

# DR11C

COMMUNICATION EXERCISER  
MD-11-DZDRF-A

EP DZDRF A DL

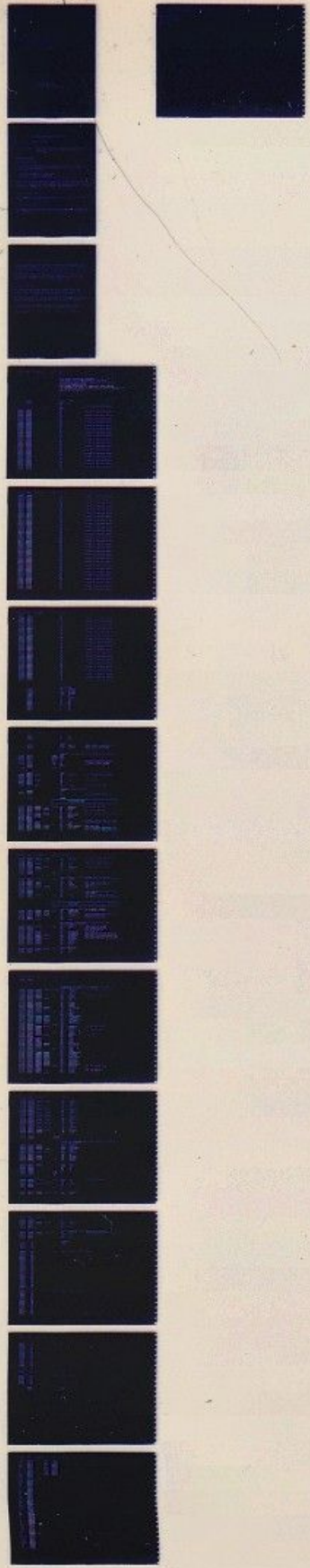
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IDENTIFICATION

PRODUCT CODE    MAINDEC-11-DZDRF-A-D  
PRODUCT NAME    DIAL DR11C COMMUNICATION EXERCISE  
DATE CREATED    DECEMBER 4, 1973  
MAINTAINER      IPG COUSTON SYSTEMS  
AUTHOR          R.C. BALDWIN

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DUAL DR11C COMMUNICATION EXERCISER

Memory Storage: 000000 - 002500

Loading Procedure: (Paper tape supplied) loaded using normal binary procedure). Both processors are loaded with MD-11-DZDRF-A.

Starting Procedures

Starting Address 200:

For non-standard vectors, device addresses & priority interrupt levels. The teletype will ask the following questions to which the operator must respond:

First device address = 6 characters

First int. vector = 3 characters

Priority int. level = Input int. level of device 4-7

If an error is encountered while inputting the device address or int. vector, the operator may type a rub out and repeat entire line inputting. When line is complete or if no changes (from standard device), the operator must terminate the line with a carriage return.

Starting Address 210:

Start address 210 in processor designated to echo data for the transmitter module in adjacent computer.

Starting Address 220:

Designates this processor the echo for the transmitter (S/A 210). No data checking is done in this mode, only received data is returned to the transmitter.

#### Control & Status Register Functions:

Since no transmit & receive flags are specifically designated, the program must transmit its own flags. After data is transmitted from the transmitter module, Bit 01 is set in the transmitter's CSR which alerts the echoing module of data transmitted.

The receiving module then responds to a request "A" interrupt and notifies the transmitter that data was received by setting Bit 00 in its CSR. The data is then transferred back to the transmit module which raises a request "B" int. in the transmit module.

#### Exerciser Testing:

The returned data is then checked against the original data sent. A data error will cause a halt and the operator may examine location "STO" for data returned and location "Count" for data sent.

The data transferred in a binary count pattern from 000000 to 111111. The exerciser will loop continuously until halted by the operator or upon a data failure.

To designate or redesignate the DR11's from transmitter to echo or echo to transmitter, the program must be halted and restarted.

Upon a successful full-count pattern transfer, the teletype will report "PASS".





707204	700200	.02	
707206	700200	HLT	ITRAPPED TO PREVIOUS VECTOR
700270	700272	.02	
707272	700000	HLT	ITRAPPED TO PREVIOUS VECTOR
707274	700276	.02	
707276	700000	HLT	ITRAPPED TO PREVIOUS VECTOR
700300	700302	.02	
700302	700000	HLT	ITRAPPED TO PREVIOUS VECTOR
700304	700306	.02	
700306	700000	HLT	ITRAPPED TO PREVIOUS VECTOR
700310	700312	.02	
700312	700000	HLT	ITRAPPED TO PREVIOUS VECTOR
700314	700316	.02	
700316	700000	HLT	ITRAPPED TO PREVIOUS VECTOR
700320	700322	.02	
700322	700000	HLT	ITRAPPED TO PREVIOUS VECTOR
700324	700326	.02	
700326	700000	HLT	ITRAPPED TO PREVIOUS VECTOR
700330	700332	.02	
700332	700000	HLT	ITRAPPED TO PREVIOUS VECTOR
700334	700336	.02	
700336	700000	HLT	ITRAPPED TO PREVIOUS VECTOR
700340	700342	.02	
700342	700000	HLT	ITRAPPED TO PREVIOUS VECTOR
700344	700346	.02	
700346	700000	HLT	ITRAPPED TO PREVIOUS VECTOR
700350	700352	.02	
700352	700000	HLT	ITRAPPED TO PREVIOUS VECTOR
700354	700356	.02	
700356	700000	HLT	ITRAPPED TO PREVIOUS VECTOR
700360	700362	.02	
700362	700000	HLT	ITRAPPED TO PREVIOUS VECTOR
700364	700366	.02	
700366	700000	HLT	ITRAPPED TO PREVIOUS VECTOR
700370	700372	.02	
700372	700000	HLT	ITRAPPED TO PREVIOUS VECTOR
700374	700376	.02	
700376	700000	HLT	ITRAPPED TO PREVIOUS VECTOR

177560  
177562  
177566  
177564  
000000  
177570  
000240  
000000  
000001  
000002  
000003  
000004  
000005

IEQUALITIES  
YKB 0177560  
YKB 0177562  
YVDB 0177566  
YVSR 0177564  
HLT 00  
SR 0177570  
NOP 0240  
R0 0X0  
R1 0X1  
R2 0X2  
R3 0X3  
R4 0X4  
R5 0X5

700076  
700087  
177776

SP 0X6  
PC 0X7  
PS 017776

169778  
169772  
169774

INDIRECT ADDRESSING FOR NON-STANDARD DEVICE ADDRESSES  
IDR11C  
DCSR 016778 IOP11C CONTROL AND STATUS REG;  
DOUTB 016772 IOP11C OUTPUT BUFFER REG;  
DINB 016774 IOP11C INPUT BUFFER REG;

700470 169778  
700472 169772  
700474 169774  
700476 700200  
700410 700110  
700412 700114  
700670 700070

XDCSR1 DCSR  
XDOUTB1 DOUTB  
XDINB1 DINB  
PRIV1 200 IOP11C PRIORITY INTERRUPT VECTOR #1  
VEC1 112 IOP11C INTERRUPT VECTOR ADDRESS  
VEC21 114 IOP11C INTERRUPT VECTOR ADDRESS  
STACK1 0

700270 700200 701144  
700274 700000  
700206 700240  
700218 700107 701002  
700214 700240  
700216 700240  
700220 700107 700254

JSR 03200 RD, VECTOR IOP11C INPUT NON-STANDARD ADDRESS  
HLT  
NOP  
JMP ECHO IOP11C IOP11C ECHO MODE  
NOP  
NOP  
JMP TRMTR IOP11C IOP11C RUN TRANSMITTER MODE

700370 700300  
700372 700000  
700374 700340  
701000

INTERRUPT VECTOR POINTERS  
0300  
340 IOP11C IOP11C PROCESSOR STATUS 7  
01000

TRANSMITTER MODE

701070 701270 700000  
701074 701270 700340 176764  
701012 701270 700001 176250  
701020 701774  
701022 701277 701150 177360  
701030 701277 701150 177354  
701036 705777 177336  
701042 701481  
701044 700070  
701046 705007 700074  
701052 705207 700070  
701056 701677 700004 177316  
701064 705277 700102 177306  
701072 701670 177310 176676  
701170 700071

TRMTR1 MOV 0STACK, SP INITIALIZE THE STACK  
MOV 0340, PS  
BIT 01, SR IOP11C IOP11C WAIT FOR 00 COMMAND  
BEQ 00 IOP11C IOP11C  
MOV 0SERP, 0VEC IOP11C IOP11C ISPT INT, SERVICE ROUTINE FOR REG A00  
MOV 0SERP, 0VEC2  
TST 0XDCSR  
BEQ 04  
HLT  
CLR COUNT IOP11C IOP11C IOP11C CONTROL & STATUS REG; NOT CLEAR  
INC COUNT IOP11C IOP11C IOP11C CLEAR INCREMENTAL PATTERN REG;  
MOV COUNT, 0XDOUTR IOP11C IOP11C IOP11C SEND DATA OUT  
BIS 0102, 0XDCSR IOP11C IOP11C IOP11C NOTIFY ADJACENT PROCESSOR THAT  
MOV PRIV, PS IOP11C IOP11C IOP11C DATA IS READY & ENABLE REG A INT  
WAIT IOP11C IOP11C IOP11C IOP11C WAIT FOR A DATA TRANSMITTED FLAG



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#01102  752777  000040  177270  #15  #47, 0XDCSR  /SET REG B ENABLE FOR M.P.R.
#01110  716707  177272  176660  #0V  PRIV,PS
#01116  000001  #01120  005707  000022  WAIT  /WAIT FOR A REG B INT
#01124  #01392  #01126  712707  #02317  001000  TST  COUNT  /WAIT FOR A NEW DATA READY
#01126  712707  #02317  001000  BNE  CY
#01134  #04367  000704  JSR  #3,PRINT  /PRINT PASS WHEN COMPLETE
#01140  #00107  177702  JMP  CY=4
#01144  #00000  STOI  #
#01146  #00000  COUNTI  #
#01150  105777  177224  SERBI  TSTB  0XDCSR  /SERVICE REQUEST AND INTERRUPTS (BIT 7015 OF CSR)
#01154  100002  BPL  ,06  /CHECK FOR BIT 7 (REG A) INTERRUPT
#01156  #00107  000020  JMP  CLRX  /BIT 7 SET SO CLR BIT 1 OF CSR
#01162  #05077  177212  CLR  0XDCSR  /CLR FLAG + INT, ENABLE
#01166  #19767  177212  177750  MOV  0XDING,STO  /READ DATA IN
#01174  #26707  177740  177742  CMP  COUNT,STO  /VERIFY DATA
#01202  #01401  BEQ  ,04
#01204  #00000  HLT
#01206  #00002  RTI
#01210  #05077  177104  CLRXI  CLR  0XDCSR  /DATA RECEIVED NOT SAME AS SENT
#01214  #00002  RTI  /HOMP FREE
#01214  #00002  RTI  /CLR BIT 1 OF CSR & INT REG A
#01214  #00002  RTI  /NOW RETURN AND WAIT FOR DATA RE

;.....
; ECHO MODE
;.....
#01216  #12777  #01294  177104  ECHOI  MOV  0SERA,0VEC  /RUN ECHO MODE OF DATA FROM ADJACENT COMPUTER
#01224  #12777  #01294  177100  MOV  0SERA,0VEC2  /SET FOR REG M INTS,
#01232  #16707  177190  176936  MOV  PRIV,PS  /DROP PROCESSOR STATUS FOR DR, INT,
#01240  #12777  000040  177132  MOV  #40,0XDCSR  /ENABLE A REG INTS,
#01246  000001  WAIT  /WAIT FOR REG A INTS,
#01250  000107  177742  JMP  ECHO

#01254  #05777  177120  SERAI  TST  0XDCSR  /SERVICE REG, B INTERRUPTS BY ECHOING DATA BACK
#01260  100401  BMT  ,04  /TO INTERRUPTING DEVICE
#01262  000000  HLT  /TEST THAT BIT 15 SET
#01264  #19700  177114  MOV  0XDING,RB  /BIT 15 NEW DATA READY
#01270  #10077  177100  MOV  RB,0XDOUTB  /BIT 15 OF CSR SET
#01274  #52777  000001  177076  BIS  #1,0XDCSR  /IN TO REG B
#01302  #04407  #000022  JSR  R4,TIME  /DATA WAS TRANSMITTED SEND BACK
#01306  #12777  #000002  177004  MOV  #2,0XDCSR  /SET CSR B TO INFORM SENDER THAT
#01314  #04407  #000010  JSR  R4,TIME  /WAIT FOR MASTER TO CLR ITS CSR1
#01320  #12700  #000000  MOV  #STACK,SP  /CLR CSR0, SET CSR1 AND CLR INT. EN.
#01324  #00107  177000  JMP  ECHO

#01330  #12707  #000090  000010  TIMEI  /TIME LOOP DELAY
#01336  #05307  #000004  MOV  #50,DCNT
#01342  #01375  DEC  DCNT
BNE  ,04

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701344 700274  
701346 700070

DCNTI

MYS M4

F

I

I

ISUBROUTINE FOR INPUTTING STANDARD VECTORS, DEVICE ADDRESSES AND PRIORITY INV. LEVELS.

701350	712707	702232	700050	VECTORI	MOV	BASK1, MES	ASK FOR FIRST DEVICE ADDRESS
701356	704307	700402			JSR	R3, PRINT	
701362	705007	700452			CLR	ADDRES	
701366	704107	700044		MOBI	JSR	R1, REC	RECEIVING A CHARACTER
701372	704307	700012			JSR	R3, ECH	
701376	722707	700219	700050		CMP	#219, HLD	TEST FOR A C.R.
701404	701410				BEO	SET	
701406	706307	700420			ASL	ADDRES	
701412	706307	700422			ASL	ADDRES	
701416	706307	700410			ASL	ADDRES	
701422	742707	177770	700024		BIC	#177770, HLD	
701430	766707	700020	700402		ADD	HLD, ADDRES	
701436	700107	177724			JMP	MOD	
701442	705707	700072		SEVI	TSY	ADDRES	
701446	701417				BEO	STRB	
701450	716707	700004	176722		MOV	ADDRES, XDCBR	
701456	762707	700002	700054		ADD	#2, ADDRES	
701464	716707	700090	176710		MOV	ADDRES, XROUTR	
701472	762707	700002	700040		ADD	#2, ADDRES	
701480	716707	700034	176676		MOV	ADDRES, XDING	
701486	700200			STRBI	NOB		
701490	712707	702200	700410		MOV	BASK2, MES	ASK FOR INT VECTOR
701496	704307	700022			JSR	R3, PRINT	
701502	705007	700014			CLR	VADDR	CLR VECTOR ADDRESS
701506	704107	700004		MOBAI	JSR	R1, REC	
701512	704307	700452			JSR	R3, ECH	
701516	722707	700219	700410		CMP	#219, HLD	TEST FOR A C.R.
701522	701410				BEO	SETA	
701526	706307	700270			ASL	VADDR	
701532	706307	700204			ASL	VADDR	
701536	706307	700200			ASL	VADDR	
701542	742707	177770	700004		BIC	#177770, HLD	
701548	766707	700000	700244		ADD	HLD, VADDR	
701554	700107	177724			JMP	MODA	
701560	705707	700034		SEPAI	TSY	VADDR	
701566	701430				BEO	STRPA	
701572	742707	177000	700224		BIC	#177000, VADDR	
701578	716707	700220	176504		MOV	VADDR, VEC	
701584	762707	700002	700210		ADD	#2, VADDR	
701590	712777	700040	700202		MOV	#340, #VADDR	
701596	762707	700002	700174		ADD	#2, VADDR	
701602	716707	700070	176536		MOV	VADDR, VEC2	
701608	762707	700002	700160		ADD	#2, VADDR	
701614	712777	700040	700152		MOV	#340, #VADDR	
701620	712707	702270	700236	STRBAI	MOV	BASK3, MES	ASK FOR VECTOR LEVEL
701626	704307	700042			JSR	R3, PRINT	
701632	704107	700030			JSR	R1, REC	REC ONE CHARACTER
701638	704307	700070			JSR	R3, ECH	RECH CHARACTER
701644	722707	700219	700234		CMP	#219, HLD	

*01720	*01427				BEB	,020	
*01722	*22707	*00204	*00224		CHP	*204,HLD	
*01730	*01024				BNE	,012	
*01732	*12707	*00140	170446		MOV	*140,PRIV	ISRT PRIORITY AT 3
*01740	*00209				RTS	R5	
*01742	*22707	*00209	*00224		CHP	*209,HLD	
*01750	*01024				BNE	,012	
*01752	*12707	*00200	170426		MOV	*200,PRIV	
*01760	*00225				RTS	R5	
*01762	*22707	*00200	*00104		CHP	*200,HLD	
*01770	*01024				BNE	,012	
*01772	*12707	*00240	170426		MOV	*240,PRIV	
*02000	*00225				RTS	R5	
*02002	*22707	*00207	*00144		CHP	*207,HLD	
*02010	*01024				BNE	,012	
*02012	*12707	*00300	170366		MOV	*300,PRIV	
*02020	*00225				RTS	R5	
*02022	*12707	*02319	*00104		MOV	*001,YES	
*02030	*004367	*000010			JSR	R3,PRINT	
*02034	*000107	177030			JMP	STRBA	TRY AGAIN
*02040	*000000			ADDRESS	P		
*02042	*000000			VADDR	R		
							PRINT DATA SPECIFIED BY LEADING ADDRESS IN REGISTER 4 UNTIL TERMINATED BY (0)
*02044	*016724	*000004		PRINT	MOV	YES,R4	
*02050	112407	*000050			MOV	(R4),DBUF	
*02054	122707	*000100	*000050		CHPB	*100,DBUF	
*02062	*001422				BEB	DONE	
*02064	122707	*000049	*000040		CHPB	*49,DBUF	
*02072	*001024				BNE	OUT	
*02074	*004207	*000050			JSR	R2,LPCR	
*02100	*000107	177704			JMP	PRINT04	
*02104	*004367	*000002		OUT	JSR	R3,PRY	
*02110	*000757				OR	PRINT04	
*02112	116707	*000010	175446	PRY	MOV	DBUF,TVDB	
*02120	105707	175440			TSYB	TVSR	
*02124	100375				BPL	,04	
*02126	*00209				RTS	R5	
*02130	*00203			DONE	RTS	R3	
*02132	*000000			DBUF	B		
*02134	*000000			YES	B		
*02136	105707	175410		REC	TSYB	TKS	INIT FOR KEYBOARD
*02142	100375				BPL	,04	
*02144	*16707	175412	*000002		MOV	TKS,HLD	
*02152	*000221				RTS	R1	
*02154	*000000			HLD	P		
*02156	*12707	*000219	175402	LPCR	MOV	*219,TVDB	
*02164	105707	175374			TSYB	TVSR	

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702170	100375				RPL ,04
702172	112707	000212	175300		MOV 0212,TVDR
702200	105707	175300			TSVB TVSR
702204	100375				RPL ,04
702206	000202				RTS R2
					IECHO CHARACTERS IN TELETYPE BUFFER REGISTER
702210	116707	175340	175350	ECHO	MOV TKB,TVDR (READY BUFFER TO PRINTER BUFFER
702216	105707	175342			TSVB TVSR (TEST PRINTER STATUS
702222	100375				RPL ,04
702224	000203				RTS R3
					MESSAGLS
702226	000				BYTE
702227	045			IT01	,ASCII /X00/ (INITIALIZE TELEPRINTER
702230	045				
702231	100				
702232	045			ASK1	,ASCII /XFIRST DEVICE ADDRESS/
702233	100				
702234	111				
702235	122				
702236	123				
702237	124				
702240	040				
702241	104				
702242	105				
702243	120				
702244	111				
702245	103				
702246	105				
702247	040				
702250	101				
702251	104				
702252	104				
702253	122				
702254	105				
702255	123				
702256	075				
702257	100				
702260	045			ASK21	,ASCII /XINT; VECTOR00/
702261	111				
702262	110				
702263	124				
702264	056				
702265	040				
702266	120				
702267	105				
702270	103				
702271	124				
702272	117				
702273	122				
702274	075				
702275	100				

702276 045  
702277 111  
702300 116  
702301 124  
702302 096  
702303 120  
702304 122  
702305 111  
702306 117  
702307 122  
702310 111  
702311 124  
702312 131  
702313 075  
702314 100

ASKSI ,ASCII /XINT,PRIORIVV60/

702315 077  
702316 100

QUI ,ASCII /70/

702317 120  
702320 101  
702321 123  
702322 123  
702323 045  
702324 100

PASSI ,ASCII /PASSX0/

702326  
700001

,EVEN  
,END



ADDRES	002040	TYDB	177566
ASK1	002232	TYBR	177564
ASK2	002200	VADDR	002042
ASK3	002270	VEC	000410
CLRX	001210	VEC2	000412
COUNT	001140	VECTOR	001350
CV	001092	XDCSR	000400
CVJF	002132	XDINS	000404
CVNI	001340	XDOU70	000402
DCSR	107770		
DINS	107774		
DONE	002130		
SOUTH	107772		
ECH	002210		
ECHO	001210		
HL0	002194		
HLT	000000		
ITP	002227		
LFCH	002196		
LES	002134		
MOD	001306		
MODA	001520		
NDP	000240		
OUT	002104		
PASS	002317		
PC	000007R		
PRINT	002044		
PRIV	000400		
PRY	002112		
PS	177776		
QJ	002315		
Q0	000000R		
Q1	000001R		
Q2	000002R		
Q3	000003R		
Q4	000004R		
Q5	000005R		
REC	002130		
SENA	001294		
SENB	001190		
SET	001442		
SEYA	001602		
SP	000000R		
SR	177570		
STACK	000670		
STD	001144		
STR0	001506		
STRBA	001670		
TIME	001330		
TKR	177562		
TKS	177560		
TRMTER	001000		

PALX12 V083

38040673

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ERRORS DETECTED 0

RUNTIME 2 SECONDS

9K CORE USED