

DQ11

OVERLAY FOR ITEP
MD-11-DZDQO-C

EP-DZDQO-C-DL-B
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FICHE 1 OF 1

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This microfiche card contains a grid of frames. The frames are arranged in approximately 10 rows and 3 columns. Each frame contains technical data, likely related to the MD-11 aircraft. The data is presented in a structured format, possibly as tables or lists, with some frames containing diagrams or charts. The text is small and difficult to read due to the resolution of the scan.

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770608

IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZDQO-C-D
PRODUCT NAME: DQ11 OVERLAY FOR INTERPROCESSOR TEST PROGRAM
PROGRAM DATE: FEBRUARY 1977
MAINTAINER: DIAGNOSTICS
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1.0 ABSTRACT.

THIS PROGRAM IS DESIGNED AS A MAINTENANCE AID FOR FIELD SERVICE PERSONEL. IT WILL VERIFY THE PROPER OPERATION OF A COMPLETE COMMUNICATION LINK FROM ONE PDP-11 SYSTEM TO ANOTHER OR TO A COMMUNICATION TEST CENTER.

THIS PROGRAM MUST BE USED IN CONJUNCTION WITH THE INTERPROCESSOR TEST PROGRAM(DZITP) ON A PDP-11 SYSTEM WITH A DL-11 INTERFACE.

2.0 REQUIREMENTS.

2.1 EQUIPMENT

- A. PDP-11 SYSTEM WITH 4K OF CORE.
- B. A DQ11 COMMUNICATION INTERFACE.

2.2 STORAGE.

4K OF CORE

3.0 LOADING PROCEDURE

THIS PROGRAM IS IN ABSOLUTE FORMAT.
THE ABS LOADER MUST BE USED TO LOAD THE PROGRAM.

4.0 OPERATING PROCEDURES.

- A. TWO METHODS OF ENTERING PARAMETERS ARE PROVIDED
 - 1. LOAD ADDRESS 200 AND START TO ENTER PARAMS FROM CONSOLE TTY, PROCEED TO SECTION B.
 - 2. LOAD ADDRESS 200 AND SET SWITCH REGISTER BIT 15 BEFORE STARTING TO ENTER PARAMS FROM CONSOLE SWITCHES, PROCEED TO SECTION C.
*THE PROGRAM MAY BE RESTARTED AT LOC 204 (ONCE PARAMETERS HAVE ALREADY BEEN SELECTED)
- B. CONSOLE DIALOGUE PARAMETER INPUT (CURRENT VALUES FOR PARAMETERS ARE FOUND IN OVERLAY)

- 1. THE PROGRAM WILL TYPEOUT THE NAME OF THE VARIABLE OVERLAY.
 - A. IF YOU WISH TO SETUP JUST THE INDICATED OVERLAY, TYPE A CARAGE RETURN
 - B. IF YOU WISH TO SETUP A DN11, TYPE IN DN.
 - C. IF YOU WISH TO SETUP A DM11BB, TYPE IN DMB.

IF DN OR DMB WAS TYPED IN STEP 1 ABOVE THEN THE BUS ADDRESS, VECTOR ETC. REFERED TO IN STEPS 2 THRU 7, PERTAIN TO THE DN11 OR DMBB.

- 2. THE PROGRAM WILL TYPE THE DEFAULT BUS ADDRESS OF THE INTERFACE UNDER TEST.
 - A. TYPE A CAR. RETURN TO USE DEFAULT BUS ADDRESS
 - B. TYPEIN ACTUAL BUS ADDRESS
- 3. THE PROGRAM WILL TYPE OUT THE DEFAULT VECTOR ADDRESS
 - A. TYPE A CAR. RETURN TO USE DEFAULT ADDRESS
 - B. TYPEIN ACTUAL VECTOR ADDRESS
- 4. THE PROGRAM WILL TYPE OUT THE DEFAULT INTERFACE PRIORITY
NOTE: 200=PRIO 4, 240=PRIO 5, 300=PRIO 6, ETC.

- A. TYPE A CAR. RETURN TO USE DEFAULT VALUE
 - B. TYPEIN ACTUAL VALUE
5. THE PROGRAM WILL TYPEOUT THE DEFAULT VALUE OF PARAM#1
IF REQUIRED BY THE ISR. (SEE SECT. 10.0 IN OVERLAY LISTING FOR PARAMETER DESCRIPTION)
- A. TYPE A CAR. RETURN TO USE DEFAULT VALUE
 - B. TYPEIN ACTUAL VALUE
6. THE PROGRAM WILL TYPEOUT THE DEFAULT VALUE OF PARAM#2
IF REQUIRED BY THE ISR.
- A. TYPE A CAR. RETURN TO USE DEFAULT VALUE
 - B. ENTER ACTUAL VALUE
7. THE PROGRAM WILL TYPEOUT THE DEFAULT VALUE OF PARAM#3
IF REQUIRED BY THE OVERLAY.
- A. TYPE A CAR. RETURN TO USE DEFAULT VALUE
THE DN-11 WILL USE PARAM #3 AS THE # TO DIAL.
IF USING A MODEM WITHOUT AUTOMATIC HANDSHAKING,
THE NUMBER MUST TERMINATE WITH A
"END-OF-NUMBER" CHARACTER (:).
 - B. ENTER ACTUAL VALUE.
8. THE PROGRAM WILL RETURN TO STEP B1 IF THIS SETUP
WAS FOR DN11 OR DN11BB.
9. THE PROGRAM WILL REQUEST THAT SWITCH REGISTER BE SET.
- A. SETUP SWITCH REGISTER AS SPECIFIED IN STEP D.
AND TYPE A CAR. RETURN.

NOTE: IF ANY OF THE ABOVE ITEMS 2 THRU 7 WERE CHANGED BY ENTERING
NEW VALUES, THE NEW VALUE BECOMES THE DEFAULT VALUE FOR SUBSEQUENT
RESTARTS OF THE PROGRAM.

- C. MANUAL PARAMETER INPUT FROM SWITCH REGISTER
1. THE PROGRAM HALTS FOR ISR (INTERFACE SERVICE ROUTINE) SPECIFICATION
SWR14=SETUP DN-11B ISR
SWR13=SETUP DN-11 ISR
SWR=00000=SETUP VARIABLE ISR
 2. THE FOLLOWING HALTS ARE REPEATED FOR EACH ISR SPECIFIED.
SETUP SEQUENCE IS: DN11, DN11-88 THEN VARIABLE OVERLAY. (EACH ENTRY SET SWITCHES THEN HIT CONTINUE.)
 - A. HALT FOR BUS ADDRESS OF INTERFACE
 - B. HALT FOR VECTOR ADDRESS OF INTERFACE
 - C. HALT FOR PRIORITY OF INTERFACE
 - D. HALT FOR INTERFACE PARAM #1 (SEE SECT. 10.0 IN OVERLAY LISTING FOR PARAMETER DESCRIPTION)
 - E. HALT FOR INTERFACE PARAM #2 (DN11 AND DMBB PARAMETERS ARE DISCUSSED IN SECT. 10.0 OF THE MONITOR.)
 - F. GO BACK TO STEP A IF THIS SETUP WAS FOR DN OR DMB.
 3. HALT FOR OPERATIONAL SWITCH SETTINGS. (SEE STEP D.)
 - A. PRESS CONTINUE TO START TESTING

BEFORE ATTEMPTING TO RUN THIS PROGRAM, THE OPERATOR MUST ACCERTAIN THE COMPLETE COMMUNICATION LOOP AND PROCEDURES TO BE USED, INCLUDING THE TYPE OF MODEMS, THE TYPE OF INTERFACE BEING USED AT THE OTHER CPU AND THE MODES OF OPERATION, DATA AND PARAMETERS TO BE USED AT EACH CPU.

THIS WILL REQUIRED VOCAL COMMUNICATION WITH THE OPERATOR AT THE OTHER CPU UNLESS ITS CONFIGURATION AND OPERATION ARE FIXED AS A TEST CENTER.

AFTER DETERMINING THAT THE EQUIPMENTS ARE COMPATIBLE AND AGREEING ON THE MODE AND VARIABLE PARAMETERS TO BE USED, THE SYSTEM WHICH IS TO RECEIVE DATA FIRST SHOULD BE LOADED AND STARTED. IF THE MODEM BEING USED ON THIS SYSTEM HAS AN AUTOMATIC ANSWER FEATURE, IT SHOULD BE ENABLED.

THE SYSTEM WHICH IS TO TRANSMIT FIRST SHOULD THEN BE LOADED AND STARTED AND THE CONNECTION ESTABLISHED EITHER MANUALLY OR AUTOMATICALLY (VIA DN-11).

D. OPERATIONAL SWITCH SETTINGS.

SW15=1 HALT ON ERROR
SW14=1 SINGLE PASS
 SW14 HAS NO EFFECT IF SW04=0
SW13=1 INHIBIT ERROR TYPEOUTS
SW12=1 INHIBIT ALL TYPEOUTS EXCEPT ERRORS
 IF SW12=0 AND SW04=1 END PASS IS TYPED
 AND TRANSMITTED/RECEIVED DATA IS TYPED.
SW11=1 USE PREVIOUSLY SPECIFIED DATA
SW10=1 DATA SELECT (WITH SW09)
SW09=1 DATA SELECT (WITH SW10)
 00=1 GET DATA FROM OPERATOR
 01=1 TEST MESSAGE #1 (SA QUICK BROWN FOX)
 10=1 TEST MESSAGE #2 (99 NUMERICS)
 11=1 TEST MESSAGE #3 (SC CONTEST/QUICK BROWN FOX/NUMERICS)
SW08=1 TRANSMIT RECEIVED DATA (INTERNAL LOOPBACK MODE)
SW07=1 DO NOT TEST RECEIVED DATA
SW06=1 MONITOR TRANSMITTED DATA ON CONSOLE TTY.*
SW05=1 MONITOR RECEIVED DATA ON CONSOLE TTY.*
 * IN MANY CASES, NOT ALL DATA WILL APPEAR ON THE CONSOLE
 TTY. THIS IS ESPECIALLY TRUE WHEN THE COMM INTERFACE IS
 RUNNING AT A FASTER BAUD THAN THE CONSOLE, BUT EVEN AT EQUAL
 OR SLOWER BAUDS, ALL CHARACTERS MAY NOT APPEAR ON THE CONSOLE.

SW04=1 RETURN TO MONITOR FOR END PASS
 WHEN SW04=0 PROGRAM LOOPS IN THE OVERLAY NEVER RETURNING TO THE MONITOR.
SW03=1 INTERNAL LOOPBACK MODE
SW02=1 EXTERNAL LOOPBACK MODE
SW01=1 ONE-WAY-IN MODE
SW00=1 ONE-WAY-OUT MODE

THIS PROGRAM HAS BEEN MODIFIED TO RUN ON A PROCESSOR WITH OR WITHOUT A HARDWARE SWITCH REGISTER. WHEN FIRST EXECUTED THE PROGRAM TESTS THE EXISTENCE OF A HARDWARE SWITCH REGISTER. IF NOT FOUND A SOFTWARE SWITCH REGISTER LOCATION (SWREG=LOC. 176) IS DEFAULTED TO. IF THIS IS THE CASE, UPON EXECUTION THE CONTENTS OF THE SWREG ARE DUMPED IN OCTAL ON THE CONSOLE TTY AND ANY CHANGES ARE REQUESTED

(IE) SWR=XXXXXX NEW=

POSSIBLE RESPONSES ARE:

1. <CR> IF NO CHANGES ARE TO BE MADE
2. 6 DIGITS 0-7 TO REPRESENT IN OCTAL THE NEW SWITCH REGISTER VALUE ;LAST DIGIT FOLLOWED BY <CR>.
3. ↑U TO ALLOW REENTERING VALUE IF ERROR IS COMMITTED KEYING IN SWREG VALUE.

BUILT INTO THE PROGRAM IS THE ABILITY TO DYNAMICALLY CHANGE THE CONTENTS OF SWREG DURING PROGRAM EXECUTION. BY STRIKING ↑G (CNTL G) ON CONSOLE TTY THE OPERATOR SETS A REQUEST FLAG TO CHANGE THE CONTENTS OF SWREG, WHICH IS PROCESSED IN KEY AREAS OF THE PROGRAM CODE (IE) ERROR ROUTINES, AFTER HALTS END OF PASS, AND OTHER APPLICABLE AREAS.

IF OPERATOR SPECIFIED DATA WAS INDICATED, THE PROGRAM WILL TYPE A REQUEST FOR THE DATA. DATA MAY BE ENTERED AS ASCII CHARACTERS OR OCTAL CODE. TYPE IN THE DATA TERMINATED WITH A CR. OCTAL CODE MAY BE ENTERED BY TYPING AN ↑(UP ARROW) FOLLOWED BY THE OCTAL CODE (IN THE RANGE 000 TO 377) SEPERATED BY SPACES AND TERMINATED BY ↑(UP ARROW).
I.E. ABCD↑ 000 123 377↑ EFG (CAR.RETURN)

A TYPICAL SWITCH SETTING FOR HALF-DUPLEX=003150 THIS SETTING USES INTERNAL LOOPBACK MODE, LOOPS IN OVERLAY, MONITORS TRANSMITTED AND RECEIVED DATA ON THE CONSOLE TTY, AND TESTS RECEIVED DATA USING TEST MESSAGE #3.

A TYPICAL SWITCH SETTING FOR FULL-DUPLEX=003144 THIS SETTING IS THE SAME AS ABOVE EXCEPT IT USES THE EXTERNAL LOOPBACK MODE.

ALL STANDARD MESSAGES(TEST MESSAGES 1-3) ARE PRECEDED BY 2 FILL CHARACTERS(177), AND ARE FOLLOWED BY A CR(015), LF(012),RECEIVE TERMINATING CHARACTER(001), 4 FILLS(177), AND A TRANSMIT TERMINATING CHARACTER(000). DURING TRANSMISSION, WHEN A 000 CHARACTER IS SEEN THE TRANSMISSION IS STOPPED.DURING RECEPTION, WHEN A 001 CHARACTER IS RECEIVED, THE RECEIVER IS SHUT OFF. IF THE MESSAGE WAS INPUTED BY THE OPERATER, THE TERMINATING CHARACTERS ARE ADDED.

TEST MODES

INTERNAL LOOPBACK MODE

1. THE OVERLAY WAITS TO RECEIVE A MESSAGE (TERMINATED BY <001>)
2. VERIFIES THE DATA AGAINST THE DATA SELECTED BY SW09 AND SW10 (SW7=0)
3. TRANSMIT THE DATA SELECTED BY SW09 AND SW10 (SW8=0) OR
TRANSMIT THE RECEIVED DATA (SW8=1)
4. RETURNS TO MONITOR FOR "END PASS" (SW4=1) OR
GO TO STEP 1. (SW4=0)

EXTERNAL LOOPBACK MODE

1. THE OVERLAY SETS REQUEST TO SEND
2. WAIT FOR CLEAR TO SEND
3. TRANSMITS THE SELECTED DATA
4. RESETS REQUEST TO SEND
5. WAIT FOR MESSAGE TO BE RECEIVED
6. VERIFIES THE DATA (SW07=0)
7. RETURNS TO MONITOR FOR "END PASS". (SW04=1) OR
GO TO STEP 1 (SW04=0)

ONE-WAY-IN MODE

1. THE OVERLAY WAITS FOR MESSAGE TO BE RECEIVED.
2. VERIFIES THE DATA (SW07=0)
3. RETURNS TO MONITOR FOR "END PASS" (SW04=1) OR
GO TO STEP 1 (SW04=0)

ONE-WAY-OUT MODE

1. THE OVERLAY SETS REQUEST TO SEND
2. WAITS FOR CLEAR TO SEND
3. TRANSMITS SELECTED DATA
4. RETURNS TO MONITOR FOR "END PASS". (SW04=1) OR
GO TO STEP 1 (SW04=0)

- E. THE OVERLAY IS THEN ENTERED AND A CONNECTION ESTABLISHED EITHER
MANUALLY OR AUTOMATICALLY.

IF ONE-WAY-IN OR INTERNAL LOOPBACK MODES ARE SELECTED.
THE OVERLAY WILL SET DATA TERMINAL READY AND WAIT FOR DATA.

IF ONE-WAY-OUT OR EXTERNAL LOOPBACK MODES WERE SELECTED.
THE OVERLAY WILL SET DATA TERMINAL READY AND REQUEST TO SEND.
THE OVERLAY WILL THEN WAIT FOR CLEAR TO SEND BEFORE ATTEMPTING TO
TRANSMIT DATA.

THE PROGRAM WILL PRINTOUT A "WAITING FOR CLEAR TO SEND"
MESSAGE AND THE CONTENTS OF THE XMIT CSR EVERY 60 SECS.
UNTIL CLEAR TO SEND IS ASSERTED.

F. IF SW04=0 THE OVERLAY WILL CONTINUE TO TRANSMIT/RECEIVE DATA.

IF SW04=1 THE OVERLAY WILL RETURN TO THE MONITOR AND TYPE "END PASS".

IF BOTH SW04=1 AND SW14=1, THE PROGRAM WILL REQUEST NEW INTERFACE PARAMS AFTER ONE PASS OF THE SELECTED TEST MODE.

TEST EXECUTION MAY BE INTERRUPTED BY TYPING THE FOLLOWING CHARACTERS ON THE CONSOLE TTY.

- LINE FEED = RESTART PROGRAM AT LOCATION 200.
- QUESTION MARK = PRINTOUT FIRST 8 WORDS OF INPUT BUFFER.(ASCII)
THEN TYPE EITHER:
 - #XXXXXXX TO PRINTOUT THE 8 WORDS AT LOC XXXXXX.
 - #BXXXXXX TO PRINTOUT THE 16 BYTES AFTER LOC XXXXXX.
 - #C TO CONTINUE

PROGRAM MUST BE RESTARTED AT 200 AFTER PRINTING. CARRIAGE RETURN = RESTART AT REQUEST FOR NEW OPERATIONAL SWITCHES.

5.0 PROGRAM AND/OR OPERATOR ACTION

IF THE OPERATOR WISHES TO MANUALLY EXAMINE THE TRANSMIT OR RECEIVE BUFFERS, DO THE FOLLOWING: TO FIND THE STARTING ADDRESS OF THE RECEIVE BUFFER, LOAD ADDRESS 11020 AND EXAMINE. TO FIND THE STARTING ADDRESS OF THE TRANSMIT BUFFER, LOAD ADDRESS 11022 AND EXAMINE.

5.1 NORMAL HALTS
SEE SECTION 4.

6.0 ERRORS

6.1 ERROR REPORTING

THE ONLY ERROR REPORT FROM THE CONTROL PROGRAM OCCURS IF THE INTERFACE SPECIFIED IS NOT LOADED.

IF DATA IS RECEIVED AND SWITCH 7 (NO DATA COMPARE) IS RESET, THE DATA WILL BE COMPARED AGAINST THE PRESELECTED DATA AFTER A LINE FEED CHARACTER IS RECEIVED. IF THERE IS A MISMATCH, THE FOLLOWING ERROR REPORT IS PRINTED:

RECEIVED DATA=RRRRRR
DATA SHOULD BE TTTTTT
DATA COMPARE ERROR; BAD DATA=BBB GOOD DATA=GGG

WHERE RRRRRR IS THE RECEIVE BUFFER (UP TO 512 CHARACTERS)
TTTTTT IS THE TRANSMIT BUFFER (UP TO 512 CHARACTERS)
BBB IS THE BAD DATA CHARACTER
GGG IS THE GOOD DATA CHARACTER

IF THE INTERFACE DETECTS A DATA ERROR, THE FOLLOWING
WILL BE PRINTED BEFORE THE DATA IS COMPARED:

THERE WAS A RECEIVER ERROR. RECEIVER DATA REGISTER =XXXXXX

WHERE XXXXXX IS THE CONTENTS OF THE RECEIVER DATA REGISTER
THE LOW BYTE IS THE DATA, AND THE HIGH BYTE IS THE ERROR BITS.

IF A RECEIVE TERMINATING CHARACTER<001> IS NOT DETECTED
WITHIN 512 CHARACTERS A "BUFFER FULL" PRINTOUT WILL OCCUR.

7.0 RESTRICTIONS

THE OPERATION OF THIS PROGRAM REQUIRES COORDINATION BETWEEN
THE OPERATOR AND THE OPERATOR OF ANOTHER PDP-11 SYSTEM
UNLESS ONE OF THE SYSTEMS IS ALWAYS OPERATING IN A FIXED
MODE. THE FOLLOWING TABLE LISTS THE VALID COMBINATIONS:

CPU #1	CPU #2
ONE-WAY-OUT	ONE-WAY-IN
ONE-WAY-IN	ONE-WAY-OUT
EXTERNAL-LOOPBACK	INTERNAL-LOOPBACK
INTERNAL-LOOPBACK	EXTERNAL-LOOPBACK
EXTERNAL-LOOPBACK	EXTERNAL-LOOPBACK (FULL DUPLEX)

WHEN THE COMMUNICATION LINK INVOLVES MODEMS THE FOLLOWING
RESTRICTION APPLY:

IF RUNNING IN FULL DUPLEX MODE BOTH SYSTEMS
MUST BE IN EXTERNAL LOOP BACK MODE.

BOTH SYSTEMS SHOULD BE RUNNING IDENTICAL ROUTINES.

EXAMPLE:
SWITCHES 14,13,7,4 SHOULD BE THE SAME
ON BOTH CPU S

IF PROGRAM IS WAITING IN A SCAN ROUTINE AND TYPES OUT
A "WAITING MESSAGE", IF AN INCOMING MESSAGE STARTS DURING
THE TYPE OUT, IT WILL BE LOST BECAUSE THE TYPEOUT PRIORITY
IS AT LEVEL 7. THIS WILL RESULT IN OVERRUN OR SILO OVER-
RUN ERRORS, DEPENDING ON THE DEVICE. TO AVOID THIS SITUATION
RUN WITH SWITCH 13 UP. IF OVERRUN DOES OCCURE DURING A
TYPEOUT THE PROGRAM SHOULD BE RESTARTED.

IF USING AN ASYNCHRONOUS DEVICE, MODEMS AND THE
MAYNARD TEST STATION AND INITIALIZE DOES NOT CLEAR THE
CONNECTION (EXAMPLE THE DJ11) IF THE PROGRAM IS RESTARTED
IN THE MIDDLE OF A MESSAGE AT LOC 204 OR BY HITTING CR
AN IMMEDIATE ERROR MESSAGE FROM MAYNARD WILL BE RE-

CEIVED. THIS IS BECAUSE THE TEST STATION IS STILL LOOKING FOR THE REST OF THE INTERRUPTED MESSAGE. TO AVOID THIS ERROR, RESTART PROGRAM ONLY AT THE END OF THE MESSAGE CURRENTLY BEING TRANSMITTED.

8.0 MISCELLANEOUS

ITEP WAS CHECKED OUT USING THE FOLLOWING BELL TELEPHONE MODEMS.
201A (HALF-DUPLEX SYNCHRONOUS 2000 BAUD)
202C (HALF-DUPLEX ASYNCHRONOUS 1200 BAUD)
103A (FULL-DUPLEX ASYNCHRONOUS 110 BAUD)

9.0 PROGRAM DESCRIPTION

9.1 THE DQ11 INTERFACE SERVICE PARAMS ARE SETUP, AS SPECIFIED BY THE OPERATOR, BY THE ITEP CONTROL PROGRAM.

TIME: PROVIDES A MEANS OF MEASURING ELAPSED TIME. IT IS INCREMENTED EVERY SECOND BY A CLOCK INTERRUPT ROUTINE IN ITEP.

9.2 WHEN THE OVERLAY IS FIRST ENTERED BY ITEP AT LOCATION START:, THE CONTENTS OF THE SWITCH REGISTER ARE STORED IN REGISTER 0. THE MODE AND DATA SELECTIONS ARE FIXED AT THIS TIME AND CANNOT BE ALTERED WITHOUT RETURNING TO THE CONTROL PROGRAM. THE INTERRUPT VECTORS AND VARIABLES ARE THEN SETUP. THE SELECTED ROUTINE DETERMINED BY THE MODE IS THEN ENTERED

9.3 THE OVERLAY THEN LOOPS IN ROUTINES: SOWI, IF "ONE WAY IN" MODE WAS SELECTED. SOWO, IF "ONE WAY OUT" MODE WAS SELECTED. SILB, IF "INTERNAL LOOP BACK" MODE WAS SELECTED. SXLB, IF "EXTERNAL LOOP BACK" WAS SELECTED.

9.31 SOWI: IN THIS ROUTINE THE RECEIVER IS INITIALIZED AND PROGRAM LOOPS WAITING FOR THE RECEIVER TO FINISH. IF NOTHING IS RECEIVED FOR 60 SECS A "WAITING" MESSAGE IS TYPED. WHEN THE RECEIVER IS DONE, THE PROGRAM CHECKS DATA IF SWITCHES PERMIT, AND TYPES END PASS DEPENDING ON SWITCH SETTINGS.

9.32 SOWO: THE TRANSMITTER IS INITIALIZED AND PROGRAM LOOPS WAITING FOR TRANSMITTER TO FINISH. A "WAITING" MESSAGE IS TYPED EVERY 60 SECS IF THERE IS NO ACTION. WHEN THE TRANSMITTER IS DONE, THE PROGRAM EITHER LOOPS BACK TO SOWO OR TYPES END PASS DEPENDING ON SWITCH SETTINGS.

9.33 SILB: THE RECEIVER IS INITIALIZED AND PROGRAM LOOPS WAITING FOR RECEIVER TO FINISH, A "WAITING" MESSAGE IS TYPED EVERY 60 SEC IF NO ACTION. WHEN RECEIVER IS DONE PROGRAM CHECKS DATA IF SWITCH SETTINGS PERMIT, AND END PASS IS TYPED IF SWITCH SETTINGS PERMIT. THEN THE TRANSMITTER IS INITIALIZED, A "WAITING" MESSAGE IS TYPED EVERY 60 SEC IF NO ACTION. WHEN TRANSMITTER IS DONE PROGRAM RETURNS TO START OF ROUTINE. (SILB)

9.34 SXLB: IF IN HALF DUPLEX THE TRANSMITTER IS INITIALIZED, A "WAITING MESSAGE IS TYPED EVERY 60 SEC IF THERE IS NO ACTION

WHEN THE TRANSMITTER IS DONE THE RECEIVER IS INITIALIZED
 A "WAITING" MESSAGE IS TYPED EVERY 60 SEC IF THERE IS NO ACTION.
 WHEN THE RECEIVER IS DONE, DATA IS CHECKED IF SWITCH SETTINGS
 PERMIT AND END PASS IS TYPED IF SWITCHES ALLOW. THE PROGRAM NOW
 REPEATS CYCLE STARTING AT \$XLB.
 IF IN FULL DUPLEX THE RECEIVER AND TRANSMITTER ARE INITIALIZED
 A "WAITING" MESSAGE IS TYPED EVERY 60 SEC IF THERE IS NO
 ACTION. WHEN BOTH THE RECEIVER AND TRANSMITTER ARE DONE, DATA IS
 CHECKED, END PASS IS TYPED AND PROGRAM LOOPS TO \$XLB DEPENDING
 ON THE SWITCH SETTINGS.

- 9.4 THE RETURN TO MONITOR ROUTINE FOR END PASS AT EOP:
 LOCKS OUT INTERRUPTS AND SAVES THE TRANSMITTER INTERRUPT ENABLE
 BIT AND ALL GENERAL REGISTERS. IT THEN RETURNS TO THE MONITOR
 TO TYPE "END PASS". THE MONITOR CHECKS SW14 IF UP IT RETURNS
 TO ENTER:, OTHERWISE IT RESTARTS THE PROGRAM.
- 9.5 ENTER: IS ENTERED FROM THE MONITOR AFTER TYPEING "END PASS",
 IT RESTORES THE GENERAL REGISTERS AND THE TRANSMITTER CSR
 AS SAVED IN EOP. THE DELAY FLAG IS SET AND PROGRAM RETURNS TO
 THE SCAN ROUTINE(OMO,OMI,ILB,XLB) WHERE IT CAME FROM.
- 9.6 THE INITIALIZE TRANSMIT SUBROUTINE AT STARTX:
 SETS UP THE INTERFACE AND POINTERS NECESSARY TO
 INITIATE A TRANSMIT OPERATION.
 AFTER SETTING "DATA TERMINAL READY" AND "REQUEST TO SEND" A CHECK
 IS MADE ON PARAM2 TO DETERMINE IF HALF DUPLEX OPERATION
 WAS SELECTED BY THE OPERATOR. IF IT WAS, THE
 SUBROUTINE WAITS FOR CLEAR TO SEND.
 A 'WAITING FOR CLEAR TO SEND' PRINTOUT OCCURS
 EVERY 30 SECONDS UNTIL CLEAR TO SEND IS ASSERTED.
- 9.7 THE INITIALIZE RECEIVED SUBROUTINE AT STARTR:
 SETS UP THE INTERFACE AND POINTERS NECESSARY TO
 RECEIVE A MESSAGE.
- 9.8 THE TRANSMIT INTERRUPT SERVICE ROUTINE,
 AT XISR:, IS ENTERED VIA TRANSMIT INTERRUPTS
 FROM THE INTERFACE.
 A TEST IS MADE TO SEE IF THE LAST CHARACTER
 TRANSMITTED WAS A NULL (ALL ZEROS) CHARACTER.
 IF IT WAS: THE TRANSMIT LOGIC IN THE INTERFACE
 IS RESET AND THE TRANSMIT COMPLETE FLAG IS SET.
 AT XISR1: THE NEXT CHARACTER IS TRANSMITTED
 AND PRINTED ON THE TTY IF THE MONITOR TRANSMIT
 SWITCH IS SET.
- 9.9 THE RECEIVE INTERRUPT SERVICE ROUTINE
 AT RISR: IS ENTERED VIA RECEIVER INTERRUPTS
 FROM THE INTERFACE.
 THE RECEIVED CHARACTER IS STORED IN
 THE INPUT BUFFER AND PRINTED ON THE TTY IF
 THE MONITOR RECEIVER SWITCH IS SET.
 IF THE INPUT BUFFER IS FULL, A 'BUFFER FULL'
 PRINTOUT WILL OCCUR. THIS INDICATES THAT A
 LINE FEED CHARACTER WAS NOT RECOGNIZED

IN THE RECEIVED DATA (WITHIN 1000 CHARACTERS).
IF THE RECEIVED CHARACTER IS A LINE FEED,
THE RECEIVED LOGIC IS RESET AND THE
RECEIVE COMPLETE FLAG IS SET.
IF A 'RECEIVE ERROR' IS DETECTED AT RISR:, THE
CSR AND DCR WILL BE SAVED AND PRINTED OUT
AFTER THE COMPLETE MESSAGE HAS BEEN RECEIVED.

9.10

THE DATA TEST SUBROUTINE AT TESTD: IS
ENTERED AFTER A COMPLETE MESSAGE HAS BEEN
RECEIVED.
IF A 'RECEIVE ERROR' HAD BEEN DETECTED,
THE CONTENTS OF THE 'RECEIVE BUFFER' AT THE
TIME THE ERROR OCCURRED WILL BE PRINTED;
THE DATA IS COMPARED UNTIL A 'ALL ZEROS'
CHARACTER IS RECOGNIZED. 'FILL' (ALL ONES)
CHARACTERS ARE IGNORED. IF A MISMATCH
IS DETECTED, THE COMPLETE CONTENTS OF THE
INPUT BUFFER AND GOOD DATA IS PRINTED.

DQ11.RESTRICTIONS

THE DQ11 HAS TWO MODES OF OPERATION IN ITEP, NORMAL (WHICH
INTERUPTS EVERY TWO CHARACTERS), AND HI-BAUD (ONE INTERRUPT PER
MESSAGE, THE WHOLE MESSAGE IS TRANSMITTED OR RECEIVED ON A
COMPLETE WORD COUNT.). WHEN IN HI-BAUD MODE, DATA CANNOT BE
MONITORED ON THE CONSOLE TTY. IF SW 5=1 (MONITOR RECEIVED DATA)
AN "R" WILL BE TYPED AFTER THE WHOLE MESSAGE IS RECEIVED.
IF SW 6=1 (MONITOR TRANSMIT DATA) A "T" WILL BE TYPED AFTER THE
WHOLE MESSAGE IS TRANSMITTED. IN NORMAL MODE, EVEN IF THE CONSOLE
TTY IS FASTER OR THE SAME BAUD AS THE DQ11, NOT EVERY CHARACTER
CAN BE TYPED BECAUSE OF THE TWO CHARACTER PER INTERRUPT
OPERATION, IN THIS CASE EVERY OTHER CHARACTER WILL BE TYPED
IF DATA MONITORING IS SELECTED. HI-BAUD MODE (SELECTABLE IN PARAM#2)
SHOULD BE USED FOR BAUDS OF 40,000 OR HIGHER. NORMAL MODE IS
SUFFICIENT FOR BAUDS LOWER THAN 40,000 .

10.0

PARAMETERS FOR THE DQ11

PARAM#1 IS NOT USED (0)

PARAM#2 (LOW BYTE)

BIT 0
BIT 1

FULL DUPLEX (1), DEFAULT= HALF DUPLEX (0)

HI-BAUD (1), DEFAULT= NORMAL (0)

(BITS 0,1 ARE NOT LOADED INTO ANY DQ11 REGISTERS, THEY ARE ONLY SOFTWARE FLAGS)

PARAM#2 (HIGH BYTE) IS LOADED INTO THE SYNC REGISTER.

BITS 8-15

SYNC CHARACTER, DEFAULT= 26 (26)

PARAM#3 IS NOT USED (177777)

B02

D011 ITEP OVERLAY MACY11 27(1006) 17-FEB-77 12:37 PAGE 14
DZD90C.P11 17-FEB-77 12:19

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599
600
601
602
603      011000
604 011000 050504 000040
605 011004 160010
606 011006 000300
607 011010 000240
608 011012 000000
609 011014 013000
610 011016 177777
611 011020 000000
612 011022 000000
613 011024 000000
614 011026 000000
615 011030 000000
616 011032 000000
617 011034 000000
618 011036 011106
619 011040
620 011040 000
621 011041
622 011041 001
623 011042 000000
624 011044 177570
625 011046 177570
626
627
628
629
630      000000
631      100000
632      040000
633      020000
634      020000
635
636 011050 000000
637 011052 000000
638 011054 000000
639 011056 000000
640 011060 000000
641
642 011062 000000
643 011064 000000
644 011066 000000
645 011070 000000
646 011072 000000
647 011074 000000
648
649 011076 177560
650 011100 177562
651 011102 177564
652 011104 177566
653
654      000001

```

```

:*****
:      DQ11 INTERFACE SERVICE PARAMS
:*****

```

```

DQ11:  .=11000
BA:    .ASCIZ  /DQ /
RIV:   300
PRIOR: 240
PARAM1: 0
PARAM2: 013000
PARAM3: 177777
IRDA:  .WORD  0
IXDA:  .WORD  0
SETTLE: .WORD  0
B2016: .WORD  0
TIME:  .WORD  0
TX. TERM: .WORD  START
RX. TERM: .BYTE  000
FLAG:    .BYTE  001
SMR:    .WORD  0
DISPLAY: 177570

```

```

:ISR NAME
:BUS ADDRESS
:VECTOR ADDRESS
:PRIORITY
:PARAM #1
:PARAM #2
:PARAM #3
:INITIAL READ DATA ADDRESS
:INITIAL XMIT DATA ADDRESS
:LINE SETTLE DELAY FLAG
:ADDR OF BIN TO OCT TYPE ROUTINE
:TIMER
:ADDR OF START OF PROGRAM
:TRANSMITTER TERMINATING CHAR.
:RECEIVER TERMINATING CHAR.

```

```

:*****
:      CONSTANTS + WORKING STORAGE
:*****

```

```

STAT=RD
XFLG=100000
RFLG=40000
DSFLG=20000
BIT13=20000

```

```

: XMIT COMPLETE FLAG
: RCV COMPLETE FLAG
: DATA SET STATUS CHANGE FLAG
: INHIBIT PRINTOUTS

```

```

SXCSR: 0
SRCSR: 0
ERCSR: 0
ERDBR: 0
DSSTAT: 0

```

```

: SAVED XMIT CSR
: SAVED RCV CSR
: RCV CSR SAVED ON ERROR
: RCV DATA REG SAVED ON ERROR
: RCV CSR SAVED ON DS CHANGE

```

```

TXWC: 0
RXWC: 0
XCC: 0
RCC: 0
RDA: 0
XDA: 0

```

```

: XMIT CHAR COUNT
: RCV CHAR COUNT
: RCV DATA ADDR.
: XMIT DATA ADDR.

```

```

TKS: 177560
TKB: 177562
TPS: 177564
TPB: 177566
FULL.DUPLEX=000001

```

```

655
656
657
658 011106 000240
659 011110 017700 177730
660 011114 042700 177400
661 011120 013702 011006
662 011124 012722 015040
663 011130 013722 011010
664 011134 012722 014216
665 011140 013722 011010
666 011144 013704 011004
667 011150 013714 011012
668 011154 013702 011014
669 011160 042702 000001
670 011164 010264 000002
671 011170 012703 000017
672 011174 112764 000014 000005
673 011202 110364 000001
674 011206 005064 000006
675 011212 005303
676 011214 100372
677 011216 005014
678 011220 005064 000002
679 011224 005064 000004
680 011230 012703 000020
681 011234 052764 010000 000004 25:
682 011242 042764 060000 000004
683 011250 005064 000006
684 011254 105264 000005
685 011260 005303
686 011262 001364
687 011264 112764 000012 000005
688 011272 012764 000040 000006
689 011300 005037 014206
690 011304 052764 000010 000002
691 011312 005037 011032
692 011316 005037 013274
693
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696
697
698
699
700
701 011322
702 011322 013702 011022
703 011326 005003
704 011330 005203
705 011332 123722 011040
706 011336 001374
707 011340 005403
708 011342 010337 011062
709 011346 013702 011022
710 011352 005003

```

```

*****
DQ11-X INTERFACE SERVICE ROUTINE
*****
START:  NOP
        MOV     @SMR, R0      ; SETUP MODE IN R0
        BIC     @177400, R0   ; STRIP JUNK
        MOV     R1V, R2      ; SETUP
        MOV     @RISR, (R2)+  ; INTERRUPT
        MOV     @PRIOR, (R2)+ ; VECTORS
        MOV     @XISR, (R2)+
        MOV     @PRIOR, (R2)+
        MOV     @BA, R4      ; SETUP BUS ADDR INDEX
        MOV     @PARAM1, @RCSR ; SETUP VARIABLES
        MOV     @PARAM2, R2
        BIC     @0001, R2
        MOV     R2, @XCSR(R4) ; IN CSR'S
        MOV     @17, R3      ; SET-UP TO CLEAR ALL 16 LOCATIONS
        MOV     @14, REG(RCSR) ; OF THE SEQUENCE CONTROL REGISTER
15:     MOV     R3, @1(RCSR)  ; CLEAR A LOCATION OF THE
        CLR     @SEC(RCSR)   ; SEQUENCE CONTROL REGISTER
        DEC     R3          ; HAVE ALL 16 LOCATIONS BEEN CLEARED?
        BPL     15         ; IF NO THEN BRANCH, OTHERWISE PROCEED ON
        CLR     @RCSR      ; CLEAR THE RX CSR
        CLR     @XCSR(R4)  ; CLEAR TX CSR
        CLR     @ERR(R4)   ; CLEAR THE ERROR REGISTER
        MOV     @16, R3    ; SET COUNTER
25:     BIS     @BIT12, @ERR(R4) ; SET WRITE ENABLE
        BIC     @60000, @ERR(R4) ; CLEAR EXT MEM BITS
        CLR     @SEC(R4)   ; CLEAR THE SECONDARY REGISTER
        INCB   @REG(R4)    ; GET NEXT REGISTER
        DEC     R3        ; DONE YET??
        BNE     25       ; KEEP CLEARING
        MOV     @12, REG(R4) ; SELECT THE MISC REGISTER
        MOV     @BITS, @SEC(R4) ; ISSUE A MASTER CLEAR.
        CLR     @ERRORS
        BIS     @BIT3, @XCSR(R4) ; ENABLE ERROR INTERRUPTS
        CLR     @TIME      ; RESET TIMER
        CLR     @DELAY    ; RESET DELAY INDICATOR.

```

```

; ROUTINE TO FIGURE RX AND TX WORD COUNTS.
; FOR HIGH BAUD THE TX AND RX MESSAGES MUST BE IDENTICAL
; THE DATA WILL BE TRANSFERED AT A BURST MODE.
; THE TXWC AND RXWC SET FOR HOW MANY CHARS TO DEAL WITH.

```

```

X.X:
15:     MOV     IXDA, R2
        CLR     R3
        INC     R3
        CMP     TX. TERM, (R2)+
        BNE     15
        NEG     R3
        MOV     R3, TXWC
        MOV     IXDA, R2
        CLR     R3

```

```

711 011354 005203
712 011356 123722 011041
713 011362 001374
714 011364 010302
715 011366 005403
716 011370 010337 011064
717
718
719
720
721
722
723
724
725

```

```

25:  INC      R3
      CMPB   RX.TERM,(R2)+
      BNE   25
      MOV   R3,R2
      NEG  R3
      MOV  R3,RXWC

```

```

:*****
:  ROUTINE USED TO GOTO
:  SUBROUTINE DEPENDENT
:  ON MODE SELECTED.
:*****

```

```

726 011374 005037 011032
727 011400 005037 013274
728 011404 005037 013300
729 011410 032700 000001
730 011414 001402
731 011416 000137 011572
732 011422 032700 000002
733 011426 001402
734 011430 000137 011464
735 011434 032700 000010
736 011440 001402
737 011442 000137 011670
738 011446 032700 000004
739 011452 001402
740 011454 000137 012120
741 011460 000000
742 011462 000776
743
744
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753
754
755
756

```

```

GO:  CLR      TIME
      CLR    DELAY
      CLR    STOP
      BIT   #OWO,MODE
      BEQ  15
      JMP  SOWO
15:  BIT   #OWI,MODE
      BEQ  25
      JMP  SOWI
25:  BIT   #ILB,MODE
      BEQ  35
      JMP  $ILB
35:  BIT   #XLB,MODE
      BEQ  45
      JMP  $XLB
45:  HALT
      BR   .-2

```

```

:*****
:  ROUTINE USED IF "ONE WAY IN" MODE WAS SELECTED.
:  NOTE THAT WHEN IN THIS MODE HALF DUPLEX IS THE
:  ONLY MODE AVAILABLE.
:  "ONE WAY IN" MEANS THAT ONLY THE RECEIVER IS
:  ENABLED. THE TRANSMITTER IS NEVER "TURNED ON".
:*****

```

```

757 011464 104416
758 011466 004737 014544
759 011472 032700 040000
760 011476 001013
761 011500 023727 011032 000100
762 011506 103771
763 011510 011402
764 011512 016403 000002
765 011516 104001
766 011520 005037 011032

```

```

SOWI: KBDIN
15:   JSR   PC,STARTR
      BIT  #RFLG,STAT
      BNE  25
      CMP  TIME,#100
      BLO  15
      MOV  @RCSR,R2
      MOV  XCSR(R4),R3
      HLT  1
      CLR  TIME

```

```

767 011524 000762            BR        1$
768
769 011526 032777 000200 177310 2$:    BIT        #NODAT,2SWR
770 011534 001002            BNE        3$
771 011536 004737 012510            JSR        PC,TESTD
772 011542 042700 040000            BIC        #RFLG,STAT    3$:
773 011546 032777 000020 177270            BIT        #LOOP,2SWR
774 011554 001405            BEQ        4$
775 011556 012737 011570 013276            MOV        #4$,BACK
776 011564 000137 012350            JMP        EOP
777 011570 000735            4$:    BR        SOWI
778
779
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787

```

```

*****
ROUTINE USED IF "ONE WAY OUT" WAS SELECTED.
NOTE THAT WHEN IN THIS MODE HALF DUPLEX IS THE ONLY
MODE AVAILABLE.
"ONE WAY OUT" MEANS THAT ONLY THE TRANSMITTER IS
ENABLED. THE RECEIVER IS NEVER "TURNED ON."
*****

```

```

788 011572 104416            SOWO:    KBDIN
789 011574 004737 013302            JSR        PC,STARTX
790 011600 005037 011032            CLR        TIME
791 011604 032700 100000            1$:    BIT        #XFLG,STAT
792 011610 001013            BNE        2$
793 011612 023727 011032 000100            CMP        TIME,#100
794 011620 103771            BLO        1$
795 011622 011402            MOV        2RCSR,R2
796 011624 016403 000002            MOV        XCSR(R4),R3
797 011630 104001            HLT        1
798 011632 005037 011032            CLR        TIME
799 011636 000762            BR        1$
800 011640 042700 100000            2$:    BIC        #XFLG,STAT
801 011644 032777 000020 177172            BIT        #LOOP,2SWR
802 011652 001405            BEQ        3$
803 011654 012737 011666 013276            MOV        #3$,BACK
804 011662 000137 012350            JMP        EOP
805 011666 000741            3$:    BR        SOWO
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807
808

```

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863

011670 104416
011672 004737 014544
011676 005037 011032
011702 032700 040000
011706 001013
011710 023727 011032 000100
011716 103771
011720 011402
011722 016403 000002
011726 104001
011730 005037 011032
011734 000762
011736 032777 000200 177100 2S:
011744 001002
011746 004737 012510
011752 042700 040000 3S:
011756 032777 000020 177060
011764 001405
011766 012737 012000 013276
011774 000137 012350
012000 032777 000400 177036 4S:
012006 001416
012010 013702 011020
012014 013703 011022
012020 010337 011074
012024 112223
012026 001376
012030 112743 000177
012034 005203
012036 112723 000177
012042 105023
012044 005037 011032 7S:
012050 004737 013302
012054 032700 100000 5S:
012060 001013
012062 023727 011032 000100
012070 103771
012072 011402
012074 016403 000002
012100 104001
012102 005037 011032
012106 000762
012110 042700 100000
012114 000137 011670

```
*****
ROUTINE USED IF INTERNAL LOOP BACK" WAS SELECTED.
NOTE THAT WHEN IN THIS MODE; HALF DUPLEX IS THE
ONLY MODE AVAILABLE.
"INTERNAL LOOP BACK" MEANS THAT THE RECEIVER IS "TURNED ON"
AND A COMPLETE MESSAGE IS RECEIVED. IF DATA IS TO BE CHECKED
IT IS; IF "END PASS" IS DESIRED; IT IS GIVEN.
THEN THE TRANSMITTER IS ENABLED. AFTER THE WHOLE MESSAGE
IS TRANSMITTED; THE CYCLE IS REPETED AS ABOVE.
*****
```

```
SILB:  KBDIN
      JSR  PC_STARTR
      CLR  TIME
1S:   BIT  #RFLG,STAT
      BNE  2S
      CMP  TIME,#100
      BLO  1S
      MOV  @RCSR,R2
      MOV  XCSR(R4),R3
      HLT  1
      CLR  TIME
      BR   1S
2S:   BIT  #NODAT,@SWR
      BNE  3S
      JSR  PC_TESTD
      BIC  #RFLG,STAT
3S:   BIT  #LOOP,@SWR
      BEQ  4S
      MOV  #4S,BACK
      JMP  EOP
4S:   BIT  #400,@SWR
      BEQ  7S
      MOV  IRDA,R2
      MOV  IXDA,R3
      MOV  R3,XDA
      MOVB (R2)+,(R3)+
      BNE  -2
      MOVB #177,-(R3)
      INC  R3
      MOVB #177,(R3)+
      CLRB (R3)+
7S:   CLR  TIME
      JSR  PC_STARTX
5S:   BIT  #XFLG,STAT
      BNE  6S
      CMP  TIME,#100
      BLO  5S
      MOV  @RCSR,R2
      MOV  XCSR(R4),R3
      HLT  1
      CLR  TIME
      BR   5S
6S:   BIC  #XFLG,STAT
      JMP  SILB
```

```
:USE EXTERNAL DATA?
:BR IF NO
:SET POINTER
:SET POINTER
:SETUP XMIT DATA ADDR
:MOVE INPUT TO OUTPUT
:LOOP IF NOT ZERO CHAR
:INSERT A FILL CHAR
:BUMP ADDRESS
:INSERT ANOTHER FILL
:INSERT ZERO CHAR
```

864
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866
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915
916
917
918
919

012120 104416
012122 032737 000001 011014
012130 001402
012132 004737 014544
012136 004737 013302
012142 005037 011032
012146 032700 100000
012152 001016
012154 032700 040000
012160 001024
012162 023727 011032 000100
012170 103766
012172 011402
012174 016403 000002
012200 104001
012202 005037 011032
012206 000757
012210 032737 000001 011014
012216 001356
012220 042700 100000
012224 004737 014544
012230 000746
012232 032737 000001 011014
012240 001420
012242 032700 100000
012246 001013
012250 023727 011032 000100
012256 103765
012260 011402
012262 016403 000002
012266 104001
012270 005037 011032
012274 000756
012276 042700 100000
012302 042700 040000
012306 005037 011032
012312 032777 000200 176524
012320 001002
012322 004737 012510
012326 032777 000020 176510
012334 001671
012336 012737 012120 013276
012344 000137 012350

```
*****
ROUTINE USED IF "EXTERNAL LOOP BACK" WAS SELECTED.
EITHER HALF OR FULL DUPLEX MAY BE SELECTED IN THIS MODE.
"EXTERNAL LOOP BACK" MEANS THAT THE TRANSMITTER IS FIRST
TURNED ON (IF HALF DUPLEX) AND THE WHOLE MESSAGE IS TRANSMITTED;
THEN THE RECEIVER IS ENABLED. AFTER THE WHOLE MESSAGE IS RECEIVED
DATA WILL THEN BE CHECKED IF DESIRED AND END PASS WILL
BE GIVEN IF DESIRED. THEN THE CYCLE IS REPEATED
AS ABOVE. IF RUNNING IN FULL DUPLEX THE PROGRAM
WAITS FOR BOTH THE RECEIVER AND TRANSMITTER TO
FINISH THEN RESTARTS THE RECEIVER AND TRANSMITTER.
*****
```

```
SXLB: KBDIN
BIT #FULL.DUPLEX,PARAM2
BEQ 1$
JSR PC,STARTR
1$: JSR PC,STARTR
CLR TIME
2$: BIT #XFLG,STAT
BNE 3$
7$: BIT #RFLG,STAT
BNE 4$
CMP TIME,#100
BLO 2$
MOV @RCSR,R2
MOV XCSR(R4),R3
HLT 1
CLR TIME
BR 2$
3$: BIT #FULL.DUPLEX,PARAM2
BNE 7$
BIC #XFLG,STAT
JSR PC,STARTR
BR 2$
4$: BIT #FULL.DUPLEX,PARAM2
BEQ 8$
BIT #XFLG,STAT
BNE 6$
CMP TIME,#100
BLO 4$
MOV @RCSR,R2
MOV XCSR(R4),R3
HLT 1
CLR TIME
BR 4$
6$: BIC #XFLG,STAT
8$: BIC #RFLG,STAT
CLR TIME
BIT #NODAT,@SWR
BNE 5$
JSR PC,TESTD
5$: BIT #LOOP,@SWR
BEQ SXLB
MOV #SXLB,BACK
JMP EOP
```

```

920
921
922
923
924
925
926 012750
927 012750 104414 000340
928 012754 016437 000002 012506
929 012362 042737 177737 012506
930 012370 042764 000040 000002
931 012376 012766 012436 000002
932 012404 010037 013260
933 012410 010137 013262
934 012414 010237 013264
935 012420 010337 013266
936 012424 010437 013270
937 012430 010537 013272
938 012434 000207
939
940 012436
941 012436 013700 013260
942 012442 013701 013262
943 012446 013702 013264
944 012452 013703 013266
945 012456 013704 013270
946 012462 013705 013272
947 012466 012737 177777 013274
948 012474 053764 012506 000002
949 012502 000177 000570
950 012506 000000
951
952
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954
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956
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958 012510 013746 011056
959 012514 001413
960 012516 032777 020000 176320
961 012524 001007
962 012526 104400 012720
963 012532 004077 176272
964 012536 005746
965 012540 104400 013001
966 012544 013701 011022
967 012550 013702 011020
968 012554 122122
969 012556 001776
970 012560 123741 011040
971 012564 001453
972 012566 122742 000002
973 012572 001005
974 012574 010237 012602
975 012600 104400

```

```

*****
ROUTINE TO RETURN
TO MONITOR FOR
END PASS.
*****

```

```

EOP:
STPS,PRTY7
MOV XCSR(R4),QTPIE ;SET PS PRIORITY TO 7
BIC #1C<TIE>,QTPIE ;SAVE TX CSR
BIC #TIE,XCSR(R4) ;CLEAR ALL BUT TX IE.
MOV #ENTER_2(SP) ;CLEAR TX IE (EVEN IF IT WASN'T SET)
MOV R0,SAVR0 ;SET FOR RETURN IF SW 14=1
MOV R1,SAVR1 ;SAVE REGISTER 0
MOV R2,SAVR2 ;SAVE REGISTER 1
MOV R3,SAVR3 ;SAVE REGISTER 2
MOV R4,SAVR4 ;SAVE REGISTER 3
MOV R5,SAVR5 ;SAVE REGISTER 4
RTS PC ;SAVE REGISTER 5
;RETURN TO CONTROL PROGRAM

```

```

ENTER:
MOV SAVR0,R0 ;RESTORE R0
MOV SAVR1,R1 ;RESTORE R1
MOV SAVR2,R2 ;RESTORE R2
MOV SAVR3,R3 ;RESTORE R3
MOV SAVR4,R4 ;RESTORE R4
MOV SAVR5,R5 ;RESTORE R5
MOV #-1,DELAY ;IF ORGINALLY SET; SET TX IE
BIS QTPIE,XCSR(R4)
JMP @BACK
QTPIE: 000000

```

```

*****
SUBROUTINE TO CHECK
RECEIVER DATA.
*****
TESTD: MOV ERDR, -(SP) ;WAS THERE A RECEIVE ERROR?
BEQ TSTDAT ;BR IF NO
BIT #BIT13,@SMR ;INHIBIT PRINTOUTS?
BNE TSTDAT ;BR IF YES
TYPE MSG0 ;<15><12>THERE WAS A RECEIVE ERROR. RBUF=
JSR R0,@2016 ;PRINT CONTENTS OF RBUF
TST -(SP)
TYPE MSG1 ;<15><12>
TSTDAT: MOV IXDA, R1 ;SETUP XMIT DATA ADDR
MOV IRDA, R2 ;SETUP RCV DATA ADDR
SCAN4: CMPB (R1)+, (R2)+ ;DATA OK ?
BEQ SCAN4 ;BR IF OK
CMPB TX_TERM,-(R1) ;IS IT END OF DATA
BEQ TESTDX ;BR IF YES
CMPB #002,-(R2)
BNE 25
MOV R2,15
TYPE

```



```

1016
1017
1018
1019
1020
1021
1022
1023
1024
1025
1026 013302 005737 013274
1027 013306 001416
1028 013310 005037 014202
1029 013314 012737 000007 014204
1030 013322 062737 000001 014202
1031 013330 001374
1032 013332 005337 014204
1033 013336 001371
1034 013340 005037 013274
1035 013344 005037 011032
1036 013350 042764 000300 000002
1037 013356 052764 000010 000002
1038 013364 032764 000004 000002
1039 013372 001403
1040 013374 004737 015414
1041 013400 000740
1042 013402 012701 000005
1043 013406 012705 014210
1044 013412 113725 011015
1045 013416 005301
1046 013420 001374
1047 013422 105015
1048
1049
1050
1051
1052 013424 112764 000012 000005
1053 013432 012764 004000 000006
1054 013440 112764 000002 000005
1055 013446 012764 014210 000006
1056 013454 105264 000005
1057 013460 012764 177773 000006
1058 013466 042700 100000
1059 013472 052764 001000 000002
1060 013500 005737 013300
1061 013504 001004
1062 013506 104400 013206
1063 013512 005137 013300
1064 013516 032764 002000 000002 16$:
1065 013524 001037
1066 013526 032764 002000 000002 8$:
1067 013534 001017
1068 013536 023727 011032 000036
1069 013544 103770
1070 013546 011402
1071 013550 016403 000002

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*****
: INITIALIZE TRANSMITTER.
: PURPOSE OF THIS ROUTINE IS TO SEND OUT FIVE
: SYNC CHARS. THE SYNC CHAR TO BE SENT IS FOUND
: IN LOCATION PARAM2+1 (HIGH BYTE OF PARAM2).
: WHEN THE SYNC CHARS. HAVE BEEN TRANSMITTED
: THE TRANSMITTER WILL BE ENABLED FOR REAL DATA
: TRANSFER. CHARACTERS WILL BE TRANSMITTED ONE AT A TIME.
*****
STARTX: TST DELAY ;IF SW04=1 & SW14=0 WAIT BEFORE TURNING TX ON
        BEQ NDLY ;NO GO AHEAD AND TURN ON TX
        CLR TEMP1
        MOV #7,TEMP2
        ADD #1,TEMP1
        BNE -6
        DEC TEMP2
        BNE -14
        CLR DELAY ;ZERO DELAY
NDLY: CLR TIME
      BIC #300,XCSR(R4) ;CLEAR BOTH DONE BITS FROM TX
      BIS #BIT3,XCSR(R4) ;ENABLE ERRORS
      BIT #BIT2,XCSR(R4) ;WHERE IS THE POINTER POINTING
      BEQ 1$ ;BR IF PRI IS NEXT.
      JSR PC,GETPRI ;GO TOGGLE TO GET PRIMARY.
      BR STARTX ;GOTO BEGGINING
1$: MOV #5,R1 ;SET FOR FIVE SYNC CHARS.
    MOV #SYNC,R5 ;SET POINTER LOCATION
    MOVB PARAM2+1,(R5)+ ;LOAD IN SYNC CHARS.
    DEC R1 ;ALL DONE??
    BNE -6 ;BRANCH IF NOT DONE
    CLRB (R5) ;SET LAST BYTE TO ZERO

;NOW THE SYNC CHARS ARE LOADED IN CORE FOR THE DQ11 TO
;PICK UP AND TRANSMIT OUT.

    MOVB #12,REG(R4) ;SELECT MISC REGISTER
    MOV #4000,SEC(R4) ;SET FOR EIGHT BITS PER CHAR.
    MOVB #2,REG(R4) ;SELECT THE TX BA PRI.
    MOV #SYNC,SEC(R4) ;LOAD TX BA PRI. WITH SYNC ADDR.
    INCB REG(R4) ;SELECT THE TX MC PRI.
    MOV #5,SEC(R4) ;SET FOR FIVE CHARS.
    BIC #XFLG,STAT ;RESET TX COMPLETE FLAG
    BIS #DTR,XCSR(R4) ;SET DATA TERMINAL READY
    TST STOP ;FIRST TIME HERE?
    BNE 16$ ;BR IF NO
    TYPE MSG5 ;MAKE CONNECTION
    COM STOP
16$: BIT #MRDY,XCSR(R4)
    BNE 2$
    BIT #MRDY,XCSR(R4)
    BNE 3$
    CMP TIME,#36 ;HAVE 30 SEC ELAPSED YET
    BLO 8$ ;NO NOT YET
    MOV #RCSR,R2 ;LOAD FOR TYPEOUT
    MOV XCSR(R4),R3 ;LOAD FOR TYPEOUT

```

```

1072 013554 032777 010000 175262      BIT      #SW12, #SWR      ;INHIBIT PRINTOUTS?
1073 013562 001001                      BNE      12S        ;BR IF YES
1074 013564 104002                      HLT+2          ;TYPE "WAITING TO TRANSMIT" MESSAGE.
1075 013566 005037 011032          12S:      CLR      TIME
1076 013572 000755                      BR        8S
1077 013574 005037 014202          3S:      CLR      TEMP1
1078 013600 012737 000005 014204      MOV      #5, TEMP2
1079 013606 062737 000001 014202      ADD      #1, TEMP1
1080 013614 001374                      BNE      -6
1081 013616 005337 014204          DEC      TEMP2
1082 013622 001371                      BNE      -14
1083 013624 032737 000001 011014      2S:      BIT      #FULL.DUPLEX, PARAM2
1084 013632 001023                      BNE      9S
1085 013634 032764 010000 000002      10S:     BIT      #10000, XCSR(R4) ; IS CARRIER UP?
1086 013642 001417                      BEQ      9S
1087 013644 023727 011032 000036      CMP      TIME, #36      ; 30 SECONDS UP ?
1088 013652 103770                      BLO      10S            ; NOT YET
1089 013654 011402                      MOV      #RCSR, R2      ; PREPARE TYPE OUT
1090 013656 016403 000002          MOV      XCSR(R4), R3   ; AS ABOVE
1091 013662 032777 010000 175154      BIT      #SW12, #SWR      ;INHIBIT PRINTOUTS?
1092 013670 001001                      BNE      13S        ;BR IF YES
1093 013672 104001                      HLT      1            ;TYPE "WAITING "
1094 013674 005037 011032          13S:      CLR      TIME        ;ZERO TIMER
1095 013700 000755                      BR        10S
1096 013702 005037 011032          9S:      CLR      TIME        ;SET TIME=0
1097 013706 052764 000400 000002      BIS      #RQTS, XCSR(R4)
1098 013714 032764 020000 000002      11S:     BIT      #CTS, XCSR(R4)
1099 013722 001017                      BNE      6S
1100 013724 023727 011032 000036      CMP      TIME, #36      ; 30 SECONDS UP ??
1101 013732 103770                      BLO      11S            ; NOT YET
1102 013734 011402                      MOV      #RCSR, R2      ; PREPARE TYPE OUT
1103 013736 016403 000002          MOV      XCSR(R4), R3   ; AS ABOVE
1104 013742 032777 010000 175074      BIT      #SW12, #SWR      ;INHIBIT PRINTOUTS?
1105 013750 001001                      BNE      14S        ;BR IF YES
1106 013752 104002                      HLT      2            ;TYPE "WAITING "
1107 013754 005037 011032          14S:      CLR      TIME        ;ZERO TIMER
1108 013760 000755                      BR        11S
1109
1110
1111      ;HERE NOW BECAUSE CLEAR TO SEND HAS BEEN SET
1112      ;NOW SEND THE SYNC CHARS.
1113
1114 013762 052764 000001 000002      6S:      BIS      #GO, XCSR(R4) ;SET THE GO BIT
1115 013770 005037 011032          CLR      TIME        ;SET TIME TO ZERO
1116
1117 013774 105764 000002          4S:      TSTB     XCSR(R4)    ; IS TX DONE WITH SYNCs
1118 014000 100417                      BMI      5S            ; BR IF YES
1119 014002 023727 011032 000036      CMP      TIME, #36      ; HAVE 30 SECOND GONE BY??
1120 014010 103771                      BLO      4S            ; BR IF NOT YET
1121 014012 011402                      MOV      #RCSR, R2      ; LOAD FOR TYPE OUT
1122 014014 016403 000002          MOV      XCSR(R4), R3   ; LOAD FOR TYPE OUT
1123 014020 032777 010000 175016      BIT      #SW12, #SWR      ;INHIBIT PRINTOUTS?
1124 014026 001001                      BNE      15S        ;BR IF YES
1125 014030 104002                      HLT      2            ;TYPE WAITING...
1126 014032 005037 011032          15S:      CLR      TIME        ;ZERO TIMER
1127 014036 000756                      BR        4S            ;GO WAIT FOR DONE

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1133 014040 112764 000002 000005 5S:   MOV  B 82,REG(R4)   ;SELECT TX BA PRI
1134 014046 013764 011022 000006   MOV  IXDA,SEC(R4)  ;LOAD BA
1135 014054 062764 000002 000006   ADD  B,SEC(R4)    ;POINT BA TWO HIGHER
1136 014062 112764 000003 000005   MOV  B,83,REG(R4) ;SELECT TX MC PRI
1137 014070 012764 177776 000006   MOV  B,8-2,SEC(R4);SET TWO CHARS AT A TIME
1138 014076 112764 000006 000005   MOV  B,86,REG(R4) ;SELECT TX BA SEC
1139 014104 013764 011022 000006   MOV  IXDA,SEC(R4) ;LOAD TX BA SEC WITH DATA POINTER
1140 014112 112764 000007 000005   MOV  B,87,REG(R4) ;SELECT TX MC SEC
1141 014120 012764 177776 000006   MOV  B,8-2,SEC(R4);SET MC WITH -2
1142
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1145
1146 014126 032737 000002 011014   BIT  #HI.BAUD,PARAM2 ;HAS HI BAUD BEEN SELECTED?
1147 014134 001413 000000 000000   BEQ  7S           ;BR IF NO
1148 014136 112764 000003 000005   MOV  B,83,REG(R4)  ;SELECT THE TX MC PRI
1149 014144 005064 000006 000000   CLR  SEC(R4)       ;ZERO THE PRI MC
1150 014150 112764 000007 000005   MOV  B,87,REG(R4)  ;SELECT THE TX MC SEC
1151 014156 013764 011062 000006   MOV  TXMC,SEC(R4)  ;SET FOR MAX CHAR TRANSFER.
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1160 014164 042764 000300 000002 7S:   BIC  #300,XCSR(R4) ;CLEAR ALL TX DONES
1161 014172 052764 000041 000002   BIS  #IE+.GO,XCSR(R4);SET INTERRUPT ENABLE AND GO
1162
1163 014200 000207 000000 000000   RTS  PC            ;GO BACK TO MAIN PROGRAM
1164
1165
1166
1167 014202 000000 000000 000000   ;SYNC CHARACTER BUFFER AREA.
1168 014204 000000 000000 000000   TEMP1: 0
1169 014206 000000 000000 000000   TEMP2: 0
1170 014210 026 026 000000   ERRORS: 0
1171 014212 026 026 000000   SYNC:  .BYTE 26,26
1172 014214 026 026 000000   .BYTE 26,26
1173

```

;NOW TRANSMITTER DONE HAS SET AND THE SYNC CHARS
 ;HAVE BEEN SENT OUT. THE TRANSMITTER IS TO BE
 ;ENABLED AND THE DATA WILL BE TRANSFERED.

;CHECK FOR HIGH BAUD RATE
 ;NOTE WELL THAT WHEN IN HIGH BAUD MESSAGES MUST BE THE SAME.

;THE D011 IS TOTALLY ENABLE TO GO. THE TRANSMISSION
 ;WILL BEGIN ON THE SECONDARY (THE SYNC CHARS WENT ON
 ;THE PRIMARY). THE D011 WILL INTERRUPT AFTER EACH CHAR
 ;AND CONTINUE TRANSMITTING WHILE THE END CHAR IS
 ;SEARCHED FOR.

```

1173 ;*****
1174 ;TRANSMITTER INTERRUPT SERVICE ROUTINE
1175 ;IN THIS ROUTINE THE END CHARACTER IS CHECKED FOR
1176 ;AND IF IT WASN'T FOUND THE TRANSMITTER CHARACTER COUNT
1177 ;REGISTER IS ADJUSTED.
1178 ;*****
1179
1180
1181 014216 000240 1.5 XISR: NOP ;LOCATION SET FOR HALT INSTRUCTION IN DEBUGGING.
1182 014220 005764 4.4 TST ERR(R4) ;IS THE D011 ERROR FLAG SET??
1183 014224 100012 2.6 BPL 25 ;NOT SET GOOD SO FAR.
1184 014226 016403 5.0 MOV XCSR(R4),R3
1185 014232 011402 3.8 MOV #RCSR,R2
1186 014234 104000 9.3 HLT 0 ;D011 ERROR FLAG SET. EXAMINE REGISTERS FOR ERRO
1187 014236 016437 6.4 MOV ERR(R4),ERRORS ;SAVE D0 ERROR REG
1188 014244 042764 7.0 BIC #377,ERR(R4)
1189 014252 011402 3.8 2S: MOV #RCSR,R2 ;PREPARE FOR ERROR TYPEOUT
1190 014254 016403 5.0 MOV XCSR(R4),R3 ;PREPARE FOR ERROR TYPEOUT
1191 014260 032764 6.5 BIT #300,XCSR(R4) ;IS EITHER TX DONE SET??
1192 014266 001001 2.6 BNE .+4 ;GOOD EITHER PRI OR SEC DONE IS SET
1193 014270 104000 9.3 HLT 0 ;REPORT ERROR. INTERRUPT WAS TO
1194 ;BE CAUSED BY TX DONE; AND TX IS NOT DONE.
1195 014272 032737 5.3 BIT #HI.BAUD,PARAM2 ;IS HIGH BAUD RATE SELECTED?
1196 014300 001402 2.6 BEQ 15 ;BR IF NO
1197 014302 005746 4.4 TST -(SP) ;FAKE STACK
1198 014304 000474 2.6 BR #BTCHK ;XFER ALL DONE
1199 014306 032764 6.5 1S: BIT #BIT2,XCSR(R4) ;WHERE IS POINTER??
1200 014314 001424 2.6 BEQ TX.SEC ;SECONDARY IS NEXT
1201 014316 112764 6.4 TX.PRI: MOVB #2,REG(R4) ;SELECT TX BA PRIMARY
1202 014324 016401 5.0 MOV SEC(R4),R1 ;GET NEXT ADDRESS TO TRANSMIT FROM
1203 014330 062764 6.4 ADD #2,SEC(R4) ;UPDATE CURRENT ADDRESS.
1204 014336 004737 5.8 JSR PC,TX.CK ;GO CHECK FOR END CHAR.
1205
1206 ;IF I COME BACK FROM THE SUBROUTINE THAT MEANS THAT THE
1207 ;END CHAR WAS NOT FOUND AND THE TRANSMISSON GOES ON.
1208
1209 014342 112764 6.4 MOVB #3,REG(R4) ;SELECT TX WC SEC
1210 014350 012764 6.4 MOV #2,SEC(R4) ;LOAD WITH A -2
1211 014356 042764 7.0 BIC #BIT7,XCSR(R4) ;CLEAR PRI DONE FROM TX
1212 014364 000002 4.8 RTI ;LEAVE TX ISR
1213
1214 ;THE ABOVE ROUTINE SERVICED THE INTERRUPT IF THE
1215 ;PRIMARY REGISTERS CAUSED THE INTERRUPT.
1216
1217 014366 112764 6.4 TX.SEC: MOVB #6,REG(R4) ;SELECT THE TX BA SECONDARY.
1218 014374 016401 5.0 MOV SEC(R4),R1 ;GET ADDRESS POINTER.
1219 014400 062764 6.4 ADD #2,SEC(R4) ;UPDATE CURRENT ADDRESS.
1220 014406 004737 5.8 JSR PC,TX.CK ;GO CHECK THE LAST CHARACTER.
1221
1222 ;JUST LIKE ABOVE: IF I COME BACK FROM THE ABOVE SUBROUTIN
1223 ;THAT MEANS THE THE LAST CHAR HASN'T BEEN TRANSMITTED
1224 ;AND THAT TRANSMISSON SHOULD CONTINUE.
1225
1226 014412 112764 6.4 MOVB #7,REG(R4) ;SELECT THE TX WC SEC
1227 014420 012764 6.4 MOV #2,SEC(R4) ;LOAD WITH A -2
1228 014426 042764 7.0 BIC #BIT6,XCSR(R4) ;CLEAR SEC DONE

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1256 014544 000240
1257 014546 042714 000300
1258 014552 032714 000004
1259 014556 001403
1260 014560 014737 015414
1261 014564 000767
1262 014566 113737 011015 014210
1263 014574 113737 011015 014211
1264 014602 112764 000011 000005
1265 014610 013764 014210 000006
1266 014616 112764 000000 000005
1267 014624 013764 011020 000006
1268 014632 105264 000005
1269 014636 012764 177776 000006
1270 014644 112764 000004 000005
1271 014652 013764 011020 000006
1272 014660 062764 000002 000006
1273 014666 105264 000005
1274 014672 012764 177776 000006
1275 014700 112764 000012 000005
1276 014706 012764 004000 000006
1277 014714 012737 000750 011070
1278 014722 042700 040000
1279 014726 005037 011054
1280 014732 005037 011056
1281 014736 032737 000002 011014
1282 014744 001413
1283 014746 112764 000001 000005
1284 014754 013764 011064 000006
1285 014762 112764 000005 000005
1286 014770 005064 000006
1287 014774 052764 001000 000002
1288 015002 005737 013300
1289 015006 001004
1290 015010 104400 013206
1291 015014 005137 013300
1292 015020
1293 015020 000240
1294 015022 000240
1295 015024 000240
1296 015026 000240
1297 015030 000240
1298 015032 052714 000041
1299 015036 000207
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*****
: INITIALIZE RECEIVER ROUTINE
*****

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STARTR: NOP ; LEAVE OPEN FOR TEST PURPOSES.
BIC #300,RCSCR ; CLEAR ALL DONES
BIT #BIT2,RCSCR ; CHECK FOR POINTER TO SEC.
BEQ 15 ; BR IF POINTING TO PRI
JSR PC,GETPRI ; POINT REGISTERS TO PRI
BR STARTR ; BEGIN AGAIN
15: MOV #PARAM2+1,SYNC ; GET SYNC CHAR
MOV #PARAM2+1,SYNC+1 ; GET SECOND SYNC CHAR
MOV #11,REG(R4) ; SELECT SYNC REGISTER
MOV SYNC,SEC(R4) ; LOAD SYNC REGISTER
MOV #0,REG(R4) ; SELECT RX BA PRI.
MOV IRDA,SEC(R4) ; LOAD RX BA FOR DATA
INCB REG(R4) ; GET MC REGISTER
MOV #2,SEC(R4) ; SET FOR ONE CHAR.
MOV #4,REG(R4) ; SELECT RX BA SEC.
MOV IRDA,SEC(R4) ; LOAD RX BA SEC.
ADD #2,SEC(R4) ; UPDATE DATA POINTER BY ONE
INCB REG(R4) ; GET MC REGISTER
MOV #2,SEC(R4) ; SET FOR TWO CHAR.
MOV #12,REG(R4) ; SELECT MISC REGISTER
MOV #4000,SEC(R4) ; SELECT EIGHT BITS PER CHAR.
MOV #750,ACC ; SET FOR MAX 750 CHARS TO BE RXED
BIC #RFLG,STAT ; RESET RX COMPLETE FLAG
CLR ERCSR
CLR ERDBR
BIT #HI.BAUD,PARAM2 ; IS HIGH BAUD RATE SELECTED?
BEQ 25 ; BR IF NO
MOV #1,REG(R4) ; SELECT THE RX MC PRI
MOV RXMC,SEC(R4) ; RECEIVE CHARS MAX.
MOV #5,REG(R4) ; SELECT THE RX MC SEC.
CLR SEC(R4) ; ZERO THE RX MC SECONDARY.
25: BIS #DTR,XCSR(R4) ; SET DATA TERMINAL READY.
TST STOP ; FIRST TIME HERE?
BNE 35
TYPE MSG5
COM STOP
35: NOP
NOP
NOP
NOP
NOP
BIS #IE+.GO,RCSCR ; SET INTERRUPT ENABLE AND GO
RTS PC ; GO TO MAINLINE.....

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; THE ABOVE SHOULD HAVE PREPARED THE RECEIVER TO
; RECEIVE ALL THE CHARS NEEDED FOR TESTING.
; THE RECEIVER WILL INTERRUPT AFTER EACH CHAR IS RECEIVED.
; CHECKING FOR THE END CHARACTER.

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015040 000240
015042 005764 000004
015046 100012
015050 011402
015052 016403 000002
015056 104000
015060 016437 000004 014206
015066 042764 000377 000004
015074 005337 011070
015100 001004
015102 000005
015104 104006
015106 000000
015110 000776
015112 011402
015114 016403 000002
015120 032714 000300
015124 001001
015126 104000
015130 032737 000002 011014
015136 001404
015140 042714 000041
015144 005746
015146 000507
015150 032714 000004
015154 001423
015156 112764 000000 000005
015164 016401 000006
015170 062764 000002 000006
015176 004737 015272

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4.4
2.6
3.8
5.0
9.3
6.4
7.0
3.7
2.6
1.5
9.3
1.8
2.6
3.8
5.0
5.3
2.6
9.3
5.3
2.6
5.8
4.4
2.6
5.3
2.6
6.4
5.0
6.4
5.8

RISR: NOP
TST ERR(R4)
BPL 25
MOV 2RCR,R2
MOV XCSR(R4),R3
HLT 0
MOV ERR(R4),ERRORS
BIC #377,ERR(R4)
2S: DEC RCC
BNE 15
RESET
HLT+6
HALT
BR -2
1S: MOV 2RCR,R2
MOV XCSR(R4),R3
BIT #300,2RCR
BNE +4
HLT 0
BIT #HI.BAUD,PARAM2
BEQ 3S
BIC #IE+.GO,2RCR
TST -(SP)
BR HBRCHK
3S: BIT #BIT2,2RCR
BEQ RX.SEC
RX.PRI: MOVB #0,REG(R4)
MOV SEC(R4),R1
ADD #2,SEC(R4)
JSR PC,RX.CK

RECEIVER INTERRUPT SERVICE ROUTINE.

;THIS ROUTINE WILL SERVICE THE PRIMARY AND SECONDARY
;REGISTERS WHEN THEY INTERRUPT.
;CHECKING FOR THE END CHAR IS PERFORMED.
;LEAVE SPACE FOR BEBUGGING
;CHECK THE DQ11 ERROR FLAG
;BR IF ERROR FLAG NOT SET
;CHECK ERROR REGISTER FOR ERROR.
;CHECK THE BUFFER SIZE
;BR IF OK
;STOP THE SHOW
;RECEIVER BUFFER FULL
;STOP EVERY THING
;DISABLE CONT SWITCH
;PREPARE FOR ERROR TYPEOUT
;PREPARE FOR ERROR TYPEOUT
;IS EITHER DONE SET??
;BR IF AT LEAST ONE DONE IS SET
;NOBODY IS DONE. BUT AN INTERRUPT OCCURED.
;HIGH BAUD??
;BR IF NO
;CLEAR GO AND INTERRUPT ENABLE
;FAKE STACK
;XFER ALL DONE
;WHERE IS THE POINTER.
;POINTING TO SECONDARY.
;SELECT THE RX BA PRIMARY
;GET THE ADDRESS OF DATA.
;UPDATE CURRENT ADDRESS
;GO CHECK THE DATA.

IF I RETURN BACK FROM THE ABOVE SUBROUTINE THE END CHAR
WAS NOT FOUND AND RECEIVING WILL CONTINUE.

MOVB #1,REG(R4)
MOV #-2,SEC(R4)
BIC #BIT7,2RCR
RTI

;SELECT THE RX WC PRI.
;LOAD WITH -2
;CLEAR RX DONE
;LEAVE HERE NOW.

THE ABOVE ROUTINE WAS FOR THE PRIMARY REGISTER INTERRUPT.
THE BELOW ROUTINE IS FOR THE SECONDARY REGISTERS.

RX.SEC: MOVB #4,REG(R4)
MOV SEC(R4),R1
ADD #2,SEC(R4)
JSR PC,RX.CK

;SELECT THE RX BA SEC.
;GET DATA ADDRESS
;UPDATE CURRENT ADDRESS
;GO CHECK THE DATA

E03

DQ11 ITEP OVERLAY MACY11 27(1006) 17-FEB-77 12:37 PAGE 30
 DZDQOC.P11 17-FEB-77 12:19 RECEIVER INTERRUPT SERVICE ROUTINE.

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1362                                     ;IF I COME BACK THAT MEANS THAT THE END CHARACTER WASN'T
1363                                     ;FOUND AND I SHOULD CONTINUE RECEIVING.
1364
1365 015250 112764 000005 000005 6.4      MOVB   #5,REG(R4)      ;SELECT THE RX WC SEC
1366 015256 012764 177776 000006 6.4      MOV    #-2,SEC(R4)   ;LOAD WITH A -2
1367 015264 042714 000100 5.8      BIC    #BIT6,RCRCSR  ;CLEAR RX DONE
1368 015270 000002 4.8      RTI                                     ;GO BACK TO MAINLINE ....
1369
1370                                     ;THE BELOW ROUTINE CHECKS THE DATA FOR END CHAR.
1371
1372 015272 142741 000200 7.0      RX.CK: BICB   #BIT7,-(R1)  ;CLEAR PARITY BIT.
1373 015276 142741 000200 7.0      BICB   #BIT7,-(R1)  ;CLEAR PARITY BIT.
1374 015302 123721 011041 4.7      CMPB   RX.TERM,(R1)+ ;WAS THE CHAR =001
1375 015306 001403 2.6      BEQ    RXISRDN      ;BR IF 001
1376 015310 123721 011041 4.7      CMPB   RX.TERM,(R1)+ ;001?
1377 015314 001012 2.6      BNE    NO.12        ;NO 001
1378 015316
1379 015316 042714 000041 5.8      RXISRDN: BIC    #IE+.GO,RCRCSR ;CLEAR GO AND INTERRUPT ENABLE
1380 015322 042714 000300 5.8      BIC    #300,RCRCSR  ;CLEAR ALL RX DONES
1381 015326 052700 040000 3.8      BIS    #RFLG,STAT   ;SET RX COMPLETE FLAG
1382 015332 005037 011032 3.7      CLR    TIME         ;ZERO TIMER
1383 015336 005726 3.2      TST    (SP)+        ;POP SUBROUTINE POINTER.
1384 015340 000002 4.8      RTI                                     ;ALL DONE GO HOME.....
1385 015342 032777 000040 173474 7.7      NO.12: BIT    #BIT5,RSWR ;MONITOR RX DATA??
1386 015350 001405 2.6      BEQ    IS           ;DON'T MONITOR
1387 015352 105777 173524 5.6      TSTB   @TPS         ;TTY READY??
1388 015356 100002 2.6      BPL    IS           ;NOT READY GO ON WITH TEST
1389 015360 114177 173520 8.8      MOVB   -(R1),@TPB   ;PRINT CHARACTER
1390 015364 000207 3.5      IS:    RTS    PC     ;GO TO RX ISR
1391 015366 032777 000040 173450 7.7      HBRCHK: BIT    #BIT5,RSWR ;MONITOR RX DATA?
1392 015374 001750 2.6      BEQ    RXISRDN     ;BR IF NO
1393 015376 105777 173500 5.6      TSTB   @TPS         ;TTY READY?
1394 015402 100345 2.6      BPL    RXISRDN     ;NO GO ON WITH TEST
1395 015404 112777 000122 173472 7.6      MOVB   #'R,@TPB    ;TYPE "R"
1396 015412 000741 2.6      BR     RXISRDN

```

F03

DQ11 ITEP OVERLAY MACY11 27(1006) 17-FEB-77 12:37 PAGE 31
 DZDQOC.P11 17-FEB-77 12:19 RECEIVER INTERRUPT SERVICE ROUTINE.

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1397
1398
1399
1400 015414 032764 000004 000002 GETPRI: BIT    #BIT2,XCSR(R4)    ;IS THE TX ON THE SEC??
1401 015422 001424                    BEQ    15                ;BR IF NO
1402 015424 112764 000012 000005                    MOVB   #12,REG(R4)    ;SELECT THE MISC REG
1403 015432 012764 004010 000006                    MOV    #4010,SEC(R4) ;SET EIGHT BITS AND TEST LOOP FOR CLK
1404 015440 112764 000007 000005                    MOVB   #7,REG(R4)    ;SELECT TX MC SEC
1405 015446 012764 177777 000006                    MOV    #-1,SEC(R4)   ;TX ONE CHAR
1406 015454 052764 000001 000002                    BIS    #.GO,XCSR(R4) ;SET GO
1407 015462 032764 000100 000002                    BIT    #BIT6,XCSR(R4) ;HANG HERE FOR SEC DONE
1408 015470 001774                    BEQ    -6             ;KEEP WAITING FOR TX DONE SEC.
1409 015472 000750                    BR     GETPRI        ;GO RECHECK AND CKECK RX
1410
1411 015474 032714 000004                    15:    BIT    #BIT2,ARCSR      ;IS RX ON SECONDARY REG
1412 015500 001430                    BEQ    25             ;BR IF ON PRI.
1413 015502 112764 000012 000005                    MOVB   #12,REG(R4)    ;SELECT MISC REGISTERS
1414 015510 012764 004010 000006                    MOV    #4010,SEC(R4) ;EIGHT BITS AND TEST LOOP (CLK)
1415 015516 112764 000005 000005                    MOVB   #5,REG(R4)    ;SELECT RX MC SEC
1416 015524 012764 177777 000006                    MOV    #-1,SEC(R4)   ;RX ONE CHAR
1417 015532 112764 000004 000005                    MOVB   #4,REG(R4)    ;SEL RX BA SEC.
1418 015540 012764 015612 000006                    MOV    #NO.DAT,SEC(R4);LOAD RX BA SEC.
1419 015546 052714 010001                    BIS    #BIT12+.GO,ARCSR ;SET GO!!!!!!+ACTIVE
1420 015552 032714 000100                    BIT    #BIT6,ARCSR    ;HANG HERE FOR RX SEC DONE.
1421 015556 001775                    BEQ    -4             ;KEEP WAITING
1422 015560 000715                    BR     GETPRI        ;GO CHECK EVERY ONE
1423
1424 015562 112764 000012 000005                    25:    MOVB   #12,REG(R4)    ;SELECT MISC REGISTER
1425 015570 042764 004010 000006                    BIC    #4010,SEC(R4) ;CLEAR EIGHT BITS AND TEST LOOP
1426 015576 042714 000300                    BIC    #300,ARCSR     ;CLEAR RX DONES
1427 015602 042764 000300 000002                    BIC    #300,XCSR(R4) ;CLEAR TX DONES
1428 015610 000207                    RTS    PC             ;GO HOME
1429 015612 000000                    NO.DAT: 0
1430
1430 015614 005015 042522 042503 MFULL: .ASCIZ <15><12>/RECEIVER BUFFER FILLED. ERROR!!/
1430 015656 005015 042522 042503 MRXDA: .ASCIZ <15><12>/RECEIVED DATA = /<15><12>
1430 015703      015    051012 041505 MRXSB: .ASCIZ <15><12>/RECEIVED DATA SHOULD BE /<15><12>

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G03

DQ11 ITEP OVERLAY MACY11 27(1006) 17-FEB-77 12:37 PAGE 32
DZD90C.P11 17-FEB-77 12:19 RECEIVER INTERRUPT SERVICE ROUTINE.

1431

000001

.EVEN
.END

K03

D011 ITEP OVERLAY MACY11 27(1006) 17-FEB-77 12:37 PAGE 38
DZDQOC.P11 17-FEB-77 12:19 CROSS REFERENCE TABLE -- MACRO NAMES

BOX	18	600	627	655															
DCPARM	18																		
DHDOC1	18																		
DHPARM	18																		
DJPARM	18																		
DLPARM	18																		
DPPARM	18																		
DQDOC1	18	560																	
DQPARM	18	581																	
DUPARM	18																		
DUPPAR	18																		
DVDOC1	18																		
DVPARM	18																		
DZPARM	18																		
HELLO	18																		
HLT	5998 1326	765 1333	797	829	859	891	907	1002	1074	1093	1106	1125	1186	1193	1320				
SEQUAT	18	599																	
SINTF	18	599																	
SITEP	18	719																	
SSERV	18	644																	

. ABS. 015740 000

ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

DSKZ:DZDQOC.BIN,DSKZ:DZDQOC.SEQ/CRF/SOL=DSKZ:ITEP1.MAC,DZDQOC.P11
RUN-TIME: 3 5 .3 SECONDS
RUN-TIME RATIO: 149/9=16.4
CORE USED: 16K (32 PAGES)