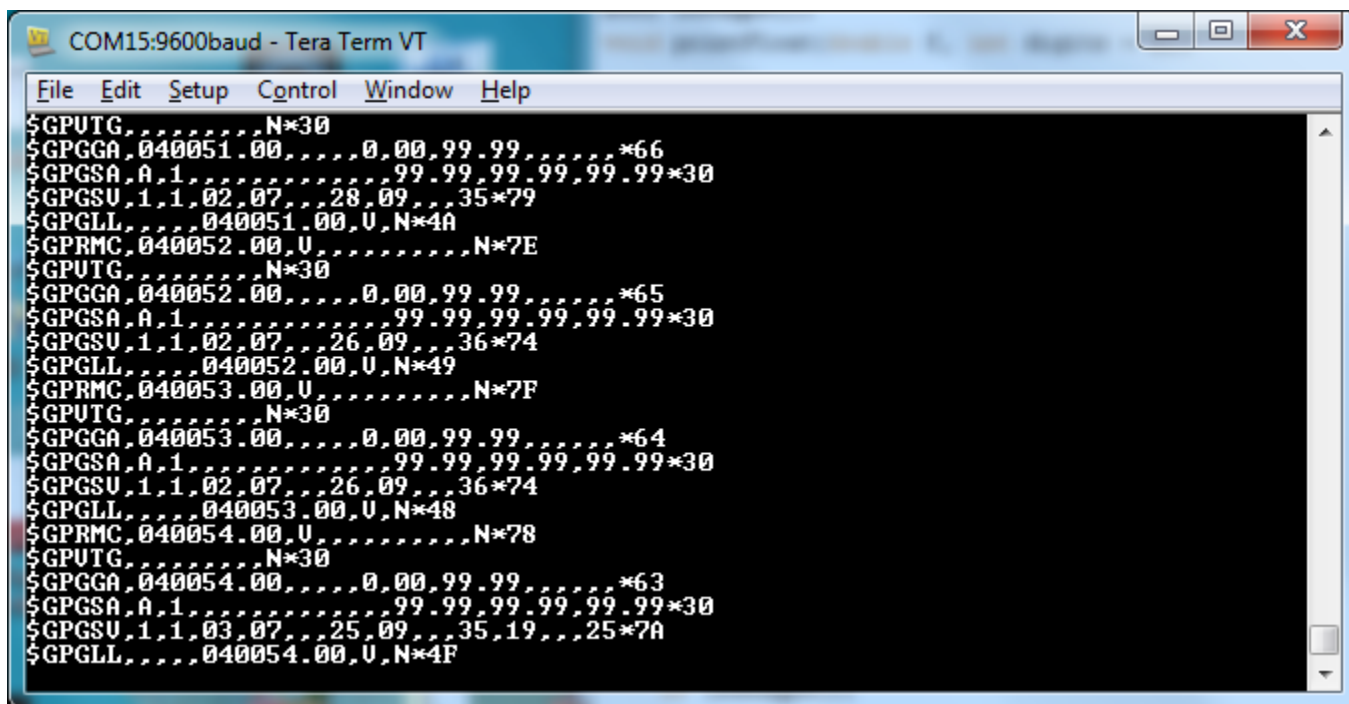


# Alphanumeric GPS Wall Clock

The problem I found is that GPS clocks are often indoors, and, in the case of the SparkFun building, that makes it seriously difficult to get a GPS lock. We have lots of concrete, metal girders, and a large solar array that wreaks havoc with GPS signals (and pretty much all cellular carriers for that matter). TinyGPS++ reports the Time/Date only after you have a lock, so, when we moved the original GPS Wall Clock to our new building, I was somewhat mystified why it wasn't working. Posting a 'NOGPS' debug statement to the display helped show that we almost never get sufficient enough satellites to allow TinyGPS to report time and date. Luckily, it doesn't take a full lock to get date and time from GPS.



```
COM15:9600baud - Tera Term VT
File Edit Setup Control Window Help
$GPUTG,.....N*30
$GPGGA,040051.00,0.00,99.99,.....*66
$GPGSA,A,1,.....99.99,99.99,99.99*30
$GPGSU,1,1,02,07,28,09,35*79
$GPGLL,.....040051.00,U,N*4A
$GPRMC,040052.00,U,.....N*7E
$GPUTG,.....N*30
$GPGGA,040052.00,0.00,99.99,.....*65
$GPGSA,A,1,.....99.99,99.99,99.99*30
$GPGSU,1,1,02,07,26,09,36*74
$GPGLL,.....040052.00,U,N*49
$GPRMC,040053.00,U,.....N*7F
$GPUTG,.....N*30
$GPGGA,040053.00,0.00,99.99,.....*64
$GPGSA,A,1,.....99.99,99.99,99.99*30
$GPGSU,1,1,02,07,26,09,36*74
$GPGLL,.....040053.00,U,N*48
$GPRMC,040054.00,U,.....N*78
$GPUTG,.....N*30
$GPGGA,040054.00,0.00,99.99,.....*63
$GPGSA,A,1,.....99.99,99.99,99.99*30
$GPGSU,1,1,03,07,25,09,35,19,25*7A
$GPGLL,.....040054.00,U,N*4F
```

If you look at the raw NMEA sentences above, you should be able to pick out '040054' or 4:00.54 UTC. With only 1 satellite and a very bad view of the sky, we are able to grab time from GPS.

```
COM15:9600baud - Tera Term VT
File Edit Setup Control Window Help
$GPUTG,.,.,.N*30
$GPGGA,040134.00,.,.,.0,00,99.99,.,.,.*64
$GPGSA,A,1,.,.,.99.99,99.99,99.99*30
$GPGSU,1,1,03,07,.,.26,09,.,.39,19,.,.21*71
$GPGLL,.,.,.040134.00,U,N*48
$GPRMC,040135.00,U,.,.,.220115,.,.,N*7B
$GPUTG,.,.,.N*30
$GPGGA,040135.00,.,.,.0,00,99.99,.,.,.*65
$GPGSA,A,1,.,.,.99.99,99.99,99.99*30
$GPGSU,1,1,03,07,.,.26,09,.,.39,19,.,.21*71
$GPGLL,.,.,.040135.00,U,N*49
$GPRMC,040136.00,U,.,.,.220115,.,.,N*78
$GPUTG,.,.,.N*30
$GPGGA,040136.00,.,.,.0,00,99.99,.,.,.*66
$GPGSA,A,1,.,.,.99.99,99.99,99.99*30
$GPGSU,1,1,03,07,.,.26,09,.,.40,19,.,.21*7F
$GPGLL,.,.,.040136.00,U,N*4A
$GPRMC,040137.00,U,.,.,.220115,.,.,N*79
$GPUTG,.,.,.N*30
$GPGGA,040137.00,.,.,.0,00,99.99,.,.,.*67
$GPGSA,A,1,.,.,.99.99,99.99,99.99*30
$GPGSU,1,1,03,07,.,.25,09,.,.40,19,.,.22*7F
$GPGLL,.,.,.040137.00,U,N*4B
```

After a few seconds we can see the date come in as well - '220115' or January 22nd, 2015. The latest version of the Alphanumeric GPS Wall Clock uses a custom NMEA parser rather than relying on TinyGPS.

**It looks only for the availability of time and date, no GPS lock necessary.**

**This allows us to display time in much harsher GPS environments.**