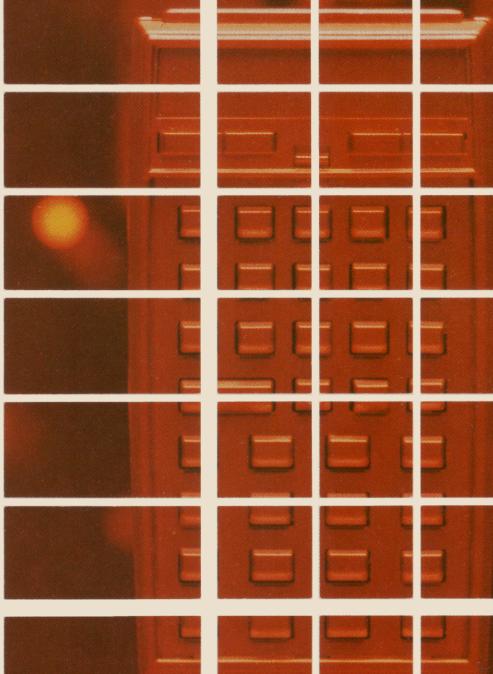
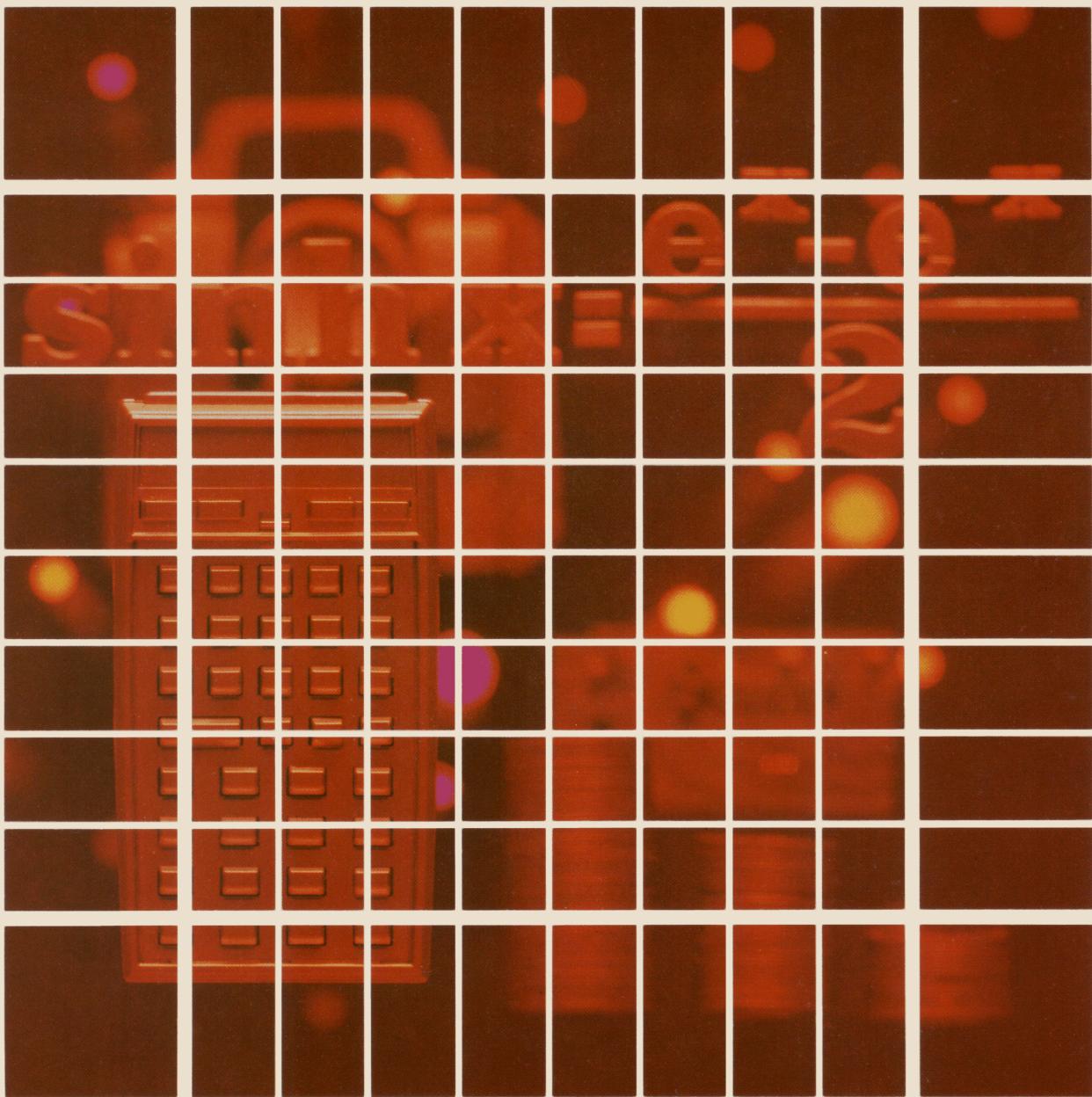


HEWLETT-PACKARD

HP-41

**USERS' LIBRARY SOLUTIONS
Calendars**

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NOTICE

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INTRODUCTION

This HP-41C Solutions book was written to help you get the most from your calculator. The programs were chosen to provide useful calculations for many of the common problems encountered.

They will provide you with immediate capabilities in your everyday calculations and you will find them useful as guides to programming techniques for writing your own customized software. The comments on each program listing describe the approach used to reach the solution and help you follow the programmer's logic as you become an expert on your HP calculator.

KEYING A PROGRAM INTO THE HP-41C

There are several things that you should keep in mind while you are keying in programs from the program listings provided in this book. The output from the HP 82143A printer provides a convenient way of listing and an easily understood method of keying in programs without showing every keystroke. This type of output is what appears in this handbook. Once you understand the procedure for keying programs in from the printed listings, you will find this method simple and fast. Here is the procedure:

1. At the end of each program listing is a listing of status information required to properly execute that program. Included is the SIZE allocation required. Before you begin keying in the program, press **XEQ ALPHA SIZE ALPHA** and specify the allocation (three digits; e.g., 10 should be specified as 010).
Also included in the status information is the display format and status of flags important to the program. To ensure proper execution, check to see that the display status of the HP-41C is set as specified and check to see that all applicable flags are set or clear as specified.
2. Set the HP-41C to PRGM mode (press the **PRGM** key) and press **■ GTO □ □** to prepare the calculator for the new program.
3. Begin keying in the program. Following is a list of hints that will help you when you key in your programs from the program listings in this handbook.
 - a. When you see " (quote marks) around a character or group of characters in the program listing, those characters are ALPHA. To key them in, simply press **ALPHA**, key in the characters, then press **ALPHA** again. So "SAMPLE" would be keyed in as **ALPHA "SAMPLE" ALPHA**.
 - b. The diamond in front of each LBL instruction is only a visual aid to help you locate labels in the program listings. When you key in a program, ignore the diamond.
 - c. The printer indication of divide sign is /. When you see / in the program listing, press **+**.
 - d. The printer indication of the multiply sign is ×. When you see × in the program listing, press **×**.
 - e. The l-character in the program listing is an indication of the **APPEND** function. When you see l, press **■ APPEND** in ALPHA mode (press **■** and the K key).
 - f. All operations requiring register addresses accept those addresses in these forms:
nn (a two-digit number)
IND nn (INDIRECT: **■**, followed by a two-digit number)
X, Y, Z, T, or L (a STACK address: **□** followed by X, Y, Z, T, or L)
IND X, Y, Z, T or L (INDIRECT stack: **■ □** followed by X, Y, Z, T, or L)

Indirect addresses are specified by pressing **■** and then the indirect address. Stack addresses are specified by pressing **□** followed by X, Y, Z, T, or L. Indirect stack addresses are specified by pressing **■ □** and X, Y, Z, T, or L.

Printer Listing

```
01 ♦LBL "SAM  
PLE"  
02 "THIS IS  
A"  
03 "I-SAMPLE  
"  
04 AVIEW  
05 6  
06 ENTER↑  
07 -2  
08 /  
09 ABS  
10 STO IND  
L  
11 "R3="  
12 ARCL 03  
13 AVIEW  
14 RTN
```

Keystrokes

■ LBL	ALPHA	SAMPLE	ALPHA
ALPHA	THIS IS A	ALPHA	
ALPHA	■ APPEND	SAMPLE	
■	AVIEW	ALPHA	
6			
ENTER↑			
2	CHS		
/			
XEQ	ALPHA	ABS	ALPHA
STO	■	□	L
ALPHA	R3=	■	ARCL
■	AVIEW		
ALPHA			
■	RTN		

Display

```
01 LBLT SAMPLE  
02T THIS IS A  
03T I- SAMPLE  
04 AVIEW  
05 6  
06 ENTER ↑  
07 -2  
08 /  
09 ABS  
10 STO IND L  
11T R3=  
12 ARCL 03  
13 AVIEW  
14 RTN
```

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2.	DAY OF YEAR - DAY OF WEEK	9
	Calculates the day of year and day of week.	
3.	NUMBER OF WEEKDAYS BETWEEN TWO DATES	17
	Calculates the number of weekdays between any two dates in history.	
4.	IN WHAT YEAR IS A GIVEN DATE AN M-DAY?	24
	User specifies a year, and a date, then a day-of-week. Program calculates what years from the specified year have the specified date falling on a specific day.	
5.	NUMBER OF M-DAYS BETWEEN TWO DATES, AND THE N-TH M-DAY OF THE MONTH	29
	User specifies a day-of-week and two dates; the program calculates the number of times that day occurs between the given dates. User specifies a year, a month, a day-of-week, and a number "N"; the program then calculates the N-th occurrence of the specified day in the given month.	
6.	HOLIDAYS	37
	Calculates the date, in a given year, for Mother's Day, Father's Day, Election Day, Thanksgiving Day, Washington's Birthday, Labor Day, Columbus Day, and Veteran's Day.	
7.	RELIGIOUS HOLIDAYS	45
	Calculates the date, in a given year, for Ash Wednesday, First Sunday in Lent, Passion Sunday, Palm Sunday, Good Friday, Easter, Rogation Sunday, Ascension Day, Whitsunday, and Trinity Sunday.	
8.	CHINESE YEARS TO/FROM GREGORIAN YEARS	53
	Converts the cyclical two-character year designation of the Chinese Calendar to/from Gregorian years.	
*9.	NEW MOON AND FULL MOON DAY OF MONTH	59
	Calculates the dates of new and full moons.	
**10.	CALENDAR PRINTOUT	68
	Calculates and prints a calendar for a given year and the number of months.	

*These programs require an additional memory module

**This program requires a printer and two memory modules.

CALENDAR DATE TO JULIAN DATE CONVERSION

This program converts any given calendar date between March 1, 1900 and February 28, 2100, to a Julian Date (a continuous count of days from an epoch in the very distant past). For example, January 1, 1979, yield a Julian Date of 2,443,875. Thus the interval between any two calendar dates (on the Gregorian calendar) can be found by obtaining the Julian Date for each and then finding the absolute value of the difference between the two.

To calculate the Julian Day number, the following equation is used:

$$\text{Julian Day number} = \text{INT}(365.25 y') + \text{INT}(30.6001 m') + d + 1,720,982$$

where

$$y' = \begin{cases} \text{year} - 1 & \text{if } m = 1 \text{ or } 2 \\ \text{year} & \text{if } m > 2 \end{cases}$$

$$m' = \begin{cases} \text{month} + 13 & \text{if } m = 1 \text{ or } 2 \\ \text{month} + 1 & \text{if } m > 2 \end{cases}$$

This program will also convert any Julian Date (greater than 0) to its corresponding Gregorian Date.

NOTE: If any discrepancy is noticed, see the reference for further details.

REFERENCE: O'Neil, W. M., Time and the Calendars, Sydney Univ. Press, Australia, 1975.

Example 1:

Determine the Julian Day Number for July 4, 1979.

Keystrokes:	Display:
-------------	----------

[XEQ] [ALPHA] SIZE [ALPHA] 007	
[XEQ] [ALPHA] JUL [ALPHA]	MM.DDYYYY ?
7.041979 [R/S]	JD=2,444,059.

Example 2:

Given the Julian Date 2,444,233, what is the corresponding Gregorian Date?

Keystrokes:	Display:
-------------	----------

[XEQ] [ALPHA] CAL [ALPHA]	JULIAN DAY?
2444233 [R/S]	12-25-1979

Keystrokes:	Display:
[XEQ] [ALPHA] JUL [ALPHA]	MM.DDYYYY ?
8.281940 [R/S]	JD=2,429,870.
[STO] 06	2,429,870.0000
[XEQ] [ALPHA] JUL [ALPHA]	MM.DDYYYY ?
8.281978 [R/S]	JD=2,443,749.
[RCL] 06	2,429,870.0000
[-]	13,879.0000

User Instructions

Program Listings

<pre> 01♦LBL "JUL " 02 FIX 0 03 "MM.DDYY YY ?" 04 PROMPT 05 INT 06 STO 00 07 LASTX 08 FRC 09 1 E2 10 * 11 INT 12 STO 01 13 LASTX 14 FRC 15 1 E4 16 * 17 STO 02 18 2 19 RCL 00 20 X>Y? 21 GTO 00 22 1 23 ST- 02 24 12 25 ST+ 00 26♦LBL 00 27 1 28 ST+ 00 29 RCL 02 30 365.25 31 * 32 INT 33 30.6001 34 RCL 00 35 * 36 INT 37 + 38 RCL 01 39 + 40 1720982 41 + 42 "JD=" 43 ARCL X 44 AVIEW 45 FIX 4 46 STOP 47♦LBL "CAL " </pre>	<p>Initialization and prompting for input</p> <p>Unpack month,day, and year. Then store into appropriate register.</p> <p>Calculate m, and y'</p> <p>Calculate day number</p> <p>Display result</p>	<pre> 48 FIX 0 49 "JULIAN DAY? " 50 PROMPT 51 CF 29 52 ENTER↑ 53 68569 54 + 55 STO 04 56 4 57 * 58 146097 59 / 60 INT 61 STO 05 62 146097 63 * 64 3 65 + 66 4 67 / 68 INT 69 CHS 70 RCL 04 71 + 72 STO 04 73 1 74 + 75 4000 76 * 77 1461001 78 / 79 INT 80 STO 03 81 1461 82 * 83 4 84 / 85 INT 86 CHS 87 31 88 + 89 RCL 04 90 + 91 STO 04 92 80 93 * 94 2447 95 / 96 INT 97 STO 02 </pre>	<p>Initialization and prompting for input</p> <p>$L = \text{Julian Date} + 68569$</p> <p>$N = 4 * L / 146097$</p> <p>$I = 4000 * (L + 1) / 1461001$</p> <p>$J = 80 * L / 2447$</p>
---	---	--	--

Program Listings

98 2447		51	
99 *			
100 80			
101 /	K=L-2447*J/80		
102 INT			
103 CHS			
104 RCL 04			
105 +			
106 STO 01		60	
107 RCL 02			
108 11			
109 /	L=J/11		
110 INT			
111 STO 04			
112 12			
113 *			
114 CHS			
115 2	J=J+2-12*L		
116 +			
117 RCL 02		70	
118 +			
119 STO 02			
120 RCL 05			
121 49	I=100*(N-49)+I+L		
122 -			
123 1 E2			
124 *			
125 RCL 03			
126 +			
127 RCL 04		80	
128 +			
129 STO 03			
130 CLA	Display result in proper format		
131 ARCL 02			
132 "F--"			
133 ARCL 01			
134 "F--"			
135 ARCL 03			
136 AVIEW			
137 SF 29		90	
138 CLX			
139 FIX 4			
140 STOP			
141 .END.			
50		00	

REGISTERS, STATUS, FLAGS, ASSIGNMENTS

DATA REGISTERS				STATUS			
#	NAME	SIZE	FORMAT	INIT		FLAGS	
				S	C	SET INDICATES	CLEAR INDICATES
00	month	50				SIZE 007 TOT. REG. 44	USER MODE
	day					ENG FIX SCI	ON OFF X
	year					DEG RAD GRAD	
	Term 1						
	Term 2						
05	Term 3	55					
	temporary for user			#	INIT S/C	SET INDICATES	CLEAR INDICATES
				29		Radix Point	No Radix Point
10		60					
15		65					
20		70					
25		75					
30		80					
35		85					
				ASSIGNMENTS			
				FUNCTION	KEY	FUNCTION	KEY
40		90					
45		95					

CALENDAR DATE/JULIAN DATE
CONVERSIONS
PROGRAM REGISTERS NEEDED: 38

ROW 1 (1 - 3)



ROW 2 (3 - 8)



ROW 3 (9 - 17)



ROW 4 (18 - 26)



ROW 5 (27 - 33)



ROW 6 (33 - 40)



ROW 7 (40 - 43)



ROW 8 (44 - 48)



ROW 9 (49 - 50)



ROW 10 (51 - 58)



ROW 11 (58 - 62)



ROW 12 (62 - 74)



ROW 13 (75 - 78)



ROW 14 (79 - 87)



ROW 15 (88 - 96)



ROW 16 (97 - 105)



ROW 17 (106 - 116)



ROW 18 (117 - 126)

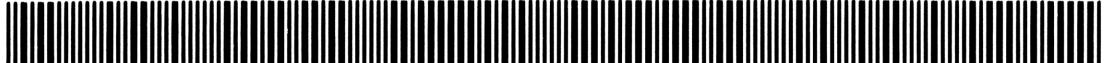


CALENDAR DATE/JULIAN DATE
CONVERSIONS

ROW 19 (127 - 134)



ROW 20 (134 - 141)



DAY OF YEAR - DAY OF WEEK

Given a date (between years 1901 and 2009), or given a year and day of the year, this program will calculate the date, the day of the year, the remaining days of the year, and the day of the week. The day of the year and date are calculated using the following Julian Day formula:

Julian Day number = INT(365.25 y') + INT(30.6001 m') + d + 1,720,982

where $y' = \begin{cases} \text{year} - 1 & \text{if } m = 1 \text{ or } 2 \\ \text{year} & \text{if } m > 2 \end{cases}$

$$m' = \begin{cases} \text{month} + 13 & \text{if } m = 1 \text{ or } 2 \\ \text{month} + 1 & \text{if } m > 2 \end{cases}$$

Example 1:

For July 4, 1979 find:

- 1) Day of the year
- 2) Remaining days in the year
- 3) The day of the week

Keystrokes:

[XEQ] [ALPHA] SIZE [ALPHA] 011

1) [XEQ] [ALPHA] DOY [ALPHA]

7.041979 [R/S]

2) [XEQ] [ALPHA] RDOY [ALPHA]

3) [XEQ] [ALPHA] DOW [ALPHA]

Display:

MM.DDYYYY ?

185 DAY

180 DAYS

WED

Example 2:

For the year 1956, the 315th day, determine the following:

- 1) The date
- 2) The remaining days in the year
- 3) The day of the week

Keystrokes:

1) [XEQ] [ALPHA] DAT [ALPHA]

1956 [R/S]

315 [R/S]

2) [XEQ] [ALPHA] RDOY [ALPHA]

3) [XEQ] [ALPHA] DOW [ALPHA]

Display:

YEAR ?

DOY ?

11-10-1956

51 DAYS

SAT

User Instructions

Program Listings

<pre> 01♦LBL "DOY" " 02 XEQ 08 03 "MM.DDYY YY ?" 04 PROMPT 05 XEQ 00 06 STO 02 07 RCL 04 08 1 E6 09 / 10 1 11 + 12 XEQ 00 13 RCL 02 14 - 15 CHS 16 STO 00 17 CF 29 18 CLA 19 ARCL X 20 SF 29 21 "F DAY" 22 AVIEW 23 RTN 24♦LBL 00 25 ENTER↑ 26 INT 27 STO 07 28 - 29 1 E2 30 * 31 ENTER↑ 32 INT 33 STO 08 34 - 35 1 E4 36 * 37 STO 09 38 STO 04 39 RCL 07 40 1 41 + 42 ENTER↑ 43 1/X 44 .7 45 + 46 CHS 47 XEQ 04 48 RCL 01 49 * </pre>	<p>Prompt for date</p> <p>Compute day number</p> <p>Compute day number for first of year</p> <p>Find the difference and display result</p> <p>Break date into month, day and year.</p> <p>Calculate Julian Day number</p>	<pre> 50 INT 51 RCL 09 52 RCL 10 53 * 54 INT 55 + 56 RCL 08 57 + 58 RTN 59♦LBL 04 60 INT 61 ST+ 09 62 12 63 * 64 - 65 RTN 66♦LBL "DAT" " 67 XEQ 08 68 "YEAR ?" 69 PROMPT 70 "DOY ?" 71 PROMPT 72 STO 00 73 RDN 74 STO 04 75 1 E6 76 / 77 1 78 + 79 XEQ 00 80 RCL 00 81 + 82 STO 02 83 RCL 05 84 - 85 RCL 10 86 / 87 INT 88 STO 09 89 RCL 10 90 * 91 INT 92 RCL 02 93 - 94 CHS 95 STO 06 96 RCL 01 97 / 98 INT 99 STO 07 </pre>	<p>Make corrections to m' and y'</p> <p>Prompt for year, and day of year.</p> <p>Compute first day of year.</p> <p>Decipher day number into month day and year</p>
--	---	--	--

Program Listings

100 RCL 06		150 "F DAYS"	
101 X<>Y		151 AVIEW	
102 RCL 01		152 SF 29	
103 *		153 RTN	
104 INT		154♦LBL "DOW	
105 -		"	
106 STO 08		155 RCL 02	
107 RCL 07		156 5	Calculate day of
108 1		157 +	week number
109 RCL 08		158 7	
110 %		159 /	
111 -		160 FRC	
112 -		161 7	
113 RCL 07		162 *	
114 14		163 RND	
115 /		164 X=0?	
116 XEQ 04		165 "SUN"	
117 CF 29		166 1	Display day of
118 CLA		167 X=Y?	week
119 INT		168 "MON"	
120 ARCL X		169 CLX	
121 "F--"		170 2	
122 LASTX		171 X=Y?	
123 FRC	Put date into	172 "TUE"	
124 1 E2	MM-DD-YYYY	173 CLX	
125 *		174 3	
126 ARCL X		175 X=Y?	
127 "F--"		176 "WED"	
128 ARCL 09		177 CLX	
129 AVIEW		178 4	
130 SF 29		179 X=Y?	
131 CLX		180 "THUR"	
132 RTN		181 CLX	
133♦LBL "RDO		182 5	
Y"		183 X=Y?	
134 RCL 04		184 "FRI"	
135 4		185 CLX	
136 /	Compute remain-	186 6	
137 FRC	ing days of the	187 X=Y?	
138 X=0?	year	188 "SAT"	
139 SF 07		189 AVIEW	
140 RCL 03		190 RTN	
141 .5		191♦LBL 08	
142 FS?C 07		192 FIX 0	
143 CHS		193 365.25	
144 -		194 STO 10	Initialize
145 RCL 00		195 .25	
146 -		196 +	
147 CF 29		197 STO 03	
148 CLA		198 30.6001	
149 ARCL X		199 STO 01	

Program Listings

200	122.1		51	
201	STO 05			
202	CLX			
203	RTN			
204	.END.			
10			60	
20			70	
30			80	
40			90	
50			00	

REGISTERS, STATUS, FLAGS, ASSIGNMENTS

DATA REGISTERS			STATUS				
			SIZE	11	TOT. REG.	60	USER MODE
			ENG		FIX		ON
			DEG		RAD		OFF X
00	DOY 30.6001	50	FLAGS				
	JD NUMBER 365.5		#	INIT S/C	SET INDICATES	CLEAR INDICATES	
05	USED 122.1	55					
	MONTH						
	DAY						
	YEAR						
10	365.25	60					
15		65					
20		70					
25		75					
30		80					
35		85					
ASSIGNMENTS							
			FUNCTION	KEY	FUNCTION	KEY	
40		90					
45		95					

DAY OF YEAR – DAY OF WEEK

PROGRAM REGISTERS NEEDED: 50

ROW 1 (1 – 3)



ROW 2 (3 – 5)



ROW 3 (6 – 14)



ROW 4 (15 – 21)



ROW 5 (21 – 30)



ROW 6 (31 – 41)



ROW 7 (42 – 51)



ROW 8 (52 – 62)



ROW 9 (63 – 67)



ROW 10 (68 – 70)



ROW 11 (70 – 79)



ROW 12 (79 – 91)



ROW 13 (92 – 104)



ROW 14 (105 – 116)



ROW 15 (116 – 123)



ROW 16 (124 – 130)



ROW 17 (130 – 135)



ROW 18 (136 – 145)

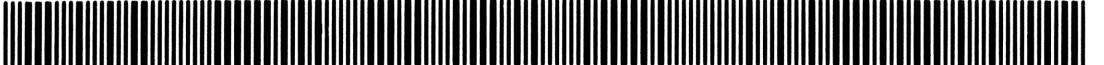


DAY OF YEAR – DAY OF WEEK

ROW 19 (146 – 150)



ROW 20 (151 – 156)



ROW 21 (157 – 166)



ROW 22 (167 – 173)



ROW 23 (174 – 180)



ROW 24 (180 – 188)



ROW 25 (188 – 193)



ROW 26 (194 – 198)



ROW 27 (199 – 204)



NUMBER OF WEEKDAYS BETWEEN TWO DATES

This program calculates the number of weekdays between any two dates in history. The program uses dates encoded in MM.DDYYYY form. The number of weekdays is calculated using the following formula:

$$W(m, d, y) = 5 \left| \frac{D(m, d, y)}{7} \right| + 1/2 \left| 1.801 (D(m, d, y) \bmod 7) \right|$$

where: $D(m, d, y) = d - \left| \frac{3}{4} \left(\left| \frac{g(y, m)}{100} \right| - 7 \right) \right| + \left| 365.25 g(y, m) \right| + \left| 30.6 f(m) \right|$

$$f(m) = \begin{cases} m + 13 & \text{if } m=1, 2 \\ m + 1 & \text{if } m>2 \end{cases} \quad g(y, m) = \begin{cases} y-1 & \text{if } m=1, 2 \\ y & \text{if } m>2 \end{cases} \quad \left| \quad \right| = \text{INT}$$

The program then calculates the difference between the current W and the previous W. These calculations are from noon-to-noon, so the difference between a weekday and a non-weekday will have a half day in it.

This program is valid from the beginning of the Gregorian Calendar, through the year 9999.

Example 1:

Determine how many weekdays there are between September 2, 1963 and June 5, 1964 and the day of the week that June 5, 1964 falls on.

Keystrokes:

```
[XEQ] [ALPHA] SIZE [ALPHA] 004
[XEQ] [ALPHA] WEEK [ALPHA]
9.021963 [R/S]
6.051964 [R/S]
[R/S]*
```

Display:

```
DATE 1 ?
DATE 2 ?
199.0 WEEKDAYS
DATE 2 = FRI.
```

Example 2:

Determine how many weekdays between April 1, 1974 and May 1, 1974. Also, what is the day-of-week of the last date entered, May 1, 1974?

Keystrokes:

```
[XEQ] [ALPHA] WEEK [ALPHA]
4.011974 [R/S]
5.011974 [R/S]
[R/S]*
```

Display:

```
DATE 1 ?
DATE 2 ?
22.0 WEEKDAYS
DATE 2 = WED.
```

*This [R/S] is not necessary if the printer is attached.

Program Listings

<pre> 01♦LBL "WEE K" 02♦LBL 05 03 SF 21 04 FIX 6 05 "DATE 1?" " 06 ADV 07 XEQ 02 08 XEQ 00 09 "DATE 2?" " 10 TONE 8 11 XEQ 02 12 XEQ 00 13 FIX 1 14 CLA 15 ARCL X 16 "F WEEKD AYS" 17 TONE 8 18 AVIEW 19 CLA 20 ARCL 00 21 "F = " 22 RCL 03 23 7 24 * 25 RND 26 INT 27 1 28 X=Y? 29 "F-MON." 30 RDN 31 2 32 X=Y? 33 "F-TUE." 34 RDN 35 3 36 X=Y? 37 "F-WED." 38 RDN 39 4 40 X=Y? 41 "F-THUR." 42 RDN 43 5 44 X=Y? 45 "F-FRI." 46 RDN 47 6 </pre>	<p>Prompt for 1st date</p> <p>Prompt for 2nd date</p> <p>Displaying output</p> <p>Determine and display day of week</p>	<pre> 48 X=Y? 49 "F-SAT." 50 RDN 51 0 52 X=Y? 53 "F-SUN." 54 TONE 8 55 AVIEW 56 GTO 05 57♦LBL 02 58 PROMPT 59 ASTO 00 60 CLA 61 ARCL 00 62 "F = " 63 ARCL X 64 FS? 55 65 PRA 66 RTN 67♦LBL 00 68 9 69 ENTER↑ 70 1 E-6 71 - 72 X<>Y 73 3 74 X<>Y 75 X<=Y? 76 XEQ 01 77 1 78 + 79 ENTER↑ 80 INT 81 STO 01 82 - 83 100 84 * 85 ENTER↑ 86 FRC 87 100 88 * 89 ENTER↑ 90 INT 91 7 92 - 93 .75 94 * 95 INT 96 X<>Y 97 36525 98 * </pre> <p>M-1 or 2? Add 12 to M & Y = Y-1</p> <p>Add 1 to M</p> <p>Store adjusted M</p> <p>.YYYY</p> <p>YY.YY C=# of centuries</p> <p>Century days</p>
--	---	---

Program Listings

99	INT		51	
100	-			
101	-			
102	INT			
103	RCL 01			
104	30.6	[365.25y] + d -		
105	*	[3/4(c-7)]		
106	INT			
107	+	30.6 f(m)		
108	?	D/7	60	
109	/			
110	ENTER↑			
111	FRC			
112	-			
113	LASTX			
114	STO 03			
115	12.61			
116	*			
117	INT			
118	.1		70	
119	*	1-801 (D mod 7)		
120	+			
121	5			
122	*			
123	RCL 02			
124	X<>Y			
125	STO 02			
126	-			
127	CHS			
128	RTN		80	
129	*LBL 01			
130	+			
131	+			
132	.END.			
40			90	
50			00	

REGISTERS, STATUS, FLAGS, ASSIGNMENTS

DATA REGISTERS				STATUS			
00	Alpha prompt f(m)	50		SIZE 004	TOT. REG. 40	USER MODE	
	Code # prev. date $\frac{1}{2}$ day-of-week			ENG _____	FIX 1 SCI _____	ON _____ OFF _____	
				DEG _____	RAD _____ GRAD _____		
05		55		FLAGS			
				#	INIT S/C	SET INDICATES	CLEAR INDICATES
				29		Radix point	No Radix point
10		60					
15		65					
20		70					
25		75					
30		80					
35		85		ASSIGNMENTS			
40		90		FUNCTION	KEY	FUNCTION	KEY
45		95					

NUMBER OF WEEKDAYS BETWEEN
TWO DATES
PROGRAM REGISTERS NEEDED: 37

ROW 1 (1 : 4)



ROW 2 (5 : 8)



ROW 3 (8 : 11)



ROW 4 (11 : 16)



ROW 5 (16 : 20)



ROW 6 (20 : 28)



ROW 7 (29 : 33)



ROW 8 (33 : 39)



ROW 9 (40 : 45)



ROW 10 (45 : 49)



ROW 11 (50 : 56)



ROW 12 (56 : 62)



ROW 13 (63 : 70)



ROW 14 (70 : 80)



ROW 15 (81 : 89)



ROW 16 (90 : 97)



ROW 17 (97 : 106)



ROW 18 (107 : 115)



NUMBER OF WEEKDAYS BETWEEN
TWO DATES

ROW 19 (116 : 127)



ROW 20 (128 : 132)



IN WHAT YEAR IS A GIVEN DATE AN M-DAY?

Given a month m , a day-of-month d , a day-of-week w , (coded 0=SUN.,...,6=SAT.), and a starting year Y , the program applies the following formula:

$$f(m) = \begin{cases} m+11 & \text{if } m > 2 \\ m+23 & \text{if } m = 1 \text{ or } 2 \end{cases} \quad g(m) = \begin{cases} 1 & \text{if } m=1 \text{ or } 2 \\ 0 & \text{if } m>2 \end{cases}$$

$$N(m,d,w) = (|2.6f(m)| + d - w) \bmod 7$$

$$h(N) = \begin{cases} 4(\left\lfloor \frac{|N|}{2} \right\rfloor + 4) & \text{if } N \text{ odd} \\ 2N & \text{if } N \text{ even} \end{cases} \quad | \quad | = \text{INT}$$

$$L(y,N) = (y-1-h(N)) \bmod 28 + h(N) + g(m)$$

L is a leap year, preceding the specified year, in which the given date is an M-day. By successively adding 6,11,6,5,6,11,6,5,... one obtains all the years one wants.

This program is valid from March 1, 1900 through February 28, 2100, but will generate erroneous output when the date supplied is February 29. The program will essentially consider every year as a leap year (having a February 29). The result is an output where every fourth year listed actually has a February 29 of the proper M-day. The user must know, then, at least one leap year in the sequence and count every fourth year from it in either direction. Also, the program does not test input for non-sensical dates and hence will produce correspondingly incorrect results.

Example 1:

When starting in 1949, is May 11 a Sunday?

Keystrokes:

[XEQ] [ALPHA] SIZE [ALPHA] 001

[XEQ] [ALPHA] M-DAY [ALPHA]

5[R/S]

11 [R/S]

0[R/S]

1949[R/S]

[R/S]

[R/S]

[R/S]

.

.

Display:

MONTH ?

DAY ?

M-DAY ?

START.YEAR ?

1952

1958

1969

1975

.

.

.

User Instructions

Program Listings

<pre> 01♦LBL "M-D AY" 02 "MONTH ?" " 03 PROMPT 04 0 05 STO 01 06 CLX 07 11 08 + 09 14 10 X>Y? 11 GTO 03 12 RDN 13♦LBL 01 14 2.6 15 * 16 INT 17 GTO 04 18♦LBL 03 19 1 20 STO 01 21 ENTER↑ 22 + 23 - 24 + 25 GTO 01 26♦LBL 04 27 "DAY ?" 28 PROMPT 29 + 30 "M-DAY ?" " 31 PROMPT 32 - 33 ENTER↑ 34 ENTER↑ 35 7 36 / 37 INT 38 7 39 * 40 - 41 2 42 / 43 ENTER↑ 44 INT 45 X≠Y? 46 XEQ 00 47 4 48 * </pre>	<p>Prompting for month</p> <p>Day of week correction factor</p> <p>[2.6m]</p> <p>Prompt for day</p> <p>Prompt for M-day</p> <p>$N = ([2.6m] + d - w) \text{ MOD } 1$</p> <p>N/Z</p> <p>If N is odd add 4</p> <p>Year # MOD 28</p>	<pre> 49 ENTER↑ 50 ENTER↑ 51 GTO 08 52♦LBL 00 53 4 54 + 55 RTN 56♦LBL 08 57 "START. YEAR ?" 58 PROMPT 59 1 60 - 61 ENTER↑ 62 R↑ 63 - 64 28 65 / 66 INT 67 28 68 * 69 R↑ 70 RCL 01 71 + 72♦LBL 02 73 + 74 X>Y? 75 XEQ 05 76 6 77 + 78 X>Y? 79 XEQ 05 80 11 81 + 82 X>Y? 83 XEQ 05 84 6 85 + 86 X>Y? 87 XEQ 05 88 5 89 GTO 02 90♦LBL 05 91 FIX 0 92 CF 29 93 CLA 94 ARCL X 95 FIX 4 96 SF 29 97 PROMPT 98 RTN </pre>	<p>Prompt for starting year</p> <p>Addition Loop</p>
--	--	--	--

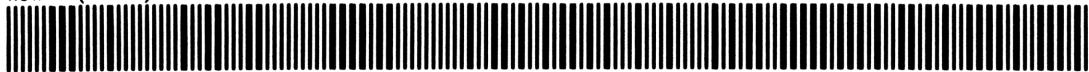
REGISTERS, STATUS, FLAGS, ASSIGNMENTS

DATA REGISTERS			STATUS				
00	50	USED	SIZE	002	TOT. REG.	25	USER MODE
			ENG	FIX	SCI		ON OFF X
			DEG	RAD	GRAD		
FLAGS				CLEAR INDICATES			
05	55	#	INIT S/C	SET INDICATES			
10	60						
15	65						
20	70						
25	75						
30	80						
35	85						
ASSIGNMENTS							
		FUNCTION	KEY	FUNCTION	KEY		
40	90						
45	95						

IN WHAT YEAR IS A GIVEN DATE
AN M-DAY?

PROGRAM REGISTERS NEEDED: 24

ROW 1 (1 - 2)



ROW 2 (2 - 9)



ROW 3 (10 - 18)



ROW 4 (19 - 27)



ROW 5 (27 - 31)



ROW 6 (32 - 44)



ROW 7 (45 - 54)



ROW 8 (55 - 57)



ROW 9 (57 - 66)



ROW 10 (67 - 76)



ROW 11 (77 - 84)



ROW 12 (85 - 92)



ROW 13 (93 - 99)



NUMBER OF M-DAYS BETWEEN TWO DATES, AND THE N-TH M-DAY OF THE MONTH

In this program the user specifies a day-of-week and two dates; the program gives the number of times that day occurs between the given dates. User specifies a year, a month, a day-of-week, and a number N; the program computes the N-th occurrence of the specified day in the given month.

This program uses dates coded mm.ddyyyy. Program computes the number of M-days since a certain date in antiquity, using the formula:

$$N(m,d,y,w) = \left\lfloor \frac{D(m,d,y,w)}{7} \right\rfloor + 1/2 \left\lfloor 0.11(D(m,d,y,w) \bmod 7) + 0.9 \right\rfloor$$

where $D(m,d,y,w) = d - \left\lfloor \frac{3/4(\left\lfloor \frac{g(y,m)}{100} \right\rfloor - 7)}{\right\rfloor} + \left\lfloor 365.25 g(y,m) \right\rfloor + \left\lfloor 30.6f(m) \right\rfloor - w$

$$f(m) = \begin{cases} m+13 & m=1 \text{ or } 2 \\ m+1 & m > 2 \end{cases} \quad g(y,m) = \begin{cases} y-1 & m=1 \text{ or } 2 \\ y & m > 2 \end{cases} \quad | \quad | = \text{INT}$$

$w = M\text{-Day}$ ($0 = \text{Sunday}$, ..., $6 = \text{Saturday}$)

The program then calculates the difference between the current N and the previous N.

Program first computes the first M-Day of the given month; given mongh = m year = y M-day = W (coded 0 = Sunday, ..., 6 = Saturday), the function computed is:

$$D(m,y,w) = h(W - \left\lfloor 2.6 f(m) \right\rfloor - \left\lfloor \frac{5}{4} g(y,m) \right\rfloor + \left\lfloor \frac{3}{4} \left(\left\lfloor \frac{g(y,m)}{100} \right\rfloor - 7 \right) \right\rfloor)$$

where $f(m) = \begin{cases} m+13 & \text{if } m = 1,2 \\ m+1 & \text{if } m > 2 \end{cases} \quad g(y,m) = \begin{cases} y-1 & m=1,2 \\ y & m > 2 \end{cases}$

$$h(x) = \begin{cases} 7 & \text{if } x \bmod 7 = 0 \\ x \bmod 7 & \text{if } x \bmod 7 \neq 0 \end{cases}$$

For the N-TH M-Day the appropriate multiple of seven is added to the day-of-month.

This program is valid from the beginning of the Gregorian calendar through the year 9999.

Example 1:

How many Saturdays are there between July 4,1776 and July 4,1976?

Keystrokes:

[XEQ] [ALPHA] SIZE [ALPHA] 005
[XEQ] [ALPHA] NDAYS [ALPHA]
6 [R/S]
7.041776 [R/S]
7.041976 [R/S]

Display:

M-DAY ?
DATE 1 ?
DATE 2 ?
10436 TIMES

Example 2:

What is the second Wednesday of June, 1984?

Keystrokes:

[XEQ] [ALPHA] NTHDAY [ALPHA]
6 [R/S]
1984 [R/S]
3 [R/S]
2 [R/S]

Display:

MONTH ?
YEAR ?
M-DAY ?
NUM. ?
6-13-1984

User Instructions

Program Listings

01♦LBL "NDA YS" 02 "M-DAY ? " 03 PROMPT 04 STO 04 05 "DATE 1 ?" 06 PROMPT 07 XEQ 00 08 "DATE 2 ?" 09 PROMPT 10 XEQ 00 11 FIX 0 12 CF 29 13 CLA 14 ARCL X 15 "F TIMES " 16 AVIEW 17 FIX 4 18 SF 29 19 STOP 20 GTO "NDA YS" 21♦LBL 00 22 9 23 ENTER↑ 24 1 E-6 25 - 26 X<>Y 27 3 28 X<>Y 29 X<=Y? 30 XEQ 09 31 1 32 + 33 ENTER↑ 34 INT 35 STO 01 36 - 37 1 E2 38 * 39 ENTER↑ 40 FRC 41 1 E2 42 * 43 ENTER↑ 44 INT 45 7	Prompt for day. and storage Prompt for first date. XEQ calculate sub. Prompt for sec- ond date. XEQ calculate sub. Preparing dis- play and output	46 - 47 .75 48 * 49 INT 50 X<>Y 51 36525 52 * 53 INT 54 - 55 - 56 INT 57 RCL 01 58 30.6 59 * 60 INT 61 + 62 RCL 04 63 - 64 7 65 / 66 ENTER↑ 67 FRC 68 - 69 LASTX 70 .77 71 * 72 .9 73 + 74 INT 75 2 76 / 77 + 78 RCL 02 79 X<>Y 80 STO 02 81 - 82 CHS 83 RTN 84♦LBL 09 85 + 86 + 87 RTN 88♦LBL 02 89 RDN 90 GTO 01 91♦LBL "NTH DAY" 92 "MONTH ? " 93 PROMPT 94 STO 03	century days yy.yy [365.25y] [30.6 f(m)] adjusted year recall day w-[2.6f(m)] stack will fill with .07's w-month days- year days Prompt for month and store
---	--	---	---

Program Listings

95 0		145 +	
96 STO 02	D(M,Y,W)/100	146 RCL 04	
97 CLX		147 1 E6	
98 1	recall year	148 /	
99 +		149 +	
100 4		150 RCL 03	
101 X<=Y?		151 +	
102 GTO 02	.ddyyyy	152 STO 03	
103 -1		153 FIX 6	
104 STO 02	mm.ddyyyy	154 "NUM. ?"	Prompt for occurance
105 CLX		155 PROMPT	
106 8		156 1	
107 +		157 -	
108 +		158 .07	
109♦LBL 01		159 *	
110 STO 01	Prompt for year	160 RCL 03	Calcualte date
111 "YEAR ?"		161 +	
112 PROMPT		162 FIX 0	
113 STO 04		163 CF 29	
114 ST+ 02		164 INT	
115 "M-DAY ?	Prompt for day	165 CLA	
"		166 ARCL X	
116 PROMPT		167 LASTX	
117 RCL 01		168 FRC	
118 2.6		169 1 E2	
119 *		170 *	
120 INT		171 INT	
121 -		172 "F-"	
122 5		173 ARCL X	
123 RCL 02		174 LASTX	
124 .07		175 FRC	
125 RDN		176 1 E4	
126 *		177 *	
127 4		178 RND	
128 /		179 "F-"	
129 INT		180 ARCL X	Display output
130 -		181 AVIEW	
131 RCL 02		182 STOP	
132 1 E2		183 GTO "NTH	
133 /		DAY"	
134 INT		184 .END.	
135 ?			
136 -			
137 .75			
138 *			
139 INT			
140 +			
141 ?			
142 /			
143 FRC			
144 *		00	

REGISTERS, STATUS, FLAGS, ASSIGNMENTS

DATA REGISTERS			STATUS			
00	50		SIZE <u>005</u>		TOT. REG. <u>52</u>	USER MODE
	f (m)		ENG _____		FIX _____	SCI _____
	code # Date		DEG _____		RAD _____	ON _____ OFF <u>X</u>
	M		RAD _____		GRAD _____	
Day of week			FLAGS			
05	55		#	INIT S/C	SET INDICATES	CLEAR INDICATES
10	60					
15	65					
20	70					
25	75					
30	80					
35	85		ASSIGNMENTS			
40	90		FUNCTION		KEY	FUNCTION
45	95					KEY

NO. OF M-DAYS BET. TWO DATES
AND THE NTH M-DAY OF THE MONTH
PROGRAM REGISTERS NEEDED: 48

ROW 1 (1 - 2)



ROW 2 (2 - 5)



ROW 3 (5 - 8)



ROW 4 (8 - 14)



ROW 5 (15 - 18)



ROW 6 (19 - 24)



ROW 7 (24 - 33)



ROW 8 (34 - 42)



ROW 9 (43 - 51)



ROW 10 (51 - 59)



ROW 11 (60 - 70)



ROW 12 (71 - 82)



ROW 13 (83 - 91)



ROW 14 (91 - 92)



ROW 15 (92 - 103)



ROW 16 (103 - 111)



ROW 17 (111 - 115)



ROW 18 (115 - 124)



NO. OF M-DAYS BET. TWO DATES
AND THE NTH M-DAY OF THE MONTH

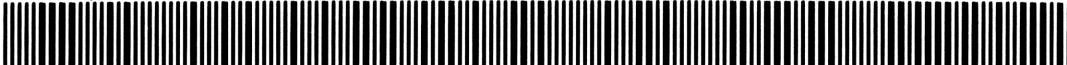
ROW 19 (124 – 134)



ROW 20 (135 – 145)



ROW 21 (146 – 154)



ROW 22 (154 – 160)



ROW 23 (161 – 169)



ROW 24 (169 – 176)



ROW 25 (177 – 183)



ROW 26 (183 – 184)



HOLIDAYS

This program calculates the date of Mother's Day, Father's Day, Election Day, Thanksgiving Day, Washington's Birthday, Labor Day, Columbus Day, and Memorial Day.

It uses the following formulas:

CODED:

MD	Mother's Day	= May 14 - D(0,y)
FD	Father's Day	= June 21 - D(3,y)
ED	Election Day	= Nov. 8 - D(1,y)
TG	Thanksgiving	= Nov. 28 - D(5,y)
WB	Wash.'s Birthday	= Feb. 21 - D(2,y-1)
LD	Labor Day	= Sep. 7 - D(3,y)
CD	Columbus Day	= Oct. 14 - D(5,y)
MM	Memorial Day	= May 31 - D(2,y)

$$\text{Where } D(x,y) = \left(x + \left\lfloor \frac{5}{4}y \right\rfloor - \left\lfloor \frac{3}{4}(1 + \left\lfloor \frac{y}{100} \right\rfloor) \right\rfloor \right) \bmod 7$$

$\lfloor \quad \rfloor = \text{INT}$

This program is valid from the beginning of the Gregorian Calendar through the year 9999.

Example 1:

When is Labor Day in 1980?

Keystrokes:

Display:

[XEQ] [ALPHA] HOLDY [ALPHA]	HOLIDAY ?
LD [R/S]	YEAR ?
1980 [R/S]	9-1-1980

Example 2:

When was Washington's Birthday in the year 1900?

Keystrokes:

[XEQ] [ALPHA] HOLDY [ALPHA]
WB [R/S]
1900 [R/S]

Display:

HOLIDAY ?
YEAR ?
2-19-1900

User Instructions

Program Listings

01♦LBL "HOL DY"	Prompt for holi- day in alpha mode	49 INT 50 1 51 + 52 .75 53 * 54 INT 55 - 56 7 57 / 58 FRC 59 .07 60 * 61 CHS 62 X<>Y 63 1 E6 64 / 65 + 66 RTN 67♦LBL "WB" 68 1 69 - 70 2 71 XEQ 09 72 2.210001 73 + 74 GTO 05 75♦LBL "LD" 76 3 77 XEQ 09 78 9.07 79 + 80 GTO 05 81♦LBL "CD" 82 5 83 XEQ 09 84 10.14 85 + 86 GTO 05 87♦LBL "MM" 88 2 89 XEQ 09 90 5.31 91 + 92♦LBL 05 93 INT 94 CLA 95 FIX 0 96 CF 29 97 ARCL X 98 LASTX 99 FRC	Century year ad- justment
Z 10♦LBL "MD" 11 0 12 XEQ 09 13 5.14 14 + 15 GTO 05 16♦LBL "FD" 17 3 18 XEQ 09 19 6.21 20 + 21 GTO 05 22♦LBL "ED" 23 1 24 XEQ 09 25 11.08 26 + 27 GTO 05 28♦LBL "TG" 29 5 30 XEQ 09 31 11.28 32 + 33 GTO 05 34♦LBL 09 35 X<>Y 36 ENTER↑ 37 ENTER↑ 38 RDN 39 RDN 40 5 41 * 42 4 43 / 44 INT 45 + 46 X<>Y 47 1 E2 48 /	Get year Go to appropri- ate subroutine Mother's Day Father's Day Election Day Thanksgiving Day Main computation routine C=Number of centuries	Days to be sub- tracted Encore year Washington's Birthday Labor Day Columbus Day Memorial Day Output routine Prepare date for output	

Program Listings

100 1 E2		51	
101 *			
102 INT			
103 "I--"			
104 ARCL X			
105 LASTX			
106 FRC			
107 1 E4			
108 *			
109 RND		60	
110 "I--"			
111 ARCL X			
112 AVIEW			
113 SF 29			
114 FIX 4			
115 END			
20		70	
30		80	
40		90	
50		00	

REGISTERS, STATUS, FLAGS, ASSIGNMENTS

DATA REGISTERS				STATUS					
00		50		SIZE	000	TOT. REG.	37	USER MODE	
05		55		ENG	FIX	0,4	SCI	ON	OFF
10		60		DEG	RAD		GRAD		
FLAGS				#	INIT S/C	SET INDICATES	CLEAR INDICATES		
15		65		29		Digit separators	Separators omitted		
20		70							
25		75							
30		80							
35		85							
ASSIGNMENTS									
40		90			FUNCTION	KEY	FUNCTION	KEY	
45		95							

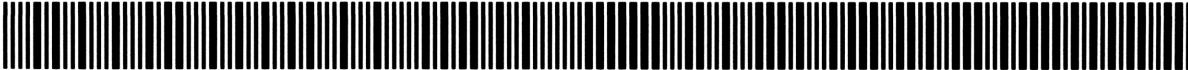
HOLIDAYS

PROGRAM REGISTERS NEEDED: 37

ROW 1 (1 : 2)



ROW 2 (2 : 7)



ROW 3 (7 : 10)



ROW 4 (11 : 16)



ROW 5 (16 : 20)



ROW 6 (21 : 25)



ROW 7 (25 : 28)



ROW 8 (29 : 34)



ROW 9 (35 : 47)



ROW 10 (47 : 56)



ROW 11 (57 : 65)



ROW 12 (66 : 71)



ROW 13 (72 : 75)



ROW 14 (75 : 79)



ROW 15 (80 : 84)



ROW 16 (84 : 87)



ROW 17 (88 : 95)



ROW 18 (95 : 103)



HOLIDAYS**HEWLETT PACKARD
SOLUTIONS BOOK
CALENDARS**

ROW 19 (103 : 110)



ROW 20 (110 : 115)



RELIGIOUS HOLIDAYS

This program calculates the dates of various holidays as listed below:

<u>CODE:</u>	<u>HOLIDAY:</u>
AW	ASH WEDNESDAY
FS	FIRST SUNDAY IN LENT
PA	PASSION SUNDAY
PM	PALM SUNDAY
GF	GOOD FRIDAY
RS	ROGATION SUNDAY
AD	ASCENSION DAY
WS	WHITSUNDAY
TS	TRINITY SUNDAY
EA	EASTER

Easter falls on the first Sunday following the arbitrary Paschal Full Moon, which does not necessarily coincide with a real or astronomical full moon. The Golden Number is calculated by adding 1 to the remainder obtained by dividing the year by 19. The Paschal Full Moon is determined by applying the Golden Number to the following table:

Golden Number	Golden Date								
1	Apr 14	5	Mar 31	9	Apr 16	13	Apr 2	17	Apr 17
2	Apr 3	6	Apr 18	10	Apr 5	14	Mar 22	18	Apr 7
3	Mar 23	7	Apr 8	11	Mar 25	15	Apr 10	19	Mar 27
4	Apr 11	8	Mar 28	12	Apr 13	16	Mar 30		

If the Paschal Full Moon falls on a Sunday, Easter is on the following Sunday. The earliest Easter can fall is March 23rd and the latest is April 25th. Ash Wednesday and the other religious holidays are determined by specific number of days from Easter. This program is good for the 200-year period of March 1, 1900 through February 28, 2100.

Example 1:

Determine when Easter occurs during the year of 1980?

Keystrokes:

[XEQ] [ALPHA] SIZE [ALPHA] 012
[XEQ] [ALPHA] RL [ALPHA]
1980 [R/S]
EA [R/S]

Display:

YR?
HOL?
5. (Golden Number)
4.061980 (Apr. 6, 1980)

Example 2:

Determine when Whitsunday occurred in 1968?

Keystrokes:

[XEQ] [ALPHA] RL [ALPHA]
1968 [R/S]
WS [R/S]

Display:

YR?
HOL?
12. (Golden Number)
6.021968 (June 2, 1968)

User Instructions

Program Listings

01♦LBL "RL"	Initialization and input of variables	48 .4	
02 365.25		49 X<>Y	"Packed
03 STO 10		50 X=Y?	
04 30.6001		51 GTO 02	
05 STO 11		52 .6	
06 122.1		53 X=Y?	Register to find
07 STO 05		54 GTO 03	Paschal Full
08 241302.2		55 1	Moon
1		56 GTO 05	
09 STO 00		57♦LBL 00	
10 10281807		58 1 E8	
.26		59 GTO 05	
11 STO 01		60♦LBL 01	
12 15042312		61 1 E6	
.01		62 GTO 05	
13 STO 02		63♦LBL 02	
14 20092717		64 1 E4	
.06		65 GTO 05	
15 STO 03	Determine Golden number and display	66♦LBL 03	
16 "YR?"		67 1 E2	
17 PROMPT		68♦LBL 05	
18 STO 09		69 RCL IND	
19 "HOL?"		06	
20 AON		70 X<>Y	
21 PROMPT		71 /	
22 AOFF		72 FRC	
23 RCL 10		73 1 E2	
24 *		74 *	
25 INT		75 INT	Determine
26 143		76 ST+ 04	following Sunday
27 +		77 RCL 04	
28 STO 04		78 5	
29 RCL 09		79 +	
30 19		80 7	
31 MOD		81 MOD	
32 1		82 FIX 0	
33 +		83 RND	
34 FIX 0		84 7	
35 PSE		85 -	
36 5		86 ST- 04	
37 /		87 ASTO X	
38 FIX 1	Select appropriate packed register	88 GTO IND	
39 RND		X	Go to Holiday
40 STO 06		89♦LBL "AW"	
41 FRC		90 -46	Ash Wednesday
42 X=0?		91 GTO 04	
43 GTO 00		92♦LBL "FS"	First Sunday in Lent
44 .2		93 -42	
45 X<>Y		94 GTO 04	
46 X=Y?		95♦LBL "PA"	Passion Sunday
47 GTO 01	Deciphering	96 -14	

Program Listings

97 GTO 04		148 -	
98♦LBL "PM"	Palm Sunday	149 -	
99 -7		150 RCL 07	
100 GTO 04		151 14	
101♦LBL "GF"	Good Friday	152 /	
102 -2		153 INT	
103 GTO 04		154 ST+ 09	
104♦LBL "RS"	Rogation Sunday	155 12	
105 35		156 *	
106 GTO 04		157 -	
107♦LBL "AD"	Ascension Day	158 RCL 09	
108 39		159 1 E6	
109 GTO 04		160 /	
110♦LBL "WS"	Whitsunday	161 FIX 6	
111 49		162 +	
112 GTO 04		163 END	
113♦LBL "TS"	Trinity Sunday		
114 56			
115♦LBL 04			
116 ST+ 04	Easter		
117♦LBL "EA"			
118♦LBL 04			
119 RCL 04			
120 RCL 05			
121 -			
122 RCL 10	Decipher day number into Gregorian date		
123 /			
124 INT			
125 STO 09			
126 RCL 10			
127 *			
128 INT			
129 RCL 04			
130 -			
131 CHS			
132 STO 06			
133 RCL 11			
134 /			
135 INT			
136 STO 07			
137 RCL 06			
138 X<>Y			
139 RCL 11			
140 *			
141 INT			
142 -			
143 STO 08	Get and format output		
144 RCL 07			
145 1			
146 RCL 08			
147 %			

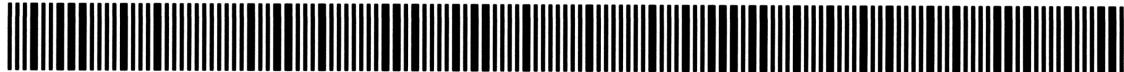
REGISTERS, STATUS, FLAGS, ASSIGNMENTS

RELIGIOUS HOLIDAYS**PROGRAM REGISTERS NEEDED: 49**

ROW 1 (1 : 3)



ROW 2 (4 : 6)



ROW 3 (7 : 10)



ROW 4 (10 : 12)



ROW 5 (12 : 14)



ROW 6 (14 : 17)



ROW 7 (18 : 26)



ROW 8 (26 : 35)



ROW 9 (36 : 45)



ROW 10 (46 : 54)



ROW 11 (54 : 61)



ROW 12 (61 : 67)



ROW 13 (68 : 76)



ROW 14 (77 : 87)



ROW 15 (87 : 91)



ROW 16 (91 : 95)



ROW 17 (95 : 98)



ROW 18 (98 : 101)



RELIGIOUS HOLIDAYS

ROW 19 (102 : 106)



ROW 20 (106 : 110)



ROW 21 (110 : 113)



ROW 22 (113 : 118)



ROW 23 (119 : 131)



ROW 24 (132 : 144)



ROW 25 (145 : 155)



ROW 26 (155 : 163)



ROW 27 (163 : 163)



CHINESE YEARS TO/FROM GREGORIAN YEARS

This program converts the cyclical two-character year designation of the Chinese Calendar to or from Gregorian years.

The Chinese year designation consists of two characters, the "most significant bit" called (千) and the "least significant bit" called (支). There are 10 (千)'s and 12 (支)'s which are represented here by consecutive numbers for computation purposes. The rule states that any odd number of Group One can associate with only the odd numbers of Group Two, and likewise even numbers can associate with only even numbers. This way, 60 possible combinations form one basic cycle of 60 years. Each cycle begins with the same year (甲子), or (1, 1) in the numeralized notations, or (R:1 C:1) in our machine notations, which falls in the years 1924 and $1924 + 60N$; where N is any integer. This program arbitrarily selects (N = -85) as the internal datum but displays 1924 (N = 0) externally as the first year and 1983 as the 60th year of the machine cycle. Actually, the machine cycle may be set to start with a year corresponding to any N. The fact that the sum of the two numbers for any year is always an even number provides us with a parity check. For example, the year 1975 falls in row 2 and column 4 (2+4=6), and the year is (R:2 C:4) or (乙卯).

	子 1	丑 2	寅 3	卯 4	辰 5	巳 6	午 7	未 8	申 9	酉 10	戌 11	亥 12
甲	1924		1974		1964		1954		1944		1934	
乙	2		1925		1975		1965		1955		1945	
丙	3	1936		1926		1976		1966		1956		1946
丁	4		1937		1927		1977		1967		1957	
戊	5	1948		1938		1928		1978		1968		1958
己	6		1949		1939		1929		1979		1969	
庚	7	1960		1950		1940		1930		1980		1970
辛	8		1961		1951		1941		1931		1981	
壬	9	1972		1962		1952		1942		1932		1982
癸	10		1973		1963		1953		1943		1933	1983

Example 1:

Convert the year 1956 to its Chinese equivalent.

Keystrokes:

[USER]
[XEQ] [ALPHA] SIZE [ALPHA] 009
[XEQ] [ALPHA] G-C [ALPHA]
1956 [R/S]

Display:

(Set USER mode)
YEAR ?
R:3 C:9 (Row 3, Column 9)

Example 2:

Convert the Chinese year Row-2 and Column 4 (乙卯) to Gregorian year.

Keystrokes:

[XEQ] [ALPHA] C-G [ALPHA]
2 [R/S]
4 [R/S]

Display:

ROW?
COLUMN?
1975

User Instructions

Program Listings

<pre> 01♦LBL "G-C " 02 FIX 0 03 CF 29 04 CLRG 05 -3176 06 STO 01 07 10 08 STO 02 09 12 10 STO 03 11 FS?C 05 12 RTN 13 "YEAR ?" 14 PROMPT 15 RCL 01 16 - 17 STO 05 18 RCL 05 19 RCL 02 20 / 21 INT 22 RCL 02 23 * 24 - 25 1 26 + 27 RCL 05 28 RCL 05 29 RCL 03 30 / 31 INT 32 RCL 03 33 * 34 - 35 1 36 + 37 " R:" 38 ARCL Y 39 "F C:" 40 ARCL X 41 AVIEW 42 STOP 43♦LBL "C-G " 44 SF 05 45 XEQ "G-C " 46 "ROW ?" 47 PROMPT 48 STO 06 </pre>		Initialization Prompt for year ΔY The most significant The least significant Display Initialize Prompt for row	<pre> 49 "COLUMN ?? 50 PROMPT 51 X>Y? 52 XEQ 00 53 STO 07 54 RCL 06 55 RCL 07 56 - 57 2 58 / 59 STO 08 60 FRC 61 0 62 X*Y? 63 GTO 01 64 RCL 08 65 RCL 03 66 * 67 RCL 07 68 + 69 1 70 - 71 1924 72 + 73 VIEW X 74 SF 29 75 FIX 4 76 RTN 77♦LBL C 78 60 79 + 80 RTN 81♦LBL D 82 60 83 - 84 RTN 85♦LBL 00 86 RCL 03 87 - 88 RTN 89♦LBL 01 90 "ILLEGAL DATE" 91 AVIEW 92 STOP 93 .END. </pre>	Prompt for column Parity check Compute years in excess of datum year 60, + 60, - Illegal date message
				00

REGISTERS, STATUS, FLAGS, ASSIGNMENTS

DATA REGISTERS				STATUS			
#	DATA	SIZE	FORMAT	STATUS		MODE	
				REG.	TYPE	ON	OFF
00	-3176	50		009	TOT. REG.	34	USER MODE
10				ENG	FIX	SCI	ON X OFF
12				DEG	RAD	GRAD	
USED							
Y							
05	Y, Y ₁	55					
	Y ₂ Y ₂						
USED							
USED							
10		60					
15		65					
20		70					
25		75					
30		80					
35		85					
40		90					
45		95					
ASSIGNMENTS							
				FUNCTION	KEY	FUNCTION	KEY

CHINESE YEARS TO/FROM
GREGORIAN YEARS
PROGRAM REGISTERS NEEDED: 26

ROW 1 (1 - 5)



ROW 2 (5 - 11)



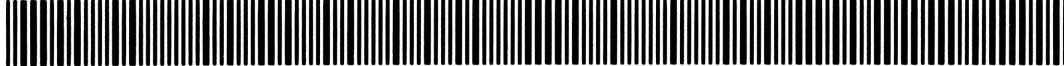
ROW 3 (12 - 18)



ROW 4 (19 - 31)



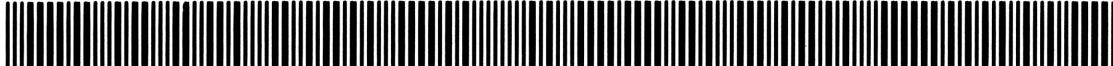
ROW 5 (32 - 39)



ROW 6 (39 - 43)



ROW 7 (43 - 46)



ROW 8 (46 - 49)



ROW 9 (49 - 59)



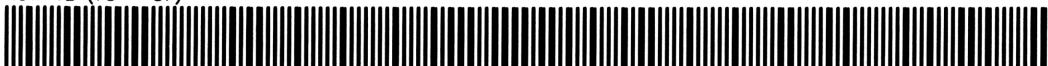
ROW 10 (60 - 71)



ROW 11 (71 - 77)



ROW 12 (78 - 87)



ROW 13 (88 - 90)



ROW 14 (90 - 93)



NEW MOON AND FULL MOON DAY OF MONTH

This program follows an empirical algorithm published in one issue of the amateur astronomers monthly, SKY & TELESCOPE. The author of the article, O.L. Harvey claims, "By testing hundreds of dates across the interval from 1001 B.C. to A.D. 2003, I found that about half the answers obtained with this device agree exactly with the day of new moon, and about half are off by one day. A very small number (two percent in my sample) are two days in error." Mr. Harvey developed a three part table based on repeating patterns in an enormous data source and on averages of date differences. An entry point was calculated for the first part, the resultant was the entry point for the second part. A calculated difference on the second part produced a number. The month provided the key for the third part of the table. These numbers are combined with other calculations to determine the day of month. Mr. Vanderburgh devised an HP-65 program to calculate the entry points and when used with the table and additional inputs would complete the calculations for the day of month.

This program uniquely incorporates that table into the registers and selects the appropriate numbers to perform the complete calculations for day of month.

This program also requires an additional memory module.

Example 1:

Determine the date of the new moon in November, 1979.

Keystrokes:

```
[XEQ] [ALPHA] SIZE [ALPHA] 026
[XEQ] [ALPHA] MOONS [ALPHA]
N [R/S]
11.1979 [R/S]
```

Display:

```
N OR F MOON?
MM.YYYY ?
11-18-1979
```

Example 2:

Find the date of the full moon in January of 1956.

Keystrokes:

```
[XEQ] [ALPHA] MOON [ALPHA]
F [R/S]
1.1956 [R/S]
```

Display:

```
N OR F MOON?
MM.YYYY ?
1-27-1956
```


Program Listings

01♦LBL "M00 NS" 02 .0925102 612 03 STO 00 04 .2813291 501 05 STO 01 06 .1703190 420 07 STO 02 08 .0622072 3 09 STO 03 10 .1113000 2 11 STO 04 12 .0204040 6 13 STO 05 14 .0708091 0 15 STO 06 16 .301020 17 STO 10 18 .112101 19 STO 11 20 .220212 21 STO 12 22 .031323 23 STO 13 24 .142404 25 STO 14 26 .250515 27 STO 15 28 .061626 29 STO 16 30 .172707 31 STO 17 32 .280818 33 STO 18 34 .091929 35 STO 19 36♦LBL "M00 N" 37 "F" 38 ASTO Y 39 "N OR F MOON?" 40 RDN 41 PROMPT	Initialization New or full moon prompt	42 R0FF 43 ASTO X 44 X=Y? 45 SF 05 46 "MM.YYYY ?" 47 PROMPT 48 CLA 49 FIX 4 50 INT 51 STO 20 52 LASTX 53 FRC 54 STO 22 55 1 E4 56 * 57 STO 21 58 2 59 RCL 20 60 X<=Y? 61 DSE 21 62♦LBL 00 63 RCL 21 64♦LBL 01 65 0 66 STO 07 67 1582 68 RCL 21 69 X<=Y? 70 GTO 03 71 13 72 STO 07 73 1900 74 STO 23 75♦LBL 02 76 RCL 21 77 RCL 23 78 X<=Y? 79 GTO 03 80 1 E2 81 - 82 STO 23 83 1 84 ST- 07 85 GTO 02 86♦LBL 03 87 RCL 21 88 4712 89 + 90 76 91 /	Prompt for year Check for Jan. or Feb. Check for year before 1582 Check for year after 1582 Calculate Julian year
--	---	--	---

Program Listings

92 INT		143 2	
93 STO 23		144 ST+ 09	
94 LASTX		145 XEQ 09	
95 FRC		146♦LBL 08	
96 76		147 RCL 25	
97 *		148 RCL 08	Count down in table L by difference
98 RND		149 -	
99 4		150 10	
100 /		151 X>Y?	
101 INT		152 GTO 06	
102 STO 24	Entry point to table R	153 RDN	
103 LASTX		154 STO 25	
104 FRC		155♦LBL 07	
105 4		156 XEQ 09	
106 *		157 ST+ 07	Number from table L
107 STO 08		158 RCL 20	
108 RCL 23	Difference in table L	159 1	
109 4		160 -	
110 /		161 4	
111 INT		162 /	
112 ST- 07		163 4	
113 RCL 24		164 +	
114 5		165 STO 25	
115 /		166 FRC	
116 STO 25		167 8	
117 FRC		168 *	
118 10		169 STO 09	
119 *		170 XEQ 09	
120 STO 09		171 ST- 07	
121 XEQ 09	Number from table R	172 FS?C 05	Number from table M
122 STO 24		173 XEQ 05	
123 10		174 RCL 07	
124 /		175 30	
125 FRC		176 X<=Y?	Check date for range 0 and 30
126 10		177 -	
127 *		178 0	
128 LASTX		179 RCL 07	
129 +		180 X>Y?	
130 STO 25		181 GTO 04	
131 0		182 30	
132 STO 09		183 RCL 07	
133 XEQ 09		184 +	
134 RCL 24		185 GTO 04	
135 X=Y?	Search for number from table R in table L	186♦LBL 09	
136 GTO 08		187 RCL 09	Obtain appro- priate number from selected register
137 2		188 10↑X	
138 ST+ 09		189 RCL IND	
139 XEQ 09		25	
140 RCL 24		190 *	
141 X=Y?		191 FRC	
142 GTO 08		192 1 E2	

Program Listings

193 *		51	
194 INT			
195 RTN			
196♦LBL 06			
197 +	Check for re-		
198 STO 25	turn to table L		
199 5			
200 RCL 09			
201 2		60	
202 +			
203 X>Y?			
204 0			
205 STO 09			
206 GTO 07			
207♦LBL 04			
208 1 E2			
209 /			
210 RCL 22	Put output into		
211 LASTX	proper display		
212 /	format:		
213 +	MM-DD-YYYY	70	
214 RCL 20			
215 +			
216 FIX 0			
217 CF 29			
218 INT			
219 ARCL X			
220 "F--"			
221 LASTX			
222 FRC			
223 1 E2		80	
224 *			
225 INT			
226 ARCL X			
227 "F--"			
228 LASTX			
229 FRC			
230 1 E4			
231 *			
232 ARCL X			
233 AVIEW		90	
234 RTN			
235♦LBL 05			
236 15			
237 ST+ 07			
238 RTN			
239 .END.			
50		00	

REGISTERS, STATUS, FLAGS, ASSIGNMENTS

NEW MOON AND FULL MOON
DAY OF MONTH
PROGRAM REGISTERS NEEDED: 73

ROW 1 (1 - 2)



ROW 2 (2 - 4)



ROW 3 (4 - 6)



ROW 4 (6 - 8)



ROW 5 (8 - 11)



ROW 6 (12 - 14)



ROW 7 (14 - 16)



ROW 8 (16 - 20)



ROW 9 (20 - 23)



ROW 10 (24 - 26)



ROW 11 (26 - 30)



ROW 12 (30 - 32)



ROW 13 (32 - 35)



ROW 14 (36 - 39)



ROW 15 (39 - 40)



ROW 16 (41 - 46)



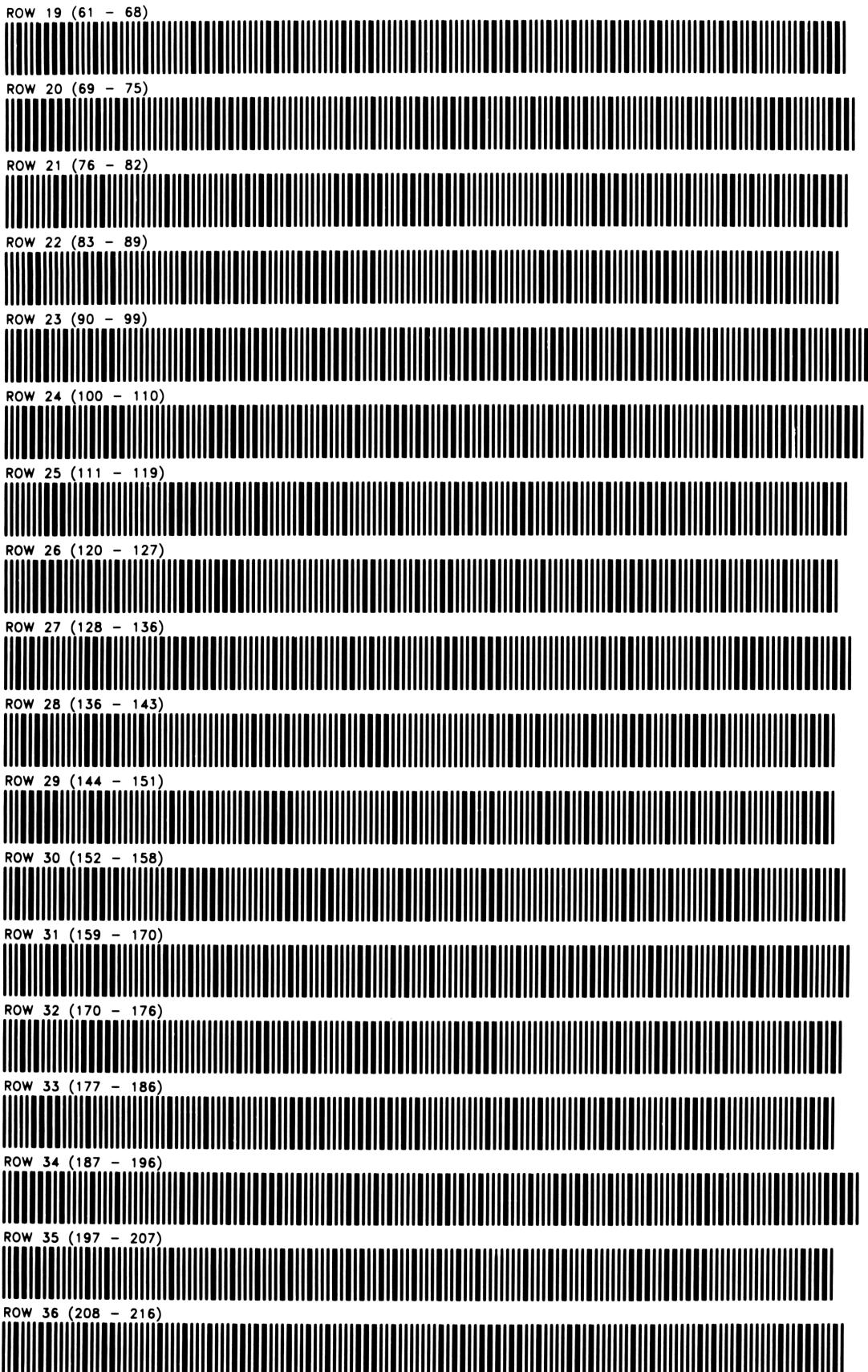
ROW 17 (46 - 53)



ROW 18 (54 - 61)



NEW MOON AND FULL MOON
DAY OF MONTH



NEW MOON AND FULL MOON
DAY OF MONTH

ROW 37 (216 - 223)



ROW 38 (223 - 230)



ROW 39 (231 - 239)



ROW 40 (239 - 239)



CALENDAR PRINTOUT

This program will printout a calendar for any valid Gregorian year between March, 1900 and February, 2100. This program requires a printer and two memory modules.

NOTE: If any discrepancy is noticed, see the reference for further details.

REFERENCE: O'Neil, W. M., Time and the Calendars, Sydney Univ. Press, Australia, 1975.

Example 1:

Print a calendar for the months June, July and August of the year 1976.

Keystrokes:

```
[XEQ] [ALPHA] SIZE [ALPHA] 043
[XEQ] [ALPHA] INIT [ALPHA]
1976 [R/S]
6 [R/S]
3 [R/S]
```

Display:

```
YEAR ?
START. MONTH?
NO. OF MON. ?
```

JUNE 1976						
S	M	T	W	T	F	S
				1	2	3
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

(Printout)

JULY 1976						
S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

AUGUST 1976						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Example 2:

Print the calendar for the first 4 months of the year 1980.

Keystrokes:

[XEQ] [ALPHA] CAL [ALPHA]
1980 [R/S]
1 [R/S]
4 [R/S]

Display:

YEAR?
START. MONTH?
NO. OF MON.?

(Print Out)

JANUARY
1980
S M T W T F S
1 2 3 4 5
6 7 8 9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30 31

FEBRUARY
1980
S M T W T F S
1 2
3 4 5 6 7 8 9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29

MARCH
1980
S M T W T F S
1
2 3 4 5 6 7 8
9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29
30 31

APRIL
1980
S M T W T F S
1 2 3 4 5
6 7 8 9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30

Program Listings

01♦LBL "INI T" 02 CF 00 03 SF 21 04 1.031 05 STO 00 06♦LBL 00 07 9 08 RCL 00 09 INT 10 X<=Y? 11 " 12 FIX 0 13 CF 29 14 ARCL X 15 ASTO IND X 16 CLA 17 ISG 00 18 GTO 00 19 0 20 STO 00 21 722923 22 STO 40 23 722892 24 STO 41 25 GTO "CAL " 26♦LBL 16 27 RCL 33 28 1 29 - 30 1 E3 31 / 32 1 33 + 34 0 35 ENTER↑ 36 32 37 BLDSPEC 38 CLA 39 ARCL X 40 "F " 41 ASTO X 42 CLA 43♦LBL 14 44 ARCL X 45 ISG Y 46 GTO 14 47 0 48 ENTER↑	Initialize flags & registers Routine to build and print the lines in the calendar Get value for DOW of 1st day Loop to blank - fill portion of first line	49 32 50 BLDSPEC 51 8 52 RCL 33 53 - 54 1 E3 55 / 56 1 57 + 58♦LBL 13 59 ARCL Y 60 ARCL IND X 61 ISG X 62 GTO 13 63 ARCL Y 64 ACA 65 ADV 66 9 67 RCL 33 68 - 69 ENTER↑ 70 ENTER↑ 71 ENTER↑ 72 ? 73 MOD 74 X=0? 75 SF 00 76 FS? 00 77 + 78 FS?C 00 79 ? 80 RCL 34 81 - 82 CHS 83 1 84 + 85 ? 86 / 87 INT 88 ? 89 * 90 .07 91 + 92 1 E3 93 / 94 + 95 STO 00 96♦LBL 23 97 RCL 00	Loop to complete first line of the calendar Print line of calendar End of the line? If so, move to next line of calendar Otherwise, cont. with same line. Build & print middle lines
--	--	--	---

Program Listings

98 INT		146 RCL 35	
99 ENTER↑	of the calendar	147 -	
100 ENTER↑		148 1 E3	
101 6		149 /	
102 +		150 1	
103 1 E3		151 +	
104 /		152♦LBL 18	
105 +		153 ARCL Y	Loop to fill in
106 0		154 " " "	blanks at end of
107 ENTER↑		155 ISG X	last line
108 32		156 GTO 18	
109 BLDSPEC		157 0	
110 CLA		158 ENTER↑	
111♦LBL 22		159 32	
112 ARCL X		160 BLDSPEC	
113 ARCL IND	Loop to build	161 ARCL X	
Y	the middle lines	162 ACA	
114 ISG Y		163 ADV	
115 GTO 22		164 RTN	
116 ARCL X		165♦LBL 29	
117 ACA	Print the line	166 RCL 37	Subroutine to
118 ADV		167 RCL 36	compute the
119 ISG 00		168 1	day of week
120 GTO 23		169 +	of the first
121 RCL 34		170 ENTER↑	day of the
122 RCL 00		171 1/X	month and the
123 INT		172 .7	Julian day
124 X>Y?		173 +	
125 RTN		174 CHS	
126 ENTER↑		175 INT	
127 ENTER↑		176 ST+ 37	
128 RCL 35		177 12	
129 +		178 *	
130 1		179 -	
131 -		180 30.6001	
132 1 E3		181 *	
133 /		182 INT	
134 +		183 RCL 37	
135 0		184 365.25	
136 ENTER↑		185 *	
137 32		186 INT	
138 BLDSPEC		187 +	
139 CLA		188 STO 40	
140♦LBL 20		189 7	
141 ARCL X	Loop to build	190 MOD	
142 ARCL IND	last line	191 X=0?	
Y		192 7	
143 ISG Y		193 RTN	
144 GTO 20		194♦LBL "CAL	
145 7		"	

Program Listings

195 "YEAR ?"	Prompt for year	242 "M"	
196 PROMPT		243 ACA	
197 STO 38		244 SKPCOL	
198 "START. MONTH?"		245 "T"	
199 PROMPT		246 ACA	
200 ENTER↑		247 SKPCOL	
201 ENTER↑		248 "W"	
202 "NO. OF MON. ?"	Ask for how many months to print	249 ACA	
203 PROMPT		250 SKPCOL	
204 +		251 "T"	
205 1		252 ACA	
206 -		253 SKPCOL	
207 .001		254 "F"	
208 *		255 ACA	
209 +		256 SKPCOL	
210 STO 42		257 "S"	
211♦LBL 15	Set up counter	258 ACA	
212 RCL 42		259 2	
213 INT		260 SKPCOL	
214 STO 36		261 ADV	
215 RCL 38		262 CF 12	
216 STO 37		263 XEQ 16	Print the calendar
217 XEQ 29		264 ADV	
218 STO 33	DOW of 1st day	265 ADV	
219 RCL 40	of month	266 RCL 42	
220 STO 41	Save Julian	267 INT	
221 1	day	268 12	
222 ST+ 36		269 X=Y?	
223 RCL 38		270 XEQ 30	
224 STO 37		271 ISG 42	
225 XEQ 29		272 GTO 15	
226 1		273 RTN	
227 -		274♦LBL 01	
228 STO 35	DOW of last day	275 " JANU	
229 RCL 40	of month	ARY"	
230 RCL 41		276 AVIEW	
231 -	# days in the	277 RTN	
232 STO 34	month	278♦LBL 02	
233 SF 12		279 " FEBR	
234 XEQ IND		UARY"	
42	Print month name	280 AVIEW	
235 " "		281 RTN	
236 ARCL 38	Print the year	282♦LBL 03	
237 AVIEW		283 " MAR	
238 "S"		CH"	
239 ACA		284 AVIEW	
240 4	Print DOW labels	285 RTN	
241 SKPCOL		286♦LBL 04	
		287 " APR	
		IL"	
		288 AVIEW	

Program Listings

289 RTN		
290♦LBL 05		
291 " MA		
Y"		
292 AVIEW		
293 RTN		
294♦LBL 06		
295 " JU		
NE"		
296 AVIEW		
297 RTN		
298♦LBL 07		
299 " JU		
LY"		
300 AVIEW		
301 RTN		
302♦LBL 08		
303 " AUG		
UST"		
304 AVIEW		
305 RTN		
306♦LBL 09		
307 " SEPT		
MBER"		
308 AVIEW		
309 RTN		
310♦LBL 11		
311 " NOVEM		
BER"		
312 AVIEW		
313 RTN		
314♦LBL 10		
315 " OCTO		
BER"		
316 AVIEW		
317 RTN		
318♦LBL 12		
319 " DECEM		
BER"		
320 AVIEW		
321 RTN		
322♦LBL 30		
323 1	Increment the	
324 ST+ 38	year	
325 12		
326 ST- 42	Set the month	
327 .001	# to 1	
328 *		
329 ST- 42	Fix pointer in	
330 RTN	R42	
331 .END.		

REGISTERS, STATUS, FLAGS, ASSIGNMENTS

DATA REGISTERS			STATUS				
			SIZE	TOT. REG.	USER MODE		
			ENG	FIX	SCI	ON	OFF X
			DEG	RAD	GRAD		
00	USED FOR LOOP COUNTER	50					
" 1"							
" 2"							
" 3"							
" 4"							
05	" 5"	55					
" 6"							
" 7"							
" 8"			00	C	Go to next cal row	Stay on same row	
" 9"			12		Print double wide	Print single width	
10	"10"	60	21	S	Printer enable	Printer disable	
"11"			29	C	Radix point	No radix point	
"12"							
"13"							
"14"							
15	"15"	65					
"16"							
"17"							
"18"							
"19"							
20	"20"	70					
"21"							
"22"							
"23"							
"24"							
25	"25"	75					
"26"							
"27"							
"28"							
"29"							
30	"30"	80					
"31"							
USED							
DOW OF 1st OF MONTH							
# DAYS IN MONTH							
35 DOW OF LAST DAY OF MONTH	85						
FIRST MONTH							
YEAR			ASSIGNMENTS				
YEAR			FUNCTION	KEY	FUNCTION	KEY	
USED							
40 JULIAN DAY #1	90						
JULIAN DAY #2							
MONTH NUMBER							
45	95						

CALENDAR PRINTOUT

PROGRAM REGISTERS NEEDED: 99

ROW 1 (1 : 4)



ROW 2 (4 : 12)



ROW 3 (12 : 19)



ROW 4 (20 : 23)



ROW 5 (23 : 27)



ROW 6 (28 : 37)



ROW 7 (37 : 44)



ROW 8 (44 : 52)



ROW 9 (52 : 60)



ROW 10 (61 : 68)



ROW 11 (69 : 78)



ROW 12 (79 : 90)



ROW 13 (90 : 98)



ROW 14 (99 : 108)



ROW 15 (109 : 115)



ROW 16 (115 : 121)



ROW 17 (122 : 132)



ROW 18 (132 : 141)



CALENDAR PRINTOUT

ROW 19 (141 : 148)



ROW 20 (148 : 154)



ROW 21 (155 : 161)



ROW 22 (162 : 170)



ROW 23 (171 : 180)



ROW 24 (180 : 184)



ROW 25 (184 : 193)



ROW 26 (194 : 195)



ROW 27 (195 : 198)



ROW 28 (198 : 202)



ROW 29 (202 : 206)



ROW 30 (207 : 213)



ROW 31 (214 : 219)



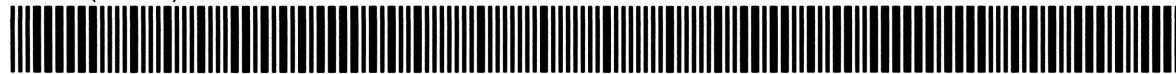
ROW 32 (220 : 226)



ROW 33 (227 : 234)



ROW 34 (234 : 239)



ROW 35 (239 : 246)

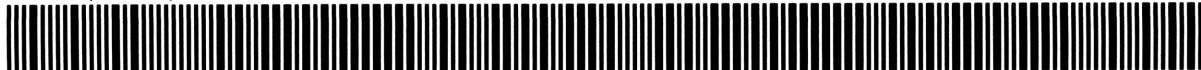


ROW 36 (246 : 252)



CALENDAR PRINTOUT

ROW 37 (253 : 259)



ROW 38 (260 : 267)



ROW 39 (268 : 274)



ROW 40 (275 : 277)



ROW 41 (278 : 279)



ROW 42 (280 : 283)



ROW 43 (284 : 287)



ROW 44 (288 : 292)



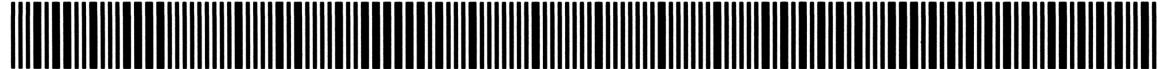
ROW 45 (293 : 296)



ROW 46 (297 : 300)



ROW 47 (301 : 303)



ROW 48 (304 : 307)



ROW 49 (307 : 311)



ROW 50 (311 : 315)



ROW 51 (315 : 319)



ROW 52 (319 : 325)



ROW 53 (325 : 331)



ROW 54 (331 : 331)



Hewlett-Packard Software

In terms of power and flexibility, the problem-solving potential of the HP-41 programmable calculator is nearly limitless. And in order to see the practical side of this potential, HP has different types of software to help save you time and programming effort. Every one of our software solutions has been carefully selected to effectively increase your problem-solving potential. Chances are, we already have the solutions you're looking for.

Application Pacs

To increase the versatility of your HP-41, HP has an extensive library of "Application Pacs". These programs transform your HP-41 into a specialized calculator in seconds. Included in these pac's are detailed manuals with examples, miniature plug-in Application Modules, and keyboard overlays. Every Application Pac has been designed to extend the capabilities of the HP-41.

You can choose from:

Aviation (Pre-Flight Only) 00041-15018	Statistics 00041-15002
Clinical Lab 00041-15024	Stress Analysis 00041-15027
Circuit Analysis 00041-15024	Games 00041-15022
Financial Decisions 00041-15004	Home Management 00041-15023
Mathematics 00041-15003	Machine Design 00041-15020
Structural Analysis 00041-15021	Navigation 00041-15017
Surveying 00041-15005	Real Estate 00041-15016
Securities 00041-15026	Thermal and Transport Science 00041-15019
	Petroleum Fluids 00041-15039

Users' Library

The Users' Library provides the best programs from contributors and makes them available to you. By subscribing to the HP-41 Users' Library you'll have at your fingertips literally hundreds of different programs from many different application areas.

***Users' Library Solutions Books**

Hewlett-Packard offers a wide selection of Solutions Books complete with user instructions, examples, and listings. These solution books will complement our other software offerings and provide you with a valuable tool for program solutions.

You can choose from:

Business Stat/Marketing/Sales 00041-90094	Civil Engineering 00041-90089
Home Construction Estimating 00041-90096	Heating, Ventilating & Air Conditioning 00041-90140
Lending, Saving and Leasing 00041-90086	Mechanical Engineering 00041-90090
Real Estate 00041-90136	Solar Engineering 00041-90138
Small Business 00041-90137	Calendars 00041-90145
Geometry 00041-90084	Cardiac/Pulmonary 00041-90097
High-Level Math 00041-90083	Chemistry 00041-90102
Test Statistics 00041-90082	Games 00041-90099
Antennas 00041-90093	Optometry I (General) 00041-90143
Chemical Engineering 00041-90100	Optometry II (Contact Lens) 00041-90144
Control Systems 00041-90092	Physics 00041-90142
Electrical Engineering 00041-90088	Surveying 00041-90141
Fluid Dynamics and Hydraulics 00041-90139	Time Module Solutions 00041-90395
Games II 00041-90443	

*Some books require additional memory modules to accomodate all programs.

CALENDARS

CALENDAR DATE/JULIAN DATE CONVERSIONS
DAY OF YEAR - DAY OF WEEK
NUMBER OF WEEKDAYS BETWEEN TWO DATES
IN WHAT YEAR IS A GIVEN DATE AN M-DAY?
NUMBER OF M-DAYS BETWEEN TWO DATES, AND THE N-TH M-DAY
OF THE MONTH
HOLIDAYS
RELIGIOUS HOLIDAYS
CHINESE YEARS TO/FROM GREGORIAN YEARS
NEW MOON AND FULL MOON DAY OF MONTH
CALENDAR PRINTOUT

