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How to use ISaGRAF functions to read multiple strings from a file?

This FAQ-172 provides an ISaGRAF demo program to show the way to use the "MSGARY_R(addr)" and the "MSGARY_W(addr,msg)" functions to read multiple strings from a file. For instance, the "User_file.txt" file has five rows and three columns for a total of fifteen strings. Then, user can use MSGARY_R(1) in the ISaGRAF program to get the first string "0F02B37837", using MSGARY_R(2) to get the 2nd string "USER01", using MSGARY_R(3) to get the 3rd string "GRANT" and using MSGARY_R(15) to get the 15th string "DENY", and so on.



1.1. Download / Upgrade the ISaGRAF Driver

The following ISaGRAF WinCE PACs support the MSGARY_R(addr) and the MSGARY_W(addr,msg) functions, and the new ISaGRAF driver versions are shown as below.

ISaGRAF WinCE PAC	ISaGRAF Driver Version
XP-8xx7-CE6	Ver. 1.46 or later
XP-8xx7-Atom-CE6	Ver. 1.03 or later
WP-8x47/8x37	Ver. 1.66 or later
WP-5147	Ver. 1.12 or later
VP-25W7/23W7/4137	Ver. 1.59 or later

Download the ISaGRAF Driver:

If your ISaGRAF does not support these functions, go to the website to download the new ISaGRAF driver. <u>ISaGRAF Web Page</u> > Download – <u>Driver</u>

http://www.icpdas.com/root/product/solutions/softplc_based_on_pac/isagraf/isagraf.html

Upgrade:

Refer to the PDF included in the downloaded ZIP file (e.g., "vp-2xw7-1.59.zip") to upgrade the ISaGRAF driver.

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1.2. Download / Restore the ISaGRAF Project

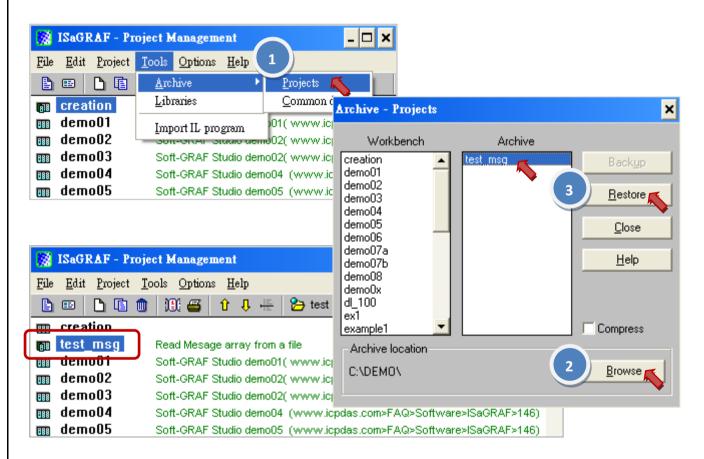
Download the demo program:

Go to <u>ISaGRAF Web Page</u> > Download – <u>FAQ</u> > FAQ-172 to download the "faq172_demo_chinese.zip" file. This file includes this document, the ISaGRAF demo program ("test_msg.pia") and the data file ("User_file.txt").

Restore the demo program:

Unzip the file and then restore the ISaGRAF demo program ("test_msg.pia") to the PC/ISaGRAF.

- 1. Click "Tools \rightarrow Archive \rightarrow Projects" to open the "Archive Projects" window.
- Restore the "test_msg.pia" project to the ISaGRAF Workbench from an assigned folder (e.g., "C:\DEMO").



3. Then, copy the "User_file.txt" data file to the "\Micro_SD\" folder of the ISaGRAF PAC by using the FTP or USB Disk. (In this example, the "\Micro_SD\" is the default file location for this ISaGRAF project to read strings).

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1.3. Introduction of the demo program

Project Architecture:

There are two ST programs in this project. Click the "Dictionary" button to see the variables that used in these programs.

 ISaGRAF - TEST_MSG - Programs
 _ □ ×

 File
 Make
 Project
 Iools
 Debug
 Options
 Help

 Image: Project
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 Image: Project
 Image: Project
 Image: Project

 Begin:
 Image: Project
 Image: Pr

ISaGRAF Variables Table:

"Booleans" variables:

🏷 ISaGRAF - TESI	🏷 ISaGRAF - TEST_MSG - Global booleans 🛛 🗖 🗙							
<u>File Edit T</u> ools <u>Op</u>	tions <u>H</u> elp							
	🖴 🔵 🕓 🌔) 🗄 🖁	< 🗈 🤞 📉 🖴					
			instances Defined words					
-Mamo /	Attrib.	Addr.	Comment					
TMP	[internal]	0000		1				
INIT	[internal]	0000	init as TRUE, set it to TRUE if wannar read one more time					
reach_file_end	[internal]	0000	TRUE: reach the end of the file					
			//					
file1 ok	[internal]	0000	TRUE: read file ok, FALSE: something wrong					
_			//					
get_msg	[internal]	0000	set as TRUE to get the message in the MSGARY_R(addr)					
0_0				-				

Name	Type Attribute		Description			
ТМР			For temporary usage.			
INIT			Set this "True" to read the data file again. To declare its initial value as "True".			
reach_file_end	Boolean	Internal	When the status is "True", it means reach the end of the file.			
file_ok			When the status is "True", it means read file OK. When the status is "False", it means read file error.			
get_msg			Set this "True" to get message by using the "MSGARY_R(addr)" function.			

	ion IS	aGRAF E	Engli	ish FAC	2-172	<u>.</u>	1			
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"Integers	/Reals".'	"Messag	es" v	variable	es:					
	×	RAF - TEST			ul integ	ers/reals			- 🗆 🗙	
	<u>File Edit</u>	<u>T</u> ools <u>O</u> pt			à 🖛	* 🗈 💰 📉	· 🖅			
	Booleans					FB instances Defi				
	Name file1		Aurib		Addr.	Comment File ID: 0 mean		exist		
	ii amount_in_row		[inter	nal,integer]	0000	index of the "fo	or end_for			
			[inter	nal,integer] nal,integer]	0000	string amount i	reachrow			
	tmp_st	r_len	[interi	nal,integer]	0000	"				
	row_ап str аm		1	nal,integer] nal,integer]		returns the rov return the total				
		ount				11	-		(108.11)	
	addr		linteri	nal,integer]	10000	1 ~ 1024 , to g∉	et which addr	ess in the MSGAR\	r_vv(addr)	
	· ·	Toole Opt			il messa	ages			- 🗆 🗙	
	<u>File E</u> dit	<u>T</u> ools <u>O</u> pt			2) v≞	* 🗈 💰 🖄	<u> </u>			
	Booleans					B instances Defi				
	Name file1 na		Attrib. [intern		Adar. 0000	Comment len = 255				
	tmp_st		[interr		0000	len = 255				
	msg_va	al	[interr	nal]	0000	// the message va	lue in the MS(ЭARY_R(addr)		
		IIISy_vai liike								
									•	
Name		Туре		Attrib	ute	Descriptio	n		Y	
Name file1		Туре		Attrib	ute	•		ile doesn't ex	 kist.	
		Туре		Attrib	ute	File ID: 0	means fi	ile doesn't ex ' loop in this		
file1 ii	in row	Туре		Attrib	ute	File ID: 0 For the use	means fi e of "For"		program.	
file1 ii amount		Туре		Attrib	ute	File ID: 0 For the use It stands fo (In this exa	means fi e of "For" or the stri mple, th	' loop in this ing amount in e value is 3)	program.	
file1 ii amount_ tmp_byt	e .	Туре		Attrib	ute	File ID: 0 For the use It stands fo (In this exa For tempo	means fi e of "For" or the stri imple, the rary usag	' loop in this ing amount in e value is 3) ge.	program. n each row	
file1 ii amount	e .	Type Integer	_	Attrib	ute	File ID: 0 For the use It stands fo (In this exa For tempo It stands fo	means fi e of "For" or the stri imple, the rary usagor string l	' loop in this ing amount in e value is 3) ge. ength. (For t	program. n each row emporary u	
file1 ii amount_ tmp_byt	e _len		_	Attrib	ute	File ID: 0 For the use It stands fo (In this exa For tempo It stands fo It stands fo	means fi e of "For" or the stri imple, the rary usag or string l or the tot	' loop in this ing amount in e value is 3) ge. ength. (For to al amount of	program. n each row emporary u	
file1 ii amount_ tmp_byt tmp_str_	e _len		_	Attrib		File ID: 0 For the use It stands fo (In this exa For tempo It stands fo (In this exa	means fi or the stri mple, the rary usag or string l or the tot	' loop in this ing amount in e value is 3) ge. ength. (For t al amount of e value is 5)	program. n each row emporary u rows.	
file1 ii amount_ tmp_byt tmp_str_	elen ount					File ID: 0 For the use It stands fo (In this exa For tempo It stands fo (In this exa It stands fo (In this exa	means fi e of "For" or the stri imple, the rary usag or string l or the tot imple, the or the tot	' loop in this ing amount in e value is 3) ge. ength. (For the al amount of e value is 5) al amount of	program. n each row emporary u rows.	
file1 ii amount_ tmp_byt tmp_str_ row_amo str_amo	elen ount					File ID: 0 For the use It stands fo (In this exa For tempo It stands fo (In this exa It stands fo (In this exa	means fi or the stri imple, the rary usag or string l or the tot imple, the or the tot	' loop in this ing amount in e value is 3) ge. ength. (For tr al amount of e value is 5) al amount of e value is 15)	program. n each row emporary u rows.	ısage)
file1 ii amount_ tmp_byt tmp_str_ row_am	elen ount					File ID: 0 For the use It stands fo (In this exa For tempo It stands fo (In this exa It stands fo (In this exa The string	means fi e of "For" or the stri imple, the rary usag or string l or the tot imple, the or the tot imple, the address v	' loop in this ing amount in e value is 3) ge. ength. (For tr al amount of e value is 5) al amount of e value is 15)	program. n each row emporary u rows. strings. y the "MSG	isage)
file1 ii amount_ tmp_byt tmp_str_ row_amo str_amo addr	e _len ount unt					File ID: 0 For the use It stands fo (In this exa For tempo It stands fo (In this exa It stands fo (In this exa The string function. (<i>J</i> It stands fo	means fi e of "For" or the stri mple, the rary usag or string I or the tot mple, the address F Address F or the file	' loop in this ing amount in e value is 3) ge. ength. (For to al amount of e value is 5) al amount of e value is 15) wish to get bo Range: 1 ~ 10 location. (In	program. n each row emporary u rows. strings. y the "MSG 24) this examp	isage)
file1 ii amount_ tmp_byt tmp_str_ row_amo str_amo addr file_nam	e _len ount unt	Integer				File ID: 0 For the use It stands fo (In this exa For tempo It stands fo (In this exa It stands fo (In this exa The string function. (<i>A</i> It stands fo located at	means fi e of "For" or the stri imple, the rary usag or string l or the tot imple, the or the tot address v Address f or the file '\Micro_S	' loop in this ing amount in e value is 3) ge. ength. (For tr al amount of e value is 5) al amount of e value is 15) wish to get b Range: 1 ~ 10 location. (In SD\User_file	program. n each row emporary u rows. strings. y the "MSG 24) this examp .txt')	isage) ARY_R(addr)"
file1 ii amount_ tmp_byt tmp_str_ row_amo str_amo addr	e _len ount unt					File ID: 0 For the use It stands fo (In this exa For tempo It stands fo (In this exa It stands fo (In this exa The string function. (<i>A</i> It stands fo located at For the ter	means fi or the stri imple, the rary usag or string l or the tot imple, the or the tot address v Address f or the file '\Micro_S	' loop in this ing amount in e value is 3) ge. ength. (For tr al amount of e value is 5) al amount of e value is 15) wish to get b Range: 1 ~ 10 location. (In SD\User_file usage in the f	program. n each row emporary u rows. strings. y the "MSG 24) this examp .txt') "MSGARY_	ARY_R(addr)"
file1 ii amount_ tmp_byt tmp_str_ row_amo str_amo addr file_nam	e _len ount unt	Integer				File ID: 0 For the use It stands fo (In this exa For tempo It stands fo (In this exa It stands fo (In this exa The string function. (<i>A</i> It stands fo located at For the ter	means fi or the stri imple, the rary usag or string l or the tot imple, the or the tot address v Address f or the file '\Micro_S	' loop in this ing amount in e value is 3) ge. ength. (For tr al amount of e value is 5) al amount of e value is 15) wish to get b Range: 1 ~ 10 location. (In SD\User_file	program. n each row emporary u rows. strings. y the "MSG 24) this examp .txt') "MSGARY_	ARY_R(addr)"
file1 ii amount_ tmp_byt tmp_str_ row_amo str_amo addr file_nam tmp_str	e _len ount unt	Integer				File ID: 0 For the use It stands fo (In this exa For tempo It stands fo (In this exa It stands fo (In this exa The string function. (<i>A</i> It stands fo located at For the ter	means fi e of "For" or the stri imple, the rary usag or string l or the tot imple, the or the tot address for the file '\Micro_S mporary t	' loop in this ing amount in e value is 3) ge. ength. (For tr al amount of e value is 5) al amount of e value is 15) wish to get b Range: 1 ~ 10 location. (In SD\User_file usage in the f	program. n each row emporary u rows. strings. y the "MSG 24) this examp .txt') "MSGARY_	ARY_R(addr)"

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T <u>1 Program</u> :							
(* Read string	g array in a file a	ind store t	hem by "M	SGARY_W(a	ddr, string)" .		
File forma	at : each row en	d with <cf< td=""><td><pre>LF>, eacl</pre></td><td>h row has 3</td><td>strings</td><td></td><td></td></cf<>	<pre>LF>, eacl</pre>	h row has 3	strings		
0F02	B37837 USER02	L GRANT					
0F02	B376EE USER02	2 DENY					
0F02	B37B0B USER0	3 GRANT					
0F02	B37DCA USER0	4 GRANT					
¦ 0F02	B37C60 USER0	5 DENY					
Then MS0	GARY_R(1) will r	eturn '0F0	2B37837'.				
MSG	iARY_R(2) will re	eturn 'USE	R01'.				I
MSG	iARY_R(3) will re	eturn 'GRA	NT'.				
i MSG	iARY_R(4) will re	eturn '0F02	2B376EE'.				
MSG	ARY_R(5) will re	eturn 'USE	R02'.				I
MSG	ARY_R(6) will re	eturn 'DEN	Y'.				
MSG	ARY_R(13) will	return '0	F02B37C60	ľ.			
MSG	ARY_R(14) will	return 'L	ISER05'.				
MSG	ARY_R(15) will	return 'D	ENY'.				
The addr	parameter can	be 1 to 102	24 in the M	SGARY_R(ad	dr) and MSG	ARY_W(ad	dr,msg) .
*)							
(* INIT is decl	lared with initia	value TRU	JE *)				
if INIT the	en						
INIT := FA	LSE ;						
file1_nam	ne := '\Micro_SD	\User_file	.txt' ;				
file1_ok :	= FALSE;(* In	it as "not o	ok" *)				
reach_file	e_end := FALSE ;	(* Init a	s no reach t	the end of fi	le yet *)		
amount_i	in_row := 3;(* This exar	nple has 3 s	strings in ea	ch row *)		
row_amo	ount := 0;(* Ir	it total rov	w amount a	s 0 *)			
str_amou	int := 0;(* Ini	t total strir	ng amount a	as 0 *)			
¦ file1 := f	ropen(file1_nar	ne);(* T	ry to open	file1 *)			
if file1 =	· · –	•		-			
(* File	doesn't exist *)					
else							
i I							
L							
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         (* File does exist, open it and read and then close it at the end *)
         while (reach_file_end = FALSE) and (row amount < 1024/amount in row) do
                                               (* Each row has 3 strings in this example *)
            for ii := 1 to amount in row do
                if reach file end then
                   exit ; (* Reach file end, exit "for" loop *)
                end if;
                tmp str := ";
                tmp str_len := 0 ; (* Init string length as 0 *)
                while tmp str len < 255 do (* Max string length is 255 in ISaGRAF *)
                   TMP := f_eof(file1) ;
                   if TMP then
                       (* Reach the end of the file *)
                       reach file end := TRUE;
                       if tmp str len > 0 then
                      (* The current read message is complete, store this string by MSGARY W() *)
                          str amount := str amount + 1;
                          TMP := MSGARY W(str amount, tmp str);
                          if ii = amount in row then
                              row amount := row amount + 1;
                          end if;
                       end_if;
                       if (row amount > 0) and (MOD(str amount, amount in row) = 0) then
                          file1 ok := TRUE ; (* File read successfully *)
                       end_if;
                              (* Exit "while" loop *)
                       exit ;
                   end if;
                   (* It hasn't reach file end *)
                   tmp byte := f read b(file1); (* Read 1 bytye *)
                         (tmp byte = 0) (* Wrong string character or f read b() fail *)
                   if
                       or (tmp_byte = 32) (* CHAR(32) = '', space *)
                       or (tmp_byte = 9) (* CHAR(9) = HT , Horizontal Tab *)
                       or (tmp_byte = 44) (* CHAR(44) = ',', Comma *)
                       or (tmp_byte = 13) (* CHAR(13) = CR *)
                       or (tmp_byte = 10) (* CHAR(10) = LF *)
                   then
                       if tmp_str_len > 0 then
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```

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                    (* The current read message is complete, store this string by MSGARY W() *)
                          str_amount := str_amount + 1;
                          TMP := MSGARY W(str amount, tmp str);
                          if ii = amount_in_row then
                              row amount := row amount + 1;
                          end if;
                          exit ;
                                 (* Exit "while" loop *)
                       end if;
                    else
                       (* Other character, add it into the tmp str *)
                       tmp str := tmp str + CHAR(tmp byte);
                       tmp str len := tmp str len + 1;
                    end_if;
                end while;
             end for;
         end while;
         TMP := f_close(file1) ;
      end if;
  (* If the final result is file1 ok = TRUE, then the "row amount" is the total row amount in this
  file *)
  end if;
<u>ST2 Program</u>: To get the result of message array.
                                                 (* Read one message in the MSGARY( addr ) *)
  if get_msg then
      get msg := FALSE ;
      msg_val := MSGARY_R( addr ) ;
  end_if;
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```

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						3	,
1.4. Test the	e demo progra	am					
Users must dowr	Users must download the ISaGRAF project ("TEST_MSG") to the PAC before test it.						
Download the IS	aGRAF project						
	enu bar "Make		pplication" or	the tool l	outton to re-c	ompile the I	SaGRAF
project.							
	ISaGRAF - TEST				<u> </u>		
File			Options Help	4 🗐 🗉	•		
Begi			the beginning a				
			compile 🥤 3. [Download	2. Set th	e PAC IP	
			/1		FL		
2. Click the m	enu bar "Debu	$\overline{2} \rightarrow \text{Link set}$	etup" or the to	ol button	to set the do	wnload IP (i.	e PAC IP).
				or button			
	PC-PLC li	nk paramete:	rs			×	
	Taract SI	ave Number:	1			_	
					<u> </u>	_	
		cation port:	ETHERNE	T <u>-</u>	<u>C</u> ancel		
	Control	narameters			Setup		
	Internet address:	192.168.7	1.19	<u>0</u> K			
	Port number:	502		<u>C</u> ancel			
	The Workbenc						
	library for TCP-I that this file is co	rrectly installed	ions. Ensure d on the hard				
		disk.					
3. Click the m	enu bar "Debu	$g \rightarrow Debug$	" or the tool b	utton to (download the	"TEST MSG	" project.
	ess is successful					—	
	ISaGRAF - TEST		ugger			- 🗆 ×	
	Control Tools (∰)) ≈ ►	puons <u>H</u> eip	A P				
RU				naximun	n=12 overfl	ow=0	
		ICP DAS	Co., Ltd. Techn	ical Docu	iment		

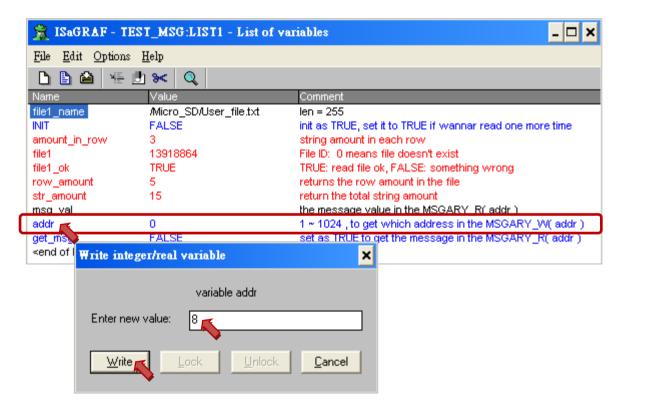
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<u>Test Way</u>:

Users will see the "Spy lists" after downloading the ISaGRAF project (or click "Tools \rightarrow Spy lists" in the "Debugger" window).

Notice: This project will try to read the data file once while running on a PAC. In this "Spy lists", If the "file_ok" shows "FALSE" that means error reading from file, verify that the file exists in the specified location (e.g., "\Micro_SD\User_file.txt") and the file format is correct (e.g., If the "amount_in_row" is specified as 3 that means there are three strings in each row. So, if there are only two strings in a row, it will cause a read error.) After the confirmation, set the "INIT" to "TRUE" to read the file again.

1. Double click the "addr" variable and assign a value (e.g., 8) to read the Nth string in the data file.



In this "Spy lists", the value of the "row _amount" is 5 and the value of the "str _amount" is 15 that means there are total five rows and fifteen strings in this data file.

The corresponding sequence of these strings:



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	k the "get_msg" ill auto reset to '		o set it as "TRU	E" to ge	et the string.				
Name	Value		Comment						
file1_name	_	D/User_file.tx							
INIT	FALSE			· · · · · · · · · · · · · · · · · · ·	RUE if wannar rea	id one more tin	ne		
amount_in_				string amount in each row					
file1 file1_ok	1391886 TRUE	13918864		File ID: 0 means file doesn't exist TRUE: read file ok, FALSE: something wrong					
row amour				returns the row amount in the file					
str_amount				return the total string amount					
msg_val				the message value in the MSGARY_R(addr)					
addr	8		1 ~ 1024 . t	o det whic	get which address in the MSGARY_W(addr)				
get_msg	FALSE		set as TRU	E to get the	message in the M	SGARY_R(ac	ldr)		
<end list<="" of="" td=""><td>Write boolean v</td><td>variable g</td><td></td><td>×</td><td></td><td></td><td></td></end>	Write boolean v	variable g		×					

3. Now, the return value of the "msg_val" variable is shown as below (e.g., "USER03")

Name	Value	Comment
file1_name	/Micro_SD/User_file.txt	len = 255
INIT	FALSE	init as TRUE, set it to TRUE if wannar read one more time
amount_in_row	3	string amount in each row
file1	13918864	File ID: 0 means file doesn't exist
file1_ok	TRUE	TRUE: read file ok, FALSE: something wrong
row_amount	5	returns the row amount in the file
str. amount	15	return the total string amount
msg_val	USER03	the message value in the MSGARY_R(addr)
addr	8	1 ~ 1024, to get which address in the MSGARY_W(addr)
get_msg <end list="" of=""></end>	FALSE	set as TRUE to get the message in the MSGARY_R(addr)

Note: If the value of the "addr" variable exceeds the total amount of strings (e.g., 20 > 15), It will show null string.

