

29" Color Monitor SERVICE MANUAL

EFG-2902F

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SAFETY PRECAUTIONS

CAUTION : No modifications of any circuits should be attempted. Service work should be performed only after you are thoroughly familiar with all of the following safety checks and servicing guidelines.

SAFETY CHECK

Care should be taken while servicing this analog color display because of the high voltages used in the deflection circuits. These voltages are exposed in such areas as the associated Fly-back transformer and yoke circuits.

FIRE & SHOCK HAZARD

- ✓ Insert an isolation transformer between the analog color display and AC power line before servicing the chassis.
- ✓ When servicing, pay close attention to the original lead dress especially in the high voltage circuit area; if a short circuit is found, replace all parts which have been overheated as a result of the short circuit.
- ✓ All the protective devices must be reinstalled per original design.
- ✓ Soldering must be inspected for possible cold solder points, frayed leads, damaged insulation, solder splashes or sharp solder points. Be certain to remove all foreign materials.

IMPLOSION PROTECTION

Picture tube in this monitor employs integral implosion protection system, but care should be taken to avoid damage and scratching during installation.

Only use same type replacement picture tubes.

IMPORTANT SAFETY NOTICE:

There are special components used in this analog color display, which are important for safety. These parts are marked on the schematic diagram and on the replacement parts list. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent X-Ray, shock, fire or other hazards. Do not modify the original design without getting written permission from EFFINET SYSTEMS, Inc. or this will void the original parts and labor warranty.

SAFETY PRECAUTIONS

X-RAY

WARNING : The only potential source of X-Ray is the picture tube. However when the high voltage circuitry is operation properly, there is no possibility of an X-Ray problem. The basic precaution which must be exercised is to keep the high voltage at the following factory recommended level.

NOTE : It is important to use an accurate, periodically, calibrated high voltage meter.

- ✓ To measure the high voltage, use a high-impedance high-voltage meter. Connect(-) to chassis and (+) to the CRT anode button.
- ✓ Turn the Contrast & Brightness Control fully counterclockwise.
- ✓ Measure the high voltage. The high voltage meter should indicate the following factory recommended levels,
- ✓ If the upper meter indication exceeds the maximum level, immediate service is required to prevent the possibility of premature component failure.
- ✓ To prevent X-Ray possibility, it is essential to use the specified picture tube.
- ✓ The normal high voltage is 27KV or below and must not exceed 29KV at zero beam current at rated voltage.

GENERAL SAFETY INFORMATION

Terms in the manual

- CAUTION** Statements identify conditions or practices that could result in damage to the equipment or other property.
- WARNING** Statements identify conditions or practices that could result in personal injury or loss of life.

Terms as marked on equipment

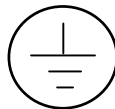
- CAUTION** Statements indicate a personal injury hazard not immediately accessible as one reads the marking or a hazard which properly included on the equipment itself.
- WARNING** Statements are clearly concerning indicated personal injury hazards.

Symbols in the manual

The symbols indicate where applicable cautionary or other information is to be found.

Symbols as marked on equipment

Protective GROUND terminal



High Voltage Warning & Critical Component Warning Label

The following warning label is on the CRT or metal case of the Monitor.

Warning: This product includes critical mechanical and electrical parts which are essential for x-ray protection. For continued safety, replace critical components that are indicated in the service manual with exact replacement parts given in the parts list. Operating high voltage with this product is 29KV at minimum brightness. Refer to service manual for measurement procedures and proper service adjustments.

SERVICING PRECAUTIONS

CAUTION : Before servicing instruments covered by this service manual, its supplements, and addendum, please read and follow the SAFETY PRECAUTIONS of this manual.

NOTE : If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions on page 3 of this manual, always follow the safety precautions.

General Servicing Precautions

1. Always unplug the AC power cord from source before:
 - ✓ Removing or reinstalling any component, circuit board, module, or any other instrument assembly.
 - ✓ Disconnecting or reconnecting any electrical plug or other electrical connection
 - ✓ Connecting a test substitute in parallel with an electrolytic capacitor in the instrument.
2. Test high voltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM. Etc.) equipped with a suitable high voltage probe. Do not test high voltage by “drawing an arc”.
3. Discharge the picture tube anode only by (a)first connecting one end of an insulated clip lead to the degaussing or line grounding system shield at the point where the picture tube socket ground lead is connected, and then (b) touching the other end of the insulated clip lead to the picture tube anode button, using an insulating handle to avoid personal contact with high voltage.
4. Do not any spray chemicals on or near this instrument, or any of its assemblies.
5. Unless otherwise specified in this service manual, only clean electrical contacts by applying the following mixture to the contacts with a pipe cleaner, cotton-tipped stick, or comparable nonabrasive applicator: 10%(by volume) Aceton and 90%(by volume) isopropyl alcohol(90%-99% strength).

CAUTION : A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in a explosion.

- ✓ Discharging the picture tube anode.

CAUTION : This is a flammable mixture. Unless specified in this service manual, lubrication of contacts is not required.

SERVICING PRECAUTIONS

6. Do not damage any plug/socket B+ voltage interlocks with which instruments covered by this service manual might be equipped.
7. Do not apply AC power to this instrument and/or any other of its electrical assemblies unless all the solid-state device heat sinks are correctly installed.
8. Always connect the test instrument ground lead to the appropriate instrument chassis ground before connecting the test instrument positive lead. Always remove the test instrument ground lead last.
9. Only use the test fixtures specified in this service manual with this instrument.

CAUTION : Do not connect the test fixture ground strap to any heat-sink in this instrument.

Electro-statically Sensitive (ES) Devices

Some semiconductor (solid state) devices can be damaged easily by static electricity.

Such components are commonly called Electro-statically Sensitive (ES) Devices.

The typical examples of ES devices are integrated circuits, some field-effect transistors, and semiconductor “chip” components. The following techniques should be used to help reduce the incidence of component damage by static electricity.

1. Immediately before handling any semiconductor or semiconductor-equipped assembly, wipe off any electrostatic charge on your body by touching any known earth ground. Alternatively, obtain any commercially available discharging wrist strap device which should be removed for potential shock reasons point to applying power to the unit under testing conditions.
2. After removing the electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil to prevent electrostatic charge buildup or exposure to the assembly.
3. Only use a grounded-tip soldering iron to solder it unsolder ES device.
4. Only use an anti-static type solder removal device. Some solder removal devices not classified as “anti-static” can generate enough electrical charges to damage ES devices.
5. Do not use Freon-propelled chemicals. These can generate enough electrical charges to damage ES devices.

SERVICING PRECAUTIONS

6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil, or comparable conductive material).
7. Immediately before removing the protective material from the leads of replacement ES devices, touch the protective material to the chassis or circuit assembly into which the device will be installed.

CAUTION : Be sure that no power is applied to the chassis or circuit, and observe all other safety precautions.

8. Minimize bodily movements when handling unpackaged replacement Es devices. (Otherwise harmful motion such as the brushing together clothes fabric or the lifting your foot from a carpeted floor can generate enough static electricity to damage ES devices).

General soldering Guidelines

1. Use a grounded-tip, low-wattage soldering iron with appropriate tip size and shape that will maintain tip temperature between a 550°F-660°F(288°C-316°C)range.
2. Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.
3. Keep the soldering iron clean.
4. Clean the surface to be soldered. Use a small wire-bristle(0.5 inch or 1.25cm) brush with a metal handle. Do not use Freon-propelled spray-on cleaners.
5. Use the following soldering technique:
 - ✓ Allow the soldering iron tip to reach normal temperature (550°F to 660°F or 288° C to 316°C)
 - ✓ Hold the soldering iron tip and solder strand against the component lead the solder melts.
 - ✓ Quickly move the soldering iron tip to the junction of the component lead and the printed circuit foil, and hold it there until the solder flows onto and around both the component lead and foil.
 - ✓ Closely inspect the solder area and remove any excess or splashed solder with a small wire-bristle brush.

SERVICING PRECAUTIONS

IC Removal/Replacement

Some utilized chassis circuit boards have slotted (oblong) holes through which the IC leads are inserted and bent flat against the circuit foil. When holes are slotted, the following technique should be used to remove and replace the IC.

Removal

1. De-solder and straighten each IC lead in one operation by gently prying up on the lead with the soldering iron tip as the solder melts.
2. Draw away the melted solder with an anti-static suction-type solder removal device (or with de-soldering braid before removing the IC).

Replacement

1. Carefully insert the replacement IC in the circuit board.
2. Carefully bend each IC lead against the circuit foil pad and solder it.
3. Clean the soldered areas with a small wire-bristle brush. (It is not necessary to reapply acrylic coating to the area)

“Small-signal” Discrete Transistor Removal / Replacement

1. Remove the defective transistor by clipping its leads as close as possible to component body.
2. Bend the ends of each of three leads remaining on the circuit board into a “U” shape.
3. Bend the replacement transistor leads into a “U” shape.
4. Bend the replacement transistor leads to the corresponding leads extending from the circuit board and crimp the “U” with long nose pliers to ensure metal-to-metal contact, then solder each connection.

Power IC, Transistor or Devices Removal/Replacement

1. Heat and remove all solders from the device leads.
2. Remove the heat-sink mounting screw (if applicable).
3. Carefully remove the device from the circuit board and
4. Insert new device in circuit board.
5. Solder each device lead and then clip off excess lead.
6. Replace heat-sink.

BRIEF SPECIFICATION

This color monitor automatically scans all horizontal frequencies from 30KHz to 50KHz, and all vertical frequencies from 50Hz to 80Hz. Since This color monitor adopted the OSD (On Screen Display), it shows the sync polarity and frequency and it provides that easily adjust control. And also this color monitor has a maximum horizontal resolution of 1024 dots and a maximum vertical resolution of 768 lines for superior clarity of display.

Scanning Frequency	Horizontal	30 ~ 50KHz
	Vertical	50 ~ 80Hz
Video Bandwidth(Pixel Clock)		65MHz
Standard Timing		720x400 @70Hz, 640x480 @60/75/85Hz 800x600 @56/60/72/75Hz 1024x768 @60Hz
Display Area	Normal	535 mm (H) x 400 mm(V)
	Maximum	540.8 mm(H) x 405.6mm (V)
Input Signal	Video	RGB Analog (0.7V, 75ohms)
	Sync	H/V Separate(TTL)
Input Signal Connector		15pin D-Sub / AMP Connector
Power	AC Input	AC 90 ~ 265V @60/50Hz, Universal Power
Control Button		Power, Up, Down, Menu, Right, Left
Control	Screen	Brightness, Contrast
	Size	H-Size, V-Size
	Center	H-Position, V-Position
	Geometry	Pincushion, Trapezoid, Pin-Balance, Parallelogram, Rotation
	Color	Color Temperature (9300°K/6550°K/User), R-Gain, G-Gain, B-Gain
	Utility	Degauss, Recall, CLTC(CRT Life Time Counter), Self Diagnosis 5 Languages(Eng / Deu. /Esp. /Fra. /Ita.)
Environmental Conditions	Operating	Temperature : 5 to 60°C / Humidity : 8 to 90%
	Storage	Temperature : -20 to 70°C / Humidity : 5 to 90%

GENERAL INFORMATION

Abbreviations

ADJ	Adjustment
AFC	Automatic Frequency Control
CRT	Cathode Ray Tube
Def	Deflection
D.Y	Deflection Yoke
FBT	Fly-back Transformer
HVG	High Voltage Generator
H. SYNC	Horizontal Synchronization
OSC	Oscillator
P. S. U	Power Supply Unit
PWA	Printed Circuit Board Wiring Assembly
R. G. B	Red, Green, Blue
V. SYNC	Vertical Synchronization

Cautions for Adjustment and Repair

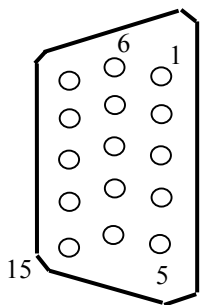
- ✓ Degaussing is always required when adjusting purity or convergence.
- ✓ The white balance adjustment has been done by a color analyzer in factory. The adjustment procedure, described in the service manual is made by a visual check.
- ✓ Allow 20 minutes warm-up time for the display before checking or adjusting only electrical specification or function.
- ✓ Reform the lead wire after any repair work.

Caution For Servicing

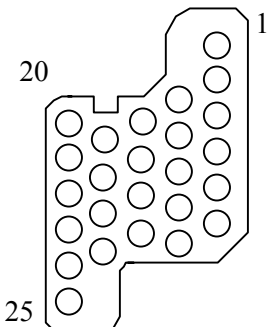
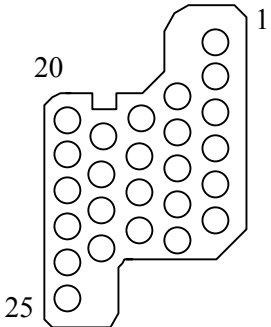
- ✓ In case of servicing or replacing CRT, high voltage sometimes remains in the anode of the CRT.
- ✓ Completely discharge high voltage before servicing or replacing CRT to prevent a shock to the serviceman.

PIN CONNECTION DIAGRAM

15pin D-sub Type

Connector Shape	Pin	Description	Pin	Description
	1	Red	9	No Connection
	2	Green	10	Ground - Sync
	3	Blue	11	Ground - Sync
	4	Ground	12	No Connection
	5	Ground	13	Horizontal Sync
	6	Ground - Red	14	Vertical Sync
	7	Ground - Green	15	No Connection
	8	Ground - Blue		

25pin AMP Connector Type

Connector Shape (A)	Pin	Description	Pin	Description
	1	Red	8	H-Sync
	2	Red-GND	9	V-Sync
	3	Green	10	Shield-GND
	4	Green-GND	11~25	No Connection
	5	Blue		
	6	Blue-GND		
	7	Sync-GND		
Connector Shape (B)	Pin	Description	Pin	Description
	1~6	No Connection		
	7	LIVE		
	8	Neutral		
	9	GND		
	10~25	No Connection		

INSTALLATION and ADJUSTMENT PROCEDURES

Adjustment Condition

- **AC Power Input** : AC 100V ~ 265V / 50~60Hz
 USA : 110V
 EUROPE : 230V
 AUSTRALIA : 240V
- **Aging Time**
 It should be turn on for minimum 30 minutes before adjustment.
 Especially for color temperature and white balance adjustment.
- **Input Signal Condition**
 Input Signal; Analog 0.7Vp-p, 75 Ohm Impedance
 Sync level ; TTL level(Negative, positive Sync.)
- **Input Signal Timing**
 If there's no special request, using the XGA(1024x768@60Hz) Timing

Voltage Adjustment

2-1. DC Voltage Adjustment

- 1) Turn on Monitor Power.
- 2) Connect positive(+) terminal of DVM on the 2nd Pin(lead of R622) of CN703
- 3) Check the measured voltage is within $6.3 \pm 0.05V$. If not, Adjust VR101.

2-2. High Voltage Adjustment

- 1) Turn off the Monitor and separate the Power cord or AMP Connector.
- 2) Connect the High Voltage Probe onto Anode Cap of CRT and Turn on the Monitor.
- 3) Check the measured High Voltage is within $27KV \pm 0.2KV$. if not, Adjust VR701.

Model Name	High Voltage Specification
EFG-2902F	$27KV \pm 0.2KV$

2-3. G2 Voltage Adjustment

- 1) Apply XGA(1024x768@60Hz) X-hatch Pattern to the Monitor.
- 2) Check measured G2 Voltage is within $500V \pm 10V$. if not, Adjust Screen VR of FBT.

2-4. Sub H-Size Adjustment

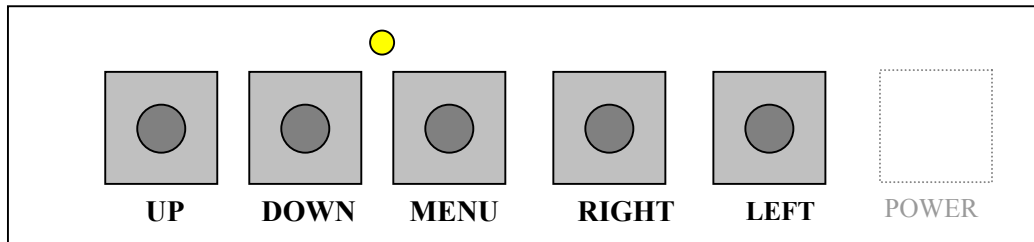
- 1) Apply XGA(1024x768@60Hz) X-hatch Pattern to the Monitor.
- 2) Set the H-Size control to Max. position with using OSD MENU.
- 3) Adjust VR501 so that H-Size can be slightly over-scanned.(About 10mm)

INSTALLATION and ADJUSTMENT PROCEDURES

Image Adjustment

3-1. Key Control & OSD

1) Key Control



- Right / Left : Move cursor to the right / left window on the OSD window.
- MENU : Launch OSD (On-Screen Display) MENU window.
- Up / Down : Increase / Decrease the value of selected Menu.

2) User and Factory Setting OSD Function

Icon	CONTROL	FUNCTION
	Contrast	Adjust the contrast level of the Display.
	Brightness	Adjust the brightness level of the Display.
	H. Size	Adjust the width (horizontal size) of the display.
	V. Size	Adjust the height (vertical size) of the display.
	H Position	Adjust the position of the display horizontally.
	V Position	Adjust the position of the display vertically.
	Pincushion	Adjust the left and right margins for more convex or more concave margins.
	Trapezoid	Adjust the trapezoid of the screen by moving the lines inward or outward.
	Parallelogram	Adjust the parallelogram when the screen is leaning left or right.
	Pin Balance	Adjust the side balance when the sides of the screen are bowed towards left or right.
	Rotation	Adjust the rotation when the screen is tilted left or right
	H-Linearity	Adjust the Horizontal line's gap (linearity)
	V-Linearity	Adjust the vertical line's gap (linearity) ; Factory setting Mode only
	Color Temp	Choose different preset color temperatures or set your own customized color parameters.
	Degauss (Right Key)	Degaussing keeps the monitor free from unwanted magnetism that can result in color impurity.
	Recall	Reset the screen to the factory Preset Display Settings
	CLTC	Display the Life Time of CDT
	Language	Select the OSD Language : 5 Language

INSTALLATION and ADJUSTMENT PROCEDURES

3-2. Factory Setting Mode

- 1) Factory Setting Mode : In case all the OSD adjustment is done in Factory Setting Mode, User can recall factory setting value anytime.
- 2) Press “MENU”, “UP” and “Right” Button 3 times simultaneously and see the OSD background color is changed to RED.
- 3) Perform the Image adjustment procedure.
- 4) Press “MENU” Button till OSD MENU screen is disappeared.
- 5) Press “MENU” button and Check whether OSD background color is blue.
- 6) Saved data will be restored only by AC power Off and On.

3-3. Image Adjustment

Effinet’s Monitor is designed with external computer controlled system.

During the factory production process, all the adjustment is done with Computer controlled Camera system.

No.	Adjustment Items	Specification	Reference	Remark
1)	H-Centering	$A-B \leq \pm 4\text{mm}$	Fig. 1	
2)	V-Centering	$C-D \leq \pm 4\text{mm}$	Fig. 1	
3)	H-Size (29 inch)	$H = 535 \pm 3\text{mm}$	Fig. 1	
4)	V-Size (29 inch)	$V = 395 \pm 3\text{mm}$	Fig. 1	
5)	Pincushion	$P \leq \pm 1\text{mm}$	Fig. 2	
6)	Trapezoidal	$HA-HB \leq \pm 2\text{mm}$	Fig. 3	
7)	Pin-Balance	$D1, D2 \leq \pm 2\text{mm}$	Fig. 4	
8)	Parallelogram	$P1 \leq 2\text{mm}$	Fig. 5	
9)	Tilt	$T1 \leq 2.5\text{mm}$	Fig. 6	
10)	H-Linearity	$A-B \leq \pm 3\text{mm}$	Fig. 7	
11)	V-Linearity	$C-D \leq \pm 3\text{mm}$	Fig. 7	

INSTALLATION and ADJUSTMENT PROCEDURES

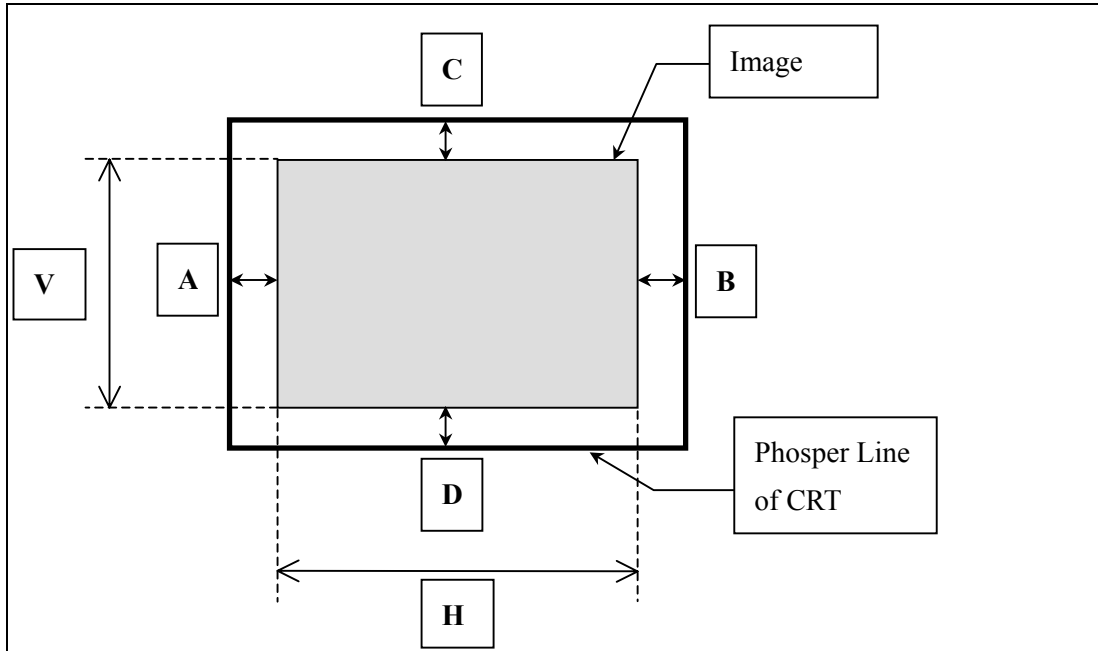


Fig.1 H / V Size and Centering

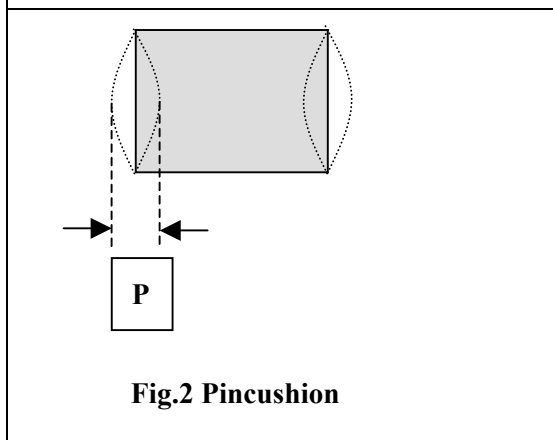


Fig.2 Pincushion

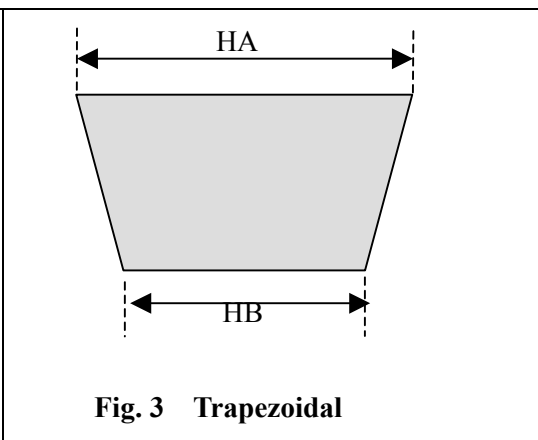


Fig. 3 Trapezoidal

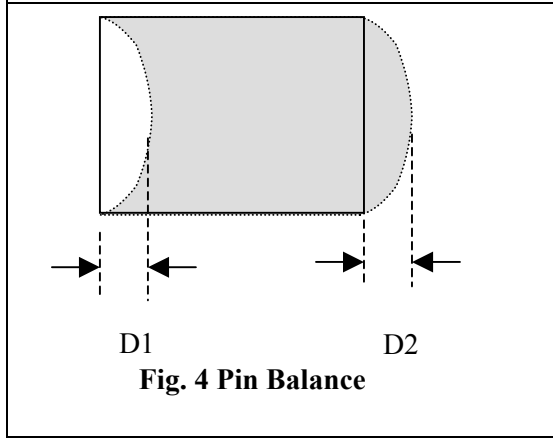


Fig. 4 Pin Balance

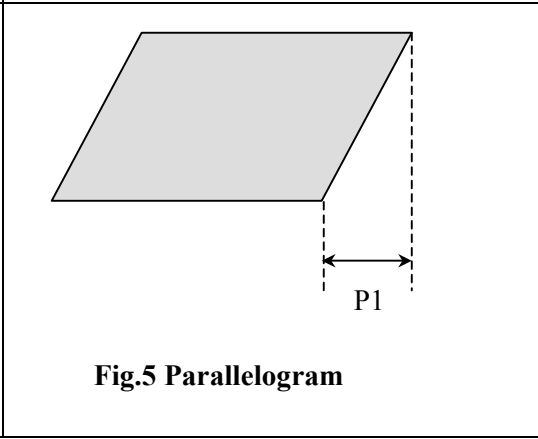
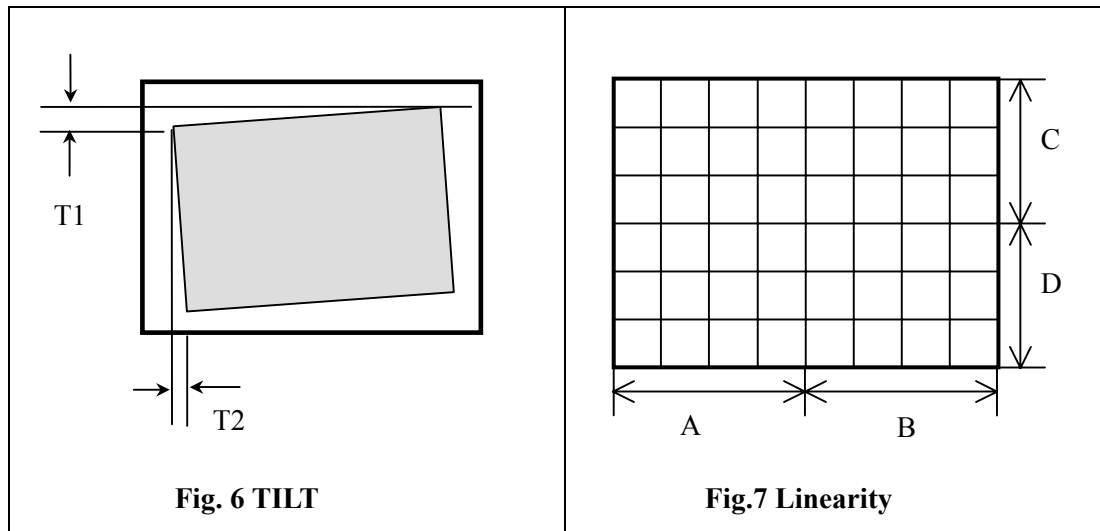


Fig.5 Parallelogram

INSTALLATION and ADJUSTMENT PROCEDURES



3-4. Brightness and Color Adjustment - 9300K

- 1) Select "9300K BIAS" ICON on OSD MENU
- 2) Apply Back Raster Pattern to the Monitor.
- 3) Set Contrast control to MAX. and Brightness control to level 16.
- 4) Change the factory mode to save.(press 3 times "Up" and "Right" button simultaneously at status of OSD menu)
- 5) Check the measured brightness of back raster is within Max. 0.5Ft-L. If not, Adjust "BR" by "Up" and "Down" button
- 6) Apply Small White pattern to the Monitor.
- 7) Check the measured brightness of small white is Min. 65Ft-L (Minolta color analyzer), If not, Adjust "CO"(brightness).
- 8) Apply Full White pattern to the Monitor.
- 9) Check the measured brightness of small white is Min. 32Ft-L, $x=0.281 \pm 0.015$, $y=0.311 \pm 0.015$ (Minolta color analyzer), If not, Adjust "ABL"(brightness), RG(x coordinate), BG(y coordinate).
- 10) If there's difficulty in adjustment, change the "GG" value and follow the procedure again.
- 11) To disappear OSD menu, Press the "Menu".

INSTALLATION and ADJUSTMENT PROCEDURES

3-4-1. Small White Brightness level Adjustment

- 1) Apply 1/8 full white pattern to the Monitor.
- 2) Select “CO” icon of “9300K Gain” OSD, and set brightness level to Min. 65Ft-L.

3-4-2. Full White Brightness level Adjustment

- 1) Apply Full White pattern to the Monitor.
- 2) Select “BL” icon of “9300K GAIN” OSD and set brightness level to Min. 32 Ft-L.

3-5. Brightness and Color Adjustment - 6550K

- 1) Select “6500K BIAS” icon on OSD MENU
- 2) Apply Back Raster Pattern to the Monitor.
- 3) Set Contrast control to MAX. and Brightness control to level 16.
- 4) Change the factory mode to save.(press 3 times “Up” and “Right” button simultaneously at status of OSD menu)
- 5) Check the measured brightness of back raster is within Max. 0.5Ft-L. If not, Adjust “BR” by “Up” and “Down” button.
- 6) Apply Small White pattern to the Monitor.
- 7) Check the measured brightness of small white is Min. 65Ft-L (Minolta color analyzer), If not, Adjust “CO”(brightness).
- 8) Apply Full White pattern to the Monitor.
- 9) Check the measured brightness of small white is Min. 32Ft-L, $x=0.313 \pm 0.015$, $y=0.329 \pm 0.015$ (Minolta color analyzer), If not, Adjust “ABL”(brightness), RG(x coordinate), BG(y coordinate).
- 10) If there’s difficulty in adjustment, change the “GG” value and follow the procedure again.
- 11) To disappear OSD menu, Press the “Menu”.

3-5-1. Small White Brightness level Adjustment

- 1) Apply 1/8 full white pattern to the Monitor.
- 2) Select “CO” icon of 6550K Gain OSD, and set brightness level to Min. 65Ft-L.

3-5-2. Full White Brightness level Adjustment

- 1) Apply Full White pattern to the Monitor.
- 2) Select “BL” icon of “6550K GAIN” OSD and set brightness level to Min. 32 Ft-L.

INSTALLATION and ADJUSTMENT PROCEDURES

3-6. Focus Adjustment

- 1) Apply X-Hatch pattern to the Monitor.
- 2) Adjust the upper volume of FBT so that horizontal line can be seen clearly.
- 3) Adjust the center volume of FBT so that vertical line can be seen clearly.
- 4) Apply “H” Character pattern and check focus status.

TROUBLESHOOTING GUIDE

Starting Hints -----

NO RASTER

- ☞ Power Circuitry, Horizontal Output Circuitry

There's High Voltage but No RASTER

- ☞ Video Output Circuitry, Horizontal Output Circuitry

No High Voltage

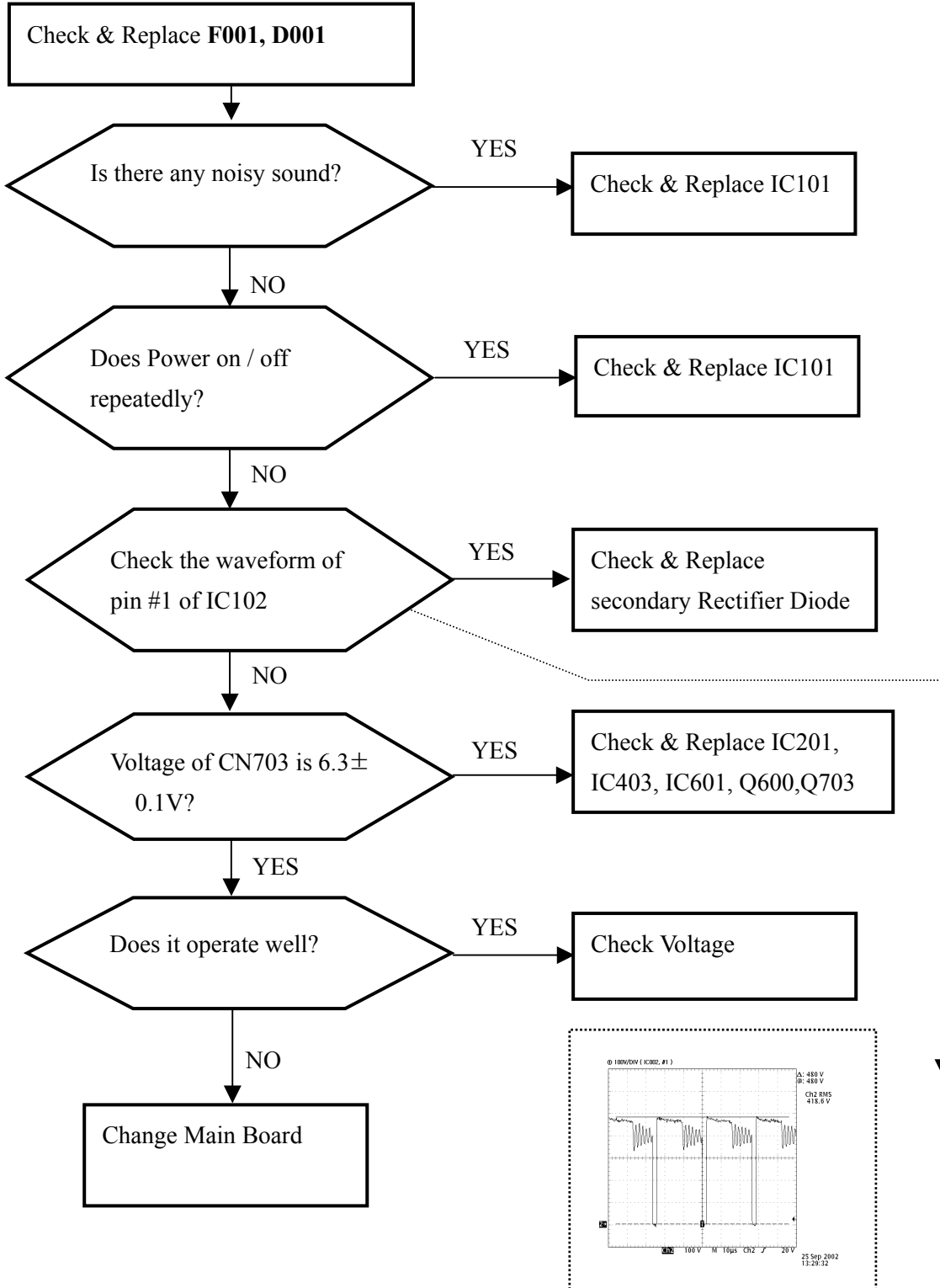
- ☞ High Voltage output Circuitry

<u>POWER SUPPLY CIRCUITRY FAILURE</u>	23
<u>HORIZONTAL DEFLECTION CIRCUITRY FAILURE</u>	24
<u>H-SIZE CONTROL IS NOT OPERATED</u>	25
<u>ABNORMAL HORIZONTAL SCREEN SIZE</u>	25
<u>PINCUSHION, TRAPEZOIDAL TROUBLE</u>	26
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Note) The reference waveform photo in the section was taken with X-Hatch pattern. So the waveform can be varied according to the applied pattern type.

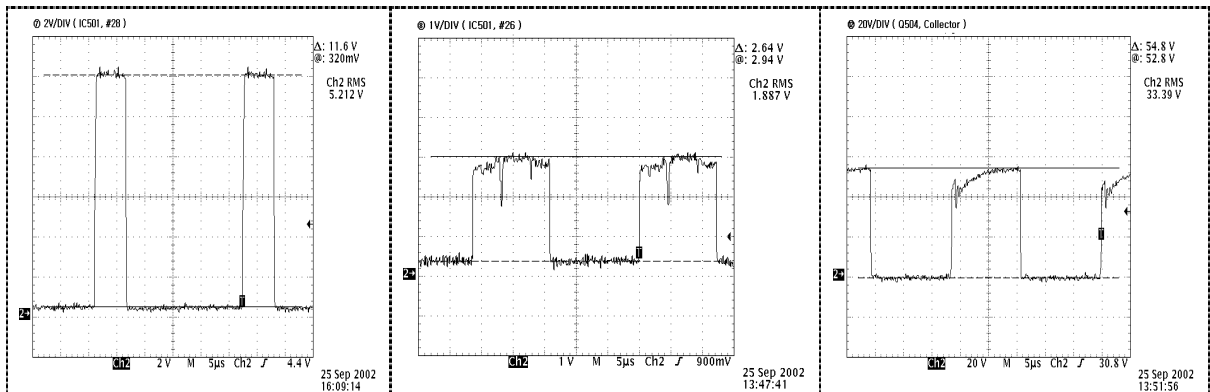
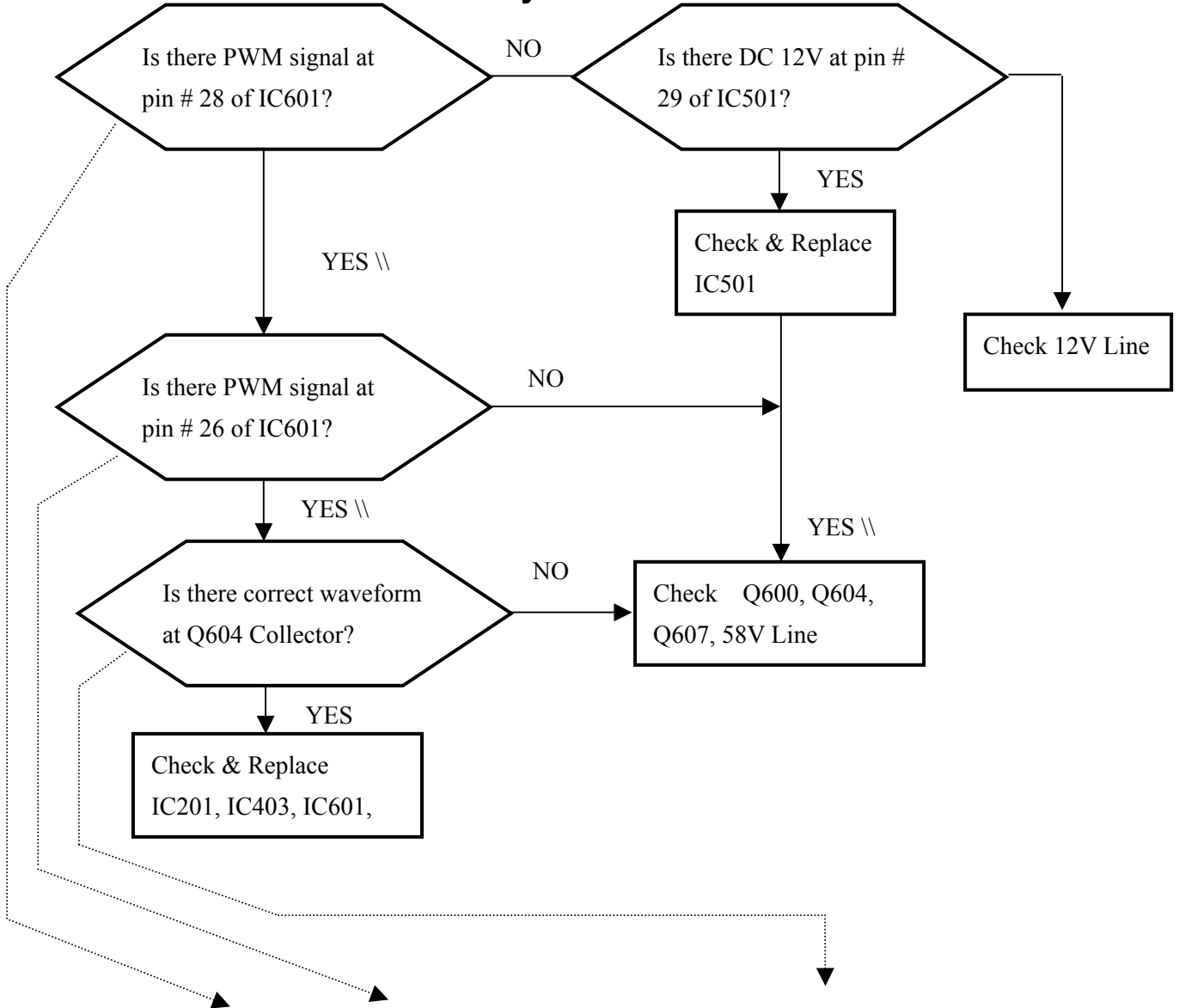
TROUBLESHOOTING GUIDE

Power Supply Circuitry Failure



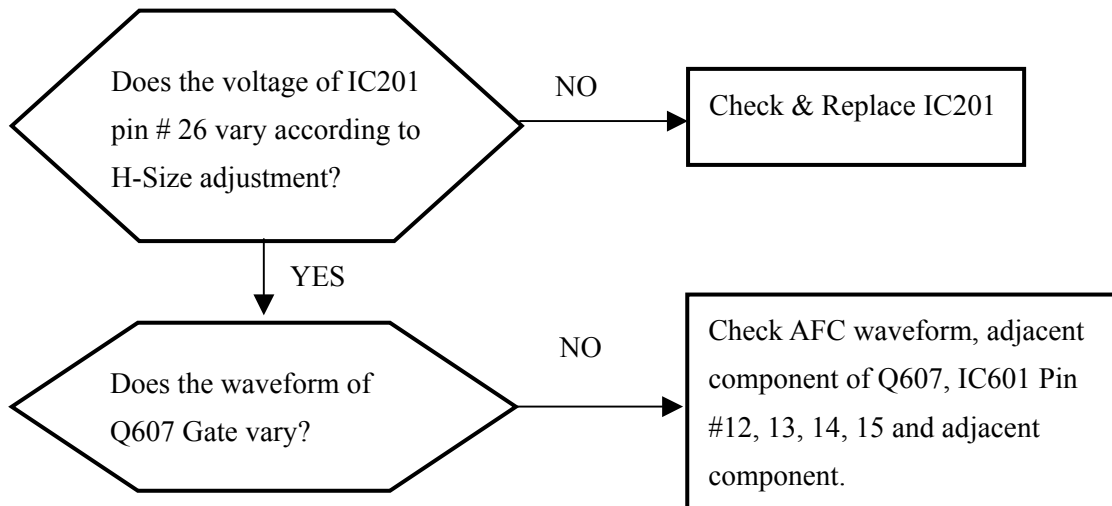
TROUBLESHOOTING GUIDE

Horizontal Deflection Circuitry Failure

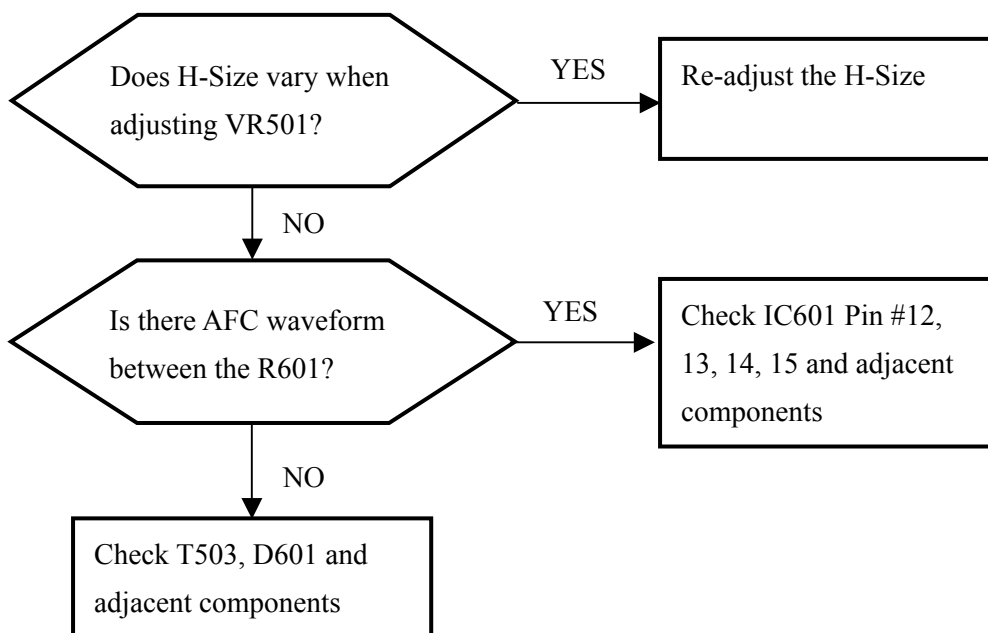


TROUBLESHOOTING GUIDE

H-size control is not operated

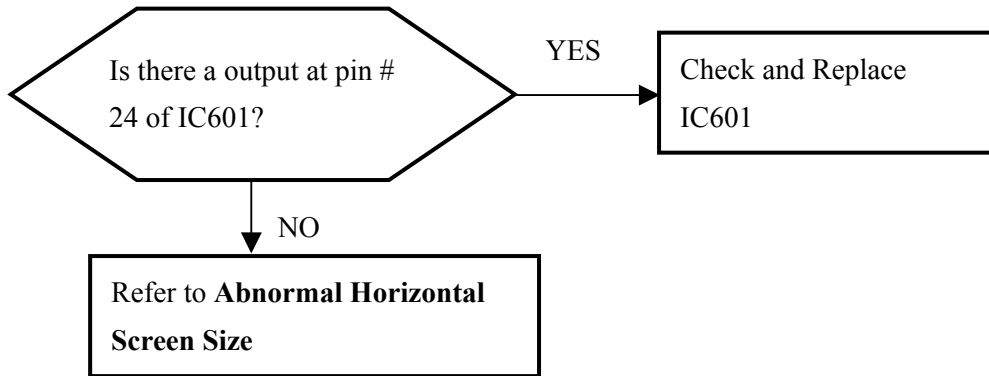


Abnormal Horizontal Screen Size

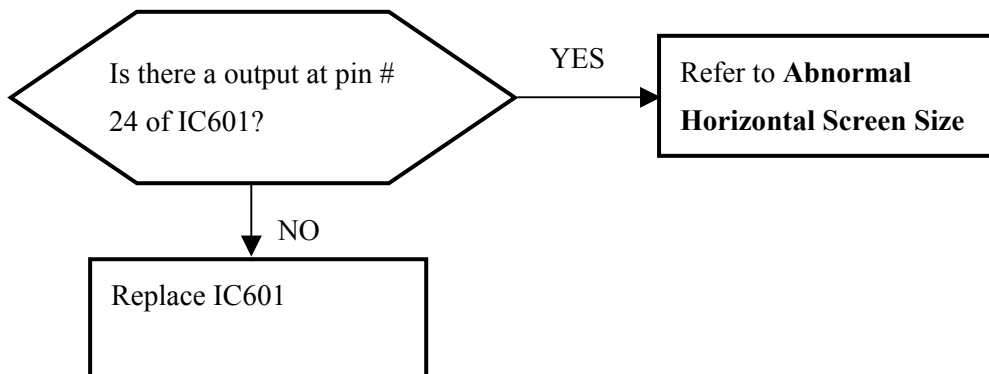


TROUBLESHOOTING GUIDE

Pincushion, Trapezoidal Trouble

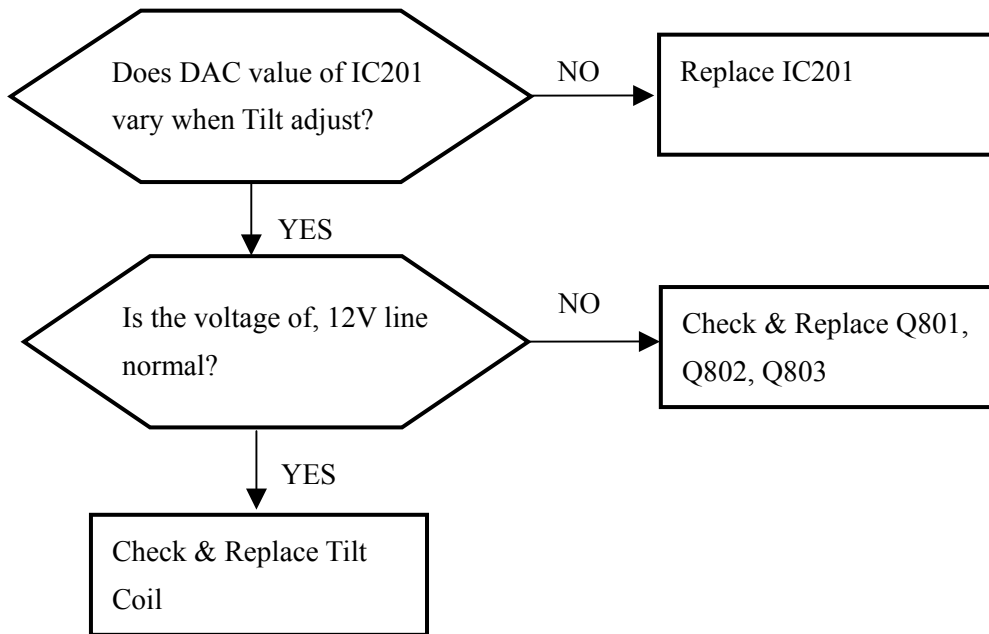


Parallelogram, Pin-Balance Trouble



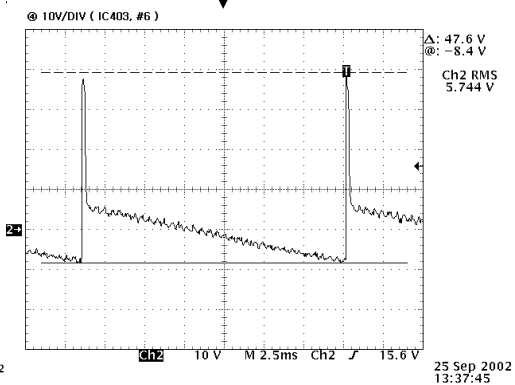
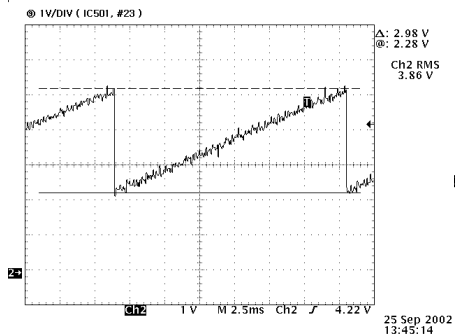
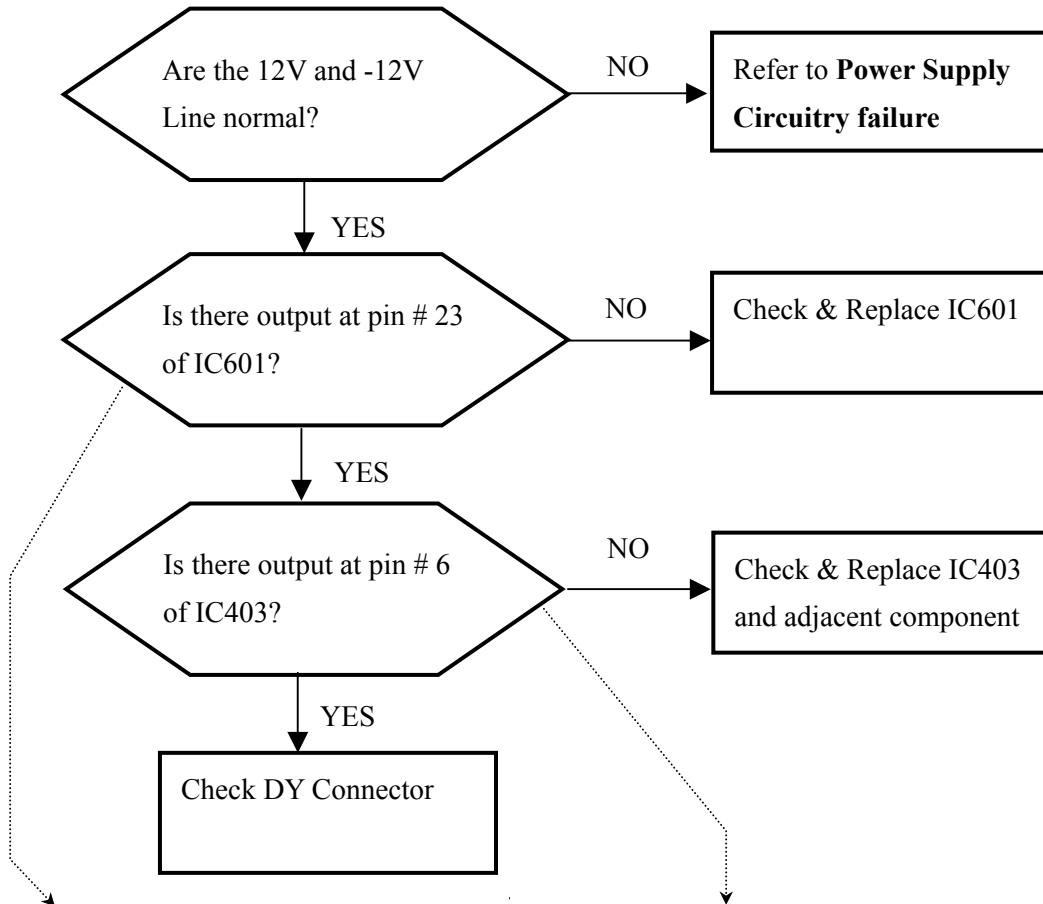
TROUBLESHOOTING GUIDE

Tilt(Rotation) Trouble



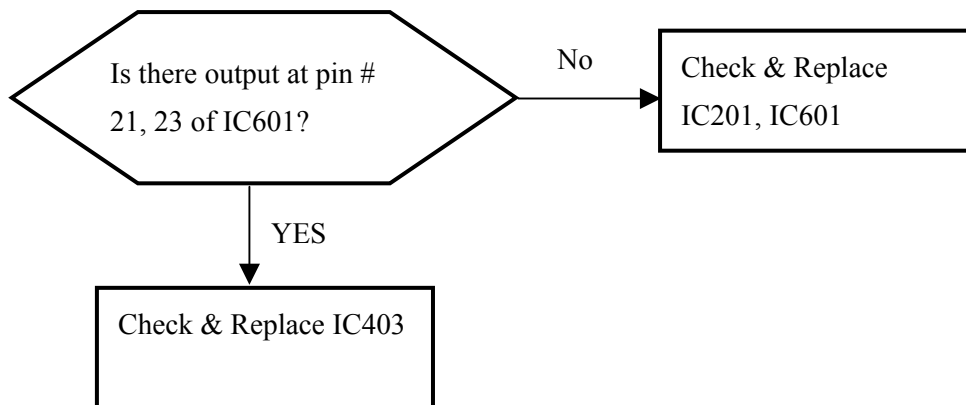
TROUBLESHOOTING GUIDE

Vertical Deflection Failure



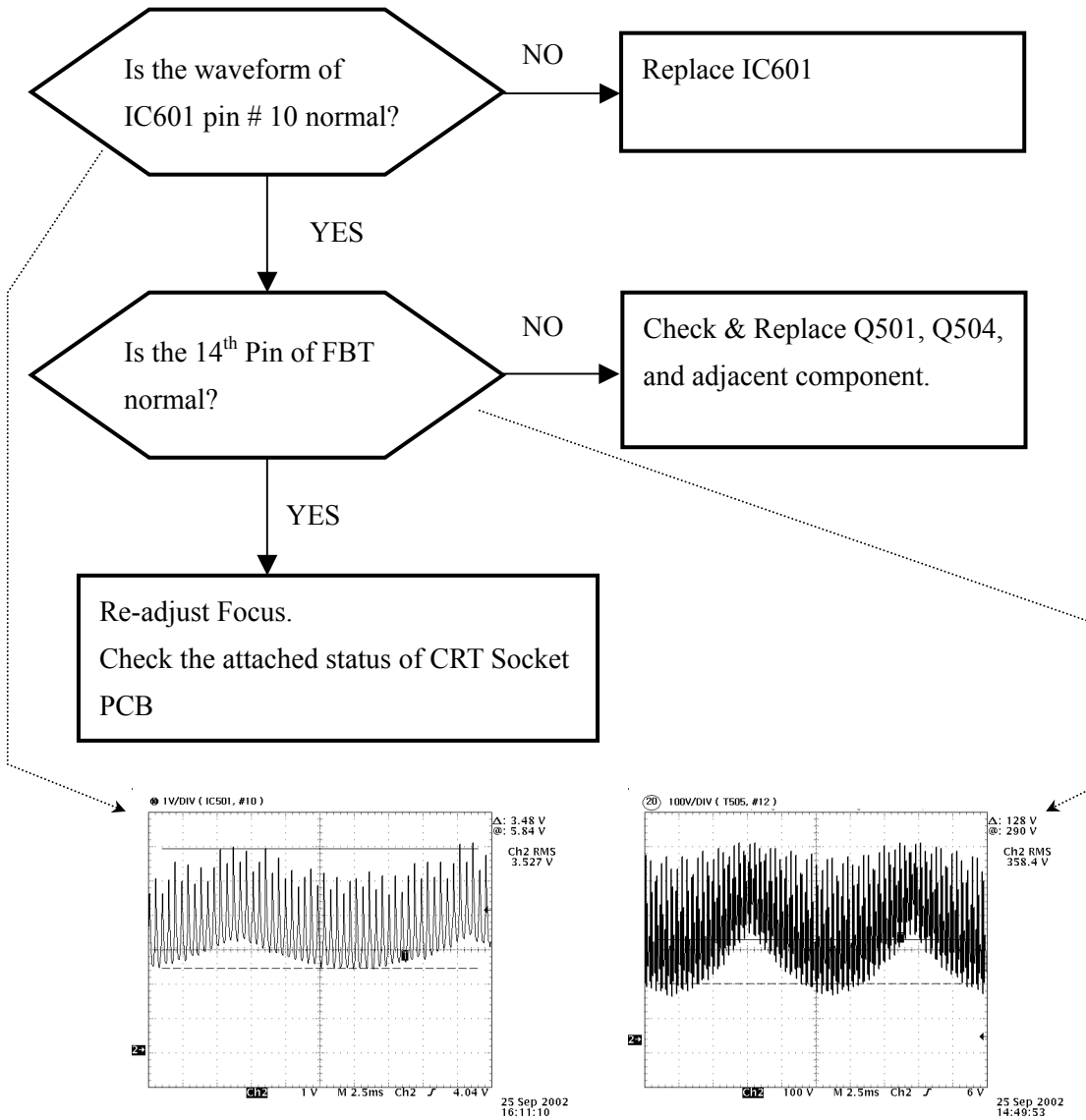
TROUBLESHOOTING GUIDE

Vertical Size, Center Trouble



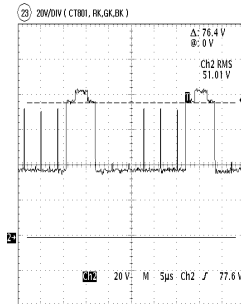
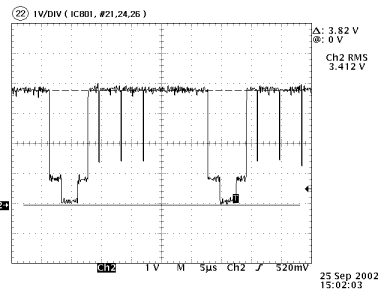
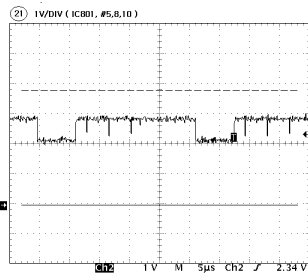
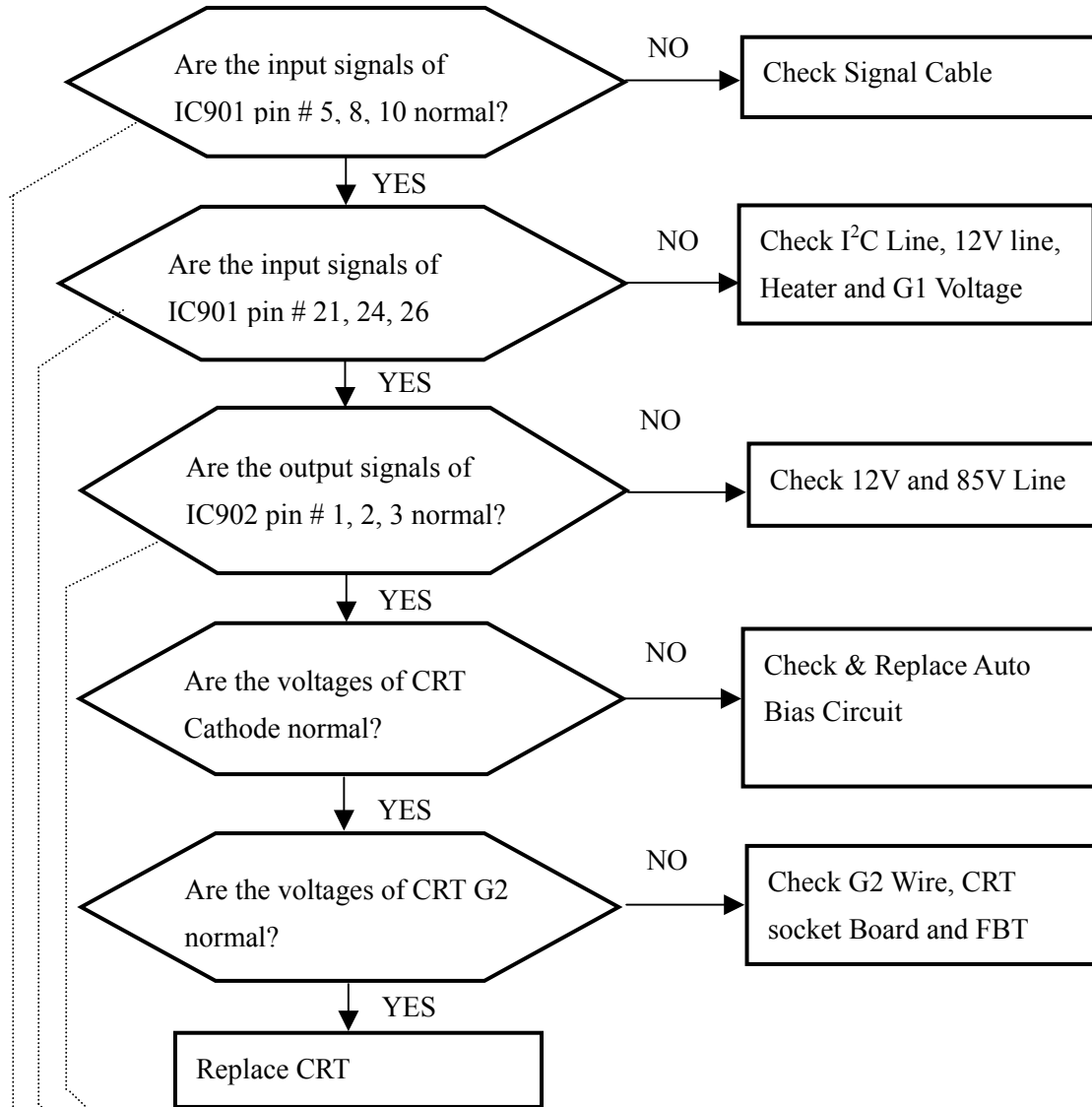
TROUBLESHOOTING GUIDE

Dynamic Focus Trouble



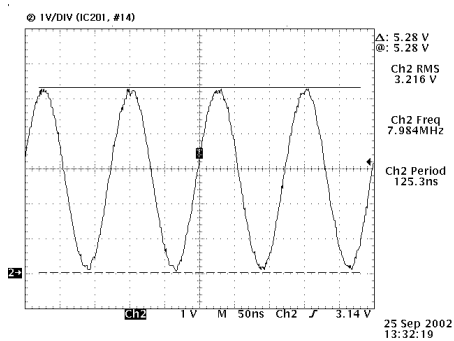
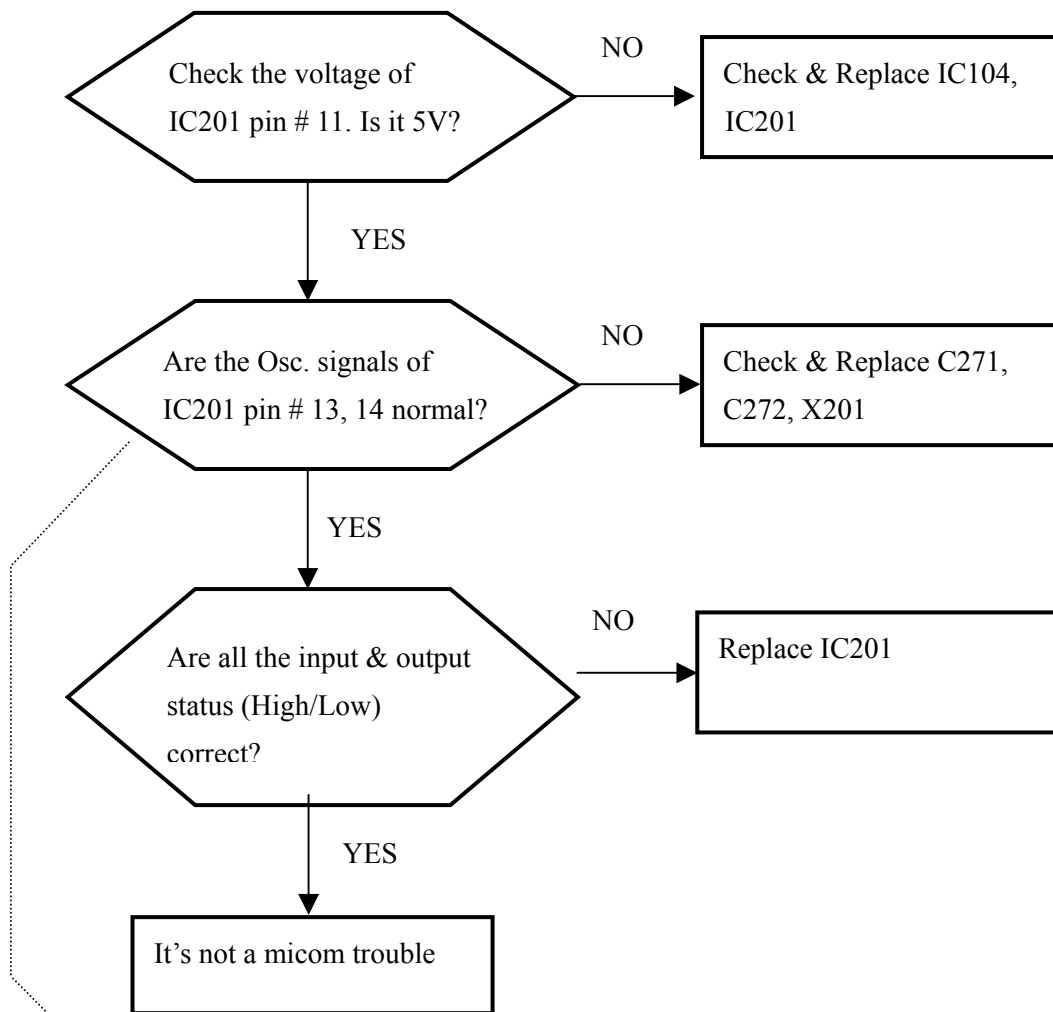
TROUBLESHOOTING GUIDE

No Video / Missing Color trouble



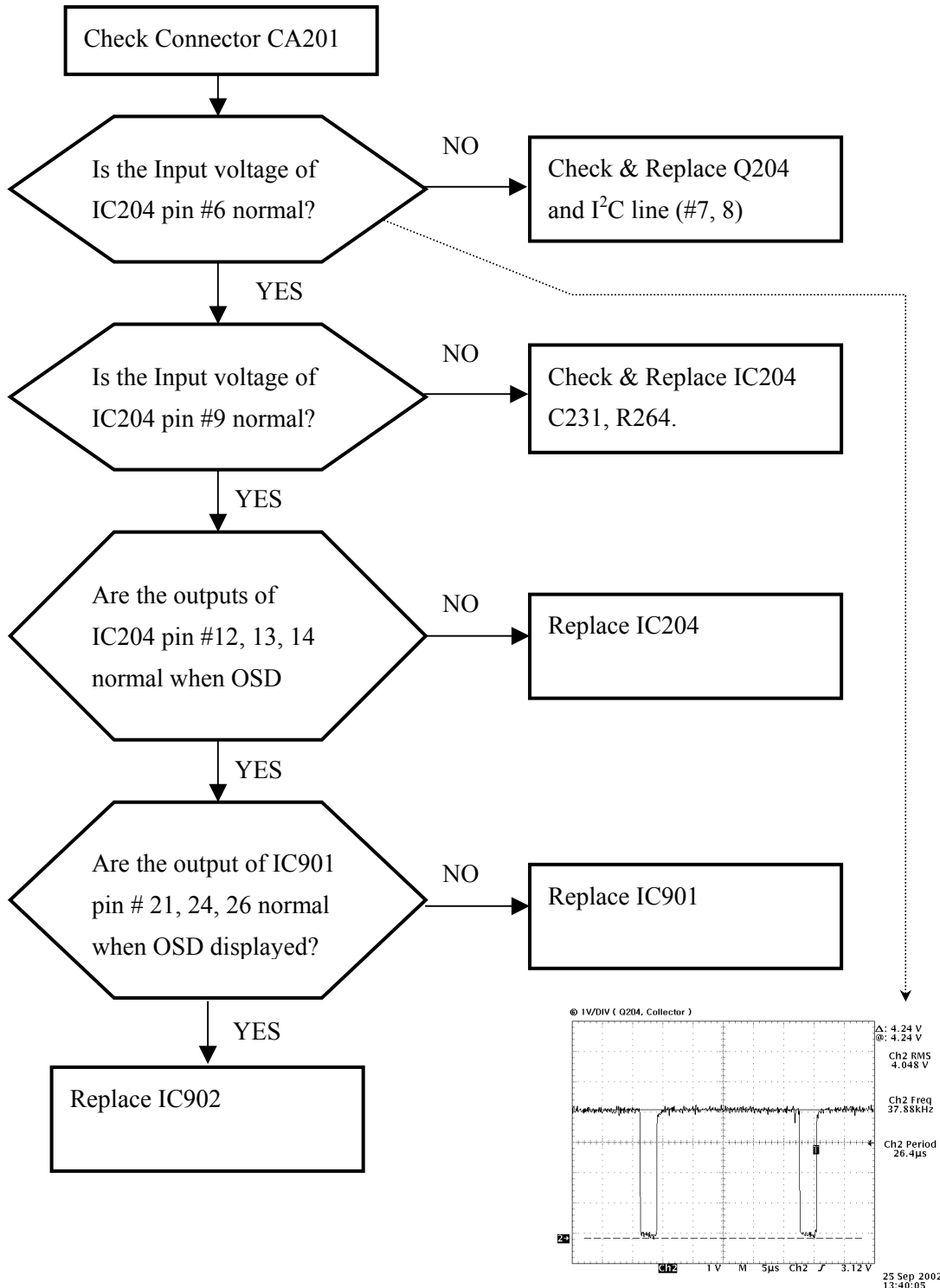
TROUBLESHOOTING GUIDE

Mi-com Failure



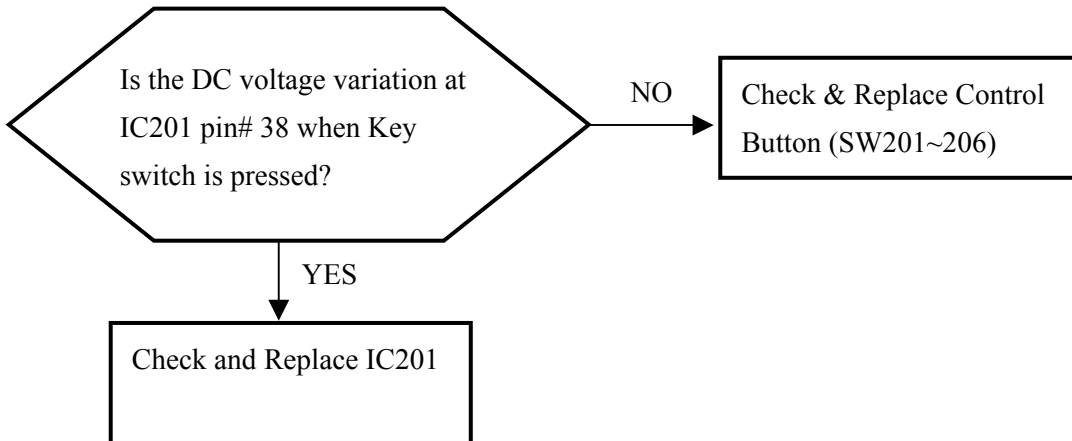
TROUBLESHOOTING GUIDE

OSD failure

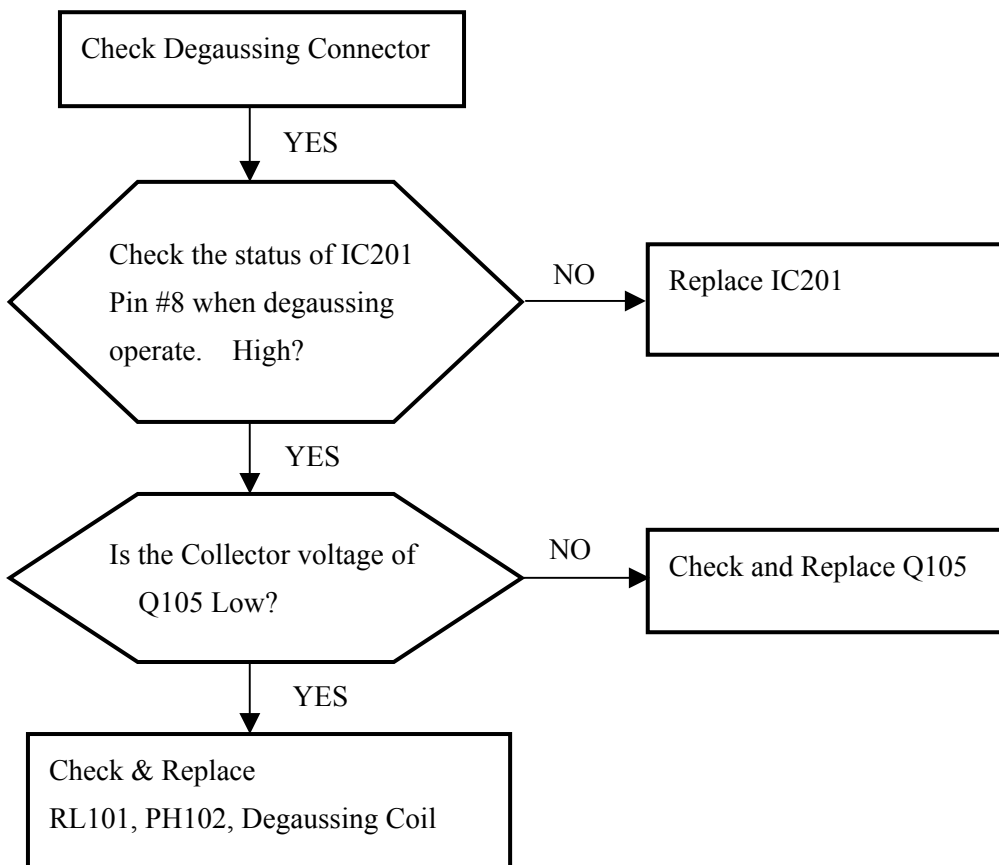


TROUBLESHOOTING GUIDE

Key Control Trouble

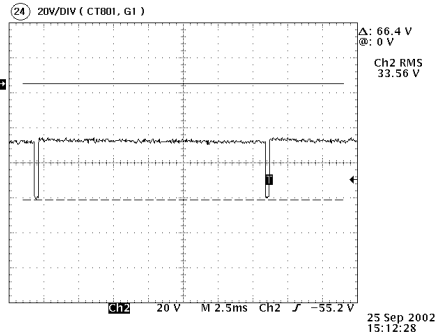
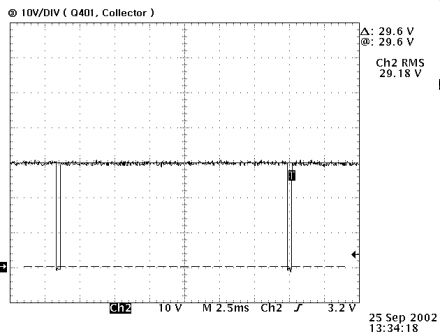
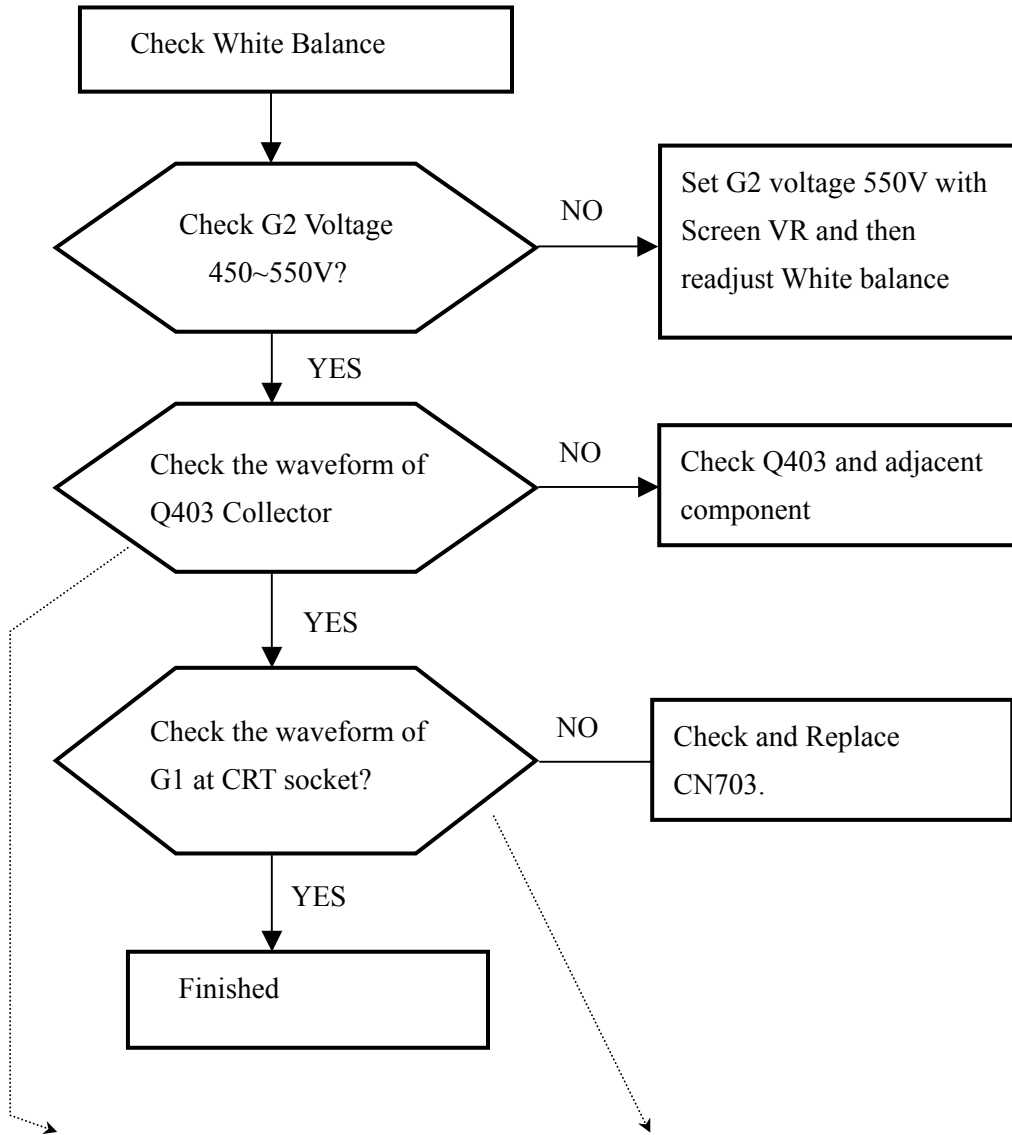


Key Control Trouble



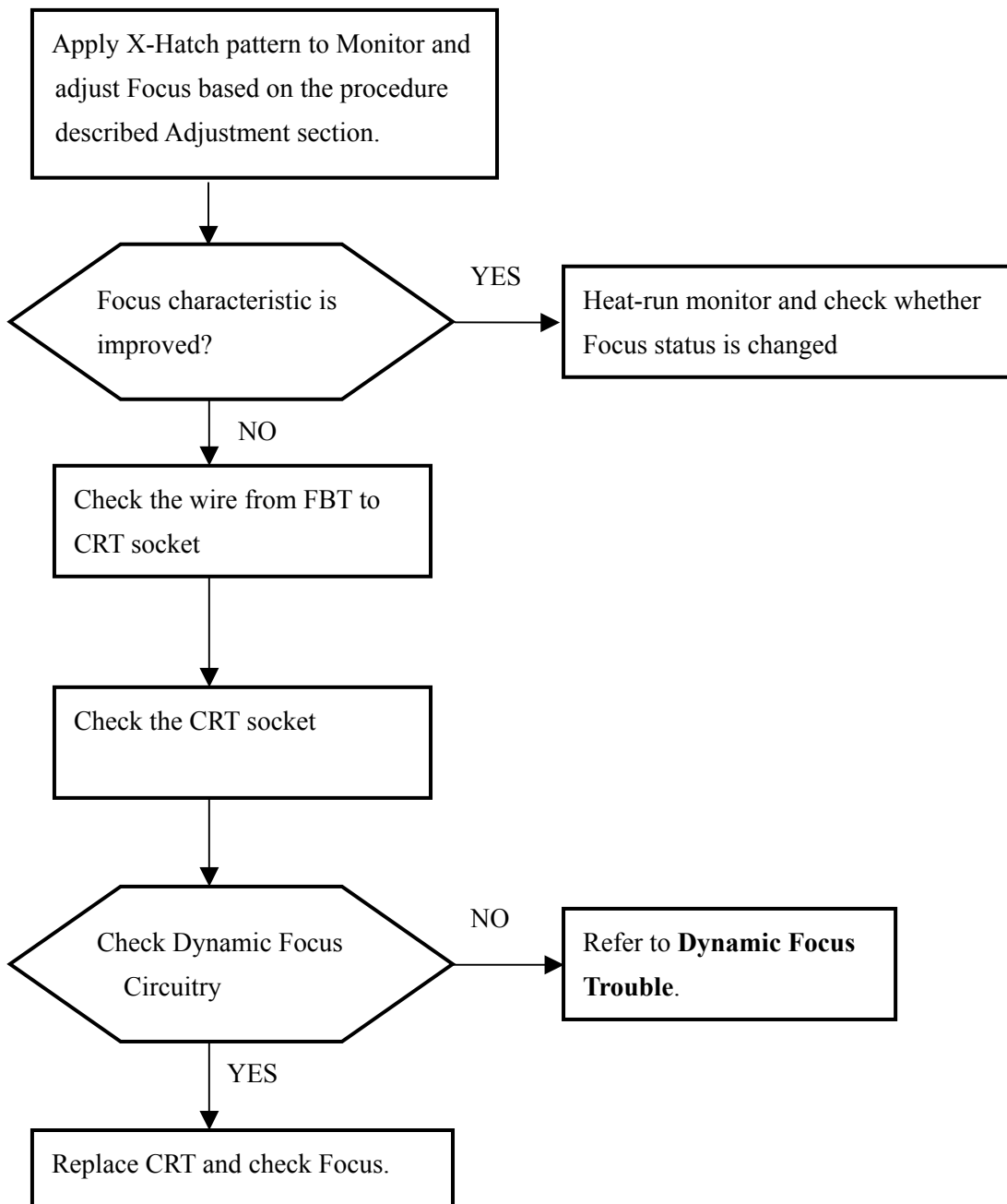
TROUBLESHOOTING GUIDE

Visible Horizontal & Vertical Retrace Line



TROUBLESHOOTING GUIDE

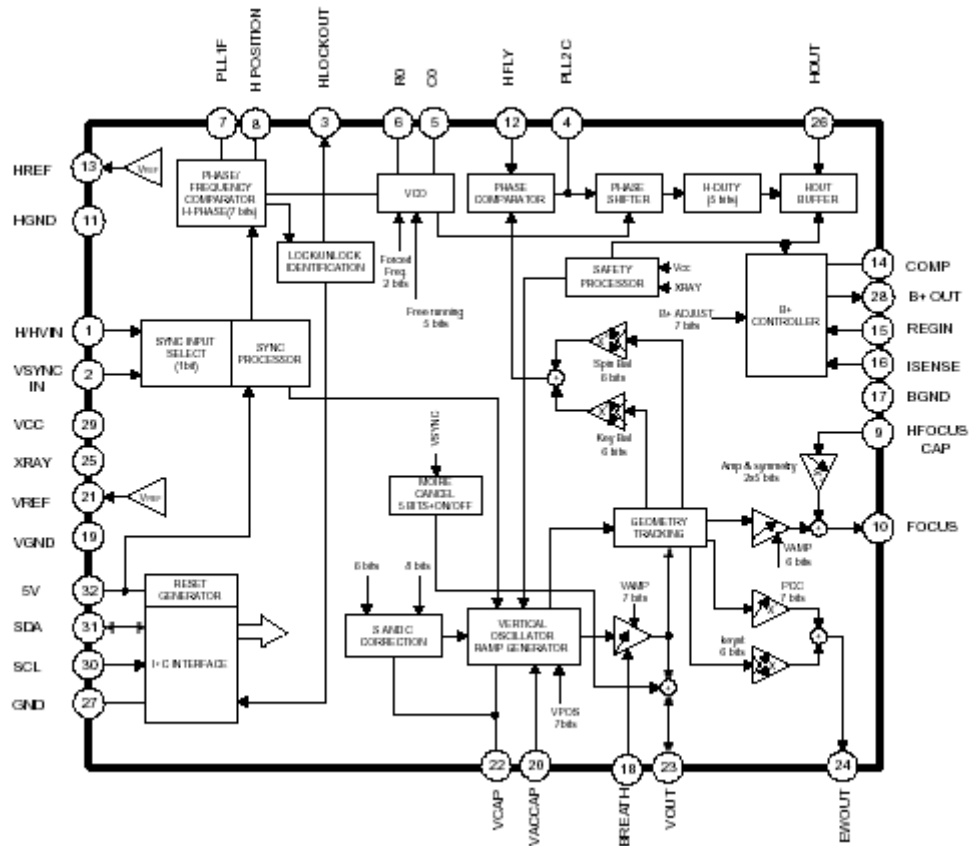
Focus Trouble



KEY COMPONENT SPECIFICATION

DEFLECTION PROCESSOR(S1D2511B01)

1) Block Diagram



2) Pin Assignments

Pin No.	Pin Name	Pin Function and Description
1	H/HVIN	TTL compatible horizontal sync input(Separate or composite)
2	VSYNCIN	TTL compatible vertical sync input (for separated H&V)
3	HLOCKOUT	First PLL lock/unlock output (0V unlocked - 5V locked)
4	PLL2C	Second PLL loop filter
5	CO	Horizontal oscillator capacitor
6	RO	Horizontal oscillator resistor
7	PLL1F	First PLL loop filter

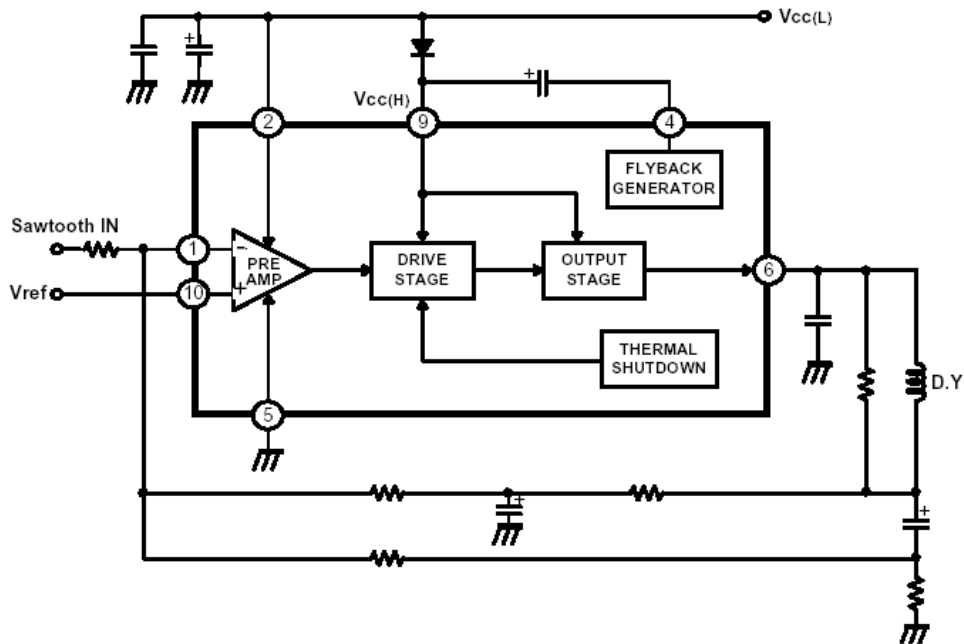
KEY COMPONENT SPECIFICATION

Pin No.	Pin Name	Pin Function and Description
8	HPOSITION	Horizontal position filter
9	HFOCUSCAP	Horizontal dynamic focus oscillator capacitor
10	FOCUSOUT	Mixed horizontal and vertical dynamic focus output
11	HGND	Horizontal Section Ground
12	HFLY	Horizontal Flyback Input (positive polarity)
13	HREF	Horizontal Section Reference Voltage (to be filtered)
14	COMP	B+ error amplifier output for frequency compensation and gain setting
15	REGIN	Regulation input of B+ control loop
16	ISENSE	Sensing of external B+ switching transistor current or switch for step-down converter
17	B+GND	Ground (related to B+ reference adjustment)
18	BREATH	DC breathing input control (Compensation of vertical amplitude against EHV variation)
19	VGND	Vertical section ground
20	VAGCCAP	Memory capacitor for automatic gain control loop in vertical ramp generator
21	VREF	Vertical section reference voltage (to be filtered)
22	VCAP	Vertical saw-tooth generator capacitor
23	VOUT	Vertical ramp output (with frequency independent amplitude and S or C corrections if any). It is mixed with vertical position voltage and vertical moiré.
24	EWOUT	Pincushion-East/West correction parabola output
25	XRAY	X-RAY protection input
26	HOUT	Horizontal drive output (internal transistor, open collector)
27	GND	General ground
28	BOUT	B+ PWM regulator output
29	Vcc	Supply voltage
30	SCL	I ² C clock input
31	SDA	I ² C data input
32	5V	Supply voltage

KEY COMPONENT SPECIFICATION

Vertical Deflection Output Circuit(KA2142)

1) Block Diagram



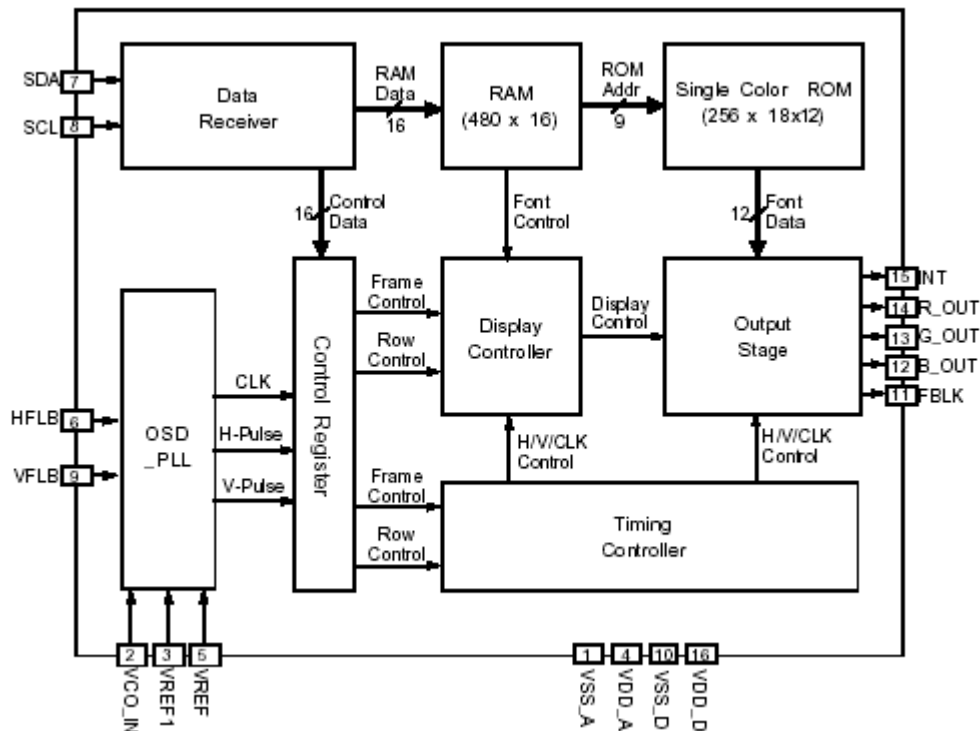
2) Pin Assignments

Pin No.	Pin Name	I/O	Pin Function Description
1	Vin (-)	I	Inverting Input
2	Vcc(L)	I	Supply Voltage
3	-	-	N.C.
4	F.G	O	Fly-back Generator
5	GND	-	Ground
6	VO	O	Output
7	-	-	
8	-	-	
9	Vcc(H)	I	Output Stage Supply Voltage
10	Vin (+)	I	Non-Inverting Input

KEY COMPONENT SPECIFICATION

OSD Processor (S5D2508A)

1) Block Diagram



2) Pin Assignments

Pin no.	Pin Name	Active	I/O	Description
1	VSS_A	-	-	Ground (Analog Part)
2	VCO_IN	-	I	This voltage is generated at the external loop filter and goes into the input stage of the VCO.
3	VREF1	-	I	1.26 V DC Voltage from the Bandgap Reference. Connected to ground through a resistor to make internal reference current
4	VDD-A	-	-	+5 V Supply Voltage for Analog Part
5	VREF	-	I	Bandgap Reference Voltage (Typical 1.26 V)
6	HFLB	Low	I	Horizontal Fly-back Signal
7	SDA	-	I/O	Serial Date (I ² C)

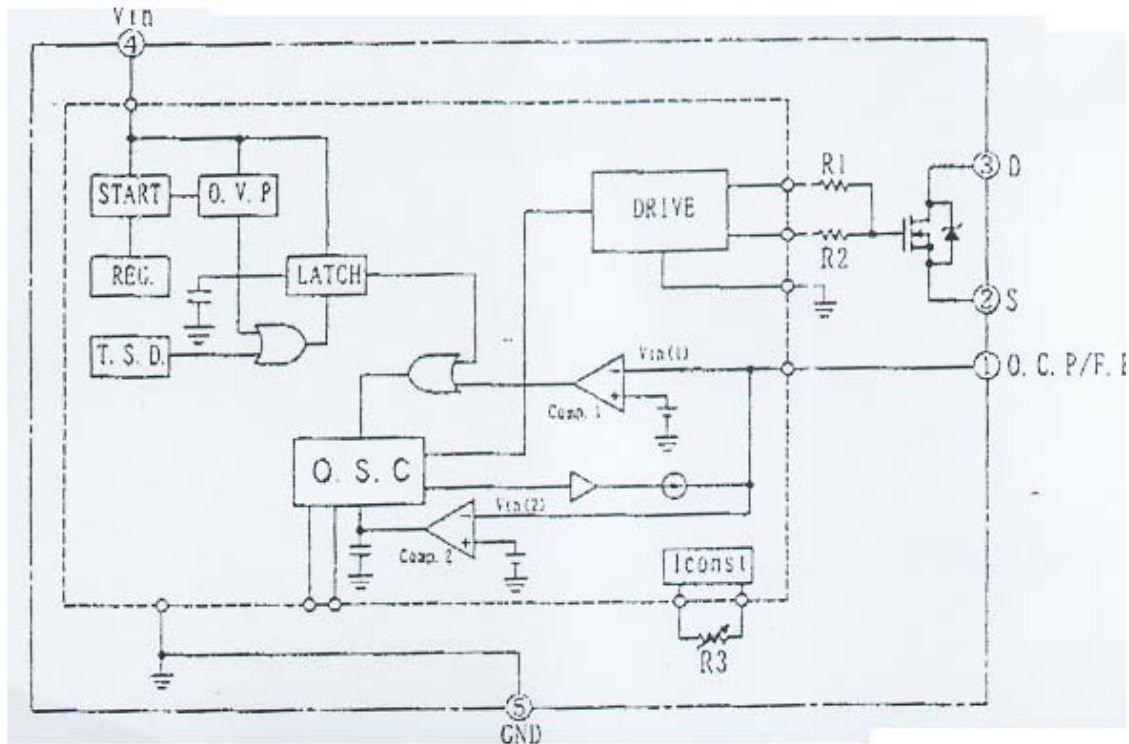
KEY COMPONENT SPECIFICATION

Pin no.	Pin Name	Active	I/O	Description
8	SCL	-	I/O	Serial Clock (I ² C)
9	VFLB	Low	I	Vertical Fly-back Signal
10	VSS_D	-	-	Ground for Digital Part
11	FBLK	-	O	Fast Blank Signal
12	B_OUT	-	O	Video Signal Output (B)
13	G_OUT	-	O	Video Signal Output (G)
14	R_OUT	-	O	Video Signal Output(R)
15	INT	-	O	Intensity Signal Output
16	VDD_D	-	-	+5 V Supply Voltage for Digital Part

KEY COMPONENT SPECIFICATION

Power Switch (STR-F6658B)

1) Block Diagram



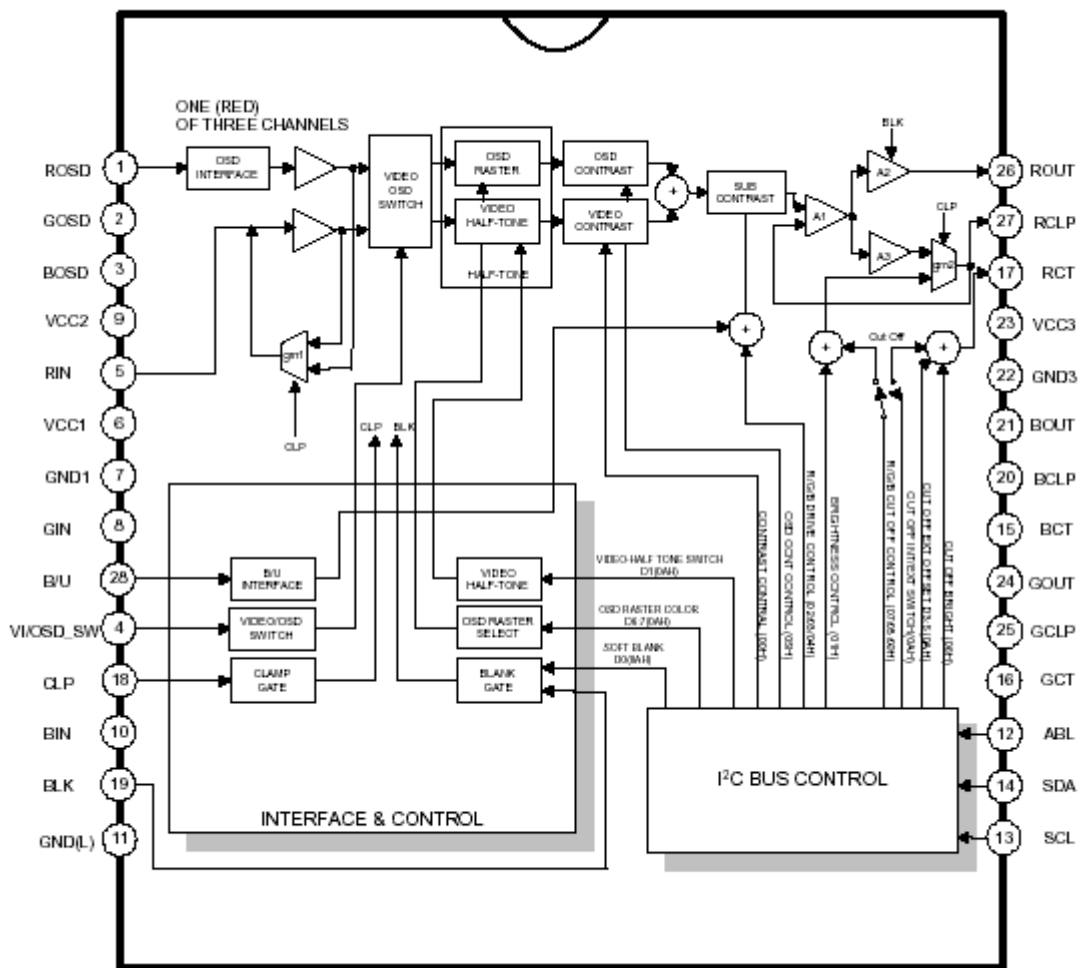
2) Pin Assignments

Pin no.	Pin Name	Description	Functions
1	O.C.P/F.B	- Over-current/Feedback terminal	Input of Over-current detection signal and constant voltage control signal
2	S	- Source Terminal	MOS FET source
3	D	- Drain Terminal	MOS FET Drain
4	VIN	- Power supply Terminal	Input of power supply for control circuit
5	GND	- GND terminal	Ground

KEY COMPONENT SPECIFICATION

Video Amplifier (S1D2500A01)

1) Block Diagram



2) Pin Assignments

Pin No	Symbol	I/O	Configuration
1	ROSD	I	Red OSD Input
2	GOSD	I	Green OSD Input
3	BOSD	I	Blue OSD Input
4	VI/OSD_SW	I	Video or OSD Switch

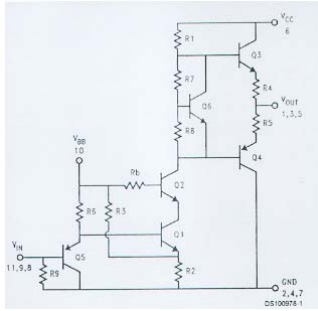
KEY COMPONENT SPECIFICATION

Pin No	Symbol	I/O	Configuration
5	RIN	I	Red Video Input
6	Vcc1	-	VCC (normal)
7	GND1	-	Ground1 (normal)
8	GIN	I	Green Video Input
9	Vcc2	-	VCC (normal)
10	BIN	I	Blue Video Input
11	GND (L)	-	Ground2 (logic)
12	ABL	-	Automatic Beam Limit
13	SCL	I/O	Serial Clock
14	SDA	I/O	Serial Data
15	BCT	I	Blue Cut Off Control
16	GCT	I	Green Cut Off Control
17	RCT	I	Red Cut Off Control
18	CLP	I	Clamp Gate Signal Input
19	BLK	I	Blank Gate Signal Input
20	BCLP	-	Blue Clamp Cap
21	BOUT	O	Blue Video Output
22	GND3	-	Ground3 (drive part)
23	Vcc3	-	Vcc(drive part)
24	GOUT	O	Green Video Output
25	GCLP	-	Green Clamp Cap
26	ROUT	O	Red Video Output
27	RCLP	-	Red Clamp Cap
28	B/U	I	Brightness Uniformity

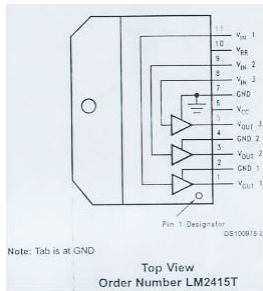
KEY COMPONENT SPECIFICATION

Monolithic Triple CRT Driver (LM2415)

1) Block Diagram



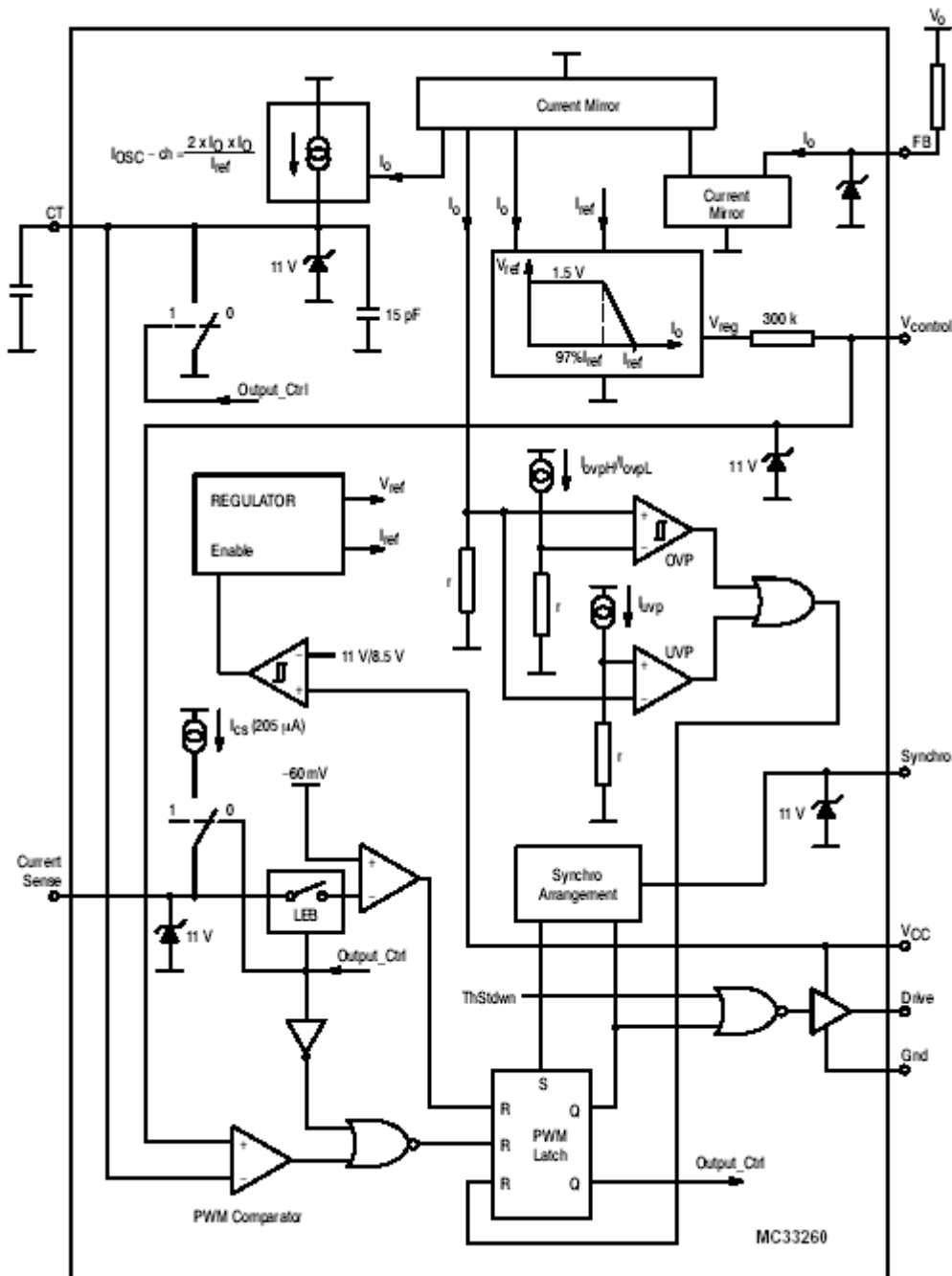
2) Pin Assignments



KEY COMPONENT SPECIFICATION

Power Factor Controller (MC33260)

1) Block Diagram



REPLACEMENT PART LIST

MAIN BOARD

Location	Part No.	Description	Location	Part No.	Description
PCB	0GE4246248A	T1.6 * 246 *197 (FR4)	C272	0CC4700K422	50V 47PF J CH
C101	0CA024R680	WORLD AC250V 0.22MF M	C280	0CQ1031N489	100V 0.01MF J
C102	0CA024R680	WORLD AC250V 0.22MF M	C403	0CQ3331N489	100V 0.033MF J
C103	0CA2221R618	2200PF M AC 250V (7.5mm)	C409	0CQ1041L489	63V 0.1MF J MKT
C104	0CA2221R618	2200PF M AC 250V (7.5mm)	C410	0CQ1041L489	63V 0.1MF J MKT
C106	0CE3370V618	450V 330MF(30X50) CE-FUX	C411	0CE1070K618	50V RUS 100MF
C107	0CQ3331Q489	630V 0.033MF PU	C412	0CQ3341L489	63V 0.33MF J MKT
C109	0CE3360K618	50V RUS 33MF	C413A	0CQ4721N489	100V 4700PF J
C112	0CQ4731N489	100V 0.047MF J	C417	0CQ4731N489	100V 0.047MF J
C115	0CE1080F618	16V RUS 1000MF	C420	0CQ3341L489	63V 0.33MF J MKT
C116	0CE2261N618	100V RUS 22MF	C422	0CQ1031N489	100V 0.01MF J
C117	0CE4771L618	63V RUS 470MF	C423	0CE1040K618	50V RUS 0.1MF
C118	0CE2260P618	160V RUS 22MF	C450	0CE1050P618	160V RUS 1MF
C119	0CE1080F618	16V RUS 1000MF	C451	0CE1060K618	50V RUS 10MF
C120	0CE1080F618	16V RUS 1000MF	C455	0CQ4721N489	100V 4700PF J
C122	0CE2280F618	16V RUS 2200MF	C460	0CQ1031N489	100V 0.01MF J
C123	0CQ1041L489	63V 0.1MF J MKT	C501	0CE4750K618	50V RUS 4.7MF
C125	0CE1080F618	16V RUS 1000MF	C503	0CE105AN618	100V 1MF NP
C130	0CE4750K618	50V RUS 4.7MF	C504	0CQ4731Q478	250V 0.047MF J MPP
C150	0CA2221R618	2200PF M AC 250V	C505	0CH102125F2	1KV B 1000PF K
C151	0CH471129F2	2KV B 470PF K(EPOXY)	C506	0CH103125F2	1KV B 0.01MF K
C180	0CQ1021N489	100V 1000PF J	C518	0CE4750P618	160V RUS 4.7MF
C181	0CH221125F2	1KV 220 PF J	C519	0CQ82218476	1.6KV BUP 8200PF J
C184	0CH101125F2	1KV 100 PF J	C525	0CQ1041U478	400V 0.1MF J MPP
C186	0CA2221R618	2200PF M AC 250V (7.5mm)	C528	0CQ1841U478	400V 0.18MF J MPP
C187	0CH101115F2	1KV 100 PF J	C530	0CQ1841Q478	250V 0.18MF J MPP
C188	0CH151115F2	1KV 150 PF	C530A	0CQ1041Q478	250V 0.1MF J MPP
C189	0CE1060K618	50V RUS 10MF	C531	0CQ1241Q478	250V 0.12MF J MPP
C190	0CE1060K618	50V RUS 10MF	C532	0CQ6831Q478	250V 0.068MF J MPP
C199	0CC511015F2	1KV 510 PF	C539	0CQ1041L489	63V 0.1MF J MKT
C221	0CQ1041L489	63V 0.1MF J MKT	C560	0CQ1041L489	63V 0.1MF J MKT
C224	0CE1070H618	25V RUS 100MF	C580	0CQ1031N489	100V 0.01MF J
C226	0CQ1031N489	100V 0.01MF J	C600	0CE2270H618	25V RUS 220MF
C227	0CE1070H618	25V RUS 100MF	C601	0CH8211K522	50V B 820PF K
C230	0CH6811K522	50V B 680PF K	C603	0CQ3341L489	63V 0.33MF J MKT
C231	0CQ1041L489	63V 0.1MF J MKT	C605	0CQ1021N489	100V 1000PF J
C233	0CE4770F618	16V RMU 470MF	C606	0CQ1041L489	63V 0.1MF J MKT
C239	0CE1070F618	16V RUS 100MF	C607	0CQ1031L489	100V 0.01MF J
C260	0CH1041K932	50V F 0.1MF Z	C608	0CQ1021L489	100V 1000PF J
C261	0CQ1041L489	63V 0.1MF J MKT	C609	0CE4750K618	50V RUS 4.7MF

Location	Part No.	Description
C611	0CE4770H618	25V RUS 47MF
C612	0CQ1031L489	100V 0.01MF J
C613	0CQ2241L489	63V 0.22MF J MKT
C614	0CE4770H618	25V RUS 47MF
C616	0CQ4721N489	100V 4700PF J
C621	0CE1050P618	160V RUS 1MF
C622	0CC3310W5F2	500V B 330PF K
C627	0CQ394Q478	250V 0.39MF J MPP
C634	0CE4770F518	16V RMU 470MF
C641	0CE4750K618	50V RUS 4.7MF
C645	0CE3350K618	50V RUS 3.3MF
C650	0CQ1041L489	63V 0.1MF J MKT
C652	0CE4750K618	50V RUS 4.7MF
C656	0CE1050K618	50V RUS 1MF
C660	0CE1050K618	50V RUS 1MF
C701	0CE1070H618	25V RUS 100MF
C704	0CQ1041L489	63V 0.1MF J MKT
C706	0CQ4721L489	100V 4700PF J
C707	0CQ2241L489	63V 0.22MF J MKT
C708	0CE4760F618	16V RUS 47MF
C711	0CE2260F618	160V RUS 22MF
C713	0CQ60118476	1.6K 600P BUP
C714	0CQ4731N489	100V 0.047MF J
C715	0CE2250K618	50V RUS 2.2MF
C750	0CE1070J718	35V NXA 100MF
C751	0CQ4721N489	100V 2700PF J
C752	0CH151125F2	1KV B 150PF K
C770	0CQ5621L48	100V 5600PF J
C801	0CE4750K618	50V RUS 4.7MF
C802	0CQ1041L489	63V 0.1MF J MKT
C850	0CE2270F618	16V RUS 220MF
CN101	2MT6400100A	DA-IB0214(D2.3/DY PIN)
CN102	2MT6400100A	DA-IB0214(D2.3/DY PIN)
CN201	0CG00CA310A	CA-31
CN202	0EW0595267A	5267-05P
CN203	0EW049SMAWA	SMW250-04P
CN204	0EW0395267A	5267-03P
CN505	2MT6400100A	DA-IB0214(D2.3/DY PIN)
CN703	0CG00CA310A	CA-32
D101	0DD406009AA	KBL406
D102	0DD400709AA	UF4007
D103	0DD4937G9AA	1N4937GP
D104	0DD414809AA	1N4148
D107	0DD50D009AA	EGP50D
D108	0DD206009AA	HER206
D109	0DZ24BM09AA	UF5408

Location	Part No.	Description
D110	0DD600009AA	D5L60
D111	0DD20D009AA	EGP20D
D112	0DD20D009AA	EGP20D
D113	0DD20D009AA	EGP50D
D120	0DD414809AA	1N4148
D201	0DZ51BM09AA	DZ-5.1B
D202	0DZ51BM09AA	DZ-5.1B
D205	0DZ51BM09AA	DZ-5.1B
D206	0DZ51BM09AA	DZ-5.1B
D208	0DD414809AA	1N4148
D209	0DD414809AA	1N4148
D260	0DD414809AA	1N4148
D261	0DD414809AA	1N4148
D401	0DZ24BM09AA	DZ-24BM
D410	0DZ400209AA	1N4002
D420	0DD414809AA	1N4148
D450	0DD400009AA	FDH400
D451	0DD400009AA	FDH400
D507	0DD206009AA	HER206
D516	0DD400709AA	UF4007
D520	0DD400709AA	UF4007
D591	0DD400009AA	FDH400
D592	0DD400009AA	FDH400
D601	0DD400009AA	FDH400
D603	0DD414809AA	1N4148
D604	0DD414809AA	1N4148
D605	0DD414809AA	1N4148
D610	0DD20D009AA	EGP20D
D660	0DD4937G9AA	1N4937GP
D702	0DD414809AA	1N4148
D703	0DD414809AA	1N4148
D704	0DD206009AA	HER206
D705	0DD206009AA	HER206
D710	0DD4937G9AA	1N4937GP
D720	0DD400009AA	FDH400
D750	0DD400009AA	FDH400
D751	0DZ15BM09AA	DZ-15BM
D770	0DZ24BM09AA	UF5406
D801	0DD414809AA	1N4148
ZD801	0DZ15BM091A	DZ-10BM (1W)
F101	0FF3151B532	T3.15A, 250V (50CT)
F101A	0FCT04SN52A	BSP3-H T0.4 SN5.2
GND1	2MT6400100A	DA-IB0214(D2.3/DY PIN)
GND2	2MT6400100A	DA-IB0214(D2.3/DY PIN)
IC102	0IFA431Z00A	KA431
IC103	0PS00ECPACA	TLP621

Location	Part No.	Description
IC104	0IFA780500A	KA7805
IC201	0IFA3P863AA	S3P863AXZZ(EFG-1902M)
IC201A	0EW4090002A	42P 2mm PITCH
IC202	0IFA24C080A	KS24C08
IC204	0ISS5D2508A	S5D2508A01
IC601	0IFA102511A	S1D2511C01
IC701	0IFA750000A	KA7500B
J512	0RK0182J609	1W 18 OHM J
L101	0LF00LF371A	LF-3711
L110	COIL PEAKING	220uH(AXIAL 3.5MM)
L150	0LA0000K023	B13857
L250	0LA0221K024	2.2uH(AXIAL 3.5MM)
L251	0LA0221K024	2.2uH(AXIAL 3.5MM)
L252	0LA0221K024	220uH(AXIAL 3.5MM)
L502	0CLTRL1902A	TRL-1902 20T
L605	0LHCH135R0A	CH-135R
PH102	0RL00HRCR7A	ECPAC140M290
Q105	0TR945YC9AA	KSC945YC
Q203	0TR945YC9AA	KSC945YC
Q204	0TR100909AA	KSR1009
Q401	0TR945YC9AA	KSC945YC
Q402	0TR945YC9AA	KSC945YC
Q403	0TR945YC9AA	KSC945YC
Q501	0TR945YC9AA	KSC945YC
Q504	0TR5042F9AA	KSCC5042F
Q509	0TR945YC9AA	KSC945YC
Q510	0TR945YC9AA	KSC945YC
Q512	0TR945YC9AA	KSC945YC
Q513	0TF640A09AA	IRF640A
Q515	0TF640A09AA	IRF640A
Q514	TRANSISTOR	KSD471AYC
Q519	0TF640A09AA	IRF640A
Q531	0TF640A09AA	IRF640A
Q550	0TF640A09AA	IRF640A
Q601	0TR733YC9AA	KSA733YC
Q603	0TR945YC9AA	KSC945YC
Q604	0TR2383Y9AA	KSC2383Y
Q606	0TR733YC9AA	KSA733YC
Q701	0TR945YC9AA	KSC945YC
Q702	0TR733YC9AA	KSA733YC
Q801	0TR100909AA	KSR1009
Q802	0TR471AY9AA	KSD471AYC
Q803	0TR1270Y9AA	KTA1270A
R100	0RD1004G609	1/4W 1M OHM J
R101	0RK1003J609	1W 100K OHM J

Location	Part No.	Description
R103	0RK6802K609	2W 68K OHM J
R104	0RK0150J609	1W 0.15 OHM J
R104A	0RD0500G609	1/4W 0.5 OHM J
R105	0RD2201F609	1/6W 2.2K OHM J
R110	0RS4461F609	1/6W 4.46K OHM F
R112	0RD2700G609	1/4W 27 OHM J
R113	0RD4701F609	1/6W 4.7K OHM J
R114	0RD4700F609	1/6W 470 OHM J
R115	0RD1001F609	1/6W 1K OHM J
R116	0RD1001F609	1/6W 1K OHM J
R117	0RS1003F609	1/6W 100K OHM F
R119	0RD3902F609	1/6W 39K OHM J
R120	0RF1800J609	1W 18 OHM J(FUSIBLE)
R121	0RK5600J609	1W 56 OHM J
R145	0RD1001F609	1/6W 1K OHM J
R150	0RD1003G609	1/4W 100K OHM J
R200	0RD4702F609	1/6W 47K OHM J
R207	0RD2001F609	1/6W 2K OHM J
R208	0RD2001F609	1/6W 2K OHM J
R209	0RD4701F609	1/6W 4.7K OHM J
R210	0RD4701F609	1/6W 4.7K OHM J
R215	0RS1502F609	1/6W 15K OHM F
R222	0RD1001F609	1/6W 1K OHM J
R224	0RD2001F609	1/6W 2K OHM J
R226	0RD2001F609	1/6W 2K OHM J
R231	0RS3703F609	1/6W 370K OHM F
R232	0RS1802F609	1/6W 18K OHM F
R233	0RS2001F609	1/6W 2K OHM F
R234	0RS1001F609	1/6W 1K OHM F
R246	0RD2001F609	1/6W 2K OHM J
R247	0RS2001F609	1/6W 2K OHM F
R253	0RD7501F609	1/6W 7.5K OHM J
R255	0RD6802F609	1/6W 68K OHM J
R257	0RD8200F609	1/6W 820 OHM J
R260	0RD2701F609	1/6W 2.7K OHM J
R261	0RD4702F609	1/6W 47K OHM J
R264	0RD1000F609	1/6W 100 OHM J
R265	0RD1001F609	1/6W 1K OHM J
R266	0RD1001F609	1/6W 1K OHM J
R270	0RS1001F609	1/6W 1K OHM F
R285	0RS1200F609	1/6W 120 OHM F
R286	0RD2701F609	1/6W 2.7K OHM J
R401	0RD4702F609	1/6W 47K OHM J
R403	0RD8201G609	1/4W 8.2K OHM J
R410	0RS1002F609	1/6W 10K OHM F

Location	Part No.	Description
R414	0RS4700F609	1/6W 470 OHM F
R415	0RD0101G609	1/4W 1 OHM J
R416	0RS7151F609	1/6W 7.15K OHM F
R417A	0RS0820K609	2W 0.82 OHM F
R421	0RD5601F609	1/6W 5.6K OHM J
R422	0RD2202F609	1/6W 22K OHM J
R424	0RD5600G609	1/4W 560 OHM J
R425	0RD1502F609	1/6W 15K OHM J
R426	0RD3300F609	1/6W 330 OHM J
R427	0RD2001F609	1/6W 2K OHM J
R428	0RD6802F609	1/6W 68K OHM J
R429	0RD8201G609	1/4W 8.2K OHM J
R502	0RS3901F609	1/6W 3.9K OHM F
R503	0RD1000F609	1/6W 100 OHM J
R505	0RD4701F609	1/6W 4.7K OHM J
R506	0RD8203F609	1/6W 820K OHM J
R507	0RD1000F609	1/6W 100 OHM J
R509	0RF0471K609	2W 4.7 OHM J
R510	0RD5603G609	1/4W 560K OHM J
R511	0RS2401F609	1/6W 2.4K OHM F
R512	0RS5602F609	1/6W 56K OHM F
R513	0RS6201G609	1/4W 6.2K OHM F
R514	0RS2700F609	1/6W 270 OHM F
R515	0RD1002F609	1/6W 10K OHM J
R518	0RD2203G609	1/4W 220K OHM J
R532	0RD1502F609	1/6W 15K OHM J
R534	0RD1502F609	1/6W 15K OHM J
R535	0RD1801F609	1/6W 1.8K OHM J
R537	0RD1502F609	1/6W 15K OHM J
R538	0RD1802F609	1/6W 1.8K OHM J
R540	0RF0331J609	1W 33 OHM J
R550	0RK6800J609	1W 680 OHM J
R551	0RD4700G069	1/4W 470 OHM J
R557	0RF1801F609	1/6W 1.8K OHM J
R560	0RD1802F609	1/6W 1K OHM J
R580	0RD1802G609	1/4W 1K OHM J
R591	0RS1361F609	1/6W 13.6K OHM F
R592	0RS1501F609	1/6W 1.5K OHM F
R593	0RK0121J609	1W 1.2 OHM J
R594	0RK0121K609	2W 1.2 OHM J
R600	0RS1802F609	1/6W 18K OHM F
R601	0RD2201F609	1/6W 2.2K OHM J
R604	0RD1002F609	1/6W 10K OHM J
R606	0RD1501F609	1/6W 1.5K OHM J
R608	0RD1001F609	1/6W 1K OHM J

Location	Part No.	Description
R611	0RS6121F609	1/6W 6.12K OHM F
R612	0RS5101F609	1/6W 5.1K OHM F
R613	0RD1801F609	1/6W 1.8K OHM J
R618	0RD4701F609	1/6W 4.7K OHM J
R619	0RD1002F609	1/6W 10K OHM J
R620	0RF0121K609	2W 1.2 OHM J
R622	0RF0750K609	2W 0.75 OHM J
R623	0RD2200G609	1/4W 220 OHM J
R629	0RD0821G609	1/4W 8.2 OHM J
R636	0RD4703F609	1/6W 470K OHM J
R641	0RD3902F609	1/6W 3.9K OHM J
R645	0RD3902F609	1/6W 3.9K OHM J
R647	0RD0331H609	1/2W 3.3 OHM J
R648	0RD0331H609	1/2W 3.3 OHM J
R649	0RS1802F609	1/6W 18K OHM F
R655	0RS1001H609	1/2W 1K OHM F
R701	0RD5101F609	1/6W 5.1K OHM J
R702	0RS9102F609	1/6W 91K OHM F
R703	0RD1003F609	1/6W 100K OHM J
R704	0RD1002F609	1/6W 10K OHM J
R705	0RD5101F609	1/6W 5.1K OHM J
R706	0RD1802F609	1/6W 18K OHM J
R707	0RD1001F609	1/6W 1K OHM J
R708	0RS8201F609	1/6W 8.2K OHM F
R709	0RD2000G609	1/4W 200 OHM J
R711	0RD1203F609	1/6W 120K OHM J
R713	0RD0331G609	1/4W 33 OHM J
R714	0RK0300J609	1W 0.3 OHM J
R717	0RM3302S609	5W 33K OHM J V R10
R718	0RD2002F609	1/6W 20K OHM J
R719	0RD1001F609	1/6W 1K OHM J
R725	0RD0471G609	1/4W 47 OHM J
R802	0RD1002F609	1/6W 10K OHM J
R804	0RD6800F609	1/6W 680 OHM J
R805	0RD0121G609	1/4W 12 OHM J
R806	0RD2000G609	1/4W 200 OHM J
R851	0RD2200J609	1/2W 220 OHM J
RL101	0RL001AD12A	IRJ-1A-D12S
T101	0TR190209AA	TMT-1902 58V
T102	0TR190209AC	DST-1902
T502	0TR190209AF	FCT-1902 63T
T503	0TR190209AE	DMT-1902
T601	0TR190209AD	DDT-1902
T701	0FB0019A34A	MCH-19A34
TH102	0TS00DSC3DA	DSC3D15

Location	Part No.	Description
VR501	0RV1202D230	CCT 065AT 2KB OHM B
VR701	0RV1203D230	CCT 065AT 20KB OHM B
X201	0XT80004KN3	8MHz
D609	0DDQG5FM9AA	FMQG5FM
Q600	0TR682509AA	FJL6825
Q600A	1DRU2000011	21 * 29
HT1	SHT1902FBT1	EFG-HT-1902-FBT-**
HT1A	SMC310MFZN1	M/C BIN 3X10 MFZN
Q703	0TF8N8009AA	FQAF8N80

Location	Part No.	Description
IC403	0IFA214200A	IC KA2142
HT403A	SHT1901VTC1	EFG-HT-1901-VTC
IC101	0IFA6658B0A	STR F6658B
HT101	SHT1901PWR1	EFG-HT-1901-PWR
Q607	0TF640A09AA	IRF640A
HT607	SHT1901HTR1	EFG-HT-1901-HTR
SC	1SEF0403220	EFG-1902M

CRT BOARD

Location	Part No.	Description
C901	0CE4750K618	50V RUS 4.7MF
C902	0CE4750K618	50V RUS 4.7MF
C903	0CE4750K618	50V RUS 4.7MF
C904	0CE1070F618	16V RUS 100MF
C905	0CH1041K932	50V F 0.1MF Z
C906	0CH1041K932	50V F 0.1MF Z
C907	0CH1041K932	50V F 0.1MF Z
C908	0CH1041K932	50V F 0.1MF Z
C909	0CE105AN618	100V 1MF N.P
C910	0CE105AN618	100V 1MF N.P
C911	0CE4750K618	50V RUS 4.7MF
C912	0CE105AN618	100V 1MF N.P
C913	0CH102125F2	2KV B 1000PF K
C914	0CH102115F2	1KV B 1000PF K
C915	0CQ1021N489	100V 1000PF J
C916	0CQ1021N489	100V 1000PF J
C917	0CQ1021N489	100V 1000PF J
C918	0CQ1021N489	100V 1000PF J
C919	0CQ1021N489	100V 1000PF J
C920	0CQ1021N489	100V 1000PF J
C921	0CE2260F618	160V RUS 1MF
C922	0CE2260K618	100V RUS 22MF
C930	0CE4750K618	50V RUS 4.7MF
C935	0CH1041K932	50V F 0.1MF Z
C940	0CE2260F618	160V RUS 1MF
C951	0CQ1021N489	100V 1000PF J
C952	0CQ1021N489	100V 1000PF J
C953	0CQ1021N489	100V 1000PF J
C970	0CH1041K932	50V F 0.1MF Z
C971	0CQ1041L489	63V 0.1MF J MKT

Location	Part No.	Description
CN901	CONN WAFER	5267-07P
CN902	CONN WAFER	SMAW250-10P(ANGLE)
CN903	CONN WAFER	SMAW250-07P(ANGLE)
D901	0DD400009AA	FDH400
D902	0DD400009AA	FDH400
D903	0DD400009AA	FDH400
D905	0DD400009AA	FDH400
D907	0DD400009AA	FDH400
D909	0DD400009AA	FDH400
D910	0DZ24BM09AA	DZ-24BM
D911	0DD400009AA	FDH400
D912	0DD400009AA	FDH400
D914	0DD400009AA	FDH400
D916	0DZ15BM09AA	DZ-24BM
D917	0DZ15BM09AA	DZ-24BM
GND	2MT6400100A	DA-IB0214(D2.3/DY PIN)
G2	2MT6400100A	DA-IB0214(D2.3/DY PIN)
IC901	0IFA1D2500A	S1D2500A01-D0
L901	0RD0332F609	1/6W 33 OHM J
L902	0RD0472F609	1/6W 47 OHM J
L903	0RD0332F609	1/6W 33 OHM J
PCB	0GE4246174A	T1.6 * 122 * 86 (FR4)
Q901	0TR940009AA	KSP94
Q902	0IFA431Z00A	KA431
Q903	0TR450009AA	KSP45
Q904	0TR940009AA	KSP94
Q905	0TR940009AA	KSP94
Q906	0IFA431Z00A	KA431
Q907	0TR450009AA	KSP45
Q908	0TR940009AA	KSP94
	0TR940009AA	

Location	Part No.	Description
O910	0IFA431Z00A	KA431
O911	0TR450009AA	KSP45
O912	0TR940009AA	KSP94
R901	0RS0752F609	1/6W 75 OHM F
R902	0RS0752F609	1/6W 75 OHM F
R903	0RS0752F609	1/6W 75 OHM F
R905	0RS2700F609	1/6W 270 OHM F
R906	0RS2700F609	1/6W 270 OHM F
R907	0RS0332F609	1/6W 33 OHM F
R909	0RS1001F609	1/6W 1K OHM F
R910	0RS1001F609	1/6W 1K OHM F
R911	0RS1001F609	1/6W 1K OHM F
R912	0RS0332F609	1/6W 33 OHM F
R913	0RS0332F609	1/6W 33 OHM F
R914	0RS4704F609	1/6W 4.7M OHM F
R915	0RS2203F609	1/6W 220K OHM F
R916	0RS1001F609	1/6W 1K OHM F
R917	0RS1001F609	1/6W 1K OHM F
R918	0RS3302F609	1/6W 33K OHM F
R919	0RS1504F609	1/6W 1.5M OHM F
R920	0RS2203F609	1/6W 220K OHM F
R921	0RS3302F609	1/6W 33K OHM F
R922	0RS1504F609	1/6W 1.5M OHM F
R923	0RS1504F609	1/6W 1.5M OHM F
R924	0RS2203F609	1/6W 220K OHM F
R925	0RS2203F609	1/6W 220K OHM F
R926	0RS2203F609	1/6W 220K OHM F

Location	Part No.	Description
R927	0RS1001F609	1/6W 1K OHM F
R928	0RS1504F609	1/6W 1.5M OHM F
R929	0RS2203F609	1/6W 220K OHM F
R930	0RS1504F609	1/6W 1.5M OHM F
R931	0RS1504F609	1/6W 1.5M OHM F
R932	0RS3302F609	1/6W 33K OHM F
R933	0RS8201F609	1/6W 8.2K OHM F
R934	0RS8201F609	1/6W 8.2K OHM F
R935	0RS8201F609	1/6W 8.2K OHM F
R936	0RS1001F609	1/6W 1K OHM F
R939	0RS4700F609	1/6W 470 OHM F
R940	0RS2001F609	1/6W 2K OHM F
R941	0RS2700F609	1/6W 270 OHM F
R944	0RS1004F609	1/6W 1M OHM F
R945	0RS1004F609	1/6W 1M OHM F
R946	0RS1004F609	1/6W 1M OHM F
R971	0RS5600F609	1/6 560 OHM F
R972	0RS5600F609	1/6 560 OHM F
R970	0RS6200F609	1/6 620 OHM F
R991	0RK0472H609	1/4 33M OHM J
SG901	0SA00WSP20A	WSP-201M
SG902	0SA00WSP20A	WSP-201M
SG903	0SA00WSP20A	WSP-201M
SO901	0ET129DS08A	ISDS08
IC902	0IFA241500A	LM2415T
IC902A	SMC306MFZN1	TT2 BIN 3X6 MFZN WHITE
IC902B	SHT1901VTC1	EFG-HT-1901-VTC

Control BOARD

Location	Part No.	Description
CN205	0CG00CA330A	CA-33
D250	0DL50GYW9AA	SD50GYW
R280	0RS7501F609	1/6W 7.5K OHM F
R281	0RS1502F609	1/6W 15K OHM F
R282	0RS3001F609	1/6W 3K OHM F
R283	0RS3002F609	1/6W 30K OHM F
R284	0RS5102F609	1/6W 51K OHM F

Location	Part No.	Description
SW201	0ST0T1102AB	I.T-1102 AH-T
SW202	0ST0T1102AB	I.T-1102 AH-T
SW203	0ST0T1102AB	I.T-1102 AH-T
SW204	0ST0T1102AB	I.T-1102 AH-T
SW205	0ST0T1102AB	I.T-1102 AH-T
PCB	0GE4246274A	T1.6 * 86 * 22 (FR4)

Others

Location	Part No.	Description
△ DG	0DG00DG290A	EFG-2902
CG	0CG00CA047A	CA-47
CG1	1DTC00DA100	DA-100
PC	0AP180016AA	"EFD-O-01-003"
DY	2MT9600300A	CDY-N29089
△ CRT	2MT9600200A	A68QCP891X002

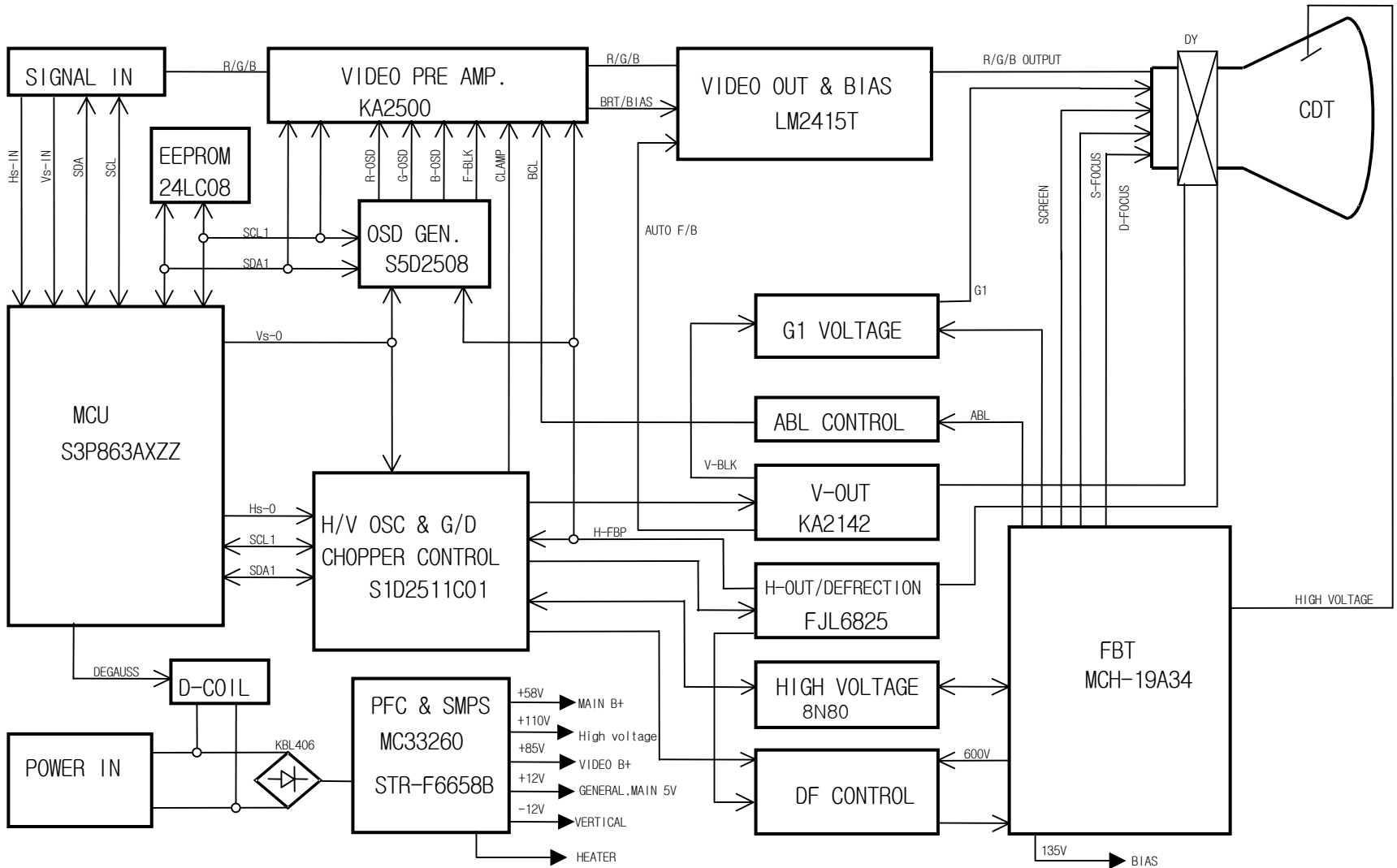
*** PFC BOARD(Optional)**

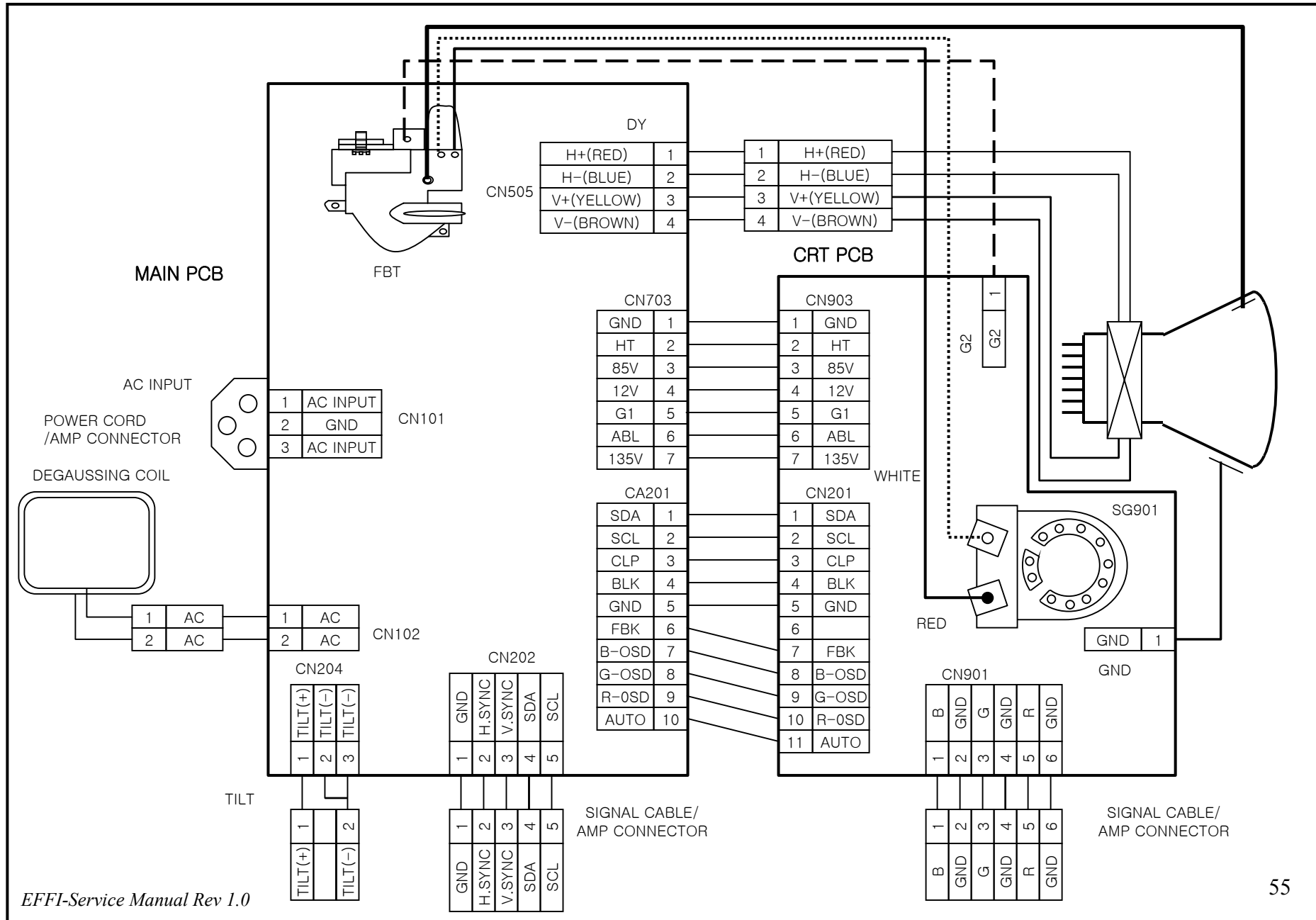
Location	Part No.	Description
PCB	0GE4246374A	PCB(T1.6 x 73 x 52 (FR4))
C302	0CQ2021K489	50V 2200PF J
C303	0CE1060K618	50V RUS 100MF
C304	0CQ5641Q478	400V 0.56MF J MPP
C305	0CQ1021K489	50V 1000PF J
C306	0CQ6841L489	63V 0.68MF J MKT
C307	0CC2210K422	50V 680 PF J SL
C308	0CA2221R618	2200PF M AC250V
C310	0CE4750V618	450V RUS 4.7MF
D301	0DD600009AA	DIODE(D5L60)
D302	0DD414809AA	1N4148
D303	0DZ15BM09AA	DZ-15BM
Q301	0TF247509AA	FET K2475
Q302	0TR945YC9AA	KSC945YC
IC301	0ION332600A	MC33260
R301	0RD0471F609	1/6W 4.7 OHM J
R302	0RS2001G609	1/4W 1M OHM F

Location	Part No.	Description
R303	0RD4710F609	1/6W 470 OHM J
R304	0RD1001F609	1/6W 1K OHM J
R305	0RD1001F609	1/6W 1K OHM J
R306	0RD1502F609	1/6W 15K OHM J
R307	0RB0100J609	1W 0.1 OHM F
R308	0RD0472F609	1/6W 47 OHM J
R320	0RS1004G609	1/4W 1M OHM F
T301	0TR190209AB	LPF-1902
CN301	0CG00CA049A	CA49
CN305	0EW119SMAWA	SMAW250-11
	SMC310MFZN1	TT2 BIN 3X10 MFZN
	1DTC00DA100	DA-100
	1DRU2000021	INSULATOR (70mm X 51mm)
CN103	0JP00JUMERC	JUMPER (Between 2 nd & 5 th Pin)
TH101	0JP00JUMERC	JUMPER
C199		delete

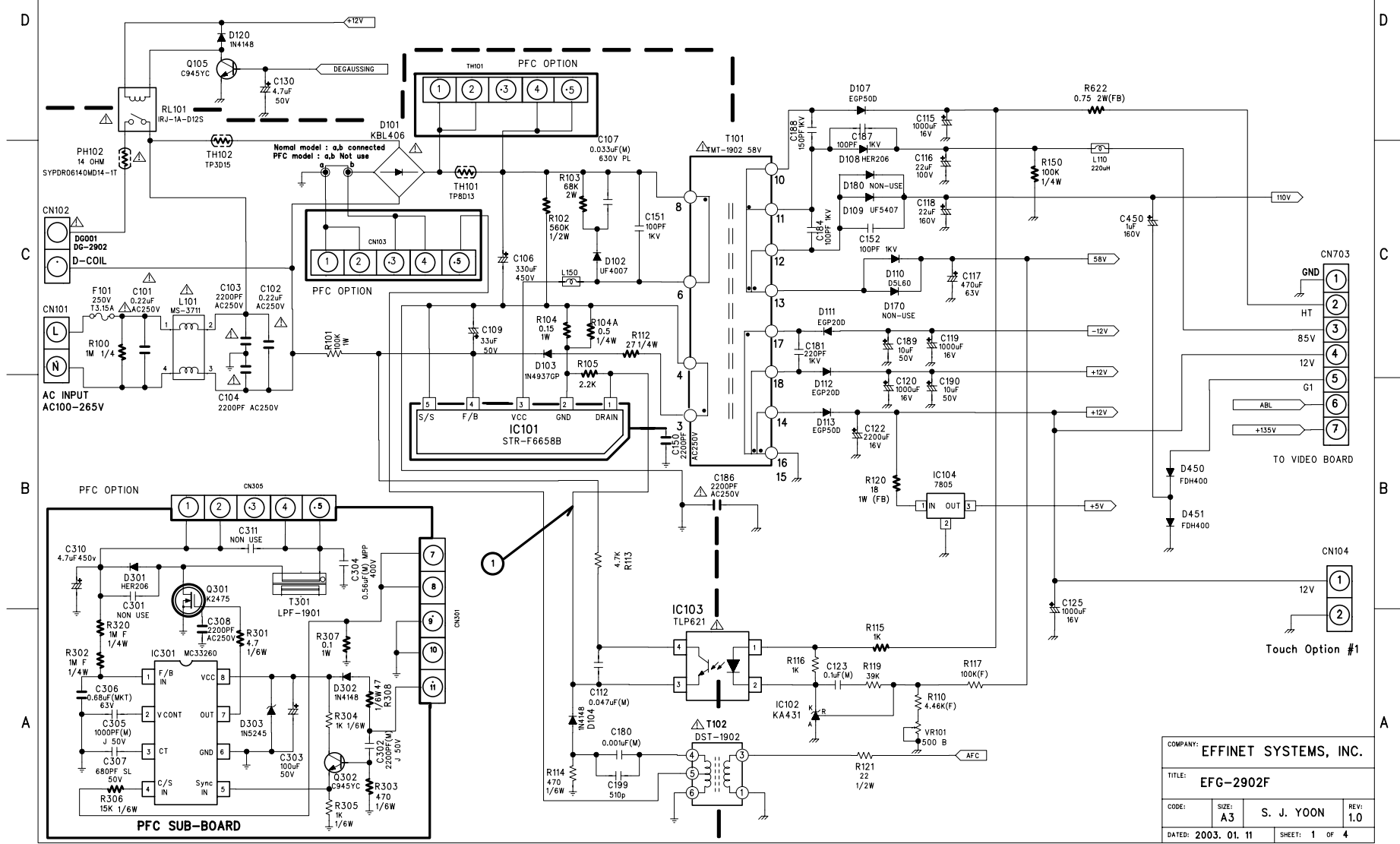
* marks designate optional component. Please refer to **OPTIONAL COMPONENT** section.

△ marks designate safety related component. Please do not use any alternate component.





SHEET 1 : POWER & CONNECTION SECTION



6

5

4

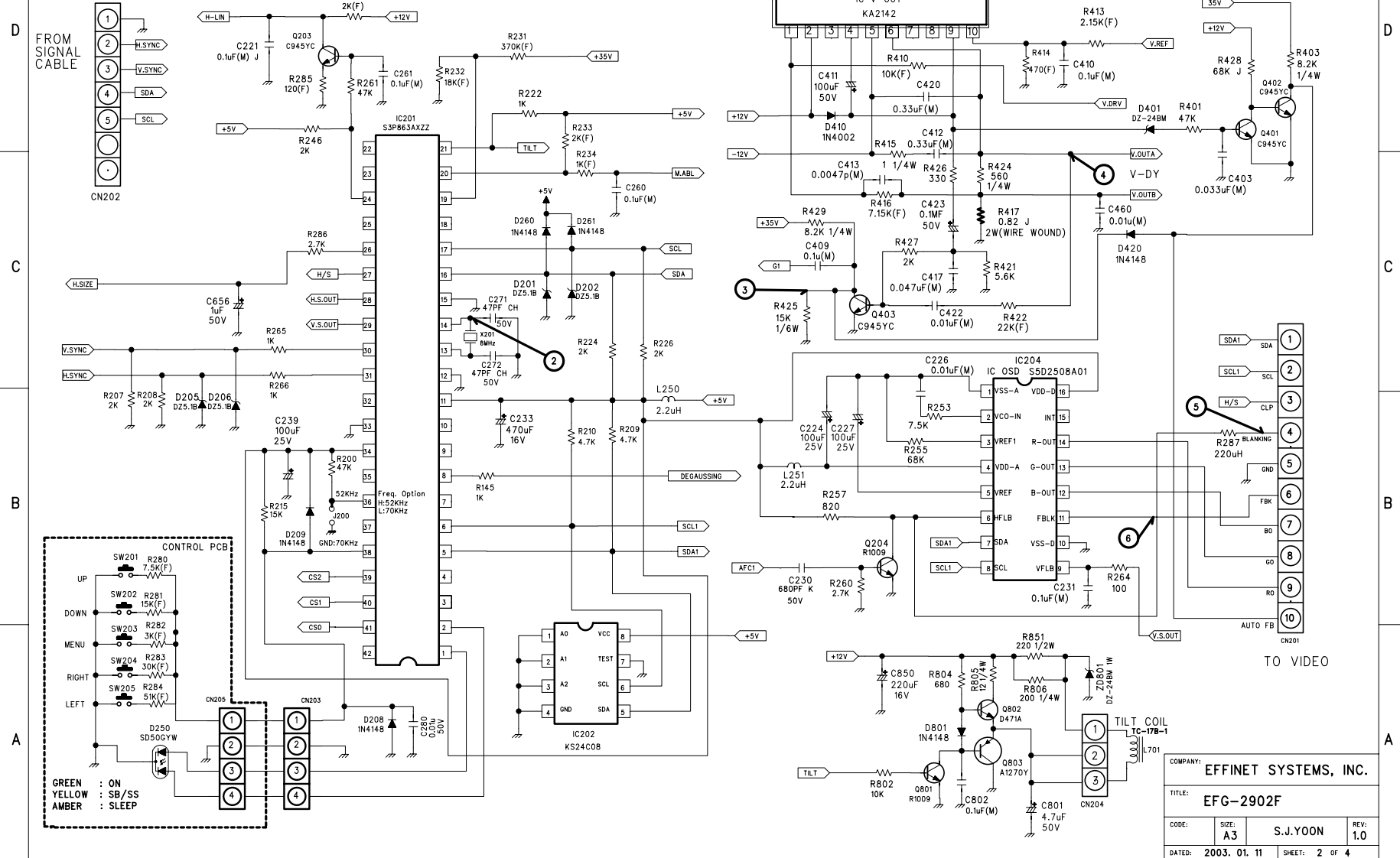
3

2

- SCHEMATIC DIAGRAM

SHEET 2 : CONTROL & VERT.OUT SECTION

EFFINET CONFIDENTIAL



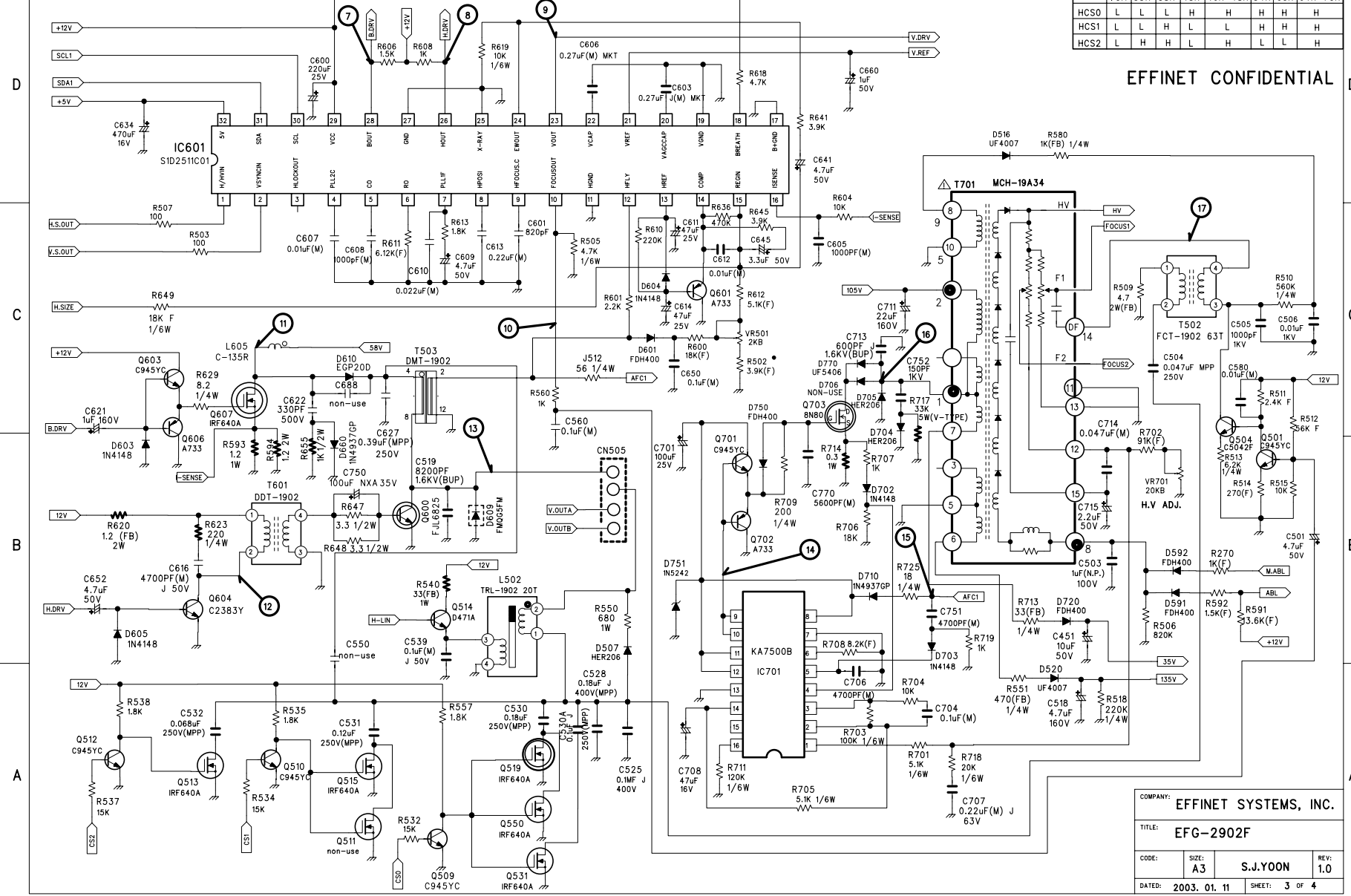
COMPANY: EFFINET SYSTEMS, INC.			
TITLE: EFG-2902F			
CODE:	SIZE: A3	S.J.YOON	REV: 1.0
DATED: 2003. 01. 11	SHEET: 2 OF 4		

6 5 4 3 2 1

- SCHEMATIC DIAGRAM SHEET 3 : HORIZONTAL SECTION

Cs SWITCHING TABLE								
	VGA	35K	38K	43K	46K-48K	54K	60K	64K-70K
HCS0	L	L	L	H	H	H	H	H
HCS1	L	L	L	L	L	L	H	H
HCS2	L	H	H	L	L	H	L	H

EFFINET CONFIDENTIAL



COMPANY: EFFINET SYSTEMS, INC.			
TITLE: EFG-2902F			
CODE:	SIZE: A3	S.J.YOON	REV: 1.0
DATED: 2003. 01. 11	SHEET: 3 OF 4		

- SCHEMATIC DIAGRAM

SHEET 4 : VIDEO SECTION

EFFINET CONFIDENTIAL

D

C

B

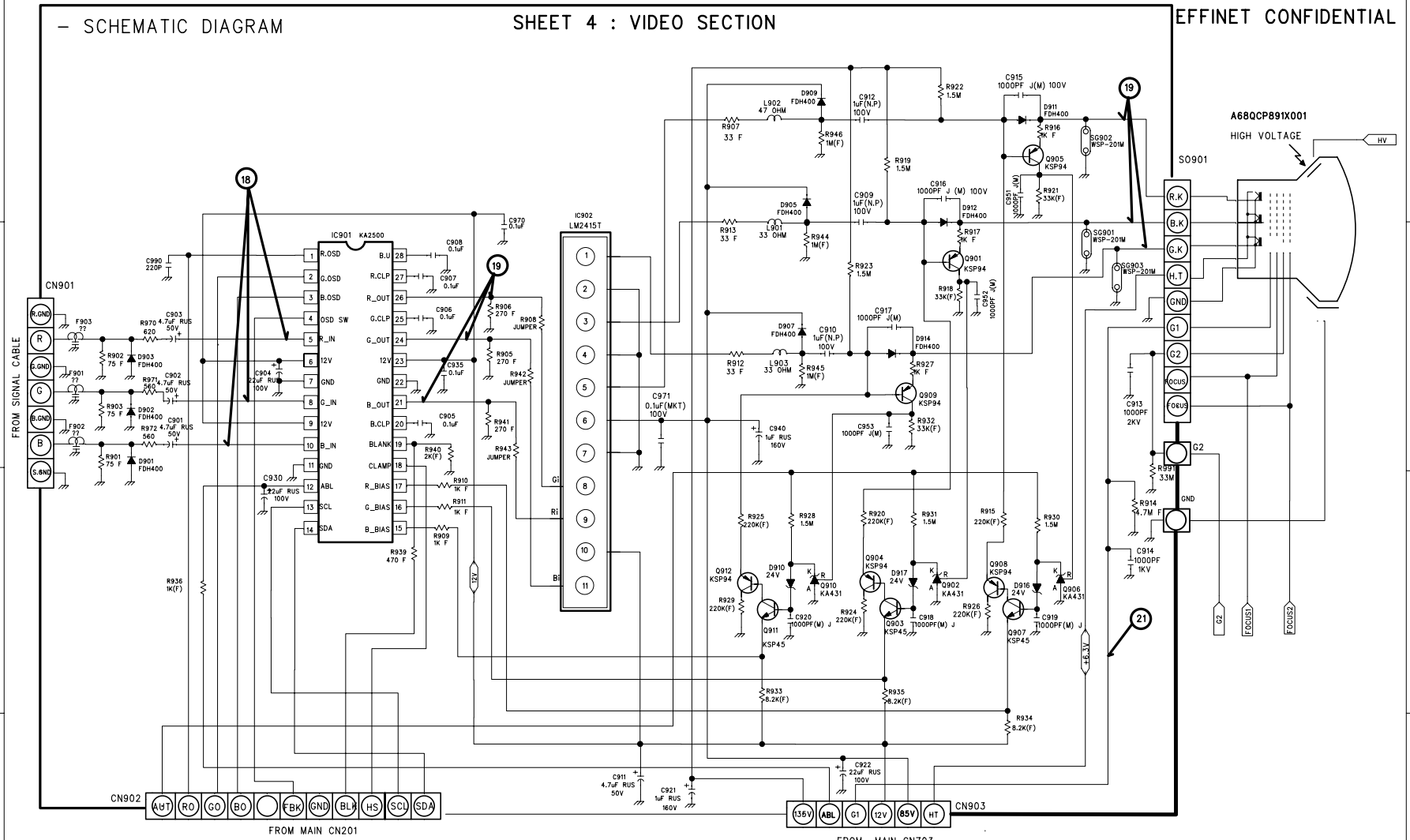
A

D

C

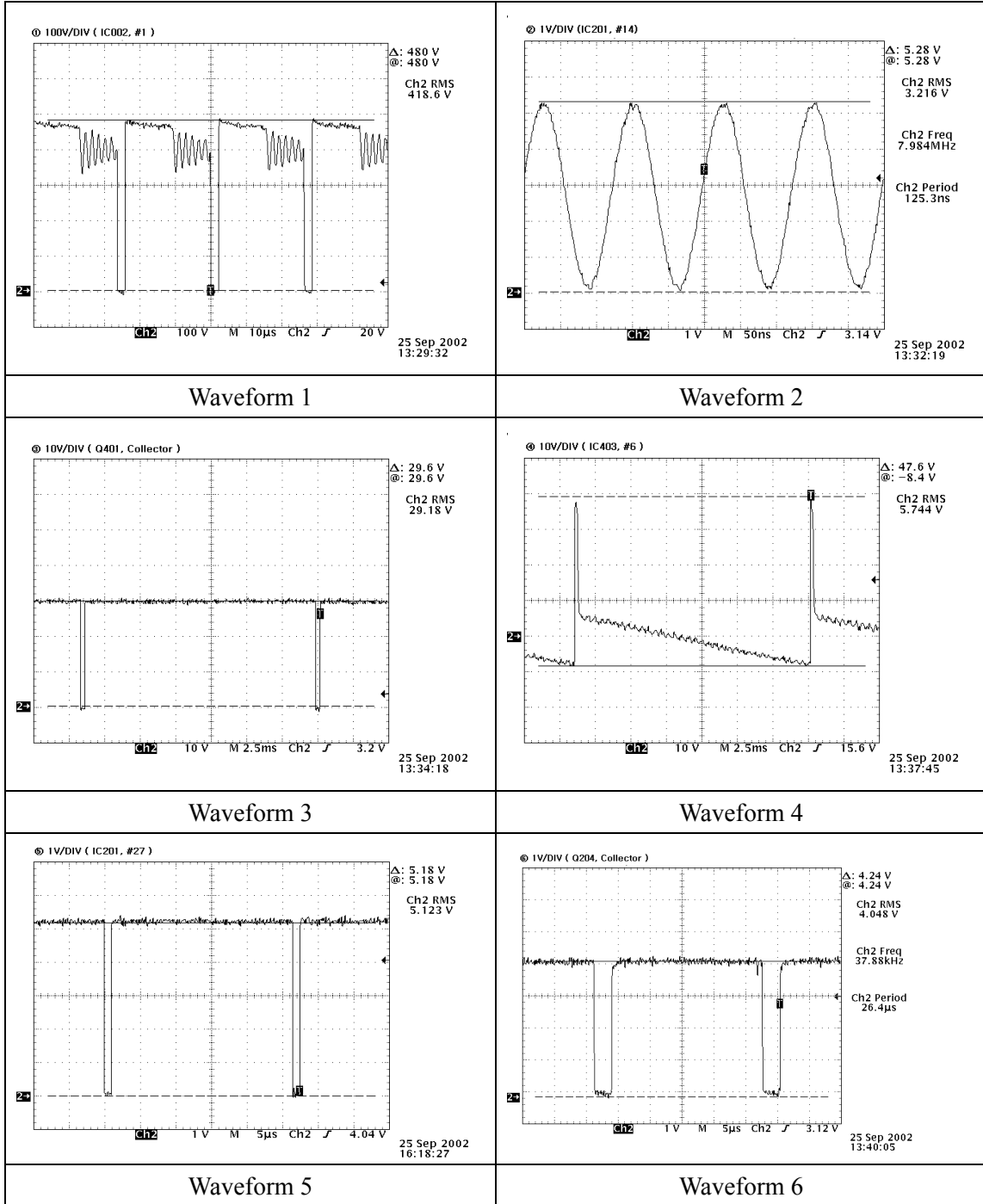
B

A



COMPANY: EFFINET STSYSTEMS, INC.			
TITLE: EFG-2902F			
CODE:	SIZE: A3	S.J.YOON	REV: 1.0
DATED: 2003. 01. 11	SHEET: 4 OF 4		

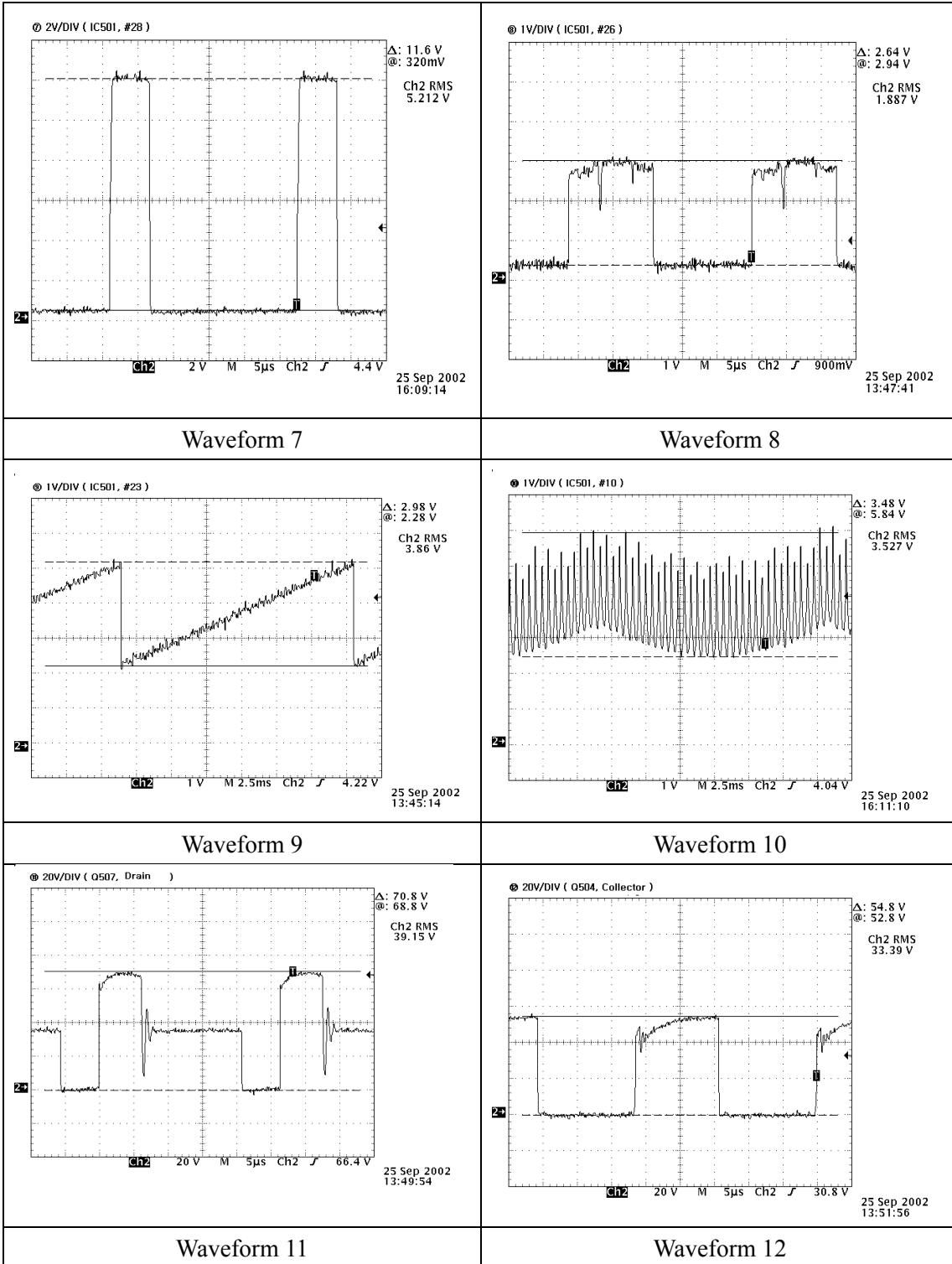
REFERENCE WAVEFORM



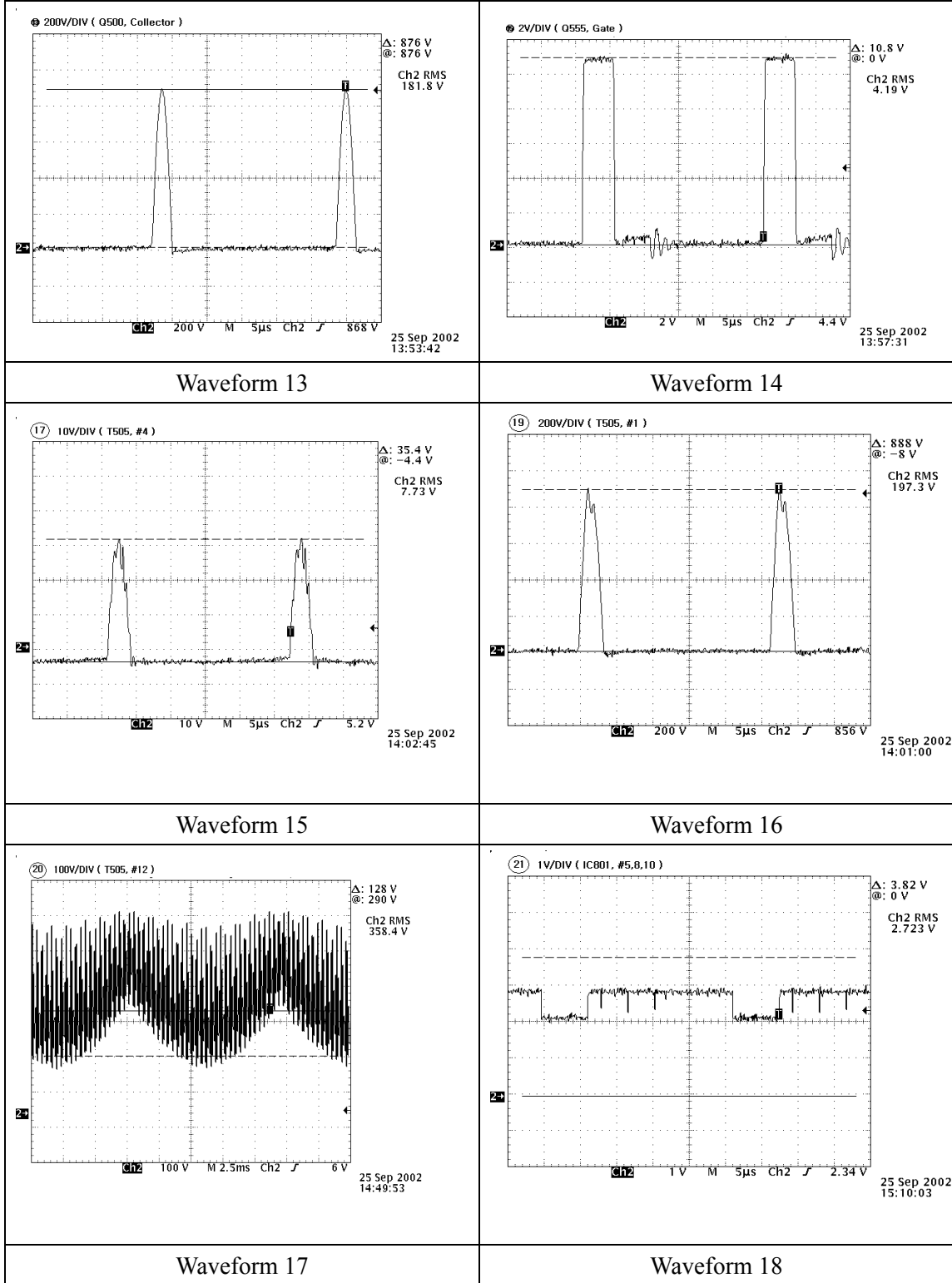
* Refer to the Schematic Diagram.

* The reference waveform photo in this section was taken with X-Hatch pattern. So the waveform can be varied according to the applied pattern type.

REFERENCE WAVEFORM



REFERENCE WAVEFORM



REFERENCE WAVEFORM

