# 2. INSTALLING YOUR TIME SOURCE

This chapter describes how to install your Time Source. You will use the following procedure:

o   Setting the internal switches to select power-on defaults

o   Connecting the Time Source

## SETTING THE SWITCHES

You will need the following tools to set the switches in your Time Source:

o   A Phillips-head screwdriver

o   A small, narrow screwdriver or mechanical pencil

NOTE: The default settings for the switches upon shipment from PSTI are given in Table 2-1.

Table 2-1 Default Switch Settings

| Commands | Setting | Bank | Switch |
|----------|---------|------|--------|
| SET COMMANDS Disable | OFF | 1 | 1 |
| Parity bit for RS-232 | ON | 1 | 2 |
| Reserved switches | OFF | 1 | 3-5 |
| Baud rate for RS-232 | 9600 | 1 | 6-8 |
| Daylight-saving time enable | ON | 2 | 1 |
| Time Format | AM/PM | 2 | 2 |
| Date format | Month/Day | 2 | 3 |
| Time Zone | PST | 2 | 4-8 |
| Year | Current year | 3 | 1-4 |
| Propagation delay: | | | |
| Colorado (0 milliseconds) | OFF/ON | 3 | 5-6 |
| Hawaii (0 milliseconds) | ON/OFF | 3 | 7-8 |

If these settings are acceptable, you may proceed to the section, "Connecting the Time Source."

## EXAMPLE OF A TYPICAL SETTING

For example, you might want to have SET commands enabled, serial transmission of seven bits plus even parity, an RS-232 baud rate of 9600, automatic daylight-saving time enabled, 24 hour time, Month and Day-of-Month display mode, Pacific Time Zone, the year 1987, and propagation delay corrections set to OFF, ON, and ON, OFF as described above. Your switch settings would look like the ON and OFF rows shown below.
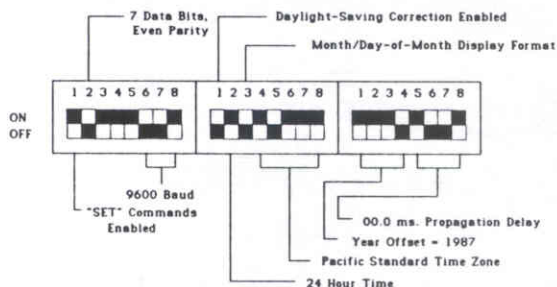


**Step 4**    Replace the cover on the Time Source enclosure.

**Step 5**    Put the two Phillips-head screws in the top of the cover, and tighten them.

## CONNECTING THE TIME SOURCE

**Step 1**    Plug the male BNC connector at the end of the RG-58 cable coming from the antenna into the "ANT." (J5) input on the back of your Time Source.

**Step 2**    If you are using the RS-232 serial port, plug the RS-232 connector from your computer into the RS-232 input (J4). See Appendix D for the RS-232 pin-outs.

**Step 3**    If you are using the battery backup, plug the battery into the BATTERY port (J1) on your Time Source.

**Step 4**    If you have a good earth-ground available, attach it to the "GND" connector on the back of your Integrated Time Source.

**Step 5**    Connect the power supply to a power outlet and the power cord to the "power" jack (J2).

The procedure for setting the switches is described in detail below:

Step 1      Remove the two Phillips-head screws on the top surface of the Time Source box cover (see Figure 2-1)
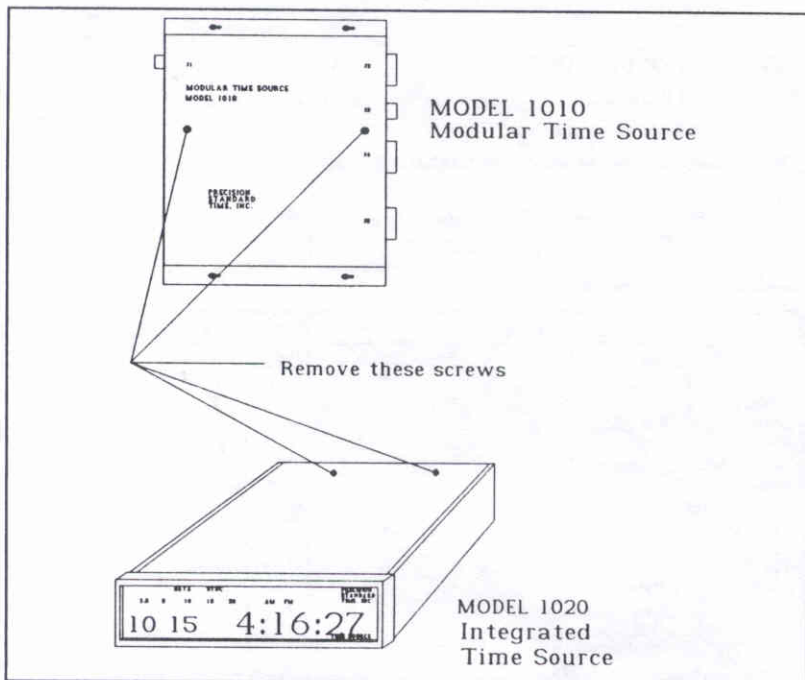


Figure 2-1 **Removing the Time Source Cover**

**Step 2**    Slide the cover off toward the back of the Integrated Time Source enclosure or lift off the cover of the Modular Time Source. The inside of the Time Source is shown in Figure 2-2.
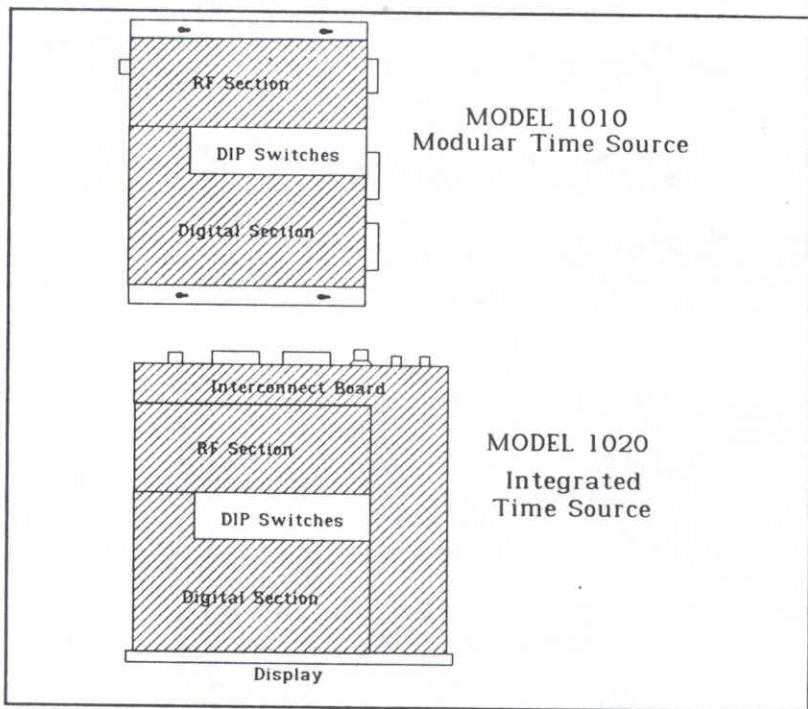


**Figure 2-2  Inside the Time Source**

**Step 3**     Using a small, narrow screw driver or mechanical pencil, set the switches as desired. The switches are in the Time Source enclosure in the center of the board. There are three banks of eight switches:

| Bank 1 | Bank 2 | Bank 3 |
|---|---|---|
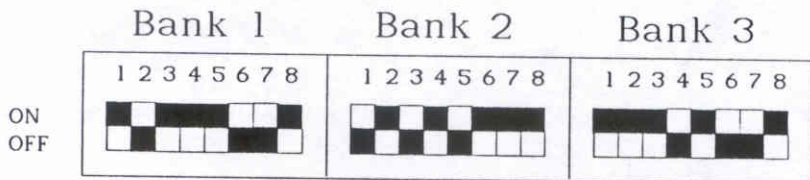


Each switch is described below. (Note: The operating characteristics of the clock set by the switches can be overridden at any time by changing the switches or with the RS-232 serial port commands unless Switch 1, Bank 1 is set to inhibit remote "SET" commands. See Chapter 5 for more information on serial port commands.)
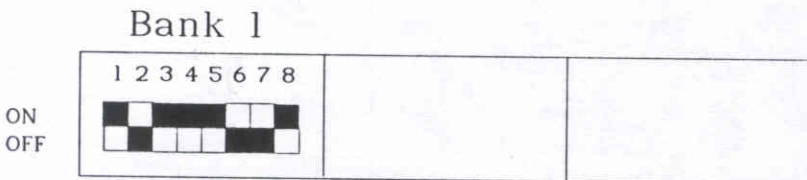
## Bank 1



Bank 1 controls SET command disable, parity, and the RS-232 serial port baud rate.

**Switches 1 through 5:**

Switches 1 and 2 set different features; 3, 4, and 5 are reserved for future use.

1       If set to **ON**, switch 1 prevents the Time Source from responding to SET commands via the RS-232 interface. Normally, this switch would be **OFF**. However, in a networking environment you may want to prevent the Time Source from responding to any of the RS-232 SET commands. See Chapter 5 for a description of the SET commands.

2       If set to **ON**, switch 2 causes the RS-232 protocol to be seven bits plus even parity. This function can be set remotely with the **SQ** command.

        If set to **OFF**, switch 2 causes the RS-232 protocol to be eight bits without parity.

3       Reserved (leave **OFF**).

4       Reserved (leave **OFF**).

5       Reserved (leave **OFF**).

## Switches 6 through 8:

Switches 6, 7, and 8 control the baud rate of the RS-232 serial port. Pick the rate you want from the table below, and set the corresponding switches to **ON** or **OFF**.

**Table 2-2 Baud Rate Switch Settings**

| Baud Rate | Switch Settings | | |
|-----------|-----|-----|-----|
|           | 6   | 7   | 8   |
| 110       | OFF | OFF | OFF |
| 300       | OFF | OFF | ON  |
| 600       | OFF | ON  | OFF |
| 1200      | OFF | ON  | ON  |
| 2400      | ON  | OFF | OFF |
| 4800      | ON  | OFF | ON  |
| 9600      | ON  | ON  | OFF |
| Reserved  | ON  | ON  | ON  |

# Bank 2



Bank 2 controls the time and date format.

## Switches 1 through 3:

Each of the first three switches in bank 2 has a special use and is described below. The last five switches set the time zone correction.

1      If set to **ON**, switch 1 enables automatic correction for daylight-saving time.

2      If set to **ON**, switch 2 selects 12 hour (AM/PM) time.

       If set to **OFF**, switch 2 selects 24 hour (0000 to 2359, or "military") time.

       Note that switch 2 affects both the display and the RS-232 serial port.

3      If set to **ON**, switch 3 selects "month day-of-month" date display format. (For example: 5 17, for May 17)

       If set to **OFF**, switch 3 selects "day-of-year year" date display format. (For example: **137 87**, for Day 137, 1987)

       NOTE that this switch affects only the display. The date provided over the RS-232 serial port is always in "day-of-year, year" format.

**Switches 4 through 8:**

To get the local time for your area, find your local time zone in the table below, and set the corresponding switches to **ON** or **OFF.** Do NOT correct for daylight-saving time, since this is handled by another switch in this bank.

**Table 2-3 Time Zone Switch Settings**

| Time Zone | Hours from UTC | Switch Settings | | | | |
|-----------|------|-----|-----|-----|-----|-----|
|           |      | 4   | 5   | 6   | 7   | 8   |
| UTC | 0 | OFF | OFF | OFF | OFF | OFF |
| Eastern Time | -5 | OFF | OFF | ON | OFF | ON |
| Central Time | -6 | OFF | OFF | ON | ON | OFF |
| Mountain Time | -7 | OFF | OFF | ON | ON | ON |
| Pacific Time | -8 | OFF | ON | OFF | OFF | OFF |
| Hawaiian Time | -10 | OFF | ON | OFF | ON | OFF |

To select some other time zone, see Figure 2-3 for a map of all the time zones and Appendix A for a table of all the time zones and their corresponding switch settings. UTC is similar to the more familiar "Greenwich Mean Time".
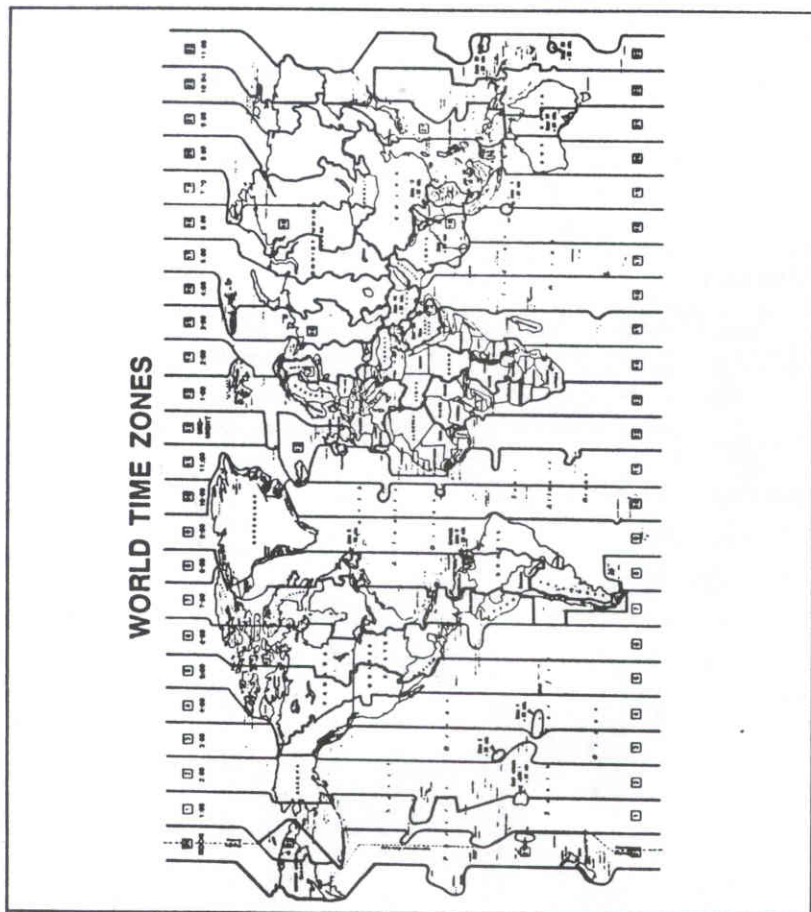
**Figure 2-3 Standard Time Zones.**

## Bank 3

|  |  | 1 2 3 4 5 6 7 8 |
|---|---|---|
| ON |  |  |
| OFF |  |  |

Bank 3 controls the year offset and the propagation delay corrections.

**Switches 1 through 4:**

The first four switches in bank 3 determine the year offset. Since the year information is not transmitted on WWV, the Time Source reads the year from the switch settings when you first turn on the instrument. After the first reading, the year automatically increments at the end of each year. You do not need to manually reset it each year unless there is a power outage. The year can also be reset over the RS-232 serial port.

To set the current year, find the year in the table below and set the corresponding switches to **ON** or **OFF**

**Table 2-4 Year Switch Settings**

| Year | Switch Settings | | | |
|---|---|---|---|---|
|  | 1 | 2 | 3 | 4 |
| 1986 | OFF | OFF | OFF | OFF |
| 1987 | OFF | OFF | OFF | ON |
| 1988 | OFF | OFF | ON | OFF |
| 1989 | OFF | OFF | ON | ON |
| 1990 | OFF | ON | OFF | OFF |
| 1991 | OFF | ON | OFF | ON |
| 1992 | OFF | ON | ON | OFF |
| 1993 | OFF | ON | ON | ON |
| 1994 | ON | OFF | OFF | OFF |
| 1995 | ON | OFF | OFF | ON |
| 1996 | ON | OFF | ON | OFF |
| 1997 | ON | OFF | ON | ON |
| 1998 | ON | ON | OFF | OFF |
| 1999 | ON | ON | OFF | ON |
| 2000 | ON | ON | ON | OFF |
| 2001 | ON | ON | ON | ON |

### Switches 5 through 8:

The last four switches set the propagation delay corrections for the Great Circle distance between the Time Source and the two transmitter sites, Fort Collins, Colorado (about sixty miles north of Denver), and Kauai, Hawaii.

### Table 2-5 Distances to Colorado and Hawaii

| Set these switches for distances to Colorado within these ranges: | | |
|---|---|---|
| | 5 | 6 |
| Less than 1023 miles | OFF | OFF |
| Between 1023 and 3064 miles | OFF | ON |
| Between 3064 and 5115 miles | ON | OFF |
| over 5115 miles | ON | ON |

| Set these switches for distances to Hawaii within these ranges: | | |
|---|---|---|
| | 7 | 8 |
| Less than 1023 miles | OFF | OFF |
| Between 1023 and 3064 miles | OFF | ON |
| Between 3064 and 5115 miles | ON | OFF |
| over 5115 miles | ON | ON |

For many users, the minor time errors due to signal propagation delay are unimportant. The propagation delay of the signal from Hawaii to the U.S. east coast is only about 30 milliseconds, for example. If this time delay is insignificant for your application, then the default setting is adequate: switches 5, 6, 7, and 8 are set to OFF, ON, ON, and OFF, respectively. That is, between 1023 and 3064 miles to Colorado and between 3064 and 5115 miles to Hawaii.

For other users, the granularity given by these switches is insufficient. In this situation, you should use the SC, SE, SG, and SH serial port commands in Chapter 5 for more precise corrections.