

**MULTIFREQUENCY VIDEO GENERATOR
FOR MONITORS
GV-241**

1 GENERAL OBSERVATIONS

1.1 Description

The **GV-241** Multifrequency Video Generator for Monitors is an equipment designed to be able to adjust and repair video monitors of different horizontal and vertical deflection frequencies, since it is equipped with the basic features of the different deflection systems most commonly used in personal computers (PCs).

The number of systems implemented depends on the characteristics of the particular unit, the limit being 32. The different systems are divided into two groups, in order to make their selection easier. The basic model has 29 systems distributed in two groups of 5 and 24 respectively. The number and type of systems, in addition to the distribution of the groups, can be modified upon request.

The **GV-241** has eight selectable test patterns in all the systems that enable basic adjustments to be made to any monitor and anomalies to be detected by means of visual inspection of the image.

It has three types of connector connecting directly to the monitor: D9 for Hercules, CGA and EGA monitors; D15 for MAC II monitors and miniature D15 for VGA monitors. It also has the individual output connections: R, G, B, CVS (video output without synchronism), HS (horizontal synchronism), VS (vertical synchronism) and CS (composite synchronism output) by means of BNC connectors.

In order to avoid possible damage to the monitors, while the system is being selected the output connectors remain inhibited until the user confirms the system selected.

It is possible to modify the polarity of the vertical and horizontal synchronism at one's discretion from the front, or work in AUTO mode, the polarity in this case being that implemented in the system selected.

An LCD display is responsible for interaction with the user, displaying the pattern and the system selected at all times.

Its great operational simplicity, small size and considerable robustness make the **GV-241** a piece of equipment that is particularly useful for meeting all the needs of Technical Assistance Services.

1.2 Specifications

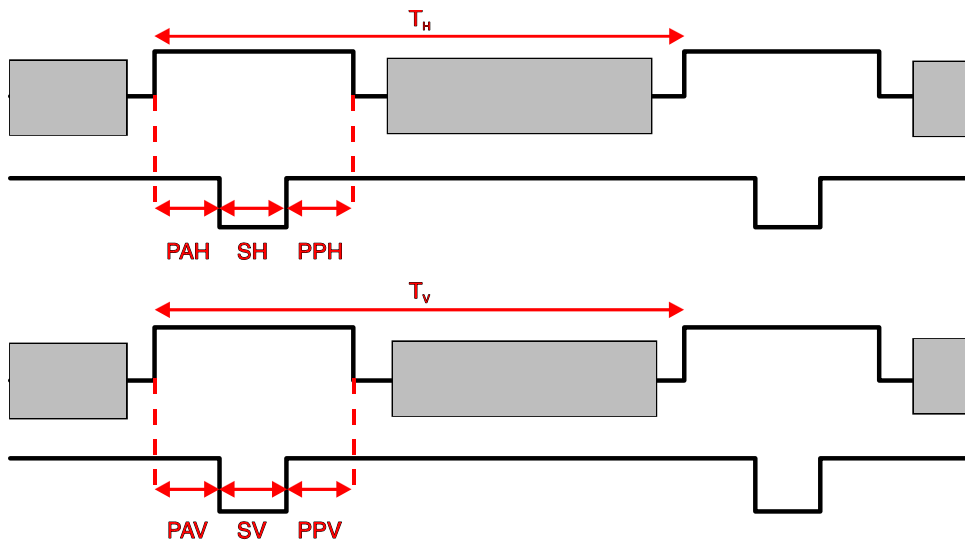
SYSTEMS

FIRST GROUP (p)

System	Pixels	Frequency		PAH (μ s)	SH (μ s)	PPH (μ s)	PAV (ms)	SV (ms)	PPV (ms)	Polarity		Interlace
		Horiz (kHz)	Vert (Hz)							H	V	
VGA	640x480	31.469	59.94	0.636	3.813	1.907	0.318	0.064	1.048	-	-	NO
VESA	800x600	37.879	60.317	1	3.2	2.2	0.026	0.106	0.607	+	+	NO
VESA	1024x768	48.363	60.004	0.369	2.092	2.462	0.062	0.124	0.6	-	-	NO
ATT	1280X1024	63.953	59.938	0.727	1.018	2.255	0.016	0.078	0.579	-	-	NO
Sun	1600X1280	89.2	66.9	0.001	2.03	1.4	0.011	0.112	0.471	+	+	

SECOND GROUP (s)

System	Pixels	Frequency		PAH (μ s)	SH (μ s)	PPH (μ s)	PAV (ms)	SV (ms)	PPV (ms)	Polarity		Interlace
		Horiz (kHz)	Vert (Hz)							H	V	
CGA, EGA	640x200	15.81	61.5	6.6	4.2	7.2	1.58	0.19	2.15	+	+	NO
MDA, Hercu	720X350	18.42	49.91	0.6	8.25	1.45	0.001	0.9	0.2	+	-	NO
EGA Hi	640X350	21.86	59.72	0.001	4.9	1.6	0.001	0.6	0.08	+	+	NO
VGA	640X350	31.469	70.09	0.636	3.813	1.907	1.176	0.064	1.902	+	-	NO
VGA	640X400	31.469	70.09	0.636	3.813	1.907	0.318	0.064	1.112	-	+	NO
VGA Text	720X400	31.48	70.11	0.635	3.812	1.906	0.304	0.063	1.111	-	+	NO
VESA	720X400	37.736	90.044	0.75	1.25	4.5	0.239	0.08	0.981	-	+	
VESA	640X350	37.86	84.136	0.762	1.27	6.603	0.924	0.079	1.638	+	-	
MAC II	840X480	35	66.67	2.116	2.116	3.175	0.084	0.086	1.114	+	+	NO
VESA	800X600	35.156	56.25	0.667	2	3.556	0.028	0.057	0.626	+/-	+/-	
VESA	640X480	37.86	72.809	0.762	1.27	4.603	0.238	0.079	0.74	-	-	
8514	1024X768	35.522	86.96	0.178	3.92	1.247	0.014	0.112	0.563	+	+	YES
SVGA 72Kc	800X600	48.09	72.01	1.121	2.399	1.279	0.479	0.124	0.774	+	+	
1025x768	1025X768	48.3	60	0.369	2.092	2.462	0.062	0.124	0.6	-	-	NO
SONY Std1	1024X768	48.78	60	1	1.5	2	0.061	0.061	0.799	+	+	NO
DEC	1024X864	54	60	0.16	1.85	1.68	0.001	0.056	0.629	+	+	
XGA	1024X768	56.5	70	0.32	1.813	1.92	0.053	0.106	0.513	-	-	NO
57K/72H	1024X768	57.09	72	0.32	1.77	1.87	0.054	0.103	0.5	+	+	
Radius	1152X882	66	72	0.138	1.28	2.42	0.001	0.2	0.38	+	+	
MAC II TP	1152X870	68.681	75.06	0.32	1.28	1.44	0.043	0.043	0.567	-	-	NO
Samsung	1006X1048	62.8	59.8	0.15	1.88	1.58	0.001	0.127	0.542	+	+	
SONY Std 2	1280X1024	63.337	59.98	0.407	1.701	1.849	0.047	0.047	0.41	+	+	NO
DEC	1280X1024	70.7	66.5	0.267	1.33	1.87	0.042	0.042	0.467	+	+	
Arts. Graf	1280X1024	78	73	0.228	0.915	1.907	0.038	0.038	0.488	+	+	



TOLERANCES

Horizontal frequency deviation	$\pm 1 \%$
Vertical frequency deviation	$\pm 1,5 \%$

TEST PATTERNS

Available test patterns 8

- 1 **Colour bars 100/0/100/0**
- 2 **Red**
- 3 **Green**
- 4 **Blue**
- 5 **Range of greys.** Seven steps of equal width varying from black to white.
- 6 **Crosshatch.** 15 white vertical lines and 11 white horizontal lines that maintain a ratio of 4:3 in all the systems, within a white asymmetrical frame, with the outer edge in accordance with the limits of the system. The vertical lines have a duration of 125 ns, 62 ns or 31 ns, depending on the system.
- 7 **Multiburst.** Horizontal line divided into nine blocks. It begins with a 50% grey and continues 8 MHz, 16 MHz, 4 MHz, 16 MHz, 4 MHz, 16 MHz, 8 MHz and 50% grey.
- 8 **100% white,** with a rectangle of grey (approx. 70%) in the top left part to identify the direction of deflection.

OUTPUTS R,B	Red and blue signals
Amplitude	0.7 Vpp
Impedance	75 Ω
Connector	BNC

OUTPUT G	Green signal output with selectable synchronism
Amplitude	0.7 Vpp
Impedance	75 Ω
Connector	BNC
OUTPUT CVS	Video signal
Amplitude	0.7 Vpp
Impedance	75 Ω
Connector	BNC
OUTPUT HS	Horizontal synchronism pulse
Signal	TTL
Connector	BNC
OUTPUT VS	Vertical synchronism pulse
Signal	TTL
Connector	BNC
OUTPUT CS	Composite synchronism (horizontal and vertical) of fixed polarity (negative direction).
Signal	TTL
Connector	BNC
OUTPUTS C1, C2, C3	Connectors D9, D15 miniature and D15 respectively. Direct connections with the monitor according to the characteristics described earlier and with the connections of section 5. D9 connector outputs are all TTL. When selecting test patterns number 1 or 5 a black and white image will appear. When using an Hercules monitor, R,G,B test patterns will be black.
POWER REQUIREMENTS	
Mains voltage	AC 110-125-220-230-240 V ± 10%
Mains frequency	50-60 Hz
Consumption	9 W
OPERATING ENVIRONMENTAL CONDITIONS	
Max. altitude	2000 m
Temperature range	From 5 °C to 40 °C
Maximum relative humidity	80% (Up to 31 °C), linearly decreasing to 50% at 40 °C.

MECHANICAL CHARACTERISTICS

Dimensions W.212 x H.102 x D.241 mm

Weight 2.4 kg

ACCESSORIES INCLUDED

90901105 Power Cable CA-05

2 SAFETY RULES

- * Use this equipment connected **only to devices or systems with their common at ground potential.**
- * This is a **class I** equipment, for safety reasons it should be connected to **supply lines with the corresponding earth terminal.**
- * This equipment can be used in **Category II** installations and **Pollution Degree 1** environments.
- * When using any of the following accessories **use only the specified ones** to ensure safety.

Power cord

- * Observe all **specified ratings** both of supply and measurement.
- * Remember than voltages higher than **60 V DC** or **30 V AC rms** are potentially dangerous.
- * Always observe the **maximum specified environmental conditions** for the equipment.
- * **The user is only authorized** to carry out the following maintenance operations:

Change the mains fuse, which should be of the **type and value indicated.**

Specific instructions are given for this action in the Maintenance section.

Any other change in the equipment should only be undertaken by specialised personnel.

- * The output negative is at ground potential.
- * **Do not obstruct the equipment's ventilation system.**
- * Strictly follow the **cleaning recommendations** that are described in the Maintenance section.
- * Use for signal outputs appropriate low radiation leads.

* Symbols related with safety



DIRECT CURRENT



ALTERNATING CURRENT



DIRECT AND ALTERNATING



GROUND TERMINAL



PROTECTIVE CONDUCTOR



FRAME TERMINAL



EQUIPOTENTIALITY



ON (Supply)



OF (Supply)



DOUBLE INSULATION PROTECTED
(CLASS II Protection)



CAUTION
(Risk of electric shock)



DOCUMENTS CAUTION REFER TO ACCOMPANYING



FUSE

3 INSTALLATION

3.1 Power supply

This equipment is designed to be powered by mains voltages of 110-125-220 or 230/240 V AC 50-60 Hz. Mains operating voltage can be selected on the rear panel.

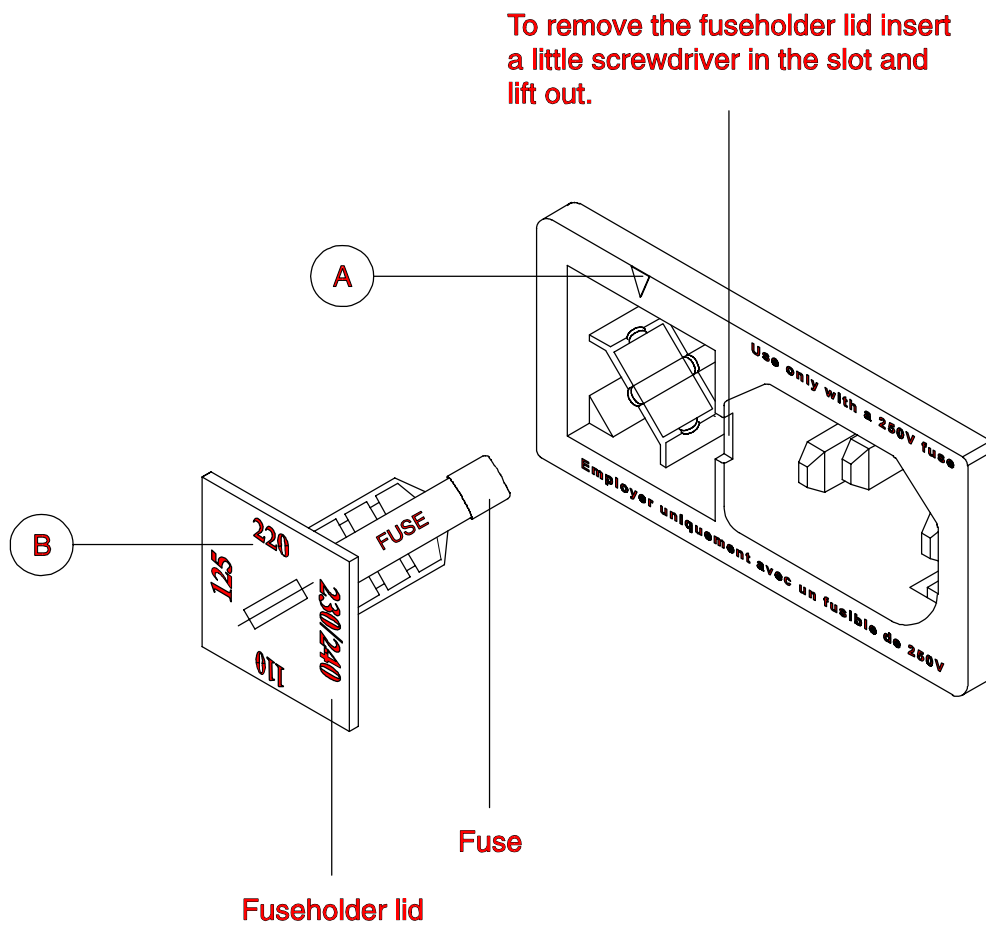


Figure 1.- Selection of mains voltage.

- 1.- Pull out the fuseholder lid.
- 2.- Set the proper fuse for the desired mains voltage.
- 3.- Insert the fuseholder lid, ensuring that the indicator **[A]** faces to the desired mains voltage **[B]**.

CAUTION:
THE EQUIPMENT IS FACTORY SET FOR 220 V OPERATING VOLTAGE.

BEFORE SWITCHING ON THIS INSTRUMENT, SET THE VOLTAGE SELECTOR TO THE PROPER POSITION AND BE SURE THAT THE FUSE VALUE IS ACCORDING TO THE MAINS VOLTAGE.

3.2 Installation

The equipment is prepared for use as a desktop unit.

4 OPERATING INSTRUCTIONS

4.1 Controls description

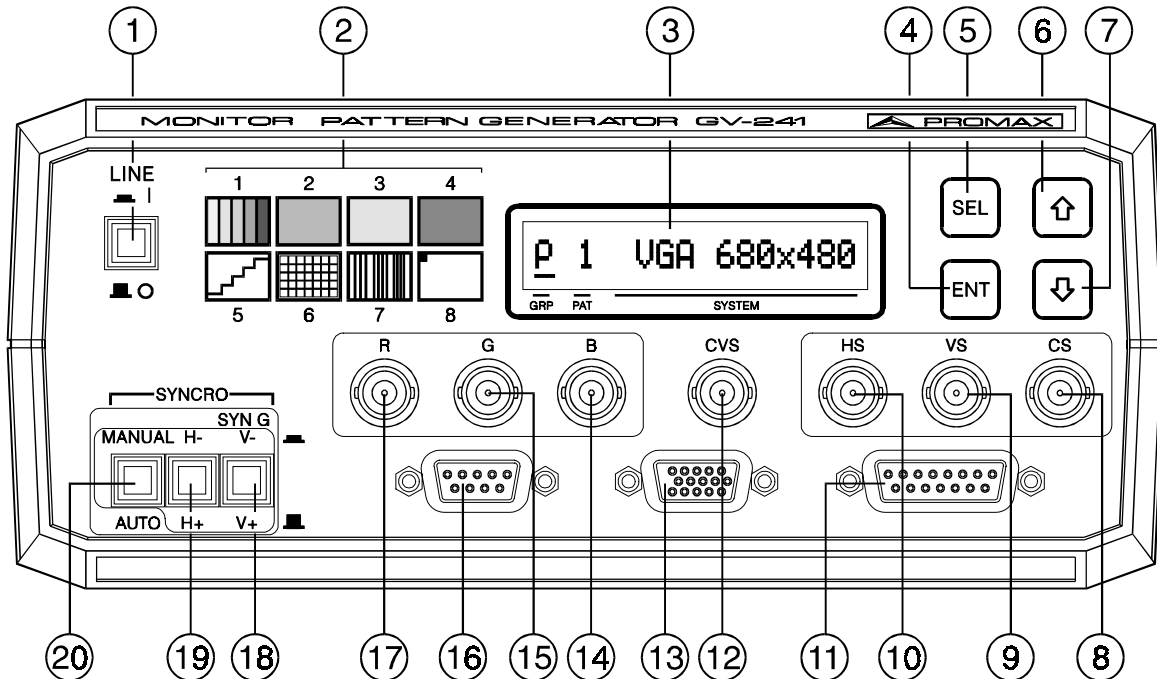




Figure 2.- Front panel.

- [1] **LINE**
On-off switch.
- [2] Pattern code indicator panel.
- [3] Alphanumeric display. Provides information about the group, pattern and system selected.
- [4] **ENT**
System confirmation key.
- [5] **SEL**
Group, system and pattern selection key.
- [6] 
Upward shift key.
- [7] 
Downward shift key.
- [8] **CS**

Composite synchronism signal output.

- [9] **VS**
Vertical synchronism signal output.

- [10] **HS**
Horizontal synchronism signal output.

- [11] 15-pin D connector.

- [12] **CVS**
Video signal without synchronism output.

- [13] Miniature 15-pin D connector.

- [14] **B**
B signal output.

- [15] **G**
G signal output with or without synchronisms

- [16] 9-pin D connector.

- [17] **R**
R signal output.

- [18] **V+/V-**
In manual synchronism mode:
Negative or positive vertical synchronism key
In automatic synchronism mode:
When pushed provides the G + synchronism signal on the G
output [15]

- [19] **H+/H-**
Positive or negative horizontal synchronism key.

- [20] **AUTO/MANUAL**
Synchronism polarity manual or automatic selection key.

4.2 Start-up

Connect the unit to the mains.

Press the **LINE** [1] switch, whereupon the LCD display [3] will light up and the following information will appear on it:

- Group of systems in which the generator is located (**p** for the first and **s** for the second).
- Pattern selected in accordance with the indicator panel [2] (1 colour bar).
- System selected (blinking).

Initially the outputs are inhibited and the cursors are in a position to change the pattern.

4.3 Method of using

The **GV-241** enables the user to change pattern and system or alter the polarity of the synchronism easily and simply using the front keyboard, while the status of the outputs is observed through the indications that appear on the LCD display.

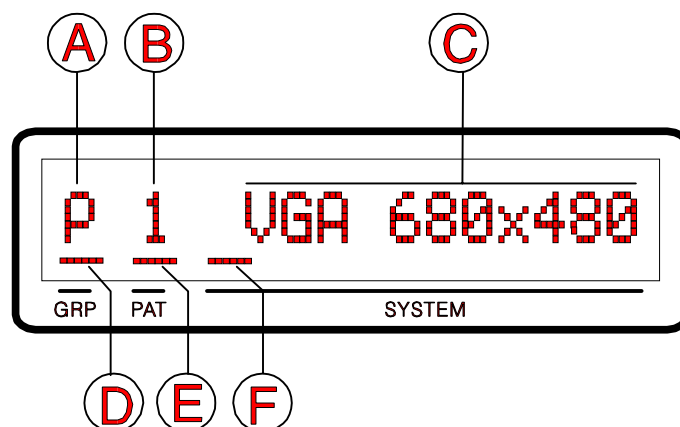








Figure 3.- Display



The indications that appear on the display are the following:

- A.- p** indicates that the **first group of systems** has been selected (table n° 1).
s indicates that the **second group of systems** has been selected (table n° 2).



- B.-** 1-8 indicates the **pattern** present in the outputs. This can be recognised by means of the indicator panel printed on the front [2].
- C.-** Indicates the name of the **system selected**. If this is flashing, it indicates that the outputs are inhibited.
- D.-** When lit up, this indicates that it is possible to change **systems group** by progressive use of the cursors [6]  and [7] .
- E.-** When lit up, this indicates that it is possible to change **pattern** by progressive use of the cursors [6]  and [7] .
- F.-** When lit up, this indicates that it is possible to change **system** by progressive use of the cursors [6]  and [7] .

When this generator is used, the required system and the group of which it forms a part (table 1 and 2 of the specifications section) must be known. In the event that the system chosen is not implemented, it is possible to look for one that has similar characteristics or request that a new personal table be made.



Change of systems group.

If line **D** is not lit up, press the **SEL** [5] key until it lights up. Then press the cursors [6]  and [7]  until the group chosen can be read. Every time the group is changed, the outputs will be inhibited and the system indicator (**F**) will flash.

Change of system.

If line **F** is not lit up, press the **SEL** [4] key until it lights up. Then press the cursors [6]  and [7]  until the system chosen can be read. Every time the system is changed, the outputs will be inhibited and the system indicator (**F**) will flash.

Change of pattern.

If line **E** is not lit up, press the **SEL** [5] key until it lights up. Then press the cursors [6]  and [7]  until the pattern chosen can be read.

Confirmation.

Once the system has been selected, by pressing the **ENT** [4] key the outputs will no longer be inhibited and the desired signals in connections [8] to [17] will be obtained.

Synchronism polarity.

With the **AUTO-MANUAL** [20] key the desired polarity in the synchronism signals can be obtained. In the **AUTO** position the polarity is that implemented in the system; in the **MANUAL** position the polarity of the vertical and horizontal synchronism can be selected at the user's discretion by means of keys **V+/V-** [18] and **H+/H-** [19].

The outputs will be inhibited when the generator is connected for the first time, whenever the ENT [4] key is pressed and every time the group or system is changed.

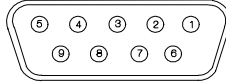
5 DESCRIPTION OF THE OUTPUT CONNECTORS

5.1 Output connectors

9-pin D connector [16]

Pin N° Signal

1	GND
2	NC
3	R
4	G
5	B
6	NC
7	VIDEO
8	HS
9	VS

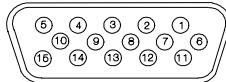


Connections for Hercules, CGA and EGA monitors.

15-pin miniature D connector [13]

Pin N° Signal

1	R
2	G
3	B
4	NC
5	GND
6	GND
7	GND
8	GND
9	NC
10	NC
11	NC
12	NC
13	HS
14	VS
15	NC

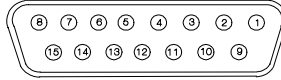


Connections for VGA monitors.

15-pin D connector [11]

Pin N° Signal

1	GND
2	R
3	CS
4	NC
5	G
6	GND
7	NC
8	NC
9	B
10	NC
11	GND
12	VS
13	GND
14	GND
15	HS



Connections for MAC II monitors.

6 PRINCIPLE OF OPERATION

Oscillator

Quartz-controlled generator of the base frequency of the system (32 MHz). This frequency is divided (**divider**) by 2, 4 and 8 to obtain 16 MHz, 8 MHz and 4 MHz in order to control the counters and generate the multiburst signal.

EPROMs

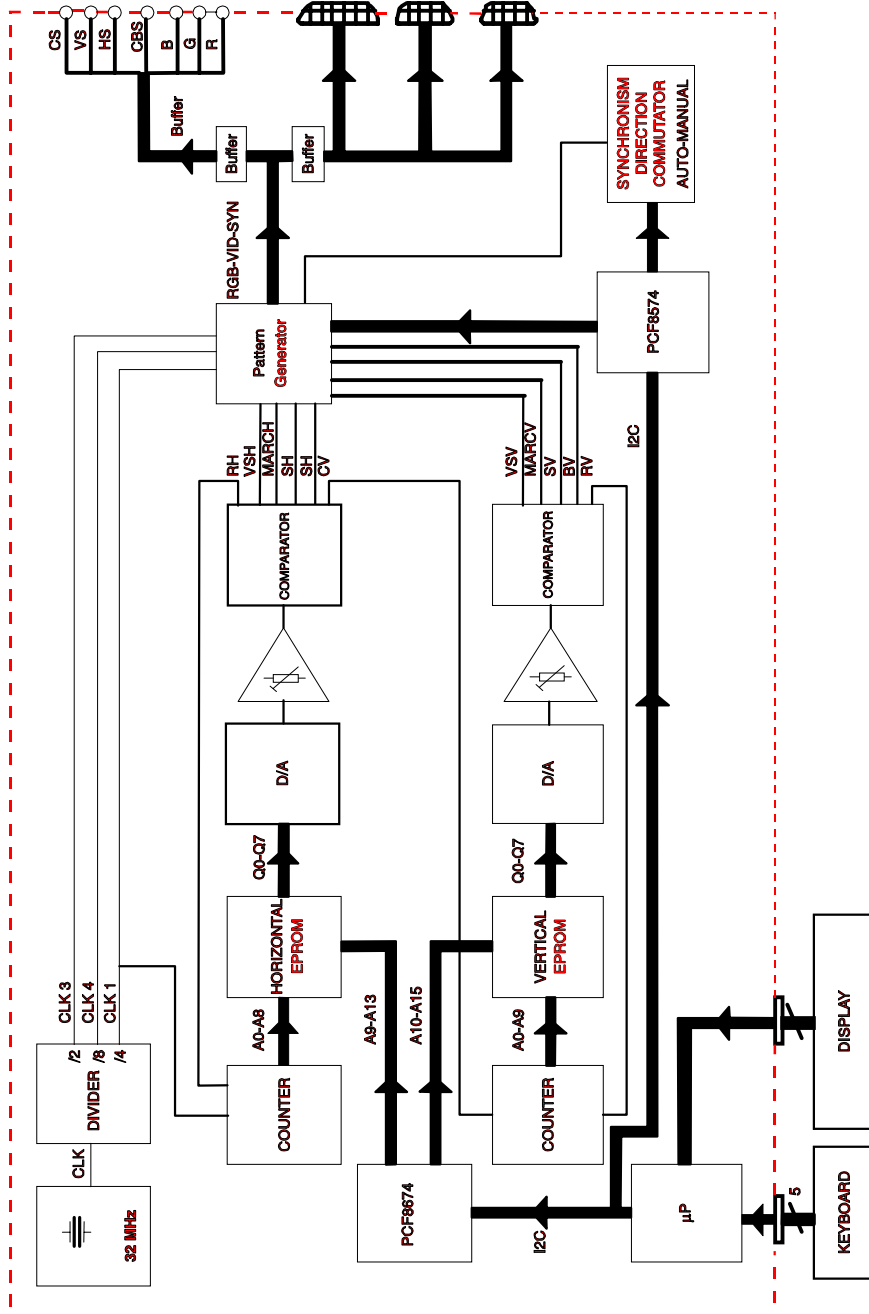
The two EPROM memories that contain the characteristics of the horizontal and vertical exploration of the systems implemented are read with counters (**counter**), the horizontal with a clock frequency of 8 MHz and the vertical with a frequency $FH/2$ read in the horizontal memory. The data obtained in the outputs of the two memories pass through a **D/A** converter, an adjustable amplifier and some comparators in whose outputs the basic signals of the systems generated are obtained (**RH, VSH, MARCH, SH, BH, CV, VSV, MARCV, SV, BV and RV**). The changes of system are made by controlling the different memory banks with part of the addressing bits, with some elements controlled by a I^2C bus (**PCF8574**).

Pattern generator

The various patterns of this generator are obtained both in the RGB and VIDEO configurations on the basis of the **VSC, MARCH, VSV and MARCV** signals, with the times appropriate to each system. The selection of patterns is controlled by the I^2C bus (**PCF8574**). The horizontal and vertical synchronism signals (**SH AND SV**) can be controlled with the **AUTO-MANUAL** commutator to invert the direction of each of these. In the automatic position the polarity of these signals is defined by the I^2 bus. The RGB, video and synchronism signals pass through some impedance-matching elements (**Buffer**) before reaching the output connectors. The possible output connections are one in any of the three D connectors and another in the BNC connectors.

μP

The microprocessor controls the **Keyboard**, the LCD **DISPLAY** and the **COU**T inhibition control, and generates the I^2C bus for the control of the memories and the pattern generator.



BLOCK DIAGRAM MOD. GV-241

7 MAINTENANCE

7.1 Replacement of the mains supply fuse

The fuseholder is situated in the actual mains socket and is in itself the mains supply voltage selector (see figure 1, section 3.1 Power requirements).

To replace the fuse, disconnect the power cable.

Remove the fuseholder cover using a suitable screwdriver.

Replace the damaged fuse with another of the following characteristics:

THE FUSE SHOULD BE OF THE TYPE: 5x20 mm, 250 V, T, AND:

**125 mA FOR 220, 230/240 V
250 mA FOR 110 AND 125 V**

When putting the fuseholder cover back, ensure that the voltage selector is situated in a position that corresponds to the mains supply voltage.

7.2 Cleaning recommendations

CAUTION

To clean the cover, take care the instrument is disconnected.

CAUTION

Do not use scented hydrocarbons or chlorized solvents as cleaning agents. These products may damage the material used in the construction of the cover.

The cover should be cleaned using a light solution of detergent and water applied soft wetted cloth.

Dry completely before using the equipment again.

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