

## **SMT Unipops Rewrite 2010**

### ***Introduction***

In conjunction with the spectral line rewrite of 2010, Unipops was modified to accommodate the new backend numbering system<sup>1</sup>. Additional modification and procedures were added to better facilitate the 250 KHz filters and AOS's.

When an observer logs in, the .login file will setup a LSETUP symbolic-link in their directory. The initial LSETUP will point to the new installation of Unipops. This new version works with the new data being taken with the new Spectral Line System. See section on Unipops for more info on this.

## **Background**

A decision was made to do away with the arcane sub-scan numbering that had grown out of the organic expansion of the old spectral line systems development<sup>2</sup>. Historically, the sub-scan numbering went something like this:

### Texas Filters:

xxxx.01	-- 62 Khz Filters
xxxx.02	-- 250 Khz Filters
xxxx.03	-- 1 MHz Filters

### AOS:

xxxx.04	-- 1 MHz AOS
xxxx.05	-- 1 MHz AOS
xxxx.06	-- 250 Khz AOS

### CTS:

xxxx.07	-- CTS - A
xxxx.08	-- None
xxxx.09	-- None

### FFB Filters:

xxxx.11	-- 1MHz Forbes Filters IF 1
xxxx.12	-- 1MHz Forbes Filters IF 2
xxxx.13	-- 1MHz Forbes Filters IF 3 (4 IF mode)
xxxx.14	-- 1MHz Forbes Filters IF 4 (4 IF mode)
xxxx.19	-- 250 KHz Forbes Filters IF 1
xxxx.20	-- 250 KHz Forbes Filters IF 2
xxxx.15	-- 250 KHz Forbes Filters IF 3 (4 IF Mode)
xxxx.16	-- 250 KHz Forbes Filters IF 4 (4 IF Mode)

What this meant was that Unipops had to have all this unique specific numbering compiled in in order to function properly. In addition, the \*.prc procedure files had a bunch of branch logic coded in that was always performing different things for different back-ends.

Clearly, a more straight forward approach was needed.

## ***New Scan Numbering<sup>1</sup>***

We plan to number scans in order of parts found in the backend. So, if there are 4 parts, then the numbering will be 0.01, 0.02, 0.03, 0.04. It is proposed to change the sub-scan numbering to be the following:

- FFB-A xxxx.01
- FFB-B xxxx.02
- FFB-C xxxx.03
- FFB-D xxxx.04
  
- FB2-A xxxx.05
- FB2-B xxxx.06
- FB2-C xxxx.07
- FB2-D xxxx.08
  
- AOS-A xxxx.01
- AOS-B xxxx.02
  
- AOS-C xxxx.05
  
- CTS-A xxxx.01

Now, the question arises that what if we are in 2-IF mode. Do we number the two scans .01, .02; or do we number them .01, .03? The later is how the 12 Meter does it. IF-A always is .01 and IF-B is always .03. If we are in 4 IF mode then it's .01, .02, .03, .04.

We contend that any analysis package should look for the backend name and not the sub-scan number.

We don't, at this time, see any problems in Unipops with just numbering them in order, .01, .02, .03, 04.

Unipops is driven by scripts so all that's needed is to edit these scripts to reflect this new numbering convention.

## ***Unipops Modifications***

Several changes were made to the Unipops binary to accommodate these changes. The following files were modified: (All files are relative to \$popsdir/)

Source code resides in: smtoast:/root/rpmbuild/SOURCES/unipops-3.6

***./source/conline/line/header.F***

***./source/conline/line/show.F***

Modified the print routines to prevent the Fortran display overflows which resulted in **\*\*\*\*\*** being displayed instead of real numbers.

***./source/conline/smt/access.c***

This was the file that had all the craziness involving sub-scan numbering. Remove all of the lunacy and cleaned up the formatting for better editing.

***./bin/Makefile***

Added -I. To the FFLAGS so *g77* would find the includes in the actual directory the compile was taking place. Added a *make install* to allow installation of newly compiled binaries in the /home/analysis/unipops.new/bin directory.

## ***Analyzing Old vs New data***

There are two new Unix scripts in the ~obs/bin directory; *setnewline* and *setoldline*. These scripts setup the environment for using Unipops for new data and old data. When logging in, *setnewline* is automatically invoked. This will be the default for all new data.

If an observer needs to look at their old data, data prior to November 2010, then they need to exit Unipops and type *setoldline* at the shell prompt. This sets up their \$PATH variable, sets the \$popsdir to the old version of Unipops and recreates the LSETUP symbolic-link in their home directory that points to the appropriate LSETUP in the \$popsdir/bin/LSETUP. The only limitation to this is that you can not have two observers, with the same initials, using Unipops at the same time. A restriction that has always been in place. But, in the case where one observer may want to look at new data while another may want to analysis old data. Can't happen. Remember, this applies only to observers using the same initials. Observers using different initials will not have any problems.

Be advised that the next time an observer logs in, the links, for their initials, will be reset to point to the new data analysis package.

Also, many of the new commands I added to handle the 250 Khz filters are not present in the old distribution. I may rectify this at a later time if there is a big demand.

## Unipops Commands

**NOTE: Every attempt was made to test out the Unipops procedures for proper functionality. It is very likely that several, procedures were missed. Please let the management know of any problems.**

All Unipops command like f, s, c1, c2 cb were modified to correctly select the proper sub-scan number. No matter if you are reducing Filter data or AOS data, the procedures are the same. Below is a quick synopsis of the commands that have been tested and or added for your convenience.

Command	Usage	Description
<b>Display Scans</b>		
f (s1)	<i>scan_number</i> f	Shows the first, 0.01, IF of scan; Works for 1 MHz filters, AOS-A,B and 50 Khz CTS. Aliased to S1
s (s2)	<i>scan_number</i> s	Shows the second, 0.02, IF of scan; Works for 1 MHz filters and AOS-A, <b>B</b> . Aliased to S2
c (s3)	<i>scan_number</i> c	Shows the third, 0.03, IF of scan; Works for 1 MHz filters in 4 IF Mode. Aliased to S3
d (s4)	<i>scan_number</i> d	Shows the fourth, 0.04, IF of scan; Works for 1 MHz filters in 4 IF Mode. Aliased to S4
q1	<i>scan_number</i> q1	Shows the fifth, 0.05, IF of scan; Works for the 250 KHZ filters and AOS-C
q2	<i>scan_number</i> q2	Shows the sixth, 0.06, IF of scan; Works for the 250 KHZ filters.
q3	<i>scan_number</i> q3	Shows the seventh, 0.07, IF of scan; Works for the 250 KHZ filters. (In 4 IF Mode)
q4	<i>scan_number</i> q4	Shows the eighth, 0.08, IF of scan; Works for the 250 KHZ filters. (In 4 IF Mode)
<b>Display Gains</b>		
g	xxxx.xx g	Show the specific gains for <i>scan_number</i> xxxx.xx If no fractional part is supplied, then the first one will be displayed. (xxxx.01)
g1	g1	Shows the latest 1MHz Filters or AOS-A, IF 1, gains
g2	g2	Shows the latest 1MHz Filters or AOS-B, IF 2, gains
g3	g3	Shows the latest 1MHz Filters, IF 3, gains
g4	g4	Shows the latest 1MHz Filters, IF 4, gains
g5	g5	Shows the latest 250KHz Filters or AOS-C, IF 1, gains
g6	g6	Shows the latest 250KHz Filters, IF 2, gains
g7	g7	Shows the latest 250KHz Filters, IF 3, gains (4 IF Mode)
g8	g8	Shows the latest 250KHz Filters, IF 4, gains (4 IF Mode)

<b>Stack Ops</b>		
c1	c1	Stacks the 0.01 IF Scans
c2	c2	Stacks the 0.02 IF Scans
c3	c3	Stacks the 0.03 IF Scans
c4	c4	Stacks the 0.04 IF Scans
cq1	cq1	Stacks the 0.05 IF Scans
cq2	cq2	Stacks the 0.06 IF Scans
cq3	cq3	Stacks the 0.07 IF Scans
cq4	cq4	Stacks the 0.08 IF Scans
cb	cb	Stacks the 0.01 and 0.02 IF Scans.
cb2	cb2	Stacks the 0.03 and 0.04 IF Scans.
cqb	cqb	Stacks the 0.05 and 0.06 -- 250 Khz Filters IF's. <i>ncb</i> below will do the same if given 5 6 as arguments.
cqb2	cqb2	Stacks the 0.07 and 0.08 -- 250 Khz Filters IF's. <i>ncb</i> below will do the same if given 7 8 as arguments.
ncb	x y ncb or ncb(x,y)	Stacks x/100 with y/100 IF Scans. Allows the combining of arbitrary IF's. Assuming they are the same resolutions.

## **Notes**

1. See *scan\_numbering.pdf* in the `~cactus/spectral/doc` directory.
2. See *sub\_scan\_numbering.as.ps* in the `~cactus/doc/` directory for details on the old numbering system.