



NetClock® ASCII Time Code Data Formats

Application Note

Data Formats 0, 1 and 2 are available from the NetClock/2 (WWWB) Master Clock. Data Formats 0,1,2,3,4, and 90 are available from the NetClock/GPS, NetClock/GTP and NetClock/NTP (GPS) Master Clocks. Data format selection for the RS-232 serial and RS-485 communications ports is performed during set-up and installation.

FORMAT 0

Includes a time sync status character, day of year, time

CR LF I ^^ DDD ^ HH:MM:SS ^ DTZ=XX CR LF

Example: 271 12:45:36 DTZ=08

The example provides the following information:

Sync Status: Time synchronized to reference

Date: Day 271

Time: 12:45:36 Pacific Daylight Time

D = DST, Time Zone 08 = Pacific Time

FORMAT 1

Provides the fully decoded time data stream. Format 1 provides a fully decoded date consisting of day of week, month, and day of the month. Format 1 also contains a time sync status character, year, and time reflecting time zone offset and DST correction when enabled. Format 1 data structure is:

CR LF I ^ WWW ^ DDMMYY ^ HH:MM:SS CR LF

Example: * THU 19DEC02 12:45:36

The example provides the following information:

Sync Status: The clock is not time synchronized to source. Time is derived from the battery backed clock or set manually

Date: Thursday, December 19, 2002

Time: 12:45:36

FORMAT 2

Provides a time data stream with millisecond resolution. The Format 2 data stream consists of indicators for time sync status, time quality, leap second and Daylight Saving Time. Time data reflects UTC time and is in the 24-hour format. Format 2 data structure is:

CR LF IQYY ^ DDD ^ HH:MM:SS.sss ^ LD

Example: ?A02 271 12:45:36.123 S

The example provides the following information:

Sync Status: The clock has lost time sync. The inaccuracy code of "A" indicates the expected time error is <10 milliseconds.

Date: Day 271 Time: 12:45:36 UTC time, standard time.

CHARACTER DESCRIPTOR:

- CR** = Carriage Return
- LF** = Line Feed
- I** = Time Sync Status (space, ?, *)
- ^** = space separator
- Q** = Quality Indicator (space, A, B, C, D)
- YY** = Year without century (02, 03, 04 etc.)
- DDD** = Day of Year (001-366)
- HH** = Hours (00-23)
- :** = Colon separator
- MM** = Minutes (00-59)
- SS** = Seconds (00-60)
- .** = Decimal Separator
- sss** = Milliseconds (000-999)
- L** = Leap Second Indicator (space, L)
- D** = Daylight Savings Time indicator (S,I,D,O)
- TZ** = Time Zone
- XX** = Time Zone offset (00-23)
- WWW** = Day of Week (MON, TUE, WED)
- DD** = Numerical Day of Month (^1-31)
- MMM** = Month (JAN, FEB, MAR)

The leading edge of the first character (CR) marks the on-time point of the data stream.

The time sync status character I is defined as described below:

- (Space)** = Whenever the front panel Time Sync lamp is green.
- ?** = When the receiver is unable to track any satellites and the Time Sync lamp is red.
- *** = the receiver time is derived from the battery backed clock or set manually through the Serial Setup Interface.

The Daylight Saving Time indicator D is defined as:

- S** = During periods of standard time for the selected DST schedule.
- I** = During the 24-hour period preceding the change into DST
- D** = During periods of Daylight Saving Time for the selected DST schedule
- O** = During the 24-hour period preceding the change out of DST

The quality indicator Q provides an inaccuracy estimate of the output data stream. When the receiver is unable to track the reference, a timer is started. The table below lists the quality indicators and the corresponding error estimates based upon the internal oscillator stability and the time elapsed tracking no satellites. The timer and the quality indicator reset when the receiver requires its reference.

TYPICAL NETCLOCK/GPS TABLE

Inaccuracy Code	Time Error (mSec)	Time Since Unlock (Hours)
Space	<1	Locked
A	<10	<10
B	<100	<10
C	<500	<10
D	>500	>500

FORMAT 3

Provides a format identifier, time sync status character, year month day, time with time zone and DST corrections, time difference from UTC, standard time/DST indicator, leap second indicator and on-time marker. Format 3 data structure is:

FFFFI^YYYYmdd^HHMMSS±HHMM L # CR LF

CHARACTER DESCRIPTOR:

FFFF = Format Identifier (0003)
I = Time Sync Status (Space, ? *)
^ = space separator
YYYY = Year (2002, 2003, 2004 etc.)
mm = Month Number (01-12)
dd = Day of the Month (01-31)
HH = Hours (00-23)
MM = Minutes (00-59)
SS = Seconds (00-60)
± = Positive or Negative UTC offset (+,-) Time Difference from UTC
HHMM = UTC Time Difference Hours, Minutes (00:00-23:00)
D = Daylight Saving Time Indicator (S,I,D,O)
L = Leap Second Indicator (space, L)
= On time point
CR = Carriage Return
LF = Line Feed

The time difference from UTC, ±HHMM, is selected when the serial comm or remote port is configured. A time difference of -0500 represents eastern time. UTC is represented by +0000.

Example: 0003 20021219 124536-0500S #

The example provides the following information:

Data Format: 3

Sync Status: Time Synchronized to GPS

Date: December 19, 2002

Time: 12:45:36 EST, The time difference is 5 hours behind UTC Leap

Second: No leap second is scheduled for this month.

FORMAT 4

Provides a format indicator, time sync status character, modified Julian date, time reflecting UTC with 0.1 millisecond resolution and a leap second indicator. Serial Comm ports configured for interrogation mode output this data stream immediately upon receiving the time request character. The data stream is output every second for the Remote Outputs or Serial Comm port configured for continuous output. Format 4 data structure is:

FFFFIMJDXX^HHMMSS.SSSS^L CR LF

CHARACTER DESCRIPTOR:

FFFF = Format Identifier (0004)
I = Time Sync Status (Space, ? *)
MJDXX = Modified Julian Date
HH = Hours (00-23 UTC time)
MM = Minutes (00-59)
SS.SSSS = Seconds (00.0000-60.0000)
L = Leap Second Indicator (^, L)
CR = Carriage Return
LF = Line Feed

The leading edge of the first character's start bit marks the on-time point of the data stream.

Example: 0004 52627 124536.1942 L

The example provides the following information:

Data Format: 4

Sync Status: Time synchronized to GPS.

Modified Julian Date: 52627

Time: 12:45:36.1942 UTC

Leap Second: A leap second is scheduled at the end of the month.

FORMAT 90

Provides a position data stream in NMEA 0183 GPGGA GPS Fix data format. The Format 90 data structure is shown below:

\$GPGGA,HHMMSS.SS,ddmm.mmmm,n,dddmm.mmmm,c,Q,SS,YY.y,+AAAAA.a,M,,,,*CC CR LF

CHARACTER DESCRIPTOR:

- \$GP** = GPS System Talker
- GGA** = GPS Fix Data Message
- HHMMSS.SS** = Latest time of Position Fix, UTC. This field is blank until a 3D fix is acquired
- ddmm.mmmm,n** = Latitude
 - dd** = degrees, 00...90 mm.mmmm = minutes, 00.0000...59.9999
 - n** = direction, N = North, S = South
- dddmm.mmmm,e** = Longitude
 - ddd** = degrees, 000...180
 - mm.mmmm** = minutes, 00.0000...59.9999
 - e** = direction, E = East, W = West
- Q** = Quality Indicator;
 - 0** = No 3D fix
 - 1** = 3D fix SS = Number of satellites tracked, 0...8
- YY.Y** = Dilution of precision, 00.0...99.9
- +AAAAA.a,M** = Antenna height in meters, referenced to mean sea level
 - ,,,,** = Fields for geoidal separation and differential GPS not supported
 - cc** = Check sum message, HEX 00...7F Check sum calculated by Xoring all bytes between \$ and *.
 - CR** = Carriage Return
 - LF** = Line Feed

Example: **\$GPGAA,151119.00,4307.0241,N,07729.2249,W,1,06,03.2,+00125.5,M,,,,*3F**

The example data stream provides the following information:

- Time of Position Fix:** 15:11:19.00 UTC
- Latitude:** 43° 07.0241' North
- Longitude:** 77° 29.2249' West
- Quality:** 3D fix
- Satellites Used:** 6
- Dilution of Precision:** 3.2
- Antenna Height:** +125.5 meters above sea level
- Check Sum:** 3F



NetClock® /GPS Programmable Event Timer

Application Note

EVENT TIMER OUTPUT

The NETCLOCK/GPS features a programmable 8-event timer with relay contact outputs. The relay contacts can control a bell, whistle, siren or other device based upon the timer setup. Each event has an assigned start and stop time having one second resolution. An event can be scheduled for daily, monthly or one time occurrences.

An example of a daily event schedule is to sound the siren at the fire station at noon every day for five seconds.

An example of a one time event is to schedule a test of the emergency evacuation horns on May 17th, 2002 from 10:00 AM to 10:05 AM.

Events:

Eight (8) events with programmable on and off times.

Event Schedule:

Events may be scheduled for daily and weekly routines, or a specific date.

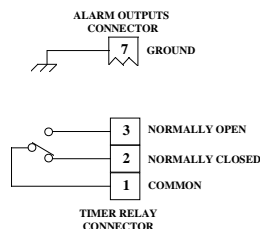
Relay Contacts:

NO, NC, and common. Contact rating 30 VDC, 2 Amps.

Connector:

3-position terminal block (supplied).

The event timer is configured using the command EVNT. Refer to Section 4, Software Commands, for a complete description on Event Timer programming. Timer relay contacts are rated at 2.0 Amps, 30 VDC. A schematic representation of the timer relay contacts is shown below. The mating 3-position terminal block is supplied in the ancillary kit.



TIMER RELAY CONTACTS

When an event start time is reached the timer relay is energized producing continuity between Pins 1 (common) and 3 (normally open). At stop time, the relay is deenergized producing continuity between Pins 1 and 2 (normally closed). The relay contacts can be referenced to ground by connecting to Pin 7 of the Alarm Outputs connector.

EVENT RELAY

The Event Timer Relay output can be programmed with up to 8 events. An event program includes, event enable, on time, off time, schedule, and time base selections. Each of these parameters is divided into separate commands.

To view the current program for all eight events, type:

EVNT <ent>

Response: Message lists each events configuration.

To view a specific event enter the event number following the command.

EVNT # <ent>

Where: # = Event number, 1...8

Example response:

```
EVENT 2 ACTIVE= YES DAY= WEEK DAYS
ON TIME= 10:32:00 OFF TIME= 10:35:00
TIME BASE= FRONT PANEL
```

EVENT TIME PROGRAMMING

An event is programmed using a series of commands to configure each parameter. The unit must be placed in SET Mode when using these commands.

EVENT ENABLE/DISABLE

The active command enables or disables an event program. The command is entered in the format below:

EVNT[#]ACTIVE[YES, NO] <ent>

Where: # = Event number, 1...8

YES = Event enabled

NO = Event disabled

SER2 = Serial Comm 2 time

Example Program:

Configure Event 3 to ring the end of shift bell at 5:00 pm for 5 seconds on weekdays. Follow the steps listed below to program event 3 as described.

- Step 1** - Place the unit in Set Mode **Command:** SM ON <ent>
- Step 2** - Enable Event 3 **Command:** EVNT 3 ACTIVE YES<ent>
- Step 3** - Set ON Time **Command:** EVNT 3 ON 17:00:00 <ent>
- Step 4** - Set OFF Time **Command:** EVNT 3 OFF 17:00:05 <ent>
- Step 5** - Select Schedule **Command:** EVNT 3 DAY WKD <ent>
- Step 6** - Select Time Base **Command:** EVNT 3 TIME FP <ent>
- Step 7** - Turn Off Set Mode **Command:** SM OFF

Example Program Complete.

For more information, please contact Spectracom.

Specifications subject to change or improvement without notice.

Spectracom® and NetClock® are Spectracom trademarks.

All other products are identified by trademarks of their respective companies or organizations.

Copyright 2003 Spectracom Corporation. Printed in USA 4/03

ANTIMECODE(C)