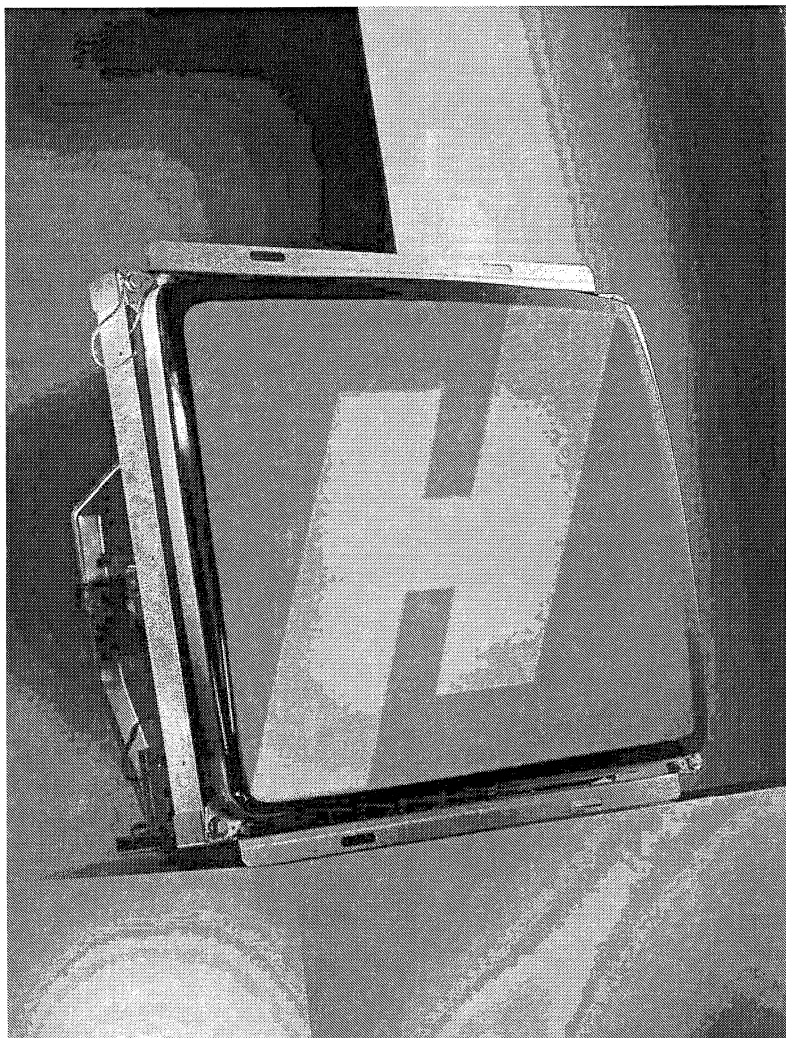


Monitors POLO

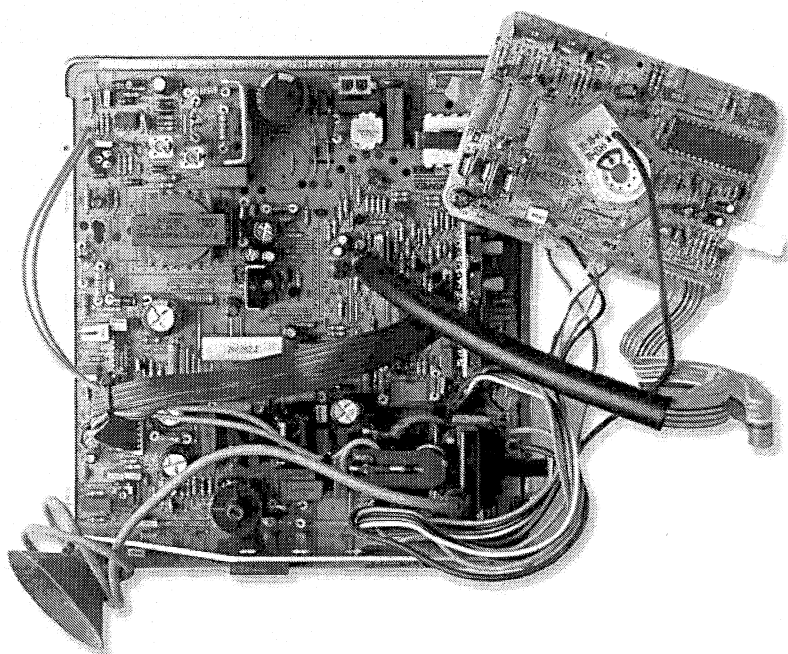
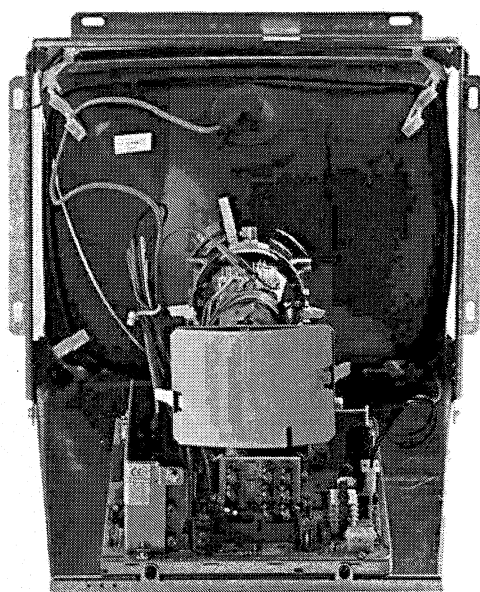
MANUALE DI SERVIZIO
SERVICE MANUAL
MANUEL DE SERVICE
MANUAL DE SERVICIO
BEDIENUNGSANLEITUNG

 **HANTAREX**
ELECTRONIC SYSTEMS

manufactured and distributed by
SAMBERS
I T A L I A



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DIMENSIONS AND WEIGHTS	2
TECHNICAL SPECIFICATIONS AND CONNECTIONS	3
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USEFUL NOTICE FOR SAFETY

- **SAFETY AND NOISE SUPPRESSION**

The monitors are manufactured in a professional manner, in compliance with European Directives as far as safety and noise suppression is concerned.

The relative insulation class is CLASS 1 of the European Regulation EN 60065, which foresees earth connection. Earth connection must be guaranteed through the central point of CN2 line input connector. Manufacturing criteria of monitor must not be altered during service operation, as, for example, removal of screens, change of wires with special insulations etc. Components such as fuse resistors, fire-proof resistors, safety capacitors etc. must correspond to original spare parts and must be assembled in a professional way.

- **E.A.T.**

The monitor has internal high voltage sources which are dangerous for the personnel safety. For any intervention, it is advisable to resort to specialized personnel.

- **CRT**

CRT utilized for the assembly of our monitors are manufactured and certified against implosion and are nevertheless high vacuum components, their surfaces being subject to strong external pressures. It is therefore necessary to take care not to bang them in order to avoid the possibility of an implosion projecting splinters. Above signifies that personnel in charge of installation must wear gloves and protective clothing during assembly operations and replacements.

ATTENTION

a - In order to carry out any control measure in the main input section, using either a digital voltmeter or a oscilloscope, it is necessary to separate the monitor from the network by using an INSULATION TRANSFORMER, assuring at the same time that earth wires of instruments are disconnected.

Above precaution is not necessary when control measures are carried out in the monitor section (deflection and video) and on secondary outputs of feeder.

b - The insulation transformer must have the following characteristics:
Input 230 V~; Output 230 V~ 200 W minimum

c - After every intervention in the power supply section, the metallic anti-electric shock cover must be reassembled.

DIMENSIONS AND WEIGHTS

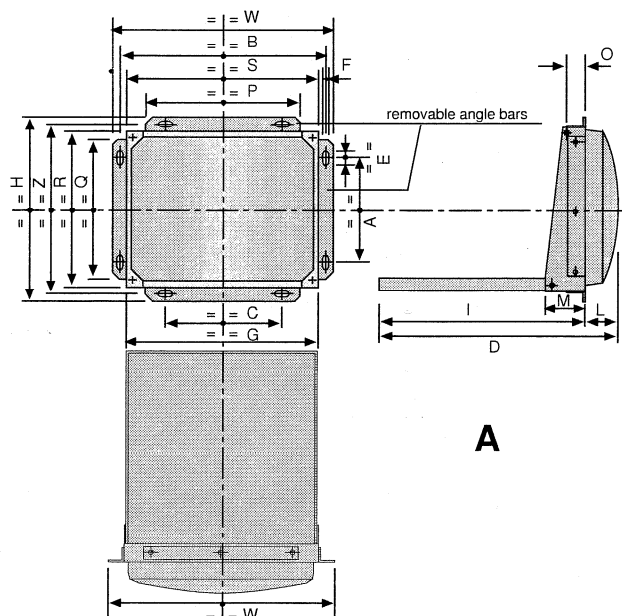
MAIN DIMENSIONS AND WEIGHTS TABLE

10"	WIDTH	HEIGHT	DEPTH	WEIGHT
	284 mm	261 mm	292 mm	9 Kg
14"	370 mm	312 mm	348 mm	12.2 Kg
15"	386 mm	321 mm	359.5 mm	13 Kg
17"	431 mm	353.5 mm	361 mm	15.7 Kg
19"	475.5 mm	391 mm	454.5 mm	18.1 Kg
20"	508 mm	411 mm	464.5 mm	19.5 Kg
21"	518 mm	423 mm	474 mm	21.8 Kg
25"	593 mm	481.5 mm	454.5 mm	27.6 Kg
28"	650.5 mm	525 mm	469 mm	31.2 Kg
29"	668 mm	538 mm	420 mm	36.9 Kg
34"	756.5 mm	610 mm	521 mm	51 Kg
37"	863 mm	688 mm	591.5 mm	56 Kg
28" ^{16/9}	704 mm	463 mm	410 mm	33.4 Kg
32"	796 mm	515.5 mm	465 mm	48.5 Kg

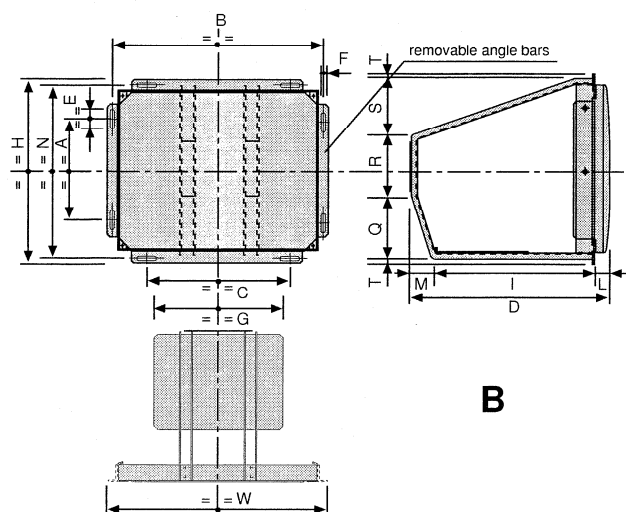
SPECIAL VERSIONS

MECHANICAL DATA

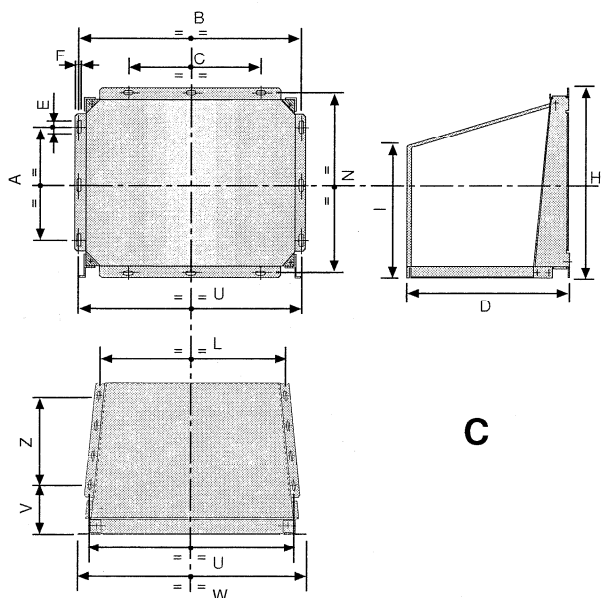
	DIM.	W	H	D	A	B	C	N	E	F	G	I	L	M	O	P	Q	R	S	T	U	V	Z
A	10"	284	261	292	155	267	155	244	20	6	246	250	42	40	25	195	195	225	248	* with frontal adjustments base			
	14"	370	312	348	145	350	195	290	16	8	322	285	63	-	-	-	-	-	-	-	-	-	-
	15"	386	321	359.5	220	369	220	304	20	6	348	310	49.5	50	25	260	260	285	350	-	-	-	-
	17"	431	353.5	361	200	413	280	333.5	20	8	305	322	39	-	-	-	-	-	-	-	-	-	-
B	20"	508	411	464.5	180	487	280	390	40	8	300	331	77.5	56	220	325	130	132	117	16	-	-	-
	21"	518	423	474	250	499	280	404	40	8	300	358	69.5	46.5	220	350	136.5	134	120.5	16	-	-	-
	25"	593	481.5	454.5	270	574	280	462.5	40	8	300	318	70	66.5	220	310	165.75	134	149.75	16	-	-	-
	28"	650.5	525	469	270	631.5	280	506	40	8	300	338	71	60	220	330	187.5	134	171.5	15	-	-	-
	34"	756.5	610	521	390	740	530	593.5	40	8	300	357	90	74	220	350	233	146	207	12	-	-	-
	37"	863	688	591.5	480	839	655	664	40	8	450	461	130.5	-	-	-	-	406	234	24	-	-	-
C	28" ^{16/9}	704	463	410	270	685	520	444	20	8	396	310.5	77.5	-	-	-	-	-	-	575	182	199	
	29"	668	538	420	350	649	480	519	20	8	396	356.5	435	-	-	-	-	-	-	550	188	201	
	32" ^{16/9}	796	515.5	465	330	777	610	496.5	20	8	410	386.5	454	-	-	-	-	-	-	607	240.5	196	
	36" ^{16/9}	893	566	470	395	873	400	546	25	8	410	369	109.5	-	-	-	-	-	-	* with angle bars adjustable in two positions			



A



B



C

GENERAL TECHNICAL SPECIFICATIONS

MAINS INPUT	230 V 50Hz (184-264 V Europe) – optionally 115 V 60Hz (80-130 V U.S.A.)		
MAINS POWER CONSUMPTION	Monitor with contrast and brightness set to maximum		
	POLO/3 15 KHz	from 14" to 21"	Max 80 W
	POLO/2 15/25 KHz AUTO	25" and 28"	Max 100 W
	POLO/2 15/25 KHz AUTO	34" and 37"	Max 130W
	POLO/2 SVGA	from 14" to 21"	Max 100 W
	POLO/2 SVGA	from 25" to 37"	Max 130 W
	POLO/2 STAR	21"	Max 80 W
	POLO/2 STtoR	from 25" to 29"	Max 100 W
	POLO/2 STAR	34"	Max 130 W
	POLO XGA	17"	Max 80 W
PEAK CURRENT	<25A		
DEGAUSSING	Automatic at power-on Automatic at power-on and from menu on 17" XGA version		
VIDEO SIGNAL INPUT			
Type	RGB positive		
Input impedance	1K (15KHz and 15/25KHz Auto) 75 (SVGA and Polo Star)		
Level	from 1.5 Vpp to 4 Vpp (15KHz and 15/25KHz Auto) 0.7 Vpp (SVGA and Polo Star)		
SYNCHRONISM INPUT	Separate, Horizontal and Vertical, positive or negative, TTL level input impedance 1K Separate, Composite, negative, TTL level input impedance 1K Automatic selection of synchronism type.		
HORIZONTAL FLYBACK	15 kHz	11.5 µs	
	25 kHz	8 µs	
	SVGA/Star	5 µs	
VERTICAL FLYBACK	15 kHz	1.2 ms	
	25 kHz	1.2 ms	
	SVGA/Star	0.6 ms	
HORIZONTAL SCANNING FREQUENCY	Frequencies	Monitor	
	15.7 KHz ± 500 Hz	15KHz, 15/25KHz, Star	
	25.0 KHz ± 500 Hz	15/25KHz, Star	
	31.5 KHz ± 500 Hz	Star, SVGA	
	35.5 KHz ± 500 Hz	Star, SVGA	
	37.5 KHz ± 500 Hz	SVGA	
	30KHz to 72KHz Auto	XGA	
VERTICAL SCANNING FREQUENCY	Adjustable from 43Hz to 86Hz Automatic from 47Hz to 160Hz, XGA only		
VIDEO BANDWIDTH	15KHz, 15/25KHz	15 MHz-3dB	
	SVGA/Star	25 MHz-3dB	
	XGA	Maximum Pixel Clock 110MHz	
OPERATING TEMPERATURE	0÷50°C		

MONITOR ADJUSTMENTS

The control module provides the following adjustments:

Horizontal frequency	RV9	H FREQ (not available on STAR version)
Horizontal phase	RV7	H PHASE
Horizontal amplitude	RV3	H AMP
Vertical frequency	RV10	V FREQ
Vertical shift	RV8	V SHIFT
Vertical amplitude	RV4	V AMP
Cushion correction	RV6	CUSHION (not available on 15KHz version from 14" to 21")
Trapezoid correction	RV2	KEYSTONE (not available on 15KHz version from 14" to 21")
Contrast	RV5	CONTRAST
Brightness	RV1	BRIGHT

On the SVGA versions, the East-West module provides the following additional adjustments:

31 KHz horizontal phase	RV1
35 KHz horizontal phase	RV3
38 KHz horizontal phase	RV2

These three adjustments are set at the factory and do not generally have to be modified. We therefore recommend you use the trimmer located on the control module first.

On the STAR versions, the East-West module provides the following adjustments:

15 KHz horizontal phase	RV1
25 KHz horizontal phase	RV3
31 KHz horizontal phase	RV2
35 KHz horizontal phase	RV2

These three adjustments are set at the factory and do not generally have to be modified. We therefore recommend you use the trimmer located on the control module first.

On the XGA version, all adjustments are made exclusively from the OSD menu.

The adjustment of trimmers other than those indicated above may cause faults and a deterioration in the machine's reliability.

POLO 15KHZ MONITOR

The POLO 15KHz monitors are designed to operate at a horizontal frequency of 15.7KHz.

POLO 15/25 KHZ AUTO MONITOR

The POLO 15/25KHz-Auto monitors are designed to work at a horizontal frequency of 15.7KHz or 25KHz.

The frequency is recognized automatically. The only operation that may have to be performed is to adjust the geometry of the picture using the control module.

POLO STAR MONITOR – 15/25/31/35 KHz

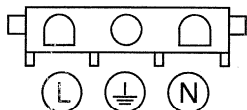
On the POLO STAR version, the frequency is recognized automatically. The only operation that may have to be performed is to adjust the geometry of the picture using the control module. With the 35KHz signal it may also be necessary to adjust the horizontal phase using the "RV2 horizontal phase" trimmer located in the E/W module.

POLO STAR supports both a high impedance input on the 6-pin connector and a low-impedance (75 Ohm) VGA input on the 15-pin connector.

To select the VGA input, the "Jumper" must be inserted in the VGA signal input module, while to select the high-impedance input on the 6-pin connector, this Jumper is to be removed.

INPUT CONNECTIONS

CN2

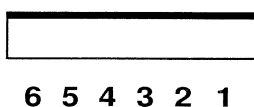


MAINS

230 V~ Europe

110 V~ U.S.A.

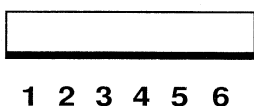
CN7



SIGNAL SYNCH.

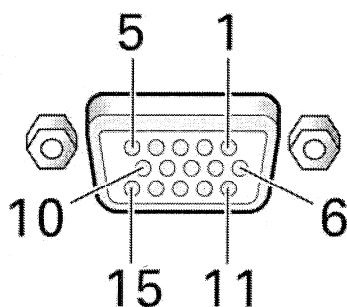
- 1 = R
- 2 = G
- 3 = B
- 4 = EARTH
- 5 = VERT. SYNCH.
- 6 = HORIZ. SYNCH. or COMPOSITE

**CN11
CN12**



YOKE-DEFLECTION

- 1 = BROWN
 - 2 = BLUE
 - 3 = BLACK
 - 4 = BLACK
 - 5 = GREEN
 - 6 = RED
-] VERT DEFL.
] MAINS
] HORIZ. DEFL.



RGB SUB D9

- 1 = GROUND
- 2 = N.C.
- 3 = RED
- 4 = GREEN
- 5 = BLUE
- 6 = N.C.
- 7 = N.C.
- 8 = COMPOSITE SYNC. OR HORIZONTAL SYNC.
- 9 = VERTICAL SYNC.

INSTALLATION, CONTROL AND ADJUSTMENT PROCEDURES

- **1. MAINS INPUT 230 V~ (EUROPE) / (optional) 110 V~ (U.S.A.)**
Insert the mains input harness into the three-position connector CN2, using a suitable cable in compliance with the EN 60065 regulation. Take care that the colours of the cables wires are inserted in the right position "Neutral-Line", following the indication and assuring that the earth wire is inserted in the central position.
- **2. VIDEO SIGNALS AND SYNC INPUT**
Insert the signal input harness in the 6-position connector CN7 or the VGA connector, taking care to respect the sequence of the various inputs. If a Polo Star monitor is used, insert or remove the jumper according to the connector used.
- **3. POSITION OF YOKE HARNESS**
If, after turning on, the image is found to be inverted, both horizontally and vertically, move the connector of the yoke harness from the original position and insert it in the adjacent connector, given that the crossed connections permit the image inversion in both senses. The connectors may be recognized on the PCB by the silk-screen printing indication CN11-CN12.
- **4. GEOMETRY ADJUSTMENT**
Adjust the trimmer situated on the control module according to the needs of the various video signals. The trimmers of the two modules have the silk-screen indication of their functions on the PCB.
- **5. BLACK AND WHITE LEVEL ADJUSTMENTS**
"POLO" monitors are calibrated at Hantarex factories with optical instrumentation for measuring chromatic coordinates of the CRT, thereby obtaining the best white possible. Should it ever be necessary to recalibrate, follow the procedure as below:

BLACK LEVEL

- a) Turn on the monitor and wait for about ten minutes
- b) Remove the video signal. Adjust G2 of the line transformer to a minimum (by turning it anticlockwise)
- c) Set the "CUT-OFF" adjusting trimmers on the CRT socket assembly RV3 (Red) RV4 (Green) RV5 (Blue) so as to obtain a voltage of 170V d.c. measured on the collector of transistors T2-T4-T6.
- d) Set Contrast and brightness to a maximum (clockwise).
- e) Adjust G2 (situated on the line transformer and called "SCREEN") until the raster becomes just visible.
- f) The RV... trimmer of the predominant colour is not to be adjusted any further. Adjust the other two trimmers (RV3/RV4 or RV5) until the best grey is obtained.
- g) This adjustment may cause an increase in brightness. We recommend you lower G2 until the raster becomes just visible again as indicated above.

WHITE LEVEL

- a) Turn on the monitor and wait approximately 10 minutes.
- b) Set the brightness and contrast situated on the control module to a medium level.
- c) Adjust brightness and contrast to maximum, situated on control module.
- d) Connect a video generator and select white page.
- e) Adjust the trimmers RV1 (red gain), RV2 (green gain) or RV6 (blue gain) on the CRT base assembly, for the best white possible.

NOTE : The 17" XGA version has no adjusting trimmer. On this version, all monitor adjustments are made using the OSD menu.

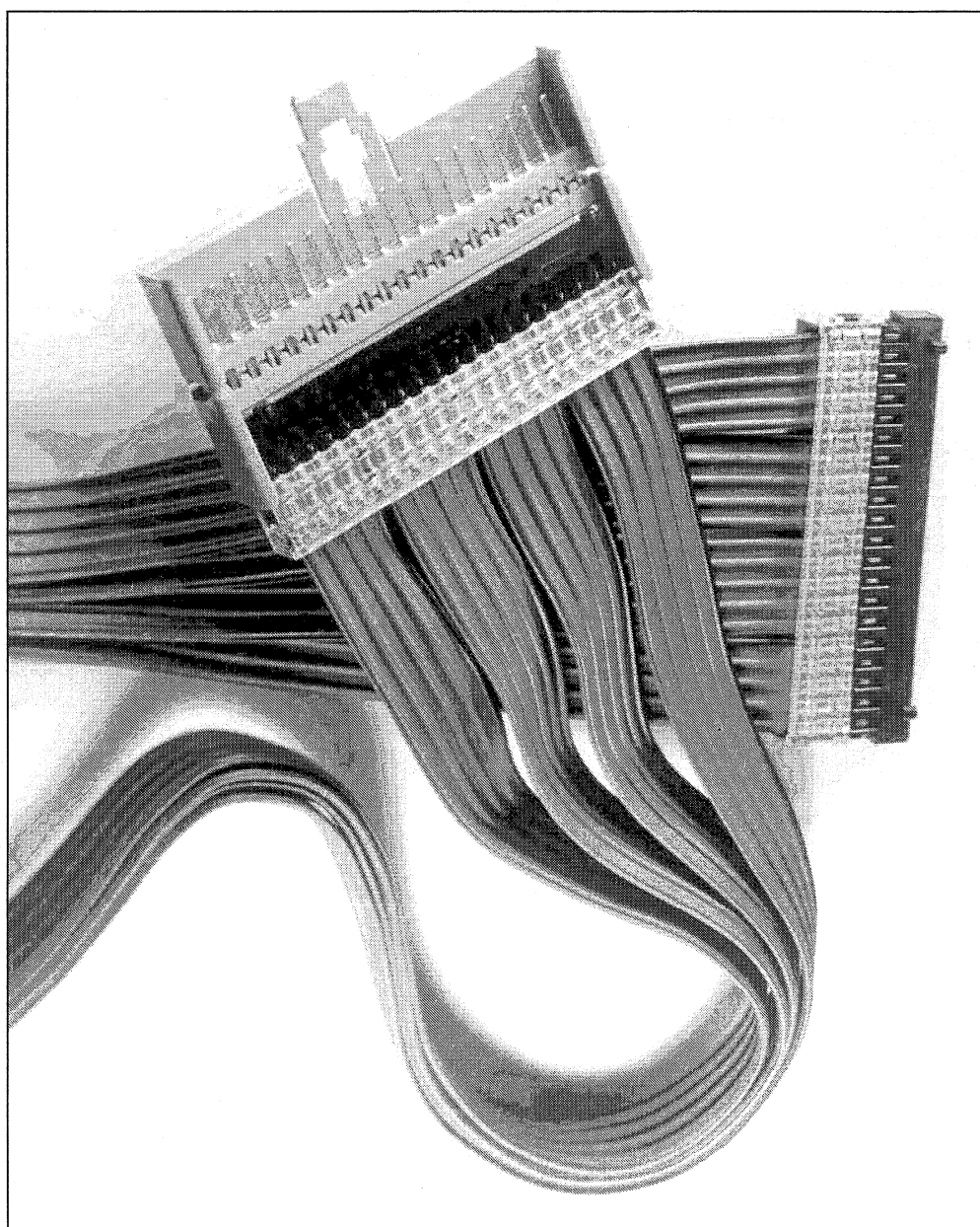
ADVICE FOR OVERALL INSTALLATION OF THE MACHINE

- **1** - The mains input plug must be easily accessible and must be calculated, together with the wire section of the main input cable, for the total power of the machine (e.g. up to a 6A absorption, with a length not exceeding 2 mt - use a cable section of 0,75 mm).
- **2** - Do not use extensions or loose mains plugs, which could create false contacts with consequent overheating and danger of fire.
- **3** - Assure that every structure where the monitor is placed is so designed that, in the eventuality of an accidental fall of liquids, they will not penetrate internally.
- **4** - Do not use the machine in environments which are too humid, thereby avoiding the possibility of electric discharges.
- **5** - The machine must be fitted with a bipolar switch, thereby permitting immediate switch-off, should it be necessary.
- **6** - The electric outlet feeding the machine, in addition to having a switch, must also be positioned within extreme vicinity of same and be easily accessible.
- **7** - Do not expose the machine to sun rays in order to avoid overheating.
- **8** - The machine must be guaranteed with earth connection.

Above suggestions are useful for a perfect function, for a machine duration and for a total security and safety of operators and users.

REMOTE CONTROLS

- The COMMAND card containing all image adjustments is connected to the base printed circuit board through a connector, this means that it may be extracted from above and, through a harness of 1,80 mt (supplied on request) the operator has the possibility of placing himself in front of the video and visibly carry out all the necessary operations. The harness and the plastic support for fixing the card must be requested as "REMOTE CONTROL ASSEMBLY" (see photo).

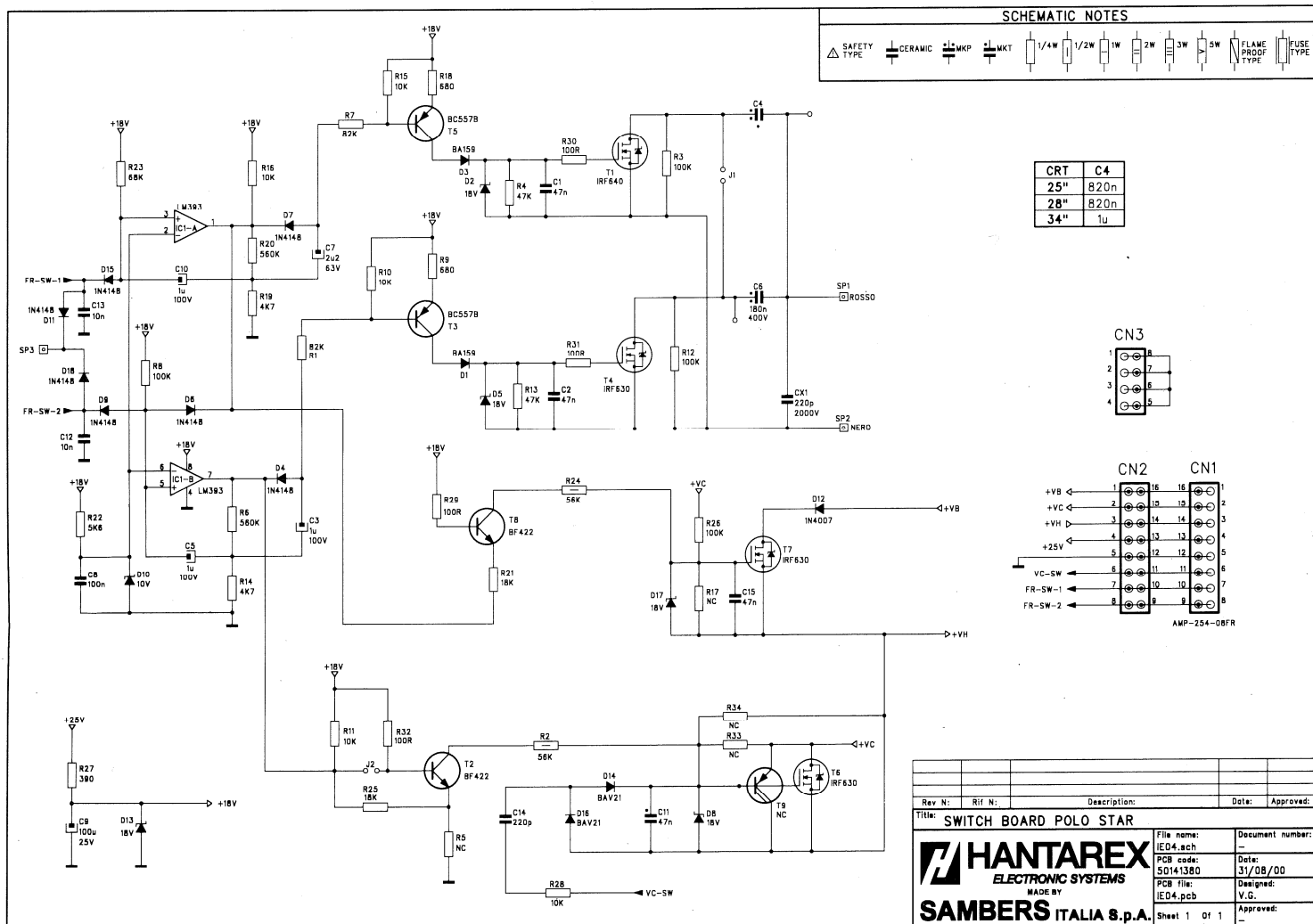
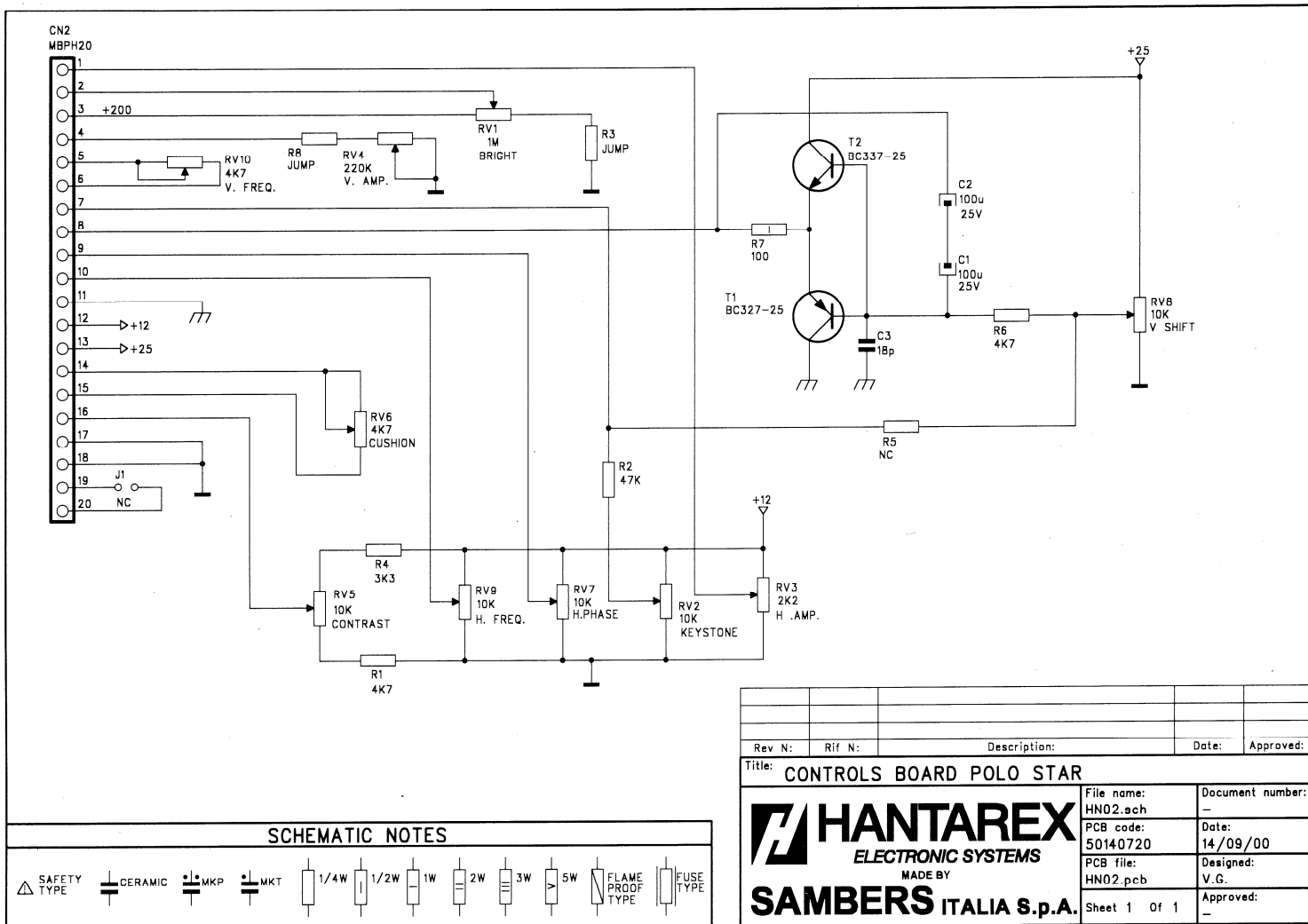


PARTI DI RICAMBIO

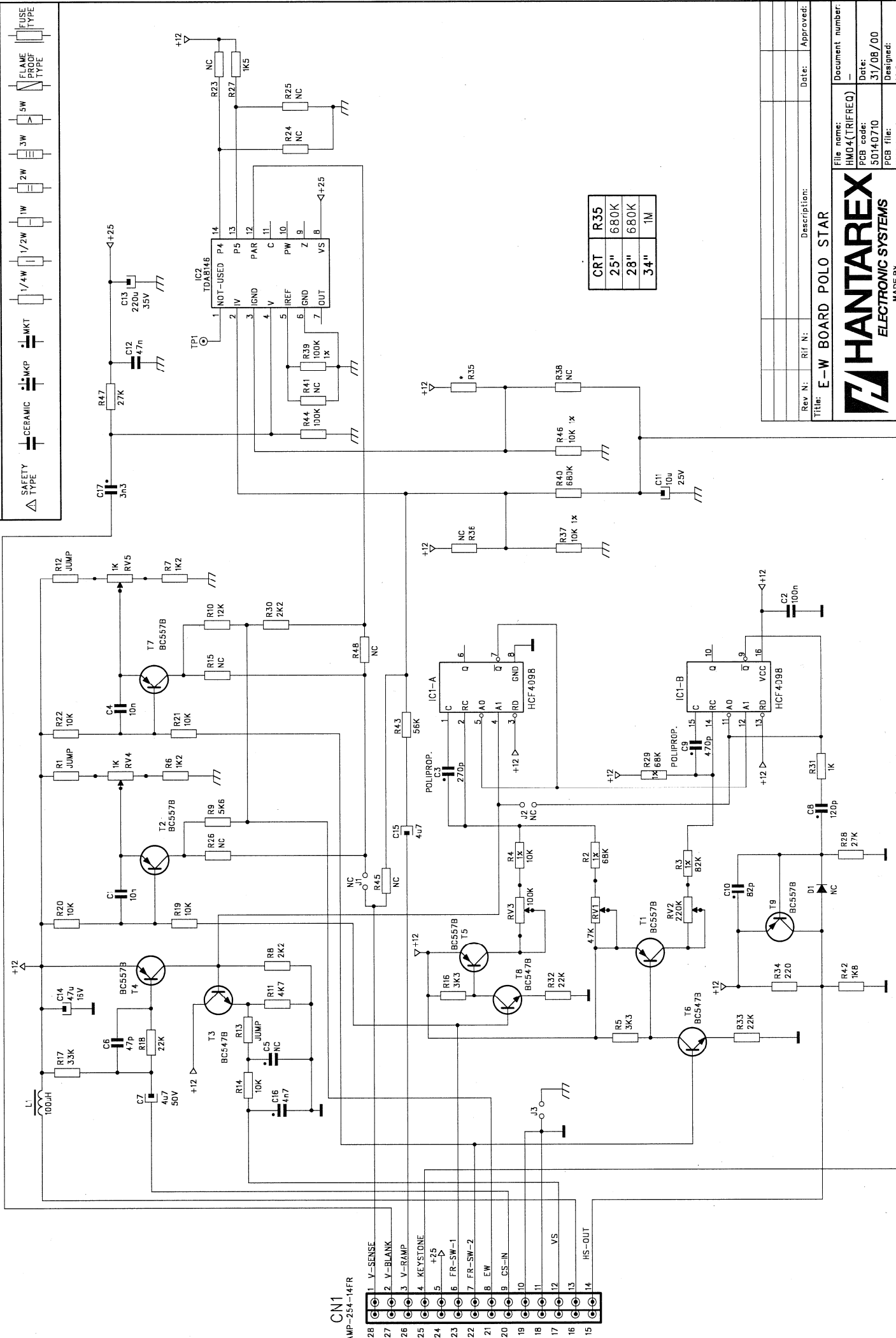
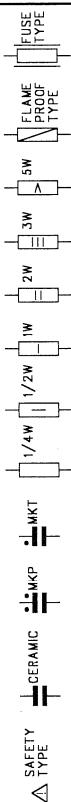
SPARE PARTS

SWITCH BOARD POLO STAR		
CODICE	DENOMINAZIONE	RIF.SCHEMA
20620510	CIRC.INT.LM 393 N	IC1
20150008	DIODO 1N 4007	D12
20100001	DIODO 1N 4148/A52R NASTR.ORIZZ.	D4-6-7-9-15
20100012	DIODO BA 159	D1-3
20100040	DIODO BAV 21	D14-16
20110010	DIODO ZENER 10V 1/2W 5%	D10
20110091	DIODO ZENER 18V 1/2W 5%	D2-5-8-13-17
20400150	TRANS. IRF 640	T1
20400409	TRANS.BC 557 B	T3-5
20420219	TRANS.BF 422-BF 422 L/RA	T2-8
20432371	TRANS.IRF 630	T4-6-7
CONTROL BOARD POLO STAR		
CODICE	DENOMINAZIONE	RIF.SCHEMA
50430742	ALBERINO REGOL. VE. TRIMMER L.10mm	RV1-2-3-4-5-6-7-8-9-10
34070000	CONN.20vie BORDO SCHEDA 90aPIN SFALSATI	CN2
20400030	TRANS.BC 327 25 NASTRATO	T1
20401069	TRANS.BC 337 25 NASTRATO	T2
23051003	TRIMM CARB 10K ORIZZ. 10 PERNO	RV5-2-7-8-9
23071005	TRIMM CARB 1M ORIZZ. 10 PERNO	RV1
23062204	TRIMM CARB 220K ORIZZ. 10 PERNO	RV4
23044705	TRIMM CARB 4K7 ORIZZ. 10 PERNO	RV10-3-6
MODULO E/W POLO STAR		
CODICE	DENOMINAZIONE	RIF.SCHEMA
28020640	BOBINA CHOCKE 100uH 10%	L1
20670210	CIRC.INT.HCF 4098 BEY	IC1
20675510	CIRC.INT.TDA 8148	IC2
34070550	CONN.14vie F.90aFILA SINGOLA p.2.54	CN1
20100001	DIODO 1N 4148/A52R NASTR.ORIZZ.	D1
20400429	TRANS.BC 547 B NASTRATO	T3-6-8
20400409	TRANS.BC 557 B NASTRATO	T5
20400409	TRANS.BC 557 B NASTRATO	T1-2-4-7-9
23061012	TRIMM CARB 100K ORIZZ. 10 PERNO	RV3
23041002	TRIMM CARB 1K ORIZZ. 10 CACCIIVITE	RV4-5
23062204	TRIMM CARB 220K ORIZZ. 10 PERNO	RV2
23054722	TRIMM CARB 47K ORIZZ. 10 PERNO	RV1
MAIN BOARD POLO STAR		
CODICE	DENOMINAZIONE	RIF.SCHEMA
28027760	BOBINA 2A/RCO621 CDU1548 15uH	L13
28021290	BOBINA CHOCKE 10uH 10%	L6
28027781	BOBINA CHOCKE 220uH 10%	L4
28027360	BOBINA CHOCKE 22uH 10%	L8
28020720	BOBINA CHOCKE 47uH 10%	L3
28029460	BOBINA LINEARITA' VGA-IDTV	L11
20829410	BOBINA PONTE UTF 477	L9
20821190	CHOCKE SU FERRITE 50UH	L12
20620080	CIRC.INT.L 7812 CV	IC2
20620510	CIRC.INT.LM 393 N	IC4
20670950	CIRC.INT.TDA 1675 A	IC6
20670271	CIRC.INT.TDA 2595/V9	IC5
20640000	CIRC.INT.TL 072	IC3
20672920	CIRC.INT.UC 3842 N	IC1
34077860	CONN.20vie M.VERI CON RITENUTA p.2.5	CN9
30476558	CONN.2vie M.VERI CON RITENUTA p.2.5	CN14
34074640	CONN.2vie MATE-N-LOK CIRC.STAMP.FEMM.	CN1
34074630	CONN.3vie MATE-N-LOK CIRC.STAMP.FEMM.	CN2
34023354	CONN.AMP MODU1 D280610/1 4VIE	CN13
34023356	CONN.AMP MODU1 D280611/1 6VIE	CN11-12-7
34076580	CONN.BURNDY WH8D-1 8VIE DIP-MATE	CN8
50135372	CONNECTORE STRIP	CN10
20150008	DIODO 1N 4007	D9-20-11-12-39
20100001	DIODO 1N 4148/A52R NASTR.ORIZZ.	D24-25-26-27-28-29-30-31-32-33-34
20100012	DIODO BA 159	D7-14-15-17-38-55-54
20100040	DIODO BAV 21	D51-53
20150131	DIODO BY 255	D1-2-3-5
20150460	DIODO BYD 33 G/M	D40-46
20150421	DIODO BYV 28-200	D10-13
20150230	DIODO BYW 95C/A52R-600	D4-6-8-16
20100090	DIODO DTV32D	D52
20151280	DIODO MUR 460	DX1
20151280	DIODO MUR 460	D47
20110091	DIODO ZENER 18V 1/2W 5%	ZD1
20110590	DIODO ZENER 2V7 1/2W 5%	R91
20110030	DIODO ZENER 0V6 0.5W	D49
20110141	DIODO ZENER 47V 1/2W 5%	ZD6-7
20110021	DIODO ZENER 6V2 1/2W	ZD3-4
28020470	FILTRO RETE 2x40 mH UTF 323	L2
29100019	FUSIBILE 3.15A RIT. 5x20mm	F1
21000340	NTC 8/10R 20%	R3
21000140	PTC 22R 15A	R1
21321001	RES ANTIFIA 1/2W 5% 10R	R146-135
21311003	RES ANTIFIA 1/2W 5% 1R	R134
22534700	RES FILO VE 10W 10% 470R	R4
22351500	RES FILO VE 9W 5% 15K	R2
20400429	TRANS.BC 547 B NASTRATO	T5-6-8-9-10-12-16
20400409	TRANS.BC 557 B NASTRATO	T7-11-13-14-15-17-18
20410100	TRANS.BDX 53 B	T19-B
20420140	TRANS.BF 419	
20420159	TRANS.BF 423/BF 421	T21-23
20400090	TRANS.BU 2727 AW	T22
20432980	TRANS.BUZ 91 A	T1
28020540	TRASF. SWITCH POLO/2 TRIFREQ.	TH1
20820150	TRASF.EAT x POLO VGA UTF 284	TH3
20820100	TRASFORMATORE DRIVER POLO 25 kHz	TH2
23061005	TRIMM CARB 100K ORIZZ. 10 CACCIIVITE	RV4
23041002	TRIMM CARB 1K ORIZZ. 10 CACCIIVITE	RV1
23044700	TRIMM CARB 4K7 ORIZZ. 10 CACCIIVITE	RV2-3
SOCKET BOARD POLO STAR		
CODICE	DENOMINAZIONE	RIF.SCHEMA
20821290	BOBINA CHOCKE 10uH 10%	L2-3-4
28020720	BOBINA CHOCKE 47uH 10%	L1
20100001	DIODO 1N 4148/A52R NASTR.ORIZZ.	D1-5-6-7
20130060	DIODO BAV 20	D2-3-4
20400429	TRANS.BC 547 B NASTRATO	T1-3-5-7
34020640	ZOCCOLO CRT SMALL-NECK	

SWITCH BOARD POLO STAR		
CODE	DESCRIPTION	LOCATION
20620510	IC LM 393 N	IC1
20150008	Diode 1N 4007	D12
20100001	Diode 1N 4148/A52R	D4-6-7-9-15
20100012	Diode BA 159	D1-3
20100040	Diode BAV 21	D14-16
20110010	Zener diode 10V 1/2W 5%	D10
20110091	Zener diode 18V 1/2W 5%	D2-5-8-13-17
20400150	Transistor IRF 640	T1
20400409	Transistor BC 557 B	T3-5
20420219	Transistor BF 422-BF 422 L/RA	T2-8
20432371	Transistor IRF 630	T4-6-7
CONTROL BOARD POLO STAR		
CODE	DESCRIPTION	LOCATION
50430742	Trimmer knob	RV1-2-3-4-5-6-7-8-9-10
34070000	20 ways connector	CN2
20400030	Transistor BC 327 25	T1
20401069	Transistor BC 337 25	T2
23051003	Trimmer 10K	RV5-2-7-8-9
23071005	Trimmer 1M	RV1
23062204	Trimmer 220K	RV4
23044705	Trimmer 4K7	RV10-3-6
MODULO E/W POLO STAR		
CODE	DESCRIPTION	LOCATION
28020640	Chocke coil 100uH 10% UTF 30	L1
20670210	IC HCF 4098 BEY	IC1
20675510	IC TDA 8148	IC2
34070550	14 ways connector	CN1
20100001	Diode 1N 4148/A52R	D1
20400429	Transistor BC 547 B	T3-6-8
20400409	Transistor BC 557 B	T5
20400409	Transistor BC 557 B	T1-2-4-7-9
23061012	Trimmer 100K	RV3
23041002	Trimmer 1K	RV4-5
23062204	Trimmer 220K	RV2
23054722	Trimmer 47K	RV1
MAIN BOARD POLO STAR		
CODE	DESCRIPTION	LOCATION
28027760	Coil 2A/RCO621 CDU1548 15uH	L13
28021290	Chocke coil 10uH 10% UTF 149	L6
28027781	Chocke coil 220uH 10%	L4
28027360	Chocke coil 22uH 10%	L8
28020720	Chocke coil 47uH 10%	L3
28029460	Linearity coil VGA-IDTV	L11
20829410	Bridge coil	L9
20821190	Chocke 50UH	L12
20620080	IC L 7812 CV	IC2
20620510	IC LM 393 N	IC4
20670950	IC TDA 1675 A	IC6
20670271	IC TDA 2595/V9	IC5
20640000	IC TL 072	IC3
20672920	IC UC 3842 N	IC1
34077860	20 ways connector	CN9
30476558	2 ways connector	CN14
34074640	2 ways connector	CN1
34074630	3 ways connector	CN2
34023354	4 ways connector	CN13
34023356	6 ways connector D280611/1	CN11-12-7
34076580	8 ways Burndy connector DIP-MATE	CN8
50135372	Strip connector	CN10
20150008	Diode 1N 4007	D9-20-11-12-39
20100001	Diode 1N 4148/A52R	D24-25-26-27-28-29-30-31-32-33-34
20100012	Diode BA 159	D7-14-15-17-38-55-54
20100040	Diode BAV 21	D51-53
20150131	Diode BY 255	D1-2-3-5
20150460	Diode BYD 33 G/M	D40-46
20150421	Diode BYV 28-200	D10-13
20150230	Diode BYW 95C/A52R-600	D4-6-8-16
20100090	Diode DTV32D	D52
20151280	Diode MUR 460	DX1
20151280	Diode MUR 460	D47
20110091	Zener diode 18V 1/2W 5%	ZD1
20110590	Zener diode 2V7 1/2W 5%	R91
20110030	Zener diode 0V6 0.5W	D49
20110141	Zener diode 47V 1/2W 5%	ZD6-7
20110021	Zener diode 6V2 1/2W	ZD3-4
28020470	Mains Filter 2x40 mH	L2
29100019	Fuse 3.15A 5x20mm	F1
21000340	NTC 8/10R 20%	R3
21000140	PTC 22R 15A	R1
21321001	Non flammable Resistor 1/2W 5% 10R	R146-135
21311003	Non flammable Resistor 1/2W 5% 1R	R134
22534700	Wire resistor VE 10W 10% 470R	R4
22351500	Wire resistor VE 9W 5% 15K	R2
20400429	Transistor BC 547 B	T5-6-8-9-10-12-16
20400409	Transistor BC 557 B	T7-11-13-14-15-17-18
20410100	Transistor BDX 53 B	T19-B
20420140	Transistor BF 419	
20420159	Transistor BF 423/BF 421	T21-23
20400090	Transistor BU 2727 AW	T22
20432980	Transistor BUZ 91 A	T1
28020540	Switch transformer POLO/2 STAR	TH1
20820150	EHT transformer POLO VGA	TH3
20820100	Driver transformer POLO 25 kHz	TH2
23061005	100K Trimmer	RV4
23041002	1K Trimmer	RV1
23044700	4K7 Trimmer	RV2-3
SOCKET BOARD POLO STAR		
CODE	DESCRIPTION	LOCATION
20821290	Chocke coil 10uH 10%	L2-3-4
28020720	Chocke coil 47uH 10%	L1
20100001	Diode 1N 4148/A52R	D1-5-6-7
20130060	Diode BAV 20	D2-3-4
20400429	Transistor BC 547 B	T1-3-5-7
34020640	SMALL-NECK socket	



SCHEMATIC NOTES



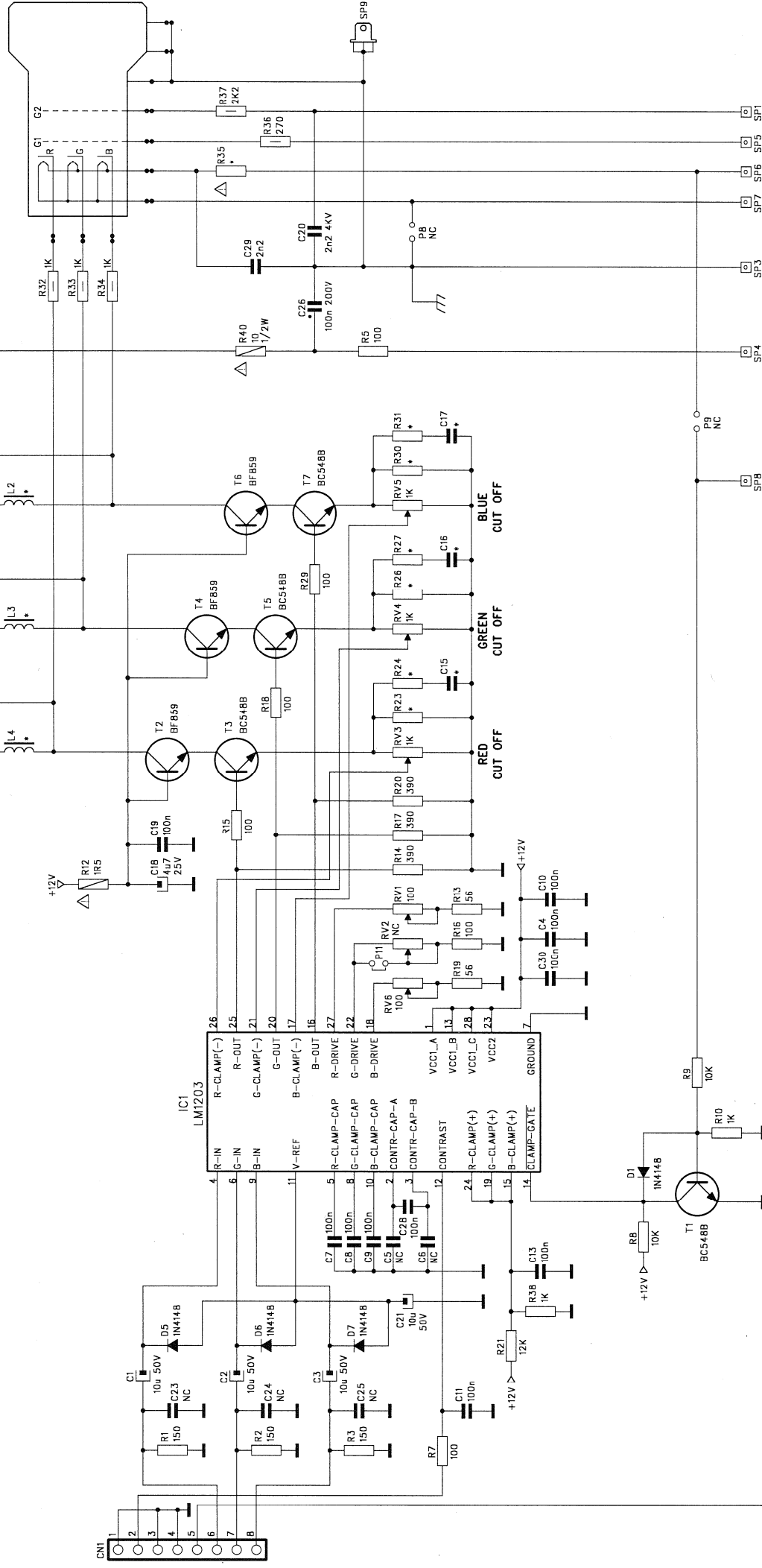
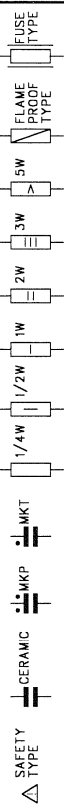
CRT	R35
25"	680K
28"	680K
34"	1M

Rev N:	Rif N:	Description:	Date:	Approved:
Title: E-W BOARD POLO STAR				
File name: HM04(TRIFREQ)				
PCB code: 50140710				
Date: 31/08/00				
PCB file: HM04.pcb				
Designed: V.G.				
Approved:				
Sheet 1 of 1				

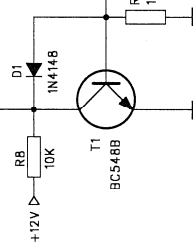
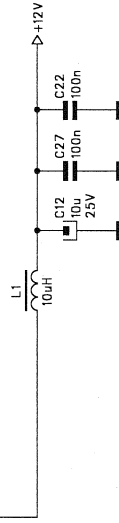
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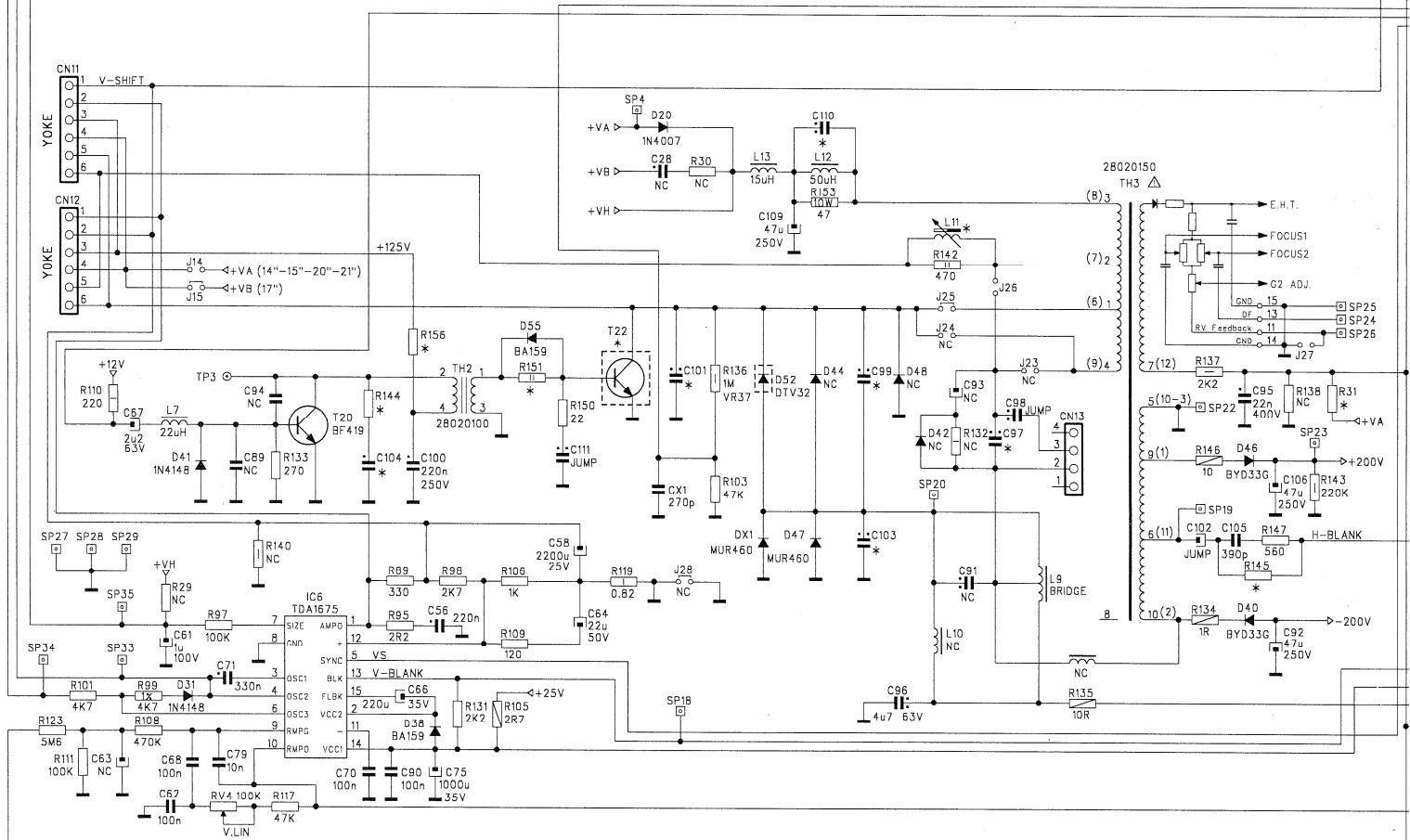
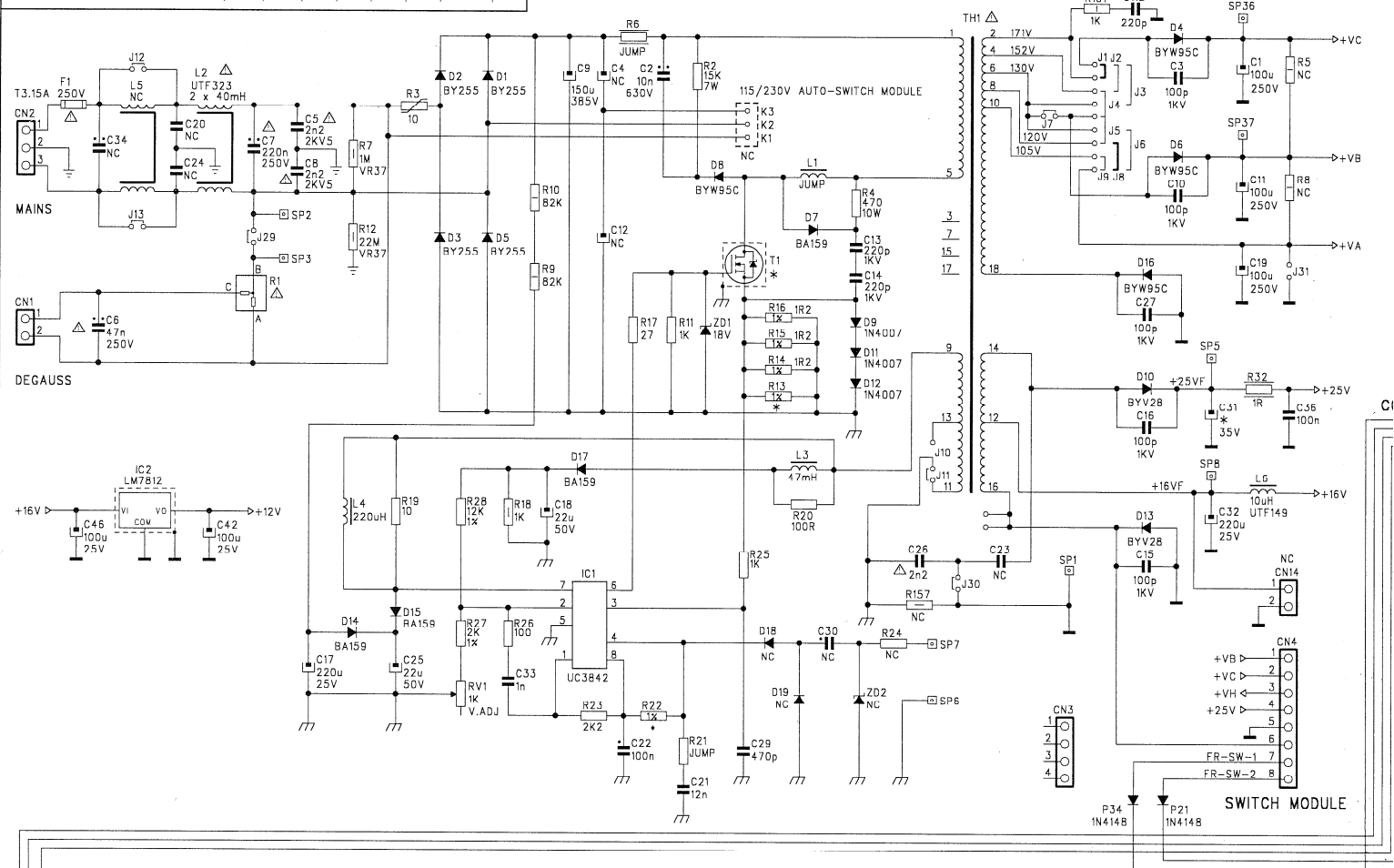
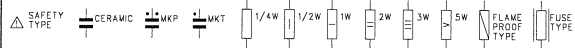
CRT	VID	PH
R35	25"	34"
R22,R25,R28	4R7	5R6
R24,R27,R31	6K8	6K8
C15,C16,C17	330p	330p
R23,R26,R30	470	270
	470	270
	470	270



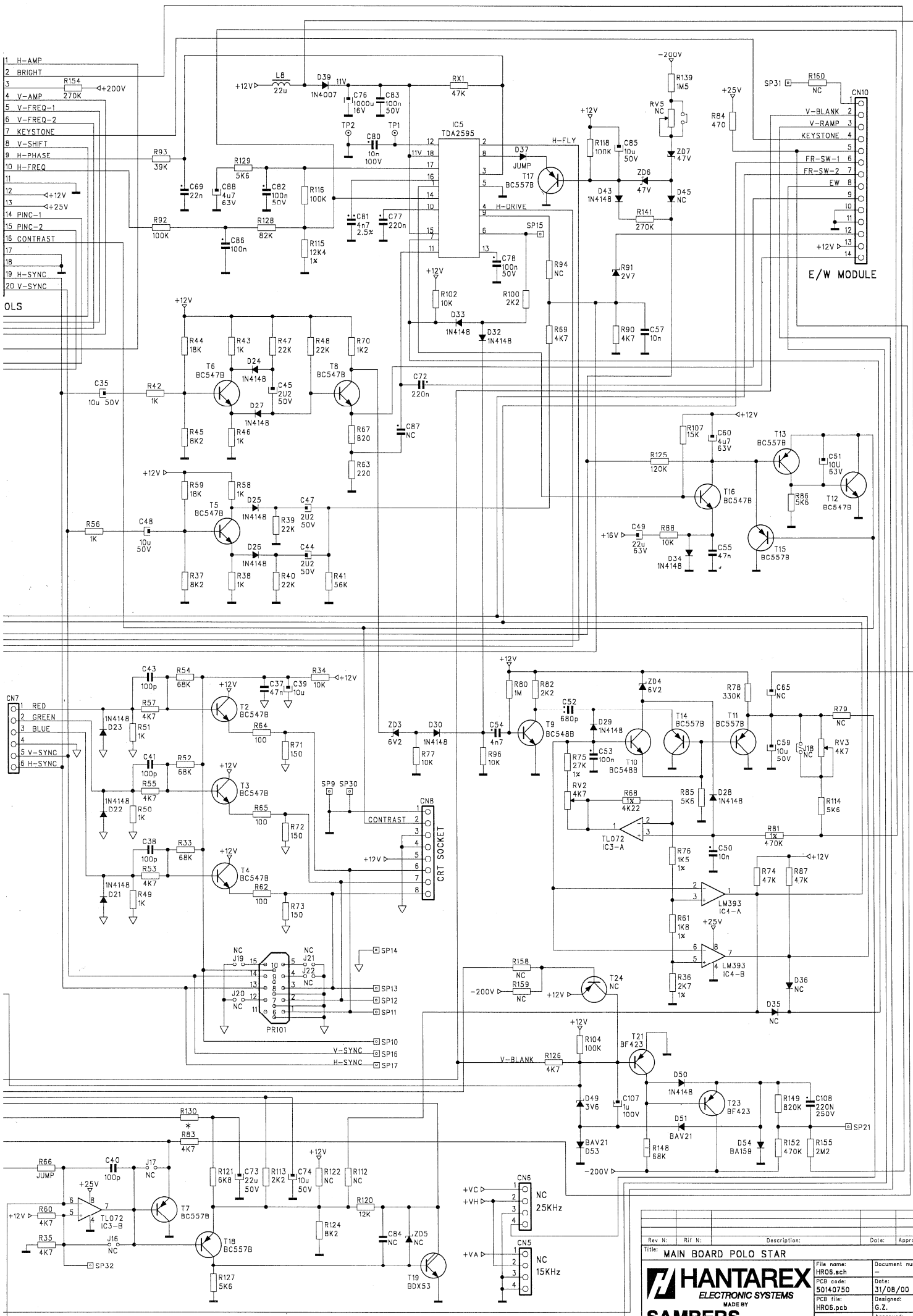
Rev N:	RIF N:	Description:	Date:	Approved:
Title: CRT SOCKET BOARD POLO STAR				
File name: JF02				
Document number: 50140890				
Date: 01/09/00				
PCB code: JF02.drw				
Designed: V.G.				
Approved: 1 Of 1				

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CRT	C110	C101	C103	C31	C97	C99	R130	R145	R31	R156	R13	R22	R151	C104	T22	T1	R144
25"-28"	4N7	1N5	15N	1000u	470N	7N5	470K	2K2	56K	1K	1R2	3K9	1R	2N2	BUH1215	BU2727AW	2K7 2W
34"	NC	1N5	18N	NC	560N	8N2	330K	1K	47K	470	R56	4K2	1R5	1N	BU2727AW	BU291A	1K 4W



Rev N:	Rif N:	Description:	Date:	Approved:
Title: MAIN BOARD POLO STAR				
HANTAREX ELECTRONIC SYSTEMS MADE BY SAMBERS ITALIA S.p.A.		File name: HRO8.sch PCB code: 50140750 PCB file: HRO8.pcb	Document number: Date: 31/08/00 Designed: G.2. Approved:	Sheet 1 Of 1