INTRODUCTION

The Digital Camera System for model 1500 - 1700 Ultratech Stepper™ is designed to assist the operator in aligning the proper target on the wafer with the proper reticle key. When the stepper is set up and calibrated correctly, target acquisition and alignment is automatically achieved without operator assistance. Periodically, the stepper may require operator assistance in capturing the correct target due to:

- Mechanical setups of the stepper drifting out of position
- Loose blind stepping accuracy on first level
- Target signal degradation due to process and/or level

If geometry surrounding the target generates an acceptable signal when scanned, the stepper could align to the geometry, instead of the correct target. This problem would not be caught until wafer inspection after develop, requiring all wafers in the lot to be reworked.

By providing a visual reference for the operator, most, if not all of gross misalignment problems will be eliminated.

INSTALLATION

PACKING LIST

1	1	Dcs-bfr-10100	Monitor, 14" Black/White
2	1	Dcs-bfr-10110	Video cable, BNC, 10'
3	1	Dcs-10300	Remote Control with speed and panning
4	1	Dcs-10310	Transformer, 12VDC, 400ma, for remote control
5	1	Dcs-10320	Cable, 9 pin remote, 10'
6	1	Dcs-10400	Transformer, 9VDC, 200ma for motorized mirror
7	1	Dcs-10500	Bracket, WAS camera base
8	1	Dcs-10501	Connector, BNC bulkhead
9	1	Dcs-10502	Connector, 12VDC Power plug
10	6	Dcs-10510	Screw, , for mounting Dcs-1050 to WAS
11	4	Dcs-10520	Screw, , For mounting top of boot to WAS bracket
12	1	Dcs-10600	Mirror, 90% reflect, 10% pass
13	1	Dcs-10610	O-Ring, mirror mount
14	1	Dcs-10620	Bracket, horseshoe mirror mount
15	1	Dcs-10700	Camera spine
16	4	Dcs-10701	Screw, , to attach camera spine to WAS mounting bracket
17	1	Dcs-10702	Labels, Camera and Lens Mount bracket indicators
18	1	Dcs-10710	Bracket, camera mount
19	1	Dcs-10711	O ring, camera mount bracket / lens mount bracket
20	1	Dcs-10720	Bracket, Lens mount
21	1	Dcs-10721	Lens, image magnification, PVC25x -100, 45027
22	1	Dcs-10722	Lens, image reduction, PCX25x 100ts, 32482
23	1	Dcs-10730	Light Shield
24	1	DCS-10731	Adjustment Slot Cover
25	4	DCS-10732	Adjustment slot cover screws
26	1	Dcs-10740	Camera pcb
27	1	Dcs-10750	Motorized Mirror Mount Assy
28	1	Dcs-10751	Mirror, flat, 90 degrees
29	1	Dcs-10752	Motorized Mirror Driver PCB
30	10	DCS-10810	5" tywraps
31	10	DCS-10820	tywrap mounts

CAMERA ASSEMBLY

STEPPER PREPARATION

1- Initialize the stepper

2- Load the test reticle to position #1 in Z mode

3- Servo a frosty wafer up under the airprobes

4- Turn on the green alignment light

5- Mount the WAS scope on the WAS assembly, and align the crosshairs in the scope with the targets at 14.9mm. Line up as accurately as possible, as this will be used as a reference to align the 90%-10% mirror.

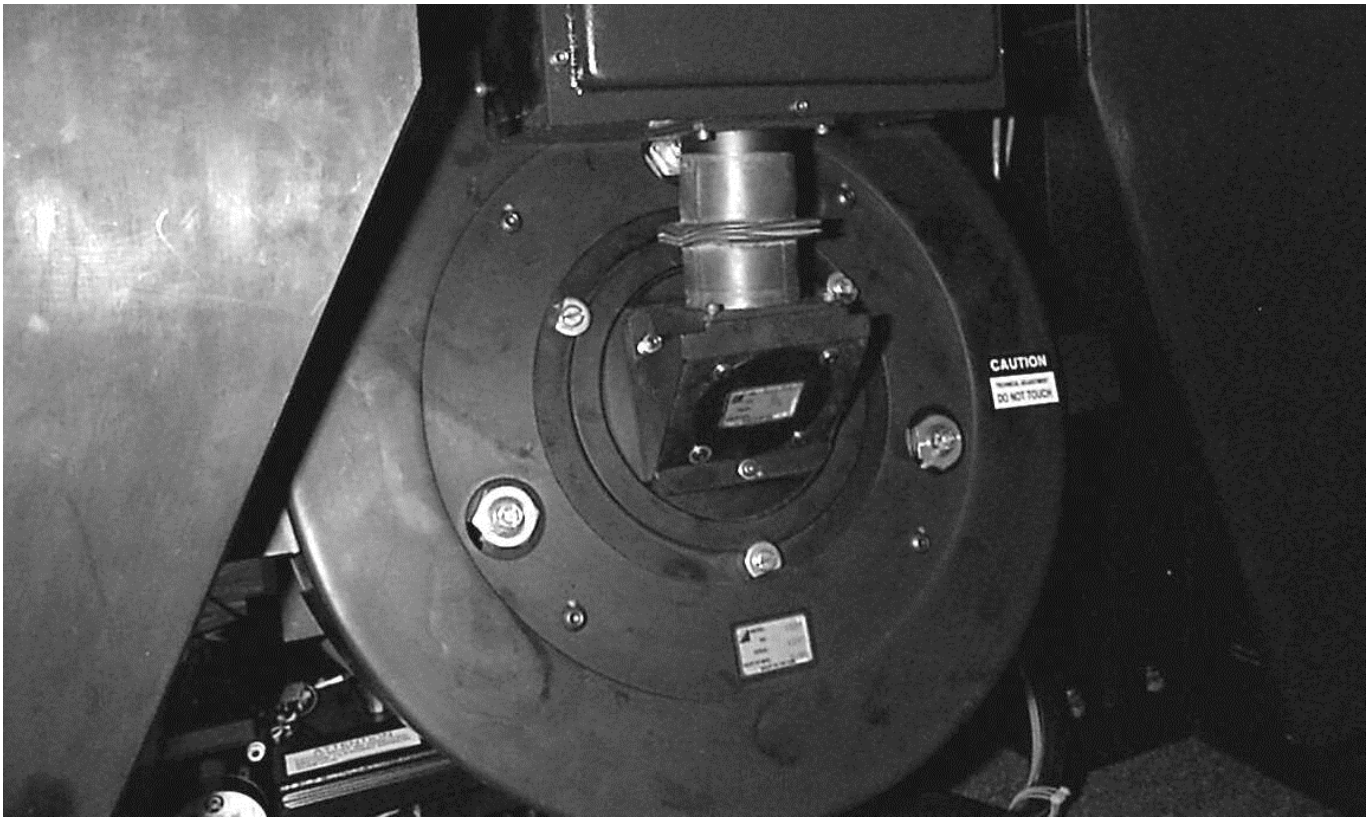
6- Do not touch or move the scope or reticle during the rest of the installation

10%-90% FOLDING MIRROR INSTALLATION

7- Remove the 4 screws and washers holding the folding mirror in the folding mirror cell on back of the lens assy. Make sure to support the back of the mirror when removing the last screw. Remove the mirror from the mount, with the securing O-Ring, and set aside

8- Carefully, insert the 90% - 10% mirror (DCS-10600) (COATED SIDE IN FIRST!!) into the folding mirror cell. Hold in place

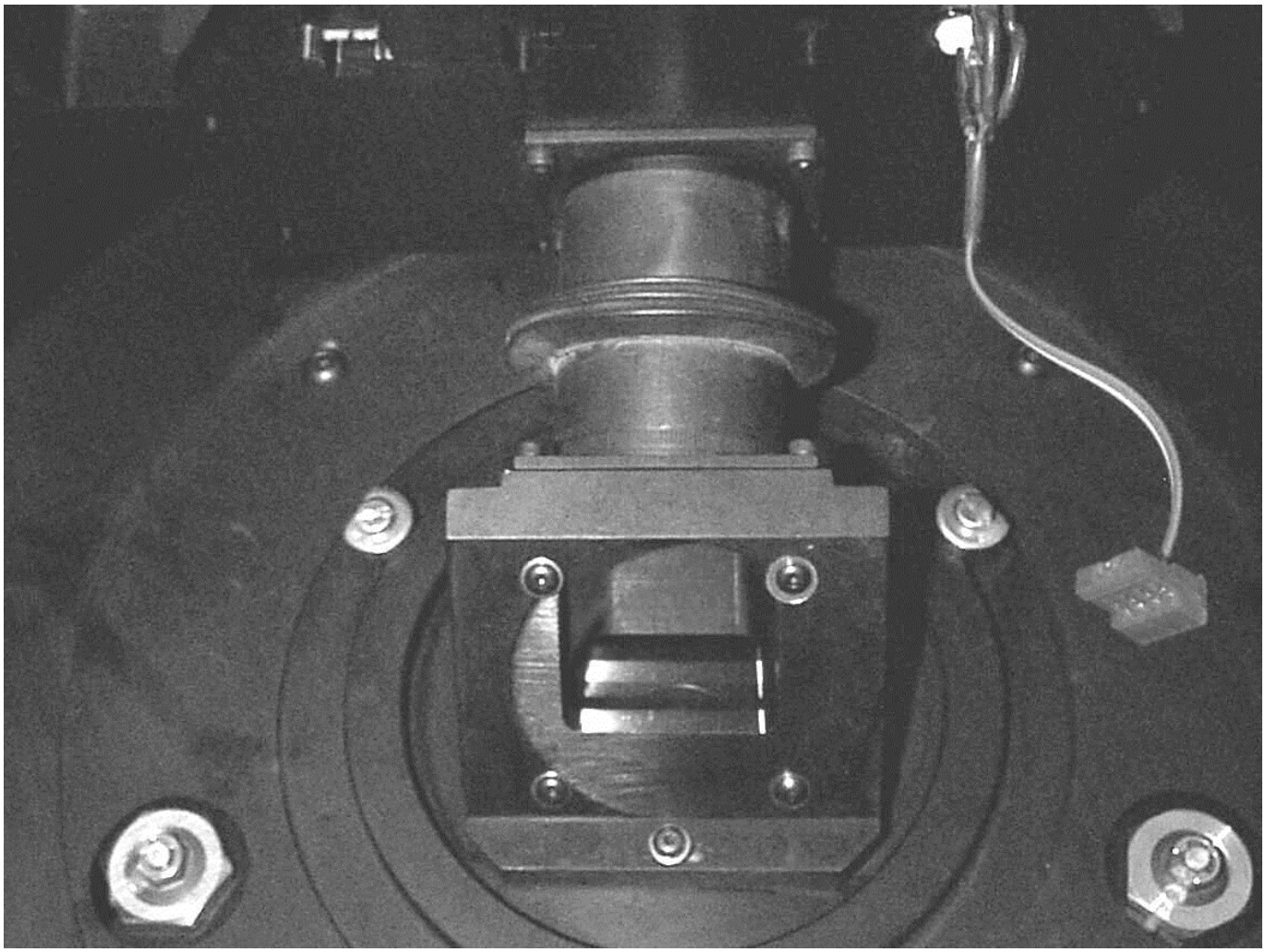
9- Insert the original O-Ring.



10- Insert the Mirror Mount horseshoe bracket (DCS-10620) into the folding mirror cell. Orient the bracket so the open end of the bracket is facing UP. (Fig 1)

11- Secure the bracket with the original 4 support screws and washers. Insure that the bracket is holding the mirror securely in place.

12- Check the target alignment in the WAS, with the crosshairs on the scope. Rotate the folding mirror assy as needed to realign the target to the scope crosshairs. Adjust the Y-axis of the image using the adjustment screw at the bottom of the folding mirror assembly as needed.



13- Check WAS horizontal travel, and adjust if necessary. Check G[1] steps/mm, and adjust if necessary (this should not change, but it is a good idea to double check the current settings while you are aligning the folding mirror.

CAMERA MOUNTING BRACKET INSTALLATION

14- Above the folding mirror on the back of the lens assembly, remove the 8 light shield screws securing the light shield boot (4 upper and 4 lower screws). Remove the boot and set aside (Fig 2)

15- Make sure that you have the WAS camera base bracket (DCS-10500) and 6 mounting screws (DCS-10510) within arms reach. Remove the 6 screws securing the WAS bottom plate to the WAS assembly (Fig 3). DO NOT REMOVE THE BOTTOM PLATE! Hold in place with one hand.

16- Place the WAS camera base bracket underneath the WAS bottom plate, and secure both plates to the WAS assembly with the 6 mounting screws provided (DCS-10510)

17- Re-install the light shield boot, using the 4 original screws on the bottom of the boot. Use the 4 screws provided (DCS-10520) to secure the top boot to the WAS camera base bracket.

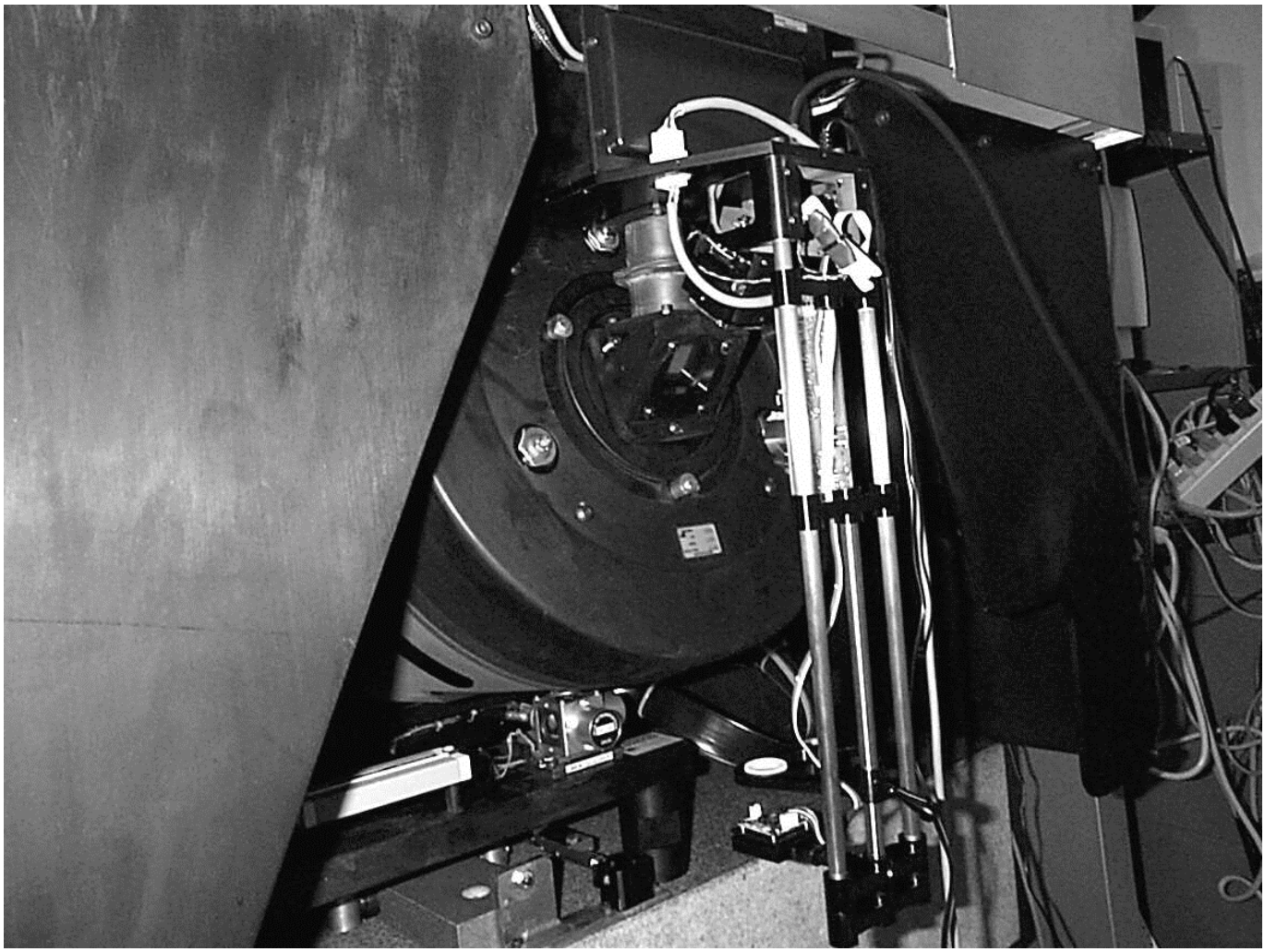
CAMERA SPINE INSTALLATION

18- Using the 4 screws provided (DCS-10701), Mount the camera spine to the WAS camera base bracket. Adjust the bracket using the slots in the base bracket such that the camera bracket and magnifying lens do not touch the base of the primary mirror. Tighten snugly. (Fig 4)

19- Plug in the connector on the BNC and camera bulkhead fitting (DCS-10501) with the mating connector on the camera spine. (Fig 5). Insure that the connectors do not interfere with the motorized mirror assembly light path

20- Plug the power transformer (DCS-10400) into the 120ac outlet on the back of the stepper. Plug the other end into the bulkhead power jack on the WAS camera mounting bracket labeled "Mirror Power"

21- Place the video monitor (DCS-BFR-10100) in a suitable location such that you can view it from the back of the stepper (preferably on top of the computer tower, if possible)



22- Plug the BNC cable (DCS-BFR-10110) into the video out connector on the back of the monitor. Plug the other end of the cable in the BNC bulkhead connector on the WAS camera mounting bracket labeled "video out".

23- Snap the 9 pin Berg connector from the Motorized Mirror PC board (DCS-10752) into the hole on the WAS camera mounting bracket labeled "Remote Control", with the pins facing out of the camera assembly.

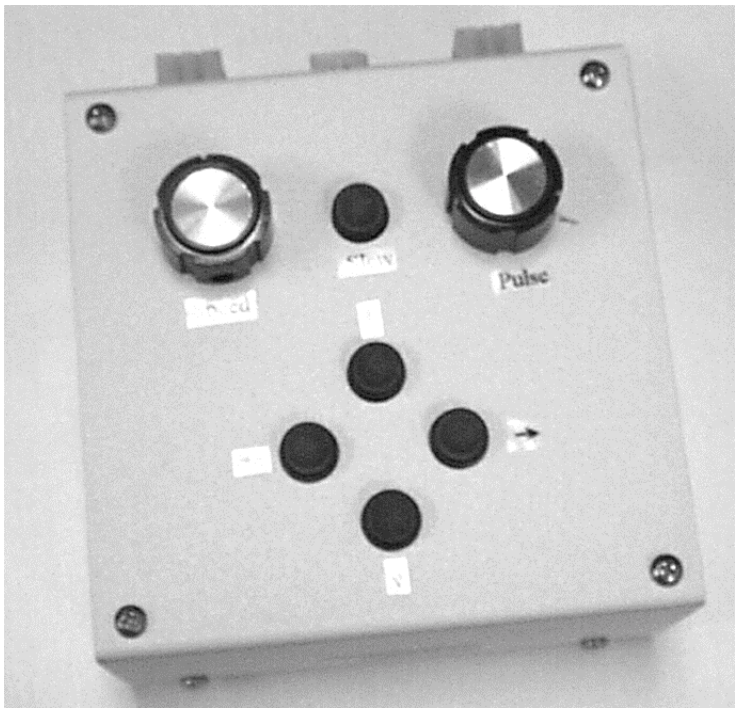
REMOTE CONTROLLER

24- Plug the remote control extension cable (DCS-10320) into the Remote Control box (DCS-10300). Plug the other end into the jack on the WAS camera mounting bracket labeled "Remote Control".

25- Temporarily plug the Remote Control power transformer (DCS-10310) into the 120VAC outlet on the back of the stepper, or in the 120VAC outlet inside the card cage. Set the Speed and Step knobs to their default positions.

26- At this point, power should be applied to the motorized mirror, CRT monitor, and remote control. From the previous setup, the darkfield image should be projected onto the mirror on the motorized mirror mount. Move the lens mounting bracket horizontally, to it's center position, so that the darkfield image is projected through the center hole (no lens).

27- Using the remote control, move the image in X and Y so that you can see the darkfield image being projected onto the CCD sensor at the bottom of the Camera spine.



CAMERA / MAG LENS SETUP

28- Move the lens mounting bracket to the center position.

29- Screw utility handle onto the camera-mounting bracket, and move the camera up or down until the darkfield image comes into best focus. Remove the handle.

30- Using the remote control, move the image in X and Y so that you can see the darkfield keys at 14.9mm on the top left of the CRT.

31- Rotate the camera board by so that the baseline of the darkfield image is horizontal across the CRT.

32- Place the light shield (DCS-10730) over the camera spine, and secure with the light shield mounting screws (DCS-10701).

33- Place the label "camera NEUTRAL ->" (DCS-10702) on the camera light shield such that the arrow on the label points to the camera mount handle from the left side of the slot in the shield.

34- Screw utility handles onto the camera-mounting bracket and the lens mounting bracket, and move the lens mount bracket handle to the left position (zoom in). Adjust the zoom level and the camera focus by moving the camera mount bracket handle and the lens mount bracket handle to the desired positions. You should have a range of 1.5mm to 2mm. Remove the utility handle.

35- Place the label "camera INCREASE ->" (DCS-10702) on the camera light shield such that the arrow on the label points to the camera mount handle from the left side of the slot in the shield. Place the label "<- mag INCREASE, LEFT" on the camera light shield such that the arrow on the label points to the lens mount bracket

36- Screw utility handles onto the camera-mounting bracket and the lens mounting bracket, and move the lens mount bracket handle to the right position (zoom out). Adjust the zoom level and the camera focus by moving the camera mount bracket handle and the lens mount bracket handle to the desired positions.

37- Place the label "camera DECREASE ->" (DCS-10702) on the camera light shield such that the arrow on the label points to the camera mount handle from the left side of the slot in the shield. Place the label "<- mag DECREASE, RIGHT" on the camera light shield such that the arrow on the label points to the lens mount bracket. You should have a range of approximatly 4 to 7 mm

38- Move the lens mount bracket to a position not occupied by the "<- INCREASE, LEFT" or "<- DECREASE, RIGHT" labels on the right side of the adjustment slot.

39- Place the label "<- mag NEUTRAL, CENTERED" on the camera light shield such that the arrow on the label points to the lens mount bracket.

40- Move the lens mount handle to the label marked "<- mag NEUTRAL, CENTERED". Adjust the handle horizontally so that it is centered in the slot.

41- Move the camera mount handle to the label marked "camera NEUTRAL ->". This is the default position for the camera focusing system.

42- The back of the camera assembly can be left as is, with both handles attached. If no adjustments to the magnification and focus are forseen, you may remove both handles and mount the adjustment slot cover using the supplied screws.

WIRE WRAPPING

43- Route the camera remote control box cables to the front of the stepper. If the power connector to the remote control is not long enough, move the transformer inside the drawer, and plug into the 120VAC outlet.

44- Mount the CRT in the desired position (the optimum position is on top of the computer rack). Route the power cable to the nearest 120VAC outlet (preferably the 120VAC strip on back of the computer rack). Route the BNC cable from the CRT to the camera assembly

45- Secure all cables with tywraps and stickers supplied (DCS-10810, DCS-10820)

OPERATION

The Digital Camera system is designed to be set up so that a range of reticle keys (3-5mm, left side of image) are visible on the CRT. Under most conditions, panning of the image is not necessary to properly align targets to keys. However, should a key distance be used that is not visible on the screen, the following controls allow the operator to "pan" the image in X and Y.

SPEED CONTROL

This knob controls how fast the image "pans". For optimal speed control, keep this knob in between the two indicators on the controller

STEP CONTROL

This knob controls the "step rate" when panning the image. For smoothest panning, it is recommended that you keep this adjustment at the default position (all the way to the right, as marked on the controller)

SLEW CONTROL

This button is used in conjunction with the arrow keys. When pressed, the camera will pan at high speed. In this application, it is recommended that this button not be used as it is very easy to pan past the projected image.

ARROW KEYS

The four arrow keys are used to pan the image in the direction of the key.