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# THOMAS ELECTRONICS

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ENGINEERING DATA SHEET  
CATHODE RAY TUBE  
TE P/N 04M302P53  
November 8, 2001  
SHEET 1 OF 4

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## BRIEF OUTLINE DESCRIPTION

The Thomas Electronics 04M302P53 is a 4 inch round CRT assembly used in a HUD application.

## ELECTRICAL DATA

Focusing Method	Electrostatic
Deflection Method	Magnetic
Deflection Angle	40 Degrees, Nominal
Direct Interelectrode Capacitance	
Cathode to All	5 pf max.
Grid No. 1 to All	5 pf max.

## OPTICAL DATA

Phosphor Number (Note 1)	P53
Fluorescence	Yellow-Green
Phosphorescence	Yellow-Green
Persistence	Medium
Faceplate (Aluminized)	Flat, 82% transmission nominal
Faceplate Thickness	0.192 ± 0.001 inch
Refractive Index	1.59 ± 0.005

## MECHANICAL DATA

Overall Length	9.5 inch nominal
Greatest Diameter of Bulb	4.25 inch
Minimum Useful Screen Diameter	3.6 inch
Anode Contact	Potted Amp or equivalent lead
Base	Potted Lead Package
Mounting Position	Any
Mounting Hardware	Flange, integral part of mu-metal shield

## RATINGS (Absolute Maximum Values)

Heater Voltage	6.7 Volts
Heater Current @ 6.3 Volts	0.275 A
Accelerator Voltage	22,000 max. Volts DC
Focusing Electrode Voltage	4500 max. Volts DC
Grid No. 2 Voltage	750 Volts DC
Grid No. 1 Voltage	
Negative Bias Value	-150 max. Volts DC
Positive Bias Value	0 max. Volts DC
Positive Peak Value	0 max. Volts
Peak Heater-Cathode Voltage	
Heater negative with respect to cathode	150 max. Volts
Heater positive with respect to cathode	150 max. Volts

Specification and price change privileges reserved. For further information, contact:

Thomas Electronics, Inc.  
100 Riverview Drive  
Wayne, NJ 07470  
Tel: (973) 696-5200  
Fax: (973) 696-8298

E-Mail: [sales@thomaselectronics.com](mailto:sales@thomaselectronics.com)

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## TYPICAL OPERATING CONDITIONS

Accelerator Voltage	20,000 VDC
Focusing Electrode Voltage	3500 Volts, nominal
Dynamic Focus Voltage	150 Volts
Grid No. 2 Voltage	350 to 650 VDC
Grid No. 1 Voltage (Note 3)	-52 VDC
Cathode Voltage	0 VDC
Modulation for brightness = 10,000 fl	45 VDC, max.
Writing speed = 23,000 inches/sec, 60 HZ refresh	
Light Output (Note 5)	10,000 fl
Anode Current	275 uAmps, max.
Focus Current	100 uAmps, max.
Brightness Uniformity	15%
Horizontal Line Width @ 10,000 fl	
Center	.007 inch
Spot Position (Note 4)	1.5mm

## MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5 max. Megohms
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## NOTES:

1. Other phosphor screen types can be supplied upon request.
2. Cutoff defined as visual extinction of an un-deflected spot, adjust G2 voltage.
3. Measured in accordance with MIL-E-1 specifications
4. With the tube shielded against external influences, the undeflected and focused spot will fall within a 1.5-mm radius circle concentric with the tube face center.
5. Writing speed = 23,000 inches / sec; refresh = 60 HZ

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## BLEMISHES

### Blemishes

The CRT shall meet the following requirements, unless otherwise specified:

The blemish specification is applicable to the whole of the useful screen area. The mean size of the blemish is defined as the sum of its length and width divided by two:

$$d = (L + D) / 2$$

Blemishes separated by a distance no greater than the size of the larger blemish shall be treated as one blemish.

Blemish Size	Maximum Number Allowed	Minimum Separation
> 0.008 inches	None	---
0.004 to 0.008 inches	5	0.100 inches
0.002 to 0.004 inches	8	0.120 inches
< 0.002 inches	Disregard	---

Less than 0.05 mm equivalent diameter defects are not considered if their number or density permits good legibility.

### Scratches

Scratches of more than 0.05mm width are not allowed. Scratches of under 0.05mm width are acceptable if the density permits good legibility.

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## DEFLECTION COIL

Inductance	Horizontal	107 uH +/- 10%
	Vertical	116 uH +/- 10%
Resistance	Horizontal	0.45 ohms +/- 10%
	Vertical	0.41 ohms +/- 10%
Sensitivity	Horizontal	TBD A nominal for .55 inch deflection at 20KV
	Vertical	TBD A nominal for .43 inch deflection at 20 KV
Orthogonality		+/- 1 degree
Alignment		+/- 1 degree, aligned to horizontal Reference point TBD.

## CRT LEAD INFORMATION

<u>Element</u>	<u>Color</u>
Anode	White, Amp style lead
Focus	White, Amp style lead
Grid 2	Orange
Grid 1	Green
Cathode	Yellow
Heaters	Brown

## ENVIRONMENTAL DATA

Humidity and Salt Spray	To Mil-Std-810, method 507.1 and 509.1
Shock	50 g's, 6 ms duration, half sine.
Vibration	Sine Vibration of 5 to 2000 HZ, at 5g input
	Random of 5 to 2000 HZ, with 08g2/HZ max between 28 and 250 HZ
Temperature	Operation: -31 deg C to 70 deg C
	Storage: -40 deg C to 85 deg C
Altitude	50,000 ft