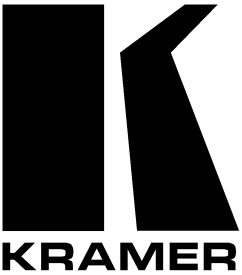
Kramer Electronics, Ltd.



USER MANUAL

Models:

VM-5YCxl, 1:5 Composite / s-Video / Audio DA

VM-10YCxl, 1:10 Composite / s-Video / Audio DA

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1 Introduction

Dedication by Kramer Electronics since 1981, to the development and manufacture of high quality video/audio equipment, makes the Kramer line an integral part of the finest production and presentation facilities in the world. In recent years, Kramer has redesigned and upgraded most of the line, making the best even better!

The Kramer line of professional video/audio electronics is one of the most versatile and complete available, and is a true leader in terms of quality, workmanship, price/performance ratio and innovation. In addition to our high quality amplifiers, we also offer excellent industrial and broadcast switchers, processors, interfaces, controllers and computer-related products.

Congratulations on purchasing[1] your Kramer **VM-5YCxl** or **VM-10YCxl** distribution amplifier. This product, which is the most flexible of its kind in the world, is ideal for the following applications:

- Video duplication studios
- Broadcasting, production, or presentation systems requiring high quality signal distribution
- Schools, retail outlets, sports bars, or other point-of-sale and CCTV[2] applications

This product comes with the following items:

- Amplifier
- AC power cable
- This user manual
- Kramer concise product catalog/CD
- Rubber feet

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual

1 When ordering a VM-5YCxl, specify whether you require a PAL or a NTSC compatible unit (unlike the VM -10YCxl, the VM-5YCxl includes no push button for selecting PAL or NTSC)

2 Closed Circuit TV

3 Overview

This section describes distribution amplifiers[1] and includes recommendations for achieving high signal quality.

3.1 About Distribution Amplifiers

A good quality distribution amplifier amplifies the incoming signal (video and audio), pre-compensates the signal for potential losses (perhaps resulting from the use of long cables) and generates several identical buffered and amplified outputs.

Often, inserting a signal processor between the source and the distribution amplifier corrects and fine-tunes the source signal before multiplication. This results in the correction of all copies in the same way.

The properties of distribution amplifiers can vary as follows:

- Number of inputs
- Looping capability
- Number of outputs
- Operating format
- Bandwidth
- Input/output coupling

3.2 High Signal Quality Recommendations

Achieving high signal quality[2] means:

- Using high quality equipment for source and acceptor signal handling capability. Different brands differ in quality and a low quality source will result in low quality duplicates
- Connecting only good quality connection cables, thus avoiding interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)
- Using good quality sockets and connectors for the sources and acceptors to avoid signal path breaks[3]. Aim for Zero Ohm connection resistance and

1 Distribution amplifiers distribute one video and/or audio source to several video/audio acceptors for simultaneous recording or monitoring of one source

2 When transmitted from a source to an acceptor

3 Poor quality connectors tend to rust, which may cause breaks

ensure that sockets and connectors match the required impedance (75 ohms in video)

- Ensuring high quality amplifying circuitry for high linearity, low distortion and low noise operation
- Compensating for extended distances[1] by using line amplifiers between the source and the acceptors
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality. Install unbalanced audio and video lines[2] (even though the cables are shielded) away from mains carrying cables, electric motors, and transmitters

4 Composite / s-Video / Audio Distribution Amplifiers

Section 4.1 describes the 1:5 model **VM-5YCxl**, and section 4.2 describes the 1:10 model **VM-10YCxl**.

4.1 Getting to Know Your VM-5YCxl

The **VM-5YCxl** is an exceptional 1:5 distribution amplifier, with dual format and bi-directional conversion between Y/C and composite video. Section 4.1.6 includes labeled illustrations of the front and rear panels, and an explanation of the features.

4.1.1 Unique 1:5 Distribution Amplifier

The **VM-5YCxl** is a unique 1:5 distribution amplifier that accepts a single input source and distributes the signal to five identical outputs designed to drive monitors, projectors, or other receiving devices for:

- S-Video (Y/C) (with 4 pin connectors)
- Composite video (with BNC connectors)
- Audio stereo signals

4.1.2 Dual Format

The **VM-5YCxl** is a true dual format distribution amplifier enabling simultaneous distribution of s-Video and composite video.

4.1.3 Bi-Directional Conversion Between Y/C and Composite Video

The **VM-5YCxl** supports:

1 In excess of 15 meters

2 Balanced audio lines are less prone to interference

- A composite input distributed to up to 5 composite outputs and 5 Y/C outputs
- A Y/C input distributed to up to 5 composite outputs and 5 Y/C outputs

The composite video input and the Y/C input each include an extra converted output (an extra Y/C output for the composite video input and an extra composite video output derived from the Y/C input) so that, even when functioning as two unconverted distribution amplifiers, an extra converted output is available.

4.1.4 Bandwidth

Bandwidth exceeding 300 MHz ensures transparent performance with typical video and audio sources.

4.1.5 Rear Panel Controls

Rear panel controls enable selecting AC or DC coupling and enable termination (to enable looping).

4.1.6 Front and Rear Panels

Figure 1 illustrates the front and rear panels of the **VM-5YCxl**:

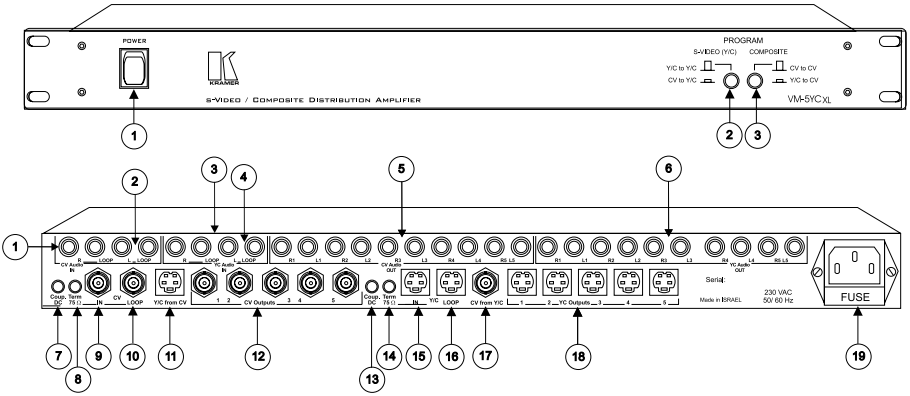

Figure 1: VM-5YCxl Front/Rear Panel Features

Tables 1 and 2 define the features and functions of the **VM-5YCxl**:

Table 1: VM-5YCxl Front Panel Features

No.	Feature	Function
1	Power Switch	Supplies power to the unit
2	S-Video (Y/C) Push Button	Selects source for 5 s-Video outputs: IN=CV input, OUT=Y/C input
3	Composite Push Button	Selects source for 5 composite video outputs: IN=Y/C input, OUT=CV input

Table 2: VM-5YCxl Rear Panel Features

No.	Feature	Function
1	CV Audio IN (RCA Connectors)	For composite video audio plug
2	CV Audio Loop (RCA Connectors)	For audio looping to increase output availability
3	Y/C Audio IN (RCA Connectors)	For s-Video (Y/C) audio plug
4	Y/C Audio Loop (RCA Connectors)	For audio looping to increase output availability
5	CV Audio OUT (RCA Connectors)	Audio out for composite video
6	Y/C Audio OUT (RCA Connectors)	Audio out for s-Video (Y/C)
7	Coup. DC Button (IN=DC)	Controls video input coupling
8	Term 75Ω Button (IN=75Ω)	Controls loop termination
9	CV IN (BNC Connector)	For the composite video source
10	CV LOOP (BNC Connector)	For video looping to increase output availability
11	Y/C from CV (4p Connector)	Converted output
12	CV Outputs (BNC Connectors)	Video outputs
13	Coup. DC Button (IN=DC)	Controls video input coupling
14	Term 75Ω Button (IN=75Ω)	Controls loop termination
15	Y/C IN (4p Connector)	For the s-Video source
16	Y/C LOOP (4p Connector)	For video looping to increase output availability
17	CV from Y/C (BNC Connector)	Converted output
18	Y/C Outputs (4p Connectors)	Video outputs
19	Power Connector with Fuse	AC connector enabling power supply to the unit

4.2 Getting to Know Your VM-10YCxl

The **VM-10YCxl** is an exceptional 1:10 distribution amplifier, with dual format and bi-directional conversion between Y/C and composite video. Section 4.2.6 includes labeled illustrations of the front and rear panels, and an explanation of the features.

4.2.1 Unique 1:10 Distribution Amplifier

The **VM-10YCxl** is a unique 1:10 distribution amplifier that accepts a single input source and distributes the signal to ten identical outputs designed to drive monitors, projectors, or other receiving devices for:

- S-Video (Y/C) (with 4 pin connectors)
- Composite video (with BNC connectors)
- Audio stereo signals

4.2.2 Dual Format

The **VM-10YCxl** is a true dual format distribution amplifier enabling simultaneous distribution of s-Video and composite video.

4.2.3 Bi-Directional Conversion Between Y/C and Composite Video

The **VM-10YCxl** supports:

- A composite input distributed to up to 10 composite outputs and 10 Y/C outputs
- A Y/C input distributed to up to 10 composite outputs and 10 Y/C outputs

The composite video input and the Y/C input each include an extra converted output (an extra Y/C output for the composite video input and an extra composite video output derived from the Y/C input) so that, even when functioning as two unconverted distribution amplifiers, an extra converted output for monitoring is available. The composite to Y/C decoding is performed using a digital comb-filter[1] for perfect Y/C outputs.

4.2.4 Bandwidth

Bandwidth exceeding 300 MHz ensures transparent performance with typical video and audio sources.

4.2.5 Rear Panel Controls

Rear panel controls enable AC or DC coupling and termination (to enable looping), as well as controls for C level, Y level and Y EQ level adjustment.

4.2.6 Front and Rear Panels

Figure 2 illustrates the front and rear panels of the **VM-10YCxl**:

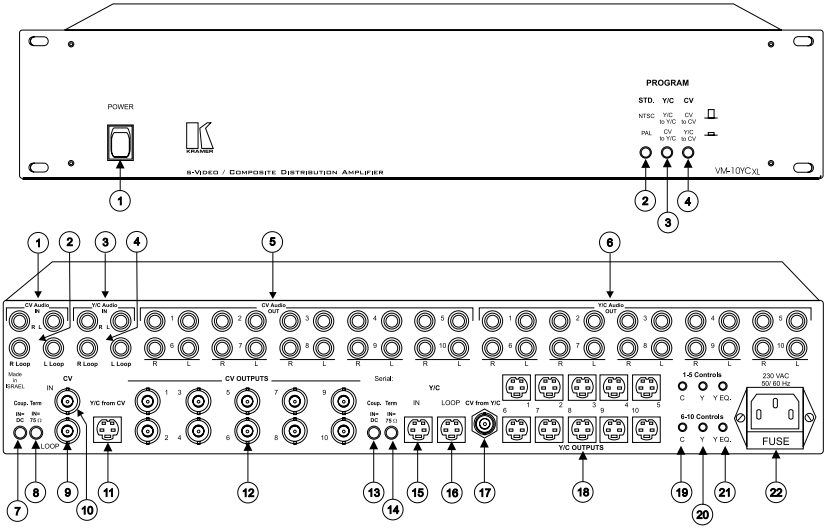

Figure 2: VM-10YCxl Front/Rear Panel Features

Tables 3 and 4 define the features and functions of the **VM-10YCxl**:

1 Comb filtering separates Y from C, based on combing out the chrominance signal from the luminance

Table 3: VM-10YCxl Front Panel Features

No.	Feature	Function
1	Power Switch	Supplies power to the unit
2	STD (NTSC or PAL) Push Button	Selects PAL or NTSC
3	S-Video (Y/C) Push Button	Selects source for 10 s-Video outputs: IN= CV input, OUT=Y/C input
4	CV Push Button	Selects source for 10 CV outputs: IN=Y/C input, OUT=CV input

Table 4: VM-10YCxl Rear Panel Features

No.	Feature	Function
1	CV Audio IN (RCA Connectors)	For composite video audio plug
2	CV Audio Loop (RCA Connectors)	For audio looping to increase output availability
3	Y/C Audio IN (RCA Connectors)	For s-Video (Y/C) audio plug
4	Y/C Audio Loop (RCA Connectors)	For audio looping to increase output availability
5	CV Audio OUT (RCA Connectors)	Audio out for composite video
6	Y/C Audio OUT (RCA Connectors)	Audio out for s-Video (Y/C)
7	Coup. IN=DC	Controls video input coupling
8	Term IN=75Ω	Controls loop termination
9	CV LOOP (BNC Connector)	For video looping to increase output availability
10	CV IN (BNC Connector)	For the composite video audio source
11	Y/C from CV (4p Connector)	Converted output
12	CV OUTPUTS (BNC Connectors)	Video outputs
13	Coup. IN=DC	Controls video input coupling
14	Term. IN=75 Ω	Controls loop termination
15	Y/C IN (4p Connector)	For the s-Video source
16	Y/C LOOP (4p Connector)	For video looping to increase output availability
17	CV from Y/C (BNC Connector)	Converted output
18	Y/C OUTPUTS (4p Connectors)	Video outputs
19	C Control	Adjustment control for C
20	Y Control	Adjustment control for Y
21	EQ. Control	Adjustment control for Y EQ.
22	Power Connector with Fuse	AC connector enabling power supply to the unit

5 Installation

This section describes rack mounting and connecting to video devices.

5.1 Rack Mounting

Each product, the **VM-5YCxl** and the **VM-10YCxl**, is housed in a professional 19-inch rack mountable enclosure. A **VM-5YCxl** unit requires one vertical rack space and a **VM-10YCxl** unit requires two vertical rack spaces. The standard 19-inch (IU) EIA rack assembly requires no specific spacing above or below the unit for ventilation. To mount either the **VM-5YCxl** or the **VM-10YCxl**, position the rack ears against

the rails of your rack, and insert standard screws through each of the four corner holes in the front panel.

5.2 Connecting to Video Devices

Connect either the **VM-5YCxl** or the **VM-10YCxl** to the power supply and to the video and audio inputs and outputs.

6 Technical Specifications

Table 5 lists the technical specifications for the **VM-5YCxl** and the **VM-10YCxl**.

Table 5: Technical Specifications for VM-5YCxl and VM-10YCxl (composite video data shown)

	VM-5YCxl	VM-10YCxl
INPUTS:	1 composite video looping, 1Vpp/75 Ω on a BNC connector 1 looping (Y), 1Vpp/75 Ω (C) 0.3Vpp/75 Ω on a 4P connector 2 audio stereo looping 1Vpp/ 50k Ω on RCAs	1 composite video looping, 1Vpp/75 Ω on a BNC type connector 1 looping (Y), 1Vpp/75 Ω (C) 0.3Vpp/75 Ω on a 4P connector 2 stereo audio looping 1Vpp/ 50k Ω on RCAs
OUTPUTS:	5 + 1 composite video, 1 Vpp/75 Ω on BNCs 5 + 1 Y/C, Y=1Vpp/75 Ω, C=0.3 Vpp/75 Ω on 4P connectors 2x5 audio stereo, 1Vpp /100 Ω on RCAs	10 + 1 composite video 1 Vpp/75 Ω on BNCs 10 + 1 Y/C, Y=1Vpp/75 Ω, C=0.3 Vpp/75 Ω on 4P connectors 2x10 audio stereo, 1Vpp /100 Ω on RCAs
VIDEO BANDWIDTH:	>300 MHz -3dB	>300 MHz -3dB
VIDEO CROSSTALK:	< - 58 dB @ 5MHz	< - 61 dB @ 5MHz
NON LINEARITY:	<0.05%	<0.1%
VIDEO S/N:	73.5 dB	75.5 dB
DIFF. GAIN:	<0.26%	<0.05%
DIFF. PHASE:	<0.11 Deg	<0.15 Deg
K-FACTOR:	<0.1%	<0.05%
COUPLING:	AC or DC (video), AC for audio	AC or DC (video), AC for audio
CONTROLS:	Y/C to Y/C or composite, composite to composite or Y/C program switches	Y/C to Y/C or composite, composite to composite or Y/C, PAL/NTSC program switches; C level, Y level, Y equalization
AUDIO BANDWIDTH:	100 kHz -3dB	100 kHz - 3dB
AUDIO S/N:	88 dB unweighted, (1Vpp)	80 dB unweighted, (1Vpp)
AUDIO THD:	0.02% (1V, 1kHz)	< 0.05% (1V, 1kHz)
2ND HARMONIC:	0.015%	0.003%
DIMENSIONS:	19-inch (W), 7-inch (D) 1U (H) rack-mountable	19-inch (W), 7-inch (D) 2U (H) rack mountable
POWER SOURCE:	230 VAC, 50/60 Hz, (115VAC, U.S.A.) 12VA	230 VAC, 50/60 Hz, (115VAC, U.S.A.) 14VA
WEIGHT:	2.5 kg (5.6 Lbs.) approx	3.8 kg (8.4 Lbs.) approx
ACCESSORIES:	Power cord	Power cord

7 Operation

Section 7.1 describes how to operate the **VM-5YCxl** and section 7.2 describes how to operate the **VM-10YCxl**.

7.1 Operating the VM-5YCxl

The **VM-5YCxl**, which has two types of video input, composite and s-Video, can function in several modes. For example, simultaneously, as two independent amplifiers, as follows:

- 1 to 5 composite video and stereo audio
- 1 to 5 Y/C and stereo audio

Section 7.1.1 describes how to operate the front panel buttons (relevant footnotes, marked as *item #*, refer to the items numbered in Figure 1). Section 7.1.2 describes the versatility of the **VM-5YCxl**.

7.1.1 VM-5YCxl Front Panel Buttons

By pressing and releasing the *S-Video (Y/C)* and the *composite video* front panel buttons[1] you can program all the functions of the **VM-5YCxl**.

7.1.1.1 S-Video (Y/C) Front Panel Button Operation

Pressing the *S-Video (Y/C)* front panel button produces five Y/C outputs from the composite input[2], converting composite to Y/C.

Releasing the *S-Video (Y/C)* front panel button amplifies the Y/C input and distributes it to five Y/C outputs, simultaneously providing a single composite (converted from Y/C) output[3].

7.1.1.2 Composite Video Front Panel Button Operation

Pressing the *composite video* front panel button produces five composite video outputs[4], converting the Y/C input[5] to composite, and simultaneously providing an additional composite (converted from Y/C) output[6].

1 Items 2 and 3, respectively

2 Item 7

3 Item 15

4 Item 10

5 Item 13

6 Item 15

Releasing the *composite video* front panel button amplifies the composite video input[1] and distributes it to five composite video outputs[2], simultaneously providing a single converted Y/C output[3].

Table 6: VM-5YCxl Front Panel Button Operation Summary

Front Panel Buttons		Result
S-Video (Y/C)	Composite Video	
P	**-**	Produces 5 converted Y/C outputs from the composite input
R	**-**	Amplifies Y/C input, distributing it to 5 Y/C outputs (and converting it to a single composite output)
-	**P**	Produces 5 converted composite video outputs from the Y/C input
-	**R**	Amplifies the composite video input, distributing it to 5 composite video outputs, (and providing a single converted Y/C output)
R	**R**	2 independent distribution amplifiers, a 1 to 5 plus 1 composite DA; and a 1 to 5 plus 1 Y/C DA
P	**R**	Composite video input provides 5 composite outputs and 5 Y/C outputs
R	**P**	Y/C input provides 5 Y/C outputs and 5 composite outputs and the composite converted output
P	**P**	Composite video input provides Y/C output plus 1 output, and the Y/C input converts to 5 composite outputs plus 1 converted output
P = Pressed In; **R** = Released		

7.1.2 VM-5YCxl Versatility

The versatility of the **VM-5YCxl** offers the following possibilities:

Releasing both the *S-Video (Y/C)* and the *composite video* front panel buttons enables the **VM-5YCxl** to function as two independent distribution amplifiers, a 1 to 5 plus 1 composite; and a 1 to 5 plus 1 Y/C.

By releasing the *composite video* front panel button, and pressing the *S-Video (Y/C*) front panel button, the composite video input[4] provides five composite outputs[5] and five Y/C outputs[6].

By releasing the *S-Video (Y/C)* front panel button, and pressing the *composite video* front panel button, the Y/C input[7], provides five Y/C outputs[1] and five composite outputs[2] and the composite converted output[3].

1 Item 7

2 Item 10

3 Item 9

4 Item 7

5 Item 10

6 Item 16

7 Item 13

By pressing both the *S-Video (Y/C)* and the *composite video* front panel buttons, the composite input[4] converts to five Y/C outputs[5] and a single converted output[6], and the Y/C input[7] converts to five composite outputs[8] and a single converted output[9]. This provides criss-crossing between the input and output formats, providing a bi-directional conversion.

7.1.2.1 Video Input Coupling Operation

The *Coup. DC* buttons[10] control the video input coupling. Pressing the *Coup. DC* buttons causes the video signal input (as well as output) to be fully DC coupled. For example, the output signal follows the DC offset, if it exists, and when the buttons are released the video input becomes AC coupled, removing the DC offset of the input signal. To achieve the best linearity and signal fidelity the signals should be DC coupled. If input signals ride on a large DC offset (sometimes provided by the video source), release the *Coup. DC* buttons to remove the DC offset.

7.1.2.2 Loop Terminating Operation

The Term 75Ω buttons[11] control loop termination to enable a loop connection between two **VM-5YCxl** units to increase the number of outputs. In this case, the signal enters the first **VM-5YCxl** unit (when composite video is used) at the video input[12]. After the termination switch of the **VM-5YCxl** unit is released (Hi-Z mode), connect the loop connector[13] to the input connector[14] of the next **VM-5YCxl** unit. If that next **VM-5YCxl** unit is the last, press its terminating switch, terminating the line to 75 Ω. In a chain of looped **VM-5YCxl** units, release the terminating button (Hi-Z mode) in all **VM-5YCxl** units except for the last,

1 Item 16

2 Item 10

3 Item 15

4 Item 7

5 Item 16

6 Item 9

7 Item 13

8 Item 10

9 Item 15

10 Items 5 and 11, respectively

11 Items 6 and 12, respectively

12 Item 7

13 Item 8

14 Item 7

thus terminating the line at its end. The audio inputs also have looping outputs. However, in audio, termination is not required[1].

7.1.2.3 Trimmers Operation

Five small holes on the underside of the **VM-5YCxl** enable access to the trimmers, as Figure 3 illustrates.

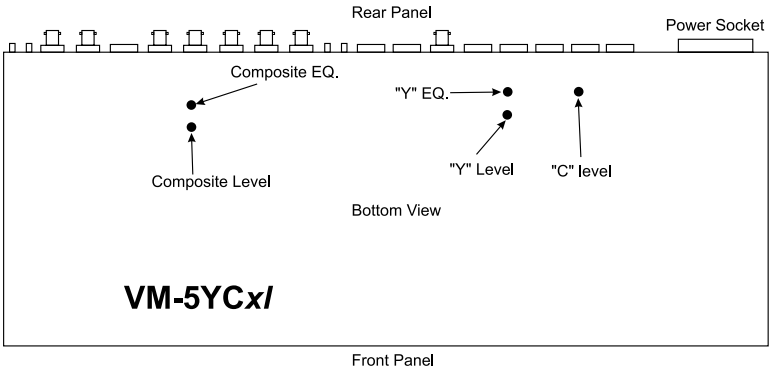

Figure 3: VM-5YCxl Underside

Warning: Adjust only in extremely problematic cases[2]. Adjustment is usually unnecessary as each unit comes factory pre-set. Verify if a problem exists, by inputting a standard signal to the machine and observing the standard output to see if there is a discrepancy. Only if a discrepancy exists, trim the unit.

7.2 Operating the VM-10YCxl

This section describes how to operate the **VM-10YCxl**. Section 7.2.1 describes how to operate the front panel buttons (relevant footnotes, marked as *item #*, refer to the items numbered in Figure 2). Section 7.2.2 describes the versatility of the **VM-10YCxl**.

The **VM-10YCxl** is similar to the **VM-5YCxl**, both in terms of design and operation. However, there are important differences, as follows:

- The **VM-10YCxl** includes rear panel adjustment controls (for C[3], Y[4] and Y EQ[1].) for adjusting the C level, the Y level and the Y EQ level

1 Since audio uses high impedance cables, there is no need for termination if the distance is not excessive

2 Trimmers are for fine-tuning; not user level control. They are fragile and break easily

3 Item 17

4 Item 18

- The **VM-10YCxl** has two blocks of Y/C outputs 1-5, and 6-10. Each block is separately adjustable[2]
- The **VM-10YCxl** uses an internal digital composite to Y/C converter[3], and the **VM-5YCxl** uses an analogue converter. The additional front panel button, *STD.*, on the **VM-10YCxl** selects either PAL or NTSC[4]. Pressing the button sets the **VM-10YCxl** for the PAL system, releasing the button sets the **VM-10YCxl** for the NTSC system[5]

The **VM-10YCxl** with its two types of video input, composite and s-Video, can function in several modes. For example, simultaneously, as two independent amplifiers, as follows:

- 1 to 10 composite video and stereo audio
- 1 to 10 Y/C and stereo audio

7.2.1 VM-10YCxl Front Panel Buttons

By pressing and releasing the *S-Video (Y/C)* and the *composite video* front panel buttons[6] you can program the functions of the **VM-10YCxl**.

7.2.1.1 S-Video (Y/C) Front Panel Button Operation

Pressing the *S-Video (Y/C)* front panel button produces ten Y/C outputs from the composite input[7], converting composite to Y/C.

Releasing the *S-Video (Y/C)* front panel button amplifies the Y/C input and distributes it to ten Y/C outputs, simultaneously providing a single composite (converted from Y/C) output[8].

7.2.1.2 Composite Video Front Panel Button Operation

Pressing the *composite video* front panel button produces ten composite video outputs[9], converting the Y/C input[10] to composite and

1 Item 19

2 This is useful, for example, when laying five cables in one room and five longer cables in a different room

3 A digital based comb-filter converter

4 Digital converters need to know what standard you use

5 Analogue machines, like the VM-5YCxl work in only one mode, not both

6 Items 3 and 4, respectively

7 Item 8

8 Item 15

9 Item 10

10 Item 13

simultaneously providing an additional composite (converted from Y/C) output[1].

Releasing the *composite video* front panel button amplifies the composite video input[2], distributes it to ten composite video outputs[3], and simultaneously provides a single converted Y/C output[4].

Table 7: VM-10YCxl Front Panel Button Operation Summary

Front Panel Buttons[5]		Result
S-Video (Y/C)	Composite Video	
P	**-**	Produces 10 converted Y/C outputs from the composite input
R	**-**	Amplifies Y/C input, distributing it to 10 Y/C outputs (and converting it to a single composite output)
-	**P**	Produces 10 converted composite video outputs from the Y/C input
-	**R**	Amplifies the composite video input, distributing it to 10 composite video outputs, (and providing a single converted Y/C output)
R	**R**	2 independent distribution amplifiers, a 1 to 10 plus 1 composite DA; and a 1 to 10 plus 1 Y/C DA
P	**R**	Composite video input provides 10 composite outputs and 10 Y/C outputs
R	**P**	Y/C input provides 10 Y/C outputs and 10 composite outputs and the composite converted output
P	**P**	Composite video input provides Y/C output plus 1 output, and the Y/C input converts to 10 composite outputs plus 1 converted output
P = Pressed In; **R** = Released		

7.2.2 VM-10YCxl Versatility

The versatility of the **VM-10YCxl** offers the following possibilities:

Releasing both the *S-Video (Y/C)* and the *composite video* front panel buttons enables the **VM-10YCxl** to function as two independent distribution amplifiers, a 1 to 10 plus 1 composite, and a 1 to 10 plus 1 Y/C.

By releasing the *composite video* front panel button, and pressing the *S-Video (Y/C*) front panel button, the composite video input[6] provides ten composite outputs[7] and ten Y/C outputs[1].

1 Item 15

2 Item 8

3 Item 10

4 Item 9

5 Press the *STD.* front panel button for PAL; release it for NTSC

6 Item 8

7 Item 10

By releasing the *S-Video (Y/C)* front panel button, and pressing the *composite video* front panel button, the Y/C input[2], provides ten Y/C outputs[3] and ten composite outputs[4] and the composite converted output[5].

By pressing both the *S-Video (Y/C)* and the *composite video* front panel buttons, the composite input[6] converts to ten Y/C outputs[7] and a single converted output[8], and the Y/C input[9] converts to ten composite outputs[10] and a single converted output[11]. This provides criss-crossing between the input and output formats, providing a bi-directional conversion.

7.2.2.1 Video Input Coupling Operation

The *Coup. DC* buttons[12] control the video input coupling. Pressing the *Coup. DC* buttons causes the video signal input (as well as output) to be fully DC coupled. For example, the output signal follows the DC offset, if it exists, and when the buttons are released the video input becomes AC coupled, removing the DC offset of the input signal. To achieve the best linearity and signal fidelity the signals should be DC coupled. If input signals ride on a large DC offset (sometimes provided by the video source), release the *Coup. DC* buttons to remove the DC offset.

7.2.2.2 Loop Terminating Operation

The Term 75Ω buttons[13] control loop termination for enabling a loop connection between two **VM-10YCxl** units to increase the number of outputs. In this case, the signal enters the first **VM-10YCxl** unit (when composite video is used) at the video input[14]. After the termination switch of the **VM-10YCxl** unit is released (Hi-Z mode), connect the loop

1 Item 16

2 Item 13

3 Item 16

4 Item 10

5 Item 15

6 Item 8

7 Item 16

8 Item 9

9 Item 13

10 Item 10

11 Item 15

12 Items 5 and 11, respectively

13 Items 6 and 12, respectively

14 Item 8

connector[1] to the input connector[2] of the next **VM-10YCxl** unit in the chain. If that next **VM-10YCxl** unit is the last in the chain, press its terminating switch to terminate the line to 75 Ω. In a chain of looped **VM-10YCxl** units, release the terminating button (Hi-Z mode) in all **VM-10YCxl** units except for the last, thus terminating the line at its end. The audio inputs also have looping outputs. However, in audio, termination is not required[3].

7.2.2.3 Trimmers Operation

Seven small holes on the underside of the **VM-10YCxl** enable access to the trimmers, as Figure 4 illustrates.

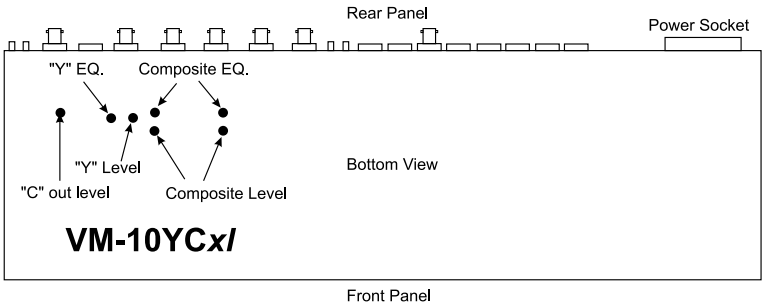

Figure 4: VM-10YCxl Underside

Warning: Adjust only in extremely problematic cases[4]. Adjustment is usually unnecessary as each unit comes factory pre-set. Verify if a problem exists, by inputting a standard signal to the machine and observing the standard output to see if there is a discrepancy. Only if a discrepancy exists, trim the unit.

1 Item 7

2 Item 8

3 Since audio uses high impedance cables, there is no need for termination if the distance is not excessive

4 Trimmers are for fine-tuning; not user level control. They are fragile and break easily

LIMITED WARRANTY

Kramer Electronics (hereafter *Kramer*) warrants this product free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY

Labor and parts are warranted for three years from the date of the first customer purchase.

WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by Kramer, or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the web site www.kramerelectronics.com.
2. Any product, on which the serial number has been defaced, modified or removed.
3. Damage, deterioration or malfunction resulting from:
   - i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
   - ii) Product modification, or failure to follow instructions supplied with the product
   - iii) Repair or attempted repair by anyone not authorized by Kramer
   - iv) Any shipment of the product (claims must be presented to the carrier)
   - v) Removal or installation of the product
   - vi) Any other cause, which does not relate to a product defect
   - vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3. Shipping charges.

HOW YOU CAN GET WARRANTY SERVICE

1. To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

EXCLUSION OF DAMAGES

The liability of Kramer for any effective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or:
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.
NOTE: All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.
This equipment has been tested to determine compliance with the requirements of:

EN-50081:	"Electromagnetic compatibility (EMC); generic emission standard. Part 1: Residential, commercial and light industry"
EN-50082:	"Electromagnetic compatibility (EMC) generic immunity standard. Part 1: Residential, commercial and light industry environment".
CFR-47:	FCC Rules and Regulations: Part 15: "Radio frequency devices Subpart B – Unintentional radiators"

CAUTION!

- Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.
- Use the supplied DC power supply to feed power to the machine.
- Please use recommended interconnection cables to connect the machine to other components.

The list of Kramer distributors appears on our web site:
www.kramerelectronics.com

We welcome your questions, comments and feedback.

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