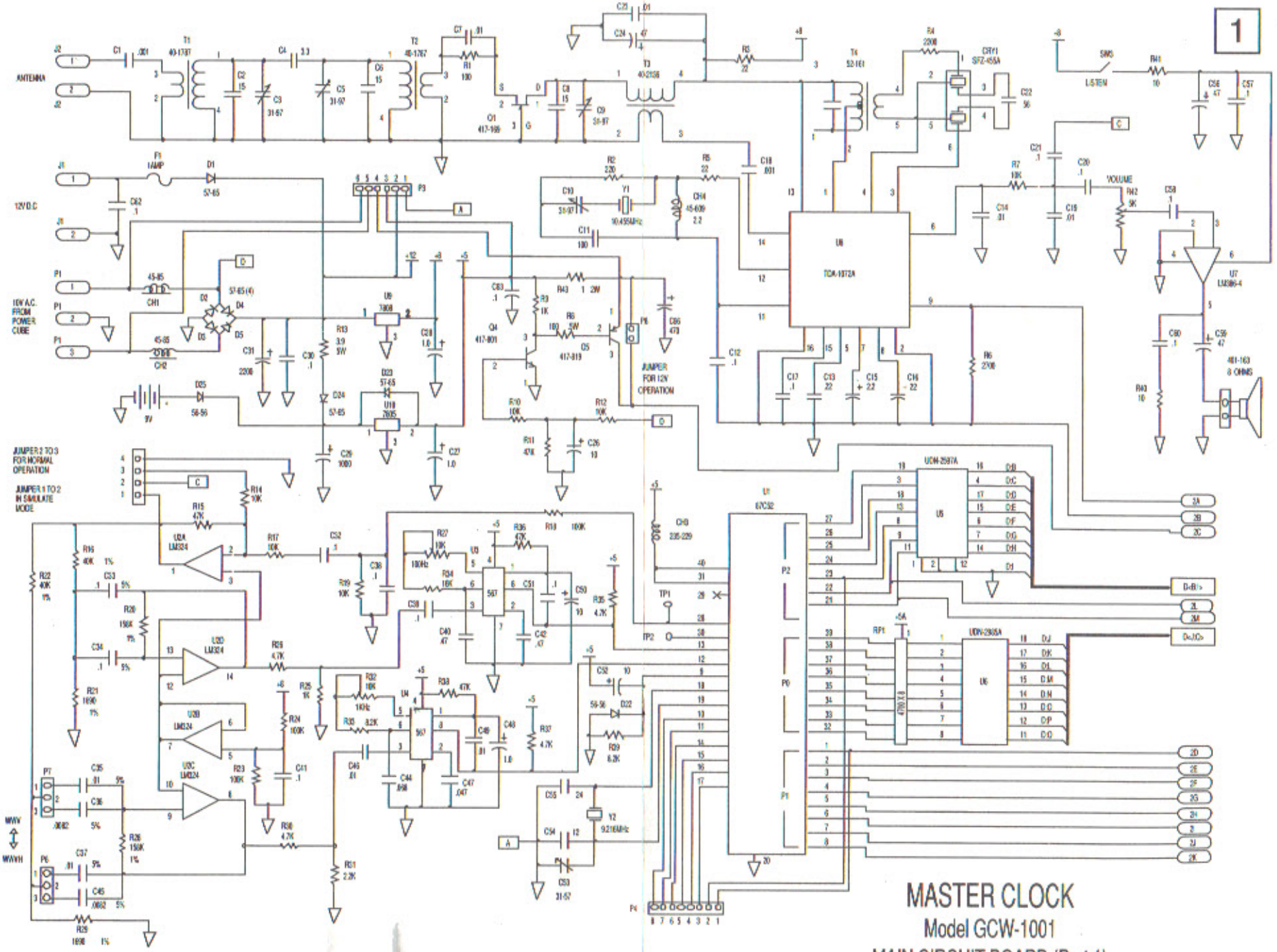
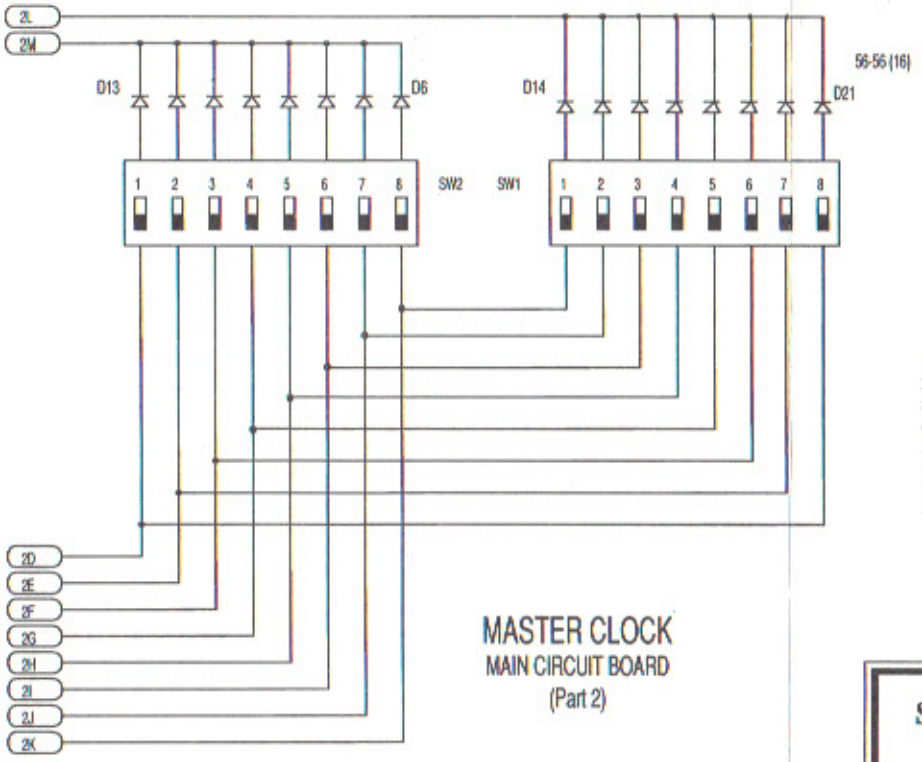
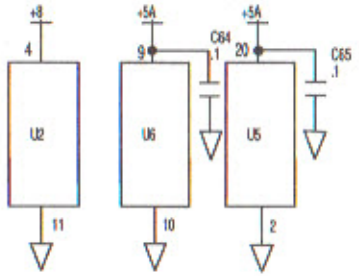

1
ANTENNA
12V D.C
10V A.C. FROM POWER CUBE
JUMPER 2 TO 3 FOR NORMAL OPERATION
JUMPER 1 TO 2 IN SIMULATE MODE
JUMPER FOR 12V OPERATION
LISTEM
VOLUME
8 OHMS
MASTER CLOCK
Model GCW-1001
MAIN CIRCUIT BOARD (Part 1)



MASTER CLOCK
MAIN CIRCUIT BOARD
(Part 2)



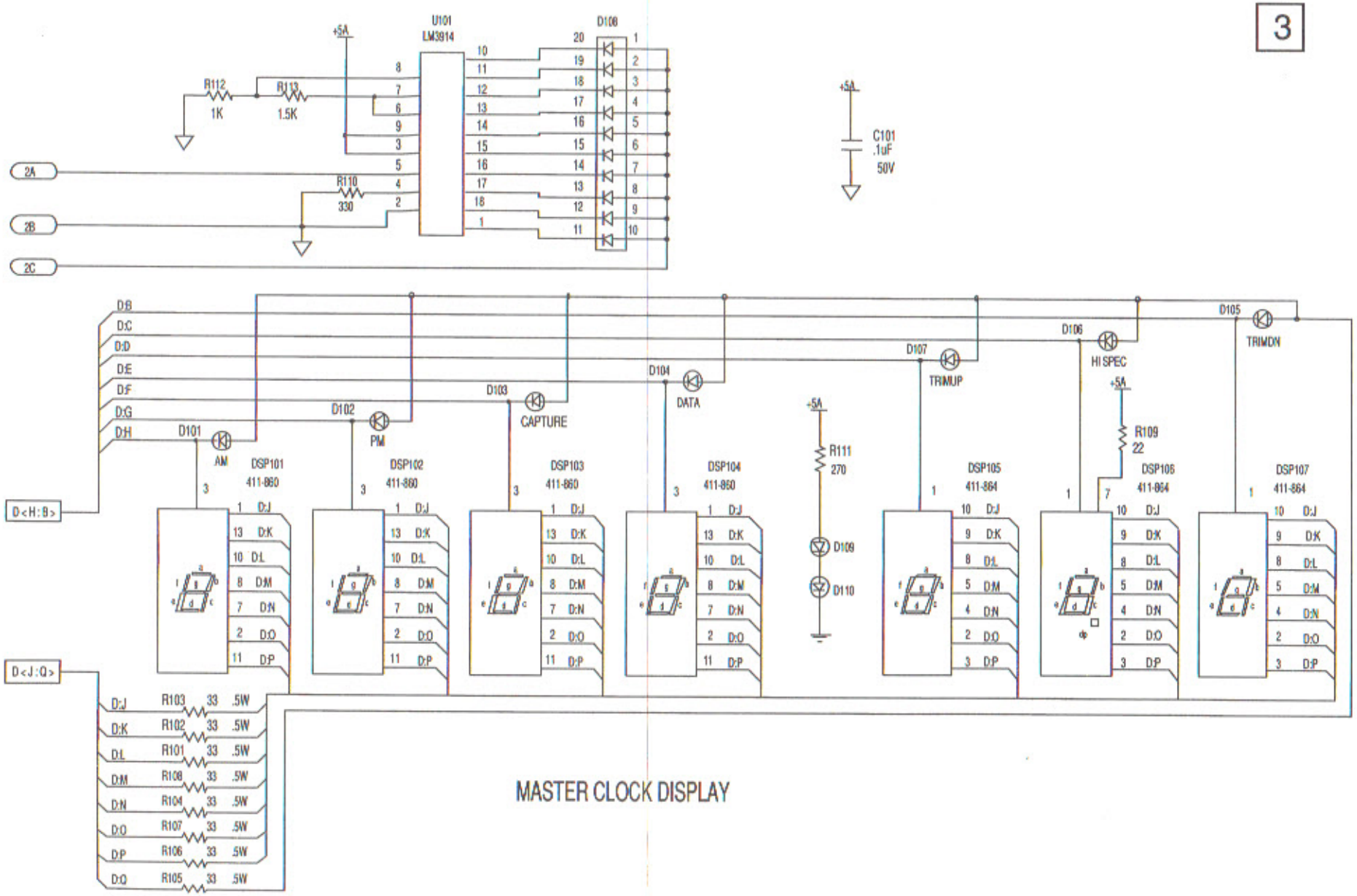
SW2	SW1
1 T.Z.1	1 P.D.1
2 T.Z.2	2 P.D.2
3 T.Z.4	3 P.D.4
4 T.Z.8	4 P.D.8
5 T.Z.8	5 OST
6 12 HR	6 TEST
7 UTC	7 MIN SET
8 UT1	8 HR SET

Schematic Notes

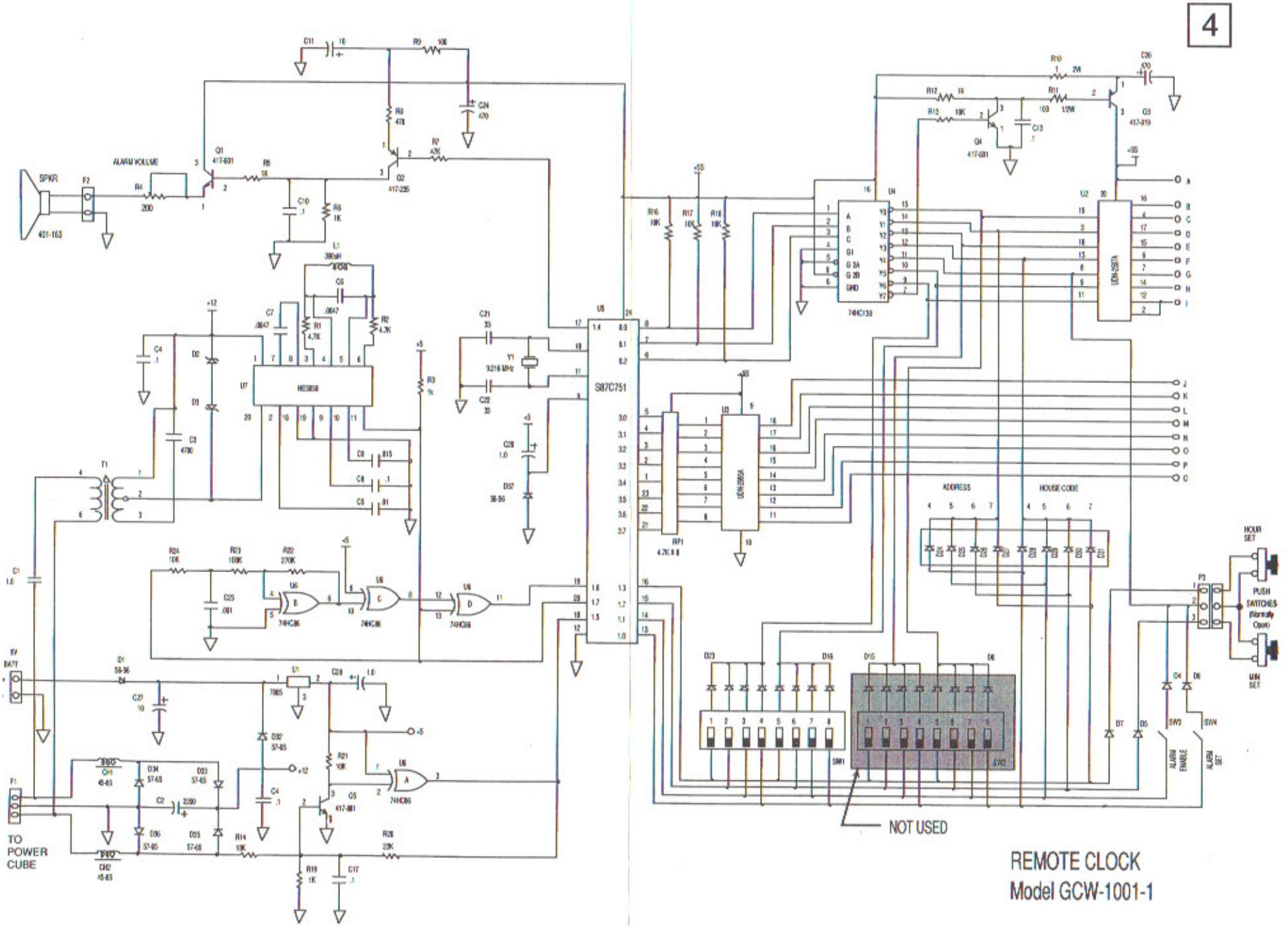
1. Resistor values are in ohms (K = 1,000; M = 1,000,000). All resistors are 1/4-watt unless marked otherwise.

2. All capacitor values are in µF (microfarads).

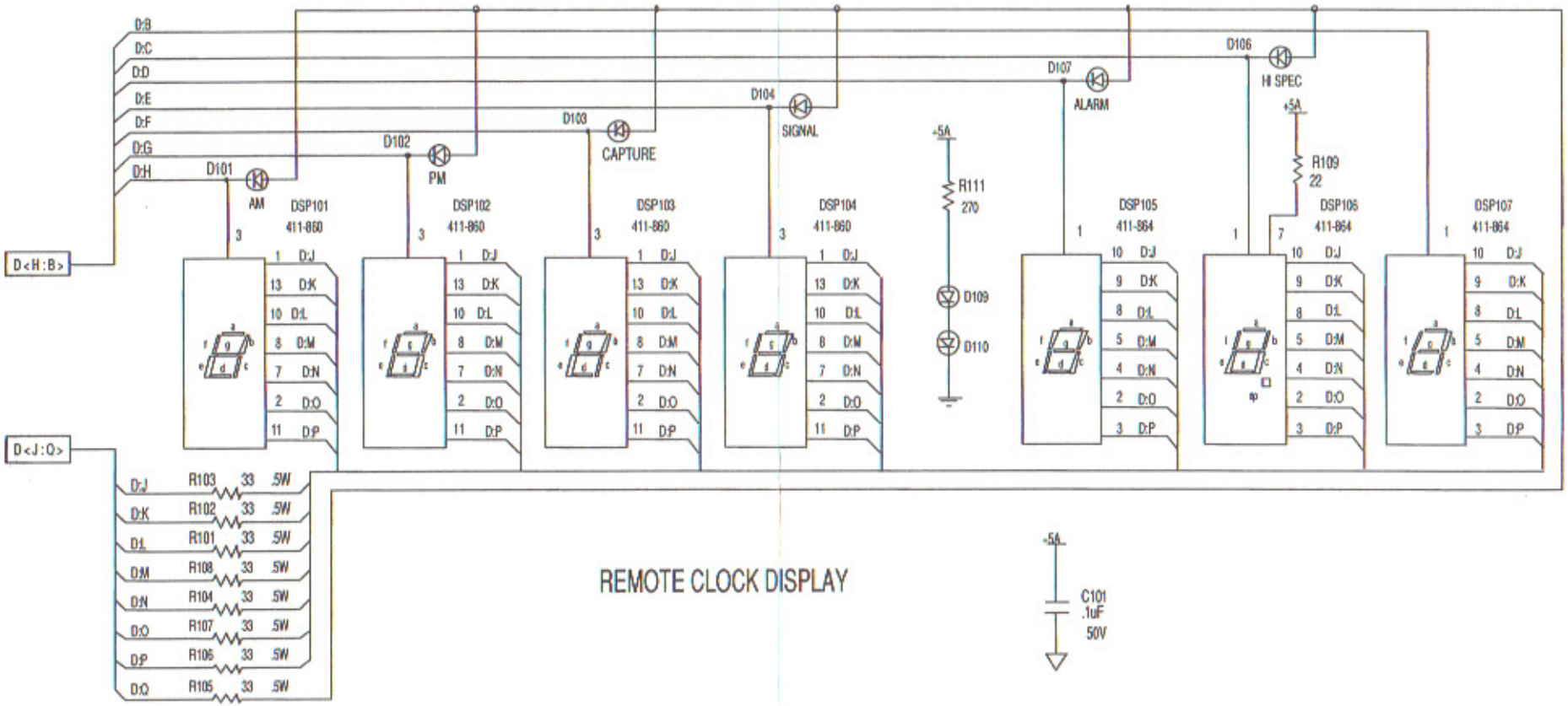
3. ⏚ This symbol indicates circuit board ground.



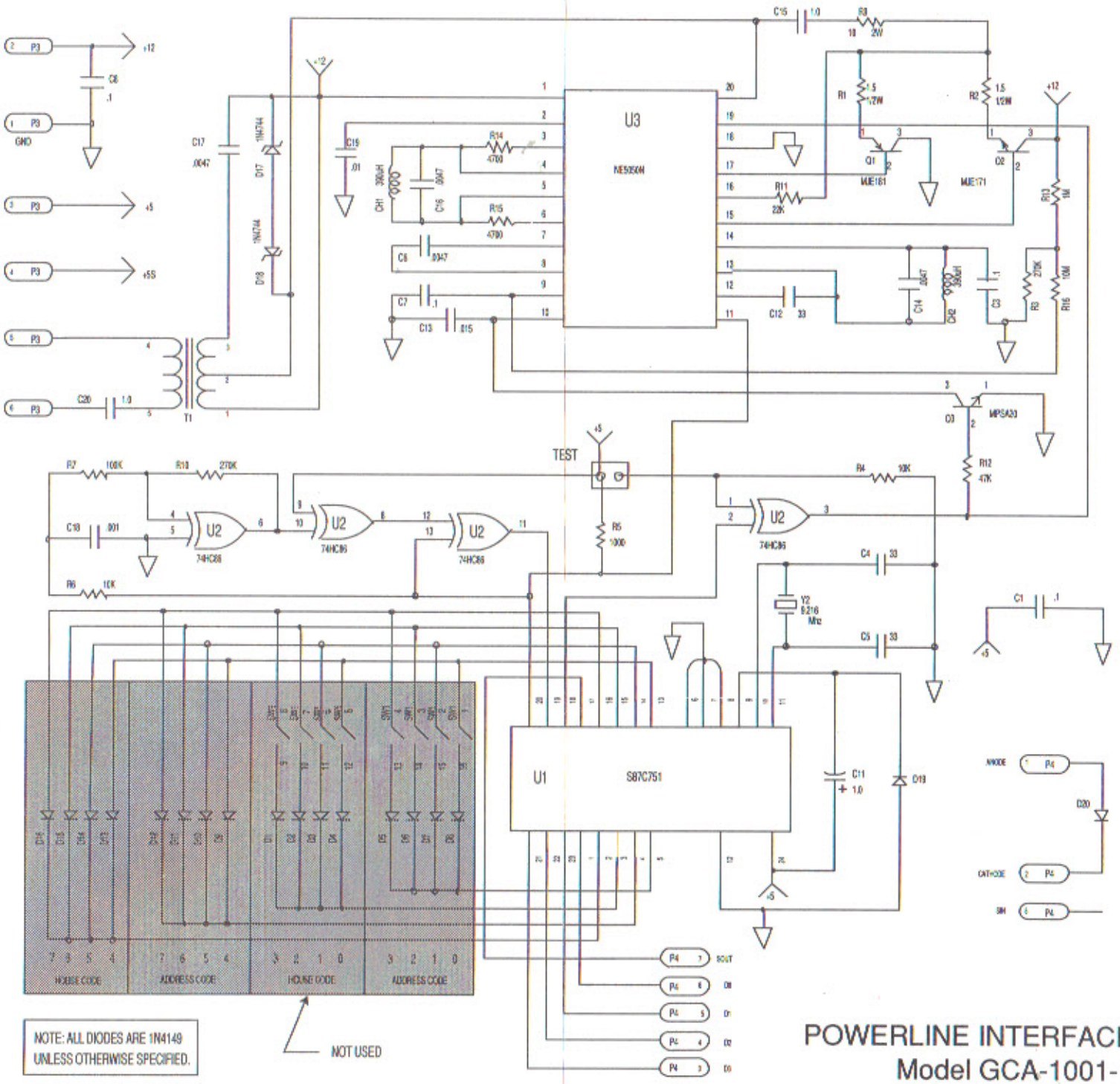
MASTER CLOCK DISPLAY



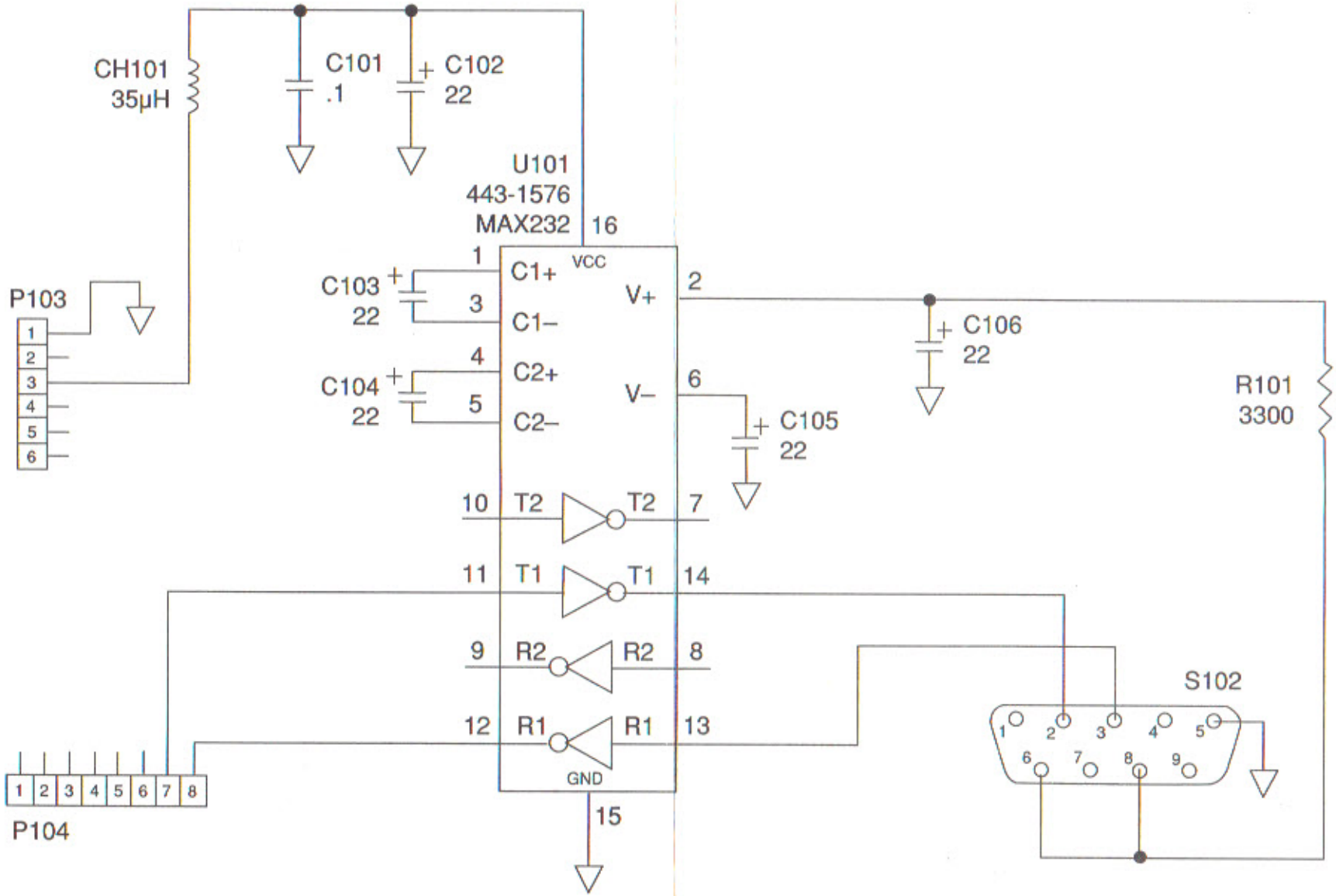
REMOTE CLOCK
Model GCW-1001-1



REMOTE CLOCK DISPLAY



POWERLINE INTERFACE
Model GCA-1001-1



RS-232 INTERFACE
Model GCA-1001-2

Instructions

for the

Heathkit®

RS-232 Interface Accessory

Model GCA-1001-2

INTRODUCTION

RS-232 Interface Accessory easily installs in your Master Clock and allows a computer or terminal to access time and clock status. This accessory includes PC utility software.

INSTALLATION

( ) Remove power from the Main Clock by unplugging its line cord or disconnecting the Clock from the DC power supply. Also remove the 9-volt battery if it has one installed.

( ) Remove the screw from the cabinet bottom, and carefully separate the cabinet halves. Free the cabinet top by sliding it over the connector that protrudes from the rear of the cabinet.

( ) Refer to Pictorial 1 on the next page, position the RS-232 Interface circuit board plugs as shown, and carefully push the connectors together. It is easy to get the pins misaligned so be sure that each pin goes into its proper connector hole.

( ) Use a small flat-bladed screwdriver and carefully remove the 'D' connector "knockout" from the rear of the cabinet top.

( ) Mount the 'D' connector to the rear panel. Use the two hex spacers, lockwashers, and nuts supplied. Do NOT overtighten them.

( ) Carefully reassemble the cabinet halves and reconnect power. Then, reinstall the 9-volt battery.

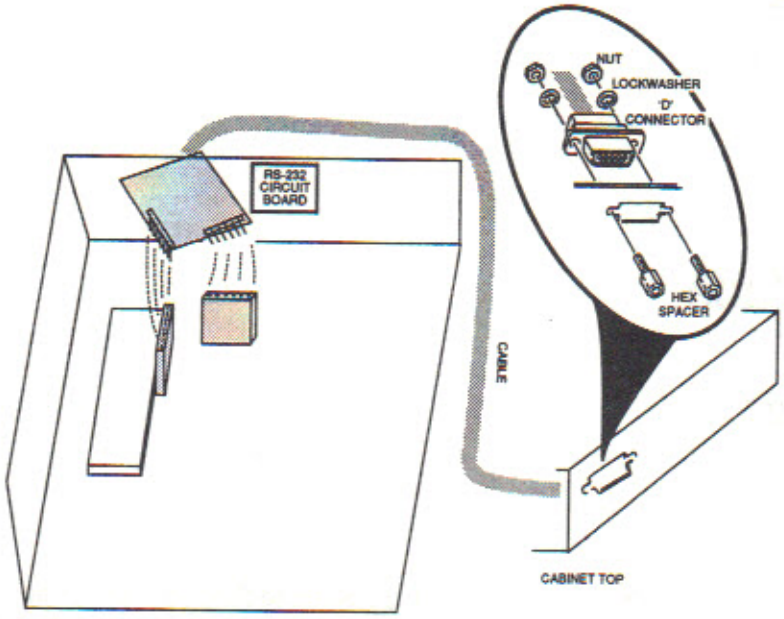


FIGURE 1

REGULATORY INFORMATION

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy. If not installed and used according to this manual, this equipment may cause harmful interference to radio and television communications. However, there is no guarantee that interference will not occur in a particular installation.

To meet Class B emission limits, the user must observe the following requirements:

1. Use only shielded I/O cables to connect this digital device.

2. The user is cautioned that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

If this equipment does cause interference to radio or television reception, which you can determine by turning the equipment off and on, try to correct the interference by using one or more of the following measures:

— Move the digital device away from the affected receiver.

— Reposition the device with respect to the affected receiver.

— Reorient the affected receiver's antenna.

— Plug the digital device into a different AC outlet so the digital device and receiver are on different branch circuits.

— Disconnect and remove any I/O cables that the digital device does not use. (Unterminated I/O cables are a potential source of high RF emission levels.)

If you need additional help, consult the dealer, manufacturer, or an experienced radio or Television technician.

This device complies with Part 15 of FCC Rules. Operation is subject to the following two conditions:

— This device must not cause harmful interference.

— This device must accept any interference that may cause undesired operation.

If 'D' is received, the clock returns 24 pairs of bytes containing the variable divisor value at the end of each of the previous 24 hours. This allows the trimming process to be observed. UTC hour 00 is always returned first. The first byte of each pair is the high byte of the divisor * 16; the second byte is the low byte * 16. For example, the byte pair 3C 10 would be returned for a divisor of 03C1 hex (961 decimal).

If 'A' is received, the clock returns an ASCII time string of the format
HH:MM:SS.T xx<CR>, where

xx = 'AM', 'PM', or ' '

Note: If connected to a terminal, this is the only useful command, since the other four commands return hexadecimal information to be interpreted by a computer with appropriate software.

For further technical information, refer to the GCW-1001 Most Accurate Clock manual.

The Heath GCW-1001 PC Display Utility

Features

* Large digit time display.
* Transient or resident (pop-up) operation.
* Selectable UTC (Coordinated Universal Time) or local time.
* Selectable 12-hour or 24-hour format.
* Large annunciator 'LEDs' mimic those on the clock.
* Display of propagation and trimming data for 24-hour period.
* Easily selectable color combinations.
* Ability to accurately set your PC's real-time clock to local or UTC time, from the program or at boot time.

Introduction

This utility program allows your PC to communicate with the GCW-1001 Most Accurate Clock through the GCA-1001-2 serial interface accessory.

The utility may be run as a transient program or installed to be memory-resident, allowing it to be popped up over other application programs.

Running the program

The name of the program is GCW.COM. As with any DOS program, it is invoked by typing its name, GCW, at the DOS prompt, and pressing ENTER.

There are four 'switches' that may be specified following GCW in the command line. If more than one switch is specified, they may be entered in any order, but each must be preceded by a slash (/). Type GCW/ to get information on switch usage.

The program defaults to the use of serial port COM1 unless the /2 (COM2) switch is used, and to the use of color unless the /M (Mono) switch is used. If you run this program on a laptop with an LCD screen, you may need to specify the /M switch for good contrast.

The third switch is /R (Resident). Using this switch causes the program to install itself as a memory resident (pop-up) utility. The program will announce that it has been installed, and remind you of the 'hot key' combination that pops up the program. To invoke the program, you must hold both SHIFT keys down while pressing the G key. The program will only pop up if the display is in an 80 column text mode (mode 2, 3, or 7). The first time it is popped up it will take a second to paint itself onto the screen; subsequent pop-ups will be instantaneous.

The final switch is /S. This switch causes the program to run just long enough to read the GCW-1001 and set your computer's clock. Then it returns to DOS. This allows you to add the

command to your AUTOEXEC.BAT file so that your computer's clock will be accurately set each time the computer is booted.

When the /S switch is used, the default time format (local or UTC) will be used. (The 12/24-hour format has no effect; the computer's time is always in 24-hour format.) See the description of function F8 (Save) for information on changing the default format.

If you add a line to your AUTOEXEC.BAT file to set your computer's clock on boot-up, you will see the clock display appear briefly as the command is executed. If the program isn't able to communicate with the GCW-1001 at that time, the time section of the display will be blank, and the computer's time will not be changed. The computer will beep to indicate that the clock was not accessed.

If you use the /S and /R switches in the same line, the /R switch will be ignored. To set the computer's clock and make the program memory-resident, use separate command lines. For example:

```
C:\CLOCK\GCW/S/2
C:\CLOCK\GCW/R/2
```

These lines assume that GCW.COM is in directory \CLOCK on drive C:, and that the GCW-1001 is connected to port COM2.

General

The display is divided into five basic sections. The top section displays the time in large numerals. Regardless of the clock's display settings, you may select either the 12 or 24 hour format there using the F1 and F2 function keys, and local or UTC time with the F3 and F4 keys.

The second section displays the status of the clock's LEDs, with two qualifications: (1) If the program's display format (12-hour or 24-hour) is set differently than the clock, the AM and PM LEDs will not match those on the clock, and (2) the blinking DATA annunciator is 'faked' by the program, and will therefore blink regardless of signal conditions.

The next section of the screen allows you to monitor both propagation characteristics and timebase trimming over the previous 24 hour period. The center of the section contains a time line from 00 hours to 23 hours UTC. Numbers above this line will range from 0 to 60, and indicate the number of good time frames received during each hour. This will allow you to determine the best times to listen to WWV(H) broadcasts, and to judge the adequacy of your antenna.

Numbers below the time line represent the value of the variable divisor at the end of the corresponding hour. These values are in hex, as they are on the clock in monitor mode. This gives you a history of the clock's trimming of its timebase. The nominal value is 3C0 hex (960 decimal). The value will change by a maximum of four counts per hour. When this value is seen to change only a few counts above and below an 'average' value, the timebase has been trimmed, and the difference between this average value and the nominal value indicates the accuracy of the timebase oscillator (not the accuracy of the clock).

Note that the values for the current UTC hour are not updated until the NEXT hour. Refer to the GCW-1001 manual for more information on the timebase trimming process.

The last two sections of the screen are the Prompts line, and the Menu line, which are self-explanitory.

Functions

Functions F1 and F2 select between 12-hour and 24-hour time formats. Functions F3 and F4 select between local and UTC time.

F5 allows you to set your computer's time. It is important to note that it will be set to the same time as is currently displayed, local or UTC. (It makes no difference whether 12-hour or 24-hour format is selected.) The time used by DOS will therefore be very accurate, and in most computers with real time clocks, the time will be stored there also.

F8 may be used to save the current time format (12/24 hour and local/UTC), and color selections (described below). This function creates (or over-writes) the file GCW.COM in the current directory, making the current selections the new defaults. The default setting of local or UTC time is important when you use the /S switch, because your computer's clock will be set to the corresponding time.

Before pressing F8, make sure that the current directory is the one where you want the modified copy of GCW.COM saved. You may need to copy the modified version to the directory specified in your AUTOEXEC.BAT file, so that it will be the copy used at boot-up.

F9 allows you to customize the colors to your liking. The changes you make will be temporary unless they are saved with function F8. (When the program is memory-resident, the new colors will stay in effect until the computer is turned off, but will change back the next time the program is run, unless F8 was used to make them permanent.)

When you press F9, a new menu will appear, defining sections of the screen, and you will be prompted to make a selection. After doing so, the selection will begin blinking in the menu line, and you will be prompted to use the arrow keys to select colors.

The up and down arrow keys change background colors, while the left and right arrow keys change foreground colors. The program automatically prevents any selections that would cause any part of the screen to become invisible due to non-contrasting colors. For example, the program won't allow the choice of a foreground (background) color of brown until the background (foreground) color is changed to something other than brown.

After changing a section, press ESC. The selection will stop blinking, and you can then choose another section to change, or press ESC again to leave the color selection mode.

To exit the program, press F10.

Problems

If you experience problems with this program, either in transient or pop-up modes, it may be due to other memory-resident programs. Uninstall them and try installing them one at a time to determine which one is causing the problem. Often, changing the order in which they are installed will resolve conflicts between memory-resident programs.