

MONITOR MTC9300

20"

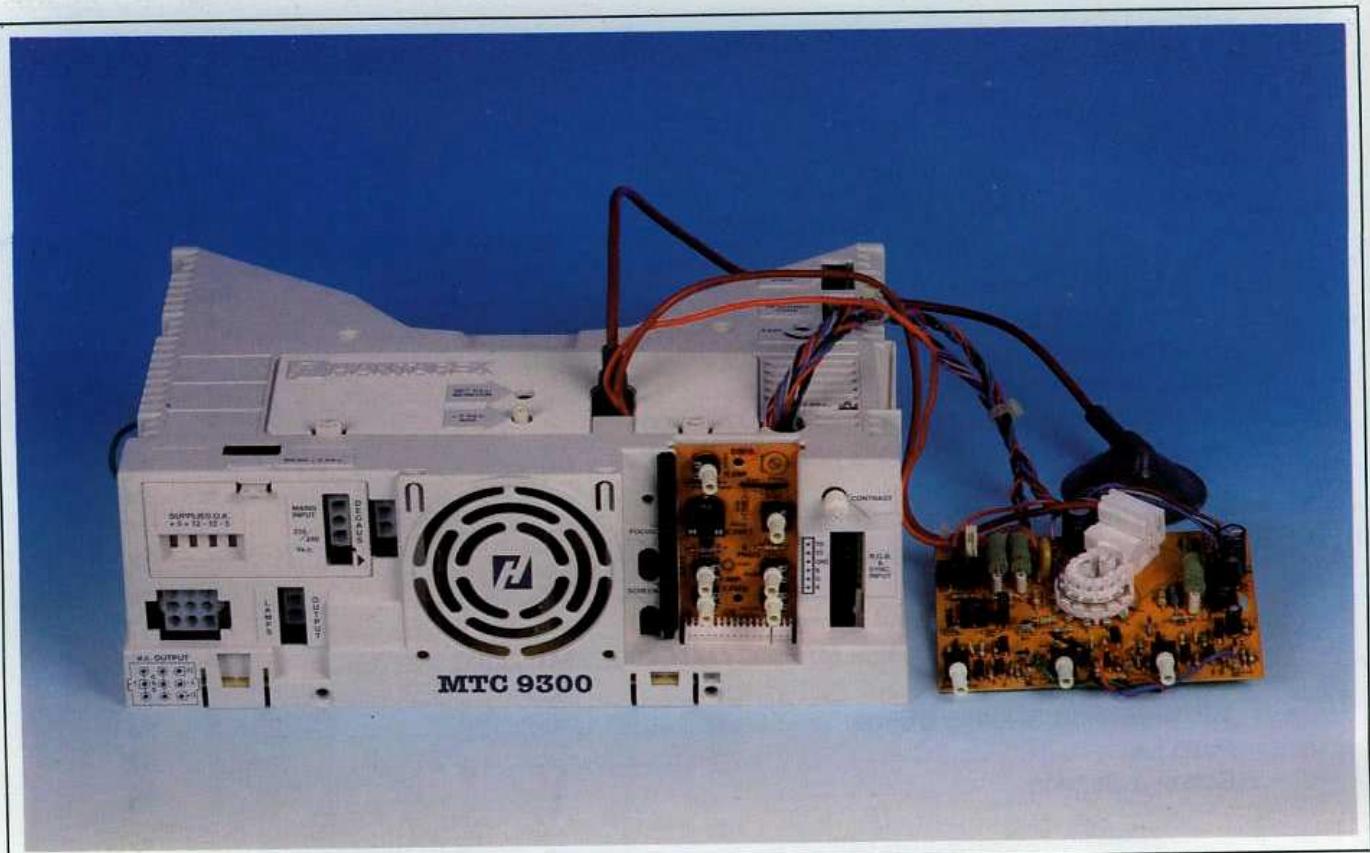
USERS' AND SERVICE MANUAL
MANUALE DISERVIZIO

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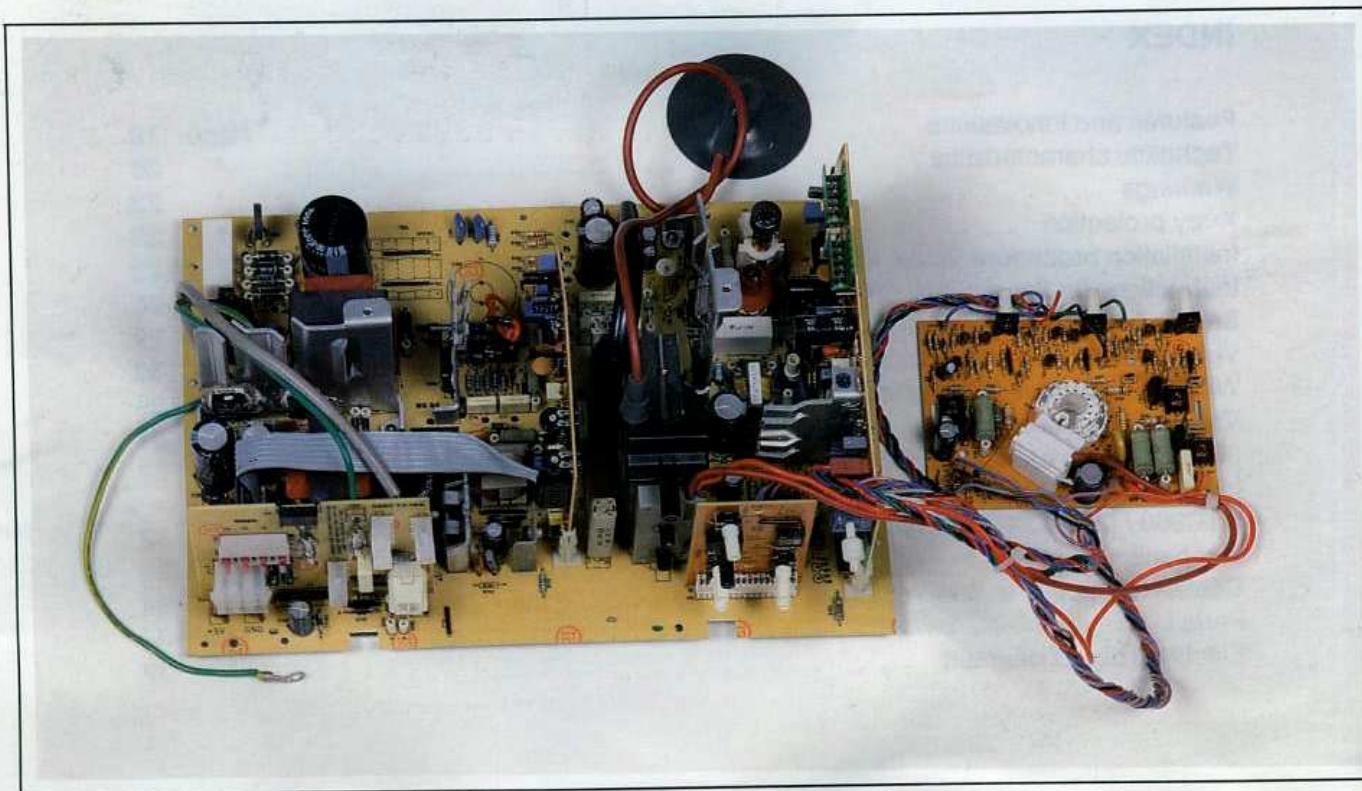
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Assieme elettronica / Electronic assembly, cod. / part 63200640

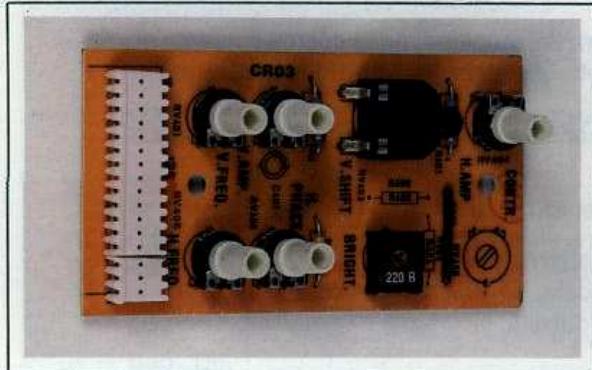
Assieme protezione plastica / Plastic protection assembly, cod. / part 62012750



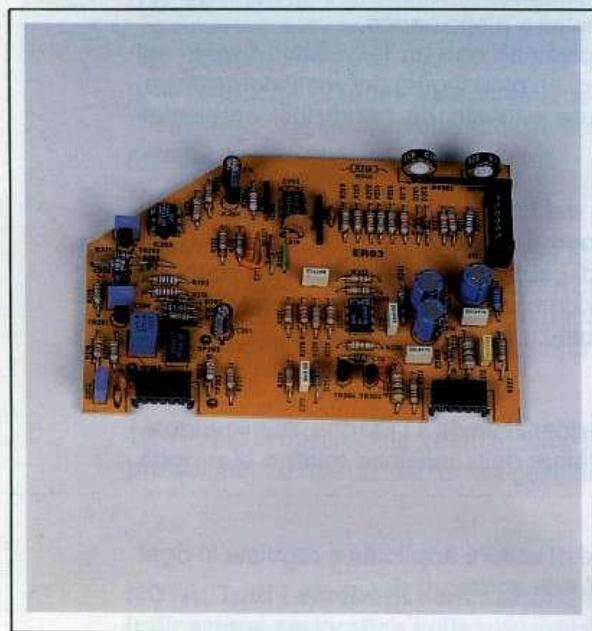
Assieme elettronica / Electronic assembly,
cod. / part 62012690.

Assieme zoccolo cinescopio / C.r.t. socket assembly
cod. / part 62012700

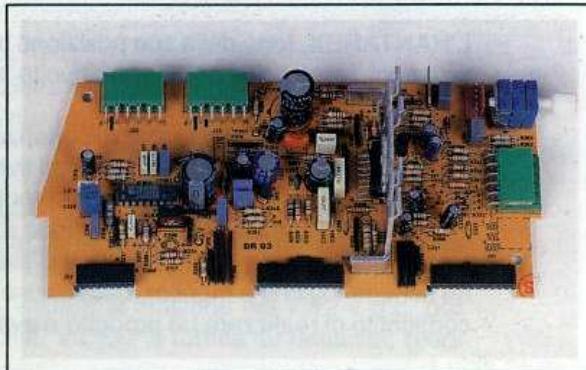
Scheda regolazioni / Adjustments card,
cod. / part 62012720



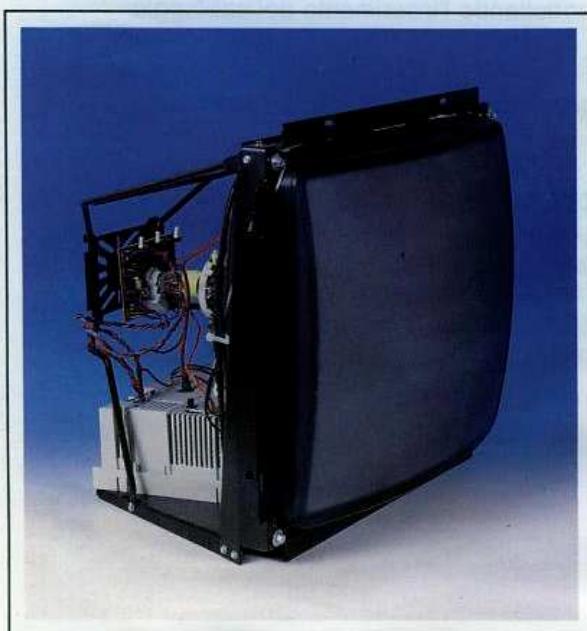
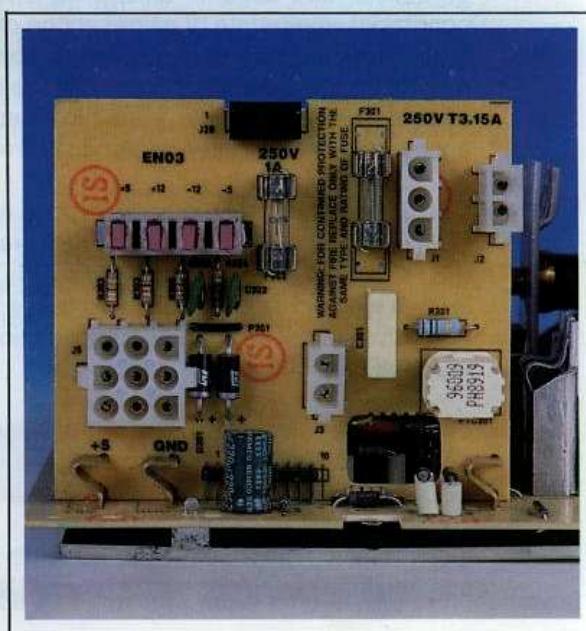
Scheda di pilotaggio alimentazione e stabilizzatore monitor ER
monitor PSU and stabilizer driver card,
cod. / part 62012730



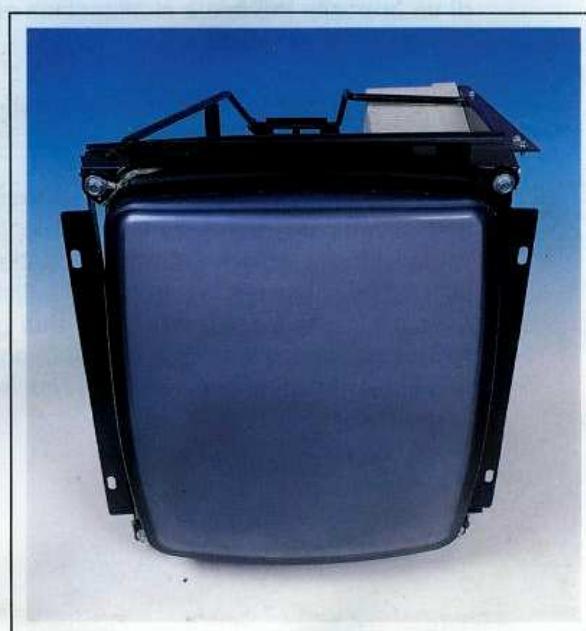
Scheda deflessione orizz.-vert. DR / DR vert.-horiz. deflexion card
cod. / part 62012710



Scheda ingresso rete ed uscite alimentazioni logica EN
Mains input and EN logic power supply card,
cod. / part 62012740



MTC9300 posizione orizzontale / Horizontal position



MTC9300 posizione verticale / Vertical position

MTC 9300 20"

E N G L I S H

PRODUCT DESCRIPTION - FEATURES AND INNOVATIONS

HANTAREX, on the strength of its dominant position in the monitor sector and in a constant search for technical and manufacturing solutions which address its customers' requirements, has created a new monitor named MTC9300.

This product, derived from the experience gained in manufacturing thousands of monitors to date, offers electronic and mechanical solutions of the highest levels.

- The use of particularly advanced technology.
- Well researched technical and aesthetic design.
- The exclusive electronics design criteria, which bring together in one circuit the power supply circuits for both the logic cards and the monitor, the horizontal and vertical deflection circuits, the video amplifier and output stages, have allowed the creation of an advanced product in terms of reliability, safety and versatility.

A specific design study was carried out to create an innovative plastic protection shield which, in addition to protecting the operator from touching potentially hazardous areas at high voltages, also facilitates assembly and disassembly at the time of servicing. The protective shield also acts as a support for the cooling fan, which allows full operation even under the most extreme operating conditions at ambient temperatures of over 50°C under full load. The design also includes a thermostatic protection device mounted on the output Mosfet device heat sink which, in the unlikely event of the fan stopping, or in the case of an unacceptable temperature rise inside the case due to excessive ambient temperature, will come into play by cutting out the power supply to the unit.

The power supply unit for the logic cards and for the monitor is of SWITCH MODE design using FORWARD technology and providing protection against overcurrent and overvoltage. All outputs (+5/-5/+12/-12 V d.c.) are protected against short circuit and against wiring errors which could cause the supply rails to be interconnected. The SWITCH MODE power supply unit uses a Mosfet power device, thus benefiting from fast switching speeds and consequently from low heat dissipation even at maximum loadings.

The power supply outputs for the logic cards are provided with 4 LED indicators which allow correct operation to be checked with ease; the power supply rail being monitored by each LED is indicated by corresponding legends on the plastic protective shield.

Although the electronic circuitry of the MTC9300 is protected as described, each function may easily be adjusted and correctly set without the need for opening the unit.

1.— The two interface connectors J22 and J23 (Normal and Reversed) are located at the top of a dedicated module and are flush with the protective shield to allow for easy cable connexion.

2.— The East-West adjustments and the adjustments to the +5 V d.c. supply are made by rotating the associated shafts, which protrude from the protective shield.

3.— The adjustments which affect the display : horizontal frequency, vertical frequency, vertical amplitude, horizontal amplitude, horizontal phase, vertical centring and luminosity, which HANTAREX has introduced on this new model, are located on a board which may also be used for remote control and which is connected to the main board by means of a connector; this board is mounted in two guides formed on the outside of the case in order to allow the board to be extracted without having to open the case. The board is provided with a hole which allows the insertion of a screwdriver or similar tool for its removal simply by pulling it upwards. (See photo on page 30).

- 4.— The fuses are easily accessible by opening a flap on the plastic protection cover.
- 5.— Innovative electronic circuitry allows automatic synchronization selection, whether these be composite, separate, positive or negative, without the need for manual intervention.
- 6.— In order to allow the use of the MTC9300 monitor with inverted video signals, HANTAREX has developed an interface board which may be fitted to the right-hand side of the protective shield, where two guides are provided for its mounting. The top of the protective housing is provided with a hole which allows the cabling to be inserted as well as the routing of the +12 V d.c. supply to the interface board. NOTE: The "INVERSE VIDEO BOARD" is supplied separately to order. (See page 30).
- 7.— A card which monitors and displays on a two-digit display the level of the +5 V d.c. supply may be fitted in the upper part of the protective housing. NOTE: The "VOLTMETER BOARD" is supplied separately to order. (See page 31).
- 8.— With a view to offering a constant level of accurate and complete service to its customers, HANTAREX has designed a board for the purpose of completing the machine wiring; this is known as the "Service Board". See page 29.
- 9.—The monitor is supplied with a plastic adjustment tool which, when inserted in the appropriate holes in the protective housing, allows the adjustment of the FOCUS and SCREEN potentiometers, which are situated within the housing, on the line output transformer. After use, the tool should be stored by clipping it into the retaining clips provided. (See page 27).
- 10.- The protective housing should be removed only for servicing, when access is required to the electronic circuitry. The procedure to be followed for its removal is described on page 26.

NOTE: All connexions and adjustments of interest to the operator are clearly shown by means of appropriate legends printed on the protective safety housing.

ITEMS SUPPLIED WITH THE MONITOR

The MTC9300 monitor is supplied with the following :

- 1 off 2-way connector (for female terminals)
 - 1 off 3-way connector (for male terminals)
 - 1 off 9-way connector (for male terminals)
 - 14 off male terminals (plus 2 spare)
 - 3 female terminals (plus one spare)
 - 2 off M4 screws for fixing of earth wiring
 - 1 off signal input cable, length 1.5 m
- } Consult Parts List for part numbers

GENERAL TECHNICAL CHARACTERISTICS

- 1) MAINS INPUT
180 + 264 V a.c. 50/60 Hz.
- 2) DEGAUSSING
180/264 V a.c., automatic, on switch-on.
- 3) POWER REQUIREMENTS
With 90 CRT at maximum contrast, maximum luminosity, with all secondary power supply rails for logic cards and services at maximum loading, the total power requirement is 210 W max.
- 4) INRUSH CURRENT
< 25 A peak.
- 5) VIDEO SIGNAL INPUT
RGB positive, with 2.2 kOhm input impedance. Input sensitivity from 1.5 to 5 V p.p. For inverted video signal input, see the "INVERTED VIDEO" additional circuit.
- 6) VIDEO BANDWIDTH
14 MHz to —3dB.
- 7) HORIZONTAL FLY-BACK TIME
11.5 μ s.
- 8) VERTICAL FLY-BACK TIME
0.7 ms.
- 9) SYNCHRONISING SIGNAL INPUTS
Horizontal and vertical, positive or negative, composite or separate with automatic selection. Input impedance 2.2 kOhm. Input level 1.5 to 5 V p.p.
- 10) HORIZONTAL AND VERTICAL SCANNING FREQUENCIES
Horizontal 15,700 Hz \pm 500 Hz, adjustable.
Vertical 45 + 65 Hz, adjustable.
- 11) MONITOR CONTROLS
Contrast, brightness, focus, horizontal frequency, horizontal phase, horizontal amplitude, horizontal linearity, vertical frequency, vertical shift, vertical amplitude.

INTERNAL VOLTAGES RELATING TO DEFLEXION, AMPLIFIERS AND VIDEO OUTPUT STAGES

130 V d.c. \pm 2%, 0.5 A max (SP 104)	Line o/p stage
25 V d.c. + 10%, 0.3 A max (SP 107)	Vert. deflection and video amplifier
15 V d.c. \pm 10%, 0.25 A max (SP 108)	Cooling fan supply and 12 V d.c. regulator for horizontal deflection
All the above are short-circuit protected	
200 V d.c. \pm 5%, 0.04 A max (SP 21)	Video o/p stage; protected by means of flameproof fusible resistor (R140 - 10 Ohms)

KEY: SP = Test points described on pages 34, 35 and 36.

OUTPUT POWER SUPPLY VOLTAGES FOR LOGIC BOARDS

+ 5 V d.c. \pm 2%	(min 1 A - max 13 A) adjustable from 4.9 to 5.5 V d.c. - Electronic overload and short circuit protection. Protection against overvoltage with intervention threshold at 6.2 V d.c. max. Residual ripple < 50 mV at full load.
+ 5 V d.c. \pm 2%	(1 A protected by fuse) Panel lamp supply.
- 5 V d.c. \pm 6%	Electronic overload and short circuit protection.
+ 12 V d.c. — 4% +15%	From 0 to 2 A (3 App) electronic overload and short circuit protection. Overvoltage protection threshold at 15.5 V d.c. max.
- 12 V d.c. \pm 6%	Electronic overload and short circuit protection.

The above measurement data were obtained from 9-way connector J5, using all available pins.

- Time output voltages are maintained in the event of mains failure > 20 ms at 220 V a.c.
- Insulation: 1500 V a.c. (class 1 with safety earth in accordance with European Regulation EN 60950).
- Operating ambient temperature range 0°C - 50°C.

WARNINGS

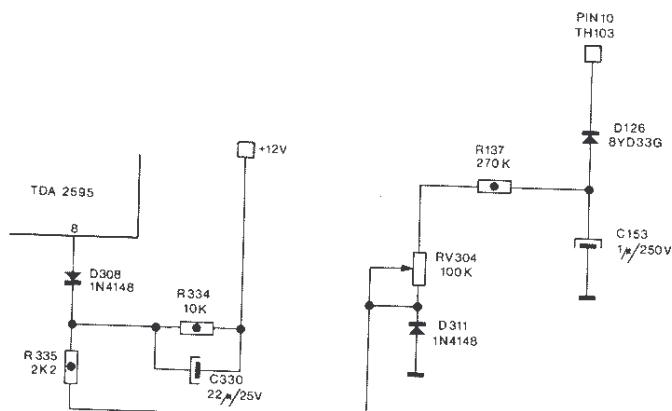
- 1) The MTC9300 monitor must be earthed (see installation procedure).
 - 2) X-RAYS
The chassis has been designed in such a way as to avoid X-ray emissions, and even in the case of a fault developing, special circuitry guarantees that radiation levels will never exceed 0.5 mR/h.
 - 3) EHT
The monitor contains parts which are at dangerously high voltage levels with regard to personal safety. Qualified personnel should be consulted with regard to servicing.
 - 4) CRT
The cathode ray tube is a high-vacuum component, and its external surfaces are subject to high external pressures. Care should therefore be taken to avoid subjecting the tube to knocks, as this may lead to implosion. Consequently service and installation personnel should wear gloves and protective clothing to avoid injury from glass splinters when handling the monitor for servicing or replacement.
 - 5) **WARNING!** When making measurements with a digital voltmeter or an oscilloscope, it is essential to separate the monitor from the mains supply by means of an ISOLATING TRANSFORMER, at the same time ensuring that the earth is disconnected, hence preventing damage to components and ensuring the safety of the operator.
The isolating transformer must have the following characteristics:

Input 220/240 V a.c.

Output 220/240 V a.c., 200 W min.

This precaution is not necessary when effecting measurements of the outputs to feed the logic boards or the monitor (+130 V d.c.)

X-RAY PROTECTION



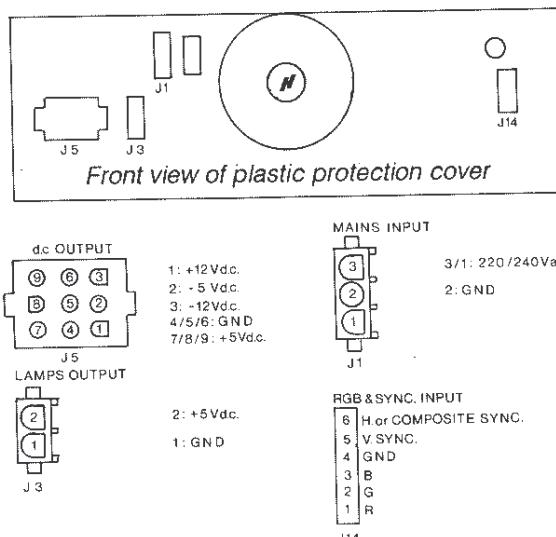
The MTC9300 monitor includes circuitry for protection against X-ray emission. A reference voltage level from a pulse from the e.h.t. transformer is sent via a resistive voltage divider to pin 8 of the TDA 2595 IC.

The voltage level on pin 8 is compared with a precise reference within the IC; when the e.h.t. exceeds 28 KV, the variation in the voltage level on pin 8 triggers a circuit which inhibits the oscillator and consequently inhibits the high-voltage circuit. The circuit continues to block the oscillator until the fault has been repaired. In any case, the monitor will first have to be switched off and then on again to reset the protection.

INSTALLATION PROCEDURE FOR THE MTC9300 MONITOR

- 1.— Connect the 220/240 V a.c. mains supply to the 3-way connector J1 in positions 1-3.
- 2.— Connect an earthing lead to the metal bracket welded to the tube support structure using one of the galvanised M4 screws supplied. See page 27 ref. C.
- 3.— Wire the 9-way connector J5 to provide the power rail voltages to the logic cards, following the wiring details given on the side of the connector. All the low-voltage outputs (+5V/-5V/+12V/-12V) are indicated by means of 4 leds; check the voltage level of the +5V supply rail with a voltmeter, and if necessary adjust by rotating the trimmer which protrudes from the upper part of the protective housing and which is labelled "+5 V d.c. Adj"; the range of this adjustment is from 4.9 to 5.5 V d.c.
- 4.— Wire the 2-way connector J3 to provide a power supply to the panel indicator lamps.
- 5.— Connect the signal input wiring to connector J14.
- 6.— Adjust the various video controls on the CR Control board as necessary (see page 27 ref. 2).

CONNEXION DIAGRAM



WARNING!

In order to achieve a unified production standard for EUROPE/USA monitors, the new wiring layout for the input signal connections is as follows:

- 1.— RED (previous version was BLUE)
- 2.— GREEN
- 3.— BLUE (previous version was RED)
- 4.— BLACK
- 5.— YELLOW
- 6.— WHITE

NOTE

For design reasons, the 9-way connector J5, which is used to provide the power supply voltages to the logic cards, has a different layout from the previous US250/US300. Refer to the diagram for the new layout.

PROCEDURE FOR CHECKING AND ADJUSTMENT OF THE MTC9300 MONITOR

- 1) Check the monitor supply voltage on the yoke connector (black link on terminals 3 - 4): this value should be 130 V d.c. \pm 2%. If necessary, adjust this voltage by means of the trimmer labelled "Set Vdc Monitor" on the plastic housing.

- 2) Horizontal frequency



Adjust RV 406

- 3) Vertical frequency



Adjust RV 401

- 4) Horizontal position



Adjust RV 405

- 5) Horizontal amplitude



Adjust RV 404

- 6) Vertical amplitude



Adjust RV 402

- 7) Vertical shift



Adjust RV 403

NOTE The above adjustment trimmers are located on the CR adjustment card

- 8) East - West



Adjust by means of the shaft which protrudes from the top of the plastic housing labelled "East-West Adj."

9) BRIDGE COIL CALIBRATION

The bridge coil (L 105) is factory-set; however, in the event of the ferrite core being displaced by accident, carry out the following procedure:

- Set horizontal amplitude to minimum by means of trimmer RV 404 on the CR card;
- Rotate the core to obtain the minimum horizontal amplitude;
- Readjust RV 404 to obtain the required horizontal amplitude.

10) ADJUSTMENT OF RGB VIDEO OUTPUT STAGE GAIN

Having connected an RGB video signal source, adjust the BLUE gain control (RV1) located on the CRT socket assembly to the mid-point setting and measure the video signal level on the relevant cathode; adjust this level to 80 V p.p. by means of the contrast control RV 301. Repeat the procedure for the RV 2 green and the RV 3 red cathodes in turn, bringing the signals to the same level by means of the appropriate gain controls.

11) ADJUSTMENT OF BLACK LEVEL AND GREY SIGNAL

- Remove the video input signal.
- Set the c.r.t. grid 1 control RV 101 (base unit) for maximum brightness.
- Set the trimmer RV 407 on the module CR for maximum brightness (fully clockwise).
- Adjust the black level trimmers RV 4 blue, RV 5 green and RV 6 red for a voltage of 150 V d.c. on the collectors of transistors (BF 459) TR 10, TR 11 and TR 12 (adjustment and measurements are made on the c.r.t. base assembly)
- Reduce the setting of c.r.t. grid 2 (SCREEN) on the line output transformer TH 103 so as to leave the dominant colour barely visible, on the c.r.t. screen and adjust the other two colours to obtain the best grey possible, e.g. if green were dominant, then red and blue would need adjustment.
- Adjust the external brightness control on module CR for the desired brightness level.

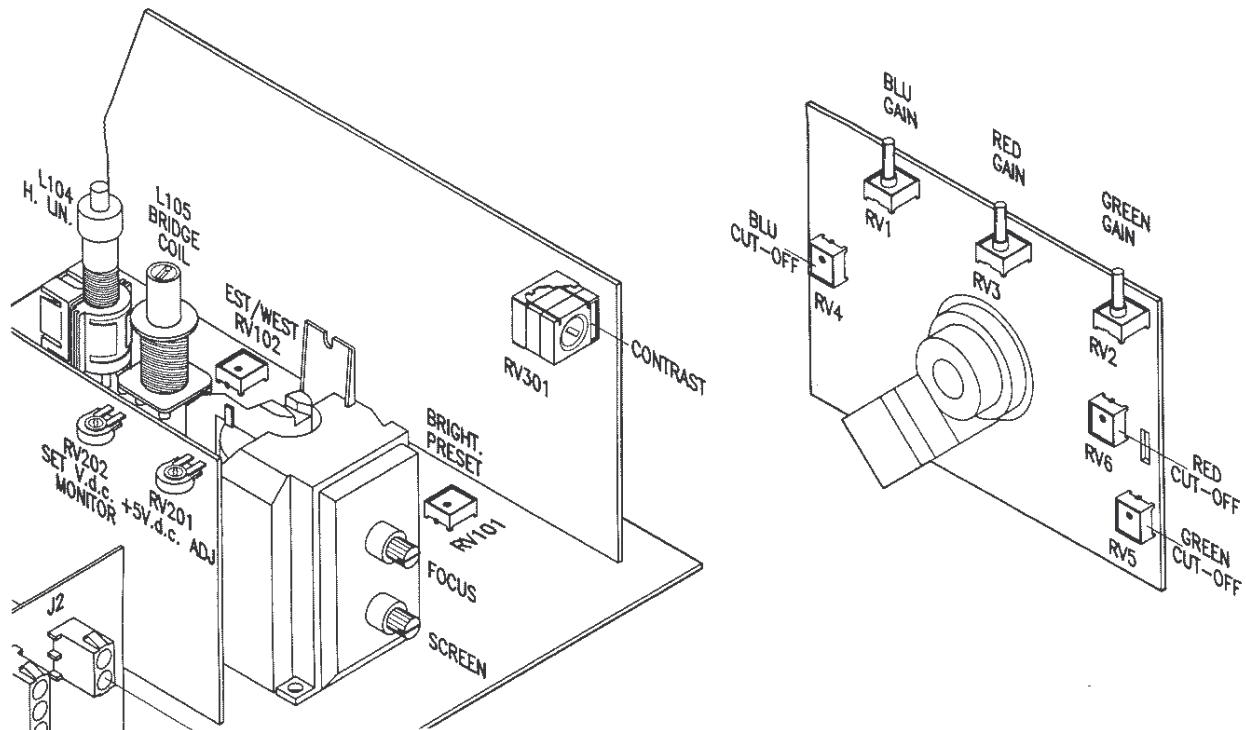
12) FOCUS

Adjust the focus (FOCUS located on line transformer TH 103), with medium brightness, to obtain the best possible picture.

13) HORIZONTAL LINEARITY

Having connected a crosshatch signal to the input, adjust the ferrite core of coil L 104 with a plastic screwdriver until the first square on the right of the picture is the same size as the last on the left.

SILK-SCREENED CONTROL REFERENCES

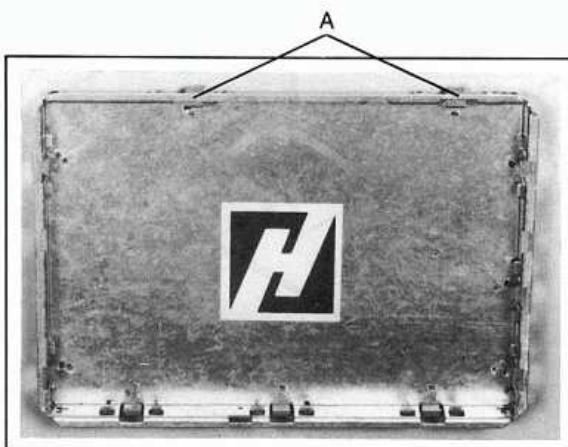


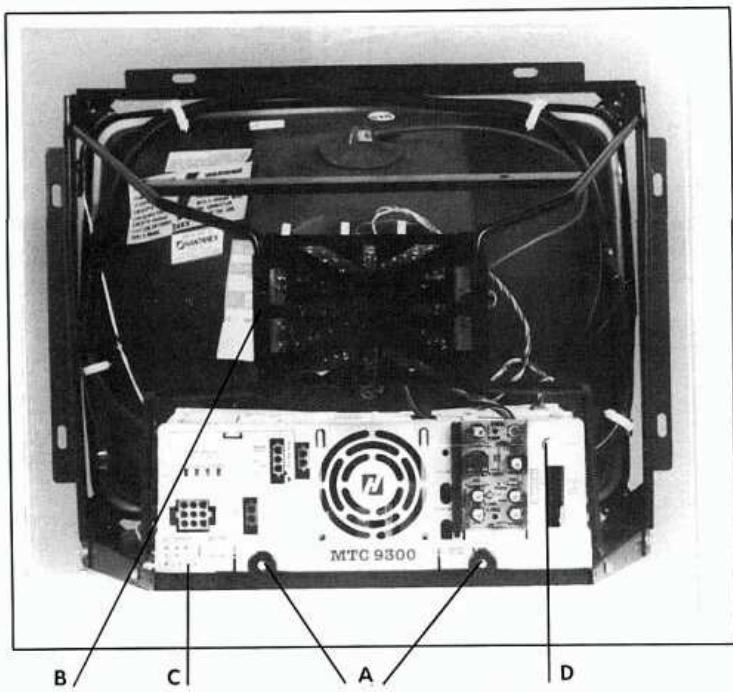
INSTRUCTIONS FOR THE REMOVAL OF THE PROTECTIVE PLASTIC HOUSING

- 1) Unscrew the two handscrews which retain the plastic housing on the metal support chassis. (See page 27 ref. A).
- 2) Remove the plastic grille protecting the c.r.t. socket assembly from the fixing peg on the chassis by flexing the grille laterally. (See page 27 ref. B).
- 3) Pull out the c.r.t. socket assembly, having first disconnected the black earth lead.
- 4) Extract the yoke cables.
- 5) Remove the e.h.t. connector.
- 6) Loosen and remove the screws fixing the earth leads to the common earthing point on the metal chassis. (See page 27 ref. C).
- 7) Disconnect the following connectors: • Mains Input, • Logic Cards Power Output, • Panel indicator lamp output, • Degaussing Braid Output, • Signal Input.
- 8) Pull off the contrast adjustment shaft. (See page 27 ref. D).
- 9) Remove the complete assembly from the metal chassis.
- 10) Pull off the adjustment shaft for the +5 V d.c. supply. (See page 27 ref. 3).
- 11) Remove the upper cover plate by pressing on the two retaining tongues to allow clearance for the c.r.t. socket assembly and the e.h.t. connector; pull out the wiring harness for the cooling fan supply. (See page 27 ref. 4).
- 12) Remove cover plate by depressing the retaining tongue. (See page 27 ref. 5).
- 13) Extract the control card. (See page 27 ref. 2).
- 14) Unscrew the three screws. (See page 27 ref. 6, 7 and 8).
- 15) Place the assembly on one of the 4 sides, insert a screwdriver in the slot next to the retaining catches, depress the retainer slightly towards the outside and pull the printed circuit board from its mounting fixture. Repeat this procedure on the remaining fixing points until the housing is totally free of the electronics. Replace the assembly in a horizontal position and remove the housing by lifting upwards. (See page 28 photo 1).

NOTE: HANTAREX has produced a metal base plate which allows the extraction of the housing from the PCB in one operation in order to simplify the dismantling procedure. It is sufficient to place the assembly in the metal jig with the cooling fan towards the two extraction points shown in the photograph and labelled "A"; light pressure is then all that is required to release the housing. (See page 28 photos 2, 3 and 4).

Part 50121400



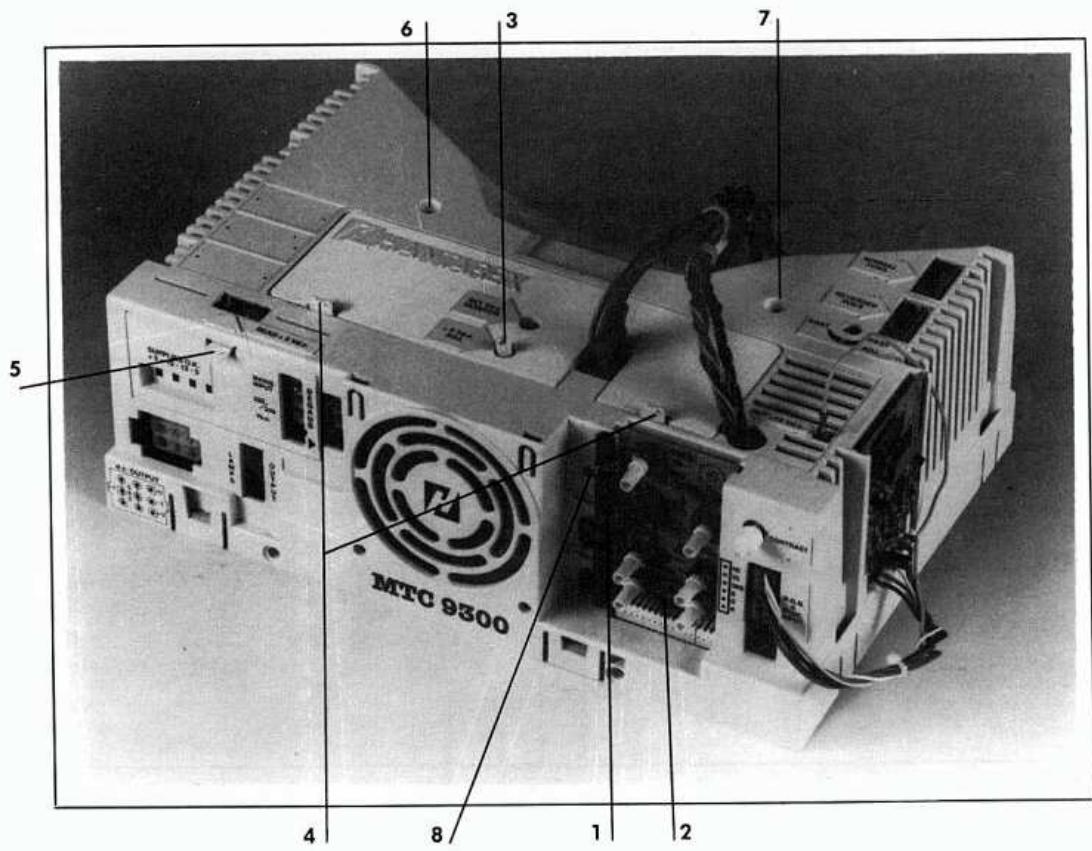


A.— Control knobs

B.— Plastic grill

C.— Earthing posts

D.— Contrast control shaft



1.— Plastic screwdriver

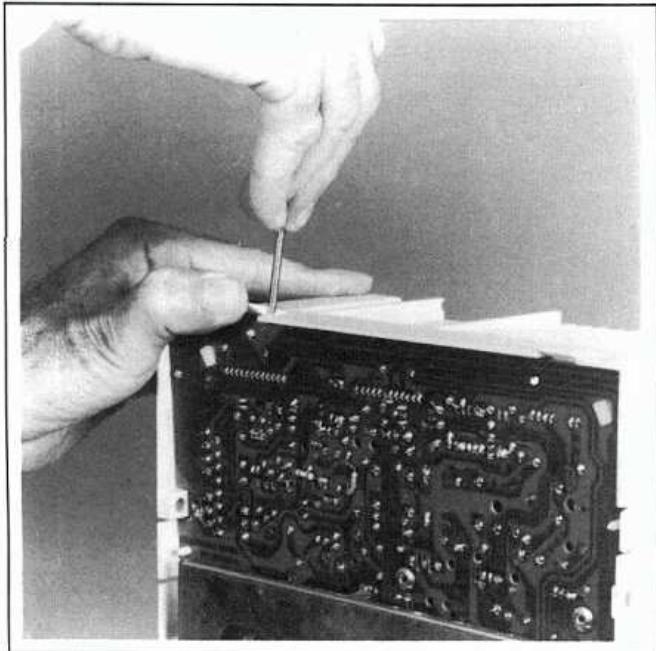
2.— CR board controls

3.— +5 V d.c. control shaft

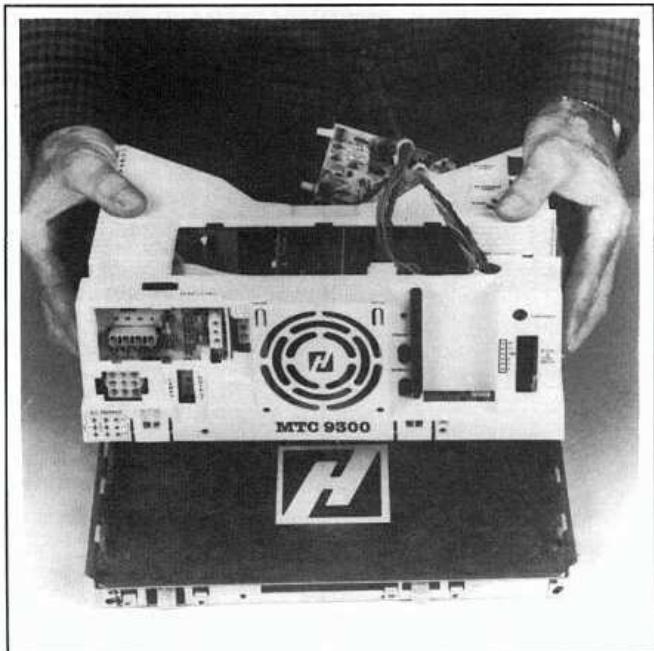
4.— Cover

5.— Fuses access flap

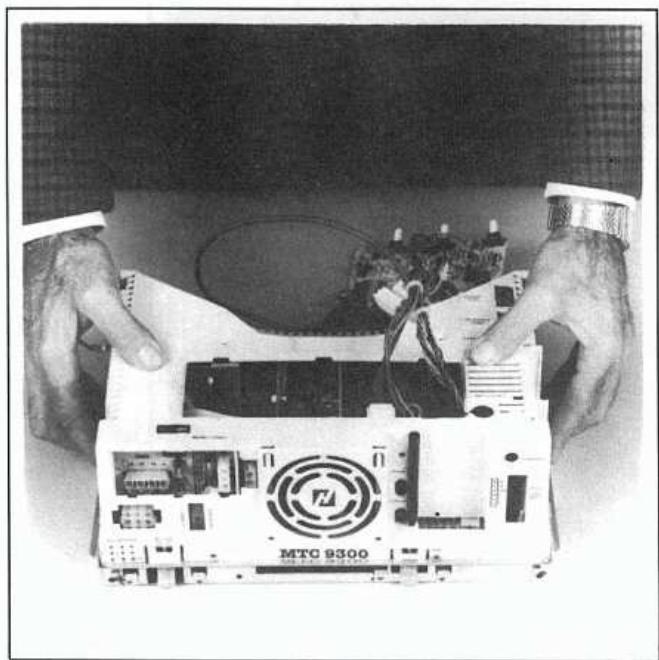
6./7./8./ Fixing screws



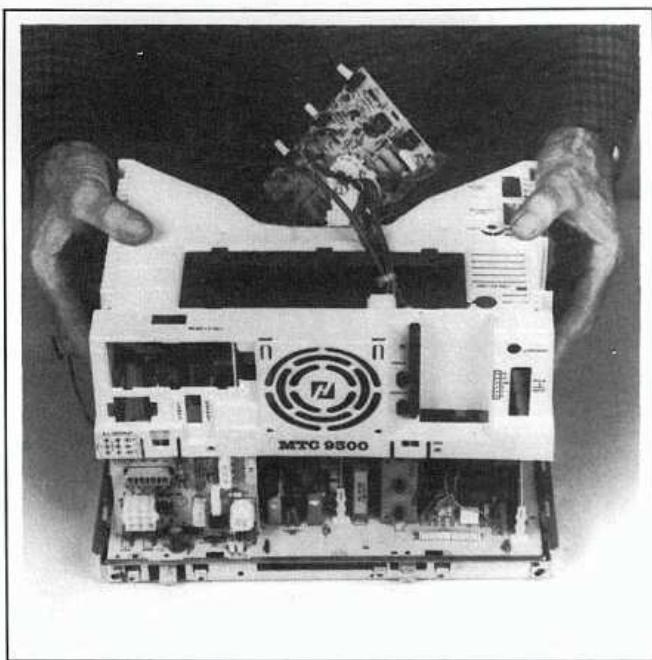
1



2



3



4

SERVICE BOARD

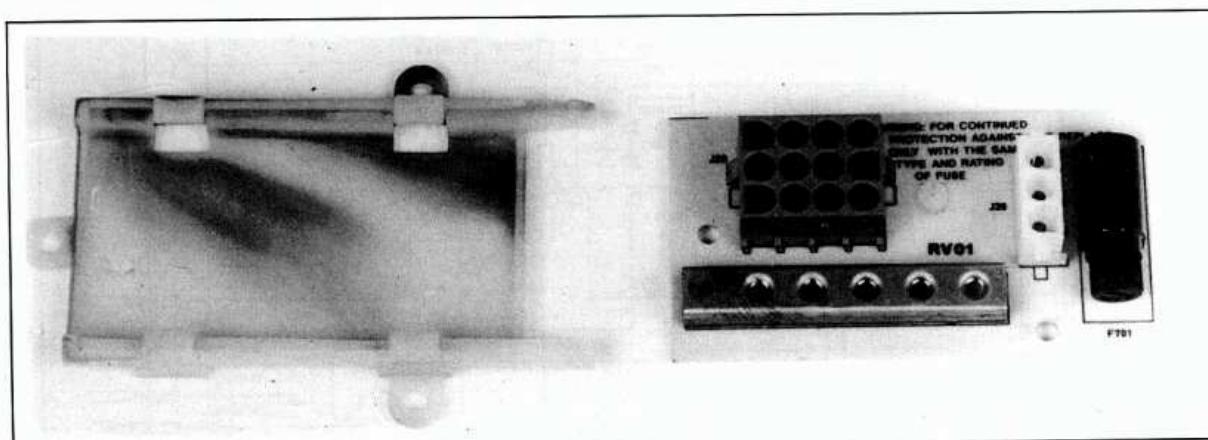
The following items are mounted on this board:

- 1 off 3-way female mains input connector, part 34074630.
- 1 off 12-way female connector for the various units requiring 220/240 V a.c. power, part 34076930; e.g. neon indicators, monitor, 2-pole or single-pole switch, etc..
- 1 off 4 AT protection fuse, part 29100004.
- 1 off fuseholder, part 29100440.
- 1 off metal plate with 5 M4 threaded holes to act as the common earth point for the entire machine: mains input, coin panel, control panel, metal chassis, and any other point which needs to be earthed.

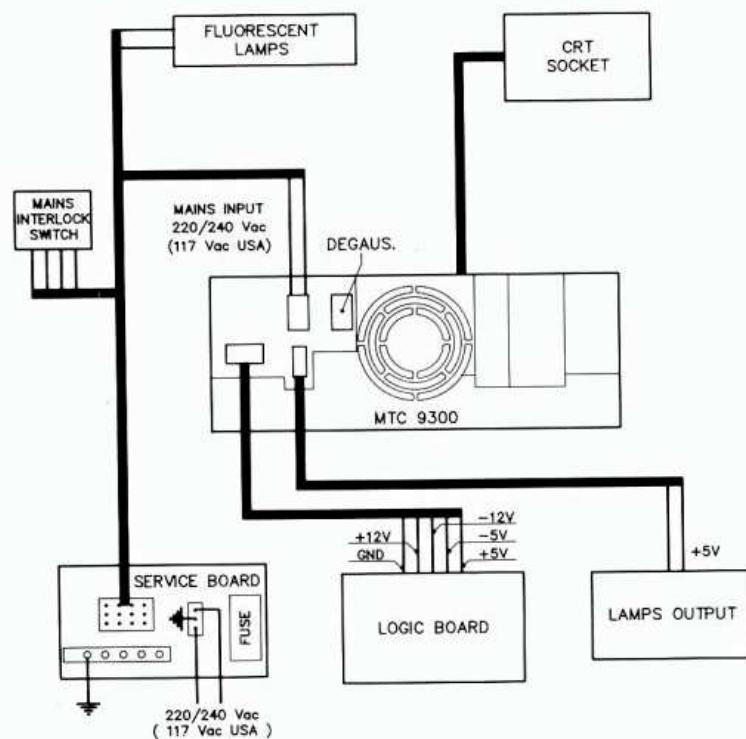
The following items are supplied with the Service Board:

- 1 off 3-way male connector, part 34074010.
- 1 off 12-way male connector, part 34076940.
- 16 off male pin inserts, part 34074550.
- 5 off M4 screws
- 5 off washers 1 off plastic support bracket with three holes for fixing the board in any position of the operator's choice. Part 50429120.

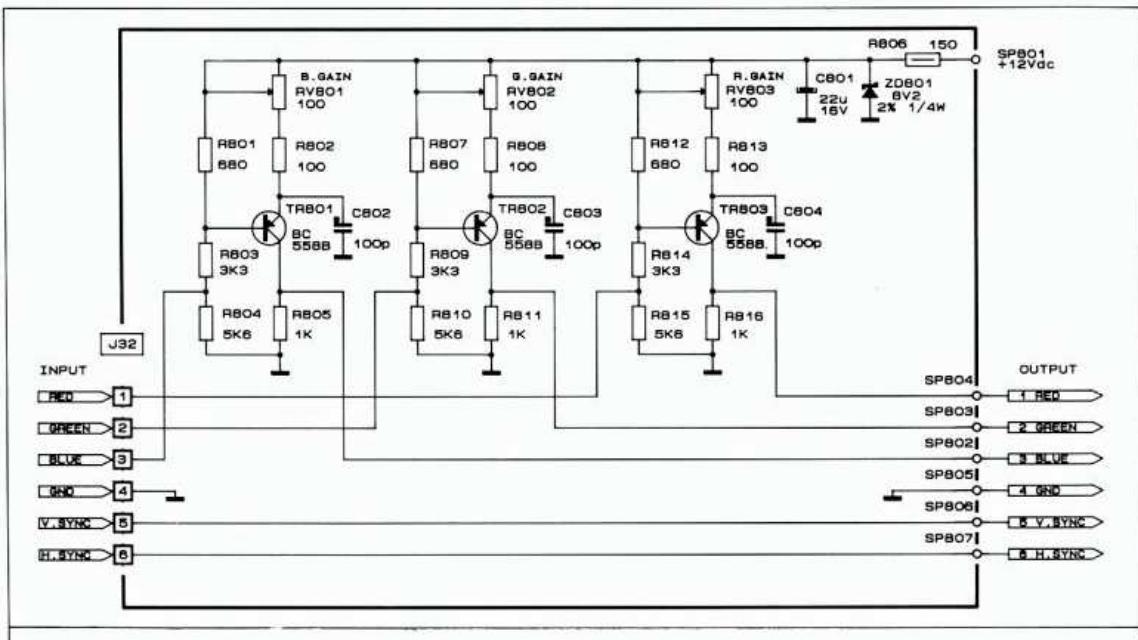
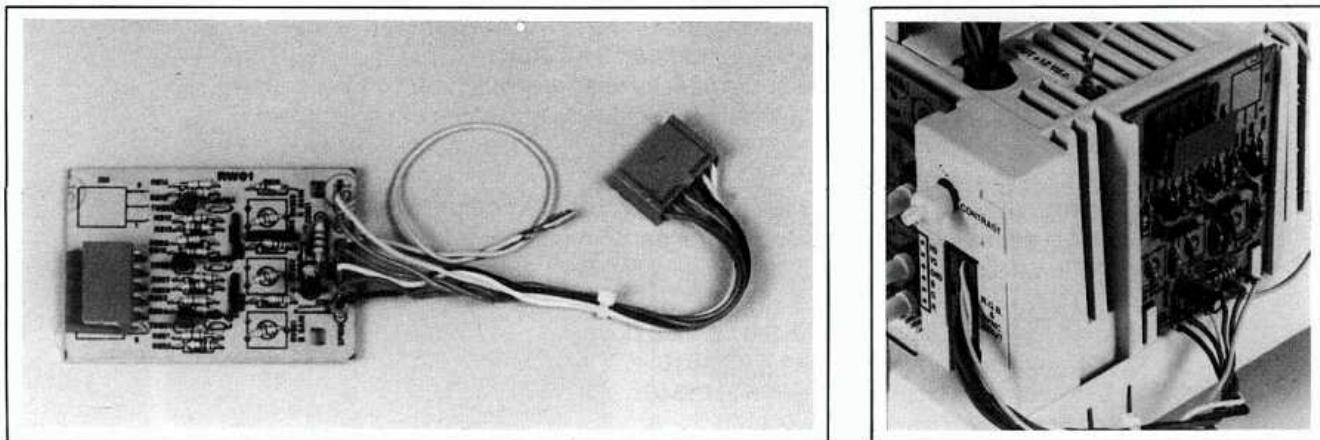
NOTE: The Service Board, complete with all accessories, is supplied as part 62013280.



MACHINE WIRING

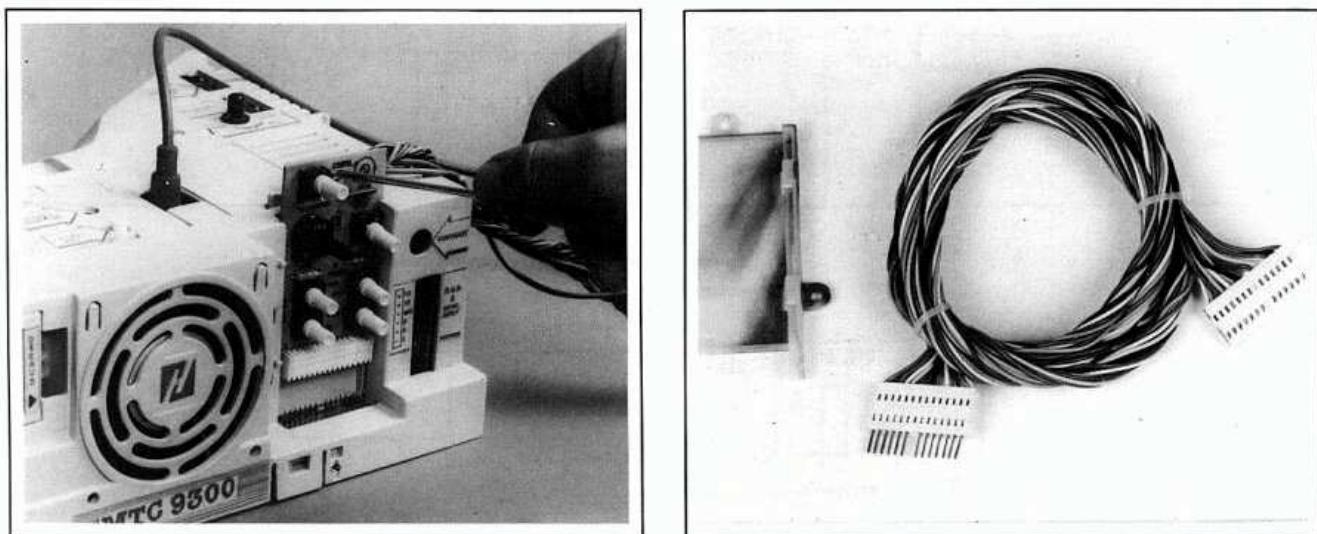


VIDEO INVERTER BOARD - Order as part 62013300

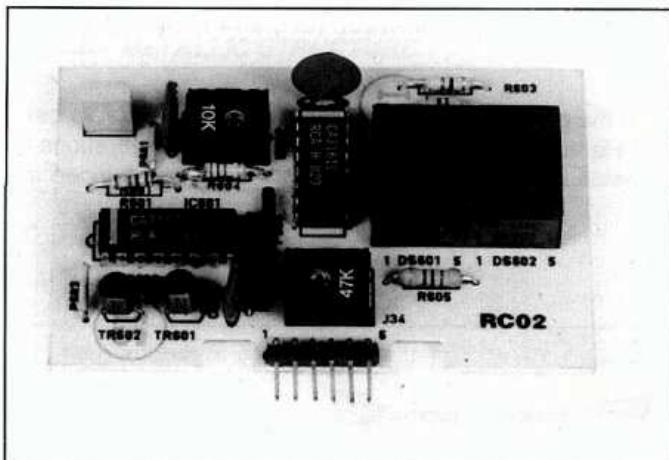


WIRING AND SUPPORT BRACKET FOR REMOTE CONTROL BOARD

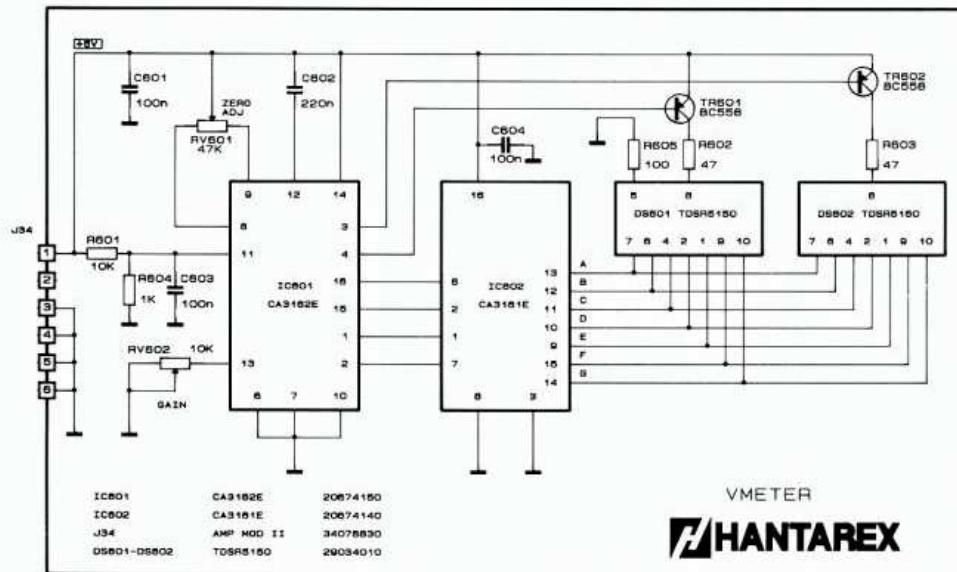
1.5 m long cable is supplied on request together with a plastic support to mount the controls in such a position that the operator may carry out the adjustments while viewing the picture on the screen directly. Order as part 62013310.



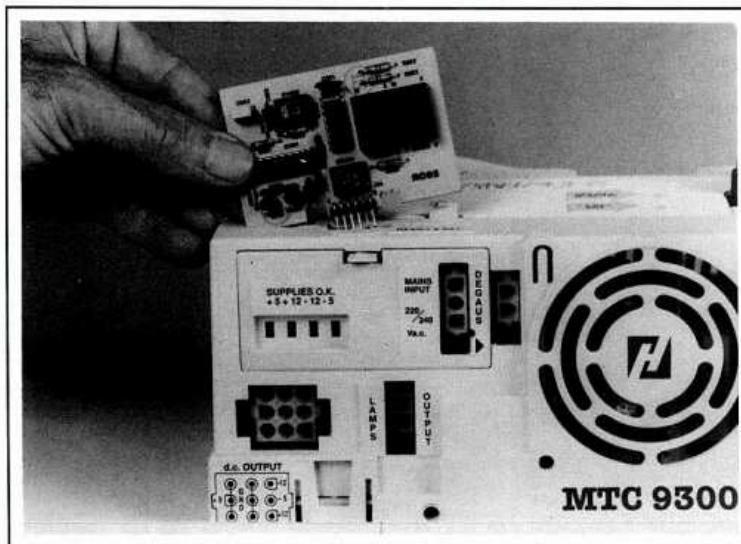
VOLTMETER - Order as part 62013290



ELECTRICAL CIRCUIT DIAGRAM



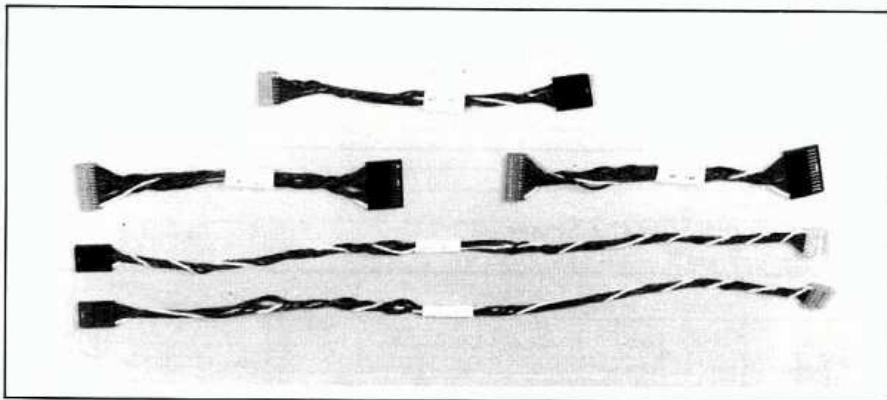
FITTING



INTERCONNEXION CABLES

For stabilization (ER) and deflexion (DR) modules

Boards ER and DR are mounted on the mother board by connectors. It is difficult to gain access to these boards for servicing, and Hantarex has therefore made servicing operations easier by providing, on request, 30 cm extension cables which allow the boards to be serviced away from the mother board.

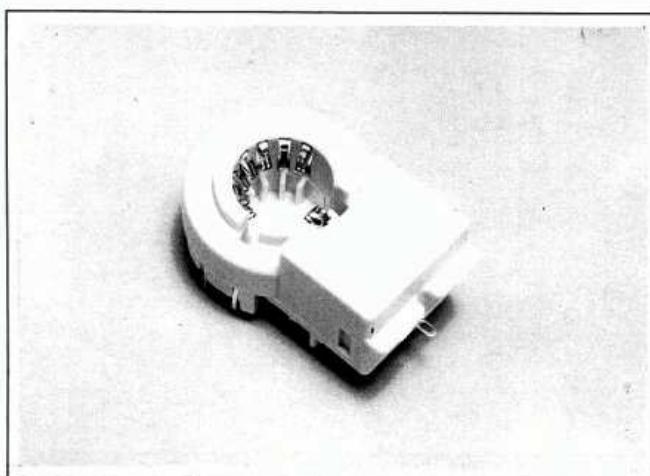


N.B. To identify the polarization of the connectors, each cableform contains one white wire which must be connected to pin n. 1 both on the p.c.b and on the base unit.
Each cableform is bound by a cable tie carrying an individual identification.
For ordering quote code 62013550.

INFORMATION FOR THE INTERCHANGEABILITY OF THE MTC9300 MONITOR WITH PREVIOUS MODELS MTC900/MTC900E/MTC9000

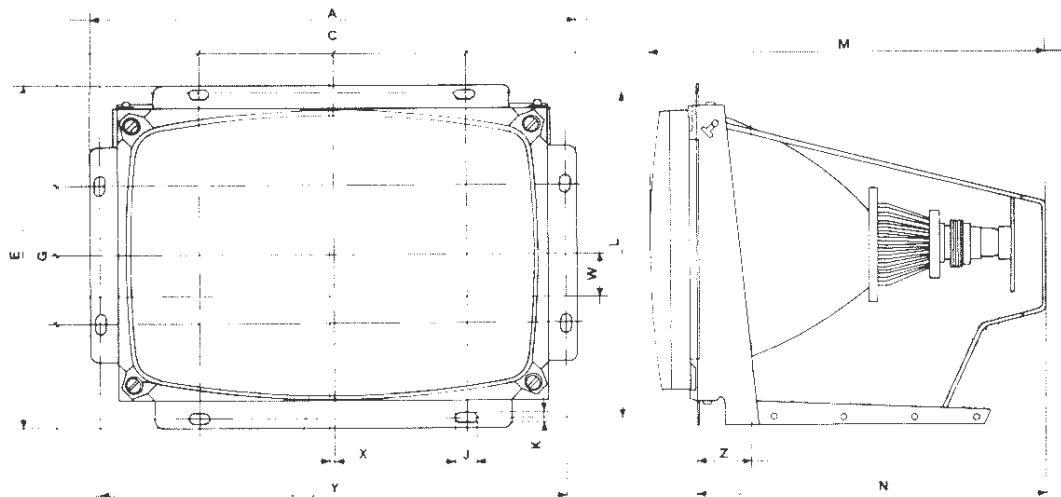
The electronic circuitry on the MTC9300 monitor is interchangeable with the previous models, in terms of signal input, control yoke deflection and fixing points, with a minimum of modification to the machine wiring.

The new monitor, MTC9300, in the 20" version, is fitted with a JEDEC B10-277 (PH) CRT socket for the following CRTs: PHILIPS, ORION, SAMSUNG, TOSHIBA, VIDEOCOLOR A51-427X. For interchangeability with the CRTs fitted to the MTC900, 900E and 9000 monitors, with JEDEC B8-274 (S4) CRT socket, we recommend ordering just the plastic socket, which may be replaced by unsoldering the socket fitted to the CRT, with the obvious advantage of not having to replace the whole assembly. Order as part 34020170 Hosiden Socket type S4.



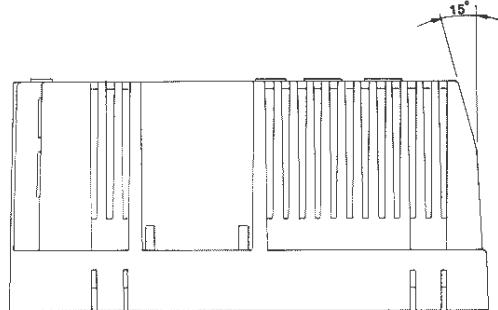
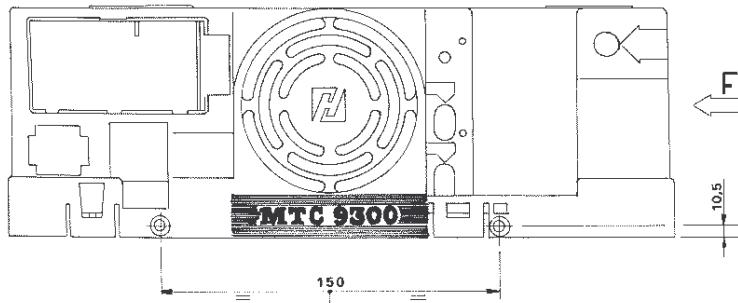
DATI MECCANICI - MECHANICAL DATA

STRUTTURA METALLICA - METALLIC STRUCTURE

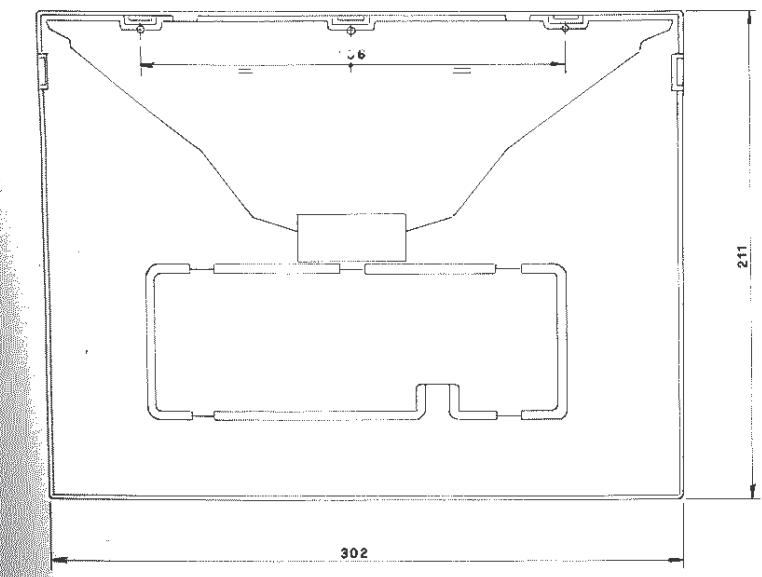


DIM.	A	C	E	G	J	K	L	M	N	W	X	Y	Z
20" mm	512	280	406	200	20	8	390	442	387	34	3	496	43

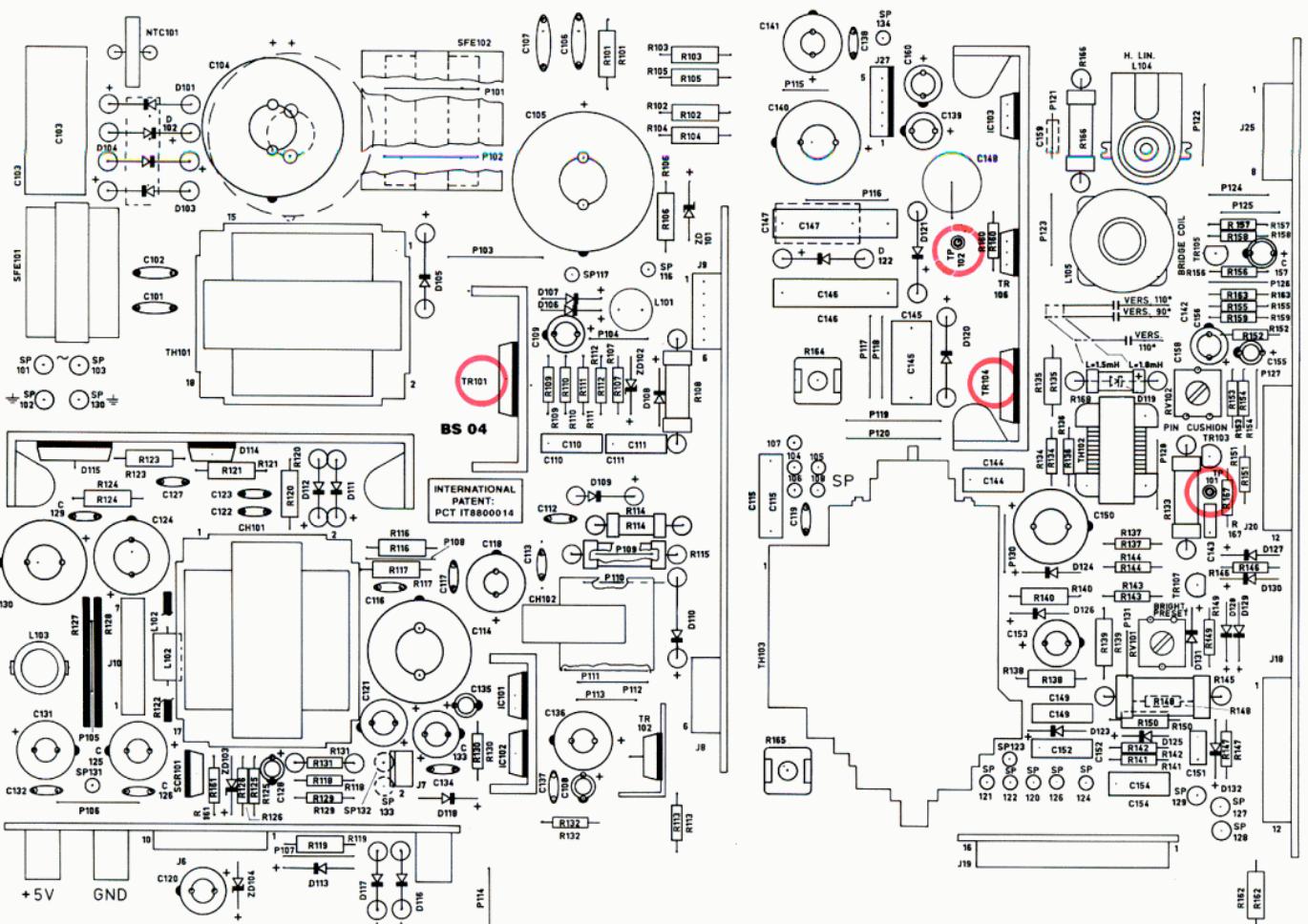
PROTEZIONE PLASTICA - PLASTIC PROTECTION



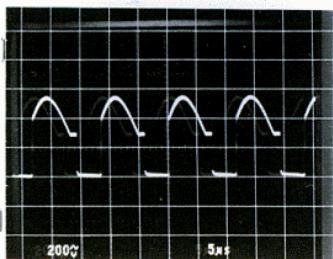
Vista da F



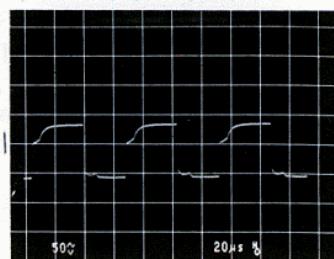
T.P. DI CONTROLLO E FORME D'ONDA / CONTROL TEST POINTS AND WAVEFORMS



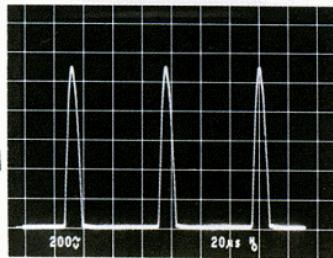
1 TR 101



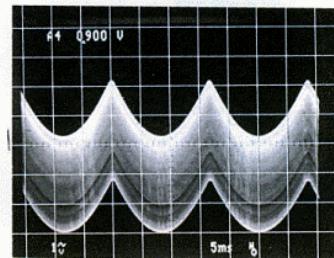
2 TP 101



3 TR 104



4 TP 102

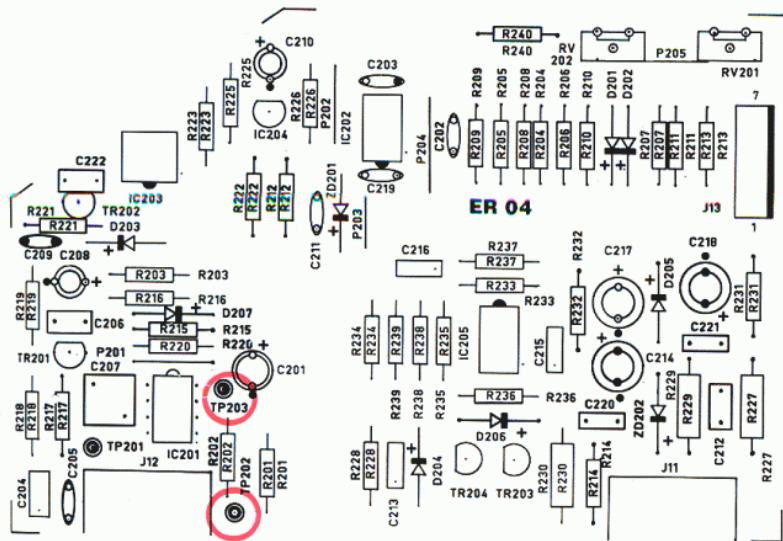


1.— Drain (collettore) Mosfet primario
Drain (Collector) Mosfet switch

2.— Pilotaggio del transistor finale di riga
Horizontal drive

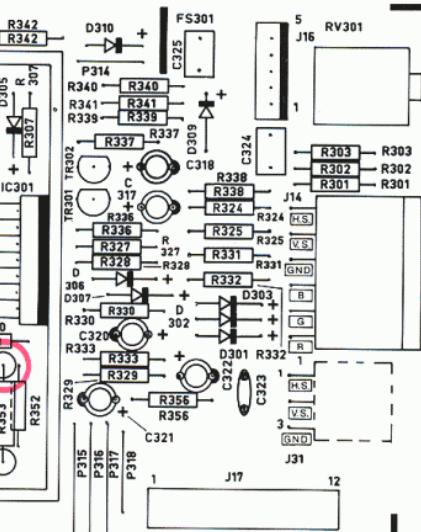
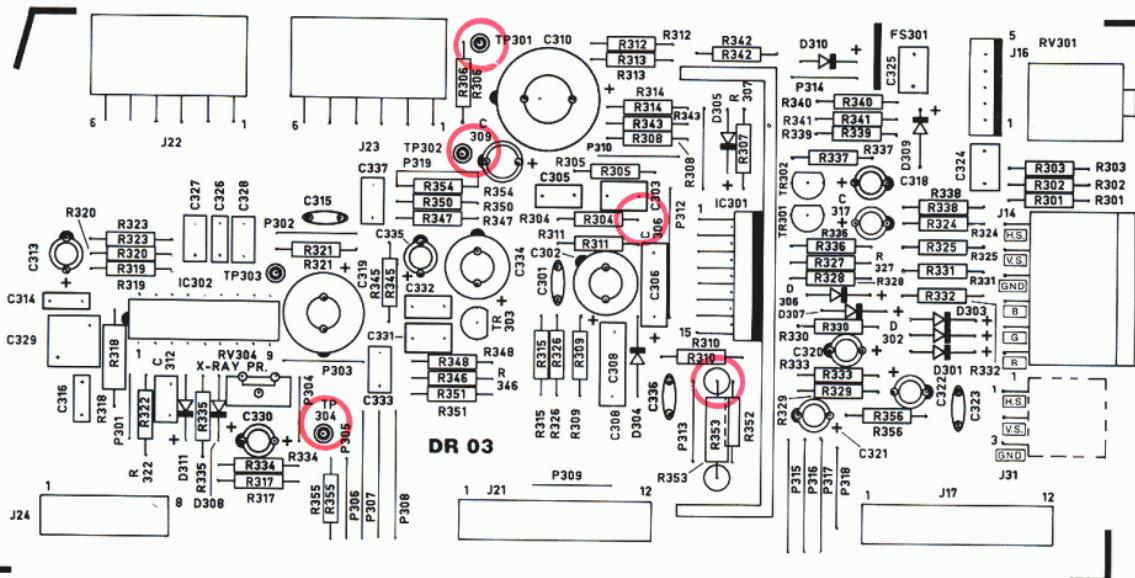
3.— Collettore BU 508 A
BU 508 A collector

4.— Correzione Est/Ovest
East/West correction

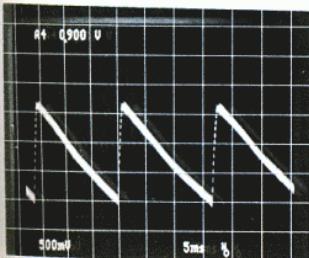


5.— Pilotaggio Gate (base)
Mosfet primario (TR 101)
Drive Switch (TR 101)

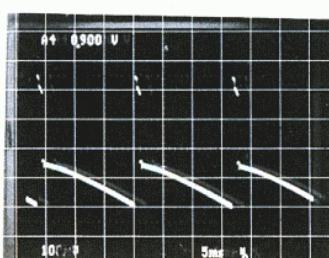
TP 203 12 : 14 V d.c.



6 TP 302



7 TP 301



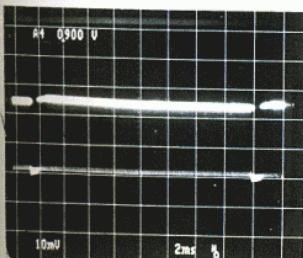
6.— Reazione della deflessione verticale
Vertical feedback

7.— Pilotaggio deflessione verticale
Vertical deflection drive

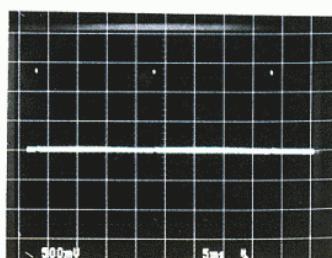
8.— Sincronismo composito
Composite sync.

9.— Sincronismo verticale
Vertical sync.

8 R 356



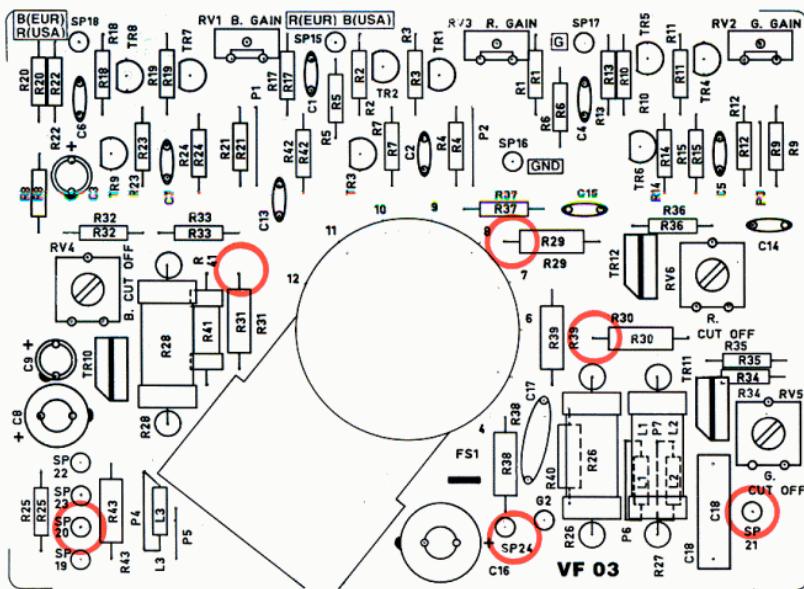
9 R 304



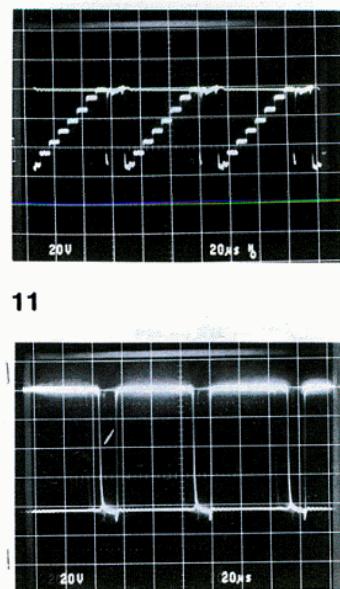
TP 304 + 12 V d.c.

R 356 + 26 V d.c.

10



11



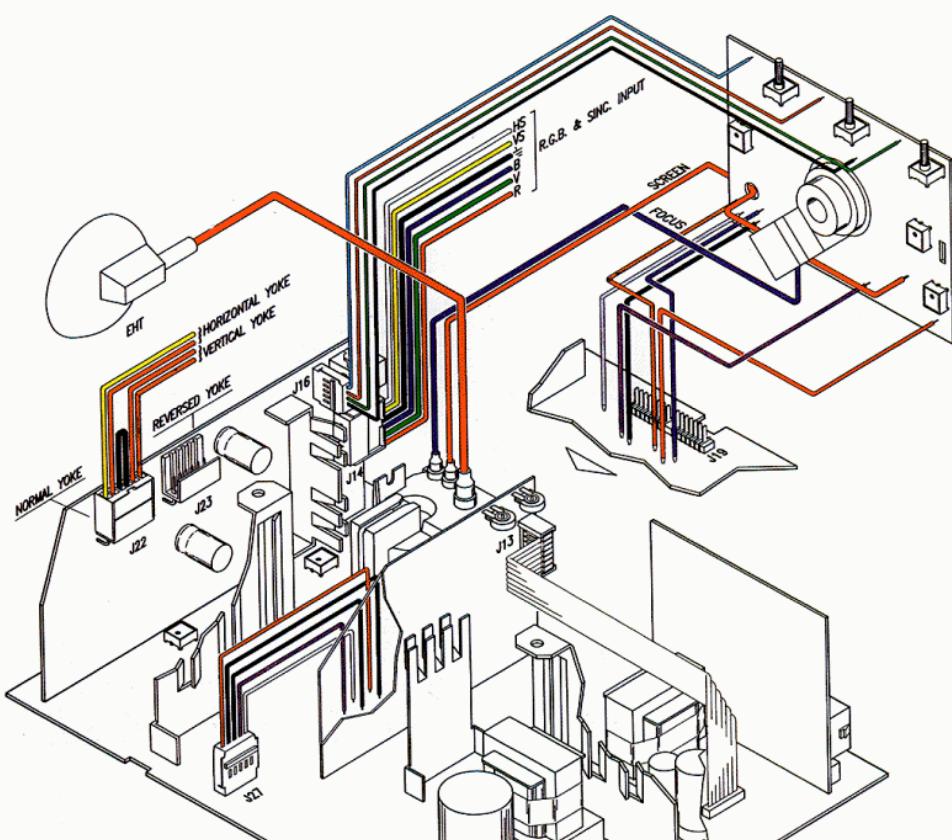
10.— R 29/30/31 Segnali video catodi RVB
Signals at cathodes of RGB Video

SP 20 + 25 V d.c.

11.— SP 24 Spegnimento orizzontale e verticale G1
Horizontal and vertical blanking

SP 21 + 190 + 210 V d.c.

DIAGRAMMA DELLE CONNESSIONI - CONNEXIONS DIAGRAM



PARTS LIST

MAIN P.C.B. ASSEMBLY, POWER SUPPLY AND MONITOR MTC9300 20"220VAC (BS) Code 62012690			
CODE	DESCRIPTION	REF. No.	Q.TY
20150131	DIODE BY 255	D101-102-103-104	4
20150171	DIODE BYV 95/C	D122	1
20150210	DIODE BY 228	D121	1
20150433	DIODE BYV 27/150	D117	1
20150530	DIODE SCHOTKY MBR 3045 PT	D115	1
20150720	DIODE BYV 32-100	D114	1
20150930	DIODE MUR 4100	D105-110	2
20151160	DIODE MUR 140	D111-112-116	3
20410100	TRANSISTOR BDX 53 A	TR106	1
20420140	TRANSISTOR BF 419	TR103	1
20430320	TRANSISTOR BU 508 A	TR104	1
20432330	MOSFET TRANSISTOR BUZ. 356	TR101	1
20432370	TRANSISTOR IRFBC 30	TR102	1
20440030	THYRISTOR TYP 212	SCR101	1
20620071	INTEGRATED CIRCUIT MA7905	IC101	1
20620080	INTEGRATED CIRCUIT MA7912	IC103	1
20620086	INTEGRATED CIRCUIT MA7912	IC102	1
21000000	COSTANTANA WIRE 0.01E	R122-127-128	3
21000061	NTC 15 Ohm	NTC101	1
21412200	METAL OXIDE RESISTOR 2.2E 5% 1W	R168	1
21531200	METAL OXIDE RESISTOR 120E 5% 2W	R115	1
21541001	METAL OXIDE RESISTOR 1K 5% 2W	R108-114-166-133	4
21751800	METAL OXIDE RESISTOR 18K 5% 4W	R145	1
22414700	VERT. WIREWOUND RESISTOR 4.7E 10% 9W	R165	1
22422200	VERT. WIREWOUND RESISTOR 2.2K 10% 9W	R164	1
23044710	SEALED TRIMMER, HORIZ. 4.7K PT10NV	RV102	1
23062209	SEALED TRIMMER, HORIZ. 220K PT10V	RV101	1
24334701	RADIAL ELECT. CAPACITOR 470MF 16V P5	C121-133	2
24334702	RADIAL ELECT. CAPACITOR 470MF 16V SXE P5	C131	1
24341006	RADIAL ELECT. CAPACITOR 1000MF 16V SXE	C125	1
24342202	RADIAL ELECT. CAPACITOR 2200MF 16V P7.5	C130	1
24432219	RADIAL ELECT. CAPACITOR 220MF 25V P5	C120	1
24434700	RADIAL ELECT. CAPACITOR 470MF 25V P5	C136	1
24441003	RADIAL ELECT. CAPACITOR 1000MF 25V SXA	C124	1
24534702	RADIAL ELECT. CAPACITOR 470MF 35V P5	C141	1
24641006	RADIAL ELECT. CAPACITOR 1000MF 35V P5/P7.5	C118	1
24911119	RADIAL ELECT. CAPACITOR 1MF 250V P5	C153	1
24924702	RADIAL ELECT. CAPACITOR 47MF 250V	C150	1
24931002	RADIAL ELECT. CAPACITOR 100MF 200V	C140	1
24932205	RADIAL ELECT. CAPACITOR 220MF 200V	C114	1
24933307	RADIAL ELECT. CAPACITOR 330MF 400V P10	C104	1
25174700	CAPACITOR, POLYESTER MKT 1.50 4.7MF 63V	C148	1
25262202	CAPACITOR, POLYESTER 1.60 220NF 100V P10	C144	1
25362201	CAPACITOR, POLYESTER 1.60 220NF 160V P10	C154	1
25451000	CAPACITOR, POLYESTER MKT 10NF P10	C152	1
25461000	CAPACITOR, POLYESTER 1.60 100NF 250V P15	C115	1
25461011	CAPACITOR, POLYESTER 1.60 100NF 250V P10	C149	1
25464710	CAPACITOR, POLYPROP. 1.76 470NF 250V P22.5	C142	1
25634700	CAPACITOR, POLYPROP. 1.73 470PF 630V P10	C110-111	2
25651200	CAPACITOR, POLYPROP. 1.73 12NF 630V P15	C147	1
25742201	CAPACITOR, POLYPROP. 1.73 2.2NF 1.5KV P15	C145	1
25746802	CAPACITOR, POLYPROP. 1.73 6.8NF 1.5KV P22.5	C146	1
25764700	CAP. POLYESTER 1.58X 470NF 250VCA P27.5	C103	1
26322400	CER. CAP. 220PF 1KV 10%	C113	1
26422640	CER. CAP. VDE 2.2NF 4KV 400VAC	C101-102	2
26433601	RADIAL CER. CAP. 3.3NF 400VAC 2.5KVP P7.5/10	C106-107	2
26447620	CER. CAP. -20+80 4.7NF 500V	C116-117-122-123-127-129	6
28010590	DRIVER TRANSFORMER, PHILIPS AT4043/01	TH102	1
28021210	BRIDGE COIL	L105	1
28025170	LINEARITY COIL	L104	1
28025400	CHOKE COIL, 1701.8059	L103	1
28025780	FILTER VK200 PHILIPS	L102	1
28027790	SWITCH TRANSFORMER (SEMAR 1701.5125)	TH101	1
28027800	MULTI-CHOKE (SEMAR 1701.5124)	CH101	1
28027810	CHOKE (SEMAR 1701.6123)	CH102	1
28027820	CHOKE 20MH	L101	1
28820050	TRANSFORMER 2 x 10MH	SFE101	1
28820061	E.H.T. TRANSFORMER	TH103	1
34073415	5 WAY PRESSACO CONNECTOR, MALE PN320/1175	J27	1
34074232	2 WAY PRESSACO CONN. BRICK RED 2S3562 M.	J7	1
34076590	7 WAY BURNDY CONNECTOR PIN WH7D-1 DIP-MATE	J10	1
34076720	6 WAY BURNDY CONNECTOR M.WSB0602 GS	J8-J9	2
34076730	8 WAY BURNDY CONNECTOR M.WSB0802 GS	J25	1
34076740	12 WAY BURNDY CONNECTOR M.WSB1202 GS	J18-20	2
34076770	16 WAY THRU-LINE P.C. PLUGS CONN. T20/1976	J19	1
43000011	SPRING FOR TO 220		6
50110141	METAL RESISTOR SUPPORT. FOR R127-131		4
50120660	LOWER METALLIC SCREEN		1
50420187	MICA INSULATOR FOR D114		1
50421130	MICA INSULATOR SOT 93A 2000V FOR D115-TR101		2
50422411	EAST-WEST TRIMMER ADJUST. SPINDLE		1
50428350	SILICONE INSULATOR FOR T0220 FOR TR106		1
50428840	P.C.B. GUIDE FASTEX 37-0676-1150		4
50429630	SILICONE INSULATOR 2KV 20x32 FOR TR104		1
50429640	MICA INSULATOR 500V 20x25		1
61008670	P.C.B. TO CONTROL	IC101-102	2
	BOARD FLAT CONNECTING CABLE (J13 CONN.)		1
61009690	POWER SUPPLY CABLE 220V		1
61009700	POWER UNIT TO MONITOR CONNECTING CABLE (J27 CONN.)		1
61009720	EARTHING CABLE		1
30000785	THERMOSTAT MOD. 4345 RT 100° P/N B901-T107		1
20100001	DIODE IN 4148	D127-128-129-130-131-132	6
20110600	ZENER DIODE 2% BZX 79 B5V6	ZD104	1
20110711	ZENER DIODE 1.3W ZPY 18V	ZD102	1
20110870	ZENER DIODE 1/2W 15V 2%	ZD103	1
20110960	ZENER DIODE ZY 180V	ZD101	1
20130060	DIODE BAV 20	D106-107-119-125	4
20150001	DIODE IN 4007	D118	1
20150460	DIODE BYD 33G	D123-124-126	3
20151160	DIODE MUR 140	D113	1
21205100	METAL FILM FUSE RES. 0.51E 5% 1/4W	R129-131	2
21211501	METAL LAYER RESISTOR 1.5E 1% 1/4W	R109-110-111-112	4
21222201	CARBON RESISTOR 22E 5% 1/4W	R126-161	2
21224701	CARBON RESISTOR 47E 5% 1/4W	R136	1
21231000	CARBON RESISTOR 100E 5% 1/4W	R125	1
21232700	CARBON RESISTOR 270E 5% 1/4W	R167	1
21234700	CARBON RESISTOR 470E 5% 1/4W	R154-163	2
21236800	CARBON RESISTOR 680E 5% 1/4W		1
21241000	CARBON RESISTOR 1K 5% 1/4W		3
21241200	CARBON RESISTOR 1.2K 5% 1/4W		1
21241800	CARBON RESISTOR 1.8K 5% 1/4W		1
21242200	CARBON RESISTOR 2.2K 5% 1/4W		1
21243300	CARBON RESISTOR 3.3K 5% 1/4W		1
21246800	CARBON RESISTOR 6.8K 5% 1/4W		1
21248200	CARBON RESISTOR 8.2K 5% 1/4W		1
21251000	CARBON RESISTOR 10K 5% 1/4W		2
21251002	METAL LAYER RESISTOR 10K 1% 1/4W		1
21253300	CARBON RESISTOR 33K 5% 1/4W		1
21254700	CARBON RESISTOR 47K 5% 1/4W		1
21261801	METAL LAYER RESISTOR 180K 1% 1/4W		1
21264700	CARBON RESISTOR 470K 5% 1/4W		2
21321000	CARBON RESISTOR 10E 5% 1/2W		1
			1
21321500	CARBON RESISTOR 15E 5% 1/2W		1
21323300	CARBON RESISTOR 33E 5% 1/2W		1
21342200	CARBON RESISTOR 2.2K 5% 1/2W		1
21351500	CARBON RESISTOR 15K 5% 1/2W		1
21358200	CARBON RESISTOR 82K 5% 1/2W		4
21361800	CARBON RESISTOR 180K 5% 1/2W		1
21364700	CARBON RESISTOR 470K 5% 1/2W		1
21371004	METAL LAYER RESISTOR 1M 5% 1/2W VR37		1
21382201	METAL LAYER RESISTOR 22M 5% 1/2W VR37		1
50147161	P.C.B. BS		1
20401039	TRANSISTOR BC 558 B	TR105	1
20420159	TRANSISTOR BF 423	TR107	1
24431059	RADIAL ELECT. CAPACITOR 100MF 25V P5	C109-139-160	3
24521019	RADIAL ELECT. CAPACITOR 10MF 50V P5	C128-135-108-155	4
24522219	RADIAL ELECT. CAPACITOR 22MF 50V P5	C156-157	2
25162219	CAPACITOR, POLYESTER 1.85 220NF 63V 5% P5	C151	1
25244709	CAP. POLYESTER 1.85 4.7NF 100V 10% P5	C143	1
26310119	CER. CAP. P5 100PF 1KV 20% CL2	C112	1
26610619	CER. CAP. —20+80 50V 100NF P5	C119-126-132-134	6
		-137-138	

**CONTROL AND STABILIZER P.C.B.
ASSEMBLY MTC9300 20" 220VAC (ER)**

CODE	DESCRIPTION	REF. No.	Q.TY
20140042	PHOTO COUPLING DIODE TCDT 1101G	IC203	1
20671000	INTEGRATED CIRCUIT LM 392	IC205	1
20671010	INTEGRATED CIRCUIT LM 393 N	IC202	1
20671473	INTEGRATED CIRCUIT UC 3844 AN	IC201	1
23034703	CARBON TRIMMER 470E VERT. PT10H	RV202	1
23041013	TRIMMER VERT. REG. 1K PT10NH PIHER	RV201	1
25142700	CAPACITOR, POLYESTER 1.42 2.7NF 63V P7.5	C207	1
34076560	AMP CONNECTOR MT 7V.P/N 2-826375-7	J13	1
34076750	6WAY BURNDY CONNECTOR TE 6R WR1 FEM.	J11-12	2
50423440	HEXAGONAL SHAFT		1
20100001	DIODE 1N 4148	D201-202-203-207	4
30110010	ZENER DIODE 1/2W ZPD 10	ZD 201	1
20110061	ZENER DIODE 1/2W ZPD 5.1V 5%	ZD 202	1
20130061	DIODE, BAV20	D204-205-206	3
21221000	CARBON RESISTOR 10E 5% 1/4W	R214	1
21222200	CARBON RESISTOR 22E 5% 1/4W	R202	1
21236801	METAL LAYER RESISTOR 680E 1% 1/4W	R221	1
21238200	CARBON RESISTOR 820E 5% 1/4W	R218	1
21241000	CARBON RESISTOR 1K 5% 1/4W	R204-205-208-209-219	9
21241002	METAL LAYER RESISTOR 1K 1/4W 1%	R203	1
21241500	CARBON RESISTOR 1.5K 5% 1/4W	R212-217	2
21241800	CARBON RESISTOR 1.8K 5% 1/4W	R222	1
21242101	METAL LAYER RESISTOR 2.1K 1% 1/4W	R231	1
21242200	CARBON RESISTOR 2.2K 5% 1/4W	R239	1
21242700	CARBON RESISTOR 2.7K 5% 1/4W	R236	1
21243300	CARBON RESISTOR 3.3K 5% 1/4W	R210	1
21243301	METAL LAYER RESISTOR 3.3K 2% 1/4W	R215	1
21243900	CARBON RESISTOR 3.9K 5% 1/4W	R238	1
21244221	METAL LAYER RESISTOR 4.22K 1% 1/4W	R226	1
21244700	CARBON RESISTOR 4.7K 5% 1/4W	R234-237	2
21245101	METAL LAYER RESISTOR 5.1K 1% 1/4W	R213	1
21246800	CARBON RESISTOR 6.8K 5% 1/4W	R206	1
21248200	CARBON RESISTOR 8.2K 5% 1/4W	R211	1
21251000	CARBON RESISTOR 10K 5% 1/4W	R220	1
21251002	METAL LAYER RESISTOR 10K 1% 1/4W	R216	1
21251200	CARBON RESISTOR 12K 5% 1/4W	R207-235	2
21251800	CARBON RESISTOR 18K 5% 1/4W	R201	1
21254700	CARBON RESISTOR 47K 5% 1/4W	R227	1
21256800	CARBON RESISTOR 68K 5% 1/4W	R232	1
21321000	CARBON RESISTOR 10E 5% 1/2W	R229-230	2
20401069	TRANSISTOR BC 337	TR201-202-203	3
20401079	TRANSISTOR BC 327-25	TR204	1
20620679	INTEGRATED CIRCUIT TL 431 CLP	IC204	1
24424719	RADIAL ELECT. CAPACITOR 47 MF 25V P5	C201	1
24431059	RADIAL ELECT. CAPACITOR 100MF 25V P5	C214-217-218	3
24514710	RADIAL ELECT. CAPACITOR 4.7MF 50V	C210	1
24521019	RADIAL ELECT. CAPACITOR 10MF 50V P5	C208	1
25241029	CAPACITOR, POLYESTER 1.85 1NF 100V P5	C216	1
25243309	CAPACITOR, POLYESTER 1.85 3.3NF 100V P5	C220-221	2
25251049	CAPACITOR, POLYESTER 1.85 10NF 100V P5	C213	1
25253319	CAPACITOR, POLYESTER 1.85 33NF 100V P5	C215	1
25254709	CAPACITOR, POLYESTER 1.85 47NF 100V P5	C212	1
25261029	CAPACITOR, POLYESTER 1.85 100NF 100V P5	C204-206-222	3
26347119	CER. CAP. N750 470PF 50V P5	C205-209	2
26422619	CER. CAP. -20° +80° 50V 2,2NF P5	C202-203	2
26610619	CER. CAP. -20° +80° 50V 100NF P5	C211-219	2
50147191	CONTROL AND STABILIZER P.C.B. ER		1

C.R.T. SOCKET ASSEMBLY 20" (VF)

CODE	DESCRIPTION	REF. No.	Q.TY
20431070	TRANSISTOR BF 859	TR10-11-12	3
21405101	METAL OXIDE RESISTOR 0.51E 10% 1W WK4	R41	1
21646800	METAL OXIDE RESISTOR 6.8K 5% 3W	R26-27-28	3
23034706	TRIMMER VERT. REG. 470E PT10NH	RV 1-2-3	3
23044711	SEALED CARBON TRIMMER 4.7K HORIZ. PT10V	RV4-5-6	3
24532200	RADIAL ELECT. CAPACITOR 220 MF 35V P5	C8	1
24921000	RADIAL ELECT. CAPACITOR 10MF 250V	C16	1
25461011	CAPACITOR, POLYESTER 1.60 100NF 250V P5	C18	1
26422641	CER. CAP. \timesDE 4KPF 2.2NF 400VAC	C17	1
34020400	FASTON LUG M.S. 187 FACON TE 34108 578703	FS1	1
34020590	SOCKET, HOSIDEN HPS0199-020 TYPE PH		1
50243440	EXAGONAL SHAFT, FOR RV1-2-3		3
53840500	C.R.T. SOCKET PLASTIC PROTECTION		1
61096881	SOCKET TO J16 CONN. RGB SIGNAL CABLE		1
21212200	CARBON RESISTOR 2.2E 5% 1/4W	R25	1
21221000	CARBON RESISTOR 10E 5% 1/4W	R42	1
21224700	CARBON RESISTOR 47E 5% 1/4W	R4-12-21	3
21225600	CARBON RESISTOR 56E 5% 1/4W	R6-14-23	3
21231200	CARBON RESISTOR 120E 5% 1/4W	R7-15-24	3
21233300	CARBON RESISTOR 330E 5% 1/4W	R8	1
21235500	CARBON RESISTOR 560E 5% 1/4W	R33-35-37	3
21241000	CARBON RESISTOR 1K 5% 1/4W	R1-9-17-20	4
21242200	CARBON RESISTOR 2.2K 5% 1/4W	R3-11-19	3
21244700	CARBON RESISTOR 4.7K 5% 1/4W	R5-13-22	3
21341800	CARBON RESISTOR 1.8K 5% 1/2W	R32-34-36	3
21261500	CARBON RESISTOR 150K 5% 1/4W	R20-10-18	3
21332700	CARBON RESISTOR 270E 5% 1/2W	R38	1
21341000	CARBON RESISTOR 1K 5% 1/2W	R29-30-31	3
21342200	CARBON RESISTOR 2.2K 5% 1/2W	R39	1
21351000	CARBON RESISTOR 10K 5% 1/2W	R40	1
21362200	CARBON RESISTOR 220K 5% 1/2W	R43	1
20401028	TRANSISTOR BC 548 B	TR 2-3-5-6-8-9	6
20401039	TRANSISTOR BC 558 B	TR 1-4-7	3
24424719	RADIAL ELECT. CAPACITOR 47MF 25V P5	C3	1
24522219	RADIAL ELECT. CAPACITOR 22MF 50V P5	C9	1
26310109	CER.CAP. NPO 50V 100PF 5%	C1-4-6-13-14-15	6
26347119	CER.CAP. N750 470PF 50V 10% P5	C2-5-7	3
50147211	C.R.T. SOCKET ASSEMBLY VF		1

CONTROLS P.C.B. ASSEMBLY 20" (CR)

CODE	DESCRIPTION	REF. No.	Q.TY
23032203	CARBON TRIMMER 220E HORIZ. PT10V	RV407	1
23041009	SEALED TRIMMER 1K HORIZ. PT15NV	RV403	1
23044710	SEALED TRIMMER 4.7K HORIZ. PT10NV	RV401	1
23051013	SEALED TRIMMER 10K HORIZ. PT10NV	RV404-405-406	3
23062207	SEALED TRIMMER 220K HORIZ. PT10NV	RV402	1

34076760	16 WAY THRU-LINE CONN. P.C., HORIZ. T20/1916	J26	1
50423430	SHAFT PT15 FOR RV402		1
50423440	HEXAGONAL SHAFT FOR RV401-402-404-405-406-407		6
21244700	CARBON RESISTOR 4.7K 5% 1/4W	R403	1
21331800	CARBON RESISTOR 180E 5% 1/2W	R401	1
21332700	CARBON RESISTOR 270E 5% 1/2W	R402	1
50147201	CONTROLS P.C.B. CR		1

INPUT/OUTPUT BOARD, P.C.B. ASSEMBLY 20" 220 VAC (EN) Code 62012740

CODE	DESCRIPTION	REF. No.	Q.TY
20150131	DIODE BY 255	D301-302	2
20180021	RECTANGULAR RED LED-DIODE, V 510 P	DL 301-302-303-304	4
21000037	PHILIPS PTC 232.662.96009 220V	PTC 301	1
25754701	CAPACITOR, POLYESTER 1.58 x 47NF 250VCA 20%	C301	1
29100019	TIME-DELAY FUSE 3.15A 5 x 20	FS301	1
29100080	FUSE HOLDER CLIPS	FS301-302	2
29100102	SEMI-DELAY FUSE 5 x 20 1A	FS302	1
34074610	9 WAY BURNDY CONNECTOR F. UHR 950T	J5	1
34074630	3 WAY BURNDY CONNECTOR UHR 350T F.	J1	1
34074640	2 WAY BURNDY CONNECTOR UHR 250T F.	J2	1
34076750	6 WAY BURNDY CONNECTOR FEM. TE 90W WR1	J4	1
34076790	10 WAY MERAK CONNECTOR P/N 0590419300	J6	1
34076820	2 WAY BURNDY CONN. M.UHP 250G BRICK RED	J3	1
50429110	LED SUPPORT		1
21233900	CARBON RESISTOR 390E 5% 1/4W	R303-304	2
21238200	CARBON RESISTOR 820E 5% 1/4W	R302-305	2
21371004	METAL LAYER RESISTOR 1M 5% 1/2W VR 37	R301	1
26610619	CER.CAP.—20 + 80 50V 100NF P5	C302-303	2
50147171	IN-OUT P.C.B. EN		1

PLASTIC PROTECTION ASSEMBLY 20" 220 VAC

CODE	DESCRIPTION	Code 62012750
40039016	SELF-TAPPING SCREW 3.9 x 13 FOR FIXING EAT TRANSFORMER	1
40039095	PROTECTION TO HEAT SINK SELF-TAPPING SCREW 3.9 x 9.5	2
50421630	FASTEX CLIP 254.04.0067 FOR FIXING VENTILATOR	2
50422411	FOCUS AND SCREEN TRIMMER ADJUSTMENT SPINDLE	1
50429090	PLASTIC PROTECTION	1
50117210	THREADED METAL INSERTS M4	2
50429100	FUSE ACCESS FLAP	1
50429130	UPPER FLAP	1
62010081	VENTILATOR ASSEMBLY	1

C.R.T. MAINFRAME ASSY 20"

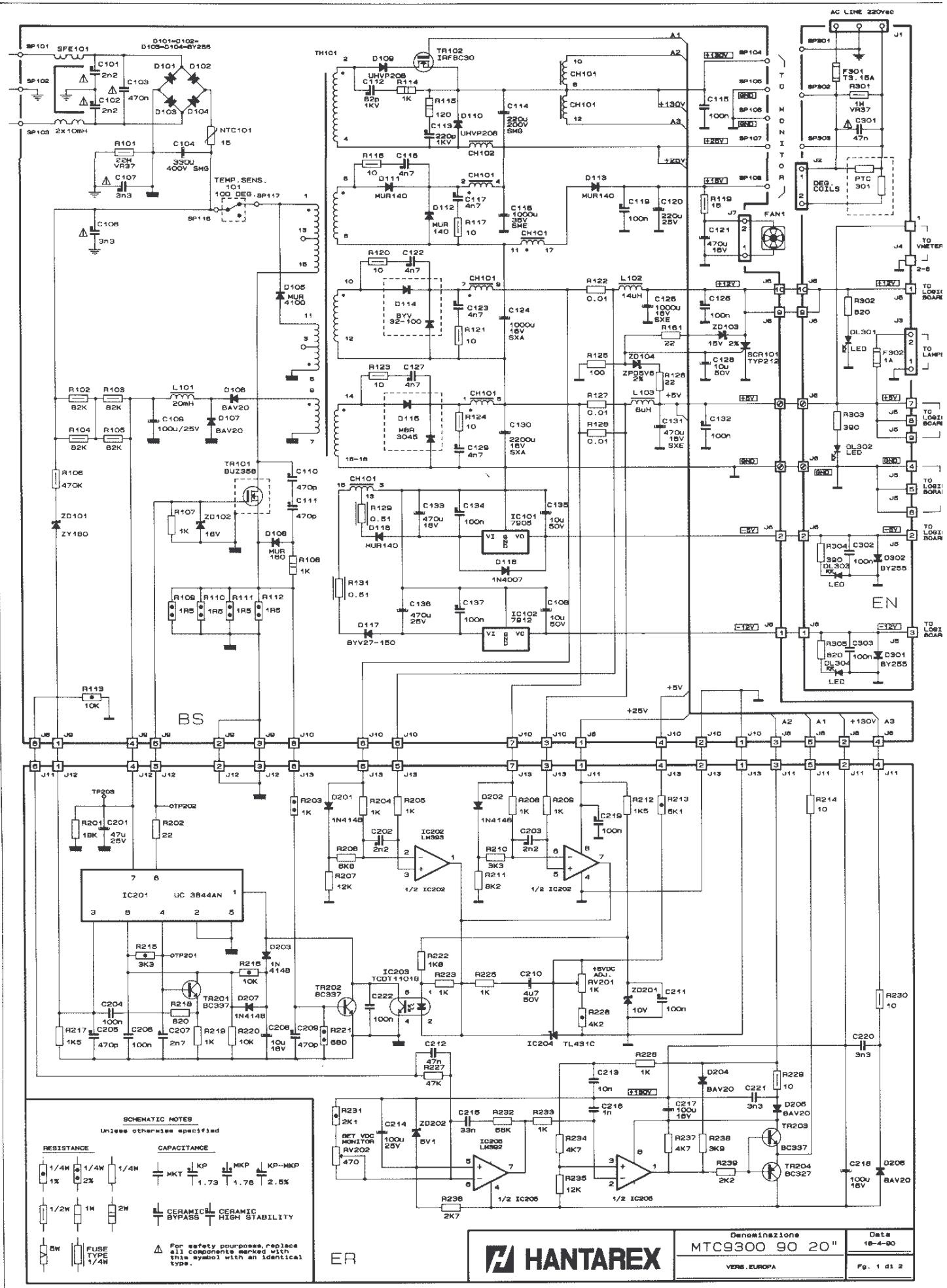
CODE	DESCRIPTION	Q.TY
40114009	THREADED EARTHING POST 4 x 6 M.	2
40114012	PROTECTION TO BASE FIXING SCREWS 4 x 10 M.	2
40213507	SCREW 4 x 7 M FOR FIXING C.R.T. NECK REINFORCING FRAME	2
40942095	SELF-TAPPING SCREW 4.2 x 9.5 FOR FIXING LEGS	8
40963016	SELF-TAPPING SCREW 6.3 x 16 FOR FIXING C.R.T.	4
42000010	FLAT ROSE WASHER 6593-69 D18 d 6.6 SP2 FOR FIXING C.R.T.	2
42000540	EARTHING POST TOOTHED WASHER DIN 6798A 4.3 x 8 x 0.5 INOX	2
50111210	RIGHT LEG FOR 20" MAINFRAME	1
50111220	LEFT LEG FOR 20" MAINFRAME	1
50111230	UPPER LEG FOR 20" MAINFRAME	1
50111241	BASE STRUCTURE WITH EARTHED SUPPORT	1
50111450	C.R.T. NECK REINFORCING FRAME	1
50420290	C.R.T. PROTECTION COLLAR IN ABS	1
50429480	ELECTRONICS PLASTIC FIXING KNOB	1

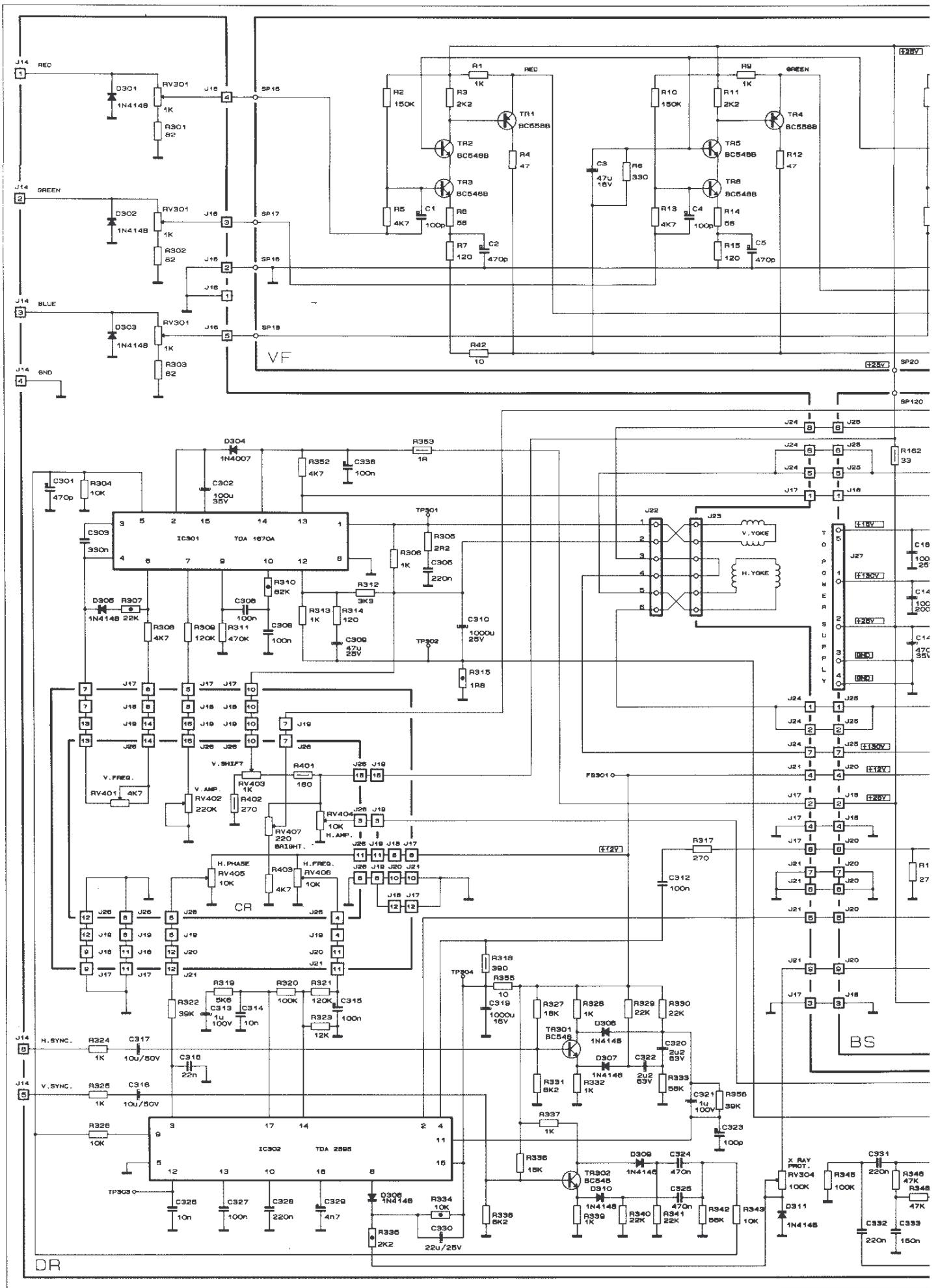
CONNECTORS AND CONTACTS AS SUPPLIED

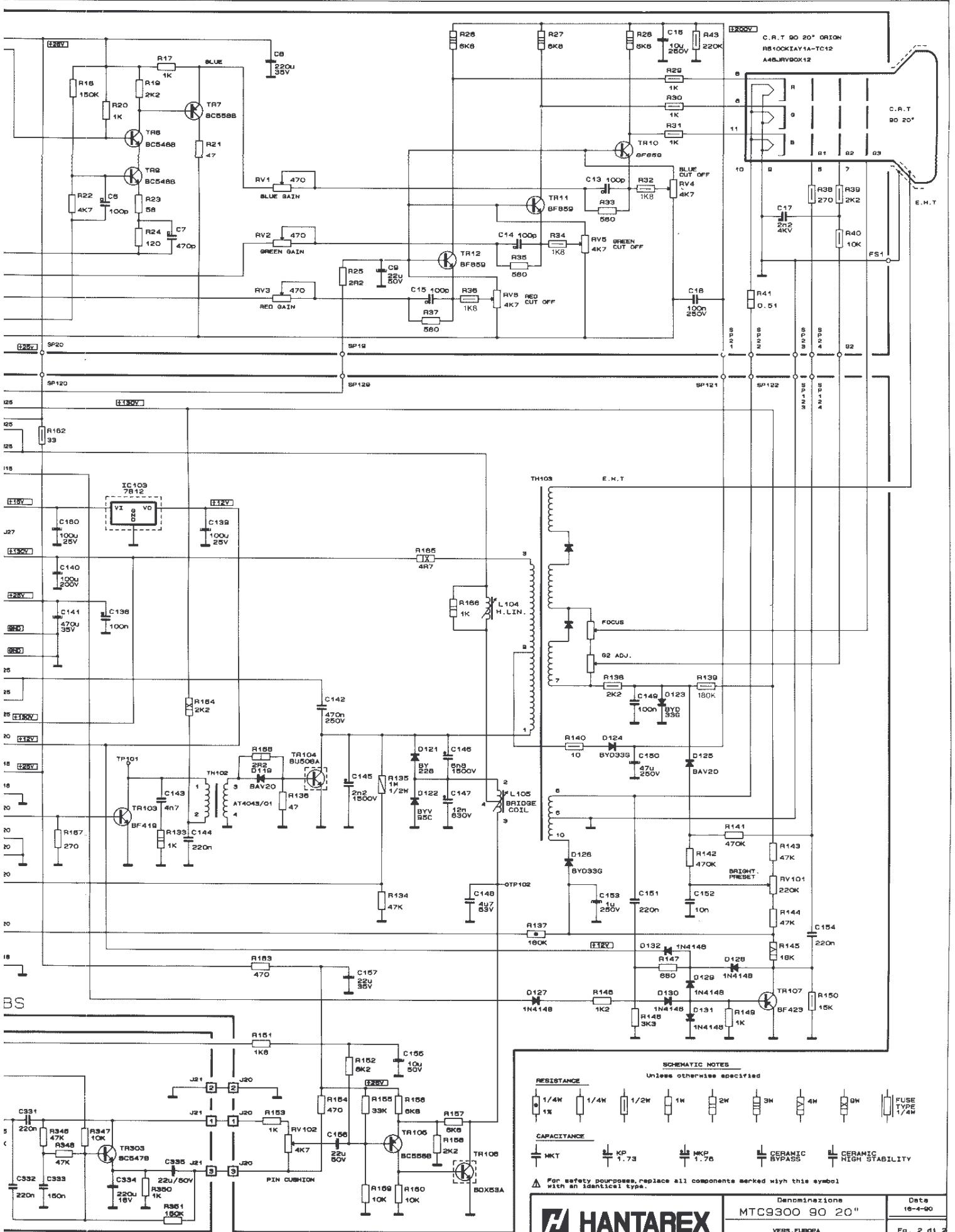
CODE	DESCRIPTION	Q.TY
34074500	2 WAY AMP CONNECTOR M., 350777/1	1
34074550	MALE LUG UHM 1100 G	14
34074560	FEMALE LUG UHC 1101 G	3
34074680	9 WAY BURNDY CONNECTOR UHP 901 T	1
34074670	3 WAY BURNDY CONNECTOR UHP 301 T	1

PACKING ASSEMBLY 20"

CODE	DESCRIPTION	Q.TY
52422000	RIGHT SIDE POLYURETANE FOR 20"	2
52422010	LEFT SIDE POLYURETANE FOR 20"	2
52827780	PACKING BOX MTC 9300 20"	1







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Denominations
MTC9300 90 20"

Date
16-4-90

VERS.EUROPA

Fg. 2 d1 2

SCHEMATIC NOTES

Unless otherwise specified

<u>RESISTANCE</u>								
1K	1/4K	1/2K	1K	2K	3K	4K	8K	
<u>CAPACITANCE</u>								
1uF	1uF	1.73	1.76					
<u>CERAMIC BYPASS</u>								
<u>CERAMIC HIGH STABILITY</u>								

⚠ For safety purposes, replace all components marked with this symbol with an identical type.



HANTAREX

50127 FIRENZE - ITALY Via dei Perfetti Ricasoli, 76/78 - Tel. 055 / **49731** (20 linee) - Fax 055 / 268486 - TIx 572341 Hantar-

HANTAREX U.K.

London SE26 5BA - England
Unit 2, Kangley Bridge Road
tel. 081-778 1414 - telex 8952421 Hantar-G
telefax 081-6599348

HANTAREX DEUTSCHLAND

D-5230 Altenkirchen
Siegenerstrasse 23
tel. 02681/3041-2 - telex 869991 Hantx-D

HANTAREX IBERICA

Barcellona II - España
210 Aragon str.
tel. 93/3232941 - telex 98017
telefax 0034/3-2538163

HANTAREX HELLAS

Gifada - Athens - Greece
35, Ippokratos str. Ellinikon
tel. 01/9910950 - telex 219875 Anta-Gr

HANTAREX CORP. OF AMERICA

Schäumburg - IL. 60195
A-1261 Wiley Road
tel. (312) 8437226/8437344
telefax 001-312-8437244

HANTAREX JAPAN

Tokyo 104 - Japan
Dai Nihon P.R. Centre BLDG
3-8 Irfune - 2 Chome
tel. 03/5550831 - telex 28185 Eujatrc-J

HANTAREX S.U.

117342 Moscow - 36, Obrouchev St.
tel. 95/120-35-75
telex 412160 HANTAR-SU
telefax 95/4202250

HANTAREX (HK) LTD.

6/F., Tung Hip Comm'l bldg., 244-248
des Voeux Road C.,
Hong Kong - tel. 8537602/3
telefax 8152903 - telex 68677 GLOBE