

**Q770**

**Multiscanning Color Monitor**

**TECHNICAL SERVICE MANUAL**



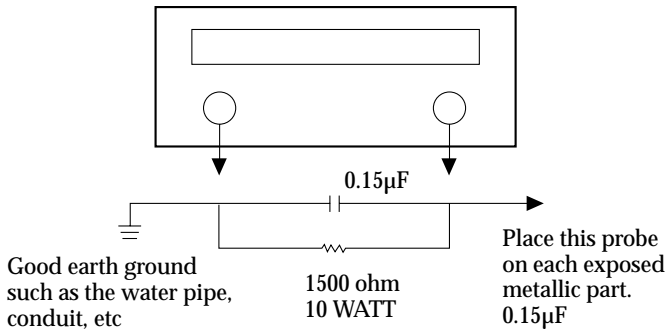
## Safety Precaution

### WARNING

Service should not be attempted by anyone unfamiliar with the necessary precautions on this monitor. The followings are the necessary precautions to be observed before servicing.

1. Always discharge the high voltage to the CRT conductive coating before handling the CRT. The picture tube is highly evacuated and if broken, glass fragments will be violently exploded. Use shatter proof goggles and keep picture tube away from the bare body while handling.
2. When replacing a chassis in the cabinet, always be certain that all the protective devices are put back in place, such as nonmetallic control knobs, insulating covers, shields, isolation resistor capacitor network etc.
3. Before returning the monitor to the customer, always perform an AC leakage current check on the exposed metallic parts of the cabinet, such as signal connectors, terminals, screw heads, metal overlays, control shafts etc, to be sure the monitor is safe to operate without danger of electrical shock. Plug the AC line cord directly into a AC outlet (do not use a line isolation trasformer during this check.). Use an AC voltmeter having 1500 ohm per volt or more sensitivity in the following manner : Connect ground(water pipe, conduit, etc.) and the exposed metallic parts, one at a time. Measure the AC Voltage across the combination of 1500 ohm resistor and 0.15  $\mu\text{F}$  capacitor. Reverse the AC plug at the AC outlet and repeat AC voltage measurements for each exposed metallic part. The Voltage must not exceed 0.3 volts RMS. This corresponds to 0.2 milliamp AC. Any value exceeded this limit constitutes a potential shock hazard and must be corrected immediately.

### AC VOLTMETER



### INSTRUCTIONS TO USER

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instruction, may cause interference to radio and television. It has been tested and found to comply with the limits for the specifications in Subpart J of Part 15 FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures.

- reorient the receiving antenna
- relocate the computer with respect to the receiver
- plug the computer into a different outlet so that computer and receiver are on different branch circuits.



## X-Ray Radiation Precaution

1. Excessive high voltage can produce potentially hazardous X-RAY RADIATION. To avoid such hazards, the high voltage must be under the specified limit. The nominal value of the high voltage of this monitor is 25KV  $\pm$ 1.0KV at zero beam current(minimum brightness) under a 120V AC power source. The high voltage must not(under any circumstances) exceed30KV. Each time a monitor requires servicing, the high voltage should be checked.  
It is recommended the high voltage be recorded as a part of the service record. It is important to use an accurate and reliable high voltage meter.
2. This monitor is equipped with a protection circuit which prevents the monitor from producing excessively high voltage. Each time the monitor is serviced, the protection circuit must be checked to determine that the circuit is properly functioning.
3. The only source of X-RAY RADIATION in this monitor is the picture-tube.  
For continued X-RAY RADIATION protection, the replacement tube must be exactly the same type tube as specified in the parts list.
4. Some parts in this monitor have special safety-related characteristics for X-RAY RADIATION protection.  
For continued safety, parts replacement should be undertaken only after referring to the product safety notice.

### RODUCT SAFETY NOTICE

Many electrical and mechanical parts in this monitor have special safety-related characteristics. These characteristics are often not evident from visual inspection.

Replacement parts which have these special safety characteristics are identified in this manual; electrical components having such features identified by " $\triangle$ " in the replacement parts list and schematic diagram.

For continued protection, replacement parts must be identical to those used in the original circuit. The use of substitute replacement parts which do not have the same safety characteristics as the factory recommended replacement parts shown in this service manual, may create shock, fire, X-RAY RADIATION or other hazards.

### PRODUCT CDRH NOTICE

Electrical potentiometers which is marked as caution " $\triangle$ " in parts list are critical components of safety & CDRH.

Therefore, for continued protection, replacements parts must be used it which is used in original PCB ASS'Y.

## General Information

### 1. Description

This 17" (16" viewable) color display monitor is operated in R, G, B, drive mode input.

### 2. Operating instructions

#### 2-1. Front

Menu, Select, Down (▼), Up (▲) DPMS(Power)LED, Power Switch

#### 2-2. Rear

Input connection (AC & SIGNAL CABLE)

#### 2-3 Service Instruction(internal controls)

H-Center, H/V Focus

#### 2-4. OSD Controls

Brightness/Contrast, H/V-Position, H/V-Size, Pincushion/Trapezoid, Pin Balance, Parallel, Top/Bottom-Corner, H/V-Linearity Rotation, H/V Moire, Degauss, Color Control, Information, Language, OSD H/V- Position, Recall

### 3. Electrical Characteristics

#### 3-1. Power supply

Input Voltage : 100-240 V AC

Input Current : 1.5A Max.

Input Frequency : 50 - 60Hz

Power Consumption : 70W (TYP)

#### 3-2. Video input signal

Input : 0.7 V<sub>p-p</sub> analog signal(at 75 ohm terminated to ground)

Polarity : Positive

Rise/Fall time : < 5ns

#### 3-3. Horizontal Synchronization Signal

Level : TTL High : 2.4V min

Low : 0.4V max

Polarity : Negative or Positive

Frequency : 30kHz - 70kHz

Timing Limits : Pulse width ( $0.1\mu\text{s} \leq \text{Thp} \leq 6\mu\text{s}$ )

#### 3-4. Vertical Synchronization Signal

Level : TTL High : 2.0V min

Low : 0.4V max

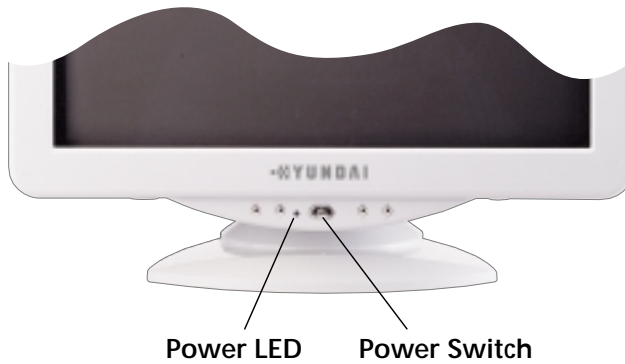
Polarity : Negative or Positive

Frequency : 50Hz - 150Hz

Timing Limits : Pulse width ( $8\mu\text{s} \leq \text{Tvp} \leq 2.048\text{ms}$ )

## Control Description

Front View



## Video Input Signal

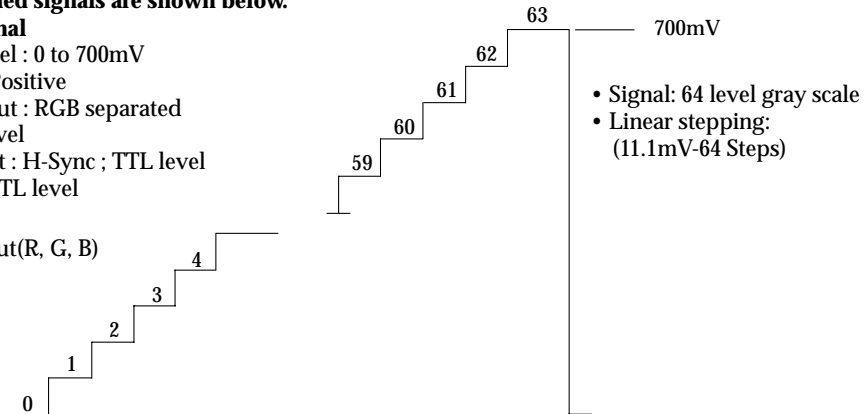
Recommended signals are shown below.

### • Video Signal

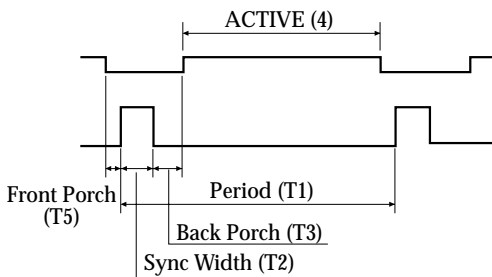
Video Level : 0 to 700mV  
 Polarity : Positive  
 Video Input : RGB separated  
 Analog level  
 Sync input : H-Sync ; TTL level  
 V-Sync ; TTL level

### • Waveform

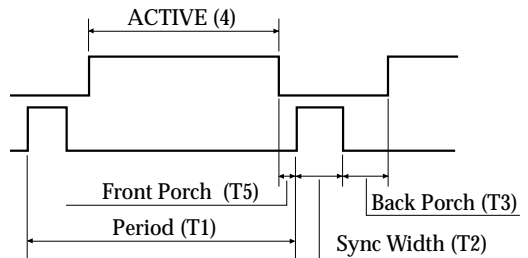
Video input(R, G, B)



### • H-Sync



### • V-Sync



**• Timing Table**

| Horizontal      | Dot | 720    | 640    | 640    | 800    | 800    | 800    | 1024   | 1024   |
|-----------------|-----|--------|--------|--------|--------|--------|--------|--------|--------|
| Frequency       | kHz | 31.469 | 43.269 | 50.625 | 46.875 | 53.674 | 63.920 | 60.023 | 68.677 |
| Period(T1)      | μs  | 31.778 | 23.111 | 19.752 | 21.333 | 18.631 | 15.645 | 16.660 | 14.561 |
| Sync Width(T2)  | μs  | 3.813  | 1.556  | 1.580  | 1.616  | 1.138  | 1.185  | 1.219  | 1.016  |
| Back Porch(T3)  | μs  | 1.907  | 2.222  | 1.975  | 3.232  | 2.702  | 2.015  | 2.235  | 2.201  |
| Active(T4)      | μs  | 25.422 | 17.778 | 15.802 | 16.162 | 14.222 | 11.852 | 13.003 | 10.836 |
| Front Porch(T5) | μs  | 0.636  | 1.556  | 0.395  | 0.323  | 0.569  | 0.593  | 0.203  | 0.508  |

| Vertical        | Line | 400    | 480    | 480    | 600    | 600    | 600    | 768    | 768    |
|-----------------|------|--------|--------|--------|--------|--------|--------|--------|--------|
| Frequency       | Hz   | 70.080 | 85.008 | 100.05 | 75.000 | 85.061 | 100.03 | 75.029 | 84.997 |
| Period(T1)      | ms   | 14.268 | 11.764 | 9.995  | 13.333 | 11.756 | 9.997  | 13.328 | 11.765 |
| Sync Width(T2)  | ms   | 0.064  | 0.069  | 0.059  | 0.064  | 0.056  | 0.063  | 0.050  | 0.044  |
| Back Porch(T3)  | ms   | 1.081  | 0.570  | 0.435  | 0.448  | 0.503  | 0.501  | 0.466  | 0.524  |
| Active(T4)      | ms   | 12.711 | 11.093 | 9.481  | 12.800 | 11.179 | 9.387  | 12.795 | 11.183 |
| Front Porch(T5) | ms   | 0.413  | 0.023  | 0.020  | 0.021  | 0.019  | 0.047  | 0.017  | 0.015  |
| Interlaced      | ms   | 1.577  | 0.671  | 0.514  | 0.553  | 0.577  | 0.610  | 0.533  | 0.582  |
| Sync Polar      | H    | -      | -      | -      | +      | +      | +      | +      | +      |
|                 | V    | +      | -      | -      | +      | +      | +      | +      | +      |
| Interlaced      | Y/N  | N      | N      | N      | N      | N      | N      | N      | N      |

The monitor is compatible with additional modes within the specified frequency ranges provided that they are different at least for one of the following :

Horizontal Freq.:  $\pm 1.0\text{kHz}$

Vertical Freq.:  $\pm 1\text{Hz}$

Note: Even if the monitor detects the input timing as a factory preset mode, the size and position may not be able to be set as desired. Check the input timings are under the specifications and adjust the image as you want.

For better quality of display image, use the timing and polarity shown in the table above. Please see your video card user's guide to ensure compatibility.

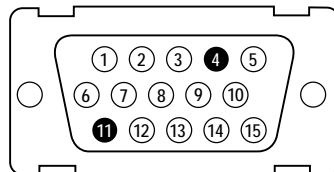
## Video Input Terminal

A 15 Pin D-sub male connector is used as the input signal connector. Pin and input signals are shown in the table below.

**Pin Description**

| PIN NO. \ SIGNAL | SEPERATE SYNC | COMPOSITE SYNC |
|------------------|---------------|----------------|
| 1                | RED           | RED            |
| 2                | GREEN         | GREEN          |
| 3                | BLUE          | BLUE           |
| 4                | N.C           | N.C            |
| 5                | DDC RETURN    | DDC RETURN     |
| 6                | RED GROUND    | RED GROUND     |
| 7                | GREEN GROUND  | GREEN GROUND   |
| 8                | BLUE GROUND   | BLUE GROUND    |
| 9                | +5            | +5             |
| 10               | LOGIC GROUND  | LOGIC GROUND   |
| 11               | N.C           | N.C            |
| 12               | SDA           | SDA            |
| 13               | H-SYNC(TTL)   | (H+V) SYNC     |
| 14               | V-SYNC(VCLK)  | VCLK           |
| 15               | SCL           | SCL            |

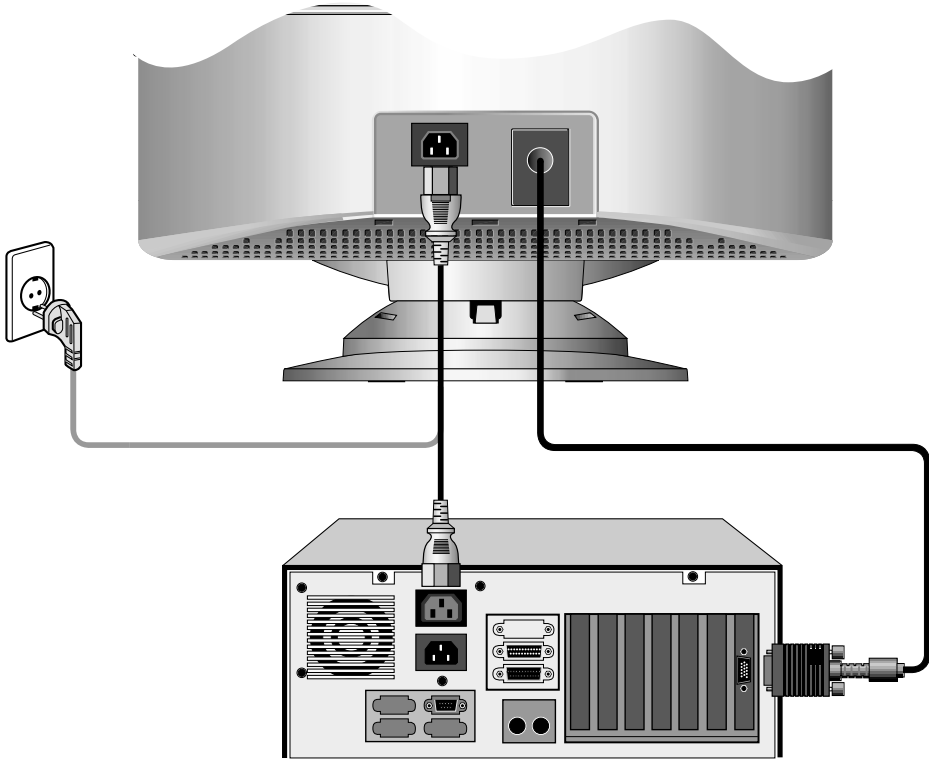
**D-Sub male connector**



## Connecting With External Equipment

### Cautions

Be sure to turn off the power of your computer before connecting the monitor.



# Theory of Operation

## 1. Power Supply

The AC line voltage range is from 100V to 240V.

The SMPS has +55V, +7.0V, +14V, +5V, -12V

The conducted noise is filtered by X(CP01, CP04) and Y (CP02, CP03, CP32, CP33, CP09) capacitors and a common mode line filter (LP01).

The input rectifier (DP01 ~ DP04) converts the AC line voltage into a DC voltage to power the SMPS. The UC3843B (ICP01) drives the power FET(QP04) according to the PWM signals generated by the  $R_T$  and  $C_T$  (RP07, CP10) connected pin 4 of ICP01.

The ICP01 is an integrated current mode PWM.

It consists of an oscillator, error amplifier, current sense comparator, under voltage lock-out and an MOSFET drive stage.

The switching frequency is locked to horizontal scan frequency by horizontal flyback pulse.

When the monitor is in Stage2 with no pulsed syncs. QP05 and QP07 is turned off. The total power consumption must be less than 5W in Stage2.

## 2. DPMS and Self test mode

The power supply supports the DPMS function. Its operation is shown in the table below.

| MODE      | H-SYNC | V-SYNC | MCU<br>PIN35<br>(BRI) | MCU<br>PIN 10<br>(Suspend) | Q905<br>QP07 | 14V | HEATER |
|-----------|--------|--------|-----------------------|----------------------------|--------------|-----|--------|
| Stage1    | O      | O      | CONTROL               | H                          | ON           | 14V | 6.3V   |
| Stage2    | X      | O      | 0                     | L                          | OFF          | 0V  | 2V     |
|           | X      | X      |                       |                            |              |     |        |
| Self Test | X      | X      | 3.5V                  | H                          | ON           | 14V | 6.3V   |

## 3. Signal Processing and MCU Control

The X-TAL resonates at 12MHz.

When the H and V sync or TTL composite sync are input to MCU, MCU can measure the H and V frequency to detect the video mode.

MCU has digital to analog converter(DACS) control function like ABL, H-LIN, SBU-SIZE, rotation, brightness, and MCU can control, Recall, H/V-Size, H/V-Position, Pincushion/Trapezoid, Top/Bottom-Corner, H/V-Linearity, Parallel/Pin Balance, H/V Moire, Color Control, Information, Language, by I2C BUS Line.

The operation of MCU is shown in the table below.

| H-FREQ<br>(kHz) | H-LIN1<br>PIN 30 | H-LIN2<br>PIN 29 | H-LIN3<br>PIN 28 | REMARK |
|-----------------|------------------|------------------|------------------|--------|
| 31 < H < 34     | L                | L                | L                |        |
| 34 < H < 36     | L                | L                | H                |        |
| 36.0 < H < 41   | L                | H                | H                |        |
| 41.0 < H < 46   | L                | H                | H                |        |
| 46 < H < 52     | H                | L                | L                |        |
| 52 < H < 59     | H                | L                | H                |        |
| 59 < H < 62     | H                | H                | L                |        |
| 62.0 < H < 66   | H                | H                | L                |        |
| 66.0 < H < 69   | H                | H                | H                |        |

#### **4. Horizontal Deflection**

TDA9116 is an I2C autosync deflection controller for H/V sync and drive processing.

All functions are controlled by I2C bus.

When H-Sync is applied, the internal oscillator is automatically locked.

The duty-cycle of H-output pulse Pin 26 is variable by frequency.

QH08 and TH01 are used to drive the H-output transistor (QH09). QH09 is turned on, it conducts current through the deflection yoke on the right hand side of the screen.

This current comes from the S correction capacitors (CH27, CH29, CH32, CH34), which have a charge equal to the effective supply voltage.

When the QH09 is opened up, the damper diode (DH12) allows current for left hand side of the screen to flow back through the deflection yoke to the S capacitors.

The flyback capacitor (CH23) determines the size and length of the flyback pulse.

The S capacitors correct outside versus center linearity in horizontal scan.

THREE FETs (QH11, QH12, QH13) select the value of S capacitors.

H-centering is controlled by a switch (SWH01). The switch selects DC offset current flow through the yoke.

A diode modulator is used to control the E-W correction and H-size. ICH01 generates the E-W parabola wave using vertical amp.

A power buffer (QH02, QH03) drives the diode modulator.

In order to keep the high voltage constant independent of the horizontal scan frequency, the supply voltage of FBT must increase with increasing scan frequency proportionally. A step-up mode DC-DC converter with PWM is used to realize this demand.

ICH01 compares high-voltage feedback with reference voltage. Its output pulse switches a FET (QH07). To adjust the high voltage, TDA9116 (ICH01) has a control terminal (Pin14).

#### **5. Vertical Deflection**

In vertical section of TDA9116 there is auto-sync processing.

The vertical output stage consists of a power OP-AMP with extra flyback generator.

TDA9302H (ICV01) is used as vertical output stage.

#### **6. X-Ray Protection and Beam Current Limiting.**

A failure in the horizontal scan control section could cause a dangerous situation; the high voltage might rise to an unacceptable high level. When the flyback voltage rise to unacceptable level, the (Pin25) of ICH01 detects these states over 8.0V TDA9116

It causes the H-drive stage and oscillator to be turned off. Then high voltage is shut down until the power switch is on.

The average anode current is measured at lower side of the High Voltage winding of the FBT.

ABL flows through Connectors (CNM06, CNC01) connected ICC01 (LM1267) and through RM07 Connected ICM01 Pin39. and ABL is controlled by ICM01.

#### **7. Video Amplifier and OSD Interface**

LM1267 (ICC01) is a Very High Frequency video amplifier with three matched video amplifiers, OSD Contrast Control SDA, SCL, OSD Interface, OSD BLK drive controls, blanking gate and clamp gate.

H-blank signal is applied to Pin 24. During blanking all three outputs are thrown to the pedestal level. MCU (ICM01) Pin32 Clamp is used to a clamp signal.

The signal is applied to ICC01 Pin 23.

Three OSD inputs (Pin 1,2,3 of ICC01) are TTL compatible and typical bandwidth is 80MHz.

A fast commutate pin is provided to select either the video or the OSD inputs as a source for amplification.

gain of three internal variable gain amplifiers through the I2C bus interface. MTV 021 is designed for monitor application to display built-in characters or fonts on to monitor screen.

The display operation occurs by transferring data and control information from the MCU to RAM through a serial data interface.

The output stage is made of 3-channel power amplifier (LM2467, ICC03). The output is capable of 40 Volts swing in less than 9 nsec?

The three cathodes are AC coupled to the video amplifiers. The DC level on each cathode is set by a cut-off amplifier and clamp diode. The value of the DC voltage is adjusted by DACS.



## Visual Characteristics

### 1. Test condition

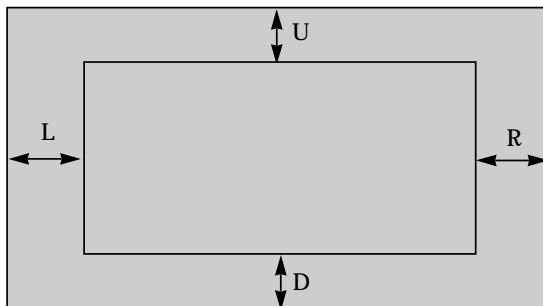
- Resolution : Any of Preset modes
- Input level : 700mV
- Pattern : Central White box covering 20% of the data area
- Brightness Control : Default position (cut off)
- Contrast Control : Adjust to 100 cd/m<sup>2</sup> of luminance (Center of the white field)
- Image duty cycle : 10% to 90%
- Magentic field : Horizontal = 0.3 Gauss  
Vertical = 0.4 Gauss
- Supply Voltage : 100 ~ 240 VAC
- Operating Condition
  - Temperature (0 to 35)°C
  - Humidity (35 to 80)% (W/O condensation)
  - Altitude (0 to 3000)m
- Stroage condition
  - Temperature (-20 to 60)°C
  - Humidity (5 to 85)% (W/O condensation)
  - Altitude (0 to 15,000)m

### 2. Display Centering

The following describes the pattern for this test. Basically it is composed by a single pixel white line around the perimeter of the data area, with marks for the horizontal and vertical axes, the background is black.

The display centering shall be met as following specification at adjusted centering function (user's control)

$$[L-R] \leq 4\text{mm} \quad [U-D] \leq 4\text{mm}$$

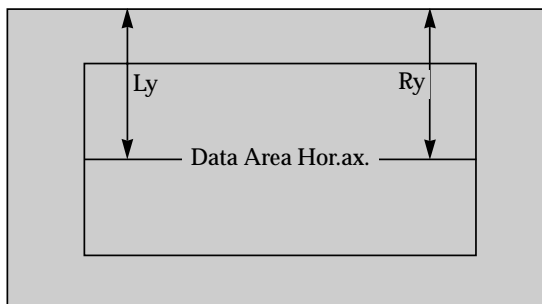


Display Cextering

### 3. Tilt

The maximum variation of the display rotation(tilt) shall be with in 2.0mm based on the following formula.

$$[Ly-Ry] \leq 2.0\text{mm}$$

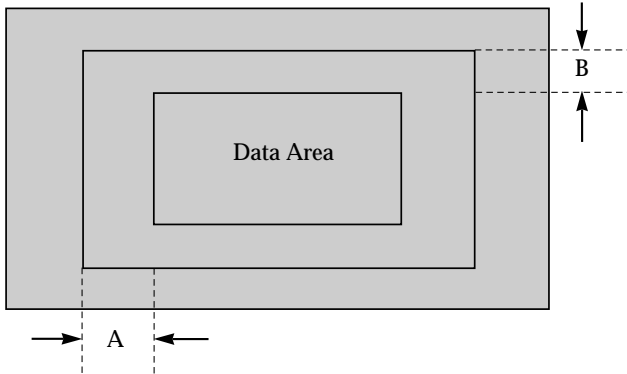


**4. Geometric Distortion**

All kind of Geometric Distortion (Pincushion, Barallel, Parallelogram and Trapezoid) shall be with in 2mm boundary (to tolerance frame) Refer to belows tolerance frame.

$A \leq 2\text{mm}$        $B \leq 2\text{mm}$

The tolerance frame sides are parallel to the window of enclosure axes.



**5. Linearity**

The linearity of an image displayed on the CRT must meet the following requirements, with reference to figure for both X and Y axis.

|     |    |   |   |   |   |   |   |   |   |     |
|-----|----|---|---|---|---|---|---|---|---|-----|
|     | X1 | . | . | . | . | . | . | . | . | X16 |
| Y1  |    |   |   |   |   |   |   |   |   |     |
| .   |    |   |   |   |   |   |   |   |   |     |
| .   |    |   |   |   |   |   |   |   |   |     |
| .   |    |   |   |   |   |   |   |   |   |     |
| .   |    |   |   |   |   |   |   |   |   |     |
| .   |    |   |   |   |   |   |   |   |   |     |
| .   |    |   |   |   |   |   |   |   |   |     |
| .   |    |   |   |   |   |   |   |   |   |     |
| Y12 |    |   |   |   |   |   |   |   |   |     |

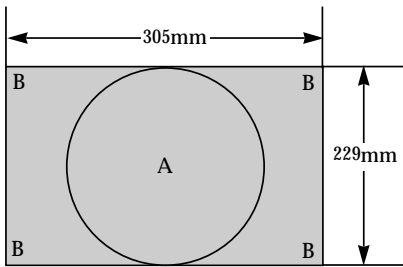
- Formula :  $\frac{X_{Max} - X_{Min}}{X_{Max} + X_{Min}} \times 100 = \leq 6\%$  overall
- $\frac{X_{Max} - X_{Min}}{X_{Max} + X_{Min}} \times 100 = \leq 5\%$  adjacent cells
- Where :  $X1=X2=...X16$   
 $Y1=Y2=...Y12$

**6. Misconvergence**

The display must confirm to all following requirements:  
Maximum convergence error.

| MODEL | Area  | Horiz. Direction | Vert. Direction |
|-------|---|------------------|-----------------|
| Q770  | A<br>Central circle field<br>of (299) mm diameter | 0.3mm            | 0.3mm           |
|       | B<br>All screen Area (305 × 229)<br>except Area A | 0.4mm            | 0.4mm           |

The maximum convergence error shall be measured for a white spot of line, and represents the maximum distance between the energy centers of any two primary colors.



Active Area


## Power Management System

The automatic power management function saves electricity and reduces heat. Used in conjunction with a PC having Power Management function, or a PC running Screen Blanking software, this monitor automatically reduces its power consumption when the PC is not in use. This monitor runs in four states: ON (Normal Operating), Stand-by (No Video Signal), Suspend (Minimum Power for Quick Recovery) and OFF (Non-Operating).

This monitor is in compliance with U.S EPA Energy Star and NUTEK requirements.

Please refer to the following specifications.

| State  | Signals  |          |         | Power consumption | Recovery time | LED Description |
|--------|----------|----------|---------|-------------------|---------------|-----------------|
|        | H-Sync   | V-Sync   | Video   |                   |               |                 |
| Stage1 | pulses   | pulses   | active  | 70W               | -             | Green           |
| Stage1 | no pulse | pulses   | blanked | Less than 5W      | within 3 sec  | Orange          |
|        | pulses   | no pulse | blanked |                   |               |                 |
|        | no pulse | no pulse | blanked |                   |               |                 |

 (\*); It is capable to select by user.

# Trouble Shooting

## 1. Introduction

This trouble shooting guide is arranged by fault conditions. Following each fault condition is a check for a signal on condition to be answered YES or NO.  
 For NO answer proceed to the right and continue until the fault is located.  
 For a YES answer continue in the left column to the next numbered check.  
 Again followed this procedure until the fault is located.

## 2. Trouble shooting procedure

When Troubleshooting this monitor, some precaution should be observed.  
 Use a high quality isolation transformer is capable of providing 3 Amps or more.  
 Never connect primary ground and secondary ground together including use with an isolation transformer.  
 Measure high voltage with respect to chassing ground only, and with a high impedance prove of 1000 mega-ohm or higher and rated for 30KV DC or higher.  
 Measure QH09 collector pulse with a high quality 100:1 probe rated for 1500 volts or higher.

## 3. Troubleshooting procedure

| Symptom                | Check(YES)  | Action(NO)   |
|------------------------|---|--|
| a) Image is scrolling. | 1) Check for Vsync at pin 41 of ICM01<br>2) Check for positive going Vsync at pin 2 of ICH01.<br>3) Will V-oscillator is locked with input signal?<br>(pin 22 of ICH01)<br>4) Check V-ramp at pin 23 of ICH01.<br>5) Check V-out at pin 5 of ICV01.           | Check 15 pin D-sub connector, cable, ZDM02.<br>Check ICM01, ICH01<br>Check CH01, CH02<br>Replace ICH01.<br>Check B+ at pin 2,4 of ICV01. |
| b) Image is unstable.  | 1) Check for Hsync at pin 40 of ICM01<br>2) Check for positive going Hsync at pin 1 of ICH01.<br>3) Will H-oscillator is locked with input signal?<br>(pin 6 of ICH01)<br>4) Check H-out at pin 26 of ICH01<br>5) Check for flyback pulse at pin 12 of ICH01. | Check 15 pin D-sub connector, cable, ZDM01.<br>Check ICM01 , ICH01<br>Check CH06, RH06<br>Replace ICH01<br>Check RH10                    |

| Symptom   | Check(YES)   | Action(NO)   |
|---|--|--|
| c) Screen is black but high voltage is present. | <ol style="list-style-type: none"> <li>1) Check for G2, pin4 of CRT. Around 500 volts?</li> <li>2) Check for heater voltage at pin 6 of CRT. (about 6.3V)</li> <li>3) Can screen be lit with brightness control at MAX?</li> <li>4) Check for video at pin 5, 6, 7 of ICC01</li> <li>5) Check for positive pulse for clamp at pin 23 of ICC01.</li> <li>6) Check if contrast controls video level at pin 18,19,20 of ICC01.</li> <li>7) Check for video at pin 1, 2, 3 of ICC03.</li> <li>8) Check if R, G, B cut-off control the video DC level at pin 6, 8, 11 of CRT.</li> <li>9) Check CRT.</li> </ol> | <p>Check DH28, RH96, RH92, CH53, CRT socket. G2 Wire</p> <p>Check DP13, RP24, RP25, QP05 CRT socket. RC32, CNC01</p> <p>Check DH21, DH25, QH18, QH19. DH26 RH99. CRT socket.</p> <p>Check 15 pin D-sub connector, cable, DC4,5,6 Check</p> <p>Check ICM01, RC13, CNC01</p> <p>Check ICM01, ICC01, 5V<sub>DC</sub> (Pin9)of ICC01</p> <p>Check ICC03, 75V<sub>DC</sub> (pin 4) 12V<sub>DC</sub>(pin 8)</p> <p>Check ICC04</p> |
| d) Screen is black with no high voltage.        | <ol style="list-style-type: none"> <li>1) Is the LED01 lighting in Green color.</li> <li>2) Check for 14V at collector of QP07.</li> <li>3) Check output pulse at pin 26, 28 of ICH01.</li> <li>4) Check Hor-Drive pulse at Base of QH09.</li> <li>5) Check B+ at pin 2 of TH04.</li> </ol>  | <p>Check H.V Sync at pin40, 41 of ICM01. Check pin 8,9 of ICM01. Check ICM01, ICM02,ICC03</p> <p>Check QP07, QP08. Check pin 10 of ICM01.</p> <p>Check for Vcc at pin 29 of ICH01. Check oscilation pulse at pin 6 of ICH01. Check X-Ray voltage below 8.0V at pin 25 of ICH01.</p> <p>Check RH11, RH12, RH13</p> <p>Check QH08, TH01.</p> <p>Check DH07, LH01, QH07, QH05 QH06, RH41, RH42, RH39, RH16, ICH01</p>           |
| e) No power                                     | <ol style="list-style-type: none"> <li>1) Check ICP01 pin 4, 7</li> <li>2) Check switch pulse at Drain of QP04.</li> <li>3) Check voltage for, 55V at Cathode of Dp11 and for 7V at Cathode of DP13 and for 14V at cathode of DP15</li> </ol>  | <p>Check QP01, QP02, DP16, DP07</p> <p>Check pin 6, 3 of ICP01, RP11</p> <p>Recheck above Item(d).</p>   |

# Adjustment Method

## 1. Caution

Extremely high voltage are present in the area around the FBT(TH04) and the anode high voltage Lead.

## 2. Equipment Required

Digital Voltmeter  
Frequency Counter : about 40 Hz to 100 KHz  
Color Analyzer  
Video Signal Generator  
High Voltmeter : up to 30 KV  
Alignment Template : Attachment 1

## 3. Before Adjustment

Verify that the video output level is 0.7 Vpp at 75 ohm termination and the video timings are same as standard timing given in specification. Place the AC power switch to the ON position. Allow the monitor to stabilize thermally for 15 minutes at least before any adjustment about the image parameters. The electron optics of the CRT and electronics of system require time of stabilize.

## 4. Adjustment Procedure

### 4-1 Horizontal raster center setting

- Video Signal : Back Raster pattern in 60kHz, 768 mode
- Measuring Point : SWH01, main board
- Place the Raster in center of the bezel.

### 4-2 Factory mode setting

- Turn off the power.
- Keep pressing the menu select key until the power turns on.
- Press the menu select key one more time.
- You can see the "F" message in 5th bottom on the right of the OSD main menu.
- This is the factory mode.
- Turn off the power to save the adjusted state.
- Select the "Mode Information" menu after you exit the factory mode.

### 4-3 Rotation setting

- Video Signal : Cross Hatch pattern in 31.5kHz, 400 mode
- Adjust the rotation of screen by using the menu select key and UP And Down Key.

### 4-4 Color setting

- Adhere color Analyzer sensor closely to CRT center.
- Set Factory mode.
- Video mode : 68.677kHz, 768 mode

### 1 Color Temperature 9300°K setting

- Select " 93 " by using the menu select key and up/ down KEY.

#### ① Back Raster Setting

- Video signal : Back Raster Pattern
- Adjust the brightness of back raster by Using up/ down KEY in "Bright"
- Limits :  $2.5 \pm 0.5$  cd/m<sup>2</sup>

#### ② Cut-off Setting

- Video signal : Back Raster Pattern
- Select "Cut-off" by using the menu select key and adjustment up/ down KEY.
- Press the menu select key to get the desired R, G or B Cut-off.
- Adjust x and y color coordinate by Using up and down key
- Limits :  $x=0.283 \pm 0.01$ ,  $y=0.297 \pm 0.01$

#### ③ Drive Setting

- Video signal : 20% white box
- Select the "9300" by using the menu select key and R,G or B up/ down KEY.
- Press the menu select key to get the desired R or B
- Adjust the x and y color coordinate by Using up and down key
- Limits :  $x=0.283 \pm 0.01$ ,  $y=0.297 \pm 0.01$

#### ④ Contrast Setting

- Video Signal : 20% white box
- Adjust the brightness go to 0.1 cd/m<sup>2</sup> by using the adjustment up/ down KEY in "Bright"
- Adjust the brightness of 20% white box by using up/ down Key in "contrast"
- Limits :  $150 \pm 3$  cd/m<sup>2</sup>

#### ⑤ Back Raster Setting again

- The method of adjustment is same to section ①

### 2) Color Temperature 6500°K Setting

- Select " 65 " by using the menu select key and up/ down KEY.

#### ① Back Raster, Cut-off Setting

- The method of adjustment is same to 9300°K
- The color coordinate is  $x=0.313 \pm 0.01$ ,  $y=0.329 \pm 0.01$

#### ② Drive, contrast Setting

- The method of adjustment is same to 9300°K
- The color coordinate is  $x=0.313 \pm 0.01$ ,  $y=0.329 \pm 0.01$

### 4-5 Geometry Setting

- Adhere template closely to the CRT surface
- Video Signal : Cross hatch pattern in 31.5kHz to 69kHz expectively.
- Adjust the all items by using the menu/ select key .

#### 1) Horizontal Position Setting

- Place the screen in center of the horizontal direction.

#### 2) Horizontal Size Setting

- Adjust the horizontal size of the screen to  $305 \pm 5$  mm
- adjust the horizontal size of the screen to  $260 \pm 4$ mm.

#### 3) Vertical Position Setting

- "Place the screen in center of the vertical direction.

#### 4) Vertical Size Setting

- Adjust the vertical size of the screen to  $229 \pm 5$  mm

#### 5) Pincushion Setting

- Make the straight line to the vertical right and left line of screen.

#### 6) Trapezoid Setting

- Make the same size to the horizontal up and bottom size of screen.

#### 7) Parallelogram & Pin Balance

- Adjust parallelogram until vertical lines are parallel to the vertical vezel.

#### 8) Corner Pin

- Adjust corner pin until 4 corners are parallel to the vertical vezel.

#### 9) Rotation Setting

- Adjust rotate until horizontal lines are parallel to the vezel.

**4-6 Focus**

- Video Signal : Reverse " Full H " character pattern in 64kHz 1024 mode
- Adjust H/V Focus VR on the top and middle of the FBT so that the image of whole screen looks clear

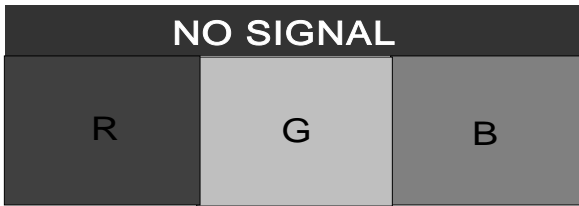
**5. X-Ray Protection Test**

- In any signal input condition, short RH12 (main board) by using the JIG.
- At this moment, check out whether raster disappears.
- Remove the JIG.
- After the power switch of the set off and on, check out proper working

**6. AGING and Self Test Mode**

The monitor has an enhanced level of self-diagnostics.  
When the signal cable is removed The monitor is operated to self test mode(Following OSD Image) and The Signal Isn't detected, the monitor is operated to OFF-Mode.

Picture A (MODE FOR END USER)



(OSD MESSAGE is moving around the screen)



## Specification

|                              |                 |   |
|------------------------------|-----------------|---|
| CRT                          | SIZE            | 17"(16" viewable) Diagonal  |
|                              | Dot Pitch       | 0.20 mm (Horizontal Dot Pitch)  |
|                              | Type            | Non-glare, Anti-Static & TCO Coated   |
| Input                        | Signal          | R.G.B Analog  |
|                              | Cable           | 15 pin D-Type male Connector  |
| SYNC                         | H-F             | 30 kHz ~ 70 kHz(Automatic)  |
|                              | V-F             | 50 Hz ~ 150 Hz(Automatic)   |
| Video Bandwidth              |                 | 108 MHz (-3dB)  |
| Display                      | Area(H×V) Color | 305 × 229mm (Max. Over Scan) Infinite   |
| Resolution                   | Max.            | 1280 × 1024(64kHz/60Hz)   |
| User Controls & OSD Controls |                 | Recall, Brightness/Contrast, H/V-Position, H/V-Size, Pincushion/Trapezoid, Rotation, H/V-Moire, Degauss, Color Control, Parallel, Information, Language, OSD H/V Poistion, Pin Balpance, Top/Botton-Corner, H/V-Linearity |
| Power Management             |                 | As per VESA Standard, Lower than EPA's recommendation   |
| VESA DDC 1/2B                |                 | Basic   |
| Compatibility                |                 | VESA, 8514/A, XGA, EVGA, MAC II   |
| Power Source                 |                 | 100-240 VAC(Universal Power) 70W 1.5A   |
| Safety & Regulation          | TCO             | Basic   |
|                              | EMC             | FCC Class B, CE,EMC   |
|                              | Safety          | cULus, TÜV-GS, SEMKO, DHHS, PCBC, GOST-R, VCCI  |
| Temperature                  | Storage         | -20 to 60 degree celsius  |
|                              | Operating       | 0 to 35 degree celsius  |
| Humidity                     | Operating       | 35% to 80% (Non-condensing)   |
|                              | Storage         | 5% to 85%   |
| Weight                       |                 | Unit : 15.5Kg • Gross Weight :17.5Kg(with carton)   |
| Dimension(W × H × D mm)      |                 | 380 × 372 × 411mm   |

► Specification is subject to change without notice for performance improvement.

## Critical Parts Specification

### WT62P1

#### GENERAL DESCRIPTION

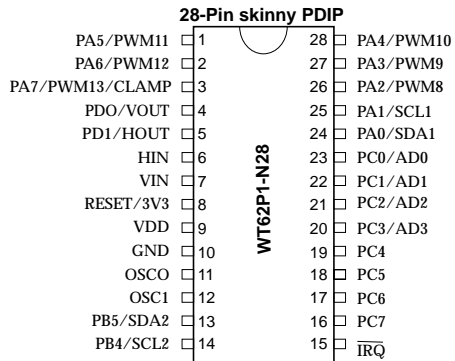
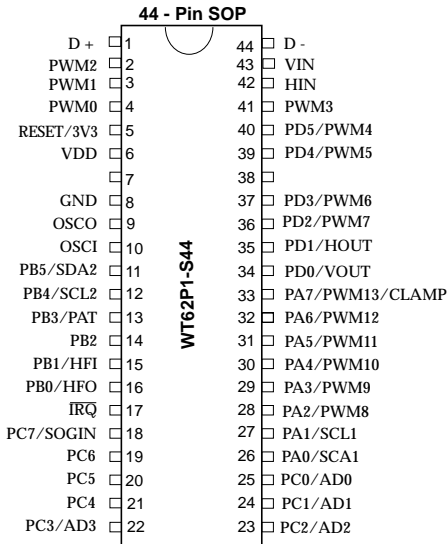
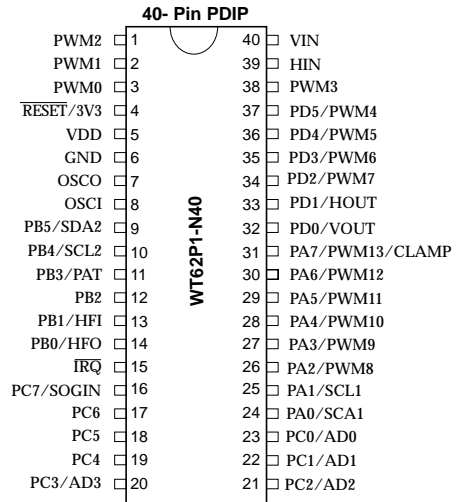
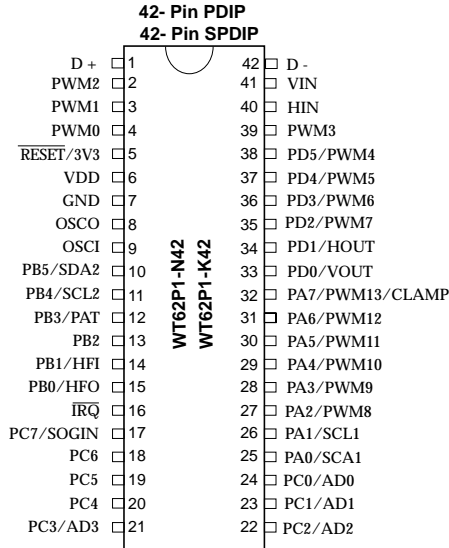
The WT62P1 is a microcontroller for digital controlled monitor with Universal Serial Bus(USB)interface. It contains an 8-bit CPU, 32k bytes flash memory, 512 bytes RAM, 14 PWMs, parallel I/Os, SYNC signal processor, time, DDC 1/2B interface, master/slave I2C interface, low speed USB device module, 6-bit A/D converter and watch-dog timer.

#### FEATURES

- 8-bit 6502 compatible CPU with 6MHz operating frequency
- 32768 bytes flash memory, 512 bytes SRAM.
- 12 MHz crystal oscillator
- 4 channels processor with H+V separation , H/V frequency counter, H/V polarity detection/control and clamp pulse output
- Sync signal processor with H+V separation, H/V frequency counter, H/V polarity detection/control and clamp pulse output
- Six free-running sync signal outputs(Horizontal frequency up to 106KHz)
- Self-test pattern
- DDC 1/2B supported
- Fast mode master slave I<sup>2</sup>C interface(up to 400KHz)
- Embedded USB function with endpoint 0 and endpoint 1
- Built-In 3.3V regulator for USB transceiver
- Watch-dog timer
- Maximum 28 programmable I/O pins
- One 8-bit programmable timer
- 6-bit A/D converter with 4 selectable inputs
- One external interrupt request input
- Low V<sub>DD</sub> reset

| Package Type       | Part Number |
|--------------------|-------------|
| 42-pin PDIP        | WT62P1-N42  |
| 42-pin shrink PDIP | WT62P1-K42  |
| 40-pin PDIP        | WT62P1-N40  |
| 28-pin skinny PDIP | WT62P1-N28  |
| 44-pin SOP         | WT62P1-S44  |

## PIN CONFIGURATION



## TDA9116

### FEATURES

#### General

- ADVANCED I<sup>2</sup>C BUS CONTROLLED DEFLECTION PROCESSOR DEDICATED FOR HIGH-END CRT MONITORS
- SINGLE SUPPLY VOLTAGE 12V
- VERY LOW JITTER
- DC/DC CONVERTER CONTROLLER
- ADVANCED EW DRIVE
- ADVANCED ASYMMETRY CORRECTIONS
- AUTOMATIC MULTISTANDARD SYNCHRONIZATION
- VERTICAL DYNAMIC CORRECTION WAVEFORM OUTPUT
- X-RAY PROTECTION AND SOFT-START & STOP ON HORIZONTAL AND DC/DC DRIVE OUTPUTS
- I<sup>2</sup>C BUS STATUS REGISTER

#### Horizontal section

- 150 kHz maximum frequency
  - Corrections of geometric asymmetry: Pin cushion asymmetry, Parallelogram
  - Tracking of asymmetry corrections with vertical size and position
- Fully integrated internal horizontal moiré cancellation and moiré cancellation output

#### Vertical section

- 200 Hz maximum frequency
  - Vertical ramp for DC-coupled output stage with adjustments of: C-correction, S-correction for super-flat CRT, Vertical size, Vertical position
  - Vertical moiré cancellation through vertical ramp waveform
- Compensation of vertical breathing with EHT variation

#### EW section

- Symmetrical geometry corrections: Pin cushion, Keystone, Top/Bottom corners separately
- Horizontal size adjustment
- Tracking of EW waveform with Vertical size and position and adaptation to frequency
- Compensation of horizontal breathing through EW waveform

#### Dynamic correction section

- Output with vertical dynamic correction waveform for dynamic corrections like focus, brightness uniformity, ...
- Fixed on screen by means of tracking system

#### DC/DC controller section

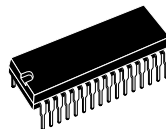
- Step-up and step-down conversion modes
- External sawtooth configuration
- Bus-controlled output voltage
- Synchronization on hor. frequency with phase selection
- Selectable polarity of drive signal

#### DESCRIPTION

The TDA9116 is a monolithic integrated circuit assembled in a 32-pin shrink dual-in-line plastic package. This IC controls all the functions related to horizontal and vertical deflection in multimode or multi-frequency computer display monitors.

The internal sync processor, combined with the powerful geometry correction block, makes the TDA9116 suitable for very high performance monitors, using few external components.

Combined with other ST components dedicated for CRT monitors (microcontroller, video preamplifier, video amplifier, OSD controller) the TDA9116 allows fully I<sup>2</sup>C bus-controlled computer display monitors to be built with a reduced number of external components.

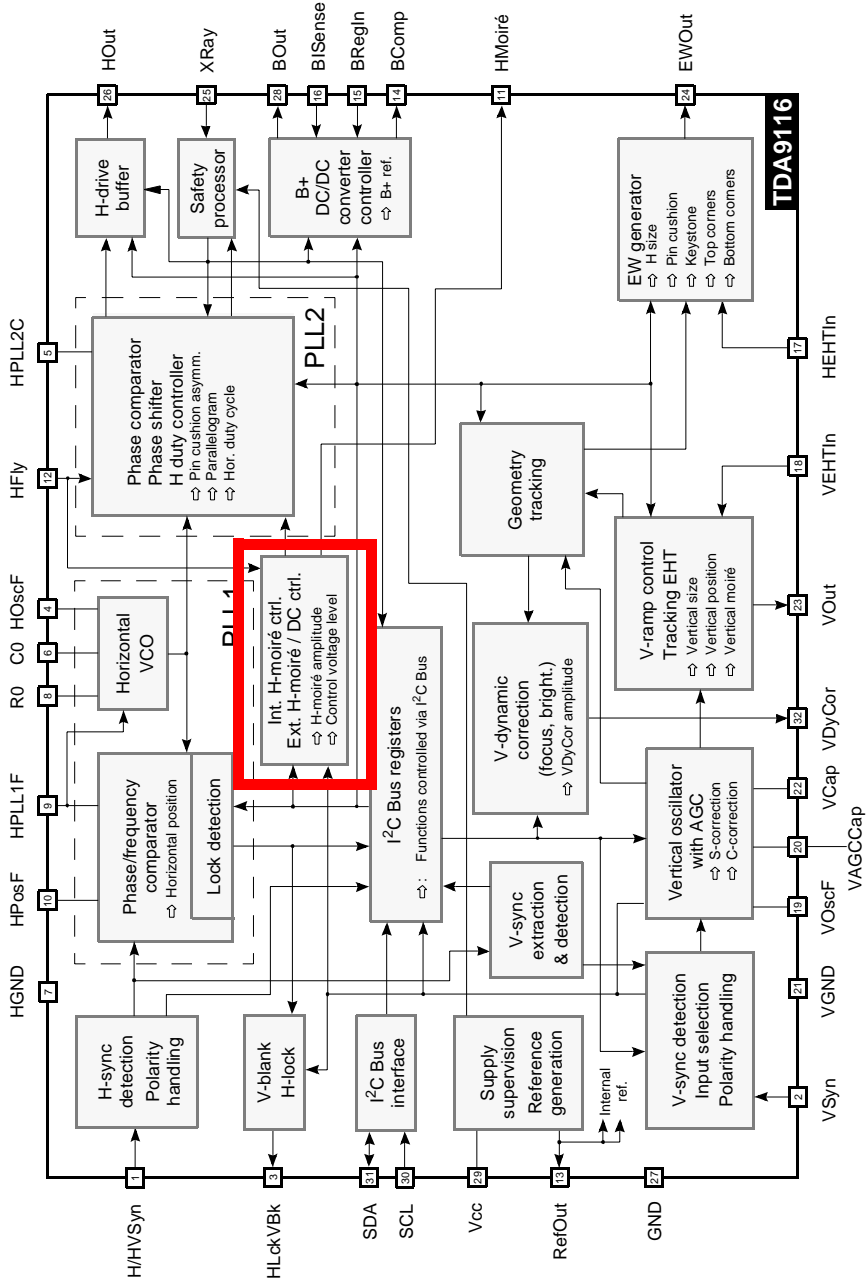


**SHRINK 32 (Plastic Package)**  
**ORDER CODE: TDA9116**

## 2 - PIN CONFIGURATION

|               |                          |           |    |                          |         |
|---------------|--------------------------|-----------|----|--------------------------|---------|
| H/HVSyn       | <input type="checkbox"/> | 1         | 32 | <input type="checkbox"/> | VDyCor  |
| VSyn          | <input type="checkbox"/> | 2         | 31 | <input type="checkbox"/> | SDA     |
| HLckVBk       | <input type="checkbox"/> | 3         | 30 | <input type="checkbox"/> | SCL     |
| HOscF         | <input type="checkbox"/> | 4         | 29 | <input type="checkbox"/> | Vcc     |
| HPLL2C        | <input type="checkbox"/> | 5         | 28 | <input type="checkbox"/> | BOut    |
| CO            | <input type="checkbox"/> | 6         | 27 | <input type="checkbox"/> | GND     |
| HGND          | <input type="checkbox"/> | 7         | 26 | <input type="checkbox"/> | HOOut   |
| RO            | <input type="checkbox"/> | 8         | 25 | <input type="checkbox"/> | XRay    |
| HPLL1F        | <input type="checkbox"/> | 9         | 24 | <input type="checkbox"/> | EWOut   |
| HPosF         | <input type="checkbox"/> | 10        | 23 | <input type="checkbox"/> | VOOut   |
| <b>HMoire</b> | <input type="checkbox"/> | <b>11</b> | 22 | <input type="checkbox"/> | VCap    |
| HFIy          | <input type="checkbox"/> | 12        | 21 | <input type="checkbox"/> | VGND    |
| RefOut        | <input type="checkbox"/> | 13        | 20 | <input type="checkbox"/> | VAGCCap |
| BComp         | <input type="checkbox"/> | 14        | 19 | <input type="checkbox"/> | VOscF   |
| BRegIn        | <input type="checkbox"/> | 15        | 18 | <input type="checkbox"/> | VEHTIn  |
| BISense       | <input type="checkbox"/> | 16        | 17 | <input type="checkbox"/> | HEHTIn  |

3 - BLOCK DIAGRAM



#### 4 - PIN FUNCTION REFERENCE

| Pin | Name    | Function  |
|-----|---------|---|
| 1   | H/HVSyn | TTL compatible <b>Horizontal / Horizontal</b> and <b>Vertical Sync.</b> input                           |
| 2   | VSyn    | TTL compatible <b>Vertical Sync.</b> input  |
| 3   | HLckVBk | <b>Horizontal PLL1 Lock</b> detection and <b>Vertical early Blanking</b> composite output               |
| 4   | HOscF   | High <b>Horizontal Oscillator</b> sawtooth threshold level Filter input                                 |
| 5   | HPLL2C  | <b>Horizontal PLL2</b> loop <b>Capacitive</b> filter input  |
| 6   | CO      | Horizontal <b>Oscillator Capacitor</b> input  |
| 7   | HGND    | <b>Horizontal</b> section <b>GrouND</b>   |
| 8   | RO      | Horizontal <b>Oscillator Resistor</b> input   |
| 9   | HPLL1F  | <b>Horizontal PLL1</b> loop Filter input  |
| 10  | HPosF   | Horizontal <b>Position</b> Filter and soft-start time constant capacitor input                          |
| 11  | HMoiré  | Horizontal <b>Moiré</b> / adjustable DC voltage output  |
| 12  | HFly    | Horizontal <b>Flyback</b> input   |
| 13  | RefOut  | <b>Reference</b> voltage <b>Output</b>  |
| 14  | BComp   | <b>B+</b> DC/DC error amplifier ( <b>Comparator</b> ) output  |
| 15  | BRegIn  | <b>Regulation</b> feedback <b>Input</b> of the <b>B+</b> DC/DC converter controller                     |
| 16  | BISense | <b>B+</b> DC/DC converter current ( <b>I</b> ) <b>Sense</b> input                                       |
| 17  | HEHTIn  | <b>Input</b> for compensation of <b>Horizontal</b> amplitude versus <b>EHT</b> variation                |
| 18  | VEHTIn  | <b>Input</b> for compensation of <b>Vertical</b> amplitude versus <b>EHT</b> variation                  |
| 19  | VOscF   | <b>Vertical Oscillator</b> sawtooth low threshold Filter (capacitor to be connected to VGND)            |
| 20  | VAGCCap | Input for storage <b>Capacitor</b> for <b>Automatic Gain Control</b> loop in <b>Vertical</b> oscillator |
| 21  | VGND    | <b>Vertical</b> section <b>GrouND</b>   |
| 22  | VCap    | <b>Vertical</b> sawtooth generator <b>Capacitor</b>   |
| 23  | VOut    | <b>Vertical</b> deflection drive <b>Output</b> for a DC-coupled output stage                            |
| 24  | EWOut   | <b>E/W</b> <b>Output</b>  |
| 25  | XRy     | <b>X-Ray</b> protection input   |
| 26  | HOuT    | <b>Horizontal</b> drive <b>Output</b>   |
| 27  | GND     | Main <b>GrouND</b>  |
| 28  | BOuT    | <b>B+</b> DC/DC converter controller <b>Output</b>  |
| 29  | Vcc     | Supply voltage  |
| 30  | SCL     | I <sup>2</sup> C bus <b>Serial C</b> Lock Input   |
| 31  | SDA     | I <sup>2</sup> C bus <b>Serial D</b> Ata input/output   |
| 32  | VDyCor  | <b>Vertical</b> <b>D</b> ynamic <b>C</b> orrection output   |

**5 - QUICK REFERENCE DATA**

| Characteristic  | Value                    | Unit |
|---|--------------------------|------|
| <b>General</b>  |                          |      |
| Package   | SDIP 32                  |      |
| Supply voltage  | 12                       | V    |
| Supply current  | 65                       | mA   |
| Application category  | Mid-range                |      |
| Means of control/Maximum clock frequency                                      | I <sup>2</sup> C bus/400 | kHz  |
| EW drive  | Yes                      |      |
| DC/DC converter controller  | Yes                      |      |
| Adjustable DC level output  | Yes                      |      |
| <b>Horizontal section</b>   |                          |      |
| Frequency range   | 15 to 150                | kHz  |
| Autosync frequency ratio (can be enlarged in application)                     | 4.5                      |      |
| Positive/Negative polarity of horizontal sync signal/Automatic adaptation     | Yes/Yes/Yes              |      |
| Duty cycle range of the drive signal  | 30 to 65                 | %    |
| Position adjustment range with respect to H period                            | ±10                      | %    |
| Soft start/Soft stop feature  | Yes/Yes                  |      |
| Hardware/Software PLL lock indication   | Yes/Yes                  |      |
| Parallelogram   | Yes                      |      |
| Pin cushion asymmetry correction (also called Side pin balance)               | Yes                      |      |
| Top/Bottom/Common corner asymmetry correction                                 | No/No/No                 |      |
| Tracking of asymmetry corrections with vertical size & position               | Yes                      |      |
| Horizontal moiré cancellation (int./ext.) for Combined/Separated architecture | Yes/Yes                  |      |
| <b>Vertical section</b>   |                          |      |
| Frequency range   | 35 to 200                | Hz   |
| Autosync frequency range (150nF at VCap and 470nF at VAGCCap)                 | 50 to 180                | Hz   |
| Positive/Negative polarity of vertical sync signal/Automatic adaptation       | Yes/Yes/Yes              |      |
| S-correction/C-correction/Super-flat tube characteristic                      | Yes/Yes/Yes              |      |
| Vertical size/Vertical position adjustment                                    | Yes/Yes                  |      |
| Vertical moiré cancellation (internal)  | Yes                      |      |
| Vertical breathing compensation   | Yes                      |      |
| <b>EW section</b>   |                          |      |
| Pin cushion correction  | Yes                      |      |
| Keystone correction   | Yes                      |      |
| Top/Bottom/Common corner correction   | Yes/Yes/No               |      |
| Horizontal size adjustment  | Yes                      |      |
| Tracking of EW waveform with Frequency/Vertical size & position               | Yes/Yes                  |      |
| Breathing compensation on EW waveform   | Yes                      |      |
| <b>Dynamic correction section (dyn. focus, dyn. brightness,...)</b>           |                          |      |
| Vertical dynamic correction output  | Yes                      |      |
| Horizontal dynamic correction output  | No                       |      |
| Composite HV dynamic correction output  | No                       |      |
| Tracking of vertical waveform with V. size & position                         | Yes                      |      |
| <b>DC/DC controller section</b>   |                          |      |
| Step-up/Step-down conversion mode   | Yes/Yes                  |      |
| Internal/External sawtooth configuration                                      | No/Yes                   |      |
| Bus-controlled output voltage   | Yes                      |      |
| Soft start/Soft stop feature  | Yes/Yes                  |      |
| Positive(N-MOS)/Negative(P-MOS) polarity of BOut signal                       | Yes/Yes                  |      |



## LM2467

# Monolithic Triple 7.5 ns CRT Driver

## General Description

The LM2467 is an integrated high voltage CRT driver circuit designed for use in color monitor applications. The IC contains three high input impedance, wide band amplifiers which directly drive the RGB cathodes of a CRT. Each channel has its gain internally set to .20 and can drive CRT capacitive loads as well as resistive loads present in other applications, limited only by the package's power dissipation. The IC is packaged in an industry standard 9-lead TO-220 molded plastic power package. See Thermal Considerations section.

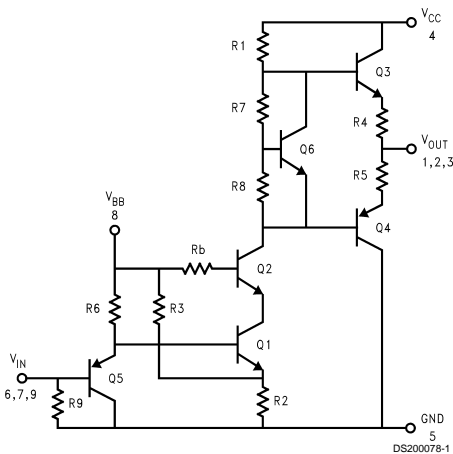
## Features

- Higher gain to match LM126X CMOS preamplifiers
- 0V to 3.75V input range
- Stable with 0±20 pF capacitive loads and inductive peaking networks
- Convenient TO-220 staggered lead package style
- Maintains standard LM243X Family pinout which is designed for easy PCB layout

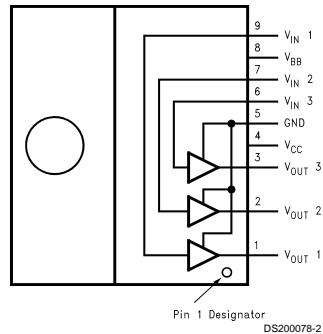
## Applications

- 024 x 768 displays up to 85 Hz refresh
- Pixel clock frequencies up to 95 MHz
- Monitors using video blanking

## Schematic and Connection Diagrams



**FIGURE 1. Simplified Schematic Diagram (One Channel)**



Note: Tab is at GND

**Top View**  
Order Number LM2467T

**Absolute Maximum Ratings** (Notes 1, 3)

**If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/ Distributors for availability and specifications.**

|   |                 |
|---|-----------------|
| Supply Voltage ( $V_{CC}$ )             | +90V            |
| Bias Voltage ( $V_{BB}$ )               | +16V            |
| Input Voltage ( $V_{IN}$ )              | 0V to 4.5V      |
| Storage Temperature Range ( $T_{STG}$ ) | ,65 C to +150 C |

|   |       |
|---|-------|
| Lead Temperature<br>(Soldering, <10 sec.) | 300 C |
| ESD Tolerance, Human Body Model           | 2 kV  |
| Machine Model                             | 250V  |

**Operating Ranges** (Note 2)

|                  |                 |
|------------------|-----------------|
| $V_{CC}$         | +60V to +85V    |
| $V_{BB}$         | +8V to +15V     |
| $V_{IN}$         | +0V to +3.75V   |
| $V_{OUT}$        | +15V to +75V    |
| Case Temperature | ,20 C to +100 C |

Do not operate the part without a heat sink.

**Electrical Characteristics**

(See Figure 2 for Test Circuit)  
 Unless otherwise noted:  $V_{CC} = +80V$ ,  $V_{BB} = +12V$ ,  $C_L = 8$  pF,  $T_C = 50$  C  
 DC Tests:  $V_{IN} = 2.25V_{DC}$   
 AC Tests: Output =  $40V_{PP}$ (25V - 65V) at 1MHz

| Symbol       | Parameter         | Conditions  | LM2467 |         |     | Units    |
|--------------|-------------------|---|--------|---------|-----|----------|
|              |                   |   | Min    | Typical | Max |          |
| $I_{CC}$     | Supply Current    | All Three Channels, No Input Signal, No Output Load |        | 30      |     | mA       |
| $I_{BB}$     | Bias Current      | All Three Channels                                  |        | 18      |     | mA       |
| $V_{OUT}$    | DC Output Voltage | No AC Input Signal, $V_{IN} = 1.25V$                | 62     | 65      | 68  | $V_{DC}$ |
| $A_V$        | DC Voltage Gain   | No AC Input Signal                                  | 18     | 20      | 22  |          |
| $\Delta A_V$ | Gain Matching     | (Note 4), No AC Input Signal                        |        | 1.0     |     | dB       |
| LE           | Linearity Error   | (Notes 4, 5), No AC Input Signal                    |        | 5       |     | %        |
| $t_R$        | Rise Time         | (Note 6), 10% to 90%                                |        | 7.5     |     | ns       |
| $t_F$        | Fall Time         | (Note 6), 90% to 10%                                |        | 8       |     | ns       |
| OS           | Overshoot         | (Note 6)  |        | 5       |     | %        |

**Note 1:** Absolute Maximum Ratings indicate limits beyond which damage to the device may occur.

**Note 2:** Operating ratings indicate conditions for which the device is functional, but do not guarantee specific performance limits. For guaranteed specifications and test conditions, see the Electrical Characteristics. The guaranteed specifications apply only for the test conditions listed. Some performance characteristics may change when the device is not operated under the listed test conditions.

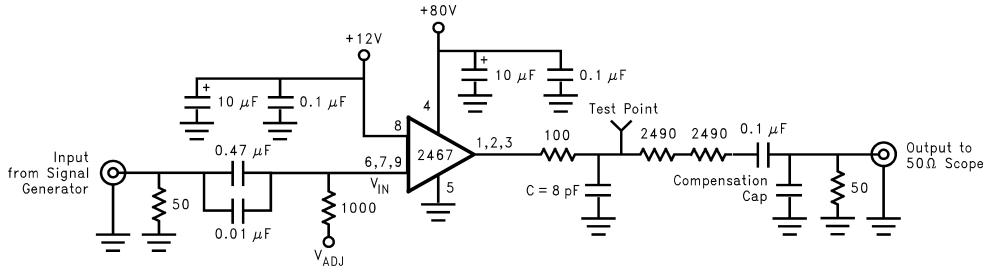
**Note 3:** All voltages are measured with respect to GND, unless otherwise specified.

**Note 4:** Calculated value from Voltage Gain test on each channel.

**Note 5:** Linearity Error is the variation in dc gain from  $V_{IN} = 1.0V$  to  $V_{IN} = 3.5V$ .

**Note 6:** Input from signal generator:  $t_r, t_f < 1$  ns.

## AC Test Circuit



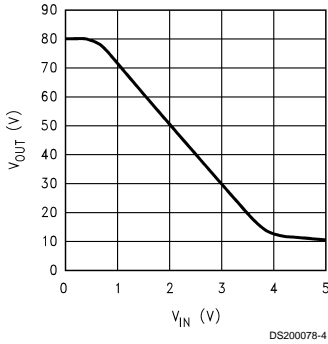
DS200078-3

**Note:** 8 pF load includes parasitic capacitance.

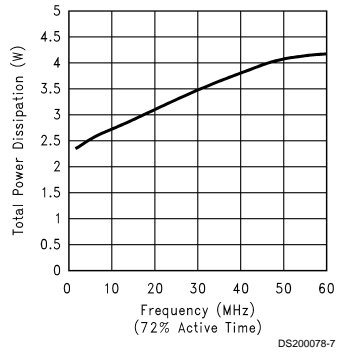
**FIGURE 2. Test Circuit (One Channel)**

*Figure 2* shows a typical test circuit for evaluation of the LM2467. This circuit is designed to allow testing of the LM2467 in a 50Ω environment without the use of an expensive FET probe. The two 2490Ω resistors form a 200:1 divider with the 50Ω resistor and the oscilloscope. A test point is included for easy use of an oscilloscope probe. The compensation capacitor is used to compensate the stray capacitance of the two 2490Ω resistors to achieve flat frequency response.

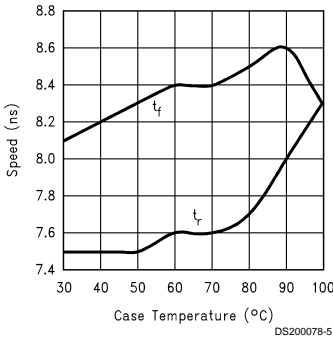
**Typical Performance Characteristics** ( $V_{CC} = +80 V_{DC}$ ,  $V_{BB} = +12 V_{DC}$ ,  $C_L = 8 pF$ ,  $V_{OUT} = 40 V_{PP}$  (25V,65V), Test Circuit - Figure 2 unless otherwise specified)



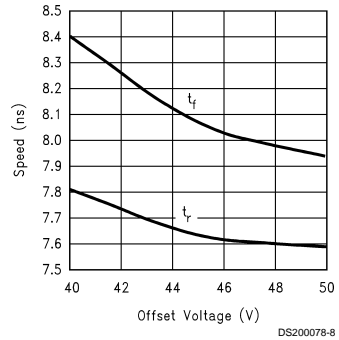
**FIGURE 3.  $V_{OUT}$  vs  $V_{IN}$**



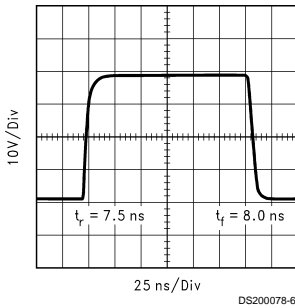
**FIGURE 6. Power Dissipation vs Frequency**



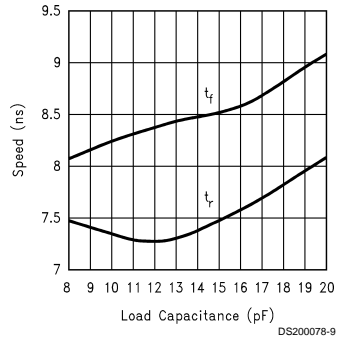
**FIGURE 4. Speed vs Temp.**



**FIGURE 7. Speed vs Offset**



**FIGURE 5. LM2467 Pulse Response**



**FIGURE 8. Speed vs Load Capacitance**

## LM2479

### 120V Triple Bias Clamp

#### General Description

The LM2479 is an integrated 120V triple bias clamp circuit for DC recovery of each of the AC coupled outputs of a CRT driver. It is well matched with the DAC outputs of the LM126X family of pre-amplifiers. Each amplifier has its gain internally set to -18. The IC is packaged in an industry standard 8 lead molded DIP package.

- High input impedance
- Single supply operation
- Matched to the LM126X family of preamplifiers

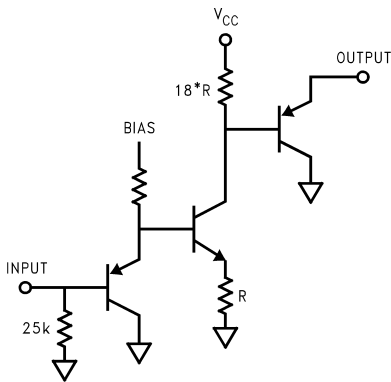
#### Recommended Applications

- CRT monitors requiring DC restoration at the cathodes

#### Features

- Wide range integrated triple bias clamp

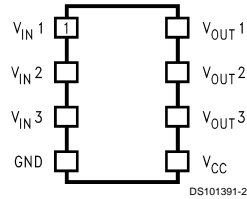
#### Block Diagrams



DS101391-1

FIGURE 1. Simplified Schematic (One Channel)

#### Package Pinout



DS101391-2

FIGURE 2. LM2479 Package Pinout  
Order Number LM2479NA  
NS Package Number: N08E

**Absolute Maximum Ratings** (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

|                                       |                 |
|---------------------------------------|-----------------|
| Supply Voltage, $V_{CC}$              | +130V           |
| Input Voltage, $V_{IN}$               | 0V to 5V        |
| Storage Temperature Range, $T_{STG}$  | -65 C to +150 C |
| Lead Temperature (Soldering, <10sec.) | 300 C           |

ESD Tolerance, Machine Model 200V

**Limits of Operating Ranges** (Note 3)

|                                  |            |
|----------------------------------|------------|
| $V_{CC}$                         | 110 to 125 |
| $V_{OUT}$ , $V_{CC} = 120V$      | 50 to 120V |
| Ambient Temperature Range, $T_A$ | 0 to 70 C  |

**DC CLAMP ELECTRICAL CHARACTERISTICS TARGETS AND LIMIT**

Unless otherwise noted:  $V_{CC} = +120V$ ,  $V_{IN} = 2.25V_{DC}$ ,  $T_A = 25 C$ .

| Symbol          | Spec Parameter       | Conditions                   | Min | Typ | Max | Units    |
|-----------------|----------------------|------------------------------|-----|-----|-----|----------|
| $I_{CC}$        | Supply Current       | All channels                 |     | 2.3 | 3.5 | mA       |
| $V_{OUT}$       | DC Output Voltage    |                              | 83  | 87  | 91  | $V_{DC}$ |
| $V_{OUT-Range}$ | Output Voltage Range | $V_{IN}$ Range = 1.0V - 4.0V |     | 53  |     | V        |
| $A_V$           | DC Voltage Gain      |                              | -16 | -18 | -20 |          |
| LE              | Linearity Error      | See Note 1                   |     | 5   |     | %        |
| $R_{IN}$        | Input Resistance     |                              |     | 24K |     | $\Omega$ |

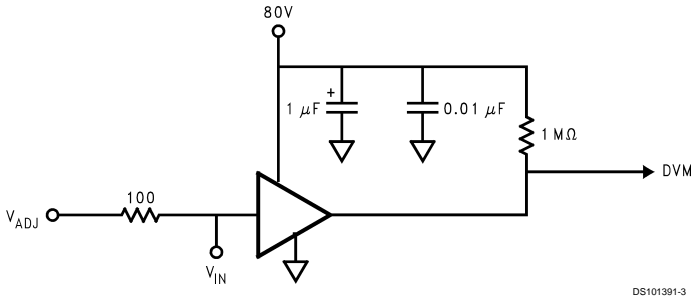
**Note 1:** Linearity Error is the variation in DC gain from  $V_{IN} = 1.0V$  to  $V_{IN} = 4.0V$ .

**Note 2:** Absolute Maximum Ratings indicate limits beyond which damage to the device may occur.

**Note 3:** Operating Ratings indicate conditions for which the device is functional, but do not guarantee specific performance limits. For guaranteed specifications and the test conditions, see the Electrical Characteristics. The guaranteed specifications apply only for the test conditions listed. Some performance characteristics may change when the device is not operated under the listed test conditions.

**Note 4:** All voltages are measured with respect to GND, unless otherwise specified.

**Test Circuit**

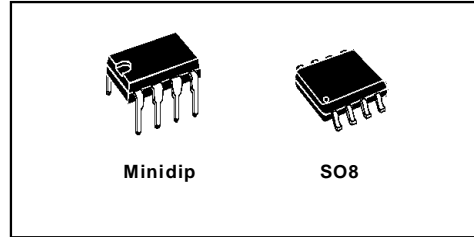


**FIGURE 3. Test Circuit (One Channel)**

Figure 3 shows the test circuit for evaluation of the LM2479 Clamp Amplifier. A high impedance VM (>100M $\Omega$ ) is used for DC measurements at the output.

## UC3843B

- TRIMMED OSCILLATOR FOR PRECISE FREQUENCY CONTROL
- OSCILLATOR FREQUENCY GUARANTEED AT 250kHz
- CURRENT MODE OPERATION TO 500kHz
- AUTOMATIC FEED FORWARD COMPENSATION
- LATCHING PWM FOR CYCLE-BY-CYCLE CURRENT LIMITING
- INTERNALLY TRIMMED REFERENCE WITH UNDERVOLTAGE LOCKOUT
- HIGH CURRENT TOTEM POLE OUTPUT
- UNDERVOLTAGE LOCKOUT WITH HYSTERESIS
- LOW START-UP AND OPERATING CURRENT



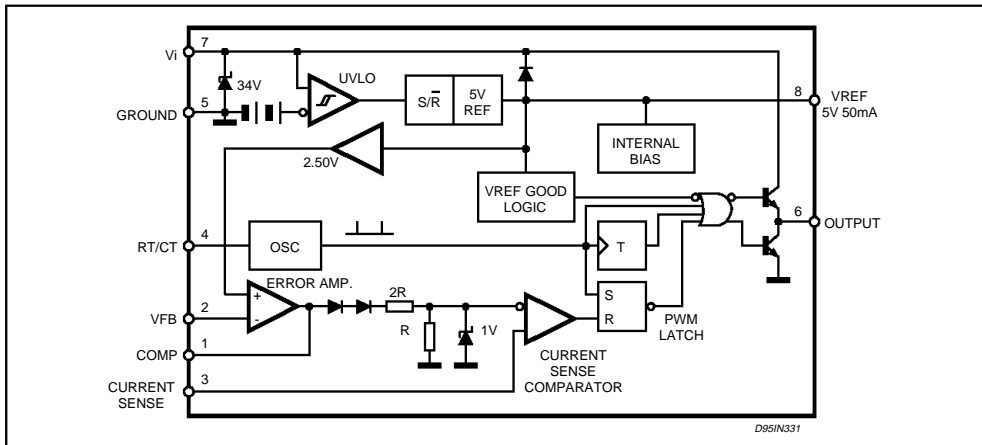
comparator which also provides current limit control, and a totem pole output stage designed to source or sink high peak current. The output stage, suitable for driving N-Channel MOSFETs, is low in the off-state.

Differences between members of this family are the under-voltage lockout thresholds and maximum duty cycle ranges. The UC3842B and UC3844B have UVLO thresholds of 16V (on) and 10V (off), ideally suited off-line applications. The corresponding thresholds for the UC3843B and UC3845B are 8.5V and 7.9V. The UC3842B and UC3843B can operate to duty cycles approaching 100%. A range of the zero to < 50% is obtained by the UC3844B and UC3845B by the addition of an internal toggle flip flop which blanks the output off every other clock cycle.

### DESCRIPTION

The UC384xB family of control ICs provides the necessary features to implement off-line or DC to DC fixed frequency current mode control schemes with a minimal external parts count. Internally implemented circuits include a trimmed oscillator for precise DUTY CYCLE CONTROL under voltage lockout featuring start-up current less than 0.5mA, a precision reference trimmed for accuracy at the error amp input, logic to insure latched operation, a PWM

### BLOCK DIAGRAM

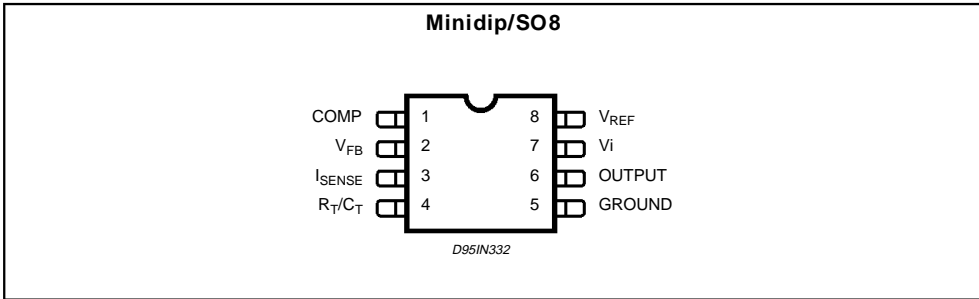


**ABSOLUTE MAXIMUM RATINGS**

| Symbol           | Parameter  | Value            | Unit             |
|------------------|--|------------------|------------------|
| $V_i$            | Supply Voltage (low impedance source)                                      | 30               | V                |
| $V_i$            | Supply Voltage ( $I_i < 30\text{mA}$ )                                     | Self Limiting    |                  |
| $I_O$            | Output Current   | +1               | A                |
| $E_O$            | Output Energy (capacitive load)  | 5                | $\mu\text{J}$    |
|                  | Analog Inputs (pins 2, 3)  | $\pm 0.3$ to 5.5 | V                |
|                  | Error Amplifier Output Sink Current  | 10               | mA               |
| $P_{\text{tot}}$ | Power Dissipation at $T_{\text{amb}} 3 25\text{ }^\circ\text{C}$ (Minidip) | 1.25             | W                |
| $P_{\text{tot}}$ | Power Dissipation at $T_{\text{amb}} 3 25\text{ }^\circ\text{C}$ (SO8)     | 800              | mW               |
| $T_{\text{stg}}$ | Storage Temperature Range  | $\pm 65$ to 150  | $^\circ\text{C}$ |
| $T_J$            | Junction Operating Temperature   | $\pm 40$ to 150  | $^\circ\text{C}$ |
| $T_L$            | Lead Temperature (soldering 10s)   | 300              | $^\circ\text{C}$ |

\* All voltages are with respect to pin 5, all currents are positive into the specified terminal.

**PIN CONNECTION (top view)**



**PIN FUNCTIONS**

| No | Function           | Description  |
|----|--------------------|--|
| 1  | COMP               | This pin is the Error Amplifier output and is made available for loop compensation.  |
| 2  | $V_{FB}$           | This is the inverting input of the Error Amplifier. It is normally connected to the switching power supply output through a resistor divider.  |
| 3  | $I_{\text{SENSE}}$ | A voltage proportional to inductor current is connected to this input. The PWM uses this information to terminate the output switch conduction.  |
| 4  | $R_T/C_T$          | The oscillator frequency and maximum Output duty cycle are programmed by connecting resistor $R_T$ to $V_{\text{ref}}$ and capacitor $C_T$ to ground. Operation to 500kHz is possible. |
| 5  | GROUND             | This pin is the combined control circuitry and power ground.   |
| 6  | OUTPUT             | This output directly drives the gate of a power MOSFET. Peak currents up to 1A are sourced and sunk by this pin.   |
| 7  | $V_{CC}$           | This pin is the positive supply of the control IC.   |
| 8  | $V_{\text{ref}}$   | This is the reference output. It provides charging current for capacitor $C_T$ through resistor $R_T$ .  |

**ORDERING NUMBERS**

| SO8                  | Minidip            |
|----------------------|--------------------|
| UC2842BD1; UC3842BD1 | UC2842BN; UC3842BN |
| UC2843BD1; UC3843BD1 | UC2843BN; UC3843BN |
| UC2844BD1; UC3844BD1 | UC2844BN; UC3844BN |
| UC2845BD1; UC3845BD1 | UC2845BN; UC3845BN |



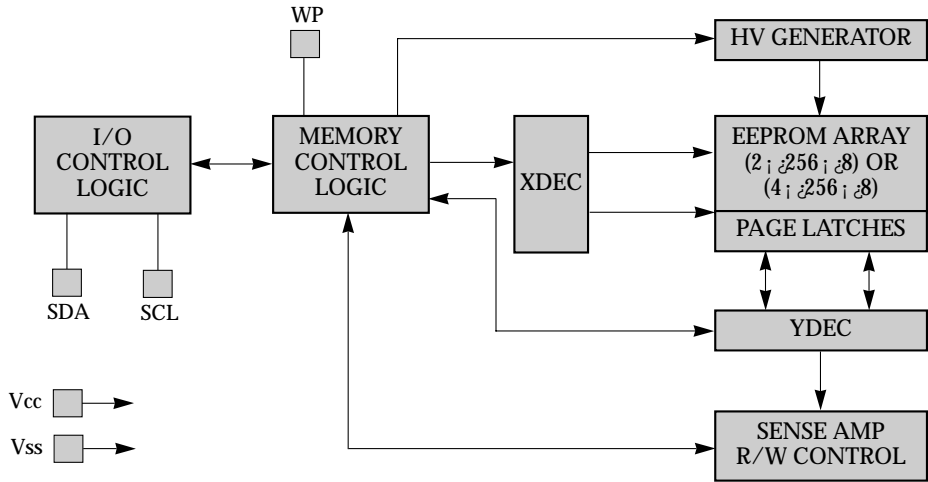
**KS24C08****4K 2.5V CMOS Serial EEPROMs****FEATURES**

- Single supply with operation down to 2.5V
- Low power CMOS technology
  - 1 mA active current typical
  - 10 $\mu$ A standby current typical at 5.5V
  - 5  $\mu$ A standby current typical at 3.0V
- Organized as two or four blocks of 256 bytes (2  $\times$  256  $\times$  8) and (4  $\times$  256  $\times$  8)
- Two wire serial interface bus, 12CTM
- Schmitt trigger, filtered inputs for noise suppression
- Output slope control to eliminate ground bounce
- 100kHz (2.5V) and 400kHz (5V) compatibility
- Self-timed write cycle (including auto-erase)
- Page-write buffer for up to 16 bytes
- 2 ms typical write cycle time for page-write
- Hardware write cycle time for page-write
- Can be operated as a serial ROM
- Factory programming (OTP) available
- ESD protection > 4,000V
- 1,000,000 ERASE/WRITE cycles (typical)
- Data retention > 40 years
- 8-pin DIP, 8-lead or 14-lead SOIC packages
- Available for extended temperature ranges
  - Commercial : 0°C to +70°C
  - Industrial : -40°C to +85°C

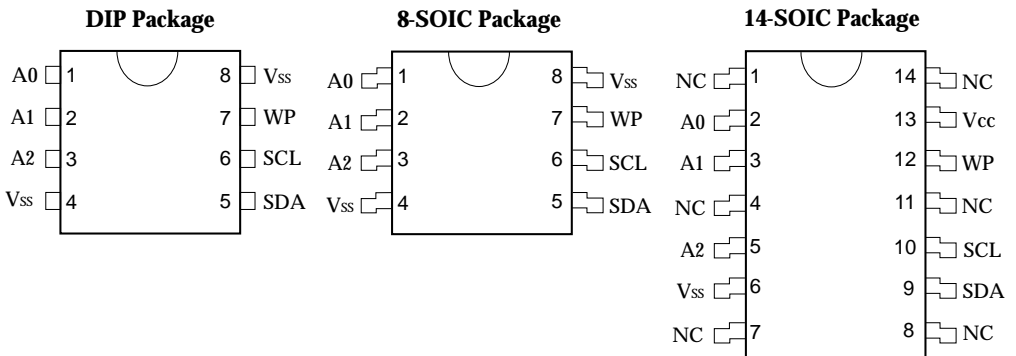
**DESCRIPTION**

The Microchip Technology Inc. 24LC04B/08B is a 4K- or 8K-bit Electrically Erasable PROM. The device is organized as two or four blocks of 256  $\times$  8 bit memory with a two wire serial interface. Low voltage design permits operation down to 2.5 volts with standby and active currents of only 5 $\mu$ A and 1mA respectively. The 24LC04B/08B also has a page-write capability for up to 16 bytes of data. The 24LC04B/08B is available in the standard 8-pin DIP and both 8-lead and 14-lead surface mount SOIC packages.

**BLOCK DIAGRAM**



**PIN CONFIGURATION**



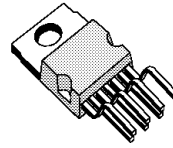
PC is a trademark of Philips Corporation

## TDA9302H

- POWER AMPLIFIER
- FLYBACK GENERATOR
- THERMAL PROTECTION

### DESCRIPTION

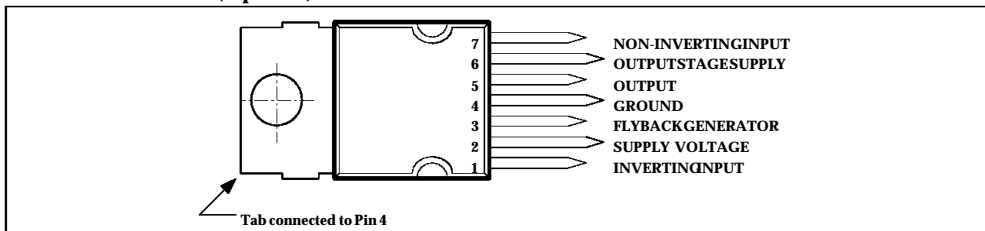
The TDA9302H is a monolithic integrated circuit in HEPTAWATT™ package. It is a high efficiency powerbooster for direct driving of vertical windings of TV yokes. It is intended for use in Color and B & W television as well as in monitors and displays.



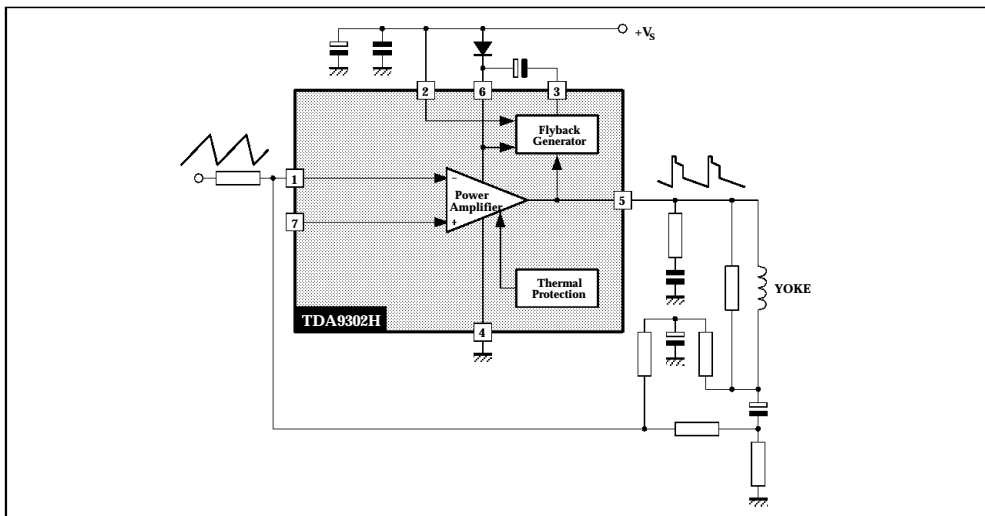
HEPTAWATT  
(Plastic Package)

ORDER CODE : TDA9302H

### PIN CONNECTIONS (top view)



### BLOCK DIAGRAM



**ABSOLUTE MAXIMUM RATINGS AT  $T_A = 25^\circ\text{C}$**

| Symbol         | Parameter  | Value                | Unit              |
|----------------|--|----------------------|-------------------|
| $V_S$          | Supply Voltage (pin2)                                    | 35                   | V                 |
| $V_5, V_6$     | Flyback Peak Voltage                                     | 60                   | V                 |
| $V_3$          | Voltage at Pin3  | + $V_S$              |                   |
| $V_1, V_7$     | Amplifier Input Voltage                                  | + $V_S$<br>$\pm 0.5$ | V                 |
| $I_b$          | Deflection Output Current                                | + 1.8                | A                 |
| $I_3$          | Pin 3 DC Current at $V_5 < V_2$                          | 100                  | mA                |
| $P_{tot}$      | Total Power Dissipation at $T_{case} = 90^\circ\text{C}$ | 15                   | W                 |
| $T_{stg}, T_j$ | Storage and Junction Temperature                         | $\pm 40, +150$       | $5^\circ\text{C}$ |

SOURCE: Q770

**THERMAL DATA**

| Symbol        | Parameter                        | Value  | Unit                |
|---------------|----------------------------------|--------|---------------------|
| $R_{th(j-c)}$ | Thermal Resistance Junction-case | Max. 4 | $5^\circ\text{C/W}$ |

SOURCE: Q770

**RECOMMENDED OPERATING CHARACTERISTICS AT  $T_A = 25^\circ\text{C}$**

| Symbol    | Parameter                      | Test Conditions | Min. | Typ. | Max. | Unit |
|-----------|--------------------------------|-----------------|------|------|------|------|
| $V_{2M}$  | Recommended Supply Voltage     |                 |      | 25   |      | V    |
| $V_{2R}$  | Operating Supply Voltage Range |                 | 15   |      | 30   | V    |
| $I_{5PP}$ | Deflection Output Current      |                 |      |      | 2    | App  |

SOURCE: Q770

**ELECTRICAL CHARACTERISTICS**

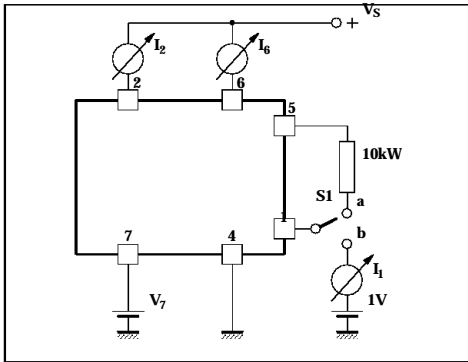
(refer to the test circuits,  $V_S = 35\text{V}$ ,  $T_{amb} = 25^\circ\text{C}$  unless otherwise specified)

| Symbol   | Parameter                                  | Test Conditions                        | Min. | Typ.      | Max.    | Unit              | Fig. |
|----------|--|--|------|-----------|---------|-------------------|------|
| $I_2$    | Pin 2 Quiescent Current                    | $I_3 = 0, I_5 = 0$                     |      |           | 16      | mA                | 1a   |
| $I_6$    | Pin 6 Quiescent Current                    | $I_3 = 0, I_5 = 0$                     |      |           | 36      | mA                | 1a   |
| $I_1$    | Amplifier Input Bias Current               | $V_1 = 1\text{ V}, V_7 = 2\text{ V}$   |      | $\pm 0.1$ | $\pm 1$ | mA                | 1a   |
|          |  | $V_1 = 2\text{ V}, V_7 = 1\text{ V}$   |      | $\pm 0.1$ | $\pm 1$ | mA                | 1a   |
| $V_{3L}$ | Pin 3 Saturation Voltage to GND            | $I_3 = 20\text{ mA}$                   |      | 1         | 1.5     | V                 | 1c   |
| $V_5$    | Quiescent Output Voltage                   | $V_S = 35\text{V}, R_a = 39\text{ kW}$ |      | 18        |         | V                 | 1d   |
|          |  | $I_5 = 1\text{ A}$                     |      | 0.9       | 1.3     | V                 | 1c   |
| $V_{5L}$ | Output Saturation Voltage to GND           | $I_5 = 0.7\text{ A}$                   |      | 0.7       | 1       | V                 | 1c   |
|          |  | $\pm I_5 = 1\text{ A}$                 |      | 1.5       | 2       | V                 | 1b   |
| $V_{5H}$ | Output Saturation Voltage to Supply        | $\pm I_5 = 0.7\text{ A}$               |      | 1.3       | 1.8     | V                 | 1b   |
|          |  |  |      | 140       |         | $5^\circ\text{C}$ |      |
| $T_j$    | Junction Temperature for Thermal Shut Down |  |      |           |         |                   |      |

SOURCE: Q770

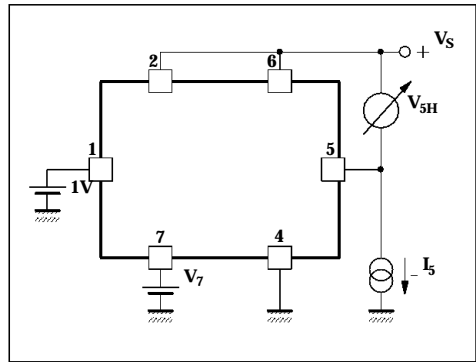
**Figure 1 : DC Test Circuits.**

**Figure 1 a : Measurement of  $I_1$  ;  $I_2$  ;  $I_6$**

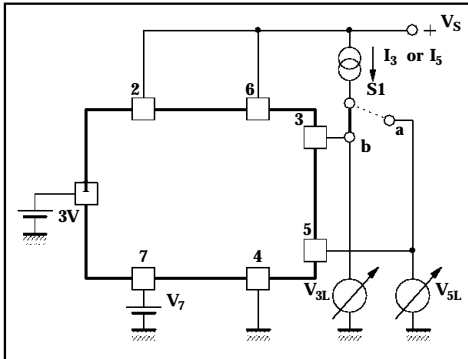


$S_1$  : (a)  $I_2$  and  $I_6$  ; (b)  $I_1$

**Figure 1 b : Measurement of  $V_{5H}$**

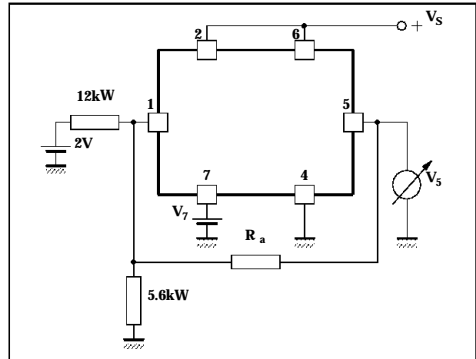


**Figure 1 c : Measurement of  $V_{3L}$  ;  $V_{5L}$**

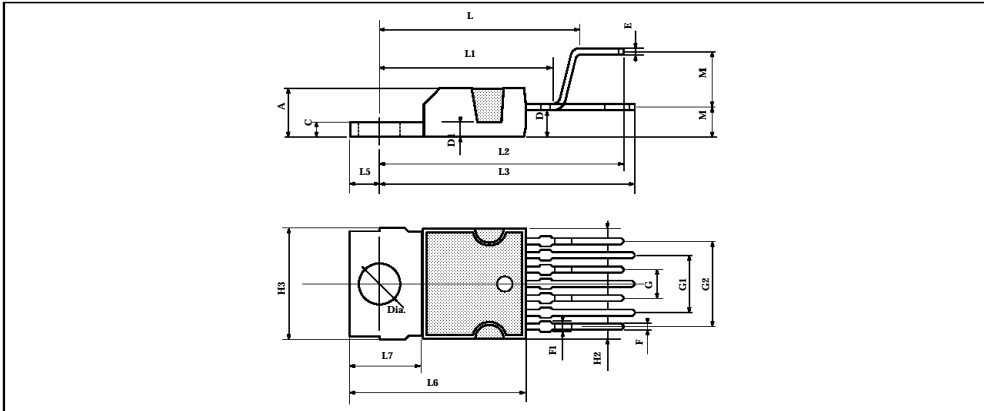


$S_1$  : (a)  $V_{3L}$  ; (b)  $V_{5L}$

**Figure 1 d : Measurement of  $V_5$**



**PACKAGE MECHANICAL DATA : 9 PINS - PLASTIC HEPTAWATT**



9 PINS - PLASTIC HEPTAWATT

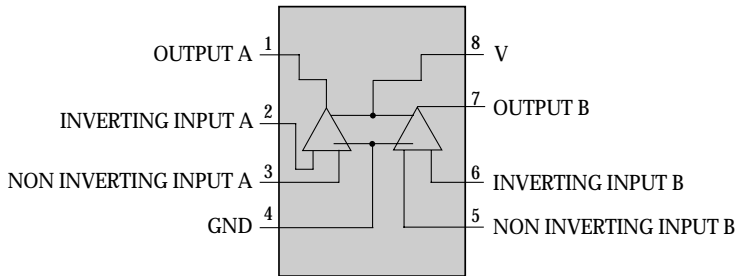
| Dimensions | Millimeters |       |      | Inches |       |       |
|------------|-------------|-------|------|--------|-------|-------|
|            | Min.        | Typ.  | Max. | Min.   | Typ.  | Max.  |
| A          |             |       | 4.8  |        |       | 0.189 |
| C          |             |       | 1.37 |        |       | 0.054 |
| D          | 2.4         |       | 2.8  | 0.094  |       | 0.110 |
| D1         | 1.2         |       | 1.35 | 0.047  |       | 0.053 |
| E          | 0.35        |       | 0.55 | 0.014  |       | 0.022 |
| F          | 0.6         |       | 0.8  | 0.024  |       | 0.031 |
| F1         |             |       | 0.9  |        |       | 0.035 |
| G          | 2.41        | 2.54  | 2.67 | 0.095  | 0.100 | 0.105 |
| G1         | 4.91        | 5.08  | 5.21 | 0.193  | 0.200 | 0.205 |
| G2         | 7.49        | 7.62  | 7.8  | 0.295  | 0.300 | 0.307 |
| H2         |             |       | 10.4 |        |       | 0.409 |
| H3         | 10.05       |       | 10.4 | 0.396  |       | 0.409 |
| L          |             | 16.97 |      |        | 0.668 |       |
| L1         |             | 14.92 |      |        | 0.587 |       |
| L2         |             | 21.54 |      |        | 0.848 |       |
| L3         |             | 22.62 |      |        | 0.891 |       |
| L5         | 2.6         |       | 3    | 0.102  |       | 0.118 |
| L6         | 15.1        |       | 15.8 | 0.594  |       | 0.622 |
| L7         | 6           |       | 6.6  | 0.236  |       | 0.260 |
| M          |             | 2.8   |      |        | 0.110 |       |
| M1         |             | 5.08  |      |        | 0.200 |       |
| Dia.       | 3.65        |       | 3.85 | 0.144  |       | 0.152 |

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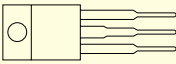
## LM358



## Voltage Detector ICs

| Type No.               | Function                         | Operating Voltage (V) | Package   |
|------------------------|----------------------------------|-----------------------|---|
| KIA7019P/F<br>~7045P/F | CPU Reset, Low Voltage Detector  | 1.9 ~ 4.5             | TO - 92  |
| KIA7419P/F<br>~7445P/F | CPU Reset, High Voltage Detector | 1.9 ~ 4.5             |   |

## Voltage Regulator ICs

| Type No.    | Function                     | Typ<br>Vo(V) | Max.  |        |       | Package  |
|-------------|------------------------------|--------------|-------|--------|-------|--|
|             |                              |              | Io(A) | Vin(V) | Pd(W) |  |
| KIA7805P/PI | 1.0A 3-Terminal<br>Regulator | 5            | 1.0   | 35     | 20.8  | <br>TO-220AB |
| KIA7806P/PI |                              | 6            |       |        |       |  |
| KIA7808P/PI |                              | 8            |       |        |       |  |
| KIA7809P/PI |                              | 9            |       |        |       |  |
| KIA7810P/PI |                              | 10           |       |        |       |  |
| KIA7812P/PI |                              | 12           |       |        |       |  |
| KIA7815P/PI |                              | 15           |       | 40     |       |  |
| KIA7818P/PI |                              | 18           |       |        |       |  |
| KIA7820P/PI |                              | 20           |       |        |       |  |
| KIA7824P/PI |                              | 24           |       |        |       |  |

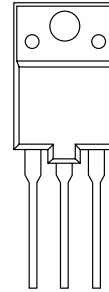
**TT2062**

**Horizontal Deflection Output For High Resolution Display, Color TV  
High Speed Switching Applications**

- High Voltage :  $V_{CBO}=1500V$
- Low Saturation Voltage :  $V_{CE(sat)}=3V(\text{Max.})$
- High Speed :  $t_f=0.2\mu s(\text{Typ.})$
- Collector Metal (Fin) is Fully covered with Mold Resin

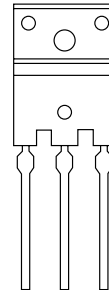
**Maximum Ratings (Ta=25°C)**

| CHARACTERISTIC                           | SYMBOL    | RATING    | UNIT |
|--|-----------|-----------|------|
| Collector-Base Voltage                   | $V_{CBO}$ | 1500      | V    |
| Collector-Emitter Voltage                | $V_{CEO}$ | 800       | V    |
| Emitter-Base Voltage                     | $V_{EBO}$ | 5         | V    |
| Collector Current                        | DC        | $I_C$     | A    |
|  | Pulse     | $I_{CP}$  |      |
| Base Current                             | $I_B$     | 4         | A    |
| Collector Power Dissipation<br>(Tc=25°C) | $P_C$     | 85        | W    |
| Junction Temperature                     | $T_j$     | 150       | °C   |
| Storage Temperature Range                | $T_{stg}$ | -55 ~ 150 | °C   |



**DMV1500M**

| CHARACTERISTIC                 | SYMBOL    | RATING                             | UNIT |
|--------------------------------|-----------|------------------------------------|------|
|                                |           | B                                  |      |
| Transient Peak Reverse Voltage | $V_{RSM}$ | 1500                               | V    |
| Peak Reverse Voltage           | $V_{RM}$  | 1500                               | V    |
| Average Forward Current        | $I_F(AV)$ | 6                                  | A    |
| Peak Surge Forward Current     | $I_{FSM}$ | 75                                 | A    |
| Pt Limiting Value              | $P_t$     | 12.5                               | A²s  |
| Junction Temperature           | $T_j$     | -40 ~ +150                         | °C   |
| Storage Temperature            | $T_{stg}$ | -40 ~ +150                         | °C   |
| Forward Voltage Drop           | $V_F$     | 1.65<br>cat $T_j=120\text{ °C}$    | V    |
| Revene Recovery Time           |           | cat $I_F=1A$<br>$T_j=25\text{ °C}$ | us   |





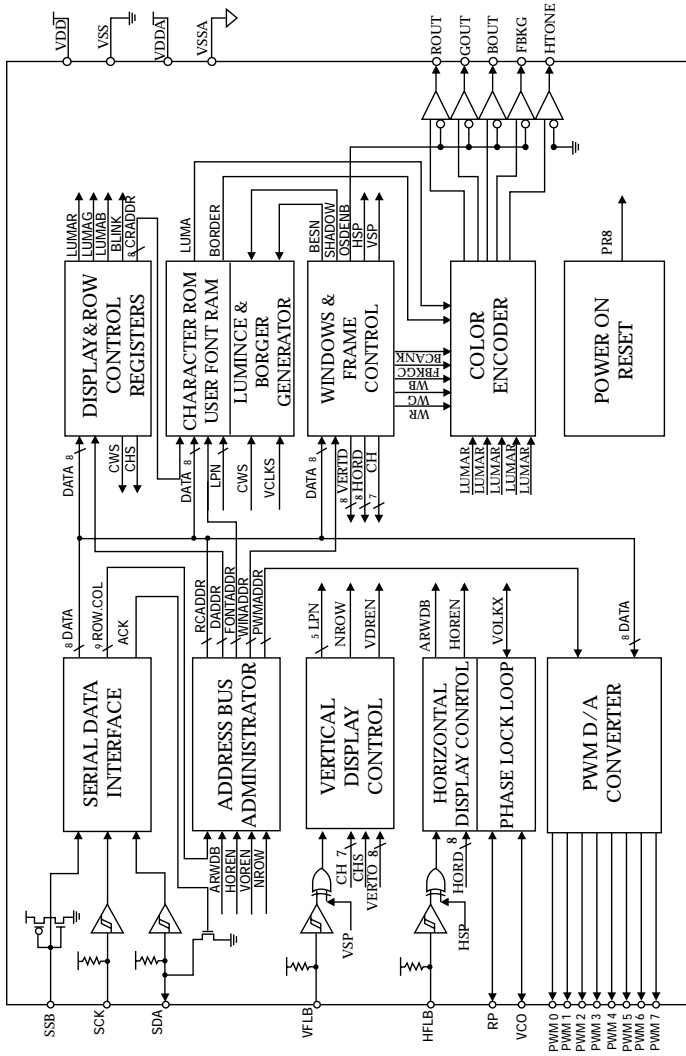
**MTV021****FEATURES**

- Horizontal SYNC input up to 120 KHz.
- On-chip PLL circuitry up to 96MHz
- Programmable horizontal resolutions up to 1524 dots per display row
- Full-screen display consists of 15(rows) by 30(columns) characters.
- 12 x 18 dot matrices per character.
- Total of 272 characters and graphic fonts, including 256 standard and 16 multi-color mark ROM fonts.
- 8 color-selectable maximum per display character.
- 7 color-selectable maximum for character background.
- Double character height and/or width control.
- Programmable positioning for display screen center.
- Bordering, shadowing and blinking effect.
- Programmable character height(18 to 71 nl lines)control.
- Row to row spacing register to manipulate the constant display height.
- 4 programmable background windows with multi-level operation and shadowing on window effect.
- Software clears bit for full-screen erasing.
- Half tone and fast blanking output.
- Fade-in fade-out effect.
- 8-channel/8-bit PWM D/A converter output.
- Compatible with SPI bus or I<sup>2</sup>C interface with slave address 7AH(slave address is mask option)
- 16-pin,20-pin or 24-pin PDIP package.

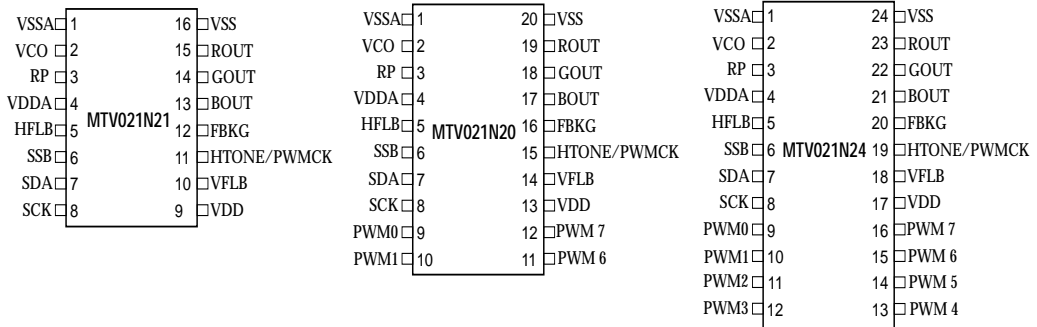
**GENERAL DESCRIPTION**

- MTV021 is designed for monitor applications to display built-in characters or fonts onto monitor screen. The display operation occurs by transferring data and control information from the micro-controller to RAM through a serial data interface. It can execute full-screen display automatically, as well as specific functions such as character background color, bordering, shadowing, blinking, double height and width, font by font color control, frame positioning, frame size control by character height and row-to-row spacing, horizontal display resolution, full-screen erasing, fade-in.fade-out effect, windowing effect and shadowing on window.
- MTV021 provides 256 standard and 16 multi-color characters and graphic fonts for more efficacious applications. The full OSD menu is formed by 15 rows x30 columns, which can be positioned anywhere on the monitor screen by changing vertical or horizontal delay
- Moreover, MTV021 also provides 8 PWM DAC channels with 8-bit resolution and a PWM clock output for external digital-to-analog control.

BLOCK DIAGRAM



## PIN CONNECTION



## PIN DESCRIPTIONS

| Name | I/O | PIN NO. |     |     | Descriptions   |
|------|-----|---------|-----|-----|--|
|      |     | N16     | N20 | N24 |  |
| VSSA | -   | 1       | 1   | 1   | Analog ground. This ground pin is used to internal analog circuitry.   |
| VCO  | I/O | 2       | 2   | 2   | Voltage Control Oscillator. This pin is used to control the internal oscillator frequency by DC voltage input from external low pass filter.   |
| RP   | I/O | 3       | 3   | 3   | Bias Resistor. The bias resistor is used to regulate the appropriate bias current for internal oscillator to resonate at specific dot frequency.   |
| VDDA | -   | 4       | 4   | 4   | Analog power supply. Positive 5V DC supply for internal analog circuitry. Any a 0.1uF decoupling capacitor should be connected across to VDDA and VSSA.  |
| HFLB | I   | 5       | 5   | 5   | Horizontal input. This pin is used to input the horizontal synchronizing signal. It is a leading edge triggered and has an internal pull-up resistor.  |
| SSB  | I   | 6       | 6   | 6   | Serial interface enable. It is used to enable the serial data and is also used to select the operation of I <sup>2</sup> C or SPI bus. If this pin is left floating, I2C bus is enabled, otherwise the SPI bus is enabled. |
| SDA  | I   | 7       | 7   | 7   | Serial data input . The external data transfer through this pin to internal display registers and control registers. It has an internal pull-up resistor.  |
| SCK  | I   | 8       | 8   | 8   | Serial clock input. The clock-input pin is used to synchronize the data transfer. It has an internal pull-up resistor.   |
| PWM0 | O   | -       | 9   | 9   | Open-Drain PWM D/A converter 0. The output pulse width is programmable by the register of Row 15, Column 23.   |
| PWM1 | O   | -       | 10  | 10  | Open-Drain PWM D/A converter 1. The output pulse width is programmable by the register of Row 15, Column 24.   |
| PWM2 | O   | -       | -   | 11  | Open-Drain PWM D/A converter 2. The output pulse width is programmable by the register of Row 15, Column 25.   |
| PWM3 | O   | -       | -   | 12  | Open-Drain PWM D/A converter 3. The output pulse width is programmable by the register of Row 15, Column 26.   |

| Name            | I/O | PIN NO. |     |     | Descriptions  |
|-----------------|-----|---------|-----|-----|---|
|                 |     | N16     | N20 | N24 |   |
| PWM4            | O   | -       | -   | 13  | Open-Drain PWM D/A converter 4. The output pulse width is programmable by the register of Row 15, Column 27.  |
| PWM5            | O   | -       | -   | 14  | Open-Drain PWM D/A converter 5. The output pulse width is programmable by the register of Row 15, Column 28.  |
| PWM6            | O   | -       | 11  | 15  | Open-Drain PWM D/A converter 6. The output pulse width is programmable by the register of Row 15, Column 29.  |
| PWM7            | O   | -       | 12  | 16  | Open-Drain PWM D/A converter 7. The output pulse width is programmable by the register of Row 15, Column 30.  |
| VDD             | -   | 9       | 13  | 17  | Digital power supply. Positive 5V DC supply for internal digital circuitry and a 0.1uF decoupling capacitor should be connected across to VDD and VSS.  |
| VFLB            | I   | 10      | 14  | 18  | Vertical input. This pin is used to input the vertical synchronizing signal. it is leading triggered and has an internal pull-up resistor.  |
| HTONE/<br>PWMCK | O   | 11      | 15  | 19  | Half tone output /PWM clock output. This is a multiplexed pin selected by PWMCK bit. This pin can be a PWM clock or used to attenuate R.G.B gain of VGA for the transparent windowing effect. |
| FBKG            | O   | 12      | 16  | 20  | Fast Blanking output. It is used to cut off external R,G,B signals of VGA white this chip is displaying characters or windows.  |
| BOUT            | O   | 13      | 17  | 21  | Blue color output. It is a blue color video signal output.  |
| GOUT            | O   | 14      | 18  | 22  | Green Color output. It is a green color video signal output.  |
| ROUT            | O   | 15      | 19  | 23  | Red Color output. It is a red color video signal output.  |
| VSS             | O   | 16      | 20  | 24  | Digital ground. This ground pin is used to internal digital circuitry.  |

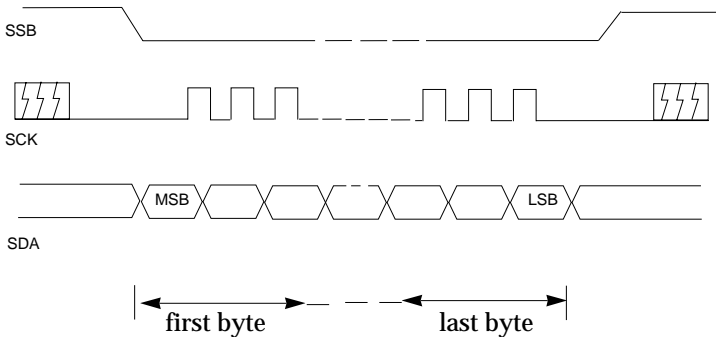
**FUNCTIONAL DESCRIPTIONS**

**SERIAL DATA INTERFACE**

The serial data interface receives data transmitted from an external controller. And there are 2 types of bus can be accessed through the serial data interface, one is SPI bus and other is I<sup>2</sup>C bus.

**SPI bus**

While SSB pin is pulled to “high” or “low” level, the SPI bus operation is selected. And a valid transmission should be starting from pulling SSB to “low” level, enabling MTV021 to receiving mode, and retain “low” level until the last cycle for a complete data packet transfer. The protocol is shown in Figure 1.

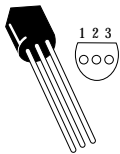


**FIGURE 1. Data Transmission Protocol(SPI)**

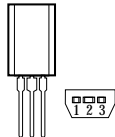
## TRANSISTORS

| Type No. | MAX. RATINGS     |                      |                          | $V_{CE(SET)}$                    |               | Max                 |   |   |   | Package  |
|----------|------------------|----------------------|--------------------------|----------------------------------|---------------|---------------------|---|---|---|----------|
|          | $V_{CEO}$<br>(V) | $I_C$<br>(mA)        | $P_C$<br>(mW)            | (V)                              | $I_C$<br>(mA) | $I_B$<br>(mA)       | 1 | 2 | 3 |          |
| KSP45    | 350              | 300                  | 1.5W                     | 0.5                              | 10            | 1                   | E | B | C | TO-92    |
| KTA1273Y | -30              | -2.0                 | 1W                       | -2.0                             | -1.5          | -30                 | E | C | B | TO-92L   |
| KSA928Y  | -30              | -2.0A                | 1W                       | -2.0                             | -1.5A         | -30                 | E | C | B | TO-92L   |
| KSA1013  | -160             | -1.0A                | 0.9W                     | -1.5                             | -500          | -50                 | E | C | B | TO-92L   |
| KSD1616Y | 50               | 1                    | 0.75W                    | 0.3                              | 1A            | 50                  | E | C | B | TO-92    |
| KSA733CY | -50              | -150                 | 250                      | -0.3                             | -100          | -10                 | E | C | B | TO-92    |
| IRF630A  | 200V             | 9A                   | 72W                      | 0.4 $\Omega$ (MAX)<br>RDS(ON)    |               | $\pm 30V$<br>(VGSS) | G | D | S | TO-220AB |
| KTC3198Y | 50               | 150                  | 625                      | 0.25                             | 100           | 10                  | E | C | B | TO-92    |
| KSC945CY | 50               | 150                  | 250                      | 0.15                             | 100           | 10                  | E | C | B | TO-92    |
| KTC3205Y | 30               | 2A                   | 1W                       | 2.0                              | 1.5A          | 30                  | E | B | C | TO-92L   |
| KSP42    | 300              | 500                  | 0.625                    | 0.5                              | 20            | 2                   | E | B | C | TO-92    |
| KSP92    | -300             | -500                 | 0.625                    | -0.5                             | -20           | -2                  | B | B | C | TO-92    |
| KRC102M  | 50               | 100                  | 400                      | -0.3                             | -100          | -0.88               | E | C | B | TO-92M   |
| 2SK2545  | 600V<br>(VDSS)   | 6A(I <sub>D</sub> )  | 40W<br>(P <sub>T</sub> ) | 1.2 $\Omega$<br>(MAX)<br>RDS(ON) |               | $\pm 30V$<br>(VGSS) | G | D | S | TO-220IS |
| YTA630   | 200V<br>(VDSS)   | 10A(I <sub>D</sub> ) | 75W<br>(P <sub>T</sub> ) | 0.8 $\Omega$<br>(MAX)<br>RDS(ON) |               | $\pm 20V$<br>(VGSS) | G | D | S | TO-220AB |

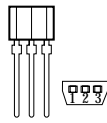
TO-92



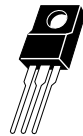
TO-92L



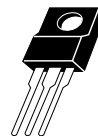
TO-92M



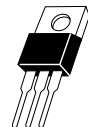
TO-220IS




TO-3P



TO-220AB



## Replacement Parts List


**PRODUCT SAFETY NOTICE :** COMPONENTS MARKED WITH  HAVE SPECIAL CHARACTERISTICS IMPORTANT TO SAFETY.

**ABBREVIATIONS :**

|                         |   |
|-------------------------|---|
| RD R-CARBON             | CK C-CERAMIC, HK                              |
| RS R-METAL OXIDE        | CE C-ELECTROLYTIC                             |
| RX R-CEMENT             | CC C-CERAMIC, TEMP                            |
| RN R-METAL( $\pm 1\%$ ) | CQ C-POLYESTER,<br>C-POLYPROPYLENE            |
|                         | CF C-METAL POLYESTER<br>C-METAL POLYPROPYLENE |

**NOTE :** COMPONENTS OF THIS PARTS LIST CAN BE CHANGED FOR QUALITY IMPROVEMENT WITHOUT INFORMATION.

MAIN BOARD

| NUM. | LOCATION | PART NUMBER | DESCRIPTION               | REMARK  |
|------|----------|-------------|---------------------------|---|
| 1    |          | E420453191C | AC INLET ASSY,Q770        |  |
| 2    |          | 3720101773  | CONN-M,AC INLET SOLDER    |   |
| 3    |          | E4208519801 | PCBA MA( I1*),Q770        |   |
| 4    |          | E4208819801 | PCBA MA( I2*),Q770        |   |
| 5    |          | E4208919801 | PCBA MA( I3*),Q770        |   |
| 6    |          | E4208419861 | PCBA MA(A6*),Q770         |   |
| 7    |          | E4208419851 | PCBA MA(A5*),Q770         |   |
| 8    |          | E4208419841 | PCBA MA(A4*),Q770         |   |
| 9    |          | 3040100886  | PCB-SINGLE,Q770 MAIN F1 1 |   |
| 10   | BH01     | 3540200058  | BD-FER,BFS3550            |   |
| 11   | BH02     | 3540200059  | BD-FER,BFS3580            |   |
| 12   | BH03     | 3540200058  | BD-FER,BFS3550            |   |
| 13   | BH04     | 3540200103  | BD-FER,HF70 BTL 3.5*6B    |   |
| 14   | BH05     | 3540200058  | BD-FER,BFS3550            |   |
| 15   | BH06     | 3540200058  | BD-FER,BFS3550            |   |
| 16   | BH07     | 3540200059  | BD-FER,BFS3580            |   |
| 17   | BH08     | 3540200058  | BD-FER,BFS3550            |   |
| 18   | BP01     | 3540200059  | BD-FER,BFS3580            |   |
| 19   | BP02     | 3540200058  | BD-FER,BFS3550            |   |
| 20   | BV01     | 3540200058  | BD-FER,BFS3550            |   |
| 21   | CH25     | 2131040020  | CAP-MULT,0.1UF 50V Z AXI  |   |
| 22   | CH60     | 2131040020  | CAP-MULT,0.1UF 50V Z AXI  |   |
| 23   | CM10     | 2133300004  | CAP-MULT,33PF 50V J AXI   |   |
| 24   | CM12     | 2131040020  | CAP-MULT,0.1UF 50V Z AXI  |   |
| 25   | C023     | 2131040020  | CAP-MULT,0.1UF 50V Z AXI  |   |
| 26   | C027     | 2131040020  | CAP-MULT,0.1UF 50V Z AXI  |   |
| 27   | DH01     | DT1N4148    | DIODE,1N4148 TAPING       |   |
| 28   | DH02     | DT1N4936    | DIODE,400V 1.0A 1N4936    |   |
| 29   | DH03     | DT1N4936    | DIODE,400V 1.0A 1N4936    |   |
| 30   | DH04     | DT1N4936    | DIODE,400V 1.0A 1N4936    |   |
| 31   | DH05     | DTUZ-3.3BSB | DIODE,ZENER UZ-3.3BSB     |   |
| 32   | DH06     | DT1N4148    | DIODE,1N4148 TAPING       |   |
| 33   | DH07     | 3100500178  | DI-SW,UF1G-5705 LEAD      |   |
| 34   | DH08     | DT1N4148    | DIODE,1N4148 TAPING       |   |
| 35   | DH09     | DT1N4148    | DIODE,1N4148 TAPING       |   |
| 36   | DH13     | 3100500178  | DI-SW,UF1G-5705 LEAD      |   |
| 37   | DH14     | DT1N4007    | DIODE,1000V 1.0A TAP      |   |
| 38   | DH15     | DT1N4007    | DIODE,1000V 1.0A TAP      |   |
| 39   | DH16     | DT1N4007    | DIODE,1000V 1.0A TAP      |   |
| 40   | DH17     | DT1N4007    | DIODE,1000V 1.0A TAP      |   |
| 41   | DH18     | DT1N4007    | DIODE,1000V 1.0A TAP      |   |
| 42   | DH19     | DT1N4937    | DIODE,1N4937 TAPING       |   |
| 43   | DH20     | DT1N4936    | DIODE,400V 1.0A 1N4936    |   |
| 44   | DH21     | DT1N4936    | DIODE,400V 1.0A 1N4936    |   |
| 45   | DH22     | DT1N4148    | DIODE,1N4148 TAPING       |   |
| 46   | DH23     | DT1N4148    | DIODE,1N4148 TAPING       |   |

| NUM. | LOCATION | PART NUMBER  | DESCRIPTION               | REMARK |
|------|----------|--------------|---------------------------|--------|
| 47   | DH24     | DT1N4007     | DIODE,1000V 1.0A TAP      |        |
| 48   | DH25     | DT1N4148     | DIODE,1N4148 TAPING       |        |
| 49   | DH26     | DT1N4007     | DIODE,1000V 1.0A TAP      |        |
| 50   | DH27     | DT1N4937     | DIODE,1N4937 TAPING       |        |
| 51   | DH28     | DTUF4007     | DIODE,UF4007              |        |
| 52   | DH30     | DT1N4148     | DIODE,1N4148 TAPING       |        |
| 53   | DH31     | DT1N4148     | DIODE,1N4148 TAPING       |        |
| 54   | DH32     | DT1N4936     | DIODE,400V 1.0A 1N4936    |        |
| 55   | DM01     | DT1N4148     | DIODE,1N4148 TAPING       |        |
| 56   | DP01     | DT1N5398     | DIODE 1N5398 TAPING       |        |
| 57   | DP02     | DT1N5398     | DIODE 1N5398 TAPING       |        |
| 58   | DP03     | DT1N5398     | DIODE 1N5398 TAPING       |        |
| 59   | DP04     | DT1N5398     | DIODE 1N5398 TAPING       |        |
| 60   | DP05     | DT1N4148     | DIODE,1N4148 TAPING       |        |
| 61   | DP06     | DT1N4937     | DIODE,1N4937 TAPING       |        |
| 62   | DP07     | DT1N4937     | DIODE,1N4937 TAPING       |        |
| 63   | DP08     | DT1N4148     | DIODE,1N4148 TAPING       |        |
| 64   | DP09     | DT1N4148     | DIODE,1N4148 TAPING       |        |
| 65   | DP10     | DT1N4148     | DIODE,1N4148 TAPING       |        |
| 66   | DP12     | DTUF4007     | DIODE,UF4007              |        |
| 67   | DP14     | DTUF4004     | DIODE,UF4004              |        |
| 68   | DP16     | DT1N4148     | DIODE,1N4148 TAPING       |        |
| 69   | DV01     | DTUF4002     | DIODE,UF4002              |        |
| 70   | J001     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 71   | J002     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 72   | J003     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 73   | J004     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 74   | J005     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 75   | J006     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 76   | J007     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 77   | J008     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 78   | J009     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 79   | J010     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 80   | J011     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 81   | J012     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 82   | J013     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 83   | J014     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 84   | J015     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 85   | J016     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 86   | J017     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 87   | J018     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 88   | J020     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 89   | J021     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 90   | J022     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 91   | J023     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 92   | J024     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 93   | J025     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 94   | J026     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |



| NUM. | LOCATION | PART NUMBER  | DESCRIPTION               | REMARK |
|------|----------|--------------|---------------------------|--------|
| 95   | J027     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 96   | J028     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 97   | J029     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 98   | J030     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 99   | J031     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 100  | J032     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 101  | J033     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 102  | J034     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 103  | J035     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 104  | J036     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 105  | J037     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 106  | J038     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 107  | J039     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 108  | J040     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 109  | J041     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 110  | J042     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 111  | J043     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 112  | J044     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 113  | J045     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 114  | J046     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 115  | J047     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 116  | J048     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 117  | J049     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 118  | J050     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 119  | J051     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 120  | J052     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 121  | J053     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 122  | J054     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 123  | J055     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 124  | J056     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 125  | J057     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 126  | J058     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 127  | J059     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 128  | J060     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 129  | J061     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 130  | J062     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 131  | J063     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 132  | J064     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 133  | J065     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 134  | J066     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 135  | J067     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 136  | J068     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 137  | J069     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 138  | J070     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 139  | J071     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 140  | J072     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 141  | J073     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 142  | J074     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |

| NUM. | LOCATION | PART NUMBER  | DESCRIPTION                | REMARK |
|------|----------|--------------|----------------------------|--------|
| 143  | J075     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/  |        |
| 144  | J076     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/  |        |
| 145  | J077     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/  |        |
| 146  | J078     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/  |        |
| 147  | J079     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/  |        |
| 148  | J081     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/  |        |
| 149  | J082     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/  |        |
| 150  | J083     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/  |        |
| 151  | LH04     | E42019097250 | COIL,PEAKING 22 UH AXIAL   |        |
| 152  | L007     | E42019097250 | COIL,PEAKING 22 UH AXIAL   |        |
| 153  | RH01     | RD-8P0T0821J | RES-CF, RD 1/8W 820 OHM J  |        |
| 154  | RH02     | RD-8P0T0331J | RES-CF, RD 1/8W 330 OHM J  |        |
| 155  | RH03     | RD-8P0T0331J | RES-CF, RD 1/8W 330 OHM J  |        |
| 156  | RH04     | RN-8P0T2201F | RES-MF, RN 1/8W 2.2KOHM F  |        |
| 157  | RH05     | RN-8P0T1802F | RES-MF, RN 1/8W 18K OHM F  |        |
| 158  | RH06     | RN-8P0T6491F | RES-MF, RN 1/8W 6.49KOHM F |        |
| 159  | RH07     | RD-8P0T0274J | RES-CF, RD 1/8W 270K OHM J |        |
| 160  | RH08     | RN-8P0T6801F | RES-MF, RN 1/8W 6.8KOHM F  |        |
| 161  | RH09     | RN-8P0T1002F | RES-MF, RN 1/8W 10K OHM F  |        |
| 162  | RH10     | RD-8P0T0472J | RES-CF, RD 1/8W 4.7K OHM J |        |
| 163  | RH100    | RD-8P0T0471J | RES-CF, RD 1/8W 470 OHM J  |        |
| 164  | RH101    | RD-4P0T0474J | RES-CF, RD 1/4W 470K OHM J |        |
| 165  | RH11     | RN-8P0T2052F | RES-MF, RN 1/8W 20.5KOHM F |        |
| 166  | RH12     | RN-8P0T2052F | RES-MF, RN 1/8W 20.5KOHM F | ⚠      |
| 167  | RH13     | 2441602003   | RES-MF, 16K 0.125W F A     | ⚠      |
| 168  | RH14     | RD-8P0T0332J | RES-CF, RD 1/8W 3.3K OHM J | ⚠      |
| 169  | RH15     | 2442941001   | RES-MF, 2.94K 0.125W F A   |        |
| 170  | RH16     | 2402709006   | RES-CF, 27 0.5W J M        |        |
| 171  | RH17     | 2401001010   | RES-CF, 1K 0.5W J M        |        |
| 172  | RH18     | RD-8P0T0752J | RES-CF, RD 1/8W 7.5K OHM J |        |
| 173  | RH19     | RD-8P0T0363J | RES-CF, RD 1/8W 36K OHM J  |        |
| 174  | RH20     | RD-8P0T0123J | RES-CF, RD 1/8W 12KOHM J   |        |
| 175  | RH21     | RD-8P0T0101J | RES-CF, RD 1/8W 100 OHM J  |        |
| 176  | RH22     | RD-8P0T0101J | RES-CF, RD 1/8W 100 OHM J  |        |
| 177  | RH23     | 2401001010   | RES-CF, 1K 0.5W J M        |        |
| 178  | RH24     | RD-8P0T0512J | RES-CF, RD 1/8W 5.1K OHM J |        |
| 179  | RH26     | RD-8P0T0362J | RES-CF, RD 1/8W 3.6K OHM J |        |
| 180  | RH27     | RD-8P0T0274J | RES-CF, RD 1/8W 270K OHM J |        |
| 181  | RH28     | RD-8P0T0362J | RES-CF, RD 1/8W 3.6K OHM J |        |
| 182  | RH29     | RD-4P0T0220J | RES-CF, RD 1/4W 22 OHM J   |        |
| 183  | RH30     | 2401801006   | RES-CF, 1.8K 0.5W J M      |        |
| 184  | RH31     | RD-8P0T0104J | RES-CF, RD 1/8W 100K OHM J |        |
| 185  | RH32     | RD-8P0T0103J | RES-CF, RD 1/8W 10KOHM J   |        |
| 186  | RH33     | RD-4P0T0362J | RES-CF, RD 1/4W 3.6K OHM J |        |
| 187  | RH34     | 2441972001   | RES-MF, 19.7K 0.125W F A   | ⚠      |
| 188  | RH35     | RD-4P0T0681J | RES-CF, RD 1/4W 680 OHM J  |        |
| 189  | RH36     | RN-8P0T5101F | RES-MF, RN 1/8W 5.1KOHM F  | ⚠      |
| 190  | RH37     | 2542208003   | RES-FUS, 2.2 1W J M        |        |

| NUM. | LOCATION | PART NUMBER  | DESCRIPTION                | REMARK |
|------|----------|--------------|----------------------------|--------|
| 191  | RH38     | RD-8P0T0472J | RES-CF, RD 1/8W 4.7K OHM J |        |
| 192  | RH39     | RD-8P0T0820J | RES-CF, RD 1/8W 82 OHM J   |        |
| 193  | RH40     | RD-4P0T0332J | RES-CF, RD 1/4W 3.3K OHM J |        |
| 194  | RH41     | RD-4P0T0220J | RES-CF, RD 1/4W 22 OHM J   |        |
| 195  | RH42     | RD-8P0T0223J | RES-CF, RD 1/8W 22K OHM J  |        |
| 196  | RH45     | 2461801006   | RES-MOF, 1.8K 2W J M       |        |
| 197  | RH46     | RD-8P0T0150J | RES-CF, RD 1/8W 15 OHM J   |        |
| 198  | RH47     | RD-8P0T0473J | RES-CF, RD 1/8W 47K OHM J  |        |
| 199  | RH48     | 2404700007   | RES-CF, 470 0.5W J M       |        |
| 200  | RH50     | RD-4P0T0334J | RES-CF, RD 1/4W 330K OHM J |        |
| 201  | RH51     | 2463008001   | RES-MOF, 3 2W J M          |        |
| 202  | RH52     | 2461000007   | RES-MOF, 100 1W J M        |        |
| 203  | RH53     | RD-8P0T0222J | RES-CF, RD 1/8W 2.2K OHM J |        |
| 204  | RH54     | 2463009001   | RES-MOF, 30 2W J M         |        |
| 205  | RH55     | RD-4P0T0122J | RES-CF, RD 1/4W 1.2K OHM J |        |
| 206  | RH56     | 2401500007   | RES-CF, 150 0.5W J A       |        |
| 207  | RH57     | 2461501003   | RES-MOF, 1.5K 2W J M       |        |
| 208  | RH58     | RD-4P0T0223J | RES-CF, RD 1/4W 22K OHM J  |        |
| 209  | RH59     | RD-4P0T0223J | RES-CF, RD 1/4W 22K OHM J  |        |
| 210  | RH60     | RD-4P0T0223J | RES-CF, RD 1/4W 22K OHM J  |        |
| 211  | RH61     | RD-8P0T0123J | RES-CF, RD 1/8W 12KOHM J   |        |
| 212  | RH62     | RD-8P0T0472J | RES-CF, RD 1/8W 4.7K OHM J |        |
| 213  | RH63     | RD-8P0T0123J | RES-CF, RD 1/8W 12KOHM J   |        |
| 214  | RH64     | RD-8P0T0472J | RES-CF, RD 1/8W 4.7K OHM J |        |
| 215  | RH65     | RD-8P0T0123J | RES-CF, RD 1/8W 12KOHM J   |        |
| 216  | RH66     | RD-8P0T0472J | RES-CF, RD 1/8W 4.7K OHM J |        |
| 217  | RH67     | 2463008001   | RES-MOF, 3 2W J M          |        |
| 218  | RH68     | 2463009001   | RES-MOF, 30 2W J M         |        |
| 219  | RH69     | RD-4P0T0274J | RES-CF, RD 1/4W 270K OHM J |        |
| 220  | RH70     | RD-8P0T0244J | RES-CF, RD 1/8W 240KOHM J  |        |
| 221  | RH71     | RD-8P0T0183J | RES-CF, RD 1/8W 18K OHM J  |        |
| 222  | RH72     | RD-8P0T0102J | RES-CF, RD 1/8W 1K OHM J   |        |
| 223  | RH73     | RD-8P0T0332J | RES-CF, RD 1/8W 3.3K OHM J |        |
| 224  | RH74     | RD-8P0T0103J | RES-CF, RD 1/8W 10KOHM J   |        |
| 225  | RH75     | RD-8P0T0124J | RES-CF, RD 1/8W 120K OHM J |        |
| 226  | RH76     | RD-8P0T0222J | RES-CF, RD 1/8W 2.2K OHM J |        |
| 227  | RH77     | RD-8P0T0513J | RES-CF, RD 1/8W 51K OHM J  |        |
| 228  | RH78     | RD-8P0T0153J | RES-CF, RD 1/8W 15K OHM J  |        |
| 229  | RH80     | RD-8P0T0123J | RES-CF, RD 1/8W 12KOHM J   |        |
| 230  | RH82     | 2407503002   | RES-CF, 750K 0.25W J A     |        |
| 231  | RH83     | RD-4P0T0364J | RES-CF, RD 1/4W 360K OHM J |        |
| 232  | RH84     | RD-8P0T0182J | RES-CF, RD 1/8W 1.8K OHM J |        |
| 233  | RH85     | RD-8P0T0102J | RES-CF, RD 1/8W 1K OHM J   |        |
| 234  | RH86     | 240270800101 | RES-CF, 2.7 0.5W J M       |        |
| 235  | RH87     | RD-8P0T0473J | RES-CF, RD 1/8W 47K OHM J  |        |
| 236  | RH88     | RD-8P0T0103J | RES-CF, RD 1/8W 10KOHM J   |        |
| 237  | RH89     | RD-8P0T0243J | RES-CF, RD 1/8W 24K OHM J  |        |
| 238  | RH90     | RD-4P0T0101J | RES-CF, RD 1/4W 100 OHM J  |        |

| NUM. | LOCATION | PART NUMBER  | DESCRIPTION                | REMARK |
|------|----------|--------------|----------------------------|--------|
| 239  | RH91     | RD-4P0T0753J | RES-CF, RD 1/4W 75KOHM J   |        |
| 240  | RH92     | RD-4P0T0475J | RES-CF, RD 1/4W 4.7M OHM J |        |
| 241  | RH93     | RD-8P0T0152J | RES-CF, RD 1/8W 1.5K OHM J |        |
| 242  | RH94     | RD-8P0T0823J | RES-CF, RD 1/8W 82K OHM J  |        |
| 243  | RH96     | RD-4P0T0475J | RES-CF, RD 1/4W 4.7M OHM J |        |
| 244  | RH97     | RD-8P0T0472J | RES-CF, RD 1/8W 4.7K OHM J |        |
| 245  | RH98     | RD-8P0T0243J | RES-CF, RD 1/8W 24K OHM J  |        |
| 246  | RH99     | 2540228001   | RES-FUS, 0.22 0.5W J A     |        |
| 247  | RM01     | RD-8P0T0432J | RES-CF, RD 1/8W 4.3KOHM J  |        |
| 248  | RM02     | RD-8P0T0103J | RES-CF, RD 1/8W 10KOHM J   |        |
| 249  | RM04     | RD-8P0T0105J | RES-CF, RD 1/8W 1M OHM J   |        |
| 250  | RM05     | RD-8P0T0101J | RES-CF, RD 1/8W 100 OHM J  |        |
| 251  | RM06     | RD-8P0T0101J | RES-CF, RD 1/8W 100 OHM J  |        |
| 252  | RM07     | RD-8P0T0152J | RES-CF, RD 1/8W 1.5K OHM J |        |
| 253  | RM08     | RD-8P0T0101J | RES-CF, RD 1/8W 100 OHM J  |        |
| 254  | RM09     | RD-8P0T0103J | RES-CF, RD 1/8W 10KOHM J   |        |
| 255  | RM11     | RD-8P0T0153J | RES-CF, RD 1/8W 15K OHM J  |        |
| 256  | RM12     | RD-8P0T0153J | RES-CF, RD 1/8W 15K OHM J  |        |
| 257  | RM13     | RD-8P0T0473J | RES-CF, RD 1/8W 47K OHM J  |        |
| 258  | RM14     | RD-8P0T0472J | RES-CF, RD 1/8W 4.7K OHM J |        |
| 259  | RM16     | RD-8P0T0101J | RES-CF, RD 1/8W 100 OHM J  |        |
| 260  | RM17     | RD-8P0T0473J | RES-CF, RD 1/8W 47K OHM J  |        |
| 261  | RM18     | RD-8P0T0472J | RES-CF, RD 1/8W 4.7K OHM J |        |
| 262  | RM19     | RD-8P0T0102J | RES-CF, RD 1/8W 1K OHM J   |        |
| 263  | RM20     | RD-8P0T0153J | RES-CF, RD 1/8W 15K OHM J  |        |
| 264  | RM21     | RD-8P0T0153J | RES-CF, RD 1/8W 15K OHM J  |        |
| 265  | RM22     | RD-8P0T0104J | RES-CF, RD 1/8W 100K OHM J |        |
| 266  | RM29     | RD-8P0T0432J | RES-CF, RD 1/8W 4.3KOHM J  |        |
| 267  | RM32     | RD-4P0T0330J | RES-CF, RD 1/4W 33 OHM J   |        |
| 268  | RM33     | RD-4P0T0302J | RES-CF, RD 1/4W 3K OHM J   |        |
| 269  | RM34     | RD-8P0T0103J | RES-CF, RD 1/8W 10KOHM J   |        |
| 270  | RM36     | RD-8P0T0101J | RES-CF, RD 1/8W 100 OHM J  |        |
| 271  | RM37     | RD-8P0T0101J | RES-CF, RD 1/8W 100 OHM J  |        |
| 272  | R011     | 2401000008   | RES-CF, 100 0.5W J M       |        |
| 273  | R012     | RD-8P0T0101J | RES-CF, RD 1/8W 100 OHM J  |        |
| 274  | R013     | RD-8P0T0101J | RES-CF, RD 1/8W 100 OHM J  |        |
| 275  | R014     | RD-8P0T0101J | RES-CF, RD 1/8W 100 OHM J  |        |
| 276  | R015     | RD-8P0T0101J | RES-CF, RD 1/8W 100 OHM J  |        |
| 277  | R016     | RD-8P0T0103J | RES-CF, RD 1/8W 10KOHM J   |        |
| 278  | R017     | RD-8P0T0331J | RES-CF, RD 1/8W 330 OHM J  |        |
| 279  | R018     | RD-8P0T0331J | RES-CF, RD 1/8W 330 OHM J  |        |
| 280  | R019     | RD-8P0T0331J | RES-CF, RD 1/8W 330 OHM J  |        |
| 281  | R020     | RD-8P0T0102J | RES-CF, RD 1/8W 1K OHM J   |        |
| 282  | R021     | RD-8P0T0151J | RES-CF, RD 1/8W 150 OHM J  |        |
| 283  | R022     | RD-8P0T0105J | RES-CF, RD 1/8W 1M OHM J   |        |
| 284  | R023     | RD-8P0T0562J | RES-CF, RD 1/8W 5.6K OHM J |        |
| 285  | R024     | RD-8P0T0622J | RES-CF, RD 1/8W 6.2K OHM J |        |
| 286  | R025     | RD-8P0T0562J | RES-CF, RD 1/8W 5.6K OHM J |        |

| NUM. | LOCATION | PART NUMBER  | DESCRIPTION                | REMARK |
|------|----------|--------------|----------------------------|--------|
| 287  | R045     | RD-8P0T0202J | RES-CF, RD 1/8W 2K OHM J   |        |
| 288  | R046     | RD-8P0T0202J | RES-CF, RD 1/8W 2K OHM J   |        |
| 289  | RP01     | 2401004008   | RES-CF, 1M 0.5W J M        |        |
| 290  | RP02     | RD-4P0T0271J | RES-CF, RD 1/4W 270 OHM J  |        |
| 291  | RP03     | RD-4P0T0471J | RES-CF, RD 1/4W 470 OHM J  |        |
| 292  | RP04     | 2465602005   | RES-MOF, 56K 2W J M        |        |
| 293  | RP05     | 2401004008   | RES-CF, 1M 0.5W J M        |        |
| 294  | RP07     | 2442402005   | RES-MF, 24K 0.125W F A     |        |
| 295  | RP08     | RD-4P0T0220J | RES-CF, RD 1/4W 22 OHM J   |        |
| 296  | RP09     | 2541001002   | RES-FUS, 1K 0.25W J A      |        |
| 297  | RP10     | RD-4P0T0102J | RES-CF, RD 1/4W 1K OHM J   |        |
| 298  | RP12     | RD-8P0T0204J | RES-CF, RD 1/8W 200K OHM J |        |
| 299  | RP13     | RD-8P0T0472J | RES-CF, RD 1/8W 4.7K OHM J |        |
| 300  | RP14     | RD-8P0T0154J | RES-CF, RD 1/8W 150K OHM J |        |
| 301  | RP15     | RD-4P0T0331J | RES-CF, RD 1/4W 330 OHM J  |        |
| 302  | RP16     | 2442322002   | RES-MF, 23.2K 0.125W F A   |        |
| 303  | RP17     | RD-4P0T04R7J | RES-CF, RD 1/4W 4.7 OHM J  |        |
| 304  | RP18     | 2401004008   | RES-CF, 1M 0.5W J M        |        |
| 305  | RP19     | RD-4P0T0623J | RES-CF, RD 1/4W 62K OHM J  |        |
| 306  | RP20     | RD-8P0T0223J | RES-CF, RD 1/8W 22K OHM J  |        |
| 307  | RP21     | RD-4P0T0154J | RES-CF, RD 1/4W 150K OHM J |        |
| 308  | RP22     | 2465102001   | RES-MOF, 51K 1W J M        |        |
| 309  | RP23     | RD-8P0T0154J | RES-CF, RD 1/8W 150K OHM J |        |
| 310  | RP24     | RD-4P0T0102J | RES-CF, RD 1/4W 1K OHM J   |        |
| 311  | RP25     | RD-4P0T0681J | RES-CF, RD 1/4W 680 OHM J  |        |
| 312  | RP27     | 2406800008   | RES-CF, 680 0.5W J M       |        |
| 313  | RP28     | 2461001005   | RES-MOF, 1K 1W J M         |        |
| 314  | RP29     | 2463309006   | RES-MOF, 33 1W J M         |        |
| 315  | RP30     | RD-8P0T0271J | RES-CF, RD 1/8W 270 OHM J  |        |
| 316  | RP31     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/  |        |
| 317  | RP32     | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/  |        |
| 318  | RV01     | 2545108002   | RES-FUS, 5.1 1W J M        |        |
| 319  | RV02     | RN-8P0T5601F | RES-MF, RN 1/8W 5.6KOHM F  |        |
| 320  | RV04     | 2401008007   | RES-CF, 1 0.5W J M         |        |
| 321  | RV05     | RD-4P0T01R5J | RES-CF, RD 1/4W 1.5 OHM    |        |
| 322  | RV07     | 2542708001   | RES-FUS, 2.7 1W J A        |        |
| 323  | RV08     | RD-4P0T0332J | RES-CF, RD 1/4W 3.3K OHM J |        |
| 324  | RV09     | 2401001010   | RES-CF, 1K 0.5W J M        |        |
| 325  | RV10     | RD-8P0T0562J | RES-CF, RD 1/8W 5.6K OHM J |        |
| 326  | RV11     | RD-8P0T0562J | RES-CF, RD 1/8W 5.6K OHM J |        |
| 327  | RV18     | RN-4P0T3402F | RES-MF, RN 1/4W 34KOHM F   |        |
| 328  | RV19     | RN-4P0T5601F | RES-MF, RN 1/4W 5.6KOHM F  |        |
| 329  | ZDH01    | DTUZ-12BSB   | DIODE, ZENER UZ-12BSB TAP  |        |
| 330  | ZDH02    | DTUZ-13B     | DIODE, ZENER UZ-13B        |        |
| 331  | ZDH03    | DTUZ-13B     | DIODE, ZENER UZ-13B        |        |
| 332  | ZDM01    | DTUZ-6.2BSB  | DIODE, ZENER UZ-6.2BSB T   |        |
| 333  | ZDM02    | DTUZ-6.2BSB  | DIODE, ZENER UZ-6.2BSB T   |        |
| 334  | ZDM03    | DTUZ-5.1BSB  | DIODE, ZENER UZ-5.1BSB TAP |        |



| NUM. | LOCATION | PART NUMBER  | DESCRIPTION               | REMARK |
|------|----------|--------------|---------------------------|--------|
| 335  | ZDM04    | DTUZ-5.1BSB  | DIODE,ZENER UZ-5.1BSB TAP |        |
| 336  | ZDM05    | DTUZ-5.1BSB  | DIODE,ZENER UZ-5.1BSB TAP |        |
| 337  | ZD001    | DTUZ-5.6BSB  | DIODE,ZENER UZ-5.6BSB TAP |        |
| 338  | CH01     | CF93BT1J474J | CAP-MPE,63V 0.47UF J      |        |
| 339  | CH02     | CQ92BT2A154J | CAP-PE,100V 0.15UF J      |        |
| 340  | CH03     | CQ92BT2A822J | CAP-PE,100V 0.0082UF J    |        |
| 341  | CH04     | CQ92BT2A104J | CAP-PE,100V 0.1UF J       |        |
| 342  | CH05     | CQ92BT2A103J | CAP-PE,100V 0.01UF J      |        |
| 343  | CH06     | E42007019220 | CAP-PP/PE,100V 680PF J    |        |
| 344  | CH07     | CE04BT1H010M | CAP-EL,SMS 50V 1UF M      |        |
| 345  | CH08     | CQ92BT2A152J | CAP-PE,100V 1500PF J      |        |
| 346  | CH09     | CQ92BT2A102J | CAP-PE,100V 0.001UF J     |        |
| 347  | CH10     | CE04BT1HR47M | CAP-EL,SMS 50V 0.47UF M   |        |
| 348  | CH11     | CQ92BT2A332J | CAP-PE,100V 3300PF J      |        |
| 349  | CH12     | CE04BT1H4R7M | CAP-EL,SMS 50V 4.7UF M    |        |
| 350  | CH13     | CQ92BT2A333J | CAP-PE,100V 0.033UF J     |        |
| 351  | CH15     | CQ92BT2A332J | CAP-PE,100V 3300PF J      |        |
| 352  | CH16     | CF93BT1J105J | CAP-MPE,63V 1UF J         |        |
| 353  | CH17     | CK45BT3A331K | CAP-CE,1KV 330PF K TAP    |        |
| 354  | CH18     | 214474001702 | CAP-M-P,0.47UF 250V J 7.5 |        |
| 355  | CH19     | CE04BT1H100M | CAP-EL,SMS 50V 10UF M     |        |
| 356  | CH20     | CQ92BT2A182J | CAP-PE,100V 1800PF J      |        |
| 357  | CH21     | CF93BT1J334J | CAP-MPE,63V 0.33UF J      |        |
| 358  | CH22     | CE04BT1C470M | CAP-EL,SMS 16V 47UF M     |        |
| 359  | CH23     | 217472001501 | CAP-P-F,4700PF 1600V J 7. | ⚠      |
| 360  | CH24     | CE04IT1V470M | CAP-EL,KME 35V 47UF M     |        |
| 361  | CH26     | CK45BT3A221K | CAP-CD,1KV 220PF K TAP    |        |
| 362  | CH28     | CE04IT1H010M | CAP-EL,KME 50V 1UF M      |        |
| 363  | CH30     | CE04IT1H010M | CAP-EL,KME 50V 1UF M      |        |
| 364  | CH31     | 2174720021   | CAP-P-F,4700PF 800V J RAD | ⚠      |
| 365  | CH32     | 2142240021   | CAP-M-P,0.22UF 250V J RAD |        |
| 366  | CH33     | CE04BT1H010M | CAP-EL,SMS 50V 1UF M      |        |
| 367  | CH34     | 2148230001   | 0.082 UF 250 V J RAD      |        |
| 368  | CH35     | CQ92BT2A473J | CAP-PE,100V 0.047UF J     |        |
| 369  | CH38     | CK45BT3A102K | CAP-CD,1KV 1000PF 10%     |        |
| 370  | CH39     | CE04BT1C470M | CAP-EL,SMS 16V 47UF M     |        |
| 371  | CH40     | CE04BT1C100M | CAP-EL,SMS 16V 10UF M TAP |        |
| 372  | CH41     | 2101510007   | CAP-CER,150PF 1KV K Y5P   |        |
| 373  | CH43     | CQ92BT2A473J | CAP-PE,100V 0.047UF J     |        |
| 374  | CH44     | CQ92BT2A223J | CAP-PE,100V 0.022UF J     |        |
| 375  | CH46     | CE04BT1E101M | CAP-EL,SMS 25V 100UF M    |        |
| 376  | CH47     | 2002280012   | CAP-AL,0.22UF 160V M 5*11 |        |
| 377  | CH48     | CE04BT2C010M | CAP-EL,SMS 160V 1UF M     |        |
| 378  | CH49     | CQ92BT2A102J | CAP-PE,100V 0.001UF J     |        |
| 379  | CH50     | CE04BT1E101M | CAP-EL,SMS 25V 100UF M    |        |
| 380  | CH51     | CQ92BT2A104J | CAP-PE,100V 0.1UF J       |        |
| 381  | CH52     | CQ92BT2A102J | CAP-PE,100V 0.001UF J     |        |
| 382  | CH54     | CE04BT2C220M | CAP-EL,SMS 160V 22UF M    |        |

| NUM. | LOCATION | PART NUMBER  | DESCRIPTION               | REMARK |
|------|----------|--------------|---------------------------|--------|
| 383  | CH57     | 2002210071   | CAP-AL,220UF 16V M 8*9 P  |        |
| 384  | CH58     | 2172230011   | CAP-P-F,0.022UF 250V J RA |        |
| 385  | CH59     | CE04BT1C470M | CAP-EL,SMS 16V 47UF M     |        |
| 386  | CH61     | CF93BT1J224J | CAP-MPE,63V 0.22UF J      |        |
| 387  | CM01     | CE04BT1H010M | CAP-EL,SMS 50V 1UF M      |        |
| 388  | CM02     | CE04BT1HR33M | CAP-EL,SMS 50V 0.33UF M   |        |
| 389  | CM05     | CC45CT1H220J | CAP-CD,50V 22PF J         |        |
| 390  | CM06     | CC45CT1H220J | CAP-CD,50V 22PF J         |        |
| 391  | CM08     | CE04BT1H0R1M | CAP-EL,SMS 50V 0.1UF M    |        |
| 392  | CM09     | CQ92BT2A103J | CAP-PE,100V 0.01UF J      |        |
| 393  | CM11     | E42007019220 | CAP-PP/PE,100V 680PF J    |        |
| 394  | CM13     | CE04BT1E470M | CAP-EL,SMS 25V 47UF M     |        |
| 395  | CM14     | CE04BT1H010M | CAP-EL,SMS 50V 1UF M      |        |
| 396  | CM15     | CE04BT1H010M | CAP-EL,SMS 50V 1UF M      |        |
| 397  | C022     | CQ92BT2A104J | CAP-PE,100V 0.1UF J       |        |
| 398  | C024     | CE04BT1C101M | CAP-EL,SMS 16V 100UF M    |        |
| 399  | C025     | CQ92BT2A103J | CAP-PE,100V 0.01UF J      |        |
| 400  | C026     | CE04BT1C101M | CAP-EL,SMS 16V 100UF M    |        |
| 401  | C028     | CQ92BT2A103J | CAP-PE,100V 0.01UF J      |        |
| 402  | C029     | CQ92BT2A222J | CAP-PE,100V 0.0022UF J    |        |
| 403  | CP02     | E42007027050 | CAP-CD,Y2 2200PF M TAP    |        |
| 404  | CP03     | E42007027050 | CAP-CD,Y2 2200PF M TAP    |        |
| 405  | CP08     | 2001010091   | CAP-AL,100UF 25V M 6.3*11 |        |
| 406  | CP10     | CQ92BT2A272J | CAP-PE,100V 0.0027UF J    |        |
| 407  | CP11     | CK45BT3A101K | CAP-CD,1KV 100PF 10%      |        |
| 408  | CP13     | CC45CT1H471J | CAP-CD,50V 470PF J        |        |
| 409  | CP14     | CC45CT1H471J | CAP-CD,50V 470PF J        |        |
| 410  | CP15     | CQ92BT2A332J | CAP-PE,100V 3300PF J      |        |
| 411  | CP16     | CF93BT1J334J | CAP-MPE,63V 0.33UF J      |        |
| 412  | CP17     | CQ92BT2A103J | CAP-PE,100V 0.01UF J      |        |
| 413  | CP18     | CQ92BT2A332J | CAP-PE,100V 3300PF J      |        |
| 414  | CP19     | 2002290042   | CAP-AL,2.2UF 50V M 5*11 N |        |
| 415  | CP21     | 2002210076   | CAP-AL,220UF 100V M 13*25 |        |
| 416  | CP23     | 2002200073   | CAP-AL,22UF 160V M 10*20  |        |
| 417  | CP24     | 2004710059   | CAP-AL,470UF 16V M 8*12 P |        |
| 418  | CP25     | 2004710059   | CAP-AL,470UF 16V M 8*12 P |        |
| 419  | CP27     | CE04BT1E681M | CAP-EL,SMS 25V 680UF M    |        |
| 420  | CP28     | CE04BT1C470M | CAP-EL,SMS 16V 47UF M     |        |
| 421  | CP29     | CE04BT1C470M | CAP-EL,SMS 16V 47UF M     |        |
| 422  | CP31     | CE04BT1E471M | CAP-EL,SMS 25V 470UF M    |        |
| 423  | CP32     | 2101020018   | CAP-CD,1000PF Y2 K TAP    |        |
| 424  | CP33     | 2101020018   | CAP-CD,1000PF Y2 K TAP    |        |
| 425  | CV01     | 217562001401 | CAP-P-F,5600PF 100V J 5.0 |        |
| 426  | CV03     | 2004710059   | CAP-AL,470UF 16V M 8*12 P |        |
| 427  | CV04     | 2004710059   | CAP-AL,470UF 16V M 8*12 P |        |
| 428  | CV05     | 2001010093   | CAP-AL,100UF 35V M 8*11.5 |        |
| 429  | CV06     | 2141040020   | CAP-M-P,0.1UF 250V J RAD  |        |
| 430  | CV07     | CQ92BT2A104J | CAP-PE,100V 0.1UF J       |        |

| NUM. | LOCATION | PART NUMBER  | DESCRIPTION               | REMARK |
|------|----------|--------------|---------------------------|--------|
| 431  | CV08     | 2002200067   | CAP-AL,22UF 16V M 5*11 P  |        |
| 432  | CV09     | CQ92BT2A224J | CAP-PE,100V 0.22UF J      |        |
| 433  | CV10     | CQ92BT2A102J | CAP-PE,100V 0.001UF J     |        |
| 434  | FP01     | E42076013010 | FUSE CLIP,TAPING          |        |
| 435  | LH02     | 3500100523   | INDUCT-FIX,DR0808 8.2MH M |        |
| 436  | QH01     | TTKSC945CY   | TR,KSC945C-Y              |        |
| 437  | QH02     | 3110100687   | TR-GEN,KSA928AY LEAD      |        |
| 438  | QH05     | TTKSC945CY   | TR,KSC945C-Y              |        |
| 439  | QH06     | TTKSA733CY   | TR,KSA733C-Y              |        |
| 440  | QH08     | TT2N7000     | TR,2N7000                 |        |
| 441  | QH10     | 3110100730   | TR-GEN,KSD1616-YTA LEAD   |        |
| 442  | QH14     | TTKSC945CY   | TR,KSC945C-Y              |        |
| 443  | QH15     | TTKSC945CY   | TR,KSC945C-Y              |        |
| 444  | QH16     | TTKSC945CY   | TR,KSC945C-Y              |        |
| 445  | QH17     | TTKSP45      | TR,KSP45                  |        |
| 446  | QH18     | 3110100689   | TR-GEN,KSA1013Y LEAD      |        |
| 447  | QH19     | TTKSC945CY   | TR,KSC945C-Y              |        |
| 448  | QH21     | TTKSA733CY   | TR,KSA733C-Y              |        |
| 449  | QH22     | TTKSC945CY   | TR,KSC945C-Y              |        |
| 450  | QM01     | TTKTC200Y    | TR,KTC200Y TAP            |        |
| 451  | QM02     | TTKTA200Y    | TR,KTA200Y TAP            |        |
| 452  | QM03     | TTKTC1815Y   | TR,KTC3198Y               |        |
| 453  | QM04     | TTKSC945CY   | TR,KSC945C-Y              |        |
| 454  | QM05     | TTKSA733CY   | TR,KSA733C-Y              |        |
| 455  | QM06     | TTKRC102M    | TR,SWITCHING KRC102M      |        |
| 456  | QP01     | TTKSP45      | TR,KSP45                  |        |
| 457  | QP02     | TTKSC945CY   | TR,KSC945C-Y              |        |
| 458  | QP03     | 3110100705   | TR-GEN,KRC105M LEAD       |        |
| 459  | QP05     | 3110100687   | TR-GEN,KSA928AY LEAD      |        |
| 460  | QP07     | 3110100687   | TR-GEN,KSA928AY LEAD      |        |
| 461  | QP08     | TTKRC102M    | TR,SWITCHING KRC102M      |        |
| 462  | QP09     | TTKTA1015Y   | TR,KTA1266Y               |        |
| 463  | QV01     | TTKSC945CY   | TR,KSC945C-Y              |        |
| 464  | RH43     | 246100800701 | RES-MOF,1 2W J M R-FORMIN |        |
| 465  | RH44     | 246100800701 | RES-MOF,1 2W J M R-FORMIN |        |
| 466  | RH49     | 246430900301 | RES-MOF,43 2W J R-FORMING |        |
| 467  | RH79     | 246430900301 | RES-MOF,43 2W J R-FORMING |        |
| 468  | RH95     | 246120100601 | RES-MOF,1.2K 2W J R-FORM  |        |
| 469  | RP06     | 246220300501 | RES-MOF,220K 2W J R-FORMI |        |
| 470  | RP11     | 246022800401 | RES-MOF,0.22 2W R-FORM    |        |
| 471  | RP26     | 246220900601 | RES-MOF,22 2W J R-FORMING |        |
| 472  | XM01     | 3530200581   | VIB-QUARTZ,12MHZ 22PF ATS |        |
| 473  | AI01A    | 6130014100   | EYELET,2.7PAI BRASS T=0.4 |        |
| 474  | AI01B    | 6130014100   | EYELET,2.7PAI BRASS T=0.4 |        |
| 475  | CNM01    | 372010105301 | CONN-M,POST 1P DEGT235 14 |        |
| 476  | CP05A    | 6130014100   | EYELET,2.7PAI BRASS T=0.4 |        |
| 477  | CP05B    | 6130014100   | EYELET,2.7PAI BRASS T=0.4 |        |
| 478  | G2       | 372010105301 | CONN-M,POST 1P DEGT235 14 |        |



| NUM. | LOCATION | PART NUMBER  | DESCRIPTION               | REMARK |
|------|----------|--------------|---------------------------|--------|
| 479  | ICH02    | 3200001531   | IC-LIN,LM358N DIP         |        |
| 480  | ICM02    | 3203000819   | IC-MEM0,S524C80D81-DCB0   |        |
| 481  | ICP01    | 3200001536   | IC-LIN,UC3843B DIP        |        |
| 482  | LP01A    | 6130014200   | EYELET,1.6PAI BRASS T=0.4 |        |
| 483  | LP01B    | 6130014200   | EYELET,1.6PAI BRASS T=0.4 |        |
| 484  | LP01C    | 6130014200   | EYELET,1.6PAI BRASS T=0.4 |        |
| 485  | LP01D    | 6130014200   | EYELET,1.6PAI BRASS T=0.4 |        |
| 486  | NTC01A   | 6130014200   | EYELET,1.6PAI BRASS T=0.4 |        |
| 487  | NTC01B   | 6130014200   | EYELET,1.6PAI BRASS T=0.4 |        |
| 488  | QH09A    | 6130014200   | EYELET,1.6PAI BRASS T=0.4 |        |
| 489  | QH09B    | 6130014200   | EYELET,1.6PAI BRASS T=0.4 |        |
| 490  | QH09C    | 6130014200   | EYELET,1.6PAI BRASS T=0.4 |        |
| 491  | TH02A    | 6130014200   | EYELET,1.6PAI BRASS T=0.4 |        |
| 492  | TH02B    | 6130014200   | EYELET,1.6PAI BRASS T=0.4 |        |
| 493  | TH04A    | 6130014100   | EYELET,2.7PAI BRASS T=0.4 |        |
| 494  | TH04B    | 6130014100   | EYELET,2.7PAI BRASS T=0.4 |        |
| 495  | TH04C    | 6130014100   | EYELET,2.7PAI BRASS T=0.4 |        |
| 496  | WHV01    | 372010105301 | CONN-M,POST 1P DEGT235 14 |        |
| 497  | DH12     | M11143008012 | SCREW,BIN(+) M3*8 MSZPC   |        |
| 498  | DH12     | M31100030012 | NUT HEX,6N1-3 MSZPC       |        |
| 499  | DH12     | 3102000245   | DI-REC,DMV1500M LEAD      |        |
| 500  | ICV01    | M11143008012 | SCREW,BIN(+) M3*8 MSZPC   |        |
| 501  | ICV01    | UTDA9302H    | IC,TDA9302H VER AMP       |        |
| 502  | ICV01    | 6124036600   | H-SINKINK V,L=40 H=18.0 V |        |
| 503  | QH03     | M11143008012 | SCREW,BIN(+) M3*8 MSZPC   |        |
| 504  | QH03     | M31100030012 | NUT HEX,6N1-3 MSZPC       |        |
| 505  | QH03     | 3110100665   | TR-GEN,KTD2061-Y LEAD     |        |
| 506  | QH07     | M11143008012 | SCREW,BIN(+) M3*8 MSZPC   |        |
| 507  | QH07     | 3114000140   | FET,YTA630 LEAD S770      |        |
| 508  | QH07     | 6124020510   | H-SINKINK POWER,L=35 H=17 |        |
| 509  | QH09     | M11143008012 | SCREW,BIN(+) M3*8 MSZPC   |        |
| 510  | QH09     | M31100030012 | NUT HEX,6N1-3 MSZPC       |        |
| 511  | QH09     | 3110100753   | TR-GEN,TT2062 LEAD        |        |
| 512  | QH09     | 6120051000   | SHLD-CASE,F/SHLD FBT ASY, |        |
| 513  |          | 6120043000   | SOLDER GRIP,V770          |        |
| 514  |          | 6120050000   | SHLD-PL,FENCE SHIELD FBT  |        |
| 515  | QH11     | M11143008012 | SCREW,BIN(+) M3*8 MSZPC   |        |
| 516  | QH11     | 3114000124   | FET,IRF630A/IRF630M       |        |
| 517  | QH11     | 6124020508   | H-SINK POWER,B790 L=22MM  |        |
| 518  | QP04     | M11143008012 | SCREW,BIN(+) M3*8 MSZPC   |        |
| 519  | QP04     | 3114000106   | FET,2SK2545-LB104 LEAD    |        |
| 520  | QP04     | 6124036602   | H-SINK V,L=40,H=18 Q770   |        |
| 521  | CH27     | 2172240013   | CAP-P-F,0.22UF 250V J RAD |        |
| 522  | CH29     | 214494000101 | CAP-M-P,0.49UF 250V J 20. |        |
| 523  | CNM04    | 3720101389   | CONN-M,SMW200-07P         |        |
| 524  | CNM05    | 3720101387   | CONN-M,SMW200-05P         |        |
| 525  | CNM06    | 3720101978   | CONN-M,SMW200-15 15       |        |
| 526  | CP01     | E4200700909B | CAP-X,250VAC 0.22UF M 15. |        |



| NUM. | LOCATION | PART NUMBER  | DESCRIPTION                | REMARK |
|------|----------|--------------|----------------------------|--------|
| 527  | CP04     | 2141540010   | CAP-M-P, 0.15UF 250V M PP  |        |
| 528  | CP05     | 2001810001   | CAP-AL, 180UF 400V M 25.4* |        |
| 529  | FP01     | E42025012060 | FUSE, TIME LAG 19181 3.15A |        |
| 530  | ICH01    | 3200001530   | IC-LIN, TDA9116 32P SDIP D |        |
| 531  | ICP02    | 3200001186   | IC-LIN, L7805CV T02        |        |
| 532  | LP01     | 352020008601 | FLT-LC, SEQ2828 25MH MIN   |        |
| 533  | PTC01    | 341130000901 | POSISTOR, 90HM 2P CASE STI |        |
| 534  | QH12     | 3114000080   | FET, 2SK2134-S12 LEAD      |        |
| 535  | QH13     | 3114000124   | FET, IRF630A/IRF630M       |        |
| 536  | RLP01    | 3710100085   | RELAY, DY3M-DC12V 5A 250V  |        |
| 537  | SWH01    | E42027014010 | LEVER SWITCH, 30'C 3P      |        |
| 538  | TH01     | 3510300160   | TRAN-SW, HDT E11916 G910   | ⚠      |
| 539  | TH03     | 3510300186   | TRAN-SW, FOCUS EE2017 V771 |        |
| 540  | TP01     | 3510200132   | TRAN-PW, EER3541 V771 WO/A |        |
| 541  | TP02     | E4203109004A | TRANS SYNC, UU1116 TUBE    |        |
| 542  |          | 6120048600   | SHLD-PL, G910/P911 MCU COV |        |
| 543  | AI01     | 3720101302   | CONN-M, YW396-03V(2ND P DE |        |
| 544  | AR01     | 2502001003   | RES NET, 2K 1/8W J SIP 6P  |        |
| 545  | CH45     | 210472001801 | CAP-CER, 1KV 472K FOR      |        |
| 546  | CH53     | 2102230017   | CAP-CER, 0.022UF 1KV J Z4U |        |
| 547  | CNM02    | 3720101396   | CONN-M, SMW250-02 2        |        |
| 548  | CNM03    | 3720101227   | CONN-M, 5045-3A 3          |        |
| 549  | CP07     | CK45BF2H103K | CAP-CD, 500V 0.01UF K      |        |
| 550  | CP09     | 210472001501 | CAP-CER, Y1 4700PF M NO-CU |        |
| 551  | DH10     | 3104100142   | DI-SCHOT, 1N5822 LEAD      |        |
| 552  | DH11     | 3100500094   | DI-SW, ERD07-15L LEAD      |        |
| 553  | DP11     | 3100500181   | DI-SW, GUR460L-5703 LEAD   |        |
| 554  | DP13     | 3100500163   | DI-SW, RG4 LF-L1(015-206)  |        |
| 555  | DP15     | 3100500163   | DI-SW, RG4 LF-L1(015-206)  |        |
| 556  | ICM01    | 3205001382   | IC-U, WT62P1-K42 DIP MTP   |        |
| 557  | ICM01    | 3721100830   | CONN-F, WSDIF-42T-1.778MM  |        |
| 558  | IC002    | 3204000577   | IC-INT, MTV021 9LANGUAGE D |        |
| 559  | LH01     | 3500101612   | INDUCT-FIX, AR5*30 V770 K  | ⚠      |
| 560  | LH03     | 3500100511   | INDUCT-FIX, SIZE DR1523 5P |        |
| 561  | NTC01    | E4207708409A | THERMISTOR 180HM 13PAI TA  |        |
| 562  | TH02     | 3500101856   | INDUCT-FIX, Q770 LIN COIL  |        |
| 563  | TH04     | 3510500090   | FBT, Q770                  | ⚠      |

**CRT BOARD**

| NUM. | LOCATION  | PART NUMBER  | DESCRIPTION               | REMARK |
|------|-----------|--------------|---------------------------|--------|
| 1    |           | E4208619802  | PCBA CRT(T1*),Q770        |        |
| 2    |           | E4208519802  | PCBA CRT(I1*),Q770        |        |
| 3    |           | E4208919802  | PCBA CRT(I3*),Q770        |        |
| 4    |           | E4208419862  | PCBA CRT(A6*),Q770        |        |
| 5    |           | E4208419852  | PCBA CRT(A5*),Q770        |        |
| 6    |           | E4208419842  | PCBA CRT(A4*),Q770        |        |
| 7    | BC01      | 3540200058   | BD-FER,BFS3550            |        |
| 8    | BC02      | 3540200059   | BD-FER,BFS3580            |        |
| 9    | CC01      | 2131040020   | CAP-MULT,0.1UF 50V Z AXI  |        |
| 10   | CC02      | 2131040020   | CAP-MULT,0.1UF 50V Z AXI  |        |
| 11   | CC03      | 2131040020   | CAP-MULT,0.1UF 50V Z AXI  |        |
| 12   | CC05      | 2131040020   | CAP-MULT,0.1UF 50V Z AXI  |        |
| 13   | CC07      | 2131040020   | CAP-MULT,0.1UF 50V Z AXI  |        |
| 14   | CC08      | 2131040020   | CAP-MULT,0.1UF 50V Z AXI  |        |
| 15   | CC10      | 2131040020   | CAP-MULT,0.1UF 50V Z AXI  |        |
| 16   | DC01      | DT1N4148     | DIODE,1N4148 TAPING       |        |
| 17   | DC02      | DT1N4148     | DIODE,1N4148 TAPING       |        |
| 18   | DC03      | DT1N4148     | DIODE,1N4148 TAPING       |        |
| 19   | DC04      | DT1N4148     | DIODE,1N4148 TAPING       |        |
| 20   | DC05      | DT1N4148     | DIODE,1N4148 TAPING       |        |
| 21   | DC06      | DT1N4148     | DIODE,1N4148 TAPING       |        |
| 22   | DC07      | DTISS81      | DIODE,SWITCHING ISS81     |        |
| 23   | DC08      | DTISS81      | DIODE,SWITCHING ISS81     |        |
| 24   | DC09      | DTISS81      | DIODE,SWITCHING ISS81     |        |
| 25   | DC10      | DTISS81      | DIODE,SWITCHING ISS81     |        |
| 26   | DC11      | DTISS81      | DIODE,SWITCHING ISS81     |        |
| 27   | DC12      | DTISS81      | DIODE,SWITCHING ISS81     |        |
| 28   | DC13      | DTISS81      | DIODE,SWITCHING ISS81     |        |
| 29   | DC14      | DTISS81      | DIODE,SWITCHING ISS81     |        |
| 30   | DC15      | DTISS81      | DIODE,SWITCHING ISS81     |        |
| 31   | JC01      | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 32   | JC02      | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 33   | JC03      | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 34   | JC04 0001 | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 35   | JC07      | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 36   | JC08      | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 37   | JC10      | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 38   | JC11      | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 39   | JC12      | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 40   | JC13      | 375300002401 | WIRE-NS-S43MM TAP. SDA 1/ |        |
| 41   | LC01      | 3500101860   | INDUCT-FIX,AL04TBR47K K A |        |
| 42   | LC02      | 3500101860   | INDUCT-FIX,AL04TBR47K K A |        |
| 43   | LC03      | 3500101860   | INDUCT-FIX,AL04TBR47K K A |        |
| 44   | LC04      | 3500101860   | INDUCT-FIX,AL04TBR47K K A |        |
| 45   | LC05      | 3500101860   | INDUCT-FIX,AL04TBR47K K A |        |
| 46   | LC06      | 3500101860   | INDUCT-FIX,AL04TBR47K K A |        |


| NUM. | LOCATION | PART NUMBER  | DESCRIPTION                 | REMARK |
|------|----------|--------------|-----------------------------|--------|
| 47   | RC01     | RD-8P0T0750J | RES-CF, RD 1/8W 75 OHM J    |        |
| 48   | RC02     | RD-8P0T0330J | RES-CF, RD 1/8W 33 OHM J    |        |
| 49   | RC03     | RD-8P0T0750J | RES-CF, RD 1/8W 75 OHM J    |        |
| 50   | RC04     | RD-8P0T0330J | RES-CF, RD 1/8W 33 OHM J    |        |
| 51   | RC05     | RD-8P0T0750J | RES-CF, RD 1/8W 75 OHM J    |        |
| 52   | RC06     | RD-8P0T0330J | RES-CF, RD 1/8W 33 OHM J    |        |
| 53   | RC07     | 2466808004   | RES-MOF, 6.8 1W J M         |        |
| 54   | RC08     | RD-8P0T0103J | RES-CF, RD 1/8W 10KOHM J    |        |
| 55   | RC09     | RD-8P0T0331J | RES-CF, RD 1/8W 330 OHM J   |        |
| 56   | RC10     | RD-8P0T0331J | RES-CF, RD 1/8W 330 OHM J   |        |
| 57   | RC11     | RD-8P0T0102J | RES-CF, RD 1/8W 1K OHM J    |        |
| 58   | RC12     | RD-8P0T0223J | RES-CF, RD 1/8W 22K OHM J   |        |
| 59   | RC13     | RD-8P0T0472J | RES-CF, RD 1/8W 4.7K OHM J  |        |
| 60   | RC14     | RD-8P0T0103J | RES-CF, RD 1/8W 10KOHM J    |        |
| 61   | RC26     | RD-4P0T0820J | RES-CF, RD 1/4W 82 OHM J    |        |
| 62   | RC27     | RD-4P0T0820J | RES-CF, RD 1/4W 82 OHM J    |        |
| 63   | RC28     | RD-4P0T0820J | RES-CF, RD 1/4W 82 OHM J    |        |
| 64   | RC29     | 2403309005   | RES-CF, 33 0.5W J M         |        |
| 65   | RC30     | 2403309005   | RES-CF, 33 0.5W J M         |        |
| 66   | RC31     | 2403309005   | RES-CF, 33 0.5W J M         |        |
| 67   | RC33     | RD-8P0T0824J | RES-CF, RD 1/8W 820K OHM J  |        |
| 68   | RC34     | RD-8P0T0824J | RES-CF, RD 1/8W 820K OHM J  |        |
| 69   | RC35     | RD-8P0T0824J | RES-CF, RD 1/8W 820K OHM J  |        |
| 70   | RC37     | 2401000008   | RES-CF, 100 0.5W J M        |        |
| 71   | RC38     | RD-4P0T0102J | RES-CF, RD 1/4W 1K OHM J    |        |
| 72   | RC39     | RD-4P0T0102J | RES-CF, RD 1/4W 1K OHM J    |        |
| 73   | RC40     | RD-4P0T0102J | RES-CF, RD 1/4W 1K OHM J    |        |
| 74   | CC04     | CE04BT1C221M | CAP-EL, SMS 16V 220UF M     |        |
| 75   | CC06     | CC45CT1H220J | CAP-CD, 50V 22PF J          |        |
| 76   | CC09     | CE04BT1C101M | CAP-EL, SMS 16V 100UF M     |        |
| 77   | CC11     | CQ92BT2A104J | CAP-PE, 100V 0.1UF J        |        |
| 78   | CC12     | CE04BT2A470M | CAP-EL, SMS 100V 47UF M     |        |
| 79   | CC13     | 2001090053   | CAP-AL, 1UF 100V M 5*11 NP  |        |
| 80   | CC14     | 2001090053   | CAP-AL, 1UF 100V M 5*11 NP  |        |
| 81   | CC15     | 2001090053   | CAP-AL, 1UF 100V M 5*11 NP  |        |
| 82   | CC16     | CE04BT1C470M | CAP-EL, SMS 16V 47UF M      |        |
| 83   | CC17     | CK45BN2H102K | CAP-CD, 500V 1000PF K       |        |
| 84   | CC19     | 2002280012   | CAP-AL, 0.22UF 160V M 5*11  |        |
| 85   | CC20     | 2002280012   | CAP-AL, 0.22UF 160V M 5*11  |        |
| 86   | CC21     | 2002280012   | CAP-AL, 0.22UF 160V M 5*11  |        |
| 87   | CC22     | CE04BT2C100M | CAP-EL, SMS 160V 10UF M     |        |
| 88   | CC23     | CE04BT1HR22M | CAP-EL, SMS 50V 0.22UF M    |        |
| 89   | CC24     | 2141040020   | CAP-M-P, 0.1UF 250V J RAD   |        |
| 90   | RC32     | 246100800601 | RES-MOF, 1 1W J R-FORMING   |        |
| 91   | RC36     | 246220500101 | RES-MOF, 22M 1W R-FORMING   |        |
| 92   | SGC01    | 3411100083   | VARI STOR, SURGE ABSORBER R |        |
| 93   | SGC02    | 3411100083   | VARI STOR, SURGE ABSORBER R |        |
| 94   | SGC03    | 3411100083   | VARI STOR, SURGE ABSORBER R |        |

| NUM. | LOCATION | PART NUMBER  | DESCRIPTION               | REMARK |
|------|----------|--------------|---------------------------|--------|
| 95   | SGC04    | 3411100084   | VARISTOR,SURGE ABSORBER R |        |
| 96   | SGC05    | 3411100043   | VARISTOR,S23 1500V 1500V  |        |
| 97   | CGND     | 372010105301 | CONN-M,POST 1P DEGT235 14 |        |
| 98   | ICC03    | M11143008012 | SCREW,BIN(+) M3*8 MSZPC   |        |
| 99   | ICC03    | 3200001527   | IC-LIN,LM2467 T02         |        |
| 100  | ICC03    | 6124036603   | H-SINK V,Q770             |        |
| 101  | CC18     | 2102230017   | CAP-CER,0.022UF 1KV J Z4U |        |
| 102  | CNC01    | 3720101978   | CONN-M,SMW200-15 15       |        |
| 103  | CNC02    | 3720101388   | CONN-M,SMW200-06P         |        |
| 104  | G2       | 375500076908 | WIRE-ASS'Y,G2 180MM Q770  |        |
| 105  | ICC01    | 3200001526   | IC-LIN,LM1267 DIP         |        |
| 106  | ICC04    | 3200001528   | IC-LIN,LM2479 DIP         |        |
| 107  | SK01     | 3721101187   | CONN-F,CRT SKT ISDW01S P9 |        |

**KEY BOARD**

| NUM. | LOCATION | PART NUMBER  | DESCRIPTION                | REMARK |
|------|----------|--------------|----------------------------|--------|
| 1    |          | E4208519803  | PCBA KEY( I1* ),Q770       |        |
| 2    |          | E4208819803  | PCBA KEY( I2* ),Q770       |        |
| 3    |          | E4208419853  | PCBA KEY( A5* ),Q770       |        |
| 4    |          | E4208419843  | PCBA KEY( A4* ),Q770       |        |
| 5    | RK01     | RN-4P0T1742F | RES-MF ,RN 1/4W 17.4KOHM F |        |
| 6    | RK02     | RD-8P0T0752J | RES-CF ,RD 1/8W 7.5K OHM J |        |
| 7    | RK03     | RD-4P0T0103J | RES-CF ,RD 1/4W 10K OHM J  |        |
| 8    | RK04     | RD-4P0T0331J | RES-CF ,RD 1/4W 330 OHM J  |        |
| 9    | RK05     | RD-8P0T0103J | RES-CF ,RD 1/8W 10KOHM J   |        |
| 10   | RK06     | RD-8P0T0332J | RES-CF ,RD 1/8W 3.3K OHM J |        |
| 11   | SW01     | E42027039010 | SWITCH TACT ,5MM 160GF VER |        |
| 12   | SW02     | E42027039010 | SWITCH TACT ,5MM 160GF VER |        |
| 13   | SW03     | E42027039010 | SWITCH TACT ,5MM 160GF VER |        |
| 14   | SW04     | E42027039010 | SWITCH TACT ,5MM 160GF VER |        |
| 15   | CNK01    | 372010139601 | CONN-M ,SMAW250-02         |        |
| 16   | CNK02    | 372010138701 | CONN-M ,SMAW200-05P        |        |
| 17   | LED01    | 3330600441   | LED ,A1329B/GYC/R2         |        |
| 18   | SWP01    | 3700800117   | SW-PUSH ,CPS-1202 30V 0.3A |        |

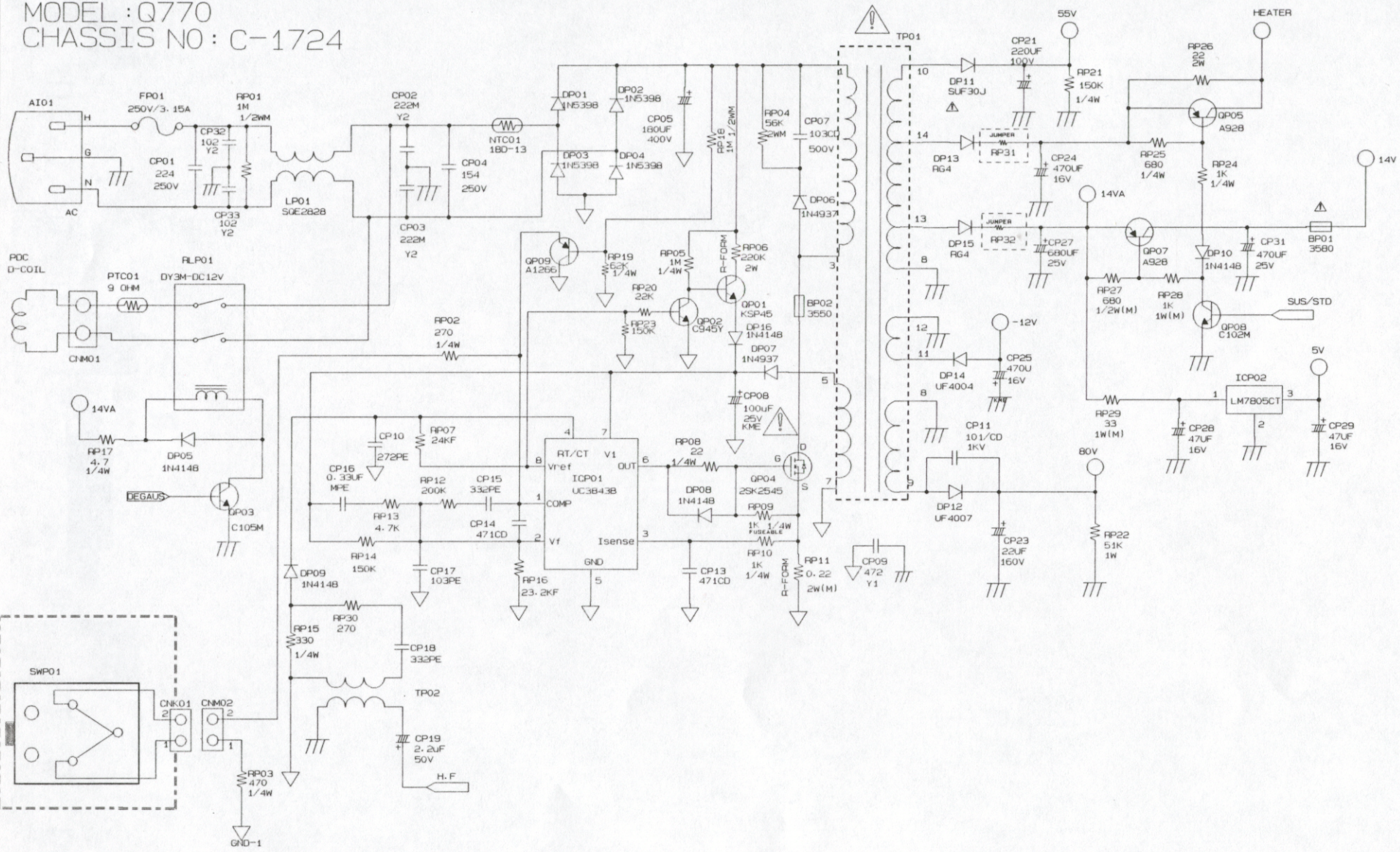
Miscellaneous

| NUM. | LOCATION | PART NUMBER  | DESCRIPTION               | REMARK  |
|------|----------|--------------|---------------------------|---|
| 1    |          | B4209531701A | BAG PE(SET)               |   |
| 2    |          | 6201296000   | BASE SWIVEL,Q770          |   |
| 3    |          | B4008500100A | CABLE TIE                 |   |
| 4    |          | B4008500100A | CABLE TIE                 |   |
| 5    |          | 6201296200   | CAP GATE,Q770             |   |
| 6    |          | 3758000200   | CBL-PWR,MW WALL 1.8MT EUR |   |
| 7    |          | 3758500454   | CBL-SGN,Q770 ATTACH 1530M |   |
| 8    |          | 6320230211   | CD MNAUAL IQT ALL         |   |
| 9    |          | 6101218200   | CHASSIS MAIN ASSY,Q770    |   |
| 10   |          | 6101218100   | CHASSIS MASIN,Q770        |   |
| 11   |          | 6223076900   | CLAMP,MOUNT BASE V770 ELO |   |
| 12   |          | 6155037600   | COIL-SP,SPRING Q770       |   |
| 13   |          | 3725005200   | CONN-A,15P CBL 150MM Q770 |   |
| 14   |          | 3725005198   | CONN-A,2P CBL 300MM Q770  |   |
| 15   |          | 3725005199   | CONN-A,5P CBL 230MM Q770/ |   |
| 16   |          | 6120051500   | CONTACT-PL BOTTOM ASSY,Q7 |   |
| 17   |          | 6120050700   | CONTACT-PLTE,Q770         |   |
| 18   |          | 6201298000   | COVER BOTTOM ASSY,Q770    |   |
| 19   |          | 6201295800   | COVER BOTTOM,Q770         |   |
| 20   |          | 6201295900   | COVER CAP,Q770            |   |
| 21   |          | 6201297900   | COVER TOP ASSY,Q770       |   |
| 22   |          | 6201295700   | COVER TOP,Q770            |   |
| 23   |          | 3010100158   | CRT,M41QCJ761X173 FLAT    |  |
| 24   |          | 6262005000   | FOOTER,RUBBER BOTTOM,Q770 |   |
| 25   |          | 6262005100   | FOOTER,RUBBER PLATE,Q770  |   |
| 26   |          | 6120051100   | GND-PL,GROUND CRT LEFT,Q7 |   |
| 27   |          | 6120050400   | GND-PL,GROUND CRT RIGHT,Q |   |
| 28   |          | 6120030100   | GND-PL,SRTING T5870C      |   |
| 29   |          | 3500101855   | INDUCT-FIX,Q770 K IH 18UH |   |
| 30   |          | 6225033000   | INSULATION ANODE,Q770     |   |
| 31   |          | 6225033100   | INSULATION CRT,Q770       |   |
| 32   |          | B4210328101  | KIT COVER,Q770 IQT        |   |
| 33   |          | B4204665800  | KIT LABEL,Q770/99 CD IQT  |   |
| 34   |          | 6215237000   | KNOB POWER,Q770           |   |
| 35   |          | 6215237100   | KNOB V/R,Q770             |   |
| 36   |          | 6316345220   | LABEL BACK,Q770 IQT       |   |
| 37   |          | B4204513263B | LABEL,B/CODE 64KHZ(DIC21) |   |
| 38   |          | B4204505100C | LABEL,X-RAY WARNING       |   |
| 39   |          | 6220084900   | LED LENS POWER,Q770       |   |
| 40   |          | E4205017601  | MAIN ASSY,Q770 EXP        |   |
| 41   |          | E4208719801  | PCB ASSY,Q770 EXP         |   |
| 42   |          | M17744006012 | SCREW,BIN(+) M4*6 MSZPC   |   |
| 43   |          | 5004000204   | SCR-TT,BIN + MC 3*8       |   |
| 44   |          | 6327035203   | SHEET INSTALL GUIDE,IQT A |   |
| 45   |          | 6120050200   | SHIELD COVER,Q770         |   |

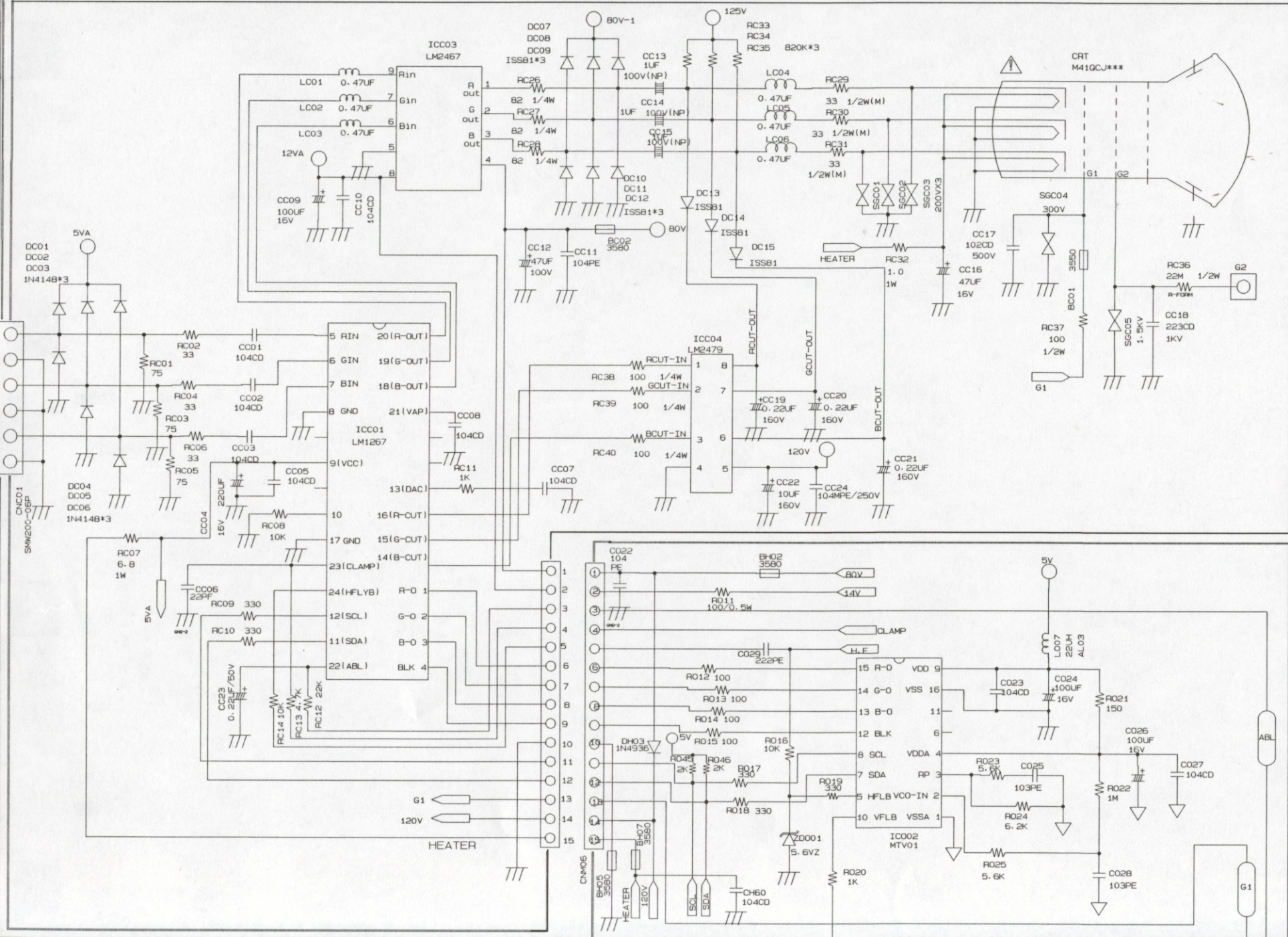
| NUM. | LOCATION | PART NUMBER  | DESCRIPTION               | REMARK |
|------|----------|--------------|---------------------------|--------|
| 46   |          | 6120042800   | SHIELD GROUND SPRING,V770 |        |
| 47   |          | 6120042800   | SHIELD GROUND SPRING,V770 |        |
| 48   |          | 6120050800   | SHLD-CASE COVER ASSY,Q770 |        |
| 49   |          | 6120050900   | SHLD-CASE,F/SHLD CRT ASY, |        |
| 50   |          | 6120050300   | SHLD-CASE,SHIELD PLATE Q7 |        |
| 51   |          | 6120050100   | SHLD-PL,FENCE SHIELD CRT  |        |
| 52   |          | 6316345101   | STICKER CABINET,TCO '99   |        |
| 53   |          | 6201298100   | SWIVEL ASSY,Q770          |        |
| 54   |          | 6201300100   | TILT&SWIVEL ASSY,Q770     |        |
| 55   |          | 375500078906 | WIRE-ASS'Y,COPPER ASSY Q7 |        |



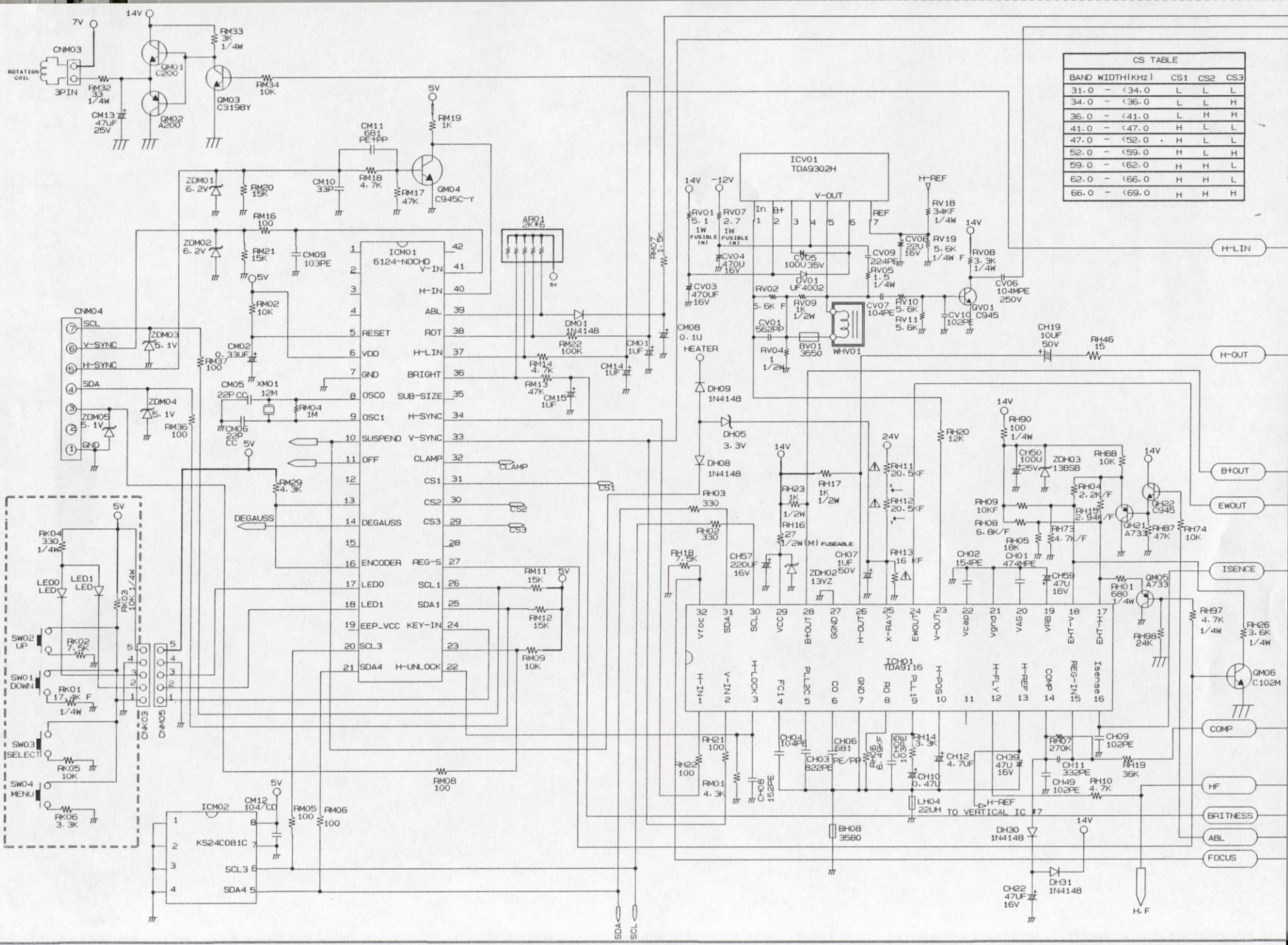
MODEL: Q770  
 CHASSIS NO: C-1724





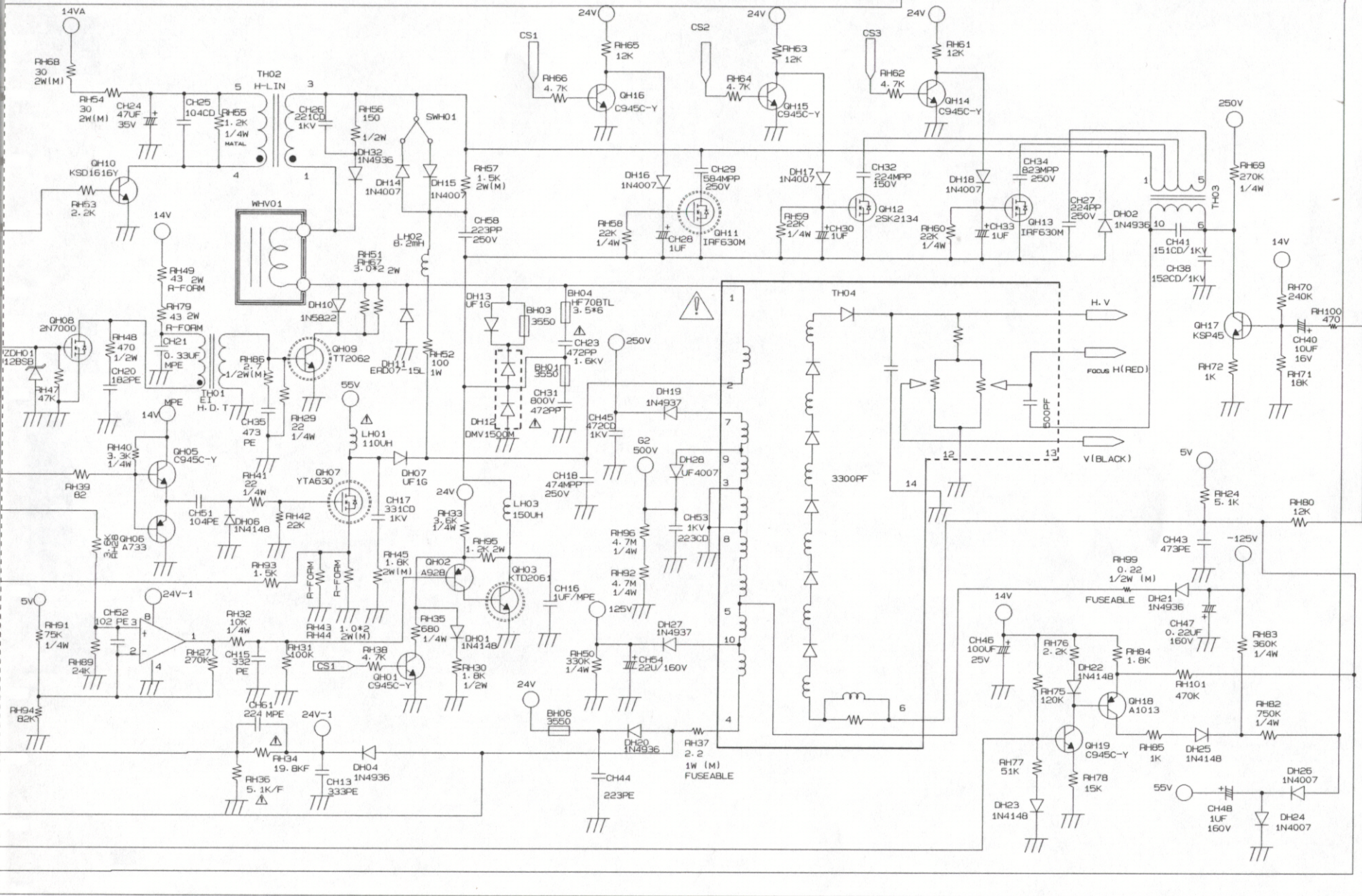






| CS TABLE        |     |     |     |
|-----------------|-----|-----|-----|
| BAND WIDTH(KHZ) | CS1 | CS2 | CS3 |
| 31.0 - <34.0    | L   | L   | L   |
| 34.0 - <36.0    | L   | L   | H   |
| 36.0 - <41.0    | L   | H   | H   |
| 41.0 - <47.0    | H   | L   | L   |
| 47.0 - <52.0    | H   | L   | L   |
| 52.0 - <59.0    | H   | L   | H   |
| 59.0 - <62.0    | H   | H   | L   |
| 62.0 - <66.0    | H   | H   | L   |
| 66.0 - <69.0    | H   | H   | H   |





WARNING: THIS EQUIPMENT CONTAINS SAFETY & CORN CRITICAL COMPONENTS  
 ALL PARTS SHOWN IN THE ⚠ MARKS OF THE SCHEMATIC ARE SAFETY  
 REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURERS  
 RECOMMENDED PARTS LIST FOR EXACT REPLACEMENTS.

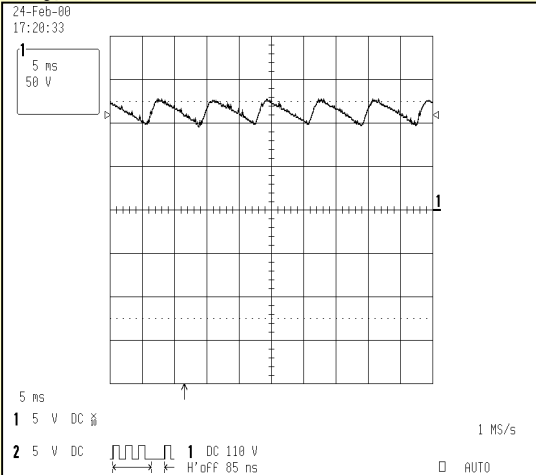
- NOTE:
1. RESISTANCE IS SHOWN IN OHM K=1,000 M=1,000,000 RATED POWER OF RESISTOR NOT NOTED IN SCHEMATIC DIAGRAM IS 1/8W P-CARBON.
  2. CAPACITANCE IS SHOWN IN PFD AND NOTES CAPACITANCES IS SHOWN UF, UF=1,000,000PF RATED VOLTAGE OF CONDENSER NOT NOTED IN SCHEMATIC DIAGRAM IS 50V.
  3. ABBREVIATION AND SYMBOLS:  
 P: POLYESTER PP: POLYPROPYLENE
  4. THIS SCHEMATIC DIAGRAM IS SUBJECTED TO CHANGE WITHOUT NOTICE FOR FURTHER IMPROVEMENT.

| DNQ. REV. | DESCRIPTION | DOC. NO.   | DATE | APPROVAL |
|-----------|-------------|------------|------|----------|
| REV01     |             |            |      |          |
| DNQ. NO.  | E42045367   |            |      |          |
| TITLE     | Q770        |            |      |          |
| DNQ       | Y. T. KIM   | 2001.06.01 |      | 1        |
| CHK       | J. R. KIM   | 2001.06.01 |      |          |
| APP       | Y. K. BYUN  | 2001.06.01 |      |          |

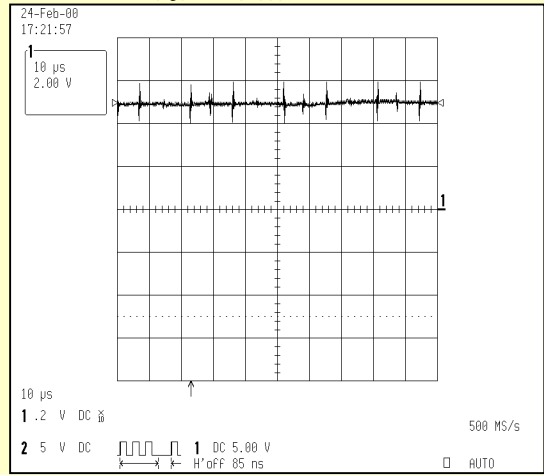
# Wave Form

[1024X768@85Hz,Full White pattern]

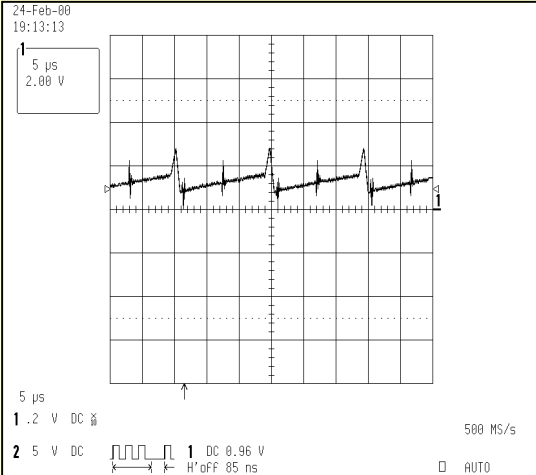
## 1. CP05 "+"



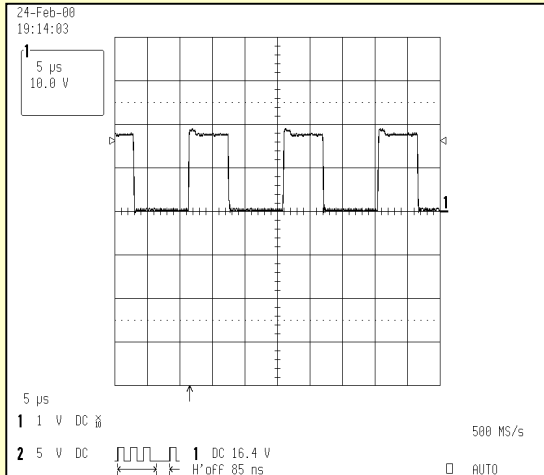
## 2. ICP01 PIN8



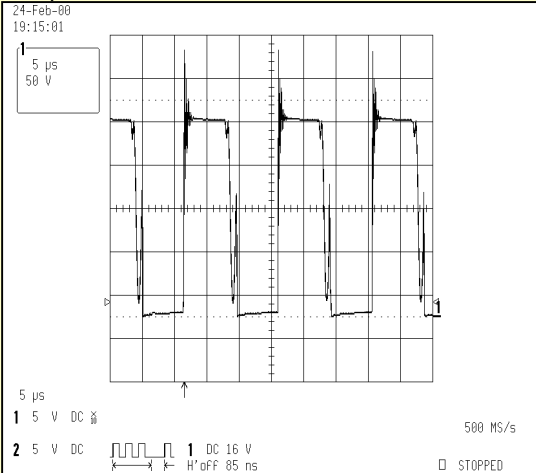
## 3. ICP01 PIN4



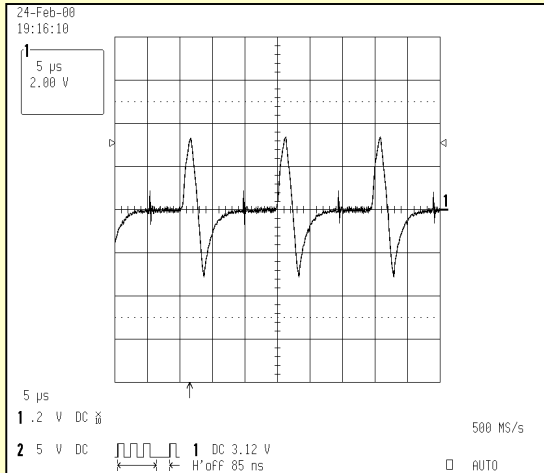
## 4. ICP01 PIN6



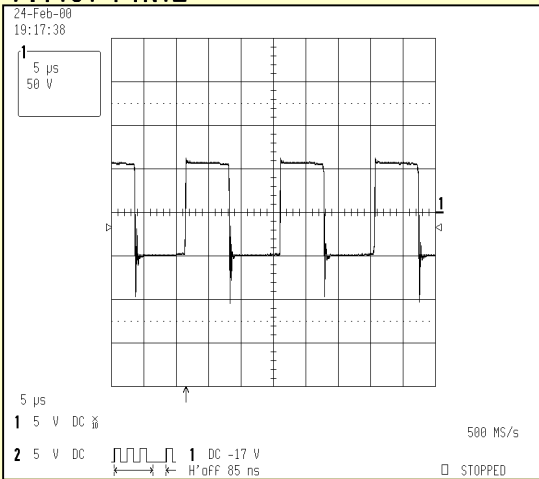
## 5. QP04 Drain



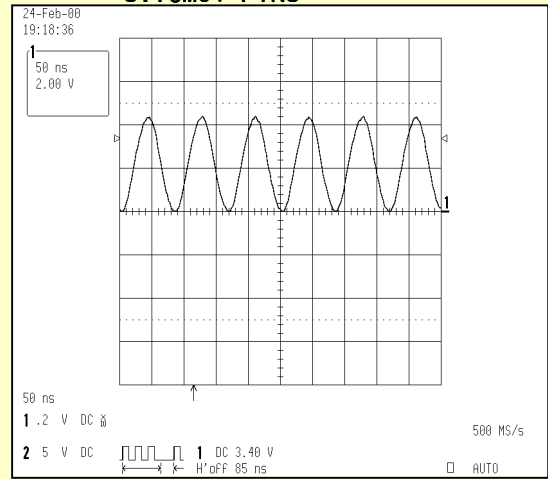
## 6. DP09 Anode



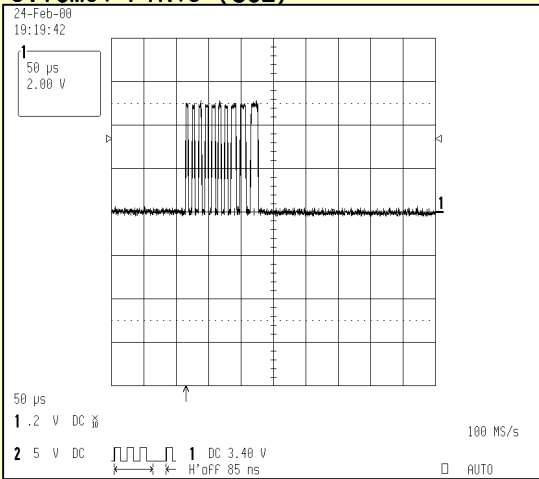
### 7. T101 PIN12



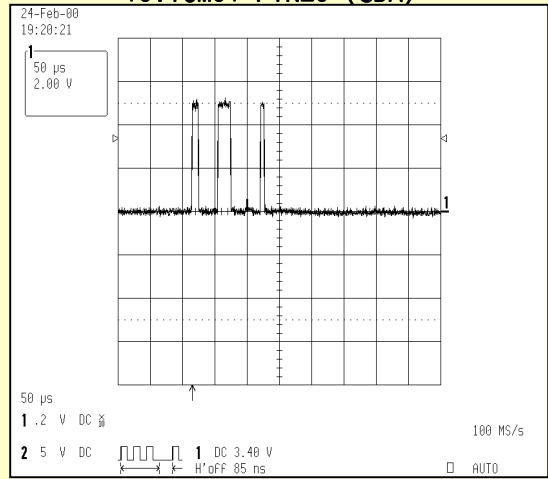
### 8. ICM01 PIN8



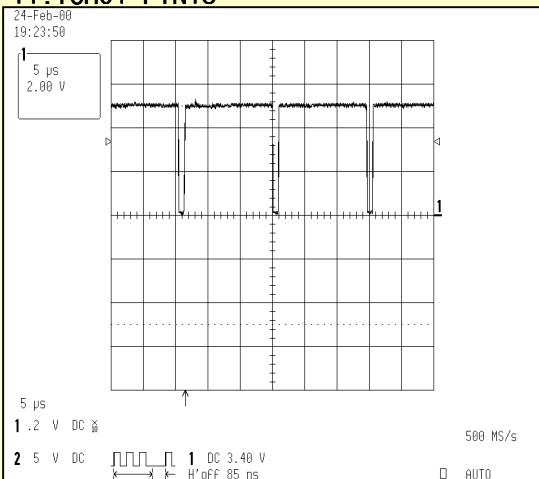
### 9. ICM01 PIN19 (SCL)



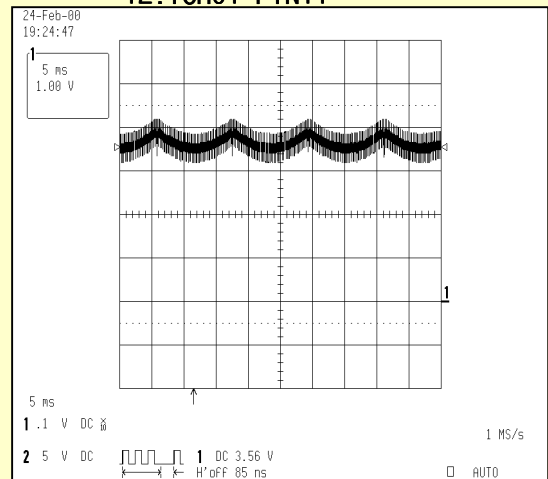
### 10. ICM01 PIN20 (SDA)



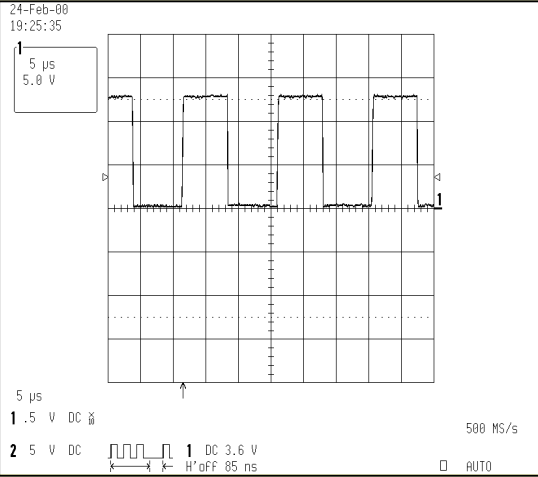
### 11. ICH01 PIN15



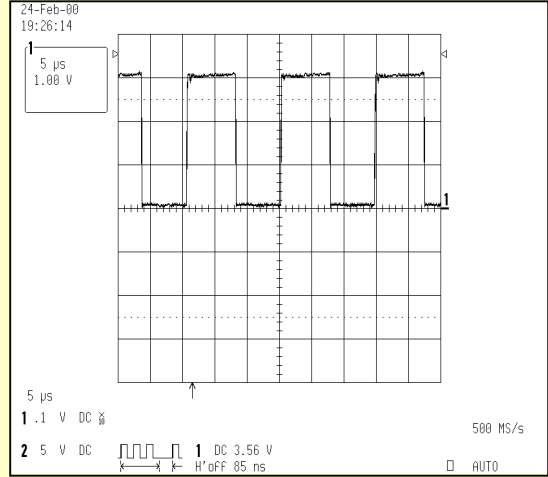
### 12. ICH01 PIN11



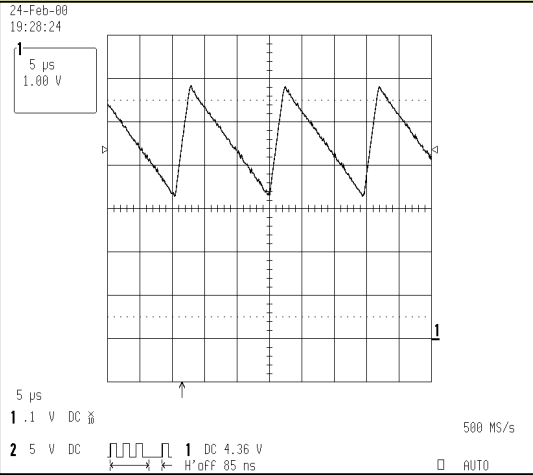
### 13. ICH01 PIN8



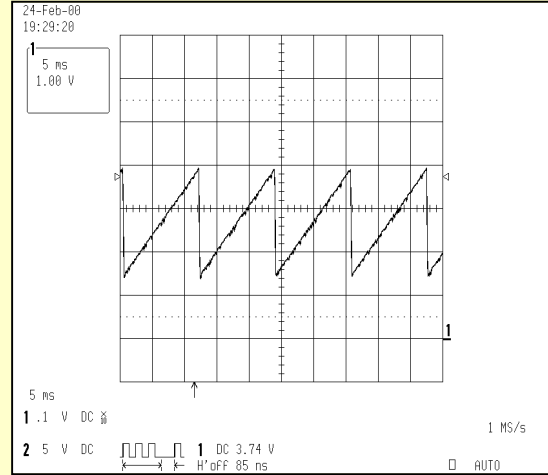
### 14. ICH01 PIN6



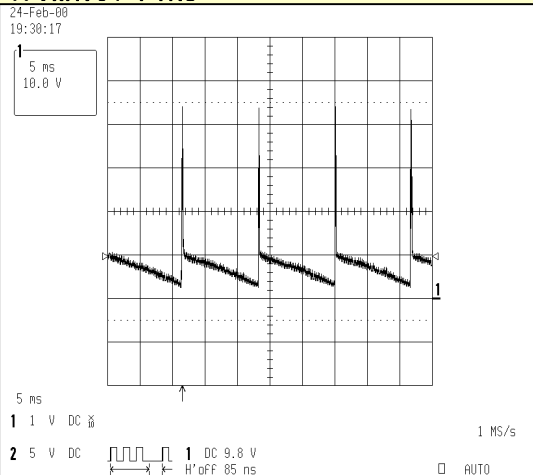
### 15. ICH01 PIN29



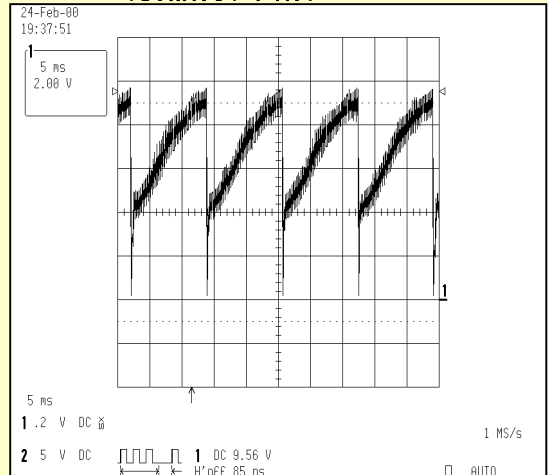
### 16. ICH01 PIN24



### 17. WHV01 PIN3

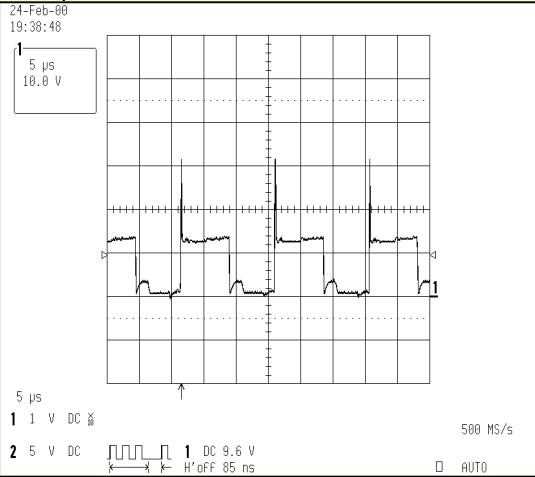


### 18. WHV01 PIN4

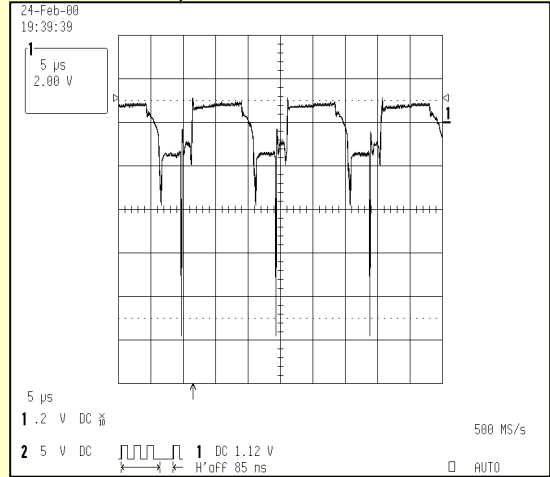




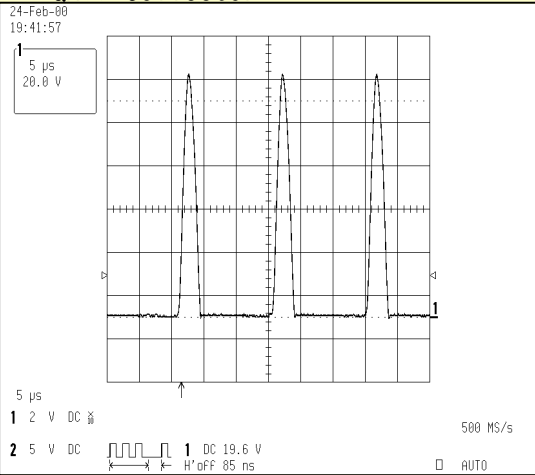
### 19.QH08 Drain



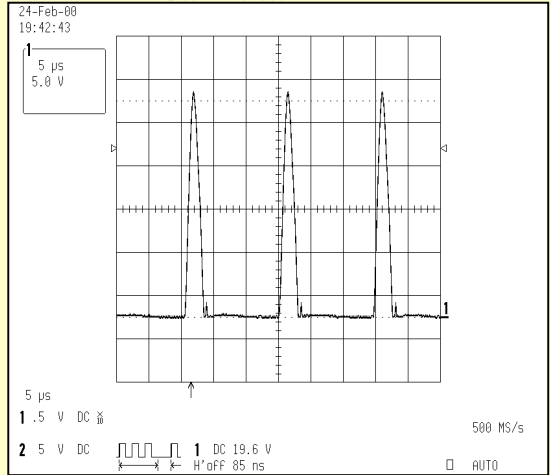
### 20.QH09 Base



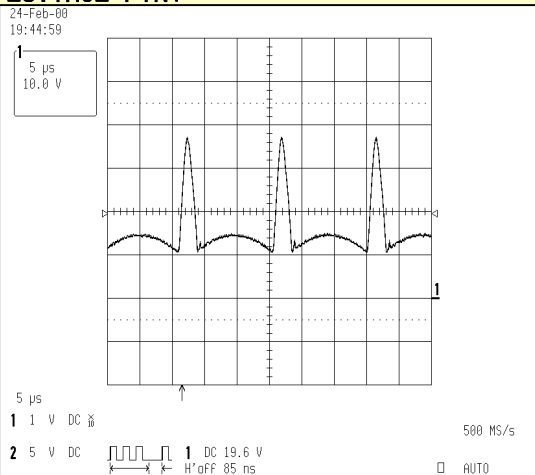
### 21.QH09 Collector



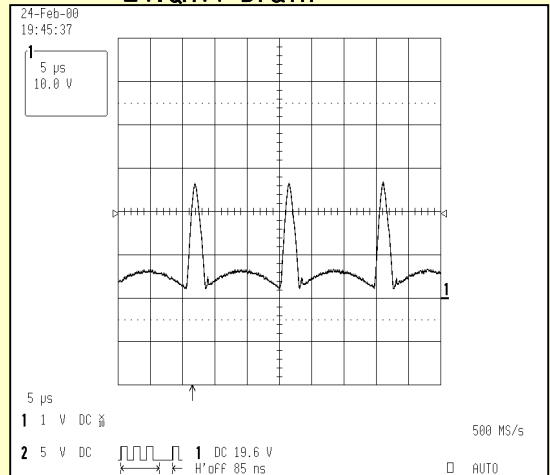
### 22.DH12 PIN2



### 23.TH02 PIN1

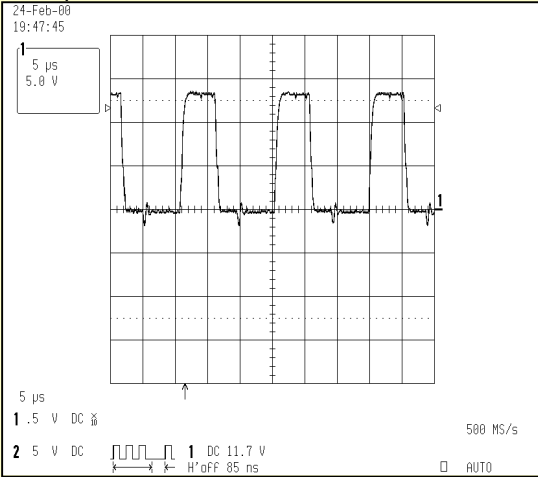


### 24.QH11 Drain

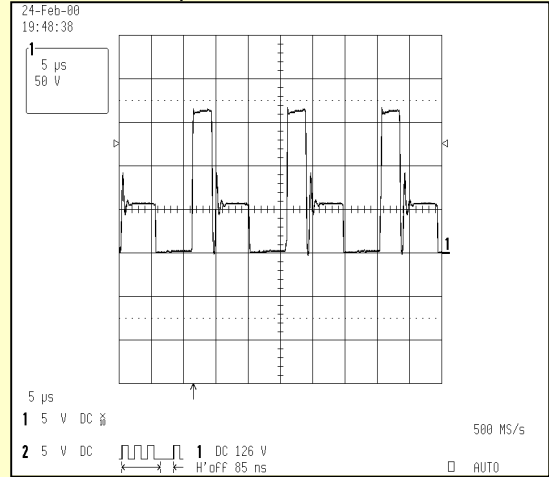




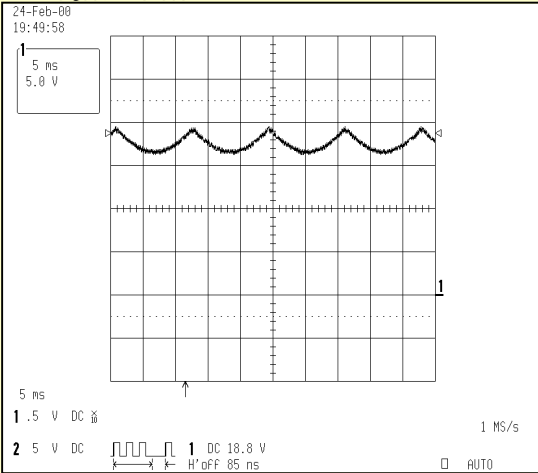
### 25. QH07 Gate



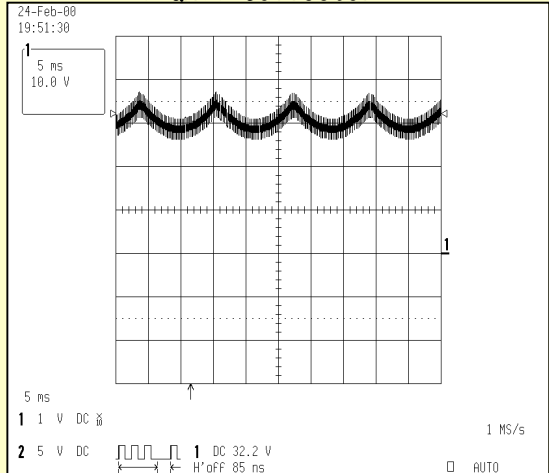
### 26. QH07 Drain



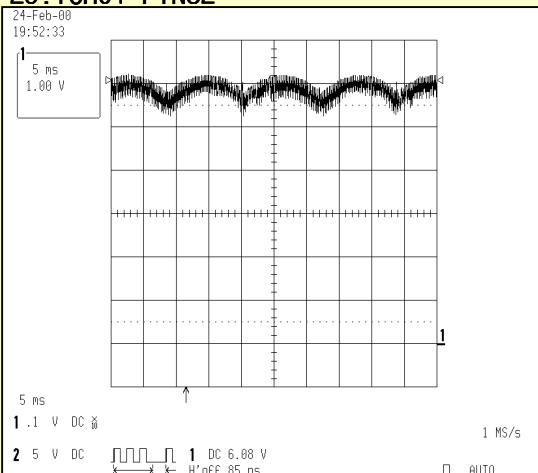
### 27. ICH02 PIN1



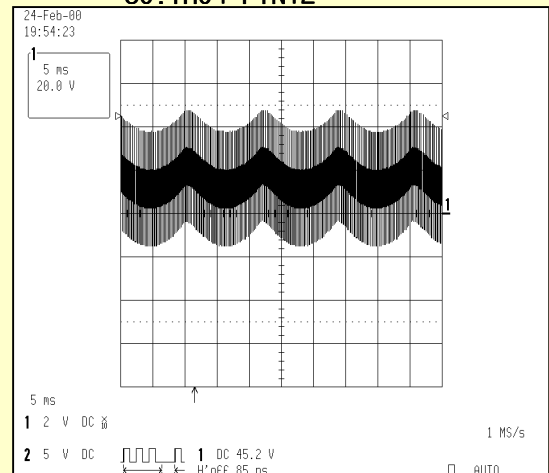
### 28. QH03 Collector



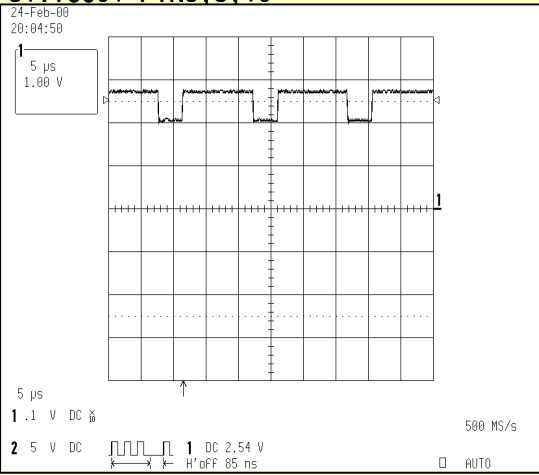
### 29. ICH01 PIN32



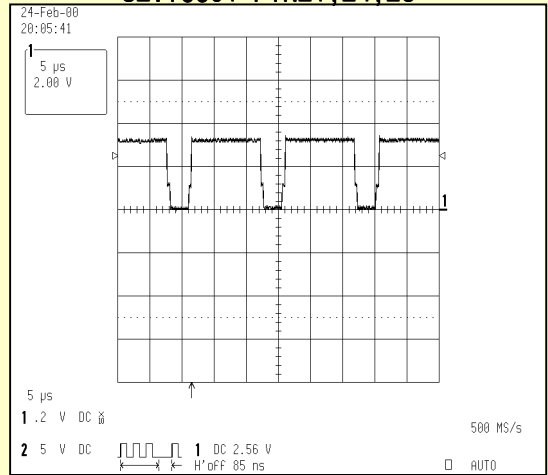
### 30. TH04 PIN12



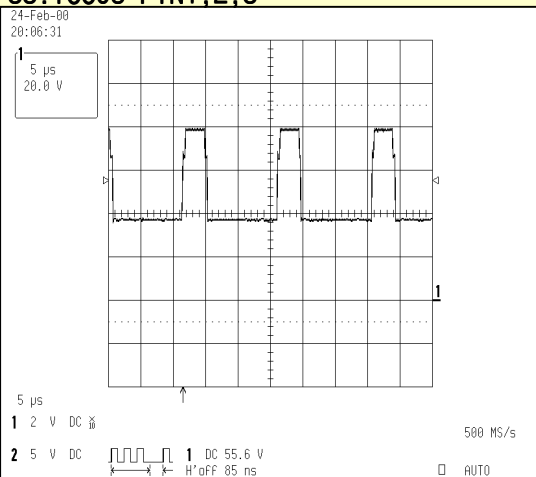
### 31. ICC01 PIN5,8,10



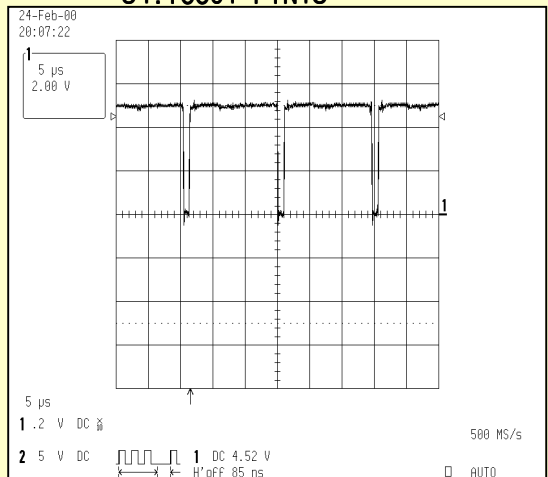
### 32. ICC01 PIN21,24,26



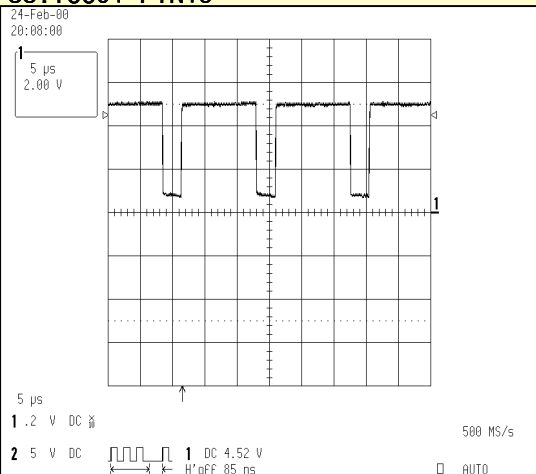
### 33. ICC03 PIN1,2,3



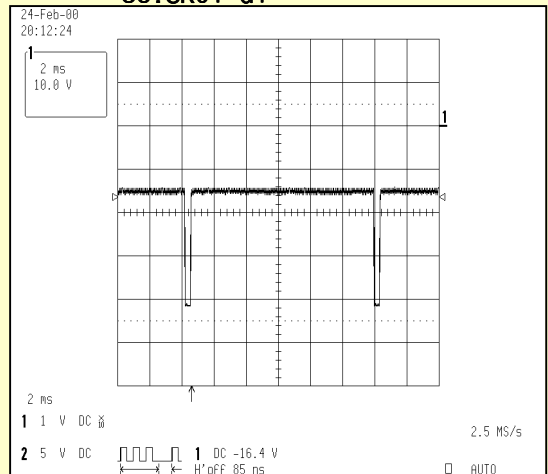
### 34. ICC01 PIN18



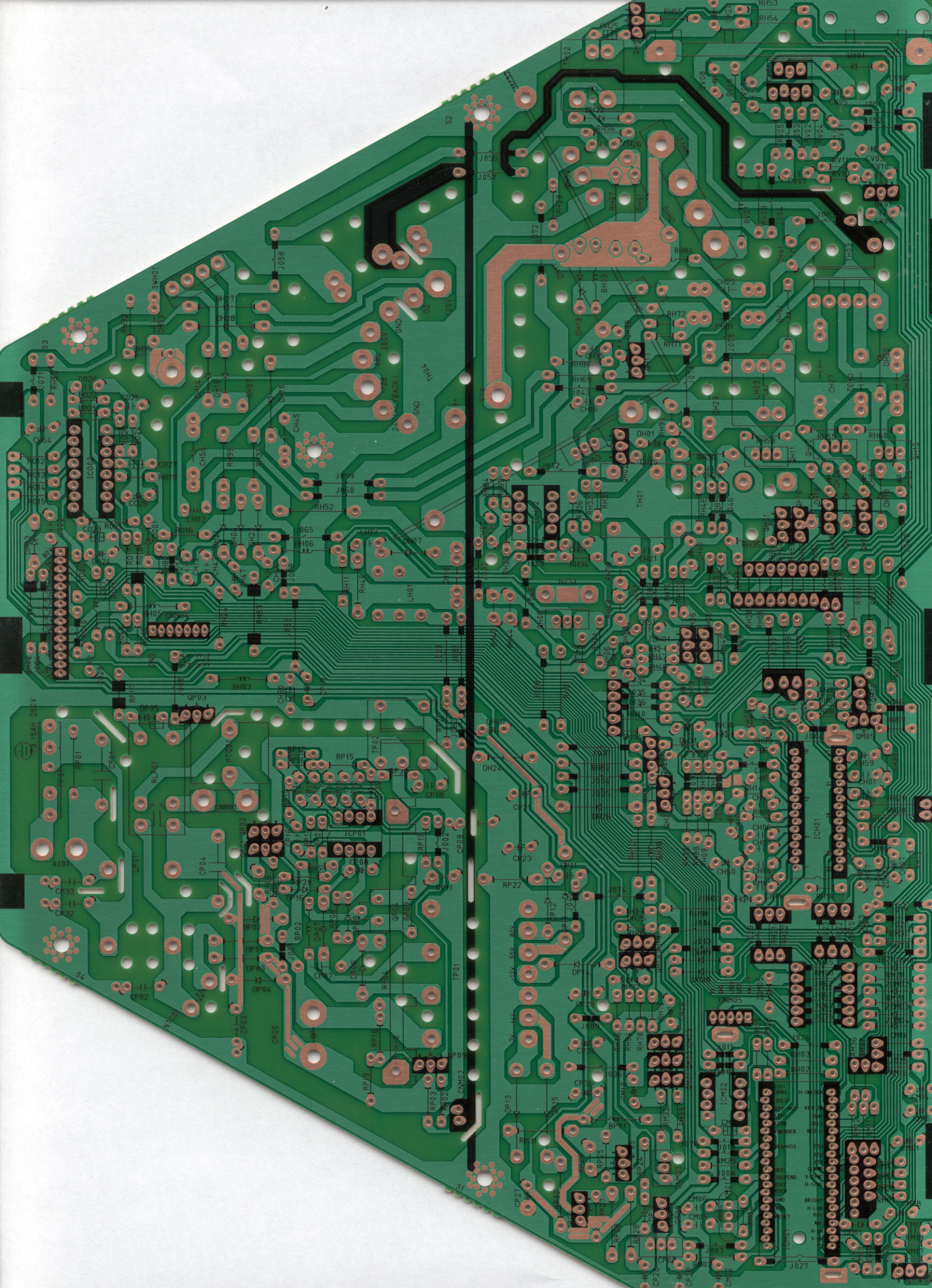
### 35. ICC01 PIN19



### 36. SK01 G1



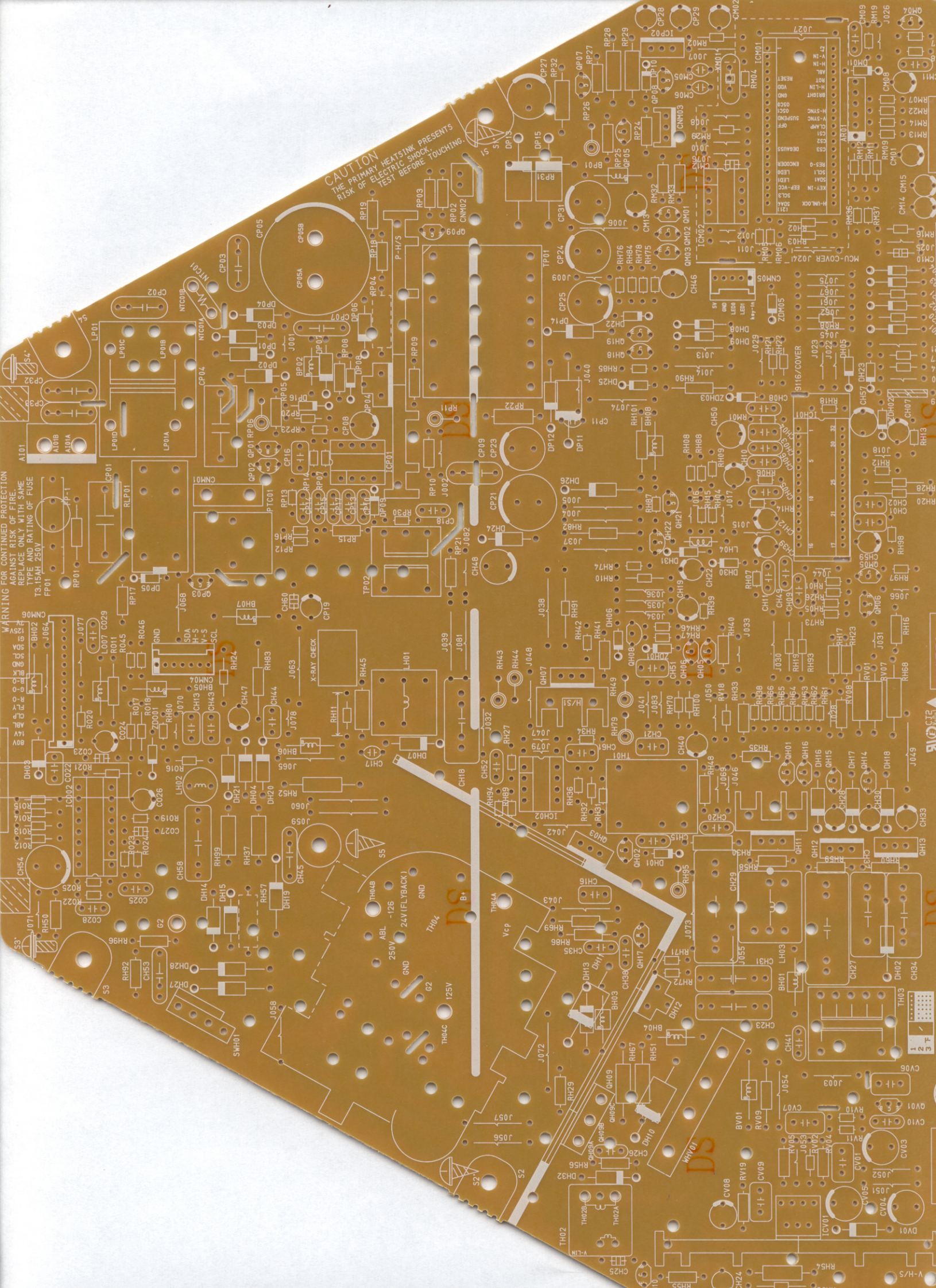






WARNING FOR CONTINUED PROTECTION  
AGAINST RISK OF FIRE.  
REPLACE ONLY WITH SAME  
TYPE AND RATING OF FUSE  
T3.15AH 250V  
FP01

CAUTION  
THE PRIMARY HEATSINK PRESENTS  
ELECTRIC SHOCK  
RISK OF TEST BEFORE TOUCHING.



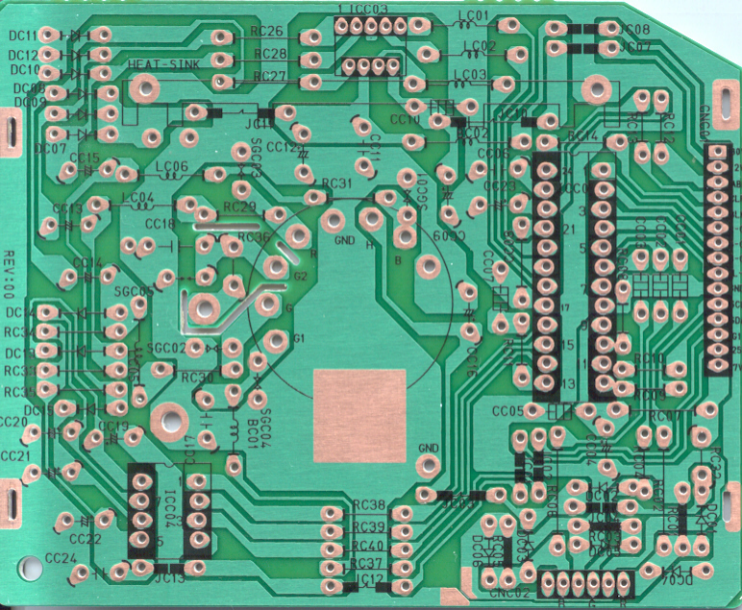
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R021 R022  
R023 R024  
R025 R026  
R027 R028  
R029 R030  
R031 R032  
R033 R034  
R035 R036  
R037 R038  
R039 R040  
R041 R042  
R043 R044  
R045 R046  
R047 R048  
R049 R050  
R051 R052  
R053 R054  
R055 R056  
R057 R058  
R059 R060  
R061 R062  
R063 R064  
R065 R066  
R067 R068  
R069 R070  
R071 R072  
R073 R074  
R075 R076  
R077 R078  
R079 R080  
R081 R082  
R083 R084  
R085 R086  
R087 R088  
R089 R090  
R091 R092  
R093 R094  
R095 R096  
R097 R098  
R099 R100

IC001 C001  
R001 R002  
R003 R004  
R005 R006  
R007 R008  
R009 R010  
R011 R012  
R013 R014  
R015 R016  
R017 R018  
R019 R020  
R021 R022  
R023 R024  
R025 R026  
R027 R028  
R029 R030  
R031 R032  
R033 R034  
R035 R036  
R037 R038  
R039 R040  
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R043 R044  
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R049 R050  
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R069 R070  
R071 R072  
R073 R074  
R075 R076  
R077 R078  
R079 R080  
R081 R082  
R083 R084  
R085 R086  
R087 R088  
R089 R090  
R091 R092  
R093 R094  
R095 R096  
R097 R098  
R099 R100

IC003 C003  
R003 R004  
R005 R006  
R007 R008  
R009 R010  
R011 R012  
R013 R014  
R015 R016  
R017 R018  
R019 R020  
R021 R022  
R023 R024  
R025 R026  
R027 R028  
R029 R030  
R031 R032  
R033 R034  
R035 R036  
R037 R038  
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R069 R070  
R071 R072  
R073 R074  
R075 R076  
R077 R078  
R079 R080  
R081 R082  
R083 R084  
R085 R086  
R087 R088  
R089 R090  
R091 R092  
R093 R094  
R095 R096  
R097 R098  
R099 R100

IC004 C004  
R004 R005  
R006 R007  
R008 R009  
R010 R011  
R012 R013  
R014 R015  
R016 R017  
R018 R019  
R020 R021  
R022 R023  
R024 R025  
R026 R027  
R028 R029  
R030 R031  
R032 R033  
R034 R035  
R036 R037  
R038 R039  
R040 R041  
R042 R043  
R044 R045  
R046 R047  
R048 R049  
R050 R051  
R052 R053  
R054 R055  
R056 R057  
R058 R059  
R060 R061  
R062 R063  
R064 R065  
R066 R067  
R068 R069  
R070 R071  
R072 R073  
R074 R075  
R076 R077  
R078 R079  
R080 R081  
R082 R083  
R084 R085  
R086 R087  
R088 R089  
R090 R091  
R092 R093  
R094 R095  
R096 R097  
R098 R099  
R100





DC11  
DC12  
DC10  
DC08  
DC09

DC07

REV: 00

DC14  
RC34  
DC13  
RC33  
RC35  
DC15

CC20  
CC21

CC22  
CC24

HEAT-SINK

RC26  
RC28  
RC27

SGC03  
CC12

CC13  
LC04  
CC18  
CC14

SGC05

SGC02

BC01  
SGC04

RC38  
RC39  
RC40  
RC37  
LC12

11CC03

CC10

RC31

GND H B

6030

GND

LC01  
LC02  
LC03

CC02

CC05

CC23

CC07

CC16

CC05

GND

DC06  
DC03  
DC04  
DC05

CC08  
CC07

RC14  
RC13  
RC12

CC01  
CC03  
CC02  
CC04

CC06

RC10  
RC09

RC07

CC05

CC02

DC01  
DC02  
DC03  
DC04  
DC05

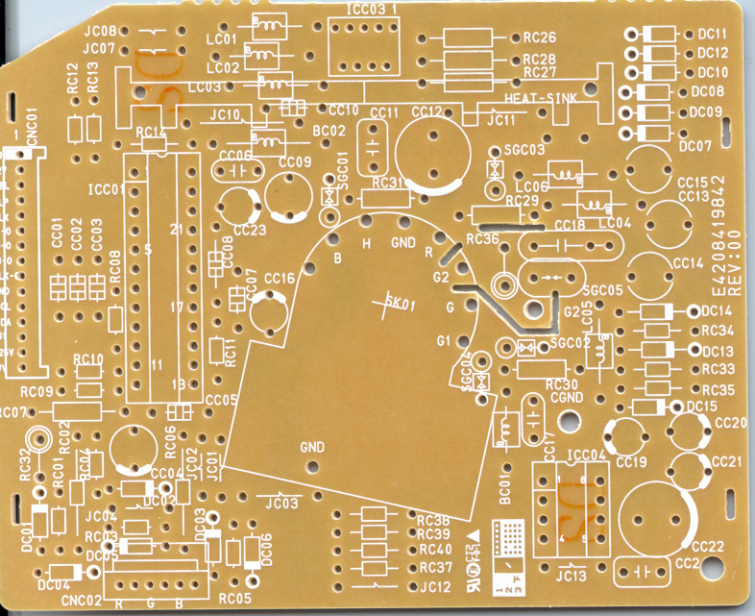
GND1

GND2

RC23  
RC21  
RC20  
RC22

DC21  
DC20

DC21



E4208419842  
REV:00

- DC11
- DC12
- DC10
- DC08
- DC09
- DC07

- DC14
- RC34
- DC13
- RC33
- RC35
- DC15

- CC19
- CC21
- CC22
- CC2

- RC26
- RC28
- RC27

- CC10
- CC11
- CC12
- CC06
- CC09
- CC15
- CC13

- RC36
- SGC05
- SGC02
- CGND

- RC38
- RC39
- RC40
- RC37
- JC12

- IC01
- IC02
- IC03
- IC04
- IC05

- LC01
- LC02
- LC03
- LC06
- LC04
- LC05

- JC08
- JC07
- RC12
- RC13
- JC10
- JC11
- JC13

- CC01
- CC02
- CC03
- CC08
- CC07
- CC16
- CC05

- CNC01
- RC09
- RC10
- RC07

- DC01
- DC02
- DC03
- DC04
- DC05
- DC06

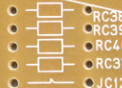
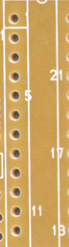
IC03 1

IC01

H  
GND  
R  
G2  
G  
G1

5K01

GND





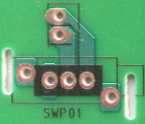
SW02  
20MS

RK02

SW01  
10MS

RK01

CNK01



SWP01

LED01



RK02

SW03  
20MS

RK05

RK03

SW04  
20MS

SW  
END  
LED1  
LED2  
KEY IN

CNK02

RK06



Q770KEY

E4208419843 REV:00



CT2  
Y-0-1 ▲

SW02



SW01



CNK01



SWP01



LED01



SW03



RK05



RK03



SW04

RK06



RK04

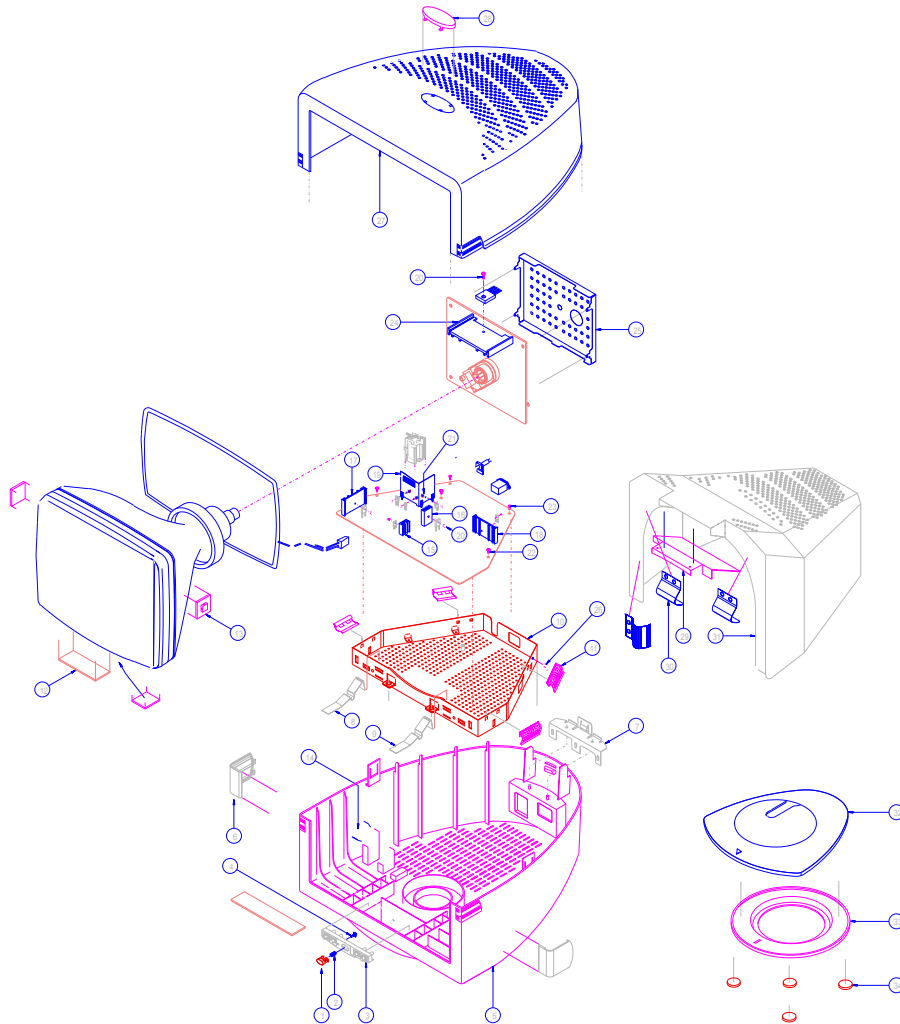


5V  
GND  
LED1  
LED2  
KEY IN

CNK02







|    |              |                        |                     |     |    |
|----|--------------|------------------------|---------------------|-----|----|
| 34 | 6282005000   | RUBBER BOTTOM          | SI-918 POLYURETHANE | 4   |    |
| 33 | 6120050700   | BOTTOM PLATE           | SECC T=2.0          | 1   |    |
| 32 | 6201296000   | SWIVEL BASE            | ABS 94HB            | 1   |    |
| 31 | 6120050200   | SHLD-CASE COVER ASSY   | A050P T=0.3         | 1   |    |
| 30 | 6120051600   | GROUND SPRING          | C5210H T=0.1        | 2   |    |
| 29 | 6225333000   | INSULATION ANODE       | ABS-PC              | 1   |    |
| 28 | 6201296000   | CAP GATE               | ABS 94HB            | 1   |    |
| 27 | 6201295700   | TOP COVER              | ABS 94HB            | 1   |    |
| 26 | M17744006012 | SCREW BIN(+)&MSZPC     | MSZPC               | 1   |    |
| 25 | 6120050900   | SHLD-PL FENCE CRT ASSY | SPTF T=0.3          | 1   |    |
| 24 | 6124035603   | HEAT SINK V            | A050P               | 1   |    |
| 23 | 5004000204   | SCR-TT WAL 3"8         | MSZPC               | 2   |    |
| 22 | 6129027600   | SPECIAL T.TW(+)&3"8    | MSZPC               | 3   |    |
| 21 | M31100030012 | NUT HEX 6N1-3          | MSZPC               | 3   |    |
| 20 | M11143008012 | SCREW BIN(+)&MSZPC     | MSZPC               | 8   |    |
| 19 | 6120051000   | FISHIELD FBT ASSY      | A050P               | 1   |    |
| 18 | 6124035602   | HEAT SINK V            | A050P               | 1   |    |
| 17 | 6124035600   | HEAT SINK V            | A050P               | 1   |    |
| 16 | 6124020510   | HEAT SINK POWER        | A050P               | 1   |    |
| 15 | 6124020508   | HEAT SINK POWER        | A050P               | 1   |    |
| 14 | 6282005100   | RUBBER PLATE           | SI-918 POLYURETHANE | 2   |    |
| 13 | 6223078900   | MOUNT BASE V770        | ---                 | 3   |    |
| 12 | 6225331100   | INSULATION CRT         | P/E                 | 1   |    |
| 11 | 6120042800   | GROUND SPRING V770     | SUS 304             | 4   |    |
| 10 | 6101218100   | CHASSIS MAIN OT70      | SECC T=0.8          | 1   |    |
| 9  | 6120050400   | GROUND CRT RIGHT       | SPTF T=0.3          | 1   |    |
| 8  | 6120051100   | GROUND CRT LEFT        | SPTF T=0.3          | 1   |    |
| 7  | 6120050300   | SHIELD CAP             | SPTF T=0.3          | 1   |    |
| 6  | 6201295900   | COVER CAP              | ABS-PC              | 2   |    |
| 5  | 6201295800   | BOTTOM COVER           | ABS 94HB            | 1   |    |
| 4  | 6220084900   | LENS LED POWER         | LUCKY P/MMA IF 850  | 1   |    |
| 3  | 6215237100   | KNOB V/R               | ABS 94HB            | 1   |    |
| 2  | 6155037600   | SPRING COM.            | SUS 304             | 1   |    |
| 1  | 6215237000   | KNOB POWER             | ABS 94HB            | 1   |    |
| NO | PART NO.     | PART NAME              | DESCRIPTION         | QTY | 備註 |

| NO | DATE       | BY         | CHK        | APP        | REV | TITLE         |
|----|------------|------------|------------|------------|-----|---------------|
| 1  | 2004.08.10 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 2  | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 3  | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 4  | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 5  | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 6  | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 7  | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 8  | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 9  | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 10 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 11 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 12 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 13 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 14 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 15 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 16 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 17 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 18 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 19 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 20 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 21 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 22 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 23 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 24 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 25 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 26 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 27 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 28 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 29 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 30 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 31 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 32 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 33 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |
| 34 | 2005.07.27 | Y. H. CHEN | Y. H. CHEN | Y. H. CHEN | 1   | EXPLODED VIEW |

