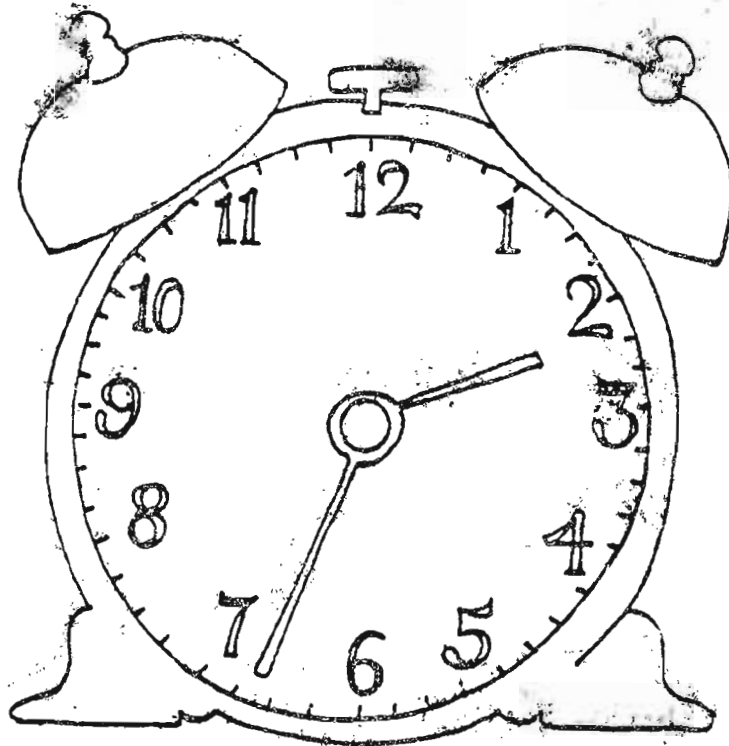OPERATOR'S MANUAL

RT-60A REAL TIME CLOCK

(For software release 2.5)

JG Communications
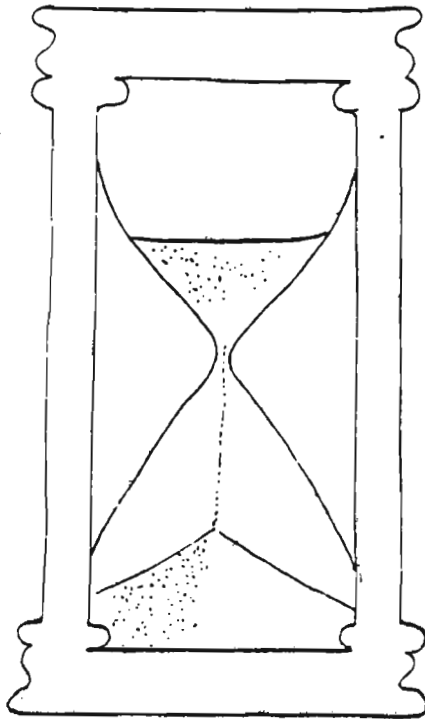
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INTRODUCTION

The RT-60A is a real time clock/calendar designed specifically for the Osborne 1 computer. It is designed to fit into the IEEE 488 port on the computer, is battery operated, and is based on the OKI Semiconductor MSM5832 and MSM58321 CMOS real time clocks.

Timekeeping is crystal controlled, and an adjustment is provided to make slight timing corrections. The RT-60A has an output connector and extra circuitry that allows the Osborne IEEE port to still be used as an IEEE 488, Centronics parallel, or general purpose port.

Software design has been done in such a way that access to the clock can be accomplished fairly easily through most application programs without any modifications to the programs themselves. Features that operate in "real time" along with the executing program are provided along with some command utilities. Those features that operate in real time require one kilobyte of the Osborne RAM area above the operating system, which pushes the operating system down by one kilobyte. In most cases, the use of this memory will not alter normal·program execution in any way. In those cases where memory space is at a premium (such as some large spreadsheets), this memory may be restored for use by the program, at the sacrifice of giving up access to the real time clock during that program's execution. The real time clock will keep the proper time and date regardless· of the program running on the computer. The only way to reset the clock is by deliberately shorting the two vertical pins on the clock when told to do so by the clock setting program. Accidental resetting of the clock is not possible. The clock may also be inserted or removed when desired without affecting the timing.

TRADEMARKS:
Osborne 1.....Osborne Computer Corp.
Wordstar......Micropro
Supercalc.....Sorcim
Mbasic........Microsoft
Dbase II......Ashton Tate
Drive C.......Drive C Company

1

INSTALLATION

The pouch the clock was shipped in has been treated with an anti-static compound. Do not handle the clock at any time unless you have touched a grounded metal object first.

Before proceeding with the clock installation, check the clock diskette to see if it has a file named BULLETIN on it. If this file is present, it contains any last minute corrections or comments and should be read first.

To install the clock, remove it from the plastic shipping pouch, and slide it into your IEEE port as shown. NOTE: You must leave the tight fitting black vinyl case on! This will make the fit a tight one. You may have to fold the edge seams of the case up a little to get the clock to slide in. Wiggling the clock up and down a little also helps.

If it is ever necessary to remove the clock, make sure the case comes out with it by pulling on the bottom lip of the case as you remove the clock.

NOTE: If you have Drive C, please see the appropriate question in the HELP section at the back of the manual before attempting to install the clock.
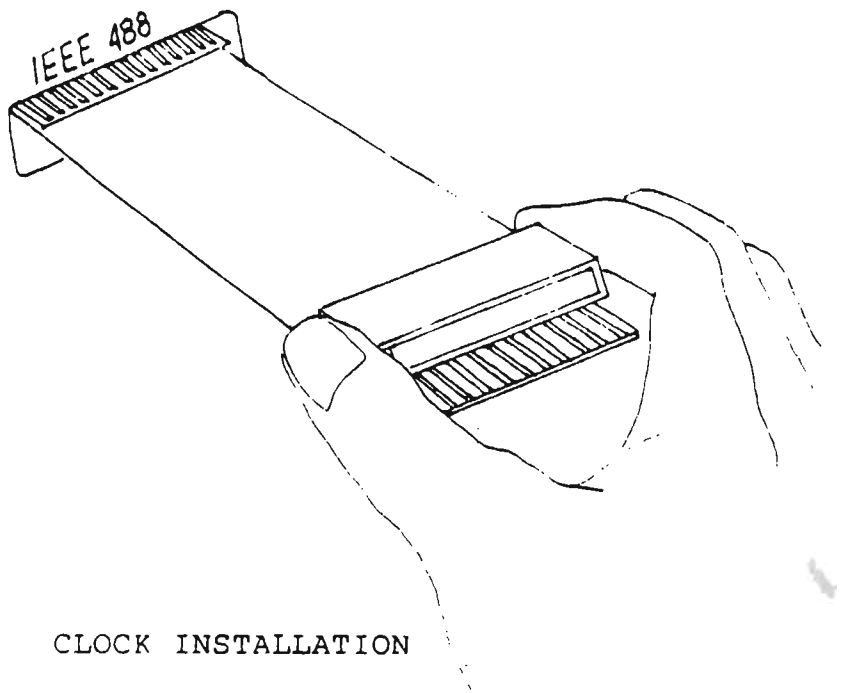
CLOCK INSTALLATION

Your clock came from the factory with the battery in place and is ticking away now. It may even be set to your local time. The clock will run whether or not it is plugged into the Osborne, and it can be unplugged and plugged-in at will. It is not necessary to turn the computer off when you are doing this, but make sure

you touch something grounded before you handle the clock.

NOTE: There are special precautions required when removing the clock case for battery replacement, time adjustment, or curiosity. See the HELP section at the rear of the manual.

To install the clock software, you must do the following:

1. Copy the clock diskette, and store the original. If you have a double density machine, you must copy the diskette onto a double density diskette, and use PIP.COM to do the copying. Do not use COPY.COM! Leave the write protect tab off this copy, and set it aside for a moment.

2. Prepare another diskette with the following files (double density machines must have this diskette also in double density):

MOVCPM.COM
SYSGEN.COM
SUBMIT.COM

Also use SYSGEN.COM to copy your system to this diskette.

You must leave the write protect tab off this diskette also. If you have had your machine upgraded, you will have more than one copy of MOVCPM.COM and SYSGEN.COM, and the copies will be different. In general you should get these files from the diskette your system came from, which will usually be the diskette you got with your last upgrade. If you have a double density upgrade, get the files from the diskette that came with it. If you got the Screen Pac (80 column) upgrade at the same time, use the files from the extended utilities diskette that cam with Screen Pac. If you got the Screen Pac upgrade at a later date, still use the Screen Pac files.

Put this diskette in drive A, and the copy of the clock diskette in drive B. Do a cold boot by pressing the reset button and pushing return, then enter:

A>B:INSTALL

you will see the diskettes activate and various commands automatically execute. Here is what is happening:

     a. The CP/M system in memory is being changed so it loads and executes at a location 1 kbyte lower than before.
     b. The system is being changed so it will call the file CLOCK.COM on both a warm and cold boot, instead of AUTOST (don't worry about this change... your software can still be set so it will call AUTOST on a boot).
     c. SYSGEN is called, and given the new system so you can copy it onto your diskettes.

(NOTE: if you got a SYNCRONIZATION ERROR message, it means that

you used the wrong MOVCPM file in the procedure. Try again with another copy.)

3. When the diskettes finish whirring, you will be in the program SYSGEN, and it will be asking you to specify a destination diskette. Remove the clock diskette from drive B and replace it with a diskette that you wish to write the new system onto. You must write the new system onto every program diskette that you will be booting from, and that you wish the clock software to operate on. When the diskette is in place, specify drive B and press RETURN. After the new system is written to the diskette, the program will again ask you the destination drive. Repeat the procedure until all the desired disks have the new system written to it.

IMPORTANT: We have actually generated a new system for your computer, and we advise that you replace your present system tracks on all your program diskettes with this new system, using SYSGEN. For the time being, you may wish to do this to only one or two diskettes until you are familiar with the clock features. When you are ready to put the new system onto all your disks, simply call SYSGEN.COM, and specify one of the disks with the new system on it as the source.

This system was generated from data inside the MOVCPM program, and, therefore won't have your function key, screen, baud rate, and printer setups in place. You must use SETUP.COM to restore these. This means that if you have a printer that plugs into the IEEE port, you must use SETUP.COM to reconfigure it for this port.

4. When you have finished copying the system to the desired diskettes, push your RESET button. In the box will be displayed the revision number of your software: a 1.2, 1.3, 1.4, 1.41, 1.42, 1.43, or 1.44. Note this number and boot the CP/M disk. Put the clock disk back on drive B. If your revision was 1.2 or 1.3, enter

A>REN B:CLOCK.COM=B:CLOCK.13

if it was any other number, enter

A>REN B:CLOCK.COM=B:CLOCK.14

5. Use PIP to transfer this new clock file to the same diskettes you put the new system onto. NOTE: You can save time when doing cold and warm boots from these diskettes if the CLOCK.COM file is the first one copied to the diskette.

When you have finished copying the CLOCK.COM file to your diskettes, software installation is complete. You can test installation by placing one of your installed diskettes on drive A and doing a COLD boot. You should see a message displayed along with the date and time. If the time is not correct, don't worry about it now; you will be shown how to set the clock later.

You should keep at least one diskette with your old operating system on it. If it ever becomes necessary to repeat the above procedure, you should boot a disk that has your old system in step 2.

If you have decided to keep your old system on some of your working diskettes, note that you must do a cold boot whenever you switch between the old and new system. A warm boot will CRASH YOUR SYSTEM! This is not a problem if you install the clock onto all your program diskettes.

NOTE: The files INSTALL.COM, INSTALL.SUB and AUTOCLK.COM were used during installation and are not used again. If you have SCREEN PAC (the 80 column upgrade) the files 52.COM, 80.COM and 104.COM are replacements to the ones you may be presently using. If you don't have the SCREEN PAC, or are not familiar with these programs, don't worry about it. All they do is change screen size without having to change disks.

There are certain programs that (although they shouldn't) address the CP/M system directly instead of through the normal channels. These programs will not work with a moved CP/M system without modification. The program WSMODS used for restoring fast cursor positioning in WORDSTAR and published (thrice) in the Portable Companion is an excellent example of such a program. If you have patched this program into your WORDSTAR, it will not work without changing some things. Since WSMODS is a popular program, we have documented how to change it in the HELP section of this manual. If you find you have problems with other software, you may have to go back to your old operating system to run these programs. We have found, luckily, that the vast majority of programs available for your computer do not have this drawback. For those that do, some hints for Osborne users bold enough to attempt modifying the programs are included in the HELP section.

Let's now continue introducing some of the clock's features. If you have followed with us this far, the Phantom display feature is all ready familiar to you. This display will show the time on your screen regardless of the program running. You can "peek" behind it by using the arrow keys on your computer to move the screen back and forth. The Phantom Display will stay where it is while any characters that were "behind" it can be seen. This is why we call the display the Phantom Display, because to your programs, it doesn't really exist.

THE AT TRAP

Lets look at another feature. If you have a printer, turn it on (if your printer plugs into the IEEE 488 port go ahead and hook it up now). Type ^P (control-P) to turn on the printer echo and enter something to make sure the printer is working (we are assuming you have the A> prompt showing...to avoid the annoyance of having CP/M look for a file name when you type something, precede what you type with a colon). If things seem to be working normally, try typing the character '@'. If your printer is the kind that prints as you type, you will notice that the @ didn't print (if you have a printer that waits till a line is finished to print, bear with us a moment). Now type a 'D'. If you didn't enter anything after the @, your printer should now print the date (those of you with the buffered printer will have to now enter RETURN to see this). This feature is called the "@ Trap", or "At Trap", and allows you to print the time or date on any document at the time the document is printed. This includes letters, Supercalc reports, program listings, etc. You will find it to be a valuable aid in helping to keep track of when a report or other document was created, modified, etc.

Let's experiment with the At Trap a little. Those of you with buffered printers keep in mind that you won't see the things described until you hit a carriage return. Also, if your printer is not a CP/M list device printer (but is instead driven by a special program), you will find that the At Trap isn't working. See the HELP section if you fit into this category.

Try entering '@G' or '@4' or '@#'. You will notice that these

print as-is. Try just '@' again, but this time followed by a space. The @ printed normally. Now try '@T'. Here's how the printer knows its supposed to print the time. The printer, then responds only to the two commands:

@D   .....prints the date
@T   .....prints the time

If you have an NEC Spinwriter, or a Diablo Daisy wheel, or any printer that emulates these, you will find that the At Trap will not work with these when they are in the "microjustification" mode. You should turn the At Trap off when printing in this mode, but it may still be possible to make the At Trap work with these printers. Please request our Technical Bulletin on the subject as described at the rear of the manual.

Lets talk about devices that can be plugged into THE RT-60A output connector for a moment. If you are like most users, you use the port for your Centronics printer interface, and hopefully have found that the clock does indeed work with the printer. Obviously, something tricky must be going on for the printer and the clock to work from the same port simultaneously. You will find that the clock updates even if the printer is busy and its buffer is full. Your clock is very careful to work around the Centronics handshake system so it won't disturb the printer. If the clock software finds that the printer is in the middle of getting a character from the port when it wants to read the clock, it will wait till the printer is done. Since characters are transferred very quickly on a parallel port, your computer spends most of its time simply waiting for the printer to catch up. The clock software is able to read the port during this time, so you will never see the clock stop reading even when the printer is operating.

There are two things Centronics users have to beware of. In most cases, the clock cannot update when your printer is off but still plugged into the port. This is because most Centronics parallel printers have TTL inputs that drop to ground when the printer is off. This has the effect of tying up the port, so the clock can't be read. You will see the Phantom Display freeze under this condition. If you find your printer does this, you will need to unplug it whenever you have it off.

The second thing Centronics users may have to watch: certain error signals generated by your printer are sometimes connected through your cable to the IEEE port. They have no effect on your Osborne because it doesn't check these lines when it is printing. These lines can, however, affect the clock. If your printer seems to be working fine right now, there is probably nothing to worry about. If you are having problems, you will need to check to see if lines 13 or 21 (see your Osborne manual for the location of these fingers) are connected to anything on your printer. If they are, you can see if they are causing problems by placing a small piece of Scotch magic tape over the clock fingers 13 and 21 to insulate them from the printer connector. If the printer and

clock work together after trying this, you will need to either
disconnect the corresponding wires on the printer cable (this
wont hurt anything) or attach the Scotch tape in a more permanent
manner, and leave it in place continually. These modifications
will not affect the way the printer is supposed to operate.

Users who have IEEE 488 devices can use these devices with no
modifications. There are certain conditions that make it hard for
the clock software to read the clock when it is supposed to.
These conditions are outlined in the HELP section.

If you have made the modification that makes the clock work with
Drive C, you will not be able to use the clock with IEEE 488
devices. The printer port on Drive C should work with a
Centronics printer, though.

Other peripherals may also work with the clock. If your device
does not use a true IEEE 488 or Centronics parallel interface,
the clock may not be compatible. See the HELP section if you are
having problems with your device.

There are other features and utilities available for the clock.
These are described in the following chapters, the first of which
will show you how to set your clock.
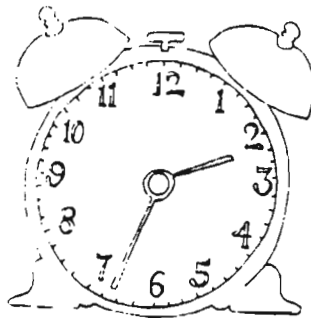
CLOCK SET PROGRAM

The clock set program is used to set the RT-60(A) and to change operating features of the clock software. The format of the ASCII time or date message may be changed in a variety of ways, the Phantom Display and the At Trap can be turned on or off, and a program to autoexecute (such as AUTOST) can be specified. Several other features can also be selected.

This program is presently written in MBASIC, so to call it you will need to load MBASIC first. The program is named CLKSET.BAS and is self-explanatory. It has two main sections: the first section allows you to set the clock, and the second allows you to change operating features of the CLOCK.COM file on the diskette of your choice (similar to the Osborne SETUP.COM program).

To run CLKSET.BAS load MBASIC and enter RUN "CLKSET.BAS". The program will prompt you from there. When you set the clock, use a bent paper clip or similar metalic object to short the posts located to the left of the clock's black connector when the program tells you to do so. NOTE: The Phantom Display will not show the updated time until you remove the short and press RETURN as instructed by the program. This operation can be a little tricky, so it is explained in detail here.

After you enter the time and date, you will be asked by the program to short the pins and press RETURN. You should make sure the pins are nicely shorted before pressing RETURN. The Phantom display will freeze to 14:32:00 PM if the pins are shorted properly. Then you should tap RETURN at the exact second you want the new time to load into the clock. It is not necessary to remove the short at the same time you press hit RETURN.

At this point, the Phantom display is turned off, and the program tells you to remove the short and press RETURN again. Don't press RETURN again until you remove the short. When you do press RETURN, the Phantom Display will come on and show the updated time.

NOTE: Even though the clock is synchronized to the exact moment you pressed return, the Phantom display updating can be off up to one second. This is due to the way the software reads the clock. See the HOW IT WORKS section.
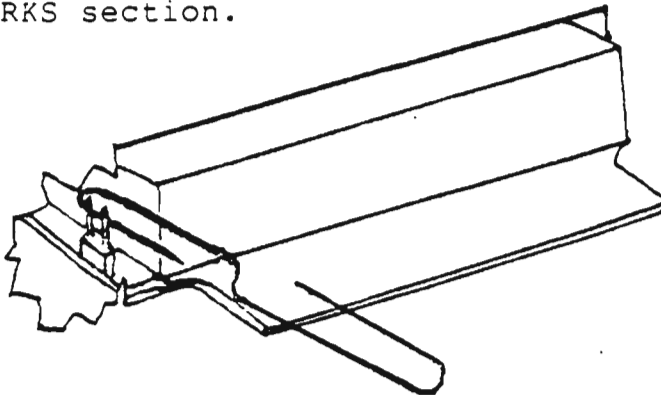
SHORTING THE CLOCK PINS

9

The "alternate format" feature you will encounter when running the CLKSET program may be a little confusing at first, so it is explained in a little more detail here. The clock software stores the time and date in two different formats; the first is a binary representation of the time and date, and the second is an ASCII string. The binary representation is normally used by computer programs, while the ASCII string is used when printing the time or date.

The ASCII strings can have a multitude of different formats that you can tailor to fit the needs of the document you may be printing. For instance, in a letter, it would be desirable to print the date as "March 14, 1983" where in a computer report the format "03/14/83" may be more desirable. The CLKSET.BAS program will allow you to specify the format desired for the diskette you happen to be configuring by selecting items on a menu.

Since programs like WORDSTAR are often used to print many different types of documents, it would be very cumbersome to have to reconfigure the diskette with WORDSTAR found on it everytime you wish to change the time or date format. For this reason, the CLKSET.BAS program gives you two alternate choices for the time and date format, in addition to the default format. When you want your printed document to have a different format than the default one, simply specify the other format as one of the alternate formats when using the CLKSET program, then when you desire the alternate format to be printed instead of the default format, press the 1 or 2 key (depending on which alternate you want) during the boot (warm or cold) of the diskette. The new format will automatically be logged in at the time of the boot. Incidentally, you can also turn the clock software completely off by pressing the 0 key during the diskette boot. This is useful if you have a program that uses critical timing loops that the clock software may delay slightly. Also, if the clock isn't plugged into the port, the software should be turned off in this way. Once you turn the software off, it takes a cold boot to turn it back on again.

You can also place the Phantom Display where you want to on the screen. It it often necessary to put it in different spots for different programs. Simply specify what row and column you want the left hand side of the display to be on.

There are a few other things the program will ask you. You have the opportunity to specify a sign-on message. This was the message that greeted you when you first booted up the clock software. Maybe your name and address would be a good thing to specify. You can also specify a password. If you place a password onto every one of your program diskettes, you can keep unauthorized users from getting into your system. If a password has been specified, you will be asked what it is whenever you do a cold boot of your system. If you don't enter the correct password, your system will lock up, and the reset button will have to be pushed, forcing you to do a cold boot again. The

password must be entered in the same case (upper or lower) that you specified it in. The password can be any ASCII sequence of characters 1-8 letters long.

After asking the password, the program will ask if you if you want to autostart a program on a warm and/or cold boot. The normal mode for this feature (to match the AUTOST feature supplied by Osborne) is to select AUTOST as the program and have it start on a cold boot only, but you can specify any program you want as long as its a command (.COM) type program. You may even specify a full command line. For instance, specifying

MBASIC DOITNOW

will automatically load MBASIC and start executing the program DOITNOW.BAS. You can use this feature with a SUBMIT file to perform some very sophisticated boot-up procedures.

<center>AUTO PROGRAM START</center>

One of the utilities supplied with your clock is named PGMSTART.COM. This program will allow you to specify a time to start any given program, and would normally be used in applications involving real-time control of your program such as wee-hour modem calls or early-morning sprinkler system control, etc.

To invoke this program, simply call it as you would any other command program. The program will ask you for the time you want to start the new program, and for the command line you want to execute. As in the autostart feature, up to a full 128 character command line may be specified.

The next time the time specified rolls around, the command line will be entered into the computer (as if it were entered directly from the keyboard), and, if the program you specified is on the proper drive, the program will begin execution.

EXAMPLE

Henry is the supervisor of a crew of milkmen that have trouble getting up in the morning (for that matter, so does Henry). He has written an MBASIC program called ALARM.BAS that will automatically call (using his autodial modem) each of his milkmen, let the phone ring five times, then go on to the next man on the list. After the calls are made, the computer beeps incessantly until Henry gets up and breaks the program (or maybe breaks the computer).

Henry wants his program to start the calling at 2:30 AM. Here's what he enters:

A>PGMSTART   (to invoke the program)

TIME HH:MM?

<center>11</center>

```
02:30                    (two-thirty)

AM/PM?

AM                       (AM)

COMMAND LINE?

MBASIC B:ALARM (invokes MBASIC from drive A and
                    runs ALARM.BAS from drive B)
WAITING TO START MBASIC B:ALARM AT 02:30 AM.
```

Henry puts MBASIC on drive A and ALARM.BAS on drive B and waits
for the fun to start the next morning.
Should Henry chicken out and decide not to do it, a ^C from the
keyboard will cancel the command.
An additional feature allows the data to be entered as part of
the PGMSTART command tail (a command tail is the data that
follows the program name when you call a CP/M program. For
instance, in A>MBASIC START , the specified START.BAS program is
in the command tail). To enter data in the command tail, use the
following format:

```
A>PGMSTART 10:52 PM MBASIC COMM
```

All parameters are seperated by a single space, with the time
always being in 12 hour format. In the line above, the MBASIC
program COMM.BAS will execute at 10:52 PM. A date may also be
specified from the command line. The command:

```
A>PGMSTART 4:15 AM @03/12/84 MBASIC COMM
```

will execute the same program as above, but not until March 12,
1984 at 4:15 am. The main use for specifying the date would be
to allow the computer to rest for a weekend, then make a modem
call Monday morning, etc. The date must be preceded by the "@"
sign.

With the data entered as part of the command line, PGMSTART can
be easily used in SUBMIT files for batch processing. Consider
the file TEST.SUB, an ASCII file that is listed below:

```
PGMSTART 03:20 AM
MBASIC CALL1
PGMSTART 03:50 AM
MBASIC CALL2
PGMSTART 04:10 AM
MBASIC CALL3
```

By calling A>SUBMIT TEST , the MBASIC programs CALL1, CALL2, and
CALL3 will be executed at 3:20, 3:50, and 4:10 respectively.
These programs must end in the MBASIC "SYSTEM" command so a warm
boot is done after each one. For more infromation on batch
processing, see a good book on CP/M. When generating the .SUB

file, make sure you use the "N" option of WORDSTAR, and do not put in any spaces after the lines. End the file with a single carriage return.
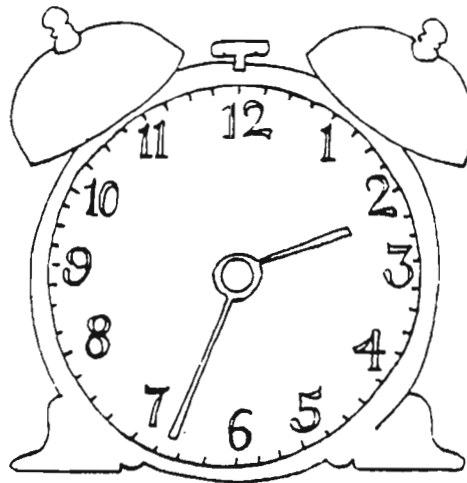
The "At Trap" has been designed to make it easy to be able to print the time or date on documents generated by WORDSTAR and SUPERCALC. Here's how it works:

If you wish to have the date appear in the heading of a letter you are generating with WORDSTAR, simply type @D where you want it to appear.

EXAMPLE

        596 E. 2875 N.
        Provo, Utah 84604
        @D

will print the heading with the current date in the format chosen.

A report generated with SUPERCALC is done the same way; simply fill a cell with the ASCII characters @D or @T.

The At Trap works by actually intercepting the @D and @T character string at the time of printing, so the original document is unaffected. This can run into problems if the @T or @D has other text following it on the same line of the document. For instance, if we are typing the following line in a WORDSTAR document:

Now (@D) is the time for every good man to come to the aid of his fellow countryman.

The extra characters generated when the At Trap is activated and prints the current date will cause the text following the date to be shifted to the right and overrun the right-hand margin of the document.

To solve this problem, the At Trap has been set up to ignore a string of x's immediately following the @D or @T. This, in combination with the length statements found on the menu of CLKSET.BAS when setting the clock format parameters can be used to generate dated or timed documents that are perfectly justified every time.

To obtain justified documents:

1. When setting up the formats you want on a specific diskettes, note the lengths of the formats you choose (you will find that date formats that spell out the Day of Week or Month fully are variable in length; these formats can only be used at the end of a line in a document).

2. Write these format lengths on the diskette after it has been configured.

EXAMPLE:
write on the diskette a sample printout and length:

DEFAULT   September 3 1983 (v)   12.42.00 PM (11)
ALT 1:   3 Sep, 1983   (13)   12:42 (5)
ALT 2:   09/03/83   (8)   12:42 (5)

3. When generating the desired document, place x's after all @D
and @T commands so that the length of the command is equal to the
length of the format you will choose when printing the document.

EXAMPLE

If you will be choosing the date format:
abbreviated month, full year (Aug. 15, 1983)
you will note the length of this format as 13, so eleven x's
should be added after the @D to make the total length of the
string 13 characters:

Now (@DXXXXXXXXXXX) is the time for all good men to come to the
aid of their fellow countryman.

Please note that a space or a carriage return must follow the
last x for the Trap to work properly.

This will give a perfectly justified document with the date
inserted regardless of the date printed.

This may all be a bit confusing, but a little experimentation
should make it clearer. We suggest that, in order to avoid
excessive bookkeeping, you try to put the date or time on a line
of its own in SUPERCALC and other documents. No following x's are
needed for time or date printings that are at the end of a
paragraph, or on a line of their own.

The AT Trap is designed for simple dating or timing requirements
such as those found in letters, reports, etc. For documents that
require different formats in the same printing, offset times or
dates, or other more complicated features, use the MAILMERGE
utility DATMERGE.BAS described in the chapter on MAILMERGE.

BASIC ACCESS

Access of the time and date in either MBASIC or CBASIC is fairly straightforward. The time and date may be obtained in either program using the following commands:

```
10 ADDRESS=PEEK(&H40)+256*PEEK(&H41) 'GET THE POINTER
20 DAY=PEEK(ADDRESS):MONTH=PEEK(ADDRESS+1):YEAR=PEEK(ADDRESS+2)
30 HOUR=PEEK(ADDRESS+3):MINUTE=PEEK(ADDRESS+4):
   SECOND=PEEK(ADDRESS+5)
40 DOW=PEEK(ADDRESS-7)
```

The numbers that will be returned in the above statements are binary numbers just like normal BASIC variables (one o'clock PM would be the number 13, 12 midnight would be 0, etc.). The DOW variable is the day of the week with 0 being Sunday, 6 being Saturday, etc.

If you examine the beginning of the listing for the CLKSET.BAS program, you will find an example of commands that access the time to see whether the user should be greeted with a "Good Morning" or a "Good Afternoon" at the start of the program.

You can also get the ASCII formatted date and time as a string in MBASIC. After getting ADDRESS as described above, execute:

```
100 FOR N=ADDRESS+7 TO ADDRESS+19
110 IF PEEK(N)=0 THEN 120 ELSE T$=T$+CHR$(PEEK(N)):NEXT
120 FOR N=ADDRESS+19 TO ADDRESS+50
130 IF PEEK(N)=0 THEN 140 ELSE D$=D$+CHR$(PEEK(N)):NEXT
140 (continue with program)...
```

When this code is executed, T$ will have the ASCII time string, D$ will have the date.

The At Trap also works in MBASIC:

```
10 LPRINT "@D"
```

prints the date.

It is possible to do timing with the clock to a resolution of one sixtieth of a second. Please request the technical bulletin on this subject.

The accuracy of this clock is not quite as good as digital watches, even though the same circutry is used. This is due to the large temperature fluctuations present inside the Osborne computer.

Use the same method as in BASIC to obtain the time in assembly language programs. The example below illustrates how to get the hour:

```
HOUR LHLD 40H   ;GET THE POINTER
     LXI  D,3   ;OFFSET TO HOURS
     DAD  D     ;ADD TO H
     MOV  B,M   ;HOURS NOW IN B
```

INSTRUCTIONS FOR FILE TIME AND DATE STAMPING

NOTE: It may be wise to become familiar with the features all ready described before proceeding beyond this point.

The file time and date stamping feature automatically records the date a file was created, and the time and date it was last changed. It does this automatically and without sacrifice of diskette access speed or data space. It works with all user areas and should theoretically (though not tested) work with other diskette setups other than the Osborne standard ones. The only sacrifice is to directory space. You are only allowed 48 files to a diskette instead of the previous 64. Single density users can only store a maximum of 48 files anyway, so this is no sacrifice to them. Double density users will only find this a limitation if they attempt to store over 48 small files averaging less than 3 K in size, which would only happen in rare cases.

You must initialize diskettes that you wish this feature to operate on. Use the INIT.COM program to do this. It works similarly to the Osborne COPY program for formatting diskettes, with one important exception: you can initialize diskettes for time and date stamping without erasing any files all ready on it. Just call INIT, enter the drive your diskette is on, and it will be initialized. You will not be able to detect any change in the diskette, but it will be set for time and date stamping. As long as the clock software is running, the time and date of any file changes will automatically be stored in the directory area of the diskette.

By using the XDIR.COM file found on our diskette, you can get a printout of the created date, and the last updated time and date. This XDIR file is different than the one you got with your Osborne, so make sure you use the right one. Our XDIR file also has some differences you should note:

First, your disk system is reset. This means that if you are logged into drive B, you may end up logged into drive A. If you want to see what is on drive B, and the XDIR file is also on drive B, you should enter

A>B:XDIR B:

We decided to reset the disk system because when this is done, the diskette you call the XDIR on is free to write directly to, without having to do a warm boot first (it eliminates the Bdos err, R/O message). This makes it easy to "scan" through several disks and do general housekeeping quickly.

The report at the bottom of the screen is also differnt but it contains the same information:

Drive B0: Files 8 (32) Bytes: 130k (53k)

This says the report is on drive B, you are in user area 0, you have 8 files, you could write up to 32 more files to the diskette, you have used 130 kbytes, and you have 53 kbytes left.

NOTES: You can still use uninitialized diskettes in your system. They will operate exactly as before, with no limitations on directory size or data storage. They simply won't have the time and date data. Calling XDIR on these diskettes will supress the time and date printouts.

You can use initialized diskettes on a system in which the clock software is not running, with no harmful effects. The system may be fooled into thinking it has less diskette space than it really does, but no data will be lost when going between systems with and without the clock software. However, the time and date data can be made invalid by using an initialized diskette on a system without the software running. The XDIR file has no way of telling whether the time and date have been made invalid in this way, and will print an invalid report anyway, even to the point of printing gibberish, so be aware of this. This is only a problem when switching between clock and non-clock systems.

When you are editing in a program such as Wordstar, you may think that you are changing the file you have specified, and that those changes are being recorded into the file on the diskette. That is not what is happening at all. What is really happening is that Wordstar is creating a totally new file of type .$$$ that contains the old file updated with the changes you are making. When you are done editing, it is only then that Wordstar changes the .$$$ file to the filename you specified, and changes the old file to .BAK . The same thing happens when overwriting files with PIP and with other programs. Since in these cases actual new files are being generated, you will find that the created date is updated even though it appears that no new file was created.

The main use for file stamping is to allow you to compare two files of the same name on two different diskettes to see which one is current. Use the updated time and date to do this. If you keep the clock software always running on your computer, and initialize all your diskettes, the file with the latest update time and datye will <u>always</u> be the most recently changed one. This can save a great deal of time and effort in backing up your files.

The created date information is not as valuable as the updated time and date (except in some data base applications). If you do not wish the created date to clutter the XDIR readout, use the XXDIR.COM file instead. In general, if you use Wordstar mostly, is is easier to use the file XXDIR, while you can get more information on database files if you use XDIR.

By the way, you can uninitialize a diskette by using the U option of the INIT program. All time and date data will be erased, and the disk will be returned to normal. No files will be lost.

INSTRUCTIONS FOR THE FLY.COM FILE

This program is useful if you wish to put several programs requiring different function key setups and different clock parameters on the same diskette. It generates a program that sets up your function keys, reformats the clock ASCII strings, repositions the Phantom display and then automatically calls the program it is associated with. It does all this "on the fly", thus the name.

Here is an example of how it works:

Joe wishes to put WORDSTAR, MBASIC, and SUPERCALC all on one diskette. Additionally, he uses WORDSTAR for more than one function: to write letters and documents, and to generate programs. Joe places a copy of FLY.COM, CLKSET.BAS and SETUP.COM (the Osborne SETUP program) on drive B, and the diskette with the three programs and CLOCK.COM on drive A.

Using SETUP, Joe first sets up all his function keys, arrow keys, and printer selection as he wants it for MBASIC. Then he saves the data to disk A. He then repeats the process for the clock parameters using CLKSET and saves the data into the clock program on drive A. Joe then does a cold boot from drive A to load all the parameters he has set. He renames the MBASIC.COM file something else, say MBASIC1.COM. Then he enters

A>B:FLY MBASIC.COM

The FLY program will ask Joe what command line he wants to execute, to which Joe answers MBASIC1 since he wants the generated program to call up MBASIC1.COM when it is finished. If Joe wanted the MBASIC program to automatically run a .BAS program, he could enter that, too, since a full command line is allowed. When Joe has entered the command line, FLY.COM will automatically generate a program on drive A called MBASIC.COM that when called will automatically set up the clock parameters and CP/M parameters to those he has chosen, then go to MBASIC1. It appears from the keyboard that the MBASIC program was the only one called. Joe repeats the process for SC.COM and for WS.COM, but for WS.COM he does it twice; the first time, he sets everything up for his letter writing and then enters

A>B:FLY WSL.COM

He then enters WS1 for the command line. The second time he sets everything up for program genertion, enters

A>B:FLY WSP.COM

and enters WS1 for the command line. When he wants to generate letters, he enters

A>WSL

and when he wants to generate programs, he enters

A>WSP

in both cases, the same Wordstar program is called, but the function keys have been set up differently.

The are a large variety of other combinations available. By specifying a longer command line, you can have your programs automatically go into execution of programs that require special key setups, etc.

Here is what you must remember when using FLY.COM:

    1. The parameters must already be set up in memory and functioning as you want them before you call FLY.COM.
    2. The filename that you enter on the same line as FLY when calling FLY.COM is the filename of the program to be generated. You must rename the program to be called first if you want this file to have the same name as that one did.
    3. The command line asked for by FLY.COM is the new name you have given your program, less the .COM extension, or it can be a full command line. If you do not enter anything, but just press RETURN, the generated program will automatically do a warm boot after executing. Screen Pac users can use this to change screen size, as a warm boot is always required to change screen size.

NOTE: When calling a program generated by FLY.COM, any command tail parameters are passed through it. That is, in Joe's MBASIC example above, entering

A>MBASIC GO

will load the program MBASIC which changes the function keys, and the call the renamed MBASIC1 with GO added to it so that the program GO.BAS automatically starts running.

        Experiment a little... you may find other uses.

INSTRUCTIONS FOR DATMERGE.BAS

The DATMERGE.BAS file is useful for generating mailmerge lists for mailings, for generating work schedules, for calculating

future dates, for placing dates in database files, etc. It is used to process files only, and works on a keyword basis. It generates a new file of the same name as the one processed, only with the extension .MER, and with keywords replaced by appropriate times and dates.

EXAMPLE:

If the MAILMERGE data file shown below is processed using TIME as keyword 1 and DATE as keyword 2, with an appropriate time and date format chosen in the DATMERGE program, the resulting file will be as shown under the first:

Mr. Bernard Smith, 21 Cedar Lane, Fort Bello, Cal.,TIME,DATE
Dr. James Dox, 4545 Mission, La Vista, New Mexico, TIME,DATE
Miss Dale Evers, 756 S. 28 E. Panguitch, Utah,TIME,DATE

The generated file will be:

Mr. Bernard Smith, 21 Cedar Lane, Fort Bello, Cal.,12:15 PM,May 15, 1983
Dr. James Dox, 4545 Mission, La Vista, New Mexico, 12:15 PM,May 15, 1983
Miss Dale Evers, 756 S. 28 E. Panguitch, Utah,12:15 PM,May 15, 1983

where the keywords have been replaced with the current time and date.

The above is a very simple application, and can actually be handled through Wordstar functions without the DATMERGE utility. The power of the DATMERGE utility comes when you need each entry to have a different time or date, which is then changed for each successive entry. DATMERGE has the capability of automatically adding a day, or a week, or other increment to the date each time the date's keyword appears. It can even skip weekends when putting in dates. This can be very useful for generating schedules.

EXAMPLE:

Jim is production manager of a widget factory that makes 12 widgets daily (these are the de luxe widgets). He has orders from 200 individuals and wishes to notify them when their order will be shipped. He prepares a form letter with the customer name, address and shipdate to be supplied by a MAILMERGE data list. The keyword for the shipping date is SHIPDATE, and Jim selects the Autoincrement weekday to be .083, since .083 is the number of weekdays it takes to make one widget (1/12). When the file is processed, the date will be incremented by one weekday (weekends will be skipped) for every 12 occurrences of the keyword SHIPDATE. The letters can then all be typed with the proper shipping date.

EXAMPLE:

Susan has been assigned to track a very complicated project that will take two years to complete. She wishes to generate a detailed schedule that gives an overview of how the project is coming, using critical path techniques. She breaks the project down into major tasks, and further breaks the major tasks into detailed milestones, each of which can be accomplished in a time frame she chooses. She then assigns a keyword to each major task, and prepares a report that lists each milestone of each major task preceded by the task keyword. Each milestone has the task keyword before it. By processing the report And choosing appropriate base dates for each task to start, and appropriate increments for the amount of time taken to accomplish the milestones in the task, Susan can tell whether or not tasks will be completed soon enough,and take appropriate actions. She can also reprocess the original file as many times as she wishes, experimanting with different start dates and milestone accomplishment times.

NOTES: You may specify fractions on autoincrement days and weekdays only. You may specify negative numbers to do an autodecrement if you wish. If you specify a time as one keyword, and a date as the next one, and if you have the time autoincrement, when the time goes past midnight, the date will automatically increment by one day.

We hope to have more applications and instructions on this utility available later through our technical bulletin service.

HOW THE CLOCK WORKS

The clock software is set up to read the clock once a second during the normal interrupt cycle of the Osborne 1. This interrupt cycle takes place once every sixtieth of a second except when interrupts are disabled or a disk access is taking place. When a normal interrupt occurs, the clock software decrements a register and checks it to see if it is zero. If it is, it loads a sixty back into the register and reads the clock time and date. The time is then translated to binary and ASCII format and stored in the appropriate registers. These actions only take place once a second after the clock is read, so program execution time is not significantly affected. Note that the date is read, but not translated to ASCII or binary in real time. This translattion is only done by the clock software when booting. If your program requires the date and there is a possiblity that midnight has passed without a warm boot being executed, your program should look at the BCD date data instead of the binary data, as that is the only date that is always current.

If the Phantom Display is on, the Osborne 1 display is updated every sixtieth of a second to give a smooth action when the screen is scrolled. It does this using the Z-80 block transfer commands to sense if the display has been moved and then

restoring the time to the proper place on the screen. Since this action must take place every sixtieth of a second, program execution is slowed slightly. We found that a BASIC program that takes 23 seconds to operate with the Phantom Display off takes 26.5 seconds with it on. In most cases, the difference won't be noticed.

The At Trap, although it resides with those routines that operate during interrupt cycles, it does not operate during interrupts. Instead, whenever the BIOS jump to the list device output routine is called, the program execution is sent to the At Trap routine first. The routine checks for the @T or @D characters and prints the time or date if they are present. Otherwise the At Trap routine sends execution to the BIOS list output routine in the normal manner.

Your normal Osborne operating system as it is found on the diskette after installing the clock contains only one minor change: it is set to call the program CLOCK.COM instead of AUTOST.COM, and to call it on both a cold and warm boot. There are no other changes on the disk system, other than the fact that it will reside one kilobyte lower in memory when it is loaded to make room for the clock software.

On a cold or warm boot, the program CLOCK.COM begins automatic execution. It starts by sensing whether the boot is cold or warm, and, if cold, moves the clock software (which is loaded as part of the CLOCK.COM file) to its appropriate place above the BIOS software. It then checks the keyboard to see if an alternate format has been chosen, and translates the date to the chosen format. The binary and ASCII formatted date is then loaded into the appropriate buffers in upper memory.

After the date is read, the CLOCK.COM program redirects the interrupt vector so that interrupts go through the clock software first (this vector is the word found at EFF8 Hex and is loaded with the beginning address of the clock routines). It then gives the clock software the original vector so the software knows where to jump to for normal interrupt processing.

The CLOCK.COM program then locates the BIOS jump command for the LIST device output and replaces the jump address with the At Trap routine address, giving the original address to the At Trap routine so it knows where to jump to for printing. After doing this, the program installs the patches for the time and date stamping, then prints the date and time to the screen and either exits to CP/M or causes the program specified in the CLKSET program to be executed. If a cold boot is being executed, the software also prints the greeting message and asks for the password if one is specified. If an invalid password is entered, the software simply sends itself into an endless loop.

Hardware operation of the RT-60A is a little complicated, because it must allow the IEEE 488 port to still be used. This requires the use of more complicated circuitry and access techniques. The

clock normally runs with its outputs in a high impedance state that does not disturb other activity on the port. When a clock read is required by the clock software, a special low voltage CMOS circuit on the clock recognizes a unique handshake sequence put out by the software and activates the clock outputs for reading. This handshake sequence is such that it does not disturb any IEEE 488 or Centronics devices plugged into the port. In order for it to work properly, the port must be found in the source handshake mode (the Centronics output mode) by the clock software. If the software doesn't find this condition, or if an interrupt has occurred in the middle of a handshake, the software will delay reading the clock until the next interrupt, a sixtieth of a second later. Since the computer is normally in the output mode, there is usually no wait for the correct time to be read.

Certain conditions will cause the clock software to be unable to read the RT-60A for long periods of time. See the HELP section for a description of these conditions.
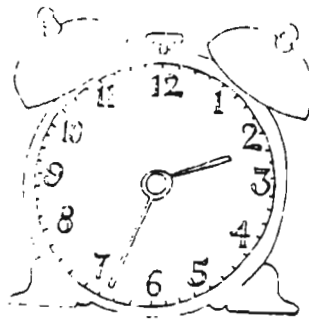
Here are memory locations that may be of interest. These locations should only be accessed through the pointer found at memory location 40 hex and should never be addressed directly, as their absolute address is subject to change in future software revisions. Their offset from the pointer should not change.

OFFSET		NAME	DESCRIPTION
FFF1 H,	-15 D	FLAGS	MISCELLANEOUS FLAGS: BIT 0: 1=PHANTOM ON, 0=OFF BIT 1: NOT ASSIGNED BIT 2: NOT ASSIGNED BIT 3,4: USED BY AT TRAP BIT 5: 1=AT TRAP ON,0=OFF BIT 6: NOT ASSIGNED BIT 7: 1=SOFTWARE OFF, 0=ON
FFF2 H,	-14 D	TIMEFLAG	TIME FORMAT FLAGS: BIT 0:0=12 HOUR FORMAT, 1=24 HOUR BIT 1:1=AM/PM OFF, 0=ON BIT 2:1=SECONDS SUPRESSED ALL OTHER BITS UNASSIGNED
FFF3 H,	-13 D	DATE	SEVEN BYTES, YYMMDD, DOW ORDER. BIT 2 OF 10's OF DAYS SET FOR LEAP YEAR. THIS IS THE ONLY DATE REPRESENTATION THAT IS ALWAYS CURRENT. THE OTHERS REQUIRE A BOOT, OR EXECUTION OF A FLY.COM PROGRAM TO UPDATE.
FFFA H,	-6D	TIME	SIX CONSECUTIVE BYTES CONTAINING THE TIME IN BCD UNPACKED 12 HOUR FORMAT. BIT 2 OF FIRST BYTE SET FOR PM, RESET FOR AM. HHMMSS ORDER. THIS IS HOW THE DATA COMES RAW FROM THE CLOCK.
0000 H,	0 D	DAY	BINARY DAY. IN SINGLE DENSITY SYSTEM, IF THIS HAS A FF HEX OR BB HEX, IT MEANS THE TIME AND DATE ARE INVALID. NO EQUIVALENT IN DD SYSTEMS.
0001 H	1 D	MONTH	BINARY MONTH
0002 H	2 D	YEAR	BINARY YEAR (53 HEX=1983)
0003 H	3 D	HOURS	BINARY, 24 HOUR, 0=MIDNIGHT
0004 H	4 D	MINUTES	BINARY
0005 H	5 D	SECONDS	BINARY
0006 H	6 D	MEMBUFF	THIS REGISTER DECREMENTS FROM 60 D TO 1 IN SIXTIETH OF A SECOND INTERVALS AS LONG AS INTERUPTS ARE BEING PROCESSED. WHEN IT EQUALS 1, A CLOCK READ TAKES PLACE AND IT IS RESTORED TO SIXTY AGAIN. FOR THE RT-60A, THIS REGISTER WILL STICK AT ONE AS LONG AS

OFFSET		NAME	DESCRIPTION
			UNSUCCESSFUL READS TAKE PLACE (SUCH AS WHEN THE PORT IS NOT FOUND IN THE OUTPUT MODE).
0007 H	7 D	TIMEASCII	ASCII TIME STRING IN CHOSEN FORMAT. TERMINATED IN NULL CHARACTER.
0013 H	19 D	DATEASCII	DATE STRING TERMINATED IN NULL.

The pointer points to the binary representation of the day of the month, and the other data may be obtained by adding the appropriate offset to the pointer and then accessing the address calculated. If the pointer address contains an FF hex or a BB hex, then the time and date are invalid, due to the clock software not running or some other reason. An invalid indicator will also show if the most recent boot of the system did not execute the file CLOCK.COM even if the software is still running. The reason for this is because the pointer may not be pointing to the correct address location any longer.

HELP!

Q. My AT Trap won't work because I have a custom printer driver routine.
A. Different routines require different solutions, so we will need information on your driver to help on this one. Probably the easiest thing to do is change the driver routine so it is tha CP/M list device. Daisy wheel printers that can do microjustification will not work with the At Trap in this mode. Please request our technical bulletin on the subject.

Q. My Phantom display drops a line when I scroll the screen all the way around. It also sometimes has little "glitches" on it. If I position it in certain places in Wordstar or Supercalc, weird things happen.
A. These are normal symptoms; the line dropping is due to a dropped carry in a sixteen bit add that would take too much execution time to correct. The occasional glitches occur because of a timing relationship between the interrupt, and the display. Turning the seconds off on the Phantom will cure them. There are certain places on the screen where the Phantom Display should NOT be positioned: in Wordstar, don't put it into the area where editing takes place. In Supercalc, don't put it into any cell areas! Strange things will result if you do. If you find the Phantom doing strange things on any progam, you may have to reposition it, or turn it off.

Q. How do I replace the battery?
A. Remove the clock from the IEEE port, making sure the case comes with it. Turn the clock over and note the bulges along the left edge of the case. These bulges are transistors, and care must be taken when removing the case so that thay are not caught by the case as it is pulled off. Remove the case by slowly pulling it off, while watching that the transistors are not caught. You will need a small pocketknife to carefully pry the battery out of its socket. Do not lift up on the battery, but

slide it out sideways. the spring contact on the battery has five
contact points so that vibrations won't have much effect; make
sure the new battery clears all five contacts by putting the
knife blade under them when sliding in the new one. The + side
goes down into the cup; we recommend Duracel DL2420 or DL2430
lithium cells, but Radio Shack CR2320 batteries will also work.
Expect the battery to last about a year. Replacement batteries
that have a shelf life of ten years are available from us for
$3.00 each postpaid.
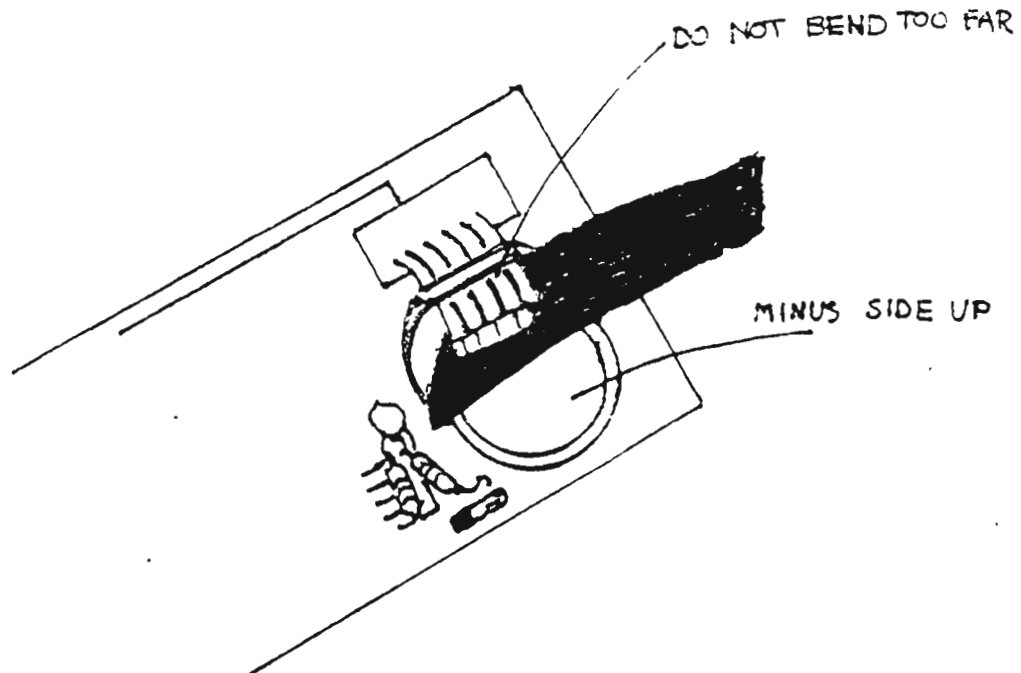
BATTERY REPLACEMENT

Q. How come you have to reload the clock file on warm boots too?
A. This is required for the time and date stamping routine to be
patched in properly. If you have a 1.4x ROM, it may be possible
to bypass this necessity. See the technical support section that
follows.

Q. My printer (hard disk/joystick/terminal) acts weird when the
clock is in place.
A. If this device plugs into IEEE, we may have a protocal clash.
If you only use the device during specific applications, we
suggest you unplug your clock while its in use. If the device is
your lifeblood,.we will try to provide the support necessary to
make the devices compatible. If you find yourself in this
situation, gather up all the interface information you can find
about the other device; timing diagrams, pin assignments and any
other information will be helpful. Then contact us about it.

Q. Is there any other care necessary besides battery replacement?
A. No.

Q. How do I modify my WSMODS program so WORDSTAR will work with
my clock?
A. Go back to the most recent magazine listing (April/May 1983,

p. 107). Three lines need changing. They presently read like
this:
UCNSTA JMP 0E506H   (THIS ONE IS AT BOTTOM OF PAGE 2)
INCON JMP 0E509H   (THIS IS HALFWAY DOWN PAGE 3)
       JMP 0E50CH   (THIS IS 2/3 DOWN PAGE THREE)

if you have single density, change these addresses to 0E106H,
0E109H, and 0E10CH respectively. If you have double density, the
addresses are 0DD06H, 0DD09H, 0DD0CH. Reassemble the file, and
repatch it into WORDSTAR according to the instructions in the
article.

Q. Under what conditions will the RT-60A software be unable to
read the clock for extended periods of time?
A. 1. Disabled interrupts.
   2. Peripheral devices turned off, or, in rare cases, off-line.
   3. The port set as input for extended periods of time.
   4. The DAV , ATN lines set low for extended periods.
   5. A Printer status line (such as PAPER OUT, SELECT, etc.)
      connected to the NRFD line (pin 13) Osborne's Centronics
      routines do not support error conditions, so if you find
      your clock doesn't update with the printer connected, check
      for wires that don't need to be there. For Centronics
      parallel devices, there should be no connections to pins 13
      and 21. If you have connections to these pins and do not
      wish to alter your printer cable, we suggest you carefully
      cover the pins with Scotch Magic Mending Tape so no
      connection is made.
   6. Long periods when the Osborne is not in IEEE Source
      Handshake mode. Also long data transfers may hold the clock
   up under certain conditions.

Luckily, most users of the clock will rarely encounter any of the
above conditions.

Q. Sometimes my At Trap doesn't print following characters that
   it should.
A. The At Trap ignores any character that immediately follows
    the @T or @D unless it is a space or a carriage return.

Q. How do I adjust the clock speed?
A.   If you find your clock is running consistently fast or slow,
     you can adjust the speed according to the diagram below.
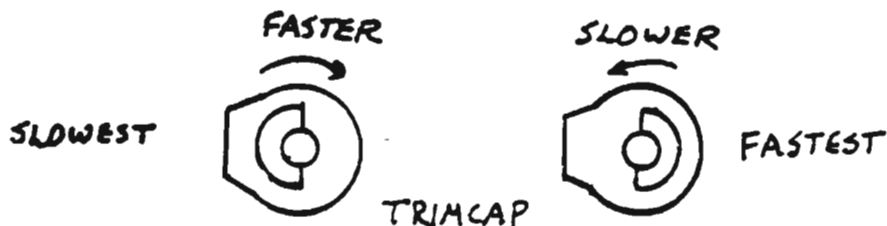
Q. My software didn't seem to install properly.
A.   Please contact us. It may be that you have a non-standard
system that will require some extra work to get it installed.

SUPPORT

Our intent is to provide you with a useful product that is as convenient to use as possible. We will try to give the necessary technical support to make the clock work for your application. In technical matters, we are better equipped to handle mail inquiries rather than phone calls. In correspondence, please include all the pertinent technical details you can find.

We plan to support the RT-60A with continued software updates and extended utilities, which will be available under the following program:

BULLETINS: We will issue technical bulletins as the need arises. These bulletins will in general be fairly technical in nature, and are fairly short, generally two pages long. To date, the following bulletins have been released:

#1 Further MBASIC ACCESS: Covers how to get sixtieth of a second resolution from the clock for timing purposes.

#2 Drive C Modification. Shows how to modify a clock for use with Drive C. This bulletin is free to owners of Drive C.

#3 Further Password usage. Shows how a single program can be protected through the password in the clock.

#4 DBASE II Access. Will show how to get the time and date for your files from DBASE II.

#5 Automatic Modem operation. Shows how to access the JG Communications Modem service. This service is scheduled to go on-line at the end of April and will have all bulletins, updates, and any bug fixes to your software. Access is free to clock users. This bulletin is not yet released, but should be soon.

#6 SUPERCALC 2 access. Explains how to automatically load the time and date into SUPERCALC 2. This bulletin has limited utility as the At Trap handles most Supercalc applications. Some basic assembly language skills are required.

#7 Disabling clock warm boots. Only works with 1.4x ROM. Shows how to eliminate the necessity of warm booting clock software. Requires knowledge of DDT.COM. (still being prepared).

These bulletins can be obtained for $1.00 each.

If you do not have a modem, any update software can be obtained by diskette for $7.50.

How to find out what bulletins and updates are available:

The best way to find out what is available is to request our general bulletin, which we will issue every quarter or so. The

general bulletin is free, but you must send a self addressed, stamped envelope to get it. We are also opening a mailbox on CompuServe, but do not yet know what the number will be.

A technical manual that includes all source code listings, schematics, and detailed operational theory is available for $17.50 ppd. Use the order form included in this manual.

Certain features of these real time clocks, such as the mounting scheme, some facets of the internal circuitry, and some software features are proprietary and may be patentable. The software is copyrighted; attempts to copy the clock will be discouraged through legal channels.

WARRANTY

JG COMMUNICATIONS warrants the RT-60 and RT-60A to be free from manufacturing defects for a ninety day period following its receipt by the end-user. The warranty does not cover damage to the product resulting from accident or misuse.

If the product should become defective within the warranty period, we will elect to repair or replace it free of charge incuding free return shipping charges, provided it is returned to us postpaid.

This warranty gives you specific legal rights, and you may have other rights which vary from state to state.