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CCD VIDEO CAMERA MODULE

XC-37/47

POWER UNIT

DC-37

TRIPOD ATTACHMENT

VCT-37

STANDARD LENS

VCL-16SBY

AUTO IRIS LENS

VCL-08SBY

C MOUNT ADAPTOR

LO-37CMT

INFRARED CUT FILTER

LO-37IR

ND FILTER

LO-37ND

CAMERA CABLE

CCXC-12P02/12P05
CCXC-12P10/12P25

OPERATION AND MAINTENANCE MANUAL

1st Edition

Serial No. 30001 to 30050 (XC-47)
30001 to 30450 (XC-37)
30001 to 30500 (DC-37)

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注意

カメラのＰＧ－８基板にはＣＣＤ欠陥補正用のＲＯＭ　ＭＢ７０５２ＰＦ（ＩＣ４０２）がマウントされているものがあります。
ＲＯＭがマウントされているＰＧ－８基板を交換する場合は、ＲＯＭを外し、新しいＰＧ－８基板にマウントし直して下さい。

CAUTION

In order to compensate the deffective picture elements of the CCD chips, the ROM IC, MB7052PF (IC402) is mounted on some PG-8 board.
In case the PG-8 board is replaced, please remove the ROM from the original PG-8 board then mount the original ROM on the new PG-8 board.

ＰＧ－８基板

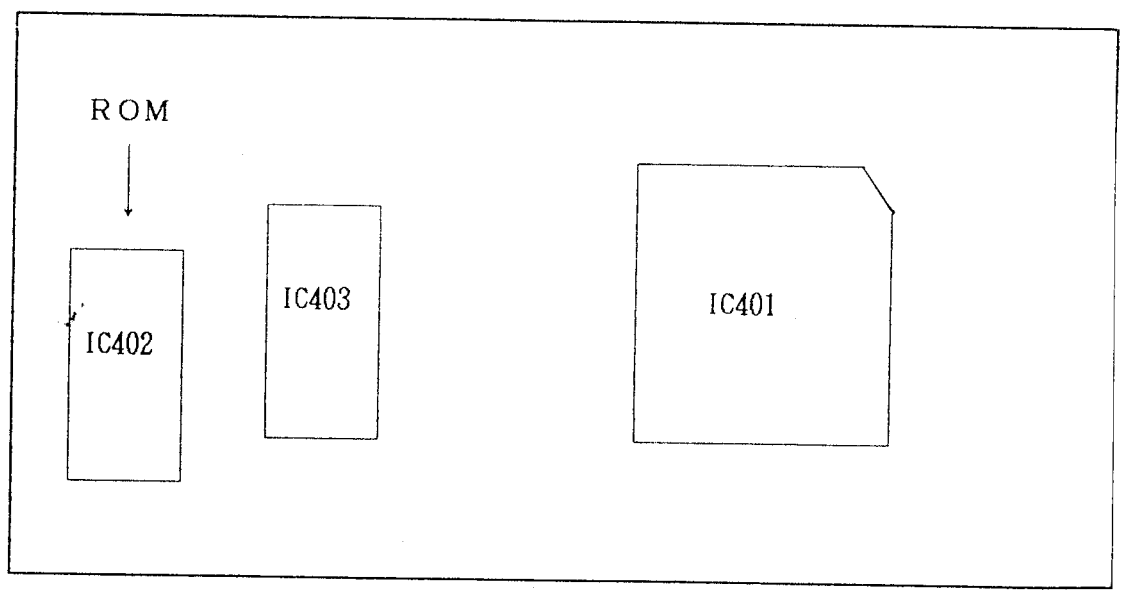


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SECTION 1
OPERATION

1-1. FEATURES AND APPLICATIONS

The XC-37/47 is a revolutionary new camera which uses a solid state image sensor – the Charge Coupled Device (CCD) – instead of pickup tube.
The CCD camera offers outstanding compactness, high performance, long life, high stability, and a number of technical innovations. The camera's various features allow versatile applications.

Miniaturized and lightweight
The adoption of a CCD image sensor in the video camera module and the development of a special mini bayonet lens mount and special small lenses make it possible to produce a very small and lightweight camera.
- ➜ For use in airplanes, avionics and underwater shooting.

Long life and high stability
The CCD solid state image sensor allows the camera to maintain a high performance level indefinitely. It requires almost no maintenance.
- ➜ For use as a monitor in a tunnel or a dangerous place and in places where it is difficult to perform maintenance work.

Precise image geometry
On the CCD image sensor, the photosensor elements form precise rows both horizontally and vertically, so very precise image geometry can be obtained.
- ➜ For image processing system using a computer, for pattern recognition and position control of industrial robots, and for making various kinds of measurements and inspections.

Low lag and high resistance to image burning
Compared with the lag of conventional cameras which use a pichup tube, the lag of the CCD video camera is considerably reduced, so a clear picture can be obtained when shooting a rapidly moving object or shooting in a place where illumination is very low. Since resistance to image burning is very high, it is possible to shoot a bright object and to hold the camera on it for a long time. (It must be noted, however, that the "smear" phenomenon will occur when shooting a very bright object. Refer to "1-6. SPECIAL CHARACTERISTICS OF A CCD".)
- ➜ For monitoring a moving object and for monitoring an object in strong light.

High resistance to vibration and mechanical shock
If the CCD imager is subjected to strong vibration or shock, noise in the picture will be negligible.
- ➜ For monitoring the rear view of a vehicle and for use on a crane.

Quick start-up
Shooting can begin within a second after turning on the power. No more missed shots waiting for the camera to warm up.
- ➜ For quick-start shooting and for interphone applications.

High sensitivity
The sensitivity of the CCD video camera module equals that of a high-sensitivity pickup tube camera (minimum illumination: 3 lux). The CCD video camera can detect images that are close to the infrared range.
- ➜ For surveillance in a dark place and for inspection of laser rays or heat-radiating objects.

Shooting in a strong magnetic field
Since the CCD imager is not influenced by a magnetic field, it is possible to obtain a stable picture even when shooting in an area subject to a strong magnetic field.
- ➜ For shooting near an electric furnace or welding machine.

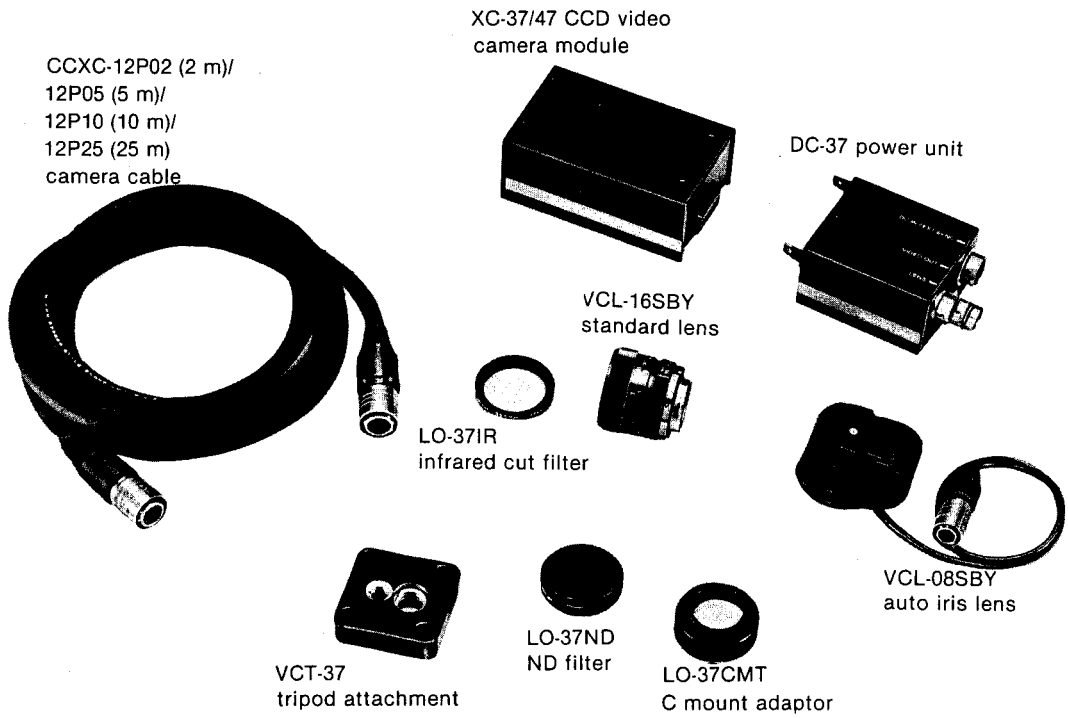
Low power consumption
Power consumption of the camera module is only 2.3 W.

Special mini bayonet lens mount
A special mini bayonet mount makes it possible to mount a very small lens in the camera. Using an optional C mount adaptor, a conventional C mount lens can be mounted.

Infrared cut filter
An infrared cut filter is supplied with the standard lens and the auto iris lens to obtain a well-contrasted picture and to reduce susceptibility to "smearing".

1-2. SYSTEM COMPOSITION

The CCD video camera system consists of the following optional products which can be purchased separately.



XC-37/47 CCD video camera module
The only difference between the XC-37 and XC-47 video camera modules is the amount of flaws on the CCD imager due to defects in its semiconductors: the XC-37 has more flaws, while the XC-47 has almost none. (Consult the specifications in "Comprehensive Specifications" for difference between the XC-37 and the XC-47.)

DC-37 power unit
This power unit accepts a dc power supply of +12 V from an external power source, converts it into one of three dc voltages (+24 V, +9.5 V or +5 V), and feeds the converted dc power to the CCD video camera module.

VCL-16SBY standard lens
This is a standard lens of f = 16 mm, F1.4. The iris and focus are adjusted manually. An LO-37IR infrared cut filter is supplied with this lens.

VCL-08SBY auto iris lens
This lens is f = 8.5 mm, F1.6 and has an auto iris. The lens focus has been fixed at a preset value. An ND filter is incorporated in the lens and an LO-37IR infrared cut filter is supplied with the lens.

LO-37ND ND filter (for the standard lens)
Because of the extremely high sensitivity of the CCD video camera module, sometimes during outdoor shooting, the picture is so bright that the contrast is insufficient, even if the iris of the lens is closed as much as possible for the lighting conditions. To obtain a well-contrasted picture under these conditions, use the ND filter. The amount of illumination will be reduced to 1/64 of the normal level so a well-contrasted picture will be obtained.

LO-37IR infrared cut filter
Use this infrared cut filter to prevent "smearing".

LO-37CMT C mount adaptor
Using this C mount adaptor, any C mount lens can be attached to the video camera module.

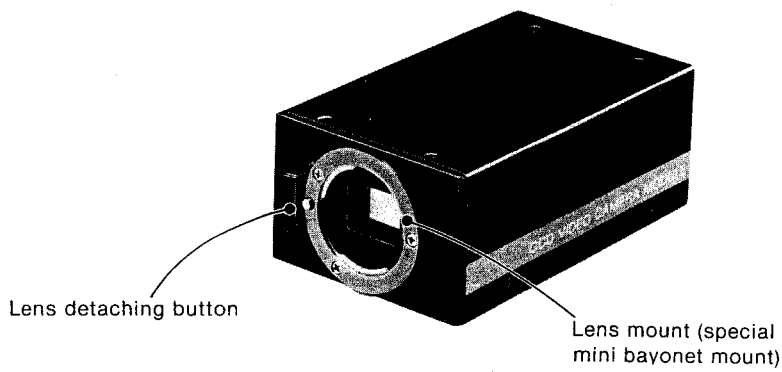
VCT-37 tripod attachment
To attach the video camera module to a tripod, use this tripod attachment. (Two tripod receptacles are provided: U1/4"– 20 UNC, U3/8"– 16 UNC.)

CCXC-12P02 (2 m), 12P05 (5 m), 12P10 (10 m) and 12P25 (25 m) camera cables
These cables can be attached to the 12-pin connector of the power unit to supply power and transmit video and sync signals.

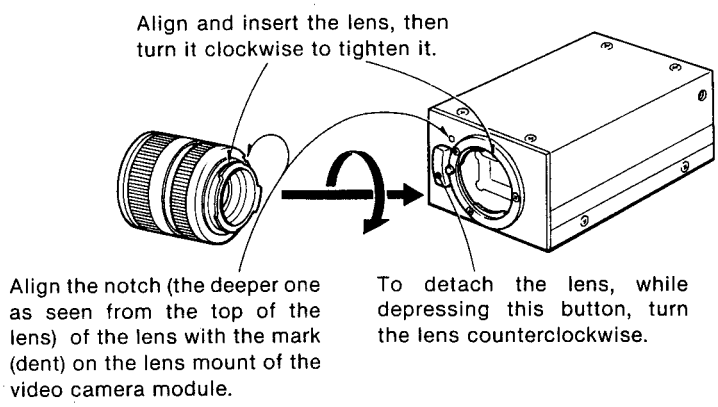
1-3. LOCATION AND FUNCTION OF PARTS AND THEIR OPERATION

1-3-1. XC-37/47 CCD Video Camera Module

Front

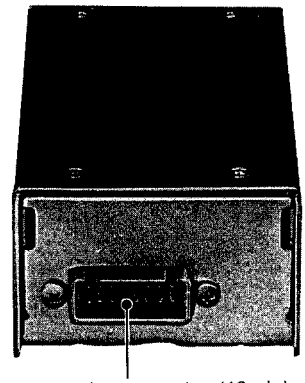


How to attach the lens to the camera module



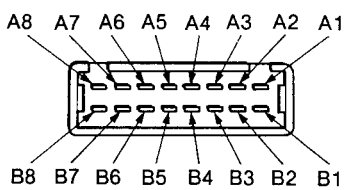
The lens shown above is the VCL-16SBY standard lens. The VCL-08SBY auto iris lens and the LO-37CMT C mount adaptor can be attached to the video camera module in the same way.

Rear



Power unit connector (16-pin)

Power unit connector (16-pin)
When the DC-37 power unit is attached to the rear of the video camera module, this connector is connected to the connector of the power unit, and accepts the power supply and sync signal, and feeds out the video signal and the signal for the auto iris. (Refer to 1-3-2.)
When the power unit is not connected to the video camera module, the camera module can be operated independently by using an optional 16-pin connector (part No. 1-562-380-11). In this case, make sure that the 16-pin connector is firmly attached to the connector of the video camera module. If the 16-pin connector is not firmly connected, the connection may loosen or noise may appear in the picture.
If the video camera module is to be operated independently without using the above optional 16-pin connector, connect the power supply (+24 V, +9 V or +5 V dc), video output signal and other signals, referring to the following pin configuration of the power unit connector.

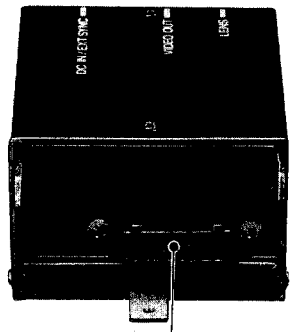


Pin No.	Signal	Pin No.	Signal
A1	Subcarrier (signal)	B1	+24 V
A2	Subcarrier (ground)	B2	Reset (signal)
A3	+5 V	B3	Reset (ground)
A4	+9.5 V	B4	VCO
A5	Ground	B5	Ground
A6	Drive 1 (for driving the meter of the auto iris lens)	B6	Drive 2 (for driving the meter of the auto iris lens)
A7	Control 1 (for adjusting the video output level with the auto iris)	B7	Control 2 (for adjusting the video output level with the auto iris)
A8	Video output (signal)	B8	Video output (ground)

Note
The signals for the auto iris lens at pins A6, A7, B6 and B7 pass through the power unit and output from the LENS connector (6-pin) of the power unit without change.

1-3-2. DC-37 Power Unit

Front

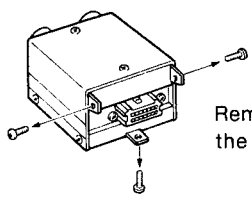


Video camera module connector (16-pin)
When the power unit is attached to the video camera module, this connector is connected to the 16-pin connector of the video camera module, and through this connector + 24 V, + 9.5 V or + 5 V dc power is supplied to the video camera module, and the video signal and other signals are output from the video camera module to the power unit.

How to attach the power unit to the video camera module

Caution
Do not turn on the power before attaching the power unit to the video camera module.

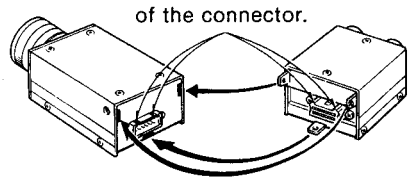
1



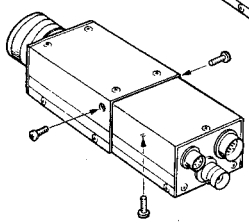
Remove the three screws from the power unit.

2 Align the projections of the power unit with the holes and notches of the video camera module, and insert.

Align the projections with the notches of the connector.



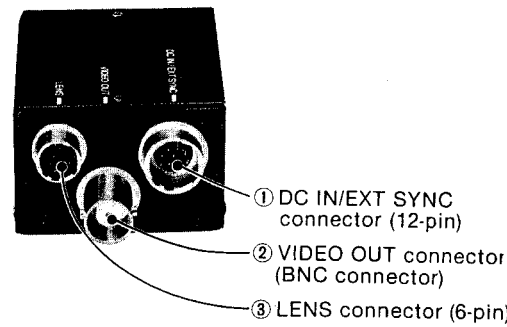
3



Secure with the three screws that have been removed in Step **1**.

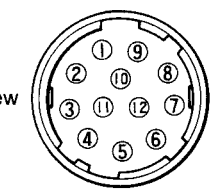
Be sure to insert the power unit firmly into the video camera module and secure it with the screws so that the connection cannot loosen. If the connection becomes loose, vibration or shock may cause noise to appear in the picture.

Rear



① DC IN (input)/EXT (external) SYNC connector (12-pin)
Connect a CCXC-12P02, CCXC-12P05, CCXC-12P10 or CCXC-12P25 camera cable to this connector to supply power (+ 12 V dc) from an external power source and output the video signal from the video camera module. When an CMA-37 external sync unit (available in the future) is connected to this connector, the video camera module will operate, synchronizing with an external signal.
The pin configuration of this connector is as shown below.

External view

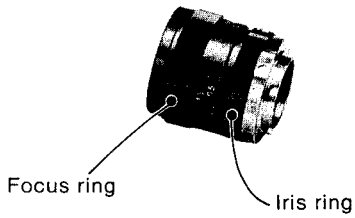


Pin No.	Signal
1	Ground
2	+ 12 V
3	Video output (ground)
4	Video output (signal)
5	Reset (ground)
6	Reset (signal)
7	VCO (signal)
8	Subcarrier (ground)
9	Subcarrier (signal)
10	Ground
11	+ 12 V
12	VCO (ground)

② VIDEO OUT (output) connector (BNC connector)
The video output signal from the video camera module is output from this connector. This connector can be used only when a CCXC-12P02 camera cable (2 m) is connected to the DC IN/EXT SYNC connector and the video output of the 12-pin connector of the CCXC-12P02 cable is not terminated with 75 ohms.

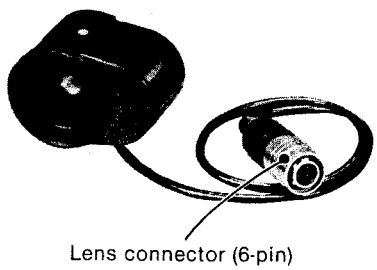
③ LENS connector (6-pin)
Connect the plug of the VCL-08SBY auto iris lens to this connector to adjust the iris of the lens automatically.

1-3-3. VCL-16SBY Standard Lens



To attach the lens to the video camera module, refer to "1-3-1. XC-37/47 CCD video camera module".

1-3-4. VCL-08SBY Auto Iris Lens



Lens connector (6-pin)
Connect to the LENS connector of the power unit for automatic iris adjustment of the lens.

The auto iris lens incorporates an neutral density (ND) filter which, in combination with the auto iris function of the lens, permits operation of the video camera module under a wide range of lighting conditions. (The black circle in the center of the lens is the ND filter.)

How to attach the lens to the video camera module
Refer to "1-3-1. XC-37/47 CCD video camera module".

1-3-5. LO-37CMT C Mount Adaptor

Using this C mount adaptor, almost any C mount lens or piece of optical equipment, such as a video camera microscope adaptor, can be attached to the video camera module. To attach the C mount adaptor to the video camera module, refer to "1-3-1. XC-37/47 CCD video camera module".

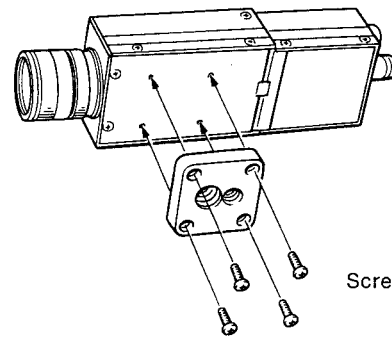
Caution

- Attach only a piece of optical equipment in which the projection from the lens mount surface is less than 7 mm.
- When attaching a piece of optical equipment using the C mount adaptor, turn the equipment with torque less than 20 kg·cm.
- If a piece of optical equipment which weighs more than 700 g is attached, be sure to hold the system by the piece of optical equipment.

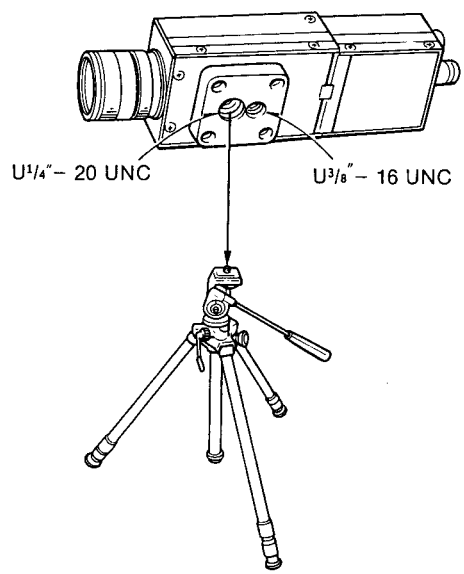
1-3-6. VCT-37 Tripod Attachment

How to attach the tripod attachment to the video camera module

1



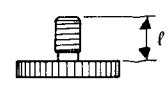
2



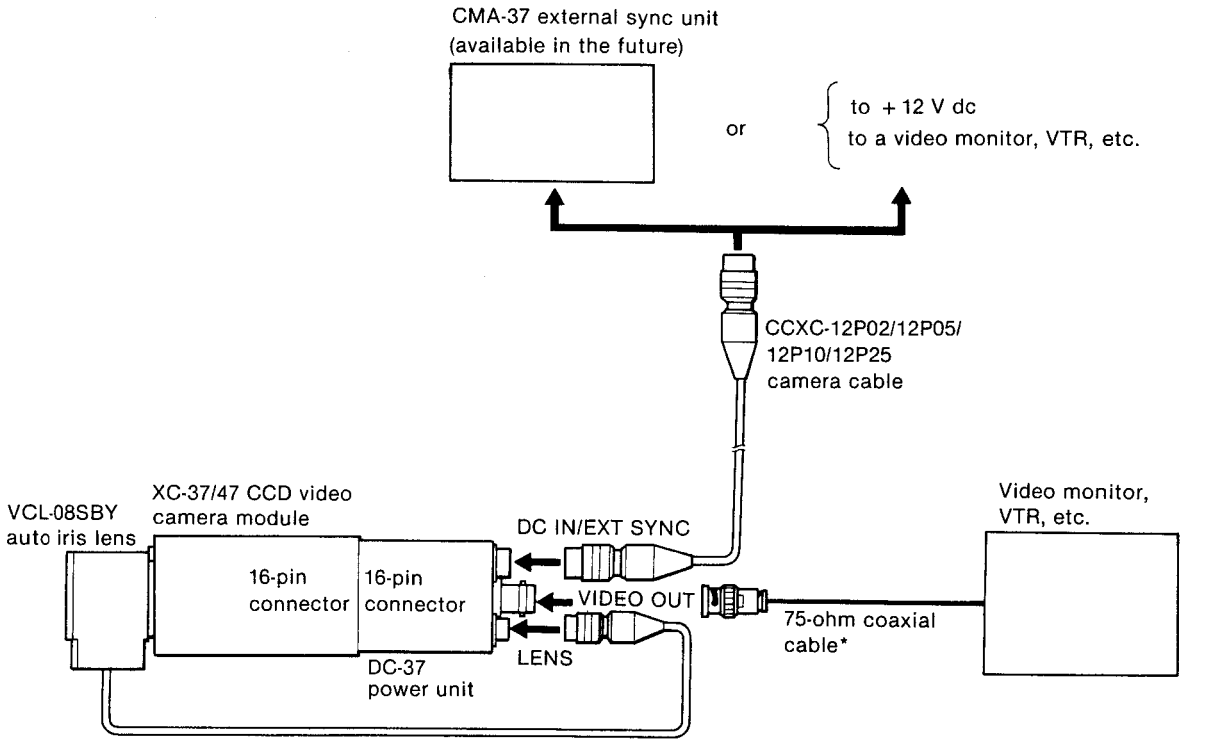
Caution

Use screws which are less than 4 mm (3/16 inches) long to attach the tripod attachment. If the screws being used are too long, the circuit boards inside the video camera module may be damaged.
The screws must also be in accordance with the following specifications.

ISO standard: ℓ = 4.5 mm ±0.2 mm
or
ASA standard: ℓ = 0.197 inches



1-4. CONNECTIONS



*This connection is possible only when the CCXC-12P02 camera cable is connected to the DC IN/EXT SYNC connector of the power unit and the video output of the camera cable's 12-pin connector is not terminated with 75 ohms.

Note

It is not possible to obtain video output signals from the VIDEO OUT connector if the cable connected to the DC IN/EXT SYNC connector is more than 5 m long. When the connection to the DC IN/EXT SYNC connector is made to supply power so video output signals can be obtained from the VIDEO OUT connector, use the CCXC-12P02 camera cable (2 m) to make the connection to the DC IN/EXT SYNC connector, as is shown above (see *).

1-5. PRECAUTIONS

If the CCD video camera module is to be operated independent of the power unit, pay attention to the following points.

Vibration and shock
The video camera module's high resistance to vibation and shock greatly depends how securely the connectors are connected. Make sure that the optional 16-pin connector is firmly connected to the 16-pin power unit connector of the video camera module.

Radiated interference
Note that radiated interference may increase depending on the effectiveness of the shielding of the 16-pin connectors and the kind of cables and wires used. Note also that the video camera module is subject to outside interference depending, again, on the effectiveness of the shielding and the video camera module's location.

Resistance to static electricity
Note that the CCD or the video camera module's electronic circuits may be damaged, depending, once again, on the effectiveness of the shielding of the 16-pin connectors and the cables and wires being used.

Power input
The power input to the 16-pin power unit connector of the CCD video camera module must be in accordance with the following specifications.

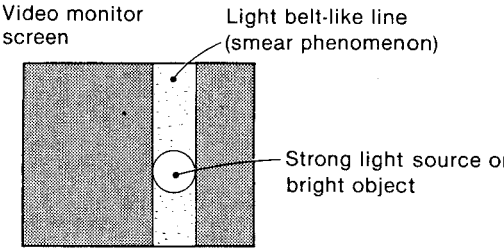
24 V ±0.8 V ripple: within 10 mV(p-p)

9.5 V $^{+0.3\ V}_{-0V}$ ripple: within 10 mV(p-p)

5 V $^{+0.3\ V}_{-0.2\ V}$ ripple: within 10 mV(p-p)

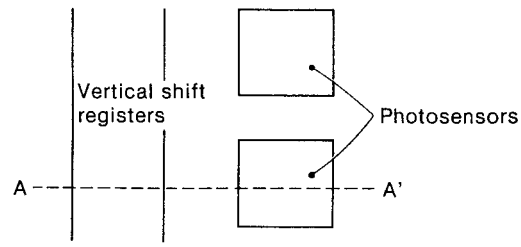
1-6. SPECIAL CHARACTERISTICS OF A CCD

Smear phenomenon

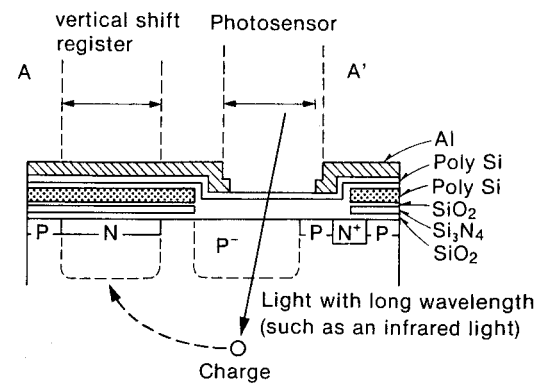


When shooting a strong light source or a very bright object, a bright belt is produced above and below the object as is shown above, due to the high sensitivity of the CCD imager to the near-infrared range. This phenomenon is called "smear". Normally, as is described on the next page, the electronic charges generated at the photosensors are fed into the vertical shift registers all at once every 1/60 seconds. However, when a light with a long wavelength, such as an infrared light, enters the CCD imager, it passes through the photosensors and generates a charge underneath them. The generated charge is sometimes fed directly into the register in the vertical blanking interval and this causes the smear phenomenon. To prevent smear, attach an infrared cut filter to the lens. (It should be noted, however, that a ghost image may appear on the picture when the infrared cut filter is used.)

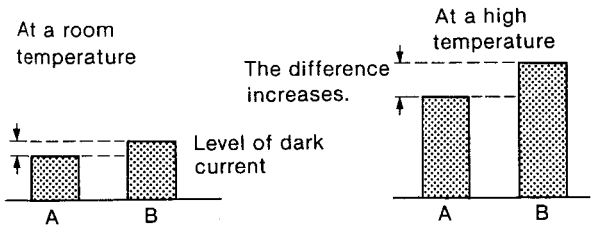
Unit cell



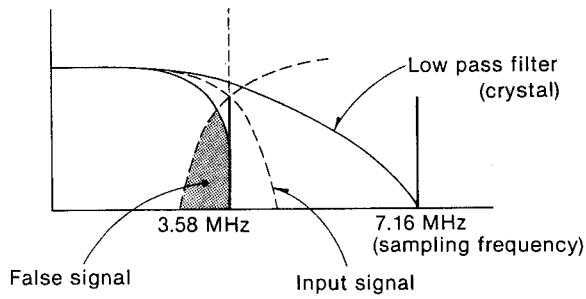
Cross-sectional view of unit cell



Patterned noise on the picture at high temperatures
Dark current (thermal noise) is inherent in semiconductors. At room temperature, the amount of dark current in all photosensors is very close but as the temperature rises, the amount of dark current increases. As a result, the relative difference between the dark current of each photosensor increases, and this difference causes the patterned noise on the picture.

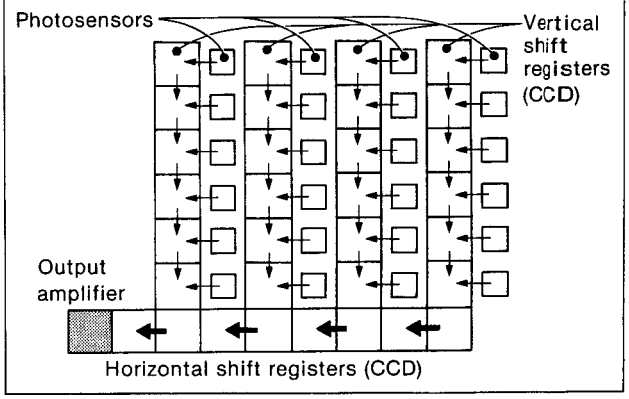


False signal
Note that straight lines may look wavy due to the symmetrical false signal as shown below.



Flaws
Consult the specifications in "Comprehensive Specifications" for difference between the XC-37 and the XC-47.

The interline-transfer organization of the CCD image sensors
The XC-37/47 CCD video camera module adopts an interline-transfer organization in which pricisely aligned photosensors and vertical shift registers are arrayed interlinearly and a horizontal shift resister links up with the vertical shift registers, as shown. Light variations are sensed by the photosensors, which generate electronic charges proportional to the light intensity. The generated charges are fed into the vertical shift registers all at once. The charges are then transferred from the vertical shift registers to the horizontal shift registers successively and finally reach the output amplifier to be read out successively.



1-7. SPECIFICATIONS

XC-37/47 CCD video camera module

Pickup device

Pickup device	Interline-transfer CCD
Picture elements	384 × 491 (h/v)
Sensing area	8.8 mm × 6.6 mm (equivalent to a 2/3-inch pickup tube)
Optical black	15 pixels on each horizontal line
Horizontal drive frequency	7.16 MHz
Vertical drive frequency	15.734 kHz
Structure	Interline-transfer
Cell size	23 μm × 13.4 μm (h/v)
Chip size	10.7 mm × 9.3 mm (h/v)

Optical and others

Lens mount	Special mini bayonet mount C mount using an LO-37CMT C mount adaptor
Signal system	EIA standards
Scanning system	525 lines 2:1 interlace 30 frames/sec.
Sync system	Internal External using an optional CMA-37 external sync unit (available in the future)
Horizontal resolution	280 lines
Vertical resolution	350 lines
Minimum illumination	3 lux (0.3 footcandles) with F1.4, without an infrared cut filter
Sensitivity	400 lux (40 footcandles) with F4, 3200°K, with an infrared cut filter
Video output	1.0 V(p-p), sync negative, 75 ohms
Signal-to-noise ratio	More than 46 dB (with AGC off, 0 dB, γ on)
Power reqirements	24 V ±0.8 V dc 9.5 V +0.3 V −0V dc 5 V +0.3 V −0.2 V dc Power inputs to the video camera module only; supplied from the DC-37 power unit
Power consumption	Camera module only: 2.3 W Camera module + power unit: 2.9 W Camera module + power unit + auto iris lens: 3 W
Operating temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	−30°C to +60°C (−22°F to +140°F)
Operating humidity	30% to 70%
Storage humidity	25% to 90%
Vibration resistance	7G (11 Hz to 200 Hz)
Shock resistance	60G
Dimensions	Approx. 44 × 29 × 72.5 mm (w/h/d) (1 3/4 × 1 3/16 × 2 7/8 inches)
Weight	Approx. 115 g (4 oz)

DC-37 power unit

Power requirements	12 V ±10% dc (camera module + power unit)
Power consumption	2.9 W (camera module + power unit)
Dimensions	Approx. 41.6 × 27.8 × 67.3 mm (w/h/d) (1 11/16 × 1 1/8 × 2 3/4 inches)
Weight	Approx. 100 g (4 oz)

VCL-16SBY standard lens

Focal length	16 mm
Maximum aperture ratio	1:1.4
Iris control	Manual F1.4 to 16
Flange focal length	8.5 mm
Filter thread	25.5 mm dia.
Mount	Special mini bayonet mount
Dimensions	Approx. 27.5 mm dia. × 27.8 mm (diameter/length) (1 1/8 inches dia. × 1 1/8 inches)
Weight	Approx. 35 g (1 oz)
Accessory supplied	Infrared cut filter LO-37IR (1)

VCL-08SBY auto iris lens

Focal length	8.5 mm
Maximum aperture ratio	1:1.6
Iris control	Automatic F1.6 to 200
Flange focal length	8.5 mm
Filter thread	25.5 mm dia.
Mount	Special mini bayonet mount
Dimensions	Approx. 27.5 mm dia. × 38.25 × 28.5 mm (diameter/width/length) ($1^1/_8$ inches dia. × $1^9/_{16}$ × $1^1/_8$ inches) not including lens cord
Weight	Approx. 65g (2 oz) including lens cord
Accessory supplied	Infrared cut filter LO-37IR (1)

LO-37ND ND filter

Dimensions	Approx. 27.5 mm dia. × 6.5 mm (diameter/length) ($1^1/_8$ inches dia. × $^9/_{32}$ inches)
Weight	Approx. 4 g (0.1 oz)

LO-37IR infrared cut filter

Dimensions	Approx. 27.5 mm dia. × 4.8 mm (diameter/length) ($1^1/_8$ inches dia. × $^7/_{32}$ inches)
Weight	Approx. 3 g (0.05 oz)

LO-37CMT C mount adaptor

Dimensions	Approx. 27 mm dia. × 9 mm (diameter/length) ($1^1/_8$ inches dia. × $^3/_8$ inches)
Weight	Approx. 12 g (0.4 oz)

VCT-37 tripod attachment

Dimensions	Approx. 35 × 8 × 35 mm (w/h/d) ($1^7/_{16}$ × $^{11}/_{32}$ × $1^7/_{16}$ inches)
Weight	Approx. 15 g (1 oz)

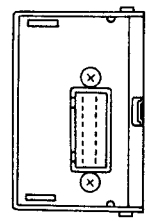
CCXC-12P02/12P05/12P10/12P25 camera cable

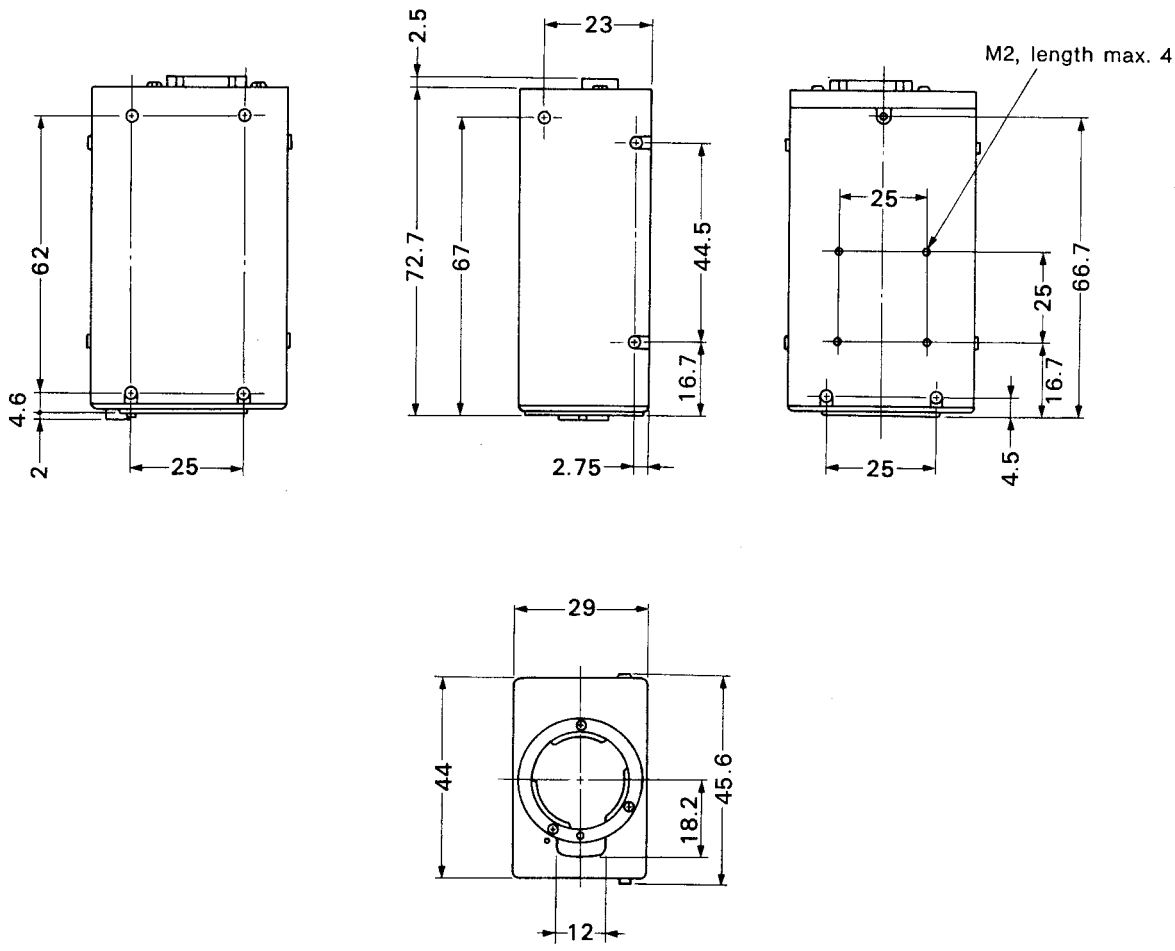
Cable length	CCXC-12P02: 2 m (6.6 feet) CCXC-12P05: 5 m (16.5 feet) CCXC-12P10: 10 m (33 feet) CCXC-12P25: 25 m (83 feet)
Weight	CCXC-12P02: 130 g (5 oz) CCXC-12P05: 295 g (10 oz) CCXC-12P10: 560 g (1 lb 4 oz) CCXC-12P25: 1.4 kg (3 lb 14 oz)

Dimensions

XC-37/47

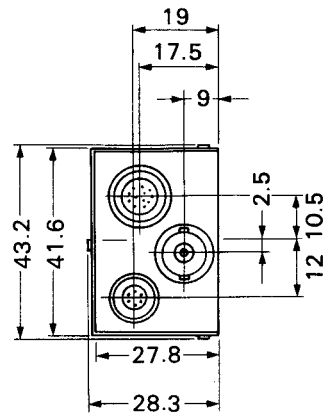
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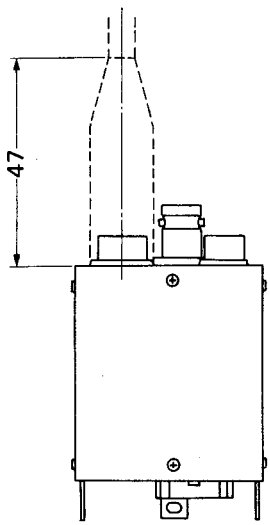


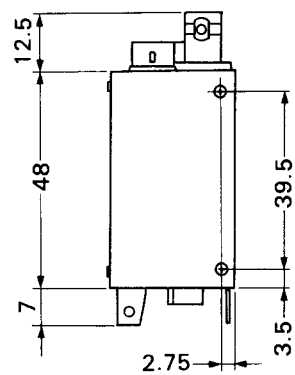


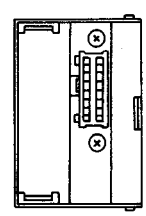
DC-37

Unit: mm



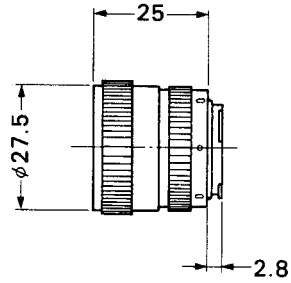






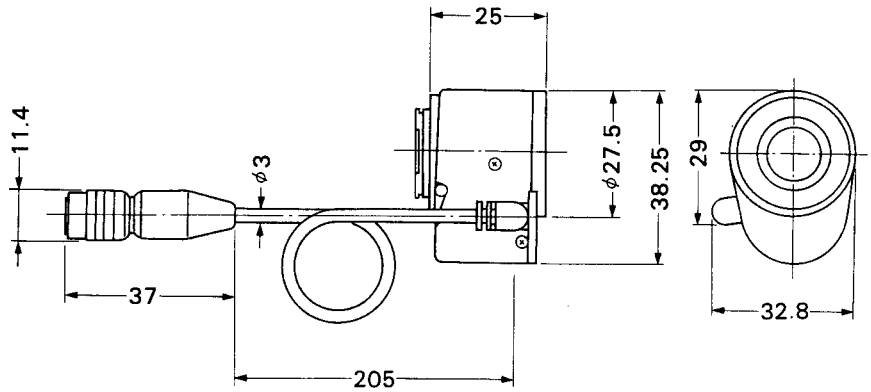
VCL-16SBY

Unit: mm



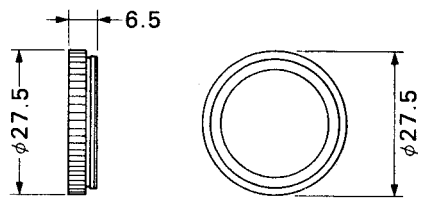
VCL-08SBY

Unit: mm



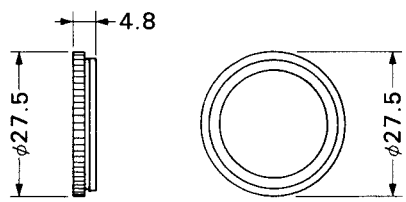
LO-37ND

Unit: mm



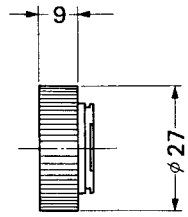
LO-37IR

Unit: mm

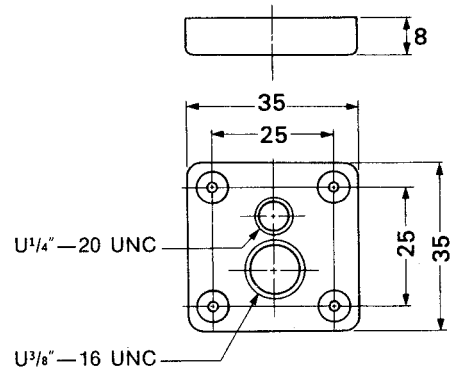


LO-37CMT

Unit: mm

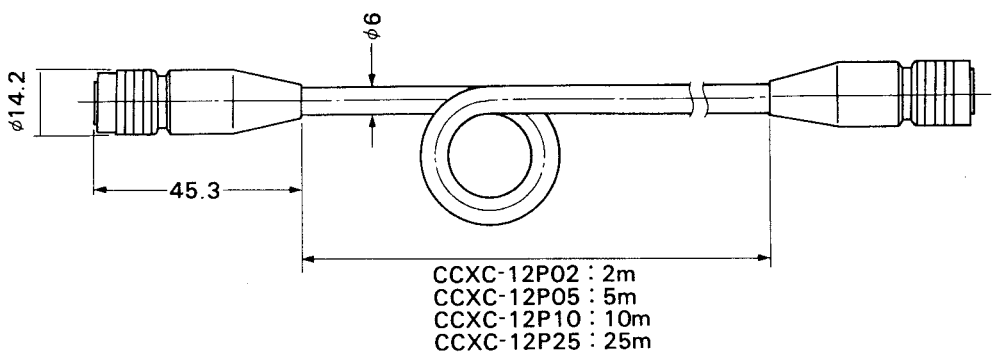


Unit: mm



CCXC-12P02/12P05/12P10/12P25

Unit: mm



SECTION 2
COMPREHENSIVE SPECIFICATIONS

2-1. SPECIFICATIONS

Pick-up device: Interline transfer CCD
- Picture elements: 384 (H) × 491 (V)
- Sensing area: 8.8 mm × 6.6 mm (the same as the 2/3-inch camera tube)
- Optical black: 15 pixels each horizontal line
- Horizontal drive frequency: 7.16 MHz (2 Fsc)
- Vertical drive frequency: 15.75 kHz
- Structure: Interline transfer
- Cell size: 23.0 μm (H) × 13.4 μm (V)
- Chip size: 10.7 mm (H) × 9.3 mm (V)

Optical system: Special mini bayonet/C mount with adaptor
- Flange back length: 8.5 mm (in air)
- Lens filter: M25.5 mm

Scanning system: 525 lines, 60 fields/sec, 2:1 Interlace

Video output: 1.0 Vp-p sync negative, 75 ohms

Horizontal resolution: 280 TV lines

Vertical resolution: 350 TV lines

Minimum illumination: 3 luxes, F1.4 (without infrared cut filter)

S/N ratio: more than 46 dB (AGC off; 0 dB)

Power requirements: 12V DC to power unit, 24V/9.5V/5V to camera module

Power consumption: 2.3W (Camera module only), 2.9W (Camera module + Power unit), 3.0W (Camera module + Power unit + Auto iris lens)

Weight:
- Camera module: 115g
- Power unit: 100g
- Standard lens: 38g
- Auto iris lens: 50g, 62g (with cable)
- C mount adaptor: 12.5g
- Tripod attachment: 18g
- Camera cable: (2m) 135g, (5m) 330g, (10m) 640g, (25m) 1570g
- ND filter: 2g
- IR cut filter: 2g

Storage temperature: −30°C to +60°C

Operating temperature: 0°C to 40°C

Vibration resistance: 7G (11 Hz to 200 Hz)

Shock resistance: 70G

MTBF: 3000 hours (30000 hours in the limited condition)

Product life: more than 12000 hours

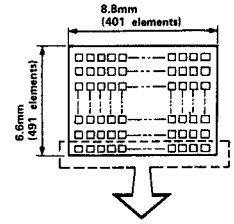
Power voltage tolerance:
- Power Unit 12V: ±10%
- Camera Module 24V: ±0.8V
- 9.5V: +0.3V −0.2V
- 5V: +0.3V −0.2V

Storage moisture: 25% to 90%

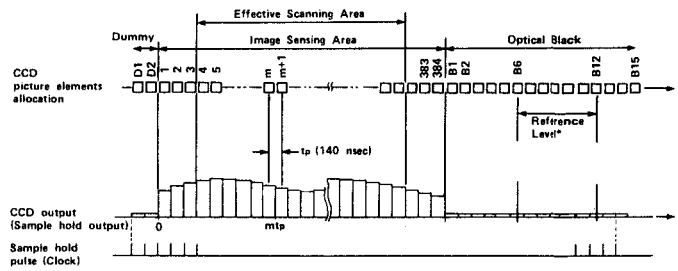
Operating moisture: 30% to 70%

Waveforms:

CCD Imager



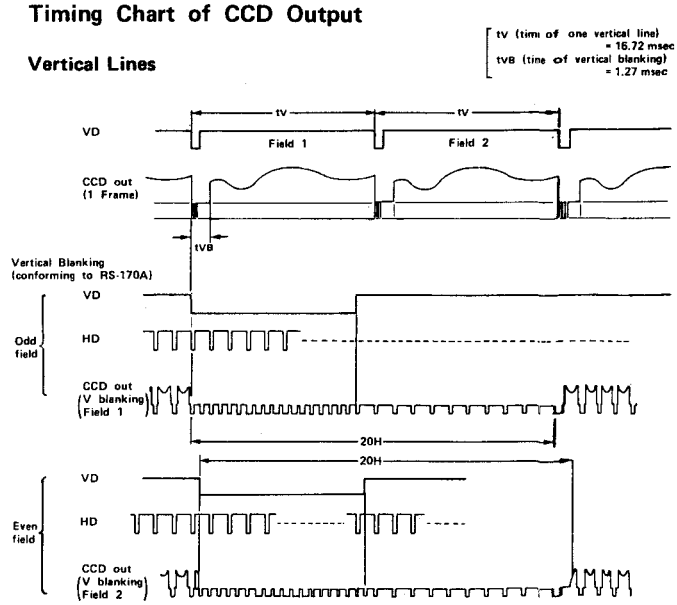
Picture Element Allocation in One Horizontal Line



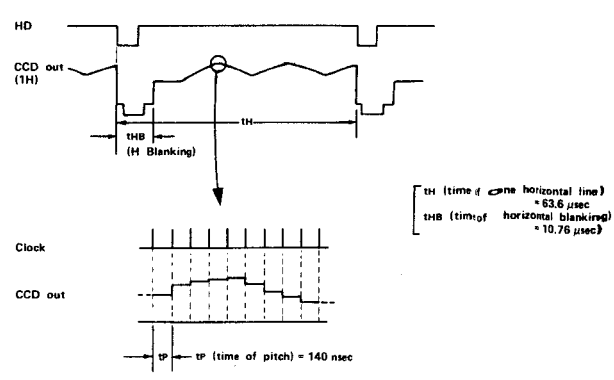
* It is recommended to use the signal of this area for an exact optical black reference.

Timing Chart of CCD Output

Vertical Lines



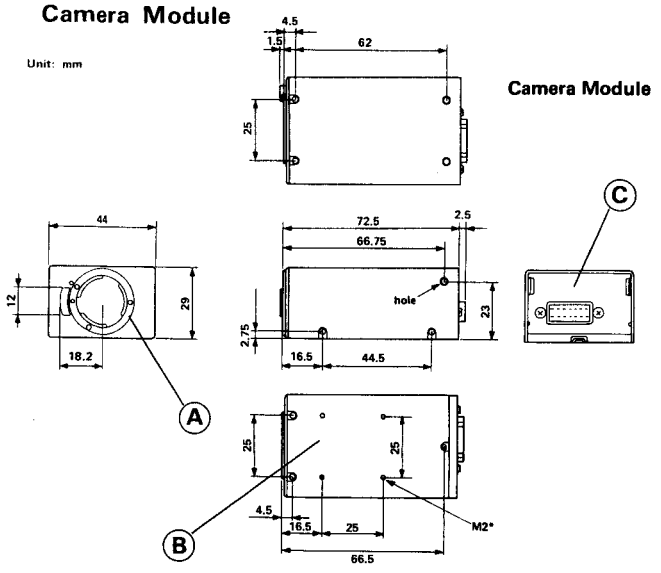
Horizontal Lines



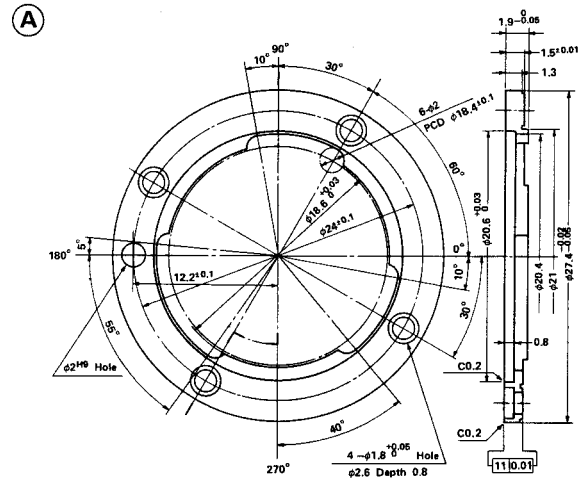
Dimensions:

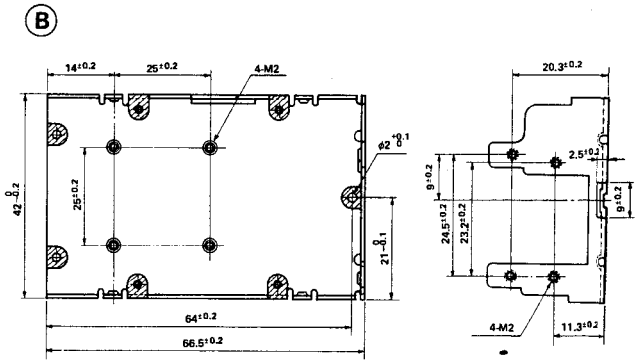
Camera Module

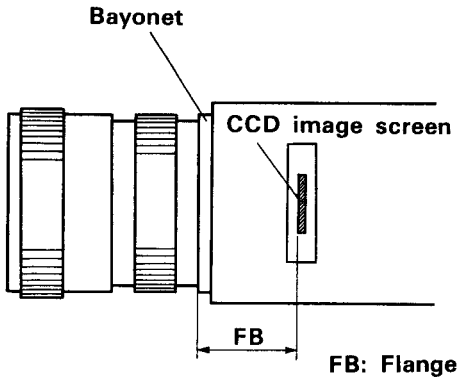
Unit: mm



* The height of the screw should be less than 2mm.



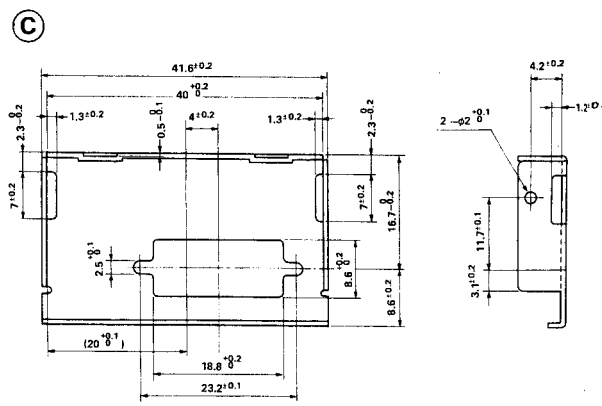




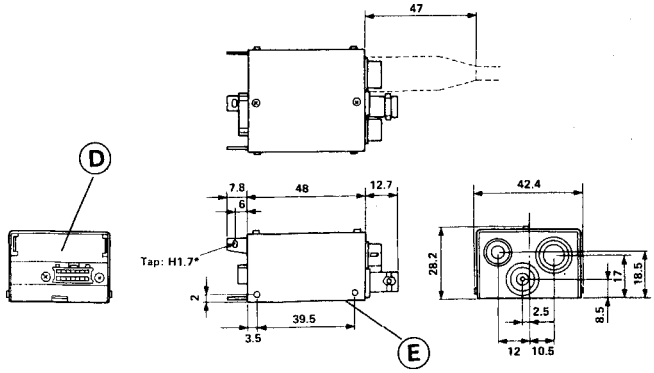
FB: Flange Back

FB = 8.5 mm (Air conversion value)

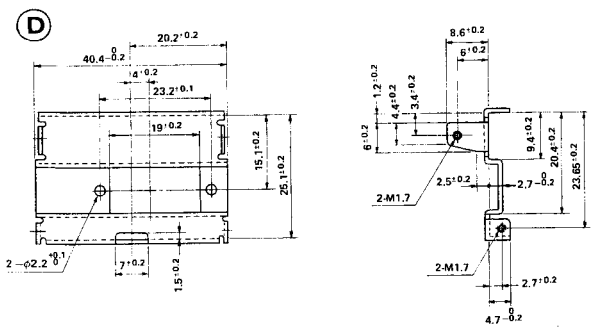
3.75 mm-lens back insertion glass (BK 7 or equivalent)

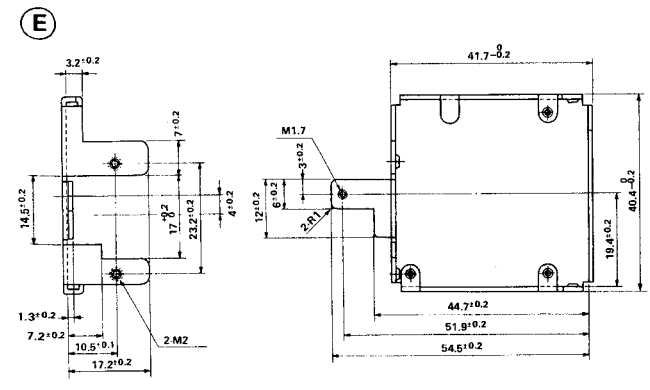


Power Unit

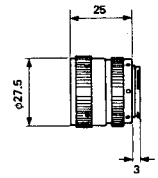


* The height of the screw should be less than 1.7mm.

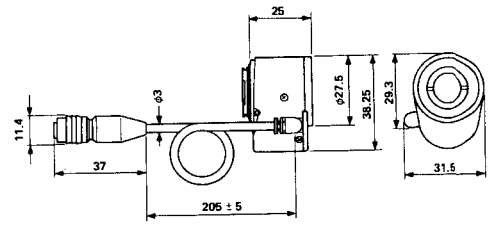




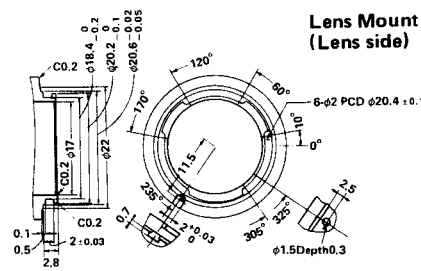
Lens



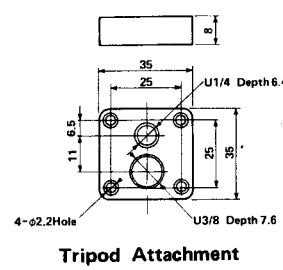
Standard Lens



Auto Iris Lens

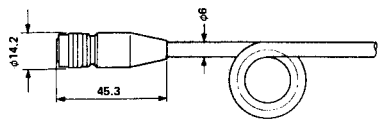


Tripod Attachment

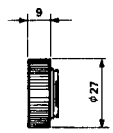


Tripod Attachment

Camera Cable



C Mount Adaptor



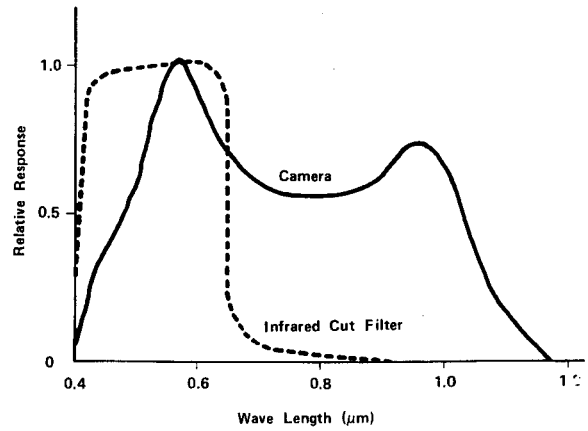
The C-mount adaptor is 7.5 mm. in depth. It should be noted that the c-mount adaptor cannot be mounted depending on lenses.

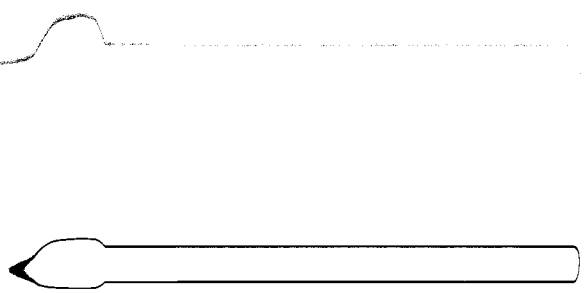
Filter



ND Filter **IR Cut Filter**

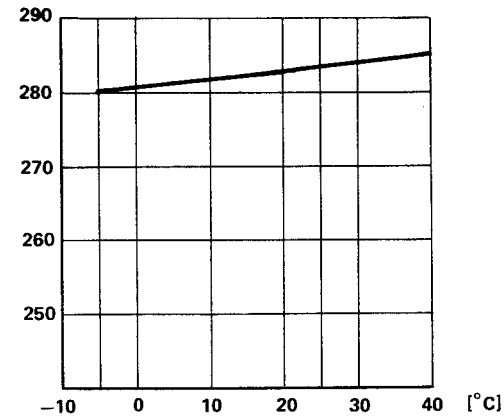
Spectral response:



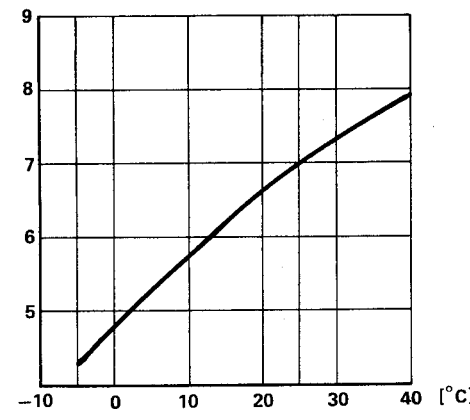


Typical characteristics:

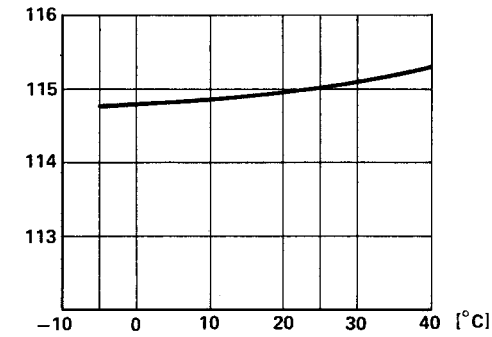
Resolution
[line]



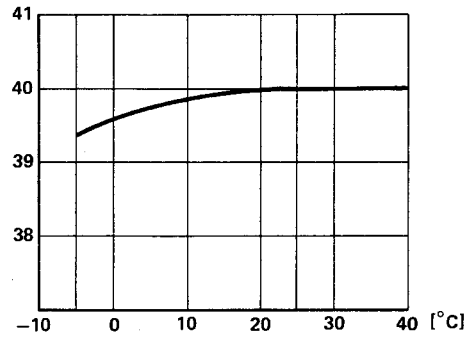
Pedestal level
[IRE]



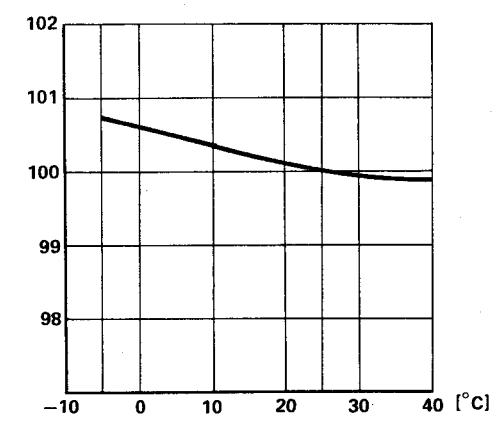
White clip level
[IRE]



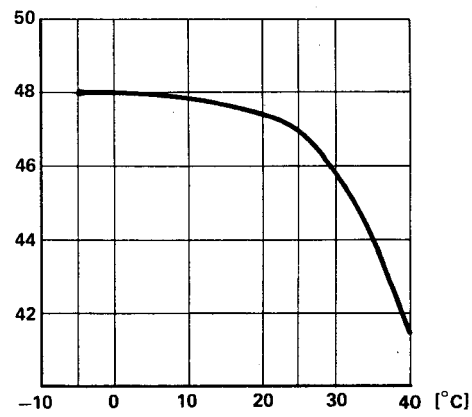
Sync level
[IRE]



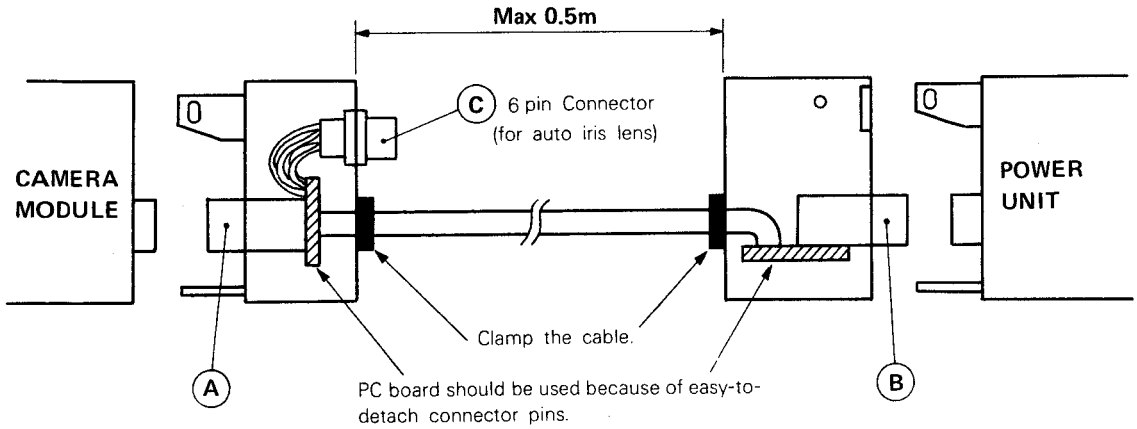
Video level
[IRE]



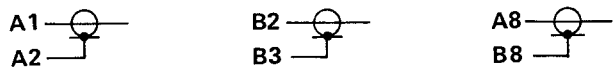
Signal to noise ratio (AGC:ON)
[dB]



2-2. WHEN THE POWER UNIT IS SEPARATELY USED

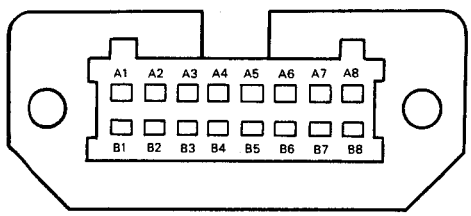


Pins using the shielding wires



Ⓐ CONNECTOR

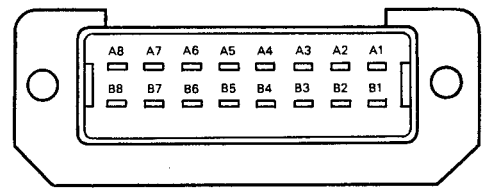
Sony Parts No. 1-562-380-00



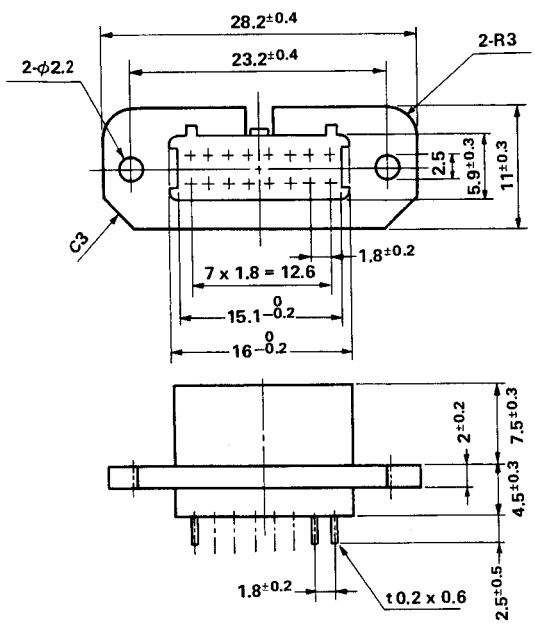
EXTERNAL VIEW (FEMALE)

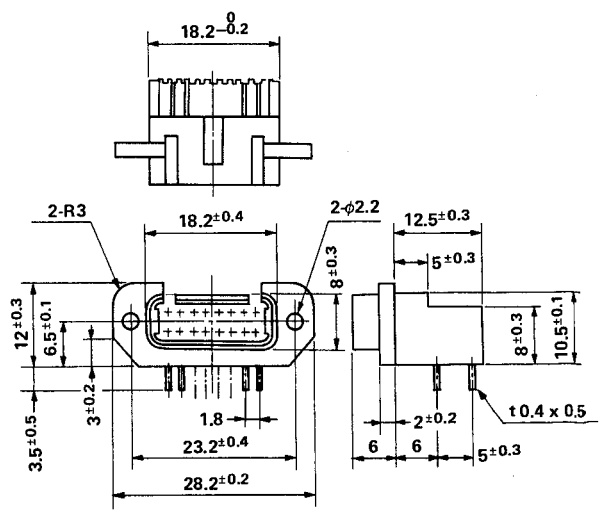
Ⓑ CONNECTOR

Sony Parts No. 1-564-361-00



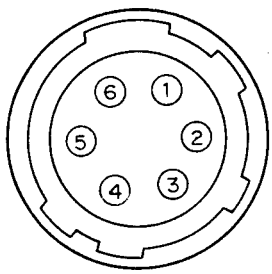
EXTERNAL VIEW (MALE)



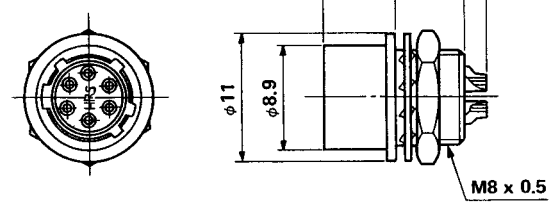


Ⓒ CONNECTOR

Manufacture: Hirose Electric Co., Ltd.
Products No.: HR10-7R-6S
(Sony Parts No. 1-562-222-00)



EXTERNAL VIEW (FEMALE)

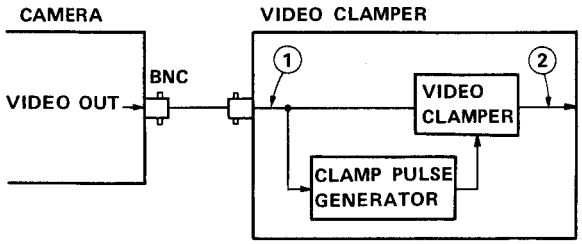


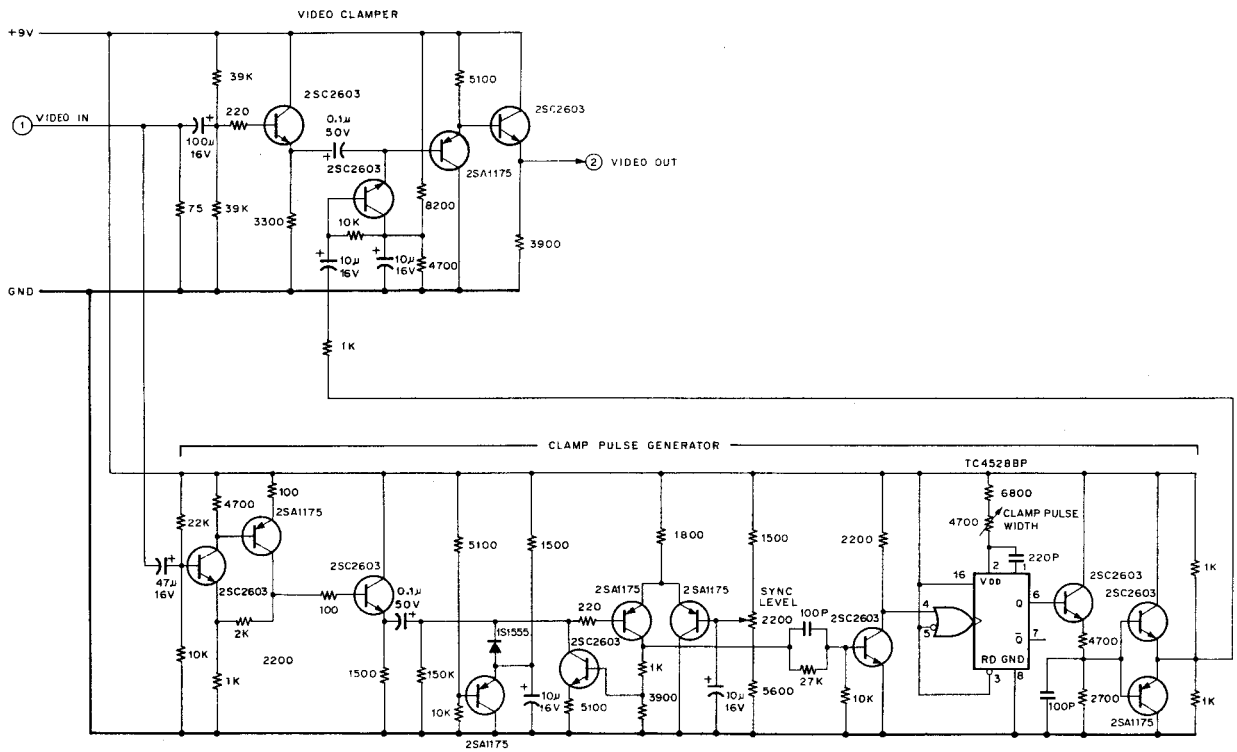
Wiring

Ⓐ-connector Pin No.		Ⓒ-connector Pin No.
A5	———	2
A6	———	1
B6	———	4
A7	———	5
B7	———	6

2-3. DC CLAMPING OF VIDEO SIGNAL

The video output signal is DC-cut off using a capacitor and fed from the VIDEO OUT connector of the camera.
When the VIDEO OUT connector of the camera is connected to ① shown in the figure below, for DC clamping, the DC clamped output signal can be obtained in ②

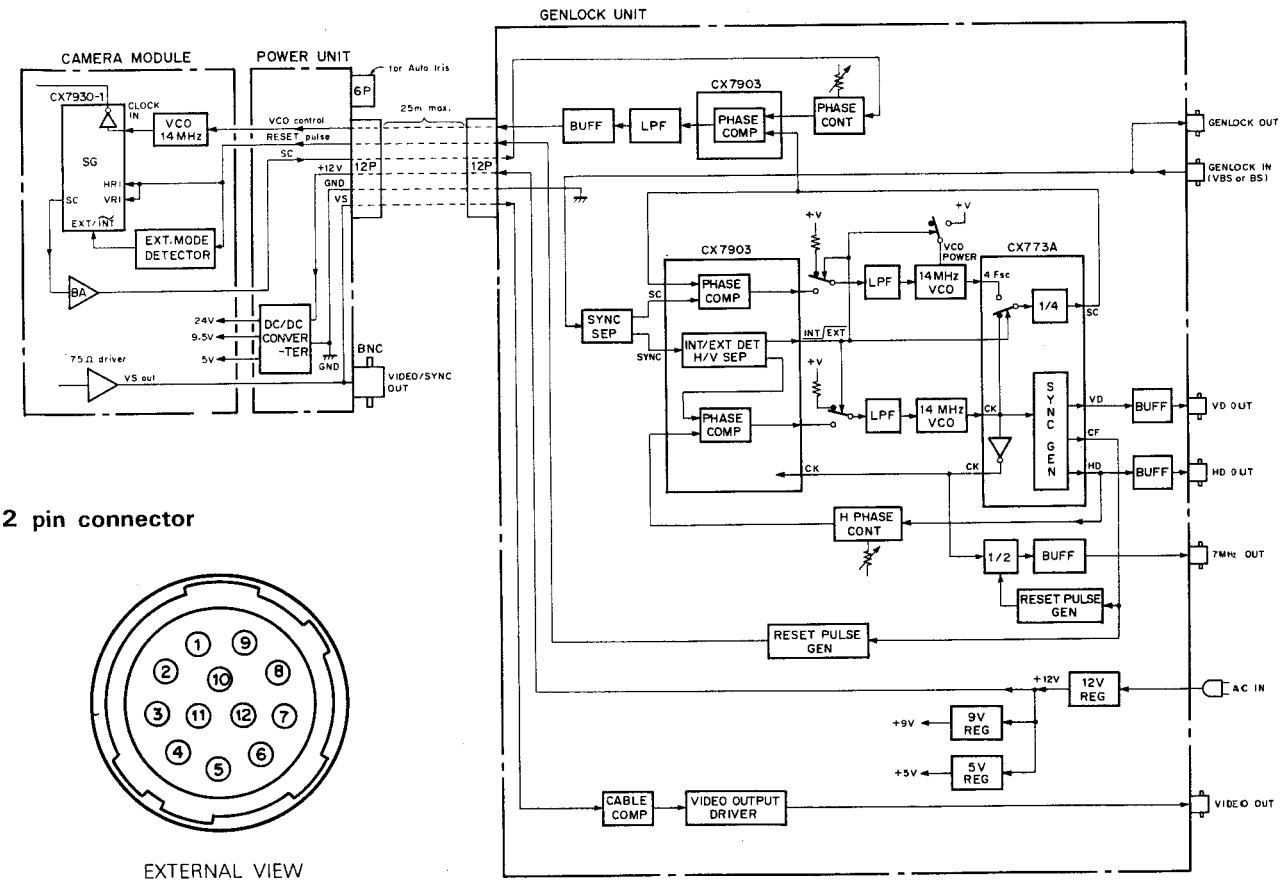




VIDEO CLAMER
XC-37

2-4. GENLOCK

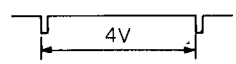
If genlock capability is required, it is recommended to use the genlock unit based on the block diagram on the right.



12 pin connector

EXTERNAL VIEW

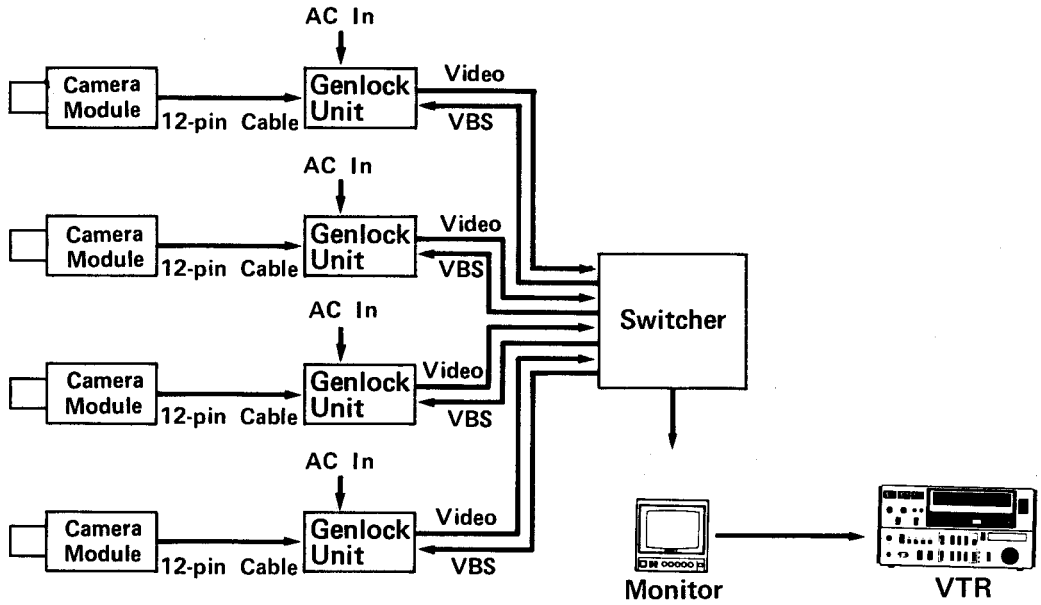
CX773A (SYNC GENERATOR): Sony Parts No. 8-757-731-00
CX7903 (GENLOCK DRIVER): Sony Parts No. 8-757-903-00

PIN NO.	SIGNAL	SPECIFICATION
1	GND	Camera power input DC 12V
2	+12V IN	
3	VIDEO OUT (G)	Composite black and white video signal output Zo = 75Ω 1 Vp-p Sync negative
4	VIDEO OUT	
5	RESET IN (G)	Reset pulse input for genlock 5 Vp-p · Pulse width 15 μs to 60 μs 
6	RESET IN	
7	GENLOCK DC IN	VCO control voltage input 0 to 5V
8	SC OUT (G)	Subcarrier output 800 mVp-p Zo ≒ 1 kΩ
9	SC OUT	
10	GND	Camera Power input DC 12V
11	+12V IN	
12	GENLOCK DC IN (G)	GND for GENLOCK DC IN

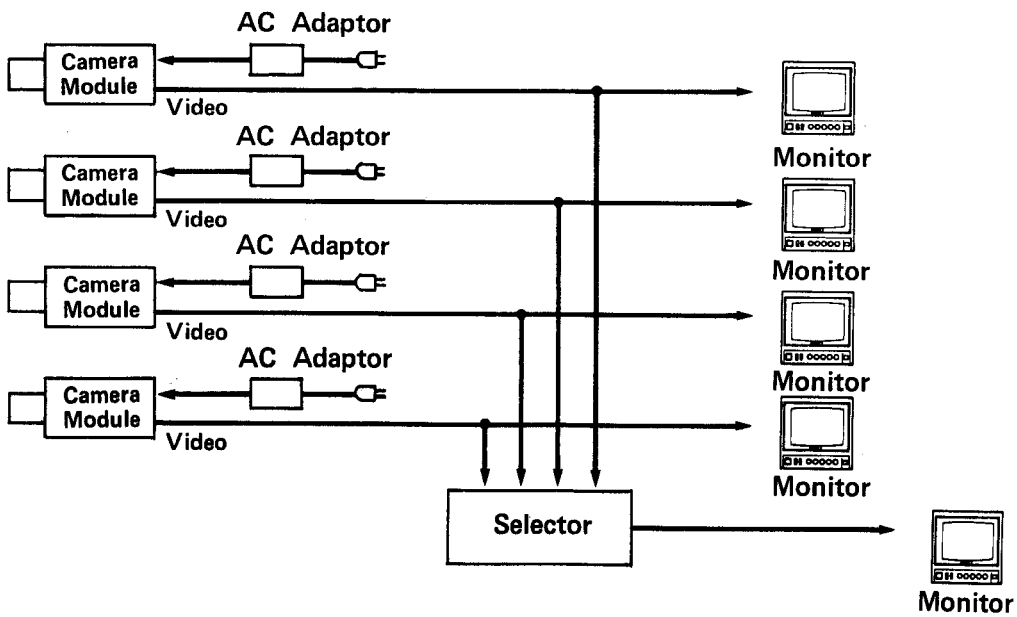
2-5. SURVEILLANCE

1. Genlock System

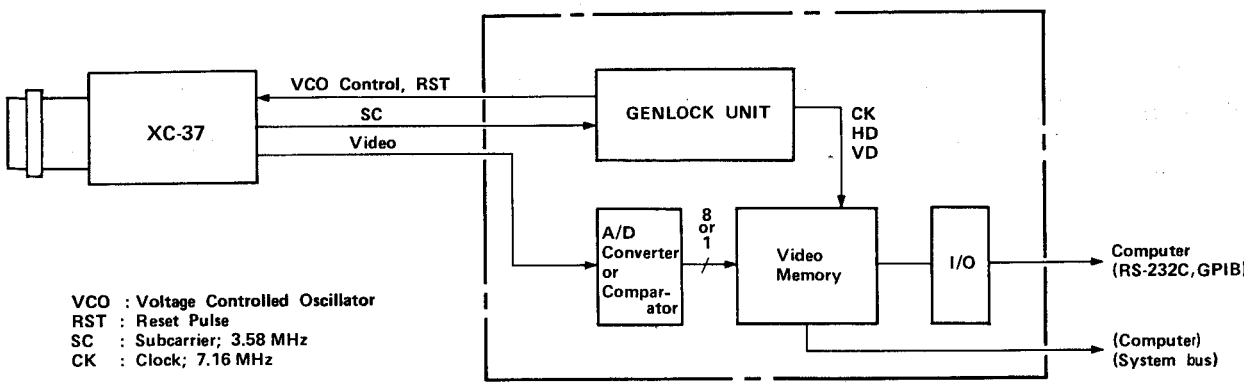
Using the genlock unit in Step 2-4, make connections as shown below.

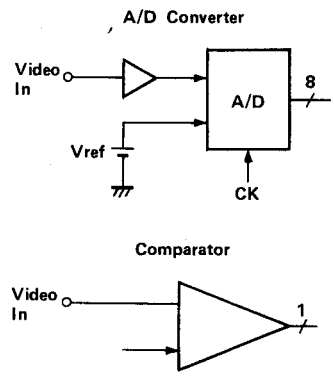


2. Non-genlock System



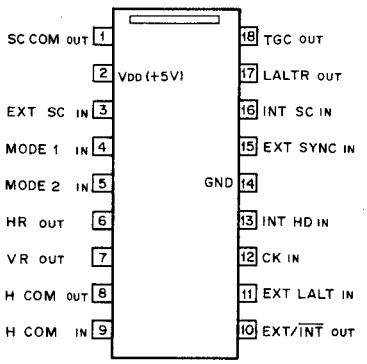
2-6. IMAGE PROCESSING

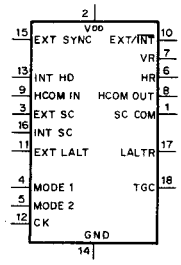




2-7. SEMICONDUCTORS

CX7903 (SONY)
C-MOS GENLOCK DRIVER FOR CX773A
— TOP VIEW —

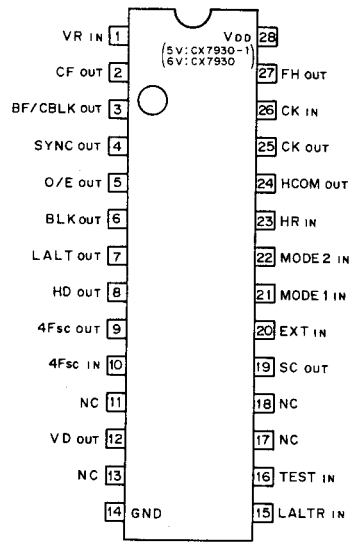


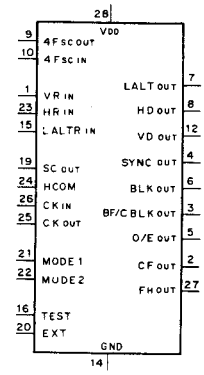


INPUTS MODE 2	INPUTS MODE 1	EXT LOCK MODE	
0	0	M1	PAL: VBS
0	1	M2	PALM: VBS
1	0	M3	PAL : VS/SC/LALT SECAM: VS/SC/LALT
1	1	M4	NTSC: VBS NTSC: VS/SC PALM: VS/SC/LALT

0 ; LOW LEVEL
1 ; HIGH LEVEL

CX7930-1 (SONY) FLAT PACKAGE
C-MOS SYNC GENERATOR (NTSC, PAL-M, PAL, SECAM)
— TOP VIEW —





O/E : ODD/EVEN FIELD
CF : COLOR FRAME PULSE
HCOM : H COMPARATOR

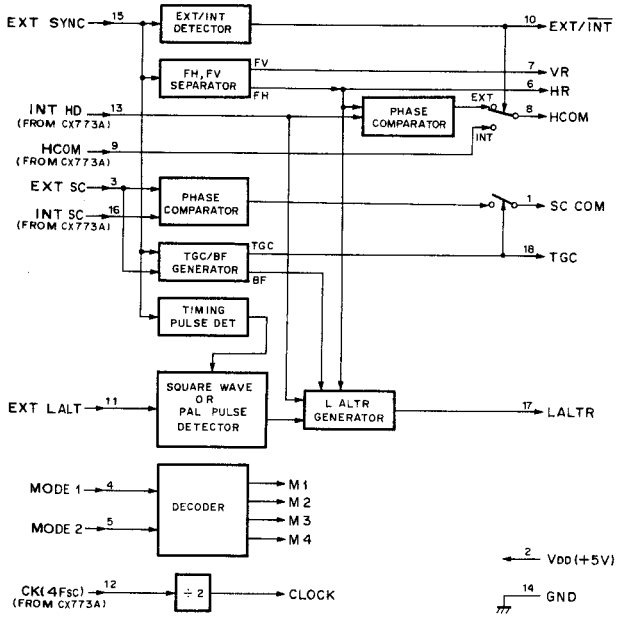
SYSTEM	4Fsc	CLOCK
NTSC	910 FH	910FH
PAL	1135FH+2Fv	908FH
PALM	909FH	910FH
SECAM	——	908FH

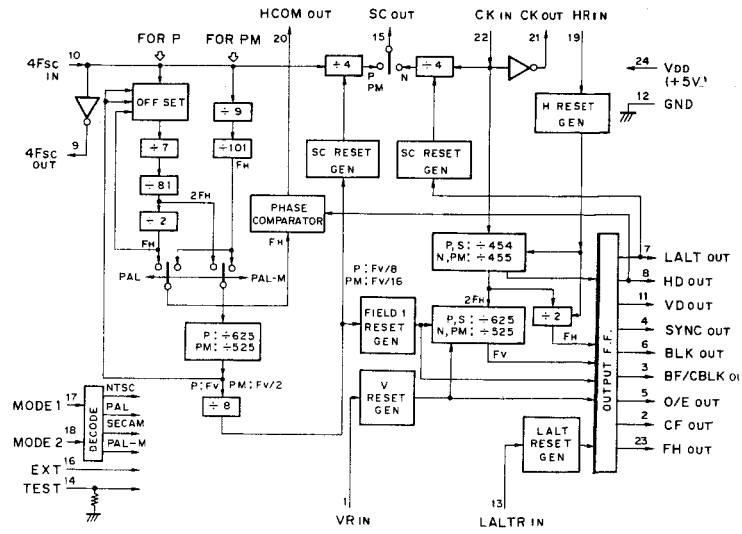
INPUTS MODE 1	INPUTS MODE 2	SYSTEM
0	0	NTSC
0	1	SECAM
1	0	PALM
1	1	PAL

0 ; LOW LEVEL (GND)
1 ; HIGH LEVEL (VDD)

INPUTS EXT	INPUTS TEST	FUNCTION
0	0	INTERNAL
0	1	INVALID
1	0	EXT
1	1	TEST

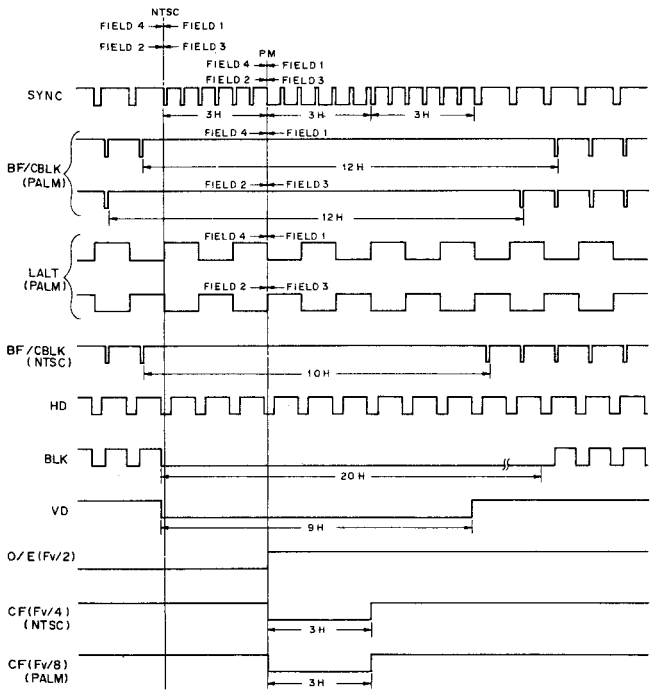
TEST "0": OPEN (INTERNALLY PULLED DOWN)



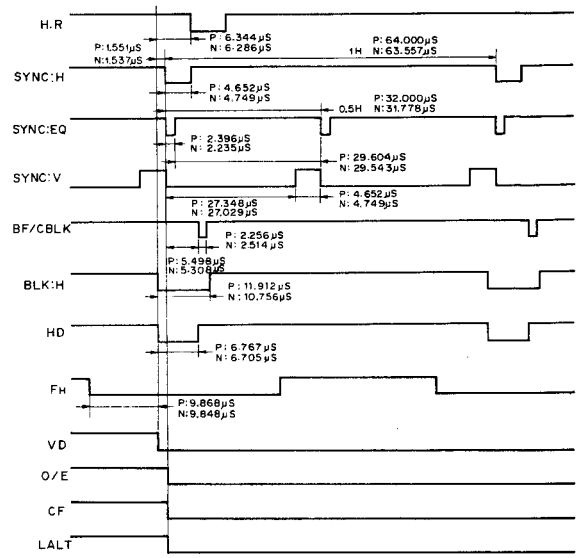


SC1
XC-37/47

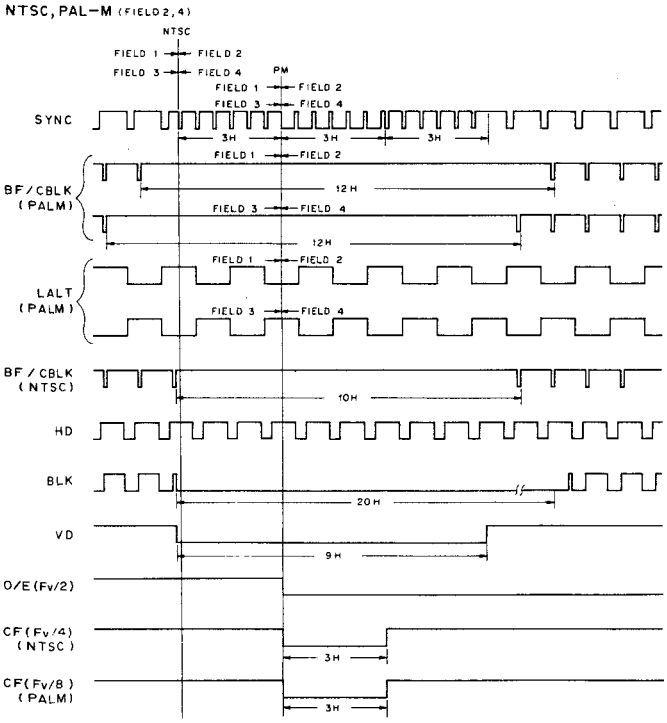
NTSC, PAL-M (FIELD 1,3)

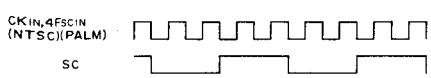


P:PAL, SECAM
N:NTSC, PALM



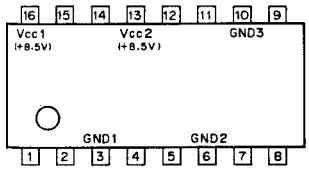
NTSC, PAL-M (FIELD 2,4)

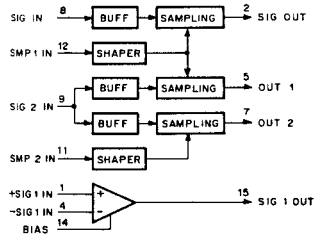




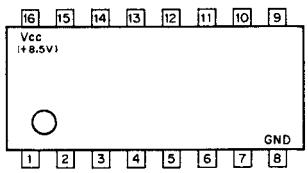
SC 2
XC - 37/47

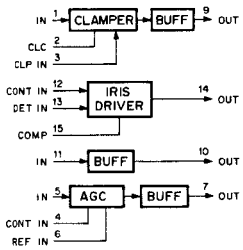
CX10045 (SONY) FLAT PACKAGE
CORELATED DOUBLE SAMPLER/MIXER
— TOP VIEW —



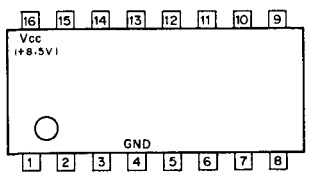


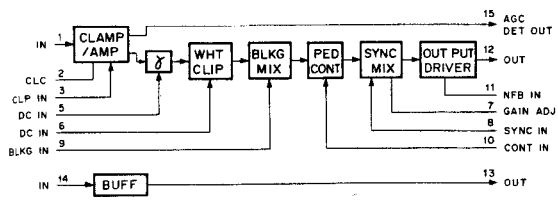
CX10046 (SONY) FLAT PACKAGE
IRIS DRIVER/AGC
— TOP VIEW —



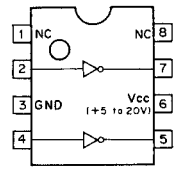


CX10047 (SONY) FLAT PACKAGE
VIDEO SIGNAL PROCESSOR
— TOP VIEW —

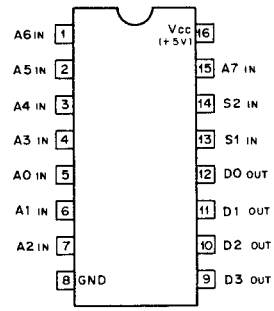


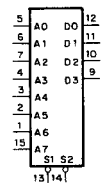


MMH0026FP (MOTOROLA) FLAT PACKAGE
BIPOLAR MOS CLOCK DRIVER
— TOP VIEW —



MB7052PF (FUJITSU) FLAT PACKAGE
1024-BIT (256x4) PROM (3-STATE OUTPUT)
— TOP VIEW —

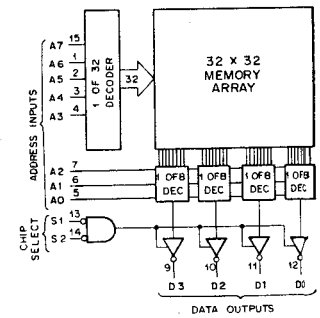




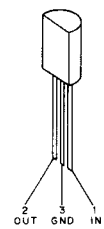
OUTPUT MODE

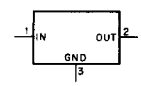
CHIP SEL		OUTPUT
S1	S2	
0	0	ENABLE
X	1	HI-IMPEDANCE
1	X	

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE



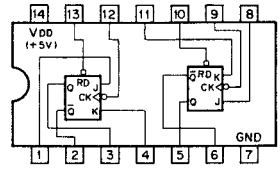
TA78L ? ? ?AP (TOSHIBA)
VOLTAGE REGULATOR





+5V	TA78L005AP
+6V	TA78L006AP
+7V	TA78L007AP
+7.5V	TA78L075AP
+8V	TA78L008AP
+9V	TA78L009AP
+10V	TA78L010AP
+12V	TA78L012AP
+13.2V	TA78L132AP
+15V	TA78L015AP
+18V	TA78L018AP
+20V	TA78L020AP
+24V	TA78L024AP

TC40H107AF (TOSHIBA)
C-MOS DUAL J-K FLIP-FLOPS
— TOP VIEW —



INPUT				OUTPUT
RD	CK	J	K	Q
0	X	X	X	0
1	↓	0	0	NO CHANGE
1	↓	1	0	1
1	↓	0	1	0
1	↓	1	1	TOGGLE

0 : LOW LEVEL
1 : HIGH LEVEL
X : DON'T CARE

SC3
XC-37

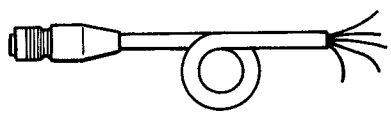
SECTION 3
ALIGNMENT

If PATTERN BOX (PTB-100) is not available or difficult to obtain, perform sec. 3-3. which may result in poorer adjustment accuracy.

3-1. PREPARATION

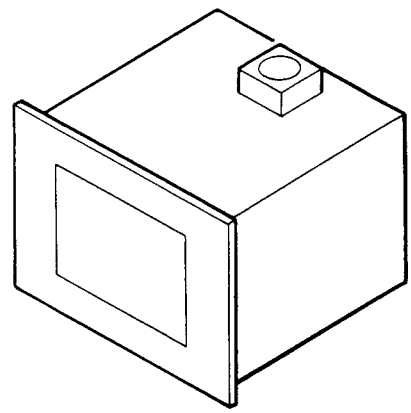
3-1-1. Equipment Required

- Oscilloscope
- B/W Monitor
- Digital Voltmeter
- DC Power Supply
- Power Unit DC-37
- Tripod Attachment VCT-37
- Lens Standard VCL-16SBY
  Auto Iris VCL-08SBY
- Infrared Cut Filter LO-37IR
- Camera Cable CCXC-12P02

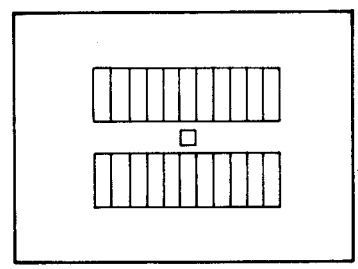


Remove the 12-pin male connector to bare the wire.

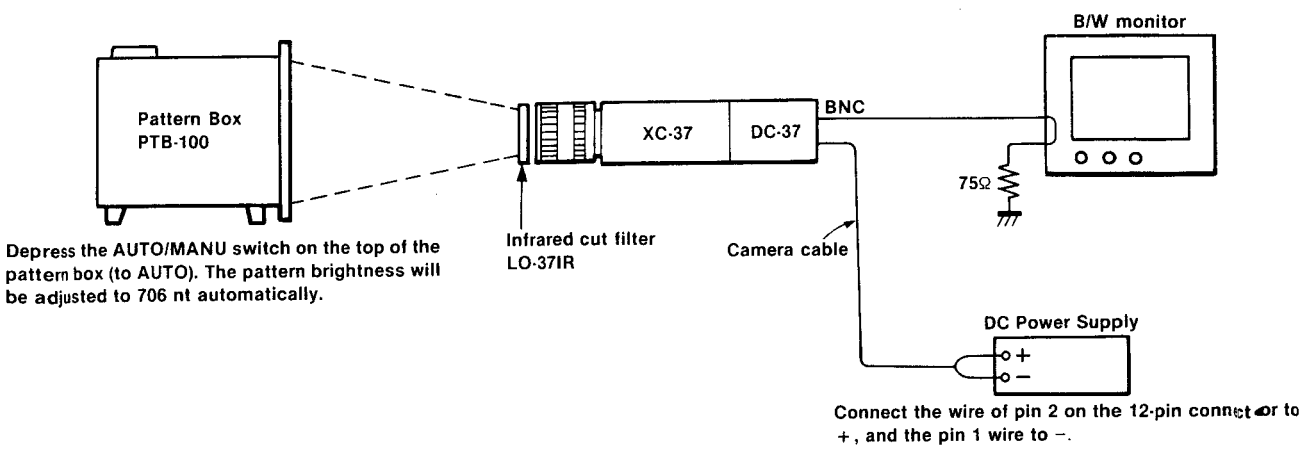
- Pattern Box PTB-100
  Sony Parts No. J-6020-490-A



- Grayscale Chart
  Sony Parts No. J-6021-880-B



3-1-2. Connection



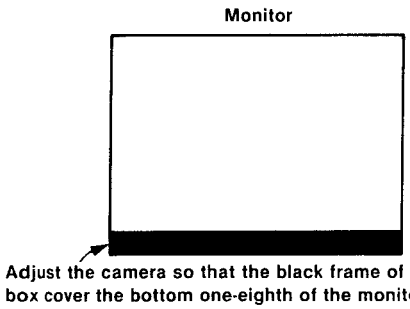
Depress the AUTO/MANU switch on the top of the pattern box (to AUTO). The pattern brightness will be adjusted to 706 nt automatically.

Connect the wire of pin 2 on the 12-pin connector to +, and the pin 1 wire to −.

3-2. ADJUSTMENT

3-2-1. Overflow Drain Adjustment

Object: Pattern box (AUTO mode)



Equipment: Digital voltmeter
Lens: Iris F2
Adj point: ◐RV1 [OFD] /DR-25 board

[When the vertical lines (overflow drain) appear]

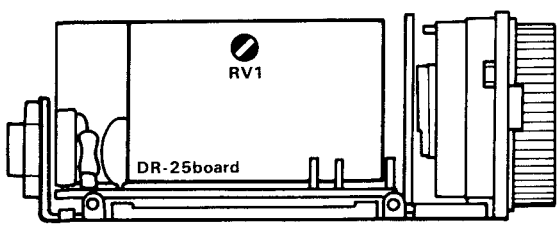
Adjust: Adjust the RV1 [OFD] /DR-25 board so that the fine vertical lines on the black part of the monitor screen disappear.
At this time, measure the voltage between pin 8 and pin 6 of IC1 on the CN-74 board.
If the voltage is more than 18Vdc, adjust RV1 [OFD] so that the voltage is $18^{+0}_{-0.4}$Vdc.

[When the vertical lines (overflow drain) don't appear]

Adjust: When the overflow drain don't appear on the black part of the screen, even if the RV1 [OFD] is turned ↻ or ↺, adjust RV1 [OFD] so that the voltage between pin 8 and pin 6 of IC1 on the CN-74 board is 11 ± 0.2Vdc.

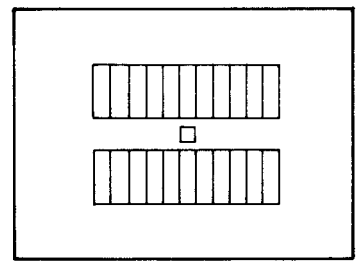
3-2-2. Video Amp Bias Adjustment

Equipment: Didital Voltmeter
Lens: Put on the black lens cap.
Test point: TP3 (GND: E)/MB-57 board
Adj point: ◐RV6 [BIAS] /PR-53 board
Spec: 5.2 ± 0.2 Vdc



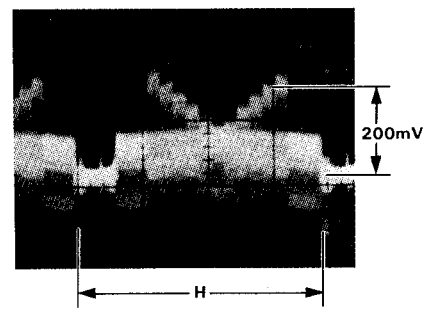
3-2-3. AGC Adjustment

Object: Grayscale chart
Adjust the camera so that the frame of the chart is aligned with the frame of the monitor.

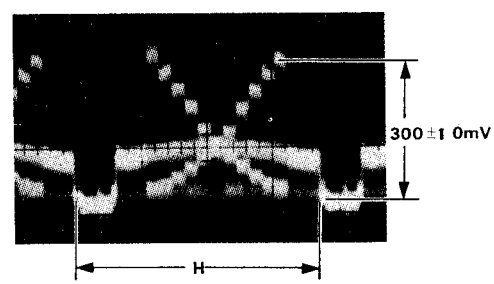


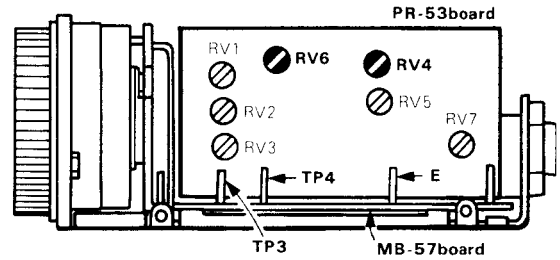
Depress the AUTO/MANU switch on the pattern box (to AUTO) and make sure the brightness of the white section is 706 nt.

Equipment: Oscilloscope
Adjust: 1. Adjust the lens iris so that the video level on the waveform at the TP3/MB-57 board is 200 mV.



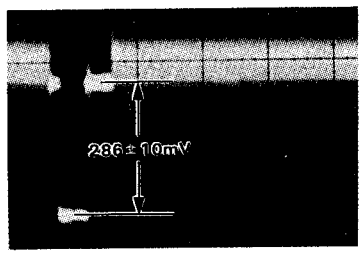
2. Adjust the ◐RV4 [AGC] /PR-53 board so that the video level on the waveform at the TP4/MB-57 board is 300 ± 10 mV.





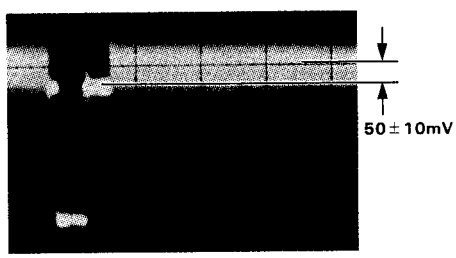
3-2-4. SYNC Level Adjustment

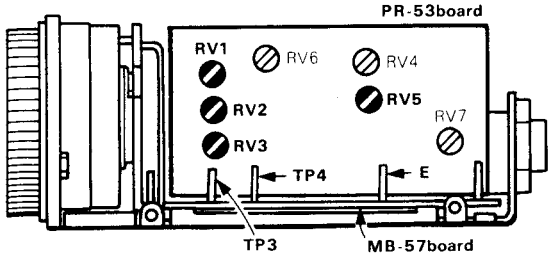
Equipment: Oscilloscope or Waveform monitor.
Test point: BNC video output terminal (75Ω termination)
Adj point: ◐RV3 [SYNC] /PR-53 board
Spec: 286 ± 10 mV (40 ± 2 IRE)



3-2-5. Pedestal Level Adjustment

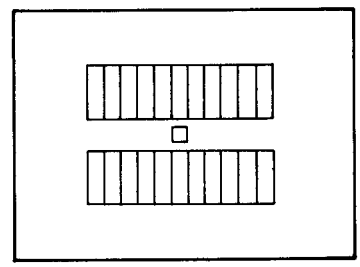
Lens: Put on the black lens cap.
Equipment: Oscilloscope or Waveform monitor
Test point: BNC video output terminal (75Ω termination)
Adj point: ◐RV5 [PED] /PR-53 board
Spec: 50 ± 10 mV (7 ± 2 IRE)



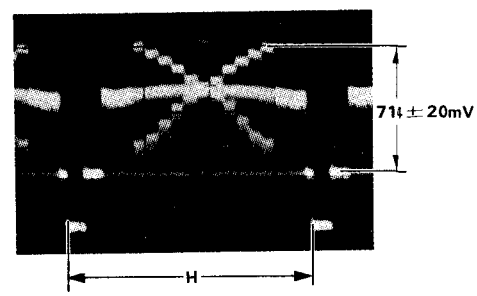


3-2-6. Gamma Correction Adjustment

Object: Grayscale chart
Adjust the camera so that the frame of the chart is aligned with the frame of the monitor.



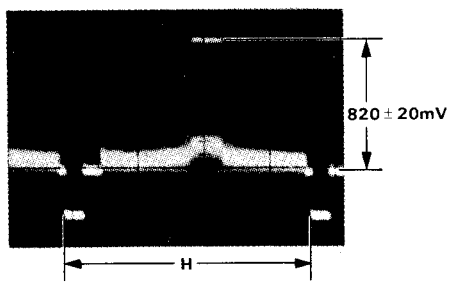
Depress the AUTO/MANU switch on the pattern box (to AUTO) and make sure the brightness of the white section is 706 nt.
Equipment: Oscilloscope or Waveform monitor.
Test point: BNC video output terminal (75 Ω termination)
Preparation Turn the RV2 [WC] /PR-53 board clockwise (↻) until the point where the all white clipping disappears.
Note: Be careful not to turn the RV2 too far. The volume has no stopper.
Adjust: Adjust the ◐ RV1 [GAM] / PR-53 board so that the video level at the BNC video output terminal is 714 ± 20 mV (100 ± 2 IRE).



Note: Proceed to sec. 3-2-7. White clip adjustment, after this adjustment is completed.

3-2-7. White Clip Adjustment

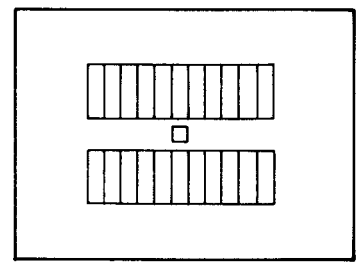
Object: Point the camera at a bright object, such as a fluorescent lamp, keeping a distance of at least 10 m.
Lens: Iris F5.6 ~ 8
Equipment Oscilloscope or Waveform monitor.
Test point BNC video output terminal (75Ω termination).
Adjust: 1. Adjust ◐ RV2 [WC] /PR-53 board so that the peak level on the waveform at the BNC video output terminal is 820 ± 20 mV (115 ± 2 IRE).



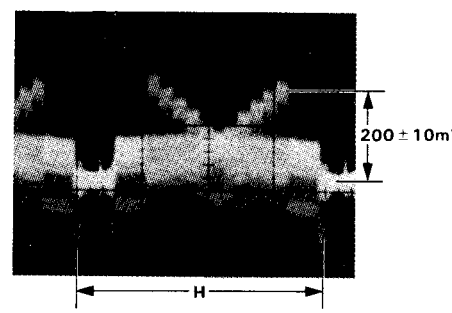
2. Make sure the clipping level of the video waveform does not exceed 820 mV when the objective size or the lens iris is changed.

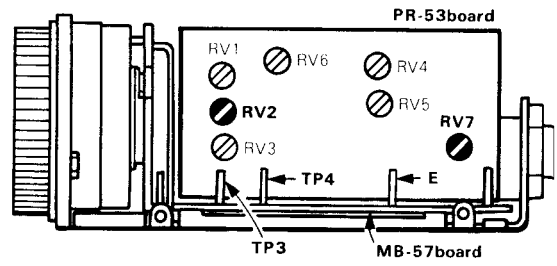
3-2-8. Auto Iris Adjustment

Object: Grayscale chart
Adjust the camera so that the frame of the chart is aligned with the frame of the monitor.



Depress the AUTO/MANU switch on the pattern box (to AUTO) and make sure the brightness of the white section is 706 nt.
Equipment: Oscilloscope
Preparation: Attach the auto iris lens (VCL-08SBY) to the camera and attach the infrared cut filter (LO-37IR) to the lens.
Test point: TP3 (GND: E)/MB-57 board
Adj point: ◐ RV7 [AIC] /PR-53 board
Spec: 200 ± 10 mV



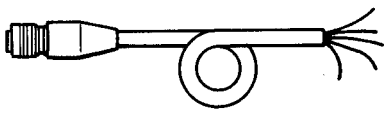


3-3. SIMPLIFIED ADJUSTMENT

If PATTERN BOX (PTB-100) and GRAYSCALE CHART are not available, perform the following adjustments.

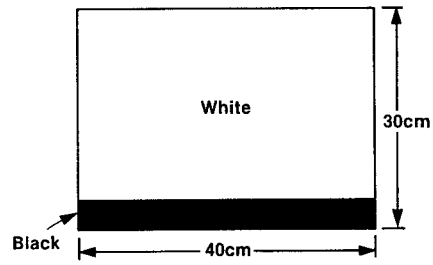
3-3-1. Equipment Required

- Oscilloscope
- B/W Monitor
- Digital Voltmeter
- DC Power Supply
- Lamp 100W
- Power Unit DC-37
- Tripod Attachment VCT-37
- Lens Standard VCL-16SBY
  Auto Iris VCL-08SBY
- Infrared Cut Filter LO-37IR
- Camera Cable CCXC-12P02

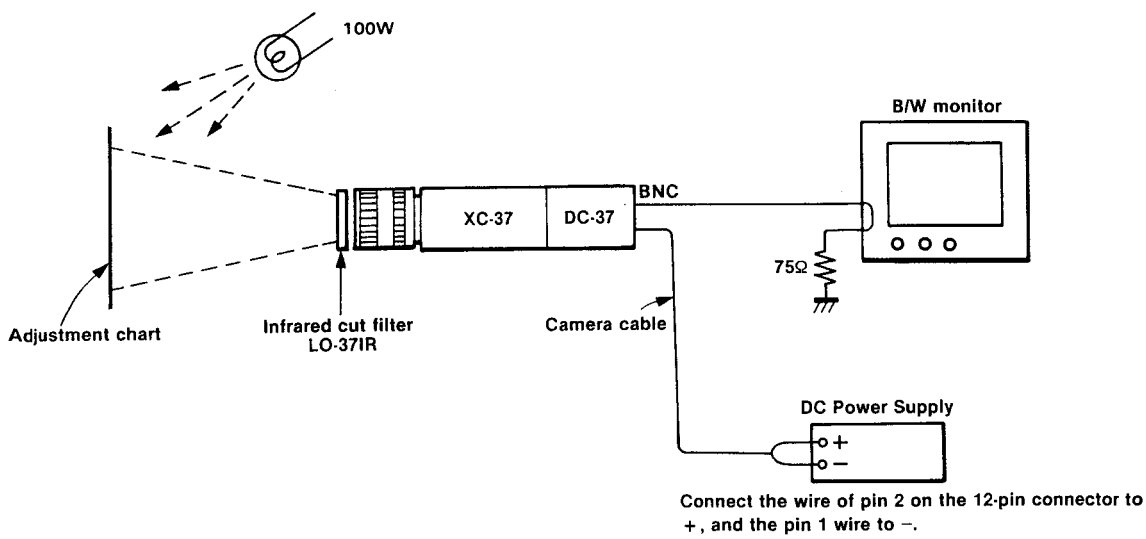


Remove the 12-pin male connector to bare the wire.

- Adjustment Chart
  Make an adjustment chart of a white paper as shown below.



3-3-2. Connection



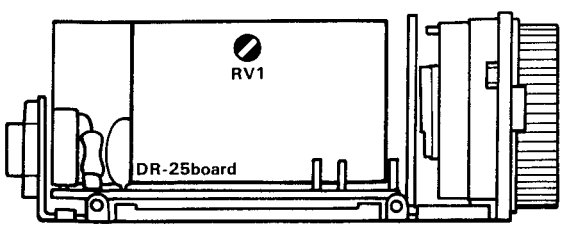
Connect the wire of pin 2 on the 12-pin connector to +, and the pin 1 wire to −.

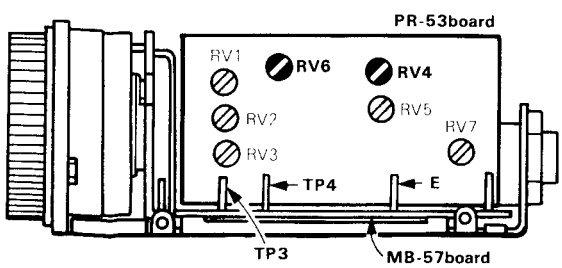
3-3-3. Overflow Drain Adjustment

Equipment: Digital Voltmeter
Test point: IC1-8 pin/CN-74 board
(GND: IC1-6 pin)
Adj point: ◐RV1 [OFD] /DR-25 board
Spec: 11.0 ± 0.2Vdc

3-3-4. Video Amp Bias Adjustment

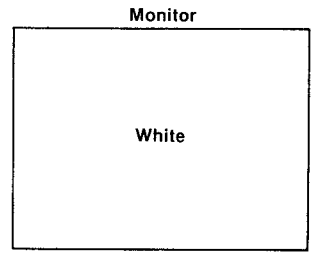
Equipment: Digital Voltmeter
Lens: Put on the black lens cap.
Test point: TP3 (GND: E)/MB-57 board
Adj point: ◐RV6 [BIAS] /PR-53 board
Spec: 5.2 ± 0.2 Vdc



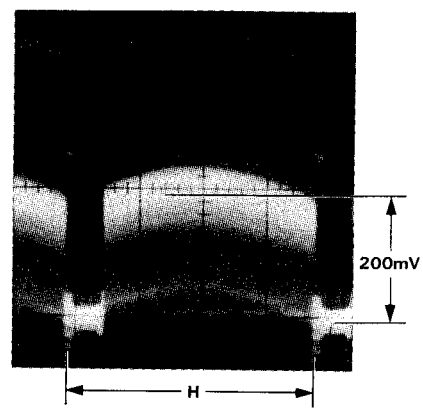


3-3-5. AGC Adjustment

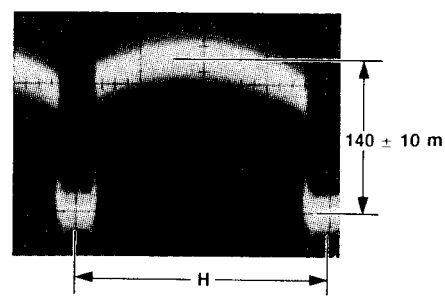
Object: Shoot the adjustment chart as shown below.



Equipment: Oscilloscope
Adjust: 1. Adjust the lens iris so that the video level on the waveform at the TP3/MB-57 board is 200 mV.

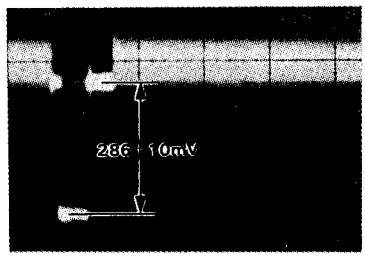


2. Adjust the ◐RV4 [AGC] /PR-53 board so that the video level on the waveform at the TP4/MB-57 board is 140 ± 10 mV.



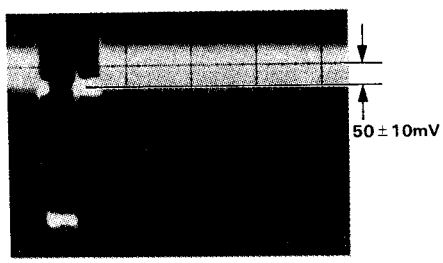
3-3-6. SYNC Level Adjustment

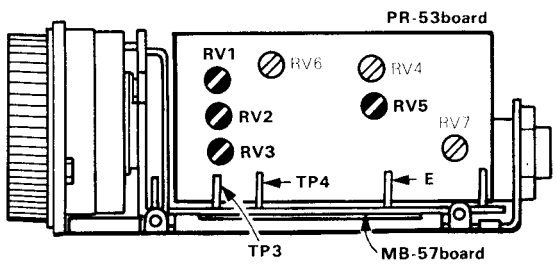
Equipment: Oscilloscope or Waveform monitor.
Test point: BNC video output terminal (75Ω termination)
Adj point: ◐RV3 [SYNC] /PR-53 board
Spec: 286 ± 10 mV (40 ± 2 IRE)



3-3-7. Pedestal Level Adjustment

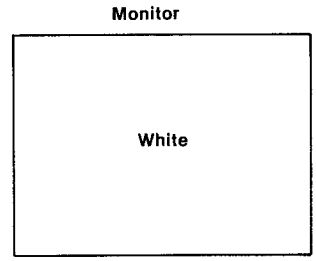
Lens: Put on the black lens cap.
Equipment: Oscilloscope or Waveform monitor
Test point: BNC video output terminal (75Ω termination)
Adj point: ◐RV5 [PED] /PR-53 board
Spec: 50 ± 10 mV (7 ± 2 IRE)



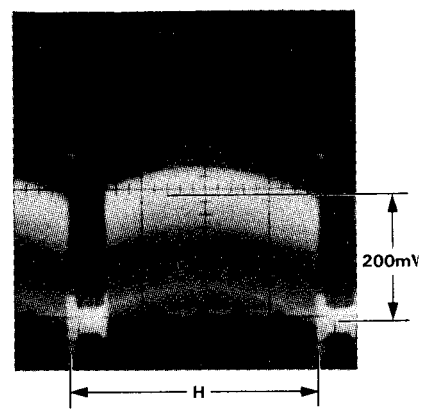


3-3-8. Gamma Correction Adjustment

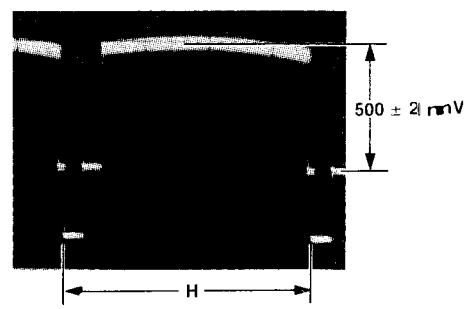
Object: Shoot the adjustment chart as shown below.
(Take the same condition as AGC adjustment)



Equipment: Oscilloscope.
Test point: BNC video output terminal (75 Ω termination)
Preparation: Turn the RV2 [WC] /PR-53 board clockwise (↻) until the point where the all white clipping disappears.
Note: Be careful not to turn the RV2 too far. The volume has no stopper.
Adjust: 1. Adjust the lens iris so that the video level at the TP3/MB-57 board is 200mV.



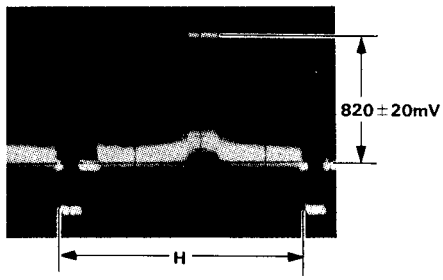
2. Adjust the ◐RV1 [GAM] /PR-53 board so that the video level at the BNC video output terminal is 500 ± 20mV.



Note: Proceed to sec. 3-3-9. White clip adjustment, after this adjustment is completed.

3-3-9. White Clip Adjustment

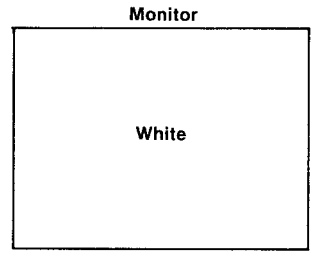
Object: Point the camera at a bright object, such as a fluorescent lamp, keeping a distance of at least 10 m.
Lens: Iris F5.6 ~ 8
Equipment: Oscilloscope or Waveform monitor.
Test point: BNC video output terminal (75Ω termination).
Adjust: 1. Adjust ◐ RV2 [WC] /PR-53 board so that the peak level on the waveform at the BNC video output terminal is 820 ± 20 mV (115 ± 2 IRE).



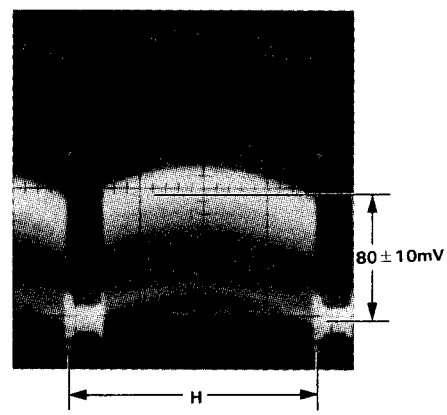
2. Make sure the clipping level of the video waveform does not exceed 820 mV when the objective size or the lens iris is changed.

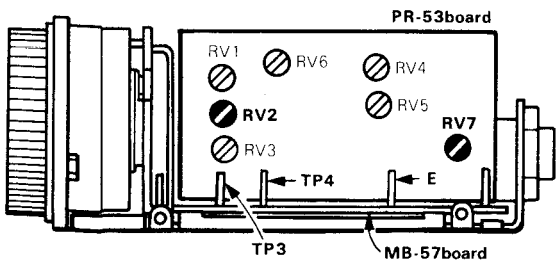
3-3-10. Auto Iris Adjustment

Object: Shoot the adjustment chart as shown below.



Equipment: Oscilloscope
Preparation: Attach the auto iris lens (VCL-08SBY) to the camera and attach the infrared cut filter (LO-37IR) to the lens.
Test point: TP3 (GND: E)/MB-57 board
Adj point: ◐ RV7 [AIC] /PR-53 board
Spec: 80 ± 10 mV

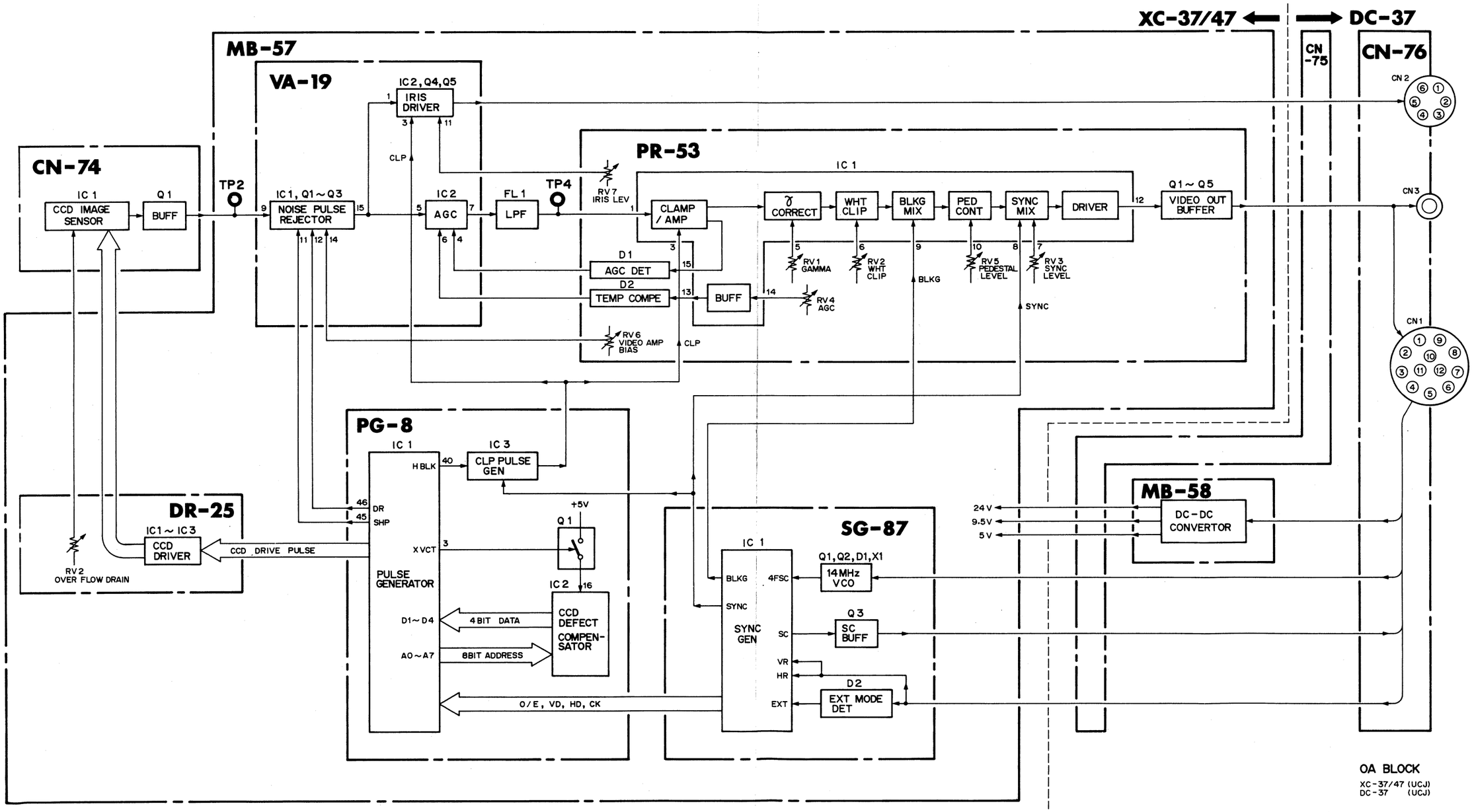




SECTION 4
DIAGRAM

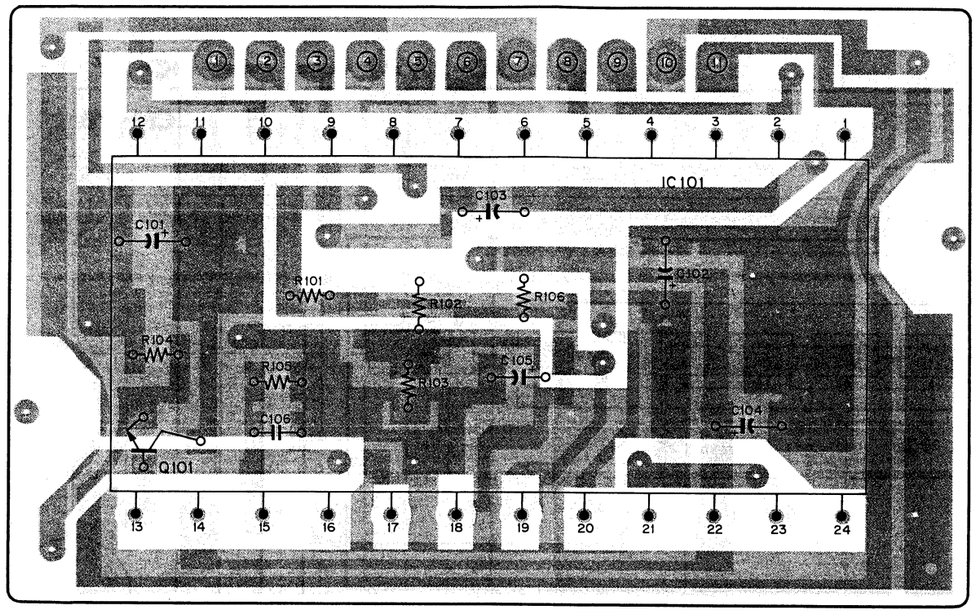
CAMERA MODULE (XC-37/47)

Overall Block Diagram



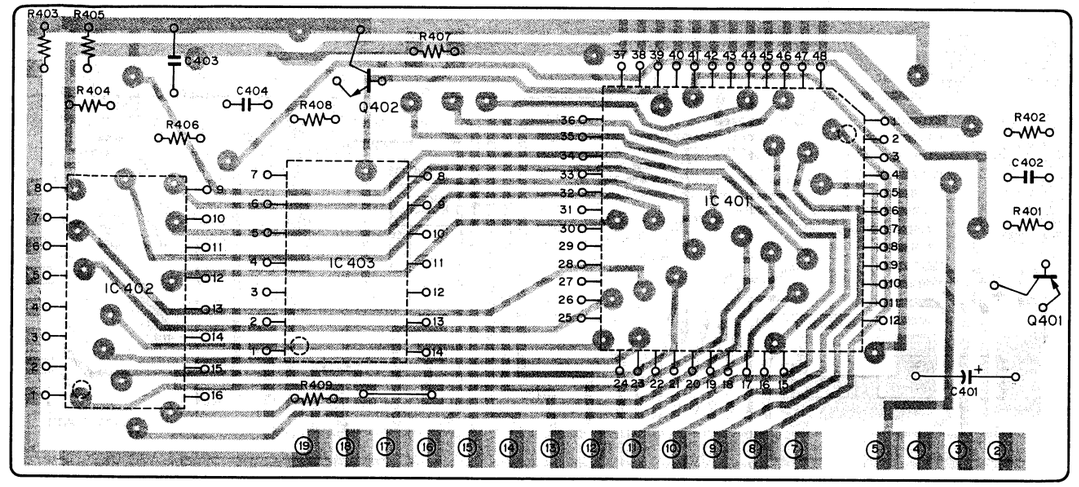
Mounting Diagram

CN-74 BOARD
-DIP SIDE-



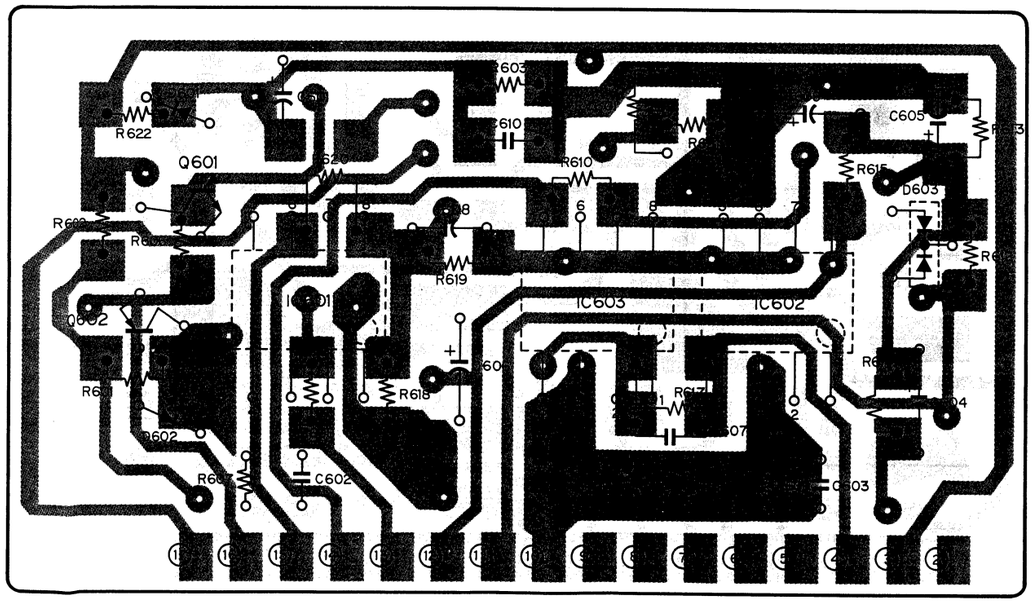
XC-37/47
1-611-355-11

PG-8 BOARD
-DIP SIDE-



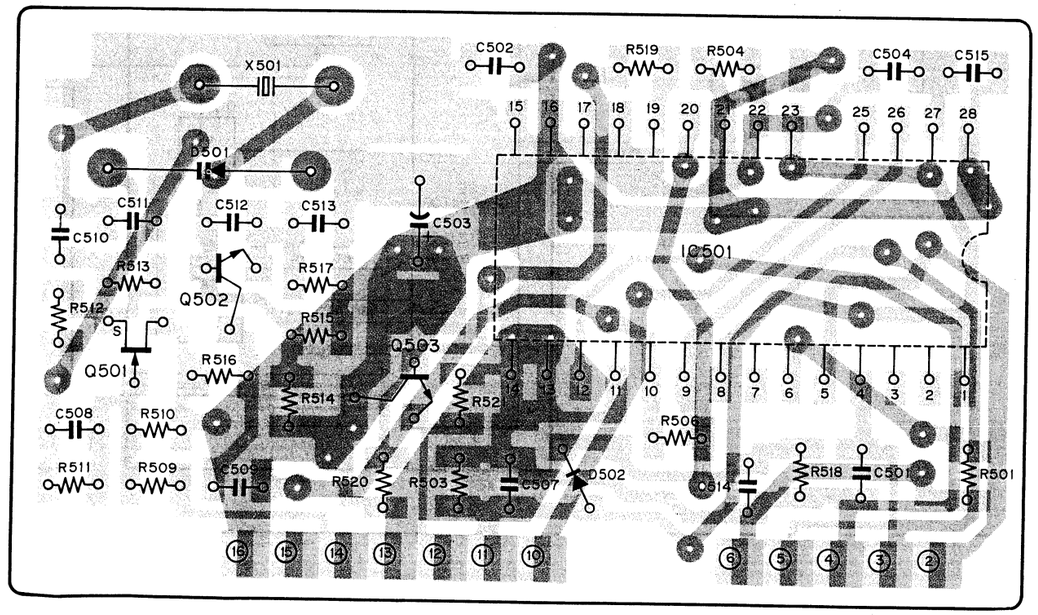
XC-37/47
1-611-359-11

DR-25 BOARD
-DIP SIDE-



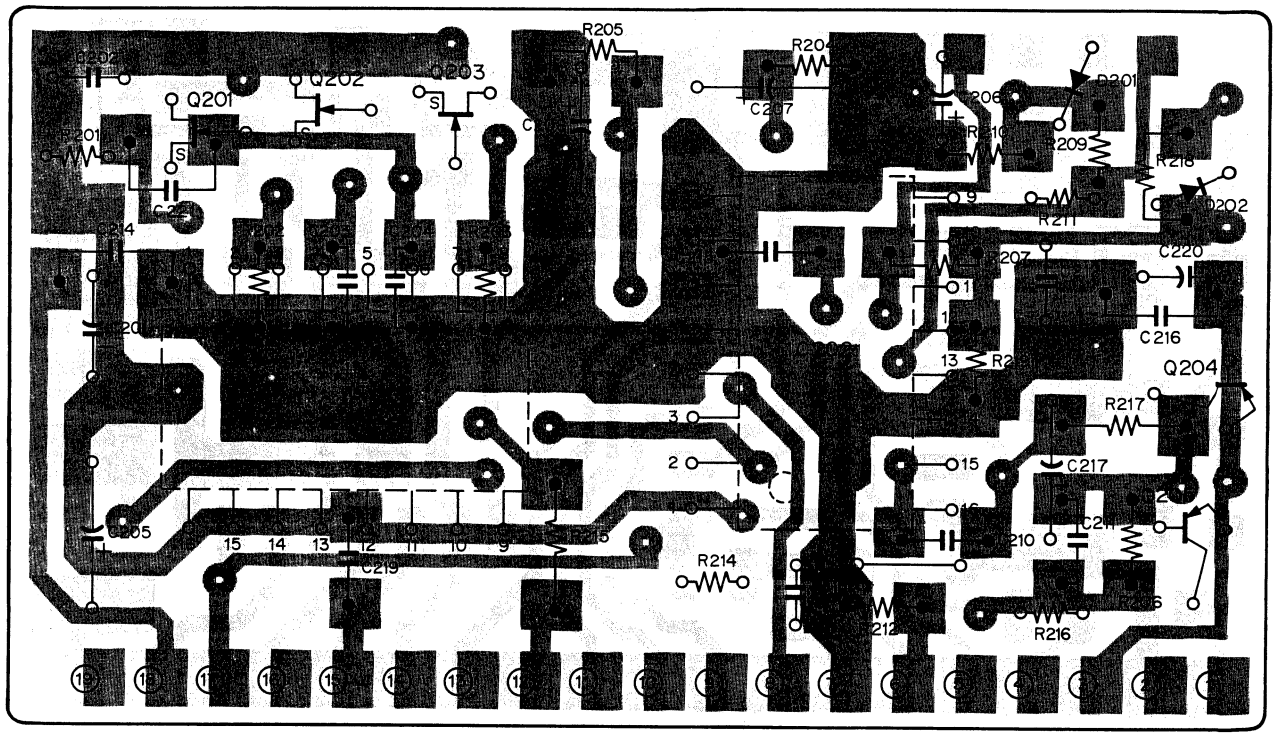
XC-37/47
1-611-360-11

SG-87 BOARD
-DIP SIDE-



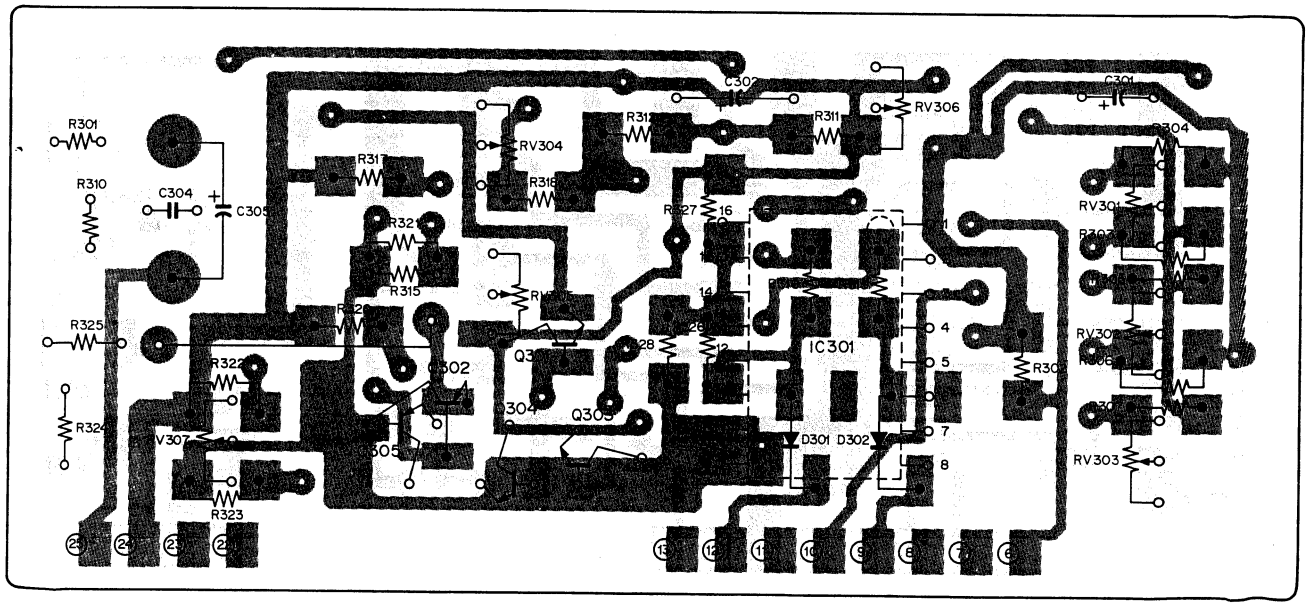
XC-37/47
1-611-358-11

VA-19 BOARD
-DIP SIDE-



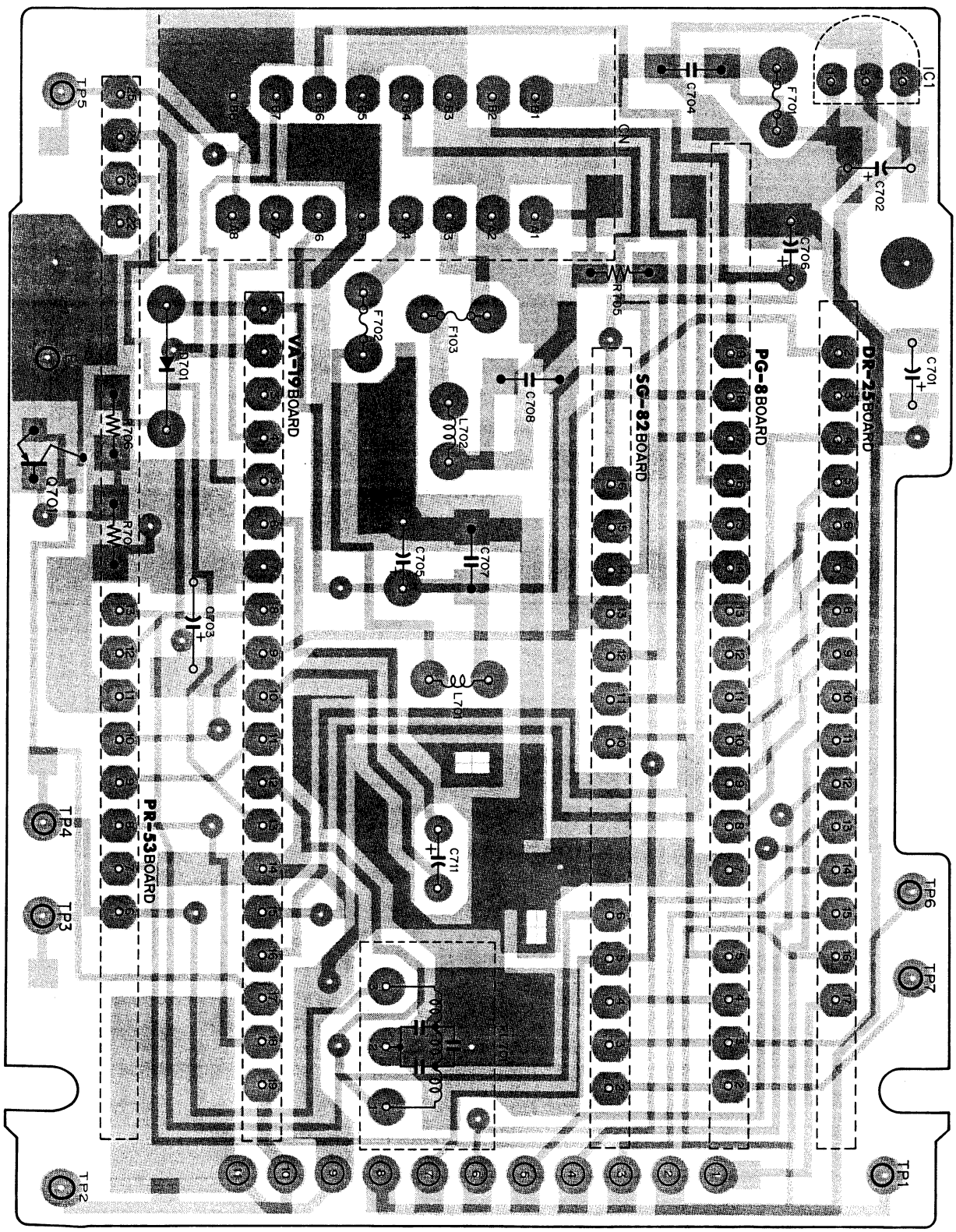
XC-37/47
1-611-359-11

PR-53 BOARD
-DIP SIDE-



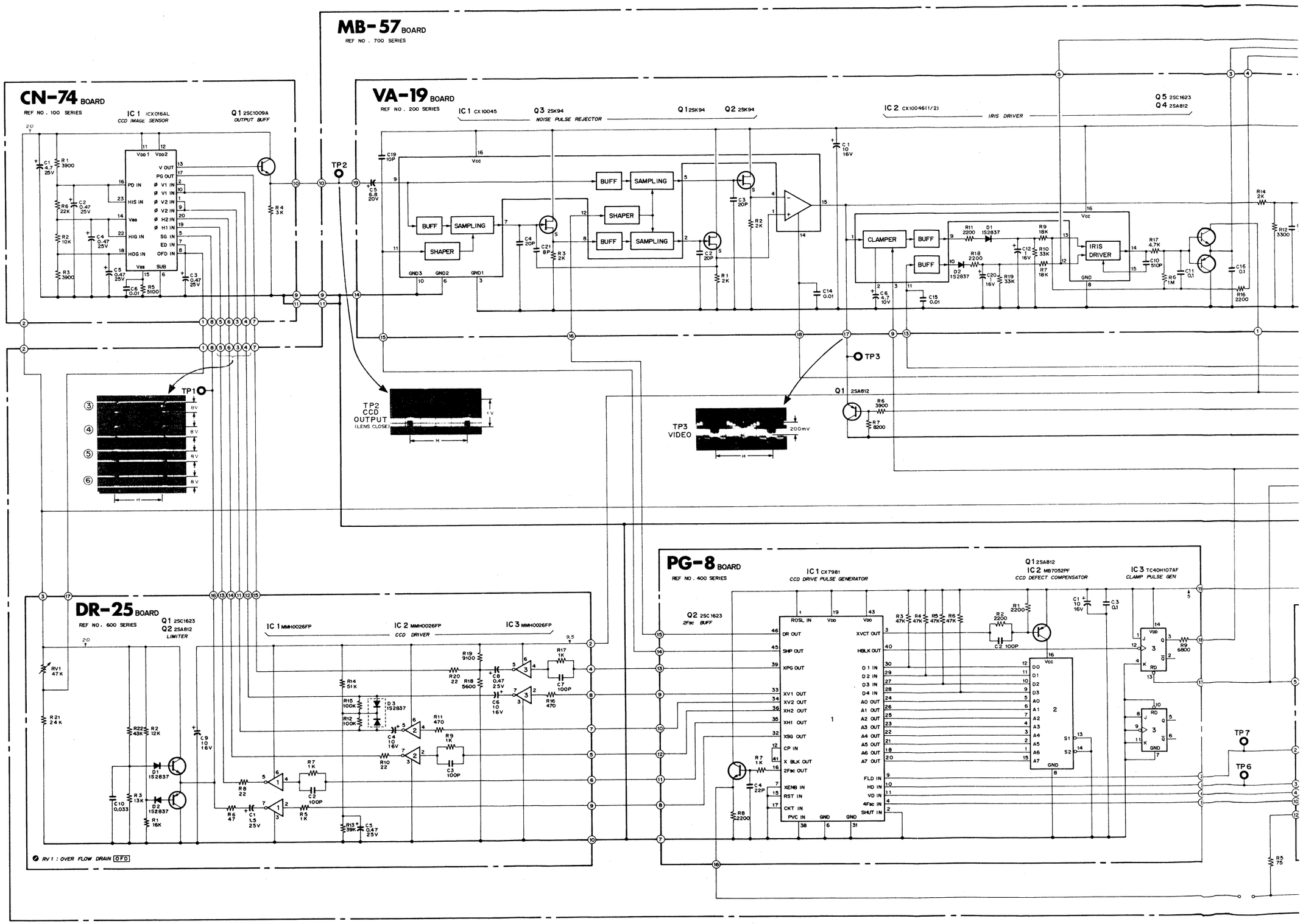
IC—37/47
1-611-357-11

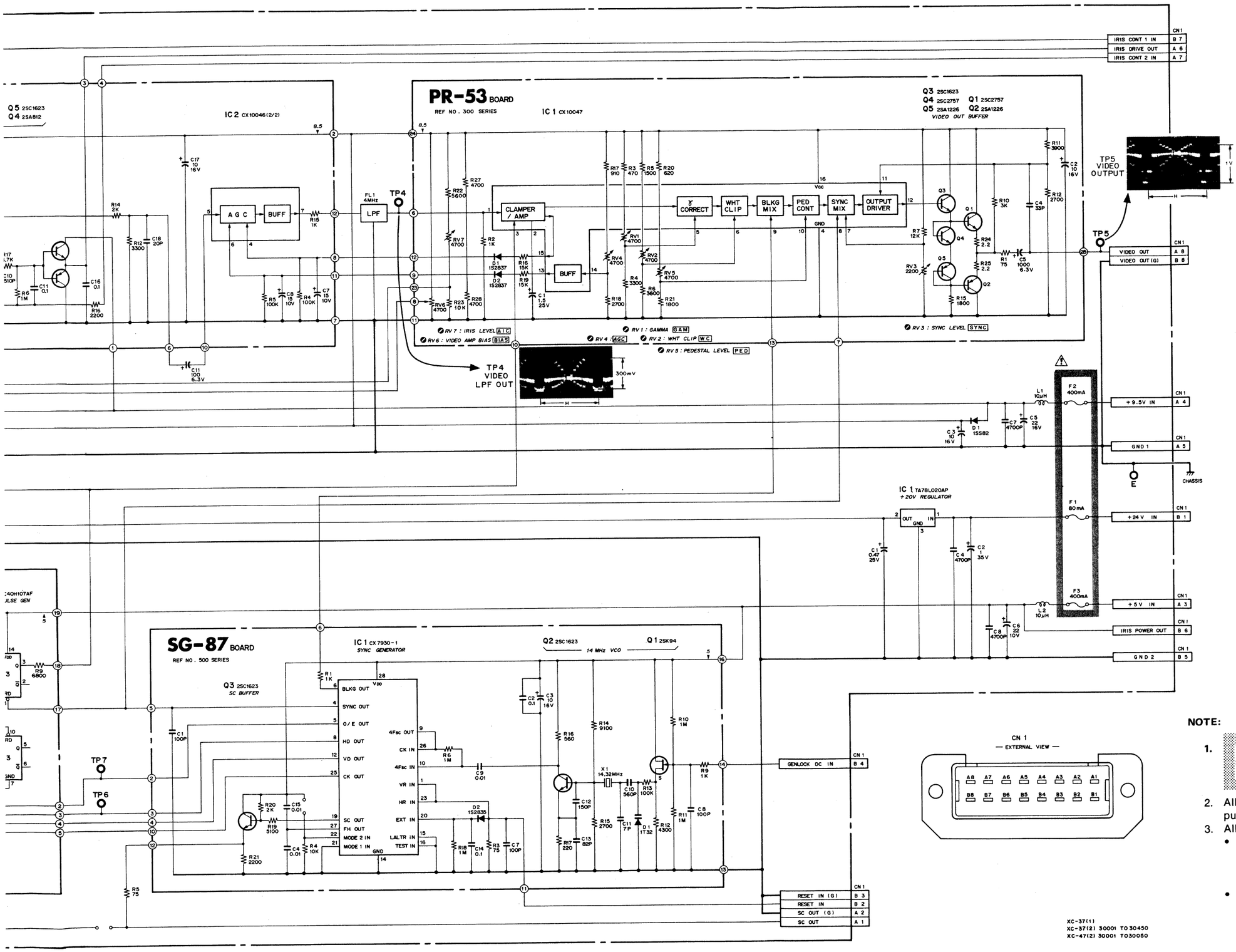
MB-57 BOARD
–DIP SIDE–



XC-37/47
1-611-360-11

Schematic Diagram





NOTE:

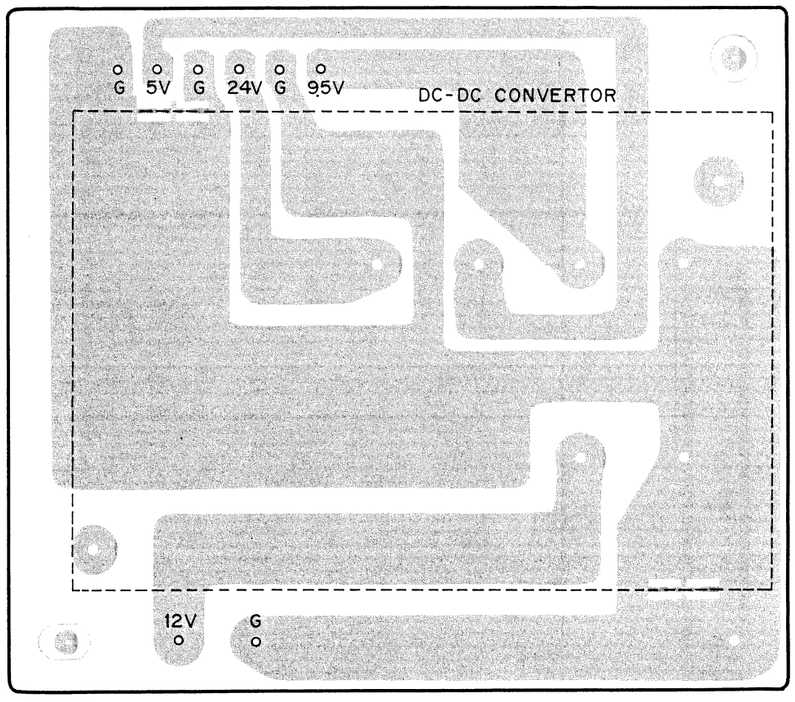
1. **The shaded and ⚠-marked components are critical to safety.**
   Replace only with same components as specified.
2. All voltages are dc, measured with a digital voltmeter (input resistance 10MΩ).
3. All waveforms are taken in conditions below.
   - Shoot the grayscale chart which has the luminance of 706 nt on the white portion. Then adjust lens iris so that the reading of white level at TP3 on the IB-57 board becomes 200 mVp-p.
   - Align the chart frame with the monitor screen frame.

XC-37(1)
XC-37(2) 30001 TO 30450
XC-47(2) 30001 TO 30050

POWER UNIT (DC-37)

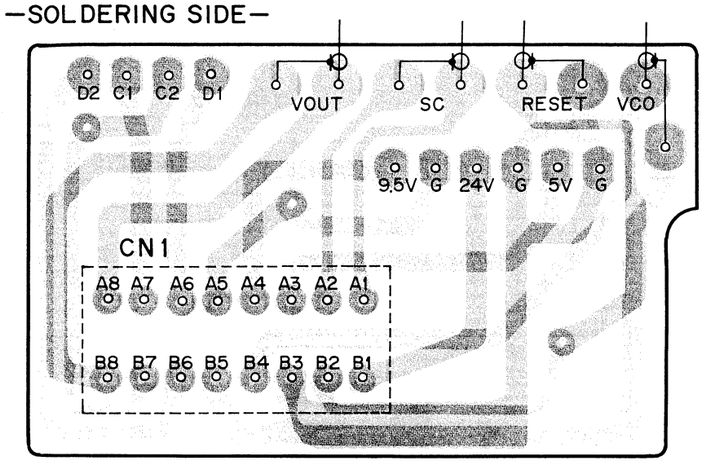
Mounting Diagram

MB-58 BOARD
— SOLDERING SIDE —



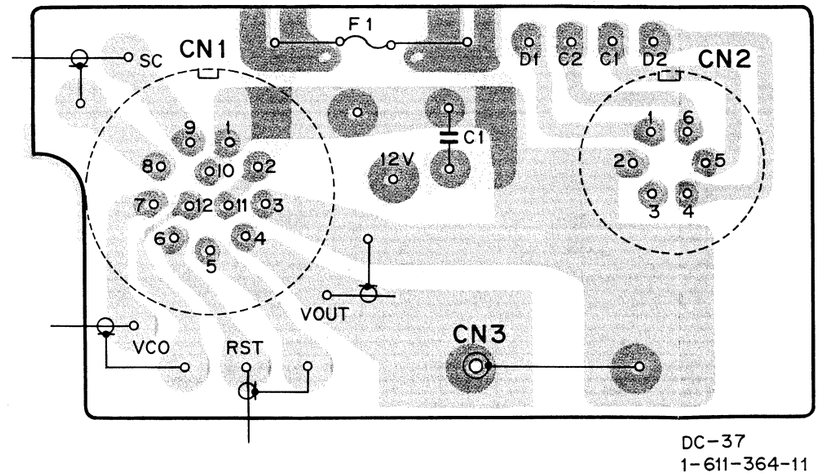
DC—37
1—611—365—11

CN-75 BOARD
— SOLDERING SIDE —



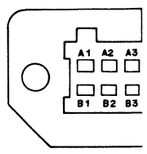
DC—37
1—611—363—11

CN-76 BOARD
— SOLDERING SIDE —



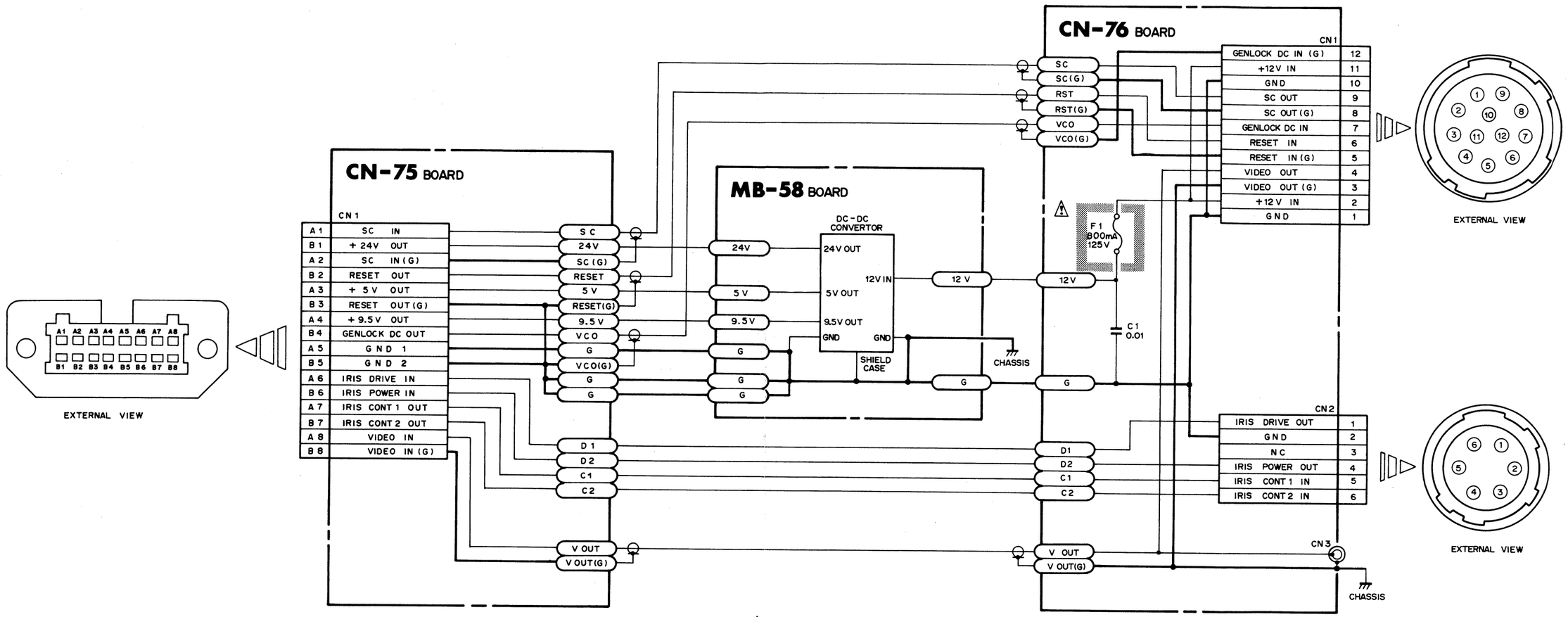
DC—37
1—611—364—11

Schematic Dia



EXTERN

Schematic Diagram



DC-37(1)
DC-37(2) 30001 TO 30500

NOTE:

The shaded and ⚠-marked components are critical to safety.
Replace only with same components as specified.

SECTION 5
SPARE PARTS

PARTS INFORMATION

1. **Safety Related Component Warning**

   Components identified by shading marked with ⚠ on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose parts numbers appear as shown in this manual or in service bulletins and service manual supplements published by Sony.

2. Replacement Parts supplied from Sony Parts Center will somtimes have different shape and outside view from the parts which actually in use. This is due to **"accommodating the improved parts and/or engineering changes"** or **"standardization of genuine parts."**
   - This manual's exploded views and electrical spare parts lists are indicating the parts numbers of "the standardized genuine parts at present".
   - Regarding engineering parts changes in our engineering department, refer Sony service bulletins and service manual supplements.

3. **Printed Components in Bold-Face type** on the exploded views and electrical spare parts list are normally stocked for replacement purposes. The remaining parts are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

4. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

5. Semiconductors, capactors and resistors are not included in the parts list. Replacement of the entire mounted circuit board is required when repairing the camera module.

パーツインフォメーション

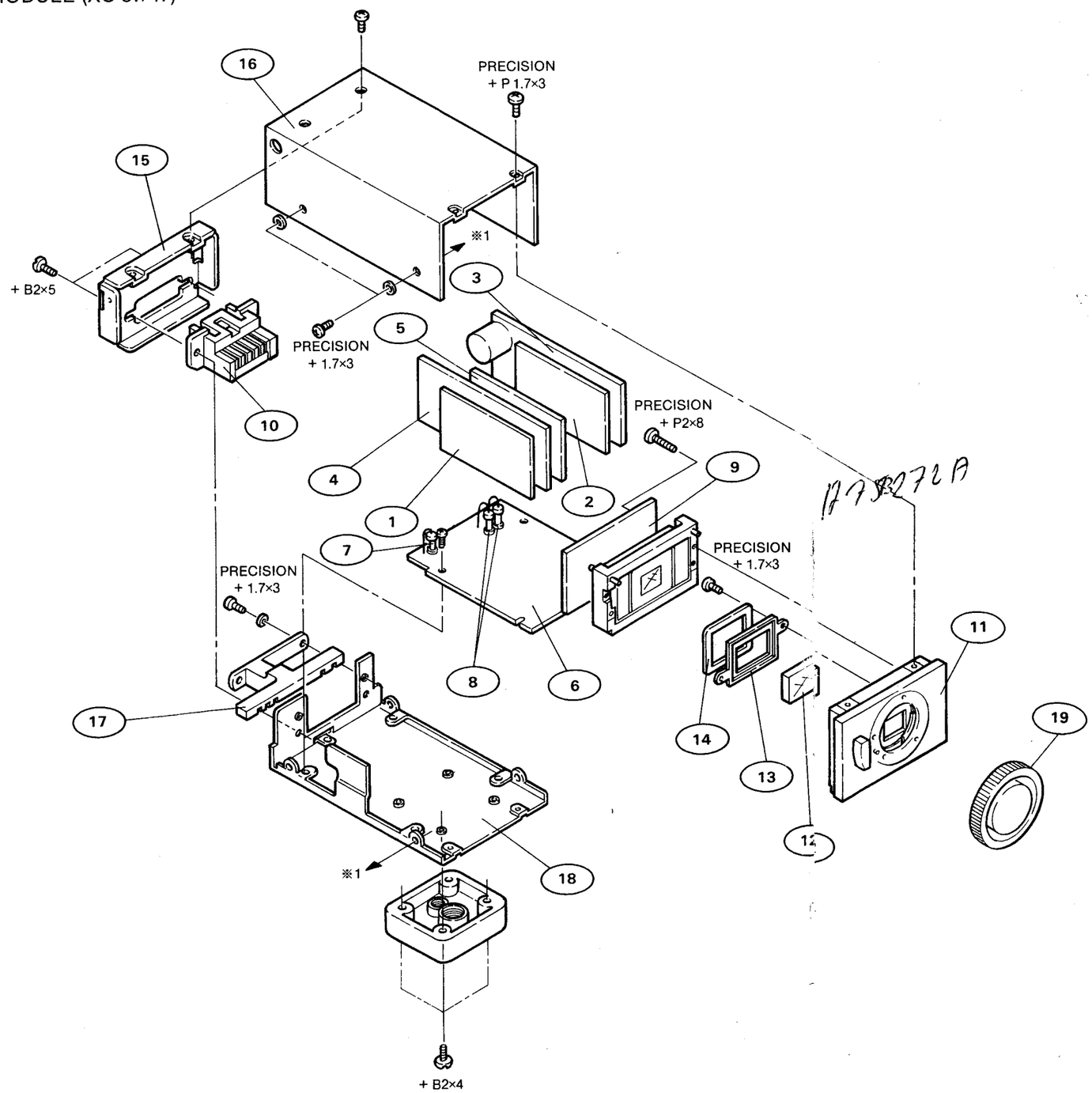
注意1. リスト中，**太い文字で示されている部品**は，常時在庫します。細文字の部品は交換頻度が低い部品ですので，一般には在庫しません。その為，納期が長くなることがあります。

注意2. リスト，分解図中で ⚠ 及び ▒▒ で囲まれた部品は安全性を維持するために重要な部品です。従って交換する時は，必ず指定の部品を使って下さい。

注意3. この価格表に示されている部品は工場から出荷された製品に実装されている部品とは異なることがあります。「部品共通化」又は「工場での設計変更」等によるものです。工場での設計変更については別途発行のテクニカルニュースを参照して下さい。

注意4. カメラモジュールの修理は基板交換となっております。従って半導体及びCR類はリストに載せておりません。

CAMERA MODULE (XC-37/47)



No.	Parts No.	Description
1		
2	A-7513-019-A	**MOUNTED CIRCUIT BOATD "DR-25"**
	A-7513-020-A	**MOUNTED CIRCUIT BOARD "VA-19"**
3	A-7513-021-A	**MOUNTED CIRCUIT BOARD "PR-53"**
4	A-7513-022-A	**MOUNTED CIRCUIT BOARD "PG-8"**
5	A-7513-023-A	**MOUNTED CIRCUIT BOARD "SG-87"**
⚠ 6	A-7513-024-A	**MOUNTED CIRCUIT BOARD "MB-57"**
⚠ 7	1-532-714-00	**FUSE, GLASS TUBE 80mA 125V (F701)**
⚠ 8	1-532-715-00	**FUSE, GLASS TUBE 400mA 125V (F702, F703)**
9	A-7520-167-A	**MOUNTED CIRCUIT BOARD "CN-74"**
10	1-564-361-00	**RECEPTACLE, 16P MALE (CN1)**
11	A-7608-014-A	MOUNT CHASSIS ASSY
12	1-235-291-00	FILTER, LOW-PASS
13	3-683-203-00	RETAINER, FITER
14	3-683-204-00	SEAL, SQUARE
15	3-683-205-00	COVER(R), CAMERA
16	3-683-208-01	COVER(T), CAMERA
17	3-683-214-00	GUIDE, PC BOARD
18	3-683-215-00	CHASSIS, CAMERA
19	3-683-216-00	**CAP, BAYONET MOUNT**

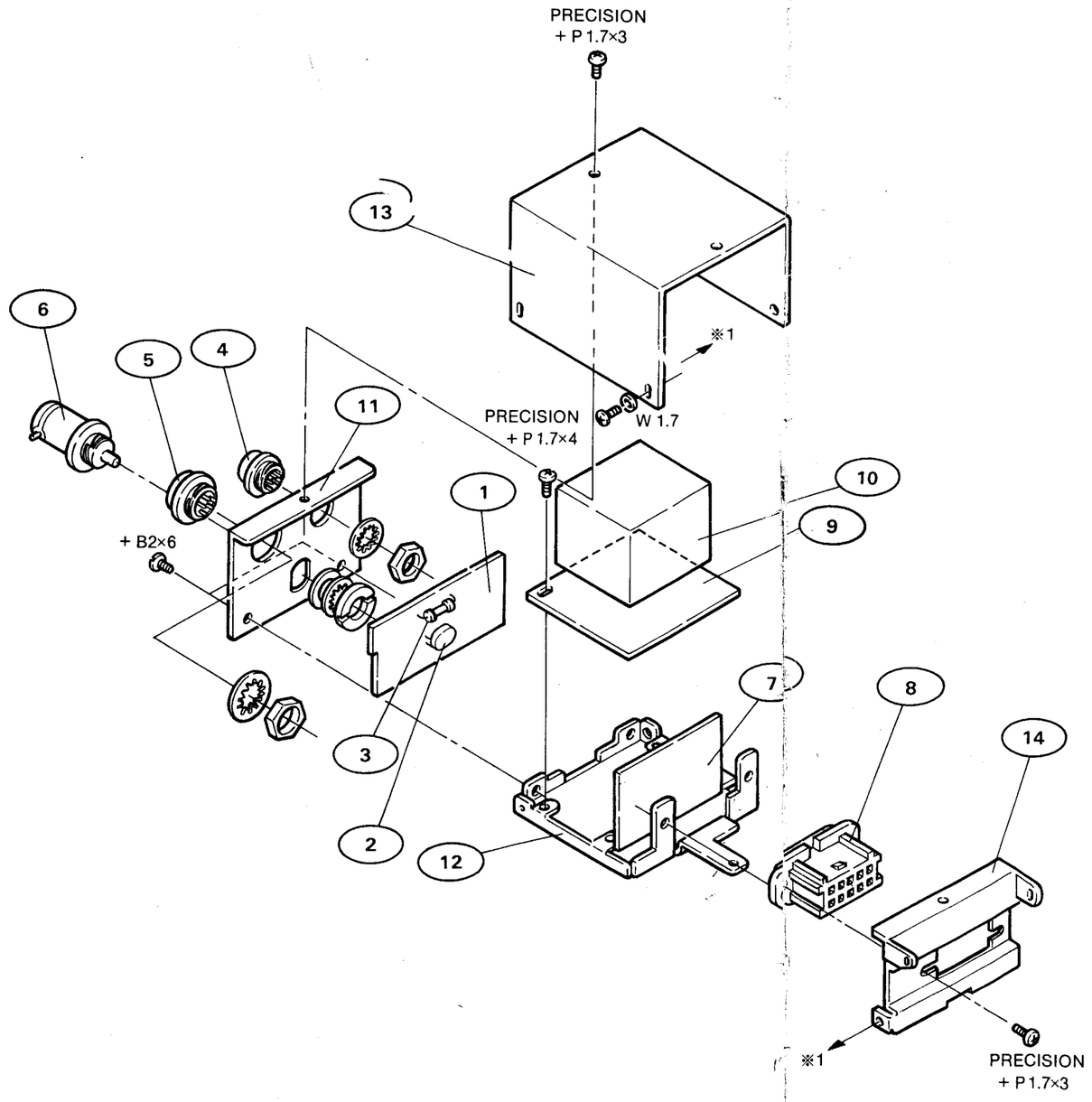
PACKING MATERIAL

3-683-221-01	CARTON, INDIVIDUAL (FOR XC-47)
3-683-223-01	CUSHION, UPPER
3-683-224-01	CUSHION, LOWER
3-683-225-01	CARTON, INDIVIDUAL (FOR XC-37)
3-701-619-00	BAG, POLYETHYLENE (FOR XC-37, XC-47)

NOTE:

1. **The shaded and ⚠ -marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in Bold-Face type are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

POWER UNIT (DC-37)



No.	Parts No.	Description
1	1-611-363-00	PRINTED CIRCUIT BOARD "CN-75"
2	**1-161-013-00**	**CAP, CERAMIC 0.01μF 10% 25V (CN1)**
⚠ 3	**1-532-721-00**	**FUSE, GLASS TUBE 800mA 125V (F1)**
4	**1-562-222-00**	**RECEPTACLE, 6P FEMALE (CN2) "LENS"**
5	**1-562-381-00**	**RECEPTACLE, 12P MALE (CN1) "DC IN/EXT SYNC"**
6	**1-562-382-00**	**CONNECTER, BNC (CN3) "VIDEO OUT"**
7	1-611-364-00	PRINTED CIRCUIT BOARD "CN-76"
8	**1-562-380-00**	**RECEPTACLE, 16P FEMALE (CN1)**
9	1-611-365-00	PRINTED CIRCUIT BOARD "MB-58"
10	**1-464-302-00**	**DC-DC CONVERTER**
11	2-385-001-00	COVER, PU (R)
12	2-385-002-00	CHASSIS, PU
13	2-385-003-00	COVER, PU (T)
14	2-385-004-00	COVER, PU (F)

PACKING MATERIAL

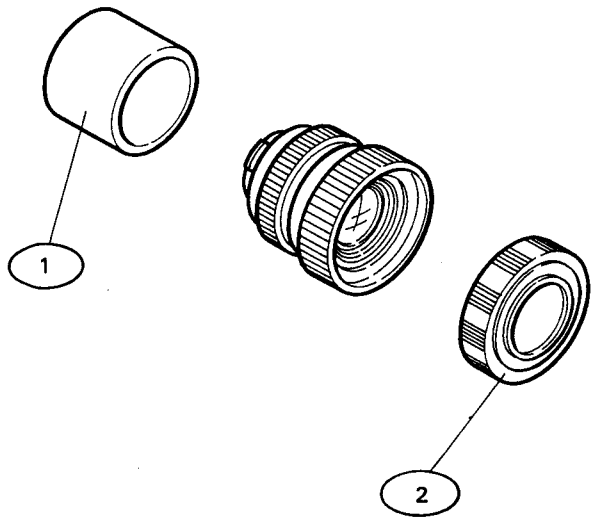
X-2385-003-1	CUSHION, UPPER & LOWER
2-385-011-01	CARTON, INDIVIDUAL
3-701-617-00	BAG, POLYETHYLENE (FOR DC-37)

NOTE:

1. **The shaded and ⚠ -marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in Bold-Face type are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
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LENS

Standard Lens (VCL-16SBY)

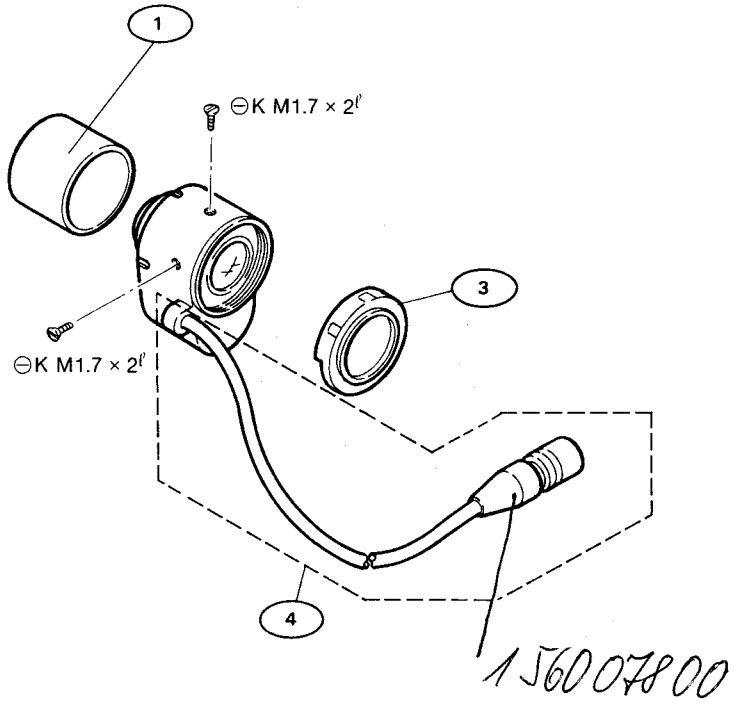


No.	Parts No.	Description
1	3-706-925-01	CAP, REAR
2	3-706-924-01	CAP, FRONT (FOR VCL-16SBY)
3	3-706-927-01	CAP, FRONT (FOR VCL-08SBY)
4	1-557-256-11	LENS CABLE WITH 6P PLUG

ACCESSARY

	2-288-928-01	CASE, FILTER

Auto Iris Lens (VCL-08SBY)



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