

Replacing a VISION 3 Engrave Head on a Spectrum Engraver

OHIO GT encourages our customers to have their engraving heads serviced every three to five years. An engrave head loaner program offers a factory engrave head during the servicing of the primary head. This document addresses the swapping of engrave heads, explaining the various steps to successfully replace the heads.

This document also has supporting video to further simplify the procedure. You can find this by going to the OHIO GT Channel at:

www.youtube.com/user/OhioGT

Look for “Swapping a VISION 3 Engrave Head” under the playlists on the OHIO channel. Here you will find the five videos that pertain to this document. The videos match the document structure and the document will point out the proper video as needed.

Note: This document is written for the Spectrum engraver, however it can be used for a Gravostar HS as well. There will be some subtle differences in the procedure used on the HS and with the location of some of the items.

Items Needed

Item	Part Number	Description
1		Loaner VISION 3 engrave head, qty 1, provided
2		Anti-static control bag, qty 1, provided
3	D1850-0145	Anti-static control wrist strap, disposable, qty 1, provided
4		Small flat-blade screwdriver
5		Metric Hex Key set
6		Inch Hex Key set
7	D370029-01	Camera adjusting tool, supplied in Spectrum Toolkit

Items to Return to OHIO GT

Place the following items securely in the engrave head shipping case for return to OHIO GT.

Item	Part Number	Description
A		Original VISION 3 engrave head, which includes: - Engrave Head without diamonds or Vista camera assembly - Matching P-Card - Matching Kaman box

Note: All assembly pieces, like screws, washers, etc., will be reused in this procedure. Please do not discard any pieces unless specifically told to do so.

Procedure

Machine Configuration Backup and P-Card Replacement

Supporting Video – Chapter 1

<https://www.youtube.com/watch?v=wJ4VM1GpBOw&list=PL03SUnX7jMpcPjzxi5f8xi1Rdl06OQmV1>

This portion of the procedure is performed at the touchscreen monitor and inside the electronics enclosure (monitor end of machine).

1. Turn ON power to the machine and retract the engrave head fully. If a cylinder is in the machine, remove it to simplify the head replacement.
2. Exit the Spectrum application software.
3. Turn OFF the machine by pressing a red STOP button.
4. Backup the machine configuration.
 - a. Insert a new USB flashdrive in the monitor with at least 2 GB of space.
 - b. Backup the Machine Configuration.
 - c. Backup the Head Configuration.
 - d. Exit the backup function and remove the USB flashdrive.
5. Remove the end cover from the electronics enclosure.
6. Prepare for exchanging the P-cards.
 - a. Find the new P-card in the shipping case for the new engrave head. Place the P-card, in its anti-static bag, on the top of the electronics enclosure.
 - b. Place the anti-static control bag – item 2 – on the top of the electronics enclosure.
7. Remove the current P-Card.
 - a. Place the anti-static wrist strap – item 3 – onto your wrist. Ground the free end on the card cage. Do not remove the wrist strap until instructed to do so.
 - b. Locate the P-Card in the card cage; it is the last card on the right side of the card cage and is labeled P-Card. Release the two screws holding the P-card in the cage using a small flat-blade screwdriver – item 4. These screws are held into the front panel and only need to be loosened until free of the card cage.
 - c. Push the thumb-tabs away from the board center to eject the P-card from the connectors and then slide the P-Card out of the cage.
 - d. Place the P-card into the empty anti-static control bag and put in a safe location. This P-card and several other items will be collected for return to OHIO GT.
8. Install the new P-Card.
 - a. Remove the new P-card from the anti-static bag.

- b. Slide the P-card into the card cage making sure to align the board in the edge guides. Slide the P-card until it touches the back.
 - c. Make sure the locking screws are pointing into the holes and not angled, then seat the P-card into the connectors by pushing in the center of the board. You should be able to feel increased resistance as the pins engage in the connector.
 - d. Tighten the two locking screws into the card cage.
9. Load the new Machine Configuration files into the machine.
 - a. Insert the Loaner USB flashdrive into the monitor.
 - b. Copy the Machine Configuration.
 - c. Copy the Head Configuration.
 - d. Exit the backup function and remove the USB flashdrive.

Removing the Original Engrave Head

Supporting Video – Chapter 2

<https://www.youtube.com/watch?v=sTXFAzK9ek8&list=PL03SUnX7jMpcPjzxi5f8xi1Rdl06OQmV1>

This portion of the procedure is performed at the engraver carriage and engrave head.

10. If not already done, turn OFF the machine by pressing a red STOP button.
11. Remove the engrave head cover using a 2.5 mm hex key wrench. Put the hardware in a safe place for re-installation.
12. Disconnect the vacuum hose from the engrave head. On some Spectrums, simply remove the hose from connecting to the engrave head, on newer Spectrums the section of hose can be removed easily (shown in the video).
13. Disconnect the head power cable at the large silver connector.
14. Disconnect the large grey cable connecting to the bottom of the Head Interface board at connector J2. The board is on the back left side of the head beside the vacuum exhaust.
15. Disconnect the power cable at the Kaman box. This is the larger of the two connectors.
16. Disconnect the Kaman sensor cable from the Kaman box. This is the single cable and smaller of the two connectors.
17. Disconnect the Firewire from the camera. This has a red connector on the end.
18. Disconnect the power cable from the camera. This has a green connector on the end.
19. Remove the Fiber-optic bundle from the mounting collar. This is a black cable running into the right side of the camera assembly. Use a 1.5 mm Hex key wrench to release the setscrew.
20. Remove the four (4) mounting screws from the front bottom of the engrave head. These are on the side of the head facing the cylinder. Use a 3/8 inch Hex key wrench. Place the screws and washers aside in a safe place for use in step 33.
21. Lift the engrave head assembly off the machine. This engrave head and several other items will be collected for return to OHIO GT.

22. Remove the sub-carriage skirt (cover) from the carriage. The skirt is a U-shaped cover that wraps around the base of the sub-carriage (the platform the engrave head sets on).
 - a. Turn ON the machine and start the Spectrum application software.
 - b. Lower the engrave head until it stops.
 - c. Turn OFF the machine by pressing a red STOP button.
 - d. Remove the lower skirt surrounding the sub-carriage. This requires the removal of eight (8) screws using 2.5 mm and 3 mm Hex key wrenches. There are six screws that use the 2.5 mm Hex key, four on the left side, and two on the right on the cylinder side of the skirt. The two screws on the cylinder side use the 3 mm Hex key wrench. Place the screws in a safe place for reuse later. Slide the skirt back then separate the rear bellows from the skirt. Lift the skirt free and place aside for later use.
23. Replace the original Kaman box.
 - a. Remove two screws holding the mounting plate to the sub-carriage. Use a 4 mm Hex key wrench.
 - b. Lay the plate with the box facing up and remove the four screws holding the box to the plate. Use a 4 mm Hex key wrench. Place the Kaman box aside where it will not be confused with the new box. This Kaman box and several other items will be collected for return to OHIO GT.
 - c. Find the new Kaman box in the shipping case for the new engrave head. Install the new box on the mounting plate using the four screws from step 23b. Do not overtighten these screws as they thread into nylon.
 - d. Re-install the mounting plate onto the sub-carriage using the two screws from step 23a. Do not overtighten these screws as they thread into nylon.
24. Re-install the lower skirt on the sub-carriage.
 - a. Install four of the smaller screws that use the 2.5 mm Hex key on the left side of the skirt (headstock side).
 - b. Install the remaining two smaller screws, also using the 2.5 mm Hex key, into the holes on the right side of the skirt nearest to the cylinder.
 - c. Install the two larger screws using a 3 mm hex key into the back two holes on the right side of the skirt. Do not overtighten these screws as they thread into nylon.
 - d. Re-attach the bellows to the back of the skirt.

Swapping the Vista Camera between Engrave Heads

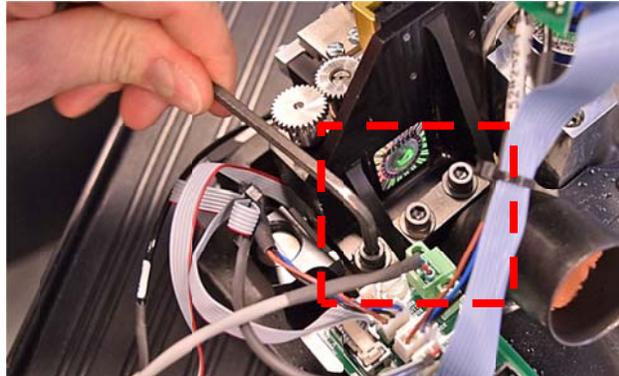
Supporting Video – Chapter 3

<https://www.youtube.com/watch?v=nAKiJHw6Zjo&index=3&list=PL03SUnX7jMpcPjzxi5f8xi1Rdl06OQmV1>

This portion of the procedure deals with removing the Vista camera assembly from the original engrave head and installing it on the new engrave head.

25. Remove the three diamonds from the original engrave head: the stylus, shoe, and burr cutter. Place the screws for the shoe and burr cutter back on the head after taking off the diamonds.
26. Lay the engrave head face down for easier access.

27. Disconnect the Focus prox cable at J8 on the Head Interconnect board.
28. Disconnect the Focus motor cable at J5 on the Head Interconnect board.
29. Remove the new Loaner head from the shipping case and place face down near the original head.
30. Remove the camera assembly from the original head.
 - a. Loosen the three screws holding the camera using a 5/32 inch hex key wrench until the threads not engaged. Do not remove the screws and clamps when they are loosened.



- b. Lift the camera assembly free of the engrave head.
 - c. Place the entire assembly aside for use in step 32.

Note: There may be a shim mounted between the camera assembly and the mounting surface of the engrave head. The shim is installed to tip the camera slightly for a better picture on smaller cylinders. This shim cannot be seen without removing the camera assembly and it may fall from its mounting position when the camera is removed.

31. If a shim was installed under the camera, position the shim on the Loaner head in the correct orientation as shown in the picture below.



32. Install the camera assembly into the new head.
 - a. Position the large clamp and screws into the camera first. One of the two holes in the clamp is closer to the edge than the second, this hole must go to the right side of the camera assembly.
 - b. Carefully slide the camera into place, with the focus motor cable fitting into the hole in the engrave head.
 - c. Lightly tighten the two screws on the large clamp.

- d. Make sure the small clamp is oriented with the chamfer of the clamp facing to the right (towards the large clamp).
- e. Tighten this screw and then finish tightening the two screws in the large clamp.
- f. Connect the Focus motor cable to J5 of the Head Interconnect board.
- g. Connect the Focus sensor cable to J8 of the Head Interconnect board.

Installing the new Engrave Head

Supporting Video – Chapter 4

<https://www.youtube.com/watch?v=bVBpGhAGupQ&index=4&list=PL03SUnX7jMpcPjzxi5f8xi1Rdl06OQmV1>

This portion of the document is for installing the new engrave head onto the Spectrum.

33. Set the new engrave head on the carriage and secure with the four sets of screws and washers removed in step 20. The head should be positioned with the left-most hole in the head aligned with the left-most hole in the carriage. Tighten the screws after all four are in place.
34. Connect the Kaman sensor to the Kaman box.
35. Connect the Kaman power cable to the Kaman box (cable D818.594.059).
36. Connect the small grey cable with the green connector to the camera power connector (cable 560458-01).
37. Connect the large grey cable with connector J2 to the Head Interface board. (cable D818.594.048)
38. Connect the FireWire cable to the camera (cable 2143-0974).
39. Connect the Head power cable to the engrave head (large silver connector).
40. Install the fiber-optic bundle into the collar but do not tighten down (2420-0085).
41. Re-install the vacuum hose onto the vacuum port on the rear of the head.

Aligning the Vista Camera

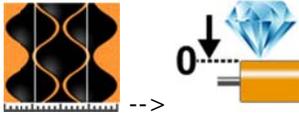
Supporting Video – Chapter 5

<https://www.youtube.com/watch?v=Z2pc1RLgLac&index=5&list=PL03SUnX7jMpcPjzxi5f8xi1Rdl06OQmV1>

In this portion of the procedure, you will be making a test cut and aligning the Vista camera over the test cut. To make things a bit easier to find, a black felt tip pen/marker can be used to make a line above the test cut. This gives a better view when using your eye to get close enough for the test cut to be in the field of view of the Vista camera.

42. Turn ON the machine and start the Spectrum application software.
43. Install a cylinder into the machine and prep it for engraving.
44. Enter the cylinder size into the software. Set the screen and screen angle to 70 l/cm at 45° screen angle.
45. Install the three diamonds – shoe, burr cutter, and stylus – onto the new head.

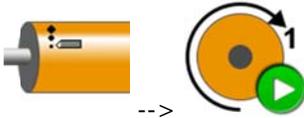
46. Perform a Tip Calibration routine from the Test Cut page on the Spectrum.



47. Perform an Auto Focus from the Vista page.



48. Make a manual test cut on the machine and then press the GoTo 1 Rev button.



49. Activate the Vista camera and look for the test cut with the camera. It may be necessary to rotate the cylinder up so that you can see the test cut location and the approximate Vista camera position. Looking at the reflection of the silver microscope objective in the cylinder is a good starting point.



50. If the camera is left or right of the test cut, move the camera assembly using the adjusting tool (item 7). This tool is provided in the Spectrum toolkit supplied with the engraver.

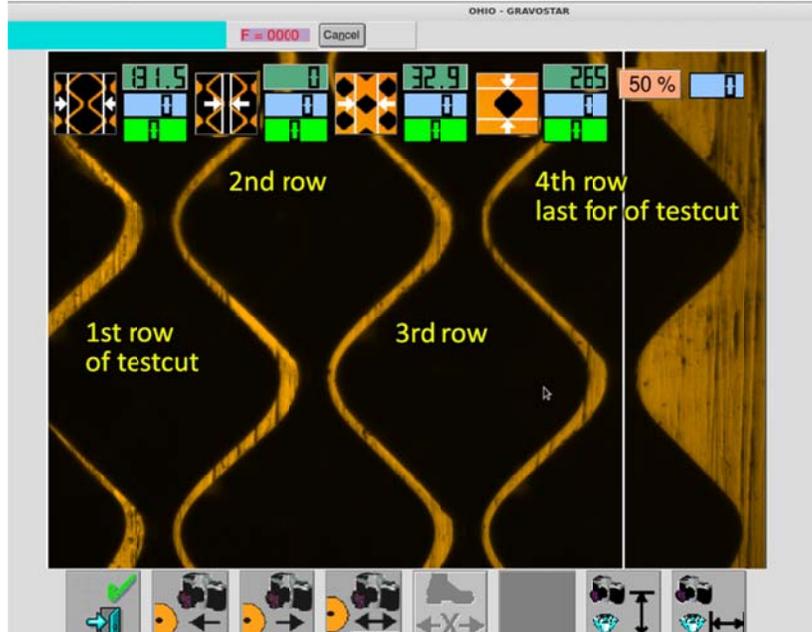
- a. Slightly loosen the three screws which secure the camera assembly slightly. Use a 1/8 inch hex key wrench.
- b. Move the camera. The adjusting tool fits onto a hex head screw found just beneath the fiber-optic bundle.
 - Clockwise rotation moves the camera left.
 - Anti-clockwise moves the camera right.
- c. When the cells are visible on the monitor, open the Camera settings from the Vista page.



This displays the Horizontal Alignment aid. Press OK to clear the prompt and display the alignment aid.

- d. Move the camera left or right until the cells are aligned as shown in the following graphic, with the white line centered on the last row of the test cut. The best cells to align on are the nested full cells at the top of the test cut.

Note: Cells do not need to be perfect. Aligning to the center of smaller cells is fine.



- e. Tighten the three screws to secure the camera in place. Do not overtighten these screws. If the camera shifts slightly, use the adjusting tool to re-position without loosening the locking screws.
- f. Verify that the camera is straight by checking the white line with the centerline of the cells. This is easily done looking at the highlight cells and trying to get three cells in the view. It is very important to have the camera aligned through the center to the operation of EasyCell. Turn the camera by slightly loosening the two screws that clamp the camera tube. Re-tighten the screws when aligned to the cell centerline.
- g. Exit the Vista page.

51. Adjust the fiber-optic bundle for the most even lighting.

- a. Activate the Vista camera again to open the Vista page and look at the cylinder surface.



- b. Move the fiber bundle in and out and also rotate it to find the most even and brightest lighting on the monitor. Secure the bundle in the locking collar by tightening the outermost setscrew with a 1.5 mm hex key wrench.
- c. Move the cylinder so a clear area of copper is shown on the monitor, free of any cells.



- d. Perform a Light Calibration routine.

52. Install the head cover on the machine.

53. Perform a QuickCell or EasyCell routine to verify the engrave head and Vista camera are working properly.

This completes the engrave head replacement.

Wrap-Up – Returning the Original Engrave Head to OHIO GT

54. Carefully place the original engrave head in the shipping case for return to OHIO GT. If possible, wrap the head with plastic.

55. Place the original Kaman box in the white cardboard box (that came in the shipping case).

56. Place the original P-card in the anti-static bag, inside the white box with the Kaman box.

57. Place the white box into the shipping case.

58. Return the original engrave head to OHIO GT using the RMA provided by OHIO GT.