Instruction Manual
for
Model 1211D
PORTABLE COLOR
PATTERN GENERATOR

BK PRECISION

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TABLE OF CONTENTS

INTRODUCTION

The **B+K Precision** Model 1211D Portable Color Pattern Generator produces five patterns of video signals in a battery operated, portable package. The patterns provide complete and easy convergence of color receivers, and are invaluable in analyzing, adjusting and troubleshooting television receivers, video monitors, video tape recorders, and most other video products.

The unit is suitable for field or shop use. The plastic case is sturdy, yet lightweight. The case provides ruggedness to withstand daily use.

This versatile instrument generates a composite video output or video modulated rf output on channels 3 and 4. The level of video and rf outputs is fully adjustable.

CMOS integrated circuits assure long battery life while digitally generating all video, audio, sync, and gating signals. Most signals are derived from a crystal-controlled master oscillator, assuring stable, jitter free patterns.

Selectable patterns include 10 color bars gated at 30° intervals from burst. The color pattern tests color circuits and permits color demodulator alignment. Color level is adjustable from 0 to 100% to adjust color saturation and for observing operation of the color killer circuit. A full field color raster is controlled by the hue control which varies the raster color. This can be used for purity checks and to check color balance.

The 7 x 11 dot and line patterns are indispensable when adjusting convergence on color receivers, and for linearity, centering, and size testing and adjustment. A clear purity pattern enhances the speed and accuracy of purity adjustments.

A 1 kHz audio tone which modulates a 4.5 MHz subcarrier is selectable with any pattern.

SPECIFICATIONS

VIDEO PATTERNS

Color Bars:	10 bars gated rainbow at 30° intervals from burst.
Color Raster:	Full field color raster, user adjustable hues.
Blank Raster:	Purity.
Crosshatch:	11 x 7.
Dot:	11 x 7.

CHROMA

Subcarrier:	3.563795 MHz ±50 ppm for color bars. 3.579545 MHz ±50 ppm for raster.
Level:	Adjustable.
Phase:	Adjustable.

SYNC

Horizontal:

Frequency:	15,750 Hz ±0.04%.
Width:	5.3 µs.

Vertical:

Frequency:	60.12 Hz±0.04%.
Width:	255 µs.

RF OUTPUT

Channel 3:	61.25 MHz, crystal controlled.
Channel 4:	67.25 MHz, crystal controlled.
Level:	Adjustable up to 10 mV rms min.
Output Impedance:	75 Ω.

VIDEO OUTPUT

Level:	Adjustable to approximately 1 V p-p.
Sync:	Negative.
Output Impedance:	75 Ω.

AUDIO: 4.5 MHz subcarrier modulated by 1 kHz tone. Selectable on all video patterns.

POWER REQUIREMENTS

Source:	One 9-volt alkaline transistor battery (NEDA 1604A or equivalent, not supplied) or external 9 VDC adapter.
Battery Life:	20 hours typical for rf output with alkaline battery.

MECHANICAL

Dimensions (HWD):	2″ x 6.5″ x 6.75″. (50 x 165 x 171mm).
Weight:	16 oz. (454 g).

CONTROLS AND INDICATORS

1. **POWER Indicator**. Lights when instrument is turned on. Battery needs replacement if indicator does not light.

2. **Power OFF-ON**. Pushbutton Switch.

3. **CHROMA Level Control**. Rotary control. Adjusts color subcarrier amplitude from 0% to 100% saturation. A setting of about 2/3 maximum can be used for most applications.

4. **BARS Switch.** Interlocking pushbutton switch. When engaged, turns on the 10 bar gated rainbow pattern.

5. **LINE Switch.** Interlocking pushbutton switch. When engaged, turns on the 11 x 7 cross hatch pattern.

6. **DOT Switch.** Interlocking pushbutton switch. When engaged, turns on the 11 x 7 dot pattern.

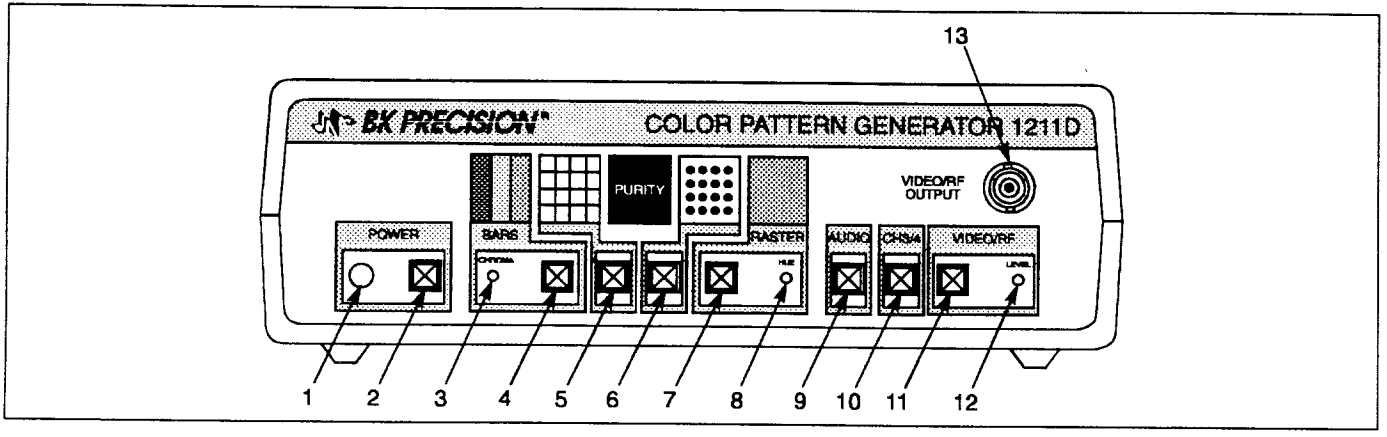

Figure 1. Controls and Indicators.

7. **RASTER Switch**. Interlocking pushbutton switch. When engaged, turns on the color raster.

NOTE:

When the BARS, LINE, DOT and RASTER switches are all released a purity pattern is provided which contains sync and setup for a clear blemish-free blank raster.

8. **HUE Control**. Rotary control. Adjusts color of color raster pattern.

9. **AUDIO Switch**. Pushbutton switch. When engaged, a 1kHz tone modulates the 4.5 MHz subcarrier which is added to the rf output signal. When released the 4.5 MHz audio subcarrier is turned off.

10. **CH 3/4 Switch.** Pushbutton switch. When engaged, rf output is channel 3. When released rf output is channel 4

11. **VIDEO/RF Switch**. Pushbutton switch. When released, rf is provided to the VIDEO/RF OUT connector. When engaged, video is provided to the VIDEO/RF OUT connector.

12. **RF/VIDEO LEVEL Control**. Rotary control. Adjusts amplitude of composite video and rf output signals. The unit produces a very high level output at maximum setting, which may overload some television receivers. A mid-range setting can be used for most applications.

13. **VIDEO/RF OUTPUT Connector.** Output signal connector. Output may be composite VIDEO, or an rf signal on CH 3 or CH 4. Output impedance is 75 Ω.

OPERATING INSTRUCTIONS

SAFETY PRECAUTIONS

WARNING

The following precautions must be observed to prevent electric shock.

1. This instrument is intended for use only by qualified electronic technicians.
2. Know and observe the TEST INSTRUMENT SAFETY recommendations listed on the inside front cover of this manual
3. Typical use of this instrument often involves "Hot Chassis" equipment and nearby high voltages. Observe caution.

AC OPERATION

For bench use, it is more desirable to use an ac power source instead of batteries. A battery eliminator (ac adapter) is supplied for this purpose. Inserting the battery eliminator's plug into the rear panel jack connects the ac source and disconnects the battery, conserving it for field use of the instrument.

BATTERY OPERATION

The Model 1211D Color Pattern Generator may be operated from an internal 9-volt transistor battery (not supplied). When using battery operation, check the battery each time the unit is switched on as follows:

1. Turn on the unit by engaging the POWER switch.
2. The POWER indicator should light. If not, the battery needs replacement. Battery replacement instructions are given in the MAINTENANCE section.

A fresh battery should give at least 20 hours continuous operation with rf output, For typical use 1 to 2 hours per day, a battery will probably last a month. An alkaline battery will give longest battery life. To conserve battery life, turn the instrument off any time the instrument is not in actual use.

VIDEO OUTPUT

To use the composite video output, perform the following steps:

1. Connect a cable from the VIDEO/RF OUTPUT connector to the desired signal injection point in the equipment under test. In television receivers, the video detector stage is usually recommended. This signal has standard negative sync polarity and should not be injected into circuits using inverted sync polarity.
2. Engage the VIDEO/RF switch.
3. The setting of the VIDEO/RF LEVEL control is dependent upon the point of signal injection. The maximum clockwise setting is typical for the input of a video monitor. A mid-range setting is typical for most other applications.
4. The CHROMA control adjusts color from 0 to 100%. A two-thirds clockwise setting is typical for most applications.
5. Select the desired pattern. Typical uses for each pattern are described in the APPLICATIONS section.

RF OUTPUT

RF output on two vhf channels (channels 3 and 4) is available for injection into the antenna terminals of a television receiver or VCR, into MATV signal distribution networks, etc. The following procedures explain how to set up the color pattern generator and a television receiver before starting other operations such as convergence or color adjustments. For use with equipment other than a television receiver, substitute appropriate equivalent steps.

1. Disconnect all antenna leads from the television receiver.
2. Connect a 75 Ω coaxial cable from the VIDEO/RF OUTPUT connector of the portable color pattern generator to the vhf antenna terminals of the equipment under test.
3. Select CH3 or CH4 as desired. Usually select the channel which does not have a commercial broadcast station in your geographical area.
4. Set the channel selector of the television receiver to the same channel as the color pattern generator .
5. Set the VIDEO/RF LEVEL control to mid-range. Too high of a setting may overload the receiver.
6. Set the CHROMA control to about two-thirds of maximum.
7. Select the lines pattern.
8. Fine tune the television receiver until a reasonably good pattern is obtained.
   a. Reduce the contrast and brightness controls on the TV set until both the horizontal and vertical lines are barely visible. At this point, one may be brighter than the other, but both should be visible.
   b. Readjust the fine tuning control for the brightest vertical lines.
   c. Now set the contrast and brightness controls for a comfortable viewing intensity.
   d. To obtain the sharpest test patterns and avoid "blooming" of the display, do not operate with excessive contrast and brightness during convergence or color adjustments.
9. Select the BARS pattern to generate the 10-bar gated rainbow pattern.
10. Advance the receiver color level control until color appears; ten bars should be visible. However, some sets may display only nine bars because of excessive overscan or blanking. When color does not appear at all or only with the color control near maximum, carefully readjust the fine tuning. It should only require a slight amount of rotation; excessive rotation indicates the tuner or i-f is misaligned. If this last step fails to produces color, it is likely that a malfunction exists somewhere in the receiver and must be corrected before proceeding. When the receiver is properly tuned, it is then ready for convergence or color adjustments.

APPLICATIONS

USE OF PATTERNS

10-Bar Gated Rainbow

The 10-color bars are raised on a luminance pedestal and gated at 30° intervals from burst. The resulting pattern is shown in Fig. 2, and a vector diagram representation of the signal is shown in Fig. 3. The pattern is primarily used for testing and aligning color circuitry. The reference black background gives sharp edge definition and aids in recognizing color spill.

11 x 7 Lines

This crosshatch pattern is extremely useful in dynamic convergence and linearity adjustments. The sharp definition of the horizontal and vertical lines helps to ensure precise convergence.

11 x 7 Dots

This dot pattern may be used in static or dynamic convergence.

Purity

The purity pattern provides sync and reference setup level for a clear blemish-free blank raster.

Color Rasters

This pattern may be used for purity adjustment and color checks.

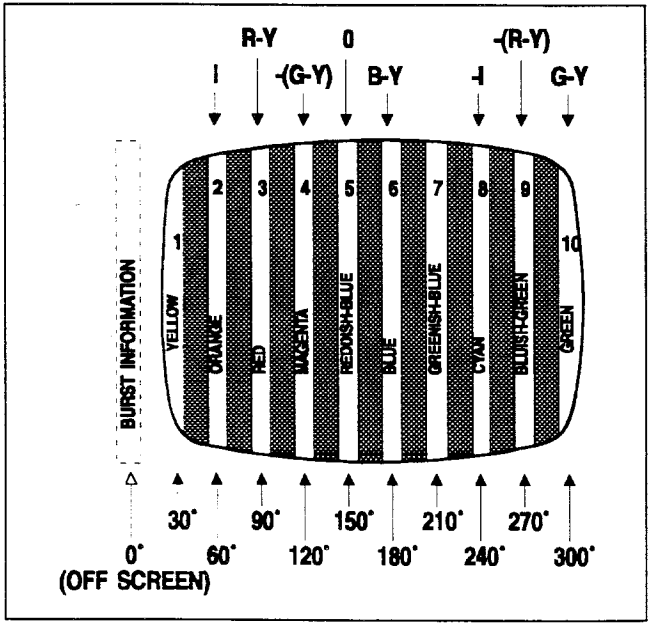

Figure 2. 10-Bar Gated Rainbow Pattern

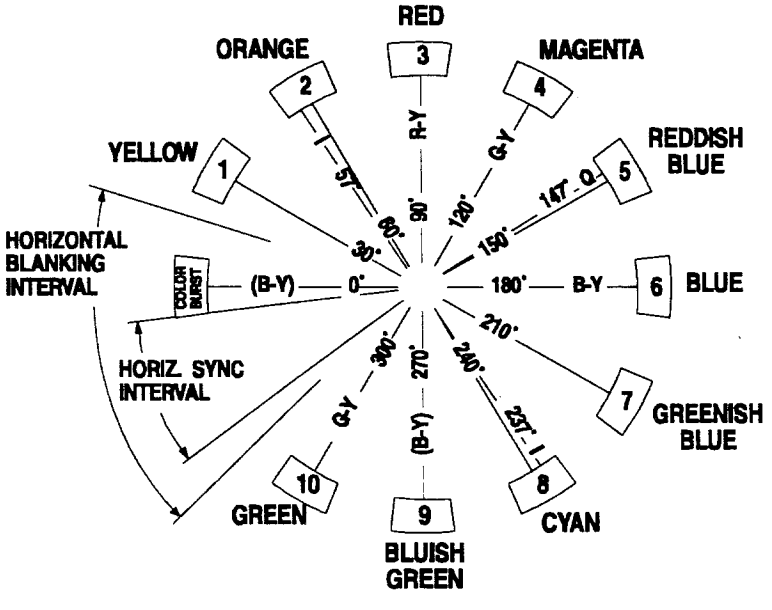

Figure 3. Gate Rainbow Phase Relationship.

CONVERGENCE

Introduction

A detailed convergence procedure is not presented here, as there are many excellent and thorough manuals available on the subject. However, the principal patterns used are reviewed here to help speed convergence adjustments. Always use the manufacture's service information, or, if not available, the Howard Sams "Photofact" series for convergence information.

Purity

The purity pattern of this color pattern generator provides sync and a reference baseline free of video information. This solid black reference is advantageous when adjusting purity. Older methods required turning to an unused channel or disabling the tuner. "Snow" produced by this method can be annoying and cause inaccuracy in set-up. Using the purity pattern, the operator can be assured that the adjusted purity condition will be maintained when the convergence is initiated.

Static Convergence

Static or dc, convergence is always performed **before** and **after** purity adjustments. Use the dot pattern.

Dynamic Convergence

Crosshatch (LINES) is the recommended pattern for performing dynamic convergence, although some technicians use dots throughout the entire procedure. This is a matter of personal preference. However, misconvergence is more easily seen with horizontal and vertical lines.

NOTE

Defocusing, blooming, and "kinks" at crosshatch intersections indicate that brightness and contrast are excessive. It is important to never perform convergence in this condition, or accuracy will greatly suffer.

COLOR ADJUSTMENTS

Introduction

The manufacturer's service notes should always be consulted when testing and aligning color circuitry. Following their recommended procedure will assure best performance. The following sections provide a general technique if the manufacturer's data is not available.

Hue Setting and Range

Select the 10-bar gated rainbow pattern.

Adjust the receiver's saturation, brightness and contrast controls to produce a pleasing color pattern. Ten individual color bars should be visible on the face of the screen (See Fig. 2 and 3). Some receivers may only display eight or nine bars due to excessive overscan or blanking.

Adjust the receiver's HUE control to so that the third bar from left to right of the 10-bar display is red, the sixth bar is blue, and the ninth bar is bluish green. If this arrangement cannot be obtained with any setting of the HUE control, then internal adjustment of the hue range coil or control is necessary.

It can be assumed that the color circuits in the receiver are operating properly, if these steps produce the correct results.

Color Sync Locking

The CHROMA level control varies the amplitude of the color subcarrier from 0 to 100%. Utilization of this control can help determine if the set will adequately lock on a color signal.

Select the 10-bar gated rainbow pattern and adjust the CHROMA level control to two-thirds of maximum. This represents normal color subcarrier amplitude.

Adjust the receiver color control to produce a recognizable color pattern.

Slowly rotate the CHROMA level control toward minimum until the colors become pale and finally disappear. The rate of fading will depend entirely upon the design of the receiver under test.

Most receivers will maintain color sync throughout the entire range of the CHROMA level control. However, some sets may lose it just before the color disappears, evidenced by their diagonal running.

Both of these conditions indicate normal operation of the color sync circuits. If a slight reduction of CHROMA causes color to fall out of lock, color synchronization of the receiver may be inadequate.

In the maximum clockwise position of the CHROMA level control, the amplitude of the color subcarrier is 100%. This is helpful in diagnosing receiver conditions, such as rf/i-f misalignment or chroma circuit malfunction.

Color Fit

The 10-bar gated color bar pattern produces color bars that are raised on a luminance pedestal so that spaces between the colors are reference black. When displaying the 10-bar pattern, color should only be seen in the luminance area. A defective delay line in the video amplifier or incorrect alignment of the chroma bandpass amplifier will cause the colors to overlap or spill into the black region.

Color Killer

Color killer threshold can be set while displaying the 11 x 7 LINES pattern. Adjust the color killer of the receiver until the vertical lines start to tear with color. Back this control off until the tear is removed, then a slight additional amount to provide a safety margin.

SOUND

For VCR's and television receivers, sound may be added to the rf output of any pattern by engaging the AUDIO switch. Note whether the sound signal is present in the video (usually diagonal lines through the pattern). There should be no difference in the pattern with sound on or off. The sound signal also can be used for testing the sound circuits of VCRs and TV sets. If sound is getting through the sound traps a herringbone condition will be displayed.

DEFLECTION SYSTEM TESTS

Introduction

A rapid check of receiver scanning can help disclose any abnormal or border-line situations which might exist in the electrical or mechanical

components of the deflection system. When evaluating any results from these tests, always use the manufacturer's recommendations as a criterion.

Overscan

Select the LINES pattern.

Adjust receiver contrast and brightness to display sharp, thin lines against a black background.

Count the number of vertical and horizontal lines. A typical receiver will display at least 10 vertical lines and 6 horizontal lines. An additional vertical line may just be visible at the screen's edge. This one is outside the normal picture area and should be ignored when performing adjustments.

Some receivers have an inherent tendency towards a greater amount of overscan and/or blanking. This phenomenon may also result in a crosshatch pattern with less that 11 x 7 lines. The same effect will produce an 8 or 9 bar gated rainbow pattern instead of 10 bars.

Linearity, Size, and Centering

The repetitive spacing of the 11 x 7 LINES pattern provides a stable source with which to perform these tests and adjustments. Abnormal conditions such as pincushion distortion, deflection nonlinearity, and excessive 60 Hz hum become immediately obvious.

Vertical size and linearity should be adjusted so that all horizontal lines are evenly spaced. Inability to do so usually indicates a vertical deflection problem.

Pincushion distortion is common to a great number of large screen receivers. The outermost vertical and horizontal crosshatch lines are most useful in determining the correct amount of compensation.

A horizontal bar rolling vertically through the crosshatch pattern indicates that 60 Hz hum is entering the receiver circuitry. Excessive amounts of it cause a very noticeable and annoying pattern displacement.

TELEVISION RECEIVERS

A color pattern generator is indispensable for convergence and color adjustment of color television receivers. This unit offers a wide variety of patterns that are valuable for general troubleshooting and signal tracing as well as in making adjustments in black and white or color television receivers. The composite video output permits signal injection into the video section and the rf output on two vhf channels permits testing of the tuner and i-f sections.

VIDEO MONITORS

Some video monitors (CGA scan only) used with small computers, word processors, etc. are similar to a television receiver except that the rf section is omitted. All patterns are used in the same manner. Most video monitors use a 75 Ω, 1 volt p-p composite video input with negative sync. This is exactly the type of video output available from this color pattern generator. Thus, it is ideal for servicing and adjusting CGA video monitors.

VCR's AND VIDEO DISK PLAYERS

Since VCR's (video cassette recorders) and video disk players use essentially the same type of signals as a television receiver, this instrument

generates appropriate test signals for troubleshooting, signal tracing and adjustment.

MATV AND CATV

This instrument includes a combination of features that make it valuable for servicing and testing MATV (master antenna television) and CATV (cable television) systems and components. It features a broadcast type signal on two VHF channels, 75Ω output, variable rf output level and variable color level. RF signals can be injected into the network from the color pattern generator and measured by a spectrum analyzer at various points to isolate causes of excessive signal attenuation such as damaged cable, defective connectors, adjustment of line amplifiers.

ADDENDUM

The HUE control on the 1211D normally provides adjustment of raster color from red thru green. However, on some television sets, the range may be limited to red through blue only. This is normal, and is due to the fact that the 1211D generates a simulated NTSC signal rather than a true NTSC signal, and some television sets react differently to the simulated signal.

MAINTENANCE

BATTERY INSTALLATION AND REPLACEMENT

1. When POWER indicator does not light, the battery should be replaced.
2. Set POWER switch to off.
3. Turn the unit over and remove the four screws from the bottom of the unit.
4. Turn unit over again and remove top cover.
5. Remove discharged battery from battery holder located at the right rear of the chassis as shown in Fig. 4. Install a new battery into the battery holder. Be sure to observe polarity and insure that battery contacts are fully connected.
6. Place top cover on unit being sure front and back panel fit into slots.
7. Turn unit over and install the four screws. Do not over tighten screws.

RF FREQUENCY CHECK

1. Turn on POWER (engaged).
2. Connect VIDEO/RF OUTPUT to frequency counter.
3. Select purity pattern.
4 Set AUDIO to off (released).
5. Select RF output (VIDEO/RF switch released).
6. Select CH4 (CH3/4 switch released). Output should read 67.25 MHz.
7. Select CH3 (CH3/4 switch engaged). Output should read 61.25 MHz.

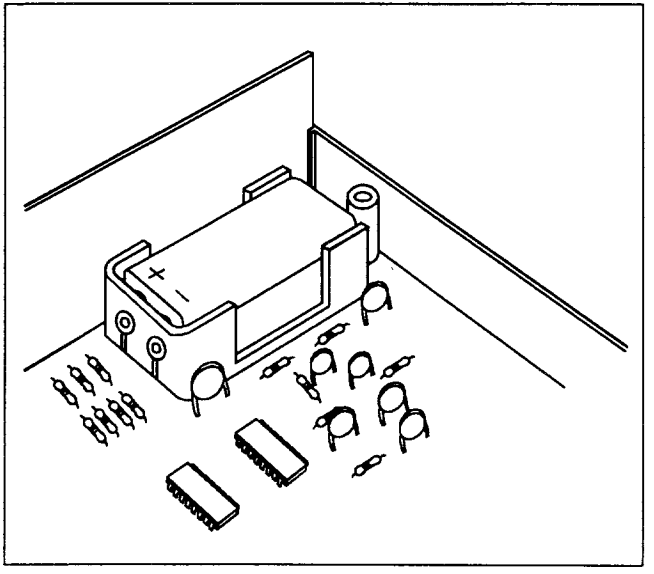

Figure 4. Location of Battery