

Rosemount Aerospace Inc.

14300 Judicial Road Burnsville, MN 55306-4898 Tel: 952 892 4000

Fax: 952 892 4800

www.collinsaerospace.com

DARPlus File Format

Rosemount Aerospace Inc. Model 8730L1

Prepared by Kerry Person 23 AUG 2023

Design Engineer

Reviewed by Dan McDowell

Product Manager

NOTE: References to the company in this document will be made as Rosemount Aerospace Inc.

U.S. EXPORT CLASSIFICATION: EAR: EAR99



Table of Contents

1	INTRO	DUCTION	3
2	DARPL	LUS FILE FORMAT	3
	2.1	Timestamp	4
	2.2	Line ID	4
	2.3	Label	4
	2.4	Subframe and Word	4
	2.5	Value	4
	2	2.5.1 ARINC 429	5
	2	2.5.2 ARINC 717	5
3	IDENT	IFICATION OF DATA TYPES	6
4	INTER	PRETATION OF DATA	6
	4.1	ARINC 429	6
	4.2	ARINC 717	7



1 INTRODUCTION

DARPlus is a data recording service hosted on the Collins Aerospace 8730L1 AID which can be configured to acquire specific ARINC 429 or ARINC 717 data words and record them to a file for later analysis.

The specific data words which are recorded are determined by subscription data which is included in a software configuration part which has been loaded onto the AID. The subscription data and the software configuration part are created by Collins, based on customer needs.

This document describes the format of the data contained in a DARPlus file.

2 DARPLUS FILE FORMAT

The DARPlus service stores received data in a file in CSV format, one line per data item. A DARPlus file will likely contain many lines.

Each line in the DARPlus file contains six comma-separated fields. Each line is terminated by a linefeed character. The general format for a line is:

```
<timestamp>, <line id>, <label>, <subframe>, <word>, <value><LF>
```

When a line contains ARINC 429 data, the timestamp, line id, label, and value fields are populated. The subframe and word fields are left empty.

ARINC 429 example:

```
1689206032542,8,75,,,673003
```

When a line contains ARINC 717 data, the timestamp, line id, subframe, word, and value fields are populated. The label field is left empty.

ARINC 717 example:

```
1506175217096,18,,3,364,03F8
```

See descriptions of each field in the following sections.



2.1 Timestamp

The timestamp field represents the time at which the data item was received by the AID. It is expressed in milliseconds since Unix Epoch (Jan 1, 1970). The above value represents July 12, 2023, 23:53:52.542, UTC.

2.2 Line ID

The line id identifies the logical interface on which the data item was received. Table 1 shows the relationship between line ids and physical interfaces:

Line ID	Interface	Line ID	Interface	Line ID	Interface
0	A429 RX 1	6	A429 RX 7	20	A429 RX 11
1	A429 RX 2	7	A429 RX 8	21	A429 RX 12
2	A429 RX 3	8	A429 RX 9	22	A429 RX 13
3	A429 RX 4	9	A429 RX 10	23	A429 RX 14
4	A429 RX 5	18	A717 BiPhase	24	A429 RX 15
5	A429 RX 6	19	A717 BiPolar	25	A429 RX 16

Table 1 - Line IDs and Physical Interfaces

2.3 Label

The label field indicates the octal label number of a received ARINC 429 data word, which along with the line id can be used to identify the data item.

2.4 Subframe and Word

The subframe and word fields indicate the position of a received ARINC 717 data word within its data frame, which along with the line id can be used to identify the data item. The subframe and word representations are zero-based.

2.5 Value

The value field contains the hexadecimal representation of the received data. The bit range contained in this field is explained below.



2.5.1 ARINC 429

An ARINC 429 word is received as a 32-bit value. The value field of a DARPlus line which contains ARINC 429 data represents bits 32-9 of the received word.

As an example, the value field in the DARPlus line shown below corresponds to the illustration in Figure 1. In this example, the data arrived on label 75 on line id 8. Line id 8 corresponds to the physical interface for ARINC 429 RX 9. This interface is often connected to an SDAC (but check your installation's wiring diagram to be sure).

1689206032542,8,75,,,673003

	ARINC 429 Data Word																														
Р	SSN	/		Data															SD	Ι	Label										
32	31 3	31 30 29 28 27 26 25 24 23 22 21					20	20 19 18 17 16 15 14 13 12 11								11	10	9	8	7	6	5	4	3	2	1					
	6		7 3									()			()			3											

Figure 1 - Data Bits for an ARINC 429 word

2.5.2 ARINC 717

An ARINC 717 data word is received as a 12-bit value. The value field of a DARPlus line which contains ARINC 717 data represents bits 12-1 (all bits) of the received word.

As an example, the value field in the DARPlus line shown below corresponds to the illustration in Figure 2. In this example, the value was located in subframe 3, word 364 and arrived on line id 18. The subframe and word representations are zero-based.

Line id 18 corresponds to the physical interface for the ARINC 717 BiPhase receiver. This interface is often connected to the DAR output of an FDIMU (but check your installation's wiring diagram to be sure).

1506175217096,18,,3,364,**03F8**

			A	RIN	C 71	.7 D	ata '	Wor	d					
	12	11	10	9	8	7	6	5	4	3	2	1		
0		3				F	=		8					

Figure 2 - Data Bits for an ARINC 717 word



3 IDENTIFICATION OF DATA TYPES

The data item represented by a line in a DARPlus file can be identified by a combination of the line id and the label (for A429), or the line id, subframe, and word (for A717).

The line id permits identifying the physical interface on which the data arrived, and therefore the LRU connected to that interface.

When the transmitting LRU is known, the label or the subframe and word can then identify the specific data item.

4 INTERPRETATION OF DATA

4.1 ARINC 429

The ARINC 429 specification contains information which provides information that can be useful in identifying and interpreting many ARINC 429 labels. However, it may be necessary to consult AMMs, CMMs, or LRU-specific documents to interpret the value field of received ARINC 429 data words.

The general formula is:

engineering value = binary value * (engineering value range / binary value range)

Example:

1689206032927,9,205,,,630A92

	ARINC 429 Data Word																														
Р	SS	M		Data SDI L														Lak	abel												
32	31	30	29 28 27 26 25 24 23 22 21								21	20	20 19 18 17 16 15 14 13 12 11									10	9	8	7	6	5	4	3	2	1
	6		3 0								Δ	١			g)			2			•			•						

Figure 3 - ARINC 429 Example Data

In this example, line id = 9 = DMC-2; Label = 205 = Mach

Ì	205	006	Mach	Mach	4.096	16	

From ARINC 429 specification, label 205 binary data occupies 16 significant bits (bits 28 - 13), so the binary range is $2^{16} = 65536$. The engineering value range is 4.096.

Bits 28 - 13 = 0x30A9 = 12457

Eng value = 12457 * (4.096 / 65536) = 0.7785



4.2 ARINC 717

ARINC 717 data words are transmitted as a continuous sequence of large data blocks known as a frame. The definition of the data types which are contained in the frame, the organization of the data within the frame, and the representation of the data is described in a frame definition specification. This content of an ARINC 717 data frame can be highly customized and depends entirely on the configuration of the specific data frame in use on the aircraft. It is therefore necessary to consult the relevant specification to identify and interpret the value field of received ARINC 717 data words.

As mentioned earlier, the subframe and word values in a DARPlus file are zero-based. A data frame specification will likely use one-based numbering.

The process for converting ARINC 717 data is basically the same as that shown for ARINC 429.