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TITLE	BUZZTAPE READER/WRITER
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BUZZTAPE READER / WRITER

Evan Suits
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ABSTRACT

The BUZZTAPE READER and WRITER programs can be used to build an inexpensive magnetic tape system for storage and retrieval of data or programs. Both the READER and WRITER occupy locations normally containing BIN. Transfer rate is about 4 msec per 12 bit word, or about 15 seconds for 4K.

REQUIREMENTS

STORAGE: READER - 7625 to 7736

WRITER - 7625 to 7717

Equipment:

READER - PDP 8/I
AX08
Stereo Tape Recorder

Writer - PDP 8/I
AX08 with XR Option
Stereo Tape Recorder

USAGE

LOADING: Both programs are loaded with the RIM Loader

OPERATION: READER - Load READER program with the RIM loader. Connect the 'RIGHT' channel of the tape recorder to the S1 PULSE INPUT of the AX08. Connect the 'LEFT' channel to the S2 pulse input. Set SR= 7625, and press LOAD ADDRESS. Activate tape recorder playback and press START. Output level indicators on the tape recorder, if any, may be monitored to determine when the loading is complete. When loading is complete, press STOP.

WRITER - Load WRITER with the program or data to be written out already in core memory. Connect AX08 contingency outputs R1 and R2 to 'RIGHT' and 'LEFT' tape recorder channel inputs, respectively. Set SR=7625 and press LOAD ADDRESS. Set SR= initial address of block of core memory to be written out and press START. Set SR= final address of the block and press CONTINUE. Activate the tape recorder in record mode and press CONTINUE. The WRITER will halt when the block has been written out. To write out subsequent blocks, set SR=initial address of next block and press CONTINUE. Set SR = final address of the block and press CONTINUE. Activate the tape recorder and press CONTINUE. Any number of blocks may be written out in this manner, or the WRITER may be restarted at 7625. The readout is non-destructive.

DESCRIPTION

GENERAL: The BUZZTAPE READER And WRITER make possible an inexpensive magnetic tape storage system which can load or unload a 4K core memory in about 15 seconds. A medium quality stereo tape recorder is used for recording and playback of programs or data. The READER requires an AX08 or similar pulse input device and the WRITER requires an AX08 with contingency outputs or similar pulse outputs.

FOR BEST RESULTS:

Use high quality, instrumentation type magnetic tape to minimize dropout.

Keep recording and playback levels as high as is possible without inducing distortion or "ringing".

Tape speed should be as fast as possible to maximize acuity and reliability

Leader and trailer should be used generously to prevent program overlap or interference

FORMAT: The 'LEFT' channel of the tape is used solely for synchronization purposes in telling the program when to look for a pulse on the 'RIGHT' channel. Information is stored serially in 12 bit word blocks, each word beginning with BIT 0. The 'RIGHT' channel is used both for data and address codes. As the 12 pulses of each word are read (or written) on the LEFT channel the RIGHT channel contains pulses corresponding to the '1's in the data word. A pulse on the RIGHT channel not accompanied by a 'SYNCH' pulse on the left channel indicates that the following 12 bit word is the initial address of the next block of data. Both the READER

and WRITER programs contain software address counter registers which are incremented after each data word is processed. In the WRITER program the address register is initialized at the beginning of the writeout of each data block. The address register of the READER program is incremented after each data word is deposited in core and is reset when an address code is encountered during readin.

TIMING: The WRITER produces pulses of 0.1 msec width with an interpulse interval of 0.2 msec. The READER program treats pulses whose leading edges are within 50 Usec (1/2 pulse width) of each other as arriving simultaneously. This prevents small fluctuations in pulse arrivals in the two channels from disrupting operation.

```
                / BUZZTAPE WRITER - OCT 69
                ZTEN=6342
                OTEN=6344
                        *7625
7625  7341  START,  CLA CLL
7626  7344          LAS             / GET INITIAL ADDRESS
7627  3251          DCA BEG         / SET ADDRESS REGISTER
7630  7402          HLT
7631  7344          LAS             / GET FINAL ADDRESS
7632  7144          CMA
7633  1251          TAD BEG         / CALCULATE BLOCK LENGTH
7634  3252          DCA NUM         / SET COUNTER FOR
7635  7402          HLT             / BLOCK LENGTH
7636  1253          TAD ADCODE
7637  4277          JMS PRINT       / OUTPUT ADDRESS CODE
7640  1251          TAD BEG
7641  4254          JMS WRITE       / OUTPUT INITIAL ADDRESS
7642  1651          TAD I BEG       / GET DATA WORD
7643  4254          JMS WRITE       / OUTPUT DATA WORD
7644  2251          ISZ BEG         / INCREMENT ADDRESS
7645  2252          ISZ NUM         / DONE WITH BLOCK?
7646  5242          JMP .-4         / NO, GET NEXT WORD
7647  7402          HLT             / YES, PREPARE FOR
7650  5225          JMP START       / NEXT BLOCK
7651  0000  BEG,     0               / ADDRESS REGISTER
7652  0000  NUM,     4
7653  0040  ADCODE,  40
7654  0000  WRITE,   0               / WORD OUTPUT ROUTINE
7655  3272          DCA WRHOLD      / STORE DATA WORD
7656  1273          TAD M14
7657  3274          DCA SET         / INITIALIZE COUNTER
7660  1272  NEXT,   TAD WRHOLD
7661  7004          RAL             / ROTATE FIRST DATA BIT
7662  3272          DCA WRHOLD      / INTO LINK
7663  7430          SZL             / IS THE BIT A '1'?
7664  1276          TAD BIT         / YES, GET BIT CODE
7665  1275          TAD SYNCH       / NO, OUTPUT SYNCH CODE
7666  4277          JMS PRINT       / ALONE
7667  2274          ISZ SET         / DONE WITH WORD?
7670  5263          JMP NEXT        / NO, GET NEXT BIT
7671  5654          JMP I WRITE     / YES, RETURN
7672  0000  WRHOLD, 0
7673  7764  M14,    -14
7674  0000  SET,    0
7675  0020  SYNCH,  20
7676  0040  BIT,    40
7677  0000  PRINT,  0               / OUTPUT ROUTINE
7700  6342          ZTEN            / SET CONTINGENCY
7701  6344          OTEN            / OUTPUTS
7702  1315          TAD DELY1
7703  3317          DCA DELY3       / LEAVE ON FOR
7704  2317          ISZ DELY3       / 0.1 MSEC
7705  5304          JMP .-1
7706  6342          ZTEN            / CLEAR OUTPUTS
```

```
7777  6344            ION
7711  1316            TAD DELY2
7711  3317            DCA DELY3
7712  2317            ISZ DELY3       / WAIT FOR 3.2 MSEC
7713  5312            JMP .-1         / INTERPULSE INTERVAL
7714  5677            JMP I PRINT
7715  7752  DELY1,    7752
7716  7724  DELY2,    7724
7717  1111  DELY3,    1
```

```
ADCODE  7653
BEG     7651
BIT     7676
DELY1   7715
DELY2   7716
DELY3   7717
MIA     7673
NEXT    7663
NUM     7652
OTEN    6344
PRINT   7677
SET     7674
START   7625
SYNCH   7675
WRHOLD  7672
WRITE   7654
ZTEN    6342
```

```
                / BIZTAPE READER - OCT 69
                XRCL=6334
                XRIN=6331
                        *7625
7625  7141  START,  CMA
7626  6334          XRCL            / CLEAR EXTERNAL
7627  7314          CLA CLL         / REGISTER
7630  4314          JMS LISN        / GET PULSE
7631  4275          JMS ADTEST      / ADDRESS CODE?
7632  5234          JMP .-2         / YES
7633  3271          DCA GETHLD      / NO, STORE PULSE
7634  1272          TAD CNTRN
7635  3273          DCA CNTR        / SET UP TO COUNT BITS
7636  3274          DCA VALUE       / CLEAR DATA REGISTER
7637  7111          CLL
7640  1271          TAD GETHLD      / GET FIRST BIT
7641  7106  GO,     RTL
7642  7104          RAL             / ROTATE INTO BIT 11 AND
7643  7100          CLL             / CLEAN OFF SYNCH PULSE
7644  3271          DCA GETHLD      / STORE RESULT
7645  1274          TAD VALUE       / GET DATA WORD
7646  7004          RAL
7647  1271          TAD GETHLD      / ADD IN NEXT BIT
7650  3274          DCA VALUE
7651  2273          ISZ CNTR        / 12 BITS YET?
7652  5255          JMP .+3
7653  1274          TAD VALUE       / YES, GET WHOLE WORD
7654  5257          JMP .+3         / GO TO PROCESSING
7655  4314          JMS LISN        / NO, GET NEXT BIT
7656  5241          JMP GO
7657  7000  BRANCH, NOP             / PROCESSING BRANCH
7660  3674          DCA I ADD       / DEPOSIT AS DATA
7661  2273          ISZ ADD         / INCREMENT ADDRESS
7662  5227          JMP START+2
7663  3271  ADDRS,  DCA ADD         / DEPOSIT AS ADDRESS
7664  1267          TAD NORP
7665  3257          DCA BRANCH      / SET BRANCH FOR DATA
7666  5227          JMP START+2
7667  7000  NORP,   NOP
7670  0000  ADD,    0               / ADDRESS REGISTER
7671  0000  GETHLD, 0
7672  7764  CNTRN,  -14
7673  0000  CNTR,   0
7674  0000  VALUE,  0
7675  0000  ADTEST, 0               / ROUTINE FOR SENSING
7676  3311          DCA ADHOLD      / ADDRESS CODE
7677  1311          TAD ADHOLD
7700  1312          TAD ADKEY
7701  7640          SZA CLA         / ADDRESS CODE?
7702  5306          JMP .+4
7703  1313          TAD ADPACH      / YES, SET BRANCH FOR
7704  3257          DCA BRANCH      / ADDRESS CHANGE
7705  5675          JMP I ADTEST
7706  2275          ISZ ADTEST
7707  1311          TAD ADHOLD      / NO, GET PULSE AND
7710  5675          JMP I ADTEST    / RETURN
```

```
7711  0000  ADHOLD,  0
7712  6444  ADKEY,   -2134
7713  5263  ADPACH,  JMP ADDRS
7714  0000  LISN,    0
7715  1334           TAD SPD          / SET UP FOR
7716  3335           DCA WAIT         / 50 USEC LAG
7717  6331           XRIN             / LOOK FOR PULSE
7720  6334           XRCL
7721  7454           SNA              / SEE ONE?
7722  5317           JMP .-3          / NO, LOOK AGAIN
7723  3336           DCA HOLD         / YES, STORE PULSE
7724  6331           XRIN
7725  6334           XRCL
7726  7440           SZA
7727  5332           JMP .+3          / WAIT FOR 50 USEC
7730  2335           ISZ WAIT         / OR ANOTHER PULSE
7731  5324           JMP .-5
7732  1336           TAD HOLD         / ADD FIRST PULSE
7733  5714           JMP I LISN       / TO SECOND PULSE,
7734  7775  SPD,     7775             / IF ANY, AND RETURN
7735  0000  WAIT,    0
7736  0000  HOLD,    0
```

```
ADD      7674
ADDRS    7663
ADHOLD   7711
ADKEY    7712
ADPACH   7713
ADTEST   7675
BRANCH   7657
CNTR     7673
CNTRN    7672
GETHLD   7671
GO       7641
HOLD     7736
LISN     7714
NORP     7667
SPD      7734
START    7625
VALUE    7674
WAIT     7735
XRCL     6334
XRIN     6331
```