

# The CONTINUE Long String Keyword Convention

Adopted by the HEASARC FITS Working Group

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## 1 Introduction

The CONTINUE long string keyword convention may be used to assign a character string value to a FITS keyword that is longer than the 68-character limit for the value of a single FITS keyword. Under this convention, the long string value is divided into multiple substrings, each of which is no longer than 67 characters in length. The first substring is written as the value of the user-specified keyword, and the remaining substrings are written to a sequence of keywords that all have the keyword name CONTINUE.

## 2 Detailed Syntax of the Convention

The following steps should be taken when writing long string keyword values using this convention:

1. Divide the long string value into a sequence of smaller substrings, each of which is no longer than 67 characters in length. (Note that if the string contains any literal single quote characters, then these must be represented as a pair of single quote characters in the FITS keyword value, and these 2 characters must both be contained within a single substring).
2. Append an ampersand character ('&') to the end of each substring, except for the last substring. This character serves as a flag to FITS reading software that this string value *may* be continued on the following keyword in the header.
3. Enclose each substring with single quote characters. Non-significant space characters may occur between the ampersand character and the closing quote character.
4. Write the first substring as the value of the user-specified keyword.
5. Write each subsequent substring, in order, to a series of keywords that all have the name CONTINUE in bytes 1 through 8 and have space characters in bytes 9 and 10 of the keyword record. The substring may be located anywhere in bytes 11 through 80 of the keyword record and may be preceded by non-significant space characters starting in byte 11. A comment string may follow the substring; if present the comment string must be separated from the substring by at least 1 space character followed by a forward slash character ('/').

An example of this long string keyword convention is shown below:

```
SVALUE = 'This is a long string value &'
CONTINUE 'extending&'
CONTINUE ' over 3 lines.'
```

This example is equivalent to the following single keyword:

```
SVALUE = 'This is a long string value extending over 3 lines.'
```

FITS reading software that supports this convention should take the following steps when reading a string-valued keyword:

1. Test if the last non-space character in the keyword value string is an '&' character. If true, then the keyword value *may* be continued on the next keyword record in the FITS header, if the following conditions are true:
  - the next keyword in the header has the name `CONTINUE`, and
  - bytes 9 and 10 of the keyword contain spaces (no '=' in byte 9), and
  - bytes 11 through 80 contain a character string enclosed in single quote characters, optionally preceded and followed by space characters, and optionally followed by a forward slash character and a comment string,
2. If all these conditions are true, then the character string on this `CONTINUE` keyword should be appended onto the character string from the previous keyword(s), after first deleting the '&' character from the previous string.
3. Repeat steps 1 and 2 to continue assembling the long keyword value until the required conditions are no longer true.

The following additional points regarding this long string keyword convention should also be noted:

- If a string keyword value ends with the '&' character, but is not immediately followed by a conforming `CONTINUE` keyword, then the '&' character should be considered as the literal last character in the string.
- If a FITS reader encounters a `CONTINUE` keyword that is not preceded by a string keyword (or another `CONTINUE` keyword) whose value string ends with the '&' character, then that `CONTINUE` keyword should be ignored (i.e., it should be interpreted the same as a `COMMENT` keyword).

The following example (in which a `MAXVOLT` keyword has somehow been inserted between the `SVALUE` keyword and its continuation keyword) illustrates both of the above conditions:

```
SVALUE = 'This is a long string value &'
MAXVOLT = 12.5
CONTINUE 'continued over 3 lines.'
```

Because the requirements of the CONTINUE convention are not met in this case, FITS readers should interpret the SVALUE keyword as a simple string-valued keyword, including the final '&' character in the value string, and the 'orphaned' CONTINUE keyword should be treated like a COMMENT keyword

- FITS readers that do not support this convention should treat any CONTINUE keywords (which have no value indicator in byte 9 and hence have no formally defined value) in the same way as COMMENT keywords.
- This convention is *not recommended* for use with reserved or mandatory FITS keywords (e.g., TYPEn or EXTNAME, or other commonly used keywords because of the likelihood of confusion by software applications that do not support this convention. It is recommended that this convention only be used for new application-specific keywords, the values of which are not critical to the general interpretation or understanding of the contents of the FITS file.

### 3 LONGSTR Keyword

It is recommended that the following keywords be added to the header of any HDU that uses this long string convention:

```
LONGSTRN= 'OGIP 1.0'           / The OGIP long string convention may be used.
COMMENT   This FITS file may contain long string keyword values that are
COMMENT   continued over multiple keywords. This convention uses the '&'
COMMENT   character at the end of a string which is then continued
COMMENT   on subsequent keywords whose name = 'CONTINUE'.
```

The presence of the LONGSTRN keyword serves to indicate that long string keywords may be present in the FITS file. The value of this keyword gives the name and version number of the specific convention that is used, which in this case is the OGIP (Office of Guest Investigator Programs, at the HEASARC) long string convention, version 1.0. The value of this keyword is a string so that it may be used to give the name of any other convention that the FITS community might adopt.