```
PPPPPPPPP      BBBBBBBBB      RRRRRRRRR
PPPPPPPPPP     BBBBBBBBBB     RRRRRRRRRR
PP       PP    BB      BB     RR       RR
PP       PP    BB      BB     RR       RR
PP       PP    BB      BB     RR       RR
PPPPPPPPPP     BBBBBBBBB      RRRRRRRRRR
PPPPPPPPP      BBBBBBBBB      RRRRRRRRR
PP             BB      BB     RR   RR
PP             BB      BB     RR    RR
PP             BB      BB     RR     RR
PP             BBBBBBBBBB     RR      RR
PP             BBBBBBBBB      RR       RR
```

```
PRINT          BUFFER         ROUTINE
```

This document contains information on P.B.R. (print buffer routine). The P.B.R. is a software program and a hardware package that allows a 2nd Atari(r) Home Computer to be used as a print buffer.

TABLE OF CONTENTS

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CHAPTER 1
HARDWARE INSTALLATION

        The 1st thing to do is to determine which computer you
will use as your main computer and which will be used as
the print buffer. It makes no difference if either one is
an XL series or a 400/800 series so use your favorite one
for the main computer.

        Now for the Hardware installation. Refer to Fig 1-1
for help with this section. Printer and Printer Interface
(if needed) are to be connected to the Print Buffer. Disk
drives will still be connected to the main computer. Take
the cable that comes with P.B.R. and plug one end into Joy-
stick Port #1 on the Main computer. The other end plugs
into Joystick Port #1 on the print buffer. The cartridge
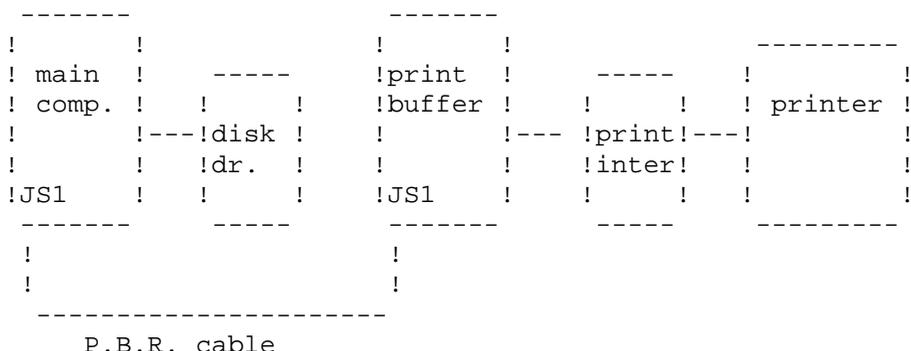that comes with P.B.R. is to be inserted into the Print
buffer.

_____

```
   -------               -------
 !       !             !       !                 ---------
 ! main  !    -----     !print  !     -----     !         !
 ! comp. !   !     !    !buffer !    !     !    ! printer !
 !       !---!disk !    !       !    !--- !print!---!         !
 !       !   !dr.  !    !       !    !     !inter!   !         !
 !JS1    !   !     !    !JS1    !    !     !   !     !         !
  -------     -----      -------      -----     ---------
   !                         !
   !                         !
   ---------------------------
       P.B.R. cable
```

                         FIGURE 1-1
_____

        Now it's time to connect the video(TV)outputs of the 2
computers. Two TV/computer switch boxes are required if you
wish to see the video output of the print buffer. This is
not really necessary during normal use but makes trouble
shooting much easier. Under normal operation the print buffer's
screen editor is disabled after a 2 second title screen.
Refer to Figure 1-2 to connect the TV/computer switch boxes.
Table 1-1 shows how the switches will need to be set in order
to view the TV, or the main computer, or the Print buffer.
We recommend labeling the switch boxes to prevent confusion.
_____

TO VIEW	SW1	SW2
TV	TV	TV
MAIN COMPUTER	COMPUTER	TV
MAIN COMPUTER	COMPUTER	COMPUTER
PRINT BUFFER	TV	COMPUTER

                         TABLE 1-1
_____
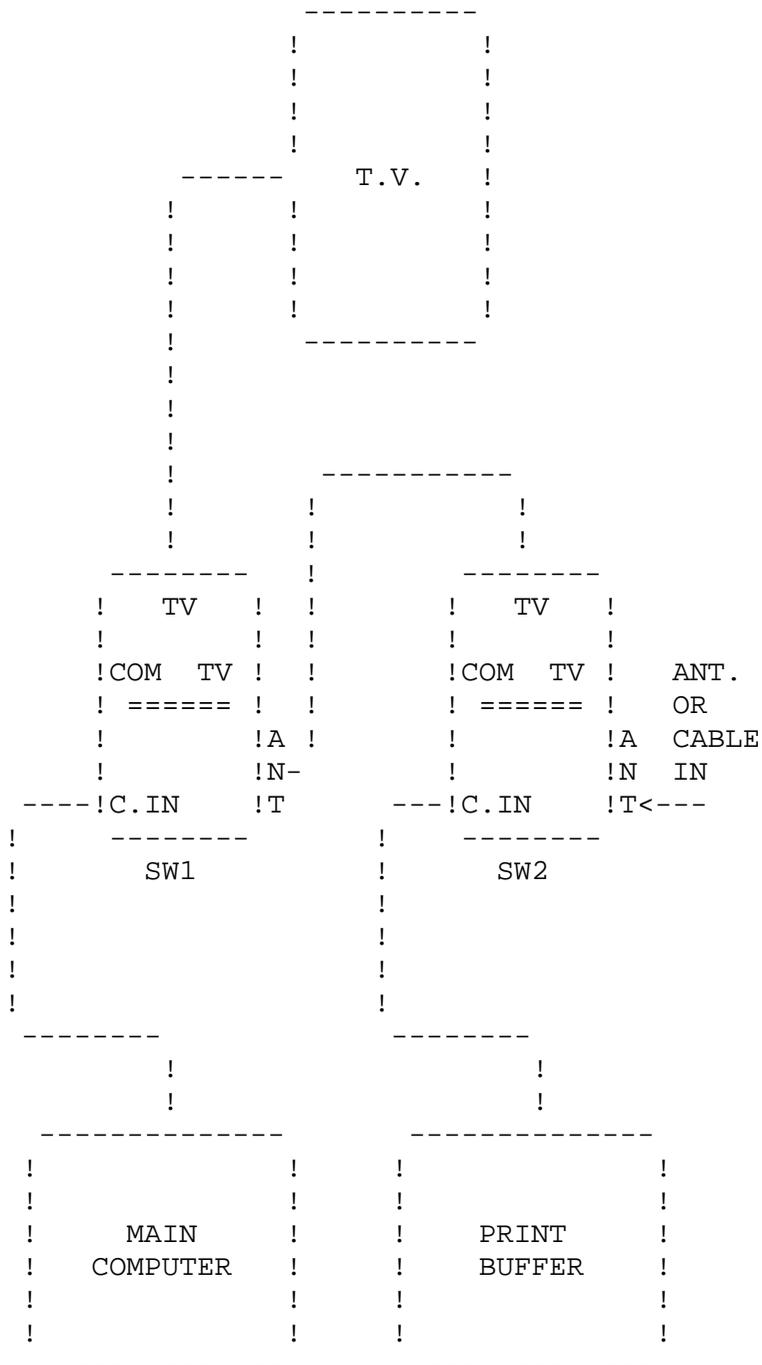
```
                        ----------
                    !            !
                    !            !
                    !            !
                    !            !
              ------      T.V.   !
            !       !            !
            !       !            !
            !       !            !
            !       !            !
            !        ----------
            !
            !
            !
            !        -----------
            !       !           !
            !       !           !
         --------   !        --------
        !   TV  !   !       !   TV  !
        !       !   !       !       !
        !COM  TV!   !       !COM  TV!  ANT.
        ! ===== !   !       ! ===== !  OR
  .     !       !A  !       !       !A CABLE
        !       !N- !       !       !N IN
    ----!C.IN   !T      ---!C.IN    !T<---
   !     --------        !    --------
   !      SW1            !      SW2
   !                     !
   !                     !
   !                     !
   !                     !
    --------              --------
        !                     !
        !                     !
   --------------        --------------
  !             !       !             !
  !             !       !             !
  !    MAIN     !       !    PRINT    !
  !  COMPUTER   !       !   BUFFER    !
  !             !       !             !
  !             !       !             !
   --------------        --------------



                    FIG. 1-2
--------------------------------------------------
```

                          CHAPTER 2
                    SOFTWARE INSTALLATION

SECTION 1

     This section is for disk based systems having 24K or
more of memory. Section 2 is for disk based systems having
16K. Section 3 is for loading P.B.R. from cassette.
     On the P.B.R. disk you receive are several programs.
The 1st is DISK.PBR. This is the program that is loaded into
the main computer. It is the standard version that will be
used. We will install and run this version 1st.
     It is B.L.Enterprises policy not to copy protect our
disks. We feel that you, as the purchaser, have the right to
make backup copies for your own use. The P.B.R disk you re-
ceive is write protected. You should leave the disk this way
and copy the files onto your Atari DOS disk. Then put the
master disk away for safe keeping. Insert the work disk you
just made into the disk drive and boot the system. When DOS
comes up copy DISK.PBR to AUTORUN.SYS. Turn the main computer
off and insert your BASIC cartridge (on non XL machines).
     Set the TV switch Boxes to view the Print Buffer video
(TV) output as per Table 1-1. Make sure the P.B.R. cartridge
is inserted in the Print Buffer. Turn on the Printer and
make it ready. Turn on the Printer Interface (if you have
one). Turn on the Print Buffer. The Print Buffer should
display this title screen:

     PRINT BUFFER ROUTINE   VERSION 2.00
      Copyright 1984, B. L. ENTERPRISES

for about 2 seconds. The buffer's RESET key will display the
title screen again for 2 seconds. The blank screen is the normal
condition for the Print Buffer. If these things do not happen
refer to CHAPTER 4.
     Next set the TV switch Boxes to view the main computer
as per Table 1-1. Insert the work disk in drive 1 and turn on
the main computer. The disk should boot and you should see
this title screen:

     FROM PBR: (c) 1984 B. L. ENTERPRISES
              PRINT BUFFER STATUS = OK.
              nnnnn BYTES AVAILABLE.

     READY

nnnnn = The amount of memory available in the Print Buffer.
     If the title screen does not appear or any errors are
displayed go to CHAPTER 4.
     The P.B.R. is now installed and ready to be used with
your favorite Basic program. For example try:

     LPRINT "0123456789"

You should see this print on the printer. Now hit the START
key on the Print Buffer. The printer should go to top of form
(some printers will not recognize the top of form control code).
SELECT is a single line feed and OPTION is a double line feed.
     Pushing RESET on the main computer will take you back to
the title screen. There is no need to reboot P.B.R. when using
DISK.PBR.

SECTION 2

     This section covers machines that have less than 24K of
memory and are disk based. The program we will be concerned
with is SLIMDISK.PBR. It must be an AUTORUN.SYS file to run.
     It is B.L.Enterprises policy not to copy protect our
disks. We feel that you, as the purchaser, have the right to
make backup copies for your own use. The P.B.R disk you re-
ceive is write protected. You should leave the disk this way
and copy the files onto your Atari DOS disk. Then put the
master disk away for safe keeping. Now insert your work disk
and boot the system. DOS files should be on this disk but,
it is a good idea to remove DUP.SYS. SLIMDISK.PBR will
not accommodate the use of the DUP functions because it was
designed for minimum memory size. Removing DUP.SYS will
help you remember this. If a DUP function is used a reboot of
SLIMDISK.PBR will be needed. We recommend using Atari DOS 2.0
(3.0 will work too). Rename (or copy to) SLIMDISK.PBR to AUTO-
RUN.SYS.
     Set the TV switch Boxes to view the Print Buffer video
(tv) output as per Table 1-1. Make sure the P.B.R. cartridge
is inserted in the Print Buffer. Turn on the Printer and
make it ready. Turn on the Printer Interface (if you have
one). Turn on the Print Buffer. The Print Buffer should
display this title screen:

     PRINT BUFFER ROUTINE   VERSION 2.00
      Copyright 1984, B. L. ENTERPRISES

for about 2 seconds. The buffer's RESET key will display the
title screen again for 2 seconds. The blank screen is the normal
condition for the Print Buffer. If these things do not happen
refer to CHAPTER 4.
     Next set the TV switch Boxes to view the main computer
as per Table 1-1. Insert the AUTORUN disk in drive 1 and turn
on the main computer. The disk should boot and you should see
this title screen:

     FROM PBR: (c) 1984 B. L. ENTERPRISES
             PRINT BUFFER STATUS = OK.
             nnnnn BYTES AVAILABLE.

     READY

nnnnn = The amount of memory available in the Print Buffer.
     If the title screen does not appear or any errors are
displayed go to CHAPTER 4.
     The P.B.R. is now installed and ready to be used with
your favorite Basic program. For example try:

     LPRINT "0123456789"

You should see this print on the printer. Now hit the START
key on the Print Buffer. The printer should go to top of form
(some printers will not recognize the top of form control code).
SELECT is a single line feed and OPTION is a double line feed.
     Note that anytime RESET is pressed on the main computer
using SLIMDISK.PBR a reboot will be needed to re-install P.B.R.

SECTION 3

        This section will tell you how to create and load DISK.PBR
from a boot load cassette.
        It is B.L.Enterprises policy not to copy protect our
disks. We feel that you, as the purchaser, have the right to
make backup copies for your own use. The P.B.R disk you re-
ceive is write protected. You should leave the disk this way
and copy the files onto your Atari DOS disk. Then put the
master disk away for safe keeping. Insert the work disk in
drive 1 and do a binary load on the program CASSETTE.PBR.
This program will load in and will also load in DISK.PBR so
make sure this program is on the disk. The title screen will
display (see Fig.2-1) and the computer will beep twice. The
prompts will ask you to insert a blank cassette into the drive.
After doing so press PLAY, RECORD on the cassette drive and
RETURN on the computer. CASSETTE.PBR will then write DISK.PBR onto
a boot loadable cassette. After the cassette is finished you will
be returned to DOS.

```
        --------------------------------------------------------
                (c) 1984   B. L. ENTERPRISES
                 P.B.R.  BOOT CASSETTE MAKER
                        VERSION 2.00


             This program will create a BOOT
            CASSETTE TAPE of the DISK VERSION
            of P.B.R.  Remember, this version
            requires a minimum of 24K MEMORY.



                     LOADING D1:DISK.PBR



             INSERT BLANK CASSETTE, PRESS REC PLAY
                      THEN PRESS RETURN

        --------------------------------------------------------
```

                        Figure 2-1

        Having DISK.PBR on cassette is used mainly for disk boot
software that allows for a cassette boot.
        Set the TV switch Boxes to view the Print Buffer video
(TV) output as per Table 1-1. Make sure the P.B.R. cartridge
is inserted in the Print Buffer. Turn on the Printer and
make it ready. Turn on the Printer Interface (if you have
one). Turn on the Print Buffer. The Print Buffer should
display this title screen:

        PRINT BUFFER ROUTINE   VERSION 2.00
         Copyright 1984, B. L. ENTERPRISES

for about 2 seconds. The buffer's RESET key will display the
title screen again for 2 seconds. The blank screen is the normal
condition for the Print Buffer. If these things do not happen
refer to CHAPTER 4.

Next set the TV switch Boxes to view the main computer as per Table 1-1. Insert the cassette into the drive and turn on the computer while holding down the start key. The computer will beep once. Insert your program disk into the disk drive, press PLAY on the recorder, and RETURN on the main computer. The tape will load and you should then get the P.B.R. title screen:


```
FROM PBR: (c) 1984 B. L. ENTERPRISES
         PRINT BUFFER STATUS = OK.
         nnnnn BYTES AVAILABLE.
```


The disk drive will come on and your program will load. The P.B.R. is now installed and should work with the program just as the printer did.

Pressing RESET will reinstall P.B.R. without having to re-load from tape. If the P.B.R. does not appear to be working correctly it could be that the program does not allow a boot from cassette.

CHAPTER 3   OPERATION

     As you can tell from the proceeding Chapters there
are several different versions of P.B.R.. This is done to
achieve compatibility with as much software as possible.
The 1st version you should try using is DISK.PBR. This is
the normal version that will remain in memory after a reset.
The easiest way to use P.B.R. is to use it in an AUTORUN.SYS
file.(1) This can be just P.B.R. or it can be appended to an
existing AUTORUN.SYS file. The method of appending the file
is easy, however precautions should be taken to not destroy
an AUTORUN.SYS file that cannot be replaced. Before append-
ing the file you should copy AUTORUN.SYS to AUTORUN.ORG (ORG
for original). That way if appending does not work you still
have the original AUTORUN.SYS file to copy back. Next copy
DISK.PBR to AUTORUN.SYS. Then copy AUTORUN.ORG to AUTORUN-
SYS/A. The /A is very important because that is what tells
DOS to append. More simply put:

          COPY AUTORUN.SYS TO AUTORUN.ORG
          COPY DISK.PBR TO AUTORUN.SYS
          COPY AUTORUN.ORG TO AUTORUN.SYS/A

     This way when you boot the disk you will load P.B.R.
just before you boot your program. If there are any errors
with the print buffer or the printer the errors will be
displayed before your program loads.
     Of course DISK.PBR can also be loaded by using the DOS
option BINARY LOAD. DISK.PBR loads itself into the uppermost
4K of memory and then changes MEMTOP to just below itself. A
4K block must be used due to restrictions of the operating
system. On machines with more than 48K the 4K above the cart-
ridge, normally wasted, is used. It then checks to see if the
print buffer has been connected and determines the memory size
of the buffer. This is then reported back to you on the title
screen. It also checks to see if the printer is connected,
turned on, and ready. Any errors with either the buffer or
the printer are reported on the main computer's screen.
     If your software does not work with DISK.PBR (for ex-
ample it acts as though it prints but the printer does noth-
ing) then you should try using SLIMDISK.PBR. This program is
a "slimmed" down version of DISK.PBR. It was design for min-
imum memory size, requiring only about 1K of memory. This
program works quite well with cartridge type programs such
as Basic, Assembler/Editor, AtariWriter etc... Because this
version was designed for minimum memory size it does not allow
for the use of DUP functions under DOS. This would require a
reboot of SLIMDISK.PBR.
     SLIMDISK.PBR must be an AUTORUN.SYS file to run and the
same precautions on protecting files that cannot be replaced
apply here also.
     There may be some cases when you would want to load the
P.B.R. from cassette. The DISK.PBR version can easily be put on
cassette as described in Chapter 2 Section 3. Be forewarned
that while any cassette can be booted before the disk some
programs will not allow the booted program to remain in memory.

     (1) We use Atari DOS 2.0 with P.B.R.

     The P.B.R. also has some nice features for use while printing.
After you have sent one print-out to the printer you can insert
a top-of-form command(1) in the buffer to insure the printer will
be at top-of-form for the next print-out. And don't wait for
the printer to finish, if the computer is ready to send more
data over go right ahead. The buffer will finish the 1st print-
ing, go to top-of-form or whatever console key you pressed, if
any, and then start the next print job.
     If you decide that you don't want the print-out you are print-
ing you can press RESET on the buffer. This will erase the contents
of the print buffer and leave it ready to receive data from the main
computer again. If you decide you don't want the print-out as it's
being sent to the buffer (or the main is hung) press the BREAK on
the main computer. You will be returned to the program.

   (1)Note: Hold console key until printer pauses and
           when key is released the function will be
           loaded and the printer will continue printing.

                          CHAPTER 4
                       TROUBLESHOOTING

SECTION 1 HARDWARE

     Hardware problems will generally display themselves in
one of four different error messages. These messages are:

  # 1.

   FROM PBR: ** ERROR ** - TURN ON
             PRINT BUFFER, RETURN
  # 2.

   FROM PBR: ** ERROR ** - CHECK PRINTER,
             RESET PRINT BUFFER, RETURN.

  # 3.

   FROM PBR: ** ERROR ** - BAD LOAD.
             PLEASE RELOAD P.B.R.

  # 4.

   FROM PBR: This version requires 24K
             minimum - use SLIM version.

     These messages will be displayed on the main computer's
screen at load time of P.B.R. Assuming no actual hardware fault
exists and the cabling is correct, all that is needed is to
follow the error messages instructions. In the case of error
message #1, you are asked to turn on the print buffer, then
press return on the main computer.
     For error message #2, you are asked to check the printer.
Is it turned on, paper loaded and on line (ready)? Next you
should reset the print buffer. This will cause the print buff-
er to recheck the printer status. Then you should press return
on the main computer.
     After correcting any problems and hitting return on the
main computer, P.B.R. will check the memory size of the buffer
and report it back to you. "PRINT BUFFER STATUS = OK" will
be displayed.

 ERROR MESSAGE   POSSIBLE CAUSE
 -------------   --------------
 TURN ON BUFFER   1. Print buffer not powered on.
                    2. P.B.R. cable not plugged into joystick #1
                       on both computers.
                    3. P.B.R. cartridge is not inserted in print
                       buffer.
                    4. Make sure printer is ready.
                    5. Print buffer needs to be reset.

PROBLEM STILL EXISTS
     If the buffer appears to be cabled correctly and is pow-
ered on you should then set the TV switches to view the print
buffer's video output as per Table 1-1 on Page 2. When the
buffer is turned on you should see the title screen for about
2 seconds. The screen will then go blank as the screen editor
is disabled. Holding down the SELECT key (on the buffer) while
the title screen is on will display the title screen until the
key is released. If the title screen is not displayed set the TV
switch's to view the main computers screen and plug the P.B.R.
cartridge into the main computer. After powering on and you do
get the title screen, this means the P.B.R. cartridge is good.
A possible problem exists in the 2nd Atari computer.
     Another way to troubleshoot this problem is to change
computers. Use your main computer as the print buffer and the
print buffer as the main. Of course you will have to recable
the peripherals to the correct computer as per Fig. 1-1.

ERROR MESSAGE   POSSIBLE CAUSE
-------------   --------------
CHECK PRINTER   1. Printer not turned on.
                   2. Printer not ready.
                   3. Printer interface not turned on.
                   4. Printer not cabled to interface.
                   5. Interface not cabled to print buffer.

     If you have eliminated these items and the problem
still exists you can troubleshoot using the basic cartridge.
Remove the P.B.R. cartridge from the print buffer and insert
the basic cartridge. (If the buffer is an XL simply power
on after removing the P.B.R. cartridge). Set the TV switch's
as per Table 1-1 on page 2. When you power on the buffer
you should now get the Basic "READY" screen. Try using
Basic to get the printer to print. For example try:

  LPRINT "0123456789"

     If the printer prints "0123456789" a fault exists in
the P.B.R. cartridge. If the printer does not print, then the
problem is in the hardware. Either the printer, printer
interface, or print buffer computer could be at fault.
The print buffer computer can be eliminated as the problem
by swapping it with the main computer and again use the
basic cartridge to do a print operation.

SECTION 2 SOFTWARE TROUBLESHOOTING

       This section deals with troubleshooting software
problems. Presumably any software problems will occur
when you are trying P.B.R. with your software for the 1st
time. The problem could be that P.B.R. loads and appears
to be working. Your program even sounds as though it's
sending information to the printer, but in a steady tone,
not the usual beeping tone. This may happen because the
software has corrupted P.B.R. or reconfigured the Joystick
ports.
       Another way a failure may present itself is by
hanging when attempting a print operation. This may
happen when the software overwrites P.B.R. in memory. Some
programs do not look at MEMTOP when determining memory
size but do an actual write and read from memory. This
of course corrupts the P.B.R.
       So, you should attempt to bypass these problems
by the steps outlined in the Operations chapter. In
fact, they are the exact steps you should take to find
a version of P.B.R. that will run with your software. If
DISK.PBR does not work, try SLIMDISK.PBR. If that does
not work, try loading P.B.R. from cassette. The methods
for loading these other versions are found in chapter 2.
       You may also use Appendix A to determine software
compatibilities. It is a list of some programs we have
tried and how P.B.R. is used with them. If you have specific
questions concerning P.B.R. please feel free to write us. We
will make every effort to answer your questions.

```
                         APPENDIX A
                    PROGRAM COMPATABILITIES


    BASIC (1)
    -----
         All versions of P.B.R. work with basic.


    ASSEMBLER/EDITOR (1)
    ----------------
         All versions of P.B.R. work with Assembler/Editor.


    ATARIWRITER (1)
    -----------
         All versions of P.B.R. work with AtariWriter,
    however only SLIMDISK.PBR works with 48K or less.
    Remember when using the SLIMDISK.PBR RESET will require
    a reboot of P.B.R. On a XL series using DISK.PBR (with
    AtariWriter) the Atari translator should be used.


    BANK STREET WRITER (2)
    ------------------
         DISK.PBR loaded from cassette works quite well.
    RESET will not destroy P.B.R. Bank Street with P.B.R.
    requires over 48K.


    VISICALC (3)
    --------
         Works with DISK.PBR loaded from cassette.


    SYNCALC (4)
    -------
         P.B.R. will not work with Syncalc, however by saving
    the spread sheet using the text option, you can print
    it out using the DOS copy function. Simply boot the
    P.B.R. disk and copy the saved text file to the printer.
    "<file-id>,P:" This may still save you time if the
    spread-sheet is extensive.


    LJK DATA PERFECT (5)
    ----------------
         P.B.R. will not work with Data Perfect. Data Perfect
    appears to corrupt memory above MEMTOP when loading.


    HOME FINACIAL MANAGEMENT (1)
    ------------------------
         SLIMDISK.PBR runs fine. Remember it must be an
    AUTORUN.SYS file to run.


    DATACOMM (using an 850 on the main computer)
    --------
         Load DISK.PBR from cassette.



     1. Atari, Inc.
     2. Broderbund
     3. Personal Software, Inc. VisiCorp.
     4. Synapse
     5. LJK Enterprises, Inc.


    ....
```