation kit (Users Guide, Warranty, etc.) for the monitor. The supplier shall review the Users Guide to insure it is accurate.

3.2.4 Revision Control

As soon as HP approves the Pilot phase of the monitor, the Vendor in the form of a change notice must provide notification for all subsequent changes to the design, materials or firmware. The procedures of revision control and documentation shall be based on HP's Supplier Change Request (SCR) process as defined by HP Procurement Engineering.

4. ELECTRICAL

All cable information in this section is for reference only. Therefore, the bill of materials for the individual kits should be consulted to determine actual specifications for these cables. However, their mating connectors are part of the monitor assembly and must meet the requirements listed herein.

4.1 INTERFACE CABLES AND CONNECTORS

All cable connections to the monitor are at the rear of the monitor. The monitor AC Power connector shall be on the Left and the Signal Cable in the Center of the interface area on the back of the monitor. The signal cable shall have a non-gloss black jacket and shall be attached to the monitor. The power cord shall be a non-gloss black jacket and shall be detachable.

4.1.1 Signal Connector

The signal cable connector shall be a molded-over, shielded, triple row, 15-position subminiature D, straight male plug at the end of the cable. The connector shell shall be blue (Pantone #661C) to comply with Microsoft WHQL requirements. The WHQL monitor symbol shall be molded into the top of the over-mold. The captive screw locks will be adequate for hand tightening. Screwdriver slots are not preferred, but are acceptable if the thumbscrew surface is not smooth.

The signals shall be as in Table 4. Reference pin numbers are shown in the connector pictorial diagram of Figure 1.



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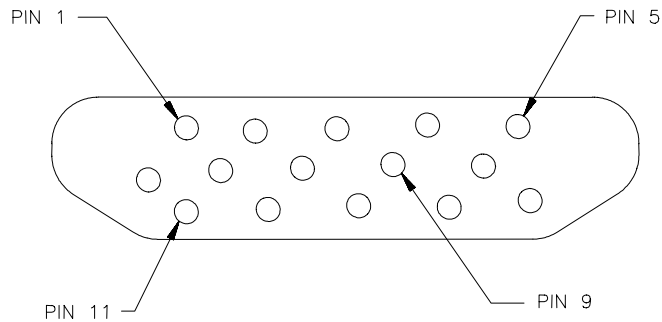
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TABLE 4
SIGNAL PINOUT (MONITOR END)

PIN	MNEMONIC	SIGNAL	WIRE TYPE (REF. ONLY)
1	RV	Red Video	Coaxial Center
2	GV	Green Video	Coaxial Center
3	BV	Blue Video	Coaxial Center
4	NC	NC	None
5	GND	GND	Ground (DDC Return)
6	RG	Red GND	Coaxial Shield Return
7	GG	Green GND	Coaxial Shield Return
8	BG	Blue GND	Coaxial Shield Return
9	+5V	+5V from PC	Single Conductor
10	SG	Sync GND	Single Conductor
11	NC	NC	None
12	SDA	DDC DATA	Single Conductor
13	HS	Horizontal Sync	Single Conductor
14	VS	Vertical Sync	Single Conductor
15	SCL	DDC CLOCK	Single Conductor

FIGURE 1
CPU CONNECTOR



4.1.2 Signal Cable

The signal cable shall be shielded, 1.5 ± 0.05 meters long, have a non-glossy Black color jacket, and shall have strain relief to withstand a minimum of 35 pounds pull. The signal cable shall be terminated (attached) internal to the monitor assembly. The area of attachment shall be the center of the interface area on the back of the monitor. The CPU end signal description is given in Table 4.



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4.1.3 Power Connector

All units shall have an IEC/CEE C-13/C-14 (Standard) type male power receptacle for the main AC input placed on the left side of the interface area on the back of the bucket.

4.1.4 Power Cable

The power cord must be unshielded and 1.8 ± 0.05 meters long. The monitor end of this cable must mate properly with the IEC/CEE C-13/C-14 (Standard) connector described in the preceding paragraph. The applicable country kit will determine the wall plug. The AC power cable supplier must be one of the HP approved suppliers of Longwell, I-Sheng, and Volex.

4.2 INPUT SIGNALS

4.2.1 Video Cable

For correlation purposes, RGB and separate TTL syncs will be used for all measurements described in this document. In addition, the video cable used must be the high density 15-pin subminiature D shell with pin assignments as shown in Section 4.1.1 which is shipped with the monitor.

4.2.2 Video Signal Amplitudes

The three video inputs consist of Red, Green, and Blue signals, each with its own coaxial cable terminated at the monitor. These video signals are analog levels, where zero V corresponds to black, and 700 mV is the nominal signal amplitude for the respective color, when a nominal 75.0 ohms terminate each signal. The monitor must meet the VESA VSIS specifications which state the video voltages shall be 700 mV +10%/-5% with $\pm 12\%$ for the overshoot. For a given monitor, Section 7.6 luminance levels are determined using this defined video amplitude driving a monitor meeting the termination requirements of Section 4.2.3. The signal amplitude is **not** to be readjusted to compensate for variations in termination impedance.

4.2.3 Video Signal Termination Impedance

The analog video signals shall be terminated by $75 \Omega \pm 1\%$, which shall be resistive with a negligible reactive component over the frequency range defined in Section 4.3.5. This is required for both signal-input methods.

4.2.4 Synchronization (Sync) Signals

Both of the following signals are separately provided to the monitor according to the pin assignments of Table 4.

4.2.4.1 Horizontal Sync (HS)

This is the signal is used to synchronize the horizontal scan of the monitor. HS may be either active high or active low, depending on the format being displayed.

4.2.4.2 Vertical Sync (VS)

This is the signal is used to synchronize the vertical scan of the monitor. VS may be either active high or active low, depending on the format being displayed.



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4.2.5 Sync Signal Amplitudes

The monitor must accept sync signals from 3.3 and 5-volt TTL logic families. The inputs shall sense a logic 0 when the input is 0.8 volt or less and shall sense a logic 1 when the input is 2.0 volts or greater. In addition to these level requirements, there shall also be a minimum of 0.3-volt hysteresis provided for noise immunity (typically by using a Schmidt Trigger input). That is, the input level at which the monitor actually detects logic 0 shall be at least 0.3 volt lower than the level at which it actually detects logic 1. If the monitor sync processing circuits are designed around the 3.3-volt logic family, then the sync inputs must be 5 volt tolerant.

4.2.6 Sync Signal Loading

The sync signal input loading shall be equivalent to one TTL gate input. When a logic 0 is asserted by a sync input, the maximum current source from any single monitor sync input to the driver is 1.6 mA. When a logic 1 is asserted, the maximum current sourced from the driver to either sync input is 400 μ A.

4.2.7 Abnormal Signal Immunity

The monitor shall not be damaged by improper sync timing, pulse duration, or absence of sync., or abnormal input signal amplitude (video and/or sync too large or too small), or any other anomalous behavior of a graphics card or video generator when changing modes, or when any combination of input signals is removed or replaced. Additionally, under these conditions, the monitor shall not cause damage to the driving source.

4.2.8 Signal Timing Definitions

The factory pre-set modes are listed in Table 6. A timing interval reference is provided in Appendix A, and has detailed signal timing for the VGA preset modes.

4.3 VIDEO PROCESSING

4.3.1 Gain Control

The external contrast control shall control the overall gain of all three amplifiers. All amplifiers shall remain stable and without any evidence of oscillations or overloading at any combination of brightness and contrast control settings.

4.3.2 Input Tracking

With Nominal Background Luminance. 0.06 Ft-L, and the video set to 0.700 V and luminance set to 30 Ft-L (100 nits) on the center square of the BRIGHTNESS pattern, record the CIE x and y coordinates. Then vary the input video amplitude over the range necessary to produce 10 to 30 Ft-L (34.3 to 100 nits). The x value shall not vary more than ± 0.015 and the y value shall not vary more than ± 0.015 .

4.3.3 Contrast Tracking

With Nominal Background Luminance, 0.06 Ft-L, and the video set to 0.700 V and luminance set to 30 Ft-L (100 nits) on the center square of the BRIGHTNESS pattern, record the CIE x and y coordinates. Then vary the contrast control over the range necessary to produce 10 to 30 Ft-L (34.3 to 100 nits). The CIE x value shall not vary more than ± 0.015 and the CIE y value shall not vary more than ± 0.015 .



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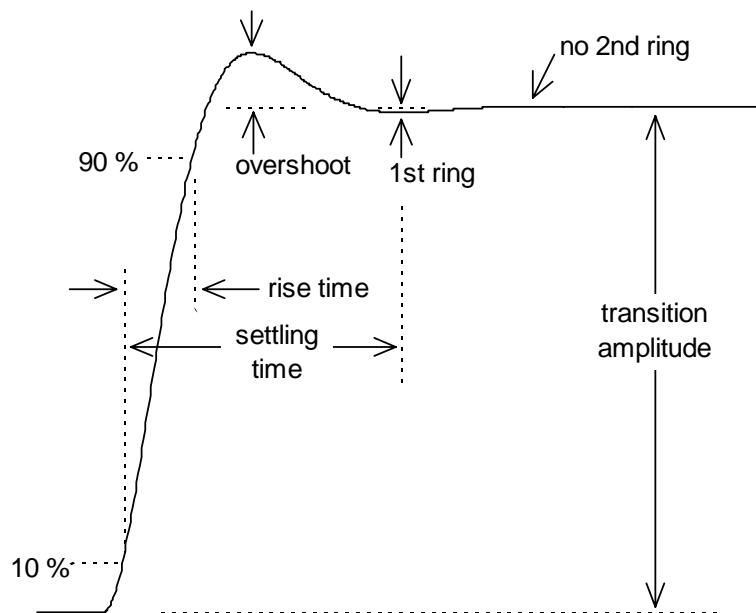
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4.3.4 Transient Response

With Nominal Background Luminance, 0.06 Ft-L, and the contrast control adjusted for a 30Vp-p cathode signal on the PULSE & BAR pattern, measure the nominal **rise** and **fall time** at the 10% to 90% level. The results shall be less than or equal to 10 ns for each amplifier. Propagation delay difference between each amplifier shall be not more than 1.0 ns. Measurements shall be made using a 10 M Ω , maximum 2.5 pF, 100x probe, or equivalent, and amplitude data are to be expressed as a percent of the **transition amplitude**. **Overshoot** shall be no more than 10%, the **first ring** shall not be visible and there shall be no visible second ring. **Settling time**, the time from the 10 % point until the transient stays within 1% of the final value shall be less than 14 nanoseconds. See Figure 2.

FIGURE 2
TRANSIENT RESPONSE



On the same PULSE & BAR pattern, there shall be no noticeable discoloration in the area of alternating white and black lines and the gray area to the right of the alternating pixels shall be of uniform luminance with no noticeable smearing or variation of gray level. Also, there shall be no ghost images of the single white and single black vertical lines to their immediate right hand sides. Critical evaluation for these requirements will occur on the 1024x768 85 Hz format.

4.3.5 Bandwidth

The amplitude response of each amplifier for sinusoidal inputs shall be flat within ± 3 dB from 10 Hz to 130 MHz and shall diminish, with increasing frequency, smoothly and slowly enough to avoid unwanted transient effects. Bandwidth shall be used for reference purposes only, as the transient response of the monitor from input to cathodes shall be the governing criterion.



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4.3.6 Pixel Clock

The monitor shall support a maximum pixel clock of 110 MHz.

4.3.7 Differential Bandwidth

The normalized gain of any two amplifiers relative to each other (Red/Blue, Red/Green, Blue/Green) shall be within ± 0.5 dB over the bandwidth of Section 4.3.5.

4.3.8 Low Frequency Response

There shall be no visible streaking, shading, or other distortion due to clamp drift or voltage sag of the video amplifier on a single scan line. Neither shall there be any noticeable vertical shading from cumulative effects on successive scan lines.

4.4 DEFLECTION PROCESSING

4.4.1 Horizontal Deflection

4.4.1.1 Frequency Range

The horizontal deflection will lock to frequencies in the range 30 KHz to 70 KHz. Once the frequency range is defined, the monitor firmware will not permit locking to frequencies outside this range. A frequency that is in-range is defined as one that is at either limit or between them.

4.4.1.2 Horizontal Retrace Time

The horizontal retrace time must be short enough to allow time for settling, ringing, and any non-linear behavior to disappear before video display begins.

4.4.1.3 Horizontal Oscillator/Synchronization

When the horizontal sync input is absent (some DC level), or continuously erratic, or stable but not in-range, the horizontal oscillator will free run at a frequency which is in-range (subject to Sleep Mode functionality described in Section 6.4). When a stable in-range frequency is applied, the oscillator will smoothly lock to it and maintain a stable display. When there is a change in horizontal frequency due to initial pull-in or from a mode change, the horizontal phase-locked loop will provide the quickest possible pull-in but with sufficient filtering to prevent excessive stress on the horizontal circuits and in particular, the horizontal output device.

4.4.1.4 Horizontal Centering

The monitor will have a means of adjusting the horizontal position of the video using the OSD. This offset shall not noticeably affect the horizontal linearity.



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4.4.2 Vertical Deflection

4.4.2.1 Frequency Range

The vertical deflection will sync from 50 Hz to 160 Hz and will provide full vertical display size over this range. An in-range frequency is defined as one that is at either limit or between them.

4.4.2.2 Vertical Retrace

The vertical retrace time must be short enough to allow time for settling, ringing, and any non-linear behavior to disappear before video display begins.

4.4.2.3 Vertical Oscillator and Sync Initiation

When the vertical sync input is absent (some DC level), or continuously erratic, or stable but not in-range, the vertical oscillator will free run at a frequency which is in-range. When a stable in-range sync frequency is applied, the oscillator will instantly lock to it when enabled by the firmware. When there is a change in vertical frequency due to a mode change, the firmware shall disable sync input to the vertical oscillator until it has stabilized.

4.4.2.4 Vertical Centering

The monitor will have a means of adjusting the vertical position of the raster using the OSD. The DC offset, when added, will not adversely affect the vertical linearity.

4.4.3 Image Rotation

In addition to the ability to center the image horizontally and vertically, there shall be a means of rotating the image to counteract the effects of the ambient magnetic field over the range given in Table 8. User control of this shall be through the on-screen display. Automatic correction of image rotation using internal field sensing is acceptable, however OSD control of the amount of correction is still required.

4.4.4 Video Interference

There shall be no direct video coupling into the horizontal and vertical deflection circuits that would cause video related transients in size or position. In addition, the power supplies shall be immune to video related loading.

5. USER INTERFACE

USER CONTROLS:

The following user controls and indicators are required. All buttons and switches shall have a smooth feel and shall not require excessive force to operate.



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5.1 POWER ON/OFF SWITCH AND LED.

The monitor shall have a power control switch visible and accessible on the front of the monitor. Its actuation force shall be low enough so the monitor will not move on its base. There shall be a LED located to the left of the power switch which lights green when the monitor is powered on with a stable and usable display. The color shall change to correspond to the power management states as given in Table 7. The LED shall not flash or blink at any time. The power switch shall be a primary type. This switch is not considered the "Mains Disconnection Device" for agency purposes. The power cord is the mains disconnection device. The switch shall be marked with icon per EN 60417, #5010. The monitor shall leave the factory with the power switch set to off.

5.2 ON-SCREEN DISPLAY

The OSD shall be an easy to use icon based menu system with 4 front panel OSD buttons (Menu , Minus ("-"), Plus ("+"), and Select). The monitor shall leave the factory with all OSD controls set to their default values.

5.2.1 OSD Bezel Buttons

The icons of the four front panel OSD buttons shall be (from Left to Right) Menu, Minus ("-"), Plus ("+") and Select. Refer to the Bezel-Button artwork drawing for more information.

5.2.2 OSD Menus


The Main OSD shall be displayed as shown in Figure 3.

**FIGURE 3
OSD MAIN MENU**



The following are the requirements for the 17" Main OSD:

1. The Main Menu shall support the controls (in order, starting at the top and moving clock-wise): Contrast, Brightness, H-Position, H-Size, V-Position, V-Size, Pincushion, Trapezoid, Pin-Balance, Parallelogram, Rotation, Moiré, Degauss, Color Temp, and Factory Recall,
2. The menu control icons shall be evenly spaced, White in color, and the background shall be Blue. When a control is selected, the icon shall turn the color Red.

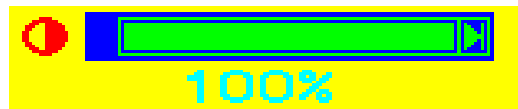
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3. The resolution and the H and V sync rates shall be displayed in the center of the main menu in green lettering (note the color of the lettering in the example is not correct). For this information the recommendation is for “x”, “z,” and “k” to be lowercase, and “H” and “V” to be uppercase.
4. The recommended size of the Main menu shall be w:80 x H:80 ± 2mm (each side) for all modes.

All controls except Degauss and Factory Recall shall have a sub-menu to allow the user to adjust the control. The OSD sub-menu shall be displayed as shown in Figure 4. The following are the requirements for the sub-menu:

1. The menu background shall be Yellow.
2. The control icon shall be Red.
3. The adjustment-bar shall be Green.
4. The control value shall be Green (note the color of the lettering in the example is not correct) and displayed as a percentage (with a “%” sign).
5. The adjustment-bar-background shall be Blue.
6. The minimum value (0%) shall be on the Left and the maximum value (100%) shall be on the Right.
7. The recommended size of the submenu shall be W:80 x H:20 ± 2mm (each side) for all modes.

**FIGURE 4
OSD SUB-MENU**



5.2.3 OSD Menu Operation

The operation of the OSD menus shall be as follows:

1. All OSD menus shall be displayed in the center of the screen.
2. The resolution and the H and V sync rates shall be displayed in the center of the main menu in Green lettering. If the selected mode is a User Mode, then the words “USER MODE” shall be displayed in Green lettering above the resolution.
3. When the Degauss and Factory Recall controls are selected, a submenu will NOT be displayed, the main menu will continue to be displayed, and the word “DONE” will be displayed with White lettering under the V sync after the operation of the control has completed.
4. The default Contrast setting shall be set to 100%, the Brightness setting shall be set for raster extinction ($L = 0.01 \text{ Ft-L}$), and the Color Temperature shall be 9300.
5. When the factory default value is selected for all controls, the background of the submenu adjustment-bar shall be changed from blue to dark-pink. If the user is adjusting the control by holding down the Minus (“-”) or Plus (“+”) buttons, the sub-menu shall pause for 0.5 second on the default value. Note this functionality is not supported for Users Modes because there are no factory default values.



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6. If a user selects the Factory Recall control, then all settings of the current mode will be changed to the factory default values. The user settings for other modes will not be changed. If the current mode is a User Mode (not a Preset Mode), then there will be no geometry changes. Note that the Factory Recall control shall set Contrast, Brightness, and Color Temperature to the factory default values. Since the Brightness, Contrast, and Color Temperature values are not individually stored for each Preset and User mode, the Brightness, Contrast, and Color Temperature settings will be changed for all modes.
7. The left arrow should be shown at 0% and right arrow at 100% (as shown in the submenu above).
8. The Minus ("-") button shall move the selection counter-clockwise in main OSD menu and the Plus ("+") button shall move clockwise.
9. When a control is selected, the icon shall turn Red.
10. Pressing "select" will choose an item in the main menu. When in a submenu, pressing Menu will save the value and return to the main menu.
11. Pressing the "menu" or "select" will open OSD Main Menu when the OSD is not displayed.
12. If the user goes to a submenu and changes a setting, but does not exit the sub-menu and the OSD times out, then the new setting value shall automatically be saved.
13. When exiting from a sub-menu back to the main menu, the selected icon shall be for same menu. In other words, if you exit from the Brightness submenu, then the selected icon when returning to the main menu shall be Brightness.
14. When the OSD is NOT being displayed and the user presses the Minus ("-") button, the Contrast sub-menu shall be displayed so the control can be adjusted with the Plus ("+") and Minus ("-") buttons. When the OSD is not being displayed and the user presses the Plus ("+") button, the Brightness sub-menu shall be displayed so the control can be adjusted with the Plus ("+") and Minus ("-") buttons. When the user exits the Brightness or Contrast sub-menu in this situation, the user shall NOT be returned to the main OSD menu.
15. The Color Temperature sub-menu shall be rectangular, have a blue background, and shall display the four Color Temperature options of 9300, 6500, 5500, and User with white lettering horizontally (9300 on the Left, 6500 and 5500 in the middle, and User on the Right) so the color temperature of the monitor may be selected. When a Color Temperature is selected, the background shall turn yellow and the lettering shall turn black. The default Color Temperature shall be 9300 K. The Color Temperature Menu shall be displayed as shown below in Figure 5. The recommended size of the submenu is W:100 x H:40 for all modes.

**FIGURE 5
COLOR TEMPERATURE MENU**



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When the User option of this menu is selected, the User control submenu shall be displayed as shown in the figure below so the Red, Green, and Blue gain controls may be individually adjusted. When an option (R, G, and B) is selected using the Plus and Minus buttons, it shall turn from Green to Red as shown in the figure below. Note for R, G, and B this includes the adjustment value. When the selected R, G, or B options are opened by pressing the Select button, the adjustment bar shall turn from Green to Red. When an item is opened, the Plus and Minus buttons can be used to adjust the value. Pressing the Select button again shall save the value and the bar shall turn from Red to Green. When entering the menu, R shall be selected as shown in the figure below. When the Menu button selected and activated, the user will be returned to the Main Menu. The recommended size of the submenu is W:80 x H:40 for all modes.

FIGURE 6
USER COLOR TEMPERATURE SUB-MENU



- 16. When going to a submenu, the main menu shall disappear.
- 17. The “select” button may serve as an exit function when in an adjustment bar (returns to previous menu)
- 18. The OSD shall time out in 20 seconds if there is no further user input.
- 19. The OSD shall remain visible when Brightness and Contrast are set to the minimum values.
- 20. The Moiré sub-menu shall be rectangular, have a blue background, and shall display the options of Video Moiré and Scanline Moiré (from left to right) with white lettering. When either Video Moiré or Scanline Moiré is selected, the control submenu shall appear. When Menu button is selected, the users shall be returned to the Main Menu. The Moiré Menu shall be displayed as shown below in Figure 7. The recommended size of the submenu shall be W:100 x H:40 ± 2 mm (each side) for all modes.

FIGURE 7
VIDEO AND SCANLINE MOIRE SUB-MENU

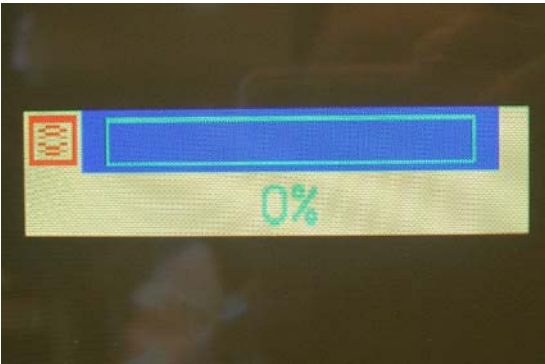
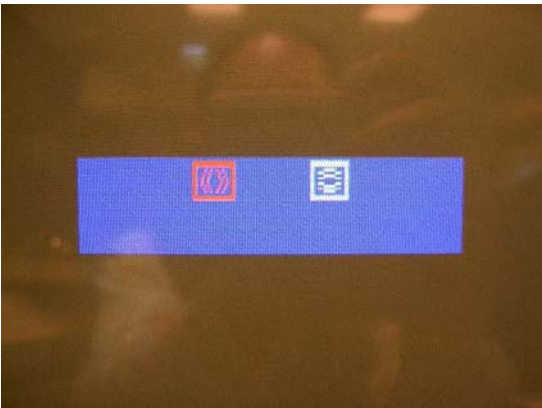


















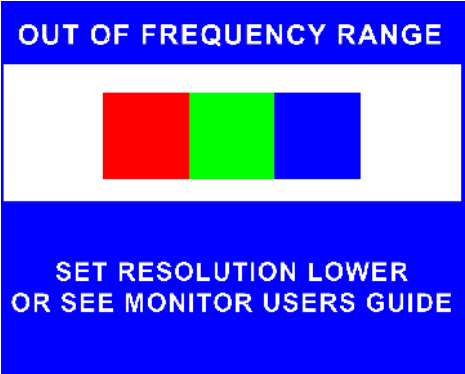
TABLE 5
OSD CONTROL

OSD Control Operation		
On-Screen Display		Function
	Contrast	The Plus ("+") button Increases and the Minus ("-") button Decreases the Contrast.
	Brightness	The Plus ("+") button Increases and the Minus ("-") button Decreases the Brightness.
	Horizontal Position	The Plus ("+") button moves the image to the Right and the Minus ("-") button moves the image to the Left.
	Horizontal Size	The Plus ("+") button increases the Horizontal image size and the Minus ("-") button decreases the size.
	Vertical Position	The Plus ("+") button moves the image up and the Minus ("-") button moves the image down.
	Vertical Size	The Plus ("+") button increases the Vertical image size and the Minus ("-") button decreases the size.
	Pincushion	The Plus ("+") button makes the image sides convex and the Minus ("-") button makes the sides concave.
	Trapezoid	The Plus ("+") button adjusts the image so the top is larger and the Minus ("-") button adjusts the image so the bottom larger.
	Zoom adjustment	The Plus ("+") button moves the v-size and h-size of the image to the expanded and the Minus ("-") button moves the v-size and h-size of the image to the small
	Tilt (Rotation)	The Plus ("+") button tilts the sides of the image to the Right and the Minus ("-") button tilts the sides Left.
	Degauss	This control Demagnetizes screen to reduce color impurities
	Color Temp	This control allows the selection of the 6500, and 9300 color temperatures.
	Reset	This control resets monitor to factory default values.
	Video moiré	Reduce the dark wavy line Moiré pattern on the screen. Press the ◀ or ▶ button to minimize the horizontal moiré image on the screen.
	DISP. FREQ (Input frequency display)	This displays the input synchronization signal frequency. It identifies the horizontal and vertical frequency sent to the monitor from the video card currently in use.
	Scanline moiré	Reduce the dark wavy line Moiré pattern on the screen. Press the ◀ or ▶ button to minimize the vertical moiré image on the screen.

5.2.3.1 Out of Frequency Range OSD Message


If either or both of the applied sync signals exceed the operating frequency range of the monitor, a screen indicating “FREQ. OUT OF RANGE” shall be displayed for 15 seconds. If time is required for the monitor to warm up before the image can be seen, that time is included in the specified 15 seconds. The bezel LED shall be Green while the OSD message is displayed. After the OSD is displayed, the monitor shall go into the power-saving mode and the LED shall be Amber. The Out of Range OSD message shall be displayed as shown in Figure 8.

FIGURE 8
OUT OF RANGE OSD MESSAGE

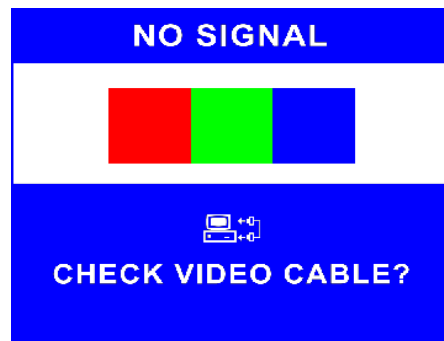


5.2.3.2 No Signal OSD Message

If the monitor detects that the VGA cable is not connected to the host PC, a screen indicating “NO SIGNAL – CHECK VIDEO CABLE?” shall be displayed for 20 seconds. The monitor shall use a ground pin to sense if the video cable is connected to the PC. It is recommended that a pull-up resistor on Pin 5 be used to detect if the video cable is connected to the PC. If time is required for the monitor to warm up before the image can be seen, that time is included in the specified 20 seconds. The message shall reappear for an additional 20 seconds if any of the OSD buttons is pressed. The bezel LED shall be Green while the OSD message is displayed. After the OSD is displayed, the monitor shall go into the Sleep mode and the LED shall be Amber. The No Signal OSD message shall be displayed as shown in Figure 9.

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**FIGURE 9
NO SIGNAL OSD MESSAGE**



5.3 FACTORY RESET FUNCTION

When the user selects “Factory Reset” from the OSD menu, the factory preset values will replace previously saved user geometry settings for picture adjustments, but just for the mode in operation at the time. If other preset modes have saved user geometry preferences, none of these will be affected by restoring the factory presets of the present mode. The Brightness, Contrast, and Color Temperature settings are also reset to their factory values for all modes.

5.4 OSD CONTROL RANGES

On formats not included in the presets/pre-loads, the horizontal and vertical position functions shall provide sufficient range to center the display image. For any magnetic environment in the range defined in the Magnetic Environment section of this specification. The OSD control ranges for the horizontal position, vertical position and image rotation shall be sufficient to center and minimize the rotation of any image which is viewable on the monitor.

6. SYSTEM INTERFACE

6.1 DISPLAY FORMATS AND TIMING CAPABILITY


The monitor shall synchronize with any horizontal frequency between 30 KHz and 70 KHz, and with any vertical frequency between 50 Hz and 160 Hz, interlaced or non-interlaced.

6.1.1 Format and Timing

The operating format information is described in the following sections. The active video is to be used for the reference for all image performance specifications unless otherwise stated. Please refer to the interval definitions in Appendix A.

6.1.2 Factory Preset Display Modes

The factory preset frequency modes listed in Table 6. These have factory-preset alignments for image size, position and geometry.

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**TABLE 6
FACTORY PRESET DISPLAY MODES**

MODE NO.	PIXEL FORMAT	HORIZONTAL SYNC RATE (kHz)	VERTICAL SYNC RATE (Hz)	VIDEO CLOCK (MHz)	NOTES
1	640 x 480	31.50	59.940	25.00	Appendix A
2	640 x 480	37.50	75.00	31.50	VESA
3	640 x 480	43.30	85.00	36.00	VESA
4	720 x 400	31.50	70.00	28.00	Appendix A
5	800 x 600	46.90	75.00	49.50	VESA
6	800 x 600	53.70	85.00	56.30	VESA
7	1024 x 768	60.00	75.00	78.75	VESA
8	1024 x 768	68.70	85.00	94.50	VESA
9	1280x1024	64.00	60.00	108.00	VESA

6.1.3 Pull-In Mode Recognition

The monitor shall recognize preset modes within a range of $\pm 1\%$ or ± 500 Hz whichever is less for horizontal; and within $\pm 1\%$ for vertical.

6.1.4 User Display Modes

In addition to the factory presets, provision shall be made to store up to 8 user modes. If the current mode is a user format, the monitor shall select its previously stored settings. If the user alters a setting, the new setting will be stored for the same user mode. These formats are not affected by the Factory Presets OSD selection. If an input signal is not recognized as a factory preset or a previously saved user mode, it shall be considered a new user mode, storage of the new format is automatically performed during user adjustment of the display. If the user attempts to save settings for more than the supported modes, the additional modes will overwrite the first user modes that were saved (FIFO).

6.2 DDC AND EDID

The monitor shall provide a display communications channel (DDC) that conforms to VESA Enhanced-DDC and WHQL hardware requirements. DDC-1 support is prohibited and the monitor shall only respond to the I2C address of "A0." In addition, the monitor shall support both 3.3V and 5.0V DDC signaling. The monitor shall support a minimum DDC clock speed of 100 kHz. The monitor may support DDC wait-state or clock-stretching by holding the DDC clock line low, but the maximum length of the wait-state is 500 ms. The monitor must accept +5 V DC through pin 9 of the VGA connector. This is to be used to power the monitor's DDC and EDID electronics, assuring that the EDID may be read by the host regardless of the monitor's power condition. The monitor shall consume less than 50 mA through pin 9. The monitor must only receive power through the pin 9 connection, and shall not feed any current into the attached computer if the monitor is on and the computer is off. The monitor shall contain the 128 byte EDID file as specified by the VESA Enhanced-EDID and WHQL specifications. The monitor shall be designed so that there is some means to rewrite the complete DDC file content without setting internal jumper. A special jig can be used to write the file.



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In order to insure the monitor will not back-power the PC when the monitor is On and the PC is Off, the monitor must meet the following requirements. All tests are to be performed with the AC power connected and the monitor powered On and Off.

1. When a 200 ohm resistor from Pin-9 to GND, the voltage across the register shall be less than 0.15V. Repeat the test for pins 1, 2, 3, 13, and 14.
2. When a 200 ohm resistor from the DDC pins (Pin-12 and Pin-15) to GND, the voltage across the resistor shall be less than 0.2 V.
3. When 5 V is applied to Pin-9, repeat the tests on pins 12 and 15. The voltage across the 200 ohm resistor shall be greater than 0.3 V.

The EDID contents shall be formatted as follows:

1. EDID Version 1.3
2. The EDID number for the monitor shall be 2632 for MV7540 and 2634 for v75.
3. Only the monitor's supported preset timings shall be listed in the Established and Standard Timing
4. The Preferred Timing Mode Bit shall be set and the maximum resolution 85 Hz mode timings placed in the First Detailed Timing Block. The Preferred Timing mode for the monitor is 1024x768-85Hz.
5. The monitor Name "Compaq 7540" for MV7540 and "HP v75" for v75 shall be in the Third Detailed Timing block.
6. The monitor Serial Number shall be stored in the Forth Detailed Timing block according to the HP Document 221676.
7. The monitor Supported Timing Range shall be listed in the Second Detailed Timing block. See below for the timing range of the monitor.

- H = 30 – 70 KHz
- V = 50 – 160 Hz
- Max Pixel Clock = 110 MHz

The detailed EDID contents are listed in Appendix C.

Accessibility Requirements

The monitor shall not use flashing or blinking text, objects, or other elements having a flash or blink frequency greater than 2 Hz and lower than 55 Hz in accordance with Section 508 of the US Federal Government Rehabilitation Act Amendments of 1998. In addition, the force required to operate the push buttons shall be less than 5 lbs.



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6.3 MAINS INPUT

6.3.1 Input Voltage Range

The operating range of the Monitor shall be from 90 to 265 VAC, sinusoidal.

6.3.2 Input Frequency Range

Input power frequency range shall be 50 ± 3 Hz and 60 ± 3 Hz over the specified input voltage range.

6.3.3 Line Fuse

The AC input shall be fused and become electrically open as a result of an excessive current level. The fuse is not user replaceable.

6.4 POWER MANAGEMENT

6.4.1 Low Power Definition

The monitor will support a single low-power mode. If the H-Sync, V-Sync, or both are removed, the monitor will go into a single low-power mode.

6.4.2 Low Power Override

A method to override power management is required for testing and service. This power management override will be used to keep the monitor electronics fully active when the video cable is not connected to the PC. The method of activating the power management override shall be to hold the OSD Menu button down while pressing the Power button. The power management override should only work when the video cable is disconnected from the PC. If the optional service OSD is supported, it shall be available in this mode to make available all monitor controls. Note there are no format requirements for this service mode OSD.

6.5 POWER CONSUMPTION

The maximum power consumption in each of the power states is given in Table 7 and shall apply over the entire combination of input voltage and frequency ranges. The state of the power switch off is not a low-power state, but is given to indicate that the monitor may optionally consume minimal power when the front panel power switch is off.

TABLE 7
POWER STATE MAXIMUMS

	Full Power	Active Off	Switch Off
Maximum Power (W)	75	3	1
Power Switch LED Color	Green	Amber	LED Off



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6.6 POWER SUPPLY PERFORMANCE

There shall be no visible interference between the internal power supply and the deflection or video circuits. This applies at all legitimate horizontal or vertical scan rates, whether caused by magnetic or capacitive effects, or ripple of any kind on the supply voltages.

6.6.1 Initial Cold Start

The power supply shall start and function properly when under full load, with worst case conditions of input voltage, input frequency, operating temperature, and a cold CRT filament.

6.6.2 Inrush Current

The inrush current must be limited to 30 A when operated at 120 VAC, and 50 A when operated at 220 VAC. Inrush current is measured at an ambient temperature of 25°C, with the test unit temperature stabilized in the power-off condition until at ambient temperature.

6.6.3 Hot Start Recycle

The power supply shall not be damaged when switched "OFF" for one second and "ON" for one second for seven consecutive times after operating for one hour at full load, 25°C, and nominal input line voltage.

6.6.4 Under Voltage

The power supply shall contain protection circuitry such that the application of an input voltage below the minimum specified in Section 6.3.1 shall not cause damage to the power supply unit nor cause failure of the input fuse.

6.6.5 Line Transients and Harmonics

The monitor power supply shall operate and comply with "CE" mark regulations.

6.6.6 Leakage Current

The maximum leakage current shall not exceed 3.5 mA for line input voltage of 265 VAC.

6.7 AUTOMATIC DEGAUSS

Degaussing shall occur automatically when the monitor is turned on with the power switch, but shall **not** occur as the monitor recovers from a power management Active Off mode.

6.7.1 Degaussing Strength

Degaussing shall be sufficient to re-magnetize the monitor to any possible change in the Earth's magnetic field within the limits given in the Magnetic Field Table resulting from shipment or movement of the monitor. Degaussing shall also be effective over the entire range of mains voltages specified in Section 6.3.1. For field changes outside these limits, external degaussing is recommended.



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6.7.2 Recovery Time

After a degauss cycle, the recovery time shall be no more than 20 minutes for the degaussing to have the same strength as when the monitor is cold.

6.7.3 External Influence

The degauss field shall not radiate outside the enclosure at a strength that is likely to alter or remove data on a floppy disk that may be inadvertently placed on or near the monitor.

6.8 **MANUAL DEGAUSS**

The manual degauss function of the OSD shall activate the same degaussing circuit described in Section 6.7. The recovery time after a manual degauss cycle shall be the same as for automatic degaussing.

7. **IMAGE PERFORMANCE**

All image performance specifications will be met after the warm-up period specified in Section 3.1.3, and will be met in each of the display modes. All image performance specifications are applicable over specified input power conditions, specified environmental operating conditions, and after being subjected to the specified non-operating environmental conditions.

7.1 **STABILIZATION TIME**

With the monitor having been previously operating for 30 minutes at Nominal Background Luminance, 0.06 Ft-L, and the contrast control set for 30 ± 0.5 Ft-L (102.7 nits) on the center square of the BRIGHTNESS pattern, it is switched off and allowed to cool to room temperature. The monitor is then switched on. The display image shall be visible after no more than 15 seconds after power is switched on, in diffuse ambient lighting of 46 ± 4 foot candles, visually observed at a distance of 61 cm [24 inches]. Under these conditions, the display image shall be visually recognized as stable within 30 seconds after power-on.

7.2 **MODE CHANGES**

Upon changing modes, the display image must be stable within two seconds and meet all image performance specifications within three seconds of the instant when H and V sync signals have stabilized. There shall be no disturbing sounds or unsynchronized video during a change of mode.

7.3 **HIGH VOLTAGE POWER SUPPLY (HVPS)**

The following criteria shall be met by the High Voltage (anode) Power Supply (HVPS) regardless of its design.

7.3.1 Interference With Deflection or Video

There shall be no visible interference between the HVPS and the display at any of the horizontal scan rates the monitor is capable of synchronizing to, whether caused by magnetic or capacitive effects or ripple of any kind on the supply voltages.



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7.3.2 Beam Current Limit

The HVPS shall contain a means of limiting the average beam current provided to the CRT to preclude excessive cathode loading, excessive power dissipation in the shadow mask or aperture grill, and long term marking of the phosphors.

7.3.3 Power-Off CRT Protection

The HVPS shall not continue to supply energy once the power is turned off. This may require a bleeding resistor or a blanking type of circuit. No images of any type are allowed for more than 300 ms after turning off the monitor.

7.4 AFTERGLOW

When the monitor is turned off, there shall be no afterglow or bright spots on the face of the CRT after one second. This supplements the requirements of Section 7.3.3. This does not cover the phosphorescent decay of the entire screen.

7.5 MAGNETIC ENVIRONMENT

All performance parameters beginning with Section 7.6 are to be measured in the magnetic field specified in Table 8. In addition, the monitor shall not display purity, white field uniformity, convergence, or geometric errors exceeding specified limits when operating in magnetic fields within the ranges in Table 8. Shielding may be used as required to reduce the affects of the earth's magnetic field on the CRT raster, and degaussing may be required to meet this requirement.

TABLE 8
MAGNETIC FIELD RANGE

ASSEMBLY DASH NO.	HORIZONTAL FIELD	HORIZONTAL DIRECTION	VERTICAL FIELD	VERTICAL DIRECTION
-x01 -x02 -x03 -x10 -x11 -x12	NH: 0 to 100 mG	Any	200 to 660 mG	Top to Bottom
-x07 -x08 -x09	EQ: 0 to 100 mG	Any	- 200 to 260 mG	Top to Bottom
-x04 -x05 -x06	SH: 0 to 100 mG	Any	- 200 to - 660 mG	Bottom to Top
India	0 to 100 mG	Any	0 to 300 mG	Top to Bottom



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7.6 LUMINANCE

7.6.1 Definition

The following methodology and definition of luminance shall be applicable throughout this specification unless otherwise noted.

Luminance measurements shall be made using a circular aperture with coverage diameter of 25.4 ± 12.7 mm [$1 \pm .5$ inch]. The contrast control shall be set to its center position unless specified otherwise.

7.6.2 Measurement

With the monitor as in a display mode, the luminance shall be measured at the five rectangular areas using a flat, white field with a Quantum Data color temp or similar pattern. The five rectangular areas are defined as:

L0Center of the screen
L1Upper left of the screen
L2Upper right of the screen
L3Lower right of the screen
L4Lower left of the screen

7.6.3 Luminance Requirements

Video Pattern	Brightness Control	Contrast Control	Spec Value
Raster Pattern	Max (100)	Minimum (0)	L0 shall be 0.2 to 1.2 FtL. (0.68 to 4.1 nits)
Raster Pattern	Factory Default	Maximum (100)	L0 shall be 0.06 ± 0.02 FtL. (0.14 to 0.27 nits)
Brightness (5 box)	Minimum (0)	Minimum (0)	Extinguished: < 0.06 FtL
All White	Set for .06 FtL	Maximum (100)	L0 shall be greater than: 30 Ft-L (103 nits)
Brightness (5 box)	Set for .06 FtL	Maximum (100)	L0 shall be greater than: 45 Ft-L (153 nits)
Brightness (5 box)	Maximum (100)	Maximum (100)	L0 should be less than 70 FtL. (240 nits)

Luminance Uniformity

With the brightness control set for a background raster level of 0.06 Ft-L (0.2 nits) and the contrast control set for L0 = $24 \pm .5$ Ft-L (82 nits) L1, L2, L3, and L4 shall be greater than or equal to 75% of L0.

7.7 CHROMATICITY, PURITY AND WHITE POINT

7.7.1 Conditions

For this monitor, the white point shall be measured when all three channels (R, G, B) are driven and controlled identically at the video cable inputs. CIE (1931) chromaticity units will be used.



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7.7.2 Measurement

Adjust the brightness control for Nominal Background Luminance on a RASTER pattern and then change to a FULL WHITE FIELD. Adjust the contrast control for $L_0 = 30 \pm 0.5$ Ft-L (102.7 nits) and observe the following. First, in each of the primary colors and then in White, visually observe the display from a distance of 61 ± 10 cm [24 ± 4 inches] for no longer than three seconds, with an ambient illumination of approximately 46 ± 4 foot candles (500 lux). The screen must appear uniform in color for each of the primary colored rasters. For a full white field, if there is an area of observed impurity in color, the difference in color coordinates between that area and the center of the display area shall be less than $x = \pm .012$; $y = \pm .012$. In addition, the square root of the sum of the squares of the differences in x and y must be less than or equal to .015. The color coordinates of the center are specified in Table 9.

TABLE 9
FACTORY ALIGNED COLOR POINTS

REFERENCE DESCRIPTION	ACTUAL COLOR POINT	CIE X	CIE Y
5500°K	5500°K + 7 M.P.C.D.	$0.333 \pm .015$	$0.348 \pm .015$
6500°K	6500°K + 7 M.P.C.D.	$0.313 \pm .015$	$0.329 \pm .015$
9300°K	9300°K + 27 M.P.C.D.	$0.283 \pm .015$	$0.298 \pm .015$

7.8 IMAGE SIZE

In addition to the following requirements, there shall be no noticeable change in image size from the time the monitor is turned on until it is fully warmed up.

7.8.1 Definition

Image size is defined as the width and height of the display using the active area, not including the border if the mode supports one. However, if a border is supported, it must be visible without any distortion or wrap-around. All size measurements shall be taken along the surface of the CRT, or alternatively along the surface of a flat template which is mounted against the CRT face. If a template is used, it must have 4 equal length legs in the 4 corners that are placed against the CRT to position the template so its center is close to but does not touch the CRT. All data shall be taken with the eyes from a position along the centerline of the CRT and 20 inches from its closest point. The head and eyes of the observer shall be in this one position for all measurements.

7.8.2 Measurement

Using the FULL WHITE FIELD pattern, the width (designated W) and the height (designated H) are measured about the center of the screen. At nominal power supply input voltage, room temperature, and a luminance of 24 ± 5 Ft-L (85.7 nits). Table 10 gives the factory preset image size and tolerances for each of the preset modes.



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**TABLE 10
PRESET MODE IMAGE SIZES**

MODE	HORIZ SIZE	VERT SIZE
All Preset Modes	312 ±4 mm	234 ± 4 mm

7.8.3 Horizontal Size Regulation

See Appendix B for all test pattern definitions.

7.8.3.1 Steady State Regulation

In the middle of the raster, measure the steady state width change which occurs when changing from a white VIDEO pattern on a black background to a 30 Foot-Lambert (100 nits) FULL WHITE FIELD. The size change must be no more than 1.0 mm for each side.

7.8.3.2 Dynamic Regulation - 1 Hz

Image motion shall be defined as the displacement of the active display when changing from a VIDEO pattern to a FULL WHITE FIELD at a 1.0 hertz rate using the Quantum Data flashing regulation pattern. As the pattern flashes on and off, measure the change in position of the perimeter line along the center points on the top, bottom, left, and right hand edges. The maximum change in position at any of the measurement points must be less than 1.0 mm for Horizontal frequencies above 37.0 KHz and less than 1.4 mm for frequencies below 37.0 KHz.

7.8.3.3 Dynamic Regulation - Refresh Rate

Set the brightness for Nominal Background Luminance. Using the DYNAMIC REGULATION pattern (white on black), adjust the white level luminance to at least 30 Ft-L (100 nits). Measure the horizontal bending of the left and right vertical lines highlighted with arrows in the test pattern (Appendix B). Repeat for the black on white pattern in Appendix B. All results must be no more than 0.5 mm for Horizontal frequencies above 37.0 KHz and less than 0.8 mm for frequencies below 37.0 KHz. Check for maximum bending of the border region near the edges of the horizontal bars.

7.9 POSITIONAL ACCURACY

In addition to the following requirements, there shall be no noticeable drift of the position of the image from the time the monitor is turned on until it is fully warmed up.

7.9.1 Measurement Conditions

Positional accuracy includes display centering, linearity, rotation, geometric distortion and line distortion. All measurements are to be made in the preset modes of the monitor using only the factory alignments for those modes. No additional adjustments are permitted. It is recommended that the Factory Presets OSD selection be made to erase all preferences.

7.9.1.1 Horizontal Centering

Horizontal Centering is defined as the absolute value of ($H_L - H_R$), which must be not more than 4 mm [.197 in.].



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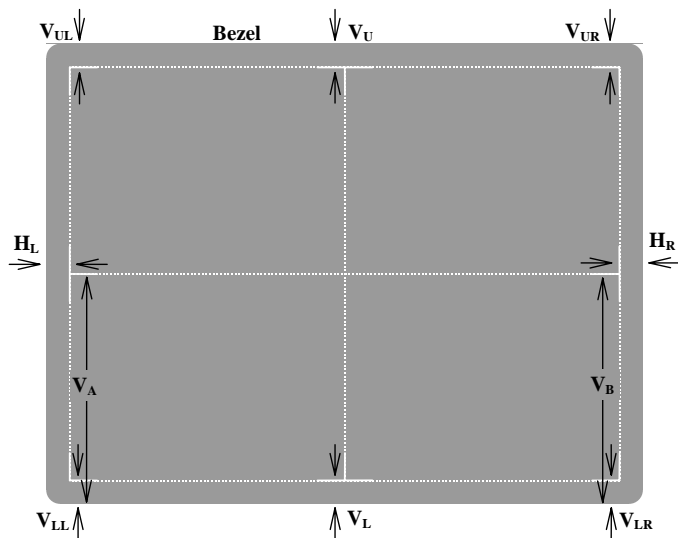
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7.9.1.2 Vertical Centering

Vertical Centering is defined as the absolute value of $(V_U - V_L)$, which must be not more than 4 mm [.197 in].

FIGURE 10
POSITIONAL DATA



7.9.2 Image Rotation

7.9.2.1 Definition

Rotation, or tilt, shall be defined as the inclination of the image on the screen with respect to the bezel.

7.9.2.2 Measurement


With the monitor in its typical vertical magnetic field and using the tilt pattern, measure the distance from the bottom edge of the bezel to the horizontal center line at the extreme left (V_A) and right edges (V_B).

7.9.2.3 Requirements

With the horizontal field component less than 1000 gamma, the absolute value of the difference between the left and right measurements ($V_A - V_B$) will be less than 1 mm. This requirement shall be met under the magnetic environments described in the Magnetic Environment section.

7.9.3 Line Straightness

Line straightness is measured using a cross-hatch pattern with solid borders along all of the horizontal and vertical edges of the display. For any line segment that is less than 50 mm in length, the maximum deviation from being perfectly straight must be less than 0.5 mm. For line segments longer than 50 mm in length, the maximum deviation from being perfectly straight must be less than 1.0% of that length.

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7.9.4 Geometric Distortion

In addition to the following requirements, there shall be no noticeable change in geometry from the time the monitor is turned on until it is fully warmed up. Display the VIDEO pattern and measure the six dimensions **H₁**, **H₂**, **V₁**, **V₂**, **D₁** and **D₂** shown in Figure 11.

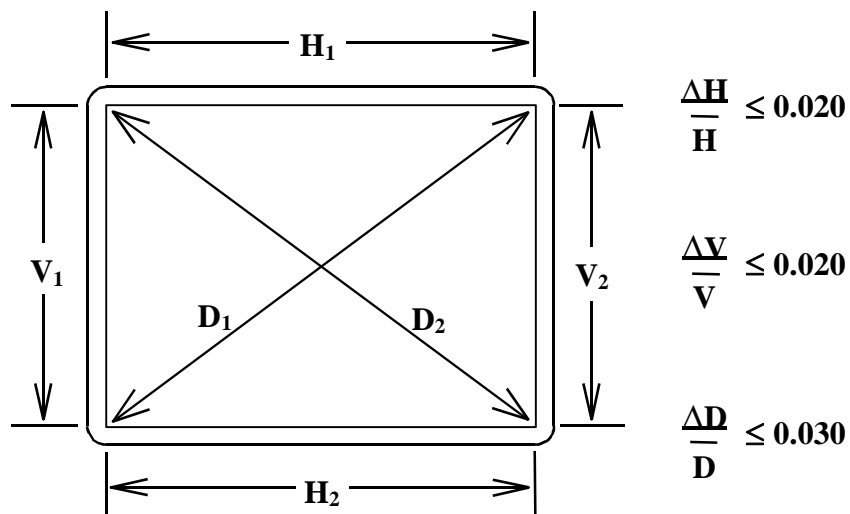
7.9.4.1 Parallelogram (Orthogonality) Distortion

Calculate ΔD , the difference between **D₁** and **D₂**, as well as the average \bar{D} . The ratio of these shall be not more than 0.030.

7.9.4.2 Keystone (Trapezoidal) Distortion

Calculate ΔH , the difference between **H₁** and **H₂**, as well as the average \bar{H} . The ratio of the difference to the average shall be not more than 0.02. Repeat for **V₁** and **V₂**, where the ratio shall be no more than 0.02.

**FIGURE 11
DISTORTION LIMITS**



7.9.5 Video Boundary Geometry

7.9.5.1 Definition

This measurement places additional limits on combined errors caused by rotation, distortion, and line straightness. The bezel is the reference as shown in Figure 12.



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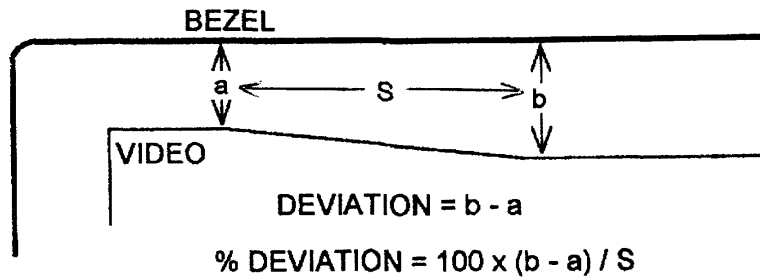
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7.9.5.2 Measurement

Measure the distance in a perpendicular direction from a point on the bezel to a point on the adjacent active video boundary. Measure a second distance in a similar way using any another point on the bezel and the same video boundary. The deviation is calculated by subtracting the smaller measurement from the larger measurement. The deviation for any line segment(s) less than 50 mm in length must be less than 0.50 mm. For line segments longer than 50 mm, the deviation must be less than 1% with a maximum deviation not greater than 1.7 mm.

**FIGURE 12
VIDEO BOUNDARY GEOMETRY**



7.9.6 Linearity

In addition to the following requirements, there shall be no noticeable change in linearity from the time the monitor is turned on until it is fully warmed up. The method of calculating overall non-linearity is:

$$2 \times [(\max - \min) / (\max + \min)]$$

Max and min are the largest and smallest separations of a grid pattern spaced at single character cell intervals. For horizontal linearity, use a grid of vertical lines spaced at the width of a single character. For vertical linearity, use a grill of horizontal lines spaced at single character cell height intervals. Table 11 gives the overall and cell-to-cell non-linearity limits both horizontally and vertically.

**TABLE 11
NON-LINEARITY LIMITS**

MODE	OVERALL	CELL TO CELL
All Presets	10 %	5 %

7.10 JITTER

Jitter is defined as image motion in terms of dynamic pixel displacement. There shall be no observable jitter when the screen is viewed from 50 cm. In addition, the measured jitter must be less than or equal to 0.15 mm RMS.



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7.11 FOCUS

7.11.1 Definition

Focus is defined as the sharpness of the displayed characters resulting from high contrast between the light and dark adjacent areas.

7.11.2 Measurement

Having adjusted the RASTER pattern for Nominal Background Luminance, adjust the contrast control to maximum. Now select an alternating "me" pattern that fills the screen with letters that are white on black. Observe the active video for clear, legible, and uniform letters. Switch to an alternating "me" pattern that fills the screen with letters that are black on white. Observe the active video for clear, legible, and uniform letters.

The observed areas must show clear, legible, and uniform letters using both "white-on-black" and "black-on-white" video presentation. All areas of the image should conform to this requirement including corners.

7.12 CONVERGENCE

7.12.1 Definition

Measurement of convergence error is made with a microscope or equipment with sufficient resolution to accurately measure, using the CROSSHATCH pattern. Horizontal misconvergence is the error between the different colors of a vertical white line, and vertical misconvergence is the error between the different colors of a horizontal white line.

7.12.2 Measurement

Measurement of convergence error is made with a microscope or equipment with sufficient resolution to accurately measure, using the dot and cross hatch "converge" pattern. The display shall be measured in three zones:

Zone A – a 234 mm diameter circle centered in the center of the screen.
Zone B – the rest of the active viewing area.

7.12.3 Requirements

MODE OF OPERATION	ZONE A	ZONE B
All Presets	0.25 mm	0.35 mm
VGA Modes (< 31.5 KHz)	0.30 mm	0.40 mm

7.13 VERTICAL TO HORIZONTAL LINE BRIGHTNESS RATIO

7.13.1 Definition

The ratio of the brightness of alternating vertical lines to alternating horizontal lines is a measure of the video frequency response.



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7.13.2 Measurement

Using the 1024x768 85 Hz mode, adjust the brightness control for Nominal Background Luminance on a RASTER pattern. Change to the BRIGHTNESS pattern and adjust the contrast control for a luminance of 25.0 Ft-L on the center square. Change to the VERTICAL RESOLUTION pattern and measure the luminance, L_V . Change to the HORIZONTAL RESOLUTION pattern and repeat the measurement to obtain L_H . The requirement is that

$$\frac{L_V}{L_H} \geq 0.50$$

7.14 **MOIRE**

7.14.1 Definition

Moiré is described as an irregular, wavy or ghost-like pattern rippling though the display image. By this we mean both scan line and video moiré. Roping of vertical lines is a form of scan line moiré. Moiré can have an adverse effect on the apparent sharpness of the displayed image.

7.14.2 Requirement

On a FULL WHITE FIELD as the luminance level is varied using the contrast control, there shall be no disturbing effects caused by moiré at ≥ 20 Ft-L.

8. **CATHODE RAY TUBE**

The CRT used shall have a dot pitch of diagonal 0.28 mm and be capable of good focus at a maximum resolution of 1280x1024 pixels, non-interlaced. A CRT sample will be submitted for approval, and if approval by HP is given, no further deviations in source, style, or type are permitted without an approved HP Engineering Memo or HP Engineering Change Notice to this document.

8.1 **SIZE**

The CRT has a 17-Inch diagonal with a 90 degree deflection angle.

8.2 **VIEWABLE DIAGONAL**

The viewable diagonal image area that can be achieved with the user controls shall be no smaller than 16.00" (406.40 mm) when projected onto a plane perpendicular to the axis of the CRT.

8.3 **PHOSPHORS**

The color phosphors shall be equivalent to a conventional P22 with rare earth red, sulfide green and blue, medium short persistence.

8.4 **PHOSPHOR TRIO PITCH**

The nominal RGB phosphor trio pitch shall be 0.28 mm.



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8.5 APPROVED CRT'S

Shows the CRTs approved for use in each of the monitor part numbers in Table 12.

**TABLE 12
CRT MANUFACTURERS**

DESCRIPTION	CRT MANUFACTURER	CRT P/N
NORTHERN HEMISPHERE	Samsung	M41QAR361X101 (A/S/SKD)
	CPT	M41AGE83X46- MPR-II
EQUATORIAL	SAMSUNG	M41QAR361X101 (A/S/0mG/SKD
	CPT	M41AGE83X46-MPR-II
SOUTHERN HEMISPHERE	SAMSUNG	M41QAR361X101 (A/S/-500mG/SKD)
	CPT	M41AGE83X46R-MPR-II

8.6 SCREEN AND FACEPLATE BLEMISHES

8.6.1 Test Procedure

Set up the tube and adjust the light output on a blanked raster at the center of the screen for approximately 15 Ft-L (51 nits) and 9300°K + 27 M.P.C.D. color temperature. The screen should be viewed at a minimum distance of 60 cm [2 feet]. Ambient light level at the tube face should be approximately 1.0 lux.

In the non-operating condition, the screen may be viewed under high-level, single-source incandescent light of 700 to 1,000 lux measured at the faceplate surface.

The size of a round blemish is equal to its diameter. The size of an irregularly shaped blemish is equal to its equivalent diameter, defined as the average of the major and minor axes.

8.6.2 Classification of Screen and Faceplate Blemishes

Blemishes are divided into phosphor screen blemishes and glass bulb blemishes.

8.6.3 Phosphor Screen Blemishes

Blemishes are classified as shown in Table 13 and judged with the standards specified in Tables 14, 15, and 16.



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**TABLE 13
PHOSPHOR SCREEN BLEMISHES**

DEGREE OF CONTRAST	CONTENTS OF BLEMISH	VALUATION OF BLEMISH
High Contrast	Black Spot More than 50% of phosphor dot missing.	The number of blemishes and quality area.
Medium Contrast	25 to 49% of phosphor dot missing.	The number of blemishes and quality area.
Low Contrast	Non-uniformity lighted part. Smudge and so on.	

Faceplate Blemishes - Faceplate blemishes are classified as scratches and bulb defects and judged with the standard specified in the following tables.

Quality Area – See Table 14.

**TABLE 14
QUALITY AREA**

TUBE SIZE	ZONES	
	A	B
	Rectangle area concentric with the center of screen	Remaining useful screen area.
38 cm [15 inches]	265 x 199 mm	Remaining useful area
TUBE SIZE	ZONES	
	A	B
	Rectangle Area Concentric With the Center of Screen	Remaining Useful Screen Area
43 cm [17-Inch]	312 x 234 mm ²	Remaining useful area.

TUBE SIZE	ZONES	
	A	B
	Rectangle area concentric with the center of screen	Remaining useful screen area.
19 inches [48 cm]	350 x 262 mm	Remaining useful area

Limits of Phosphor Screen Blemishes:



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High Contrast Blemishes - the following criteria is applied to high contrast blemishes.

**TABLE 15
HIGH CONTRAST BLEMISHES**

BLEMISH			ALLOWABLE NUMBER OF BLEMISHES			ALLOWABLE MINIMUM SEPARATION (mm)	
			ZONE A	ZONE B	TOTAL (ZONES A and B)	ZONE A	ZONE B
A	1 Trio		1	1	1		
B	(Note 1)		0	0	0		
C	(Note 2)		0	2	2		20 [.79]
	(Note 3)		1	2	2	20 [.79]	20 [.79]
		Green	3	3	5	50 [1.97]	20 [.79]
D	1 Dot	Red	3	3	5	50 [1.97]	20 [.79]
		Blue	3	3	5	50 [1.97]	20 [.79]
E	In Case of A + C					50 [1.97]	20 [.79]
F	In Case of A + C + D					50 [1.97]	20 [.79]
G	Total Number of Blemishes				7	---	---

NOTES:

1. Three or more consecutive same color phosphor dots.
2. Two consecutive same color phosphor dots.
3. Two consecutive different color phosphor dots.

Medium Contrast Blemishes - The following criteria is applied to medium contrast blemishes:

**TABLE 16
MEDIUM CONTRAST BLEMISHES**

BLEMISH	ALLOWABLE MAXIMUM NUMBER		ALLOWABLE MINIMUM SEPARATION (mm)	
	ZONE A	ZONE B	ZONE A	ZONE A +B
3 consecutive dots	1	2	50 [1.97]	30 [1.18]
2 consecutive dots	3	6	30 [1.18]	20 [.99]
1 dot	Ignore	Ignore		

NOTE:

Minimum separation is 20 mm [.79] among any high and medium contrast blemishes (excluding one dot medium contrast blemishes).



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Low Contrast Blemishes - The following criteria is applied to low contrast blemishes:

**TABLE 17
LOW CONTRAST BLEMISHES**

BLEMISHES IN ZONE A	Equivalent Diameter of the Total Area of Low Contrast Blemishes Should Be Less Than 13 mm [.51].
Extended Blemishes in Both Zones A and B.	Equivalent diameter of the total area of low contrast blemishes should be less than 50 mm [1.97].

8.7 LIMITS OF FACEPLATE BLEMISHES

8.7.1 Scratches

The following criteria is applied to scratches on the faceplate of the CRT. See Table 18 for the maximum size of scratches allowed.

**TABLE 18
SCRATCHES ALLOWED**

WIDTH (mm)	LENGTH OF SINGLE SCRATCH (mm)
< 0.05	100 [3.93] if visible; otherwise ignore.
0.05 to 0.10	25 mm [.98]
0.11 to 0.15	13 mm [.51]
> 0.15	Not Allowed

8.7.2 Limits of Faceplate Defects

The following criteria are applied to defects of useful screen on the panel face.

**TABLE 19
LIMITS OF FACEPLATE DEFECTS**

TUBE SIZE				43 Cm (17 inches)	
ZONE				ZONE A	ZONE B
Major Defects	Blister (mm)			0.41 - 0.60 [.016 - .023]	0.41 - 0.60 [.016 - .023]
	Opaque Spot and Open Blister (mm)			0.31 - 0.50 [.012 - .020]	0.31 - 0.50 [.012 - .020]
	Allowed Number of Defects	Single Zone		1	1
		Total		2	
Gathering Defects	Allowable Minimum Separation (mm)			57 [2.24]	
	Blister (mm)			0.25 - 0.40 [.010 - .015]	
	Opaque Spot and Open Blister (mm)			0.20 - 0.30 [.008 - .012]	
	Within 50 mm				
Elongated	Allowable Number of Defects			3	
	Allowed Minimum Separation (mm)			50 [1.97]	
	Width (mm)			0.10 - 0.20 [.004 - .008]	0.10 - 0.30 [.004 - .012]
	Maximum Length (mm)			4.0 [.157]	6.0 [.236]
Allowable Number of Defects			Total	2	



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TABLE 19
LIMITS OF FACEPLATE DEFECTS

TUBE SIZE			43 Cm (17 inches)		
ZONE			ZONE A		ZONE B
Refractive Spots and Coating Voids	Size (mm)		0.51 - 0.75 [.020 - .030]	0.25 - 0.50 [.010 - .020]	0.25 - 0.75 [.010 - .030]
	Allowable Number of Defects	Single Zone	2	8	6
	Allowed Minimum Separation		20		

8.8 FACEPLATE

8.8.1 Treatments

For TCO static E field decay requirements, the CRT will require a multi-layer coating to meet the requirements outlined in Section 13. MPR tubes shall also use a multi-layer screen coating. Silica-based coatings are not allowed.

8.8.2 Transmission

The nominal faceplate light transmission shall be 53% for all models.

8.8.3 Radius of Curvature

The CRT faceplate shall be of the flat faceplate type. The nominal radius of curvature of the CRT shall be 50 kmm Horizontally and 80 kmm Vertically.

8.9 IMPLOSION PROTECTION

The CRT shall have integral implosion protection and will comply with the requirements of UL 1418 and international requirements.

8.10 X-RAY PROTECTION

The CRT shall be "intrinsically safe" in accordance with the German PTB.



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9. **ENVIRONMENTAL**

The unit should suffer no visible cosmetic damage and should operate with no degradation in display quality during exposure to the operating conditions and after exposure to the non-operating conditions, in any sequence.

9.1 **TEMPERATURE**

Operating..... 10 to 35°C [50 to 95°F].
Non-operating..... -30 to 60°C [-22 to 140°F].

9.2 **HUMIDITY**

Operating..... 20% to 80% non-condensing.
Non-Operating (38.7°C maximum wet bulb temperature)..... 5% to 90%.

9.3 **ALTITUDE**

Operating, over the entire operating temperature range..... 0 to 10,000 ft. [3048 m].
Non-Operating, over the entire non-operating temperature range..... 0 to 30,000 ft. [9144 m].

9.4 **SHOCK AND VIBRATION**

Testing with vibration and shock shall be done in each of three mutually perpendicular axes. Axes are referenced to the position of the system as it normally sits in front of the user (i.e., front-to-back, side-to-side, and top-to-bottom).

9.4.1 Operating Conditions


The unit shall suffer no visible cosmetic damage and shall operate with no degradation in display quality during exposure to the operational conditions.

Sinusoidal Vibration: 0.25 g zero-to-peak, 10 to 500 Hz, 0.25 octaves/minute sweep rate in each of three mutually perpendicular axes. The number of sweeps from 10 to 500 to 10 Hz shall be sufficient to evaluate the monitor's performance at all frequencies.

Dwell Testing: At the lowest resonant frequency (greater than 10 Hz) identified by the sinusoidal vibration test, maintain the 0.25 G (zero-to-peak) input for 15 minutes. This dwell testing should be performed for one frequency for each of the three axes.

Random Vibration: 0.002 G²/Hz, 10 to 500 Hz, nominal 1.0 Grms in each of three mutually perpendicular axes. The test duration in each axis shall be sufficient so that the monitor's performance can be completely evaluated.

Half Sine Wave Shock: 10 G peak acceleration for 11 milliseconds, along each direction of each axis (6 shocks total). The number of shock inputs in each direction shall be sufficient so that the monitor's performance can be evaluated.

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9.4.2 Non-Operating Conditions

The unit should suffer no visible cosmetic damage or damage that presents a safety hazard, or impairs the setup and operation of the system after exposure to the conditions stated.

Sinusoidal Vibration: 0.75 G zero-to-peak, 10 to 500 Hz, 0.5 octaves/minute sweep rate. One sweep, 10 to 500 to 10 Hz, along each axis.

Dwell Testing: At the lowest resonant frequency (greater than 10 Hz) identified by the sinusoidal vibration test, maintain the 0.05 G (zero-to-peak) input for 15 minutes. This dwell testing should be performed for one frequency for each of the three axes.

Random Vibration: 0.008 G²/Hz, 10 to 500 Hz, nominal 2 g rms, in each of three mutually perpendicular axes, One Hour/axis; three hours total.

Two Millisecond Shock: 140 g peak acceleration, half sine pulse shape, nominal 2 ms pulse duration, one pulse input/direction. There shall be one shock input in each direction of three mutually perpendicular axes for a total of six shock inputs.

Half Sine Wave Shock: 100 G peak acceleration, 2 millisecond pulse duration, one pulse along each direction of each axis (6 shocks total).

Square Wave Shock: 40 G peak acceleration, 166 in/sec velocity change in each of the two directions along the three axes (6 total).

9.5 **PACKAGE QUALIFICATION**

The packaging qualification shall require 6 free-fall unit drops. The supplier must still measure and record the g values on the CDT face. This package g value will not be used for package acceptance evaluation.

9.5.1 Packaging Test Sequence

- Single container resonance test (Refer to Drawing 109291. Upper frequency limit 200Hz)
- Random vibration tests: Truck vibration + Air vibration (Refer to Drawing 109291)
- Free fall drop test: 61cm height; 1 corner, 3 edges, 6 faces (g value to be recorded on CDT face)

9.5.2 Pass/Fail Criteria

Unacceptable product damage:

Any condition which causes the product not to meet its performance specifications. In addition, it is any condition such as cosmetic damage, which makes the product unacceptable for sale (e.g. cracked or scratched plastics, abrasion, etc.)

Monitors must be inspected carefully after drop test.

Acceptable package damage:

- Small fracture or permanent deformation that still permits internal packaging to maintain product position.



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Unacceptable package damage:

- Failure of bonded joints or surfaces which results in internal packaging to lose original configurations.
- Fractured or deformed material which no longer maintains product position.
Supplier should provide HP with pictures of all foams (for 6 units) after drop test.

9.6 ELECTROSTATIC DISCHARGE (ESD)

HP requirements for ESD testing are described and defined in HP Document 131296. The monitor manufacturer is responsible for originating a suitable test plan based on the applicable parts of the referenced specification. The plan shall be mutually agreed upon between the manufacturer and HP and once the plan is accepted it shall become part of this specification incorporated by this reference. The purpose of this approach is to enable tests to be conducted that give repeatable (duplicate) results wherever and whenever the test is performed.

9.7 OUTGASSING

The monitor shall not be made of environmentally hazardous materials that outgas into the environment during normal operation or storage. Objectionable odors, even from non-hazardous materials, are not permitted. In addition, the monitor shall not produce hazardous gasses when exposed to high temperatures such as a fire. For example, the monitor plastics shall not contain such chemicals as bromides and chlorides.

9.8 ENVIRONMENTALLY SAFE MATERIALS

The plastic casework and the packaging material shall not contain any ozone depleting chemicals such as CFCs, PBDE, PBDPE, or Halon compounds.

All parts and materials used in the monitor assembly shall comply with HP's General Specification for the Environment (GSE), Revision F. The specification is available at the following URL:

http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/ser_program.html

All EMEA products must be compliant with the EU RoHS directive. In addition to complying with HP's General Specification for the Environment, the product will also comply with HP's Interim RoHS Compliance Specification at the following URL:

http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/rohs_compliance_spec.pdf.

9.9 TOXIC MATERIALS

Materials that produce toxic effects during service usage or due to component failure shall not be used in the monitor construction. Cadmium and polychlorinated biphenyl may not be used in any form. The use of beryllium is only allowed in semiconductors and shall not be exposed upon failure.



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10. MECHANICAL

10.1 MONITOR DIMENSIONS

All measurements in Table 20 are approximate and for reference only. Mechanical drawings should be consulted for precise dimensions and tolerances.

**TABLE 20
DIMENSIONS (MM)**

	Width	Height	Depth	Diagonal
Footprint:	234.5mm		234.5 m m	
Bezel Opening:	328.05 mm	245.9mm		406mm
Unpacked Monitor (base detached):	404.1 mm	356.9mm	421mm	
Unpacked Monitor (base attached):	404.1 mm	402mm	421mm	
Shipping carton Exterior dimensions	458 mm	530 mm	472 mm	
Shipping carton Interior dimensions	444 mm	502 mm	458 mm	

10.2 WEIGHT

The unpacked weight of the monitor shall be not more than 17.5 Kg (38.6 Lbs).

The packed weight of the monitor shall not be more than 21 Kg (46.2 Lbs).

10.3 CASE WORK

10.3.1 General

The casework shall be injection molded plastic. The color and texture shall be molded into the plastic. The color and texture must be approved by HP. The casework shall consist of three major pieces; bezel, bucket, and bottom with a swivel base.

10.3.2 Industrial Design

The cabinet will have the HP family look, shown for reference in Figure 13. The brightness and contrast controls are easily accessible through the OSD interface. The ON/OFF switch will be of the push on, push off type, and the remaining controls will be accessible via the three-button OSD interface.



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10.3.3 Color Requirements

The color of individual parts and printing are defined in table below.

PART	MV7540	v75
Bezel	Molded in 114047-085 Silver Substrate and Painted with Silver Paint 114047-091	Molded in OOV #3 gray HP 6009-0300 plastic with Alloy Metallic HP 6009-0279
Power/OSD Buttons	Molded in 114047-085 Silver Substrate and Painted with Silver Paint 114047-091	Platinum silver HP SP 1230
Bucket, base and all Other Plastic Parts	Carbonite (GE # GY2A547)	OOV Gray #4 HP 6009-0309
Model Name – Tampo Print	PMS 426c	Pantone 432C
Brand Logo Tampo Print	Compaq Standard	Pantone 432C
Regulatory Label	Carbonite label stock	Pantone 432C on silver label stock

**FIGURE 13
FAMILY ID EXAMPLE**



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10.3.4 Material

The plastic materials used shall be FR ABS or PC/ABS grades for the main enclosure applications and/or HB ABS for base & Swivel applications. The approved HP FR-ABS manufacturers and grades are Starex VH-0810, VE-0812, VE-0856, NH-0951S, NH-0951N, GE SEA-2X, LG AF-312, AF-320T, and AF-345. The approved HP PC/ABS manufacturers and grades are Starex NH-1000T, G.E. C-2800, G.E. C-6600, G.E. CU 6800, LG GN5001TF, GN5008HF, Bayer FR-2000, Bayer FR-2010, Bayer FR-3005, and Bayer FR-86. HP must be informed if another manufacturer or grade of plastic is to be considered or used for manufacturing this product. HP does not allow the use of HB flame rated plastics for any of the main housing parts. HB flame rated plastics can only be used on the base and swivel assemblies.

10.3.5 Finish/Texture

The exterior surfaces shall have a uniform texture that is machined into the molds. HP must approve the mold texturing.

The texture of the parts shall be as follows:

PART	TEXTURE
Bezel (painted or unpainted)	MT-11020
Carbon Plastics (bucket, pedestal, etc.)	MT-11020
Pedestal Ball	No Texture
Power Button (Slate)	MT-11010
OSD Buttons (painted)	MT-11010
LED Lens	MT-11000

10.3.6 Base and Pedestal

The consumer monitors shall ship with the pedestal detached to minimize the shipping box size. The pedestal of all monitors shall attach as shown in the following figure. The pedestal hooking features (base and bucket) must be design to the hp drawing. The base should be universally assembled with other supplier monitors. Note the ID of the monitor in the picture is not correct.

**FIGURE 14
PEDESTAL ATTACHMENT**



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10.3.6.1 Tilt

The monitor base shall have a 15 ± 1 degrees upward tilt and 5 ± 1 degrees of downward tilt from the center line, as viewed from the front of the monitor.

10.3.6.2 Swivel

The monitor base shall swivel at least 45 degrees either side of center ($\pm 45^\circ$).

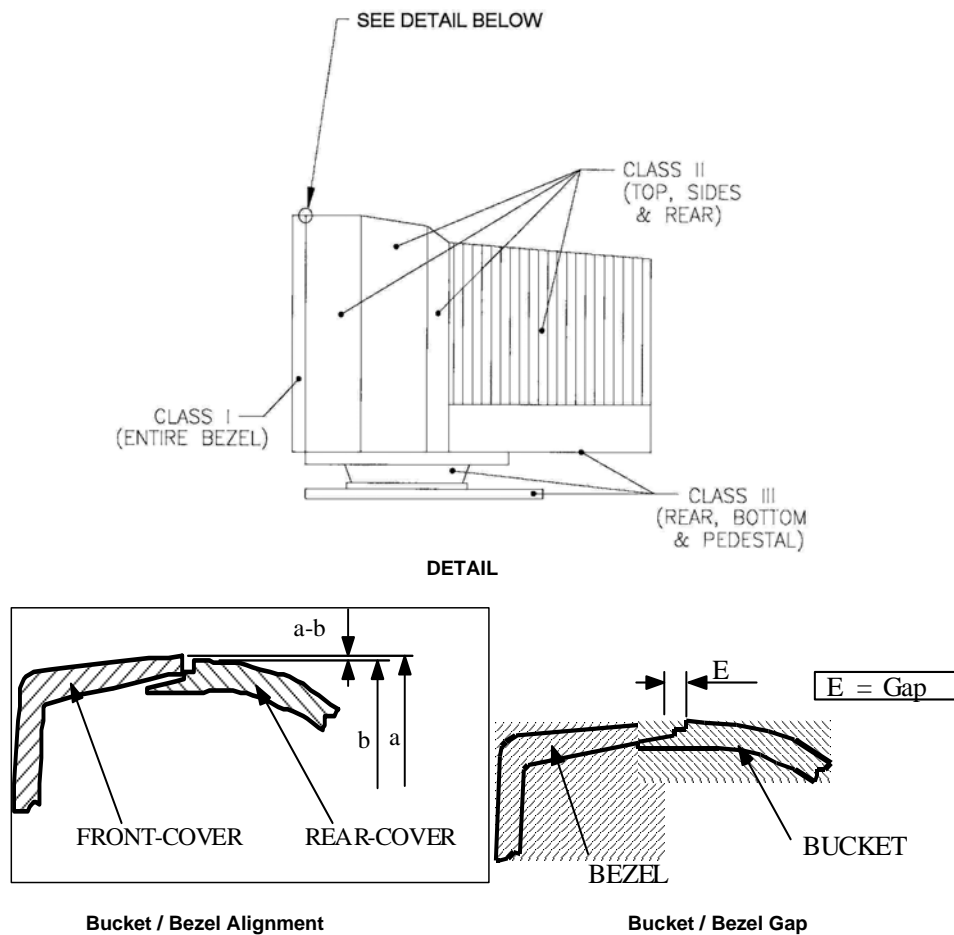
10.3.7 Cosmetic Surfaces

The plastic surfaces shall meet the requirements of HP Document 106413.

10.3.8 Bucket to Bezel Alignment

The maximum acceptable bucket to bezel mismatch is 1.0 mm [.0394 inch] all around the joined surfaces. The Bucket to Bezel Gap shall be at least 1.0 ± 0.5 mm. See Figure 15 for the explanation drawings. Note the ID of the monitor picture is not correct.

**FIGURE 15
BUCKET TO BEZEL ALIGNMENT**



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10.3.9 CRT to Bezel Gap

The maximum acceptable CRT to bezel gap shall be 0.8 mm [.03 inch].

10.4 **MARKINGS AND LABELS**

10.4.1 Bezel Logos and Marking

The marketing name for Compaq brand is 7540 shall be located in the upper right area of bezel; whereas, the hp brand name is v75 shall be located in the bottom right area of the bezel. HP Industrial Design shall specify font, color, size and location.

10.4.2 Icons

The user controls and power switch shall be marked with icons per EN60417, #5009. These are to be permanently molded into the plastic surfaces.

10.4.3 Agency Series Label

Each monitor shall have a permanently affixed label with the following information legibly and permanently marked. Refer to HP specification 308097 for the requirements of the rating label.

10.5 **SPEAKER SUPPORT**

The speakers and separate speaker power adapter shall ship in the monitor carton. Refer to the SKU matrix for more information. For more information on the speakers, refer to the HP Document 259139.

11. **SHIPPING AND PACKING**

Packaging and wrapping shall be sufficient to protect the product against damage or loss during shipment from the supplier to the destination specified in the purchase order. Packaging materials are subject to test and evaluation per HP Document 109291.

11.1 **SHIPPING CARTON**

Each monitor shall be packaged in a post-printed retail carton per the HP Artwork Drawing (refer to the SKU matrix). Additional HP packaging requirements are specified in HP Document 109893. The monitor shall be sealed in a plastic bag to prevent accumulation of dust, particulate contaminants, or other debris. The video signal cable and the connector shall be protected with disposable "cap lugs." Refer to sections 10.1 and 10.2 for the monitor weight and shipping box dimensions.

11.2 **BOX STRENGTH**

The box strength shall be sufficient to prevent damage to the monitor and packing materials when stacked for storage.

The stack height of the monitor shall be 8 stacked on two pallets. The supplier shall insure the box artwork has the appropriate stack-height icon.



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To insure the box will not be damaged when the monitors are stacked, the minimum compression strength of the box shall be 1680 lbs. The supplier shall provide a test report showing the box meets the minimum compression strength requirements. A deflection of the empty box (no monitor or cushions) of more than 0.5 inch when the load is applied shall be considered a failure.

11.3 CARTON LABEL

A thermal printed barcode label identifying the monitor part number and serial number shall be adhered to the carton. Label stock shall conform to HP Document 106128 and the label-printing format shall meet HP Document 298640.

Samples of carton labels for shipments to HP should be pre-approved by HP to ensure machine "readability"; a bar width of between .017- and .020-inch is required on such labels.

11.4 PALLETIZATION

Monitor cartons may be palletized or slip sheet stacked depending on HP Procurement's requirements as specified in HP Document 298640. If monitor cartons are palletized, good quality reusable wooden pallets shall be used. A partial 4-way pallet is acceptable. Palletize so that carton labels are readable.

The container loading quantities for the monitor are listed in Table 21.

**TABLE 21
CONTAINER LOADING**

Packaging				
Consumer MV7540 and v75	Box Dimension (W x D x H)			458(W)x472(D)x530(H)
	Loading Q'ty	Slip Sheet	20 ft	\
			40 ft	\
			40 ft - High	\
		Pallet	20 ft	240SETS
			40 ft	500SETS
			40 ft - High	\
	Gross weight (kg)			17.5
	Net weight (kg)			14

All solid wood packing materials, such as pallets, must be totally free of bark and apparently free from live pests. All shipping invoices for shipments with wood pallets that are destined for the United States must contain a certification statement that the wood packing materials are totally free from bark, and apparently free from live pests.



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11.5 SHIPMENT IDENTIFICATION

Each lot shipped must include an easily accessible document (such as a packing slip) clearly showing the following 9 items:

1. Shipped From Address
2. Shipped to Address
3. HP PO number
4. HP part number
5. A description (in English) of the device(s)
6. Unit value in U.S. dollars
7. Extended value in U.S. dollars
8. Country of origin (Japan)
9. DHHS Accession Number

NOTE:

If the monitor does not yet have an Accession Number, it shall be shipped in quantities not to exceed 10.

12. **AGENCY APPROVALS**

12.1 **PRODUCT SAFETY REQUIREMENTS AND APPROVALS**


The information contained in this section and in the Reference Document section was the criteria and approvals anticipated at the time of release of this document. This information may not be current. It is suggested that for current information, the Hewlett Packard Product Safety Group be contacted. The monitor shall be approved/licensed/certified as the Model(s) HSTND-1XXX-X. Copies of ALL approval licenses for the monitor shall be provided to the Product Safety Group as part of the final Hewlett Packard monitor qualification.

EN 60950 (IEC 60950): All monitors shall comply with all applicable requirements of EN/IEC 60950 or EN/IEC 60950-1. The monitor shall also comply with the applicable requirements of each of the IEC based 60950 national or regional standards identified below.

CB SCHEME CERTIFICATION: The manufacturer of the monitor shall obtain a CB Test Certificate and CB Test Report from a Notified National Certification Body. The Certificate and Report shall be valid for and state conformity with IEC 60950 or IEC 60950-1 and all country Deviations listed in the latest revision of CB Bulletin. The Certificate shall be in Hewlett Packard's name and model designation.

UL APPROVAL: All monitors shall be Listed by Underwriters Laboratories Inc. in accordance with UL 60950 or UL 60950-1 (without the use of D3 deviations). The nameplate shall include the Supplier's UL Listing mark, the Supplier's UL file number and any other factory identification. In addition to the letter of completion, the OEM shall obtain a certificate of compliance from UL.

CSA APPROVAL: All monitors shall be Certified by Canadian Standards Association in accordance with CSA C22.2 60950 or CSA C22.2 60950-1. The nameplate shall include the CSA Certification Mark and the Supplier's CSA File number (LR #).

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GS APPROVAL: All monitors shall be Approved ("GS Mark") by TUV to the requirements of EN 60950 and EK1-ITB 2000. The "GS" mark shall appear on the nameplate label. [It may be acceptable to obtain GS through another accredited agency. Check with the Houston product safety group for more info.]

MEXICAN SAFETY COMPLIANCE: All monitors shall be designed to comply with NOM-019-SCFI-1993. The Supplier will coordinate with the Hewlett Packard Mexican Agency Contact in submitting all monitors to the appropriate Mexican authority. The Supplier will provide samples and other required materials to the Hewlett Packard Mexican Agency Contact for agency submittal in Mexico. Once approved, Hewlett Packard will notify the supplier to place the NOM-NYCE Mark on the monitor nameplate. Information on the Hewlett Packard agency contact in Mexico is available from the Hewlett Packard Agency Group in Houston.

POLISH COMPLIANCE: The monitor shall be registered as an Approved Product by an accredited Polish Certification Body in accordance with the requirements of IEC 60950, CISPR 22, and any local regulations. The PCBC "B" Mark shall be located on the nameplate label. Information on the Hewlett Packard agency contact in Poland is available from the Hewlett Packard Agency Group in Houston. [Not required for 23 in. and larger monitors]. [TO BE OBTAINED BY HP]

RUSSIAN (GOST) COMPLIANCE: The monitor shall be registered as an Approved Product by Russia's GOST in accordance with the requirements of IEC 60950, CISPR 22, and any local regulations. The GOST R Safety Mark is required on the nameplate label and packaging label. Information on the Hewlett Packard agency contact for Russia is available from the Hewlett Packard Agency Group in Houston. [APPROVAL TO BE OBTAINED BY HP]

CROATIAN APPROVAL: The monitor shall be registered as an Approved Product by an accredited Croatian certification body in accordance with the requirements of IEC 60950, CISPR 22, and any local regulations. The Croatian Safety Mark is not required on the nameplate label. Information on the Hewlett Packard agency contact for Slovenia is available from the Hewlett Packard Agency Group in Houston. [TO BE OBTAINED BY HP]

UKRAINE (UKRSERTCOMPUTER) APPROVAL: The monitor shall be registered as an Approved Product by Ukraine's UKRSERTCOMPUTER in accordance with the requirements of IEC 60950, CISPR 22, and any local regulations. Use of a CB scheme report is recommended to obtain this certification. The UKRSERTCOMPUTER Safety Mark is not required on the nameplate label. [TO BE OBTAINED BY HP]

BELARUS (BNCI) APPROVAL: The monitor shall be registered as an Approved Product by Belarus' BNCI in accordance with the requirements of IEC 60950, CISPR 22, and any local regulations. Use of a CB scheme report is recommended to obtain this certification. The BNCI Safety Mark is not required on the nameplate label. [TO BE OBTAINED BY HP]

SAUDI ARABIA (SASO) APPROVAL: The monitor shall be registered as an Approved Product by Saudi Arabia's SASO in accordance with the requirements of IEC 60950, CISPR 22, and any local regulations. Use of a CB scheme report is recommended to obtain this certification. The SASO Mark is not required on the nameplate label. [TO BE OBTAINED BY HP]

SOUTH AFRICAN (SABS) APPROVAL: The monitor shall be registered as an Approved Product by the South African Bureau of Standards (SABS) in accordance with the requirements of IEC 60950, CISPR 22, and any local regulations. The SABS Mark is not required on the nameplate label. [TO BE OBTAINED BY HP]



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CONSUMER PROTECTION REGISTRATION SCHEME OF SINGAPORE: The monitor shall be registered as an Approved Controlled Product by the Consumer Product Safety Department, Quality Assurance Division of the Singapore Institute Of Standards and Industrial Research (SISIR) in accordance with the requirements of IEC 60950. The registration number for the product and the Singapore Safety Mark shall be located on the nameplate label. Information on the Hewlett Packard agency contact for Singapore is available from the Hewlett Packard Agency Group in Houston.

CHINA APPROVAL (CCC): All monitors manufactured in China intended for sale in China shall be approved by the China Commission for Conformity Certification for Electrical Equipment. The CCC Safety mark shall appear on the product nameplate label. Information on the Hewlett Packard agency contact in China is available from the Hewlett Packard Agency Group in Houston. The CCEE, CCIB and CEMC China agency certifications will be combined into a single certification called CCC (China Compulsory Certification). This new certification takes effect on May 1st, 2002. More information may be found on the following website: <http://www.cemc.org.cn>

ARGENTINA CERTIFICATION: The product shall be Certified by a nationally approved test laboratory in accordance with the requirements of IRAM 4100 (IEC 60950). The product shall bear the "S" approval mark in accordance with the issuing agencies requirements. The certificate should be in HP Argentina's name. If it is in the vendor's name, then a letter of authorization must be issued by the vendor to HP to allow our use of the certificate. Contact the Hewlett Packard Agency Group in Houston for additional information.

DHHS APPROVAL (US): All monitors shall comply with the United States Department Health and Human Services DHHS Rules and Regulations for X-Radiation, United States Code of Federal Regulations 21 (CFR) Sub-chapter J effective at the time of manufacture. The DHHS compliance statement shall appear on the nameplate label. The reporting requirements of the DHHS are the responsibility of the vendor. In order to avoid US Customs Service shipment holds, the ACCESSION Number shall be provided to Hewlett Packard Agency prior to production.

KOREA EK APPROVAL: All monitors shall be approved by the Korean government to the requirements of the Electrical Appliance Control Laws.. The monitor shall be marked with the appropriate EK Marking and file number along with the associated mandatory markings (rated voltage, VA, frequency, Factory/Importer Registration #). Hewlett Packard recommends contacting www.estech.co.kr if assistance is needed in making application.

AUSTRALIA: The CB test report must include the deviations for Australia. If Australian deviations are not published for the version of IEC60950 being used in the CB report, the deviations from the previous version must be used.

RADIATION EMITTING DEVICES REGULATIONS: All monitors shall be designed and marked in accordance with C.R.C., c. 1370.

PTB (X-RADIATION) APPROVAL: All monitors shall be tested and Approved by the Physikalisch Technische Bundesanstalt (PTB) in accordance with RoV 8.01.87. (Röntgenverordnung - RöV - vom 8.1.1987, BGBl.I S.173.) The X-Ray warning and information shall be included on the nameplate label in English and German.

NON PATIENT VICINITY APPLICATIONS IN MEDICAL FACILITIES: When tested in accordance with EN 60950, Clause 5.2, the power supply leakage current shall not exceed 500 microamps at an input of 120 Volts AC



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POWER SUPPLY MODULE: If provided with a separate AC/DC power adapter, for example for optional speakers, the power supply shall be individually certified and labeled in accordance with the applicable requirements for power adapters. Refer to Hewlett Packard's boilerplate for AC adapters for specific agency requirements.

12.2 POWER CORD REQUIREMENTS AND APPROVALS

All power cords shipped with the display shall meet the safety requirements and have the applicable certifications for the country of destination. It is recommended that the appropriate HP power cord be procured through HP approved vendors by the respective p/n. If a power cord other than the appropriate HP p/n is shipped with the display, the supplier must provide copies of the safety certifications for the cord. In most cases, this will include 3 separate certificates (the plug, the cord, and the female connector).

12.3 ERGONOMIC REQUIREMENTS AND APPROVALS

The information contained in this section was the criteria and approvals anticipated at the time of release of this document. This information may not be current. It is suggested that for current information, the Hewlett Packard Product Safety Group be contacted.

GERMAN ERGONOMIC APPROVAL: All monitors shall be tested and approved by TUV to the applicable requirements of EK1-ITB2000 and ISO9241-3, -7, and -8 as required for German Safety Approval. ("GS" Mark). The GS license shall include a reference to compliance with ISO9241-3, -7, and -8.

SWEDISH MPR EMISSIONS: This monitor shall comply with the recommended limits outlined in the MPR 1990:10, 1990-12-31 Guidelines when evaluated using the methods outlined in the MPR 1990:8, 1990-12-01. Particularly this device shall comply with the recommended limits noted below for electrostatic field strength, magnetic field strengths (ELF and VLF) and electric field strengths (ELF and VLF) when measured in accordance with referenced MPR test methods.


Electrostatic Field Strength: The equivalent electrostatic surface potential at the face of the CRT shall be less than $\pm 500V$.

Magnetic Field: The magnetic field strength, measured 50cm from the monitor using the MPR guidelines, shall be less than 250nT (2.5mG) in the frequency range from 5Hz to 2kHz and less than 25nT (0.25mG) in the frequency range from 2kHz to 400kHz.

Electric Field: The electric field strength, measured 50cm from the monitor using the MPR guidelines, shall be less than 25V/m in the frequency range from 5Hz to 2kHz and less than 2.5V/m in the frequency range from 2kHz to 400kHz.

The monitor shall be tested by a lab accredited to perform TCO emissions measurements (i.e. SEMKO or NEMKO). The monitor shall be submitted under Hewlett Packard's name and model number. A copy of the test report shall be forwarded to the Hewlett Packard Agency Group for compliance verification.

Choose applicable TCO requirements below for actual spec.

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TCO 1999 APPROVAL: This monitor shall be tested and found compliant to the provisions detailed by the TCO for TCO'99 Certification. The Supplier shall provide verification of meeting the compulsory values as specified in the following sections:

- Displays (CRT), Report No. 1.
- Ecology for Displays, System Units and Keyboards, Report No. 5.

The test protocol shall be coordinated through the TCO or their designated laboratory. The monitor shall bear the TCO'99 mark, and the Certificate in Hewlett Packard's Name and Model XXX shall be forwarded to the Hewlett Packard Agency Group. The supplier shall also provide copies of the test data used to verify compliance with each TCO component (i.e. ergonomics, field emissions, and energy consumption).

TCO 2003 APPROVAL: This monitor shall be tested and found compliant to the provisions detailed by the TCO for TCO'03 Certification. The Supplier shall provide verification of meeting the compulsory values as specified in the following sections:

- CRT Displays. TCOD1023 Ver1.1.

The test protocol shall be coordinated through the TCO or their designated laboratory. The monitor shall bear the TCO'03 mark, and the Certificate in Hewlett-Packard's Name and Model XXX shall be forwarded to the Hewlett-Packard Agency Group. The supplier shall also provide copies of the test data used to verify compliance with each TCO component (i.e. ergonomics, field emissions, and energy consumption).

12.4 EMC REQUIREMENTS AND APPROVALS

The information contained in this section was the criteria and approvals anticipated at the time of release of this document. This information may not be current. It is recommended that for current information, the Hewlett Packard EMC Services group be contacted.

NOTE: All video resolutions and horizontal sweep rates shall be used in testing. A non-shielded power cord shall be used during testing of this monitor.

Based upon the intended marketing and use of the product, the product shall comply with:

FCC APPROVAL: All administrative and performance requirements for CFR 47, Part 15 class B using the C.I.S.P.R. Publication 22 limits and the ANSI C63.4 procedures. Radiated emission testing shall be performed at 10 meters. Conducted emission testing shall be performed at the rated line voltages. This device, when tested as part of a system defined by Hewlett Packard, shall not increase the emissive level of that system to a level greater than 3 dB below the C.I.S.P.R. Publication 22 limits. Testing shall be performed using Hewlett Packard labeled/manufactured peripherals. The manufacturer shall obtain a Grant of Equipment Authorization from the FCC. The manufacturer shall supply the appropriate information to the user in the user's manual. The product label shall contain the FCCID and the appropriate statement. As an alternative, the manufacturer shall perform the Declaration of Conformity authorization [e.g., using NVLAP/A2LA accredited laboratories, etc.]. The manufacturer shall supply the appropriate information to the user in the user's manual. The manufacturer shall supply the Declaration of Conformity to Hewlett Packard. The product label shall contain the FCC logo.



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C.I.S.P.R. REQUIREMENTS: All administrative and performance requirements for C.I.S.P.R. Publication 22 Class B. Radiated emission testing shall be performed at 10 meters. Conducted emission testing shall be performed at the rated line voltages. This device, when tested as part of a system defined by Hewlett Packard, shall not increase the emissive level of that system to a level greater than 3 dB below the class B limits. Testing shall be performed using Hewlett Packard labeled/manufactured peripherals.

V.C.C.I. APPROVAL: All administrative and performance requirements for VCCI class B. Radiated emission testing shall be performed at 10 meters. Conducted emission testing shall be performed at the rated line voltages. This device, when tested as part of a system defined by Hewlett Packard, shall not increase the emissive level of that system to a level greater than 3 dB below the VCCI class B limits. Testing shall be performed using Hewlett Packard labeled/manufactured peripherals. The manufacturer shall obtain an approved class B Certificate of Acceptance from the VCCI, using the appropriate Hewlett Packard series designator. The manufacturer shall supply the appropriate information to the user in the users manual. The product label shall contain the VCCI logo.

CANADIAN REQUIREMENTS: All administrative and performance requirements for ICES-003 class B. Radiated emission testing shall be performed at 10 meters. Conducted emission testing shall be performed at the rated line voltages. This device, when tested as part of a system defined by Hewlett Packard, shall not increase the emissive level of that system to a level greater than 3 dB below the CISPR Publication 22 class B limits. Testing shall be performed using Hewlett Packard labeled/manufactured peripherals. The product label shall contain the Canadian compliance statement.

AUSTRALIAN ACA APPROVAL: All administrative and performance requirements for ACA AS/NZS 3548, class B in accordance with the Electromagnetic Compatibility Framework Information for Suppliers document, July 1995 and URL: <http://www.aca.gov.au> . The product label shall contain the C-Tick logo with no supplier code. HP will issue the DoC.


TAIWAN BSMI APPROVAL: All administrative and performance requirements for the BSMI Taiwan "Commodity EMC Regulation" in accordance with Chinese National Standard (CNS) 13438 (CISPR 22), class B and URL: <http://www.bsmi.gov.tw> . The product label shall contain the BSMI ID number. The BSMI certificate must include both the Hewlett Packard series number and the marketing name.

KOREA MIC APPROVAL: All administrative and performance requirements for the MIC Korea "EMC Registration Regulation" Class B and URL: <http://www.rri.go.kr/> . The product label shall contain the MIC registration number.

All EMC testing/submissions shall be performed using the most recent operating systems software appropriate for the product (e.g., Windows XP), Hewlett Packard labeled/manufactured peripherals, the defined test systems (contact EMC Services), and a continuous scrolling 'H' pattern.

12.5 HARMONIC CURRENT EMISSIONS

IEC 61000-3-2 – The monitor shall comply with the class D limits for harmonic current emissions in IEC 61000-3-2 when tested under max. load conditions. The OEM shall provide Hewlett Packard's Agency group with a copy of the test report showing all harmonic current measurements and the calculated limits based on the measured input power for each loading condition. **NOTE** – There are no harmonic current limits for class D products with a maximum rated input power of 75 Watts or less.

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12.6 VOLTAGE FLUCTUATIONS FLICKER REQUIREMENTS

IEC 61000-3-3 – The monitor shall comply with the applicable limits for voltage fluctuations and flicker in IEC 61000-3-3 when tested under all conditions of varying load. The OEM shall provide Hewlett Packard's Agency group with a copy of the test report showing all applicable measurements.

12.7 CE MARK REQUIREMENTS

The product shall comply with all of the performance requirements for placing the CE Marking on the product in accordance with the CE Marking Directive (93/68/EEC), the EMC Directive [89/336/EEC] with its amendments, and the Low Voltage Directive [73/23/EEC] with its amendments. Specifically, the product shall comply with the following requirements and associated test parameters:

Electrical Product Safety requirements EN 60950

EMC emissions compliance requirements EN 55022:1998 (CISPR 22 - Class B at 10 meters)

Harmonic distortion compliance requirements EN 61000-3-2

Line voltage fluctuation and flicker requirements EN 61000-3-3

Immunity compliance requirements EN 55024 consisting of:

IEC 61000-4-2: 1995 Electrostatic Discharge [4kV contact, 8kV air discharge]

IEC 61000-4-3: 1995 RF Fields [3V/m; 80 - 1000 MHz; 80% modulated at distance of 3 meters]

IEC 61000-4-4: 1995 Elec. Fast Transients[± 1 kV on AC power port for 1 minute; ± 0.5 kV on signal/control lines]

IEC 61000-4-5: 1995 Surge [± 1 kV line to line/ ± 2 kV line to earth on AC power port; ± 0.5 kV for outdoor cables]

IEC 61000-4-6:1996 Conducted RF [3V; 0.15-80MHz; 80% modulated]

IEC 61000-4-8; 1993 Magnetic field [50Hz; 1A/m]

IEC 61000-4-11:1994 Voltage variations [>95% dip,0.5 period; 30% dip, 25 periods;>95% reduction, 250 periods]

For the purposes of compliance with EN 55024, the product when tested with the intended Hewlett Packard system, shall not cause a halt of the operation of software applications operating on the Hewlett Packard. Voltages and currents shall remain within the specified parameters contained elsewhere in this document. Test setups shall be in accordance with EN 55022, namely complete systems with all ports appropriately terminated into a peripheral.

- The manufacturer shall place the "CE" marking on the product.
- Manufacturer's Declaration of Conformity - A DoC accompanied by a complete Technical Data file containing all associated Test Reports shall be provided to the Hewlett Packard EMC Services and Product Safety groups prior to first revenueable product shipment.

12.8 AGENCY ACCEPTANCE TESTING

Acceptance testing will be performed by HP. Test samples for acceptance testing will be retained by HP.

Copies of all submissions documents and resulting approvals will be supplied to HP Product Safety and EMC Services representatives prior to first revenueable product shipment.



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13. **QUALITY AND RELIABILITY**

13.1 **QUALITY ASSURANCE**

Unless otherwise specified in the purchase order, the supplier shall be responsible for maintaining a statistical process-monitor program or performing inspections that are sufficient to assure that the parts supplied meet the requirements specified herein.

HP utilizes the HP Supplier Development Process (5-Step Qualification) as a tool for assessment, continuous material improvement, and supplier development. As needed, suppliers are expected to support activities such as surveys, process and machine capability studies, control plans and correlation studies.

The HP quality goals (purges, field and out-going DPPM) and expectations shall be documented in the HP Quality Plan. HP and the Supplier prior to mass-production release must accept the Quality Plan.

13.2 **LOT ACCEPTANCE**

Product furnished to this specification will be capable of passing a sampling inspection for defects to a maximum Associated Acceptable Quality Level (AQL) of 0.25% according to a C = 0 sampling plan. Continuous improvement will be implemented with the associated AQL tightening under agreement of both parties. Failing lots shall be subject to return or other supplier corrective action.

13.3 **ELECTRICAL CRITERIA**

Electrical assemblies and components shall meet requirements of IPC-A-610 and J-STD-001, Class 1, "Acceptability of Electronic Assembly."

13.4 **MOLDING CRITERIA**

Parts will be produced to the configuration and dimensional tolerance specified on the part drawings including all general notes. Parts shall be free of blisters, bubbles, blowholes, voids, sink marks or other defects that degrade the part or affect its cosmetic quality in compliance with HP Document 106413.

13.5 **RELIABILITY**

The monitor shall be designed for a minimum 100,000 hour Mean Time between Failure (MTBF) with a 90% confidence level EXCLUDING the CRT.

The product shall have a demonstrated MTBF of greater than 100,000 hours with a 90% confidence level prior to the first revenue shipment to HP. The MTBF demonstration plan, results, and calculations shall be subject to HP OEM Engineering for review and approval. HP requires on-going repeated demonstrations during the life of the product to ensure that the MTBF has not degraded due to changes made in the design or fabrication of this product.

The CRT life is defined as the time period for the maximum luminance to reduce to 50% of the initial value as defined in this specification. The CRT life for this display is 20k Hrs minimum at the condition of displaying an All White field at maximum Brightness and Contrast settings. In addition to the luminance requirement, the focus must remain at an acceptable level for the life of the CRT so the customer can continue to use the monitor even if luminance is reduced.



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13.6 SUSTAINING RELIABILITY PLAN

The supplier shall perform an Ongoing Reliability Audit (ORA) throughout the life of the product. The ORA plan and calculation format shall be reviewed and approved by HP Engineering prior to first shipment of production level product. Data and results of this test shall be provided to HP at regular agreed upon intervals. HP Engineering reserves the right, at their discretion, to conduct tests it deems necessary to verify the reliability of the product it receives.

Semiconductor Operating Temperature: The maximum allowable semiconductor junction temperature shall be such as not to degrade the MTBF of this product. Thermal data and calculations to support this requirement shall be furnished to HP Reliability Engineering upon request.

13.7 CRITICAL COMPONENTS

The supplier and the applicable HP Commodity Management Team (CMT) shall develop a list of the product-critical components. The supplier's qualification data for these components shall be submitted to HP Reliability Engineering for approval. No changes in the Approved Vendor List (AVL) or manufacturer's data sheets shall be permitted without the prior written approval of the HP CMT once the product has gone to production. During the development of the monitor, the critical component list shall be subject to continuous revision.

13.8 ASIG DESIGN REVIEW

As part of the qualification process, two samples shall be sent to ASIG for a complete design review. The supplier shall be responsible for working with ASIG to close all issues found during the design review. Note that separate samples must be sent for each version of the controller that is qualified.

13.9 COMPONENT DE-RATING

In order to insure the reliability of the monitor, the supplier design shall follow the following component de-rating specifications.



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Component Typ		Normal Case			Worst Case		
Resistors		Peak Voltage (%)	Power (%)	Temperature	Peak Voltage (%)	Power (%)	Temperature
Carbon/Metal Film		50	50	Criteria: The solder Temp. of PCB ≤ 85° C	50	80	Criteria: The solder Temp. of PCB ≤ 100° C
≥ 100 Kohm	≤ 1/4 W				50	80	
	1/2 W	50	50		50	80	
	≥ 1 W	40	50		40	80	
< 100 Kohm	≤ 1/4 W	80	50		80	80	
	1/2 W	80	50		80	80	
	1 W	80	60		80	80	
	≥ 2 W	80	50		80	60	
Meral gaze					70	60	
VR		80	50		80	80	

Peak Voltage Spec.. Vs Power: 1/6 W – 200V, 1/4 W –250V, 1/2 W –350 V, 1W – 350 V, 2W –350V, 3W –500 V, 5W- 500V

NTC-Resistor / PTC-Resistor	Isteady (%)			Im (%)			Isteady (%)			Im (%)		
							80			80		
Capacitors	V DC (%)	V CP (%)	V peak (%)	I rms (%)	I p-p (%)	Temp (%)	V DC (%)	V CP (%)	V peak (%)	I rms (%)	I p-p (%)	Temp (%)
Film fixed									85			85
PE												
MPE									90			85
MPP								85			85	85
Ceramic fixed			75			80			90			90
Electrolytic (85° C, 2000 h)	80		80	85		60	90		95	90		70
Electrolytic (105° C, 2000 h)	80		80	90		60	90		95	90		70



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Component Typ	Normal Case				Worst Case			
Inductors	Core Temp (°C)		Core Temp (%)		Core Temp (°C)		Core Temp (%)	
Choke Coil							80	
Transformer								
Semiconductors	Tj min. = 150°C Note: Tj to Tcase has to be calculated for verification in any case							
Diode	Vrm (%)	Io (%)	I fsm (%)	Tcase (°C)	Vrm (%)	Io (%)	I fsm (%)	Tcase (°C)
					90	50	70	90
Zener Diode	Pd (%)	Iz (%)	IFM (%)	Tcase (°C)	Pd (%)	Iz (%)	IFM (%)	Tcase (°C)
					50	50	80	90
Damp/Modulation Diode					Vrm (%)	Io (%)	I fsm (%)	Tcase (°C)
					90	50	70	90
Transistors	Vce (%)	Veb (%)	IC (%)	Tcase (°C)	Vce (%)	Veb (%)	IC (%)	Tcase (°C)
	85	85	85		85	85	85	90
MOSFET	Vpss (%)	Ip (%)	IDM (%)	VGS (%)	Vpss (%)	Ip (%)	IDM (%)	VGS (%)
	85	80	80	85	90	85	80	85
IC	Vpeak (%)	Pd (%)	Tcase (°C)		Vpeak (%)	Pd (%)	Tcase (°C)	
	80	80	90		85	80	90	
PCB (Solder Temp)	≤ 85°C				≤ 100°C			
Special Parts	Vpeak (%)	Irms (%)	Tcase (°C)		Vpeak (%)		Irms (%)	Tcase (°C)
Switch Power MOSFET	85			90	85			100
DC-DC booster MOSFET								
DC- DC booster rectifier								
Hor.- output								

Component Typ	Normal Case			Worst Case		
Special Parts	Vpeak (%)	Irms (%)	Tcase (%)	Vpeak (%)	Irms (%)	Tcase (%)
H-Driver/ Vertical	80	80	75	85	80	80



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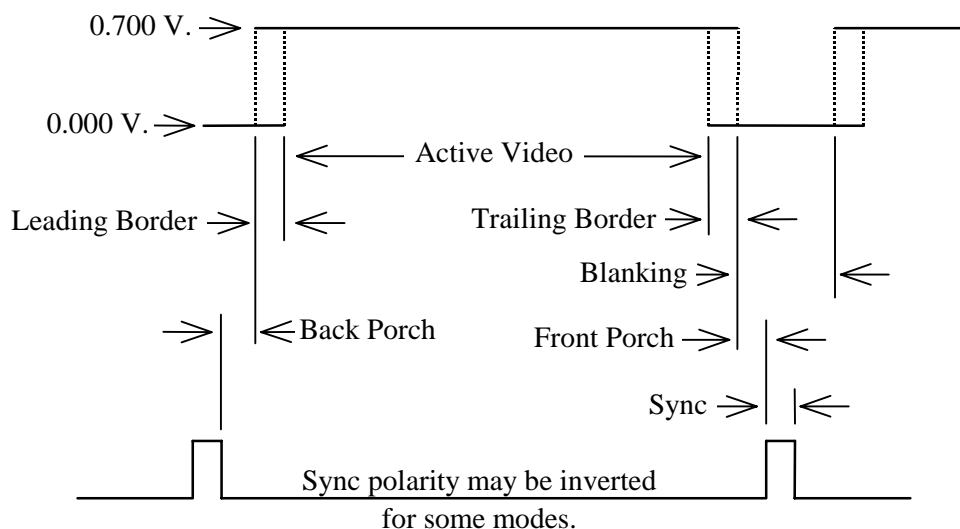
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APPENDIX A SIGNAL TIMING DEFINITIONS

The following table shows the detailed timing of each of the non-VESA standard modes specified in Table 2. The displayed video times do not include borders if the format supports them. Rather, the borders are included in the front and back porch times. The following show the horizontal and vertical timing interval definitions. These drawings are not to scale.

Clock (MHz)	Format	Horizontal (usec)						Vertical (msec)					
		Display	HFP	Sync	HBP	Total	Freq. (kHz)	Display	VFP	Sync	VBP	Total	Freq. (Hz)
25.175	640 x 480	25.422	.636	3.813	1.907	31.778	31.469	15.253	318	64	1049	16.683	59.940
28.321	720 x 400	25.423	.636	3.813	1.907	31.779	31.468	12.711	381	64	1112	14.269	70.084
56.250	800 x 600	14.222	.569	1.138	2.702	18.631	53.674	11.179	19	56	503	11.756	85.061
65.000	1024x768	15.754	.369	2.092	2.462	20.677	48.363	15.880	62	124	600	16.666	60.004
78.750	1024 x 768	13.003	.203	1.219	2.235	16.660	60.023	12.795	17	50	466	13.328	75.029
94.500	1024 x 768	10.836	.508	1.016	2.201	14.561	68.677	11.183	15	44	524	11.765	84.997
135.000	1280x1024	9.481	.119	1.067	1.837	12.504	79.976	12.804	13	38	475	13.329	75.025
175.500	1600x1200	9.117	.365	1.094	1.732	12.308	81.250	14.769	12	37	566	15.385	65.000

A.1 HORIZONTAL TIMING INTERVALS



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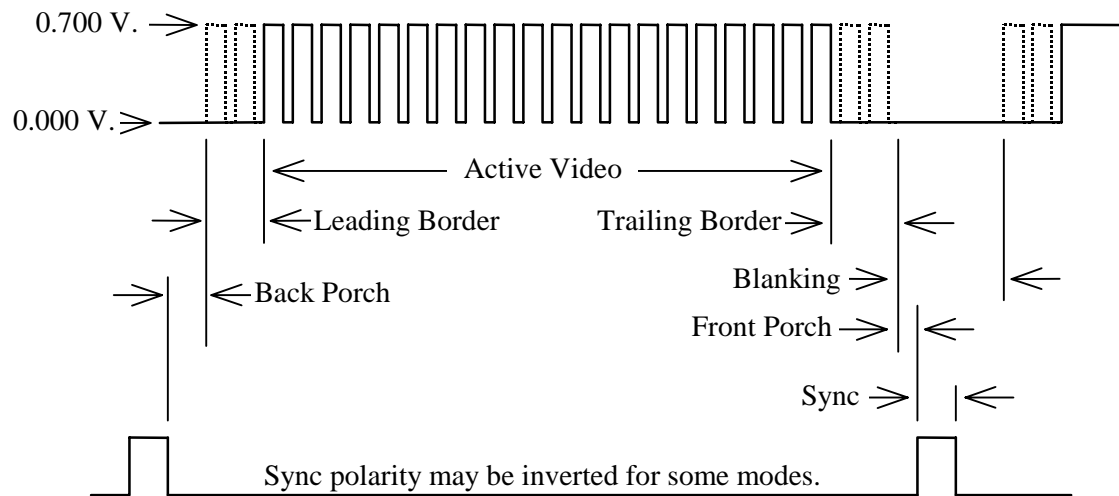
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A.2 VERTICAL TIMING INTERVALS



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APPENDIX B TEST PATTERN DEFINITIONS

The coordinates specified in the following pattern definitions assume a pixel format of H+1 pixels horizontally and V+1 pixels (lines or line-pairs) vertically. This is written as a "(H+1) by (V+1) format." The upper left hand pixel is at (0,0) and the lower right hand pixel is at (H, V). After computing the coordinates of the patterns, each should be rounded to the nearest integer (not truncated down).

For example, the 720 by 400 format gives H=719 pixels and V=399 pixels (lines). Therefore, in this format, the VIDEO pattern is a one pixel wide white rectangle between the four corners (0,0), (719, 0), (719, 399) and (0, 399).

The test pattern graphics should all be full intensity white except when otherwise specified.

Raster:

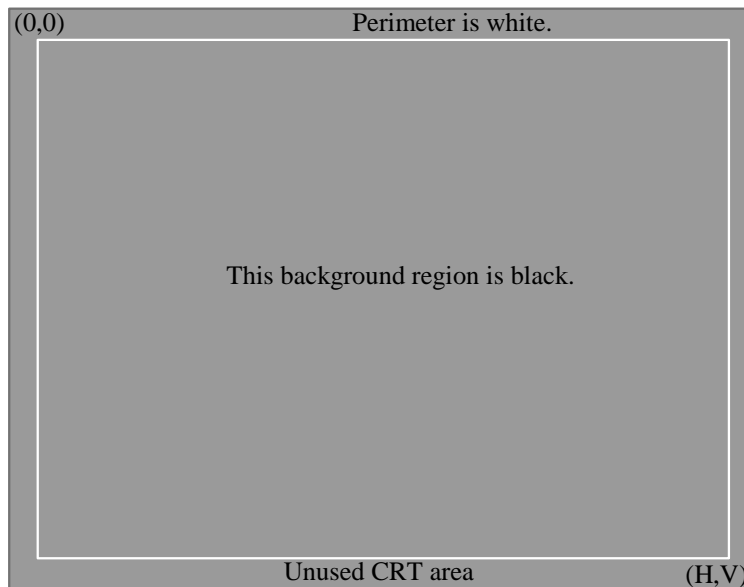
The RASTER pattern is defined as an all black screen produced by 0.0 volt video input to Red, Green and Blue.

Full White Field:

The FULL WHITE FIELD pattern is defined as an all white screen produced by 0.700 volt video input to Red, Green and Blue.

Video Pattern:

The VIDEO pattern consists of a black background and a white perimeter, one pixel wide around the addressable area of the screen.



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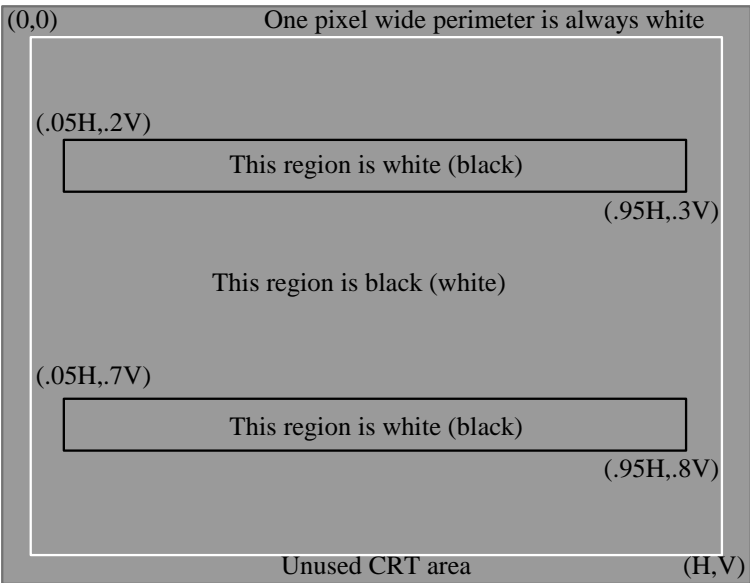
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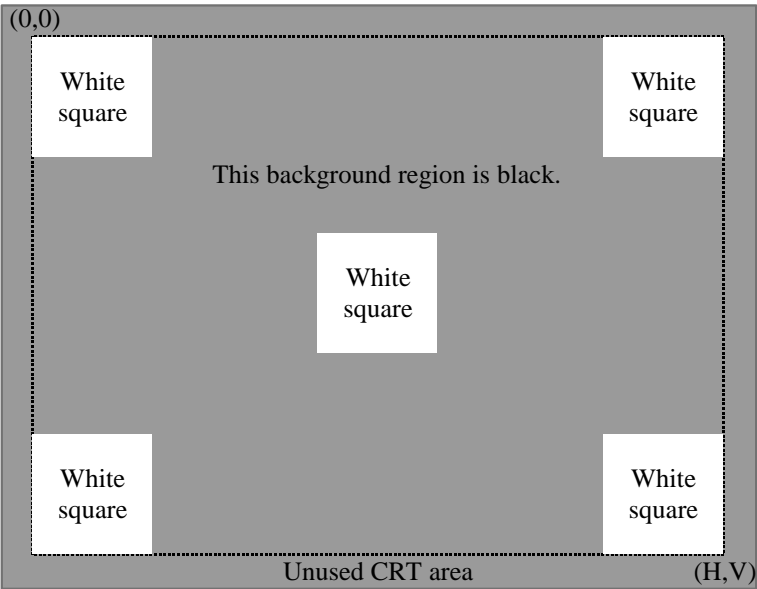
Dynamic Regulation Pattern:

The DYNAMIC REGULATION pattern is either white bars on a black background with a white perimeter, or black bars on a white background.



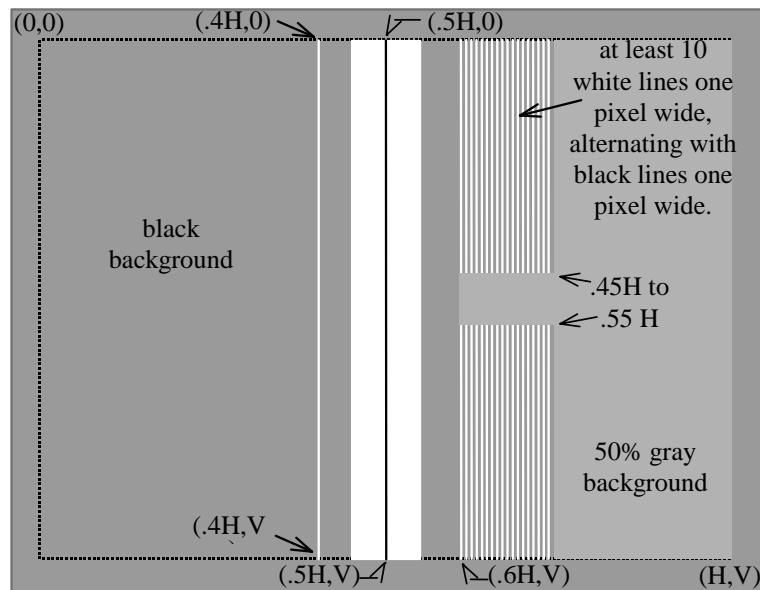
Brightness Pattern:

The BRIGHTNESS pattern has a black background and five white squares. The total area of the five windows is 20% of the total active area.



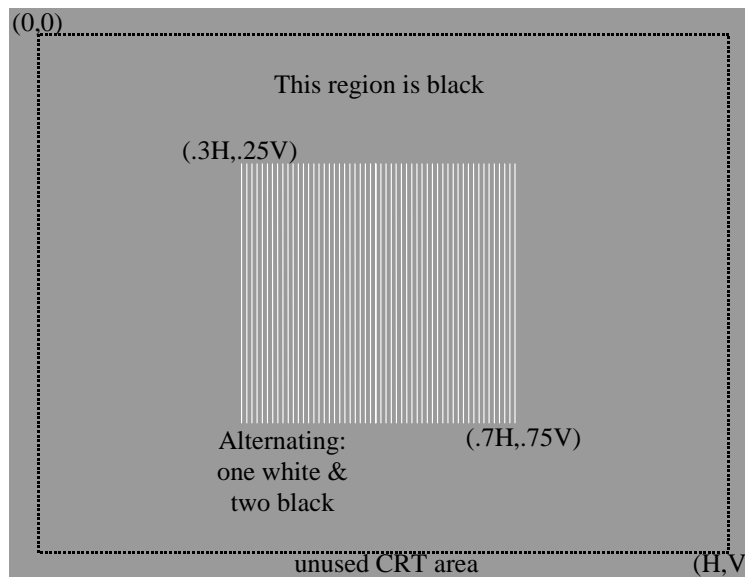
Pulse & Bar Pattern:

The PULSE & BAR pattern has a black background with a centered white vertical bar with a centered vertical black line. One vertical white line is to the left of the bar and a minimum of 10 white and black vertical line pairs follow the white bar, except in the middle 10% where there is a 50% gray level. The 50 % gray level also occupies the area to the right of the alternating pixels.



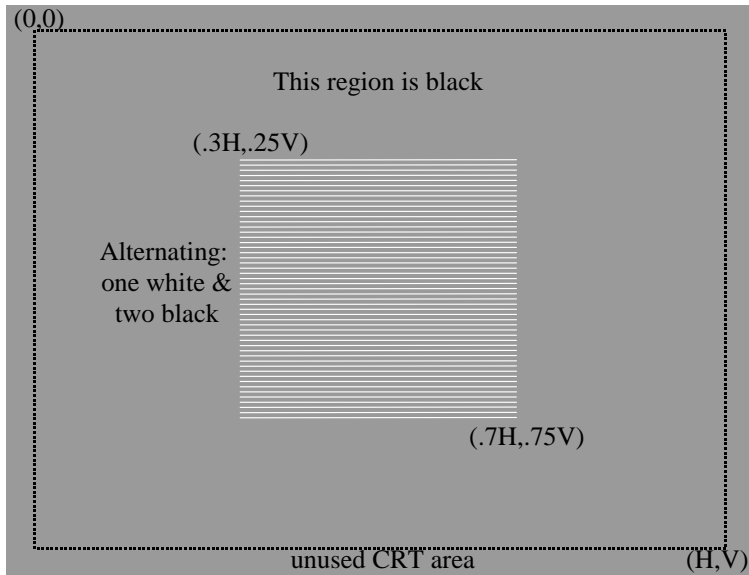
Vertical Resolution Pattern:

The VERTICAL RESOLUTION pattern has a group of white single pixel vertical lines spaced two pixels apart in the center of the screen.



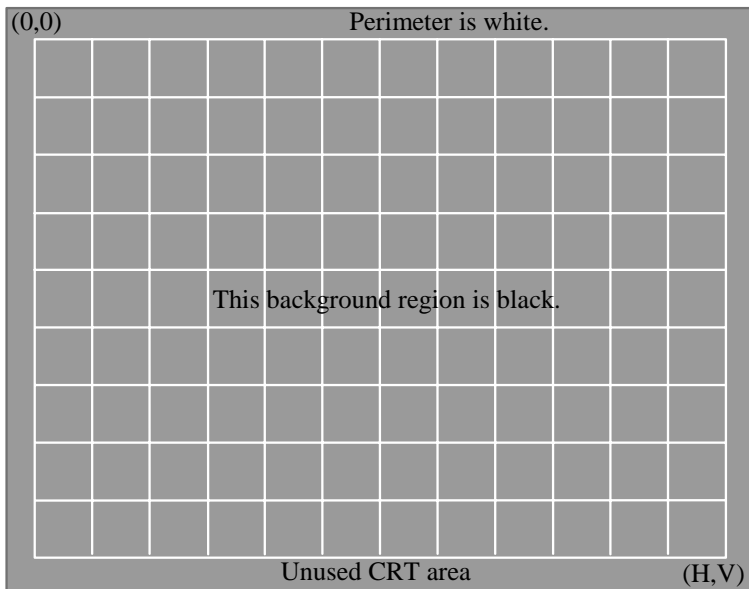
Horizontal Resolution Pattern:

The HORIZONTAL RESOLUTION pattern has a group of white single pixel horizontal lines spaced two pixels apart in the center of the screen.



Crosshatch Pattern:

The CROSSHATCH pattern has equally spaced horizontal and vertical lines. The boxes formed should be square and there must be a minimum of 12 boxes horizontally (9 boxes vertically on a 4 by 3 aspect ratio). Note the test pattern below is not 12 x 9.



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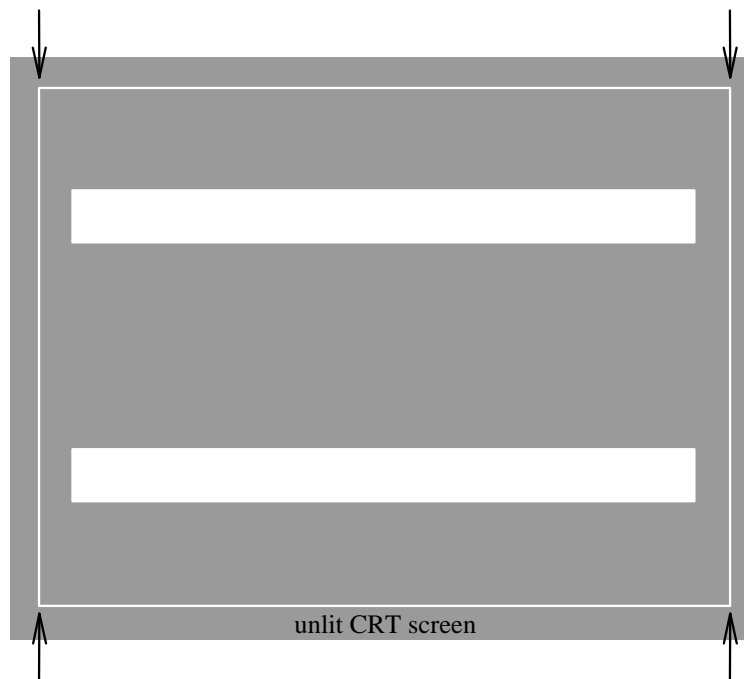
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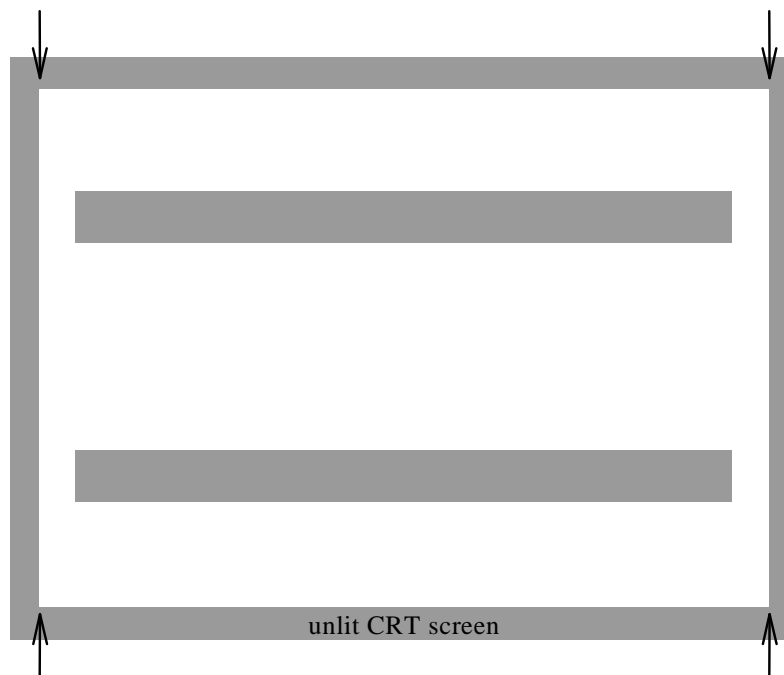
Dynamic Size Regulation: (White on Black Background):

The arrows delineate the vertical lines to be inspected for bending.



Dynamic Size Regulation: (Black on White Background):

The arrows delineate the vertical edges to be inspected for bending.



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**APPENDIX C
DETAILED EDID CONTENTS**

**TABLE 22
HP v75 EDID CONTENTS**

BYTE #	DESCRIPTION	DATA HEX	REMARKS
00 - 07h	Header	00, FF, FF, FF, FF, FF, FF, 00	
08, 09h	Manufacturer Code	xx, xx	HWP
0A, 0Bh	Product Code	xx, xx	2634
0C - 0Fh	Serial Number	01, 01, 01, 01	
10h	Week Manufactured	xx	
11h	Year Manufactured	xx	
12h	EDID Version	01	1
13h	EDID Revision	03	3
14h	Video Input	68	0.700V,0V Analog RGB Color Separate Syncs
15h	Max. Horizontal Size	20	32 Cm
16h	Max. Vertical Size	18	24 Cm
17h	Gamma + S/N Encoding	xx	
18h	Feature Support	EA	Standby, Suspend and Active OFF supported
19 - 22h	R, G, B, White	xx, xx, xx, xx, xx xx, xx, xx, xx, xx	Chromaticity data
23h	Timing I	A4	720x400@70, 640x480@60, 640x480@75
24h	Timing II	42	800x600@75, 1024x768@75
25h	Mfr.'s Reserved Timing	00	Not Used
26, 27h	Standard Timing ID #1	31, 59	640x480 85Hz
28, 29h	Standard Timing ID #2	45, 59	800x600 85Hz
2A, 2Bh	Standard Timing ID #3	61, 59	1024x768 85Hz
2C,2Dh	Standard Timing ID #4	81, 80	1280x1024 60Hz
2E,2Fh	Standard Timing ID #5	01,01	Unused blocks
30 - 35h	Standard Timing ID	01, 01, 01, 01,	
36 - 47h	# 6-# 8 Monitor Descriptor 1	01, 01,	
		EA, 24, 00, 60, 41,00, 28, 30, 30, 60, 13, 00,	Prime Mode: 1024x768 85 Hz
48 - 59h	Monitor Descriptor 2	38, EA, 10, 00, 00, 1E	
		00, 00, 00, FD, 00, 32,	Vertical : 50 - 160 Hz
		A0, 1E, 46, 0B, 00, 0A,	Horizontal : 30 - 70 kHz
		20, 20, 20, 20, 20, 20	Pixel Clock : 110 MHz



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TABLE 22
HP v75 EDID CONTENTS

BYTE #	DESCRIPTION	DATA HEX	REMARKS
5A - 6Bh	Monitor Descriptor 3		GTF not supported
		00, 00, 00, FC, 00,	
		48, 50, 20, 76, 37, 35, 0A	HP v75
6C - 7Dh	Monitor Descriptor 4	20 , 20 , 20 , 20 , 20	
		00, 00, 00, FF, xx, xx,	Serial Number
		xx, xx, xx, xx, xx, xx	
		xx, xx, xx, xx, xx, xx	
7Eh	Extension	00	



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**TABLE 23
COMPAQ 7540 EDID CONTENTS**

BYTE #	DESCRIPTION	DATA HEX	REMARKS
00 - 07h	Header	00, FF, FF, FF, FF, FF, FF, 00	
08, 09h	Manufacturer Code	xx, xx	HWP
0A, 0Bh	Product Code	xx, xx	2632
0C - 0Fh	Serial Number	01, 01, 01, 01	
10h	Week Manufactured	xx	
11h	Year Manufactured	xx	
12h	EDID Version	01	1
13h	EDID Revision	03	3
14h	Video Input	68	0.700V,0V Analog RGB Color Separate Syncs
15h	Max. Horizontal Size	20	32 Cm
16h	Max. Vertical Size	18	24 Cm
17h	Gamma + S/N Encoding	xx	
18h	Feature Support	EA	Standby, Suspend and Active OFF supported
19 - 22h	R, G, B, White	xx, xx, xx, xx, xx xx, xx, xx, xx, xx	Chromaticity data
23h	Timing I	A4	720x400@70, 640x480@60, 640x480@75
24h	Timing II	42	800x600@75, 1024x768@75
25h	Mfr.'s Reserved Timing	00	Not Used
26, 27h	Standard Timing ID #1	31, 59	640x480 85Hz
28, 29h	Standard Timing ID #2	45, 59	800x600 85Hz
2A, 2Bh	Standard Timing ID #3	61, 59	1024x768 85Hz
2C, 2Dh	Standard Timing ID #4	81, 80	1280x1024 60Hz
2E, 2Fh	Standard Timing ID #5	01, 01	
30 - 35h	Standard Timing ID #6-#8	01, 01, 01, 01, 01, 01,	Unused blocks
36 - 47h	Monitor Descriptor 1	EA, 24, 00, 60, 41, 00, 28, 30, 30, 60, 13, 00,	Prime Mode: 1024x768 85 Hz
48 - 59h	Monitor Descriptor 2	38, EA, 10, 00, 00, 1E 00, 00, 00, FD, 00, 32, A0, 1E, 46, 0B, 00, 0A, 20, 20, 20, 20, 20, 20	Vertical : 50 - 160 Hz Horizontal : 30 - 70 kHz Pixel Clock : 110 MHz



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**TABLE 23
COMPAQ 7540 EDID CONTENTS**

BYTE #	DESCRIPTION	DATA HEX	REMARKS
5A - 6Bh	Monitor Descriptor 3		GTF not supported
		00, 00, 00, FC, 00, 43,	
		4F, 4D, 50, 41, 51, 20, 37, 35, 34, 30, 0A	COMPAQ 7540
6C - 7Dh	Monitor Descriptor 4	20 , 20 , 20 , 20 , 20	
		00, 00, 00, FF, xx, xx,	Serial Number
		xx, xx, xx, xx, xx, xx	
		xx, xx, xx, xx, xx, xx	
7Eh	Extension	00	

From: Krill, Rick (Display)
Sent: Friday, August 20, 2004 7:19 PM
To: Warren, Ja'net
Subject: FW: 371237 -APPROVAL REQUIRED

Importance: High
Ja'net,

I approve this 371237 specification with 1 change. Please make the following correction:

Section 10.3.3, Color Requirements, column v75
V75 bucket base and all other plastic parts
From: OOV Gray #4 HP 6009-0302
To: OOV Gray #4 HP 6009-0309

Thanks,

Rick Krill
Phone: 281-514-8139
Fax: 281-514-3153

Hewlett-Packard Confidential



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