Nabity System

UPDATES:

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- Walk-through

As of 10/19/16 (though truly from 2013-2014 during MoS2 work):

Chip Spinning:

1. spin 4% 495 @ 3000 rpm, 1000 ramp, 60 s (resist will be ~150 nm thick)
    - bake @ 170 °C for 15 min
2. spin 2% 950 @ 3000 rpm, 1000 ramp, 60 s (resist will be ~50 nm thick)
    - bake @ 170 °C for 15 min

(develop in 1:3 MIBK:IPA - see below - & lift-off in 1:1 methylene chloride:acetone)
E-beam Writing on the Nabity

1. Measure the current in pA for all apertures you are going to use (typically, 10 µm ap => 30-40 pA & 60 µm ap => ~1000+ pA)
2. Parameters common to all run files (including alignment):
    a. gun @ 20 kV
    b. 900 magnification
    c. general params:

-
    -
        - Non-stop writing mode yes
        - Disable automated stage control no
        - Disable digital SEM control no
        - Disable x-y focus mode yes
        - Enable global rotation correction no

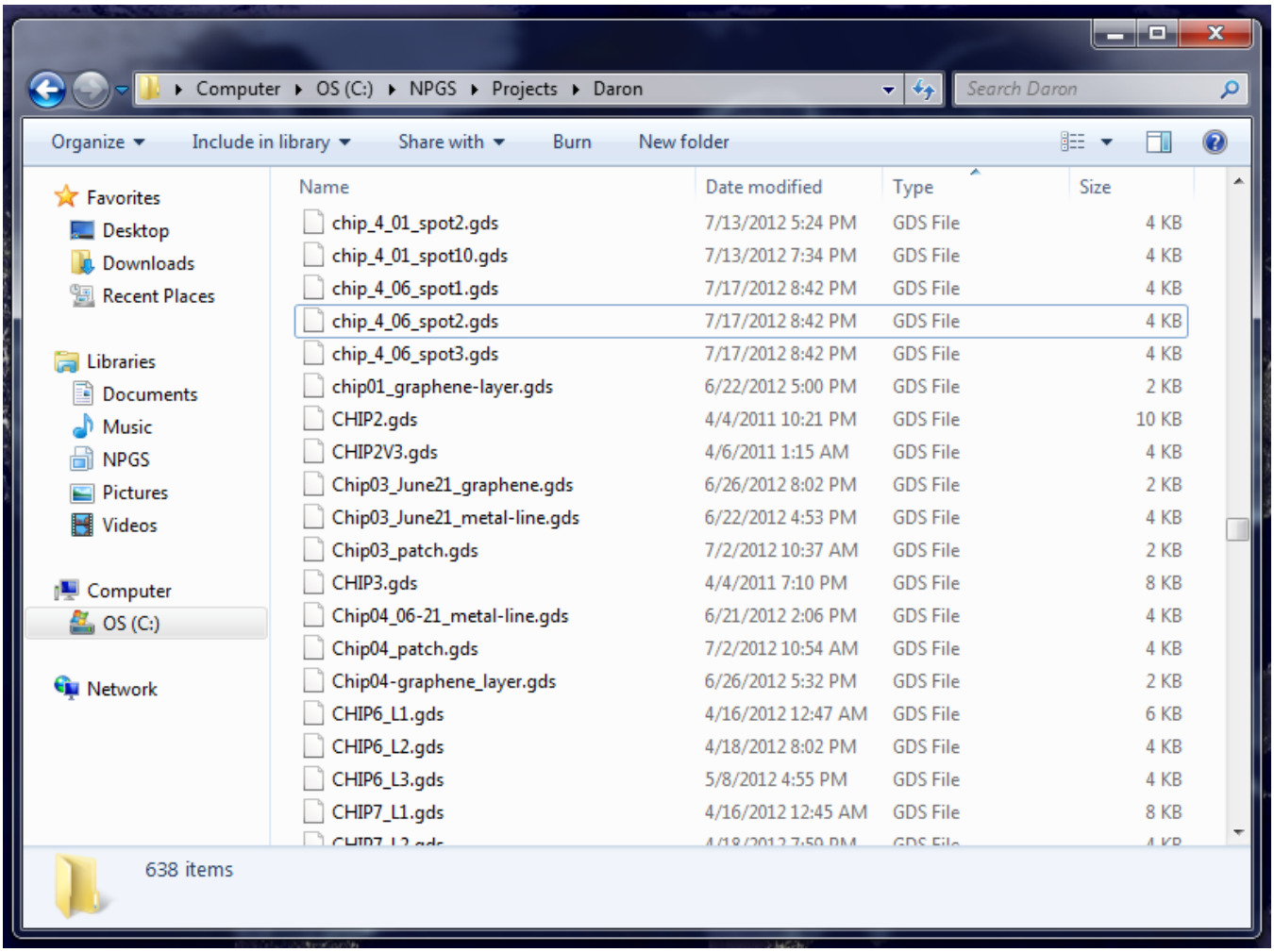
1. alignment windows:
    - counts of 15
    - center-to-center spacing 50 nm
    - line spacing of 50 nm
2. pattern writing of fine features:
    - 10 µm aperture (set in Supra system, not Nabity system)
    - continuous write
    - center-to-center spacing 5 nm
    - line spacing of 5 nm
    - 300 µC/cm^2 area dose
3. pattern writing of large features:
    - 60 µm aperture (set in Supra system, not Nabity system)
    - continuous write
    - center-to-center spacing 30 nm
    - line spacing of 30 nm
    - 500 µC/cm^2 area dose

*see screenshots below
Development

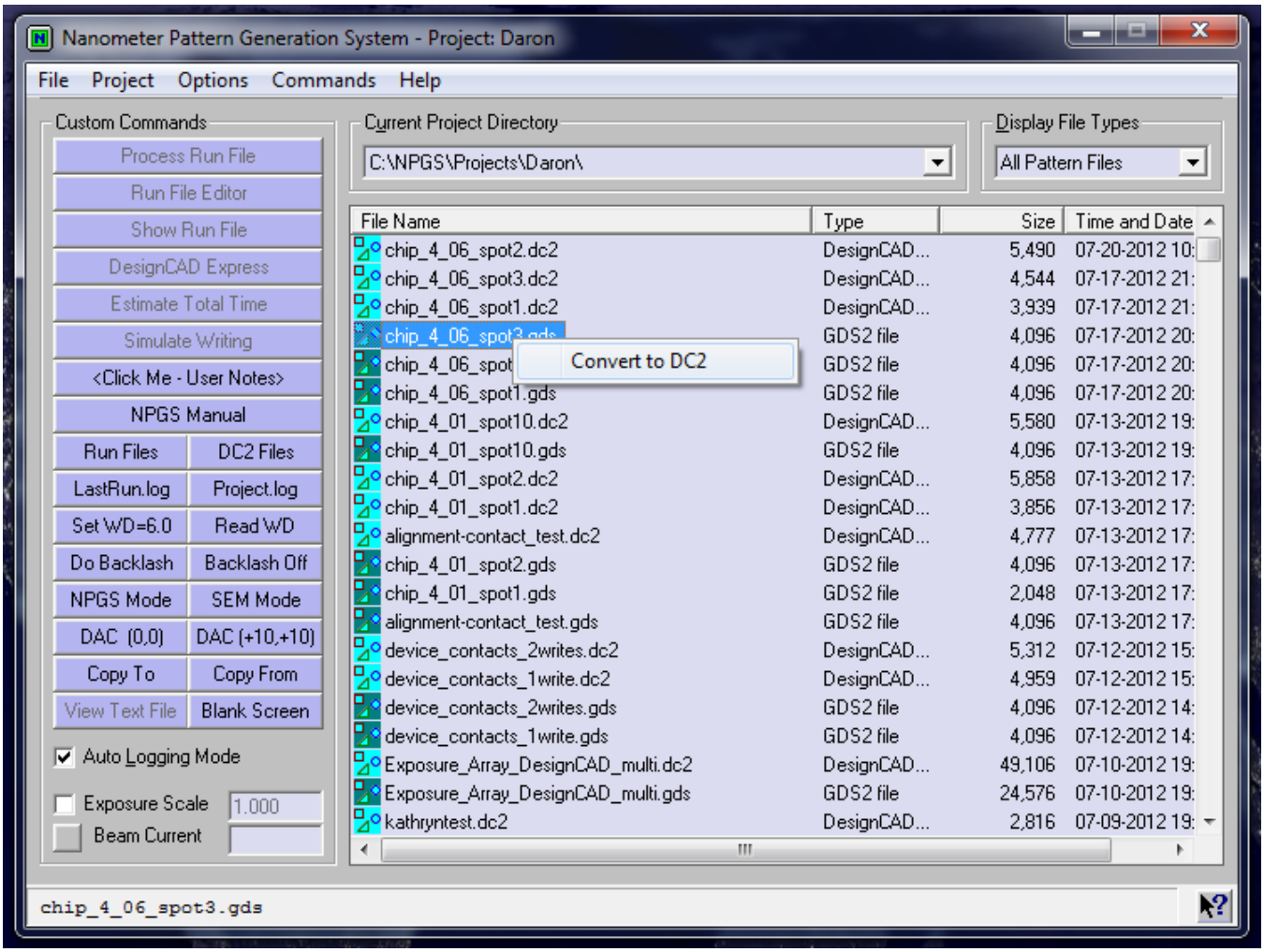
- 45 sec in 1:3 MIBK:IPA (shake chip back-and-forth in soln) & quench in IPA; N2 dry

Walk-through

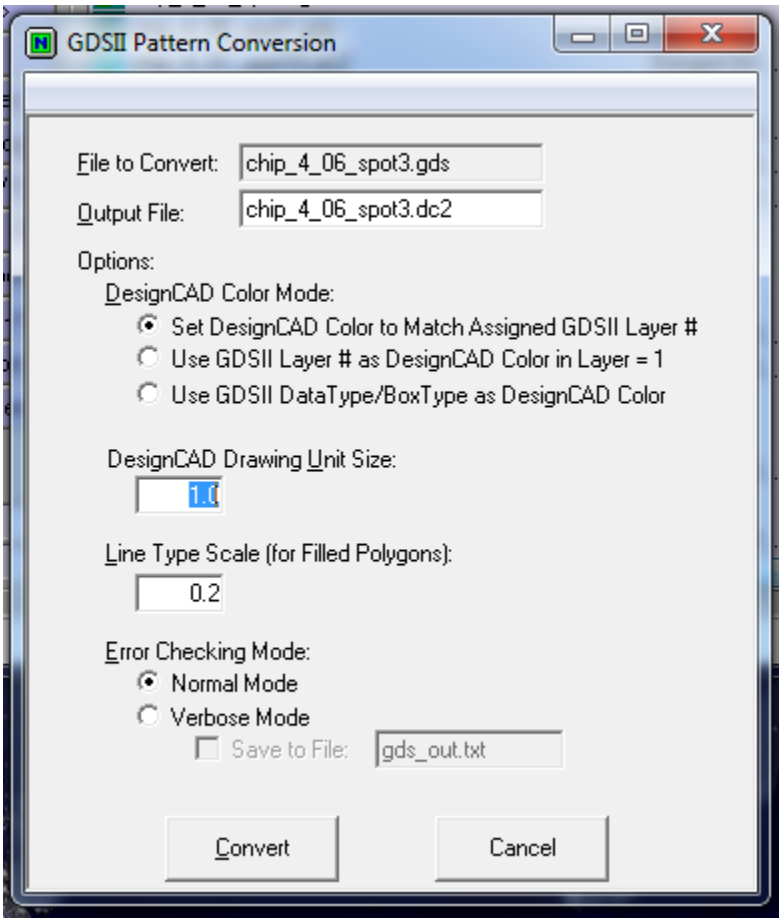
step 1 - copy gds file into this directory:



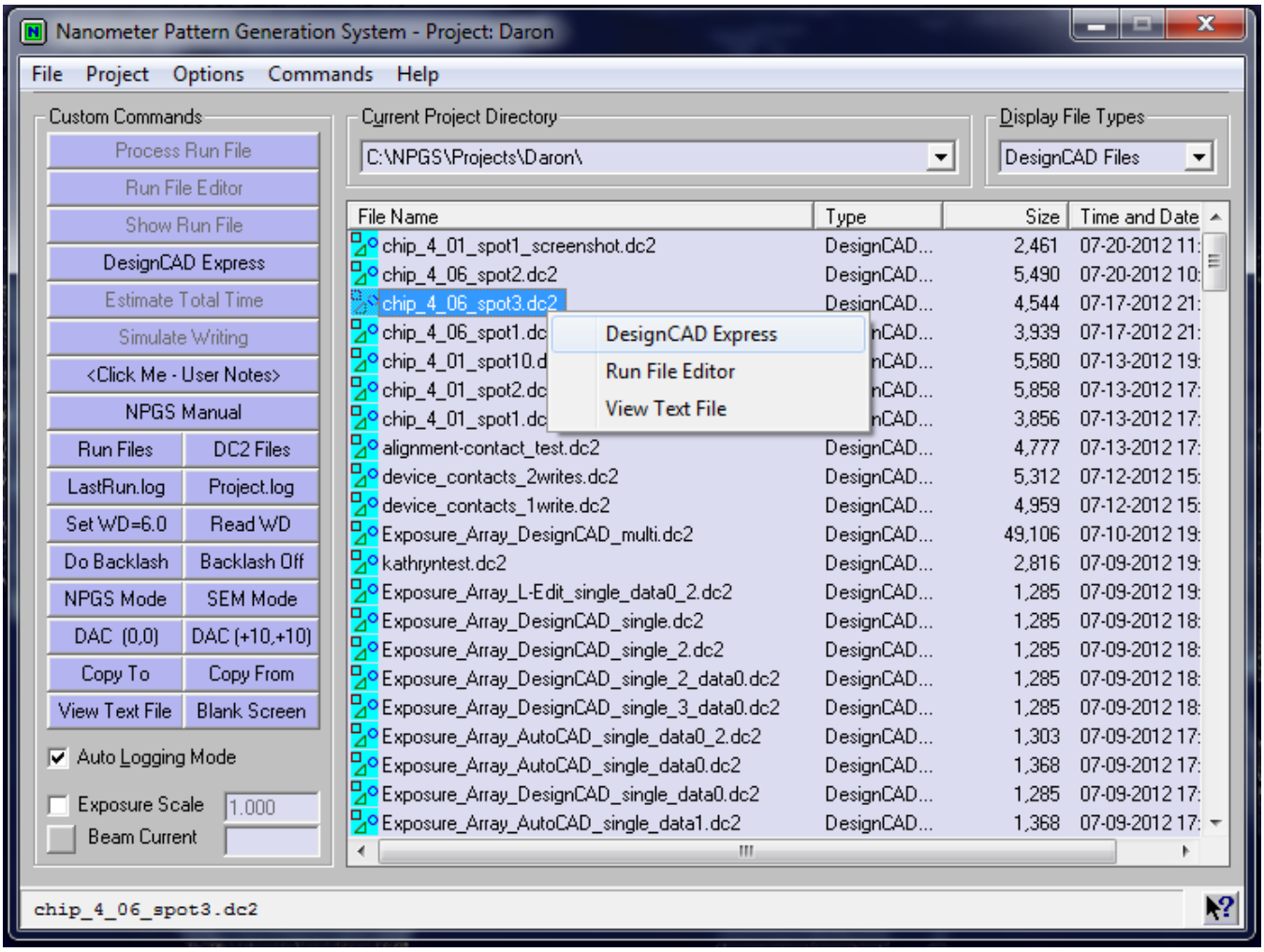
step 2 - right click to convert gds to dc2:



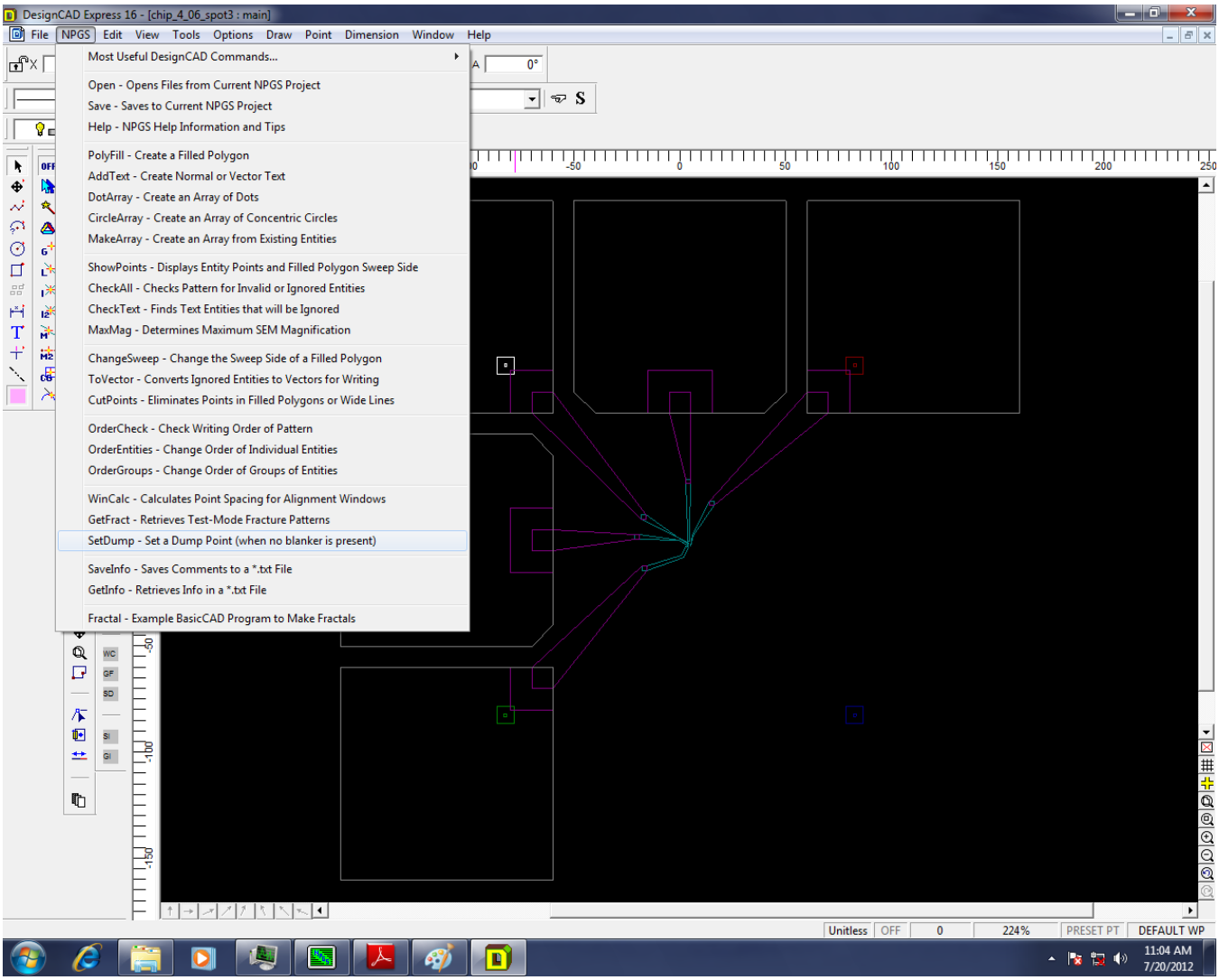
step 2.1 - change drawing unit size to 1 and press convert:



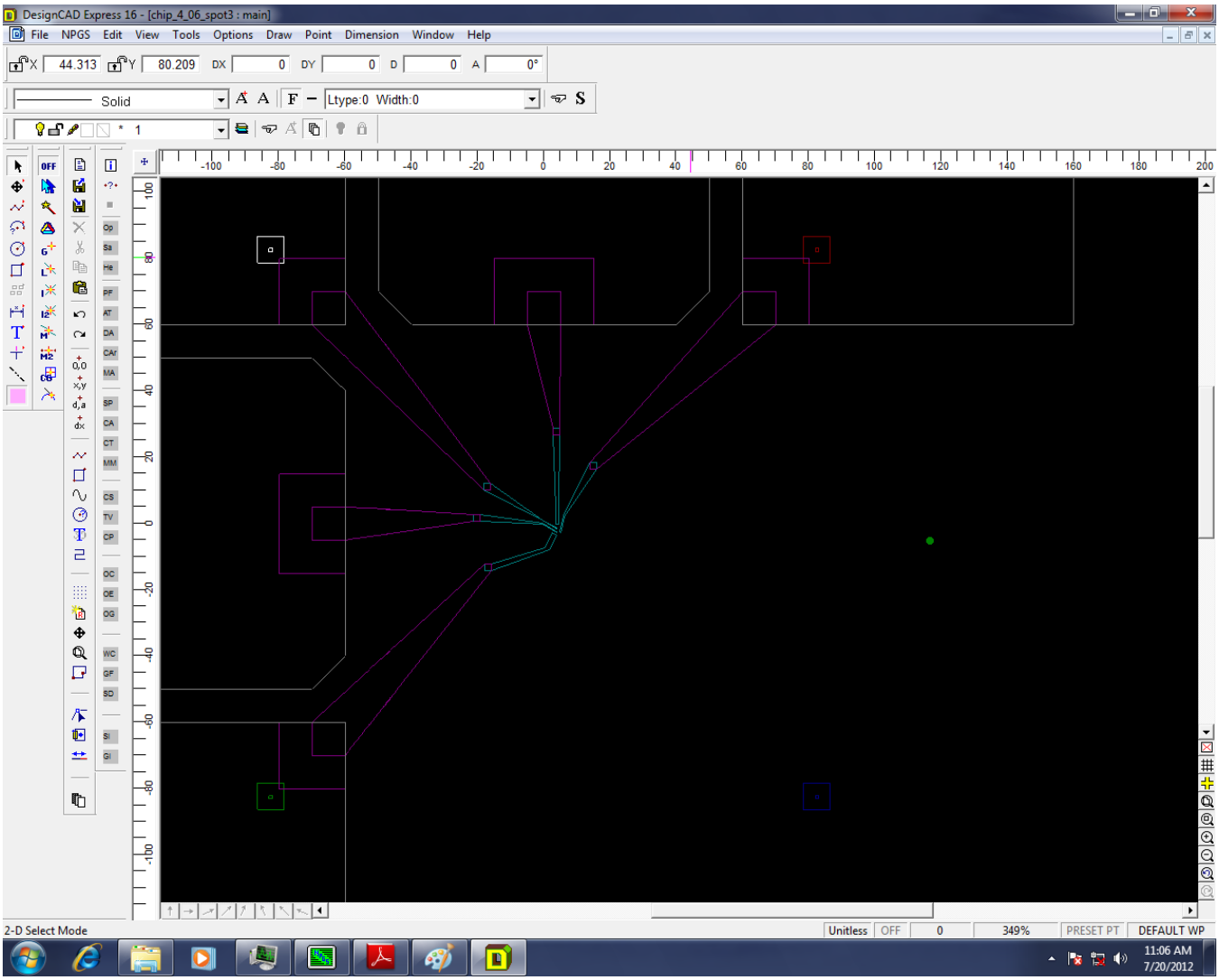
step 3 - right click on new dc2 file and select DesignCAD Express:



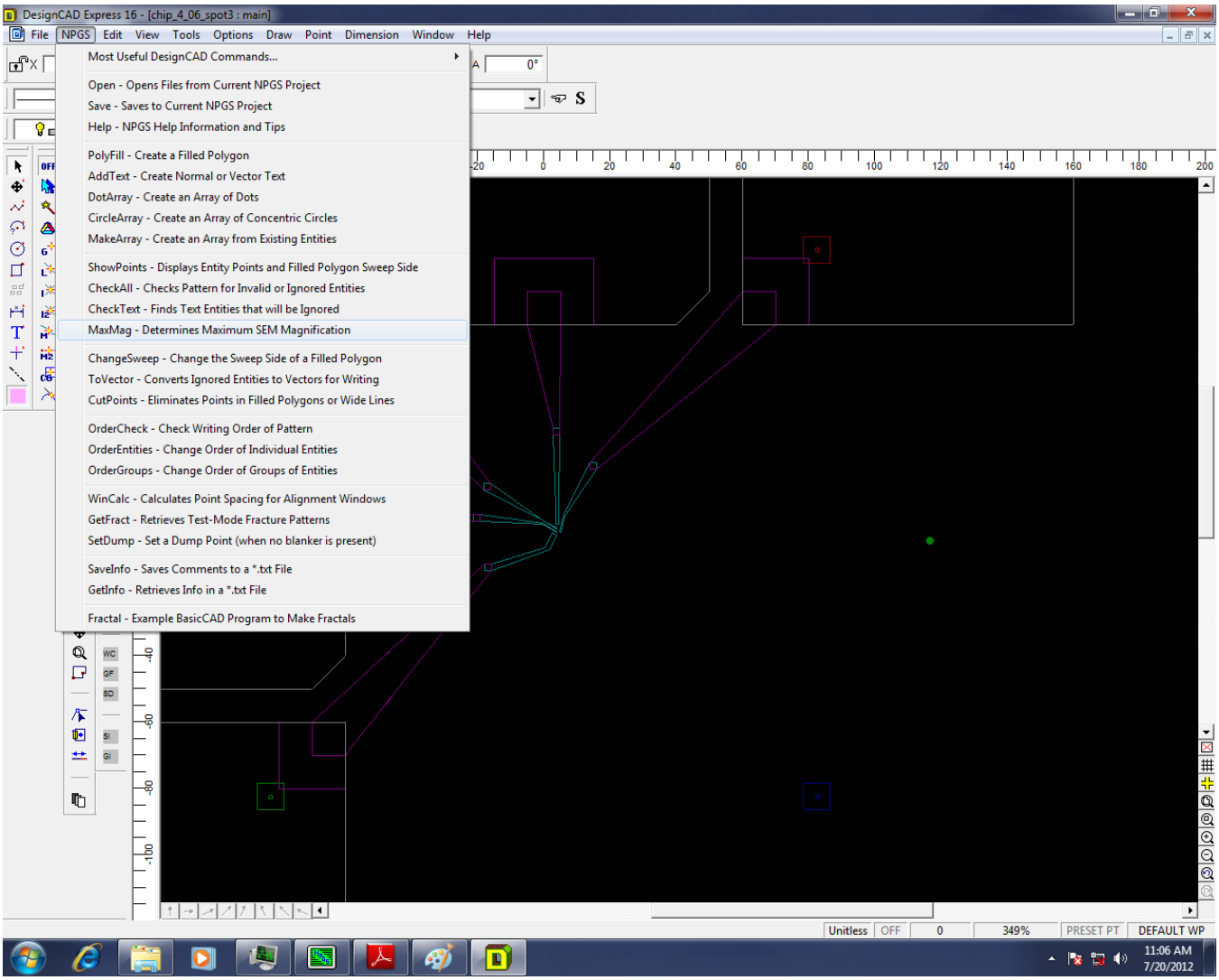
step 3.1 - click NPGS - setdump



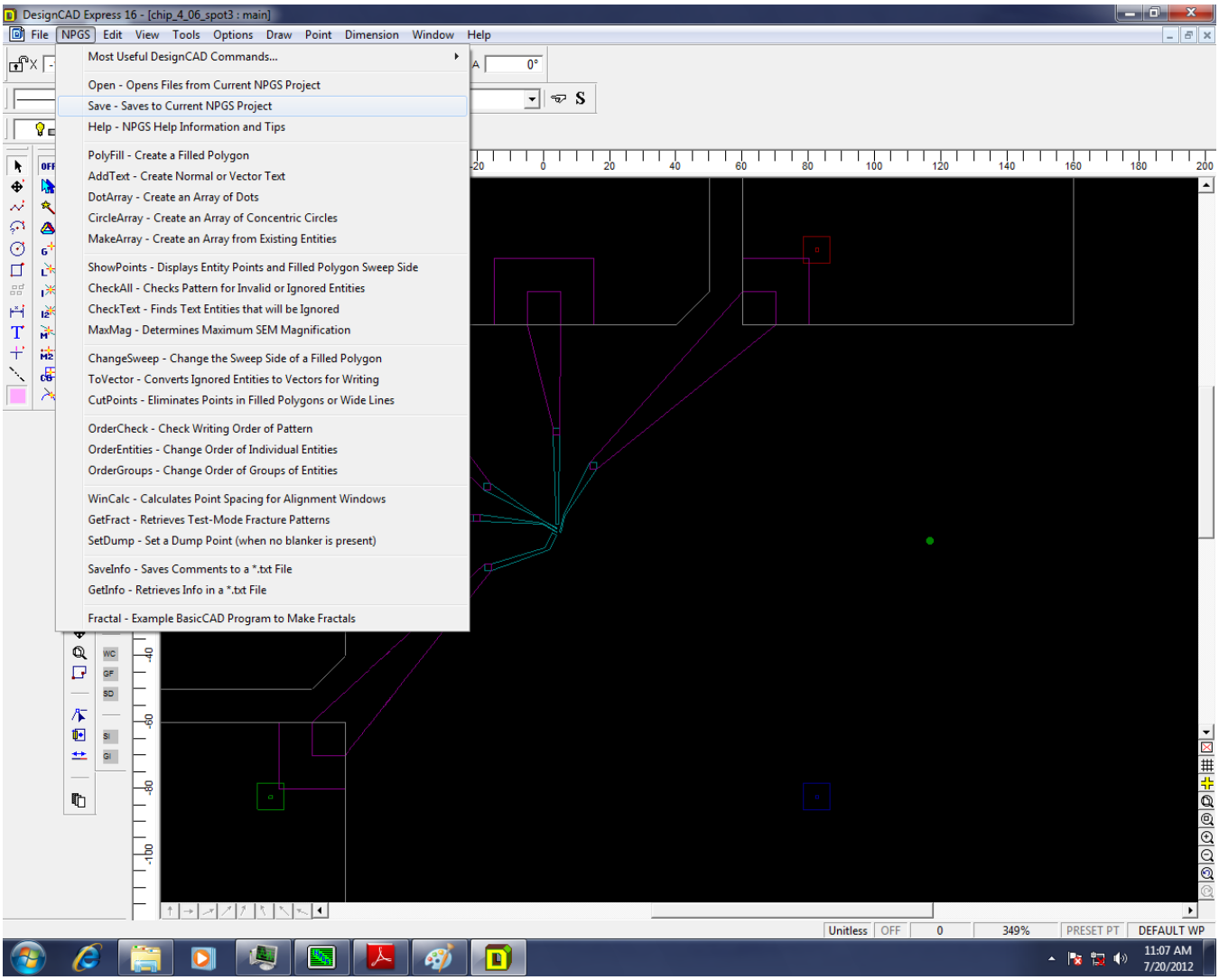
step 3.1.1 - the dump point is green:



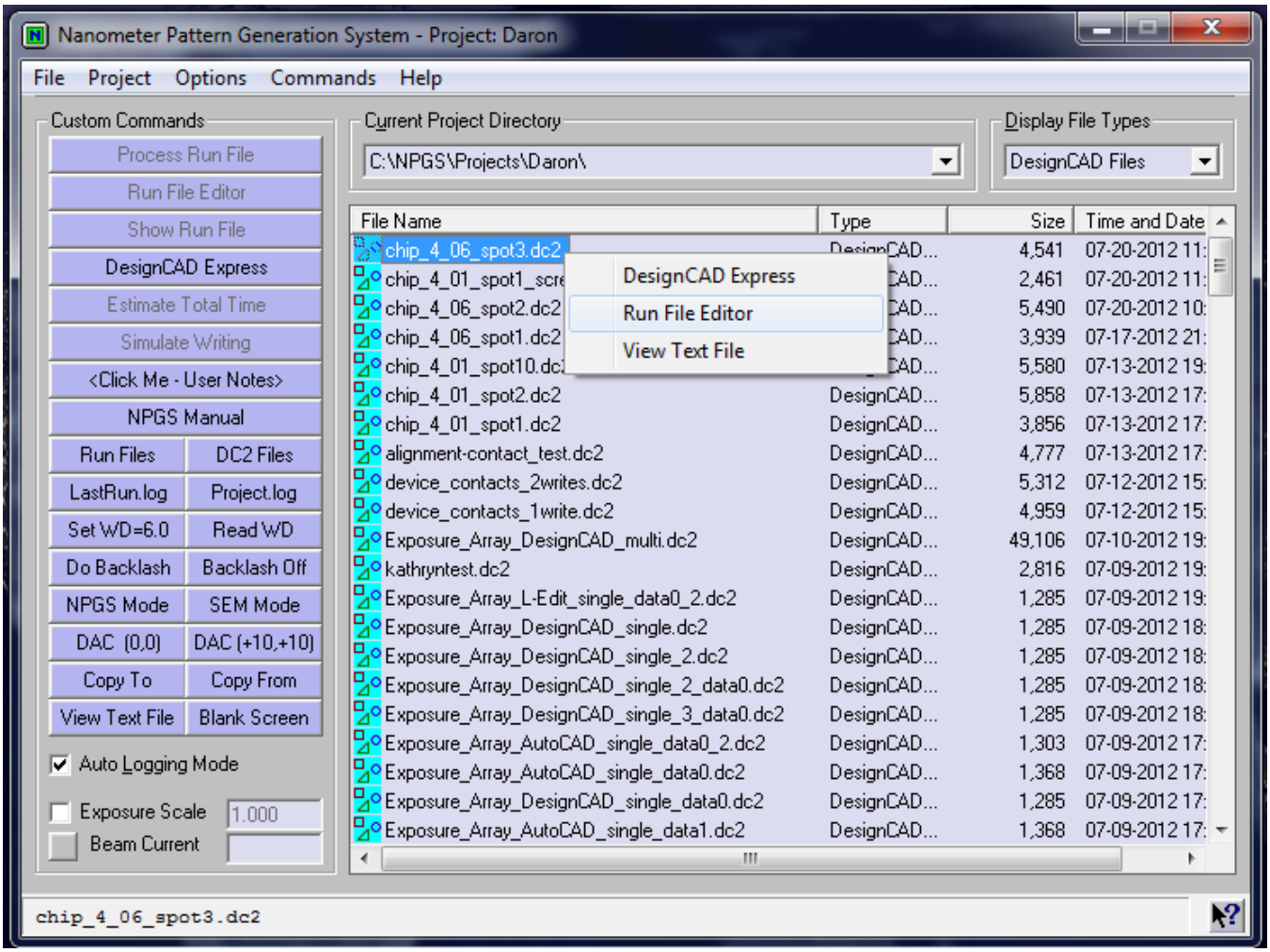
step 3.2 - click NPGS - MaxMag:



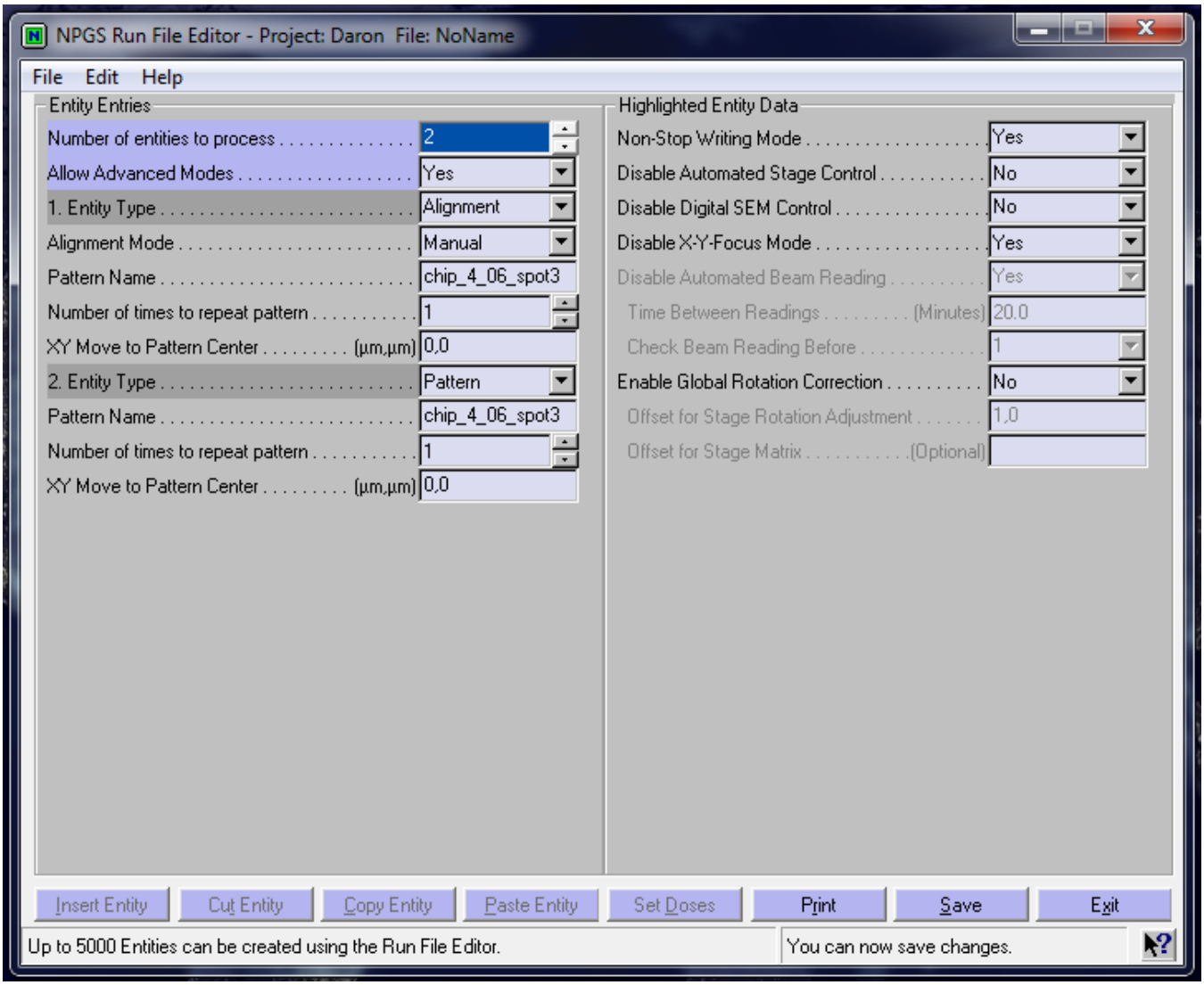
step 3.3 - click NPGS - save - exit when done - then re-open to double check dump existence:



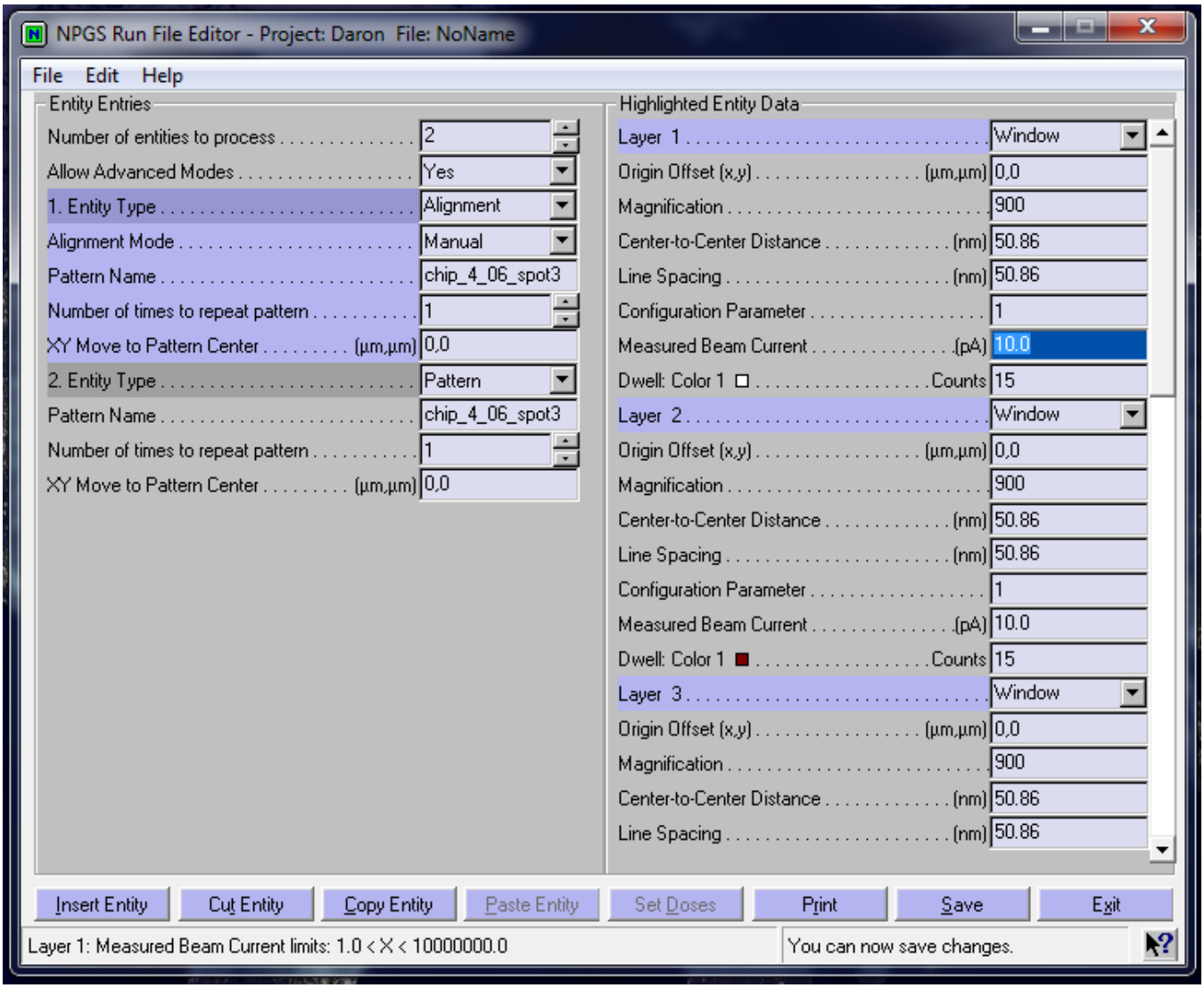
step 4 - right click on dc2 - choose run file editor:



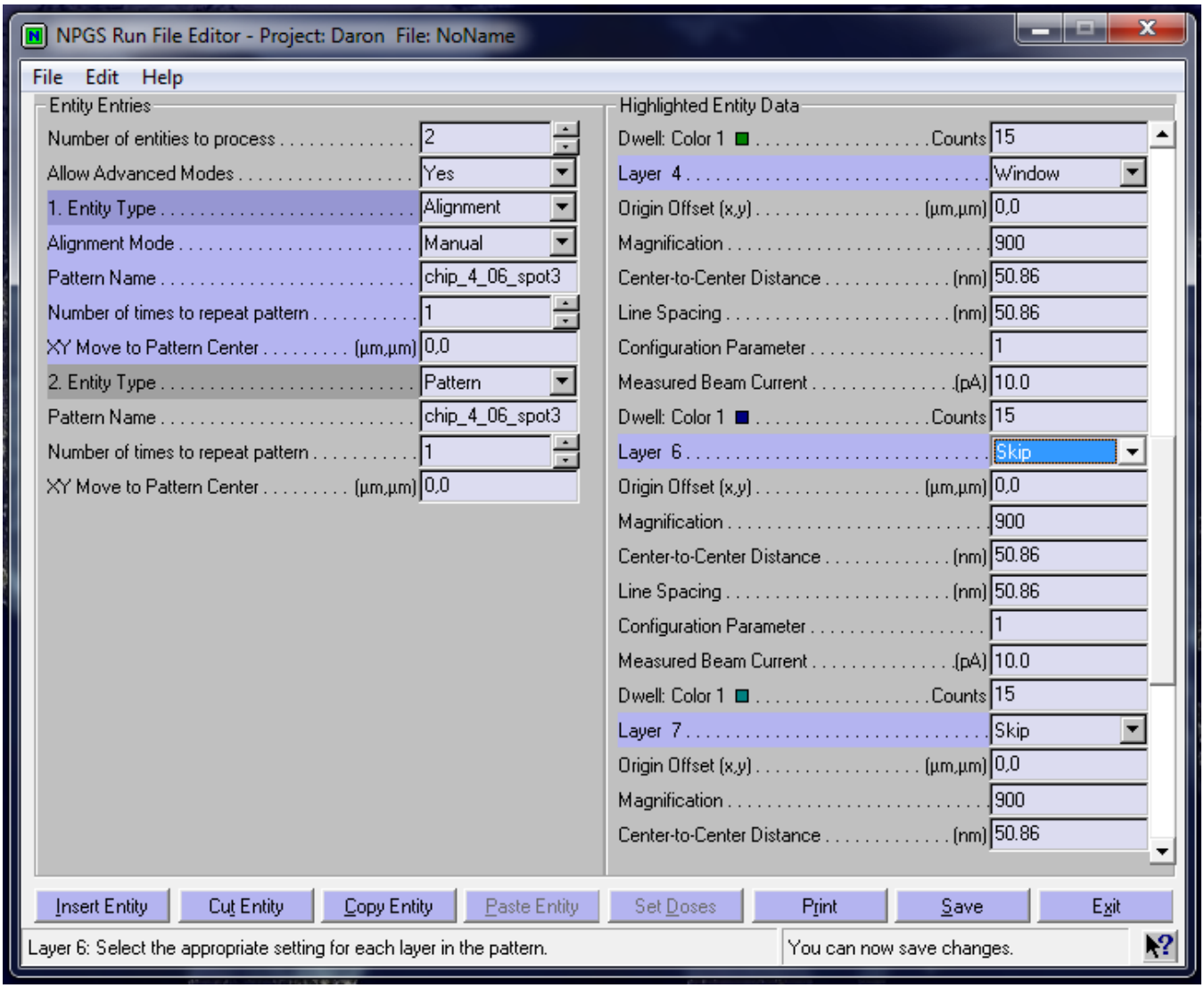
step 4.1 - for fine contacts process 2 entities - set params as shown - pattern name is name of dc2 file:



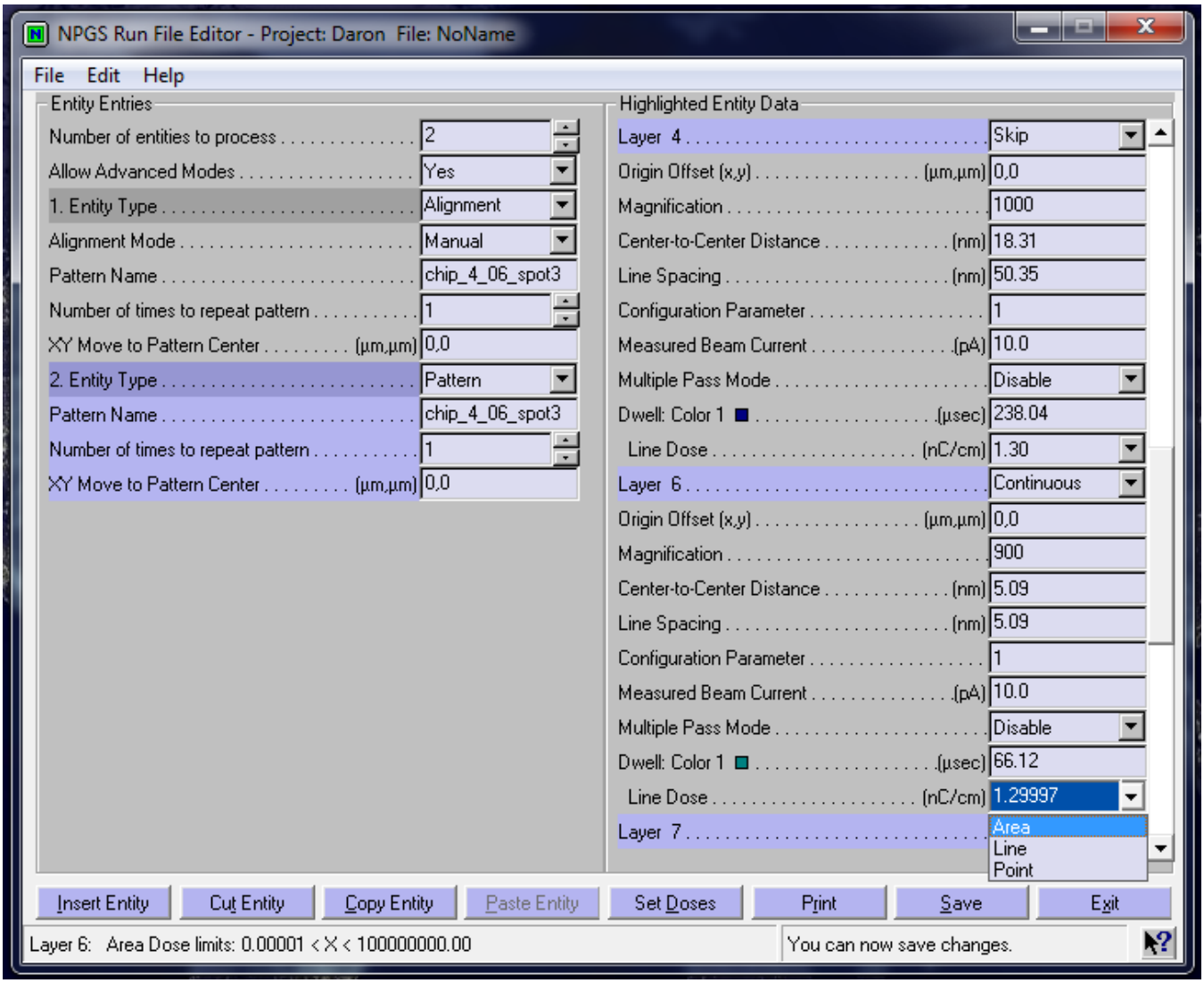
step 4.2 - 1st entity is alignment - set params as shown - insert measured beam current in pA:



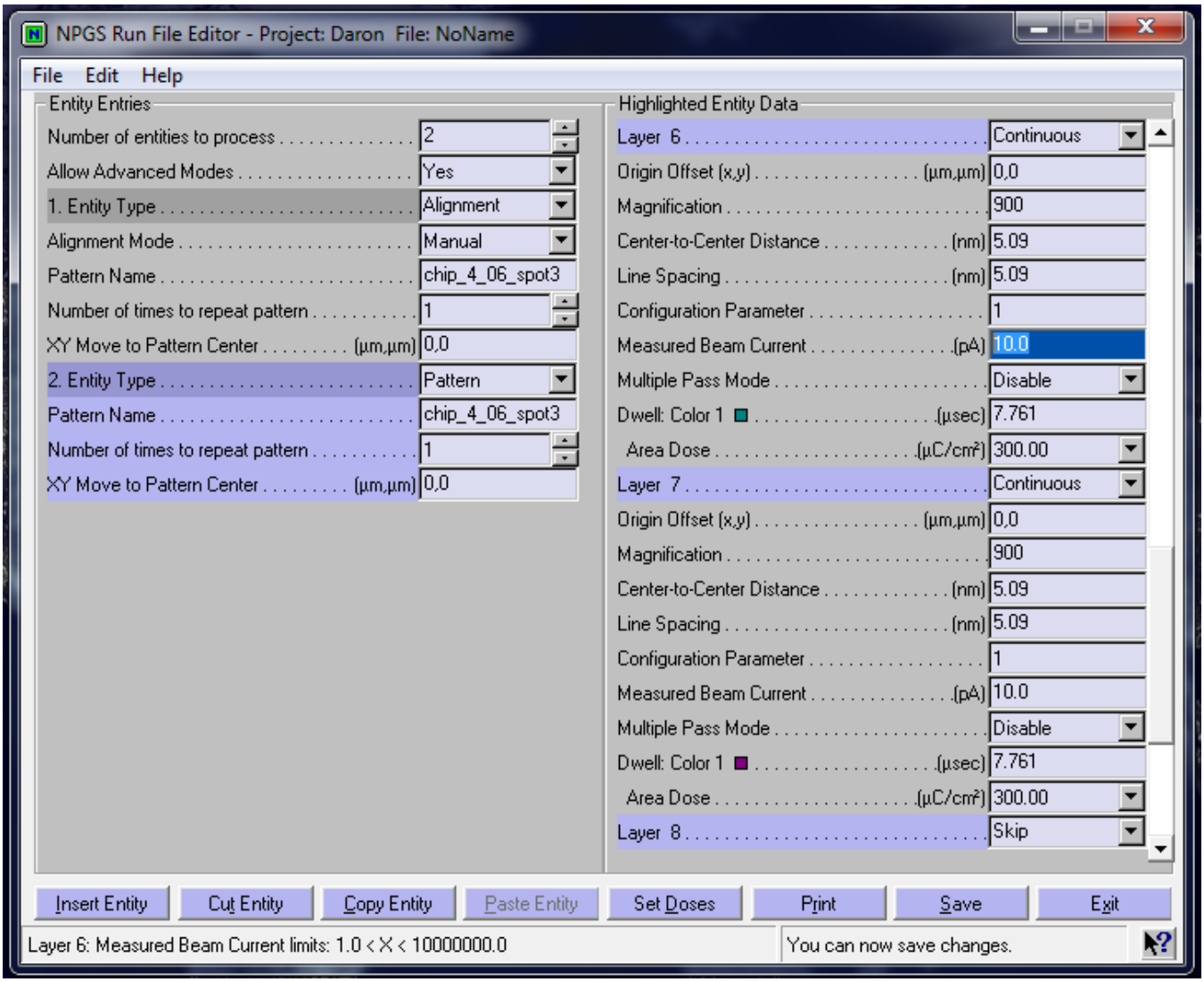
step 4.2.1 - skip all non alignment layers:



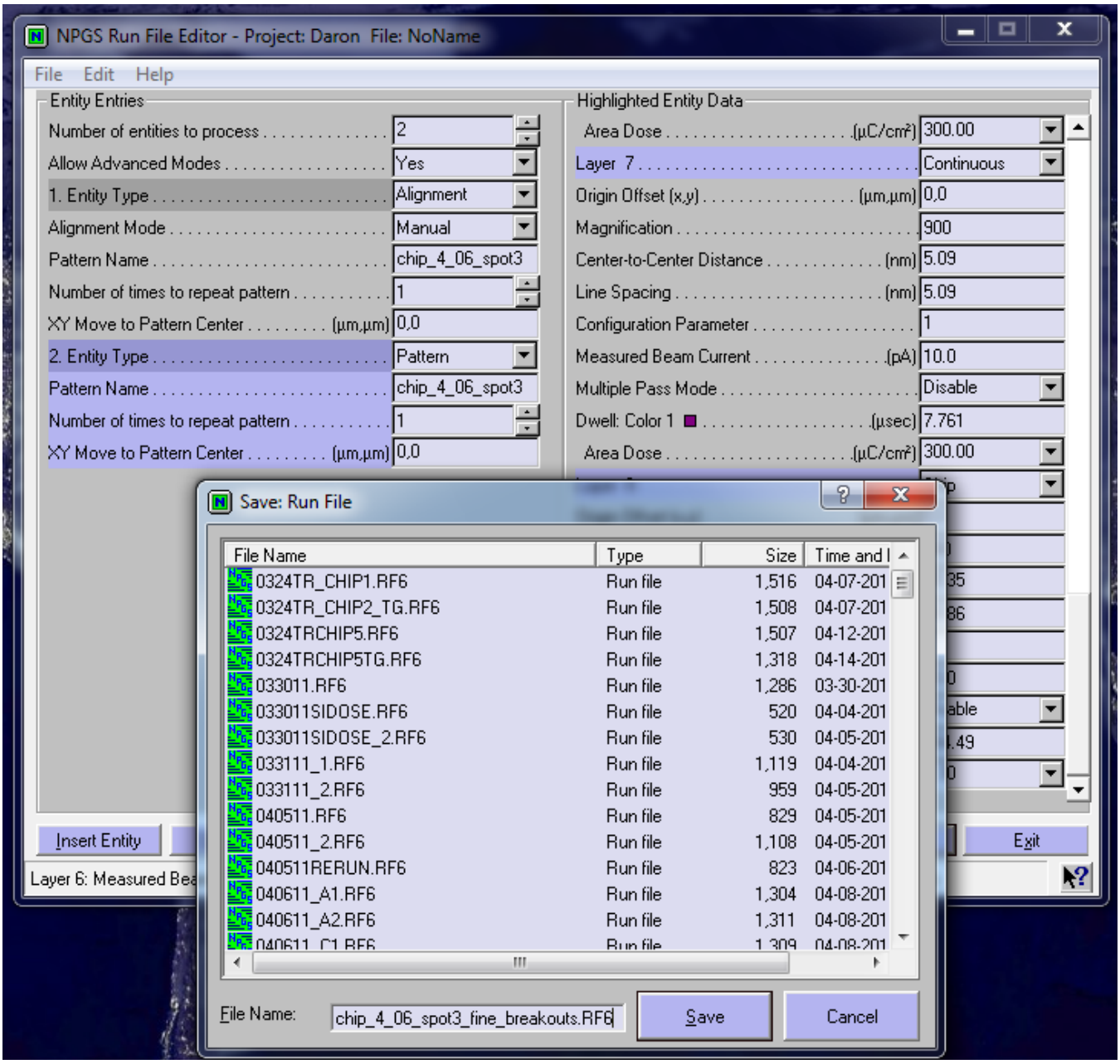
step 4.3 - 2nd entity for fine contacts - skip all alignment layers - change line to area dose:



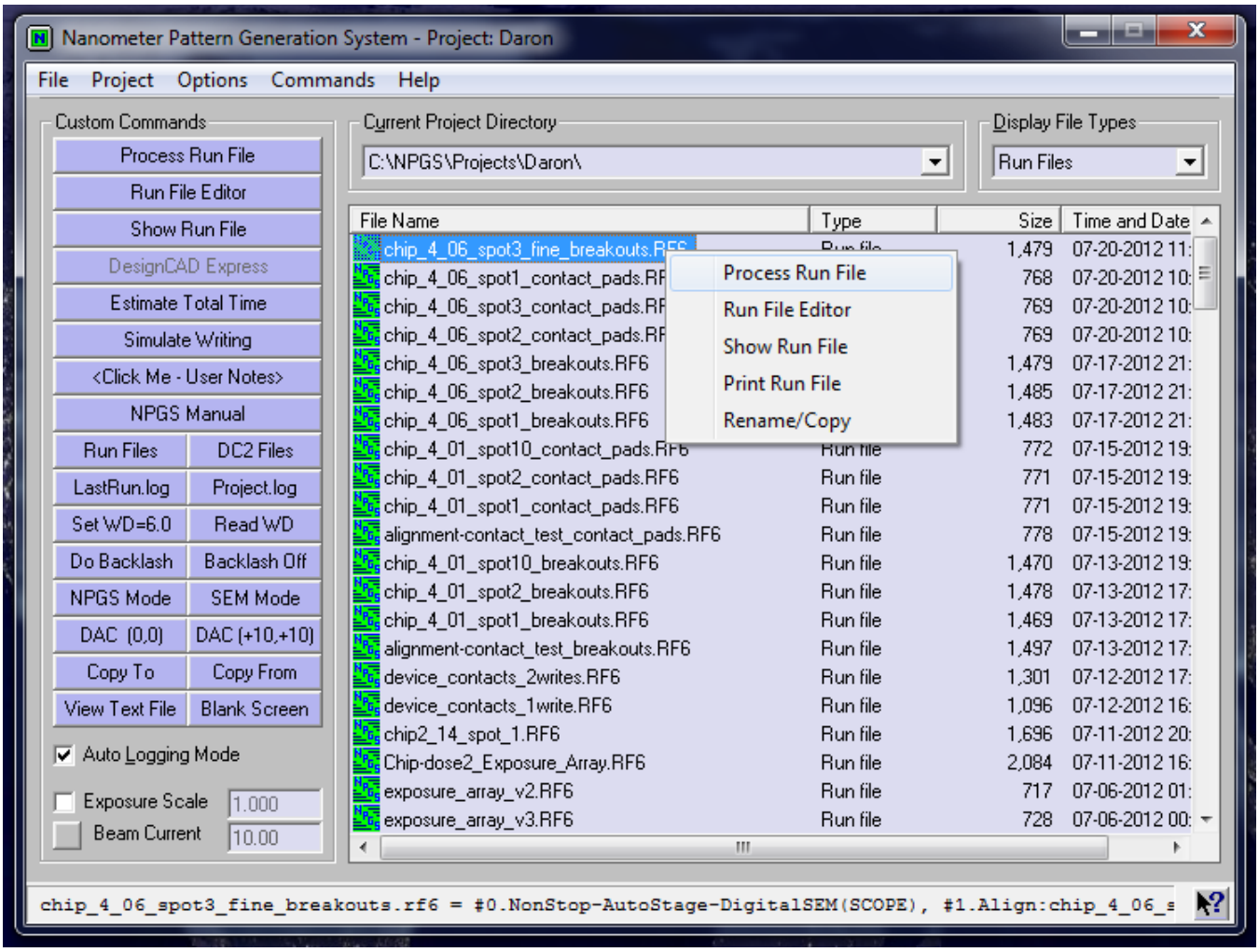
step 4.3.1 - enter params as shown - same for each layer! - skip contact pad layer - remember to update measured current



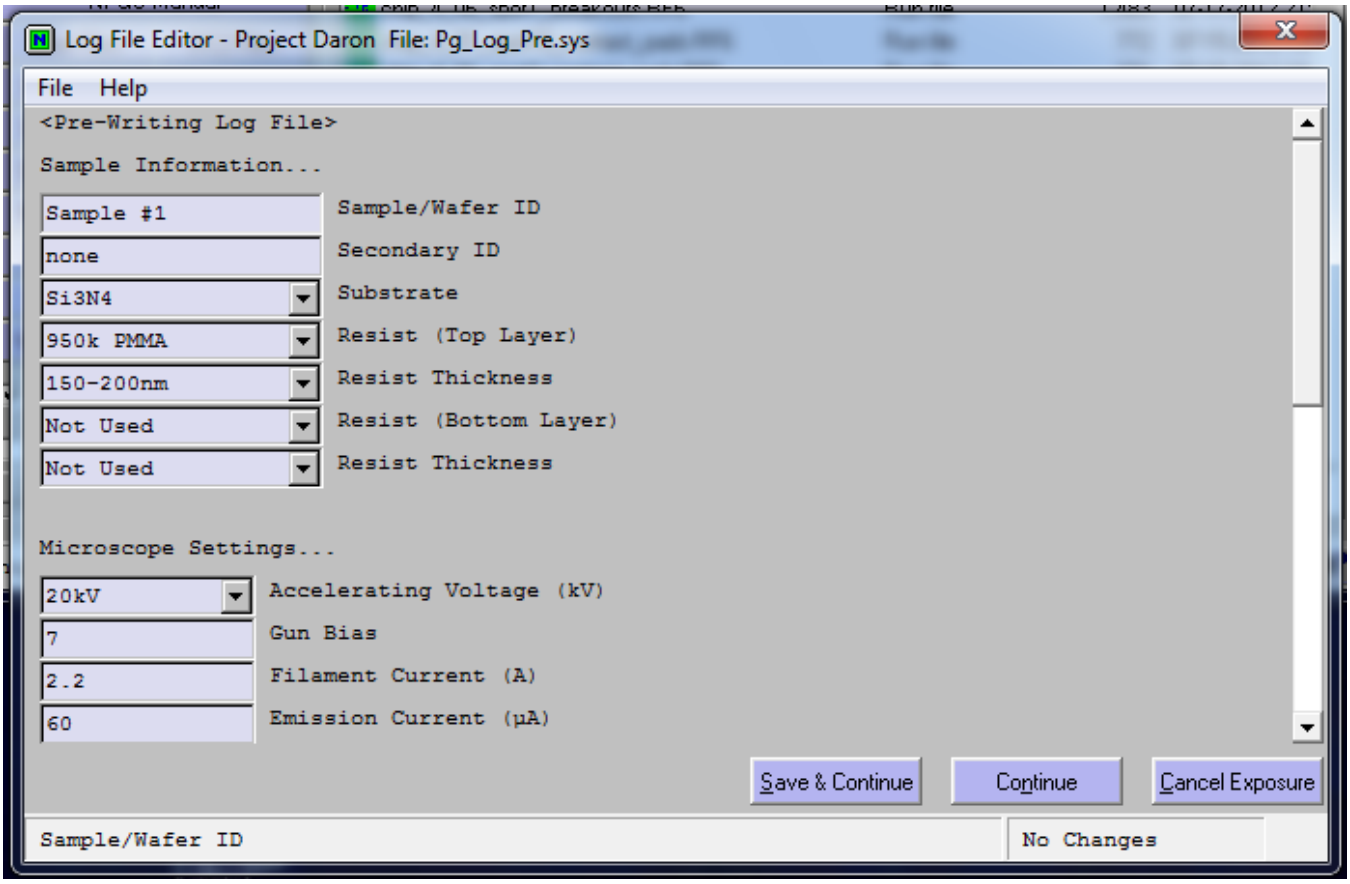
step 4.4 - save run file - extension RF6 - and exit:



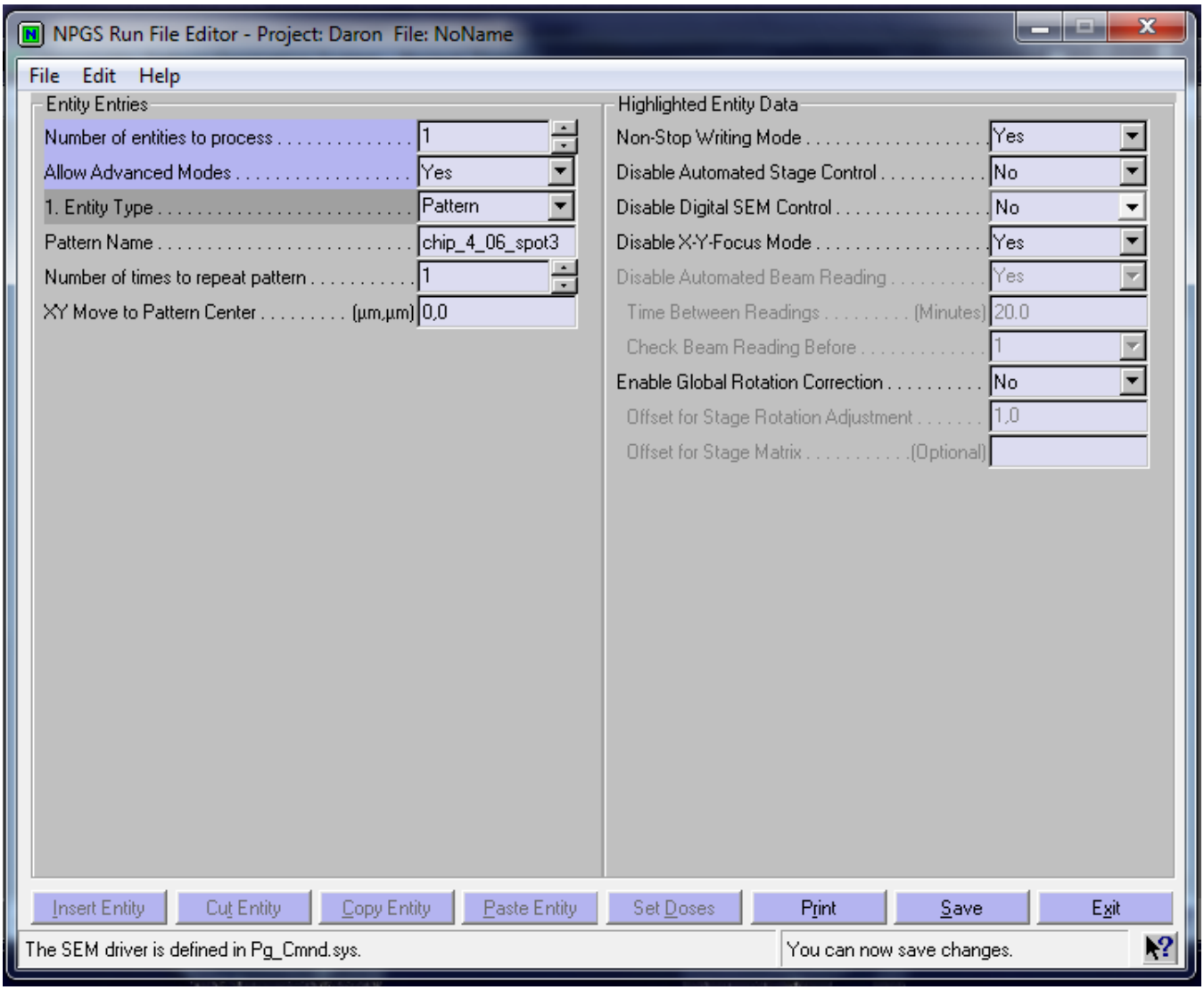
step 5 - find run file - right click - process run file:



step 5.1 - click continue - the writing will start!



step 6 - set up contact pad exposure - use these params:



step 6.1 - skip all but contact pad layer - enter params - remember to update measured current - proceed as before:

NPGS Run File Editor - Project: Daron File: NoName

File Edit Help

Entity Entries

Number of entities to process	1
Allow Advanced Modes	Yes
1. Entity Type	Pattern
Pattern Name	chip_4_06_spot3
Number of times to repeat pattern	1
XY Move to Pattern Center (µm,µm)	0,0

Highlighted Entity Data

Line Dose (nC/cm)	1.30
Layer 7	Skip
Origin Offset (x,y) (µm,µm)	0,0
Magnification	1000
Center-to-Center Distance (nm)	32.04
Line Spacing (nm)	50.35
Configuration Parameter	1
Measured Beam Current (pA)	10.0
Multiple Pass Mode	Disable
Dwell: Color 1 (µsec)	416.56
Line Dose (nC/cm)	1.30
Layer 8	Continuous
Origin Offset (x,y) (µm,µm)	0,0
Magnification	900
Center-to-Center Distance (nm)	30.52
Line Spacing (nm)	30.52
Configuration Parameter	1
Measured Beam Current (pA)	10.0
Multiple Pass Mode	Disable
Dwell: Color 1 (µsec)	465.661
Area Dose (µC/cm²)	500.00

Insert Entity | Cut Entity | Copy Entity | Paste Entity | Set Doses | Print | Save | Exit

Layer 8: Measured Beam Current limits: 1.0 < X < 10000000.0

You can now save changes.