



# Tarsus Archive Data Format

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# Tarsus Archive Data Files Explained

Archive files recorded by the ALTAIR software are binary files containing data from either the Decom or Frame Sync circuitry of the ALTAIR hardware. The archive data files begin with a 328-byte File Header. After the File Header, the rest of the file is composed of minor frame blocks. Each minor frame block begins with a 12-byte Minor Frame Header, which contains the time stamp of the minor frame and lock indicator information. After the Minor Frame Header, the minor frame data follows. All archive data files end with the extension “.tad” (Tarsus Archive Data). This section of the manual explains the format of the archive data.

For a Decom archive file, the PCM data is received in the hardware, bit synchronized, frame synchronized, and then decommutated. The decommutated data is word aligned and stored into a large dual port memory device. This byte aligned data is stored as the minor frame data in the archive file.

For a Frame Sync archive file, the PCM data is received in the hardware, bit synchronized, and frame synchronized. The minor frame data is packed into a bit stream and stored into a large dual port memory device. This continuous bit stream data is stored as the minor frame data in the archive file.

## 1.1 Data Storage Format

The TarsusHS hardware and ALTAIR software stores the archive data in “Little Endian” format. “Little Endian,” derived from the phrase “Little End In,” means the little end of the data is stored in memory first. For example, 0x12345678 would be stored in memory as (0x78 0x56 0x34 0x12).

## 1.2 File Header Definition

Each archived data file contains one file header structure. The file header is stored to indicate the date, time, and configuration file used during the archive sequence. All file header data is in ASCII characters to allow viewing with a standard text editor. The header consists of 328 bytes and is defined as follows:

10 bytes – Signature

12 bytes – Version

22 bytes – Date/Time **Note: Time stamped when the file is created**

260 bytes – Configuration file and path

12 bytes – Input Data Source (“Frame Sync” or “Decom”)

1 Unsigned Integer (32 bits) - Bits/Minor Frame

1 Unsigned Integer (32 bits) - Spare

1 Unsigned Integer (32 bits) – Spare

### 1.2.1 File Header Example

|          |    |    |    |    |    |    |    |    |       |       |       |       |       |       |       |       |                  |
|----------|----|----|----|----|----|----|----|----|-------|-------|-------|-------|-------|-------|-------|-------|------------------|
| 00000000 | 54 | 61 | 72 | 73 | 75 | 73 | 50 | 43 | 4D    | 00    | 31    | 2E    | 38    | 2E    | 32    | 2E    | TarsusPCM.1.8.2. |
| 00000010 | 32 | 00 | 00 | 00 | 00 | 00 | 32 | 2F | 31    | 31    | 2F    | 32    | 30    | 30    | 35    | 20    | 2.....2/11/2005  |
| 00000020 | 31 | 31 | 3A | 34 | 39 | 3A | 35 | 38 | 20    | 41    | 4D    | 00    | 43    | 3A    | 5C    | 50    | 11:49:58 AM.C:\N |
| 00000030 | 72 | 6F | 67 | 72 | 61 | 6D | 20 | 46 | 69    | 6C    | 65    | 73    | 5C    | 55    | 6C    | 79    | rogram Files\Uly |
| 00000040 | 73 | 73 | 69 | 78 | 5C | 54 | 61 | 72 | 73    | 75    | 73    | 50    | 43    | 4D    | 5C    | 43    | ssix\TarsusPCM\C |
| 00000050 | 6F | 6E | 66 | 69 | 67 | 75 | 72 | 61 | 74    | 69    | 6F    | 6E    | 46    | 69    | 6C    | 65    | onfigurationFile |
| 00000060 | 73 | 5C | 64 | 65 | 6D | 6F | 2E | 78 | 6D    | 6C    | 00    | 00    | 00    | 00    | 00    | 00    | s\demo.xml.....  |
| 00000070 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00    | 00    | 00    | 00    | 00    | 00    | 00    | 00    | .....            |
| 00000080 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00    | 00    | 00    | 00    | 00    | 00    | 00    | 00    | .....            |
| 00000090 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00    | 00    | 00    | 00    | 00    | 00    | 00    | 00    | .....            |
| 000000a0 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00    | 00    | 00    | 00    | 00    | 00    | 00    | 00    | .....            |
| 000000b0 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00    | 00    | 00    | 00    | 00    | 00    | 00    | 00    | .....            |
| 000000c0 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00    | 00    | 00    | 00    | 00    | 00    | 00    | 00    | .....            |
| 000000d0 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00    | 00    | 00    | 00    | 00    | 00    | 00    | 00    | .....            |
| 000000e0 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00    | 00    | 00    | 00    | 00    | 00    | 00    | 00    | .....            |
| 000000f0 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00    | 00    | 00    | 00    | 00    | 00    | 00    | 00    | .....            |
| 00000100 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00    | 00    | 00    | 00    | 00    | 00    | 00    | 00    | .....            |
| 00000110 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00    | 00    | 00    | 00    | 00    | 00    | 00    | 00    | .....            |
| 00000120 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00    | 00    | 00    | 00    | 00    | 00    | 00    | 00    | .....            |
| 00000130 | 46 | 72 | 61 | 6D | 65 | 53 | 79 | 6E | 63    | 00    | 00    | 00    | 00    | 02    | 00    | 00    | FrameSync.....   |
| 00000140 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | .....            |

**File Header Information**  
Signature = TarsusPCM  
Version = 1.8.2.  
Date/Time = 2/11/2005  
11:49:58 AM  
Configuration File =  
C:\Program  
Files\Ulyssix\TarsusPCM\Co  
nfigurationsFiles\demo.xml  
Source = Frame Sync

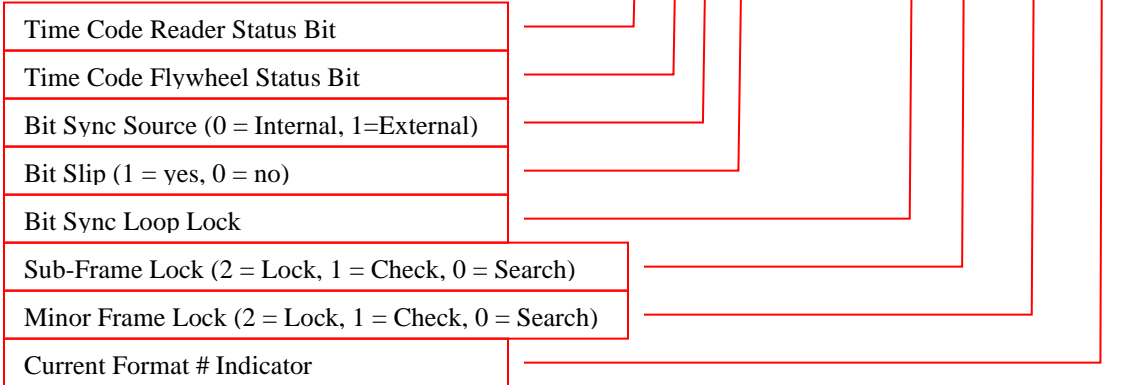
Figure 1 – Archive File Header Example

### 1.3 Minor Frame Header Definition

As stated above, header data precedes every minor frame in the archive file. The header contains time in Binary Coded Decimal (BCD) along with various status indicators. The time stamp for each minor frame occurs at the first bit on the frame sync pattern. The header data is defined as three 32-bit data words with the following format.

| 32 BIT WORDS | BITS              |    |    |    |             |    |    |    |            |    |    |    |                |                |     |      |               |    |    |    |            |            |            |     |              |   |   |   |             |   |   |   |
|--------------|-------------------|----|----|----|-------------|----|----|----|------------|----|----|----|----------------|----------------|-----|------|---------------|----|----|----|------------|------------|------------|-----|--------------|---|---|---|-------------|---|---|---|
|              | 31                | 30 | 29 | 28 | 27          | 26 | 25 | 24 | 23         | 22 | 21 | 20 | 19             | 18             | 17  | 16   | 15            | 14 | 13 | 12 | 11         | 10         | 9          | 8   | 7            | 6 | 5 | 4 | 3           | 2 | 1 | 0 |
| 0            | 0000              |    |    |    | 100's days  |    |    |    | 10's days  |    |    |    | 1's days       |                |     |      | 10's hours    |    |    |    | 1's hours  |            |            |     | 10's minutes |   |   |   | 1's minutes |   |   |   |
| 1            | 10's seconds      |    |    |    | 1's seconds |    |    |    | 100's msec |    |    |    | 10's msec      |                |     |      | 1's msec      |    |    |    | 100's usec |            |            |     | 10's usec    |   |   |   | 1's usecs   |   |   |   |
| 2            | Minor Frame Count |    |    |    |             |    |    |    |            |    |    |    | TC<br>R<br>Bit | TC<br>F<br>Bit | I/E | Slip | # Sync Errors |    |    |    | B<br>Lock  | SF<br>Lock | MF<br>Lock | FFI |              |   |   |   |             |   |   |   |

Table 1 – Archive Data Header Definition



## 1.4 Data Description

The TarsusHS hardware aligns the archived Decom data on 16-bit boundaries regardless of the PCM word size. The 16-bit alignment provides an efficient way of extracting a single word of data out of the archive file. The PCM data will always be right justified in a 16-bit word. For example, a 12-bit PCM word with a value 0x444 hexadecimal followed by another word with a value of 0x555 hexadecimal will show up in the archive file as 0x04440555. This value can be broken into four hexadecimal bytes: 0x04, 0x44, 0x05, and 0x55.

The ALTAIR hardware bit packs the archive Frame Sync data. The bit packing provides a smaller data size; however, it makes extracting a single word of data out of the archive file more difficult. For example, a 12-bit PCM word with a value of 0x444 hexadecimal followed by another word with a value of 0x555 hexadecimal will show up in the archive file as 0x 444555. This value can be broken into three hexadecimal bytes: 0x44, 0x45, and 0x55.

The following examples show the actual archived data using a hexadecimal viewer application:

### 1.4.1 Archive Data 32-Bit Sync 16-Bit Data

For this Frame Sync configuration, a Decom Archive File and a Frame Sync Archive file will have identical data. Since the Frame Sync and Word Size are both integer multiples of 8-bits, the byte aligned Decom archive data and the bit stream Frame Sync archive data are identical.

Sync Pattern Size: 32-bits  
Sync Pattern: FE6B2840  
# Minor Frames: 1  
# Words per Frame: 16

```
{ 02741012 30422590 000000D0 } FE6B2840 11112222 33334444  
55556666 77778888 CCCCCCCC CCCCCCCC CCCCCCCC 02741012  
30423000 000000D0 FE6B2840 11112222 33334444 55556666  
77778888 CCCCCCCC CCCCCCCC CCCCCCCC 02741012 30423409  
000000D0 FE6B2840 11112222 33334444 55556666 77778888  
CCCCCCCC CCCCCCCC CCCCCCCC 02741012 30423819 000000D0  
FE6B2840 11112222 33334444 55556666 77778888 CCCCCCCC
```

Figure 2 – Archive Data Header Example

#### Header Information

Time = 274:10:12:30.422.590 (Sampled 1<sup>st</sup>  
bit frame sync pattern)  
Minor Frame Count = 0  
Internal Bit Sync  
No Bit Slips  
Bit Sync Loop Lock  
Sub-Frame = Lock  
Minor Frame = Lock  
Current Format = 0

```

03420946 45392808 000040B0 FE6B2840 11112222 33334444
55556666 77778888 9999CCCC CCCCCCCC CCCCCCCC 03420946
45393064 000040B0 FE6B2840 11112222 33334444 55556666
77778888 9999CCCC CCCCCCCC CCCCCCCC 03420946 45393320
000040B0 FE6B2840 11112222 33334444 55556666 77778888
9999CCCC CCCCCCCC CCCCCCCC 03420946 45393576 000040B0
FE6B2840 11112222 33334444 55556666 77778888 9999CCCC

```

**Data Information**  
Word 1 = 1111  
Word 2 = 2222  
Word 3 = 3333  
Word 4 = 4444  
Word 5 = 5555  
Word 6 = 6666  
Word 7 = 7777  
Word 8 = 8888  
Word 9 – 14 = CCCC

Figure 3 – Archive Data Example

### 1.4.2 Archive Data 24-Bit Sync 12-Bit Data

For this Frame Sync configuration, the Decom archive data will have leading zeros as the 12-bit decom word is packed into a 16-bit space. The Frame Sync archive will not have the leading zeros; therefore, the Frame Sync Archive minor frame will take up fewer bytes than the Decom Archive minor frame.

Sync Pattern Size: 32-bits  
Sync Pattern: FE6B2840  
# Minor Frames: 1  
# Words per Frame: 8

```

00000008 26687072 000040B0 FE6B2840 01110222 03330444 05550666 07770888
00000008 26687334 000040B0 FE6B2840 01110222 03330444 05550666 07770888
00000008 26687592 000040B0 FE6B2840 01110222 03330444 05550666 07770888
00000008 26687843 000040B0 FE6B2840 01110222 03330444 05550666 07770888
00000008 26688098 000040B0 FE6B2840 01110222 03330444 05550666 07770888
00000008 26688361 000040B0 FE6B2840 01110222 03330444 05550666 07770888

```

**Data Information In (Hexadecimal)**  
Word 1 = 0111  
Word 2 = 0222  
Word 3 = 0333  
Word 4 = 0444  
Word 5 = 0555  
Word 6 = 0666  
Word 7 = 0777  
Word 8 = 0888

Figure 4 – 12-bit Decom Archive Example

```

00000004 19685662 000040B0 FE6B2840 11122233 34445556 66777888
00000004 19685917 000040B0 FE6B2840 11122233 34445556 66777888
00000004 19686198 000040B0 FE6B2840 11122233 34445556 66777888
00000004 19686487 000040B0 FE6B2840 11122233 34445556 66777888
00000004 19686748 000040B0 FE6B2840 11122233 34445556 66777888
00000004 19687010 000040B0 FE6B2840 11122233 34445556 66777888

```

**Data Information In (Hexadecimal)**  
Word 1 = 111  
Word 2 = 222  
Word 3 = 333  
Word 4 = 444  
Word 5 = 555  
Word 6 = 666  
Word 7 = 777  
Word 8 = 888

Figure 5 – 12-bit Frame Sync Archive Example