# Service Manual

## CHASSIS : CP-850FX

## MODEL : DTF-2950-100D
DTF-2950GB-100D
DTF-2950K-100D
DTF-2930-100D
DTF-2930GB-100D
DTF-2930K-100D

**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.

## DAEWOO
ELECTRONICS

**SEP.2006**

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## DOCUMENT HISTORY

| VERSION | DATE | COMMENTS |
|---------|------|----------|
| V1.00 | 31/07/06 | Creation of document (Author JS KIM) for project CP-850FX 100Hz TV. |
| | | |

# 1 MAIN FEATURES

## 1.1 SPECIFICATIONS

### 1.1.1 GENERAL

| TV standard | | PAL/SECAM-B/G, D/K, PAL-I/I, SECAM-L/L' |
|---|---|---|
| Colour system | Tuner | PAL, SECAM |
| | AV | PAL, SECAM, PAL 60, NTSC M, NTSC 4.43 |
| Sound system | | NICAM B/G, I, D/K, L, FM 2Carrier B/G, D/K |
| Power consumption | | 105W |
| Sound Output Power | | 7W x 2 (at 60% mod, 10%THD) |
| Speaker | | 12W 8 ohm x2 |
| Teletext system | | 9 pages memory FASTEXT (FLOF or TOP) |
| Aerial input | | 75 ohm unbalanced |
| Channel coverage | | Off-air channels, S-cable channels and hyperband |
| Tuning system | | frequency synthesiser tuning system |
| Visual screen size | | 68cm |
| Channel indication | | On Screen Display |
| Program Selection | | 100 programmes |
| Aux. terminal | | EURO-SCART 1 : Audio / Video In and Out, R/G/B In, Slow and Fast switching. EURO-SCART 2 : Audio / Video In and Out, SVHS In. AV3 : Audio-Video Jack on side of cabinet. Headphone jack (3.5 mm) on side of cabinet SVHS3 : Jack on side of cabinet – sound input common with AV3. |
| Remote Control Unit | | R-49C10(AAA) |

### 1.1.2 EURO-SCART 1 (21 Pin)

| Pin | Signal Description | Matching value |
|---|---|---|
| 1 | Audio Output Right | 0.5 Vrms, Impedance < 1 k$\Omega$, ( RF 54% Mod ) |
| 2 | Audio Input Right | 0.5 Vrms, Impedance > 10 k$\Omega$ |
| 3 | Audio Output Left | 0.5 Vrms, Impedance < 1 k$\Omega$, ( RF 54% Mod ) |
| 4 | Audio Earth | |
| 5 | Blue Earth | |
| 6 | Audio Input Left | 0.5 Vrms, Impedance > 10 k$\Omega$ |
| 7 | Blue Input | 0.7 Vpp $\pm$0.1V, Impedance 75$\Omega$ |
| 8 | Slow Switching | TV : 0 to 2V, AV 16/9 : 4.5 to 7V, AV 4/3 : 9.5 to 12V , Impedance > 10 k$\Omega$ |
| 9 | Green Earth | |

| 10 | N.C. | |
| --- | --- | --- |
| 11 | Green Input | 0.7 Vpp $\pm$ 0.1V, Impedance 75$\Omega$ |
| 12 | N.C. | |
| 13 | Red Earth | |
| 14 | Blanking Earth | |
| 15 | Red Input | 0.7 Vpp $\pm$ 0.1V, Impedance 75$\Omega$ |
| 16 | Fast Switching | 0 to 0.4V : Logic "0", 1 to 3V : Logic "1", Impedance 75$\Omega$ |
| 17 | Video Out Earth | |
| 18 | Video In Earth | |
| 19 | Video Output | 1 Vpp $\pm$ 3dB, Impedance 75$\Omega$ |
| 20 | Video Input | 1 Vpp $\pm$ 3dB, Impedance 75$\Omega$ |
| 21 | Common Earth | |

## 1.1.3 EURO-SCART 2 (21 Pin)

| Pin | Signal Description | Matching value |
| --- | --- | --- |
| 1 | Audio Output Right | 0.5 Vrms, Impedance < 1 k$\Omega$, ( RF 54% Mod ) |
| 2 | Audio Input Right | 0.5 Vrms, Impedance > 10 k$\Omega$ |
| 3 | Audio Output Left | 0.5 Vrms, Impedance < 1 k$\Omega$, ( RF 54% Mod ) |
| 4 | Audio Earth | |
| 5 | Earth | |
| 6 | Audio Input Left | 0.5 Vrms, Impedance > 10 k$\Omega$ |
| 7 | N.C. | |
| 8 | Slow Switching | TV : 0 to 2V, AV 16/9 : 4.5 to 7V, AV 4/3 : 9.5 to 12V , Impedance > 10 k$\Omega$ |
| 9 | Earth | |
| 10 | N.C. | |
| 11 | N.C. | |
| 12 | N.C. | |
| 13 | Earth | |
| 14 | Earth | |
| 15 | Chroma Input | $\pm$ 3dB for a luminance signal of 1 Vpp |
| 16 | N.C. | |
| 17 | Earth | |
| 18 | Video In Earth | |
| 19 | Video Output | 1 Vpp $\pm$ 3dB, Impedance 75$\Omega$ ( Monitor output ) |
| 20 | Video Input, Y In. | 1 Vpp $\pm$ 3dB, Impedance 75$\Omega$ |
| 21 | Common Earth | |
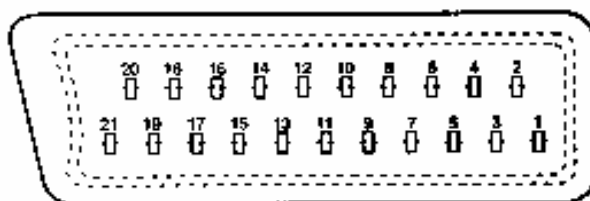
## 1.2 CHANNEL/FREQUENCY TABLE

| CHANNEL | EUROPE CCIR | FRANCE | GB(IRELAND) | EAST OIRT |
|---|---|---|---|---|
| C01 | 46.25 | - | 45.75 | 49.75 |
| C02 | 48.25 | 55.75 (L') | 53.75 | 59.25 |
| C03 | 55.25 | 60.5 (L') | 61.75 | 77.25 |
| C04 | 62.25 | 63.75 (L') | 175.25 | 85.25 |
| C05 | 175.25 | 176.00 | 183.25 | 93.25 |
| C06 | 182.25 | 184.00 | 191.25 | 175.25 |
| C07 | 189.25 | 192.00 | 199.25 | 183.25 |
| C08 | 196.25 | 200.00 | 207.25 | 191.25 |
| C09 | 203.25 | 208.00 | 215.25 | 199.25 |
| C10 | 210.25 | 216.00 | 223.25 | 207.25 |
| C11 | 217.25 | 189.25 (LUX) | 231.25 | 215.25 |
| C12 | 224.25 | 69.25 (L') | 239.25 | 223.25 |
| C13 | 53.75 | 76.25 (L') | 247.25 | - |
| C14 | - | 83.25 (L') | 49.75 | - |
| C15 | 82.25 | 90.25 | 57.75 | - |
| C16 | - | 97.25 | 65.75 | - |
| C17 | 183.75 | - | 77.75 | - |
| C18 | 192.25 | - | 85.75 | - |
| C19 | 201.25 | - | - | - |
| C20 | - | - | - | - |
| C21 | 471.25 | 471.25 | 471.25 | 471.25 |
| C22 | 479.25 | 479.25 | 479.25 | 479.25 |
| C23 | 487.25 | 487.25 | 487.25 | 487.25 |
| C24 | 495.25 | 495.25 | 495.25 | 495.25 |
| C25 | 503.25 | 503.25 | 503.25 | 503.25 |
| C26 | 511.25 | 511.25 | 511.25 | 511.25 |
| C27 | 519.25 | 519.25 | 519.25 | 519.25 |
| C28 | 527.25 | 527.25 | 527.25 | 527.25 |
| C29 | 535.25 | 535.25 | 535.25 | 535.25 |
| C30 | 543.25 | 543.25 | 543.25 | 543.25 |
| C31 | 551.25 | 551.25 | 551.25 | 551.25 |
| C32 | 559.25 | 559.25 | 559.25 | 559.25 |
| C33 | 567.25 | 567.25 | 567.25 | 567.25 |
| C34 | 575.25 | 575.25 | 575.25 | 575.25 |
| C35 | 583.25 | 583.25 | 583.25 | 583.25 |
| C36 | 591.25 | 591.25 | 591.25 | 591.25 |
| C37 | 599.25 | 599.25 | 599.25 | 599.25 |
| C38 | 607.25 | 607.25 | 607.25 | 607.25 |
| C39 | 615.25 | 615.25 | 615.25 | 615.25 |
| C40 | 623.25 | 623.25 | 623.25 | 623.25 |
| C41 | 631.25 | 631.25 | 631.25 | 631.25 |
| C42 | 639.25 | 639.25 | 639.25 | 639.25 |
| C43 | 647.25 | 647.25 | 647.25 | 647.25 |
| C44 | 655.25 | 655.25 | 655.25 | 655.25 |
| C45 | 663.25 | 663.25 | 663.25 | 663.25 |
| C46 | 671.25 | 671.25 | 671.25 | 671.25 |

| | | | | |
|------|--------|--------|--------|--------|
| **C47** | 679.25 | 679.25 | 679.25 | 679.25 |
| **C48** | 687.25 | 687.25 | 687.25 | 687.25 |
| **C49** | 695.25 | 695.25 | 695.25 | 695.25 |
| **C50** | 703.25 | 703.25 | 703.25 | 703.25 |
| **C51** | 711.25 | 711.25 | 711.25 | 711.25 |
| **C52** | 719.25 | 719.25 | 719.25 | 719.25 |
| **C53** | 727.25 | 727.25 | 727.25 | 727.25 |
| **C54** | 735.25 | 735.25 | 735.25 | 735.25 |
| **C55** | 743.25 | 743.25 | 743.25 | 743.25 |
| **C56** | 751.25 | 751.25 | 751.25 | 751.25 |
| **C57** | 759.25 | 759.25 | 759.25 | 759.25 |
| **C58** | 767.25 | 767.25 | 767.25 | 767.25 |
| **C59** | 775.25 | 775.25 | 775.25 | 775.25 |
| **C60** | 783.25 | 783.25 | 783.25 | 783.25 |
| **C61** | 791.25 | 791.25 | 791.25 | 791.25 |
| **C62** | 799.25 | 799.25 | 799.25 | 799.25 |
| **C63** | 807.25 | 807.25 | 807.25 | 807.25 |
| **C64** | 815.25 | 815.25 | 815.25 | 815.25 |
| **C65** | 823.25 | 823.25 | 823.25 | 823.25 |
| **C66** | 831.25 | 831.25 | 831.25 | 831.25 |
| **C67** | 839.25 | 839.25 | 839.25 | 839.25 |
| **C68** | 847.25 | 847.25 | 847.25 | 847.25 |
| **C69** | 855.25 | 855.25 | 855.25 | 855.25 |
| **C70** | 863.25 | 863.25 | 863.25 | 863.25 |
| **C71** | 69.25 | - | - | - |
| **C72** | 76.25 | - | - | - |
| **C73** | 83.25 | - | - | - |
| **C74** | 90.25 | - | - | - |
| **C75** | 97.25 | - | - | - |
| **C76** | 59.25 | - | - | - |
| **C77** | 93.25 | - | - | - |
| **S01** | 105.25 | 104.75 | 103.25 | 105.25 |
| **S02** | 112.25 | 116.75 | 111.25 | 112.25 |
| **S03** | 119.25 | 128.75 | 119.25 | 119.25 |
| **S04** | 126.25 | 140.75 | 127.25 | 126.25 |
| **S05** | 133.25 | 152.75 | 135.25 | 133.25 |
| **S06** | 140.25 | 164.75 | 143.25 | 140.25 |
| **S07** | 147.25 | 176.75 | 151.25 | 147.25 |
| **S08** | 154.25 | 188.75 | 159.25 | 154.25 |
| **S09** | 161.25 | 200.75 | 167.25 | 161.25 |
| **S10** | 168.25 | 212.75 | - | 168.25 |
| **S11** | 231.25 | 224.75 | - | 231.25 |
| **S12** | 238.25 | 236.75 | - | 238.25 |
| **S13** | 245.25 | 248.75 | 255.25 | 245.25 |
| **S14** | 252.25 | 260.75 | 263.25 | 252.25 |
| **S15** | 259.25 | 272.75 | 271.25 | 259.25 |
| **S16** | 266.25 | 284.75 | 279.25 | 266.25 |
| **S17** | 273.25 | 296.75 | 287.25 | 273.25 |
| **S18** | 280.25 | 136.00 | 295.25 | 280.25 |

| | | | | |
|---|---|---|---|---|
| **S19** | 287.25 | 160.00 | 303.25 | 287.25 |
| **S20** | 294.25 | - | - | 294.25 |
| **S21** | 303.25 | 303.25 | - | 303.25 |
| **S22** | 311.25 | 311.25 | 311.25 | 311.25 |
| **S23** | 319.25 | 319.25 | 319.25 | 319.25 |
| **S24** | 327.25 | 327.25 | 327.25 | 327.25 |
| **S25** | 335.25 | 335.25 | 335.25 | 335.25 |
| **S26** | 343.25 | 343.25 | 343.25 | 343.25 |
| **S27** | 351.25 | 351.25 | 351.25 | 351.25 |
| **S28** | 359.25 | 359.25 | 359.25 | 359.25 |
| **S29** | 367.25 | 367.25 | 367.25 | 367.25 |
| **S30** | 375.25 | 375.25 | 375.25 | 375.25 |
| **S31** | 383.25 | 383.25 | 383.25 | 383.25 |
| **S32** | 391.25 | 391.25 | 391.25 | 391.25 |
| **S33** | 399.25 | 399.25 | 399.25 | 399.25 |
| **S34** | 407.25 | 407.25 | 407.25 | 407.25 |
| **S35** | 415.25 | 415.25 | 415.25 | 415.25 |
| **S36** | 423.25 | 423.25 | 423.25 | 423.25 |
| **S37** | 431.25 | 431.25 | 431.25 | 431.25 |
| **S38** | 439.25 | 439.25 | 439.25 | 439.25 |
| **S39** | 447.25 | 447.25 | 447.25 | 447.25 |
| **S40** | 455.25 | 455.25 | 455.25 | 455.25 |
| **S41** | 463.25 | 463.25 | 463.25 | 463.25 |

## 1.3   ATSS SORTING METHOD

The TV set sweeps all the TV bands from beginning of VHF to end of UHF. The TV controlling software for each program checks if a VPS CNI code is transmitted (this system exists for German, Swiss and Austrian transmissions).
If no VPS CNI code is found, then the system checks if a CNI code is transmitted as part of the teletext transmission ( Packet 8/30 format 1 and format 2). If such a code ( VPS or teletext ) is found and if this code is in the ATSS list, the program is automatically named.
If the transmission does not have VPS CNI, and no teletext service is available, then there is no possibility of the program being automatically named.
The programs found are then sorted in 4 groups :

**Group I** : It contains all the programs from the selected country and named by the TV controlling software. Within this group the sorting order is fixed by the ATSS list.
**Group II** : It contains all the programs with a strong signal strength which are not listed in group I.
**Group III** : It contains all the programs with a weak signal strength which are not listed in group I.
**Group IV** : If two or more programs with the same code are found, only the strongest ( or if they have the same level the one with the lowest frequency) is listed in group I, II or III. The others are listed in group IV.

### 1.3.1   GENERAL CASE

| Program number | Group | Skip |
|---|---|---|
| 1 | Group I | |
| 2 | | |
| ... | | |
| n | | |
| n+1 | Group II | |
| ... | | |
| m | | |
| m+1 | Group III | |
| ... | | |
| p | | |
| p+1 | Group IV | ✓ |
| ... | | |
| q | | |
| q+1 | not used | ✓ |
| ... | | |
| 99 | | |
| 0 | | |

### 1.3.2   SPECIAL CASE

| Program number | Group | Skip |
|---|---|---|
| 1 | Group II | |
| ... | | |
| m | | |
| m+1 | Group III | |
| ... | | |
| p | | |
| p+1 | Group IV | ✓ |
| ... | | |
| q | | |
| q+1 | not used | ✓ |
| ... | | |
| 99 | | |
| 0 | | |

Special case : Country selection = Others

Note : If two programs with the same name but a different code are found these two programs are listed in group I, II or III .

The sorting order within group II, III, and IV is based on the channel frequency. The program with the lowest frequency is allocated the first rank in its group, and so forth until the last program of the group which has the highest frequency.

Special case : **France**
If France is selected, the TV controlling software first sweeps all TV bands with France system selected ( positive video modulation) and then a second time with Europe system selected ( negative video modulation).

Special case : **Switzerland**
If Switzerland is selected the TV controlling software first sweeps all TV bands with Europe system selected (negative video modulation) and then a second time with France system selected ( positive video modulation).

Special case : **GB**
Note for satellite receiver users : Before starting ATSS turn on your satellite receiver and tune to " SKY NEWS ".
If GB is selected the TV controlling software seeks for programs only in UHF ( C21 to C70 ). The sorting order is :
1 - BBC1
2 - BBC2
3 - ITV
4 - CH4
5 - CH5
6 – NEWS (Sky News)

If two or more " identical "programs ( same name but different code e.g. BBC1 and BBC1 Scotland ) are found the following programs in the list will be shifted up. (1 - BBC1, 2 - BBC1, 3 - BBC2, 4 - ITV, 5 - CH4, 6 - CH5, 7 - NEWS, ..)

If one of the programs above is not found, the associated program number remains empty ( freq.=467.25 MHz - Skip selected - no name – system = GB).
example A : 1 - BBC1, 2 - BBC2, 3 - ITV, 4 - -----, 5 - CH5, 6 - NEWS, ...
example B ( if 2 BBC1 found ) : 1 - BBC1, 2 - BBC1, 3 - BBC2, 4 - ITV, 5 - -----, 6 - CH5, 7 - NEWS, ...

## 2   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 produce 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 25-26 KV (20"-21") or  26 KV (25" - 28") at max beam current. The high voltage must not, under any circumstances, exceed 27.5 KV (20"), 29KV (21"), 29.5 KV (25") or 30 KV (28"). Each time a receiver requires servicing, the high voltage should be checked. It is important 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

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. Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high voltage equipment.
Discharge 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.
If any Fuse in this TV receiver is blown, replace it with the FUSE specified in the Replacement Parts List.
When replacing a high wattage resistor (metal oxide film resistor) in the circuit board, keep the resistor 10 mm away from circuit board.
Keep wires away from high voltage or high temperature components.
This receiver must operate under AC 230 volts, 5O Hz. NEVER connect to a DC supply or any other voltage or frequency.

### PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this equipment 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 by designated symbol on the parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of substitutes replacement parts which do not have the same safety characteristics as specified in the parts list may create X-RAY Radiation.

## 3 ALIGNMENT INSTRUCTIONS

### 3.1 MICROCONTROLLER CONFIGURATION : SERVICE MODE

To switch the TV set into service mode please see instruction below.
1 - Select PR. number 91
2 - Adjust sharpness to minimum and exit all menus.
3 – Within 2 seconds press the key sequence : **RED - GREEN - menu**

The software version is displayed beside the word Service, e.g. "SERVICE V1.00".
To exit SERVICE menu press **menu** key or **Std By** key.

### 3.2 SERVICE MODE NAVIGATION

Pr Up/Down remote keys : cycle through the service items available.
Vol -/+ remote keys : Dec./Increment the values within range – Cycle trough option bits.
OK key : Toggle bits in option byte

| Order | Item | Default setting Note:All settings are approximate |
|:---:|:---:|:---:|
| 1 | HOR CEN | -154 |
| 2 | RED GAIN | 412 |
| 3 | GRN GAIN | 363 |
| 4 | BLUE GAIN | 380 |
| 5 | RED BIAS | 226 |
| 6 | GRN BIAS | 210 |
| 7 | AGC LEVEL | 56 |
| 8 | G2 – SCREEN | 32 |
| 9 | AFT | 32 |
| 10 | AVL | OFF |
| 11 | OPTION1 | 0011 1000 [0x38] |
| 12 | OPTION2 | 0000 0110 [0x06] |
| 13 | OPTION3 | 1111 1111 [0xFF] |
| 14 | PARABOLA | 346 |
| 15 | HOR WIDTH | -71 |
| 16 | CORNER T | -100 |
| 17 | CORNER B | -30 |
| 18 | HOR. PARAL | 2 |
| 19 | V. LINEAR | 16 |
| 20 | EW TRAPEZ | 12 |
| 21 | S CORRECT | 130 |
| 22 | VERT CENT | -14 |
| 23 | VERT SIZE | 40 |
| 24 | SHIPPING | OFF |

### 3.3 MICROCONTROLLER CONFIGURATION : OPTION BITS

There are three option bytes available (16 bits in all). These option bits are available from
Service mode. First find the OPTION1 or OPTION2 control, and then use the Volume
PLUS/MINUS buttons on the remote control keypad to locate the bits, and OK key to toggle them.
The table below shows the two option bytes available;

### 3.3.1 OPTION 1

|   | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 |
|---|----|----|----|----|----|----|----|----|
| 1 | TOP Teletext OFF | FASTEXT (FLOF) OFF | TUBE 4:3 | Headphone Volume/Balance control OFF | Dolby Virtual OFF | SVHS3 disable | **Tuner options**<br><br>00 = Philips<br>01 = not used<br>10 = ALPS<br>11 = PARTSNIC | |
| 0 | TOP Teletext ON | FASTEXT (FLOF) ON | TUBE 16:9 | Headphone Volume/Balance control ON | Dolby Virtual ON | SVHS3 enable | | |

### 3.3.2 OPTION 2

|   | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 |
|---|----|----|----|----|----|----|----|----|
| 1 | Fixed to '0' | JVC remote control | AVL control OFF | PICTURE TILT ON | Program list enabled | See table below | | |
| 0 | | Daewoo Remote control | AVL control ON | PICTURE TILT OFF | Program list disabled | | | |

### 3.3.3 OPTION 3

|   | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 |
|---|----|----|----|----|----|----|----|----|
| 1 | Must be set to "1" for future compatibility | | | Local keyboard : 6 keys | Must be set to "1" for future compatibility ( See CP830 NEC) | OSD display "AV" in extern mode | AV3 Enabled | Full ATSS |
| 0 | | | | Local keyboard : 5 keys | | OSD display "EXT" in extern mode (JVC only) | AV3 Disabled (NEC only) | Basic ATSS |

| Tube | Beam | Current (mA) | B2 | B1 | B0 |
|------|------|--------------|----|----|----|
|      | Nominal | Max |  |  |  |
|      | 0.95 | 1.10 | 0 | 0 | 0 |
|      | 1.00 | 1.15 | 0 | 0 | 1 |
|      | 1.05 | 1.20 | 0 | 1 | 0 |
|      | 1.10 | 1.25 | 0 | 1 | 1 |
|      | 1.20 | 1.35 | 1 | 0 | 0 |
| LG PHILIPS CRT | 1.25 | 1.40 | 1 | 0 | 1 |
| SAMSUNG SDI CRT | 1.30 | 1.45 | 1 | 1 | 0 |
|      | 1.35 | 1.50 | 1 | 1 | 1 |

All values modified are immediately memorised in eeprom.

## 3.4 <u>TV SET ALIGNMENT</u>

### 3.4.1 LOCAL OSCILLATOR ALIGNMENT

Tune a colour bar pattern. The frequency of the signal carrier must be accurate ( Max +/- 10KHz deviation from the nominal channel frequency).
Find "AFT" item in service mode.
Adjust the coil L150 to bring the cursor to central position : 32.

### 3.4.2 G2 ALIGNMENT

- Tune a colour bar pattern.
- Find the "G2 – SCREEN" item in service mode.
- Adjust screen volume ( on FBT ) to bring the cursor to central position : 32.

### 3.4.3 WHITE BALANCE

- Select a dark picture and adjust RED BIAS and GRN BIAS to the desired colour temperature.
- Select a bright picture and adjust RED, GRN and BLUE GAIN to the desired colour temperature.

### 3.4.4 FOCUS

Adjust the Focus volume ( on FBT ) to have the best resolution on screen.

### 3.4.5 VERTICAL GEOMETRY

Adjust V. LINEAR (linearity), S CORRECT (S. Correction), VERT SIZE (Vertical amplitude), VERT CENT (vertical centring) to compensate for vertical distortion.
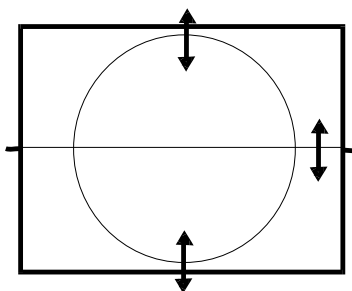
### 3.4.6 HORIZONTAL PICTURE CENTRING

Adjust HOR CEN (Horizontal centre) to have the picture in the centre of the screen.

### 3.4.7 EAST / WEST CORRECTION

Adjust the PARABOLA, HOR WIDTH, CORNER, HOR PARAL, EW TRAPEZ, to compensate for geometrical distortion.
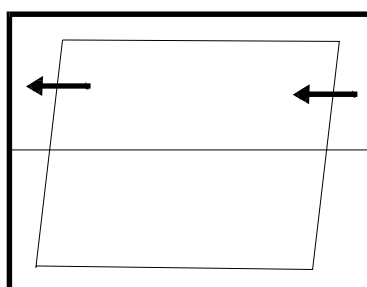
HOR PARAL
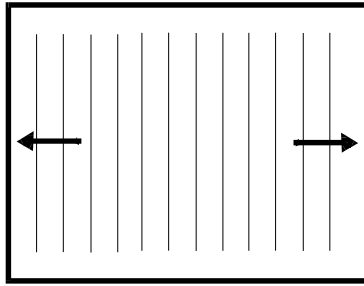
**HOR WIDTH**
adjust for 93% overscan.
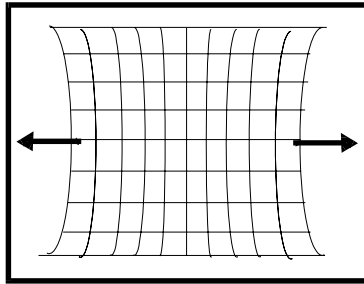
**PARABOLA**
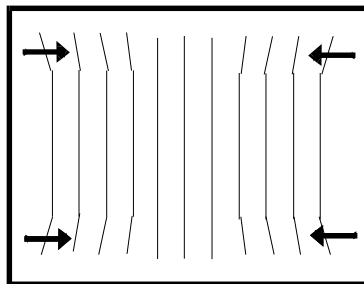
**CORNER B & CORNER T**
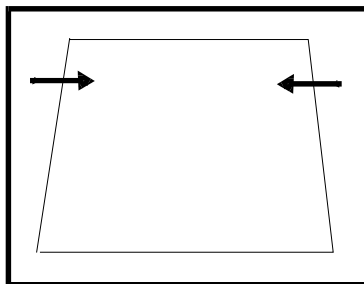
**EW TRAPEZ**

### 3.4.8  AGC

- Make sure option bits are correct for the tuner fitted on the chassis (See above how to change option bits).
- Adjust the antenna signal level at 62 dB$\mu$V$\pm$ 1
- Tune a colour bar pattern.
- Find the "AGC" item in service mode.
- Press the key "OK" on the remote keypad and wait until AGC level stabilise to the optimum value.
- Alternatively, use "Vol Up/Dwn" keys to adjust manually to the desired Tuner Take Over Point (TOP).

# 4   IC DESCRIPTION

## 4.1   TELETEXT DECODER WITH EMBEDDED 8-BIT CONTROLLER

TVText Pro is a 8-bit controller based on a enhanced 8051 core with embedded teletext, On screen Display and TV controller functions.

### 4.1.1   BLOCK DIAGRAM OF THE SDA55XX
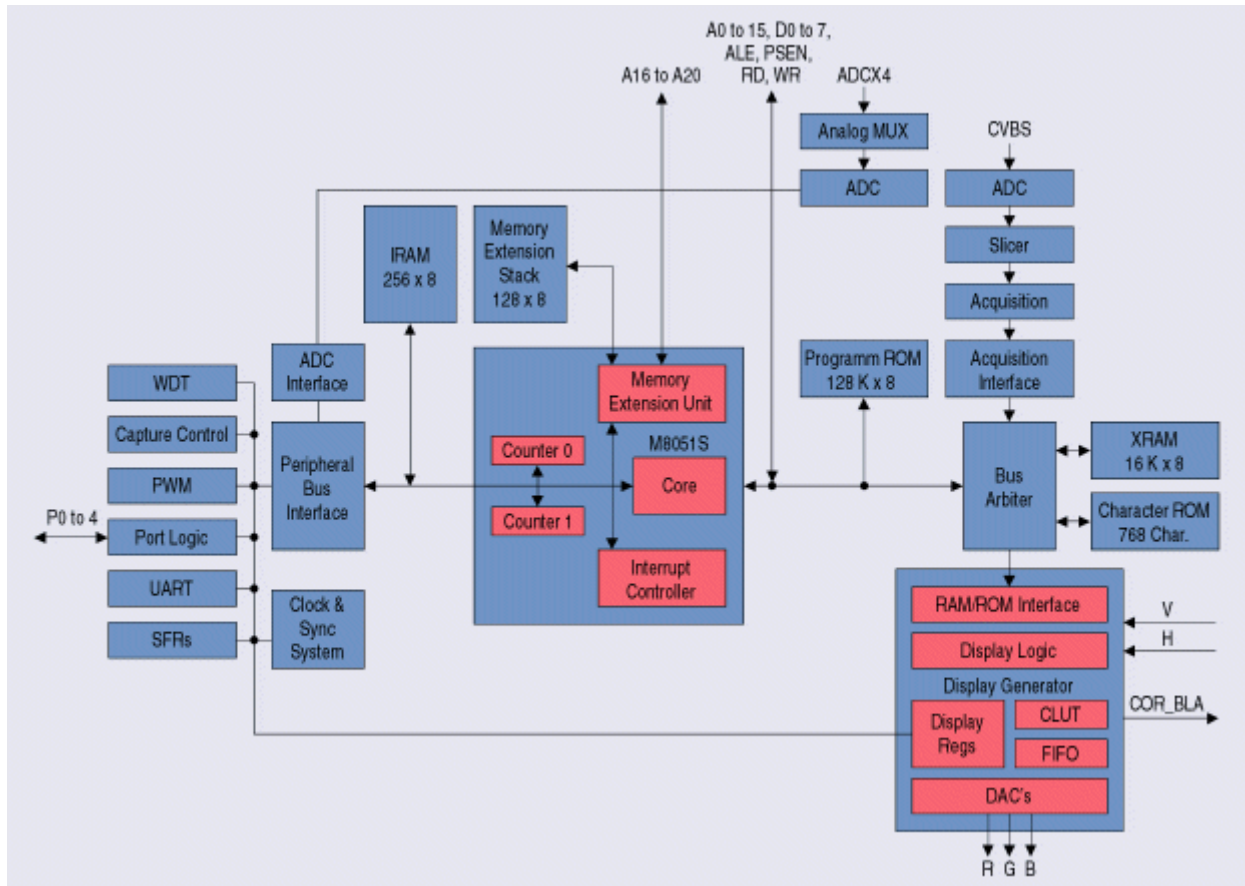


### 4.1.2   DESCRIPTION

The SDA 55xx is a single chip teletext decoder for decoding World System Teletext data as well as Video Programming System (VPS), Program Delivery Control (PDC), and Wide Screen Signalling (WSS) data used for PAL plus transmissions (line 23).
The device provides an integrated general-purpose, fully 8051-compatible Microcontroller with television specific hardware features. The microcontroller has been enhanced to provide powerful features such as memory banking, data pointers and additional interrupts etc.
The on-chip display unit for displaying Level 1.5 teletext data is also used for customer defined on-screen displays. Internal XRAM consists of 16 Kbytes. Device has an internal ROM of 128 Kbytes.
The SDA 55xx supports a wide range of standards including PAL, NTSC and contains a digital slicer for VPS, WSS, PDC, TTX and Closed Caption, an accelerating acquisition hardware module, a display generator for Level 1.5 TTX data and powerful On screen Display capabilities based on parallel attributes, and Pixel oriented characters (DRCS).

The 8-bit Microcontroller runs at 360 ns. cycle time (min.). Controller with dedicated hardware does most of the internal TTX acquisition processing, transfers data to/from external memory

interface and receives/transmits data via I 2 C-firmware user-interface. The slicer combined with dedicated hardware stores TTX data in a VBI buffer of 1 Kilobyte. The Microcontroller firmware performs all the acquisition tasks (hamming-and parity-checks, page search and evaluation of header control bits) once per field. Additionally, the firmware can provide high-end Teletext-features like Packet-26-handling, FLOF, TOP and list-pages.

## 4.1.3  IC MARKING AND VERSION

| Chassis | IC marking | OSD languages | ATSS countries | Text |
|---|---|---|---|---|
| **CP850FX** | SDA555X FL | **BULGARIAN, CZECH, GERMAN, DANISH, SPANISH, FRENCH, FINNISH, ENGLISH, GREEK, HUNGARIAN, ITALIAN, NORWEGIAN, DUTCH, POLISH, ROMANIAN, RUSSIAN, SWEDISH, SLOVAKIAN.** | Austria, Belgium, Switzerland, Czech Republic, Germany, Denmark, Spain, France, Finland, GB, Greece, Hungary, Italy, Ireland, Norway, Netherlands, Portugal, Poland, Sweden, Slovak Republic, Others | **PAN-EUROPEAN LATIN, CYRILLIC, GREEK.** |

## 4.1.4  PINNING

| PSDIP 52-pin | Pin Name | Type | Short Description |
|---|---|---|---|
| 1 | SCL | IN/OUT | Software driven I2C bus Clock line |
| 2 | SDA | IN/OUT | Software driven I2C bus Data line |
| 3 | S/SW2 | IN | Slow switching control for SCART 2. |
| 4 | S/SW2 | IN | (See Microcontroller I/O pin configuration) |
| 5 | S/SW1 | IN | Slow switching control for SCART 1. |
| 6 | S/SW1 | IN | (See Microcontroller I/O pin configuration) |
| 7 | n.c. | | |
| 8 | Reset Out | OUT | Driven by controlling software to reset video IC's. |
| 9 | VDD2.5 | IN | Supply voltage 2.5V |
| 10 | VSS | IN | Ground (0V) |
| 11 | VDD3.3 | IN | Input/Output 3.3V |
| 12 | CVBS | IN | CVBS input for the acquisition circuit |
| 13 | VDDA2.5 | IN | Supply voltage for analog components |
| 14 | VSSA | IN | Ground for analog components |
| 15 | AFT | IN | ADC input, AFT input |
| 16 | AGC | IN | ADC input, for AGC alignment only |
| 17 | KEY | IN | ADC input, local key sensing |
| 18 | OCP | IN | Switch Off the set when the voltage goes below a trigger level |
| 19 | HS | IN | Horizontal sync for OSD/Txt synchronisation |
| 20 | VS | IN | Vertical sync for OSD/Txt synchronisation |
| 21 | MODESW | OUT | High : Negative video modulation (B, G, D, K,I) Low : Positive video modulation (L / L') |
| 22 | L/L' | OUT | High : L', Low : L |

| 23 | IR | IN | Remote control signal input |
|----|------|------|------------------------------|
| 24 | INT | IN | Interrupt input from audio processor |
| 25 | n.c. | | |
| 26 | n.c. | | |
| 27 | n.c. | | |
| 28 | n.c. | | |
| 29 | VSS | IN | Ground (0V) |
| 30 | VDD3.3 | IN | Input/Output 3.3V |
| 31 | n.c. | | |
| 32 | n.c. | | |
| 33 | RESET | IN | A low level on this pin resets the device. |
| 34 | XTAL2 | OUT | Output of the inverting oscillator amplifier |
| 35 | XTAL1 | IN | Input of the inverting oscillator amplifier |
| 36 | VSSA | IN | Ground for analog components |
| 37 | VDDA2.5 | IN | Supply voltage for analog components |
| 38 | R OUT | OUT | Red output |
| 39 | G OUT | OUT | Green output |
| 40 | B OUT | OUT | Blue output |
| 41 | BK OUT | OUT | Blanking |
| 42 | VDD2.5 | IN | Supply voltage 2.5V |
| 43 | VSS | IN | Ground (0V) |
| 44 | VDD3.3 | IN | Input / Output 3.3V |
| 45 | n.c. | | |
| 46 | n.c. | | |
| 47 | n.c. | | |
| 48 | AGC | OUT | Tuner TOP adjustment |
| 49 | n.c. | | |
| 50 | n.c. | | |
| 51 | LED | OUT | High : Green LED, Low : Red LED |
| 52 | POWER | OUT | High : SMPS ON, Low : SMPS in stand by |

## 4.2   VSP94x5B (version C4)– OPTIMUS Color Decoder and Scan-Rate Converter

The VSPB family supports 15/32kHz systems and is available with different options. VSP 94x5B has one channel only.

### 4.2.1   BLOCK DIAGRAM OF THE VSP94x5B
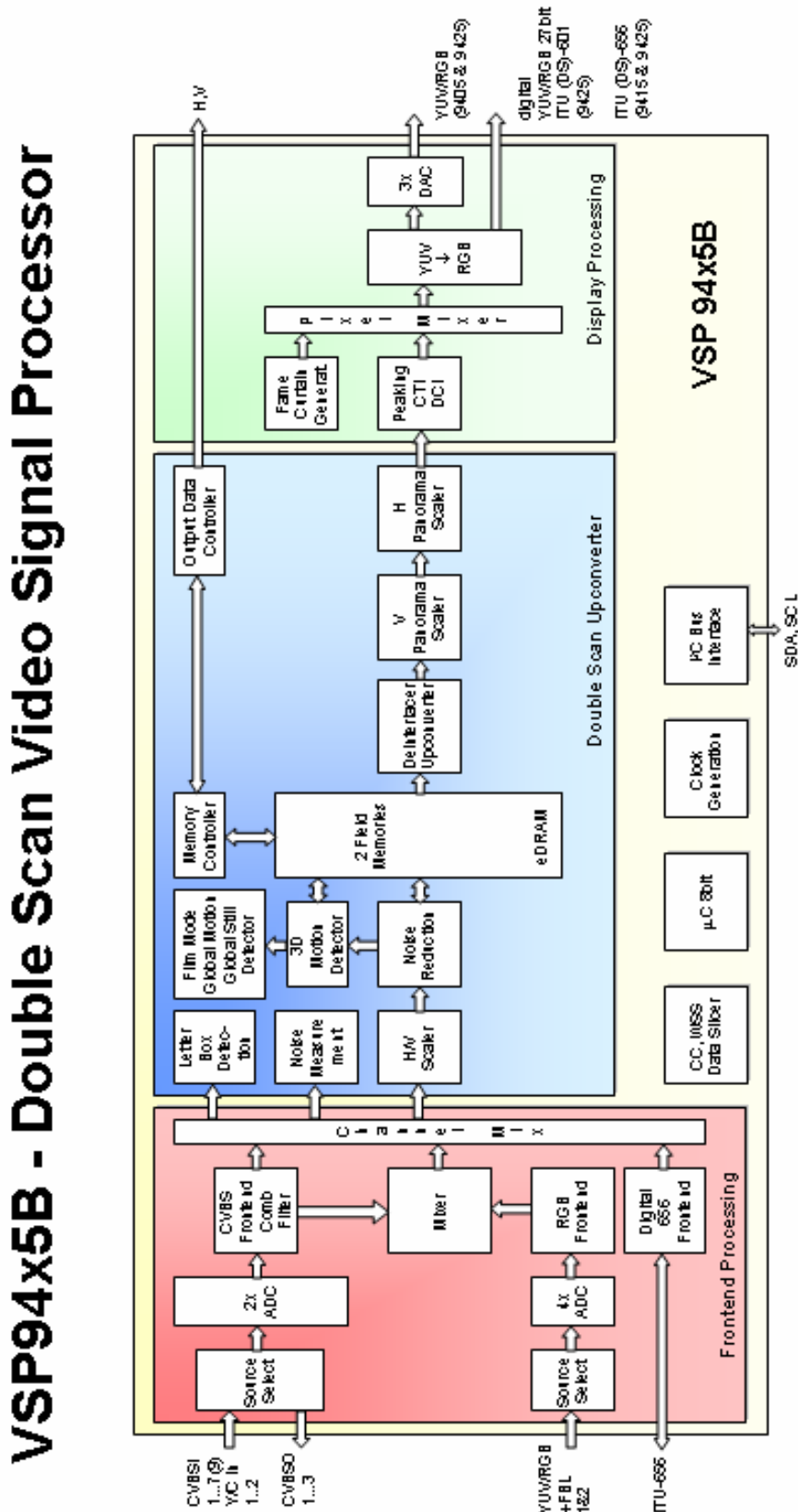
4.2.2  Feature Overview

- Different application modes
  - FSM : Frame based high performance master with PIP
  - SSC : Split screen ("Double Window")
- Data acquisition connectivity
  - Up to seven (VSP 9425B/9427B: nine) CVBS inputs, up to two Y/C inputs
  - Up to three CVBS outputs (even when Y/C input)
  - ITU-R 656 compatible digital input
  - RGB/FBL or YUV or YUV-H-V input
  - 9 bit amplitude resolution for CVBS/Y/C A/D converter
  - 8 bit amplitude resolution for RGB/FBL A/D converter
- Multi-standard color decoder with 4H comb-filter
  - PAL/NTSC/SECAM including all substandard
  - Automatic recognition of chroma standard
  - AGC (Automatic Gain Control)
- Temporal noise reduction for master and slave channel
  - Field or frame based temporal noise reduction for luminance and chrominance
- Pre-scaling of the $1f_H$ signal
  - Horizontal scaling factors: 3/2...1...1/28
  - Vertical scaling factors: 1...1/30
- Horizontal and vertical scaling of the $2f_H$ signal
  - Horizontal Scaling factors: 3...0.75
  - 5 zone horizontal panorama generator
- Vertical scaling of the $2f_H$ signal
  - Vertical scaling factors: 8...0.92
  - 5 zone vertical panorama generator
- Detection circuits
  - Global motion and global still detection
  - Film mode and phase detection (PAL, NTSC; 2-2, 3-2 pull down)
  - Measurement of the noise level (blanking)
  - Detection of letter box formats
- Embedded memory
  - On-chip memory controller
  - Embedded DRAM core for field memory
  - SRAM for delay lines
- Data format 4:2:2
- Data slicer for closed caption ("V-chip") and WSS
- Flexible clock and synchronization concept
  - Horizontal line-locked or free-running mode
  - Vertical locked or free-running mode
- Scan-rate-conversion
  - Motion adaptive frame based 100/120 Hz interlaced scan-rate conversion
  - Motion adaptive frame based 50/60 Hz progressive scan-rate conversion
  - Special treatment for film material ("Inverse 3-2 pull down")
  - Large area and line flicker reduction
  - Simple progressive modes: AB, AA*
  - Simple interlaced modes (100/120 Hz): ABAB, AABB, AAAA, BBBB
  - No scan-rate-conversion modes (50/60 Hz): AB, AA, BB
- Signal manipulations
  - Still field or still frame
  - Insertion of colored background

- 2D and 3D frames for master and slave channel
- Vertical chrominance shift for improved VCR picture quality
- Contrast, brightness and saturation control
- Sharpness improvement
  - Digital color transition improvement (DCTI)
  - Adaptive horizontal and vertical peaking (luminance)
  - Digital luminance transition improvement (DLTI)
  - Digital contrast improvement (DCI, master channel only)
- Three D/A converters
- 9 bit amplitude resolution for YUV, RGB output
- (Nominal) 72 MHz clock frequency with two-fold oversampling
- I2C bus control (400 kHz)
- 1.8 V± 5% and 3.3 V ± 5% supply voltages
- PMQFP80-1 or PMQFP144-1 packages
- Only one crystal necessary for whole IC and all color standards

## 4.2.3 PINNING

| Pin | Name | I/O | Description |
|-----|------|-----|-------------|
| 1 | VDDDACY | S | DAC(Y) |
| 2 | AYOUT | O | Y output |
| 3 | VSSDACY | S | DAC(Y) |
| 4 | VSSD2 | S | Supply voltage for digital (0V digital) |
| 5 | VDDD2 | S | Supply voltage for digital(1.8V digital) |
| 6 | SDA | I/O | I2C-Bus data |
| 7 | TMS | I | Testmode select (Connected to vdd33) |
| 8 | 656VIN/BLANK | I/O | Separate V input for 656 / BLANK output |
| 9 | 656CLK | I/O | Digital input / output clock |
| 10 | 656IO7 | I/O | Digital input / output (MSB) |
| 11 | VSSP2 | S | Supply voltage for digital (0 V pad) |
| 12 | VDDP2 | S | Supply voltage for digital (3.3 V pad) |
| 13 | SCL | I | I2C-Bus clk |
| 14 | V | I | Vertical pulse for RGB input |
| 15 | 656IO6 | I/O | Digital input / output |
| 16 | 656IO5 | I/O | Digital input / output |
| 17 | HOUT | O | Horizontal output |
| 18 | H50 | O | Hout 50 Hz |
| 19 | ADR / TDI | I | I2C address / test data in |
| 20 | V50 | O | Vout 50 Hz |
| 21 | 656IO4 | I/O | Digital input / output |
| 22 | 656IO3 | I/O | Digital input / output |
| 23 | VOUT | O | Vertical output |
| 24 | RESET | I | Reset input (Reset active low) |
| 25 | VDDP3 | S | Supply voltage for digital (3.3 V pad) |
| 26 | VSSP3 | S | Supply voltage for digital (0 V pad) |
| 27 | CLKOUT | O | Output clock (27 MHz nom.) |
| 28 | VDDD3 | S | Supply voltage for DRAM (1.8 V digital) |
| 29 | VSSD3 | S | Supply voltage for digital (0 V digital) |
| 30 | 656IO2 | I/O | Digital input / output |
| 31 | 656IO1 | I/O | Digital input / output |
| 32 | 656IO0 | I/O | Digital input / output (LSB) |

| 33 | VSSD4 | S | Supply voltage for digital (0 V digital) |
|----|-------|---|------------------------------------------|
| 34 | VDDD4 | S | Supply voltage for digital 1.8 V digital |
| 35 | VDDAFBL | S | Supply voltage for FBL (1.8 V) |
| 36 | VSSAFBL | S | Supply voltage for FBL (0 V) |
| 37 | FBL1 | I | Fast Blank input 1 (H1) (Analog input) |
| 38 | FBL2 | I | Fast Blank input 2 (H2) (Analog input) |
| 39 | RIN1 | I | R or V in1 (Analog input) |
| 40 | GIN1 | I | G or Y in1 (Analog input) |
| 41 | BIN1 | I | B of U in1 (Analog input) |
| 42 | VDDARGB | S | Supply voltage for RGB (1.8 V) |
| 43 | VDDARGB | S | Supply voltage for RGB (0 V) |
| 44 | VDD33RGB | S | Supply voltage RGB (3.3 V) |
| 45 | VDD33RGB | S | Supply voltage RGB (0 V) |
| 46 | RIN2 | I | R or V in2 (Analog input) |
| 47 | GIN2 | I | G or Y in2 (Analog input) |
| 48 | BIN2 | I | B of U in2 (Analog inpu) |
| 49 | VSSD5 | S | Supply voltage for digital (0 V) |
| 50 | VDDAC1 | S | Supply voltage CVBS1 (1.8 V) and digital core supply |
| 51 | VSSAC1 | S | Supply voltage CVBS1 (0 V) |
| 52 | CVBS1 | I | CVBS input (Analog input) |
| 53 | CVBS2 | I | CVBS input (Analog input) |
| 54 | CVBS3 | I | CVBS input (Analog input) |
| 55 | CVBS4 | I | CVBS input or Y1 (Analog input) |
| 56 | CVBS5 | I | CVBS input or C1 (Analog input) |
| 57 | CVBS6 | I | CVBS input or Y2 (Analog input) |
| 58 | CVBS7 | I | CVBS input or C2 (Analog input) |
| 59 | VDD33C | S | Supply voltage CVBS (3.3 V) |
| 60 | VSS33C | S | Supply voltage CVBS (0 V) |
| 61 | CVBSO3 | O | CVBS output 3 (Analog output) |
| 62 | CVBSO2 | O | CVBS output 2 (Analog output) |
| 63 | CVBSO1 | O | CVBS output 1 (Analog output |
| 64 | VDDAC2 | S | Supply voltage CVBS2 (1.8 V) |
| 65 | VSSAC2 | S | Supply voltage CVBS2 (0 V) |
| 66 | VDDD1 | S | Supply voltage for digital (1.8 V digital) |
| 67 | VSSD1 | S | Supply voltage for digital (0 V digital) |
| 68 | VDDAPLL | S | Supply voltage for PLL (1.8 V) |
| 69 | XOUT | O | Crystal connection 2 |
| 70 | XIN | I | Crystal connection 1 |
| 71 | TCLK | I | Testclock |
| 72 | VDDP1 | S | Supply voltage for digital (3.3 V pad) |
| 73 | VSSP1 | S | Supply voltage for digital (0 V pad) |
| 74 | 656HIN/CLKF20 | I/O | Separate H input for 656 / 20.25 clock output |
| 75 | VDDDACV | S | DAC (V) |
| 76 | AVOUT | O | V output |
| 77 | VSSDACV | S | DAC (V) |
| 78 | VDDDACU | S | DAC (U) |
| 79 | AUOUT | O | U output |
| 80 | VSSDACU | S | DAC (U) |

### 4.3 DDP 3315C – DISPLAY AND DEFLECTION PROCESSOR

The DDP 3315C is a mixed-signal single-chip digital display and deflection processor, designed for high-quality backend applications in double scan and HDTV TV sets with 4:3 or 16:9 picture tubes. The interfaces qualify the IC to be combined with state of the art digital scan rate converters, as well as analog HDTV sources. The DDP 3315C contains the entire digital video component, deflection processing, and all analog interfaces to display the picture on a CRT.

### 4.3.1 BLOCK DIAGRAM OF THE DDP 3315C
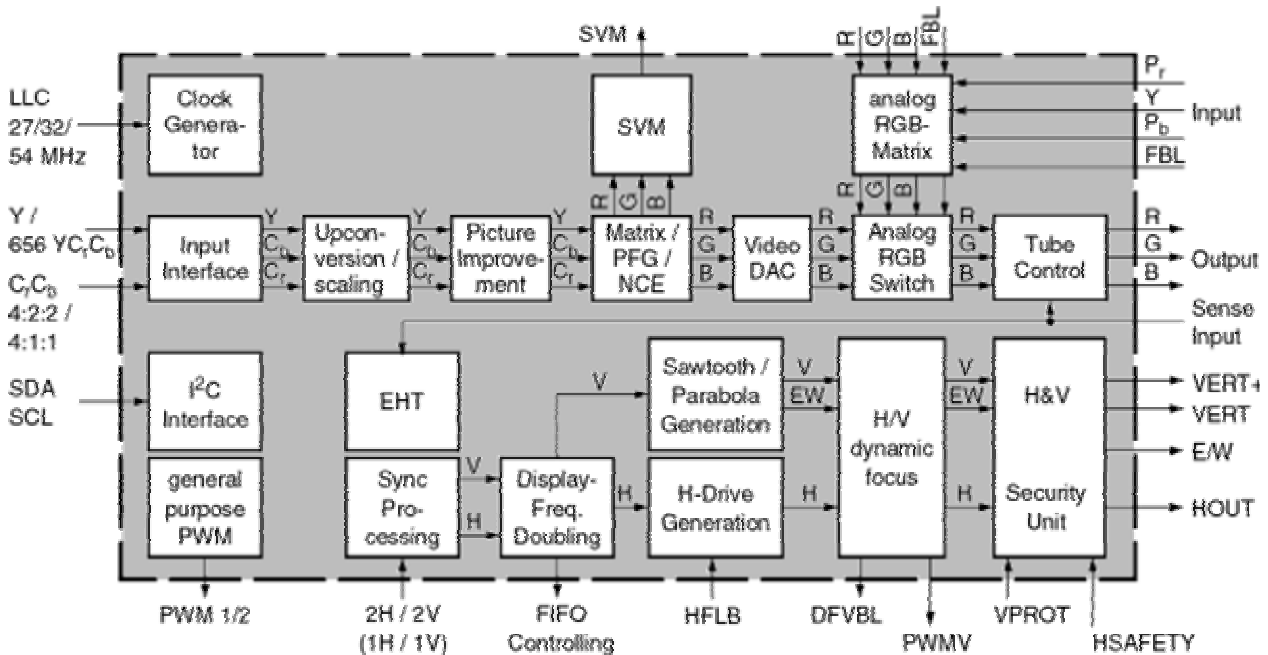


### 4.3.2 DESCRIPTION

**Video Processing**
– linear horizontal scaling (0.25 ... 4), as well as nonlinear horizontal scaling "panorama vision"
– dynamic black level expander
– luma sharpness enhancement by dynamic peaking and luma transient improvement (LTI)
– color transient improvement (CTI)
– programmable RGB matrix
– black stretch, blue stretch, gamma correction via programmable Non-linear Colorspace Enhancer (NCE) on RGB
– two analog double scan inputs with fast blank (one RGB and one RGB/YC r C b /YP r P b selectable)
– average and peak beam current limiter
– automatic picture tube adjustment (cutoff, drive)
– histogram calculation
**Deflection Processing**
– scan velocity modulation output
– digital EHT compensation for vertical / east-west
– soft start/stop of horizontal-drive
– vertical angle and bow correction
– differential vertical outputs
– vertical zoom via deflection adjustment
– horizontal and vertical protection circuit

– horizontal frequency for VGA/SVGA/1080I
– black switch off procedure
– supports horizontal and vertical dynamic focus

**Miscellaneous**
– selectable ITU-R 601 4:1:1 / 4:2:2 YC r C b input at 27/32 MHz or double scan ITU-R 656 input at 54 MHz line-locked clock
– crystal oscillator for horizontal safety
– picture frame generator
– hardware for simple 50/60 Hz to 100/120 Hz conversion (display frequency doubling)
– PQFP80 package, 5 V analog and 3.3 V digital supply

**IC architecture**

A clock generator converts different external line locked clock rates to a common internal sample rate of ~40 MHz, in order to provide a higher horizontal resolution. The input interface accepts ITU-R 601 at 27 or 32 MHz and ITU-R 656 with encoded or external sync at 54 MHz. The horizontal scaler is used for the scan rate conversion and for the nonlinear aspect ratio conversion as well.

For the picture improvement, luma and chroma are processed separately. The luminance contrast ratio can be extended with a dynamic black level expander. In addition the frequency characteristic is improved by a transient improvement (LTI) and an adaptive dynamic peaking circuit. The peaking adapts to small AC amplitudes of high frequency parts, while large AC amplitudes are processed by the LTI. The chroma signal is enhanced with a transient improvement (CTI) with proper limitation to avoid wrong colours.

The full programmable RGB matrix covers control of colour saturation and temperature. A digital white drive control is used to adjust the white balance and for the beam current limitation to prevent the CRT from over-load. A non-linear colorspace enhancer (NCE) for RGB gives full flexibility for any amplitude characteristic.

High speed10-bit D/A converters are used to convert digital RGB to analog signals. Separate 9-bit D/A converters control brightness and cutoff. For picture tubes equipped with an appropriate yoke a scan velocity modulation (SVM) signal is calculated using a differentiated luminance signal.

Two analog sources can be inserted in the main RGB, controlled by separate fastblank (FBL) signals. Contrast and brightness are adjusted separately from main RGB. One input is dedicated to RGB for on screen display (OSD). The second input is processed with an analog RGB matrix to insert $YC_bC_r$/YpbPr or RGB with control of colour saturation and programmable half contrast. The bandwidth of ~30MHz guarantees pixel based graphics to be displayed with full accuracy.

All previously mentioned features are implemented in dedicated hardware. An integrated processor controls the horizontal and vertical deflection, tube measurement loops and beam current limitation. It is also used to calculate an amplitude histogram of the displayed image.

The horizontal deflection is synchronized with two numeric phase-locked loops (PLL) to the incoming sync. One PLL generates the horizontal timing signals, e.g. blanking and key-clamping. The second PLL adjusts the phase of the horizontal drive pulse with a subpixel accuracy less than 1 ns.

Vertical deflection and east/west correction waveforms are calculated as 6th order polynomials. This allows adjustment of an east/west parabola with trapezoidal, pincushion and an upper/lower corner correction (even for real flat CRT's), as well as a vertical sawtooth with linearity and S-correction. Scaling both waveforms, and limiting to fix amplitudes, performs a vertical zoom or compression of the displayed image. A field and line frequent control loop compensates picture content depending EHT distortions.

## 4.3.3 PINNING

| Pin No. | Pin Name | I/O | Description | Remarks |
|---------|----------|-----|-------------|---------|
| 1 | Y6 | I | Picture bus Luma | |
| 2 | Y7 | I | Picture bus Luma (MSB) | |
| 3 | 656EN | I | Enable 656 input mode | |
| 4 | LLC2 | I | System clock input | |
| 5 | HS | I | Horizontal Sync Input | |
| 6 | VS | I | Vertical Sync Input | |
| 7 | FREQSEL | I | Selection of H-Drive Frequency Range | |
| 8 | CM1 | I | Clock select 1 | |
| 9 | CM0 | I | Clock select 0 | |
| 10 | VS2 | I | Additionnal VSYNC input | |
| 11 | XTAL2 | O | Analog Crystal Output | |
| 12 | XTAL1 | I | Analog Crystal Input | |
| 13 | NC | | | |
| 14 | GNDP | S | Ground, Output Pin Driver | |
| 15 | VSUPP | S | Supply voltage, Output Pin Driver | |
| 16 | FIFORRD | O | FIFO Read Counter Reset | |
| 17 | FIFORD | O | FIFO Read Enable | |
| 18 | FIFOWR | O | FIFO Write Enable | |
| 19 | FIFORWR | O | FIFO Write Counter Reset | |
| 20 | PWM1 | O | $I^2C$ controlled DAC | |
| 21 | PWM2 | O | $I^2C$ controlled DAC / Tilt output | |
| 22 | PWMV | O | $I^2C$ controlled DAC | |
| 23 | HOUT | O | Horizontal drive output | |
| 24 | VSTBY | S | Standby supply voltage, Hout generation | |
| 25 | DFVBL | O | Dynamic focus blanking / horizontal DAF pulse | |
| 26 | HSYNC | O | Horizontal sync output | |
| 27 | VSYNC | O | Vertical sync output | |
| 28 | NC | | | |
| 29 | ASG1 | S | Analog Shield Ground | |
| 30 | HFBL | I | Horizontal flyback input | |
| 31 | SAFETY | I | Safety input | |
| 32 | VPROT | I | Vertical protection input | |
| 33 | RSW2 | O | Range Switch2, measurement ADC | |
| 34 | RSW1 | I/O | Range Switch1, measurement ADC | |
| 35 | SENSE | I | Sense ADC input | |
| 36 | GNDM | S | Ground, MADC input | |
| 37 | VERT+ | O | Differential Vertical Sawtooth Output | |
| 38 | VERT- | O | Differential Vertical Sawtooth Output | |
| 39 | EW | O | East / West Correction Output | |
| 40 | NC | | | |
| 41 | SVM | O | Scan Velocity Modulator | |
| 42 | ROUT | O | Analog Output Red | |
| 43 | GOUT | O | Analog Output Green | |
| 44 | BUT | O | Analog Output Blue | |
| 45 | GNDO | S | Ground, analog Back End | |
| 46 | XREF | I | Reference Input for RGB DAC's | |
| 47 | VSUPO | S | Supply voltage, Analog Back End | |

| 48 | VRD/BCS | I | DAC Reference, Beam current safety | |
|---|---|---|---|---|
| 49 | AGND | S | Analog Ground for Analog Matrix | |
| 50 | FBLIN1 | I | Fast Blank1input | 28 |
| 51 | RIN1 | I | Analog Red1input | |
| 52 | GIN1 | I | Analog Green1 input | |
| 53 | BIN1 | I | Analog Blue1input | |
| 54 | FBLIN2 | I | Fast Blank2 input | |
| 55 | RIN2 / $P_R$ | I | Analog Red2 input / $P_R$ Input | |
| 56 | GIN2 / Y | I | Analog Green2 input / Y Input | |
| 57 | BIN2/ $P_B$ | I | Analog Blue2 input / $P_B$ Input | |
| 58 | ASG2 | S | Analog Shield Ground | |
| 59 | HCS | I | Half Contrast | |
| 60 | NC | | | |
| 61 | TEST | I | | |
| 62 | RESQ | I | Reset Input, active low | |
| 63 | SCL | I/O | $I^2$C Bus clock | |
| 64 | SDA | I/O | $I^2$C Bus data | |
| 65 | C0 | I | Picture Bus Chroma (LSB) | |
| 66 | C1 | I | Picture Bus Chroma | |
| 67 | C2 | I | Picture Bus Chroma | |
| 68 | C3 | I | Picture Bus Chroma | |
| 69 | C4 | I | Picture Bus Chroma | |
| 70 | C5 | I | Picture Bus Chroma | |
| 71 | C6 | I | Picture Bus Chroma | |
| 72 | C7 | I | Picture Bus Chroma (MSB) | |
| 73 | VSUPD | S | Supply voltage, Digital Circuitry | |
| 74 | GNDD | S | Ground, Digital Circuitry | |
| 75 | Y0 | I | Picture Bus Luma (LSB) | |
| 76 | Y1 | I | Picture Bus Luma | |
| 77 | Y2 | I | Picture Bus Luma | |
| 78 | Y3 | I | Picture Bus Luma | |
| 79 | Y4 | I | Picture Bus Luma | |
| 80 | Y5 | I | Picture Bus Luma | |

## 4.4   MSP341X MULTISTANDARD SOUND PROCESSOR

The MSP 341x is designed as a single-chip Multistandard Sound Processor for applications in analogue and digital TV sets, video recorders, and PC cards.

The MSP3411 has all functions of MSP3410 with the addition of a virtual surround sound features.
Surround sound can be reproduced to a certain extent with two loudspeakers. The MSP3411 includes virtualizer algorithm "3D Panorama" which has been approved by the Dolby laboratories for compliance with the "Virtual Dolby Surround" technology. In addition, the MSP3411 includes Micronas "Panorama" algorithm.

**MSP 341x features:**

- sound IF input
- No external filters required
- Stereo baseband input via integrated AD converters
- Two pairs of DA converters
- Two carrier FM or NICAM processing
- AVC : Automatic Volume Correction
- Bass, treble, volume processing
- Full SCART in/out matrix without restrictions
- Improved FM-identification
- Demodulator short programming
- Auto-detection for terrestrial TV - sound standards
- Precise bit-error rate indication
- Automatic switching from NICAM to FM/AM or vice versa
- Improved NICAM synchronisation algorithm
- Improved carrier mute algorithm
- Improved AM-demodulation
- Reduction of necessary controlling
- Less external components

### 4.4.1   BASIC FEATURES OF THE MSP 341X

#### 4.4.1.1  Demodulator & NICAM Decoder Section

The MSP 341x is designed to simultaneously perform digital demodulation and decoding of NICAM-coded TV stereo sound, as well as demodulation of FM or AM mono TV sound. Alternatively, two carrier FM systems according to the German terrestrial specs can be processed with the MSP 341x.

The MSP 341x facilitates profitable multistandard capability, offering the following advantages:
- Automatic Gain Control (AGC) for analogue input: input range:  0.10 - 3 Vpp
- integrated A/D converter for sound-IF input
- all demodulation and filtering is performed on chip and is individually programmable
- easy realisation of all digital NICAM standards (B/G, I, L and D/K)
- FM-demodulation of all terrestrial standards (include identification decoding)
- no external filter hardware is required
- only one crystal clock (18.432 MHz) is necessary
- high deviation FM-mono mode (max. deviation: approx. ±360 kHz)

## 4.4.1.2 DSP-Section (Audio Baseband Processing)

- flexible selection of audio sources to be processed
- performance of terrestrial de-emphasise systems (FM, NICAM)
- digitally performed FM-identification decoding and de-matrixing
- digital baseband processing: volume, bass, treble
- simple controlling of volume, bass, treble

## 4.4.1.3 Analogue Section

- two selectable analogue pairs of audio baseband input (= two SCART inputs) input level: <2 V RMS, input impedance: >25 k$\Omega$
- one selectable analogue mono input (i.e. AM sound): Not used in this chassis
- two high-quality A/D converters, S/N-Ratio: >85 dB
- 20 Hz to 20 kHz bandwidth for SCART-to-SCART copy facilities
- loudspeaker: one pair of four-fold oversampled D/A converters. Output level per channel: max. 1.4 VRMS output resistance: max. 5 k$\Omega$. S/N-ratio: >85 dB at maximum volume max. noise voltage in mute mode: < 10 $\mu$V (BW: 20 Hz... 16 kHz)
- one pair of four-fold oversampled D/A converters supplying a pair of SCART-outputs. Output level per channel: max. 2 V RMS, output resistance: max. 0.5 k$\Omega$, S/N-Ratio: >85 dB (20 Hz... 16 kHz)

## 4.4.1.4 NICAM & FM/AM-Mono

According to the British, Scandinavian, Spanish, and French TV-standards, high-quality stereo sound is transmitted digitally. The systems allow two high-quality digital sound channels to be added to the already existing FM/AM-channel. The sound coding follows the format of the so-called Near Instantaneous Companding System (NICAM 728). Transmission is performed using Differential Quadrature Phase Shift Keying (DQPSK. Table below offers an overview of the modulation parameters.

In the case of NICAM/FM (AM) mode, there are three different audio channels available: NICAM A, NICAM B, and FM/AM-mono. NICAM A and B may belong either to a stereo or to a dual language transmission. Information about operation mode and about the quality of the NICAM signal can be read by the controlling software via the control bus. In the case of low quality (high bit error rate), the controlling software may decide to switch to the analogue FM/AM-mono sound. Alternatively, an automatic NICAM-FM/AM switching may be applied.

## 4.4.1.5 German 2-Carrier System (DUAL FM System)

Since September 1981, stereo and dual sound programs have been transmitted in Germany using the 2-carrier system. Sound transmission consists of the already existing first sound carrier and a second sound carrier additionally containing an identification signal. More details of this standard are given in Tables below. For D/K very similar system is used.

TV standards

| TV system | Position of sound carrier (MHz) | Sound modulation | Colour system | Country |
|---|---|---|---|---|
| B/G | 5.5 / 5.7421875 | FM Stereo | PAL | **GERMANY** |
| B/G | 5.5 / 5.85 | FM-Mono / NICAM | PAL | Scandinavia, Spain |
| L | 6.5 / 5.85 | AM – Mono / NICAM | SECAM-L | France |

| | | | | |
|---|---|---|---|---|
| I | 6.0 / 6.552 | FM-Mono / NICAM | PAL | UK |
| D/K | 6.5 / 6.2578125 D/K1<br>6.5 / 6.7421875 D/K2<br>6.5 / 5.85 D/K-NICAM | FM Stereo<br>FM-Mono / NICAM | SECAM-East | USSR<br>Hungary |
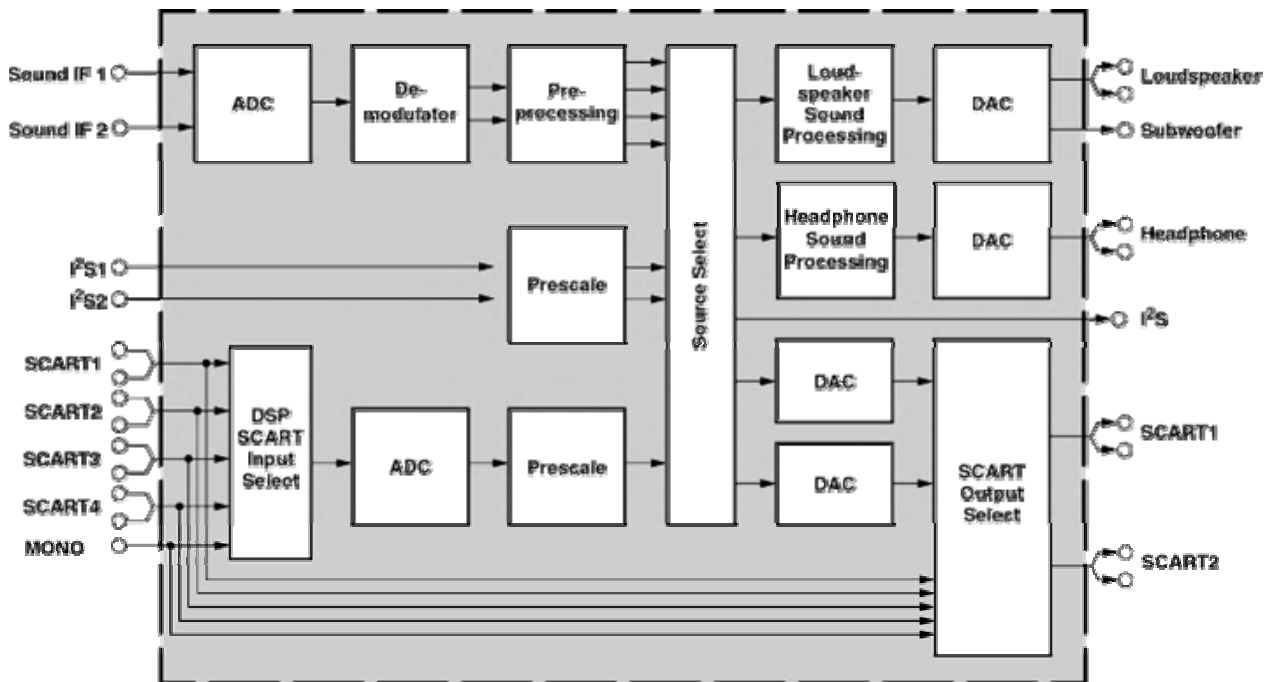


Architecture of MSP341x

Pin connections and short description

| Pin No. | Pin Name | Type | Short description |
|---|---|---|---|
| 1 | NC | | Not Connected |
| 2 | NC | | Not Connected |
| 3 | NC | | Not Connected |
| 4 | INT | Out | Interrupt out |
| 5 | MUTE | Out | Mute out |
| 6 | ADR_SEL | In | I2C bus Address select |
| 7 | STANDBYQ | In | Standby ( Low-active) |
| 8 | NC | | Not Connected |
| 9 | I2C_CL | In / Out | I2C Clock |
| 10 | I2C_DA | In / Out | I2C data |
| 11 | NC | | Not Connected |
| 12 | NC | | Not Connected |
| 13 | NC | | Not Connected |
| 14 | NC | | Not Connected |
| 15 | NC | | Not Connected |
| 16 | NC | | Not Connected |
| 17 | NC | | Not Connected |
| 18 | DVSUP | | Digital power supply +5V |
| 19 | DVSS | | Digital Ground |
| 20 | NC | | Not Connected |
| 21 | NC | | Not Connected |
| 22 | NC | | Not Connected |

| 23 | NC | | Not Connected |
|----|----|----|----|
| 24 | RESETQ | In | Power-On-reset |
| 25 | DACA_R | Out | Headphone out right |
| 26 | DACA_L | Out | Headphone out left |
| 27 | VREF2 | | Reference ground 2 high voltage part |
| 28 | DACM_R | Out | Loudspeaker out Right |
| 29 | DACM_L | Out | Loudspeaker out Left |
| 30 | NC | | Not Connected |
| 31 | NC | | Not Connected |
| 32 | NC | | Not Connected |
| 33 | SC2_OUT_R | Out | Scart output 2 right |
| 34 | SC2_OUT_L | Out | Scart output 2 left |
| 35 | VREF1 | | Reference ground 1 high voltage part |
| 36 | SC1_OUT_R | Out | Scart output 1, right |
| 37 | SC1_OUT_L | Out | Scart output 1, left |
| 38 | CAPL_A | | Volume capacitor AUX |
| 39 | AHVSUP | | Analog power supply 8.0V |
| 40 | CAPL_M | | Volume capacitor MAIN |
| 41 | AHVSS | | Analog ground |
| 42 | AGNDC | | Analog reference voltage high voltage part |
| 43 | NC | | Not Connected |
| 44 | NC | | Not Connected |
| 45 | NC | | Not Connected |
| 46 | SC3_IN_L | In | Scart input 3 in, left |
| 47 | SC3_IN_R | In | Scart input 3 in, right |
| 48 | ASG2 | | Analog Shield Ground 2 |
| 49 | SC2_IN_L | In | Scart input 2 in, left |
| 50 | SC2_IN_R | In | Scart input 2 in, right |
| 51 | ASG1 | | Analog Shield Ground 1 |
| 52 | SC1_IN_L | In | Scart input 1 in, left |
| 53 | SC1_IN_R | In | Scart input 1 in, right |
| 54 | VREFTOP | | Reference voltage IF A/D converter |
| 55 | MONO_IN | In | Mono input |
| 56 | AVSS | | Analog ground |
| 57 | AVSUP | | Analog power supply |
| 58 | ANA_IN1+ | In | IF input 1 |
| 59 | ANA_IN1- | In | IF common |
| 60 | NC | | Not Connected |
| 61 | TESTEN | In | Test pin |
| 62 | XTAL_IN | In | Crystal oscillator |
| 63 | XTAL_OUT | Out | Crystal oscillator |
| 64 | NC | | Test pin |

### 4.5 TDA4470 - MULTISTANDARD VIDEO-IF AND QUASI PARALLEL SOUND PROCESSOR

#### 4.5.1 DESCRIPTION

The TDA4470 is an integrated bipolar circuit for multi-standard video/sound IF (VIF/SIF) signal processing in TV/VCR and multimedia applications. The circuit processes all TV video IF signals with negative modulation (e.g., B/G standard), positive modulation (e.g., L standard) and the AM, FM/NICAM sound IF signals.

#### 4.5.2 FEATURES

- 5 V supply voltage; low power consumption.
- Active carrier generation by FPLL principle (frequency-phase-locked-loop) for true synchronous demodulation.
- Very linear video demodulation, good pulse response and excellent intermodulation figures.
- VCO circuit operates at picture carrier frequency, the VCO frequency is switchable for L'-mode
- Alignment-free AFC without external reference circuit, polarity of the AFC curve is switchable.
- VIF-AGC for negative modulated signals (peak sync. detection) and for positive modulation (peak white/black level detector).
- Tuner AGC with adjustable take over point.
- Alignment-free quasi parallel sound (QPS) mixer for FM/NICAM sound IF signals.
- Intercarrier output signal is gain controlled (necessary for digital sound processing).
- Complete alignment-free AM demodulator with gain controlled AF output.
- Separate SIF-AGC with average detection
- Two independent SIF inputs
- Parallel operation of the AM demodulator and QPS mixer (for NICAM-L stereo sound).

#### 4.5.3 PINNING

| Pin | Symbol | Function |
|---------|--------|-----------------------------------|
| 1, 2 | $V_{i, SIF1}$ | SIF1 input (symmetrical) |
| 3 | $V_{SW}$ | Input selector switch |
| 4, 9, 16 | GND | Ground |
| 5 | $V_{AGC}$ | SIF – AGC (time constant) |
| 6, 7 | $V_{i, VIF}$ | VIF input (symmetrical) |
| 8 | $C_{AGC}$ | VIF – AGC (time constant) |
| 10 | $R_{TOP}$ | Take Over Point, tuner AGC |
| 11 | $I_{tun}$ | Tuner AGC output current |
| 12 | $V_{O, VID}$ | Video output |
| 13 | $V_{SW}$ | Standard switch |
| 14 | $V_{SW}$ | L' switch |
| 15 | $C_{bl}$ | Black level capacitor |
| 17 | $C_{ref}$ | Internal reference voltage |
| 18 | LF | Loop Filter |
| 19 | $V_{SW}$ | AFC switch |
| 20, 21 | $V_{VCO}$ | VCO circuit |
| 22 | $V_{AFC}$ | AFC output |
| 23 | $V_S$ | Supply voltage |
| 24 | $V_{O, FM}$ | Intercarrier output |
| 25 | $V_{O, AM}$ | AF output – AM sound |
| 26 | $R_{comp}$ | Offset compensation |
| 27, 28 | $V_{i, SIF2}$ | SIF2 input (symmetrical) |

## 4.5.4 BLOCK DIAGRAM
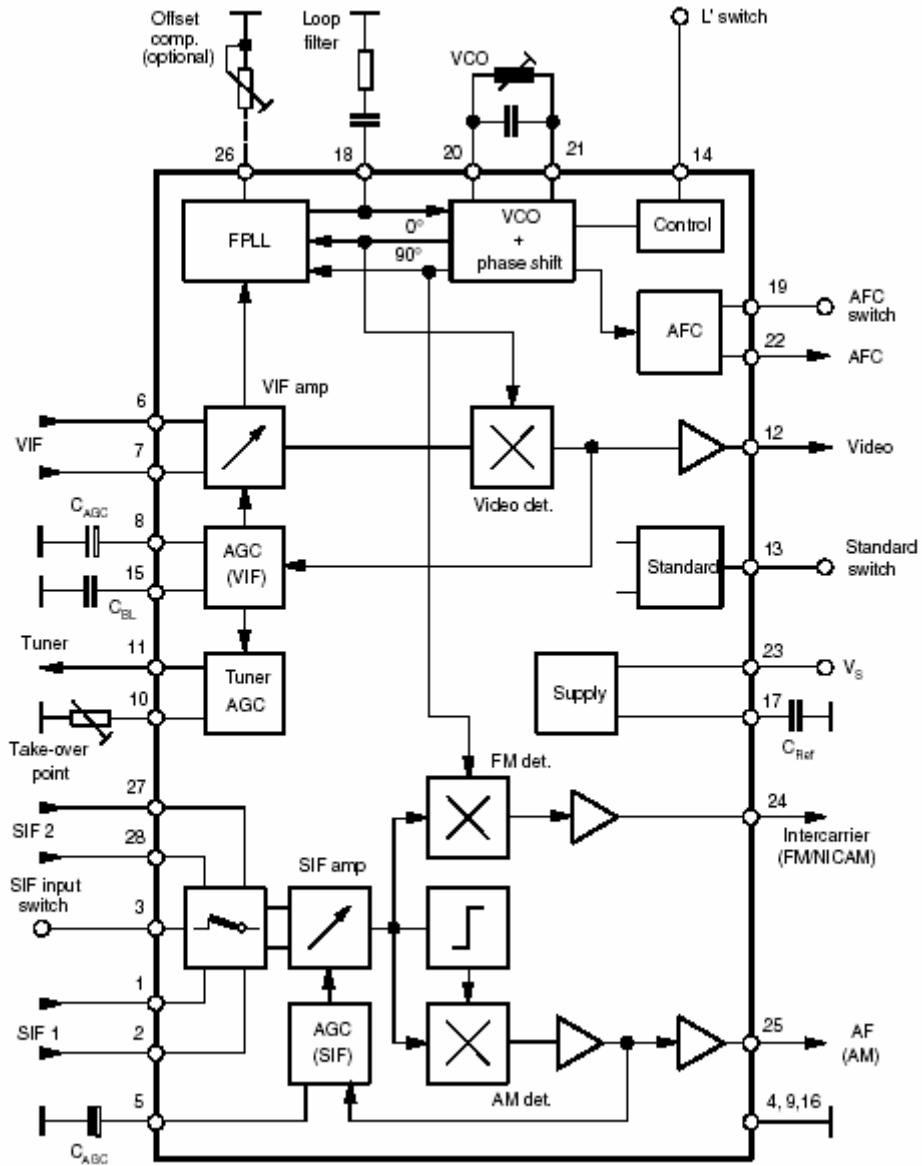
## 4.6   TDA8946J STEREO AUDIO AMPLIFIER

The TDA 8946J is a dual-channel audio power amplifier with an output power of 2 x 15 W  at an 8 Ω load and a 18 V supply. The circuit contains two Bridge Tied Load (BTL) amplifiers with an all-NPN output stage and standby/mute logic. The TDA8946J comes in a 17-pin DIL-bent-SIL(DBS) power package. The TDA8946J is printed-circuit board compatibel with all other types in the TDA894x family.
One PCB footprint accommodates both the mono and the stereo products.

### 4.6.1  FEATURES

- Few external components
- Fixed gain
- Standby and mute mode
- No on/off switching plops
- Low standby current
- High supply voltage ripple rejection
- Outputs short-circuit protected to ground, supply and across the load
- Thermally protected
- Printed-circuit board compatible

Pin description

| Pin | Symbol | Description |
|-----|--------|-------------|
| 1 | OUT1- | negative loudspeaker terminal 1 |
| 2 | GND1 | ground channel 1 |
| 3 | Vcc1 | supply voltage channel 1 |
| 4 | OUT1+ | positive loudspeaker terminal 1 |
| 5 | n.c. | not connected |
| 6 | IN1+ | positive input1 |
| 7 | n.c. | not connected |
| 8 | IN1- | negative input1 |
| 9 | IN2- | negative input2 |
| 10 | MODE | mode selection input |
| 11 | SVR | half supply voltage decoupling (ripple rejection) |
| 12 | IN2+ | positive input2 |
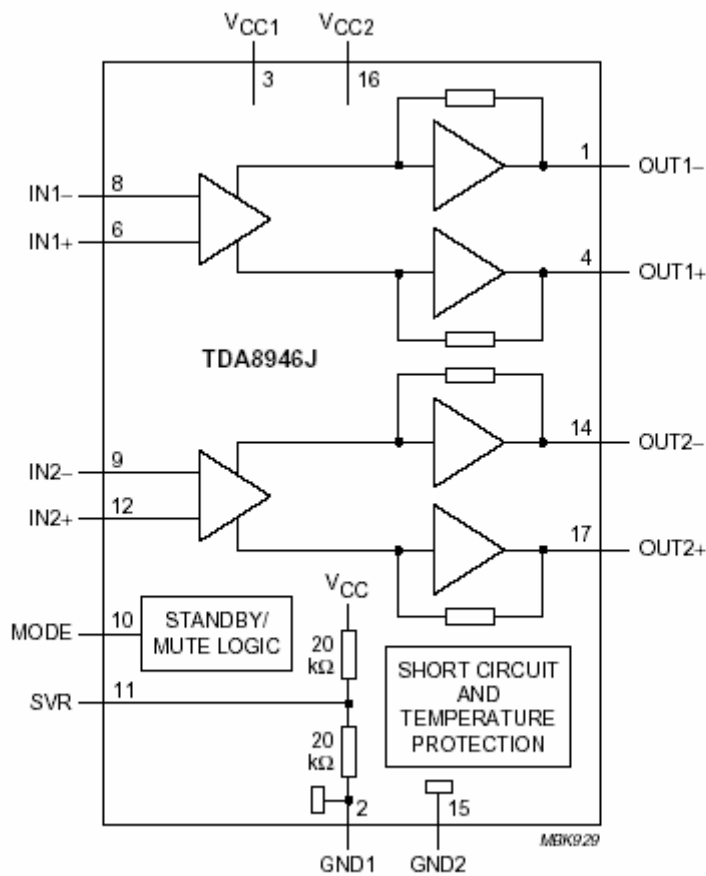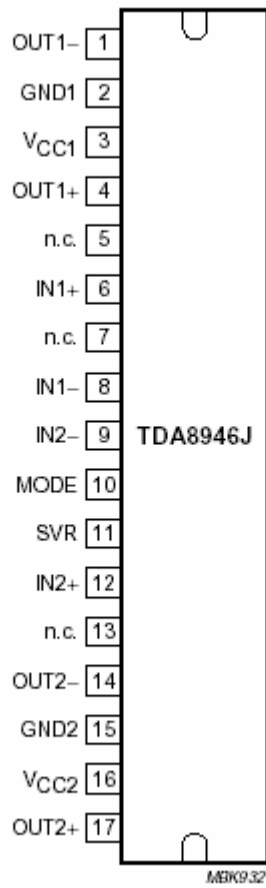
Block diagram TDA8946J

## 4.7  TDA8358J VERTICAL AMPLIFIER

The TDA8358J are power circuit for use in 90° and 110° colour deflection systems for field frequencies of 25 to 200Hz field frequencies, and for 4:3 and 16:9 picture tubes.  The IC contains a vertical diflection output circuit, operating as a high efficiency class G system. The full bridgeoutput circuit allows DC coupling of the deflection coil in combination with single positive supply voltages.

The east-west output stage is able to supply the sink current for a diode modulator circuit.

The IC is constructed in a Low Voltage DMOS(LVDMOS) process that combines Bipolar, CMOS and DMOS devices. MOS transistors are used in the output stage because of the absence of second breakdown.

### 4.7.1  FEATURES
- Few external components
- Highly efficiency fully DC-coupled vertical output bridge circuit
- Vertical flyback switch with short rise and fall times
- Built-in guard circuit
- Thermal protection circuit
- Improved EMC performance due to differential inputs
- East-West output stage
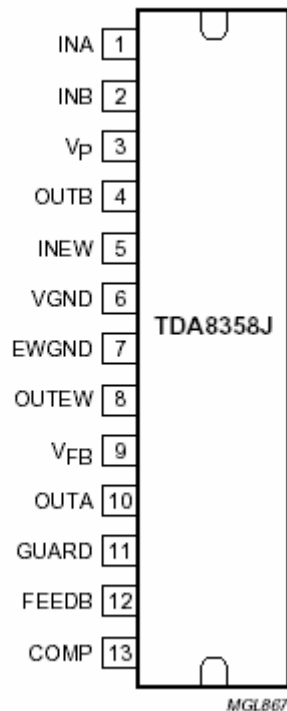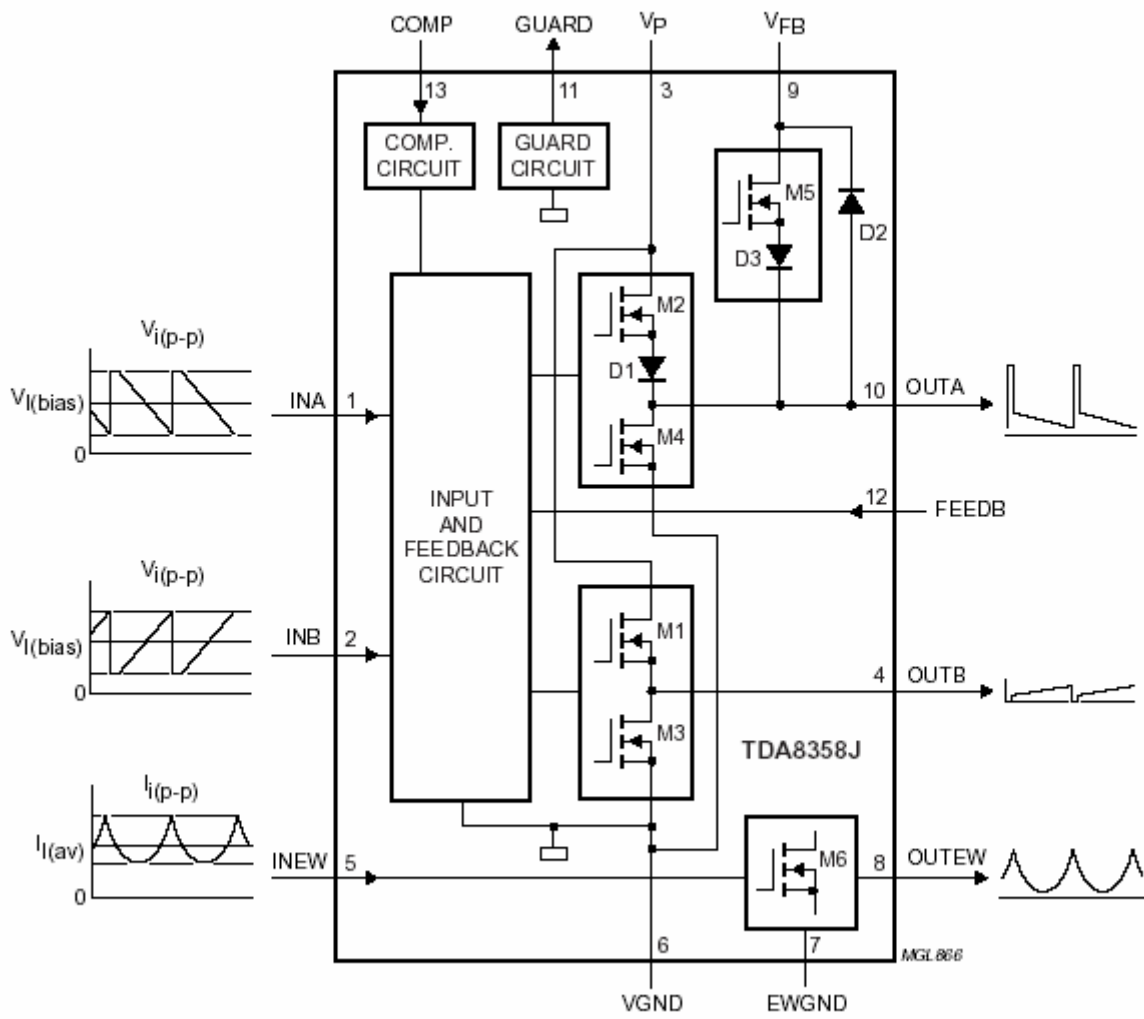
## 4.8 TDA6108JF

The TDA6108JF includes three video output amplifiers in one plastic DIL-Bent-SIL 9-pin medium power(DBS9MPF) package(SOT111-1), using high voltage DMOS technology, and is intended to drive the three cathodes of a colour CRT directly. To obtain maximum performance, the amplifier should be used with black-current control.

Features
- Typical bandwidth of 9.0 MHz for an output signal of 60 Vpp
- High slew rate of 1850V/$\mu$s
- No external components required
- Very simple application
- Single supply voltage of 200V
- Internal reference voltage of 2.5 V
- Fixed gain of 51.
- Black-current stabilisation (BCS) circuit
- Thermal protection

Pin description

| Pin | Symbol | Description |
|-----|--------|-------------|
| 1 | $V_{i(1)}$ | inverting input 1 |
| 2 | $V_{i(2)}$ | inverting input 2 |
| 3 | $V_{i(3)}$ | inverting input 3 |
| 4 | GND | ground (fin) |
| 5 | $I_{om}$ | black current measurement output |
| 6 | $V_{DD}$ | supply voltage |
| 7 | $V_{OC(3)}$ | cathode output 3 |
| 8 | $V_{OC(2)}$ | cathode output 2 |
| 9 | $V_{OC(1)}$ | cathode output 1 |



MGL319
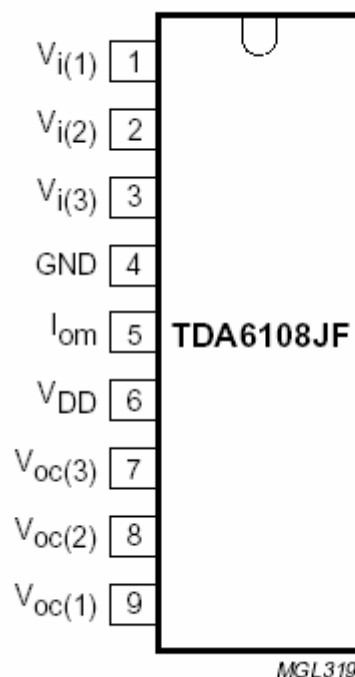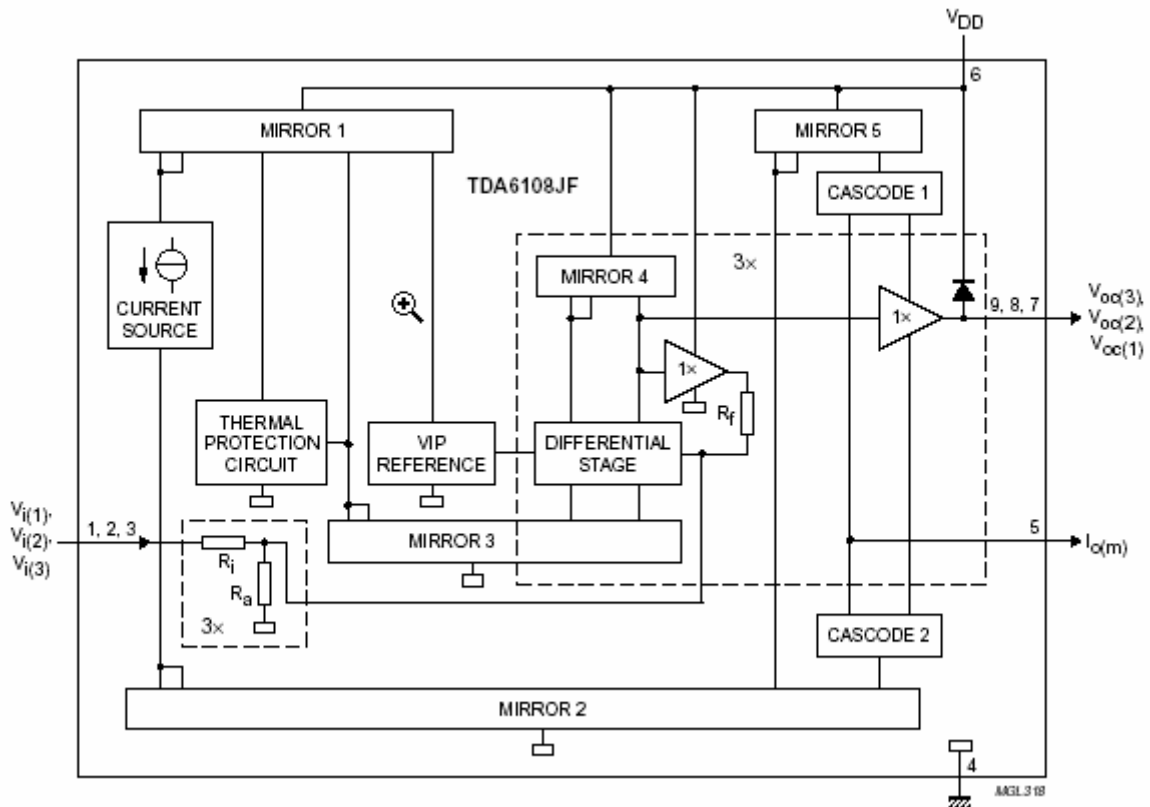
Block diagram TDA6108JF

## 4.9  24C16 - 16 KB EEPROM

Features :
- 16 Kbit serial I2C bus EEPROM
- Single supply voltage : 4.5 V to 5.5 V
- 1 Million Erase/Write cycles (minimum)
- 40 year data retention (minimum)

Pin description

| Pin No. | Name | Description |
|---------|------|-------------|
| 1, 2, 3 | E0, E1, E2 | Device address – not used |
| 5 | SDA | Serial Data/Address Input/Output |
| 6 | SCL | Serial clock |
| 7 | WC | Write control |
| 8 | Vcc | Supply voltage |
| 4 | Vss | Ground |

The memory device is compatible with the I2C memory standard. This is a two wire serial interface that uses a bi-directional data bus and serial clock. The memory carries a built-in 4-bit unique device type identifier code (1010) in accordance with the I2C bus definition.

Serial Clock (SCL)
The SCL input is used to strobe all data in and out of the memory.
Serial Data (SDA)
The SDA pin is bi-directional, and is used to transfer data in or out of the memory

## 4.10 STR – W6754

### 4.10.1 GENERAL DESCRIPTION

The STR-W6700 series is a Hybrid IC (HIC) designed for Quasi-Resonant type Switching Mold Power Supply built-in a Power MOSFET and Control IC.

### 4.10.2 FEATURES

- operation mode turns blocking oscillation by reducing output voltage at stand-by mode.
- In addition to the existing Quasi-Resonant Operation, the Bottom-Skip Function is added in order to be efficient from light to medium load.
- Soft-Start Operation is provided at the SMPS start-up.
- Switching noise is reduced by Step-Drive Function.
- Avalanche energy of the MOSFET is guaranteed.
- Overcurrent Protection (OCP), Overvoltage Protection (OVP), Overload Protection (OLP), and Maximum ON-Time control circuits are incorporated.
- It is possible to save the SMPS design time by utilizing the present designs and evaluation processes.

### 4.10.3 BLOCK DIAGRAM
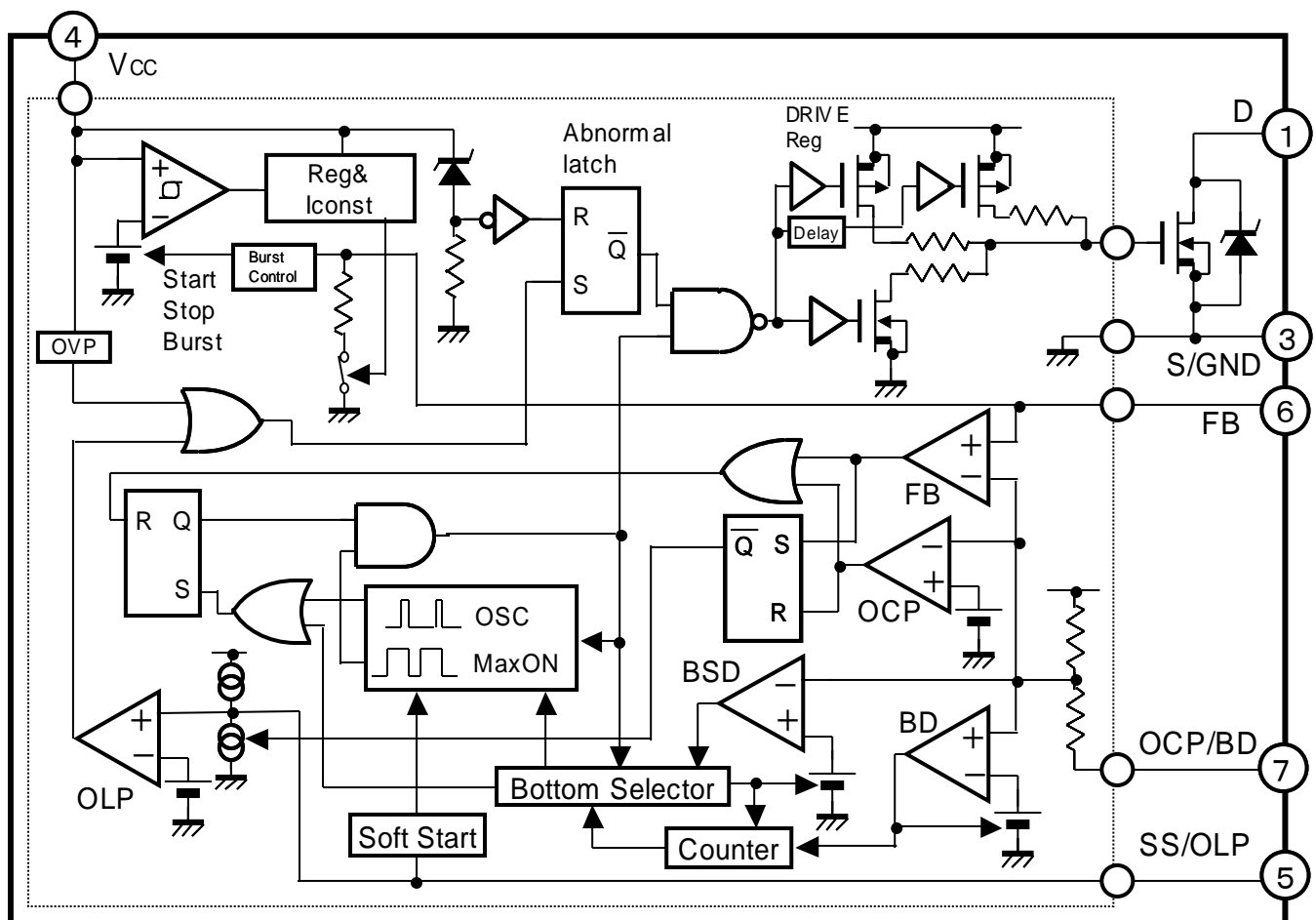
## 4.10.4 PIN DESCRIPTION

| Pin No. | Symbols | Terminal Descriptions | Functions |
|---------|---------|----------------------|-----------|
| 1 | D | Drain Terminal | MOSFET Drain |
| 2 | − | Source/Grand Terminal | MOSFET Source and Ground |
| 3 | S/GND | | |
| 4 | Vcc | Power Supply Terminal | Control Circuit Power Supply Input |
| 5 | SS/OLP | Delay at Overload/Soft-Start set up Terminal | Overload Protection and Soft- Start Operation Time set up |
| 6 | FB | Feedback Terminal | Constant Voltage Control Signal Input, Blocking Oscillation Control |
| 7 | OCP/BD | Overcurrent Protection Input/Bottom Detection Terminal | Overcurrent Detection Signal Input / Bottom Detection Signal Input |

## 4.10.5 MOSFET ELECTRICAL CHARACTERISTICS

| Parameters | Terminal | Symbols | Ratings | | | Units | Conditions |
|-----------|----------|---------|-----|-----|-----|-------|-----------|
| | | | MIN | TYP | MAX | | |
| Drain-Source Voltage ※7 | 1 - 3 | $V_{DSS}$ | 650 | — | — | V | ※6 |
| Drain Leakage Current | 1 - 3 | $I_{DSS}$ | — | — | 300 | µA | |
| ON Resistance ※7 | 1 - 3 | $R_{DS(ON)}$ | — | — | 0.73 | Ω | |
| Switching Time | 1 - 3 | $t$ f | — | — | | Nsec | |
| Thermal Resistance ※7 | — | $\Theta$ ch-F | — | — | | ℃/W | Channel – Internal Frame |

## 4.10.6  ELECTRICAL CHARACTERISTICS

| Parameters | Terminal | Symbols | Ratings | | | Units |
|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | |
| ower Supply Start-up Operation | | | | | | |
| Operation Start-up Voltage | 4 - 3 | VCC(ON) | | 18.2 | | V |
| Operation Stop Voltage | 4 - 3 | VCC(OFF) | | 9.6 | | V |
| Operation Circuit Current | 4 - 3 | ICC(ON) | — | — | 6 | mA |
| Non Operation Circuit Current | 4 - 3 | ICC(OFF) | — | — | 100 | µA |
| Oscillation Frequency | 1 - 3 | fOSC | | 22 | | kHz |
| Soft-Start Operation Stop Voltage | 5 - 3 | VSSOLP(SS) | | 1 | | V |
| Soft-Start Operation Charging Current | 5 - 3 | ISSOLP(SS) | | -450 | | µA |
| ormal Operation | | | | | | |
| Overcurrent Detection Threshold Voltage | 7 - 3 | VOCPBD(LIM) | | -0.95 | | V |
| Bottom-Skip Operation Threshold Voltage 1 | 7 - 3 | VOCPBD(BS1) | | -0.66 | | V |
| Bottom-Skip Operation Threshold Voltage 2 | 7 - 3 | VOCPBD(BS2) | | -0.44 | | V |
| OCP/BD Terminal Outflow Current | 7 - 3 | IOCPBD | | | | µA |
| Quasi-Resonant Operation Threshold Voltage 1 | 7 - 3 | VOCPBD(TH1) | | 0.4 | | V |
| Quasi-Resonant Operation Threshold Voltage 2 | 7 - 3 | VOCPBD(TH2) | | 0.8 | | V |
| Minimum Quasi-Resonant Signal Input Time | 7 - 3 | TOFF(MIN) | — | — | 1 | µsec |
| FB Terminal Threshold Voltage | 6 - 3 | VFB(OFF) | | 1.5 | | V |
| FB Terminal Inflow Current (Normal Operation) | 6 - 3 | IFB(ON) | | | | mA |
| tand-by Operation | | | | | | |
| Stand-by Operation Start-up Power Supply Voltage | 4 - 3 | VCC(S) | | 11.2 | | V |
| Stand-by Power Supply Voltage Interval | 4 - 3 | VCC(SK) | | 1.5 | | V |
| Stand-by Non-Operational Circuit Current | 4 - 3 | ICC(S) | | 30 | | µ A |
| FB Stand-by Operation Threshold Voltage | 6 - 3 | VFB(S) | | | | V |
| FB Terminal Inflow Current (Stand-by) | 6 - 3 | IFB(S) | | | | µA |
| Minimum ON Time | 1 - 3 | TON(MIN) | | 1 | | µsec |
| tection Operation | | | | | | |
| Maximum ON Time | 1 - 3 | TON(MAX) | | 34 | | µS |
| OLP Operation Threshold Voltage | 5 - 3 | VSSOLP(OLP) | | 5 | | V |
| OLP Operation Charging Current | 5 - 3 | ISSOLP(OLP) | | -10 | | µA |
| Normal Operation Discharging Current | 5 - 3 | ISSOLP(NOR) | | 40 | | µA |
| OLP Delay Time | 1 - 3 | TOLP | | | | ms |
| OVP Operational Voltage | 4 - 3 | VCC(OVP) | | 27.5 | | V |
| Latch Circuit Holding Current ※10 | 4 - 3 | ICC(H) | — | — | 150 | µA |
| Latch Circuit Releasing Power Supply Voltage ※10 | 4 - 3 | VCC(La.OFF) | | 7.3 | | V |

# 5 CP-850FX CHASSIS DESCRIPTION

## 5.1 POWER SUPPLY BLOCK DIAGRAM
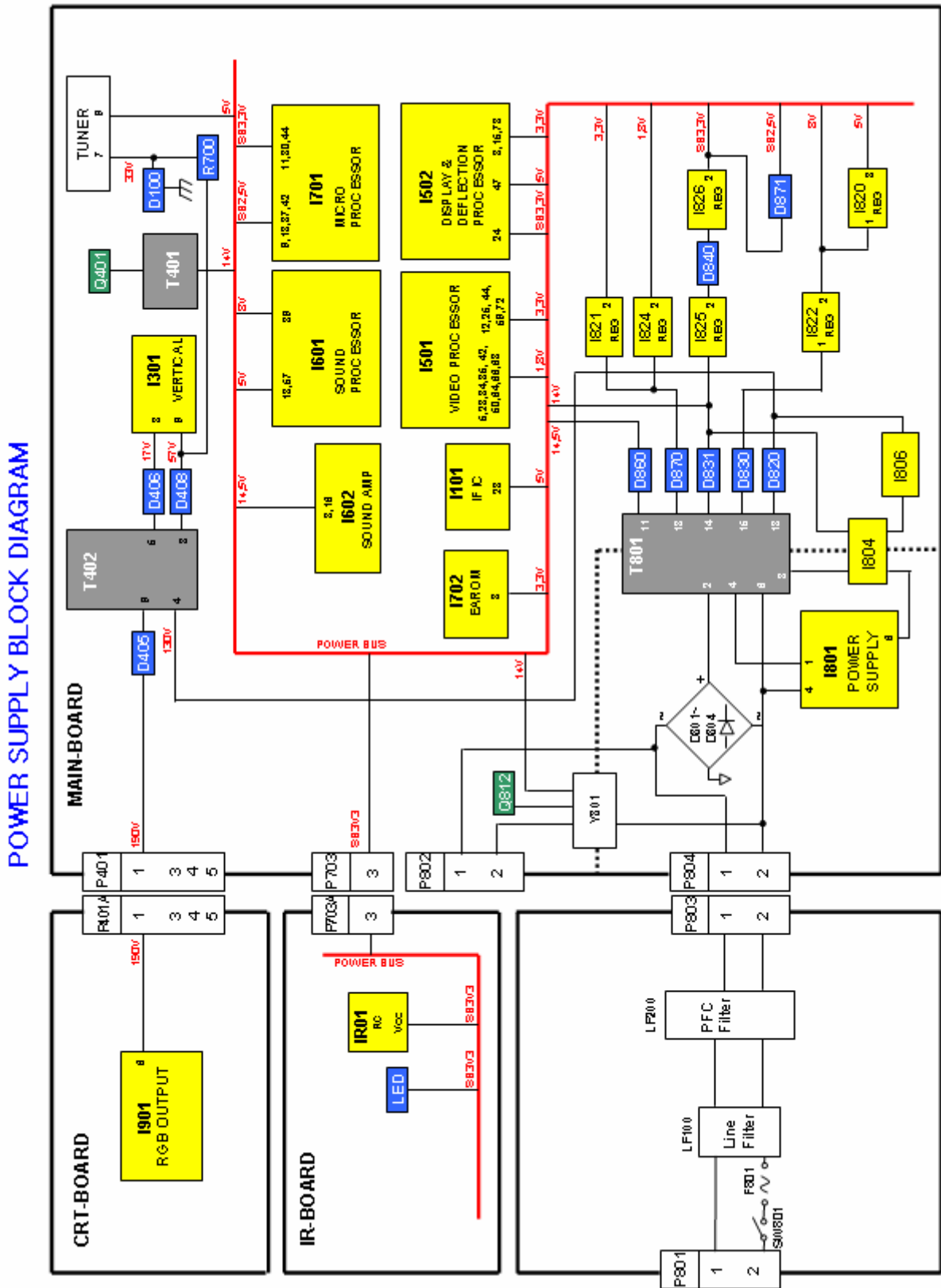
## 5.2 VIDEO & STEREO AUDIO BLOCK DIAGRAM
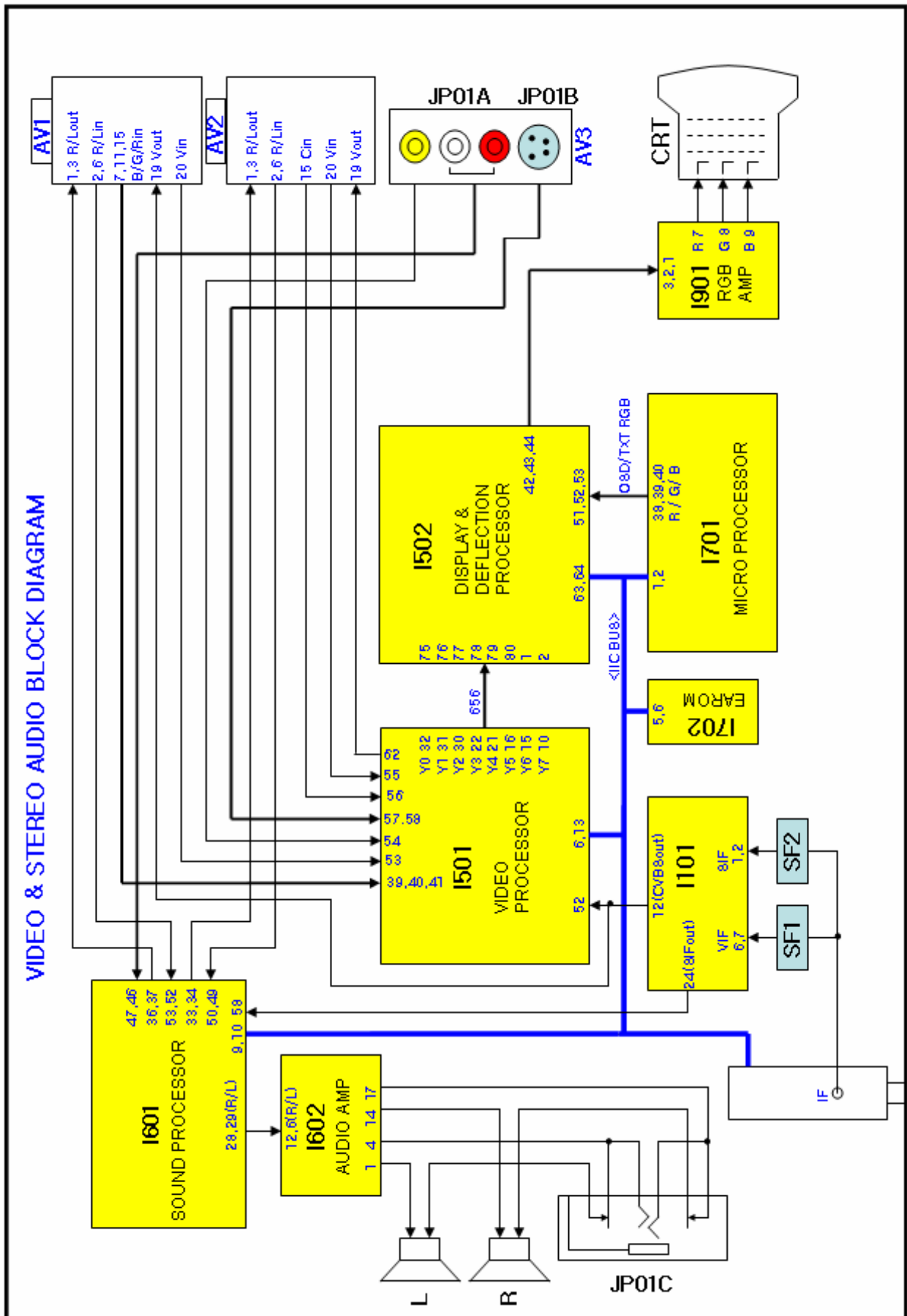
## 5.3   IF SECTION

## 5.3.1   BLOCK DIAGRAM
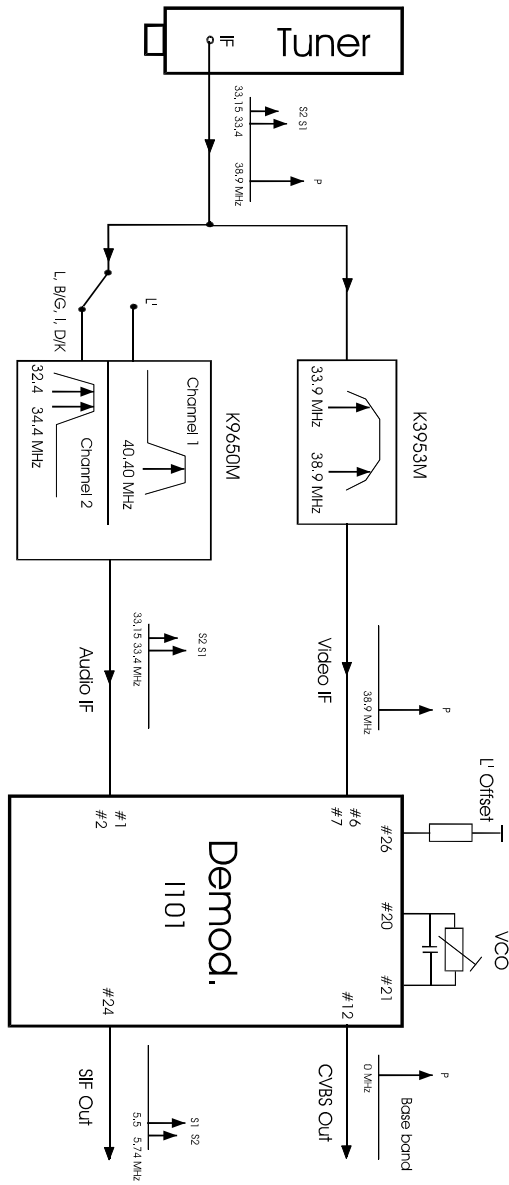
## 5.3.2  VISION IF AMPLIFIER

The video IF signal (VIF) is fed through a SAW filter to the differential input (Pin 6-7) of the VIF amplifier. This amplifier consists of three AC-coupled amplifier stages. Each differential amplifier is gain controlled by the automatic gain control (VIF-AGC). The output signal of the VIF amplifier is applied to the FPLL carrier generation and the video demodulator.

SAW filters

| Ref. | Standard | Features |
|------|----------|----------|
| K3953M | **B/G - D/K - I - L/L'** | ▪ IF filter for video application<br>▪ TV IF filter with Nyquist slopes at 33.9 MHz and 38.9 MHz<br>▪ Constant group delay |
| K9650M | B/G - D/K - I - L/L' | ▪ IF filter for audio application<br>▪ TV IF audio filter with two channels<br>▪ Channel 1 (L') with one pass band for sound carrier at 40.40 MHz<br>▪ Channel 2 ( L, D/K, I, B/G) with one pass band for sound carriers between 32.40 MHz and 33.40 MHz |

## 5.3.3  TUNER-AND VIF-AGC

At Pin 8, the VIF-AGC charges/discharges the AGC capacitor to generate a control voltage for setting the gain of the VIF amplifier and tuner in order to keep the video output signal at a constant level. Therefore, in the case of all negative modulated signals (e.g., B/G standard) the sync. level of the demodulated video signal is the criterion for a fast charge/discharge of the AGC capacitor. For positive modulation (e.g., L standard) the peak white level of video signal controls the charge current. In order to reduce reaction time for positive modulation, where a large time constant is needed, an additional black level detector controls the discharge current in the event of decreasing VIF input signal. The control voltage (AGC voltage at Pin 8) is transferred to an internal control signal, and is fed to the tuner AGC to generate the tuner AGC current at Pin 11 (open collector output). The take over point of the tuner AGC is adjusted at Pin 10 by an external dc voltage from microprocessor. A PWM output from microcontroller is low pass filtered for this AGC control. See also "AGC" adjustment for details on how to align TOP in SERVICE mode.

## 5.3.4  FPLL, VCO AND AFC

The FPLL circuit (frequency phase locked loop) consists of a frequency and phase detector to generate the control voltage for the VCO tuning. In the locked mode, the VCO is controlled by the phase detector and in unlocked mode, the frequency detector is superimposed. The VCO operates with an external resonance circuit (L and C parallel) and is controlled by internal varicaps. The VCO control voltage is also converted to a current and represents the AFC output signal at Pin 22. At the AFC switch (Pin 19) three operating conditions of the AFC are possible: AFC curve "rising" or "falling" and AFC "off". A practicable VCO alignment of the external coil is the adjustment to zero AFC output current at Pin 22. At center frequency the AFC output current is equal to zero. Furthermore, at Pin 14, the VCO center frequency can be switched for setting to the required L' value (L' standard). The optional potentiometer at Pin 26 allows an offset compensation of the VCO phase for improved sound quality (fine adjustment). Without a potentiometer (open circuit at Pin 26), this offset compensation is not active. The oscillator signal passes a phase shifter and supplies the in-phase signal ˜(°) and the quadrature signal (9̃°)of the generated picture carrier.

### 5.3.5   VIDEO DEMODULATION AND AMPLIFIER

The video IF signal, which is applied from the gain controlled IF amplifier, is multiplied with the inphase component of the VCO signal. The video demodulator is designed for low distortion and large bandwidth. The demodulator output signal passes an integrated low pass filter for attenuation of the residual vision carrier and is fed to the video amplifier. The video amplifier is realised by an operational amplifier with internal feedback and 8 MHz bandwidth (–3 dB). A standard dependent dc level shift in this stage delivers the same sync. level for positive and negative modulation. An additional noise clipping is provided. The video signal is fed to VIF-AGC and to the video output buffer. This amplifier with a 6 dB gain offers easy adaptation of the sound trap. For nominal video IF modulation the video output signal at Pin 12 is 2 Vpp.

### 5.3.6   SOUND IF AMPLIFIER AND SIF-AGC

The SIF amplifier is nearly identical with the 3-stage VIF amplifier. Only the first amplifier stage exists twice and is switchable by a control voltage at Pin 3. Therefore with a minimal external expense it is possible to switch between two different SAW filters. Both SIF inputs features excellent cross-talk attenuation and an input impedance which is independent from the switching condition. The SIF-AGC is related to the average level of AM- or FM-carrier and controls the SIF amplifier to provide a constant SIF signal to the AM demodulator and QPS mixer.

### 5.3.7   QUASI-PARALLEL-SOUND (QPS) MIXER

The QPS mixer is realised by a multiplier. The SIF signal (FM or NICAM carrier) is converted to the intercarrier frequency by the regenerated picture carrier (quadrature signal) which is provided from the VCO. The intercarrier signal is fed via an output amplifier to Pin 24.

### 5.3.8   STANDARD SWITCH

To have equal polarity of the video output signal the polarity can be switched in the demodulation stage in accordance with the TV standard. Additional a standard dependent dc level shift in the video amplifier delivers the same sync. level. In parallel to this, the correct VIF-AGC is selected for positive or negative modulated VIF signals. In the case of negative modulation (e.g., B/G standard) the AM output signal is switched off. For positive modulation (L standard) the AM demodulator and QPS mixer is active. This condition allows a parallel operation of the AM sound signal and the NICAM-L stereo sound.

### 5.3.9   L' SWITCH

With a control voltage at Pin 14 the VCO frequency can be switched for setting to the required L' value (L' standard). Also a fine adjustment of the L'-VCO center frequency is possible via a potentiometer. The L' switch is only active for positive modulated video IF-signals (standard switch in L mode).

### 5.3.10 INTERNAL VOLTAGE STABILISER

The internal bandgap reference ensures constant performance independent of supply voltage and temperature.

## 5.4   <u>VIDEO / RGB</u>

### 5.4.1   FRONT END

#### 5.4.1.1  CVBS Front-End

The CVBS front-end consists of the colour-decoding circuit itself, a sync processing circuit for generation of H/V signals out of the CVBS signal, and the luminance processing. The main task of the luminance processing is to remove the colour carrier by means of a notch filter. For PAL

and SECAM operation a baseband delay line is used for U and V signals. This can be used as comb filter in NTSC operation (only for chrominance). The RGB input from SCART is used as an overlay for the CVBS channel (RGB+FBL).
This block contains a matrix (for RGB signals).

### 5.4.1.2  Input Selector

The analog CVBS or SVHS luma signal are  fed to the inputs CVBS1...7 of VSP94x2A (amplitude 0.5...1.5 V pp ). One signal is selected and fed to the first ADC. A second signal (SVHS Chroma) can be selected and fed to the other ADC.  After clamping to the back porch both signals are AD-converted with an amplitude resolution of 9 bit. The AD conversion is done using a 20.25 MHz free-running stable crystal clock. Before the A to D conversion the signals are lowpass filtered to avoid antialias effects. One input is looped back to output CVBSO1(#63).  A signal addition is performed to output a CVBS signal even when separate Y/C signals are used at input.

### 5.4.1.3  Signal Levels And Gain Control

To adjust to different CVBS input voltages a digitally working automatic gain control is implemented. Input voltages in the range between 0.6 to 1.8 V pp can be applied to the CVBS inputs.

### 5.4.1.4  Synchronization

After elimination of the high frequent components of the CVBS signal by a low pass filter, horizontal and vertical sync pulses are separated. Horizontal sync pulses are generated by a digital phase locked loop. The time constant is adjusted between fast and slow behaviour to accommodate different input sources (e.g. VCR).

### 5.4.1.5  Chroma Decoder

The digital multistandard chroma decoder is able to decode NTSC and PAL signals with a subcarrier frequency of 3.58 MHz and 4.43 MHz  as well as SECAM signals with automatic standard detection. The TV controller software has configured the colour decoder to operate in automatic detection mode. When the signal source comes from the tuner, only SECAM and PAL (50Hz) standard are enabled. In AV mode or when program number 0 is selected the following standards are also enabled : NTSC M, NTSC 4.43 and PAL 60.
The demodulation is done with a regenerated colour-carrier.

### 5.4.1.6  Luminance Processing

A luminance notch filter is implemented to separate the chroma information from the luminance. Depending on the colour standard, one out of three different notch characteristics is chosen ('PAL', 'NTSC', 'SECAM') automatically.

### 5.4.1.7  RGB Front-End

An analogue RGB input port for an external RGB source is available. The incoming signal is clamped to the back porch by a clamping pulse. This input as an overlay input (soft mix). The RGB signal must then be synchronised to the main CVBS/YC signal.

### 5.4.1.8  Signal Processing

#### 5.3.1.8.1  Horizontal Prescaler

The main application of the horizontal prescaler is the conversion of the number of pixels coming form the 40.5/20.25 MHz pixel clock domain down to the number of pixels stored in the memory (factor 2/3). Generally the number of incoming pixels can be decimated by a factor between 1 and 64 in a granularity of 2 output pixels. The horizontal scaler reduces the number of incoming

pixels by subsampling. To prevent the introduction of alias distortion low pass filters are used for luminance and chrominance processing. The horizontal prescaler consists of two main subsampling stages. The first stage is a scaler for rational decimation factors in a range of 1 to 2. The second stage decimates in integer steps (1,2,3,4...32).

### 5.3.1.8.2 Noise Reduction

The structure of the temporal motion adaptive noise reduction is the same for luminance as for chrominance signal.
The output of the motion detector is weighted. The look-up table input value range is separated into 8 segments. It is possible to freely program different behaviour of the noise reduction by using predefined curve characteristic for each segment.

### 5.3.1.8.3 Noise Measurement

The noise measurement algorithm is used to sort program during ATSS. This is done by the TV-microcontroller which reads the noise level in VSP. The value is determined by averaging over several fields.

### 5.3.1.8.4 Operation Modes

The interlaced input signal (e.g. 50 Hz PAL or 60 Hz NTSC) is composed of a field A (odd lines) and a field B (even lines). The 100Hz operation mode used is simply AABB, where each stored field in the memory is displayed double times on the TV screen.
A still field can be displayed using *FREEZE* command, the operation mode becomes ABAB.

### 5.3.1.8.5 Digital 656 Output

The output data format corresponds to CCIR 656 with double-scan format (8-bit bus at a data rate of 54 MHz). There all frequencies and data-rates are doubled compared to standard CCIR656 specification. Timing reference codes (SAV, EAV) are inserted according to the specification. The output is set to 720 pixels per line and the display clock is set to 54 MHz.

## 5.4.2  BACK END

### 5.4.2.1  Digital Input Interface

The digital input interface is set to receive 8 bit 4:2:2 Y Cr Cb multiplexed with separate H/V-syncs and clock (ITU-R-656 format). The data inputs Y0...Y7 and C0...C7 are clocked with the external clock LLC2. The clock frequency is 54 MHz for 8 bit data input. The horizontal sync pulse at the HS pin should be an active video signal, which is not vertically blanked. A clock generator converts the different external line locked clock rates to a common internal sample rate of approximately 40.5 MHz, in order to provide a fix bandwidth for all digital filters. Therefore the input data is sample rate converted to the common processing frequency by the horizontal scaler.

### 5.4.2.2  Horizontal Scaler

The horizontal scaler supports linear or nonlinear horizontal scaling of the digital input video signal in the range of 0.25 to 4. Nonlinear scaling, also called "panorama vision", provides a geometrical distortion of the input picture. It is used to fit a picture with 4:3 format on a 16:9 screen by stretching the picture geometry at the borders. Also, the inverse effect can be produced by the scaler. See also microcontroller section to find details on format switching logic.

### 5.4.2.3 Luma Contrast and Brightness

The luminance signal is multiplied by a factor of 0...2 (contrast adjustment). The signal can be shifted by ±100% of its maximal amplitude with the digital brightness value

### 5.4.2.4 Black Level Expander/Compressor (BLEC)

The black level expander/compressor modifies the luminance signal with an adjustable non-linear function to enhance the contrast of the picture.
Dark areas are stretched to black, while bright areas remain unchanged. Advantageously, this black level processing is performed dynamically and only if it will be most noticeable to the viewer.

### 5.4.2.5 Luma Sharpness Enhancer (LSE)

Sharpness is one of the most critical features for optimum picture quality. This important processing is performed in the LSE circuitry of DDP 3315C. It consists of the dynamic peaking, the luma transient improvement (LTI) and an adaptive mixer. The luma input signal is processed in the peaking and LTI block in parallel. Both output signals are combined in the mixer depending on the selected LSE characteristic.

### 5.4.2.6 Dynamic Peaking

The dynamic peaking improves the details of a picture by contour emphasis. It adapts to the amplitude and the frequency of the input signal. Small detail amplitudes are sharpened, while large detail amplitudes stay nearly unmodified.

### 5.4.2.7 Luma Transient Improvement (LTI)

For small detail amplitudes the dynamic peaking is the most appropriate processing to improve the sharpness. However, for large amplitudes even small over-and/ or undershoots of the peaking are too annoying. The luma transient improvement enhances the slope of picture detail without these effects by a non-linear processing. The contour correction signal calculated in this block, is limited to the adjacent extreme values to prevent over- and undershoots. The LTI features an adjustable gain control and an adjustable coring threshold to prevent the enhancement of small noise amplitudes.

### 5.4.2.8 Mixing of Dynamic Peaking and LTI

The contour correction signals of the dynamic peaking and the LTI block are combined by the mixer. Controlled by the amplitude of a picture edge, this circuitry fades between these two signals. Thus, small and medium picture detail is enhanced by contour emphasis (peaking) and large picture detail is enhanced by step-improvement (LTI).

### 5.4.2.9 Chroma Transient Improvement

The intention of this block is to enhance the chroma resolution. A correction signal is calculated by differentiation of the colour difference signals. The differentiation can be selected according to the signal bandwidth, e.g. for PAL/NTSC/SECAM or digital component signals, respectively. The amplitude of the correction signal is adjustable. Small noise amplitudes in the correction signal are suppressed by an adjustable coring circuit. To eliminate "wrong colours", which are caused

by over and undershoots at the chroma transition, the sharpened chroma signals are limited to a proper value automatically

a)
Cr in
Cb in

b)
Ampl.

c)
Cr out
Cb out
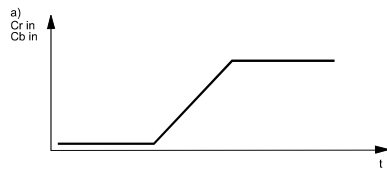
a) Cr Cb input of CTI
b) Cr Cb input + correction signal
c) sharpened and limited Cr Cb
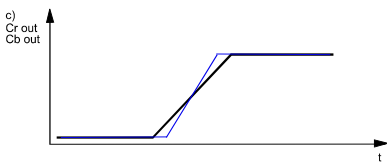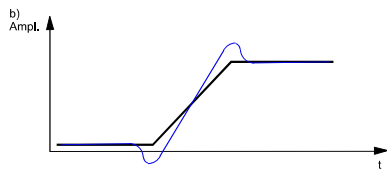
### 5.4.2.10 Analog Back End

The digital RGB signals are converted to analogue RGB by three 10-bit digital to analogue converters (DAC). Each RGB signal has two additional DACs with 9-bit resolution to adjust analogue brightness (40% of the full RGB range) and cutoff / black level (60% of the full RGB range). An additional fixed current is applied for the blanking level.

The back-end supports the insertion of two external analogue component signals, only one is used for OSD/Text from the microcontroller. These signals are clamped, processed in an analogue matrix (RGB2), converted by a voltage/current converter (VCC), and inserted into the main RGB by the fast blank switch. The analogue RGB outputs are current outputs with current-sink characteristics.

### 5.4.2.11 Analog RGB Insertion

Each component signal is clamped, converted to RGB if required, and inserted into the main RGB by the fast blank switch. The external component signals are adjustable independently as regards DC level (brightness) and magnitude (contrast).

Fast Blank selection logic Over-/underlay of the external component signal and the main RGB signal depends on the fast blank input signal.

### 5.4.2.12 CRT Measurement and Control

In order to define accurate colour on different CRT displays, the cut-off and white drive settings are adjusted in factory depending on the characteristic of CRT phosphor.

To guarantee correct colours during the lifetime of the display, a build in automatic tube control loop measures and adjusts the black level on every field and white point every third field. The display processor is equipped with an 9/12-bit PDM-ADC for all picture tube measuring purposes. This MADC is connected to the SENSE input pin, the input range is 0 to 2.6 V. Cutoff and white drive current measurement are carried out with 8-bit resolution during the vertical blanking interval. The current range for cutoff measurement is set by connecting the sense resistor RC591 to the SENSE input. Due to the fact of a 1:10 relation between cutoff and white drive current the range select 2 output (RSW2) becomes active for the white drive measurement and connects R533 in parallel to RC591, thus determining the correct current range.

During the active picture, the MADC is used for the average beam current limiter with a 12-bit resolution. Again a different measurement range is selected with active range select 1&2 outputs (RSW1&RSW2) connecting R534 in parallel to R533 and RC591.

These measurements are typically done at the summation point of the picture tube cathode currents.

The picture tube measurement returns results on
every field for:
– cutoff R
– cutoff G
– cutoff B
– white drive R or G or B (sequentially)

The average beam current limiter (BCL) works on both the digital YC r C b input  from VSP and the inserted analog RGB signals (OSD and Teletext) by using the sense input for the beam current measurement. The BCL uses a different filter to average the beam current during the active picture resulting in a 12-bit resolution. The filter bandwidth is approximately 4 kHz. The beam current limiter allows the setting of a threshold current, a gain and an additional time constant. To accommodate several CRT's, beam current threshold and gain can be modified by microcontroller option2. If the beam current is above the threshold, the excess current is low-

pass filtered with the according gain and time constant. The result is used to attenuate the RGB outputs by adjusting the white drive multipliers for the internal (digital) RGB signals, and the analog contrast multipliers for the analog RGB inputs, respectively. The lower limit of the attenuator is programmable, thus a minimum contrast can always be set. If the minimum contrast is reached, the brightness will be decreased to a programmable minimum as well.

### 5.4.2.13      Synchronization and Deflection

The deflection processing generates the signals for the horizontal and vertical drive. This block contains two numeric phase-locked loops and a security unit:
– PLL2 generates the horizontal and vertical timing, e.g. blanking, clamping and sync signals. Phase and frequency are synchronised by the incoming sync signals.
– PLL3 adjusts the phase of the horizontal drive pulse and compensates for the delay of the horizontal output stage.
– The security unit observes the H-Drive output signal.
With an external 5 MHz reference clock this unit
controls the H-drive "off time" and period. In case of
an incorrect H-drive signal the security unit generates
a free running h-drive signal divided down from
beam current

### 5.4.2.14      EHT Compensation

The vertical deflection waveform is scaled according the average beam current. This is used to compensate the effects of electric high tension changes due to beam current variations. EHT compensation for East/West deflection is done with an offset corresponding to the average beam current.

### 5.5   MICRONTROLLER

### 5.5.1   MICROCONTROLLER FEATURES

- 8-bit 8051 instruction set compatible CPU
- 33.33-MHz internal clock (max.)
- 0.360 µs (min.) instruction cycle
- Two 16-bit timers : schedule software tasks , and user clock
- Watchdog timer
- Capture compare timer for infrared remote control decoding
- Pulse width modulation unit (2 channels 14 bit, 6 channels 8 bit) : used to control AGC Take Over Point .
- ADC (4 channels, 8 bit) : AFT, AGC, Local keys, OCP.
- UART

### 5.5.2   ACQUISITION FEATURES

- Multistandard Digital Data Slicer
- Parallel Multi-norm Slicing (TTX, VPS, WSS)
- Four Different Framing Codes Available
- Data Caption only Limited by available Memory
- Programmable VBI-buffer
- Full Channel Data Slicing Supported
- Fully Digital Signal Processing
- Noise Measurement and Controlled Noise Compensation

- Attenuation Measurement and Compensation
- Group Delay Measurement and Compensation
- Exact Decoding of Echo Disturbed Signals

### 5.5.3  PORTS

- One 8-bit I/O-port with open drain output and optional I 2 C Bus emulation support (Port 0)
- Two 8-bit multifunction I/O-ports (Port 1, Port 3)
- One 4-bit port working as digital or analogue inputs for the ADC (Port 2)
- One 2-bit I/O-port with secondary functions (P4.2, 4.3, 4.7)

### 5.5.4  μ-CONTROLLER I/O PIN CONFIGURATION AND FUNCTION TABLE

| PIN | NAME | CONFIGURATION | | DESCRIPTION |
| --- | --- | --- | --- | --- |
| | | STAND BY | TV ON | |
| 3 | S/SW2 | Open Drain | Open Drain | #4 #3 Source / L L Tuner / L H AV2-16/9 / H L AV2-4/3 / H H AV2-4/3 |
| 4 | S/SW2 | Open Drain | Open Drain | |
| 5 | OCP | Open Drain | Open Drain | Over Current Protection |
| 8 | RESET out | Low | Open Drain | Reset video IC's |
| 15 | S/SW1 | High impedance | High impedance | ADC input |
| 16 | AGC in | High impedance | High impedance | AGC input – ADC input |
| 17 | KEY | High impedance | High impedance | Keyboard input – ADC input |
| 18 | AFT | High impedance | High impedance | AFT input– ADC input |
| 21 | Mod SW | High impedance | Push Pull | High = Negative modulation, Low = Positive modulation (L/L'). |
| 22 | SECAM L' | High impedance | Push Pull | Low = L, High =L' |
| 23 | IR | High impedance | High impedance | Infrared Interrupt input |
| 24 | SOUND INT | Input | input | Sound interrupt input – edge triggered |
| 47 | Sound Mute | Push Pull - Low | Push Pull - High | Low=Mute |
| 48 | AGC out | -- | PWM out | Control tuner AGC (TOP) |
| 50 | Relay | Push Pull - Low | Push Pull - High | |
| 51 | LED | Push Pull | Push Pull | Low : LED Red / High : LED Green |
| 52 | Power | Push Pull - Low | Push Pull - High | SMPS operation mode / High=ON, Low=ST-BY |

### 5.5.5  TUNING

The AFC information is supplied by the demodulator IC, and becomes available on SDA55xx pin 15 for controlling software. The controlling software uses this information for tuner frequency tracking ( automatic following ). The AFC windows is typically between 50 KHz and 100 KHz. The minimum frequency step of the tuner is 50 Khz.

This AFC function is disabled when a program is tuned using the direct frequency entry or after fine tuning adjustment. Therefore it is recommended to tune channel with the TV search function ( manual or ATSS ) or using the direct channel entry to enable the Automatic Frequency Control.

## 5.5.6  AUTOMATIC PICTURE FORMAT SWITCHING

When AUTO mode is selected by the user, the television will automatically select the picture format for the user. If the user does not want to accept this selected format, he can always override the setting by use of the ZOOM control on the remote control.

The received information used for automatic picture format control (only while AUTO is selected) is supplied from two sources;
- By WSS data (Wide Screen Signalling Information : see the WSS European Telecommunication Standard ETS 300 294).
- The voltage level from SCART 1 or SCART 2, pin 8 (slow switching)

### 5.5.6.1  WSS Data

This digital signal is a received at the beginning of line 23 in each frame. It is not a teletext signal, but the controller uses the same decoder resources to receive and decode the digital signal.
This is bi-phase encoded using a clock frequency of 5 MHz. In total, 14 data bits are available, in 4 groups.
- Group 1 : Aspect Ratio        (b0, b1, b2, b3)
- Group 2 : Enhanced Services   (b4, b5, b6, b7)
- Group 3 : Subtitles           (b8, b9, b10)
- Group 4 : Reserved            (b11, b12, b13)

The signal contains bits in Data Group 1 which define an Aspect Ratio label, and in Data Group 3 (b10) which defines if subtitles are available in the video. The other data groups have no application in this TV for picture format selection.
The TV decoder recognises 5 bits of data (where b3 is an odd parity bit for Data Group 1).

| Position | Aspect Ratio label | WSS Bits 0 | 1 | 2 | 3 | 10 | Format Name Tube 16:9 | Tube 4:3 |
|---|---|---|---|---|---|---|---|---|
| N/A | FORMAT_4_3 | 0 | 0 | 0 | 1 | 0 | 4:3 | FULL SCREEN |
| CENTRE | FORMAT_14_9 | 1 | 0 | 0 | 0 | 0 | ZOOM 14:9 | FULL SCREEN |
| TOP | FORMAT_14_9 | 0 | 1 | 0 | 0 | 0 | DEFAULT | DEFAULT |
| CENTRE | FORMAT_16_9 | 1 | 1 | 0 | 1 | 0 | ZOOM 16:9 | FULL SCREEN |
| TOP | FORMAT_16_9 | 0 | 0 | 1 | 0 | 0 | FULL SCREEN | FULL SCREEN |
| CENTRE | FORMAT_16_9_PLUS | 1 | 0 | 1 | 1 | 0 | ZOOM 16:9 | FULL SCREEN |
| CENTRE | FORMAT_14_9_FULL | 0 | 1 | 1 | 1 | 0 | FULL SCREEN | 14:9 |
| N/A | FORMAT_16_9_ANAM | 1 | 1 | 1 | 0 | 0 | FULL SCREEN | 16:9 |
| N/A | SUBTITLE_OUT_IMAGE | X | X | X | X | 1 | FULL SCREEN | FULL SCREEN |

There are the following output possibilities;
- 4:3
- 14:9
- 16:9
- ZOOM 14:9
- ZOOM 16:9
- FULL SCREEN (for either 4:3 or 16:9 tubes)

DEFAULT refers to a signal for which there is no implementation, so is treated as if there is no signal data available.

## 5.5.6.2  SCART Pin 8 Data (Slow Switching)

When there is a signal from SCART 1 pin 8 or SCART 2 pin 8 (named the Slow Switching SSW signal) the TV will enter AV mode, unless the user forces another source (which is possible even though slow switching is present).

| Position | Aspect Ratio | Switching Voltage Level | Format Name | |
|---|---|---|---|---|
| | | | Tube 16:9 | Tube 4:3 |
| CENTRE | 4:3 | HIGH | 4:3 | FULL SCREEN |
| CENTRE | 16:9 | MEDIUM | FULL SCREEN | 16:9 |

The SCART 1 signal SSW1 has priority over SSW2.

## 5.5.6.3  Picture Format Description

From the information collected from the above sources is the input, from which the TV must decide which format to select. The WSS data always has priority over Slow Switching.

If no valid data is received from either source, then a default value must be assumed (this is controlled also by the user by the use of "ZOOM AUTO" in the "FEATURES" menu).

### 5.3.1.8.1 *16:9 CRT*

Formats available with 16:9 cathode ray tube;
- 4:3                    (AUTO selectable)
- 14:9                   (AUTO selectable)
- ZOOM 14:9        (AUTO selectable)
- ZOOM 16:9        (AUTO selectable)
- FULL SCREEN    (AUTO selectable)
- PANORAMA       (only available/selectable by the user)
- FAVOURITE       (only available/selectable by the user)

The table below gives a summary of the FORMAT modes available with a 16:9 CRT, and their given properties.

| Format Name | Zoom factor – 16:9 CRT | | Description | Application |
|---|---|---|---|---|
| | Vertical | Horizontal | | |
| 4:3 | 100% | 75% | Picture is centred with black bars at the left and right hand side of the display | Standard 4/3 picture with 576 active lines |
| 14:9 | 114% | 87% | Picture is centred with black bars at the left and right hand side of the display | 14:9 picture – letter box format with 504 active lines |
| ZOOM 14:9 | 114% | 100% | Picture is displayed filling the full width of the screen by incorporating a small horizontal geometrical error (typically 8% linear) | 14:9 picture – letter box format with 504 active lines |
| ZOOM 16:9 | 133% | 100% | Picture is displayed filling the full screen (width and height) | 16:9 picture – letter box format with 430 active lines |

| | | | Picture is displayed filling the full screen (width and height) | Standard 16/9 picture with 576 active lines |
|---|---|---|---|---|
| FULL SCREEN | 100% | 100% | Picture is displayed filling the full screen (width and height) | Standard 16/9 picture with 576 active lines |
| PANORAMA (not AUTO) | 100% | 100% | Picture is displayed filling the full screen (width and height) by incorporating a non-linear horizontal geometrical error | Used to fit a picture with 4:3 format on a 16:9 screen by stretching the picture geometry at the borders |
| FAVOURITE (not AUTO) | 100% to 133% | 75% to 100% | Customised picture size | User-definable format. |

### 5.3.1.8.2 *4:3 CRT*

Formats available with 16:9 cathode ray tube;
- 14:9                     (AUTO selectable)
- 16:9                     (AUTO selectable)
- FULL SCREEN    (AUTO selectable)
- WATERGLASS     (only available/selectable by the user)
- FAVOURITE         (only available/selectable by the user)

The table below gives a summary of the FORMAT modes available with a 4:3 CRT, and their given properties.

| Format Name | Zoom factor – 4:3 CRT | | Description | Application |
|---|---|---|---|---|
| | **Vertical** | **Horizontal** | **Description** | **Application** |
| 14:9 | 87% | 100% | Picture is centred with black bars at the top and bottom of the display, realised by compressing the vertical size | 14:9 picture – letter box format with 576 active lines |
| 16:9 | 75% | 100% | Picture is centred with black bars at the top and bottom of the display, realised by compressing the vertical size | 16:9 picture – letter box format with 576 active lines |
| FULL SCREEN | 100% | 100% | Picture is displayed filling the full screen (width and height) | Standard 4:3 picture with 576 active lines |
| WATERGLASS (not AUTO) | 100% | 100% | Picture is displayed filling the full screen (width and height) by incorporating a non-linear horizontal geometrical error | Used to fit a picture with 16:9 format on a 4:3 screen by compressing the picture geometry at the borders |
| FAVOURITE (not AUTO) | 100% to 133% | 75% to 100% | Customised picture size | User-definable format. |

## 5.5.7  EXTERNAL SOURCE CONTROL LOGIC

The following schematic, illustrates the logic of control for the two SCART connectors.
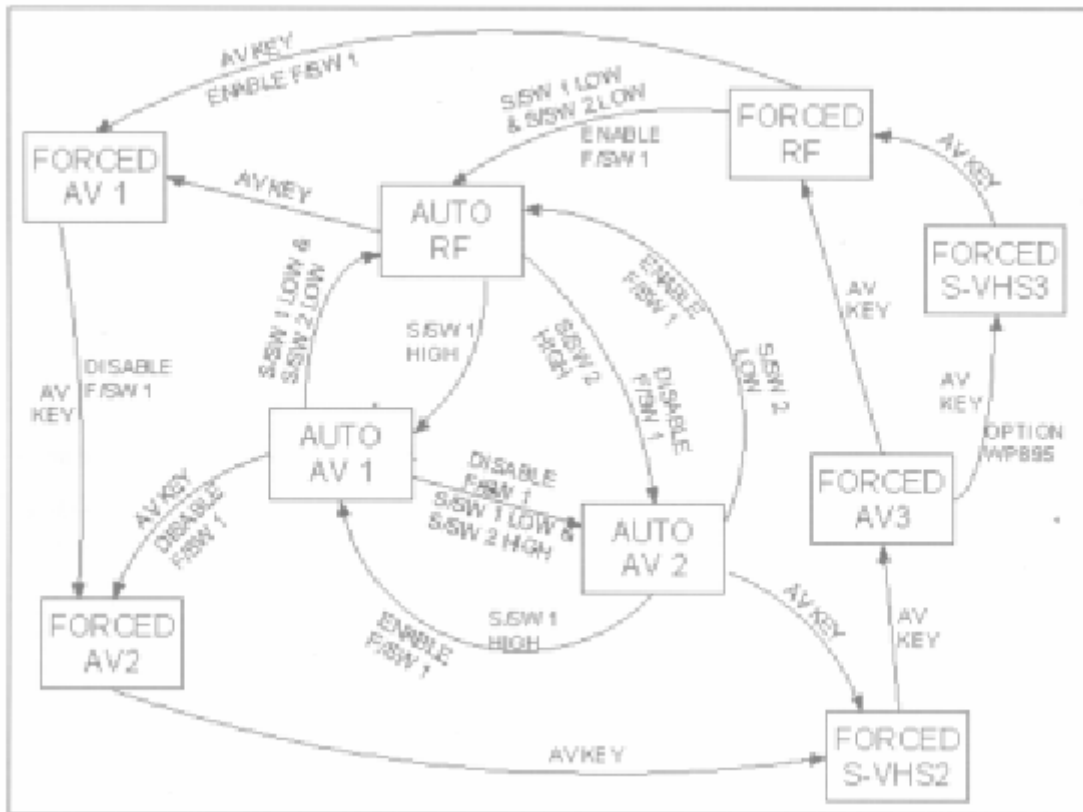


The terms used in the schematic are described below;

1.  AUTO represents a situation where the television has self-selected its picture source. This could be when the SCART SLOW SWITCHING pin has gone to a high state, and the AV 1 input is selected without the intervention of the user.
2.  FORCED represents the change of source which has been commanded by the user (using the EXTERNAL button). The user always has priority, and can override the AUTO change of source by the television.
3.  AV KEY represents the EXTERNAL button of the remote control, or on the television.
4.  S/SW 1, or S/SW 2 represent the SLOW SWITCHING inputs of the first SCART (AV 1) or second SCART (AV 2), these each being pin number 8.
5.  F/SW 1 represents the FAST SWITCHING input of the first SCART (AV 1), on pin number 16. The second SCART, AV 2, input does not possess a FAST SWITCHING input.

The HIGH state of a slow switching input represents the request from the external source to be selected by the television. Whether this is accepted or not depends on the position in the logic diagram. The general rule is that the user always has priority, so the use of the AV KEY will always result in a defined logic path being followed.

Under certain circumstances, defined in the diagram, the change of state of a slow switching input will result in the automatic change of source by the television. This change, such as the change from RF broadcast to the AV 1 input, can always be overridden by the user after the event.

Each line on the diagram, with its associated text, represents the exact conditions under which the change of state will occur. Sometimes this will be accompanied by another action which will be automatically performed by the television, being to either ENABLE or DISABLE F/SW 1.

## 5.5.8  OVER CURRENT PROTECTION

In case of overload, the SMPS secondary voltages will drop. The voltage on pin 5 of microcontroller changes Low to High. The controlling software which continuously monitors this voltage will switch the set to stand by mode. To power on the set again the user must switch it off using the main power switch. Appropriate hysteresis guaranty a reliable operation.

## 5.6  <u>TELETEXT DISPLAY</u>

National character option bits C12, C13, C14 are transmitted in the page header of a given teletext page. The national option bits are intended to change (or exchange) 13 characters within the G0 character set, according to the needs of each national language.
These codes represent, for a given broadcaster, the intended language that the teletext page should be displayed in. As there are only 3 bits, there are only 8 codes available to cover all the possible language combinations. This means that for a received code there are several possibilities meanings, according to the local code of practice.

This is not as bad as it first seems, as we use the user-selected OSD language to identify the intention of the broadcaster. For example, a user wishing to see Russian teletext should select Russian OSD language, otherwise he would not have correct teletext display on the TV.
The table below allows the reader to understand the relationship between selected OSD language (which is under user control), the teletext language display (selected by national option bits in transmission page header) and the Packet 26 language selection (selected within packet 26 of the transmission page).

An example: For Greek teletext display, (if national option code 1 1 1 is received from the broadcaster), the user should select the Greek OSD language. Even if English, French, German, Italian, Spanish, Dutch, Danish, Finnish, Norwegian or Swedish OSD languages are selected, the teletext will be correctly displayed.
However, if Polish, Hungarian, Czech, Slovakian, Rumanian or Russian OSD are selected, the consequence will be incorrect teletext display for the national option characters. Romanian national font options will be selected.

| OSD Language | C12 | C13 | C14 | PRIMARY LANGUAGE | Secondary Language | X26 Language |
|---|---|---|---|---|---|---|
| English, French, German, Italian, Spanish, Dutch, Danish, Finnish, Norwegian, Swedish, Greek | 0 | 0 | 0 | English | English | West Euro |
| | 0 | 0 | 1 | German | German | West Euro |
| | 0 | 1 | 0 | Scandinavian | Scandinavian | West Euro |
| | 0 | 1 | 1 | Italian | Italian | West Euro |
| | 1 | 0 | 0 | French | French | West Euro |
| | 1 | 0 | 1 | Spanish | Spanish | West Euro |
| | 1 | 1 | 0 | Turkish | Turkish | West Euro |
| | 1 | 1 | 1 | Greek | English | Greek |
| Polish, Hungarian, Czech, Slovakian, Rumanian | 0 | 0 | 0 | Polish | Polish | East Euro |
| | 0 | 0 | 1 | German | German | West Euro |
| | 0 | 1 | 0 | Hungarian | Hungarian | East Euro |
| | 0 | 1 | 1 | Italian | Italian | West Euro |
| | 1 | 0 | 0 | French | French | West Euro |
| | 1 | 0 | 1 | Serbian | Serbian | East Euro |
| | 1 | 1 | 0 | Czech | Czech | East Euro |
| | 1 | 1 | 1 | Rumanian | Rumanian | East Euro |
| Bulgarian, Russian | 0 | 0 | 0 | English | Russian | Cyrillic |
| | 0 | 0 | 1 | German | German | West Euro |
| | 0 | 1 | 0 | Estonian | Estonian | East Euro |
| | 0 | 1 | 1 | Lettish | Lettish | East Euro |
| | 1 | 0 | 0 | Russian | English | Cyrillic |
| | 1 | 0 | 1 | Ukrainian | English | Cyrillic |
| | 1 | 1 | 0 | Czech | Czech | East Euro |
| | 1 | 1 | 1 | Rumanian | Rumanian | Cyrillic |

## 5.7   SOUND PROCESSING

### 5.7.1   ANALOGUE SOUND IF - INPUT  SECTION

The input pins ANA_IN1+ and ANA_IN- offer the possibility to connect sound IF sources to the MSP 341xG. The analogue-to-digital conversion of the preselected sound IF signal is done by an A/D converter, whose output is used to control an analogue automatic gain circuit (AGC), providing an optimal level for a wide range of input levels.

### 5.7.2   QUADRATURE MIXERS

The digital input coming from the integrated A/D converter may contain audio information at a frequency range of theoretically 0 to 9 MHz corresponding to the selected standards. By means of two programmable quadrature mixers, two different audio sources ; for example, NICAM and FM-mono, may be shifted into baseband position.

### 5.7.3   PHASE AND AM DISCRIMINATION

The filtered sound IF signals are demodulated by means of the phase and amplitude discriminator block. On the output, the phase and amplitude is available for further processing. AM signals are derived from the amplitude information, whereas the phase information serves for FM and NICAM demodulation.

### 5.7.4 NICAM DECODER

In case of NICAM - mode, the phase samples are decoded according the DQPSK - coding scheme. The output of this block contains the original NICAM bitstream.

### 5.7.5 DSP SECTION

All audio baseband functions are performed by digital signal processing (DSP). The DSP section controls the source and output selection, and the signals processing.

### 5.7.6 SOUND MODE SWITCHING

In case of NICAM transmission, the controlling software read the bit error rate and the operation mode from the NICAM Decoder. When the set is in "Auto detection" mode ( default mode after ATSS ) the MSP firmware set automatically the sound mode ( NICAM mono, NICAM Dual 1 or NICAM Dual 2 ) depending on the transmitted mode.
In case of 2 Carrier FM transmission, the MSP firmware read the transmission mode and the signal quality level from the Stereo Detection Register. When the set is in "Auto detection" mode the firmware set automatically the sound mode ( mono, Stereo, Dual 1, Dual 2 ) depending on the transmitted mode.
In "Auto detection" mode the firmware evaluate the signal quality and automatically switch to the analogy sound carrier 1, if the transmission quality is too poor. To avoid unwanted automatic switching the threshold levels mono to stereo and stereo to mono is different.
When the sound mode change, the MSP firmware informs the microcontroller by rising pin 4. This generates an interrupt to the controller, which then read MSP registers via I2C bus to know the new sound status, and update OSD when needed.
In "forced mono " mode ( locker icon ), the controlling software configure the MSP341xG to demodulate only the analogue (FM or AM)  sound carrier 1, no matter the signal quality. The sound mode " forced " or " Autodetect" is stored for each programme.

### 5.8  SOUND AMPLIFICATION

The TDA8946J is a stereo BTL audio amplifier capable of delivering 2 x 15 W output power to an 8 $\Omega$ load at THD = 10%, using a 18 V power supply and an external heatsink. The voltage gain is fixed at 32dB.

With the three-level MODE input the device can be switched from 'standby' to 'mute' and to 'operating' mode.
The TDA 8946J outputs are protected by an internal thermal shutdown protection mechanism and short-circuit protection.

### 5.8.1 POWER AMPLIFIER

The power amplifier is a Bridge Tied Load (BTL) amplifier with an all-NPN output stage, capable of delivering a peak output current of 1.5 A.
The BTL principle offers the following advantages :
- Lower peak value of the supply current.
- The ripple frequency on the supply voltage is twice the signal frequency.
- No DC-blocking capacitor
- Good low frequency performance

## 5.8.2  MODE SELECTION

The TDA8946J has several functional modes, which can be selected by applying the proper DC voltage to pin MODE.

Mute : In this mode the amplifier is DC biased but not operational (no audio output). This allows the input coupling capacitors to be charged to avoid pop-noise. The devices is in mute mode when 2.5 V < $V_{MODE}$ < (Vcc-1.5 V).

Operating : In this mode the amplifier is operating normally. The operating mode is activated at $V_{MODE}$ < 0.5 V.

## 5.9  VERTICAL DEFLECTION

The vertical driver circuit is a bridge configuration. The deflection coil is connected between the output amplifiers, which are driven in phase opposition. The differential input circuit is voltage driven. The input circuit is especially intended for direct connection to driver circuits which deliver symmetrical current signals, but is also suitable for asymmetrical currents. The output current of these devices is converted to voltages at the input pins via resistors R350 and R351. The differential input voltage is compared with the output current through the deflection coils measured as voltage across R302, which provides internal feedback information. The voltage across R302 is proportional to the output current.

### 5.9.1  FLYBACK VOLTAGE

The flyback voltage is determined by an additional supply voltage $V_{flb}$. The principle of operation with two supply voltages (class G) makes it possible to fix the supply voltage Vp optimum for the scan voltage and the second supply voltage $V_{flb}$ optimum for the flyback voltage. Using this method, very high efficiency is achieved. The supply voltage $V_{flb}$ is almost totally available as flyback voltage across the coil, this being possible due to the absence of a coupling capacitor.

### 5.9.2  PROTECTION

The output circuit has protection circuits for :
- Too high die temperature
- overvoltage of output stage A

### 5.9.3  GUARD CIRCUIT

The guard signal is not used by the video IC to blank the screen in case of fault condition.

### 5.9.4  DAMPING RESISTOR

For HF loop stability a damping resistor (R331 & R332) is connected across the deflection coil.

### 5.9.5  EAST-WEST AMPLIFIER

The East-West amplifier is current driven. It can only sink currents of the diode modulator circuit. A feedback resistor R397 is connected between the input and output of this inverting amplifier in order to convert the East-West correction input into an output voltage.

### 5.10  POWER SUPPLY (STR-W6754) - Functions of Each Terminal

5.10.1 Vcc Terminal (Pin 4)

#### 5.10.1.1　　Start-up Circuit

The start-up circuit detects Vcc terminal (No.4 pin) voltage, and makes a control IC start and stop. The power supply of the control IC (Vcc terminal input) employs a circuit as shown in Fig.1.  At start-up, C3 is charged through a start-up resistor R2. The R2 value needs to be set more than the holding current of the latch circuit (150µA Max), which is described later, to be flown at the minimum AC input.

However, where the R2 value is too high, the current charging to C3 shall be reduced after AC input.  Consequently, it takes much time to reach the operation start-up voltage, so it is required to monitor the capacity of C3 that is mentioned later simultaneously.  The Vcc terminal voltage falls immediately after the control circuit starts its operation; however the voltage drop is reduced by the increase of the C3 capacity.  Therefore, even if the auxiliary drive winding voltage is delayed in rising, the Vcc terminal voltage does not fall up to the operation stop voltage to maintain the start-up operation.  However, with larger capacity of C3, it takes much time, after AC input, to reach the operation start since the certain time is required to charge C3.  In general, SMPS performs its operation properly with the value, C3 is 10 to 47µF, R2 is 47k to 150k Ohm for 100V wide input, and 82K to 330K Ohm for 200V narrow input for its start up.
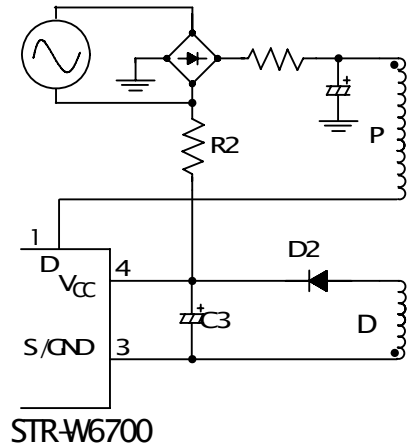
**Fig.1.  Start-up Circuit**

As shown in Fig.2, the circuit current which makes the control circuit start is regulated at 100µA MAX (Vcc = 15V, Ta = 25C), and higher value resister R2 is applicable to the circuit.  Once the Vcc terminal voltage reaches 18.2V (TYP), the control circuit starts its operation by the Start-up Circuit, and current consumption shall be increased.  Once the Vcc terminal voltage falls and it becomes lower than the operation stop voltage 9.6V (TYP) with the decrease of the Vcc terminal voltage, Under Voltage Lock Out (UVLO) circuits stops the controlling operation and returns to the start-up mode.
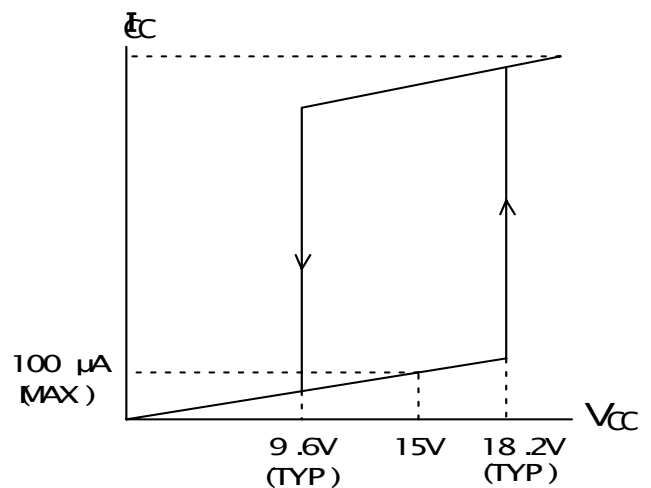
**Fig.2.  Vcc Terminal Vol. – Circuit Cur. Icc**

### 5.10.1.2    Auxiliary/Drive Winding

After the control circuit starts its operation, the power supply is gained by rectifying and smoothing the voltage of the auxiliary winding D.

Fig.3 shows the start-up voltage waveform of the Vcc Terminal.  The auxiliary winding voltage does not rise up to the set voltage after the control circuit starts its operation, and the Vcc terminal voltage starts falling.  However, because the operation stop voltage is set as low as 10.6V(Max), the auxiliary winding voltage D reaches stabilizing voltage before falling to the operation stop voltage, and the control circuit continues its operation.



Fig.3. Waveform of VCC Terminal Vol. at Start-up

The auxiliary winding voltage, at the normal power supply operation, is to be set the number of windings for both the ends voltage of C3 to be higher than the operation stop voltage [Vcc(OFF) 10.6V(MAX)] and lower than the OVP operation voltage [Vcc(OVP) 25.5V(MIN)].

Besides, in an actual power supply circuit, the Vcc terminal voltage might be varied by the value of secondary output current as shown in Fig.4.  This is caused by the small circuit current of STR-W6700 itself and C3 is charged up to the peak value by the surge voltage generated instantly after the MOSFET is turned OFF.

In order to prevent this, it is effective to add a resistor having several to several tens ohms (R7) in series to a rectifier diode as shown in Fig.5.  The optimum value of the additional resistor should be determined in accordance with the specs of a transformer since the Vcc terminal voltage is varied by the structure difference of transformers.  Furthermore, the variation ratio of the Vcc terminal voltage becomes worse due to an inaccurate coupling between primary and secondary windings of the transformer (the coupling between the auxiliary winding D and the stabilizing output winding for the constant voltage control).  Thus, for designing the transformer, the winding position of the auxiliary winding D needs to be studied carefully.
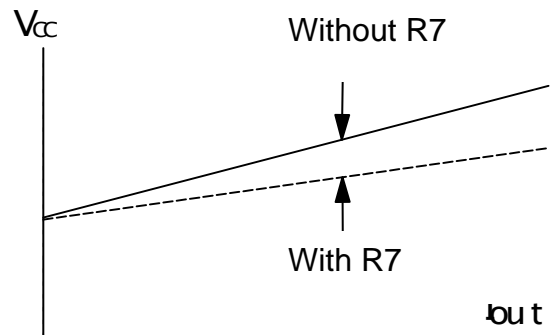


Fig.4. Output Current IOUT – VCC Terminal Vol.
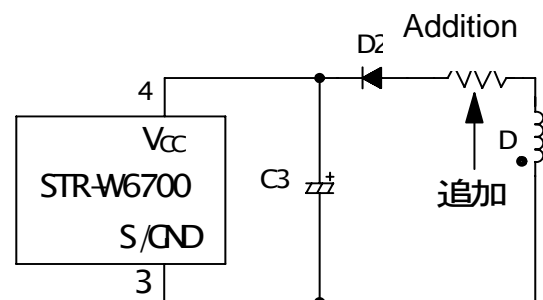


Fig.5. Auxiliary Power Supply Circuit not affected by Output Current IOUT

5.10.1.3    Overvoltage Protection Circuit

Where the voltage exceeding 27.5V(TYP) is imposed on between Vcc and GND terminals, the OVP circuit of the control IC starts its operation and turns latch-mode, and the control IC stops its oscillation.   Generally, the Vcc terminal voltage is supplied from the auxiliary winding of the transformer, and the voltage is in proportion to the output voltage; thus, the circuit also operates at that time when the overvoltage output of the secondary side comes out such as the voltage detection circuit open.

The secondary output voltage at the Overvoltage Protection circuit operation is obtained form the following formula:

$$V_{OUT}(OVP) \fallingdotseq \frac{V_{OUT} \text{ at Normal Operation}}{\text{Vcc Terminal Voltage at Normal Operation}} \times 27.5V\ (TYP) \quad \ldots\ldots (1)$$

### 5.10.1.4 Latch Circuit

The latch circuit is a circuit that holds the oscillator output low and stops the power supply circuit operation when OVP or OLP circuit operates. The holding current of the latch circuit is 150µA MAX (Ta = 25C) when the Vcc terminal voltage is minus 0.3V to the operation stop.

In order to avoid improper operations caused by noises, etc., the delay-time is provided with a timer circuit incorporated in the HIC, and thereafter, the latch circuit starts its operation when OVP or OLP circuit operates for more than the set time. While, the Vcc terminal voltage drops even after the latch circuit starts its operation because the constant voltage (Reg) circuit of the control circuit continues its operation with higher circuit current.

Where the Vcc terminal voltage falls lower than the operation stop voltage (9.6V(TYP)), the voltage starts rising as the circuit current becomes lower than 150µA (Ta = 25C). Where the Vcc terminal voltage reaches the operation start voltage (18.2V(TYP)), it falls as the circuit current is increased again. Consequently, the latch circuit prevents the Vcc terminal voltage from rising abnormally by controlling the voltage between 9.6V (TYP) and 18.2V(TYP). The Fig.6 indicates the voltage waveform when the latch circuit is under operation. The latch circuit operation is cancelled by reducing the Vcc terminal voltage below 7.3V (TYP), and generally, it is restarted by AC input switch-off of the power supply.
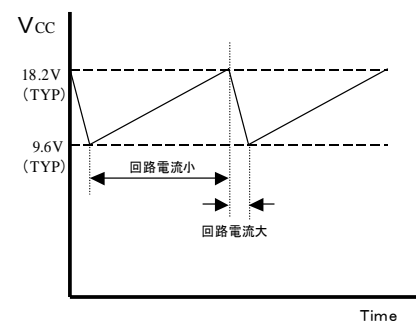


**Fig.6. VCC Terminal Vol. Waveform at Latch-mode**

### 5.10.2 SS/OLP Terminal (Pin 5)

The operation of SS/OLP terminal is classified as Soft-Start and Overload Protection, and the SS/OLP terminal is generally connected to a condenser having the value of 0.47µF to 3.3µF.

### 5.10.2.1 Soft-Start Operation at Start-up of Power Supply

At the power supply start-up, an external condenser is charged up to the threshold operating charging voltage (VSSOLP(SS)) by the Soft-Start operating charging current (ISSOLP(SS)) flowing from SS/OLP. The Soft- Start is provided at power supply start-up by utilizing the changing of SS/OLP terminal voltage from 0V to 1.0V. The timing chart of the Soft-Start is shown in Fig.7. Comparing the oscillation waveforms between OLP terminal voltage and the oscillation waveform of the internal control part, the Soft-Start widen the ON width. Besides, at the burst stand-by, the Soft-Start is operated every time; so, the magnetostriction noises from transformers are controlled with the increase of the drain current gradually.
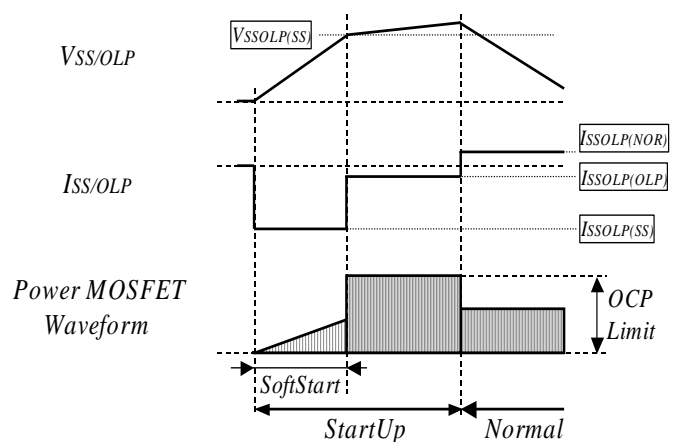


**Fig.7. Soft-Start Operation**

### 5.10.2.2    Overload Protection

The output characteristics of the secondary side at the time when the OCP circuit operates, due to the overload of the secondary side output, is shown in Fig.8.  Where the output voltage falls below the overload mode, the auxiliary winding voltage of the primary side also falls proportionally, and the Vcc terminal voltage falls below shutdown voltage to stop the operation.  In that case, as the circuit current is also decreased simultaneously, the Vcc terminal voltage rise again by the start-up resistor Rs 's charging current, and the circuit re-operates intermittently at the operation start-up voltage.  However, where the transformer has lots of output windings and the coupling is not sufficient, and even if the



**Fig.8. SMPS Output Overload Characteristics**

output voltage is reduced in overload mode, the operation may not be intermittent because the primary side auxiliary winding voltage does not fall.  Although the intermittent operation is not provided, the operation itself can be protected by the OLP circuit.

In the overload mode (the mode in which the drain current is controlled by OCP operation), the secondary side output voltage falls. Thus, the error-amplifier and photo-coupler in secondary side need to be cut off.  The STR-W6700 series recognizes the circumstances continuing OCP operation without FB signal as overload mode, and the SS/OLP terminal voltage starts rising by $I_{SSOLP(OLP)}$ as shown in Fig.9, and after the SS/OLP terminal voltage continues rising to reach $V_{SSOLP(OLP)}$ TYP 5V, the oscillation is stopped and turns the latch protection operation.
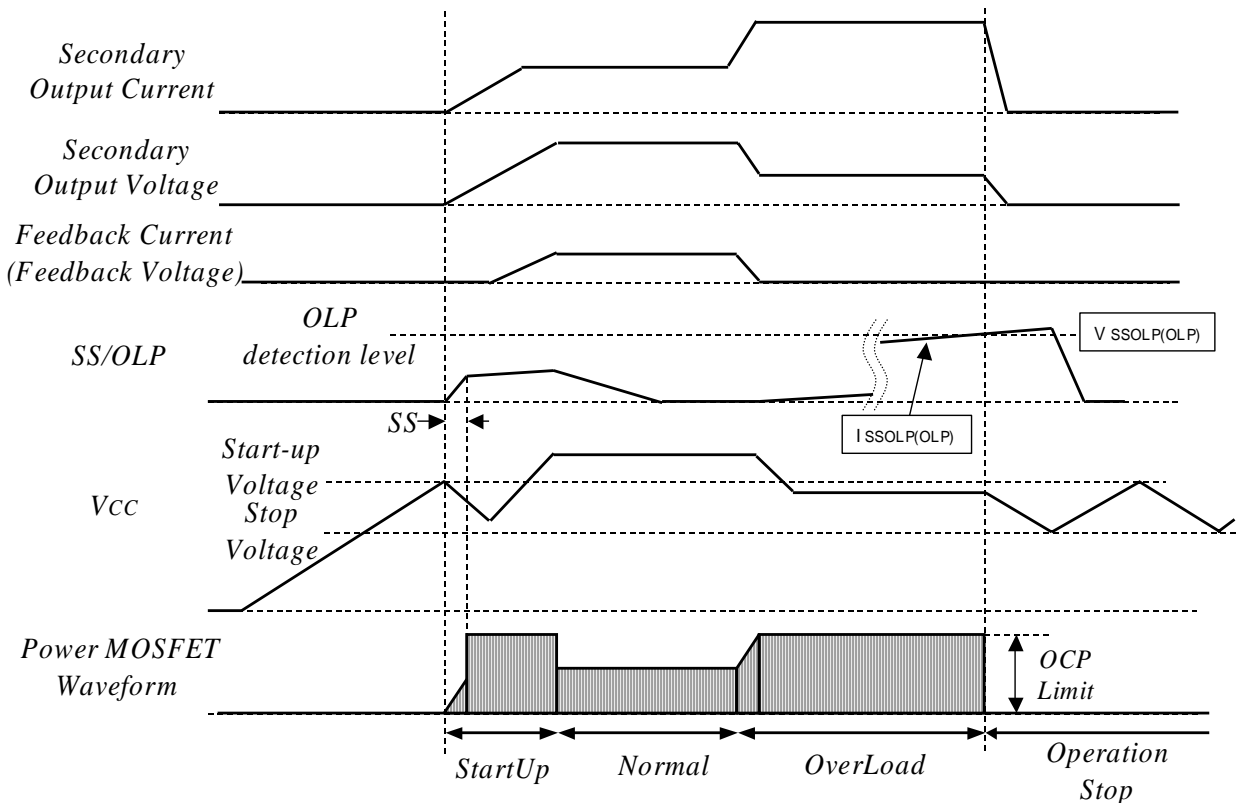


**Fig.9. Timing-Chart at Overload**

The time until the latch protection operation starts its operation can be calculated from the following formula since the $I_{SSOLP(OLP)}$ is a constant current circuit.  That is,

C (Condenser Capacity)  x $\triangle$V(Condenser Charging Voltage: approx. 5V) = $I_{SSOLP\ (OLP)}$ x t (time) …… (2)

While, the ISSOLP(OLP) contains the voltage dependent characteristics on SS/OLP terminal voltage, and ISSOLP(OLP) falls when SS/OLP terminal voltage rises.  The actual value does not match to the value calculated from the formula (2) completely, so it is recommended to monitor the actual load conditions.  Furthermore, the power supply start-up voltage turning OCP operation is also needed to confirm.

### 5.10.2.3  Operation at Power Supply OFF

The voltage of the condenser mounted externally to SS/OLP terminal is discharged by the internal reset circuit of the HIC at power OFF.  The reset circuit does not start its operation at normal operation (i.e., while the internal constant voltage circuit operates).

### 5.10.2.4  Cancellation of OLP Circuit

The OLP operation is cancelled by inserting a resistor having 47K ohms (or Zener diodes) into SS/OLP terminal at start-up or overload maintaining Soft-Start operation effectively.
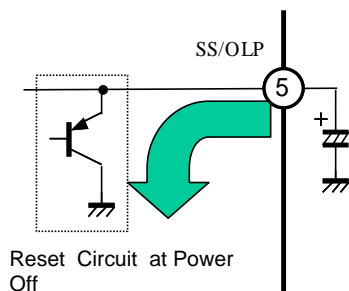
**Fig.10.  Reset Circuit**
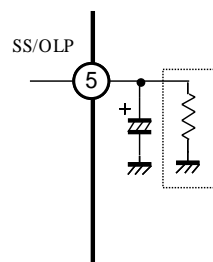
**Fig.11.  OLP Cancellation Circuit**

5.10.3 FB Terminal (Pin. 6)

The operation of FB terminal is divided into normal (constant voltage control circuit operation) and stand-by operation control.  Refer to item No. 8.6 for the controlling at stand-by operation.


### 5.10.3.1        Constant Voltage Control Circuit

The STR-W6700 series adopts the current mode controlling circuit for the constant voltage control, which proves its superiority in a heavy load.  The MOSFET drain current peak value ($≒$ ON time) is varied comparing FB terminal voltage and HIC's internal VOCPM.  During the OFF-time, Quasi-Resonant operation synchronized to the reset signal from a transformer is applied. While, where no reset signal is supplied from the transformer, the fixed oscillation frequency (approx. 22kHz) is applied by the HIC's internal oscillation circuit.  The timing chart is shown in Fig.12, and the internal circuit diagram at the constant voltage control is shown in Fig. 13. respectively.
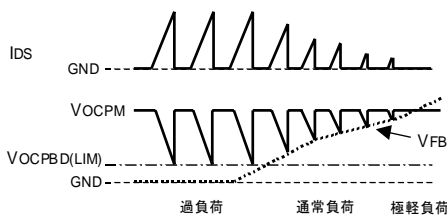


**Fig.12.  Constant Control Voltage**     **Fig.13. Constant Voltage Control Circuit (Theory)**
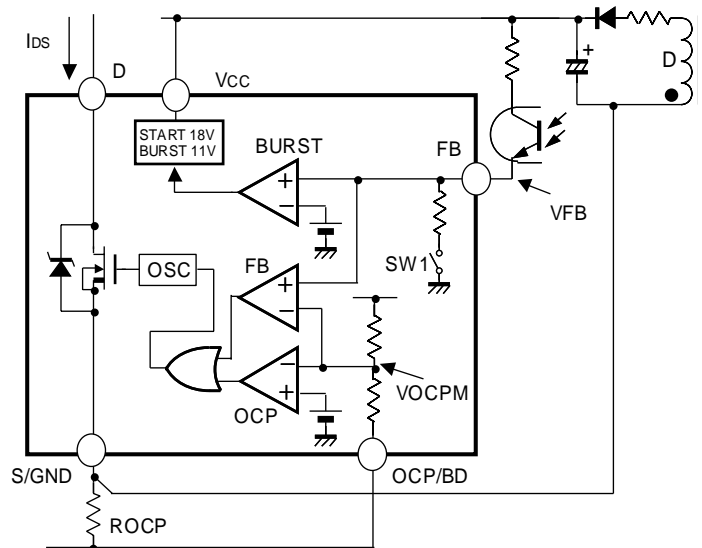
The constant voltage controlling circuit makes the control signal (FB current) flowing from the secondary side error-amplifier input to No.6 terminal by the photo-coupler.  The input FB current is transformed into Feedback voltage VFB by the HIC internal resistor (SW1 is ON at normal). While, the reversed voltage waveform (VOCPM) of the drain current waveform is input to the input terminal of the FB comparator.  It is the current mode controlling circuit that controls the peak value of the drain current by the FB comparator.

The FB current shall be decreased to nil value at the overload in Fig.12.  At that time, the drain current is controlled under the current value regulated by the Overcurrent Protection Circuit.  At the transition period from the normal load to the lowest load in Fig.12, the drain current is decreased since the FB current increases and VFB rises.  Where the VFB exceeds the FB terminal threshold voltage (VFB(OFF), 1.5V TYP) such as at the lowest load, the thinned-out oscillating operation starts and the HIC controls the secondary side output voltage so as not to raise the secondary side output voltage.

## 5.10.4 OCP/BD Terminal (Pin 7)

The functions of OCP/BD terminal are categorized as Overcurrent Protection (OCP), Bottom-Skip, and Quasi-Resonant Operation control. Refer to item No. 8.5 for Bottom-Skip and Quasi-Resonant operation.

### 8.4.1. Minus-Detection Type OCP Circuit

The OCP of the STR-W6700 series is pulse-by-pulse type Overcurrent protection circuit, which detects the peak value of the MOSFET drain current per pulse and reverses oscillator output. As shown in Fig.14, overcurrent detecting resistors, R5, R4, and C5 are mounted externally. R4 and C5 construct the filter circuit that prevents malfunctions caused by the surge current generating at the MOSFET Turn-ON. As the Overcurrent Protection Circuit operation (OCP), it turns OFF the MOSFET at that time when OCP/BD terminal threshold voltage reaches VOCPBD(LIM) by the voltage generated at the overcurrent detecting resistor R5 after the switching current flows at the MOSFET ON.
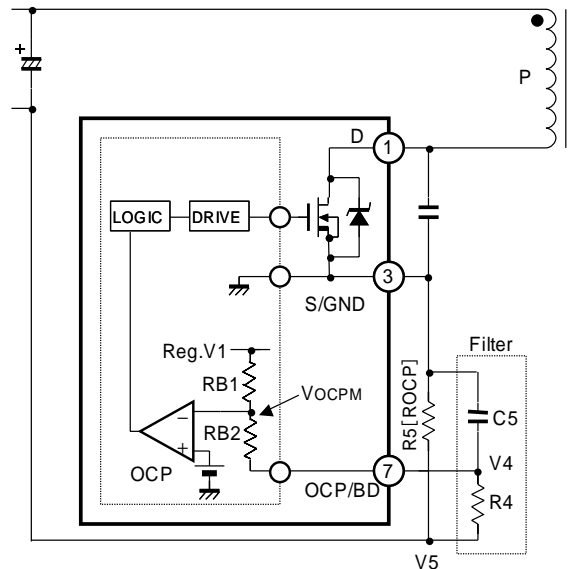


**Fig.14. Minus-Detection OCP Circuit**

The threshold voltage VOCPBD(LIM) of the OCP/BD terminal is set at –0.95V (Typ). The OCP circuit adopts the minus-detection circuit, which provides the detecting voltage VOCPM in the MIC by dividing the voltage (between V1 and R5) with RB1, RB2, and R4. Since the RB1 and RB2 are resistors incorporated in the HIC, taking the distributions of RB1 and RB2 (regulated as IOCPBD in the specs) into consideration, the value of R4 is to be between 100 to 330 Ohms in order to lower the influence from the distributions between RB1 and RB2.

5.10.5 Quasi-Resonant and Bottom-Skip Operation

5.10.5.1  Quasi-Resonant Operation

The Quasi-Resonant operation is to match the timing of the MOSFET Turn-ON to the bottom point of the voltage resonant waveform after a transformer releases the energy (i.e., 1/2 cycle of the resonant-frequency). As shown in Fig.15, the voltage resonant condenser C4 is connected between the drain and source, and the delay circuit, C10, D3, D4, and R9 are connected between the auxiliary winding D and OCP/BD terminal (Pin No.7).  Where the MOSFET is turned OFF, the Quasi-Resonant signal is made of the fly-back voltage generated in the auxiliary winding, which operates BD comparator, and it provides the Quasi-Resonant operation.  Due to the operation of the delay circuit, even if the energy of the transformer is released to complete, the Quasi-Resonant signal imposed on Pin No. 7 terminal does not fall immediately.  This is why the C10 is discharged by R4, and after a certain period, the voltage falls to the threshold voltage $V_{OCPBD(TH1)} \fallingdotseq 0.4V$ and below.  Consequently, the delay- time needs to be set by adjusting C10 monitoring the operating waveform in order to turn ON the MOSFET at that time when the $V_{DS}$ of the MOSFET reaches the lowest point.
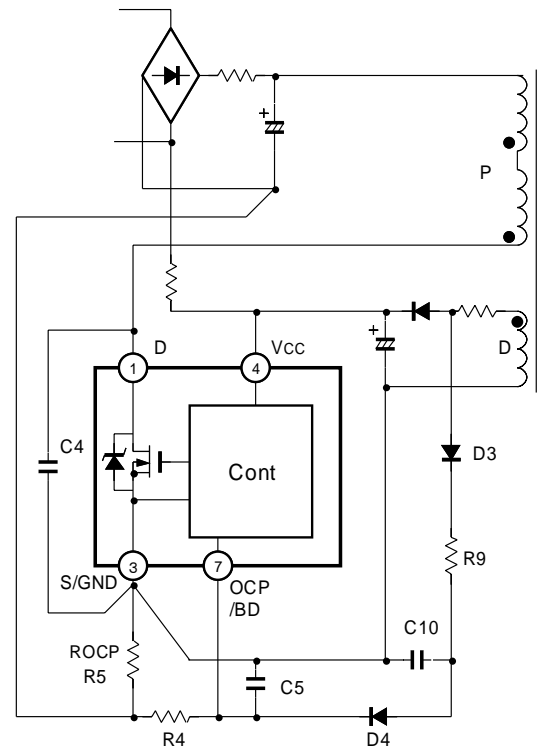


**Fig.15. Quasi-Resonant and Delay Circuit**

In addition to the Quasi-Resonant operation, in order to control the increase of the oscillating frequency at light to medium load, the Bottom-Skip operation widening OFF time is built-in in accordance with the load volumes.  The switching timing between the Quasi-Resonant and Bottom-Skip operation is described in the item No. 8.5.2.

Where the Quasi-Resonant signal voltage imposed on OCP/BD terminal is below $V_{OCPBD(TH2)} \fallingdotseq 0.8V$, the internal oscillator starts PWM operation with the fixed oscillating frequency ($\fallingdotseq 22kHz$). The PWM operation is also provided at power supply start-up or low auxiliary winding voltage such as winding-short, which lowers oscillating frequency, and the stress of the MOSFET is fairly reduced. After the Quasi-Resonant signal is over $V_{OCPBD(TH2)} \fallingdotseq 0.8V$, the MOSFET remains OFF while $V_{OCPBD(TH1)} \fallingdotseq 0.4V$ and more is imposed on.  That is, the gap between $V_{OCPBD(TH1)}$ and $V_{OCPBD(TH2)}$ prevents the HIC from operating improperly.

While, in the setting up R9 and R4, the Quasi-Resonant signal imposed on the OCP/BD terminal needs to be 5V or below since the OCP/BD terminal voltage is maximum 5V.  At the normal condition, it should be 1.5V approximately.

### 5.10.5.2 Bottom-Skip Operation (Switching from Quasi-Resonant Operation)

The basic bottom-skip operation is that the load of the secondary side is detected by the drain current value (actually OCP/BD terminal voltage), which switches to the Quasi-Resonant (at heavy load) and the Bottom-Skip operation (at light load).  The timing of distinguishing is made by taking the OCP/BD terminal voltage in at start-down of the MOSFET gate voltage of the HIC.  Furthermore, the number of start-down (OCP/BD terminal voltage is under VOCPBD(TH1)) is measured, which makes the MOSFET turn ON in accordance with the mode described above.
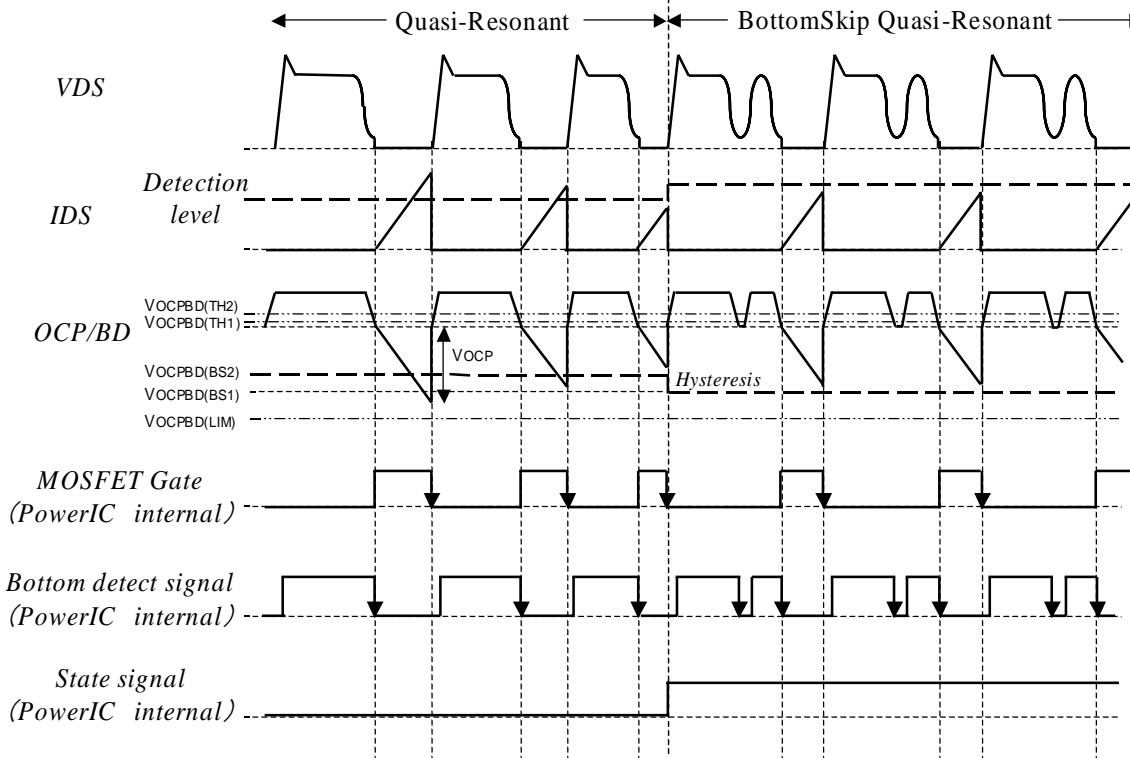
**Fig.16.  Bottom-Skip Quasi-Resonant Operation Timing Chart**

### 1). Quasi-Resonant Operation ⇒ Bottom-Skip Operation

The Quasi-Resonant is operated under the mode that VOCP is higher than VOCPBD(BS2) at the absolute rating.  Where the load becomes lighter than that of the mode, the drain current falls. As the result, the mode is switched to the Bottom-Skip operation when the VOCP becomes lower than VOCPBD(BS2) at the absolute rating, and the standard voltage is automatically changed to VOCPBD(BS1).  Fig 16 shows the switching timing chart from the Quasi-Resonant to the Bottom-Skip operation.

### 2). Bottom-Skip Operation ⇒ Quasi-Resonant Operation

The Bottom-Skip is operated under the mode that VOCP is lower than VOCPBD(BS1) at the absolute rating.  Where the load becomes higher than that of the mode, the drain current rises.  As the result, the mode is switched to the Quasi-Resonant operation when VOCP becomes higher than VOCPBD(BS1) at the absolute
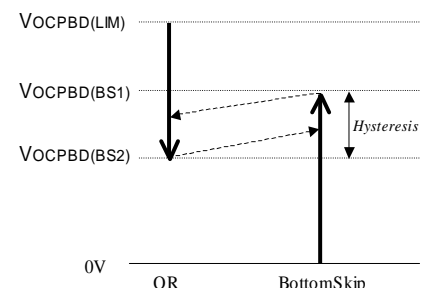
**Fig.17. Operation Mode switching**

rating, and the standard voltage is automatically changed to VOCPBD(BS2).

Besides, the VOCP is OCP/BD terminal voltage at that time when the MOSFET gate voltage starts down.

As described above, the standard voltage (VOCPBD(BS1), VOCPBD(BS2)) realizing the Bottom-Skip operation provides the hysteresis operation automatically and makes it possible to have the stabilized operation.  Fig.17 shows the above operation switching changing mode.

## 5.10.6 Stand-By Operation

The STR-W6700 series contains the burst-mode switching function to reduce the power dissipation at stand-by mode.  At the stand-by with a remote controller, the switching mode is set in the secondary side, which makes the HIC switch to the burst-mode automatically by reducing the output voltage.

The transformer winding voltage falls reducing the output voltage by switching in the secondary side, and it reduces the primary side auxiliary winding voltage, which cuts off the power supply from the auxiliary winding to VCC terminal (Pin No. 4), and the VCC terminal voltage is reduced by the HIC's dissipation current itself.  Where the VCC terminal (Pin No.4) voltage reaches the operation stop power supply voltage (9.6V TYP), the HIC stops its operation, and the dissipation current of the HIC turns circuit current (ICC(S)) at stand-by non-operation, and with the charging to the back-up condenser through a start-up resistor, the VCC terminal voltage (Pin No.4) rises again, and the HIC starts its operation immediately after the VCC terminal voltage reaches the operation start-up power supply voltage.  Repeating the above cycles, the HIC has the power supply continue the burst-mode.

In order to reduce the transformer's magnetostriction noises at the burst-mode, by lowering the voltage gap between the operation start-up power supply voltage at the stand-by and the operation stop voltage, the operation frequency is increased and switched to the mode controlling the switching current as low as possible without increasing the loss at the start-up resistor.

This switching is made by detecting that the FB terminal voltage exceeds the FB stand-by operation threshold voltage VFB(S), and the operation voltage width of the VCC terminal is determined as "the power supply voltage interval 1.5V(TYP) at stand-by" and the width is approximately one fifth compared to the normal operation.

In the transition period from the normal to stand-by operation, the output voltage continues falling because the HIC's oscillation is suspended by the feedback current.  Thus, it is inevitable to secure the voltage exceeding the required output voltage of secondary side in the period until the HIC starts the stand-by operation.

Meanwhile, in the transition period from the stand-by to normal operation, the output voltage

continues falling because the HIC's oscillation is suspended until the Vcc terminal voltage (Pin 4) reaches the operation start-up voltage 18V (TYP). Thus it is required to secure the voltage exceeding the required output voltage of secondary side.
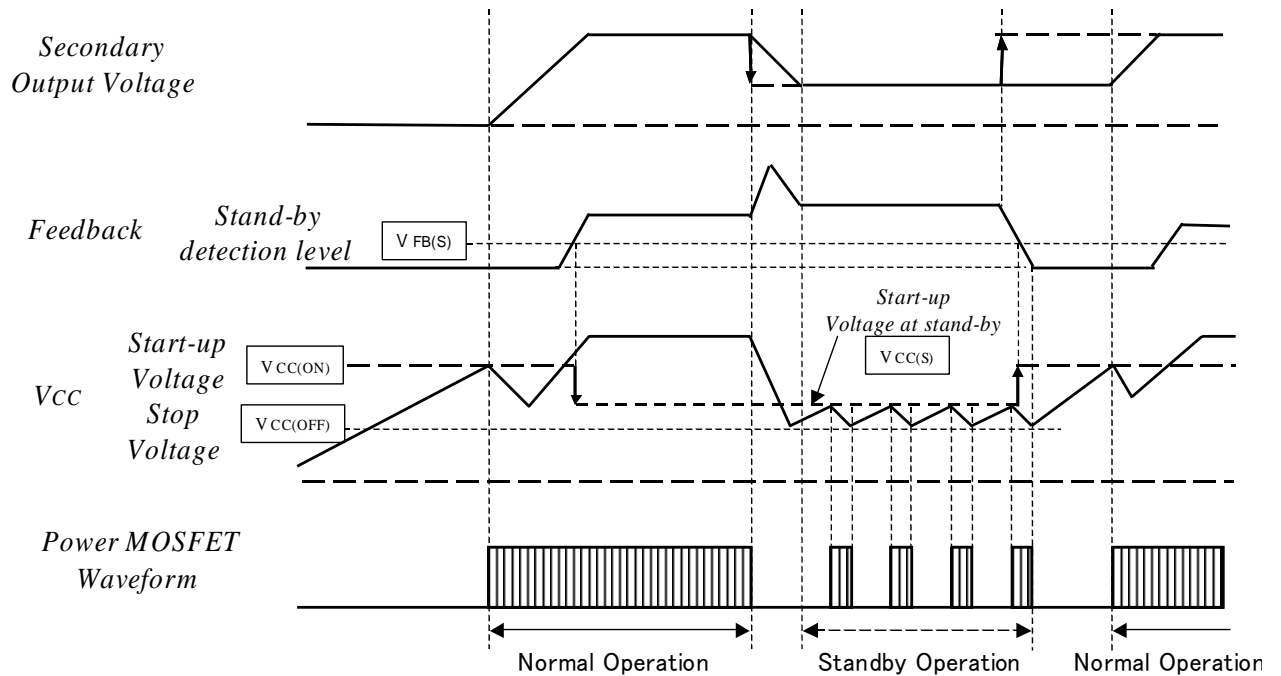


**Fig.18. Timing-Chart at Operation Switching**

At the stand-by mode, as mentioned above, due to the burst-mode of the HIC's intermittent operation, the output voltage falls since the HIC stops its operation during the oscillation stop period. While, during the stand-by operation, the intermittent operation repeating oscillation and stop through the start-up resistor is provided because the transformer's auxiliary winding voltage supplying the power supply to the HIC is extremely decreased. Accordingly, the load except stand-by load cannot be taken out at the stand-by operation (the period of intermittent operation). Where the load excluding the stand-by load is imposed on the transition period from the stand-by to normal operation, the incomplete start-up might be occurred. Thus, for the switching to the normal mode, it is required to have the sequence (no load at stand-by should be imposed on the normal mode), and the switching needs to be made after the power supply is completely turned to the normal mode.

## 5.10.7 Step-Drive Circuit

The STR-W6700 series reduces noises at Turn-ON by adopting the step-drive circuit for the MOSFET drive circuit as shown in Fig. 19. The drive current at Turn-ON is controlled at low by RG1 first, and it makes the gate voltage increase gradually, and the gate voltage is increased rapidly through RG1 + RG2 after 0.8µsec approximately. While, the MOSFET drive voltage adopts the constant voltage drive circuit maintained at VDRM=7.6Vtyp, and it is not affected to VCC. The MOSFET gate electric charge is discharged rapidly through RG3 when the MOSFET is turned OFF. That is, in the STR-W6700 series' drive circuit, the gate
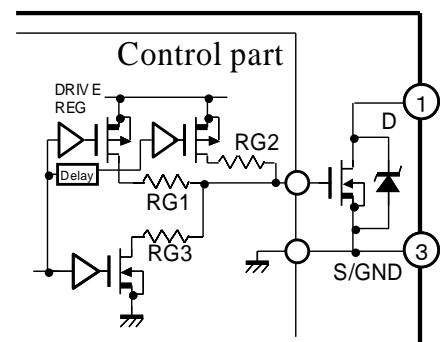


**Fig.19. Step-Drive Circuit**

voltage imposed on the MOSFET is shifted with the two steps, which lowers the gate voltage at

Turn ON and controls the surge current flowing at Turn ON, and provides the ideal drive circuit

securing the sufficient gate voltage at normal drive mode.

## 5.10.8 Maximum ON Time Controlling Function

The MOSFET ON Time is controlled in the transition mode such as a low input voltage or AC input ON and OFF. The maximum ON Time is set at about 80% of the oscillation cycle (= 1/fOSC approx. 45µsec) and approximately 35µsec (TYP). While, for the design of power supply, it is also required to monitor the MOSFET ON time at maximum load and input voltage minimum.
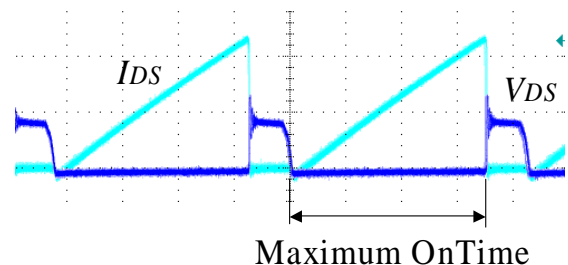


**Fig.20. Maximum ON Time**

# 6 SERVICE PARTS LIST

**Caution:** In this Service Manual, some parts can be changed for imroving, 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)

**Important Safety Notice**

Components Identified by ⚠ mark have special characteristics inportant for safety.
When replacing any of these components, use only manufacturers specified parts. In case of Ordering these spare parts, please always add the complete Model-Type number to your order.

## 6.1 DTF-2950

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|---|---|---|---|---|
| ZZ100 | PTACPWT2950F | ACCESSORY AS | DTF-2950FZF-SB | |
| 12000 | 48B5849C1001 | TRANSMITTER REMOCON | R-49C10 | |
| 13000 | 4850Q00910 | BATTERY | AAA R03 SUPERGARD/ROCKET | |
| 14000 | 4858213801 | BAG INSTRUCTION | L. D. P. E. T0. 05X250X400 | |
| ZZ120 | PTBCSHL2950S | COVER BACK AS | DTL-2950FZF-S | |
| M211 | 4852174911 | COVER BACK | 2950 HIPS GY8301A | |
| M211D | 4857817610 | CLOTH BLACK | "300 MM 20"" | |
| M541 | 4855415800 | S/PLATE | 150ART P/E FILM (C/TV) | |
| M542 | 485580002207 | LABEL SERIAL | ART 90 | |
| ZZ130 | PTCACAT2950FSS | CABINET AS | DTF-2950FZS-SB | |
| M201A | 4856017752 | SCREW CRT FIX | 6X35 L120 YL 3CR | |
| M201B | 4856219502 | WASHER RUBBER | CR T2.0 BLACK | |
| M201C | 7178301051 | SCREW TAPPTITE | TT2 WAS 3X10 MFZN 3CR | |
| M201D | 4856017800 | SCREW SPKR FIX | SWRM+SECC 3CR | |
| M201E | 7178301051 | SCREW TAPPTITE | TT2 WAS 3X10 MFZN 3CR | |
| M211A | 7172401652 | SCREW TAPPTITE | TT2 TRS 4X16 MFZN BK 3CR | |
| M211B | 7172401252 | SCREW TAPPTITE | TT2 TRS 4X12 MFZN BK 3CR | |
| M352 | 2TF01612CL | TAPE FILAMENT | 12MMX55ME CLEAR | |
| M481 | 485487071101 | BUTTON POWER | 2950 GY340A+SV2405BP | |
| M481A | 4856716000 | SPRING | 14Q1/M3 SWPA PIE0.5 | |
| M561 | 48556293SD02 | MARK BRAND | "DAEWOO 25""29""32"" NEW" | |
| PWC1 | 4859906210 | CORD POWER | W/F 6-LO (LOMAX NEW) | ⚠ |
| SP01A | 4856017800 | SCREW SPKR FIX | SWRM+SECC 3CR | |
| SP02A | 4856017800 | SCREW SPKR FIX | SWRM+SECC 3CR | |
| V901 | 4859651760 | "CRT (SAMSUNG 29"")" | A68QFZ893X002 | ⚠ |
| ZZ131 | 58G0000194 | COIL DEGAUSSING | DC-29SF BF AL | ⚠ |
| ZZ132 | 48519A7810 | CRT GROUND AS | 2903S-1015-1P | |
| ZZ200 | PTFMSJT2950S | MASK FRONT AS | DTF-2950FZF-SB | |
| M201 | 4852092411 | MASK FRONT | 2950 HIPS GY | |
| ZZ201 | PTSPPWT2950F | SPEAKER AS | DTF-2950FZF-SB | |
| 51100 | 4850704S28 | CONN AS | YH025-04+35089+ULW=600 | |
| SP01 | 48A8311400 | SPEAKER SYSTEM | SS-58126F04C | |
| SP02 | 48A8311400 | SPEAKER SYSTEM | SS-58126F04C | |
| ZZ280 | PTU1MST2950FF | PCB UNION MANUAL AS | DTF-2950FZF-SB | |
| C801 | CL1UC3474M | C LINE ACROSS | 0.47MF 1J(UCVSNDF/SV | ⚠ |
| DL01 | DH1L25RS— | LED(RED) | HI-L25RS | |
| DL02 | DH1L25G— | "LED (R,G-3 COLOR)" | HI-L25G | |
| F801 | 5FSCB4022R | FUSE CERA | SEMKO F4AH 4A 250V MF51 | ⚠ |
| HP01 | 4859105240 | JACK PHONO | LGT1516-0100 | |
| I703 | 1TS0P4838Y | IC PREAMP | TSOP34838YA1 | |
| JPA3 | 4859105450 | JACK PIN BOARD | YSC03P-4120-9S | |
| JPA4 | 4859105340 | JACK S-VHS | DSW-10 (STRAIGHT) | |
| LF801 | 5PLF24A3— | FILTER LINE | LF-24A3 | ⚠ |
| LF802 | 58C0000153 | COIL CHOKE PFC | 6001.0016B | ⚠ |
| M231 | 485233251102 | PANEL CTRL | 2950 ABS GY | |
| M231A | 7178301051 | SCREW TAPPTITE | TT2 WAS 3X10 MFZN 3CR | |
| M351 | 485356811101 | HOLDER SENSOR | 2950 GY340A(SILVER) | |
| M491 | 485496331101 | BUTTON CTRL | 2950 ABS GY | |
| M551 | 485555530001 | DECO SENSOR | 2950 GPPS GY9304AT | |
| P702A | 4850703N43 | CONNECTOR | YH025-03+YBH250-03+ULW=500 | |
| P703A | 4850704S02 | CONN AS | YH025-04+YST025+ULW=200 | |
| P801 | 4859287320 | CONN WAFER | MKS2822 (LOMAX NEW TYPE) | |
| P803 | 4859238620 | CONN WAFER | YPW500-02 | |
| PA01A | 4950712003 | CONNECTOR | YH025-12+YST250+ULW=450 | |
| SW801 | 5S40101146 | SW POWER PUSH | SS-160-7-B | ⚠ |
| ZZ200 | PTU1JBT2950FF | PCB UNION EYE LET AS | DTF-2950FZF-SB | |
| E1 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E2 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E3 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|---|---|---|---|---|
| E4 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E5 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E6 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E7 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| ZZ200 | PTU1JRT2950FF | PCB UNION RADIAL AS | DTF-2950FZF-SB | |
| C690 | CEXF1H479V | C ELECTRO | 50V RSS 4.7MF (5*11) TP | |
| C691 | CEXF1H479V | C ELECTRO | 50V RSS 4.7MF (5*11) TP | |
| C770 | CEXF1C101V | C ELECTRO | 16V RSS 100MF (6.3X11) TP | |
| CA21 | CCXB1H472K | C CERA | 50V B 4700PF K (TAPPING) | |
| F801A | 4857415001 | CLIP FUSE | PFC5000-0702 | |
| F801B | 4857415001 | CLIP FUSE | PFC5000-0702 | |
| Q506 | T2SC5343Y- | TR | 2SC5343Y | |
| Q507 | T2SA1980Y- | TR | 2SA1980Y | |
| SW700 | 5S50101Z90 | SW TACT | SKHV10910A | |
| SW701 | 5S50101Z90 | SW TACT | SKHV10910A | |
| SW702 | 5S50101Z90 | SW TACT | SKHV10910A | |
| SW703 | 5S50101Z90 | SW TACT | SKHV10910A | |
| SW704 | 5S50101Z90 | SW TACT | SKHV10910A | |
| SW705 | 5S50101Z90 | SW TACT | SKHV10910A | |
| Z601 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | |
| Z602 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | |
| Z603 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | |
| Z604 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | |
| ZZ200 | PTU1JAT2950FF | PCB UNION AXIAL AS | DTF-2950FZF-SB | |
| 10 | 2TM14006LB | TAPE MASKING | 3M #232 6.0X2000M (WITH GLUE) | |
| 20 | 2TM10006LB | TAPE MASKING | 3M #232-MAP-C 6.2X2000M (W/O GLUE) | |
| A001 | 4859816424 | PCB UNION | 246X246(120X210X2)D1B | ⚠ |
| C608 | CCZB1H471K | C CERA | 50V B 470PF K (AXIAL) | |
| C609 | CCZB1H471K | C CERA | 50V B 470PF K (AXIAL) | |
| CA20 | CCZB1H472K | C CERA | 50V B 4700PF K (AXIAL) | |
| DA21 | CCZB1H471K | C CERA | 50V B 470PF K (AXIAL) | |
| DA22 | CCZB1H471K | C CERA | 50V B 470PF K (AXIAL) | |
| J001 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| L701 | 5CPZ560K02 | COIL PEAKING | 56UH 3.5MM K (LAL02TB) | |
| R530 | RD-AZ151J- | R CARBON FILM | 1/6 150 OHM J | |
| R531 | RD-AZ750J- | R CARBON FILM | 1/6 75 OHM J | |
| R532 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R533 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R608 | RD-2Z151J- | R CARBON FILM | 1/2 150 OHM J | |
| R609 | RD-2Z151J- | R CARBON FILM | 1/2 150 OHM J | |
| R701 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R721 | RD-AZ181J- | R CARBON FILM | 1/6 180 OHM J | |
| R722 | RD-AZ221J- | R CARBON FILM | 1/6 220 OHM J | |
| R723 | RD-AZ331J- | R CARBON FILM | 1/6 330 OHM J | |
| R724 | RD-AZ471J- | R CARBON FILM | 1/6 470 OHM J | |
| R725 | RD-AZ681J- | R CARBON FILM | 1/6 680 OHM J | |
| R802 | RD-2Z824J- | R CARBON FILM | 1/2 820K OHM J | |
| RA22 | RD-AZ750J- | R CARBON FILM | 1/6 75 OHM J | |
| ZZ290 | PTMPMST2950FS | PCB MAIN MANUAL AS | DTF-2950FZS-SB | |
| 10 | 2193110001 | SOLDER WIRE | SN-3.0AG (NP303T) 3.0 | |
| 20 | 2193110002 | SOLDER WIRE | SN-3.0AG-0.5CU (DHB-RMA3) | |
| 30 | 2291050620 | FLUX SOLDER | DF-2810U (0.810) | |
| 40 | 2291050314 | FLUX SOLVENT | IM-1000 | |
| C315 | CEXF2A470V | C ELECTRO | 100V RSS 47MF (10X16) TP | |
| C402 | CMYH3C752J | C MYLAR | 1.6KV 7500PF J (BUP) | |
| C404 | CMYH3C562J | C MYLAR | 1.6KV 5600PF J (BUP) | |
| C405 | CMXE2G243J | C MYLAR | 400V PU 0.024MF J | |
| C408 | CMYE2G184J | C MYLAR | 400V PU 0.18MF J | |
| C411 | CMYF2E105J | C MYLAR | 250V MPP 1MF J | |
| C415 | CEXF2E100V | C ELECTRO | 250V RSS 10MF (10X20) TP | |
| C418 | CEYD1H689W | C ELECTRO | 50V RHD 6.8MF (16X35.5) | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|---|---|---|---|---|
| C604 | CEXF1E102V | C ELECTRO | 25V RSS 1000MF (13X20) TP | |
| C805 | CEYD2G181D | C ELECTRO | 400V FHS 180MF | |
| C812 | CH1BFE472M | C CERA AC | AC400V 4700PF M U/C/V | ⚠ |
| C813 | CEXF2E101V | C ELECTRO | 250V RSS 100MF 18X35.5 | |
| C814 | CEYF2E470V | C ELECTRO | 250V RSS 47MF (16X25 | |
| C820 | CCXR3D221K | C CERA | 2KV R 220PF K125C | |
| C823 | CEXF1E222V | C ELECTRO | 25V RSS 2200MF (16X25) TP | |
| C840 | CEXF1C102V | C ELECTRO | 16V RSS 1000MF (10X20) TP | |
| C861 | CEXF1E102C | C ELECTRO | 25V RUS 1000MF 13X20 TP | |
| C899 | CMXF2J333J | C MYLAR | 630V MPP 0.033MF J | |
| CP01 | CMYF2G224J | C MYLAR | 400V MPU 0.22MF J | |
| CP02 | CMXE2J222J | C MYLAR | 630V PU 2200PF | |
| CP04 | CEXF1H221V | C ELECTRO | 50V RSS 220MF (10X16) TP | |
| CP07 | CMYF2J154J | C MYLAR | 630V MPP 0.15MF J | |
| D401 | DDTV1500MD | DIODE | DTV1500MD TO-220AC01 | |
| D404 | DFMP3FU—- | DIODE | FMP3FU | |
| D404A | 4857027603 | HEAT SINK | AL EX | |
| D404B | 7174301051 | SCREW TAPPTITE | TT2 RND 3X10 MFZN 3CR | |
| D406 | DRGP30J—- | DIODE | RGP30J | |
| D820 | DRGP30J—- | DIODE | RGP30J | |
| D860 | DRGP30J—- | DIODE | RGP30J | |
| D870 | DRGP30J—- | DIODE | RGP30J | |
| I301 | 1TDA8358J- | IC VERTICAL | TDA8358J | |
| I301A | 4857028219 | HEAT SINK | AL EX ANODIZING | |
| I301B | 7174301051 | SCREW TAPPTITE | TT2 RND 3X10 MFZN 3CR | |
| I601 | 1MSP3410V3 | IC SOUND | MSP3410G-V3 | |
| I602 | 1TDA8946J- | IC AUDIO | TDA8946J | |
| I602A | 4857028215 | HEAT SINK | AL EX NO ANODOZING | |
| I602B | 7174301051 | SCREW TAPPTITE | TT2 RND 3X10 MFZN 3CR | |
| I701 | 1SDA555XFL | IC MICOM OTP | SDA555XFL/PO | |
| I702 | 1M24C16BN6 | IC MEMORY | M24C16WRN6 | |
| I801 | 1STRW6754- | IC POWER | STR-W6754 | |
| I801A | 4857024600 | HEAT SINK | AL EX B/K | |
| I801B | 7174300851 | SCREW TAPPTITE | TT2 RND 3X8 MFZN 3CR | |
| I804 | 1LTV817C— | IC PHOTO COUPLER | LTV-817C | ⚠ |
| I806 | 1DP125—— | IC ERROR AMP | DP125 | |
| I820 | 1S7805P1C- | IC REGULATOR | S7805PIC 5.0V 1.0A | |
| I821 | 1K78R33—- | IC REGULATOR | KIA78R33AP | |
| I822 | 1K78R08—- | IC REGULATOR | KIA78R08API | |
| I822A | 4857026900 | HEAT SINK | AL EX | |
| I822B | 7174300851 | SCREW TAPPTITE | TT2 RND 3X8 MFZN 3CR | |
| I824 | 1K78R018P1 | IC REGULATOR | KIA78R018PI | |
| I825 | 1K78R05—- | IC REGULATOR | KIA78R05PI | |
| I826 | 1A1117P133 | IC REGULATOR | KIA1117PI33 3.3V TO-220IS | |
| JPA1 | 4859200401 | SOCKET RGB | SR-21A1 (ANGLE TYPE) | |
| JPA2 | 4859200401 | SOCKET RGB | SR-21A1 (ANGLE TYPE) | |
| L150 | 58E0000041 | COIL AFT | TRF-A005 | |
| L401 | 58H0000054 | COIL H-LINEARITY | TRL-040F | |
| L403 | 58C0000130 | COIL CHOKE | CH-161A | |
| P401 | 4850705S04 | CONN AS | YH025-05+YST025+ULW=400 | |
| P402 | 4859242420 | CONN WAFER | YFW800-04 | |
| P404 | 4859242220 | CONN WAFER | YFW800-02 | |
| P501 | 4850708N15 | CONNECTOR | YH025-08+YBNH250+USW=600 | |
| P601 | 4859231720 | CONN WAFER | YW025-04 | |
| P702 | 4859231620 | CONN WAFER | YW025-03 | |
| P703 | 4859231720 | CONN WAFER | YW025-04 | |
| P802 | 4859242220 | CONN WAFER | YFW800-02 | |
| P804 | 4859238620 | CONN WAFER | YPW500-02 | |
| PA01 | 4859235520 | CONN WAFER | YW025-12 | |
| Q401 | TST2310DH1 | TR | ST2310DHI | |
| Q401A | 4857033201 | HEAT SINK | AL EX BK (ANODIZING) | |
| Q401B | 7174301051 | SCREW TAPPTITE | TT2 RND 3X10 MFZN 3CR | |
| Q807 | TKTA1659AY | TR | KTA1659AY | |
| QP03 | T1RF640N— | FET | IRF640NPBF | |
| QP03A | 4857026900 | HEAT SINK | AL EX | |
| QP03B | 7174300851 | SCREW TAPPTITE | TT2 RND 3X8 MFZN 3CR | |
| R388 | RW02Y678FS | R WIRE WOUND | 2W 0.67 OHM F SMALL | |
| R399 | RS02Y829JS | R M-OXIDE FILM | 2W 8.2 OHM J SMALL | |
| R407 | RF01Y129JA | R FUSIBLE | 1W 1.2 OHM J A CURVE | |
| R444 | RS02Y330JS | R M-OXIDE FILM | 2W 33 OHM J SMALL | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|---|---|---|---|---|
| R801 | DJ5020M270 | POSISTOR | J502P72D070M270 | ⚠ |
| R803 | RS02Y338JS | R M-OXIDE FILM | 2W 0.33 OHM J SMALL | |
| R806 | RS02Y228JS | R M-OXIDE FILM | 2W 0.22 OHM J SMALL | |
| R819 | RX07B339JP | R CEMENT | 7W 3.3 OHM J BEN 15MM 4P | |
| R841 | RS02Y309JS | R M-OXIDE FILM | 2W 3 OHM J SMALL | |
| R850 | RS02Y569JS | R M-OXIDE FILM | 2W 5.6 OHM J SMALL | |
| R852 | RS02Y569JS | R M-OXIDE FILM | 2W 5.6 OHM J SMALL | |
| R854 | RS02Y569JS | R M-OXIDE FILM | 2W 5.6 OHM J SMALL | |
| R885 | RS02Y339JS | R M-OXIDE FILM | 2W 3.3 OHM J SMALL | |
| R899 | RS02Y683J- | R M-OXIDE FILM | 2W 68K OHM J | |
| SF1 | 5PK3953M— | FILTER SAW | K3953M | |
| SF2 | 5PK9650M— | FILTER SAW | K9650M | |
| T401 | 50D25A2— | TRANS DRIVE | TD-25A2 | |
| T402 | 50H0000317 | FBT | 1372.0136 | ⚠ |
| T801 | 50M4818A2- | TRANS SMPS | 2094.0119 | ⚠ |
| U100 | 4859724930 | TUNER VARACTOR | UV1316/AI-4 | |
| X501 | 5XE20R250E | CRYSTAL QUARTZ | HC-49/U 20.2500MHZ 30PPM | |
| X601 | 5XE18R432E | CRYSTAL QUARTZ | HC-49/U 18.43200MHZ 30PPM | |
| Y801 | 5SC0101003 | SW RELAY | DG12D1-0(M)-II 1C-1P | ⚠ |
| Z153 | 5PXXT5R5MB | FILTER CERA | XT 5.5MB (TAPPING) | |
| ZZ200 | PTMPJBT2950FS | PCB MAIN EYE LET AS | DTF-2950FZS-SB | |
| E1 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E10 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E11 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E12 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E13 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E14 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E15 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E16 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E17 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E18 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E19 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E2 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E20 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E21 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E22 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E23 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E24 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E25 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E26 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E27 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E28 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E29 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E3 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E30 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E31 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E32 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E33 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E34 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E35 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E36 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E37 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E38 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E39 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E4 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E40 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E41 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E42 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E43 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E48 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E49 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E5 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E50 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E51 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E52 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E53 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E54 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E56 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E57 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|---|---|---|---|---|
| E58 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E6 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E62 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E63 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E7 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E8 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E9 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| ZZ200 | PTMPJ2T2950FS | PCB CHIP MOUNT B AS | DTF-2950FZS-SB | |
| CC01 | HCBK471KBA | C CHIP CERA | 50V X7R 470PF K 1608 | |
| CC02 | HCBK471KBA | C CHIP CERA | 50V X7R 470PF K 1608 | |
| CC03 | HCBK471KBA | C CHIP CERA | 50V X7R 470PF K 1608 | |
| CC04 | HCBK471KBA | C CHIP CERA | 50V X7R 470PF K 1608 | |
| CC05 | HCBK471KBA | C CHIP CERA | 50V X7R 470PF K 1608 | |
| CC06 | HCBK471KBA | C CHIP CERA | 50V X7R 470PF K 1608 | |
| CC07 | HCBK471KBA | C CHIP CERA | 50V X7R 470PF K 1608 | |
| CC08 | HCBK471KBA | C CHIP CERA | 50V X7R 470PF K 1608 | |
| CC10 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC101 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC103 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC110 | HCBK103KBA | C CHIP CERA | 50V X7R 0.01MF K 1608 | |
| CC115 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC117 | HCBK103KBA | C CHIP CERA | 50V X7R 0.01MF K 1608 | |
| CC119 | HCBK103KBA | C CHIP CERA | 50V X7R 0.01MF K 1608 | |
| CC127 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC129 | HCBK103KBA | C CHIP CERA | 50V X7R 0.01MF K 1608 | |
| CC13 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC136 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC14 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC15 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC158 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC16 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC160 | HCBK103KBA | C CHIP CERA | 50V X7R 0.01MF K 1608 | |
| CC166 | HCQK470JBA | C CHIP CERA | 50V CH 47PF J 1608 | |
| CC17 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC177 | HCQK470JBA | C CHIP CERA | 50V CH 47PF J 1608 | |
| CC18 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC19 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC501 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC502 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC503 | HCFF334ZBA | C CHIP CERA | 16V Y5V 0.33MF Z 1608 | |
| CC504 | HCQK100JBA | C CHIP CERA | 50V CH 10PF J 1608 | |
| CC505 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC506 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC507 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC508 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC509 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC511 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC512 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC513 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC514 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC515 | HCQK470JBA | C CHIP CERA | 50V CH 47PF J 1608 | |
| CC516 | HCQK470JBA | C CHIP CERA | 50V CH 47PF J 1608 | |
| CC517 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC518 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC521 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC522 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC523 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC524 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC526 | HCQK220JBA | C CHIP CERA | 50V CH 22PF J 1608 | |
| CC527 | HCQK220JBA | C CHIP CERA | 50V CH 22PF J 1608 | |
| CC528 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC549 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC550 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC551 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC552 | HCQK270JBA | C CHIP CERA | 50V CH 27PF J 1608 | |
| CC553 | HCQK270JBA | C CHIP CERA | 50V CH 27PF J 1608 | |
| CC556 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC560 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC561 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC567 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC568 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|---|---|---|---|---|
| CC569 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC570 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC578 | HCBK561KBA | C CHIP CERA | 50V X7R 560PF K 1608 | |
| CC579 | HCBK561KBA | C CHIP CERA | 50V X7R 560PF K 1608 | |
| CC589 | HCBK561KBA | C CHIP CERA | 50V X7R 560PF K 1608 | |
| CC601 | HCBK472KBA | C CHIP CERA | 50V X7R 4700PF K 1608 | |
| CC602 | HCBK472KBA | C CHIP CERA | 50V X7R 4700PF K 1608 | |
| CC617 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC620 | HCQK309CBA | C CHIP CERA | 50V CH 3PF C 1608 | |
| CC621 | HCQK309CBA | C CHIP CERA | 50V CH 3PF C 1608 | |
| CC622 | HCQK680JBA | C CHIP CERA | 50V CH 68PF J 1608 | |
| CC629 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC631 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC635 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC665 | HCBK222KBA | C CHIP CERA | 50V X7R 2200PF K 1608 | |
| CC667 | HCBK222KBA | C CHIP CERA | 50V X7R 2200PF K 1608 | |
| CC680 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC701 | HCBK103KBA | C CHIP CERA | 50V X7R 0.01MF K 1608 | |
| CC709 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC710 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC711 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC712 | HCQK151JBA | C CHIP CERA | 50V CH 150PF J 1608 | |
| CC713 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC714 | HCBK103KBA | C CHIP CERA | 50V X7R 0.01MF K 1608 | |
| CC715 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC716 | HCBK103KBA | C CHIP CERA | 50V X7R 0.01MF K 1608 | |
| CC722 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC726 | HCQK330JBA | C CHIP CERA | 50V CH 33PF J 1608 | |
| CC727 | HCQK330JBA | C CHIP CERA | 50V CH 33PF J 1608 | |
| CC730 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC737 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC742 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC744 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC777 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| IC101 | 14470MFLGD | IC CHIP VIDEO IF | TDA4470-MFLG3 | |
| IC501 | 1VSP9405C4 | IC CHIP VIDEO | VSP9405C4 | |
| IC502 | 1DDP3315CQ | IC CHIP | DDP3315CQ | |
| RC102 | HRFT561JBA | R CHIP | 1/10 560 OHM J 1608 | |
| RC106 | HRFT101JBA | R CHIP | 1/10 100 OHM J 1608 | |
| RC107 | HRFT101JBA | R CHIP | 1/10 100 OHM J 1608 | |
| RC109 | HRFT104JBA | R CHIP | 1/10 100K OHM J 1608 | |
| RC111 | HRFT113JBA | R CHIP | 1/10 11K OHM J 1608 | |
| RC112 | HRFT223JBA | R CHIP | 1/10 22K OHM J 1608 | |
| RC114 | HRFT472JBA | R CHIP | 1/10 4.7K OHM J 1608 | |
| RC118 | HRFT151JBA | R CHIP | 1/10 150 OHM J 1608 | |
| RC119 | HRFT272JBA | R CHIP | 1/10 2.7K OHM J 1608 | |
| RC151 | HRFT102JBA | R CHIP | 1/10 1K OHM J 1608 | |
| RC159 | HRFT682JBA | R CHIP | 1/10 6.8K OHM J 1608 | |
| RC160 | HRFT472JBA | R CHIP | 1/10 4.7K OHM J 1608 | |
| RC164 | HRFT752JBA | R CHIP | 1/10 7.5K OHM J 1608 | |
| RC169 | HRFT222JBA | R CHIP | 1/10 2.2K OHM J 1608 | |
| RC179 | HRFT222JBA | R CHIP | 1/10 2.2K OHM J 1608 | |
| RC190 | HRFT221JBA | R CHIP | 1/10 220 OHM J 1608 | |
| RC191 | HRFT331JBA | R CHIP | 1/10 330 OHM J 1608 | |
| RC501 | HRFT221JBA | R CHIP | 1/10 220 OHM J 1608 | |
| RC506 | HRFT750JBA | R CHIP | 1/10 75 OHM J 1608 | |
| RC509 | HRFT472JBA | R CHIP | 1/10 4.7K OHM J 1608 | |
| RC513 | HRFT103JBA | R CHIP | 1/10 10K OHM J 1608 | |
| RC516 | HRFT471JBA | R CHIP | 1/10 470 OHM J 1608 | |
| RC517 | HRFT332JBA | R CHIP | 1/10 3.3K OHM J 1608 | |
| RC518 | HRFT151JBA | R CHIP | 1/10 150 OHM J 1608 | |
| RC519 | HRFT151JBA | R CHIP | 1/10 150 OHM J 1608 | |
| RC527 | HRFT333JBA | R CHIP | 1/10 33K OHM J 1608 | |
| RC530 | HRFT103JBA | R CHIP | 1/10 10K OHM J 1608 | |
| RC532 | HRFT223JBA | R CHIP | 1/10 22K OHM J 1608 | |
| RC551 | HRFT471JBA | R CHIP | 1/10 470 OHM J 1608 | |
| RC560 | HRFT102JBA | R CHIP | 1/10 1K OHM J 1608 | |
| RC568 | HRFT102JBA | R CHIP | 1/10 1K OHM J 1608 | |
| RC577 | HRFT151JBA | R CHIP | 1/10 150 OHM J 1608 | |
| RC578 | HRFT330JBA | R CHIP | 1/10 33 OHM J 1608 | |
| RC579 | HRFT330JBA | R CHIP | 1/10 33 OHM J 1608 | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK | LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|-----|-----------|-----------|-------------|--------|-----|-----------|-----------|-------------|--------|
| RC580 | HRFT821JBA | R CHIP | 1/10 820 OHM J 1608 | | C524 | CEXF1E470V | C ELECTRO | 25V RSS 47MF (5X11) TP | |
| RC581 | HRFT102JBA | R CHIP | 1/10 1K OHM J 1608 | | C530 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| RC582 | HRFT102JBA | R CHIP | 1/10 1K OHM J 1608 | | C550 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| RC583 | HRFT102JBA | R CHIP | 1/10 1K OHM J 1608 | | C551 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| RC584 | HRFT821JBA | R CHIP | 1/10 820 OHM J 1608 | | C560 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| RC585 | HRFT911JBA | R CHIP | 1/10 910 OHM J 1608 | | C561 | CEXF1H339V | C ELECTRO | 50V RSS 3.3MF (5X11) TP | |
| RC586 | HRFT911JBA | R CHIP | 1/10 910 OHM J 1608 | | C568 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| RC587 | HRFT821JBA | R CHIP | 1/10 820 OHM J 1608 | | C590 | CEXF1H479V | C ELECTRO | 50V RSS 4.7MF (5*11) TP | |
| RC589 | HRFT330JBA | R CHIP | 1/10 33 OHM J 1608 | | C602 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| RC591 | HRFT393JBA | R CHIP | 1/10 39K OHM J 1608 | | C605 | CEXF1E470V | C ELECTRO | 25V RSS 47MF (5X11) TP | |
| RC595 | HRFT271JBA | R CHIP | 1/10 270 OHM J 1608 | | C608 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| RC598 | HRFT271JBA | R CHIP | 1/10 270 OHM J 1608 | | C610 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| RC611 | HRFT224JBA | R CHIP | 1/10 220K OHM J 1608 | | C611 | CEXF1H339V | C ELECTRO | 50V RSS 3.3MF (5X11) TP | |
| RC661 | HRFT512JBA | R CHIP | 1/10 5.1K OHM J 1608 | | C612 | CEXF1H109V | C ELECTRO | 50V RSS 1MF (5X11) TP | |
| RC662 | HRFT512JBA | R CHIP | 1/10 5.1K OHM J 1608 | | C613 | CEXF1H109V | C ELECTRO | 50V RSS 1MF (5X11) TP | |
| RC701 | HRFT103JBA | R CHIP | 1/10 10K OHM J 1608 | | C614 | CEXF1H109V | C ELECTRO | 50V RSS 1MF (5X11) TP | |
| RC708 | HRFT472JBA | R CHIP | 1/10 4.7K OHM J 1608 | | C615 | CEXF1H109V | C ELECTRO | 50V RSS 1MF (5X11) TP | |
| RC715 | HRFT103JBA | R CHIP | 1/10 10K OHM J 1608 | | C616 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| RC716 | HRFT113JBA | R CHIP | 1/10 11K OHM J 1608 | | C623 | CEXF1H109V | C ELECTRO | 50V RSS 1MF (5X11) TP | |
| RC725 | HRFT103JBA | R CHIP | 1/10 10K OHM J 1608 | | C624 | CEXF1H109V | C ELECTRO | 50V RSS 1MF (5X11) TP | |
| RC729 | HRFT103JBA | R CHIP | 1/10 10K OHM J 1608 | | C625 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| RC730 | HRFT223JBA | R CHIP | 1/10 22K OHM J 1608 | | C626 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| RC731 | HRFT223JBA | R CHIP | 1/10 22K OHM J 1608 | | C627 | CEXF1H479V | C ELECTRO | 50V RSS 4.7MF (5*11) TP | |
| RC732 | HRFT103JBA | R CHIP | 1/10 10K OHM J 1608 | | C630 | CEXF1E470V | C ELECTRO | 25V RSS 47MF (5X11) TP | |
| RC733 | HRFT473JBA | R CHIP | 1/10 47K OHM J 1608 | | C634 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| RC737 | HRFT682JBA | R CHIP | 1/10 6.8K OHM J 1608 | | C636 | CEXF1E470V | C ELECTRO | 25V RSS 47MF (5X11) TP | |
| RC738 | HRFT000-BA | R CHIP | 1/10 0 OHM 1608 | | C641 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| RC739 | HRFT000-BA | R CHIP | 1/10 0 OHM 1608 | | C642 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| RC740 | HRFT000-BA | R CHIP | 1/10 0 OHM 1608 | | C660 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| RC741 | HRFT682JBA | R CHIP | 1/10 6.8K OHM J 1608 | | C661 | CMXM2A224J | C MYLAR | 100V 0.22MF J | |
| RC742 | HRFT682JBA | R CHIP | 1/10 6.8K OHM J 1608 | | C662 | CMXM2A224J | C MYLAR | 100V 0.22MF J | |
| RC743 | HRFT682JBA | R CHIP | 1/10 6.8K OHM J 1608 | | C666 | CBXF1H104Z | C CERA SEMI | 50V F 0.1MF Z (TAPPING) | |
| RC750 | HRFT183JBA | R CHIP | 1/10 18K OHM J 1608 | | C668 | CMXM2A224J | C MYLAR | 100V 0.22MF J | |
| RC770 | HRFT332JBA | R CHIP | 1/10 3.3K OHM J 1608 | | C669 | CMXM2A224J | C MYLAR | 100V 0.22MF J | |
| RC799 | HRFT472JBA | R CHIP | 1/10 4.7K OHM J 1608 | | C709 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| RC881 | HRFT103JBA | R CHIP | 1/10 10K OHM J 1608 | | C711 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| RC882 | HRFT103JBA | R CHIP | 1/10 10K OHM J 1608 | | C713 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| ZZ200 | PTMPJRT2950FS | PCB MAIN RADIAL AS | DTF-2950FZS-SB | | C730 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C102 | CEXF1E470V | C ELECTRO | 25V RSS 47MF (5X11) TP | | C733 | CEXF1H229V | C ELECTRO | 50V RSS 2.2MF (5X11) TP | |
| C106 | CEXF1C221V | C ELECTRO | 16V RSS 220MF (8X11.5) TP | | C737 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C117 | CEXF1H229V | C ELECTRO | 50V RSS 2.2MF (5X11) TP | | C742 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C118 | CMXL1J474J | C MYLAR | 63V 0.47MF MKT | | C744 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C120 | CXRH1H150J | C CERA | 50V RH 15PF J (TAPPING) | | C803 | CCXF3A472Z | C CERA | 1KV F 4700PF Z (T) | |
| C121 | CEXF1E470V | C ELECTRO | 25V RSS 47MF (5X11) TP | | C804 | CCXF3A472Z | C CERA | 1KV F 4700PF Z (T) | |
| C150 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | | C806 | CCXR3A102K | C CERA | 1KV R 1000PF (T) 125C | |
| C152 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | | C807 | CEXF1H109V | C ELECTRO | 50V RSS 1MF (5X11) TP | |
| C153 | CEXF1H229V | C ELECTRO | 50V RSS 2.2MF (5X11) TP | | C810 | CEXF1E100V | C ELECTRO | 50V RSS 10MF (5X11) TP | |
| C157 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | | C811 | CMXM2A473J | C MYLAR | 100V 0.047MF J TP | |
| C164 | CEXF1E470V | C ELECTRO | 25V RSS 47MF (5X11) TP | | C830 | CEXF1H479V | C ELECTRO | 50V RSS 4.7MF (5*11) TP | |
| C188 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | | C831 | CEXF1H109V | C ELECTRO | 50V RSS 1MF (5X11) TP | |
| C301 | CMXM2A224J | C MYLAR | 100V 0.22MF J | | C833 | CCXB1H821K | C CERA | 50V B 820PF K (TAPPING) | |
| C305 | CEXF1E221V | C ELECTRO | 25V RSS 220MF (8X11.5) TP | | C835 | CEXF1E470V | C ELECTRO | 25V RSS 47MF (5X11) TP | |
| C313 | CMXM2A104J | C MYLAR | 100V 0.1MF J TP | | C845 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| C320 | CBXF1H104Z | C CERA SEMI | 50V F 0.1MF Z (TAPPING) | | C846 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| C340 | CMXM2A683J | C MYLAR | 100V 0.068MF J TP | | C847 | CEXF1H100V | C ELECTRO | 50V RSS 10MF (5X11) TP | |
| C350 | CMXM2A223J | C MYLAR | 100V 0.022MF J TP | | C850 | CEXF1H100V | C ELECTRO | 50V RSS 10MF (5X11) TP | |
| C351 | CMXM2A223J | C MYLAR | 100V 0.022MF J TP | | C853 | CCXF3A472Z | C CERA | 1KV F 4700PF Z (T) | |
| C370 | CCXF1H473Z | C CERA | 50V F 0.047MF Z (TAPPING) | | C854 | CCXF3A472Z | C CERA | 1KV F 4700PF Z (T) | |
| C401 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | | C863 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| C410 | CCXB2H681K | C CERA | 500V B 680PF K (TAPPING) | | C864 | CEXF1H100V | C ELECTRO | 50V RSS 10MF (5X11) TP | |
| C416 | CCXB2H471K | C CERA | 500V B 470PF K (TAPPING) | | C865 | CEXF1H100V | C ELECTRO | 50V RSS 10MF (5X11) TP | |
| C417 | CMXM2A392J | C MYLAR | 100V 3900PF J TP | | C866 | CCXR3A471K | C CERA | 1KV R 470PF K 125C | |
| C420 | CMXM2A273J | C MYLAR | 100V 0.027MF J TP | | C871 | CEXF1C471V | C ELECTRO | 16V RSS 470MF (10X12.5)TP | |
| C424 | CMXM2A333J | C MYLAR | 100V 0.033MF J TP | | C880 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| C425 | CCXB1H472K | C CERA | 50V B 4700PF K (TAPPING) | | C888 | CEXF1E220V | C ELECTRO | 25V RSS 22MF TP | |
| C501 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | | CP05 | CEXF1H100V | C ELECTRO | 50V RSS 10MF (5X11) TP | |
| C502 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | | CP06 | CCXB3A102K | C CERA | 1KV B 1000PF K (TAPPING) | |
| C503 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | | I704 | 1K1A7025AP | IC RESET | KIA7025AP | |
| C504 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | | L101 | 5CPX479K— | COIL PEAKING | 4.7UH K RADIAL | |
| C505 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | | L380 | 58C0000116 | COIL BEAD | HC-3550R | |
| C506 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | | L381 | 58C0000116 | COIL BEAD | HC-3550R | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|---|---|---|---|---|
| L802 | 58CX430599 | COIL CHOKE | AZ-9004Y 940K TP | |
| Q103 | T2SC5343Y- | TR | 2SC5343Y | |
| Q104 | T2SC5343Y- | TR | 2SC5343Y | |
| Q110 | T2SC5343Y- | TR | 2SC5343Y | |
| Q150 | T2SC5343Y- | TR | 2SC5343Y | |
| Q151 | T2SC5343Y- | TR | 2SC5343Y | |
| Q333 | T2SC5343Y- | TR | 2SC5343Y | |
| Q334 | T2SC5343Y- | TR | 2SC5343Y | |
| Q402 | T2SD1207T- | TR | 2SD1207-T (TAPPING) | |
| Q502 | T2SC5343Y- | TR | 2SC5343Y | |
| Q503 | T2SC5343Y- | TR | 2SC5343Y | |
| Q504 | T2SA1980Y- | TR | 2SA1980Y | |
| Q542 | T2SA1980Y- | TR | 2SA1980Y | |
| Q543 | T2SA1980Y- | TR | 2SA1980Y | |
| Q544 | T2SA1980Y- | TR | 2SA1980Y | |
| Q550 | T2SC5343Y- | TR | 2SC5343Y | |
| Q601 | T2SA1980Y- | TR | 2SA1980Y | |
| Q602 | T2SC5343Y- | TR | 2SC5343Y | |
| Q603 | T2SA1980Y- | TR | 2SA1980Y | |
| Q604 | T2SC5343Y- | TR | 2SC5343Y | |
| Q605 | T2SC5343Y- | TR | 2SC5343Y | |
| Q730 | T2SC5343Y- | TR | 2SC5343Y | |
| Q731 | T2SC5343Y- | TR | 2SC5343Y | |
| Q809 | T2SC5343Y- | TR | 2SC5343Y | |
| Q810 | T2SC5343Y- | TR | 2SC5343Y | |
| Q812 | TKTC3203Y- | TR | KTC3203-Y | |
| QP01 | T2SD1207T- | TR | 2SD1207-T (TAPPING) | |
| QP02 | T2SC5343Y- | TR | 2SC5343Y | |
| R331 | RN02B681JS | R METAL FILM | 2W 680 OHM J SMALL | |
| R332 | RN02B681JS | R METAL FILM | 2W 680 OHM J SMALL | |
| R401 | RN02B360JS | R METAL FILM | 2W 36 OHM J SMALL | |
| R402 | RN02B360JS | R METAL FILM | 2W 36 OHM J SMALL | |
| R410 | RN02B473JS | R METAL FILM | 2W 47K OHM J SMALL | |
| R415 | RN02B561JS | R METAL FILM | 2W 560 OHM J SMALL | |
| RP04 | RN02B753JS | R METAL FILM | 2W 75K OHM J SMALL | |
| RP05 | RN02B333JS | R METAL FILM | 2W 33K OHM J SMALL | |
| RP14 | RN01B124JS | R METAL FILM | 1W 120K OHM J SMALL | |
| X502 | 5XEX5R000E | CRYSTAL QUARTZ | HC-49/U 5.00MHZ 30PPM | |
| X701 | 5XEX6R000C | CRYSTAL QUARTZ | HC-49/U 6.000M 20PPM TP | |
| Z601 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | |
| Z602 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | |
| Z603 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | |
| Z604 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | |
| Z605 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | |
| Z606 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | |
| Z607 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | |
| Z608 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | |
| ZZ200 | PTMPJAT2950FS | PCB MAIN AXIAL AS | DTF-2950FZS-SB | |
| 10 | 2TM14006LB | TAPE MASKING | 3M #232 6.0X2000M (WITH GLUE) | |
| 20 | 2TM10006LB | TAPE MASKING | 3M #232-MAP-C 6.2X2000M (W/O GLUE) | |
| A001 | 4859812993 | PCB MAIN | CP-850FX DTF-2950 (330X246 D1B) | °, |
| C101 | CCZB1H101K | C CERA | 50V B 100PF K (AXIAL) | |
| C111 | CCZB1H103K | C CERA | 50V B 0.01MF K (AXIAL) | |
| C112 | CCZB1H102K | C CERA | 50V B 1000PF K (AXIAL) | |
| C161 | CZCH1H220J | C CERA | 50V CH 22PF J (AXIAL) | |
| C414 | CCZB1H103K | C CERA | 50V B 0.01MF K (AXIAL) | |
| C440 | CCZB1H221K | C CERA | 50V B 220PF K (AXIAL) | |
| C508 | CCZB1H473K | C CERA | 50V B 0.047MF K (AXIAL) | |
| C509 | CCZB1H473K | C CERA | 50V B 0.047MF K (AXIAL) | |
| C510 | CCZB1H473K | C CERA | 50V B 0.047MF K (AXIAL) | |
| C515 | CBZF1H104Z | C CERA SEMI | 50V F 0.1MF Z (AXIAL) | |
| C516 | CBZF1H104Z | C CERA SEMI | 50V F 0.1MF Z (AXIAL) | |
| C517 | CBZF1H104Z | C CERA SEMI | 50V F 0.1MF Z (AXIAL) | |
| C518 | CBZF1H104Z | C CERA SEMI | 50V F 0.1MF Z (AXIAL) | |
| C519 | CBZF1H104Z | C CERA SEMI | 50V F 0.1MF Z (AXIAL) | |
| C532 | CCZB1H103K | C CERA | 50V B 0.01MF K (AXIAL) | |
| C534 | CCZB1H103K | C CERA | 50V B 0.01MF K (AXIAL) | |
| C536 | CCZB1H102K | C CERA | 50V B 1000PF K (AXIAL) | |
| C537 | CCZB1H103K | C CERA | 50V B 0.01MF K (AXIAL) | |
| C538 | CCZB1H103K | C CERA | 50V B 0.01MF K (AXIAL) | |
| C540 | CCZB1H333K | C CERA | 50V B 0.033MF K (AXIAL) | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|---|---|---|---|---|
| C553 | CCZB1H103K | C CERA | 50V B 0.01MF K (AXIAL) | |
| C557 | CBZF1H104Z | C CERA SEMI | 50V F 0.1MF Z (AXIAL) | |
| C558 | CBZF1H104Z | C CERA SEMI | 50V F 0.1MF Z (AXIAL) | |
| C650 | CZSL1H680J | C CERA | 50V SL 68PF J (AXIAL) | |
| C712 | CBZF1H104Z | C CERA SEMI | 50V F 0.1MF Z (AXIAL) | |
| C809 | CCZB1H102K | C CERA | 50V B 1000PF K (AXIAL) | |
| C834 | CCZF1H103Z | C CERA | 50V F 0.01MF Z | |
| D100 | DTZX33B— | DIODE ZENER | TZX33B (TAPPING) | |
| D101 | DBAT85—— | DIODE | BAT85 (TAPPING) | |
| D103 | DBA282—— | DIODE | BA282 | |
| D313 | DRGP15J— | DIODE | RGP15J | |
| D367 | DTZX33B— | DIODE ZENER | TZX33B (TAPPING) | |
| D405 | D1N4937G— | DIODE | 1N4937G | |
| D408 | D1N4937G— | DIODE | 1N4937G | |
| D410 | D1N4937G— | DIODE | 1N4937G | |
| D414 | D1N4004S— | DIODE | 1N4004S | |
| D415 | D1N4937G— | DIODE | 1N4937G | |
| D530 | D1N4148— | DIODE | 1N4148 (TAPPING) | |
| D531 | D1N4148— | DIODE | 1N4148 (TAPPING) | |
| D535 | D1N4148— | DIODE | 1N4148 (TAPPING) | |
| D540 | D1N4148— | DIODE | 1N4148 (TAPPING) | |
| D541 | D1N4148— | DIODE | 1N4148 (TAPPING) | |
| D550 | D1N4148— | DIODE | 1N4148 (TAPPING) | |
| D551 | D1N4148— | DIODE | 1N4148 (TAPPING) | |
| D602 | D1N4148— | DIODE | 1N4148 (TAPPING) | |
| D603 | D1N4148— | DIODE | 1N4148 (TAPPING) | |
| D701 | D1N4148— | DIODE | 1N4148 (TAPPING) | |
| D702 | D1N4148— | DIODE | 1N4148 (TAPPING) | |
| D720 | DTZX2V7A— | DIODE ZENER | TZX2V7A (TAPPING) | |
| D730 | DTZX7V5C— | DIODE ZENER | TZX7V5C (TAPPING) | |
| D777 | DTZX5V6B— | DIODE ZENER | TZX5V6B (TAPPING) | |
| D801 | DLT2A05G— | DIODE | LT2A05G | |
| D802 | DLT2A05G— | DIODE | LT2A05G | |
| D803 | DLT2A05G— | DIODE | LT2A05G | |
| D804 | DLT2A05G— | DIODE | LT2A05G | |
| D805 | D1N4148— | DIODE | 1N4148 (TAPPING) | |
| D806 | D1N4937G— | DIODE | 1N4937G | |
| D807 | D1N4937G— | DIODE | 1N4937G | |
| D808 | DTZX6V2— | DIODE ZENER | TZX6V2B (TAPPING) | |
| D811 | DTZX7V5C— | DIODE ZENER | TZX7V5C (TAPPING) | |
| D825 | D1N4148— | DIODE | 1N4148 (TAPPING) | |
| D826 | DTZX5V1B— | DIODE ZENER | TZX5V1B (TAPPING) | |
| D827 | D1N4004S— | DIODE | 1N4004S | |
| D830 | DRGP15J— | DIODE | RGP15J | |
| D831 | DRGP15J— | DIODE | RGP15J | |
| D871 | D1N4937G— | DIODE | 1N4937G | |
| D899 | DRGP15J— | DIODE | RGP15J | |
| DA11 | DTZX5V6B— | DIODE ZENER | TZX5V6B (TAPPING) | |
| DA13 | DTZX5V6B— | DIODE ZENER | TZX5V6B (TAPPING) | |
| DA16 | DTZX5V6B— | DIODE ZENER | TZX5V6B (TAPPING) | |
| DA17 | DTZX5V6B— | DIODE ZENER | TZX5V6B (TAPPING) | |
| DA27 | DTZX5V6B— | DIODE ZENER | TZX5V6B (TAPPING) | |
| DP02 | D1N4148— | DIODE | 1N4148 (TAPPING) | |
| DP03 | D1N4148— | DIODE | 1N4148 (TAPPING) | |
| DP04 | DTZX12C— | DIODE ZENER | TZX12C (TAPPING) | |
| DP05 | DTZX8V2A— | DIODE ZENER | TZX8V2A (TAPPING) | |
| DP06 | D1N4148— | DIODE | 1N4148 (TAPPING) | |
| DP08 | D1N4148— | DIODE | 1N4148 (TAPPING) | |
| J1 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J112 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J113 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J114 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J115 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J125 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J128 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J135 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J143 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J156 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J2 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J201 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J232 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK | LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|---|---|---|---|---|---|---|---|---|---|
| J234 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J380 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J235 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J381 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J236 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J382 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J240 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J383 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J243 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J385 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J276 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J387 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J278 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J388 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J28 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J389 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J287 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J39 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J289 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J390 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J30 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J391 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J300 | 5MC0000100 | COIL BEAD | MD-5 (HC-3550) | | J392 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J301 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J394 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J303 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J396 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J305 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J397 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J306 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J398 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J307 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J399 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J308 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J400 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J31 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J401 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J310 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J403 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J311 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J404 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J32 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J405 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J320 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J406 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J322 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J407 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J324 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J408 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J325 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J409 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J327 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J41 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J328 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J410 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J33 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J414 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J335 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J416 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J336 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J417 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J337 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J418 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J339 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J419 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J34 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J42 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J340 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J420 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J341 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J423 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J342 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J426 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J344 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J429 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J345 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J43 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J347 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J430 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J348 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J431 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J35 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J432 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J350 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J433 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J351 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J434 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J353 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J45 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J354 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J450 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J355 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J46 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J356 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J460 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J357 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J47 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J358 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J48 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J359 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J483 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J36 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J488 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J362 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J49 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J363 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J50 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J365 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J500 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J366 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J501 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J367 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J502 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J368 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J51 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J369 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J52 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J37 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J54 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J371 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J56 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J373 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J57 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J374 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J58 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J375 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J59 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J377 | 85801060GY | SIRE COPPER | 1/0.6 TIN COATING | | J60 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J378 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J602 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J379 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J61 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J38 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J62 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK | LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|---|---|---|---|---|---|---|---|---|---|
| J63 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | R519 | RD-AZ750J- | R CARBON FILM | 1/6 75 OHM J | |
| L105 | 5CPZ479K02 | COIL PEAKING | 4.7UH 3.5MM K (LAL02TB) | | R520 | RD-AZ750J- | R CARBON FILM | 1/6 75 OHM J | |
| L153 | 5CPZ120K02 | COIL PEAKING | 12UH 3.5MM K (LAL02TB) | | R524 | RD-AZ391J- | R CARBON FILM | 1/6 390 OHM J | |
| L402 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | R525 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| L501 | 5CPZ479K04 | COIL PEAKING | 4.7UH 10.5MM K (LAL04TB) | | R533 | RD-AZ392J- | R CARBON FILM | 1/6 3.9K OHM J | |
| L502 | 5CPZ479K04 | COIL PEAKING | 4.7UH 10.5MM K (LAL04TB) | | R534 | RD-AZ391J- | R CARBON FILM | 1/6 390 OHM J | |
| L506 | 5CPZ479K04 | COIL PEAKING | 4.7UH 10.5MM K (LAL04TB) | | R535 | RD-AZ122J- | R CARBON FILM | 1/6 1.2K OHM J | |
| L507 | 5CPZ100K04 | COIL PEAKING | 10UH 10.5MM K (LAL04TB) | | R537 | RD-AZ301J- | R CARBON FILM | 1/6 300 OHM J | |
| L524 | 5CPZ100K02 | COIL PEAKING | 10UH 3.5MM K (LAL02TB) | | R538 | RD-AZ301J- | R CARBON FILM | 1/6 300 OHM J | |
| L551 | 5CPZ479K04 | COIL PEAKING | 4.7UH 10.5MM K (LAL04TB) | | R540 | RD-AZ472J- | R CARBON FILM | 1/6 4.7K OHM J | |
| L568 | 5CPZ100K02 | COIL PEAKING | 10UH 3.5MM K (LAL02TB) | | R545 | RD-AZ750J- | R CARBON FILM | 1/6 75 OHM J | |
| L601 | 5CPZ479K02 | COIL PEAKING | 4.7UH 3.5MM K (LAL02TB) | | R550 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| L602 | 5CPZ100K02 | COIL PEAKING | 10UH 3.5MM K (LAL02TB) | | R551 | RD-AZ471J- | R CARBON FILM | 1/6 470 OHM J | |
| L603 | 5CPZ479K02 | COIL PEAKING | 4.7UH 3.5MM K (LAL02TB) | | R563 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| L605 | 5CPZ479K02 | COIL PEAKING | 4.7UH 3.5MM K (LAL02TB) | | R564 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| L650 | 5MC0000100 | COIL BEAD | MD-5 (HC-3550) | | R566 | RD-AZ220J- | R CARBON FILM | 1/6 22 OHM J | |
| L709 | 5CPZ100K02 | COIL PEAKING | 10UH 3.5MM K (LAL02TB) | | R570 | RD-AZ271J- | R CARBON FILM | 1/6 270 OHM J | |
| L711 | 5CPZ100K02 | COIL PEAKING | 10UH 3.5MM K (LAL02TB) | | R576 | RD-AZ151J- | R CARBON FILM | 1/6 150 OHM J | |
| L713 | 5CPZ100K02 | COIL PEAKING | 10UH 3.5MM K (LAL02TB) | | R580 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| L730 | 5CPZ100K02 | COIL PEAKING | 10UH 3.5MM K (LAL02TB) | | R588 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| L737 | 5CPZ100K02 | COIL PEAKING | 10UH 3.5MM K (LAL02TB) | | R590 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| L742 | 5CPZ100K02 | COIL PEAKING | 10UH 3.5MM K (LAL02TB) | | R593 | RD-AZ203J- | R CARBON FILM | 1/6 20K OHM J | |
| L744 | 5CPZ100K02 | COIL PEAKING | 10UH 3.5MM K (LAL02TB) | | R594 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| L801 | 5MC0000100 | COIL BEAD | MD-5 (HC-3550) | | R595 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R103 | RD-AZ123J- | R CARBON FILM | 1/6 12K OHM J | | R599 | RD-AZ151J- | R CARBON FILM | 1/6 150 OHM J | |
| R110 | RN-4Z1502F | R METAL FILM | 1/4 15K OHM F | | R602 | RD-AZ104J- | R CARBON FILM | 1/6 100K OHM J | |
| R150 | RD-AZ561J- | R CARBON FILM | 1/6 560 OHM J | | R605 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R152 | RD-AZ271J- | R CARBON FILM | 1/6 270 OHM J | | R606 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R153 | RD-AZ470J- | R CARBON FILM | 1/6 47 OHM J | | R610 | RD-AZ682J- | R CARBON FILM | 1/6 6.8K OHM J | |
| R154 | RD-AZ470J- | R CARBON FILM | 1/6 47 OHM J | | R612 | RD-AZ474J- | R CARBON FILM | 1/6 470K OHM J | |
| R155 | RD-AZ751J- | R CARBON FILM | 1/6 750 OHM J | | R613 | RD-AZ473J- | R CARBON FILM | 1/6 47K OHM J | |
| R161 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | | R614 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R162 | RD-AZ153J- | R CARBON FILM | 1/6 15K OHM J | | R615 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R163 | RD-AZ752J- | R CARBON FILM | 1/6 7.5K OHM J | | R616 | RD-AZ103J- | R CARBON FILM | 1/6 10K OHM J | |
| R177 | RD-AZ562J- | R CARBON FILM | 1/6 5.6K OHM J | | R620 | RD-AZ242J- | R CARBON FILM | 1/6 2.4K OHM J | |
| R301 | RD-4Z472J- | R CARBON FILM | 1/4 4.7K OHM J | | R621 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R310 | RD-AZ432J- | R CARBON FILM | 1/6 4.3K OHM J | | R622 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R311 | RD-AZ432J- | R CARBON FILM | 1/6 4.3K OHM J | | R641 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R333 | RD-AZ222J- | R CARBON FILM | 1/6 2.2K OHM J | | R642 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R334 | RD-AZ222J- | R CARBON FILM | 1/6 2.2K OHM J | | R646 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R340 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | R647 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R341 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | R649 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R345 | RD-4Z473J- | R CARBON FILM | 1/4 47K OHM J | | R650 | RD-AZ362J- | R CARBON FILM | 1/6 3.6K OHM J | |
| R350 | RN-AZ2201F | R METAL FILM | 1/6 2.2K OHM F | | R651 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R351 | RN-AZ2201F | R METAL FILM | 1/6 2.2K OHM F | | R652 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R370 | RD-4Z159J- | R CARBON FILM | 1/4 1.5 OHM J | | R660 | RD-AZ362J- | R CARBON FILM | 1/6 3.6K OHM J | |
| R394 | RD-AZ272J- | R CARBON FILM | 1/6 2.7K OHM J | | R680 | RD-AZ152J- | R CARBON FILM | 1/6 1.5K OHM J | |
| R395 | RD-4Z754J- | R CARBON FILM | 1/4 750K OHM J | | R700 | RD-2Z332J- | R CARBON FILM | 1/2 3.3K OHM J | |
| R396 | RD-AZ272J- | R CARBON FILM | 1/6 2.7K OHM J | | R701 | RD-AZ472J- | R CARBON FILM | 1/6 4.7K OHM J | |
| R397 | RD-AZ104J- | R CARBON FILM | 1/6 100K OHM J | | R702 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R414 | RD-AZ681J- | R CARBON FILM | 1/6 680 OHM J | | R703 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R420 | RD-AZ471J- | R CARBON FILM | 1/6 470 OHM J | | R704 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R424 | RD-4Z472J- | R CARBON FILM | 1/4 4.7K OHM J | | R709 | RD-AZ472J- | R CARBON FILM | 1/6 4.7K OHM J | |
| R430 | RD-4Z103J- | R CARBON FILM | 1/4 10K OHM J | | R720 | RD-AZ681J- | R CARBON FILM | 1/6 680 OHM J | |
| R440 | RD-4Z274J- | R CARBON FILM | 1/4 270K OHM J | | R741 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R501 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | | R748 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R502 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | | R777 | RD-AZ750J- | R CARBON FILM | 1/6 75 OHM J | |
| R504 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | | R781 | RD-AZ332J- | R CARBON FILM | 1/6 3.3K OHM J | |
| R507 | RD-AZ562J- | R CARBON FILM | 1/6 5.6K OHM J | | R788 | RD-AZ103J- | R CARBON FILM | 1/6 10K OHM J | |
| R510 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | | R789 | RD-AZ103J- | R CARBON FILM | 1/6 10K OHM J | |
| R511 | RD-AZ330J- | R CARBON FILM | 1/6 33 OHM J | | R790 | RD-AZ512J- | R CARBON FILM | 1/6 5.1K OHM J | |
| R512 | RD-AZ330J- | R CARBON FILM | 1/6 33 OHM J | | R804 | RD-4Z479J- | R CARBON FILM | 1/4 4.7 OHM J | |
| R513 | RD-AZ330J- | R CARBON FILM | 1/6 33 OHM J | | R805 | RD-2Z104J- | R CARBON FILM | 1/2 100K OHM J | |
| R514 | RD-AZ151J- | R CARBON FILM | 1/6 150 OHM J | | R807 | RD-4Z221J- | R CARBON FILM | 1/4 220 OHM J | |
| R515 | RD-AZ223J- | R CARBON FILM | 1/6 22K OHM J | | R808 | RD-4Z182J- | R CARBON FILM | 1/4 1.8K OHM J | |
| R516 | RD-AZ752J- | R CARBON FILM | 1/6 7.5K OHM J | | R809 | RD-4Z102J- | R CARBON FILM | 1/4 1K OHM J | |
| R517 | RD-AZ471J- | R CARBON FILM | 1/6 470 OHM J | | R810 | RD-4Z220J- | R CARBON FILM | 1/4 22 OHM J | |
| R518 | RD-AZ750J- | R CARBON FILM | 1/6 75 OHM J | | | | | | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|---|---|---|---|---|
| R811 | RC-2Z565KP | R CARBON COMP | 1/2 5.6M OHM K | ⚠ |
| R817 | RD-AZ473J- | R CARBON FILM | 1/6 47K OHM J | |
| R818 | RD-AZ683J- | R CARBON FILM | 1/6 68K OHM J | |
| R820 | RD-4Z363J- | R CARBON FILM | 1/4 36K OHM J | |
| R821 | RD-AZ563J- | R CARBON FILM | 1/6 56K OHM J | |
| R823 | RD-4Z332J- | R CARBON FILM | 1/4 3.3K OHM J | |
| R827 | RD-AZ103J- | R CARBON FILM | 1/6 10K OHM J | |
| R828 | RD-4Z153J- | R CARBON FILM | 1/4 15K OHM J | |
| R829 | RD-AZ103J- | R CARBON FILM | 1/6 10K OHM J | |
| R830 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R831 | RD-AZ472J- | R CARBON FILM | 1/6 4.7K OHM J | |
| R832 | RD-AZ473J- | R CARBON FILM | 1/6 47K OHM J | |
| R834 | RD-4Z470J- | R CARBON FILM | 1/4 47 OHM J | |
| R870 | RD-4Z102J- | R CARBON FILM | 1/4 1K OHM J | |
| R883 | RD-AZ103J- | R CARBON FILM | 1/6 10K OHM J | |
| R884 | RD-AZ103J- | R CARBON FILM | 1/6 10K OHM J | |
| RA01 | RD-AZ220J- | R CARBON FILM | 1/6 22 OHM J | |
| RA10 | RD-AZ103J- | R CARBON FILM | 1/6 10K OHM J | |
| RA13 | RD-AZ332J- | R CARBON FILM | 1/6 3.3K OHM J | |
| RA15 | RD-AZ680J- | R CARBON FILM | 1/6 68 OHM J | |
| RA16 | RD-AZ750J- | R CARBON FILM | 1/6 75 OHM J | |
| RA32 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| RA35 | RD-AZ750J- | R CARBON FILM | 1/6 75 OHM J | |
| RA88 | RD-AZ750J- | R CARBON FILM | 1/6 75 OHM J | |
| RP03 | RD-4Z102J- | R CARBON FILM | 1/4 1K OHM J | |
| RP06 | RD-4Z472J- | R CARBON FILM | 1/4 4.7K OHM J | |
| RP08 | RD-4Z361J- | R CARBON FILM | 1/4 360 OHM J | |
| RP10 | RD-2Z472J- | R CARBON FILM | 1/2 4.7K OHM J | |
| RP12 | RD-4Z470J- | R CARBON FILM | 1/4 47 OHM J | |
| RP13 | RD-2Z101J- | R CARBON FILM | 1/2 100 OHM J | |
| ZZ400 | PTCPMST2950FS | PCB CRT MANUAL AS | DTF-2950FZS-SB | |
| C900 | CCXB3D102K | C CERA | 2KV B 1000 PF K (TAPPING) | |
| C910 | CEXF2E479V | C ELECTRO | 250V RSS 4.7MF (10X16)TP | |
| C997 | CEXF2E100V | C ELECTRO | 250V RSS 10MF (10X20) TP | |
| I901 | 1TDA6108JF | IC VIDEO | TDA6108JF | |
| I901A | 4857025401 | HEAT SINK | A1050P-H24 T2 | |
| I901B | 7174300851 | SCREW TAPPTITE | TT2 RND 3X8 MFZN 3CR | |
| P401A | 4859231820 | CONN WAFER | YW025-05 | |
| P501A | 4859235120 | CONN WAFER | YW025-08 | |
| P903 | 4859238620 | CONN WAFER | YPW500-02 | |
| R906 | RF02Y629J- | R FUSIBLE | 2W 6.2 OHM J | |
| SCT1 | 4859304130 | SOCKET CRT | ISHG93S | ⚠ |
| ZZ200 | PTCPJRT2950FS | PCB CRT RADIAL AS | DTF-2950FZS-SB | |
| C902 | CMXL2E104K | C MYLAR | 250V 0.1MF K MEU TP | |
| C921 | CMXM2A102J | C MYLAR | 100V 1000PF J TP | |
| C922 | CMXM2A102J | C MYLAR | 100V 1000PF J TP | |
| C923 | CMXM2A102J | C MYLAR | 100V 1000PF J TP | |
| G900 | 4SG0DX0001 | SPARK GAP | SSG-102-A1 (1.0KV) | |
| G901 | 4SG0DX0001 | SPARK GAP | SSG-102-A1 (1.0KV) | |
| G902 | 4SG0DX0001 | SPARK GAP | SSG-102-A1 (1.0KV) | |
| G903 | 4SG0DX0001 | SPARK GAP | SSG-102-A1 (1.0KV) | |
| Q921 | TBF423—— | TR | BF423 TO-92 | |
| Q922 | TBF423—— | TR | BF423 TO-92 | |
| Q923 | TBF423—— | TR | BF423 TO-92 | |
| R905 | RN02B102JS | R METAL FILM | 2W 1K OHM J SMALL | |
| ZZ200 | PTCPJAT2950FS | PCB CRT AXIAL AS | DTF-2950FZS-SB | |
| A001 | 4859829013 | PCB CRT | CP-830/830F (DTG/DTH) | ⚠ |
| D911 | D1N4004S— | DIODE | 1N4004S | |
| D912 | D1N4004S— | DIODE | 1N4004S | |
| D913 | D1N4004S— | DIODE | 1N4004S | |
| D921 | D1N4004S— | DIODE | 1N4004S | |
| D922 | D1N4004S— | DIODE | 1N4004S | |
| D923 | D1N4004S— | DIODE | 1N4004S | |
| D997 | DLT2A05G— | DIODE | LT2A05G | |
| R901 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R902 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|---|---|---|---|---|
| R903 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R911 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R912 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R913 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R921 | RC-2Z102K- | R CARBON COMP | 1/2 1K OHM K | |
| R922 | RC-2Z102K- | R CARBON COMP | 1/2 1K OHM K | |
| R923 | RC-2Z102K- | R CARBON COMP | 1/2 1K OHM K | |
| R931 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R932 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R933 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R996 | RD-2Z105J- | R CARBON FILM | 1/2 1M OHM J | |
| R997 | RD-2Z102J- | R CARBON FILM | 1/2 1K OHM J | |
| ZZ140 | PTPKCPT2950F | PACKING AS | DTF-2950FZF-SB | |
| 10 | 6520010200 | STAPLE PIN | #3417 ALL | |
| M681 | 2TP06575CL | TAPE OPP | T0.065XW75X500M CLEAR | |
| M801 | DMP5018800 | BOX | DTL-2950 (NEW) | |
| M811 | 485819C900DN | PAD DOWN | 2950 EPS | |
| M811A | 485819C900UP | PAD UP | 2950 EPS | |
| M821 | 4858215601 | BAG P.E. | "PE FOAM T0.5X1600X1270 25"-28" | |

## 6.2 DTF-2930

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|---|---|---|---|---|
| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
| ZZ100 | PTACPWT2950F | ACCESSORY AS | DTF-2950FZF-SB | |
| 12000 | 48B5849C1001 | TRANSMITTER REMOCON | R-49C10 | |
| 13000 | 4850Q00910 | BATTERY | AAA R03 SUPERGARD/ROCKET | |
| 14000 | 4858213801 | BAG INSTRUCTION | L. D. P. E. T0. 05X250X400 | |
| ZZ120 | PTBCSHL2950S | COVER BACK AS | DTL-2950FZF-S | |
| M211 | 4852174911 | COVER BACK | 2950 HIPS GY8301A | |
| M211D | 4857817610 | CLOTH BLACK | "300 MM 20"" | |
| M541 | 4855415800 | S/PLATE | 150ART P/E FILM (C/TV) | |
| M542 | 4855800022P1 | LABEL SERIAL | ART 90 55X34 | |
| ZZ130 | PTCACAF2930FSS | CABINET AS | DTF-2930FZS-SB | |
| M201A | 4856017752 | SCREW CRT FIX | 6X35 L120 YL 3CR | |
| M201B | 4856219502 | WASHER RUBBER | CR T2.0 BLACK | |
| M201C | 7178301051 | SCREW TAPPTITE | TT2 WAS 3X10 MFZN 3CR | |
| M201D | 4856017800 | SCREW SPKR FIX | SWRM+SECC 3CR | |
| M201E | 7178301051 | SCREW TAPPTITE | TT2 WAS 3X10 MFZN 3CR | |
| M211A | 7172401652 | SCREW TAPPTITE | TT2 TRS 4X16 MFZN BK 3CR | |
| M211B | 7172401252 | SCREW TAPPTITE | TT2 TRS 4X12 MFZN BK 3CR | |
| M352 | 2TF01612CL | TAPE FILAMENT | 12MMX55ME CLEAR | |
| M481 | 485487141101 | BUTTON POWER | 2930 GY340A+SV2405BP | |
| M481A | 4856716000 | SPRING | 14Q1/M3 SWPA PIE0.5 | |
| M561 | 48556293SD02 | MARK BRAND | "DAEWOO 25""29""32"" NEW" | |
| PWC1 | 4859906210 | CORD POWER | W/F 6-LO (LOMAX NEW) | ⚠ |
| SP01A | 4856017800 | SCREW SPKR FIX | SWRM+SECC 3CR | |
| SP02A | 4856017800 | SCREW SPKR FIX | SWRM+SECC 3CR | |
| V901 | 4859951760 | "CRT (SAMSUNG 29"")" | A68QFZ893X002 | ⚠ |
| V901A | 4857824500 | CLOTH BLACK | FELT T1.0 L=500 W=35 | |
| V901B | 4857824500 | CLOTH BLACK | FELT T1.0 L=500 W=35 | |
| ZZ131 | 58G0000182 | COIL DEGAUSSING | DC-29SF AL | ⚠ |
| ZZ132 | 48519A7810 | CRT GROUND AS | 2903S-1015-1P | |
| ZZ200 | PTFMSJF2930S | MASK FRONT AS | DTF-2930FZS-SB | |
| M201 | 4TB2M926A305 | MASK FRONT | 2930 HIPS GY+SV/BK(100HZ) | |
| ZZ201 | PTSPPWT2950F | SPEAKER AS | DTF-2950FZF-SB | |
| 51100 | 4850704S28 | CONN AS | YH025-04+35089+ULW=600 | |
| SP01 | 48A8311400 | SPEAKER SYSTEM | SS-58126F04C | |
| SP02 | 48A8311400 | SPEAKER SYSTEM | SS-58126F04C | |
| ZZ280 | PTU1MSF2930FS | PCB UNION MANUAL AS | DTF-2930FZS-SB | |
| C801 | CL1UC3474M | C LINE ACROSS | 0.47MF 1J(UCVSNDF/SV | ⚠ |
| DL01 | DH1L25RS— | LED(RED) | HI-L25RS | |
| DL02 | DH1L25G— | "LED (R,G-3 COLOR)" | HI-L25G | |
| F801 | 5FSCB4022R | FUSE CERA | SEMKO F4AH 4A 250V MF51 | ⚠ |
| HP01 | 4859105240 | JACK PHONO | LGT1516-0100 | |
| I703 | 1TS0P4838Y | IC PREAMP | TSOP34838YA1 | |
| JPA3 | 4859105450 | JACK PIN BOARD | YSC03P-4120-9S | |
| JPA4 | 4859105340 | JACK S-VHS | DSW-10 (STRAIGHT) | |
| LF801 | 5PLF24A3— | FILTER LINE | LF-24A3 | ⚠ |
| LF802 | 58C0000153 | COIL CHOKE PFC | 6001.0016B | ⚠ |
| M191 | 485195711106 | DECO SENSOR AS | 2930 3568811+5556000 | |
| M231 | 485233251102 | PANEL CTRL | 2950 ABS GY | |
| M231A | 7178301051 | SCREW TAPPTITE | TT2 WAS 3X10 MFZN 3CR | |
| M491 | 485496331101 | BUTTON CTRL | 2950 ABS GY | |
| P702A | 4850703N43 | CONNECTOR | YH025-03+YBH250-03+ULW=500 | |
| P703A | 4850704S02 | CONN AS | YH025-04+YST025+ULW=200 | |
| P801 | 4859287320 | CONN WAFER | MKS2822 (LOMAX NEW TYPE) | |
| P803 | 4859238620 | CONN WAFER | YPW500-02 | |
| PA01A | 4950712003 | CONNECTOR | YH025-12+YST250+ULW=450 | |
| SW801 | 5S40101146 | SW POWER PUSH | SS-160-7-B | ⚠ |
| ZZ200 | PTU1JBT2950FF | PCB UNION EYE LET AS | DTF-2950FZF-SB | |
| E1 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E2 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E3 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E4 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E5 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E6 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E7 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| ZZ200 | PTU1JRT2950FF | PCB UNION RADIAL AS | DTF-2950FZF-SB | |
| C690 | CEXF1H479V | C ELECTRO | 50V RSS 4.7MF (5*11) TP | |
| C691 | CEXF1H479V | C ELECTRO | 50V RSS 4.7MF (5*11) TP | |
| C770 | CEXF1C101V | C ELECTRO | 16V RSS 100MF (6.3X11) TP | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|---|---|---|---|---|
| CA21 | CCXB1H472K | C CERA | 50V B 4700PF K (TAPPING) | |
| F801A | 4857415001 | CLIP FUSE | PFC5000-0702 | |
| F801B | 4857415001 | CLIP FUSE | PFC5000-0702 | |
| Q506 | T2SC5343Y- | TR | 2SC5343Y | |
| Q507 | T2SA1980Y- | TR | 2SA1980Y | |
| SW700 | 5S50101Z90 | SW TACT | SKHV10910A | |
| SW701 | 5S50101Z90 | SW TACT | SKHV10910A | |
| SW702 | 5S50101Z90 | SW TACT | SKHV10910A | |
| SW703 | 5S50101Z90 | SW TACT | SKHV10910A | |
| SW704 | 5S50101Z90 | SW TACT | SKHV10910A | |
| SW705 | 5S50101Z90 | SW TACT | SKHV10910A | |
| Z601 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | |
| Z602 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | |
| Z603 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | |
| Z604 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | |
| ZZ200 | PTU1JAT2950FF | PCB UNION AXIAL AS | DTF-2950FZF-SB | |
| 10 | 2TM14006LB | TAPE MASKING | 3M #232 6.0X2000M (WITH GLUE) | |
| 20 | 2TM10006LB | TAPE MASKING | 3M #232-MAP-C 6.2X2000M (W/O GLUE) | |
| A001 | 4859816424 | PCB UNION | CP-650/850FX 246X246(120X210X2)D1B | ⚠ |
| C608 | CCZB1H471K | C CERA | 50V B 470PF K (AXIAL) | |
| C609 | CCZB1H471K | C CERA | 50V B 470PF K (AXIAL) | |
| CA20 | CCZL1H472K | C CERA | 50V B 4700PF K AXL (1608) | |
| DA21 | CCZB1H471K | C CERA | 50V B 470PF K (AXIAL) | |
| DA22 | CCZB1H471K | C CERA | 50V B 470PF K (AXIAL) | |
| J001 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| L701 | 5CPZ560K02 | COIL PEAKING | 56UH 3.5MM K (LAL02TB) | |
| R530 | RD-AZ151J- | R CARBON FILM | 1/6 150 OHM J | |
| R531 | RD-AZ750J- | R CARBON FILM | 1/6 75 OHM J | |
| R532 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R533 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R608 | RD-2Z151J- | R CARBON FILM | 1/2 150 OHM J | |
| R609 | RD-2Z151J- | R CARBON FILM | 1/2 150 OHM J | |
| R701 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R721 | RD-AZ181J- | R CARBON FILM | 1/6 180 OHM J | |
| R722 | RD-AZ221J- | R CARBON FILM | 1/6 220 OHM J | |
| R723 | RD-AZ331J- | R CARBON FILM | 1/6 330 OHM J | |
| R724 | RD-AZ471J- | R CARBON FILM | 1/6 470 OHM J | |
| R725 | RD-AZ681J- | R CARBON FILM | 1/6 680 OHM J | |
| R802 | RD-2Z824J- | R CARBON FILM | 1/2 820K OHM J | |
| RA22 | RD-AZ750J- | R CARBON FILM | 1/6 75 OHM J | |
| ZZ290 | PTMPMST2950FS | PCB MAIN MANUAL AS | DTF-2950FZS-SB | |
| 10 | 2193110001 | SOLDER WIRE | SN-3.0AG (NP303T) 3.0 | |
| 20 | 2193110002 | SOLDER WIRE | SN-3.0AG-0.5CU (DHB-RMA3) | |
| 30 | 2291050620 | FLUX SOLDER | DF-2810U (0.810) | |
| 40 | 2291050314 | FLUX SOLVENT | IM-1000 | |
| C315 | CEXF2A470V | C ELECTRO | 100V RSS 47MF (10X16) TP | |
| C402 | CMYH3C752J | C MYLAR | 1.6KV 7500PF J (BUP) | |
| C404 | CMYH3C562J | C MYLAR | 1.6KV 5600PF J (BUP) | |
| C405 | CMXE2G243J | C MYLAR | 400V PU 0.024MF J | |
| C408 | CMYE2G184J | C MYLAR | 400V PU 0.18MF J | |
| C411 | CMYF2E105J | C MYLAR | 250V MPP 1MF J | |
| C415 | CEXF2E100V | C ELECTRO | 250V RSS 10MF (10X20) TP | |
| C418 | CEYD1H689W | C ELECTRO | 50V RHD 6.8MF (16X35.5) | |
| C604 | CEXF1E102V | C ELECTRO | 25V RSS 1000MF (13X20) TP | |
| C805 | CEYD2G181D | C ELECTRO | 400V FHS 180MF | |
| C812 | CH1BFE472M | C CERA AC | AC400V 4700PF M U/C/V | ⚠ |
| C813 | CEXF2E101V | C ELECTRO | 250V RSS 100MF 18X35.5 | |
| C814 | CEYF2E470V | C ELECTRO | 250V RSS 47MF (16X25 | |
| C820 | CCXR3D221K | C CERA | 2KV R 220PF K125C | |
| C823 | CEXF1E222V | C ELECTRO | 25V RSS 2200MF (16X25) TP | |
| C840 | CEXF1C102V | C ELECTRO | 16V RSS 1000MF (10X20) TP | |
| C861 | CEXF1E102C | C ELECTRO | 25V RSS 1000MF 13X20 TP | |
| C899 | CMXF2J333J | C MYLAR | 630V MPP 0.033MF J | |
| CP01 | CMYF2G224J | C MYLAR | 400V MPU 0.22MF J | |
| CP02 | CMXE2J222J | C MYLAR | 630V PU 2200PF | |
| CP04 | CEXF1H221V | C ELECTRO | 50V RSS 220MF (10X16) TP | |
| CP07 | CMYF2J154J | C MYLAR | 630V MPP 0.15MF J | |
| D401 | DDTV1500MD | DIODE | DTV1500MD TO-220AC01 | |
| D404 | DFMP3FU—- | DIODE | FMP3FU | |
| D404A | 4857027603 | HEAT SINK | AL EX | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|---|---|---|---|---|
| D404B | 7174301051 | SCREW TAPPTITE | TT2 RND 3X10 MFZN 3CR | |
| D406 | DRGP30J— | DIODE | RGP30J | |
| D820 | DRGP30J— | DIODE | RGP30J | |
| D860 | DRGP30J— | DIODE | RGP30J | |
| D870 | DRGP30J— | DIODE | RGP30J | |
| I301 | 1TDA8358J- | IC VERTICAL | TDA8358J | |
| I301A | 4857028219 | HEAT SINK | AL EX ANODIZING | |
| I301B | 7174301051 | SCREW TAPPTITE | TT2 RND 3X10 MFZN 3CR | |
| I601 | 1MSP3410V3 | IC SOUND | MSP3410G-V3 | |
| I602 | 1TDA8946J- | IC AUDIO | TDA8946J | |
| I602A | 4857028215 | HEAT SINK | AL EX NO ANODOZING | |
| I602B | 7174301051 | SCREW TAPPTITE | TT2 RND 3X10 MFZN 3CR | |
| I701 | 1SDA555XFL | IC MICOM OTP | SDA555XFL/PO | |
| I702 | 1M24C16BN6 | IC MEMORY | M24C16WRN6 | |
| I801 | 1STRW6754- | IC POWER | STR-W6754 | |
| I801A | 4857024600 | HEAT SINK | AL EX B/K | |
| I801B | 7174300851 | SCREW TAPPTITE | TT2 RND 3X8 MFZN 3CR | |
| I804 | 1LTV817C— | IC PHOTO COUPLER | LTV-817C | ⚠ |
| I806 | 1DP125—— | IC ERROR AMP | DP125 | |
| I820 | 1S7805P1C- | IC REGULATOR | S7805PIC 5.0V 1.0A | |
| I821 | 1K78R33— | IC REGULATOR | KIA78R33AP | |
| I822 | 1K78R08— | IC REGULATOR | KIA78R08API | |
| I822A | 4857026900 | HEAT SINK | AL EX | |
| I822B | 7174300851 | SCREW TAPPTITE | TT2 RND 3X8 MFZN 3CR | |
| I824 | 1K78R018P1 | IC REGULATOR | KIA78R018PI | |
| I825 | 1K78R05— | IC REGULATOR | KIA78R05PI | |
| I826 | 1A1117P133 | IC REGULATOR | KIA1117PI33 3.3V TO-220IS | |
| JPA1 | 4859200401 | SOCKET RGB | SR-21A1 (ANGLE TYPE) | |
| JPA2 | 4859200401 | SOCKET RGB | SR-21A1 (ANGLE TYPE) | |
| L150 | 58E0000041 | COIL AFT | TRF-A005 | |
| L401 | 58H0000054 | COIL H-LINEARITY | TRL-040F | |
| L403 | 58C0000130 | COIL CHOKE | CH-161A | |
| P401 | 4850705S04 | CONN AS | YH025-05+YST025+ULW=400 | |
| P402 | 4859242420 | CONN WAFER | YFW800-04 | |
| P404 | 4859242220 | CONN WAFER | YFW800-02 | |
| P501 | 4850708N15 | CONNECTOR | YH025-08+YBNH250+USW=600 | |
| P601 | 4859231720 | CONN WAFER | YW025-04 | |
| P702 | 4859231620 | CONN WAFER | YW025-03 | |
| P703 | 4859231720 | CONN WAFER | YW025-04 | |
| P802 | 4859242220 | CONN WAFER | YFW800-02 | |
| P804 | 4859238620 | CONN WAFER | YPW500-02 | |
| P804A | 4850702N08 | CONN AS | YPH500-02+YLT500+USW=300 | |
| PA01 | 4859235520 | CONN WAFER | YW025-12 | |
| Q401 | TST2310DH1 | TR | ST2310DHI | |
| Q401A | 4857033201 | HEAT SINK | AL EX BK (ANODIZING) | |
| Q401B | 7174301051 | SCREW TAPPTITE | TT2 RND 3X10 MFZN 3CR | |
| Q807 | TKTA1659AY | TR | KTA1659AY | |
| QP03 | T1RF640N— | FET | IRF640NPBF | |
| QP03A | 4857026900 | HEAT SINK | AL EX | |
| QP03B | 7174300851 | SCREW TAPPTITE | TT2 RND 3X8 MFZN 3CR | |
| R388 | RW02Y678FS | R WIRE WOUND | 2W 0.67 OHM F SMALL | |
| R399 | RS02Y829JS | R M-OXIDE FILM | 2W 8.2 OHM J SMALL | |
| R407 | RF01Y129JA | R FUSIBLE | 1W 1.2 OHM J A CURVE | |
| R444 | RS02Y330JS | R M-OXIDE FILM | 2W 33 OHM J SMALL | |
| R801 | DJ5020M270 | POSISTOR | J502P72D070M270 | ⚠ |
| R803 | RS02Y338JS | R M-OXIDE FILM | 2W 0.33 OHM J SMALL | |
| R806 | RS02Y228JS | R M-OXIDE FILM | 2W 0.22 OHM J SMALL | |
| R819 | RX07B339JP | R CEMENT | 7W 3.3 OHM J BEN 15MM 4P | |
| R841 | RS02Y309JS | R M-OXIDE FILM | 2W 3 OHM J SMALL | |
| R850 | RS02Y569JS | R M-OXIDE FILM | 2W 5.6 OHM J SMALL | |
| R852 | RS02Y569JS | R M-OXIDE FILM | 2W 5.6 OHM J SMALL | |
| R854 | RS02Y569JS | R M-OXIDE FILM | 2W 5.6 OHM J SMALL | |
| R885 | RS02Y339JS | R M-OXIDE FILM | 2W 3.3 OHM J SMALL | |
| R899 | RS02Y683J- | R M-OXIDE FILM | 2W 68K OHM J | |
| SF1 | 5PK3953M— | FILTER SAW | K3953M | |
| SF2 | 5PK9650M— | FILTER SAW | K9650M | |
| T401 | 50D25A2— | TRANS DRIVE | TD-25A2 | |
| T402 | 50H0000317 | FBT | 1372.0136 | ⚠ |
| T801 | 50M4818A2- | TRANS SMPS | 2094.0119 | ⚠ |
| U100 | 4859724930 | TUNER VARACTOR | UV1316/AI-4 | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|---|---|---|---|---|
| X501 | 5XE20R250E | CRYSTAL QUARTZ | HC-49/U 20.2500MHZ 30PPM | |
| X601 | 5XE18R432E | CRYSTAL QUARTZ | HC-49/U 18.43200MHZ 30PPM | |
| Y801 | 5SC0101003 | SW RELAY | DG12D1-0(M)-II 1C-1P | ⚠ |
| Z153 | 5PXXT5R5MB | FILTER CERA | XT 5.5MB (TAPPING) | |
| ZZ200 | PTMPJBT2950FS | PCB MAIN EYE LET AS | DTF-2950FZS-SB | |
| E1 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E10 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E11 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E12 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E13 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E14 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E15 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E16 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E17 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E18 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E19 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E2 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E20 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E21 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E22 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E23 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E24 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E25 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E26 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E27 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E28 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E29 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E3 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E30 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E31 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E32 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E33 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E34 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E35 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E36 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E37 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E38 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E39 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E4 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E40 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E41 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E42 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E43 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E48 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E49 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E5 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E50 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E51 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E52 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E53 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E54 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E56 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E57 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E58 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E6 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E62 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E63 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E7 | 4856310600 | EYE LET | BSR 2.3(R2.3) BIG | |
| E8 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| E9 | 4856310300 | EYE LET | BSR T0.2 (R1.6) SMALL | |
| ZZ200 | PTMPJ2T2950FS | PCB CHIP MOUNT B AS | DTF-2950FZS-SB | |
| CC01 | HCBK471KBA | C CHIP CERA | 50V X7R 470PF K 1608 | |
| CC02 | HCBK471KBA | C CHIP CERA | 50V X7R 470PF K 1608 | |
| CC03 | HCBK471KBA | C CHIP CERA | 50V X7R 470PF K 1608 | |
| CC04 | HCBK471KBA | C CHIP CERA | 50V X7R 470PF K 1608 | |
| CC05 | HCBK471KBA | C CHIP CERA | 50V X7R 470PF K 1608 | |
| CC06 | HCBK471KBA | C CHIP CERA | 50V X7R 470PF K 1608 | |
| CC07 | HCBK471KBA | C CHIP CERA | 50V X7R 470PF K 1608 | |
| CC08 | HCBK471KBA | C CHIP CERA | 50V X7R 470PF K 1608 | |
| CC10 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK | LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|---|---|---|---|---|---|---|---|---|---|
| CC101 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | CC701 | HCBK103KBA | C CHIP CERA | 50V X7R 0.01MF K 1608 | |
| CC103 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | CC709 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC110 | HCBK103KBA | C CHIP CERA | 50V X7R 0.01MF K 1608 | | CC710 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC115 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | | CC711 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC117 | HCBK103KBA | C CHIP CERA | 50V X7R 0.01MF K 1608 | | CC712 | HCQK151JBA | C CHIP CERA | 50V CH 150PF J 1608 | |
| CC119 | HCBK103KBA | C CHIP CERA | 50V X7R 0.01MF K 1608 | | CC713 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC127 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | CC714 | HCBK103KBA | C CHIP CERA | 50V X7R 0.01MF K 1608 | |
| CC129 | HCBK103KBA | C CHIP CERA | 50V X7R 0.01MF K 1608 | | CC715 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC13 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | CC716 | HCBK103KBA | C CHIP CERA | 50V X7R 0.01MF K 1608 | |
| CC136 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | | CC722 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC14 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | CC726 | HCQK330JBA | C CHIP CERA | 50V CH 33PF J 1608 | |
| CC15 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | CC727 | HCQK330JBA | C CHIP CERA | 50V CH 33PF J 1608 | |
| CC158 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | | CC730 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC16 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | CC737 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC160 | HCBK103KBA | C CHIP CERA | 50V X7R 0.01MF K 1608 | | CC742 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC166 | HCQK470JBA | C CHIP CERA | 50V CH 47PF J 1608 | | CC744 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | |
| CC17 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | CC777 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | |
| CC177 | HCQK470JBA | C CHIP CERA | 50V CH 47PF J 1608 | | IC101 | 14470MFLGD | IC CHIP VIDEO IF | TDA4470-MFLG3 | |
| CC18 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | IC501 | 1VSP9405C4 | IC CHIP VIDEO | VSP9405C4 | |
| CC19 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | IC502 | 1DDP3315CQ | IC CHIP | DDP3315CQ | |
| CC501 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | RC102 | HRFT561JBA | R CHIP | 1/10 560 OHM J 1608 | |
| CC502 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | RC106 | HRFT101JBA | R CHIP | 1/10 100 OHM J 1608 | |
| CC503 | HCFF334ZBA | C CHIP CERA | 16V Y5V 0.33MF Z 1608 | | RC107 | HRFT101JBA | R CHIP | 1/10 100 OHM J 1608 | |
| CC504 | HCQK100JBA | C CHIP CERA | 50V CH 10PF J 1608 | | RC109 | HRFT104JBA | R CHIP | 1/10 100K OHM J 1608 | |
| CC505 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | RC111 | HRFT113JBA | R CHIP | 1/10 11K OHM J 1608 | |
| CC506 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | | RC112 | HRFT223JBA | R CHIP | 1/10 22K OHM J 1608 | |
| CC507 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | RC114 | HRFT472JBA | R CHIP | 1/10 4.7K OHM J 1608 | |
| CC508 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | RC118 | HRFT151JBA | R CHIP | 1/10 150 OHM J 1608 | |
| CC509 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | RC119 | HRFT272JBA | R CHIP | 1/10 2.7K OHM J 1608 | |
| CC511 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | RC151 | HRFT102JBA | R CHIP | 1/10 1K OHM J 1608 | |
| CC512 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | RC159 | HRFT682JBA | R CHIP | 1/10 6.8K OHM J 1608 | |
| CC513 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | RC160 | HRFT472JBA | R CHIP | 1/10 4.7K OHM J 1608 | |
| CC514 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | | RC164 | HRFT752JBA | R CHIP | 1/10 7.5K OHM J 1608 | |
| CC515 | HCQK470JBA | C CHIP CERA | 50V CH 47PF J 1608 | | RC169 | HRFT222JBA | R CHIP | 1/10 2.2K OHM J 1608 | |
| CC516 | HCQK470JBA | C CHIP CERA | 50V CH 47PF J 1608 | | RC179 | HRFT222JBA | R CHIP | 1/10 2.2K OHM J 1608 | |
| CC517 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | | RC190 | HRFT221JBA | R CHIP | 1/10 220 OHM J 1608 | |
| CC518 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | | RC191 | HRFT331JBA | R CHIP | 1/10 330 OHM J 1608 | |
| CC521 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | | RC501 | HRFT221JBA | R CHIP | 1/10 220 OHM J 1608 | |
| CC522 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | | RC506 | HRFT750JBA | R CHIP | 1/10 75 OHM J 1608 | |
| CC523 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | | RC509 | HRFT472JBA | R CHIP | 1/10 4.7K OHM J 1608 | |
| CC524 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | RC513 | HRFT103JBA | R CHIP | 1/10 10K OHM J 1608 | |
| CC526 | HCQK220JBA | C CHIP CERA | 50V CH 22PF J 1608 | | RC516 | HRFT471JBA | R CHIP | 1/10 470 OHM J 1608 | |
| CC527 | HCQK220JBA | C CHIP CERA | 50V CH 22PF J 1608 | | RC517 | HRFT332JBA | R CHIP | 1/10 3.3K OHM J 1608 | |
| CC528 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | RC518 | HRFT151JBA | R CHIP | 1/10 150 OHM J 1608 | |
| CC549 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | | RC519 | HRFT151JBA | R CHIP | 1/10 150 OHM J 1608 | |
| CC550 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | | RC527 | HRFT333JBA | R CHIP | 1/10 33K OHM J 1608 | |
| CC551 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | | RC530 | HRFT103JBA | R CHIP | 1/10 10K OHM J 1608 | |
| CC552 | HCQK270JBA | C CHIP CERA | 50V CH 27PF J 1608 | | RC532 | HRFT223JBA | R CHIP | 1/10 22K OHM J 1608 | |
| CC553 | HCQK270JBA | C CHIP CERA | 50V CH 27PF J 1608 | | RC551 | HRFT471JBA | R CHIP | 1/10 470 OHM J 1608 | |
| CC556 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | RC560 | HRFT102JBA | R CHIP | 1/10 1K OHM J 1608 | |
| CC560 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | RC568 | HRFT102JBA | R CHIP | 1/10 1K OHM J 1608 | |
| CC561 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | | RC577 | HRFT151JBA | R CHIP | 1/10 150 OHM J 1608 | |
| CC567 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | RC578 | HRFT330JBA | R CHIP | 1/10 33 OHM J 1608 | |
| CC568 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | | RC579 | HRFT330JBA | R CHIP | 1/10 33 OHM J 1608 | |
| CC569 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | RC580 | HRFT821JBA | R CHIP | 1/10 820 OHM J 1608 | |
| CC570 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | | RC581 | HRFT102JBA | R CHIP | 1/10 1K OHM J 1608 | |
| CC578 | HCBK561KBA | C CHIP CERA | 50V X7R 560PF K 1608 | | RC582 | HRFT102JBA | R CHIP | 1/10 1K OHM J 1608 | |
| CC579 | HCBK561KBA | C CHIP CERA | 50V X7R 560PF K 1608 | | RC583 | HRFT102JBA | R CHIP | 1/10 1K OHM J 1608 | |
| CC589 | HCBK561KBA | C CHIP CERA | 50V X7R 560PF K 1608 | | RC584 | HRFT821JBA | R CHIP | 1/10 820 OHM J 1608 | |
| CC601 | HCBK472KBA | C CHIP CERA | 50V X7R 4700PF K 1608 | | RC585 | HRFT911JBA | R CHIP | 1/10 910 OHM J 1608 | |
| CC602 | HCBK472KBA | C CHIP CERA | 50V X7R 4700PF K 1608 | | RC586 | HRFT911JBA | R CHIP | 1/10 910 OHM J 1608 | |
| CC617 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | | RC587 | HRFT821JBA | R CHIP | 1/10 820 OHM J 1608 | |
| CC620 | HCQK309CBA | C CHIP CERA | 50V CH 3PF C 1608 | | RC589 | HRFT330JBA | R CHIP | 1/10 33 OHM J 1608 | |
| CC621 | HCQK309CBA | C CHIP CERA | 50V CH 3PF C 1608 | | RC591 | HRFT393JBA | R CHIP | 1/10 39K OHM J 1608 | |
| CC622 | HCQK680JBA | C CHIP CERA | 50V CH 68PF J 1608 | | RC595 | HRFT271JBA | R CHIP | 1/10 270 OHM J 1608 | |
| CC629 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | | RC598 | HRFT271JBA | R CHIP | 1/10 270 OHM J 1608 | |
| CC631 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | | RC611 | HRFT224JBA | R CHIP | 1/10 220K OHM J 1608 | |
| CC635 | HCBK104KBA | C CHIP CERA | 50V X7R 0.1MF K 1608 | | RC661 | HRFT512JBA | R CHIP | 1/10 5.1K OHM J 1608 | |
| CC665 | HCBK222KBA | C CHIP CERA | 50V X7R 2200PF K 1608 | | RC662 | HRFT512JBA | R CHIP | 1/10 5.1K OHM J 1608 | |
| CC667 | HCBK222KBA | C CHIP CERA | 50V X7R 2200PF K 1608 | | RC701 | HRFT103JBA | R CHIP | 1/10 10K OHM J 1608 | |
| CC680 | HCBK102KBA | C CHIP CERA | 50V X7R 1000PF K 1608 | | RC708 | HRFT472JBA | R CHIP | 1/10 4.7K OHM J 1608 | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|-----|-----------|-----------|-------------|--------|
| RC715 | HRFT103JBA | R CHIP | 1/10 10K OHM J 1608 | |
| RC716 | HRFT113JBA | R CHIP | 1/10 11K OHM J 1608 | |
| RC725 | HRFT103JBA | R CHIP | 1/10 10K OHM J 1608 | |
| RC729 | HRFT103JBA | R CHIP | 1/10 10K OHM J 1608 | |
| RC730 | HRFT223JBA | R CHIP | 1/10 22K OHM J 1608 | |
| RC731 | HRFT223JBA | R CHIP | 1/10 22K OHM J 1608 | |
| RC732 | HRFT103JBA | R CHIP | 1/10 10K OHM J 1608 | |
| RC733 | HRFT473JBA | R CHIP | 1/10 47K OHM J 1608 | |
| RC737 | HRFT682JBA | R CHIP | 1/10 6.8K OHM J 1608 | |
| RC738 | HRFT000-BA | R CHIP | 1/10 0 OHM 1608 | |
| RC739 | HRFT000-BA | R CHIP | 1/10 0 OHM 1608 | |
| RC740 | HRFT000-BA | R CHIP | 1/10 0 OHM 1608 | |
| RC741 | HRFT682JBA | R CHIP | 1/10 6.8K OHM J 1608 | |
| RC742 | HRFT682JBA | R CHIP | 1/10 6.8K OHM J 1608 | |
| RC743 | HRFT682JBA | R CHIP | 1/10 6.8K OHM J 1608 | |
| RC750 | HRFT183JBA | R CHIP | 1/10 18K OHM J 1608 | |
| RC770 | HRFT332JBA | R CHIP | 1/10 3.3K OHM J 1608 | |
| RC799 | HRFT472JBA | R CHIP | 1/10 4.7K OHM J 1608 | |
| RC881 | HRFT103JBA | R CHIP | 1/10 10K OHM J 1608 | |
| RC882 | HRFT103JBA | R CHIP | 1/10 10K OHM J 1608 | |
| ZZ200 | PTMPJRT2950FS | PCB MAIN RADIAL AS | DTF-2950FZS-SB | |
| C102 | CEXF1E470V | C ELECTRO | 25V RSS 47MF (5X11) TP | |
| C106 | CEXF1C221V | C ELECTRO | 16V RSS 220MF (8X11.5) TP | |
| C117 | CEXF1H229V | C ELECTRO | 50V RSS 2.2MF (5X11) TP | |
| C118 | CMXL1J474J | C MYLAR | 63V 0.47MF MKT | |
| C120 | CXRH1H150J | C CERA | 50V RH 15PF J (TAPPING) | |
| C121 | CEXF1E470V | C ELECTRO | 25V RSS 47MF (5X11) TP | |
| C150 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C152 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C153 | CEXF1H229V | C ELECTRO | 50V RSS 2.2MF (5X11) TP | |
| C157 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C164 | CEXF1E470V | C ELECTRO | 25V RSS 47MF (5X11) TP | |
| C188 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C301 | CMXM2A224J | C MYLAR | 100V 0.22MF J | |
| C305 | CEXF1E221V | C ELECTRO | 25V RSS 220MF (8X11.5) TP | |
| C313 | CMXM2A104J | C MYLAR | 100V 0.1MF J TP | |
| C320 | CBXF1H104Z | C CERA SEMI | 50V F 0.1MF Z (TAPPING) | |
| C340 | CMXM2A683J | C MYLAR | 100V 0.068MF J TP | |
| C350 | CMXM2A223J | C MYLAR | 100V 0.022MF J TP | |
| C351 | CMXM2A223J | C MYLAR | 100V 0.022MF J TP | |
| C401 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| C410 | CCXB2H681K | C CERA | 500V B 680PF K (TAPPING) | |
| C416 | CCXB2H471K | C CERA | 500V B 470PF K (TAPPING) | |
| C417 | CMXM2A392J | C MYLAR | 100V 3900PF J TP | |
| C420 | CMXM2A273J | C MYLAR | 100V 0.027MF J TP | |
| C424 | CMXM2A333J | C MYLAR | 100V 0.033MF J TP | |
| C425 | CCXB1H472K | C CERA | 50V B 4700PF K (TAPPING) | |
| C501 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C502 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C503 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C504 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C505 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C506 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C524 | CEXF1E470V | C ELECTRO | 25V RSS 47MF (5X11) TP | |
| C530 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C550 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C551 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C560 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| C561 | CEXF1H339V | C ELECTRO | 50V RSS 3.3MF (5X11) TP | |
| C568 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| C590 | CEXF1H479V | C ELECTRO | 50V RSS 4.7MF (5*11) TP | |
| C602 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| C605 | CEXF1E470V | C ELECTRO | 25V RSS 47MF (5X11) TP | |
| C608 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C610 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C611 | CEXF1H339V | C ELECTRO | 50V RSS 3.3MF (5X11) TP | |
| C612 | CEXF1H109V | C ELECTRO | 50V RSS 1MF (5X11) TP | |
| C613 | CEXF1H109V | C ELECTRO | 50V RSS 1MF (5X11) TP | |
| C614 | CEXF1H109V | C ELECTRO | 50V RSS 1MF (5X11) TP | |
| C615 | CEXF1H109V | C ELECTRO | 50V RSS 1MF (5X11) TP | |
| C616 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|-----|-----------|-----------|-------------|--------|
| C623 | CEXF1H109V | C ELECTRO | 50V RSS 1MF (5X11) TP | |
| C624 | CEXF1H109V | C ELECTRO | 50V RSS 1MF (5X11) TP | |
| C625 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| C626 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| C627 | CEXF1H479V | C ELECTRO | 50V RSS 4.7MF (5*11) TP | |
| C630 | CEXF1E470V | C ELECTRO | 25V RSS 47MF (5X11) TP | |
| C634 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C636 | CEXF1E470V | C ELECTRO | 25V RSS 47MF (5X11) TP | |
| C641 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| C642 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| C660 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C661 | CMXM2A224J | C MYLAR | 100V 0.22MF J | |
| C662 | CMXM2A224J | C MYLAR | 100V 0.22MF J | |
| C666 | CBXF1H104Z | C CERA SEMI | 50V F 0.1MF Z (TAPPING) | |
| C668 | CMXM2A224J | C MYLAR | 100V 0.22MF J | |
| C669 | CMXM2A224J | C MYLAR | 100V 0.22MF J | |
| C709 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| C711 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| C713 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C730 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C733 | CEXF1H229V | C ELECTRO | 50V RSS 2.2MF (5X11) TP | |
| C737 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C742 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C744 | CEXF1E100V | C ELECTRO | 25V RSS 10MF TP | |
| C803 | CCXF3A472Z | C CERA | 1KV F 4700PF Z (T) | |
| C804 | CCXF3A472Z | C CERA | 1KV F 4700PF Z (T) | |
| C806 | CCXR3A102K | C CERA | 1KV R 1000PF (T) 125C | |
| C807 | CEXF1H109V | C ELECTRO | 50V RSS 1MF (5X11) TP | |
| C810 | CEXF1H100V | C ELECTRO | 50V RSS 10MF (5X11) TP | |
| C811 | CMXM2A473J | C MYLAR | 100V 0.047MF J TP | |
| C830 | CEXF1H479V | C ELECTRO | 50V RSS 4.7MF (5*11) TP | |
| C831 | CEXF1H109V | C ELECTRO | 50V RSS 1MF (5X11) TP | |
| C833 | CCXB1H821K | C CERA | 50V B 820PF K (TAPPING) | |
| C835 | CEXF1E470V | C ELECTRO | 25V RSS 47MF (5X11) TP | |
| C845 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| C846 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| C847 | CEXF1H100V | C ELECTRO | 50V RSS 10MF (5X11) TP | |
| C850 | CEXF1H100V | C ELECTRO | 50V RSS 10MF (5X11) TP | |
| C853 | CCXF3A472Z | C CERA | 1KV F 4700PF Z (T) | |
| C854 | CCXF3A472Z | C CERA | 1KV F 4700PF Z (T) | |
| C863 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| C864 | CEXF1H100V | C ELECTRO | 50V RSS 10MF (5X11) TP | |
| C865 | CEXF1H100V | C ELECTRO | 50V RSS 10MF (5X11) TP | |
| C866 | CCXR3A471K | C CERA | 1KV R 470PF K 125C | |
| C871 | CEXF1C471V | C ELECTRO | 16V RSS 470MF (10X12.5)TP | |
| C880 | CEXF1E101V | C ELECTRO | 25V RSS 100MF (6.3X11) TP | |
| C888 | CEXF1E220V | C ELECTRO | 25V RSS 22MF TP | |
| CP05 | CEXF1H100V | C ELECTRO | 50V RSS 10MF (5X11) TP | |
| CP06 | CCXB3A102K | C CERA | 1KV B 1000PF K (TAPPING) | |
| I704 | 1K1A7025AP | IC RESET | KIA7025AP | |
| L101 | 5CPX479K— | COIL PEAKING | 4.7UH K RADIAL | |
| L380 | 58C0000116 | COIL BEAD | HC-3550R | |
| L381 | 58C0000116 | COIL BEAD | HC-3550R | |
| L802 | 58CX430599 | COIL CHOKE | AZ-9004Y 940K TP | |
| Q103 | T2SC5343Y- | TR | 2SC5343Y | |
| Q104 | T2SC5343Y- | TR | 2SC5343Y | |
| Q110 | T2SC5343Y- | TR | 2SC5343Y | |
| Q150 | T2SC5343Y- | TR | 2SC5343Y | |
| Q151 | T2SC5343Y- | TR | 2SC5343Y | |
| Q333 | T2SC5343Y- | TR | 2SC5343Y | |
| Q334 | T2SC5343Y- | TR | 2SC5343Y | |
| Q402 | T2SD1207T- | TR | 2SD1207-T (TAPPING) | |
| Q502 | T2SC5343Y- | TR | 2SC5343Y | |
| Q503 | T2SC5343Y- | TR | 2SC5343Y | |
| Q504 | T2SA1980Y- | TR | 2SA1980Y | |
| Q542 | T2SA1980Y- | TR | 2SA1980Y | |
| Q543 | T2SA1980Y- | TR | 2SA1980Y | |
| Q544 | T2SA1980Y- | TR | 2SA1980Y | |
| Q550 | T2SC5343Y- | TR | 2SC5343Y | |
| Q601 | T2SA1980Y- | TR | 2SA1980Y | |
| Q602 | T2SC5343Y- | TR | 2SC5343Y | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK | LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|---|---|---|---|---|---|---|---|---|---|
| Q603 | T2SA1980Y- | TR | 2SA1980Y | | D410 | D1N4937G— | DIODE | 1N4937G | |
| Q604 | T2SC5343Y- | TR | 2SC5343Y | | D414 | D1N4004S— | DIODE | 1N4004S | |
| Q605 | T2SC5343Y- | TR | 2SC5343Y | | D415 | D1N4937G— | DIODE | 1N4937G | |
| Q730 | T2SC5343Y- | TR | 2SC5343Y | | D530 | D1N4148—- | DIODE | 1N4148 (TAPPING) | |
| Q731 | T2SC5343Y- | TR | 2SC5343Y | | D531 | D1N4148—- | DIODE | 1N4148 (TAPPING) | |
| Q809 | T2SC5343Y- | TR | 2SC5343Y | | D535 | D1N4148—- | DIODE | 1N4148 (TAPPING) | |
| Q810 | T2SC5343Y- | TR | 2SC5343Y | | D540 | D1N4148—- | DIODE | 1N4148 (TAPPING) | |
| Q812 | TKTC3203Y- | TR | KTC3203-Y | | D541 | D1N4148—- | DIODE | 1N4148 (TAPPING) | |
| QP01 | T2SD1207T- | TR | 2SD1207-T (TAPPING) | | D550 | D1N4148—- | DIODE | 1N4148 (TAPPING) | |
| QP02 | T2SC5343Y- | TR | 2SC5343Y | | D551 | D1N4148—- | DIODE | 1N4148 (TAPPING) | |
| R331 | RN02B561JS | R METAL FILM | 2W 560 OHM J SMALL | | D602 | D1N4148—- | DIODE | 1N4148 (TAPPING) | |
| R332 | RN02B561JS | R METAL FILM | 2W 560 OHM J SMALL | | D603 | D1N4148—- | DIODE | 1N4148 (TAPPING) | |
| R401 | RN02B360JS | R METAL FILM | 2W 36 OHM J SMALL | | D701 | D1N4148—- | DIODE | 1N4148 (TAPPING) | |
| R402 | RN02B360JS | R METAL FILM | 2W 36 OHM J SMALL | | D702 | D1N4148—- | DIODE | 1N4148 (TAPPING) | |
| R410 | RN02B473JS | R METAL FILM | 2W 47K OHM J SMALL | | D720 | DTZX2V7A— | DIODE ZENER | TZX2V7A (TAPPING) | |
| R415 | RN02B561JS | R METAL FILM | 2W 560 OHM J SMALL | | D730 | DTZX7V5C— | DIODE ZENER | TZX7V5C (TAPPING) | |
| RP04 | RN02B753JS | R METAL FILM | 2W 75K OHM J SMALL | | D777 | DTZX5V6B— | DIODE ZENER | TZX5V6B (TAPPING) | |
| RP05 | RN02B333JS | R METAL FILM | 2W 33K OHM J SMALL | | D801 | DLT2A05G— | DIODE | LT2A05G | |
| RP14 | RN01B124JS | R METAL FILM | 1W 120K OHM J SMALL | | D802 | DLT2A05G— | DIODE | LT2A05G | |
| X502 | 5XEX5R000E | CRYSTAL QUARTZ | HC-49/U 5.00MHZ 30PPM | | D803 | DLT2A05G— | DIODE | LT2A05G | |
| X701 | 5XEX6R000C | CRYSTAL QUARTZ | HC-49/U 6.000MH 20PPM TP | | D804 | DLT2A05G— | DIODE | LT2A05G | |
| Z601 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | | D805 | D1N4148—- | DIODE | 1N4148 (TAPPING) | |
| Z602 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | | D806 | D1N4937G— | DIODE | 1N4937G | |
| Z603 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | | D807 | D1N4937G— | DIODE | 1N4937G | |
| Z604 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | | D808 | DTZX6V2— | DIODE ZENER | TZX6V2B (TAPPING) | |
| Z605 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | | D811 | DTZX7V5C— | DIODE ZENER | TZX7V5C (TAPPING) | |
| Z606 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | | D825 | D1N4148—- | DIODE | 1N4148 (TAPPING) | |
| Z607 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | | D826 | DTZX5V1B— | DIODE ZENER | TZX5V1B (TAPPING) | |
| Z608 | 5PXF1B471M | FILTER EMI | CFI 06 B 1H 470PF | | D827 | D1N4004S— | DIODE | 1N4004S | |
| ZZ200 | PTMPJAT2950FS | PCB MAIN AXIAL AS | DTF-2950FZS-SB | | D830 | DRGP15J— | DIODE | RGP15J | |
| 10 | 2TM14006LB | TAPE MASKING | 3M #232 6.0X2000M (WITH GLUE) | | D831 | DRGP15J— | DIODE | RGP15J | |
| 20 | 2TM10006LB | TAPE MASKING | 3M #232-MAP-C 6.2X2000M (W/O GLUE) | | D871 | D1N4937G— | DIODE | 1N4937G | |
| A001 | 4859812993 | PCB MAIN | CP-850FX DTF-2950 (330X246 D1B) | ⚠ | D899 | DRGP15J— | DIODE | RGP15J | |
| C101 | CCZB1H101K | C CERA | 50V B 100PF K (AXIAL) | | DA11 | DTZX5V6B— | DIODE ZENER | TZX5V6B (TAPPING) | |
| C111 | CCZJ1H103Z | C CERA | 50V F 0.01MF Z AXL (1608) | | DA13 | DTZX5V6B— | DIODE ZENER | TZX5V6B (TAPPING) | |
| C112 | CCZB1H102K | C CERA | 50V B 1000PF K (AXIAL) | | DA16 | DTZX5V6B— | DIODE ZENER | TZX5V6B (TAPPING) | |
| C161 | CZCH1H220J | C CERA | 50V CH 22PF J (AXIAL) | | DA17 | DTZX5V6B— | DIODE ZENER | TZX5V6B (TAPPING) | |
| C414 | CCZJ1H103Z | C CERA | 50V F 0.01MF Z AXL (1608) | | DA27 | DTZX5V6B— | DIODE ZENER | TZX5V6B (TAPPING) | |
| C440 | CCZB1H221K | C CERA | 50V B 220PF K (AXIAL) | | DP02 | D1N4148—- | DIODE | 1N4148 (TAPPING) | |
| C508 | CCZJ1H473Z | C CERA | 50V F 0.047MF Z AXL (1608) | | DP03 | D1N4148—- | DIODE | 1N4148 (TAPPING) | |
| C509 | CCZJ1H473Z | C CERA | 50V F 0.047MF Z AXL (1608) | | DP04 | DTZX12C— | DIODE ZENER | TZX12C (TAPPING) | |
| C510 | CCZJ1H473Z | C CERA | 50V F 0.047MF Z AXL (1608) | | DP05 | DTZX8V2A— | DIODE ZENER | TZX8V2A (TAPPING) | |
| C515 | CCZJ1H104Z | C CERA | 50V F 0.1MF Z AXL (1608) | | DP06 | D1N4148—- | DIODE | 1N4148 (TAPPING) | |
| C516 | CCZJ1H104Z | C CERA | 50V F 0.1MF Z AXL (1608) | | DP08 | D1N4148—- | DIODE | 1N4148 (TAPPING) | |
| C517 | CCZJ1H104Z | C CERA | 50V F 0.1MF Z AXL (1608) | | J1 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| C518 | CCZJ1H104Z | C CERA | 50V F 0.1MF Z AXL (1608) | | J112 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| C519 | CCZJ1H104Z | C CERA | 50V F 0.1MF Z AXL (1608) | | J113 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| C532 | CCZJ1H103Z | C CERA | 50V F 0.01MF Z AXL (1608) | | J114 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| C534 | CCZJ1H103Z | C CERA | 50V F 0.01MF Z AXL (1608) | | J115 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| C536 | CCZB1H102K | C CERA | 50V B 1000PF K (AXIAL) | | J125 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| C537 | CCZJ1H103Z | C CERA | 50V F 0.01MF Z AXL (1608) | | J128 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| C538 | CCZJ1H103Z | C CERA | 50V F 0.01MF Z AXL (1608) | | J135 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| C540 | CCZL1H333K | C CERA | 50V B 0.033MF K AXL (1608) | | J143 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| C553 | CCZJ1H103Z | C CERA | 50V F 0.01MF Z AXL (1608) | | J156 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| C557 | CCZJ1H104Z | C CERA | 50V F 0.1MF Z AXL (1608) | | J2 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| C558 | CCZJ1H104Z | C CERA | 50V F 0.1MF Z AXL (1608) | | J201 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| C650 | CZSL1H680J | C CERA | 50V SL 68PF J (AXIAL) | | J232 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| C712 | CCZJ1H104Z | C CERA | 50V F 0.1MF Z AXL (1608) | | J234 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| C809 | CCZB1H102K | C CERA | 50V B 1000PF K (AXIAL) | | J235 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| C834 | CCZJ1H103Z | C CERA | 50V F 0.01MF Z AXL (1608) | | J236 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| D100 | DTZX33B— | DIODE ZENER | TZX33B (TAPPING) | | J240 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| D101 | DBAT85—— | DIODE | BAT85 (TAPPING) | | J243 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| D103 | DBA282—— | DIODE | BA282 | | J276 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| D313 | DRGP15J— | DIODE | RGP15J | | J278 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| D367 | DTZX33B— | DIODE ZENER | TZX33B (TAPPING) | | J28 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| D405 | D1N4937G— | DIODE | 1N4937G | | J287 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| D408 | D1N4937G— | DIODE | 1N4937G | | J289 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| | | | | | J30 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK | LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|-----|-----------|-----------|-------------|--------|-----|-----------|-----------|-------------|--------|
| J300 | 5MC0000100 | COIL BEAD | MD-5 (HC-3550) | | J392 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J301 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J394 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J303 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J396 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J305 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J397 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J306 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J398 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J307 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J399 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J308 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J400 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J31 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J401 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J310 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J403 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J311 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J404 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J32 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J405 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J320 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J406 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J322 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J407 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J324 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J408 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J325 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J409 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J327 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J41 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J328 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J410 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J33 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J414 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J335 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J416 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J336 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J417 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J337 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J418 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J339 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J419 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J34 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J42 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J340 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J420 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J341 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J423 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J342 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J426 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J344 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J429 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J345 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J43 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J347 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J430 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J348 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J431 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J35 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J432 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J350 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J433 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J351 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J434 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J353 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J45 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J354 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J450 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J355 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J46 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J356 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J460 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J357 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J47 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J358 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J48 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J359 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J483 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J36 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J488 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J362 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J49 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J363 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J50 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J365 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J500 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J366 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J501 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J367 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J502 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J368 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J51 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J369 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J52 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J37 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J54 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J371 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J56 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J373 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J57 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J374 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J58 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J375 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J59 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J377 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J60 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J378 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J602 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J379 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J61 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J38 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J62 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J380 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | J63 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J381 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | L105 | 5CPZ479K02 | COIL PEAKING | 4.7UH 3.5MM K (LAL02TB) | |
| J382 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | L153 | 5CPZ120K02 | COIL PEAKING | 12UH 3.5MM K (LAL02TB) | |
| J383 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | L402 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| J385 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | L501 | 5CPZ479K04 | COIL PEAKING | 4.7UH 10.5MM K (LAL04TB) | |
| J387 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | L502 | 5CPZ479K04 | COIL PEAKING | 4.7UH 10.5MM K (LAL04TB) | |
| J388 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | L506 | 5CPZ479K04 | COIL PEAKING | 4.7UH 10.5MM K (LAL04TB) | |
| J389 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | L507 | 5CPZ100K04 | COIL PEAKING | 10UH 10.5MM K (LAL04TB) | |
| J39 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | L524 | 5CPZ100K02 | COIL PEAKING | 10UH 3.5MM K (LAL02TB) | |
| J390 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | L551 | 5CPZ479K04 | COIL PEAKING | 4.7UH 10.5MM K (LAL04TB) | |
| J391 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | | L568 | 5CPZ100K02 | COIL PEAKING | 10UH 3.5MM K (LAL02TB) | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|-----|-----------|-----------|-------------|--------|
| L601 | 5CPZ479K02 | COIL PEAKING | 4.7UH 3.5MM K (LAL02TB) | |
| L602 | 5CPZ100K02 | COIL PEAKING | 10UH 3.5MM K (LAL02TB) | |
| L603 | 5CPZ479K02 | COIL PEAKING | 4.7UH 3.5MM K (LAL02TB) | |
| L605 | 5CPZ479K02 | COIL PEAKING | 4.7UH 3.5MM K (LAL02TB) | |
| L650 | 5MC0000100 | COIL BEAD | MD-5 (HC-3550) | |
| L709 | 5CPZ100K02 | COIL PEAKING | 10UH 3.5MM K (LAL02TB) | |
| L711 | 5CPZ100K02 | COIL PEAKING | 10UH 3.5MM K (LAL02TB) | |
| L713 | 5CPZ100K02 | COIL PEAKING | 10UH 3.5MM K (LAL02TB) | |
| L730 | 5CPZ100K02 | COIL PEAKING | 10UH 3.5MM K (LAL02TB) | |
| L737 | 5CPZ100K02 | COIL PEAKING | 10UH 3.5MM K (LAL02TB) | |
| L742 | 5CPZ100K02 | COIL PEAKING | 10UH 3.5MM K (LAL02TB) | |
| L744 | 5CPZ100K02 | COIL PEAKING | 10UH 3.5MM K (LAL02TB) | |
| L801 | 5MC0000100 | COIL BEAD | MD-5 (HC-3550) | |
| R103 | RD-AZ123J- | R CARBON FILM | 1/6 12K OHM J | |
| R110 | RN-4Z1502F | R METAL FILM | 1/4 15K OHM F | |
| R150 | RD-AZ561J- | R CARBON FILM | 1/6 560 OHM J | |
| R152 | RD-AZ271J- | R CARBON FILM | 1/6 270 OHM J | |
| R153 | RD-AZ470J- | R CARBON FILM | 1/6 47 OHM J | |
| R154 | RD-AZ470J- | R CARBON FILM | 1/6 47 OHM J | |
| R155 | RD-AZ751J- | R CARBON FILM | 1/6 750 OHM J | |
| R161 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R162 | RD-AZ153J- | R CARBON FILM | 1/6 15K OHM J | |
| R163 | RD-AZ752J- | R CARBON FILM | 1/6 7.5K OHM J | |
| R177 | RD-AZ562J- | R CARBON FILM | 1/6 5.6K OHM J | |
| R301 | RD-4Z472J- | R CARBON FILM | 1/4 4.7K OHM J | |
| R310 | RD-AZ432J- | R CARBON FILM | 1/6 4.3K OHM J | |
| R311 | RD-AZ432J- | R CARBON FILM | 1/6 4.3K OHM J | |
| R333 | RD-AZ222J- | R CARBON FILM | 1/6 2.2K OHM J | |
| R334 | RD-AZ222J- | R CARBON FILM | 1/6 2.2K OHM J | |
| R340 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| R341 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| R345 | RD-4Z473J- | R CARBON FILM | 1/4 47K OHM J | |
| R350 | RN-AZ2201F | R METAL FILM | 1/6 2.2K OHM F | |
| R351 | RN-AZ2201F | R METAL FILM | 1/6 2.2K OHM F | |
| R394 | RD-AZ272J- | R CARBON FILM | 1/6 2.7K OHM J | |
| R395 | RD-4Z754J- | R CARBON FILM | 1/4 750K OHM J | |
| R396 | RD-AZ272J- | R CARBON FILM | 1/6 2.7K OHM J | |
| R397 | RD-AZ104J- | R CARBON FILM | 1/6 100K OHM J | |
| R414 | RD-AZ681J- | R CARBON FILM | 1/6 680 OHM J | |
| R420 | RD-AZ471J- | R CARBON FILM | 1/6 470 OHM J | |
| R424 | RD-4Z472J- | R CARBON FILM | 1/4 4.7K OHM J | |
| R430 | RD-4Z103J- | R CARBON FILM | 1/4 10K OHM J | |
| R440 | RD-4Z274J- | R CARBON FILM | 1/4 270K OHM J | |
| R501 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R502 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R504 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R507 | RD-AZ562J- | R CARBON FILM | 1/6 5.6K OHM J | |
| R510 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R511 | RD-AZ330J- | R CARBON FILM | 1/6 33 OHM J | |
| R512 | RD-AZ330J- | R CARBON FILM | 1/6 33 OHM J | |
| R513 | RD-AZ330J- | R CARBON FILM | 1/6 33 OHM J | |
| R514 | RD-AZ151J- | R CARBON FILM | 1/6 150 OHM J | |
| R515 | RD-AZ223J- | R CARBON FILM | 1/6 22K OHM J | |
| R516 | RD-AZ752J- | R CARBON FILM | 1/6 7.5K OHM J | |
| R517 | RD-AZ471J- | R CARBON FILM | 1/6 470 OHM J | |
| R518 | RD-AZ750J- | R CARBON FILM | 1/6 75 OHM J | |
| R519 | RD-AZ750J- | R CARBON FILM | 1/6 75 OHM J | |
| R520 | RD-AZ750J- | R CARBON FILM | 1/6 75 OHM J | |
| R524 | RD-AZ391J- | R CARBON FILM | 1/6 390 OHM J | |
| R525 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R533 | RD-AZ392J- | R CARBON FILM | 1/6 3.9K OHM J | |
| R534 | RD-AZ391J- | R CARBON FILM | 1/6 390 OHM J | |
| R535 | RD-AZ122J- | R CARBON FILM | 1/6 1.2K OHM J | |
| R537 | RD-AZ301J- | R CARBON FILM | 1/6 300 OHM J | |
| R538 | RD-AZ301J- | R CARBON FILM | 1/6 300 OHM J | |
| R540 | RD-AZ472J- | R CARBON FILM | 1/6 4.7K OHM J | |
| R545 | RD-AZ750J- | R CARBON FILM | 1/6 75 OHM J | |
| R550 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|-----|-----------|-----------|-------------|--------|
| R551 | RD-AZ471J- | R CARBON FILM | 1/6 470 OHM J | |
| R563 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R564 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R566 | RD-AZ220J- | R CARBON FILM | 1/6 22 OHM J | |
| R570 | RD-AZ271J- | R CARBON FILM | 1/6 270 OHM J | |
| R576 | RD-AZ151J- | R CARBON FILM | 1/6 150 OHM J | |
| R580 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R588 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R590 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R593 | RD-AZ203J- | R CARBON FILM | 1/6 20K OHM J | |
| R594 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R595 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R599 | RD-AZ151J- | R CARBON FILM | 1/6 150 OHM J | |
| R602 | RD-AZ104J- | R CARBON FILM | 1/6 100K OHM J | |
| R605 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R606 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R610 | RD-AZ682J- | R CARBON FILM | 1/6 6.8K OHM J | |
| R612 | RD-AZ474J- | R CARBON FILM | 1/6 470K OHM J | |
| R613 | RD-AZ473J- | R CARBON FILM | 1/6 47K OHM J | |
| R614 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R615 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R616 | RD-AZ103J- | R CARBON FILM | 1/6 10K OHM J | |
| R620 | RD-AZ242J- | R CARBON FILM | 1/6 2.4K OHM J | |
| R621 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R622 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R641 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R642 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R646 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R647 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R649 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R650 | RD-AZ362J- | R CARBON FILM | 1/6 3.6K OHM J | |
| R651 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R652 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R660 | RD-AZ362J- | R CARBON FILM | 1/6 3.6K OHM J | |
| R680 | RD-AZ152J- | R CARBON FILM | 1/6 1.5K OHM J | |
| R700 | RD-2Z332J- | R CARBON FILM | 1/2 3.3K OHM J | |
| R701 | RD-AZ472J- | R CARBON FILM | 1/6 4.7K OHM J | |
| R702 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R703 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R704 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R709 | RD-AZ472J- | R CARBON FILM | 1/6 4.7K OHM J | |
| R720 | RD-AZ681J- | R CARBON FILM | 1/6 680 OHM J | |
| R741 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R748 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R777 | RD-AZ750J- | R CARBON FILM | 1/6 75 OHM J | |
| R781 | RD-AZ332J- | R CARBON FILM | 1/6 3.3K OHM J | |
| R788 | RD-AZ103J- | R CARBON FILM | 1/6 10K OHM J | |
| R789 | RD-AZ103J- | R CARBON FILM | 1/6 10K OHM J | |
| R790 | RD-AZ512J- | R CARBON FILM | 1/6 5.1K OHM J | |
| R804 | RD-4Z479J- | R CARBON FILM | 1/4 4.7 OHM J | |
| R805 | RD-2Z104J- | R CARBON FILM | 1/2 100K OHM J | |
| R807 | RD-4Z221J- | R CARBON FILM | 1/4 220 OHM J | |
| R808 | RD-4Z182J- | R CARBON FILM | 1/4 1.8K OHM J | |
| R809 | RD-4Z102J- | R CARBON FILM | 1/4 1K OHM J | |
| R810 | RD-4Z220J- | R CARBON FILM | 1/4 22 OHM J | |
| R811 | RC-2Z565KP | R CARBON COMP | 1/2 5.6M OHM K | ⚠ |
| R817 | RD-AZ473J- | R CARBON FILM | 1/6 47K OHM J | |
| R818 | RD-AZ683J- | R CARBON FILM | 1/6 68K OHM J | |
| R820 | RD-4Z363J- | R CARBON FILM | 1/4 36K OHM J | |
| R821 | RD-AZ563J- | R CARBON FILM | 1/6 56K OHM J | |
| R823 | RD-4Z332J- | R CARBON FILM | 1/4 3.3K OHM J | |
| R827 | RD-AZ103J- | R CARBON FILM | 1/6 10K OHM J | |
| R828 | RD-4Z153J- | R CARBON FILM | 1/4 15K OHM J | |
| R829 | RD-AZ103J- | R CARBON FILM | 1/6 10K OHM J | |
| R830 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R831 | RD-AZ472J- | R CARBON FILM | 1/6 4.7K OHM J | |
| R832 | RD-AZ473J- | R CARBON FILM | 1/6 47K OHM J | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|---|---|---|---|---|
| R834 | RD-4Z470J- | R CARBON FILM | 1/4 47 OHM J | |
| R870 | RD-4Z102J- | R CARBON FILM | 1/4 1K OHM J | |
| R883 | RD-AZ103J- | R CARBON FILM | 1/6 10K OHM J | |
| R884 | RD-AZ103J- | R CARBON FILM | 1/6 10K OHM J | |
| RA01 | RD-AZ220J- | R CARBON FILM | 1/6 22 OHM J | |
| RA10 | RD-AZ103J- | R CARBON FILM | 1/6 10K OHM J | |
| RA13 | RD-AZ332J- | R CARBON FILM | 1/6 3.3K OHM J | |
| RA15 | RD-AZ680J- | R CARBON FILM | 1/6 68 OHM J | |
| RA16 | RD-AZ750J- | R CARBON FILM | 1/6 75 OHM J | |
| RA32 | 85801060GY | WIRE COPPER | 1/0.6 TIN COATING | |
| RA35 | RD-AZ750J- | R CARBON FILM | 1/6 75 OHM J | |
| RA88 | RD-AZ750J- | R CARBON FILM | 1/6 75 OHM J | |
| RP03 | RD-4Z102J- | R CARBON FILM | 1/4 1K OHM J | |
| RP06 | RD-4Z472J- | R CARBON FILM | 1/4 4.7K OHM J | |
| RP08 | RD-4Z361J- | R CARBON FILM | 1/4 360 OHM J | |
| RP10 | RD-2Z472J- | R CARBON FILM | 1/2 4.7K OHM J | |
| RP12 | RD-4Z470J- | R CARBON FILM | 1/4 47 OHM J | |
| RP13 | RD-2Z101J- | R CARBON FILM | 1/2 100 OHM J | |
| ZZ400 | PTCPMST2950FS | PCB CRT MANUAL AS | DTF-2950FZS-SB | |
| C900 | CCXB3D102K | C CERA | 2KV B 1000 PF K (TAPPING) | |
| C910 | CEXF2E479V | C ELECTRO | 250V RSS 4.7MF (10X16)TP | |
| C997 | CEXF2E100V | C ELECTRO | 250V RSS 10MF (10X20) TP | |
| I901 | 1TDA6108JF | IC VIDEO | TDA6108JF | |
| I901A | 4857025401 | HEAT SINK | A1050P-H24 T2 | |
| I901B | 7174300851 | SCREW TAPPTITE | TT2 RND 3X8 MFZN 3CR | |
| P401A | 4859231820 | CONN WAFER | YW025-05 | |
| P501A | 4859235120 | CONN WAFER | YW025-08 | |
| P903 | 4859238620 | CONN WAFER | YPW500-02 | |
| R906 | RF02Y629J- | R FUSIBLE | 2W 6.2 OHM J | |
| SCT1 | 4859304130 | SOCKET CRT | ISHG93S | ⚠ |
| ZZ200 | PTCPJRT2950FS | PCB CRT RADIAL AS | DTF-2950FZS-SB | |
| C902 | CMXL2E104K | C MYLAR | 250V 0.1MF K MEU TP | |
| C921 | CMXM2A102J | C MYLAR | 100V 1000PF J TP | |
| C922 | CMXM2A102J | C MYLAR | 100V 1000PF J TP | |
| C923 | CMXM2A102J | C MYLAR | 100V 1000PF J TP | |
| G900 | 4SG0DX0001 | SPARK GAP | SSG-102-A1 (1.0KV) | |
| G901 | 4SG0DX0001 | SPARK GAP | SSG-102-A1 (1.0KV) | |
| G902 | 4SG0DX0001 | SPARK GAP | SSG-102-A1 (1.0KV) | |
| G903 | 4SG0DX0001 | SPARK GAP | SSG-102-A1 (1.0KV) | |
| Q921 | TBF423—— | TR | BF423 TO-92 | |
| Q922 | TBF423—— | TR | BF423 TO-92 | |
| Q923 | TBF423—— | TR | BF423 TO-92 | |
| R905 | RN02B102JS | R METAL FILM | 2W 1K OHM J SMALL | |
| ZZ200 | PTCPJAT2950FS | PCB CRT AXIAL AS | DTF-2950FZS-SB | |
| A001 | 4859829013 | PCB CRT | CP-830/830F (DTG/DTH) | ⚠ |
| D911 | D1N4004S— | DIODE | 1N4004S | |
| D912 | D1N4004S— | DIODE | 1N4004S | |
| D913 | D1N4004S— | DIODE | 1N4004S | |
| D921 | D1N4004S— | DIODE | 1N4004S | |
| D922 | D1N4004S— | DIODE | 1N4004S | |
| D923 | D1N4004S— | DIODE | 1N4004S | |
| D997 | DLT2A05G— | DIODE | LT2A05G | |
| R901 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R902 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R903 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R911 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R912 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R913 | RD-AZ101J- | R CARBON FILM | 1/6 100 OHM J | |
| R921 | RC-2Z102K- | R CARBON COMP | 1/2 1K OHM K | |
| R922 | RC-2Z102K- | R CARBON COMP | 1/2 1K OHM K | |
| R923 | RC-2Z102K- | R CARBON COMP | 1/2 1K OHM K | |
| R931 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R932 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R933 | RD-AZ102J- | R CARBON FILM | 1/6 1K OHM J | |
| R996 | RD-2Z105J- | R CARBON FILM | 1/2 1M OHM J | |
| R997 | RD-2Z102J- | R CARBON FILM | 1/2 1K OHM J | |
| ZZ140 | PTPKCPF2930F | PACKING AS | DTF-2930FZS-SB | |

| LOC | PART CODE | PART NAME | DESCRIPTION | REMARK |
|---|---|---|---|---|
| 10 | 6520010200 | STAPLE PIN | #3417 ALL | |
| M681 | 2TP06575CL | TAPE OPP | T0.065XW75X500M CLEAR | |
| M801 | DMP5018800 | BOX | DTL-2950 (NEW) | |
| M811 | 485819D500DN | PAD DOWN | 2930 EPS | |
| M811A | 485819D500UP | PAD UP | 2930 EPS | |
| M821 | 4858215601 | BAG P.E. | "PE FOAM T0.5X1600X1270 25""-28""" | |

# 7. EXPLODED VIEW



| 21 | NA | CRT | 1 | 29INCH SLIM CRT | |
|----|----|-----|---|-----------------|---|
| 20 | 7178301252 | SCREW TAPPING | 6 | TT2 WAS 3X12 MFZN BK 3CR | |
| 19 | 7178301051 | SCREW TAPPING | 2 | TT2 WAS 3X10 MFZN 3CR | |
| 18 | 7172401652 | SCREW TAPPING | 12 | TT2 TRS 4X16 MFZN BK 3CR | |
| 17 | 4856716000 | SPRING | 1 | SWPA PIE0.5 | |
| 16 | 4856017800 | SCREW SPKR FIX | 5 | SWRM+SECC 3CR | |
| 15 | 4856017752 | SCREW CRT FIX | 4 | 6X35 L120 YL 3CR | |
| 14 | 4855617400 | MARK BRAND | 1 | SILVER DIA-CUTTING | |
| 13 | 4854963311 | BUTTON CH | 1 | ABS GY | |
| 12 | 4854870710 | BUTTON POWER | 1 | FR ABS GY | |
| 11 | 4853526600 | HOLDER CORD | 1 | NYLON6(DACB-183) | |
| 10 | 4852332511 | PANEL CTRL | 1 | ABS GY | |
| 9 | 4852174901 | COVER BACK | 1 | HIPS NP BK | |
| 8 | 4852092411 | MASK FRONT | 1 | HIPS NP | |
| 7 | NA | DECO.PCB.AS | 1 | NA | |
| 6 | NA | SIDE JACK PCB AS | 1 | NA | |
| 5 | NA | PFC PCB AS | 1 | NA | |
| 4 | NA | MAIN PCB AS | 1 | CP-650 | |
| 3 | NA | BUTTON CH PCB AS | 1 | NA | |
| 2 | 48A8310600 | SPEAKER SYSTEM | 2 | SS-58126F05 | |
| 1 | 4851954911 | DECO SENSOR AS | 1 | 3568111+5555300 | |
| NO | PART CODE | PART NAME | QTY | MATERIAL | REMARKS |

| UNITS | mm | Designed by | Checked by | Inspected by | Approved by | ASSY NAME |
|-------|-----|-------------|------------|--------------|-------------|-----------|
| | | J.H.BAE | NA | | K.P.HONG | DEVELOPMENT DRAWING (1/1) |
| SCALE | 0.170 | | | | 2006.02.08 | |

DAEWOO ELECTRONICS Corp.
Mechanical Design Team, DISPLAY R & D

| MODEL | DTF-2950 | D/N | 48500CKX |
|-------|----------|-----|----------|
| CHASSIS | | | |

A2(594mm X 420mm)

# EXPLODED VIEW



| 21 | | CRT | 1 | 29INCH SLIM CRT | |
|----|---|-----|---|-----------------|---|
| 20 | 7178301252 | SCREW TAPPING | 9 | TT2 WAS 3X12 MFZN BK 3CR | |
| 19 | 7178301051 | SCREW TAPPING | 2 | TT2 WAS 3X10 MFZN 3CR | |
| 18 | 7172401652 | SCREW TAPPING | 12 | TT2 TRS 4X16 MFZN BK 3CR | |
| 17 | 4856716000 | SPRING | 1 | SWPA PIE0.5 | |
| 16 | 4856017800 | SCREW SPKR FIX | 5 | SWRM+SECC 3CR | |
| 15 | 4856017752 | SCREW CRT FIX | 4 | 6X35 L120 YL 3CR | |
| 14 | 4855617400 | MARK BRAND | 1 | SILVER DIA-CUTTING | |
| 13 | 4854963311 | BUTTON CH | 1 | ABS GY | |
| 12 | 4854871411 | BUTTON POWER | 1 | ABS GY | |
| 11 | 4853526600 | HOLDER CORD | 1 | NYLON6(DACB-183) | |
| 10 | 4852332511 | PANEL CTRL | 1 | ABS GY | |
| 9 | 4852174801 | COVER BACK | 1 | HIPS NP BK | |
| 8 | 4852092611 | MASK FRONT | 1 | HIPS NP | |
| 7 | | DECO PCB AS | 1 | | |
| 6 | | SIDE JACK PCB AS | 1 | | |
| 5 | | PFC PCB AS | 1 | | |
| 4 | | MAIN PCB AS | 1 | CP-850FX | |
| 3 | | BUTTON CH PCB AS | 1 | | |
| 2 | 48A8310600 | SPEAKER SYSTEM | 2 | SS-58126F05 | |
| 1 | 4851957111 | DECO AS | 1 | 3568811+5556000 | |
| NO | PART CODE | PART NAME | QTY | MATERIAL | REMARKS |

| 25 | 4858215601 | BAG P.E. | 1 | PE FOAM T0.5X1600X1270 25"-28" | |
|----|-----------|----------|---|--------------------------------|---|
| 24 | DMP5018800 | BOX | 1 | DTL-2950 (NEW) | |
| 23 | 485819C900UP | PAD UP | 1 | EPS 2950 | |
| 22 | 485819C900DN | PAD DOWN | 1 | EPS 2950 | |
| NO | PART CODE | PART NAME | QTY | MATERIAL | REMARKS |

| REV | LIST OF MODIFICATION | REASON OF MODIFICATION | DATE | NAME | APPR |
|-----|---------------------|------------------------|------|------|------|
| △1 | | | | | |
| △2 | | | | | |

UNITS: mm
SCALE: N/A

Designed by / Checked by / Inspected by / Approved by

ASSY NAME
DEVELOPMENT DWG

Daewoo Electronics CO.,LTD.
Mechanical Design Team, TV Research Center

MODEL: DTF-2930
REFERENCE: CP-850FX
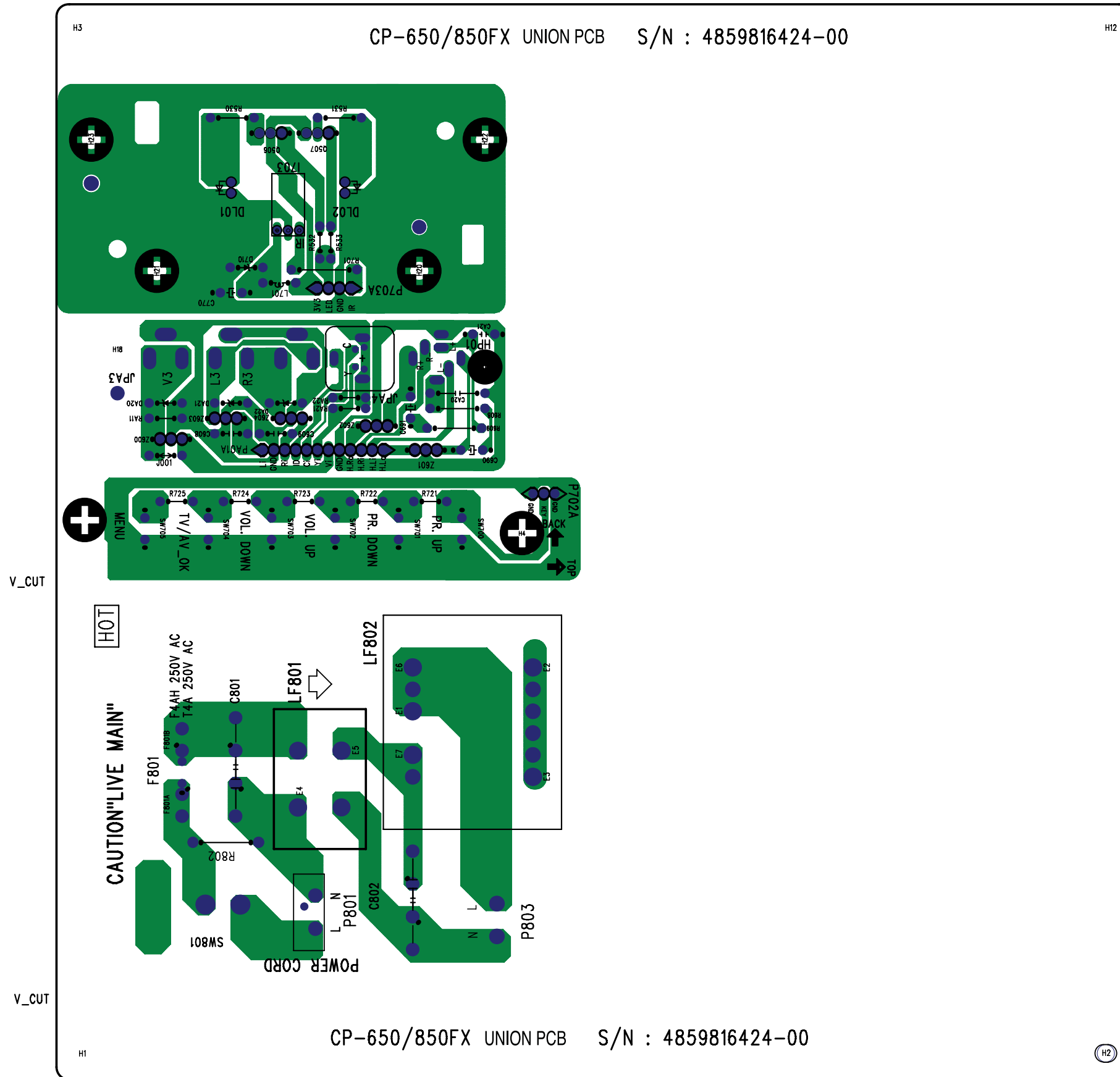
D/N 48500CKV

A3(420mm X 297mm)

# 8. PRINTED CIRCULT BOARD

## 8.1 MAIN PCB
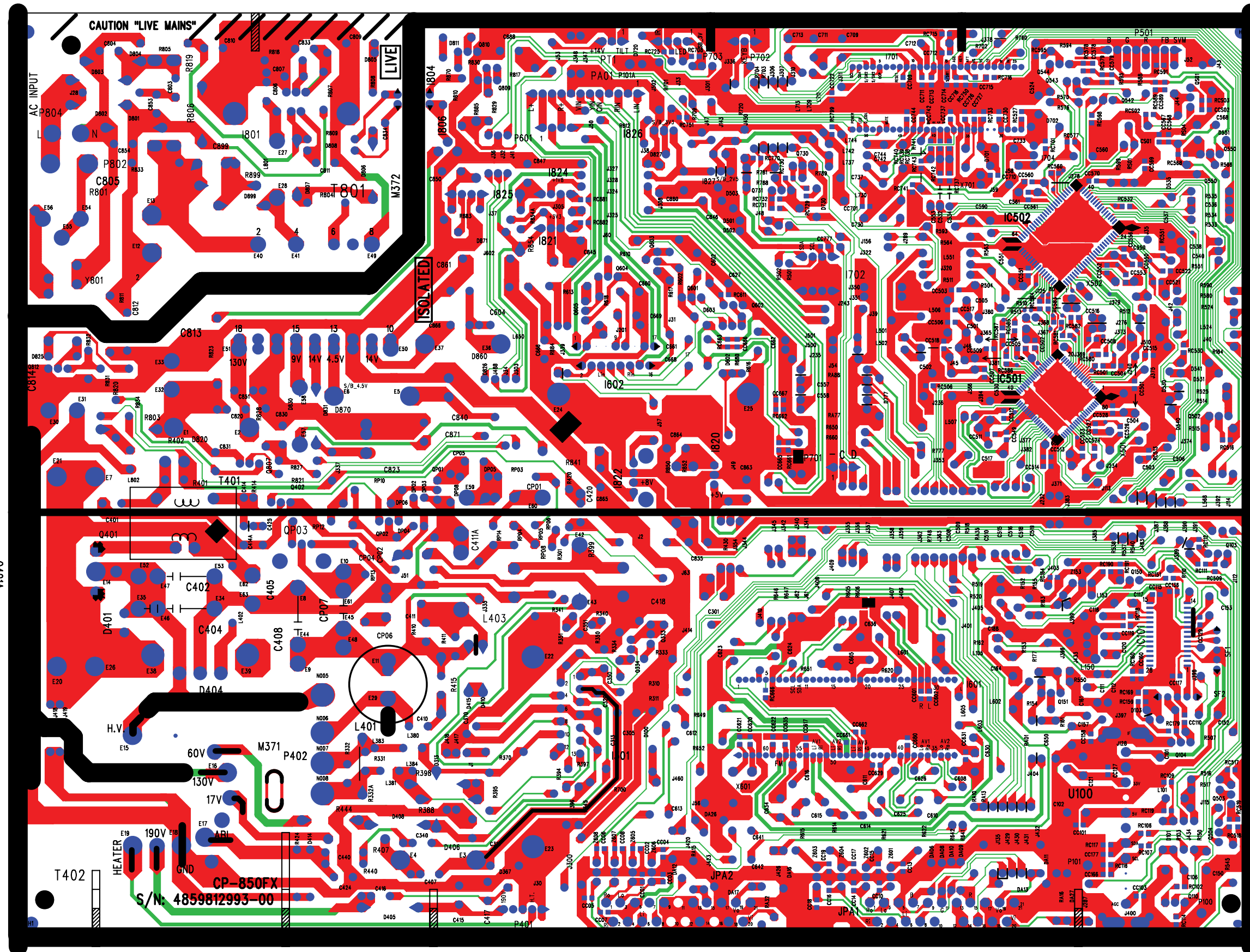
# PRINTED CIRCUIT BOARD

## 8.2 UNION PCB

# PRINTED CIRCULT BOARD

## 8.3 CRT PCB
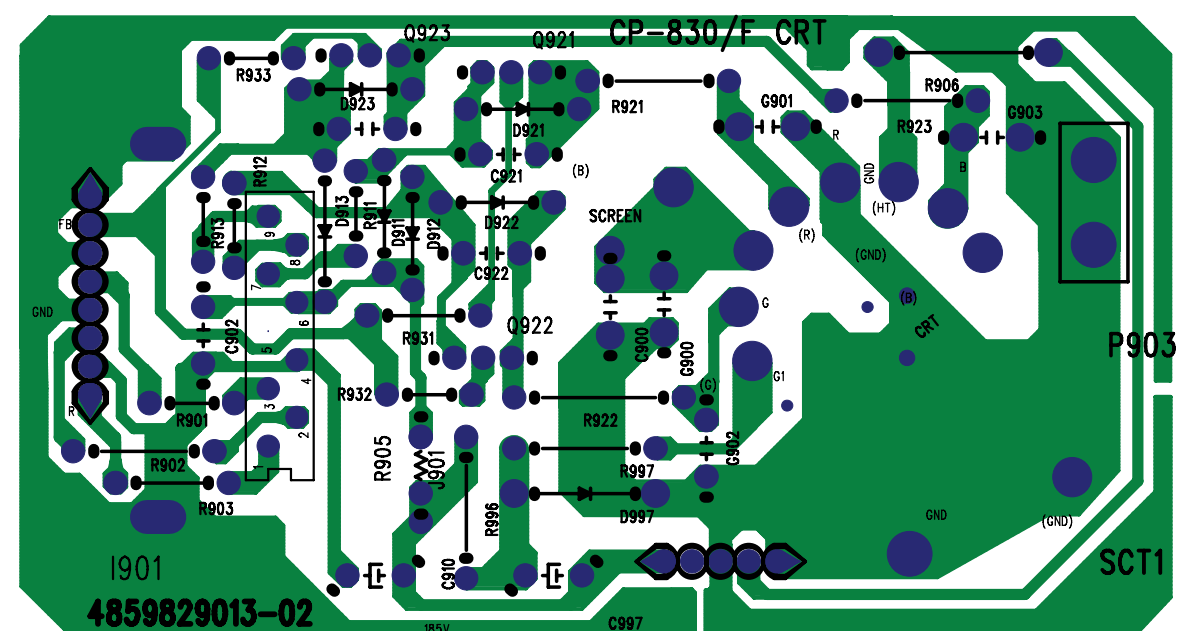
# 9. SCHEMATIC DIAGRAM

## 9.1 MAIN



CP-850FX 29" FLAT 100Hz SLIM  09/AUG/2006

## 9.2 UNION & CRT

DTF-2950(850FX SLIM 100Hz)

S/N : 4859812993-00
       (09/AUG/2006)

NOTE:
1. RESISTANCE IS SHOWN IN OHM. K=1000, M=1000000
2. UNLESS OTHERWISE NOTED IN SCHEMATIC ALL CAPACITOR VALUES ARE
   EXPRESSED IN uF
3. VOLTAGES READ WITH "VTVM" FROM POINT INDICATED TO CHASSIS GROUND
   USING A COLOR BAR SIGNAL WITH ALL CONTROLS AT NORMAL LINE 230V AC
   VOLTAGE READINGS SHOWN ARE NORMAL VALUES AND MAY VARY ±20% EXCEPT H.V
4. THIS CIRCUIT DIAGRAM IS A STANDARD ONE CIRCUIT PRINTED MAY BE
   SUBJECT TO CHANGE FOR PRODUCT IMPROVEMENT WITHOUT PRIOR NOTICE

WARNING:
BEFORE SERVICING THE CHASSIS, READ "X-RAY RADIATION", "SAFETY
PRECAUTION", AND "PRODUCT SAFETY NOTICE" IN SERVICE MANUAL

CAUTION TO SERVICE TECHNICIANS:
BEFORE RETURNING THE RECEIVER TO CUSTOMER, LEAKAGE CURRENT QR
RESISTANCE MEASUREMENTS SHOULD BE PERFORMED TO DETERMINE THAT
EXPOSED PARTS ARE PROPERLY INSULATED FROM THE SUPPLY CIRCUIT.

| RESISTOR | | | CAPACITOR | | | COIL | | |
|---|---|---|---|---|---|---|---|---|
| CARBON FILM | | | ELECTRO | | | PEAKING | | |
| R M-OXIDE | | (M) | CERAMIC | | | CHOKE | | (C) |
| CARBON COMP | | (CC) | CERAMIC CH | | (CH) | BEAD | | (B) |
| FUSIBLE | | (F) | ELECTRO NONPOLAR | | (NP) | | | |
| CEMENT | | (C) | MYLAR | | (M) | | | |

PRODUCT SAFETY NOTE :
THE COMPONENTS MARKED WITH ⚠ ARE IMPORTANT FOR MAINTAINING
THE SAFETY OF THE SET AND SHOULD BE REPLACED ONLY WITH TYPES
IDENTICAL TO THOSE IN THE ORIGINAL OR SPECIFIED ONE IN THE PART LIST.
DON'T DEGRADE THE SAFETY OF THE SET THROUGH IMPROPER SERVICING.

PCB PFC & INNER_PINCUSHION

PCB CONTROL

PCB LED_REMOTE

PCB AV3 INPUT

# DAEWOO
## ELECTRONICS