

S962A

SERVICE MANUAL



The Monitor Specialists

**EDITION 1
DEC. 2003**

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
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1. SCOPE

This specification defines the design and performance requirements for the 19" SXGA TFT LCD display monitor "S962A".

The features of "S962A" is listed in the following table:

| Feature | Description |
|---------|--|
| 1 | Universal input AC/DC power supply inside the monitor |
| 2 | Analog RGB interface (VGA) 30~80KHz, 59~75Hz, 135MHz |
| 3 | 19" SXGA 1280*1024, TFT LCD panel |
| 4 | Function keys * 5 : Power On/Off, ESC, ▲ (up), ▼ (down), ↵ (enter) |
| 5 | Direct Access function keys : ▲ for  contrast function, ▼ for  brightness function , ESC for audio mute function |
| 6 | Green/Amber LED indicator for power on/power saving |
| 7 | Plug & play support with DDC2B protocol installed. |
| 8 | Power saving mode compliant with Energy Star |
| 9 | OSD (on screen display) MENU operation |
| 9.1 | Brightness adjustment |
| 9.2 | Contrast adjustment |
| 9.3 | Auto tune function (VGA) |
| 9.4 | Color selection |
| 9.5 | Image adjustment |
| 9.6 | Language selection |
| 9.7 | OSD position adjustment |
| 9.8 | Reset function |
| 9.9 | 1W * 2 Audio function inside the monitor |
| 9.10 | Volume adjust by OSD |

2. INPUT REQUIREMENTS

2.1 Input Power

- 2.1.1. Power Source 100 ~ 240 Vac, + -10%, 50/60 Hz
- 2.1.2. Power Consumption
 - Normal operating mode
 - Audio function is operating at max output: $\leq 43W$
 - w/o audio function: $\leq 36W$
 - Power saving mode
 - Audio function is operating at max output: $\leq 7W$
 - w/o audio function: $\leq 2W$
 - Power switch off: $\leq 1.5W$
- 2.1.3. AC Line Drop Out
 - Picture must not disappear while AC 100 V input drop out(10ms, 100%)
- 2.1.4. AC Wave Distortion
- 2.1.5. In-rush Current 10% max. Permitted
- 2.1.6. Power Cord
 - 50 A max at 240 Vac cold start
 - Detachable, 3P with ground type.

2.2 Display Input

- 2.2.1. Analog Input RGB Video
 - Analogue, 0.0 to 0.7 V peak to peak
 - Separate RGB
 - Input impedance 75 Ohm
 - Positive polarity
- 2.2.1.1 Sync Signal
 - Separate horizontal & vertical sync (3.3V & 5V)
 - Low level 0.8 V maximum
 - High level 2.0 V minimum
 - Positive or negative polarity

Analog Input Connection

- a. Captive cable length 1.5M in LCD Monitor end, D-sub male connector in another end.
- b. A female Mini D-sub 15 pin base.

| | | | |
|-------|---------------|--------|---------------|
| Pin 1 | Red | Pin 9 | No Connection |
| Pin 2 | Green | Pin 10 | Ground |
| Pin 3 | Blue | Pin 11 | Ground |
| Pin 4 | No Connection | Pin 12 | SDA |
| Pin 5 | Ground | Pin 13 | H. Sync |
| Pin 6 | R Return | | |
| Pin 7 | G Return | Pin 14 | V. Sync |
| Pin 8 | B Return | Pin 15 | SCL |

2.3 Audio Input

2.3.1 Audio Input Signal

Right & Left channels.

Input level: 1Vrms(typ), 2Vrms(max)

Input Impedance: 15Kohm

2.3.2 Audio Input Connection

- a. Detachable stereo phone head in two ends signal cable.
- b. A female stereo phone jack base.

3. ELECTRICAL CHARACTERISTICS

3.1 LCD Panel

3.1.1. Type

19" diagonal, SXGA resolution, color TFT-LCD

3.1.2. Pixel structure

R/G/B sub-pixels in vertical stripes
1280 x 1024 array matrix
a-Si TFT active matrix

3.1.3. Gray scale

16.7 million colors.

3.1.4. Surface treatment

3H hard coating, anti-static, anti-glare

3.1.5. Backlight

Integral CCFL, type to support field replacement.
Life time 30000 hours @ 25C, 50% of initial value.

3.1.6 Pixel Faults

| Pixel Faults type | | Model |
|-------------------|--|-----------------------|
| | | Project |
| | | S962A LBL19SS4HA01 |
| Type1 | Bright Pixels (Note 1) | ≤ 5 |
| Type2 | Dark Pixels (Note 2) | ≤ 5 |
| Type3 | Fault Pixels / Sub-Pixels (Note 3) | ≤ 3 |
| Type4 | Cluster of type1 or type 2 faults (Note 4) | ≤ 2 |
| Type5 | Cluster of type3 faults (Note4) | ≤ 3 |
| Type6 | Total Pixel Faults | ≤ 8 |

Note 1: Bright pixels in full black pattern.

Note 2: Dark pixels in full white pattern

Note 3: fault Pixel / Sub-Pixel: The pixel or sub-pixel is abnormal but not bright/dark pixel.

Note 4: Fault Cluster: Two or more Pixels/Sub-pixels with faults within 5 * 5 block of pixels.

3.2 Modes and Timing Comparability

3.2.1 Analog Input Supported Timing VESA Standard mode:

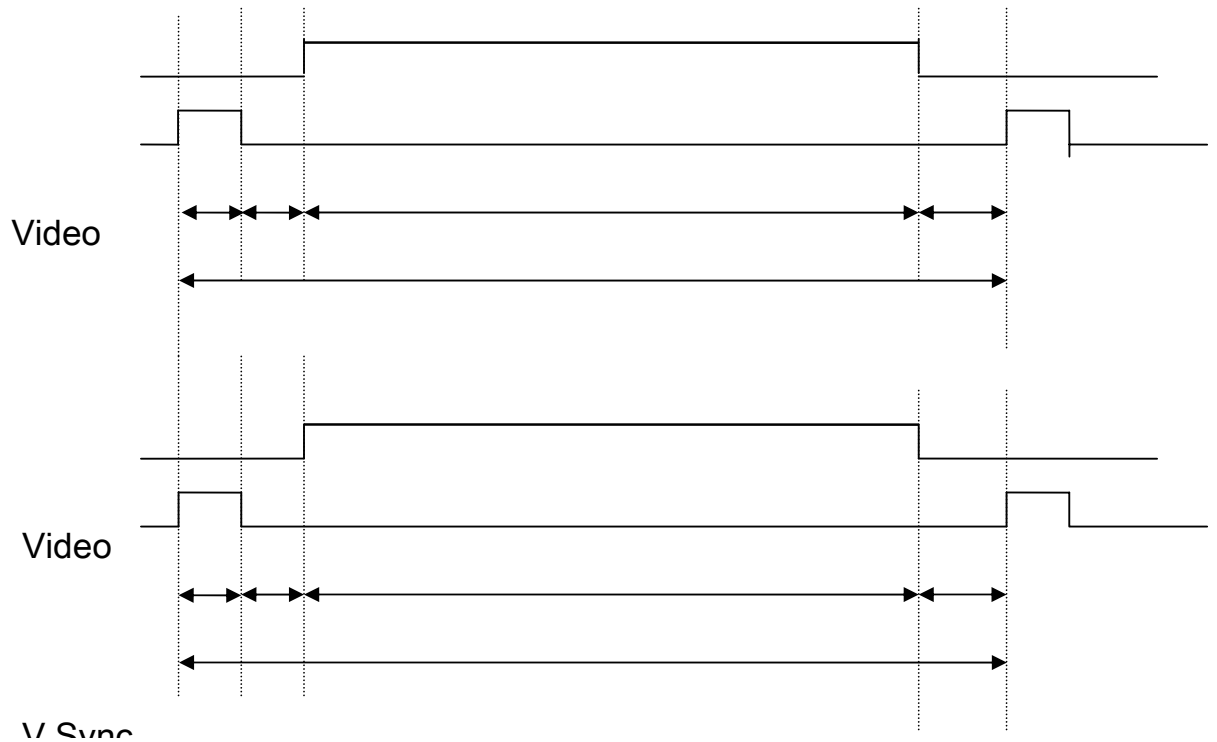
| Display Format | IBM VGA | | VESA | VESA | VESA | VESA | VESA |
|---------------------------|---------|--------|--------|--------|--------|--------|--------|
| Horizontal Dots | 720 | 640 | 640 | 640 | 800 | 800 | 800 |
| Vertical lines | 400 | 480 | 480 | 480 | 600 | 600 | 600 |
| Horizontal Frequency | 31.469 | | 37.861 | 37.5 | 37.879 | 48.077 | 46.875 |
| Vertical Frequency (Hz) | 70 | 59.94 | 72.809 | 75 | 60.317 | 72.188 | 75.000 |
| Pixel Rate (MHz) | 28.322 | 25.175 | 31.5 | 31.5 | 40 | 50 | 49.5 |
| H. Sync. Polarity | - | - | - | - | + | + | + |
| A μ S (Period) | 31.778 | | 26.413 | 26.667 | 26.4 | 20.8 | 21.333 |
| B μ S (Pulse Width) | 3.813 | | 1.270 | 2.032 | 3.2 | 2.4 | 1.616 |
| C μ S (Back Porch) | 1.907 | | 4.063 | 3.810 | 2.2 | 1.28 | 3.232 |
| D μ S (Active Area) | 25.422 | | 20.317 | 20.317 | 20.0 | 16.0 | 16.162 |
| E μ S (Front Porch) | 0.636 | | 0.763 | 0.508 | 1.00 | 1.12 | 0.323 |
| V. Sync. Polarity | + | - | - | - | + | + | + |
| O ms (Period) | | 16.683 | 13.735 | 13.333 | 16.579 | 13.853 | 13.333 |
| P ms (Pulse Width) | | 0.064 | 0.079 | 0.080 | 0.106 | 0.125 | 0.064 |
| Q ms (Back Porch) | | 1.048 | 0.739 | 0.427 | 0.607 | 0.478 | 0.448 |
| R ms (Active Area) | 12.711 | 15.253 | 12.678 | 12.800 | 15.840 | 12.480 | 12.8 |
| S ms (Front Porch) | | 0.318 | 0.237 | 0.027 | 0.026 | 0.770 | 0.021 |

| Display Format | VESA | VESA | VESA | VESA | VESA | VESA |
|---------------------------|--------|--------|--------|--------|--------|--------|
| Horizontal Dots | 1024 | 1024 | 1024 | 1152 | 1280 | 1280 |
| Vertical lines | 768 | 768 | 768 | 864 | 1024 | 1024 |
| Horizontal Frequency | 48.363 | 56.746 | 60.023 | 67.5 | 63.981 | 79.976 |
| Vertical Frequency (Hz) | 60.004 | 70.069 | 75.029 | 75 | 60.013 | 75.025 |
| Pixel Rate (MHz) | 65.0 | 75 | 78.75 | 108 | 108 | 135 |
| H. Sync. Polarity | - | - | + | + | + | + |
| A μ S (Period) | 20.667 | 17.707 | 16.660 | 14.815 | 15.631 | 12.504 |
| B μ S (Pulse Width) | 2.092 | 1.813 | 1.219 | 1.185 | 1.180 | 1.067 |
| C μ S (Back Porch) | 2.462 | 1.920 | 2.235 | 2.370 | 2.065 | 1.837 |
| D μ S (Active Area) | 15.754 | 13.653 | 13.003 | 10.667 | 11.797 | 9.481 |
| E μ S (Front Porch) | 0.369 | 0.321 | 0.203 | 0.593 | 0.590 | 0.119 |
| V. Sync. Polarity | - | - | + | + | + | + |
| O ms (Period) | 16.666 | 14.272 | 13.238 | 13.333 | 16.663 | 13.329 |
| P ms (Pulse Width) | 0.124 | 0.106 | 0.050 | 0.044 | 0.047 | 0.038 |
| Q ms (Back Porch) | 0.6 | 0.513 | 0.466 | 0.474 | 0.594 | 0.475 |
| R ms (Active Area) | 15.88 | 13.599 | 12.795 | 12.8 | 16.006 | 12.804 |
| S ms (Front Porch) | 0.062 | 0.054 | 0.017 | 0.015 | 0.016 | 0.012 |

VGA Support Mode

| |
|------------------------------------|
| 1280 * 1024 @70Hz, 72Hz |
| 1280 * 960 @ 60Hz, 70H, 72Hz, 75Hz |
| 1280 * 720 @ 60Hz |
| 1152 * 864 @ 60Hz, 70Hz, 72Hz |
| 1024 * 768 @ 72Hz |
| 800 * 600 @ 70Hz |
| 640 * 480 @ 70Hz |
| 640 * 350 @ 70Hz |

Timing Chart



3.3 Plug & Play

DDC 2B data transmission only for I²C BUS interface card.

3.4 Scanning characteristics

Horizontal frequency

VGA

30KHz to 80KHz

Refresh rate

59Hz to 75Hz

3.5 Audio Module

- 3.5.1. Type: Stereo BTL audio output amplifier with DC volume control with two 1W speakers.
- 3.5.2. Input Level: 1Vrms
- 3.5.3. Output Power: 1W * 2 (10% THD, 1KHz)
- 3.5.4. Total Harmonic Distortion (THD): 0.3% (Typ.) (0.5W * 2, 1KHz)
- 3.5.5. Frequency Response ±3dB: 550Hz ~ 20KHz
- 3.5.6. Channel unbalance (output power): 1dB (max.)

3.6 User Controls and Indicator

- 3.6.1 Power ON/OFF Switch The switch control scaler power down and turn off panel.
- 3.6.2 LED Indicator The LED color shall indicate power status as shown in paragraph 3.7
- 3.6.3 OSD
 - 3.6.3.1 Buttons ESC , ▽ , △ , ←
 - 3.6.3.2 OSD Menu Level See Table 2. S962A OSD Control Map
- 3.6.4 Hot Keys Function
 - 3.6.4.1 Contrast (☉) Press “△ ” to pop up ;then press “△ ” or “▽ ” to adjust Contrast up or down.
 - 3.6.4.2 Brightness (☀) Press “▽ ” to pop up ;then press “△ ” or “▽ ” to adjust Brightness up or down.
 - *3.6.4.3 Mute On (🔇) Press “Esc” directly to disable speakers, while speakers in normal state.
 - *3.6.4.4 Mute Off (🔊) Press “Esc” directly to enable speakers, while speakers in audio mute state.
“Esc” key is for Mute On and Off function
 - *3.6.4.5 In monitor power saving mode “△ ” key is for increasing volume function.
“▽ ” key is for decreasing volume function.
“ESC” key is disable or enabling audio mute.

Table 2 S962A OSD Control Map

1.VGA-D15 input:

| | Level 1 | Level 2 | Level 3 | Level 4 |
|------------|------------|-----------------------|---------|---------|
| Direct Adj | Brightness | | | |
| Direct Adj | Contrast | | | |
| Direct Adj | Audio Mute | | | |
| Main Menu | Volume | Adjustment scale | | |
| | Auto Tune | | | |
| | Color | Auto Color 9300° K | | |

| | | | | | |
|-------|--------------|-----------------|--------------|------------------|--|
| | | 6500° K | | | |
| | | User | R/G/B select | Adjustment scale | |
| | Image | Clock | | Adjustment scale | |
| | | Phase | | Adjustment scale | |
| | | H-Position | | Adjustment scale | |
| | | V-Position | | Adjustment scale | |
| | | Smooth | | On/Off | |
| | Language | English(select) | | | |
| | | German(select) | | | |
| | | French(select) | | | |
| | | Spanish(select) | | | |
| | | Italian(select) | | | |
| | OSD Position | 中文(option) | | | |
| | | H-Position | | Adjustment scale | |
| | | V-Position | | Adjustment scale | |
| Reset | Center | | | | |
| | Reset | Yes/No | | | |

3.6.5 Accessory OSD Indications

| | |
|---------------------------------|---|
| Signal out of range | An input signal which is outside the range defined in Section 3.4 shall cause the monitor to display a message Signal Out of Range . |
| No Signal Input and power down. | When the signal cable is not plugged into PC or when the horizontal or vertical sync are absent and when the monitor is turned on. After 5 sec isn't to detect H or V Sync then show " No Signal Input " for 5 seconds and then show " Power down " message on screen 2 sec. And then the monitor shall go to power saving status. If first turn on the monitor, shows " No Signal Input " 30 sec. |

3.7 Power Management

This monitor will meet the low power specification, including USA governmental requirements For Energy Star, the NUTEK standard and the VESA DPMS standard which detected the Hori. /Vert. Sync signal from host CPU.

A dual color (green/amber) LED is located on the front bezel to indicate the power management states.

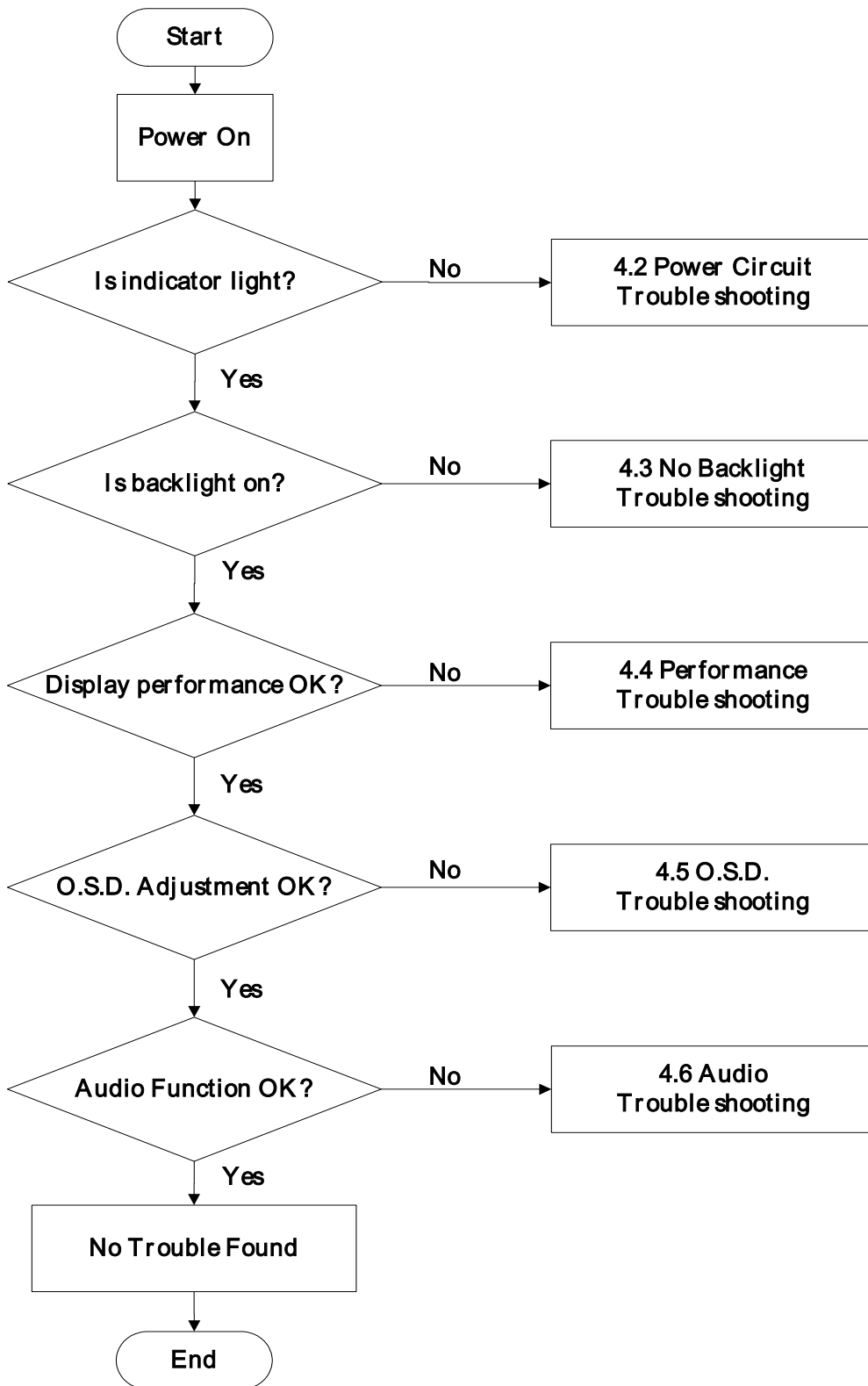
| Status | | Power consumption | Power management | Picture Recovery time | LED Color |
|----------|---------|-------------------|------------------|-----------------------|-----------|
| Sync. | Video | | | | |
| Active | Active | 43W max. | On | - | Green |
| No Sync. | Blanked | ≦ 2W (Note.1) | Power saving | ≦ 3 sec | Amber |

Note. 1 : Audio function is operating at no signal input.

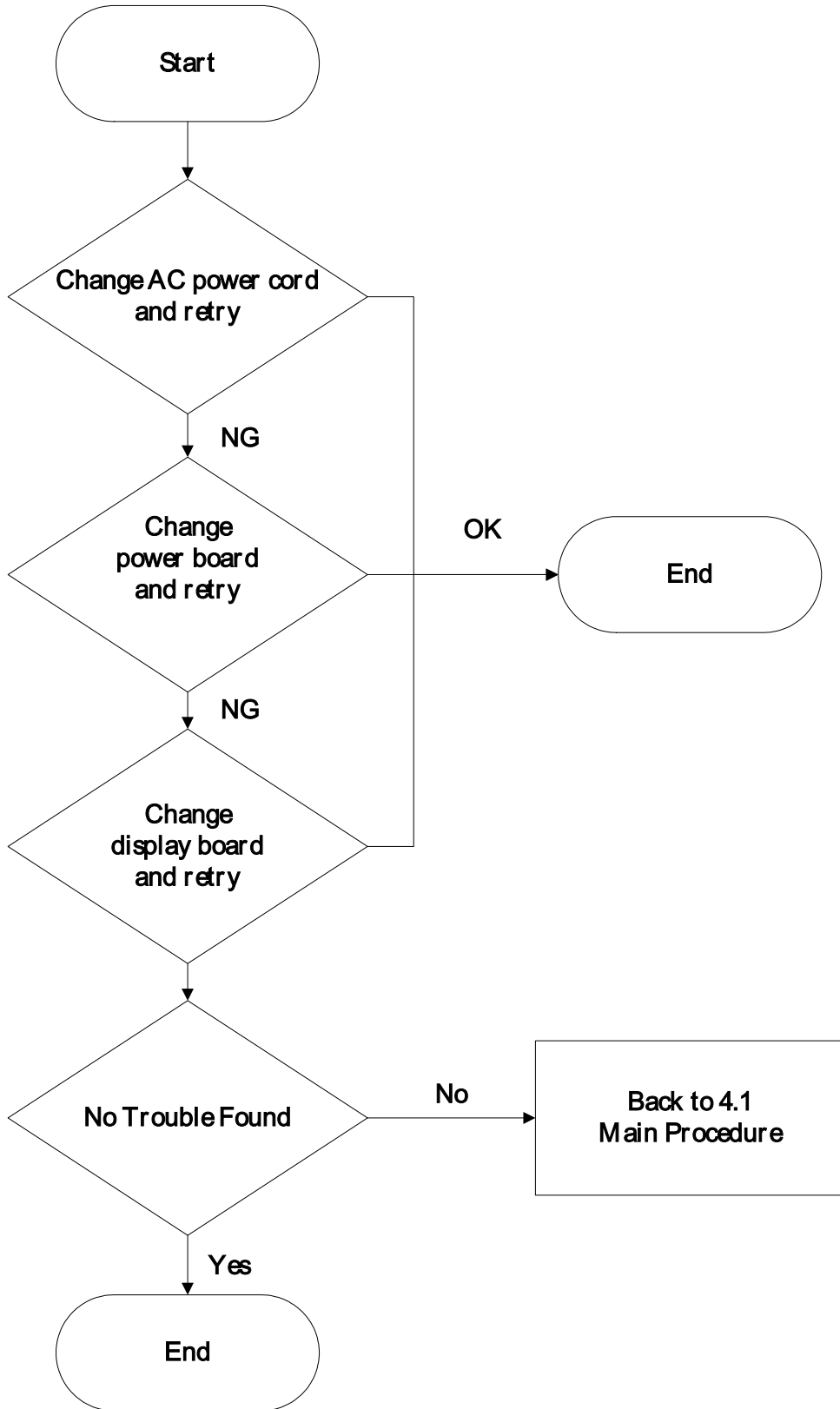
Once "Esc" or "△" or "▽" key initiates under power saving condition, the audio function can be waked up and the power consumption can not be the above definition.

4. TROUBLE SHOOTING

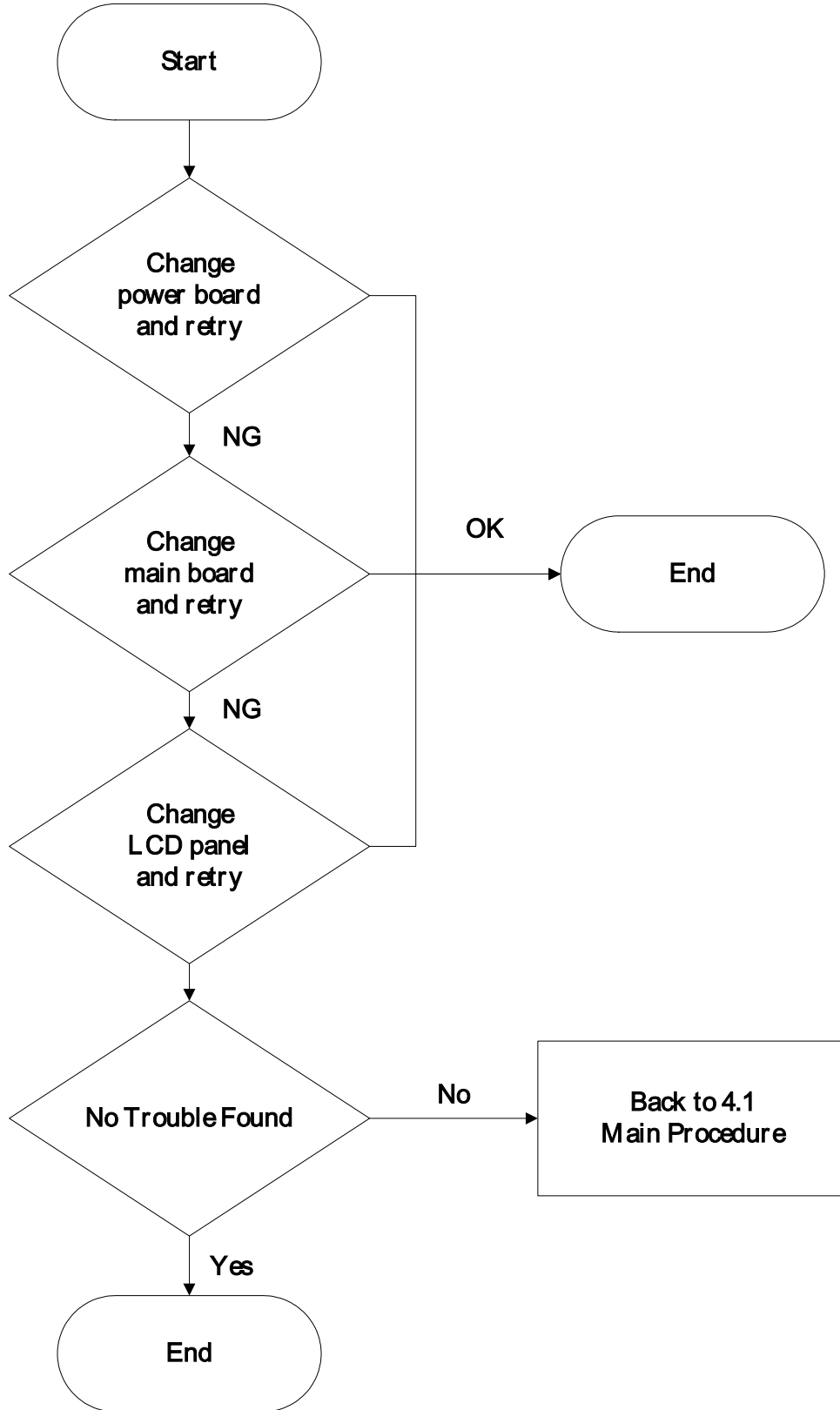
4.1 Main Procedure



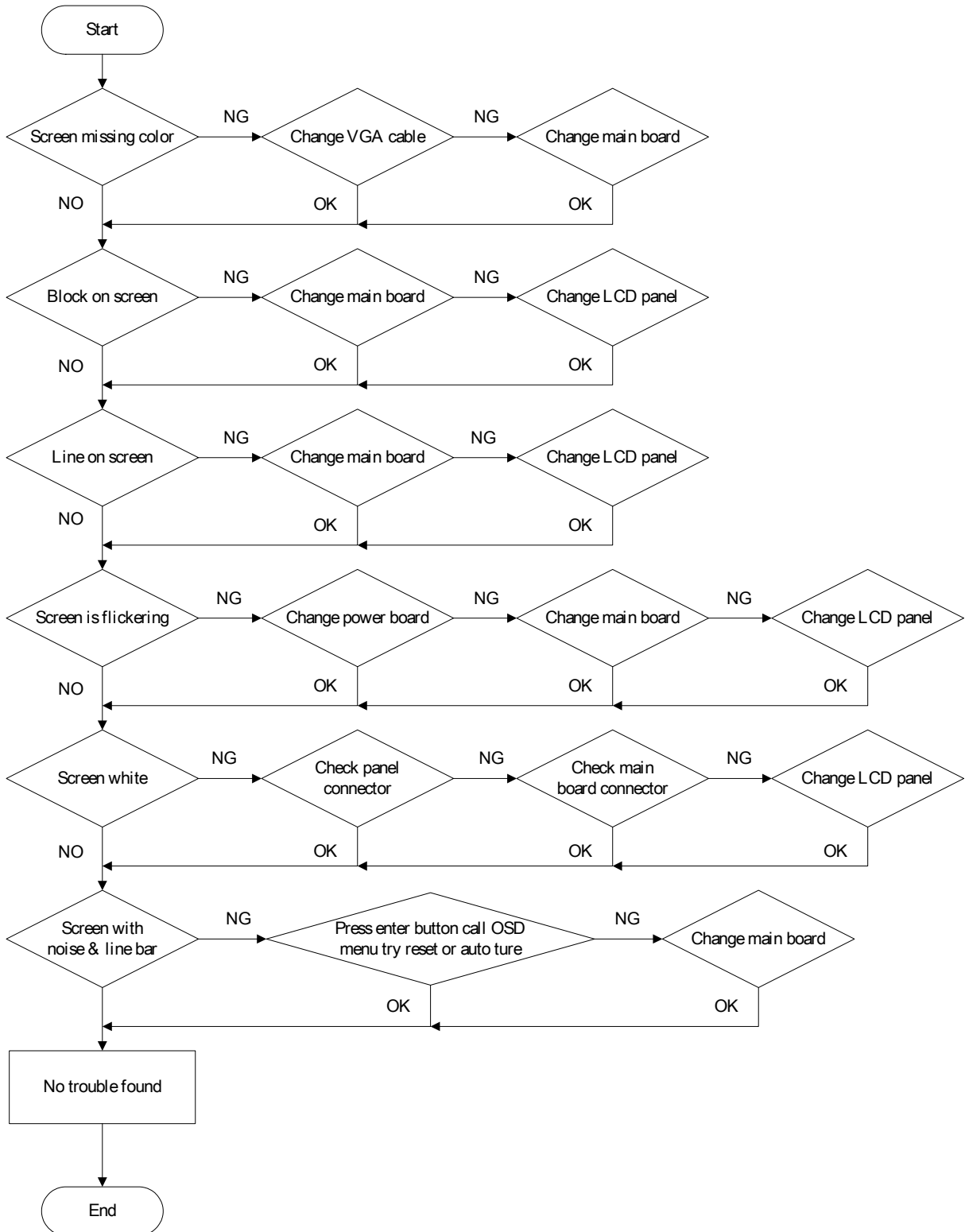
4.2 Power Circuit Trouble Shooting



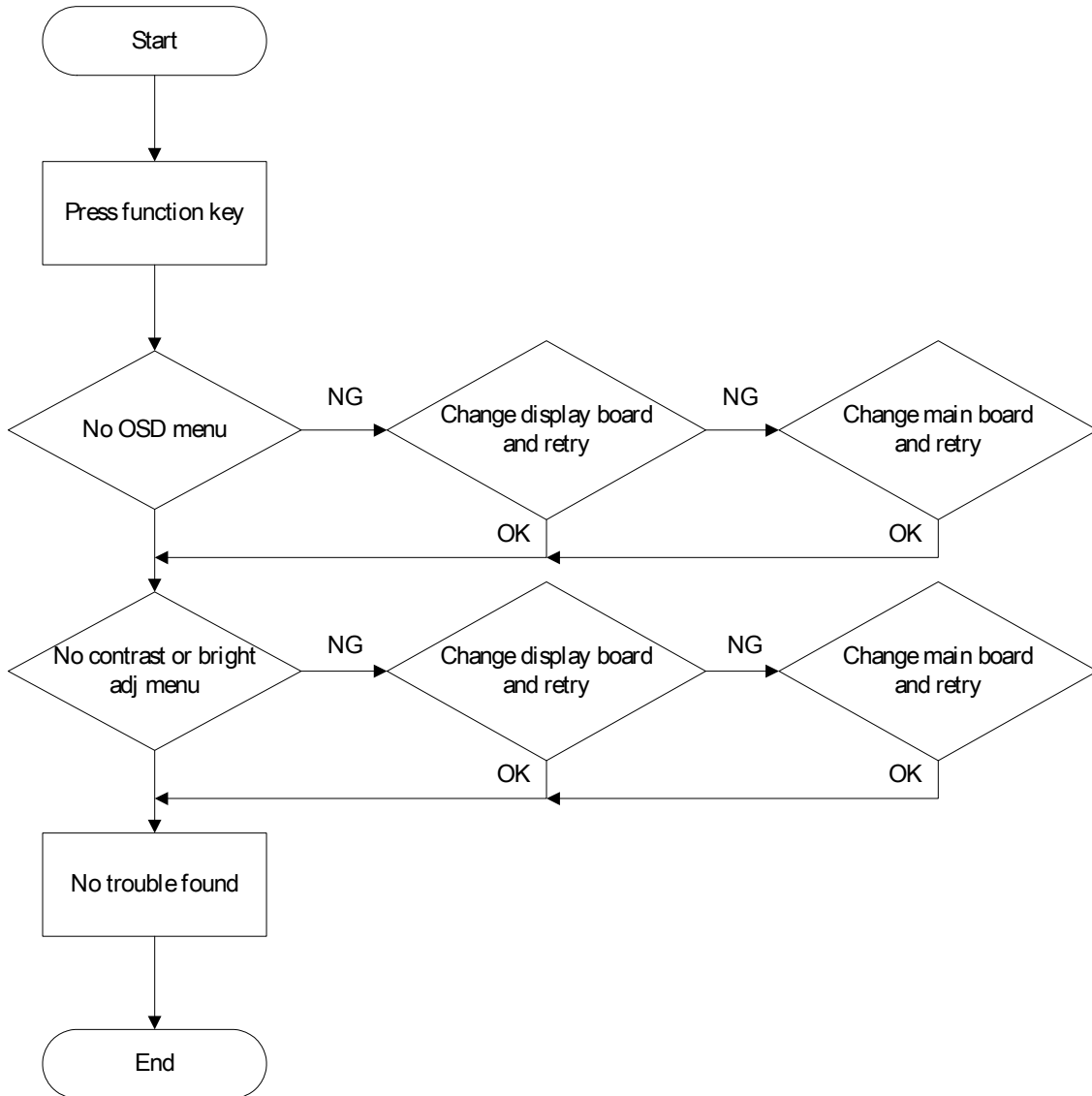
4.3 Backlight Trouble Shooting



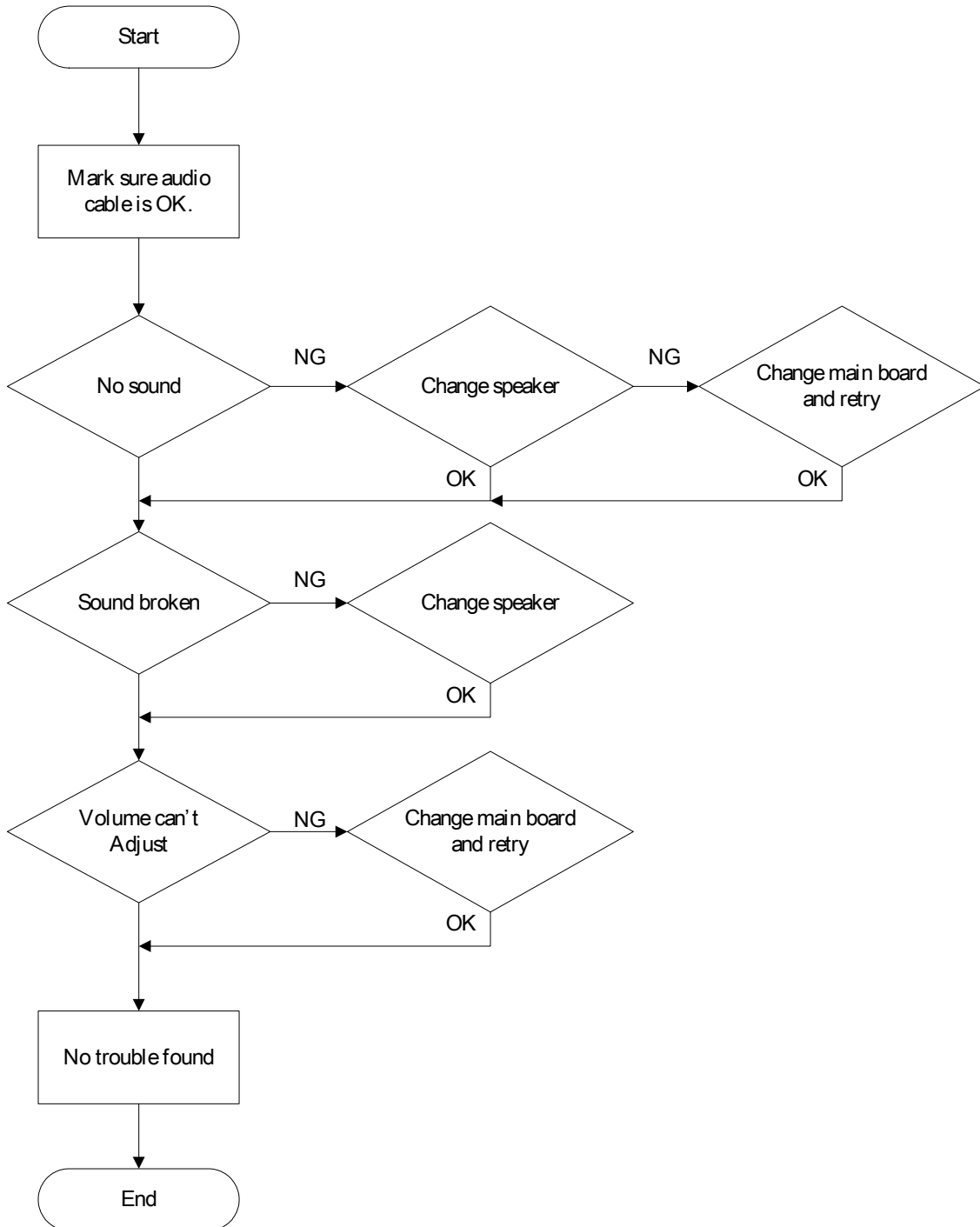
4.4 Performance Trouble Shooting



4.5 O.S.D. Trouble Shooting



4.6 Audio Trouble Shooting



PARTS LIST

| ITEM | PART NUMBER | DESCRIPTION |
|------|--------------|----------------------|
| 1 | AC1921-B01 | MAIN PCBA |
| 2 | DC1921-B01 | POWER PCBA |
| 3 | GC1921-B01 | DISPLAY PCBA |
| 4 | 10A19-1A2A | LCD TFT 1280*1024 AU |
| 5 | SSBASE-508 | SUB ASSY BASE |
| 6 | 04007983000H | CARTON |
| 7 | 05101668000H | HOLDER (R) |
| 8 | 05101678000H | HOLDER (L) |
| 9 | 05Z0001900E | PLASTIC HANDLE BAR |
| 10 | 05Z0002900E | PLASTIC CLAP BOARD |
| 11 | 06208061000H | USER MANUAL |
| 12 | 65B70-1801ZH | CABLE AUDIO |
| 13 | 98T111-P62 | DISKETTE 3.5IN 1.44M |
| 14 | 65S10-150CZH | CABLE SIGNAL |
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