

Thermal 1.x head

Adjusting the Beam Blockers

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Creo Inc.
3700 Gilmore Way
Burnaby, BC
Canada V5G 4M1
(604) 451-2700

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Revision History

Revision	Date	Author	Comments
A-A	05 Feb 2003		Initial release
A-B	05 Aug 2004	Maureen Munroe	Removed reference to adjustment tool for the newer beam blockers.

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1. BACKGROUND

This procedure is necessary if the head has pixels that are stuck ON, or if you suspect there may be some light leakage causing imaging artifacts (such as Pin-Striping). When pixels are stuck ON, changing the `swidth` is not sufficient because a stuck ON pixel will still generate a line of exposed media in any image.

1.1 Electronic pixel chopping: How the beam blockers work

Note: For examples of beam blocker adjustments, refer to the Appendix.

The diagram below defines the head parameters `swidth` and `soffset`:

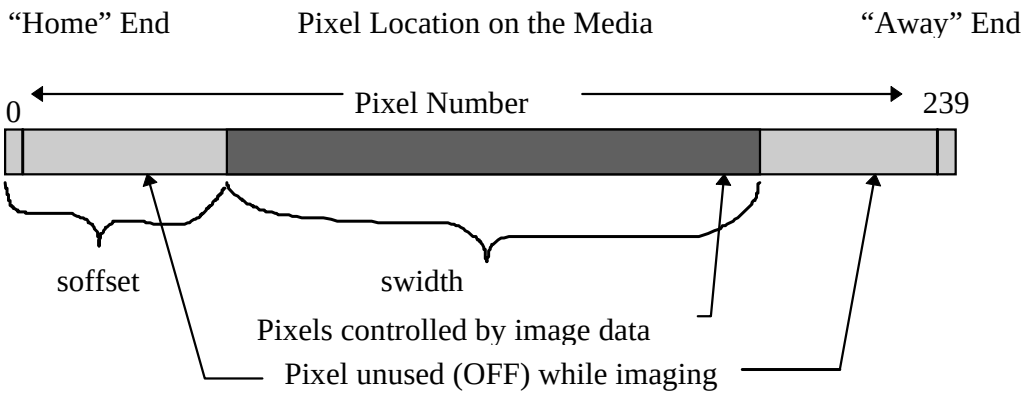


Figure 1: Description of swidth and soffset

- The `swidth`, or swath width, specifies the number of continuous pixels that are used for image data. Swidth ÷ 8 *must* be a whole number (for example, swidth = … 120, 128, 136… 186, 192, 200… 232, 240)
- The `soffset`, or swath offset, specifies the number of pixels that are *not* used for image data between the home end of the swath and the start of the swath width. soffset ÷ 8 *must* be a whole number (for example, soffset = 0, 8, 16, 24, … 120).

The head includes two adjustable beam blockers that can be used to physically block the ends of the beam within the swath. One blocker extends inward to block the beam from the home side (pixel 0) of the swath and the other blocks the beam from the away side (pixel 239).

You can determine the current location of the blockers by electronically opening the entire swath and examining the stroke profile. Type the following commands:

```
>>set head soffset 0
>>set head swidth 240
>>set mode X pps 240   (x = current mode of operation, typically 1)
>>stroke init 33
>>laser on
>>stroke profile
```

The profile will take a moment to appear (in this case it is not necessary to reset because you will not be imaging).

```
Stroke profile: increment = 2
```

```
Stroke profile: samples = 120
Waiting for beam balance sensor to stabilize ...
Stroke profile:   6   1   5   1   0   7 320 740 A
Stroke profile: 740 758 768 766 774 769 776 789
Stroke profile: 793 797 778 766 772 758 750 747
Stroke profile: 746 757 764 756 747 737 722 737
Stroke profile: 746 744 737 747 753 750 777 765
Stroke profile: 793 800 795 778 766 756 749 758
Stroke profile: 752 771 746 766 773 784 756 766
Stroke profile: 772 775 773 763 751 769 772 766
Stroke profile: 774 770 772 735 747 747 773 782
Stroke profile: 776 786 805 814 804 803 790 764
Stroke profile: 764 771 797 791 817 814 827 812
Stroke profile: 818 806 817 805 798 808 811 809
Stroke profile: 806 784 797 806 802 814 820 820
Stroke profile: 818 822 821 814 814 815 833 855
Stroke profile: 854 430   3   0   0   0   2   0 B
*** State message: Stroke command (2) Complete
```

This example illustrates the goal for the correct positioning of the beam blockers. The original values are `swidth=208`, and `soffset=16`.

The pixel pairs blocked by the beam blockers can be seen above in rows **A** and **B**. The Home end blocker completely blocks off pixels 0 through 11. Pixel 12 and 13 are partially shadowed by the blockers and are at half the power. Pixels 14 and 15 should be near or at full power when compared to the remaining active pixel in the swath, starting with pixels 16 and 17. Similar observations can be made with the last 16 pixels in the swath.

The “shadow” the blockers cast in the light valve does not have sharp edges because of the location of the blockers in the head. Consequently, the “edge” of the blockers extends across 3 or 4 pixel pairs.

Note: It is not possible to completely block off one pixel pair without affecting the adjacent pixel pair used for imaging.

When adjusting the blockers, the goal is to block off as much as possible of the beam **without affecting the pixels used for imaging**.

A rule of thumb is to leave 1.5 pixel pairs adjacent to the swath edge. (*7 320 740* |*…swath...*| 854 430 3)

2. PROCEDURE: ADJUSTING THE BEAM BLOCKERS

Note: For examples of beam blocker adjustments, refer toAppendix A: Examples of beam blocker adjustment.

1. Find and **record** the current `soffset` and the `swidth` settings:

   ```
   >> set head soffset

   >> set head swidth
   ```

2. Examine all of the pixel pairs by typing the following commands (this will open up the entire swath width):

   ```
   >> set head swidth 240
   ```

```
>> set head soffset 0
>> shutter close
>> laser off
```

3. To gain access to the head, remove the appropriate set screws (or desiccant box hoses, or DHU hose and fitting, whichever is applicable) from the outside of the head. Figure 2 is a top view of the thermal head on the carriage, and identifies which access hole can be used to adjust the blocker.

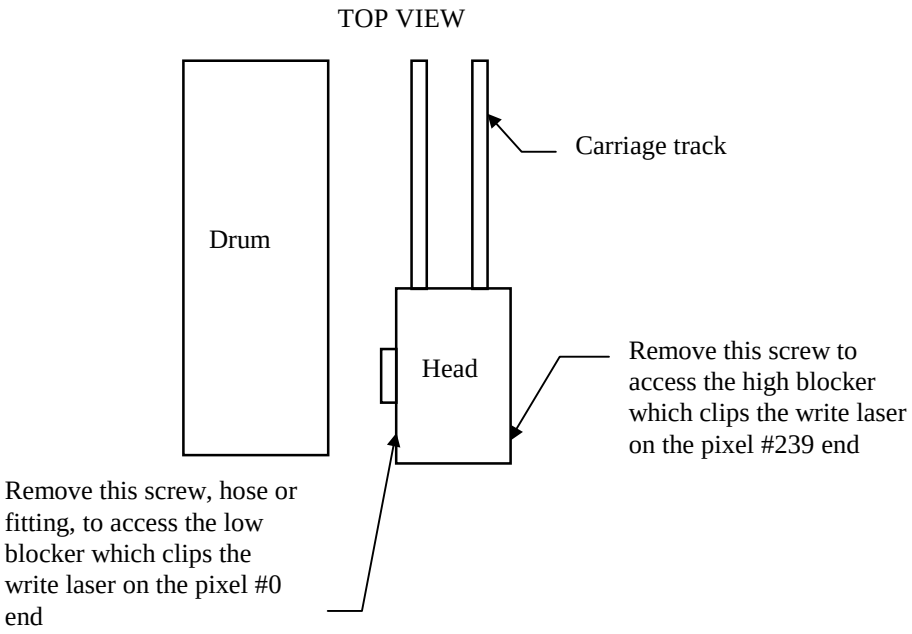


Figure 2: Gaining access to the head

4. Close the enclosure door and check the blocker position. Type the following commands:

```
>> stroke init 33
>> laser on
>> stroke profile (wait for the results)
>> laser off
```

5. Identify the first three pixel pairs in the `stroke profile` that will be used for imaging. Remember that `soffset` and `swidth` must be in multiples of 8.

6. Record the power readings of the first three pixel pairs that will be used for imaging.

Note: Do not change the power of these imaging pixels when you adjust the blocker position.

7. Adjust the blocker position:

   To adjust the blocker position on older heads (see Figure 3, top):

a. Note that the thread pitch is such that 2.5 turns of the screw is equal to 8 pixels (4 pixel pairs). 1 turn = 3 pixels, or 1.5 pixel pairs.

b. Insert a small flat-head screwdriver into the access hole. Ensure that the screwdriver is inserted perpendicular to the casting wall (the screw and access hole are aligned with one another).

c. Turn the screw as needed. Turning the screw clockwise will clip more of the beam. Turning it counterclockwise will unblock more of the beam.

   While adjusting the screw position, periodically issue a **`>>stroke profile`** command to check how many pixel pairs are being clipped. Type the following commands:

```
>> laser on
>> stroke profile
```

	Ensure that **all** enclosure doors are closed.

d. Proceed to step 8 to complete the procedure.

Note: If a flat-head screwdriver does not fit into the slot in the blocker hole, it is likely you have a new style of beam blocker (see Figure 3, bottom).

To adjust to blocker position on new style beam blockers (see Figure 3, bottom):

a. Locate the guide holes on the side of the thermal head and remove the M5 screws (see Figure 4).

b. Insert a #2 Philips screwdriver. Slowly rotate the screwdriver until the end seats properly in the lock sleeve.

c. Loosen the sleeve by three or four turns counterclockwise.

d. Remove the screwdriver and insert the hex key.

e. The set screw beam blocker can now be adjusted. The approximate amount of rotation required to change the pixel width by 8 pixels is 1.75 turns (use this amount as a guideline only). Proceed to step 8 to complete the procedure.

8. Adjust the blocker position to progressively cut off more of the beam until the power of the first pixel pair used for imaging begins to be affected. Then unscrew the screw slightly to restore the first pixel pair used for imaging to its original power setting. Unscrew the screw slightly more for a safety margin.

Note: If the imaging pixels are located at the beginning or end of the table, the position of the beam blocker may not be apparent. Extend the beam blocker in until it starts to interfere with the first (or last) pixel pair. Then unscrew it so that it no longer shadows over the end pair.

9. Replace the set screw used to close the access hole.

10. Type the commands below to electronically clip the write laser beam back to the desired size:

```
>> set head soffset x
>> set head swidth y
>> set mode # pps y
>> nvs save all
>> reset
```

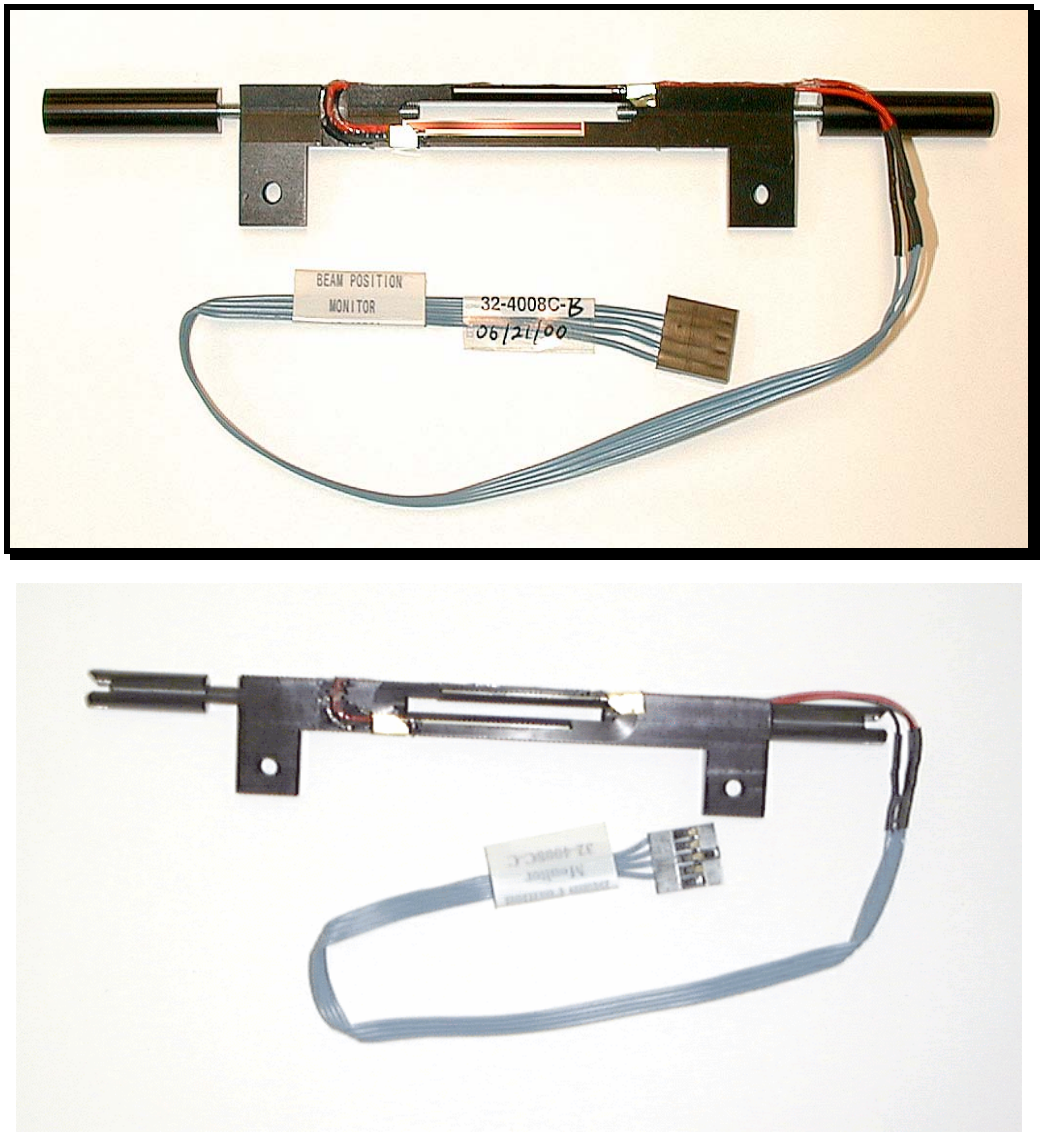


Figure 3: Top: The old BP Sensor, Bottom: The new sensor, showing the differences

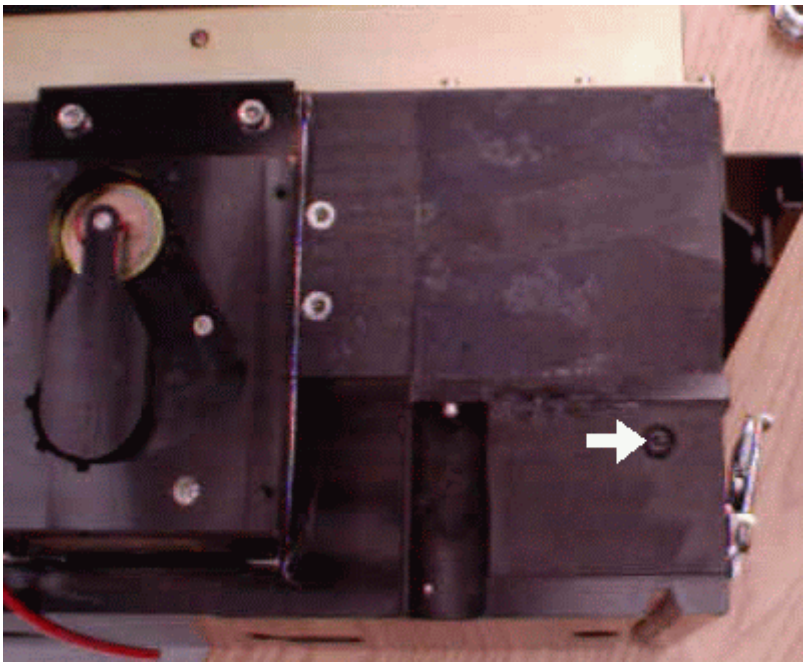


Figure 4: The M5 screw has to be removed prior to Beam blocker adjustment, there is an identical screw on the other side of the head.

APPENDIX A: EXAMPLES OF BEAM BLOCKER ADJUSTMENT

1. Stroke table with beam blockers completely out of the way:

```
Stroke profile: 288 305 424 747 766 756 749 740
Stroke profile: 740 758 768 766 774 769 776 789
Stroke profile: 793 797 778 766 772 758 750 747
Stroke profile: 746 757 764 756 747 737 722 737
Stroke profile: 746 744 737 747 753 750 777 765
Stroke profile: 793 800 795 778 766 756 749 758
Stroke profile: 752 771 746 766 773 784 756 766
Stroke profile: 772 775 773 763 751 769 772 766
Stroke profile: 774 770 772 735 747 747 773 782
Stroke profile: 776 786 805 814 804 803 790 764
Stroke profile: 764 771 797 791 817 814 827 812
Stroke profile: 818 806 817 805 798 808 811 809
Stroke profile: 806 784 797 806 802 814 820 820
Stroke profile: 818 822 821 814 814 815 833 855

Stroke profile: 854 530 322 315 292 291 271 144
```

2. The same stroke table with 192 good imaging pixels (soffset=8)

```
                    (Soffset = 8)
Stroke profile:   0   2  13 385 766 756 749 740
Stroke profile: 740 758 768 766 774 769 776 789
Stroke profile: 793 797 778 766 772 758 750 747
Stroke profile: 746 757 764 756 747 737 722 737
```

```
Stroke profile: 746 744 737 747 753 750 777 765
Stroke profile: 793 800 795 778 766 756 749 758
Stroke profile: 752 771 746 766 773 784 756 766
Stroke profile: 772 775 773 763 751 769 772 766
Stroke profile: 774 770 772 735 747 747 773 782
Stroke profile: 776 786 805 814 804 803 790 764
Stroke profile: 764 771 797 791 817 814 827 812
Stroke profile: 818 806 817 805 798 808 811 809
Stroke profile: 806 784 797 806 450  98   4   1
Stroke profile:   4   2   1   2   3   3   3   0
Stroke profile:   4   0   2   1   2   1   1   1

                    (Swidth = 192)
```

3. The same stroke table with 216 good imaging pixels

```
                    (Soffset = 8)
Stroke profile:   0   2  13 385 766 756 749 740
Stroke profile: 740 758 768 766 774 769 776 789
Stroke profile: 793 797 778 766 772 758 750 747
Stroke profile: 746 757 764 756 747 737 722 737
Stroke profile: 746 744 737 747 753 750 777 765
Stroke profile: 793 800 795 778 766 756 749 758
Stroke profile: 752 771 746 766 773 784 756 766
Stroke profile: 772 775 773 763 751 769 772 766
Stroke profile: 774 770 772 735 747 747 773 782
Stroke profile: 776 786 805 814 804 803 790 764
Stroke profile: 764 771 797 791 817 814 827 812
Stroke profile: 818 806 817 805 798 808 811 809
Stroke profile: 806 784 797 806 802 814 820 820
Stroke profile: 818 822 821 814 814 815 833 855
Stroke profile: 474   0   2   1   2   1   1   1

                    (Swidth = 216)
```

4. In this particular example, we can not open the blockers any wider in order to image more pixels because the remaining pixels are too weak:

```
                    (Soffset = 8)
Stroke profile:   0   2  13 385 766 756 749 740
Stroke profile: 740 758 768 766 774 769 776 789
Stroke profile: 793 797 778 766 772 758 750 747
Stroke profile: 746 757 764 756 747 737 722 737
Stroke profile: 746 744 737 747 753 750 777 765
Stroke profile: 793 800 795 778 766 756 749 758
Stroke profile: 752 771 746 766 773 784 756 766
Stroke profile: 772 775 773 763 751 769 772 766
Stroke profile: 774 770 772 735 747 747 773 782
Stroke profile: 776 786 805 814 804 803 790 764
Stroke profile: 764 771 797 791 817 814 827 812
Stroke profile: 818 806 817 805 798 808 811 809
Stroke profile: 806 784 797 806 802 814 820 820
```

```
Stroke profile: 818 822 821 814 814 815 833 855
Stroke profile: 854 530 322 315 292  10   1   1
```

(Swidth = 224)

The **underlined pixels** are too weak and will cause imaging artifacts.