



SD card read write instruction manual

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## 1. SD card file

### 1.1 Document content and format conventions

|   | A      | B         | C        | D                | E          | F      | G      |
|---|--------|-----------|----------|------------------|------------|--------|--------|
| 1 | w      | dw        | s8       | f4.15            | dw         | w      | dw     |
| 2 | -32765 | -32770    | hellbaby | 1237.20100156164 | 30000      | 999    | 3121   |
| 3 | 454    | -91877301 | testh    | 2351.25150102545 | -454532088 | -15453 | 124522 |

Fig. 1 document format example

As shown in Figure 1, the first line of the file is the data type declaration, which supports four types of data: Word (W), Double Word (DW), Floating Point (Fm.n) and Character (Sx). Explanations are given in Table 1:

Table 1 File Data Type Description

|  | W               | DW                        | Fm.n(m<=15,n<=15)                             | Sx(x<=16) |
|--|-----------------|---------------------------|---|-----------|
| Scope of representation                        | [-32768, 32767] | [-2147483648, 2147483647] | [-18446742974197923840, 18446742974197923840] | \         |
| Number of Occupied Characters Stored in SDCard | 6               | 11                        | m+1+n   | 2*x       |
| WORD number                                    | 1               | 2                         | 2   | x         |

When the actual length of the data is less than the number of characters stored in SDCard, space is used to fill it up. For example, row 3, column 1, data bit 454, less than 6 characters occupied by W type, fill in 6-3 = 3 spaces, and the actual occupancy is L L L 454. (L denotes spaces).

The X of the character Sx represents the word length, not the character length.

### 1.2 Agreement on file name and storage location

- File Name: All files must be named in the form of dataxxx.csv. XXX is the index number of the file. When XXX < 100, add 0 to complete. If the file index number is 1, the corresponding file name is data001.csv.
- Storage Location: All files must be located in the SD card root directory.

### 1.3 SD Card File System Agreement

Before using SD card, it is necessary to format SD card into FAT32 format on computer.

## 2 Software programming

### 2.1 Read SD card: READ SD WORD

Take READSD D0 D10 D50 as an example, see fig 2.

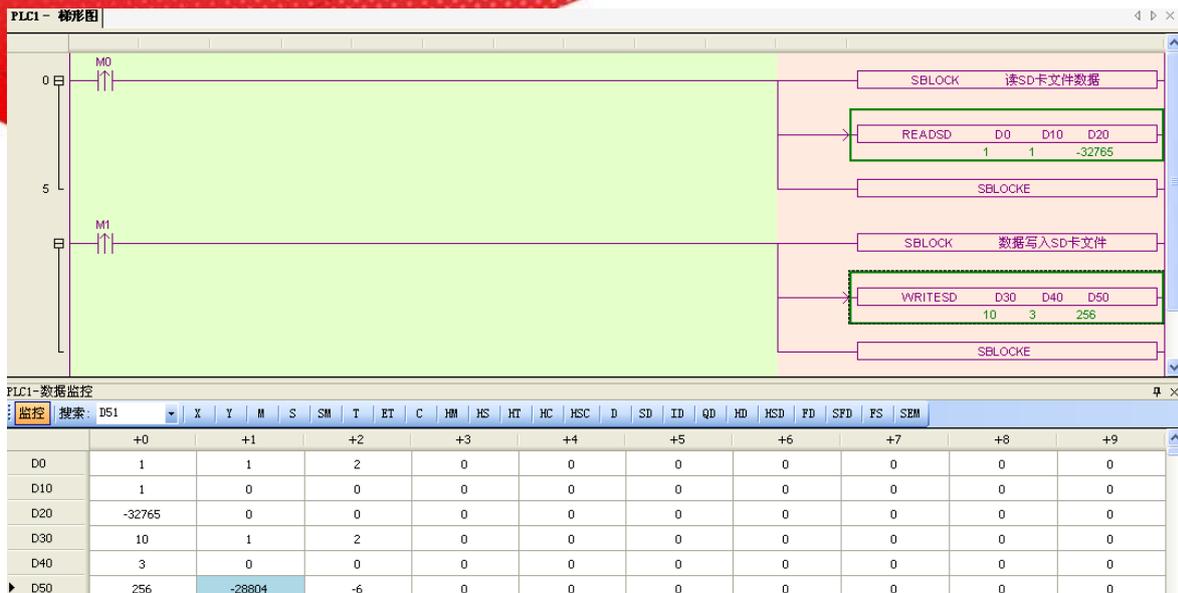


Fig. 2 read SD card example

- D0: File Index Number/Column/Line Header Address. (1,1,2) meaning:  
The file index number is 1: that is, the file name is data001.csv  
Column No. 1: Column 1  
Line Number 2: Line 2 (Data Line 2)
- D10: read the WORD number of data  
Read 1 WORD data in this example.
- D20: the read data is in PLC header address  
The read data is -32765 in this example

The specific meaning of this command is: read the 1 word data of column 1 and line 2 of the file named data001.csv in the SD Card root directory, and save the read data in register D20. If the column number is 0, the WORD number of read data represents the number of read rows. For example: D0 (1, 0, 1), D10 (5), D20 means to read five rows of data from the first line of the file data001.csv and store it in a register starting from D20.

## 2.2 Write SD card: WRITE SD WORD

Take WRITESD D30 D40 D50 as an example, see fig 3:

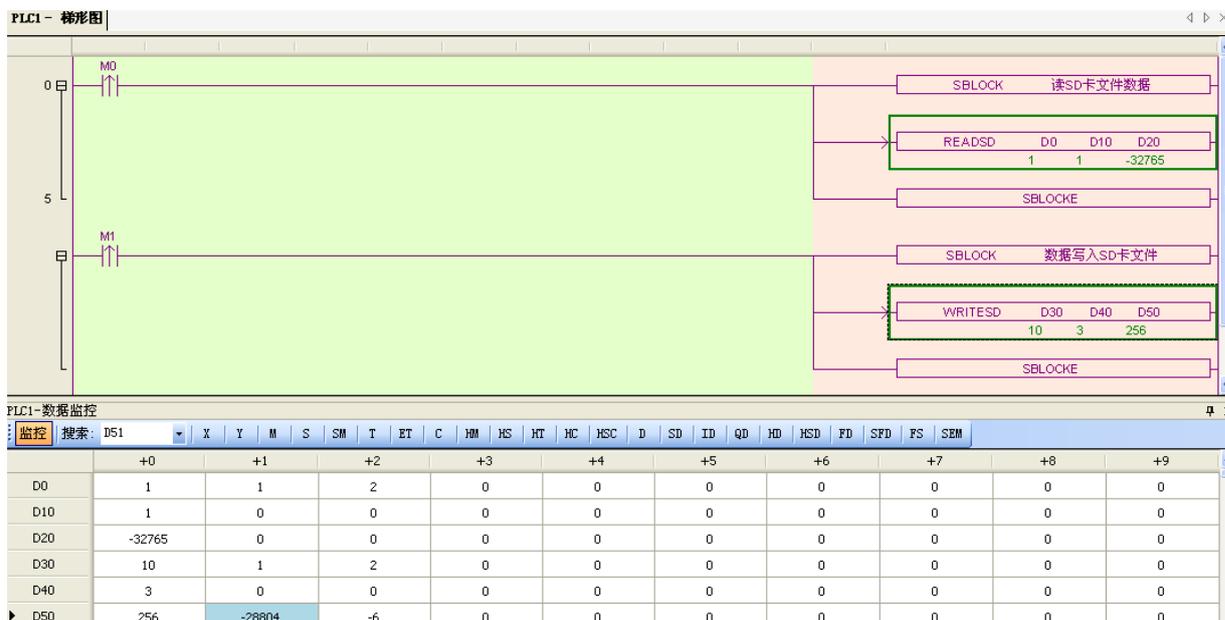


Fig 3 SD card write data example

- D30: File Index Number/Column/Line Header Address. (10,1,2) meaning:  
The file index number is 10: that is, the file name is data010.csv  
Column No. 1: Column 1  
Line Number 2: Line 2 (Data Line 2)
- D40: The WORD number of write data  
In this case, write 3 WORD data
- D50: The first address of the written data in the PLC  
In this case, write in from the address D50.

The specific meaning of this command is to write 3 words data starting from register D50 to column 1 and line 2 of SD Card file named data001.csv.

If the column number is zero, the word number of write in data represents the number of write in rows. For example: D0 (2, 0, 3), D10 (5), D20 means to write five rows of data starting from D20 to lines 3-7 of the file data002. csv.

### 2.3 Notes

(1) Visible characters (letters, numbers) are only supported in character types. That is, the characters in the range [32, 126] of the ASCII code table.

Exceptions:

Supports terminators in invisible characters.

The ','(comma) in visible characters is not supported.

(2) CSV File Restriction

The number of file columns should not exceed 20.

File data rows should not more than 512 characters (including commas and newline characters).

(3) WORD Number Limitation for Reading and Writing Data

Consider that a piece of data cannot be read only part of it. For example, the format is defined as w, dw, s8. If reading from the first column W, the word number is 10, then S8 cannot be read out completely, and the program will report an error (the correct WORD number is 3, or 11). When the program judges the parameters wrong, it will not read and write SD cards.

(4) Creating CSV File Restrictions

If a CSV file is created with a Notepad that comes with Windows, the last line must be line feeded at the end, and the data is created strictly according to the type definition (Table 2), as shown in Figure 4.

Existing CSV files need to be converted using the format conversion tools described in the third section of this article before they can be used.

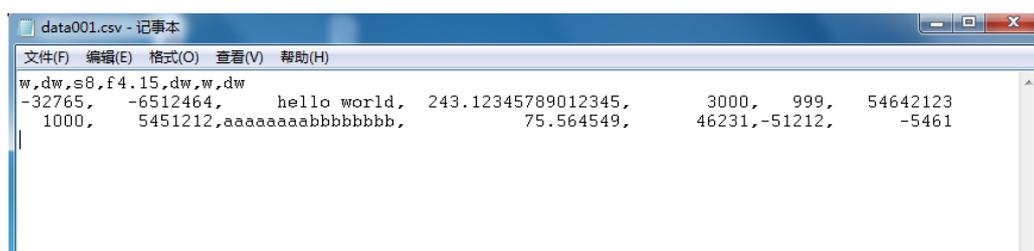


Fig 4 create CSV file by using notepad

(5) Read process limitation

In reading instructions, if the number of rows specified exceeds the actual number of rows in the file, the program will report an error.

(6) Writing process description

In writing instructions, when the number of rows specified exceeds the actual number of rows in the file, the file is expanded. In the expansion process, according to the column data type, space is inserted in the corresponding position, leaving a fixed space for insertion of data later.

Note: If the number of write in rows is greater than the actual number of rows in the file, the file will be expanded. The file expansion speed is very slow, which will affect the scanning cycle of PLC and trigger the watchdog. This is not recommended.

(7) SD card status information

The status information of SD card can be seen through XDPPro SD453, as shown in Table 2.

Table 2 SD card status information

| SD453 | Meaning  | Reasons  |
|-------|--|--|
| 0     | Operation succeeded  |  |
| 1     | Reserved   |  |
| 2     | Reserved   |  |
| 3     | Reserved   |  |
| 4     | read write file does not exist                                     | file does not exist  |
| 5     | read the file to the end   | Arrive at the end of the file  |
| 6     | reading the file   | task is reading the file   |
| 7     | writing the file   | task is writing the file   |
| 8     | read write error   | Pull out SD card while reading and writing   |
| 9     | SD card space is insufficient                                      | SD card space is insufficient  |
| 10    | Reserved   |  |
| 11    | FAT32 error  | The SD card is not plugged in properly.<br>Or the SD card is not formatted as FAT32    |
| 12    | Reserved   |  |
| 13    | Reserved   |  |
| 14    | SD card cannot be initialized                                      | SD card is not plugged in properly   |
| 15    | Reserved   |  |
| 16    | Reserved   |  |
| 17    | Reserved   |  |
| 18    | Reserved   |  |
| 19    | Undetectable SD card   | SD Card Not Inserted   |
| 20    | Errors in reading and writing parameters                           | Check index, row, line, wordcnt  |
| 21    | Reading and writing data does not conform to the format definition | Lack of data type definition   |
| 22    | file data type error   | The type definition out of the range of w,dw,Sn,Fx.y appeared                          |
| 23    | File data type does not conform to definition                      | Floating Point and Character Data occupied Character Number do not meet the definition |
| 24    | Illegal filenames  | index>999  |
| 25    | Illegal column index   | Column index greater than file column number   |
| 26    | Illegal row index  | The row index is less than 1   |
| 27    | illegal write read word number                                     | Read and write word number is less than 1  |
| 28    | illegal write read word number                                     | Word number cannot read the complete data  |
| 29    | File Data Line Character Number Over limit                         | Data line characters exceed 512 characters   |
| 30    | Other error  |  |

### 3 Format conversion tool

#### 3.1 Microsoft Excel Conversion Tool

When making existing data into CSV format and saving it to SD, please use the format conversion tool.

Steps:

- (1) Unzip the format conversion.rar to any directory
- (2) Open Excel, click File/option, it will show below window:

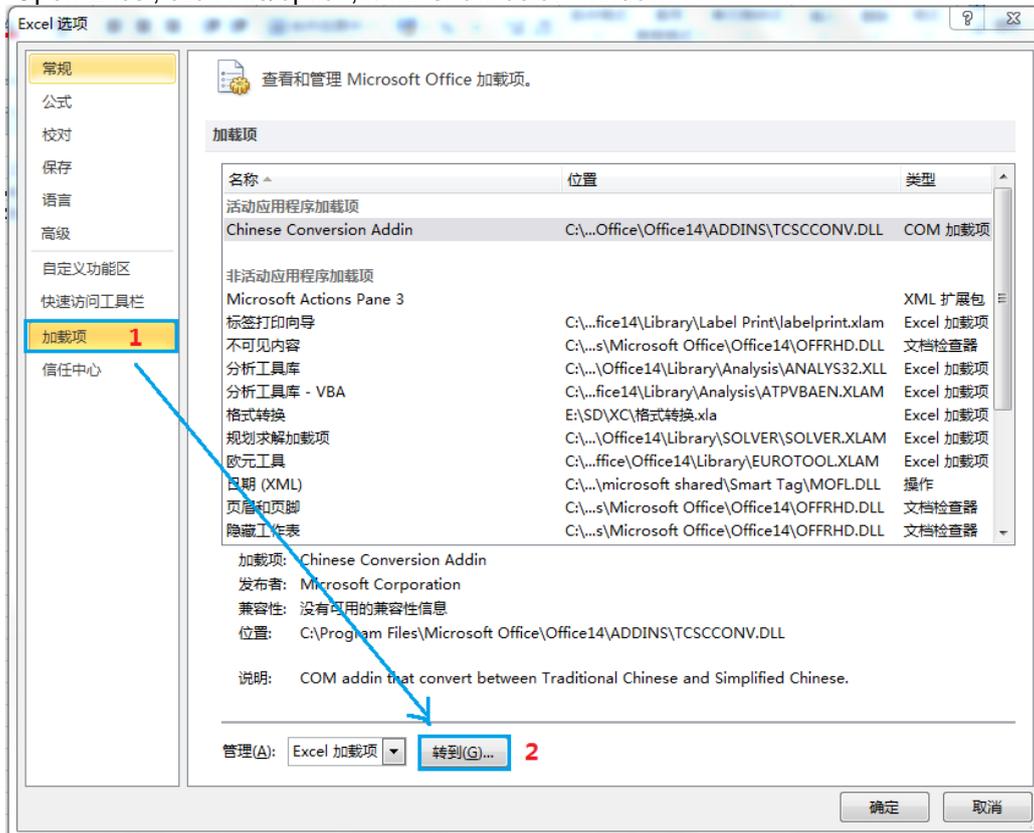


Fig. 5 Excel option

- (3) As shown in fig. 5, open the loading macro window:

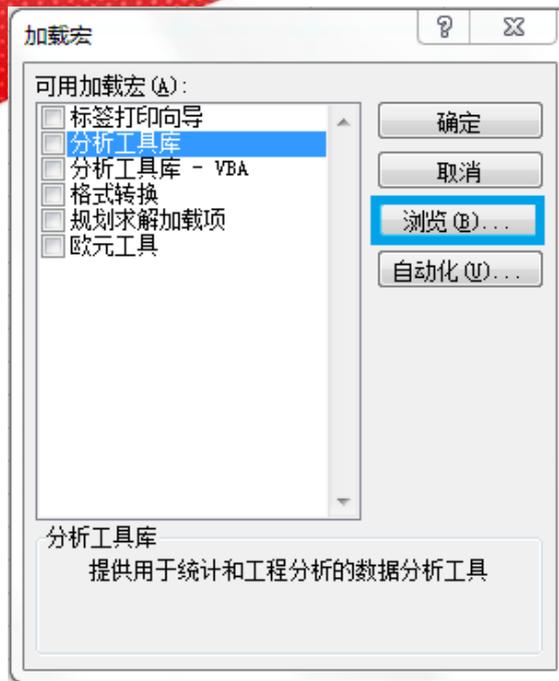


Fig. 6 Excel loading macro

- (4) As shown in fig. 6, click browse, select the unzip file format conversion.xla.

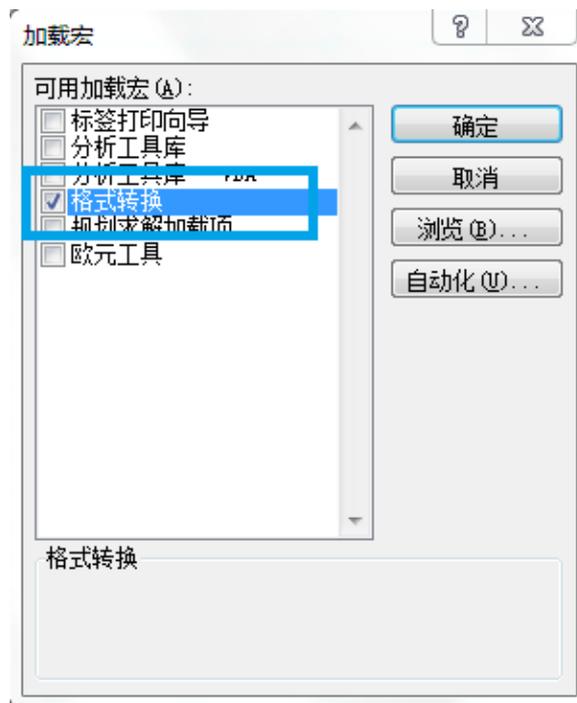


Fig. 7 Excel loading macro

- (5) As shown in fig. 7, the format conversion is added in the loading macro list, and tick this item.  
(6) After clicking OK, there is the add-in and format conversion item in the Excel tool menu.

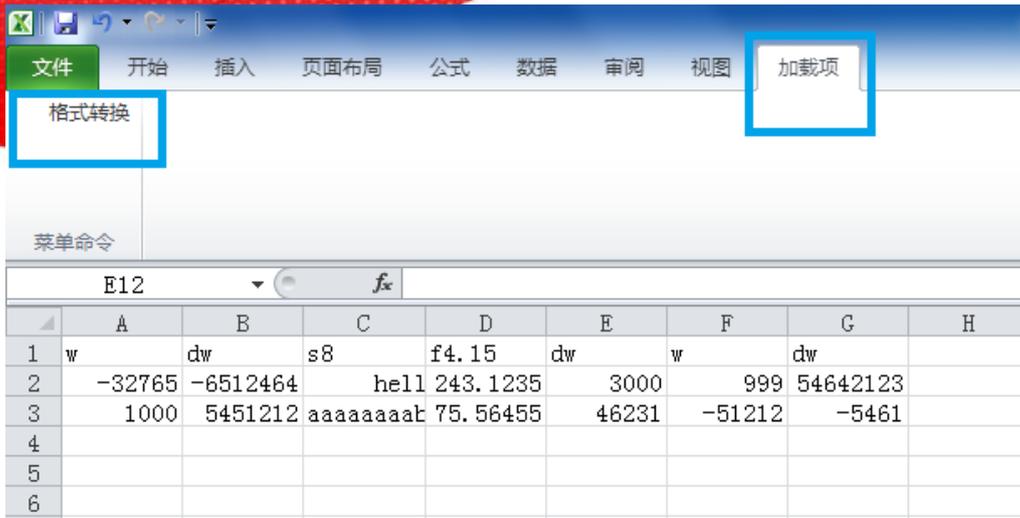


Fig. 8 Excel add-in item

- (7) Open the existed CSV file, click the format conversion to complete the conversion process.
- (8) When saving the file, it will show the dialog box of fig.9, select YES to save the file in csv format.

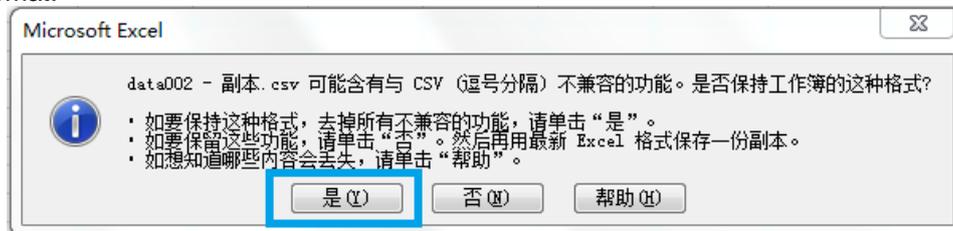


Fig. 9 CSV file saving dialog box

### 3.2 Microsoft Office Conversion Tool

When making existing data into CSV format and saving it to SD, please use the format conversion tool.

Steps:

- (1) Unzip the format conversion.rar to any directory
- (2) Open Microsoft office, click Tool/loading macro, it will show loading macro window. Click browse, select the unzip file format conversion.xla.
- (3) Click Tool/custom/command, it will shown as below.



Fig. 11

- (4) Select the **【Custom menu item】** and drag it to the menu bar.

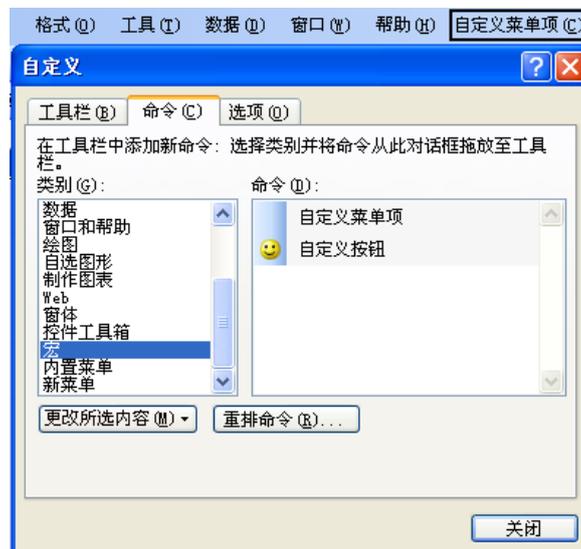


Fig. 12

- (5) select **【Change the selected content】** -> **【name】**, change custom menu item to format conversion.

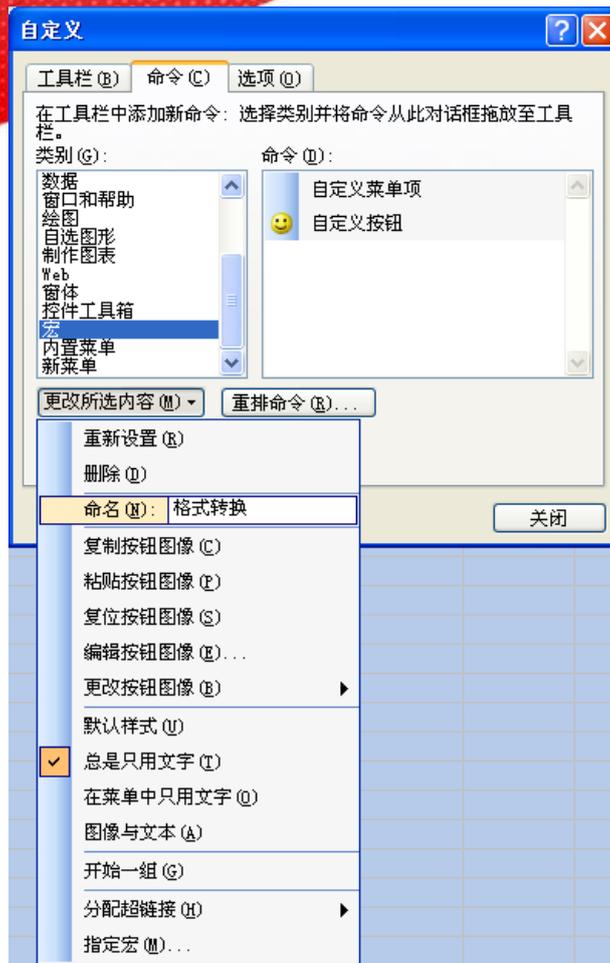


Fig. 13

- (6) select **【Change the selected content】** -> **【Specified macro】**, change custom menu item to format conversion.
- (7) After the data input is completed, click Format Conversion and save the file as CSV format.



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