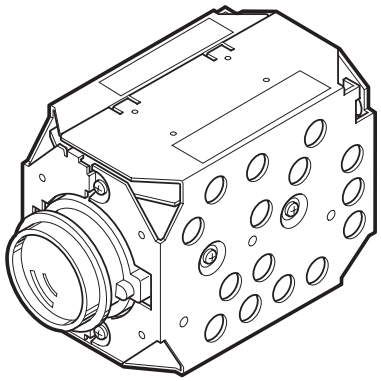
# HITACHI

TK | No. 8302E

# SERVICE MANUAL

**VK-S274R/S274ER**
**VK-K274R/K274ER**



SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

## COLOR & B/W VIDEO CAMERA

March 2003 Digital Media Division,Tokai

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# 1 Safety Precaution for Repair

## 1-1 Cautions

**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.

## 1-2 Notes When Using Service Manual

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

### 1-2-1 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 |

### 1-2-2 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<br>K ····· kΩ<br>M ····· MΩ |
| Tolerance | No indication ····· ±5%<br>(All tolerances other than ±5% are indicated in schematic diagrams) |
| Power capacitance | No indication ····· 1/8W<br>(1/16W for leadless resistors without indication)<br>All capacitances other than the above are indicated in schematic diagrams. |

[Capacitors]

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

[Coils]

| Item | Indication |
|---|---|
| Value | μ ····· μH<br>m ····· mH |

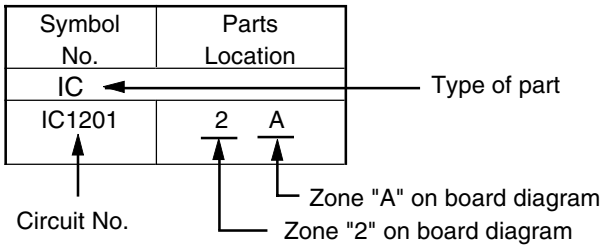
## 1-2-3 Identifications of sides A/B in circuit board diagrams

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.

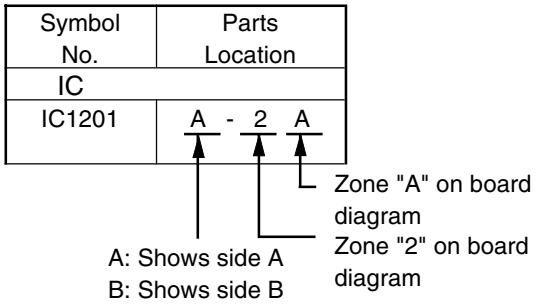
## 1-2-4 Table for indexing locations of parts

The table of "Identification of parts location" on circuit board diagrams shows locations of each part as below explanations. 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



# 1-3 Electrostatic Protection Measures

Semiconductor components, including optical pickups, may be damaged by static electricity charged on clothes, human body, etc. Take great care when handling it to avoid electrostatic damage.

## 1-3-1 Grounding for prevention of electrostatic damage

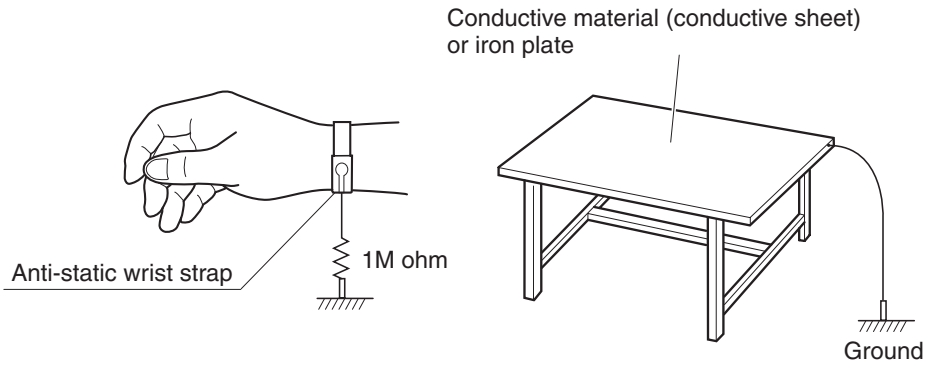
Perform servicing in an environment where grounding is complete.

**Grounding work bench**

1) Lay out a conductive material (conductive sheet) or iron plate under the work bench on which semiconductor components, such as optical pickups, are placed to ground the bench.

**Grounding human body**

1) Use an anti-static wrist strap to discharge static electricity charged on human body. Note, however, that static electricity charged on clothes will not be discharged by anti-static wrist strap: Be careful that your clothes do not touch the semiconductor components, such as optical pickups.




## 1-3-2 Cautions when handling optical pickup - only for DVD products

1) The optical pickup has a high precision structure: Do not subject it to any impact.
2) Do not perform disassembly further than that described in this manual.
3) Never turn the semi-variable resistors in drive unit block.

# 1-4 Lead-Free Solder

To protect the global environment, lead-free solder is used in this product.
Be sure to read the following before soldering.

**Caution**

Be sure to wear protective goggles so that no solder smoke or scattered solder enters the eye during servicing. Lead-free solder may scatter at high temperatures (600°C).

## 1-4-1 Characteristics of lead-free solder

The melting point of lead-free solder is 30-40°C higher than that of lead based solder.

- Composition of alloy (wt%): Sn-3.0Ag-0.5Cu
- Melting temperature: Approx. 220°C

## 1-4-2 Solder for servicing

It is recommended that you use lead-free solder whose characteristics are the same as that used in this product, although it is also possible to service using lead based solder. However, if lead based solder is used for servicing, some precautions are necessary. (Neglecting these could decrease strength, causing malfunctions.)

Cautions when using lead based solder:

- When replacing components, remove the lead-free solder previously used for soldered points as far as possible.
- For additional soldering, melt lead-free solder completely and mix well with lead based solder. Never perform repair using the bare soldering iron tip without adding solder.

## 1-4-3 Soldering iron for servicing

It is recommended that you use a soldering iron with thermal control function, with which the temperature at its tip can be set.
Lead-free solder melts at a temperature 30-40°C higher than lead based solder. Therefore, workability will be reduced unless you use a soldering iron whose temperature is high, whose temperature at tip does not change greatly (heat capacity is large), and that can be set to match the work points.

Recommended soldering iron:

- With thermal control function (temperature setting range: 320-450°C)

Recommended tip temperatures for different work points:

| Work point | Recommended tip temperature |
|---|---|
| Circuit board with surface-mounted (chip) parts | 320°C ± 30°C |
| Circuit board without surface-mounted (chip) parts | 380°C ± 30°C |
| Chassis, metal shield | 420°C ± 30°C |

# 2 General Description

## 2-1 Overview

VK-S274R/S274ER is a color chassis video camera; VK-K274R/K274ER is a Black-and-white chassis video camera: All these models incorporate an optical 22-power compact zoom lens.
Models VK-S274R/S274ER/K274R/K274ER are successor cameras to VK-S274/S274E/K274/K274E.
The signal process circuit is equipped with a digital signal processor (D.S.P.5) that is the same as that of VK-S274/S274E/K274/K274E.
The external appearance is identical to VK-S274/S274E/K274/K274E.

### 2-1-1 Servicing method

Table 2-1-1 shows the method for servicing each circuit board.
Refer to "4 Troubleshooting" for the method of judging defects in each circuit board.

Information:
These servicing methods are subject to change without notice for the purpose of facilitating service procedures.

Table 2-1-1 Circuit Board Servicing Method

| Circuit board | Servicing method |
|---|---|
| CSR circuit board | Component replacement. |
| PC circuit board | |
| SP circuit board | |

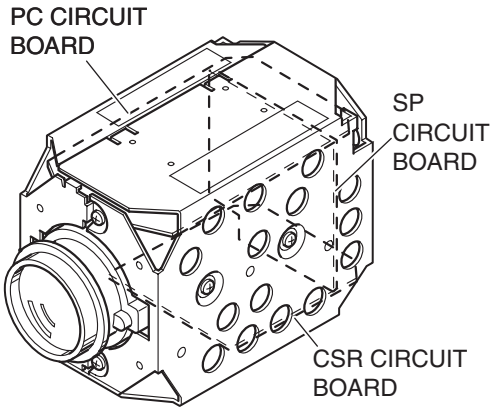



Fig. 2-1-1 Locations of Circuit Boards

## 2-2 Features

**Built-in Optical Power Zoom Lens**

A highly reliable optical 22-power zoom lens is mounted, and it is equipped with auto-focus and auto iris functions.

**12-Power Digital Zoom Function**

The 12-power digital zoom, combined with the 22-power optical zoom, makes possible up to 264-power zooming.

**Remote Control via RS-232C**

Focus, iris and zoom can be remotely operated via RS-232C.

**External Synchronization with AC-Line Pulse Signal**

This chassis camera is compatible with external sync using AC-line pulse signal, as well as with internal sync.

# 2-3 Specifications

The specifications in shaded columns are different from those of previous models.
Design and specifications are subject to change without notice.

| Item | | | VK-S274R/S274ER<br>VK-K274R/K274ER | VK-S274/S274E<br>VK-K274/K274E |
|---|---|---|---|---|
| Signal Format | | | VK-S274R: NTSC<br>VK-K274R: EIA B/W<br>VK-S274ER: PAL<br>VK-K274ER: CCIR B/W | VK-S274: NTSC<br>VK-K274: EIA B/W<br>VK-S274E: PAL<br>VK-K274E: CCIR B/W |
| Scanning System | | | 2:1 Interlacing | 2:1 Interlacing |
| Scanning Frequency | Horizontal | | VK-S274R/K274R: 15.734 kHz<br>VK-S274ER/K274ER: 15.625 kHz | VK-S274/K274: 15.734 kHz<br>VK-S274E/K274E: 15.625 kHz |
| | Vertical | | VK-S274R/K274R: 59.94 Hz<br>VK-S274ER/K274ER: 50 Hz | VK-S274/K274: 59.94 Hz<br>VK-S274E/K274E: 50 Hz |
| Image Sensor | | | 1/4-inch CCD | 1/4-inch CCD |
| | Total Pixels | | VK-S274R/K274R:<br>811 (H) × 508 (V), 410k<br>VK-S274ER/K274ER:<br>795 (H) × 596 (V), 470k | VK-S274/K274:<br>811 (H) × 508 (V), 410k<br>VK-S274E/K274E:<br>795 (H) × 596 (V), 470k |
| | Effective Pixels | | VK-S274R/K274R:<br>768 (H) × 494 (V), 380k<br>VK-S274ER/K274ER:<br>752 (H) × 582 (V), 440k | VK-S274/K274:<br>768 (H) × 494 (V), 380k<br>VK-S274E/K274E:<br>752 (H) × 582 (V), 440k |
| Lens | | | F1.6 f = 4 - 88 mm, High Durability ×22 Zoom Lens, Video Auto Focus | F1.6 f = 4 - 88 mm, High Durability ×22 Zoom Lens, Video Auto Focus |
| | Angle of View | | Horizontal 47°(Wide), 2.2°(Tele) | Horizontal 47°(Wide), 2.2°(Tele) |
| | Min. Distance | | 1.0m (Tele), 0.01m (Wide) | 1.0m (Tele), 0.01m (Wide) |
| Signal Processing | | | Digital Signal Processor (D.S.P. 5) | Digital Signal Processor (D.S.P. 5) |
| Sync. System | | | Internal/External | Internal/External |
| Camera Functions (Control through RS-232C) | Optical Zoom | | TELE-WIDE (Zoom speed: 3.9s*/6.3s) | TELE-WIDE (Zoom speed: 3.9s*/6.3s) |
| | Digital Zoom | | Off*/On (Up to 12×) | Off*/On (Up to 12×) |
| | Video Focus | | Auto*/Manual (NEAR-FAR/Fix) | Auto*/Manual (NEAR-FAR/Fix) |
| | White Balance | | Auto*/Manual (Red/Blue Gain: UP-DOWN/Fix) | Auto*/Manual (Red/Blue Gain: UP-DOWN/Fix) |
| | Shutter Speed | | | |
| | | Auto (Pro-AE) | VK-S274R/K274R: 1/60 - 1/4000s<br>VK-S274ER/K274ER: 1/50 - 1/4000s | VK-S274/K274: 1/60 - 1/4000s<br>VK-S274E/K274E: 1/50 - 1/4000s |
| | | Auto (Pro-AE+) | VK-S274R/K274R:<br>1/2 - 1/4* - 1/4000s<br>VK-S274ER/K274ER:<br>1/1.5 - 1/3* - 1/4000s | VK-S274/K274:<br>1/2 - 1/4* - 1/4000s<br>VK-S274E/K274E:<br>1/1.5 - 1/3* - 1/4000s |
| | | Manual | VK-S274R/K274R:<br>Shutter (1/2 - 1/4000s)/<br>Exposure (F1.6 - F34)/<br>AGC priority (0 - 27dB)<br>VK-S274ER/K274ER:<br>Shutter (1/1.5 - 1/4000s)/<br>Exposure (F1.6 - F34)/<br>AGC priority (0 - 27dB) | VK-S274/K274:<br>Shutter (1/2 - 1/4000s)/<br>Exposure (F1.6 - F34)/<br>AGC priority (0 - 27dB)<br>VK-S274E/K274E:<br>Shutter (1/1.5 - 1/4000s)/<br>Exposure (F1.6 - F34)/<br>AGC priority (0 - 27dB) |

*: Default settings

| Item | | VK-S274R/S274ER<br>VK-K274R/K274ER | VK-S274/S274E<br>VK-K274/K274E |
|---|---|---|---|
| Camera Functions (Control through RS-232C) | Mirror | Off*/On | Off*/On |
| | Mosaic | Off*/On | Off*/On |
| | Iris Control | Auto* | Auto* |
| | Privacy Zone Masking | Off/On* (2 zone 2-D/8 zone 3-D) | Off/On* (2 zone) |
| | Freeze | Off*/On | Off*/On |
| | Extrenal Sync. | Off*/On | Off*/On |
| | Communication Speed of RS-232C | Selective (4.8k*/9.6k/19.2k/38.4/57.6k bps) | Fixed (4.8k bps) |
| | Position Preset | No-Trace preset/Trace preset<br>(Memory: max. 64 position) | ---------- |
| Sensitivity | | VK-S274R/S274ER:<br>1.0 lx (Pro-AE: 1/60s or 1/50s, F1.6, 27dB)<br>0.06 lx (Pro-AE+: 1/4s)<br>VK-K274R/K274ER:<br>0.1 lx (Pro-AE: 1/60s or 1/50s, F1.6, 27dB)<br>0.01 lx (Pro-AE+: 1/4s) | VK-S274/S274E:<br>1.0 lx (Pro-AE: 1/60s or 1/50s, F1.6, 27dB)<br>0.1 lx (Pro-AE+: 1/4s)<br>VK-K274/K274E:<br>0.1 lx (Pro-AE: 1/60s or 1/50s, F1.6, 27dB)<br>0.01 lx (Pro-AE+: 1/4s) |
| Horizontal Resolution | | VK-S274R: More than 470 TV lines<br>VK-S274ER: More than 460 TV lines<br>VK-K274R/K274ER:<br>More than 500 TV lines | VK-S274: More than 470 TV lines<br>VK-S274E: More than 460 TV lines<br>VK-K274/K274E:<br>More than 500 TV lines |
| Luminance S/N | | More than 50dB | More than 50dB |
| Video output | | VK-S274R/S274ER:<br>Composite: 1.0 ± 0.2Vp-p<br>VK-K274R/K274ER:<br>Y (Luminance): 1.0 ± 0.2Vp-p | VK-S274/S274E:<br>Composite: 1.0 ± 0.2Vp-p<br>VK-K274/K274E:<br>Y (Luminance): 1.0 ± 0.2Vp-p |
| Supplied Voltage | | 9 V - 12 V DC ± 0.5 V | 9 V DC ± 0.5 V |
| Power Requirement | | 3.65 W (When suppling 9 V DC) | 3.3 W (When suppling 9 V DC) |
| Operating Temperature | | 0 - 60° (Recommended: 0 - 40°) | 0 - 60° (Recommended: 0 - 40°) |
| Operating Humidity | | 10 - 90% | 10 - 90% |
| Dimensions | | 50 (W) × 60 (H) × 89.5 (D) mm | 50 (W) × 60 (H) × 89.5 (D) mm |
| Weight | | Approx. 222g | Approx. 225g |

*: Default settings

# 2-4 Comparison of Main Control ICs

The comparison of main control ICs in shaded columns are different from those of previous models

| Item | VK-S274R/S274ER<br>VK-K274R/K274ER | | VK-S274/S274E<br>VK-K274/K274E | |
|---|---|---|---|---|
| Image Sensor | VK-S274R: ICX278AK-L<br>VK-S274ER: ICX279AK-L<br>VK-K274R: ICX278AL-7<br>VK-K274ER: ICX279AL-7 | (IC1001)<br>(IC1001)<br>(IC1001)<br>(IC1001) | VK-S274: ICX278AK-L<br>VK-S274E: ICX279AK-L<br>VK-K274: ICX278AL-7<br>VK-K274E: ICX279AL-7 | (IC1001)<br>(IC1001)<br>(IC1001)<br>(IC1001) |
| Sensor Drive | µPD16510GR | (IC1002) | µPD16510GR | (IC1002) |
| CDS/AGC & A/D Conv. | HD49323AF | (IC1101) | HD49323AF | (IC1101) |
| Camera DSP | HG73C053FE | (IC1121) | HG73C053FE | (IC1121) |
| DRAM | IC41LV16100S-50G | (IC1122) | MSM51V18165F | (IC1122) |
| Inv. | TC7SU04FU | (IC1173) | TC7SU04FU | (IC1173) |
| Clock Gen. | TC7SHU04FUL | (IC1174) | TC7SHU04FUL | (IC1174) |
| Camera µP | HD6432238RN41FA | (IC1201) | HD6432238RN30FA | (IC1201) |
| EEPROM | BR9016RFV<br>BR9016RFV | (IC1202)<br>(IC1203) | X25097V1-2.7 | (IC1202) |
| Reset Pulse Gen. | NC7SZ14P5<br>NC7SZ14P5<br>SN74AHC1G08HDCK<br>RN5VD27AA | (IC1204)<br>(IC1205)<br>(IC1206)<br>(IC1251) | TC7SH14FU<br>TC7SH14FU<br>TC7S08FU<br>RN5VD27AA | (IC1204)<br>(IC1205)<br>(IC1206)<br>(IC1203) |
| Zoom Motor Drive | TB6512AF | (IC1301) | MPC17AT85VM | (IC1301) |
| Focus Motor Drive | TB6512AF | (IC1302) | MPC17AT85VM | (IC1302) |
| F.DET./Iris Drive | µPC5023GS-147-GJG | (IC1351) | µPD5023GS-147-GJG | (IC1351) |
| PWM | TL1464IPT | (IC1501) | TL1464IPT | (IC1501) |
| 7.2V Reg. | PQ20WZ51 | (IC1502) | ---------- | |
| Y/C Mix & Video Amp | BA7665FS | (IC1601) | BA7664FV | (IC1601) |
| Level Shift | SN74AHCT125PW | (IC1602) | HD74HCT125T | (IC1602) |
| VCO/Phase Compa. | 74VHC4046MTCX | (IC1603) | 74VHC4046MTCX | (IC1603) |
| FV Pulse Gen. | SN74AHC1G08HDCK | (IC1604) | IDC-7S08 | (IC1604) |

# 3 Description of Operation

## 3-1 Structure Schematics

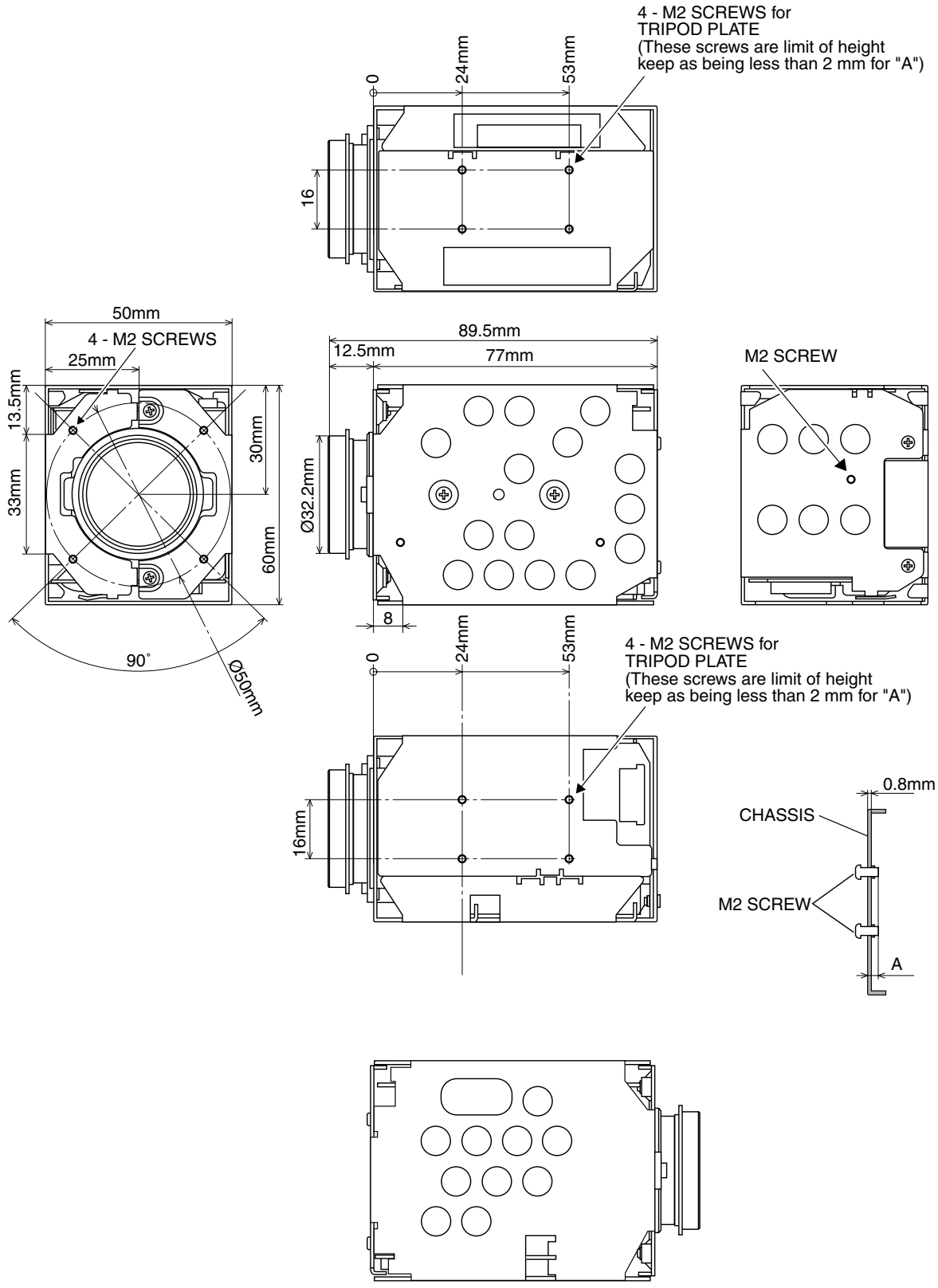



Fig. 3-1-1 Structure Schematics

# 3-2 Microprocessor Pin Function Table

## 3-2-1 Camera microprocessor (IC1201: Camera µP)

| Pin No. | I/O | Active Level | Abbreviation | Function |
|---|---|---|---|---|
| 1 | O | (Pulse) | LD-DSP | Activates data communication with IC1121 (CAMERA 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 | Not used. Open. |
| 12 | ----- | ----- | VCC1 | 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 | ----- | ----- | GND1 | Ground. |
| 15 | O | Hi/Lo | IRDCW | Not used. Open. |
| 16 | O | (Pulse) | IROREB | |
| 17 | O | Hi | IR-RESET | |
| 18 | I | (Pulse) | IR-SENS | |
| 19 | O | ----- | IR-LED | |
| 20 | ----- | ----- | NC1 | |
| 21 | ----- | ----- | TST-PIN1 | |
| 22 | I | 0V-3V | H-VAP | Not used. Open. |
| 23 | ----- | ---- | TST-PIN0 | |
| 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 | ZDCW | Issues a command which determines with IC1301 (ZOOM MOTOR DRIVE). |
| 35 | O | (Pulse) | RDCW | Issues a command which determines with IC1302 (FOCUS MOTOR DRIVE). |
| 36 | O | (Pulse) | ZD-PWMA | Not used. Open. |
| 37 | O | ----- | RD-PWMA | |

| Pin No. | I/O | Active Level | Abbreviation | Function |
|---|---|---|---|---|
| 38 | I | (Pulse) | FV | Receives the vertical sync pulses that detect the iris detection area, from IC1121 (CAMERA DSP). |
| 39 | I | (Pulse) | FCUS-SEN | Focus motor position detection input. |
| 40 | ----- | ----- | NC2 | Not used. Open. |
| 41 | I | (Pulse) | ZOOM-SEN | Zoom motor position detection input. |
| 42 | ----- | ----- | GND2 | Ground. |
| 43 | O | 0V-3V | HAL-ADJ1 | Controls the offset voltage of IC1351 (F.DET/IRIS DRIVE). |
| 44 | O | 0V-3V | HAL-ADJ0 | Drives bias generator in IC1351 (F.DET/IRIS DRIVE) via Q1351 (BIAS DRIVE) to control the bias voltage of the Hall devices. |
| 45 | I | 0V-5V | 5V_DET | DC5V detection input. Monitors the 5V line voltage. |
| 46 | I | 0V-3V | ZOOM-SW | Not used. |
| 47 | I | 0V-3V | FOCUS-SW | |
| 48 | I | 0V-3V | +B_DET | Power voltage (+B) detection input. Monitors the +B line voltage. |
| 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. |
| 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 | ----- | ----- | AVCC1 | Reference 3V power input. |
| 54 | ----- | ----- | AVCC2 | A/D reference voltage input (connected to 3V power supply). |
| 55 | ----- | ----- | VCC2 | 3V power input. |
| 56 | ----- | ----- | VCC3 | |
| 57 | ----- | ----- | NC4 | Not used. Open. |
| 58 | ----- | ----- | NC5 | Not used. Connect to ground. |
| 59 | I | Lo | SYS-REST | Reset signal input from IC1206 (RESET PULSE GEN.). |
| 60 | ----- | ----- | VCC4 | 3V power input. |
| 61 | ----- | ----- | STBY | Not used. Connect to 3V power supply. |
| 62 | ----- | ----- | VCC5 | 3V power input. |
| 63 | I | (Pulse) | XTAL | Not used. Open. |
| 64 | ----- | ------ | GND3 | Grounded. |
| 65 | O | (Pulse) | EXTAL | Inputs controk pulses from IC1211 (CAMERA DSP). |
| 66 | I | Lo | FWE | Not used. |
| 67 | I | Hi | MD2 | |
| 68 | ----- | ----- | NC6 | Not used. Open. |
| 69 | O | Hi | HALL-G | Controls the amplification (gain of Hall device) of IC1351 (F.DET/IRIS DRIVE). |
| 70 | ----- | ----- | NC7 | Not used. Open. |
| 71 | ----- | ----- | NC8 | |
| 72 | I | (Pulse) | HD | Inputs horizontal sync from IC1121 (CAMERA DSP). |
| 73 | ----- | ----- | SHUT-CTL | Not used. Open. |
| 74 | ----- | ----- | STROBE | |
| 75 | I | (Pulse) | FP | Inputs field discrimination pulse from IC1121 (CAMERA DSP). |
| 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 | Receives pulses which discriminate the iris detection area. |

| Pin No. | I/O | Active Level | Abbreviation | Function |
|---|---|---|---|---|
| 79 | ----- | ----- | NC9 | Not used. Open. |
| 80 | ----- | ----- | NC10 | |
| 81 | ----- | ----- | NC11 | |
| 82 | ----- | ----- | NC12 | |
| 83 | O | (Pulse) | SDO | For data communications with IC1121 (CAMERA DSP), IC1202 (EEPROM), IC1203 (EEPROM). |
| 84 | I | (Pulse) | SDI | |
| 85 | O | (Pulse) | SCLK | |
| 86 | ----- | ----- | DC-LIGHT | Not used. Open. |
| 87 | ----- | ----- | NC13[1] | |
| 88 | I | (Pulse) | 4800SET | Not used. |
| 89 | ----- | ----- | LIGHT-SW | Not used. Open. |
| 90 | I | Hi/Lo | COLOR/BW | Color model and B/W model select input. (Hi: Color model/Lo: B/W model) |
| 91 | ----- | ----- | NC13[2] | Not used. Open. |
| 92 | ----- | ----- | F-DIAL1 | |
| 93 | ----- | ----- | F-DIAL2 | |
| 94 | ----- | ----- | LIGHT-0 | |
| 95 | O | Hi/Lo | STBY_5V | 5V regulator control output. (Hi: On/Lo:Off) |
| 96 | O | (Pulse) | CLK-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[1] | Activates data communications with IC1202 (EEPROM). |
| 100 | O | (Pulse) | CS-EE[2] | Activates data communications with IC1203 (EEPROM). |

# 4 Troubleshooting

## 4-1 Trouble Diagnosis

### 4-1-1 Setting to service position

Remove chassis R and chassis L, referring to "5. Disassembly and Reassembly", and connect the camera as shown in Fig. 4-1-1.

Note:
To prevent short-circuit, always perform trouble diagnosis of camera on insulated mat.

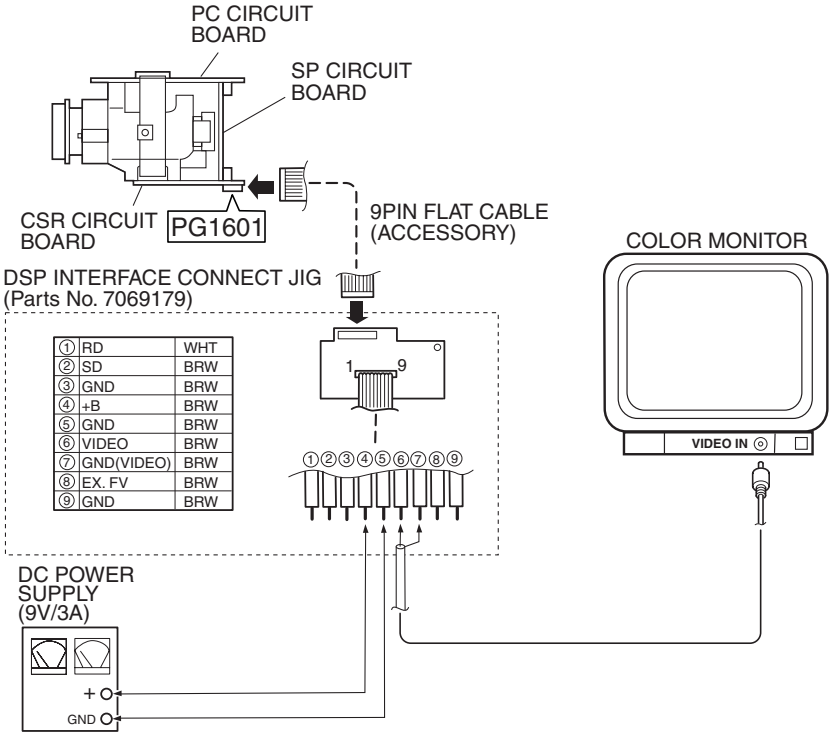
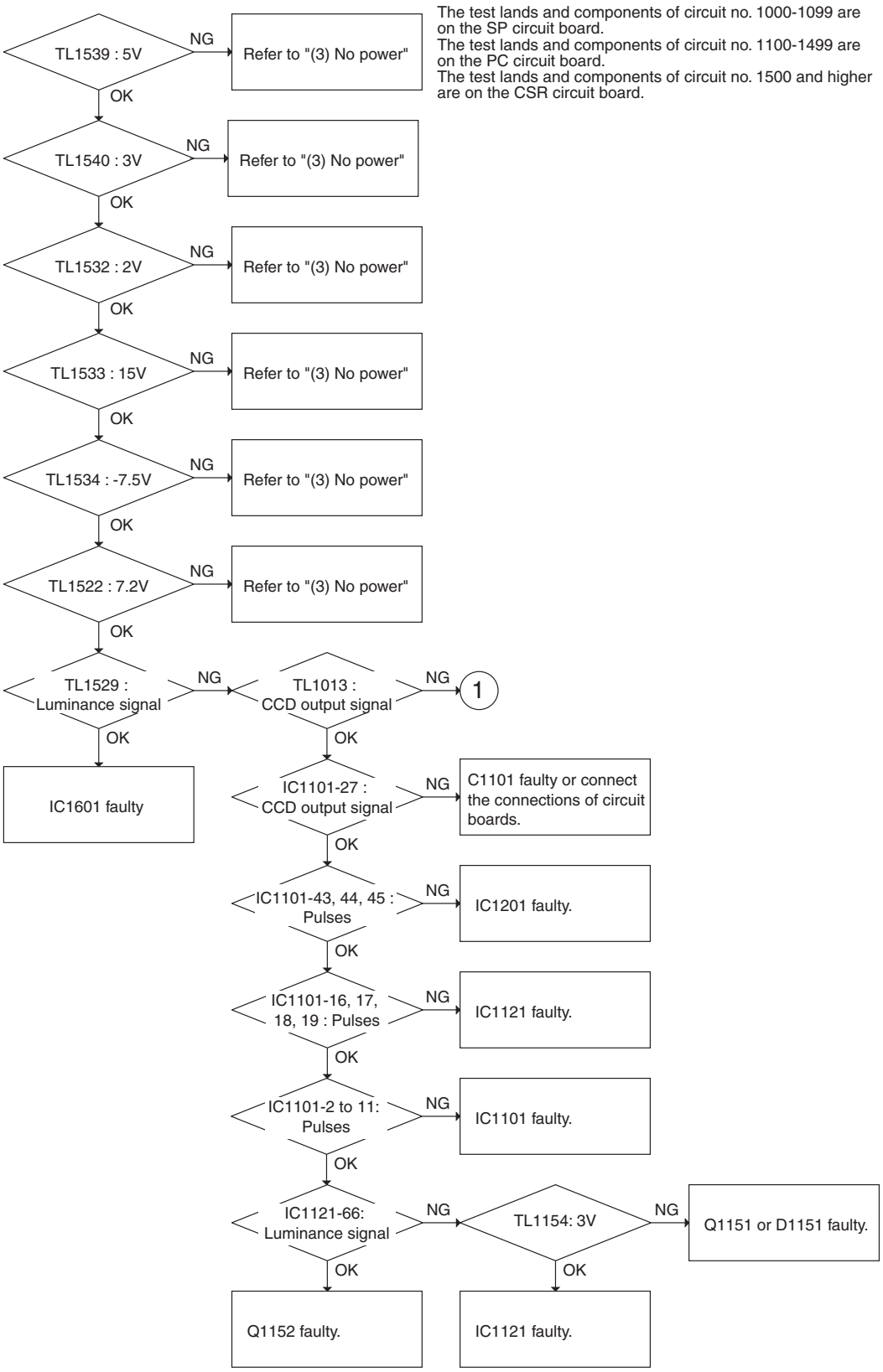
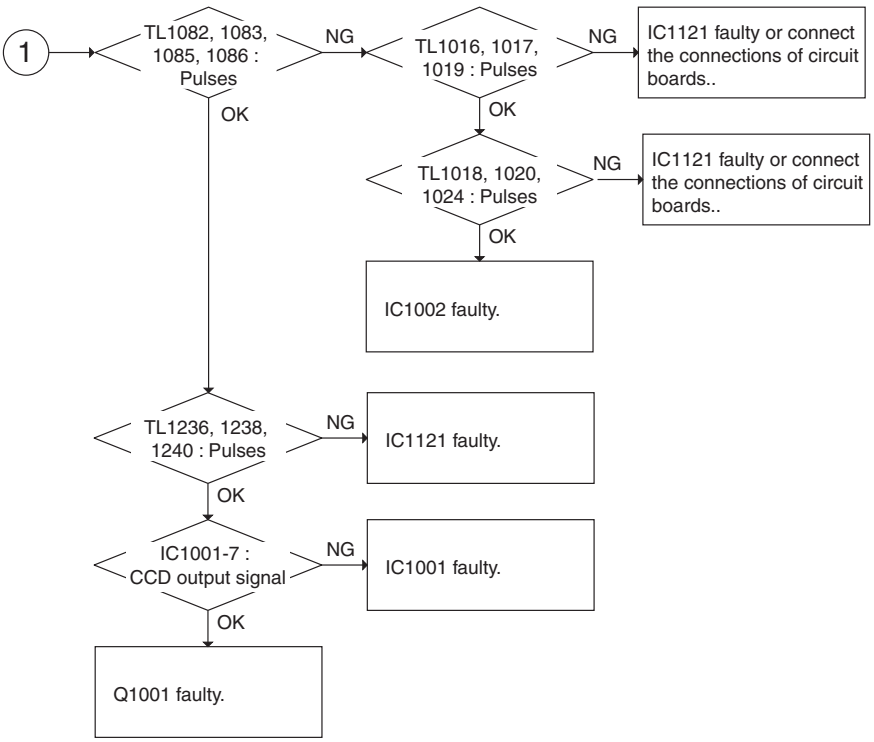



Fig. 4-1-1 Connections for Trouble Diagnosis

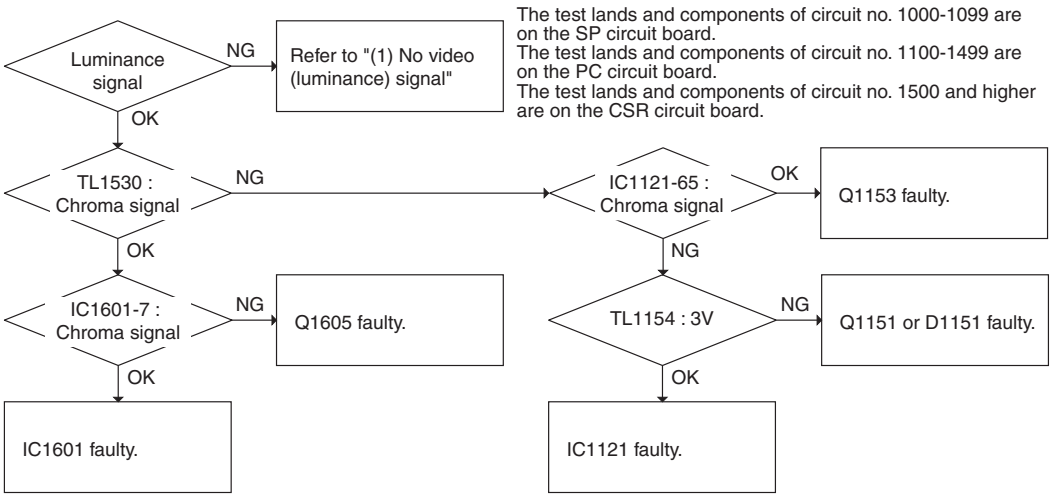
# 4-1-2 Trouble diagnosis flowchart

## (1) No video (luminance) signal





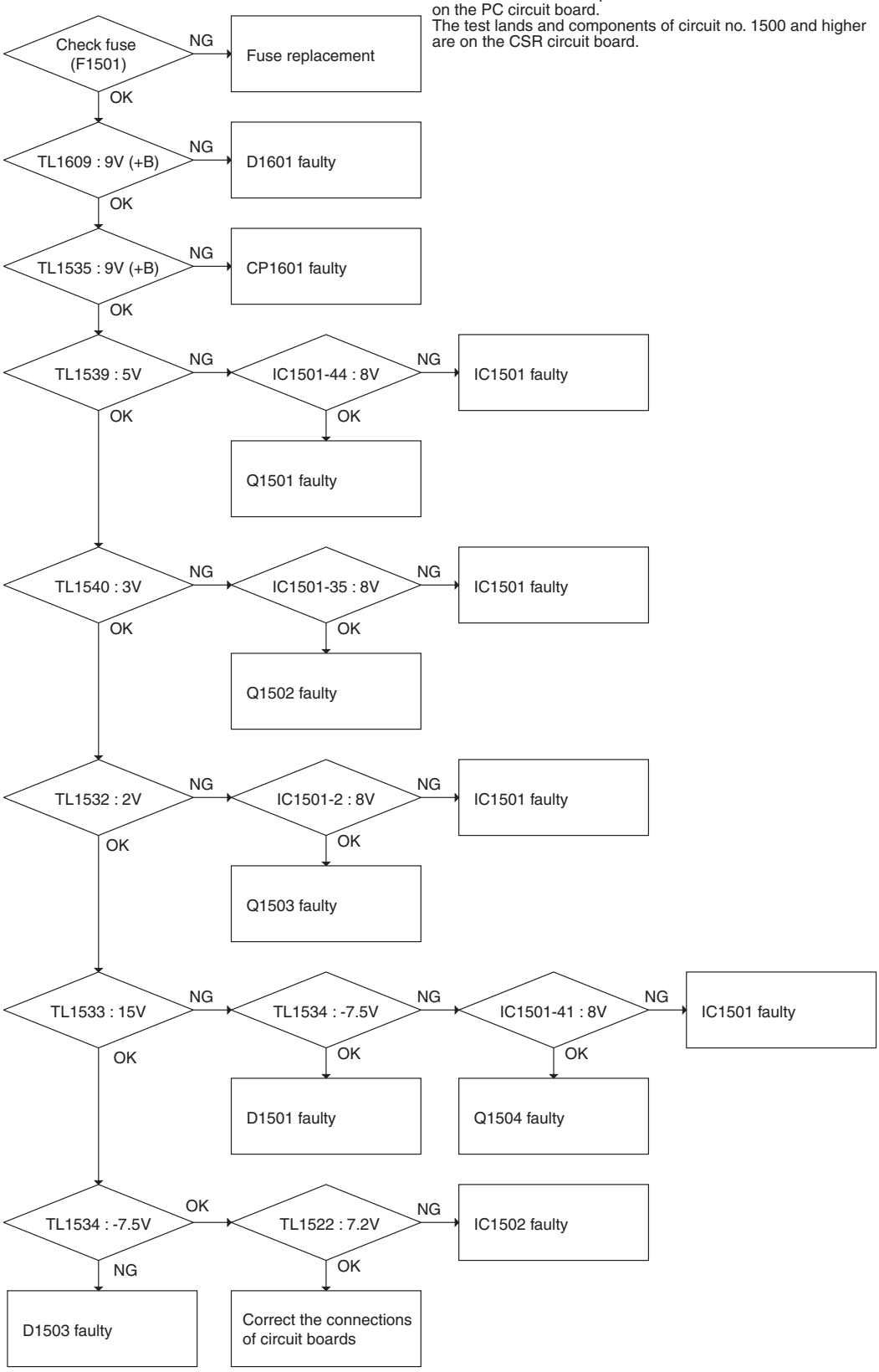

## (2) No chroma signal [For VK-S274R/S274ER]



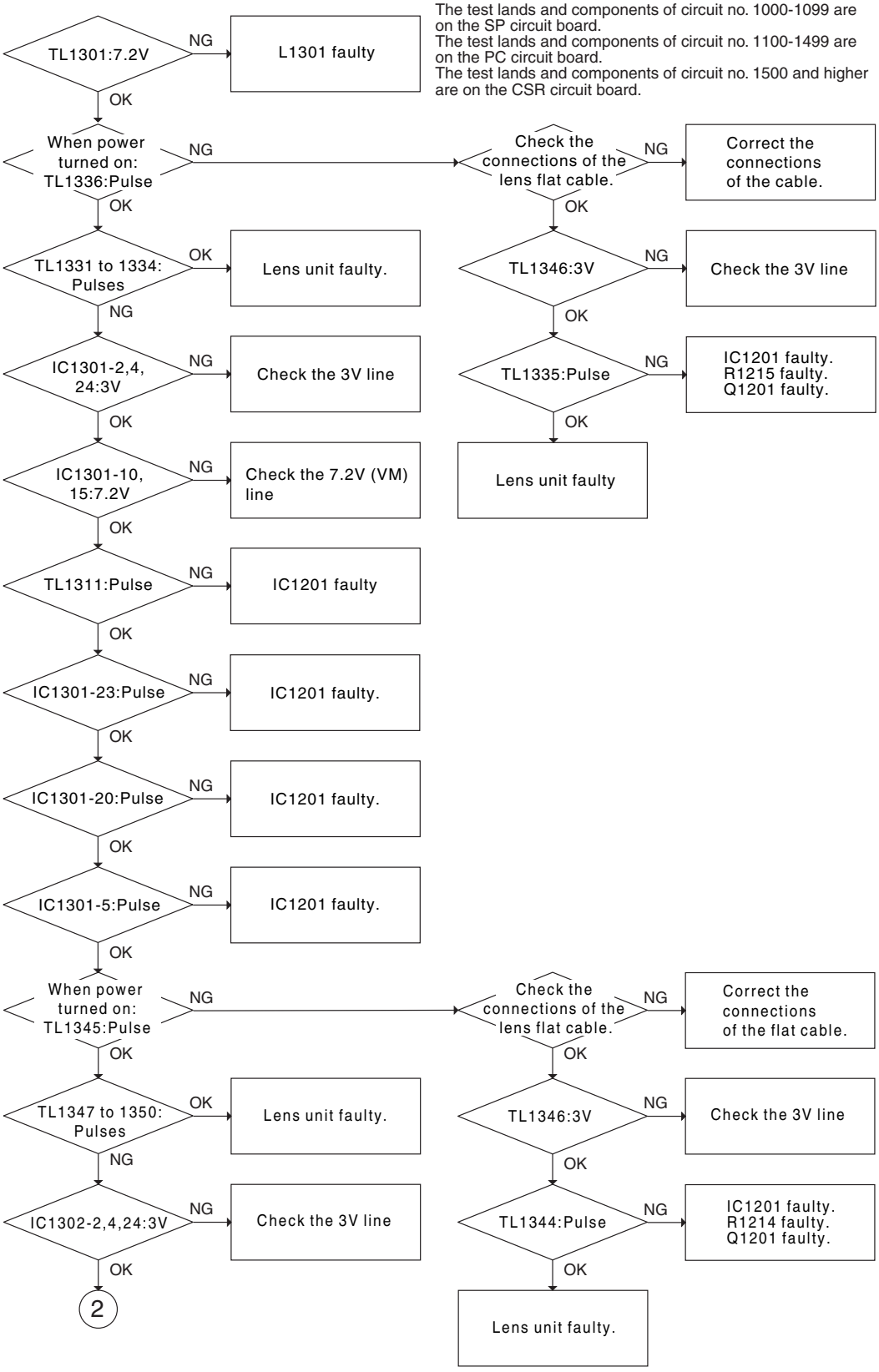

The test lands and components of circuit no. 1000-1099 are on the SP circuit board.
The test lands and components of circuit no. 1100-1499 are on the PC circuit board.
The test lands and components of circuit no. 1500 and higher are on the CSR circuit board.

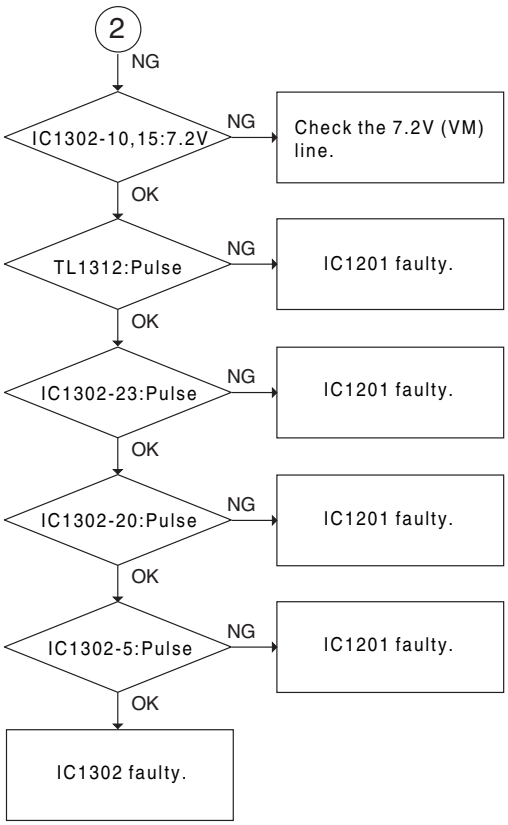
## (3) No power

The test lands and components of circuit no. 1000-1099 are on the SP circuit board.
The test lands and components of circuit no. 1100-1499 are on the PC circuit board.
The test lands and components of circuit no. 1500 and higher are on the CSR circuit board.

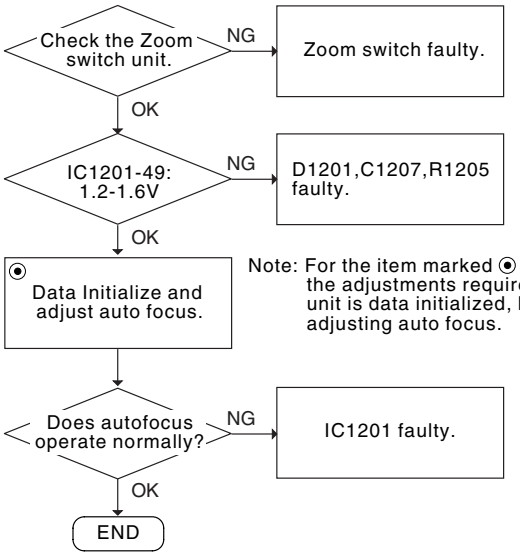


## (4) No zoom and focus operation





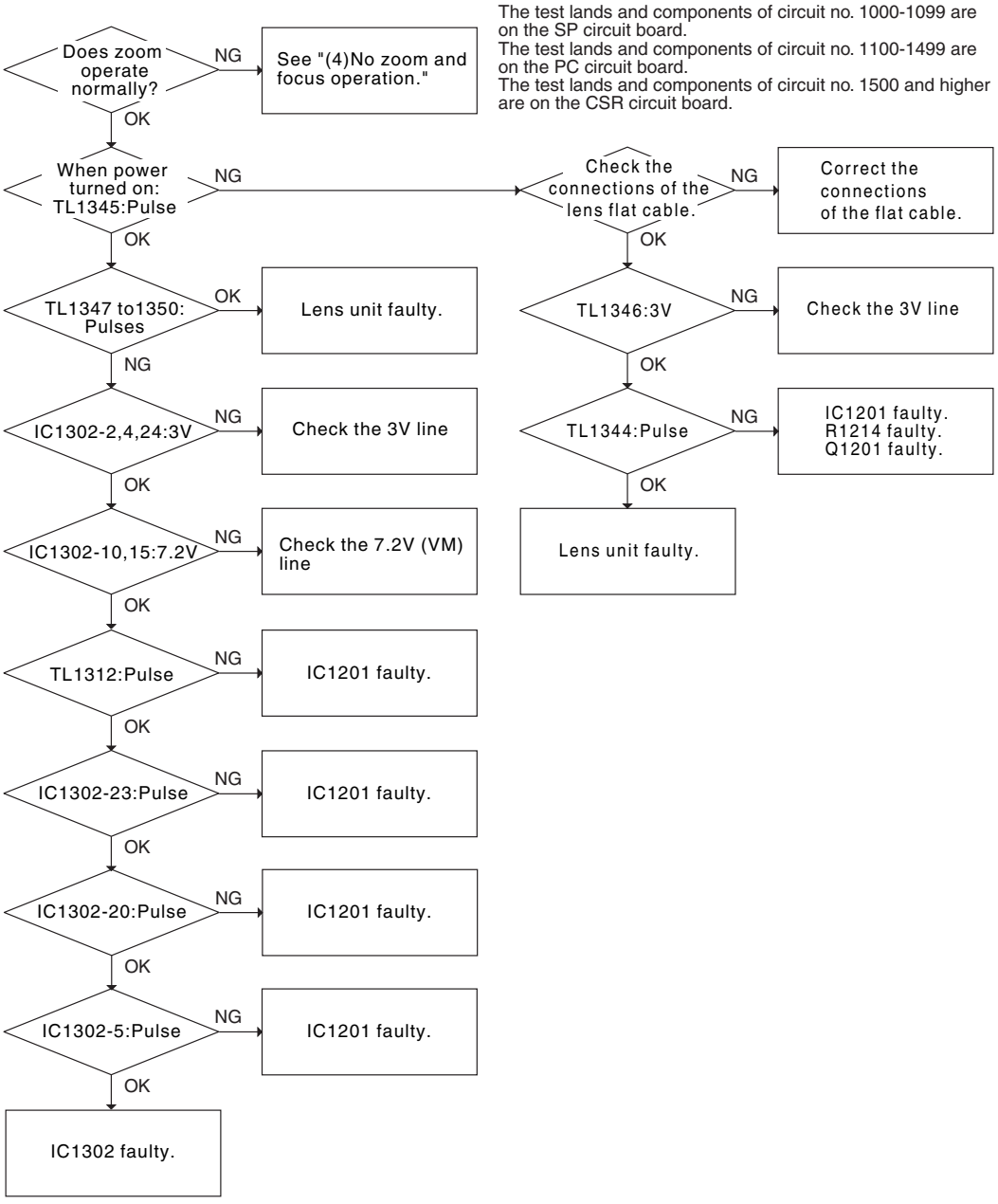

## (5) Subject is greatly out-of-focus when zoomed



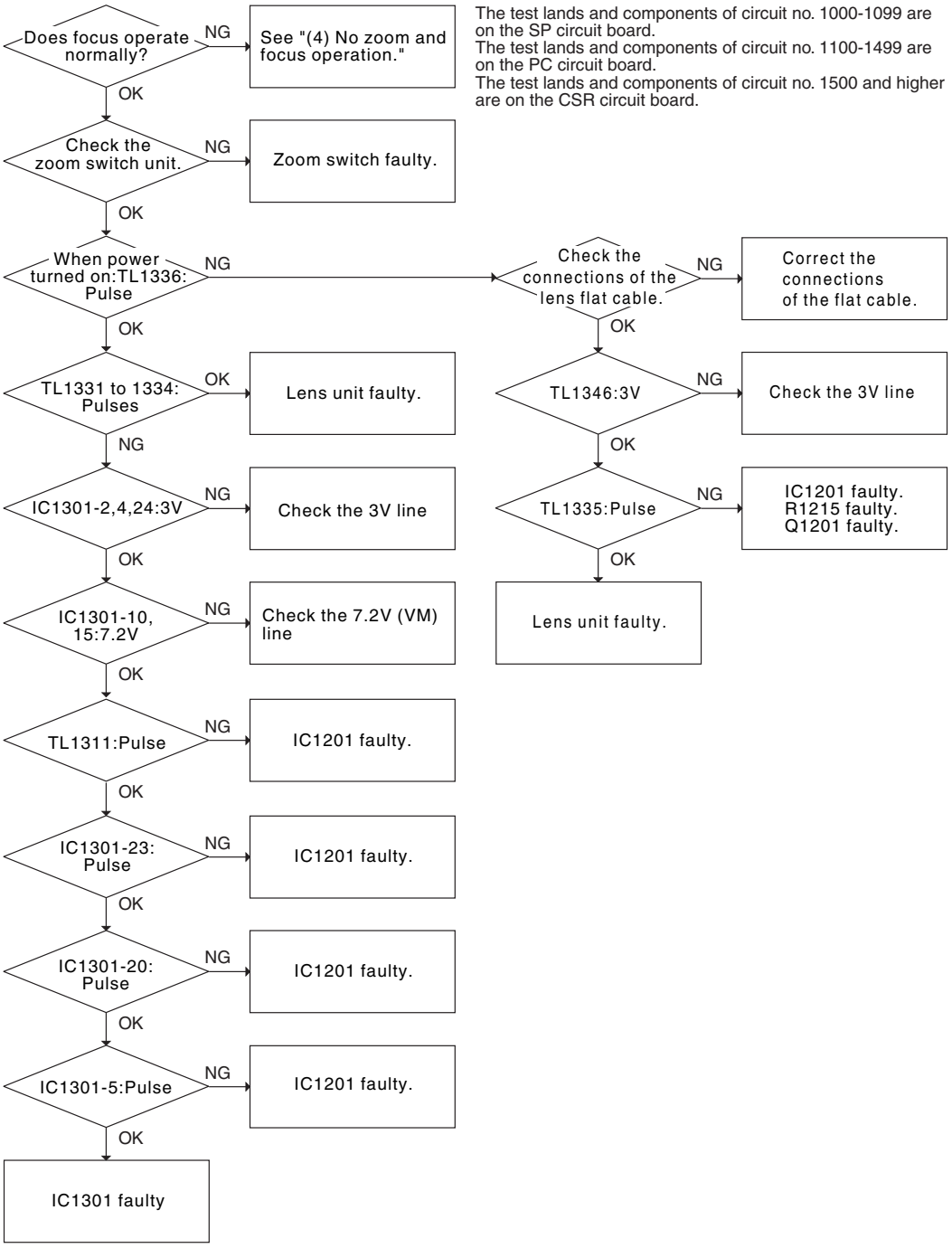

Note: For the item marked ⊙, perform all the adjustments required when the unit is data initialized, before adjusting auto focus.

The test lands and components of circuit no. 1000-1099 are on the SP circuit board.
The test lands and components of circuit no. 1100-1499 are on the PC circuit board.
The test lands and components of circuit no. 1500 and higher are on the CSR circuit board.

## (6) No focus lens operation

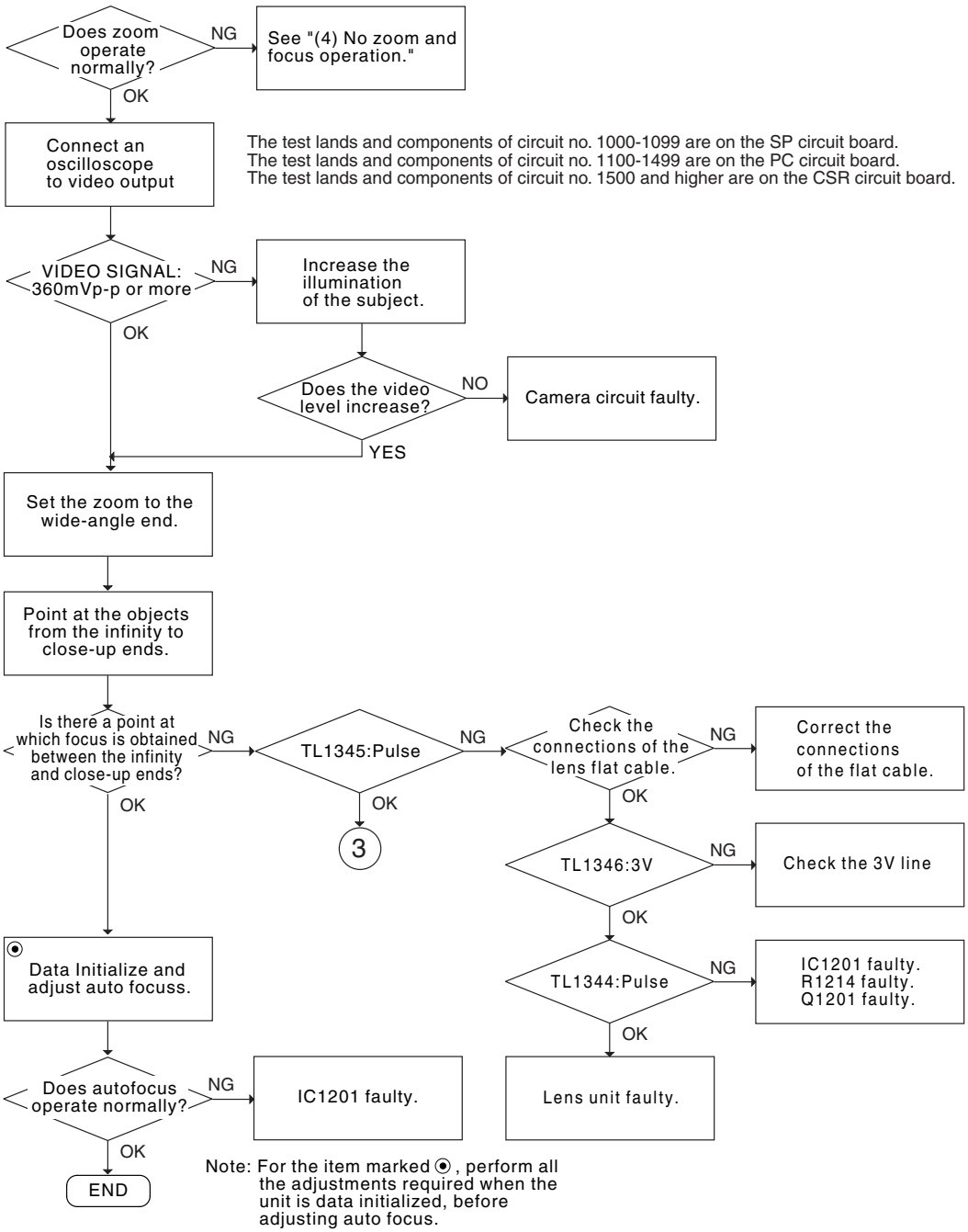


## (7) No zoom operation

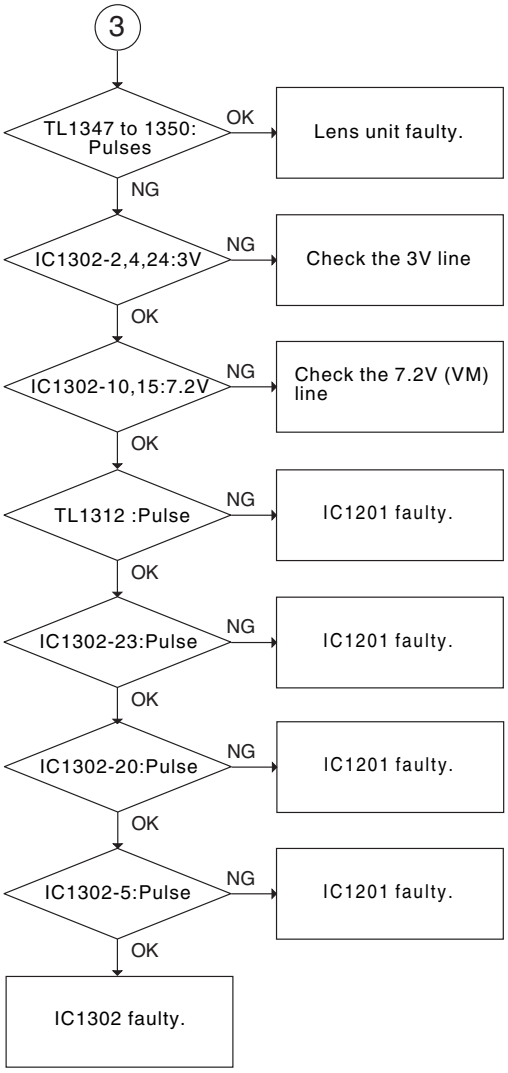



The test lands and components of circuit no. 1000-1099 are on the SP circuit board.
The test lands and components of circuit no. 1100-1499 are on the PC circuit board.
The test lands and components of circuit no. 1500 and higher are on the CSR circuit board.

## (8) No auto focus operation




Note: For the item marked ⦿, perform all the adjustments required when the unit is data initialized, before adjusting auto focus.


3
TL1347 to 1350: Pulses
OK
Lens unit faulty.
NG
IC1302-2,4,24:3V
NG
Check the 3V line
OK
IC1302-10,15:7.2V
NG
Check the 7.2V (VM) line
OK
TL1312 :Pulse
NG
IC1201 faulty.
OK
IC1302-23:Pulse
NG
IC1201 faulty.
OK
IC1302-20:Pulse
NG
IC1201 faulty.
OK
IC1302-5:Pulse
NG
IC1201 faulty.
OK
IC1302 faulty.

# 5 Disassembly and Reassembly

## 5-1 Order of Disassembly

Refer to “Disassembly Flowchart” in Fig. 5-1-1 for the order of removing components. When reassembling components, use the reverse order to removal unless otherwise specified.

Note:
When replacing components in the VK-S274R/S274ER/K274R/K274ER, be sure to use only those shown in "Replacement Parts List".

**Reading Disassembly Flowchart:**

After locating the target component in the flowchart, remove all components of the target in sequence, following the arrows (routes) from the top of flowchart.

| Component name | Item No. |
|---|---|
| •Chassis R<br>•Chassis L | 1) and 2) |
| ↓ | |
| •PC Circuit Board | 3) to 5) |
| ↓ | |
| •CSR Circuit Board | 6) and 7) |
| ↓ | |
| •SP Circuit Board<br>•Image Sensor | 8) and 10) |
| ↓ | |
| •Lens unit | 11) |

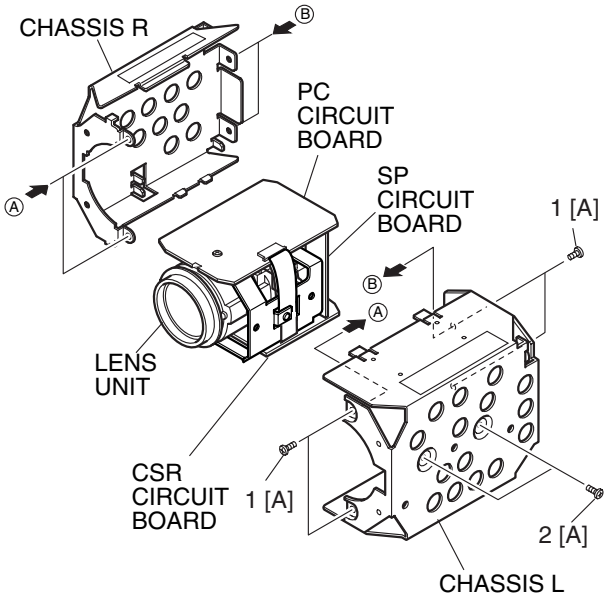
Fig. 5-1-1 Disassembly Flowchart

## 5-2 Disassembly

Information:
Numbers in figures are step numbers in disassemble procedure, and letters in brackets [ ] show the types of screw.

◆ Chassis L and R (Fig. 5-2-1)

1) Remove four screws [A] and remove the chassis L.
2) Remove two screws [A] and remove the chassis R.




[A] M2×3 (Black)



Fig. 5-2-1 Chassis L and R

◆ PC Circuit Board (Fig. 5-2-2)

3) Disconnect the flat cable from the PC circuit board.
   To connect flat cables, perform the procedure in Fig. 5-2-3.
4) Remove one screw [B].
5) Remove the PC circuit board in the direction of the arrow.

◆ CSR Circuit Board (Fig. 5-2-2)

6) Remove one screw [B].
7) Remove the CSR circuit board in the direction of the arrow.

◆ SP Circuit Board and Image Sensor (Fig. 5-2-2)

8) Remove two screw [C] and remove image sensor assembled with SP circuit board, the crystal filter and rubber also removed. Be careful not damage and lost them.
9) Unsolder the terminals (fourteen points) of image sensor on the SP circuit board.
10) Remove two screw [D] and remove image sensor form the SP circuit board.

◆ Lens Unit (Fig. 5-2-2)

11) Remove three screws [C] and remove the camera chassis for the lens unit.

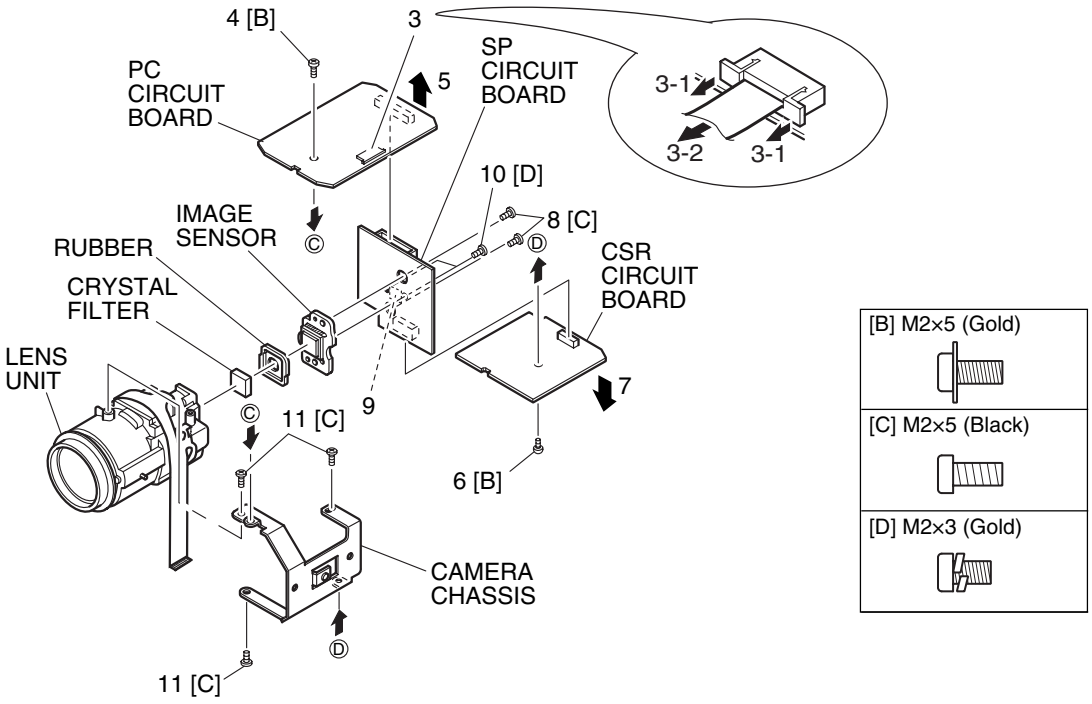



Fig. 5-2-2 PC, CSR, SP Circuit Boards, Image Sensor and Lens Unit

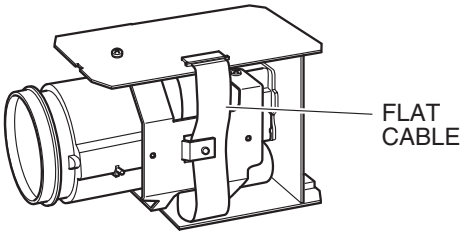


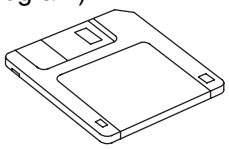
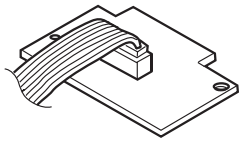
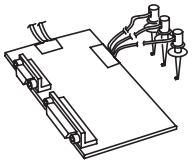
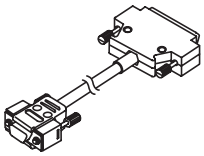

Fig. 5-2-3 Connecting Flat Cable

# 6 Adjustment

## 6-1 Preparations for Adjustment

All adjustments are performed using the adjustment program (ZMAP: Zoom camera Manual Adjustment Program) and personal computer (PC). If error message appears during adjustment, refer to "6-8 Error Messages and Countermeasure".

### 6-1-1 List of equipment and jigs

| | | | |
|---|---|---|---|
| **New** Adjustment Floppy Disk (Adjustment Program)*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]  | RS-232C Cable (9 or 25 pins) Straight Type [Goods on the Market]  | | |

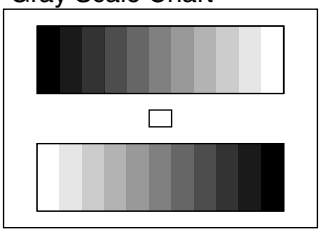
*1: The adjustment floppy disk is not for sale: It will be supplied only when service maintenance contract is concluded.

### 6-1-2 List of test equipment and charts

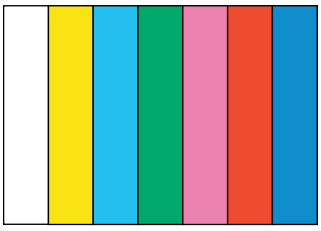
1) Gray scale chart
2) Color bar chart
3) Backfocus chart
4) Oscilloscope
5) Vectorscope
6) Digital voltmeter (DVM)
7) 3100K light box
8) Color Monitor
9) DC power supply for the video camera
10) DC power supply for the DSP-R jig

Information:
It is recommended that you use a vectorscope when performing the chroma gain adjustment. You can use an oscilloscope instead:
Note, however, that the adjustment accuracy will be lower.

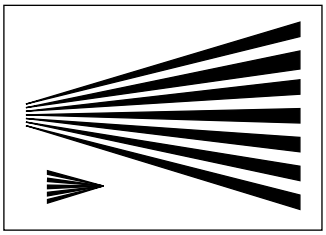
Gray Scale Chart



Color Bar Chart



Backfocus Chart



## 6-1-3 Connections for adjustment

Connect the video camera to the test equipment and jigs as shown in Fig. 6-1-1

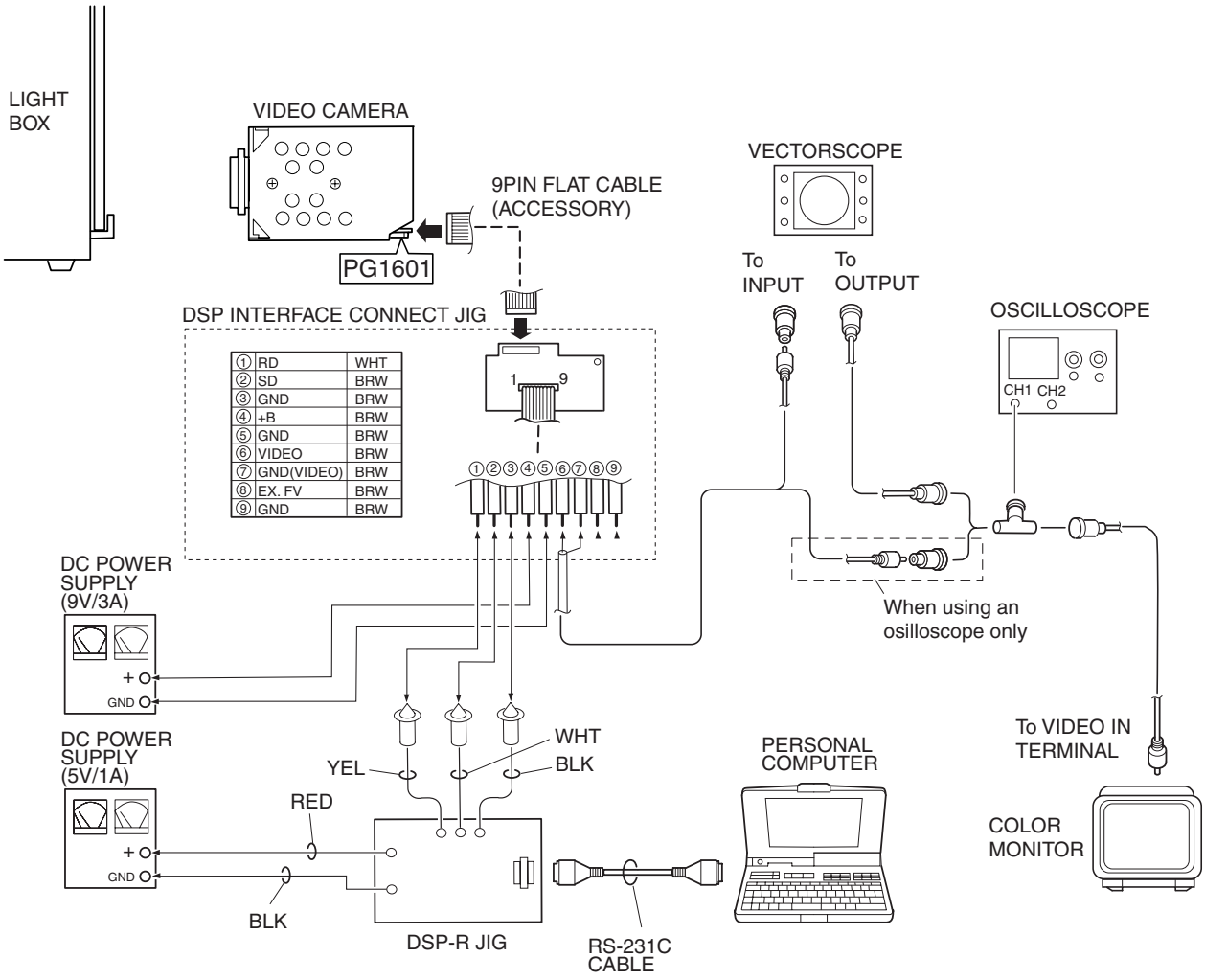



Fig. 6-1-1 Connections for Adjustment

Note:

1) The adjustment program will not operate normally unless the video camera, PC and DSP-R jigs are all turned on.
2) Take care with the following when pointing the video camera at a chart (light box):
   a) Focus the chart correctly.
   b) 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).
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.
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.

## 6-1-4 Setting test equipment

### (1) Oscilloscope

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.

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

### (2) Vectorscope

1) SATURATION: 75%

## 6-1-5 Starting adjustment program (ZMAP)

1) Connect the video camera, DSP-R jig and PC as shown in Fig. 2-1, and supply power to them. If the connection of jig, etc. is inappropriate or power is not supplied, the adjustment program will not start normally.
2) Operate the PC to start MS-DOS. For details on how to start MS-DOS, refer to the instruction manual of PC, since this varies for each PC.
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:** and press **Enter** key. (See the MS-DOS screen-1 and 2)
   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.
6) Input **ZMAP_2002** (space) **1** and press **Enter** key. (See the ZMAP input screen)
   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 number.

MS-DOS screen-1

```
C>
```

Input A and press Enter key. ⬇

MS-DOS screen-2

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

Input ZMAP_ 2002 (space) 1. ⬇

ZMAP input screen

```
C>A:
A>ZMAP_2002 1
```

Press Enter key. ⬇

(Continued on next page)

7) The ZMAP will start: Make sure that the model select screen appears on the PC display. (See the model select screen)
   If the model select screen does not appear, make sure of the following:
   a) Power is supplied to the video camera and DSP-R jig.
   b) The designation of drive (in step 5) is correct.
   c) The designation of serial port is correct.
   d) The correct adjustment floppy disk has been correctly inserted.
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. 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.
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.

(Continued from preceding page)

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]
```

Model select (Input the number).

Screen for verifying model name

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

Input Y.

Main menu

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

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

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

**Reference**

Misoperation message

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

### To terminate the adjustment program (ZMAP):

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.

# 6-2 List of Adjustment Items

## 6-2-1 List of adjustments needed after replacing major

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.

Table 6-2-1 List of adjustments needed after replacing major

●: CHECK

| Items | Purpose Adjustment | Electrical Parts | | | | | Other |
|---|---|---|---|---|---|---|---|
| | | IC1001 | IC1101 | IC1201 | IC1202 IC1203 (*1) | IC1351 | Lens Block |
| ***Data Initialize*** | | | | | | | |
| Data Initilize (*2) | Initilizing EEPROM. | | | | ● | | |
| ***Electric Volume*** | | | | | | | |
| CDS Sampling Pulse | To suppress noise in the CCD sensor output signal and maximize the signal level. | | ● | | ● | | |
| ***Camera Adjustment (Adjustment)*** | | | | | | | |
| Auto Iris | To set the iris control data. | ● | | ● | ● | ● | ● |
| White Balance [For VK-S274R/S274ER] | To input the automatic white balance control data. | ● | | | ● | | |
| Chroma Gain [For VK-S274R/S274ER] | To set the color satuation under the reference color temperrature. | ● | | | ● | | |
| ***Auto Focus*** | | | | | | | |
| Zoom/Focus Tracking | To set the out-of -focus correction level during zooming. | ● | | | ● | | ● |
| AF Noise Level | To set the noise level in the autofocus circuit. | ● | | | ● | | ● |
| Check of Zoom/Focus Trace | To check the autofocus adjustment. | ● | | | ● | | ● |
| ***Spot Noise*** | | | | | | | |
| Spot Noise | To correct spot noise. | ● | | | ● | | |

*1: When replacing the 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.

## 6-2-2 Adjustment flowchart

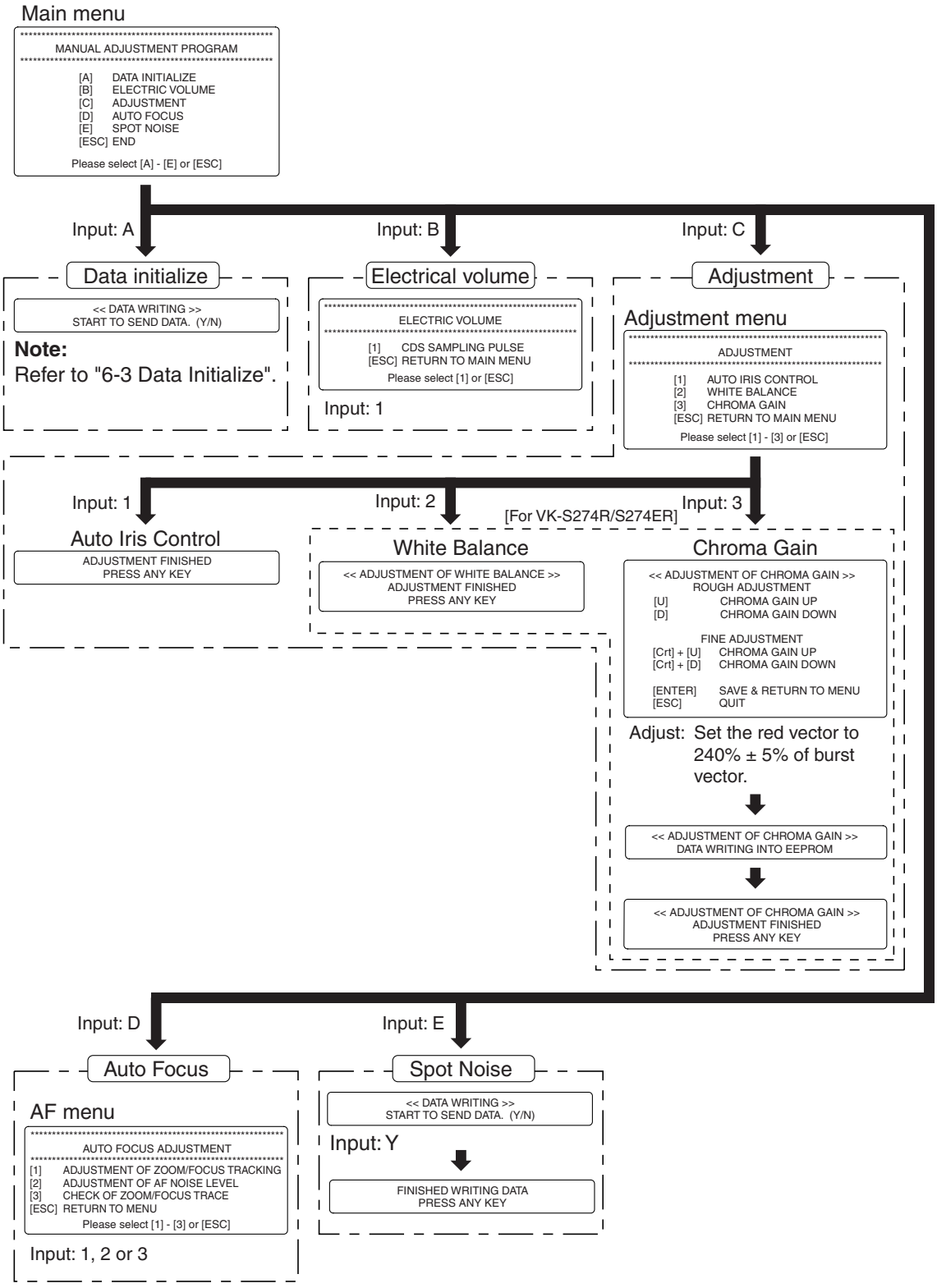



Fig. 6-2-1 Adjustment Flowchart

# 6-3 Data Initialize

Restriction:

1) This procedure initializes the adjustment data in EEPROM (including the adjustment data). Any time you replace the EEPROM, be sure to perform this procedure. Generally, this procedure is not necessary after replacing other components.
2) 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. Entering N on the screen for verifying initialization will restore the data main menu screen.
3) Follow the instructions on PC display thereafter.

Main menu

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

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

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

Input A. ⬇

Screen for verifying initialization

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

Input Y. ⬇

Follow the instructions on PC display thereafter.

# 6-4 Electronic Volume

Input **B** to PC on the main menu screen to display the electronic volume menu screen. Pressing the Esc key on the adjustment menu screen will restore the main menu screen.

Main menu

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

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

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

Input B. ⬇

Electronic volume menu

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

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

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

## 6-4-1 CDS sampling pulse adjustment

◆ Incompleted Phenomenon

Diagonal beats and horizontal noise occur.

◆ Condition:

Leave the video camera for more than 2 minutes until the circuits are stabilized after turning it on, then start adjustment.

◆ Procedure

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

Electronic volume menu

```
**********************************************************
                    ELECTRIC VOLUME
**********************************************************
          [1]     CDS SAMPLING PULSE
          [ESC]   RETURN TO MAIN MENU
          Please select [1] or [ESC]
```

Input 1. ⬇

Follow the instructions on PC display thereafter.

# 6-5 Adjustment (Camera Adjustment)

Input **C** to PC on the main menu screen to display the adjustment menu screen and input to PC the appropriate adjustment number. Pressing the Esc key on the adjustment menu screen will restore the main menu screen.

Main menu

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

Input C. ⬇

Adjustment menu

```
**********************************************************
                    ADJUSTMENT
**********************************************************
          [1]     AUTO IRIS CONTROL
          [2]     WHITE BALANCE
          [3]     CHROMA GAIN
          [ESC]   RETURN TO MAIN MENU
          Please select [1] - [3] or [ESC]
```

## 6-5-1 Auto iris control adjustment

◆ Incompleted Phenomenon

1) The picture becomes too bright.
2) The picture becomes too dark.

◆ Condition

Set 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. When the video camera is turned on again, the ZMAP 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 ZMAP.

Adjustment menu

```
**********************************************************
                      ADJUSTMENT
**********************************************************
          [1]    AUTO IRIS CONTROL
          [2]    WHITE BALANCE
          [3]    CHROMA GAIN
          [ESC]  RETURN TO MAIN MENU
          Please select [1] - [3] or [ESC]
```

Input 1. ⬇

Follow the instructions on PC display thereafter.

⬇

AIC adjustment complete

```
ADJUSTMENT FINISHED
PRESS ANY KEY
```

Press any key. ⬇

Turn the video camera off.

## 6-5-2 White balance adjustment

### [For VK-S274R/S274ER]

◆ Incompleted Phenomenon

1) Color of the subject is different from that of the picture.
2) A white subject is not seen as white.

◆ Equipment/Jig

C12 light balance filter

◆ Conditions

1) Attach a C12 light balance filter to lens.
2) 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.

Adjustment menu

```
**********************************************************
                      ADJUSTMENT
**********************************************************
          [1]    AUTO IRIS CONTROL
          [2]    WHITE BALANCE
          [3]    CHROMA GAIN
          [ESC]  RETURN TO MAIN MENU
          Please select [1] - [3] or [ESC]
```

Input 2. ⬇

Follow the instructions on PC display thereafter.

⬇

White balance adjustment complete

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

Press any key. ⬇

Adjustment menu

## 6-5-3 Chroma gain adjustment (Figs. 6-5-1, 6-5-2, 6-5-3)

[For VK-S274R/S274ER]

◆ Incompleted Phenomenon

1) Color of the picture is denser than that of the subject.
2) Color of the picture is lighter than that of the subject.

◆ Test Point

Video Out (PG1601-6)

◆ Equipment/Jig

1) Vectorscope or Oscilloscope (It is recommended that you use a vectorscope when performing this adjustment.You can use an oscilloscope instead: Note, however, that the adjustment accuracy will be lower.)
2) C12 light balance filter

◆ Condition

1) Attach a C12 light balance filter to lens.
2) Point 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 a vectorscope (Figs. 6-5-1, 6-5-2):
   Press the **D** or **U** key to set the red vector to approx. 240% of burst vector. Then, while holding down the **Ctrl** key, press the **D** or **U** key to set the red vector to approx. 240% ± 5% of burst vector.
   When using an oscilloscope (Fig. 6-5-3):
   Press the **D** or **U** key to set the red level on waveform to approx. 686 mVp-p.
   Then, while holding down the **Ctrl** key, press the **D** or **U** key to set the red level on waveform to approx. 686 mV ± 20 mVp-p.
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.

Adjustment menu

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

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

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

Input 3. ⬇

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
```

Press the D or U, and Cont key to set the red vector to 240 % ± 5 % of burst vector, and press Enter key. ⬇

Chroma gain data write

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

⬇

Chroma gain adjustment complete

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

Press any key. ⬇

Adjustment menu

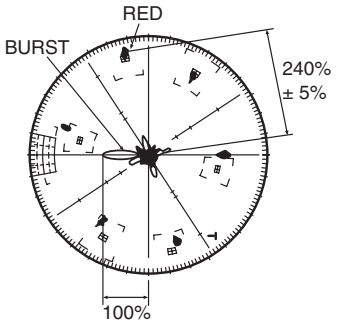



Fig. 6-5-1 Chroma Gain (For VK-S274R)

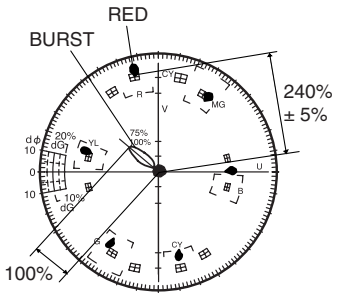



Fig. 6-5-2 Chroma Gain (For VK-S274ER)

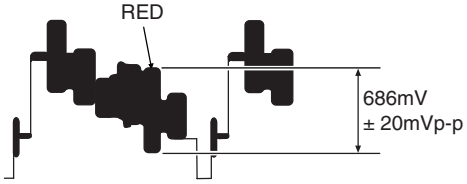



Fig. 6-5-3 Chroma Gain

# 6-6 Auto Focus

Input **D** to PC on the main menu screen to display the AF menu screen. Input the appropriate adjustment number to PC. Pressing the Esc key on the AF menu screen will restore the main menu screen.

Main menu

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

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

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

Input D. ⬇

AF menu

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

## 6-6-1 Zoom/focus tracking adjustment

◆ Incompleted Phenomenon

Focus is lost during zooming.

◆ Condition

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

Note:

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.

AF menu

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

Input 1. ⬇

Follow the instructions on PC display thereafter.

## 6-6-2 AF noise level adjustment

◆ Incompleted Phenomenon

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

◆ Condition

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

Note:
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.

AF menu

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

Input 2. ⬇

Follow the instructions on PC display thereafter.

## 6-6-3 Check of zoom/focus trace

◆ Incompleted Phenomenon

Focus is lost during zooming.

◆ Condition

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

Note:
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:
   6-6-1 Zoom/focus tracking adjustment
   6-6-2 AF noise level adjustment

AF menu

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

Input 3. ⬇

Follow the instructions on PC display thereafter.

# 6-7 Spot Noise

Spot noise refers to bright points that appear on the screen, which are caused by a defect in pixel of image sensor.

Note:
1) Perform this adjustment after specified components have been replaced (see "6-2-1 List of Adjustments Needed After Replacing Major ").
2) Perform this adjustment if spot noise occurs under abnormal usage conditions or after long-term use.
3) Perform this adjustment after completing all other adjustments. Perform this adjustment in normal video status.

◆ Incompleted Phenomenon

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

◆ Equipment/Jig

Color video monitor (CRT type is desirable)

◆ Condition

Cap the lens (so that no light enters).

◆ 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**. Entering N on the screen for verifying writing of spot noise data will restore the main menu screen.
4) When writing data is complete, the spot noise data write complete screen will appear: Press any key to restore the main menu screen.

Note:
If spot noise still occurs after this adjustment is complete, the image sensor may be defective.

Main menu

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

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

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

Input E. ⬇

Follow the instructions on PC display thereafter.

⬇

Screen for verifying writing of spot noise data

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

Input Y. ⬇

Spot noise data write complete

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

Press any key. ⬇

Adjustment menu

# 6-8 Error Messages and Countermeasure

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.

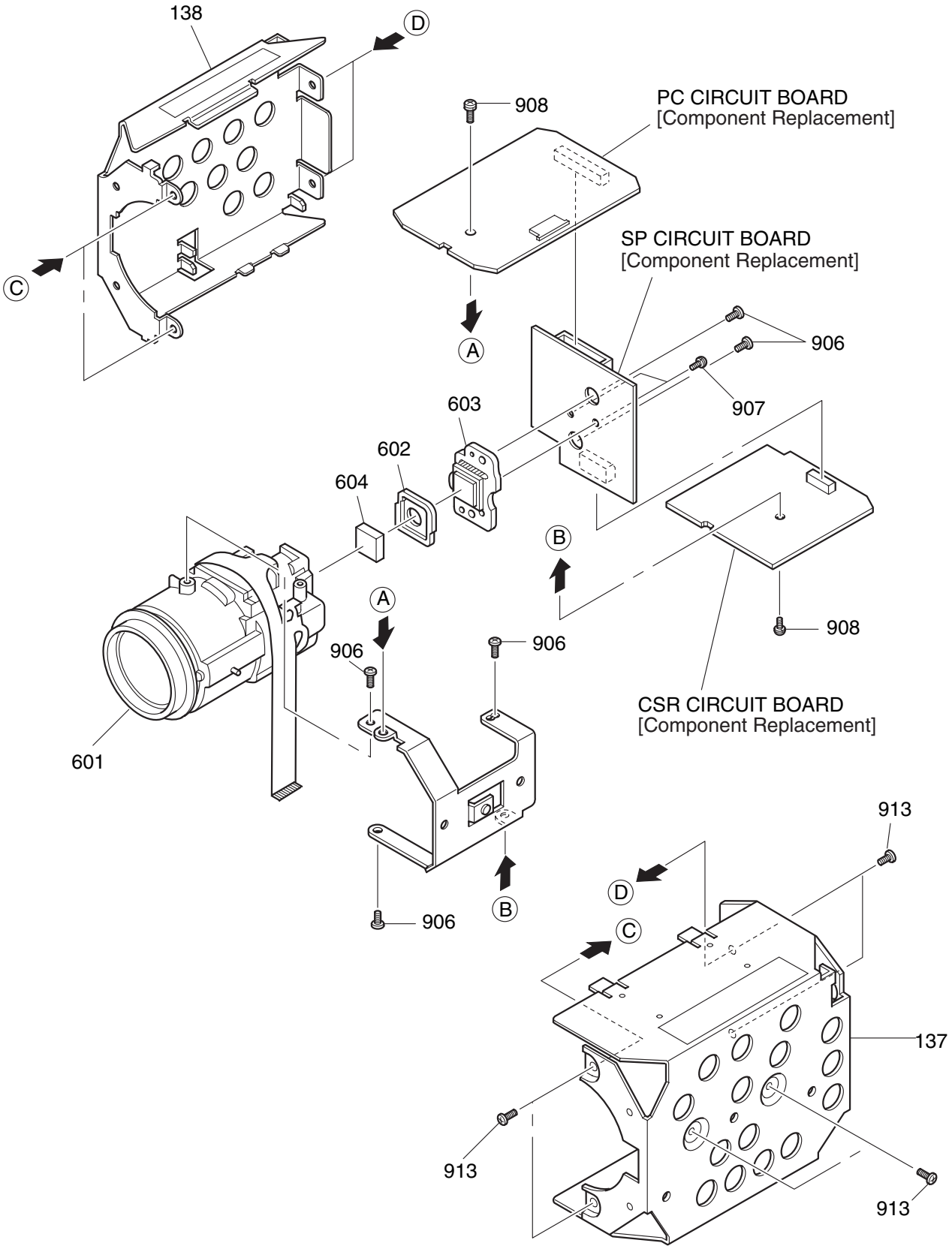
| Error Messages | Countermeasure |
|---|---|
| When adjusting the electric volume and adjustment | |
| CAN'T ADJUST WHITE BALANCE<br>PLEASE RETRY<br>PRESS ANY KEY | 1) The subject is too bright or too dark.<br>2) Check the light box.<br>3) Move the camera closer to or away from the light box.<br>4) Supply power again and readjust. |
| D RANGE OVER. ERROR ON da×<br>ADJUSTMENT<br>PRESS ANY KEY.<br><br>(×: Error code) | 1) Check the values in the hall amp circuit.<br>2) Defective soldering, damage to pattern, etc. in the above circuit. |
| D RANGE OVER ERROR ON HALL AMP<br>IRIS CANNOT OPEN ANY MORE<br>PRESS ANY KEY | 1) Supply power again and readjust.<br>2) The subject is too dark.<br>3) Check the light box.<br>4) Move the camera closer to the light box.<br>5) Check the values in the hall amp circuit.<br>6) Defective soldering, damage to pattern, etc. in the above circuit. |
| ERROR OCCURRED. IRIS TROUBLE<br>PRESS ANY KEY | 1) Check whether or not power is supplied.<br>2) Check the values of the iris drive circuit.<br>3) Defective soldering, damage to pattern, etc. in the above circuit.<br>4) Check the iris block and replace it if necessary. |
| ERROR OCCURRED ON da× ADJUSTMENT<br>PRESS ANY KEY | 1) Check the values in the hall amp circuit.<br>2) Defective soldering, damage to pattern, etc. in the above circuit. |
| ERROR OCCURRED ON da0 and da1<br>ADJUSTMENT<br>PRESS ANY KEY | 1) Check the values in the hall amp circuit and its peripheral circuits.<br>2) Defective soldering, damage to pattern, etc. in the above circuits. |
| FILE NOT FOUND !!!!<br>PRESS ANY KEY | 1) The adjustment program (file) cannot be found.<br>2) Check the adjustment floppy disk and replace it if necessary. |
| FILE OPEN ERROR !!!!<br>PRESS ANY KEY | 1) The adjustment program (file) does not start.<br>2) Check the adjustment floppy disk and replace it if necessary. |
| ERROR OCCURRED ON C DUTY<br>ADJUSTMENT<br>PRESS ANY KEY | 1) Check the values of the iris drive circuit.<br>2) Defective soldering, damage to pattern, etc. in the above circuit. |
| ERROR OCCURRED ON FDET<br>ADJUSTMENT<br>PRESS ANY KEY | 1) Supply power again and readjust.<br>2) Check the values in the hall amp circuit.<br>3) Defective soldering, damage to pattern, etc. in the above circuit. |
| ERROR OCCURRED. ZOOM DOES NOT WORK<br>PRESS ANY KEY | 1) Supply power again and readjust. |
| STAURATION ERROR. TOO BRIGHT<br>PRESS ANY KEY | 1) The subject is too bright.<br>2) Move the camera further away from the light box. |

| Error Messages | Countermeasure |
|---|---|
| TOO BRIGHT<br>PRESS ANY KEY | 1) The subject is too bright.<br>2) Move the camera further away from the light box. |
| TOO DARK<br>PRESS ANY KEY | 1) The subject is too dark.<br>2) Check the light box.<br>3) Move the camera closer to the light box. |
| When adjusting the auto focus | |
| AF ERROR | 1) If this error message appears even when the adjustment is performed 2 or 3 times, the autofocus circuit system is defective.<br>2) Refer to "(4) No zoom and focus operation" on "4-1-2 Trouble Diagnosis Flowchart". |
| AF LIMIT OVER | 1) Check the conditions of subject.<br>2) If this error message appears even when the adjustment is performed 2 or 3 times, the autofocus circuit system is defective.<br>3) Refer to "(6) No focus lens operation" on "4-1-2 Trouble Diagnosis Flowchart". |
| TIME OUT ERROR ON AF STEP | 1) Check the conditions of subject.<br>2) If this error message appears even when the adjustment is performed 2 or 3 times, the autofocus circuit system is defective.<br>3) Refer to "(4) No zoom and focus operation" on "4-1-2 Trouble Diagnosis Flowchart". |
| TIME OUT ERROR ON FOCUS | |
| TIME OUT ERROR ON ZOOM | 1) If this error message appears even when the adjustment is performed 2 or 3 times, the autofocus circuit system is defective.<br>2) Refer to "(7) No zoom operation" on "4-1-2 Trouble Diagnosis Flowchart". |
| TOO DARK | 1) Insufficient lighting. Check the subject. |
| TRACE ERROR. ADJUST ZOOM TRACE & AF NOISE AGAIN | 1) Supply power again and readjust. |
| When adjusting the spot noise | |
| ERROR!!<br>SPOT NOISE COMPENSATION IS STOPPED BY INITIAL DATA.<br>PLEASE CHECK THE EEPROM.<br>PRESS ANY KEY. | 1) Spot noise compensation is inhibited by the data in the EEPROM.<br>2) Turn the power on again.<br>3) Data in the EEPROM is defective. (data Initialize it.)<br>4) Check the EEPROM, and if necessary, replace it. |
| ERROR!!<br>THE SPOT NOISE IS TOO MANY.<br>CAN'T COMPENSATE ANY MORE.<br>PRESS ANY KEY. | 1) The amount of spot noise that can be compensated reaches the limit.<br>2) Turn the power on again.<br>3) Check the image sensor, and if necessary, replace it. |
| ERROR!!<br>THRESHOLD DATA ERROR.<br>PLEASE CHECK THE EEPROM.<br>PRESS ANY KEY. | 1) Turn the power on again.<br>2) Data in the EEPROM is defective. (data Initialize it.)<br>3) Check the EEPROM, and if necessary, replace it. |

# 7 Exploded View and Parts List

## 7-1 Exploded View

Note: Components without any numbers in exploded views had not been assigned as service parts as of the date of issue of this manual.



# 7-2 Replacement Parts List

*TBR*: To Be Reported

## 7-2-1 Mechanical Parts List

| SYMBOL NO | P-NO | DESCRIPTION |
|---|---|---|
| | | MECHANISM SECTION |
| 137 | NA31542 | CHASSISE,L |
| 138 | NA31552 | CHASSISE,R |
| 601 | KQ10752 | LENS ASSY |
| 602 | NX11252 | RUBBER |
| 603 | UE15521 | CCD IMAGE SENSOR [S274R] |
| 603 | *TBR* | CCD IMAGE SENSOR [S274ER] |
| 603 | *TBR* | CCD IMAGE SENSOR [K274R] |
| 603 | *TBR* | CCD IMAGE SENSOR [K274ER] |
| 604 | DT10251 | TUBE,CAMERA |
| 906 | 7775945 | SCREW(2X5) |
| 907 | 8650103 | SCREW(2X3) |
| 908 | MK11051 | SCREW(2X5) |
| 913 | MK13481 | SCREW(M2X3DT) |

## 7-2-2 Electrical Parts List

| SYMBOL NO | P-NO | DESCRIPTION |
|---|---|---|
| | | CAPACITORS |
| C1001 | 0893107 | CERAMIC CHIP 5PF+-0.25% 50V |
| C1002 | AA00393R | CHIP CERAMIC 1.0UF+80-20% 50V |
| C1003 | AA00393R | CHIP CERAMIC 1.0UF+80-20% 50V |
| C1004 | 0893211 | CERAMIC CHIP 1500PF+-10% 50V |
| C1005 | AA00422R | CERAMIC CHIP 10UF 16V |
| C1006 | 0893222 | CERAMIC CHIP 0.01UF+-10% 50V |
| C1007 | AA00393R | CHIP CERAMIC 1.0UF+80-20% 50V |
| C1008 | AA00393R | CHIP CERAMIC 1.0UF+80-20% 50V |
| C1009 | 0893222 | CERAMIC CHIP 0.01UF+-10% 50V |
| C1010 | AA00393R | CHIP CERAMIC 1.0UF+80-20% 50V |
| C1011 | 0893062 | CERAMIC CHIP 1UF+80-20% 16V |
| C1012 | 0893062 | CERAMIC CHIP 1UF+80-20% 16V |
| C1013 | AA00422R | CERAMIC CHIP 10UF 16V |
| C1018 | 0893062 | CERAMIC CHIP 1UF+80-20% 16V |
| C1101 | 0893062 | CERAMIC CHIP 1UF+80-20% 16V |
| C1102 | 0893225 | CERAMIC CHIP 0.1UF+80-20% 16V |
| C1103 | 0893225 | CERAMIC CHIP 0.1UF+80-20% 16V |
| C1104 | 0893225 | CERAMIC CHIP 0.1UF+80-20% 16V |
| C1105 | 0893179 | CERAMIC CHIP 0.1UF+-10% 16V |
| C1106 | AA00441R | CHIP CAPACITOR 22UF+-20% 6.3V |
| C1107 | 0893062 | CERAMIC CHIP 1UF+80-20% 16V |
| C1108 | 0893062 | CERAMIC CHIP 1UF+80-20% 16V |
| C1109 | 0893179 | CERAMIC CHIP 0.1UF+-10% 16V |
| C1110 | 0893193 | CERAMIC CHIP 0.01UF+-10% 25V |
| C1111 | AA00951R | CERAMIC CAPACITOR 1.0UF+-10% 16V |
| C1112 | AA00931R | CERAMIC CAPACITOR 1.0UF+-10% 10V |
| C1113 | 0893193 | CERAMIC CHIP 0.01UF+-10% 25V |
| C1114 | 0893179 | CERAMIC CHIP 0.1UF+-10% 16V |
| C1115 | AA00442R | CERAMIC CAPACITOR 10UF 6.3V |
| C1116 | AA00441R | CHIP CAPACITOR 22UF+-20% 6.3V |
| C1117 | AA00381R | CERAMIC CHIP 10UF+-10% 6.3V |
| C1118 | AA00381R | CERAMIC CHIP 10UF+-10% 6.3V |
| C1121 | AA00441R | CHIP CAPACITOR 22UF+-20% 6.3V |
| C1122 | 0893193 | CERAMIC CHIP 0.01UF+-10% 25V |
| C1123 | AA01111R | CERAMIC CHIP 1UF 6.3V |
| C1124 | 0893193 | CERAMIC CHIP 0.01UF+-10% 25V |
| C1125 | 0893193 | CERAMIC CHIP 0.01UF+-10% 25V |
| C1127 | 0893179 | CERAMIC CHIP 0.1UF+-10% 16V |
| C1128 | 0893107 | CERAMIC CHIP 5PF+-0.25% 50V |
| C1129 | 0893107 | CERAMIC CHIP 5PF+-0.25% 50V |
| C1130 | 0893014 | CERAMIC CHIP 0.01UF+-10% 25V |
| C1131 | AA00931R | CERAMIC CAPACITOR 1.0UF+-10% 10V |
| C1132 | 0893119 | CERAMIC CHIP 33PF+-5% 50V |
| C1133 | AA00381R | CERAMIC CHIP 10UF+-10% 6.3V |
| C1134 | AA00381R | CERAMIC CHIP 10UF+-10% 6.3V |
| C1135 | 0893062 | CERAMIC CHIP 1UF+80-20% 16V |
| C1136 | 0893225 | CERAMIC CHIP 0.1UF+80-20% 16V |
| C1137 | 0893225 | CERAMIC CHIP 0.1UF+80-20% 16V |
| C1138 | 0893225 | CERAMIC CHIP 0.1UF+80-20% 16V |
| C1139 | 0893225 | CERAMIC CHIP 0.1UF+80-20% 16V |
| C1140 | 0893225 | CERAMIC CHIP 0.1UF+80-20% 16V |
| C1141 | 0893225 | CERAMIC CHIP 0.1UF+80-20% 16V |
| C1142 | 0893225 | CERAMIC CHIP 0.1UF+80-20% 16V |
| C1143 | AA00442R | CERAMIC CAPACITOR 10UF 6.3V |
| C1144 | AA00441R | CHIP CAPACITOR 22UF+-20% 6.3V |
| C1145 | 0893179 | CERAMIC CHIP 0.1UF+-10% 16V |
| C1151 | 0893123 | CERAMIC CHIP 56PF+-5% 50V |
| C1160 | 0893062 | CERAMIC CHIP 1UF+80-20% 16V |
| C1162 | 0893225 | CERAMIC CHIP 0.1UF+80-20% 16V |
| C1176 | 0893225 | CERAMIC CHIP 0.1UF+80-20% 16V |
| C1177 | 0893193 | CERAMIC CHIP 0.01UF+-10% 25V |
| C1178 | 0893123 | CERAMIC CHIP 56PF+-5% 50V |

| SYMBOL NO | P-NO | DESCRIPTION |
|---|---|---|
| C1180 | 0893123 | CERAMIC CHIP 56PF+-5% 50V |
| C1182 | 0893225 | CERAMIC CHIP 0.1UF+80-20% 16V |
| C1183 | 0893112 | CERAMIC CHIP 9.0PF+-0.5% 50V |
| C1185 | 0893101 | CERAMIC CHIP 0.5PF+-0.25% 50V |
| C1186 | 0893112 | CERAMIC CHIP 9.0PF+-0.5% 50V |
| C1187 | 0893225 | CERAMIC CHIP 0.1UF+80-20% 16V |
| C1188 | 0893107 | CERAMIC CHIP 5PF+-0.25% 50V |
| C1189 | 0893101 | CERAMIC CHIP 0.5PF+-0.25% 50V |
| C1191 | 0893175 | CERAMIC CHIP 1000PF+-5% 50V |
| C1192 | 0893175 | CERAMIC CHIP 1000PF+-5% 50V |
| C1201 | AA00442R | CERAMIC CAPACITOR 10UF 6.3V |
| C1202 | 0893193 | CERAMIC CHIP 0.01UF+-10% 25V |
| C1203 | 0893193 | CERAMIC CHIP 0.01UF+-10% 25V |
| C1204 | 0893193 | CERAMIC CHIP 0.01UF+-10% 25V |
| C1205 | 0893225 | CERAMIC CHIP 0.1UF+80-20% 16V |
| C1206 | 0893193 | CERAMIC CHIP 0.01UF+-10% 25V |
| C1207 | 0893193 | CERAMIC CHIP 0.01UF+-10% 25V |
| C1208 | AA00442R | CERAMIC CAPACITOR 10UF 6.3V |
| C1209 | 0893179 | CERAMIC CHIP 0.1UF+-10% 16V |
| C1212 | 0893179 | CERAMIC CHIP 0.1UF+-10% 16V |
| C1213 | 0893179 | CERAMIC CHIP 0.1UF+-10% 16V |
| C1215 | 0893177 | CAPACITOR 0.068UF+-10% 16V |
| C1216 | 0893193 | CERAMIC CHIP 0.01UF+-10% 25V |
| C1217 | 0893225 | CERAMIC CHIP 0.1UF+80-20% 16V |
| C1218 | 0893225 | CERAMIC CHIP 0.1UF+80-20% 16V |
| C1250 | 0893239 | CERAMIC CHIP 0.01UF+80-20% 50V |
| C1251 | AA01111R | CERAMIC CHIP 1UF 6.3V |
| C1252 | 0893239 | CERAMIC CHIP 0.01UF+80-20% 50V |
| C1300 | AA00422R | CERAMIC CHIP 10UF 16V |
| C1301 | 0893014 | CERAMIC CHIP 0.01UF+-10% 25V |
| C1303 | 0893179 | CERAMIC CHIP 0.1UF+-10% 16V |
| C1304 | 0893014 | CERAMIC CHIP 0.01UF+-10% 25V |
| C1305 | 0893215 | CERAMIC CHIP 3300PF+-10% 50V |
| C1306 | 0893179 | CERAMIC CHIP 0.1UF+-10% 16V |
| C1311 | AA00422R | CERAMIC CHIP 10UF 16V |
| C1314 | AA00751R | CERAMIC CHIP 10UF+-10% 6.3V |
| 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 |
| 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 |
| C1390 | 0893215 | CERAMIC CHIP 3300PF+-10% 50V |
| 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 | AA00422R | CERAMIC CHIP 10UF 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 | AA01001R | CHIP CAPACITOR 1.0UF 25V |
| C1520 | AA00422R | CERAMIC CHIP 10UF 16V |
| C1521 | 0893062 | CERAMIC CHIP 1UF+80-20% 16V |
| C1522 | AA01001R | CHIP CAPACITOR 1.0UF 25V |
| C1523 | AA00751R | CERAMIC CHIP 10UF+-10% 6.3V |
| C1524 | AA00441R | CHIP CAPACITOR 22UF+-20% 6.3V |
| C1525 | AA01001R | CHIP CAPACITOR 1.0UF 25V |
| C1526 | AA00751R | CERAMIC CHIP 10UF+-10% 6.3V |
| C1527 | 0893062 | CERAMIC CHIP 1UF+80-20% 16V |
| C1528 | AA01001R | CHIP CAPACITOR 1.0UF 25V |
| 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 |
| C1533 | 0893179 | CERAMIC CHIP 0.1UF+-10% 16V |
| C1543 | AA00807R | CHIP CAPACITOR 10UF+-20% 25V |
| C1544 | AA00807R | CHIP CAPACITOR 10UF+-20% 25V |
| C1546 | AA00422R | CERAMIC CHIP 10UF 16V |
| C1547 | AA00422R | CERAMIC CHIP 10UF 16V |
| C1548 | AA00422R | CERAMIC CHIP 10UF 16V |
| C1601 | 0893193 | CERAMIC CHIP 0.01UF+-10% 25V |
| C1602 | AA00422R | CERAMIC CHIP 10UF 16V |
| 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 |
| C1608 | TBR | CERAMIC CHIP |
| 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 [S274R] |
| C1617 | TBR | CERAMIC CHIP [S274ER] |
| C1626 | AA00381R | CERAMIC CHIP 10UF+-10% 6.3V |
| C1643 | 0893193 | CERAMIC CHIP 0.01UF+-10% 25V |
| C1650 | 0893206 | CERAMIC CHIP 680PF+-10% 50V |
| C1651 | AA00931R | CERAMIC CAPACITOR 1.0UF+-10% 10V |
| CP1171 | BE10591R | COIL |
| CP1601 | BV10201R | CHOKE COIL |
| | | RESISTORS |
| RM1121 | AQ00064R | CHIP RESISTOR 100KOHM+-5% 1/16W |
| RM1122 | AQ00064R | CHIP RESISTOR 100KOHM+-5% 1/16W |
| RM1123 | AQ00064R | CHIP RESISTOR 100KOHM+-5% 1/16W |
| RM1124 | AQ00064R | CHIP RESISTOR 100KOHM+-5% 1/16W |
| R1001 | 0103853 | CHIP RESISTOR 6.8KOHM+-5% 0.1W |
| R1002 | 0790024 | CHIP RESISTOR 100 OHM+-5% 1/16W |
| R1004 | 0790077 | CHIP RESISTOR 1MOHM+-5% 1/16W |
| R1007 | 0790064 | CHIP RESISTOR 100KOHM+-5% 1/16W |
| R1101 | AQ00231R | CHIP RESISTOR 24KOHM+-1% 1/16W |
| R1121 | 0790028 | CHIP RESISTOR 220 OHM+-5% 1/16W |
| R1122 | BM00132R | FILTER |
| R1123 | 0790025 | CHIP RESISTOR 120 OHM+-5% 1/16W |
| R1124 | 0790025 | CHIP RESISTOR 120 OHM+-5% 1/16W |
| R1125 | 0790028 | CHIP RESISTOR 220 OHM+-5% 1/16W |
| R1126 | AQ00215R | CHIP RESISTOR 6.2KOHM+-1% 1/10W |
| R1128 | 0790061 | CHIP RESISTOR 56KOHM+-5% 1/16W |
| R1155 | AQ00198R | CHIP RESISTOR 1.5KOHM+-1% 1/16W |
| R1156 | AQ00212R | CHIP RESISTOR 4.7KOHM+-1% 1/16W |
| R1157 | 0790037 | CHIP RESISTOR 1KOHM+-5% 1/16W |
| R1158 | AQ00232R | CHIP RESISTOR 27KOHM+-1% 1/16W |
| R1159 | AQ00187R | CHIP RESISTOR 560 OHM+-1% 0.063W |

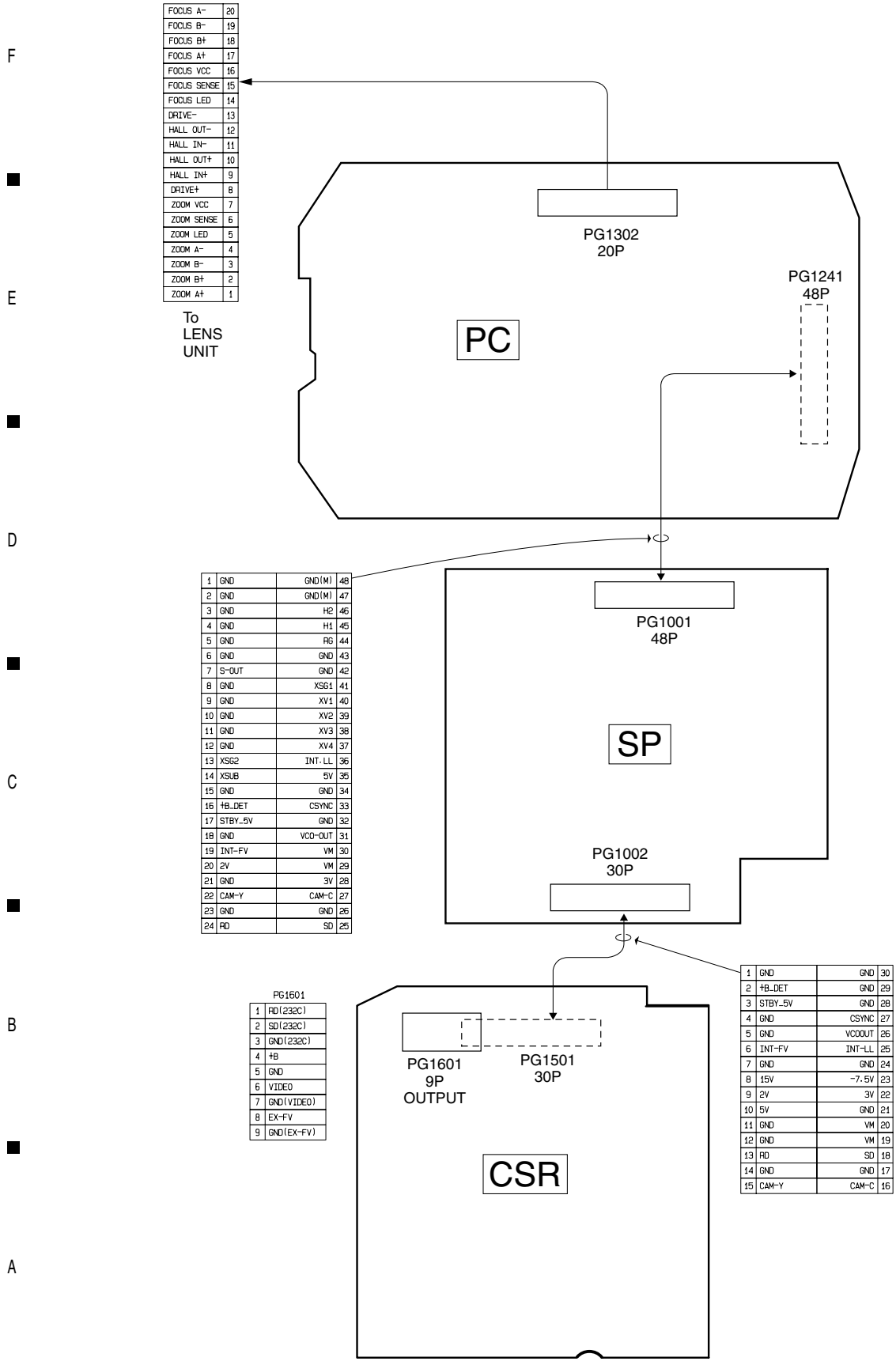
| SYMBOL NO | P-NO | DESCRIPTION |
|---|---|---|
| R1162 | 0790037 | CHIP RESISTOR 1KOHM+-5% 1/16W |
| R1164 | AQ00205R | CHIP RESISTOR 2.7KOHM+-1% 1/16W |
| R1165 | AQ00194R | CHIP RESISTOR 1.0KOHM+-1% 1/16W |
| R1173 | 0790051 | CHIP RESISTOR 10KOHM+-5% 1/16W |
| R1174 | 0790059 | CHIP RESISTOR 47KOHM+-5% 1/16W |
| R1175 | 0790059 | CHIP RESISTOR 47KOHM+-5% 1/16W |
| R1176 | 0790059 | CHIP RESISTOR 47KOHM+-5% 1/16W |
| R1177 | 0790077 | CHIP RESISTOR 1MOHM+-5% 1/16W |
| R1178 | AQ00192R | CHIP RESISTOR 820 OHM+-1% 1/16W |
| R1179 | 0790077 | CHIP RESISTOR 1MOHM+-5% 1/16W |
| R1201 | 0790059 | CHIP RESISTOR 47KOHM+-5% 1/16W |
| R1202 | 0790037 | CHIP RESISTOR 1KOHM+-5% 1/16W |
| R1203 | 0790064 | CHIP RESISTOR 100KOHM+-5% 1/16W |
| R1205 | AQ00223R | CHIP RESISTOR 12KOHM+-1% 1/16W |
| R1208 | 0790068 | CHIP RESISTOR 220KOHM+-5% 1/16W |
| R1209 | 0790037 | CHIP RESISTOR 1KOHM+-5% 1/16W |
| R1210 | 0790064 | CHIP RESISTOR 100KOHM+-5% 1/16W |
| R1211 | 0790072 | CHIP RESISTOR 390KOHM+-5% 1/16W |
| R1214 | 0790027 | CHIP RESISTOR 180 OHM+-5% 1/16W |
| R1215 | 0790027 | CHIP RESISTOR 180 OHM+-5% 1/16W |
| R1216 | 0790061 | CHIP RESISTOR 56KOHM+-5% 1/16W |
| R1217 | 0790061 | CHIP RESISTOR 56KOHM+-5% 1/16W |
| R1220 | 0790059 | CHIP RESISTOR 47KOHM+-5% 1/16W |
| R1221 | 0790059 | CHIP RESISTOR 47KOHM+-5% 1/16W |
| R1222 | 0790046 | CHIP RESISTOR 4.7KOHM+-5% 1/16W |
| R1223 | 0790059 | CHIP RESISTOR 47KOHM+-5% 1/16W |
| R1227 | 0790051 | CHIP RESISTOR 10KOHM+-5% 1/16W |
| R1228 | 0790047 | CHIP RESISTOR 5.6KOHM+-5% 1/16W |
| R1229 | 0790037 | CHIP RESISTOR 1KOHM+-5% 1/16W |
| R1230 | 0790051 | CHIP RESISTOR 10KOHM+-5% 1/16W |
| R1231 | 0790051 | CHIP RESISTOR 10KOHM+-5% 1/16W |
| R1233 | AQ01021R | CHIP RESISTOR 10KOHM+-0.5% 1/16W |
| R1234 | AQ01027R | CHIP RESISTOR 33KOHM+-0.5% 1/16W |
| R1235 | AQ01018R | CHIP RESISTOR 6.8KOHM 1/16W |
| R1257 | 0790051 | CHIP RESISTOR 10KOHM+-5% 1/16W |
| R1301 | 0105574 | CHIP RESISTOR 4.7 OHM+-1% 1/10W |
| R1302 | 0103812 | CHIP RESISTOR 2.7 OHM+-10% 0.1W |
| R1303 | 0105574 | CHIP RESISTOR 4.7 OHM+-1% 1/10W |
| R1304 | 0103812 | CHIP RESISTOR 2.7 OHM+-10% 0.1W |
| R1305 | 0105574 | CHIP RESISTOR 4.7 OHM+-1% 1/10W |
| R1306 | 0103812 | CHIP RESISTOR 2.7 OHM+-10% 0.1W |
| R1307 | 0105574 | CHIP RESISTOR 4.7 OHM+-1% 1/10W |
| R1308 | 0103812 | CHIP RESISTOR 2.7 OHM+-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 | 0790064 | CHIP RESISTOR 100KOHM+-5% 1/16W |
| R1370 | 0790044 | CHIP RESISTOR 3.3KOHM+-5% 1/16W |
| R1371 | 0790029 | CHIP RESISTOR 270 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 |
| 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 | AQ00212R | CHIP RESISTOR 4.7KOHM+-1% 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 | AQ01027R | CHIP RESISTOR 33KOHM+-0.5% 1/16W |
| R1528 | AQ01024R | CHIP RESISTOR 18KOHM+-0.5% 1/16W |
| R1529 | AQ01021R | CHIP RESISTOR 10KOHM+-0.5% 1/16W |
| R1531 | AQ01014R | CHIP RESISTOR 3.3KOHM +-0.5% 1/16W |
| R1532 | AQ01021R | CHIP RESISTOR 10KOHM+-0.5% 1/16W |
| R1533 | AQ01028R | CHIP RESISTOR 39KOHM 1/16W |
| R1534 | AQ01029R | CHIP RESISTOR 47KOHM 1/16W |
| R1535 | 0105205 | CHIP RESISTOR 510 OHM+-0.5% 1/16W |
| R1536 | 0105194 | CHIP RESISTOR 2400 OHM+-0.5% 1/16W |
| R1541 | AQ00247R | CHIP RESISTOR 100KOHM+-1% 1/16W |
| R1542 | AQ01015R | CHIP RESISTOR 3.9KOHM+-0.5% 1/16W |
| R1543 | AQ01012R | CHIP RESISTOR 2.2KOHM+-0.5% 1/16W |
| R1545 | 0790064 | CHIP RESISTOR 100KOHM+-5% 1/16W |
| R1546 | 0790056 | CHIP RESISTOR 27KOHM+-5% 1/16W |
| R1601 | 0103829 | CHIP RESISTOR 68 OHM+-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 | 0790063 | CHIP RESISTOR 82KOHM+-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 | AQ00205R | CHIP RESISTOR 2.7KOHM+-1% 1/16W |
| R1627 | AQ00203R | CHIP RESISTOR 2.2KOHM+-1% 1/16W |
| R1628 | 0103851 | CHIP RESISTOR 4.7KOHM+-5% 0.1W |
| R1629 | 0790044 | CHIP RESISTOR 3.3KOHM+-5% 1/16W |
| R1630 | 0105205 | CHIP RESISTOR 510 OHM+-0.5% 1/16W |
| R1639 | 0790037 | CHIP RESISTOR 1KOHM+-5% 1/16W |
| R1640 | 0790037 | CHIP RESISTOR 1KOHM+-5% 1/16W |

## SEMI-CONDUCTORS

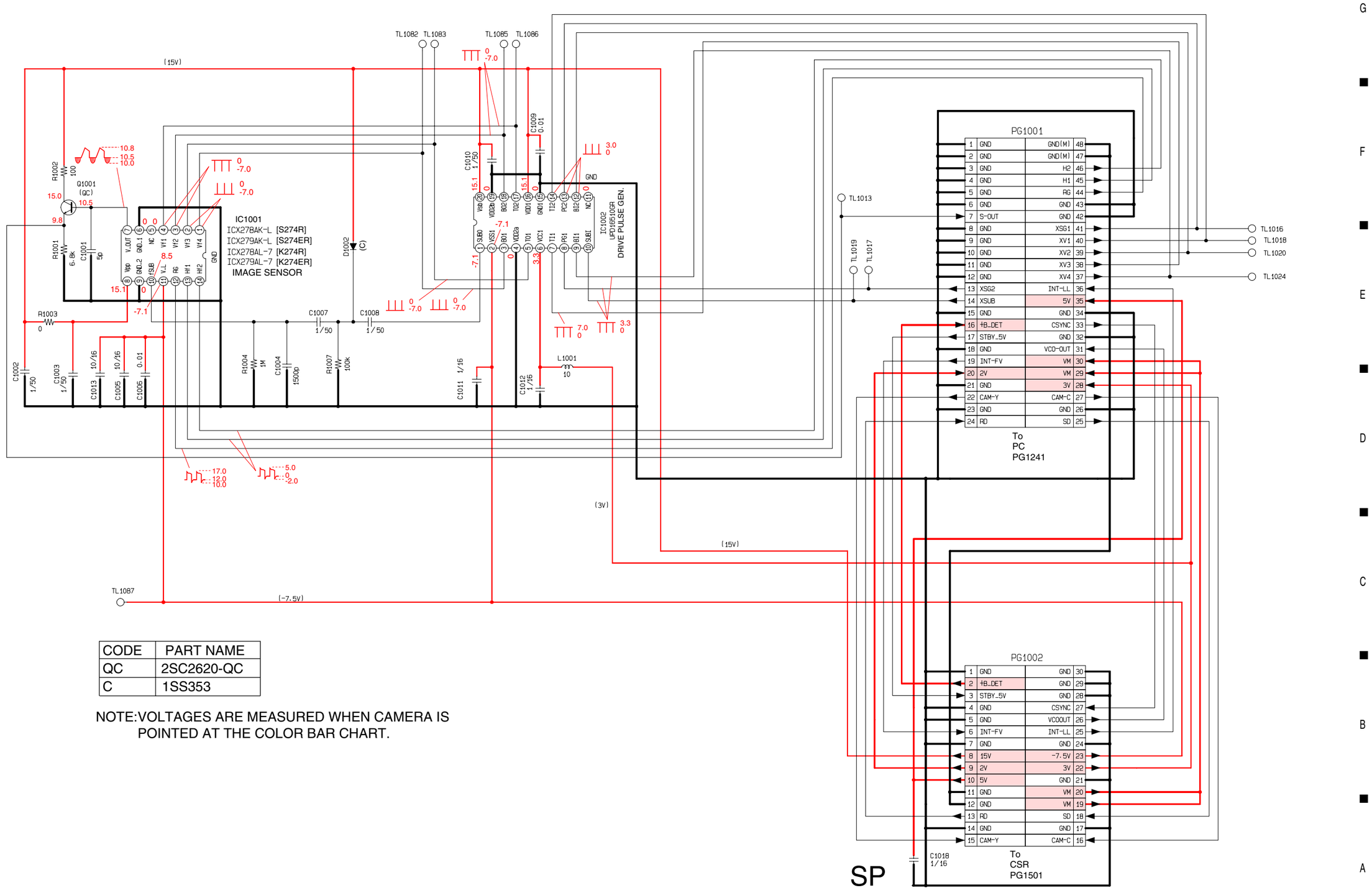
| | | |
|---|---|---|
| D1002 | CC10291R | DIODE 1SS353 |
| D1151 | 5337352 | DIODE MA132WA |
| D1171 | 5337471 | DIODE KV1470 |
| D1201 | 5337422 | DIODE DA221 |
| D1202 | 5337352 | DIODE MA132WA |
| D1351 | 5337422 | DIODE DA221 |
| D1501 | CC10291R | DIODE 1SS353 |

| SYMBOL NO | P-NO | DESCRIPTION |
|---|---|---|
| D1502 | 5337352 | DIODE MA132WA |
| D1503 | CC10291R | DIODE 1SS353 |
| D1504 | 5337372 | DIODE SB07-03C |
| D1505 | 5337372 | DIODE SB07-03C |
| D1506 | 5337372 | DIODE SB07-03C |
| D1510 | 5337354 | DIODE MA133 |
| D1511 | 5337354 | DIODE MA133 |
| D1601 | 5337391 | DIODE D1FS4 |
| IC1002 | CK12061R | IC UPD16510GR |
| IC1101 | CK21332U | IC HD49323AF |
| IC1121 | CK22461U | IC HG73C053FE |
| IC1122 | CK43142R | IC LV16100S-50G |
| IC1173 | CK15051R | IC TC7SU04FU |
| IC1174 | CK18421R | IC TC7SHU04FU |
| IC1202 | CK28301R | IC BR9016RFV |
| IC1203 | CK28301R | IC BR9016RFV |
| IC1204 | CK25261R | IC NC7SZ14P5 |
| IC1205 | CK25261R | IC NC7SZ14P5 |
| IC1206 | CK26401R | IC SN74AHC1G08HDCK |
| IC1251 | CK20403R | IC RN5VD27AA |
| IC1301 | CK40401R | IC TB6512AF |
| IC1302 | CK40401R | IC TB6512AF |
| IC1351 | CK20621R | IC UPD5023GS-147-GJG |
| IC1501 | 1366251 | IC TL1464IPT |
| IC1502 | CK20191R | IC PQ20WZ51 |
| IC1601 | CK26651R | IC BA7665FS |
| IC1602 | CK18302R | IC SN74AHCT125PW |
| IC1603 | CK23291R | IC 74VHC4046MTCX |
| IC1604 | CK26401R | IC SN74AHC1G08HDCK |
| Q1001 | 5328221 | TRANSISTOR 2SC2620-QC |
| Q1151 | 5328192 | TRANSISTOR 2SC2462LD |
| Q1152 | 1323231 | TRANSISTOR 2SB1462 |
| Q1153 | 1323231 | TRANSISTOR 2SB1462 |
| Q1201 | 1323286 | TRANSISTOR UMH9N |
| Q1351 | 5328192 | TRANSISTOR 2SC2462LD |
| Q1352 | 5328974 | TRANSISTOR 2SC2412K |
| Q1353 | 1323142 | TRANSISTOR 2SC2411K |
| Q1501 | CA10271R | TRANSISTOR 2SB1424 |
| Q1502 | CA10271R | TRANSISTOR 2SB1424 |
| Q1503 | CA10271R | TRANSISTOR 2SB1424 |
| Q1504 | CA10271R | TRANSISTOR 2SB1424 |
| Q1506 | 5326422 | TRANSISTOR 2SC4081 |
| Q1601 | 1323273 | TRANSISTOR DTA143EE |
| Q1602 | 1323271 | TRANSISTOR DTC144EE |
| Q1603 | 1323279 | TRANSISTOR DTC114YE |
| Q1605 | 1323231 | TRANSISTOR 2SB1462 |
| Q1607 | 5328221 | TRANSISTOR 2SC2620-QC |
| Q1609 | 1323253 | TRANSISTOR XP4401 |
| Q1610 | 1323291 | TRANSISTOR 2SC4617 |
| Q1611 | 1323231 | TRANSISTOR 2SB1462 |
| ZD1171 | CC10433R | DIODE(MA3030L) |
| | | TRANSFORMER |
| T1501 | BC10261R | TRANS |
| | | COILS |
| L1001 | BA10577R | COIL 10UH |
| L1101 | BA10577R | COIL 10UH |
| L1102 | BA10577R | COIL 10UH |
| L1103 | BA10577R | COIL 10UH |
| L1201 | BA10577R | COIL 10UH |
| L1202 | BA10577R | COIL 10UH |
| L1301 | BA11233R | COIL 22UH |
| L1302 | BA10577R | COIL 10UH |
| L1501 | BA10579R | COIL 22UH |
| L1503 | BA11236R | COIL 68UH |
| L1504 | BA11233R | COIL 22UH |
| L1505 | BA11235R | COIL 47UH |
| L1506 | 0773004 | COIL 100UH |
| L1507 | 0773004 | COIL 100UH |
| L1601 | BA10577R | COIL 10UH |
| L1602 | BA10579R | COIL 22UH |
| L1603 | BA10584R | COIL 10UH |
| | | CRYSTALS |
| X1172 | BL11096R | CRYSTAL [S274R/K274R] |
| X1172 | TBR | CRYSTAL [S274ER/K274ER] |
| | | MISCELLANEOUS |
| BL1121 | BM00137R | FILTER |
| BL1122 | BM00137R | FILTER |
| BL1601 | BM00158R | FILTER |
| BL1602 | BM00152R | FILTER |
| ⚠ F1601 | 5723235 | FUSE 1A |
| PG1001 | 1830315 | CONNECTOR |
| PG1002 | 1830307 | PLUG |
| PG1241 | 1830316 | CONNECTOR |
| PG1302 | EA10407R | CONNECTOR |
| PG1501 | 1830301 | PLUG |
| PG1601 | 5666914 | MINI PLUG |

## 1 Wiring Diagram



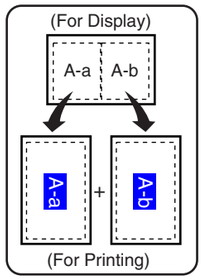
# 2 Schematic Diagrams
## 2-1 SP Schematic Diagram

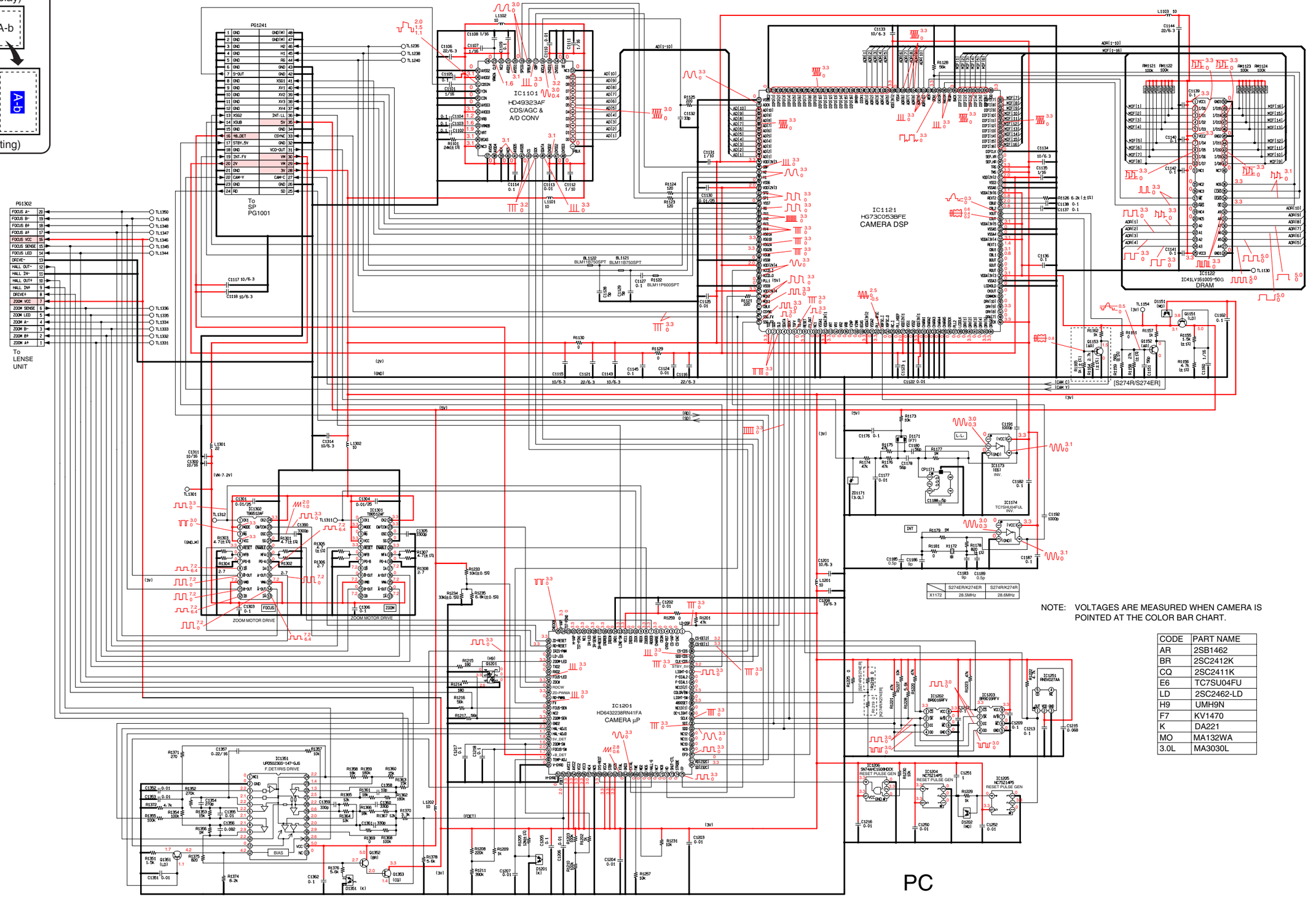



| CODE | PART NAME |
|---|---|
| QC | 2SC2620-QC |
| C | 1SS353 |

NOTE:VOLTAGES ARE MEASURED WHEN CAMERA IS POINTED AT THE COLOR BAR CHART.

# 2-2 PC Schematic Diagram (For Display)



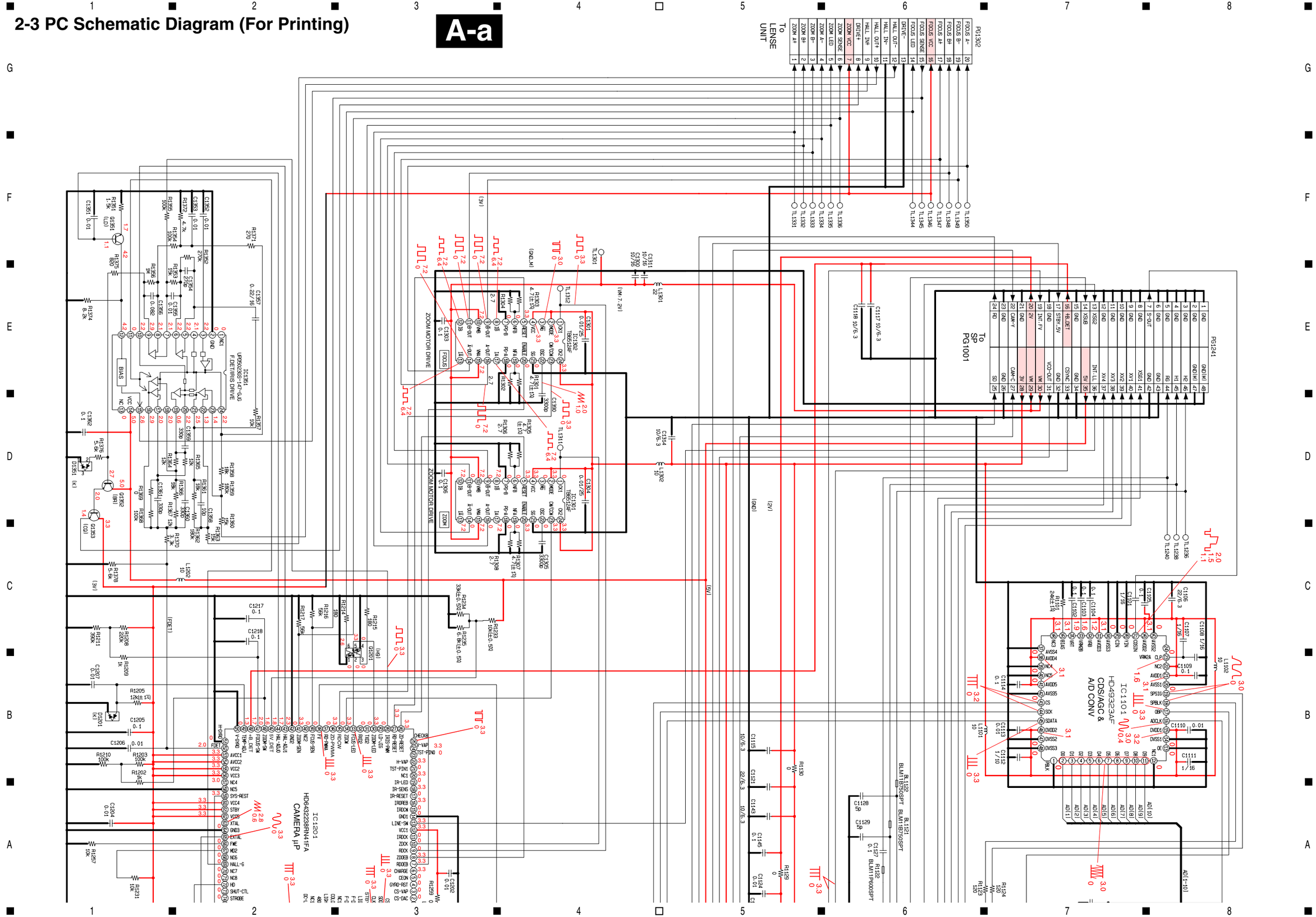




NOTE: VOLTAGES ARE MEASURED WHEN CAMERA IS POINTED AT THE COLOR BAR CHART.

| CODE | PART NAME |
|---|---|
| AR | 2SB1462 |
| BR | 2SC2412K |
| CQ | 2SC2411K |
| E6 | TC7SU04FU |
| LD | 2SC2462-LD |
| H9 | UMH9N |
| F7 | KV1470 |
| K | DA221 |
| MO | MA132WA |
| 3.0L | MA3030L |

# 2-3 PC Schematic Diagram (For Printing)

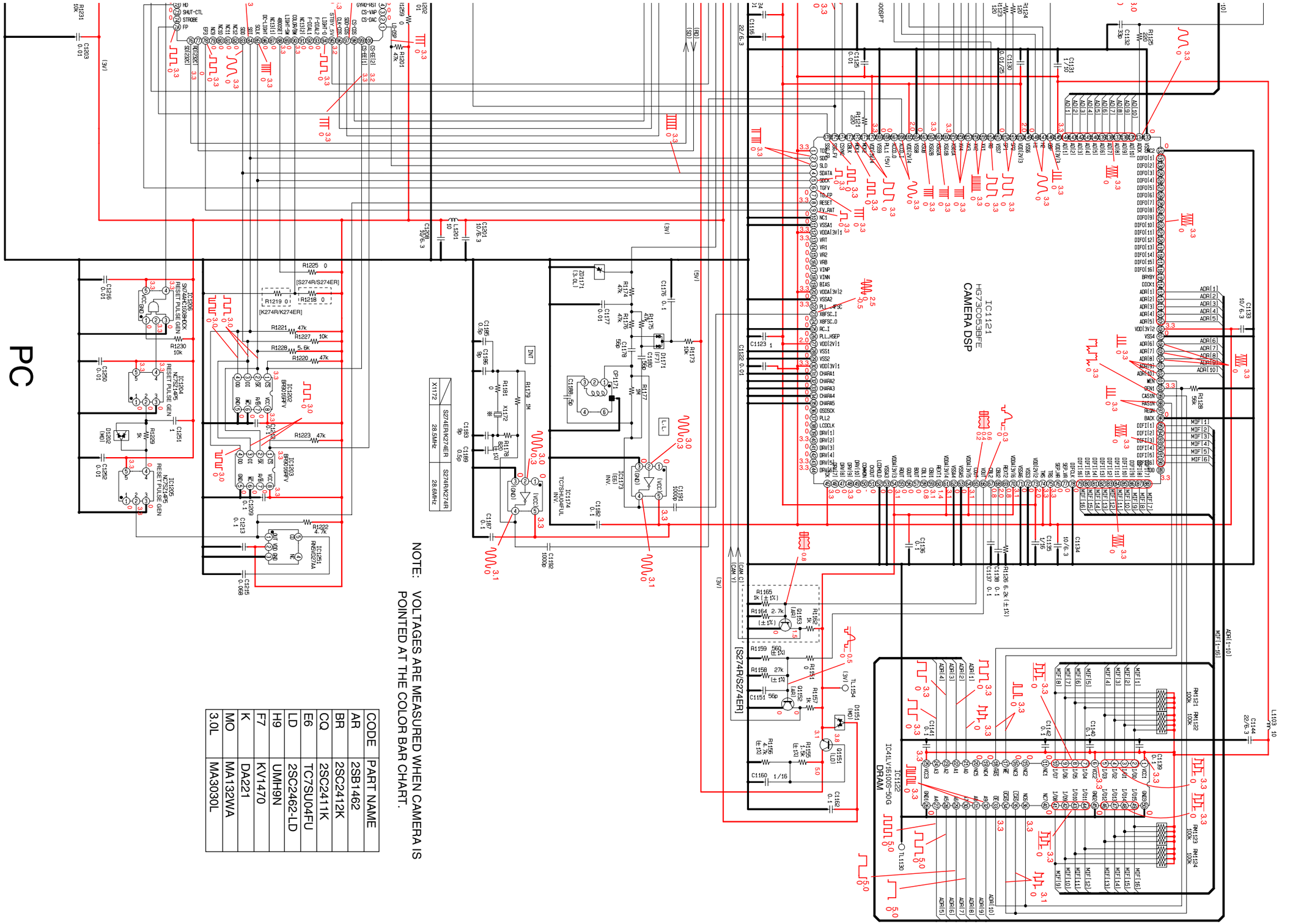
**A-a**



# 2-4 PC Schematic Diagram (For Printing)

**A-b**

PC



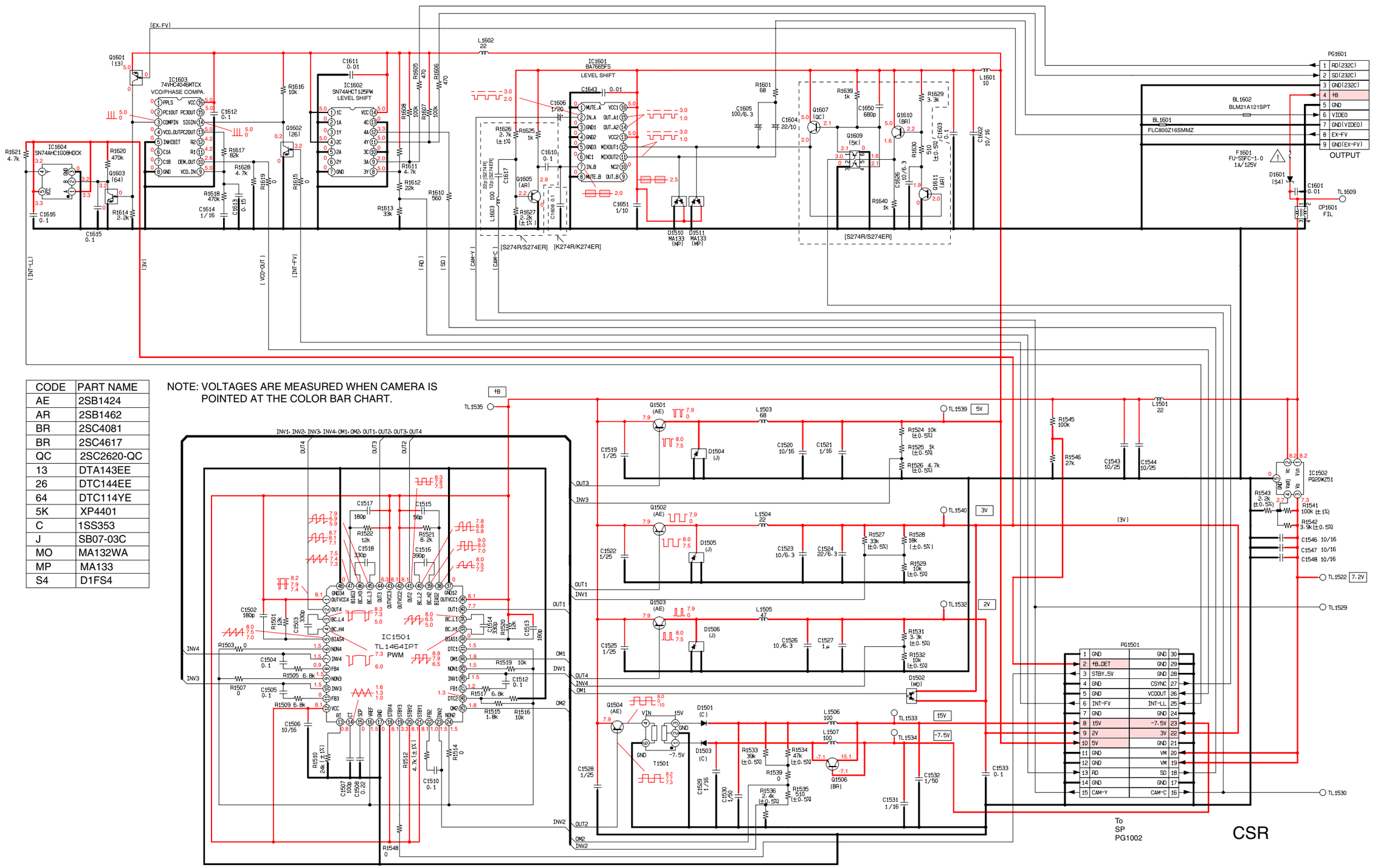

NOTE: VOLTAGES ARE MEASURED WHEN CAMERA IS POINTED AT THE COLOR BAR CHART.

| CODE | PART NAME |
|---|---|
| AR | 2SB1462 |
| BR | 2SC2412K |
| CQ | 2SC2411K |
| E6 | TC7SU04FU |
| LD | 2SC2462-LD |
| H9 | UMH9N |
| F7 | KV1470 |
| K | DA221 |
| MO | MA132WA |
| 3.0L | MA3030L |

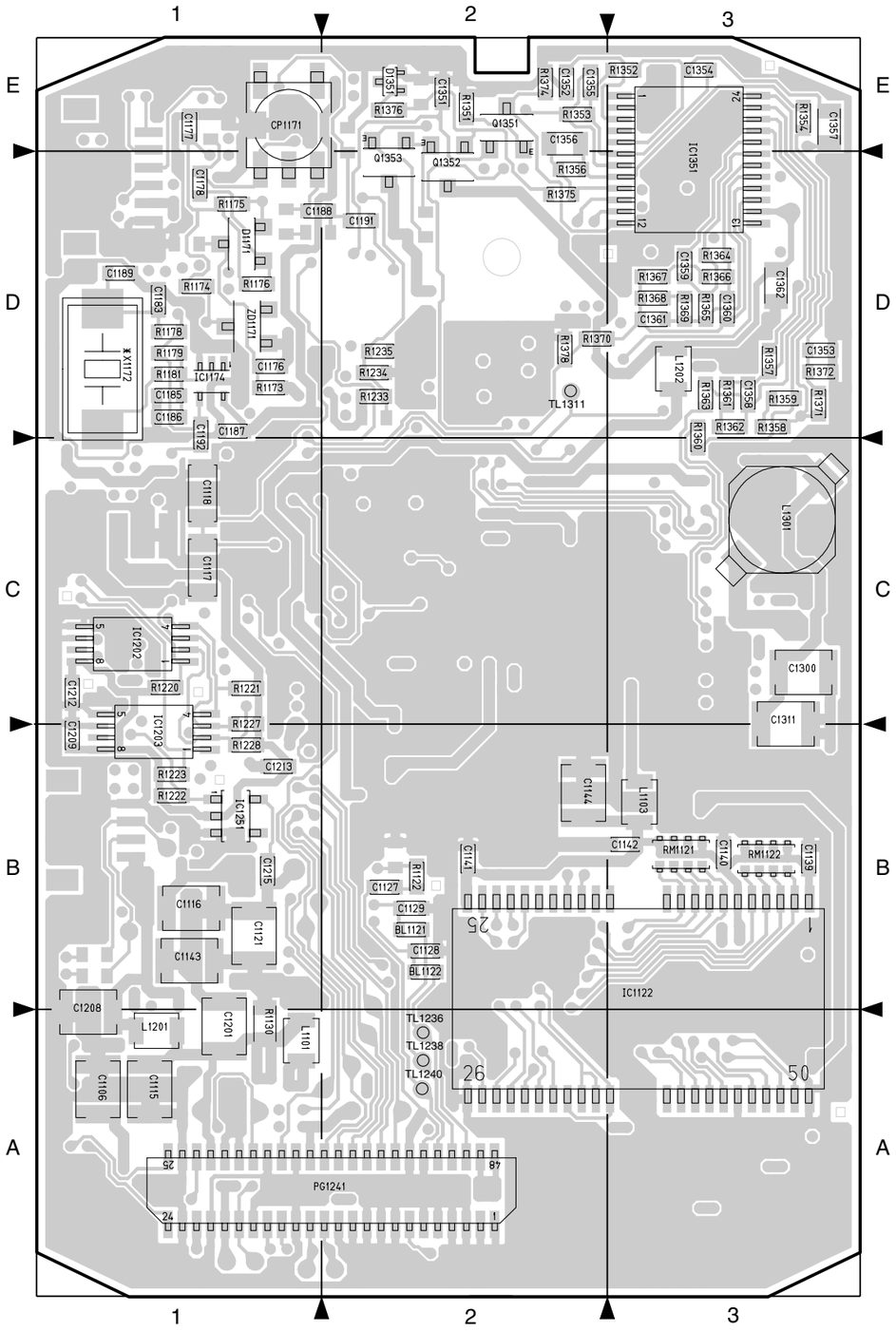
# 2-5 CSR Schematic Diagram

| CODE | PART NAME |
|---|---|
| AE | 2SB1424 |
| AR | 2SB1462 |
| BR | 2SC4081 |
| BR | 2SC4617 |
| QC | 2SC2620-QC |
| 13 | DTA143EE |
| 26 | DTC144EE |
| 64 | DTC114YE |
| 5K | XP4401 |
| C | 1SS353 |
| J | SB07-03C |
| MO | MA132WA |
| MP | MA133 |
| S4 | D1FS4 |

NOTE: VOLTAGES ARE MEASURED WHEN CAMERA IS POINTED AT THE COLOR BAR CHART.

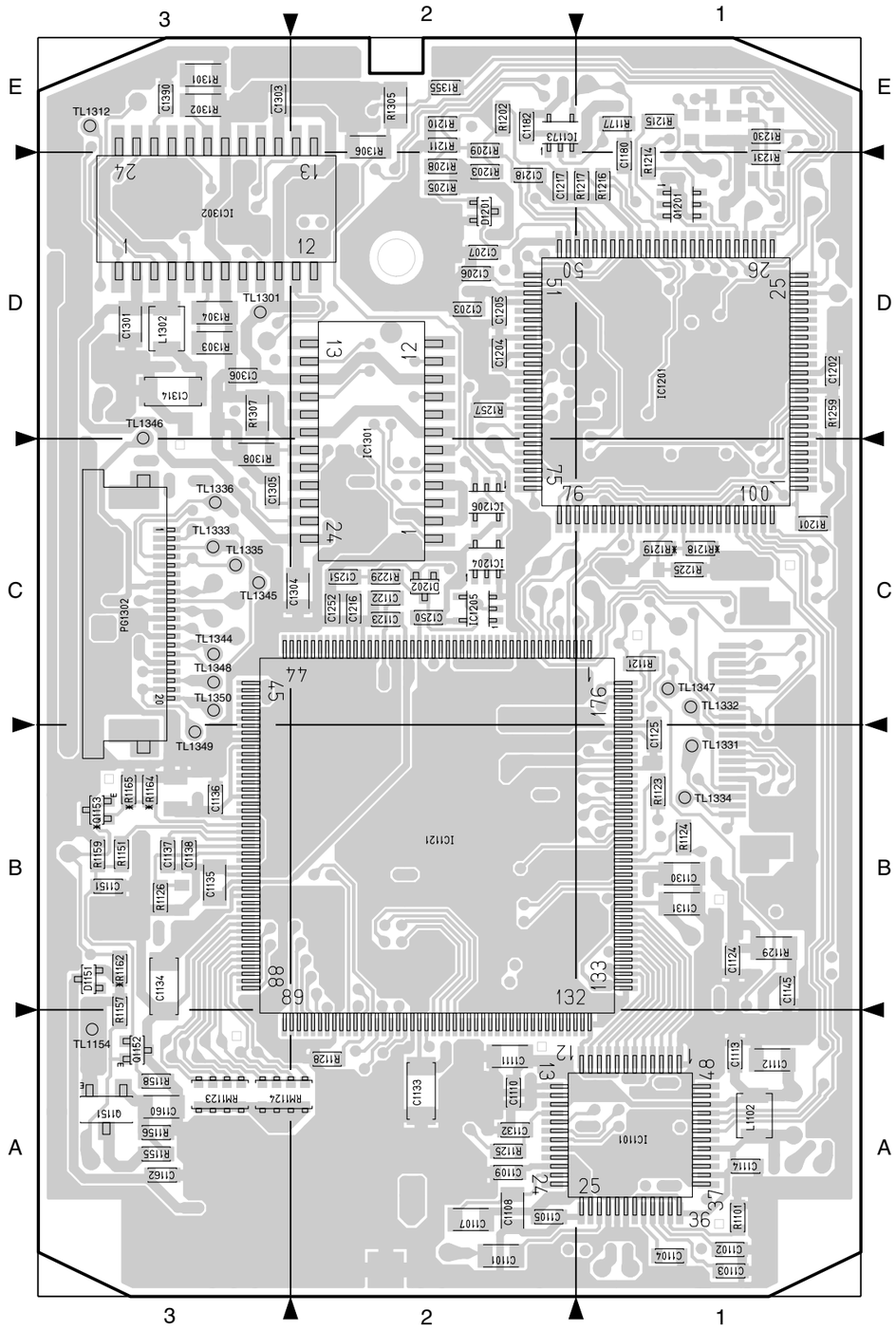


# 3 Circuit Board Diagrams
## 3-1 PC Circuit Board Diagram




| | S274ER/K274ER | S274R/K274R |
|---|---|---|
| X1172 | 28.5MHz | 28.6MHz |

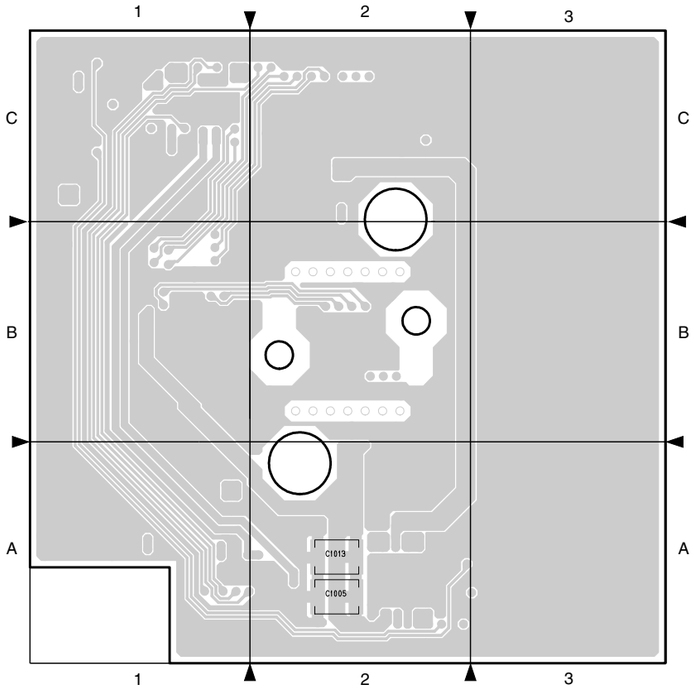
PC -SIDE A-
[PATTERN No.JA2133-2]



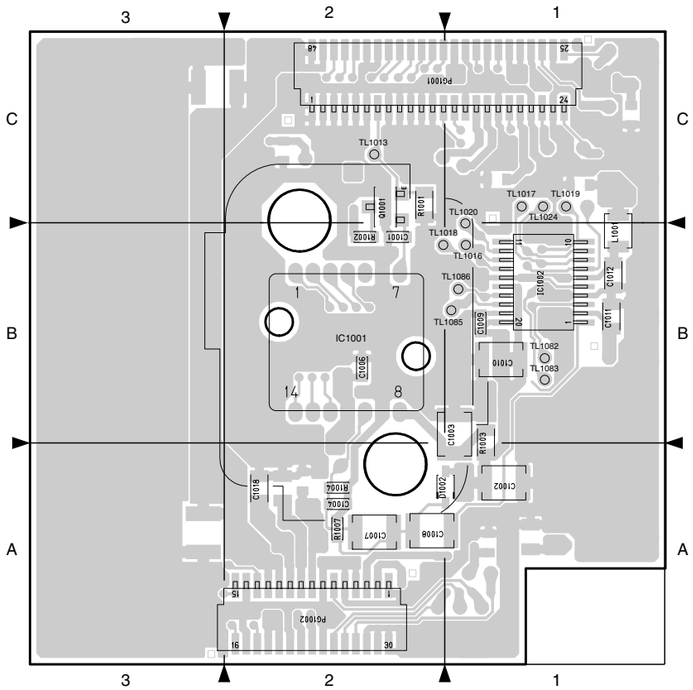

| | S274R/S274ER | K274R/K274ER |
|---|---|---|
| Q1153 | 2SB1462 | Not Provided |
| R1162 | 1K | Not Provided |
| R1164 | 2.7K 1% | Not Provided |
| R1165 | 1K 1% | Not Provided |
| R1218 | 0 | Not Provided |
| R1219 | Not Provided | 0 |

PC -SIDE B-
[PATTERN No.JA2133-2]

## 3-2 SP Circuit Board Diagram



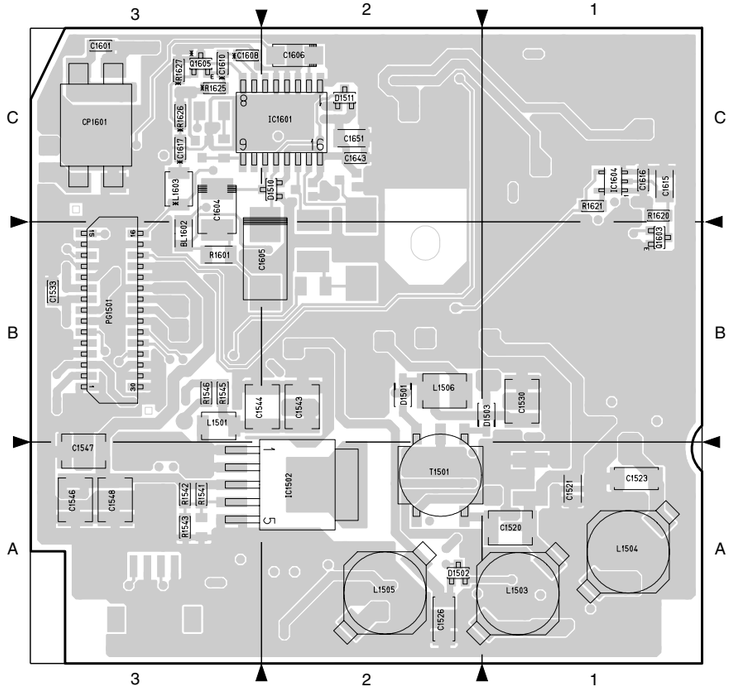

SP -SIDE A-
[PATTERN No.JA2133-2]




SP -SIDE B-
[PATTERN No.JA2133-2]

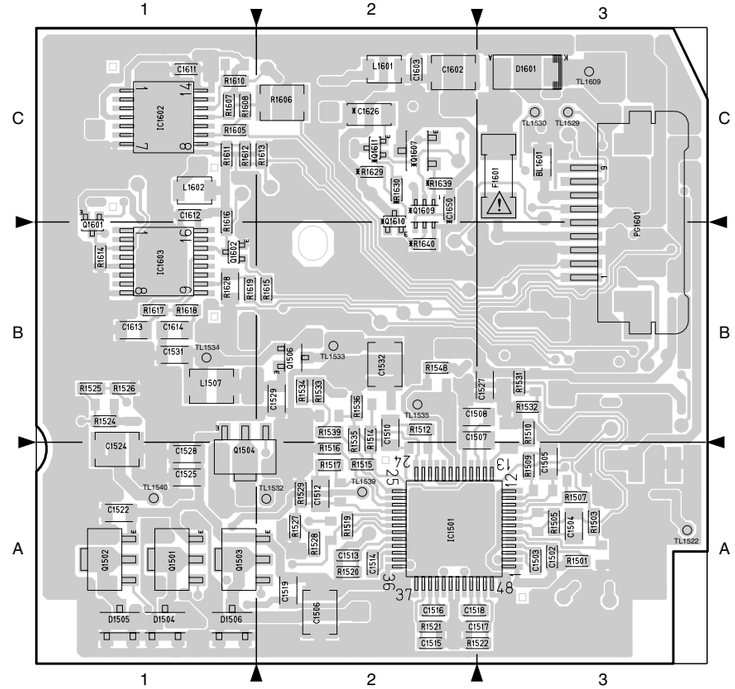
## 3-3 CSR Circuit Board Diagram

| | S274R/S274ER | K274R/K274ER |
|---|---|---|
| C1608 | Not Provided | 0.1uF |
| C1610 | 0.1uF | Not Provided |
| C1617 | 22p [S274R],12p [S274ER] | Not Provided |
| Q1605 | 2SB1462 | Not Provided |
| L1603 | 100uH | Not Provided |
| R1625 | 1k | Not Provided |
| R1626 | 2.7k 1% | Not Provided |
| R1627 | 2.2k 1% | Not Provided |




CSR -SIDE A-
[PATTERN No.JA2133-2]

| | S274R/S274ER | K274R/K274ER |
|---|---|---|
| C1626 | 10uF/6.3V | Not Provided |
| C1650 | 680p | Not Provided |
| Q1607 | 2SC2620 | Not Provided |
| Q1609 | XP4401 | Not Provided |
| Q1610 | 2SC4617 | Not Provided |
| Q1611 | 2SB1462 | Not Provided |
| R1629 | 3.3k | Not Provided |
| R1630 | 510 0.5% | Not Provided |
| R1639 | 1k | Not Provided |
| R1640 | 1k | Not Provided |




CSR -SIDE B-
[PATTERN No.JA2133-2]

# 3-4 Identification of Parts Location

## PC

| Symbol No. | Parts Location |
|---|---|
| **BL** | |
| BL1121 | A-2B |
| BL1122 | A-2B |
| **C** | |
| C1101 | B-2A |
| C1102 | B-1A |
| C1103 | B-1A |
| C1104 | B-1A |
| C1105 | B-2A |
| C1106 | A-1A |
| C1107 | B-2A |
| C1108 | B-2A |
| C1109 | B-2A |
| C1110 | B-2A |
| C1111 | B-2A |
| C1112 | B-1A |
| C1113 | B-1A |
| C1114 | B-1A |
| C1115 | A-1A |
| C1116 | A-1B |
| C1117 | A-1C |
| C1118 | A-1C |
| C1121 | A-1B |
| C1122 | B-2C |
| C1123 | B-2C |
| C1124 | B-1B |
| C1125 | B-1B |
| C1127 | A-2B |
| C1128 | A-2B |
| C1129 | A-2B |
| C1130 | B-1B |
| C1131 | B-1B |
| C1132 | B-2A |
| C1133 | B-2A |
| C1134 | B-3B |
| C1135 | B-3B |
| C1136 | B-3B |
| C1137 | B-3B |
| C1138 | B-3B |
| C1139 | A-3B |
| C1140 | A-3B |
| C1141 | A-2B |
| C1142 | A-3B |
| C1143 | A-1B |
| C1144 | A-2B |
| C1145 | B-1B |
| C1151 | B-3B |
| C1160 | B-3A |
| C1162 | B-3A |
| C1176 | A-1D |
| C1177 | A-1E |
| C1178 | A-1D |
| C1180 | B-1D |
| C1182 | B-2E |
| C1183 | A-1D |
| C1185 | A-1D |
| C1186 | A-1D |
| C1187 | A-1D |
| C1188 | A-1D |
| C1189 | A-1D |
| C1191 | A-2D |
| C1192 | A-1D |
| C1201 | A-1A |
| C1202 | B-1D |
| C1203 | B-2D |
| C1204 | B-2D |
| C1205 | B-2D |
| C1206 | B-2D |
| C1207 | B-2D |
| C1208 | A-1A |
| C1209 | A-1B |
| C1212 | A-1C |
| C1213 | A-1B |
| C1215 | A-1B |
| C1216 | B-2C |
| C1217 | B-2D |
| C1218 | B-2D |
| C1250 | B-2C |
| C1251 | B-2C |
| C1252 | B-2C |
| C1300 | A-3C |
| C1301 | B-3D |
| C1303 | B-3E |
| C1304 | B-2C |
| C1305 | B-3C |
| C1306 | B-3D |
| C1311 | A-3C |
| C1314 | B-3D |
| C1351 | A-2E |
| C1352 | A-2E |
| C1353 | A-3D |
| C1354 | A-3E |
| C1355 | A-2E |
| C1356 | A-2E |
| C1357 | A-3E |
| C1358 | A-3D |
| C1359 | A-3D |
| C1360 | A-3D |
| C1361 | A-3D |
| C1362 | A-3D |
| C1390 | B-3E |
| **CP** | |
| CP1171 | A-1E |
| **D** | |
| D1151 | B-3B |
| D1171 | A-1D |
| D1201 | B-2D |
| D1202 | B-2C |
| D1351 | A-2E |
| **IC** | |
| IC1101 | B-1A |
| IC1121 | B-2B |
| IC1122 | A-3B |
| IC1173 | B-2E |
| IC1174 | A-1D |
| IC1201 | B-1D |
| IC1202 | A-1C |
| IC1203 | A-1B |
| IC1204 | B-2C |
| IC1205 | B-2C |
| IC1206 | B-2C |
| IC1251 | A-1B |
| IC1301 | B-2D |
| IC1302 | B-3D |
| IC1351 | A-3D |
| **L** | |
| L1101 | A-1A |
| L1102 | B-1A |
| L1103 | A-3B |
| L1201 | A-1A |
| L1202 | A-3D |
| L1301 | A-3C |
| L1302 | B-3D |
| **PG** | |
| PG1241 | A-2A |
| PG1302 | B-3C |
| **Q** | |
| Q1151 | B-3A |
| Q1152 | B-3A |
| Q1153 | B-3B |
| Q1201 | B-1D |
| Q1351 | A-2E |
| Q1352 | A-2D |
| Q1353 | A-2D |
| **R** | |
| R1101 | B-1A |
| R1121 | B-1C |
| R1122 | A-2B |
| R1123 | B-1B |
| R1124 | B-1B |
| R1125 | B-2A |
| R1126 | B-3B |
| R1128 | B-2A |
| R1129 | B-1B |
| R1130 | A-1A |
| R1151 | B-3B |
| R1155 | B-3A |
| R1156 | B-3A |
| R1157 | B-3A |
| R1158 | B-3A |
| R1159 | B-3B |
| R1162 | B-3B |
| R1164 | B-3B |
| R1165 | B-3B |
| R1173 | A-1D |
| R1174 | A-1D |
| R1175 | A-1D |
| R1176 | A-1D |
| R1177 | B-1E |
| R1178 | A-1D |
| R1179 | A-1D |
| R1181 | A-1D |
| R1201 | B-1C |
| R1202 | B-2E |
| R1203 | B-2D |
| R1205 | B-2D |
| R1208 | B-2D |
| R1209 | B-2E |
| R1210 | B-2E |
| R1211 | B-2E |
| R1214 | B-1D |
| R1215 | B-1E |
| R1216 | B-1D |
| R1217 | B-1D |
| R1218 | B-1C |
| R1219 | B-1C |
| R1220 | A-1C |
| R1221 | A-1C |
| R1222 | A-1B |
| R1223 | A-1B |
| R1225 | B-1C |
| R1227 | A-1B |
| R1228 | A-1B |
| R1229 | B-2C |
| R1230 | B-1E |
| R1231 | B-1D |
| R1233 | A-2D |
| R1234 | A-2D |
| R1235 | A-2D |
| R1257 | B-2D |
| R1259 | B-1D |
| R1301 | B-3E |
| R1302 | B-3E |
| R1303 | B-3D |
| R1304 | B-3D |
| R1305 | B-2E |
| R1306 | B-2E |
| R1307 | B-3D |
| R1308 | B-3C |
| R1351 | A-2E |
| R1352 | A-3E |
| R1353 | A-2E |
| R1354 | A-3E |
| R1355 | B-2E |
| R1356 | A-2D |
| R1357 | A-3D |
| R1358 | A-3D |
| R1359 | A-3D |
| R1360 | A-3D |
| R1361 | A-3D |
| R1362 | A-3D |
| R1363 | A-3D |
| R1364 | A-3D |
| R1365 | A-3D |
| R1366 | A-3D |
| R1367 | A-3D |
| R1368 | A-3D |
| R1369 | A-3D |
| R1370 | A-2D |
| R1371 | A-3D |
| R1372 | A-3D |
| R1374 | A-2E |
| R1375 | A-2D |
| R1376 | A-2E |
| R1378 | A-2D |
| **RM** | |
| RM1121 | A-3B |
| RM1122 | A-3B |
| RM1123 | B-3A |
| RM1124 | B-3A |
| **TL** | |
| TL1236 | A-2A |
| TL1238 | A-2A |
| TL1240 | A-2A |
| TL1301 | B-3D |
| TL1311 | A-2D |
| TL1312 | B-3E |
| TL1331 | B-1B |
| TL1332 | B-1C |
| TL1333 | B-3C |
| TL1334 | B-1B |
| TL1335 | B-3C |
| TL1336 | B-3C |
| TL1344 | B-3C |
| TL1345 | B-3C |
| TL1346 | B-3D |
| TL1347 | B-1C |
| TL1348 | B-3C |
| TL1349 | B-3B |
| TL1350 | B-3C |
| **X** | |
| X1172 | A-1D |
| **ZD** | |
| ZD1171 | A-1D |

## SP

| Symbol No. | Parts Location |
|---|---|
| **C** | |
| C1001 | B-2B |
| C1002 | B-1A |
| C1003 | B-1B |
| C1004 | B-2A |
| C1005 | A-2A |
| C1006 | B-2B |
| C1007 | B-2A |
| C1008 | B-2A |
| C1009 | B-1B |
| C1010 | B-1B |
| C1011 | B-1B |
| C1012 | B-1B |
| C1013 | A-2A |
| C1018 | B-2A |
| **D** | |
| D1002 | B-2A |
| **IC** | |
| IC1001 | B-2B |
| IC1002 | B-1B |
| **L** | |
| L1001 | B-1B |
| **PG** | |
| PG1001 | B-2C |
| PG1002 | B-2A |
| **Q** | |
| Q1001 | B-2C |
| **R** | |
| R1001 | B-2C |
| R1002 | B-2B |
| R1003 | B-1B |
| R1004 | B-2A |
| R1007 | B-2A |
| **TL** | |
| TL1013 | B-2C |
| TL1016 | B-1B |
| TL1017 | B-1C |
| TL1019 | B-1C |
| TL1020 | B-1B |
| TL1024 | B-1C |
| TL1082 | B-1B |
| TL1083 | B-1B |
| TL1085 | B-1B |
| TL1086 | B-1B |

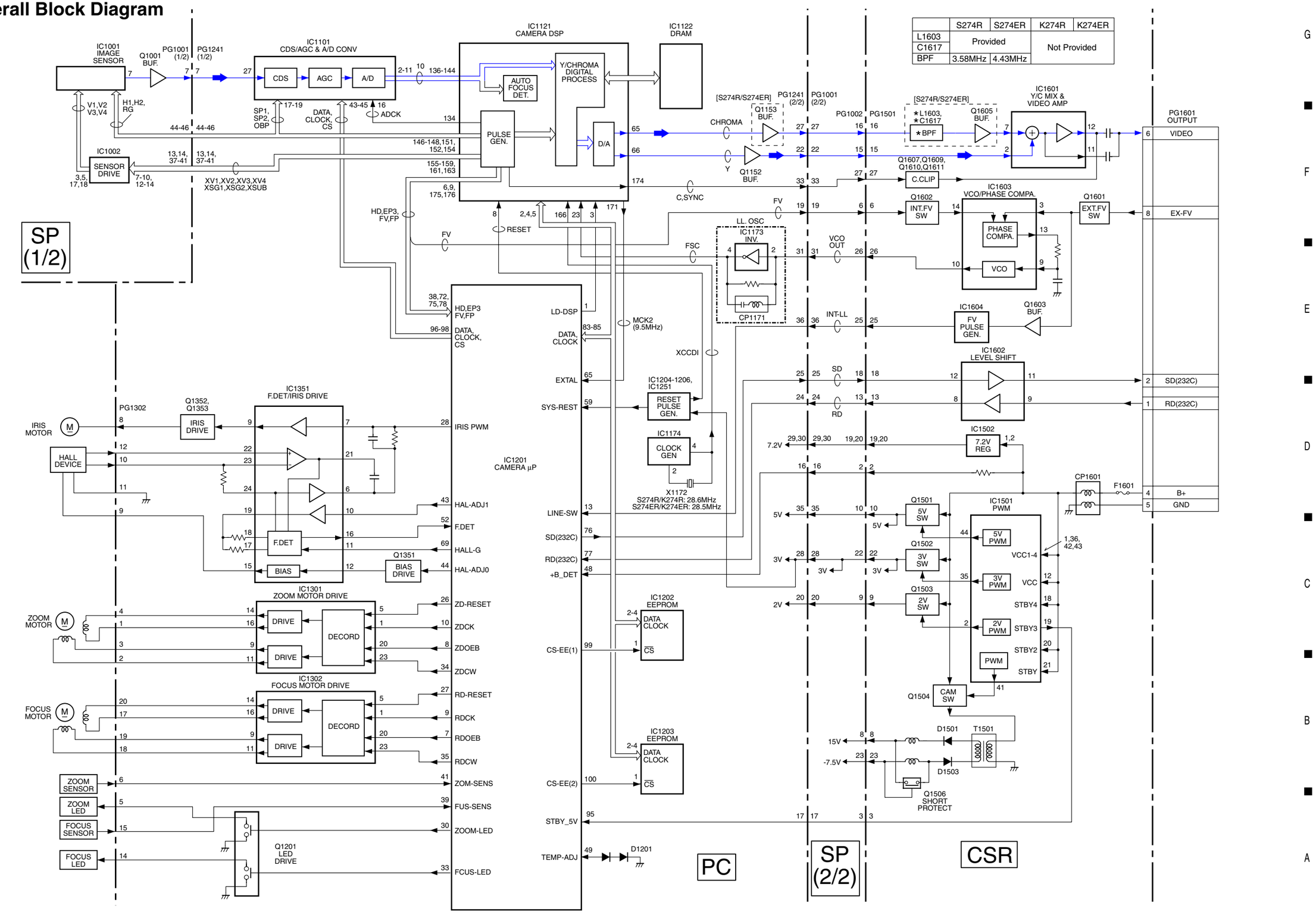
## CSR

| Symbol No. | Parts Location |
|---|---|
| **BL** | |
| BL1601 | B-3C |
| BL1602 | A-3B |
| **C** | |
| C1502 | B-3A |
| C1503 | B-3A |
| C1504 | B-3A |
| C1505 | B-3A |
| C1506 | B-2A |
| C1507 | B-3B |
| C1508 | B-3B |
| C1510 | B-2B |
| C1512 | B-2A |
| C1513 | B-2A |
| C1514 | B-2A |
| C1515 | B-2A |
| C1516 | B-2A |
| C1517 | B-2A |
| C1518 | B-2A |
| C1519 | B-2A |
| C1520 | A-1A |
| C1521 | A-1A |
| C1522 | B-1A |
| C1523 | A-1A |
| C1524 | B-1A |
| C1525 | B-1A |
| C1526 | A-2A |
| C1527 | B-3B |
| C1528 | B-1A |
| C1529 | B-2B |
| C1530 | A-1B |
| C1531 | B-1B |
| C1532 | B-2B |
| C1533 | A-3B |
| C1543 | A-2B |
| C1544 | A-2B |
| C1546 | A-3A |
| C1547 | A-3A |
| C1548 | A-3A |
| C1601 | A-3C |
| C1602 | B-2C |
| C1603 | B-2C |
| C1604 | A-3C |
| C1605 | A-2B |
| C1606 | A-2C |
| C1608 | A-3C |
| C1610 | A-3C |
| C1611 | B-1C |
| C1612 | B-1C |
| C1613 | B-1B |
| C1614 | B-1B |
| C1615 | A-1C |
| C1616 | A-1C |
| C1617 | A-3C |
| C1626 | 3-2C |
| C1643 | A-2C |
| C1650 | B-2C |
| C1651 | A-2C |
| **CP** | |
| CP1601 | A-3C |
| **D** | |
| D1501 | A-2B |
| D1502 | A-2A |
| D1503 | A-1B |
| D1504 | B-1A |
| D1505 | B-1A |
| D1506 | B-1A |
| D1510 | A-2C |
| D1511 | A-2C |
| D1601 | B-3C |
| **F** | |
| F1601 | B-3C |
| **IC** | |
| IC1501 | B-2A |
| IC1502 | A-2A |
| IC1601 | A-2C |
| IC1602 | B-1C |
| IC1603 | B-1B |
| IC1604 | A-1C |
| **L** | |
| L1501 | A-3B |
| L1503 | A-1A |
| L1504 | A-1A |
| L1505 | A-2A |
| L1506 | A-2B |
| L1507 | B-1B |
| L1601 | B-2C |
| L1602 | B-1C |
| L1603 | A-3C |
| **PG** | |
| PG1501 | A-3B |
| PG1601 | B-3B |
| **Q** | |
| Q1501 | B-1A |
| Q1502 | B-1A |
| Q1503 | B-1A |
| Q1504 | B-1A |
| Q1506 | B-2B |
| Q1601 | B-1B |
| Q1602 | B-1B |
| Q1603 | A-1B |
| Q1605 | A-3C |
| Q1607 | B-2C |
| Q1609 | B-2C |
| Q1610 | B-2C |
| Q1611 | B-2C |
| **R** | |
| R1501 | B-3A |
| R1503 | B-3A |
| R1505 | B-3A |
| R1507 | B-3A |
| R1509 | B-3A |
| R1510 | B-3B |
| R1512 | B-2B |
| R1514 | B-2B |
| R1515 | B-2A |
| R1516 | B-2A |
| R1517 | B-2A |
| R1519 | B-2A |
| R1520 | B-2A |
| R1521 | B-2A |
| R1522 | B-2A |
| R1524 | B-1B |
| R1525 | B-1B |
| R1526 | B-1B |
| R1527 | B-2A |
| R1528 | B-2A |
| R1529 | B-2A |
| R1531 | B-3B |
| R1532 | B-3B |
| R1533 | B-2B |
| R1534 | B-2B |
| R1535 | B-2B |
| R1536 | B-2B |
| R1539 | B-2B |
| R1541 | A-3A |
| R1542 | A-3A |
| R1543 | A-3A |
| R1545 | A-3B |
| R1546 | A-3B |
| R1548 | B-2B |
| R1601 | A-3B |
| R1605 | B-1C |
| R1606 | B-2C |
| R1607 | B-1C |
| R1608 | B-1C |
| R1610 | B-1C |
| R1611 | B-1C |
| R1612 | B-1C |
| R1613 | B-2C |
| R1614 | B-1B |
| R1615 | B-2B |
| R1616 | B-1B |
| R1617 | B-1B |
| R1618 | B-1B |
| R1619 | B-1B |
| R1620 | A-1C |
| R1621 | A-1C |
| R1625 | A-3C |
| R1626 | A-3C |
| R1627 | A-3C |
| R1628 | B-1B |
| R1629 | B-2C |
| R1630 | B-2C |
| R1639 | B-2C |
| R1640 | B-2B |
| **TL** | |
| T1501 | A-2A |
| TL1522 | B-3A |
| TL1529 | B-3C |
| TL1530 | B-3C |
| TL1532 | B-2A |
| TL1533 | B-2B |
| TL1534 | B-1B |
| TL1535 | B-2B |
| TL1539 | B-2A |
| TL1540 | B-1A |
| TL1609 | B-3C |

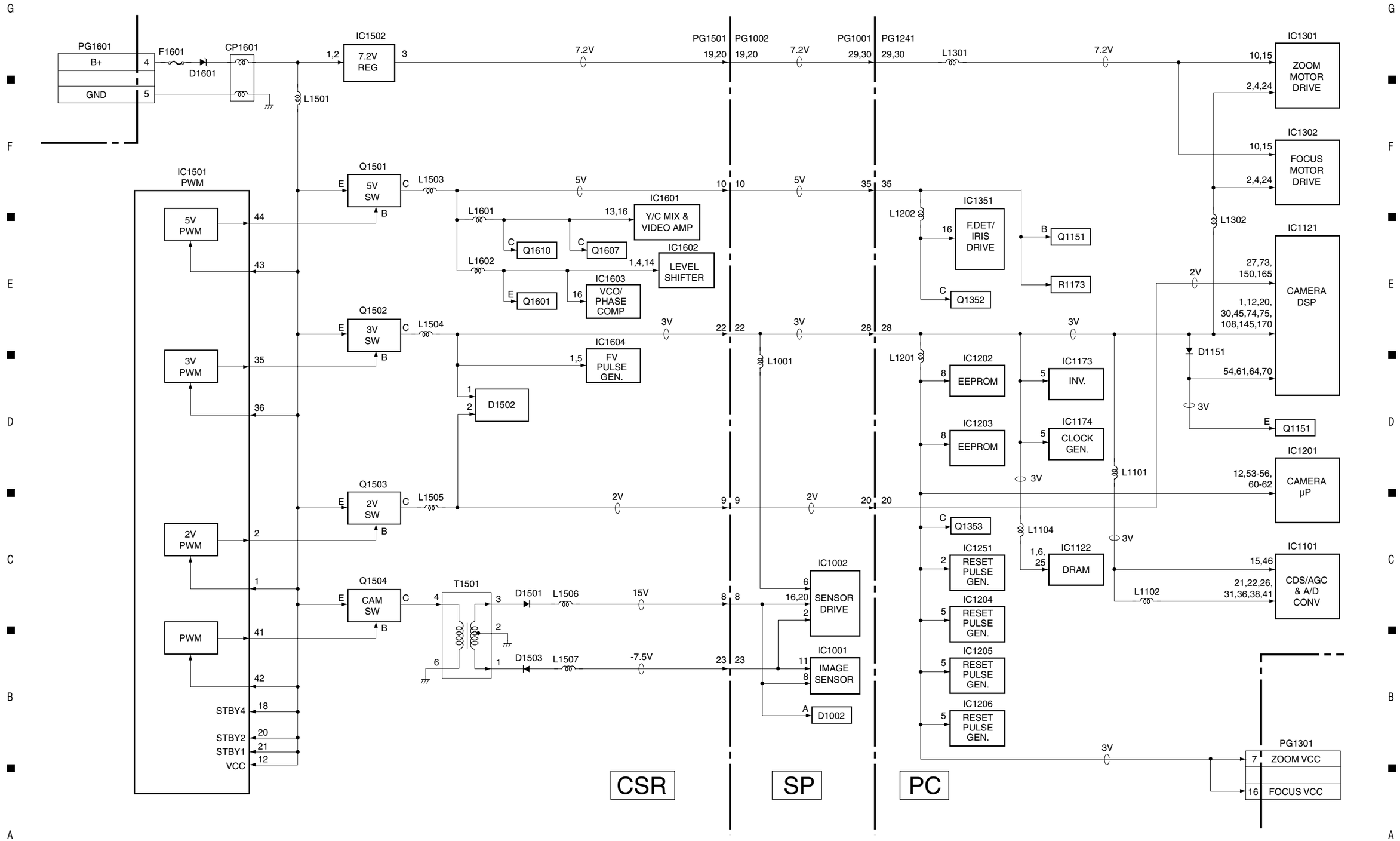
# 4. Block Diagrams

## 4-1 Overall Block Diagram

| | S274R | S274ER | K274R | K274ER |
|---|---|---|---|---|
| L1603 | Provided | | Not Provided | |
| C1617 | | | | |
| BPF | 3.58MHz | 4.43MHz | | |



# 4-2 Powe Block Diagram



VK-S274R/S274ER
VK-K274R/K274ER

HITACHI

VK-S274R/S274ER
VK-K274R/K274ER

VK-S274R/S274ER TK No. 8302E Digital Media Division,Tokai
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