Terminology used in the 2013 solar – lunar data sheet

Column # - Explanation

1. ***Date***
2. Blank Space
3. ***Day of the week***
4. ***Day number*** for the year
5. ***Hours and minutes of Local Sidereal Time*** (star time) - Astronomers have a system used to locate objects in the sky. It is similar to latitude and longitude on the surface of the earth. The system is called right ascension and declination. Declination is the sun's position on the celestial sphere (clear dome of stars surrounding the earth). It ranges from zero (above the earth's equator) to +90 (above the North Pole), to -90 (above the South Pole). It is measured in degrees. The declination of a star directly overhead in Lancaster would be +40 degrees. The sun is never directly overhead at our latitude. Right ascension is similar to longitude. It starts when the sun is located at a position in the sky called the Vernal Equinox (location of the sun on the first day of spring). The Vernal Equinox occurs when the sun's path on the celestial sphere (called the ecliptic) moves across the celestial equator (point over the earth's equator), going towards Polaris. It is measured eastward along the ecliptic in hours. It ranges from 0 to 24 hours (one and the same place). The sun's right ascension is 0 hours on the first day of spring, 6 hours on the first day of summer, 12 hours on the first day of fall, and 18 hours on the first day of winter. The local sidereal time indicates the right ascension of an object that is currently crossing your meridian (north-south line) at your location. The sidereal time on the printout was calculated for local noon, sun time each day. Sidereal clocks are used in observatories to tell "star time." One day on a sidereal clock is equal to 23 hours, 56 minutes, and 4.09 seconds of a "normal" solar day (24 hours). The difference is due to the motion of the earth as it orbits the sun.
6. ***Hours and minutes of Right Ascension***
7. ***Degrees and minutes of Declination of the sun***
8. ***Distance between the earth and sun in astronomical units*** (1 A.U. = the average distance between sun/earth)
9. ***Equation of time in minutes*** (the earth does not orbit the sun at a constant speed. It goes fast when near the sun in winter, and slow when it is far from the sun in summer. Yes, we ARE close to the sun in winter! The speed variation causes the sun to appear to run "fast and slow." If you observed a sundial, you would notice this effect in a matter of a few days. The equation of time is the difference between local noon (on a sundial) and mean solar noon (on your clock).
10. ***Beginning of Civil Twilight*** - This occurs when the morning sky starts to get light. The sun is 6 degrees below the horizon. Nautical Twilight is defined as the sun located 12 degrees below the horizon; Astronomical Twilight is when the sun is 18 degrees below the horizon.
11. ***Sunrise*** – this is when the sun appears above the horizon. The sun is actually below the horizon but the atmosphere bends the light to make it appear above our horizon.
12. The ***azimuth of the sun at sunrise*** - Azimuth is the angular measure going around the horizon. Think of compass directions. North = an azimuth of 000 or 360 degrees. East = 090 degrees, south = 180 degrees, and northwest = 315 degrees. The sun only rises due east (090 degrees) and sets due west (270 degrees) on the equinoxes.
13. ***Sun transit*** - Time when the sun crosses your local meridian (north-south line).
14. ***Sun's altitude*** - The angle of the sun above your horizon when it crosses your meridian. Helps cause seasons.
15. ***Sunset*** (see #11 sunrise)
16. ***Azimuth of sunset*** - See azimuth of sunrise (#16).
17. ***End of Civil Twilight*** – (see # 10)
18. The ***length of daylight*** in hours and minutes.
19. ***Moonrise*** – This value is not corrected for daylight saving time.
20. ***Azimuth of moonrise***
21. ***Moon's Transit***- Time when the moon crosses your local meridian (north-south line).
22. ***Moon's greatest altitude*** above your horizon for that day.
23. ***Moonset*** - This value is not corrected for daylight saving time.
24. ***Azimuth of moonset***
25. ***Moon phase*** – percent of visible moon illuminated directly by the sun.
26. ***Moon – Earth distance*** in miles.
27. ***Julian Day*** – a benchmark used in astronomy to count time from a specific date.