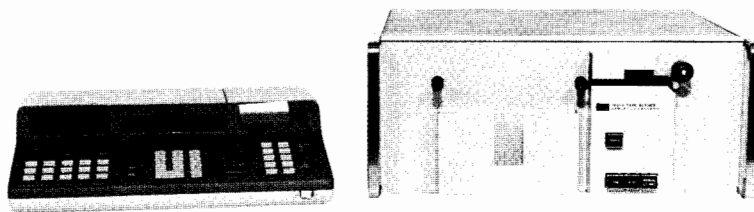


Hewlett-Packard 9815A Calculator
98134A Option 083 Interface
Tape Reader Operating Note



HP 98134A Option 083 Interface



HP 9815A Calculator and HP 9883A Tape Reader



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1

Installation

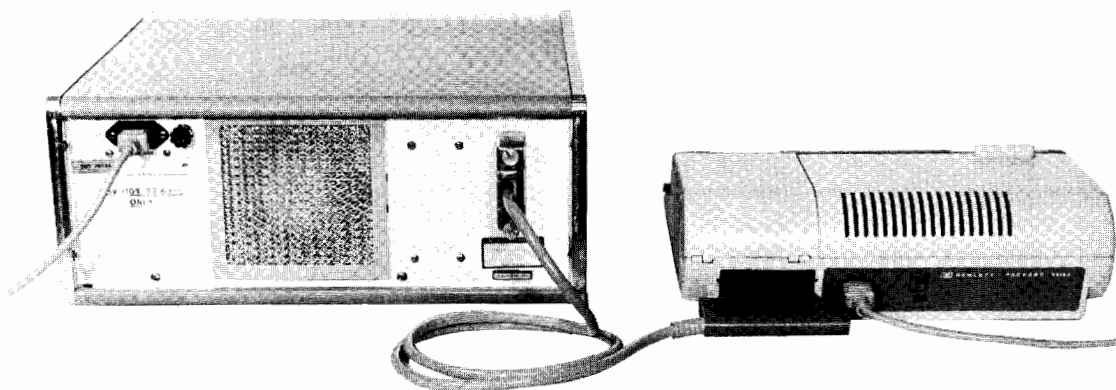
The HP 98134A Option 083 interfaces an HP 9883A High Speed Tape Reader to an HP 9815A Calculator. The following sections describe the specific General I/O instructions used to input data or programs from the tape reader into the calculator. For complete information concerning interface operation and service, refer to the General I/O Operating and Service Manual, HP Part No. 98134-90000.

Connecting the System

You should be familiar with the mechanical operation of the tape reader and its installation requirements before continuing. For information concerning power requirements, grounding, maintenance, etc., refer to the HP 2748B Tape Reader Service Manual (HP Part No. 02748-90032).

The calculator must be equipped with option 002, two channel I/O, which provides the calculator with the interface connectors and internal I/O compatibility.

The calculator-reader system will function properly only if the interface is connected with the calculator switched off. If you accidentally connect the interface with the calculator on, you must switch the calculator off and then on again.



Connecting the Interface

With the calculator switched off, connect the interface to the calculator and the tape reader as shown above. You can connect the interface to either I/O channel in the back of the calculator.

Select Code

The General I/O Interface is preset at the factory to select code 2. Operating two interfaces together requires that each be set to a different select code. If two interfaces set to the same select code are connected to the calculator, the error message "SELECT CODE ERR" will result. Refer to General I/O Operating and Service Manual, Section 1, for the procedure used to change select codes.

Operational Test

With the interface properly connected, switch both the calculator and tape reader on.

On the tape reader:

Press



Load the diagnostic test tape (HP Part No. 09883-90002) into the tape reader head.

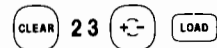
Press



On the calculator:

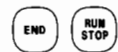
Insert the Utility and Test Cartridge (HP Part No. 09815-10004) into the calculator tape drive. To load the test program from file -23:

Press



When the tape drive halts:

Press



The program should read the entire tape during the test. When the test is completed, the calculator should print "TEST PASSED."

If the calculator either prints "TEST FAILED" or doesn't read the entire tape, switch the calculator off then on again and repeat the entire test procedure.

If the test still fails, contact the nearest HP Sales and Service Office for assistance. See Section 3 of your General I/O Operating and Service Manual for the location of an office near you.

2

Operation

This section explains the calculator instructions used to control the printer. The preceding section should be read before continuing, to insure that the calculator and the tape reader are properly connected and that their operation has been verified.

NOTE

This section assumes that the reader is familiar with the operation of the calculator as described in the HP 9815A Operating and Programming Manual.

I/O Control Instructions



FLAG Instruction



Stack

$-0 \rightarrow X$

The tape reader requires that the calculator I/O control be established with a -0 parameter for the FLAG instruction. Once this control is set, it will remain set until you either execute a new FLAG instruction or switch the calculator off. The calculator, when first switched on, automatically sets the I/O control with a -1 parameter. Therefore, you must reset the I/O control with a -0 for the FLAG instruction before inputting data with the tape reader.

DATA Instruction



$+ \text{ or } - (\text{any value}) \rightarrow X$

Data can be input in either a negative-true or positive-true logic level. The logic level is set according to the sign of the value in X when the DATA key sequence is executed. A positive value sets positive-true logic and a negative value sets negative-true logic. The logic level should be set to match the level that was set when the tape was originally punched.

The DELIM instruction (steps 0007-0010) sets the slash (decimal 47) as the delim₁ character. A READ X inputs numbers, and then they are printed. When the slash is read, flag 4 is set and the program branches to step 0020.

At step 0020, the LF (decimal 10) is set as the delim₁ character. Then numbers are read in but not printed. When the LF is read, flag 4 is set and the program branches back to step 0006. The remaining numbers are now read and printed.

```

0000 0
0001 +÷-
0002 FLAG      2
0004 DATA     2
0006 CFG       4
0007 CLEAR
0008 4
0009 7
0010 DELIM     2
0012 READX    2
0014 IF SFG    4
0015 GOTO     0020
0017 PRINT
0018 GOTO     0012

0020 CFG       4
0021 CLEAR
0022 1
0023 0
0024 DELIM     2
0026 READX    2
0028 IF SFG    4
0029 GOTO     0006
0031 GOTO     0026
0033 END
    
```

This is the resulting printout. ⚡

```

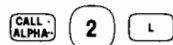
1.00
2.00
3.00
4.00
8.00
9.00
    
```

READ BYTE Instruction



The READ BYTE instruction (RBYTE) inputs one 8-bit binary character from the tape reader and enters its decimal-equivalent value in X. The range is from 0 through 255.

LDPGM Instruction



Starting Step Address → X

The LOAD PROGRAM instruction (LDPGM) inputs program steps into the program memory from the tape reader. The program is loaded, starting at the step address indicated in the X register and continues until an END has been loaded. Since the LDPGM instruction inputs program steps from a tape that has been previously punched with a DUPGM instruction, the logic level (DATA instruction) should be set to match the level that was used when the tape was punched.

6 Operation

When the LDPGM instruction is executed from a program, the calculator loads the new program and then executes the next program step after LDPGM. The program segment below shows one method of using LDPGM.

The LDPGM instruction is located at the top portion of the program memory (steps 0008-0010). The LDPGM instruction is executed at the proper time by the GOTO instruction in step 0351. The new program will be loaded starting at step 0013. After the new program is loaded, the program continues from step 0012.

```
0005      ●  
0006 GOTO   0012  
0008 1  
0009 3  
0010 LDPGM  2  
0012 RCL   A  
0013      ●  
  
0349      ●  
0350 IF X=Y  
0351 GOTO   0008  
0353      ●
```

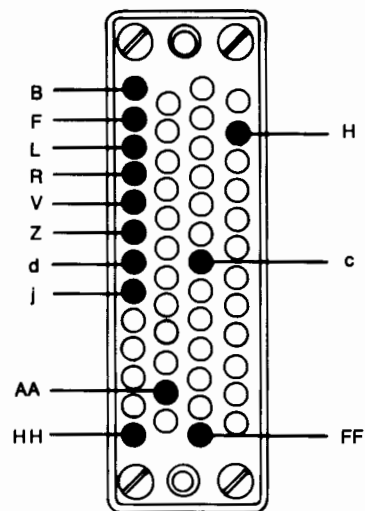
ASCII-Decimal Equivalent Values

ASCII Char.	Dec	ASCII Char.	Dec	ASCII Char.	Dec	ASCII Char.	Dec
NULL	0	space	32	@	64	a	97
				A	65	b	98
SOH	1	!	33	B	66	c	99
STX	2	"	34	C	67	d	100
ETX	3	#	35	D	68	e	101
EOT	4	\$	36	E	69	f	102
ENQ	5	%	37	F	70	g	103
ACK	6	&	38	G	71	h	104
BELL	7	'	39	H	72	i	105
BS	8	(	40	I	73	j	106
H _{TAB}	9	)	41	J	74	k	107
LF	10	*	42	K	75	l	108
V _{TAB}	11	+	43	L	76	m	109
FF	12	,	44	M	77	n	110
CR	13	-	45	N	78	o	111
SO	14	.	46	O	79	p	112
SI	15	/	47	P	80	q	113
DLE	16	ø	48	Q	81	r	114
DC ₁	17	1	49	R	82	s	115
DC ₂	18	2	50	S	83	t	116
DC ₃	19	3	51	T	84	u	117
DC ₄	20	4	52	U	85	v	118
NAK	21	5	53	V	86	w	119
SYNC	22	6	54	W	87	x	120
ETB	23	7	55	X	88	y	121
CAN	24	8	56	Y	89	z	122
EM	25	9	57	Z	90	{	123
SUB	26	:	58	[	91	;	124
ESC	27	;	59	\	92	}	125
FS	28	<	60	]	93	~	126
GS	29	=	61	^	94	DEL	127
RS	30	>	62	_	95		
US	31	?	63	`	96		



Option 083 Interface Connector

Pin	I/O Line	Wire Color
B	I0	Yel
F	I1	Orn
L	I2	Red
R	I3	Brn
V	I4	Wht/Vio
Z	I5	Wht/Gra
d	I6	Grn
j	I7	Blu
HH	GND	Blk
AA	CTL	Wht/Blk/Orn
c	jumper	Pink
FF	FLG	Wht/Blk/Red
H	jumper	Pink












Front View

Material List

HP Part No.	Qty.	Description
1251-0337	1	Connector Body
1251-0190	13	Pins
1251-0339	1	Hood
98134-61603	1	General I/O cable assembly

Error Messages

SELECT CODE ERR	Both interfaces are set to the same select code – change one of the settings immediately!
* OVERFLOW	Number or result exceeds calculating range.
* SQRT OF NEG #	
* DIVISION BY ZERO	
* LOG OF # <=0	
* NO I/O DEVICE	General I/O Interface is either not connected or set to another select code.
ILLEGAL ADDRESS	Improper step address or storage register specified.
ILLEGAL ARGUMENT	Range exceeded for DELIM, FIELD, WBYTE, AND, OR, ROT, or FLAG instructions.
MEMORY OVERFLOW	Program instruction, storage register assignment, or program loaded from tape exceeds available memory.
GOSUB OVERFLOW	More than seven subroutines (including special functions) nested at a time.
KEY NOT DEFINED	Special function just called is not defined.
IMPROPER SYNTAX	Incorrect use of        or  .
* CHECKSUM ERROR	Program or data loaded into calculator not identical to that in file; this usually indicates a dirty tape head or a worn tape.
* VERIFY FAILED	Program or data in file not identical to that in calculator.
WRONG FILE TYPE	Attempting to load an empty, extra, or binary file; recording on an extra file.
END OF TAPE	End of tape reached during MARK operation. Also indicates a broken or defective tape; if the tape does not appear to be broken, (advance it using the drive wheel), replace the cartridge, press  , and continue.
PROTECTED TAPE	The cartridge RECORD slide is positioned to prevent MARK and RECORD operations.
SECURED MEMORY	Attempting to list, edit, or record a secured program.
MISSING FOR STMT	
LABEL NOT FOUND	
FILE NOT FOUND	
CARTRIDGE OUT	
MISSING GOSUB	

*These messages are suppressable. See "Flags" in Section 3 of the 9815A Operating and Programming manual.

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