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Utility Program Descriptions

Milestone 11
Write Change Tape (SWRTOUT)

by

R. C. Wise

12 March 1963

Approved

J. B. Munson

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IDENTIFICATION
A. Title: Write Change Tape (SWRTOUT), Ident K35 Mod AE
B. Programmed: R. C. Wise, System Development Corporation
   1 February 1963
C. Documented: R. C. Wise, System Development Corporation
   15 February 1963

PURPOSE
SWRTOUT produces a tape for later use by the program SMERGE. The tape contains messages input to SWRTOUT and operated upon by SWRTOUT. SWRTOUT accepts individual or grouped messages from a user program and collects like messages until a block of these messages is built. It then adds a checksum and writes the messages on a magnetic tape.

USAGE
A. Calling Sequence
   L  RTJ  SWRTOUT
   N  B
   L+1  ERROR RETURN
   L+2  NORMAL RETURN
Where: "N" is the number of words in buffer starting at location "B".

B. Parameters
   "N" is the number of words to be accepted by SWRTOUT. "N" occupies bits 15 to 23 of location L. If "N" is zero, SWRTOUT will terminate operation by calling SMERGE.

   "B" is the starting location of the first message SWRTOUT is to accept. "B" occupies bits 0 to 14 of location L.

C. On-line Messages
   SWRTOUT has two messages, both are printed on the on-line 1612.
1. PLEASE MOUNT WRITE TAPE FOR SWRTOUT ON TAPE 18, AND HIT START.
2. UNRECOVERABLE ERROR IN SWRTOUT - MOUNT NEW TAPE 18 AND REINITIATE PREVIOUS FUNCTION . . 

Message 1 occurs the first time SWRTOUT is entered.

Message 2 occurs if there is persistent write parity or write length error, the change tape is too short, or a commanding message cannot be verified.

D. Tape Assignments
SWRTOUT uses tape 18 - unit 1, cabinet 2, channel 5/6 for the change tape.

E. Input Formats
The individual messages are described in Reference A.

Grouped messages must have each individual message begin left justified in the 1604 word. Only like messages (i.e., same message code) may be grouped.

F. Output
The Change Tape

The Change tape is an intermediate tape produced by SWRTOUT for the use of SMERGE.

It is a single file tape, each record is a message block. Message blocks concerning a given vehicle, station, revolution are separated by a header record specifying the vehicle, station and revolution. Maximum record size is 512 words.
CHANGE TAPE FORMAT

Header \( V_1 R_j S_k \)

BLOCK A \( (V_1 R_j S_k) \)

BLOCK B \( ("\) \)

BLOCK C \( ("\) \)

Header \( V_1 R_m S_n \)

BLOCK B \( (V_1 R_m S_n) \)

Header \( V_o R_p S_q \)

BLOCK A \( (V_o R_p S_q) \)

BLOCK B \( ("\) \)

BLOCK A \( ("\) \)

EOF

G. Error Return

The error return in the SWRTOUT calling sequence is not presently used, but must be present as SWRTOUT returns to L+2 for a normal return.

When an unrecoverable error occurs, SWRTOUT informs the operator of the error and halts. No restart is possible - the previous function must be reinitiated.

OPERATING DESCRIPTION

SWRTOUT is entered by the user program with an RTJ instruction followed by two parameters; the "B" parameter specifying the location of the input message block and the "N" parameter specifying the number of words in the message block \( (1 \leq N \leq 511) \).
SWRTOUT will make the following checks.

1. If buffer is empty, transfer input to buffer.
2. If buffer is not empty
   a. If message type input is same as buffer type
      1) If the number of words input plus the number of words in buffer is greater than 511 words, write the buffer and transfer the input to the buffer.
      2) Transfer the input to buffer
   b. Write the buffer and transfer the input to the buffer.

If SWRTOUT writes the buffer on the Change Tape, a complement checksum of the buffer will be added to the record written. If a block consists of commanding messages, SWRTOUT will reread the record and verify the block, using a word-by-word comparison of a one word input buffer and the original message.

If the conditions for writing the output buffer are not met, SWRTOUT will immediately return to the user program after transferring the message block to its own output buffer.

Upon receipt of the "end of input" flag, SWRTOUT will empty its buffer, write an end of file, and transfer to SMERGE via the COPII successor call. The Change Tape will be rewound.

All error recoveries will be attempted four times before an error message is given.

RESTRICTIONS
A. SWRTOUT uses tape 18, unit 3, cabinet 2, channel 5/6
B. Interrupt is locked out by SWRTOUT.
C. Only one type of message may be in a message block.
D. Messages must start left justified in a 1604 word and must be an integral number of 1604 words.
E. An index register cannot be used in specifying the starting location of a message block.
F. Header messages must precede sets of message blocks.
G. SWRTOUT has a time dependent processing loop and should not be stopped.
H. SWRTOUT uses TAPE, PRINT1612, CALL.

TIMING
The timing of SWRTOUT is dependent upon the volume of data to be written on the change tape.

STORAGE

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TRANSFER FUNCTION

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<th>Operation</th>
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<tr>
<td>SWRTOUT</td>
<td>Disable interrupt. Set up exit. If this is initial entry, go to REW.</td>
</tr>
<tr>
<td>SWR1</td>
<td>Get input parameters. If &quot;N&quot; parameter is zero, go to FINIS.</td>
</tr>
<tr>
<td>SWR2</td>
<td>Set up index for transfer of data. If buffer is empty, go to INBUF.</td>
</tr>
<tr>
<td>CHKIN</td>
<td>If input message type differs from buffer go to OUTPUT (a SBR). If number of words to be input plus number</td>
</tr>
</tbody>
</table>
Area | Operation
-----|------------------

INBUF | Transfer input to buffer. Clear buffer, empty flag. Go to EXIT.

REW | Request a write tape on unit 18, rewind the tape. Go to SWR3.

SWR3 | Clear initial flag, go to SWR1.

FINIS | If buffer is empty, go to WEF. Go to OUTPUT.

WEF | Write an End-of-file on Tape 18. Rewind tape 18. Transfer control to SMERGE via MTCII's CALL.

OUTPUT (A SBR) | Compute complement checksum for buffer and store as last word of buffer.

VERIF | Backspace 1 record, Read record into 1 word buffer. Compare against record written. If cannot compare with four
Area Operation

tries, go to ERR.

INIT Initialize buffer flags and indices.
Return

TER Print message to operator and Stop.

ERR Same as TER

EXIT Return to user.

VALIDATION TESTS

SWRTOUT was validated by using a driver (Reference C) to input messages of varying types and lengths. These messages were written on the Change tape and the Change tape was sorted by SMERGE and a new Transfer tape was produced. The Transfer tape was dumped and the dump checked for the desired result.

REFERENCES

A. TM-891/001/00, 1604 Augmentation Communication Programs, Milestone 3/4, 22 December 1962.

B. The AFCPL number for SWRTOUT is 79935.

C. The AFCPL number for the SWRTOUT driver (SAUGY) is 810

D. TM-(L)-715/043/00, Utility Program Descriptions, Milestone 11, Merge Change and Transfer Tapes (SMERGE).
OUTPUT

Set up to write Buffout on Tape #18

Generate Check for Buffout

Tape write Check

Write OK

No

TER

Yes

Was Message Commanding

No

INIT

Yes

VCUR

In this 5th try

Yes

ERR

No

Backspace Tape

Read 1 word at a time & check against Buffout

No

Same

Yes

INIT

PRINT

Initialize Buffout Index & Flag

OUTPUT

ERR

TER

PRINT 1612

STOP

Print: Unrecoverable error in SWXOUT. Mount new tape & reinitiate previous function.
Print: Please mount a write tape for SWRTOUT on Tape 18, and hit start.
12 March 1963

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System Development Corporation,  
Santa Monica, California  
UTILITY PROGRAM DESCRIPTIONS, MILESTONE II,  
WRITE CHANGE TAPE (SWRTOUT)  
Scientific rept., TM(L)-715/044/00, by  
(Contract AF 19(628)-1646, Space Systems  
Division Program, for Space Systems  
Division, AFSC)  

Unclassified report  

DESCRIPTORS: Programming (Computers).  
Satellite Networks.  

Reports that SWRTOUT (Write Change Tape)  
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