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SMOKE SIGNAL BROADCASTING

SG-I

SOURCE GENERATOR

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SOURCE GENERATOR

INTRODUCTION

The SOURCE GENERATOR (SOURCE GEN) is a program for disassembling object code into source code which may then be directly assembled or edited.

The output of SOURCE GEN may be written to tape or disc in one of two forms: either SWTPCo's Co-resident assembler format or SMOKE SIGNAL BROADCASTING's Text Editing system format. SOURCE GEN will output to the terminal the number of bytes of code generated, the number of external labels, the number of local labels, and the number of variables in order to facilitate the computing of memory space necessary to assemble the source code generated.

OPERATING THE SOURCE GENERATOR

STEP 1: LOAD THE PROGRAM TO BE DISASSEMBLED

The program to be disassembled must be present in memory when the SOURCE GENERATOR is executed.

STEP 2: LOAD THE SOURCE GENERATOR

The SOURCE GENERATOR is loaded into memory from either cassette or disc depending on the user's system (see APPENDIX A for addressing space versions available).

STEP 3: BEGIN EXECUTING SOURCE GEN

Begin executing SOURCE GEN at location \$X000 (where X is the high order load address of SOURCE GEN; see APPENDIX A for the addressing space versions supplied).

STEP 4: ENTER THE RANGE OF MEMORY TO BE DISASSEMBLED

The SOURCE GENERATOR will ask for the starting address:

DISSA FROM

Enter the starting address of the object program as a four digit hex number. SOURCE GEN will respond by typing "TO":

DISSA FROM ssss TO

Enter the ending address of the object program being disassembled as a four digit hex number. The display will now show:

DISSA FROM ssss TO eeee

Where "ssss" is the starting address and "eeee" is the ending address

STEP 5: ENTER THE RAM AREA WHICH MAY BE USED BY SOURCE GEN

The SOURCE GENERATOR requires an area of memory in which it can build a symbol table. Enter the memory address range which SOURCE GEN may use, keeping in mind that each symbol requires four bytes.

SYMBOL TABLE FROM ssss TO eeee

STEP 6: SPECIFYING KNOWN VARIABLE AREAS

SOURCE GEN will ask if there are any known variable storage areas within the address range being disassembled. If there are no known areas, enter "N" for NEXT to proceed to the next step. If there are known variable areas, then enter "V" for VARIABLES. Follow the "V" by the address range of the area:

(V)AR OR (N)EXT V ssss TO eeee
(V)AR OR (N)EXT V ssss TO eeee
(V)AR OR (N)EXT N

STEP 7: SPECIFYING KNOWN DATA (CONSTANT) AREAS

If any areas within the address range being disassembled are known to be data constants then the address ranges of these areas may now be specified as in the previous step. Enter "G" to go on to the next step if no areas are known; otherwise, enter "D" and the address ranges:

(D)ATA OR (G)O D ssss TO eeee
(D)ATA OR (G)O G

STEP 8: PASS ONE DISASSEMBLY

SOURCE GEN will now perform a one pass disassembly of the object program in order to locate and categorize all labels, variables, and constants. At the completion of this pass, SOURCE GEN will prompt with:

D OR T OR P OR L?

Entering one of the options (D,T,P, OR L) will perform one of the following functions:

- D The source code is saved on disc.
- T The source code is saved on tape.
- P The source code is listed on a PR-40, or other compatible, type printer.
- L The source code is listed on the terminal.

<CR> A carriage return sends SOURCE GEN back to STEP 4.

<ESC> An ESCAPE returns control to SMARTBUG<03>

Upon entering "D" or "T", SOURCE GEN will ask for the desired format.

Entering "S" will generate source code compatible with the SMOKE SIGNAL BROADCASTING TEXT EDITING SYSTEM (ie, no line numbers and no line feeds following carriage returns). Entering any other letter will result in generation of source code compatible with the SWTPCo's Co-resident assembler.

If "T" was selected for tape output, the control signals for an AC-30 will be generated. If "D" was selected for disc output, SOURCE GEN will ask for the file name by which to save the source.

Upon entering "P" or "L", SOURCE GEN will ask for a 'pause' count. The 'pause' count is the number of lines to listed to the terminal, or the number of pages to be printed on the printer, before SOURCE GEN pauses while you view the listing. The pause count is entered as a single hex digit where the value of the digit is the number of lines (on the terminal) or pages (on the printer) to be printed between 'pauses'. Once SOURCE GEN pauses, the listing may be continued by striking any key other than carriage return. Striking carriage return will cause SOURCE GEN to terminate the listing and return to prompt after the pass one disassembly in step 8. NOTE: a pause count of zero will result in a continuous listing without any pauses.

To exit back to MIKBUG or SMARTBUG, enter an ESC (escape) in place of the D,T,P, or L.

OPERATIONAL NOTES:

If in pass one of the disassembly, the symbol table area is exceeded, or the maximum number of labels is exceeded (SOURCE GEN will handle no more than 4095 symbols, i.e. \$FFF), an error message will be output and SOURCE GEN will return to STEP 4.

At the completion of pass two of the disassembly, SOURCE GEN will display (in hex) the number of external labels, local labels, and variables generated. Further, if the disc or tape options were selected, the total number of bytes of source code generated will be displayed.

If a mistake is made entering data, entering any non-hexadecimal character will cancel the line and SOURCE GEN will ask the question over again. If an invalid command letter is entered, SOURCE GEN will also ask again for the command.

There are three entry points into SOURCE GEN. The first is at location \$X000 (where X is the high order digit of the load address for SOURCE GEN). This is the normal cold start entry point. The second entry point, at location \$X003, is the warm start entry point which will restart SOURCE GEN at the question in STEP 8. The third entry point, at \$X006, is a listing pickup point for use in the case of printer jams. This entry point causes SOURCE GEN to first ask for the instruction address at which to restart the listing. Second, SOURCE GEN asks for the listing line number corresponding to the instruction address. Third, SOURCE GEN asks for the page number to start on (all numbers are entered as four digit numbers). SOURCE GEN then goes to the question asked in STEP 8.

NOTE: Only use the second and third entry points after you have done the first pass of the disassembly.

ADAPTING SOURCE GEN FOR NON-STANDARD SYSTEMS

This section contains information relevant to patching SOURCE GEN for different hardware configurations and software conventions (Most of the following information is summarized in APPENDIX B).

The location of the base address for the printer port is stored in locations \$X024 and \$X025.

If your tape write routine does not use the SMARTBUG or MIKBUG output function, then change the JMP at \$X012.

As delivered, SOURCE GEN outputs compacted source code. That is, generated labels are output, for example, as L3 as opposed to L003. If it is desired to output the label in the more unique form without the zero suppression then place NOP instructions in the bytes at locations \$X69B and \$X69C. Doing so will facilitate program editing using editor change functions to scan the entire program without conflicts. Otherwise, note that changing L3 might be confused with changing L300.

It is possible to increase the line number increment by storing the packed BCD increment in location \$X028. For example, to have line numbers incrementing by 10, set \$X028 to \$10.

Provisions for generating a form feed following each listing page have been provided. At locations \$XF2B through \$XF2D is the string \$00,\$00,\$0A in which the form feed control character(s) may be placed.

The number of lines per listing page is defined by the byte at location \$XAB0. The number of lines skipped down from the top of the page is determined by the byte at \$XAC4.

If you do not have a disc system, it would be advisable to change the JMP at \$X01B to \$7E,\$X0,\$03. This prevents anything bad from happening should you respond to with a "D" to the question "D OR T OR P OR L?".

LICENSE

Purchase of this manual and the media containing SOURCE GEN program conveys to the purchaser a license to copy SOURCE GEN for his own use, and not for sale or free distribution to others. No other license, expressed or implied is granted.

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APPENDIX A

SOURCE GEN comes assembled for four different addressing spaces as follows:

\$1000 \$3000 \$6000 \$C000

- 6F34

When supplied on cassette tape, these are ordered as follows:

Side one first program is the \$1000 version
Side one second program is the \$3000 version
Side two first program is the \$6000 version
Side two second program is the \$C000 version

When supplied on diskette, the files are named as follows:

\$1000 version is named SGl.1
\$3000 version is named SGl.3
\$6000 version is named SGl.6
\$C000 version is named SGl.C

APPENDIX B

The following table is a summary of the information contained in the first portion of SOURCE GEN (locations \$X000 through \$X028). This information may be useful to those wishing to modify SOURCE GEN for non-standard systems.

<u>ADDR</u>	<u>NAME</u>	<u>CONTENTS</u>	<u>USAGE</u>
X000	COLDS	JMP \$X0B8	Cold start entry point
X003	WARMS	JMP \$XA98	Warm start entry point
X006	PICKUP	JMP \$X2F5	Entry point to restart an interrupted listing
X009	DEBUG	JMP \$E0E3	Exit to users resident monitor
X00C	INEEE	JMP \$E1AC	Character input routine for terminal
X00F	OUTEEE	JMP \$E1D1	Character output routine to terminal
X012	OUTTAP	JMP \$E1D1	Character output to cassette tape
X015	PRINIT	JMP \$XAF3 ^D	Printer initialization routine D30F
X018	WRITEP	JMP \$X944-	Output character to printer 0312
X01B	DISCOP	JMP \$XB06	Request disc file name and open file
X01E	DISCWR	JMP \$XB50	Character output to disc
X021	DISCOF	JMP \$XB3A	Close disc file
X024	PRPORT	FDB \$801C	Base address of printer PIA
X026	STACK	FDB \$A032	Stack area definition
X028	INC	FCB \$01	Packed BCD of line number increment
X69B		BEQ *+9	NOP this instruction to not suppress zeros in
XAB0		FCB 56	Number of lines to print per listing page
XAC4		FCB 3	Number of lines to skip at top of a new page
XF2B		FCB 0,0,13,4	String to output to perform top of form

