SPORTY'S E6B
ELECTRONIC FLIGHT COMPUTER SOFTWARE

Sporty's E6B Flight Computer software is designed to perform 23 aviation functions and 14 standard conversions, and includes timer and clock functions. This manual is designed to offer an introduction to the operation of the E6B software. For each calculation, a sample problem has been given.

We hope that you enjoy your Sporty's E6B Flight Computer software. Its use has been made easy through direct path menu selection and calculation prompting. As you will soon learn, it is one of the most useful and versatile of all aviation computers.

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The figure above shows the main menu. To choose a function, press the appropriate button with the stylus pen. The display will change to the function showing the values to be entered at the top, the calculated values shown below the line and the entry keypad (shown below) at the bottom of the screen.

Your E6B software performs all of the basic arithmetic functions with the keys shown above (addition, subtraction, multiplication, and division). These functions, as well as any conversions, can be performed at any time while performing an aviation function. The E6B software will display up to eight digits of the answer. The button should be used to compute any arithmetic function.
AVIATION FUNCTIONS

The aviation functions are displayed on the main menu. Your E6B software will automatically save computed values from one aviation function to another. To override this option, key in the new value when prompted. The E6B software will save true airspeed, groundspeed, time, and fuel per hour calculations. It will also save cumulative weight and balance totals.

PROMPTS AND LABELS

| WT:    | Weight                                      | I°C:   | Indicated Temperature in Celsius |
| W SPD: | Wind Speed                                  | MOM:   | Moment                           |
| RWY:   | Runway                                      | CG:    | Center of Gravity                |
| X-WIND:| Crosswind                                   | GS:    | Groundspeed                      |
| H-WIND:| Headwind                                    | HDG:   | Heading                          |
| W DIR: | Wind Direction                              | P ALT: | Pressure Altitude                |
| ARM:   | Arm                                          | T°C:   | Temperature in Celsius           |
| CAS:   | Calibrated Airspeed                         | CRS:   | Course                           |
| TAS:   | True Airspeed                               | RF:    | Reduction Factor                 |
| MACH#: | Mach Number                                 | GW:    | Gross Weight                     |
| D ALT: | Density Altitude or Desired Altitude        | DIST:  | Distance                         |
| %MAC:  | Percent Mean Aerodynamic Chord              | HOME:  | Home Time Clock Label            |
| FPH:   | Fuel Per Hour                               | TIME:  | Time                             |
| I ALT: | Indicated Altitude                          | MAC:   | Mean Aerodynamic Chord           |
| FUEL:  | Fuel                                        | LOCAL: | Local Time Clock Label           |
| °C:    | Temperature in Celsius Label                | FEET:  | Feet                             |
NAUT: Nautical       CONV: Conversion Function
RGR: Required Gradient Rate       MROC: Minimum Rate of Climb
CRALT: Crossing Altitude       FXDIS: Fix Distance
RQ/DN: Required Descent Rate       SPRNG: Specific Range
RATE: Descent Rate       T-DSC: Top of Descent
LEMAC: Leading Edge Mean Aerodynamic Chord
ZULU: Coordinated Universal Time Clock Label
BARO: Altimeter Setting in Inches in Mercury (Barometer)

SPECIAL FUNCTION KEYS

Clk/Tmr       Displays clocks and timer.
Main       Returns to main menu.
Conv       Converts the value between units of measurement.
Timer       Imports current value from timer onto current number entry line.
Ent       Accepts the entered number.
=       Totals calculator functions.
←       Deletes last digit entered.
C       Clears current number entry line.
△ ▼       Moves cursor between number entry lines.
+/−       Changes a positive value to a negative and a negative value to a positive. A negative number will be denoted with a minus sign in front of the number.
CONVERSIONS

Conversions may be made at any time during any function. For example, if a calculation prompts for the temperature in Celsius and only 68° Fahrenheit is available, enter 68 as the value, press Conv, press F ➞ C. 20.00 will be displayed on the top line. Press Return to accept this value and return to the calculation. Conversions can be calculated for:

- Nautical Miles ➞ Statute Miles
- Nautical Miles ➞ Kilometers
- Nautical Miles ➞ Statute Miles
- Feet ➞ Meters
- Kilometers ➞ Statute Miles
- Meters ➞ Feet
- Kilometers ➞ Statute Miles
- Pounds ➞ Kilograms
- Kilometers ➞ Statute Miles
- Kilograms ➞ Pounds
- Gallons ➞ Liters
- Liters ➞ Gallons
- Fahrenheit ➞ Celsius
- Celsius ➞ Fahrenheit
- Hours ➞ Hours, Minutes, Seconds
- Hours, Minutes, Seconds ➞ Hours

There are no conversion keys for kilometers to statute miles or statute miles to kilometers. To convert from kilometers to statute miles, first convert kilometers to nautical miles, then nautical miles to statute miles. To convert statute miles to kilometers, first convert from statute miles to nautical miles, then nautical miles to kilometers.

CLOCKS AND TIMER

The E6B software has three clocks that run simultaneously. They are labeled as Zulu, Home and Local. The independent timer is below the clocks. To display, press Clk/Tmr.

To set 11:25:00 on Zulu clock, tap ➞ under the hour position until 11 is displayed. Tap ➞ under the minutes position until 25 is displayed. Press Set to start the clock. This also synchronizes the minutes and seconds of the Home and Local clocks with the Zulu clock.

Set the hours for the Home and Local clocks using ➞, then synchronize the minutes and seconds by tapping Set on the Zulu clock.

A time can be entered in the timer by using ➞. To activate the timer, tap Up to start the timer counting up or tap Down to start counting down. Stop pauses the timer. Reset returns the timer to 0:00:00. An indicator to the right of the timer indicates if the timer is counting up ( ) or counting down ( ). ➞ indicates the timer is stopped.

Next to this indicator is a + or -. When the timer is counting down and reaches 0:00:00, this changes from + to - to show the timer is now counting how much time has passed since reaching zero. The count down timer can be used as a reminder when to switch fuel tanks, to fly a non-precision approach (LEG TIME function) or measuring groundspeed from one checkpoint to another checkpoint (GS).

Any function requiring time to be entered, the timer may be used by tapping Timer, Ent when prompted for time.
ADDING AND SUBTRACTING TIME

Time can be entered into the E6B software in either hours or hours, minutes and seconds. To enter in hours, simply key in a normal decimal number. For example, entering 2.75 hours is the same as entering 02:45:00.

To key in time in hours, minutes and seconds mode, the \( \text{:} \) must be used. For example, to enter 3 hours, 14 minutes and 25 seconds, tap 3, \( \text{:} \), 1, 4, \( \text{:} \), 2, 5. The display will read 3:14:25.

To key in 5 minutes even, the leading zeroes must be used: tap 0, \( \text{:} \), 0, 5. The display will read 0:05.

Time can be added in either mode; times from different modes can also be added without converting. For example, to add 3.45 hours and 2:45:00:

Enter in 3.45 and tap \( + \)

Enter in 2:45 and tap \( = \)

The display will read 6.2. Answers will always appear in hours. Use the conversion function \( \text{H} \rightarrow \text{HMS} \) to change to hours, minutes and seconds. The display will read 6:12:00.

PERCENT MAC

(\%MAC)

This function computes the center of gravity in terms of percentage of mean aerodynamic chord, or the percentage distance of the center of gravity from the average distance between the leading edge to the trailing edge of the wing. In this example, leading edge mean aerodynamic chord (LEMAC) is 22.29, the CG is 37.27, and the mean aerodynamic chord (MAC) is 61.4.

Tap \( \text{%MAC} \) from the main menu. The display will prompt for LEMAC. Key in 22.29 and press \( \text{Ent} \).

The display will prompt for CG. Key in 37.27 and press \( \text{Ent} \).

The display will prompt for MAC. Key in 61.4 and press \( \text{Ent} \).

The display will read:
The total for %MAC should be checked against the aircraft’s approved operating limits.

PRESSURE AND DENSITY ALTITUDE (P-D/ALT)

This function will compute the pressure and density altitude given the indicated altitude, barometric pressure (altimeter setting in inches of Mercury), and temperature in Celsius. In this example, indicated altitude is 10,000 feet, the barometer is 29.94 inches, and the temperature is 5°C.

Tap P-D/ALT from the main menu. The display will prompt for IAlt. Key in 10000 and press Ent. The display will prompt for BARO. Key in 29.94 and press Ent. The display will prompt for T°C. Key in 5 and press Ent.

The display will read:

IAlt 10000
BARO 29.94
T°C 5
PAAlt 9980
DAAlt 11088

FLIGHT PLAN TRUE AIRSPEED (PLAN TAS)

This function is used to calculate true airspeed for preflight planning. It will compute the density altitude, mach number and true airspeed in knots, given the pressure altitude, temperature, and calibrated airspeed in knots. In this example, pressure altitude is 10,000 feet, temperature is 2°C, and CAS is 200 knots.

Tap PLAN TAS from the main menu. The display will prompt for PAAlt. Key in 10000 and press Ent. The display will prompt for T°C. Key in 2 and press Ent.
The display will prompt for **CAS**. Key in **200** and press \( \text{Ent} \).

The display will read:

- **PAlt**: 10000
- **T°C**: 2
- **CAS**: 200
- **DAlt**: 10770
- **Mach#**: 0.36
- **TAS**: 234.7

---

**HEADING AND GROUNDSPEED (HDG/GS)**

This function will compute heading and groundspeed given wind direction, wind speed, course, and true airspeed. In this example, the wind is from 270° at 20, course is 180°, and true airspeed is 185.

Tap \( \text{WT/ARM} \) from main menu. The display will prompt for **WDir**. Key in **270** and press \( \text{Ent} \).

The display will prompt for **WSpd**. Key in **20** and press \( \text{Ent} \).

The display will prompt for **CRS**. Key in **180** and press \( \text{Ent} \).

The display will prompt for **TAS**. Key in **185** and press \( \text{Ent} \).

The display will read:

- **WDir**: 270
- **WSpd**: 20
- **CRS**: 180
- **TAS**: 185
- **HDG**: 186.2
- **GS**: 183.9

---

**LEG TIME (LEG TIME)**

This function computes the time required to fly a particular distance given distance and groundspeed. In this example, distance is 25 and groundspeed is 185.
Tap (LEG TIME) from the main menu. The display will prompt for Dist. Key in 25 and press (Ent). The display will prompt for GS. Key in 185 and press (Ent).

The display will read:

- Dist: 25
- GS: 185
- Time: 0.1351351
- 0:08:06

Note: The calculated time is displayed in both hours and hours, minutes, seconds.

FUEL REQUIRED
(FUEL REQ)

This function calculates fuel requirements given time and fuel per hour consumption. In this example, flying time is 3 hours 15 minutes and fuel per hour consumption is 14 gallons.

Tap (FUEL REQ) from the main menu. The display will prompt for Time. Key in 3 hours, 15 minutes. Tap 3, (:), 1, 5 and press (Ent).

The display will prompt for FPH. Key in 14 and press (Ent).

The display will read:

- Time: 3:15
- FPH: 14
- Fuel: 45.5

Note: The Fuel Required function computes the fuel consumption only. It does not take required fuel reserves into account.

CROSSWIND, HEADWIND AND TAILWIND
(X/H-WIND)

This function computes the crosswind component and headwind or tailwind component given wind direction, wind speed and runway number. In this example, the wind is from 270° at 20, and the runway number is 30. Note that the runway heading of 30 should be entered, not 300.

Tap (X/H-WIND) from the main menu. The display will prompt for WDir. Key in 270 and press (Ent).

The display will prompt for WSpd. Key in 20 and press (Ent).

The display will prompt for RWY. Key in 30 and press (Ent).

The display will read:

- WDir: 270
- WSpd: 20
- RWY: 30
- H-Wind: -17.3
- X-Wind: -10
Right crosswinds are shown as positive numbers, while left crosswinds are shown as negative numbers. A positive value for H-WIND denotes a tailwind, while a negative value denotes a headwind.

**ACTUAL TRUE AIRSPEED**

(ACL TAS)

This function calculates true airspeed, mach number and density altitude given pressure altitude, indicated temperature in Celsius and calibrated airspeed. In this example, the pressure altitude is 10,000 feet, temperature is 3°C, and calibrated airspeed is 200.

Tap \( \text{ACT TAS} \) from main menu. The display will prompt for \( \text{PA} \). Key in 10000 and press \( \text{Ent} \).

The display will prompt for I° C. Key in 3 and press \( \text{Ent} \).

The display will prompt for CAS. Key in 200 and press \( \text{Ent} \).

The display will read:

- PA\( \text{Alt} \) 10000
- I° C 3
- CAS 200
- DA\( \text{Alt} \) 10039.6
- Mach# 0.36
- TAS 232

**WIND SPEED AND DIRECTION**

(WIND)

This function calculates wind speed and direction given course, true airspeed, groundspeed, and heading. In this example, the course is 355°, true airspeed is 200, groundspeed is 170, and the heading is 350°.

Tap \( \text{WIND} \) from main menu. The display will prompt for \( \text{CRS} \). Key in 355 and press \( \text{Ent} \).

The display will prompt for \( \text{TAS} \). Key in 200 and press \( \text{Ent} \).

The display will prompt for \( \text{GS} \). Key in 170 and press \( \text{Ent} \).

The display will prompt for \( \text{HDG} \). Key in 350 and press \( \text{Ent} \).

The display will read:

- CRS 355
- TAS 200
GROUND SPEED (GS)

This function calculates groundspeed given distance and time. In this example, distance is 18, and time is 7 minutes.

Tap **GS** from the main menu. The display will prompt for **Dist**. Key in **18** and press **Ent**.

The display will prompt for **Time**. Key in **7 minutes**. Tap **0**, **0**, **7** and press **Ent**.

The display will read:
- Dist: **18**
- Time: **0:07**
- GS: **154.3**

NOTE: Time can be imported from the timer for groundspeed calculations. This can be done by tapping **Timer**, **Ent** when the computer prompts for time.

---

FUEL PER HOUR (FPH)

This function computes fuel per hour given time and total fuel consumed. In this example, time is 3 hours 15 minutes, and fuel consumed is 45.5 gallons.

Tap **FPH** from the main menu. The display will prompt for **Fuel**. Key in **45.5** and press **Ent**.

The display will prompt for **Time**. Key in **3 hours, 15 minutes**. Tap **3**, **1**, **5** and press **Ent**.

The display will read:
- Fuel: **45.5**
- Time: **3:15**
- FPH: **14**
FLIGHT PLAN MACH NUMBER

(PLAN M#)

This function will compute the true airspeed given the temperature in Celsius and the mach number. In this example, temperature is -20°C and the Mach# is 0.85.

Tap PLAN M# from the main menu. The display will prompt for T°C. Key in 20, press +/- and press Ent.

The display will prompt for Mach#. Key in 0.85 and press Ent.

The display will read:

<table>
<thead>
<tr>
<th>T°C</th>
<th>Mach#</th>
</tr>
</thead>
<tbody>
<tr>
<td>-20</td>
<td>0.85</td>
</tr>
<tr>
<td>TAS</td>
<td>527.2</td>
</tr>
</tbody>
</table>

REQUIRED TRUE AIRSPEED

(REQ TAS)

Required True Airspeed is a planning function used to maintain a certain groundspeed and course in order to arrive at a desired point at a specific time. It will compute true airspeed and heading given wind direction and speed, course, and groundspeed. In this example, the wind is from 270° at 15, course is 355°, and groundspeed is 225 kts.

Tap WT/ARM from main menu. The display will prompt for WDir. Key in 270 and press Ent.

The display will prompt for WSpd. Key in 15 and press Ent.

The display will prompt for CRS. Key in 355 and press Ent.

The display will prompt for GS. Key in 225 and press Ent.

The display will read:

<table>
<thead>
<tr>
<th>WDir</th>
<th>WSpd</th>
<th>CRS</th>
<th>GS</th>
<th>TAS</th>
<th>HDG</th>
</tr>
</thead>
<tbody>
<tr>
<td>270</td>
<td>15</td>
<td>355</td>
<td>225</td>
<td>226.8</td>
<td>351.2</td>
</tr>
</tbody>
</table>

REQUIRED CALIBRATED AIRSPEED

(REQ CAS)
This function calculates the calibrated airspeed, corresponding mach number, and density altitude given the pressure altitude, temperature in Celsius, and true airspeed. In this example, pressure altitude is 10,000 feet, temperature is 2°C, and the true airspeed is 200.

Tap \texttt{REQ CAS} from main menu. The display will prompt for \texttt{PAlt}. Key in 10000 and press \texttt{Ent}.

The display will prompt for \texttt{T°C}. Key in 2 and press \texttt{Ent}.

The display will prompt for \texttt{TAS}. Key in 200 and press \texttt{Ent}.

The display will read:

\begin{align*}
\text{PAlt} & : 10000 \\
\text{T°C} & : 2 \\
\text{TAS} & : 200 \\
\text{DAlt} & : 10769.5 \\
\text{Mach#} & : 0.31 \\
\text{CAS} & : 170.4
\end{align*}

\textbf{DISTANCE FLOWN} (DIST FLN)

This function calculates for distance given time and groundspeed. In this example, the groundspeed is 185 and time is 15 minutes.

Tap \texttt{DIST FLN} from the main menu. The display will prompt for \texttt{GS}. Key in 185 and press \texttt{Ent}.

The display will prompt for \texttt{Time}. Key in 15 minutes. Tap 0, 1, 5 and press \texttt{Ent}.

The display will read:

\begin{align*}
\text{GS} & : 185 \\
\text{Time} & : 0:15 \\
\text{Dist} & : 46.3
\end{align*}

\textbf{ENDURANCE} (ENDUR)

This function calculates endurance given the total fuel on board and the fuel per hour consumption. In this example, fuel on board is 74, and fuel per hour is 14.

Tap \texttt{ENDUR} from the main menu. The display will prompt for \texttt{Fuel}. Key in 74 and press \texttt{Ent}. 
The display will prompt for **FPH**. Key in 14 and press **Ent**.

The display will read:

**Fuel**  74
**FPH**  14
**Time**  5:2857143
  5:17:09

Note: The calculated time is displayed in both hours and hours, minutes, seconds.

______________________________________________________________________________

**ACTUAL MACH NUMBER**

*(ACT M#)*

This function calculates true airspeed given the indicated temperature and mach number. It differs from the PLAN M# function only in that indicated temperature is used. In this example, the indicated temperature is -17°C and the mach number is 0.85.

Tap **ACT M#** from the main menu. The display will prompt for I°C. Key in 17, press ** +/-** and press **Ent**.

The display will prompt for **Mach#**. Key in 0.85 and press **Ent**.

The display will read:

I°C  -17
**Mach#**  .85
**TAS**  502.2

**REQUIRED RATE OF CLimb**

*(Rte O Climb)*

This function calculates required rate of climb (common in departure procedures) in feet per minute given groundspeed and required climb gradient in feet per mile. In this example, the groundspeed is 80 and the required climb gradient is 330 feet per mile.

Tap **RteOClimb** from the main menu. The display will prompt for **GS**. Key in 80 and press **Ent**.

The display will prompt for **RGR**. Key in 330 and press **Ent**.

The display will read:

**GS**  80
**RGR**  330
**MROC**  440
**GRAD**  5.4%
REQUIRED RATE OF DESCENT  
(Req/Dscn)

This function determines the required descent or climb rate to arrive at a fix at a specific altitude given
groundspeed, indicated altitude, crossing altitude and fix distance. In this example, the aircraft is cruising
at 14,000 feet with a groundspeed of 180. ATC assigns a crossing altitude of 8,000 feet for a fix located
25 miles away.

Tap Req / Dscn from the main menu and the display will prompt for GS. Key in 180 and press Ent.

Display will prompt for IALT. Key in 14,000 and press Ent.

Display will prompt for CRALT. Key in 8,000 and press Ent.

Display will prompt for FXDIS. Key in 25 and press Ent.

The display will read:
GS  180
IALT 14000
CRALT 8000
FXDIS 25
RQ/DN 720

This ATC crossing restriction will require a descent rate of 720 feet per minute.

A positive value for RQ/DN indicates a descent. A negative value indicates a climb to the crossing altitude.

SPECIFIC RANGE  
(SPRNG)

Specific range is a planning function used to determine the most desirable altitude for long range flight. 
Range is calculated in miles given the total fuel, groundspeed and fuel burn. In this example, we will 
compute aircraft range at 12,000 feet with 140 gallons of fuel. Our fuel burn will be 24 gallons per hour 
with a groundspeed of 150.
Tap \text{SPRNG} from the main menu and the display will prompt for \text{FUEL}. Key in 140 and press \text{Ent}.

Display will prompt for \text{GS}. Key in 150 and press \text{Ent}.

Display prompts for \text{FPH}. Enter 24 and press \text{Ent}.

The display will read:

\begin{itemize}
  \item \text{FUEL} 140
  \item \text{GS} 150
  \item \text{FPH} 24
  \item \text{SPRNG} 875
\end{itemize}

This cruise altitude will yield a range of 875 miles.

Following the same sequence for a flight at 8,000 feet with 140 gallons of fuel, a groundspeed of 165, and fuel burn of 27 gallons per hour, a specific range of 855.6 is calculated. An additional 20 miles of range is available at 12,000 feet.

\begin{center}
TOP OF DESCENT (T-DCN)
\end{center}

This function determines when to begin a descent to arrive at the destination at a desired altitude given aircraft groundspeed, indicated altitude, desired altitude and rate of descent. In this example, our indicated altitude is 11,500 feet. We desire to be at a pattern altitude of 1,500 feet descending at 600 feet per minute with a groundspeed of 140.

Tap \text{T-DCN} from the main menu and the display will prompt for \text{GS}. Key in 140 and press \text{Ent}.

Display will prompt for \text{IALT}. Key in 11,500 and press \text{Ent}.

Display will prompt for \text{DALT}. Key in 1,500 and press \text{Ent}.

Display will prompt for \text{RATE}. Key in 600 and press \text{Ent}.

The display will read:

\begin{itemize}
  \item \text{GS} 140
  \item \text{IALT} 11500
  \item \text{DALT} 1500
  \item \text{RATE} 600
  \item \text{T-DCN} 38.9
\end{itemize}

The descent should begin 39 miles from our destination.
This function is an easy method to compute the proper loading of the aircraft. The E6B software will retain and display cumulative totals for center of gravity, (CG), gross weight (GW), and moment (MOM). This will allow you to continue keying in weight and ARM values for to obtain running totals. In the WT/ARM mode, the E6B software continuously prompts for new WT and ARM values.

ARM is the distance in inches from the datum line to the center of gravity of an item. The datum line is an imaginary line established by the manufacturer from which all ARM measurements are taken. The moment is the product of arm and weight, divided by the reduction factor. The reduction factor is a constant of 1 for WT/ARM calculations. The computer will always assume RF=1.

In this example, aircraft empty weight is 2467, arm is 76.7", and the reduction factor is 1.

Tap WT/ARM from main menu. The display will prompt for WT. Key in 2467 and press Ent.

The display will prompt for ARM. Key in 76.7 and press Ent. The display will read:

<table>
<thead>
<tr>
<th>WT</th>
<th>2467</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARM</td>
<td>76.7</td>
</tr>
<tr>
<td>CG</td>
<td>76.7</td>
</tr>
<tr>
<td>MOM</td>
<td>189218.9</td>
</tr>
<tr>
<td>GW</td>
<td>2467</td>
</tr>
</tbody>
</table>

After keying in the airplane's empty weight and arm, the next step is to calculate the weight and balance for the aircraft at takeoff. For this example, we'll assume the following load:

<table>
<thead>
<tr>
<th>Item</th>
<th>Weight</th>
<th>Arm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel</td>
<td>72.5 gal (6 lbs./gal.)</td>
<td>75</td>
</tr>
<tr>
<td>Front passengers</td>
<td>340</td>
<td>75</td>
</tr>
<tr>
<td>Rear passengers</td>
<td>340</td>
<td>115</td>
</tr>
<tr>
<td>Baggage</td>
<td>18</td>
<td>164</td>
</tr>
</tbody>
</table>

With display from the previous page shown:

Key in \( \text{72.5 } \times \text{ 6 } = \); WT will display 435. Press Ent.

Key in ARM of 75. Press Ent.

New totals will appear for MOM, CG and GW. The passengers and baggage can be added onto the total in the same manner the fuel was added above. The final calculations can be used to confirm that the weight and CG are within the aircraft's operating limitations.

When finished, the cumulative totals will be displayed. The display will read:

<table>
<thead>
<tr>
<th>WT</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARM</td>
<td>164</td>
</tr>
<tr>
<td>CG</td>
<td>80.39</td>
</tr>
<tr>
<td>MOM</td>
<td>289395.9</td>
</tr>
<tr>
<td>GW</td>
<td>3600</td>
</tr>
</tbody>
</table>

Weight can also be moved or subtracted. Suppose one of the rear passengers can't make the trip:
Key in WT of 170 and press +/-; Press Ent.

Key in ARM of 115. Press Ent. The display will read:

<table>
<thead>
<tr>
<th>WT</th>
<th>AR M</th>
</tr>
</thead>
<tbody>
<tr>
<td>-170</td>
<td>115</td>
</tr>
</tbody>
</table>

CG 78.67
MOM 269845.9
GW 3430

**WEIGHT/MOMENT**

(WT/MOM)

This function is similar to the (WT/ARM) function. However, flight manuals for some aircraft describe weight and balance problems in terms of moments. Sporty's E6B software will retain and display cumulative totals for center of gravity, gross weight and moment given weight and moment for each item and reduction factor. The reduction factor for this example is 100. As an example, use the following table for entry:

<table>
<thead>
<tr>
<th>ITEM</th>
<th>WEIGHT</th>
<th>MOM/100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empty weight</td>
<td>3472</td>
<td>1220</td>
</tr>
<tr>
<td>Seat #1</td>
<td>170</td>
<td>63</td>
</tr>
<tr>
<td>Seat #2</td>
<td>160</td>
<td>59</td>
</tr>
<tr>
<td>Seat #3</td>
<td>100</td>
<td>68</td>
</tr>
<tr>
<td>Seat #4</td>
<td>120</td>
<td>82</td>
</tr>
<tr>
<td>Baggage, nose compartment</td>
<td>100</td>
<td>-31</td>
</tr>
<tr>
<td>Baggage, rear compartment</td>
<td>60</td>
<td>74</td>
</tr>
<tr>
<td>Fuel, main tanks</td>
<td>600</td>
<td>210</td>
</tr>
<tr>
<td>Fuel, auxiliary tanks</td>
<td>378</td>
<td>178</td>
</tr>
</tbody>
</table>

Tap WT/MOM from main menu. The display will prompt for WT. Key in 3472 and press Ent.

The display will prompt for MOM. Key in 1220 and press Ent.

The display will prompt for RF. Key in 100 and press Ent.

The display will read:

<table>
<thead>
<tr>
<th>WT</th>
<th>MOM</th>
<th>RF</th>
</tr>
</thead>
<tbody>
<tr>
<td>3472</td>
<td>1220</td>
<td>100</td>
</tr>
</tbody>
</table>

Enter remaining weights and moments. Since the RF has already been keyed in, the computer will not prompt for RF after the first entry. The E6B software will keep running totals for moment, center of gravity and gross weight.

When finished, the display will read:

<table>
<thead>
<tr>
<th>WT</th>
<th>MOM</th>
<th>RF</th>
</tr>
</thead>
<tbody>
<tr>
<td>378</td>
<td>1923</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CG</th>
<th>GW</th>
</tr>
</thead>
<tbody>
<tr>
<td>37.27</td>
<td>5160</td>
</tr>
</tbody>
</table>

Totals for moment, center of gravity, and gross weight should then be checked against the aircraft's approved operating limits.
APPENDIX A
SAMPLE PROBLEMS

TIME

4:45:00 + 2:15:30 = CONV H->HMS = 07:00:30
6.7 - 5:20:00 = CONV H->HMS = 01:22:00

CONVERSIONS

25 pounds to kilograms.....................................11.3398
12 kilograms to pounds.....................................26.4554
30 feet to meters .............................................9.144
100 meters to feet ...........................................328.084
32° Fahrenheit to Celsius.....................................0°
100° Celsius to Fahrenheit................................212°
100 nautical miles to kilometers...........................185.2
50 kilometers to nautical miles.............................26.9978
9.5125 hrs to hms............................................9:30:45
12:30:30 hms to hrs.........................................12.5083
87 nautical miles to statute miles.......................100.117
115 statute miles to nautical miles......................99.9322
1 U.S. gallon to liters......................................3.78541
10 liters to U.S. gallons....................................2.64172

<table>
<thead>
<tr>
<th>INPUT</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>%MAC</td>
<td>(use CG from WT/MOM problem)</td>
</tr>
<tr>
<td>LEMAC</td>
<td>285.6</td>
</tr>
<tr>
<td>CG</td>
<td>308.08</td>
</tr>
<tr>
<td>%MAC</td>
<td>27.8</td>
</tr>
<tr>
<td>MAC</td>
<td>81.0</td>
</tr>
</tbody>
</table>

P-D/ALT
<table>
<thead>
<tr>
<th>INPUT</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>X/H-WIND</td>
<td></td>
</tr>
<tr>
<td>WDir</td>
<td>270</td>
</tr>
<tr>
<td>WSpd</td>
<td>20</td>
</tr>
<tr>
<td>RWY</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>H-Wind -17.3</td>
</tr>
<tr>
<td></td>
<td>X-Wind -10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ACT TAS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PAIt</td>
<td>12000</td>
</tr>
<tr>
<td>T°C</td>
<td>2</td>
</tr>
<tr>
<td>CAS</td>
<td>195</td>
</tr>
<tr>
<td></td>
<td>DAlt 12367.9</td>
</tr>
<tr>
<td></td>
<td>Mach# 0.37</td>
</tr>
<tr>
<td></td>
<td>TAS 234.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WIND</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CRS</td>
<td>355</td>
</tr>
<tr>
<td>TAS</td>
<td>195</td>
</tr>
<tr>
<td>GS</td>
<td>175</td>
</tr>
<tr>
<td>HDG</td>
<td>349</td>
</tr>
<tr>
<td></td>
<td>WDir 307.8</td>
</tr>
<tr>
<td></td>
<td>WSpd 27.8</td>
</tr>
</tbody>
</table>
Dist  32  GS  128
Time  00:15:00

FPH
Fuel  33  FPH  12
Time  02:45:00

PLAN M#
T°C  -45  TAS  482.8
Mach#  0.82

REQ TAS
WDir  270
W Spd  20  TAS  194.8
CRS  355  HDG  349.1
GS  192

REQ CAS
PAlt  8000  DAIt  9457
T°C  12  Mach#  0.28
TAS  185  CAS  160.7

DIST FLN
GS  220  Dist  476.7
Time  02:10:00

APPENDIX A (cont.)
SAMPLE PROBLEMS

INPUT       OUTPUT

ENDUR
Fuel  70  Time  5
FPH  14  5:00:00

ACT M#
I°C  -52  TAS  451.7
Mach#  0.82

RteOClimb
GS    70  MROC  460.8
RGR   400  Grad%  6.6%

Req/Dscn
GS    220  RQ/DN  1320
IALT  20000
CRALT 11000
FIXDIS 25

SPRNG
FUEL  2500  SPRNG  1000
GS    280
FPH   700

T-DCN
GS    230  T-DSC  53.7
IALT  22000
DALT  1000
RATE  1500

WT/ARM

<table>
<thead>
<tr>
<th>ITEM</th>
<th>WT</th>
<th>ARM</th>
<th>MOM</th>
<th>GW</th>
</tr>
</thead>
<tbody>
<tr>
<td>empty</td>
<td>2467</td>
<td>76.7</td>
<td>189218</td>
<td>2467</td>
</tr>
<tr>
<td>fuel</td>
<td>444</td>
<td>75.0</td>
<td>222518</td>
<td>2911</td>
</tr>
<tr>
<td>front seat</td>
<td>340</td>
<td>75.0</td>
<td>248018</td>
<td>3251</td>
</tr>
<tr>
<td>2nd row</td>
<td>0</td>
<td>115</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd row</td>
<td>0</td>
<td>148</td>
<td></td>
<td></td>
</tr>
<tr>
<td>baggage</td>
<td>100</td>
<td>164</td>
<td>264418</td>
<td>3351</td>
</tr>
</tbody>
</table>

CG = 78.91

APPENDIX A (cont.)
SAMPLE PROBLEMS

WT/MOM
Payload computations

<table>
<thead>
<tr>
<th>ITEM</th>
<th>WEIGHT (pounds)</th>
<th>MOMENT /1000</th>
</tr>
</thead>
</table>

Page 22
<table>
<thead>
<tr>
<th></th>
<th>Basic operating weight</th>
<th>Zero fuel weight</th>
<th>+ Fuel</th>
<th>= Ramp weight</th>
<th>— Taxi fuel</th>
<th>= Takeoff gross weight</th>
<th>— En Route fuel</th>
<th>= Landing weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8916</td>
<td>9716</td>
<td>5424</td>
<td>15140</td>
<td>-200</td>
<td>14940</td>
<td>-2000</td>
<td>12940</td>
</tr>
<tr>
<td></td>
<td>2809.0</td>
<td>3017.2</td>
<td>1644.1</td>
<td>4661.3</td>
<td>-61.8</td>
<td>4599.5</td>
<td>-612.9</td>
<td>3986.6</td>
</tr>
</tbody>
</table>

CG = 308.08

**WEIGHT AND MEASURE CONVERSIONS**

<table>
<thead>
<tr>
<th></th>
<th>Conversion Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 inch</td>
<td>2.54 centimeters</td>
</tr>
<tr>
<td>1 centimeter</td>
<td>0.3937 inches</td>
</tr>
<tr>
<td>1 statute mile</td>
<td>1.61 kilometers</td>
</tr>
<tr>
<td>1 kilometer</td>
<td>0.62 statute miles</td>
</tr>
<tr>
<td>1 U.S. gallon</td>
<td>0.833 Imperial gallons</td>
</tr>
<tr>
<td>1 Imperial gallon</td>
<td>1.201 U.S. gallons</td>
</tr>
<tr>
<td>1 liter</td>
<td>0.22 Imperial gallons</td>
</tr>
<tr>
<td>1 Imperial gallon</td>
<td>4.55 liters</td>
</tr>
<tr>
<td>1 ounce</td>
<td>28.35 grams</td>
</tr>
<tr>
<td>1 gram</td>
<td>0.035 ounces</td>
</tr>
<tr>
<td>1 inch of Mercury</td>
<td>33.86 millibars</td>
</tr>
<tr>
<td>1 millibar</td>
<td>0.0295” of Mercury</td>
</tr>
</tbody>
</table>
TROUBLESHOOTING & INFORMATION

Improper input of data will cause incorrect answers. Read the operating instructions to ensure that you are entering problems correctly. Also be sure that units agree, i.e., all units in statute miles, nautical miles, or kilometers.

NOTE: Sporty's E6B software is an instruction and informational aid, and is not an avionics instrument.