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Utility Program Descriptions

Milestone 11

Write Change Tape (SWRTOUT)

12 March 1963
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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 $V_o R S_p q$

BLOCK A $(V_o R S_p q)$

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
   
   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
Program  1468
Buffer    10018
Total     11478

TRANSFER FUNCTION

<table>
<thead>
<tr>
<th>Area</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<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>
<tr>
<td>Area</td>
<td>Operation</td>
</tr>
<tr>
<td>--------</td>
<td>-----------</td>
</tr>
<tr>
<td></td>
<td>of words in buffer is greater than buffer length (511), go to OUTPUT.</td>
</tr>
<tr>
<td>INBUF</td>
<td>Transfer input to buffer. Clear buffer, empty flag. Go to EXIT.</td>
</tr>
<tr>
<td>REW</td>
<td>Request a write tape on unit 18, rewind the tape. Go to SWR3.</td>
</tr>
<tr>
<td>SWR3</td>
<td>Clear initial flag, go to SWR1.</td>
</tr>
<tr>
<td>FINIS</td>
<td>If buffer is empty, go to WEF. Go to OUTPUT</td>
</tr>
<tr>
<td>WEF</td>
<td>Write an End-of-file on Tape 18. Rewind tape 18. Transfer control to SMERGE via MTCII's CALL.</td>
</tr>
<tr>
<td>OUTPUT (A SBR)</td>
<td>Compute complement checksum for buffer and store as last word of buffer. Write buffer on tape. If any error after four tries, go to TER.</td>
</tr>
</tbody>
</table>
| 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).
SWRTOUT

Disable interrupt
Save index
Set up exit

Is Init Flag Zero?
Yes - REM
No - SWRTOUT

Get Buffer Parameter

Get Number of Words Parameter

Is Parameter Zero
Yes - FINIS
No - Set up to transfer words to Buffout

Is Buffout Empty?
Yes - INBUF
No - SWRTOUT

Is new Message same as OLD?
No - SWRTOUT
Yes - Is Number of Words in Buffout + New Words GR 911

INBUF

INBUF

Transfer New Words to Buffout.

Increase Buffout Index

Clear Buffout Empty Flag

EXIT

Restore Index & Return to L:2

INBUF
Set up to write Buffout on Tape #18
Generate Check for Buffout
Tape write Check
Write OK
Yes
No
TER

Was Message Commanding
Yes
No
INIT

Write OK

Yes

No

Yes

No

INOUT

In this 5th try
Yes

No

Backspace Tape

Exam 1 word at a time & check against Buffout

No

Same

Yes

INIT

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

REW

Print 1612

STOP

Tape Rewind #18

SWR3

Set Initflag = -1

SWR1

FINIS

Is Buffout Empty

No

OUTPUT

WEF

Yes

Write EOF

Tape #18

Rewind

Tape #18

Call SMERGE
Space Systems Division
(Contracting Agency)
Major C. R. Bond (SSOCD)

6594th Aerospace Test Wing
(Contracting Agency)
Col. A. W. Dill (TWRD)
Lt. Col. M. S. McDowell (TWRU) (2)
TWACS (6)
V. Thomas

PIR-E1 (Lockheed)
N. N. Epstein
C. H. Finnie
H. F. Grover
H. R. Miller
W. E. Moorman (5)
698BK Program Office

PIR-E2 (Philco)
J. A. Bean
J. A. Isaacs
R. Morrison
S. M. Stanley

PIR-E3 (LFE)
K. B. Williams (5)
D. F. Criley

PIR-E8 (Mellonics)
F. Druding

PIR-E5 (Aerospace)
F. M. Adair
R. D. Brandsberg
R. V. Bigelow
L. H. Garcia
G. J. Hansen (3)
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L. J. Kreisberg
T. R. Parkin
E. E. Retzlaff
H. M. Reynolds
D. Saadeh
R. C. Stephenson
V. White

PIR-E7 (STL)
A. J. Carlson

PIR-E4 (GE-Sunnyvale)
J. Farrentine
N. Kirby

PIR-E4 (GE-Santa Clara)
D. Alexander

PIR-E4 (GE-Box 8555)
J. S. Brainard
R. J. Katucki
J. D. Selby

PIR-E4 (GE-3198 Chestnut)
J. F. Butler
H. D. Gilman

PIR-E4 (GE-Bethesda)
W. L. Massey

PIR-E4 (GE-Box 8661)
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Skelton, R. H. 22148
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Speer, N. J. 24086A
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Sweeney, M. J. 25026
Taber, W. E. 22101
Tennant, T. C. 27029
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Wilson, G. D. 24124
Winsor, M. E. 22156
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Wise, R. C. 22085
Wong, J. P. Sunnyvale
Zubris, C. J. 24075
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Pruett, B. R.  22084
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Rosenberg, E. J.  14050
Russell, R. S.  14050
Scholz, J. W.  14039
Scott, R. J.  24110
Seacat, C. M.  Sunnyvale
Seiden, H. R.  22126B
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

DESRIPTORS: Programming (Computers).
Satellite Networks.

Reports that SWRTOUT (Write Change Tape)
produces a tape for later use by the
program SMERGE. The tape contains
messages input to SWRTOUT and
operated upon by SWRTOUT. Also
reports that SWRTOUT accepts individual
or grouped messages from a user program
and collects like messages until a block
of these messages is built, then adds
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a magnetic tape.