S/M No: TWP811MEF0

Service Manual

Colour Television 66 Cm WIDE STEREO

CHASSIS : WP-811N

MODEL : DTW - 28W2F
DTW - 2810F

■ Specifications

CRT	28" : W66ECK001X44
SYSTEM	PAL / SECAM-B/K, PAL-I/I', SECAM-L/L', NTSC-3.58/4.43 (Play back)
MAIN VOLTAGE	230V AC, 50Hz
POWER CONSUMPTION	Stand-by mode : 2.0 Watts Normal operating mode : 100 Watts
SOUND OUTPUT	10 + 10 Watts, 10% THD at RF 60% mod. (1 kHz)
SPEAKER	12W 8 ohm x 2 EA
ANTENNA IMPEDANCE	75 ohm unbalanced input (Din Standard)
TUNING SYSTEM	Frequency Systhesize (FS) Tuning System
TUNER	DT5-BF14D
NUMBER OF PROGRAM	100 program
AUX. TERMINAL	21 pin EURO-SCART jack (AV input, TV output, RGB input) 21 pin EURO-SCART jack (AV input, S-VHS input) RCA type AV input jack Headphone jack (3.5 mm Φ) JACK AUDIO TERMINAL (AUDIO OUT L, R)
REMOTE CONTROL	R-22D05(or R-23D05) with 2 "AAA" type batteries
TELETEXT	TOP(5 Page memory) & FLOF(7 Page memory) - West option : English, German/Dutch/Flemish, French, Italian, Spanish/Portuguese, Swedish/Finnish/Danish, Hungarian, Rumanian, Turkish - East option : Polish, Czech/Slovak, Rumanian, Servo-croat, German/Dutch/Flemish, French, Estonian, Lettish
OSD LANGUAGE	- West : English, German, French, Italian, Spanish, Nethelands, Swedish - East : English, Russian, Polish, Rumanian, Czech, Hungarian

✔ Caution

: In this Manual, some parts can be changed for improving, their performance without notice in the parts list. So, if you need the latest parts information,please refer to PPL(Parts Price List) in Service Information Center (http://svc.dwe.co.kr).

DAEWOO ELECTRONICS CO., LTD

http://svc.dwe.co.kr DEC.2000

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SAFETY INSTRUCTION

WARNING : Only competent service personnel may carry out work involving the testing or repair of this equipment

X-RAY RADIATION PRECAUTION

1. Excessive high voltage can prodece potentially hazardous X-RAY RADIATION. To avoid such hazards, the high voltage must not exceed the specified limit. The nominal value of the high voltage of this receiver is 25-27kv at max beam current. The high voltage must not, under any circumstances, exceed 30kv.
   Each time a receiver require servicing, the high voltage should be checked. It is imprortant to use an accurate and reliable high voltage meter.
2. The only source of X-RAY Radiation in this TV receiver is the picture tube. For continued X-RAY RADIATION protection, the replacement tube must be exactly the same type tube as specified in the parts list.

SAFETY PRECAUTION

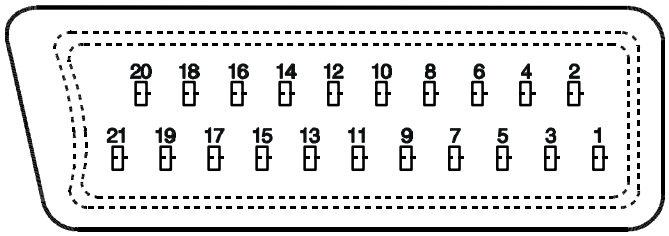
1. Potentials of high voltage are present when this receiver is operating. Operation of the receiver outside the cabinet or with the back board removed involves a shock hazard from the receiver.
   1) Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high-voltage equipment.
   2) Dischange the high potential of the picture tube before handling the tube. The picture tube is highly evacuated and if broken, glass fragments will be violently expelled.
2. If any Fuse in this TV receiver is blown, replace it with the FUSE specified in the Replacement Parts List.
3. When replacing a high wattage resistor (oxide metal film resistor) in circuit board, keep the resistor 10mm away from circuit board.
4. Keep wires away from high voltage or high temperature components.
5. This receiver must operate under AC230 volts, 50Hz. NEVER connect to DC supply or any other power or frequency.

PRODUCT SAFETY NOTICE

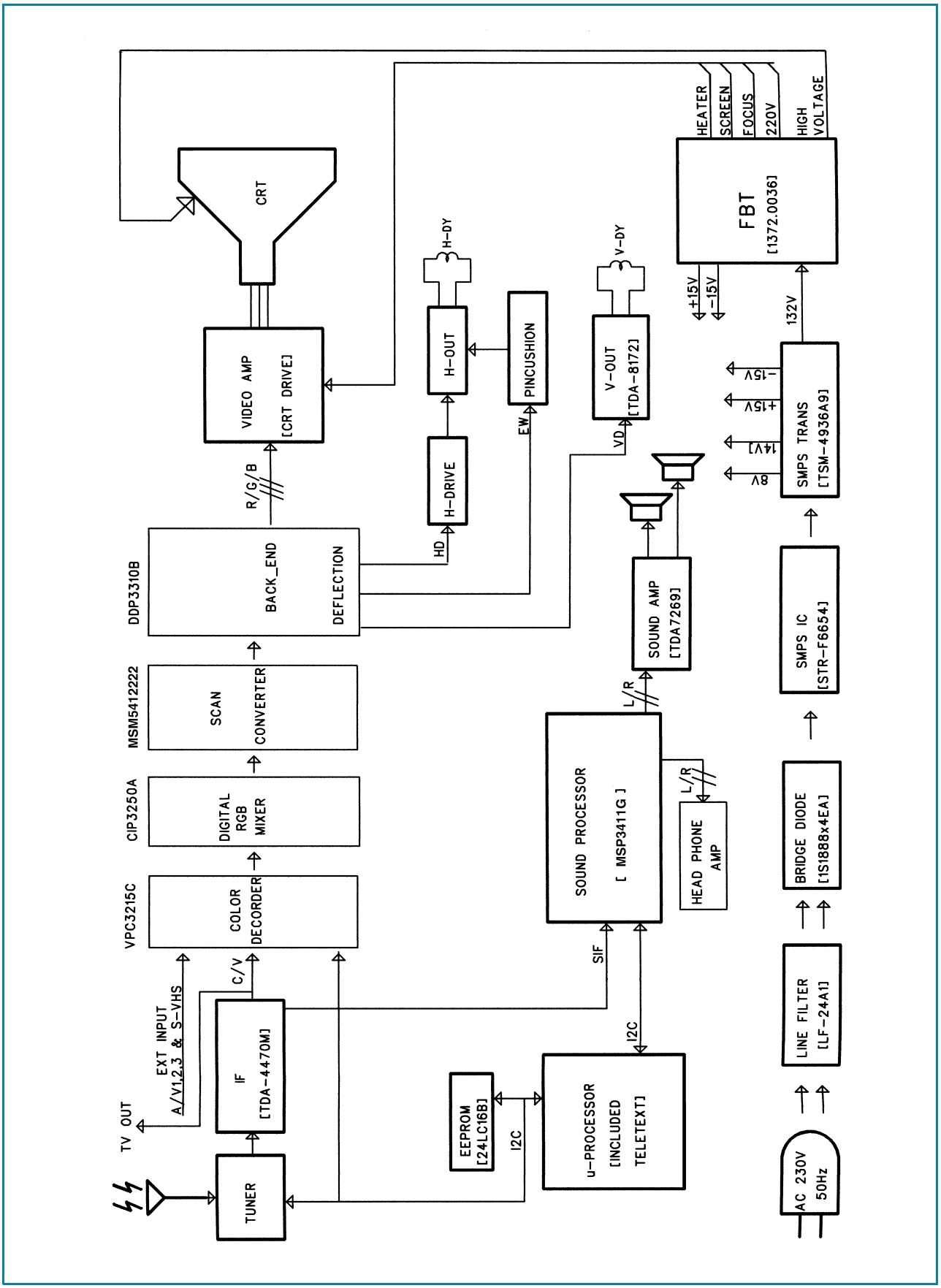
Many electrical and mechanical parts in this have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-RAY RADIATION protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual and its supplements, electrical components having such features are identified designated symbol on the parts list.
Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts which do not have the same safety characterisitics as specifide in the parts list may create X-RAY Radiation.

SPECIFICATIONS

PIN	Signal Designation	Matching Value
1	Audio Out (linked with 3)	0.5Vrms, Imp < 1 kΩ (RF 60% MOD)
2	Audio In (linked with 6)	0.5Vrms, Imp < 10 kΩ
3	Audio Out (linked with 1)	0.5Vrms, Imp < 1 kΩ(RF 60% MOD)
4	Audio Earth	
5	Blue Earth	
6	Audio in (linked with 2)	0.5Vrms, Imp < 10 kΩ (RF 60% MOD)
7	Blue in	0.7Vpp ± 2dB, Imp 75Ω
8	Slow (Function) Switching	TV : 0-2V, PERI : 9.5 - 12V, Imp > 10 kΩ
9	Green Earth	
10	NC	
11	Green In	0.7Vpp ± 2dB, Imp 75Ω
12	NC	
13	Red Earth	
14	Rapid(Blanking) Switching Earth	
15	Red In, C In	0.7Vpp ± 2dB, Imp 75Ω
16	Rapid(Blanking) switching	Logic 0 : 0 - 0.4V, Logic 1 : 1 - 3V, Imp 75Ω
17	Video Earth	
18	Rapid Blanking Earth	
19	Video Out	1Vpp ± 2dB, Imp 75Ω
20	Video In, Y In	1Vpp ± 2dB, Imp 75Ω
21	Common Earth	



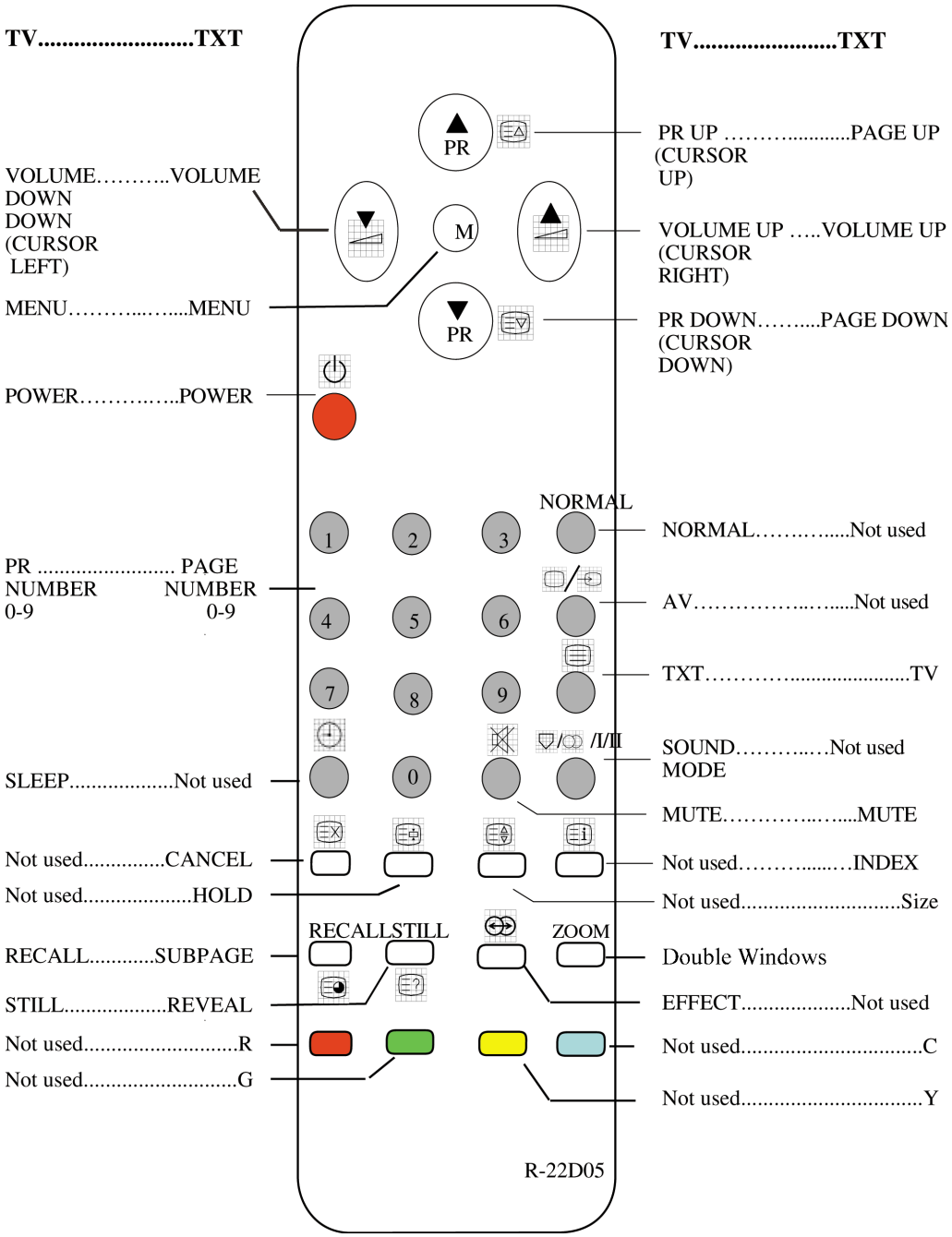
CIRCUIT BLOCK DIAGRAM



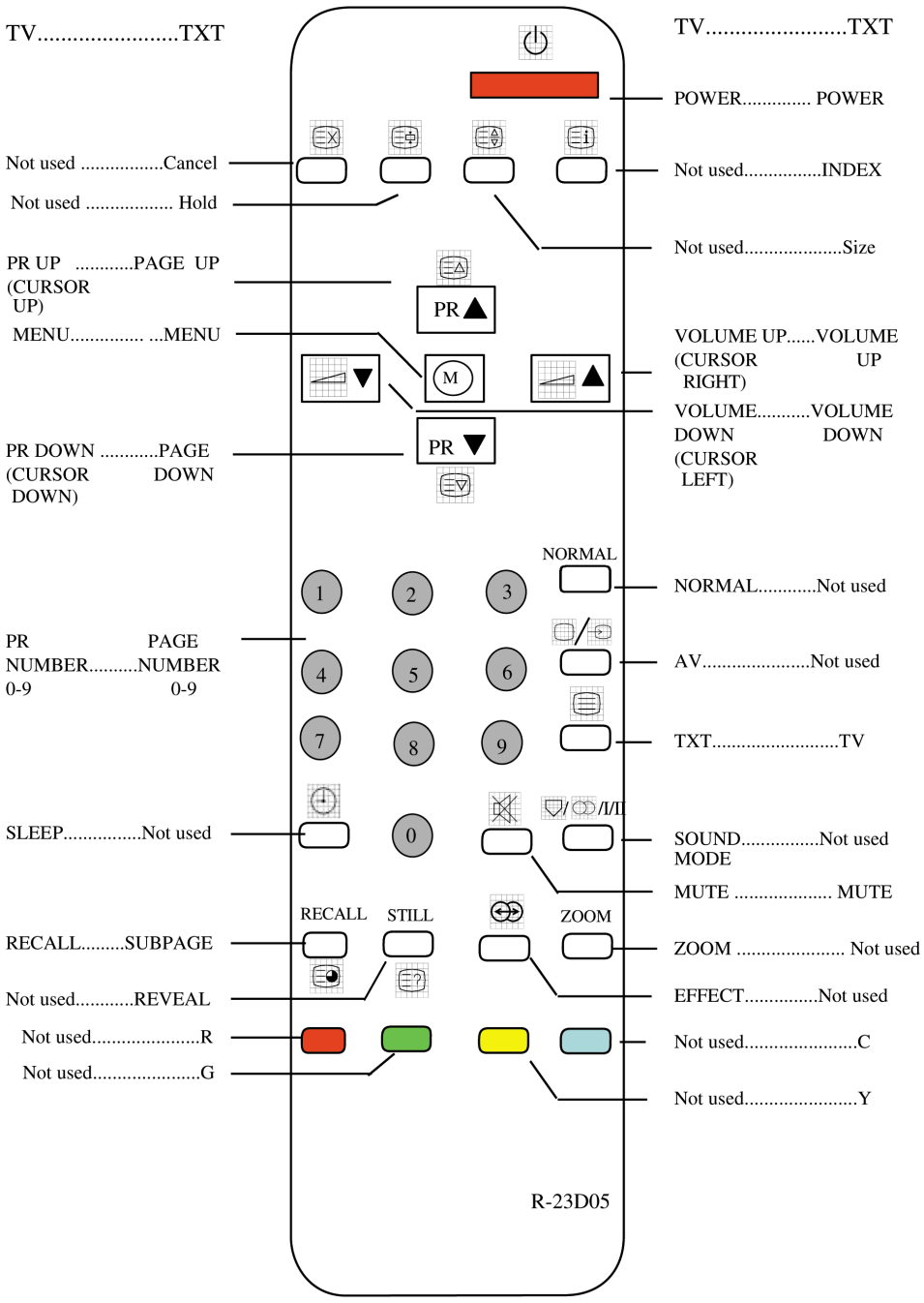
ALIGNMENT INSTRUCTIONS

■ User Remocon

1. R-22D05



2. R-23D05


TV.....TXT
TV.....TXT
POWER..... POWER
Not used .....Cancel
Not used..... INDEX
Not used ..... Hold
Not used.....Size
PR UP .....PAGE UP
(CURSOR
UP)
PR
MENU..... ...MENU
M
VOLUME UP.....VOLUME
(CURSOR UP
RIGHT)
VOLUME.....VOLUME
DOWN DOWN
(CURSOR
LEFT)
PR DOWN .....PAGE
(CURSOR DOWN
DOWN)
PR
NORMAL
NORMAL.....Not used
1
2
3
PR PAGE
NUMBER.....NUMBER
0-9 0-9
4
5
6
AV.....Not used
7
8
9
TXT.....TV
SLEEP.....Not used
0
/I/II
SOUND.....Not used
MODE
MUTE ..... MUTE
RECALL
STILL
ZOOM
RECALL.....SUBPAGE
ZOOM ..... Not used
Not used.....REVEAL
EFFECT.....Not used
Not used.....R
Not used.....C
Not used.....G
Not used.....Y
R-23D05

* How to Enter the “Service Mode ”with user remocon.

1) Set the TV Pr 91

2) Sharpness “MIN “control.

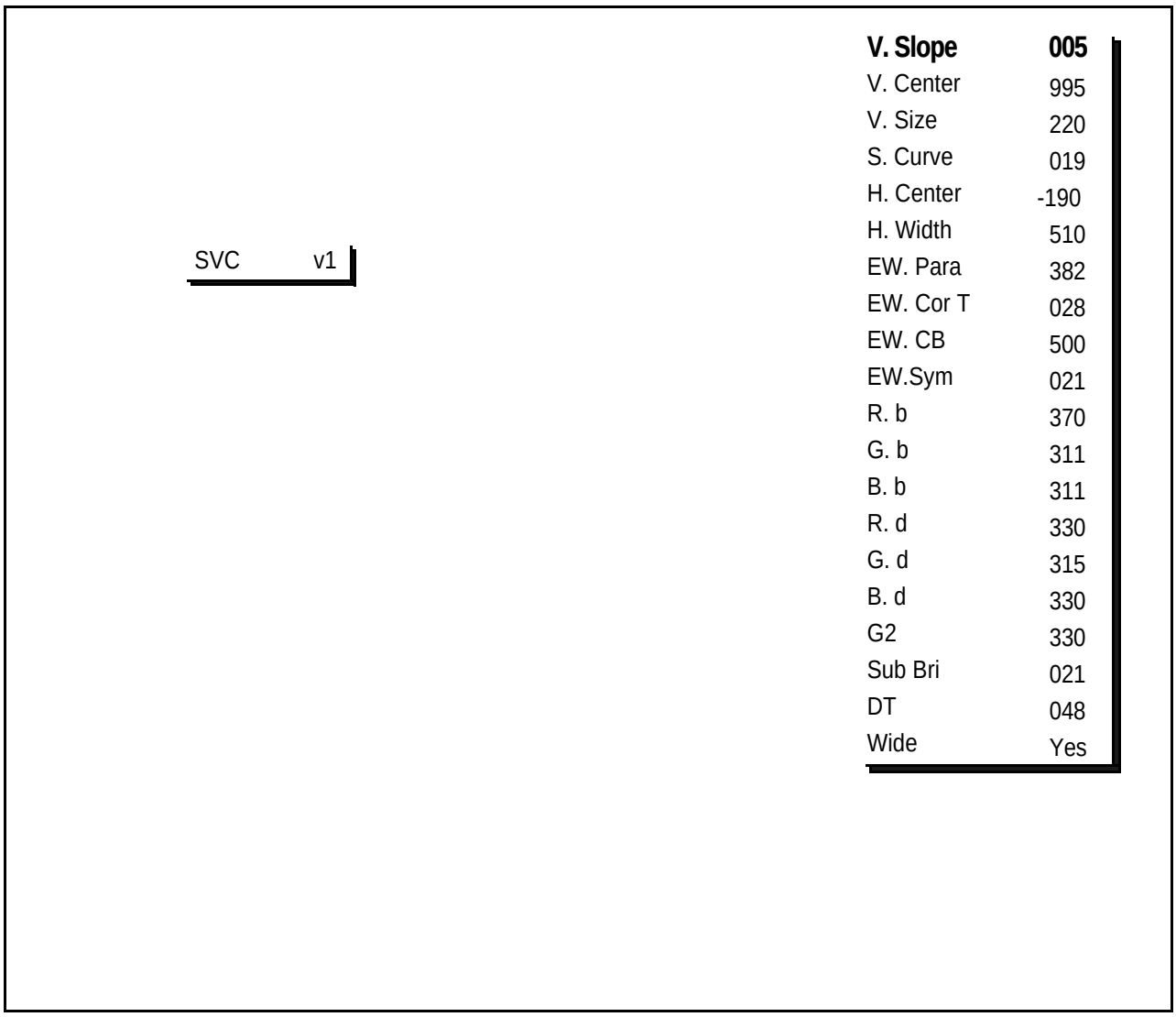
3) Push the Red, Green, Menu buttons in regular sequency within 5 seconds after setting TV power off.

4) You can see the Menu of “service mode “on the screen.

5) The PR UP/DOWN buttons on the remote controller are used to move the selection bar up or down the Menus.

6) The VOL UP/DOWN buttons on the remote controller are used to adjust levels.

7) If you want to exit from “Service Mode “then power the TV off.



- You can see the SVC Menu by OSD in TV set.

■ AFT

Standard B/G, D/K, I and L

1) Set a Signal Generator with
   - RF FREQUENCY = 38.9 MHz,
   - RF OUTPUT LEVEL = 80 ±5dBuV
   - Pattern = Color Bar
   - System = PAL-B/G
2) Connect the Signal Generator RF Output to TP2 (Tuner IF Output).
   There must be no signal input to the tuner.
3) Set the L109 to TP1(I101, #22) with DC Voltage to 2.5V ±0.1V

■ AGC

1) Set a Pattern Generator with RF LEVEL 60 ±3dBuV, RF Frequency 210. 25MHz(10CH), Pattern Color Bar.
2) Connect a OSCILLOSCOPE PROBE to P101 (TUNER AGC INPUT).
3) Set the RBOI to P101(Tuner AGC Input) with DC Voltage to 2.8V ± 0.2V

■ SCREEN (G2)

1) Set a Pattern Generator with - RF Frequency : 210.25MHz (10CH)
   - Pattern : RETMA
2) Select the "G2" in Menu
3) And a Horizontal Line will appear on the screen.
4) Adjust the SCREEN VOLUME on FBT barely to see the Horizontal Line.
5) Press the PR UP/DOWN keys to finish the SCREEN adjustment.

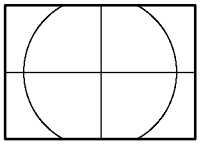
■ FOCUS

1) Apply a RETMA PATTERN signal.
2) Adjust the FOCUS VOLUME on FBT to obtain optimal resolution.

■ GEOMETRY

1. VERTICAL SLOPE (Fixed : Adjust if need be)

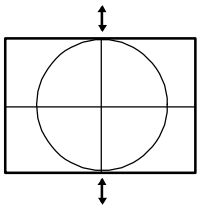
1) Apply a RETMA PATTERN Signal.
2) Set the TV to Normal I mode.
3) Adjust the higher semicircle and the lower semicircle to be the same, with the V.Slope by volume Up/Down keys.



2. VERTICAL CENTER

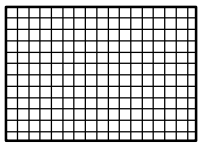
1) Apply a RETMA PATTERN Signal.
2) Set the TV to Normal I mode.
3) Adjust the center of the picture with the V.Center by volume Up/Down keys.

3. VERTICAL SIZE



* The VERTICAL CENTER adjustment has to be done in advance.
1) Apply a RETMA PATTERN Signal.
2) Set the TV to Normal I mode.
3) Adjust the VERTICAL SIZE of the picture with the select V.size by volume UP/DOWN keys.

4. VERTICAL S-CORRECTION (Fixed : Adjust if need be)



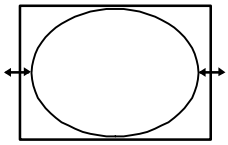
1) Apply a CROSSHATCH PATTERN Signal.
2) Adjust the S-CORRECTION to obtain the same distance between horizontal lines with the S.Curve by volume UP/DOWN keys.

5. HORIZONTAL CENTER

1) Apply a RETMA PATTERN Signal.
2) Adjust picture centering with the select H.Center by volume UP/DOWN keys.

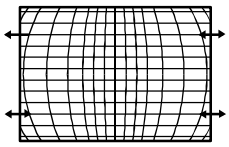
■ EW

1. WIDTH



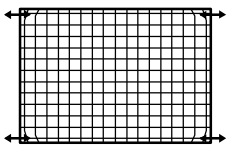
1) Apply a RETMA PATTERN Signal.
2) Adjust the horizontal width to make a perfect circle with the select H.Width by volume UP/DOWN keys.

2. PARA



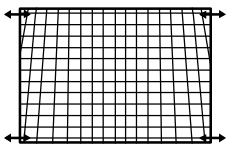
1) Apply a CROSSHATCH PATTERN Signal.
2) Adjust the vertical line to straight with the select E.W Para by volume UP/DOWN keys.

3. CORNER (Fixed : Adjust if need be)



1) Apply a CROSSHATCH PATTERN Signal.
2) Adjust the vertical line to straight with the select EW.Cor T by volume UP/DOWN keys.

4. SYMMETRY (Fixed : Adjust if need be)



1) Apply a CROSSHATCH PATTERN Signal.
2) Adjust the symmetrical balance to be suitable with the select EW Sym by volume UP/DOWN keys.

■ WHITE BALANCE

1. RGB Reference R

2. Beam Reference LOW (288, 301 : 10Cd/ m^2)
   HIGH (288, 301 : 10Cd/ m^2)

3. Adjust G, B Gain with select Menu G,B of BIAS, DRIVE of select Menu so that R, G, B Bars are on the center position of the analog meter. If R Analog meter is not on center, control the Brightness +/- of user Remocon so as R Analog meter to be on the center position.

■ SUB BRIGHT

1. Pattern : Retma

2. Adjust the SUB BRIGHT with the select Sub Bri by volume UP/DOWN keys.
   so that only H-Center parts of picture can be seen.

■ DOUBLE TEXT CENTER

1. Pattern : Pattern RED

2. Select Menu

3. Select DT in SVC menu time to see the Double Text Picture.
   (Left : RF Picture, Right : Text Picture)

4. Change the Double Text control keys volume UP/DOWN keys so that the left edge of text picture concur with the right edge of RF picture.

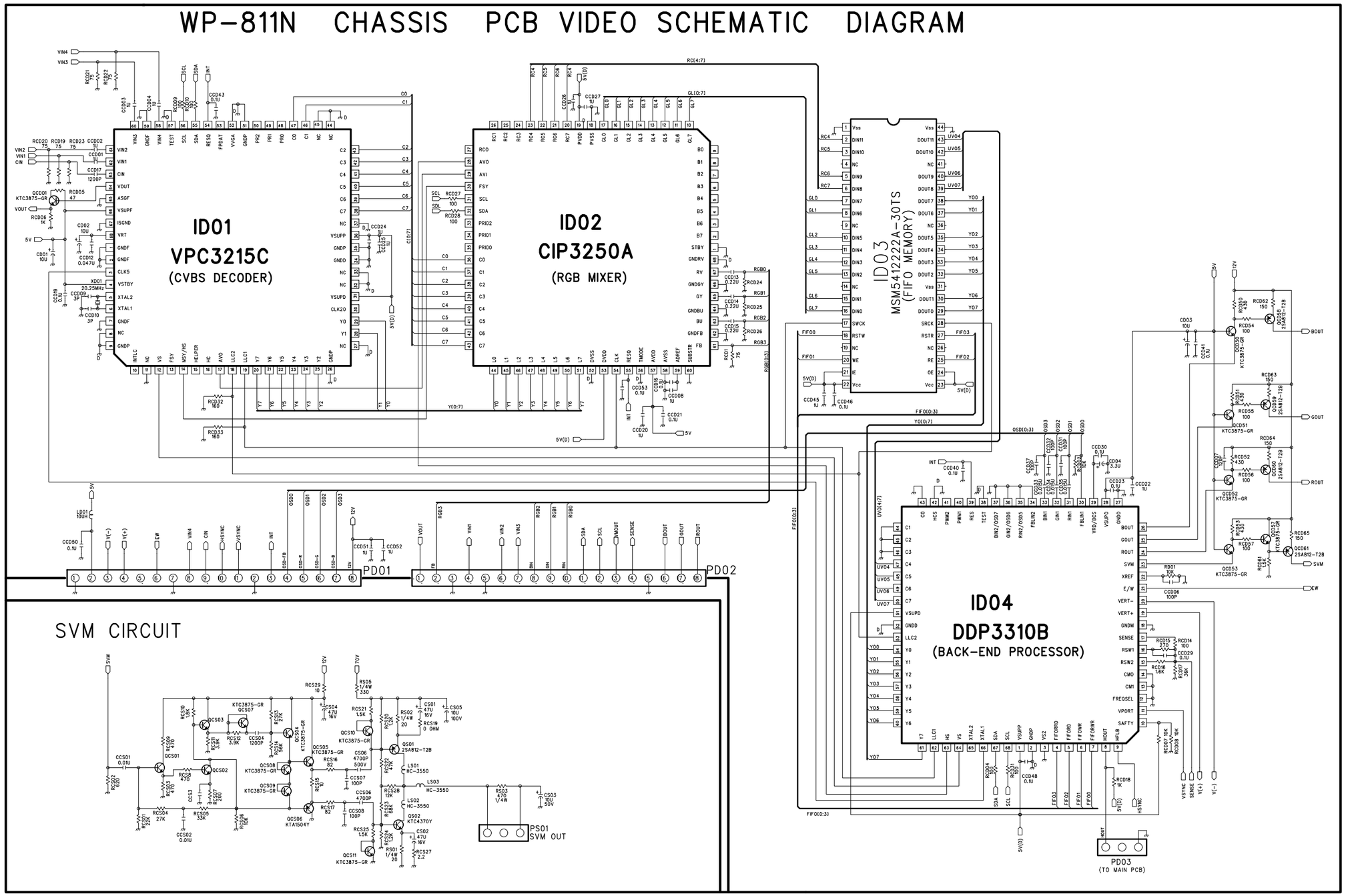
■ WIDE MODE

1. Locate the cursor on 'Wide' in SVC Menu.

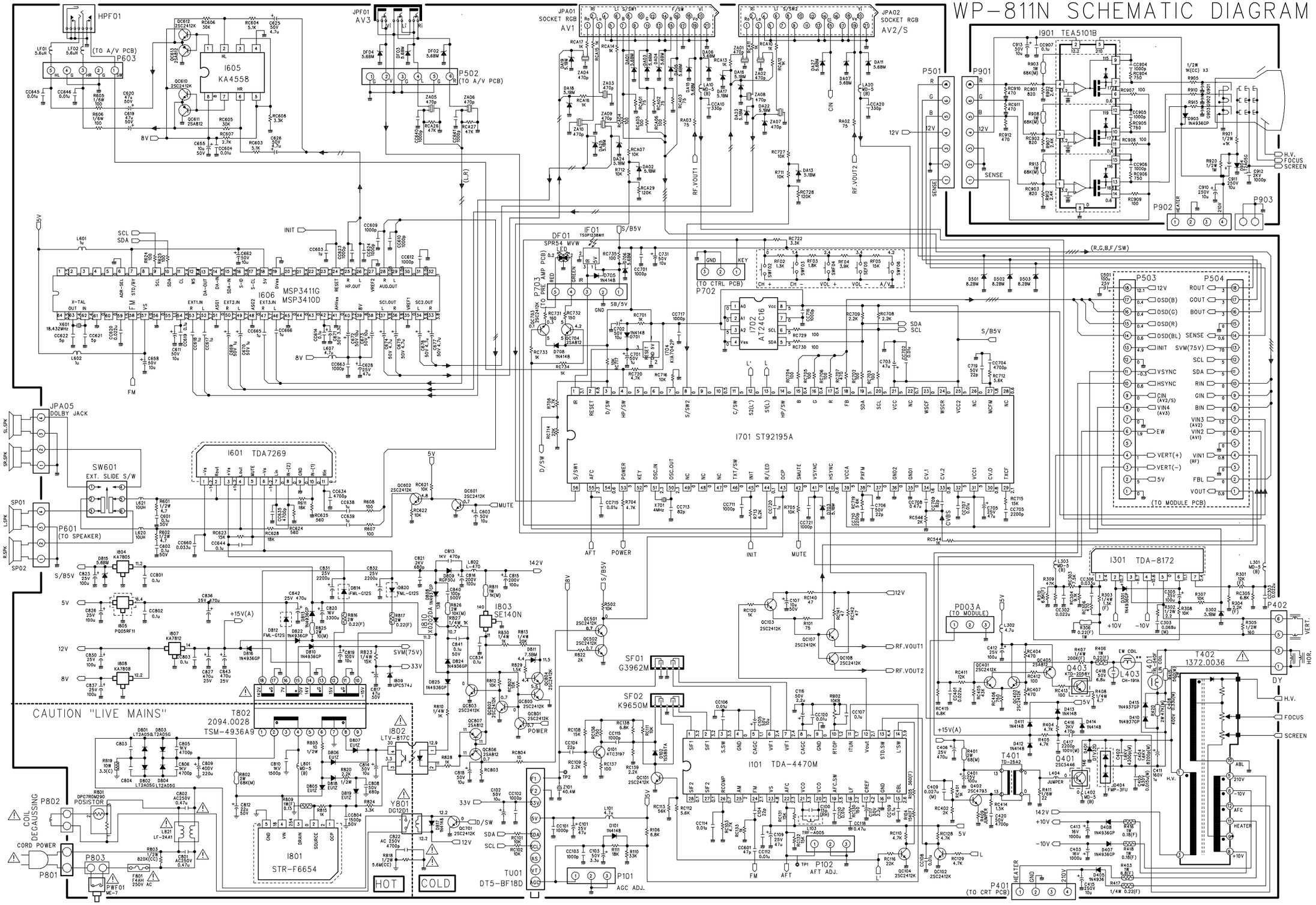
2. 'Yes' changes the display to 16:9 mode.

3. 'No' change the display to 4:3 mode.

SCHEMATIC DIAGRAM

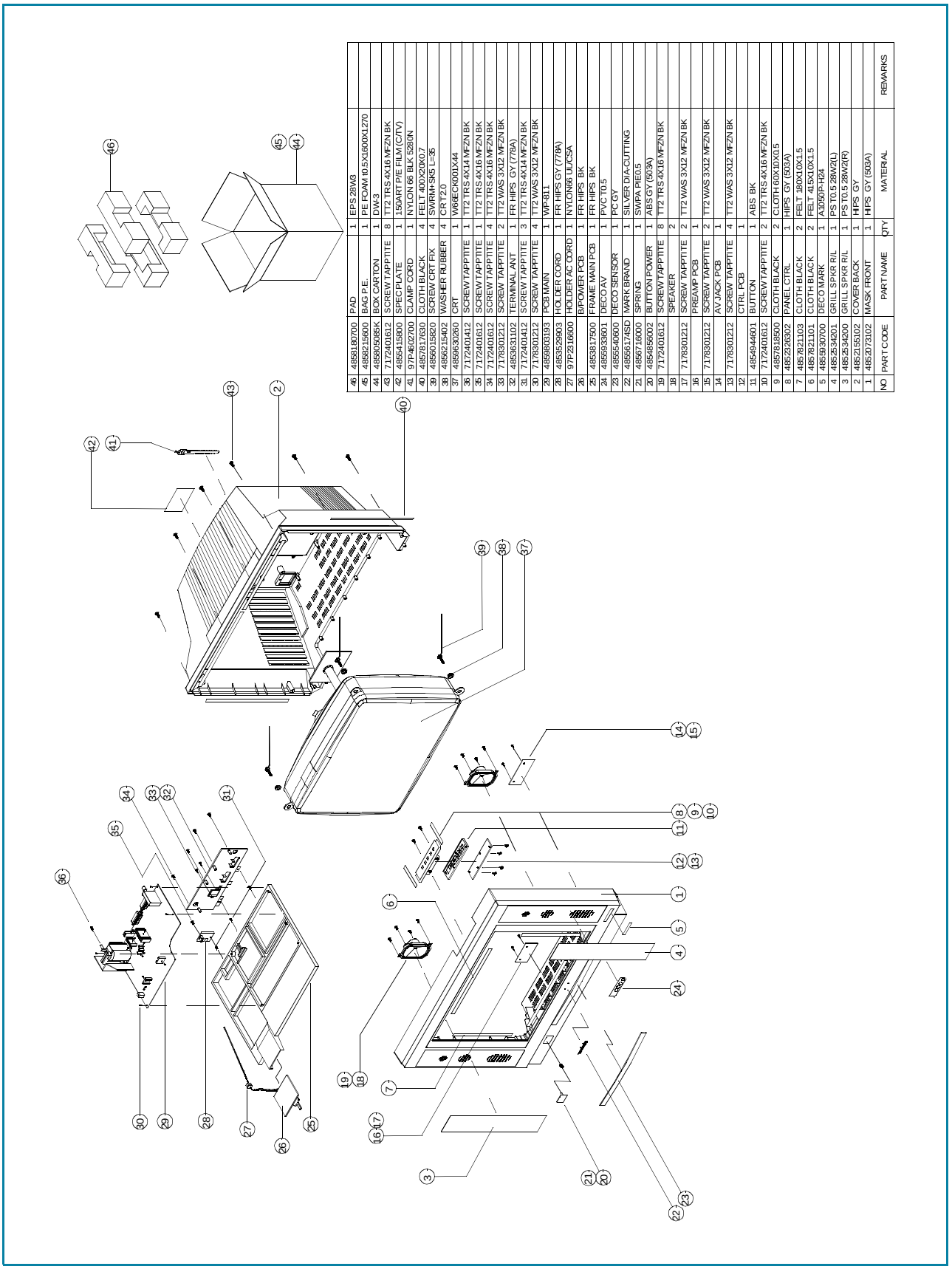


WP-811N SCHEMATIC DIAGRAM



EXPLODED VIEW

■ DTW-28W2F



NO	PART CODE	PART NAME	QTY	MATERIAL	REMARKS
46	4858180700	PAD	1	EPS 28W3	
45	4858215600	BAG P.E.	1	PE FOAM 60.5X1600X1270	
44	4858050085K	BOX CARTON	1	DW-3	
43	7172401612	SCREW TAPPTITE	8	TT2 TRS 4X16 MFZN BK	
42	4855415800	SPEC PLATE	1	150ART P/E FILM (C/TV)	
41	97P4602700	CLAMP CORD	1	NYLON 66 BLK 5280N	
40	4857817630	CLOTH BLACK	4	FELT 400X20X0.7	
39	4856019820	SCREW CRT FIX	4	SWRM+SKS L=35	
38	4856215402	WASHER RUBBER	4	CRT 2.0	
37	4859630260	CRT	1	W68ECK001X44	
36	7172401412	SCREW TAPPTITE	1	TT2 TRS 4X14 MFZN BK	
35	7172401612	SCREW TAPPTITE	1	TT2 TRS 4X16 MFZN BK	
34	7172401612	SCREW TAPPTITE	4	TT2 TRS 4X16 MFZN BK	
33	7178301212	SCREW TAPPTITE	2	TT2 WAS 3X12 MFZN BK	
32	4853631102	TERMINAL ANT	1	FR HIPS GY (778A)	
31	7172401412	SCREW TAPPTITE	3	TT2 TRS 4X14 MFZN BK	
30	7178301212	SCREW TAPPTITE	4	TT2 WAS 3X12 MFZN BK	
29	4859803193	PCB MAIN	1	WP-811	
28	4853529903	HOLDER CORD	1	FR HIPS GY (778A)	
27	97P2316600	HOLDER AC CORD	1	NYLON66 UL/CSA	
26		B/POWER PCB	1	FR HIPS BK	
25	4853817500	FRAME MAIN PCB	1	FR HIPS BK	
24	4855933601	DECO AV	1	PVC T0.5	
23	4855540600	DECO SENSOR	1	PC GY	
22	4855617ASD	MARK BRAND	1	SILVER DIA-CUTTING	
21	4856716000	SPRING	1	SWPA PIE0.5	
20	4854856002	BUTTON POWER	1	ABS GY (503A)	
19	7172401612	SCREW TAPPTITE	8	TT2 TRS 4X16 MFZN BK	
18		SPEAKER	2		
17	7178301212	SCREW TAPPTITE	2	TT2 WAS 3X12 MFZN BK	
16		PREAMP PCB	1		
15	7178301212	SCREW TAPPTITE	2	TT2 WAS 3X12 MFZN BK	
14		AV JACK PCB	1		
13	7178301212	SCREW TAPPTITE	4	TT2 WAS 3X12 MFZN BK	
12		CTRL PCB	1		
11	4854944601	BUTTON	1	ABS BK	
10	7172401612	SCREW TAPPTITE	2	TT2 TRS 4X16 MFZN BK	
9	4857818500	CLOTH BLACK	2	CLOTH 60X10X0.5	
8	4852326302	PANEL CTRL	1	HIPS GY (503A)	
7	4857821103	CLOTH BLACK	2	FELT 180X10X1.5	
6	4857821101	CLOTH BLACK	2	FELT 415X10X1.5	
5	4859930700	DECO MARK	1	AU050P-H24	
4	4852534201	GRILL SPKR R/L	1	PS T0.5 28W2(L)	
3	4852534200	GRILL SPKR R/L	1	PS T0.5 28W2(R)	
2	4852155102	COVER BACK	1	HIPS GY	
1	4852073102	MASK FRONT	1	HIPS GY (503A)	

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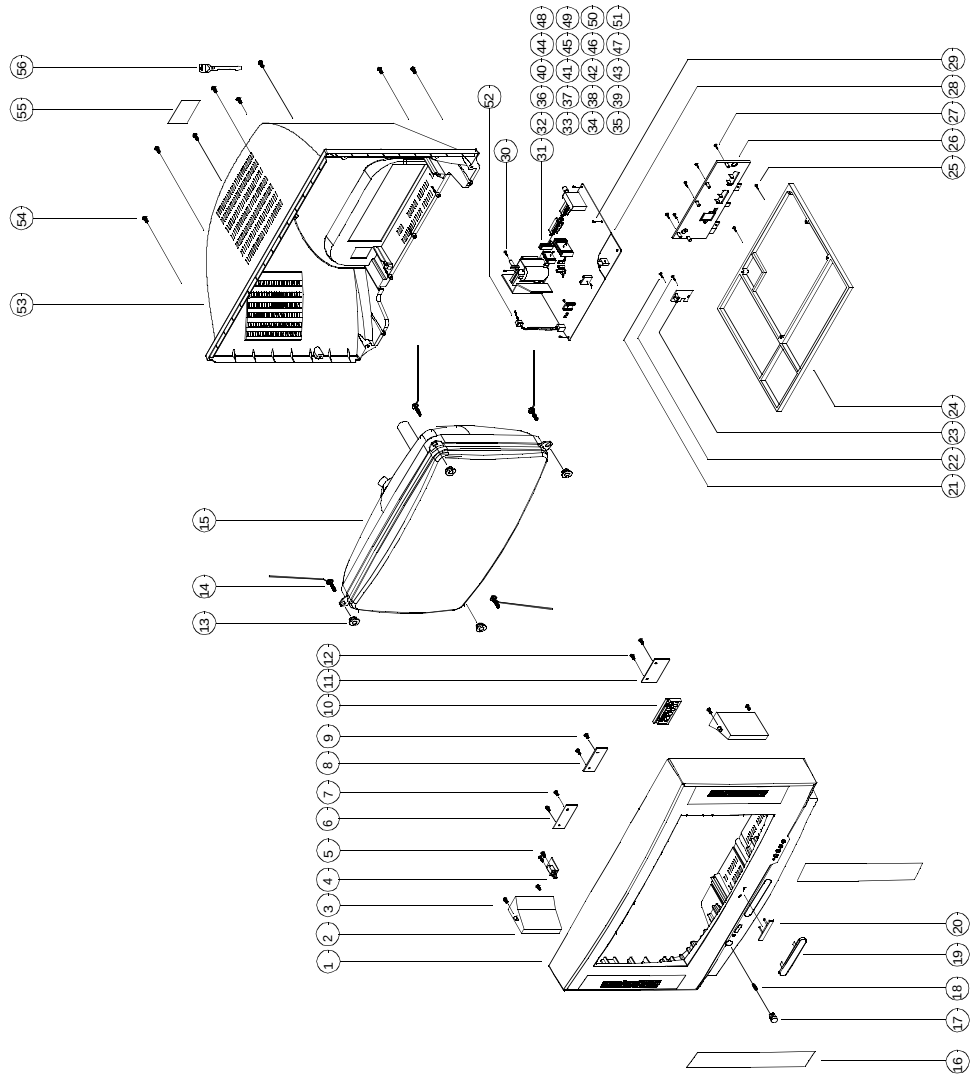
56	97P46027700	CLAMP CORD	1	NYLON 66 BLK 5/280N	
55	4855415800	SPEC PLATE	1	150ART P/E FILM(C/TV)	
54	7172401612	SCREW TAPPTITE	8	TT2 TRS 4X16 MFZN BK	1+52
53	4852154602	COVER BACK	1	FR HIPS GY	
52	97P23166600	HOLDER AC CORD	1	NYLON 66 UL/CSA	
51	7174300811	SCREW TAPPTITE	1	TT2 RND 3X8 MFZN	
50	4857027800	HEAT SINK	1	AL EX	
49	7174301011	SCREW TAPPTITE	1	TT2 RND 3X10 MFZN	
48	4857026900	HEAT SINK	1	AL EX	
47	7174301011	SCREW TAPPTITE	1	TT2 RND 3X10 MFZN	
46	4857026900	HEAT SINK	1	AL EX	
45	7174301011	SCREW TAPPTITE	1	TT2 RND 3X10 MFZN	
44	4857026900	HEAT SINK	1	AL EX	
43	7174300811	SCREW TAPPTITE	1	TT2 RND 3X8 MFZN	
42	4857028205	HEAT SINK	1	AL EX BK	
41	7174300811	SCREW TAPPTITE	1	TT2 RND 3X8 MFZN	
40	4857025403	HEAT SINK	1	AL05QP-H24 T=2	
39	7174300811	SCREW TAPPTITE	1	TT2 RND 3X8 MFZN	
38	4857031000	HEAT SINK	1	AL EX	
37	7174300811	SCREW TAPPTITE	1	TT2 RND 3X8 MFZN	
36	4857027910	HEAT SINK	1	AL EX	
35	7174300811	SCREW TAPPTITE	1	TT2 RND 3X8 MFZN	
34	4857027710	HEAT SINK	1	AL EX	
33	7174300811	SCREW TAPPTITE	1	TT2 RND 3X8 MFZN	
32	4857027534	HEAT SINK	1	AL EXBK	
31	4857415001	CLIP FUSE	2	PFC5000-0702	
30	7128301011	SCREW TAPPTITE	1	T2S WAS 3X10 MFZN	28/+52
29	7128301011	SCREW TAPPTITE	4	T2S WAS 3X10 MFZN	24+28
28		CHASSIS	1	WP-811	
27	7172401212	SCREW TAPPTITE	5	TT2 TRS 4X12 MFZNCK	26+52
26	4853631002	TERM ANT	1	FR HIPS GY	
25	7172401212	SCREW TAPPTITE	2	TT2 TRS 4X12 MFZNCK	24+26
24	4853817400	FRAME M/PCB	1	FR HIPS BK	
23	4853529903	HOLDER CORD	1	FR HIPS GY(778A)	
22	7172401212	SCREW TAPPTITE	1	TT2 TRS 4X12 MFZNCK	23+24
21	7172401212	SCREW TAPPTITE	1	TT2 TRS 4X12 MFZNCK	23+52
20	4855617415D	MARK BRAND	1	SILVER DIA-CUTTING	
19	4855526502	DECO SENSOR	1	PC GY	
18	4856716000	SPRING	1	SWPA PIE 0.5	
17	4854857903	BUTTON POWER	1	HIPS GY	
16	4852530501	GRILL	2	PS SHEET T=0.4	
15		CRT	1	PHILIPS 28"WIDE	
14	4856015820	SCREW CRT FIX	4	SWRM+SK5 L=35	1+15
13	4856215402	WASHER RUBBER	4	CR T2.0	
12	7128301011	SCREW TAPPTITE	2	T2S WAS 3X10 MFZN	1+10+11
11		SUB-PCB	1	Button	
10	4854929903	BUTTON	1	HIPS GY	
9	7128301011	SCREW TAPPTITE	2	T2S WAS 3X10 MFZN	1+8
8		SUB-PCB	1	PRE-AMP	
7	7128301011	SCREW TAPPTITE	2	T2S WAS 3X10 MFZN	1+6
6		SUB-PCB	1	A/V Jack	
5	7128301011	SCREW TAPPTITE	2	T2S WAS 3X10 MFZN	1+4
4		SUB-PCB	1	Switch	
3	4856013600	SCREW SPKR FIX	4	SWRM + SECC	1+2
2		SPKR SYSTEM	2		
1	4852072703	MASK FRONT	1	HIPS GY	



PRINTED CIRCUIT BOARD

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SERVICE PARTS LIST

Caution Ⓡ is a recommendable part for stock.

⚠ is safety component, so it must be used the same component.

LOC.	PART CODE	PART NAME	DESCRIPTION
ZZ100 Ⓡ	48B3822D05	TRANSMITTER REMOCON	R-22D05
ZZ110	PTACPWD228	ACCESSORY AS	DTJ-28G6F
10	4850Q00910	BATTERY	R03/NN
20	4859102620	JACK ANT	3104.308.73221
M821	4858213800	BAG INSTRUCTION	L.D.P.E T0.05X250X400
ZZ120	PTBCSHD359	COVER BACK AS	DTW-28W2F
M211	4852155102	COVER BACK	HIPS GY (778A)
M211D	4857817630	CLOTH BLACK	FELT 400X20X0.7
M541	4855415800	SPEC PLATE	150ART P/E FILM (C/TV)
ZZ130	PTPKCPD359	PACKING AS	DTW-28W2F
M681	4856812400	BAND	18MM X 3M
M801	485805085K	BOX CARTON	DW-3
M811	4858180700	PAD	EPS 28W3
M822	4858215600	BAG P.E	PE FOAM t0.5x1600x1270
ZZ131	58G0000151	COIL DEGAUSSING	DC-28SFW
ZZ132	4851902110	CRT GROUND NET	24/5/0.12-1560+4850702029
ZZ140	PTCACAD359	CABINET AS	DTW-28W2F
M201A	4857821103	CLOTH BLACK	FELT 180X10X1.5
M201B	4857821101	CLOTH BLACK	FELT 415X10X1.5
M201C	4856215402	WASHER RUBBER	CR T2.0
M201D	4856015820	SCREW CRT FIX	SWRM+SK5 L=35
M201E	7178301212	SCREW TAPPTITE	TT2 WAS 3X12 MFZN BK
M201F	7178301212	SCREW TAPPTITE	TT2 WAS 3X12 MFZN BK
M211A	7172401612	SCREW TAPPTITE	TT2 TRS 4X16 MFZN BK
M211B	7172401612	SCREW TAPPTITE	TT2 TRS 4X16 MFZN BK
M211C	7172401612	SCREW TAPPTITE	TT2 TRS 4X16 MFZN BK
M231	4852326302	PANEL CTRL	HIPS GY (503A)
M231A	7172401612	SCREW TAPPTITE	TT2 TRS 4X16 MFZN BK
M231B	4857818500	CLOTH BLACK	CLOTH 60X10X0.5
M352	97P4602700	CLAMP CORD	NYLON 66 BLK 5280N
M481	4854856002	BUTTON POWER	ABS GY (503A)
M481A	4856716000	SPRING	SWPA PIE0.5
M491	4854944601	BUTTON	ABS BK
M491A	7178301212	SCREW TAPPTITE	TT2 WAS 3X12 MFZN BK
M511	4855540600	DECO SENSOR	PC GY
M561	48556174SD	MARK BRAND	SILVER DIA-CUTTING
M562	4855930700	DECO MARK	A1050P-H24
M681	4856812001	TIE CABLE	NYLON66 DA100
M682	4856816300	CLAMP WIRE	NYLON 6 (V0)
P405	4850704N07	CONNECTOR	SE100J+172792+USW=500
SP01A	7172401612	SCREW TAPPTITE	TT2 TRS 4X16 MFZN BK
SP02A	7172401612	SCREW TAPPTITE	TT2 TRS 4X16 MFZN BK
V901 Ⓡ⚠	4859630260	CRT	W66ECK001X44
ZZ200Ⓡ	PTFMSJD359	MASK FRONT AS	DTW-28W2F
M201	4852073102	MASK FRONT	HIPS GY (503A)
M251	4852534202	GRILL SPKR R	PS T0.5 28W2 (R)
M252	4852534203	GRILL SPKR L	PS T0.5 28W2 (L)
M591	4855933601	DECO AV	PVC T0.5
ZZ202	PTU1MSD359	PCB UNION-1 MANUAL AS	DTW-28W2F
DF01	DSD50RH51B	LED	SD50-RH51BGRW
HPF01	4859105240	JACK PHONO	LGT1516-0100

LOC.	PART CODE	PART NAME	DESCRIPTION
IF01	1SR5HP----	IC PREAMP	SR-5HP
JPF01	4859105450	JACK PIN BOARD	YSC03P-4120-9S
P502A	4850706S02	CONNECTOR	YH025-06+YST025+ULW=400
P603A	4850704S04	CONNECTOR	YH025-04+YST025+ULW=400
P702A	4850703S21	CONNECTOR	YH025-03+YST025+ULW=600
P703A	4850705S04	CONNECTOR	YH025-05+YST025+ULW=400
P803A	4850702S09	CONNECTOR	BL102NG+MXH40058-02=300
SWF01	5S40202142	SW POWER PUSH	ME-7 (70063-072)
ZZ200	PTU1JRD359	PCB UNION RADIAL AS	DTW-28W2F
SWF02	5S50101Z90	SW TACT	SKHV10910A
SWF03	5S50101Z90	SW TACT	SKHV10910A
SWF04	5S50101Z90	SW TACT	SKHV10910A
SWF05	5S50101Z90	SW TACT	SKHV10910A
SWF06	5S50101Z90	SW TACT	SKHV10910A
ZZ200	PTU1JAD359	PCB UNION AXIAL AS	DTW-28W2F
CF01	CCZF1H103Z	C CERA	50V F 0.01MF Z
CF02	CCZF1H103Z	C CERA	50V F 0.01MF Z
DF02	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM(TAPPING)
DF03	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM(TAPPING)
DF04	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM(TAPPING)
JF01	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING
JF02	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING
JF04	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING
LF01	5CPZ569K02	COIL PEAKING	5.6UH K (AXIAL 3.5MM)
LF02	5CPZ569K02	COIL PEAKING	5.6UH K (AXIAL 3.5MM)
RF02	RD-4Z132J-	R CARBON FILM	1/4 1.3K OHM J
RF03	RD-4Z182J-	R CARBON FILM	1/4 1.8K OHM J
RF04	RD-4Z392J-	R CARBON FILM	1/4 3.9K OHM J
RF05	RD-4Z153J-	R CARBON FILM	1/4 15K OHM J
ZZ220Ⓡ	PTSPPWD359	SPEAKER AS	DTW-28W2F
P601A	4850704S30	CONNECTOR	YH025-04+35098+ULW=700
ZZ290Ⓡ	PTMPMSD359	PCB MAIN MANUAL AS	DTW-28W2F
C402	CMYH3C432J	C MYLAR	1.6KV BUP 4300PF J
C404	CMYH3C822J	C MYLAR	1.6KV BUP 8200PF J
C405	CMYE2J153J	C MYLAR	630V PU 0.015MF J
C408	CMYE2G334J	C MYLAR	400V PU 0.33MF J
C418	CEYD1H689W	C ELECTRO	50V RHD 6.8MF (16X35.5)
C801	CL1JB3474K	C LINE ACROSS	AC250V 0.47MF U/C/SNDF/SV
C802	CL1JB3474K	C LINE ACROSS	AC250V 0.47MF U/C/SNDF/SV
C809	CEYN2G181P	C ELECTRO	400V LHS 180MF (25X35)
C810	CBYB3D152K	C CERA SEMI	2KV BL(N) 1500PF K
C815	CEYF2D101V	C ELECTRO	200V RSS 100MF (16X31.5)
C816	CEYF2D101V	C ELECTRO	200V RSS 100MF (16X31.5)

LOC.	PART CODE	PART NAME	DESCRIPTION
C822	CH1AFE472M	C CERA AC	4KV 4700PF M KX DE1610
D401	DDTV32F---	DIODE	DTV32F
D809	DRGP30J---	DIODE	RGP30J
D812	PTP2SW6900	HEAT SINK ASS`Y	DFMLG12S-- + 7174301011
1	DFMLG12S--	DIODE	FML-G12S
0000A	4857026900	HEAT SINK	AL EX
0000B	7174301011	SCREW TAPPTITE	TT2 RND 3X10 MFZN
D814	PTP2SW6900	HEAT SINK ASS`Y	DFMLG12S-- + 7174301011
1	DFMLG12S--	DIODE	FML-G12S
0000A	4857026900	HEAT SINK	AL EX
0000B	7174301011	SCREW TAPPTITE	TT2 RND 3X10 MFZN
D820	PTP2SW6900	HEAT SINK ASS`Y	DFMLG12S-- + 7174301011
1 Ⓡ	DFMLG12S--	DIODE	FML-G12S
0000A	4857026900	HEAT SINK	AL EX
0000B	7174301011	SCREW TAPPTITE	TT2 RND 3X10 MFZN
F801	5FSCB4022R	FUSE CERA	SEMKO F4AH 4A 250V MF51
G901	4SG0D00103	SPARK GAP	S-23 900V-1.5KV
G902	4SG0D00103	SPARK GAP	S-23 900V-1.5KV
G903	4SG0D00103	SPARK GAP	S-23 900V-1.5KV
I101	1TDA4470M-	IC IF	TDA4470-M
I301	PTB2SW8205	HEAT SINK ASS`Y	1TDA8172-- + 7174300811
I301 Ⓡ	1TDA8172--	IC V-OUT	TDA8172
I301A	4857028205	HEAT SINK	AL EX BK
I301B	7174300811	SCREW TAPPTITE	TT2 RND 3X8 MFZN
I601	PTA2SW7534	HEAT SINK ASS`Y	1TDA7269-- + 7174300811
I601 Ⓡ	1TDA7269--	IC AUDIO	TDA7269
I601A	4857027534	HEAT SINK	AL EXBK
I601B	7174300811	SCREW TAPPTITE	TT2 RND 3X8 MFZN
I605 Ⓡ	1KA4558---	IC AMP	KA4558
I606 Ⓡ	1MSP3410C5	IC AUDIO	MSP3410-PP-C5
I701 Ⓡ	1ST195EPM-	IC MICOM OTP	ST92T195B1/EPM
I702	1AT24C16PC	IC	AT24C16-10PC
I801	PTA2SW7910	HEAT SINK ASS`Y	1STRF6654- + 7171300811
I801 Ⓡ⚠	1STRF6654-	IC SMPS	STR-F6654
I801A	4857027910	HEAT SINK	AL EX
I801B	7174300811	SCREW TAPPTITE	TT2 RND 3X8 MFZN
I802	1LTV817C--	IC PHOTO COUPLER	LTV-817C
I803 Ⓡ⚠	1SE140N---	IC AMP	SE140N
I804 Ⓡ	1KA7805---	IC REGULATOR	KA7805
I805	PTA2SW7710	HEAT SINK ASS`Y	1K78R05--- + 7174300811
I805	1K78R05---	IC REGULATOR	KIA78R05PI
I805A	4857027710	HEAT SINK	AL EX
I805B	7174300811	SCREW TAPPTITE	TT2 RND 3X8 MFZN
I807 Ⓡ	1MC7812---	IC REGULATOR	MC7812 12V 1A (KA7812)
I808 Ⓡ	1KA7808---	IC REGULATOR	KA7808
I810	TX0202DA--	THYRISTOR	X0202DA1BA2
I901	PTB2SW5403	HEAT SINK ASS`Y	1TEA5101B- + 7174300811
I901 Ⓡ	1TEA5101B-	IC VIDEO AMP	TEA5101B
I901A	4857025403	HEAT SINK	AL050P-H24 T=2
I901B	7174300811	SCREW TAPPTITE	TT2 RND 3X8 MFZN
JPA01	4859200401	SOCKET RGB	YRS21-R1
JPA02	4859200401	SOCKET RGB	YRS21-R1
JPA05	4859100680	JACK AUDIO TERMINAL	SI-T55220P 4P

LOC.	PART CODE	PART NAME	DESCRIPTION
L103	5.80E+42	COIL AFT	TRF-A005
L401	58H0000054	COIL H-LINEARITY	TRL-040F
L403	58C0000118	COIL CHOKE	CH-191A
L821	5PLF24A1--	FILTER LINE	LF-24A1
M351	4853529903	HOLDER CORD	FR HIPS GY(778A)
M351A	7172401412	SCREW TAPPTITE	TT2 TRS 4X14 MFZN BK
M361	4853631102	TERMINAL ANT	FR HIPS GY (778A)
M361A	7178301212	SCREW TAPPTITE	TT2 WAS 3X12 MFZN BK
M361B	7172401412	SCREW TAPPTITE	TT2 TRS 4X14 MFZN BK
M361C	7172401412	SCREW TAPPTITE	TT2 TRS 4X14 MFZN BK
M381	4853817500	FRAME MAIN PCB	FR HIPS BK
M381A	7178301212	SCREW TAPPTITE	TT2 WAS 3X12 MFZN BK
M951B	97P2316600	HOLDER AC CORD	NYLON66 UL/CSA
P401A	4850704S04	CONNECTOR	YH025-04+YST025+ULW=400
P501A	4850707S02	CONNECTOR	YH025-07+YST025+ULW=400
P503	4859281320	CONN WAFER	TAC-L18X-A1
P504	4859281320	CONN WAFER	TAC-L18X-A1
P801	4859242220	CONN WAFER	YFW800-02
P802	4859242220	CONN WAFER	YFW800-02
P803	4859242220	CONN WAFER	YFW800-02
P903	4859238620	CONN WAFER	YPW500-02
PD03A	4850703S29	CONNECTOR	YH025-03+YST025+USW=300
PWC1	PTWBSW7410	CORD POWER ASS`Y	906111+HOUS-ING+TUBE+17700
PW000	4859906111	CORD POWER	M5206+H03VVH2-F=2250
PW001	4857417700	TERM CLAMP	PT-01-T3
Q401	PTB3SW1000	HEAT SINK ASS`Y	DDMU32F5-- + 7174300811
D404	DDMV32F5--	DIODE	DMV32F5
D404A	7174300811	SCREW TAPPTITE	TT2 RND 3X8 MFZN
Q401	T2SC5446--	TR	2SC5446(AS)
Q401A	4857031000	HEAT SINK	AL EX
Q401BⓇ⚠	7174300811	SCREW TAPPTITE	TT2 RND 3X8 MFZN
Q402	T2SC2238--	TR	2SC2238
Q403	PTQ2SW7800	HEAT SINK ASS`Y	TKTD2058Y-+ 7174300811
Q403 Ⓡ⚠	TKTD2058Y-	TR	KTD 2058-Y
Q403A	4857027800	HEAT SINK	AL EX
Q403B	7174300811	SCREW TAPPTITE	TT2 RND 3X8 MFZN
R306	RW01Y228F-	R WIRE WOUND	1W 0.22 OHM F
R417	RF-4Y228K-	R FUSIBLE	1/4 0.22 OHM K
R801	DPC7R0M290	POSISTOR	2322 662 96709
R819 Ⓡ⚠	RX10T339J-	R CEMENT	10W 3.3 OHM J TRIPOD
SCT1	4859302930	SOCKET CRT	ISHS-09S
SF01	5PG3962M--	FILTER SAW	G 3962-M
SF02	5PK9650M--	FILTER SAW	K9650M
SW601	5S30202033	SW SLIDE	KSA-2273S
T401 Ⓡ⚠	50D25A1---	TRANS DRIVE	TD-25A1
T402 Ⓡ⚠	50H0000200	FBT	1372.0036
T801 Ⓡ	50M4936A9-	TRANS SMPS	TSM-4936A9
TU01 Ⓡ	4859719930	TUNER VARACTOR	DT5-BF18D
W101	4851900130	GROUND TUNER AS	DS-W1015-S

SERVICE PARTS LIST

LOC.	PART CODE	PART NAME	DESCRIPTION
X601	5XE18R432E	CRYSTAL QUARTZ	HC-49/U 18.43200MHZ 30PPM
Y801	5SC0101003	SW RELAY	DG12D1-0(M)-II 1C-1P
Z101	5PMKT40MA-	FILTER CERA	MKT40MA100P
ZZ200	PTMPJ2D359	PCB CHIP MOUNT B AS	DTW-28W2F
CC101	HCBK102KCA	C CHIP CERA	50V X7R 1000PF K 2012
CC102	HCBK102KCA	C CHIP CERA	50V X7R 1000PF K 2012
CC103	HCBK102KCA	C CHIP CERA	50V X7R 1000PF K 2012
CC104	HCQK220JCA	C CHIP CERA	50V CH 22PF J 2012
CC106	HCFK103ZCA	C CHIP CERA	50V Y5V 0.01MF Z 2012
CC107	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012
CC108	HCFK103ZCA	C CHIP CERA	50V Y5V 0.01MF Z 2012
CC109	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012
CC110	HCFK103ZCA	C CHIP CERA	50V Y5V 0.01MF Z 2012
CC112	HCFK103ZCA	C CHIP CERA	50V Y5V 0.01MF Z 2012
CC114	HCFK103ZCA	C CHIP CERA	50V Y5V 0.01MF Z 2012
CC115	HCBK102KCA	C CHIP CERA	50V X7R 1000PF K 2012
CC118	HCFK474ZCA	C CHIP CERA	Y5V 50V 0.47MF Z 2012
CC120	HCFK103ZCA	C CHIP CERA	50V Y5V 0.01MF Z 2012
CC302	HCBK223KCA	C CHIP CERA	50V X7R 0.022MF K 2012
CC303	HCBK223KCA	C CHIP CERA	50V X7R 0.022MF K 2012
CC306	HCBK333KCA	C CHIP CERA	50V X7R 0.033MF K 2012
CC401	HCBK223KCA	C CHIP CERA	50V X7R 0.022MF K 2012
CC601	HCQK470JCA	C CHIP CERA	50V CH 47PF J 2012
CC603	HCFK105ZCA	C CHIP CERA	50V Y5V 1MF Z 2012
CC604	HCFK103ZCA	C CHIP CERA	50V Y5V 0.01MF Z 2012
CC609	HCBK102KCA	C CHIP CERA	50V X7R 1000PF K 2012
CC610	HCBK102KCA	C CHIP CERA	50V X7R 1000PF K 2012
CC612	HCBK102KCA	C CHIP CERA	50V X7R 1000PF K 2012
CC614	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012
CC617	HCFK105ZCA	C CHIP CERA	50V Y5V 1MF Z 2012
CC618	HCFK105ZCA	C CHIP CERA	50V Y5V 1MF Z 2012
CC619	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012
CC620	HCBK223KCA	C CHIP CERA	50V X7R 0.022MF K 2012
CC621	HCQK509DCA	C CHIP CERA	50V CH 5PF D 2012
CC622	HCQK509DCA	C CHIP CERA	50V CH 5PF D 2012
CC623	HCBK102KCA	C CHIP CERA	50V X7R 1000PF K 2012
CC624	HCBK102KCA	C CHIP CERA	50V X7R 1000PF K 2012
CC634	HCBK472KCA	C CHIP CERA	50V X7R 4700PF K 2012
CC635	HCBK472KCA	C CHIP CERA	50V X7R 4700PF K 2012
CC638	HCFK105ZCA	C CHIP CERA	50V Y5V 1MF Z 2012
CC639	HCFK105ZCA	C CHIP CERA	50V Y5V 1MF Z 2012
CC640	HCBK102KCA	C CHIP CERA	50V X7R 1000PF K 2012
CC641	HCBK102KCA	C CHIP CERA	50V X7R 1000PF K 2012
CC644	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012
CC645	HCFK103ZCA	C CHIP CERA	50V Y5V 0.01MF Z 2012
CC646	HCFK103ZCA	C CHIP CERA	50V Y5V 0.01MF Z 2012
CC660	HCBK333KCA	C CHIP CERA	50V X7R 0.033MF K 2012
CC663	HCBK102KCA	C CHIP CERA	50V X7R 1000PF K 2012
CC665	HCFK105ZCA	C CHIP CERA	50V Y5V 1MF Z 2012
CC666	HCFK105ZCA	C CHIP CERA	50V Y5V 1MF Z 2012
CC701	HCBK102KCA	C CHIP CERA	50V X7R 1000PF K 2012

LOC.	PART CODE	PART NAME	DESCRIPTION
CC702	HCFK103ZCA	C CHIP CERA	50V Y5V 0.01MF Z 2012
CC704	HCBK472KCA	C CHIP CERA	50V X7R 4700PF K 2012
CC705	HCBK222KCA	C CHIP CERA	50V X7R 2200PF K 2012
CC707	HCFK103ZCA	C CHIP CERA	50V Y5V 0.01MF Z 2012
CC708	HCFK474ZCA	C CHIP CERA	Y5V 50V 0.47MF Z 2012
CC709	HCQK820JCA	C CHIP CERA	50V CH 82PF J 2012
CC710	HCBK222KCA	C CHIP CERA	50V X7R 2200PF K 2012
CC711	HCBK102KCA	C CHIP CERA	50V X7R 1000PF K 2012
CC713	HCQK820JCA	C CHIP CERA	50V CH 82PF J 2012
CC715	HCFK103ZCA	C CHIP CERA	50V Y5V 0.01MF Z 2012
CC716	HCBK102KCA	C CHIP CERA	50V X7R 1000PF K 2012
CC717	HCBK102KCA	C CHIP CERA	50V X7R 1000PF K 2012
CC720	HCFK105ZCA	C CHIP CERA	50V Y5V 1MF Z 2012
CC721	HCBK102KCA	C CHIP CERA	50V X7R 1000PF K 2012
CC801	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012
CC802	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012
CC803	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012
CC804	HCBK152KCA	C CHIP CERA	50V X7R 1500PF K 2012
CC834	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012
CC904	HCBK102KCA	C CHIP CERA	50V X7R 1000PF K 2012
CC905	HCBK102KCA	C CHIP CERA	50V X7R 1000PF K 2012
CC906	HCBK102KCA	C CHIP CERA	50V X7R 1000PF K 2012
CC907	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012
CCA10	HCBK331KCA	C CHIP CERA	50V X7R 330PF K 2012
CCA20	HCBK331KCA	C CHIP CERA	50V X7R 330PF K 2012
JC103	HRFT000-CA	R CHIP	1/10 0 OHM 2012
JC107	HRFT000-CA	R CHIP	1/10 0 OHM 2012
JC108	HRFT000-CA	R CHIP	1/10 0 OHM 2012
JC110	HRFT000-CA	R CHIP	1/10 0 OHM 2012
JC120	HRFT000-CA	R CHIP	1/10 0 OHM 2012
JC123	HRFT000-CA	R CHIP	1/10 0 OHM 2012
JC306	HRFT000-CA	R CHIP	1/10 0 OHM 2012
JC702	HRFT000-CA	R CHIP	1/10 0 OHM 2012
JC704	HRFT000-CA	R CHIP	1/10 0 OHM 2012
JC705	HRFT000-CA	R CHIP	1/10 0 OHM 2012
JC706	HRFT000-CA	R CHIP	1/10 0 OHM 2012
JC803	HRFT000-CA	R CHIP	1/10 0 OHM 2012
JC806	HRFT000-CA	R CHIP	1/10 0 OHM 2012
JCA02	HRFT000-CA	R CHIP	1/10 0 OHM 2012
JCA03	HRFT000-CA	R CHIP	1/10 0 OHM 2012
QC101	T2SC2412KB	TR CHIP	2SC2412K-T146-BR
QC102	T2SC2412KB	TR CHIP	2SC2412K-T146-BR
QC103	T2SC2412KB	TR CHIP	2SC2412K-T146-BR
QC104	T2SC2412KB	TR CHIP	2SC2412K-T146-BR
QC107	T2SC2412KB	TR CHIP	2SC2412K-T146-BR
QC108	T2SC2412KB	TR CHIP	2SC2412K-T146-BR
QC401	T2SC2412KB	TR CHIP	2SC2412K-T146-BR
QC402	T2SC2412KB	TR CHIP	2SC2412K-T146-BR
QC405	T2SA812T2B	TR CHIP	2SA812-T2B
QC501	T2SC2412KB	TR CHIP	2SC2412K-T146-BR
QC502	T2SC2412KB	TR CHIP	2SC2412K-T146-BR
QC601	T2SC2412KB	TR CHIP	2SC2412K-T146-BR
QC602	T2SC2412KB	TR CHIP	2SC2412K-T146-BR

LOC.	PART CODE	PART NAME	DESCRIPTION
QC610	T2SC2412KB	TR CHIP	2SC2412K-T146-BR
QC611	T2SA812T2B	TR CHIP	2SA812-T2B
QC612	T2SC2412KB	TR CHIP	2SC2412K-T146-BR
QC613	T2SA812T2B	TR CHIP	2SA812-T2B
QC701	T2SC2412KB	TR CHIP	2SC2412K-T146-BR
QC703	T2SC2412KB	TR CHIP	2SC2412K-T146-BR
QC704	T2SA812T2B	TR CHIP	2SA812-T2B
QC801	T2SC2412KB	TR CHIP	2SC2412K-T146-BR
QC802	T2SC2412KB	TR CHIP	2SC2412K-T146-BR
QC803	T2SC2412KB	TR CHIP	2SC2412K-T146-BR
QC804	T2SC2412KB	TR CHIP	2SC2412K-T146-BR
QC805	T2SC2412KB	TR CHIP	2SC2412K-T146-BR
QC806	T2SA812T2B	TR CHIP	2SA812-T2B
QC807	T2SA812T2B	TR CHIP	2SA812-T2B
RC101	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RC102	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RC103	HRFT472JCA	R CHIP	1/10 4.7K OHM J 2012
RC108	HRFT153JCA	R CHIP	1/10 15K OHM J 2012
RC109	HRFT222JCA	R CHIP	1/10 2.2K OHM J 2012
RC110	HRFT472JCA	R CHIP	1/10 4.7K OHM J 2012
RC111	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RC112	HRFT562JCA	R CHIP	1/10 5.6K OHM J 2012
RC113	HRFT563JCA	R CHIP	1/10 56K OHM J 2012
RC116	HRFT223JCA	R CHIP	1/10 22K OHM J 2012
RC120	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC128	HRFT472JCA	R CHIP	1/10 4.7K OHM J 2012
RC129	HRFT472JCA	R CHIP	1/10 4.7K OHM J 2012
RC130	HRFT151JCA	R CHIP	1/10 150 OHM J 2012
RC131	HRFT153JCA	R CHIP	1/10 15K OHM J 2012
RC132	HRFT153JCA	R CHIP	1/10 15K OHM J 2012
RC133	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC136	HRFT751JCA	R CHIP	1/10 750 OHM J 2012
RC137	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC138	HRFT682JCA	R CHIP	1/10 6.8K OHM J 2012
RC139	HRFT222JCA	R CHIP	1/10 2.2K OHM J 2012
RC140	HRFT470JCA	R CHIP	1/10 47 OHM J 2012
RC141	HRFT470JCA	R CHIP	1/10 47 OHM J 2012
RC142	HRFT470JCA	R CHIP	1/10 47 OHM J 2012
RC303	HRFT752JCA	R CHIP	1/10 7.5K OHM J 2012
RC304	HRFT912JCA	R CHIP	1/10 9.1K OHM J 2012
RC305	HRFT682JCA	R CHIP	1/10 6.8K OHM J 2012
RC306	HRFT471JCA	R CHIP	1/10 470 OHM J 2012
RC401	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC402	HRFT202JCA	R CHIP	1/10 2K OHM J 2012
RC404	HRFT471JCA	R CHIP	1/10 470 OHM J 2012
RC405	HRFT433JCA	R CHIP	1/10 43K OHM J 2012
RC406	HRFT751JCA	R CHIP	1/10 750 OHM J 2012
RC407	HRFT471JCA	R CHIP	1/10 470 OHM J 2012
RC411	HRFT123JCA	R CHIP	1/10 12K OHM J 2012
RC412	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC413	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC414	HRFT152JCA	R CHIP	1/10 1.5K OHM J 2012
RC415	HRFT682JCA	R CHIP	1/10 6.8K OHM J 2012

LOC.	PART CODE	PART NAME	DESCRIPTION
RC544	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC546	HRFT202JCA	R CHIP	1/10 2K OHM J 2012
RC603	HRFT512JCA	R CHIP	1/10 5.1K OHM J 2012
RC604	HRFT512JCA	R CHIP	1/10 5.1K OHM J 2012
RC605	HRFT303JCA	R CHIP	1/10 30K OHM J 2012
RC606	HRFT303JCA	R CHIP	1/10 30K OHM J 2012
RC607	HRFT272JCA	R CHIP	1/10 2.7K OHM J 2012
RC608	HRFT332JCA	R CHIP	1/10 3.3K OHM J 2012
RC621	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RC622	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RC623	HRFT153JCA	R CHIP	1/10 15K OHM J 2012
RC624	HRFT561JCA	R CHIP	1/10 560 OHM J 2012
RC625	HRFT561JCA	R CHIP	1/10 560 OHM J 2012
RC628	HRFT183JCA	R CHIP	1/10 18K OHM J 2012
RC701	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC702	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC703	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC704	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC705	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC706	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC707	HRFT471JCA	R CHIP	1/10 470 OHM J 2012
RC708	HRFT222JCA	R CHIP	1/10 2.2K OHM J 2012
RC709	HRFT222JCA	R CHIP	1/10 2.2K OHM J 2012
RC712	HRFT562JCA	R CHIP	1/10 5.6K OHM J 2012
RC714	HRFT223JCA	R CHIP	1/10 22K OHM J 2012
RC715	HRFT153JCA	R CHIP	1/10 15K OHM J 2012
RC716	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RC717	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RC719	HRFT562JCA	R CHIP	1/10 5.6K OHM J 2012
RC720	HRFT472JCA	R CHIP	1/10 4.7K OHM J 2012
RC722	HRFT332JCA	R CHIP	1/10 3.3K OHM J 2012
RC727	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RC728	HRFT124JCA	R CHIP	1/10 120K OHM J 2012
RC729	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC730	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC731	HRFT161JCA	R CHIP	1/10 160 OHM J 2012
RC732	HRFT151JCA	R CHIP	1/10 150 OHM J 2012
RC733	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC734	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RC735	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC802	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RC804	HRFT100JCA	R CHIP	1/10 10 OHM J 2012
RC901	HRFT821JCA	R CHIP	1/10 820 OHM J 2012
RC902	HRFT821JCA	R CHIP	1/10 820 OHM J 2012
RC903	HRFT821JCA	R CHIP	1/10 820 OHM J 2012
RC904	HRFT751JCA	R CHIP	1/10 750 OHM J 2012
RC905	HRFT751JCA	R CHIP	1/10 750 OHM J 2012
RC906	HRFT751JCA	R CHIP	1/10 750 OHM J 2012
RC907	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC908	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC909	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RC910	HRFT471JCA	R CHIP	1/10 470 OHM J 2012
RC911	HRFT471JCA	R CHIP	1/10 470 OHM J 2012

SERVICE PARTS LIST

LOC.	PART CODE	PART NAME	DESCRIPTION
RC912	HRFT471JCA	R CHIP	1/10 470 OHM J 2012
RCA01	HRFT750JCA	R CHIP	1/10 75 OHM J 2012
RCA02	HRFT750JCA	R CHIP	1/10 75 OHM J 2012
RCA03	HRFT750JCA	R CHIP	1/10 75 OHM J 2012
RCA04	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RCA05	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RCA06	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RCA07	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RCA10	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RCA11	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RCA12	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RCA13	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RCA14	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RCA15	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RCA16	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RCA17	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RCA26	HRFT473JCA	R CHIP	1/10 47K OHM J 2012
RCA27	HRFT473JCA	R CHIP	1/10 47K OHM J 2012
RCA29	HRFT124JCA	R CHIP	1/10 120K OHM J 2012
ZZ200	PTMPJ0D359	PCB MAIN (RHU) AS	DTW-28W2F
C403	CEXF1C102C	C ELECTRO	16V RUS 1000MF (10X20) TP
C406	CEXF1E471C	C ELECTRO	25V RUS 470MF (10X16) TP
C413	CEXF1C102V	C ELECTRO	16V RSS 1000MF (10X20) TP
C415	CEXF2E100V	C ELECTRO	250V RSS 10MF (10X20) TP
C416	CCXB3D471K	C CERA	2KV B 470PF K (TAPPING)
C605	CEXF1E471C	C ELECTRO	25V RUS 470MF (10X16) TP
C606	CEXF1E471C	C ELECTRO	25V RUS 470MF (10X16) TP
C820	CEXF1C332V	C ELECTRO	16V RSS 3300MF (16X25) TP
C821	CCXB3D681K	C CERA	2KV B 680PF K (TAPPING)
C827	CEXF1E471C	C ELECTRO	25V RUS 470MF (10X16) TP
C831	CEXF1E222V	C ELECTRO	25V RSS 2200MF (16X25) TP
C832	CEXF1E222V	C ELECTRO	25V RSS 2200MF (16X25) TP
C836	CEXF1E471C	C ELECTRO	25V RUS 470MF (10X16) TP
C842	CEXF1E471C	C ELECTRO	25V RUS 470MF (10X16) TP
C843	CEXF1E471C	C ELECTRO	25V RUS 470MF (10X16) TP
C910	CEXF2E100V	C ELECTRO	250V RSS 10MF (10X20) TP
C911	CEXF2E100V	C ELECTRO	250V RSS 10MF (10X20) TP
C912	CCXB3D102K	C CERA	2KV B 1000PF K (TAPPING)
ZZ200	PTMPJBD359	PCB MAIN M-10 AS	DTW-28W2F
10	2TM18006BE	TAPE MASKING	6.2X500
E101	4856310600	EYE LET	BSR T0.2 (R2.3)
E102	4856310600	EYE LET	BSR T0.2 (R2.3)
E103	4856310600	EYE LET	BSR T0.2 (R2.3)
E104	4856310600	EYE LET	BSR T0.2 (R2.3)
E105	4856310600	EYE LET	BSR T0.2 (R2.3)
E106	4856310600	EYE LET	BSR T0.2 (R2.3)
E107	4856310600	EYE LET	BSR T0.2 (R2.3)
E108	4856310600	EYE LET	BSR T0.2 (R2.3)
E109	4856310300	EYE LET	BSR T0.2 (R1.6)
E110	4856310300	EYE LET	BSR T0.2 (R1.6)
E111	4856310300	EYE LET	BSR T0.2 (R1.6)
E112	4856310300	EYE LET	BSR T0.2 (R1.6)
E113	4856310600	EYE LET	BSR T0.2 (R2.3)

LOC.	PART CODE	PART NAME	DESCRIPTION
E114	4856310600	EYE LET	BSR T0.2 (R2.3)
E115	4856310300	EYE LET	BSR T0.2 (R1.6)
E116	4856310300	EYE LET	BSR T0.2 (R1.6)
E117	4856310300	EYE LET	BSR T0.2 (R1.6)
E118	4856310300	EYE LET	BSR T0.2 (R1.6)
E119	4856310300	EYE LET	BSR T0.2 (R1.6)
E120	4856310300	EYE LET	BSR T0.2 (R1.6)
E121	4856310300	EYE LET	BSR T0.2 (R1.6)
E122	4856310300	EYE LET	BSR T0.2 (R1.6)
E123	4856310300	EYE LET	BSR T0.2 (R1.6)
E124	4856310300	EYE LET	BSR T0.2 (R1.6)
E125	4856310300	EYE LET	BSR T0.2 (R1.6)
E126	4856310300	EYE LET	BSR T0.2 (R1.6)
E127	4856310300	EYE LET	BSR T0.2 (R1.6)
E128	4856310300	EYE LET	BSR T0.2 (R1.6)
E129	4856310300	EYE LET	BSR T0.2 (R1.6)
E130	4856310300	EYE LET	BSR T0.2 (R1.6)
E131	4856310600	EYE LET	BSR T0.2 (R2.3)
E134	4856310600	EYE LET	BSR T0.2 (R2.3)
E135	4856310600	EYE LET	BSR T0.2 (R2.3)
E136	4856310600	EYE LET	BSR T0.2 (R2.3)
E137	4856310600	EYE LET	BSR T0.2 (R2.3)
E138	4856310600	EYE LET	BSR T0.2 (R2.3)
E139	4856310600	EYE LET	BSR T0.2 (R2.3)
E140	4856310600	EYE LET	BSR T0.2 (R2.3)
E141	4856310600	EYE LET	BSR T0.2 (R2.3)
E142	4856310600	EYE LET	BSR T0.2 (R2.3)
E143	4856310600	EYE LET	BSR T0.2 (R2.3)
E144	4856310600	EYE LET	BSR T0.2 (R2.3)
E145	4856310600	EYE LET	BSR T0.2 (R2.3)
E146	4856310600	EYE LET	BSR T0.2 (R2.3)
E147	4856310600	EYE LET	BSR T0.2 (R2.3)
E148	4856310300	EYE LET	BSR T0.2 (R1.6)
E149	4856310300	EYE LET	BSR T0.2 (R1.6)
E150	4856310300	EYE LET	BSR T0.2 (R1.6)
E151	4856310600	EYE LET	BSR T0.2 (R2.3)
E152	4856310600	EYE LET	BSR T0.2 (R2.3)
E155	4856310600	EYE LET	BSR T0.2 (R2.3)
E156	4856310600	EYE LET	BSR T0.2 (R2.3)
E157	4856310300	EYE LET	BSR T0.2 (R1.6)
E158	4856310300	EYE LET	BSR T0.2 (R1.6)
N005	4857417500	TERM PIN	DA-IB0214(D2.3/DY PIN)
N006	4857417500	TERM PIN	DA-IB0214(D2.3/DY PIN)
N007	4857417500	TERM PIN	DA-IB0214(D2.3/DY PIN)
N008	4857417500	TERM PIN	DA-IB0214(D2.3/DY PIN)
P101	485923162S	CONN WAFER	YW025-03 (STICK)
P102	485923162S	CONN WAFER	YW025-03 (STICK)
P104	485923162S	CONN WAFER	YW025-03 (STICK)
P401	485923172S	CONN WAFER	YW025-04 (STICK)
P501	485923202S	CONN WAFER	YW025-07 (STICK)
P502	485923192S	CONN WAFER	YW025-06 (STICK)
P601	485923172S	CONN WAFER	YW025-04 (STICK)
P603	485923172S	CONN WAFER	YW025-04 (STICK)

LOC.	PART CODE	PART NAME	DESCRIPTION
P702	485923162S	CONN WAFER	YW025-03 (STICK)
P703	485923182S	CONN WAFER	YW025-05 (STICK)
R401	RS02Z620JS	R M-OXIDE FILM	2W 62 OHM J SMALL
R403	RF01Z689J-	R FUSIBLE	1W 6.8 OHM J (TAPPING)
R406	RF01Z228K-	R FUSIBLE	1W 0.22 OHM K (TAPPING)
R415	RS02Z561JS	R M-OXIDE FILM	2W 560 OHM J SMALL
R416	RF01Z188K-	R FUSIBLE	1W 0.18 OHM K (TAPPING)
R418	RF01Z188K-	R FUSIBLE	1W 0.18 OHM K (TAPPING)
R802	RS02Z683JS	R M-OXIDE FILM	2W 68K OHM J SMALL
R809	RF01Z158K-	R FUSIBLE	1W 0.15 OHM K (TAPPING)
R811	RS01Z102J-	R M-OXIDE FILM	1W 1K OHM J (TAPPING)
R816	RF02Z228K-	R FUSIBLE	2W 0.22 OHM K (TAPPING)
R817	RF02Z228K-	R FUSIBLE	2W 0.22 OHM K (TAPPING)
R825	RS02Z100JS	R M-OXIDE FILM	2W 10 OHM J SMALL
R826	RS02Z103JS	R M-OXIDE FILM	2W 10K OHM J SMALL
R903	RS01Z683J-	R M-OXIDE FILM	1W 68K OHM J (TAPPING)
R908	RS01Z683J-	R M-OXIDE FILM	1W 68K OHM J (TAPPING)
R913	RS01Z683J-	R M-OXIDE FILM	1W 68K OHM J (TAPPING)
ZZ200	PTMPJRD359	PCB MAIN RADIAL AS	DTW-28W2F
C100	CXRH1H150J	C CERA	RH 50V 15PF J (TAPPING)
C101	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP
C102	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP
C103	CEXF1E330V	C ELECTRO	25V RSS 33MF (5X11) TP
C104	CXCH1H220J	C CERA	50V CH 22PF J (TAPPING)
C105	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP
C107	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP
C109	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP
C116	CEXF1H229V	C ELECTRO	50V RSS 2.2MF (5X11) TP
C117	CEXF1H229V	C ELECTRO	50V RSS 2.2MF (5X11) TP
C303	CMXM2A683J	C MYLAR	100V 0.068MF J (TP)
C305	CEXF1V101C	C ELECTRO	35V RUS 100MF (8X11.5) TP
C401	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP
C409	CMXB1H273J	C MYLAR	50V EU 0.027MF J (TP)
C411	CEXF2C109V	C ELECTRO	160V RSS 1MF (6.3X11) TP
C412	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP
C417	CMXM2A222J	C MYLAR	100V 2200PF J (TP)
C420	CCXB1H472K	C CERA	50V B 4700PF K (TAPPING)
C501	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP
C603	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP
C611	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP
C619	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP
C620	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP
C625	CEXF1H479C	C ELECTRO	50V RUS 4.7MF (5X11) TP
C626	CEXF1H479C	C ELECTRO	50V RUS 4.7MF (5X11) TP
C628	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP
C655	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP
C658	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP
C662	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP
C669	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP
C670	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP
C671	CEXF1H339V	C ELECTRO	50V RSS 3.3MF (5X11) TP
C672	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP

LOC.	PART CODE	PART NAME	DESCRIPTION
C673	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP
C674	CEXF1H479C	C ELECTRO	50V RUS 4.7MF (5X11) TP
C675	CEXF1H479C	C ELECTRO	50V RUS 4.7MF (5X11) TP
C676	CEXF1H479C	C ELECTRO	50V RUS 4.7MF (5X11) TP
C677	CEXF1H479C	C ELECTRO	50V RUS 4.7MF (5X11) TP
C701	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP
C702	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP
C703	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP
C705	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP
C731	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP
C805	CCXF3A472Z	C CERA	1KV F 4700PF Z (T)
C806	CCXF3A472Z	C CERA	1KV F 4700PF Z (T)
C812	CEXF1H220V	C ELECTRO	50V RSS 22MF (5X11) TP
C813	CCXB3A471K	C CERA	1KV B 470PF K (T)
C814	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP
C817	CEXF1H470V	C ELECTRO	50V RSS 47MF (6.3X11) TP
C818	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP
C819	CEXF2A100V	C ELECTRO	100V RSS 10MF (6.3X11) TP
C823	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP
C826	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP
C830	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP
C837	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP
C840	CXSL2H470J	C CERA	500V SL 47PF J (TAPPING)
C913	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP
F801A	4857415001	CLIP FUSE	PFC5000-0702
F801B	4857415001	CLIP FUSE	PFC5000-0702
I704	1K1A7042AP	IC REGULATOR	KIA7042AP
I809	1UPC574J--	IC	UPC574J
L610	58C0000116	COIL BEAD	HC-3550R
L620	5CPX100K04	COIL PEAKING	10UH K ELC0607RA
L621	5CPX100K04	COIL PEAKING	10UH K ELC0607RA
L802	58C0000096	COIL CHOKE	610G0233(470K)
Q101	TKTC3197--	TR	KTC3197 (TP)
R420	RN02B473JS	R METAL FILM	2W 47K OHM J SMALL
RB02	RV5426103P	R SEMI FIXED	ENV-DJAA03B14 10K OHM B
X701	5XEX4R000C	CRYSTAL QUARTZ	HC-49U 4.0000MHZ (TP)
ZA01	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF
ZA02	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF
ZA03	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF
ZA04	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF
ZA05	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF
ZA06	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF
ZA07	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF
ZA08	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF
ZA09	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF
ZA10	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF
ZZ200	PTMPJAD359	PCB MAIN AXIAL AS	DTW-28W2F
10	2TM14006LB	TAPE MASKING	3M #232 6.0X2000M
20	2TM10006LB	TAPE MASKING	3M #232-MAP-C 6.2X2000M
A001	4859804493	PCB MAIN	330X246 D1L
C601	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z
C602	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z
C706	CCZB1H220K	C CERA	50V B 22PF K

SERVICE PARTS LIST

LOC.	PART CODE	PART NAME	DESCRIPTION
C719	CCZB1H220K	C CERA	50V B 22PF K
C808	CCZB1H681K	C CERA	50V B 680PF K (AXIAL)
C841	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z
D101	D1N4148---	DIODE	1N4148 (TAPPING)
D102	D1SS85TA--	DIODE	1SS85TA
D301	D1N4936GP-	DIODE	1N4936GP (TAPPING)
D302	DUZ5R1B---	DIODE ZENER	UZ-5.1B UNIZON
D405	D1N4936GP-	DIODE	1N4936GP (TAPPING)
D407	D1N4936GP-	DIODE	1N4936GP (TAPPING)
D408	D1N4936GP-	DIODE	1N4936GP (TAPPING)
D410	D1N4937G--	DIODE	1N4937G (TAPPING)
D411	D1N4148---	DIODE	1N4148 (TAPPING)
D412	D1N4148---	DIODE	1N4148 (TAPPING)
D413	D1N4148---	DIODE	1N4148 (TAPPING)
D414	D1N4148---	DIODE	1N4148 (TAPPING)
D415	D1N4937G--	DIODE	1N4937G (TAPPING)
D501	DUZ8R2BM--	DIODE ZENER	UZ-8.2B (8.2V)
D502	DUZ8R2BM--	DIODE ZENER	UZ-8.2B (8.2V)
D503	DUZ8R2BM--	DIODE ZENER	UZ-8.2B (8.2V)
D701	D1N4148---	DIODE	1N4148 (TAPPING)
D703	DUZ5R1B---	DIODE ZENER	UZ-5.1B UNIZON
D705	D1N4148---	DIODE	1N4148 (TAPPING)
D706	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM(TAPPING)
D708	D1N4148---	DIODE	1N4148 (TAPPING)
D801	DLT2A05G--	DIODE	LT2A05G (TP)
D802	DLT2A05G--	DIODE	LT2A05G (TP)
D803	DLT2A05G--	DIODE	LT2A05G (TP)
D804	DLT2A05G--	DIODE	LT2A05G (TP)
D805	DEU1Z-----	DIODE	EU1Z (HIGH SPEED)
D806	DEU1Z-----	DIODE	EU1Z (HIGH SPEED)
D807	DEU1Z-----	DIODE	EU1Z (HIGH SPEED)
D808	D1N4937G--	DIODE	1N4937G (TAPPING)
D810	D1N4936GP-	DIODE	1N4936GP (TAPPING)
D811	DUZ7R5BM--	DIODE ZENER	UZ-7.5BM 7.5V
D813	D1N4936GP-	DIODE	1N4936GP (TAPPING)
D815	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM(TAPPING)
D816	D1N4936GP-	DIODE	1N4936GP (TAPPING)
D817	D1N4148---	DIODE	1N4148 (TAPPING)
D818	DEU1Z-----	DIODE	EU1Z (HIGH SPEED)
D819	DEU1Z-----	DIODE	EU1Z (HIGH SPEED)
D822	D1N4936GP-	DIODE	1N4936GP (TAPPING)
D824	D1N4936GP-	DIODE	1N4936GP (TAPPING)
D825	D1N4936GP-	DIODE	1N4936GP (TAPPING)
D904	DLT2A05G--	DIODE	LT2A05G (TP)
D905	D1N4936GP-	DIODE	1N4936GP (TAPPING)
DA01	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM(TAPPING)
DA02	DUZ5R1B---	DIODE ZENER	UZ-5.1B UNIZON
DA03	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM(TAPPING)
DA04	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM(TAPPING)
DA05	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM(TAPPING)
DA07	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM(TAPPING)
DA11	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM(TAPPING)
DA13	DUZ5R1B---	DIODE ZENER	UZ-5.1B UNIZON

LOC.	PART CODE	PART NAME	DESCRIPTION
DA15	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM(TAPPING)
DA16	DUZ5R1B---	DIODE ZENER	UZ-5.1B UNIZON
DA17	DUZ5R1B---	DIODE ZENER	UZ-5.1B UNIZON
DA18	DUZ5R1B---	DIODE ZENER	UZ-5.1B UNIZON
DA19	DUZ5R1B---	DIODE ZENER	UZ-5.1B UNIZON
DA22	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM(TAPPING)
DA23	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM(TAPPING)
DA24	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM(TAPPING)
DA25	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM(TAPPING)
DA27	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM(TAPPING)
DA30	DUZ5R1B---	DIODE ZENER	UZ-5.1B UNIZON
DA31	DUZ5R1B---	DIODE ZENER	UZ-5.1B UNIZON
DA32	DUZ5R1B---	DIODE ZENER	UZ-5.1B UNIZON
Jxxx	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING
L101	5CPZ479K02	COIL PEAKING	4.7UH K (AXIAL 3.5MM)
L301	5MC0000100	COIL BEAD	HC-3550
L302	5CPZ479K02	COIL PEAKING	4.7UH K (AXIAL 3.5MM)
L303	5MC0000100	COIL BEAD	HC-3550
L402	5MC0000100	COIL BEAD	HC-3550
L404	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING
L601	5CPZ109M02	COIL PEAKING	1UH M (AXIAL 3.5MM)
L602	5CPZ109M02	COIL PEAKING	1UH M (AXIAL 3.5MM)
L607	5CPZ479K02	COIL PEAKING	4.7UH K (AXIAL 3.5MM)
L609	5MC0000100	COIL BEAD	HC-3550
L801	5MC0000100	COIL BEAD	HC-3550
LA10	5MC0000100	COIL BEAD	HC-3550
LA20	5MC0000100	COIL BEAD	HC-3550
R101	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J
R104	RN-AZ1502F	R METAL FILM	1/6 15K OHM F
R105	RN-AZ3600F	R METAL FILM	1/6 360.0 OHM F
R106	RD-AZ682J-	R CARBON FILM	1/6 6.8K OHM J
R110	RD-AZ333J-	R CARBON FILM	1/6 33K OHM J
R111	RD-AZ183J-	R CARBON FILM	1/6 18K OHM J
R301	RN-AZ1202F	R METAL FILM	1/6 12K OHM F
R302	RD-2Z229J-	R CARBON FILM	1/2 2.2 OHM J
R303	RN-4Z1301F	R METAL FILM	1/4 1.30K OHM F
R304	RN-AZ2201F	R METAL FILM	1/6 2.2K OHM F
R305	RD-2Z151J-	R CARBON FILM	1/2 150 OHM J
R307	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J
R308	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J
R309	RD-AZ473J-	R CARBON FILM	1/6 47K OHM J
R310	RN-AZ6801F	R METAL FILM	1/6 6.8K OHM F
R404	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J
R405	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J
R407	RN-4Z2003F	R METAL FILM	1/4 200K OHM F
R408	RD-4Z479J-	R CARBON FILM	1/4 4.7 OHM J
R409	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING
R411	RD-AZ220J-	R CARBON FILM	1/6 22 OHM J
R502	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J
R601	RD-4Z479J-	R CARBON FILM	1/4 4.7 OHM J
R602	RD-4Z479J-	R CARBON FILM	1/4 4.7 OHM J
R605	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R606	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J

LOC.	PART CODE	PART NAME	DESCRIPTION
R607	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R608	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R611	RD-AZ183J-	R CARBON FILM	1/6 18K OHM J
R624	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R625	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R704	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J
R705	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J
R706	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J
R711	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J
R712	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J
R713	RD-AZ622J-	R CARBON FILM	1/6 6.2K OHM J
R803	RC-2Z225KP	R CARBON COMP	1/2 2.2M OHM K
R805	RD-2Z100J-	R CARBON FILM	1/2 10 OHM J
R810	RD-4Z102J-	R CARBON FILM	1/4 1K OHM J
R812	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J
R813	RD-AZ203J-	R CARBON FILM	1/6 20K OHM J
R815	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J
R818	RC-2Z565KP	R CARBON COMP	1/2 5.6M OHM K
R820	RD-2Z222J-	R CARBON FILM	1/2 2.2K OHM J
R822	RD-AZ202J-	R CARBON FILM	1/6 2K OHM J
R823	RD-4Z153J-	R CARBON FILM	1/4 15K OHM J
R824	RD-AZ332J-	R CARBON FILM	1/6 3.3K OHM J
R827	RD-4Z102J-	R CARBON FILM	1/4 1K OHM J
R828	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J
R829	RD-AZ152J-	R CARBON FILM	1/6 1.5K OHM J
R830	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J
R902	RD-AZ242J-	R CARBON FILM	1/6 2.4K OHM J
R905	RC-2Z102K-	R CARBON COMP	1/2 1K OHM K
R907	RD-AZ242J-	R CARBON FILM	1/6 2.4K OHM J
R910	RC-2Z102K-	R CARBON COMP	1/2 1K OHM K
R912	RD-AZ242J-	R CARBON FILM	1/6 2.4K OHM J
R915	RC-2Z102K-	R CARBON COMP	1/2 1K OHM K
R920	RD-2Z105J-	R CARBON FILM	1/2 1M OHM J
R921	RD-2Z102J-	R CARBON FILM	1/2 1K OHM J
RA02	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J
RA03	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J
ZZ200	PTMPJ1D228	PCB CHIP MOUNT A AS	DTJ-28G6F
ZZ400	PTMAMSD359	PCB MAIN MODULE MANU	DTW-28W2F
PD01	4859279820	CONN WAFER	TAC-L18P-A1 (ANGLE)
PD02	4859279820	CONN WAFER	TAC-L18P-A1 (ANGLE)
PD03	4859231620	CONN WAFER	YW025-03
PD04	4853946000	BRKT JUMPER A	SECC T1.0 (VCR-63DB)
PD05	4853946000	BRKT JUMPER A	SECC T1.0 (VCR-63DB)
PS01	4850702N07	CONNECTOR	YH500D-02+YBNH250+USW=400
QS01	TKTA1659AY	TR	KTA1659AY
QS02	TKTC4370AY	TR	KTC4370AY
XD01	5XE20R250E	CRYSTAL QUARTZ	HC-49/U 20.2500MHZ 30PPM
ZZ200	PTMAJ2D359	PCB MAIN MODULE CHIP	DTW-28W2F
CCD01	HCFK105ZCA	C CHIP CERA	50V Y5V 1MF Z 2012

LOC.	PART CODE	PART NAME	DESCRIPTION
CCD02	HCFK105ZCA	C CHIP CERA	50V Y5V 1MF Z 2012
CCD03	HCFK105ZCA	C CHIP CERA	50V Y5V 1MF Z 2012
CCD04	HCFK105ZCA	C CHIP CERA	50V Y5V 1MF Z 2012
CCD07	HCQK121JCA	C CHIP CERA	50V CH 120PF J 2012
CCD08	HCFK105ZCA	C CHIP CERA	50V Y5V 1MF Z 2012
CCD09	HCQK309CCA	C CHIP CERA	50V CH 3PF C 2012
CCD10	HCQK309CCA	C CHIP CERA	50V CH 3PF C 2012
CCD12	HCBK473KCA	C CHIP CERA	50V X7R 0.047MF K 2012
CCD13	HCBH224KCA	C CHIP CERA	25V X7R 0.22MF K 2012
CCD14	HCBH224KCA	C CHIP CERA	25V X7R 0.22MF K 2012
CCD15	HCBH224KCA	C CHIP CERA	25V X7R 0.22MF K 2012
CCD16	HCBK104KCA	C CHIP CERA	50V X7R 0.1MF K 2012
CCD17	HCBK122KCA	C CHIP CERA	50V X7R 1200PF K 2012
CCD19	HCBK104KCA	C CHIP CERA	50V X7R 0.1MF K 2012
CCD20	HCFK105ZCA	C CHIP CERA	50V Y5V 1MF Z 2012
CCD21	HCBK104KCA	C CHIP CERA	50V X7R 0.1MF K 2012
CCD22	HCFK105ZCA	C CHIP CERA	50V Y5V 1MF Z 2012
CCD23	HCBK104KCA	C CHIP CERA	50V X7R 0.1MF K 2012
CCD24	HCFK105ZCA	C CHIP CERA	50V Y5V 1MF Z 2012
CCD25	HCBK104KCA	C CHIP CERA	50V X7R 0.1MF K 2012
CCD26	HCFK105ZCA	C CHIP CERA	50V Y5V 1MF Z 2012
CCD27	HCFK105ZCA	C CHIP CERA	50V Y5V 1MF Z 2012
CCD29	HCFK104ZCA	C CHIP CERA	50V Y5V 0.1MF Z 2012
CCD30	HCBK104KCA	C CHIP CERA	50V X7R 0.1MF K 2012
CCD31	HCQK101JCA	C CHIP CERA	50V CH 100PF J 2012
CCD32	HCQK101JCA	C CHIP CERA	50V CH 100PF J 2012
CCD33	HCBK153KCA	C CHIP CERA	50V X7R 0.015MF K 2012
CCD34	HCBK153KCA	C CHIP CERA	50V X7R 0.015MF K 2012
CCD35	HCBK153KCA	C CHIP CERA	50V X7R 0.015MF K 2012
CCD37	HCQK101JCA	C CHIP CERA	50V CH 100PF J 2012
CCD40	HCBK104KCA	C CHIP CERA	50V X7R 0.1MF K 2012
CCD41	HCBK104KCA	C CHIP CERA	50V X7R 0.1MF K 2012
CCD42	HCBK104KCA	C CHIP CERA	50V X7R 0.1MF K 2012
CCD43	HCBK104KCA	C CHIP CERA	50V X7R 0.1MF K 2012
CCD45	HCFK105ZCA	C CHIP CERA	50V Y5V 1MF Z 2012
CCD46	HCFK105ZCA	C CHIP CERA	50V Y5V 1MF Z 2012
CCD48	HCBK104KCA	C CHIP CERA	50V X7R 0.1MF K 2012
CCD50	HCBK104KCA	C CHIP CERA	50V X7R 0.1MF K 2012
CCD51	HCFK105ZCA	C CHIP CERA	50V Y5V 1MF Z 2012
CCD52	HCFK105ZCA	C CHIP CERA	50V Y5V 1MF Z 2012
CCD53	HCBK104KCA	C CHIP CERA	50V X7R 0.1MF K 2012
CCS01	HCFK103ZCA	C CHIP CERA	50V Y5V 0.01MF Z 2012
CCS02	HCFK103ZCA	C CHIP CERA	50V Y5V 0.01MF Z 2012
CCS04	HCBK122KCA	C CHIP CERA	50V X7R 1200PF K 2012
CCS06	HCBK472KCA	C CHIP CERA	50V X7R 4700PF K 2012
CCS07	HCQK101JCA	C CHIP CERA	50V CH 100PF J 2012
CCS08	HCQK101JCA	C CHIP CERA	50V CH 100PF J 2012
JCD01	HRFT000-CA	R CHIP	1/10 0 OHM 2012
JCD02	HRFT000-CA	R CHIP	1/10 0 OHM 2012
JCD03	HRFT000-CA	R CHIP	1/10 0 OHM 2012
JCD04	HRFT000-CA	R CHIP	1/10 0 OHM 2012
JCD05	HRFT000-CA	R CHIP	1/10 0 OHM 2012
JCD06	HRFT000-CA	R CHIP	1/10 0 OHM 2012

SERVICE PARTS LIST

LOC.	PART CODE	PART NAME	DESCRIPTION
JCD07	HRFT000-CA	R CHIP	1/10 0 OHM 2012
JCD08	HRFT000-CA	R CHIP	1/10 0 OHM 2012
JCD09	HRFT000-CA	R CHIP	1/10 0 OHM 2012
JCD10	HRFT000-CA	R CHIP	1/10 0 OHM 2012
JCD11	HRFT000-CA	R CHIP	1/10 0 OHM 2012
QCD01	TKTC3875GB	TR CHIP	KTC3875-GR
QCD50	TKTC3875GB	TR CHIP	KTC3875-GR
QCD51	TKTC3875GB	TR CHIP	KTC3875-GR
QCD52	TKTC3875GB	TR CHIP	KTC3875-GR
QCD53	TKTC3875GB	TR CHIP	KTC3875-GR
QCD57	TKTC3875GB	TR CHIP	KTC3875-GR
QCD58	T2SA812T2B	TR CHIP	2SA812-T2B
QCD59	T2SA812T2B	TR CHIP	2SA812-T2B
QCD60	T2SA812T2B	TR CHIP	2SA812-T2B
QCD61	T2SA812T2B	TR CHIP	2SA812-T2B
QCS01	TKTC3875GB	TR CHIP	KTC3875-GR
QCS02	TKTC3875GB	TR CHIP	KTC3875-GR
QCS03	TKTC3875GB	TR CHIP	KTC3875-GR
QCS04	TKTC3875GB	TR CHIP	KTC3875-GR
QCS05	TKTC3875GB	TR CHIP	KTC3875-GR
QCS06	T2SA812T2B	TR CHIP	2SA812-T2B
QCS07	TKTC3875GB	TR CHIP	KTC3875-GR
QCS08	TKTC3875GB	TR CHIP	KTC3875-GR
QCS09	TKTC3875GB	TR CHIP	KTC3875-GR
QCS10	TKTC3875GB	TR CHIP	KTC3875-GR
QCS11	TKTC3875GB	TR CHIP	KTC3875-GR
RCD01	HRFT750JCA	R CHIP	1/10 75 OHM J 2012
RCD02	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RCD04	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RCD05	HRFT470JCA	R CHIP	1/10 47 OHM J 2012
RCD06	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RCD07	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RCD08	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RCD09	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RCD10	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RCD14	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RCD15	HRFT271JCA	R CHIP	1/10 270 OHM J 2012
RCD16	HRFT162JCA	R CHIP	1/10 1.6K OHM J 2012
RCD17	HRFT363JCA	R CHIP	1/10 36K OHM J 2012
RCD18	HRFT102JCA	R CHIP	1/10 1K OHM J 2012
RCD19	HRFT750JCA	R CHIP	1/10 75 OHM J 2012
RCD20	HRFT750JCA	R CHIP	1/10 75 OHM J 2012
RCD21	HRFT750JCA	R CHIP	1/10 75 OHM J 2012
RCD22	HRFT750JCA	R CHIP	1/10 75 OHM J 2012
RCD23	HRFT750JCA	R CHIP	1/10 75 OHM J 2012
RCD27	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RCD28	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RCD31	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RCD32	HRFT161JCA	R CHIP	1/10 160 OHM J 2012
RCD33	HRFT161JCA	R CHIP	1/10 160 OHM J 2012
RCD50	HRFT431JCA	R CHIP	1/10 430 OHM J 2012
RCD51	HRFT431JCA	R CHIP	1/10 430 OHM J 2012
RCD52	HRFT431JCA	R CHIP	1/10 430 OHM J 2012

LOC.	PART CODE	PART NAME	DESCRIPTION
RCD53	HRFT431JCA	R CHIP	1/10 430 OHM J 2012
RCD54	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RCD55	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RCD56	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RCD57	HRFT101JCA	R CHIP	1/10 100 OHM J 2012
RCD61	HRFT152JCA	R CHIP	1/10 1.5K OHM J 2012
RCD62	HRFT151JCA	R CHIP	1/10 150 OHM J 2012
RCD63	HRFT151JCA	R CHIP	1/10 150 OHM J 2012
RCD64	HRFT151JCA	R CHIP	1/10 150 OHM J 2012
RCD65	HRFT151JCA	R CHIP	1/10 150 OHM J 2012
RCS01	HRFT223JCA	R CHIP	1/10 22K OHM J 2012
RCS02	HRFT621JCA	R CHIP	1/10 620 OHM J 2012
RCS03	HRFT471JCA	R CHIP	1/10 470 OHM J 2012
RCS04	HRFT273JCA	R CHIP	1/10 27K OHM J 2012
RCS05	HRFT333JCA	R CHIP	1/10 33K OHM J 2012
RCS06	HRFT103JCA	R CHIP	1/10 10K OHM J 2012
RCS07	HRFT201JCA	R CHIP	1/10 200 OHM J 2012
RCS08	HRFT471JCA	R CHIP	1/10 470 OHM J 2012
RCS09	HRFT471JCA	R CHIP	1/10 470 OHM J 2012
RCS10	HRFT182JCA	R CHIP	1/10 1.8K OHM J 2012
RCS11	HRFT392JCA	R CHIP	1/10 3.9K OHM J 2012
RCS12	HRFT392JCA	R CHIP	1/10 3.9K OHM J 2012
RCS13	HRFT273JCA	R CHIP	1/10 27K OHM J 2012
RCS14	HRFT563JCA	R CHIP	1/10 56K OHM J 2012
RCS15	HRFT100JCA	R CHIP	1/10 10 OHM J 2012
RCS16	HRFT820JCA	R CHIP	1/10 82 OHM J
RCS17	HRFT820JCA	R CHIP	1/10 82 OHM J
RCS19	HRFT000-CA	R CHIP	1/10 0 OHM 2012
RCS20	HRFT122JCA	R CHIP	1/10 1.2K OHM J 2012
RCS21	HRFT152JCA	R CHIP	1/10 1.5K OHM J 2012
RCS22	HRFT473JCA	R CHIP	1/10 47K OHM J 2012
RCS23	HRFT683JCA	R CHIP	1/10 68K OHM J 2012
RCS24	HRFT122JCA	R CHIP	1/10 1.2K OHM J 2012
RCS25	HRFT152JCA	R CHIP	1/10 1.5K OHM J 2012
RCS27	HRFT229JCA	R CHIP	1/10 2.2 OHM J 2012
RCS28	HRFT123JCA	R CHIP	1/10 12K OHM J 2012
RCS29	HRFT100JCA	R CHIP	1/10 10 OHM J 2012
ZZ200	PTMAJRD359	PCB MAIN MODULE RADIAL	DTW-28W2F
CD01	CEXD1E100F	C ELECTRO	25V RND 10MF (5X11) TP
CD02	CEXD1E100F	C ELECTRO	25V RND 10MF (5X11) TP
CD03	CEXD1E100F	C ELECTRO	25V RND 10MF (5X11) TP
CD04	CEXD1H339F	C ELECTRO	50V RND 3.3MF (5X11) TP
CS01	CEXF1C470V	C ELECTRO	16V RSS 47MF (5X11) TP
CS02	CEXF1C470V	C ELECTRO	16V RSS 47MF (5X11) TP
CS03	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP
CS04	CEXF1C470V	C ELECTRO	16V RSS 47MF (5X11) TP
CS05	CEXE2A100C	C ELECTRO	100V RU 10MF (8X11.5) TP
CS06	CCXB2H472K	C CERA	500V B 4700PF K (TAPPING)
LD01	5CPX100K04	COIL PEAKING	10UH K ELC0607RA
ZZ200	PTMAJAD359	PCB MAIN MODULE AXIAL	DTW-28W2F
10	2TM14006LB	TAPE MASKING	3M #232 6.0X2000M

LOC.	PART CODE	PART NAME	DESCRIPTION
20	2TM10006LB	TAPE MASKING	3M #232-MAP-C 6.2X2000M
A001	4859811224	PCB VIDEO	123X78(246X180/4) D2Z
LS01	5MC0000100	COIL BEAD	HC-3550
LS02	5MC0000100	COIL BEAD	HC-3550
LS03	5MC0000100	COIL BEAD	HC-3550
RD01	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J
RS01	RD-4Z200J-	R CARBON FILM	1/4 20 OHM J
RS02	RD-4Z200J-	R CARBON FILM	1/4 20 OHM J
RS03	RD-4Z471J-	R CARBON FILM	1/4 470 OHM J
RS05	RD-4Z331J-	R CARBON FILM	1/4 330 OHM J
ZZ200	PTMAJ1D359	PCB MAIN MODULE CHIP	DTW-28W2F
ID01	1VPC3215CT	IC CHIP VIDEO	VPC3215C
ID02	1C1P3250AT	IC CHIP VIDEO	CIP3250A
ID03	1MSM54122Q	IC MEMORY	MSM5412222
ID04	1DDP3310BT	IC CHIP	DDP3310B

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APPENDIX
IC DESCRIPTION

5-1. ST92195
(1) General Description
1.1 INTRODUCTION
The ST92195 microcnontoller is developed and manufactured by STMicroelecrtonics using a proprietary n-well HCMOS process. Its performance derives from the use of a flexible 256-register programming model for ultra-fast context switching and real-time event response. The intelligent onchip peripherals offload the ST9 core from I/O and data management processing tasks allowing critical application tasks to get the maximum use off core resources. The ST92195 MCU supports low power consumption and low voltage operation for power-efficient and low-cost embedded systems.

1.1.1 ST9+Core
The advanced Core consists of the Central Processing Unit (CPU), the Register File and the Interrupt controller. The general-purpose registers can be used as accumulator, Index register, or address pointers. Adjacent register pairs make up 16-bit registers for addressing or 16-bit processing. Although the ST9 has an 8-bit ALU, the chip handles 16-bit operations, including arithmetic, loads/stores, and memory/register and memory/memory exchanges. Two basic memory spaces are available : Program Memory and the Register File, Which includes the control and status registers of the on-chip peripherals.

1.1.2 Power Saving Modes
To optimize performance versus power consumption, a range of operating modes can be dynamically selected.

Run Mode. This is the full speed execution mode with CPU and peripherals running at the maximum clock speed delivered by the phase Locked Loop(PLL) of the Clock Control Unit(CCU).

Wait For Interrupt Mode. The Wait For Interrupt(WFI) instruction suspends program execution until an interrupt request is acknowledged. During WFI, the CPU clock is halted while the peripheral and interrupt controller keep running at a frequency programmable via the CCU. In this mode, the power consumption of the device can be reduced by more than 95%(LP WFI).

Wait For Interrupt Mode. The Wait For Interrupt(WFI) instruction, and if the Watchdog is not enable, the CPU and its peripherals stop operation and the I/O ports enter high impedance mode. A reset is necessary to exit from Halt mode.

1.1.3 I/O Ports
Up to 28 I/O lines are dedicated to digital Input/Output. These lines are grouped into up to five I/O Ports and can be configureed on a bit basis under software control to provide timing, status signals, timer and output, analog inputs, external interrupts and serial or parallel I/O.

1.1.4 TV Peripherals
A set of on-chip peripherals form a complete system for TV set and VCR applications:
- Voltage Synthesis
- VPS/WSS Slicer
- Teletext Slicer
- Teletext Display RAM
- OSD

1.1.5 On Screen Display
The human interface is provided by the On Screen Display module, this can produce up to 26 lines of up to 80 characters from a ROM defined 512 character set. The character resolution is 10x10 dot. Four character sizes are supported. Serial attributes allow the user to select foreground and background. Parallel attributes can be used to select additional foreground and background colors and underline on a character by character basis.

1.1.6 Teletext and Display RAM
The internal 8k Teletext and Display storage RAM can be used to store Teletext pages as well as Display parameters.

1.1.7 Teletext, VPS and WSS Data Slicers
The three on-board data slicers using a single external crystal are used to extract the Teletext, VPS and WSS information from the video signal. Hardware Hamming decoding is provided.

1.1.8 Voltage Synthesis Tuning Control
14-bit Voltage Synthesis using the PWM (Pulse Width Modulation)/BRM (Bit Rate Modulation) technique can be used to genetate tuning voltages for TV set applications. The tuning voltage is output on one of two separate output pins.

1.1.9 PWM Output

Control of TV settings is able to be made with up to eight 8-bit PWM outputs, with a frequency maximum of 23,437Hz at 8-bit resolution(INTCLK=12 MHz). Low resolutions with higher frequency operation can be programmed.

1.1.10 Serial Peripheral Interface (SPI)

The SPI bus is used to communicate with external devices via the SPI, or I^2C bus communication standards. The SPI uses one or two lines for serial data and a synchronous clock signal.

1.1.11 Standard Timer (STIM)

The Standard Timer includes a programmable 16-bit down counter and an associated 8-bit prescaler with Single and Continuous counting modes.

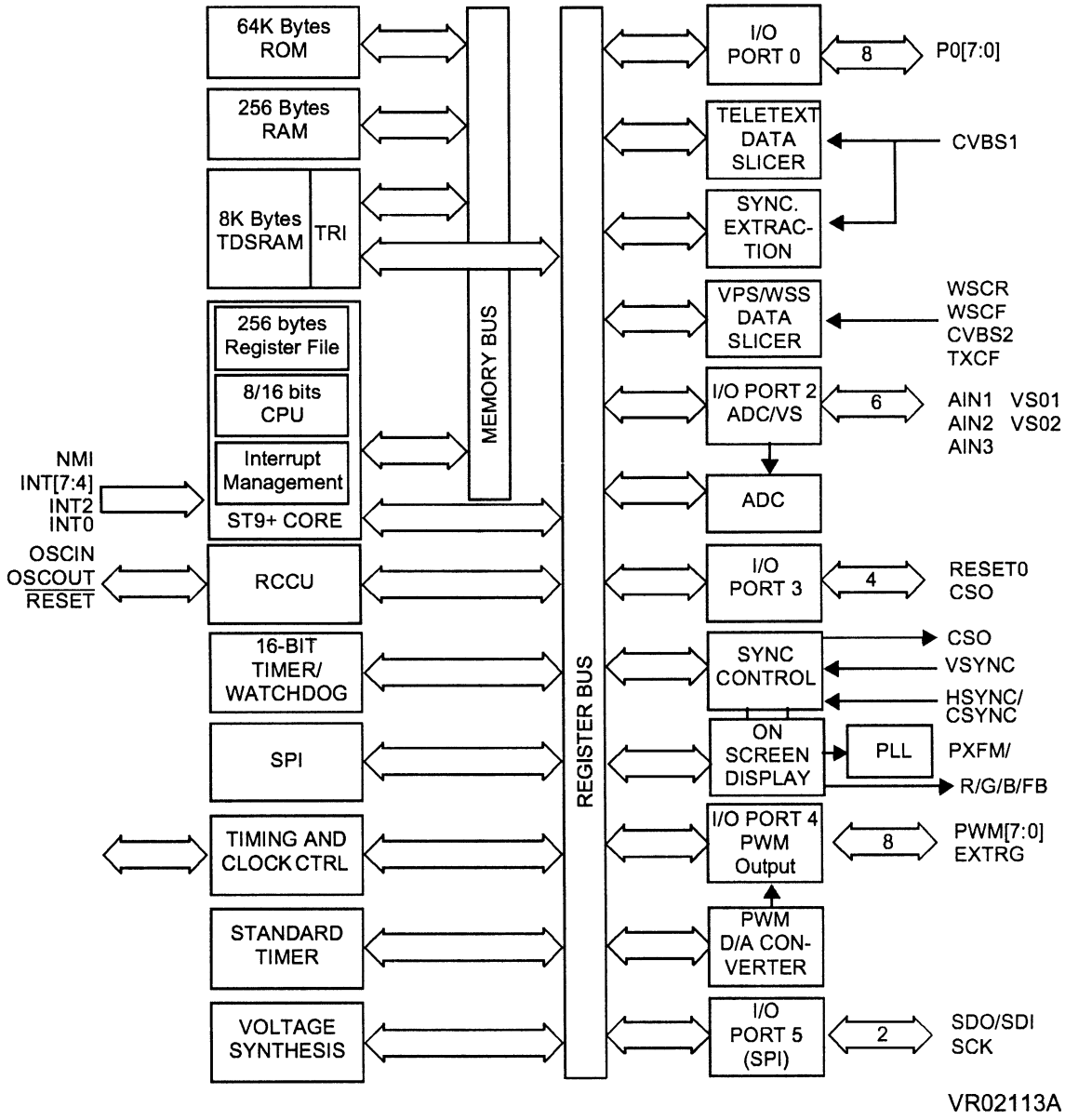
1.1.12 Analog/Digital Converter (ADC)

In addition there is a 3 channel Analog to Digital Converter with integral sample and hold, fast 5.7us conversion timer and 6-bit guaranteed resolution.

(2) Feature

- Register File based 8/16 bit Core Architecture with
- RUN, WFI, SLOW and HALT modes
- $0^{\circ}C$ to 70° Coperating temperature range
- Up to 24 MHz Operation @5V ±10%
- Minimum instruction cycle time : 375ns at 16MHz internal clock
- 64K Bytes ROM
- 256 Bytes RAM of Register file(accumulator or index registers)
- 256 Bytes of on-chip static RAM
- 8K Bytes of TDSRAM(Teletext and Display RAM)
- 56-lead Shrink DIP package
- 28 fully programmable I/O pins
- Serial Peripheral Interface
- Flexible Clock controller for OSD, Data Slicer and Core clocks running from one single low frequency external crystal.
- Enhanced Display Controller with 26 rows of 40/80 characters
  - Serial and Parallel attributes
  - 10x10 dot Matrix, 512 ROM characters, definable by user
  - 4/3 and 16/9 supported
  - Rounding, fringe, double width, double height, scrolling, cursor, full background colour, semitransparent mode and reduced intensity colour supported
- Teletext unit, including Data slicer, Acquisition Unit and up to 8K Bytes RAM for Data Storage
- VPS and Wode Screen Signalling slicer
- Integrated Sync Extractor and Sync Controller
- 14-bit Voltage Synthesis for tuning reference voltage
- Up to 6 external interrupts plus 1 non-maskable interrupt
- 8x8-bit programmable PWM outputs with 5V open-drain or push-pull capability
- 16-bit Watchdog timer with 8-bit prescale
- 16-bit standard timer with 8-bit prescaler usable as a Watchdog timer
- 3-channel Analog-to-Digital converter ; 6-bit guaranteed
- Rich instruction set and 14-Addressing modes
- Versatile Development Tools, including Assembler, Linker, C-compiler, Archiver, Source Level Debugger and Hardware Emulators with Real-Time Operating System available from third parties
- Piggyback board available for prototyping

(3) Block Diagram



(4) PIN DESCRIPTION

$\overline{\text{RESET}}$ *Reset* (input, active low). The ST9+ is initialised by the Reset signal. With the deactivation of RESET, program execution begins from the Program memory location pointed to by the vector contained in program memory locations 00h and 01h.

R/G/B *Red/Green/Blue.* Video color analog DAC outputs

FB *Fast Blanking.* Video analog DAC output.

VOD Main power supply voltage(5V 10%, digital)

WSCF, WSCR Analog pins for the VPS/WPP slicer line PLL.

MCFM Analog pin for the display pixel frequency multiplier.

OSCIN, OSCOUT *Oscillator* (input and output).
These pins connect a parallel-resonant crystal(24MHz maximum), or an external source to the on-chip clock oscillator and buffer. OSCIN is the input of the oscilltor inverter and internal clock generator; OSCOUT is the output of the oscillator inverter.

VSYNC *Vertical Sync.* Vertical video synchronisation input to OSD. Positive or negative polarity.

HYNC/CSYNC *Horizontal/Composite sync.* Horizontal or composite video synchronisation input to OSD. Positive or negativety.

PXFM Analog pin for the Display Pixel Frequency Multiplier

AVDD *Analog VDD of PLL.* This pin must be tied to VDD externally to the ST92195.

GND Digital circuit ground.

AGND Analog circuit ground(must be tied externally to digital GND).

CVBS1 Composite video input signal for the Teletext slicer and sync extraction.

CVBS2 Composite video input signal for the VPS/WSS slicer. Pin AC coupled.

AVDD1, AVDD2 Analog power supplies(must be tied externally to AVDD).

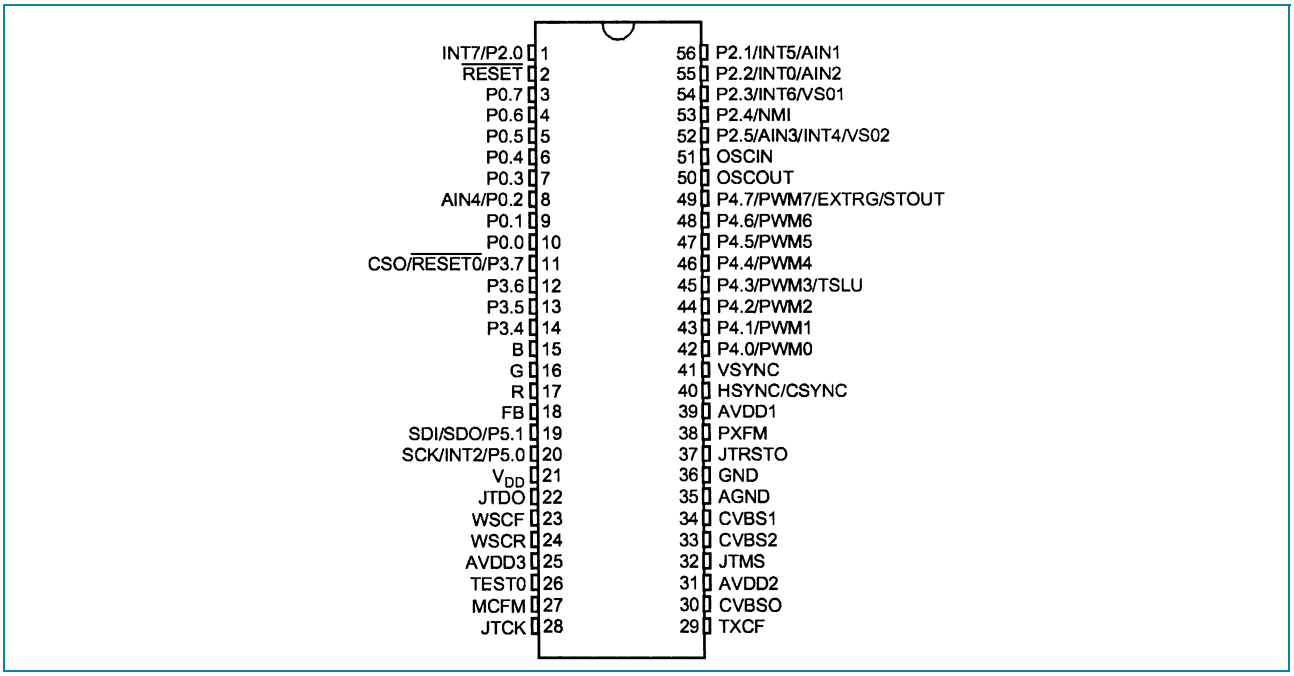
TXCF Analog pin for the VPS/WSS line PLL.

CVBSO, JTDO, JTCK Test pins : leave floating.

JTMS, TEST0 Test pins : must be tied to AVDD2.

JTRST0 Test pin : must be tied to GND.

Figure 2. Pin Description



5-2. VPS 3215C(Video Processor)

(1) Description

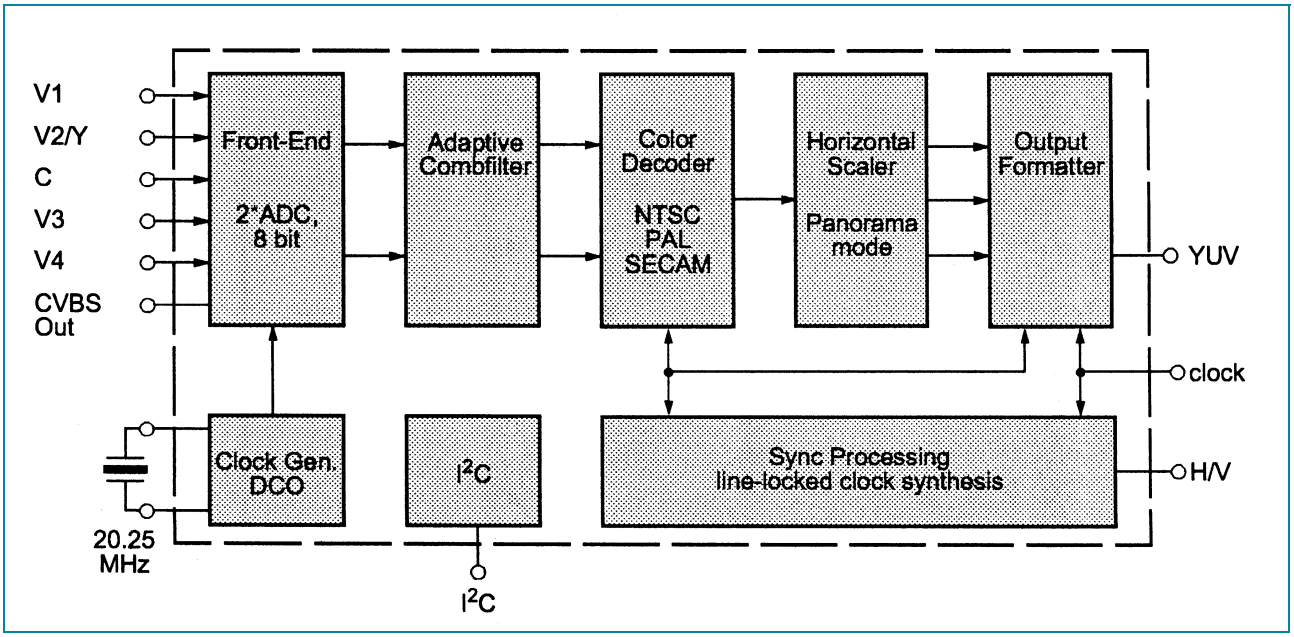
The VPC 3215C is a high-quality, single-chip video front-end, which is targeted for 4:3 and 16:9, 100/120Hz TV sets.

It can be conbined with other members of the DIGIT3000 IC family (such as CIP 3250A, DDP 3300A, TPU 3040) and/or it can be used with 3rd-party products.

(2) Features

- all-digital video processing
- high-performance adaptive 4H comb filter Y/C separator with adjustable vertical peaking
- multi-standard color decoder PAL/NTSC/SECAM including all substandards
- 4 composite, 1 S-VHS input, 1 composite output
- integrated high-quality A/D converters and associated clamp and AGC circuits
- multi-standard sync processing
- linear horizontal scaling (0.25 ... 4), as well as non-linear horizontal scaling ‚panorama vision'
- PAL + preprocessing (VPC 3215)
- submicron CMOS technology

(3) Block Diagram



(4) Pin Descriptions

Pin 1 - Ground, Analog Front-End GND_F

Pin 2 - Ground, Analog Front-End GND_F

Pin 3 - CCU 5 MHz Clock Output CLK5

This pin provides a clock frequency for the TV microcontroller, e.g. a CCU 3000 controller, It is also used by the DDP 3300A display controller as a standby clock.

Pin 4 - Standby Supply Voltage V_{STDBY}

In standby mode, only the clock oscillator is active, GND_F should be ground reference. Please activate RESQ before powering-up other supplies Pins 6 and 5-XTAL1 Crystal Input

These pins are connected to an 20.25MHz crystal oscillator which is digitally tuned by integrated shunt capacitances. The CLK20 and CLK5 clock signals are derived from this oscillator. An external clock can be fed into XTAL1. In this case, clock frequency adjustment must be switched off.

Pin 7 - Ground, Analog Front-End GND_F

Pin 9 - Ground, Output Pad Circuitry GND_P

Pin 10 - Interlace Output, INTLC

This pin supplies the interlace information, 0 indicates first field, 1 indicates second field.

IC DESCRIPTION

Pin 12 - Vertical Sync Pulse, VS
This pin supplies the vertical sync signal.
Pin 13 - Front Sync Pulse, FSY
This pin supplies the front sync information.
Pin 14 - Main Sync/Horizontal Sync Pulse MSY/HS
This pin supplies the horizontal sync pulse information in line-locked mode. In DIGIT3000 mode, this pin is the main sync input.
Pin 15 - Helper Line Output, Helper
This signal indicated a helper line in PAL + mode.
Pin 16 - Horizontal Clamp Pulse, HC
This signal can be used to clamp an external video signal, that is synchronous to the input signal. The timing is programmable.
Pin 17 - Active Video Output, AVO
This pin indicates the active video output data. The signal is clocked with the LLC1 clock.
Pin 18 - Double Output Clock, LLC2
Pin 19 - Output Clock, LLC1
This is the clock reference for the luma, chroma, and status outputs.
Pin 26 - Ground, Output Pad Circuitry GND_P
Pin 20 to 25,28,29 - Luma Output Y0-Y7
These output pins carry the digital luminance data. The data are clocked with the LLC1 clock.
Pin 30 - Main Clock Output CLK20
This is the 20.25MHz main clock output.
Pin 31 - Supply Voltage, Digital Circuitry V_{SUPD}
Pin 34 - Ground, Digital Circuitry GND_D
Pin 35 - Ground, Output Pad Circuitry GND_P
Pin 36 - Supply Voltage, Output Pad Supply V_{SUPP}
Pin 38 to 43,46,47 - Chroma Outputs C0-C7
These outputs carry the digital CrCb chrominance data. The data are clocked with the LL1 clock. The data are sampled at half the clock rate and multiplexed. The CrCb multiplex is reset for each TV line.
Pin 48 to 50 - Picture Bus Priority PR0-PR2
The Picture Bus Priority lines carry the digital priority selection signals. The priority interface allows digital switching of up to 8 sources to the back-end processor. Switching for different sources is prioritized and can be on a per pixel basis.
Pin 51 - Ground, Output Pad Circuitry GND_P
Pin 52 - VGAV-Input.
This pin is connected to the vertical sync signal of a VGA signal.
Pin 53 - Front-End/Back-End Data FPDAT
This pin interfaces to the DDP 3300A back-end processor. The information for the deflection drives and for the white drive control, i.e. the beam current limiter, is transmitted by this pin.
Pin 54 - Reset Input RESQ
A low level on this pin resets the VPC 32xx.
Pin 55 - I^2C Bus Data SDA
The pin connects to the I^2C bus data line.
Pin 57 - Test Input TEST
This pin enables factory test modes. For normal operation, it must be connected to ground.
Pin 59 - Ground, Analog Front-End GND
Pins 62,61,60,58 - Video 1-4
These are the analog video inputs. A CVBS or S-VHS luma signal is converted using the luma (Video 1) AD converter. The VIN1 input can also be switched to the chroma (Video 2) ADC. The input signal must be AC-coupled.
Pin 63 - Chroma Input CIN
This pin is connected to the S-VHS chroma signal. A resistive divider is used to bias the input signal to the middle of the converter input range. CIN can only be connected to the chroma (Video 2) A/D converter. The signal must be AC-coupled.
Pin 64 - Analog Video Output, VOUT
The analog video signal that is selected for the main (luma, CVBS) ADC is output at this pin. An emitter follower is required at this pin.
Pin 65 - Ground, Analog Shield Front-End GND
Pin 66 - Supply Voltage, Analog Front-End V
Pin 67 - Signal GND for Analog Input ISGND
This is the high quality ground reference for the video input signals.
Pin 68 - Reference Voltage Top VRT
Via this pin, the reference voltage for the A/D converters is decoupled. The pin is connected with 10uF/47nF to the Signal Ground Pin.

5-3. CIP3250A (Component Interface Processor)

(1) Description

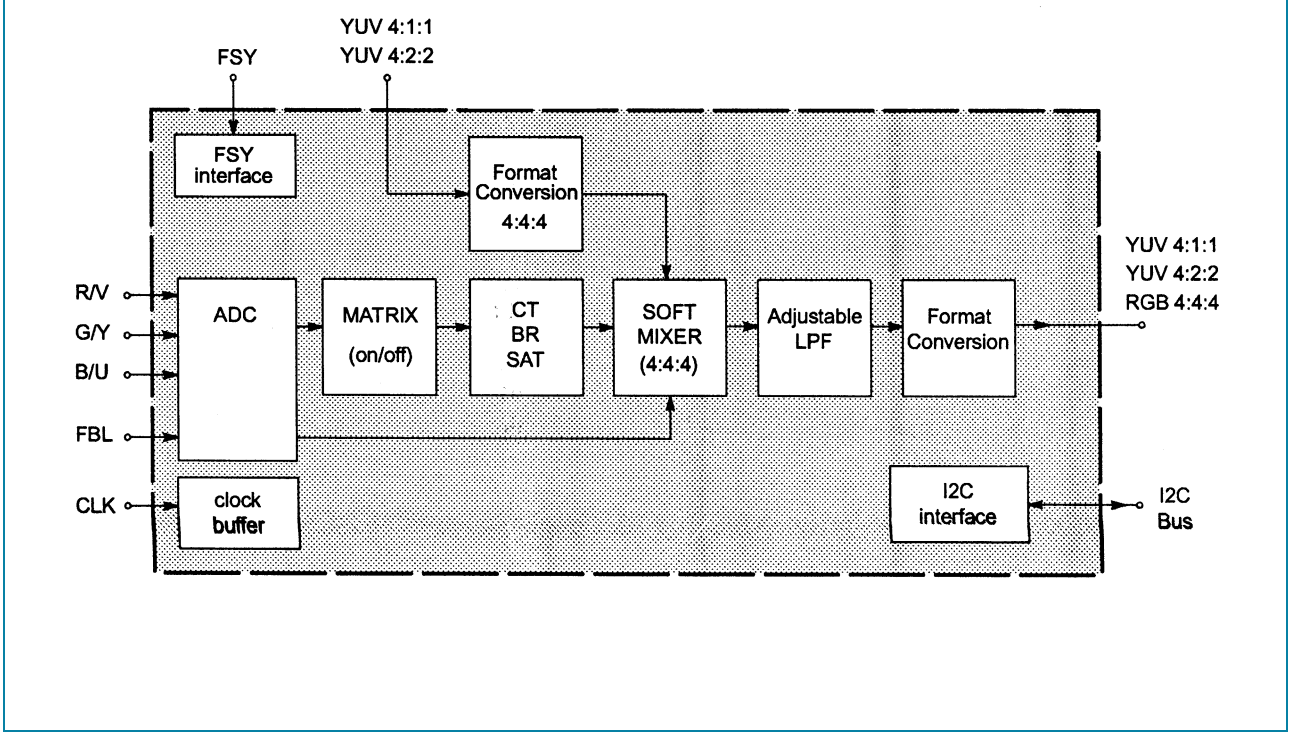
The CIP 3250A is a new CMOS IC that contains on a single chip the entire circuitry to interface analog YUV/RGB/ Fast Blank to a digital YUV system. The Fast Blank signal is used to control a soft mixer between the digitized RGB and an external digital YUV source. The CIP supports various output formats such as YUV 4:1:1/4:2:2 or RGB 4:4:4.

Together with the DIGIT 3000 (e.g. VPC 32xxA) or DIGIT 2000 (e.g. DTI 2250), an interface to a TV-scanrate conversion circuit and/or multi-media frame buffer can be obtained.

(2) Feature

- analog input for RGB or YUV and Fast Blank
- triple 8 bit analog to digital converters for RGB/YUV with internal programmable clamping
- single 6 bit analog to digital converter for Fast Blank singnal
- digital matrix RGB => YUV (Y, B-Y, R-Y)
- luma contrast and brightness correction for signals from analog input
- color saturation and hue correction for signals from analog input
- digital input for DIGIT 2000 or DIGIT 3000 formats
- digital interpolation to 4:4:4 format
- high quality soft mixer controlled by Fast Blank signal
- programmable delays to match digital YUV in and analog RGB/YUV
- variable low pass filters for YUV output
- digital output in DIGIT 2000 and DIGIT 3000 formats, as well as RGB 4:4:4
- I^2C bus interface
- clock frequency 13.5...20.25 MHz

(3) Block Diagram



(4) Pin Description

Pin 1 - STANDBY Input
Via this input pin, the standby mode of the CIP 3250A is enabled. A high level voltage switches all outputs to tristate mode, and power consumption is signigicantly reduced. When the IC IS returned to active mode, a reset is generated internally. Connect to VSS if not used.

Pins 2 to 9 - B7 to B0 Blue Output
In a stand alone application, where the CIP 3250A serces as an A/D-converter, these are the output for the digital Blue signal (pure binary) or the digital U signal (2's complement). Leave vacant if not used.

Pin 10 to 17 - GL7 to GL0 Green/Luma Output
At these outputs, the digital luminance signal is received in pure binary cided format for DIGIT 2000 and DIGIT 3000 applications. In a stand alone application, where the CIP 3250A serves as an A/D-converter, these are the outputs for the digital Green signal(pure binary) or the digital luma signal(pure binary). Leave vacant if not used.

Pin 18 - PVSS Output Pin Ground
This is the common ground connection of all output stages and must be connected to ground.
Note : All ground pins of the chip (i.e. 18,52,58,60,62,64,66 and 68) must be connected together low resistive. The layout of the PCB must take into consideration the need for a low-noise ground.

Pin 19 - PVDD Output Pin Supply + 5V/+3.3V
This pin supplies all output stages and must be connected to a positive supply voltage.
Note : The layout of the PCB must take into consideration the need for a low-noise supply. A bypass capacitor has to be connected between ground and PVDD

Pins 20 to 27 - RC7 to RC0 Red/Chroma Output
These are the outputs for the digital chroma signal in the DIGIT 3000 system, where U and V are multiplexed bytewise. In a DIGIT 2000 system, RC3 to RC0 and RC7 to RC4 carry the halfbyte(nibble) multiplex format. In a stand alone application, where the CIP 3250A serces as an AD-converter, these are the outputs for the digital Red signal(pure binary) or the digital chroma V signal (2's component). Leave vacant if not used.

Pin 29 - AVI Active Video Input
In a DIGIT 2000 application, this input can be connected to ground. In a DIGIT 3000 application, this input expects the DIGIT 3000 AVI signal. In a stand alone application, this input expects the VSYNC vertical sync pulse. Connect ground if not used.

Pin 30 - FSY Front Sync Input
In a DIGIT 2000 application, this input pin expects the DIGIT 2000 SKEW protocol. In a DIGIT 3000 application, this input expects the DIGIT 3000 FSY protocol. In a stand alone application, this unput expects the HSYNC horizontal sync pulse. Connect to ground if not used.

Pin 31 to 32 - SDA and SCL of I^2C-Bus
These pins connect to the I^2Cbus, which takes over the control of the CIP 3250A via the internal registers. The SDA pin is the data input/output, and the SCL pin is the clock input/output of I^2Cbus control interface. All registers are writerable(except address hex27) and readable.

Pin 33 to 35 - PRIO0 to PRIO2 Priority Bus
These pins connect to the Priority Bus of a DIGIT 3000 application. The Picture Bus Priority lines carry the digital priority selection signals. The priority interface allows digital switching of up to 8 sources to the backend processor. Switching for different sources is prioritized and can be on a per pixel basis. In all other applications, they must not be connected.

Pin 36 to 43 - C0 to C7 Chroma Input
These are the inputs for the digital chroma signal which can be received in binary offset or 2's complement coded format. In a DIGIT 2000(4:1:1) system, C3 to C0 take the halfbyte (nibble) multiplex format. C7 to C4 have to be connected to ground. Within the DIGIT 3000(4:2:2) system, U and V are multiplexed bytewise. Connect to ground if not used.

Pin 44 to 51 - L0 to L7 Luma Input
These are the inputs for the digital luma signal which must be in pure binary coded format. Connect to ground if not used.

Pin 52 - DVSS Digital Ground
This is the common ground connection of all digital stages and must be connected to ground.
Note : All ground pins of the chip(i.e. 18, 52, 58, 60, 62, 64, 66, and 68) must be connected together low resistive. The layout of the PCB must take into consideration the need for a low-noise ground.

Pin 53 - DVDD Digital Supply +5V
This pin supplies all digital stages and must be connected to a positive supply voltage.
Note : The layout of the PCB must take into consideration the need for a low-noise supply. A bypass capacitor has to be connected between ground and DVDD.

Pin 54 - CLK Main Clock Input
This is the input for the clock signal. The frequency and vary in the range from 13.5MHz to 20.25MHz.

Pin 55 - RESQ Input
A low signal at this input pin generates a reset. The low-to-high transition of this signal should occur when the supply voltage is stable(power-on reset).

Pin 56 - TMODE Input
This pin is for test purposes only and must be connected to ground in normal operation.

Pin 57 - AVDD Analog Supply +5V
This is the supply voltage pin for the A/D converters and must be connected to a positive supply voltage.
Note : The layout of the PCB must take into consideration the need for a low-noise supply. A bypass capacitor has to be connected between ground and AVDD.

Pin 58 - AVSS Analog Ground
This is the ground pin for the A/D converters and must be connected to ground.
Note : All ground pins of the chip (i.e. 18,52,58,60,62,64, 66, and 68) must be connected together low resistive. The layout of the PCB must take into consideration the need for a low-noise ground.

Pin 59 - ADREF Connect External Capacitor
This pin should be connected to ground over a 10uF and a 100nF capacitor in parallel.

Pin 60 - SUBSTRATE
This is connected to the platform which carries the "die" and must be cvonnected to the ground.
Note : All ground pins of the chip(i.e. 18,52,58,60,62,64,66, and 68) must be connected together low resistive. The layout of the PCB must take into consideration the need for a low-noise ground.

Pin 61 - FB Analog Fast Blank Input
This input takes the DC-coupled analog Fast Blank signal. The amplitude is 1.0V maximum at 75 Ohms. Connect to ground if not used.

Pin 62 - GNDFB Analod Ground
This is the ground pin for the AD converter of the Fast Blank signal and has to be connected to ground.
Note : All ground pins of the chip (i.e. 18,52,58,60,62,64, 62,64,66 and 68) must be connected together low resistive. The layout of the PCB must take into consideration the need for a low-noise ground.

Pin 63 - BU Analog Blue/U Chroma Input
The input pin takes the AC-coupled analog compont signal Blue or U Chroma. The amplitude is 1.0V maximum at 75 Ohms and a coupling capacitor of 220 nF. Internally, the DC-offset of the input signal is adjusted via the programmable internal clamping circuit. Connect to ground if not used.

Pin 64 - GNDBU Analog Ground
This is the ground pin for the A/D converter of the Blue or U Chroma signal and must be connected to ground.
Note : All ground pins of the chip(i.e. 18,52,58,60,62,64,66, and 68) must be connected together low resistive. The layout of the PCB must take into consideration the need for a low-noise ground.

IC DESCRIPTION

Pin 65 - GY Analog Green/Luma Input
This input pin takes the AC-coupled analog compinent signal Green or Luma. The amplitude is 1.0V maximum at 75 Ohms and a couplign capacitor of 220nF. Internally, the DC-offset of the input signal is adjusted via the programmable internal clamping circuit. Connect to ground if not used.

Pin 66 - GNDGY Analog Ground
This is the ground pin for the A/D converter of the Green or Luma signal and must be connected to ground.
Note : All ground pins of the chip(i.e. 18,52,58,60,62,64, 66, and 68) must be connected together low rresistive. The layout of the PCB must take into consideration the need for a low-noise ground.

Pin 67 - RV Analog Red/V Chroma Input
This input pin takes the AC-coupled analog component signal Red or V Chroma. The amplitude is 1.0V maximum at 75ohms and a coupling capacitor of 220nF. Internally, the DC-offset of the input signal is adjusted via the programmable internal clamping circuit. Connect to ground if not used.

Pin 68 - GNDRY Analog Ground
This is the ground pin for the A/D converter of the Red or V Chroma signal and must be connected to ground.
Note : All ground pins of the chip (i.e. 18,52,58,62,64,66, and 68) must be connected together low resistive. The layout of the PCB must take into consideration the need for a low-noise ground.

5-4. MSM5412222 (262, 214-Word X 12-Bit Field Memory)

(1) DESCRIPTION

The OKI MSM541222 is a high performance 3-Mbit, 256K x 12-bit, Field Memory. It is especially designed for high-speed serial access applications such as HDTVs, conventional NTSC TVs, VTRs, digital movies and Multi-media systems. MSM541222 is a FRAM for wide or low or low end use in general commodity TVs and VTRs exclusively. MSM5412222 is not designed for high end use in medical systems, professional graphics systems which require long term picture storage, data storage systems and others. Two or more MSM541222s can be cascaded directly without any delay devices between them. (Cascading provides larger storage depth or a longer delay).

Each of the 12-bit planes has separate serial write and read ports. These employ independent control clocks to support asynchronous read and write operations. Different clock rates are also supported, which allow alternate data rates between write and read data streams.

The MSM5412222 provides high speed FIFO, First-In First-Out, operation without external refreshing: MSM5412222 refreshes its DRAM storage cells automatically, so that it appears fully static to the users. Moreover, fully static type memory cells and decoders for serial access enable the refresh free serial access operation, so that serial read and / or write control clock can be halted high or low for any duration as long as the power is on. Internal conflicts of memory access and refreshing operations are prevented by special arbitration logic.

The MSM5412222 's function is simple, and similar to a digital delay device whose delay-bit-length is easily set by reset timing. The delay length, and the number of read delay clocks between write and read, is determined by externally controlled write and read reset timings.

Additional SRAM serial registers, or line buffers for the initial access of 256 x 12-bit enable high speed first-bit-access with no clock delay just after the write of read reset timings.

Additionally, the MSM5412222 has a write mask function or input enable function (IE), and read-data skipping function or output enable function (OE). The differences between write enable (WE) and input enable (IE), and between read enable (RE) and output enable (OE) are that WE and RE can stop serial write / read address increments, but IE and OE cannot stop the increment, when write / read clocking is continuously applied to MSM5412222. The input enable (IE) function allows the user to write into selected locations of the memeory only, leaving the reset of the memory contents unchanged. This facilitates data processing to display a " picture in picture" on a TV screen.

The MSM5412222 is similar in operation and functionality to OKI 1-Mbit Field Memory MSM514222B and 2-Mbit Field Memory MSM518222. Three MSM514222Bs or one MSM514222B plus one MSM518222 can be replaced simply by one MSM5412222.

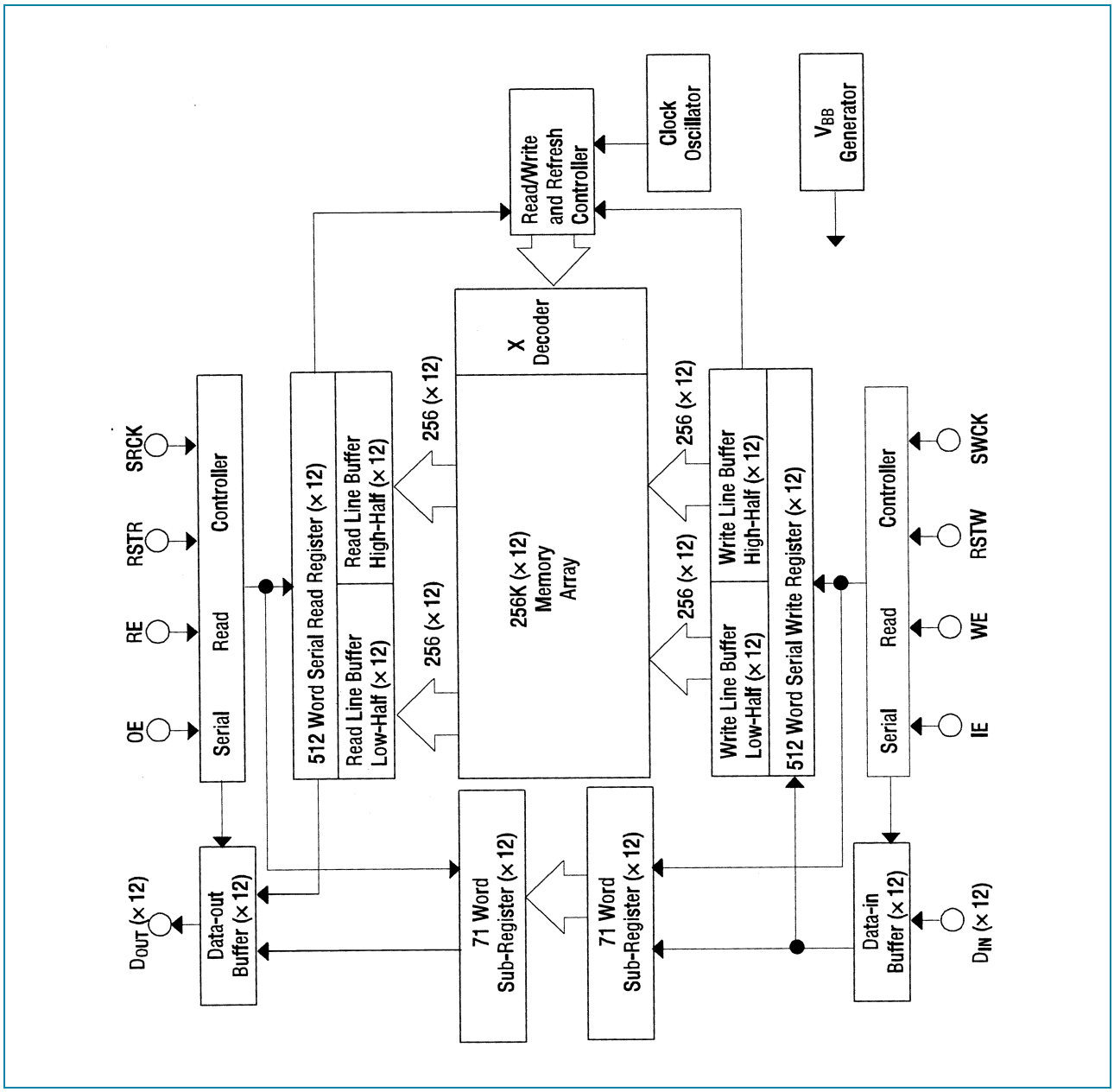
(2) FEATURES

- Single power supply : 5V 10%
- 512 Rows x 512 Columns x 12 bits
- Fast FIFO (First-In First-Out) operation
- High speed asynchronous serial access

  Read / write cycle time 25 ns / 30 ns

  Access time 23 ns / 25 ns
- Direct cascading capability
- Write mask function (Input enable control)
- Data skipping function (Output enable control)
- Self refresh (No refresh control is required)

(3) BLOCK DIAGRAM



(4) Pin Description

Pin No.	Pin Name	Function
17	SWCK	Serial Write Clock
28	SRCK	Serial Read Clock
20	WE	Write Enable
25	RE	Read Enable
21	IE	Input Enable
24	OE	Output Enable
18	RSTW	Write Resert Clock
27	RSTR	Read Reset Clock
2,3,5,6,7,8,10,11,12,13,15,16	$D_{IN}0 \sim D_{IN}11$	Data Input
29,30,32,33,34,35,37,38,39,40,42,43	$D_{OUT}0 \sim D_{OUT}11$	Data Output
22,23	Vcc	Power Supply (5V)
1,31,44	Vss	Ground (0V)
4,9,14,19,26,36,41	NC	No Connection

5-5. DDP 3310B (Display and Deflection Processor)

(1) Description

The DDP 3310B is a single-chip digital Display and Deflection Processor designed for high-quality backend applications in 100/120MHz TV sets with 4:3- or 16:9 picture tubes. The IC can be combined with members of the DIGIT 3000 IC family (VPC 32xx, TPU 3040), or it can be used with third-party products. The IC contains the entire digital video component and deflection processing and all analog interface components.

(2) Feature

Video processing

- linear horizontal scaling (0.25 ... 4)
- non-linear horizontal scaling "panoramavision"
- dynamic peaking
- soft limiter (gamma correction)
- color transient improvement
- programmable RGB matrix
- picture frame generator
- two analog RGB/Fast-Blank inputs

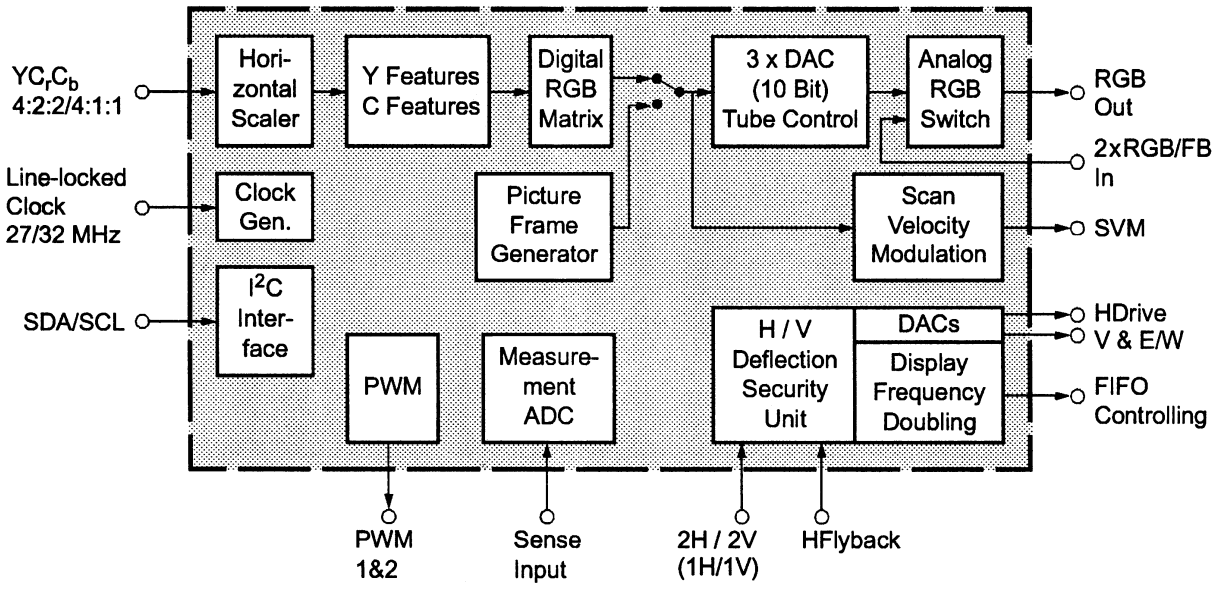
Deflection processing

- scan velocity modulation output
- high-performance H/V deflection
- EHT compensation for vertical / East/West
- soft start/stop of H-Drive
- vertical angle and bow
- differential vertical output
- horizontal and vertical protection circuit
- adjustable horizontal frequency for VGA/SVGA dislay

Miscellaneous

- selectable 4:1:1/4:2:2 YC_rC_b input
- selectable 27/32-MHz line-locked clock input
- crystal oscillator for horizontal protection
- automatic picture tube adjustment(cutoff, whitedrive)
- single 5-V power supply
- hardware for simple 50/60-Hz to 100/120-Hz conversion (display frequency doubling)
- two I^2C-controlled PWM outputs
- beam current limiter

(3) Block Diagram



(4) Pin Description

Pin 1 - Supply Voltage, Output Pin Driver **VSUPP***
This pin is used as supply for the following digital output pins : FIFORRD, FIFORD, FIFOWR, FIFORWR.

Pin 2 - Ground, Output Pin Driver **GNDP***
Output Pin Driver Reference

Pin 3 - Sync Signal Input **VS2**
Additional pin for the vertical sync information. Via I^2C Register the used vertical sync can be switched between the inputs VS2 and VS(Pin 64)

Pin 4 - Reset for FIFO Read Counter **FIFORRD**
This signal is active-High and resets the read counter in the display frequency doubling FIFO.

Pin 5 - Read Enable for FIFO **FIFORD**
This signal is active-High and enabels the read counter in the display frequency doubling FIFO.

Pin 6 - Write Enable for FIFO **FIFOWR**
This signal is active-High and enables the write counter in the display frequency doubling FIFO.

Pin 7 - Reset for FIFO Write Counter **FIFOWR**
This signal is active-High and enables the write counter in the display frequency doubling FIFO.

Pin 8 - Horizontal Drive **HOUT**
This open-drain output supplies the drive pulse for the horizontal output stage. A pull-up resistor has to be used.

Pin 9 - Horizontal Flyback Input **HFLB**
Via this pin, the horizontal flyback pulse is supplied to the DDP 3310B.

Pin 10 - Safety Input **SAFETY**
This input has two thresholds. A signal between the lower and upper threshold means normal function. Other signals are detected as malfunction.

Pin 11 - Vertical Protection Input **VPROT**
The vertical protection circuitry prevents the picture tube from burn-in in the event of a malfunction of the vertical deflection stage. If the peak-to-peak value of the vertical sawtooth signal is too small, the RGB output signals are blanked.

Pin 12 - H-Drive Frequency Range Select **FREQSEL**
This pin selects the frequency range for the horizontal drive signal.

Pin 13 - Clock Select 40.5 or 27/32 MHz**CM1**
Low level selects 27/32 MHz, High level selects 40.5 MHz

Pin 14 - Clock Select 40.5 or 27/32 MHz**CM0**
Low level selects 27 MHz, High level selects 32 MHz

Pin 15 - Range Switch2 for Measuring ADC **RSW2**
This pin is an open-drain pull-down output. During cutoff measurement the switch is off. During white drive measurement the switch is on. Also during the rest of time it is on.

Pin 16 - Range Switch 1 or Second Input for Measuring ADC **RSW1**
This pin is an open-drain pull-down output. During cutoff and white-drive measurement, the switch is off. During the rest of time it is on. The RSW1 pin can be used as second measurement ADC input.

Pin 17 - Measurement ADC Input **SENSE**
This is the input of the analog to digital converter for the picture and tube measurement. Three measurement ranges are selectable with RSW1 and RSW2

Pin 18 - Measurement ADC Reference Input **MGND**
This is the ground reference for the measurement A/D converter.

Pin 19 - Vertical Sawtooth Output **VERT+(19)**
This pin supplies the drive signal for the vertical output stage. The drive signal is generated with 15-bit precision. The analog voltage is generated by a 4-bit current DAC with external resistor (6 k for proper operation) and uses digital noise-shaping.

Pin 20 - Vertical Sawtooth Output inverted **VERT-**
This pin supplies the inverted signal of VERT+.

Together with this pin, it can be used to drive symmetrical deflection amplifiers.

Pin 21 - East/West Parabola Output **EW**
This pin supplies the parabola signal for the East/West correction. The drive signal is generated with 15-bit precision. The analog voltage is generated by a 4-bit current DAC with external resistor and uses digital noise-shaping.

Pin 22 - DAC Current Reference **XREF**
External reference resistor for DAC output currents, typical 10 kΩ, to adjust the output current of the D/A converters. (see recommended operation conditions).
This resistor has to be connected to analog fround as closely as possible to the pin.

Pin 23 - Scan Velocity Modulation Output **SVM**
This output delivers the analog SVM signal. The D/A converters. At zero signal the output current is 50% of the maximum output current.

Pin 24,25,26 - Analog RGB Output **ROUT, GOUT, BOUT**
These pins are the analog Red/Green/Blue outputs of the back-end. The outputs are current sinks.

Pin 27 - Ground, Analog Back-end **GNDO***
This pin has to be connected to the analog supply voltage. No supply current for the digital stages should flow through this line.

Pin 28 - Supply Voltage, Analog Back-end **VSUPO***
This pin has to be connected to the analog supply voltage. No supply current for the digital stages should flow through this line.

Pin 29 - DAC Reference Decouplign/Beam Current Safety **VRD/BCS**
Via this pin, the DAC reference voltage is decoupled by an external capacitor. The DAC output currents depend on this voltage, therefore a pull-down transistor can be used to shut off all beam currents. A decoupling capacitor of 4.7uF in parallel to 100uF (low inductance) is required.

Pin 30, 34 - Fast-Blank Input **FBLIN1/2**
These pins are used to switch the RGB outputs to the external analog RGB inputs. FBLIN1 switches the RIN1, GIN1 and BIN1 inputs, FBLIN2 switches the RIN2, GIN2 and BIN2 inputs. The active level (Low or High) can be selected by software.

Pin 31, 32, 33 - Analog RGB Input1 **RIN1, GIN1, BIN1**
These pin are used to insert an external analog RGB signal, e.g. from a SCART connector which can by switched to the analog RGB outputs with the Fast-Blank signal.
The analog back-end provides separate brightness and contrast settings for the external analog RGB signals.

Pin 35, 36, 37 - Analog RGB Input2 **RIN2, GIN2, BIN2**
These pins are used to insert an external analog RGB signal, e.g. from a SCART connector which can by switched to the analog RGB outputs with the Fast-Blank signal.
The analog back-end provides separate brightness and contrast settings for the external analog RGB signals.

Pin 38 - Test Input **TEST**
This pin enables factory test modes. For normal operation it must be connected to ground.

Pin 39 - Reset Input **RESQ**
A low level on this pin resets the DDP 3310B.

Pin 40 - Adjustable DC Output 1 **PWM1**
This output delivers a DC voltage with a resolution of 8 bit, adjustable over the I^2Cbus. The output is driven by a push-pull stage. The PWM frequency is appr 79.4MHz. For a ripple-free voltage a first order lowpass filter with a corner frequency < 120 Hz should be applied.

Pin 41 - Adjustable DC Output 2 **PWM2**
See pin 40.

Pin 42 - Half-Contrast Input **HCS**
Via this input pin the output level of the D/A-converted internal RGB signals can be reduced by 6dB. Inserted external analog RGB signals remain unchanged.

Pin 43...50 - Picture Bus Chroma **C0...C7**
The Picture Bus Chroma lines carry the multiplexed color component data. For the 4:1:1 input signal (4-bit chroma) the pins C4...C7 are used.

Pin 51 - Supply Voltage, Digital Circuitry **VSUPD***

Pin 52 - Ground, Digital Circuitry **GNDD***
Digital Circuitry Input Reference

Pin 53 - Main Clock Input **LLC2(53)**
This is the input for the line-locked clock signal. The frequency can be 27, 32, or 40.5 MHz.

Pin 54...61 - Picture Bus Luma **Y0...Y7**
The Picture Bus Luma lines carry the digital luminance data.

Pin 62 - Line-Locked Clock Input **LLC1**
This is the reference clock for the single frequency input sync signals required in a FIFO application. The frequency can be 13.5, 16, or 20.25 MHz.

Pin 63 - Sync Signal Input **HS**
This pin gets the horizontal sync information. Either single or double horizontal frequency or VGA horizontal sync signal.

Pin 64 - Sync Signal Input **VS**
This pin gets the vertical sync informatoion. Either single or double vertical frequency or VGA vertical sync signal.

Pin 65, 66 - Crystal Output / Input **XTAL2 / XTAL1**
These pins are connectecd to an 5-MHz crystal oscillator. The security unit for the HOUT signal uses this clock signal as reference.

Pin 67 - I^2C Data Input/Output **SDA**
Via this pin the I^2C - bus data are written to or read from the DDP 3310B.

Pin 68 - I^2C Clock Input **SCL**
Via this pin, the clock signal for the I^2C-bus will be supplied. The signal can be pulled down by an internal transistor.

*** Application Note :**
All ground pins should be connected separeately with short and low-resistive lines to a central power supply ground. Accordingly, all supply pins should be connected separately with short and low-resistive lines to the power supply. Decoupling capacitors from VSUPP to GNDP, VSUPD to GNDD, and VSUPO to GNDO are recommended to be placed as closely as possible to the pins.

IC DC VOLTAGE CHARTS

*** Input signal** - - - - - - - PAL/CH5 - Video : 8 step colour bar (87% AM)
Audio : 1KHz sinewave (60% FM)

*** User's control condition** - - - - - - - Contrast, Brightness, Colour, Volume Controls-max.

*** Line voltage** - - - - - - - AC 230V, 50Hz

*** All the voltage in each point are measured with Multimeter.**

1. TDA 8172 (I301)

Pin No.	1	2	3	4	5	6	7
V(DC)	0.2	+10.0	-8.1	-10.0	0	10.2	0.2

2. MSP 3410D (I606)

Pin No.	1	2	3	4	5	6	7	8	9	10
V(DC)	2.6	0	0	0	0	0	4.9	0	5.0	5.0

Pin No.	11	12	13	14	15	16	17	18	19	20
V(DC)	2.4	2.4	0	0.2	0.2	0.2	0.2	4.9	0	0.2

Pin No.	21	22	23	24	25	26	27	28	29	30
V(DC)	0	0	0	4.9	0.1	0.1	0	0.1	0.1	0

Pin No.	31	32	33	34	35	36	37	38	39	40
V(DC)	0.1	0	3.7	3.7	0	3.7	3.7	6.9	8.0	6.9

Pin No.	41	42	43	44	45	46	47	48	49	50
V(DC)	0	3.7	3.7	3.7	0	3.7	3.7	0	3.7	3.7

Pin No.	51	52	53	54	55	56	57	58	59	60
V(DC)	0	3.7	3.7	2.6	3.7	0	5.0	1.5	1.5	0.3

Pin No.	61	62	63	64
V(DC)	0	2.2	2.1	0.3

3. TDA 4470-M (I101)

Pin No.	1	2	3	4	5	6	7	8	9	10
V(DC)	3.1	3.1	3.4	0	1.1	2.4	2.4	2.1	0	1.1

Pin No.	11	12	13	14	15	16	17	18	19	20
V(DC)	2.6	2.1	4.4	3.8	2.6	0	4.2	2.3	3.4	3.3

Pin No.	21	22	23	24	25	26	27	28
V(DC)	3.3	2.7	4.8	2.1	2.1	0.7	0.1	0

4. TDA 7269 (I601)

Pin No.	1	2	3	4	5	6	7	8	9	10	11
V(DC)	-15.0	-0.1	+15.0	-0.1	+8.5	-15.0	0	0	0	0	0

5. ST92195 (I701)

Pin No.	1	2	3	4	5	6	7	8	9	10
V(DC)	4.9	4.8	0	0	0	0	0	0	0	0.2

Pin No.	11	12	13	14	15	16	17	18	19	20
V(DC)	5.0	0	0	0	0.4	0.5	0.4	0	5.0	5.0

Pin No.	21	22	23	24	25	26	27	28	29	30
V(DC)	5	0.2	0	0	5.0	0.2	1.8	0.2	2.2	0.3

Pin No.	31	32	33	34	35	36	37	38	39	40
V(DC)	5.0	5.0	0.3	1.4	0	0	0	2.0	5.0	0.5

Pin No.	41	42	43	44	45	46	47	48	49	50
V(DC)	-0.3	0	0	0.1	5.0	0	0	0	0	2.3

Pin No.	51	52	53	54	55	56
V(DC)	2.3	5.0	4.9	0.2	2.7	0.1

6. AT24C16-10PC (I702)

Pin No.	1	2	3	4	5	6	7	8
V(DC)	0	0	5.0	0	5.0	5.0	0	5.0

7. STR-F6654 (I801)

Pin No.	1	2	3	4	5
V(DC)	2.0	0	254.0	18.0	0

8. TEA5101B(I901)

Pin No.	1	2	3	4	5	6	7	8	9	10
V(DC)	3.4	12.1	3.4	3.4	208.5	0.2	149.9	0	152.8	151.3

Pin No.	11	12	13	14	15
V(DC)	0.2	154.5	151.4	0.2	154.8

IC DC VOLTAGE CHARTS

9. P503

Pin No.	1	2	3	4	5	6	7	8	9	10
V(DC)	0	5.0	1.1	0.8	0	1.8	0	0	0	0.5

Pin No.	11	12	13	14	15	16	17	18
V(DC)	-0.3	0	4.9	0	0.4	0.4	0.4	12.1

10. P504

Pin No.	1	2	3	4	5	6	7	8	9	10
V(DC)	0.8	0	0	0.8	0	0	0	0	0	0

Pin No.	11	12	13	14	15	16	17	18
V(DC)	5	5	71	0.2	0	2.8	2.8	2.8