Model TG19C SERIES

MULTI TEST SIGNAL GENERATOR

OPERATING INSTRUCTIONS

ShibaSoku Co., Ltd.

Introduction

Thank you for your purchase of ShibaSoku product.

This manual contains detailed instructions on the operation and maintenance of this product. To enjoy the full performance and advantage of this product, you must carefully read and follow the instructions in this manual. Please keep this manual in a handy place near the product.

When relocating the product, also relocate this manual so that it is always available aside the product.

Warranty

Every ShibaSoku product is assured for a year (six months for CRT) from the date of purchase. Malfunction of the product that results from the product liability during this warranty period will be repaired in free of charge, excluding those caused by erroneous operation, wear parts or other inevitable reasons such as natural disasters.

In the case of malfunction conforming to the above qualification, please contact the nearest ShibaSoku sales representative along with product type, model name, and status of malfunction, serial number and other information.

The Foreign Exchange and Foreign Trade Control Act

Some ShibaSoku products may conform to the "Foreign Exchange and Foreign Trade Control Act" of Japanese government. If exporting a ShibaSoku product, please contact the nearest ShibaSoku sales representative and inquire of the details on the regulations. Addresses of ShibaSoku's sales representatives are shown on the list available at the end of this manual.

Cautions when unpacking

Before this unit leaves the manufacturing plant, it is subjected to thorough mechanical and electrical inspections. Normal operation is guaranteed. Upon delivery, unpack the unit and check for damage about following checkpoints.

1. Is the model name correct?
2. Are the types of standard accessories and quantity correct?
3. Are the product and standard accessories not damaged during transportation?

If the unit has sustained damage or is not working properly, please contact your nearest distributor of ShibaSoku Co., Ltd. Addresses of ShibaSoku's sales representatives are shown on the list available at the end of this manual.

Calibration

Performance of this product is subject to change depending on aging; therefore, periodic calibration is necessary to maintain its original performance. When calibration is requested, please contact your ShibaSoku sales representative.

Packaging for transportation

When returning or transporting the ShibaSoku product to another location, use the original packing material. ShibaSoku Co., Ltd. recommends you to keep original packing material for this purpose. If it has been lost or not usable due to damage, pack it in the following manner.

1. If the inner packing material is lost, wrap the unit in strong paper, vinyl or air cap. Place cushions on the protruding parts.
2. Use a wooden or cardboard box, making sure that the size is large enough to accommodate the unit with a 10 cm clearance on each side.
3. Fully fill the clearance between the unit and box with shock-absorbing materials such as polyurethane foam.

When transporting the unit (like PC board) from which electrical parts or connectors are exposed, use the packing material that can protect them from static electricity.

If you have any question on packing for transportation, please contact your nearest ShibaSoku sales representative.

Operating Instructions manual

If this Operating Instructions manual has missing pages or is incorrectly collated, it will be replaced with the new one in free of charge. If it is lost, stained or damaged, the new one will be supplied at actual cost. In either case, please contact your nearest ShibaSoku sales representative.

Contents shown in this Operating Instructions manual have been examined carefully, however, if you have any question or found missing of description, please contact your nearest ShibaSoku sales representative.

A part of the content described in this Operating Instructions manual is subject to change depending on the improvement/changes of product performance without notice.

Cautions for Safety Operations

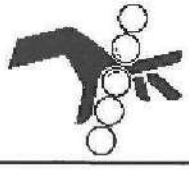
Various cautions and safety precautions are shown on the product and in the Operating Instructions manual, enabling the operator to use the product safely and correctly, and to prevent people and properties from damages. Meanings of these cautions and precautions are as follows.

Please read them before using the unit, and adhere to the cautions and precautions.

<Basic caution icons and meaning>

Display (and icon)	Meaning
⚠ DANGER	This mark indicates that wrong operations by ignoring this warning may cause serious injury or even death.
⚠ WARNING	This mark indicates that wrong operations by ignoring this warning may cause serious injury or even death.
⚠ CAUTION	Ignoring this caution could cause injury or damage to property.
	Do NOT carry out the operation represented by this symbol.
	This symbol means you MUST perform this operation.

<Concrete caution icons and meaning>

Icon	Meaning
	This icon means "Dangerous voltage". Combination of "Danger", "Warning" and "Caution" icons conveys the content of caution in accordance with the degree of danger.
	This icon means "heavy object". Combination of "Danger", "Warning" and "Caution" icons conveys the content of caution in accordance with the degree of danger.
	This icon means "Caught in the rotating parts". Combination of "Danger", "Warning" and "Caution" icons conveys the content of caution in accordance with the degree of danger.
	This icon means "Caught between the components". Combination of "Danger", "Warning" and "Caution" icons conveys the content of caution in accordance with the degree of danger.

⚠ DANGER — Obey these cautions!

Do not look into the optical circuit nor directly see the laser beam.

Laser beam generated in this product is as dangerous as conforming to the Safety Standard Classes 4 and 3B. Therefore, you must be obedient to cautions shown below.

1. If the semiconductor laser beam is directly input to eyes, it may cause loss of sight or other danger. To prevent this, do NOT look at the laser beam nor see it through the optical circuit.
2. If controls and adjustments besides those described in this Operating Instructions manual are made, they may cause you to suffer from laser emission. To prevent this, do NOT try those controls and adjustments.
3. Do NOT give a modification that makes its safety device not to function.

If abnormality occurs, immediately turn OFF the power switch, disconnect the power plug from the AC line outlet, then, contact your ShibaSoku Sales representative.

If the operator may be exposed to the reflected laser beam, he or she must put on the safety glasses.

If there is a chance to get a reflection of laser beam, put on the safety glasses to prevent the eyes from direct exposure to the reflected laser beam.

⚠ WARNING — Obey these warnings!

Grounding must be completed before using this product.

To increase operating safety, this product must be grounded before use. Unless grounding has been completed, it may cause fire, electric shocks, or malfunction of the product. Erroneous operation may be caused by external noise, or the noise generated in this product may become larger. Three grounding methods are available. Use one of them and secure grounding between the equipment and the ground.

1. Connect the grounding terminal (⏚) provided on the front or rear panel to the ground.
2. Directly insert the 3-wire power cable (which is standard on most of ShibaSoku products) into the AC line outlet having the grounding circuit.
3. Plug the power cable via the 3-wire/2-wire conversion connector (which is standard on most of ShibaSoku products) into the AC line outlet, and connect the grounding terminal of the conversion connector to the ground.

Use the rated AC power voltage.

Unless otherwise requested, AC power voltage has been set to AC 100 V when the product is shipped from the plant. Use this product with the preset AC line voltage. If it is used with the other AC line voltage, it may cause fire, electric shock or malfunction of the equipment.

Do not open the cabinet or external covers with a tool.

Unless described in the Operating Instructions manual, never open the cabinet or external covers. Since the high-voltage unit is contained in the equipment, doing so may cause an electric shock.

Do not modify or disassemble the product.

Unless described in the Operating Instructions manual, never open the hatches or external covers. Unauthorized modification or disassembly in the wrong way may cause such hazard as fire, electric shock and malfunction.

Do not insert a foreign material into the product.

Do not insert a metallic object or inflammable object into the product through the ventilation slits and other openings. Doing so may cause such hazard as fire, electric shock and malfunction. Should a foreign object be input into the product, immediately turn OFF the power switch, disconnect the power plug from the AC line outlet, and then contact your ShibaSoku sales representative. Do NOT continue to use the product with the foreign material being caught in it.

⚠ WARNING — Obey these warnings!

Do not place a vessel with liquid on the product.

Do not place a flower vase, flowerpot, cup or other vessels with chemical material or water. If the liquid in it is spilt over the product, it may cause such hazard as fire, electric shock or malfunction. Should liquid or water invades in the equipment, immediately turn OFF the power switch, disconnect the power plug from the AC line outlet, then contact your ShibaSoku sales representative. Do NOT continue to use the product in which water leaked.

Do not install the product on the location where it is exposed to water.

Do not get the product wet with water. If it is wet with water, it may cause such hazard as fire, electric shock or malfunction. Should the product gets wet with water, immediately turn OFF the power switch, disconnect the power plug from the AC line outlet, then contact your ShibaSoku sales representative. Do NOT continue to use the product wet with water.

Do not touch the antenna wire when it begins to thunder.

If it begins to thunder, do NOT touch the antenna wire or power plug. It may cause electric shock.

Do not give a shock to the product.

If a shock is applied, components inside the product are removed from their original place or get damaged, causing such hazard as fire, electric shock or malfunction.

If the product is dropped or rolled over, or its cabinet is damaged, immediately turn OFF the power switch, disconnect the power plug from the AC line outlet, then contact your ShibaSoku sales representative.

Remove dust adhered to the power plug.

Clean the dust around the power plug periodically. If the plug is covered with dust, it may deteriorate insulation due to moisture and cause a fire.

⚠ WARNING — Obey these warnings!

Do not give damage on the power cable or plug.

Do not give damage, modify, expose to the heat-generating equipment, forcibly bend, twist, extend, place under the heavy object or bundle the power cable or plug. If they are used under the status being damaged by these reasons, it may cause fire or electric shock.

Do not touch the power plug with wet hands.

Do not touch, connect or disconnect the power plug with wet hands. Doing so may cause electric shock.

Securely insert the power plug into the AC line outlet all the way.

Fully insert the power plug into the AC line outlet. If insertion is insufficient, it may cause electric shock or fire resulting from heat generation.

Keep the allowable voltage limit of the AC line outlet.

Do not connect multiple devices, whose total voltage consumption exceeds the maximum capacity, to a single AC line outlet or a power distributor. Doing so may cause fire resulting from heat generation.

If abnormality is found, immediately turn OFF the power switch and disconnect the AC plug from the AC line outlet.

If the equipment is continuously used regardless of such abnormality that it is damaged, a foreign material is caught inside, unusual sound is generated, unusual smell is generated, a smoke is generated, temperature rises unusually, or signals are not output, it may causes fire, electric shock or malfunction. If these abnormalities occur, immediately turn OFF the power switch, disconnect the power plug from the AC line outlet, and contact your ShibaSoku sales representative.

⚠ CAUTION — Obey these cautions!

Do not block the ventilation slits. Do not place an object near the ventilation slits.

Do not interrupt smooth ventilation by covering the ventilating slits with a newspaper, tablecloth, curtain or other object. This spoils smooth ventilation and builds up the heat inside the equipment, causing fire.

Install the equipment 10 cm or more apart from the wall.

Do not place the equipment close to the wall. If it is located near the wall, smooth ventilation is interrupted, resulting in heat buildup to cause fire.

Do not install the equipment on the unstable location.

Do not install the equipment on such unstable location as on the shaking rack or inclined cabinet. If the balance of the equipment is lost, it may drops on the floor, causing malfunction or injury.

Do not install the equipment on the location with much moisture or dust.

Do not place the equipment on the location where a lot of moisture or dust is filled. Doing so may cause fire or electric shock.

Do not install the equipment on the location where harmful gas is filled.

Do not install the equipment on the location where a gas harmful to the equipment is filled. It may cause fire.

Do not install the equipment on the location where continuous vibration is generated.

Unless otherwise designated in the Operating Instructions manual, do not install the equipment on the location where continuous vibration is generated. The equipment may lose the balance and roll over or drop, causing malfunction or injury.

Do not install the equipment on the location where strong magnetic field or electric field is generated.

Do not install the equipment on the location nearby which a strong magnetic or electric field exits. The equipment may cause fire, electric shock or malfunction due to erroneous operations.

⚠ CAUTION — Obey these cautions!

Do not install the equipment on the location where it is exposed to soot, smoke or steam.

Do not install the equipment on the location where it is exposed to soot, smoke or steam. Doing so may cause fire, electric shock or malfunction.

When installing the equipment on the rack with casters, securely fix the caster locks.

When installing the equipment on the rack with casters, securely fix the caster locks. Otherwise, the rack moves or rolls over, causing an injury.

Do not leave the equipment in a car on a hot sunny day.

Do not leave the equipment in a car on a hot sunny day for long hours. High temperature may cause cabinet deformation, malfunction or deterioration of internal components. If the equipment is continuously used under such condition, it may cause fire, electric shock or malfunction due to short-circuiting or deteriorated insulation.

Do not bring an uncovered fire source near the equipment.

Do not bring an uncovered fire source such as a candle close to the equipment nor place it on the equipment. It may fall down or drops on the equipment, causing injury or fire.

Do not splash water onto the equipment.

Be attentive so that water is not sprayed or spilt over the equipment. Doing so may cause fire, electric shock or malfunction.

Do not place a heavy object on the equipment.

Do not place a heavy object on the equipment. By losing the balance, it may fall down, drop or collapsed, causing injury.

Do not move the equipment while the power cable and/or connection cables are being connected.

Do not move the equipment without disconnecting the power cable and connection cables. Doing so may give damage on the power cable, connection cables or connectors, causing fire, electric shock or malfunction.

⚠ CAUTION — Obey these cautions!

Pull out/insert the plug from/to the AC line outlet by securely gripping the plug.

Pull out/insert the AC power plug from/to the AC line outlet by gripping the plug. Do not pull the power cable to avoid damaging the cable and causing fire or electric shock.

Outdoor use of the equipment is inhibited.

Unless otherwise designated in the Operating Instructions manual, do not use the equipment in the outdoors. The equipment may be exposed to dust, wind or rain, causing fire, electric shock or malfunction.

Do not step onto the equipment or rack.

Do not step onto the equipment or rack. Doing so may fall down the equipment or rack, damaging the equipment or causing injury.

If the equipment weight exceeds 18 kg, carry it by two or more persons.

When moving the equipment weighing 18 kg or heavier, carry it by two or more persons. Otherwise, the equipment may be dropped or fallen down, causing injury. Equipment mass is described in the Operating Instructions manual.

Unplug the AC power plug when the equipment is not used for a long period.

When not using the equipment for a long period, disconnect the AC power plug from the AC line outlet for safety consideration. If not disconnected, it may cause fire or electric shock.

Use the assigned power cable and connection cables.

Use the power cable and connection cables, which are provided as standard equipment or described in the Operating Instructions manual. If other cables are used, they may cause electric shock or malfunction. If you want to use cables not authorized, please contact your ShibaSoku sales representative.

Turn OFF the power switch when connecting cables.

When connecting the power cable or connection cables, turn OFF the power switch. If they are connected without turning OFF the power switch, it may cause electric shock or malfunction.

⚠ CAUTION — Obey these cautions!

Do not use thinner or benzene to clean the cabinet.

When cleaning the cabinet, do not use such chemical agents as thinner and benzene. Using them may damage the cabinet surface or erase the caution icons, inducing erroneous operation or malfunction.

Use detergent for cleaning the cabinet.

To clean the cabinet, use a damp, soft cloth soaked in the detergent, which is diluted to 5-6 times with water. Squeeze it tightly and wipe the dust softly. Then, wipe the cabinet with a dry cloth to eliminate unevenness.

For cleaning the inside of the equipment

If the equipment has been used for a long period without cleaning its inside, the dust accumulated in it may cause fire, electric shock or malfunction. To prevent this, periodic internal cleaning is recommended. For periodic internal cleaning, please contact your ShibaSoku sales representative. We undertake cleaning in charge.

When replacing the fuse, use the one of the same type and specifications.

In case of the equipment on which rear panel a fuse panel is located, you can replace the fuse by yourself. To replace it, use the same type of fuse having the same rating. Be sure that the power switch is turned OFF and the power plug is disconnected from the AC line outlet before starting fuse replacement. If the new fuse also blows immediately, it may be caused by a trouble of the equipment. In this case, stop to use the equipment and contact your ShibaSoku sales representative.

Please let us know when you dispose the WL-XX series and S-XX series equipment.

Most of ShibaSoku's WL-XX series and S-XX series products contain mercury relays. To prevent the environmental contamination by mercury, ShibaSoku Co., Ltd. collects them and disposes them correctly. So, if you wish to dispose this product, please inform your ShibaSoku sales representative.

⚠ CAUTION — Obey these cautions!

About backup power supply (battery)

1. There are two types of ShibaSoku products-those equipped with the backup function and those without it. For the former products, rechargeable type battery or non-rechargeable battery is used for the backup function.

2. If your product is equipped with the rechargeable battery, complete full battery charging for about 10 hours before starting to use it. Original functions and performance may not be obtained with the battery that is not fully charged.

3. Availability of backup battery, type of backup battery (rechargeable or non-rechargeable), and assured memory-retaining time with the fully charged backup battery is described in the Operating Instructions manual. If these are not described in the manual, please ask your ShibaSoku sales representative.

Since both the rechargeable and non-rechargeable batteries are consuming parts, they will be replaced in charge when their performance deterioration is recognized. For further information, please contact your ShibaSoku sales representative.

Safety cautions on batteries

Obey these safety cautions!

<<In this section, safety cautions for the equipment employing batteries are explained.>>

If abnormality occurs;

- If a smoke is generated from the battery…
  ① Turn OFF the power switch immediately, and disconnect the power plug from the AC line outlet.
  ② Then, contact your ShibaSoku sales representative.

- If battery fluid enters the eyes…
  ① Wash away the fluid with clean water.
  ② Then, consult with the doctor.

- If battery fluid attaches on the skin or clothes…
  ① Wash away the fluid with clean water.
  ② Then, consult with the doctor.

- If battery fluid leaks in the battery holder…
  ① Immediately turn OFF the power switch, and disconnect the power plug from the AC line outlet.
  ② Then, contact your ShibaSoku sales representative.

DANGER	If following cautions are not obeyed, battery may cause explode, get fire, generate heat or cause fluid leakage, causing an accident resulting in injury or death.

- Do not through the battery into fire, do not heat it up, or do not solder it.
- Do not modify, disassemble or recharge the battery.
- Do not leave or use the battery on the location exposed to direct sunlight, in a car on the hot summer day, near the stove or other high-temperature location.
- Do not short-circuit the contact points, plus and minus poles, or do not carry or store it together with metallic objects.

WARNING	If following cautions are not obeyed, battery may cause explode, get fire, generate heat or cause fluid leakage, causing an accident resulting in injury or death.

- If abnormal smell, heat, liquid leakage, change of colors or deformation is found in the battery, which is in use or stored, immediately stop to use the equipment.
- Install the battery with the + and - poles correctly positioned.
- When replacing the battery, use the same brand and type.
- When disposing the battery, adhere to the influence on the environment.

CONFIGURATION

Concerning model names

Model name changes depending on the combination of output signals Alphabet letters following after the series name express the change of specifications as introduced in the table below.
Unless otherwise described specially, this principle is applied to all products.

(1). Main units

Output signal \ Model name	TG19CA	TG19CB	TG19CC
Video signal	O	O	O
RF signal	O	O	O
Sound signal (MONO)	O	O	O
Sound MPX signal (STEREO)	×	O	O
Teletext	×	×	O
Closed caption	×	×	O

(2). Options

[***CAUTION***]
Simultaneous use of two or more option patterns is impossible. These patterns are not usable for the PAL-M system.)

- TGI9CA001 Special pattern (composite color pattern or user-designated pattern)
- TGI9CA006 Natural picture (dining table)
- TG19CA007 Natural picture (stationery)
- TGI9CA008 Natural picture (toys)
- TG19CA009 Natural picture (White House)
- TGI9CA010 Natural picture (Omar lobster and fruits)
- TG19CA011 Natural picture (Japanese chestnut)
- TGI9CAG12 Natural picture (New year gift)
- TG19CA013 CZP (NTSC: 4.2 MHz max/PAL: 4.8 MHz max)
- TGI9CA014 V SWEEP (NTSC: 4.2 MHz max/PAL: 4.8 MHz max)

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1 GENERAL DESCRIPTION

The TC19C Series Multi-Test Signal Generators are designed to testing requirements of six television systems – NTSC, PAL, SECAM, PAL-M, PAL-N and NTSC-4. 43 MHz. Video signals generated are composite and GBR signals, or YUV and S-VHS (YC) signals. Also generated is an RF signal of 30 to 900 MHz. As for sound signals, the built-in oscillator can modulate a 400 Hz or 1 kHz sine wave signal.

Equipped with over 20 types of standard video output signals including monoscope pattern, color bar, stair step, multiburst and white signals, the TG19C test signals generators are ideal for inspecting resolution, color reproducibility, frequency response, linearity, SN and others.

Moreover, operating mode selecting features such as burst signal ON/OFF, color/monochrome, interlace /non-interface (262 lines/field or 312 lines/field), aspect ratio (4:3/16:9) and NTSC setup (0% / 7.5%, only for composite output), they are also widely applicable for various testing purposes.

Equipped with an external video input connector and an external audio input (monaural) connector, the TG19C is also usable as a modulator.

The TG19C Series Multi-Test Signal Generators also includes models equipped with the sound MPX and teletext functions, offering the ideal selection of the signal generator that exactly meet any customer requirement.

Sound MPX functions available are China, Germany, Japan, Korea, the United States, U.K., Scandinavia and other nation's sound MPX system. in each sound MPX system, MONO, STEREO or DUAL mode is selectable. The teletext function enables to select one of four coding systems (TOP, FLOF, VBI or Closed Caption). Selection of PDC or VPS is also possible.

The front panel keys allow to memorize 99 ways of setting.

Not only pursuing the versatility of television systems and signal selection but also useful functions and switch arrangement have been considered from the standpoint of operational ease. As the result, the TGI9C Series Multi-Test Signal Generators are widely applicable as the signal source for research & development, production facility and any other location which requires a wide range of test signals.

2 FEATURES

- Two composite analog signals, which conform to six television systems - NTSC, PAL, SECAM, PAL-M. PAL-N and NTSC-4.43 MHz, are generated.
- Either GBR or YUV analog output, which conforms to six television systems -NTSC, PAL, SECAM, PAL-M, PAL-N and NTSC-4.43 MHz, is output.
- Equipped with one S-VHS connector.
- HD and VD output connector, it is each equipped with one system.
- In the NTSC system, setup level of composite output is selectable (0% or 7.5%).
- More than 20 types of test signals including color bar, multiburst, circle and crosshatch signals are generated. (Refer to table 3.1.)
- Monoscope pattern signal is generated.
- Aspect ratio, 4:3 or 16:9, can be switched at video signal output (Refer to table 3.1.)
- Interlace or non-interlace mode (262 lines/field or 312 lines/field) is selectable.
- Output frequency of RF signal is variable in a range of 30 to 900 MHz.
- SAW filter is employed in the video modulator to obtain residual side-band characteristics.
- One video signal input is equipped. An external signal is modulated and can be output as an RF signal. (However, in case of external input, TELETEXT signal of TG19C cannot be added.)
- One audio signal input is equipped. So, the TG19C can be connected with an external audio signal generator, ShibaSoku's TA35C or AS953B. (2-carrier system. Audio signal generator of the NICAM system is not usable.)
- Video RF signal modulation is variable.
- Deviation and modulation of audio RF signal are variable.
- P/S ratio is variable.
- Video RF and audio RF signals can be turned on or off independently.
- With the memory setting operation, 99 ways of setting including television systems, signals, frequency and other conditions can be memorized.
- Sound MPX functions corresponding to various nations can be equipped. (TG19CB/TG19CC)
- Teletext function can be equipped. (TGI9CC)
- Special patterns (composite color pattern or user-defined pattern, excluding PAL-M) can be equipped as optional feature. In addition, such signals as natural picture, CZP or V SWEEP (excluding for the PAL-M system) can be loaded. However, simultaneous use of two or more of these patterns (TG19CA001, TG19CA006 to 014) is impossible.

3 SPECIFICATIONS

3.1. Television systems

3.1.1. NTSC-M

- No. of scanning lines per frame 525
- Field frequency 59.94 Hz
- Line frequency within 15734 Hz+/-5 Hz
- Color sub carrier frequency within 3579545 Hz+/-100 Hz
- Interlace ratio 2:1

3.1.2. PAL-B, G, D, H, I

- No. of scanning lines per frame 625
- Field frequency 50 Hz
- Line frequency within 15625 Hz+/-5 Hz
- Color sub carrier frequency within 4433619 Hz+/-100 Hz
- Interlace ratio 2:1

[NOTE]
Unless otherwise designated, "PAL-B, G, D, H, I" will be described as simply "PAL" hereafter.

3.1.3. PAL-M

- No. of scanning lines per frame 525
- Field frequency 59.94 Hz
- Line frequency within 15734 Hz+/-5 Hz
- Color sub carrier frequency within 3575611 Hz +/-100 Hz
- Interlace ratio 2:1

3.1.4. PAL-N

- No. of scanning lines per frame 625
- Field frequency 50 Hz
- Line Frequency within 15625 Hz+/-5 Hz
- Color sub carrier frequency within 3 582056 Hz+/-100 Hz
- Interlace ratio 2:1

3.1.5. SECAM-B, G, D, H, K, K1, L

[NOTE]
SECAM discrimination signal for vertical blanking period is not added.

- No. of scanning lines per frame 625
- Field frequency 50 Hz
- Line frequency within 15625 Hz+/-5 Hz
- Color sub carrier frequency fOR = within 4406250 Hz+/-15 kHz
  fOB = within 4250000 Hz+/-15 kHz
- Interlace ratio 2:1

3.1.6. NTSC-4.43 MHz

- No. of scanning lines per frame 525
- Field frequency 59.94 Hz
- Line frequency within 15734 Hz+/-5 Hz
- Color sub carrier frequency within 4433619 Hz+/-100 Hz
- Interlace ratio 2:1

3.2. Video signal output

3.2.1. Composite output

(1). Video signal level (rear panel)	
• NTSC, NTSC-4.43 MHz	within 714.3mVp-p+/-5%
• PAL, PAL-M, PAL-N, SECAM	within 700.0 mVp-p+/-5%
(2). Video signal level (front panel)	0 to 1.0 Vp-p or more
(3). Sync signal level	
• NTSC, NTSC-4.43 MHz	within 285.7 mVp-p+/-5%
• PAL, PAL-M, PAL-N, SECAM	within 300.0 mVp-p+/-5%
(4). Color burst signal level	
• NTSC, NTSC-4.43 MHz	within 285.7 mVp-p+/-5%
• PAL, PAL-M, PAL-N	within 300.0 mVp-p+/-5%
(5). Color bar signal standard	Refer to "4.5.14 COLOR BAR signal"
(6). Connectors	75 Ω unbalanced, BNC type, two connectors

3.2.2. GBR/YUV output

[NOTE]
Selection of GBR/YUB is made by the select switch on the control panel.

(1). Video signal level	
• Y (NTSC, NTSC-4.43 MHz)	within 714.3mVp-p+/-5%
• Y (PAL, PAL-M, PAL-N, SECAM)	within 700.0 mVp-p+/-5%
• UV (NTSC, NTSC-4.43 MHz)	within 714.3 mVp-p+/-5%
• UV (PAL, PAL-M, PAL-N, SECAM)	within 700.0 mVp-p+/-5%
• GBR (NTSC, NTSC-4.43 MHz)	within 714.3mVp-p+/-5%
• GBR (PAL, PAL-M, PAL-N, SECAM)	within 700.0 mVp-p+/-5%
(2). Sync signal level	
• NTSC, NTSC-4.43 MHz	within 285.7mVp-p+/-5%
• PAL, PAL-M, PAL-N, SECAM	within 300.0 mVp-p+/-5%
(3). Composite sync signal level	
• NTSC, NTSC-4.43 MHz	within 300.0 mVp-p+/-5%
• PAL, PAL-M, PAL-N, SECAM	within 300.0 mVp-p+/-5%
(4). Connectors	
• Y/G	75 Ω unbalanced, BNC type, one connector
• U/B	75 Ω unbalanced, BNC type, one connector
• V/R	75 Ω unbalanced, BNC type, one connector
• CSYNC	75 Ω unbalanced, BNC type, one connector

3.2.3. HD, VD output

(1). Signal level	more than 2.0 Vp-p
(2). Connector	
• HD	75 Ω, unbalanced/BNC connector/one
• VD	75 Ω, unbalanced/BNC connector/one

3.2.4. S-VHS output

(1) Video signal level	
• Y (NTSC, NTSC-4.43 MHz)	within 714.3 mVp-p+/-5%
• Y (PAL, PAL-M, PAL-N, SECAM)	within 700.0 mVp-p+/-5%
• C (NTSC, NTSC-4.43 MHz)	rated value: within+/-5%
• C (PAL, PAL-M, PAL-N, SECAM)	rated value: within+/-5% (SECAM DR, DB : Amplitude value within+/-15%)
(2) Sync signal level	
• NTSC, NTSC-4.43 MHz	within 285.7 mVp-p+/-5%
• PAL, PAL-M, PAL-N, SECAM	within 300.0 mVp-p+/-5%
(3) Sync signal level	
• NTSC, NTSC-4.43 MHz	within 285.7 mVp-p+/-5%
• PAL, PAL-M, PAL-N	within 300.0 mVp-p+/-5%
(4) Connectors	75 Ω unbalanced, 4-pin mini

3.2.5. Video signal mode selection

• Color burst	ON/OFF switching
• Color	COLOR/MONO switching
• Interlace	INTERLACE/NON-INTERLACE (262 lines/field or 312 lines/field) switching
• Aspect ratio	4:3 / 16:9 switching (Refer to table 3.1.)
• W/B reversing	W/B reversing of CIRCLE, CROSS, DOT, MARKER and WINDOW signals

3.2.6. Sync signal specifications

Table 3-1 Sync signal specifications

Name	Rated value	
	NTSC, NTSC-4.43M, PAL-M	PAL, PAL-N, SECAM
Horizontal sync signal width	within 4.7 μs +/- 0.1 μs	within 4.7 μs +/- 0.2 μs
Horizontal blanking signal width	within 10.9 μs +/- 0.2 μs	within 12.0 μs +/- 0.3 μs
Vertical blanking signal width	21H	25H
Serrated pulse signal width	within 4.7 μs +/- 0.1 μs	within 4.7 μs +/- 0.2 μs
Equalizing pulse signal width	within 2.3 μs +/- 0.1 μs	within 2.35 μs +/- 0.1 μs
Horizontal front porch signal width	within 1.5 μs +/- 0.2 μs	within 1.5 μs +/- 0.3 μs
Vertical front porch signal width	3H	2.5H
No. of color burst cycles	9 cycles (NTSC)	-
Color burst signal width	within 2.5 μs +/- 0.1 μs	within 2.25 μs +/- 0.2 μs (PAL, PAL-N)
SCH phase	within 0 degrees +/- 15 degrees (NTSC)	within 0 degrees +/- 15 degrees (PAL)

3.2.7. Types of output signals

Table 3-2 Types of output signals

Name of switch	Types of output signals	Aspect ratio	ROUND No.
CIRCLE	Circle	4:3/16:9	1
MARKER	Marker	4:3/16:9	1
DOT	Dot	4:3/16:9	1
CROSS	Cross	4:3/16:9	1
CHECKER	Checker	4:3/16:9	1
MULTI BURST	Multi burst	4:3	1
DEM	Demonstration	4:3	1
MONO SCOPE	Monoscope pattern	4:3	1
SPECIAL	Special pattern (composite color pattern or user-defined pattern) excluding PAL-M	4:3	1
WINDOW	Window	4:3	1 to 9
WHITE	0% white	4:3	1
	10% white	4:3	2
	25% white	4:3	3
	50% white	4:3	4
	75% white	4:3	5
	100% white	4:3	6
STAIR	5 step	4:3	1
	10 step	4:3	2
	Mod 5 step	4:3	3
	Mod 10 step	4:3	4
RAMP	Ramp	4:3	1
	Mod ramp	4:3	2
COLOR BAR	Full-field color bar	4:3	1
	Split color bar 1	4:3	2
	Split color bar 2	4:3	3
PURITY	White raster	4:3	1
	Yellow raster	4:3	2
	Cyan raster	4:3	3
	Green raster	4:3	4
	Magenta raster	4:3	5
	Red raster	4:3	6
	Blue raster	4:3	7
	Black raster	4:3	8

[NOTE]
Circle, marker, dot and cross signals can be multiplexed with other signals.

3.3. RF signal output

(1). Output frequency	30 to 900 MHz (in increment of 50 kHz) only in the status of fv < fs (by vestigial sideband)
(2). Frequency display	By 5-digit LED (Two digits are displayed below decimal point.)
(3). Frequency setup error	30 to 99.95 MHz:within+/-70ppm 100 to 900 MHz:within+/-40ppin
(4). Frequency setup method	Direct input by ten-key keys
(5). RF signal output level	0 dBm (peak value of video signal) About -1 dBm for RF signal of SECAM-L system
(6). Output deviation	within+/-4dB (200 MHz to 800 MHz) within+/-6 dB (<200MHz,>800MHz:at max. output)
(7). Video modulation	
• STD	Negative modulation: within 87.5%+/-2% Positive modulation: within 96%+/-2%
• VAR	Adjustable in a range of less than 10% to more than 100% (except L system)

[NOTE]
Depend on the internal signal {when external input: see "3.4. (1)}

(8). Audio modulation	
• STD	Standard set modulation (See item 3.6.)
• VAR	

System	Variable range	
	MIN	MAX
M, N	+/- 5 kHz or less	+/- 25 kHz or less
B, G, H, D, K, K1, I	+/- 5 kHz or less	+/- 50 kHz or less
L	10% or less	95% or more

[NOTE]
Can be variable only "fs1 INT OSC"
When external input: 0 dBm (600 Ω) 1 kHz
Input: Same as the above

(9). Video clamp	Sync chip clamp system
(10). Spurious	less than -30dBm (less than 1000 MHz)
(11). Saw filter	Band: Sound 6 MHz Group delay: flat
(12). DG/DP	DG:less than 3%, DP:less than 3 degrees (Except SECAM-L system)
(13). Maximum attenuation	More than 40 dB (by 30 dB ATT+RF volume)
(14). P/S ratio	Can be set within a range of – 30 dB to 0 dB
(15). P/S setting error	Within the set value+/-1 dB
(16). Connector	75 Ω unbalanced, BNC, one connector

3.4. Video signal input

(1). Input level	within 1 Vp-p+/-0.2 V (VBS and sync signal: negative polarity) [Input level=1 Vp-p, Vision MOD: STD (Video modulation is specification same as "3.3.(7)".)] (*TELETEXT signal cannot be added.)
(2). Connector	75 Ω unbalanced, BNC, one connector

3.5. Sound signal input

(1). Input level	0 dBm (0.775 Vrms)
(2). Input frequency	within 40Hz to 100kHz [Input level=0 dBm, Vision MOD: STD, Input frequency=1 kHz (Frequency deviation is specification same as "3.6. (3)".)] (*There is not pre-emphasis function.)
(3). Connector	600 Ω unbalanced, BNC, one connector.

3.6. Sound signal (MONO)

(1). Signal level (ratio to video in shipment)

• M, N systems	10 dB
• B, G, H systems	10 dB
• I system	10 dB
• D, K, K1, L systems	10 dB

(2). Modulation system	FM/AM (SECAM-L)

(3). Frequency deviation

• M, N systems	within+/-15 kHz+/-2 kHz
• B, G, H systems	within+/-30 kHz+/-3 kHz
• I system	within+/-30 kHz+/-3 kHz
• D, K, K1, L systems	within+/-30 kHz+/-3 kHz

(4). Modulation	within 60%+/-6%(SECAM-L)
(5). Internally generated signals	400 Hz or 1 kHz is selectable. (with standard specifications)
(6). Distortion rate	M, N and L system less than 1.5% B, G, H, D, K, K1 and I system less than 1% (Internal sound signal: 1 kHz)

3.7. Sound MPX signal (STEREO) /TG19CB.TG19CC

- Sound MPX signal output — Only for RF section
- MODE — STEREO, DUAL and MONO is selectable
- Internal generate signal CH1 — OFF, 1 kHz and 3 kHz is selectable (Sine wave)
  CH2 — OFF and 1 kHz is selectable (Sine wave)

3.7.1. Two-carrier system

(1). Carrier frequency

TV SYSTEM	NTSC-M	PAL-B, G, H
COUNTRY	KOREA	GERMAN
First sound carrier frequency	4.5 MHz	5.5 MHz
Second sound carrier frequency	4.724213 MHz	5.7421875 MHz
First sound carrier frequency signal level (video ratio)	-13 dB	-13 dB
Second sound carrier frequency signal level (video ratio)	-20 dB	-20 dB

(2). Sound

		KOREA		GERMAN	
		1st sound carrier freq.	2nd sound carrier freq.	1st sound carrier freq.	2nd sound carrier freq.
Pre-emphasis		75 μs	75 μs	50 μs	50 μs
Frequency deviation	MONO, DUAL CH1 1 kHz	+/- 15 kHz within +/-2 kHz	+/- 15 kHz within +/- 2 kHz	+/- 30 kHz within +/- 3 kHz	+/- 30 kHz within +/- 3 kHz
	STEREO CH1 1 kHz CH2 OFF	+/- 7.5 kHz within +/-1 kHz	+/- 7.5 kHz within +/-1 kHz	+/- 15 kHz within +/- 2 kHz	-
	STEREO CH1 1 kHz CH2 1 kHz	+/- 15 kHz within +/- 2 kHz	-	+/- 30 kHz within +/- 3 kHz	+/- 30 kHz within +/- 3 kHz
MONO		CH1	CH1	CH1	CH1
DUAL		CH1	CH2	CH1	CH2
STEREO		(CH1+CH2)/2	(CH1+CH2)/2	(CH1+CH2)/2	CH2

(3). Pilot signal

		KOREA	GERMAN
Carrier frequency		55.069 kHz (3.5 fh)	54.6875 kHz (3.5 fh)
Modulation system		50% AM	50% AM
ID signal frequency	STEREO	149.85 Hz	117.5 Hz
	DUAL	276.04 Hz	274.1 Hz
	MONO	No modulation	No modulation
Frequency deviation		+/- 2.5 kHz	+/- 2.5 kHz

[NOTE]

In the Korean system may be influenced by video signal. (Due to the internal SAW filter's characteristics, video signal may leak into the audio band, making it unable to recognize the pilot signal.)

3.7.2. NICAM system

TV SYSTEM		PAL-B, G, H/D, K, K1/SECAL-L	PAL-I
COUNTRY		SCANDINAVIA CHINA FRANCE	U.K
Carrier frequency		5.85 MHz	6.552 MHz
First sound carrier frequency signal level (video ratio)		-13 dB	-13 dB
Second sound carrier frequency signal level (video ratio)		-20 dB	-20 dB
Sound encoding	Encoding	10 (bits/samples) 32 (samples/block) conform to NICAM-728	10 (bits/samples) 32 (samples/block) conform to NICAM-728
	Bit rate	728 kbit/s	728 kbit/s
	Pre-emphasis	Recommendation CCITT, J.17	Recommendation CCITT, J.17
	Signal level	0 dBm	0 dBm
	Modulation system	QPSK COS roll off rate 40%	QPSK COS roll off rate 100%

3.7.3. BTSC system

COUNTRY		USA (NTSC-M)/ BRAZIL (PAL-M)
Carrier frequency		4.5 MHz
Modulation system		FM modulation
Signal level ratio (video ratio)		-10 dB
Main channel (L+R)	Pre-emphasis	75 μs
	Frequency deviation	+/- 15 kHz within +/- 2 kHz
Sub channel (L-R)	Modulation system	AM modulation
	Sub carrier frequency	31.468 kHz
SAP channel ON/OFF at the DUAL switch	Modulation system	FM modulation
	Sub carrier frequency	78.67 kHz
	Frequency deviation	+/- 9 kHz within +/- 1 kHz
	Generate signal frequency	5 kHz
Pilot signal	Frequency	15.734 kHz
	Frequency deviation	+/- 5 kHz

[NOTE]

ON/OFF operations of the BTSC system's SAP channel means ON/OFF operations of the frequency-modulated carrier.
The BTSC system may be influenced by video signal.

3.7.4. FM-FM system

COUNTRY			JAPAN (NTSC-M)
Carrier frequency			4.5 MHz
Modulation system			FM modulation
Signal level ratio (video ratio)			-10 dB
Main channel (L+R)	Pre-emphasis		75 μs
	Frequency deviation		+/- 15 kHz within +/- 2 kHz
Sub channel (L-R)	Pre-emphasis		75 μs
	Sub carrier frequency		31.468 kHz
	Frequency deviation		+/- 6 kHz within +/- 2 kHz
Pilot signal	Modulation system		60% AM
	Sub carrier frequency		55.069 kHz
	ID signal frequency	STEREO	982.5 Hz
		DUAL	922.5 Hz
	Frequency deviation		+/- 2.0 kHz

[NOTE]
The FM-FM system may be influenced by video signal.

3.8. Teletext / TG19CC

[NOTE]
TELETEXT signal cannot be added to external video signal.

3.8.1. FLOF/TOP

(1). Television system	PAL-B, G, D, H, I, N
(2). Data output level	
• "1"	within 462 mVp-p+/-10%
• "0"	within 0 mVp-p+/-60mV
(3). Data clock frequency	within 6.9375 MHz+/-50 ppm
(4). Data timing	within 12.0 µs+/-5%
(5). Superposing line	Fixed at 20H, 21H, 333H, 334H
(6). Number of output pictures	
• FLOF	21 pages
• TOP	21 pages

3.8.2. VBI

(1). Television system	NTSC-M
(2). Data output level	
• "1"	within 500 mVp-p+/-10%
• "0"	within 0mVp-p+/-60mV
(3). Data clock frequency	within 5.727272 MHz+/-50 ppm
(4). Data timing	within 9.78 µs+/-5%
(5). Superposing line	
• Teletext	Fixed at 16 Hand 279 H.
(6). Number of output pictures	9 pages

3.8.3. PDC (8/30format2)

(1). Television system	PAL-B, G, D, H, I, N
(2). Data output level	
• "1"	within 462m Vp-p+/-10%
• "0"	within 0mVp-p+/-60mV
(3). Data clock frequency	within 6.9375 MHz+/-50 ppm
(4). Data timing	within 12.0 µs+/-5%
(5). Superposing line	Inserted into the FLOF data.
(6). Memory function	4 patterns (Desired data can be input by ten-key keys.)

[NOTE]
PDC can output only when FLOF is selected

3.8.4. VPS

(1). Television system	PAL-B, G, D, H, I, N
(2). Data output level	
• "1"	within 500 mVp-p+/-10%
• "0"	with in 0 mVp-p+/-60 mV
(3). Data clock frequency	within 5 MHz+/-50 ppm
(4). Data timing	12.5 μs+/-5%
(5). Superposing line	Fixed at 16 H.
(6). Memory function	4 patterns (Desired data can be input by ten-key keys.)

[NOTE]
VPS can output only when TOP is selected.

3.9. Closed caption/TG19CC

(1). Television system	NTSC-M
(2). Data output level	
• "1"	within 357.2 mVp-p+/-10%
• "0"	within 0 mVp-p+/-60 mV
(3). Data clock frequency	within 503.4965 kHz+/-50 ppm
(4). Data timing	within 10.5 μs+/-5%
(5). Superposing line	Fixed at 21 H and 284 H (XDS is added).
(6). Output pictures	CC1, CC2, CC3, CC4, T1, T2, T3, T4, XDS

3.10. Memory function

• No. of preset	99
• Preset items	SYSTEM, SOUND, VIDEO, TELETEXT, RF (except output level variation of video and RF signals)

3.11. Interface

(1). RS-232C serial interface
For controlling switches on the front panel (except output level variation of video and RF signals)

• Communication system	Start-stop synchronizing system
• Communication velocity	9600bps (standard)
• Data length	8 bits
• Stop bit	2 bits
• Parity bit	No bit
• Flow control	without XON/XOFF
• Connector	D-sub 25 pin (female)

(2). Connection of RS-232C

a. In case of 25-pin

TG19B's side (male)	Wiring	PC and others (male)
Pin 1 (FG)	———	Pin 1
Pin 2 (TXD)	———	Pin 2 (TXD)
Pin 3 (RXD)	———	Pin 3 (RTD)
Pin 4 (RTS)	———	Pin 4 (RTS)
Pin 5 (CTS)	———	Pin 5 (CTS)
Pin 6 (DSR)	———	Pin 6 (DSR)
Pin7 (GND)	———	Pin 7 (GND)
Pin 8		Pin 8
Pin 20 (DTR)	———	Pin 20 (DTR)

b. In case of 9-pin

TG19B's side (male)	Wiring	PC and others (female)
Pin 1 (FG)		Pin 1
Pin 2 (TXD)		Pin 2 (RXD)
Pin 3 (RXD)		Pin 3 (TXD)
Pin 4 (RTS)		Pin 4 (DTR)
Pin 5 (CTS)		Pin 5 (GND)
Pin 6 (DSR)		Pin 6 (DSR)
Pin 7 (GND)		Pin 7 (RTS)
Pin 8		Pin 8 (CTS)
Pin 20 (DTR)		Pin 9

[NOTE]
Pins to which no wire is connected are NC.

3.12. Option

(1). TG19CA001

- Special pattern (composite color pattern or user-defined pattern, excluding PAL-M)

[CAUTION]
Simultaneous use of these two patterns is impossible.

(2). Characteristics of user defined pattern

- Frequency response 4.2 MHz: within+/-0.5 dB
  4.8 MHz: within -3 dB to 0 dB

3.13. Other specifications

- Memory backup time: Longer than 1,000 hours
- Operating temperature range: 0 to 40 degrees C
- Relative humidity: 25 to 90%RH (no dew condensation)
- Power voltage: 90 to 130/180 to 250 V AC; 50/60 Hz
- Power consumption: Max. 150 VA
- Dimensions: 426(W) x 149(H) x 360(D) mm
- Weight: Approx.11kg
- Standard accessories: AC power cable (1)
  3P-2P conversion connector (1)
  Operating Instruction Manual (1)

4 Operation

4.1. Operating precautions

Heat is constantly generated inside this instrument. To maintain the optimum ventilating performance at all times, adhere not to blockage ventilating slits provided on the top panel.

4.2. Controls on the front panel

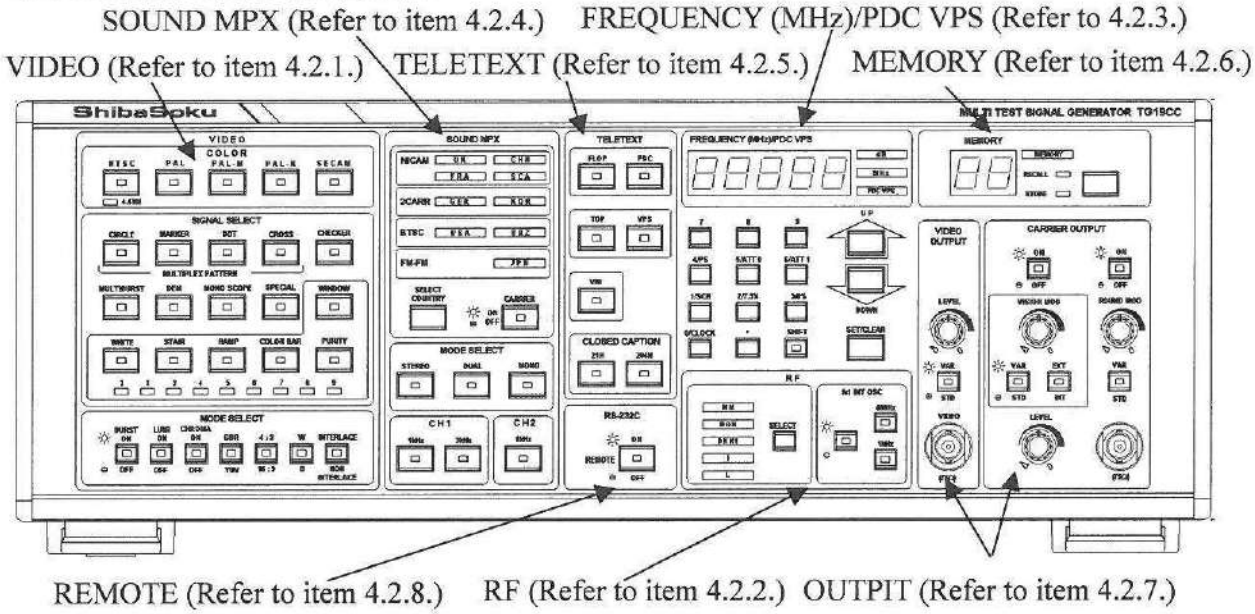
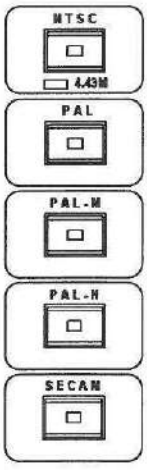


Fig. 4-1 Controls on the front panel

4.2.1. VIDEO

Select the desired test signals and output mode using a total switches provided on the front panel.

(1). Setting color system



NTSC select switch for color system. Push it again to switch to the NTSC-4.43M mode.

PAL select switch for color system.

PAL-M select switch for color system.

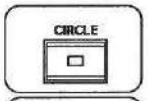
PAL-N select switch for color system.

SECAM select switch for color system.

[NOTE]

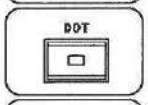
SECAM discrimination signal is not added during vertical blanking period.

(2). Test signal selection

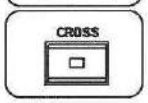


Switch to select which does multiple of circle signal.

Switch to select which does multiple of marker signal.

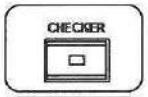


Switch to select which does multiple of dot signal.

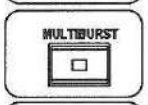


Switch to select which does multiple of cross signal.

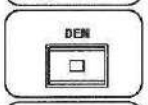
[NOTE]
Circle, marker, dot and cross signals can be multiplexed with other signals.
White-and black signal is inverse-displayed by operating the W/B switch.
Aspect ratio is switched by the 4:3/16:9 switch.



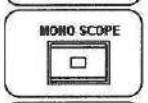
Checker signal select switch. It switches aspect ratio by operating the 4:3/16:9 select switch.



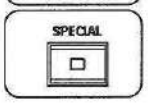
Multiburst signal select switch.



Demonstration signal select switch.

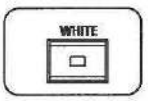


Monoscope signal select switch.

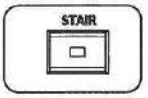


Addition of optional patterns enables to select composite color pattern, user-designated pattern (TG19CAO01), natural picture (TG19CA006 to 012), CZP (TG91CA013) or V SWEEP (TG19CAO14). These option patterns are available on the NTSC, PAL, PAL-N, SECAM and NTSC-4.43 MHz, but are not available on the PAL-M system. Simultaneous use of two or more of these patterns is impossible.

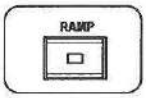
For selecting a window signal which splits the picture into nine blocks. Every when this switch is pressed, block is selected one after another. Black-and-white signal is inverse-displayed by operating the W/B switch. Continuous movement is accomplished by keep this switch pushed.



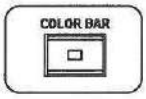
White signal select switch. Six types of white signals are available:0%, 10%, 25%, 50%, 75% and 100%. Every when this switch is pressed, white signals are selected one after another in this order.



Stair signal select switch
Six types of stair signals are available: 5-step, 10-step, MOD 5-step and MOD 10-step. Every when this switch is pressed, stair signals are selected one after another in this order.

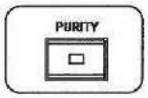


Ramp signal select switch.
Two types of stair signals are available: ramp and MOD 1 ramp. Every when this switch is pressed, these ramp signals are alternately selected.



Color bar signal select switch.
Three types of stair signals are available: full-field color bar, split color bar 1 (EIA color bar signal for the NTSC system) and split color bar 2 (SMPTE color bar signal for the NTSC system). Every when this switch is pressed, these signals are selected one after another in this order.

[NOTE]
Split color bar 2 signal is not available in the PAL, PAL-M and PAL-N systems.



Purity signal select switch.
Eight types of purity signals are available: white, yellow, cyan, green, magenta, red, blue and black. Every when this switch is pressed, white signals are selected one after another in this order.

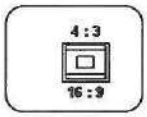
(3). Mode setting

Burst signal ON/OFF switch.
Burst signal is on when LED lights up, and it is off when the LED goes out.

Luminance signal ON/OFF switch.
Luminance signal is on when the LED lights up, and it is off when the LED goes out.

Chroma signal ON/OFF switch.
Chroma signal is on when the LED lights up, and it is off when the LED goes out.

GBR/YUV output select switch.
GBR signal is output when the LED lights up, and YUV sis output when the LED goes out.



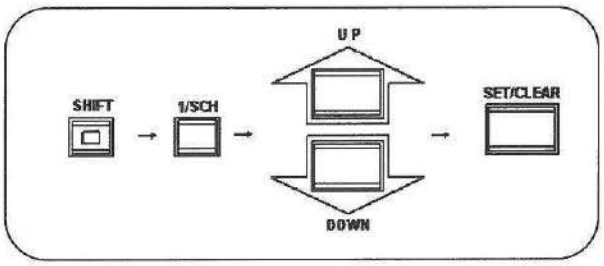
Aspect ratio select switch (4:3/16:9). Signals corresponding to 16:9 aspect ratio are CIRCLE, MARKER, DOT, CROSS and CHECKER. Signals with 4:3 aspect ratio are output when the LED lights up, and those with 16:9 are output when the LED goes out. (Refer to table 3-2.)

WHITE/BLACK select switch. Signals corresponding to WHITE/BLACK inverse are CIRCLE, MARKER, DOT, CROSS and WINDOW. Signals are output in white when the LED lights up, and in black when the LED goes out.

This is the switch to select interlace or non-interlace scanning method.
Interlace-scan signals are output when the LED lights up, and non-interlace-scan signals are output when it goes out.

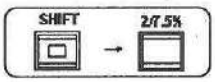
[NOTE]
Non-interlace scanning offers 262 lines per field in case of the 525-line system, while 312 lines per field in case of the 625-line system.

(4). SCH setting

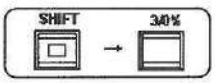


For adjusting SCH phase of each television system (except SECAM and NTSC-4.43M systems).

(5). Setup setting

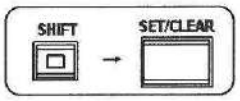


Set setup of a composite output NTSC system to 7.5%.



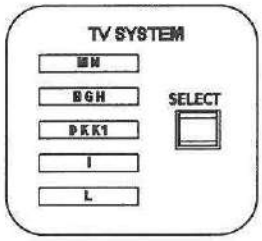
Set setup of a composite output NTSC system to 0%.

(6). Clear



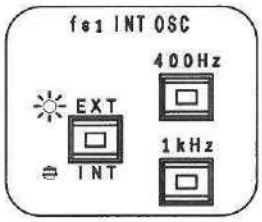
For clearing the input data of the segment. This clearing operation is effective when a data is erroneously input.

4.2.2. RF



TV system select switches.
Five television systems-"M, N", "B, G, H", "D, K, K1", "I" and "L"-are available. However, television system selection is limited by selected "VIDEO COLOR" key. In case that several TV systems are selectable, television system is selected one after another in the above order every when the SELECT switch is pushed. As described below, only the right TV system can be selected for the left VIDEO COLOR.

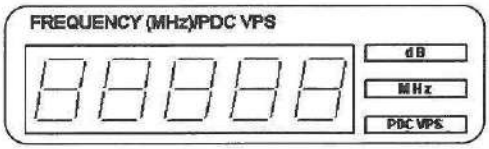
Example:
NTSC (3.58) —— "M, N"
NTSC (4.43) —— "B, G, H"
PAL —— "B, G, H", "D, K, K1", "I"
PAL-M —— "M, N"
PAL-N —— "M, N"
SECAM —— "B, G, H", "D, K, K1", "L"



The left switch is for selecting either internal or external signal to be measured. The two swilch on the right hand are for selecting the modulation frequency of the selected signal.
Three types of modulation frequency are available: 400 Hz, 1 kHz and non-modulation. The former two can be directly selected by pressing the "400 kHz" or "1 kHz" key. To select the non-modulation mode, press the key, whose LED is lighting, once again. The LED goes out and the non-modulation mode is established.
Press to light up the LED of the INT/EXT switch, and the signal, which is input to the SOUND input connector on the rear panel, is selected as the modulation signal. In this case, pre-emphasis is not active.
Press the INT/EXT switch to go out its LED, and the "INT" mode is established, enabling to select 400 Hz, 1 kHz or non-modulation mode of the internal oscillator.

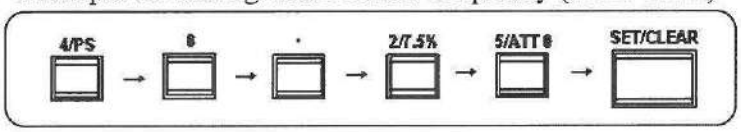
4.2.3. FREQUENCY (MHz)/PDC VPS

(1). Setting method for video carrier frequency



Input a numeric value in a range of 30 to 900 MHz by using numeric keys of the FREQUENCY (MHz) section, then press the "SET" key, and the desired video carrier can be set.
Although video carrier frequency can be input in a range of 1 to 5 digits, if the value below "30" is input, video carrier frequency is set to "30.00 MHz". When the value above "900" is input, it is set to "900.00 MHz". Since input is made in increments of 50 kHz, if a fraction is input, it is omitted to the closed 50 kHz value.

a. Example for setting video carrier frequency (48.25 MHz)



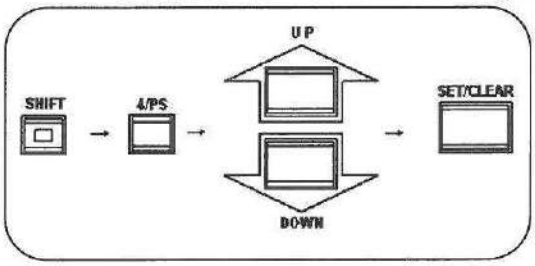
- Other setting examples

"1", "SET" → 30.00 MHz
"0", "5", "SET" → 30.00 MHz
"0", "2", "0", "SET" → 30.00 MHz
"0", "5", "0", "SET" → 50.00 MHz
"5", "0", "SET" → 50.00 MHz
"5", "0", ".", "1". "SET" → 50.10 MHz
"9", "1", "0", "SET" → 900.00 MHz
"9", "1", "2", ".", "5", "8", "SET" → 900.00 MHz
"5", "0", "0", ".", "2", "7", "SET" → 500.25 MHz

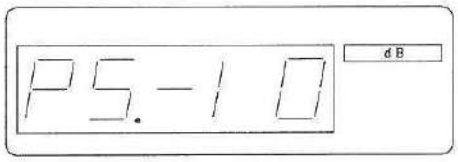
b. Change/precise adjustment of the frequency
Video carrier frequency that was set by pressing the UP and DOWN keys increases or decreases in increments of 50 kHz. By keeping these keys pressed, increasing or decreasing speed is accelerated. Lower and higher limits of set frequency are 30.00MHz and 900.00MHz, respectively.

(2). Setting PS ratio

Press the "UP" or "DOWN" key to set P/S ratio in a range of 0 dB to 30 dB.



Press the "SHIFT" + "4/PS" key and the following message is displayed on the FREQUENCY (MHz)/PDC VPS section. (It is set to 10 dB when this unit is delivered.)

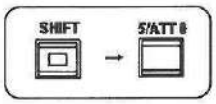


Numeric increase in increments of 1 dB by pressing the "UP" and "DOWN" key.
Press the "SET" key to return to the "frequency setup" mode.

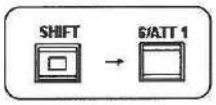
(3). Setting 30 dB attenuator

Press the "SHIFT" + "5/ATT0" keys or "SHIFT" + "6/ATT1" keys simultaneously to turn on/off the 30 dB attenuator.

- To turn OFF the 30 dB attenuator



- To turn ON the 30 dB attenuator



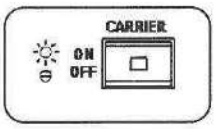
Output level lowers about 30 dB.

(4). Setting method for PDC/VPS (only for TG19CC)

Refer to item 4.2.5. "TELETEXT".

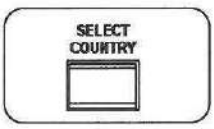
4.2.4. SOUND MPX/TG19CB, TG19CC

(1). COUNTRY



Sound MPX ON/OFF switch.
Relationship between TV system and country that are selectable by the SELECT COUNTRY key under CARRIER-ON status are as follows.

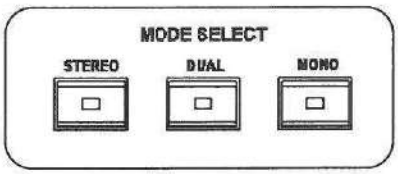
- NTSC (M, N) ——— USA, JPN, KOR
- PAL (M) ——— BRZ
- PAL (B, G, H) ——— GER, SCA
- PAL (D, K, K1) ——— CHN
- PAL (I) ——— UK
- SECAM (L) ——— FRA



This is the switch to select COUNTRY of the sound MPX signal.
Every when this switch is pressed in the CARRIER-ON status, the country changes.
Relationship between sound MPX system and country are as follows.

- NICAM ——— UK, SCA, FRA, CHN
- 2 CARRIER ——— GER, KOR
- BTSC ——— USA, BRZ
- FM-FM ——— JPN

(2). MODE SELECT



Switches provided in the MODE SELECT section enable to set STEREO, DUAL and MONO mode. In case of channel setting, CH1 is fixed at 1 kHz and 3 kHz and CH2 is fixed at 1 kHz.
Selection and ON/OFF of each is possible.

a. In case of NICAM system
"fs1 INT OSC" described in item 4.2.2. "RF" becomes effective only when the NICAM system is selected.

b. In case of BTSC system
Only in the BTSC system, the "DUAL" key function as the SAP ON/OFF switch and "5 kHz" is set.

4.2.5. TELETEXT/TG19CC

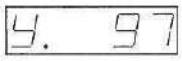
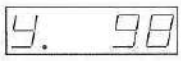
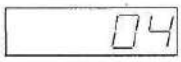
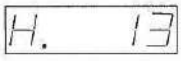
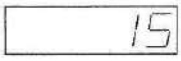
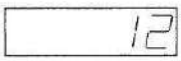
4.2.5.1. TOP/FLOF

(1). About TOP
TOP is the page reading system designed in Germany. Each pages are grouped, and grouped pages are consisted in the form of hierarchy and are managed in the Manager screen. Each desired page can be read from its hierarchy by key operation of the remote controller.

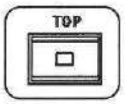
(2). About FLOF
FLOF is the page reading system designed in the UK. It employs the extension packed called "link page". Four papers memorized on the decoder can be read by selecting the red, green, yellow and blue keys of the remote controller.

(3). Real time lock setting
Page header, and the time and date which are inserted to 8/30 format can be set.
To set them, press the SHIFT key, then push the CLOCK, and the screen is ready for inputting "year". Input the lower two digits of the year by using the ten-key, and push the SET key. "Year" that can be established is range to 1990-2089.)
Next, to set "month", press the DOWN key once, input the month by using the ten-key, then press the SET key. In the same manner, input "date", "hour", "minute" and "second" one after another.
After all data have been input, press the SET key. When reading of the real time clock setting is over, the "Frequency" screen is displayed.

Example to set real time clock (13 o'clock 15 minutes 12 seconds on February 4, 1998)

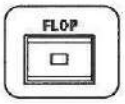
SHIFT → CLOCK		
9 → 8 → SET		Input "year"
DOWN → 2 → SET		Input "month"
DOWN → 4 →SET		Input "day"
DOWN → 13 → SET		Input "hour"
DOWN → 15 → SET		Input "minute"
DOWN → 12 → SET		Input "second"
SET		

(4). TOP signal output



TOP ON/OFF switch.
When the LED of the TOP switch is lighting, TOP is turned ON. When it goes out, TOP is turned OFF. Only when the select TV system is PAL- B, G, D, H, I and N, a TOP data is superposed on the 20H, 21H, 333H and 334H of the vertical blanking period.

(5). FLOF signal output



TOP ON/OFF switch.
When the LED of the FLOF switch is lighting, TOP is turned ON. When it goes out, TOP is turned OFF. Only when the select TV system is PAL- B, G, D, H, I and N, a FLOF data is superposed on the 20H, 21H, 333H and 334H of the vertical blanking period.

(6). Contents of TOP/FLOF

Page	Content
100	INDEX
101	INTRODUCTION
102	NEWSFLASH
103	SUBTITLE
110	COLOR
120	ERASE PAGE
121	CLOCK CRACKER
200	CHARACTER
201	MEMORY TEST
202	INHIBIT
203	MULTI PAGE
204	VPS/PDC
301	CONTROL BIT CHECK 1
to	to
309	CONTROL BIT CHECK 9

(7). About VPS
VPS is developed in Germany to control the start/stop operations of VCR timer recording. In this system, a program identify signal is allotted to the 16H of the vertical blanking period. When the received ID of the recording TV program coincides with that of the timer-recording program, the VCR commences recording, and when they become unmatched, TV program recording is stopped.

(8). About PDC
PDC is developed in UK. to control the start/stop operations of VCR timer recording. The desired program is reserved in the VTR from the program list in the Teletext screen. ID of the selected TV program and the ID sent by the exclusive-use packet are compared, and when they are identical, recording of the reserved VCR's program is started.

(9). VPS signal output

VPS ON/OFF switch. When the LED of the VPS switch is lighting, VPS is turned ON. When it goes out, VPS is turned OFF. Only when the select TV system is PAL-B, G, D, H, I and N a VPS data is superposed on the 16H of the vertical blanking period. VPS can be output only when TOP is selected.

One of four data saved in four memories (memory numbers 1 to 4) are output. When this switch is turned ON, memory number of the data being output is displayed on the indicator for five seconds. When change of data to be output is necessary, in five seconds later, input the memory number (1 to 4) in which the desired data to be output and finally press the SET key.

[Attention]
If the VPS switch is set to ON when the power switch is turned on, the memory number is displayed for five seconds immediately after power on.

(10). Initial values of VPS data

Memory No.	PIL		CNI		PTY	PCS
	Day/month	Hour/minute	Country	Network	Program type	Reserve
1	04.02	10:00	29	193	8	0
2	04.02	10:23	29	193	8	0
3	15.11	13:15	29	193	8	0
4	24.12	21:00	29	193	8	0
			BCD			

(11). Setting of VPS data
To change the content of VPS data, turn on the VPS switch, press the SHIFT key and the memory number(1 to 4) to be changed during five second when the memory number is being displayed.

At first, the status waiting for data input is displayed. Input the desired date in the order of day/month, then press the SET key.
Next, press the DOWN key once and the TG19C enters the status waiting for input time. Input the hour and minute, then press the SET key.
In the same manner, go on inputting necessary parameters.

Input the country code.
Input value range: 0 to 255

Input the network ID.
Input value range: 0 to 255

Input the program type.
Input value range: 0 to 255

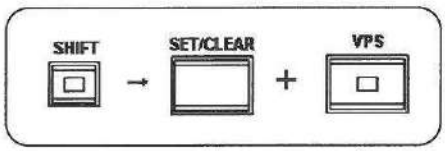
Input the reserve bit.
Input value range: 0 to 3

Memory number is displayed. After all parameters have been input, finally press the SET key to write the setting into the memory.

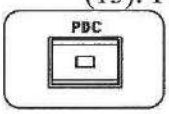
- To change the particular parameter only, call that parameter by using the DOWN or UP key.
- Country code, network ID and program type is encoding in BCD. (See the data format at the end of book.)
- Since German Sound MPX is selected as the sound coding for PCS, it is written in the memory together with the VPS data when it is input.

(12). Initialization of VPS data

VPS data can be returned to its initial value. Press the VPS switch and the memory number will be displayed for five seconds. During this five seconds, first press the SHIFT key, then press the CLEAR and VPS keys simultaneously. All VPS data return to their initial values.



(13). PDC signal output



PDC ON/OFF switch.
When the LED of the PDC switch is lighting, PDC is turned ON. When it goes out, PDC is turned OFF. Only when the selected TV system is PAL-B, G, D, H, I or N, a PDC data is superposed on the 20H, 21H, 333H and 334H of the vertical blanking period.
PDC can be output only when FLOF is selected.

One of four data saved in four memories (memory numbers 1 to 4) are output. When this switch is turned ON, memory number (1 to 4) of the data being output is displayed on the indicator for five seconds.

[Attention]

If the PDC switch is set to ON when the power switch is turned on, the memory number is displayed for five seconds immediately after power on.

(14). Initial value of PDC data

Memory No.	PIL		CNI		Pty	PCS	Plug
	Day/month	Hour/minute	Country	Network	Program type	Reserve	
1	04.02	10:00	28	17	8	0	0
2	04.02	10:23	28	17	8	0	1
3	15.11	13:15	28	17	8	0	2
4	24.12	21:00	28	17	8	0	3

BCD

(15). PDC data setting
To change the content of a PDC data, turn on the PDC switch. Within five seconds during the memory number is displayed, press the SHIFT key then press the memory number (1 to 4) to be changed.

At first, the status waiting for data input is displayed. Input the desired date in the order of day/month, then press the SET key.

Next press the DOWN key once and the TG19C enters the status waiting for input time. Input the hour and minute, then press the SET key. Addition of the start time and 5 minutes is automatically set as the end time.

In the same manner, go on inputting necessary parameters.

Input the country code.
Input value range: 0 to 255

Input the network ID.
Input value range: 0 to 255

Input the program type.
Input value range: 0 to 255

Input the reserve bit.
Input value range: 0 to 3

Input the flag.
- Content of flag
  PRF ····· MSB side
  LUF
  LCI (2)*
  LCI (1) ··· LSB side

[NOTE]
Since each memory number (1 to 4) of LCI is fixed, only upper two bits are changeable.

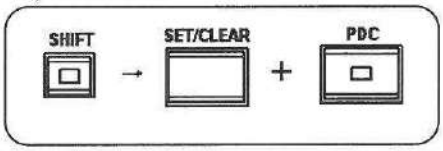
The selected memory number is shown.
When all parameters have been input, press the "SET" key to write the new setting into the memory.

Input values of flag

Memory No.	Values that can be input
1	0, 4, 8, 12
2	1, 5, 9, 13
3	2, 6, 10, 14
4	3, 7, 11, 15

- When changing the particular parameter, read out the parameter by pressing the DOWN or UP key.
- Country code, network ID and program type is encoding in BCD.

(16). Initialization of PDC data
PDC data can be returned to its initial value. Press the VPS switch and the memory number will be displayed for five seconds. During this five seconds, first press the SHIFT key, then press the CLEAR and VPS keys simultaneously. All PDC data return to their initial values.



4.2.5.2. VBI

(1). About VBI
VBI means Vertical Blanking Interval. When this switch is turned on, the data of Japanese teletext broadcasting is output from the TG19C.

(2). VBI signal output

VBI ON/OFF switch.
When the LED of the VBI switch is lighting, VBI is turned ON. When it goes out, VBI is turned OFF. Only when the select TV system is NTSC (3.58 MHz)-M a VBI data is superposed on the 16H and 278H of the vertical blanking period.

(3). Contents of VBI data

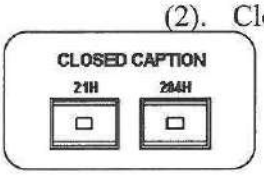
Page	Contents
0	Contents
1	Text
2	Function display
3	Mosaic
4	D R C S
5	Photographic
6	Added sound
7	Horizontal scroll
8	Vertical scroll

4.2.5.3. Closed Caption

(1). About Closed Caption

The Closed Caption is the teletext broadcasting employed in the United States. With this system, alphanumeric, codes and other data are superposed on the 21H of the 1st and 2nd fields for transmission.
Two modes are available. Caption mode for the data relating to TV programs and the text mode for data service which in general has no relation to TV programs.

(2). Closed Caption signal output

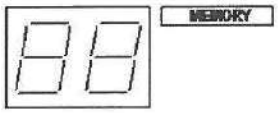


The "21H" and "284H" keys are used to superpose a closed caption on the corresponding line. When the LED of these switches light up, their functions are turned off. When not, they are turned off. Only when the selected TV system is NTSC (3.58 MHz)-M, data of CC1, CC2, T1 and T2 are superposed on 21H, while data of CC3, CC4, T3, T4 and XDS are on 284H.

(3). Content of Closed Caption data

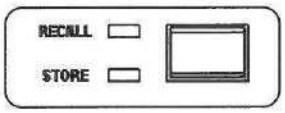
21H	CC1 data	Paint ON Pop ON Roll up
	T1 data	Text mode
	CC2 data	Paint ON Pop ON Roll up
	T2 data	Text mode
284H	CC3 data	Paint ON
	T3 data	Text mode
	CC4 data	Pop ON
	T4 data	Text mode
	XDS	See separate cover.

4.2.6. MEMORY



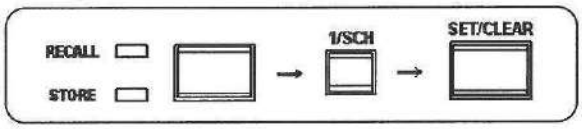
Maximum 99 ways of settings can be memorized.
Preset items: VIDEO, SOUND MPX, TELETEXT, RF

(1). RECALL



Push the MEMORY switch once and the LED of RECALL switch lights up. Input the number to be memorized by using the ten-key keys or UP/DOWN keys. If the number that has not been memorized is set, "— —" is displayed. Next, press the SET switch. Now, setting is completed and the LED of RECALL switch goes out.

- Example to recall a memory data (recalling the data having the memory number "1")

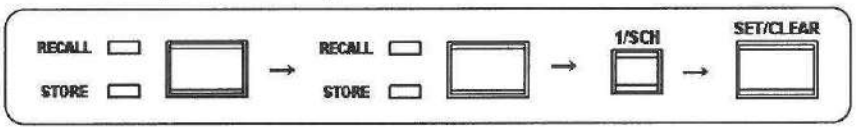


[NOTE]
Confirm that the LED of RECALL key lights. Number input can be made by ten-key keys or UP/DOWN keys.

(2). STORE

Push the MEMORY switch twice and the LED of STORE switch lights up. Input the numbert to be memorized by using the ten-key keys. Next, press the SET switch. Now, setting is completed and the LED of STORE switch goes out.

- Example to recall a memory data (memorizing the data having the memory number "1")

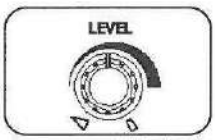


[NOTE]
Confirm that the LED of RECALL key lights. Number input can be made by ten-key keys or UP/DOWN keys.

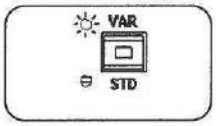
4.2.7. OUTPUT

For independently varying video and RF output signal level.

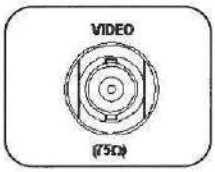
(1). VIDEO circuit



Composite signal, which is output from VIDEO, is varied only when the VAR/STD switch is set to the VAR mode.

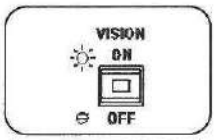


This is the switch to select the variable mode and fixed mode for video signal level(only video signal available from the front VIDEO output). Composite output signal is varied by the VIDEO volume control when the LED is lighting. When the LED goes out, composite signal which is fixed at 1Vp-p is output.



Output connector for a composite signal. (75 Ω unbalanced BNC connector)

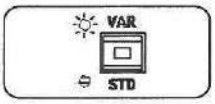
(2). RF circuit



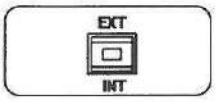
The switch to turn ON/OFF vision carrier.

The switch to turn ON/OFF sound carrier.

This volume control knob can vary modulation of the RF video signal only when the VAR/STD switch located at the left bottom of the knob is set to the "VAR" position.



The switch to select the variable or fixed mode of modulation of the RF video signal. When the "STD" mode is selected, modulation is fixed to 87.5% with a negative modulation signal and 95% or more with a positive modulation signal.

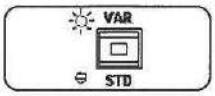


The switch to select a signal to be modulated for video carrier. When the "EXT" mode is selected, the signal which is input to the VIDEO input connector on the rear panel is modulated. When the "INT" mode is selected, the internal video signal is modulated.

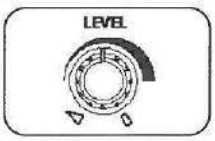
[NOTE]

When the "EXT" mode is selected, TELETEXT signal cannot be added.

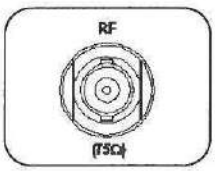
This volume control can vary deviation of the RF sound signal (analog) only when the VAR/STD select switch is set to the "VAR" mode.



The switch to select the variable or fixed mode of deviation of the RF sound signal.



When the "30 dB ATT-OFF" and "LEVEL" volume controls are fully turned clockwise, an RF output of 0 dBm(about 109 dBμV) can be obtained at the RF OUTPUT 75 Ω BNC connector on the front panel. The "LEVEL" control and the "30dB ATT" key are usable simultaneously. Turning the "LEVEL" volume control counter clockwise reduces output level. Attenuation characteristics are subject to differ depending on the set frequency.



This is the output connector for RF signal. (75 Ω unbalanced BNC connector) Video modulation of RF output signal does not change even by turning the "VIDEO LEVEL" volume control of the OUTPUT section.

4.2.8. REMOTE

When the TG19C is remotely operated through the RS232C serial interface, the LED of this switch lights up. In this case, switches on the front panel are locked and become inactive. To release the remote status, turn off the REMOTE switch manually(The LED goes out).

4.3. Controls on the rear panel

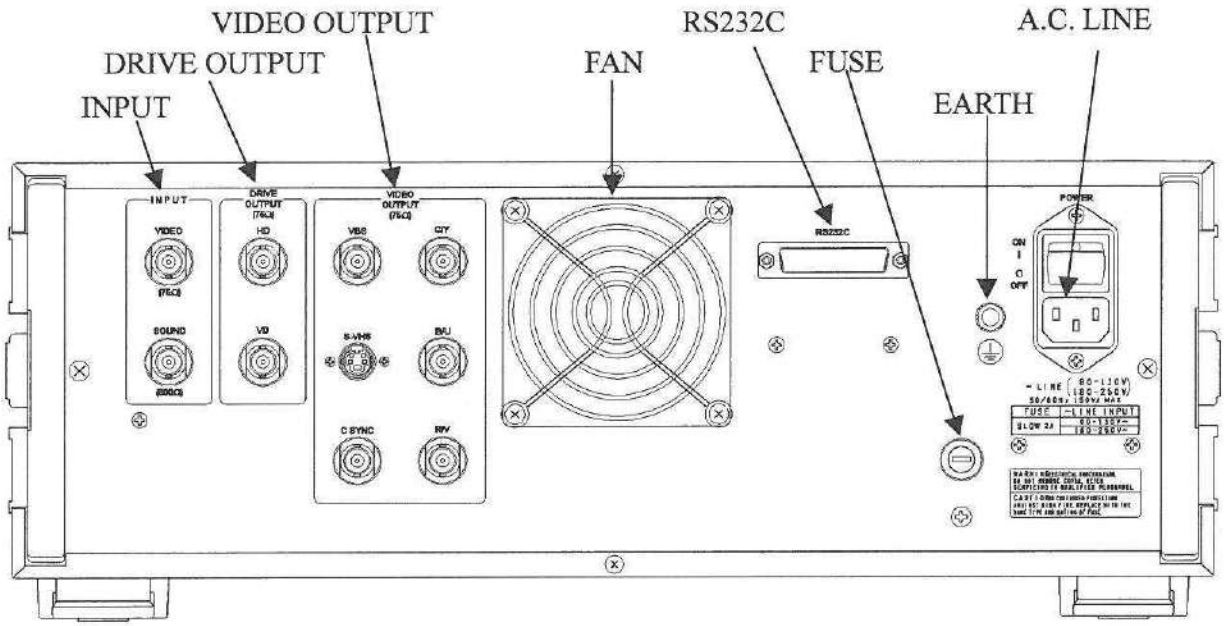


Fig. 4-2 Controls on the rear panel

- A.C. LINE
  AC power inlet.
  Input voltage ranges are: 90 to 130 V AC and 180 to 250 V AC. Connect the standard power cable to this inlet, then insert its plug to the AC line voltage that is shown on this equipment. For increased operational safety, confirm that the power switch is turned off when connecting the power cable to this equipment. The connect the power plug to the AC line outlet. Switching of 100 V AC/200 V AC system is automatically made internally.

  Power switch

Position	Status of switch
|	Power switch ON
○	Power switch OFF

- FAN
  The DC fan.
  Be attentive not to insert a protruded object in it during it is rotating.

- FUSE
  Protection fuse. When the fuse blew, replace it with the new one having the same amperage. If the new fuse also blows immediately, it may result from the abnormality in the equipment. Turn off the power switch, disconnect the plug from the AC outlet, and contact ShibaSoku Co., Ltd. or its service facility. If AC input voltage setting is changed, use the fuse having the corresponding amperage as printed on the rear panel.

Input voltage range	FUSE
90 to 130 V AC	SLOW 2 A
180 to 250 V AC	

- EARTH
  Grounding terminal. Before starting to use this equipment, connect this to the ground for operational safety.

- INPUT
  VIDEO: BNC connector (75 Ω, unbalanced) to which a composite signal is input.
  SOUND: BNC connector (600 Ω, unbalanced) to which a sound signal is input.

- VIDEO OUTPUT
  VBS: Output connector for composite signal (75 Ω unbalanced BNC connector)
  G/Y: This 75 Ω unbalanced BNC connector is commonly used for G and Y signal of GBR/YUV signals.
  B/U: This 75 Ω unbalanced BNC connector is commonly used for B and U signal of GBR/YUV signals.
  R/V: This 75 Ω unbalanced BNC connector is commonly used for R and V signal of GBR/YUV signals.
  CSYNC: Output connector for composite signal (75 Ω unbalanced BNC connector)
  S-VHS: S output connector for Y and C signals (75 Ω unbalanced 4pin mini DIN connector)

1: Y signal grounding
2: C signal grounding
3: Y signal output
4: C signal output

Fig. 4-3 4-pin mini DIN connector

- DRIVE OUTPUT
  HD: BNC connector (75 Ω, unbalanced) to which a HD signal is output.
  VD: BNC connector (75 Ω, unbalanced) to which a VD signal is output.

- RS-232C
  Interface for remote controlling by an external equipment (Dsub 25-pin connector)

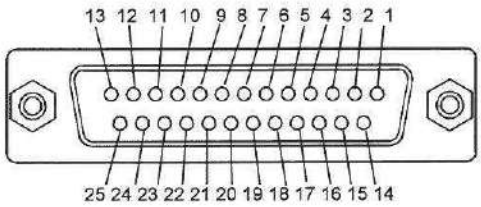


Fig. 4-4 Dsub25-pin connector

Table 4-1 Pin assignment Dsub 25-pin

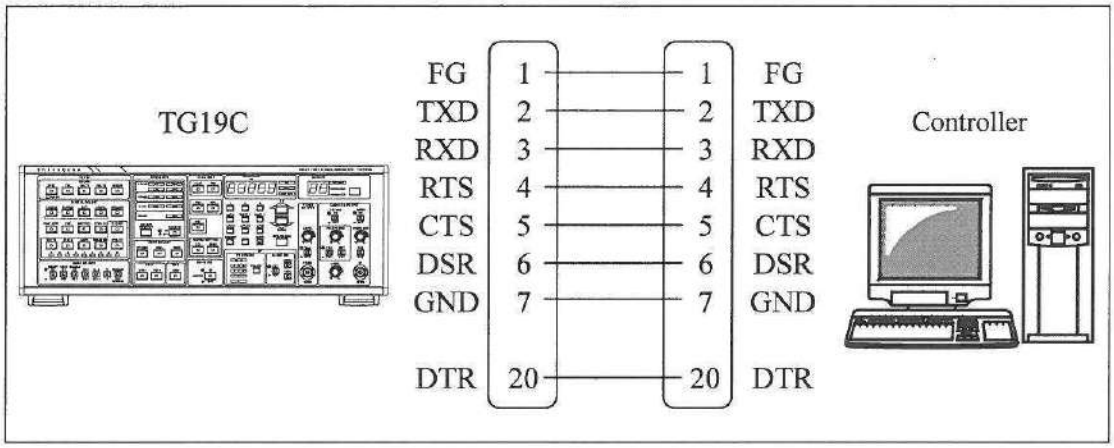
Pin No.	Code	Name
1	FG	Frame ground
2	TXD	Transmitting data
3	RXD	Received data
4	RTS	Request transmission
5	CTS	Approval transmission
6	DSR	Data set ready
7	GND	Signal ground
8	CD	Carrier detection
20	DTR	Data peripheral ready

4.4. Operation of RS232C

4.4.1. Connection method

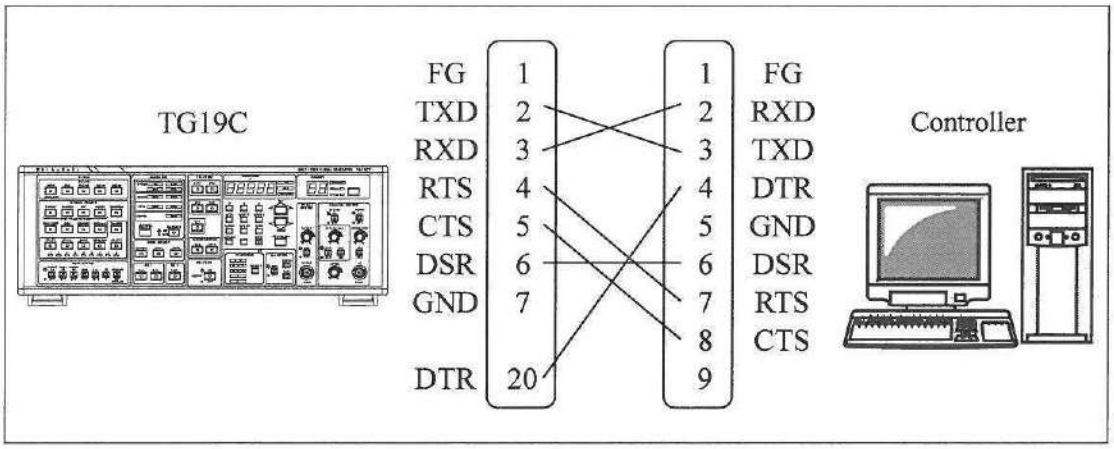
Since the TG19C employs the straight connection method, it allows to be connected with a modem-type cable. Popular connection examples are shown below.

(1). In case of 25-pin connection



[NOTE]
Pins without a wire are NC (not connected).

(2). In case of 9-pin connection



[NOTE]
Pins without a wire are NC (not connected).

4.4.2. Controlling

When controlling the TG19C through communication, add [CR] immediately behind the command indicating this equipment. Since it is designed to return the status after having processed the received command, confirm the reception of status, then commence the next command transmission in order to prevent erroneous operation.

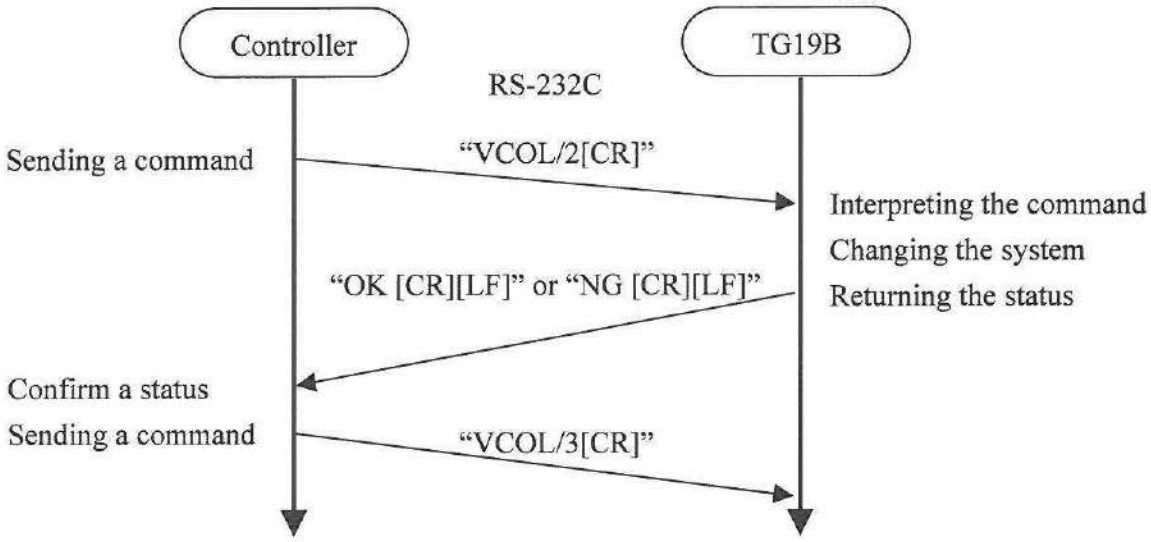
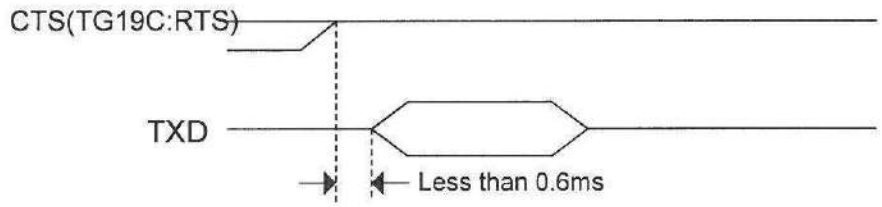


Fig. 4-5 Controlling

4.4.3. Timing of signal

Commands, which are sent to the TG19C, can be transmitted by ignoring RTS. However, when using a controller which must perform RTS-CTS handshake operation, transmit the command under the status that RTS is high as the transmission timing shown in figure 4.6. When receiving the status of the transmitted command, the TG19C can receive the status in the condition that RTS is high. It is also possible to stop the reception from the TG19C by setting RTS to "low". (Handshaking is possible with RTS.)
If such RTS-CTS handshaking is not performed, you must keep RTS of the controller high at all times, or short-circuit RTS and CTS of the TG19C.

- Controller' s transmission timing



- Controller' s reception timing

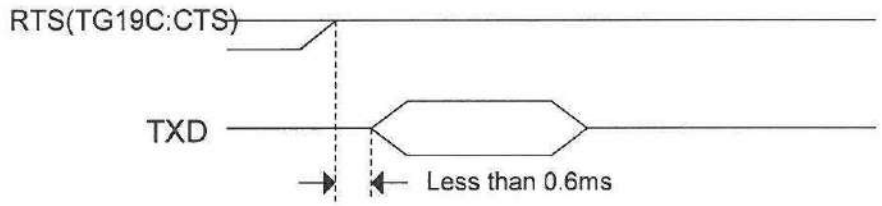


Fig. 4-6 Transmission/reception timing of controller

[NOTE]
DTR and DSR are short-circuited inside the TG19C.

4.4.4. Command table of RS232C

Table 4-2 RS-232C command table

Part	RS-232C command	Content
VIDEO	VCOL/☐	For change of color system. ☐ designates SYSTEM No.1.NTSC, 2:PAL, 3:PAL-M, 4:PAL-N, 5:SECAM, 6:NTSC-4.43 MHz
	VSIGCI/■	For selecting SIGNAL SELECT (CIRCLE). ■ means ON/OFF. 1:ON, 0:OFF
	VSIGMA/■	For selecting SIGNAL SELECT (MARKER). ■ means ON/OFF 1:ON, 0:OFF
	VSIGDO/■	For selecting SIGNAL SELECT (DOT). ■ means ON/OFF 1:ON, 0:OFF
	VSIGCR/■	For selecting SIGNAL SELECT (CROSS). ■ means ON/OFF 1:ON, 0:OFF
	VSIGCH	For selecting SIGNAL SELECT (CHECKER).
	VSIGMU	For selecting SIGNAL SELECT (MULTI BUTST).
	VSIGDE	For selecting SIGNAL SELECT (DEMO).
	VSIGMO	For selecting SIGNAL SELECT (MONOSCOPE).
	VSIGSP	For selecting SIGNAL SELECT (SPECIAL).
	VSIGWI/☐	For selecting SIGNAL SELECT (WINDOW). ☐ designates ROUND No.(1 to 9).
	VSIGWH/☐	For selecting SIGNAL SELECT (WHITE). ☐ designates ROUND No.(1 to 6).
	VSIGST/☐	For selecting SIGNAL SELECT (STAIR). ☐ designates ROUND No.(1 to 4).
	VSIGRA/☐	For selecting SIGNAL SELECT (RAMP). ☐ designates ROUND No.(1 to 2).
	VSIGCO/☐	For selecting SIGNAL SELECT (COLOR BAR). ☐ designates ROUND No. NTSC, SECAM: 1 to 3 PAL, PAL-M, PAL-N, NTSC-4.43MHz: 1 to 2
	VSIGPU/☐	For selecting SIGNAL SELECT (PURITY). ☐ designates ROUND No.(1 to 8).
	VMODE/☐/■	For selecting MODE. ☐ designates MODE No. 1:BURST, 2:LUMI, 3:CHROMA, 4:GBR/YUV, 5:4:3/16:9, 6:W/B, 7:INTERLACE/NON INTERLACE ■ designates ON/OFF. 1:ON, 0:OFF

	NTSC/□	For selecting SET UP (NTSC). □ designates MODE. 0:SET UP 0%, 75:SET UP 7.5%
SOUND	SUK	For setting sound MPX (UK). Impossible depending on the color system.
	SCHN	For setting sound MPX (China). Impossible depending on the color system.
	SFRA	For setting sound MPX (France). Impossible depending on the color system.
	SSCA	For setting sound MPX (Scandinavia). Impossible depending on the color system.
	SGER	For setting sound MPX (Germany). Impossible depending on the color system.
	SKOR	For setting sound MPX (Korea). Impossible depending on the color system.
	SUSA	For setting sound MPX (U.S.A). Impossible depending on the color system.
	SBRZ	For setting sound MPX (Brazil). Impossible depending on the color system.
	SJPN	For setting sound MPX (Japan). Impossible depending on the color system.
	SCAR/■	For setting CARRIER. ■ means ON/OFF. 1:ON, 0:OFF
	SST/■	For setting STEREO. ■ means ON/OFF. 1:ON, 0:OFF
	SDU/■	For setting DUAL. ■ means ON/OFF. 1:ON, 0:OFF
	SMO/■	For setting MONO. ■ means ON/OFF. 1:ON, 0:OFF
	SCH11K/■	For setting CH1 (1K). ■ means ON/OFF. 1:ON, 0:OFF
	SCH13K/■	For setting CH1 (3K). ■ means ON/OFF. 1:ON, 0:OFF
	SCH2/■	For setting CH2. ■ means ON/OFF. 1:ON, 0:OFF
	SNDC/■	For setting CARRIER OUTPUT/SOUND. ■ means ON/OFF. 1:ON, 0:OFF
	SNDM/□	For setting SOUND MOD. □ designates VAR/STD. 1:VAR, 0:STD
TELETEXT	TFLOF/■	For setting FLOF. ■ means ON/OFF. 1:ON, 0:OFF

	TPDC/■	For setting PDC. ■ means ON/OFF. 1:ON, 0:OFF If PDC is set to ON when FLOF is set to OFF, FLOF is also set to ON simultaneously. When PDC is set to OFF, PDC operates alone.
	TTOP/■	For setting TOP. ■ means ON/OFF. 1:ON, 0:OFF
	TVPS/■	For setting VPS. ■ means ON/OFF. 1:ON, 0:OFF If TOP is set to ON when VPS is set to OFF, TOP is also set to ON simultaneously. When VPS is set to OFF, VPS operates alone.
	TVBI/■	For setting VBI. ■ means ON/OFF. 1:ON, 0:OFF
	C21H/■	For setting CC21H. ■ means ON/OFF. 1:ON, 0:OFF
	C284H/■	For setting CC284H. ■ means ON/OFF. 1:ON, 0:OFF
TV SOUND	RSYS/□	For setting TV SYSTEM. □ designates SYSTEM No. 1:MN, 2:BGH, 3:DKK1, 4:I, 5:L
	ROSC400/■	For setting INT OSC (400 Hz). ■ means ON/OFF. 1:ON, 0:OFF
	ROSC1K/■	For setting INT OSC (1 kHz). ■ means ON/OFF. 1:ON, 0:OFF
	FSI/□	For setting TV SOUND INPUT. □ means EXT/INT. 1:EXT, 0:INT
OUTPUT	0V/■	For setting OUTPUT VIDE (VAR/STD). ■ designates VAR/STD. 1:VAR, 0:STD
	OR/■	For setting 30dB ATT. ■ means ON/OFF. 1:ON, 0:OFF
MEMORY	R/□	For processing MEMORY RECALL. □ designates MEMORY No. (1 to 99) to be read.
	S/□	For processing MEMORY STORE. □ designates MEMORY No. (1 to 99) to be read. [***CAUTION***] If the MEMORY No. that has already been used, it will be overwritten.
FREQUENCY	F/□	For setting frequency. □ designates the frequency (30.00 MHz to 900.00 MHz).

	FSU/☐	For setting frequency STEP UP. ☐ designates the number of steps to be increased. (1 STEP=0.05 MHz)
	FSD/☐	For setting frequency STEP DOWN. ☐ designates the number of steps to be reduced. (1 STEP=0.05 MHz)
RF	VISC/■	For setting CARRIER OUTPUT/VISION. ■ means ON/OFF. 1:ON, 0:OFF
	VISM/☐	For setting VISION MOD. ☐ designates VAR/STD. 1:VAR, 0:STD
	VISI/☐	For setting VISION INPUT. ☐ means EXT/INT. 1:EXT, 0:INT
	PS/☐	For setting PS ratio. Designate PS ratio to change in ☐. Designating range :0 to –30 dB

4.4.5. RS-232C sample program

(1). Operating environment DOS/V Windows 95
(2). Language Microsoft Visual Basic 5.0
(3) Program

This sample program remotely controls the TG19C series by using the RS-232C, and the program will finish by pushing the EXT button.

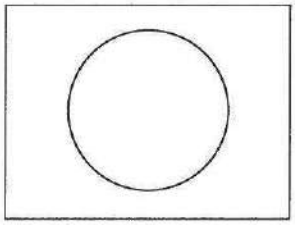
```
Option Explicit
Private Sub From_Load()
  `By setting InputLen to 0, when using the input property,
  `Informs the MSCommof reading the whole content of the reception buffer
  MSComm1.InputLen=0
  `Sets the communication port.
  `Set CommPort to 1.
  MSComm1.CommPort=1
  `Baud rate          9600
  `Parity bit         No
  `Data bit           8
  `Stop bit           2
  MSComm1.Settings="9600, N, 8, 2"
  `Opens the communication port.
  On Error Resume Next
  MSComm1.PortOpen=True
  Command1.Default=True
End Sub
Private Sub Command1_Click() `OK button
Dim ascii, instring, dummy As Variant
`Reception buffer is cleared.
MSComm1.InBufferCount=0
ascii=Text1.Text
ascii=ascii+vbCr `Carriage return(vbCr)
MSComm1.Output=ascii
`Stands by until"OK"is given from the TG19C.
  Do
      dummy=DoEvents ()
      `If there is a reception data, it is read out.
      If MSComm1.InBufferCount Then
          instring=MSComm1.Input
          `Inspects whether "OK" has been received or not.
          If InStr(instring, "OK") Then
              Text2.Text="Command OK"
              Beep
              Exit Do
          End if
          `Checks whether "NG" has been received or not.
          If InStr(instring, "NG") Then
              Text2.Text="Command Error!!"
              Beep
              Exit Do
          End if
      End if
  Loop
`Clears the text box.
  Text1.Text=""
```

```
`Shifts the focus to the text box.
  Text1.SetFocus
End Sub
Private Sub Command2_Click() `EXT button
`Ends the program.
End
End Sub
```

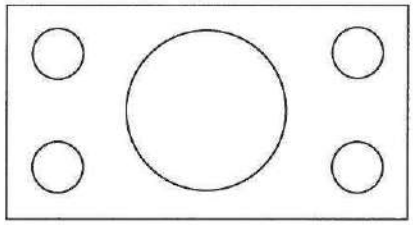
Remarks: Windows 95 is the trademark of Microsoft Corporation in the United States and other nations.

4.5. Detail of test signal

4.5.1. CIRCLE signal



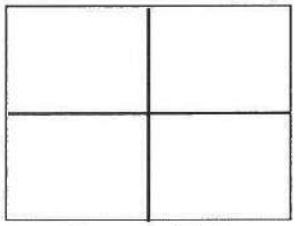
Screen of 4:3



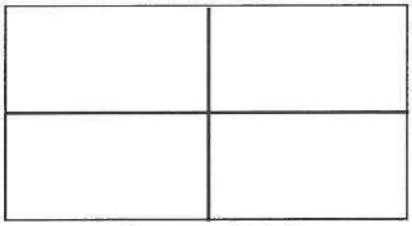
Screen of 16:9

		Aspect ratio			
		4:3		16:9	
Line system		525	625	525	625
White level 0% setup		714.3 mV	700.0 mV	714.3 mV	700.0 mV
White level 7.5% setup NTSC only		714.3 mV	-	714.3 mV	-
Black level 0% setup		0 mV	0 mV	0 mV	0 mV
Black level 7.5% setup NTSC only		53.6 mV	-	53.6 mV	-
Position of center circle					
Horizontal	525 system	35.69 µs +/- 0.3 µs			
	625 system	36.33 µs +/- 0.3 µs			
Vertical	525 system	142 lines/404 lines			
	625 system	166 lines/479 lines			
Circle width					
Horizontal		29.6 µs +/- 0.3 µs			
Vertical	525 system	52 lines to 231 lines/314 lines to 494 lines			
	625 system	56 lines to 276 lines/359 lines to 589 lines			
Corner circle width		(Aspect ratio 16:9 only)			
Horizontal		6.6 µs +/- 0.3 µs			
Vertical	525 system				
	Upper	52 lines to 106 lines/314 lines to 368 lines			
	Lower	178 lines to 231 lines/440 lines to 494 lines			
	625 system				
	Upper	56 lines to 122 lines/369 lines to 435 lines			
	Lower	210 lines to 276 lines/523 lines to 589 lines			

4.5.2. MARKER signal



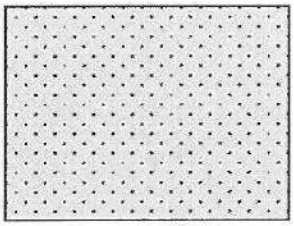
Screen of 4:3



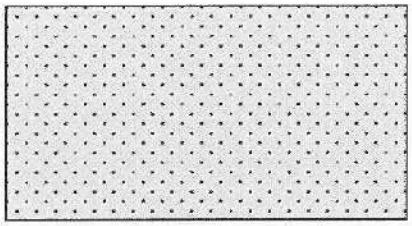
Screen of 16:9

	Aspect ratio			
	4:3		16:9	
Line system	525	625	525	625
White level 0% setup	714.3 mV	700.0 mV	714.3 mV	700.0 mV
White level 7.5% setup NTSC only	714.3 mV	-	714.3 mV	-
Black level 0% setup	0 mV	0 mV	0 mV	0 mV
Black level 7.5% setup NTSC only	53.6 mV	-	53.6 mV	-
Position of center marker				
Horizontal 525 system	35.69 μs +/- 0.3 μs			
625 system	36.33 μs +/- 0.3 μs			
Vertical 525 system	142 lines/404 lines			
625 system	166 lines/479 lines			
Pulse width				
Horizontal	296 ns +/- 100 ns			
Vertical	2 lines			

4.5.3. DOT signal



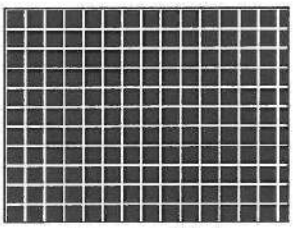
Screen of 4:3



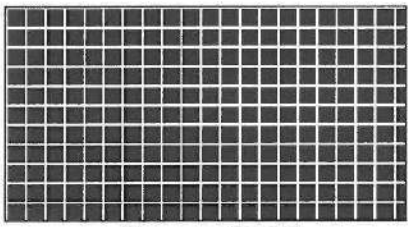
Screen of 16:9

	Aspect ratio			
	4:3		16:9	
Line system	525	625	525	625
White level 0% setup	714.3 mV	700.0 mV	714.3 mV	700.0 mV
White level 7.5% setup NTSC only	714.3 mV	-	714.3 mV	-
Black level 0% setup	0 mV	0 mV	0 mV	0 mV
Black level 7.5% setup NTSC only	53.6 mV	-	53.6 mV	-
No. of horizontal dots	18		24	
No. of vertical dots	14		14	
Pulse width Horizontal Vertical	296 ns +/- 100 ns 2 lines			

4.5.4. CROSS signal



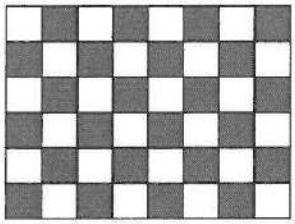
Screen of 4:3



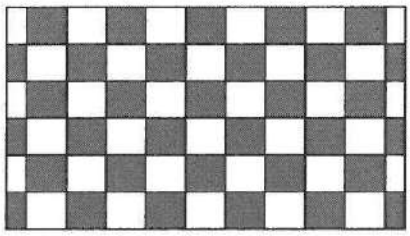
Screen of 16:9

	Aspect ratio			
	4:3		16:9	
Line system	525	625	525	625
White level 0% setup	714.3 mV	700.0 mV	714.3 mV	700.0 mV
White level 7.5% setup NTSC only	714.3 mV	-	714.3 mV	-
Black level 0% setup	0 mV	0 mV	0 mV	0 mV
Black level 7.5% setup NTSC only	53.6 mV	-	53.6 mV	-
No. of horizontal crosshatch	17		23	
No. of vertical crosshatch	13		13	
Pulse width Horizontal Vertical	296 ns +/- 100 ns 2 lines		296 ns +/- 100 ns 2 lines	
Crosshatch width Horizontal Vertical 525 system 625 system	2.96 µs +/- 0.3 µs 36 lines 44 lines		2.22 µs +/- 0.3 µs 36 lines 44 lines	

4.5.5. CHECKER signal



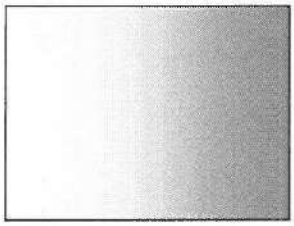
Screen of 4:3



Screen of 16:9

	Aspect ratio			
	4:3		16:9	
Line system	525	625	525	625
White level 0% setup	714.3 mV	700.0 mV	714.3 mV	700.0 mV
White level 7.5% setup NTSC only	714.3 mV	-	714.3 mV	-
Black level 0% setup	0 mV	0 mV	0 mV	0 mV
Black level 7.5% setup NTSC only	53.6 mV	-	53.6 mV	-
No. of horizontal checker	8		11	
No. of vertical checker	6		6	

4.5.6. MULTIBURST signal

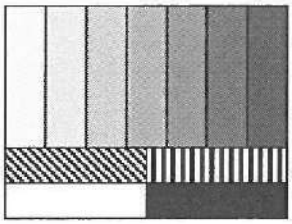


MULTIBURST

Color system	NTSC, NTSC-4.43 MKz		PAL, PAL-M, PAL-N, SECAM
MultiBurst frequency	0.5, 1.0, 2.0, 3.0, 3.58, 4.2 MHz		0.5, 1.0, 2.0, 3.0, 4.0, 4.8 MHz
Frequency characteristic	within +/- 1.0 dB		within +/- 1.0 dB
Setup	0%	7.5% NTSC only	0%
White REF signal	714.3 mV	714.3 mV	700.0 mV
MultiBurst pedestal	357.2 mV	384.0 mV	385.0 mV
Black level	0 mV	53.6 mV	0 mV

4.5.7. DEM signal

(1). NTSC, NTSC-4.43 MHz



DEM

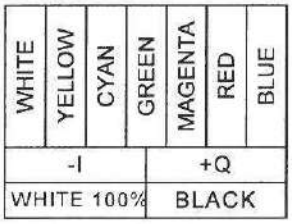
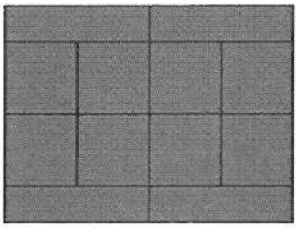


Figure of reference

Setup	Luminance signal		Chrominance signal		Phase
	0%	7.5% NTSC only	0%	7.5% NTSC only	
WHITE	535.7 mV	549.1 mV	-	-	-
YELLOW	476.8 mV	494.6 mV	480.2 mV	444.2 mV	167 degrees
CYAN	375.0 mV	400.4 mV	681.2 mV	630.1 mV	283 degrees
GREEN	316.1 mV	345.9 mV	636.0 mV	588.3 mV	241 degrees
MAGENTA	219.6 mV	256.7 mV	636.0 mV	588.3 mV	61 degrees
RED	160.7 mV	202.2mV	681.2 mV	630.1 mV	103 degrees
BLUE	58.9 mV	108.1 mV	480.2 mV	444.2 mV	347 degrees
BLACK	0 mV	53.6 mV	-	-	-
-I			357.2 mV	330.4 mV	303 degrees
+Q			357.2 mV	330.4 mV	33 degrees
WHITE 100%	714.3 mV	714.3 mV	-	-	-
BLACK	0 mV	53.6 mV	-	-	-

(2). PAL, PAL-N



DEM

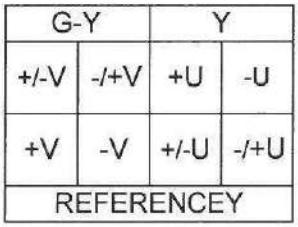
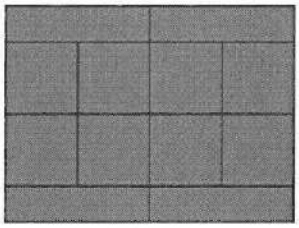


Figure of reference

	Luminance signal	Chrominance signal	Phase
G-Y	350.0mV	350.0mV	146 degrees/214 degrees
Y		-	-
+/-V		350.0mV	90 degrees/270 degrees
V			270 degrees/90 degrees
+U			0 degrees
-U			180 degrees
+V (COLOR LESS)			90 degrees
-V (COLOR LESS)			270 degrees
+/-U (COLOR LESS)			0 degrees/180 degrees
U (COLOR LESS)			180 degrees/0 degrees
REFERENCE Y		-	-

(3). PAL-M



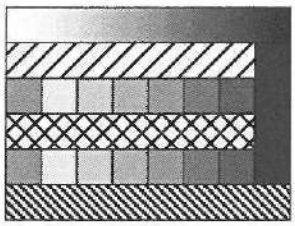
DEM

G-Y		Y	
+/-V	-/+V	+U	-U
+V	-V	+/-U	-/+U
REFERENCEY			

Figure of reference

	Luminance signal	Chrominance signal	Phase
G-Y	378.0mV	350.0mV	146 degrees/214 degrees
Y		-	-
+/-V		350.0mV	90 degrees/270 degrees
V			270 degrees/90 degrees
+U			0 degrees
-U			180 degrees
+V (COLOR LESS)			90 degrees
-V (COLOR LESS)			270 degrees
+/-U (COLOR LESS)			0 degrees/180 degrees
U (COLOR LESS)			180 degrees/0 degrees
REFERENCE Y		-	-

(4). SECAM



DEM

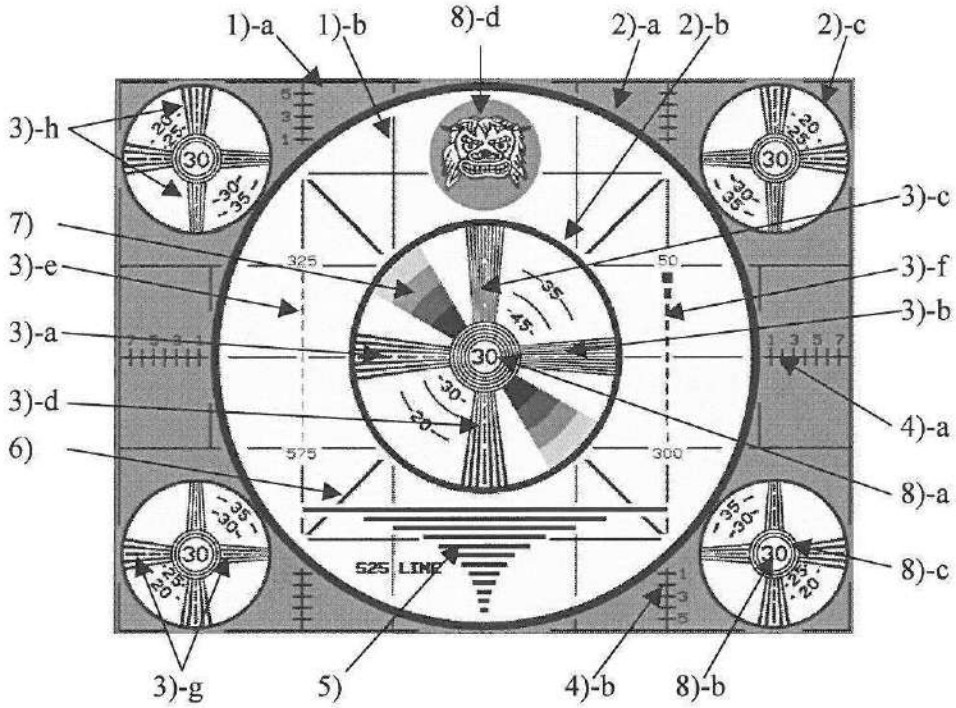
MULTIBURST							
Y 30%							Bk
Mg	Ye	Cy	Gr	Mg	Re	Bl	
Y 75%							
Mg	Ye	Cy	Gr	Mg	Re	Bl	
REFERENCE 75%							

Figure of reference

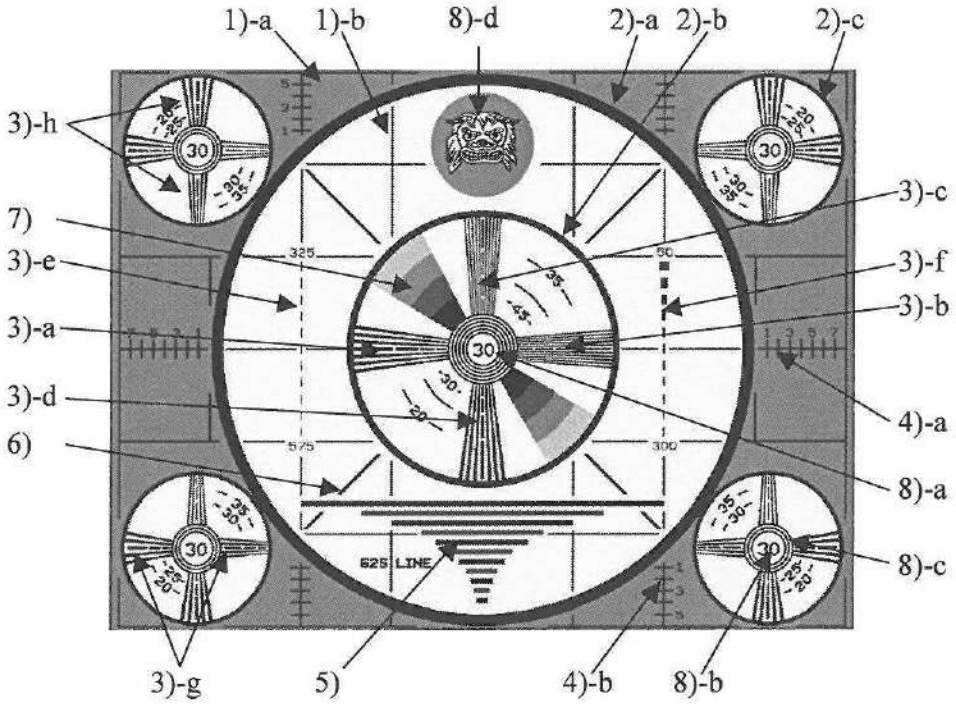
	Luminance signal	DR signal		DB signal	
		Frequency	Amplitude	Frequency	Amplitude
MultiBurst freq.	0.8, 1.8, 2.8, 3.0, 3.2, 3.4, 3.8, 4.8 MHz				
Freq. Charac.	within +/- 1.0 dB				
Y30%	210.0 mV	4.4063 MHz	214.5 mV	4.2500 MHz	166.7 mV
Y75%	525.0 mV	4.4063 MHz	214.5 mV	4.2500 MHz	166.7 mV
YELLOW	465.2 mV	4.3607 MHz	183.8 mV	4.0200 MHz	362.8 mV
CYAN	368.0 mV	4.6863 MHz	476.0 mV	4.3276 MHz	168.5 mV
GREEN	308.2 mV	4.6407 MHz	431.9 mV	4.0976 MHz	280.5 mV
MAGENTA	216.8 mV	4.1713 MHz	212.3 mV	4.4024 MHz	211.6 mV
RED	157.0 mV	4.1263 MHz	252.2 mV	4.1724 MHz	211.6 mV
BLUE	59.8 mV	4.4518 MHz	252.2 mV	4.4800 MHz	277.5 mV
REFERENCE 75%	525.0 mV	4.4063 MHz	214.5 mV	4.2500 MHz	166.7 mV

4.5.8. MONOSCOPE signal

(1). 525 system

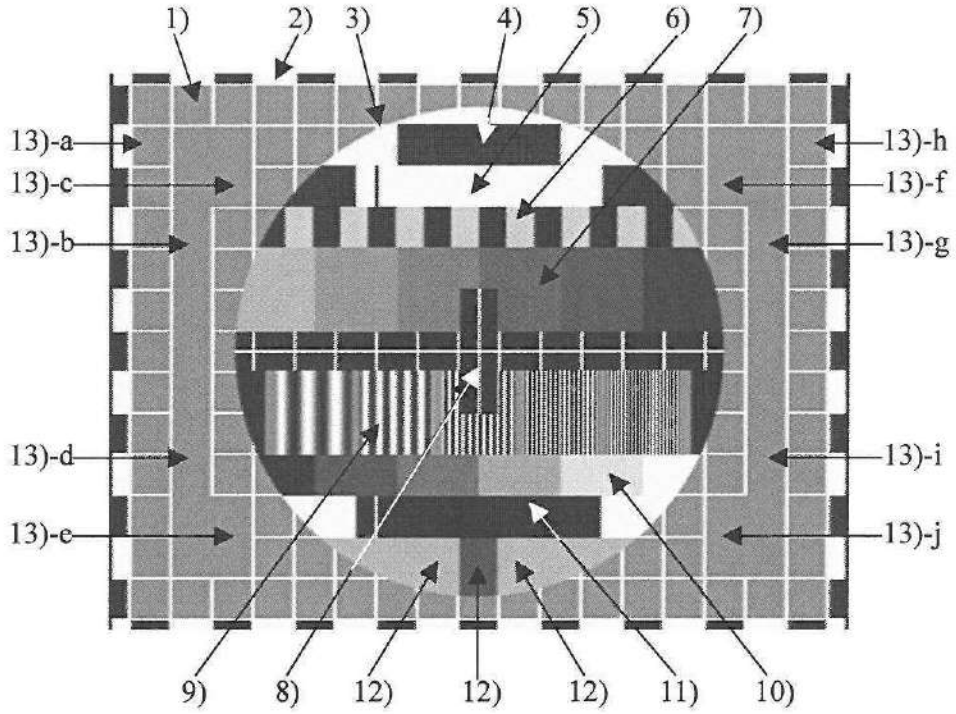


(2). 625 system



Line system	525	625
1) Grid signal a. Size of one grid	40 lines x 6.5 µs	47.5 lines x 6.4 µs
b. Pulse width	140 ns +/- 20 ns	
2) Circle signal a. Large circle in center b. Small circle in center c. Small circle in corners d. Center position of the circle	Approx. 100% of the effective picture Approx. 50% of the effective picture Approx. 28% of the effective picture SYNC falling 50% 35.69 µs +/-0.3 µs	 SYNC falling 50% 36.33 µs +/-0.3 µs
3) Wedges signal a. Center, horizontal, left b. Center, horizontal, right c. Center, vertical, upper d. Center, vertical, bottom e. Left corners, vertical f. Right corners, vertical g. Corners, horizontal h. Corners, vertical	Resolution: 50 to 350 lines Resolution: 300 to 500 lines Resolution: 300 to 500 lines Resolution: 150 to 350 lines Resolution: 325 to 575 lines (intervals of 25 lines) Resolution: 50 to 300 lines (intervals of 25 lines) Resolution: 150 to 350 lines Resolution: 250 to 400 lines Resolution: 150 to 300 lines Resolution: 250 to 400 lines	
4) Picture size a. Horizontal size marker b. Vertical size marker	A grid is horizontally divided into eight. Indicators: 1, 3, 5, 7 A grid is vertically divided into six. Indicators: 1, 3, 5	
5) Blind signal Vertical resolution	A total 12 square wave signals of horizontal 4H width 1.5, 2.3, 3, 4.5, 6, 9, 12, 18, 24, 36, 49 and 72 lines	A total of 11 square wave signals of horizontal 4H width 1.5, 2.3, 3, 4.5, 6, 9, 12, 18, 24, 36 and 49 lines
6) Diagonal signals	A pair of diagonal signals is arranged symmetrically against the picture center.	
7) Stair step signal 4 graduation	0, 25, 50, 75%	
Signal level	0, 178.5, 357.2, 535.7 mV	0, 175.0, 350.0, 525.0 mV
Set up 7.5% NTSC only	53.6, 218.7, 384.0, 549.1 mV	-
8) Focus check a. Center rings b. Corner rings c. Character d. Mascot mark	Resolution: 300 lines/No. of rings: 6 Resolution: 300 lines/No. of rings: 3 Indicators in center and corner rings: 30 "Shishi" mark	

4.5.9. SPECIAL (TG19CA001/option)

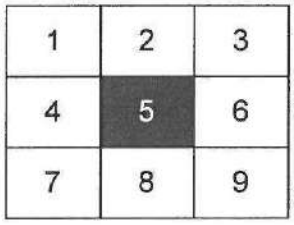


Color system	NTSC, NTSC-4.43 MHz	PAL, PAL-N, SECAM
1) Crosshatch and raster signal		
Luminance signal level	714.3 mV (714.3 mVp-p)	700.0 mV (700.0 mVp-p)
Pulse level	714.3 mV (357.2 mVp-p)	700.0 mV (350.0 mVp-p)
Setup 7.5% NTSC only	714.3 mV (330.0 mVp-p)	-
Half-amplitude of pulse	230 ns +/- 23 ns	230 ns +/- 23 ns
Size of one grid	36 lines x 2.96 µs +/- 0.1 µs	42 lines x 2.85 µs +/- 0.1 µs
Back ground level	357.2 mV	350.0 mV
Setup 7.5% NTSC only	384.0 mV	-
2) Corner stripe sig. (checker pattern)		
Luminance signal level	714.3 mV	700.0 mV
H. width of stripe signal, L and R	1.35 µs +/- 0.1 µs	2.25 µs +/- 0.1 µs
Horizontal width white signal	3.18 µs +/- 0.1 µs	3.08 µs +/- 0.1 µs
Horizontal level black signal	2.72 µs +/- 0.1 µs	2.62 µs +/- 0.1 µs
V. width of stripe sig, up and bottom	7.5 lines	13.5 lines
Vertical width of white signal	38 lines	44 lines
Vertical width of black signal	34 lines	40 lines
3) Circle signal		
Diameter	Approx. 88% of effective	Approx. 88% of effective
Center position of the circle	SYNC falling 50%	SYNC falling 50%
	35.69 µs +/- 0.3 µs	36.33 µs +/- 0.3 µs
4) Black square wave signal		
Luminance signal level	0 mV (714.3 mVp-p)	0 mV (700.0 mVp-p)
Width	36 lines x 11.5 µs +/- 0.1 µs	42 lines x 11.5 µs +/- 0.1 µs

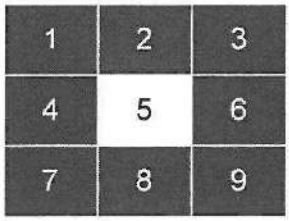
5) Black bar & white square wave sig.		
Luminance signal level	714.3 mV (714.3 mVp-p)	700.0 mV (700.0 mVp-p)
Pulse level	0 mV (714.3 mVp-p)	0 mV (700.0 mVp-p)
Half-amplitude of pulse	230 ns +/- 23 ns	230 ns +/- 23 ns
White signal width	36 lines x 17.0 µs +/- 1 µs	42 lines x 17.0 µs +/- 1 µs
6) 250 kHz square wave		
Luminance signal level	0 mV, 535.0 mV	0 mV, 525.0 mV
Setup 7.5% NTSC only	53.6 mV, 549.0 mV	-
Width	36 lines x 2.0 µs +/- 0.1 µs	42 lines x 2.0 µs +/- 0.1 µs
7) Color bar signal	75/0/75/0	100/0/75/0
Setup 7.5% NTSC only	77/7.5/77/7.5	-
Width	74 lines	86 lines
8) White crosshatch & center marker		
Pulse level	714.3 mV	700.0 mV
Pulse-Pulse interval width	2.96 µs +/- 0.1 µs	2.85 µs +/- 0.1 µs
Pulse-center marker interval width	1.48 µs +/- 0.1 µs	1.43 µs +/- 0.1 µs
Half-amplitude of pulse	230 ns +/- 23 ns	230 ns +/- 23 ns
Center marker	SYNC falling 50% 35.69 µs +/- 0.3 µs	SYNC falling 50% 36.33 µs +/- 0.3 µs
9) Multi burst signal		
Frequency	0.5, 1.0, 2.0, 3.0, 4.0 MHz	0.8, 1.8, 2.8, 3.8, 4.8 MHz
Width	74 lines	89 lines
10) Stair signal		
Luminance signal level	142.9, 285.7, 428.6, 571.4, 714.3 mV	140.0, 280.0, 420.0, 560.0, 700.0 mV
Setup 7.5% NTSC only	185.8, 317.9, 450.1, 582.1, 714.3 mV	-
Width	36 lines	42 lines
11) White bar & black square wave sig.		
Luminance signal level	0 mV (714.3 mVp-p)	0 mV (700.0 mV)
Pulse level	714.3 mV (714.3 mVp-p)	700.0 mV (700.0 mVp-p)
Half-amplitude of pulse	230 ns +/- 23 ns	230 ns +/- 23 ns
Black signal width	36 lines x 17.0 µs +/- 1 µs	42 lines x 17.0 µs +/- 1 µs
12) Y/C delay checker		
Luminance signal level		
Red	160.7 mV	157.0 mV
Setup 7.5% NTSC only	202.2 mV	-
Yellow	476.8 mV	465.2 mV
Setup 7.5% NTSC only	494.6 mV	-
Chrominance signal level		
Red	681.2 mV	663.8 mV (except SECAM)
Setup 7.5% NTSC only	630.1 mV	-
Yellow	480.2 mV	470.5 mV (except SECAM)
Setup 7.5% NTSC only	444.2 mV	-
Phase (except SECAM)		
Red	103 degrees	103, 257 degrees
Yellow	167 degrees	167, 193 degrees
13) Mod color difference signal		
Luminance signal level	357.2 mV	350.0 mV
Setup 7.5% NTSC only	384.0 mV	-

Chrominance signal level	285.7 mV	300.0 mV (except SECAM)
Setup 7.5% NTSC only	266.0 mV	-
Phase (except SECAM)		
a. + (R-Y)	90 degrees	90 degrees (COLOR LESS)
b. -/+ (R-Y), NTSC: + (R-Y)	270 degrees	270, 90 degrees
c. + (G-Y)	34 degrees	34, 326 degrees
d. +/- (R-Y), NTSC: + (R-Y)	90 degrees	90, 270 degrees
e. – (G-Y)	146 degrees	146, 214 degrees
f. (+ (G-Y)	34 degrees	34, 326 degrees
g. – (B-Y)	180 degrees	180 degrees
h. +/- (B-Y), NTSC: + (B-Y)	0 degrees	0, 180 degrees (COLOR LESS)
i. + (B-Y)	0 degrees	0 degrees
j. – (G-Y)	146 degrees	146, 214 degrees

4.5.10. WINDOW signal



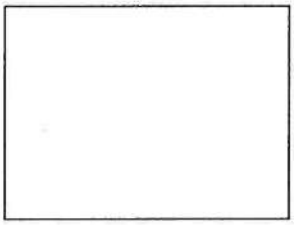
WINDOW (Round5)-W



WINDOW (Round5)-B

	NTSC, NTSC-4.43MHz		PAL, PAL-M, PAL-N, SECAM
Setup	0%	7.5% NTSC only	0%
WHITE 100% signal	714.3 mV	714.3 mV	700.0 mV
BLACK level	0 mV	53.6 mV	0 mV
MOVING	Whenever one time of a switch is pushed, a window moves by 9 blocks from 1. Round1 to 9		
W/B	Whenever W/B switch is pushed, a window turns over by IN and EXT monochrome.		

4.5.11. WHITE signal

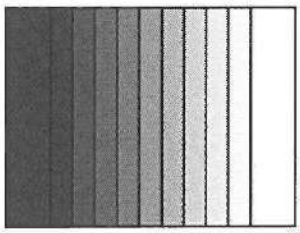


100% WHITE

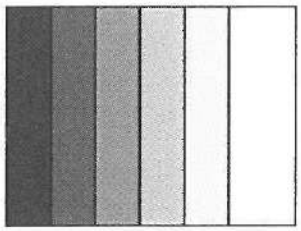
		NTSC, NTSC-4.43MHz		PAL, PAL-M, PAL-N, SECAM
Setup		0%	7.5% NTSC only	0%
0%	Round1	0mV	53.6mV	0mV
10%	Round2	71.4mV	119.6mV	70.0mV
25%	Round3	178.5mV	218.7mV	175.0mV
50%	Round4	357.3mV	384.0mV	350.0mV
75%	Round5	535.7mV	549.1mV	525.0mV
100%	Round6	714.3mV	714.3mV	700.0mV

4.5.12. STAIR signal

(1). NTSC, NTSC-4.43MHz



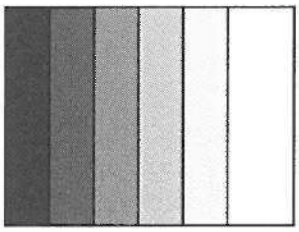
5 STAIR



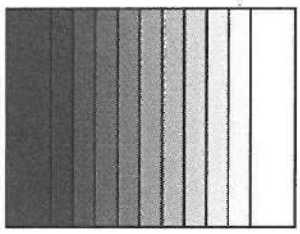
10 STAIR

Setup		Luminance signal		Chrominance signal		Phase
		0%	7.5% NTSC only	0%	7.5% NTSC only	
5STAIR	10STAIR					
0STAIR	0STAIR	0 mV	53.6 mV	285.7 mV	266.0 mV	180 degrees
-	1STAIR	71.4 mV	119.6 mV			
1STAIR	2STAIR	142.9 mV	185.8 mV			
-	3STAIR	214.3 mV	251.8 mV			
2STAIR	4STAIR	285.7 mV	317.9 mV			
-	5STAIR	357.2 mV	384.0 mV			
3STAIR	6STAIR	428.6 mV	450.1 mV			
-	7STAIR	500.0 mV	516.1 mV			
4STAIR	8STAIR	571.4 mV	582.1 mV			
-	9STAIR	642.9 mV	648.3 mV			
5STAIR	10STAIR	714.3 mV	714.3 mV			
DG		Within 1%				
DP		Within 1 degrees				
5STAIR		Round1				
MOD 5STAIR		Round2				
10STAIR		Round3				
MOD 10STAIR		Round4				

(2). PAL, PAL-M, PAL-N



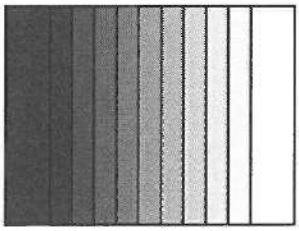
5 STAIR



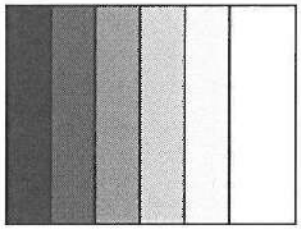
10 STAIR

		Luminance signal	Chrominance signal	Phase
5STAIR	10STAIR			
0STAIR	0STAIR	0 mV	300.0 mV	180 degrees
-	1STAIR	70.0 mV		
1STAIR	2STAIR	140.0 mV		
-	3STAIR	210.0 mV		
2STAIR	4STAIR	280.0 mV		
-	5STAIR	350.0 mV		
3STAIR	6STAIR	420.0 mV		
-	7STAIR	490.0 mV		
4STAIR	8STAIR	560.0 mV		
-	9STAIR	630.0 mV		
5STAIR	10STAIR	700.0 mV		
DG		Within 1%		
DR		Within 1 degrees		
5STAIR		Round1		
MOD 5STAIR		Round2		
10STAIR		Round3		
MOD 10STAIR		Round4		

(3). SECAM



5 STAIR

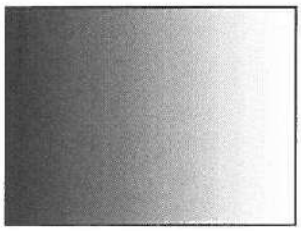


10 STAIR

		Luminance signal	DR signal		DB signal	
			Frequency	Amplitude	Frequency	Amplitude
5STAIR	10STAIR					
0STAIR	0STAIR	0 mV	4.4063 MHz	214.5 mV	4.2500 MHz	166.7 mV
-	1STAIR	70.0 mV				
1STAIR	2STAIR	140.0 mV				
-	3STAIR	210.0 mV				
2STAIR	4STAIR	280.0 mV				
-	5STAIR	350.0 mV				
3STAIR	6STAIR	420.0 mV				
-	7STAIR	490.0 mV				
4STAIR	8STAIR	560.0 mV				
-	9STAIR	630.0 mV				
5STAIR	10STAIR	700.0 mV				
5STAIR		Round1				
MOD 5STAIR		Round2				
10STAIR		Round3				
MOD 10STAIR		Round4				

4.5.13. RAMP signal

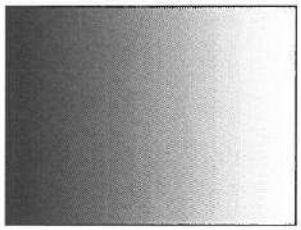
(1). NTSC, NTSC-4.43MHz



RAMP

	Luminance signal		Chrominance signal		Phase
Setup	0%	7.5% NTSC only	0%	7.5% NTSC only	
BLACK	0 mV	53.6 mV	285.7 mV	266.0 mV	180 degrees
RAMP	0 to 714.3 mV	53.6 to 714.3 mV			
WHITE 100%	714.3 mV	714.3 mV			
DG	Within 1%				
DP	Within 1 degrees				
RAMP MOD RAMP	Round1 Round2				

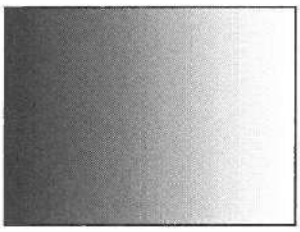
(2). PAL, PAL-M, PAL-N



RAMP

	Luminance signal	Chrominance signal	Phase
BLACK	0 mV	300.0 mV	180 degrees
RAMP	0 to 700.0 mV		
WHITE 100%	700.0 mV		
DG	Within 1%		
DP	Within 1 degrees		
RAMP MOD RAMP	Round1 Round2		

(3). SECAM

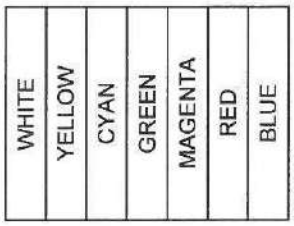


RAMP

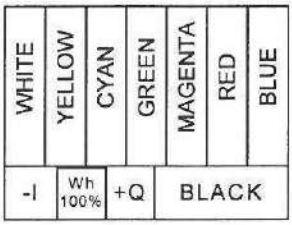
	Luminance signal	DR signal		DB signal	
		Frequency	Amplitude	Frequency	Amplitude
BLACK	0 mV	4.4063 MHz	214.5 mV	4.2500 MHz	166.7 mV
RAMP	0 to 700.0 mV				
WHITE 100%	700.0 mV				
RAMP MOD RAMP	Round1 Round2				

4.5.14. COLOR BAR signal

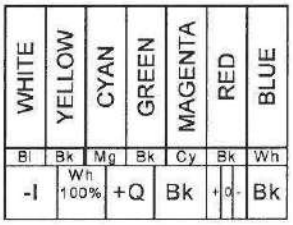
(1). NTSC, NTSC-4.43 MHz



FULL COLOR BAR (reference)



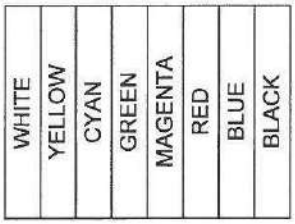
EIA COLOR BAR (reference)



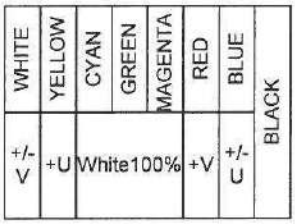
SMPTE COLOR BAR (reference)

	Luminance signal		Chrominance signal		Phase
Setup	0%	7.5% NTSC only	0%	7.5% NTSC only	
WHITE	535.7 mV	549.1 mV	-	-	-
YELLOW	476.8 mV	494.6 mV	480.2 mV	444.2 mV	167 degrees
CYAN	375.0 mV	400.4 mV	681.2 mV	630.1 mV	283 degrees
GREEN	316.1 mV	345.9 mV	636.0 mV	588.3 mV	241 degrees
MAGENTA	219.6 mV	256.7 mV	636.0 mV	588.3 mV	61 degrees
RED	160.7 mV	202.2 mV	681.2 mV	630.1 mV	103 degrees
BLUE	58.9 mV	108.1 mV	480.2 mV	444.2 mV	347 degrees
BLACK	0 mV	53.6 mV	-	-	-
-I			285.7 mV	266.0 mV	303 degrees
+Q			285.7 mV	266.0 mV	33 degrees
WHITE 100%	714.3 mV	714.3 mV	-	-	-
BLACK	0 mV	53.6 mV	-	-	-
PLUGE (+)	28.6 mV	80.1 mV	-	-	-
PLUGE (0)	0 mV	53.6 mV	-	-	-
PLUGE (-)	-28.6 mV	27.1 mV	-	-	-
FULL COLOR BAR	Round1				
EIA COLOR BAR	Round2				
SMPTE COLOR BAR	Round3				

(2). PAL, PAL-M, PAL-N



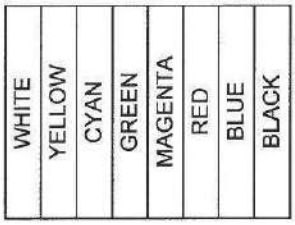
FULL COLOR BAR (reference)



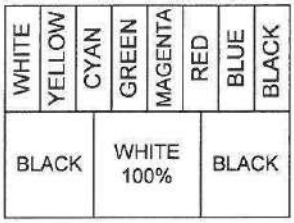
SPLIT COLOR BAR (reference)

	Luminance signal	Chrominance signal	Phase
WHITE	700.0 mV	-	-
	525.0 mV (PAL-M)	-	-
YELLOW	465.2 mV	470.5 mV	167 degrees/193 degrees
CYAN	368.0 mV	663.8 mV	283 degrees/77 degrees
GREEN	308.2 mV	620.1 mV	241 degrees/119 degrees
MAGENTA	216.8 mV	620.1 mV	61 degrees/299 degrees
RED	157.0 mV	663.8 mV	103 degrees/257 degrees
BLUE	59.8 mV	470.5 mV	347 degrees/13 degrees
BLACK	0 mV	-	-
+/-V	0 mV	300.0 mV	90 degrees/270 degrees
+U	0 mV	300.0 mV	0 degrees
WHITE 100%	700.0 mV	-	-
+V (COLOR LESS)	0 mV	300.0 mV	90 degrees
+/-U (COLOR LESS)	0 mV	300.0 mV	0 degrees/180 degrees
FULL COLOR BAR	Round1		
SPLIT COLOR BAR	Round2		

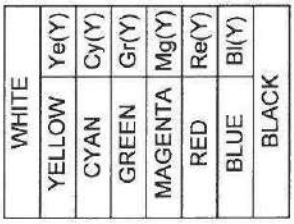
(3). SECAM



FULL COLOR BAR (reference)



SPLIT COLOR BAR1 (reference)

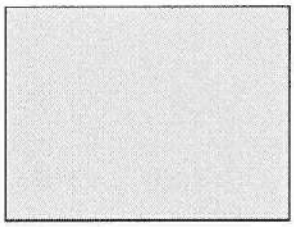


SPLIT COLOR BAR2 (reference)

	Luminance signal	DR signal		DB signal	
		Frequency	Amplitude	Frequency	Amplitude
WHITE	700.0 mV	4.4063 MHz	214.5 mV	4.2500 MHz	166.7 mV
YELLOW	465.2 mV	4.3607 MHz	183.8 mV	4.0200 MHz	362.8 mV
CYAN	368.0 mV	4.6863 MHz	476.0 mV	4.3276 MHz	168.5 mV
GREEN	308.2 mV	4.6407 MHz	431.9 mV	4.0976 MHz	280.5 mV
MAGENTA	216.8 mV	4.1713 MHz	212.3 mV	4.4024 MHz	211.6 mV
RED	157.0 mV	4.1263 MHz	252.2 mV	4.1724 MHz	211.6 mV
BLUE	59.8 mV	4.4518 MHz	252.2 mV	4.4800 MHz	277.5 mV
WHITE 100%	700.0 mV	4.4063 MHz	214.5 mV	4.2500 MHz	166.7 mV
FULL COLOR BAR Round1 SPLIT COLOR BAR Round2 SPLIT COLOR BAR Round3					

4.5.15. PURITY signal

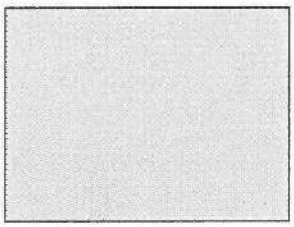
(1). NTSC, NTSC-4.43 MHz



PULITY

Setup		Luminance signal		Chrominance signal		Phase
		0%	7.5% NTSC only	0%	7.5% NTSC only	
WHITE	Round1	714.3 mV	714.3 mV	-	-	-
YELLOW	Round2	476.8 mV	494.6 mV	480.2 mV	444.2 mV	167 degrees
CYAN	Round3	375.0 mV	400.4 mV	681.2 mV	630.1 mV	283 degrees
GREEN	Round4	316.1 mV	345.9 mV	636.0 mV	588.3 mV	241 degrees
MAGENTA	Round5	219.6 mV	256.7 mV	636.0 mV	588.3 mV	61 degrees
RED	Round6	160.7 mV	202.2 mV	681.2 mV	630.1 mV	103 degrees
BLUE	Round7	58.9 mV	108.1 mV	480.2 mV	444.2 mV	347 degrees
BLACK	Round8	0 mV	53.6 mV	-	-	-

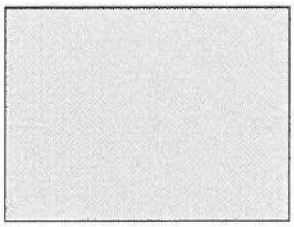
(2). PAL, PAL-M, PAL-N



PULITY

		Luminance signal	Chrominance signal	Phase
WHITE	Round1	700.0 mV	-	-
YELLOW	Round2	465.2 mV	470.5 mV	167 degrees/193 degrees
CYAN	Round3	368.0 mV	663.8 mV	283 degrees/77 degrees
GREEN	Round4	308.2 mV	620.1 mV	241 degrees/119 degrees
MAGENTA	Round5	216.8 mV	620.1 mV	61 degrees/299 degrees
RED	Round6	157.0 mV	663.8 mV	103 degrees/257 degrees
BLUE	Round7	59.8 mV	470.5 mV	347 degrees/13 degrees
BLACK	Round8	0 mV	-	-

(3). SECAM



PULITY

		Luminance signal	DR signal		DB signal	
			Frequency	Amplitude	Frequency	Amplitude
WHITE	Round1	700.0 mV	4.4063 MHz	214.5 mV	4.2500 MHz	166.7 mV
YELLOW	Round2	465.2 mV	4.3607 MHz	183.8 mV	4.0200 MHz	362.8 mV
CYAN	Round3	368.0 mV	4.6863 MHz	476.0 mV	4.3276 MHz	168.5 mV
GREEN	Round4	308.2 mV	4.6407 MHz	431.9 mV	4.0976 MHz	280.5 mV
MAGENTA	Round5	216.8 mV	4.1713 MHz	212.3 mV	4.4024 MHz	211.6 mV
RED	Round6	157.0 mV	4.1263 MHz	252.2 mV	4.1724 MHz	211.6 mV
BLUE	Round7	59.8 mV	4.4518 MHz	252.2 mV	4.4800 MHz	277.5 mV
BLACK	Round8	0 mV	4.4063 MHz	214.5 mV	4.2500 MHz	166.7 mV

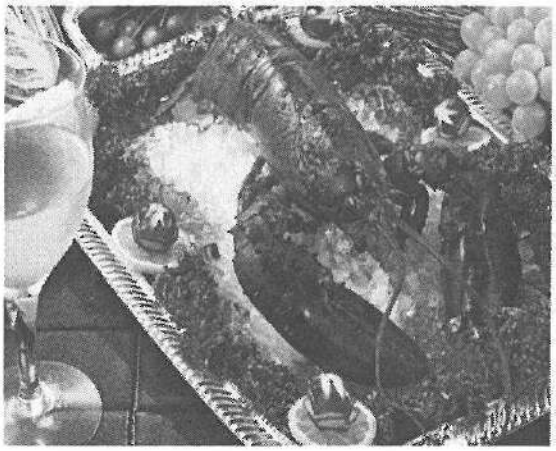
4.5.16. SPECIAL (TG19CA006 to TG19CA012/OPTION)

TG19CA006 (dining table)

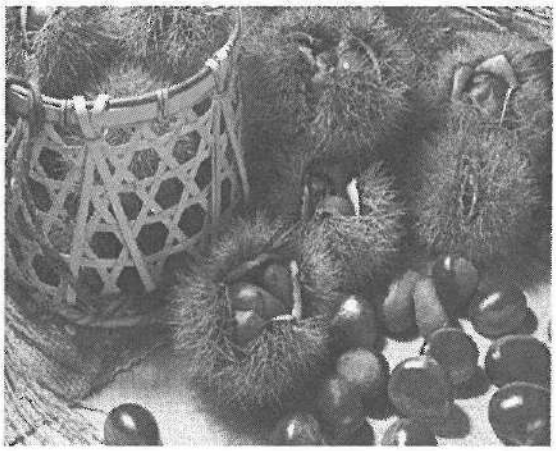
TG19CA007 (stationery)

TG19CA008 (toys)

TG19CA009 (White House)



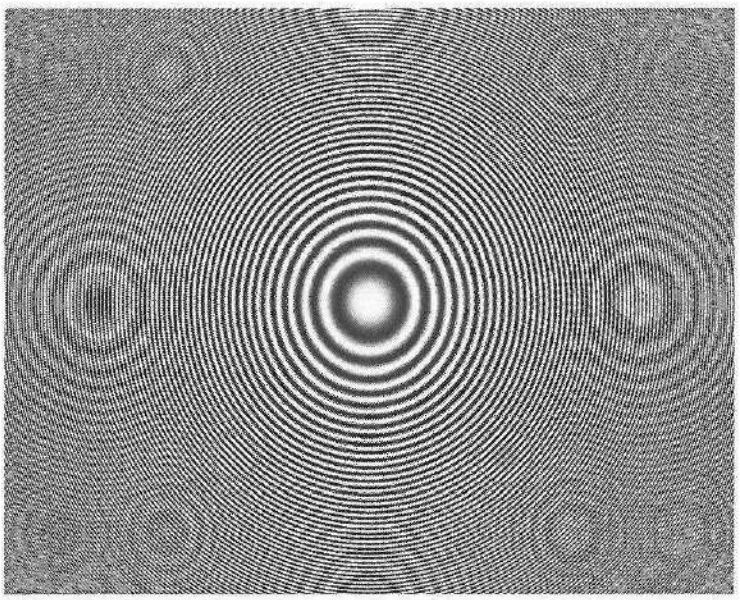
TG19CA010 (Omar lobster and fruits)



TG19CA011 (Japanese chestnut)

TG19CA012 (New year gift)

4.5.17. SPECIAL (TG19CA013/OPTION)

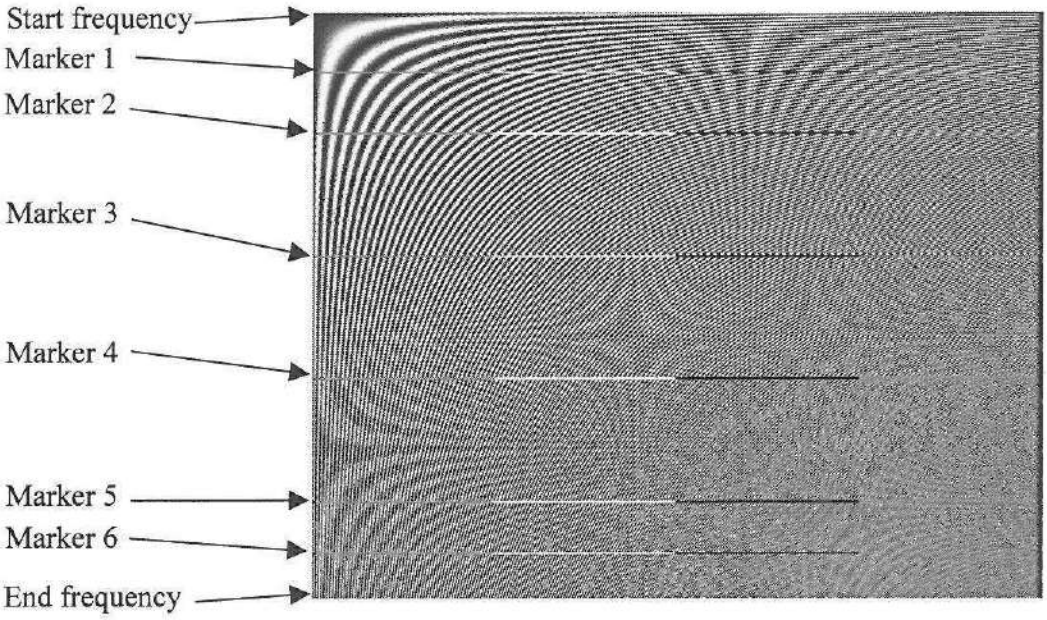


CZP signal

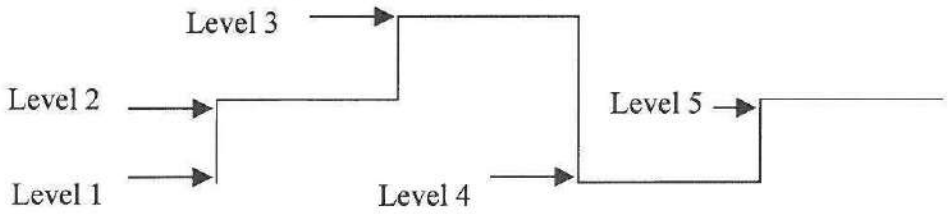
NTSC/NTSC-4.43: 4.2 MHz MAX.
PAL/PAL-N/SECAM: 4.8 MHz MAX.

4.5.18. SPECIAL (TG19CA014/OPTION)

	System	
	NTSC/NTSC-4.43 MHz	PAL/PAL-N/SECAM
Start frequency	10 kHz	10 kHz
End frequency	4.2 MHz	4.8 MHz
Marker 1	0.5 MHz	0.5 MHz
Marker 2	1.0 MHz	1.0 MHz
Marker 3	2.0 MHz	2.0 MHz
Marker 4	3.0 MHz	3.0 MHz
Marker 5	3.58 MHz	4.0 MHz
Marker 6	4.0 MHz	4.43 MHz
Level 1	0 mVp-p	0 mVp-p
Level 2	357.2 mVp-p	350.0 mVp-p
Level 3	714.3 mVp-p	700.0 mVp-p
Level 4	0 mVp-p	0 mVp-p
Level 5	357.2 mVp-p	350.0 mVp-p



Marker signal waveform diagram



4.6. How to use test signals

(1). CIRCLE signal	For checking the reproducibility of circles on the screens having aspect ratio 4:3 and 16:9.
(2). MARKER signal	For checking the center position on the monitor screen.
(3). DOT CROSS signal	Test signal for checking convergence in aspect ratio of 4:3 and 16:9. This signal is used to check color miss-matching (especially at corners of the screen).
(4). CHECKER signal	For checking synchronization performance, influence by blanking line, flare and others of the TV monitors having aspect ratio of 4:3 and 16:9.
(5). MULTIBURST signal	For checking frequency response caused by amplitude changes of frequency.
(6). DEM signal	This signal is used for orthogonal adjustment of the color demodulator.
(7). MONOSCOPE signal	For checking resolution, linearity of deflection, convergence, focus, streaking, interlace, gradation picture size and others on a single screen.
(8). SPECIAL signal	For checking resolution, linearity of deflection, convergence, focus, streaking, gradation, picture size, color reproducibility, Y/C delay, characteristics of color demodulator and matrix, burst gate and others on a signal screen.
(9). WINDOW signal	This window signal divides the monitor screen into nine blocks, each of which is movable.
(10). STAIR signal	It is possible to judge the linearity performance by checking whether brightness from the pedestal to the reference value is correctly transmitted. This stair signal is also usable for checking differential gain and phase.
(11). RAMP signal	It is possible to judge the linearity performance by checking whether brightness from the pedestal to the reference value is correctly transmitted. This ramp signal is also usable for checking differential gain and phase.
(12). COLOR BAR signal	Each color has the highest saturation that can be reproduced in a color television set. This color bar signal is used for checking whether phase and chroma are correctly transmitted or not.
(13). PURITY signal	For checking color unevenness, uniformity, and others.

5 OPERATING PRINCIPLE

[NOTE]
Refer to block diagram at the end of this instruction manual.

a.	CPU	Both operation of controls and signal selection on the front panel (1), and remote operation by the RS232C (3) are made by the CPU (2).
b.	Timing generation circuit	Internal clock and various timing signals of the TG19C are generated by the TIMING GENERATOR (4).
c.	Data MEMORY	Test signals output from the TG19C are saved in the TEST SIGNAL MEMORY (6). Output signal and color system are switched by the CPU (2), and the memory readout address is generated in the TIMING GENERATOR (4).
d.	Video encoder	Output data(YUV data of the 4:2:2 format) of the TEST SIGNAL MEMORY (6) are converted to analog signals ? composite signal, Y/C signal, GBR signal and YUV signal by the VIDEO ENCODER (5). These analog signals are output to the corresponding output connectors on the rear panel.
e.	Audio	At AUDIO (8), each sound MPX base-band signal is frequency -modulated by an IF frequency. The resulting signal is output to the RF MODULATOR output connector (9).
f.	RF	VBS signal available at (5) is DC-clamped and modulated by an IF frequency. The resulting signal is synthesized with a sound IF signal (8), and the resulting signal is converted to the second IF frequency. This signal and the local signal (10) are synthesized, as the RF signal having the set frequency, and it is output to the connector provided on the front panel.
g.	Teletext	Clocks of each system are locked to HD at the TELETEXT (7), the data which are read from the memory are P/S-converted. They are superposed on the predetermined positions of VBS (5) which has passed through the filter.

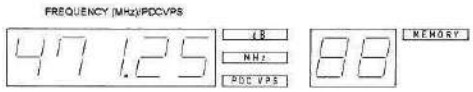
6 MAINTENANCE and CALIBRATION

6.1. Notice

Any component, mechanism or setting of the TG19C are not adjustable by the customer. If you have any request or problem, please do not hesitate to contact ShibaSoku Co.,Ltd. or its representative.

6.2. Memory initialization

1. Turn on the power switch while the WHITE switch of the SIGNAL SELECT is being pressed.
2. When memory initialization has been completed, frequency value is shown on the FREQUENCY LED.
   This operation requires several seconds only with the model TG19CC.



3. Set the memory again.

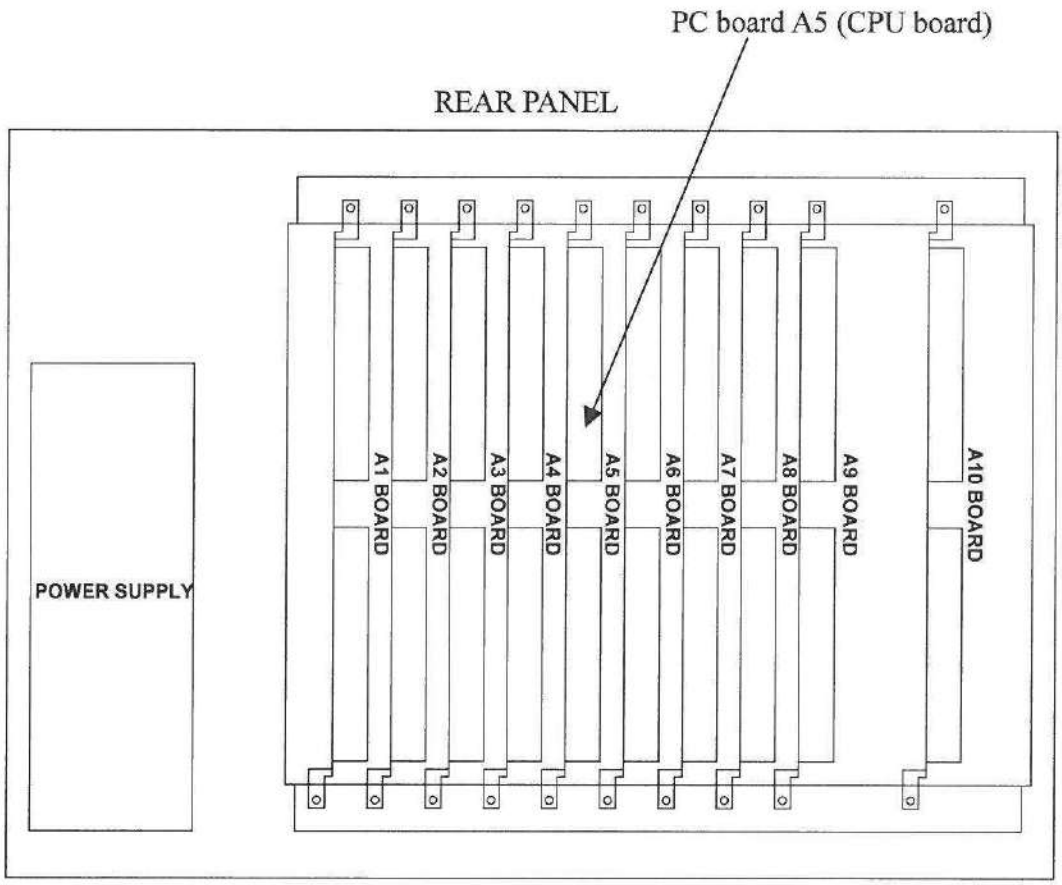
6.3. Troubleshooting

Before judging the problem as a malfunction, please check following points.

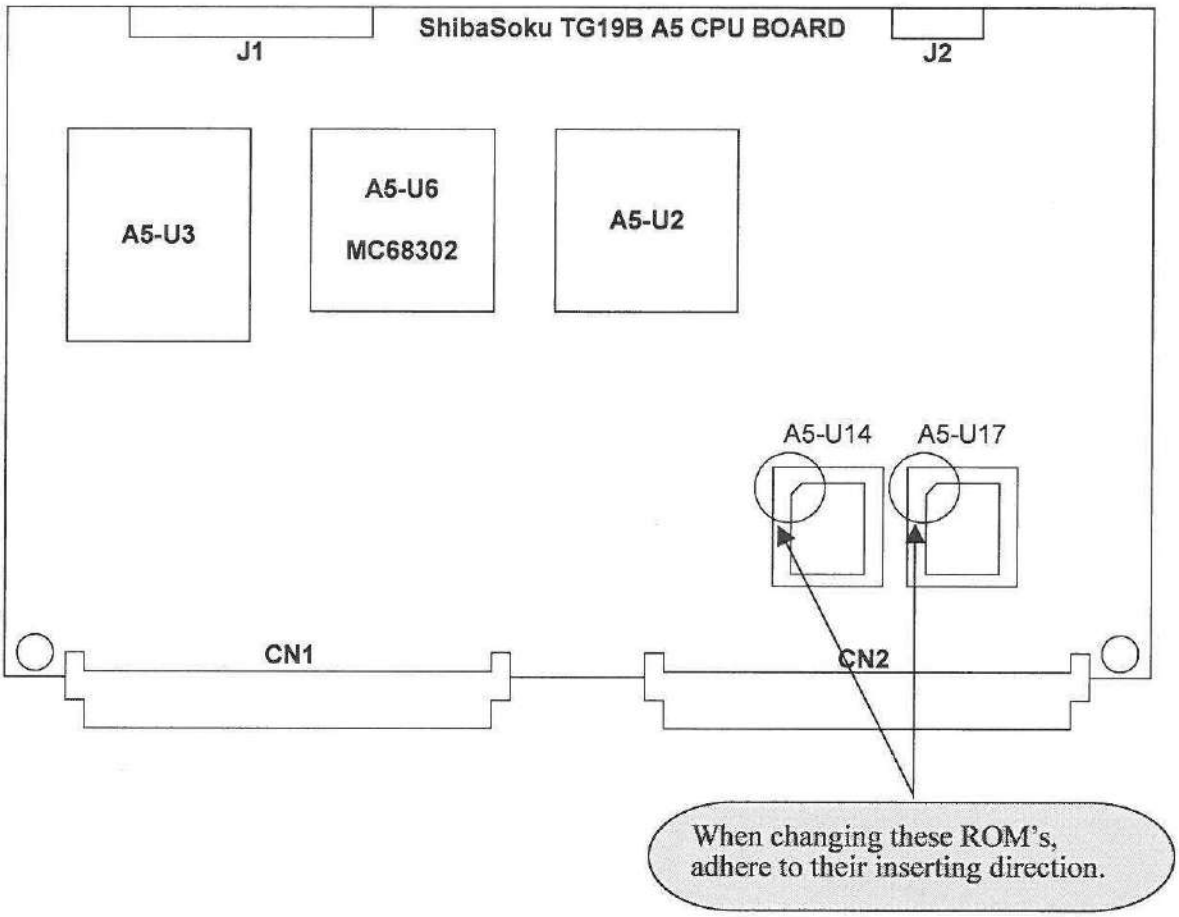
Problem	Check	Measure or solution
Power does not turn on.	Is the power plug loosened or disconnected?	Securely insert the power plug into the AC outlet.
	Is the fuse blown?	Replace it with the new one having the same amperage.
Video signal is not output or panel operation is disabled.	Is video signal cable (VBS, G/Y, B/U, R/V, S-VHS, RF) disconnected or broken?	Check video signal cables and securely connect them to the TV receiver.
	Is an abnormal sync or video signal output?	Turn off the power switch, then on it back again by depressing the WHITE switch on the front panel. This operation initializes to the status that was set when shipment.
No colors attached.	Is color system setting of the NTSC, PAL, PAL-M, PAL-N, SECAM and NTSC-4.43M OK?	Set them correctly in accordance with the type of input signal.
	Is the CHROMA ON/OFF or BURST ON/OFF switch set to OFF?	Set the switch to ON.
Screen is too bright.	Is the input signal cable terminated with a 75 Ω resistor?	Connect a 75 Ω terminator to the BNC connector at the final stage of input signal.
SPECIAL signal is not output.	Is the optional TG19CA001 installed?	Purchase the option (TG19CA001) and installed it to the TG19C.
Colors displayed on the color monitor when GBR/YUV	Are cable connections of GBR or YUV signals correct?	Correctly connect video signal cables.

signals are input are abnormal.		
Remote operation is unable.	Is the remote-control cable connected correctly?	Check it by referring to items "3.11.Interface", "4.3.Controlson the rear panel" and "4.4. Operation of RS232C".
	Is communication setting of the serial interface OK?	
RF output level is low.	Is the RF variable volume control turned to the left?	Turn the RF variable volume control clockwise.
	Is the "30 dB ATT" switch turned on?	Turn the "30 dB ATT" switch off.
Video modulation is low.	Is the signal whose luminance level is 100% used?	Select stair, ramp and white (100%) signals and check them with the spectrum analyzer.
TV programs cannot be received.	Are the TG19C and TV receiver set interconnected?	Securely connect the TG19C and TV receiver set with a coaxial cable.
	Is TV's tuning OK?	Readjust TV's tuning.
	Is the signal having the adequate input level supplied to the TV receiver set?	Confirm that the input level to the TV receiver set is adequate by using a spectrum analyzer or other measuring instrument.
Although the program is received on the TV, but it is not displayed on the screen.	Is the LUMI switch turned off?	Turn on the LUMI switch.
	Is the WHITE 0% or black signal or PURITY selected?	Try to change to the other signal.
No sound is output. [400 Hz/1 kHz]	Is the CARRIER switch located in the SOUND MPX [TG19CB/CC] turned on? [Except NICAM]	If so, turn off the CARRIER switch and set "400 Hz" or"1 kHz".
	Is M, N/B, G, H/D, K or K1/I/L selected correctly?	Correctly set the TV system in accordance with that of the input signal.
	Is the EXT (external sound input) mode selected?	Press the EXT/INT select switch to select INT mode.
	Is the SOUND MOD switch set to VAR mode, and is the volume control minimized?	Select STD mode for SOUND MOD. Or, when VAR mode is necessary, turn the volume control.
	Is sound carrier turned off?	If so, set the SOUND switch of the CARRIER OUTPUT to on.
No MPX sound is output.	Aren't you using the TG19CA?	Please purchase the TG19CB or TG19CC.
	Is the CARRIER switch located in the SOUND MPX set to on?	If not, set the CARRIER switch to on.
No sound is output in the sound MPX mode. [1 kHz/3 kHz]	Is the setting correct?	Set the sound MPX system correctly in accordance with the input signal.

6.4. Replacement of CPU ROM



- Remove two screws that fix the PC board A5, then disconnect the cable which is connected to the connector.
- Remove the PC board from the main unit, then replace the CPU ROM as instructed in the separate instruction sheet.
- When CPU ROM replacement has been completed, reconnect the cable to the connector, then remount the PC board A5. When turning on the power switch, press the power to on, while the WHITE switch on the front panel is being depressed.

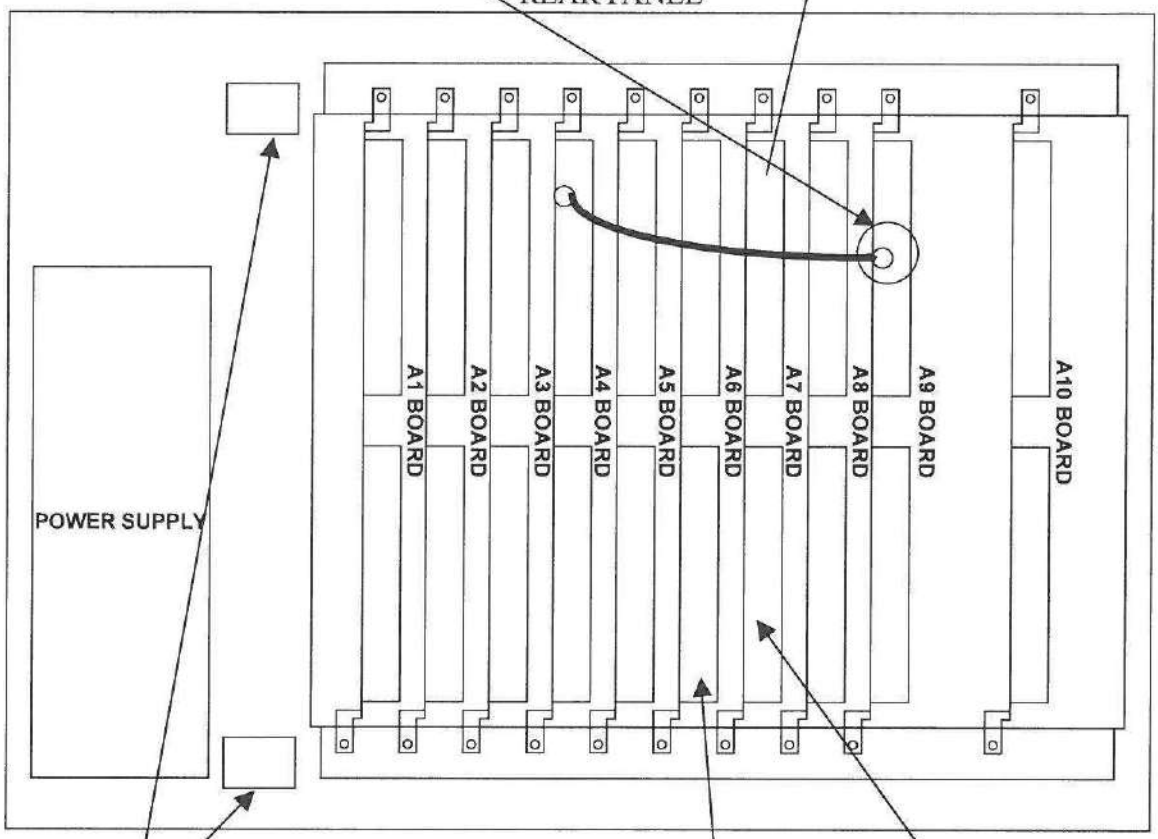


- Disconnect CPU ROM's U14 and U17 of the PC board A5 with the new version ones.
- When turning on the power switch, press the power switch to on, while the WHITE switch on the front panel is being depressed. This simultaneous switch operation is necessary to clear the data in the memory. **Otherwise, correction operation cannot be established.**

6.5. Adding the option board (TG19CA001)

Before integrating the TG19CA001 option board, remove the connector on the PC board A9 from the chassis.

Next, connect the option board to the connector of the board locating on the position which is indicated as "A7 PC board (TG19CA001) by an arrow, in the direction that the component surface comes to the right as the PC board is viewed from the front control panel. When the option board has been connected, securely reconnect the connector that has been disconnected to its original position.



WARNING
Circuit Board A1 to A10 Location
A1A2A3A4A5A6A7A8A9A10

Fix the connector to the chassis with screws. Finally, place the top panel and fix it with screws. Now, addition of the option board has been completed.

About XDS

(1). Current (01h)

1). Data (01h): 25, November/1:00 (D=0/L=0/Z=1/T=0)

01h 01h	40h	41h	59h	6Bh	0Fh 2Ah
Start	00	01	25	Nov.	End
	(minute)	(hour)	(day)	(month)	

2). Length/Time-in-Show (02h): 0:45 /0:12:34

01h 02h	6Dh	40h	4Ch	40h	62h	40h	0Fh 13h
Start	45	0	12	0	34		End
	(minute)	(hour)	(minute)	(hour)	(minute)		

3). Program Name (03h): JURASSIC PARK

01h 03h	4Ah	55h	52h	41h	53h	53h	49h	43h	20h	50h	41h	52h	4Bh	00h	0Fh 3Bh
Start	J	U	R	A	S	S	I	C		P	A	R	K		End

4). Program Type (04h): Movie(22h)/Fantasy(40h)/Fiction(43h)/History(4Eh)

01h 04h	22h	40h	43h	0Fh 79h
Start				End

5). Program Rating (05h)

(a). 01h 05h 68h 7Ch 0Fh 07h: TV Parental Guidelines, TV-PG, V/S/L/D
Start End

(b). 01h 05h 48h 43h 0Fh 60h: TV Parental Guidelines, TV-G
Start End

(c). 01h 05h 44h 40h 0Fh 67h: MPAA, R
Start End

6). Audio Services (06h): main=English (stereo-surround)/sub=French (mono)

01h 06h	4Ch	59h	0Fh 45h
Start			End

7). Aspect Ratio (09h): 70 to 214 (cinemascope)

01h 09h	70h	70h	0Fh 07h
Start			End

8). Program Description row 1 to row 8(10h to 17h)

(a).	row1	01h 10h	50h	52h	4Fh	47h	52h	41h	4Dh	23h	31h	00h	0Fh 74h
		Start	P	R	O	G	R	A	M	#	1		End
(b).	row2	01h 11h	50h	52h	4Fh	47h	52h	41h	4Dh	23h	32h	00h	0Fh 72h
		Start	P	R	O	G	R	A	M	#	2		End
(c).	row3	01h 12h	50h	52h	4Fh	47h	52h	41h	4Dh	23h	33h	00h	0Fh 70h
		Start	P	R	O	G	R	A	M	#	3		End
(d).	row4	01h 13h	50h	52h	4Fh	47h	52h	41h	4Dh	23h	34h	00h	0Fh 6Eh
		Start	P	R	O	G	R	A	M	#	4		End
(e).	row5	01h 14h	50h	52h	4Fh	47h	52h	41h	4Dh	23h	35h	00h	0Fh 6Ch
		Start	P	R	O	G	R	A	M	#	5		End
(f).	row6	01h 15h	50h	52h	4Fh	47h	52h	41h	4Dh	23h	36h	00h	0Fh 6Ah
		Start	P	R	O	G	R	A	M	#	6		End
(g).	row7	01h 16h	50h	52h	4Fh	47h	52h	41h	4Dh	23h	37h	00h	0Fh 68h
		Start	P	R	O	G	R	A	M	#	7		End
(h).	row8	01h 17h	50h	52h	4Fh	47h	52h	41h	4Dh	23h	38h	00h	0Fh 66h
		Start	P	R	O	G	R	A	M	#	8		End

(2). Future (03h)

1). Data(01h): 31, December/23:59 (D=0/L=0/Z=1/T=0)

03h 01h	7Bh	57h	5Fh	6Ch	0Fh 50h
Start	59	23	31	12	End
	(minute)	(hour)	(day)	(month)	

2). Length/Time-in-Show (02h): 1: 58 /0:34:56

03h 02h	7Ah	41h	62h	40h	78h	40h	0Fh 57h
Start	45	0	12	0	34		End
	(minute)	(hour)	(minute)	(hour)	(minute)		

3). Program Name (03h): US Open Tennis Match

03h 03h	55h	53h	20h	4Fh	70h	65h	6Eh	20h	54h	65h	6Eh	6Eh	69h	73h
Start	U	S		O	p	e	n		T	e	n	n	i	s

20h	4Dh	61h	74h	63h	68h	0Fh73h
	M	a	t	c	h	End

4). Program Type (40h):
Sports (25h)/National (62h)/Professional (69h)/Tennis (7Ah)

03h 04h	25h	62h	69h	7Ah	0Fh 00h
Start					End

5). Program Audience (05h):
C=1/T=1/A=1/S=1/W=1/M=1, N=0/V=0/L=0/Not-Rated

03h 05h	7Fh	47h	0Fh23h
Start			End

6). Audio Services(06h): main=English(stereo-surround)/sub=Spanish(mono)

03h 06h	4Ch	51h	0Fh4Bh
Start			End

7). Aspect Ratio (09h): 16:9

03h 09h	7Fh	7Fh	0Fh 67h
Start			End

(3). Channel (05h)

1). Network Name (01h): PBS

05h 01h	50h	42h	53h	00h	0Fh 06h
Start	P	B	S		End

2). Call Letters (02h): WGBH12

05h 02h	57h	47h	42h	48h	42h	48h	0Fh 06h
Start	W	G	B	H	1	2	End

(4). Miscellaneous (07h)

1). Time of Day(01h): 1994 / 20 January/Thursday/13:30 (D=0/L=0/Z=1/T=0)

07h 01h	5Eh	4Dh	54h	61h	45h	44h	0Fh 50h
Start	30	13	20	01	Thu	94	End
	(minute)	(hour)	(day)	(month)	(Thursday)	(year)	

2). Impulse Capture (02h): 7 February/21:00 (D=0/L=0/Z=1/T=0)/2:00

07h 02h	40h	55h	47h	62h	40h	42h	0Fh 28h
Start	00	21	07	02	00	2	End
	(minute)	(hour)	(day)	(month)	(minute)	(hour)	

Time ⟶

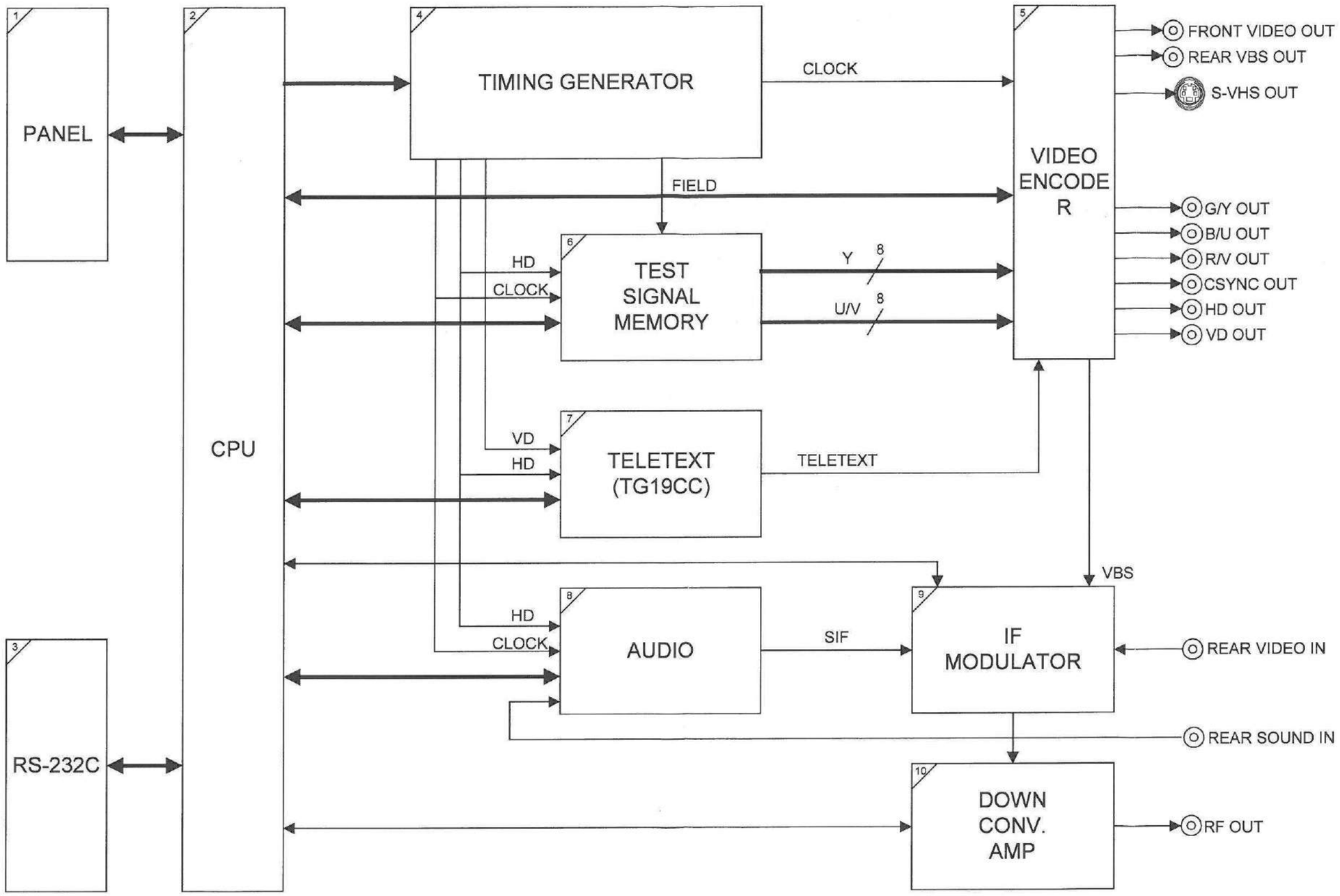
Parameter ⟶			PCS	CNI		CNI	PIL				CNI		PTY
Byte No. ⟶	1	2	3, 4	5	6 to 10	11	12	13	14	15			
Parameter Bits b, i ⟶				1 2 3 4 1 2 3 4		9 10 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	5 6 7 8	11 12 13 14 15 16	1 2 3 4 5 6 7 8				
Transmission Bit No. ⟶				0 1 2 3 4 5 6 7		0 1 2 3 4 5 6 7 0 1 2 3 4 5 6 7 0 1 2 3 4 5 6 7 0 1 2 3 4 5 6 7			0 1 2 3 4 5 6 7				
				M L		M L	M L	M L	M L	M L	M L	M L	M L
Content ⟶	Clock Run-in	Start Code	Not relevant to PDC	Bits b1,and b2: 00 Don't know 01 Mono 10 Stereo 11 Dual Sound Bits b3,and b4 are reserved	Reserved for enhancement of VPS	Net.or Prog.Prov.Bin.	Day Binary	Month Binary	Hour Binary	Minute Binary	Country Binary	Network or Programme Provider Binary	Programme Type Binary
Reserved Code Values for Receiver Control (Service Codes)	Timer Control Code			N·····N		N N 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					N·····N		A·····A
	Record Inhibit/Term.			N·····N		N N 0 0 0 0 0 0 1 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1					N·····N		A·····A
	Interruption Code			N·····N		N N 0 0 0 0 0 0 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1 1					N·····N		A·····A
	Continuation Code			N·····N		N N 0 0 0 0 0 0 1 1 1 1 1 1 1 0 0 1 1 1 1 1 1 1					N·····N		A·····A
	Unenhanced VPS			1 1 1 1		N N P·····	·····	·····	·····	····· P	N·····N		A·····A
	PTY not in Use			N·····N		N N P·····	·····	·····	·····	····· P	N·····N		1 1 1 1 1 1 1 1

Abbreviations:
CNI – Country and Network Identification
PCS – Programme Control Status
PIL – Programme Identification Label
PTY – Programme Type

M – Most-Significant Bit
L – Least-Significant Bit

A – Bit Value is that of the current PTY Code
N – Bit Value is that of the current CNI Code
P – Bit Value is that of the current PIL Code

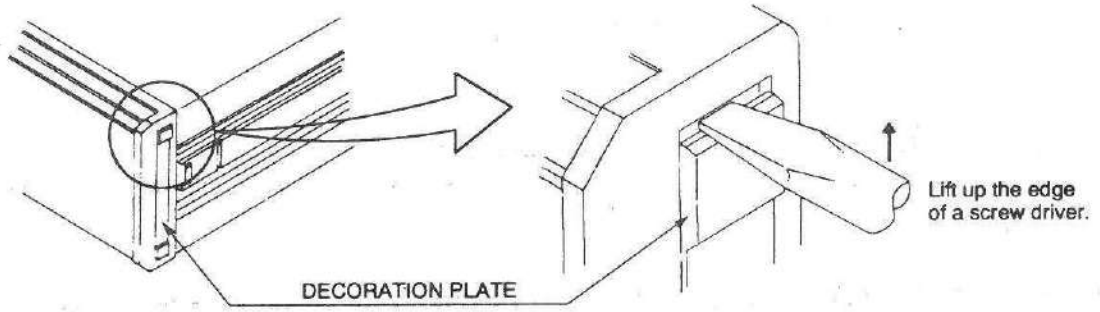
Data format of the programme delivery data in the dedicated TV line.



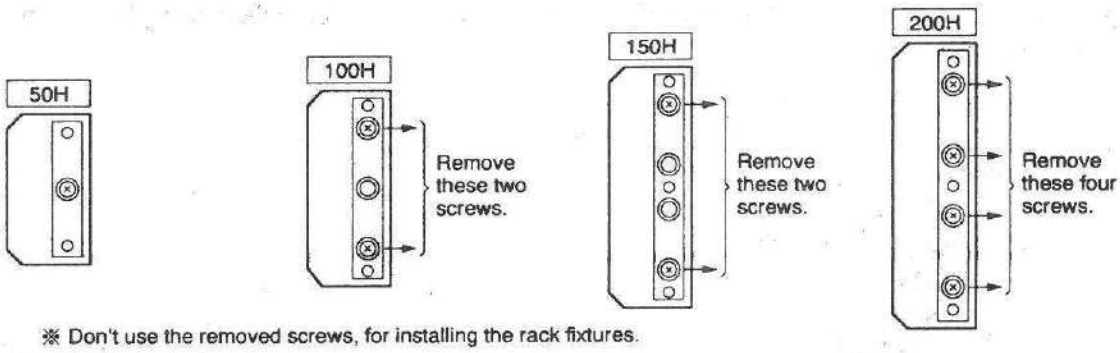
TG19C SERIES BLOCK DIAGRAM

Installing methods of rack fixtures with grip

1 Remove the **DECORATION PLATE** by inserting a screw driver or other tool whose edge is flat into the top or bottom clearance.



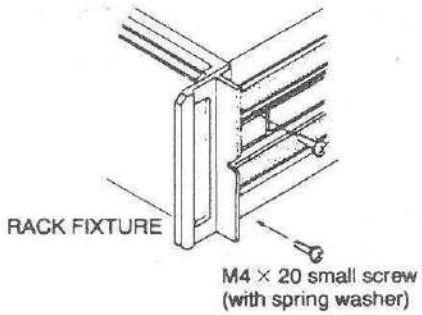
2 Status when **DECORATION PLATE** has been removed.



※ Don't use the removed screws, for installing the rack fixtures.

50H : (The bigger screw in the center should never be loosened.)
100H : Remove the top and bottom small screws as shown in the above illustration.
(In case there is a screw in the center, never loosen it.)
150H : Remove the top and bottom small screws as shown in the above illustration.
(In case there are two screw in the center, never loosen them.)
200H : Remove all four screws you can see.

3 Fit the **RACK FIXTURE** to the surface where the decoration plate was installed, and fix it and the rack mount fixture using the M4 × 20 screwes.



Types of rack fixtures with grip

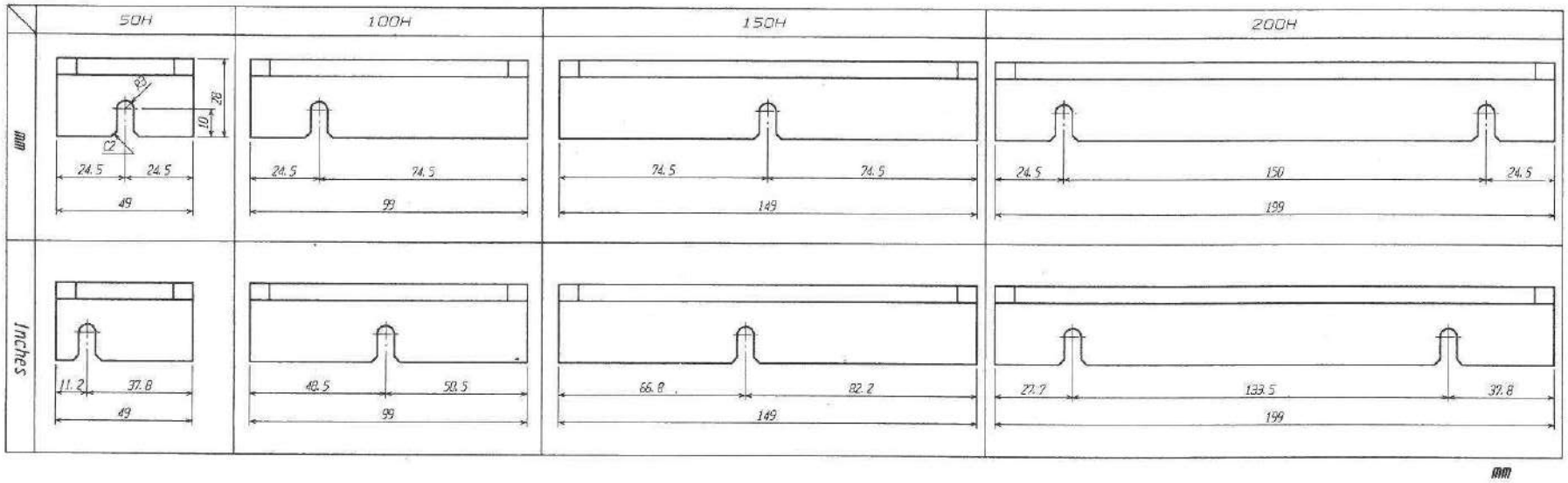
Cabinet height	Parts No.(mm)	Parts No.(inches)
50H	635301003	635301011(R)
		635301012(L)
100H	635302010	635302022(R)
	635302011	635302023(L)
150H	635303011	635303020(R)
		635303021(L)
200H	635304006	635304019(R)
		635304020(L)

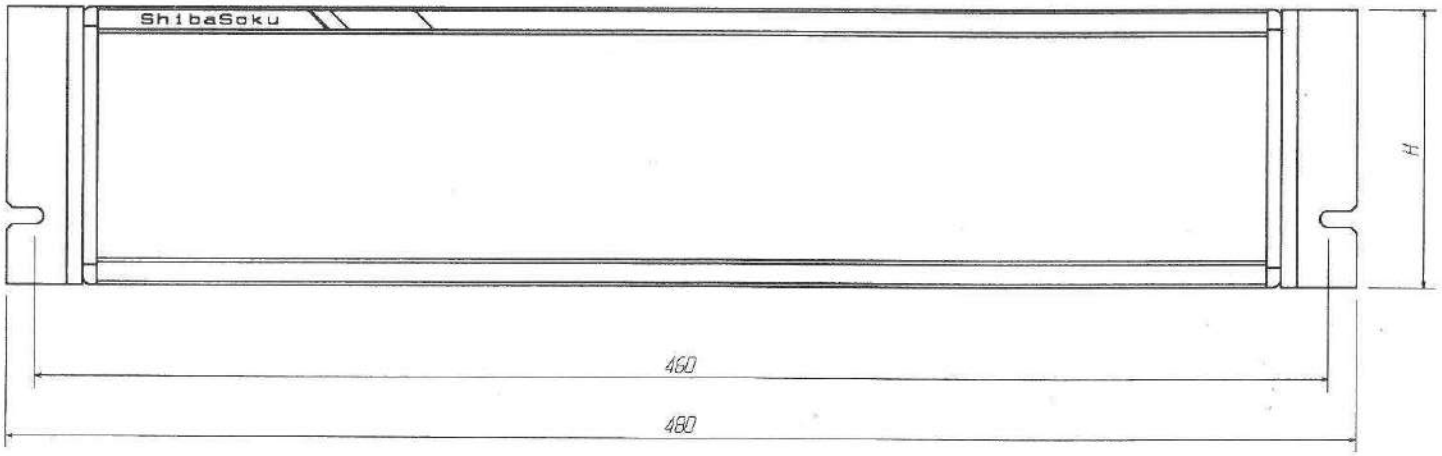
R····Right hand L····Left hand

4 Remove the **LEG.**(Since it is fixed with a small screw from the inside of the bottom plate to remove it.)

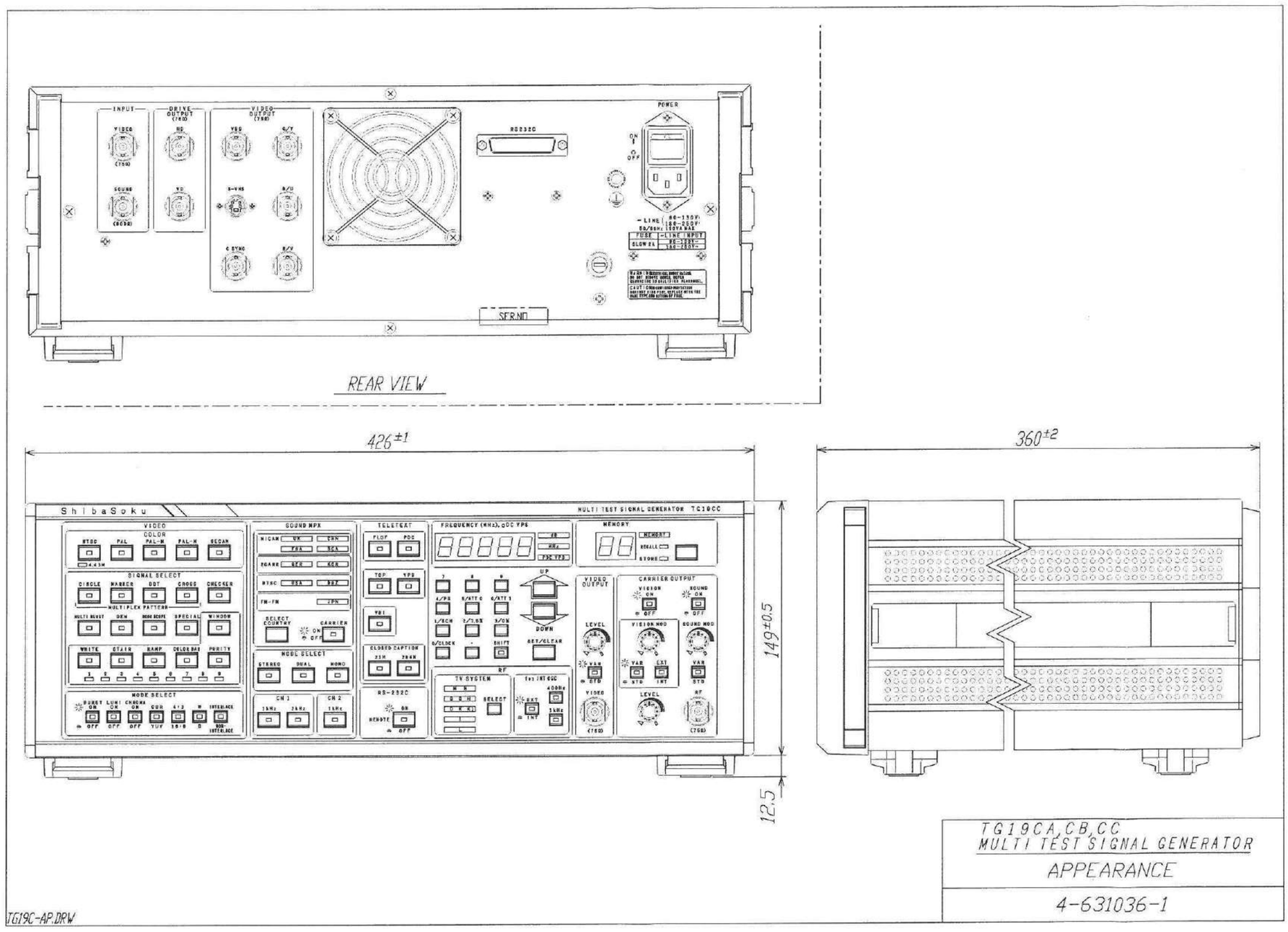
CAUTION!!

When integrating the cabinet into the rack, the cabinet is not sustainable by these rack fixtures with grip. Therefore, mount the chassis guide-rails, which can support the cabinet, on the rack.





Model 87　　取っ手付ラック取付具寸法表　*Dimensions of rack fixtures with grip*



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Revision history

Revision	Date	Remarks
First edition	2004. 2	Release

Manual name: Model TG19C SERIES MULTI TEST SIGNAL GENERATOR OPERATING INSTRUCTIONS

Manual number: 912000062651

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  URL http://www.di.co.kr/
- DONG HWA AV Co., Ltd. (Korea, Broadcast Instruments)
  Rm. 703, O-Ryun Bldg., 36-4 Yoido-Dong, Yeong-DeungPo-Ku, Seoul, Korea
  TEL +82-2-783-4055 FAX +82-2-784-9941
  URL http://www.dhav.co.kr
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  Block 9 Kallang Place, #01-09, Singapore, 339154
  TEL +65-6295-2323 FAX +65-6298-2333
  URL http:// www. caltron-tmi.com/
- AIMIL Ltd. (India, Audio/Video Instruments)
  Naimex House, A-8, Mohan Co-operative Industrial Estate, Mathura Road, New Delhi, 110044, India
  TEL +91-11-2695-0001 FAX +91-11-2695-0011
  URL http://www.aimil.com/
- T&M INSTRUMENTS Repres. Ltda. (Brazil, Audio/Video Instruments)
  Rua Princesa Isabel, 1750-Brooklin Paulista, 04601-003, Sao Paulo, Brazil
  TEL +55-11-5092-5229 FAX +55-11-5044-2414
  URL http://www.tminstruments.com.br
- AVI. SYS Electronics GmbH (Austria, Broadcast Instruments)
  Felbigergasse 38, A-1140 Wien, Austria
  TEL +43-1-419 60 10 FAX +43-1-419-6007
  URL http://www.avisys.co.at/sites/indexbig.htm
- EQUIPMENTS SCIENTIFIQUES FRANCE (France, Audio/Video & Broadcast Instruments)
  127, Rue de Buzenval - BP26, 92380 Garches, France
  TEL +33-1-47 95 99 00 FAX +33-1-47 01 16 22
  URL http://www.es-france.com

- DIGINET NV/SA (Belgium, Broadcast Instruments)
  Aarschotsestraat 87, 1801 Peutie, Belgium
  TEL +32-2-257 01 83 FAX +32-2-253 04 50
  URL http://www.diginet.be/
- REXEL AUSTRALIA VIDEO SYSTEMS
  (Australia, Broadcast Instruments)
  2 Giffnock Ave., North Ryde NSW 2113, Australia
  TEL +61-2-9887-6222 FAX +61-2-9888-5376
  URL http://www.rexelvideo.com.au/index2.htm/

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- Power Tech Corp. (Korea)
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  TEL +82-41-564-0575 FAX +82-41-564-0577
- GRACE ELECTRIC Co., Ltd. (Taiwan)
  No.39, Shi-Wei St., San-Chung City, Taipei Hsien, Taiwan, R.O.C.
  TEL +886-2-2280-6741 FAX +886-2-2982-4371
- CALTRON Pte. Ltd. (Singapore)
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□ 本　社			
〒105-0004　東京都港区新橋 4-6-8 TEL(03)5401-3811　FAX(03)5401-3815 URL http://www.shibasoku.co.jp/			
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□ 川崎営業所	○	○	○
〒213-0011　川崎市高津区久本 3-3-2（溝ノ口第一生命ビル） TEL(044)850-5133　FAX(044)850-5134			
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□ 仙台サービス・サポートステーション	○		
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□ 筑波事業所			○
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