Selective Soldering System
Quick Start Guide & Tips
For Photoscan and Off-Line Editor

Use this Selective Soldering Quick Start Guide with any SP A200, SP A300, or SP A400 Selective Soldering System.

GETTING STARTED

1) Load the Photoscan Editor and Off-Line Editor software into your computer
   a) Go to Photoscan Editor folder then PhotoscanEdit.exe and install
   b) Go to Spa Edit-Setup folder then Setup.exe and install
2) Print-out the Photoscan and Off-Line Editor Programming manuals for future reference unless you've received hard copies.
3) Scan the solder side (usually the bottom side) of the 1st panel you will program. Any 100 – 400 dpi scanner is acceptable (100 dpi is the best setting and please scan in color if possible)
4) Save the file as a .jpg in an easy to find folder. It's a good idea to save this and all subsequent files in the same directory for easy access.

PHOTOSCAN SOFTWARE PROGRAMMING

1) Go the the Photoscan Editor software and click :
   a) File
   b) Open image File
2) Make sure the image as it appears on the display is in the proper orientation as you will run it through the Selective Soldering system. A good rule of thumb is that the X dimension should be the smaller dimension. If you need to rotate the image 90 degrees a good method is to open up the image in Microsoft Paint, perform the quick rotation flip, save the image and repeat step 1
3) Your image will now be displayed in the software.
4) Enter the exact X & Y dimensions of the scanned board in millimeters (mm). Please hit enter after entering each value.
   a) **Note :** Use the X-Y reference diagram to ensure you enter the correct X-Y values in the right spot.
5) Go to :
   a) View
   b) Zoom All to have your image fit the screen
6) Click :
   a) Edit
   b) Set Border Points
7) Go to the upper left corner of your board and line up the cross hairs with the corner as close as possible.
   a) Left Click the mouse
8) Drag the box to the lower right corner and left click the mouse again.
9) You have now created the border points
10) Select the nozzle you want to use. Choose one that will work for all solder joints on your board.
    a) **Note :** If you need to add a nozzle simply go to
       i) Nozzle and Click Add button
       ii) Enter the name (Ex. A18/17/55) and inner nozzle diameter in mm.
           (1) 18 = Outside Diameter in millimeters (mm)
           (2) 17 = Inside Diameter in millimeters (mm)
           (3) 55 = Nozzle Height
               (a) **Important** : The standard nozzle height for the SPA with FLAT solder pumps is 75mm long. However, the standard value you **MUST** enter in the OFF-LINE EDITOR is 55mm. The reason for this is that the high pressure chamber in the solder pot is 20 mm lower. That means the height of the

solder nozzle is 75mm, but the value for the OFF-LINE EDITOR must be 55mm.
(b) Example: If you get a nozzle with a height of 85mm, the height value in the OFF-LINE EDITOR must be 85mm – 20mm or 65mm.

iii) Press Enter to save the info.
iv) Click OK

11) Now add your solder points.
    a) Click Edit
    b) Add Solder Point
12) Using the red nozzle outline, place the red circle over the points to be soldered
    a) Left click on your mouse
13) Repeat Step 12's process until you have accounted for all points
    a) **Note :** For line soldering connectors and similar parts, drop a red circle at the beginning of the connector and the end of the connector. It is always better to leave room before and after the connector if you have room.
    b) **Note :** To view points at a higher magnification
        i) Click View
        ii) Zoom 50+
        iii) Click View again
        iv) Click Pan
        v) Click on the board and hold down the left mouse button. You can then drag the entire board down until you reach the location you want. Repeat process as needed.
14) You are now finished with Photoscan software programming of your board.
15) Go to :
    a) File
    b) Click Save As (name your .orj file something you can remember (Ex. Board #). Keep all saved files in the same folder for easy reference.
    c) Go back to File
    d) Click Save SPA file (name your .spa file the SAME name as the .orj file). Save in the same folder as Step b.
16) Close the Photoscan Editor Software

SPA OFF-LINE EDITOR SOFTWARE PROGRAMMING

1) Go to :
    a) File
    b) Open
    c) Open your recently created .spa file
2) You will now see the points you created on the left side of the screen
3) Got to :
    a) Extras
    b) Nozzles
    c) If your nozzle is not listed, click Edit
    d) Type in the password : secret
    e) Click OK, then click Insert
    f) Enter the new nozzle information and click OK
4) Click Settings
    a) Click PCB
    b) Select the correct nozzle for this program
    c) Click OK
5) Go to :
    a) Edit

b) Steps

6) You will now see your program speed settings. We suggest using the drop down menu to open the “default” speed settings until you are more familiar with programming. The default settings will work with the majority of programs
   a) **Note:** The Speed setting box will pop-up in subsequent settings and will be renamed to your .spa program name. You can simply click OK each time the Speed Settings box appears.
   b) **Note :** The important settings you may change in the future are :
      i) Flux Point Dwell time (seconds)
      ii) Flux Line End Dwell time (seconds)
      iii) Solder Point Dwell time (seconds)
      iv) Solder Line End Dwell time (seconds)
      v) Speed Over Preheat time (speed settings in mm/min)
         (1) for thick boards reduce to 60

7) FLUXING
   a) Now it’s time to add your flux points and flux lines
   b) Feel free to drag open the board window to see your points in higher magnification.
   c) If you want to flux a point,
      i) Click Flux Point
      ii) Click on the Point to be fluxed. Several lines of data will be generated automatically to the right
   d) If you want to flux a line,
      i) Click Flux Line Start
      ii) Go to the Green Board and click on the point where the flux line will start
      iii) Click on Flux Line End
      iv) Go back to the Green Board and click on the point where the flux line will stop
   e) Complete adding flux points and / or flux lines until ALL points are shaded

8) PREHEATING
   a) If you want to preheat your board :
      i) Click on the Preheat Box
      ii) Click OK
      iii) You have now added preheat to your board
      iv) If you do not want to add preheat then simply skip the preheat button (DO NOT CLICK)

9) SOLDERING
   a) Now it’s time to add you solder points and solder lines.
   b) Click on the Solder button
   c) Click OK in the Speed Settings window.
   d) If you want to solder a point,
      i) Click Solder Point button
      ii) Click on the Point to be soldered. Several lines of data will be generated automatically to the right
   e) If you want to solder a line (i.e. connector),
      i) Click Solder Line Start
      ii) Go to the Green Board and click on the point where the solder line will start
      iii) Click on Solder Line End
      iv) Go back to the Green Board and click on the point where the solder line will stop
   f) Complete adding solder points and / or solder lines until ALL points are shaded
      i) **Note :** You can only program in the Y-axis from top to bottom or you will get an error sound.

PROGRAM COMPLETION AND PROGRAM QUICK ADJUSTMENTS

1) Click the End button.
2) Click the Save button.

You have now completed your program. It is ready for transfer to the SPA system.

TIP #1 – WAVE % and Preparing the Nozzle for Soldering

Prior to loading the program into the SPA system, make sure the **NOZZLE WAVE HEIGHT** is correct in the program. You can check this by :

1) Going to the SPA system
2) **New wettable nozzle - Pretinning must be completed. (Not necessary for jet wave nozzle):**
   a) Dip the nozzle tip (which is in socket already of course) into your Flux
   b) Put nozzle upside down into the Solder for 1 minute
   c) Tap the nozzle against the pot to let the solder drain out
   d) Place the nozzle (tip up) into the solder pot nozzle location without locking it in. Let it heat-up for 5 minutes.
   e) Lock the nozzle into the solder pot socket with the nozzle tool.
   i) If you turn the wave on too early you can get a clogged nozzle which can only be unclogged by removing the nozzle from the socket, tipping the tip in the solder for 1 minute, and quickly reinserting the nozzle and turning on the wave to 70%.
   f) Turn the wave % to 70% in the Soldering Parameters screen
   g) After the solder flows for 15 seconds turn the wave percentage 60 – 65% to get a smooth flow
3) **Existing nozzle already mounted**
   a) Simply run the wave and brush on flux as the wave is overflowing
   b) Brush with solder iron paste (Use Hakko FS 100 or similar type) http://www.hakko.com/english/products/hakko_fs100.html
   c) Ensure you get a smooth flow around the entire nozzle tip
   d) You may need to replace the tip after 2 – 3 months of operation
4) Installing the correct nozzle in the solder pot
5) Going into the “Soldering Parameters” touchscreen
6) Entering the same wave height that’s in your program into “Wave” area of Soldering Parameters
7) Monitor the wave flow. Is it flowing properly ? Is it too low or too high ?
8) Adjust the % on the fly until you get a good solder flow.
9) Go back into your program
10) Click Edit-Program and make sure that wave % that worked best on your SPA is the wave % that you have in your program.
11) To quickly adjust the % right click in any wave % box
    a) Click “Change Wave %”
    b) Using the arrows adjust to the correct %
    c) Click OK
    d) Automatically all % boxes will change to your new wave %.
    e) Click the Save button

TIP #2 – Z Height (Bottom Board to top nozzle)

Prior to loading a populated board into the SPA system, you should load a dummy blank board to make sure the NOZZLE to BOTTOM BOARD Z Value is correct in the program. You can check this by :

1) Going to the SPA system
2) Loading the Blank dummy panel in the pallet
3) Loading your recently created program (see TRANFER PROGRAM instructions below)
4) Press Start and monitor the board to nozzle distance through the back window.
   a) If you see the nozzle hitting the board you will increase the Z value in your program (see below)
   b) If you see the solder "mushrooming out" on the bottom side of the board then you will increase the Z value in your program (see below for instructions)
   c) If the solder is not touching the board or barely touching the board, you will decrease the Z value in the program to bring the board closer to the nozzle.
5) Go back into your program
6) Click Edit-Program
7) To quickly adjust the Z right click in any Z box
   a) Click "Solder Change Z mm"
   b) Using the arrows increase or decrease the Z mm dimension as you see fit.
   c) Click OK
   d) Automatically all Z boxes will change. (Ex. If you increased the Z by 1 mm then all boxes will be increase by 1 mm and the board will now be 1 mm further away from the board.
      i) **Note :** 2 mm is the max adjustment you can make in this area.
      ii) **Note :** For changes greater than 2 mm you must go to Edit, Steps, Click the Manual button and make those changes at each solder step.
      e) Click the Save button

TIP #3 – Programming a line solder

When programming a line solder, the Y coordinate at the starting point must be greater than the Y-coordinate of the end point. Otherwise you will get a programming error. One way to change this quickly is to do the following :

1) Go into Edit the Points
2) Find the points causing the programming problems and manually change the Y-values so that the starting and ending points have the same value. Save the Program.

TIP #4 – Reducing shorts on a line solder

Drive diagonal (45 degrees) at the end of the connector.

1) Set the "solder line start" Z value to 0 if the pins aren't too long that you will hit them
2) Set the "solder line end" Z value to 3
3) Use wettable nozzles

TRANSFERRING PROGRAMS TO THE SPA

1) Enter the password 76767 in the Password screen to all access to the menus
2) Connect your PC to the SPA. You may need to use a USB converter cable if your PC doesn't have a RS232 port.
3) There is a USB cable and software driver included with your system. Please load the driver into your computer before starting.
4) Open up your Off-Line Editor software
5) Go to File and Open up your program
6) Go to Edit then Program
   a) You must ensure the COM port setting in your software is the same as your laptop "USB" comport or the program transfer will not work.
   b) Click Settings in the Off-Line Editor
   c) Click Serial port
   d) Verify which COM port is set in the drop down
   e) Go to you computer now and see which COM port the USB cable you plugged in is set to
      i) One method to find this is to Click View System info.
      ii) Click Hardware
      iii) Click Device Manager
      iv) Open COM ports and see which one is called out
      v) If different from the Off-Line editor COM port then go to the Off-Line Editor software and change the COM port to match the computer COM port.
7) Go to File and open your newly create .spa program
8) Go into the Program – Editor (computer touch-screen icon) on the SPA system
9) Press the Download icon. Do not press any additional icons.
10) Go back to your PC and your Off-Line editor software. Click the Send button
11) Go back to the SPA system and Press the Large DOWNLOAD icon
12) Go back to you PC, the program should now be scrolling on your display (i.e. Rx NAME, etc…)
13) If the program is not scrolling the transfer did not go through.
14) Click Edit, Program and Send again.
15) If it still doesn't transfer disconnect and reconnect all cables.
   a) You can also shut down the machine at the Main Power Switch while your USB is still connected to your computer.
16) Also, check in the Off-Line Editor to make sure the COM setting matches the USB com setting on your PC.
17) If a transfer is successful the program will scroll. Once it stops scrolling you can look on the SPA and the program will now be loaded and ready to run.
18) Load your board, load the pallet in the system and press Start.
   a) **Note :** Pressing the Green Start button will clear errors.