

# Service Manual

## Color Television

### TC-14RM10LP

### TC-20RM10LP

### TC-20RA10LP

### GP31 Chassis



## Specifications

TELEVISOR	TC-14RM10LP	TC-20RM10LP	TC-20RA10LP
Power source	127V / 220V AC, 50/60Hz ACAUTO	127V / 220V AC, 50/60Hz ACAUTO	127V / 220V AC, 50/60Hz ACAUTO
Consumption	51W	61W	61W
Antenna input jack	75Ω - VHF/UHF/CATV	75Ω - VHF/UHF/CATV	75Ω - VHF/UHF/CATV
Color system	PAL-M / NTSC / PAL-N	PAL-M / NTSC / PAL-N	PAL-M / NTSC / PAL-N
Tuning system	(FST)	(FST)	(FST)
Channel capability	VHF: 2 ~ 13 UHF: 14 ~ 69 CATV: 1 ~ 125	VHF: 2 ~ 13 UHF: 14 ~ 69 CATV: 1 ~ 125	VHF: 2 ~ 13 UHF: 14 ~ 69 CATV: 1 ~ 125
Picture Tube	PANABLACK 14" CRT, 36cm (NBR5258) 33cm Measured diagonally	PANABLACK 20" CRT, 51cm (NBR5258) 48cm Measured diagonally	PANABLACK 20" CRT, 51cm (NBR5258) 48cm Measured diagonally
Audio Output	8 W max (PMPO)	13 W max (PMPO)	13 W max (PMPO)
AV Terminals	1 (rear)	1 (rear)	1 (front), 1 (rear) 1 (Head Phone)
Dimension (LxAxP)	370 x 352 x 372 mm	514 x 468x 461mm	514 x 468x 461mm
Weight	9,6 Kg	17,0 Kg	17,0 Kg

#### REMOTE CONTROL TRANSMITTER:

Model: TNQ2B2502-1

Power source: 3V (2 AA type batteries)

Infrared Length: 9500 Å (angstrom)

#### SUPPLIED ACCESSORIES:

- 1 Remote Control Transmitter
- 1 300Ω/75Ω Adaptor Ballum
- 2 "AA" type batteries
- 1 internal antenna

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## Important Safety Notice

Special components are used in this television set which are important for safety. These parts are identified on the schematic diagram by the symbol  $\triangle$ . It is essential that these critical parts are replaced with the manufacturer's specified replacement parts to prevent X-ray radiation, shock, fire or other hazards. Do not modify the original design without manufacturer's permission.

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## General Guidelines

An Isolation Transformer should always be used during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks. It will also protect the Receiver from being damaged by accidental shorting that may occur during servicing.

When servicing, observe the original lead dress, especially in the high voltage circuit. Replace all damaged parts (also parts that show signs of overheating.)

Always Replace Protective Devices, such as fishpaper, isolation resistors and capacitors, and shields after servicing the Receiver. Use only manufacturer's recommended rating for fuses, circuit breakers, etc.

High potentials are present when this Receiver is operating. Operation of the Receiver without the rear cover introduces danger from electrical shock. Servicing should not be performed by anyone who is not thoroughly familiar with the necessary precautions when servicing high-voltage equipment.

Extreme care should be practiced when Handling the Picture Tube. Rough handling may cause it to implode due to atmospheric pressure (14.7 lbs per sq. in). Do not sick or scratch the glass or subject it to any undue pressure. When handling, use safety goggles and heavy gloves for protection. Discharge the picture tube by shorting the anode to chassis ground (not to the cabinet or to other mounting hardware). When discharging, connect cold ground (i.e. dag ground lead) to the anode with a well insulated wire or use a grounding probe.

Avoid prolonged exposure at close range to unshielded areas of the picture tube to prevent exposure to X-ray radiation.

The Test Picture Tube used for servicing the chassis at the bench should incorporate safety glass and magnetic shielding. The safety glass provides shielding for the tube viewing area against X-ray radiation as well as implosion. The magnetic shield limits X-ray radiation around the bell of the picture tube in addition to restricting magnetic effects. When using a picture tube test jig for service, ensure that the jig is capable of handling 31kV without causing X-ray radiation.

Before returning a serviced receiver to the owner, the service technician must thoroughly test the unit to ensure that is completely safe to operate. Do not use a line isolation transformer when testing.



### Warning !

It is essential that these critical parts are replaced with the manufacturer's specified replacement parts to prevent X-ray radiation, shock, fire or other hazards.

## ■ ABOUT LEAD FREE SOLDER (PbF)

### Note:

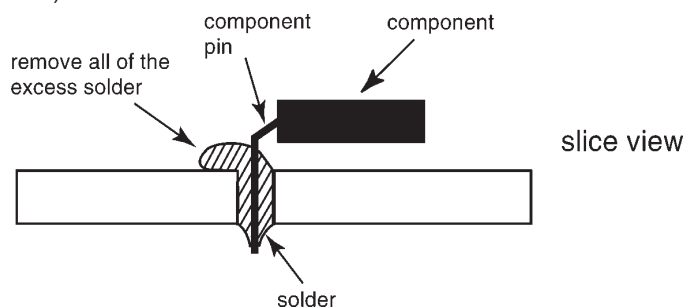
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.

We will use PbF solder when discussing the lead free solder used in our manufacturing process which is made from Tin (Sn), Silver, (Ag), and Copper, (Cu).

This model, and others like it, manufactured using lead free solder will have PbF stamped on the PCB. For service and repair work we suggest using the same type of solder although, with some precautions, standard Pb solder can also be used.

### Caution

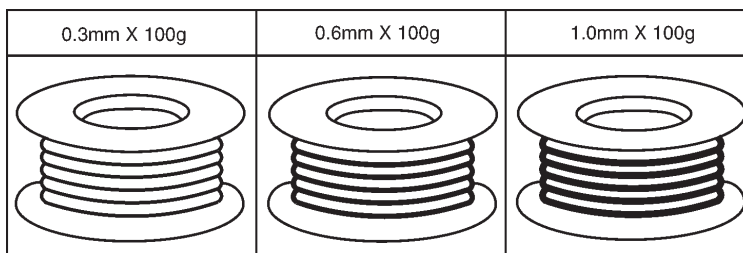
- PbF solder has a melting point that is 50° ~ 70° F, (30° ~ 40°C) higher than Pb solder. Please use a soldering iron with temperature control and adjust it to 700° ± 20° F, (370° ± 10°C). In case of using high temperature soldering iron, please be careful not to heat too long.
- PbF solder will tend to splash if it is heated much higher than its melting point, approximately 1100°F, (600°C).
- If you must use Pb solder on a PCB manufactured using PbF solder, remove as much of the original PbF solder as possible and be sure that any remaining is melted prior to applying the Pb solder.
- When applying PbF solder to double layered boards, please check the component side for excess which may flow onto the opposite side (See figure, below).



## ■ SUGGESTED PbF SOLDER

There are several types of PbF solder available commercially. While this product is manufactured using Tin, Silver, and Copper, (Sn+Ag+Cu), you can also use Tin and Copper, (Sn+Cu), or Tin, Zinc, and Bismuth, (Sn+Zn+Bi). Please check the manufacturer's specific instructions for the melting points of their products and any precautions for using their product with other materials.

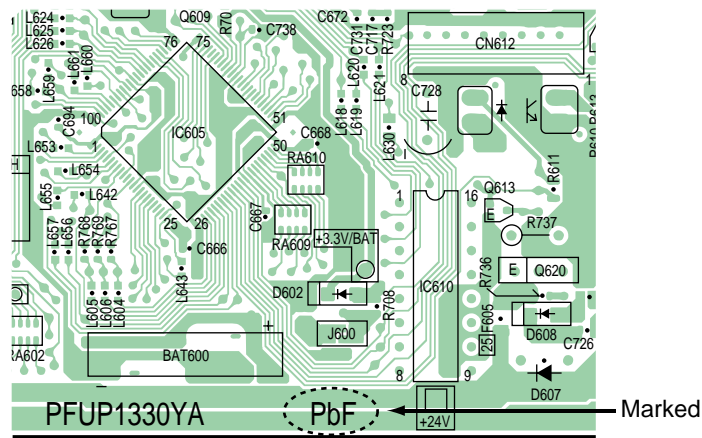
The following lead free (PbF) solder wire sizes are recommended for service of this product: 0.3mm, 0.6mm and 1.0mm.



## ■ HOW TO RECOGNIZE THAT PB FREE SOLDER IS USED

P.C. Boards marked as "PbF" use Pb Free solder. (See the figure below.) Pb Free is not used the Power Supply Board of this unit.

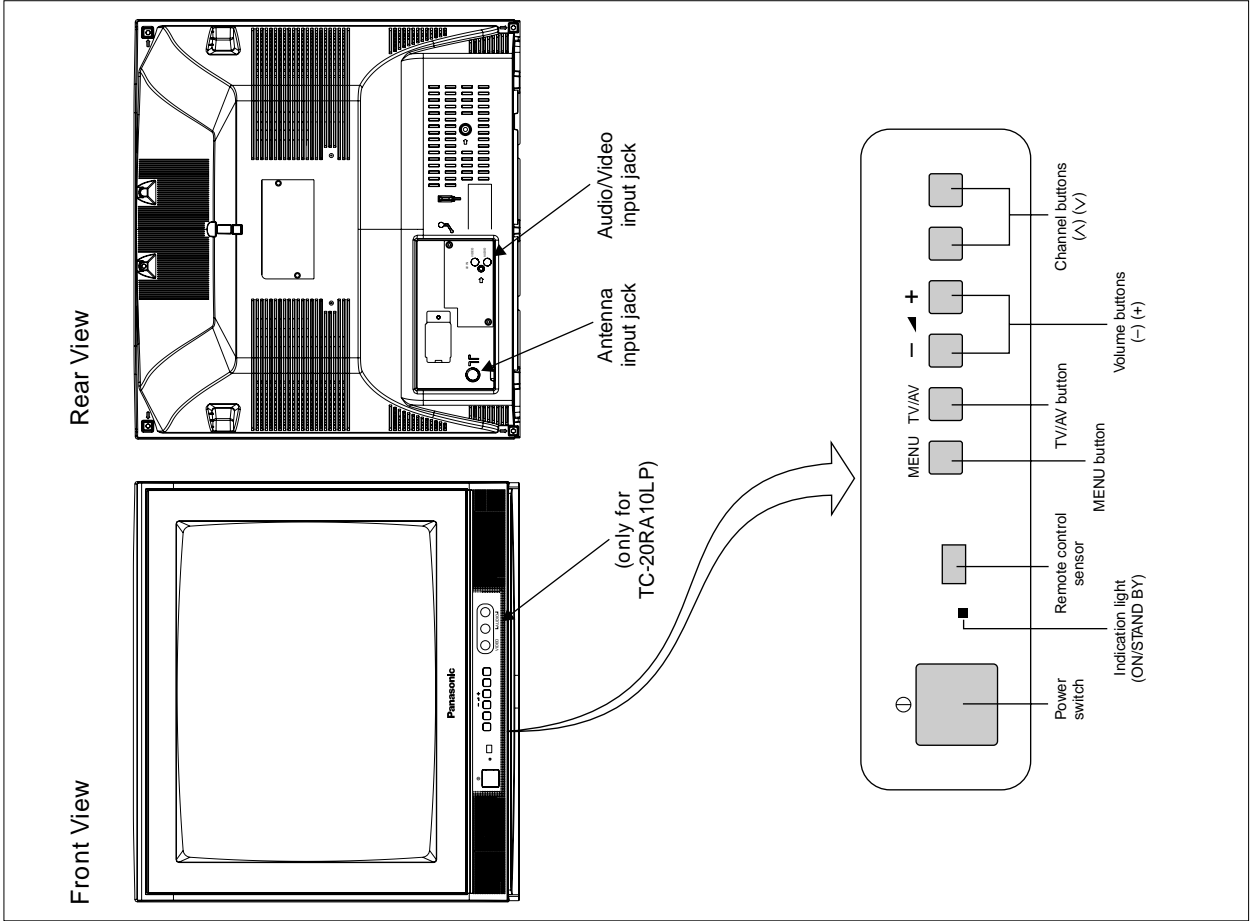
(Example : Digital Board)



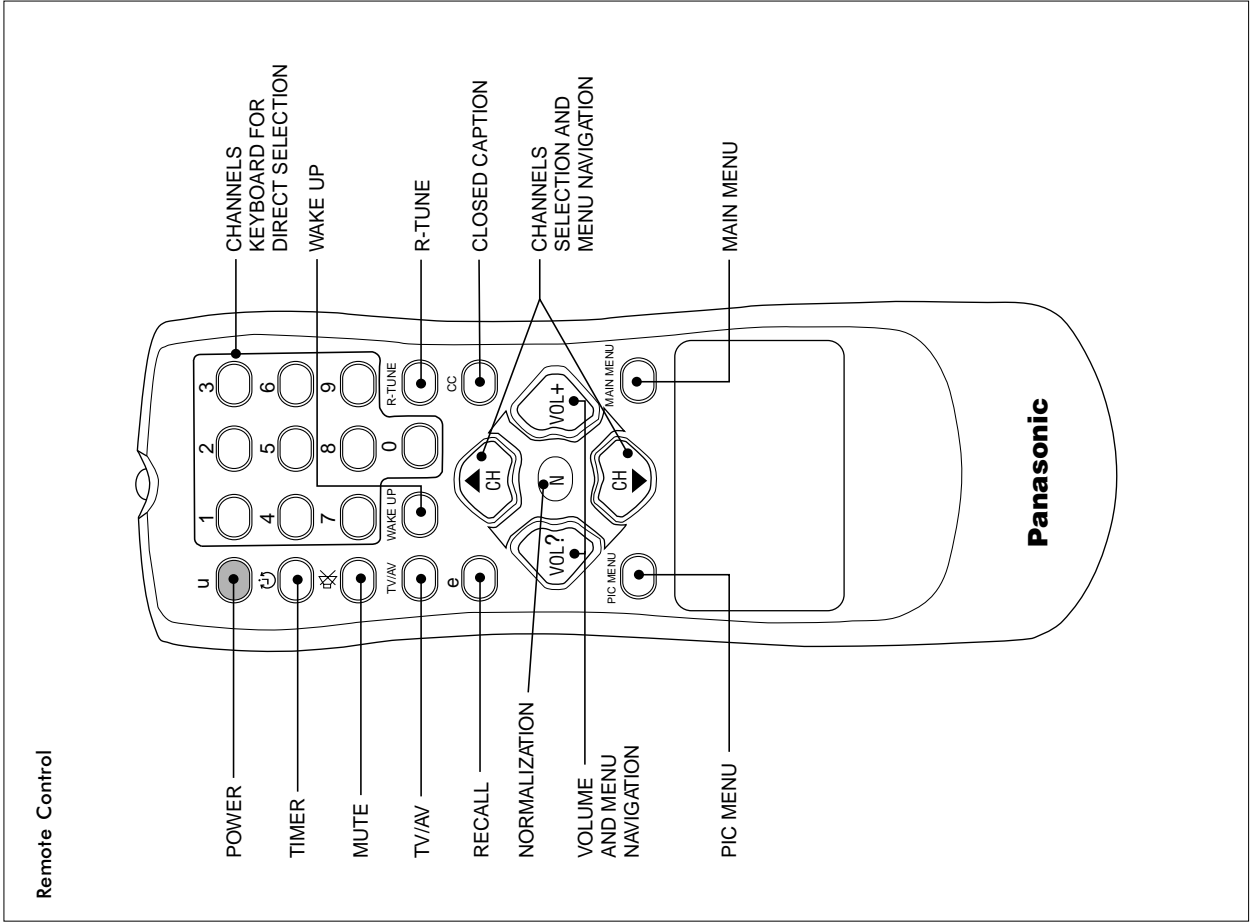
# OPERATING INSTRUCTIONS

## LOCATION OF CONTROLS

### TC-14RM10LP / TC-20RM10LP / TC-20RA10LP



### REMOTE CONTROL



## ■ IC601 - PINOUT

Symbol	Pin	Description
P3.1/ADC1	1	port 3.1 or ADC1 input
P3.2/ADC2	2	port 3.2 or ADC2 input
P3.3/ADC3	3	port 3.3 or ADC3 input
VSSC/P	4	digital ground for m-Controller core and periphery
P0.5	5	port 0.5 (8 mA current sinking capability for direct drive of LEDs)
P0.6/CVBSTD	6	port 0.6 (8 mA current sinking capability for direct drive of LEDs) or Composite video input. A positive-going
VSSA	7	digital ground of TV-processor
SECPLL	8	SECAM PLL decoupling
VP2	9	2nd supply voltage TV-processor (+8V)
DECDIG	10	supply voltage decoupling of digital circuit of TV-processor
PH2LF	11	phase-2 filter
PH1LF	12	phase-1 filter
GND3	13	ground 3 for TV-processor
DECBG	14	bandgap decoupling
AVL	15	Automatic volume levelling
VDRB	16	vertical drive B output
VDRA	17	vertical drive A output
IFIN1	18	IF input 1
IFIN2	19	IF input 2
IREF	20	reference current input
VSC	21	vertical sawtooth capacitor
AGCOUT	22	tuner AGC output
NC	23	Not connected
NC	24	Not connected
GND2	25	ground 2 for TV processor
SNDPLL	26	narrow band PLL filter
IC	27	Internally connected
AUDIO2	28	audio 2 input
AUDIO3	29	audio 3 input
HOUT	30	horizontal output
FBISO	31	flyback input/sandcastle output
DECSDEM	32	decoupling sound demodulator
AUDEEM	33	Deemphasis (front-end audio out)
EHTO	34	EHT/overvoltage protection input
PLLIF	35	IF-PLL loop filter
IC SIF AGC	36	AGC Sound
IC	37	Internally connected
IFVO/SVO	38	IF video output / selected CVBS output
VP1	39	main supply voltage TV processor
CVBS1	40	internal CVBS input
GND	41	ground for TV processor
CVBS2	42	external CVBS2 input
GND	43	ground for TV-processor
CVBS3/Y	44	CVBS3/Y input
C	45	chroma input
WHSTR	46	white stretch capacitor
CVBSO	47	CVBS output
AUDOUT	48	Audio output
NC	49	Not connected
INSSW2	50	2nd RGB / YUV insertion input
R2/VIN	51	2nd R input / V (R-Y) input / PR input
G2/YIN	52	2nd G input / Y input
B2/UIN	53	2nd B input / U (B-Y) input / PB input
BCLIN	54	beam current limiter input
BLKIN	55	black current input / V-guard input
RO	56	Red output
GO	57	Green output
BO	58	Blue output
VDDA	59	analog supply of Teletext decoder and digital supply of TV-processor (3.3 V)

## ■ IC601 - PINOUT

Symbol	Pin	Description
VPE	60	OTP Programming Voltage
VDDC	61	digital supply to core (3.3 V)
OSCGND	62	oscillator ground supply
XTALIN	63	crystal oscillator input
XTALOUT	64	crystal oscillator output
RESET	65	reset
VDDP	66	digital supply to periphery (+3.3 V)
P1.0/INT1	67	port 1.0 or external interrupt 1 input
P1.1/T0	68	port 1.1 or Counter/Timer 0 input
P1.2/INT0	69	port 1.2 or external interrupt 0 input
P1.3/T1	70	port 1.3 or Counter/Timer 1 input
P1.6/SCL	71	port 1.6 or I2C-bus clock line
P1.7/SDA	72	port 1.7 or I2C-bus data line
P2.0/TPWM	73	port 2.0 or Tuning PWM output
P2.1/PWM0	74	port 2.1
P2.2/PWM1	75	port 2.2
P2.3/PWM2	76	port 2.3
P2.4/PWM3	77	port 2.4
P2.5/PWM4	78	port 2.5
SYNC FILTER	79	Sync Filter
P3.0/ADC0	80	port 3.0 or ADC0 input

## ■ IC VOLTAGE TABLES

IC601			
Pin	Voltage	Pin	Voltage
1	3,3	41	0
2	5,0	42	3,8
3	1,8	43	0
4	0	44	3,3
5	4,5	45	0
6	0	46	3,5
7	0	47	3,0
8	2,3	48	3,3
9	8,0	49	0
10	5,0	50	2,5
11	3,2	51	2,5
12	4,0	52	2,5
13	0	53	2,5
14	4,0	54	2,0
15	0,2	55	5,3
16	1,3	56	4,0
17	1,3	57	3,8
18	1,9	58	3,8
19	1,9	59	3,3
20	4,0	60	0
21	3,8	61	3,3
22	0	62	0
23	0	63	1,6
24	0	64	1,6
25	0	65	0
26	0	66	3,3
27	2,5	67	3,3
28	3,7	68	5,0
29	3,7	69	5,0
30	0,6	70	3,2
31	0,6	71	0
32	2,2	72	5,0
33	3,1	73	0
34	1,6	74	0,2
35	1,5	75	0
36	2,4	76	0
37	1,5	77	0
38	2,8	78	0
39	8,0	79	0
40	3,6	80	0

IC451	
Pin	Voltage
1	0,3V
2	0,14V
3	-12V
4	-14V
5	0V
6	15V
7	3V

IC801	
Pin	Voltage
1	187V
3	0,5V
4	22,5V
5	0,1V
6	1,3V
7	0,5V

IC851	
Pin	Voltage
1	10,7V
2	10,7V
3	3,3V
4	0V
5	3,1V
6	8V
7	5V

IC802	
Pin	Voltage
1	141V
2	9V
3	0V

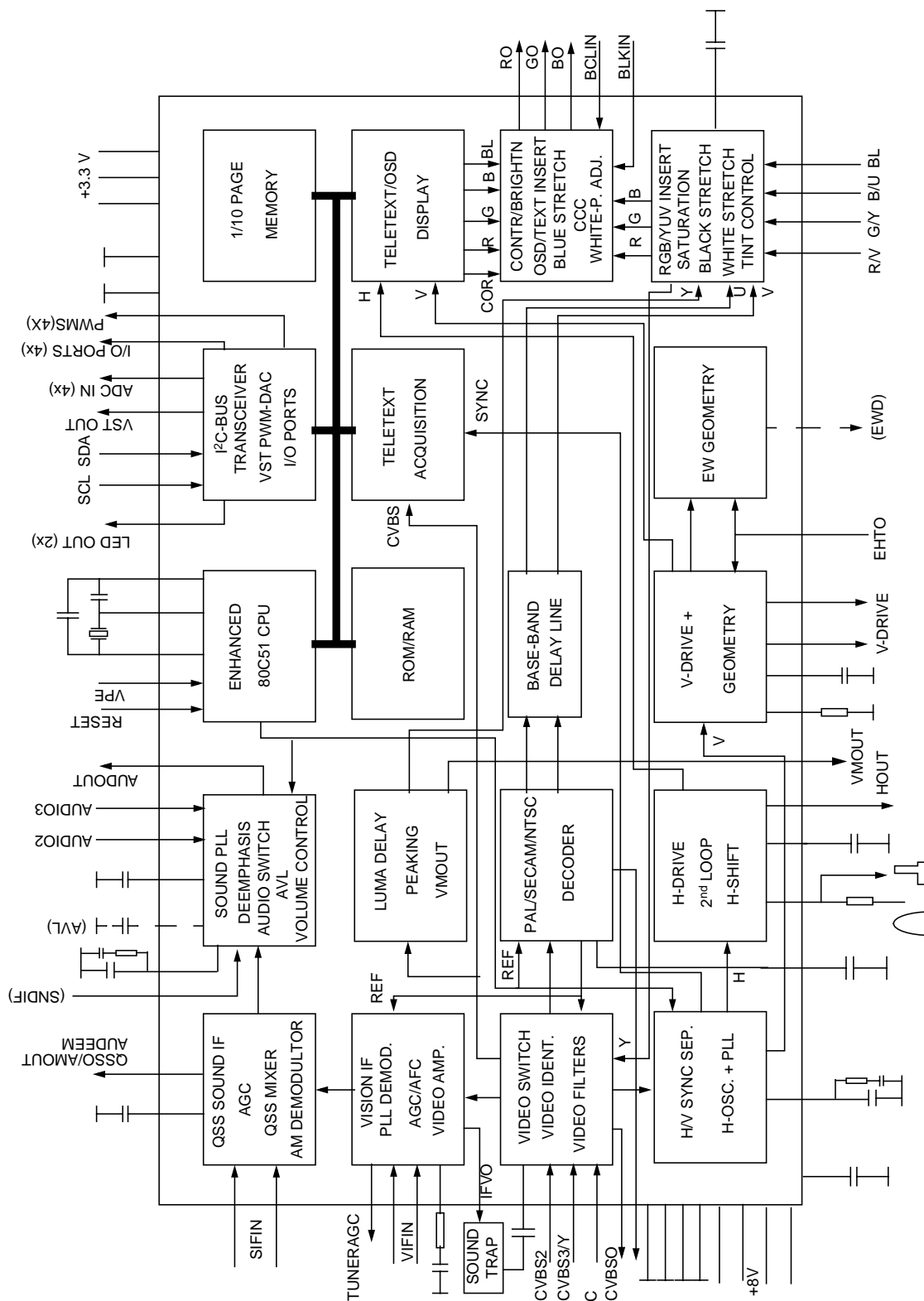
IC880	
Pin	Voltage
1	10,4V
2	5V
3	0V

IC1201	
Pin	Voltage
1	5V
2	0V
3	1,27V
4	3,3V
5	0V
6	5V

IC2301	
Pin	Voltage
1	11,5V
2	5V
3	0V
4	5V
5	2,8V
6	1,5V
7	0V
8	0V
9	0,5V

All voltage measurements were made in POWER ON mode, with 127V 60Hz power source and Color Bars Video Pattern.

# IC601 - BLOCK DIAGRAM



## ■ GP31 CHASSIS FEATURE SUMMARY

<b>CHASSIS</b>	: GP31
<b>MODEL</b>	: TC-14RM10LP, TC-20RM10LP and TC-20RA10LP
<b>SYSTEM</b>	: (PAL-M/PAL-N/NTSC) (PAL-M 50Hz)
<b>POWER SOURCE</b>	: AC automatic power switching 127/220V, 50/60Hz
<b>MEMORY</b>	: 125 positions
<b>TV TUNING RANGE</b>	: 181 channels (TV / CATV)
<b>OSD LANGUAGE</b>	: Spanish , Portuguese and English
<b>AUDIO SYSTEM</b>	: Mono
<b>VERTICAL MAGNETIC FELD</b>	: -0.15 ±0.03 (PANALAT)
<b>COLOR TEMPERATURE</b>	: (High Light) $x=0.275 \pm 0.01$ , $y=0.284 \pm 0.01$ , $Y=150$ (nit) (Low Light) $x=0.273 \pm 0.01$ , $y=0.283 \pm 0.01$ , $Y=7.0$ (nit)

### REFERENCE VOLTAGE

CONTENTS	REFERENCE	TEST POINT	POINTS	SPECIFICATIONS
+B VOLTAGE	002	TPA10		140 ± 1,5V
		TPA8		8 ±1V
		TPA9		5 ±1V
		TPA21		175 ±1V
Sound confirmation	007	Between A22-1 and A22-3 or A22-2 and A22-4		0.5 Vp-p
PAL color output	009	TPL2	D	2.25 ±0.1Vo-p
		TPL1	C	2.25 ±0.5Vo-p
NTSC color output	010	TPL1	C	2.5 ±0.5Vo-p
Anode (EHT) voltage	008	CRT ANODE		<b>TC-14RM10LP</b> 24.5 +0.7 (kV) 24.5 -1.5 (kV)
				<b>TC-20RM10LP</b> <b>TC-20RA10LP</b> 26.5 +0.7 (kV) 26.5 -1.5 (kV)
Memory Data	[A]=C0H, [B]=00H, [C]=00H, [D]=B3H, [E]=04H, [F]=04H, [G]=00H, [H]=01H			



## ■ DAC CONTROL FOR GP31 CHASSIS FUNCTIONS AND ADJUSTMENTS

### HOW TO RESET THE UNIT (SELF CHECK)

To reset the unit, press simultaneously "**VOLUME (-)**" on the front panel and "**TIMER**" on the remote control.

### HOW TO ENTER IN THE SERVICE MODE:

1. Adjust "**OFF TIMER**" to 30 minutes.

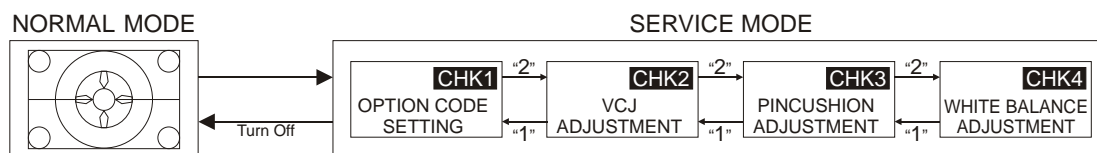
Press simultaneously "**VOLUME (-)**" on the front panel and "**RECALL**" on the remote control to enter "**SERVICE MODE**".

After a couple of seconds, the expression "**CHK1**" should appear on the right superior side of the TV screen.

2. To change to memory data, press "**MUTE**" and "**VOLUME(-)**" simultaneously while the OSD is still on CHK1 mode.
3. Press key "**2**" to move forward and "**8**" to move backward each page (8h positions) in the memory.  
Example: Memory position is 100. After pressing "**2**" the cursor will go to position 0F8 and after pressing "**8**" the cursor will go to position 108.
4. Press "**4**" and "**6**" to move to right or left.
5. Press "**CH(+)**" e "**CH(-)**" to move for blocks.  
Example: Initial memory position is 000. By pressing "**CH(+)**" cursor will go to position 100, pressing it once again the cursor will go to position 200. The key "**CH(-)**" does the inverse move.
6. To change values in the memory, press "**VOLUME(+)**" to increase and "**VOLUME(-)**" to decrease.
7. After data adjustment, OSD will change to RED color. Press "0" to memorize the adjustment and the OSD will change to GREEN color.

#### NOTE:

To alter from CHK1 mode to CHK2, CHK3 or CHK4 mode, press key "2" to move forward and key "1" to move back, as ilustrad below.



### CHK1 MODE - OPTIONS

On CHK1 mode it is possible to adjust the items of the table shown here.

#### Note:

To select an option, type "4" to move forward and "3" to move back.

After having selected the desired option, adjust it by pressing the "**VOL(-)**" or "**VOL(+)**" keys.

Press "**0**" to memorize the adjustment.

#### Observation:

Values of CHK1 table in should be programed, exactly as described in the table shown here.

CHK1 MODE TABLE	
Standard values	
OPTION1	C0
OPTION2	00
OPTION3	00
OPTION4	B3
OPTION5	04
OPTION6	04
OPTION7	00
OPTION8	01
For TC-20RA10LP only	
OPTION4	33

## ■ ADJUSTMENTS

### CHK2 MODE - VCJ ADJUSTMENTS

On CHK2 mode it is possible to adjust the items of the table shown here.

**Note:**

To select an item, type “4” to move forward and “3” to move back.

After having selected the desired option, adjust it by pressing the “VOL(–)” or “VOL(+)” keys. The OSD color will change for red.

CHK2 MODE TABLE	
Standard values	
RF AGC	23
CONTRAST	100
COLOUR	50
SUB COLOUR	28
TINT	50
SUB NTSC-TINT	28
BRIGHT	50

### CHK3 MODE - PINCUSHION ADJUSTMENTS

On CHK3 mode it is possible to adjust the items of the table shown here.

**Note:**

To select an item, type “4” to move forward and “3” to move back.

After having selected the desired option, adjust it by pressing the “VOL(–)” or “VOL(+)” keys. The OSD color will change for red.

CHK3 MODE TABLE	
Standard values	
V-SLOPE	32
V-SHIFT	37
V-AMP	43
H-SHIFT	45

### CHK4 MODE - WHITE BALANCE ADJUSTMENTS

On CHK4 mode it is possible to adjust the items of the table shown here.

**Note:**

To select an item, type “4” to move forward and “3” to move back.

After having selected the desired option, adjust it by pressing the “VOL(–)” or “VOL(+)” keys. The OSD color will change for red.

CHK4 MODE TABLE	
Standard values	
R-CUT	28
G-CUT	30
BRIGHT	50
SUB-BRIGHT	30
CONTRAST	100
SUB- CONTRAST	11
R-DRIVE	33
G-DRIVE	31
B-DRIVE	35
RGB-CONTRAST	2

**Observation:**

The values of the tables CHK2, CHK3 and CHK4 are average values and they can vary, the values described here are reference values.

### TO EXIT SERVICE MODE AND RETURN TO NORMAL MODE

To exit SERVICE MODE, turn off or reset (SELF CHECK) the television.

## ■ TEST AND MEASUREMENT EQUIPMENTS

To execute all these electrical adjustments, the following equipment are required:

- Dual-Trace Oscilloscope
  - Voltage Range: 0.001 V to 50 V/Div.
  - Frequency Range: DC to 50 MHz
  - Probes: 10:1, 1:1
- NTSC Video Pattern Generator
- DVM (Digital Volt Meter)
- MTS/SAP Signal Generator
- (TV Multi-Channel Sound Modulator (U.S.A.))
- Plastic Tip Driver and Non-Metal Driver
- Isolation Transformer (Variable)
- Degaussing Coil
- White Pattern Generator
- Audio Generator

## EEPROM MEMORY MAPS

### TABLE 0

	COLUMN 0	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	COLUMN A	COLUMN B	COLUMN C	COLUMN D	COLUMN E	COLUMN F
LINE 0	00	00	06	01	00	06	02	00	06	03	00	06	04	00	06	05
LINE 1	00	06	06	00	06	07	00	06	08	00	06	09	00	06	0A	00
LINE 2	06	0B	00	06	0C	00	06	0D	00	06	0E	00	06	0F	00	06
LINE 3	10	00	06	11	00	06	12	00	06	13	00	06	14	00	06	15
LINE 4	00	06	16	00	06	17	00	06	18	00	06	19	00	06	1A	00
LINE 5	06	1B	00	06	1C	00	06	1D	00	06	1E	00	06	1F	00	06
LINE 6	20	00	06	21	00	06	22	00	06	23	F6	06	24	00	06	25
LINE 7	00	06	26	00	06	27	00	06	28	00	06	29	00	06	2A	00
LINE 8	06	2B	00	06	2C	00	06	2D	00	06	2E	00	06	2F	00	06
LINE 9	30	00	06	31	00	06	32	00	06	33	F6	06	34	00	06	35
LINE A	00	06	36	00	06	37	00	06	38	00	06	39	00	06	3A	00
LINE B	06	3B	00	06	3C	00	06	3D	00	06	3E	00	06	3F	00	06
LINE C	40	00	06	41	00	06	42	00	06	43	00	06	44	00	06	45
LINE D	00	06	46	00	06	47	00	06	48	00	06	49	00	06	4A	00
LINE E	06	4B	00	06	4C	00	06	4D	00	06	4E	00	06	4F	00	06
LINE F	50	00	06	51	00	06	52	00	06	53	00	06	54	00	06	55

### TABLE 1

	COLUMN 0	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	COLUMN A	COLUMN B	COLUMN C	COLUMN D	COLUMN E	COLUMN F
LINE 0	00	06	56	00	06	57	00	06	58	00	06	59	00	06	5A	00
LINE 1	06	5B	00	06	5C	00	06	5D	00	06	5E	00	06	5F	00	06
LINE 2	60	00	06	61	00	06	62	00	06	63	09	06	64	00	06	65
LINE 3	00	06	66	00	06	67	00	06	68	00	06	69	00	06	6A	00
LINE 4	06	6B	00	06	6C	00	06	6D	00	06	6E	00	06	6F	00	06
LINE 5	70	00	06	71	00	06	72	00	06	73	00	06	74	00	06	75
LINE 6	00	06	76	00	06	77	00	06	78	00	06	79	00	06	7A	00
LINE 7	06	7B	00	06	7C	00	06	7D	00	06	FF	FF	FF	FF	FF	FF
LINE 8	7F	AE	FD	BB	F7	DF	B7	F5	FF	DE	FD	7E	F5	DD	7F	DB
LINE 9	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
LINE A	06	06	FF	FF	00	00	00	00	00	00	01	02	01	02	03	04
LINE B	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
LINE C	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
LINE D	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
LINE E	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
LINE F	00	00	00	00	00	00	FF	FF	00	00	00	00	00	00	00	00

TABLE 2

	COLUMN 0	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	COLUMN A	COLUMN B	COLUMN C	COLUMN D	COLUMN E	COLUMN F
LINE 0	07	00	A5	5A	01	02	01	01	00	08	00	04	FF	00	01	00
LINE 1	00	00	00	00	00	00	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
LINE 2	00	00	00	00	0F	0E	00	00	00	00	FF	16	00	00	00	00
LINE 3	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
LINE 4	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
LINE 5	32	32	32	64	4B	32	32	32	4B	44	2D	32	32	41	32	32
LINE 6	FF	FF	FF	FF	FF	FF	FF	14	FF	FF	FF	FF	1A	1F	FF	FF
LINE 7	00	00	2B	13	13	13	37	37	37	37	70	02	03	02	00	00
LINE 8	32	32	32	64	*1	32	32	32	4B	44	2D	32	32	4B	32	FF
LINE 9	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	00	00
LINE A	00	FF	FF	FF	00	00	00	FF	FF	FF	00	00	00	FF	FF	02
LINE B	03	19	15	02	00	09	0C	3F	1C	FF	FF	FF	FF	FF	FF	02
LINE C	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
LINE D	0C	54	0E	04	20	0D	FF	01	00	03	FF	FF	FF	FF	FF	FF
LINE E	FF	FF	FF	FF	FF	FF	FF	FF	C0	00	00	B3	04	00	00	01
LINE F	FF	FF	2A	1E	0F	1F	FF	FF	FF	FF	FF	FF	FF	A5	3F	A5

	14''	20''
*1	32	3C

TABLE 3

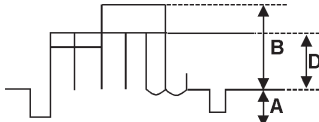
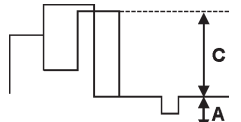
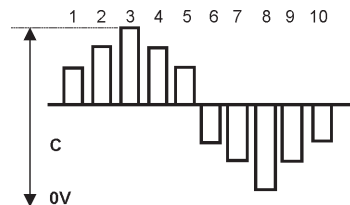
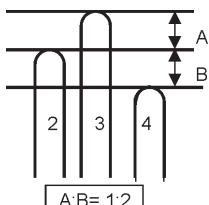
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LINE 0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
LINE 1	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
LINE 2	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	22	88	*1	20	23	21
LINE 3	FF	29	1E	26	17	1A	0F	21	2B	12	14	19	20	19	1F	1F
LINE 4	25	FF	0C	00	FD	00	1F	25	80	00	2A	00	35	20	30	21
LINE 5	02	48	12	44	00	80	34	01	FE	00	08	00	FD	01	00	00
LINE 6	01	FE	1B	12	18	19	00	00	00	00	00	00	00	00	00	00
LINE 7	00	00	00	00	00	00	00	00	00	06	00	00	00	00	00	00
LINE 8	00	00	00	00	00	00	00	00	08	11	0C	0C	08	0C	0C	00
LINE 9	09	00	00	00	00	00	00	0A	F8	00	00	00	00	00	00	03
LINE A	01	03	02	03	03	00	34	*2	*3	2F	20	63	03	16	03	00
LINE B	CA	49	4B	02	31	00	00	FF	FD	04	00	01	FC	F8	FE	F2
LINE C	FF	07	4F	41	00	FE	FE	0E	0F	0E	0D	0E	0C	00	00	00
LINE D	05	0A	01	00	FE	FE	00	00	00	F7	00	F0	01	FF	FF	FF
LINE E	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
LINE F	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	20	FF	FF	FF	FF	FF

	14''	20''
*1	12	28
*2	12	28
*3	12	28

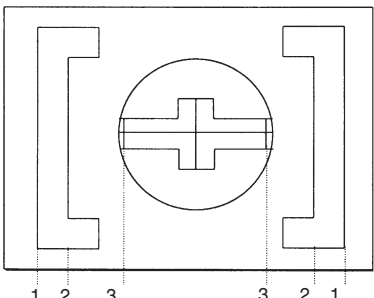
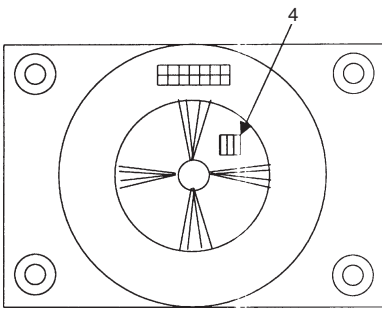
## ADJUSTMENTS

ITEM / PREPARATION	PROCEDURE										
<div>1- RF AGC ADJUSTMENT</div> <div><div>1. Supply a color bar PHILIPS pattern and adjust the RF input signal of 69 dB mV (75W opened channel 7 RF freq.: 175.25 MHz).</div><div>2. Connect the digital multimeter in TPA15.</div></div>	<div>ADJUSTMENT:</div> <div><div>1. Select "RF AGC" on "CHK2" service mode.</div><div>2. Adjust "RF AGC" by pressing VOL(+) or (-) until obtaining 2.2±0.1V in TPA15.</div><div>3. Increase the input level by +2 dB and confirm that the voltage decreases in TPA15.</div></div>										
<div>2- VIF DETECTOR OUTPUT LEVEL CONFIRMATION</div>	<div>CONFIRMATION:</div> <div><div>1. Install the chassis in the VIF calibration JIG and tune in a 63 dBu colorbar pattern (75Ω opened).</div><div>2. Connect the oscilloscope in TPA31.</div><div>3. Confirm that the output video sign is 1.05 ± 0.15 Vp-p in TPA 31.</div></div>										
<div>3- BUZZING CONFIRMATION (AUDIO CIRCUIT)</div> <div><div>1. Connect the oscilloscope with a 7kHz filter between A22-2 and A22-3 speakers terminals . Ajustar VOLUME=máximo.</div><div>2. Para modelos MONO: AVL=desligado.</div></div> <div><div><div><div><div>3.3mH</div><div>0,33µF</div><div>3.3mH</div><div>7KHz Filter</div><div>150Ω</div></div><div></div></div></div></div> <div><div>To STEREO models:</div><table><tr><td>BALANCE</td><td>CENTER</td></tr><tr><td>SURROUND</td><td>OFF</td></tr><tr><td>HYPER BASS</td><td>OFF</td></tr><tr><td>AVL</td><td>OFF</td></tr><tr><td>SOUND MENU</td><td>DIALOG</td></tr></table></div>	BALANCE	CENTER	SURROUND	OFF	HYPER BASS	OFF	AVL	OFF	SOUND MENU	DIALOG	<div>CONFIRMATION:</div> <div><div>1. Supply a colorbar signal with local frequency adjusted and the AFC ON (Channel with sound bearer and without modulation).</div><div>2. Assure that the width in the buzzing waveform is smaller than 500 m Vp-p.</div></div> <div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><d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BALANCE	CENTER										
SURROUND	OFF										
HYPER BASS	OFF										
AVL	OFF										
SOUND MENU	DIALOG										

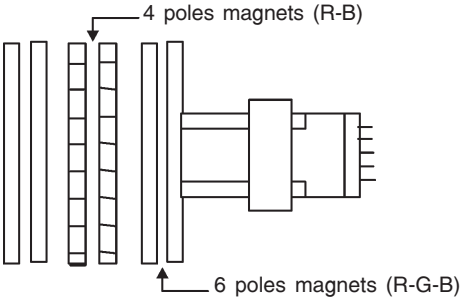
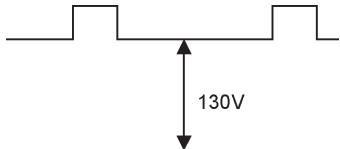
## ADJUSTMENTS

ITEM / PREPARATION	PROCEDURE												
<b>5- PAL COLOR OUTPUT SIGNAL ADJUSTMENT</b>  1. Supply a color bar signal and adjust the local frequency. 2. Adjust "IMAGE" to DYNAMIC NORMAL, "CONTRAST" to 63 and "SUB-CONTRAST" to 21. 3. Adjust the "CHANNEL COLOR" level to NORMAL. 4. Set to CHK2 service mode option, press "5" on the remote control unit and confirm that OSD becomes blue (AKB turned off). 5. Set ABL to OFF (in CHK2 mode, to access BRT, CONT, S-CONT or S-TINT). 6. Adjust [A] for $2.3 \pm 0.2V$ through the BRIGHT control variation in the test point TPL2. 7. Confirm that the RGB Contrast is 11DAC and {352} = 1B 8. Fix G-DRIVE GAIN, R-DRIVE GAIN and B-DRIVE GAIN data in 1FH or 31 DAC.  R-DRIVE GAIN: [SLV(8A), SUB (16)] G-DRIVE GAIN: [SLV(8A), SUB (17)] B-DRIVE GAIN: [SLV(8A), SUB (18)]	<b>CALIBRATION:</b>  1. Connect the oscilloscope in TPL2 (G-OUT) with a 10K $\Omega$ resistor and adjust "CONTRAST", so that the [B] waveform it is $2.3\pm0.5V$ with 14" CRT and $2.6\pm0.1V$ with 20" CRT. 2. Adjust "SUB-COLOR" to obtain $2,45\pm0.5V$ in [D] according to fig. 1. 3. Connect the oscilloscope in TPL1 (R-OUT) with a 10K $\Omega$ resistor and confirm that the [C] waveform it is $2.45\pm0.5V$ according to fig. 2. 4. Press the key "5" (AKB ON) and confirm that OSD becomes white.  <div><div><p><b>Fig. 1</b> A = <math>2.0 \pm 0.2V_{o-p}</math> B = <math>2.3 \pm 0.5V</math> D = <math>2.15 \pm 0.5V</math></p></div><div><p><b>Fig. 2</b> A = <math>2.0 \pm 0.2V_{o-p}</math> C = <math>2.5 \pm 0.5V</math></p></div></div>												
<b>6- NTSC SUB-TINT CALIBRATION</b>  1. Connect the oscilloscope in TPL1 (R-OUT) with a 10K $\Omega$ resistor. 2. Supply a Rainbow signal (NTSC 3.58 MHz) through VIDEO IN. 3. Select "IMAGE" to DYNAMIC NORMAL. 4. Select "COLOR FOR CHANNEL" to NORMAL. 5. On CHK2 service mode, press "5" (AKB OFF) and confirm that OSD becomes blue (AKB turned off). 6. Set ABL to OFF (on CHK2 mode, to access BRT, CONT, S-CONT or S-TINT).	<b>CALIBRATION:</b>  1. Adjust [C] for $5.0\pm0.2V$ through the BRIGHT control variation (CHK2) according to fig. 1. 2. Adjust SUB TINT-NTSC so that the levels of positions 2, 3 and 4 of Fig. 1 in accordance with the Fig. 2. 3. Set ABL to ON. 4. Press "5" and confirm that OSD becomes white (AKB turned on).  <div><div><p><b>Fig. 1</b></p></div><div><p><b>Fig. 2</b></p></div></div>												
<b>7- PROTECTION CIRCUIT (SHUTDOWN) CONFIRMATION OF OPERATION</b>  1. Supply a crosshatch pattern signal and adjust the CONTRAST and BRIGHT DAC controls to minimum. (Ibeam=0 $\mu A$ )	<b>CONFIRMATION:</b>  1. Connect the voltmeter in TPA22 and confirm that the voltage is smaller than [A]. 2. Connect a DC source in TPA22 and confirm that the protection circuit doesn't act when the voltage is [B]. 3. Confirm that the protection circuit acts with smaller voltage than [C]. <table><tr><th>Condition/Model</th><th>14" Philips</th><th>20" Philips</th></tr><tr><td>A</td><td>22,8</td><td>23,3</td></tr><tr><td>B</td><td>23,9</td><td>24,5</td></tr><tr><td>C</td><td>26,7</td><td>27,4</td></tr></table> 4. Use D512 catode or C511 (+) terminal, if TP22 access it is difficult.	Condition/Model	14" Philips	20" Philips	A	22,8	23,3	B	23,9	24,5	C	26,7	27,4
Condition/Model	14" Philips	20" Philips											
A	22,8	23,3											
B	23,9	24,5											
C	26,7	27,4											

## ADJUSTMENTS

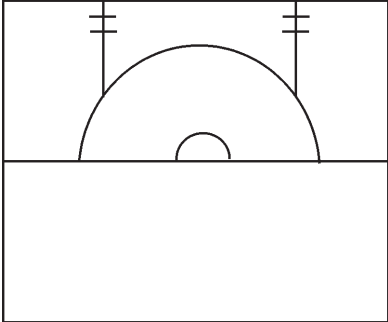
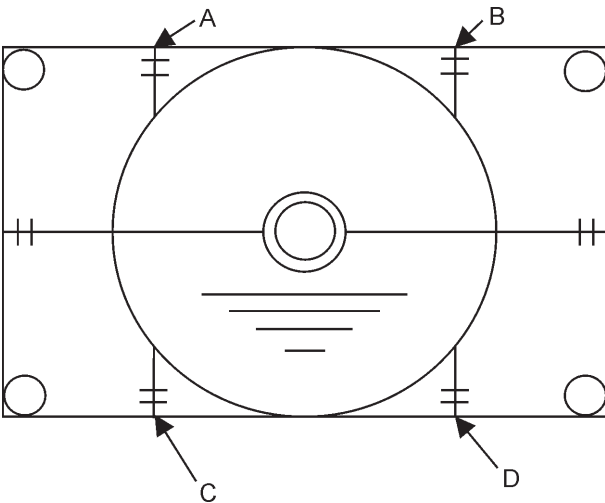
ITEM / PREPARATION	PROCEDURE
<p><b>8- SUB-BRIGHT AND SUB-CONTRAST CALIBRATION</b></p> <ol style="list-style-type: none"> <li>1. Supply a WINDOW pattern signal.</li> <li>2. Adjust IMAGE MENU to DYNAMIC NORMAL</li> </ol>	<p><b>SUB-BRIGHT CALIBRATION</b></p> <ol style="list-style-type: none"> <li>1. Position the color analyzer in the LOW LIGHT image area.</li> <li>2. Adjust S-BRT &lt;CHK 4&gt; control, so that it is <math>Y=0,7\pm0,2</math>.</li> </ol> <p><b>SUB-CONTRAST CALIBRATION</b></p> <ol style="list-style-type: none"> <li>1. Position the color analyzer in the HIGH LIGHT image area.</li> <li>2. Adjust S-CONT &lt;CHK 4&gt; DAC control, so that it is <math>Y=230\pm10</math> for 20" CRT and <math>Y=380\pm20</math> for 14" CRT.</li> <li>3. If impossible to obtain that adjustment, adjust SUB-CONT &lt;CHK 4&gt; again.</li> <li>4. Check the SUB-BRIGHT adjust.</li> </ol>
<p><b>9- FOCUS CALIBRATION</b></p> <ul style="list-style-type: none"> <li>• Assure that the SUB-BRIGHTNESS adjustment has been done.</li> </ul> <ol style="list-style-type: none"> <li>1. Supply a Philips or monoscope pattern signal.</li> <li>2. Adjust IMAGE MENU to DYNAMIC NORMAL.</li> </ol>  <p>Fig. 1</p>	<p><b>CALIBRATION:</b></p> <ol style="list-style-type: none"> <li>1. Adjust the FOCUS variable resistor for the point of better adjustment.</li> </ol> <ul style="list-style-type: none"> <li>• with <b>PHILIPS signal</b> .... take as reference for adjustment the third vertical line (fig. 1).</li> <li>• with <b>MONOSCOPE signal</b> in the number 4 (fig.2).</li> </ul>  <p>Fig. 2</p>
<p><b>10- PURITY CALIBRATION</b></p> <ol style="list-style-type: none"> <li>1. Adjust the HELMHOLTZ device for the local magnetic field (HORIZONTAL: <math>0 \pm 0.03 \times 10^{-4}T</math>)</li> <li>2. Let the set warm up (aging time) for a minimum of 60 minutes.</li> <li>3. Supply a purity pattern (white pattern).</li> <li>4. Adjust CONTRAST and BRIGHT to MAXIMUM.</li> <li>5. The static convergence adjustment must have been made preliminarily.</li> <li>6. Connect a DC ampere meter between FBT pin11 (-) and FBT pin3 (+), and adjust to <math>920\mu A \pm 10\%</math>, varying the S-BRT DAC control.</li> </ol>	<p><b>CALIBRATION:</b></p> <ol style="list-style-type: none"> <li>1. Position the "ears" of the purity magnets both upward.</li> <li>2. Adjust the purity until the markers in the purity jig monitorscope becomes symmetrical in the horizontal direction.</li> <li>3. The vertical centralization correction is made through the purity magnets for stripe CRT type only.</li> <li>4. Slide the yoke forward by <math>10 \text{ mm} \pm 5</math> in the monitor. Then, tighten the deflection yoke.</li> <li>5. Repeat the procedures 2 ~ 3 ~ 4.</li> <li>6. Press the belt of deflection yoke.</li> <li>7. Adjust "beam landing" using a microscope. (for model change or instrument check only)</li> </ol>

## ADJUSTMENTS

ITEM / PREPARATION	PROCEDURE												
<p><b>11- WHITE QUALITY CALIBRATION</b></p> <p><b>PREPARATION:</b></p> <ol style="list-style-type: none"> <li>1. Adjust the HELMHOLTZ device to local magnetic field. Horizontal: <math>0 \pm 0.003 \times 10^{-4}T</math></li> <li>2. Receive a white purity pattern.</li> <li>3. Adjust CONTRAST and BRIGHT controls to maximum.</li> <li>4. Previously adjust the CONVERGENCE.</li> <li>5. Fully degauss the CRT by using an external degaussing coil.</li> </ol>	<p><b>CALIBRATION:</b></p> <ol style="list-style-type: none"> <li>1. Adjust the magnetic field in <math>0.4 \times 10^{-4}T</math> (400 mG), and check the white quality with the CRT turned to EAST and to WEST.</li> <li>2. Receive a red pattern, adjust the COLOR control to maximum and confirm the purity adjustment.</li> <li>3. If purity error is found at the CRT corners, apply magnetic tapes to correct it, fully degauss the CRT again and repeat the steps 1 and 2. Don't use this magnetic tapes on the internal side of the yoke.</li> <li>4. When magnetic tapes be used, fully degauss the face of CRT (in a horizontal magnetic field = <math>0 \pm 0.03 \times 10^{-4}T</math>), and repeat the items 1 and 2.</li> <li>5. Adjust the control of COLOR to MINIMUM, and repeating the item 1.</li> </ol>												
<p><b>12- CONVERGENCE CALIBRATION</b></p> <ol style="list-style-type: none"> <li>1. Adjust the HELMHOLTZ device to local magnetic field.</li> <li>2. Receive a crosshatch pattern.</li> <li>3. Adjust IMAGE menu to DINÂMIC NORMAL and the DAC BRIGHT control for the crosshatch pattern to be gray.</li> <li>4. Remove the DY wedges and slightly tilt the deflection yoke to the vertically and horizontally to obtain the good overall convergence.</li> <li>5. If purity error is found, repeat "Color Purity" adjustment</li> </ol>  <p>The diagram shows a side view of a CRT deflection yoke. On the left, there are four vertical rectangular magnets labeled '4 poles magnets (R-B)'. To their right, there are six smaller vertical rectangular magnets labeled '6 poles magnets (R-G-B)'. The yoke itself is shown in the center, with its internal structure partially visible.</p>	<p><b>CALIBRATION</b></p> <p>Static convergence calibration</p> <ol style="list-style-type: none"> <li>I) Assure that the magnets are positioned according to illustration 1.</li> <li>II) Adjust the 4 poles magnets to align the R and B CENTRAL DOTS and adjust the 6 poles magnets to align both DOTS with G.</li> <li>III) After adjustment above, assure that the magnets are sealed, through the application of white glue.</li> </ol> <p><b>Note:</b></p> <p>The electron beams are moved rotationally when the static convergence magnets are rotated.</p> <p>The reduction of rotational beams differ depending of the two magnets angle. Therefore, it is necessary to repeat the magnets calibrations sometimes, until obtaining a good alignment.</p>												
<p><b>13- CRT CUT OFF CALIBRATION</b></p> <ol style="list-style-type: none"> <li>1. Supply a WINDOWS signal.</li> <li>2. Position DACs with the data below:</li> </ol> <table border="0"> <tr> <td><b>BRT</b></td><td>→ 50H</td></tr> <tr> <td><b>S-BRT</b></td><td>→ 31H</td></tr> <tr> <td><b>RGB CONTRAST</b></td><td>→ 02DAC</td></tr> <tr> <td><b>SUB-CONTRAST</b></td><td>→ 21H</td></tr> <tr> <td><b>R,G,B DRIVE</b></td><td>→ 31H</td></tr> <tr> <td><b>R,G CUT</b></td><td>→ 31H</td></tr> </table>	<b>BRT</b>	→ 50H	<b>S-BRT</b>	→ 31H	<b>RGB CONTRAST</b>	→ 02DAC	<b>SUB-CONTRAST</b>	→ 21H	<b>R,G,B DRIVE</b>	→ 31H	<b>R,G CUT</b>	→ 31H	<p><b>CALIBRATION:</b></p> <ol style="list-style-type: none"> <li>1. Press "5" (AKB OFF) and confirm that OSD becomes blue.</li> <li>2. Connect the oscilloscope in TPL5 and adjust BRT to obtain 130V as in the Fig. 1 below.</li> <li>3. Adjust the SCREEN to obtain a horizontal fine line in the screen center.</li> <li>4. Press "5" (AKB ON) and confirm that OSD becomes white.</li> </ol>  <p>The diagram shows a square wave pulse on a horizontal baseline. A vertical double-headed arrow indicates the peak-to-peak voltage of the pulse, which is labeled as 130V.</p> <p>Fig. 1</p>
<b>BRT</b>	→ 50H												
<b>S-BRT</b>	→ 31H												
<b>RGB CONTRAST</b>	→ 02DAC												
<b>SUB-CONTRAST</b>	→ 21H												
<b>R,G,B DRIVE</b>	→ 31H												
<b>R,G CUT</b>	→ 31H												

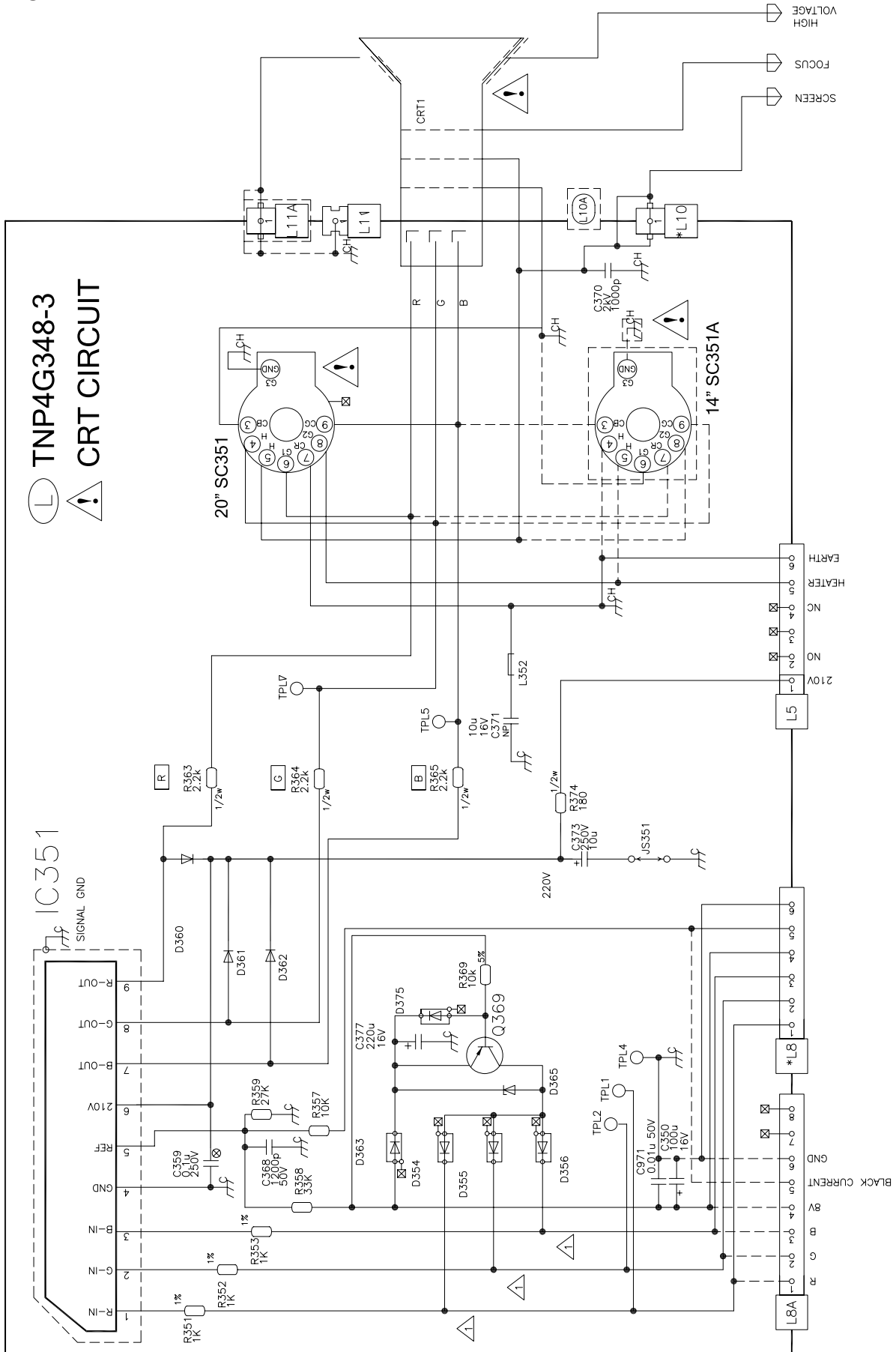


## ADJUSTMENTS

ITEM / PREPARATION	PROCEDURE				
<p><b>14- VERTICAL DEFLECTION CALIBRATION AND CONFIRMATION</b></p> <p>1. Adjust IMAGE to DYNAMIC NORMAL</p>  <p>Fig.1</p>  <p>Fig.2</p>	<p><b>1) V-SLOPE CALIBRATION</b></p> <ol style="list-style-type: none"> <li>1. Supply a PHILIPS PAL-M signal.</li> <li>2. Adjust V_SLOPE &lt;CHK3&gt; so that the begin of the black image part is aligned with the dividing line of Philips pattern. The dividing line of the Philips pattern circle should be visible partially.</li> </ol> <p><b>2) V-SHIFT 50Hz CALIBRATION</b></p> <ol style="list-style-type: none"> <li>1. Supply a PHILIPS PAL-N signal.</li> <li>2. Adjust the vertical centralization (V-SHIFT 50Hz) &lt;CHK3&gt; so that PHILIPS pattern center be in the center of CRT.</li> </ol> <p><b>3) V-SHIFT 60Hz CALIBRATION</b></p> <ol style="list-style-type: none"> <li>1. Supply a MONOSCOPE signal.</li> <li>2. Adjust the vertical centralization (V-SHIFT 60Hz) &lt;CHK3&gt; so that MONOSCOPE pattern center be in the center of CRT.</li> </ol> <p><b>4) V-AMP 50Hz CALIBRATION</b></p> <ol style="list-style-type: none"> <li>1. Supply a PHILIPS PAL-N signal.</li> <li>2. Adjust the vertical height (V-AMP-50Hz) &lt;CHK3&gt; so that the pattern PHILIPS circle height has the same dimension of his width.</li> </ol> <p><b>5) V-AMP 60Hz CALIBRATION</b></p> <ol style="list-style-type: none"> <li>1. Supply a MONOSCOPE signal.</li> <li>2. Adjust the vertical height (V-AMP-60Hz) &lt;CHK3&gt; so that "C" and "D" values in illustration 2 it is 1.9 ~ 2.2 (tipic 2.0) for 14" and 1.5 ~ 2.0 for 20" and "A" and "B" values in illustration 2 it is 1.5 ~ 2.3 (tipic 2.0) for 14" and 1.5 ~ 1.6 for 20".</li> <li>3. To MEMORIZE in EEPROM.</li> </ol> <table border="1" data-bbox="938 1298 1200 1372"> <tr> <td><b>C,D</b></td><td>1.5 ~ 2.0</td></tr> <tr> <td><b>A,B</b></td><td>1.5 ~ 1.6</td></tr> </table>	<b>C,D</b>	1.5 ~ 2.0	<b>A,B</b>	1.5 ~ 1.6
<b>C,D</b>	1.5 ~ 2.0				
<b>A,B</b>	1.5 ~ 1.6				
<p><b>15- WHITE BALANCE CALIBRATION</b></p> <ol style="list-style-type: none"> <li>1. Adjust the HELMHOLTZ device to local magnetic field.</li> <li>2. Let the set warm up for a minimum of 30 minutes.</li> <li>3. Receive a white balance. (This sign should contain burst sign).</li> <li>4. Adjust the IMAGE menu to DINÂMICO NORMAL.</li> <li>5. Fully degauss the CRT by using an external degaussing coil.</li> <li>6. Position the color analyzer in contact with the CRT face.</li> </ol>	<p><b>CALIBRATION:</b></p> <p><b>[1] LOW LIGHT CALIBRATION</b></p> <ol style="list-style-type: none"> <li>1. Adjust S-BRT, so that <math>Y = 7</math></li> <li>2. Adjust R-CUT OFF, so that <math>x = 0.273 \pm 0.01</math></li> <li>3. Adjust G-CUT OFF, so that <math>y = 0,283 \pm 0.01</math></li> </ol> <p><b>[2] HIGH LIGHT CALIBRATION</b></p> <p>(Confirm that G-DRIVE is 31 DAC)</p> <ol style="list-style-type: none"> <li>1. Adjust S-BRT, so that <math>Y = 150</math></li> <li>2. Adjust R-DRIVE, so that <math>x = 0,275 \pm 0.01</math></li> <li>3. Adjust B-DRIVE, so that <math>y = 0,284 \pm 0.01</math></li> </ol> <p><b>[3] Repeat the procedures [1] and [2].</b></p> <p>Assure that not entering light for the meter borders and that the CUT OFF voltage calibration has been done. If the value in the color analyzer is below 150, adjust CONTRAST to 50 and press "8" in CHK2 mode.</p>				

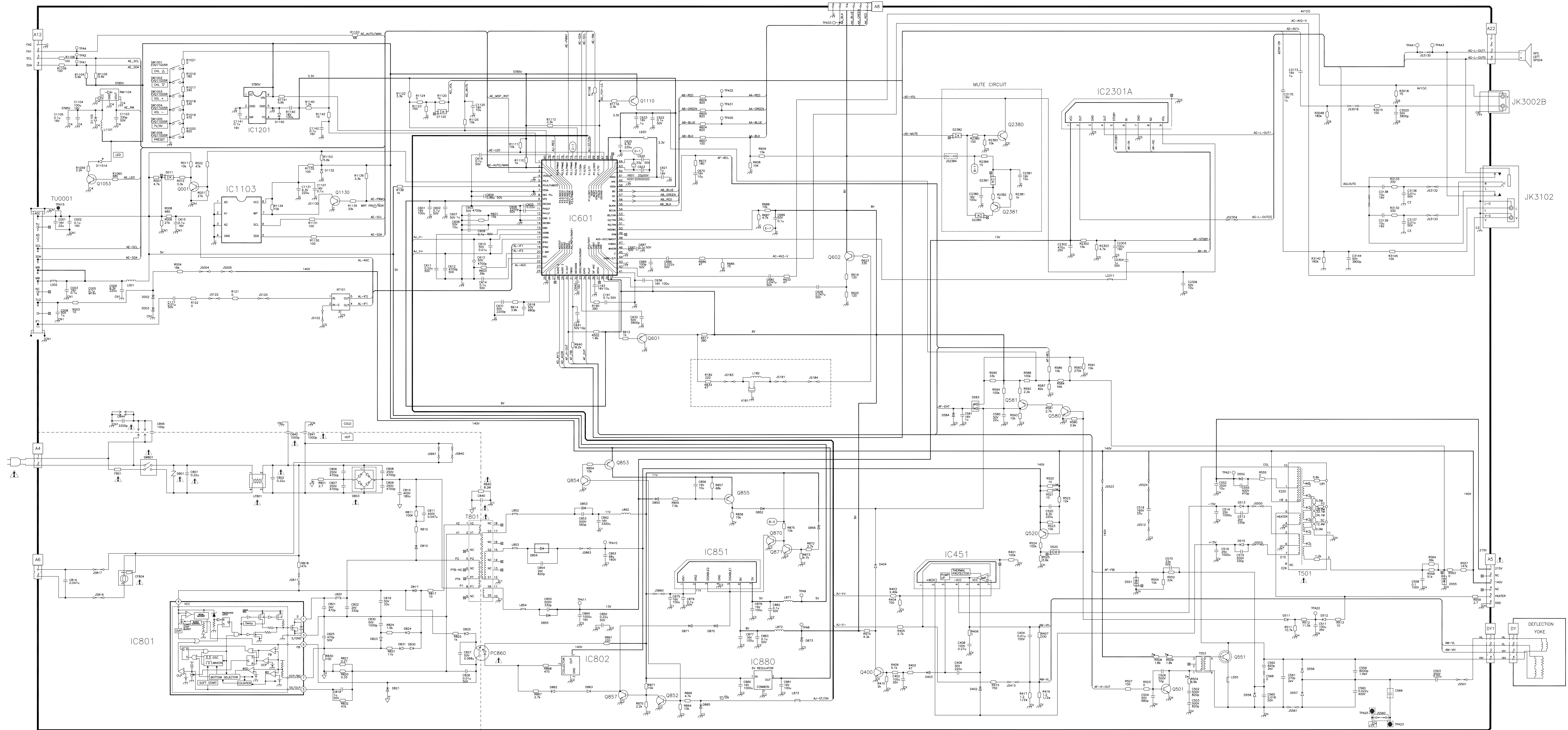
# SCHEMATICS DIAGRAMS

## CRT P.C.B.



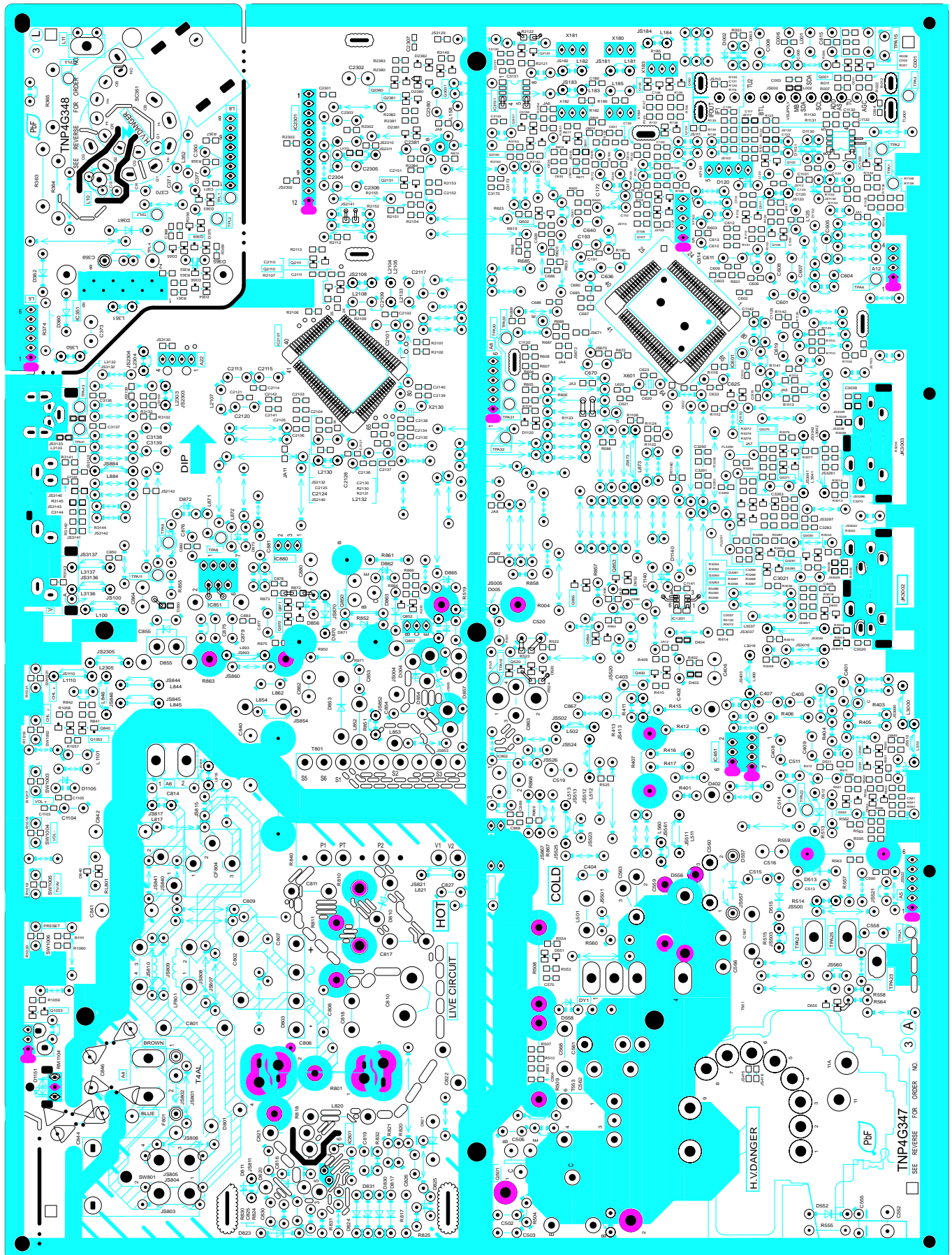
## ■ MAIN P.C.B. SCHEMATIC DIAGRAM - TC-14RM10LP / TC-20RM10LP / TC-20RA10LP

**TC-14RM10LP / TC-20RM10LP / TC-20RA10LP**



# MAIN P.C.B. CIRCUIT LAYOUT

## Component View

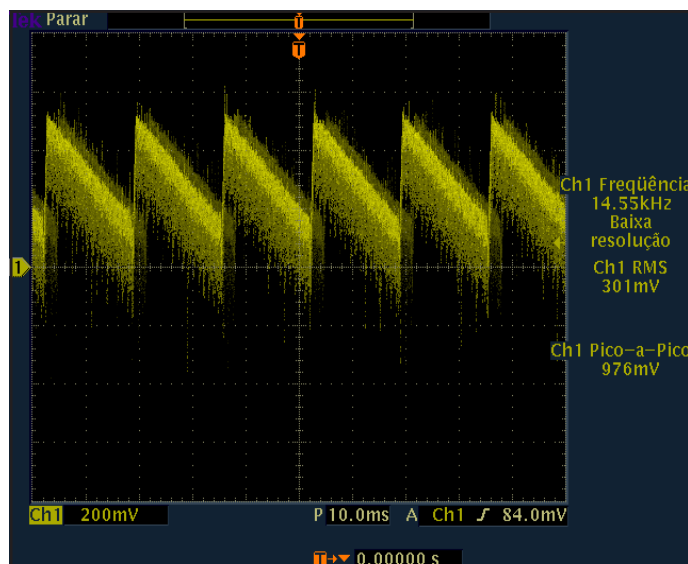




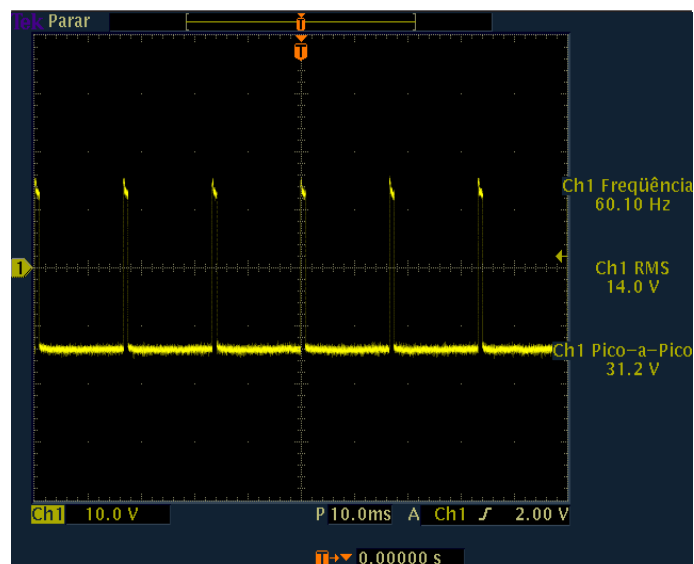
## SIGNAL WAVEFORM

- All waveforms were obtained using 127V 60Hz power source and Color Bars Pattern.

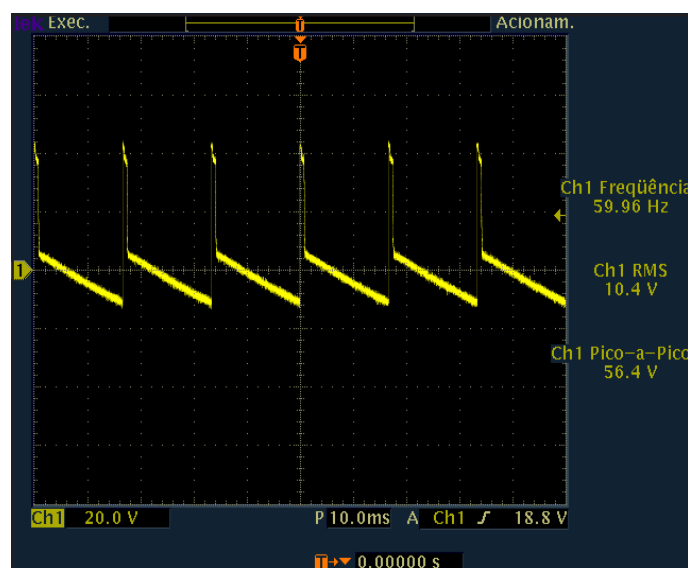
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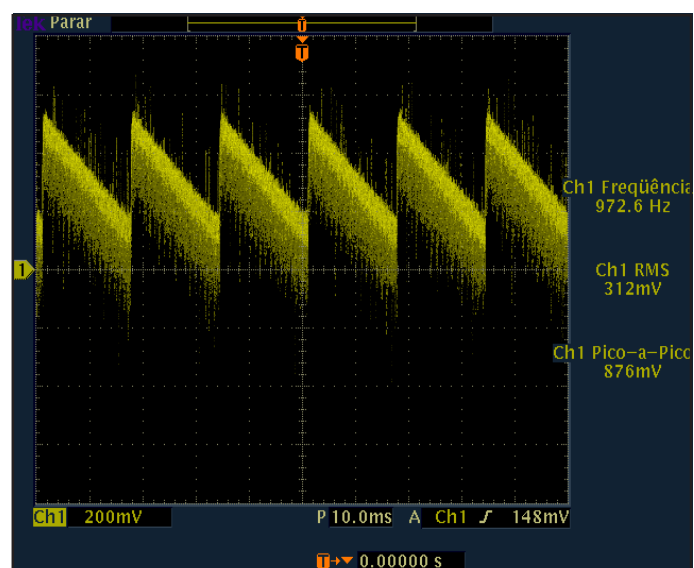
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Pin 3

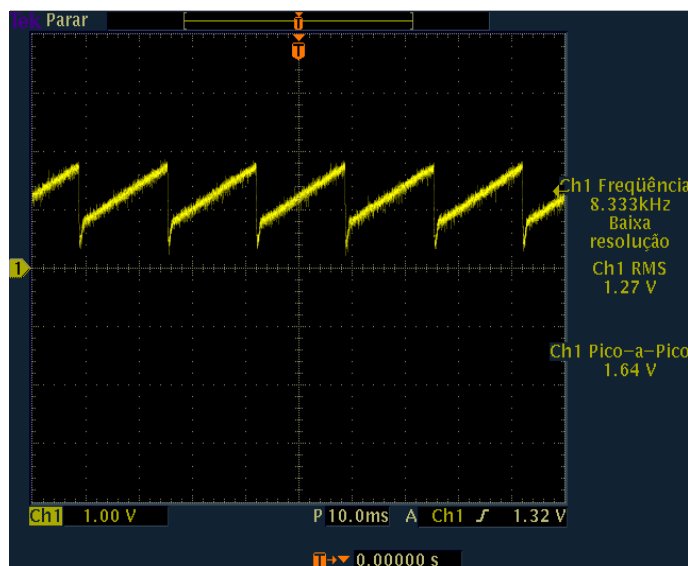


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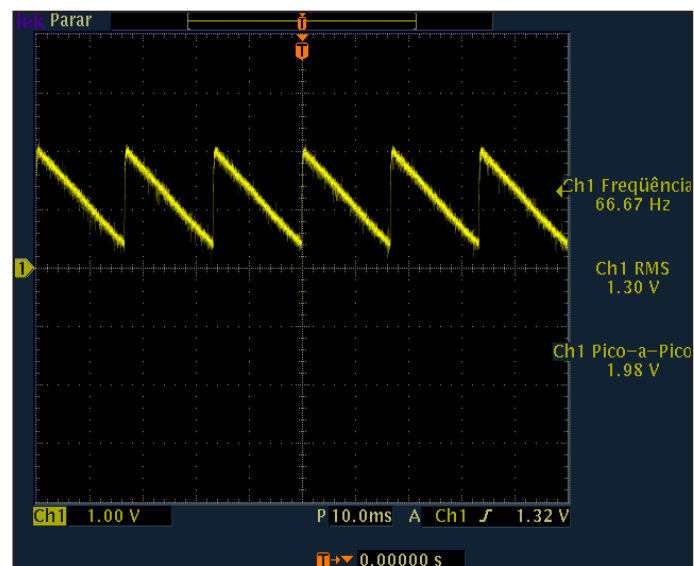


Pin 7

### IC601

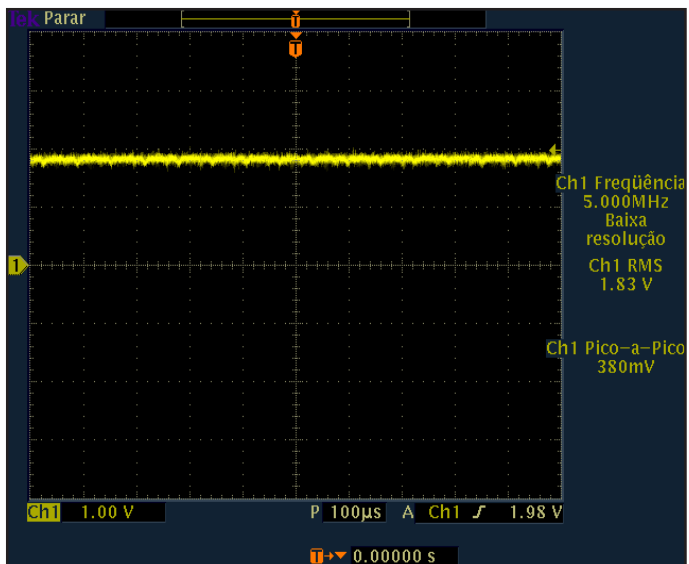


Pin 16

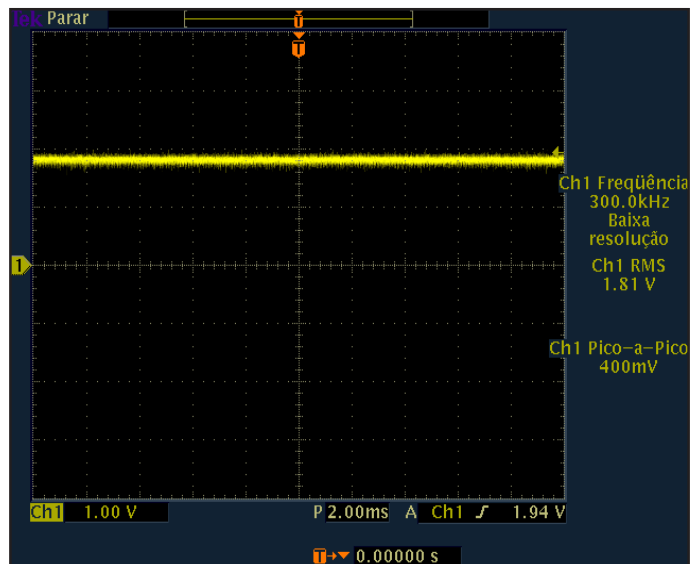


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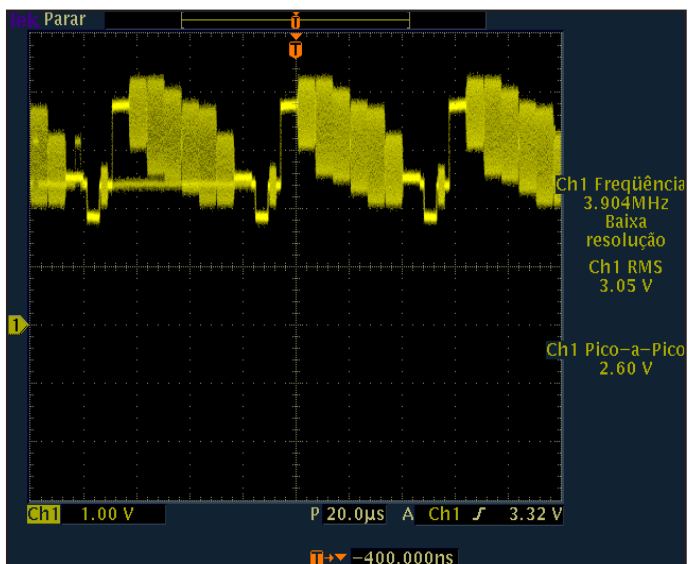
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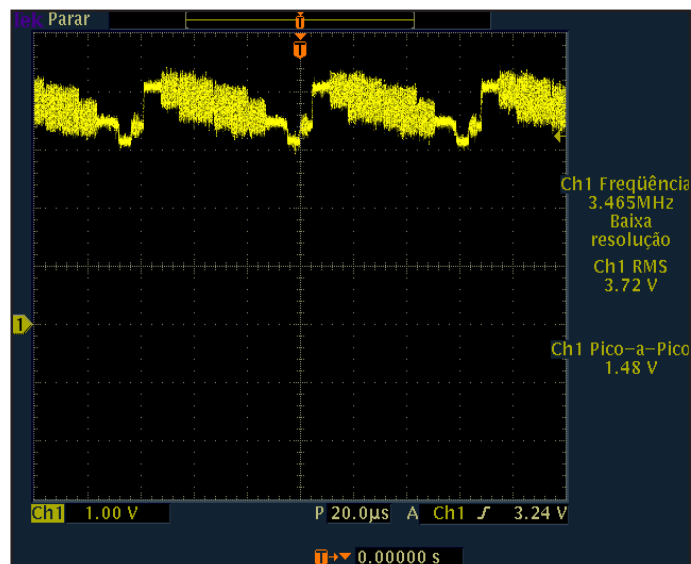
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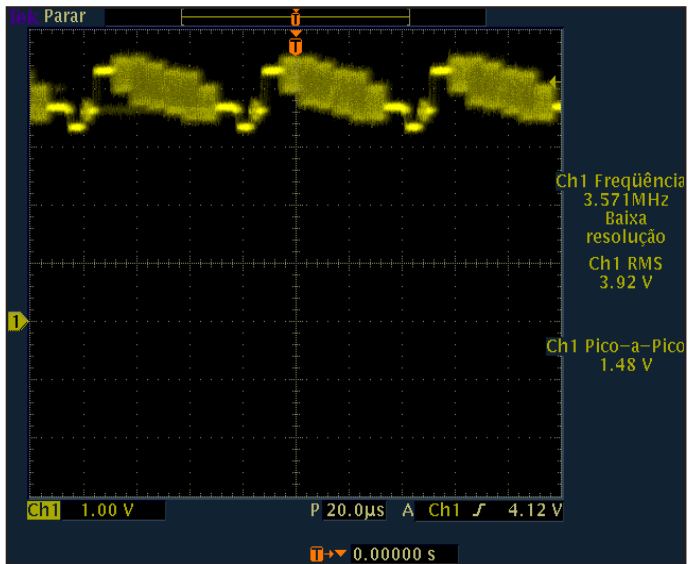
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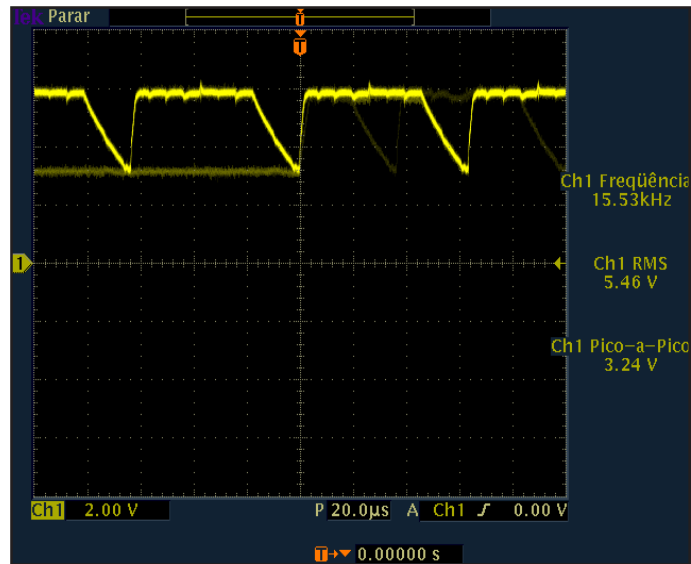
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Pin 40

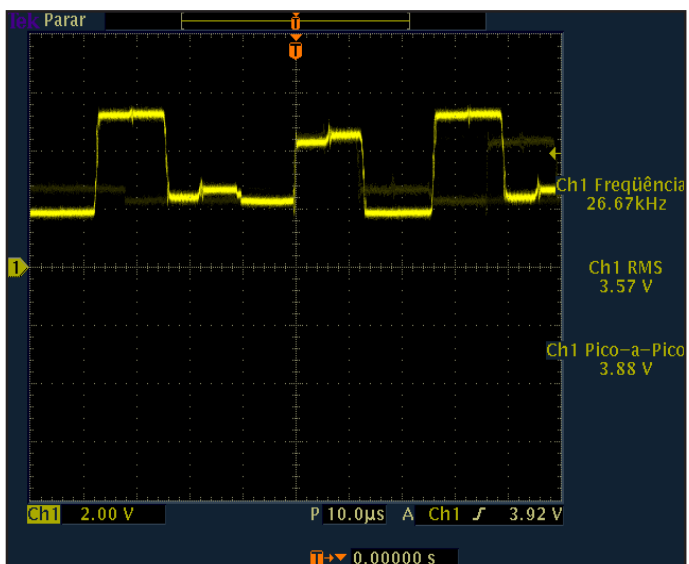


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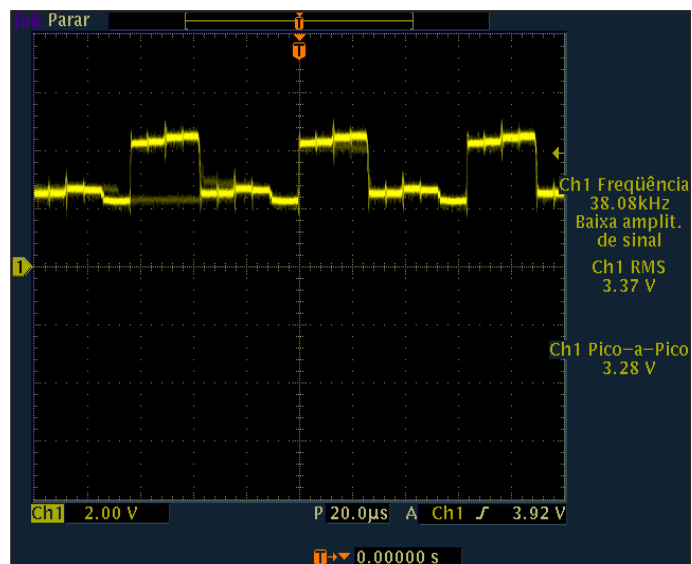


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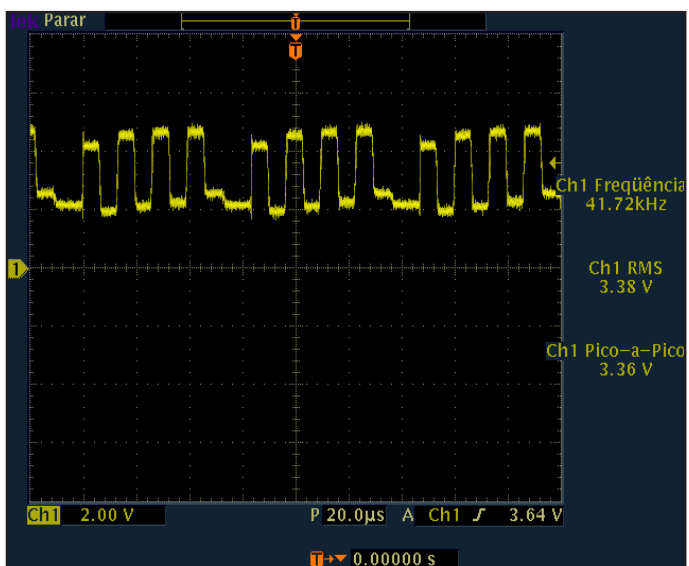
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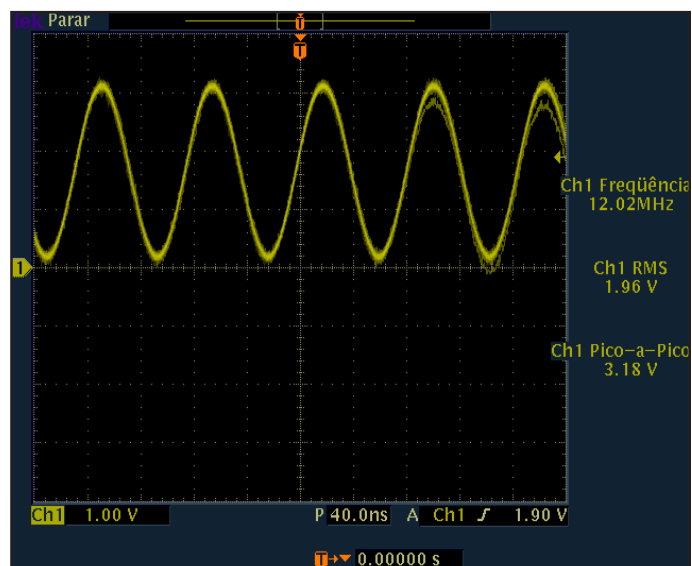
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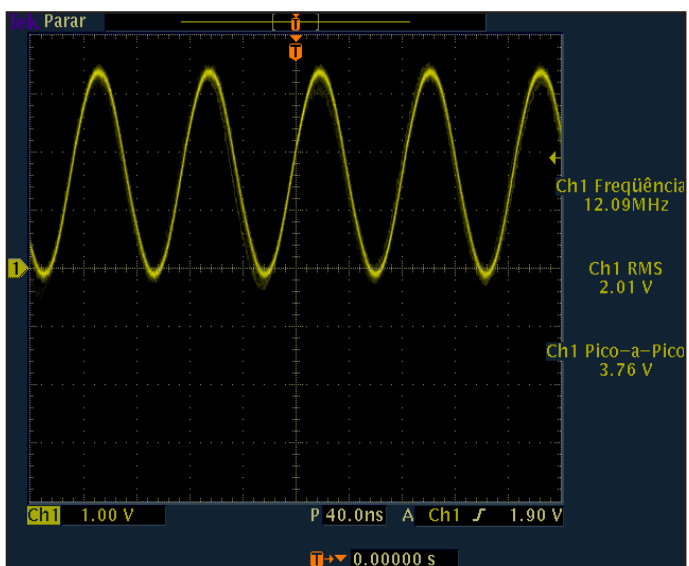
Pin 57



Pin 58

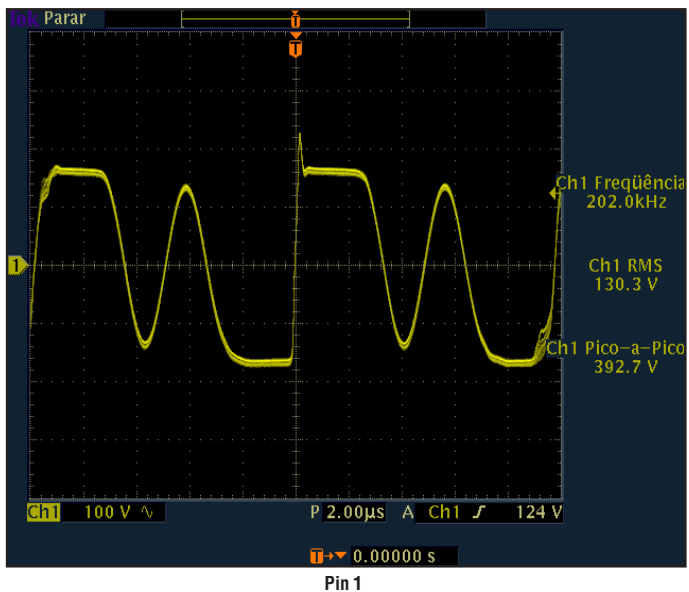


Pin 63

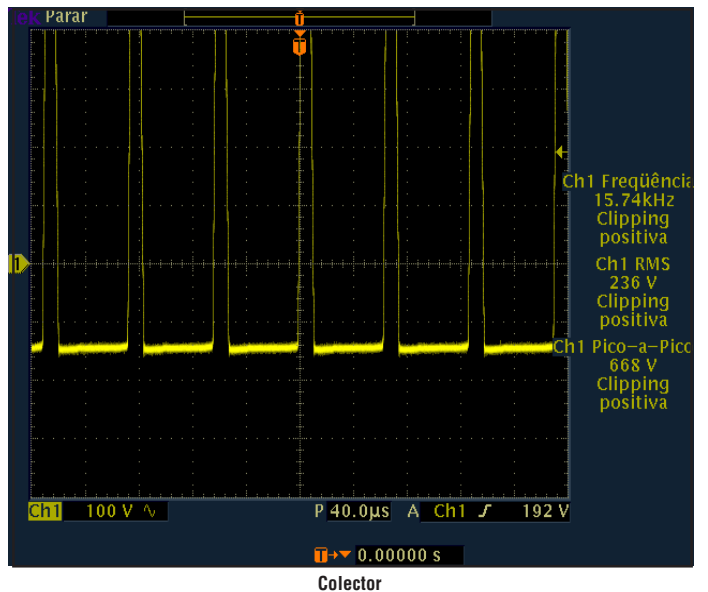


Pin 64

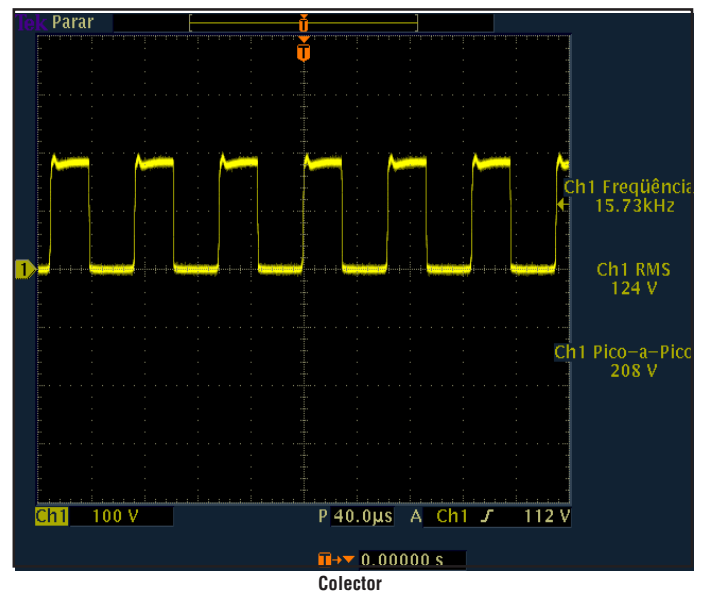
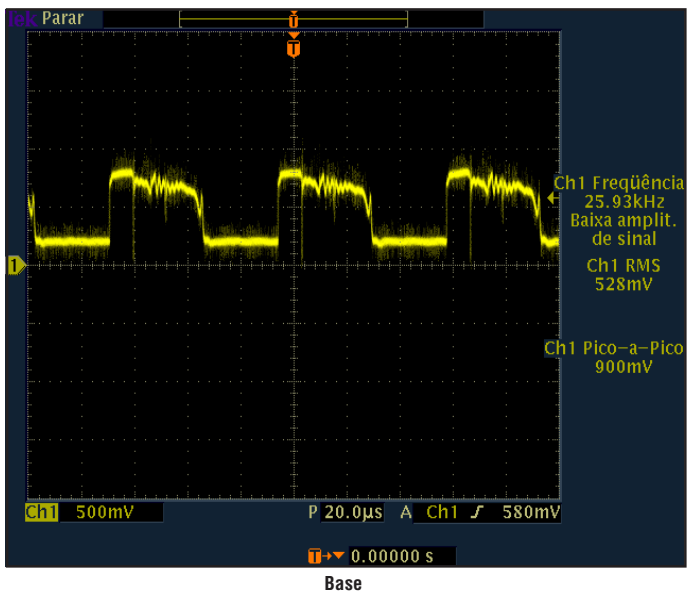
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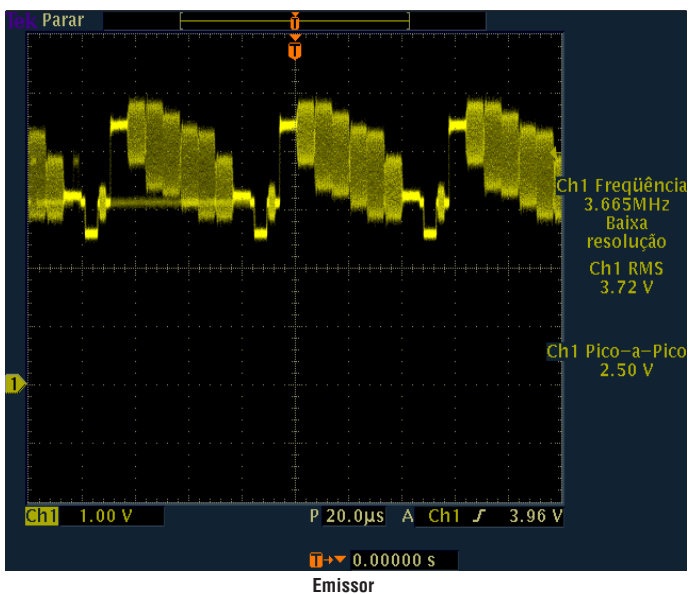
## Q551



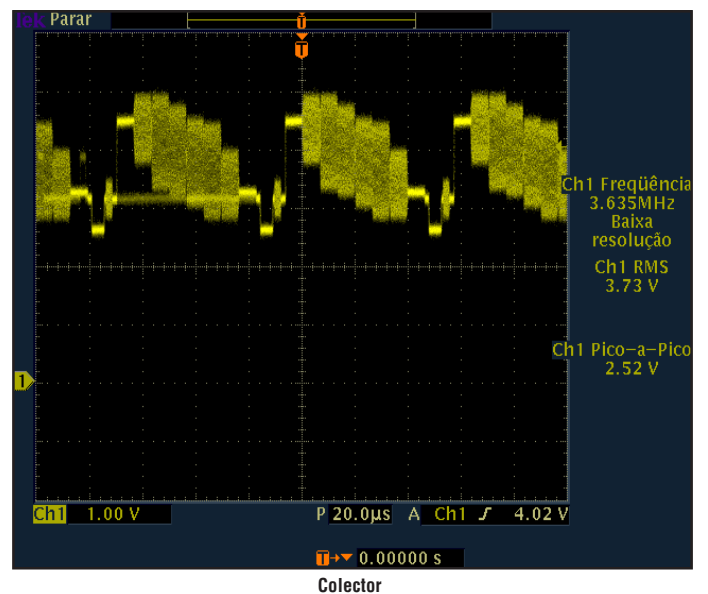
## Q501



## Q601



## Q602







## ■ REPLACEMENT MECHANICAL PARTS LIST

Ref No.	TC-14RM10LP part No.	TC-20RM10LP part No.	TC-20RA10LP part No.	Part Name & Description
1	TBM4G3016	TBM4G3015	TBM4G3015	PANASONIC LABEL
2	TBX2B869	TBX2B870	TBX2B870	POWER BUTTON
3	TES4G214	TES4G214	TES4G214	POWER BUTTON SPRING
4	EASG9D559D2	EASG9D559D2	EASG9D559D2S	SPEAKER FULL RANGE 8W
5	TXAJTA22TC14A12	TXAJTA2220RM	TXAJTA2220RM	CONNECTOR (SPEAKER)
6	TXFKY14RM10LP	TXFKY20RM10LP	TXFKY20RA10LP	CABINET ASSEMBLED
6	TXPTKY2B2501	TXPTKY2B2601	TXPTKY2B2701	CABINET
7	TKP2B11311	TKP2B11321	TKP2B11321	LED GUIDE
8	TBX2B871	TBX2B872	TBX2B872	6 POSITIONS BUTTON
9	A34EAK01X094R	A48EAK01X094	A48EAK01X094	CRT
10	TLK2B14001A	TLK2B20001A	TLK2B20001A	DEGAUSSING COIL
11	TXF3A14C7	TXF3A20C7-1	TXF3A20C7-1	COIL SPRING
12	TXITKU2B22901	TXITKU2B23001	TXITKU2B23001	REAR COVER
13	TKP2B11161-2	TKP2B11161-2	TKP2B11161-2	AC CABLE HOLDER
14	TSX2BA06	TSX2BA06	TSX2BA06	AC CABLE W/ TAB (URUGUAY/CHILE/PARAGUAY)
14	TSX2BA07	TSX2BA07	TSX2BA07	AC CABLE W/ TAB (PANALAT)
15	S-U5012	S-U5012	S-U5012	ADAPTOR BALLUM 300W / 75W
16	TSA8108-6KP	TSA8108-6KP	TSA8108-6KP	ANTENNA
17	330620065	K3B095A00001	K3B095A00001	CRT SOCKET 14" / 20"
18	ESB92DA1B	ESB92DA1B	ESB92DA1B	POWER SWITCH
19	TMW2B212-1	TMW2B212-1	TMW2B212-1	BRACKET LED
20	EVQ11G05R	EVQ11G05R	EVQ11G05R	TOUCH SWITCHES (SW1001~SW1006)
21	J3AAAAB00002	J3AAAAB00002	J3AAAAB00002	TUNER PACK
22	TQB2B0146	TQB2B0146	TQB2B0146	OPERATION GUIDE
23	TNQ2B2502-1	TNQ2B2502-1	TNQ2B2502-1	REMOTE CONTROL

# ■ REPLACEMENT ELECTRICAL PARTS LIST

**COMPONENTS WITH DIFFERENTIATED CODES FOR EACH MODEL (TC-14RM10LP/TC-20RM10LP/TC-20RA10LP)**

Ref. No.	TC-14RM10LP Part No.	TC-20RM10LP Part No.	TC-20RA10LP Part No.	Part Name & Description
<b>CAPACITORS</b>				
C559	ECWH16752JVB	ECWH16103JVB	ECWH16103JVB	POLYPROPYLENE 7,50 nF 1.600V / 10nF 1.600V
C560	ECQM4223JZW	ECQM4333JZW	ECQM4333JZW	POLYESTER CAP 22nF 400V / 33nF 400V
C561	ECKW3D221JBR	ECKW3D151KBR	ECKW3D151KBR	CERAMIC 220 PF 2.000V / 150 PF 2.000V
C563	ECWF2224JSR	ECWF2394JSR	ECWF2394JSR	POLYPROPYLENE 220nF 250V / 390nF 250V
C827	ECQV1H184JL3	ECQB1H683JF3	ECQB1H683JF3	POLYESTER CAP 180nF 50V / 68PF 50V
C830	ECQB1H561JF3	ECQB1H102JF3	ECQB1H102JF3	POLYESTER CAP 1nF 50V / 560PF 50V
C3020	ECJ2VB1H561K	ECJ2VB1H392K	ECJ2VB1H392K	CERAMIC CAP. 3.900PF 50V / 560PF 50V
C3136	-----0-----	-----0-----	ECJ2VF1H103Z	CERAMIC CAP. 10 nF 50V
C3137	-----0-----	-----0-----	ECJ2VF1H103Z	CERAMIC CAP. 10 nF 50V
C3138	-----0-----	-----0-----	F2A1C100A180	ELECTROLYTICAL CAP. 10 µF 16V
C3139	-----0-----	-----0-----	F2A1C100A180	ELECTROLYTICAL CAP. 10 µF 16V
C3144	-----0-----	-----0-----	ECJ2VB1H392K	CERAMIC CAP. 560PF 50V
C3175	-----0-----	-----0-----	ECJ2VF1C105Z	CERAMIC CAP. 1µF 16V
<b>CONNECTORS</b>				
JK3102A	-----0-----	-----0-----	K4BC08B00012	AV TERMINAL - FRONTAL ( MONO )
SC351	-----0-----	K3B095A00001	K3B095A00001	CRT SOCKET ( 20" / 21" / 29" )
SC351A	330620065	-----0-----	-----0-----	CRT SOCKET 14"
<b>RESISTOR</b>				
R416	ERDS1TJ1R8T	ERDS1TJ1R2T	ERDS1TJ1R2T	RES. 1,8 Ω 1/2 W / 1,2 Ω 1/2 W
R417	ERDS1TJ1R5T	ERDS1TJ1R2T	ERDS1TJ1R2T	RES. 1,5 Ω 1/2 W / 1,2 Ω 1/2 W
R508	ERG3FJ222H	ERG3FJ152H	ERG3FJ152H	RES. 2,2 Ω 3 W / 1,5 Ω 3 W
R509	ERG3FJ222H	ERG3FJ182H	ERG3FJ182H	RES. 2,2 Ω 3 W / 1,8 Ω 3 W
R511	ERJ6ENF1072V	ERJ6ENF1002V	ERJ6ENF1002V	RES. 10,7 Ω 1/10 W / 10Ω 1/10 W
R512	ERJ6ENF1202V	ERJ6ENF1182V	ERJ6ENF1182V	RES. 12Ω 1/10 W / 11,80 Ω 1/10 W
R520	ERQ12AJ6R8E	ERQ12AJ2R7E	ERQ12AJ2R7E	FUS. 2,7 Ω 1/2 W
R521	ERQ12AJ6R8E	ERQ12AJ2R7E	ERQ12AJ2R7E	FUS. 2,7 Ω 1/2 W
R522	D0GD273JA017	D0GD123JA017	D0GD123JA017	RES. 27Ω 1/8 W / 12Ω 1/8 W
R557	ERO50PKF1743	ERO50PKF1473	ERO50PKF1473	RES. 174Ω 1/2 W / 147Ω 1/2 W
R559	ERQ1CJP3R9S	ERQ1CJP4R7S	ERQ1CJP4R7S	FUSISTOR 3,9Ω 1 W / 4,70 Ω 1 W
R623	-----0-----	-----0-----	D0GD331JA017	RESISTOR 330Ω 1/8 W 5%
R685	-----0-----	-----0-----	D0GD331JA017	RESISTOR 330Ω 1/8 W 5%
R818	ERG2FJ683H	ERG2FJ473H	ERG2FJ473H	RESISTOR 68Ω 2 W / 47Ω 2 W
R820	ERX12SJR39E	ERX12SJR33E	ERX12SJR33E	RESISTOR 0,39Ω 1/2 W / 0,33 Ω 1/2 W
R821	ERX12SJR47E	ERX12SJR27E	ERX12SJR27E	RESISTOR 0,47Ω 1/2 W / 0,27 Ω 1/2 W
R824	ERDS2TJ561T	D0AE152JA046	D0AE152JA046	RESISTOR 560Ω 1/4 W / 1,50 Ω 1/4 W
R831	ERDS2TJ272T	EROS2THF1102	EROS2THF1102	RESISTOR 2,70Ω 1/4 W / 11Ω 1/2 W
R867	ERDS2TJ222T	D0AE272JA046	D0AE272JA046	RESISTOR 2,20Ω 1/4 W / 2,70 Ω 0,25 W
R3018	-----0-----	-----0-----	D0GD331JA017	RESISTOR 330Ω 1/8 W
R3048	-----0-----	-----0-----	D0GD101JA017	RESISTOR 100Ω 1/8 W
R3132	-----0-----	-----0-----	D0GD331JA017	RESISTOR 330Ω 1/8 W
R3133	-----0-----	-----0-----	D0GD331JA017	RESISTOR 330Ω 1/8 W
R3142	-----0-----	-----0-----	D0GD101JA017	RESISTOR 100Ω 1/8 W
R3145	-----0-----	-----0-----	D0GD101JA017	RESISTOR 100Ω 1/8 W
<b>TRANSFORMER</b>				
T501	ZTFP12506A	ZTFP12504A	ZTFP12504A	FLYBACK 15.750 Hz 0,040kVA
T801	ETS29AV156AC	ETS29AV136AD	ETS29AV136AD	CHOPPER 0,093 kVA (93VA) / 0,095 kVA (95VA)

# REPLACEMENT ELECTRICAL PARTS LIST

COMPONENTS WITH THE SAME CODE FOR ALL MODELS (TC-14RM10LP / TC-20RM10LP / TC-20RA10LP)

Ref.No.	Part No.	Part Name & Description
<b>MAIN P.C.B.</b>		
	PAL14RM10LMON	MAIN P.C.B. ASS'Y TC-14RM10LP
	PAL20RM10LMON	MAIN P.C.B. ASS'Y TC-20RM10LP
	PAL20RA10LPMOM	MAIN P.C.B. ASS'Y TC-20RA10LP
<b>CAPACITORS</b>		
C001	F2A1C220A147	ELECTROLYTIC CAP. 22µF 16V 20%
C002	ECJ2VF1C104Z	CERAMIC CAP. 100nF 16V 20% +80 -20%
C003	ECJ2VF1C104Z	CERAMIC CAP. 100 nF 16 V 20 % +80 -20%
C006	F2A0J221A181	ELECTROLYTIC CAP. 220 µF 6,3 V 20%
C008	F2A1H1R0A145	ELECTROLYTIC CAP. 1 µF 50 V 20 %
C117	ECJ2VB1H103J	CERAMIC CAP. 10 nF 50V 5%
C191	F1J1H104A717	CERAMIC CAP. 100 nF 50V 10%
C193	F2A1C100A180	ELECTROLYTIC CAP. 10 µF 16V 20%
C350	F2A1C101A180	ELECTROLYTIC CAP. 100 µF 16V 20%
C359	ECQE2104KFB	POLYESTER CAP. 0,10 µF 250V 10%
C368	ECJ2VC1H122J	CERAMIC CAP. 1,20 nF 50V 5%
C370	ECKW3D102KBP	CERAMIC CAP. 1 nF 2.000V 10%
C371	ECEA1CN100UB	ELECTROLYTIC CAP. 10 µF 16V 20%
C373	F2A2E1000011	ELECTROLYTIC CAP. 10 µF 250V 20%
C377	F2A1C4710045	ELECTROLYTIC CAP. 470 µF 16V 20%
C402	ECA1VM101B	ELECTROLYTIC CAP. 100 µF 35V 20%
C404	ECQB1103JF3	POLYESTER CAP. 0,01 µF 100V 5%
C406	F2A1H221A247	ELECTROLYTIC CAP. 220 µF 50 V 20%
C408	ECQB1274JF3	POLYESTER CAP. 270 nF 100V 5%
C502	F1B2H821A025	CERAMIC CAP. 820 PF 500V 10%
C503	F1B2H821A025	CERAMIC CAP. 820 PF 500V 10%
C504	ECJ2VB1H681K	CERAMIC CAP. 680 PF 50V 10%
C506	F1A2H1000002	CERAMIC CAP. 10 PF 500V 0,50 PF
C511	ECA1VM101B	ELECTROLYTIC CAP. 100 µF 35V 20%
C513	ECKW3D331JBP	CERAMIC CAP. 330 PF 2.000V 5%
C514	F2A1E102A151	ELECTROLYTIC CAP. 1.000 µF 25V 20%
C515	F1B2H331A025	CERAMIC CAP. 330PF 500V 10%
C516	F2A1E102A151	ELECTROLYTIC CAP. 1.000 µF 25V 20%
C519	F2A2C330A096	ELECTROLYTIC CAP. 33µF 160V 20%
C520	F2A0J221A181	ELECTROLYTIC CAP. 220 µF 6,3 V 20%
C552	F2A2E1000011	ELECTROLYTIC CAP. 10 µF 250V 20%
C555	F1B2H471A025	CERAMIC CAP. 470PF 500V 10%
C558	ECQB1104JF3	POLYESTER CAP. 100 nF 100V 5%
C562	ECKW3D821JBR	CERAMIC CAP. 0,82 nF 2.000V 5%
C565	ECQP1H183JZW	CAP. POLIPROPILENO 18 nF 50V 5%
C570	ECJ2VC1H330J	CERAMIC CAP. 33 PF 50V 5%
C580	F2A1H220A162	ELECTROLYTIC CAP. 22µF 50V 20% 50
C581	ECJ2VF1C105Z	CERAMIC CAP. 1 µF 16V +80 -20%
C601	F2A1C101A180	ELECTROLYTIC CAP. 100 µF 16V 20%
C602	F1J1H104A717	CERAMIC CAP. 100 nF 50V 10%
C603	ECJ2VB1H472K	CERAMIC CAP. 4.700 PF 50V 10%
C604	ECQV1H224JL3	POLYESTER CAP. 220 nF 50V 5%
C605	ECQV1H224JL3	POLYESTER CAP. 220 nF 50V 5%
C606	ECJ2VC1H222J	CERAMIC CAP. 2.200PF 50V 5%
C607	F2A1H1R0A145	ELECTROLYTIC CAP. 1µF 50V 20%
C608	F2A1H100A145	ELECTROLYTIC CAP. 10µF 50V 20%
C609	F1J1H104A717	CERAMIC CAP. 100 nF 50V 10%
C610	ECJ2VB1H103J	CERAMIC CAP. 10 nF 50V 5%
C611	ECEA1HKAR22B	ELECTROLYTIC CAP. 0,22 µF 50V 20%
C612	ECJ2VB1H472K	CERAMIC CAP. 4.700 PF 50V 10%
C613	ECJ2VB1H472K	CERAMIC CAP. 4.700 PF 50V 10%
C614	ECQV1H104JL3	POLYESTER CAP. 100 nF 50V 5%
C615	ECQV1H224JL3	POLYESTER CAP. 220 nF 50V 5%
C618	F1B1H681A130	CERAMIC CAP. 680PF 50V 10%
C619	ECQV1H104JL3	POLYESTER CAP. 100 nF 50V 5%
C620	ECJ2VC1H330J	CERAMIC CAP. 33 PF 50V 5%
C621	ECJ2VF1C105Z	CERAMIC CAP. 1 µF 16V +80 -20%
C622	ECJ2VF1H104Z	CERAMIC CAP. 100 nF 50V +80 -20 %
C623	ECJ2VC1H330J	CERAMIC CAP. 33 PF 50V 5%
C625	F2A0J221A181	ELECTROLYTIC CAP. 220 µF 6,3 V 20%
C628	ECJ2YB1H473K	CERAMIC CAP. 47 nF 50V 10%
C631	ECJ2VB1H222K	CERAMIC CAP. 2.200 PF 50V 10%
C632	ECJ2VB1H392K	CERAMIC CAP. 3.900 PF 50V 10%
C633	ECJ2VF1C105Z	CERAMIC CAP. 1 µF 16V +80 -20%
C636	F2A1C101A180	ELECTROLYTIC CAP. 100 µF 16V 20%

Ref.No.	Part No.	Part Name & Description
C640	F2A1C100A180	ELECTROLYTIC CAP. 10 µF 16V 20%
C641	ECJ2VC1H100C	CERAMIC CAP. 10 PF 50V
C670	F2A1C100A180	ELECTROLYTIC CAP. 10 µF 16V 20%
C680	ECJ2YB1H473K	CERAMIC CAP. 47 nF 50V 10%
C685	ECJ2VC1H101K	CERAMIC CAP. 100 PF 50V 10%
C686	ECJ2YB1H473K	CERAMIC CAP. 47 nF 50V 10%
C687	ECJ2VF1H104Z	CERAMIC CAP. 100 nF 50V +80 -20 %
C689	ECJ2VF1H104Z	CERAMIC CAP. 100 nF 50V +80 -20 %
C801	ECQU2A224BN9	CAP. POLIPROPILENO 220 nF 100V
C802	ECQU2A224BN9	CAP. POLIPROPILENO 220 nF 100V
C806	ECKWAE472ZED	CERAMIC CAP. 4,70 nF 250V +80 -20 %
C807	ECKWAE472ZED	CERAMIC CAP. 4,70 nF 250V +80 -20 %
C808	ECKWAE472ZED	CERAMIC CAP. 4,70 nF 250V +80 -20 %
C809	ECKWAE472ZED	CERAMIC CAP. 4,70 nF 250V +80 -20 %
C810	F2B2G1810011	ELECTROLYTIC CAP. 180µF 400V 20%
C811	ECQM4473JZW	POLIÉSTER RADIAL 47 nF 400V 5%
C814	ECQE2A473JFB	POLYESTER CAP. 47 nF 250V 5%
C816	F2A1H3300037	ELECTROLYTIC CAP. POLAR 33µF 50V 20%
C819	F2A1H1R0A162	ELECTROLYTIC CAP. POLAR 1µF 50V 20%
C821	ECKW3D471KBR	CERAMIC CAP. 470 PF 2.000V 10%
C822	ECKW3D331JBR	CERAMIC CAP. 330 PF 2.000V 5%
C825	ECQB1H471JF3	POLYESTER CAP. 470 PF 50V 5%
C826	FOA1H103A039	CAP. POLIPROPILENO 0,01 µF 50V 5%
C840	F1A2E471A002	CERAMIC CAP. 470 PF 250V 10%
C841	ECKCNA102MB7	CERAMIC CAP. 1.000PF 250V 20%
C842	F1A2E102A001	CERAMIC CAP. 1.000PF 250V 20%
C844	ECKCNA222ME7	CERAMIC CAP. 2,2nF 4.000V 20%
C846	F1A2E101A002	CERAMIC CAP. 100 PF 250V 10%
C850	ECJ2VF1H224Z	CERAMIC CAP. 220nF 50V +80 -20%
C853	F1B2H561A025	CERAMIC CAP. 560 PF 500V 10%
C854	ECKW3D821KBP	CERAMIC CAP. 820 PF 2.000V 10%
C855	F1B2H331A025	CERAMIC CAP. 330PF 500V 10%
C856	F2A1C100A180	ELECTROLYTIC CAP. 10 µF 16V 20%
C862	F2A1C332A232	ELECTROLYTIC CAP. 3.300µF 16V 20%
C863	F2A2C680A022	ELECTROLYTIC CAP. 68 µF 160V 20%
C864	F2A1C102A252	ELECTROLYTIC CAP. 1.000µF 16V 20%
C875	F2A1C101A180	ELECTROLYTIC CAP. 100 µF 16V 20%
C876	F2A1C101A180	ELECTROLYTIC CAP. 100 µF 16V 20%
C877	F2A1C101A180	ELECTROLYTIC CAP. 100 µF 16V 20%
C879	ECQV1H104JL3	POLYESTER CAP. 100 nF 50V 5%
C880	F2A1C1020049	ELECTROLYTIC CAP. 1.000 µF 16V 20%
C881	F2A1C101A180	ELECTROLYTIC CAP. 100 µF 16V 20%
C882	ECJ2VF1H104Z	CERAMIC CAP. 100 nF 50V +80 -20 %
C883	ECJ2VF1H104Z	CERAMIC CAP. 100 nF 50V +80 -20 %
C971	ECJ2VF1H103Z	CERAMIC CAP. 10 nF 50V +80 -20 %
C1101	ECJ2VF1C104Z	CERAMIC CAP. 100nF 16V 20% +80 -20%
C1103	ECJ2VC1H331J	CERAMIC CAP. 330 PF 50V 5%
C1104	F2A1C101A180	ELECTROLYTIC CAP. 100 µF 16V 20%
C1105	ECJ2VF1C104Z	CERAMIC CAP. 100nF 16V 20% +80 -20%
C1120	ECJ2VF1H103Z	CERAMIC CAP. 10 nF 50V +80 -20 %
C1125	F2A1C100A147	ELECTROLYTIC CAP. 10µF 16V 20%
C1130	ECJ2VC1H560J	CERAMIC CAP. 56 PF 50V 5%
C1131	F2A0J221A181	ELECTROLYTIC CAP. 220 µF 6,3 V 20%
C1132	ECJ2VC1H560J	CERAMIC CAP. 56 PF 50V 5%
C1140	F2A1C101A180	ELECTROLYTIC CAP. 100 µF 16V 20%
C1141	ECJ2VF1C104Z	CERAMIC CAP. 100nF 16V 20% +80 -20%
C1142	ECJ2VF1C104Z	CERAMIC CAP. 100nF 16V 20% +80 -20%
C2302	F2A1E471A151	ELECTROLYTIC CAP. 470 µF 25V 20%
C2303	F2A1C101A180	ELECTROLYTIC CAP. 100 µF 16V 20%
C2304	ECEA1HKN010B	ELECTROLYTIC CAP. 1 µF 50V 20%
C2306	F2A1H100A162	ELECTROLYTIC CAP. POLAR 10µF 50V 20%
C2380	F2A1C101A180	ELECTROLYTIC CAP. 100 µF 16V 20%
C2381	F2A1C100A180	ELECTROLYTIC CAP. 10 µF 16V 20%
C3173	ECJ2VF1C105Z	CERAMIC CAP. 1 µF 16V +80 -20%
<b>DIODES</b>		
D002	B0BA01700031	ZENER DIODE 17V 0,5 W 5,0 mA
D003	B0BA01500036	ZENER DIODE 15V 0,5 W 5,0 mA
D011	B0ACQJ000001	SWITCHING DIODE 80V 250,0 mA
D354	B0ACQJ000001	SWITCHING DIODE 80V 250,0 mA
D355	B0ACQJ000001	SWITCHING DIODE 80V 250,0 mA

Ref.No.	Part No.	Part Name & Description
D356	B0ACQJ000001	SWITCHING DIODE 80V 250,0 mA
D360	B0HAMP000067	RECTIFIER DIODE 400V 1,0 A
D361	B0HAMP000067	RECTIFIER DIODE 400V 1,0 A
D362	B0HAMP000067	RECTIFIER DIODE 400V 1,0 A
D363	B0ACQJ000001	SWITCHING DIODE 80V 250,0 mA
D365	B0BA9R900005	ZENER DIODE 9,9 V 0,5 W 5,0 mA
D375	B0ACQJ000001	SWITCHING DIODE 80V 250,0 mA
D402	B0HAHM000008	RECTIFIER DIODE 200V 0,6 A
D403	B0ACMJ000001	SWITCHING DIODE 80V 1,0 A
D404	B0ACMJ000001	SWITCHING DIODE 80V 1,0 A
D511	MAZ4108J0F	ZENER DIODE 10,8 V 0,37 W 250,0 mA
D512	MA2B17100E	D. 200,0 mA VRM=80V; VFM=1,0
D513	B0HAJP000015	RECTIFIER DIODE 400V 0,7 A
D515	B0HAJP000015	RECTIFIER DIODE 400V 0,7 A
D520	B0ACQJ000001	SWITCHING DIODE 80V 250,0 mA
D551	MAZ30470HL	ZENER DIODE 4,9 V 0,2 W 5,0 mA
D552	B0HAJP000015	RECTIFIER DIODE 400V 0,7 A
D555	B0ACQJ000001	SWITCHING DIODE 80V 250,0 mA
D556	B0EAKV000008	RECTIFIER DIODE 1.000 V 1,0 A VFM=1,2V
D557	B0HAMR000073	RECTIFIER DIODE 600V 1,0 A
D558	B0AADM000003	SWITCHING DIODE 200V 0,2 A
D583	B0ACQJ000002	SWITCHING DIODE 80V 0,25 200,0 mA
D584	B0BA5R600016	ZENER DIODE 5,6 V 0,5 W 5 mA
D801	ERZV10V621CS	VARISTOR
D803	B0EBNT000007	RECTIFIER DIODE 800V 4,0 A
D810	B0EAKT000018	RECTIFIER DIODE 800V 1,0 A
D817	B0HAJL000001	RECTIFIER DIODE 100V 0,7 A
D821	MAZ20750A0LS	ZENER DIODE 7,2 V 1/2 W
D823	B0HAJL000001	RECTIFIER DIODE 100V 0,7 A
D824	B0HAJL000001	RECTIFIER DIODE 100V 0,7 A
D825	B0BA6R100043	ZENER DIODE 6,1 V 0,5 W 5,0 mA
D830	B0HAJL000001	RECTIFIER DIODE 100V 0,7 A
D831	B0BA02400029	ZENER DIODE 24V 0,5 W 5 mA
D850	B0ACMJ000001	SWITCHING DIODE 80V 1,0 A
D852	B0ACMJ000001	SWITCHING DIODE 80V 1,0 A
D853	B0HAMM000108	RECTIFIER DIODE 200V 1,5 A
D854	B0HAPV000009	RECTIFIER DIODE 1.000V 3,0 A
D855	B0HFRJ000012	RECTIFIER DIODE 80V 5,0 A
D856	B0BA7R400019	ZENER DIODE 7,4 V 0,5 W 5,0 mA
D862	B0BA2R100016	ZENER DIODE 2,1 V 0,5 W 5 mA
D863	B0HAJL000001	RECTIFIER DIODE 100V 0,7 A
D865	B0BA3R500006	ZENER DIODE 3,5 V 0,5 W 5,0 mA
D870	B0HAJL000001	RECTIFIER DIODE 100V 0,7 A
D871	B0HAJL000001	RECTIFIER DIODE 100V 0,7 A
D873	B0BA8R200005	ZENER DIODE 8,2 V 0,5 W 5,0 mA
D1105	B0BA7R500006	ZENER DIODE 7,5 V 1/2 W 5,0 mA
D1120	B0ACQJ000001	SWITCHING DIODE 80V 250,0 mA
D1130	B0BA5R700008	ZENER DIODE 5,7 V 0,5 W 5,0 mA
D1131	B0BA5R700008	ZENER DIODE 5,7 V 0,5 W 5,0 mA
D1132	B0BA5R400008	ZENER DIODE 5,4 V 1/2 W 5,0 mA
D1140	B0BA5R600016	ZENER DIODE 5,6 V 0,5 W 5,0 mA
D1151	EL333ID/S928	D. LED 5V 1/10 W 30,0 mA
D2380	B0ACQJ000001	SWITCHING DIODE 80V 250,0 mA
D2381	B0ACQJ000001	SWITCHING DIODE 80V 250,0 mA
D2382	B0ACQJ000001	SWITCHING DIODE 80V 250,0 mA
PC860	B3PAA0000261	DIODO FOTO ACOPLADOR
<b>INTEGRATED CIRCUITS</b>		
IC351	TDA6107JF/N3	RGB IC
IC451	AN15525A	VERTICAL CONTROL IC
IC601	TDA9540N48CH	UOC IC
IC801	C5HABZ00116	IC MOSFET PTH OSCILADOR
IC802	C0EAS0000026	VOLTAGE DETECTOR IC
IC851	C0DAAHF00005	VOLTAGE REGULATOR IC
IC880	AN77L05-TA	VOLTAGE REGULATOR IC
IC1103	C3EBFC000042	EEPROM MEMORY IC
IC1201	C0CBABC00160	VOLTAGE REGULATOR IC
IC2301	AN7523N	AUDIO PROCESSOR IC
RM1104	B3RAC0000014	REMOTE CONTROL RECPTOR IC
<b>CONECTORES</b>		
A12	K1KA04AA0190	BASE DE PINS 4P
A22	B02B-XASS-1-T	BASE DE PINS 2P
D556-L	TEL376	PIN GT OCO ESTANHADO
D556-R	TEL376	PIN GT OCO ESTANHADO

Ref.No.	Part No.	Part Name & Description
F801-L	K3GE1ZA00010	GARRA PARA FUSÍVEL - METAL
F801-R	K3GE1ZA00010	GARRA PARA FUSÍVEL - METAL
L5~A5	TXAJTA5CB14A12	CONECTOR 6 PIN ( USO: 3 VIAS )
L8~A8	TXAJTA8CB20A12	CONECTOR 6 PINOS (USO: 6 VIAS)
L8~A8	TXAJTA8CB29K	CONECTOR 6 PINOS (USO: 6 VIAS)
JK3002	K4BC03B00021	TERMINAL AV - TRASEIRO ( MONO )
<b>COILS</b>		
L001	G0C100K00008	PIC COIL 10 µH 10% I=0,4A
L002	EXC3BB221H	FERRITE SMD Z=200 OHMS
L182	TALV35VB6R8K	PIC COIL 6,80 µH I=0,4A
L352	J0JKA0000022	FERRITE I=6 A / Z= 60 OHMS( 100MHZ)
L511	J0JKA0000038	FERRITE Z=80 OHMS(100 MHZ); I=6A
L550	J0JKB0000038	FERRITE BEAD CORE I=6A / Z=100 OHMS (100MHZ)
L620	J0JCC0000009	FERRITE 200MA, 2,25KOHM
L820	J0JKA0000025	FERRITE Z=80 OHMS(100 MHZ); I=6A
L821	J0JKA0000038	FERRITE Z=80 OHMS(100 MHZ); I=6A
L852	J0JKA0000023	FERRITE Z=80 OHMS(100MHZ); I= 6 A
L853	J0JKA0000025	FERRITE Z=80 OHMS(100 MHZ); I=6A
L854	J0JKA0000023	FERRITE Z=80 OHMS(100MHZ); I= 6 A
L862	G0C1R5KA0030	PIC COIL 1,50 µH 10%
L871	G0C1R5KA0030	PIC COIL 1,50 µH 10%
L872	G0C1R5KA0030	PIC COIL 1,50 µH 10%
L873	J0JKA0000024	FERRITE I=6 A / Z= 100 OHMS( 100MHZ)
L1101	TALV35VB331K	PIC COIL 330 µH I=0,4A
LF801	ELF21V012S	FILTRO DE LINHA 25 mH
L2311	J0JCC0000009	FERRITE 200MA, 2,25KOHM
L3136	J0JKA0000038	FERRITE Z=80 OHMS(100 MHZ); I=6A
L3137	J0JKA0000038	FERRITE Z=80 OHMS(100 MHZ); I=6A
<b>TRANSISTORS</b>		
Q001	B1ABCE000015	TRANSISTOR NPN 0,2W 200,0 mA
Q1110	B1ADDF000005	TRANSISTOR PNP 0,2 W 50V 200 mA
Q369	B1ADDF000005	TRANSISTOR PNP 0,2 W 50V 200,0 mA
Q400	B1ABCE000015	TRANSISTOR NPN 0,2W 200,0 mA
Q501	2SC4212H00LB	TRANSISTOR NPN 1 W 300V
Q520	2SB792ATX	TRANS. PNP 0,2 W 185V 50mA
Q551	2SC5902000LK	TRANSISTOR NPN 1.000V 8,0 A
Q580	B1ABCE000015	TRANSISTOR NPN 0,2W 200,0 mA
Q581	B1ADDF000005	TRANSISTOR PNP 0,2 W 50V 200mA
Q601	B1ADDF000005	TRANSISTOR PNP 0,2 W 50V 200mA
Q602	B1ABCE000015	TRANSISTOR NPN 0,2W 200mA
Q852	B1ABCE000015	TRANSISTOR NPN 0,2W 200,0 mA
Q853	B1ADCE000012	TRANSISTOR PNP 0,1 W 50V 100,0 mA
Q854	B1ABCE000015	TRANSISTOR NPN 0,2W 200,0 mA
Q855	B1ADCE000012	TRANSISTOR PNP 0,1 W 50V 100,0 mA
Q857	B1BAAN000029	TRANSISTOR NPN 1 300V 1,0 A
Q870	B1ABCE000015	TRANSISTOR NPN 0,2W 200,0 mA
Q871	B1ABCE000015	TRANSISTOR NPN 0,2W 200,0 mA
Q1053	B1ABCE000015	TRANSISTOR NPN 0,2W 200,0 mA
Q1130	B1ABCE000015	TRANSISTOR NPN 0,2W 200,0 mA
Q2380	B1ABCE000015	TRANSISTOR NPN 0,2W 200,0 mA
Q2381	B1ADDF000005	TRANSISTOR PNP 0,2 W 50V 200,0 mA
<b>RESISTOR</b>		
CF804	TAP4GA0005	POSISTOR 12,0 OHM
R003	D0GD100JA017	RESISTOR 10 Ohm 1/8 W 5%
R004	ERG3FJ183H	RESISTOR 18 kOhm 3 W 5%
R006	D0GD273JA017	RESISTOR 27 kOhm 1/8 W 5%
R007	D0GD472JA017	RESISTOR 47,0 kOhm 1/8 W 5%
R008	D0GD681JA017	RESISTOR 680 Ohm 1/8 W 5%
R011	D0GD103JA017	RESISTOR 10 kOhm 1/8 W 5%
R012	D0GD332JA017	RESISTOR 3,30 kOhm 1/8 W 5%
R021	D0GD273JA017	RESISTOR 27 kOhm 1/8 W 5%
R022	D0GD473JA017	RESISTOR 47 kOhm 1/8 W 5%
R182	D0GD221JA017	RESISTOR 220 Ohm 1/8 W 5%
R190	D0GD391JA017	RESISTOR 390 Ohm 1/8 W 5%
R351	ERJ6ENF1001V	RESISTOR 1 kOhm 1/10 W 1%
R352	ERJ6ENF1001V	RESISTOR 1 kOhm 1/10 W 1%
R353	ERJ6ENF1001V	RESISTOR 1 kOhm 1/10 W 1%
R357	D0GD103JA017	RESISTOR 10 kOhm 1/8 W 5%
R358	D0GD333JA017	RESISTOR 33 kOhm 1/8 W 5%
R359	D0GD273JA017	RESISTOR 27 kOhm 1/8 W 5%
R363	ERC12GK222V	RESISTOR 2,20 kOhm 1/2 W 10%
R364	ERC12GK222V	RESISTOR 2,20 kOhm 1/2 W 10%
R365	ERC12GK222V	RESISTOR 2,20 kOhm 1/2 W 10%



Ref.No.	Part No.	Part Name & Description
R369	D0GD103JA017	RESISTOR 10 kOhm 1/8 W 5%
R374	ERQ12AJ181P	FUSISTOR 180 Ohm 1/2 W 5%
R401	D0AE104JA046	RESISTOR 100 kOhm 1/4 W 5%
R402	D0GD470JA017	RESISTOR 47 Ohm 1/8 W 5%
R403	EROS2THF2491	RESISTOR 2,49 kOhm 0,25 W
R404	D0AE751JA046	RESISTOR 750 Ohm 1/4 W 5%
R405	EROS2THF2701	RESISTOR 2,70 kOhm 0,25 W 1%
R406	ERDS1FJ1R0T	RESISTOR 1 Ohm 1/2 W 5%
R407	ERG2FJ331H	RESISTOR 330 Ohm 2 W 5%
R409	D0GD512JA017	RESISTOR 5,10 kOhm 1/8 W 5%
R410	D0GD202JA017	RESISTOR 2 kOhm 1/8 W 5%
R414	D0GD432JA017	RESISTOR 4,30 kOhm 1/8 W 5%
R415	EROS2THF7500	RESISTOR 750 Ohm 0,25 1%
R502	D0GD182JA017	RESISTOR 1,80 kOhm 1/8 W 5%
R504	ERG2SJ682E	RESISTOR 6,80 kOhm 2 5%
R507	D0GD101JA017	RESISTOR 100 Ohm 1/8 W 5%
R513	ERQ14AJ100E	FUSISTOR 10 Ohm 1/4 W 5%
R523	D0GD103JA017	RESISTOR 10 kOhm 1/8 W 5%
R524	D0GD104JA017	RESISTOR 100 kOhm 1/8 W 5%
R525	D0GD392JA017	RESISTOR 3,90 kOhm 1/8 W 5%
R553	D0GD223JA017	RESISTOR 22 kOhm 1/8 W 5%
R554	ERJ6GEYJ103V	RESISTOR 10 kOhm 1/8 W 5%
R555	ERQ14AJ2R0P	FUSISTOR 2 Ohm 1/4 W 5%
R558	D0AE513JA046	RESISTOR 51 kOhm 0,25 W 5%
R564	D0AE393JA046	RESISTOR 39 kOhm 1/4 W 5%
R580	D0GD392JA017	RESISTOR 3,90 kOhm 1/8 W 5%
R581	ERJ6GEYJ332V	RESISTOR 3,30 kOhm 1/8 W 5%
R583	D0GD274JA017	RESISTOR 270 kOhm 1/8 W 5%
R584	D0GD563JA017	RESISTOR 56 kOhm 1/8 W 5%
R586	D0GD103JA017	RESISTOR 10 kOhm 1/8 W 5%
R587	D0GD823JA017	RESISTOR 82 kOhm 1/8 W 5%
R588	D0GD104JA017	RESISTOR 100 kOhm 1/8 W 5%
R591	D0GD103JA017	RESISTOR 10 kOhm 1/8 W 5%
R592	D0GD222JA017	RESISTOR 2,20 kOhm 1/8 W 5%
R593	D0GD103JA017	RESISTOR 10 kOhm 1/8 W 5%
R594	D0GD104JA017	RESISTOR 100 kOhm 1/8 W 5%
R596	ERJ6GEYJ333V	RESISTOR 33 kOhm 1/8 W 5%
R601	D0GD153JA017	RESISTOR 15 kOhm 1/8 W 5%
R603	D0GD393JA017	RESISTOR 39 kOhm 1/8 W 5%
R604	ERJ6GEYJ821V	RESISTOR 820 Ohm 1/8 W 5%
R605	ERJ6GEYJ821V	RESISTOR 820 Ohm 1/8 W 5%
R606	ERJ6GEYJ821V	RESISTOR 820 Ohm 1/8 W 5%
R607	D0GD101JA017	RESISTOR 100 Ohm 1/8 W 5%
R612	D0GD102JA017	RESISTOR 1 kOhm 1/8 W 5%
R614	D0GD392JA017	RESISTOR 3,90 kOhm 1/8 W 5%
R617	D0GD391JA017	RESISTOR 390 Ohm 1/8 W 5%
R619	D0GD121JA017	RESISTOR 120 Ohm 1/8 W 5%
R620	D0GD121JA017	RESISTOR 120 Ohm 1/8 W 5%
R623	D0GD331JA017	RESISTOR 330 Ohm 1/8 W 5%
R633	D0GD470JA017	RESISTOR 47 Ohm 1/8 W 5%
R640	D0GD822JA017	RESISTOR 8,20 kOhm 1/8 W 5%
R672	D0GD181JA017	RESISTOR 180 Ohm 1/8 W 5%
R686	D0GD470JA017	RESISTOR 47 Ohm 1/8 W 5%
R687	D0GD472JA017	RESISTOR 4,70 kOhm 1/8 W 5%
R688	D0GD103JA017	RESISTOR 10 kOhm 1/8 W 5%
R801	D0D72R7KA002	RESISTOR 2,70 Ohm 7 W 10%
R810	ERG2FJ470	RESISTOR 47 Ohm 2 W 5%
R811	ERG2FJ104H	RESISTOR 100 kOhm 2 W 5%
R817	ERDS1TJ100T	RESISTOR 10 Ohm 1/2 W 5%
R825	D0AE102JA046	RESISTOR 1 kOhm 1/4W 5%
R830	D0AE101JA046	RESISTOR 100 Ohm 1/4 W 5%
R832	D0AE473JA046	RESISTOR 47 kOhm 0,25 W 5%
R840	ERIC2ZGM825V	RESISTOR 8,20 MOhm 3/4 W 5%
R854	ERJ6GEYJ103V	RESISTOR 10 kOhm 1/8 W 5%
R855	ERDS2TJ752T	RESISTOR 7,50 kOhm 1/4 W 5%
R857	ERDS2TJ683T	RESISTOR 68 kOhm 1/4 W 5%
R858	ERDS2TJ153T	RESISTOR 15 kOhm 1/4 W 5%
R861	ERDS1TJ221T	RESISTOR 220 Ohm 1/2 W 5%
R864	D0GD103JA017	RESISTOR 10 kOhm 1/8 W 5%
R866	D0GD472JA017	RESISTOR 4,70 kOhm 1/8 W 5%
R868	ERDS1TJ471T	RESISTOR 470 Ohm 1/2 W 5%
R870	ERJ6GEYJ222V	RESISTOR 2,20 kOhm 1/8 W 5%
R871	ERDS1TJ103T	RESISTOR 10 kOhm 1/2 W 5%

Ref.No.	Part No.	Part Name & Description
R872	D0GD272JA017	RESISTOR 2,70 kOhm 1/8 W 5%
R873	D0GD472JA017	RESISTOR 4,70 kOhm 1/8 W 5%
R875	D0GD103JA017	RESISTOR 10 kOhm 1/8 W 5%
R1016	ERJ6ENF1800V	RESISTOR 180 Ohm 1/10 W 1%
R1017	ERJ6ENF2400V	RESISTOR 240 Ohm 1/10 W 1%
R1018	ERJ6ENF3300V	RESISTOR 330 Ohm 1/10 W 1%
R1019	ERJ6ENF4700V	RESISTOR 470 Ohm 1/10 W 1%
R1020	ERJ6ENF8200V	RESISTOR 820 Ohm 1/10 W 1%
R1059	D0GD182JA017	RESISTOR 1,80 kOhm 1/8 W 5%
R1060	D0GD683JA017	RESISTOR 68 kOhm 1/8 W 5%
R1103	D0GD680JA017	RESISTOR 68 Ohm 1/8 W 5%
R1104	D0GD562JA017	RESISTOR 5,60 kOhm 1/8 W 5%
R1105	D0GD562JA017	RESISTOR 5,60 kOhm 1/8 W 5%
R1106	D0GD102JA017	RESISTOR 1 kOhm 1/8 W 5%
R1108	D0GD101JA017	RESISTOR 100 Ohm 1/8 W 5%
R1109	D0GD101JA017	RESISTOR 100 Ohm 1/8 W 5%
R1110	D0GD102JA017	RESISTOR 1 kOhm 1/8 W 5%
R1111	D0GD103JA017	RESISTOR 10 kOhm 1/8 W 5%
R1112	D0GD332JA017	RESISTOR 3,30 kOhm 1/8 W 5%
R1116	D0GD332JA017	RESISTOR 3,30 kOhm 1/8 W 5%
R1120	D0GD102JA017	RESISTOR 1 kOhm 1/8 W 5%
R1122	D0GD332JA017	RESISTOR 3,30 kOhm 1/8 W 5%
R1123	D0GD751JA017	RESISTOR 750 Ohm 1/8 W 5%
R1125	D0GD103JA017	RESISTOR 10 kOhm 1/8 W 5%
R1130	D0GD101JA017	RESISTOR 100 Ohm 1/8 W 5%
R1131	D0GD101JA017	RESISTOR 100 Ohm 1/8 W 5%
R1132	D0GD101JA017	RESISTOR 100 Ohm 1/8 W 5%
R1133	D0GD562JA017	RESISTOR 5,60 kOhm 1/8 W 5%
R1134	D0GD103JA017	RESISTOR 10 kOhm 1/8 W 5%
R1135	D0GD333JA017	RESISTOR 33 kOhm 1/8 W 5%
R1136	D0GD332JA017	RESISTOR 3,30 kOhm 1/8 W 5%
R1140	ERJ6ENF1201V	RESISTOR 1,20 kOhm 1/10 W 1%
R1141	D0GD562JA017	RESISTOR 5,60 kOhm 1/8 W 5%
R1142	D0GD100JA017	RESISTOR 10 Ohm 1/8 W 5%
R2302	D0GD153JA017	RESISTOR 15 kOhm 1/8 W 5%
R2303	D0GD472JA017	RESISTOR 4,70 kOhm 1/8 W 5%
R2380	D0GD151JA017	RESISTOR 150 Ohm 1/8 W 5%
R2381	D0GD102JA017	RESISTOR 1 kOhm 1/8 W 5%
R2382	D0GD102JA017	RESISTOR 1 kOhm 1/8 W 5%
R2383	D0GD103JA017	RESISTOR 10 kOhm 1/8 W 5%
R2384	D0GD100JA017	RESISTOR 10 Ohm 1/8 W 5%
R3015	D0GD101JA017	RESISTOR 100 Ohm 1/8 W 5%
R3018	D0GD750JA017	RESISTOR 75 Ohm 1/8 W 5%
R3048	D0GD184JA017	RESISTOR 180 kOhm 1/8 W 5%
JA1	ERJ6GEY0R00V	RESISTOR 0 Ohm 1/8 W
JA4	ERJ6GEY0R00V	RESISTOR 0 Ohm 1/8 W
JA5	ERJ6GEY0R00V	RESISTOR 0 Ohm 1/8 W
JA6	ERJ6GEY0R00V	RESISTOR 0 Ohm 1/8 W
JA7	ERJ6GEY0R00V	RESISTOR 0 Ohm 1/8 W
JA8	ERJ6GEY0R00V	RESISTOR 0 Ohm 1/8 W
JA9	ERJ6GEY0R00V	RESISTOR 0 Ohm 1/8 W
JA10	ERJ6GEY0R00V	RESISTOR 0 Ohm 1/8 W
JA12	ERJ6GEY0R00V	RESISTOR 0 Ohm 1/8 W
JS102	ERJ6GEY0R00V	RESISTOR 0 Ohm 1/8 W
JS110	ERJ6GEY0R00V	RESISTOR 0 Ohm 1/8 W
JS111	ERJ6GEY0R00V	RESISTOR 0 Ohm 1/8 W
JS112	ERJ6GEY0R00V	RESISTOR 0 Ohm 1/8 W
JS113	ERJ6GEY0R00V	RESISTOR 0 Ohm 1/8 W
JS122	ERJ6GEY0R00V	RESISTOR 0 Ohm 1/8 W
JS2140	ERJ6GEY0R00V	RESISTOR 0 Ohm 1/8 W
JS2141	ERJ6GEY0R00V	RESISTOR 0 Ohm 1/8 W
JS3001	ERJ6GEY0R00V	RESISTOR 0 Ohm 1/8 W
JS3130	ERJ6GEY0R00V	RESISTOR 0 Ohm 1/8 W
JS3138	ERJ6GEY0R00V	RESISTOR 0 Ohm 1/8 W
<b>TRANSFORMERS</b>		
T553	ETH19Y210AZZ	HORIZONTAL DRIVER TRANSFORMER
<b>OSCILLATORS</b>		
X181	EFCS4R5MW5	CERAMIC FILTER 4,5 MHz
X601	HO120500020	CRYSTAL OSCILLATOR 12 MHz
XF101	M1971M	SAW FILTER 45,75 MHz
<b>FUSE</b>		
F801	K5D402BK0004	FUSE ( 4A / 250V )

# **Panasonic da Amazônia S.A.**

## **CS DIVISION - TECHNICAL SUPPORT**

Rod. Presidente Dutra, Km 155  
São José dos Campos - SP  
BRAZIL