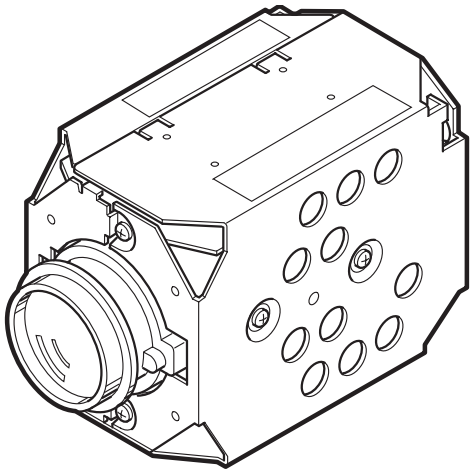
HITACHI

TK | No. 8101E

SERVICE MANUAL

VK-S454
VK-S454E



SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

COLOR VIDEO CAMERA

January 2001 Digital Media Products Division,Tokai

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts have special safety-related characteristics. These are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for a higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual. Electrical components having such features are identified by marking with a ⚠ on the schematics and the parts list in this Service Manual. The use of a substitute replacement component which does not have the same safety characteristics as the HITACHI recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards. Product safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current HITACHI Service Manual. A subscription to, or additional copies for, HITACHI Service Manual may be obtained at a nominal charge from HITACHI SALES CORPORATION.

Notes When Using Service Manual

The following shows the contents to be noted when using service manual:

1. Value units used in parts list

Certain symbols are indicated below for value units of resistors, capacitors and coils in parts list. When you read them note the following regular indications:

Parts	Indication in list Regular indication
Resistor	KOHM ····· kΩ
Capacitor	UF ····· μF
	PF ····· pF
Coil	UH ····· μH
	MH ····· mH

2. Values in schematic diagrams

The values, dielectric strength (power capacitance) and tolerances of the resistors (excluding variable resistors) and capacitors are indicated in the schematic diagrams using abbreviations.

[Resistors]

Item	Indication
Value	No indication ····· Ω
	K ····· kΩ
	M ····· MΩ
Tolerance	No indication ····· ±5%
	(All tolerances other than ±5% are indicated in schematic diagrams)
Power capacitance	No indication ····· 1/8W
	(1/16W for leadless resistors without indication)
	All capacitances other than the above are indicated in schematic diagrams.

[Capacitors]

Item	Indication
Value	No indication ····· μF
	P ····· pF
Dielectric strength	No indication ····· 50V
	(All dielectric strengths other than 50V are indicated in schematic diagrams)

[Coils]

Item	Indication
Value	μ ····· μH
	m ····· mH

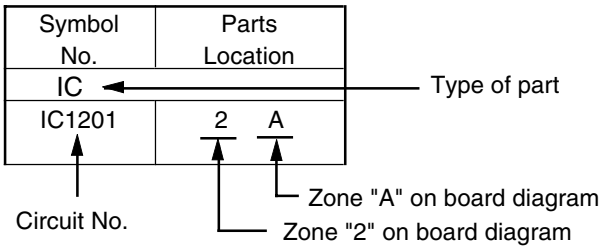
3. Identifications of sides A/B in circuit board diagrams

1) Board having a pattern on one side and parts on both sides.
   Side A: Shows discrete parts, viewed from the pattern side.
   Side B: Shows leadless parts, viewed from the pattern side.
2) Board having patterns on both sides and parts on both sides.
   Side A: Shows parts and patterns which can be seen when the case is opened.
   Side B: Shows parts and the pattern on the back of side A.

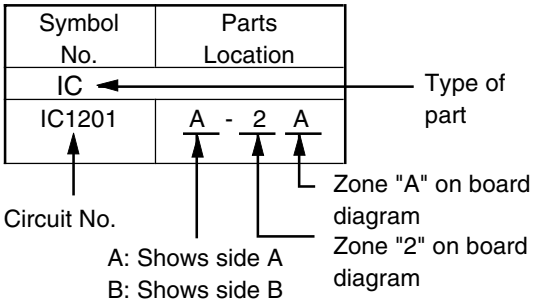
4. Table for indexing locations of parts

This table shows locations of each part on circuit board diagrams. The locations are indicated using the guide scales on the external lines of diagrams.

1) One diagram indicated for each board



2) Two diagrams indicated for each board



CONTENTS

CHAPTER 1 GENERAL INFORMATION

SPECIFICATINOS

Note: The specifications are subject to change for improvement without notice.

Signal	VK-S454:	NTSC Format	
	VK-S454E:	PAL Format	
Scanning System	2:1 Interlaced		
Image Sensor	4.5 mm Dia. (1/4-inch) CCD Image Sensor		
Number of Effective Pixels	VK-S454:	724 (H) × 494 (V)	
	VK-S454E:	724 (H) × 582 (V)	
Total Number of Pixels	VK-S454:	758 (H) × 504 (V)	
	VK-S454E:	758 (H) × 592 (V)	
Scanning Frequency	VK-S454:	Horizontal	15.734 kHz
		Vertical	59.94 Hz
	VK-S454E:	Horizontal	15.625 kHz
		Vertical	50 Hz
Video Signal Output	Composite Signal 1.0 Vp-p		
Minimum Required Illumination	Standard	3.0 lx	
	DS shutter	0.2 lx	
	IRcf OFF	0.02 lx	
S/N Ratio	50 dB or more		
Horizontal Resolution	470 TV Line or more		
Operating Temperature	0 - 60 °C		
Operating Humidity	10 - 90 %		
Power Input	DC 9 V ± 0.5 V		
Power Consumption	4.6 W or less		
Dimensions	50 (W) × 60 (H) × 89.5 (D) mm		
Weight	Approx. 230 g		

COMPARISON OF SPECIFICATION

ITEM	VK-S454/VK-S454E	VK-S234/VK-S234E
Signal Format	VK-S454: NTSC VK-S454E: PAL	VK-S234: NTSC VK-S234E: PAL
Power Requirements	DC 9 V	
Power Consumption	4.6 W (MAX)	3.3 W (MAX)
Dimensions (W × H × D mm)	50 × 60 × 89.5	
Weight	Approx. 230 g	
Lens	Power zoom × 23 (3.6 - 82.8 mm) F 1.6 - 3.7	Power zoom × 22 (4.0 - 88.0 mm) F 1.6 - 3.8
Operating Temperature/Humidity	0 °C to 60 °C (Recommendation: 0 °C to 40 °C) 10 % to 90 %	
Image Sensor	4.5mm Dia. (1/4 inch) CCD	
Number of Effective Pixels	VK-S454: 724 (H) × 494 (V) VK-S454E: 724 (H) × 582 (V)	VK-S234: 768 (H) × 494 (V) VK-S234E: 752 (H) × 582 (V)
Total Number of Pixels	VK-S454: 758 (H) × 504 (V) VK-S454E: 758 (H) × 592 (V)	VK-S234: 811 (H) × 508 (V) VK-S234E: 795 (H) × 596 (V)
Scanning System	2:1 Interlaced	
Horizontal Scanning Frequency	VK-S454: 15.734 kHz VK-S454E: 15.625 kHz	VK-S234: 15.734 kHz VK-S234E: 15.625 kHz
Vertical Scanning Frequency	VK-S454: 59.94 Hz VK-S454E: 50 Hz	VK-S234: 59.94 Hz VK-S234E: 50 Hz
Sync Format	Internal/External	
Video Signal Output	Composite Signal 1.0 Vp-p	
S/N Ratio	50 dB or more	
Horizontal Resolution	470 TV Line or more	VK-S234: 470 TV Line or more VK-S234E: 460 TV Line or more
Minimum Required Illumination (Standard)	3.0 lx	
IR cf Mode	Provided	Not Provided

COMPARISON OF MAIN CONTROL ICs

ITEM	VK-S454/VK-S454E		VK-S234/VK-S234E	
CCD Sensor	VK-S454: ICX216AN VK-S454E: ICX217AN	(IC1001) (IC1001)	VK-S234: ICX208AK VK-S234E: ICX209AK	(IC1001) (IC1001)
Sensor Drive	µPD16510GR	(IC1002)		
Buf. Amp	HD74AC244	(IC1003)	Not provided	
CDS AGC & A/D CONV.	HD49325BHF	(IC1101)	HD49323AF	(IC1101)
Camera Digital Signal Processor (DSP)	HG75C015ABT	(IC1121)	HG73C053FE	(IC1121)
SD RAM	µPD456323G5-A10BL-9JH	(IC1150)	MSM51V18165BSL-6TS-K	(IC1122)
Inv.	TC7SHU04FU	(IC1171)	TC7SU04F	(IC1173)
Clock Generator	MJU6321P	(IC1173)	TC7SU04F	(IC1174)
Digital µP	VK-S454 Series µP	(IC1201)	HD6432237M09TE	(IC1201)
EEPROM	X25097V1-2.7	(IC1250)	X25097V1-2.7	(IC1202)
Reset Pulse Gen.	RN5VD27AA TC7S08FU	(IC1251) (IC1206)	RN5VD27AA	(IC1203)
Zoom Motor Drive	MPC17AT85VMEL	(IC1301)		
Focus Motor Drive	MPC17AT85VMEL	(IC1302)		
IR Filter Drive	MPC17AT85VMEL	(IC1380)	Not provided	
F.Det./Iris Drive	µPD5023GS-147-GJG	(IC1351)		
PWM	TL1464IPT	(IC1501)		
Y/C Mix. & Video Amp	BA7664FV	(IC1601)		
Level Shift	HD74HCT125T	(IC1602)		
VCO/Phase Compa.	74VHC4046MTCX	(IC1603)		
FV Pulse Gen.	TC7S08	(IC1604)		
Inv.	TC7SHU04FU	(IC1605)	Not provided	
NTSC/PAL Switch	NJM2533V	(IC1606)	Not provided	

PROCEDURE

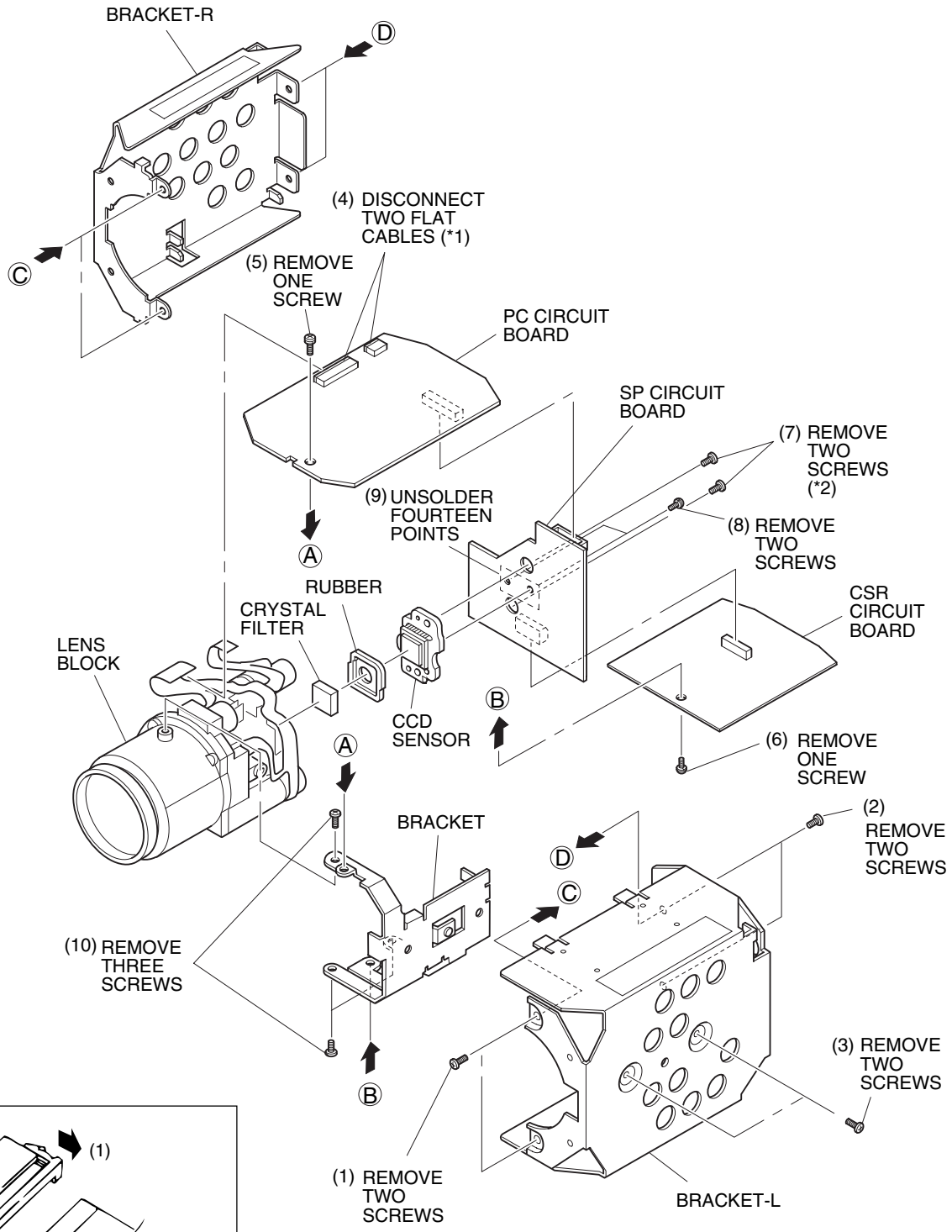
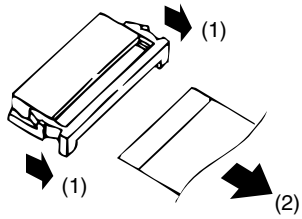


Fig. 2-1



(1) Release the lock of the connector on the left and right.
(2) Pull out the flat cable

Fig. 2-1-1

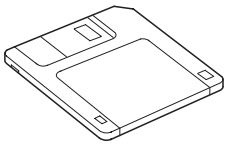
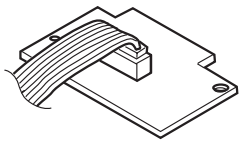
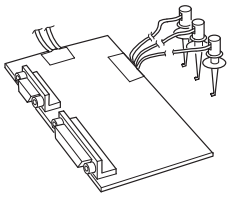
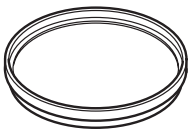
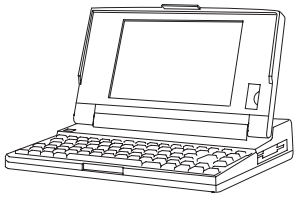
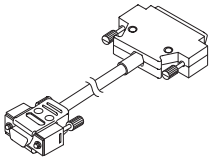
***1**: Do not the pull out the flat cable or touch the exposed terminal at the connecting position with your bare hands as it could cause a defective (1) and (2) shown in Fig. 2-1-1.

***2**: When the SP circuit board is removed, the crystal filter and rubber are also removed.
Be careful not to damege and lose them.

CHAPTER 3 ELECTRIC CIRCUIT ADJUSTMENT

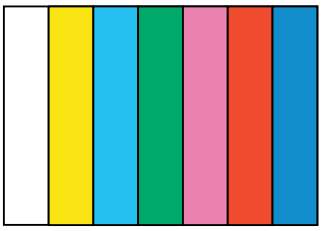
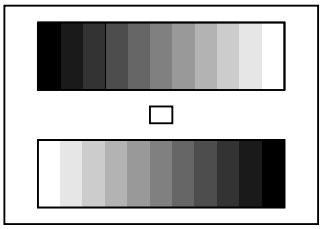
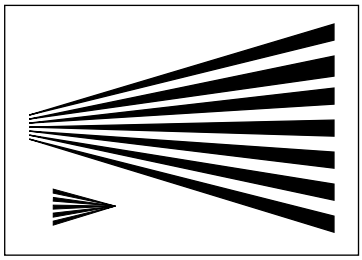
1. Test Equipment/Jigs Necessary for Adjustment

1.1 List of equipment and jigs

New **Adjutsment Floppy Disk (*1)** 	**DSP Interface Connect Jig** No. 7069179 	**DSP-R Jig** No.7099448 	**C12 Light Balancing Filter** No.7099369 
Personal Computer (PC) *[Goods on the Market]* 	**Personal Computer Cable** RS-232C (9 or 25 pins) Straight Type *[Goods on the Market]* 		

1: The adjustment floppy disk is not for sale: It will be supplied only when service maintenance contract is concluded.

1.2 List of charts for adjustment

Color Bar Chart 	**Gray Scale Chart** 	**Backfocus Chart** 

1.3 Test equipment, etc.

Color video monitor (color TV for monitoring)
Oscilloscope
Vectorscope [If not available, adjustment is still possible, but easier if this is used]
Digital voltmeter (DVM)
3100 K light box
DC power supply (9 V/3 A) [To power of video camera]
DC power supply (5 V/1 A) [To power of DSP-R jig]

2. Before Starting Adjustment

2.1 Connections for adjustment

Connect the video camera to the test equipment and jigs as shown in Fig. 2-1.

2.2 Notes

1) All adjustments are performed using the adjustment program and personal computer (PC). The adjustment program is subject to change without notice for improvements in functions and operability, and the actual instructions on PC screen may be different from those in this manual: If so, follow the instructions on PC screen to proceed with adjustment.
2) The adjustment program will not operate normally unless the video camera, PC and test equipment/jigs are all turned on.
3) Be sure to connect the video output of video camera to a color video monitor (terminate the video output with 75 ohm: If the video output is not connected to the monitor (and if it is not terminated with 75 ohm), the output video signal level cannot be measured correctly.

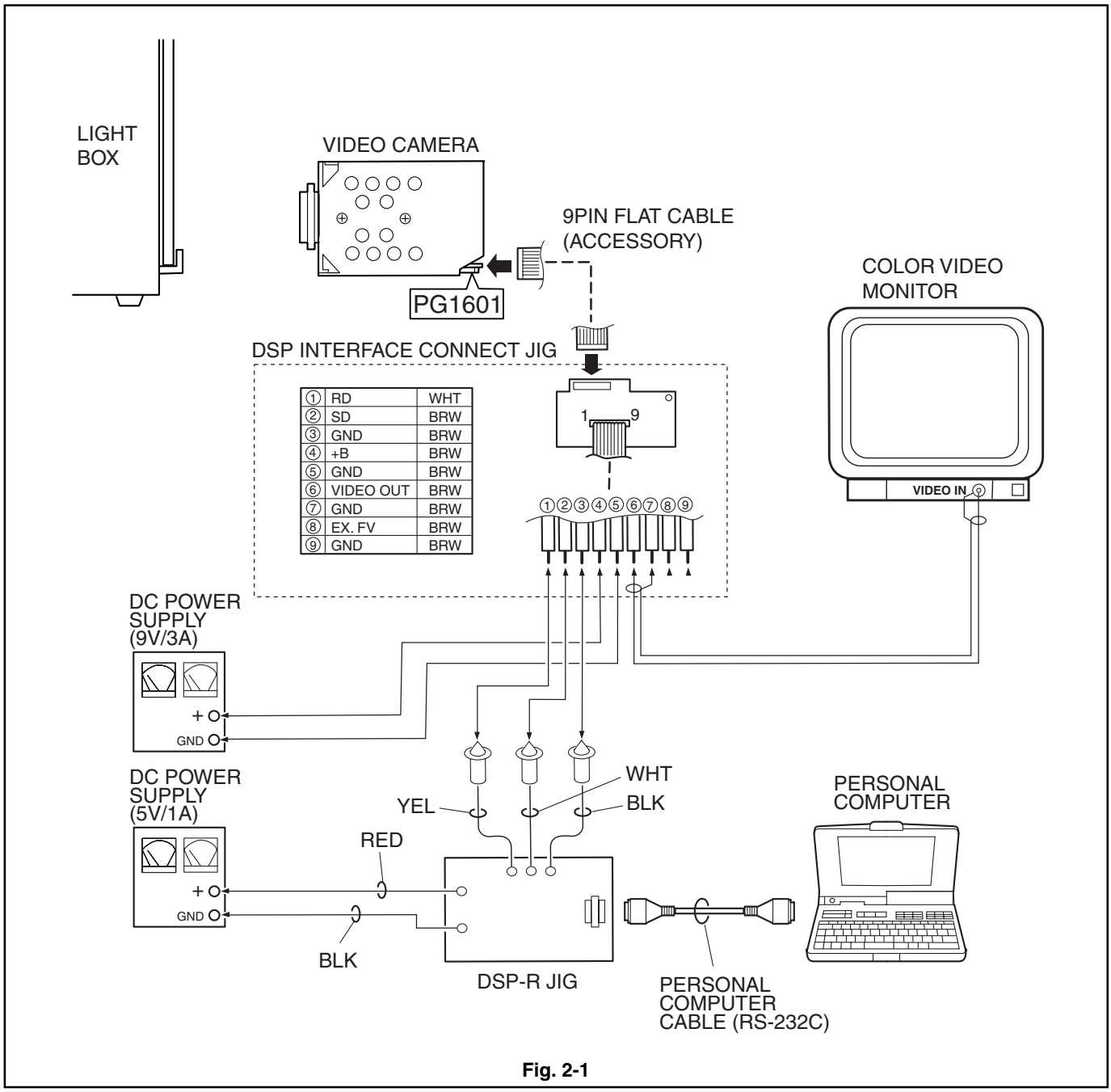


Fig. 2-1

4) Use light box that does not flicker and whose color temperature is controlled, for adjustment. If an inappropriate light box is used, precise adjustment will not be possible, and the adjustment program will not operate normally.
5) Take care with the following when pointing the video camera at a chart (light box):
   - Focus the chart correctly.
   - Set the chart (light box) 30-50 cm away from the lens surface, and avoid any effects from surrounding light (except for a case where some designation is given).
   - Aim at the chart and let chart fill the screen (video period). (Except for a case where some designation is given.)

2.3 Setting test equipment

1) Set the switches, knobs and each mode of oscilloscope as follows for adjustment:

Probe:	10:1
TIME/DIV:	10 or 20 μs (except for a case where some designation is given)
VOLTS/DIV:	Will vary depending on the measurement object (except for a case where some designation is given)
Synchronization:	Internal sync (except for a case where some designation is given)
AC/DC/GND:	AC (except for a case where some designation is given)

Note: The names of switches, knobs, modes, etc. of oscilloscope may vary slightly depending on the manufacturer or model. Since some oscilloscopes may have switches, etc. other than the above that must be set, see the instruction manual of the particular oscilloscope for details.

3. List of Adjustment Items

The following table shows the adjustment items, their purposes, and whether or not check is required after replacing major components.
The components shown in the table below are the minimum to be checked after replacing major components: If several components have been replaced - or depending on the cause of a defect - more components may need to be checked.

● : **CHECK**

Item of Adjustment	**Purpose of Adjustment**	**Name of Major Components**							
		SP circuit board	PC circuit board (*1)	IC1001	IC1101	IC1201	IC1250 (*1)	IC1351	Lens Block
Data Initialize									
(1) Data Initialize (*2)	Initilizing EEPROM.		●				●		
Electric Volume									
(1) CDS Sampling Pulse	To suppress noise in the CCD sensor output signal and maximize the signal level.		●		●		●		
Adjustment									
(1) Auto Iris Control	To set the iris control data.	●	●	●		●	●	●	●
(2) White Balance	To input the automatic wihite balance control data.	●	●	●			●		
(3) Chroma Gain	To set the color saturation under the reference color temperature.	●	●	●			●		
Autofocus									
(1) Zoom/Focus Tracking	To set the out-of -focus correction level during zooming.	●	●	●			●		●
(2) AF Noise Level	To set the noise level in the autofocus circuit.	●	●	●			●		●
(3) Check of Zoom Trace	To check the autofocus adjustment.	●	●	●			●		●
Spot Noise									
(1) Spot Noise	To correct spot noise.	●	●	●			●		
IR Control									
(1) IR Control	To set the IR filter control data.		●				●		●

*1: When replacing the PC circuit board (containing EEPROM) or EEPROM, be sure to perform all adjustments only after “Data Initialize”.
*2: Since all adjustments must be performed any time “Data Initialize” is done, do not perform it indiscriminately.

4. Starting Adjustment Program (SMAP)

Note: If error message appears during adjustment, refer to "6. Error Messages".

1) Connect the video camera, DSP-R jig and PC as shown in Fig. 2-1, and supply power to them. (*1)
2) Operate the PC to start MS-DOS®. (*2)
3) Make sure that the adjustment floppy disk is write-protected.
4) Insert the adjustment floppy disk into the floppy disk drive of PC.
5) Use the PC keyboard to type **A:**. (*3) (See the MS-DOS screen)
6) Type **SMAP_IBM**®(space) **1**. (*4) (See the SMAP input screen)
7) The SMAP will start: Make sure that the model select screen appears on the PC display. (*5) (See the model select screen)
8) If the appropriate model is displayed on the model select screen, input the number to PC. If the appropriate model name is not shown on the model select screen, input **P** to PC until the model name appears. (*6)
9) The screen for verifying the model name will appear on PC display: If it is correct, input **Y** to PC. If it is incorrect, input **N** and start over (from step 8).
10) Make sure that the main menu appears on PC display: If it does not appear, check whether model selection (in step 8) is correct.

*1: If the connection of jig, etc. is inappropriate or power is not supplied, the adjustment program will not start normally.
*2: For details on how to start MS-DOS, refer to the instruction manual of PC, since this varies for each PC.
*3: The letter to be input is to designate the drive into which the adjustment floppy disk has been inserted. If using a drive other than A, designate the drive.
*4: The number to be input after a space is to designate the serial port no. of PC. If the PC has two or more serial ports, and the DSP-R jig is connected to a port other than serial port 1, input the serial port no.
*5: If the model select screen does not appear, make sure of the following:
- Power is supplied to the video camera and DSP-R jig.
- The designation of drive (in step 5) is correct.
- The designation of serial port is correct.
- The correct adjustment floppy disk has been correctly inserted.

*6: If an erroneous model name or number is selected, misoperation message will appear on PC display: Press any key to restore the model select screen.

To terminate the adjustment program (SMAP):

Press the [Esc] key once to three times until the PC display returns from each menu screen to the MS-DOS screen. When the MS-DOS screen appears on PC display, turn off the video camera and jig.

PC Display & Figs

MS-DOS screen

```
C>A:
A>
```

SMAP input screen

```
C>A:
A>SMAP_IBM 1
```

Model select screen

```
**********************************************************
                    MODEL SELECT
**********************************************************

              [1]    xxxxxxxx
              [2]    xxxxxxxx
              [3]    xxxxxxxx
              [4]    xxxxxxxx
              [5]    xxxxxxxx
              [P]    NEXT SELECTION
              [ESC]  END

        Please select the type of the set
        Press [1] - [5] or [P] or [ESC]
```

Screen for verifying model name

```
Selected model is xxxxxxxx
Are you sure ?  (Y/N)
```

Main menu

```
**********************************************************
                MANUAL ADJUSTMENT PROGRAM
**********************************************************

              [A]    DATA INITIALIZE
              [B]    ELECTRIC VOLUME
              [C]    ADJUSTMENT
              [D]    AUTO FOCUS
              [E]    SPOT NOISE
              [F]    IR CONTROL
              [ESC]  END

        Please select [A] - [F] or [ESC]
```

Misoperation message

```
CAN NOT FIND THE DATA FILE
**** PRESS ANY KEY ****
```

5. Adjustment Procedure

The following explains the adjustment procedure using the adjustment program (SMAP), following the order of items on the main menu screen.
Refer to “4. Starting Adjustment Program (SMAP)” in advance, start SMAP and display the main menu on PC display.
In actual work, it is possible to adjust one item independently.

Note: If error message appears on PC display during adjustment, perform troubleshooting, referring to “6. Error Messages”.

5.1 Data Initialize

(1) Data Initialize

This procedure initializes the data in EEPROM (including the adjustment data). Any time you replace the PC circuit board (containing EEPROM), be sure to perform this procedure. [Generally, this procedure is not necessary after replacing other circuit board (components).]

Important:

- After completing this adjustment, be sure to perform all adjustment items as follows.

Procedure:

1) Input **A** to PC on the main menu screen.
2) The screen for verifying the initialization will appear: Input **Y** to PC. (*1)
3) Follow the instructions on PC display thereafter.

*1: Entering **N** on the screen for verifying initialization will restore the data main menu screen.

5.2 Electronic Volume

Before starting:

1) Input **B** to PC on the main menu screen to display the electronic volume menu screen.
2) Input to PC the appropriate adjustment number. (*1)

*1: Pressing the [Esc] key on the adjustment menu screen will restore the main menu screen.

(1) CDS Sampling Pulse Adjustment

Incompleted Phenomenon:

Diagonal beats and horizontal noise occure.

Procedure:

1) Input **1** to PC on the adjustment menu screen.
2) Follow the instruction on PC display thereafter.

PC Display & Figs

Main menu

```
**********************************************************
          MANUAL ADJUSTMENT PROGRAM
**********************************************************

        [A]    DATA INITIALIZE
        [B]    ELECTRIC VOLUME
        [C]    ADJUSTMENT
        [D]    AUTO FOCUS
        [E]    SPOT NOISE
        [F]    IR CONTROL
        [ESC]  END

        Please select [A] - [F] or [ESC]
```

Screen for verifying initialization

```
<< DATA WRITING >>
START TO SEND DATA.  (Y/N)
```

Electronic volume menu

```
**********************************************************
          ELECTRIC VOLUME
**********************************************************

        [1]    CDS SAMPLING PULSE
        [ESC]  RETURN TO MAIN MENU

        Please select [1] or [ESC]
```

5.3 Adjustment

Before starting:

1) Input **C** to PC on the main menu screen to display the adjustment menu screen.
2) Input to PC the appropriate adjustment number. (*1)

*1: Pressing the [Esc] key on the adjustment menu screen will restore the main menu screen.

(1) Auto Iris Control Adjustment

Incompleted Phenomenon:

The picture becomes too bright.
The picture becomes too dark.

Condition:

Set the zoom to wide end and point at the light box, without chart inserted, to fill the screen.

Procedure:

1) Input **1** to PC on the adjustment menu screen.
2) Follow the instruction on PC display thereafter.
3) After the AIC (auto iris control) adjustment complete screen appears, press any key to restore the adjustment menu screen.
4) Turn the video camera off, leave as is for at least 5 seconds, and then turn it on again. (*1)

*1: When the video camera is turned on again, the SMAP may not operate normally, and the following adjustments may not be possible. If this happens, press the [Esc] key to restore the MS-DOS screen, and then restart the SMAP.

(2) White Balance Adjustment

Incompleted Phenomenon:

Color of the subject is different from that of the picture.
A white subject is not senn as white.

Conditions:

Attach a C12 filter.
Set the zoom to wide end, and point at a gray scale chart.

Procedure:

1) Input **2** to PC on the adjustment menu screen.
2) Follow the instructions on PC display thereafter.
3) After the white balance adjustment complete screen appears, press any key to restore the adjustment menu screen.

PC Display & Figs

Main menu

```
**********************************************************
          MANUAL ADJUSTMENT PROGRAM
**********************************************************

        [A]    DATA INITIALIZE
        [B]    ELECTRIC VOLUME
        [C]    ADJUSTMENT
        [D]    AUTO FOCUS
        [E]    SPOT NOISE
        [F]    IR CONTROL
        [ESC]  END

      Please select [A] - [F] or [ESC]
```

Adjustment menu

```
**********************************************************
                  ADJUSTMENT
**********************************************************

        [1]    AUTO IRIS CONTROL
        [2]    WHITE BALANCE
        [3]    CHROMA GAIN
        [ESC]  RETURN TO MAIN MENU

      Please select [1] - [3] or [ESC]
```

AIC adjustment complete

```
ADJUSTMENT FINISHED
PRESS ANY KEY
```

White balance adjustment complete

```
<< ADJUSTMENT OF WHITE BALANCE >>
ADJUSTMENT FINISHED
PRESS ANY KEY
```

(3) Chroma Gain Adjustment (Figs. 5-1, 5-2, 5-3)

Incompleted Phenomenon:

Color of the picture is denser than that of the subjuct.

Color of the picture is lighter than that of the subject.

Equipment:

Oscilloscope or Vectorscope

Test Point:

Video Out (PG1601-6)

Condition:

Atach a C12 filter

Point the at a color bar chart.

Procedure:

1) Input **3** to PC on the adjustment menu screen.
2) The chroma gain adjustment screen will appear.
3) When using an oscilloscope (Fig. 5-1):

   Press the **D** or **U** key to set the red level on waveform to approx. 620 mVp-p.

   Then, while holding down the [Ctrl] key, press the **D** or **U** key to set the red level on waveform to approx. 620 mV ± 20 mVp-p.

   When using a vectorscope (Figs. 5-2, 5-3):

   Press the **D** or **U** key to set the red vector to approx. 220% of burst vector.

   Then, while holding down the [Ctrl] key, press the **D** or **U** key to set the red vector to approx. 220% ± 5% of burst vector.
4) Press the [Enter] key: The PC display will switch from the chroma gain data write screen to chroma gain adjustment complete screen.
5) Press any key to restore the adjustment menu screen.

PC Display & Figs

Adjustment menu

```
**********************************************************
                    ADJUSTMENT
**********************************************************

          [1]    AUTO IRIS CONTROL
          [2]    WHITE BALANCE
          [3]    CHROMA GAIN
          [ESC]  RETURN TO MAIN MENU

          Please select [1] - [3] or [ESC]
```

Chroma gain adjustment complete

```
<< ADJUSTMENT OF CHROMA GAIN >>
ADJUSTMENT FINISHED
PRESS ANY KEY
```

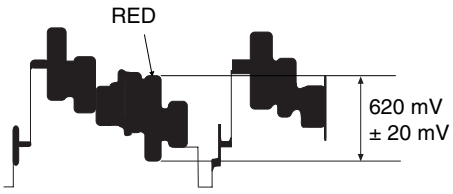


Fig. 5-1

Chroma gain adjustment

```
<< ADJUSTMENT OF CHROMA GAIN >>
          ROUGH ADJUSTMENT
[U]             CHROMA GAIN UP
[D]             CHROMA GAIN DOWN

          FINE ADJUSTMENT
[Crt] + [U]     CHROMA GAIN UP
[Crt] + [D]     CHROMA GAIN DOWN

[ENTER]         SAVE & RETURN TO MENU
[ESC]           QUIT
```

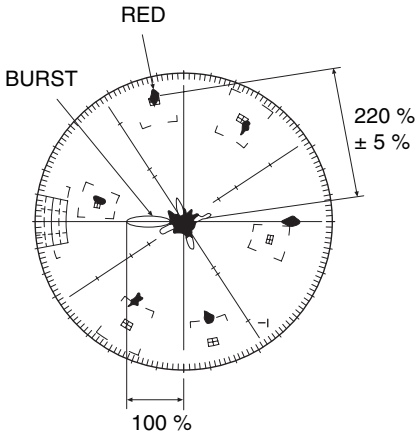


Fig. 5-2

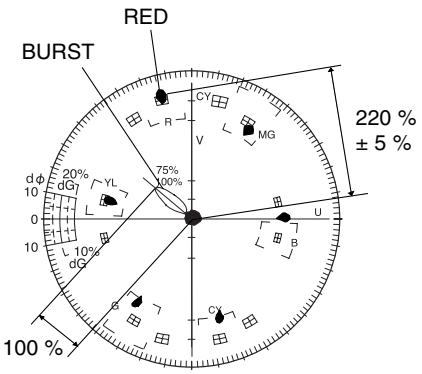


Fig. 5-3

Chroma gain data write

```
<< ADJUSTMENT OF CHROMA GAIN >>
DATA WRITING INTO EEPROM
```

5.4 Autofocus

Before starting adjustment:

1) Input **D** to PC on the main menu screen to display the AF menu screen.
2) Input the appropriate adjustment number to PC. (*1)

*1: Pressing the [Esc] key on the AF menu screen will restore the main menu screen.

(1) Zoom/Focus Tracking Adjustment

Incompleted Phenomenon:

Focus is lost during zooming.

Condition:

Point at the backfocus chart, 1500 ± 5mm away from the lens surface.
Light the backfocus chart with 200 - 400 lx.

Caution when Adjustment:

1) Measure the distance between the chart and lens surface precisely.
2) Place the chart as parallel as possible to the lens surface.
3) The backfocus chart should always be at the center of the monitor screen when the zoom is set to the wide-angle and telephoto ends.
4) The zoom trace adjustment procedure is completed within 2 minutes after it is selected.
5) Do not place any obstruction between the lens and chart during adjustment.

Procedure:

1) Input **1** to PC on the AF menu screen.
2) Follow the instructions on PC display thereafter.

(2) AF Noise Level Adjustment

Incompleted Phenomenon:

It takes time until a subject is brought into focus.
Correct focus is not obtained.

Condition:

Point at a light box without a chart inserted at a distance of up to 10cm.

Caution when Adjustment:

1) Place the light box as parallel as possible to the lens surface.
2) The AF noise level adjustment procedure will be completed within thirty seconds after it is selected.

Procedure:

1) Input **2** to PC on the AF menu screen.
2) Follow the instructions on PC display thereafter.

PC Display & Figs

Main menu

```
**********************************************************
          MANUAL ADJUSTMENT PROGRAM
**********************************************************

          [A]    DATA INITIALIZE
          [B]    ELECTRIC VOLUME
          [C]    ADJUSTMENT
          [D]    AUTO FOCUS
          [E]    SPOT NOISE
          [F]    IR CONTROL
          [ESC]  END

        Please select [A] - [F] or [ESC]
```

AF menu

```
**********************************************************
          AUTO FOCUS ADJUSTMENT
**********************************************************
[1]    ADJUSTMENT OF ZOOM/FOCUS TRACKING
[2]    ADJUSTMENT OF AF NOISE LEVEL
[3]    CHECK OF ZOOM TRACE
[ESC]  RETURN TO MENU
        Please select [1] - [3] or [ESC]
```

(3) Check of Zoom Trace

Incompleted Phenomenon:

Focus is lost during zooming.

Condition:

Point at the backfocus chart, 1500 ± 5mm away from the lens surface.
Light the backfocus chart with 200 - 400 lx.

Caution when Adjustment:

1) Measure the distance between the chart and lens surface precisely.
2) Place the chart as parallel as possible to the lens surface.
3) The backfocus chart should always be at the center of the monitor screen when the zoom is set to the wide-angle and telephoto ends.
4) Do not place any obstruction between the lens and chart during adjustment.

Procedure:

1) Input **3** to PC on the AF menu screen.
2) Follow the instructions on PC display thereafter.
   If error message appears, readjust the following items:
   (1) Zoom/Focus Tracking Adjustment
   (2) AF Noise Level Adjustment

5.5 Spot Noise

Important:

- Spot noise refers to bright points that appear on the screen, which are caused by a defect in pixel of CCD image sensor.
- Perform this adjustment after specified components have been replaced (see “List of Adjustment Items”).
- Perform this adjustment if spot noise occurs under abnormal usage conditions or after long-term use.
- If spot noise still occurs after this adjustment is complete, the CCD image sensor may be defective.
- Perform this adjustment after completing all other adjustments. (Perform this adjustment in normal video status.)

(1) Spot Noise Adjustment

Incompleted Phenomenon:

Spot noise occurs under abnormal usage conditions or after long-term use.

Equipment:

Color video monitor (CRT type is desirable)

Condition:

Cap the lens (so that no light enters).

PC Display & Figs

Main menu

```
**********************************************************
        MANUAL ADJUSTMENT PROGRAM
**********************************************************
        [A]     DATA INITIALIZE
        [B]     ELECTRIC VOLUME
        [C]     ADJUSTMENT
        [D]     AUTO FOCUS
        [E]     SPOT NOISE
        [F]     IR CONTROL
        [ESC]   END
      Please select [A] - [F] or [ESC]
```

AF menu

```
**********************************************************
            AUTO FOCUS ADJUSTMENT
**********************************************************
[1]     ADJUSTMENT OF ZOOM/FOCUS TRACKING
[2]     ADJUSTMENT OF AF NOISE LEVEL
[3]     CHECK OF ZOOM TRACE
[ESC]   RETURN TO MENU
      Please select [1] - [3] or [ESC]
```

Procedure:

1) Input **E** to PC on the main menu screen.
2) Follow the instructions on PC display thereafter.
3) The screen for verifying writing of spot noise data will appear: Input **Y**. (*1)
4) When writing data is complete, the spot noise data write complete screen will appear: Press any key to restore the main menu screen.

*1: Entering **N** on the screen for verifying writing of spot noise data will restore the main menu screen.

5.6 IR Control

(1) IR Control Adjustment

Condition:

Cap the lens (so that no light enters).

Procedure:

1) Input **F** to PC on the main menu screen.
2) Follow the instructions on PC display thereafter.
3) After the IR control adjustment complete screen appears, press any key to restore the adjustment menu screen.

PC Display & Figs

Main menu

```
**********************************************************
          MANUAL ADJUSTMENT PROGRAM
**********************************************************

          [A]    DATA INITIALIZE
          [B]    ELECTRIC VOLUME
          [C]    ADJUSTMENT
          [D]    AUTO FOCUS
          [E]    SPOT NOISE
          [F]    IR CONTROL
          [ESC]  END

          Please select [A] - [F] or [ESC]
```

Screen for verifying writing of spot noise data

```
<< DATA WRITING >>
START TO SEND DATA.  (Y/N)
```

Spot noise data write complete

```
FINISHED WRITING DATA
PRESS ANY KEY
```

IR control adjustment complete

```
FINISHED WRITING DATA
PRESS ANY KEY
```

6. Error Message

A message may appear while you are adjusting the video camera. If a message appears, refer to the following table and take appropriate corrective action.

6.1 Error Message of Electric Volume and Adjustment

ERROR MESSAGE	COUNTERMEASURE
ERROR OCCURRED. IRIS TROUBLE PRESS ANY KEY	• Check whether or not power is supplied. • Check the values of the iris drive circuit. • Defective soldering, damage to pattern, etc. in the above circuit. • Check the iris block and replace it if necessary.
ERROR OCCURRED ON da× ADJUSTMENT PRESS ANY KEY	• Check the values in the hall amp circuit. • Defective soldering, damage to pattern, etc. in the above circuit.
D RANGE OVER. ERROR ON da× ADJUSTMENT PRESS ANY KEY.	• Check the values in the hall amp circuit. • Defective soldering, damage to pattern, etc. in theabove circuit.
ERROR OCCURRED ON da0 and da1 ADJUSTMENT PRESS ANY KEY	• Check the values in the hall amp circuit and its peripheral circuits. • Defective soldering, damage to pattern, etc. in the above circuits.
FILE NOT FOUND !!!! PRESS ANY KEY	• The adjustment program (file) cannot be found. • Check the adjustment floppy disk and replace it if necessary.
FILE OPEN ERROR !!!! PRESS ANY KEY	• The adjustment program (file) does not start. • Check the adjustment floppy disk and replace it if necessary.
ERROR OCCURRED ON C DUTY ADJUSTMENT PRESS ANY KEY	• Check the values of the iris drive circuit. • Defective soldering, damage to pattern, etc. in the above circuit.
ERROR OCCURRED ON FDET ADJUSTMENT PRESS ANY KEY	• Supply power again and re-adjust. • Check the values in the hall amp circuit. • Defective soldering, damage to pattern, etc. in the above circuit.
ERROR OCCURRED. ZOOM DOES NOT WORK PRESS ANY KEY	• Supply power again and re-adjust.
TOO BRIGHT PRESS ANY KEY	• The subject is too bright. • Move the camera further away from the light box.
TOO DARK PRESS ANY KEY	• The subject is too dark. • Check the light box. • Move the camera closer to the light box.
D RANGE OVER ERROR ON HALL AMP IRIS CANNOT OPEN ANY MORE PRESS ANY KEY	• Supply power again and re-adjust. • The subject is too dark. • Check the light box. • Move the camera closer to the light box. • Check the values in the hall amp circuit. • Defective soldering, damage to pattern, etc. in the above circuit.
STAURATION ERROR. TOO BRIGHT PRESS ANY KEY	• The subject is too bright. • Move the camera further away from the light box.
CAN'T ADJUST WHITE BALANCE PLEASE RETRY PRESS ANY KEY	• The subject is too bright or too dark. • Check the light box. • Move the camera closer to or away from the light box. • Supply power again and re-adjust.

6.2 Error Message of Autofocus

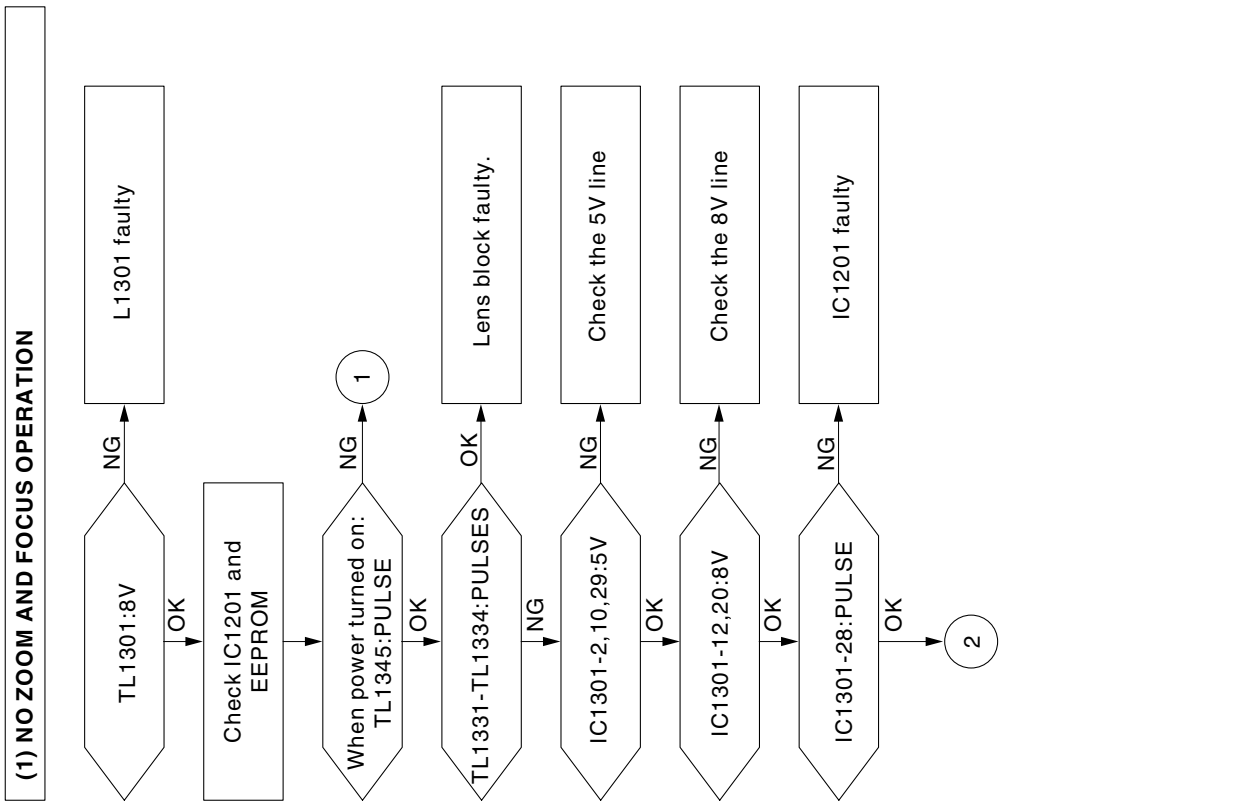
ERROR MESSAGE	COUNTERMEASURE
ERROR OCCURRED. ZOOM DOES NOT WORK PRESS ANY KEY	• Supply power again and re-adjust.
TIME OUT ERROR ON FOCUS	• Check the conditions of subject. • If this error message appears even when the adjustment is performed 2 or 3 times, the autofocus circuit system is defective. • Refer to (1) of TROUBLESHOOTING OF AUTOFOCUS.
TIME OUT ERROR ON ZOOM	• If this error message appears even when the adjustment is performed 2 or 3 times, the autofocus circuit system is defective. • Refer to (2) of TROUBLESHOOTING OF AUTOFOCUS.
TIME OUT ERROR ON AF STEP	• Check the conditions of subject. • If this error message appears even when the adjustment is performed 2 or 3 times, the autofocus circuit system is defective. • Refer to (1) of TROUBLESHOOTING OF AUTOFOCUS.
AF LIMIT OVER	• Check the conditions of subject. • If this error message appears even when the adjustment is performed 2 or 3 times, the autofocus circuit system is defective. • Refer to (2) of TROUBLESHOOTING OF AUTOFOCUS.
AF ERROR	• If this error message appears even when the adjustment is performed 2 or 3 times, the autofocus circuit system is defective. • Refer to (1) of TROUBLESHOOTING OF AUTOFOCUS.
TOO DARK	• Insufficient lighting. Check the subject.

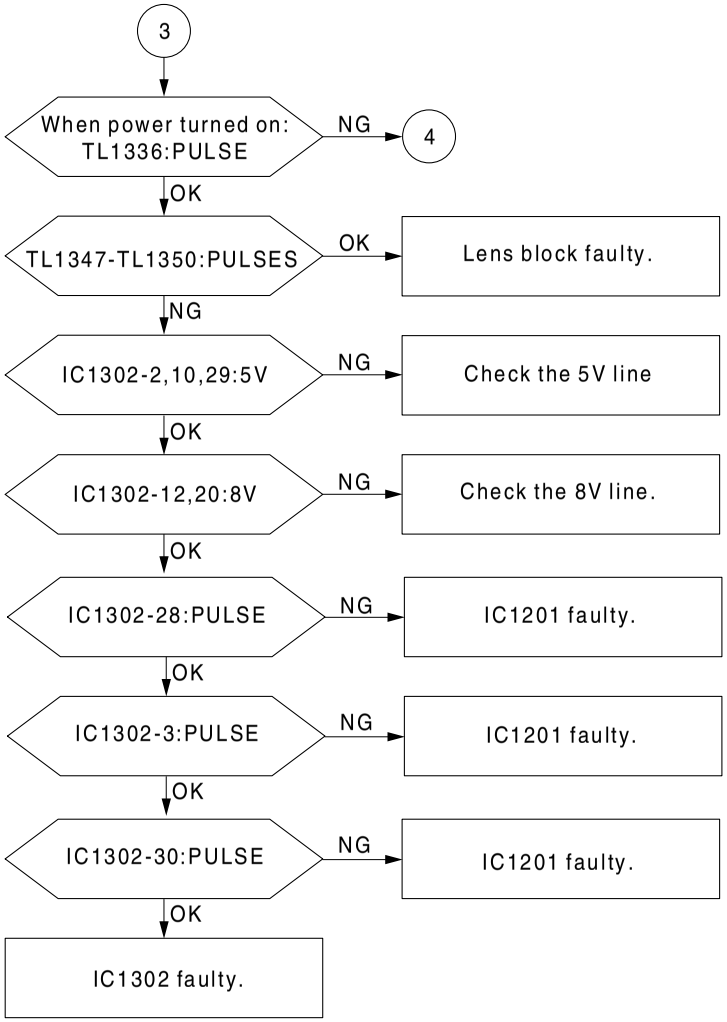
6.3 Error Message of Spot Noise Adjustment

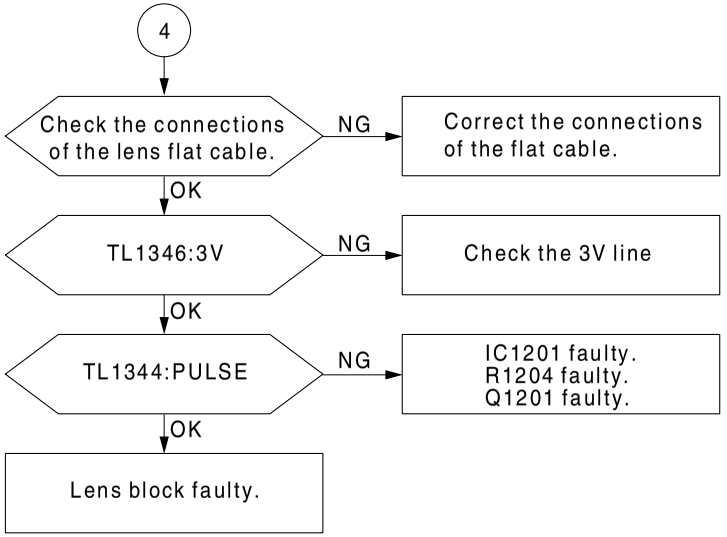
ERROR MESSAGE	COUNTERMEASURE
ERROR!! SPOT NOISE COMPENSATION IS STOPPED BY INITIAL DATA. PLEASE CHECK THE EEPROM. PRESS ANY KEY.	• Spot noise compensation is inhibited by the data in the EEPROM. • Turn the power on again. • Data in the EEPROM is defective. (Initialize it.) • Check the EEPROM, and if necessary, replace it.
ERROR!! THRESHOLD DATA ERROR. PLEASE CHECK THE EEPROM. PRESS ANY KEY.	• Turn the power on again. • Data in the EEPROM is defective. (Initialize it.) • Check the EEPROM, and if necessary, replace it.
ERROR!! THE SPOT NOISE IS TOO MANY. CAN'T COMPENSATE ANY MORE. PRESS ANY KEY.	• The amount of spot noise that can be compensated reaches the limit. • Turn the power on again. • Check the CCD image sensor, and if necessary, replace it.

6.4 Error Message of IR Control

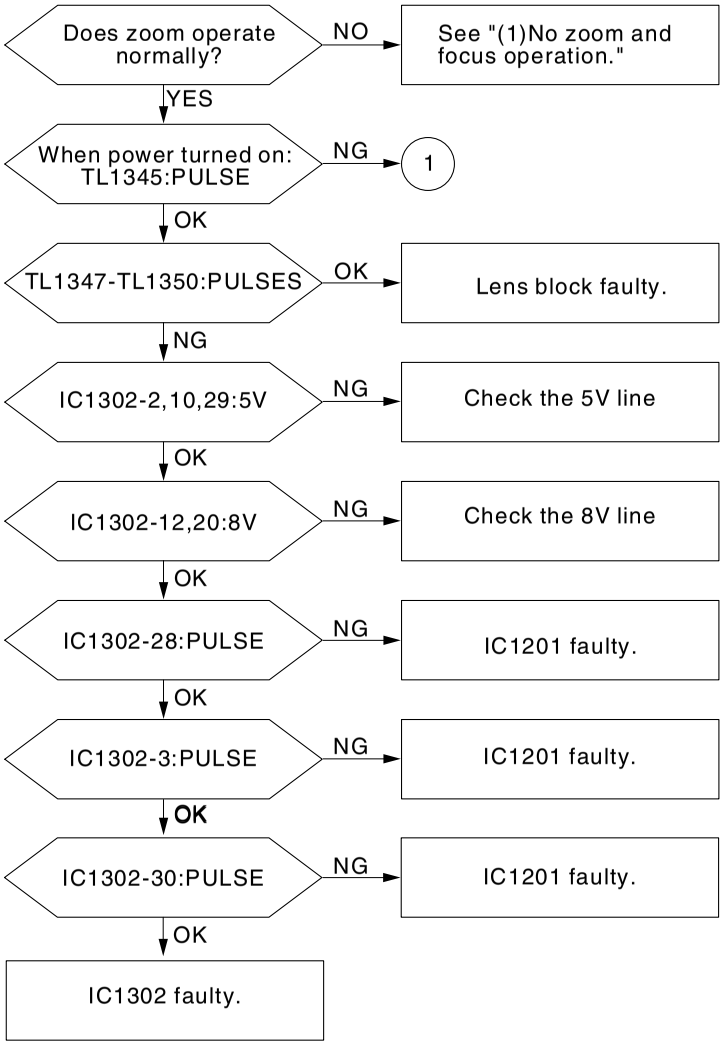
ERROR MESSAGE	COUNTERMEASURE
IR ERROR	• If this error message appears even when the adjustment is performed 2 or 3 times, the IR control circuit system is defective. • Refer to TROUBLESHOOTING OF IR CONTROL.

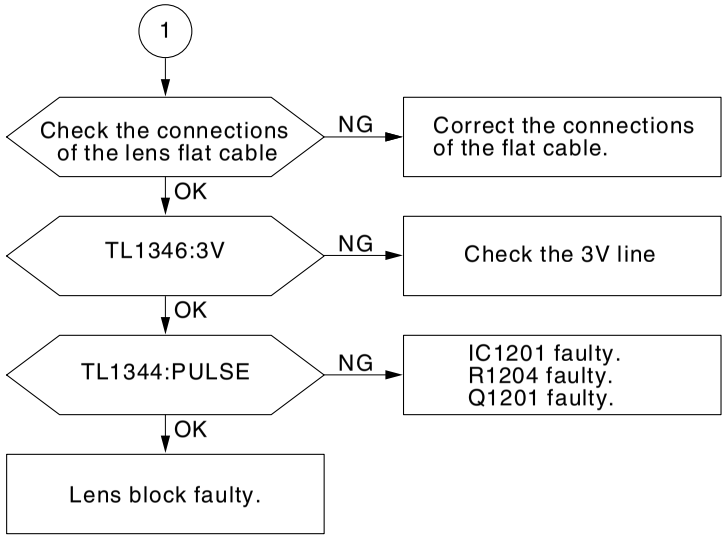

(1) NO ZOOM AND FOCUS OPERATION
TL1301:8V
NG
L1301 faulty
OK
Check IC1201 and EEPROM
When power turned on: TL1345:PULSE
NG
1
OK
TL1331-TL1334:PULSES
OK
Lens block faulty.
NG
IC1301-2,10,29:5V
Check the 5V line
OK
NG
IC1301-12,20:8V
Check the 8V line
OK
NG
IC1301-28:PULSE
IC1201 faulty
OK
2
1
Check the connections of the lens flat cable.
NG
Correct the connections of the cable.
OK
TL1346:3V
NG
Check the 3V line
OK
TL1335:PULSE
NG
IC1201 faulty. R1203 faulty. Q1201 faulty.
OK
Lens block faulty
2
IC1301-3:PULSE
NG
IC1201 faulty.
OK
IC1301-4:PULSE
NG
IC1201 faulty.
OK
IC1301-30:PULSE
NG
IC1201 faulty.
OK
Check IC1301
3


3
When power turned on: TL1336:PULSE
NG
4
OK
TL1347-TL1350:PULSES
OK
Lens block faulty.
NG
IC1302-2,10,29:5V
NG
Check the 5V line
OK
IC1302-12,20:8V
NG
Check the 8V line.
OK
IC1302-28:PULSE
NG
IC1201 faulty.
OK
IC1302-3:PULSE
NG
IC1201 faulty.
OK
IC1302-30:PULSE
NG
IC1201 faulty.
OK
IC1302 faulty.

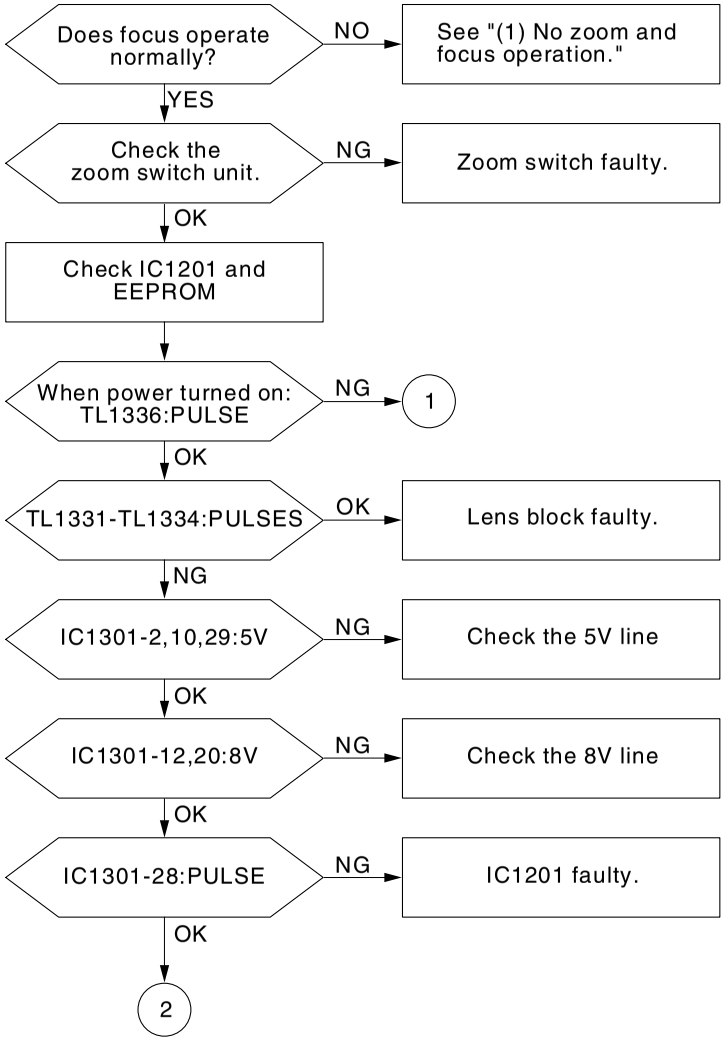

4
Check the connections of the lens flat cable.
NG
Correct the connections of the flat cable.
OK
TL1346:3V
NG
Check the 3V line
OK
TL1344:PULSE
NG
IC1201 faulty.
R1204 faulty.
Q1201 faulty.
OK
Lens block faulty.

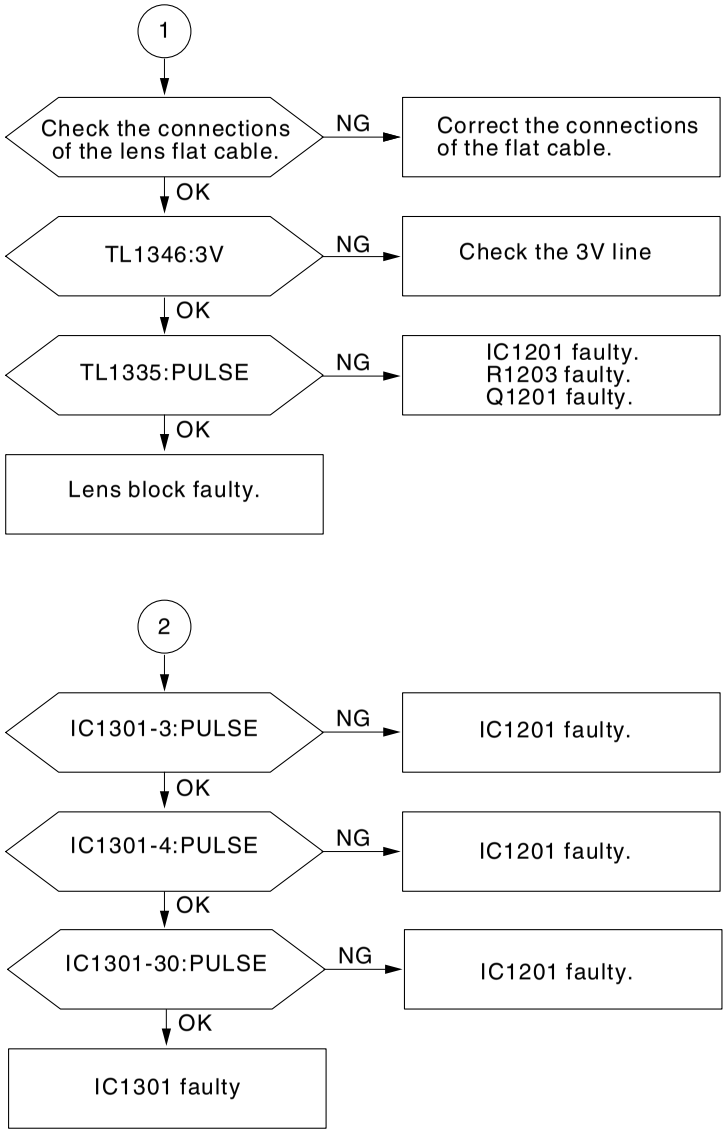
(2) NO FOCUS LENS OPERATION



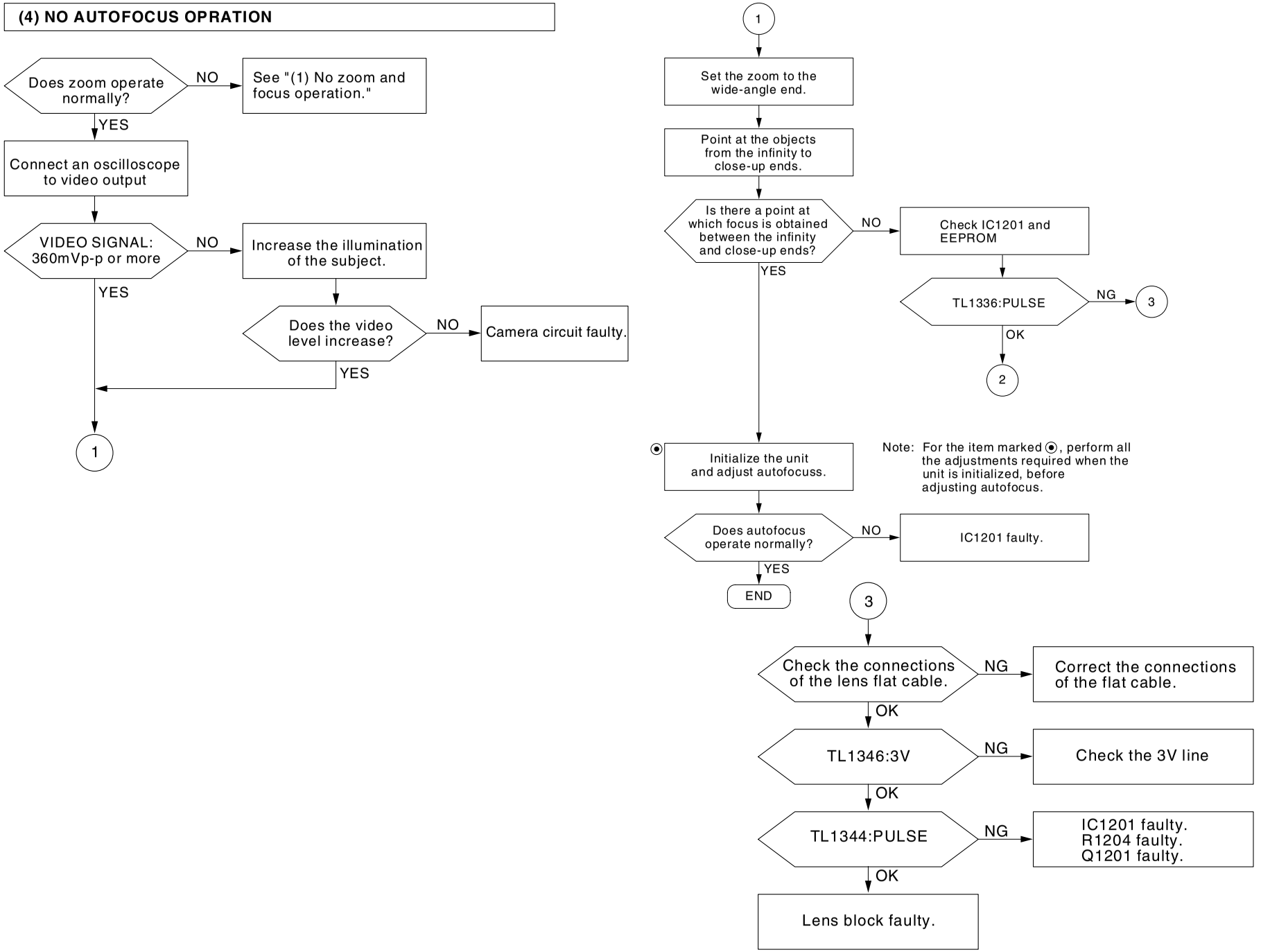


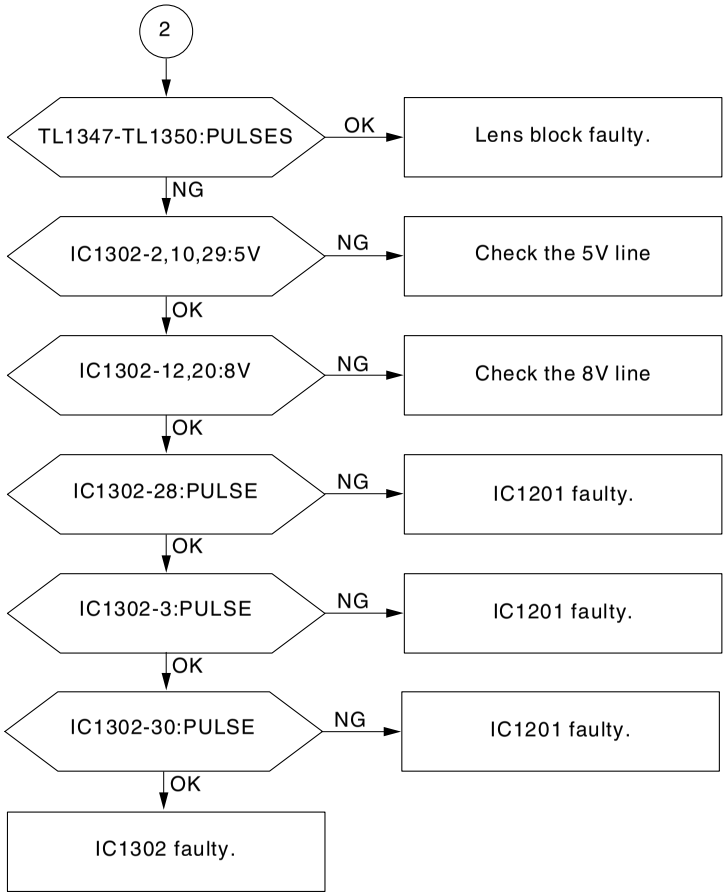
(3)NO ZOOM OPERATION



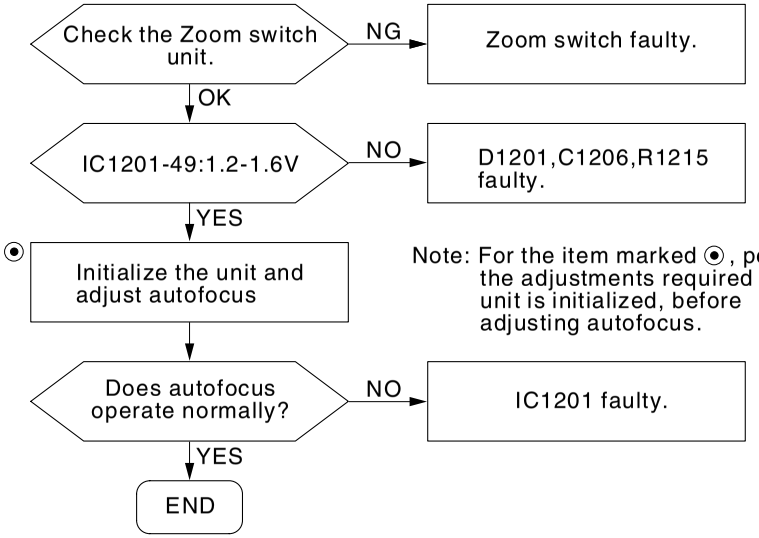


(4) NO AUTOFOCUS OPRATION

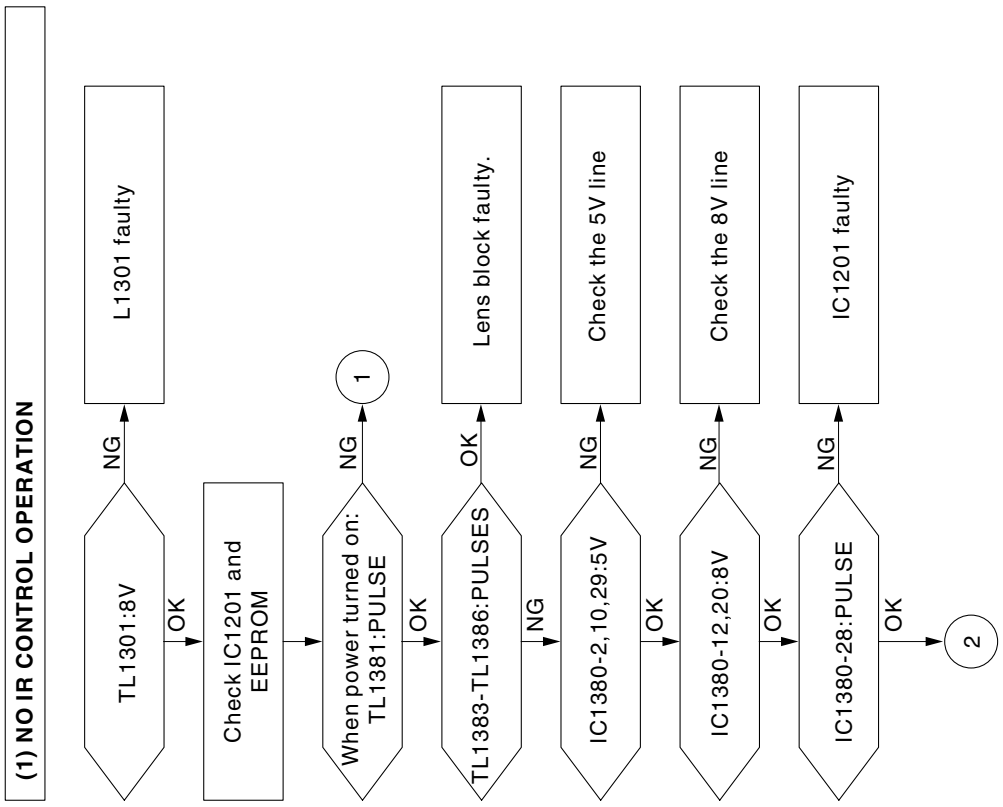


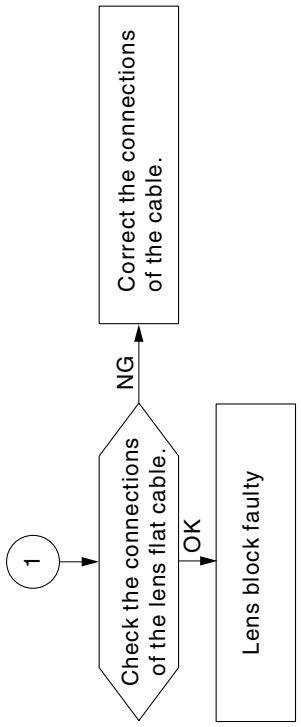


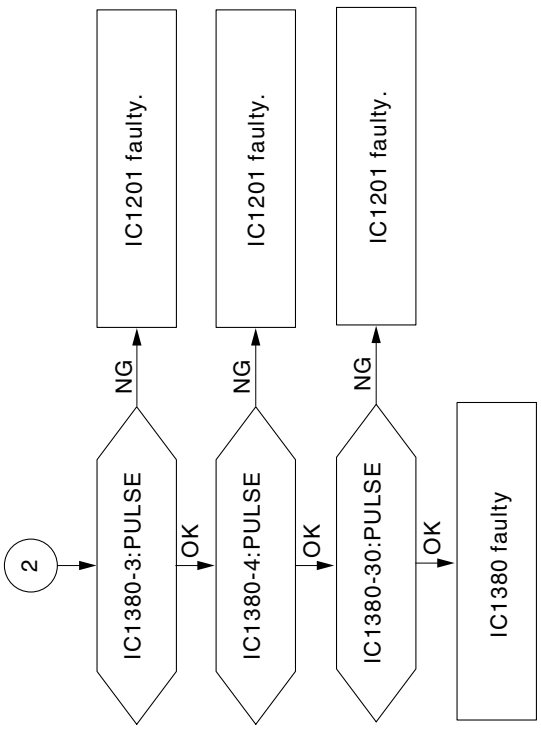
(5) SUBJECT IS GREATLY OUT-OF-FOCUS WHEN ZOOMED.

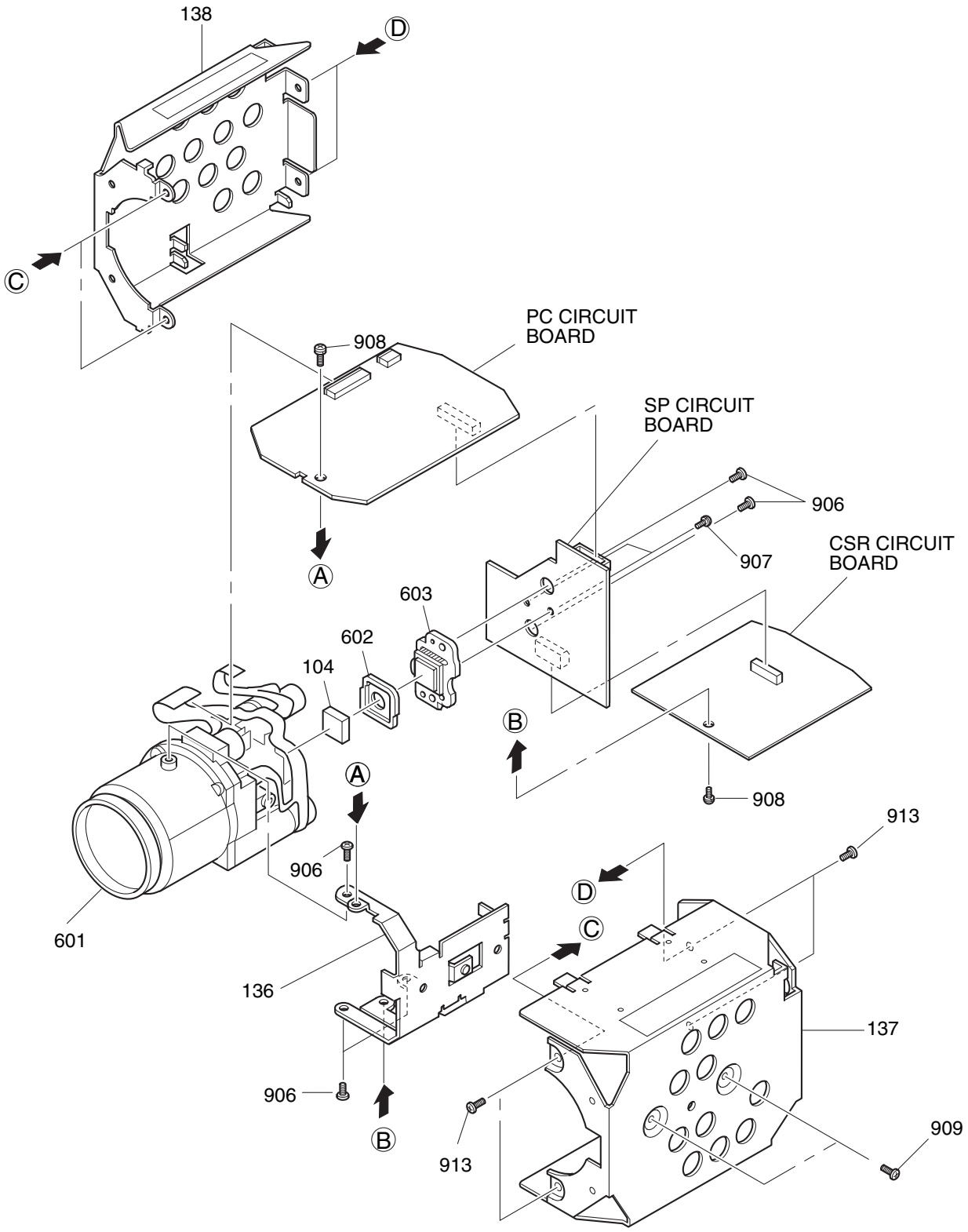


Note: For the item marked ⊙, perform all the adjustments required when the unit is initialized, before adjusting autofocus.


(1) NO IR CONTROL OPERATION
TL1301:8V
NG
L1301 faulty
OK
Check IC1201 and EEPROM
When power turned on: TL1381:PULSE
NG
1
OK
TL1383-TL1386:PULSES
OK
Lens block faulty.
NG
IC1380-2,10,29:5V
Check the 5V line
OK
NG
IC1380-12,20:8V
Check the 8V line
OK
NG
IC1380-28:PULSE
IC1201 faulty
OK
2


1
Check the connections of the lens flat cable.
NG
Correct the connections of the cable.
OK
Lens block faulty


2
IC1380-3:PULSE
NG
IC1201 faulty.
OK
IC1380-4:PULSE
NG
IC1201 faulty.
OK
IC1380-30:PULSE
NG
IC1201 faulty.
OK
IC1380 faulty


138
D
C
PC CIRCUIT BOARD
908
SP CIRCUIT BOARD
906
907
CSR CIRCUIT BOARD
A
603
602
104
B
908
A
913
906
D
C
601
136
137
906
B
913
909

CHAPTER 5 REPLACEMENT PARTS LIST

1. MECHANICAL PARTS LIST

SYMBOL NO	P-NO	DESCRIPTION
		MECHANISM SECTION
002	JP31901	PWB ASSY PC [For VK-S454]
002	JP31902	PWB ASSY PC [For VK-S454E]
104	DT10392	CRYSTAL
136	NA30812	BRACKET
137	NA19622	BRACKET(L)
138	NA19631	BRACKET
601	KQ10861	LENS ASSY
602	NX18521	RUBBER
603	UE15091	CCD IMAGE SENSOR [For VK-S454]
603	UE15092	CCD IMAGE SENSOR [For VK-S454E]
906	7775945	SCREW(2X5)
907	8650103	SCREW(2X3)
908	8650105	SCREW (2X5)
909	8749103	2X3 BIND SCREW
913	7775963	SCREW(2X3)

SYMBOL NO	P-NO	DESCRIPTION

2. ELECTRICAL PARTS LIST

SYMBOL NO	P-NO	DESCRIPTION
		CAPACITORS
C1001	0893107	CERAMIC CHIP 5.0PF+-0.25% 50V
C1002	AA00393R	CHIP CERAMIC 1.0UF+80-20% 50V
C1003	AA00393R	CHIP CERAMIC 1.0UF+80-20% 50V
C1004	AA00393R	CHIP CERAMIC 1.0UF+80-20% 50V
C1005	AA00393R	CHIP CERAMIC 1.0UF+80-20% 50V
C1006	0893213	CERAMIC CHIP 2200PF+-10% 50V
C1007	AA00422R	CERAMIC CHIP 10UF 16V
C1008	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1009	AA01032R	CERAMIC CAPACITOR 100000PF+-10% 250V
C1010	AA10383R	CHIP CAPACITOR 1UF+-10% 50V
C1011	0893014	CERAMIC CHIP 0.01UF+-10% 25V
C1012	AA00951R	CERAMIC CAPACITOR 1.0UF+-10% 16V
C1013	AA00931R	CERAMIC CAPACITOR 1.0UF+-10% 10V
C1014	AA00393R	CHIP CERAMIC 1.0UF+80-20% 50V
C1015	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C1019	AA00441R	CHIP CAPACITOR 22UF+-20% 6.3V
C1020	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C1021	AA00422R	CERAMIC CHIP 10UF 16V
C1022	AA00422R	CERAMIC CHIP 10UF 16V
C1023	AA00393R	CHIP CERAMIC 1.0UF+80-20% 50V
C1024	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C1025	AA00931R	CERAMIC CAPACITOR 1.0UF+-10% 10V
C1026	AA00441R	CHIP CAPACITOR 22UF+-20% 6.3V
C1027	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C1029	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C1101	AA00931R	CERAMIC CAPACITOR 1.0UF+-10% 10V
C1102	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1103	AA00931R	CERAMIC CAPACITOR 1.0UF+-10% 10V
C1104	AA00441R	CHIP CAPACITOR 22UF+-20% 6.3V
C1105	AA00931R	CERAMIC CAPACITOR 1.0UF+-10% 10V
C1106	AA00381R	CERAMIC CHIP 10UF+-10% 6.3V
C1107	0893088	CERAMIC CHIP 0.015UF+-10% 16V
C1108	AA00931R	CERAMIC CAPACITOR 1.0UF+-10% 10V
C1109	0893179	CERAMIC CHIP 0.1UF+-10% 16V
C1110	0893179	CERAMIC CHIP 0.1UF+-10% 16V
C1111	0893179	CERAMIC CHIP 0.1UF+-10% 16V
C1112	0893179	CERAMIC CHIP 0.1UF+-10% 16V
C1113	0893179	CERAMIC CHIP 0.1UF+-10% 16V
C1114	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1115	AA00931R	CERAMIC CAPACITOR 1.0UF+-10% 10V
C1125	0893114	CERAMIC CHIP 12PF+-5% 50V
C1126	0893114	CERAMIC CHIP 12PF+-5% 50V
C1131	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1132	AA00441R	CHIP CAPACITOR 22UF+-20% 6.3V
C1133	AA00422R	CERAMIC CHIP 10UF 16V
C1134	AA00441R	CHIP CAPACITOR 22UF+-20% 6.3V
C1135	AA00422R	CERAMIC CHIP 10UF 16V
C1140	AA00931R	CERAMIC CAPACITOR 1.0UF+-10% 10V
C1141	AA00931R	CERAMIC CAPACITOR 1.0UF+-10% 10V
C1142	AA00931R	CERAMIC CAPACITOR 1.0UF+-10% 10V
C1143	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1144	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1145	AA00422R	CERAMIC CHIP 10UF 16V
C1146	AA00931R	CERAMIC CAPACITOR 1.0UF+-10% 10V
C1147	AA00931R	CERAMIC CAPACITOR 1.0UF+-10% 10V
C1148	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1149	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1150	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1151	AA01101R	CERAMIC CAPACITOR 1UF+80-20% 10V
C1152	AA01101R	CERAMIC CAPACITOR 1UF+80-20% 10V
C1153	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1154	AA00931R	CERAMIC CAPACITOR 1.0UF+-10% 10V
C1155	AA00931R	CERAMIC CAPACITOR 1.0UF+-10% 10V
C1156	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1157	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1158	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1159	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1160	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1161	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1162	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1163	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1165	AA00931R	CERAMIC CAPACITOR 1.0UF+-10% 10V
C1166	0893179	CERAMIC CHIP 0.1UF+-10% 16V
C1167	AA00931R	CERAMIC CAPACITOR 1.0UF+-10% 10V
C1168	AA00422R	CERAMIC CHIP 10UF 16V
C1170	0893101	CERAMIC CHIP 0.5PF+-0.25% 50V
C1171	0893179	CERAMIC CHIP 0.1UF+-10% 16V
C1172	0893123	CERAMIC CHIP 56PF+-5% 50V
C1173	0893123	CERAMIC CHIP 56PF+-5% 50V
C1174	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1177	0893179	CERAMIC CHIP 0.1UF+-10% 16V
C1178	0893175	CERAMIC CHIP 1000PF+-5% 50V
C1180	0893108	CERAMIC CHIP 6.0PF+-0.5% 50V
C1181	0893108	CERAMIC CHIP 6.0PF+-0.5% 50V
C1183	0893175	CERAMIC CHIP 1000PF+-5% 50V
C1184	0893179	CERAMIC CHIP 0.1UF+-10% 16V
C1185	AA00422R	CERAMIC CHIP 10UF 16V
C1186	0893179	CERAMIC CHIP 0.1UF+-10% 16V
C1201	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1204	0893179	CERAMIC CHIP 0.1UF+-10% 16V
C1205	0893179	CERAMIC CHIP 0.1UF+-10% 16V
C1206	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1207	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1208	0893179	CERAMIC CHIP 0.1UF+-10% 16V
C1209	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1210	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1211	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1215	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1216	0893177	CAPACITOR 0.068UF+-10% 16V
C1218	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1220	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1221	AA00422R	CERAMIC CHIP 10UF 16V
C1222	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1301	0893222	CERAMIC CHIP 0.01UF+-10% 50V
C1302	0893215	CERAMIC CHIP 3300PF+-10% 50V
C1303	0893217	CERAMIC CHIP 4700PF+-10% 50V
C1304	0893217	CERAMIC CHIP 4700PF+-10% 50V
C1305	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1306	0893222	CERAMIC CHIP 0.01UF+-10% 50V
C1307	0893215	CERAMIC CHIP 3300PF+-10% 50V
C1308	0893217	CERAMIC CHIP 4700PF+-10% 50V
C1309	0893217	CERAMIC CHIP 4700PF+-10% 50V
C1310	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1311	AA00422R	CERAMIC CHIP 10UF 16V
C1312	0893179	CERAMIC CHIP 0.1UF+-10% 16V
C1313	0893179	CERAMIC CHIP 0.1UF+-10% 16V
C1314	AA00422R	CERAMIC CHIP 10UF 16V
C1317	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1318	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1319	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1320	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1351	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1352	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1353	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1354	0893132	CERAMIC CHIP 270PF+-5% 50V
C1355	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1356	0893007	CERAMIC CHIP 0.082UF+-10% 16V

SYMBOL NO	P-NO	DESCRIPTION
C1357	0893013	CERAMIC CHIP 0.22UF+-10% 16V
C1358	0893113	CERAMIC CHIP 10PF+-0.5% 50V
C1359	0893133	CERAMIC CHIP 330PF+-5% 50V
C1360	0893133	CERAMIC CHIP 330PF+-5% 50V
C1361	0893133	CERAMIC CHIP 330PF+-5% 50V
C1362	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C1380	0893222	CERAMIC CHIP 0.01UF+-10% 50V
C1381	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1382	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1383	0893215	CERAMIC CHIP 3300PF+-10% 50V
C1384	0893179	CERAMIC CHIP 0.1UF+-10% 16V
C1385	0893217	CERAMIC CHIP 4700PF+-10% 50V
C1386	0893217	CERAMIC CHIP 4700PF+-10% 50V
C1387	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1388	AA00422R	CERAMIC CHIP 10UF 16V
C1501	0206672	CHIP CAPACITOR 10UF+-20% 16V
C1502	0893165	CERAMIC CHIP 180PF+-5% 50V
C1503	0893202	CERAMIC CHIP 330PF+-10% 50V
C1504	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C1505	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C1506	0893013	CERAMIC CHIP 0.22UF+-10% 16V
C1507	0209942	CERAMIC CHIP 100PF+-5% 50V
C1508	0893013	CERAMIC CHIP 0.22UF+-10% 16V
C1510	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C1512	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C1513	0893165	CERAMIC CHIP 180PF+-5% 50V
C1514	0893202	CERAMIC CHIP 330PF+-10% 50V
C1515	0893158	CERAMIC CHIP 56PF+-5% 50V
C1516	0893203	CERAMIC CHIP 390PF+-10% 50V
C1517	0893165	CERAMIC CHIP 180PF+-5% 50V
C1518	0893202	CERAMIC CHIP 330PF+-10% 50V
C1519	0893062	CERAMIC CHIP 1UF+80-20% 16V
C1520	0206671	ELECTROLYTIC 10UF 10V
C1521	0893062	CERAMIC CHIP 1UF+80-20% 16V
C1522	0893062	CERAMIC CHIP 1UF+80-20% 16V
C1523	0206671	ELECTROLYTIC 10UF 10V
C1524	AA00441R	CHIP CAPACITOR 22UF+-20% 6.3V
C1525	0893062	CERAMIC CHIP 1UF+80-20% 16V
C1526	0206671	ELECTROLYTIC 10UF 10V
C1527	0893062	CERAMIC CHIP 1UF+80-20% 16V
C1528	0893062	CERAMIC CHIP 1UF+80-20% 16V
C1529	0893062	CERAMIC CHIP 1UF+80-20% 16V
C1530	AA00393R	CHIP CERAMIC 1.0UF+80-20% 50V
C1531	0893062	CERAMIC CHIP 1UF+80-20% 16V
C1532	AA00393R	CHIP CERAMIC 1.0UF+80-20% 50V
C1601	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1602	0206671	ELECTROLYTIC 10UF 10V
C1603	0893225	CERAMIC CHIP 0.1UF+80-20% 16V
C1604	0806129	ELECTROLYTIC 22UF 10V
C1605	AD10273R	CHIP RESISTOR 100UF+-20% 6.3V
C1606	AD10252R	ELECTROLYTIC 1.0UF 20V
C1610	0893179	CERAMIC CHIP 0.1UF+-10% 16V
C1611	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1612	0893179	CERAMIC CHIP 0.1UF+-10% 16V
C1613	0893011	CERAMIC CHIP 0.15UF+-10% 16V
C1614	AA00951R	CERAMIC CAPACITOR 1.0UF+-10% 16V
C1615	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C1616	0893225	CERAMIC CHIP 0.1UF+80-20% 16V
C1617	0893117	CERAMIC CHIP 22PF+-5% 50V
C1618	0893179	CERAMIC CHIP 0.1UF+-10% 16V
C1621	0893114	CERAMIC CHIP 12PF+-5% 50V
C1622	0893179	CERAMIC CHIP 0.1UF+-10% 16V
C1623	0893193	CERAMIC CHIP 0.01UF+-10% 25V
C1624	AA01111R	CERAMIC CHIP 1UF 6.3V
C1625	0893179	CERAMIC CHIP 0.1UF+-10% 16V
C1626	AA00381R	CERAMIC CHIP 10UF+-10% 6.3V
C1650	0893206	CERAMIC CHIP 680PF +-10% 50V
CP1101	5172801	FILTER,LOW PASS
CP1171	BE10501R	FILTER
CP1601	BV10211R	FILTER

RESISTORS

R1001	0790049	CHIP RESISTOR 8.2KOHM+-5% 1/16W
R1002	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W
R1003	0103829	CHIP RESISTOR 68 OHM+-5% 0.1W
R1005	0790064	CHIP RESISTOR 100KOHM+-5% 1/16W
R1020	AQ00196R	CHIP RESISTOR 1.2KOHM+-1% 1/16W
R1021	AQ00215R	CHIP RESISTOR 6.2KOHM+-1% W/16W
R1101	0790015	CHIP RESISTOR 22 OHM+-5% 1/16W
R1102	AQ00231R	CHIP RESISTOR 24KOHM+-1% 1/16W
R1105	0790025	CHIP RESISTOR 120 OHM+-5% 1/16W
R1140	0790059	CHIP RESISTOR 47KOHM+-5% 1/16W
R1143	0790059	CHIP RESISTOR 47KOHM+-5% 1/16W
R1144	AQ00251R	RESISTOR 130 OHM+-1%0.063W
R1145	AQ00214R	CHIP RESISTOR 5.6KOHM+-1% 1/16W
R1146	0790059	CHIP RESISTOR 47KOHM+-5% 1/16W
R1147	AQ00194R	CHIP RESISTOR 1.0KOHM+-1% 1/16W
R1148	AQ00205R	CHIP RESISTOR 2.7KOHM+-1% 1/16W
R1149	0790037	CHIP RESISTOR 1KOHM+-5% 1/16W
R1151	AQ00194R	CHIP RESISTOR 1.0KOHM+-1% 1/16W
R1155	AQ00194R	CHIP RESISTOR 1.0KOHM+-1% 1/16W
R1156	0790037	CHIP RESISTOR 1KOHM+-5% 1/16W
R1157	AQ00198R	CHIP RESISTOR 1.5KOHM+-1% 1/16W
R1158	AQ00212R	CHIP RESISTOR 4.7KOHM+-1% 1/16W
R1171	0790051	CHIP RESISTOR 10KOHM+-5% 1/16W
R1172	0790059	CHIP RESISTOR 47KOHM+-5% 1/16W
R1173	0790059	CHIP RESISTOR 47KOHM+-5% 1/16W
R1174	0790059	CHIP RESISTOR 47KOHM+-5% 1/16W
R1175	0790077	CHIP RESISTOR 1MOHM+-5% 1/16W
R1177	AQ00194R	CHIP RESISTOR 1.0KOHM+-1% 1/16W
R1201	0790027	CHIP RESISTOR 180OHM+-5% 1/16W
R1202	0790055	CHIP RESISTOR 22KOHM+-5% 1/16W
R1203	0790027	CHIP RESISTOR 180OHM+-5% 1/16W
R1204	0790027	CHIP RESISTOR 180OHM+-5% 1/16W
R1205	0790061	CHIP RESISTOR 56KOHM+-5% 1/16W
R1206	0790061	CHIP RESISTOR 56KOHM+-5% 1/16W
R1211	0790055	CHIP RESISTOR 22KOHM+-5% 1/16W
R1212	0790037	CHIP RESISTOR 1KOHM+-5% 1/16W
R1213	0790055	CHIP RESISTOR 22KOHM+-5% 1/16W
R1214	0790037	CHIP RESISTOR 1KOHM+-5% 1/16W
R1215	AQ00223R	CHIP RESISTOR 12KOHM+-1% 1/16W
R1216	0790037	CHIP RESISTOR 1KOHM+-5% 1/16W
R1217	0790064	CHIP RESISTOR 100KOHM+-5% 1/16W
R1218	0790064	CHIP RESISTOR 100KOHM+-5% 1/16W
R1219	0790051	CHIP RESISTOR 10KOHM+-5% 1/16W
R1220	0790051	CHIP RESISTOR 10KOHM+-5% 1/16W
R1221	0790051	CHIP RESISTOR 10KOHM+-5% 1/16W
R1222	0790051	CHIP RESISTOR 10KOHM+-5% 1/16W
R1225	0790059	CHIP RESISTOR 47KOHM+-5% 1/16W
R1227	0790055	CHIP RESISTOR 22KOHM+-5% 1/16W
R1228	0790059	CHIP RESISTOR 47KOHM+-5% 1/16W
R1230	0790046	CHIP RESISTOR 4.7KOHM+-5% 1/16W
R1231	0790051	CHIP RESISTOR 10KOHM+-5% 1/16W
R1232	0790031	CHIP RESISTOR 330 OHM+-5% 1/16W
R1233	0790031	CHIP RESISTOR 330 OHM+-5% 1/16W
R1234	0790031	CHIP RESISTOR 330 OHM+-5% 1/16W
R1237	0790031	CHIP RESISTOR 330 OHM+-5% 1/16W
R1238	0790031	CHIP RESISTOR 330 OHM+-5% 1/16W
R1256	0790037	CHIP RESISTOR 1KOHM+-5% 1/16W

SYMBOL NO	P-NO	DESCRIPTION
R1306	0103818	CHIP RESISTOR 8.2OHM+-10% 0.1W
R1307	0103813	CHIP RESISTOR 3.3 OHM+-10% 0.1W
R1308	0790051	CHIP RESISTOR 10KOHM+-5% 1/16W
R1309	0790051	CHIP RESISTOR 10KOHM+-5% 1/16W
R1310	0103818	CHIP RESISTOR 8.2OHM+-10% 0.1W
R1311	0103813	CHIP RESISTOR 3.3 OHM+-10% 0.1W
R1313	0103813	CHIP RESISTOR 3.3 OHM+-10% 0.1W
R1314	0103818	CHIP RESISTOR 8.2OHM+-10% 0.1W
R1315	0790051	CHIP RESISTOR 10KOHM+-5% 1/16W
R1316	0790051	CHIP RESISTOR 10KOHM+-5% 1/16W
R1317	0103813	CHIP RESISTOR 3.3 OHM+-10% 0.1W
R1318	0103818	CHIP RESISTOR 8.2OHM+-10% 0.1W
R1351	0790039	CHIP RESISTOR 1.5KOHM+-5% 1/16W
R1352	0790069	CHIP RESISTOR 0.27MOHM+-5% 1/16W
R1353	0790053	CHIP RESISTOR 15KOHM+-5% 1/16W
R1354	0790064	CHIP RESISTOR 100KOHM+-5% 1/16W
R1355	0790064	CHIP RESISTOR 100KOHM+-5% 1/16W
R1356	0790077	CHIP RESISTOR 1MOHM+-5% 1/16W
R1357	0790051	CHIP RESISTOR 10KOHM+-5% 1/16W
R1358	0790054	CHIP RESISTOR 18KOHM+-5% 1/16W
R1359	0790067	CHIP RESISTOR 180KOHM+-5% 1/16W
R1360	0790053	CHIP RESISTOR 15KOHM+-5% 1/16W
R1361	0790054	CHIP RESISTOR 18KOHM+-5% 1/16W
R1362	0790067	CHIP RESISTOR 180KOHM+-5% 1/16W
R1363	0790053	CHIP RESISTOR 15KOHM+-5% 1/16W
R1364	0790052	CHIP RESISTOR 12KOHM+-5% 1/16W
R1365	0790052	CHIP RESISTOR 12KOHM+-5% 1/16W
R1366	0790054	CHIP RESISTOR 18KOHM+-5% 1/16W
R1367	0790052	CHIP RESISTOR 12KOHM+-5% 1/16W
R1368	0790065	CHIP RESISTOR 120KOHM+-5% 1/16W
R1370	0790044	CHIP RESISTOR 3.3KOHM+-5% 1/16W
R1371	0790026	CHIP RESISTOR 150 OHM+-5% 1/16W
R1372	0790046	CHIP RESISTOR 4.7KOHM+-5% 1/16W
R1374	0790049	CHIP RESISTOR 8.2KOHM+-5% 1/16W
R1375	0790036	CHIP RESISTOR 820 OHM+-5% 1/16W
R1376	0790047	CHIP RESISTOR 5.6KOHM+-5% 1/16W
R1378	0790047	CHIP RESISTOR 5.6KOHM+-5% 1/16W
R1380	0103818	CHIP RESISTOR 8.2OHM+-10% 0.1W
R1381	0103813	CHIP RESISTOR 3.3 OHM+-10% 0.1W
R1382	0790051	CHIP RESISTOR 10KOHM+-5% 1/16W
R1383	0790051	CHIP RESISTOR 10KOHM+-5% 1/16W
R1384	0103818	CHIP RESISTOR 8.2OHM+-10% 0.1W
R1385	0103813	CHIP RESISTOR 3.3 OHM+-10% 0.1W
R1501	0790052	CHIP RESISTOR 12KOHM+-5% 1/16W
R1505	0790048	CHIP RESISTOR 6.8KOHM+-5% 1/16W
R1509	0790048	CHIP RESISTOR 6.8KOHM+-5% 1/16W
R1510	AQ00231R	CHIP RESISTOR 24KOHM+-1% 1/16W
R1512	0790049	CHIP RESISTOR 8.2KOHM+-5% 1/16W
R1515	0790041	CHIP RESISTOR 1.8KOHM+-5% 1/16W
R1516	0790051	CHIP RESISTOR 10KOHM+-5% 1/16W
R1517	0790048	CHIP RESISTOR 6.8KOHM+-5% 1/16W
R1519	0790051	CHIP RESISTOR 10KOHM+-5% 1/16W
R1520	0790052	CHIP RESISTOR 12KOHM+-5% 1/16W
R1521	0790049	CHIP RESISTOR 8.2KOHM+-5% 1/16W
R1522	0790052	CHIP RESISTOR 12KOHM+-5% 1/16W
R1524	AQ01021R	CHIP RESISTOR 10KOHM+-0.5% 1/16W
R1525	AQ01007R	CHIP RESISTOR 1KOHM+-0.5% 1/16W
R1526	AQ01016R	CHIP RESISTOR 4.7KOHM+-0.5% 1/16W
R1527	AQ01026R	CHIP RESISTOR 27KOHM+-0.5% 1/16W
R1528	0105203	CHIP RESISTOR 18KOHM+-0.5% 1/16W
R1529	AQ01021R	CHIP RESISTOR 10KOHM+-0.5% 1/16W
R1530	AQ01012R	CHIP RESISTOR 2.2KOHM+-0.5% 1/16W
R1532	AQ01021R	CHIP RESISTOR 10KOHM+-0.5% 1/16W
R1533	AQ01028R	CHIP RESISTOR 39KOHM1/16W
R1534	AQ01029R	CHIP RESISTOR 47KOHM1/16W

SYMBOL NO	P-NO	DESCRIPTION
R1535	0105205	CHIP RESISTOR 510 OHM+-0.5% 1/16W
R1536	0105194	CHIP RESISTOR 2400OHM+-0.5% 1/16W
R1601	0103829	CHIP RESISTOR 68OHM+-5% 0.1W
R1605	0790033	CHIP RESISTOR 470 OHM+-5% 1/16W
R1606	0104153	CHIP RESISTOR 470 OHM+-10% 0.125W
R1607	0790064	CHIP RESISTOR 100KOHM+-5% 1/16W
R1608	0790064	CHIP RESISTOR 100KOHM+-5% 1/16W
R1610	0790034	CHIP RESISTOR 560 OHM+-5% 1/16W
R1611	0790046	CHIP RESISTOR 4.7KOHM+-5% 1/16W
R1612	0790055	CHIP RESISTOR 22KOHM+-5% 1/16W
R1613	0790057	CHIP RESISTOR 33KOHM+-5% 1/16W
R1614	0790042	CHIP RESISTOR 2.2KOHM+-5% 1/16W
R1616	0790051	CHIP RESISTOR 10KOHM+-5% 1/16W
R1617	0790068	CHIP RESISTOR 220KOHM+-5% 1/16W
R1618	0790073	CHIP RESISTOR 470KOHM+-5% 1/16W
R1620	0790073	CHIP RESISTOR 470KOHM+-5% 1/16W
R1621	0790046	CHIP RESISTOR 4.7KOHM+-5% 1/16W
R1625	0790037	CHIP RESISTOR 1KOHM+-5% 1/16W
R1626	AQ00203R	CHIP RESISTOR 2.2KOHM+-1% 1/16W
R1627	AQ00205R	CHIP RESISTOR 2.7KOHM+-1% 1/16W
R1628	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R1629	0790044	CHIP RESISTOR 3.3KOHM+-5% 1/16W
R1630	0790032	CHIP RESISTOR 390 OHM+-5% 1/16W
R1633	AQ00203R	CHIP RESISTOR 2.2KOHM+-1% 1/16W
R1635	AQ00205R	CHIP RESISTOR 2.7KOHM+-1% 1/16W
R1636	0790037	CHIP RESISTOR 1KOHM+-5% 1/16W
R1639	0790037	CHIP RESISTOR 1KOHM+-5% 1/16W
R1640	0790037	CHIP RESISTOR 1KOHM+-5% 1/16W
RM1151	AQ00564R	CHIP RESISTOR 100KOHM
RM1152	AQ00564R	CHIP RESISTOR 100KOHM
RM1153	AQ00564R	CHIP RESISTOR 100KOHM
RM1154	AQ00564R	CHIP RESISTOR 100KOHM
RM1155	AQ00564R	CHIP RESISTOR 100KOHM
RM1156	AQ00564R	CHIP RESISTOR 100KOHM
RM1157	AQ00564R	CHIP RESISTOR 100KOHM
RM1158	AQ00564R	CHIP RESISTOR 100KOHM

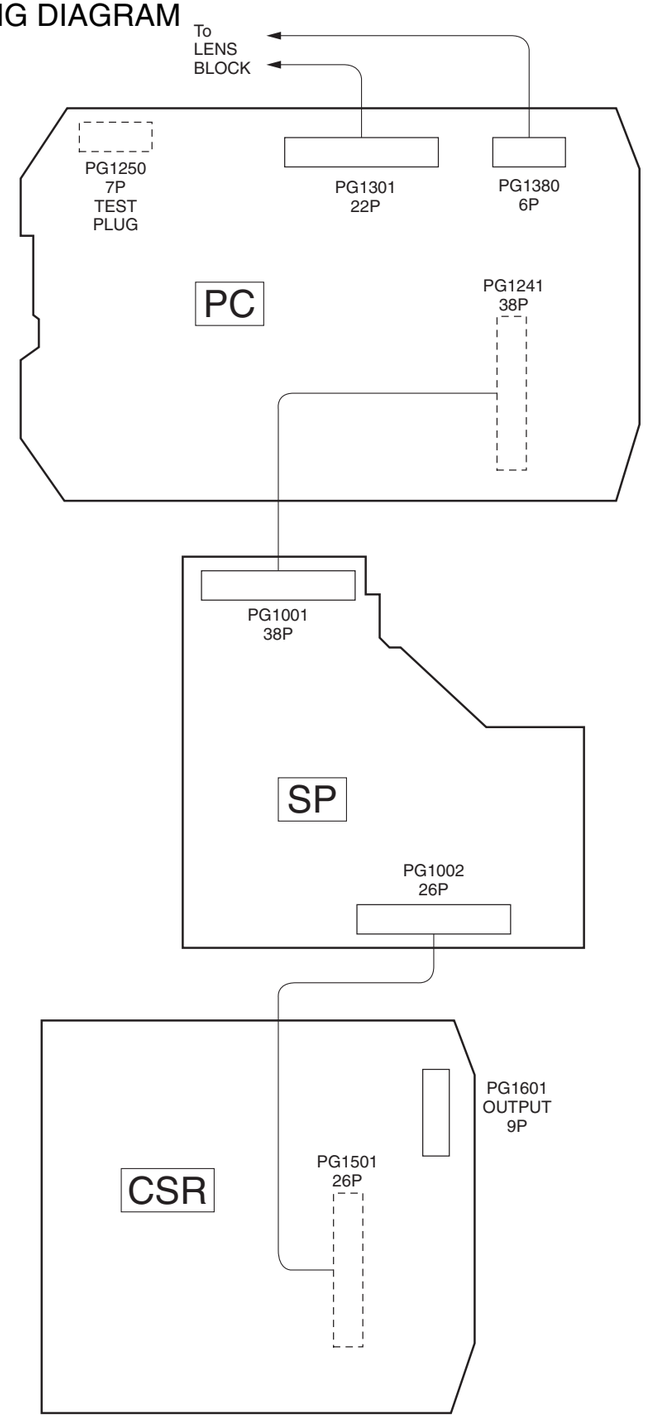
SEMI-CONDUCTORS

D1001	CC10291R	DIODE 1SS353
D1101	5337352	DIODE MA132WA
D1171	5337471	DIODE KV1470
D1201	5337422	DIODE DA221
D1351	5337422	DIODE DA221
D1501	CC10291R	DIODE 1SS353
D1502	5337352	DIODE MA132WA
D1503	CC10291R	DIODE 1SS353
D1601	5337391	DIODE D1FS4
D1602	CC10463R	DIODE MA3100L
IC1002	CK12061R	IC UPD16510GR
IC1003	CK26391R	IC HD74AC244
IC1101	CK27041U	IC HD49325BHF
IC1150	CK23583U	IC UPD4564323G5-A10BL-9JH
IC1171	CK18421R	IC TC7SHU04FU
IC1173	CK23401R	IC MJU6321P
IC1206	CK16201R	IC TC7S08FU
IC1250	CK21351R	IC X25097V1-2.7
IC1251	CK20403R	IC RN5VD27AA
IC1301	1366804	IC MPC17AT85VMEL
IC1302	1366804	IC MPC17AT85VMEL
IC1351	CK20621R	IC UPD5023GS-147-GJG
IC1380	1366804	IC MPC17AT85VMEL
IC1501	1366251	IC TL1464IPT
IC1601	CK23321R	IC BA7664FV
IC1602	1366081	IC HD74HCT125T

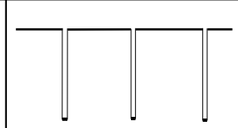
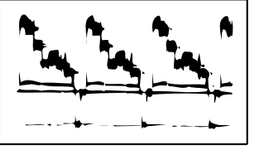
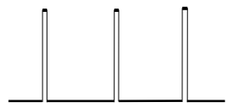
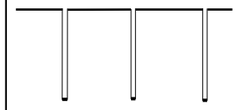
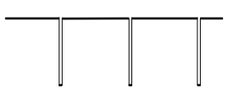
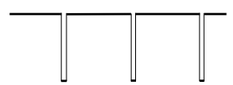
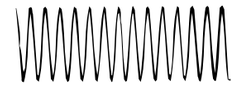
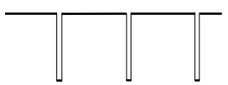
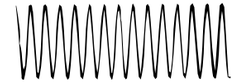
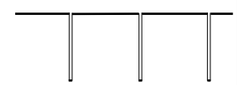
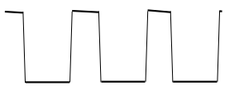
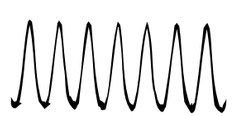
SYMBOL NO	P-NO	DESCRIPTION
IC1603	CK23291R	IC 74VHC4046MTCX
IC1604	5305831	IC TC7S08
IC1605	CK18421R	IC TC7SHU04FU
IC1606	CK21441R	IC NJM2533V
Q1001	5328221	TRANSISTOR 2SC2620-QC
Q1020	5328192	TRANSISTOR 2SC2462LD
Q1101	1323231	TRANSISTOR 2SB1462
Q1102	1323231	TRANSISTOR 2SB1462
Q1103	5328192	TRANSISTOR 2SC2462LD
Q1201	1323286	TRANSISTOR UMH9N
Q1351	5328192	TRANSISTOR 2SC2462LD
Q1352	5328974	TRANSISTOR 2SC2412K
Q1353	1323142	TRANSISTOR 2SC2411K
Q1501	1308011	TRANSISTOR MPL1
Q1502	1308011	TRANSISTOR MPL1
Q1503	1308011	TRANSISTOR MPL1
Q1504	CA10271R	TRANSISTOR 2SB1424
Q1506	5326421	TRANSISTOR 2SC4081BR
Q1601	1323273	TRANSISTOR DTA143EE
Q1602	1323271	TRANSISTOR DTC144EE
Q1603	1323279	TRANSISTOR DTC114YE
Q1604	1323271	TRANSISTOR DTC144EE
Q1605	1323321	TRANSISTOR 2SD2216
Q1606	1323271	TRANSISTOR DTC144EE
Q1607	5328221	TRANSISTOR 2SC2620-QC
Q1608	1323321	TRANSISTOR 2SD2216
Q1609	1323253	TRANSISTOR XP4401
Q1610	1323291	TRANSISTOR 2SC4617
Q1611	1323231	TRANSISTOR 2SB1462
ZD1171	CC10433R	DIODE(MA3030L)
		TRANSFORMER
T1501	BC10441R	COIL
		COILS
L1001	BA10334R	COIL 10UH
L1002	BA10334R	COIL 10UH
L1101	BA10334R	COIL 10UH
L1102	BA10334R	COIL 10UH
L1103	BA10334R	COIL 10UH
L1201	BA10334R	COIL 10UH
L1202	BA10334R	COIL 10UH
L1301	BA10696R	COIL 680UH
L1302	BA10334R	COIL 10UH
L1501	BA10335R	COIL 22UH
L1503	BA10695R	COIL
L1504	BA10693R	COIL
L1505	BA10695R	COIL
L1506	0773004	COIL 100UH
L1507	0773004	COIL 100UH
L1601	BA10334R	COIL 10UH
L1602	BA10335R	COIL 22UH
L1603	BA10337R	COIL 100UH
L1604	BA10337R	COIL 100UH
		CRYSTAL
X1171	BL10937R	CRYSTAL
		MISCELLANEOUS
BL1101	BM00137R	FILTER B750
BL1102	BM00137R	FILTER B750
BL1601	BE10132R	FILTER,LC
BL1602	BM00152R	FILTER
⚠ F1601	5723235	FUSE 1A
PG1001	1830311	CONNECTOR
PG1002	1830096	MINI PLUG
PG1241	1830312	CONNECTOR
PG1250	5669199	PLUG
PG1301	EA10409R	PLUG
PG1380	EA10362R	CONNECTOR
PG1501	1830104	MINI PLUG
PG1601	5666914	MINI PLUG

CHAPTER 6 SCHEMATIC, CIRCUIT BOARD AND BLOCK DIAGRAMS/MICROPROCESSOR PINS FUNCTION TABLES

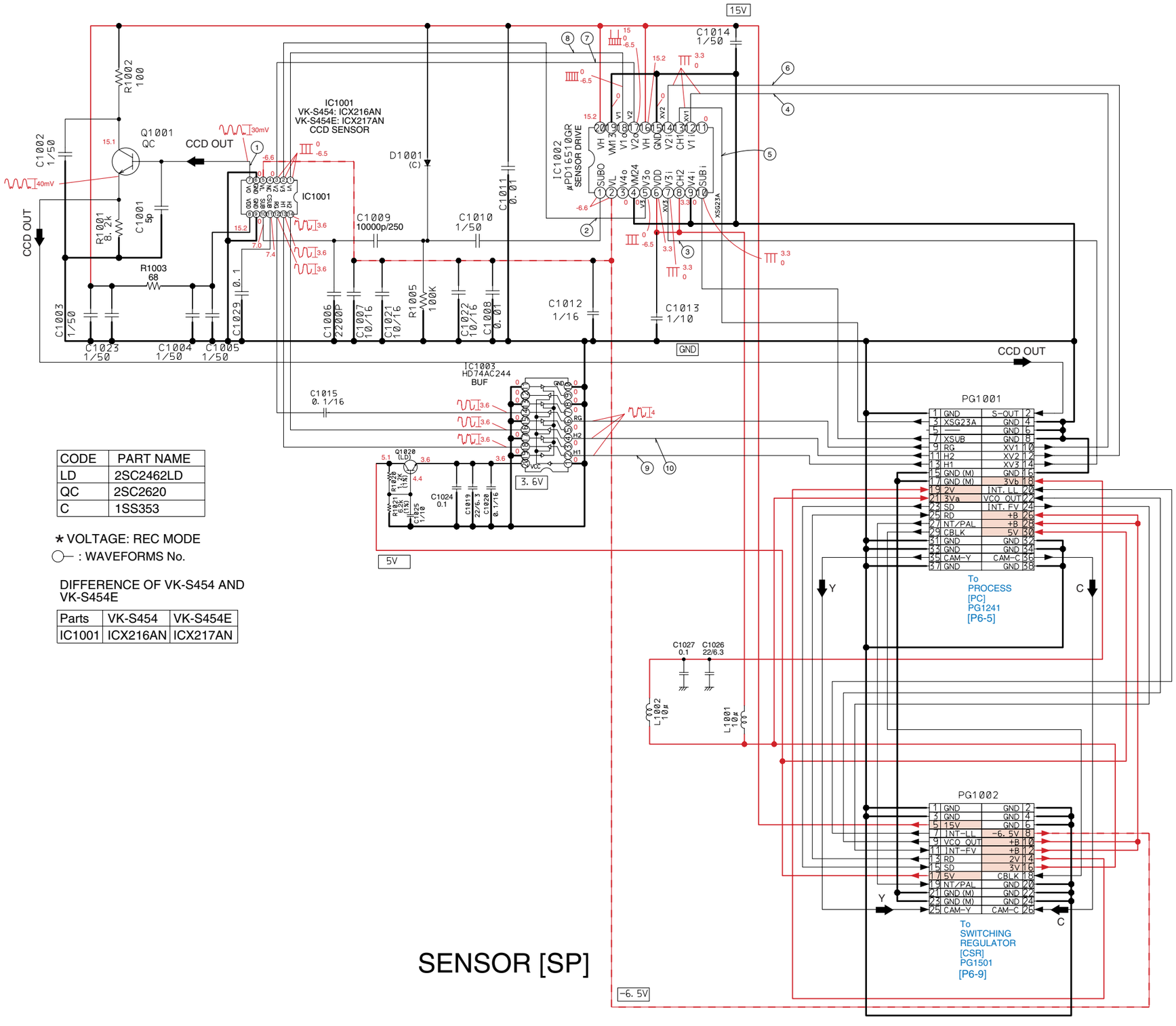
INTERNAL WIRING DIAGRAM



WAVEFORMS

1 IC1001-7 1.1Vp-p 0.2V/20.0µs COLOR CHART	7 IC1002-17 6.5Vp-p 2V/20.0µs COLOR CHART	13 IC1101-26 1.1Vp-p 0.2V/20.0µs COLOR CHART	19 Q1102-B 1.0Vp-p 0.2V/20.0µs COLOR CHART
			
2 IC1002-5 6.5Vp-p 2V/20.0µs COLOR CHART	8 IC1002-18 6.5Vp-p 2V/20.0µs COLOR CHART	14 IC1201-38 3.0Vp-p 1V/5.0ms COLOR CHART	
			
3 IC1002-7 3.1Vp-p 1V/20.0µs COLOR CHART	9 IC1003-2 6.0Vp-p 2V/100ns COLOR CHART	15 IC1201-72 3.0Vp-p 1V/20.0µs COLOR CHART	
			
4 IC1002-12 3.1Vp-p 1V/20.0µs COLOR CHART	10 IC1003-4 6.0Vp-p 2V/100ns COLOR CHART	16 IC1201-75 3.0Vp-p 1V/5.0ms COLOR CHART	
			
5 IC1002-13 3.1Vp-p 1V/5.0ms COLOR CHART	11 IC1101-18 4.2Vp-p 1V/50.0ns COLOR CHART	17 IC1201-78 3.0Vp-p 1V/5.0ms COLOR CHART	
			
6 IC1002-14 3.1Vp-p 1V/20.0µs COLOR CHART	12 IC1101-19 4.2Vp-p 1V/50.0ns COLOR CHART	18 Q1101-B 550mVp-p 0.2V/20.0µs COLOR CHART	
			

SENSOR [SP] SCHEMATIC DIAGRAM



CODE	PART NAME
LD	2SC2462LD
QC	2SC2620
C	1SS353

★ VOLTAGE: REC MODE

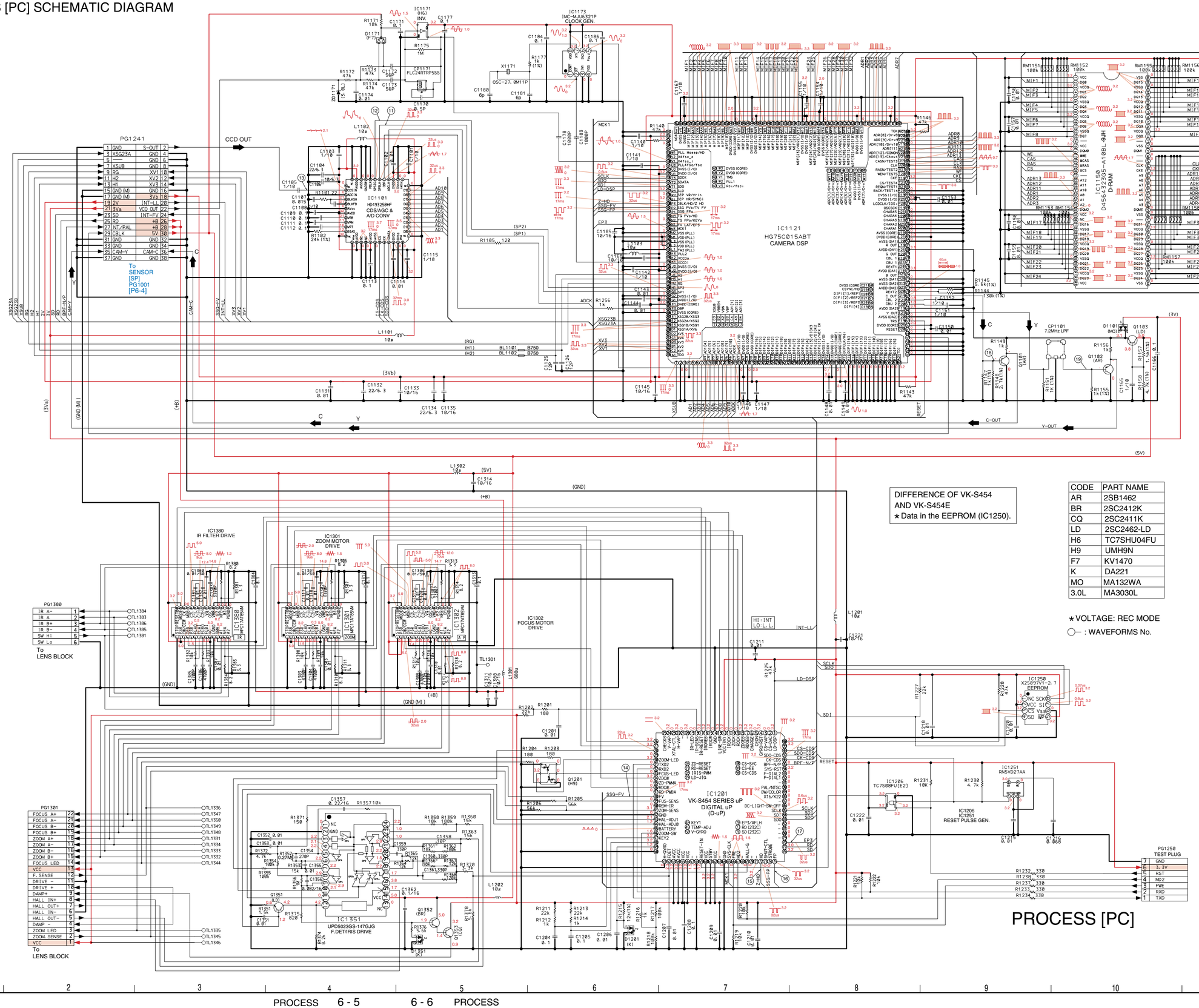
◯— : WAVEFORMS No.

DIFFERENCE OF VK-S454 AND VK-S454E

Parts	VK-S454	VK-S454E
IC1001	ICX216AN	ICX217AN

SENSOR [SP]

PROCESS [PC] SCHEMATIC DIAGRAM



CODE	PART NAME
AR	2SB1462
BR	2SC2412K
CQ	2SC2411K
LD	2SC2462-LD
H6	TC7SHU04FU
H9	UMH9N
F7	KV1470
K	DA221
MO	MA132WA
3.0L	MA3030L

IDENTIFICATION OF PARTS LOCATION

CSR

Symbol No.	Parts Location
BL	
BL1601	B-1B
BL1602	A-2B
C	
C1501	A-1A
C1502	B-2A
C1503	B-1A
C1504	B-1A
C1505	B-1A
C1506	B-1A
C1507	B-1A
C1508	B-1A
C1510	B-1A
C1512	B-1A
C1513	B-2A
C1514	B-1A
C1515	B-2A
C1516	B-2A
C1517	B-2A
C1518	B-2A
C1519	B-2A
C1520	A-2A
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C1523	B-3A
C1524	B-3A
C1525	B-2B
C1526	A-2A
C1527	B-2A
C1528	B-2B
C1529	B-2B
C1530	B-2A
C1531	B-2B
C1532	B-2B
C1601	A-1B
C1602	A-1B
C1603	A-2C
C1604	A-2C
C1605	A-2C
C1606	A-2C
C1610	A-2B
C1611	B-2C
C1612	B-2B
C1613	B-3B
C1614	B-2B
C1615	B-3B
C1616	B-3B
C1617	A-2B
C1618	B-1B
C1621	B-1B
C1622	A-2B
C1623	A-2B
C1624	A-2B
C1625	A-2B
C1626	B-2B
C1650	B-2B
CP	
CP1601	A-1A
D	
D1501	A-2A
D1502	B-2A
D1503	A-2B
D1601	B-1C
D1602	B-1A
F	
F1601	B-1B
IC	
IC1501	B-1A
IC1601	A-2C
IC1602	B-2B
IC1603	B-2B
IC1604	B-3B
IC1605	A-1B
IC1606	A-2B
L	
L1501	A-1A
L1503	A-2A
L1504	A-3A
L1505	A-2A
L1506	B-2A
L1507	B-2B
L1601	A-1B
L1602	B-2B
L1603	A-1B
L1604	A-1B
PG	
PG1501	A-1A
PG1601	B-1B
Q	
Q1501	B-2A
Q1502	B-3A
Q1503	B-2A
Q1504	B-2A
Q1506	B-2B
Q1601	B-3B
Q1602	B-2B
Q1603	B-3B
Q1604	A-1B
Q1605	A-2B
Q1606	A-2B
Q1607	B-2B
Q1608	A-1B
Q1609	B-2B
Q1610	B-2C
Q1611	B-2C
R	
R1501	B-2A
R1505	B-1A
R1509	B-1A
R1510	B-1A
R1512	B-1A
R1515	B-1A
R1516	B-1A
R1517	B-1A
R1519	B-1A
R1520	B-1A
R1521	B-2A
R1522	B-2A
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R1526	B-2A
R1527	B-3A
R1528	B-3A
R1529	B-3A
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R1532	B-2A
R1533	A-2A
R1534	A-2A
R1535	A-2A
R1536	A-2A
R1601	A-2B
R1605	B-2B
R1606	B-2B
R1607	B-2B
R1608	B-2B
R1610	B-2C
R1611	B-2B
R1612	B-2B
R1613	B-2B
R1614	B-3B
R1616	B-2B
R1617	B-2B
R1618	B-2B
R1620	B-3C
R1621	B-3B
R1625	A-2B
R1626	A-1B
R1627	A-2B
R1628	B-2B
R1629	B-2C
R1630	B-2C
R1633	A-1B
R1635	A-1B
R1636	A-1B
R1639	B-2B
R1640	B-2C
T	
T1501	A-2B

PC

Symbol No.	Parts Location
BL	
BL1101	A-3B
BL1102	A-3B
C	
C1101	B-3B
C1102	B-3B
C1103	B-3B
C1104	B-3B
C1105	A-4B
C1106	B-3C
C1107	B-4B
C1108	B-4B
C1109	B-4B
C1110	B-4B
C1111	B-4B
C1112	B-4B
C1113	B-4B
C1114	B-4B
C1115	B-4B
C1125	A-3B
C1126	A-3B
C1131	B-2C
C1132	B-2C
C1133	A-4B
C1134	A-4A
C1135	A-4A
C1140	B-2A
C1141	B-2A
C1142	B-3A
C1143	B-3A
C1144	B-3A
C1145	B-3A
C1146	B-3B
C1147	B-3B
C1148	B-3B
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C1150	B-3B
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C1155	B-2B
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C1157	B-2C
C1158	B-2B
C1159	B-2B
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C1161	B-1B
C1162	B-1B
C1163	B-1C
C1165	B-4C
C1166	B-4C
C1167	B-2A
C1168	B-3A
C1170	A-2A
C1171	A-2A
C1172	A-2A
C1173	A-2A
C1174	A-2A
C1177	A-2A
C1178	A-1A
C1180	A-2A
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C1183	A-3A
C1184	A-2A
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C1206	A-1A
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C1216	A-1A
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C1221	A-3A
C1222	A-1A
C1301	A-2B
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C1303	A-2B
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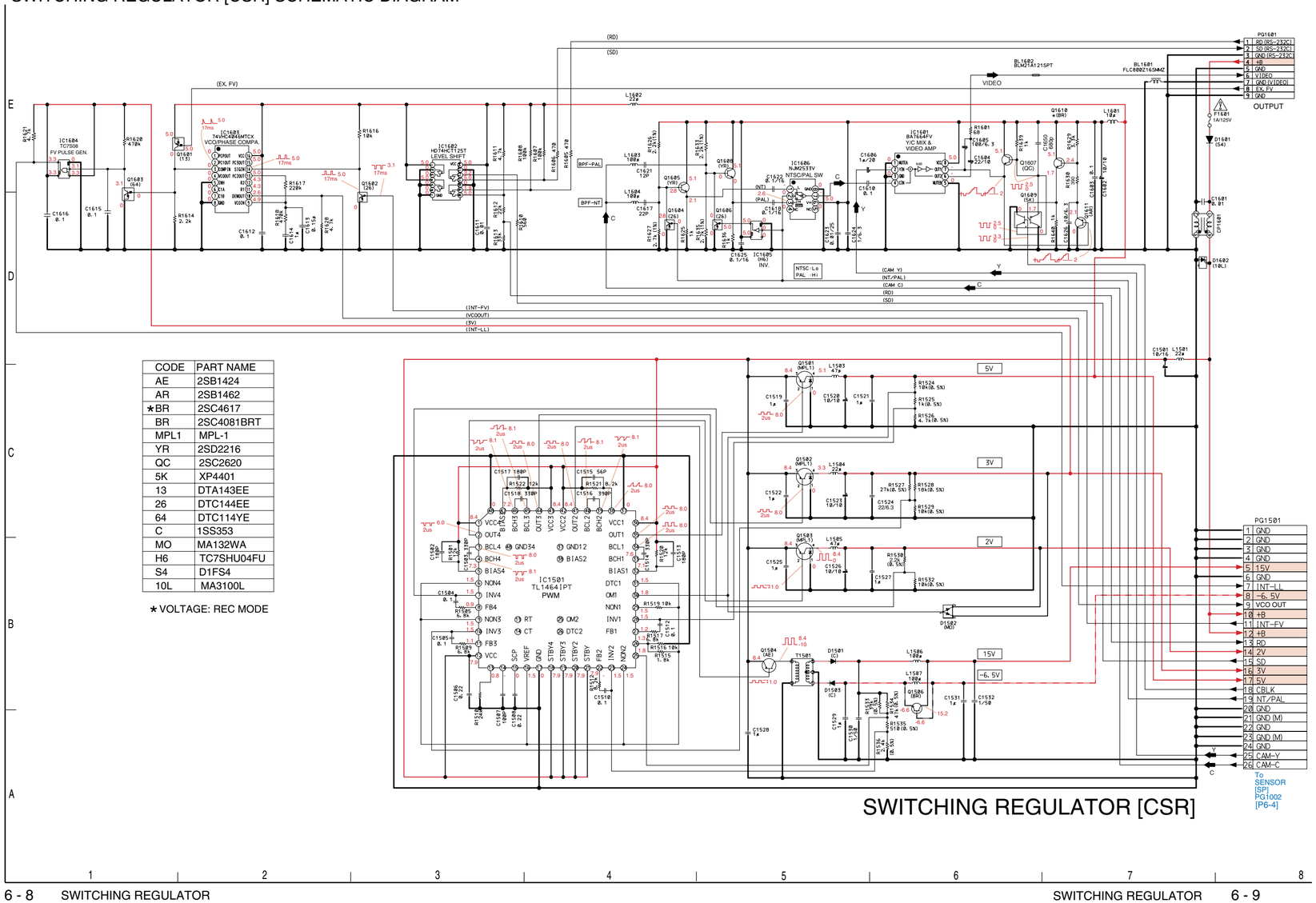
C1383	B-3A
C1384	B-3A
C1385	B-4B
C1386	B-4A
C1387	B-4A
C1388	A-1C
CP	
CP1101	B-3C
CP1171	A-2A
D	
D1101	B-4C
D1171	A-2A
D1201	A-2B
D1351	A-1A
IC	
IC1101	B-4B
IC1121	B-3B
IC1150	B-2B
IC1171	A-2A
IC1173	A-3A
IC1201	B-2A
IC1206	A-1A
IC1250	A-3A
IC1251	A-1A
IC1301	A-2B
IC1302	A-3B
IC1351	B-1B
IC1380	B-4A
L	
L1101	B-3C
L1102	A-4B
L1103	B-3A
L1201	A-3A
L1202	A-1A
L1301	A-1B
L1302	A-4C
L1381	B-3A
PG	
PG1241	A-3B
PG1250	A-1A
PG1301	B-2A
PG1380	B-3A
Q	
Q1101	B-3C
Q1102	B-2C
Q1103	B-4C
Q1201	B-1A
Q1351	B-1B
Q1352	A-1A
Q1353	A-1A
R	
R1101	B-3B
R1102	B-4B
R1105	B-3B
R1140	B-2A
R1143	B-3B
R1144	B-3B
R1145	B-3B
R1146	B-2B
R1147	B-3B
R1148	B-3C
R1149	B-3C
R1151	B-3C
R1155	B-3C
R1156	B-2C
R1157	B-4B
R1158	B-4C
R1171	A-2A
R1172	A-2A
R1173	A-2A
R1174	A-2A
R1175	A-2A
R1177	A-2A
R1201	B-3A
R1202	B-3A
R1203	B-1A
R1204	B-1A
R1205	B-1A
R1206	B-1A
R1211	A-1B
R1212	A-1B
R1213	A-1B
R1214	A-1B
R1215	A-1A
R1216	B-1A
R1217	B-1A
R1218	B-1A
R1219	B-2B
R1220	B-2B
R1221	A-1A
R1222	A-1A
R1225	B-2A
R1227	A-4A
R1228	A-3A
R1230	A-1A
R1231	A-1A
R1232	A-1A
R1233	A-1A
R1234	A-1A
R1237	B-1A
R1238	B-1A
R1256	A-3B
R1306	A-2C
R1307	A-2C
R1308	A-2B
R1309	A-2B
R1310	A-2C
R1311	A-2C
R1313	A-2C
R1314	A-2C
R1315	A-3B
R1316	A-3B
R1317	A-3C
R1318	A-3C
R1351	B-1B
R1352	B-1B
R1353	B-1B
R1354	B-1B
R1355	B-1B
R1356	B-1B
R1357	B-1B
R1358	B-1A
R1359	B-1A
R1360	B-1A
R1361	B-1A
R1362	B-1A
R1363	B-1A
R1364	B-1A
R1365	B-1A
R1366	B-1A
R1367	B-1A
R1368	B-1A
R1370	A-1B
R1371	B-1B
R1372	B-1B
R1374	B-1B
R1375	B-1B
R1376	A-1A
R1378	A-1B
R1380	A-4A
R1381	A-4A
R1382	B-4A
R1383	B-4A
R1384	B-4A
R1385	B-4A
RM	
RM1151	A-2B
RM1152	A-2B
RM1153	A-2B
RM1154	A-2B
RM1155	B-1C
RM1156	B-1C
RM1157	A-1B
RM1158	A-1B
TL	
TL1301	A-1C
TL1331	B-3A
TL1332	B-3A
TL1333	B-3A
TL1334	B-3A
TL1335	B-2A
TL1336	A-2A
TL1344	A-3A
TL1345	B-2A
TL1346	A-3A
TL1347	A-3A
TL1348	A-3A
TL1349	A-3A
TL1350	A-3A
TL1381	B-3A
TL1383	B-4A
TL1384	B-4A
TL1385	B-4A
TL1386	B-4A
X	
X1171	A-2A
ZD	
ZD1171	A-2A

SP

Symbol No.	Parts Location
C	
C1001	B-2B
C1002	B-2A
C1003	B-2A
C1004	B-2B
C1005	B-2B
C1006	B-2B
C1007	B-2A
C1008	B-2A
C1009	B-2B
C1010	B-2B
C1011	B-2A
C1012	A-1B
C1013	A-1B
C1014	A-1C
C1015	B-2B
C1019	B-2B
C1020	B-1B
C1021	B-2A
C1022	B-2A
C1023	B-2A
C1024	A-1B
C1025	A-2B
C1026	A-2B
C1027	A-2B
C1029	A-2B
D	
D1001	B-2A
IC	
IC1001	B-2B
IC1002	A-1B
IC1003	B-1B
L	
L1001	A-1B
L1002	B-2B
PG	
PG1001	B-1B
PG1002	B-3A
Q	
Q1001	B-2B
Q1020	A-2B
R	
R1001	B-2B
R1002	A-2A
R1003	B-2A
R1005	B-2A
R1020	A-2B
R1021	A-2B

SWITCHING REGULATOR [CSR] SCHEMATIC DIAGRAM

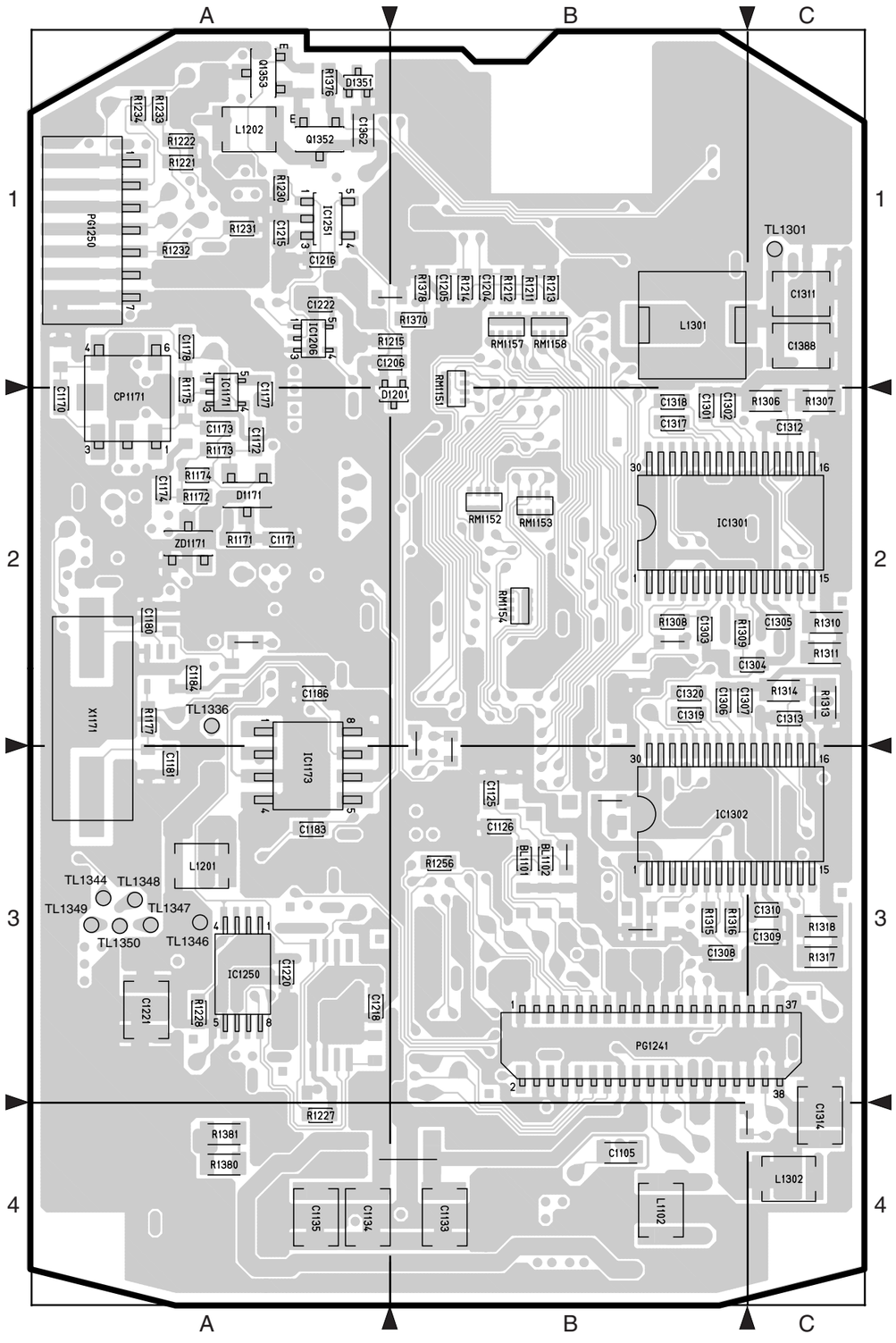


CODE	PART NAME
AE	2SB1424
AR	2SB1462
★BR	2SC4617
BR	2SC4081BRT
MPL1	MPL-1
YR	2SD2216
QC	2SC2620
5K	XP4401
13	DTA143EE
26	DTC144EE
64	DTC114YE
C	1SS353
MO	MA132WA
H6	TC7SHU04FU
S4	D1FS4
10L	MA3100L

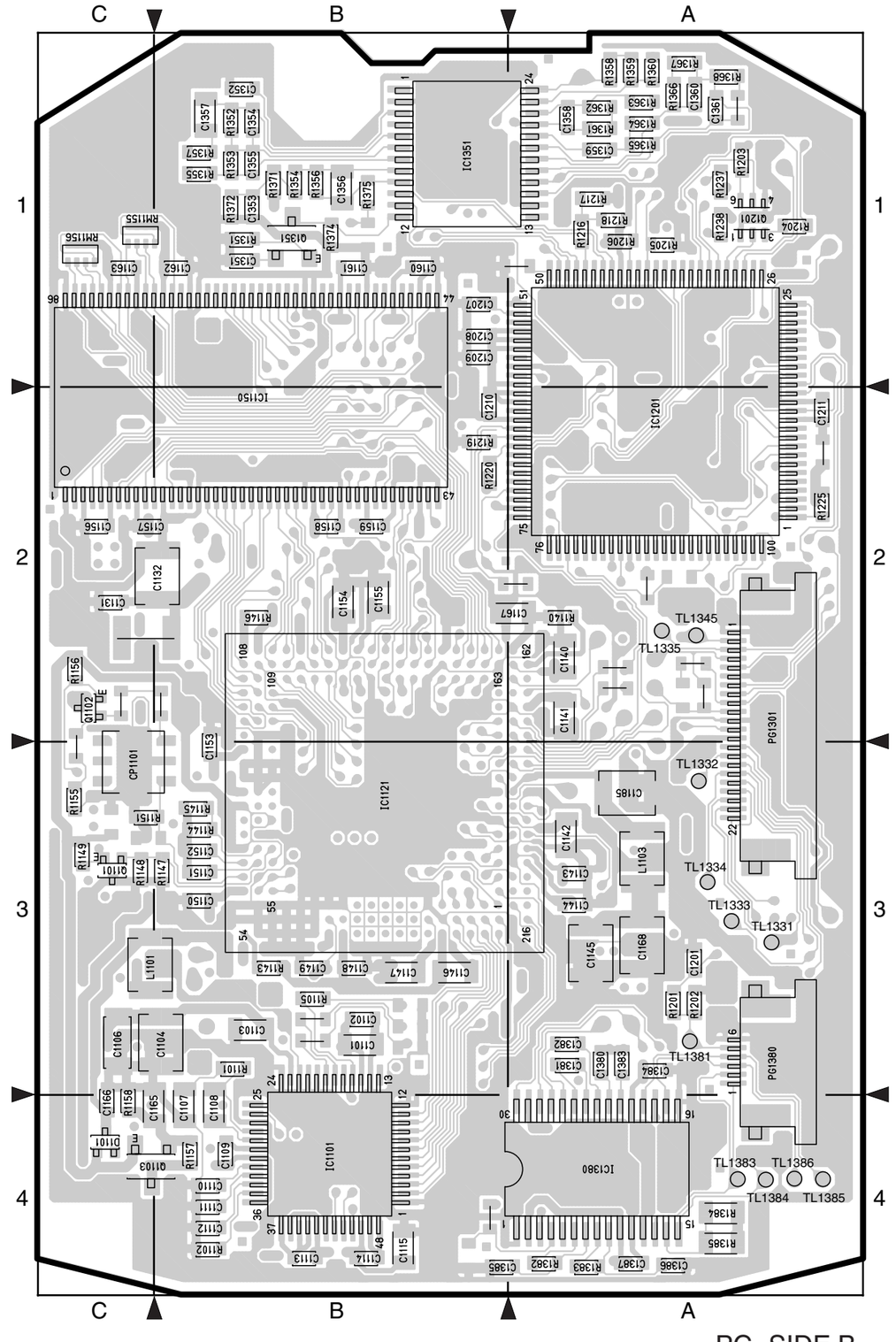
★ VOLTAGE: REC MODE

SWITCHING REGULATOR [CSR]

PC CIRCUIT BOARD DAIGRAM

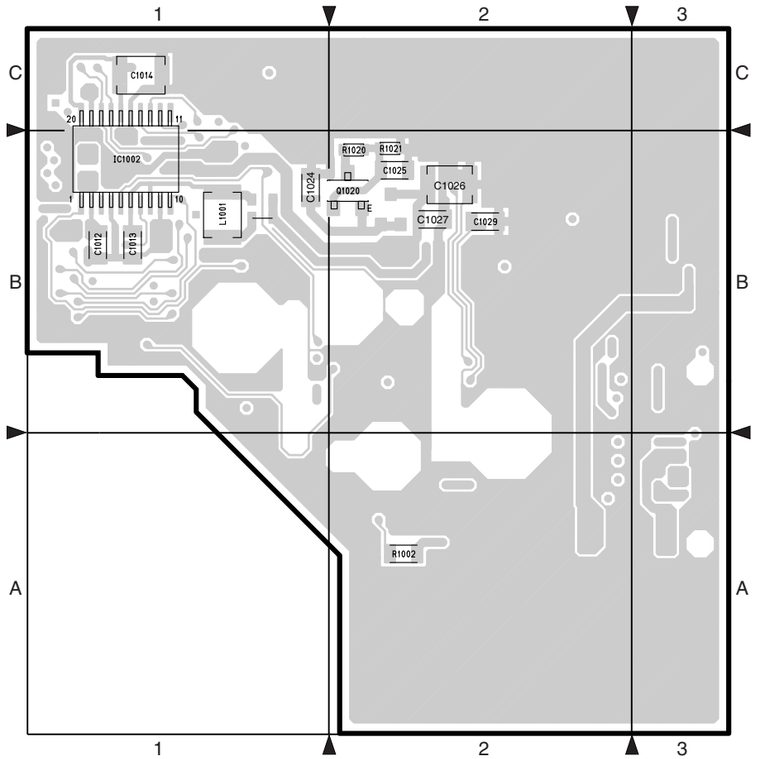


PC -SIDE A-

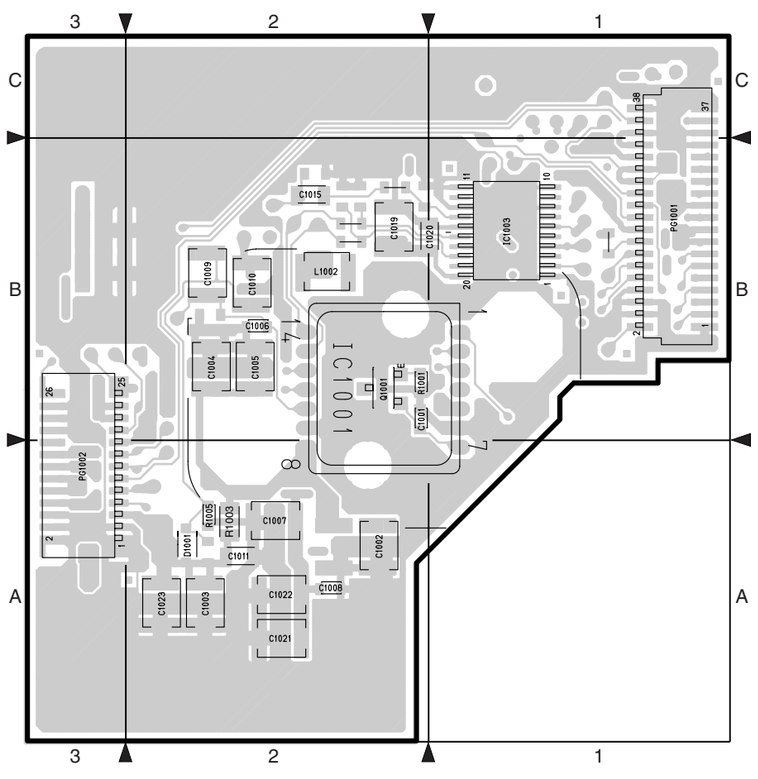


PC -SIDE B-
[PATTERN No.JA1893-1]

SP CIRCUIT BOARD DIAGRAM



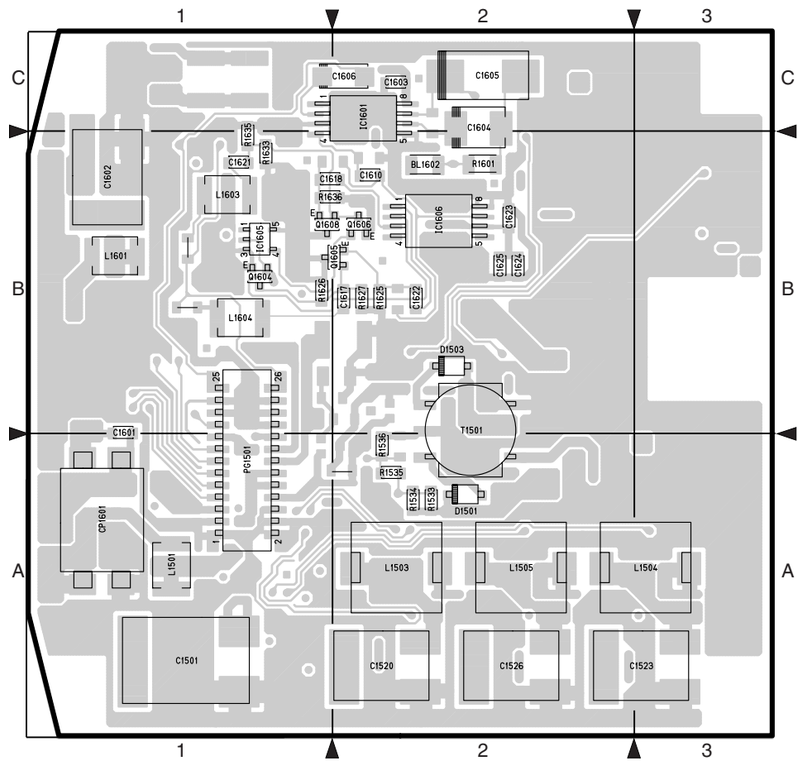
SP -SIDE A-



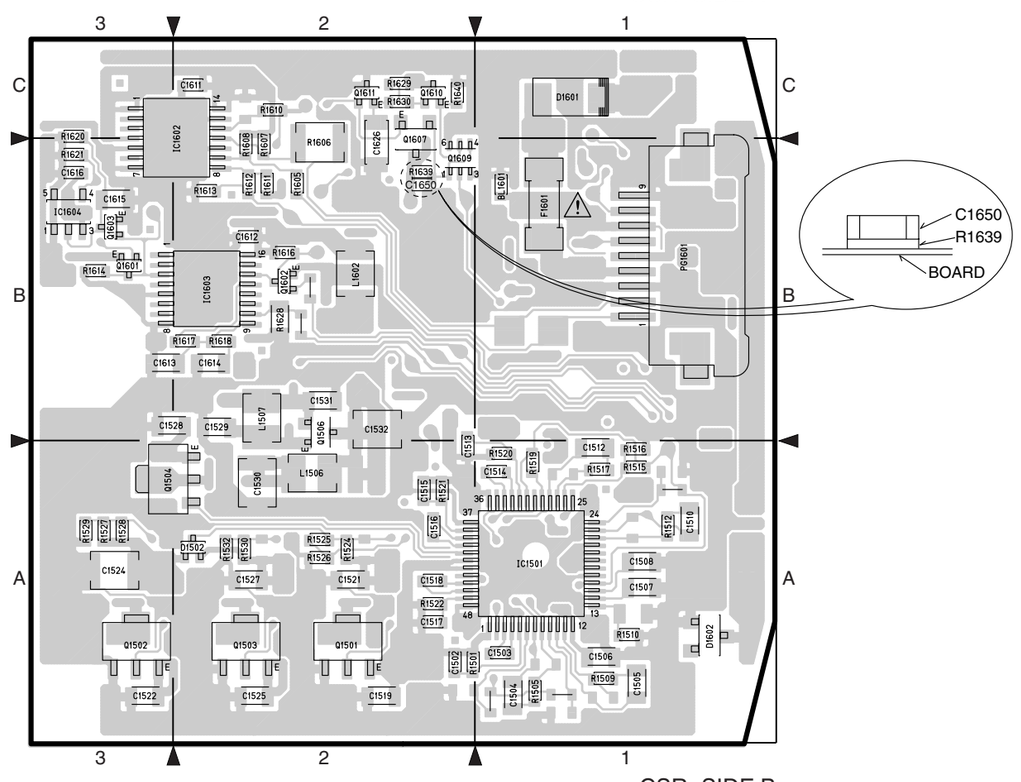
SP -SIDE B-

[PATTERN No.JA1893-1]

CSR CIRCUIT BOARD DIAGRAM



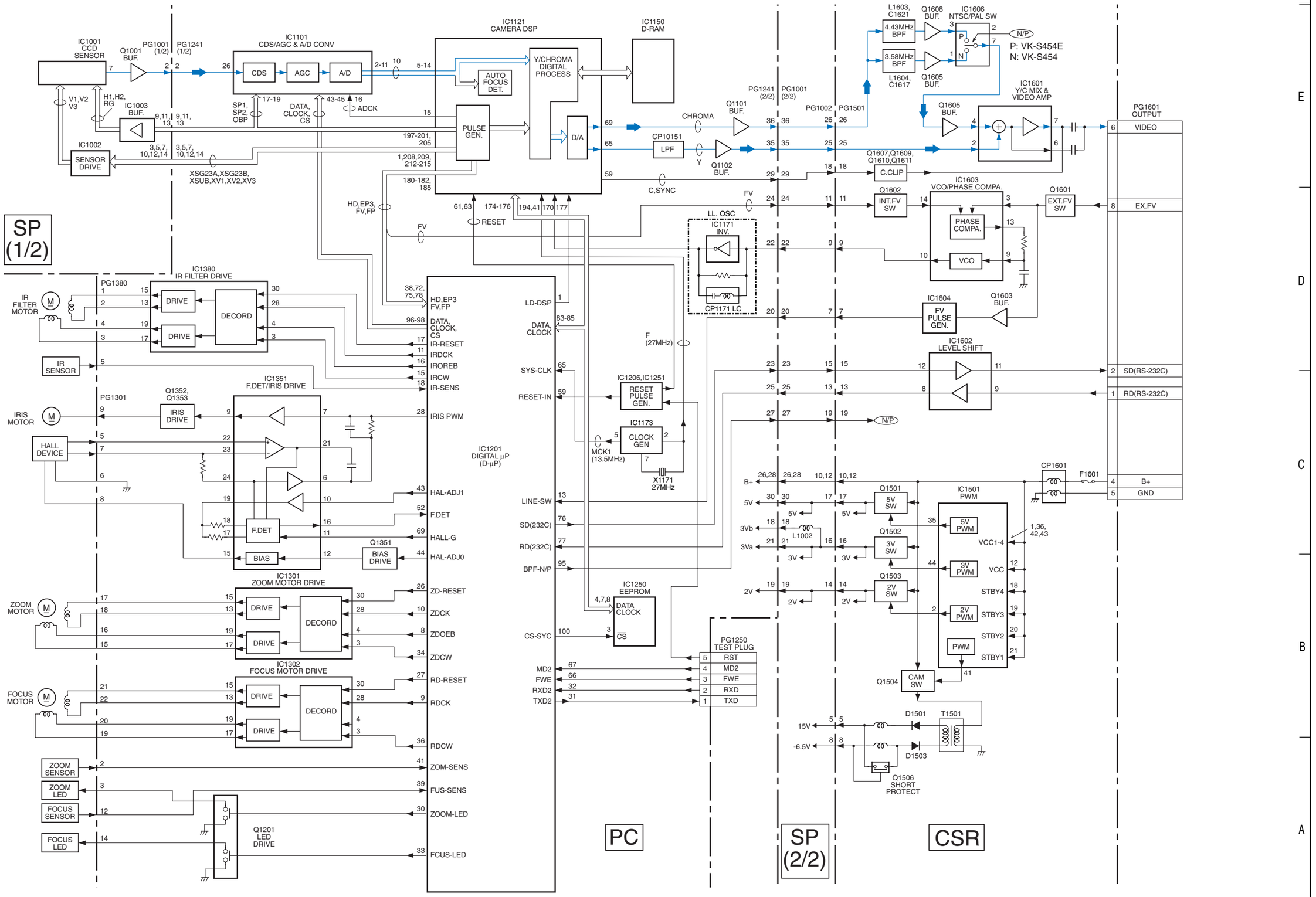
CSR -SIDE A-



CSR -SIDE B-

[PATTERN No.JA1893-1]

BLOCK DIAGRAM



MICROPROCESSOR PIN FUNCTION TABLES

Digital Microprocessor (IC1201: D-μP)

Pin No.	I/O	Active Level	Abbreviation	Function
1	O	(Pulse)	LD-DSP	Activates data communication with IC1121 (DSP).
2	O	(Pulse)	CS-DAC	Not used. Open.
3	O	(Pulse)	CS-VAP	
4	O	Hi	GYRO-RST	
5	-----	-----	CEON	
6	-----	-----	CHARGE	
7	O	(Pulse)	RDOEB	Activates focus drive data communications with IC1302 (FOCUS MOTOR DRIVE).
8	O	(Pulse)	ZDOEB	Activates zoom drive data communications with IC1301 (ZOOM MOTOR DRIVE).
9	O	(Pulse)	RDCK	Outputs focus motor drive signal to IC1302 (FOCUS MOTOR DRIVE).
10	O	(Pulse)	ZDCK	Outputs zoom motor drive signal to IC1301 (ZOOM MOTOR DRIVE).
11	O	(Pulse)	IRDCK	Outputs IR motor drive signal to IC1380 (IR FILTER DRIVE).
12	-----	-----	VCC (3V)	3V power input.
13	I	Hi/Lo	LINE-SW	External sync detection input. When "Hi" is input, the unit will be driven in the external sync mode; when "Lo" is input, it will be driven in the internal sync mode.
14	-----	-----	GND	Ground.
15	O	Hi/Lo	IRDCW	Issues a command which determines with IC1380 (IR FILTER DRIVE).
16	O	(Pulse)	IROREB	Activates IR motor drive data communications with IC1380 (IR FILTER DRIVE).
17	O	Hi	IR-RESET	Resets IC1380 (IR FILTER DRIVE).
18	I	(Pulse)	IR-SENS	IR motor position detection input.
19	O	-----	IR-LED	Not used. Open.
20	-----	-----	----------	
21	-----	-----	----------	
22	I	0V-3V	H-VAP	
23	-----	-----	XTAL-CTL	
24	I	0V-3V	V-VAP	
25	-----	-----	CHECK8	
26	O	Hi	ZD-RESET	Resets IC1301 (ZOOM MOTOR DRIVE).
27	O	Hi	RD-RESET	Resets IC1302 (FOCUS MOTOR DRIVE).
28	O	(Pulse)	IRIS-PWM	Iris motor drive output .
29	-----	-----	LD-JIG	Not used. Open.
30	O	(Pulse)	ZOOM-LED	Output pulses to drive the ZOOM LED in the lens block via Q1201 (LED DRIVE).
31	-----	-----	TXD2	Not used.
32	-----	-----	RXD2	
33	O	(Pulse)	FCUS-LED	Output pulses to drive the FOCUS LED in the lens block via Q1201 (LED DRIVE).
34	O	Hi/Lo	ZD CW	Issues a command which determines with IC1301 (ZOOM MOTOR DRIVE).
35	-----	-----	ZD-PWMA	Not used. Open.
36	O	Hi/Lo	RD CW	Issues a command which determines with IC1302 (FOCUS MOTOR DRIVE).
37	-----	-----	RD-PWMA	Not used. Open.
38	I	(Pulse)	FV	Receives the vertical sync pulses that detect the iris detection area, from IC1121 (DSP).
39	I	(Pulse)	FUS-SENS	Focus motor position detection input.
40	I	(Pulse)	REM-IR	Not used. Open.
41	I	(Pulse)	ZOM-SENS	Zoom motor position detection input.
42	-----	-----	GND	Ground.
43	O	0V-5V	HAL-ADJ1	Controls the offset voltage of IC1351 (F.DET/IRIS DRIVE).
44	O	0V-5V	HAL-ADJ0	Drives bias generator in IC1351 (F.DET/IRIS DRIVE) via Q1351 (BUF) to control the bias voltage of the Hall devices.
45	-----	-----	BATTERY	Not used. Open.
46	I	0V-5V	ZOOM-SW	Not used.
47	I	0V-3V	KEY2	
48	I	0V-3V	KEY1	
49	I	0V-3V	TEMP-ADJ	Temperature change detection input. Detects variations in the forward voltage at the connected diode to correct the back-focus.

Pin No.	I/O	Active Level	Abbreviation	Function
50	I	0V-3V	V-GYRO	Not used. Connect to ground.
51	I	0V-3V	H-GYRO	
52	I	0V-3V	FDET	F-value detection input. Receives the F.DET voltage detected by IC1351 (F.DET/ IRIS DRIVE) and compares this with the reference voltage input via pin 53 to detect the F-value.
53	-----	-----	AVCC	Reference 3V power input.
54	-----	-----	AVCC	A/D reference voltage input (connected to 3V power supply).
55	-----	-----	VCC	3V power input.
56	-----	-----	VCC	
57	-----	-----	----------	Not used. Open.
58	-----	-----	----------	Not used. Connect to ground.
59	I	Lo	RESET-IN	Reset signal input from IC1203 (RESET PULSE GEN.).
60	-----	-----	VCC	3V power input.
61	-----	-----	STBY	Not used. Connect to 3V power supply.
62	-----	-----	VCC	3V power input.
63	-----	-----	----------	Not used. Open.
64	-----	-----	GND	Grounded.
65	I	(Pulse)	SYS-CLK	Inputs control clock pulses from IC1121 (DSP).
66	-----	-----	FWE	Not used.
67	-----	-----	MD2	
68	-----	-----	----------	Not used. Open.
69	O	Hi	HALL-G	Controls the amplification (gain of Hall device) of IC1351 (F.DET/IRIS DRIVE).
70	-----	-----	----------	Not used. Open.
71	-----	-----	----------	
72	I	(Pulse)	HD	Horizontal sync input.
73	-----	-----	SHUT-CTL	Not used. Open.
74	-----	-----	STROBE	
75	I	(Pulse)	FP	Field discrimination pulse input.
76	O	(Pulse)	SD (232C)	Used for initial settings and adjustment. For data communications with personal computer.
77	I	(Pulse)	RD (232C)	
78	I	(Pulse)	EP3/AFLH	Receives pulses which discriminate the iris detection area.
79	-----	-----	----------	Not used. Open.
80	-----	-----	----------	
81	-----	-----	----------	
82	-----	-----	----------	
83	O	(Pulse)	SDO	For data communications with IC1121 (DSP), IC1250 (EEPROM).
84	I	(Pulse)	SDI	
85	O	(Pulse)	SCLK	
86	-----	-----	DC-LIGHT-SW-OFF	Not used. Open.
87	-----	-----	----------	
88	O	-----	x16/x22	
89	O	-----	BW/COLOR	
90	O	-----	PAL/NTSC	
91	-----	-----	----------	
92	I	0V-5V	F-DIAL1	
93	I	0V-5V	F-DIAL2	
94	I	-----	SYS-RST	
95	O	Hi/Lo	BPF-N/P	BPF (for chroma signal) setect signal output.
96	O	(Pulse)	CK-CDS	Transfer data to IC1101 (CDS/AGC & A/D CONV.).
97	O	(Pulse)	SDO-CDS	
98	O	(Pulse)	CS-CDS	Activates data communications with IC1101 (CDS/AGC & A/D CONV.).
99	O	(Pulse)	CS-EE	Not used. Open.
100	O	(Pulse)	CS-SYC	Activates data communications with IC1250 (EEPROM).

HITACHI

VK-S454/S454E

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TK No. 8101E Digital Media Products Division,Tokai

 Printed in Japan (I)