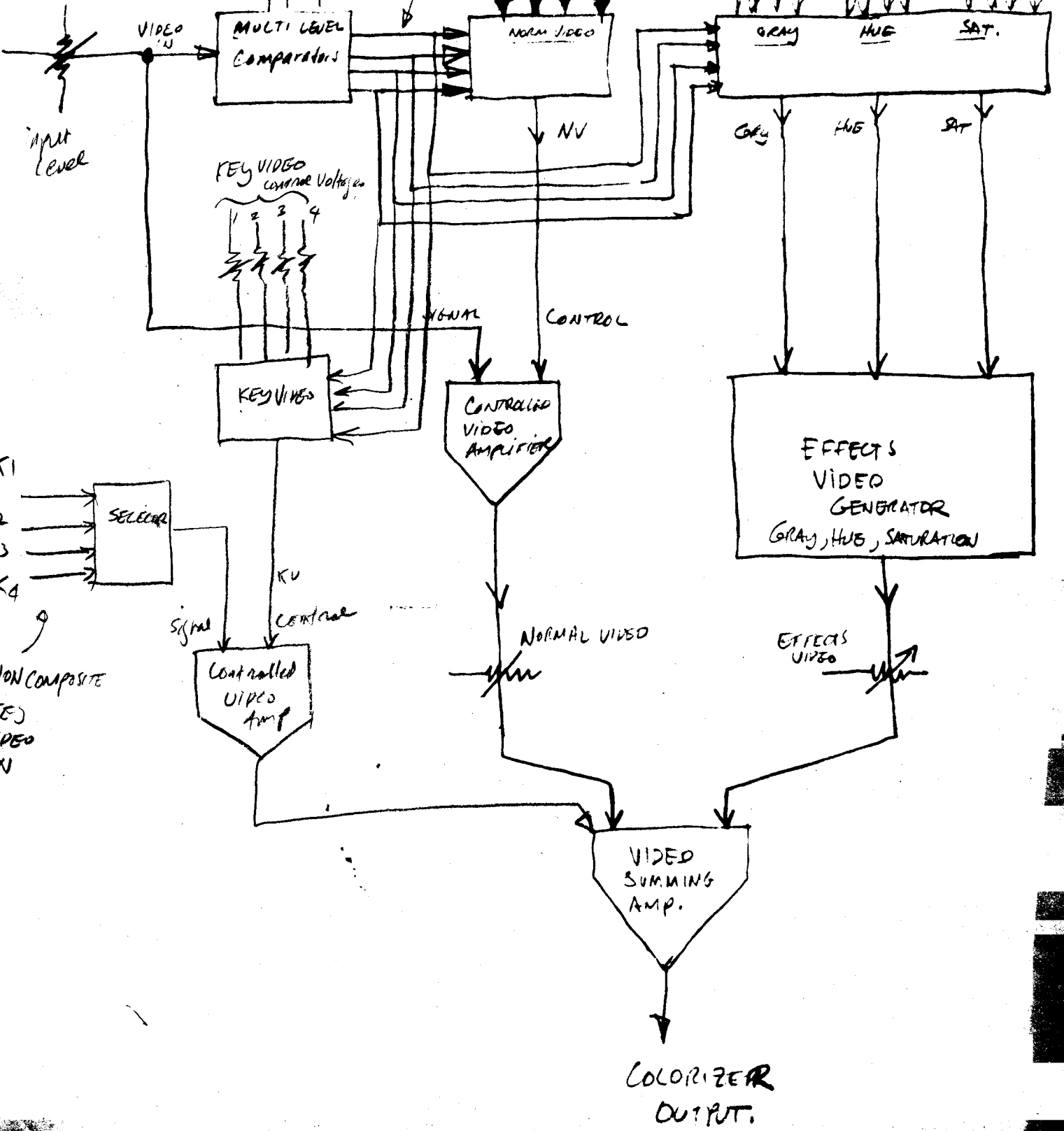# SIGNAL FLOW BLOCK DIAGRAM 200 COLORIZER WITH EXT KEY
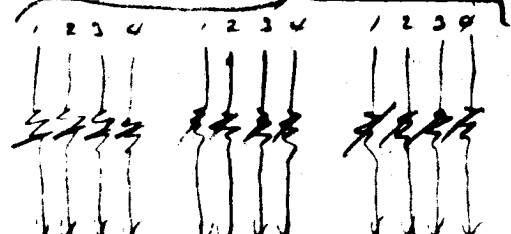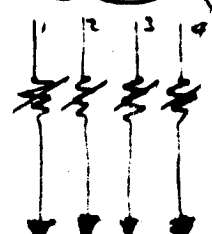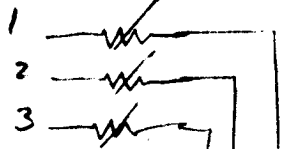
WEA

NORM VIDEO CONTROL VOLTAGES

EFFECTS VIDEO CONTROL VOLTAGES

GRAY SCALE BREAK POINTS.

1
2
3

1 2 3 4

1 2 3 4   1 2 3 4   1 2 3 4

4 LOGIC LEVELS

VIDEO 'IN

MULTI LEVEL Comparators

NORM VIDEO

GRAY   HUE   SAT.

input Level

NV

GRAY   HUE   SAT

KEY VIDEO CONTROL VOLTAGES

1 2 3 4

SIGNAL   CONTROL

KEY VIDEO

CONTROLLED VIDEO AMPLIFIER

K1
K2
K3
K4

SELECTOR

NON COMPOSITE KEY VIDEO IN

Signal   Control   KV

EFFECTS VIDEO GENERATOR GRAY, HUE, SATURATION

Controlled VIDEO Amp

NORMAL VIDEO

EFFECTS VIDEO

VIDEO SUMMING AMP.

COLORIZER OUTPUT.

this is not your model but the theory is correct

PRELIMINARY OPERATING MANUAL

THE EAB MODEL 100 COLORIZER

The following information on the EAB Model 100 will assist colorizer users. The information is divided into two parts: First, a description of the colorizer system; and second, a set of practical instructions for operating the colorizer. It is recommended that the operator be as familiar as possible with part one before attempting to operate the colorizer. A thorough understanding of the basic concept of this device is essential to fully utilize its capabilities.

COLORIZER THEORY

The most important technical fact to remember about the colorizer is that the output of the colorizer is the sum of two separate video signals. The first is the original signal which is the monochrome input signal, and the second is the effects signal, which is created in the colorizer and contains all the color information as well as the artificial gray scale information. Thus,

Colorizer output = Norm video + Effects video.

Please examine the colorizer control panel and note the location of the two controls labeled "Norm Video" and "Effects Video". Advancing either of these two controls will add its component into the output. Any combination of the original signal (norm video) and the "synthetic" signal (effects video) is possible in setting these controls. Very effective results are obtained by equal amounts of the two signals.

Nearly all of the controls on the colorizer are used for generating the synthetic video signal or "effects video" described above. These controls are divided into two basic groups. First, the gray dividers (three controls at panel left) and second, twelve controls in four groups of three at panel right.

The function of the three gray divider controls at left is to cut the gray scale of the input video in three places, forming four "gray bands". In each of these bands, which may conform to the shadows, two middle gray levels, and highlights of the incoming video, the colorizer can add or subtract brightness and can add color of a controllable hue and saturation. The setting of the controls determines the break points between the four bands. Naturally, the leftmost control must be set at the lowest break point and will have the lowest dial setting and the two controls to the right will show successively higher settings.

When the three gray divider controls are set to isolate the four bands of gray as described above, the effects video signal will be generated by means of the twelve controls at right labeled Hue, Saturation, and Gray. Each of the four groups' controls sets the brightness and color in each of the four gray bands. Thus the leftmost group (1) controls the brightness and color in the shadow areas of the

picture, the rightmost controls the brightness and color in the highlight areas, and so forth.

Each of the four groups of Hue, Saturation, and Gray are capable of forming any subjective color possible in color television. All possible combinations of chrominance and luminance are available from the three controls provided. Setting the "Saturation" control to zero causes no chrominance to appear in the band associated with that control. Setting the "Gray" control to four causes no brightness to be added, and settings below four produce darker shades while settings above four produce brighter shades. It is important to understand that the Gray controls may be used to either add or subtract brightness when the "effects video" signal is combined with the "normal video" signal. This allows the middle tones of a picture to be offest either to black or to white if desired.

COLORIZER OPERATION

Effective use of the Model 100 Colorizer relies on successful completion of three operations. These are:

1) Adjust for acquisition of input signal.

2) Adjust to generate useful effects video signal, and

3) Mix "effects" and "normal" video signals to produce a useful output.

The following list of instructions should be followed for consistent results:

1) Set "Effects Video" off. Set "Normal Video" full. Advance Input Level control for stable picture. Set this control to the middle of its stable range.

2) Set all "Sat" controls to "0". Set Gray controls to "4".

3) Preset "Gray Divider" controls to "2", "3", and "4" (left to right).

4) Advance "Effects Video" to approximately "5" and identify keying points visible in the gray scale by adjusting each Gray control to slightly different settings above and below "4". Do fine settings on Gray Divider controls to achieve key points which divide the picture effectively. All Divider controls must have higher dial settings to the right. This is the most important operation and takes practice to do well.

5) Working with each of the gray bands, adjust the "Gray" control to add or subtract gray. Advance the "Sat" control to add color. Note that the Normal Video may be completely eliminated if desired by turning the control to "0".

SOME TIPS ON USING THE COLORIZER

Because of the large amount of control which the colorizer gives over a video signal, it is possible to add so much effects video to the signal as to make the signal unusable or unacceptable for certain video applications. For this reason, it is suggested that the output signal be observed on a waveform monitor or oscilloscope (minimum bandwidth 5 mhz) during operation. Some important things to watch for are as follows:

1) **Excessive black:**
Using the Gray controls to drive the video signal below the pedestal can produce impressive "super black" areas in the picture. Unfortunately this is nonstandard video and is not acceptable for some applications. In addition, it will cause horizontal sync instability.

2) **Excessive chroma:**
The most common error in using the colorizer is laying on excessive color. In general, the best effects will be produced when less color is used, not more.

3) **Random scan video:**
When non-interlaced video is colorized it often exhibits an extremely objectionable "crawl" or shimmer. There is no easy way to prevent this.

4) **Subcarrier beating:**
In color broadcasts and other high quality video sources, the chroma information is time-locked to the video signal in such a way as to minimize the natural tendency of the color to "beat" with the horizontal scan. When the colorizer is used to colorize tapes and other monochrome material, the only way to aviod this very objectional effect is to finely adjust the 3.58 mhz color carrier frequency by a small amount to match the incoming video.

The Model 100 Colorizer has a control on the rear of the unit which should be trimmed for minimum beating effect. Usually the best way to set this control for maximum subjective picture definition is to turn the control to the point where the beating occurs the most rapidly. At this point the beating will visually "disappear".

For applications requiring quality it is recommended that the user utilize a sync generator with subcarrier output. When the subcarrier output is connected, to the colorizer it automatically replaces the internal subcarrier oscillator.

If any problems are encountered in using the colorizer please call Electronic Associates of Berkeley, Berkeley, Ca. Please note that attempting to make adjustments to the numerous trimmers inside the unit without first consulting the factory voids the warranty. Experience has also shown that it almost always requires the unit to be realigned by EAB.

Yours truly,

Bill Hearn, Electronics Engineer

200-B Colorizer

The most important thing to know about the 200 colorizer is that two separate signals are generated inside the colorizer and summed at the output. These signals are the NORMAL VIDEO signal and the EFFECTS VIDEO signal. *(also, the Key video signal, with your unit, woody.)*

The level of these two signals is set by the two controls at lower right on the front panel labeled NORM VIDEO and EFFECTS. Advancing either of these controls increases the amount of "normal" or "effects" signal present in the output of the colorizer.

Please refer to the block diagram of Figure 1. This diagram describes the video signal flow within the colorizer. Video coming into the colorizer is operated upon by the multi-level comparators which generate four logic signals corresponding to four bands of gray in the video signal. The signal is divided at 3 points in the gray scale, creating four gray bands. The division points are set by the three slide controls at upper left on the control panel. The upper slider sets the lowest (darkest) division point; the middle slider and the lowest slider set successively higher break points.

Moving a slider to the right causes the break point to occur at a lighter point in the gray scale.

NOTE THAT FOR PROPER OPERATION OF THE COLORIZER THE UPPER SLIDER MUST BE LEFTMOST AND THE LOWER SLIDER MUST BE RIGHTMOST.

The logic signals generated by the multilevel comparators are used to "gate" the control signals which are set by the four colums of controls on the front panel (1,2,3 and 4). Thus the video signal is "sliced" into four separate adjoining gray bands and a separate video, gray, hue and saturation control is provided for each band. The amount of normal video in each band is gated at the controlled amplifier and the hue, gray and saturation components are created in the video effects generator. Each of these two components is separately controllable.

It is useful to describe a procedure by which a colorized picture may be reliably obtained. The following simple procedure may be followed until the user has gained familiarity with the instrument.

1. Set all NORM VIDEO controls to 10 $NV_{1,2,3,4} \rightarrow 10$

    Set all GRAY controls to 5 $G_{1,2,3,4} \rightarrow 5$

    Set all HUE controls to 5 $H_{1,2,3,4} \rightarrow 5$

    Set all SAT controls to 0 $S_{1,2,3,4} \rightarrow 0$

2. Set the input level control to 4.   Input $\rightarrow 4$

    Set Effects Video to 0   Effects $\rightarrow 0$

3. Advance the main NORMAL VIDEO control and observe on a color monitor that this brings the picture up.

4. The next step is to select the gray bands. It takes some practice to select useful gray bands in a picture. Turn the NORM VIDEO controls as follows:

NV 1	10
NV 2	3
NV 3	6
NV 4	0

This produces a high contrast "sliced" video image. Manipulate the gray dividers (keeping the upper control leftmost and the lower control right-most) until useful gray scale breakpoints in the picture are found.

After the gray scale breakpoints are found, return the Norm Video controls to full (NV 1,2,3,4 - 10).

5. Advance the main EFFECTS VIDEO pot at the lower left. Adjust GRAY LEVEL controls above and below the center value of 5 to add and subtract luminance values. Try turning the normal video pot to zero and manipulate all the gray level controls to show a synthetic picture based solely on 4 gray levels.

6. Create a totally synthetic video signal by adjusting Gray, Hue and Saturation controls in all four bands.

7. Mix this signal with the Norm Video signal by advancing and re-tarding the Effects Video and Norm Video controls at the lower left.

Woody:

several points:

1. Composite sync output not used in your model. (Genlocked comp. sync)

2. separate Non composite video output jack Not used on your model: Throw switch to NON comp To get non comp video

3. Set key input pots to center range when not using key Inputs.

4. NOTE THAT SETTINGS BELOW 5 on key and Norm video Controls will give inverted video.

I will send more Documentation later - Call me if you have any questions   -   Bill Hearn