HANTAREX®

MTC 9000

open frame colour monitor

ADVANCE INFORMATION

COMPATIBILITY

The MTC 9000 has been created bearing in mind its numerous predecessor that are still in daily service, so that its technical specification, its connexions, and its mechanical fixing points are all totally compatible with its antecedants, thus making possible any variation of "crosses" with chassis, picture tubes and metal structures of the old MTC 900 and its derivatives.

INTRODUCTION

The principal new features of the MTC 9000 are as follows:

- All the controls which directly affect the display, horizontal frequency, vertical frequency, vertical amplitude, horizontal amplitude, horizontal phase and vertical shift, are mounted on a small printed circuit board connected to the main board by a connecting cable.
  The monitor is supplied complete with a connecting cable 1.5 metres long, which permits the remote mounting of the control board in the most convenient position for any particular application.

  This "remote" feature is exclusive to the Hantarex MTC 9000.
- Addition of two connectors to each deflexion yoke with inverted connexions which, by choice of connector, permits the easy inversion of the image both vertically and horizontally for certain applications.
- Introduction of a novel circuit into the power supply, which, at an excessive drop in supply voltage, transforms the stabilizer circuit into an anti-ripple circuit so permitting the use of the monitor outside the limits of stabilization.
- Use of a special three-position switch in the video input circuit using close tolerance resitors, permitting the monitor to be connected to input signals varying between 2 and 5 V p.p. without the introduction of tracking errors, which would otherwise cause undesirable colour changes.
- Introduction of a new integrated circuit (TDA 1670) for vertical deflexion which permits the achievement of a short vertical fly-back time (0.9 ms), and extends the use of the monitor where a short vertical blanking period is required.
- Introduction of a new integrated circuit in the horizontal oscillator synchronization circuit, which, among other things, provides for more accurate intervention of the x-ray protection circuit as required by the principal international safety standars, such as F.D.A., the Federal Drug Administration.

TECHNICAL SPECIFICATION

TUBE SIZE	14", 16" and 20"	
POWER REQUIRED (excluding degaussing)	a.c. current*	
	Voltage	115-142 V a.c.
	Frequency	50-400 Hz
	r.m.s. Current	at Ib 0 = 0.3 A at Ib 1 mA, = 0.7 A
	d.c. current**	
	Voltage	155-200 V d.c.
	Current	at Ib 0 = 0.3 A at ib 1 mA, = 0.7 A

*IMPORTANT: It is mandatory to use an isolating transformer with a capacity of at least 100 VA built to local safety standards. Hantarex declines all responsibility for eventual damage or injury caused by non observance of the above standards.

**IMPORTANT: It is mandatory that the d.c. supply is floating, viz. with no reference to earth and/or chassis (as is the case when using Hantarex Power Supply US 300)

POWER REQUIRED (degaussing)	Voltage	220 V a.c. ±20%
	Frequency	50-60 Hz
	Current	4 A for approx 0.2 s
EARTH SAFETY CONNEXION	This connexion must be made to the metallic structure of the monitor which is not separable from the electrical earth.	
SYNC. AND DEFLEXION	Sync. signals	
	Composite:	
	Amplitude	1.5 - 5 V p.p.
	Polarity	positive/negative (switchable by switch on p.c.b.)
	Timing	conforms to t.v. standards ± 10%
	Separate:	
	Amplitude	1.5 - 5 V p.p.
	Polarity	positive/negative (switchable simultaneously*** by switch on p.c.b.)
	H width	1-10 us
	H Freq.	15-16 kHz
	V width	80-1000 us
	V Freq.	45-70 Hz
	H Phase	with standard European t.v. signals the H phase control permits a displacement of the image (of nominal ampl.) of ± 4 cm
	V Linearity	errors < 3%
	H Linearity	errors < 3%
	H Amplitude	with standard European t.v. - signals the H ampl. permits active video of 40-51 us.
	V Amplitude	with standard European t.v. signals the V ampl. permits active video of 16-19 ms.

***The polarity of the separate synchronizing pulses can be different (between H and V) only by modification of the circuit, substituting the switch by a bridge.

VIDEO SIGNAL	Type	RGB anal/TTL compat.
	Polarity	positive, white (high-level)
	Amplitude	2-5 V p.p. (by use of input switch)
	Bandwidth	10 MHz at 40 V pp.
	Rise/Fall Time	< 50 ns at 70 V p.p.

NOTE (a): The MTC 9000 is provided with both horizontal and vertical blanking signals, which permits the use of the monitor with signals without blanking.

(b): The three RGB video amplifiers are d.c. coupled: there is thus no lower limit to the pass band.

PROTECTION CIRCUITS

The MTC 9000 is provided with the following protection circuits:
a) Protection against excessive x-ray radiation.
This circuit is obligatory in many countries, and ensures that, with the worst cathode-ray tube and with a breakdown in any part of the monitor, x-ray radiation will not exceed 0.5 mR/h. This is the international safety limit; however, in practice, statistical measurements made on Hantarex production show that radiation never exceeds 0.1 mR/h.
b) Protection of the Power Supply Unit.
This circuit protects the power unit from accidental short-circuit which could happen during installation or adjustment of the monitor.

DEGAUSSING CIRCUIT:	Demagnetizing	time 5 s
	Time between successive Demagnetizations	< 30 min.

NOTE:
- The monitor must be left switched-off between successive de-magnetizations.
- Normally the degaussing circuit operates automatically each time it is switched on; there is available, on request, an accessory comprising a connector, a cable and a push-button, which provides for manual operation of the de-gaussing circuit.

BEAM CURRENT LIMITER:	Level of limit	1 mA approx.
FUSES:	F1	2 AT (slow-blow)
	F2	3 AT (slow-blow)

NOTE:
Fuse F1 protects the whole monitor with the exception of the de-gaussing circuit. Fuse F2 protects the de-gaussing circuit only.

INSTALLATION

a) Connect to the power source as follows via connector CC:
Contacts 1-2 to an isolated source (see note) of alternating current at 128V, 50-400 Hz capable of supplying 100VA. Alternatively one may use a direct current supply in the range 155-200 V, irrespective of polarity, subject to its being isolated from chassis or earth, as, for example, one of the Hantarex series US 200/US 250/US 300. (see the note)
Contacts 3-4 to the mains supply at 220-240 V a.c., 50-60 Hz.

b) Connect to the signal source as follows via connector CA:
Contact 1 positive video signal BLUE (B)
Contact 2 positive video signal GREEN (G)
Contact 3 positive video signal RED (R)
Contact 4 common signal earth (GND)
Contact 5 vertical sync. (V SYNC)
(or no connexion if using composite sync.)
Contact 6 horizontal or composite sync (H SYNC)

Important
The use of an isolating transformer is obligatory; it needs a power capacity of at least 100VA and to be constructed to meet local safaty regulations. Hantarex accepts no responsability for any harm to persons or property resulting from non-observance of this warning.

Important
It is obligatory that the direct current source shall be «floating», i.e. without any reference to earth or chassis, such as in the case of the Hantarex US 200/US 250/US 300.

c) Connect the Earth wire to the metal structure as prescribed by safety regulations.

d) Set the sync. selector switch (SW4) to adjust the monitor for the type of synchronizing signals available; SW4 functions on both composite sync., and on separate sync. (simultaneously).

e) Set the input selector SW3 to adjust the monitor to accept the level of video signal available; the monitor functions in the range 1.5 - 5 V p.p.

f) If necessary is possible to invert the image (vertically and horizontally) by inserting the connector to the deflexion yoke in position CL.

g) If it is necessary to adjust the controls on the removable control panel (either with the panel inserted in the chassis or connected via its extension lead) the image characteristics are optimized as follows:

H freq. - horizontal scan frequency
Adjust within the range 15.625 +/- 0.3 kHz to obtain the most stable display.
V freq. - vertical scan frequency
Adjust from the condition where the image scrolls upwards to obtain a stable display.
V ampl. - vertical scan amplitude
Adjust for optimum display height.
H ampl.- horizontal scan amplitude
Adjust for optimum display width.
H phase - horizontal phase
Adjust for correct horizontal positioning of the display.
V shift - vertical shift
Adjust for correct vertical positioning of the display.

SETTING-UP SPECIFICATION

regulation or control	test signal	measurement conditions	point of measurement	point of regulation	value
monitor supply voltage	grid		TP10		130 ± 3% V d.c.
horiz. synchronization	grid	set SW4, bridge TP6 & TP7	screen	RV5	adjust to obtain most stable display unbridge TP6 & TP7
vert. synchronization	grid	check 50 & 60 Hz	screen	RV1	adjust to stabilize upward scrolling display
horiz. oscillator supply voltage	grid		TP12		12 v ± 5% V d.c.
vert. oscillator supply voltage	grid		TP13		26 ± 5% V d.c.
video amplifier supply voltage	grid		TP1		24 ± 5% V d.c.
video output stage supply voltage	grid		SP11		190 ± 5% V d.c.
diode modulator	grid	horizontal amplitude RV4 set to minimun	TP9	B3	adjust for maximun *
G2 voltage	grey scale		p.c.b. ZG	TH2 'screen'	set for 600 V d.c. (100:1 probe) **
black level	grey scale	set RV203, 204 & 205 to min & RV 201 & 202 half	screen	RV7	adjust to make the darkest band disappear and the adjacent band just visible
c.r.t. cut-off	none	faintly illuminated screen by G2	screen	RV203, 204 & 205	eliminate the dominant colour by adjustment of the other two colours, adjusting brightness
white level	white field		KR & KG p.c.b. ZG	RV 201 & 202	adjust the level of green and red cathodes to same as blue
focus	dot	medium brightness	screen	TH2 focus	adjust for best focus
horizontal linearity	grid		screen	B1	adjust width of first square equal to last

*The maximun voltage at TP9 can vary between approximately 34 and 50 V d.c. according to the type of c.r.t. used.
**The position of the shaft of G2 is marked with a reference point.

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