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DECUS NO.	8-390
TITLE	PALEDCO (<u>PAL</u> ASSEMBLER AND <u>EDITOR</u> <u>COMBINED</u>)
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SOURCE LANGUAGE	PAL III

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PALEDCO (PAL ASSEMBLER AND EDITOR COMBINED)

DECUS Program Library Write-up

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Program Description: PALEDCO is a combined editor and assembler, based on Symbolic Editor (DEC-08-ESAB-PB) and PAL III Assembler (DEC-08-ASB1-PB). It allows the user with an 8K machine to enter PAL III language programs on-line using the editor, edit them, and then to assemble them from the text image in core, without the intervening paper tape step previously required. If an error diagnostic should occur during assembly, he has immediate access to the editor and his incorrect text, so that "instant" editing and reassembly is possible. "Instant" editing and higher assembly speed are the two primary advantages of this system over the existing ones. In addition, the editor's text storage area has been expanded by 1030 (octal) locations. Finally, all editor and assembler options which were available in the DEC programs have been retained, and Bin loader in lower core is not destroyed, advantages over earlier programs of this sort.

Loading: The Bin loader must be in the top page of lower core. PALEDCO is supplied as a two segment paper tape. Load using the Bin loader. The tape will halt about two-thirds of the way through. Press Continue to load the last third of the tape. Load Address at 10000 and deposit Editor bit 0 and 1 options (see below).

Starting: Set the Switch Register (SR) to 1777 (7777 in upper core). Press Load Address. Set SR = 0000, and press Start. Use this same procedure when restarting is necessary.

¹This program is based on an earlier and similar modification, DECUS 8-197, by John Knox.

²The development of this program was supported by Grant MH11857 from the National Institute of Mental Health, awarded to Marvin Levine.

Operating the editor: After starting, the program will echo a carriage return and line feed, and control will be in the command mode of the editor. The editor operates almost identically to DEC's Symbolic Editor, including all options (See tables below). The only differences are the SR bit 0 and 1 options (I/O formatting), and the P command. The bit 0 and 1 options must be deposited in location 10000; they are no longer SR options. The P command has been modified to allow punching as usual when bits 0 and 1 of the SR are both set to 0, and to branch to the assembler when the high-speed punch bit (10) and bit 0 and/or 1 are set to 1. This branching function is explained in detail below.

Operating the assembler (low-speed): The assembler operates identically to the DEC PAL III assembler, except that text for each pass is read from the core image stored in the editor, rather than input from paper tape. To assemble, be sure that the editor is in the command mode (type CTRL/FORM).

Pass I--Set SR = 2002, type P, and press Continue on the console. Control will return to the editor in the command mode when the pass is finished.

Pass II--Set SR = 4002, type P, turn on the low-speed punch, and press Continue. Control will return to the editor when the pass is finished.

Pass III--Set SR = 6002, type P, and press Continue. Control will return to the editor when the pass is finished.

Operating the assembler (high-speed): To obtain pass I and/or III output on the high-speed punch, set SR bit 11 in addition to the setting indicated above. To obtain pass II output on the high-speed punch, turn on the high-speed punch instead of the low-speed punch at the point indicated in the pass II instructions above. All SR settings are summarized in the tables below.

Note that since control returns to the editor after each pass, an error diagnostic can be attended to immediately, and the assembly can then be reinitiated.

Program Operation: Following a high-speed punch command (SR bit 10 = 1; type P(V)), the editor examines SR bits 0 and 1. If both are 0, it punches. If either is 1, it interprets them as an assembly pass number, and transfers control to the assembler.

Summary of new commands and options:

Editor

Location 10000

Bit	Setting	Function
0	0	Input text as is
	1	Convert all occurrences of 2 or more spaces to a tab
1	0	Output each tab as 8 spaces
	1	Output each tab as tab/rubout

SR options

Bit	Position	Function
2	0	Output as specified
	1	Cease ongoing output and return to command mode
10	0	Low-speed punch and teleprinter
	1	High-speed punch (also used to indicate assembler request in conjunction with SR bits 0 and 1 as noted above)
11	0	Low-speed reader
	1	High-speed reader
0,1	1	Used to indicate desired assembler pass, when bit 10 is set and Punch command has been given.

Assembler (from editor command mode, set SR, type P/V, and press Continue)

Switch Register Settings

Pass	Low-speed	High-speed
I	2002	2003
II	4002	4002 (turn on high-speed punch instead of low-speed punch)
III	6002	6003

/MODIFICATIONS TO PAL III AND EDITOR FOR PALEDCO
 /EDITOR IN UPPER; PAL IN LOWER
 CDF=6201
 CIF=6202
 RDF=6214
 RIF=6224
 RMF=6244
 RIB=6234
 FIXTAB

/EDITOR MODIFICATIONS
 FIELD 1

		*0	
000	0000	0000	/BIT 0 & 1 SR OPTIONS
001	7730	7730	/TOP OF TEXT STORAGE
		*172	
172	1156	1156	/PNTR TO MIDDLE /OF HI-SPEED /PUNCH ROUTINE
		*1104	
104	1000	TAD 0	/GET SR OPTION
		*1154	
154	5755	JMP I PALIII	
155	7731	PALIII, 7731	
		*1445	
445	1000	TAD 0	/GET SR OPTION
		*7731	
731	3343	DCA SAVE	
732	7404	OSR	
733	0342	AND MASK	
734	7640	SZA CLA	
735	5344	JMP PALIN	
736	1343	TAD SAVE	
737	6021	6021	/CHECK FLAG
740	5337	JMP .-1	
741	5572	JMP Z I 172	/TO PUNCH
742	7000	MASK, 7000	
743	0000	SAVE, 0	

744	1343	PALIN,	TAD SAVE
745	7000		NOP
746	3371		DCA ASCII
747	1376		TAD STARTF
750	7650		SNA CLA
751	5355		JMP SETPAL
752	1371	PALOUT,	TAD ASCII
753	6203		CIF CDF 00
754	5774		JMP I PAL
755	2376	SETPAL,	ISZ STARTF
756	6203		CIF CDF 00
757	5775		JMP I START
760	1372	CHAR,	TAD CIFLAG
761	7640		SZA CLA
762	5773		JMP I EDITR
763	2372		ISZ CIFLAG
764	5352		JMP PALOUT
765	7300	CLEAR,	CLL CLA
766	3372		DCA CIFLAG
767	3376		DCA STARTF
770	5177		JMP 177
771	0000	ASCII,	0
772	0000	CIFLAG,	0
773	1157	EDITR,	1157
774	1404	PAL,	1404
775	0200	START,	200
776	0000	STARTF,	0
777	5365	ENTER,	JMP CLEAR

/
/PAL III MODIFICATIONS
FIELD 0

			*241
241	5642		JMP I PASS
242	7600	PASS,	7600

			*1401
401	6213		CIF CDF 10
402	5603		JMP I EDIT
403	7760	EDIT,	7760

			*7600
500	6213	PASSD,	CIF CDF 10
501	5602		JMP I PCLEAR
502	7765	PCLEAR,	7765

ASCII	7771
CHAR	7760
CLEAR	7765
CIFLAG	7772
EDIT	1403
EDITR	7773
ENTER	7777
MASK	7742
PAL	7774
PALIII	1155
PALIN	7744
PALOUT	7752
PASS	0242
PASSD	7600
PCLEAR	7602
SAVE	7743
SETPAL	7755
START	7775
STARTF	7776