

**NAME**

adjtimex – tune kernel clock

**SYNOPSIS**

```
#include <sys/timex.h>
```

```
int adjtimex(struct timex *buf);
```

**DESCRIPTION**

Linux uses David L. Mills' clock adjustment algorithm (see RFC 1305). The system call **adjtimex()** reads and optionally sets adjustment parameters for this algorithm. It takes a pointer to a *timex* structure, updates kernel parameters from field values, and returns the same structure with current kernel values. This structure is declared as follows:

```
struct timex {
    int modes;          /* mode selector */
    long offset;        /* time offset (usec) */
    long freq;          /* frequency offset (scaled ppm) */
    long maxerror;       /* maximum error (usec) */
    long esterror;       /* estimated error (usec) */
    int status;          /* clock command/status */
    long constant;       /* pll time constant */
    long precision;       /* clock precision (usec) (read-only) */
    long tolerance;       /* clock frequency tolerance (ppm)
                          (read-only) */
    struct timeval time; /* current time (read-only) */
    long tick;           /* usecs between clock ticks */
};
```

The *modes* field determines which parameters, if any, to set. It may contain a bitwise-*or* combination of zero or more of the following bits:

```
#define ADJ_OFFSET      0x0001 /* time offset */
#define ADJ_FREQUENCY    0x0002 /* frequency offset */
#define ADJ_MAXERROR     0x0004 /* maximum time error */
#define ADJ_ESTERROR     0x0008 /* estimated time error */
#define ADJ_STATUS       0x0010 /* clock status */
#define ADJ_TIMECONST    0x0020 /* pll time constant */
#define ADJ_TICK         0x4000 /* tick value */
#define ADJ_OFFSET_SINGLESHOT 0x8001 /* old-fashioned adjtime() */
```

Ordinary users are restricted to a zero value for *mode*. Only the superuser may set any parameters.

**RETURN VALUE**

On success, **adjtimex()** returns the clock state:

```
#define TIME_OK  0 /* clock synchronized */
#define TIME_INS 1 /* insert leap second */
#define TIME_DEL 2 /* delete leap second */
#define TIME_OOP 3 /* leap second in progress */
#define TIME_WAIT 4 /* leap second has occurred */
#define TIME_BAD 5 /* clock not synchronized */
```

On failure, **adjtimex()** returns `-1` and sets *errno*.

**ERRORS****EFAULT**

*buf* does not point to writable memory.

**EINVAL**

An attempt is made to set *buf.offset* to a value outside the range  $-131071$  to  $+131071$ , or to set *buf.status* to a value other than those listed above, or to set *buf.tick* to a value outside the range  $900000/\text{HZ}$  to  $1100000/\text{HZ}$ , where **HZ** is the system timer interrupt frequency.

**EPERM**

*buf.mode* is non-zero and the caller does not have sufficient privilege. Under Linux the **CAP\_SYS\_TIME** capability is required.

**CONFORMING TO**

**adjtimex()** is Linux-specific and should not be used in programs intended to be portable. See **adjtime(3)** for a more portable, but less flexible, method of adjusting the system clock.

**SEE ALSO**

**settimeofday(2)**, **adjtime(3)**, **capabilities(7)**, **time(7)**

**COLOPHON**

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