

## **GUIDE TO THE ANALECT CONCENTRATION FILE FORMAT**

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## **1. Introduction**

### **1.1 Purpose**

The purpose of this document is to serve as an overview of the Analect Concentration File format used by Applied Instrument Technologies (AIT), Upland, California. This document is identified as the Guide to the Analect Concentration File Format, document number 98-0452.

### **1.2 Scope**

The Analect Concentration File format is the primary quantitative data file format used for the Analect product line. Providing a clear and concise description of the file format allows for quicker and more reliable internal and external software development. This guide describes the overall structure of the Analect Concentration File format, and details the individual elements and definitions used within the group header, item headers, and item data.

### **1.3 Definitions, Acronyms, and Abbreviations**

Please refer to Appendix A for clarification of terminology used in this document.

## 2. Basic Structure

The basic structure of an Analect concentration file consists of a single group header, item headers for each component, and some number of item data records with floating-point values for each component. The following diagram illustrates the overall structure of an Analect concentration file.

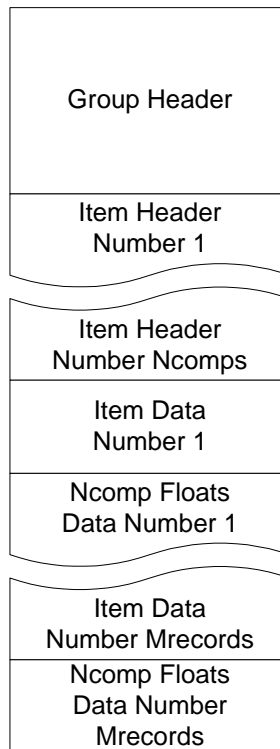


Figure 1 - ACF file block diagram.

### 3. Group Header

Each Analect concentration file has one, and only one, group header. The group header contains information about a variety of items describing the data in the file. The group header also contains the names of the previous and next files in a concentration data set. The concept of a concentration data “set” was introduced in revision 4.00. A group header revision greater than 400 will indicate that these file links are valid, and not just spare characters. The following structure details the elements of a group header.

```
typedef struct
{
    char
        szMethodName[10],           // Method Name (9 chars max)
        szInstID[42],               // Instrument Identification (41 chars max)
        szAppID[62],               // Application Identification (61 chars max)
        szPrevFile[9],             // Previous filename in data set (8 chars max)
        szNextFile[9],             // Next filename in data set (8 chars max)
        _C_SPARE[82];              // Reserved for future enhancements
    short
        nStreamNum,                // The "stream" number this data was collected on
        nNcomps,                  // Number of components
        nRevision,                 // Revision number / 100
                                   // Example: revision number 4.00 = Revision 400
        _I_SPARE[20];              // Reserved for future enhancements
    time_t
        StartTD,                  // Time and date of first data collect
        EndTD;                    // Time and date of last data collect
    long
        lNumRecords,              // Number of data records in the file
        _L_SPARE[10];             // Reserved for future enhancements
} GROUPHDR, FAR * LPGROUPHDR;
```

The time\_t structure was redefined by Microsoft; therefore, the StartTD and EndTD values in ACF files produced by SpectraRTS versions prior to V1.26 will each be 4 bytes long while the values will be 8 bytes each in files written by SpectraRTS V1.26 or later. The following code fragment from an Excel macro shows how to read ACF files with either type of time\_t:

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```
Open ACF For Binary As #1
'Read Group-Header
LongDOSDT = False
Get #1, , MethodName: MethodName = Trunc(MethodName)
Get #1, , InstId: InstId = Trunc(InstId)
Get #1, , Appid: Appid = Trunc(Appid)
Get #1, , szPrevFile: szPrevFile = Trunc(szPrevFile)
Get #1, , szNextFile: szNextFile = Trunc(szNextFile)
Get #1, , C_SPARE
Get #1, , StreamNo
Get #1, , Ncomps
Get #1, , Revision
For i = 1 To 20: Get #1, , j: Next
Get #1, , StartDOSDT
Get #1, , EndDOSDT
Rem If file has 64 bit time, then high order of Start will have filled End
If EndDOSDT = 0 Then
    LongDOSDT = True
    Get #1, , EndDOSDT
    Rem Skip extra time bits
    Get #1, , SkipDOSDT
End If
```

## Item Headers

Each Analect concentration file has an item header for each component in the file, as indicated in the group header. The item header contains information for identification and display of each individual component. The following structure details the elements of an item header.

```
typedef struct
{
    char
        szCompName[22],          // Component name (21 chars max)
        szCompUnits[8];          // Component units (7 chars max)
    float
        UCL,                     // Upper control limit
        NCL,                     // Nominal control limit
        LCL;                     // Lower control limit
    short
        nDisplay,                // Display flag (0=No, and 1=Yes)
        nColor;                  // Color flag, maps to a palette
    char
        C_SPARE[4];              // Reserved for future enhancements
} ITEMHDR, FAR * LPITEMHDR;
```

## 4. Item Data

Each data record in an Analect concentration file is composed of an item data record followed by one float for each component, as indicated in the group header. The order of the floating-point values must match the order of the item headers. The following structure details the elements of an item data.

```
typedef struct
{
    time_t
        CollectTime;             // Collect time of the interferogram or spectrum
    short
        nRecordCode;             // Gap detect flag, 0=continuation, 1=gap in data
    char
        _C_SPARE[2];             // Reserved for future enhancements
} ITEMDATA, huge * LPITEMDATA;
```



## **Appendixes**

### **Appendix A - Definitions, Acronyms, and Abbreviations**

AIT	Applied Instrument Technologies.
ACF	Analect concentration file.