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TV SYSTEM USER'S GUIDE

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TV SYSTEM - USERS GUIDE

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NEW LICK TV SYSTEM

Section I. Operating Information

INTRODUCTION

A new TV system has been installed on the 120" telescope. It consists of the following equipment:

1. A new TV camera with two filter slides
2. A new integration-time controller
3. A digital TV memory to replace the disc
4. A cross generator to replace the dot generator

No external sync generator is used with this equipment.

The connection of these separate units is shown in diagram 1 of appendix A. Each is discussed in more detail below.

A) TV Camera

The new camera consists of two boxes; the Camera Control, and the Camera Head. Both reside on the cass tub; the connection diagram is shown in diagram 2 of Appendix A. The controls for the camera are located on the right hand side of the cass. Control Panel (both in the R.O. Room and on the tub). The controls are:

1. TV Power ON/OFF (bottom right corner)

This control turns the main power on in the camera control. There is a shield over the switch to prevent inadvertently turning the power on or off. This shield must be lifted to press the switch. The switch is a push on-push off toggeling type with an indicator light which tells the state of the AC power in the camera control.

2. TV Shutter OPEN/CLOSED (next to TV power)

This switch is also a push on-push off type. When pushed on it causes the shutter on the front of the Camera Head to open. A magnetically operated switch on the shutter causes the "closed" light in the control switch to go out if the shutter opens by even a small amount.

## 2. Continued

The switches on the Cass Control Panels (in the R.O. Room and on the tub) have been wired in series as a safety precaution. Thus the shutter may be closed from either position without having the controls switched from one panel to the other. This means, however, that both switches must be on for the shutter to operate. This is only true for the TV shutter.

## 3. TV GAIN (above shutter switch, next to Reticle)

This pot controls the gain of the camera by controlling the high voltage. Initially this pot should be turned fully counterclockwise (lowest gain). It should not be adjusted for about 20 seconds after the camera has been turned on, to allow the SEC filaments to reach normal operating temperature. Turning the pot clockwise will increase the gain of the camera.

NOTE

The zoom and focus pots serve no function at present.

## 4. Filter Controls

On the top right hand side of the Cass Control Panel are two 4 position switches with associated meters. These control filter slides in front of the camera. Filter 1 is in front of filter 2. Each filter slide has four positions which may be selected. The meters tell which position each filter is in.

NOTE

Position 4, when selected from the tub control panel is the load position for inserting new slides. The slides must be inserted from the right side of the camera (viewed from the front) until they just catch on

## NOTE (Continued)

the gear. The selector switch should be set to 3 to drive the slide in. It may be necessary to adjust the position read-out pot clockwise a small amount to correctly align the filter after it has been installed. To do this turn the pot about 1/4 turn and select a new position for the filter. Continue this until the alignment is satisfactory. Position 4 when selected from the R.O. Room will select the open position on the slide. The position 4 selected in the R.O. Room is offset from position 4 selected at the tub.; thus position 4 can be used from the R.O. Room for observing, but will drive the slide out if selected at the tub.

CAUTION

Never move a filter slide unless the TV shutter is closed. Otherwise the TV may be damaged by a sudden increase in illumination. No electronic interlock exists at present to protect against such damage.

B) Memory Vision Interface EL-570

This unit allows the new camera to be interfaced with the Data Disc, the TV memory, or the Hitashi MEMORY VISION. It also allows the old camera to interface with the Hitashi or TV memory. These various interfaces are accomplished by changing cable connections on the back. Drawing EL-570-20 shows the various configurations.

When used with the new camera this unit controls the integration time. The controls for integration are on the left side of

## B) Continued

the chassis and consist of a pot and a switch. When the INTEGRATION switch is in the OFF position the camera is not integrating; when in the ON position the camera is integrating with integration time determined by the pot. The STORE switch on the right side controls the FREEZE REQUEST for the Hitashi memory vision. When ON, this switch allows the Hitashi to be updated by new pictures; when OFF it prevents updating of the Hitashi.

C) Digital TV Memory EL-533

The Digital TV Memory is a solid state replacement for the Data Disc. It has a resolution of 200 horizontal elements by 256 lines in two separate memories. This resolution is somewhat lower than that provided by the Data Disc, but the memory should be completely free of the sync failure and motor burnout problems that have been seen on the Data Disc.

The memory can improve the quality of a picture by averaging successive frames. A fraction of each new frame is added to a fraction of the picture already in the memory. The particular fraction used is selected by the SCANS/PICTURE switch associated with the particular memory. For example; if the switch is set on 8 scans/picture, 7/8 of the picture in the memory will be added to 1/8 of the incoming picture.

The rest of the controls are summarized below.

## 1. ADD/SAVE

This switch when in the ADD position allows the particular memory to add successive frames as controlled by the scans/picture switch. When in the SAVE position the contents of the memory selected are saved, with no additional information added.

## NOTE

If the camera is turned off the memory will lose sync and the contents of memory will be lost.

## 2. ERASE

This push button will cause the contents of the memory being viewed to be erased and replaced with the next frame that arrives from the camera.

## 3. VIDEO OUT

This switch selects the source of the video sent to the monitor. It allows one to select either memory A or B, or the sum of A and B, or the difference (A-B).

## 4. POLARITY

This switch causes the video selected by the video out switch to be either inverted or not. Thus one can view either the positive or negative of the image.

## NOTE

Both this switch and the video out switch are bypassed by the camera/memory switch when in the CAMERA position.

## 5. CAMERA/MEMORY

This switch when in the CAMERA position causes the video to bypass the memory. Thus the monitor output comes straight from the camera bypassing all controls on the front panel. The video does pass through some amplifiers, which means that the memory unit power must be on.

When in the MEMORY position, the video is sent through the digitizing circuitry and the memory. It is only in this position that the rest of the front panel controls are functional.

#### 6. TEST ON/OFF

When turned ON, the video from the camera (including sync) is replaced by an internally generated test grey scale. This test scale begins as black on the left and changes to white on the right side of the screen. This test scale may be used to test the memory and the analog to digital converter without a camera. When fed through the memory a series of vertical bars graduated from black on the left to white on the right will be seen. A continuous smooth gradation is seen if the CAMERA/MEMORY switch is at CAMERA (see START UP PROCEDURE.)

#### 7. CONTRAST

This pot controls the amplitude of the video being digitized. It should be left in the NORMAL position (fully clockwise) for normal video. Turning the pot counterclockwise increases the gain for very weak signals. Since the picture strength is digitized into a maximum of 15 levels it is important that the signal be large enough to use most of the levels, but not so large as to exceed full scale on the digitizer.

#### 8. POSITION

This pot subtracts a constant level from the video before it reaches the analog to digital converter. It allows a high flat background illumination to be subtracted, so that the 15 levels available in the Analog to Digital converter can better cover the light variations present.

#### 9. INTEGRATION ON/OFF

In the ON position this switch causes the memory to go into SAVE mode while the camera is integrating. The BEAM ON signal which is sent to the camera is monitored by the TV memory and will cause it to update the picture when a new picture is generated at the end of each video integration period.



D) Cross Generator EL-596

This unit accepts the video input signal, adds three cross marks to it, and sends the modified video out to the monitor.

The three crosses are controlled by two pots each; one for vertical position and one for horizontal position. The intensity of the crosses, relative to the video background, may be controlled by the INTENSITY pot on the bottom of the front panel.

The horizontal and vertical sync needed within the cross generator are derived from the video input. These sync signals are made available on the back panel and can be used to sync other devices.

START UP PROCEDURE

1. Turn monitor on, TURN CROSS generator ON.

2. Turn TV memory ON.

a. TV memory switch settings:

<u>Switch</u>	<u>Position</u>
SOURCE	CAMERA
INTEGRATION	OFF
VIDEO OUT	A
SCANS/PICTURE	1
SAVE/ADD	ADD
TEST	ON
POLARITY	POSITIVE
POTS AT BOTTOM	NORMAL

A gray scale should appear on the monitor shading from black on the left to white on the right.

b. Switch SOURCE from CAMERA to MEMORY

The gray scale should be broken up into 15 levels.

c. Check the other positions of the SCANS/PICTURE switch.

d. Check memory B in the same manner as memory A.

e. Verify that all three crosses may be adjusted properly.

f. These tests verify that the memory and cross generator are functioning. After they are completed turn the TEST switch OFF and the SOURCE switch to CAMERA. Push the ERASE button.

3. Turn on the Memory Vision Interface (EL-584). Set both INTEGRATE and STORE switches in the OFF position. Turn the INTEGRATION TIME pot to minimum.

4. TV Camera

a. Verify that the shutter will operate by pressing the SHUTTER button. The indicator on the bottom half of the switch should go out. If it does, the shutter is open. Close the shutter by pressing the SHUTTER button again.

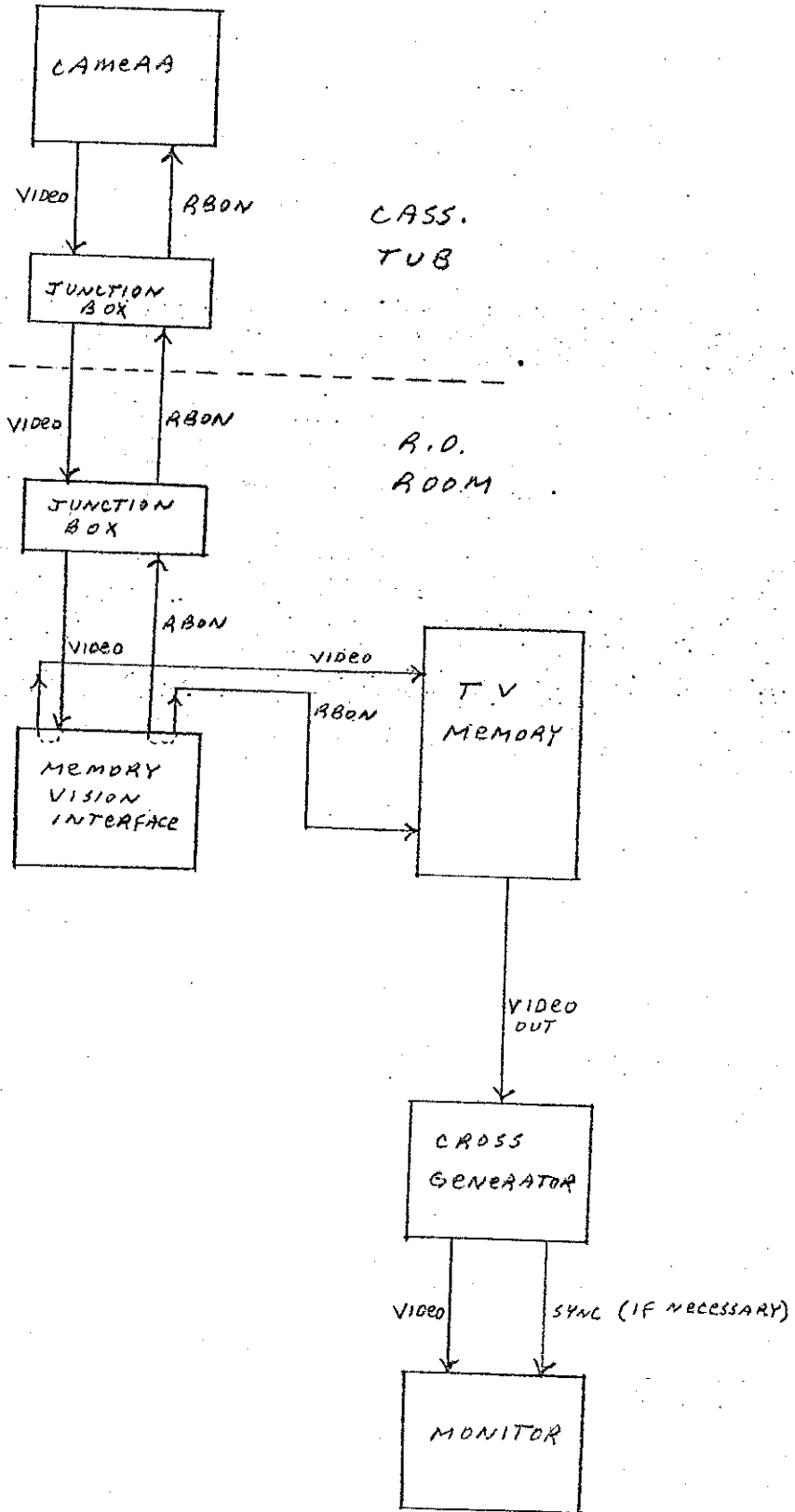
4. Continued
  - b. Verify that the X-Y and TV stages are in the proper positions to see the Reticle. Turn the Reticle brightness about half way up. Verify that both filters are in an open position.
  - c. Turn on the camera by raising the protective cover and pressing TV POWER. Check on the monitor screen that the camera is ALIVE (random noise), and that the crosses are present.
  - d. Wait about 20 seconds; then open the Shutter and slowly turn up the gain. The Reticle should appear on the monitor screen.
5. The SOURCE switch on the TV Memory may now be set to MEMORY. The SCANS/PICTURE switch and CONTRAST pot may be adjusted for the best picture.
6. To Integrate with slower than normal frame rates, set the INTEGRATE switch on both the TV Memory and the Memory Vision Interface to ON. The Integration time per frame is set by the INTEGRATION TIME pot on the Memory Vision Interface.
7. To select a new filter turn the TV gain down, close the shutter, and then select the desired filter combination with the FILTER 1 and FILTER 2 switches. When the meters associated with each filter indicate that the filters have stopped in the right position, the shutter may be opened and the gain slowly turned up.

CAUTION

The TV camera may be permanently damaged by exposure to bright light if the power is on and the gain turned up. Use extreme care whenever the power is on.

I

# SYSTEM CABLE CONNECTIONS



II

# TV CAMERA CONNECTION

