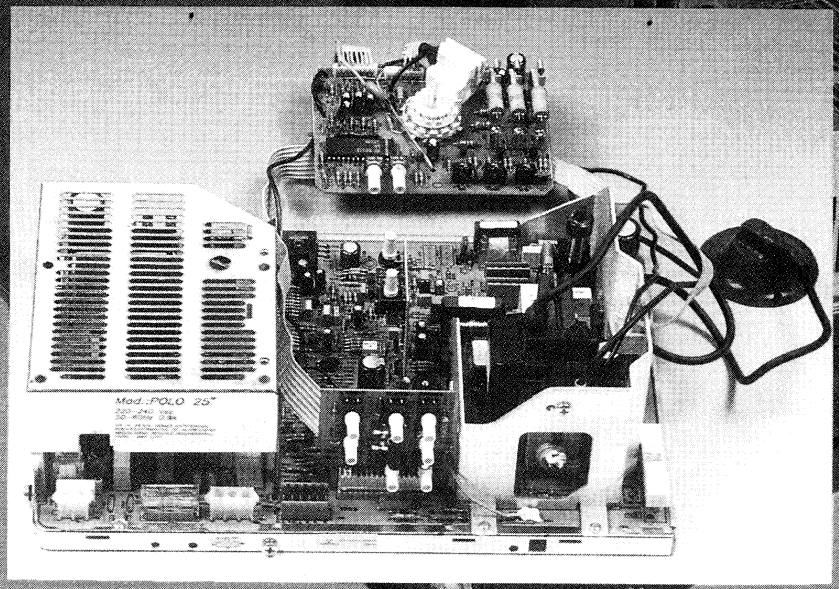
HANTAREX
VIDEOCOMMUNICATIONS

MONITORS POLO

10″
14″
15″
16″
20″
21″
25″
28″
33″

- **MANUALE DI SERVIZIO**
- **SERVICE MANUAL**
- **HANDBUCH**
- **MANUAL DE SERVICIO**
- **MODE D'EMPLOI**



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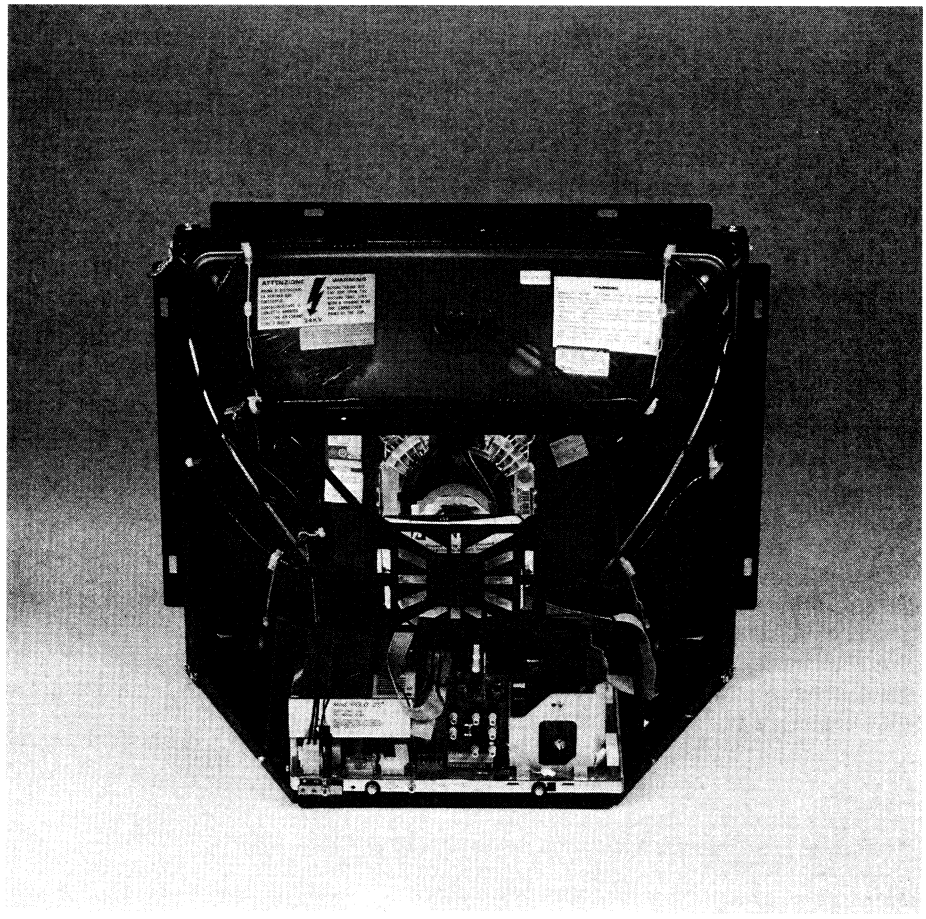
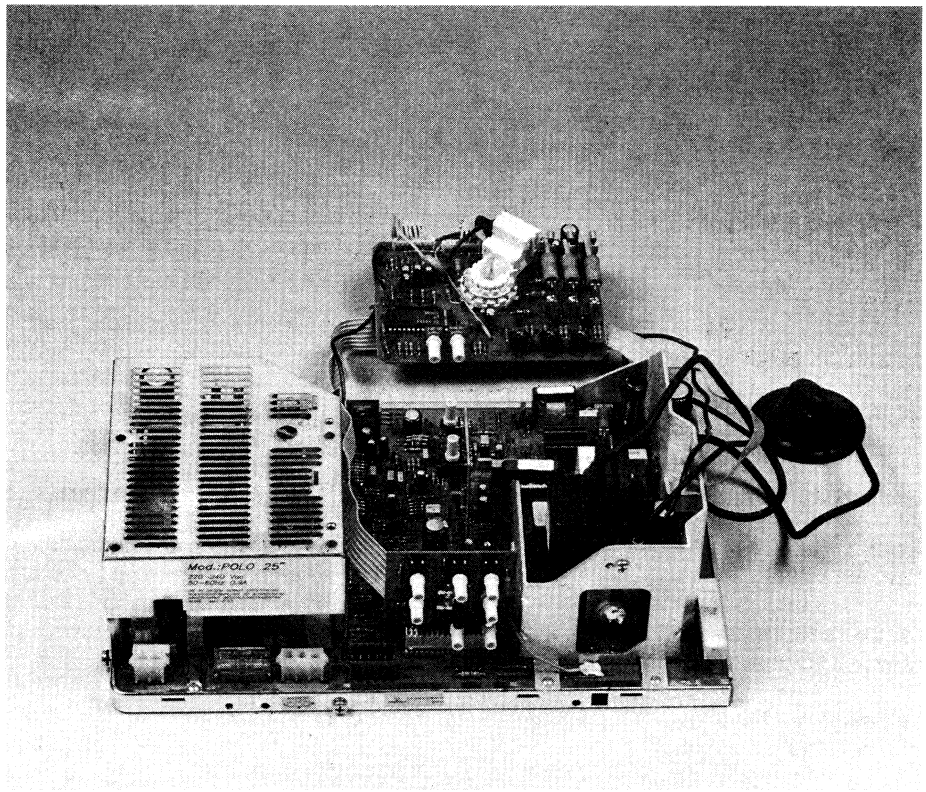



Mod.:POLO 25"

ENGLISH

SAFETY INFORMATION

1) MAINS SUPPLY
The mains supply to the monitor (230 V~. Europe / 110 V ~ USA) must include an earth connexion to the monitor metal frame, by means of the earth post provided, to ensure maximum protection from electric shock, as required by international standards for Class I apparatus.

2) X-RADIATION
The chassis has been designed to avoid x-ray radiation; moreover, a special safety circuit guarantees that radiation ever exceeds 0.5 mR/h, never under fault conditions.

3) E.H.T.
Dangerous high voltages are present inside the monitor that could be harmful to personnel. For any servicing requirement, it is recommended to call upon specialized personnel.

4) CATHODE-RAY TUBES
The cathode-ray tubes used in Hantarex monitors are constructed and certified to be implosion resistant. They are, however, high vacuum components whose surfaces are subjected to high external pressure. It is therefore necessary to take care to avoid knocking them with the risk of possible implosion and possible flying glass splinters. It follows that personnel involved in their installation should use gloves, spectacles, and protective clothing whenever inserting or substituting a cathode-ray tube.

5) **WARNING**!
a) Whenever voltage checks are to be made in the primary circuits of the power suppply, using a digital voltmeter or an oscilloscope, it is necessary to isolate the monitor from the mains supply by means of an ISOLATING TRANSFORMER also taking care that the instruments are disconnected from earth.
This precaution is not necessary when making measurements in the monitor section (deflexion and video), nor in the secondary circuits of the power supply.

b) The isolating transformer for the above purpose should have following characteristics:
Input 230 V~; Output 230 V~ 200 W minimum.

c) Following any inspection on the power supply unit, the metal safety cover and the screen below the printed circuit board must both be replaced as well as the relative earthing cable.

6) **SAFETY STANDARDS**
POLO monitors manufactured from April/96 are certified by IMQ in accordance with European standard EN 60065. Class I with earth connexion.
The electronic circuit of POLO monitors destined for the USA are made in compliance with the UL 1950 (FILE E 106786) and CSA-C 22.2 n. 950 (FILE LR 94960) safety standards.

RECOMMENDATIONS FOR INSTALLATION ON OTHER EQUIPMENT

1) The mains input connector should be easily accessible and it and the connecting cable should be rated for the total power consumption of the machine, (e.q. up to 6A capacity with a lenght not exceedind 2 m and a cable cross section of 0.75 mm^2)

2) Extension cables are not to be used with the risk of poor contact and consequent overheating and fire hazard.

3) The structure into which the monitor is mounted must provide for complete protection from any accidentally spilt liquid entering the inside of the monitor.

4) The monitor must not be used in excessively high ambient humidity so as to prevent electric discharge.

5) The machine must be provided with a double pole switch to provide for instant isolation whenever necessary.

6) The mains input supplying the machine, in addition to being switched, must be positioned in the immediate vicinity of the switch and be easily accessible.

7) The machine should not be exposed to direct sunlight which would cause overheating.

All the above suggestions are directed to satisfactory operation, long life and complete safety and protection of operators and users.

GENERAL TECHNICAL CHARACTERISTICS

1) MAINS INPUT
180 - 264 V~ 50 Hz (Europe) / 80 - 130 V~ 60 Hz (U.S.A.)

2) DEGAUSSING
Automatic at switch on. 230 V~ ±20% (Europe); 110 V ~ ± 20% (U.S.A.)

3) INPUT POWER
Monitors with 90° c.r.t. at maximum contrast and brightness, 80 W
Monitors with 110° c.r.t. at maximum contrast and brightness, 100 W
Monitors 25 kHz with 110° c.r.t. at maximum contrast and brightness 130 W

4) INRUSH CURRENT
<25 A peak.

5) VIDEO INPUT SIGNAL
RGB positive going with input inpedance of 1 kΩ. Sensitivity 1.5 - 4.0 V p.p.

6) VIDEO BANDWIDTH
15 MHz -3 dB.

7) HORIZONTAL FLYBACK TIME
15.7 kHz: 11.5 μs.
25 kHz: 6.5 μs.

8) VERTICAL BLANKING PERIOD
0.9 ms.

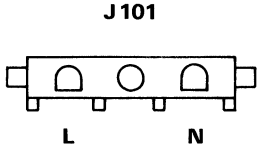
9) SYNC. INPUT
Horizontal and vertical, composite or separate negative and CVBS signal with automatic selection. Input impedance 1 kΩ. Input level 1.5 - 4 V p.p.

10) HORIZONTAL and VERTICAL SCANNING FREQUENCIES
Horizontal 15,700 ± 500 Hz adjustable (and 25 kHz)
Vertical 45 - 65 Hz adjustable.

11) WORKING TEMPERATURE
0 - 50°C

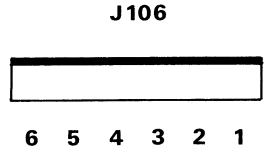
12) MONITOR CONTROLS
Horizontal frequency-phase-amplitude-linearity; vertical frequency-shift-amplitude-linearity; contrast, brightness, focus, trapezium and pin cushion correction and d.c. deflexion control. (The d.c. line voltage of POLO monitors is factory adjusted and should never be alterated by the adjustment potentiometer. Other feed voltages are dependent upon this setting and incorrect setting will result in faulty operation and will affect reliability. For checking voltages see the attached circuit diagram).
Adjustment of horizontal amplitude stretches the image, permitting the display of signals with an active video time of only 39 μs .

MAINS INPUT, SIGNAL INPUT, AND DEFLEXION YOKE CONNEXIONS DIAGRAM



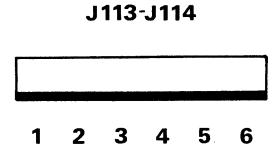
MAINS SUPPLY

230 V~ EUROPE
110 V~ U.S.A.



INPUT SIGNALS AND SYNCS.

1 = R
2 = G
3 = B
4 = EARTH
5 = VERT. SYNC.
6 = HORIZ. SYNC. OR COMP. SYNC.



DEFLEXION YOKE

1 - BROWN] VERTICAL DEFLEXION
2 - RED
3 - BLACK] POWER SUPPLY
4 - BLACK
5 - ORANGE] HORIZONTAL DEFLEXION
6 - YELLOW

PROCEDURE FOR INSTALLATION, CHECKING AND ADJUSTMENT

1) MAINS SUPPLY 230 V~. Europe / 110 V~ U.S.A.
Insert a mains lead into the 3-way input connector (J101) using a cable of suitable dimensions in accordance with standard EN 60065. Take care that the colours of the wires in the cable are inserted into the correct positions for "live" and "neutral", by following the indications printed on the monitor p.c.b.
For connecting the earth wire of the mains cable, use the termination, the screw and the stainless steel washer provided and fasten securely to the threaded metal post on the metal framework. **The central pin of the J101 connector must NOT be used,** it being of insufficient dimensions to carry the current set by international safety standards.
The correct method of connexion is shown in the illustration on page 10.

2) VIDEO SIGNAL AND SYNC. CONNEXIONS
Insert the signal input cable into the 6-way connector J106 paying attention to the correct sequence of the colour inputs that is printed on the monitor p.c.b. **N.B. the sequence is RGB and NOT BGR as on earlier models.**

3) POSITION OF THE DEFLEXION YOKE CABLE
As two connectors (J 113 & J 114) are provided with cross connexions, the deflexion yoke cable should be moved into the adjacent connector should the image be inverted both vetrtically and horizontally.

4) DEFLEXION ADJUSTMENT
Adjust the trimmers situated on the remote control board CR according to the requirements of the video signals. Following those adjustments, any trapezoidal or pin cushion distortions should be eliminated by use of the trimmers on the EAST/WEST BOARD JA.
The trimmers on both those modules have their functions printed on the p.c.b.

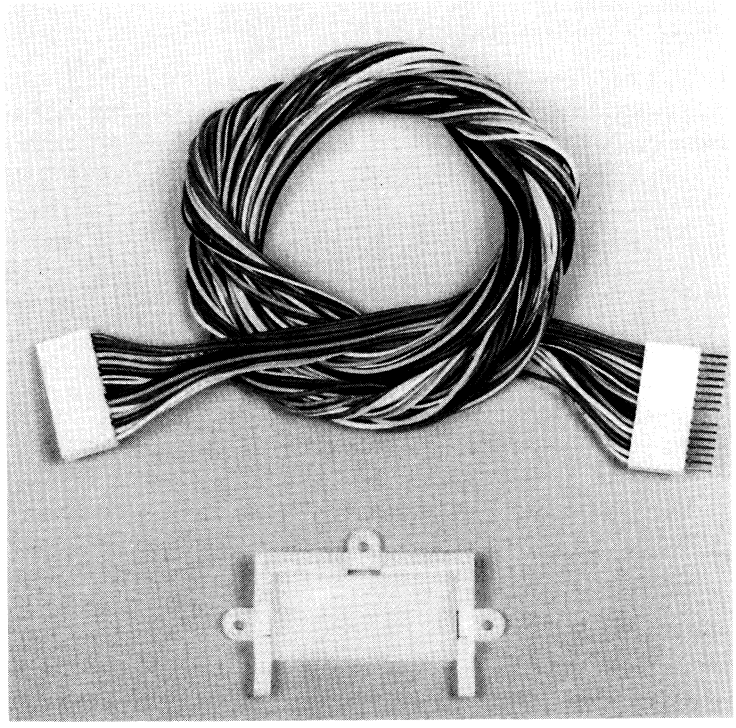
5) BLACK AND WHITE LEVEL SETTINGS
Polo monitors are factory adjusted with optical instruments for measuring the colour co-ordinates of the c.r.t. to obtain the correct colour temperature white.
Should it be necessary to adjust that pre-alignment, following the ensuing instructions:

BLACK LEVEL
a) Leave the monitor turned on for at least 10 minutes.
b) Remove the video signal
c) Set the CUT-OFF trimmers on the c.r.t. base assembly, RV3 (Red), RV4 (Green) and RV5 (Blue) so as to obtain a voltage of 180 V at the collectors of transistors T2, T4 and T6.
d) Adjust the contrast trimmer RV 405 to minimum (anti-clockwise) and the brightness trimmer RV 406 to maximum (clockwise).
e) Adjust the G2 control (situated on the line output transformer and labelled "screen") to obtain a raster that is only just visible.
f) Eliminate the predominating colour by adjustment of trimmers RV3/RV4/RV5 so as to obtain the best grey possible.
This adjustment may be accompanied by an increase in brightness. In that case, the G2 voltage should be reduced to obtain once more a barely visible raster, and the adjustments should be repeated.

WHITE LEVEL
a) Leave the monitor switched on for at least 10 minutes.
b) Remove the video signal
c) Adjust the controls on on the remote control module CR for maximum brightness (RV 406) and contrast (RV 405).
d) Insert the bridge "TEST VIDEO" situated on the remote control module CR into the ON position so as to obtain vertical white lines.
e) Adjust the trimmer RV 1 (Red gain) and RV 2 (Green gain) or alternatively RV 6 (Blue gain) on the c.r.t. neck board to obtain the best white possible.

REMOTE CONTROL

The module CR contains all the image control trimmers and is connected to the mother board by a male connector (J 107); this permits the module to be disconnected from the mother board, and re-connected via a 1.5m extension cable (available as an extra), giving the ability for an operator to make all necessary adjustments from in front of the game cabinet. The extension cable and plastic support for the module can be ordered as «Remote Control Unit» code no. 62016260. (See illustration).



DESCRIPTION OF THE FUNCTIONING OF INTEGRATED CIRCUIT (7406) IC102, USED AS A BAR GENERATOR AND A VIDEO BLANKING GENERATOR

Section A/B/C & D/E/F (see attached circuit)

Section A/B/C A vertical bar generator used by an operator for a rapid check on the functioning of the video circuitry and for geometry adjustments. To activate the function generator, move the bridge on the "Test Video" connector mounted on the remote control module into the "ON" position.

Section D/E/F Alternatively it functions as a vertical and horizontal blanking generator in those cases where the logic board does not provide blanking, or where the blanking pulse available is less than 7 μs; **in this way irregular colouration or horizontal fly back lines of differing colours in certain parts of the screen can be eliminated.**

WARNING **As supplied the monitor has the artificial blanking circuit unactivated. To activate this function, remove the bridge P152.**
In this condition, the monitor still functions in the presence of a normal external blanking signal.

Cod. 53889750

SAMBERS
VIDEOCOMMUNICATIONS

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