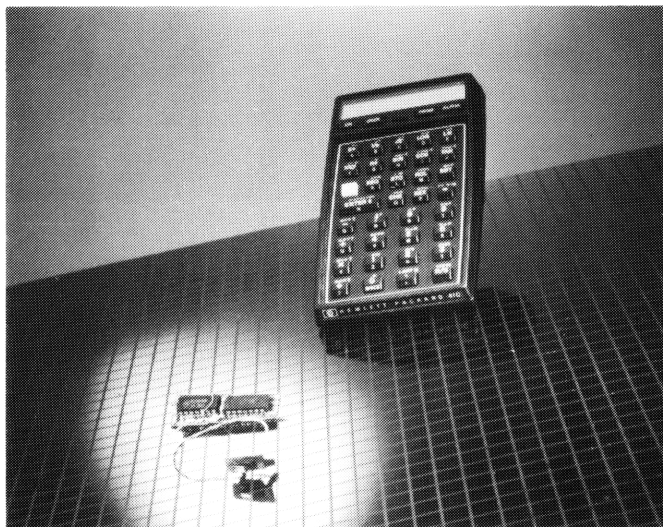# HYPER 41

INSTALLATION/INSTRUCTION MANUAL

HYPER-41
ELECTRONIC DUAL SPEED
UPGRADE
FOR SERIES '41 HEWLETT PACKARD
HANDHELD COMPUTERS
VERSION B.—1.1
INSTALLATION/INSTRUCTION MANUAL
FOR '41 HALFNUT* CV/CX

INTRODUCTION TO THE HYPER-41

The astonishing power of the Hewlett-Packard 41 Series Hand Held Computers has prompted users' of many professions and backgrounds to incorporate it among a broad variety of applications. Demands placed upon the '41 have escalated from simple calculation to more complex activities such as data acquisition and machine control.

In keeping with the growing demands placed upon many '41's, we at Synergistic have developed a product to further enhance its capabilities. Our HP-41 HYPER upgrade has been designed to permit operation a roughly two to three times the "normal" clocking rate (for halfnuts, i.e. units purchased after Sept. '85). It also provides electronic switching between standard/normal and elevated "HYPER" clocking rates at any time.

The following material has been presented to allow most any technically oriented '41 user to install a HYPER into their machine. Since no special tools are required, the installation can be performed simply and typically completed within an hour and a half's time. Soldering and desoldering accounting for the majority of the installation procedure. Comprehensive figures and illustrations are provided as a guide through the installation. Should you encounter any difficulty, we will assist you or if required perform the installation for you.

We think the Hewlett-Packard 41 Series extraordinary machines that time and again have shown the prowess of portable computing. We think as well that you will find the HYPER-41™ in all its regards in keeping with the expectations you as an HP-41 user has of any product to be used in conjunction with it. Our HYPER-41 offers an exciting level of performance while introducing new dimensions to the flexibility of your '41 without sacrificing the convenience and low power consumption of the normal operating mode.

Thank you for your interest in our product. Please read the following material carefully. It will answer most questions you may have regarding our product and its installation. This will insure your unit is operating properly with the HYPER-41 installed in the shortest possible time.

PREFACE TO INSTALLATION

We would like to take this opportunity to communicate a few important points regarding the installation of the HYPER-41 upgrade. The topics raised here are intended to clarify what you will be required to do in order to complete the installation and also what impact the installation of the HYPER has upon your '41's warranty.

THE INSTALLATION

'CV (HALFNUTT)
Installing the HYPER into your '41 is a relatively simple task. It entails opening the case, locating a single component on the printed circuit board (PCB), removing it from the board, installing the replacement component, connecting the control and power circuits from the HYPER'S PCB to the '41's PCB, closing the case and finally routing the hyper's switch through the A.C. tunnel and snapping it into place. Apart from earlier versions of where soldering was not a requirement the replacement component located on the '41's PCB must be soldered into place. Soldering is required whether you choose to perform the operation yourself or elect to have us complete this for you it must be executed by a competent technician.

'CX (HALFNUTT)

In the case of the '41 CX technical soldering/desoldering ability will clearly make or break the installation. Here a miniature PCB mounted across the '41's base circuit and supported by five (5) posts on both ends must first be removed so as to allow all the steps outlined above in the 'CV section to be performed. Make certain that either yourself or a qualified experienced technician possesses the technical ability to remove this "second" board in such a fashion that it can be reinstalled in accordance with the instructions detailed herein. If you have any doubts whatsoever d o   n o t   p e r f o r m   t h e i n s t a l l a t i o n   y o u r s e l f!!! Allow our office to perform the installation for you. Check the appropriate section in this manual for custom installation details if you decide to defer the installation to our facilities.

YOUR '41's WARRANTY

One of the most frequently asked questions regarding the HYPER-41 conversion has to do with the warranty of the machine. If your machine is a year or greater in age your original warranty from Hewlett-Packard is no longer in effect. Installing a HYPER simply won't matter. Secondly, if your machine is less than a year old installing a HYPER will nullify your warranty. If HP's warranty is important to you we suggest waiting a few months for it to expire as your best option. However, if you own a machine that is currently in warranty and your circumstance necessitates a "HYPERISED" '41 another alternative is available. We at Synergistic will perform a custom installation of a HYPER while extending your original '41 warranty through to its term. A five month old unit for example would have its original HP warranty extended seven months assuming the purchase receipt information is forwarded to us with the unit. Refer to section IV. for additional details.

REQUIRED TECHNICAL EXPERTISE

As mentioned above the installation of your HYPER imparticularly in the case of a '41 CX necessitates the skills of an experienced electronic technician. Removal of the miniature "bridging" PCB from the '41's base PCB involves sensitive desoldering ability. If you have any doubts as to whether you can perform these operations successfully or if such a skilled individual cannot be retained for this purpose we suggest you allow our office to perform the installation for you. This is simply not an undertaking for an amateur!

S T O P

If you have read the foregoing material you should now consider whether or not you wish to embark upon this operation. We suggest that if you are not 100% certain that you can complete the installation from beginning to end that you allow us to install it for you.

If you have read the preface completely and do not feel the "butterflys" coming over you, then you will more than likely have little difficulty completing all of the steps as outlined above.

If you've gotten this far (without the butterflys!) we would like you to proceed to the first step of the installation. Good luck…we'll continue on page 1. of the installation guide.

If you've read the foregoing and do not feel confident about installing the HYPER into your '41, then turn to Part 3, where you will find information regarding how to go about returning your unit for installation either by our Chicago office staff or by a local HYPER technical installer. In any case it is our foremost concern that your unit is professionally installed and operating without flaw to your satisfaction.

Larry P. Weigel   Synergistic Design Inc.   June 1986

!!! K.I.S. AND CONFIDENCE !!!

K e e p   I t   S i m p l e!!! Most of us have heard this adage at some time amidst our routine activities, especially among individuals in technical circles. The point being that things are usually difficult enough without attempts at "brainstorming" through the problem at hand. Often adding to the complicity! This has been the tenor of and style in which this manual has been written—we're simply attempting to render an involved technical task a bit simpler. We ask that you take advantage of our efforts by closely refering to this manual throughout the installation of your HYPER. By following through each step you will complete the installation in surprising time and have a properly functioning HYPERISED '41 in the bargain!

This manual has been written in such a manner that it provides a stepwise guide to completing the installation of the HYPER. Whether you own a halfnut 'CV or 'CX (make certain that your unit is a halfnut—i.e. has a black bezel "picture frame" like border in its LCD display: Version B. conversion only!) this manual illustrates those areas particular to your machine. Many disassembly steps are common to all '41 models. However, at the printed circuit board level special care has been taken to highlight those areas specific to a particular model 'CV or 'CX.

If you do have gifted technical ability and particularly experience in the area of circuit board soldering and desoldering forge ahead! Our illustrations and diagrams have been designed in such a manner that no area of the installation should be of critical concern. Good luck and should you have any questions that arise during the installation don't hesitate calling our Chicago office for assistance. Check the optimization service section of this manual for further details.

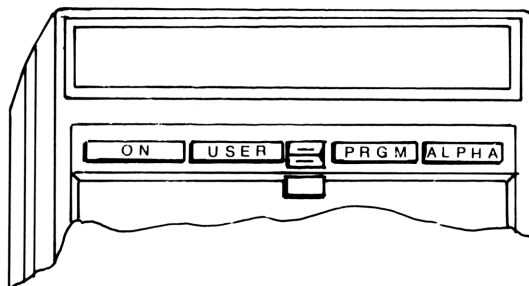Thank you, Synergistic Design Inc.

TABLE OF CONTENTS

NOTE: **An asterisk in the "'CX ONLY" column refers to an operation that applies to the HP-41CX model ONLY!**

IDENTIFYING/MATCHING
YOUR '41 AND ITS CORRESPONDING
HYPER KIT VERSION

VERSION A — JULY '79 - SEP. '85   VERSION B — SEP. '85 — PRESENT
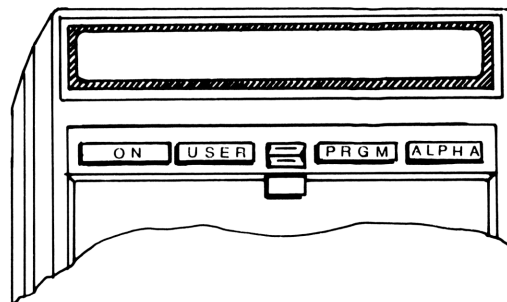
HP - 41C/41CV/41CX   HP- 41CV/41CX
"HALFNUT"

Identify which '41 model you own and check it against the version of the HYPER-41 upgrade you have purchased. Make certain that you do not proceed with the upgrade unless you have the correct/matching HYPER-41 version. Check the label on the carton or the title page of this manual for the version type.

CONTENTS OF VERSION B.
CONVERSION KIT
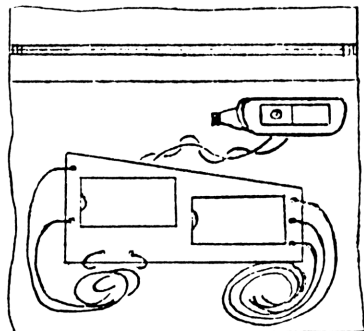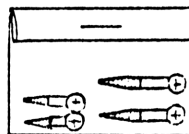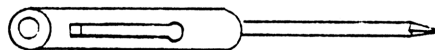
1. Hyper-41 Printed Circuit Board And Switch Assembly.
2. No. 0. Phillips Screwdriver.
3. Oversize Screws
   2 ea. ¼″
   2 ea. ¾″

CONVERSION CONTENTS:

1. HYPER-41 printed circuit board and switch assembly.

2. Oversize screws 2 ea. 3/4″ & 2 ea. 1/4″.

3. Phillips head no. 0. screwdriver.

CONVERSION INSTRUCTIONS

Begin the conversion by carefully reading each step. After completing that step place a check mark in the box provided to the right of each step. Go on to the next step only if you have successfully completed the previous instruction.

MODEL '41 CV
If you're installing a HYPER-41 into a '41 model CV complete the first five steps and continue on at page 7.

MODEL '41 CX
If you're installing a HYPER-41 into a '41 model CX continue with the installation immediately after the fifth step. These operations are specific to the 'CX model only!

REQUIRED TOOLS

In order to complete this installation in a professional manner a few special tools are required. These are commonly used in printed circuit assembly and/or repair.

1. 25 watt soldering iron with three (3) conductor grounded power connector.

2. Soldapult™ or equivalent solder pump (evacuator). Motor driven hot vacuum pump is preferable.

3. Miniature needle nose pliers.

4. Miniature diagonal cutters.

5. Kester or another high quality 60/40 rosin core solder.

6. Patience!

PART 2.
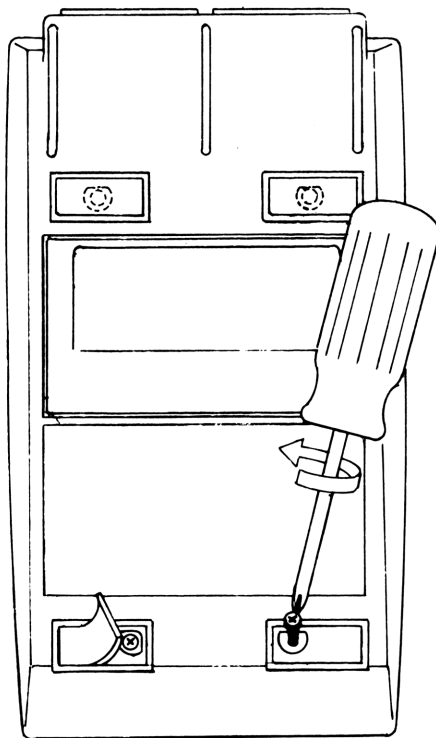
Figure 1

PART 2.

S E C T I O N A.   CASE REMOVAL & PREINSTALLATION PREPARATION

STEP	INSTRUCTION	CHECK
1.	Place a clean soft cloth approximately one square foot in area on your surface. (This will protect the '41 from being marred during the installation).	[ ]
2.	Remove the '41's battery pack and place it off to the side.	[ ]
3.	Place your '41 face down (keyboard/display side) onto the protective cloth covering your working surface.	[ ]
4.	Refer to the figure on the preceeding page and remove all four (4) rubber feet. For storage purposes place them on the rear of the battery pack adhesive side down. Upper left to lower right.	[ ]
5.	Using the enclosed phillips screwdriver, remove the screw at each foot position. Follow the same order in step no. 4. for removing the rubber feet. Place each screw aside, preferably onto the adhesive side of a 2″ piece of tape.	[ ]
6.	MODEL: —'CV jump ahead to page 7 and continue there. —'CX continue on to the next page.	[ ]

Good Job!!!...Now on to opening the case.

PART 2.
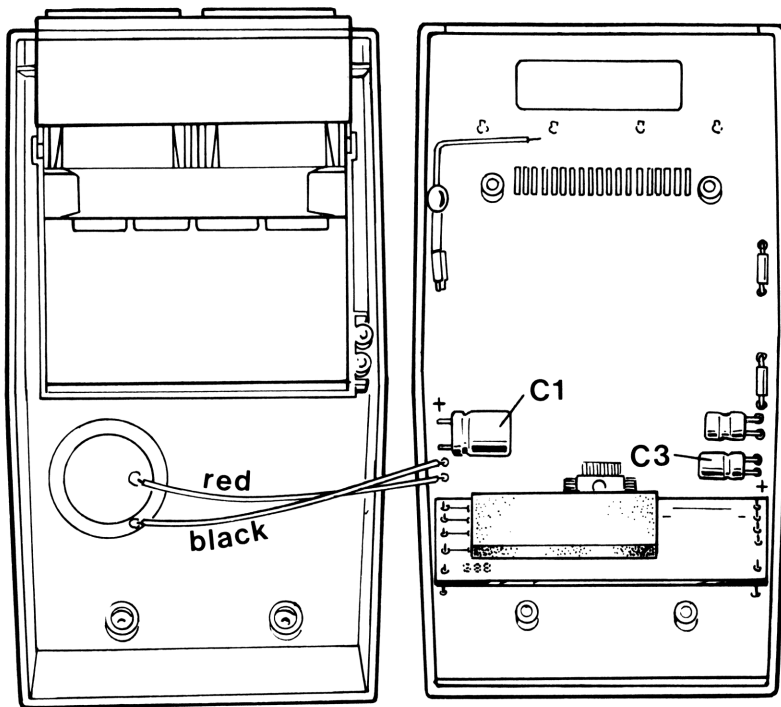
Figure 2

PART 2.

S T O P ! ! ! continue here only if you have a model 'CX.

STEP NO.	INSTRUCTION	CHECK
7.	Refer to the drawing on the facing page. Locate the two (2) wires one **BLACK**, one **RED** connected to the piezoelectric beeper disc shown on the left. **UNSOLDER** the red and black wires from the **CPU/LOGIC** board side shown adjacent to component C1.	[ ]
8.	Next locate the small "bridging" P.C. Board shown in the lower half of the drawing above.	[ ]
9.	Locate the five (5) soldered contacts on the left and righthand sides of this circuit board.	[ ]
10.	Using the diagonal cutters remove i.e. clip off as much of each contact as possible without damaging the printed circuit board contacts.	[ ]
11.	Next use a solder vacuum pump while applying heat to each circuit contact you cut level in the previous step and remove all the solder from each of the five contacts/circuit board pads. Start on the left side of the board.	[ ]
12.	Cautiously guide the soldering iron while applying a firm "rocking" force to free the left side of the board from the five supporting circuit stakes.	[ ]

PART 2.

C1

+

blk

red

C3

+

CPU
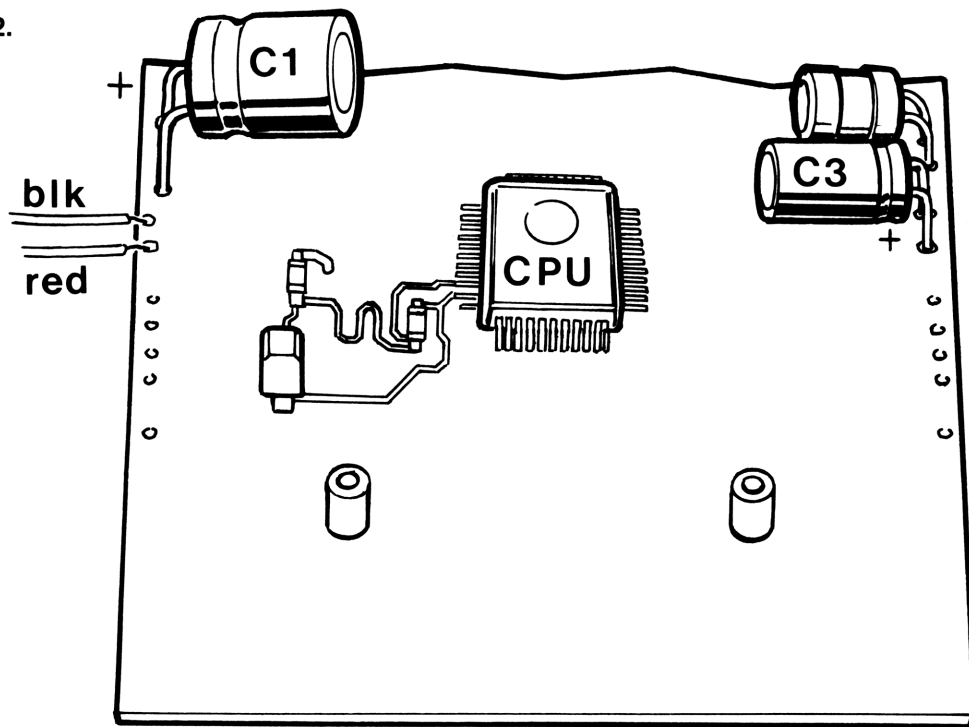
Figure 3

PART 2.

STEP	INSTRUCTION	CHECK

13. Good job! Now repeat the previous operation with the five (5) P.C. board [   ]
     contacts on the right side. Use a lengthwise rocking motion while applying
     heat to each contact. C A U T I O N !—Use only enough pressure to loosen
     the contacts. Excessive pressure can damage the main printed circuit
     board.

     Great Job!...That was tough!
     Continue onto the next page (Note: Common to 'CV)

```
'CV  CONTINUE  HERE!!!
```

Continue here if you have a 'CV or if you have just removed the piggy
backed miniature P.C. board from a 'CX.

14. Refer to the pictorial on the next page.   [   ]

15. Study the area shown in the detail portion of the diagram.   [   ]

16. Note the location of the component labeled "C4".   [   ]

PART 2.

DETAIL

red

black

C1

C3

C4

CPU

Figure 4
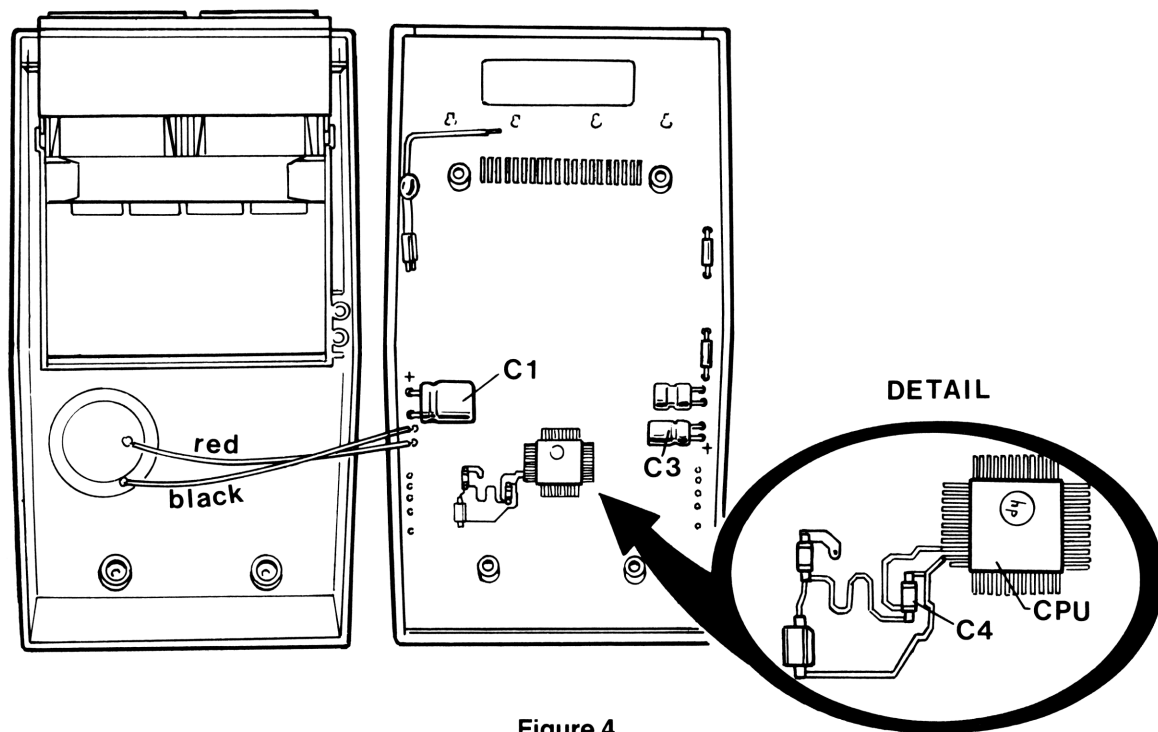
PART 2.

STEP	INSTRUCTION	CHECK
17.	Locate C4 in your machine.	[ ]
18.	Refering to pictorial no. 5. on the next page use the soldering iron and desoldering pump to remove the component labeled "C4". A needle nose pliers can also be used in conjunction with the iron.	[ ]
19.	Once removed place it off to the side. Remove any excess solder left on either of the two pads to which it was connected.	[ ]
20.	Continue on to the next page. Refer to pictorial no. 6 as you proceed.	[ ]
	Good job so far!!!…continue on the next page.	
21.	Carefully check the **CPU/Logic** board and make certain that no unwanted "flecks" of solder remain after removing C4.	[ ]

PART 2.
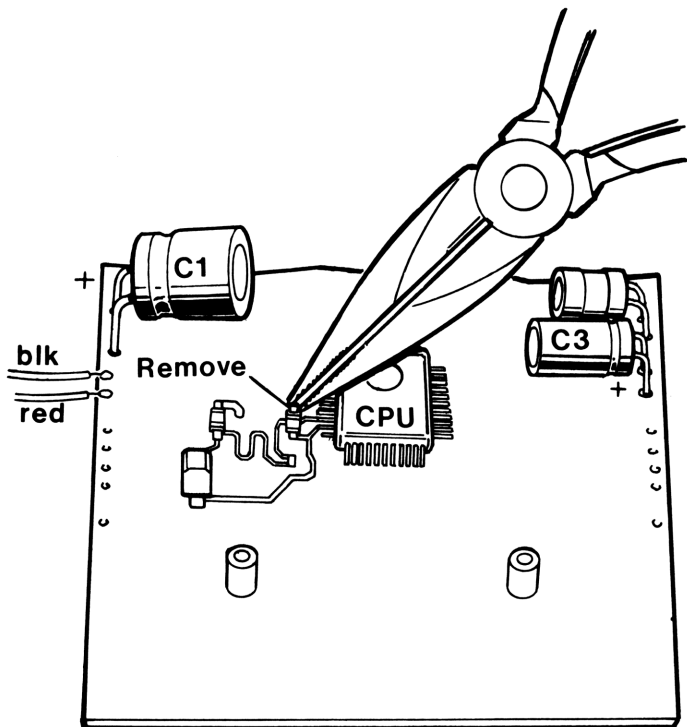
Figure 5

PART 2.

STEP	INSTRUCTION	CHECK

S E C T I O N   B.   CONNECTING THE HYPER-41 TO THE MAIN CPU/LOGIC BOARD

22.   First, refer to pictorial no. 6.   [   ]

C A U T I O N ! ! ! — exercise extreme caution connecting the **red** (positive) & **black** (negative) HYPER leads to the '41's power supply circuit. A reversed connection here could result in permanent damage to the HYPER'S circuitry and void its warranty!

23.   **Connect** and solder the **black** wire lead from the HYPER'S circuit board to [   ] the main CPU/logic board at the component C3's negative lead.

     Note: This component is P O L A R I S E D (i.e. has positive and negative leads.) make sure the **black** lead wire from the HYPER circuit board connects to C3's **negative** "−" lead!

24.   Again refering to pictorial no. 6., connect and solder the **red** (positive) lead [   ] of the HYPER circuit board to C3's **positive** lead.

PART 2.

+

−

RED

BLACK

+

C3

C4

C4 shown upright
should mount resting
against CPU/Logic
board.
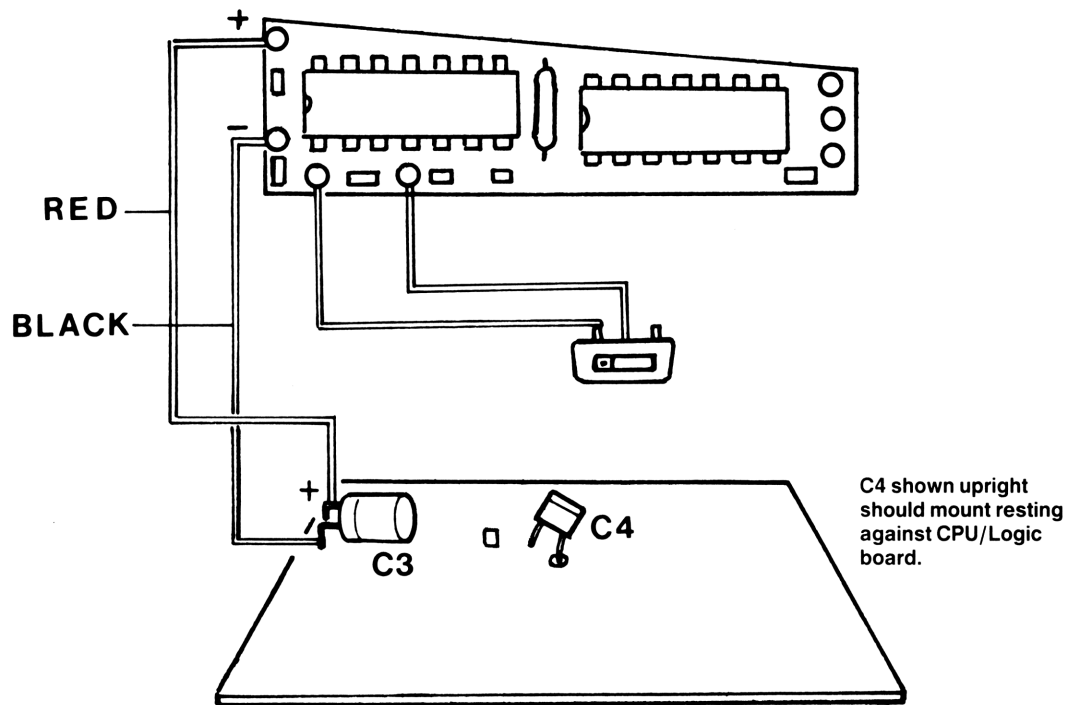
Figure 6

PART 2.

STEP	INSTRUCTION	CHECK

S E C T I O N   C.   INSTALLING THE REPLACEMENT TIMING COMPONENT

25. Locate the timing component (capacitor) included with this conversion. [   ]
Refer figure 7. for the possible variations of this part.

26. Refer to figure 8. . Solder either lead of the timing component (C4) to the [   ]
topmost circuit board pad on the CPU/logic board as shown.

27. Now position it to lie down onto the CPU/logic board such that the body of [   ]
the part (colored area) is resting against the board itself, yet above the
topmost pad where it was previously soldered.

28. Refer to figure 6. . This figure illustrates the present state of the conver- [   ]
sion.

Note: C4, the timing component you installed in the previous step is shown
in an upright position. This representation is included to clarify its relative
location only! Upon completion of the HYPER'S installation this compo-
nent should be mounted on its side against the circuit board with the same
orientation as the CPU and secured with foam tape (supplied) in this
position.

PART 2.

Figure 7

PART 2.

+

C1

C3

blk

red

solder

CPU

+

this end free

Figure 8

PART 2.

+

−

RED

BLACK

ORANGE

BLUE

GREEN

SOLDER

C3

C4

+
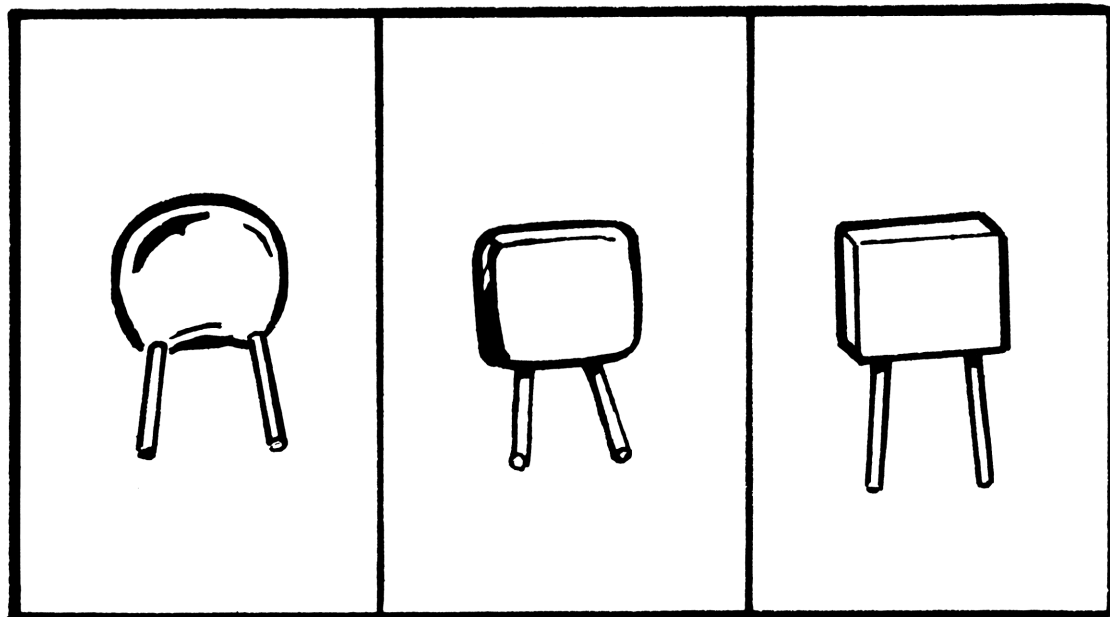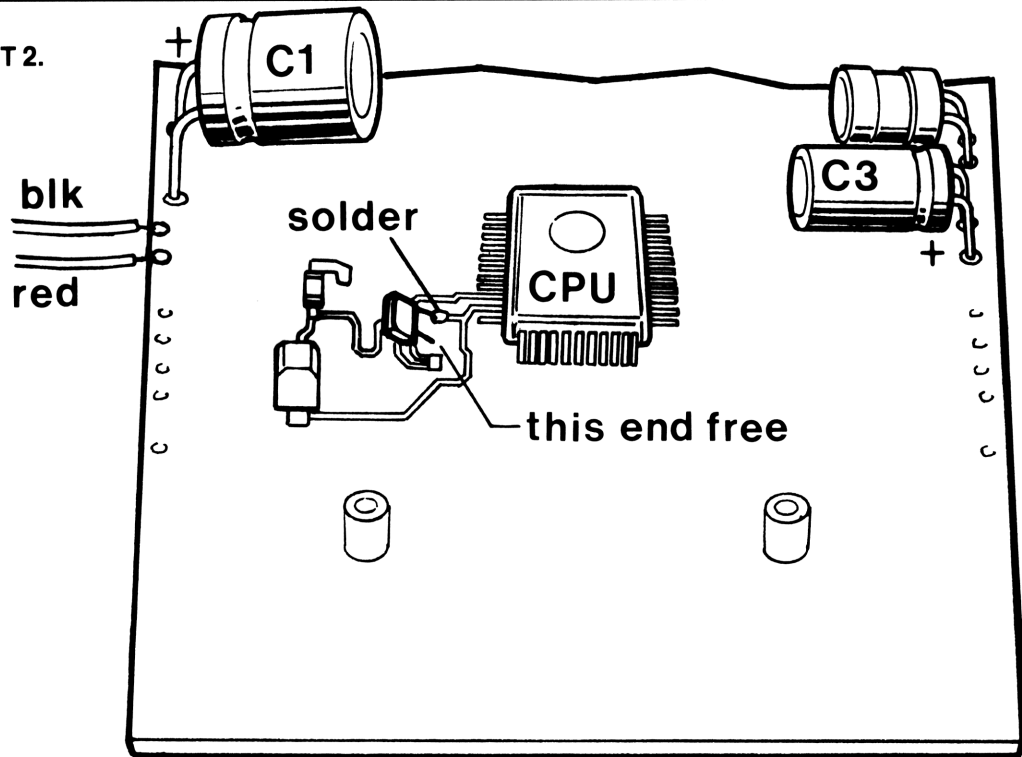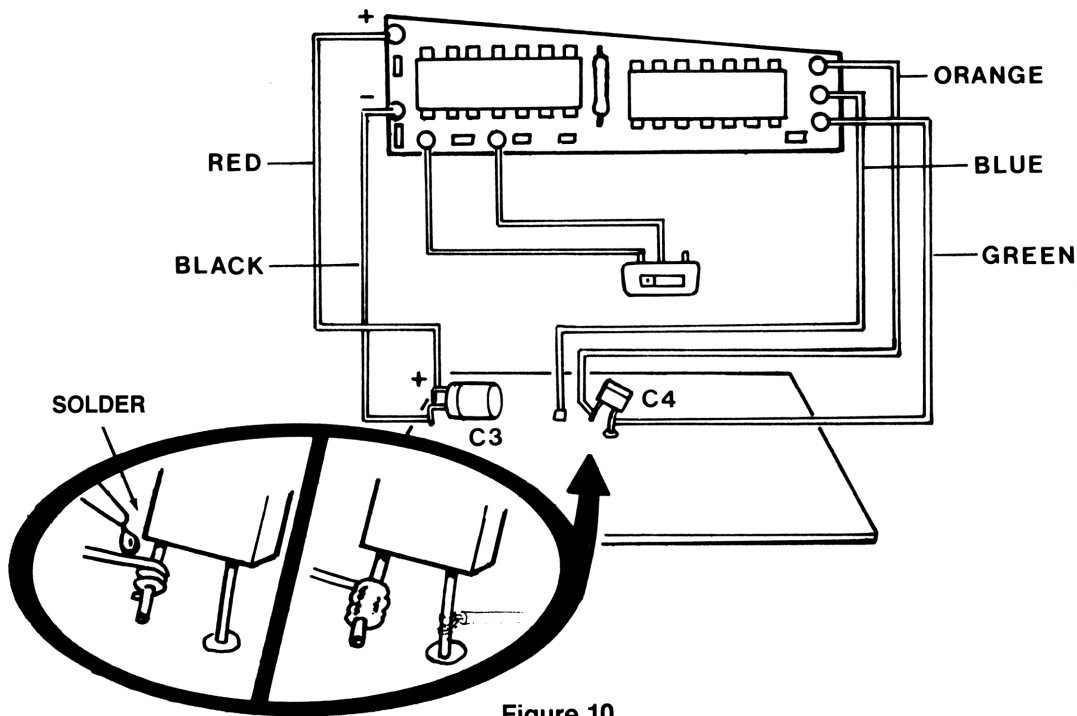
Figure 10

PART 2.

STEP	INSTRUCTION	CHECK

29. Refer now to figure 10. . Connect and solder the **ORANGE** lead wire from [   ] the HYPER to the free lead of component C4 as shown.

30. Again refering to figure 10., solder the **BLUE** lead wire from the **HYPER** to [   ] the free pad on the CPU/logic board.

31. Again in reference to figure 10., connect and solder the **GREEN** lead wire [   ] from the HYPER board to the previously soldered lead of C4.

S T O P ! ! !—If your installation is being performed upon an HP-41 model C V continue the conversion at step 35. Otherwise continue on to the next step. ('41 C X)

PART 2.
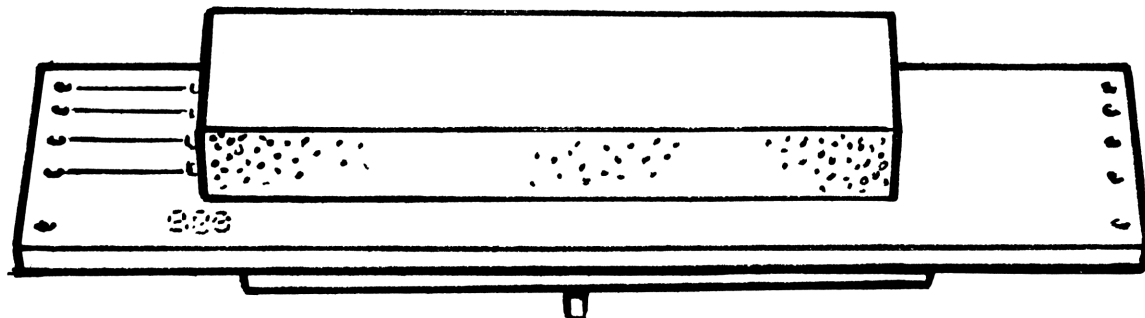
Figure 11

PART 2.

STEP	INSTRUCTION	CHECK

Continue 'C X installation here!

S E C T I O N D. PLACEMENT OF THE HYPER BOARD ONTO THE CPU BOARD

32. Refer to figure 11. . Replace miniature bridging circuit board after remov- [ ]
    ing any remaining solder from the plated through contacts.

33. Make sure the three (3) support posts on the bottom side of this board rest [ ]
    against the CPU/logic board. Check carefully that the timing component
    C4 does not interfere with the post in the vicinity of the B L U E lead wire
    soldered to the '41's P.C. board.

34. If all three (3) support posts contact the CPU/logic board without inter- [ ]
    eference solder all contacts to their corresponding support post/circuit
    pad on the bridging P.C. board.

PART 2.
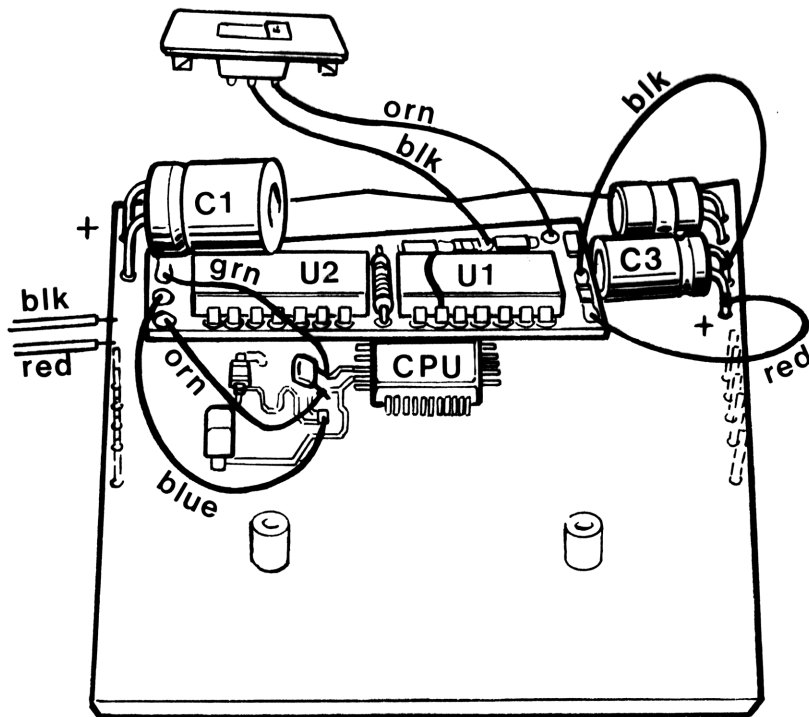
Figure 12

PART 2.

STEP	INSTRUCTION	CHECK

35. Now refer to figure 12. . Mount the HYPER circuit board using C3 as a [   ]
    footing/pivot point while affixing the foam tape along its back to the front
    edge of the bridging circuit board.

36. Refering to the same figure as in the previous step, push and route the [   ]
    black and **red** wires under the bridging P.C. board on the left side of the
    HYPER board.
    Note: This precaution is taken to prevent any interference problems when
    the 'C X' s case is reassembled.

37. Repeat the procedure in the previous step with the **orange, blue & green** [   ]
    wires on the right side of the HYPER circuit board.

PART 2.

'41CX

C1   Hyper-41

CPU

'41CV

C1   Hyper-41

CPU
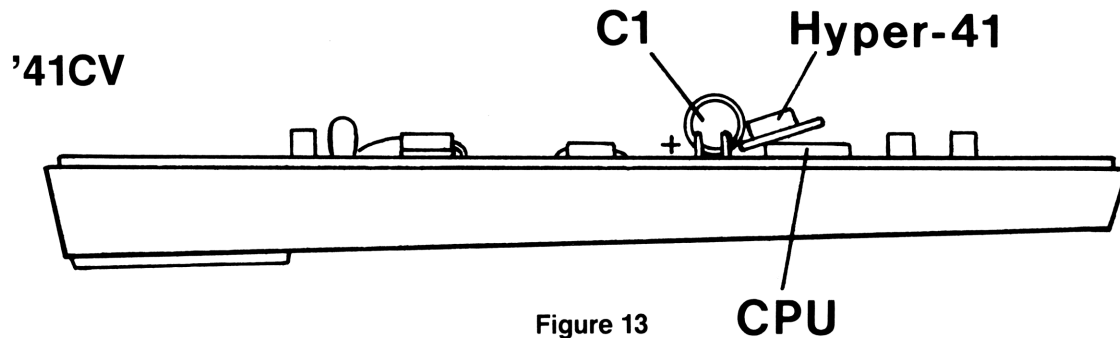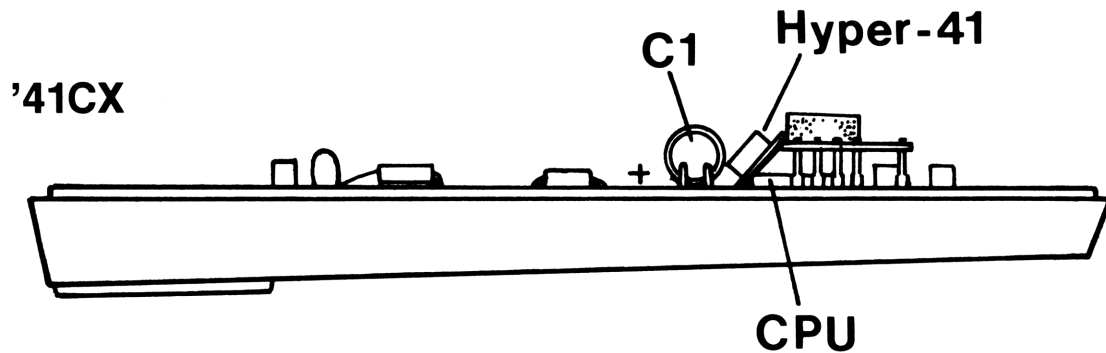
Figure 13

PART 2.

STEP	INSTRUCTION	CHECK
38.	Refer to figure 13. . Make certain the HYPER board is installed in the same fashion as that shown in the figure.	[ ]
39.	At this point in the installation carefully check all your connections. Make certain all agree with those shown in figure 12. .	[ ]
40.	If you are certain that all connections have been properly made, reconnect the r e d and b l a c k **piezo acoustic beeper** leads. Refer to fig. 14. for exact wire connections.	[ ]
41.	Refering to figure 4. for a '41 CV and figure 2. for a CX replace both halves of your '41's case.	[ ]
42.	Make certain that no wire interferes with either of the two bottom screw posts as you rejoin the case halves.	[ ]
43.	Hold the bottom case half with one hand in the top and bottom center areas while you replace each of the corner screws. Tighten each screw to a "snug feel" only!—don't overtighten.	[ ]
44.	Replace each corner rubber foot.	[ ]

Part 3. Operation and use of the Hyper and normal modes

Within this section we have attempted to facilitate your use of the HYPER-41 by introducing several topics that directly relate to its operation under most normal circumstances. Read carefully through this material. It has been compiled from the accumulated experience of many HYPER users and it offers several suggestions many of which you would more than likely have adopted through your own experience—it may reduce your learning curve!

General Operation

1. To operate your newly installed HYPER simply depress the HYPER'S mode switch. A mode change will take place for each depression, i.e. by "Toggling" from (or to) the HYPER or normal mode.

2. To determine which mode you have entered (assuming you didn't already know) simply execute the '41's "Beep" command. Listen to the rate of the audio output. Depress the HYPER'S mode switch. Again execute the "Beep" command. You will notice a change in the rate of the audio output from your '41. An increase or decrease in rate took place depending upon the initial mode of your machine.

3. To exit the HYPER mode (or either mode for that matter) simply depress the HYPER'S mode switch.

An important point regarding the operation of the HYPER-41 is that you are free to change the operating mode at any time…even during running programs! There is no restriction to the use of mode switching with the HYPER. However there are a few recommendations

that should be followed to avoid "Crashes" in some situations. A "Crash" is an unstable or "Hung Up" condition whereby the CPU looses control of the system. In the case of the '41 these can be either hardware of software induced. Refer to the following sections for further details.

This short program has been included so that you may determine the per cent speed increase your unit is now capable of above the "Normal" rate. Note that the degree of speed increase is largely due to the age of your machine. Refer to the program on the following page. Execute "HYPER%".

Anticipated speed increases for 'CV or 'CX "halfnutts" are typically in the range of two (2) to three (3) times the nominal clocking rate of factory units. Although these are only typical no claims are made to the exact speed increase a given machine will experience. An optimization service is offered to permit a given machine the greatest possible performance. Refer to the appropriate section for additional details regarding this service.

Recommended Use of HYPER vs. Normal Operating Modes

1. We suggest that if you are operating the HP-IL* with your '41 that you restrict its use to the "Normal" operating mode. Some HP-IL chip circuits can operate at the HYPER rate, however many have been found to be "Marginal" when operated at the greater data transmission rate that would be introduced by the HYPER mode. Keep in mind that this suggestion does not imply any deficiency on the part of the HP-IL loop interface itself, only that it was originally intended to operate at the nominal (normal) '41 clocking frequency.

2. Another area of possible malady has to do with operation at the HYPER mode with either several customized modules present on the '41 bus or in conjunction with a fully populated port extender.

Here the problem has to do with the physical properties of the semiconductor family from which the '41 (and the HYPER-41 as well) were fabricated. Basically, as the speed at which they are expected to operate is increased the available power is decreased. Customized or 'Multimodules' impose operational limitations as a result. So that if you have more than two "Doubles" and a fully populated '41, operating at the HYPER rate could induce crashes. This situation obviously applies to the use of "Triples" as well.

Extended memory functions could be affected by the operation of your '41 at the HYPER rate as well. We suggest you try operating your '41 configured as you intend to use it on a day-by-day basis, and evaluate its performance for this configuration at the HYPER speed. It is important to do this now prior to using your upgraded '41 so as to avoid possible "Crashes" in an actual working situations.

A short program has been included which can be used to indicate the current mode of your '41. The **time module** will be required if you do not have a 'CX. Execute "HYPERT".

```
01  ◆LBL "HYPER%"        25  .0004
02  XEQ 01               26  X>Y?
03  "CHANGE SPEED"       27  "HYPER SPEED"
04  AVIEW                28  X<=Y?
05  STOP                 29  "NORMAL SPEED"
06  XEQ 01               30  AVIEW
07  X>Y?                 31  STOP
08  X<>Y                 32  GTO "HYPERT"
09  ST- Y                33  ◆LBL 01
10  /                    34  RUNSW
11  100                  35  RCLSW
12  *                    36  HR
13  FIX 0                37  20
14  CF 29                38  ◆LBL 02
15  CLA                  39  DSE X
16  ARCL X               40  GTO 02
17  SF 29                41  RDN
18  FIX 4                42  RCLSW
19  "⊦ % FASTER"         43  HR
20  AVIEW                44   -
21  STOP                 45  CHS
22  GTO "HYPER%"         46  RTN
23  ◆LBL "HYPER%"        47  END
24  XEQ 01
```

Custom Module Use and Configuration

Use the schedule to determine which modules/peripherals can be operated at the elevated rates and those that cannot. It is a good idea to begin by trying each module/peripheral one-at-a-time in the HYPER mode recording your results as you go along. Once you've determined which can support the increased speed of operation pair the items that you most require and try them in the HYPER mode. By proceeding in this manner you can assemble an 'Optimum' configured system capable of collectively performing at the elevated clock frequency.

If you are not certain that a given module/peripheral is capable of operating in the HYPER mode, the "Rule of Thumb" to adopt is to switch to the normal mode! Testing should be done only under noncritical circumstances.

Directions: Record each module/peripheral by name and include its serial number for future reference, insurance purposes, servicing, etc. In the space as provided, indicate whether the item is a custom multimodule or peripheral.

*HP-IL Trademark of Hewlett/Packard Co.

41 Module / Peripheral	Custom	HYPER Mode	Operates with #
1. _____ Ser. No. _____			
2. _____ Ser. No. _____			
3. _____ Ser. No. _____			
4. _____ Ser. No. _____			
5. _____ Ser. No. _____			
6. _____ Ser. No. _____			
7. _____ Ser. No. _____			
8. _____ Ser. No. _____			

Optimumly Configured System:
Date Configured:

_/_/_ A.) 1. — 2. — 3. — 4. — 5. — 6. — 7. — 8. —
_/_/_ B.) 1. — 2. — 3. — 4. — 5. — 6. — 7. — 8. —
_/_/_ C.) 1. — 2. — 3. — 4. — 5. — 6. — 7. — 8. --
_/_/_ D.) 1. -- 2. -- 3. -- 4. — 5. — 6. — 7. — 8. —
_/_/_ E.) 1. — 2. — 3. --- 4. --- 5. — 6. — 7. — 8. —

Power Consumption, Battery, and A.C. Operation

When operating your '41 in the HYPER mode you should notice a decrease in the life cycle of your batteries/Nicad pack. This is probably the only unfortunate aspect of operating your '41 in the HYPER mode! In a sense it is a mixed blessing if you are using rechargeable Nicads. Frequent recharging of Nicads tends to lengthen their useful life. However, primary cells such as alkalines, mercury etc. will have to be replaced more frequently if your '41 is used heavily in a running state.

While idle yet in the "On" state power consumption is at the normal level. The power requirements of the HYPER circuitry are miniscule. The entire HYPER circuit uses only a fraction of the power required to turn on a single character segment. It simply has no impact upon battery use, increased power consumption is due to the additional power dissipated by the '41's circuitry needed to function at the increased clock frequency.

We recommend for extended use of the '41 in the running state that you keep a second set of alkalines on hand. For medium to light duty use rechargeable Nicads are without peer. Remember Nicad performance improves with frequent use and charge/discharge cycling.

With regard to use of the HP Nicad pack a few important points must be made. If the pack is to be used with the A.C. adaptor be sure to place the HYPER'S switch assembly so that its wire connections are fitted in either of the upper corners of the A.C. tunnel. This will avoid placing excessive stress on the wires eventually producing switch assembly failures. Secondly, we recommend the use of a line filter and A.C. surge suppressor. Simply put, our A.C. power mains are "Party Lines", that is thousands of us are using them for

just as many tasks throughout the day. Many users while thoughtlessly using the A.C. mains to perform a given job do so in such a manner that energy is returned to the power lines in an electrically improper fashion in the form of noise. A portion of this noise is conducted to your '41 via the A.C. adapter and Nicad pack. Although H/P has taken several precautions in this regard under certain circumstances excessive A.C. mains "Spikes" and/or noise could upset the HYPER'S circuitry not to mention your '41's!

Changing Battery Packs and Irratic Mode Control

Under most circumstances changing your '41's battery pack should pose no special problems. Replace as you had prior to having the HYPER installed. Your HYPER will remain in the mode you left it before replacing the battery pack.

If your machine has been left for some time in a state of disuse or without its battery pack present installing the pack will result in setting to either mode. The HYPER has been designed to "Come Up" in the normal mode although either mode as the initial state implies no unusual circuit behavior.

Generally, any quantity that will possibly upset your '41 can as well upset the HYPER circuitry. So all the handling measures you have taken with respect to using your '41 applies to the "HYPERISED '41".

Program Time Performance

For your convenience we have provided a place where you can record the normal vs. the HYPER time required to execute frequently used programs. In this way you will gain a somewhat more depthful understanding of the improvement derived from operating in the HYPER mode.

Keep in mind that under certain conditions the lower power "Normal" operating mode might be preferable to the HYPER mode. This is especially true if power supply considerations are critical or if the sole available power is derived from primary (nonrechargeable) cells alone.

TIME/PERFORMANCE SCHEDULE

Program / Routine Name	Time "Normal" Mode	Time "HYPER" Mode
1. _____ Date: ___ / ___ / ___	Time:	Time:
2. _____ Date: ___ / ___ / ___	Time:	Time:
3. _____ Date: ___ / ___ / ___	Time:	Time:
4. _____ Date: ___ / ___ / ___	Time:	Time:
5. _____ Date: ___ / ___ / ___	Time:	Time:
6. _____ Date: ___ / ___ / ___	Time:	Time:
7. _____ Date: ___ / ___ / ___	Time:	Time:
8. _____ Date: ___ / ___ / ___	Time:	Time:
9 _____ Date: ___ / ___ / ___	Time:	Time:
10. _____ Date: ___ / ___ / ___	Time:	Time:

Warranty, Extended Warranty and Service

Your HYPER-41 is warranted against defects in manufacture for a period of one year from its original purchased date. This warranty is extended to subsequent owners as well. This warranty does not protect units that have been operated in such a manner as to cause damage duly construed by the owner as a manufacturing liability.

Any unit deemed defective will be replaced or repaired at our discretion. Replacement or repair will not include a minimum installation charge unless the defective unit was originally installed by our facility or an agent of our facility.

An extended warranty service is available and is offered on a yearly basis. If you are interested in extended warranty service support from Synergistic. Please indicate this on your warranty registration card. Additional information will be forwarded to you.

Optimization Service

Several users have requested special adaptation of their HP-41's to a specific operating environment. These have required modifications which support the HYPER mode as well as an elevated "Normal" mode. We refer to this procedure as 'Optimizing'.

Optimizing provides an increase in the "Normal" clocking rate with a given module/peripheral combination so as to allow the greatest performance from a specific '41 configuration.

The result is the greatest possible performance from a specifically configured '41 in either the HYPER or normal mode of operation.

If you are interested in this service you can either contact us by phone or indicate your interest on your warranty response card.

Synergistic Design Inc.

(312) 463-5090

9:00 A.M.-5:00 P.M. Central Time   (312) 733-4379

Custom Installation - Return/Repair Authorization

This section outlines how to go about returning your '41 for custom installation, optimization, or for return/return reasons. If you wish to return your '41:

1.) Pack your '41 in a rugged carton box with a minimum of two (2) inches of packing material on all sides.

2.) Complete a mailing label with your return address in the upper left hand corner to the following address:

SYNERGISTIC DESIGN INC.
3760 No. Ridgeway Ave.
Chicago, IL 60618

Attn: Reason for Return (Use Code Below)

3.) Indicate after attention the reason for which you are returning your unit use the code provided.

Code	Service Performed
i). Custom Installation	Installation of HYPER by our office
ii). Optimization	Optimized install for both modes
iii). Repair/Warranty service	Defective HYPER-41 warranty service

i). If you would like our office or one of our local agents to perform the HYPER-41 installation return your '41 and the HYPER-41 conversion kit as instructed above. Include a check or money order for $15.00 and $2.95 for shipping, handling and insurance.

ii). For an optimized HYPER-41 installation include your '41, your HYPER-41 conversion kit, and those modules and/or peripherals you wish to use in conjunction with your upgraded '41. Enclose a check or money order for $30.00 to defray the cost of the optimization. An additional $2.95 is required for shipping, handling and insurance.

iii). Warranty service will be performed on all defective HYPER-41's deemed defective upon receipt as a result of a manufacturing error. Enclose your '41, the HYPER-41 conversion kit and a photocopy or duplicate of your original purchase receipt.

If your unit (HYPER-41) is a year or more in age enclose a check or money order for $20.00 to defray the cost of warranty service for out of warranty repairs.

4.) Return your unit to us via parcel post with the appropriate insurance.

5.) We will inform you by mail of the receipt of your unit and the approximate date repairs/installations/optimizations will commence.

6.) In the event of a problem with the respective operation we will notify you by mail of the situation and will solicit your instructions for additional service etc.

Section C. In Case of Difficulty

For some reason a problem has arisen with your installation. These are usually (over 99%) misconnections. Due to an oversight or a poor connection in the Logic/CPU Board itself.

As mentioned earlier, each **HYPER-41** circuit is pretested before it is shipped to your dealer and is infrequently the "Culprit" in an inoperative unit.

Refer to the following table by reviewing the symptom associated with your unit and read through the **Probable Cause & Remedy** to the right. In the majority of cases careful troubleshooting reveal the problem.

Begin with Level I. Troubleshooting First! Proceed to Level II only if you're certain all Level I, remedies have failed. Should Level II, remedies prove ineffective. Refer to Section IV, consultation return authorization.

PART 4. **In case of difficulty/troubleshooting Level I**

SYMPTOM	PROBABLE CAUSE	REMEDY
A. '41 completely inoperative either in **normal** or **HYPER** modes.	**1.** Power supply connections to HYPER-41 PCB are reversed.	**1.** Check your connections against Plate No. 12. to assure correct connections.
	2. Power supply connections are incorrect or connected to the wrong component.	**2.** Check your connections against those shown in Plate No. 6., make sure your power supply connections are made to the smaller polarized capacitor. Recheck the polarity.
	2.a. Power supply's control connections are reversed.	If the previous steps have no effect proceed to Level II, Step 1.

SYMPTOM	PROBABLE CAUSE	REMEDY
B. Operative in either **HYPER** or **Normal** mode, but not both. Operative, but won't switch between modes.	**1.** Incorrect connections to timing component from HYPER's printed circuit board.	**1.** Recheck your connections against those shown in Plate No. 12., make sure your connections agree with those shown.
	2. Connections from the HYPER'S switch to the HYPER PCB are disconnected or broken.	**2.** Check the switch connection, make certain they agree with those shown on Plate No. 12.. Reconnect if found open.
	3. Malfunctioning or defective mode switch.	**3.** Remove the HYPER switch assembly from the A.C. tunnel. Power up your '41. Press "shift" then "Beep". Place a penny or a paperclip onto the switch contacts where the wire connections are soldered. Execute the

SYMPTOM	PROBABLE CAUSE	REMEDY
		"Beep" again. If your beep is faster (or slower) you have entered HYPER mode or change modes by side stepping the mode switch. The mode switch is probably defective. Call for return authorization.
		Part 2 to order a replacement switch assembly.
		If your "Beep" did not change proceed to Section IV. Part 1 for return/repair authorization.
		If you feel technically confident or have had some experience in troubleshooting proceed to Level II, Step 2.

SYMPTOM	PROBABLE CAUSE	REMEDY
C. '41 operates in **HYPER** & **normal** modes. But intermittently crashes in either mode.	**1.** Stripped screw posts in '41 case. Can cause intermittent connection to I/O compartment and modules. This condition can upset and lockup the '41.	**1.** Locate oversize screws (2 long & short). Replace screws that can be turned loosely in any of the four post positions.
D. '41 operates normally in **Normal** but "crashes" in **HYPER** mode.	**1.** Timing components used in **HYPER** mode produces an excessive clock frequency for your machine.	**1.** Proceed to Section IV for return/repair authorization.
E. '41 operates normally in **HYPER** mode, but not in **normal** mode.	**1.** Defective clock timing component for **normal** mode of operation.	**1.** Recheck connections shown on fig. 12. Make certain all control connections are correct and mechanically snug.
	2. Poor or intermittent connection to CPU/Logic Board timing component.	**2.** Proceed to Section IV for return/repair authorization.

SYMPTOM	PROBABLE CAUSE	REMEDY
	3. Malfunctioning or defective electronic switch on HYPER'S PCB.	**3.** Proceed to Section IV for return/repair authorization.
F. '41 operates normally most of the time, but infrequently changes from **normal** to **HYPER** or to the opposite mode of operation.	**1.** Using A.C. adaptor in A.C. tunnel to operate '41 with HP Nicad pack can induce "spikes" into the circuitry, thereby forcing a change in its mode.	**1.** A.C. potential leak intermittently switching **HYPER** to **normal** or **normal** to **HYPER** mode of operation. Place line filter into A.C. outlet and operate converter from line filter. A.C. line sources could introduce "spikes" into HYPER'S circuitry via switch assembly and its connections.
		1.b. Malfunctioning or old Nicad pack replace with new unit.

SYMPTOM	PROBABLE CAUSE	REMEDY
	2. Malfunctioning or defective electronic switch on HYPER'S PCB.	**2.** Proceed to Section IV for repair/return authorization.
G. '41 operates in **normal** or **HYPER** mode but infrequently changes mode with battery or A.C. operated Nicad pack.	**1.** Malfunctioning or defective switching components on HYPER'S PCB.	**1.** Proceed to Section IV, for repair/return authorization.

*Contact local authorized dealer/installer or our office for Level II, trouble shooting support.

FOR YOUR RECORDS

MODEL H/P-41
Check one: C   - ☐

                   CV - ☐

                   CX - ☐

Serial Number:_____

Date Purchased: _____

HYPER-41 Serial Number:_____

Date Purchased: _____

SYNERGISTIC DESIGN, INC.