

OrthAlign, Inc. Proprietary		Document Title Work Instructions: Lantern Nav PCBA Wired Programming		
Originator Michael Chavez	CO 9332	Document Number WI3-0089	Rev E	Page 1 of 10

REVISION HISTORY

Rev	CO	Description of Change	Release Date
AX01	6887	Initial Release	15 Apr 2022
A	7034	Revision update from Alpha-X to Alpha. Updated Document title by adding "Work Instructions" and removing "Procedure." Minor format updates throughout document.	15 Jul 2022
B	7536	Introducing a new programming flashing application that can be used to program up to 10 devices at a time on a fixture, PN 500010.	20 Jul 2023
C	8019	Removed type A to mini USB from Equipment Table Added pre-program PIC section (8.1.1) Removed Section 8.2.7 "to show "Production Mode Enabled" on the screen" and changed it to "Power on all PCBAs by holding the switch for 3 seconds until the blue light is blinking". Updated Figures 9-12 Added labeling instruction	25 Oct 2024
D	9195	Including 403607 PCBA into scope of document.	24 Oct 2025
E	9332	Updated SOM Multi-programming flashing sequence to include latest SW0131 feature. Updated DC power supply specs on equipment and materials table to align with existing requirements of section 8.2.3.	02 Jun 2026

1. SCOPE

1.1 This document is applicable to PCBA, Programmed and Tested, Nav, LSA, PN 403607 and 405231.

2. PURPOSE

2.1 To define the procedures to program to the PCBA, Programmed and Tested, Nav, LSA (P/N 405231 or 403607) via wired connection.

3. DEFINITIONS

- 3.1 PCBA – Printed Circuit Board Assembly
- 3.2 ESD – Electrostatic Discharge
- 3.3 DHR – Device History Record

4. REFERENCE DOCUMENTS

- 4.1 MP0064 Manufacturing Procedure: PCBA, Programmed and Tested, Nav, LSA
- 4.2 MP0064-01 Traveler: PCBA, Programmed and Tested, Nav, LSA

5. QUALITY RECORDS

5.1 Quality records will be generated via MP0064-01 or as needed and stored with the work order DHR.

6. EQUIPMENT AND MATERIALS

Equipment	Asset Number	OA PN	Manufacturing PN or Spec
Type A to Micro USB cable	N/A	N/A	SC-2AMK006F or equivalent

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Equipment	Asset Number	OA PN	Manufacturing PN or Spec
NAV Software Package Programming Assembly	Asset # 0552, or 0553 or Any Qualified Asset	139636	N/A
Microchip Curiosity Board	Asset # 0494, or 0495, or 0496 or Any Qualified Asset	N/A	DM164137
PIC Programming Daughter Board		132297	N/A
PIC Programming Header Adapter Board		139632	N/A
6 Pos Cable Assembly Rectangular Socket to Socket		139631-01	0451110603 or equivalent
Windows Laptop	Asset: 1028 or Any Qualified Asset	N/A	Windows 11 or later, I7 (12 th Gen), , 16GB RAM, USB 3.2 Gen 1 w/ Powershare. MPLAB X IDE Programming Software installed on Windows Laptop – SW0111 (PIC Programming SW) and SW0131 (SOM Programming SW)
DC power supply	Any Qualified Asset	N/A	Output min 4.5V 10A
PCBA Power Cable, HSA or RS BATTERY CABLE, HSA	Any Qualified Asset	139640 or 133326	N/A
Lantern Multi-Programmer	Any Qualified Asset	500010	N/A

7. PRECAUTIONS

7.1. Follow ESD Control to prevent damage to electronic components. Store and transport electronic components and assemblies in ESD Bins. When handling electronic components, do not drag component across any surface (ESD mat, ESD bin, Reference Sensors housing bottoms), lift and set electronic component.

7.2. ~~If program the boards wirelessly, the operator shall maintain a minimum separation distance of 20 cm (8 inches) between themselves and the device's Wi-Fi antenna/transmitter. This minimum distance must be maintained throughout the duration of the wireless communication process to ensure compliance with FCC and RF exposure requirements.~~

7.4-7.3.

8. PROCEDURE

8.1 PROGRAM PIC

8.1.1 If using preprogram board,

8.1.1.1 Verify board is labeled with preprogrammed software version and software matches with label on the chip that was installed.

8.1.1.2 Record the Software version displayed on MP0064-01 section 3.8 and select the pre-program option.

8.1.1.3 Proceed to Section 8.2 "SOM Multi-Programming".

8.1.2 If programming is required,

8.1.2.1 Locate the MicroChip Curiosity Development Board, PIC Programming Daughter Board, PIC Programming Header Adapter Board, 6 Position Rectangular Cable Assembly, and mini-USB cable.

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8.1.2.2 Attach the PIC Programming Daughter Board to the Curiosity Board as shown in figure below. Connect the daughter boards' pins to the inner and left-most pins of the Curiosity board as indicated in Figure below.

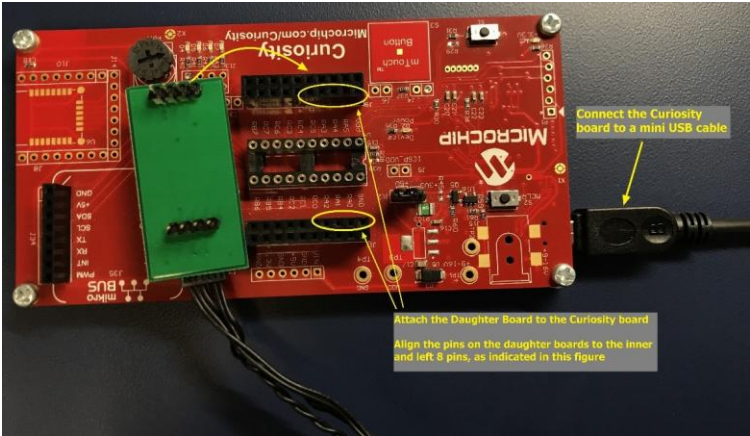


Figure 1
Microchip Curiosity board with Harvey PIC Programming Cable Attached

8.1.2.3 Connect the 6-position rectangular cable to the daughter board as shown in Figure below.

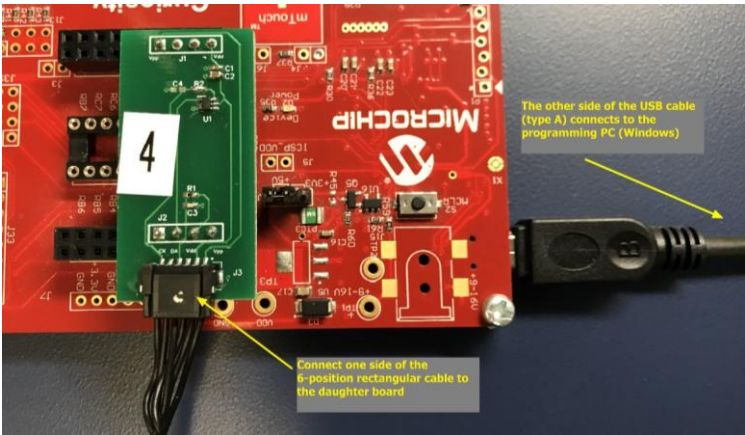


Figure 2
Connect cables to the PIC programming boards

- 8.1.2.4 Connect the Curiosity board to the PC using the USB cable.
- 8.1.2.5 Connect the other side of the 6-position rectangular cable to the J1 of the PIC Programming Header Adapter board.

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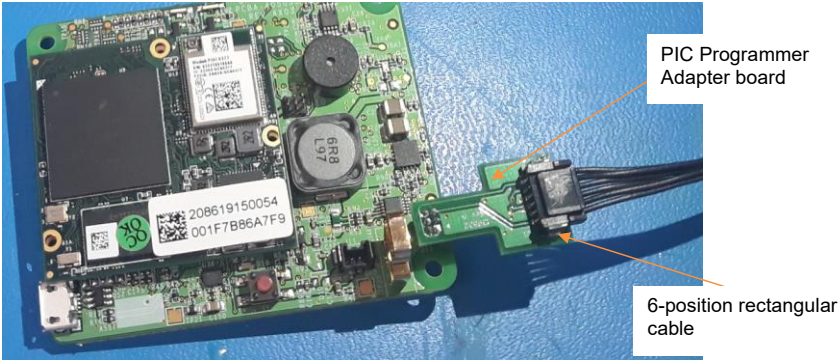


Figure 3

- 8.1.2.6 Connect the Harvey PIC Programming Cable to the unprogrammed Nav PCBA at J15. Ensure the pin 1 marking matches. Pin 1 is typically denoted by a white line or arrow.

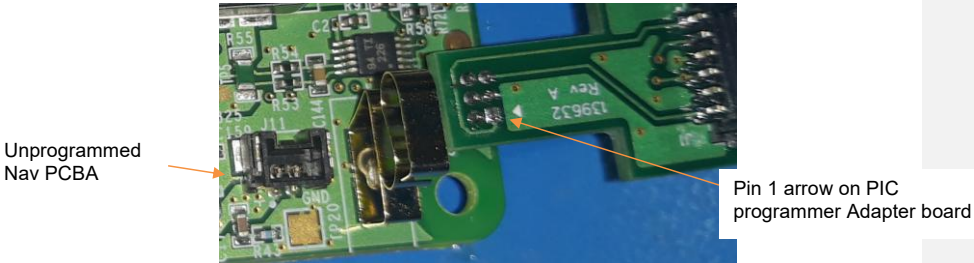


Figure 4. PIC Programmer Header and NAV Board Location

- 8.1.2.7 Start the MPLAP IPE application on the windows computer
- 8.1.2.8 Ensure the proper Device and Tool are selected in the application as shown in Figure below. Press the Connect button.

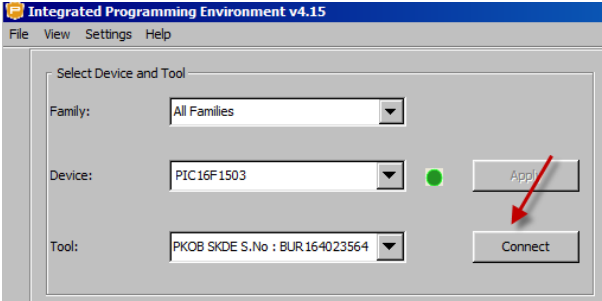


Figure 5: IPE Application

- 8.1.2.9 "Target device PIC16F1503 found" will appear in the "Output" window" when device is successfully connected. Confirm there are no errors displayed.

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8.1.2.10 Select the hex programming file (i.e. the latest version of SW0100) by using the "Browse" button. "Hex file loaded successfully" will appear in the output window

8.1.2.11 Select "Program" to program the part.

8.1.2.12 Select "Verify" to verify the file was programmed correctly.

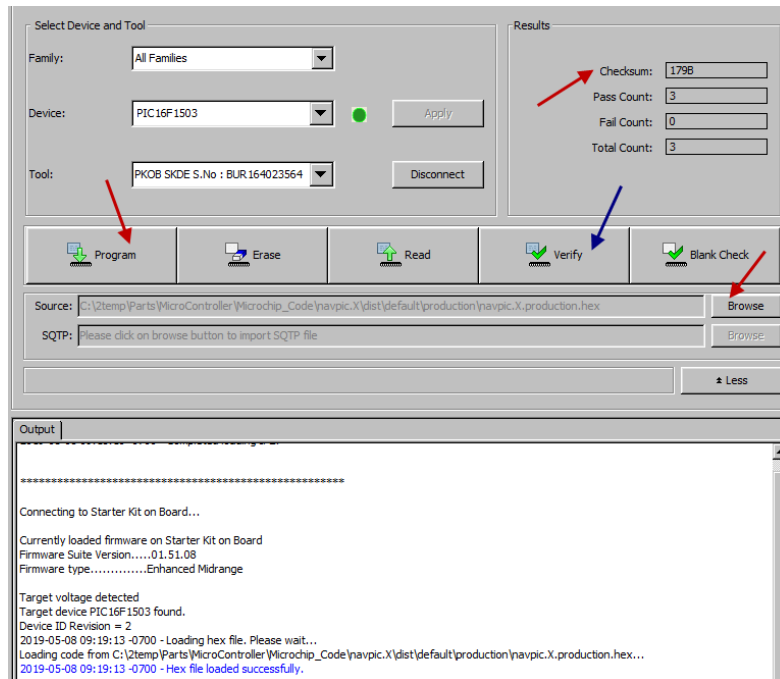


Figure 6: IPE Application Programming Steps

8.1.2.13 Exit the MPLAB IPE Application by pressing the "Disconnect button" and detach the PIC Programming Header Adapter board from the Nav board.

8.2 SOM Multi-Programming

8.2.1 Connect multi-programmer, PN 500010, to a DC power supply and a programming laptop with the lantern SOM flashing tool installed.

8.2.2 Place PCBAs onto fixture's standoffs, install programming header onto J10 of the PCBAs, and connect micro-USBs at P1 for each PCBA as shown in the Figures below:

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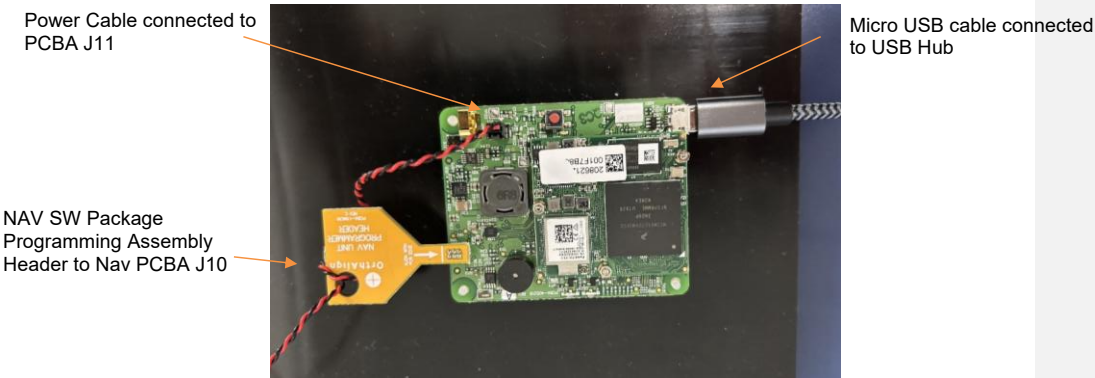


Figure 7: Cable Locations per Unit

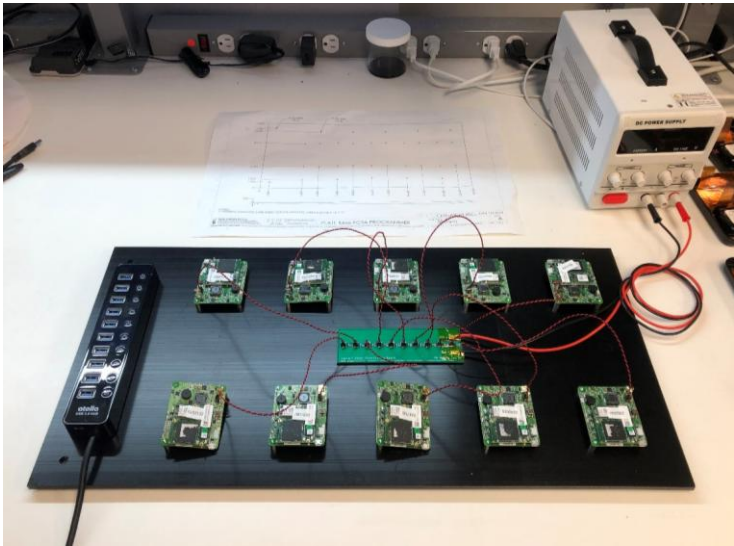


Figure 8: Connected Multi-Programming Fixture

- 8.2.3 Connect power board cables at J11 for each PCBA, and power on USB hub & power supply (4.5V 10A).
- 8.2.4 Open the Lantern SOM Flasher application on assigned Windows laptop.

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8.2.5 The OrthAlign Lantern SOM Flasher application should appear as shown below:

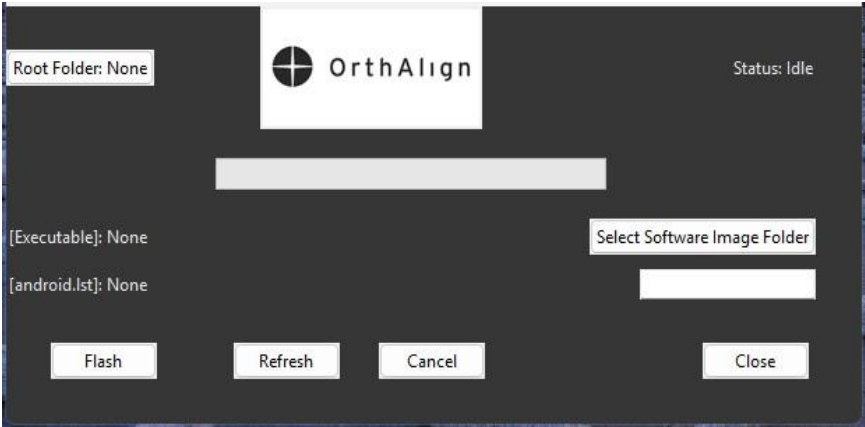


Figure 9- OrthAlign Lantern SOM Flasher Application

8.2.6 Press “Select Software Image Folder” to select the folder containing the unzipped software release package.

Ensure no warning messages are shown in the top right “Status:” field. When the software release package is properly selected, the filepath / found files will be displayed as follows:

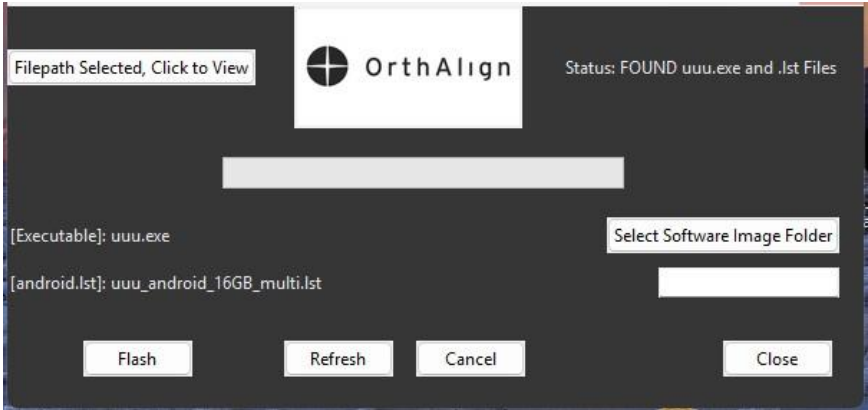


Figure 10- Lantern SOM Flasher with Good File Path

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8.2.7 Power on all PCBAs by holding the switch for 3 seconds until the blue light is blinking.

Note: If a green light is turned on, as shown in Figure 11, disregard it and continue to the next step.



Figure 11- Green Light in a PCBA

8.2.8 Select the "Flash" button on the Lantern SOM Flasher Application. The board(s) should begin programming, and the progress indicator will move to the right. Programming is complete when the progress bar is full, and the application shows a pop up that says "Flashing sequence completed for the following COMs (Devices):" Refer to Figure 13.

Note: A "Warning!" dialog will be shown to the user if programming is unsuccessful for any devices. The text "Flashing ended with errors for the following COMs (Devices):" will also be displayed in a pop up. Follow the warning prompt.

8.2.8.1 If a "FAILURE" dialog is shown to the user for unsuccessful programming, then proceed with the following instructions. The failure pop up message will detail location(s) that caused the programming to fault.

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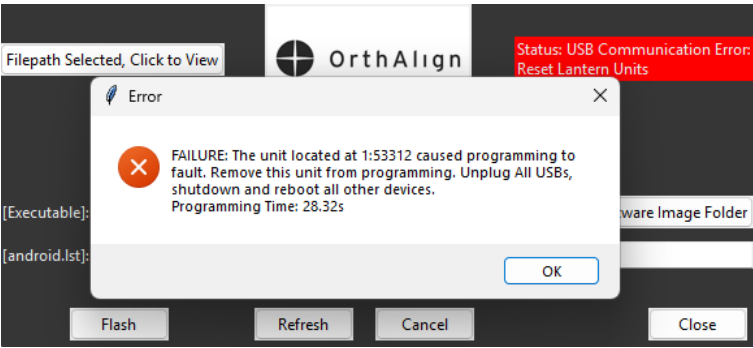


Figure 12: Programming Failure Error Message (REFERENCE)

- 8.2.8.1.1 Power off all devices, unplug all USBs, remove failed unit shown on error message from tagged fixture location, plug in USBs, and power on remaining devices.
- 8.2.8.1.2 Re-flash (program) all other devices. Repeat section 8.2.8 until all failed units are removed from the batch and all devices program successfully.

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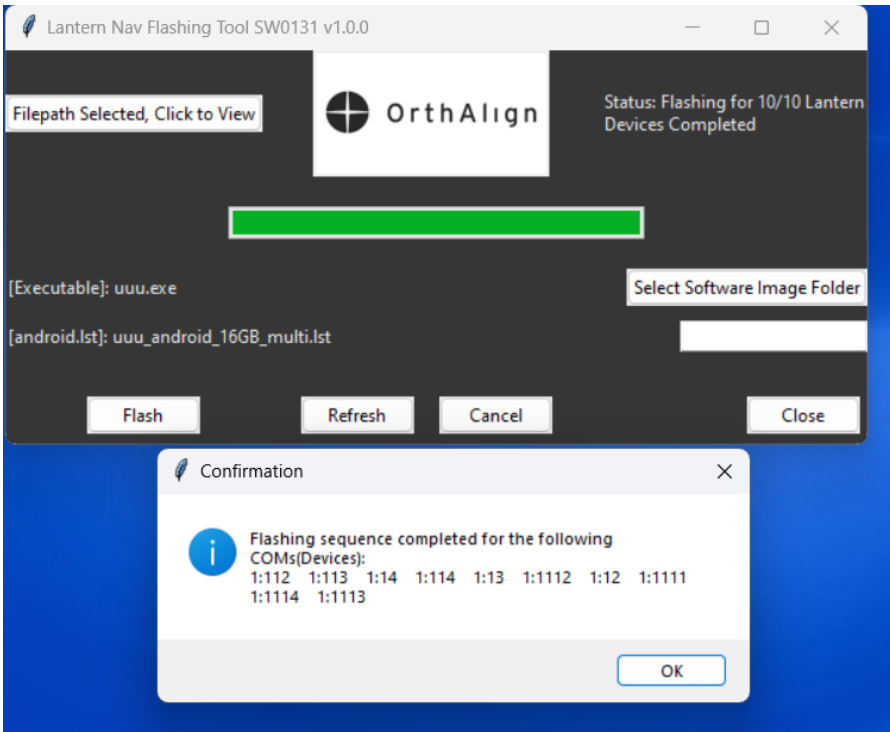


Figure 13: Programming Complete Confirmation

- 8.2.9 If programming is unsuccessful, try clicking the “Refresh” button and retry programming step per 8.2.7. Record number of attempts required to program on datasheet in comments section.
- 8.2.10 After PCBAs are successfully programmed, power down the power supply and unplug all cables attached to the Nav PCBAs.

9. LABELING

- 9.1 Suppliers are allowed to label the PIC and SOM after programming if desired for their traceability purposes. If preprogram PIC, refer to section 8.1.1.