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## TECHNICAL DETAILS AND INSTALLATION INFORMATION

### 1.1. Introduction

This compact unit, with its remote control facilities, is designed to generate colour captions from the broadcaster's existing black and white caption sources. It can also be used for a variety of effects using black and white or colour input signals. The unit can be arranged to analyse the input signal and form signals corresponding to black, grey and white areas in the original artwork or scene. These areas may then be coloured independently by means of the remote controls.

However it is sometimes required to transmit a half tone picture without distortion. The mark IV unit incorporates a switchable 'Linear' mode, which still allows tinting or colouring of the picture using the white level controls. It also incorporates a shading corrector to correct for any deficiencies in lighting or the caption camera electro-optical system.

Because of the R, G, B type of operation and the stringent measures taken to clip the output signals at 0.7 volt, this type of device is completely free of the chrominance overmodulation effects which can so easily arise with gated subcarrier types of synthesiser. Our well known type 153 (PAL) or 203 (NTSC) Coders are especially suitable for use with the Coxbox.

Nearly 200 of the earlier Coxbox units are in service in studios and Outside Broadcast units throughout the world.

The electronic circuits are housed in a 4.4cm by 48cm rack mounting unit, arranged as four plug-in modules.

The red, green and blue output channels each consist of 3 variable gain amplifiers feeding a common load, followed by clamping and peak clipping and the output stage. Each amplifier is assigned to black, grey or white levels, and are fed in parallel. We thus have a 3 x 3 matrix with three inputs, three outputs and a controlled amplifier at each crosspoint. Potentials from the control facility set the gains of the amplifiers in a linear manner from zero to unity. The distribution of each level signal in the output can be varied and hence the hue, brightness and saturation corresponding to that level in the original black and white input signal.

The processing module forms the signals corresponding to black, grey and white areas in the input picture. Note that in a unit set for two level working, signals corresponding to black and white areas only are formed. These signals feed the matrix in the output module. The standard processor module gives a smooth transition between levels, with little additional 'twinkle' effect along horizontal edges. The signals are mutually exclusive, that is, for any value of the input signal, only one of the output signals is high. The others are at zero.

For special effects use and to order, units can be supplied with three processor output signals available for external use. The third module provides clamp and blanking pulses for the other two modules a 0.7 volt test sawtooth signal to replace the video input for test and set up purposes, and the shading waveform generators and modulator. The correction signal formed is fed to the processing module (225) and is there subtracted from the input signal in the input long tail pair stage.

A standard power module (156) provides regulated power for the unit and control panel. This module is identical to that used in the rest of our range.

## 1.2. Control Facilities

In its simplest form, control could consist of nine potentiometers supplying control voltages to the crosspoints of the matrix in the output module. Control panel type 123 is arranged in this manner, incorporating nine linear faders in three groups of three, with scales graduated 0-10 for logging. Control unit 122/1 has been devised to make colour selection correspond closely to the Munsell notation. Accordingly each level has controls for hue, brightness (or value) and saturation (or chroma). Eleven steps of brightness and saturation are provided, while hue can be selected with a push button strip giving primary and complementary colours or with a 24 hue rotary selector.

For fast change of colour in caption sequences, a ten event store unit type 144/1 has been developed. The colour combinations are set up on small plug-in cards. The store carries ten cards, with an eleventh position at the front for card setting up. The card in use is selected by a simple illuminated push button strip, which can be mounted in a studio control desk some distance from the store unit. The system has been arranged to be as flexible as possible, and special arrangements can be made to suit customer's requirements. For example, a single preset card can be supplied with a Control unit 122/1 to allow instant recall of, say, station identification colours, or the 122/1 can be combined with the store system.

## 1.3. Installation details

### 1.3.1. Mechanical

The electronic circuits are housed in a 44mm x 480mm (1 $\frac{3}{4}$ " x 19") rack mounting unit. The depth of the unit is 320mm (13") excluding connectors. Control unit 122/1 provides three levels of control of hue, brightness and saturation on a panel 240mm (9  $\frac{7}{16}$ ") x 150 (5  $\frac{1}{8}$ ")

Control Unit 123 provides controls of Red, Green and Blue output on each of three levels. The panel is identical in size to the 122/1 above (240 x 150mm).

The Store Unit 144/1 is an 88mm x 480mm (3 $\frac{1}{2}$ " x 19") rack mounting unit with a depth of 320mm (13") with its accompanying studio control panel 254mm x 76mm (10" x 3")

### 1.3.2. Electrical

Inputs

Power: 100-125 or 200-250 volts, 50-60Hz, loading approximately 17VA

Camera: Composite or non-composite signal with black to white amplitude of 0.7 volts +2dB. Input impedance is high

Mixed Sync: 1-4 volts, negative going into high impedance. Timing of sync should be +100nS relative to sync on camera input.

Mixed Blanking: 1-4 volts, negative going into high impedance. Timing should be as above

Outputs 0.7 volt red, green and blue signals, non-composite from a 75 ohm source

Timing Red, green and blue outputs will be within 15nS of each other, while the typical insertion delay from camera input to any output is 140nS.

Connectors

Power: Cannon XLR LNE (3 pin DIN to order)

Video: BNC (other connectors, such UHF, DIN 13 mm etc available to special order)

Control: Rack unit to control unit 122/1, 123 or Preset Store Unit 144/1, McMurdo Red Range 16 way RS16 on rack unit, RP16 on control units. Preset Store Unit to studio panel 15 way Cannon D.

RS16 16 way connector. Coxbox rack unit to control facility

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|---------------|-------------|----------------------|
| 1. Red        | White level | 9. Earth             |
| 2. Green      | White level | 10. Red Grey level   |
| 3. Blue       | White level | 11. Green Grey level |
| 4. Red        | Black level | 12. Blue Grey level  |
| 5. Green      | Black level | 13. Lamp volts       |
| 6. Blue       | Black level | 14. Lamp volts       |
| 7. -ve supply |             | 15. Linear mode      |
| 8. +ve supply |             | 16. Spare            |

Cannon D 15 way Preset Store 144/1 to studio panel

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|-----------|----------------|
| 1. Card 1 | 9. Card 9      |
| 2. Card 2 | 10. Card 10    |
| 3. Card 3 | 11. Earth      |
| 4. Card 4 | 12. -ve supply |
| 5. Card 5 | 13. Lamp volts |
| 6. Card 6 | 14. Lamp volts |
| 7. Card 7 | 15. +ve supply |
| 8. Card 8 |                |