Type: Autozoom 5000
(Auto 611)

SUNPAK

Technical Information

Service Manual

Electronic Flash Unit Autozoom 5000 (Auto 611)

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Electronic Flash Unit:
Autozoom 5000: (Marketed elsewhere than U.S.A.)
Auto 611 : (Marketed U.S.A. only)

Year of manufacture:
Autozoom 5000: September, 1976
Auto 611 : March, 1976

Serial number started from:
Autozoom 5000: 16600001
Auto 611 : 10600001

Edition: October, 1976

CONTENTS:

1. TECHNICAL DESCRIPTION FOR AUTOZOOM 5000/AUTO 611

Electrical power per flash: Approx. 110 W/S

Guide Numbers:

Max.	48 ASA100(m)/160	ASA100(f)
	43 ASA 80(m)/143	ASA 80(f)
	24 ASA 25(m)/ 80	ASA 25(f)
	34 DIN 18(m)/	-
Min.	4.3 ASA100(m)/ 14	ASA100(f)
	3.8 ASA 80(m)/ 12	ASA 80(f)
	2.1 ASA 25(m)/ 7	ASA 25(f)
	3 Din 18(m)/	-

BCPS (ECPS): Max. 4530 Min. 35

Power Source:

a) Battery Cluster Type CL-1
b) NICD C cell x 4 pcs.
c) Accumulated layer cells 510V
d) Alkaline manganese C cell x 4 pcs.
e) AC 90 - 120V 50/60Hz.
AC 200 - 250V 50/60Hz.

Recycling time to 80% (when red neon glows.)

Power Source	Sec.
a) CL-1	0.25 - 9.5
b) NICD	0.25 - 9.5
c) 510V	0.25 - 3.0
d) Alkaline	0.25 - 19.0
e) AC	0.25 - 30.0

Recycling time to 100% (when green neon glows.)

a) CL-1	0.25 - 10.5
b) NICD	0.25 - 10.0
c) 510V	0.25 - 3.5

Numbers of flash per load of batts (Red).

a) CL-1	40 - 510
b) NICD	60 - 575
c) 510V	70 - 3000
d) Alkaline	50 - 1600
e) AC	unlimited

Auto effective distance:

Max. aperture	0.5 - 12	meters
	1.6 - 40	feet
Min. aperture	0.5 - 4.3	meters
	1.6 - 14	feet

Flash covering angle:

Vertical: 45 degree
Horizonta: 60 degree
(covers the format of a 35mm lenses for standard camera.)

Flash duration: 1/700 - 1/50000 sec.

Color temperature: Most suitable for daylight films.

Flash tube:	MG6545S selected
Synchro contacts:	a) Hot shoe contact b) Detachable parallel blades c) Detachable PC/Jack cord to remote sensor d) Open flash button
Camera bracket:	360° rotatable forward and backward one action detachable bracket by pressing button with released safety lock.
Neon indicator:	Red ready light for 80% of fully charged main capacitor. Green ready light for 100% of fully charged main capacitor. When green light glows, monitor circuit controls to minimize the current from batteries to the main capacitor.
Tolerance of light intensity when monitor circuit start to control the current:	± 0.1 EV
Ambient temoerature to enable to operate the unit:	From -20°C to 60°C -40°F to 140°F
Guide number dial:	Click stop system with coaxial power ratio selector with positive knurl.
Manual convertion of light intensity:	Carbon resistor switching method.
Flash body grip:	Covered with silicon rubber sleeve to protect slipping, with the tripod socket at the bottom side of the grip.
Extensive A/C adapter:	AC 90 - 120V 50/60Hz. AC 200 - 240V 50/60Hz.
Hours to recharge battery cluster CL-1:	3 Hours External Quick Charger QBC-1 with red L.E.D. illuminate charging is on the process.
Dimensions Flash body:	120 x 96 x 250mm/4.8x3.8x10"
Dimensions Remote Sensor:	63 x 51 x 25mm/2.5x2.0x1"
Weight Flash body:	915 grams/34.5oz. (less batteries)
Weight Remote Sensor:	70 grams/ 2.5oz.

2. OPERATION DESCRIPTION

BATTERY OPERATION

When the batt. switch is set to "BATT" position, the battery (BATT), silicon rectifier (SR11), resistor (R4), silicon rectifier (SR10), transistor (TR3), and capacitor (C1) & resistor (R1) are connected in series.

As the transistor (TR4) becomes 'ON' by battery current through resistor (R4), the collector current of the transistor (TR4) flows into base of the transistor (TR3).

At the same time the base current of one of the transistors (TR1 or TR2) becomes greater than that of the other transistor. For the purpose of this description, the transistor with the larger base current flow is taken as TR1.

This base current of transistor (TR1) also flows through the loop of feedback windings (FF-FC) of transformer (TR) -- collector & emitter of transistor (TR3) -- resistor (R1) and capacitor (C1) -- negative contact of battery. Then, collector current (Ic1) of transistor (TR1) flows the loop of emitter & collector of transistor (TR1) -- primary windings (PS - PC) of transformer (TF) -- negative contact of battery (BATT).

And in the same manner the collector current is increased by the ratio of Ic = hfe x ib. Although, when transistor (TR1) becomes saturated, its collector current suddenly becomes constant. Reverse electromotive force (EMF) is produced in the feedback windings (FF - FC) and the base current flow ceases, rapidly cutting off transistor (TR1).

This reversal of transistor (TR1) is produced by a back EMF in the base of transistor (TR1), cutting it off. But when transistor (TR1) is saturated, this back EMF causes bias to be supplied to transistor (TR2) base. The base current flows due to the EMF produced in the feedback windings (FS - FC). At the same time, collector current flows in the primary windings (PF - PC) by exactly the same principle as that of (TR1) saturation. Oscillation is performed by repeating this. Resistor (R1) and Capacitor (C1) are bias elements for imparting the initiating and regulating bias. Through induction, high voltage is produced in the secondary windings (SS-SC-SF) of transformer (TF) by the large EMF in the primary windings (PS-PC-PF).

The neon lamp (NL3) does not light at the low starting voltage of the main capacitor (C6) and transistor (TR6) is cut off. Transistor (TR6) cuts the battery voltage and thyristor (SCR1) becomes OFF. At this moment, the high voltage pulse produced at secondary windings of the transformer (TF) is charged to the main capacitor through diodes (SR2, SR4, SR5) and resistor (R1) & Capacitor (C1) under center top double wave rectifying circuitry. When the main capacitor (C6) is charged to their rated value, the neon lamp (NL3) lights.

Then the transistor (TR6) is ON, the battery voltage is applied to the gate of thyristor (SCR1) and the thyristor (SCR1) becomes ON. From this moment, the high voltage pulse produced at the secondary windings of transformer (TF) is charged into main capacitor (C6) through thyristor (SCR1) and diodes (SR1, SR2, SR3, SR4) under bridge all wave rectifying circuitry. If the charged voltage (VC6) of main capacitor (C6) is lower than secondary voltage of transformer (TF), the diode (SR5) is bias and performs charging to main capacitor (C6).

$$(N2/N1) \times V\ Batt > Vc\ 6{,}7$$

And when charged voltage (Vc6) is same or higher than secondary voltage of transformer (TF), the diode (SR5) becomes reverse bias and charging is performed through thyristor (SCR1) and its voltage becomes twice high than previous.

$$(N2/N1) \times V\ Batt \leq Vc\ 6$$

This principle is so called "transformer ratio selection". Capacitors (C2 and C3) are for spike killer and capacitor (C4), diode (SR7), resistors (R2, R3) compensate for di/dt and dv/dt of thyristor (SCR1).

Abbreviations:

N1 ..... Primary windings of transformer (TF)
N2 ..... Secondary windings of transformer (TF)
V Batt ..... Voltage of battery

When batt. switch (SW1) turned to A.C. Position, the A.C. connector portion is also open at this time, accepting connection of A.C. and power pack plugs. The input current of the receptacle is supplied at rather high tension from the plug.

When input current flows from A.C. adapter, capacitor (C5) is charged through resistor (R10) and the tension across capacitor (C5) increase up to 24 - 36V, then trigger diode (DIAC) breaks over, turning on and the charge of the capacitor (C5) discharges through trigger diode (DIAC) and pulse-transformer (PT1).

At the same time inducted pulse at the secondary windings of pulse transformer (PT1) flows into gate of the thyristor (SCR1) through resistor (R7) and diode (SR9). The thyristor becomes ON. Then the current from A.C. adapter charges main capacitor (C6) through thyristor (SCR1).

REGULATOR OPERATION

If the main capacitor (C6) starts to charge, the voltages of the resister (R14) and zener diode (ZR1) start to stabilize. Further charging increases the voltage to an established value, and the zener diode (ZR2) is break-over by the voltage divided by the resister (R25, R26) and potentiometer (VR1), accordingly transistor (TR7) conducts.

Capacitor (C8) is charged through transistor (TR8) and resister (R21) and at the same time when the voltage of the PUT anode (Va) becomes (about 0.7V) larger than that of the gate voltage (Vg), the PUT conducts. Capacitor (C8) which was charged at that time, discharges through PUT, resister (R20) and transistor (TR9). The gate potential applies to zener diode (ZR1) the voltage which was divided by resister (R18) and resister (R19). Neon lamp (NL2) lights when transistor (TR8) is ON. As neon lamp (NL2) is for a full charge indication, it does not light until transistor (TR9) is ON. Neon current does not flow when the voltage is divided by resister (R15) and resister (R16).

However, the neon lamp lights when transistor (TR9) is ON, as current is supplied by resisters (R11, R12) and transistor (TR9). Accordingly transistors (TR5, TR14) are ON. (Refer to battery operation and main operation.)

Rectifier (SR15), resister (R24) and capacitor (C9) are for compensation.

FLASH OPERATION

Resisters (R27, R28), capacitor (C10) are connected to the main capacitor in parallel. When the synchro contact or test button is short circuitted, the charging energy of capacitor (C10) is discharged through the primary of pulse transformer (PT2). At the same time, the pulse resulting at the secondary of pulse transformer (PT2), enters the thyristor (SCR2) gate through rectifier (SR16) and resister (R45), as gate current, and turns thyristor (SCR2) ON.

Capacitor (C11) is charged with the same voltage as that of the main capacitor (C6). When thyristor (SCR2) is ON, capacitor (C11) discharges through the primary winding of the trigger coil. And Xenon gas in FT is ionized by a pulse on the secondary of the trigger coil, and a discharge takes place to cause a flash. Also, as the main switching element (SSS1) is ON just before the flash starts, energy which is stored in the main capacitor, discharges through the loop of C6 - CH - FT - SSS1.

Details are explained in the "Chopper operation" section later.

When the sensor unit is connected, electrical performance is equalized. Also parts such as R27-35, R28-36, SR16-SR28, PT2-PT3 are matched parts respectively.

THE CHOPPER UNIT

When thyristor (SCR2) is ON, energy which charged capacitor (C16), discharges through the primary winding of pulse transformer (PT4). Accordingly, a high tension pulse exists on the secondary winding of pulse transformer (PT4), and flows into main switching element (SSS1) through rectifier (SR22). Then the main switching element breaks over and becomes ON. And when the Xenon gas in the flash tube is ionized, it flashes.

Choke coil (CH) is furnished to protect the main flash tube (FT) and the main switching element (SSS1), rectifier (SR21), resister (R44) and capacitor (C23) are furnished to stabilize the functions.

Thyristor (SCR3) is on after the flash. Accordingly, when the charging energy of capacitor (C21) discharges through the primary winding of pulse transformer (PT5) and the high tension pulse which reaches the secondary winding of pulse transformer (PT5) makes the switching element (SSS2) ON by connection to capacitor (C20). At the same time, energy which is stored in capacitor (C13), discharges through the loop of SSS2 - SSS1 - FT - SSS3. This function is the so called "commutation current". This becomes OFF by current flowing in a reverse direction to SSS1. Reisters (R40, R41) are charging resisters of the commutation current capacitor (C13), and resister (R42) is for charging of capacitor (C21) and current limitter, capacitor (C24) is also a noise filter.

AUTO SENSOR OPERATION

This circuit is activated by connection of a sensor plug into the remote sensor connector, and switching the Auto/Power Ratio switch on the back of the flash body to the "Auto" position.

Capacitor (C14) is charged through resister (R37) and zener diode (ZR6). This capacitor (C14) is discharged when the main switching element (SSS1) and FT are connected. The discharge loop at this time is as follows: Capacitor (C14) - FT - main switching element (SSS1) - zener diode (ZR6) - Resister (R37).

The voltage of the zener diode is restricted by the zener voltage of the standard. The discharged energy of this capacitor (C14) becomes the power source of the sensor circuit.

Light rays which radiated from FT, and were reflected by the subject, are received at the photo-transistor and converted into current proportional to the brightness of the rays. This current flows as the correcter current of the photo-transistor (PHTR1), charges capacitor (C35) and is integrated. When the voltage loaded to the potentiometer (VR3) becomes more than the level which was previously established, transistor (TR12) conducts.

The setting level is fixed by the charging voltage division of the integration capacitor by potentiometer (VR3).

When transistor (TR12) becomes ON and the correcter current flows, the current flows as the gate current of thyristor (SCR5) and thyristor (SCR5) becomes ON.

Rays reflected from a subject give the appropriate film exposure, thyristor (SCR5) becomes ON and provides signal current for termination of the flash. Resisters (R57, R60) and capacitors (C34, C37, C38) here, are for protection and to supplement this circuit.

AUTO INDICATOR

This circuit is activated when the Auto Sensor circuit is activated (Refer to Auto Sensor Operation.). Auto verification lamp (NL4) is charged on capacitor (C41) through main capacitor (C6) and resisters (R42, R65). When the charging voltage of capacitor (C41) becomes more than the neon start voltage, auto confirmation neon lamp (NL4) lights.

A flash termination signal is sent from the Auto Sensor circuits, thyristor (SCR5) is introduced, the electric potential between the anode and cathode becomes almost zero, and the voltage charged in capacitor (C41), discharges through diode (SR29). Accordingly, as the charging level becomes lower than the neon lamp (NL4) lighting voltage, the neon lamp is extinguished.

Response time is decided by a combination of resisters (R42, R65) and capacitor (C41).

POWER RATIO SELECTOR OPERATION

This circuit is activated by sliding the AUTO/POWER RATIO switch to the Power Ratio position.

This circuit operates the same as that of "Auto Sensor Operation" and the zener diode power source of the sensor exists. The integration capacitor is charged with a fixed time through reister (R48) and potentiometer (VR2).

On the other hand, the voltage of capacitor (C31) which is charged with a certain fixed time, is changed by resister (R55) and potentiometer (VR2).

When the voltage of capacitor (C31) is over the vlaue which was previously set, transistor (TR11) becomes ON. Operation after this is the same as that explained in the "Auto Sensor Operation" section.

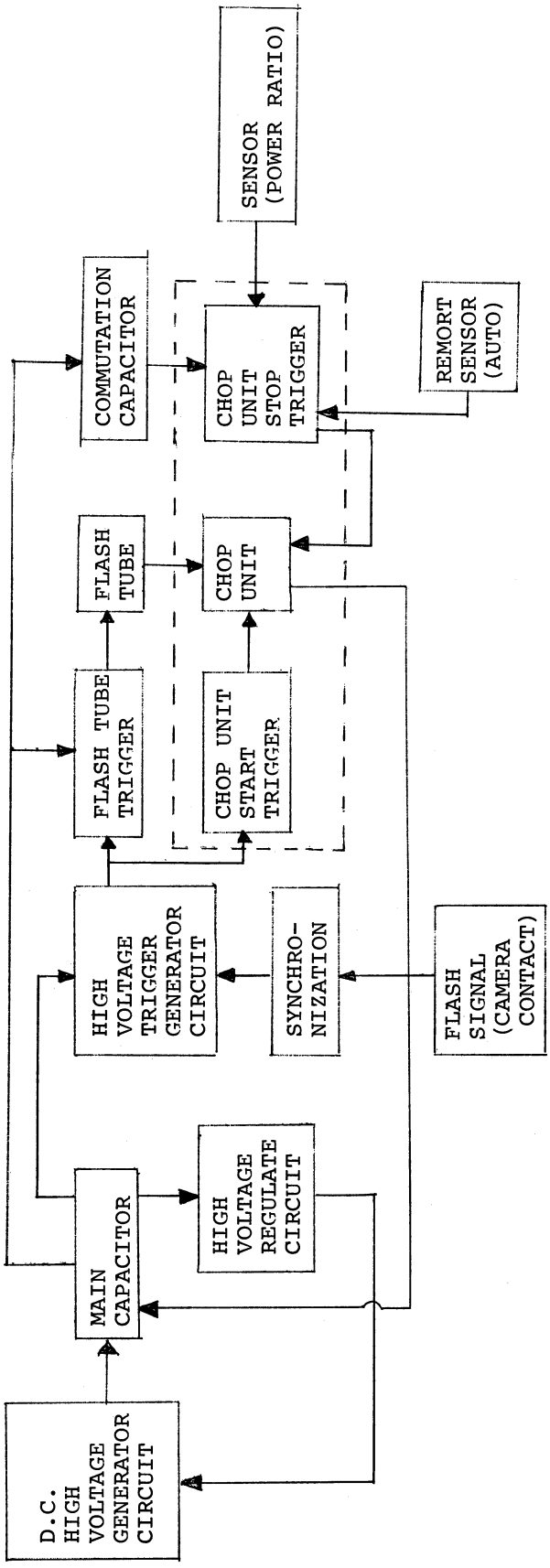
MAIN OPERATION

When the battery switch (SW1) is switched to AC, the AC connector section opens at the same time. This connector is used to connect a plug of the AC adapter or the power pack. This input current is supplied from a plug with a higher voltage.

The main capacitor is charged by this power source. When the main capacitor voltage increases more than the voltage fixed by resister (R68, R69), variable resister (VR4) and zener diode (ZR7) (about 327V+2, -3V), current flows to zener diode (ZR7) and transistor (TR7) becomes on.

The operation performed hereafter is the same as that of the regulator operation.

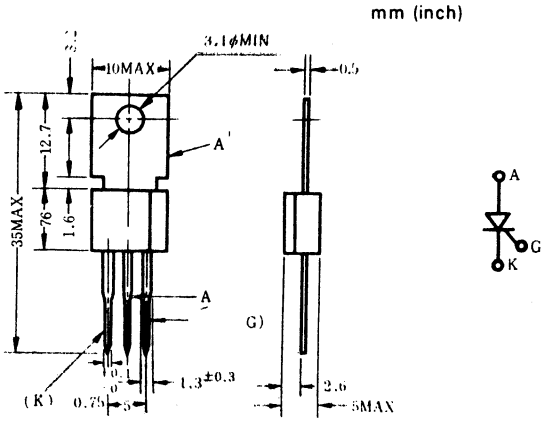
AUTO 611
AUTO ZOOM 5000 BLOCK DIAGRAM



3. MEASURING DATA

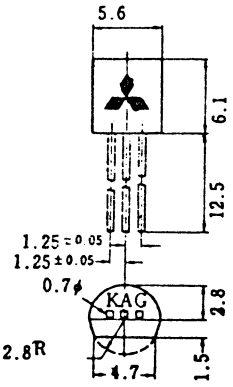
Thyristor SCR1 CV12E-13 (Selected)

Vbo	400V
If	1A



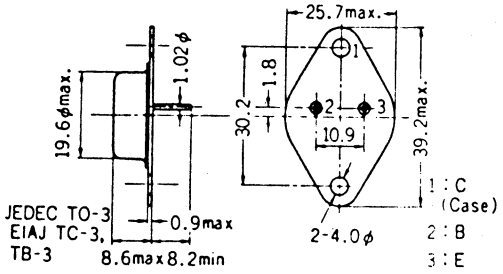
Thyristor SCR2, SCR3, SCR4, SCR5, CR02AM-6 (Selected)

Vrrm	300V
IT(rms)	0.47A
Pgm	0.1W



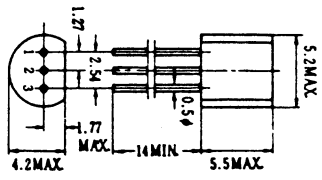
Transistor TR1, TR2 2SB407 (Selected)

Ic max.	-7A
Pc	30W
Vcbo	30V
Veco	30V
Vebo	10V
hfe	100 over
(Class: YLW, GRN)	



Transistor TR4, TR7, 2SC945 (Selected)

Ic	100mA
Vcbo	50V
Vceo	40V
Vebo	5.0V
hfe	200 over

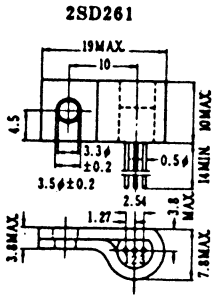


1. Emitter
2. Collector
3. Base

EIAJ : SC-43
JEDEC : TO-92
IEC : PA33

Transistor TR3 2SD261 (Selected)

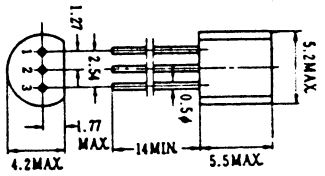
Ic (DC)	500mA
Vcbo	40V
Vceo	20V
Vebo	5.0V



1. Emitter
2. Collector
3. Base

Transistor TR5, TR6, TR8, TR14 2SA641 (Selected)

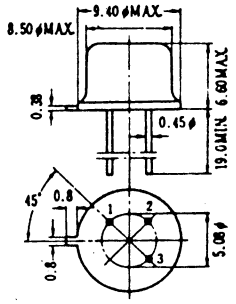
Ic	-30mA
Vcbo	-50V
Vceo	-45V
Vebo	-5.0V
hfe	450 over



1. Emitter
2. Collector
3. Base
EIAJ : SC-43
JEDEC : TO-92
IEC : PA33

Transistor TR9 2SC1103A (Selected)

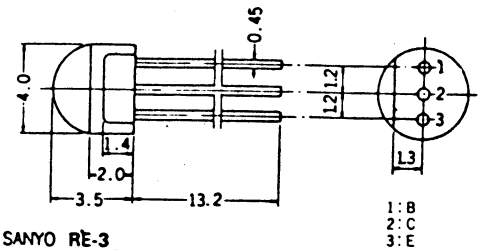
Ic	100mA
Vcbo	250V
Vceo	250V
Vebo	7.0V
hfe	60 over



1. Emitter
2. Base
3. Collector (Case)
EIAJ : TC-5, TB-5B
JEDEC : TO-205MD (TO-39)
IEC : C4, B4B

Transistor TR11, TR12 2SC536 (Selected)

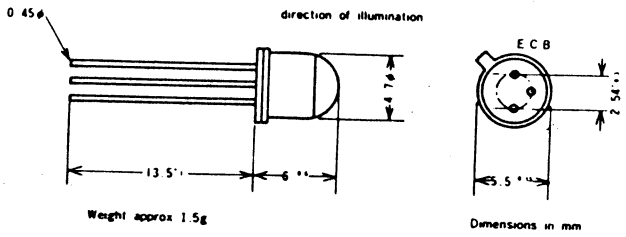
Vcbo	40V
Vceo	20V
Vebo	5V
Ic	100mA
Pc	200mA



SANYO RE-3

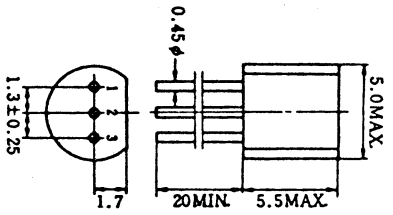
Photo-transistor PHTR-1 PT-350A (Selected)

Ic typ.	2.5mA
Vceo	20V
Vebo	5V
Pc	50mW
Il	1 to 2.5mA
TrTf	8 (10)ps



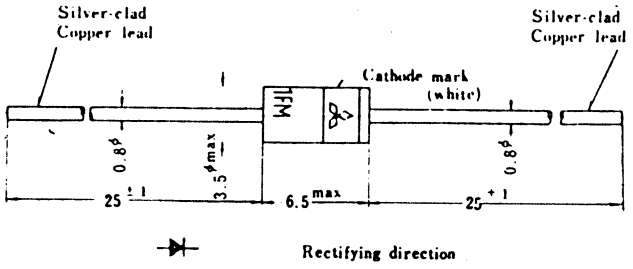
Programmable Unijunction Transistor PUT NI3T1 (Selected)

Vgkf	40V
Vgkr	5V
Vak	+40V
It	150mA



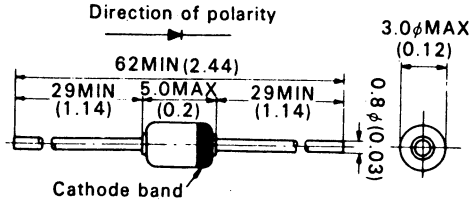
Silicon rectifier SR-5, 7, 8, 13, 16, 25, 26 SR1FM/16 (Selected)

Vrrm	800V
If	0.8A



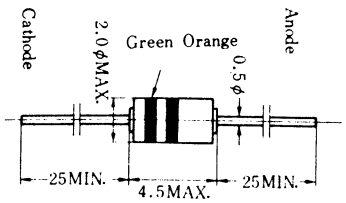
Silicon rectifier SR10-12, 23 W06A (Selected)

Vrrm	50V
If	1A



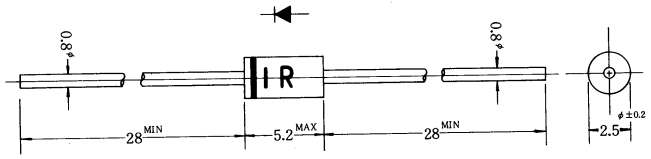
Silicon rectifier SR14, SR15 1S953 (Selected)

Vrrm	35V
If	100mA



Silicon rectifier SR27-29 10D4

Vrrm	400V
If	1A

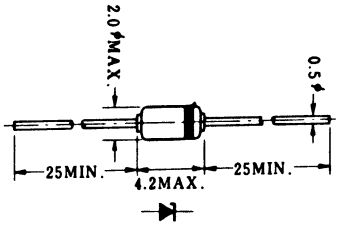


Zener diode ZR1, ZR2, ZR7 RD16A-M (Selected)

Vz max.	16.5V
Vz min.	14.9V

Zener diode ZR3, ZR6 RD6.2EB (Selected)

Vz max.	6.6V
Vz min.	5.7V



N.B. The transistors, thyristors, and diode in substitute must be satisfied above requirements.

Charging current of I Batt.
(measured at 330V across C6):

Control circuit "ON"	:	100 - 300mA
Control circuit "OFF"	:	10 - 50mA

Charging current of C6.
(measures at 330V across C6):

Control circuit "ON"	:	0 mA
Control circuit "OFF"	:	1.5 mA

Tension across C6. : 260V ± 10V
(at which the ready lamp glows. Naturally the ready lamp is selected one.)

Fixed tension at R13
(at 260V across C6, 7) : 70 - 90V
(measured after ignition of C11, 60-70V)

Maximum tension across C6.

at 4 fresh Alkaline Manganese batts.	327V +2V/-3V
at 4 fully charged CL-1/NICD batts.	327V +2V/-3V
at A.C. 90-120V/200-240V	327V +2V/-3V
at accumulated layer cells batt. 510V	327V +2V/-3V

Tension of battery
(After flashing measured at 330V across C6)
(50V range)

Battery charged	
Alkaline Manganese batts.	4.7 - 5.0V
Charged CL-1/NICD batts.	4.5 - 4.8V
Battery discharged	
Alkaline Manganese batts.	4.1 - 4.4V
Discharged CL-1/NICD batts	4.0 - 4.2V

All tensions and current have been measured with SANWA ELECTRIC INSTRUMENT CO., LTD., Multiple meter model U-500N if not otherwise stated.

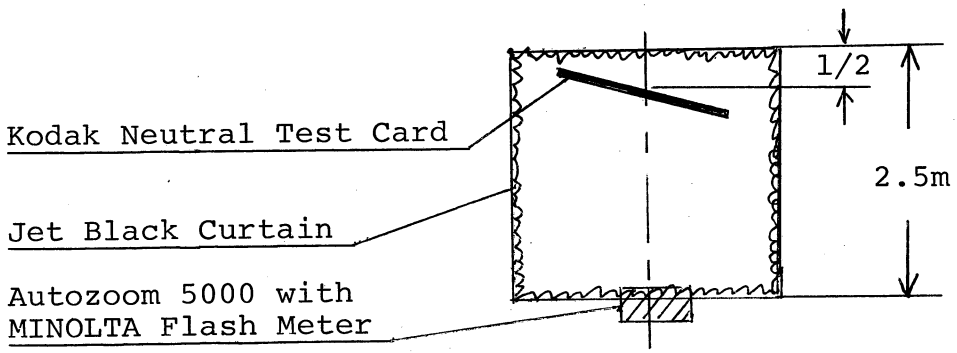
In regards to guide number, recycling time, number of flashes and illumination, the value with these tolerances according to JAPAN CAMERA INSPECTION INSTITUTE'S requirements.

MEASUREMENT OF COMPUTER OPERATION

Test on Computer

Set the Minolta Flash Meter and the Autozoom 5000 (Auto 611) set at Automatic operation position and 2 meter before the wall of Kodak Neutral Test Card with the Gray side of 18% reflectance, and these instruments should be placed in the space 2 meter long, 2.5 meter wide and 2 meter high covered with jet black curtain.

The Minolta Flash Meter should be placed with Autozoom 5000 2 meter before the wall and set at DIN 18 (ASA 50) and Autozoom 5000 set on Automatic operation should be flashed 2 meter before the wall of Kodak Neutral Test Card to be F4 for Blue square position without ND Filter and to be F8 for Red square with ND Filter, and then for this case the computerised light intensity of Autozoom 5000 should be correct. As the tolerances, we allow up to one F-stop.



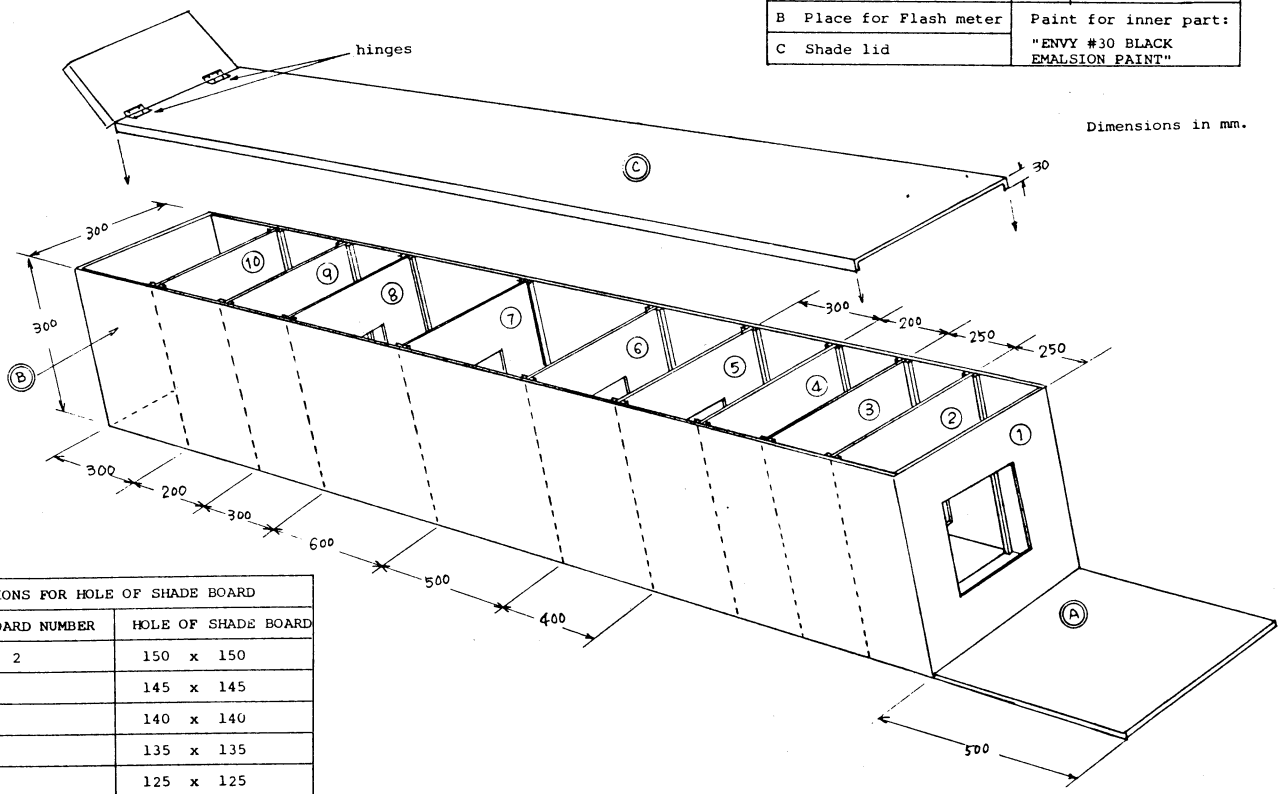
MEASUREMENT OF POWER RATIO OPERATION

For this test the light measuring box is required to measure the correct light intensity of the flash light, selecting straight light only and no reflected light effect the flash meter. The dimensions of the box are depth 3500mm, height 300mm, and width 300mm.

The box consists of body, cover and shade boards with square holes, and all the inner parts must be painted in black by the paint "ENVY No.30 BLACK EMALSION PAINT made by SHINTO TORYO K.K." and should be placed in dark room. Detailed dimensions are shown by the figure below. Set the J.C.I.I. flash meter Type-2 to the position "B" of the light measuring box and set the Autozoom 5000 (Auto 611) to the position "A", setting the Auto/Power Ratio selector Power Ratio selector side. The measured light intensity of the flash unit should be correspond to the value of Power Ratio. As the tolerances, we allow up to one F-stop.

The light Measuring Box for Electronic Flash Unit		
A Flash light input	1-10	Shade board
B Place for Flash meter	Paint for inner part:	
C Shade lid	"ENVY #30 BLACK EMALSION PAINT"	

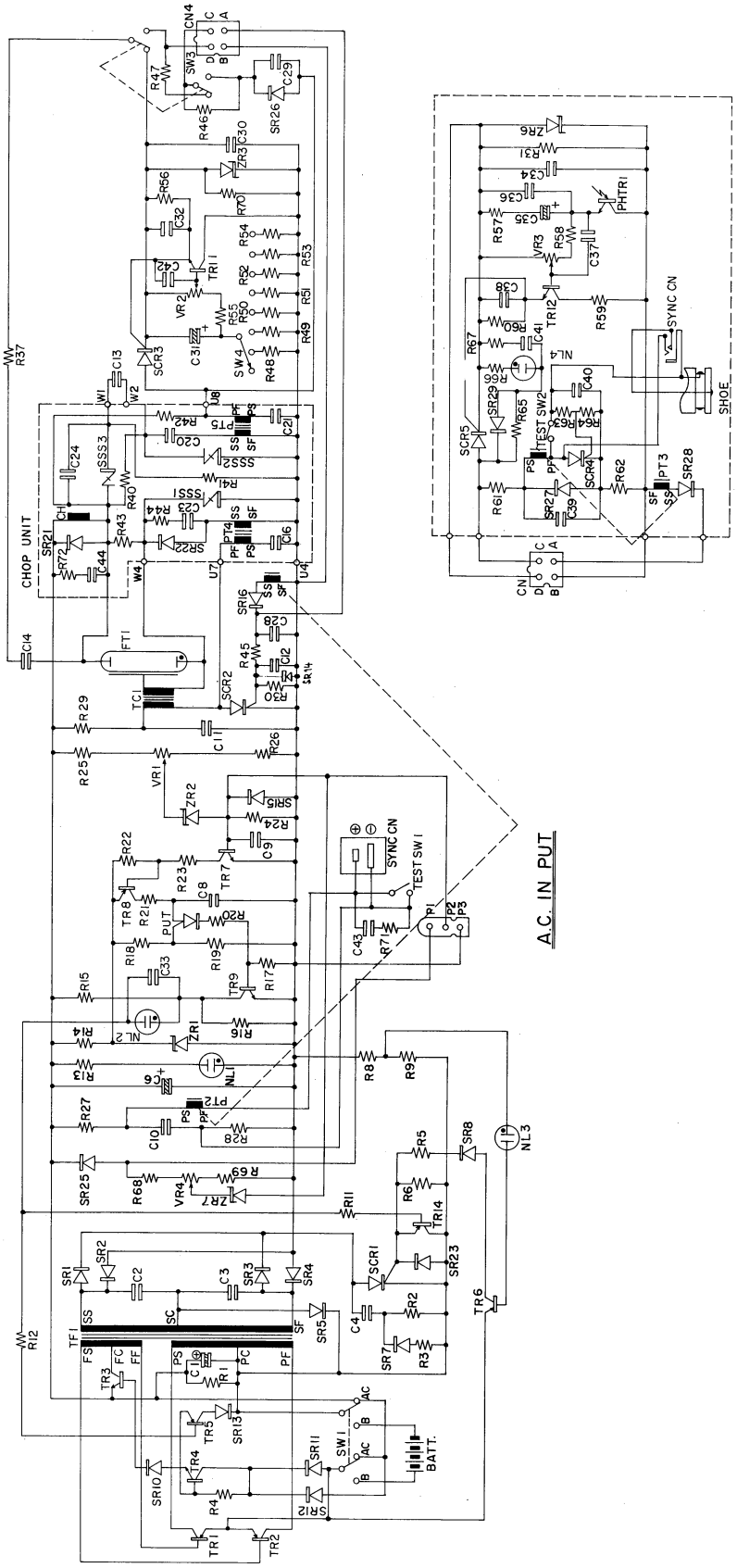
Dimensions in mm.



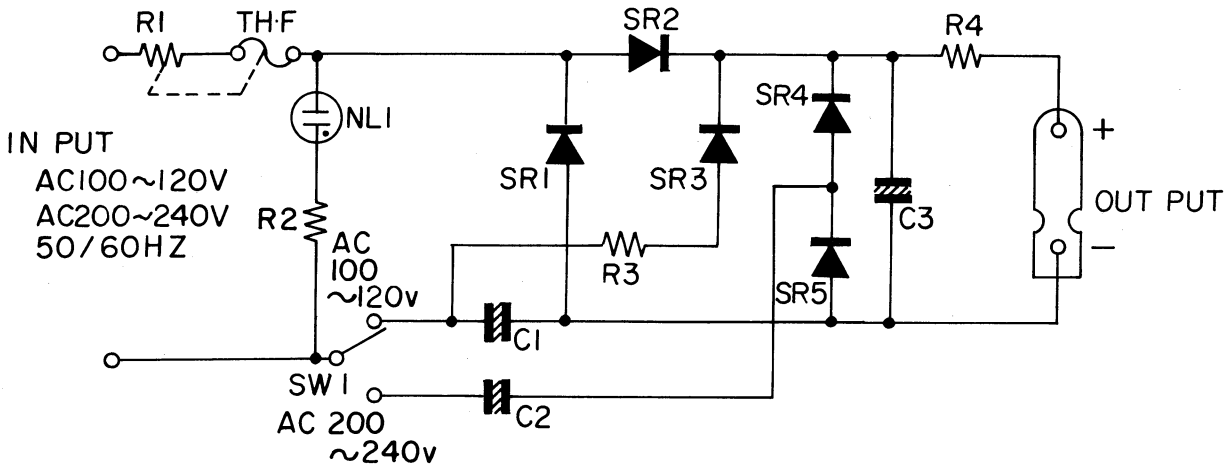
DIMENSIONS FOR HOLE OF SHADE BOARD	
SHADE BOARD NUMBER	HOLE OF SHADE BOARD
1 2	150 x 150
3	145 x 145
4	140 x 140
5	135 x 135
6	125 x 125
7	120 x 120
8	110 x 110
9 10	100 x 100

4. CIRCUIT DIAGRAM for Autozoom 5000/(Auto 611)

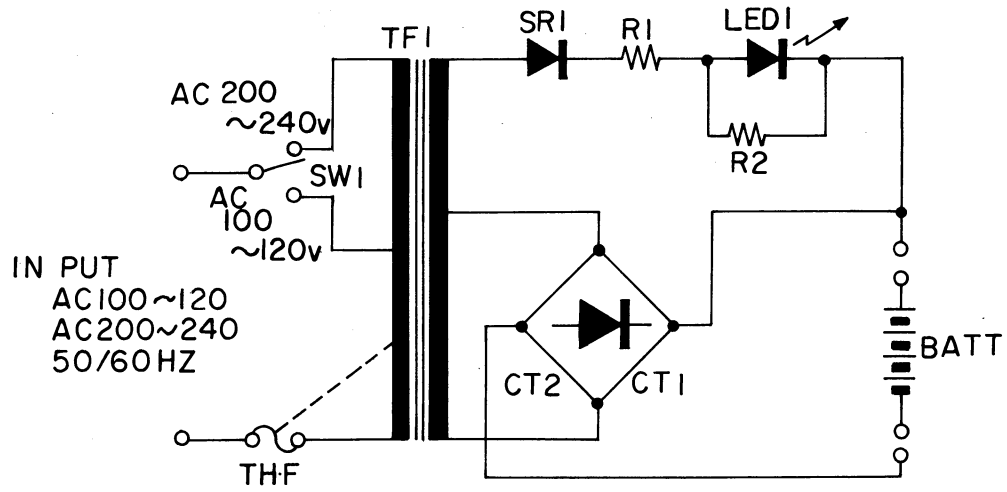
AUTO 611
AUTO ZOOM 5000 COMPLETE CIRCUIT DIAGRM



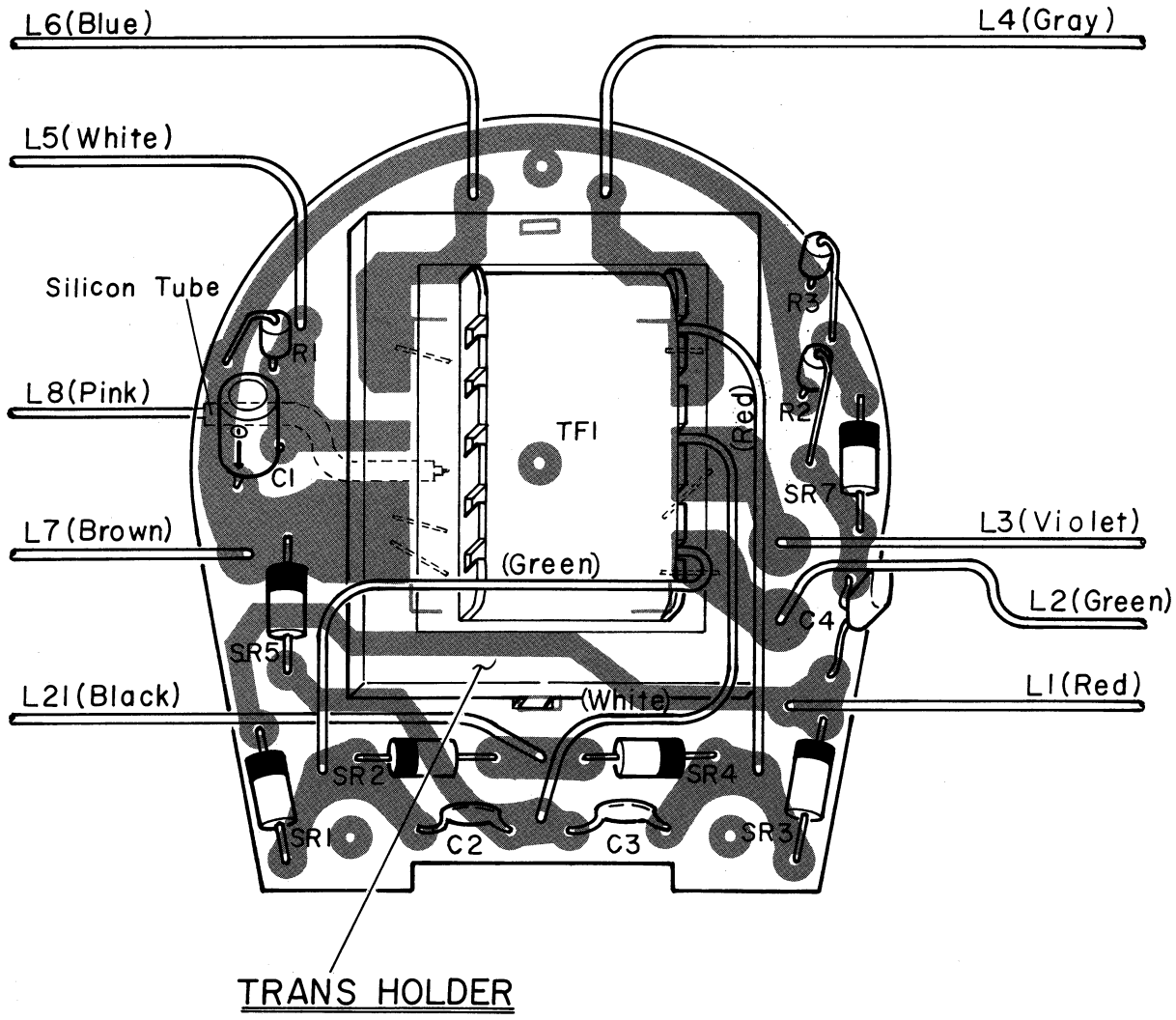
AC ADAPTOR(AD-11)



QUICK CHARGER(QBC-1)



5. LAYOUT OF COMPONENTS (Electrical part)
Printed Circuit Board 'A'



PRINTED CIRCUIT BOARD "A"

*Diode

SR1	SR1FM/16
SR2	SR1FM/16
SR3	SR1FM/16
SR4	SR1FM/16
SR5	SR1FM/16
SR7	SR1FM/16

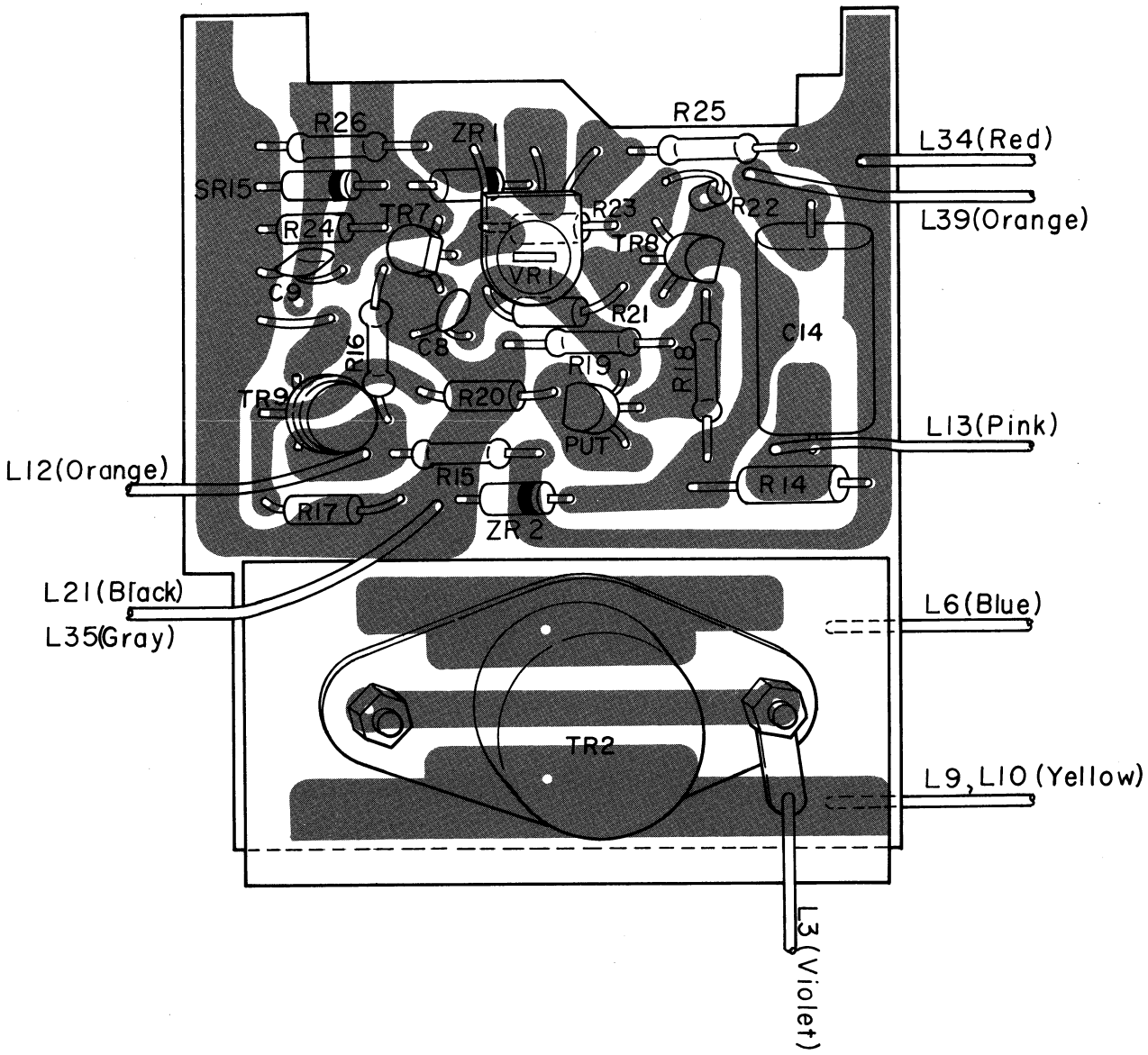
*Resistor

R1	120 ohm 1/2W
R2	51 ohm 1/2W
R3	3.3 ohm 1/2W

*Capacitor

C1	47MFD	10WV
C2	220PFD	500WV
C3	220PFD	500WV
C4	0.02MFD	400WV

LAYOUT OF COMPONENTS for Autozoom 5000 (Auto 611)
Printed Circuit Board 'B'



PRINTED CIRCUIT BOARD "B"

*Transistor

TR2	.....	2SB407
TR7	.....	2SC945
TR8	.....	2SA641
TR9	.....	2SC1103A
PUT	.....	N13T1

*Diode

CR15	.....	1S953
ZR1	.....	RD16A-M
ZR2	.....	RD16A-M

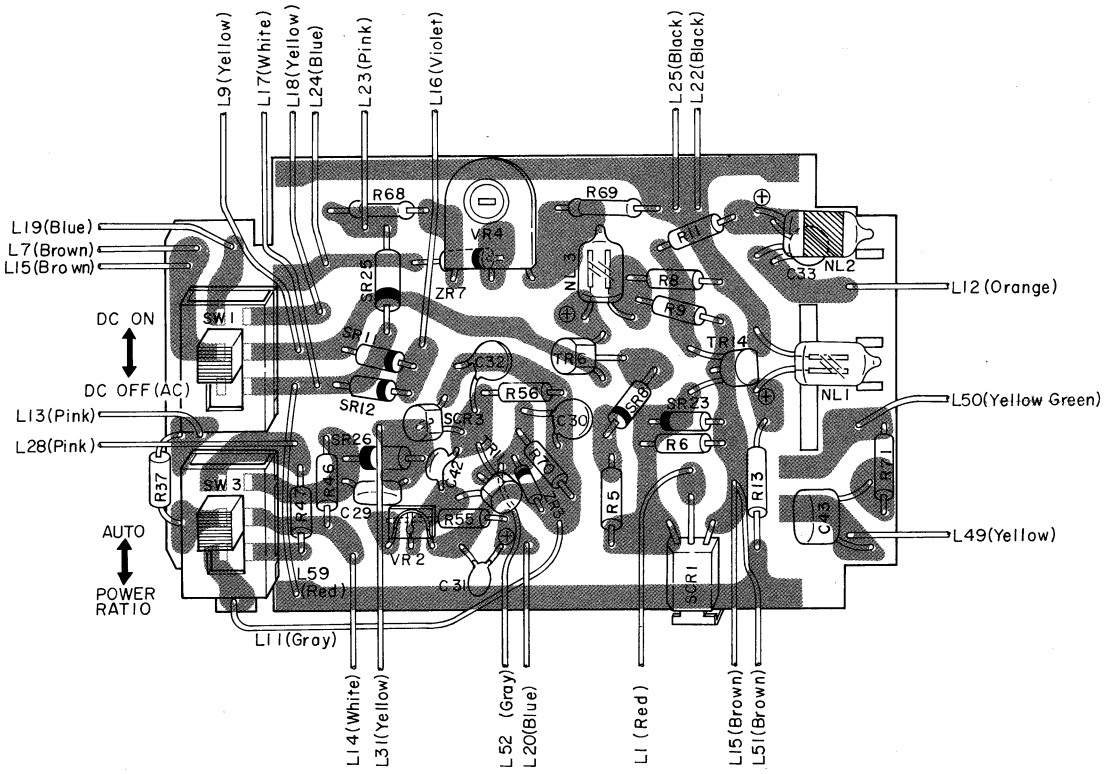
*Capacitor

C8	.....	C.33MFD 35WV
C9	.....	2200PFD 50WV
C14	.....	0.22MFD 250WV

*Resistor

R14	.....	680K ohm 1/2W
R15	.....	1M ohm 1/4W
R16	.....	1.2M ohm 1/4W
R17	.....	100K ohm 1/4W
R18	.....	390K ohm 1/4W
R19	.....	390K ohm 1/4W
R20	.....	10 ohm 1/4W
R21	.....	100K ohm 1/4W
R22	.....	100K ohm 1/4W
R23	.....	560K ohm 1/4W
R24	.....	100K ohm 1/4W
R25	.....	1M ohm 1/4W
R26	.....	47K ohm 1/4W
VR1	.....	30K ohm 10ø

LAYOUT OF COMPONENTS for Autozoom 5000 (Auto 611)
Printed Circuit Board 'C'



PRINTED CIRCUIT BOARD "C"

*Thyristor

SCR1	CV12E-13
SCR3	CR02AM-6

*Transistor

TR6	2SA641
TR11	2SC536
TR14	2SA641

*Diode

SR8	SR1FM/16
SR11	W06A
SR12	W06A
SR23	W06A
SR26	SR1FM/16
ZR3	RD6.2EB
ZR7	RD16A

*Switch

SW1	7EB
SW3	7EB

*Neon Lamp

NL1	NL260D
NL2	NG220D
NL3	NE2B

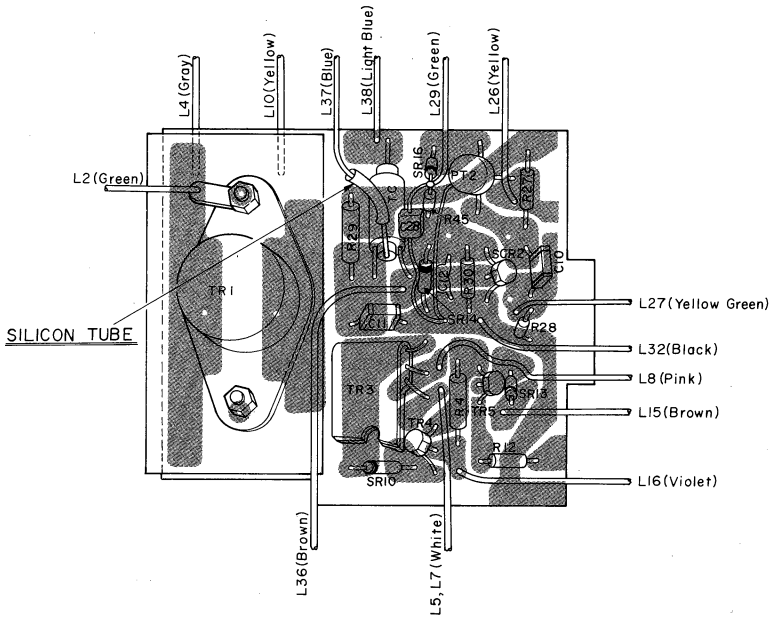
*Resistor

R5	1K ohm 1/4W
R6	1K ohm 1/4W
R8	820 ohm 1/4W
R9	1M ohm 1/4W
R11.....	680 ohm 1/4W
R13	1M ohm 1/4W
R37	1K ohm 1/4W
R46	330K ohm 1/4W
R47	150K ohm 1/4W
R55	5.6K ohm 1/4W
R56	470 ohm 1/4W
R69	47K ohm 1/4W
R70	10K ohm 1/4W
R71	10 ohm 1/4W
VR2	100K ohm 6 square
VR4	30K ohm 10 ø

*Capacitor

C29	0.0022MFD 400V
C30	0.02MFD 50V
C31	0.68MFD 35V
C32	0.02MFD 50V
C33	220PFD 500V
C42	100PFD 50V
C43	0.02MFD 400V

LAYOUT OF COMPONENTS for Autozoom 5000 (Auto 611)
Printed Circuit Board 'D'



PRINTED CIRCUIT BOARD "D"

*Thyristor
SCR2 ..... CR02AM-6

*Transistor
TR1 ..... 2SB407
TR3 ..... 2SD261
TR4 ..... 2SC945
TR5 ..... 2SA641

*Diode
SR10 ..... W06A
SR13 ..... SR1FM/16
SR14 ..... 1S953
SR16 ..... 1S953

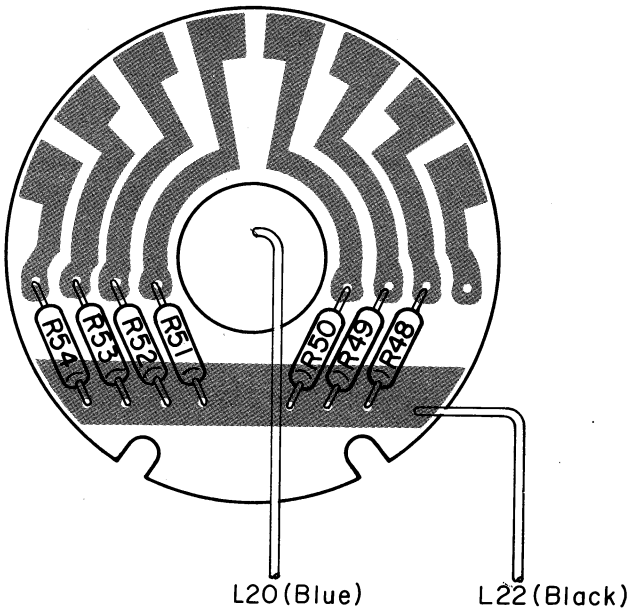
*Transformer
PT2 ..... PT2
TC1 ..... TC6

*Resistor
R4 ..... 2.7K ohm 1/2W
R12 ..... 680K ohm 1/4W
R27 ..... 3.3M ohm 1/4W
R28 ..... 3.3M ohm 1/4W
R29 ..... 220K ohm 1/4W
R30 ..... 470 ohm 1/4W
R45 ..... 10K ohm 1/4W

*Capacitor
C10 ..... 0.047MFD 250WV
C11 ..... 0.047MFD 250WV
C12 ..... 0.002MFD 400WV

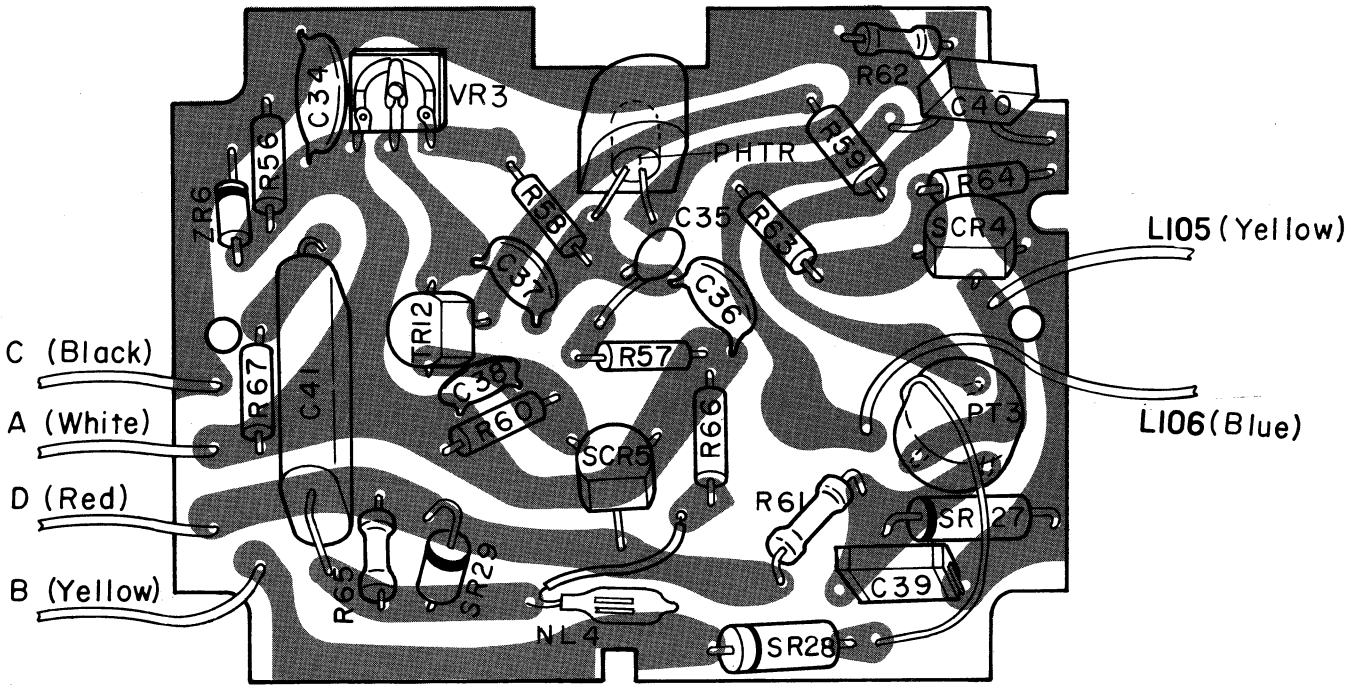
PRINTED CIRCUIT BOARD "E"

*Resistor
R48 ..... 3.0K ohm 1/8W
R49 ..... 1.5K ohm 1/8W
R50 ..... 910 ohm 1/8W
R51 ..... 620 ohm 1/8W
R52 ..... 430 ohm 1/8W
R53 ..... 360 ohm 1/8W
R54 ..... 240 ohm 1/8W



LAYOUT OF COMPONENTS for Remote Sensor
Autozoom 5000 (Auto 611)

AUTO 611
AUTO ZOOM 5000 REMOTE SENSOR "P.C.B.-F"



*Thyristor
SCR4 ..... CR02AM-6
SCR5 ..... CR02AM-6

*Transistor
TR12 ..... 2SC536

*Photo-Transistor
PHTR1 .... PT350A

*Diode
SR27 ..... 10D4
SR28 ..... 10D4
SR29 ..... 10D4
ZR6 ..... RD6.2EB

*Transformer
PT3 ..... PT2

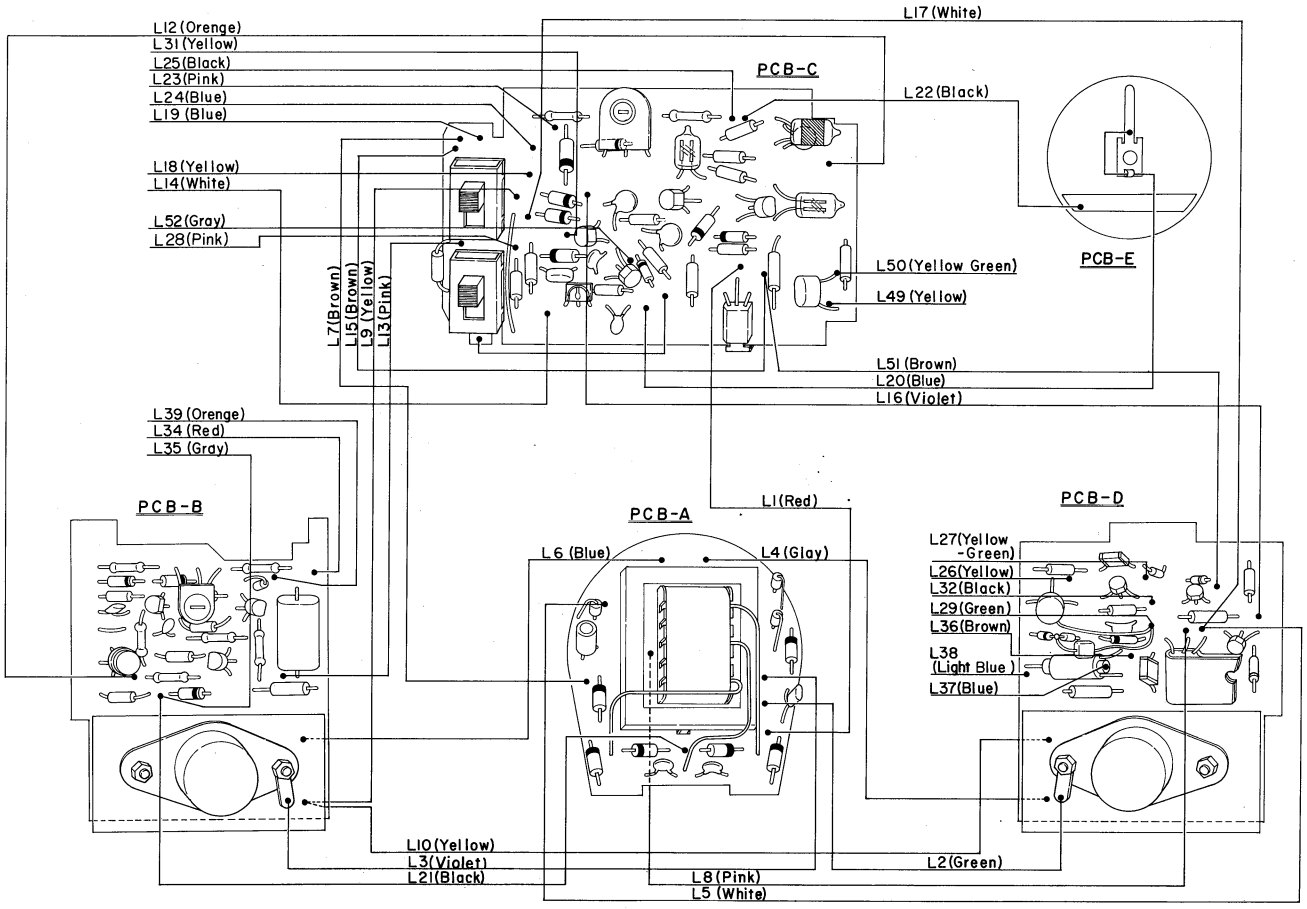
*Neon Lamp
NL4 ..... NL8D

*Capacitor
C34 ..... 0.02MFD 50WV
C35 ..... 0.15MFD 35WV
C36 ..... 0.01MFD 50WV
C37 ..... 220PFD 50WV
C38 ..... 0.02MFD 50WV
C39 ..... 0.02MFD 250WV
C40 ..... 0.002MFD 400WV
C41 ..... 0.22MFD 250WV

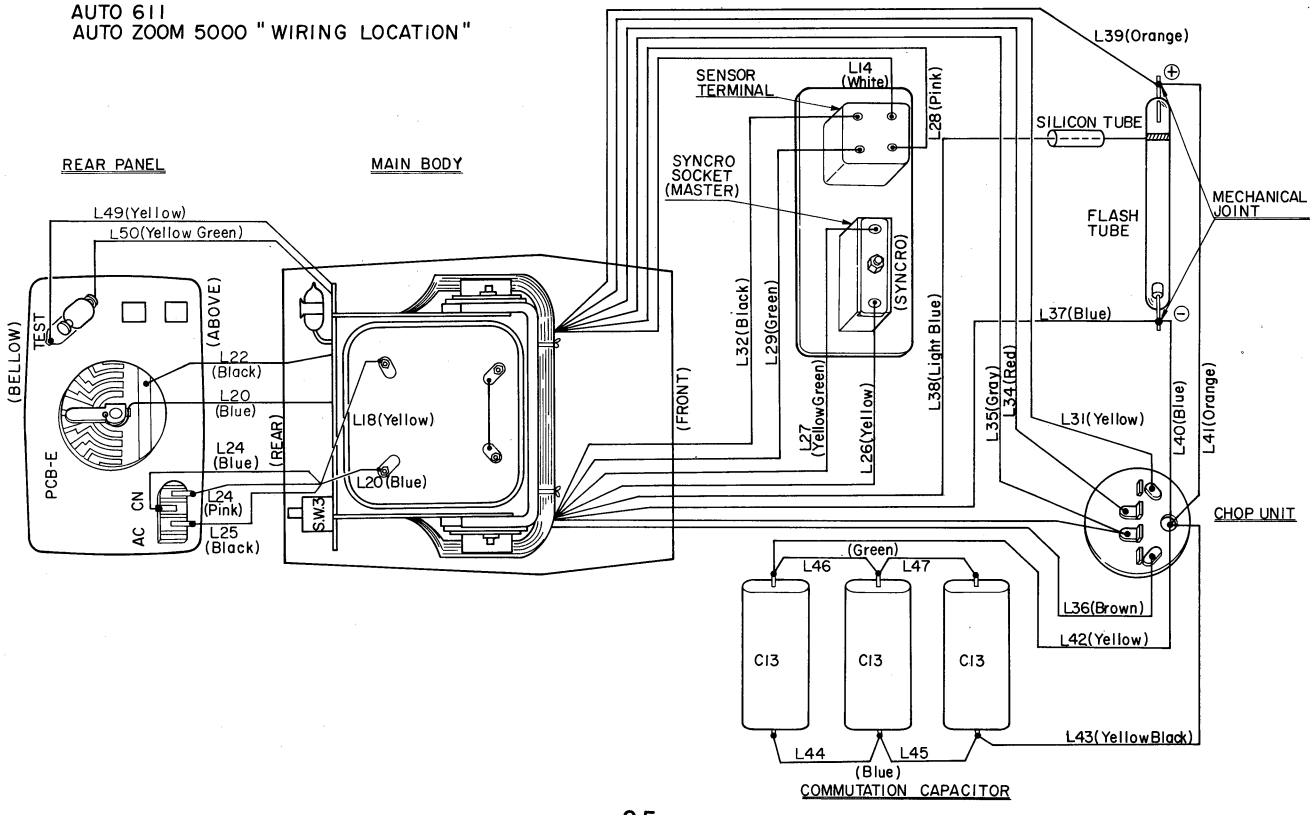
*Resistor
R56 ..... 10K ohm 1/4W
R57 ..... 10 ohm 1/4W
R58 ..... 5.6 ohm 1/4W
R59 ..... 10 ohm 1/4W
R60 ..... 470 ohm 1/4W
R61 ..... 3.3M ohm 1/4W
R62 ..... 3.3M ohm 1/4W
R63 ..... 10K ohm 1/4W
R64 ..... 470 ohm 1/4W
R65 ..... 5.1M ohm 1/4W
R66 ..... 10M ohm 1/4W
R67 ..... 100 ohm 1/4W
VR3 ..... 100K ohm 6 square

WIRING DIAGRAM FOR AUTOZOOM 5000/AUTO 611

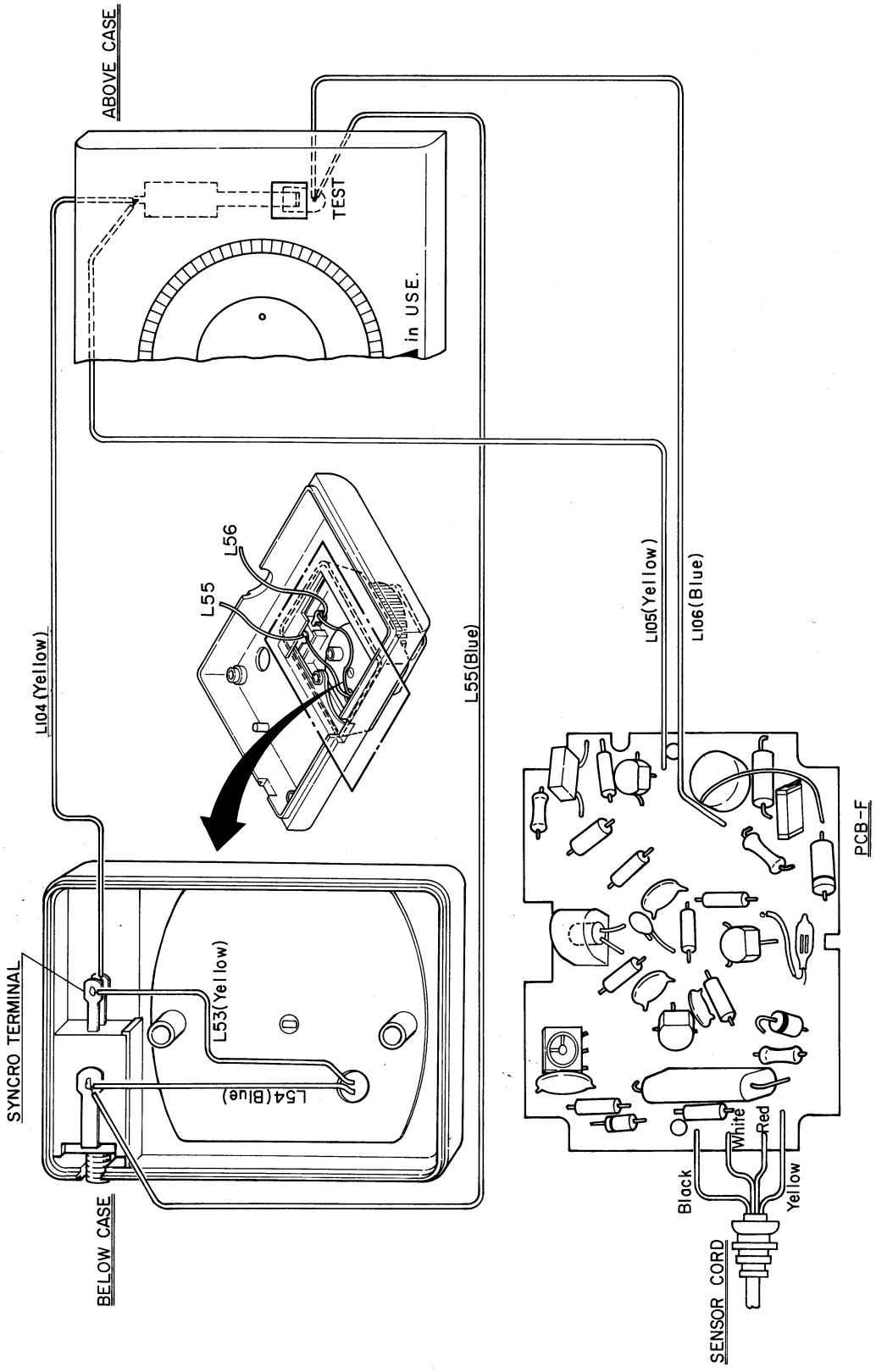
AUTO 611
AUTO ZOOM 5000 "WIRING LOCATION"



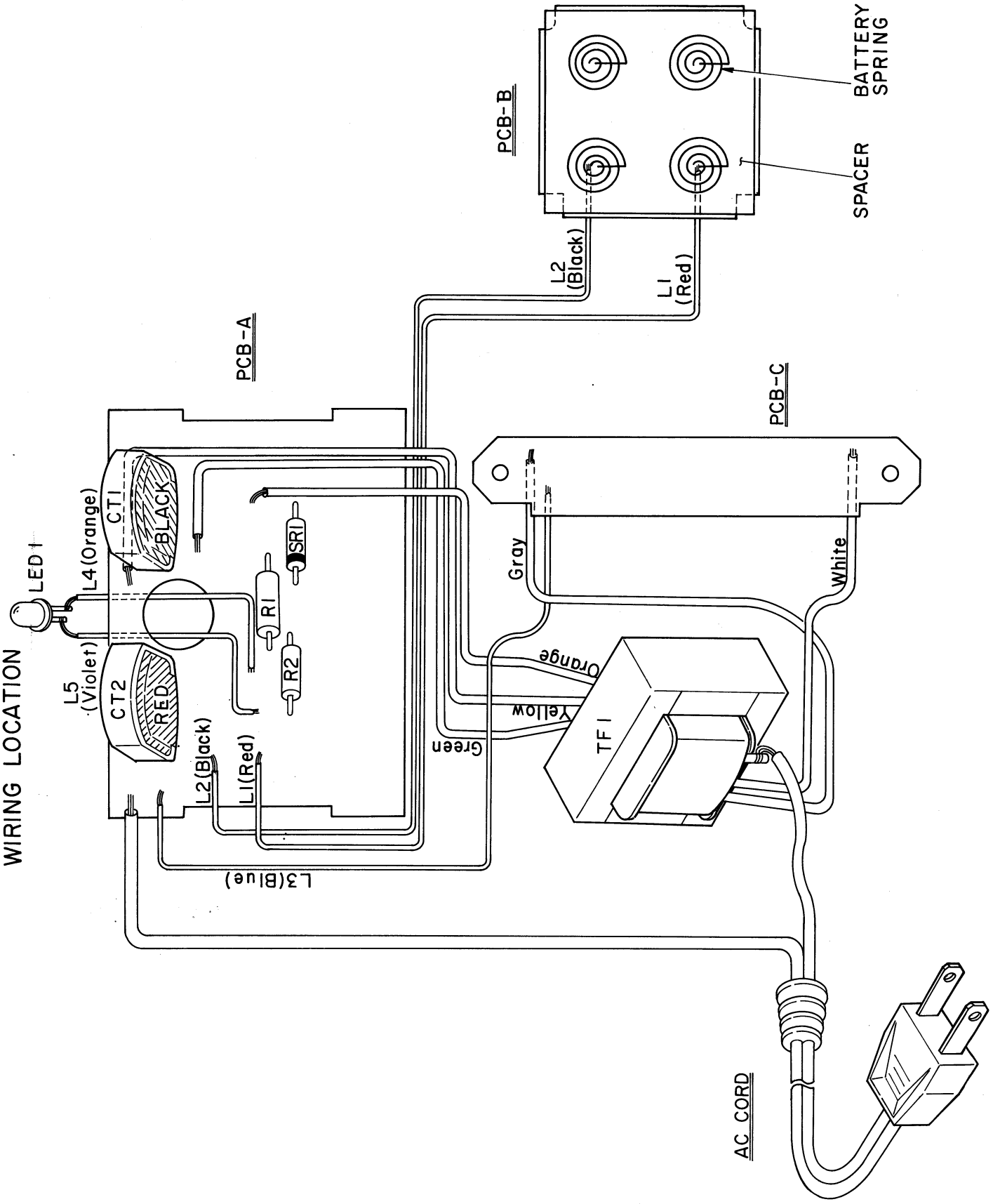
AUTO 611
AUTO ZOOM 5000 "WIRING LOCATION"



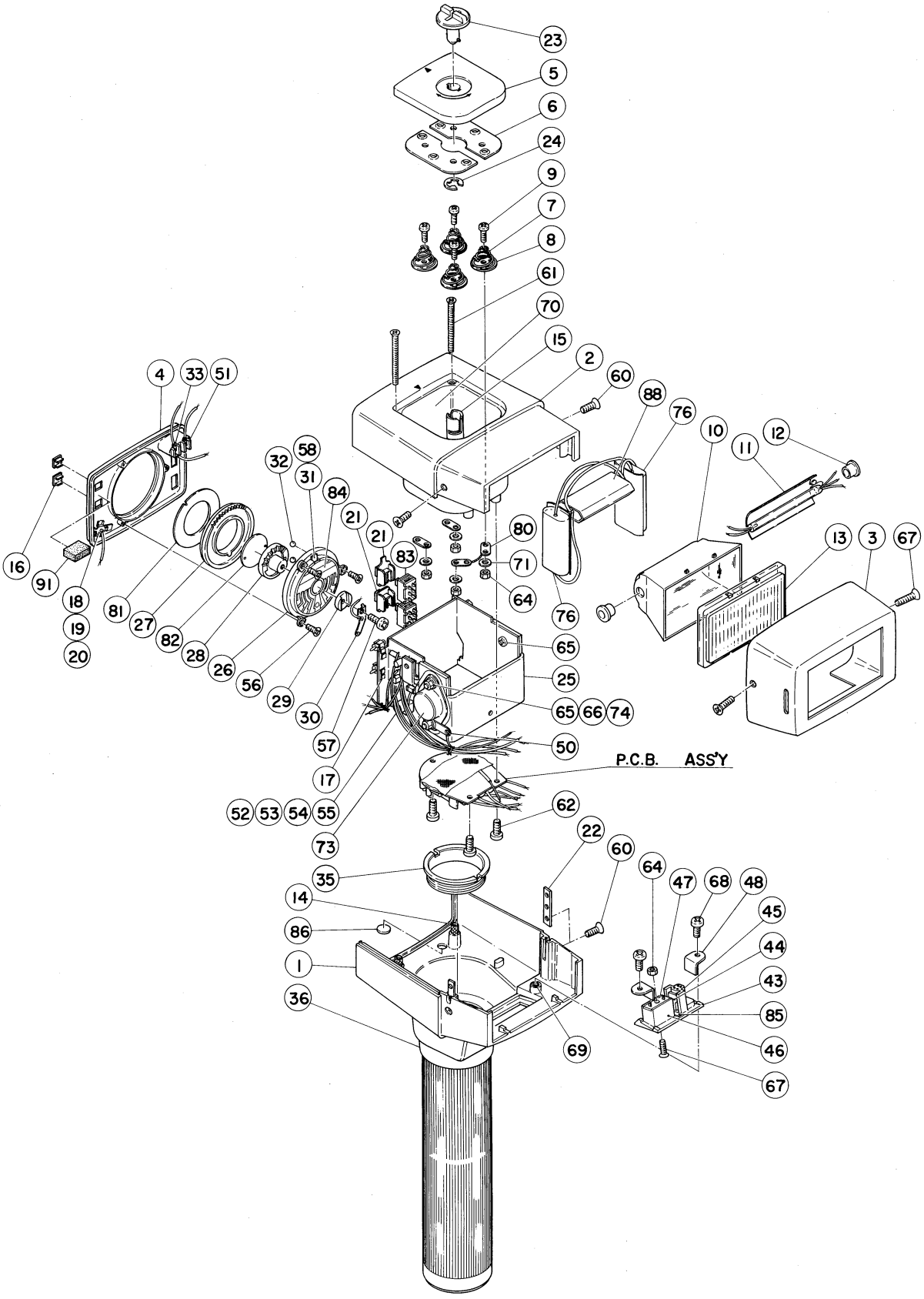
AUTO 611
AUTO ZOOM 5000 REMOTE SENSOR "WIRING LOCATION"



AUTO 611
AUTO ZOOM 5000 QUICK CHARGER (QBC-1)
WIRING LOCATION

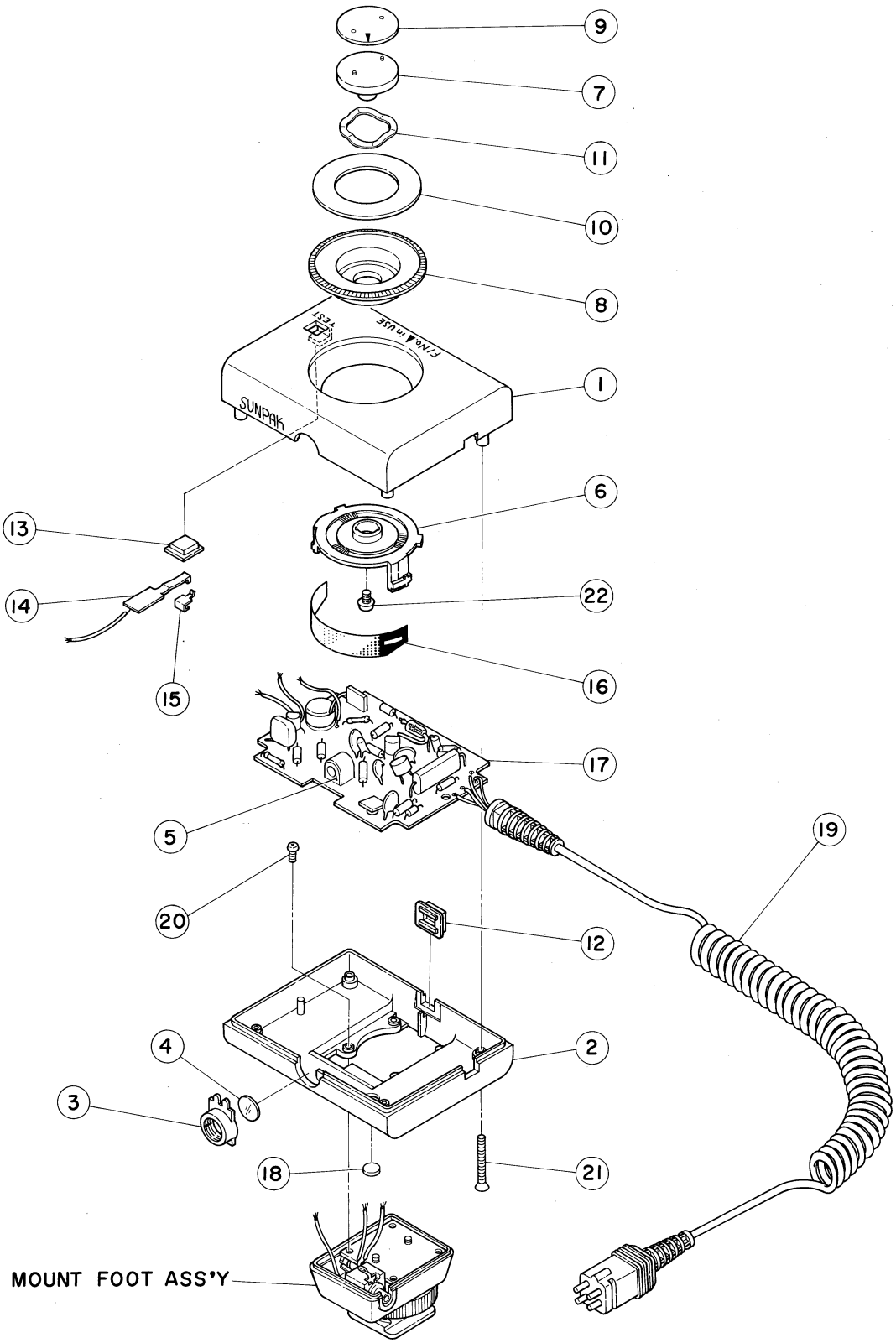


LAYOUT OF COMPONENTS for Autozoom 5000 (Auto 611)
(Mechanical part)



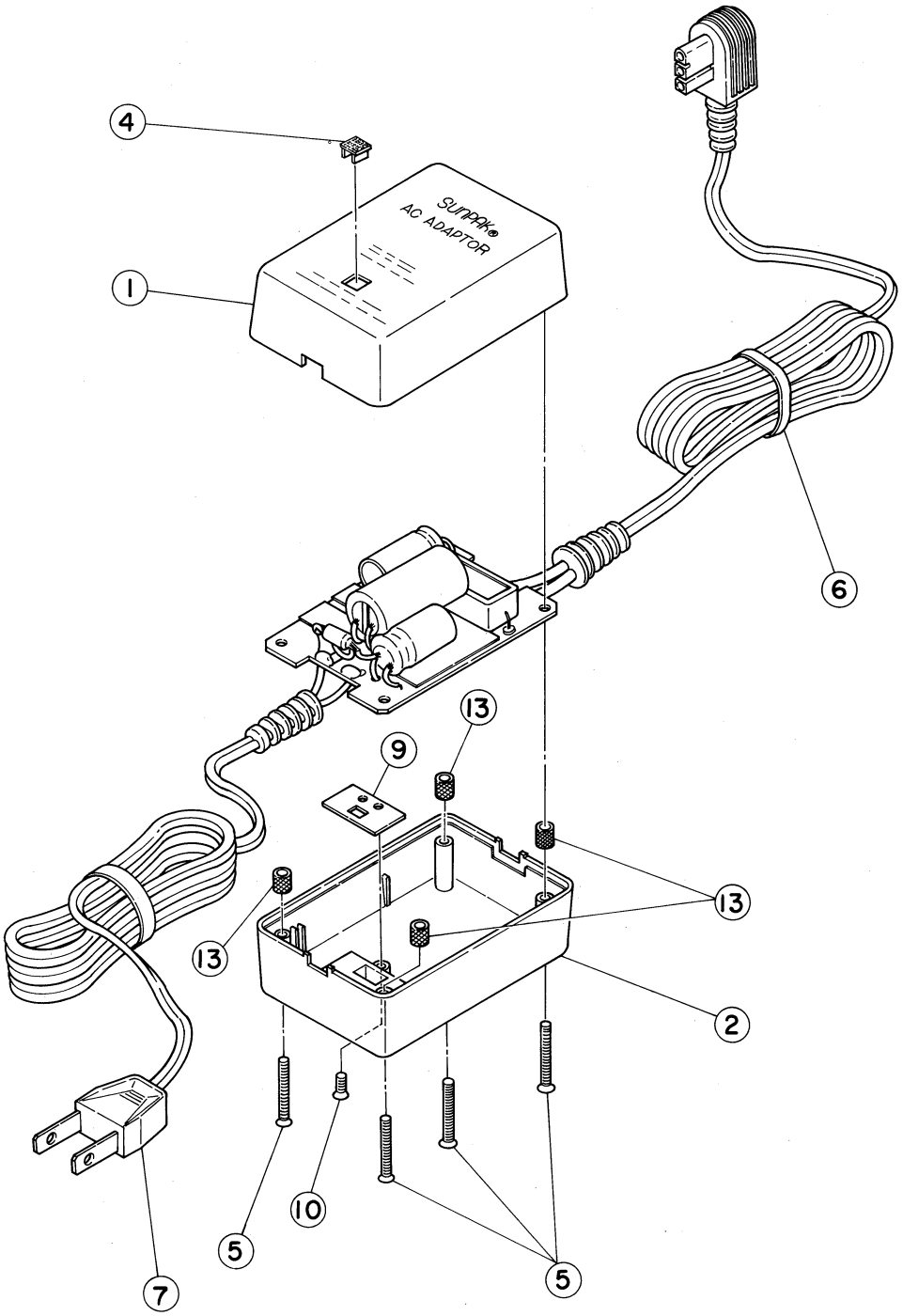
LAYOUT OF COMPONENTS for REMOTE SENSOR

AUTO 611 REMOTE SENSOR



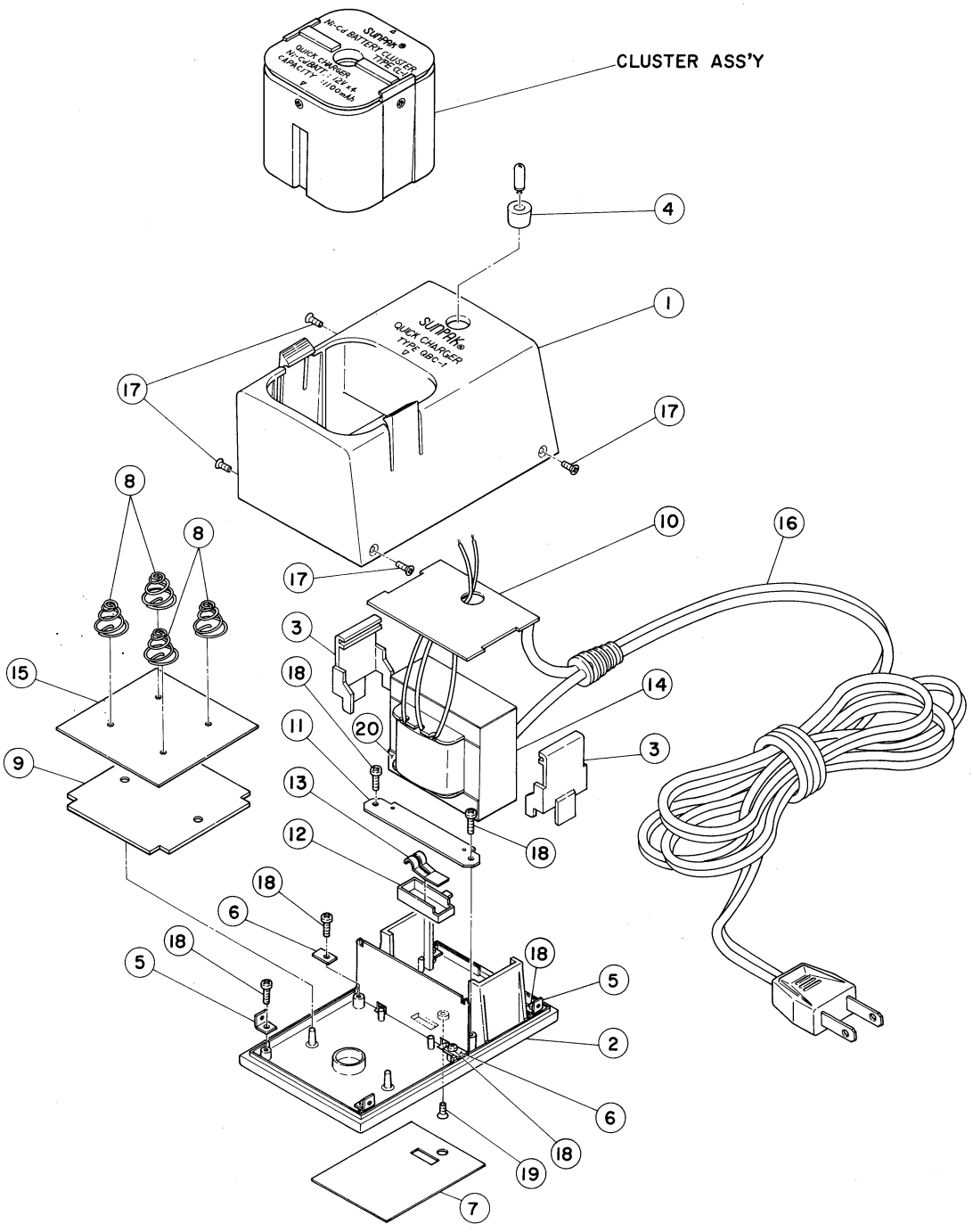
LAYOUT OF COMPONENTS for Autozoom 5000 (Auto 611)

AC ADAPTOR



LAYOUT OF COMPONENTS for QUICK CHARGER TYPE QBC-1

QUICK CHARGER TYPE QBC-I



Mechanical Parts List
Autozoom 5000 (Auto 611) Body

ID #	Item	Q'ty	Code #
1.	Case (B)	1	P0537
2.	Case (A)	1	P0487
3.	Front Cover	1	P0490
4.	Rear Panel	1	P0540
5.	Battery Compartment Lid	1	P0494
6.	Battery Contact	2	P0495
7-9.	Battery Spring Assembly	4	P0496
10.	Reflector	1	P0693
11.	Reflection Board	1	P0694
12.	Gum Bushing for Flashtube	2	P0435
13.	Flash Window	1	P0501
14.	Case Insert	2	
15.	Battery Insert	1	
16.	Neon Cover	2	P0864
17.	Neon Holder	2	P0483
18.	Test Button	1	P0436
19.	Test Contact (A)	1	P0437
20.	Test Contact (B)	1	P0326
21.	Switch Cover	2	P0438, P0511
22.	Plate Nut (F)	2	P0054
23.	Lid Fixing Metal	1	P0506
24.	'E' Ring	1	P0507
25.	Heat Sink	1	P0514
26.	Outer Dial Holder	1	P0573
27.	Outer Dial Disk	1	P0574
28.	Inner Dial Disk	1	P0575
29.	Contact Fixer	1	P0576
30.	Power Ratio Contact	1	P0964
31.	Click Board Spring	1	P0965
32.	Click Ball	2	P0966
33.	AC Pin	3	P0328
34.	Grip	1	P0577
35.	Inner Coupling	1	P0578
36.	Outer Coupling	1	P0579
37.	Grip Lid	1	P0580
38.	Gum Sleeve	1	
39.	Spring	1	P0582
40.	Choke Coil Bobbin	1	P0748
41.	Stopper	1	P0583
42.	Insulation Board f/Capacitor (w/o hole)	2	P0613
43.	Synchro Terminal (C)	1	P0584
44.	Lock Lever	1	P0586
45.	Female Terminal	4	P0522
46.	Synchro Contact	2	P0317
47.	Synchro Socket Plate	1	P0318

Mechanical Parts List
Autozoom 5000 (Auto 611) Body

ID #	Item	Q'ty	Code #
48.	Terminal Holder	2	P0526
49.	Capacitor Sleeve	1	P0439
50.	Lug Plate	2	P0528
51.	AC Pin Lug Plate	3	P0329
52.	Printed Circuit Board (A)		P0440
53.	Printed Circuit Board (B)		P0441
54.	Printed Circuit Board (C)		P0592
55.	Printed Circuit Board (D)		P0443
56.	Screw M2x4L	5	
57.	Tapping Screw M3x5L	1	
58.	Tapping Screw M2x4L	1	
59.	Master Synchro Cord	1	
60.	Screw M2x4	2	
61.	Screw M2.6x4	2	
62.	Tapping Screw M2x6	3	
63.	Tapping Screw M2x4	1	
64.	Nut	5	
65.	Screw M3x12	4	
66.	Nut	4	
67.	Screw M2x6	1	
68.	Screw M2.6x4	2	
69.	Insert (6)	2	
70.	Battery Guide Plate	2	P0530
71.	Washer	4	P0531
72.	Moldplane 30x30x10	1	
73.	Mika plate	2	
74.	Washer for Insulation	4	
75.	Vinyl Tape		
76.	Fiber (A)	2	
77.	Double-face adhesive tape		
78.	Acetate Cloth Tape		
79.	Acetate Cloth Tape		
80.	Jack Lug Plate	4	P0423
81.	Outer Dial	1	P1115
82.	Inner Dial	1	P0588
83.	Slide Switch	2	P0404
84.	Printed Circuit Board (E)	1	P0594
85.	Lock Lever Regulation Board	1	P0749
86.	Name Plate	1	P1705
87.	Sticker		
88.	Fiber (B)	1	
89.	Set Screw	1	
90.	Bracket Assembly	1	
91.	Sponge (black)	1	
92.	Diffuser		P1110
93.	Filter Holder		P1111
94.	Screw M2x8	2	
95.	Screw M2x6	2	
96.	Eyelet ø1.4x2.5	12	

Mechanical Parts List
Remote Sensor for Autozoom 5000 (Auto 611)

ID #	Item	Q'ty	Code #
1.	Case (A)	1	P0661
2.	Case (B)	1	P0662
3.	Hood	1	P0663
4.	Dust Cover	1	P0664
5.	Photo-Transistor Holder	1	P0665
6.	Filter Holder	1	P0335
7.	Zoom Dial Inner	1	P0337
8.	Zoom Dial Outer	1	P0336
9.	Zoom Dial Plate Inside	1	P1118
10.	Zoom Dial Plate Outside	1	P1117
11.	Wave Washer	1	P0343
12.	Neon Cover	1	P1113
13.	Test Button	1	P0750
14.	Test Contact (B)	1	P0326
15.	Test Contact (C)	1	P0751
16.	Filter	1	P0668
17.	Printed Circuit Board	1	P0639
18.	VR Adjustment Hole Lid	1	P0752
19.	Sensor Cord	1	P0669
20.	Screw 2x6	4	
21.	Screw 2x20	4	
22.	Tapping Screw 3x5	1	
23.	Synchro Cord	1	
24.	Hot Shoe Assembly	1	P0638

Electrical Parts List
Autozoom 5000 (Auto 611) Body

ID #	Item	Schematic Designation	Q'ty	Code #
1.	Transistor 2SB407	TR1, 2	2	P0248
2.	" 2SD261	TR3	1	P0445
3.	" 2SC945	TR4, 7	2	P0446
4.	" 2SA641	TR5, 6, 8, 14	4	P0448
5.	" 2SC1748	TR9	1	P0447
6.	" 2SC586	TR11	1	P0249
7.	Diode SR1FM-16 0.8A 800V	SR1-5, 7, 8, 13, 16, 25, 26	11	P0253
8.	Diode W06A 0.75A 50V	SR10-12, 15, 23	5	P0252
9.	Diode IS953 100mA 30V	SR14,	1	P0254
10.	P.U.T. N13T1	PUT	1	P0449
11.	Zener Diode RD16A-M	ZR1, 2, 7	3	P0451
12.	Zener Diode RD6.2EB	ZR3	1	P0256
13.	Thyristor CV12E-13	SCR1	1	P0452
14.	Thyristor CR02AM-6	SCR2, 3	2	P0247
15.	Neon Lamp NL260D	NL1	1	
16.	Neon Lamp NG220D	NL2	1	
17.	Neon Lamp NE2	NL3	1	
18.	Pulse Transformer	PT2	1	P0276
19.	Trigger Coil TC-6	TC1	1	P0453
20.	Oscillation Transformer	TF1	1	P0456
21.	Flashtube MG6545S	FT1	1	P0523
22.	Potentiometer	VR1, 4	2	P0457
23.	Potentiometer	VR2	1	P0279
24.	Resistor 120 ohm 1/2W 5%	R1	1	P0458
25.	" 51 ohm 1/2W 10%	R2	1	P0464
26.	" 3.3 ohm 1/2W 10%	R3	1	P0463
27.	" 2.7K ohm 1/2W 10%	R4	1	P0466
28.	" 1K ohm 1/4W 10%	R5, 6, 37	3	P0043
29.	" 820K ohm 1/4W 10%	R8	1	P0474
30.	" 1M ohm 1/4W 10%	R9, 13, 68	3	P0012
31.	" 680K ohm 1/4W 10%	R11, 12	2	P0472
32.	" 680K ohm 1/2W 10%	R14	1	P0468
33.	" 1M ohm 1/4W 5%	R15, 25	2	P0460
34.	" 1.2M ohm 1/4W 5%	R16	1	P0459
35.	" 100K ohm 1/4W 10%	R17, 21, 22, 24	4	P0384
36.	" 390K ohm 1/4W 5%	R18, 19	2	P0462
37.	" 10 ohm 1/4W 10%	R20, 71, 72	3	P0164
38.	" 560K ohm 1/4W 10%	R23	1	P0471
39.	" 47K ohm 1/4W 5%	R26, 69	2	P0461
40.	" 3.3M ohm 1/4W 5%	R27, 28	2	P0622
41.	" 3.3M ohm 1/4W 10%	R29	1	P0044
42.	" 470 ohm 1/4W 10%	R30, 56	2	P0010
43.	" 10K ohm 1/4W 10%	R45, 70	2	P0489

Electrical Parts List
Autozoom 5000 (Auto 611) Body

ID #	Item	Schematic Designation	Q'ty	Code #
44.	Resistor 330K ohm 1/4W 10%	R46	1	P0585
45.	" 150K ohm 1/4W 10%	R47	1	P0753
46.	" 3.0K ohm 1/8W 5%	R48	1	P0434
47.	" 1.5K ohm 1/8W 5%	R49	1	P0433
48.	" 910 ohm 1/8W 5%	R50	1	P0432
49.	" 620 ohm 1/8W 5%	R51	1	P0431
50.	" 430 ohm 1/8W 5%	R52	1	P0430
51.	" 360 ohm 1/8W 5%	R53	1	P0429
52.	" 240 ohm 1/8W 5%	R54	1	P0428
53.	" 5.6K ohm 1/4W 10%	R55	1	P0353
54.	Capacitor 10WV 47MFD	C1	1	P0165
55.	" 1KV 100PFD	C2, 3, 33	3	P1131
56.	" 400WV 0.022MFD	C4, 43, 44	3	P0008
57.	" 350SV 2000MFD	C67	1	P0529
58.	" 35WV 0.33MFD	C8	1	P0477
59.	" 50WV 0.0022MFD	C9	1	P0478
60.	" 250WV 0.022MFD	C10	1	P0269
61.	" 250WV 0.047MFD	C11	1	P0270
62.	" 50WV 0.0022MFD	C12	1	P0503
63.	" 250WV 3.3MFD	C13	1	P0479
64.	" 250WV 0.22MFD	C14	1	P0268
65.	" 400WV 0.0022MFD	C28, 29	2	P0512
66.	" 50WV 0.02MFD	C30, 32	2	P0273
67.	" 35WV 0.68MFD	C31	1	P0300
68.	Chop Unit	CU		P9589
69.	Lead Wire			
70.	Silicon Tube 0.8ø 70mm		1	
71.	" " 0.8ø 15mm		2	
72.	" " 2ø 15mm		2	
73.	" " 2ø 30mm		1	
74.	Epoxy			
75.	Silicon Grease			
76.	Screw Lock			
77.	Nil			
78.	Binding Lead			
79.	Elax Tube 2ø 30mm		1	
80.	Capacitor 50WV 100PFD	C42	1	P0274

Electrical Parts List
Remote Sensor for Autozoom 5000 (Auto 611)

ID #	Item	Schematic Designation	Q'ty	Code #
101	Resistor 10K ohm 1/4W 10%	R56, 63	2	P0489
102	" 10 ohm 1/4W 10%	R57	1	P0164
103	" 5.6K ohm 1/4W 10%	R58	1	P0353
104	" 470 ohm 1/4W 10%	R60, 64	2	P0010
105	" 3.3M ohm 1/4W 5%	R61, 62	2	P0622
106	" 5.1M ohm 1/4W 5%	R65	1	P0625
107	" 10M ohm 1/4W 10%	R66	1	P0624
108	Capacitor 50WV 0.02MFD	C34, 38	2	
109	" 35WV 0.15MFD	C35	1	P0288
110	" 250WV 0.022MFD	C39	1	P0269
111	" 400WV 0.0022MFD	C40	1	P0512
112	" 250WV 0.22MFD	C41	1	P0268
113	Transistor 2SC536	TR12	1	P0249
114	Photo Transistor	PHTR1	1	P0626
115	Diode 10D4	SR27, 28	2	P0251
116	Thyristor CR02AM-6	SCR4, 5	2	P0247
117	Potentiometer	VR3	1	P0279
118	Pulse Transformer	PT3	1	P0276
119.	Neon Lamp NL8D	NL4	1	P0852
120	Resistor 1K ohm 1/4W 10%	R59	1	P0043
121	" 100 ohm 1/4W 10%	R67	1	P0263
122	Capacitor 500WV 220PFD	C37	1	
123	Zener Diode RD6.2EB	ZR6	1	P0256
124	Elax Tube 2ø 30mm		1	
125	Capacitor 50WV 0.01MFD	C36	1	P0322