D Units outside the Universal System of Units Standard

(This Appendix is for reference only. It is not part of the Universal System of Units Standard.)

D.1 Time units based on the earth's rotation

universal minute	=	$100.17_{(12)}\mathrm{s}_u$	(strict)
clock	=	$10_{(12)}$ universal minutes	
day	=	128 clocks	
year	=	365 days and 31 clocks	
universal century	=	64 years	
	=	$10\_0513\_16\mathrm{A}2.8_{(12)}\mathrm{s}_u$	

The time units can be seen as both as units of time and as units of the angle of rotation of the earth in space.

For activities on the earth, year and day cannot be ignored as time units. However, year and day cannot be expressed as s_u multiples of integer powers of 12, nor is their ratio a simple value. Therefore, are the following possible within small integer powers?

1. The ratio of the largest unit of local earth time and s_u is approximately an integer power of 12.
2. The ratio of the largest unit of local earth time and year is exactly an integer power of a certain integer n.
3. The ratio of the smallest unit of local earth time and day is exactly an integer power of same integer n.
4. The ratio of the smallest unit of local earth time and s_u is approximately an integer power of 12.

Actually, for $n = 2$, this kind of unit can be constructed within small integer powers.

universal century	=	the largest unit of local earth time	=	2^6 years	$\approx$ $12^9\mathrm{s}_u$
clock	=	the smallest unit of local earth time	=	2^{-7} days	$\approx$ $12^3\mathrm{s}_u$

The relations of clock to day and year to universal century are completely binary, but clock and universal century are both approximately s_u multiples of integer powers of 12, [15] and so connect smoothly to the Universal System of Units Standard. People have a proclivity for using large units for large quantities and using small units for small quantities, so the inconvenience of having to exclude year and day from the Universal System of Units Standard is reduced by connecting both units smoothly to the Universal System of Units Standard.

Accidentally one clock is equal to the difference between one Julian year and one tropical year. For the earth at this time, the relationship

$$1 \text{ tropical year} = 365\frac{2^5 - 1}{2^7} \text{ mean sun days} \tag{38}$$

holds to a high degree of accuracy (error on the order of 10^{-8}). Moreover, not only are leap years every 2^2 years and leap year corrections every 2^7 years, for integer power of 2 years, there is some interesting coincidences, as shown in Table 5. Therefore, if we make one universal century 64 years, the same positional relationship among the sun, Venus, the earth and Mars recurs successive universal centuries (because the rotation of Venus is in the reverse direction of the revolution, in 8 earth tropical years, Venus makes exactly 25 rotations with respect to the sun).

[15] Because 12 is $2^2 \times 3$, All factor 3 appeares between year and day as a factor of the ratio of a universal century and