

# INPUT DATA STRUCTURES

## LAG FRAME STORE

### SEGMENT LIST

| Segment Number | Frame Count Flag |
|----------------|------------------|
| 1              | 0                |
| 2              | 119              |
| 3              | 1000             |
| 4              | 1000             |
| 5              | 1000             |
| 6              | -1000            |
| 7              | -1               |
| 8              | 0                |
| 9              | 0                |
| 10             | 0                |

|                  | Frame Index | LTA Frame Data       |
|------------------|-------------|----------------------|
| Segment 1        | 1           |                      |
|                  | 2           |                      |
|                  | ·           | ·                    |
|                  | 1000        |                      |
| Segment 2        | 1001        |                      |
|                  | 1002        |                      |
|                  | ·           | ·                    |
|                  | 2000        |                      |
| Segment 3        | 2001        |                      |
|                  | 2002        |                      |
|                  | ·           | ·                    |
|                  | ·           | ·                    |
|                  | 2999        | Lag Set N, Frame 0   |
|                  | 3000        | Lag Set N+1, Frame 0 |
| Segment 4        | 3001        | Lag Set N, Frame 2   |
|                  | 3002        | Lag Set N, Frame 1   |
|                  | 3003        | Lag Set N+1, Frame 3 |
|                  | 3004        | Lag Set N+1, Frame 1 |
|                  | ·           | ·                    |
|                  | ·           | ·                    |
|                  | 3017        | Lag Set N, Frame 7   |
|                  | 3018        | Lag Set N+3, Frame 0 |
|                  | 3019        | Lag Set N, Frame 6   |
|                  | 3020        | Lag Set N+3, Frame 1 |
|                  | ·           | ·                    |
|                  | 4000        |                      |
| Segments 5 to 10 | 4001        |                      |
|                  | ·           | ·                    |
|                  | ·           | ·                    |
|                  | 10000       |                      |

# SEGMENT LIST

| Segment<br>Number | Frame<br>Count<br>Flag |                         |
|-------------------|------------------------|-------------------------|
| 1                 | 0                      | Available for Input     |
| 2                 | 119                    | DP in progress          |
| 3                 | 1000                   | Sorted and ready for DP |
| 4                 | 1000                   | Sorted and ready for DP |
| 5                 | 1000                   | Sorted and ready for DP |
| 6                 | -1000                  | Sort in progress        |
| 7                 | -1                     | Input in progress       |
| 8                 | 0                      | Available for Input     |
| 9                 | 0                      | Available for Input     |
| 10                | 0                      | Available for Input     |

Segment List Frame Count Flag Values:

0 = Available for input  
 -1 = Locked for input  
 -Max = Input completed, available for Sort  
 +Max = Sort completed, available for DP  
 >0 and < Max = DP in progress  
 > -MAX and < -1 = Partial input

MAX = Number of frames per Lag Frame Store segment

Total Lag Frame Store size on the order of 100s of Mbytes

# LAG SET TABLE (LST) DATA STRUCTURE

| Backend<br>Integration<br>Interval<br>Bin | Correlator<br>Dump (Time<br>Stamp)<br>Bin | (Local)<br>Baseline<br>Bin | Polarization<br>Product<br>Bin | Subband<br>Bin |
|-------------------------------------------|-------------------------------------------|----------------------------|--------------------------------|----------------|
| 0                                         | 0                                         | 0                          | 0                              | 0              |
| 1                                         | 1                                         | 1                          | 1                              | 1              |
| 2                                         | 2                                         | 2                          | 2                              | 2              |
| ⋮                                         | ⋮                                         | 3                          | ⋮                              | ⋮              |
| ⋮                                         | ⋮                                         | 4                          | ⋮                              | ⋮              |
| 67                                        | 17                                        | 5                          | 9                              | 11             |
| ⋮                                         | ⋮                                         | 6                          | ⋮                              | ⋮              |
| ⋮                                         | ⋮                                         | 7                          | ⋮                              | ⋮              |
| 149                                       | 63                                        | 8                          | 15                             | 15             |

The total observation interval in this example is 16 minutes.

The Integration Interval is the Backend integration time, 6.4 seconds in this example or 150 Backend Integration bins.

The Time Stamp Interval is the Correlator dump rate, 0.1 seconds in this example or 64 Correlator Dump bins.

The baseline bin number is local to a given processor, 9 baselines per processor are used in this example.

There can be from 1 to 16 polarization products, 16 are used in this example.

There can be from 1 to 16 subbands, 16 are used in this example.

# GLOBAL BASELINE NUMBER LOOKUP TABLE

|       |    | 0   | 1   | 2   | 3  | SID_X | 24  | 25  | 26   |
|-------|----|-----|-----|-----|----|-------|-----|-----|------|
| SID_Y | 0  | 351 | 0   | 1   | 2  |       | 23  | 24  | 25   |
|       | 1  | 0   | 352 | 26  | 27 |       | 48  | 49  | 50   |
|       | 2  | 1   | 26  | 353 | 51 |       | 72  | 73  | 2743 |
|       |    |     |     |     |    |       |     |     |      |
|       | 24 | 23  | 48  | 72  | 95 |       | 375 | 348 | 349  |
|       | 25 | 24  | 49  | 73  | 96 |       | 348 | 376 | 350  |
|       | 26 | 25  | 59  | 74  | 97 |       | 349 | 350 | 377  |

# POLARIZATION PRODUCT NUMBER LOOKUP TABLE

|        | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | BBID_X |
|--------|----|----|----|----|----|----|----|----|--------|
| 0      | 0  | 1  | -1 |    |    |    |    |    | →      |
| 1      | 2  | 3  | -1 |    |    |    |    |    | →      |
| 2      | -1 | -1 | 4  | 5  | -1 |    |    |    | →      |
| 3      |    |    | 6  | 7  | -1 |    |    |    | →      |
| 4      |    |    | -1 | -1 | 8  | 9  | -1 | -1 |        |
| 5      |    |    |    |    | 10 | 11 | -1 | -1 |        |
| 6      |    |    |    |    | -1 | -1 | 12 | 13 |        |
| 7      |    |    |    |    | -1 | -1 | 14 | 15 |        |
| BBID_Y | ↓  | ↓  | ↓  | ↓  |    |    |    |    |        |

All 16 possible products are active

# POLARIZATION PRODUCT NUMBER LOOKUP TABLE

|        | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | BBID_X |
|--------|----|----|----|----|----|----|----|----|--------|
| 0      | 0  | -1 |    |    |    |    |    |    | →      |
| 1      | -1 | 1  | -1 |    |    |    |    |    | →      |
| 2      |    | -1 | 2  | -1 |    |    |    |    | →      |
| 3      |    |    | -1 | 3  | -1 |    |    |    | →      |
| 4      |    |    |    | -1 | 4  | -1 |    |    | →      |
| 5      |    |    |    |    | -1 | 5  | -1 | -1 |        |
| 6      |    |    |    |    |    | -1 | 6  | -1 |        |
| 7      |    |    |    |    |    | -1 | -1 | 7  |        |
| BBID_Y | ↓  | ↓  | ↓  | ↓  | ↓  |    |    |    |        |

Only RR and LL products are active

# LAG SET TABLE ENTRIES

( 8 lag frames X 128 lags per frame = 1024 lags per lag set )

| First Time Stamp | Last Time Stamp | Integration Interval Bin | Time Stamp Bin | Baseline Bin | Polarization Product Bin | Subband Bin | Frame Count | Skip Count | LFS Frame Index | FFT Flag | Integration Flag | Output Flag | Reserved for Future Use |  |  |
|------------------|-----------------|--------------------------|----------------|--------------|--------------------------|-------------|-------------|------------|-----------------|----------|------------------|-------------|-------------------------|--|--|
|                  |                 |                          |                |              |                          |             |             |            |                 |          |                  |             |                         |  |  |
|                  |                 |                          |                |              |                          |             |             |            |                 |          |                  |             |                         |  |  |
| .                | .               | .                        | .              | .            | .                        | .           | .           | .          | .               | .        | .                | .           |                         |  |  |
| 403.7            | 403.7           | 67                       | 17             | 5            | 9                        | 3           | 8           | 0          | i               | 0        | 0                | 0           |                         |  |  |
| 403.7            | 403.7           | 67                       | 17             | 5            | 9                        | 4           | 8           | 0          | i + 1024        | 0        | 0                | 0           |                         |  |  |
| 403.7            | 403.7           | 67                       | 17             | 5            | 9                        | 5           | 4           | 0          | i + 2048        | 0        | 0                | 0           |                         |  |  |
| 403.7            | 403.7           | 67                       | 17             | 5            | 9                        | 6           | 2           | 0          | i + 3072        | 0        | 0                | 0           |                         |  |  |
| .                | .               | .                        | .              | .            | .                        | .           | .           | .          | .               | .        | .                | .           |                         |  |  |

Note: Time stamps are shown in seconds from the beginning of the observation for presentation purposes. In practice they will be expressed in Correlator clock tics or the equivalent.

# LAG SET STORE (LSS) DATA STRUCTURE

| Integration Interval Bin |  | Subband Bin | Complex Lags / Complex Spectral Points |       |            |
|--------------------------|--|-------------|----------------------------------------|-------|------------|
| 0                        |  | 0           | 0 - 127                                | . . . | 896 - 1023 |
| 1                        |  | 1           | 0 - 127                                | . . . | 896 - 1023 |
| 2                        |  | 2           | 0 - 127                                | . . . | 896 - 1023 |
| .                        |  | .           |                                        | .     |            |
| .                        |  | .           |                                        | .     |            |
| .                        |  | .           |                                        | .     |            |
| 67                       |  | 11          | 0 - 127                                | . . . | 896 - 1023 |
| .                        |  | .           |                                        | .     |            |
| .                        |  | .           |                                        | .     |            |
| .                        |  | .           |                                        | .     |            |
| 149                      |  | 15          | 0 - 127                                | . . . | 896 - 1023 |

The total observation interval in this example is 16 minutes.

The Integration Interval is the Backend integration time, 6.4 seconds in this example or 150 Backend Integration bins.

The Time Stamp Interval is the Correlator dump rate, 0.1 seconds in this example or 64 Correlator Dump bins.

The baseline bin number is local to a given processor, 9 baselines per processor are used in this example.

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There can be from 1 to 16 subbands, 16 are used in this example.

# INPUT LAG FRAME TO LAG SET STORE MAPPING

| Subband<br>Bin | 0    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | Lag Frame<br>Number in<br>Lag Set |
|----------------|------|------|------|------|------|------|------|------|-----------------------------------|
| •<br>•<br>•    |      |      |      |      |      |      |      |      |                                   |
| 3              | 2999 | 3002 | 3001 | 3003 | 3007 | 3008 | 3019 | 3017 |                                   |
| 4              | 3000 | 3004 | 3005 | 3006 | 3011 | 3012 | 3013 | 3014 |                                   |
| 5              | 3009 | 3010 | 3015 | 3016 |      |      |      |      |                                   |
| 6              | 3018 | 3020 |      |      |      |      |      |      |                                   |
| •<br>•<br>•    |      |      |      |      |      |      |      |      |                                   |