

CONVERT

A PROGRAM TO TRANSLATE LAP6 or LAP6-3L SOURCE TO DIAL

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ABSTRACT

Program CONVERT will perform the major tasks in translating a LAP6 or LAP6-3L source stored on a LINC tape to a suitable source for utilization by the DIAL system on the PDP-12.

REQUIREMENTS

- 1. The minimum configuration is the PDP-12A.
- 2. A DIAL system tape containing CONVERT on Unit 0.
- 3. A LAP6 tape on Unit 1 containing the source program to be translated.

OPERATING PROCEDURE

- 1. Load a DIAL system tape containing the CONVERT program onto Unit 0.
- 2. Load the LAP6 tape on Unit 1.
- 3. Call in DIAL.
- 4. Clear the DIAL work area with the CL monitor command.
- 5. Call PROGRAM CONVERT by typing:
 - LO CONVERT,0)
- 6. Complete the questionnaire seen on the scope by inserting the starting Block Number of the program to be converted. Press the LINEFEED Key upon completion. (See QANDA documentation for more details.)
- 7. Upon completion of the program, CONVERT rewinds the LAP6 tape on Unit 1, types out a message warning the user to remove the LAP tape from Unit 1 and to type:

8. The user now has two alternative procedures:

Choice 1 - if more than one program will be translated, leave the LAP tape on Unit 1, type:

→ SP name,0)

and file your source program ("name" is an eight-character name selected by the user). Then issue a:

→LO CONVERT,0 2

to translate another source program.

Choice 2 - Replace the LAP tape on Unit 1 with a DIAL system tape, check and edit program, then type:

- →LI ≥ to assemble and obtain a listing
- →AS ≥ to assemble only
- →PS ≥ to obtain a quick source listing without assembling.

WARNING

If you issue a LI or AS command without removing your LAP tape, your assembled binary will overlay filed programs on the LAP tape.

PROGRAM RESULTS

- 1. Converts LAP6 packed LINC code source into packed ASCII source code. (See Table 1.)
- 2. Removes the LAP tag indicator and reverses the tag to that acceptable by DIAL (i.e., "#2C" becomes "C2,TAB") and follows the user tag with a comma and a TAB.
- 3. Initiates each line with a TAB unless the line begins with a tag or comment.
- 4. Inserts a space after all three letter combinations except those in a comment or text environment.
- 5. Changes each "i" to an "I $_$ ", each "u" to an "U $_$ ", and each "p" to a period, " ."
- 6. Reverses all number-letter combinations to letter-number combinations indicating valid references to tags.
- 7. Inserts an *20) into the new source along with a warning message.
- 8. Inserts equalities for old mnemonics that can be legally used on the 12. These will be at the start of the new program.
- 9. Changes ALT MODE/A to TEXT -> and ALT MODE/B to >. (See restriction for this text system when used with the new QANDA.)
- 10. The LAP terminator code 77 changes to code 00 (\$) indicating a source terminator for DIAL source programs.
- 11. Ignores the first two words of a LAP6 source (2065, 5712).
- 12. Replaces the square left bracket with a slash to indicate comments in the DIAL system.
- 13. Replaces the vertical bar with a backslash to indicate the 1000_8 x +y operator.

LIMITATIONS

The CONVERT program only accomplishes the major efforts involved in translation. The user must accept responsibility for solutions to overcome situations caused by a new monitor system (DIAL) and a new computer (PDP-12). These situations are outlined below:

- 1. KBD DIAL will issue a US error and the user must insert the correct IOB's or a PDP-8 mode routine. (Also see Limitation 10.)
- 2. OPR n DIAL will issue a US error. The user must determine how the LINC-8 PROGOFOP was modified to handle particular OPR situations.
- 3. TAPE READ/WRITE The DIAL index format file locations, QANDA size and location, working area, etc. differ from LAP6 and LAP6-3L.

- 4. EXC Use of the EXC mnemonic will cause a US error. The user may desire to insert his PDP-8 mode program directly into the program at this point.
- 5. SAM n The A-D sampling instruction utilizes one additional bit in the PDP-12.
- 6. PDP DIAL will create an instruction (002) which changes the processor from LINC Mode to PDP-8 Mode. The LINC-8 PDP mnemonic (0513) also transferred to PDP-8 mode, but to the location in the LINC accumulator.
- 7. REARRANGED INSTRUCTION ELEMENTS LAP6 allowed rearranged field elements (seldom used) which will confuse the translator and will not be accepted by DIAL. DIAL expects (if present) a tag, mnemonic, operand and comment:

Example:

"i6LDA" becomes "TABI L6DA".

- 8. QANDA Check all "JMP 1000", "RDC 2403", and "RDE 2403" instructions as these may indicate use of the LINC-8 Q+A Subroutine. The new QANDA Subroutine is contained in two tape blocks and its location may not be Block 403.
- 9. TEXT META Check all data between brackets after translation. These indicate a text mode probably used with the LINC-8 Q+A buffer. The new QANDA has a separate text and answer string (see the QANDA documentation for more details).
- 10. TELETYPE INPUT The old Q+A and KBD inputs were in LINC code. The new QANDA and most input routines utilize ASCII code. Thus, the routines following an input routine will require changing. (Example a 1 is 01 in LINC code, 261 in ASCII, and 61 in packed ASCII.) The new QANDA left justifies packed ASCII in an answer buffer, while the Q+A right-justified packed LINC code in the text buffer.
- 11. ZTA The retrieval of the Block Number from the Z register after a LAP LO command does not apply to the MQ register in the DIAL system.

Table 1 Character Changes

	LAP	DIAL		
Code	Character	Character	Code	
00	0	0	60	
01	1	1	61	
02	2	2	62	
03	3	3	63	
04	4	4	64	
05	5	5	65	
06	6	6	66	
07	7	7	67	
10	8	8	70	
11	9	9	<i>7</i> 1	
12	•)	43	
13	Rubout	Rubout	None	
14	Space	Space	40	
15	·i	· I	11	

Table 1 (Cont) Character Changes

LAP

DIAL

Code	Character	Character	Code
16	р	•	56
17	-	-	55
20	+	+	53
21	Vert Bar #	\ Z	34
22			32
23 24	ALT	ALT	none
24 25	A	A	01
26	B C	В	02
26 27	D	C D	03
30	E	E	04 05
31	F	F	05 06
32	G	G	07
33	Н	H	10
34	Ï	I	11
35	j	j	12
36	K	K	13
37	Ĺ	Ĺ	14
40	M	M	15
41	N	N	16
42	0	Ö	1 <i>7</i>
43	P	P	20
44	Q	Q	21
45	R	R	22
46	S	S	23
47	T	T	24
50	U	U	25
51	V	V	26
52	W	W	27
53	X	X	30
54	Υ	Υ	31
55	Z	Z	32
56	LINEFEED	LINEFEED	37
57	illegal	?	77
60	?	?	77
61	=	=	<i>7</i> 5
62	υ	U	25
63	,	,	54
64	•	•	56
65	Ð	*	52
66	[/	57
67	-	?	77
70	"	See Item 9 of Pro	
71	"	>	76

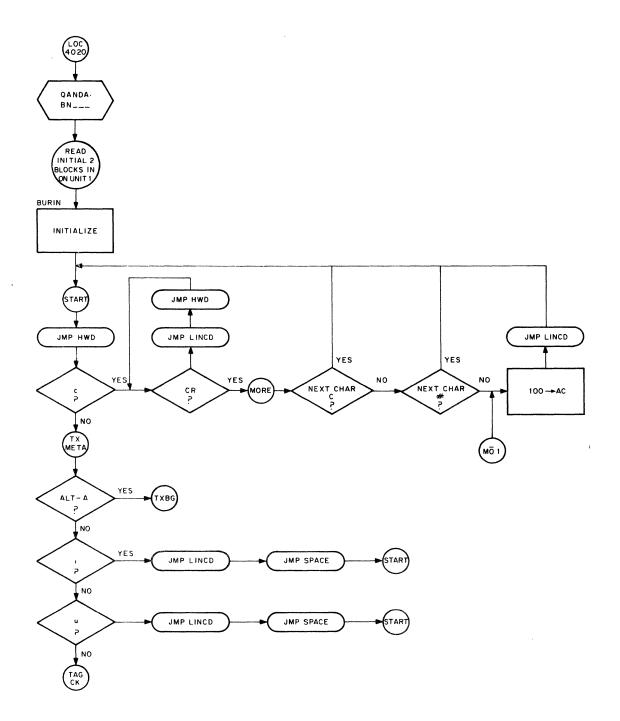
Table 1 (Cont) Character Changes

LAP

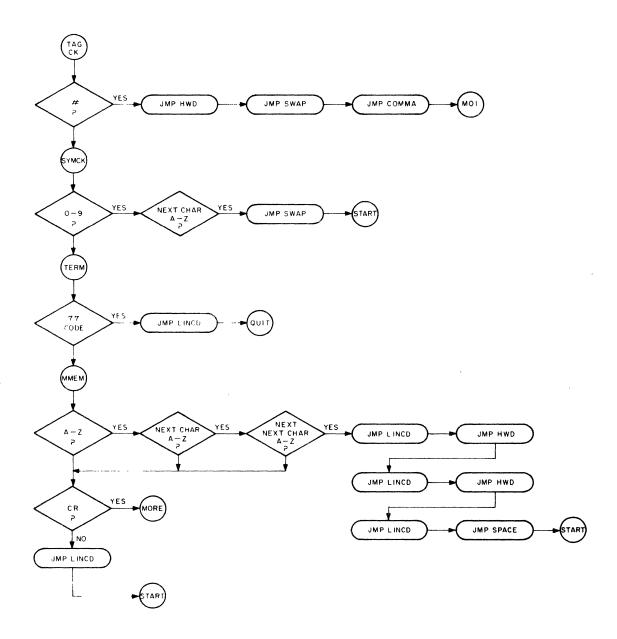
DIAL

	Code	Character	Character	<u>Code</u>
	72 73 74 75 76 77	<pre> <</pre>	<pre> <</pre>	74 76 35 52 72 00 47 36 44
INTERNAL	_MACRO-FLOV	V CHART	%	45

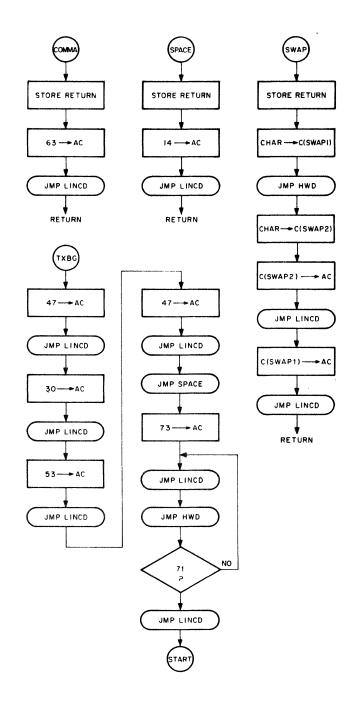
AC	= Reference to Accumulator
IX10	= Reference to the Auto-Index Register used as the input half-word pointer.
IX11	= Reference to the Auto-Index Register used as the output buffer half-word pointer .
CR	= Carriage Return
HWD	= Routine that reads in the next character (half-word) from the input buffer and, if necessary, refills the input buffer. Each buffer refill reads in two blocks to eliminate character look-ahead problems.
LINCD	= Routine that stores a converted character into the output buffer. When filled the output buffer is written into the next block of the DIAL working area.
WA	= Working Area on Unit 0.
SWAP	- Routine that reverses half-word characters to create a legal DIAL tag.



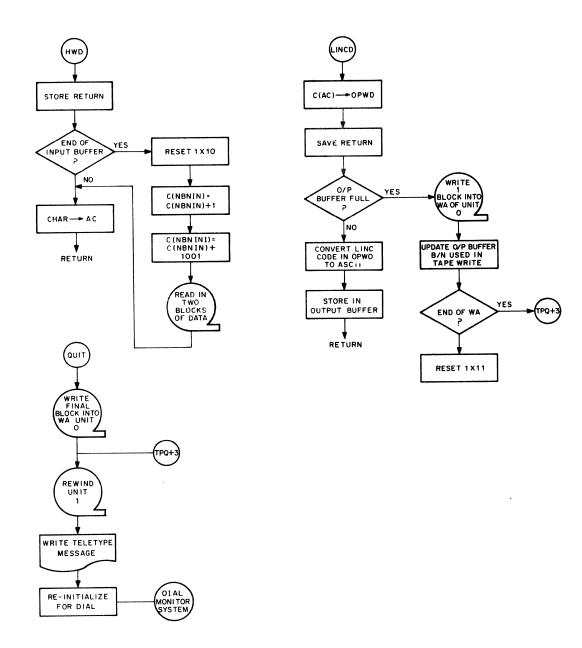
Flow Chart (Part 1 Of 4)



Flow Chart (Part 2 of 4)



Flow Chart (Part 3 of 4)



Flow Chart (Part 4 of 4)

```
*20
0000
000
                        /PROGRAM
                                         CONVERT
000
                       /PDP-12 PROGRAM
                       /INPUT: PACKED LINC SOURCE
0003
                       /FILED IN LAP6, LAP6A-3L, OR
0004
0005
                       /LAP6-3L SYSTEM ON UNIT 1
0006
                       /OUTPUT:
                                         PACKED ASCII SOURCE
                       /IN WA OF DIAL ON UNIT Ø
0007
0010
                                JMP QAINIT
           2220
                 6071
0011
           0021
                0025
0012
                                TEX1
0013
           0022
                 0066
                                ANS1
0014
           0023
                 6144
                                JMP QARFSH
0015
           2024
                 7060
                                JMP SETUP
           0025
                 0603
0016
0016
           ØØ26 1716
0016
           0027
                 2605
                        TEX1, TEXT >FCONVERT
0016
0017
           0030
                 2224
           0031
                 4310
0017
0017
0020
           0032
                 4043
0020
           0033 1014
                 0120
           0034
0020
0020
           0035
                 6640
           0036
                 2317
0020
                 2522
           0037
0020
0020
           0040
                 0305
           0041
                 4020
0020
                 2217
0020
           0042
                 0722
0020
           0043
0020
                       HLAP6 SOURCE PROGRAM
           0044
                 Ø115
0021
           0045
                 4310
0021
           0046
                2324
0021
           0047
                 0122
0021
0021
           0050
                 2423
           0051
                 4011
0021
           ØØ52
                 1640
0021
                 0214
0021
           0053
                 1703
0021
           0054
           0055
                 1374
0021
                        HSTARTS IN BLOCK<3
0021
           0056
                 6343
0022
           0057
                1017
0022
0022
           0060
                1640
           0061 2516
0022
0022
           0062
                 1124
0022
           0063
                 4017
0022
           0064
                 1605
0022
           0065
                 3400
                       HON UNIT ONE >>
0022
0023
           0066
                 7400
                       ANS1,
                                7400
           ØØ67
                 0000
                                0000
0024
           0070
                 3400
                                3400
0025
                       /PUT QANA HERE
0026
                                                  /G+A ROUTINE FOR PDP-12
0027
                                                 ZSAVE JMP RETURN
0030
           0071
                 1020
                        QAINIT, LDA I
                 0002
           0072
0031
0032
           0073
                 2000
                                ADD Ø
           0074
                1060
                                STA I
0033
           0075
                 0000
                                                  /JMP
                                                          +3
8834
                       GAB,
```

```
/PTR TO FIRST PARAM
0036
           0077
                 4001
                                 STC 1
                                                   /GET FIRST PARAM
          0100
                 1001
                                 LDA 1
0037
                                                   /PTR TO HALFWORD-1
          0101
                 2355
                                 ADD QAQ+1
0040
          0102
                 4150
                                 STC QAG-3
0041
          0103
                                 LDA I 1
                 1021
0042
                                 STC QARFSH-1
          2104
                 4143
0043
                                 STC 6
          0105
                 4006
0044
          0106
                 0043
                                 SET 3
0045
                        QACA,
                                 QARFSH-1
                 0143
          0107
0046
                                                   /XR4 TO PTR TO QUESTIONS
          0110
                 2044
                                 SET 4
0047
          2111
                 0150
                                 QAG-3
0050
                                                   /TO HERE IF FIRST TIME THROUGH OR FOLLOWING A CR
0051
                                 SET 1
          0112
                 0041
0052
                 0004
          0113
ØØ53
                                 JMP GAT
          2114
                 6361
0054
                                 NOP
          0115
                 2016
0055
                                                      BUMP PTR IF H OR F
           0116
                                 LDH I 4
                                                   /H.
                 1324
0056
          0117
                 6322
                        QAD,
                                 JMP QAO
0057
                                 JMP
                                                   174
          0120
0060
                 6126
                                     ,+6
                                 JMP GAE
                                                   134
          0121
                 6141
0061
                                                   /CR?
          0122
                 1460
                                 SAE I
ØØ62
           0123
                 0043
                                 43
0063
                                                   /NO
                                 JMP QAD
          0124
                 6117
0064
                                 JMP QACA+4
           0125
                 6112
0065
                                                   /INITIALIZE ANSWER BUFR
0066
                                                   /74 TO ANSWERS
                 1343
                                 STH 3
          0126
0067
                                                   /NEXT HALFWORD
          0127
                 1324
                                 LDH I 4
0070
           0130
                                 ADA I
                 1120
0071
          0131
                 7717
                                 -60
0072
          Ø132
                 0017
                                 COM
ØØ73
                                 STC 6
          0133
                 4006
0074
          0134
                                 STH I 3
                                                   /Ø IN AC
ØØ75
                 1363
           Ø135
                 Ø226
                                 XSK I 6
0076
0077
           Ø136
                 6134
                                 JMP .-2
                                                   /BUMP PTR TO ANSWERS
          0137
                 1323
                                 LDH I 3
0100
                                 JMP GAD
           0140
                 6117
0101
                                                   /ANSWER BUFR IS INITIATED
0102
          0141 1343
                        QAE,
                                 STH 3
0103
                                                   /XR4 TO PTR TO LAST TYPED CHAR IN ANSWER BUFR
                 0064
           0142
                                 SET I 4
0104
          @143
                 0000
                                 Ø
0105
                                                   /----RE-ENTER HERE TO REFRESH----
Ø1 Ø6
                                                   /INITIAL Y POSITION
                        QARFSH, LDA I
           0144
                 1020
Ø107
           Ø145
                 Ø137
                                 137
0110
           0146
                 4204
                                 STC QAH-1
Ø111
                                                   /XR3 TO PTR TO HALFWORD QUESTIONS-1
                                 SET I 3
           0147
                 ØØ63
Ø112
           0150
                 0000
0113
                                 SET 5
                                                   /XR5 TO PTR TO LAST DISPLAYED CHAR IN ANSWER BUFR
           Ø151
                 0045
0114
           Ø152
                 0143
                                 QARFSH-1
0115
                                 SET 1
           Ø153
                 2041
                        QAG.
Ø116
           0154
                 0003
                                 3
Ø117
           0155
                 6361
                        JMP QAT
0120
                                 JMP .+7
                                                   /F
           Ø156
                 6165
0121
                                                   /H. BUMP PTR
                                 LDH I 3
0122
           0157
                 1323
                                                   /NEITHER, ASSUME HALF SIZE
                                 LDA I
          Ø160
                 1020
0123
           0161
                 1560
                                 BCL I
0124
                                                   /SET INSTR TO CLEAR FF FOR HALF SIZE
                                 STC QAM+2
Ø125
          Ø162
                 4174
                                 ADD QAW
                                                   /NOP IN AC
          0163
                 2603
0126
                                 JMP QAM
Ø127
           0164
                 6172
                                                   /BUMP PTR
           0165
                 1323
                                 LDH I 3
0130
           Ø166
                 1020
                                 LDA I
Ø131
           Ø167
                 1620
                                 BSE I
0132
                                                  SET INSTR TO SET FF FOR FULL SIZE
           0170
                 4174
                                 STC QAM+2
0133
```

0076

0035

ADD QAL+3

```
0134
           0171
                 2604
                                 ADD GAW+1
                                                   /ADD 9U IN AC
Ø13
Ø13
           @172
                 4336
                                 STC QAP+3
                        QAM.
                                                   /EAD CONTRE REGISTER
           0173
                 0024
                                 MSC I 4
                                                   /THIS INSTR CHANGES, EITHER BSE & OR BCL &
           0174
                 1620
                                 BSE I
0137
0140
           0175
                 0200
                                 200
                                                   /AC TO CONTROL REGISTER
0141
           0176
                 0004
                                 MSC 4
                                                  /XR1 TO INITIAL X POSITION
0142
           0.177
                 0061
                                 SET I 1
0143
           0200
                 0100
                                 100
                                                   /Y COORDINATE MULTIPLE
                 1020
0144
           0201
                                 LDA I
           0202
0145
                 7737
                                 -40
0146
           0203
                 1160
                                 ADM I
                                                   /Y COORDINATE
           0204
                 0000
01 47
                                 Ø
                 1323
           0205
                        QAH,
                                 LDH I 3
0150
                                 JMP QAO+1
           0206
                 6323
0151
                                                   /74 BUMP PTR TO NEXT CHAR, PUT 40 IN AC
           0207
                                 JMP QAZ
0152
                 6372
           0210
                 6227
                                 JMP QAJ
                                                   134
0153
           0211
0212
0154
                 1420
                                 SHD I
                                                   /NEITHER
                 4300
                                 4300
0155
                                 JMP QAG
                                                   /CR. MOVE X AND Y COORDINATE
           0213
                 6153
Ø156
           0214
                 6333
                                 JMP QAP
                                                   /ISPLAY CHAR
Ø157
                                 JMP QAH
                                                   /PICK UP NEXT CHAR
           Ø215
0160
                 6205
                                 JMP QAP
                                                   /TO HERE IF DISPLAYING ANSWER BUFR
           0216
                 6333
0161
                                          /SWITCH TO DISPLAY CURSOR, EITHER ØØØØ OR 7777
Ø162
           0217
                 1520
                                 SRO I
           0220
                 0000
                                 Ø
                                                   /IFXR4=XR5, THEN SWITCH=7777
0163
                                 JMP GAF
Ø164
           Ø221
                 6607
                                                   /QUESTION MODE
Ø165
           Ø222
                 1325
                                 LDH I 5
Ø166
                        QAI,
           Ø2 23
                 6323
                                 JMP QAO+1
Ø1 67
           0224
                 6205
                                 JMP QAH
                                                   174
0170
           Ø225
                 6205
                                 JMP
                                                   134
                                     QAH
0171
           Ø226
                 6216
                                                   /NEITHER, DISPLAY IT
                                 JMP QAI-4
0172
           Ø227
                 6612
                                 JMP GETKBD
                                                  /TO HERE IF DISPLAYED BUFFER
Ø173
                        QAJ.
           0230
                 0470
                                 AZE
0174
           Ø231
                 6075
                                 JMP QAB /NOTHING TYPED . EXIT
0175
           0232
                 0062
                                 SET I 2
Ø176
Ø177
           Ø233
                 0503
                                 QAY
           0234
                 1402
                                 SHD 2
                                                  /LF?
0200
           0235
                                 JMP QAK+4
                                                  /YES. EXIT
                 6402
0201
                                                   /CR?
0202
           0236
                 1422
                                 SHD I 2
           Ø237
                                 JMP GAN
0203
                 6314
                                                   /IS THERE AN ANSWER FIELD?
0204
           0240
                 Ø2Ø6
                                 XSK 6
                                 JMP QARFSH
           Ø241
                 6144
0205
           0242
                 1422
                                 SHD I 2
                                                   /<?
0206
0207
           0243
                 6266
                                 JMP GAL
                                                   1>?
0210
           0244
                 1422
                                 SHD I 2
           Ø245
                 6376
                                 JMP QAK
0211
           0246
                 1422
                                                   /ALT?
0212
                                 SHD I 2
0213
           0247
                 6106
                                 JMP QACA
           0250
                                                  /BACK SLASH?
0214
                 1422
                                 SHD
                                     I 2
Ø215
           Ø251
                 6144
                                 JMP QARFSH
                                                   /IGNORE
0216
           Ø252
                 1422
                                 SHD I 2
                                                   /RUBOUT?
                                                   /IGNORE
           0253
                 6266
                                 JMP QAL
Ø217
0220
           2254
                 1422
                                 SHD I 2
                                                   /TAB?
                                 JMP GARFSH
                                                   /IGNORE
0221
           0255
                 6144
Ø222
           Ø256
                 4263
                                 STC
                                     , +5
                                                   /ACCEPTABLE CHAR
                                                   /TEST NEXT CHAR
           0257
                 6322
                                 JMP
                                     QAO
0223
                                                   /74 BACK PTR UP BY 1
           Ø26Ø
                 6354
                                 JMP QAQ
Ø224
                                                   /34 +
           0261
                 6354
                                 JMP QAQ
0225
                                                   /OK. STORE IT
Ø226
           Ø262
                 1020
                                 LDA I
           Ø263
                 0000
Ø227
           Ø264
                 1344
                                 STH 4
0230
           Ø265
                 6144
                                 JMP GARFSH
                                                   /REDISPLAY
0231
                                                   /TO HERE IF RUBBOUT OR <
ベワサフ
           2266
                 1304
                        DAI .
                                 IDH 4
```

```
JMP QAO+1
           026/
                 6323
0233
                                                  174 IGNORE
           0270
                                 JMP QARFSH
0234
                 6144
           0271
                 1775
                                -6002
0235
                                                  /TEST THE CHAR
Ø236
           Ø272
                 1302
                                LDH 2
                                                  /RUBOUT?
Ø237
           Ø273
                 1460
                                 SAE I
0240
           0274
                 0037
                                37
           Ø275
                 6354
                                 JMP QAQ
                                                  /NO. BACK PTR UP BY 1
0241
Ø242
           Ø276
                 0045
                                SET 5
           0277
0243
                 0004
           0300
                 0043
                                SET 3
0244
           0301
                 0004
0245
           Ø3Ø2
                 6304
                                 JMP .+2
Ø246
                                LOH I 5
                                                  /BUMP PTR
0247
           Ø3Ø3
                 1325
          0304
                                LDH I 3
                                                  /GET NEXT CHAR
                 1323
0250
Ø251
           0305
                 6323
                                 JMP QAO+1
                                                  /IF 74 OR 34, REPLACE CURRENT CHAR WITH Ø
Ø252
          Ø3Ø6
                 0016
                                NOP
Ø253
          0307
                 0011
                                CLR
0254
          0310
                 1345
                                STH 5
          0311
                 0450
                                AZE
                                                  /WAS IT 74 OR 34?
Ø255
                                                  /NO. CONTINUE
0256
          0312
                 6303
                                JMP .-7
                                 JMP QAQ
                                                  /BACK PTR UP BY 1
                 6354
0257
          0313
                                                  /TO HERE IF CR
0260
           0314
                                XSK 6
                 0206
                        QAN.
Ø261
           0315
                                JMP QAK+4
                                                  /EXIT ROUTINE IF NO ANSWER FIELD
Ø262
                 6402
           0316
                 6322
                                JMP QAO
Ø263
                                JMP QARFSH
                                                  174 MOVE PTR TO NEXT QUESTION FIELD
          Ø317
                 6144
0264
                                                  /34 END OF BUFR, MOVE PTR TO FIRST QUESTION FIELD
0265
          0320
                6142
                                JMP QAE+1
                                 JMP QAN+2
          0321
                 6316
Ø266
Ø267
                                                  /S/R
                                LDH I 4
          Ø322 1324
                        QAO,
0270
                                                           +1 74 BEGIN FIELD
          Ø323
                1420
                                SHD I
0271
                                                           +2 34 END BUFR
          0324
                                7400
0272
                 7400
                                                           +3 NEITHER 74 NOR 34
           Ø325
                                 JMP Ø
Ø273
                 6000
Ø274
           Ø326
                 1460
                                SAE I
          Ø327
                 0034
Ø275
                                34
          0330
                 0220
                                XSK I Ø
Ø276
0277
          Ø331
                 0220
                                XSK I Ø
                                 JMP Ø
0300
          Ø332
                 6000
                                                  /S/R TO DISP LINC CHAR IN AC
0301
                                                  /MULT BY 2 FOR INDEX TO ADDRESS OF TABLE
                        QAP,
                                ROL 1
          Ø333
                 0241
0302
                                ADD QAX+4
0303
           Ø334
                 2521
                                                  /ADDRESS OF CHAR TO DISP IN XR2
                                STC 2
0304
           Ø335
                 4002
                                ADD QAU
                                                  /THIS INSTR CHANGES, EITHER OP OR ADD 9U
0305
          Ø336
                 2577
          Ø337
                 2577
                                ADD GAU
0306
          0340
                 2001
                                ADD 1
                                                  /ADD 4 TO XR1 TO SPACE CHAR
0307
                                STC 1
0310
           Ø341
                 4001
                                                  /GET ADDRESS OF ANSWER BUFR
          0342
                 2005
                                ADD 5
0311
0312
          Ø343
                 0017
                                COM
          0344
                 2004
                                ADD 4
0313
          Ø345
                 0450
                                AZE
0314
           0346
                                CLR
                 0011
0315
                                                  /SWITCH=Ø OR 7777
          Ø347
                 4220
                                STC QAI-2
Ø316
                                                  /Y COORDINATE IN AC
                                ADD QAH-1
          0350
Ø317
                 2204
          Ø351
                 1742
                                DSC 2
0320
          Ø352
                1762
                                DSC I 2
                                                  /DISPLAY CHAR
0321
0322
           Ø353
                 6000
                                JMP Ø
                                                  /BACK UP PTR BY 1
Ø323
          0354
                 1020
                       QAQ,
                                LDA I
0324
          Ø355
                 3777
                                -4000
          Ø356
                                ADM
0325
                 1140
           Ø357
                 0004
Ø326
                                                  /REDISPLAY
                                 JMP GARFSH
Ø327
           0360
                 6144
0330
                                                  /S/R
           0361 1321 QAT.
                                LDH I 1
0331
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0332	a 7 7 9	0.349 4	40.0	CUD !	/ .1 5
333					
8335 8365 1448 SAE 1 8336 8366 8218 8267 8218 8378 8367 8228 XSK I 0 8337 8378 8228 XSK I 0 8334 8378 8228 XSK I 0 8342 8378 8272 XSK I 0 8343 8372 1323 DAZ, LDH I 3 8344 8373 1828 LDA I 8345 8374 8840 40 8346 8375 6216 JMP DAI-4 8346 8375 6216 JMP DAI-4 8347 8378 8478 AZE I /IS CURRENT CHAR BLANK? 8349 8376 1324 GAK, LDH I 4 8351 8352 8480 6354 JMP DAI /YES, IGNORE 8353 8481 8282 JMP DAI /YES, IGNORE 8355 8481 1628 JMP DAI /YES, IGNORE 8355 8482 1828 LDA I 8355 8482 1828 LDA I 8355 8483 8891 1 8355 8482 1828 LDA I 8355 8483 8891 1 8355 8482 1828 LDA I 8356 8483 8891 1 8357 8486 8875 JMP DAB 8358 8487 8181 DAV, 8181 8888 SB / CHARACTER PATTERNS 8358 8481 2577 444 7744 8368 8412 7744 7744 7744 8368 8412 7744 7744 7744 8367 8415 3577 8415 4366 436 436 /331C 8357 8415 4366 436 436 /331C 8357 8415 4366 436 436 /331C 8357 8415 4366 436 /436 /436 /436 /436 /436 /436					
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0337 0367 0220 XSK 1 0 0344 0377 0220 XSK 1 0 0341 0371 0200 JMP 0 0342 0343 0372 1323 DAZ, LDH I 3 0344 0373 1020 A0 0345 0374 0040 40 0346 0375 0216 JMP 0AI 4 0346 0375 0216 JMP 0AI 4 0347 0377 0470 AZE I 0350 0376 0404 5054 JMP 0AI 4 0355 0400 6554 JMP 0AQ /YES, IGNORE 0355 0400 0595 JMP 0AQ /YES, IGNORE 0355 0400 0205 JMP 0AQ /YES, IGNORE 0357 0404 1140 A0M 0355 0400 02075 JMP 0AQ /YES, IGNORE 0356 0403 0201 1 0357 0404 1140 A0M 0358 0406 0275 JMP 0AB //OLD ATTERNS 0358 0407 0211 0AV, 0101 //OLD ATTERNS 0358 0407 0211 0AV, 0101 //OLD ATTERNS 0356 0412 4774 4477 //OLD ATTERNS 0366 0412 7744 7744 7744 7744 7744 7744 7744 7				SAE I	
8340	Ø336	Ø366 Ø	010	10	
8340 0370 0220 XSK 1 0 8341 0371 0800 JMP 0 8342 8343 0373 1020 LDA I 8344 0373 1020 LDA I 8345 0374 0273 1020 LDA I 8346 0375 0240 JMP 0AI-4 8347 0373 1020 LDA I 8348 0375 0216 JMP 0AI-4 8350 0376 1324 QAK, LDH I 3 8350 0376 1324 QAK, LDH I 4 8351 0377 0470 AZE I 8353 0400 6354 JMP 0AX / YES, IGNORE 8355 0400 6354 JMP 0AX / MOVE DOT FORMARD 8357 0400 6355 JMP 0AX / MOVE DOT FORMARD 8358 0402 1020 LOA I 8357 0403 0001 1 8357 0402 0075 QAB 8350 0402 0075 QAB 8350 0402 0075 QAB 8351 0407 0001 1 8357 0408 1100 QAR 8358 0407 0001 1 8358 0407 0001 1 8358 0407 0001 1 8358 0407 0001 1 8358 0407 0001 1 8358 0407 0001 1 8359 0407 0001 1 8351 0001 1 8351 0001 1 8351 0407 0001 1 8351 0001 1 8	0337	Ø367 Ø	1220	XSK I Ø	
0341 0371 0300		0370 0	220	XSK T Ø	*
0342					
8343 8372 1323 0A2, LOH I 3 8344 8373 1020 8345 8374 0040 8346 8375 6216 JMP 0A1-4 8351 8377 0470 8352 8430 6354 JMP 0A2 8353 8437 0470 8353 8401 6515 JMP 0A2 8353 8401 6515 JMP 0A2 8353 8401 6515 JMP 0A2 8356 8403 30801 1 8357 0404 1140 8357 0408 0275 JMP 0A2 8358 0409 0275 JMP 0A8 8359 0400 0275 JMP 0A8 8350 0400 0275 JMP 0A8 8351 0351 0400 0275 JMP 0A8 8356 0403 0201 1 8357 0404 1140 0201 020 JMP 0A8 8358 0409 0275 JMP 0A8 8359 0411 4477 /11A 8356 0411 4477 /7444 /477 8356 0411 4477 /7444 /477 8357 0413 5177 5177 /21B 8377 0413 5177 5177 /21B 8377 0413 5177 5177 /21B 8377 0413 4177 4177 /41D 8378 0417 4157 4177 /41D 8379 0414 023 4477 4477 /61F 8480 0420 4404 4044 4044 /4049 /40		20, 2		5 1 5	/
8344 8373 1828 LOA		0770 1	727 047	104 1 3	′
0345 0374 0040 49 0346 0375 6216 JMP 0AI-4 0359 0376 1324 QAK, LDH I 4 0359 0377 0470 JMP 0AS JMP 0AS JMOVE DOT FORWARD 0359 0400 6554 JMP 0AS JMOVE DOT FORWARD 0359 0402 1020 LDA I 0357 0404 1140 ADM 0356 0405 0075 JMP 0AB 0358 0409 0075 QAB 0358 0409 0075 QAB 0358 0409 0075 QAB 0358 0409 0075 QAB 0351 0406 6075 JMP 0AB 0350 0409 0075 QAB 0351 0406 6075 JMP 0AB 0353 0407 0101 QAV, 0101 JMP 0AB 0356 0411 4477 JAH 0357 0413 5177 5177 JAH 0357 0413 5177 5177 JAH 0357 0413 5177 5177 JAH 0377 0413 415 4136 4136 JAH 0377 0413 5177 5177 JAH 0377 0413 415 4136 4136 JAH 0377 0414 1457 4177 JAH 0377 0413 415 1456 4136 JAH 0377 0413 5177 5177 JAH 0377 0413 415 1456 4136 JAH 0377 0413 5177 5177 JAH 0377 0413 415 1456 4136 JAH 0377 0414 1457 4177 JAH 0377 0413 3647 4177 4177 JAH 0377 0423 4477 4477 JAH 0406 0422 4145 4136 4136 JAH 0407 0433 142 1457 4177 JAH 0408 0424 4844 4044 0409 0425 4136 4136 JAH 0409 0425 4136 4136 JAH 0409 0438 0427 1877 1877 JAH 0409 0438 0427 1877 1877 JAH 0410 0434 4076 4076 0411 0435 1877 1877 JAH 0411 0435 1877 1877 JAH 0412 0436 4324 4324 0413 0437 706 7706 7706 0422 0444 7706 7706 0422 0444 7706 7706 0422 0447 744 777 177 0423 0447 177 177 0426 0452 0454 1477 177 0427 0458 3044 3044 0428 0452 0454 1477 177 0417 0442 0443 3077 3077 0422 0444 7706 7706 0422 0444 7706 7706 0422 0447 741 7741 0423 0447 4477 4477 1710 0426 0452 0454 1477 177 0417 0442 0450 3044 3044 0424 0450 3047 177 0417 0443 3077 1700 0420 0444 7706 7706 0420 0444 7706 7706 0420 0447 741 7741 0420 0447 0453 3076 3076 0422 0459 3476 4477 177 0417 0423 3447 1477 0426 0459 3084 3084 0427 0453 34477 4477 177 0417 0428 3447 1477 0427 0453 3047 1477 0427 0453 3047 1477 0428 0459 3084 3084 0427 0453 34477 4477 177 0417 04477 1710					
### G346 JMP DAI-4 ### G357 626 JMP DAI-4 ### G358 G376 G354 GAK, LDH 1 ### G359 G376 G354 GAK, LDH 1 ### G351 G377 G470 AZE I					
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0351					/TO HERE IF >
0352 0400 6554 JMP 0AG /YES, IGNORE 0353 0401 6515 JMP 0AX /MOVE DOT FORWARD 0354 0402 1020 LOA I 0355 0403 0001 1 0357 0404 1140 ADH 0360 0405 0275 QAB 0361 0406 6975 QAB 0361 0406 6975 JMP 0AB 0362 /CHARACTER PATTERNS 0364 0410 0101 0101 0366 0412 7744 7744 0366 0412 77744 7774 0370 0414 2651 2651 0371 0415 1136 4136 /31C 0372 0414 136 4136 /31C 0373 0414 12651 2651 0373 0417 4177 4177 /410 0375 0421 4577 4577 /51E 0375 0421 4577 4577 /51E 0377 0423 4477 4477 /61F 0378 0424 4084 4084 0401 0425 4136 4136 /71G 0377 0423 4477 4477 /61F 0400 0424 4084 4084 0401 0425 4136 4136 /71G 0402 0426 2645 2645 0403 0427 1077 1077 /101H 0406 0432 0801 0001 0407 0413 1142 /1141 0408 0434 4076 4076 0411 0435 1077 1077 /131K 0415 0441 3077 3077 /151M 0416 0442 7730 7776 0417 0443 3077 3077 /151M 0418 0436 4330 7710 7770 /1710 0419 0436 4324 4076 4076 0411 0435 1077 1077 /131K 0416 0447 3087 3077 1077 /151M 0416 0447 3087 3077 3077 /151M 0417 0443 3077 3077 /151M 0418 0441 3047 7447 /7741 0419 0436 4327 4477 4477 /221R					
9353	Ø351	Ø377 Ø	1470	AZE I	/IS CURRENT CHAR BLANK?
0355	0352	Ø4ØØ 6	354	JMP QAQ	/YES. IGNORE
0355	Ø353	0401 6	515	JMP QAX	/MOVE DOT FORWARD
0356	Ø354				/TO HERE TO EXIT WITH SKIP
0356	0355	0402 1	.020	LDA I	
0357					
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0352 0363 0407 0101 0364 0410 0101 0365 0411 0477 0476 0366 0412 0417 0366 0412 0367 03413 0367 0370 0414 0455 0371 0415 0377 0416 0377 0416 0377 0417 0378 0417 0378 0417 0378 0417 0378 0417 0378 0417 0379 0416 0377 0416 0377 0417 0378 0378 0417 0379 0416 0377 0417 0374 0378 0378 0417 0379 0416 0377 0417 0374 0376 0421 0377 0421 0377 0422 0445 0491 0492 0424 0491 0495 0437 0497 0498 0424 0491 0495 0437 0437 0447 0498 0427 0433 0427 0433 0427 0433 0427 0433 0447 0433 0447 0448 0491 0495 0431 0496 0432 0426 0497 0433 0427 0433 0447 0448 0497 0433 0447 0448 0497 0433 0447 0448 0497 0433 0447 0448 0497 0433 0447 0448 0497 0433 0447 0448 0497 0433 0447 0448 0497 0433 0447 0448 0391 0391 0391 0419 0444 0449 0391 0391 0391 0411 0435 0417 0443 0437 0413 0437 0417 0444 0391 0391 0391 0415 0441 0440 0397 0397 7180 0416 0442 7730 7730 0417 0443 0477 0420 0444 7786 0421 0445 0427 0428 0446 7741 7741 0428 0447 7747 7786 0421 0445 0429 0444 7786 0421 0420 0444 0429 0444 0420 0444 0420 0444 0420 0444 0420 0444 0420 0444 0449 0391 0391 0317 0416 0422 0446 7741 7741 0428 0447 0429 0446 0459 0451 0458 0467 0459 0468 0477 0477 0422 0446 0459 0453 4477 4477 04210 0422 0446 0453 0477 4477 0422 0446 0453 0477 4477 0422 0446 0453 0477 4477 0422 0446 0453 0477 4477 0422 0446 0453 0453 0477 4477 0422 0446 0453 0477 4477 0422 0446 0453 0477 4477 0422 0446 0453 0477 4477 0421 0422 0446 0453 0477 4477 0422 0446 0453 0477 4477 0422 0446 0453 0477 4477 4477 0422 0446 0453 0477 4477 4477 0422 0446 0453 0477 4477 4477 0422 0446 0453 0477 4477 4477 04210 0422 0446 0453 0477 4477 4477 04210 0422 0446 0453 0477 4477 4477 4477 4477 4477 4477 447					
0353 0407 0101 QAV, 0101 /KBD 0, ILLEGAL, USED AS MARKER 03564 0410 0101 0101 0101 0101 03654 0410 0101 0101 0101 0101 0365 0411 4477 4477 /1:A 03565 0411 4477 7744 7744 7744 7744 7744 7744		9450 0	W 7	OH GAD	ACH AD ACTER PATTERNS
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-	0471	0513	7000	7000	/42:"
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,	0473				CODES 43:, 44:, 45:LF NOT DISPLAYED
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. ~-	0501	0522	0000	Ø 5144	/46: &
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1110
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                        SETUP1, LDH
1111
                                 ANS1+4001
           1100
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1112
                 0450
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1113
           1101
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                 7121
1114
           1103
                 1300
                                 LDH
1115
           1104
                 0067
                                 ANS1+1
1116
           1105
                 1560
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1117
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           1106
                 0070
1120
           1107
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1121
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1122
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1123
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                                 LDH
```

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4066
  1124
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                                  ANS1+4000
  112
             1113
                  156Ø
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             1114
                   0070
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  1127
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1177
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  1204
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                   4357
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             1205
```

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```

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                  7257
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                        MO1,
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1301
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           1334
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1307
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                                 - 55
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1356
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1361
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1364
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                        TERM,
                                 LDH 10
1371
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1372
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           1414
1373
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1377
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                        MNEM,
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                                 10
           1422
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                                 ADA I
1401
                                 -55
1402
           1423
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                                 APO I
1403
           1424
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                                 ADA I
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           1436
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           1437
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                                 JMP HWD
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1461
1462
                        /AND BRING-IN NEW
                         /HALF WORD
1463
1464
           1476
                  0011
                        HWD,
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1465
           1500
                  551Ø
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1466
1467
           1501
                 1000
                                 LDA
1470
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                  0010
                                 10
1471
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                  1460
                                 SAE I
1472
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1473
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                                 JMP EQ4
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1477
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           1513
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1501
1502
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           1516
1504
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           1517
1505
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1506
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1510
           1522
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                                 1001
1511
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           1524
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                                 RDC U
           1530
1516
                 0000
                        NBNIN1. Ø
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1520
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                        /SPACE CREATES A SPACE
1521
                        SPACE,
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                  0011
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           1533
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1523
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1524
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                  757Ø
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1532
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                  2000
                                  ADD Ø
1533
           1543
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1534
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           1545
1535
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```

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AUL PTHAM
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                        /THEN OUTPUTS BOTH
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                 2000
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1557
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                 757Ø
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1600
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1661
                  0215
                        TEXTZ.
                                  Ø215
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           1665
                  Ø212
1662
                  0322
                                  322
1663
           1666
1664
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           1667
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1665
           167Ø
                  0315
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           1671
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1667
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1670
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1671
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1672
1673
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                                  301
1674
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1712
1713
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                                  301
1726
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1731
           1733
1732
           1734
                  0260
                                  260
                  Ø254
1733
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1741	1743	0212	212	
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1743			/CONVERT	
1744			/18 DEC 69	

BOOL ERRORS

ANS1 BACK 4066 5510 5540 BACK1 BACK2 5547 BACK3 5567 BACK4 5626 5152 5154 BNIN BNIN1 CHARS 4746 CKLF 4712 CNTRL 4675 COMMA 5541 5263 COMMT CONV 4757 CRMORE 5467 5511 EQ4 EXIT 4726 GETKBD 4612 HWD 5476 5342 ICK 5167 INIT LEGAL 4666 LINCD 5570 LKRB 6036 LTLS 6046 LTSF 6041 MNEM 542Ø 5306 MOCT 5266 MORE 5302 MO1 5526 NBNIN NBNIN1 553Ø OPWD 5617 OUTPUT 5616 OVRIN 5251 OVRTEX 5151 PICKUP 5624 4075 QAB 4106 QACA 4117 QAD 4141 QAE 4607 QAF QAG 4153 4205 QAH QAI 4222 QAINIT 4071 4227 QAJ QAK 4376 QAL 4266 4172 QAM QAN 4314

4322 4333 QAP QAQ 4354 QARFSH 4144 QAT 4361 QAU 4577 4407 4603 4515 4503 QAV QAW QAX QAY 4372 5627 QAZ QUIT QUIT 5627 SETUP 5060 SETUP1 5077 SETUP2 5121 SETUP3 5145 SPACE 5257 SWAP 5550 SWAP1 5565 SWAP1 5565 SWAP2 5565 5562 5365 5356 SYMCK 5365 TAGCK 5356 TERM 5412 TEXTZ 5664 4025 TEX1 TPE 4/05 TPOUT 5601 TPO 5634 TPQ 5634 TXAGIN 5333 TXBG 5314 TXBG 5314 TXMETA 5311 TY 4627 UCK 5350