The

PLUS

WORKS ™

Software Family

AppleWorks™ conversion
and/or memory expansion
software for the Apple II, II+,
IIe, Franklin, Laser and
BASIS computers.

Written expressly
for the computer
hardware you
already own!!

From
NDS
Norwich Data Services, Ltd.
East Norwich, NY 11732

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From the President......

Our philosophy at NDS is to give the user AppleWorks power with the most variety of hardware possible. Since the first introduction of PLUS–WORKS over a year ago we have continued to add hardware support. As you can see from the manufacturer's listed we support more hardware than any other company where AppleWorks is concerned.

More than any other software firm we have tried to accomodate the user. We have added support to many hardware products whose companies have been out of business for years. This demonstrates our commitment to you and to the Apple II+, Ace 1000, 1200 and other so-called "outdated" computers.

We at NDS will continue to add new and old hardware to our list for PLUS–WORKS support. And continue to add new features to AppleWorks. We were the first to offer a 1 megabyte desktop for AppleWorks and we give you the most desktop for your dollar by using all the ram on your card.

Take your time and read through the descriptions of the different PLUS-WORKS programs available. Be confident there is one for your current system. We don't want you to have to buy more hardware just to run AppleWorks. And if you have hardware that is not supported let us know and we'll work together.

Andrew S. Hajdu
President
Norwich Data Services Ltd.

PLUS-WORKS (not for AppleWorks 2.0)

PLUS-WORKS, our first product, rewrites a copy of AppleWorks after which it will run on an Apple II, II+ or compatible. The minimum hardware requirements are 64K of ram, an 80 column card, the shift-key modification and a copy of AppleWorks.

All 16K language cards are supported. 80 column cards supported include:

Videoterm	Magnum 80
Ultraterm	Viewmax 80
Franklin	Smarterm
Viewmaster 80	Smarterm II
Vision 80	Multiview
M&R	Fullview 80
Wizard 80	

PLUS-WORKS supports more than one type of keyboard. A standard Apple II keyboard is required to have the shift-key modification. This is the standard one-wire modification and is easy to do.

If you have a full ASCII keyboard the shift-key mod is not needed. If you have an Ace 1200 you are given full support for the keypad area.

Of course you need a copy of AppleWorks to convert. Any version from 1.0 to 1.3 will work. Once converted you don't need PLUS-WORKS any more (unless you change 80 column cards). AppleWorks will boot and run directly on your system.

How does it work?

To run the configuration you'll need to know what brand of 80 column card you own and your keyboard type. After answering these questions the AppleWorks startup disk is altered permanently and is bootable. If you have a Franklin the ProDos on the AppleWorks disk is altered to boot properly.

Absolutely every available key on the IIe has been provided for on the II+ or Franklin. This includes the open-apple, up and down arrows, delete key, and even extra control characters for printer controls.

AppleWorks will function as it does on a 64K Apple IIe, it is still copyable and can be transfered to hard disk.

How much desktop is available?

Since this version of PLUS-WORKS will not change the memory driver, even in the presence of a ram card, you will have a 10K desktop. There are two exceptions.

1. Owners of Applied Engineering's Transwarp card will obtain a 55K desktop automatically.

2. Owners of an Apple II memory expansion card and AppleWorks version 1.3 will have a desktop based on the

PLUS–WORKS-II & PLUS-WORKS-XM

PLUS-WORKS II and PLUS-WORKS-XM do all that the plain PLUS-WORKS does but adds desktop expansion and the II version adds support for the 2.0 version of AppleWorks.

HARDWARE

All major 80 column cards listed under the plain version and the following ram cards for desktop expansion are supported
  Apple memory card & compats
    Ramfactor/Flipster
  Bank switched cards
    Legend/Saturn/Microtek/Ramex
    Orbital/Big Board /Jameco
  Serial cards
    Flash card(PW II only)
  CP/M cards
    Micropro Star card PCPI
    Franklin

Which version(s) of AppleWorks are supported?

PLUS-WORKS-XM supports AppleWorks versions 1.0 thru 1.3. PLUS-WORKS II supports AppleWorks 2.0 and has limited support for earlier versions of AppleWorks.

What if I have an Apple IIe?

PLUS-WORKS II will work on the Apple IIe with any Auxillary 80 col memory card and any IIe compatible bank-switched peripheral slot memory card.

What size desktop will I get?

The desktop size you receive depends on the ram card size. Up to 1 full megabyte is available with a 1 meg card. Only one ram card is supported at a time (IIe owners can use an aux ram card and an additional bank switched card).

Can AppleWorks be loaded into memory?

Yes, if you have a 256K or larger ram card AppleWorks can be set up to load into memory, greatly increasing the speed of AppleWorks. This ram disk feature functions differently depending on which version of Apple-Works you are using.

Can I use Pinpoint and Autoworks?

Only on the **Apple IIe or IIe compatibles.** If you use PWII on the Apple IIe you are given the option of leaving room for these programs.

Which hardware does PLUS-WORKS II not work with?

If you have AppleWorks 2.0, all above mentioned hardware is supported by PW II. If you are using an earlier version of Apple-Works, the following hardware is not supported:
  80 col cards
    M & R / Smarterm I / Vision 80 / Wizard 80 / Fullview 80
  Ram cards
    Orbital / Microtek
This does not mean you cannot run Appleworks but you must purchase the XM product instead of the PLUS-WORKS II product.

Must I have a ram card?

No, you need 64K minimum. You can add a ram card later.

PLUS-WORKS-L

Norwich Data Services didn't stop with the Apple II or Franklin. We developed a special version for the Laser 3000 computer from Video Technologies.

PLUS-WORKS-L will rewrite AppleWorks so it will boot directly on the Laser 3000. The Laser keyboard is used to its full capability with the BREAK keyacting as the Ö key, and the 8 function keys all mapped for cursor movement within AppleWorks.

The desktop size obtained with PLUS-WORKS-L is 10K only. Our PLUS-WORKS-XML will support the additional ram available for the 3000 users.

PLUS-WORKS-XMB (Not for Appleworks 2.0)

Continuing to add various hardware support we added a version for the BASIS 108 computer.

After being rewritten by PLUS-WORKS-XMB, AppleWorks will boot directly on the BASIS using the original 80 column display. As with all our PLUS-WORKS products the patch procedure is menu driven and easy to perform.

Ram card expansion

PLUS-WORKS-XMB support desktop expansion into a variety of ram cards including:

Legend Saturn Titan Prometh eus Adon Quadram Ramex Or bital Microtek BASRAM PCPI cp/m Micropro cp/m Franklin cp/m

Maximum desktop is 1024K. Note the Apple memory expansion card will not work in the BASIS

Also note that all of the extra 64K on the BASIS is not available to AppleWorks. With no addtional ram card you will have a desktop size of 24K.

If your expansion is 128K or more you will be asked if you want to expand the number of database records to 4,222 records compared with the normal 1,350 records.

Ram disk features

Both Permanent and Dynamic ram disk features are available providing you have 256K or more of ram card memory. The Permanent ram offers a fast bootup time at startup, opens up drive 1 and costs 140K of desktop. The dyanamic ram loses no desktop but is slow to boot. Both will give you

Using AppleWorks

All cursor keys and function keys have been used to their utmost!! PLUS-WORKS installs printer drivers for printer port use.

PLUS-WORKS-DT

Our DT product is for the Apple IIe or Laser 640K & Franklin 500 or 2000 series with the 512K option.

For the Apple IIe the DT product will enable auxillary slot extended memory cards to use the memory more efficiently. For example, a 1 meg ramworks card will provide a desktop of 1 megabyte as opposed to 735K with the patch program supplied with the ramworks card.

In addition 100% of peripheral slot bank-switched card memory (up to 3/4 meg) can be appended.

As with our other XM products, database expansion and dynamic ram features are added as well.

The DT product also offers support for the Ultraterm and Multiview 80 column cards for use in AppleWorks.

DT is fully menu driven and needs no documentation.

Hardware Support

Auxillary 80 column ram cards supported include:
RamWorks Legend E Card Neptune Viewmax 80E Multiram

Peripheral Bank swithed cards supported inlclude:
Legend Titan Prometheus Ad on Quadram Ramex

Note that some original ram cards designed for the II+ will not work in the IIe.

Laser & Franklin

The DT product will expand the AppleWorks desktop into the 512K cards available for these machines. As well as provide database and dynamic ram disks.

All versions of PLUS-WORKS are menu driven, not copyprotected and come with clear documentation. BASIS 108 owners may require ProDOS 1.0.1 and/or Apple disk controller cards.

PLUS-WORKS
PLUS-WORKS-L...................................... $19.95
PLUS-WORKS-DT..................................... $24.95

PLUS-WORKS-XM
PLUS-WORKS-XML
PLUS-WORKS-XMB
PLUS-WORKS II.................................... $49.95
PLUS-WORKS III (AppleWorks 3 and 4) **$49.95**
Add $3.00 shipping/handling per order. Add 4% for Mastercard or Visa. Orders only - phone (800) 221-3826.
NJ residents, information and tech support - call (516) 922-9584.

PLUS WORKS

PLUS-WORKS ™   **PLUS-WORKS-XM** ™   **PLUS-WORKS-XMP** ™

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TABLE OF CONTENTS

PLUS-WORKS -What does it do?

PLUS-WORKS is a patch program that permits you, the Apple 1 I+ owner, to join the growing world of AppleWorks users. PLUS-WORKS will modify the 'AppleWorks Startup' disk allowing the program to operate on an Apple][or][+, a Franklin ACE. or any Apple work-alike, when configured as described in Section 11. In addition, the XM and XMP versions incorporate an extended memory feature which will expand the 'AppleWorks desktop'. PLUS-WORKS-XM will recognize most popular peripheral slot ram cards and will use 100% of its ram memory for desktop expansion up to 1 megabyte even on the Apple)][e. For XM configurations of 256k an) above, two optional 'ram disk' features are included, minimizing disk access after startup. PLUS-WORKS-XMP will utilize the 64k of ram on the ACE 80 CPU CARD (or other compatible Z80 card) with a resulting desktop of 72k.

HARDWARE REQUIREMENTS

PLUS-WORKS currently supports the following 80 column displays: videoterm (with inverse), ultraterm. viewmax 80, franklin, viewmaster 80, magnum 80, wizard 80 and smartem II (1][+ only). The display card must be in slot 3. PLUS-WORKS and AppleWorks both require 64k RAM, therefore, the Apple language card or an equivalent 16k ramcard is required in slot 0. If your computer has the standard 11 keyboard, the popular game button shift-key modification is required. If necessary, consult your dealer or other capable individual to perform this simple installation. Helpful, but not necessary, is an auto repeat device installed on your keyboard. Also, AppleWorks works best with a minimum of two disk drives.

The XM version supports desktop expansion into many popular peripheral slot ramcards from 16k to 1024k. The card may occupy any available slot. Those supported are all cards from Legend Industries, Titan/Saturn, Abacus, Prometheus and their equivalents.

][e owners require an Apple compatible, auxilliary slot 80 column card or ultraterm (slot 3), and a compatible ramcard to take advantage of the extended desktop feature of PLUS-WORKS-XM. Be advised that auxilliary slot ram memory will be ignored by the patched AppleWorks. As a result, owners of 64k auxilliary slot 80 column cards will only substantially benefit from PLUS-WORKS-XM with 128k or more of peripheral slot ram.

INSTALLATION

All steps are performed in drive 1 (boot drive). If you wish to use AppleWorks on a hard disk, you must first install the patches on a diskette. You may then transfer the Appleworks files to a ProDOS subdirectory on the hard disk as described in the Appleworks reference manual

A. On a properly configured computer (80 column display installed, set for 40 columns and ramcard installed for XM version), insert the PLUS-WORKS disk in drive 1 and turn on the machine.
B. The disk drive starts, quickly stops, and prompts you to insert the Appleworks 'Startup' disk. Press a key to continue. If the message "UNABLE TO LOAD PRODOS" appears, you most likely mistakenly inserted the AppleWorks 'Program' disk. Check the label and restart.
C. When you are prompted to insert the PLUS-WORKS disk again, do so, then press a key to continue.
D. After the ProDOS greeting, you are prompted to select from a menu of 80 column display cards. If the name of your card does not appear on the list, choose 'videoterm' as it is the most common format amongst the generic displays. Contact NDS if you have difficulty.
E. Upon making your selection, the appropriate display driver is loaded and the 80 column screen becomes active. If your display switch is manual, switch on now. The program prompts you to insert the 'Startup' disk (for the last time). Make sure that what you insert is a copy of the original 'Startup' disk (if necessary, consult the DOS, ProDOS, or AppleWorks manual for instructions on how to copy a disk). Press RETURN, and put away the PLUS-WORKS disk.] [e owners skip to part G.
F. Depending on your version, the program will ask for responses to a few questions. The first is 'keyboard type'. If you have the standard] [keyboard with the shift-key mod installed press '1'. If your machine is a Franklin ACE 1200 (or newer ACE 1000 with a keyboard that is functionally a 1200) select '2'. If your non-type-2 machine has a full

ASCII upper and lower case keyboard, press '3'. If you choose '3', you will be asked to make two selections in order to somewhat customize your keyboard driver. The first option is choice of 'lead-in' key. This is the keypress that emulates the open-apple function. Choose any non-used control character or function key. The computer will beep if an unacceptable key is entered. When in doubt, use ESC . The hex code for the key pressed will appear on the screen. If you make an error, don't worry, you'll have a chance to repeat the selection sequence. Second, your choice of the DELETE key is requested. The standard delete key (hex 7F) may not be available on your keyboard, but again, you may choose any unused control-key or function key. Note that the left arrow (control-H) is acceptable. With each choice (1-3). a corresponding informational screen is displayed, illustrating the keyboard specific mapping of Apple-Works functions. They are described more fully below.

G. When you are satisfied with your keyboard choices you are then asked whether a printer patch should be performed. Choose 'no' unless you know for sure that you have printer problems. See section V. for additional information. The rest of the configuration is automatic with one exception; the XM version requests that you indicate the slot which contains the ramcard. Be aware that while slot 0 is acceptable, the 16k required by Pro-DOS 1s not available to AppleWorks. The card must be presently installed for successful configuration. You may choose 'N', if you do not wish to drive a ramcard at the present time. If 256k or more of ram is found, you will be asked to decide on the permanent ram disk option. Responding 'yes' sets this feature up as the default at startup, however, the dynamic 'ram disk' option will still be available at runtime. See section IV. D. for a complete description of 'ram disk' features. If your intention is to run Appleworks on a hard disk, you must choose <u>no</u>.

H, When configuration is complete, press a key to boot the disk. AppleWorks will start and away you go. The alterations to 'Startup' permit it to boot directly on your system from now on. If after using the program, you wish to change your configuration, repeat the procedure using a fresh copy of 'Appleworks Startup'.

IV. USING THE MODIFIED APPLEWORKS

The key sequences necessary to achieve a fully functioning AppleWorks balanced with ease of use of the software has been the product of careful consideration and letting. We   are confident that a user will be quite comfortable and satisfied with out choices. The following is not a description of how to use AppleWorks and it is assumed that the user is at least somewhat familiar with the operating features of AppeWorks and we present only information on transposing the][e/c keyboard functions.][e owners need only refer to the sections on ram disk features since the user functions are otherwise unchanged.

A. GENERAL KEYBOARD FEATURES

With the exception of the cursor functions (arrow-keys), open-apple functions (as described throughout the Appleworks manuals) are available to you by rust pressing the 'lead-in' key, then the desired function key. For example, if you want a <H>ard-copy of the current screen (open-apple-H), press the 'lead-in' key, then H. When the 'lead-in' key is pressed, an inverse '+' appears at the active position, To return from an inadvertant 'lead-in' press, press an unused open-apple key such as '0' (zero). Alternatively, since the real open-apple key is nothing more than a game-button press, one may choose to use d game-button as such Note that the button press must be made simultaneously with the keypress. It is not a 'lead-in' sequence.

Remapping of certain control keys has yellded a convenient, easy to remember, cluster of keys for cursor movement. While the two arrow keys. <ctrl-J > , and <ctrl-k >, are available as equivalent to the][e arrows, greater ease of use in cursor movement has been acheived by remappmg the ESDX cluster. When holding the control key down, pressing E, S, D. or X gives the corresponding up, left, right. and down cursor movement. The special arrangement of these keys is a simple reminder of their function of movement. Not entiiely by coinci- dence, this modification allows use of the arrow keys on the Franklin ACE 1200 keypad for cursor movement after < CTRL-NUMLOCK > is pressed.

Emulation of the open-apple arrow cursor movements, that is, up and down by page, and left and right by word, is implemented differently on the different keyboards and is discussed in the separate sections that follow as are other features unique to each

Literal control codes are sometimes required for printer setup strings. It a control character is required that has been remapped, it is obtainable by first pressing the 'lead-in' key.

B.][/][+ KEYBOARD

The 'lead-in' key is <ESC>. To generate a real <ESC>(very important), press <ESC > twice Open-apple cursor movements we accomplished by simultaneously pressing <SHIFT> <CTRL> and E, S, D or X. The delete function (destructive back-space) is handled with a shift-left arrow Caps-lock toggle is <CTRL-A>. Characters not normally available on the][can be generated by first pressing <ESC>, then the following

to get this	press <ESC>, then this
]	>
[	<
}	)
{	(
\	/
:	!
`	'
~	=
-	-

The and <Ã are obtained also by first pressing <ESC>. Keep that in mind when entering control codes for printer setups (requires A to exit) TAB is <CTRL-I>. Open-apple TAB (inverse TAB) is <SHIFT> <CTRL>I. One additional note, open-apple-" (ditto) is obtained with <ESC>-<SHIFT>-" (not unshifted as described in the Appleworks manual) or with game-button-shift-7 (').

C. FULL ASCII KEYBOARDS (including ACE)

If the ACE 1200 keypad option is selected the action of the keys 1-9 are self explanatory. Remember to activate the keypad with control-numlock. The <INSRT>key (0) is the open-apple tab (reverse tab) function required for moving left through the data base. The <FORMT>key is not remapped since is equivalent to <ctrl-B>. a valid Appleworks function key (bold).

With other full ASCII keyboards, (he following keys when pressed along with the control key, serve the same functions as the keypad keys.

ctrl-A	hex 81	left one word
ctrl-F	hex 86	right one work
ctrl-R	hex 92	up one page
ctrl-C	hex 83	down one page
ctrl-V	hex 96	reverse TAB

Note that the A-F surrounds the S-D (left-right) and the R-C is next to the E-X (updown). The special characters described in section IV.B. are also available using the 'lead-in' sequence. Special to the ACE, the ditto is mapped as <ctrl-">. Remember, for generating real control key values (eg. printer string setups), use the 'lead-in' key sequence.

If your keyboard has programmable function keys, use the values above to obtain the corresponding functions.

D. 'RAM DISK FEATURES

AppkWorks is a very large program, all the parts of which cannot be in main memory at the same time. For this reason, the 'Program* disk is called upon frequently to 'overlay' certain portions of memory in response to the user's functional requests. Appleworks has a built in capability for dynamic storage of program code modules. It stores these modules in unused desktop space. With a sufficiently large desktop, a module need only be loaded once from disk. Subsequent requests are serviced by the desktop storage driver. The user's data. of course, has the highest priority and as the data grows, the available desktop space shrinks and modules are removed. This will force program disk access at a later time. With this m mind, it is apparent that a larger desktop represents not only greater space for data, but a savings in time when moving between different sections of the program. The following are descriptions of the two options available for further reducing or eliminating program disk access for ramcards of 256k or greater.

DYNAMIC 'RAM DISKS'

With this option, the user elects to store all of the modules in the free desktop space at start up time. This procedure takes a bit of time to execute, but afterward, disk access is dramatically reduced. It is, however, not completely eliminated, and the 'program' disk must be left in the drive.

This feature is automatically enabled with 256k or larger ramcards, but will not function unless specifically called for at startup time. To select this option, do the following. During the Appleworks startup, when prompted to insert the 'AppteWorks Program' disk, insert it in the drive and press <SPACE> instead of <RETURN>. Enter the date as usual and press <RETURN>. The module transfer will begin and take approximately 75 seconds (AW version 1.2,earlier version > 2 min.) to complete.

This feature has limited utility and most user's will find the long startup time annoying. However, if ApplWorks is started early in the day and is utilized for various purposes throughout the day, this feature is, indeed, useful.

PERMANENT RAM DISK

This option is a <u>real</u> ram disk. It partitions the memory on the ram card into useable desktop space and a pseudo disk drive. The obvious disadvantage of this option is the loss of 136-144k of desktop space, but it does have two advantages over the dynamic 'ram disk'. One is leading time. You only have to wait 20 seconds after entering the date before reaching main Appleworks menu. The other is that drive I is now free! Chances are you have more data than can fit on a single diskette. Now you can swap less often.

The dynamic 'ram disk' is still an option that can be made at startup time. The same instructions apply as described above and the full desktop size is restored. This can be useful in temporarily expanding the desktop fur special needs, but it is also useful for updating the program disk defaults, ie. printer setups, default disk drive, etc. Choices made while the permanent ram disk is operating will not be 'remembered' on the startup disk. The date, however, will be. Once you have configured the program disk to your hardware and to your style, you'll seldom need to update it.

V. PRINTER PATCH

This is a feature unrelated to screen display and memory management. It has been included as a service to our customers who have had difficulty obtaining complete control of printer options due to interface incompatibility. The patch simply sets the 8th bit of each character sent to the printer interface. This is required by some &bit interfaces for proper formatting. We recommend choosing 'no', but if you discover the problem later on, simply rerun PLUS-WORKS and choose 'yes' to the printer patch question. The symptoms are fairly specific and include all or part of the interface setup string (80N) appearing at the beginning of the printout. gaps in lines, improper right margins, and inability to acheive lines longer than 80 characters even when the appropriate set up string is supplied.

IMPORTANT

If the set up string is appearing on the printout, it is likely (hat the 40 column echo has not been disabled. This means that even though you can't see them. characters are being sent to the 40 column screen. This is a function of the interface and means that the set up string has been ignored. This is a clear indication for choosing the 8 bit patch. 40 column echo <u>must</u> be disabled because part of the PLUS-WORKS patch occupies some of the unused screen memory.

It is recommended that users upgrade to Appleworks version 1.2 (free updates la original purchasers). This version contains a feature that permits installing a printer setup string. The recommended string is '<ctrl-I > 0 N' and is installed under 'Interface cards' in the printer set-up.

If you have any difficulty whatsoever, please contact us. We are committed to getting you up and running and enjoying what is probably the most powerful Apple program ever developed.

```
 VI  80 Column Cards

 The patches do not use the 80 column firmware. As a result, full videx compatibility
 is not required . A surprising number of card are hardware compatible and will
 function properly. Inverse characters must be available. If you are unsure about the
 display compatibility of your hardware, type in the following short machine language
 routine.

1. With no disk in the drive, cold start the computer and press reset.

2. at the ] prompt type call -1513. at the * prompt type:

    300: A9 0C 20 00 C3 A9 0A 8D B0 C0 A9 20 8D B1 C0 A2
         00 BD 25 03 F0 FE 48 8A 0A 0A AB B9 B0 C0 E8 68
         8D 5F CD D0 EC CE 44 53 CC 00 N300G <RETURN>

4. If your 80 column switch is manual then switch now

5. The display should contain four charactersa in a tilted diamond shape.
   From the top to bottom, inverse N, normal D, Normal S, and inverse L.
   There should be no cursor.
```

PLUS
WORKS
II

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Transwarp is a trademark of Applied Engineering

I. Introduction

Congradulations on purchasing PLUS-WORKS II. With it your Apple II+ or Franklin will be able to run AppleWorks, with all features available. Your II+ or IIe will have the expanded desktop you need with AppleWorks and any popular ram card device, be it Aux-ram or peripheral slot ram. All this with any version of AppleWorks, including the new 2.0 version.

II. HARDWARE REQUIREMENTS

- II+ or compatible -

PLUS-WORKS currently supports the following 80 column displays. Videoterm (with inverse), ultraterm, viewmax 80, franklin, viewmaster 80, magnum 80, wizard 80*, smarterm*, smarterm II, vision 80*, multiview 80/160, M&R Sup'r-terminal* and fullview 80*. The display card must be in slot 3. PLUS-WORKS and AppleWorks both require 64K RAM, therefore, the Apple language card or an equivalent 16K ramcard is required in slot 0. If your computer has the standard II keyboard, the popular game button shift-key modification is required (see back page of manual). Helpful, but not necessary, is an auto repeat device installed on your keyboard. Also, AppleWorks works best with a minimum of two disk drives.

PLUS-WORKS II supports desktop expansion into many peripheral slot ramcards from 64K to 1024K. The card may occupy any available slot. Those supported are all cards from Legend Industries, Titan/Saturn, Abacus, Prometheus, the Big Board, Quadram, Ramex, Orbital disco-ram*, Microtek Q disk*, Flash Card, Apple memory expansion card, Ramfactor, Sprint disk, Flipster, the PCPI Applicard , the Micropro star card and the Franklin ACE 80 CPU card.

- IIe owners -

An Apple Compatible auxiliary slot 80 column card or an ultraterm or multiview(slot 3) is required. All auxiliary memory cards are supported including Ramworks, Legend E card, Neptune, Viewmax 80e and Multiram. The Franklin and Laser 512K boards are also supported. Additional destop expansion into peripheral slot ram (from 64 to 1024K) is available to owners of bank-switched ram cards. **Note: some bank-switched cards originally designed for use with the Apple II+ will not function with the Apple IIe. Most cards with a motherboard ribbon connector fall into this category.**

III. INSTALLATION

All steps are performed in drive 1 (boot drive). If you wish to use AppleWorks on a hard disk , you must first install the patches on a diskette. You may then transer the AppleWorks

files to a ProDOS subdirectory on the hard disk (/HARD1 for the sider) as described in the AppleWorks manual. For II+ or II owners, the presence of a 16K ram card in slot 0 is assumed. References to "ram card" in the manual refer to additional ram.

A. On a properly configured computer (80 column display installed, set for 40 columns and ram card installed), insert the PLUS-WORKS II disk in drive 1 and turn on the machine.

B. The disk drive starts, quickly stops, and prompts you to insert the AppleWorks 'Startup' disk. Press a key to continue. If the message "UNABLE TO LOAD PRODOS" appears, you most likely inserted the AppleWorks 'Program' disk by mistake. Check the label and restart. Make sure the AppleWorks disk is not write-protected and that it is an unmodified copy of your original AppleWorks disk. (If necessary, consult the DOS, ProDOS, or AppleWorks manual for instructions on how to copy a disk).

C. When you are prompted to insert the PLUS-WORKS disk again, do so, then press a key to continue.

D. After the ProDOS greeting, you will see the "limited support for earlier versions of AppleWorks" message. If you have version 2.0 of AppleWorks you will press [N] if you wish to modify an earlier version of AppleWorks (1.0-1.3) then press [Y]. Note that some of the less popular 80 column cards and ram cards are not supported for earlier versions (see above). Following your selection you are prompted to select from a menu of 80 column display cards. Contact NDS if you have difficulty. Note the selection for IIe/Franklin 2000 and Laser 128 computers.

E. A second 40 column menu will appear asking you to select your ram card. Select the appropriate card. Note the IIe Aux card option. If you have only 64K total choose no ram card. Transwarp owners with a II+ should also note that with AppleWorks versions 1.0-1.3 you should choose Auxiliary slot card. With AppleWorks version 2.0 choose [No ram card]. Upon making your selection, the appropriate display driver is loaded and the 80 column screen becomes active. If your display switch is manual switch on now. The program prompts you to insert the 'Startup' disk. Press RETURN to continue. IIe owners skip to part G.

F. (II+ or compatible only) Depending on your version, the program will ask for responses to a few questions. The first is 'keyboard type'. If you have the standard II keyboard with the shift-

key mod installed press '1'. If your machine is a Franklin Ace 1200 (or newer Ace 1000 with a keyboard that is functionally a 1200) select '2'. If your non-type 2 machine has a full ASCII upper and lower case keyboard, press '3'. If you choose '3', you will be asked to make two selections in order to somewhat customize your keyboard driver. The first option is choice of 'lead-in' key. This is the keypress that emulates the open-apple (Ó) key. Choose any non-used control character or function key. The computer will beep if an unacceptable key is entered. When in doubt, use ESC. The hex code for the key pressed will appear on the screen. If you made an error, don't worry, you'll have a chance to repeat the selection sequence. Second, your choice of the DELETE key is requested. The standard delete key (hex 7F) may not be available on your keyboard, but again, you may choose any unused control-key or function key. Note that the left-arrow (control-H) is acceptable. If your II/II+ has been hardware modified with Upper/Lower case (not just the lowercase chip) choose '4' from the keyboard menu.

G. When you are satisfied with your keyboard choices you are then asked whether a printer patch should be performed. Choose 'no' unless you know for sure that you have printer problems. See Printer difficulties in the troubleshooting section for further details.

    IIe aux slot ram card users - at this time enter the appropriate card from the displayed list. You then will be asked to confirm [OK?], then, if you have a bank-switched card, indicate its peripheral slot location, otherwise choose 'None'. Upon selection the card size is determined and displayed. If no card is found, you are notified. Recheck your ram card location and try again. Remember that the peripheral slot ram card must be of the "bank-switched" type. Repeated failure may indicate a faulty ram card or some incompatibility. Early appleworks versions - You are offered to dedicate 16K for a desktop accessory (such as Pinpoint) to be installed after PLUS WORKS is installed.

II/II+ owners - The rest of the configuration is automatic with one exception. You may be requested to indicate the slot which contains the ramcard. Be aware that while slot 0 is acceptable, the 16K required by ProDOS is not available to AppleWorks. Franklin users should use some other slot than 0 unless the top 16K of ram on the motherboard has been disabled. The card must be presently installed for successful configuration.

    Early AppleWorks only - If 256K or more of ram is found, you will be asked to decide on the permanent ram disk option. Responding 'yes' sets this feature up as the default at startup, however, the dynamic 'ram disk' will still be available at runtime. See section B for a complete description of 'ram disk' features. If your intention is to run AppleWorks on a hard disk or unidisk 'you must choose no. At the conclusion of the configuration the database expand feature will be offered automatically. If you select not to expand at this time, you may do so later as per instructions at the end of this manual.

5

I. When the configuration is complete, press reset (or control-reset) to boot the disk. Apple-Works will start and away you go. The alterations to 'Startup' permit it to boot directly on your system from now on. If after using the program, you wish to change your configuration, repeat the procedure using a fresh copy of 'AppleWorks startup.'

IV. USING THE MODIFIED APPLEWORKS - II/II+ & compatibles

The key sequences necessary to achieve a fully functioning AppleWorks balanced with ease of use of the software has been the product of careful consideration and testing. We are confident that a user will be quite comfortable and satisfied with our choices. The following is not a description of how to use AppleWorks and it is assumed that the user is at least somewhat familiar with the operation of AppleWorks and we present only information on transposing the IIe/c keyboard functions.

A. KEYBOARD

PLUS-WORKS has been designed to adapt AppleWorks to several keyboard types in an effort to accomodate the limitations of the II/II+ as well as the versatility of some of the more modern add-ons. What follows is a general description of how AppleWorks functions are selected, and afterward, the special features of each keyboard type are discussed. Note that there may be several ways to select a given function. Please read this material carefully.

1. GENERAL KEYBOARD FEATURES

Open-apple (Ó) functions (as described throughout the AppleWorks manuals) are available to you by first pressing the 'lead in' key (lead in keys are discussed further in the individual keyboard sections below), then the desired function key. For example, if you want a <H>ardcopy of the current screen (Ó-H), press the 'lead-in' key, then H. When the 'lead in' key is pressed, an inverse '+' appears at the active cursor position. To return from an inadvertant 'lead-in' press, press an unused Ó key such as '0' (zero). Use of the game button as the Ó key is not supported.

Remapping of certain control keys has yielded a convenient, easy to remember, cluster of keys for cursor movement. While the two arrow keys, <ctrl-J>, and <ctrl-K>, are available as equivalent to the IIe arrows, greater ease of use in cursor movement has been achieved by remapping the ESDX cluster. When holding the control key down, pressing E, S, D, or X gives the corresponding ↑, ←, →, and ↓ cursor movement. The spacial arrangement

6

of these keys is a simple reminder of their direction of movement. ()-arrow functions, useful for moving by word or by page and for adjusting column widths, are obtained either by the 'lead-in' sequence or with <ctrl-A> and <ctrl-F> for ()<- and ()->, and <ctrl-R> and <ctrl-C> for ()↑ and ()↓. The latter method has the benefit of repeatability since the 'lead-in' is not required. Similarly, the TAB key, <ctrl-I>, has an () function, alternately obtainable with <ctrl-V>. <Ctrl-G> can be used for DELETE.

We have introduced an alternate character function, <ctrl-Z>, to allow you to generate characters that otherwise are not available on your keyboard, and to allow control characters to be sent without remapping. For example, if you want to enter a <ctrl-A> into a printer set-up string, first, press <ctrl-Z>, then <ctrl-A>. The alternate characters are described in the following table. () functions of these are obtained with the 'lead-in' sequence.

<Ctrl-Z> then ...	gives	<Ctrl-Z> then ...	gives
>	]	A	Ä
<	[	o	ö
)	]	O	Ö
(	{	u	ü
/	\	U	Ü
!	¦	=	ß
.		C or c	<ctrl-\> (hex 1C)
=	~	D or d	<ctrl-]> (hex 1D)
	_	E or e	<ctrl-^> (hex 1E)
a	ä	F or f	<ctrl-_> (hex 1F)

Note that the German characters will appear only if a German character ROM is installed, otherwise the alternate characters earlier in the list will appear in their place. Conversely, with the German ROM installed, those alternate characters are not available. The hex codes 1C-1F are required by some printers to enable special features.

2. II/II+ KEYBOARD with one-wire shift-key modification

The 'lead-in' key is <ESC>. To generate a real <ESC> (very important), press <ESC> twice. The ability to read the SHIFT key has allowed for some additional flexibility in obtaining certain () functions. Simultaneously pressing <SHIFT><CTRL> and E, S, D or X emulates the () arrow functions. TAB is <CTRL-I>. The DELETE

7

function (destructive back-space) is handled with a simultaneous SHIFT <-.

Caps-lock toggle is <CTRL-W> or <Ctrl-Z><Ctrl-W> where the <Ctrl-Z> prepress allows transmission of the <Ctrl-W> to AppleWorks if desired. The ^ and @ are obtained by pressing <SHIFT-N> or <SHIFT-P> respectively, either with caps-lock on or after pressing <Ctrl-Z>. Keep that in mind when entering control codes for printer setups (requires ^ to exit). One additional note, ()-" (ditto) is obtained with <ESC><SHIFT-7> (').

3. ACE 1200 KEYBOARD

This keyboard has a numeric keypad, which, when activated with a <Ctrl-NUMLOCK>, will deliver an alternate set of control key functions. <Ctrl-NUMLOCK> also deactivates the keypad and restores its numerical functions. We have installed a rational set of AppleWorks functions based on the labels on these keypad keys. The keypad must be active when these functions are desired. The equivalent control codes mentioned below are the actual codes generated by the keypad keys when active. They are included for reference only and can be of some utility to users with programmable keyboards.

The 'lead-in' key is <MENU>. It is keypad-#5 and it is also equivalent to <Ctrl-Q>. The arrow keys at keypad-#8,4,2,6 give the ↑, <-, ->, ↓ and are equivalent to <Ctrl-E,S,D,X>. <PREV WORD> and <NEXT WORD>, keypad-#7,9, give the ()<- and ()->, respectively, and are equivalent to <Ctrl-A,F>. These keys are useful for moving left and right by word in the Word Processor and for widening or shrinking column widths. <PREV SCRN> and <NEXT SCRN>, keypad-#1,3, give the ()↑ and ()↓ functions and are equivalent to <Ctrl-R,C>. These () keypad functions do not require a 'lead-in' press. <DEL CHAR>, keypad-., is DELETE, equiv. to <Ctrl-G> and <INSERT>, keypad-#0, is ()TAB, equiv. to <Ctrl-V>.

4. OTHER FULL-ASCII KEYBOARDS

The 'lead-in' and DELETE keys were selected during configuration. The remapped control keys described in the General Section above are available to you. If you have programmable function keys, you may wish to define them using the control codes described in the General section and in the section on the ACE 1200. Software caps-lock is not supported. If you have a later model ACE 1000, it may have a keyboard that is functionally equivalent to the 1200, buy without the function names on the keycaps. If you know this to be the case, or if during configuration, pressing <Ctrl-PAUSE> once allows keypad-#5 to give an acceptable 'lead-in' key, then choose keypad-. for DELETE and follow the instructions for the 1200 above.

8

5. HARDWARE MODIFIED II/II+ with upper/lower case

This selection is essentially the same as the standard II/II+ keyboard. The 'lead-in' key is <ESC>. The DELETE key, however, is <Ctrl-G>. Software caps-lock <Ctrl-W> is enabled and the @ and ^ symbols are available in the same fashion as on the standard II/II+. Keep in mind that all of the remapped control codes, all of the <Ctrl-Z> alternates, and all of the possible 'lead-in' sequences are available to you. A real <ESC> requires two <ESC> presses.

B. 'RAM DISK FEATURES' (Early AppleWorks versions only 1.0-1.3)

AppleWorks is a very large program, all the parts of which cannot be in main memory at the same time. For this reason, the 'Program disk' is called upon frequently to 'overlay' certain portions of memory in response to the user's functional requests. AppleWorks has a built in capability for dynamic storage of program code modules. It stores these modules in unused desktop space. With a sufficiently large desktop, a module need only be loaded once from disk. Subsequent requests are serviced by the desktop storage driver. The user's data, of course, has the highest priority and as the data grows, the available desktop space shrinks and modules are removed. This will force program disk access at a later time. With this in mind, it is apparent that a larger desktop represents not only greater space for data, but a savings in time when moving between different sections of the program. The following are descriptions of the two options available for further reducing or eliminating program disk access for ramcards of 256K or greater.

DYNAMIC 'RAM DISK'

With this option, the user elects to store all of the modules in the free desktop space at start up time. This procedure takes a bit of time to execute, but afterward, disk access is dramatically reduced. It is, however, not completely eliminated, and the 'program' disk must be left in the drive.

This feature is automatically enabled with 256K or larger ramcards, but will not function unless specifically called for at startup time. To select this option, do the following. During the AppleWorks startup, when prompted to insert the 'AppleWorks Program' disk, insert it in the drive and press <SPACE> instead of <RETURN>. Enter the date as usual and press

<RETURN>. The module transfer will begin and take approximately 75 seconds (early versions >2 min.) to complete.

This feature has limited utility and most user's will find the long startup time annoying. However, if AppleWorks is started early in the day and utilized for various purposes throughout the day, this feature is, indeed, useful.

PERMANENT RAM DISK (not available for the aux ram cards)

This option is a real ram disk. It partitions the memory on the ram card into usable desktop space and a pseudo disk drive. The obvious disadvantage of this option is the loss of 136-144K of desktop space, but it does have two advantages over the dynamic 'ram disk'. One is loading time. You only have to wait 20 seconds after entering the date before reaching the main AppleWorks menu. The other is that drive one is now free! Chances are you have more data than can fit on a single diskette. Now you can swap less often.

The dynamic 'ram disk' is still an option that can be made at startup time. The same instructions apply as described above and the full desktop size is restored. This can be useful in temporarily expanding the desktop for special needs, but it is also useful for updating the program disk defaults, ie. printer setups, default disk drive, etc. Choices make while the permanent ram disk is operating will not be "remembered" on the startup disk. The date, however, will be. Once you have configured the program disk to your hardware and to your style, you'll seldom need to update it.

V. DATABASE EXPANSION UTILITY (Early AppleWorks versions only 1.0-1.3)

A database expansion is included on the PLUS-WORKS disk. A system program called DBEXP will alter your AppleWorks disk to allow 4,222 database records. You may have performed this operation at configuration time but it can be performed separately. To run this program boot your configured AppleWorks disk. If you have the permanent ram disk installed you must enable the dynamic ram disk by pressing the space bar at startup. Otherwise the patches will be made to your ram card instead of the program disk. Once the main menu is up select the quit function and if the screen goes blank, reset. Place the PLUS-WORKS disk in any drive and enter /PLUSWORKS2 as the prefix and DBEXP as the application and follow the instructions. Note that there is a loss of 8K from the desktop when this option is selected.

VI. TROUBLESHOOTING

Configuration difficulties that result in the "ProDOS error $XX" message may be remedied by consulting the partial list of errors below. Many of the errors are the result of the wrong disk being in the drive at that particular time. One frequent source of errors is the attempt to configure an AppleWorks disk that is not a true copy of an original. Pre-release versions and Pinpoint or Ramworks modified copies WILL NOT WORK!! Your most reliable source for AppleWorks is your dealer.

A. ProDOS Error Codes

$27 I/O Error
$28 No device connected
$2B Write protected
$2E Volume switched
$44 Nonexistant path
$45 Volume not mounted
$46 File not found
$4E Access error
$51 File count bad
$52 Not a ProDOS disk
$53 Bad volume bit map

B. Printer problems

Printer difficulties are AppleWorks problems, not PLUS-WORKS problems. However, we recognize the fact that Apple Computer is not going to assist you since AppleWorks is not supposed to work at all on your machine. The following is a guide to trouble shooting printer problems. We hope it is helpful.

1. CONFIGURE YOUR PRINTER! Usually, nothing will print correctly with the default selections. Read the sections on printing (Ch. 13 & Appendix B) in your AppleWorks manual.

2. If your printer does not appear on the list of supported printers don't assume that you know which one to choose.

11

Choose 'Custom printer' for yours and 'remove' the Imagewriter and Apple DMP. Make sure that your printer is selected as the ◊-H printer. Come back later to install the special codes (section 5 below).

3. Concentrate on getting an accurate screen dump with ◊-H. If the printer doesn't advance or if it skips a line after each one it prints go back to the printer set-up menu and reverse the line feed setting. If you get nothing and the cursor is still active see section 6 below. If your dump starts a few spaces over and/or prints 80N, it means that your printer interface is not recognizing the <ctrl-I>80N set-up string. If that's happening, then the rest of your dump is likely to also be quite strange. YOU MUST FIX THIS! If the program hasn't crashed yet, it will. Some interface cards only work properly if they think they're working with Applesoft Basic. As a result, many of the characters that AppleWorks sends are interpreted in an unpredictable way. Perform the PLUS-WORKS configuration over again and choose 'Y' for the printer patch option. This usually does the trick for the GRAPPLER and other similar 'graphics' cards. If you have AppleWorks versions 1.0 or 1.1, the printer patch also replaces athe set-up string with <ctrl-I>0N. This will help you in the future when you try to print wider than 80 columns. Later versions give you the option of installing your own interface set-up string, so if you're still having problems, go to your dealer and get a newer version of AppleWorks and install a set-up string that, according to your printer interface manual, will turn off the screen echo and inhibit the card from issuing carriage returns. Don't go on until you have an accurate dump.

4. Set-up strings are important for printing wider than 80 columns. With ◊-O, you can use the SC option in the database and spreadsheet to put in <ctrl-I>nN (n=0-255), but you may have difficulty printing wider than 80 columns in the wordprocessor unless you have AppleWorks version 1.2 or 1.3. They allow you to enter your own set up string in the main menu printer info section.

5. ◊-P printing. If you're getting wierd things at the beginning of each line, you've chosen the wrong printer type. Even if your printer goes buy the name you chose or swears ultimate compatibility, don't knock yourself out - set up a custom printer. If your Epson printer won't stop underlining, subscripting, or superscripting, forget it. Apple made a mistake. Set up a custom printer. You'll need your printer manual.
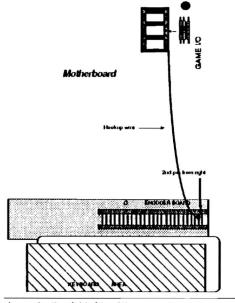
12

The AppleWorks reference manual Appendix B will help. Put on caps-lock. Enter your printer codes for each function. SHIFT-N with caps-lock on gives you "^" for exiting each string entry. If you have an Okidata and need the hex codes 1C, 1D, 1E, and 1F, remember, <ctrl-Z> C, D, E, F (not on IIe). If you have an Epson, don't make the same mistake Apple did, when you need 'n-0', its not "0" it's <Ctrl @>.

6. Dead printer? Is it switched on? Does it say its printing, but its not? If it works   properly with Basic, we can fix it. Give us a call

13

PLUS-WORKS REFERENCE CHART

AppleWorks function	II/II+ w shift key mod	Ace 1200	Full ASCII	U/L II+ (hardware mod)
⟁	ESC	Menu keypad #5	User defined	ESC
↑	Ctrl E	keypad #8	Ctrl E	Ctrl E
←	Ctrl S	keypad #4	Ctrl S	Ctrl S
→	Ctrl D	keypad #2	Ctrl D	Ctrl D
↓	Ctrl X	keypad #6	Ctrl X	Ctrl X
⟁↑	Ctrl R Shift Ctrl E ESC, then Ctrl E	keypad #1 PREV SCRN	Ctrl R Lead in, then Ctrl E	Ctrl R ESC, then Ctrl E
⟁←	Ctrl R Shift Ctrl S ESC, then Ctrl S	keypad #7 PREV WORD	Ctrl R Lead in, then Ctrl S	Ctrl R ESC, then Ctrl S
⟁→	Ctrl F Shift Ctrl D ESC, then Ctrl D	keypad #9 NEXT WORD	Ctrl F Lead in, then Ctrl D	Ctrl F ESC, then Ctrl D
⟁↓	Ctrl C Shift Ctrl X ESC, then Ctrl X	keypad #3 NEXT SCRN	Ctrl C Lead in, then Ctrl X	Ctrl C ESC, then Ctrl X
TAB	Ctrl I	TAB	Ctrl I	Ctrl I
⟁TAB	Ctrl V Shift Ctrl I ESC, then Ctrl I	keypad #0 INSERT	Ctrl V Lead in, then Ctrl I	Ctrl V ESC, then Ctrl I
DELETE	Shift←	DEL CHAR	user defined	Ctrl G

14

Motherboard

GAME I/O

Hookup wire →

2nd pin from right

ENCODER BOARD

KEYBOARD AREA

SHIFT KEY MODIFICATION

The shift key mod allows you to use your Apple II keyboard like a typewriter and is required to run AppleWorks with PLUS-WORKS. The modification is not required for full ASCII keyboards.

To install the modification follow these instructions. Refer to the drawing to the left

1. Turn off the computer and remove the top.

2. Standing in front of the computer, note the game paddle port in the far right corner on the motherboard.

3. Insert small hookup wire into 4th hole on right side counting from keyboard.

4. Bend over computer and look under the keyboard. Note the 25 pins under the right side of the computer on the encoder board.

5. Attach the other end of the wire to the 2nd pin from the right and you have completed the modification. The mini clip leads from Radio Shack (part no. 278-016) work well for the modification (only one of the two clips is needed). You can also use plain wire with an alligator clip.

15

PLUS-WORKS-III
for AppleWorks 3.0

Version 1.0 Release Notes
Update to User Manual

Before installing PLUS-WORKS-III, please be advised of the following requirements and limitations:

- you _must_ own a ramcard of sufficient size such that the total memory of your computer system exceeds 64k, preferably 64k minimally added. Card types supported are bank-switched (Saturn, Legend, NEXO, Memory Plus), Apple II Memory Expansion (RamFactor, Sprintdisk, Flipster) and PCPI CP/M (Franklin ACE 80 CPU, StarCard, AppliCard). The extra memory in the TransWarp card is _not_ presently supported for desktop. There is also no AUX slot driver.
- 80 column card support is presently limited to the Videx hardware standard. Cards included are the Videoterm, Ultraterm, Viewmaster 80, Viewmax 80, Franklin, Magnum 80, NEXO, Memory Plus, and most generic, far eastern boards.

The PLUS-WORKS-III installation must be performed with copies of AppleWorks 3.0 on 5 1/4" floppy disks. Transfer to another ProDOS compatible disk type can be made afterwards. We suggest that before doing so that you first verify proper operation on floppy. Directions are provided in the AW 3.0 Reference Manual, pp. B10-B11. For item 3 on B10 select SEG.XM.

AW 3.0 is now on three floppies - Startup, Word Processor/Database, and Spreadsheet. For II+ and compatibles, PLUS-WORKS-III will call for all three of them. If you have a IIe or a TransWarp card, only Startup will be required. Make sure that you use fresh copies of your AppleWorks masters and that you use a standard copy program, not a bit-copier. A fourth disk, Dictionary, requires no modification.

The PLUS-WORKS-III diskette contains support for AW 3.0 only. ▀▀▀▀▀▀▀▀▀▀▀▀

The PLUS-WORKS-III installation procedure is essentially the same as described in the manual with the exception of the 'earlier version' question (section III D).

The ProDOS-8 V1.7 on the AW 3.0 Startup diskette contains the BETTER-BYE program selector. This nice feature is activated upon quitting AppleWorks from the MAIN MENU. It runs on the 40 column screen. In order to see and use the selector, PLUS-WORKS-III installs a slight modification that switches off your 80 column screen. This will work properly only if your 80 column card uses the 'control-Z-1' switch-off convention. Contact us if you have difficulty.

NOTE: Per Fred at Memory Plus Distributors, Plus-Works III works fine with AppleWorks 4, too. But, you must run the patch on the floppies before transferring to a hard drive. (Same as with AppleWorks 3).

Plus-Works III is untested with AppleWorks 5. AW 5 also requires a 65C02 CPU, which most Apple II+ do not have.