The Comprehensive Dozenal Watch

In 2016 I produced a programmable dozenal wristwatch face that tracks time of day, calendar date, and weather. If unfamiliar with dozenal timekeeping, please look at the *About* files on this site, for basic information about the clock and the calendar.

The goal for the watch was to increase options for dozenal timekeeping of both the day and the year on one wearable device. The result was achieved after the clock on this site was created, and after it was ported to Apple's mobile devices (iPhone and iPad) in late 2015. The watch goes beyond what that displays, although it doesn't have its four imitation analog hands.

In building the watch face, the basic question was: Using the dozenal number base, how may we keep track of daily and yearly time, starting from no assumptions other than the solar day and year? From use of the work already done, a few more answers suggested themselves and are included in the watch's user-specified settings. All are described below.

Thomas Cassidy was the watch's ace programmer, resolving issues creatively and elegantly. The hardware was made by Pebble. Although Pebble went out of business the day the watch face was completed (Dec. 7, 2016), the watch continues to work as intended. Because there were minor problems with some types, Pebble Time Steel is the watch that is strongly recommended for these dozenal displays. It may still be available.

The watch displays the following:
- calendar date
- weekday
- time of day
- local outdoor weather:
    - temperature, barometric pressure, UV index,
    - relative humidity, wind speed, wind direction
    - weather conditions in words
    - locality, i.e. source of the weather information

The watch receives information via a Bluetooth connection on a nearby smartphone. The number system it uses exclusively is dozenal ("base twelve"), and its measures come from three sets of scales: varied traditional, Primel, and TGM (Tim Grafut Maz). Those last two are coherent metrologies best explained at the URLs indicated. They base all measures on time, the earth's force of gravity, and a few aspects of water. They are superior to traditional systems currently in use in most of the world, including Imperial, United States Customary, and (Decimal) Metric.

Here is a description of what the watch provides. Its programmable nature enables changes, additions, and deletions.

Calendar date

yyyy-mm-dd, m/d/yyyy, d.m.yyyy
Holocene Seasonal, Holocene Seasonal Cardinal

The first three are the traditional date, in international, American, and British format. Holocene Seasonal comes with weekdays or without, because the numerical date in a month always implies the weekday; e.g. dates ending in 3 or 9 are always an F-Day. (The days of the week are the Latin words for the primary and secondary colours: Ruber (red), Arantius (orange), Flāvus (yellow), Viridis (green), Cæruleus (blue), Purpureus (violet).)

Holocene Seasonal Cardinal trades the ordinal months and days (1st, 2nd, etc.) for elapsed months, weeks, and days. The ordinal date 0Ƨ-23 becomes cardinal 9-4-2, because on that date, 9 months, 4 weeks, and 2 days have gone by. Likewise, the last day of the year becomes Ɛ-4-5 and the first day 0-0-0.

The Holocene calendar may be set to begin on the first day of winter, spring, summer, or autumn, whose months vary according to whether the northern or southern hemisphere is selected. If northern winter or southern summer, year 0 starts in December, -9564 (9565 BCE). The other seasonal beginnings are in -9563. These years are near the start of the Holocene epoch, at the end of the last ice age. Significantly, in -9563 the perihelion coincided with the June solstice, which happens only every 21,000 years, approximately.

There are no known written records predating the Holocene epoch.

Time

diurnal, semidiurnal, phasic, shift, semishift (each displayed in four digits)

Diurnal and semidiurnal may be familiar from this site. The latter divides the day first by 2, before dividing each half by successive powers of a dozen. By extension, the remaining three formats divide the day first by 4, 3, and 6 respectively.

The beginning of the day may be set to the traditional midnight, noon, 6 AM, 8 AM, or 4 AM.

Temperature

stadigrees crystallic, stadigrees familiar, gross degrees, Tregrees, Celsius, Fahrenheit

Stadigrees come from the Primel metrology. Stadigrees familiar set the freezing point of water at $_{z}40°$ and imitate Fahrenheit. Tregrees, also known as triquaCalgs, come from the TGM metrology. Gross degrees convert a number out of $_{d}100$ into a number out of $_{z}100$, both being the boiling point of water.

Barometric pressure
pressurels, uncialengthels Hg, unciaPrems, biciaGrafuts Hg, millibars

Pressurels and uncialengthels come from Primel, the former converted from millibars and the latter from inches of mercury. The same conversion sources apply to TGM's unciaPrems and biciaGrafuts Hg respectively.

Ultraviolet rays index
quadciaintensitels, hexciaPenz, SI intensity

No attempt has been made to take apart the components of the index. It is considered an intensity in mW/m^2. Quadciaintensitels come from Primel, and hexciaPenz from TGM.

Relative humidity
%

This works like temperature's gross degrees, converting a number out of $_{d}100$ into a number out of $_{z}100$. Unlike gross degrees, these numbers stay between 0 and 100.

Wind speed
velocitels, unciaVlos, km/h, mph

Velocitels come from Primel, and unciaVlos from TGM.

Wind direction
biciaturns, unciaPis, degrees

Biciaturns come from Primel, and unciaPis from TGM.

Weather conditions and location
The watch calls for weather in its wearer's location every $_{z}10$ trices ($_{d}10$ minutes). Like everything else, that may be changed in the programming code.

In Primel and TGM, powers of a dozen may be applied to measurements that are not in a useful range for some purpose, just as powers of ten may be applied in the decimal metric system, e.g. to get millimetres instead of metres, or kiloWatts instead of Watts. Examples in dozenal measures are found in the discussion below.

The most familiar measures to use are a traditional calendar format, semidiurnal time, °C or °F, barometric pressure in millibars, UV index in the SI formulation, wind speed in km/h or mph, and wind direction in degrees. They're unrelated to each other, derived from different systems of measurement. More cogent is one of the Holocene solstice calendar formats along with a coherent set of measures, e.g. from Primel. Another set might use a traditional calendar format plus time and weather measures from TGM.

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All numbers below are decimal unless preceded by a subscript z, to indicate dozenal. The dozenal results are rounded to the nearest integer. Other numbers are rounded to a maximum of four decimal or dozenal places.

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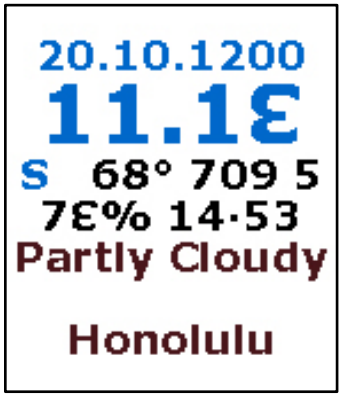
Watch face with traditional, unrelated measures



The traditional decimal measures behind this face are described below. The least interesting and dozenally the least useful, the data are simply converted to dozenal.

Calendar: 24 December 2016 (in the traditional British format)

Time: just before 1:10 PM (in semidiurnal time)

Day of week: Saturday
Temperature: 80.0°F
(Because water freezes at 32°F, conversions from Fahrenheit to a scale where water freezes at 0° require an initial subtraction of 32.)

Not shown:
1°G = 1.25°F
1°F = 0.8°G
80.0°F = $_z$32°G

1°C = 1.8°F
1°F = 0.5556°C
80.0°F = $_z$23°C

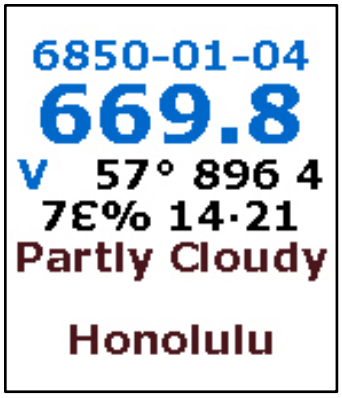
Barometric pressure: 1017 millibars
UV index: 4.7 (rounded to 5)

Relative humidity: 66%
Wind speed: 16.3 km/h (rounded to 16)

Not shown:
1 mph = 1.6093 km/h
1 km/h = 0.6214 mph
16.3 km/h = $_z$Ƨ mph

Wind direction: 63° (ENE)

Watch face in the Primel metrology



This calendar format is not part of Primel. It is Holocene (Ordinal) with the day of the week indicated, V. The time is diurnal.

Temperature
1 stadigree = 0.7143° Fahrenheit
1° Fahrenheit = 1.4 stadigrees
80.0°F = $_z$57 stadigrees crystallic

Not shown:
80.0°F = $_z$97 stadigrees familiar

Barometric pressure
1 pressurel = 0.8035 millibar
1 millibar = 1.2446 pressurels
1017 millibars = $_z$896 pressurels

Not shown:
1 lengthel = 0.3229 inch
1 inch = 3.0968 lengthels
1 inch Hg = 33.8639 millibars
1 millibar = 0.0914 lengthel Hg
1 millibar = 1.0974 uncialengthels Hg
1017 millibars = $_z$790 uncialengthels Hg

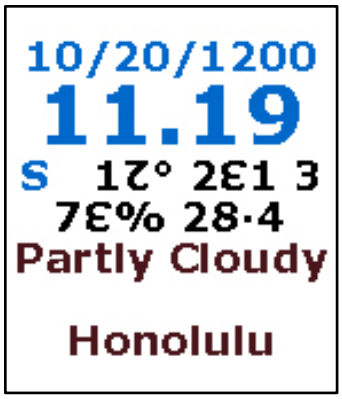
UV index
1 intensitel = 22.7762 W/m^2
1 W/m^2 = .0439 intensitel
1 mW/m^2 = 1 in the UV index = 0.9104 quadciaintensitel
4.7 in the UV index = $_z$4 quadciaintensitels

Relative humidity
66% = $_z$7Ɛ%

Wind speed
1 velocitel = 1.0205 km/h
1 km/h = 0.9799 velocitel
16.3 km/h = $_z$14 velocitels

Wind direction
1 turn = 360°
1° = 0.0028 turn
1° = 0.4 biciaturn
63° = ᵶ21 biciaturns

Watch face in the TGM metrology



Here the calendar appears in the traditional American format. The time is semidiurnal.

Temperature
1 Tregree = 2.16° Fahrenheit
1° Fahrenheit = 0.463 Tregree
80.0°F = ᵶ1Ƨ Tregrees

Barometric pressure
1 Prem = 29.0058 millibars
1 millibar = 0.0345 Prem
1 millibar = 0.4137 unciaPrem
1017 millibars = ᵶ2Ɛ1 unciaPrems

Not shown:
1 Grafut = 11.6411 inches
1 inch = 0.0859 Grafut
1 inch Hg = 33.8639 millibars
1 millibar = 0.0025 Grafut Hg
1 millibar = 0.3653 biciaGrafut Hg
1017 millibars = ᵶ26Ɛ biciaGrafuts Hg

UV index
1 Penz = 4940.0799 W/m^2
1 W/m^2 = .0002 Penz
1 mW/m^2 = 1 in the UV index = 0.6044 hexciaPenz
4.7 in the UV index = ᵶ3 hexciaPenz

Relative humidity
66% = ᵶ7Ɛ%

Wind speed
1 Vlos = 6.1313 km/h
1 km/h = 0.1631 Vlos
1 km/h = 1.9572 unciaVlos
16.3 km/h = $_z$28 unciaVlos

Wind direction
2 Pis = 360°
1° = 0.0056 Pi
1° = 0.0667 unciaPi
63° = $_z$4 unciaPis

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Saturday, December 24, 2016

6850-01-04 Viridis
6850-0-0-3 Viridis
1200-10-20 Saturday
Saturday, 10/20/1200
Saturday, 20.10.1200