



* 0070-001-H001 (ASR33IOL) DRAWING NO. 41286032-001-01

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0037* 0070-001-H001 (ASR33IOL) DRAWING NO. 41286032-001-01
*
*
* COMPUTER: H316, DDP-516
*
* PROGRAM CATEGORY: INPUT/OUTPUT
*
* PROGRAM TITLE: ASR33IOL
ASR 33 FORTRAN AND STANDARD INPUT/OUTPUT LIBRARY USING
IOBUS

APPROVAL

DATE

PROG-- PJ Yule ----- 12 Nov 70SUPR-- N G. Depledge ----- 12 Nov 70QUAL-- M R. Herryman ----- 18 Nov 70

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0074*
*
* AUTHOR
*
* HONEYWELL - COMPUTER CONTROL DIVISION (EUROPE)
*
* PURPOSE
*
* TO PROVIDE AN ASR 33 FORTRAN AND STANDARD INPUT/OUTPUT LIBRARY
* USING IOBUS
*
* RESTRICTIONS
*
* THIS LIBRARY WILL WORK ON AN H316 OR DDP-516 COMPUTER WITH AN
* ASR 33
*
* STORAGE
*
* SEE CONTENTS
*
* CONTENTS
*
* MODULE NAME DEFINITION STORAGE OCT DEC PAGE NO.
*
* FSR1 FORTRAN READ FROM ASR 30 24 15
*
* FSW1 FORTRAN OUTPUT ON ASR
* F\$AL FORTRAN ASR LINES/PAGE 74 60 17
*
* F\$B1 FORTRAN REWIND ASR
* F\$F1 FORTRAN BACKSPACE ASR 6 6 20
*

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0075	*	O\$HH	ASR LIST HEADING	4	4	21
0076	*					
0077	*	O\$GHAP	GENERAL HEADING ASR/HSP			
0078	*	O\$ALHB	ASR LIST HEADING BUFFER			
0079	*	O\$PLHB	HSP LIST HEADING BUFFER			
0080	*	O\$ALPB	ASR LIST PAGE NUMBER BUFFER			
0081	*	O\$PLPB	HSP LIST PAGE NUMBER BUFFER			
0082	*	O\$ALPN	ASR LIST PAGE NUMBER			
0083	*	O\$PLPN	HSP LIST PAGE NUMBER			
0084	*	O\$ALLC	ASR LIST LINE COUNT/PAGE			
0085	*	O\$PLLC	HSP LIST LINE COUNT/PAGE			
0086	*	O\$ALLN	ASR LIST LINE NUMBER			
0087	*	O\$PLLN	HSP LIST LINE NUMBER	70	56	22
0088	*					
0089	*	O\$AE	ASR LIST EJECT PAGE	44	36	24
0090	*					
0091	*	O\$LL	ASR LIST	26	22	26
0092	*					
0093	*	O\$AE	ASR LIST EJECT PAGE	2	2	28
0094	*		(THIS IS A DEFAULT MODULE)			
0095	*					
0096	*	O\$ALHB	ASR LIST HEADING BUFFER			
0097	*	O\$ADHB	ASR DEFAULT HEADING BUFFER			
0098	*	O\$ALPB	ASR LIST PAGE NUMBER BUFFER	44	36	29
0099	*		(THIS IS A DEFAULT MODULE)			
0100	*					
0101	*	O\$ALLC	ASR LIST LINE COUNT/PAGE			
0102	*	O\$ADLC	ASR DEFAULT LINE COUNT/PAGE			
0103	*	O\$ALLN	ASR LIST LINE NUMBER			
0104	*	O\$ADLN	ASR DEFAULT LINE NUMBER	2	2	31
0105	*		(THIS IS A DEFAULT MODULE)			
0106	*					
0107	*	O\$ALPN	ASR LIST PAGE NUMBER			
0108	*	O\$ADPN	ASR DEFAULT PAGE NUMBER	2	2	32
0109	*		(THIS IS A DEFAULT MODULE)			
0110	*					
0111	*	O\$AP	ASR PRINT ROUTINE	10	8	33

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0112	*					
0113	*	O\$ALL	ASR LIST LINE	24	20	34
0114	*					
0115	*	O\$AC	ASR OUTPUT CARRIAGE RETURN	6	6	36
0116	*					
0117	*	O\$AF	ASR OUTPUT LINE FEED	6	6	37
0118	*					
0119	*	I\$AA	ASR INPUT SOURCE RECORD			
0120	*	I\$AAE	ASR INPUT SOURCE RECORD	50	40	38
0121	*					
0122	*	O\$AA	ASR OUTPUT SOURCE RECORD			
0123	*	O\$AAE	ASR OUTPUT SOURCE RECORD	32	26	40
0124	*					
0125	*	O\$AS	ASR OUTPUT END OF TEXT			
0126	*	O\$ASS	ASR OUTPUT SOURCE END OF TEXT			
0127	*	O\$ASE	ASR OUTPUT SOURCE END OF TEXT	16	14	42
0128	*					
0129	*	I\$AB	ASR INPUT OBJECT LINK	14	12	43
0130	*					
0131	*	O\$AB	ASR OUTPUT OBJECT LINK	12	10	44
0132	*					
0133	*	O\$ASO	ASR OUTPUT OBJECT END OF TEXT			
0134	*	F\$D1	FORTRAN WRITE FILE MARK ASR	14	12	45
0135	*					
0136	*	I\$AO	ASR INPUT OBJECT	102	66	46
0137	*					
0138	*	O\$AO	ASR OUTPUT OBJECT	36	30	49
0139	*					
0140	*	O\$ALDR	ASR PUNCH LEADER	16	14	51
0141	*					
0142	*	I\$AINT	ASR INITIALISE FOR INPUT			
0143	*	I\$AK	ASR INPUT CHARACTER	14	12	52
0144	*					
0145	*	I\$AT	ASR TIMING DELAY (ASR 33)	12	10	54
0146	*					
0147	*	O\$AINT	ASR INITIALISE FOR OUTPUT (ASR 33)	2	2	55
0148	*					

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0149 * O\$AK ASR OUTPUT CHARACTER 10 8 56
0150 *
0151 *
0152 * USE
0153 *
0154 * INTERNAL MODULES
0155 *
0156 * NAME CALLING SEQUENCE CALLS ERRORS
0157 *
0158 * F\$R1 CALL F\$R1 F\$IO EF END OF FILE
0159 * DAC FORMAT DESCRIPTOR LIST ISAO ERROR
0160 * RETURN ISAA
0161 * F\$ER
0162 *
0163 * F\$W1 CALL F\$W1 F\$IO NONE
0164 * DAC FORMAT DESCRIPTOR LIST C\$SW
0165 * RETURN O\$AO
0166 * O\$AK
0167 * O\$ALL
0168 *
0169 * (LINKED WITH F\$AL)
0170 *
0171 * F\$AL XAC F\$AL NONE
0172 * (LINKED WITH F\$W1)
0173 *
0174 * F\$B1 CALL F\$B1 F\$ER ID ILLEGAL DEVICE
0175 * RETURN
0176 * (IDENTICAL WITH F\$F1)
0177 *
0178 * F\$F1
0179 * (SEE F\$B1)
0180 *
0181 * O\$HH CALL O\$HH O\$GHAP NONE
0182 * DAC HEADING BUFFER O\$AE
0183 * RETURN
0184 *
0185 * O\$GHAP LDX RETURN PARAMETER NONE
* CALL O\$GHAP

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0186 * (RETURN PARAMETER POINTS TO
0187 * BUFFER POINTER AND RETURN
0188 * IS MADE TO NEXT LOCATION)
0189 * (LINKED WITH O\$ALHB, O\$PLHB, O\$ALPB, O\$PLPB, O\$ALPN, O\$PLPN,
0190 * O\$ALLC, O\$PLLC, O\$ALLN, O\$PLLN)
0191 *
0192 * O\$ALHB XAC O\$ALHB NONE
0193 * (SIMILARLY FOR O\$PLHB)
0194 * (LINKED WITH O\$GHAP, O\$ALPB, O\$PLPB, O\$ALPN, O\$PLPN, O\$ALLC,
0195 * O\$PLLC, O\$ALLN, O\$PLLN)
0196 *
0197 * O\$ALPB XAC O\$ALPB NONE
0198 * (SIMILARLY FOR O\$PLPB)
0199 * (LINKED WITH O\$GHAP, O\$ALHB, O\$PLHB, O\$ALPN, O\$PLPN, O\$ALLC,
0200 * O\$PLLC, O\$ALLN, O\$PLLN)
0201 *
0202 * O\$ALPN XAC O\$ALPN NONE
0203 * (SIMILARLY FOR O\$PLPN)
0204 * (LINKED WITH O\$GHAP, O\$ALHB, O\$PLHB, O\$ALPB, O\$PLPB, O\$ALLC,
0205 * O\$PLLC, O\$ALLN, O\$PLLN)
0206 *
0207 * O\$ALLC XAC O\$ALLC NONE
0208 * (SIMILARLY FOR O\$PLLC)
0209 * (LINKED WITH O\$GHAP, O\$ALHB, O\$PLHB, O\$ALPB, O\$PLPB, O\$ALPN,
0210 * O\$PLPN, O\$ALLN, O\$PLLN)
0211 *
0212 * O\$ALLN XAC O\$ALLN NONE
0213 * (SIMILARLY FOR O\$PLLN)
0214 * (LINKED WITH O\$GHAP, O\$ALHB, O\$PLHB, O\$ALPB, O\$PLPB, O\$ALPN,
0215 * O\$PLPN, O\$ALLC, O\$PLLC)
0216 *
0217 * O\$AE CALL O\$AE O\$AK NONE
0218 * RETURN C\$BB
0219 * O\$ALPB
0220 * O\$ALL
0221 * O\$ALHB
0222 * O\$ALPN

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0223	*				O\$ALLC	
0224	*				O\$ALLN	
0225	*					
0226	*	O\$LL	CALL	O\$LL	O\$AE	NONE
0227	*		DAC	BUFFER ADDRESS	O\$AK	
0228	*			RETURN	O\$ALL	
0229	*				O\$ALLC	
0230	*				O\$ALLN	
0231	*					
0232	*	O\$AE	CALL	O\$AE		NONE
0233	*			RETURN		
0234	*			(THIS IS A DEFAULT MODULE)		
0235	*					
0236	*	O\$ALHB	XAC	O\$ALHB		NONE
0237	*			(THIS IS A DEFAULT MODULE)		
0238	*			(LINKED WITH O\$ALPB DEFAULT MODULE)		
0239	*			(IDENTICAL WITH O\$ADHB)		
0240	*					
0241	*	O\$ADHB				
0242	*			(SEE O\$ALHB)		
0243	*					
0244	*	O\$ALPB	XAC	O\$ALPB		NONE
0245	*			(THIS IS A DEFAULT MODULE)		
0246	*			(LINKED WITH O\$ALHB DEFAULT MODULE)		
0247	*					
0248	*	O\$ALLC	XAC	O\$ALLC		NONE
0249	*			(THIS IS A DEFAULT MODULE)		
0250	*			(LINKED WITH O\$ALLN DEFAULT MODULE)		
0251	*			(IDENTICAL WITH O\$ADLC)		
0252	*					
0253	*	O\$ADLC				
0254	*			(SEE O\$ALLC)		
0255	*					
0256	*	O\$ALLN	XAC	O\$ALLN		NONE
0257	*			(THIS IS A DEFAULT MODULE)		
0258	*			(LINKED WITH O\$ALLC DEFAULT MODULE)		
0259	*			(IDENTICAL WITH O\$ADLN)		

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0260	*					
0261	*	O\$ADLN				
0262	*			(SEE O\$ALLN)		
0263	*					
0264	*	O\$ALPN	XAC	O\$ALPN		NONE
0265	*			(THIS IS A DEFAULT MODULE)		
0266	*			(IDENTICAL WITH O\$ADPN)		
0267	*					
0268	*	O\$ADPN				
0269	*			(SEE O\$ALPN)		
0270	*					
0271	*	O\$AP	CALL	O\$AP	O\$ALL	NONE
0272	*		DAC	BUFFER ADDRESS		
0273	*			RETURN		
0274	*					
0275	*	O\$ALL	LDX	MINUS NO. BUFFER WORDS	C\$SW	NONE
0276	*		CALL	O\$ALL	O\$AK	
0277	*		DAC	BUFFER ADDRESS		
0278	*			RETURN		
0279	*					
0280	*	O\$AC	CALL	O\$AC	O\$AK	NONE
0281	*			RETURN		
0282	*					
0283	*	O\$AF	CALL	O\$AF	O\$AK	NONE
0284	*			RETURN		
0285	*					
0286	*	I\$AA	CALL	I\$AA	C\$II	PE PARITY ERROR
0287	*		DAC	BUFFER ADDRESS	I\$AINT	
0288	*			END OF TEXT RETURN	I\$AK	
0289	*			NORMAL RETURN	C\$IP	
0290	*				C\$ER	
0291	*				C\$TF	
0292	*				C\$IF	
0293	*				C\$IT	
0294	*				I\$AT	
0295	*			(IDENTICAL WITH I\$AAE)		
0296	*					

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0297 * I\$AAE
0298 * (SEE I\$AA)
0299 *
0300 * O\$AA CALL O\$AA O\$AINT NONE
0301 * DAC BUFFER ADDRESS C\$OI
0302 * RETURN C\$OP
0303 * O\$AK
0304 * C\$OE
0305 * (IDENTICAL WITH O\$AAE)
0306 *
0307 * O\$AAE
0308 * (SEE O\$AA)
0309 *
0310 * O\$AS CALL O\$AS O\$AINT NONE
0311 * RETURN C\$OP
0312 * (IDENTICAL WITH O\$ASS AND O\$ASE) O\$AK
0313 *
0314 * O\$ASS
0315 * (SEE O\$AS)
0316 *
0317 * O\$ASE
0318 * (SEE O\$AS)
0319 *
0320 * I\$AB CALL I\$AB I\$AO CK CHECKSUM ERROR
0321 * DAC BUFFER ADDRESS C\$ER
0322 * END OF TEXT RETURN
0323 * NORMAL RETURN
0324 *
0325 * O\$AB CALL O\$AB O\$AO NONE
0326 * DAC BUFFER ADDRESS
0327 * RETURN
0328 * (THE FIRST WORD OF THE BUFFER
0329 * CONTAINS THE NUMBER OF DATA
0330 * WORDS FOLLOWING)
0331 *
0332 * O\$ASO CALL O\$ASO O\$AINT NONE
0333 * RETURN O\$AK

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0334 * (IDENTICAL WITH F\$D1)
0335 *
0336 * F\$D1
0337 * (SEE O\$ASO)
0338 *
0339 * I\$AO LDA BUFFER ADDRESS I\$AINT BL BLOCK LENGTH
0340 * CALL I\$AO I\$AK ERROR
0341 * END OF TEXT RETURN C\$ER
0342 * NORMAL RETURN I\$AT
0343 * C\$IS
0344 *
0345 * A-REGISTER ON RETURN:-
0346 * ZERO = CHECKSUM AGREED
0347 * NON-ZERO = CHECKSUM VIOLATION
0348 *
0349 * O\$AO LDX MINUS NO. DATA WORDS O\$AINT NONE
0350 * LDA BUFFER ADDRESS O\$AK
0351 * CALL O\$AO C\$SI
0352 * RETURN
0353 *
0354 * O\$ALDR CALL O\$ALDR O\$AINT NONE
0355 * RETURN O\$AK
0356 *
0357 * I\$AINT CALL I\$AINT O\$AK NONE
0358 * RETURN
0359 * (LINKED WITH I\$AK)
0360 *
0361 * I\$AK CALL I\$AK NONE
0362 * RETURN
0363 *
0364 * A-REGISTER ON RETURN
0365 * EQUALS CHARACTER INPUT
0366 * (LINKED WITH I\$AINT)
0367 *
0368 * I\$AT CALL I\$AT NONE
0369 * RETURN
0370 *
0370 * O\$AINT CALL O\$AINT NONE

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```
0371 *                                     RETURN
0372 *
0373 *      O$AK   LDA   CHARACTER
0374 *             CALL  O$AK
0375 *             RETURN
0376 *
0377 *
0378 *      EXTERNAL MODULES
0379 *
0380 *      NAME   DEFINITION
0381 *
0382 *      C$BB   CONVERT BINARY TO BCI
0383 *
0384 *      C$ER   CONTROL ERROR ROUTINE
0385 *
0386 *      C$IF   CHARACTER INPUT FILL
0387 *
0388 *      C$II   CHARACTER INPUT INITIALISE
0389 *
0390 *      C$IP   INPUT PARITY
0391 *
0392 *      C$IS   CONVERT FROM INVISIBLE TO 6 BIT CODE
0393 *
0394 *      C$IT   CHARACTER INPUT TAB
0395 *
0396 *      C$OE   CHARACTER OUTPUT EXTRACT
0397 *
0398 *      C$OI   CHARACTER OUTPUT INITIALISE
0399 *
0400 *      C$OP   OUTPUT PARITY
0401 *
0402 *      C$SI   CONVERT FROM 6 BIT TO INVISIBLE CODE
0403 *
0404 *      C$SW   STRIP TRAILING WORDS
0405 *
0406 *      C$TF   TEST FRAME
0407 *
```

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```
0408 *      F$ER   FORTRAN ERROR ROUTINE
0409 *
0410 *      F$IO   FORTRAN SCANNER AND CONVERSIONS
0411 *
0412 *
0413 *      ERRORS
0414 *
0415 *      BL     BLOCK LENGTH ERROR
0416 *      CK     CHECKSUM ERROR
0417 *
0418 *      THESE ERRORS ARE REPORTED THROUGH C$ER (CONTROL ERROR
0419 *      ROUTINE).
0420 *
0421 *      EF     END OF FILE ERROR
0422 *      ID     ILLEGAL DEVICE
0423 *
0424 *      THIS ERROR IS REPORTED THROUGH F$ER (FORTRAN ERROR ROUTINE).
0425 *
0426 *      PE     PARITY ERROR
0427 *
0428 *      THIS ERROR IS REPORTED THROUGH C$ER (CONTROL ERROR ROUTINE).
0429 *
0430 *      CONTINUATION AFTER ANY OF THE ABOVE ERRORS EXCEPT ID PROCESSES THE
0431 *      NEXT RECORD. CONTINUATION AFTER AN ID ERROR RETURNS CONTROL TO
0432 *      THE CALLING PROGRAM.
0433 *
0434 *
0435 *      METHOD
0436 *
0437 *      THE MODULES ARE ORDERED SO THAT HIGHER LEVEL MODULES PRECEDE LOWER
0438 *      LEVEL MODULES.
0439 *
0440 *      NO REGISTER PRESERVATION IS ATTEMPTED. IT IS ASSUMED THAT THE
0441 *      MODULES C$IS, C$OP, C$SI, I$AK, AND O$AK WILL NOT USE THE
0442 *      X-REGISTER.
0443 *
0444 *      THE FOLLOWING RECORD FORMAT IS ASSUMED:
```

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0446 *
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0451 *
0452 *
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0455 *
0456 *
0457 *
0458 *
0459 *
0460 *
0461 *
0462 *
0463 *
0464 *
0465 *
0466 *
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0471 *
0472 *
0473 *
0474 *
0475 *
0476 *
0477 *
0478 *
0479 *
0480 *
0481 *

SOURCE:

LINEFEED, TEXT, CARRIAGE RETURN, DC3, DEL

(DC3 AND DEL ARE ONLY ESSENTIAL FOR PAPERTAPE)
BLANK TAPE ('000 OR '200) AND DEL ARE IGNORED. TAB
CHARACTERS ('134 OR '334) PROCESS SPACE CHARACTERS ('240) TO
A PREDETERMINED POSITION. CONTROL H ('210) CHARACTER
DELETES THE PREVIOUS CHARACTER AND LEFT-ARROW ('137 OR '337)
DELETES THE CURRENT RECORD ENTIRELY AND PROCESSES THE NEXT
RECORD.
A CARRIAGE RETURN TERMINATES THE RECORD. ONLY TEXT
CHARACTERS ARE RELATED TO THE CONTENTS OF THE BUFFER, OTHER
CHARACTERS ARE FOR CONTROL ONLY. THE BUFFER LENGTH WITH
TAB POSITIONS IS PRE-SET (SEE C\$CC, C\$TC AND C\$TT) BUT CAN BE
INITIALISED USING THE INITIALISATION MODULE (SEE C\$IN).
CHARACTERS IN EXCESS OF THE BUFFER LENGTH ARE DISCARDED AND
EXCESS TAB CHARACTERS ARE CHANGED TO SPACES. THE BUFFER IS
POST FILLED WITH SPACES FOR INPUT.

OBJECT:

SOH ('201), DATA WORDS (UP TO 60), DC3, DEL

THE DATA WORDS ARE IN INVISIBLE FORMAT.
A CHECKSUM VALUE WHICH IS THE EXCLUSIVE OR OF ALL THE DATA
WORDS IS CALCULATED DURING OBJECT READ BUT ONLY ACTIONED
BY I\$AB.

END OF TEXT RECORD:

END OF TEXT ('003 OR '203), DC3, DEL

NOTE THAT AN END OF TEXT CHARACTER IN ANY CHARACTER POSITION
WILL CAUSE THE END OF TEXT RETURN TO BE TAKEN.

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0482 *
0483 *
0484 *
0485 *
0486 *
0487 *
0488 *
0489 *
0490 *
0491 *

ASR LISTING FORMAT IS SET AT 72 LINES PER PAGE OF WHICH 60 ARE
AVAILABLE FOR LISTING INCLUDING HEADING EXCEPT UNDER FORTRAN
CONTROL WHEN PAGINATION IS ACTIONED BY THE CALLING PROGRAM.

PARITY IS DETERMINED BY THE INPUT AND OUTPUT PARITY ROUTINES USED.

EJCT

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```

0492      *
0493      *
0494      *      SJBR  F$R1      FORTRAN READ FROM ASR
0495      *
0496      *
0497      *      CF5
0498      *      REL      H316 AND DDP-516
0499      *      RELOCATABLE
0500      *
0501 00000 -0 000000 F$R1 DAC* **      RETURN PARAMETER
0502 00001 0 10 00000      CALL F$10      FORTRAN SCANNER AND CONVERSIONS
0503 00002 0 000000 RETN DAC **      RETURN
0504 00003 -0 02 00002 RSTR LDA* RETN      RETURN
0505 00004 0 04 00021      STA BUFF      BUFFER
0506 00005 0 02 00000      LDA F$R1      RETURN PARAMETER
0507 00006 140100      SSP      ADDRESS OF FORMAT
0508 00007 0 04 00000      STA 0      INDEX
0509 00010 -0 02 00000      LDA* 0      FORMAT
0510 00011 100040      SZE      TEST FOR FORMAT
0511 00012 0 01 00020      JMP FRED      FORMATTED READ
0512      *
0513      * UNFORMATTED READ
0514 00013 0 02 00021      LDA BUFF      BUFFER
0515 00014 0 10 00000      CALL I$A0      ASR INPUT OBJECT
0516 00015 0 01 00024      JMP ERROR      ERROR
0517 00016 0 12 00002 EXIT IRS RETN      RETURN
0518 00017 -0 01 00002      JMP* RETN      RETURN
0519      *
0520      * FORMATTED READ
0521 00020 0 10 00000 FRED CALL I$AA      ASR INPUT SOURCE RECORD
0522 00021 000000      BUFF BSZ 1      BUFFER
0523 00022 0 01 00024      JMP ERROR      ERROR
0524 00023 0 01 00016      JMP EXIT      EXIT
0525      *
0526      * ERROR
0527 00024 0 10 00000 ERROR CALL F$ER      FORTRAN ERROR ROUTINE

```

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```

0528 00025 0 000027      DAC EFMG      END OF FILE MESSAGE
0529 00026 0 01 00003      JMP RSTR      RESTART
0530      *
0531      *
0532      * ERROR MNEMONIC
0533      *
0534 00027 142706 EFMG BCI 1,EF      END OF FILE MESSAGE
0535      *
0536      *
0537      *      END      END OF F$R1 16.MAR.70 P.J.VYSE
NO ERRORS IN ABOVE ASSEMBLY.
$DA 41285326-002-02

```

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```
0001      *
0002      *
0003      SUBR F$W1      FORTTRAN OUTPUT ON ASR
0004      SUBR F$AL      FORTTRAN ASR LINES/PAGE
0005      *
0006      *
0007      CF5           H316 AND DDP-516
0008      REL           RELOCATABLE
0009      *
0010      *
0011      * FORTTRAN OUTPUT ON ASR
0012      *
0013 00000 0 000000 F$W1 DAC **      RETURN PARAMETER
0014 00001 0 10 00000 CALL F$10      FORTTRAN SCANNER AND CONVERSIONS
0015 00002 0 000000 RETN DAC **      RETURN
0016 00003 -0 02 00002 LDA* RETN      RETURN
0017 00004 0 04 00050 STA BUFF      BUFFER
0018 00005 0 04 00014 STA WORK      WORK
0019 00006 -0 02 00000 LDA* F$W1      RETURN PARAMETER
0020 00007 100040     SZE           TEST FOR FORMAT
0021 00010 0 01 00021 JMP F$WRT      FORMATTED WRITE
0022      *
0023      * UNFORMATTED WRITE
0024 00011 0 35 00073 LDX =-60      SET INDEX
0025 00012 140040     CRA           STRIP TRAILING WORDS
0026 00013 0 10 00000 CALL C$SW      WORK
0027 00014 000000     WORK BSZ 1      BUFFER
0028 00015 0 02 00050 LDA BUFF      ASR OUTPUT OBJECT
0029 00016 0 10 00000 CALL O$AO      RETURN ADDRESS
0030 00017 0 12 00002 EXIT IRS RETN   RETURN
0031 00020 -0 01 00002 JMP* RETN
0032      *
0033      * FORMATTED WRITE
0034 00021 0 02 00072 F$WRT LDA ='177615 DEL/CARRIAGE RETURN
0035 00022 0 10 00000 CALL O$AK      ASR OUTPUT CHARACTER
0036 00023 141340     TCA
```

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```
0037 00024 0 10 00000 CALL O$AK      ASR OUTPUT CHARACTER
0038      *
0039 00025 -0 02 00050 LDA* BUFF      BUFFER
0040 00026 141050     CAL           CHARACTER 1 TO SPACE
0041 00027 0 05 00071 ERA = '120000   BUFFER
0042 00030 -0 13 00050 IMA* BUFF      CONTROL CHARACTER RIGHT JUSTIFIED
0043 00031 141140     ICL
0044      *
0045 00032 100100     S-LZ
0046 00033 0 01 00052 JMP NFHD       NO FEED OR HEADING
0047 00034 0 35 00070 LDX =-2        SET INDEX
0048 00035 0404 74     LGR 4         ONE OR TWO LINE FEEDS?
0049 00036 101100     SLN
0050 00037 0 12 00000 IRS 0          INDEX
0051 00040 0 02 00067 FEED LDA ='212  LINEFEED
0052 00041 0 10 00000 CALL O$AK      ASR OUTPUT CHARACTER
0053 00042 0 12 00065 IRS LINE       LINE
0054 00043 101000     NOP
0055 00044 0 12 00000 IRS 0          INDEX
0056 00045 0 01 00040 JMP FEED      FEED
0057      *
0058 00046 0 35 00066 OLIN LDX =-36   SET INDEX
0059 00047 0 10 00000 CALL O$ALL      ASR LIST LINE
0060 00050 000000     BUFF BSZ 1      BUFFER
0061 00051 0 01 00017 JMP EXIT      EXIT
0062      *
0063 00052 0404 77     NFHD LGR 1     NO FEED OR HEADING
0064 00053 100100     SLZ
0065 00054 0 01 00046 JMP OLIN      OUTPUT LINE
0066 00055 0 02 00065 LDA LINE      LINE
0067 00056 0 07 00064 SUB F$AL      FORTTRAN ASR LINES/PAGE
0068 00057 101400     SMI
0069 00060 0 01 00056 JMP =-2     INDEX
0070 00061 0 04 00000 STA 0         LINE
0071 00062 0 04 00065 STA LINE     LINE
0072 00063 0 01 00040 JMP FEED      FEED
0073      *
```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

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```
0074      *
0075      *
0076      *
0077 00064 000110  F$AL DEC 72      FORTRAN ASR LINES/PAGE
0078 00065 000000  LINE BSZ 1      LINE
0079      *
0080 00066 177734      FIN      LITERALS
      00067 000212
      00070 177776
      00071 120000
      00072 177615
      00073 177704

0081      *
0082      *
0083      *
NO ERRORS IN ABOVE ASSEMBLY.      END OF F$W1 6.MAR.70 P.J.VYSE
$DA 41285326-002-02
```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

PAGE 20

```
0001      *
0002      *
0003      SUBR F$B1      FORTRAN REWIND ASR
0004      SUBR F$F1,F$B1  FORTRAN BACKSPACE ASR
0005      *
0006      *
0007      CF5      H316 AND DDP-516
0008      REL      RELOCATABLE
0009      *
0010      *
0011 00000 0 000000  F$B1 DAC **      RETURN ADDRESS
0012 00001 0 10 00000  CALL F$ER      FORTRAN ERROR ROUTINE
0013 00002 0 000004  DAC =AID      ILLEGAL DEVICE
0014 00003 -0 01 00000  JMP F$B1      RETURN
0015      *
0016      *
0017      * LITERALS
0018      *
0019 00004 144704      FIN      LITERALS

0020      *
0021      *
0022      *
NO ERRORS IN ABOVE ASSEMBLY.      END OF F$B1 14.MAY.70 P.J.VYSE
$DA 41285326-002-02
```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

PAGE 21

```
0001 *
0002 *
0003 SJBR O$HH,O$AH ASR LIST HEADING
0004 *
0005 *
0006 CF5 H316 AND DDP-516
0007 REL RELOCATABLE
0008 *
0009 *
0010 00000 0 000000 O$AH DAC ** RETURN ADDRESS
0011 00001 0 35 00000 LDX O$AH RETURN ADDRESS
0012 00002 0 10 00000 CALL O$GHAP GENERAL HEADING ASR/HSP
0013 *
0014 * ASR LIST EJECT PAGE
0015 00003 0 000000 XAC O$AE ASR LIST EJECT PAGE
0016 *
0017 *
0018 END
NO ERRORS IN ABOVE ASSEMBLY. END OF O$HH 22.MAY.70 P.J.VYSE
$DA 41285326-002-02
```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

PAGE 22

```
0001 *
0002 *
0003 SUBR O$GHAP,O$AH GENERAL HEADING ASR/HSP
0004 SUBR O$ALHB,HEAD ASR LIST HEADING BUFFER
0005 SUBR O$PLHB,HEAD HSP LIST HEADING BUFFER
0006 SUBR O$ALPB,PBUF ASR LIST PAGE NUMBER BUFFER
0007 SUBR O$PLPB,PBUF HSP LIST PAGE NUMBER BUFFER
0008 SUBR O$ALPN,PAGE ASR LIST PAGE NUMBER
0009 SUBR O$PLPN,PAGE HSP LIST PAGE NUMBER
0010 SUBR O$ALLC,LCNT ASR LIST LINE COUNT/PAGE
0011 SUBR O$PLLC,LCNT HSP LIST LINE COUNT/PAGE
0012 SUBR O$ALLN,LINE ASR LIST LINE NUMBER
0013 SUBR O$PLLN,LINE HSP LIST LINE NUMBER
0014 *
0015 *
0016 CF5 H316 AND DDP-516
0017 REL RELOCATABLE
0018 *
0019 *
0020 * LIST HEADING
0021 *
0022 00000 0 000000 O$AH DAC ** RETURN ADDRESS
0023 00001 0 15 00000 STX O$AH RETURN ADDRESS
0024 00002 -0 02 00000 LDA* O$AH HEADING ADDRESS
0025 00003 0 12 00000 IRS O$AH RETURN ADDRESS
0026 00004 0 04 00063 STA PAGE LIST PAGE NUMBER
0027 00005 0 35 00066 LDX =-28 SET INDEX
0028 00006 -0 02 00063 LOOP LDA* PAGE
0029 00007 1 04 00053 STA HEAD+28,1 LIST HEADING BUFFER
0030 00010 0 12 00063 IRS PAGE LIST PAGE NUMBER
0031 00011 0 12 00000 IRS 0 INDEX
0032 00012 0 01 00006 JMP LOOP LOOP
0033 00013 0 15 00063 STX PAGE PAGE
0034 00014 0 02 00064 LDA LCNT LIST LINE COUNT/PAGE
0035 00015 0 04 00065 STA LINE LIST LINE NUMBER
0036 00016 -0 01 00000 JMP* O$AH RETURN
```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

PAGE 23

```
0037 *
0038 *
0039 * CONSTANTS AND VARIABLES
0040 *
0041 * LIST HEADING BUFFER
0042 00017 HEAD BSS 28 LIST HEADING BUFFER
0043 00053 120320 BCI 5, PAGE
0054 140707
0055 142640
0056 120240
0057 120240
0044 *
0045 * LIST PAGE NUMBER BUFFER
0046 00060 120240 PBUF BCI 3, LIST PAGE NUMBER BUFFER
0061 120240
0062 120240
0047 *
0048 * LIST PAGE NUMBER
0049 00063 000000 PAGE BSZ 1 LIST PAGE NUMBER
0050 *
0051 * LIST LINE COUNT/PAGE
0052 00064 000110 LCNT DEC 72 LIST LINE COUNT/PAGE
0053 *
0054 * LIST LINE NUMBER
0055 00065 000000 LINE BSZ 1 LIST LINE NUMBER
0056 *
0057 * LITERALS
0058 00066 177744 FIN LITERALS
0059 *
0060 *
0061 * END
NO ERRORS IN ABOVE ASSEMBLY. END OF OSGHAP 22.MAY.70 P.J.VYSE
*DA 41285326-002-02
```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

PAGE 24

```
0001 *
0002 *
0003 * SJBR O$AE ASR LIST EJECT PAGE
0004 *
0005 *
0006 * CF5 H316 AND DDP-516
0007 * REL RELOCATABLE
0008 *
0009 *
0010 00000 0 000000 O$AE DAC ** RETURN ADDRESS
0011 00001 -0 02 00036 LDA* O$LN LIST LINE NUMBER
0012 00002 -0 07 00035 SUB* O$LC LIST LINE COUNT/PAGE
0013 00003 0 11 00043 CAS =0
0014 00004 0 01 00002 JMP *-2
0015 00005 101000 NOP
0016 00006 0 07 00042 SJB =13
0017 00007 0 04 00000 STA 0 INDEX
0018 00010 0 02 00041 LDA =15
0019 00011 -0 04 00036 STA* O$LN LIST LINE NUMBER
0020 00012 0 02 00037 LDA CRLF CR/LF
0021 00013 141340 ICA
0022 00014 0 10 00000 CALL O$AK ASR OUTPUT CHARACTER
0023 00015 141340 ICA
0024 00016 0 10 00000 CALL O$AK ASR OUTPUT CHARACTER
0025 00017 0 12 00000 IRS 0 INDEX
0026 00020 0 01 00016 JMP *-2
0027 00021 -0 12 00034 IRS* O$PN LIST PAGE NUMBER
0028 00022 -0 02 00034 LDA* O$PN LIST PAGE NUMBER
0029 00023 0 10 00000 CALL C$BB CONVERT BINARY TO BCI
0030 00024 0 000000 XAC O$ALPB ASR LIST PAGE NUMBER BUFFER
0031 00025 0 35 00040 LDX =-36 SET INDEX
0032 00026 0 10 00000 CALL O$ALL ASR LIST LINE
0033 00027 0 000000 XAC O$ALHB ASR LIST HEADING BUFFER
0034 00030 0 02 00037 LDA CRLF CR/LF
0035 00031 0 10 00000 CALL O$AK ASR OUTPUT CHARACTER
0036 00032 0 10 00000 CALL O$AK ASR OUTPUT CHARACTER
```

Form 4536



```
0037 00033 -0 01 00000 JMP* 0$AE RETURN
0038 *
0039 *
0040 *
0041 *
0042 00034 0 000000 0$PN XAC 0$ALPN ASR LIST PAGE NUMBER
0043 00035 0 000000 0$LC XAC 0$ALLC ASR LIST LINE COUNT/PAGE
0044 00036 0 000000 0$LN XAC 0$ALLN ASR LIST LINE NUMBER
0045 *
0046 00037 106612 CRLF OCT 106612 CR/LF
0047 *
0048 00040 177734 FIN LITERALS
0041 000017
0042 000015
0043 000000

0049 *
0050 *
0051 END END OF 0$AE 11.MAR.70 P.J.VYSE
NO ERRORS IN ABOVE ASSEMBLY.
$DA 41285326-002-02
```

Form 4536



```
0001 *
0002 *
0003 SJBR 0$LL,0$AL ASR LIST
0004 *
0005 *
0006 CF5 H316 AND DDP-516
0007 REL RELOCATABLE
0008 *
0009 *
0010 00000 0 000000 0$AL DAC ** RETURN ADDRESS
0011 00001 -0 02 00025 LDA* 0$LN LIST LINE NUMBER
0012 00002 -0 11 00024 CAS* 0$LC LIST LINE COUNT/PAGE
0013 00003 101000 NOP
0014 00004 0 10 00000 CALL 0$AE ASR LIST EJECT PAGE
0015 00005 -0 12 00025 IRS* 0$LN LIST LINE NUMBER
0016 00006 101000 NOP
0017 00007 0 02 00022 LDA LFCR LF/CR
0018 00010 0 10 00000 CALL 0$AK ASR OUTPUT CHARACTER
0019 00011 141340 ICA
0020 00012 0 10 00000 CALL 0$AK ASR OUTPUT CHARACTER
0021 00013 -0 02 00000 LDA* 0$AL BUFFER ADDRESS
0022 00014 0 04 00020 STA WORK WORK
0023 00015 0 12 00000 IRS 0$AL RETURN ADDRESS
0024 00016 0 35 00023 LDX =-36 SET INDEX
0025 00017 0 10 00000 CALL 0$ALL ASR LIST LINE
0026 00020 000000 WORK BSZ 1 WORK
0027 00021 -0 01 00000 JMP* 0$AL RETURN
0028 *
0029 *
0030 *
0031 *
0032 00022 105215 LFCR OCT 105215 LF/CR
0033 00023 177734 FIN LITERALS

0034 *
0035 * LIST LINE COUNT/PAGE
```

Form 4536



COMPUTER CONTROL DIVISION (EUROPE)

PROGRAM DOCUMENTATION

* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

PAGE 27

```
0036 00024 0 000000 O$LC XAC O$ALLC ASR LIST LINE COUNT/PAGE
0037 *
0038 * LIST LINE NUMBER
0039 00025 0 000000 O$LN XAC O$ALLN ASR LIST LINE NUMBER
0040 *
0041 *
0042 * END
NO ERRORS IN ABOVE ASSEMBLY. END OF O$LL 18.MAR.70 P.J.VYSE
$DA 41285326-002-02
```

Form 4536



COMPUTER CONTROL DIVISION (EUROPE)

PROGRAM DOCUMENTATION

* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

PAGE 28

```
0001 *
0002 *
0003 SUBR O$AE ASR LIST EJECT PAGE
0004 *
0005 *
0006 CF5 H316 AND DDP-516
0007 REL RELOCATABLE
0008 *
0009 *
0010 00000 0 000000 O$AE DAC ** RETURN ADDRESS
0011 00001 -0 01 00000 JMP* O$AE RETURN
0012 *
0013 *
0014 * END
NO ERRORS IN ABOVE ASSEMBLY. END OF O$AE 18.MAR.70 P.J.VYSE
$DA 41285326-002-02
```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

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```
0001
0002
0003
0004
0005
0006
0007
0008
0009
0010
0011
0012 00000 120240
      00001 120240
      00002 120240
      00003 120240
      00004 120240
      00005 120240
      00006 120240
      00007 120240
      00010 120240
      00011 120240
      00012 120240
      00013 120240
      00014 120240
      00015 120240
      00016 120240
      00017 120240
      00020 120240
      00021 120240
      00022 120240
      00023 120240
      00024 120240
      00025 120240
      00026 120240
      00027 120240
      00030 120240

      *
      *
      SJBR 0$ALHB,HEAD    ASR LIST HEADING BUFFER
      SJBR 0$ADHB,HEAD    ASR DEFAULT HEADING BUFFER
      SJBR 0$ALPB,PAGE     ASR LIST PAGE NUMBER BUFFER
      *
      *
      CF5
      REL                  H316 AND DDP-516
                           RELOCATABLE
      *
      * ASR LIST HEADING BUFFER
      HEAD BCI 28.
```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

PAGE 30

```
00031 120240
00032 120240
00033 120240
0013 00034 120320
      00035 140707
      00036 142640
      00037 120240
      00040 120240
      BCI 5, PAGE

0014
0015
0016 00041 120240
      00042 120240
      00043 120240
      *
      * ASR LIST PAGE NUMBER BUFFER
      PAGE BCI 3,

0017
0018
0019
      *
      *
      END
      NO ERRORS IN ABOVE ASSEMBLY.
      SDA 41285326-002-02
      END OF 0$ALHB 8.MAY.70 P.J.VYSE
```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

PAGE 31

```
0001      *
0002      *
0003      SJBR  O$ALLC,O$LC      ASR LIST LINE COUNT/PAGE
0004      SJBR  O$ADLC,O$LC      ASR DEFAULT LINE COUNT/PAGE
0005      SJBR  O$ALLN,O$LN      ASR LIST LINE NUMBER
0006      SJBR  O$ADLN,O$LN      ASR DEFAULT LINE NUMBER
0007      *
0008      *
0009      CF5                      H316 AND DDP-516
0010      REL                      RELOCATABLE
0011      *
0012      *
0013      * LIST LINE COUNT/PAGE
0014      *
0015 00000  000110  O$LC DEC  72      LIST LINE COUNT/PAGE
0016      *
0017      *
0018      * LIST LINE NUMBER
0019      *
0020 00001  000110  O$LN DEC  72      LIST LINE NUMBER
0021      *
0022      *
0023      * END                      END OF O$ALLC 8.MAY.70 P.J.VYSE
NO ERRORS IN ABOVE ASSEMBLY.
$DA 41285326-002-02
```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

PAGE 32

```
0001      *
0002      *
0003      SJBR  O$ALPN,O$PN      ASR LIST PAGE NUMBER
0004      SJBR  O$ADPN,O$PN      ASR DEFAULT PAGE NUMBER
0005      *
0006      *
0007      CF5                      H316 AND DDP-516
0008      REL                      RELOCATABLE
0009      *
0010      *
0011 00000  000000  O$PN BSZ  1      LIST PAGE NUMBER
0012      *
0013      *
0014      * END                      END OF O$ALPN 8.MAY.70 P.J.VYSE
NO ERRORS IN ABOVE ASSEMBLY.
$DA 41285326-002-02
```

Form 4536



```
0001      *
0002      *
0003      SUBR  O$AP          ASR PRINT ROUTINE
0004      *
0005      *
0006      CF5
0007      REL  RELOCATABLE    H316 AND DDP-516
0008      *
0009      *
0010 00000  0 000000  O$AP DAC  **      RETURN ADDRESS
0011 00001  0 35 00007  LDX  =-36      SET INDEX
0012 00002  -0 02 00000  LDA*  O$AP     BUFFER ADDRESS
0013 00003  0 04 00005  STA  BUFF      BUFFER
0014 00004  0 10 00000  CALL  O$ALL     ASR LIST LINE
0015 00005  000000  BUFF BSZ  1         BUFFER
0016 00006  -0 01 00000  JMP*  O$AP     RETURN
0017      *
0018      *
0019      * LITERALS
0020      *
0021 00007  177734      FIN          LITERALS

0022      *
0023      *
0024      END
NO ERRORS IN ABOVE ASSEMBLY.
FDA 41285326-002-02
```

Form 4536



```
0001      *
0002      *
0003      SUBR  O$ALL          ASR LIST LINE
0004      *
0005      *
0006      CF5
0007      REL  RELOCATABLE    H316 AND DDP-516
0008      *
0009      *
0010 00000  0 000000  O$AL DAC  **      RETURN ADDRESS
0011 00001  -0 02 00000  LDA*  O$AL     BUFFER ADDRESS
0012 00002  0 04 00006  STA  BUFF      BUFFER
0013 00003  0 12 00000  IRS  O$AL     TALLY RETURN ADDRESS
0014 00004  0 02 00023  LDA  =A        SPACES
0015 00005  0 10 00000  CALL  C$SW     STRIP TRAILING WORDS
0016 00006  000000  BUFF BSZ  1         BUFFER
0017      *
0018 00007  0 02 00000  LDA  0          INDEX
0019 00010  101040      SVZ
0020 00011  -0 01 00000  JMP*  O$AL     RETURN
0021      *
0022      *
0023 00012  -0 02 00006  NEXT LDA*  BUFF  BUFFER
0024 00013  141340      ICA
0025 00014  0 10 00000  CALL  O$AK     ASR OUTPUT CHARACTER
0026 00015  141340      ICA
0027 00016  0 10 00000  CALL  O$AK     ASR OUTPUT CHARACTER
0028 00017  0 12 00006  IRS  BUFF      BUFFER
0029 00020  0 12 00000  IRS  0          INDEX
0030 00021  0 01 00012  JMP  NEXT     NEXT WORD
0031 00022  -0 01 00000  JMP*  O$AL     RETURN
0032      *
0033      *
0034      * LITERALS
0035      *
0036 00023  120240      FIN          LITERALS
```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

PAGE 35

0037 *
0038 *
0039 * END
NO ERRORS IN ABOVE ASSEMBLY. END OF 0\$ALL 8.MAY.70 P.J.VYSE
\$DA 41285326-002-02

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

PAGE 36

0001 *
0002 *
0003 SJBR 0\$AC ASR OUTPUT CARRIAGE RETURN
0004 *
0005 *
0006 CF5 H316 AND DDP-516
0007 REL RELOCATABLE
0008 *
0009 *
0010 00000 0 000000 0\$AC DAC ** RETURN ADDRESS
0011 00001 0 02 00004 LDA ='215 CARRIAGE RETURN
0012 00002 0 10 00000 CALL 0\$AK ASR OUTPUT CHARACTER
0013 00003 -0 01 00000 JMP* 0\$AC RETURN
0014 *
0015 *
0016 * LITERALS
0017 *
0018 00004 000215 FIN LITERALS
0019 *
0020 *
0021 * END
NO ERRORS IN ABOVE ASSEMBLY. END OF 0\$AC 7.MAY.70 P.J.VYSE
\$DA 41285326-002-02

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

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```
0001 *
0002 *
0003 SJBR 0$AF ASR OUTPUT LINE FEED
0004 *
0005 *
0006 CF5 H316 AND DDP-516
0007 REL RELOCATABLE
0008 *
0009 *
0010 00000 0 000000 0$AF DAC ** RETURN ADDRESS
0011 00001 0 02 00004 LDA ='212 LINE FEED
0012 00002 0 10 00000 CALL 0$AK ASR OUTPUT CHARACTER
0013 00003 -0 01 00000 JMP* 0$AF RETURN
0014 *
0015 *
0016 * LITERALS
0017 *
0018 00004 000212 FIN LITERALS
0019 *
0020 *
0021 END END OF 0$AF 7.MAY.70 P.J.VYSE
NO ERRORS IN ABOVE ASSEMBLY.
$DA 41285326-002-02
```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

PAGE 58

```
0001 *
0002 *
0003 SUBR I$AA ASR INPUT SOURCE RECORD
0004 SUBR I$AAE, I$AA ASR INPUT SOURCE RECORD
0005 *
0006 *
0007 CF5 H316 AND DDP-516
0008 REL RELOCATABLE
0009 *
0010 *
0011 00000 0 000000 I$AA DAC ** RETURN ADDRESS
0012 00001 -0 02 00000 RSTR LDA* I$AA BUFFER ADDRESS
0013 00002 0 10 00000 CALL C$II CHARACTER INPUT INITIALISE
0014 00003 0 10 00000 CALL I$AINT ASR INITIALISE FOR INPUT
0015 00004 0 10 00000 NEXT CALL I$AK ASR INPUT CHARACTER
0016 00005 0 10 00000 CALL C$IP INPUT PARITY
0017 00006 0 01 00012 JMP CONT CONTINUE
0018 00007 0 10 00000 PERR CALL C$ER CONTROL ERROR ROUTINE
0019 00010 150305 BCI 1,PE PARITY ERROR MNEMONIC
0020 00011 0 01 00001 JMP RSTR RESTART
0021 *
0022 00012 0 10 00000 CONT CALL C$TF TEST FRAME
0023 00013 0 01 00004 JMP NEXT NEXT (200)
0024 00014 0 01 00024 JMP FILL FILL (201)
0025 00015 0 01 00043 JMP END END (203)
0026 00016 0 01 00004 JMP NEXT NEXT (212)
0027 00017 0 01 00037 JMP EREC END OF RECORD (215)
0028 00020 0 01 00001 JMP RSTR RESTART (223)
0029 00021 0 01 00035 JMP TAB TAB (334)
0030 00022 0 01 00027 JMP DELT DELETE (337)
0031 00023 0 01 00004 JMP NEXT NEXT (377)
0032 00024 BSS 0 OTHER CHARACTER
0033 *
0034 00024 0 10 00000 FILL CALL C$IF CHARACTER INPUT FILL
0035 00025 101000 NOP
0036 00026 0 01 00004 JMP NEXT
```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

PAGE 39

```
0037
0038 00027 0 10 00000 * DELT CALL I$AK ASR INPUT CHARACTER
0039 00030 0414 67 LSL 9
0040 00031 0 11 00047 CAS ='15000 CARRIAGE RETURN?
0041 00032 100000 SKP
0042 00033 0 01 00001 JMP RSTR RESTART
0043 00034 0 01 00027 JMP DELT DELETE
0044
0045 00035 0 10 00000 * TAB CALL C$IT CHARACTER INPUT TAB
0046 00036 0 01 00004 JMP NEXT NEXT
0047
0048 00037 0 12 00000 * EREC IRS I$AA RETURN ADDRESS
0049 00040 0 02 00046 LDA ='240 SPACE
0050 00041 0 10 00000 CALL C$IF CHARACTER INPUT FILL
0051 00042 0 01 00040 JMP *-2
0052 00043 0 12 00000 END IRS I$AA RETURN ADDRESS
0053 00044 0 10 00000 CALL I$AT ASR TIMING DELAY
0054 00045 -0 01 00000 JMP* I$AA RETURN
0055
0056
0057 * LITERALS
0058
0059 00046 000240 FIN LITERALS
00047 015000

0060
0061 *
0062 * END END OF I$AA 18.MAR.70 P.J.VYSE
NO ERRORS IN ABOVE ASSEMBLY.
$DA 41285326-002-02
```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

PAGE 40

```
0001
0002
0003 * SJBR O$AA ASR OUTPUT SOURCE RECORD
0004 SJBR O$AAE,O$AA ASR OUTPUT SOURCE RECORD
0005
0006 *
0007 CF5 H316 AND DDP-516
0008 REL RELOCATABLE
0009
0010 *
0011 00000 0 000000 O$AA BAC *- RETURN ADDRESS
0012 00001 0 10 00000 CALL O$AINT ASR INITIALISE FOR OUTPUT
0013 00002 -0 02 00000 LDA* O$AA BUFFER ADDRESS
0014 00003 0414 77 LSL 1 CHARACTERS
0015 00004 0 04 00013 STA BUFF BUFFER
0016 00005 0 12 00000 IRS O$AA TALLY RETURN ADDRESS
0017 00006 0 10 00000 CALL C$O1 CHARACTER OUTPUT INITIALISE
0018 00007 0 02 00030 LDA ='212 LINEFEED
0019 00010 0 10 00000 NEXT CALL C$OP OUTPUT PARITY
0020 00011 0 10 00000 CALL O$AK ASR OUTPUT CHARACTER
0021 00012 0 10 00000 CALL C$OE CHARACTER OUTPUT EXTRACT
0022 00013 000000 BUFF BSZ 1 BUFFER
0023 00014 0 01 00010 JMP NEXT NEXT
0024 00015 0 35 00027 LDZ =-3 SET INDEX
0025 00016 1 02 00027 LOOP LDA ECHR+3,1 END CHARACTERS
0026 00017 0 10 00000 CALL C$OP OUTPUT PARITY
0027 00020 0 10 00000 CALL O$AK ASR OUTPUT CHARACTER
0028 00021 0 12 00000 IRS 0 INDEX
0029 00022 0 01 00016 JMP LOOP LOOP
0030 00023 -0 01 00000 JMP* O$AA RETURN
0031
0032
0033 * CONSTANTS AND VARIABLES
0034
0035 00024 000215 ECHR OCT 215 END CHARACTERS CARRIAGE RETURN
0036 00025 000223 OCT 223 DC3
```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

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```
0037 00026 000377      OCT 377      DEL
0038      *
0039 00027 177775      FIN      LITERALS
      00030 000212

0040      *
0041      *
0042      *      END      END OF 0$AA 9.MAR.70 P.J.VYSE
NO ERRORS IN ABOVE ASSEMBLY.
$DA 41285326-002-02
```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

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```
0001      *
0002      *
0003      *      SJBR 0$AS      ASR OUTPUT END OF TEXT
0004      *      SJBR 0$ASS,0$AS      ASR OUTPUT SOURCE END OF TEXT
0005      *      SJBR 0$ASE,0$AS      ASR OUTPUT SOURCE END OF TEXT
0006      *
0007      *
0008      *      CFS      H316 AND DDP-516
0009      *      REL      RELOCATABLE
0010      *
0011      *
0012 00000 0 000000 0$AS 0AC **      RETURN ADDRESS
0013 00001 0 10 00000      CALL 0$AINT      ASR INITIALISE FOR OUTPUT
0014 00002 0 35 00014      LDX =-3      SET INDEX
0015 00003 1 02 00014      LOOP LDA ECHR+3,1      END CHARACTERS
0016 00004 0 10 00000      CALL C$OP      OUTPUT PARITY
0017 00005 0 10 00000      CALL 0$AK      ASR OUTPUT CHARACTER
0018 00006 0 12 00000      IRS 0      INDEX
0019 00007 0 01 00003      JMP LOOP      LOOP
0020 00010 -0 01 00000      JMP* 0$AS      RETURN
0021      *
0022      *
0023      *      CONSTANTS AND VARIABLES
0024      *
0025 00011 000203      ECHR OCT 203      END CHARACTERS (END OF TEXT)
0026 00012 000223      OCT 223      (DC3)
0027 00013 000377      OCT 377      (DEL)
0028      *
0029 00014 177775      FIN      LITERALS

0030      *
0031      *
0032      *      END      END OF 0$AS 9.MAR.70 P.J.VYSE
NO ERRORS IN ABOVE ASSEMBLY.
$DA 41285326-002-02
```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

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```

0001      *
0002      *
0003      SJBR  I$AB          ASR INPUT OBJECT LINK
0004      *
0005      *
0006      CF5
0007      REL                H316 AND DDP-516
0008                        RELOCATABLE
0009      *
0010 00000  0 000000  I$AB DAC  **
0011 00001 -0 02 00000 RSTR LDA* I$AB
0012 00002  0 10 00000      CALL I$AO
0013 00003  0 01 00007      JMP  FILE
0014 00004 100040      SZE
0015 00005  0 01 00011      JMP  CERR
0016 00006  0 12 00000      IRS  I$AB
0017 00007  0 12 00000 FILE IRS  I$AB
0018 00010 -0 01 00000      JMP* I$AB
0019      *
0020 00011  0 10 00000 CERR CALL C$ER
0021 00012 141713      RCI  1,CK
0022 00013  0 01 00001      JMP  RSTR
0023      *
0024      *
0025      END
NO ERRORS IN ABOVE ASSEMBLY.
$DA 41285326-002-02

```

RETURN ADDRESS
BUFFER ADDRESS
ASR INPUT OBJECT
FILE
TEST CHECKSUM
CHECKSUM ERROR
RETURN ADDRESS
RETURN ADDRESS
RETURN
CONTROL ERROR ROUTINE
CHECKSUM ERROR MNEMONIC
RESTART

END OF I\$AB 16.MAR.70 P.J.VYSE

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

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```

0001      *
0002      *
0003      SJBR  O$AB          ASR OUTPUT OBJECT LINK
0004      *
0005      *
0006      CF5
0007      REL                H316 AND DDP-516
0008                        RELOCATABLE
0009      *
0010 00000  0 000000  O$AB DAC  **
0011 00001 -0 35 00000      LDx* O$AB
0012 00002  1 02 00000      LDA  0,1
0013 00003 140407      TCA
0014 00004  0 13 00000      IMA  0
0015 00005 141206      AOA
0016 00006  0 10 00000      CALL O$AO
0017 00007  0 12 00000      IRS  O$AB
0018 00010 -0 01 00000      JMP* O$AB
0019      *
0020      *
0021      END
NO ERRORS IN ABOVE ASSEMBLY.
$DA 41285326-002-02

```

RETURN ADDRESS
BUFFER ADDRESS
GET NO. OF WORDS
NEGATE AND
PUT IN INDEX
BUMP BUFFER ADDRESS
ASR OUTPUT OBJECT
RETURN ADDRESS
RETURN

END OF O\$AB 16.MAR.70 P.J.VYSE

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

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```
0001      *
0002      *
0003      SUBR  O$ASO,O$AS      ASR OUTPUT OBJECT END OF TEXT
0004      SUBR  F$D1,O$AS      FORTRAN WRITE FILE MARK ASR
0005      *
0006      *
0007      CF5
0008      REL                  H316 AND DDP-516
                                RELOCATABLE
0009      *
0010      *
0011 00000 0 000000 O$AS DAC **      RETURN ADDRESS
0012 00001 0 10 00000 CALL O$AINT    ASR INITIALISE FOR OUTPUT
0013 00002 0 35 00013 LDX  =-3      SET INDEX
0014 00003 1 02 00013 LOOP LDA ECHR+3,1 END CHARACTERS
0015 00004 0 10 00000 CALL O$AK      ASR OUTPUT CHARACTER
0016 00005 0 12 00000 IRS 0         INDEX
0017 00006 0 01 00003 JMP LOOP      LOOP
0018 00007 -0 01 00000 JMP* O$AS    RETURN
0019      *
0020      *
0021      * CONSTANTS AND VARIABLES
0022      *
0023 00010 000203 ECHR OCT 203      END CHARACTERS (END OF TEXT)
0024 00011 000223 OCT 223          (DC3)
0025 00012 000377 OCT 377          (DEL)
0026      *
0027 00013 177775 FIN              LITERALS
0028      *
0029      *
0030      * END
                                END OF O$ASO 25.MAY.70 P.J.VYSE
NO ERRORS IN ABOVE ASSEMBLY.
$DA 41285326-002-02
```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

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```
0001      *
0002      *
0003      SUBR  I$A0            ASR INPUT OBJECT
0004      *
0005      *
0006      CF5
0007      REL                  H316 AND DDP-516
                                RELOCATABLE
0008      *
0009      *
0010 00000 0 000000 I$A0 DAC **      RETURN ADDRESS
0011 00001 0 04 00072 STA KEEP      KEEP
0012 00002 0 02 00072 RSTR LDA KEEP  KEEP
0013 00003 0 04 00067 STA BUFF      BUFFER
0014      *
0015 00004 140040 CRA
0016 00005 0 04 00070 STA CKSM      CHECKSUM
0017      *
0018 00006 0 10 00000 CALL I$AINT    ASR INITIALISE FOR INPUT
0019 00007 0 10 00000 NEXT CALL I$AK ASR INPUT CHARACTER
0020      *
0021 00010 0 03 00100 AVA  ='177    FORCED-EIGHT PARITY
0022 00011 0 05 00077 ERA  ='200
0023 00012 0 11 00076 CAS  ='201    SOH
0024 00013 100000 SKP
0025 00014 0 01 00024 JMP  OBLK      OBJECT BLOCK
0026 00015 0 11 00075 CAS  ='223    DC3
0027 00016 100000 SKP
0028 00017 0 01 00002 JMP  RSTR      RESTART
0029 00020 0 11 00074 CAS  ='203    END OF TEXT
0030 00021 100000 SKP
0031 00022 0 01 00051 JMP  END      END
0032 00023 0 01 00007 JMP  NEXT     NEXT
0033      *
0034 00024 0 35 00073 OBLK LDX  =-61  SET INDEX
0035 00025 0 10 00054 NFRM JST  FRME  INPUT TEST AND PACK FRAME
0036 00026 0 10 00054 JST  FRME  FRAME
```

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* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

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```

0037 00027 0 10 00054 JST FRME FRAME
0038 00030 0 12 00000 IRS 0 INDEX
0039 00031 100000 SXP
0040 00032 0 01 00040 JMP BLER BLOCK LENGTH ERROR
0041 00033 -0 04 00067 STA* BUFF BUFFER
0042 00034 0 12 00067 IRS BUFF BUFFER
0043 00035 0 05 00070 ERA CKSM CHECKSUM
0044 00036 0 04 00070 STA CKSM CHECKSUM
0045 00037 0 01 00025 JMP NFRM NEXT FRAME
0046
0047 00040 0 10 00000 BLER CALL C$ER CONTROL ERROR ROUTINE
0048 00041 141314 BCI 1,BL BLOCK LENGTH ERROR MNEMONIC
0049 00042 0 01 00002 JMP RSTR RESTART
0050
0051 00043 140040 ZERO CRA
0052 00044 -0 04 00067 STA* BUFF BUFFER
0053 00045 0 12 00067 IRS BUFF BUFFER
0054
0055 00046 0 12 00000 EXIT IRS 0 INDEX
0056 00047 0 01 00043 JMP ZERO ZERO
0057
0058 00050 0 12 00000 IRS I$AO RETURN ADDRESS
0059 00051 0 10 00000 END CALL I$AT ASR TIMING DELAY
0060 00052 0 02 00070 LDA CKSM CHECKSUM
0061 00053 -0 11 00000 JMP* I$AO RETURN
0062
0063
0064 00054 0 00000 FRME DAC >* RETURN ADDRESS
0065 00055 0 10 00000 CALL I$AK ASR INPUT CHARACTER
0066 00056 0 11 00075 CAS ='223
0067 00057 100000 SXP
0068 00060 0 01 00046 JMP EXIT EXIT
0069 00061 0 10 00000 CALL C$IS CONVERT FROM INVISIBLE TO 6 BIT CODE
0070 00062 0 13 00071 TMA FLAG PACK WORD INTO FLAG
0071 00063 0414 72 LSL 6
0072 00064 0 06 00071 ADD FLAG FLAG
0073 00065 0 04 00071 STA FLAG FLAG

```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

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```

0074 00066 -0 01 00054 JMP* FRME RETURN
0075
0076
0077
0078
0079 00067 000000 BUFF BSZ 1 BUFFER
0080 00070 000000 CKSM BSZ 1 CHECKSUM
0081 00071 000000 FLAG BSZ 1 FLAG
0082 00072 000000 KEEP BSZ 1 KEEP
0083
0084 00073 177703 FIN LITERALS
00074 000203
00075 000223
00076 000201
00077 000200
00100 000177

0085
0086
0087
NO ERRORS IN ABOVE ASSEMBLY. END OF I$AO 17.MAR.70 P.J.VYSE
$DA 41285326-002-02

```

Form 4536



```
0001 *
0002 *
0003 SJBR 0$A0 ASR OUTPUT OBJECT
0004 *
0005 *
0006 CF5 H316 AND DDP-516
0007 REL RELOCATABLE
0008 *
0009 *
0010 00000 0 000000 0$A0 DAC ** RETURN ADDRESS
0011 00001 0 04 00032 STA WORK WORK
0012 00002 0 10 00000 CALL 0$AINT ASR INITIALISE FOR OUTPUT
0013 00003 0 02 00034 LDA ='201
0014 00004 0 10 00000 CALL 0$AK ASR OUTPUT CHARACTER
0015 00005 0 02 00000 LDA 0 INDEX
0016 00006 101040 SNZ
0017 00007 0 01 00020 JMP EXIT EXIT
0018 *
0019 00010 -0 02 00032 LOOP LDA* WORK WORK
0020 00011 0400 64 LRL 12
0021 00012 0 10 00025 JST FRME FRAME
0022 00013 0 10 00025 JST FRME FRAME
0023 00014 0 10 00025 JST FRME FRAME
0024 00015 0 12 00032 IRS WORK WORK
0025 00016 0 12 00000 IRS 0 INDEX
0026 00017 0 01 00010 JMP LOOP LOOP
0027 *
0028 00020 0 02 00033 EXIT LDA ='177623 DEL/DC3
0029 00021 0 10 00000 CALL 0$AK ASR OUTPUT CHARACTER
0030 00022 141340 ICA
0031 00023 0 10 00000 CALL 0$AK ASR OUTPUT CHARACTER
0032 00024 -0 01 00000 JMP* 0$A0 RETURN
0033 *
0034 * FRAME
0035 00025 0 00000 FRME DAC ** RETURN ADDRESS
0036 00026 0 10 00000 CALL 0$SI CONVERT FROM 6 BIT TO INVISIBLE CODE
```

Form 4536



```
0037 00027 0 10 00000 CALL 0$AK ASR OUTPUT CHARACTER
0038 00030 0410 72 LLL 6
0039 00031 -0 01 00025 JMP* FRME RETURN
0040 *
0041 *
0042 * CONSTANTS AND VARIABLES
0043 *
0044 00032 000000 WORK BSZ WORK
0045 00033 177623 FIN LITERALS
0046 00034 000201
0047 *
0048 * END
NO ERRORS IN ABOVE ASSEMBLY. END OF 0$A0 16.MAR.70 P.J.VYSE
$DA 41286326-002-02
```

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* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

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```
0001 *
0002 *
0003 SJBR 0$ALDR ASR PUNCH LEADER
0004 *
0005 *
0006 CF5 H316 AND DDP-516
0007 REL RELOCATABLE
0008 *
0009 *
0010 00000 0 000000 0$AL DAC ** RETURN ADDRESS
0011 00001 0 10 00000 CALL 0$AINT ASR INITIALISE FOR OUTPUT
0012 00002 0 35 00015 LDX =-150 COUNT
0013 00003 140040 CRA BLANK
0014 00004 0 10 00000 PNCH CALL 0$AK ASR OUTPUT CHARACTER
0015 00005 0 12 00000 IRS 0 TEST COUNT
0016 00006 0 01 00004 JMP PNCH REPEAT
0017 00007 0 02 00014 LDA ='177623 DEL/DC3
0018 00010 0 10 00000 CALL 0$AK ASR OUTPUT CHARACTER
0019 00011 141340 ICA
0020 00012 0 10 00000 CALL 0$AK ASR OUTPUT CHARACTER
0021 00013 -0 01 00000 JMP* 0$AL RETURN
0022 *
0023 *
0024 * LITERALS
0025 *
0026 00014 177623 FIN LITERALS
00015 177552
0027 *
0028 *
0029 * END
NO ERRORS IN ABOVE ASSEMBLY. END OF 0$ALDR 22.APR.70 G.S.LITTLE
$DA 41285326-002-02
```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

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```
0001 *
0002 *
0003 SJBR I$AINT,I$TU ASR INITIALISE FOR INPUT
0004 SJBR I$AK ASR INPUT CHARACTER
0005 *
0006 *
0007 CF5 H316 AND DDP-516
0008 REL RELOCATABLE
0009 *
0010 *
0011 * ASR DEVICE CODES
0012 *
0013 * ASR ADDRESS
0014 000004 ASRA EQU '4 ASR ADDRESS
0015 *
0016 * OCP
0017 000004 ASRM EQU ASRA ASR INPUT MODE
0018 *
0019 * SKS
0020 000104 ASRB EQU ASRA+'100 ASR SKIP IF NOT BUSY
0021 *
0022 * INA
0023 001004 ASRI EQU ASRA+'1000 ASR CLEAR A AND INPUT CHARACTER IF READY
0024 *
0025 *
0026 * ASR INITIALISE FOR INPUT
0027 *
0028 00000 0 000000 I$TU DAC ** RETURN ADDRESS
0029 00001 0 02 00013 LDA ='221 DC1
0030 00002 0 10 00000 CALL 0$AK ASR OUTPUT CHARACTER
0031 00003 34 0104 SKS ASRB ASR SKIP IF NOT BUSY
0032 00004 0 01 00003 JMP *-1 WAIT UNTIL NOT BUSY
0033 00005 14 0004 OCP ASRM ASR INPUT MODE
0034 00006 -0 01 00000 JMP* I$TU RETURN
0035 *
0036 *
```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

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```
0033 * ASR INPUT CHARACTER
0034 *
0039 000000 0 000000 I$AK DAC ** RETURN ADDRESS
0040 00010 54 1004 INA ASR: ASR CLEAR A AND INPUT CHARACTER IF READY
0041 00011 0 01 00010 JMP *-1 WAIT UNTIL READY
0042 00012 -0 01 00007 JMP* I$AK RETURN
0043 *
0044 *
0045 * LITERALS
0046 *
0047 00013 000221 FIN LITERALS
0048 *
0049 *
0050 END END OF I$AKT 13.MAY.70 P.J.VYSE
NO ERRORS IN ABOVE ASSEMBLY.
$DA 41285326-002-02
```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

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```
0001 *
0002 *
0003 * SUBR I$AT ASR TIMING DELAY (ASR 33)
0004 *
0005 *
0006 * CF5 H316 AND DDP-516
0007 * REL RELOCATABLE
0008 *
0009 *
0010 00000 0 000000 I$AT DAC ** RETURN ADDRESS
0011 00001 0 35 00011 LDX =-2 SET INDEX
0012 00002 140040 CRA
0013 00003 141206 LOOP ADA
0014 00004 100040 SZE
0015 00005 0 01 00003 JMP LOOP
0016 00006 0 12 00000 IRS 0
0017 00007 0 01 00003 JMP LOOP
0018 00010 -0 01 00000 JMP* I$AT RETURN
0019 *
0020 *
0021 * LITERALS
0022 *
0023 00011 177776 FIN LITERALS
0024 *
0025 *
0026 END END OF I$AT 16.APR.70 P.J.VYSE
NO ERRORS IN ABOVE ASSEMBLY.
$DA 41285326-002-02
```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

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```
0001      *
0002      *
0003      *      SJBR  O$AINT,O$TU      ASR INITIALISE FOR OUTPUT (ASR 33)
0004      *
0005      *
0006      *      CF5
0007      *      REL      H316 AND DDP-516
0008      *                      RELOCATABLE
0009      *
0010 00000 0 000000 O$TU DAC **      RETURN ADDRESS
0011 00001 -0 01 00000 JMP* O$TU      RETURN
0012      *
0013      *
0014      *      END      END OF O$AINT 13.MAY.70 P.J.VYSE
NO ERRORS IN ABOVE ASSEMBLY.
N/A 41285326-002-02
```

Form 4536



* 0070-001-H001 (ASR3310L) DRAWING NO. 41286032-001-01

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```
0001      *
0002      *
0003      *      SJBR  O$AK      ASR OUTPUT CHARACTER
0004      *
0005      *
0006      *      CF5
0007      *      REL      H316 AND DDP-516
0008      *                      RELOCATABLE
0009      *
0010      *      ASR DEVICE CODES
0011      *
0012      *      ASR ADDRESS
0013      *      ASRA EQU  '4      ASR ADDRESS
0014      *
0015      *      OCP
0016      *      ASRM EQU  ASRA+'100      ASR OUTPUT MODE
0017      *
0018      *      SKS
0019      *      ASRB EQU  ASRA+'100      ASR SKIP IF NOT BUSY
0020      *
0021      *      OTA
0022      *      ASRO EQU  ASRA      ASR OUTPUT CHARACTER IF READY
0023      *
0024      *
0025      *      ASR OUTPUT CHARACTER
0026      *
0027 00000 0 000000 O$AK DAC **
0028 00001 34 0104   SKS  ASRB      ASR SKIP IF NOT BUSY
0029 00002 0 01 00001   JMP  *-1    WAIT UNTIL NOT BUSY
0030 00003 14 0104   OCP  ASRM      ASR OUTPUT MODE
0031 00004 74 0004   OTA  ASRO      ASR OUTPUT CHARACTER IF READY
0032 00005 0 01 00004   JMP  *-1    WAIT UNTIL READY
0033 00006 -0 01 00000   JMP* O$AK   RETURN
0034      *
0035      *
0036      *      END      END OF O$AK 13.MAY.70 P.J.VYSE
```

Form 4536



NO ERRORS IN ABOVE ASSEMBLY.
IDA 41285326-002-02