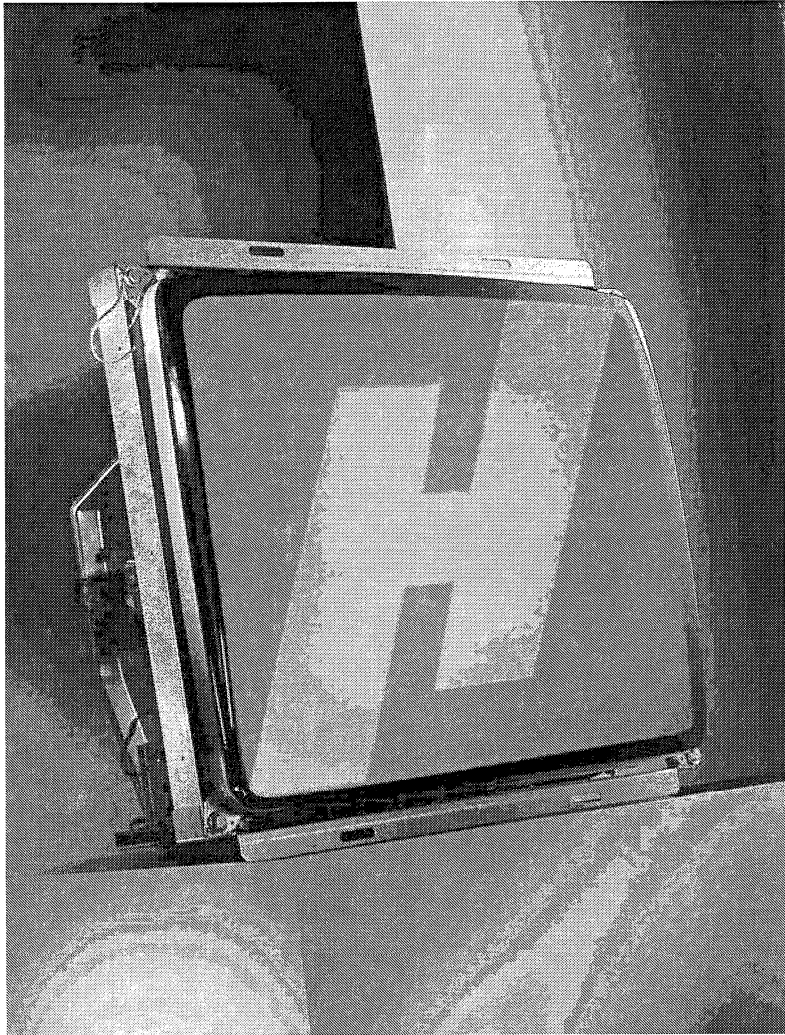


Monitors POLO

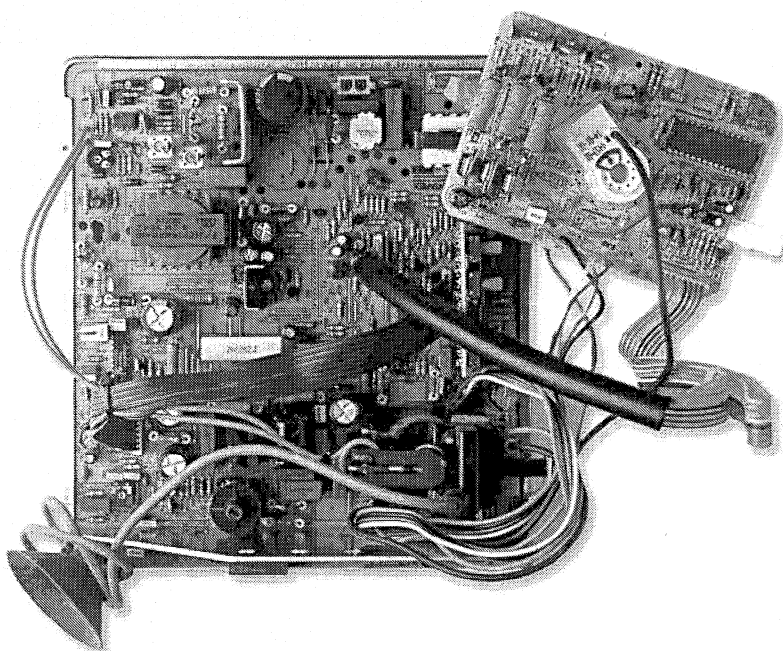
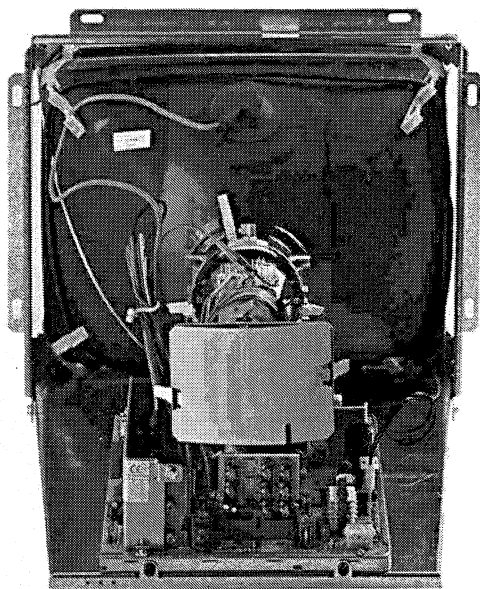
MANUALE DI SERVIZIO
SERVICE MANUAL
MANUEL DE SERVICE
MANUAL DE SERVICIO
BEDIENUNGSANLEITUNG

 **HANTAREX**
ELECTRONIC SYSTEMS

manufactured and distributed by
SAMBERS
I T A L I A



SAFETY PRECAUTIONS	1
DIMENSIONS AND WEIGHTS	2
TECHNICAL SPECIFICATIONS AND CONNECTIONS	3
INSTALLATION, CONTROL AND ADJUSTMENT PROCEDURES	4
ADVICE FOR INSTALLATION OF OVERALL MACHINE	5
REMOTE CONTROLS	6



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

SIZE	WIDTH	HEIGHT	DEPTH	WEIGHT
10"	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" ^{16/9}	796 mm	515.5 mm	465 mm	48.5 Kg

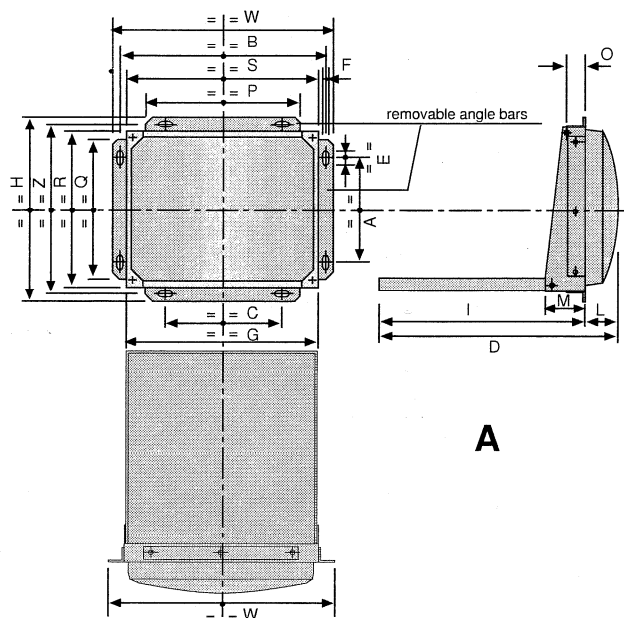
SPECIAL VERSIONS

MECHANICAL DATA

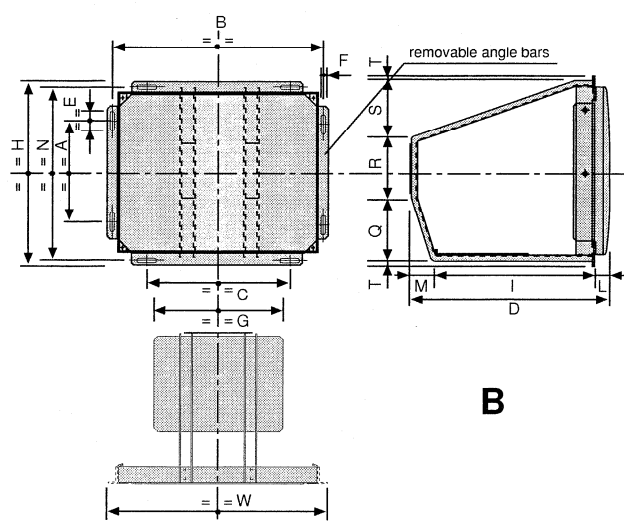
	DIM.	W	H	D	A	B	C	N	E	F	G	I	L	M	O	P	Q	R	S	T	U	V	Z	
A	10"	284	261	292	155	267	155	244	20	6	246	250	42	40	25	195	195	225	248	* with frontal adjustments base				
	14"	370	312	348	145	350	195	290	16	8	322	285	63	-	-	-	-	-	-	-	-	-	-	
	15"	386	321	359.5	220	369	220	304	20	6	348	310	49.5	50	25	260	260	285	350	-	-	-	-	-
	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	-	-	-	
C	37"	863	688	591.5	480	839	655	664	40	8	450	461	130.5	-	-	-	-	406	234	24	-	-	-	
	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

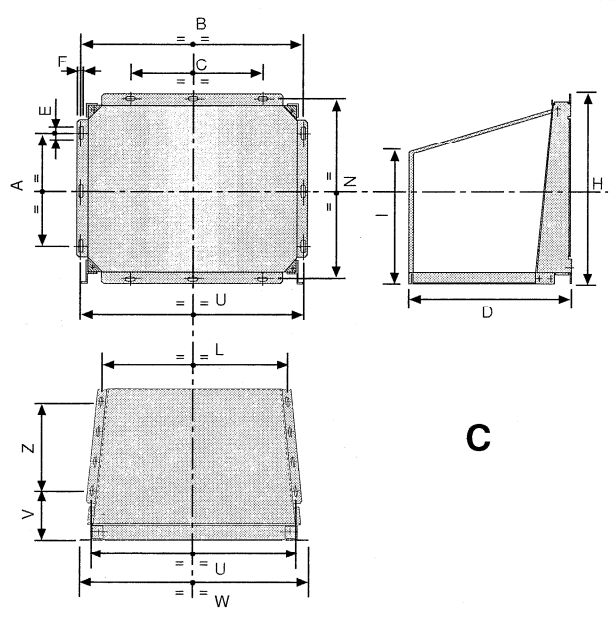
DIMENSIONS AND WEIGHTS



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	RGB positive	
Type	1K (15KHz and 15/25KHz Auto)	
Input impedance	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 15.7 Khz ± 500 Hz 25.0 Khz ± 500 Hz 31.5 Khz ± 500 Hz 35.5 Khz ± 500 Hz 37.5 Khz ± 500 Hz 30KHz to 72KHz Auto	Monitor 15KHz, 15/25KHz, Star 15/25KHz, Star Star, SVGA Star, SVGA SVGA XGA
VERTICAL SCANNING FREQUENCY	Adjustable from 43Hz to 86Hz Automatic from 47Hz to 160Hz, XGA only	
VIDEO BANDWIDTH	15KHz, 15/25KHz SVGA/Star XGA	15 MHz-3dB 25 MHz-3dB 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	BRIGH

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

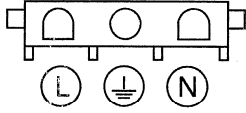
On the POLO STAR version, the frequency is recognized automatically. The only operation that may have to be performed is to adjust the geometry of the picture using the control module. With the 35KHz signal it may also be necessary to adjust the horizontal phase using the "RV2 horizontal phase" trimmer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

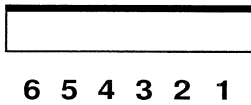


MAINS

230 V~ Europe

110 V~ U.S.A.

CN7



SIGNAL SYNCH.

1 = R

2 = G

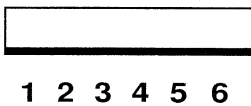
3 = B

4 = EARTH

5 = VERT. SYNCH.

6 = HORIZ. SYNCH. or COMPOSITE

CN11
CN12



YOKE-DEFLECTION

1 = BROWN

2 = BLUE

3 = BLACK

4 = BLACK

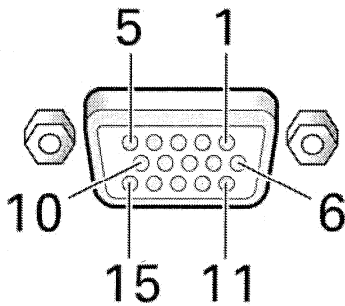
5 = GREEN

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.

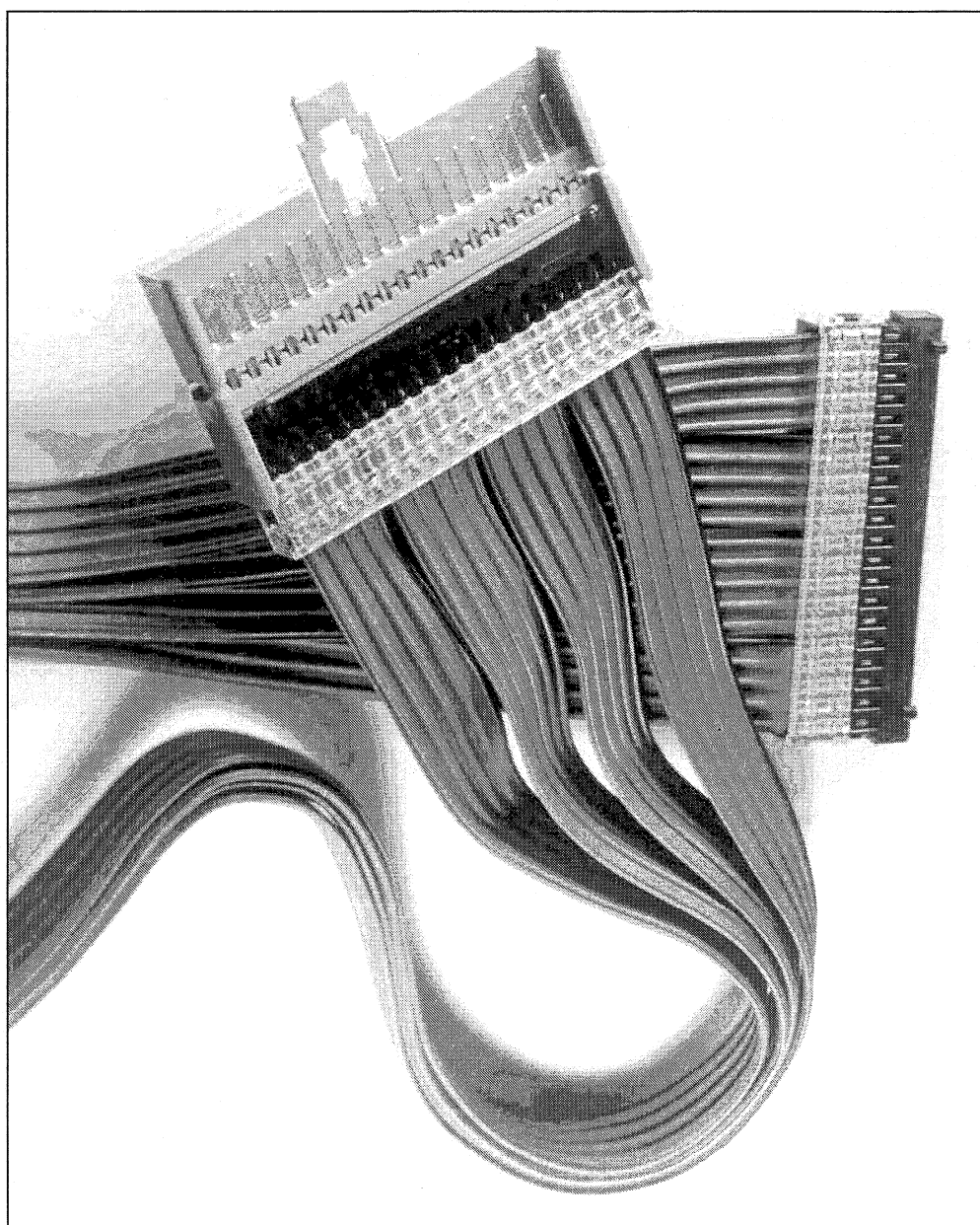
ADVICE FOR OVERALL INSTALLATION OF THE MACHINE

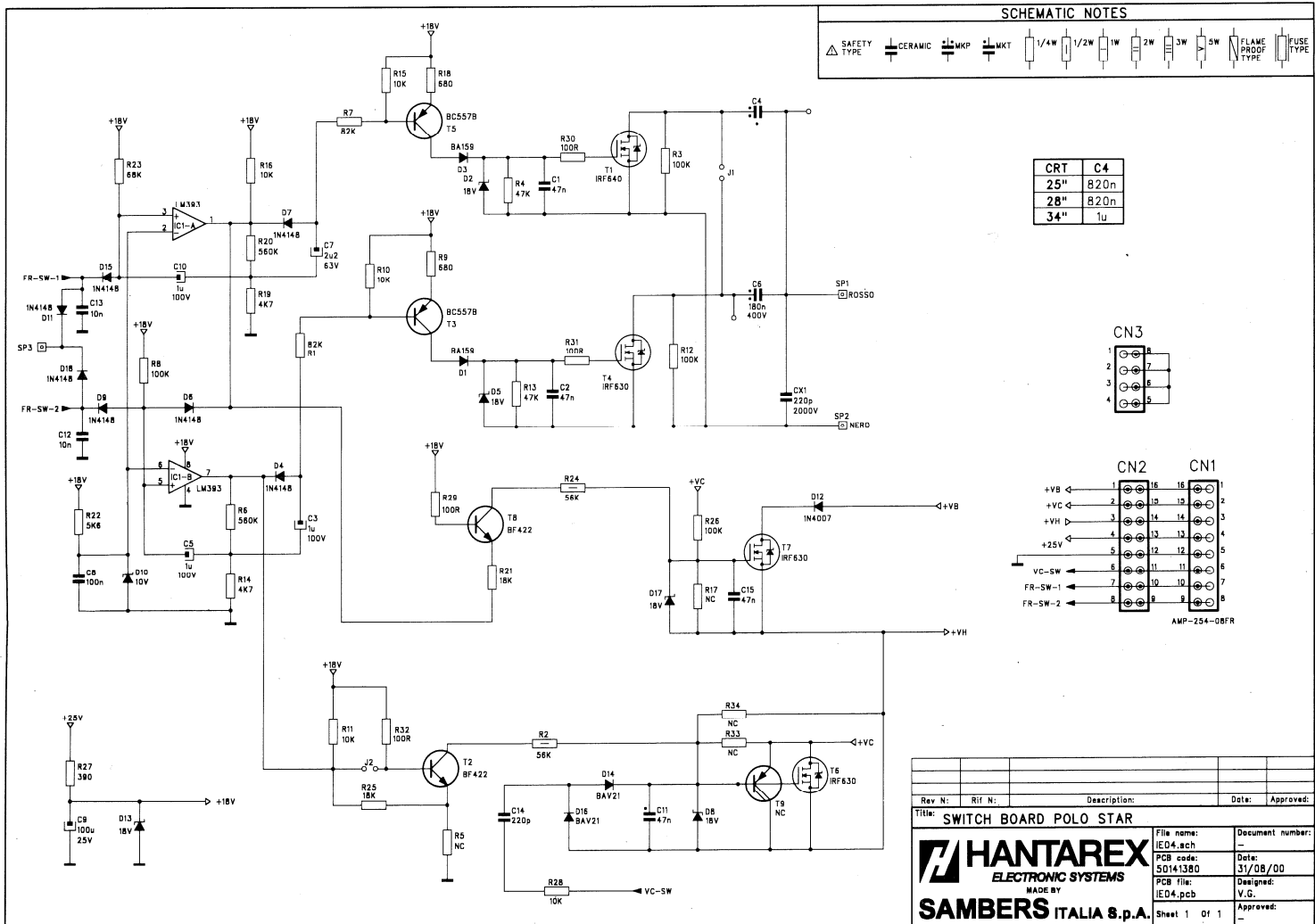
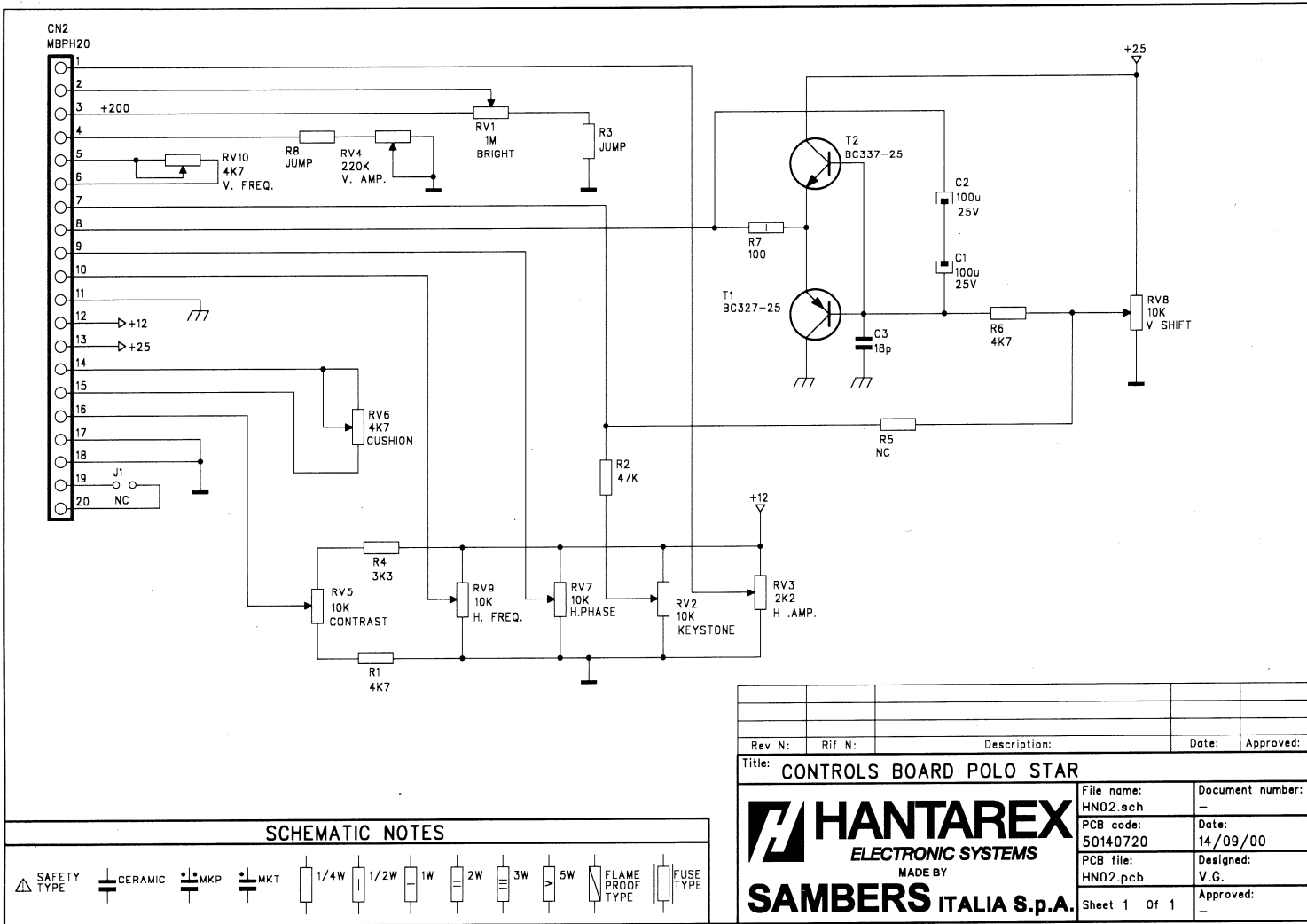
- **1** - The mains input plug must be easily accessible and must be calculated, together with the wire section of the main input cable, for the total power of the machine (e.g. up to a 6A absorption, with a length not exceeding 2 mt - use a cable section of 0,75 mm).
- **2** - Do not use extensions 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.

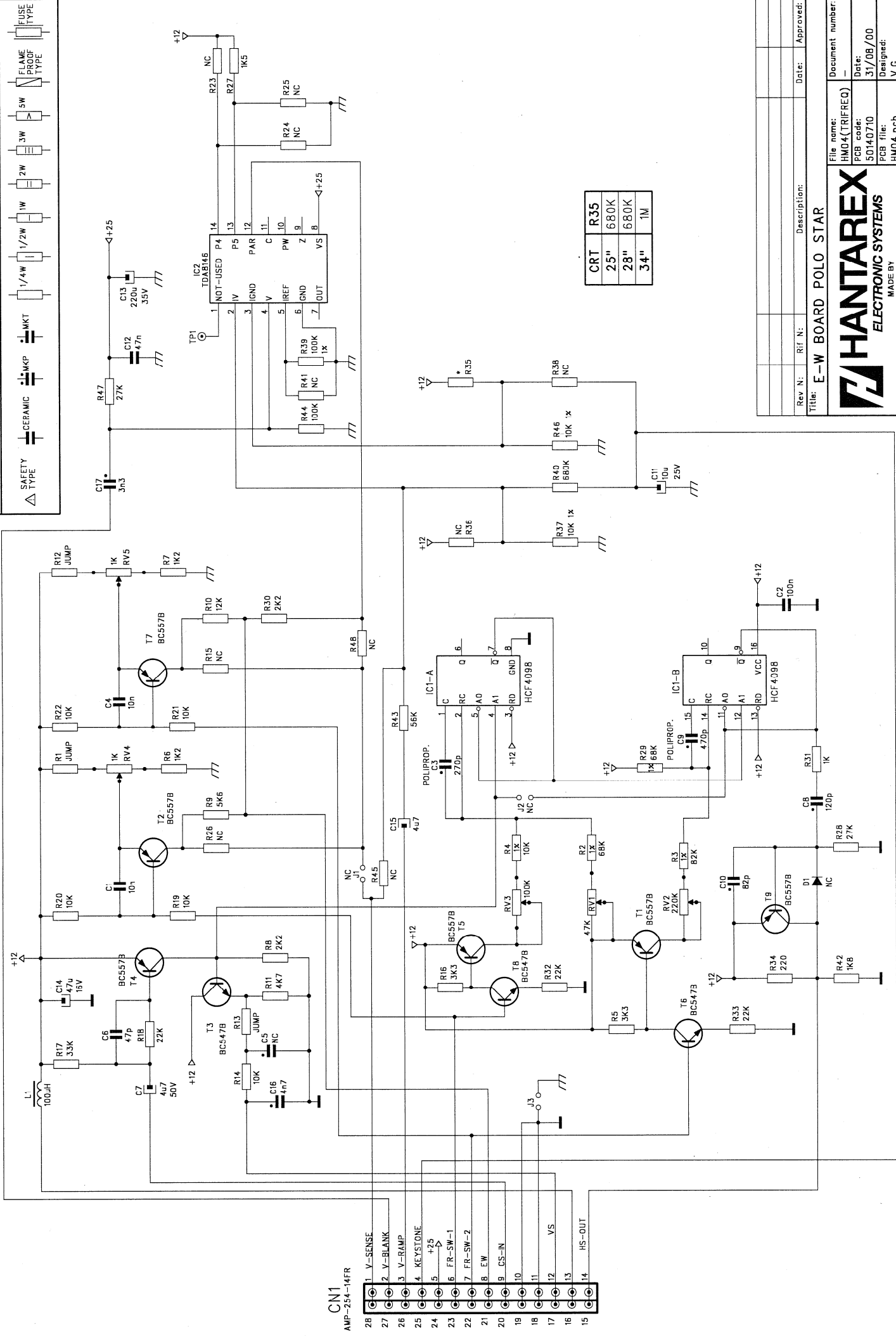
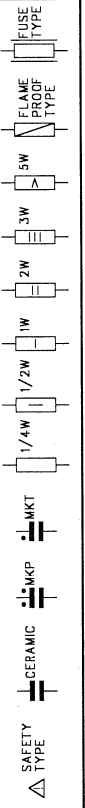
REMOTE CONTROLS

- 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).





SCHEMATIC NOTES



CRT	R35
	680K
	28"
	34"
	1M

- CN1**
AMP-254-14FR
- 28 1 V--SENSE
 - 27 2 V--BLANK
 - 26 3 V--RAMP
 - 25 4 KEYSTONE
 - 24 5 +25
 - 23 6 FR-SW-1
 - 22 7 FR-SW-2
 - 21 8 EW
 - 20 9 CS-IN
 - 19 10
 - 18 11
 - 17 12 VS
 - 16 13
 - 15 14 HS-OUT

Rev. N: Rif. N: Description: Date: Approved:

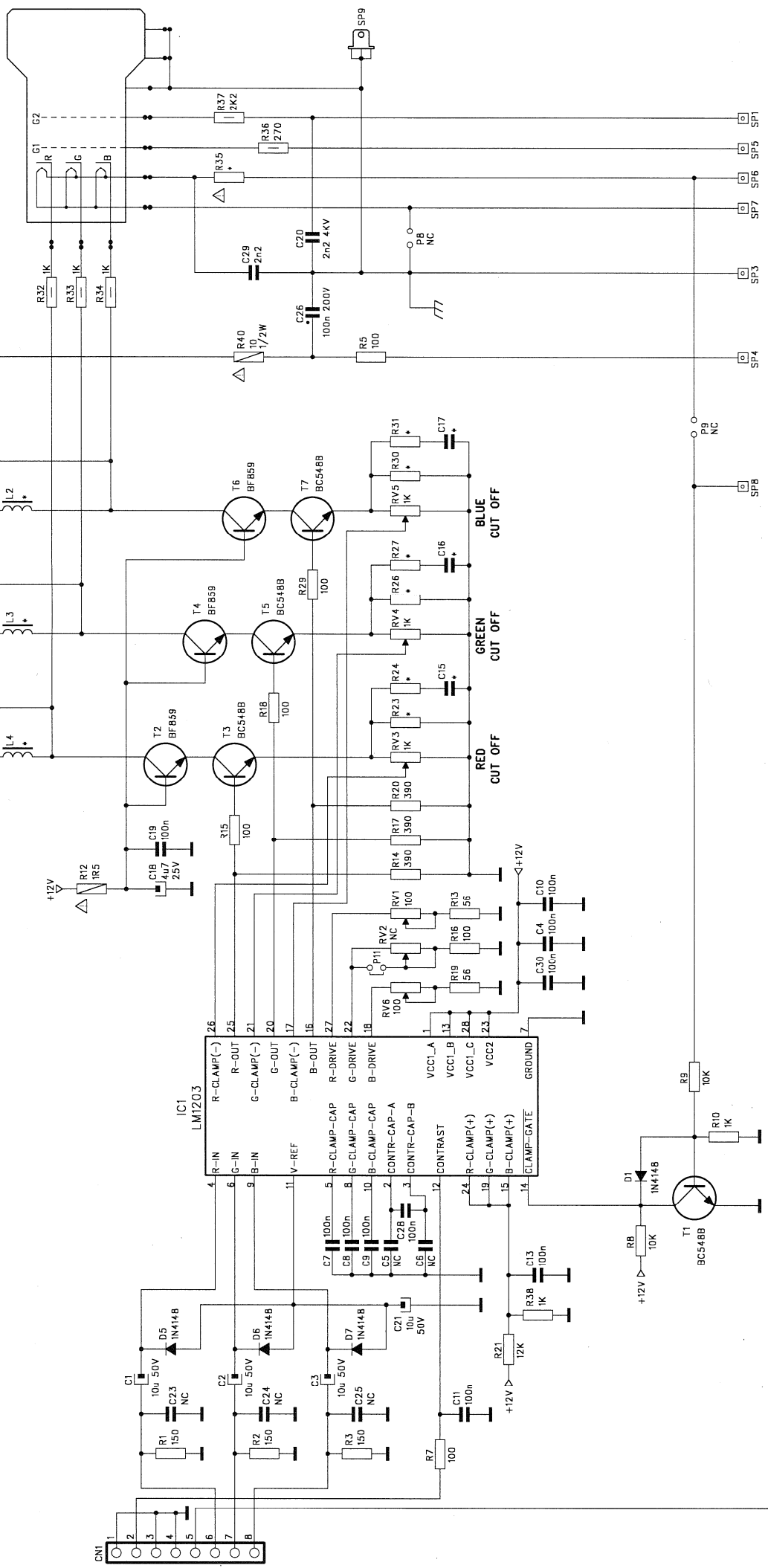
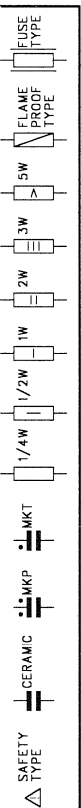
Title: **E-W BOARD POLO STAR**

File name: HMO4(TRIFREQ)
 PCB code: 50140710
 Date: 31/08/00
 PCB file: HMO4.pcb
 Designed: V.G.
 Approved: _____

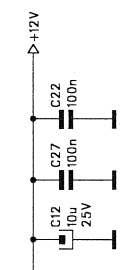
HANTAREX
ELECTRONIC SYSTEMS
MADE BY
SAMBERS ITALIA S.p.A.

Sheet 1 of 1

SCHEMATIC NOTES



CRT	VID	PH
R35	25"	34"
R22,R25,R28	4R7	5R6
R24,R27,R31	6K8	6K8
C15,C16,C17	22R	22R
R23,R26,R30	330p	330p
	470	270
	470	270
	270	270



Rev. N: RIF. N: Description: Date: Approved:

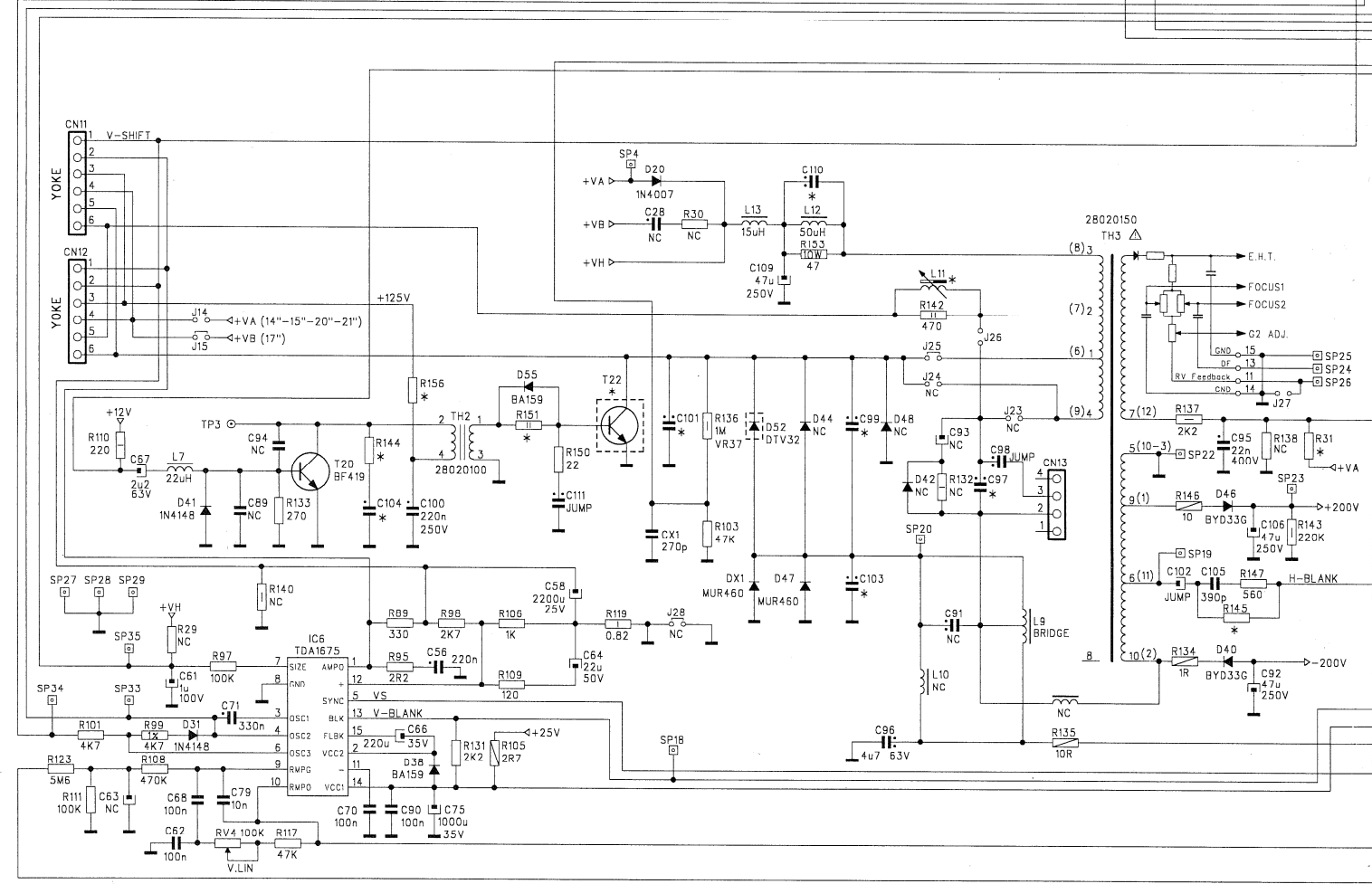
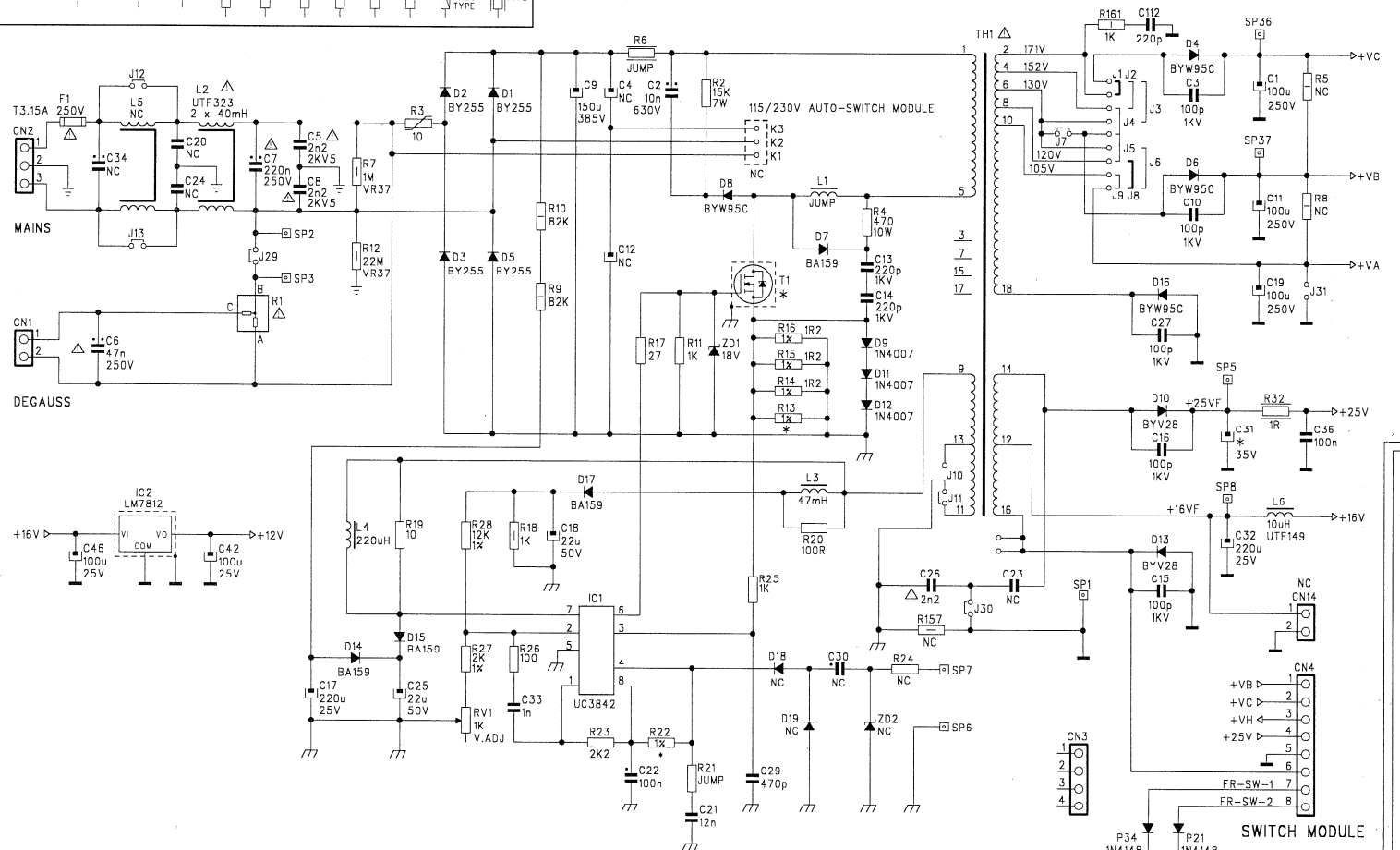
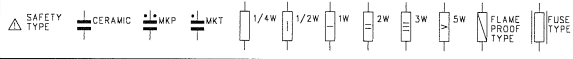
Title: CRT SOCKET BOARD POLO STAR

File name: JF02
 PCB code: 50140890
 PCB file: JF02.drw
 Designed: V.G.
 Document number: —
 Date: 01/09/00
 Approved: —

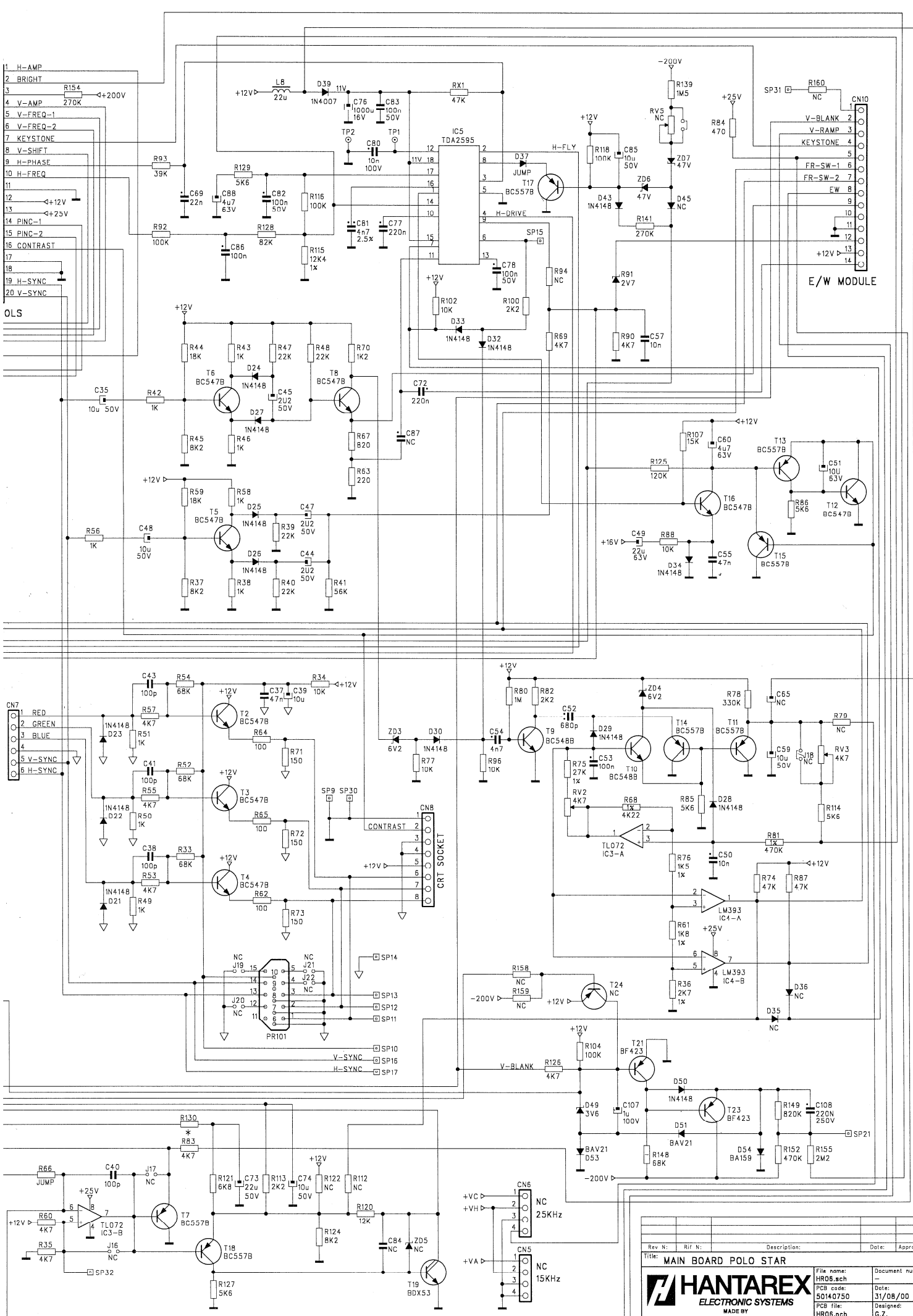
HANTAREX
 ELECTRONIC SYSTEMS
 MADE BY
SAMBERS ITALIA S.p.A.

Sheet 1 Of 1

SCHEMATIC NOTES



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				
		File name:	Document number:	
		PCB code:	Date:	
		PCB file:	Designed:	
		HR08.pcb	G.Z.	
		Sheet 1	Approved:	
		1	01	