



# DECUS

## PROGRAM LIBRARY

DECUS NO.

FOCAL8-10

TITLE

PATCH TO FOCAL-W FOR LINC-8  
A-D CONVERTER



# PATCH TO FOCAL-W FOR LINC-8 A-D CONVERTER

DECUS Program Library Write-up

DECUS No. FOCAL-10

## INTRODUCTION

The following patch allows FOCAL-W programs to use the LINC-8 analog-to-digital converter.

Calls to the function are in the format:

```
SET A=FADC(K)
```

where A is any FOCAL variable, and K is the decimal number of the channel to be sampled. The function returns values in the range of -256 to +256, corresponding to minus and plus 1 volt respectively.

Execution of each function call requires approximately 10 milliseconds, limiting the maximum sampling rate to 100 SPC.

Minor changes to the patch will allow the execution of any single LINC instruction (stored at LINSTR) by FOCAL programs. Such a function could be designated FNEW by placing its starting address in FNTABF + 15 (location 413 in FOCAL-W).

/SAM PATCH FOR FOCAL

/8-68.

/TLN 28 FEB 69

\*27

0027	5200	5200
		*404
0404	5201	5201 /ADC FUNCTION
		EFUN3I=100
		INTEGER=52
		FLAC=44
		IACF=6175
		ICON=6141
		ISSP=6165
		IAAC=6171
		*5201
5201	4452	XFADC, JMS I INTEGER
5202	1377	TAD #100 /SAM INST
5203	3307	DCA LINSTR
5204	4212	JMS LINCDO
5205	7200	CLA
5206	6171	IAAC
5207	3045	DCA FLAC+1
5210	4232	JMS FLOAT
5211	5500	JMP I EFUN3I
		/DO 1 LINC INSTR.
5212	0000	LINCDO, 0
5213	7200	CLA
5214	1376	TAD #1370
5215	6165	ISSP /SET LINC P
5216	7200	CLA
5217	1375	TAD #3
5220	6175	IACF /SET IBI
5221	7200	CLA
5222	1374	TAD #10
5223	6141	ICON
5224	1373	TAD #2
5225	6141	ICON /GO DO LINSTR
5226	7000	NOP
5227	1372	TAD #-1
5230	6141	ICON /DESEL LINC
5231	5612	JMP I LINCDO
		/SR TO FLOAT FAC
5232	0000	FLOAT, 0
5233	3046	DCA 46
5234	1371	TAD #13
5235	3044	DCA 44
5236	4407	JMS I 7
5237	7000	FNOR
5240	0000	FEXT
5241	5632	JMP I FLOAT
		*5370
5370	0000	LINSTR,0
5371	0013	Ⓜ
5372	7777	
5373	0002	
5374	0010	
5375	0003	
5376	1370	
5377	0000	

## CHANGES TO FOCAL8-10

The command at location 5203 calls for a DCA from location 5307. There is no location 5307. Secondly, there is no specific return to PDP-8 mode from the LINCDO routine. Both of these deficiencies can be corrected by the following changes and additions:

5203	3367	DCA-LINCSTR
5367	0000	LINSTR, 0
5370	0000	PDP-8 Return
5376	1367	

The attached sheet is a renumbering of this program so that it can be used with FOCAL 1969. One comment should be included and that is, the questions in the initial dialogue in FOCAL should be answered with No's so that no extended functions are in memory before these patches are keyed in.



/SAM PATCH FOR FOCAL

/8-68

/TLN 28 FEB 69

\*27

0027 5200

5200

\*404

0404 5201

5201 /ADC FUNCTION

EFUN3I=100

INTEGER=52

FLAC=44

IACF=6175

ICON=6141

ISSP=6165

IAAC=6171

\*5201

5201 4452

XFADC, JMS I INTEGER

5202 1377

TAD  100 /SAM INST

→ 5203 3367

DCA LINSTR

5204 4212

JMS LINCDO

5205 7200

CLA

5206 6171

IAAC

5207 3045

DCA FLAC+1

5210 4232

JMS FLOAT

5211 5500

JMP I EFUN3I

/DO I LINC INSTR.

5212 0000

LINCDO, 0

5213 7200

CLA

5214 1376

TAD  1370

5215 6165

ISSP /SET LINC P

5216 7200

CLA

5217 1375

TAD  3

5220 6175

IACF /SET IBI

5221 7200

CLA

5222 1374

TAD  10

5223 6141

ICON

5224 1373

TAD  2

5225 6141

ICON /GO DO LINSTR

5226 7000

NOP

5227 1372

TAD  -1

5230 6141

ICON /DESEL LINC

5231 5612

JMP I LINCDO

/SR TO FLOAT FAC

5232 0000

FLOAT, 0

5233 3046

DCA 46

5234 1371

TAD  13

5235 3044

DCA 44

5236 4407

JMS I 7

5237 7000

FNOR

5240 0000

FEXT

5241 5632

JMP I FLOAT





\*5370

→ 5367 0000  
5370 0000  
5371 0013  
5372 7777  
5373 0002  
5374 0010  
5375 0003  
→ 5376 1367  
5377 0100

LINSTR,0





/FADC PATCH, FOCAL-1969

0035	5320	
0401	5321	
5321	4453	JMS I INTEGER
5322	1372	TAD ⊕ 100
5323	3362	DCA LINSTR
5324	4332	JMS LINCDO
5325	7200	CLA
5326	6171	IAAC LINC ACC TO PDP-8 ACC
5327	3045	DCA FLAC+1
5330	4352	JMS FLOAT
5331	5536	JMP I EFUN3I TO FOCAL
LINCDO		
5332	0000	
5333	7200	CLA
5334	1371	TAD ⊕ 1362
5335	6165	ISSP SET LINC PROG COUNTER
5336	7200	CLA
5337	1370	TAD ⊕ 3
5340	6175	IACF SET IBI
5341	7200	CLA
5342	1367	TAD ⊕ 10
5343	6141	ICON ENABLE LINC
5344	1366	TAD ⊕ 2
5345	6141	ICON START LINC
5346	7000	NOP
5347	1365	TAD ⊕ -1
5350	6141	ICON DESELECT LINC
5351	5732	JMP I LINCDO
FLOAT		
5352	0000	
5353	3046	DCA 46 FLAC+2=0
5354	1364	TAD ⊕ 13
5355	3044	DCA 44 FLAC=13
5356	4407	JMS I 7 GO TO PROC
5357	7000	FNOR NORMALIZE ANSWER
5360	0000	FEXT COME BACK
5361	5752	JMP I FLOAT
5362	0000	LINSTR, O
5363	0000	LINC HALT: BACK TO PDP-8
5364	0013	
5365	7777	
5366	0002	
5367	0010	
5370	0003	
5371	1362	
5372	0100	
END		

