



BUFFERLINK

User's Guide & Reference Manual

"Warning.--This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference."

If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the computer with respect to the receiver.
- Move the computer away from the receiver.
- Plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful, "How to Identify and Resolve Radio-TV Interference Problems". When you order make sure you include the following Stock No. 004-000-00345-4. You can obtain the booklet by writing to the US Government Printing Office located in Washington, D.C. 20402.

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CHAPTER 1:

INTRODUCTION

A word of thanks to you our new customer for your having purchased one of Perisoft's products, the BUFFERLINK. The BUFFERLINK is one of the finest printer buffers available. Having the capability of connecting to over 15 different printer interfaces on the market, the BUFFERLINK, can be installed in just a few minutes to allow practically any microcomputer user to add buffering capability to his printer.

You are one of the smart people in this world who realize the importance and the value of our most precious commodity--time! You will definitely cease your wasting of time while your printer is incessantly chugging on. With the BUFFERLINK as your ever ready companion you will begin getting more done with your personal computer. Finally you can cease being the slave to your printer and computer. Until BUFFERLINK many of America's personal computers had been teaming up with slow printers to go against their owner's wishes.

Your BUFFERLINK comes standard in a 16K configuration. This means that it can store up to 16,384 characters waiting to be fed to your printer. You will be able to upgrade the size of the buffer in your BUFFERLINK with RAM chips available off the shelf or available from Perisoft, Inc. You can upgrade the BUFFERLINK to either 32,768 or to 85,536 characters of holding ability.

You can have on going confidence in your BUFFERLINK's reliability because it will let you know when it is not working right. Every time you will turn on your computer the BUFFERLINK will undergo a complete and thorough memory test to assure you that the data sent through the BUFFERLINK will be reliably stored and handled. And it does that automatically, every time.

To allow for the most convenience possible the BUFFERLINK comes with a little switch assembly that requires no drilling for it to be mounted on your Apple II+ or Apple IIe computer's case. These switches perform two functions for you. The first switch will allow you to select the FORM FEED MODE while the second switch will allow you to purge or flush the buffer of data you decide you would rather not have printed after all.

When you will need to print letterheads on your printer the BUFFERLINK will assist you with it's FORM FEED MODE. The Form Feed Mode causes your printer to pause after it gets a Form Feed command until you press one of the Bufferlink's two switches labeled "FORM FEED". Once this switch has been pressed the next page will be printed out and then once again the printer will pause until the "FORM FEED" switch is pressed. This sequence will go on and on as long as there are full pages of information to be printed. You can turn the FORM FEED mode on or off by means of the FORM FEED switch when it is used in conjunction with

the FLUSH BUFFER switch.

The BUFFERLINK allows you to decide if you would like it to reset (thereby loose all data) every time your Apple Computer has it's RESET button pushed or have it be reset only once when the power is initially applied to turn the computer on.

Whatever type of existing printer interface you now own chances are very good that if it was designed for a parallel Centronics type printer that the BUFFERLINK can be made to work with it. You will find listed in the Table of Contents of this manual some 15 different types of Printer Interfaces. Included in this manual are complete installation instructions for using the BUFFERLINK with each of these different printer interfaces. In most cases you will be able to use the cable which originally came with your Printer Interface.

If you own a Serial Printer you should probably consider the Serial Option available for the BUFFERLINK. You can contact your dealer to obtain this option. It consists of a special adapter cable and one of a couple of different versions of EPROMs available. The special adapter cable will allow the signals to get to the back of the IIe case.

If you should ever have trouble with the BUFFERLINK a special self test feature will tell you where the problem is. With it you can isolate the cause of the failure to circuitry on board, to memory chips, to input data lines or to output data lines. With this feature, should you ever find that your BUFFERLINK is not working, you will be able to isolate the problem in a very short period of time. If you find that the memory chips are bad a special procedure outlined in this manual will tell you how to find the bad chip or chips. In the event that the bad memory chip was purchased from Perisoft your warranty will cover the bad parts for a period up to a year from date of purchase. To facilitate this all Integrated Circuits on the BUFFERLINK are socketed. The only components soldered in directly are resistors, capacitors and connectors; components which are generally reliable.

And now a word on:

HOW TO USE THIS MANUAL

You should first read the section which deals with the specifics of installation for your particular type of interface, then the section which deals with the installation of the Switch assembly and finally the section dealing with the ins and outs of operation. You should also read any other sections which you might find of interest to your specific application.

CHAPTER 2:

INSTALLATION SPECIFICS...

2.1: INSTALLATION SPECIFICS FOR USE WITH THE PRINTERLINK

1. Hook the 12" jumper interface cable provided with your BUFFERLINK to the output connector of the PRINTERLINK. Be careful to orient the side of the cable with the red stripe toward pin one on the PRINTERLINK. Six holes in the interface cable will not have pins connected into them. On some PRINTERLINKs it will be necessary to bend over the bypass capacitor C3. It is simply a matter of pushing on C3 so as to bend it over in the direction of the connector J1. Note Illustration #1 which will show you the direction that the cable should travel.

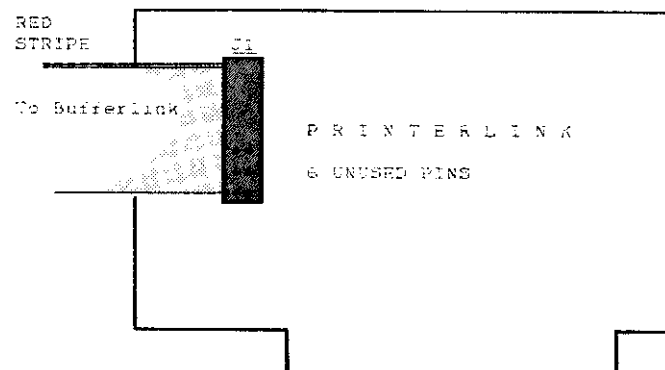


ILLUSTRATION #1

2. Install the PRINTERLINK into the slot you normally would choose. This will still be the slot you will access to select the printing function. Route the other end of the jumper cable over to the BUFFERLINK and install it to connector J1A. Pin one of this connector is down and the Cable's RED STRIPE should be oriented to pin 1. See illustration #10 on page 10.
3. Install the original PRINTERLINK cable by connecting it to the BUFFERLINK's connector J4A. Pin one (the RED STRIPE on the cable) should be oriented as in illustration #21 (page 22).
4. Install the BUFFERLINK into a convenient slot. If you have an Apple IIe then you can use slot #3 as this will not interfere with the Auxiliary Slot operation. If you have an Apple II+ or a Franklin computer you can use any convenient slot which will be out of the way.
5. You are now ready to save time by using the BUFFERLINK.

2.2: INSTALLATION SPECIFICS FOR USE WITH THE GRAFLINK

1. Hook the 12" jumper interface cable provided with your BUFFERLINK to the output connector of the GRAFLINK. Be careful to orient the side of the cable with the red stripe toward pin one on the GRAFLINK. Note Illustration 2 which will show you the direction that the cable should travel.

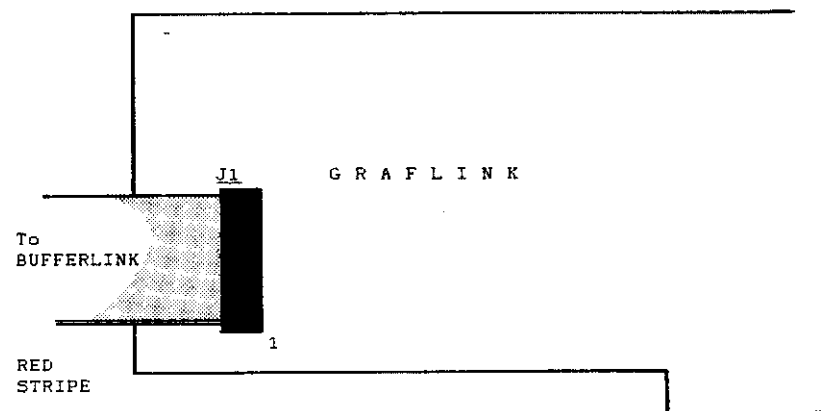


ILLUSTRATION #2

2. Install the GRAFLINK into the slot you normally would use. This will be the slot you will use to select the printer. Route the other end of the jumper cable over to the BUFFERLINK and install it to connector J1B. Pin one of this connector is down. Orient the cable as shown in illustration 22 on page 24.
3. Install the original GRAFLINK cable by connecting it to the BUFFERLINK's connector J4B. Pin one (the RED STRIPE on the cable) should be up or away from the Printed Circuit Board's gold fingers. See illustration #23 on page 24.
4. Install the BUFFERLINK into a convenient slot. If you have an Apple IIe then you can use slot #3 as this will not interfere with the Auxiliary Slot operation. If you have an Apple II+ or a Franklin computer you can use any convenient slot which will be out of the way.
5. You are now ready to use the BUFFERLINK and to save time and money while using your computer.

2.3: INSTALLATION SPECIFICS FOR USE WITH THE SSM AIO-II

1. Hook the 12" jumper interface cable provided with your BUFFERLINK to the output connector of the AIO-II. Be careful to orient the side of the cable with the red stripe toward pin one on the AIO-II. Note illustration 7 which will show you the direction that the cable should travel.

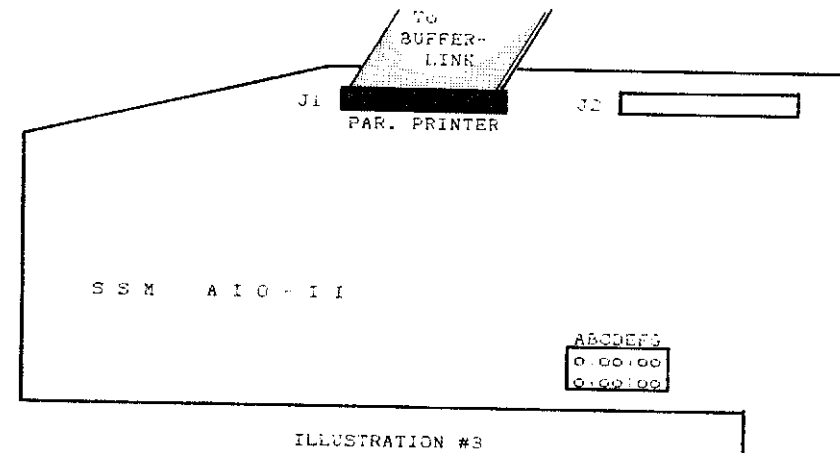


ILLUSTRATION #3

- NOTE: Jumpers B and E should be installed in order for proper operation to occur. Jumper A-Auto Line Feed is optional.
2. Install the AIO-II in the slot you normally would use. This will be the slot you will use to select the printer. Route the other end of the jumper cable over to the BUFFERLINK and install it to connector J1B. Pin one of this connector is down. Orient the cable as shown in illustration 22, (Page 24).
 3. Install the original AIO-II printer cable by connecting it to the BUFFERLINK's connector J4B. Pin one (the RED STRIPE on the cable) should be up or away from the Circuit Board's gold fingers. See illustration 23 on page 24.
 4. Install the BUFFERLINK into a convenient slot. If you have an Apple IIe then you can use slot #3 as this will not interfere with the Auxiliary Slot operation. If you have an Apple II+ or a Franklin computer you can use any convenient slot which will be out of the way.
 5. You are now ready to save your time with BUFFERLINK.

2.4: INSTALLATION SPECIFICS FOR USE WITH THE APPLE AII (PIC)

1. To interface the BUFFERLINK to this interface requires a little more doing than most. Because the 26 pin header connector is designed to handle both data in and also out it does not follow the normal layout for Centronics type parallel interfaces. Therefore a special cable will need to be made to connect between the interface and the BUFFERLINK.

Observe the following pinout connections when you make your cable:

<u>BUFFERLINK</u>	<u>SIGNAL NAME</u>	<u>AII INTERFACE</u>
20 PIN FEMALE HDR		25 PIN FEMALE HDR
1	STROBE*	4
3	DATA 0	9
5	DATA 1	11
7	DATA 2	15
9	DATA 3	18
11	DATA 4	20
13	DATA 5	21
15	DATA 6	23
17	DATA 7	25
19	ACK*	6

NOTE: The pinout used in the above list is as follows:

```

--
1 !*! 2
3 !*! 4
5 !*! 6
7 !*! 8
... and so forth

```

2. Hook this cable you have made to the output connector on your AII PIC. Observe the proper connection to pin one.
3. Install the AII PIC in the slot you normally would use. This will be the slot you will use to select the printer. Route the other end of the jumper cable over to the BUFFERLINK and install it to connector J1A. Pin one of this connector is down. Orient the cable as shown in illustration 20.(page 23)
4. Obtain a normal PRINTERLINK type of cable from the place you purchased your BUFFERLINK and connect it to the BUFFERLINK's connector J4A. Pin one (the RED STRIPE on the cable) should be oriented as shown in illustration #21 on page 23.
4. Install the BUFFERLINK into a convenient slot. If you have an Apple IIe then you can use slot #3 as this will not interfere with the Auxiliary Slot operation. If you have an Apple II+ or a Franklin computer you can use any convenient slot which will be out of the way.
5. You are now ready to save your time with BUFFERLINK.

2.5: INSTALLATION SPECIFICS FOR USE WITH THE APPLE PAR PRN INTRF

1. Hook the 12" jumper interface cable provided with your BUFFERLINK to the output connector of the PPI. Be careful to orient the side of the cable with the red stripe toward pin one on the PPI. Note illustration 7 which will show you the direction that the cable should travel.

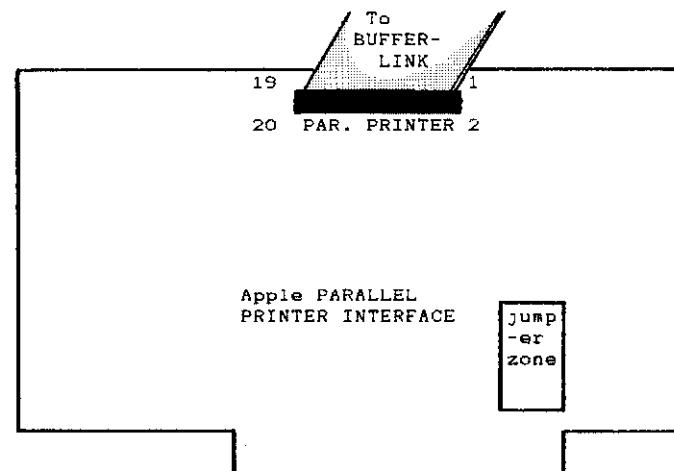


ILLUSTRATION #4

NOTE: Jumpers should be installed as per your printer type.

2. Install the PPI in the slot you normally would use. This will be the slot you will use to select the printer. Route the other end of the jumper cable over to the BUFFERLINK and install it to connector J2. Pin one of this connector is down. Orient the cable as shown in illustration 24.(page 25)
3. Install the original PPI printer cable by connecting it to the BUFFERLINK's connector J5. Pin one (the RED STRIPE on the cable) should be up or away from the Circuit Board's gold fingers. See illustration 25 on page 25.
4. Install the BUFFERLINK into a convenient slot. If you have an Apple IIe then you can use slot #3 as this will not interfere with the Auxiliary Slot operation. If you have an Apple II+ or a Franklin computer you can use any convenient slot which will be out of the way.
5. You are now ready to save your time with BUFFERLINK.

2.6: INSTALLATION SPECIFICS FOR USE WITH THE GRAPHITTI

1. Hook the 12" jumper interface cable provided with your BUFFERLINK to the output connector of the GRAPHITTI. Be careful to orient the side of the cable with the red stripe toward pin one on the GRAPHITTI.
2. Install the GRAPHITTI in the slot you normally would use. This will be the slot you will use to select the printer. Route the other end of the jumper cable over to the BUFFERLINK and install it to connector J2. Pin one of this connector is down. Orient the cable as shown in illustration #24 on page 25.
3. Install the original GRAPHITTI printer cable by connecting it to the BUFFERLINK's connector J5. Pin one (the RED STRIPE on the cable) should be up or away from the Circuit Board's gold fingers. See illustration 25 on page 25.
4. Install the BUFFERLINK into a convenient slot. If you have an Apple IIe then you can use slot #3 as this will not interfere with the Auxiliary Slot operation. If you have an Apple II+ or a Franklin computer you can use any convenient slot which will be out of the way.
5. You are now ready to save your time with BUFFERLINK.

2.7: INSTALLATION SPECIFICS FOR USE WITH THE PIKASO

1. Hook the 12" jumper interface cable provided with your BUFFERLINK to the output connector of the PIKASO. Be careful to orient the side of the cable with the red stripe toward pin one on the PIKASO.
2. Install the PIKASO in the slot you normally would use. This will be the slot you will use to select the printer. Route the other end of the jumper cable over to the BUFFERLINK and install it to connector J3. Pin one of this connector is down. Orient the cable as shown in illustration 26.(page 26)
3. Install the original PIKASO printer cable by connecting it to the BUFFERLINK's connector J6. Pin one (the RED STRIPE on the cable) should be up or away from the Circuit Board's gold fingers. See illustration 27 on page 26.
4. Install the BUFFERLINK into a convenient slot. If you have an Apple IIe then you can use slot #3 as this will not interfere with the Auxiliary Slot operation. If you have an Apple II+ or a Franklin computer you can use any convenient slot which will be out of the way.
5. You are now ready to save your time with BUFFERLINK.

2.8: INSTALLATION SPECIFICS FOR USE WITH THE APPLE DUMPLING-GX

1. Hook the 12" jumper interface cable provided with your BUFFERLINK to the output connector of the DUMPLING. Be careful to orient the side of the cable with the red stripe toward pin one on the DUMPLING. Note illustration 7 which will show you the direction that the cable should travel.

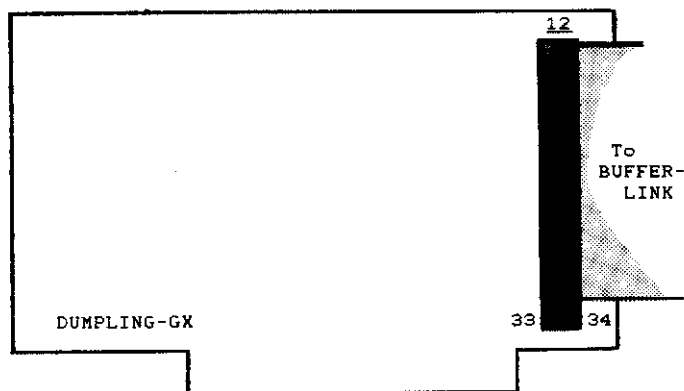


ILLUSTRATION #5

2. Install the DUMPLING in the slot you normally would use. This will be the slot you will use to select the printer. Route the other end of the jumper cable over to the BUFFERLINK and install it to connector J1B. Pin one of this connector is down. Orient the cable as shown in illustration 28.(page 27)
3. Install the original DUMPLING printer cable by connecting it to the BUFFERLINK's connector J4B. Pin one (the RED STRIPE on the cable) should be up or away from the Circuit Board's gold fingers. See illustration 29 on page 27.
4. Install the BUFFERLINK into a convenient slot. If you have an Apple IIe then you can use slot #3 as this will not interfere with the Auxiliary Slot operation. If you have an Apple II+ or a Franklin computer you can use any convenient slot which will be out of the way.
5. You are now ready to save your time with BUFFERLINK.

2.9: INSTALLATION SPECIFICS FOR USE WITH THE ASAP PARALLEL INTRF

1. Hook the 12" jumper interface cable provided with your BUFFERLINK to the output connector of the ASAP. Be careful to orient the side of the cable with the red stripe toward pin one on the AIO-II. Note illustration 7 which will show you the direction that the cable should travel.

Observe the following pinout connections when you make your cable:

<u>BUFFERLINK</u>	<u>SIGNAL NAME</u>	<u>ASAP INTERFACE</u>
20 PIN FEMALE HDR		16 PIN FEMALE HDR
1	STROBE*	10
3	DATA 0	11
5	DATA 1	4
7	DATA 2	12
9	DATA 3	5
11	DATA 4	13
13	DATA 5	6
15	DATA 6	14
17	DATA 7	7
19	ACK*	15
2	GND	1
4	GND	2

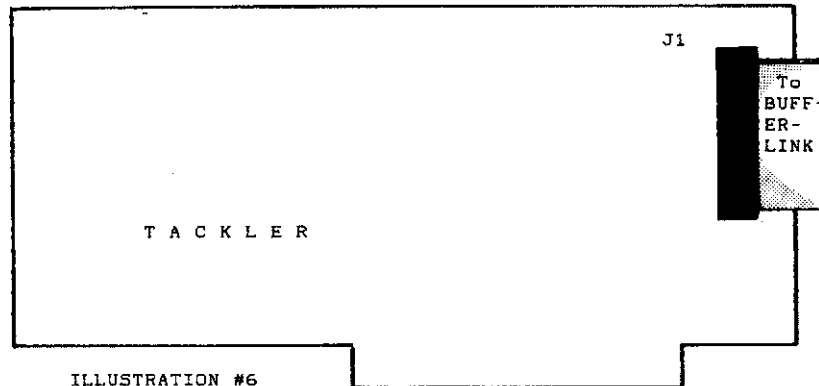
NOTE: The pinout used in the above list is as follows:

1 !*! 2
 3 !*! 4
 5 !*! 6
 7 !*! 8
 ... and so forth

2. Hook this cable you have made to the output connector on your ASAP. Observe the proper connection to pin one.
3. Install the ASAP in the slot you normally would use. This will be the slot you will use to select the printer. Route the other end of the jumper cable over to the BUFFERLINK and install it to connector J1B. Pin one of this connector is down. Orient the cable as shown in illustration 22.(page 24)
4. Obtain a normal PRINTERLINK type of cable from the place you purchased your BUFFERLINK and connect it to the BUFFERLINK's connector J4a. Pin one (the RED STRIPE on the cable) should be oriented as shown in illustration #21 on page 23.
4. Install the BUFFERLINK into a convenient slot. If you have an Apple IIe then you can use slot #3 as this will not interfere with the Auxiliary Slot operation. If you have an Apple II+ or a Franklin computer you can use any convenient slot which will be out of the way.
5. You are now ready to save your time with BUFFERLINK.

2.10: INSTALLATION SPECIFICS FOR USE WITH THE TACKLER

1. Hook the 12" jumper interface cable provided with your BUFFERLINK to the output connector of the TACKLER. Be careful to orient the side of the cable with the red stripe toward pin one on the TACKLER. Note illustration 7 which will show you the direction that the cable should travel.



2. Install the TACKLER in the slot you normally would use. This will be the slot you will use to select the printer. Route the other end of the jumper cable over to the BUFFERLINK and install it to connector J1B. Pin one of this connector is down. Orient the cable as shown in illustration 22.(Page 24)
3. Install the original TACKLER printer cable by connecting it to the BUFFERLINK's connector J4B. Pin one (the RED STRIPE on the cable) should be up or away from the Circuit Board's gold fingers. See illustration 23 on page 24.
4. Install the BUFFERLINK into a convenient slot. If you have an Apple IIe then you can use slot #3 as this will not interfere with the Auxiliary Slot operation. If you have an Apple II+ or a Franklin computer you can use any convenient slot which will be out of the way.
5. You are now ready to save your time with BUFFERLINK.

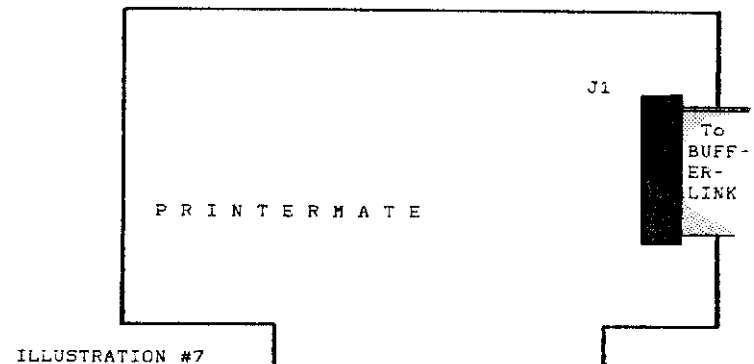
2.11: INSTALLATION SPECIFICS FOR USE WITH THE PRINTERMATE

1. Prior to installation you should connect a few jumper points on the BUFFERLINK as noted below:

1. Pull out U16 (74LS04) and bend pin 2 away from the rest of the pins so that when you go to reinstall it that it will not connect to the socket. (Pin 2 is the one right next to pin one which is usually noted by a little dot on the package).
2. Connect by a little drop of solder pin 1 and pin 2 of U16 (74LS04). You can accomplish this easily on the back of the Printed Circuit Board.
3. Using an exacto knife (or equivalent) cut the two small jumpers connecting the dual half moon pads on the back of the board. One of the pairs of pads are located between U10 and U11 (on the back of the circuit board) and the other pair is located between J6 and U12 (also on the back of the board).
4. Connect by using a little drop of solder the two pairs of dual half moon pads situated just by the two pairs of pads you just cut.

NOTE: If you are inexperienced at using a soldering iron it is suggested you contact the dealer where you purchased your BUFFERLINK to have him perform these cuts and solder jumpers.

2. Hook the 12" jumper interface cable provided with your BUFFERLINK to the output connector of the PRINTERMATE. Be careful to orient the side of the cable with the red stripe toward pin one on the PRINTERMATE. Note illustration 7 which will show you the direction that the cable should travel.



2. Install the PRINTERMATE in the slot you normally would use. This will be the slot you will use to select the printer. Route the other end of the jumper cable over to the BUFFERLINK and install it to connector J3. Pin one of this connector is down. Orient the cable as shown in illustration 26 on page 26.
3. Install the original PRINTERMATE printer cable by connecting it to the BUFFERLINK's connector J6. Pin one (the RED STRIPE on the cable) should be up or away from the Circuit Board's gold fingers. See illustration 27 on page 26.
4. Install the BUFFERLINK into a convenient slot. If you have an Apple IIe then you can use slot #3 as this will not interfere with the Auxiliary Slot operation. If you have an Apple II+ or a Franklin computer you can use any convenient slot which will be out of the way.
5. You are now ready to save your time with BUFFERLINK.

2.12: INSTALLATION SPECIFICS FOR USE WITH THE GRAPPLER

1. Hook the 12" jumper interface cable provided with your BUFFERLINK to the output connector of the GRAPPLER. Be careful to orient the side of the cable with the red stripe toward pin one on the GRAPPLER. Note illustration 7 which will show you the direction that the cable should travel.

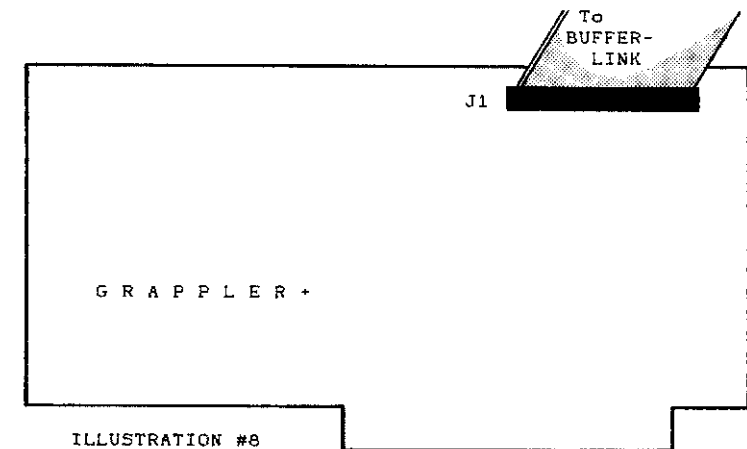
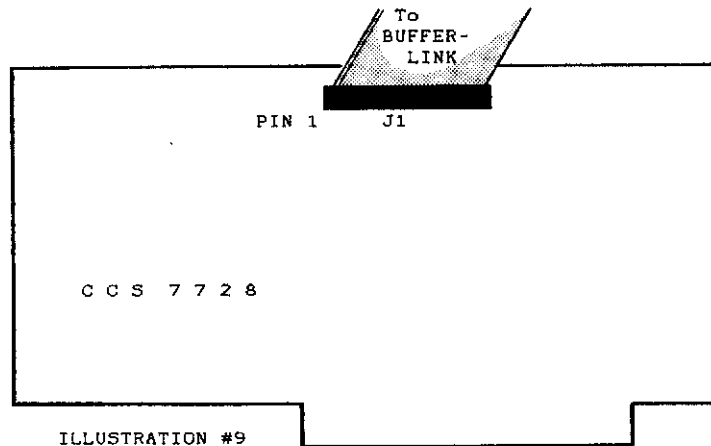


ILLUSTRATION #8

2. Install the GRAPPLER in the slot you normally would use. This will be the slot you will use to select the printer. Route the other end of the jumper cable over to the BUFFERLINK and install it to connector J1B. Pin one of this connector is down. Orient the cable as shown in illustration 22 on page 24.
3. Install the original GRAPPLER printer cable by connecting it to the BUFFERLINK's connector J4B. Pin one (the RED STRIPE on the cable) should be up or away from the Circuit Board's gold fingers. See illustration 23 on page 24.
4. Install the BUFFERLINK into a convenient slot. If you have an Apple IIe then you can use slot #5 as this will not interfere with the Auxiliary Slot operation. If you have an Apple II+ or a Franklin computer you can use any convenient slot which will be out of the way.
5. You are now ready to save your time with BUFFERLINK.

2.13: INSTALLATION SPECIFICS FOR USE WITH THE CCS 7728 (/A)

1. Hook the 12" jumper interface cable provided with your BUFFERLINK to the output connector of the 7728. It will be necessary to bend two of the pins on the 7728's header strip out of the way to allow clearance for the cable. The two pins you will have to bend will be numbered 14 + 15. Be careful to orient the side of the cable with the red stripe toward pin one on the 7728. Note illustration 7 which will show you the direction that the cable should travel.



2. Install the 7728 in the slot you normally would use. This will be the slot you will use to select the printer. Route the other end of the jumper cable over to the BUFFERLINK and install it to connector J1B. Pin one of this connector is down. Orient the cable as shown in illustration 22.(page 24)
3. Install the original 7728 printer cable by connecting it to the BUFFERLINK's connector J4B. Pin one (the RED STRIPE on the cable) should be up or away from the Circuit Board's gold fingers. See illustration 23. (Page 24)
4. Install the BUFFERLINK into a convenient slot. If you have an Apple IIe then you can use slot #3 as this will not interfere with the Auxiliary Slot operation. If you have an Apple II+ or a Franklin computer you can use any convenient slot which will be out of the way.
5. You are now ready to save your time with BUFFERLINK.

2.14: INSTALLATION SPECIFICS FOR USE WITH THE EPSON

Contact the factory to receive an application note on this one.

2.15: INSTALLATION SPECIFICS FOR USE WITH THE FOURTH DIMENSION

1. To connect to the Fourth Dimension it will be necessary to make an adapter interface cable. Be careful to orient the side of the cable with the red stripe toward pin one on the FOURTH when you install it.

Observe the following pinout connections when you make your cable:

<u>BUFFERLINK</u>	<u>SIGNAL NAME</u>	<u>FOURTH DIMEN.</u>
20 PIN FEMALE HDR		16 PIN FEMALE HDR
1	STROBE*	16
3	DATA 0	1
5	DATA 1	15
7	DATA 2	4
9	DATA 3	14
11	DATA 4	3
13	DATA 5	13
15	DATA 6	12
17	DATA 7	11
19	ACK*	10
2	GND	4
4	GND	8

NOTE: The pinout used in the above list is as follows:

1 !**! 2	1 !**! 16
3 !**! 4	2 !**! 15
5 !**! 6	3 !**! 14
7 !**! 8	4 !**! 13
... and so forth	... and so forth

2. Hook this cable you have made to the output connector on your FOURTH. Observe the proper connection to pin one.
3. Install the FOURTH in the slot you normally would use. This will be the slot you will use to select the printer. Route the other end of the jumper cable over to the BUFFERLINK and install it to connector J1B. Pin one of this connector is down. Orient the cable as shown in illustration 20.(page 23)
4. Obtain a normal PRINTERLINK type of cable from the place you purchased your BUFFERLINK and connect it to the BUFFERLINK's connector J4A. Pin one (the RED STRIPE on the cable) should be oriented as shown in illustration #21 on page 23.
4. Install the BUFFERLINK into a convenient slot. If you have an Apple IIe then you can use slot #3 as this will not interfere with the Auxiliary Slot operation. If you have an Apple II+ or a Franklin computer you can use any convenient slot which will be out of the way.
5. You are now ready to save your time with BUFFERLINK.

2.16: INSTALLATION WITH UNLISTED INTERFACES

If you should be unfortunate enough to have purchased an interface not listed here there are two routes you can choose to obtain a proper installation.

The first route assumes that you understand some of the technical aspects involved in a Centronics type parallel interface. You should in this case examine the pertinent documentation supplied with your Printer Interface when you purchased it. Compare the pinouts of the Printer Interface with the pinouts available on the BUFFERLINK. Chapter 6 includes a complete list of all of the different pinouts used by the BUFFERLINK. Be careful to make sure that the same pin numbering procedure is used. There are about 3 different ways the connectors can be numbered. They are:

Method 1		Method 2		Method 3	
1	26	1	14	1	2
2	25	2	15	3	4
3	24	3	16	5	6
4	23	4	17	7	8
5	22	5	18	9	10
6	21	6	19	11	12
7	20	7	20	13	14
8	19	8	21	15	16
9	18	9	22	17	18
10	17	10	23	19	20
11	16	11	24	21	22
12	15	12	25	23	24
13	14	13	26	25	26

The second route can be used if you do not understand a whole lot about all of this hullabaloo called electronics. If you fall into this category then you will need to send some information to the Technical Support department at Perisoft, Inc. and we will do our best to rush our reply to you. The information we will need to give our reply is photocopies of:

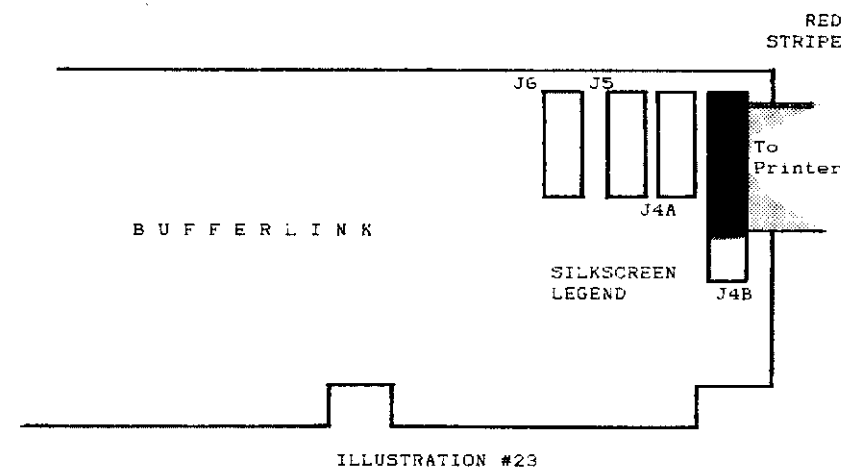
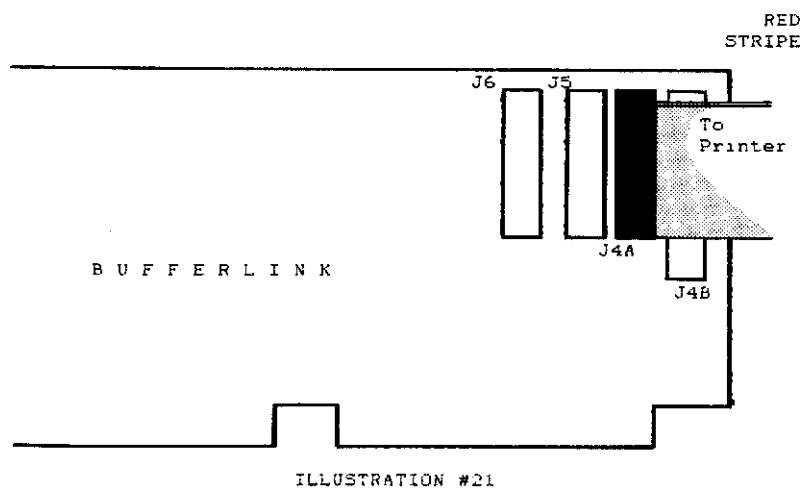
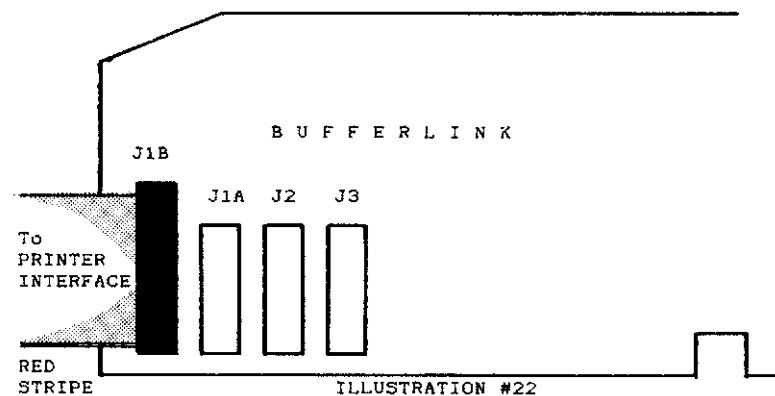
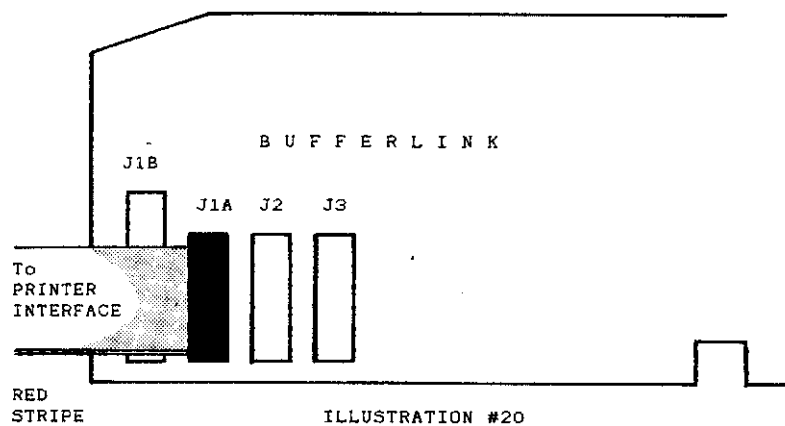
- Schematic of the Printer Interface
- Pertinent sections in the user's manual

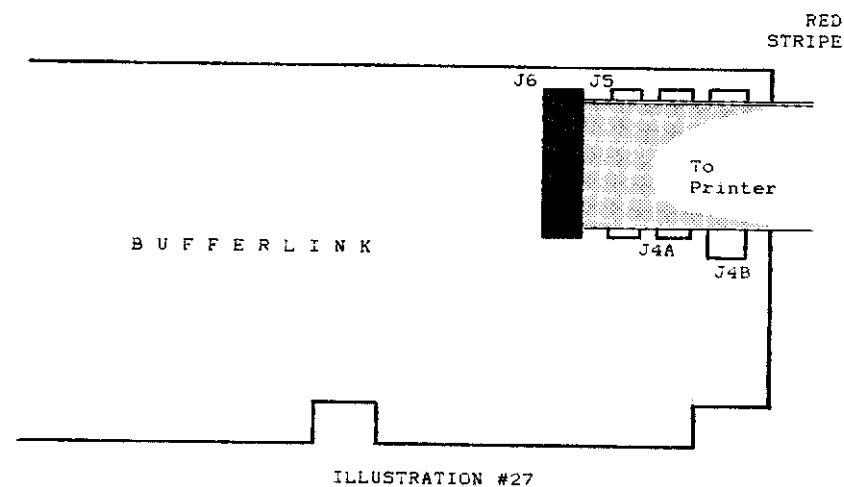
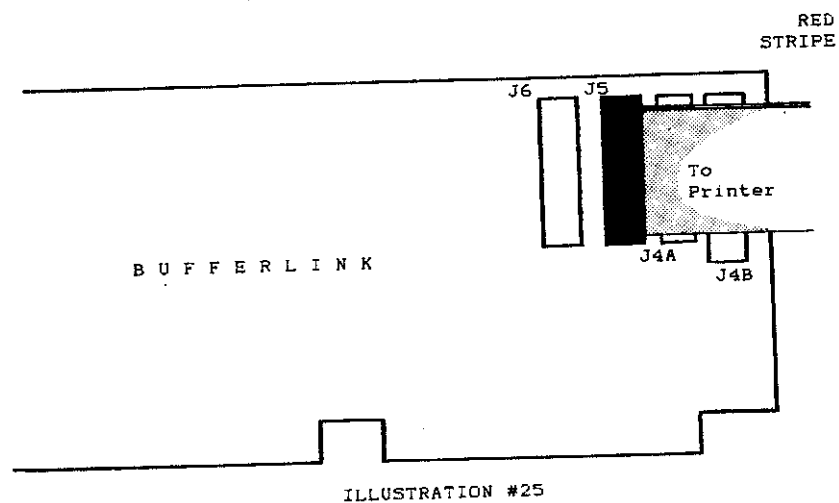
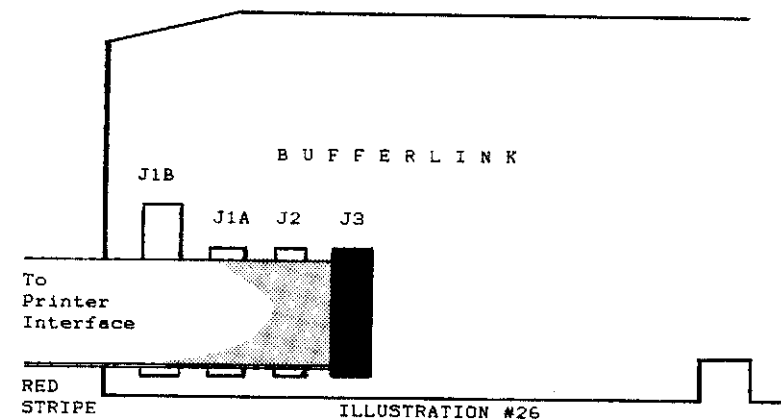
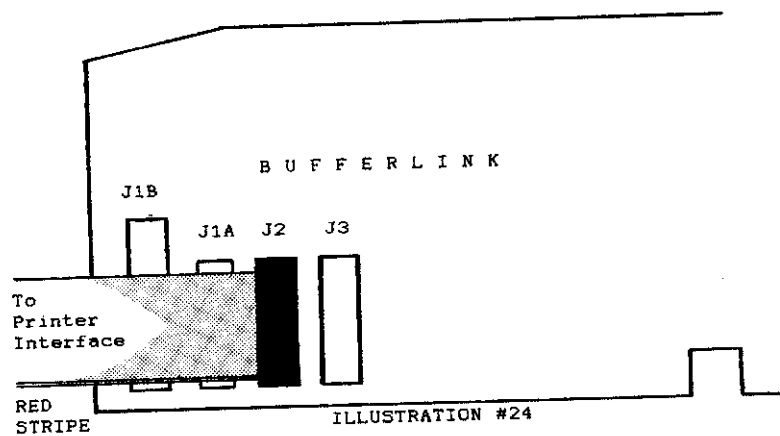
If you don't know what is pertinent then just photocopy as much of the manual as you can and send it to:

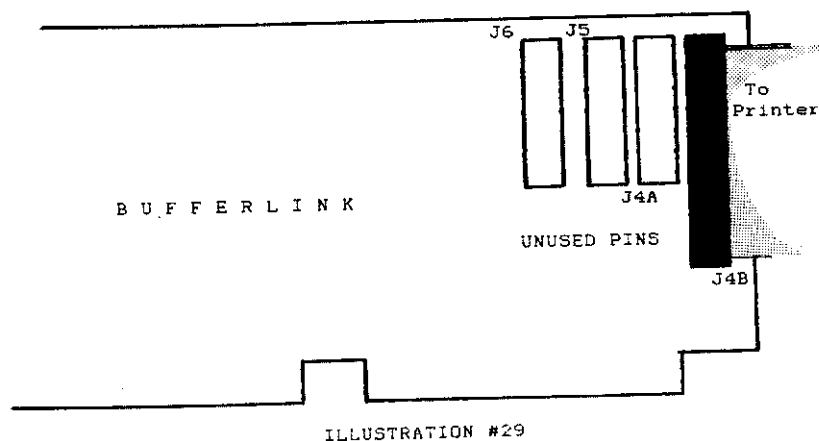
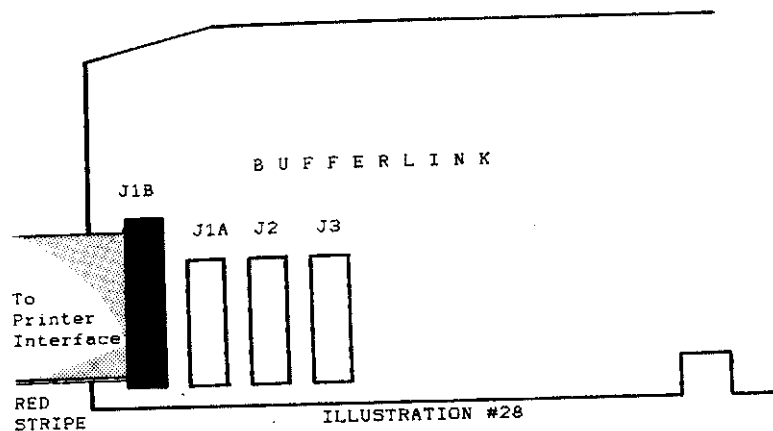
Perisoft, Inc.
BL Technical Support
2084C Walsh Avenue
Santa Clara, CA 95050

We will do our best to respond by return mail within a week.

2.17: ILLUSTRATIONS COMMON TO ALL OF THE PRECEDING INTERFACES







CHAPTER 3:

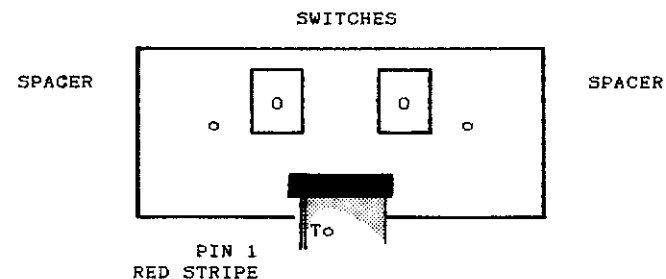
INSTALLATION OF THE SWITCH BOARD

To install the switch assembly into your computer the items you will need are:

QUANTITY	ITEM
1	BUFFERLINK SWITCH ASSEMBLY (SUPPLIED)
2	4x40 x 1/2" SCREWS (SUPPLIED)
1	RIBBON CABLE, 12" 10 CONDUCTOR (SUPPLIED)
1	PHILLIPS SCREWDRIVER, #1 size

Installation consists of the following steps:

1. Insert one of the Ribbon Cable's Connectors onto the header strip on the switch assembly as shown below:



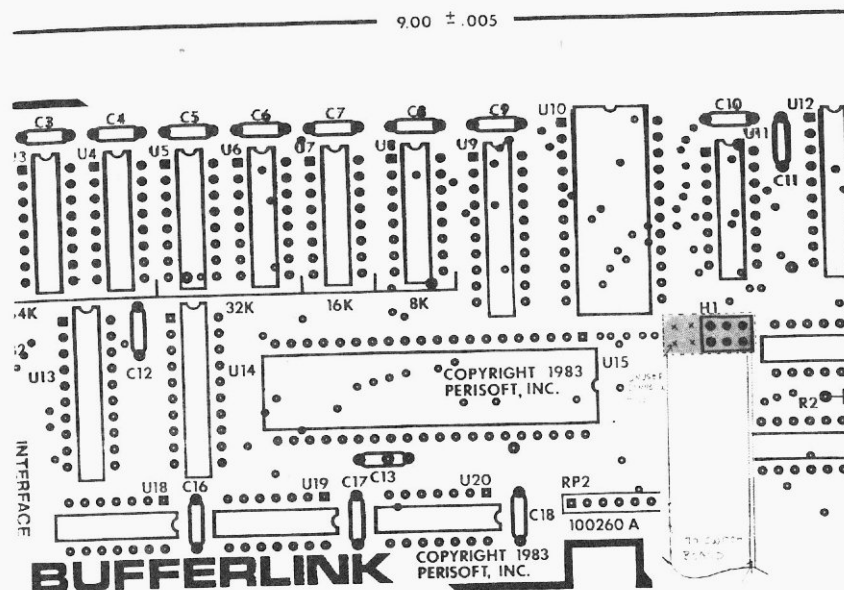
2. Take the switch assembly and position it so that the handles of the toggle switches go thru the ventilation slots (from the inside going out) on the side of your computer. A slight amount of force may be required to push the tips of the toggle switch handles through the slots. You should pick the ventilation slots so that there is at least one slot to the left and also one slot to the right of each switch handle. These two "open" slots will be used to insert the mounting screws through.

3. Install the two #4-40 screws by putting them through the two slots immediately to the left of the left toggle switch and the other to the right of the right toggle switch. Tighten the two screws so they are snug but not to the point of binding.

4. Route the Ribbon Cable so that it will be out of the way of any other interfaces you may be planning to use in your computer. Direct it toward the middle of the Bufferlink Board.

WHEN IT COMES TIME to install the other end of the switch assembly cable to the BUFFERLINK install it onto the header strip as shown on the diagram on the next page:

INSTALLATION OF THE SWITCH BOARD CABLE TO THE BUFFERLINK



DOTTED LINES SHOW PATH OF SWITCH ASSEMBLY CABLE

NOTE: The Switch Assembly Cable will be installed onto H1. Since H1 has only 6 pins and the Cable has 10 holes be carefull to get the proper orientation when installing the cable. The proper orientation for pin 1 is toward U16. This means that the Red stripe on the cable should be toward U16 and not away from it. The four unused holes in the cable connector will be to the left side of H1.

CHAPTER 4:

INS AND OUTS OF OPERATION...

4.1: HOW TO USE THE FORM FEED MODE

The BUFFERLINK can assist you greatly when it comes time for you to print large quantities of letterheads or whenever you want to put computer printout on great quantities of single sheet paper.

When the BUFFERLINK's Form Feed Mode is enabled it will automatically pause it's printing every time it encounters a Form Feed character in the data. It will first put out the Form Feed and then pause. It will remain in a pause mode until you briefly depress the Form Feed Switch on the Switch Board. (For this reason it is necessary to first, install the BUFFERLINK SWITCH BOARD. Refer to Chapter 3 for instructions on installation.) Once you have released the Form Feed Switch printing will resume until the next Form Feed is encountered in the data. At this point the exact same sequence is repeated and will continue to repeat as long as the Form Feed mode is enabled.

Now that you know what the Form Feed Mode does you probably would like to know how to "enable" the mode. There are two methods of enabling this mode. The first is to simply hold the Form Feed Mode Switch down in a depressed position while you first turn your Computer's power on. The second method will aid you if you find that you forgot to turn it on upon power up. This method requires you to first depress the Form Feed Mode Switch and then to depress the Reset or Flush Switch. When both switches are released the Form Feed Mode will be enabled. Don't forget however that any data the BUFFERLINK is holding while you depress the Reset or Flush Switch will be bumped into the big bit bucket in the sky (in other words...lost).

4.2: HOW TO DESELECT THE FORM FEED MODE

Suppose you have previously enabled the Form Feed Mode, have done an extensive amount of printing while using this mode and now since the printing task requiring the Form Feed Mode is done you would like to disable or deselect the Mode. A very quick simple push of the Flush or Reset Switch will accomplish this. It will also cause any data being held in the BUFFERLINK's memory to be lost also. So you will need to disable or deselect this mode when you are between printing jobs in order to assure no data is annihilated.

4.3: HOW TO FLUSH THE BUFFER

The BUFFERLINK can be cause to lose it's data by one of 3 ways.

The first method of flushing the buffer is to, quite simply, turn the power to your computer off. Yes, it needs power to remember.

The second method of flushing the buffer can occur only if the jumper at H2 is installed. If the jumper is installed and if the Computer's Reset button is pushed the BUFFERLINK will be forced to Reset also. It is for this reason that the BUFFERLINK SWITCH ASSEMBLY was developed. A convenient method of forcing the flush of buffer memory was needed without having the cover of the computer off.

The third method of flushing the buffer can occur only if the BUFFERLINK SWITCH ASSEMBLY is installed. Once it has been installed the user can leave out that jumper at H2 and thereby have separate switches for resetting the computer and for resetting or flushing the BUFFERLINK. The process of flushing the BUFFERLINK is as simple as pushing a switch mounted on the side of your computer. A press and a release of the switch accomplish the task.

CHAPTER 5:

IN CASE IT DOESN'T WORK...

The BUFFERLINK has included in it's on board software two features which will assist you should your board ever become defective. The first feature is the built in self checking routine and the second feature is the automatic memory test upon power up.

The built in self checking routine is activated when you depress both of the switches on the BUFFERLINK SWITCH BOARD at power up time. What this test does is the following items:

- Determine memory configuration
- Test the memory for proper data retention
- Perform a program check sum

As the routine does these tests it prints out the results. This allows you to determine just where the problem lies, if there is one. For example, if your BUFFERLINK is working properly the proper memory size will be determined, the memory test will be passed and the correct checksum for the memory will be found. On the other hand, if the microprocessor and it's support circuitry is not working at all you will not get any report and things will seem to hang up. If the memory configuration is not determined correctly or the memory does not test properly you will know that you should suspect one of the Dynamic Ram Devices. If the check sum on the program is not correct you will know that there is a problem of some sort in the data stored in the program EPROM (Erasable Programmable Read Only Memory).

The second testing feature is one which is performed every time the BUFFERLINK is powered up. This test occurs after the self checking routine is performed if the user so selects to have it performed. This BUFFERLINK routine automatically determines whether 1, 2, 4 or 8 Dynamic memory devices are installed. It expects them to be in the corresponding sockets as shown below:

1 device(s) should be installed in the U8 socket(s)
2 " " " " " " U7+8 "
4 " " " " " " U5-8 "
8 " " " " " " U1-8 "

After it has determined the number of devices it proceeds to go and test them for proper data retention. If all of the memory, as it is configured, tests OK the program proceeds to go to normal buffer operation. If it finds any one device or data address to be bad it transfers operation to the non-buffered mode. Just before it does this however, it alerts you by sending a "BELL" character out to the printer and then sending the characters "BEEP" out also. After these characters have been output the user can use his BUFFERLINK in a non-buffered mode with each character being passed to the printer on a character by character basis. This assures you, the user, of continued operation until you can manage to get the BUFFERLINK's defective Dynamic Memory

Device weeded out from amongst it's neighbors.

Just how then would you take advantage of this automatic memory test? Assume that one day your printer told you right after power up "BEEP". Since your printer did not operate on the "BELL" character all you saw or heard was the printed characters. Knowing what you know now, you knew that this meant that one or more of your Dynamic Memory Devices were defective. At this point you need to weed the defective device out from amongst it's neighbors. To do so you can remove all of the Dynamic Memory Devices from the BUFFERLINK and then install them one at a time into the U8 socket (8K configuration). With each one installed turn the power on to your computer and see if you get a "BEEP" printed out. Only defective devices will signal you with the "BEEP" while the good ones will allow normal buffered (8K) operation. If you find a defective Dynamic Memory Device you can use 1, 2 or 4 of the remaining good devices to obtain 8K, 16K or 32K of buffering. If the defective Dynamic Memory Device came with your BUFFERLINK as you purchased it initially and if you are still within the one year warranty period you can return the defective device to Perisoft, Inc. for replacement. You will need to also show the serial # of the BUFFERLINK and must also have returned the Warranty card to obtain this service.

IN THE EVENT that all of the Dynamic Memory Devices test to be defective then it is possible that some additional failure has occurred on your BUFFERLINK. In this case return the BUFFERLINK with all of it's Dynamic Memory Devices installed. Prior to return you should contact the factory to obtain a Return Merchandise Authorization number. You can do this by phone or by mail.

CHAPTER 6:

INTERNALS OF THE BUFFERLINK...

6.1: CIRCUIT DESCRIPTION

The BUFFERLINK is a completely self-contained Microprocessor based system. It has on one board input ports, output port, microprocessor, program memory, storage memory and necessary support circuits.

The Microprocessor is a Z80 (U15) which can be made to run at 1 or 2 Mhz. It comes configured from the factory to run at 2 Mhz. The lower speed can be selected by disconnecting the pad by pin 37 on the card edge and connecting the pad by pin 38. The Z80 on the BUFFERLINK runs without RAM (Random Access Memory) accessible to it in the Memory address range and as such does not employ the use of interrupts. This is not a disadvantage as the software gives a high priority to examining whether data is waiting to come in from the printer interface. The Z80 has access to the various ports by memory mapping them. This gives the Z80 a full 64K addressing to the Dynamic Random Access Memories DRAMs. This 64K of addressing is accomplished by providing 256 addresses (8 data lines) from the Z80 as it is addressing its IO. The remaining 256 addresses (8 data lines) are provided from the output of a Memory mapped port.

The Dynamic memories operate by use of the following support devices: U19, U14, U16, U17, U19 and U20. The two devices U9 and U14 multiplex the two halves of the address to the DRAMs. The first half of the address is taken off of the output of U14. It is latched into the DRAMs by the RAS* signal generated straight off of IORQ* (thru U17). At a time delay generated by two gates of U20 (74C02) the output of U14 is turned off and the output of U9 is turned on. Two additional gate delays later of U20 the signal CAS* goes back high latching U9's addresses into the DRAMs. CAS* is generated by U19 which makes sure it goes back high when the IORQ* cycle is finished. The gate delay through U20 is about 20 to 25 nS per gate. This accomplishes the setup and hold times required for the DRAMs right nicely with much time to spare. The DRAMs are refreshed automatically by the Z80 at it's normal refresh time. This time is indicated to the outside world by both RFSH* and MEMRQ* being low. This is accomplished in the logic by the action of U19. The output of U19 is passed thru U17 and onto the RAS* lines of the DRAMs. Since the SELR/C' line is normally high during this period the outputs of Address line buffer U9 are active thereby passing the Refresh Address available on the Z80's address lines to the DRAMs.

Access to the various ports used on the BUFFERLINK is accomplished by U22. This decodes the various addresses used by the various ports. The Octal latch U13 (74LS374) receives the data

from the printer interface and stores it until the Z80 CPU can take it. One half of U18 is used to provide some of the handshaking involved in this data transfer. It's Q output provides the BUSY signal on the input connectors. The ACK' signal going back to the printer interface is generated by U22. This signal is normally 500 nS of duration. The output data is put out to the printer through U12. Once again one half of U18 is used to facilitate the handshaking required. The STROBE' signal going to the printer is normally of 500 nS duration. In some applications the user will need to slow down the Z80's clock to allow an ACK' pulse of longer duration. This can be accomplished in a manner noted in the second paragraph of this description. The applications where this might be required would be in cases where an excessively long interconnect cable is used or in some cases where a shorter shielded cable is used.

The other ports used in the BUFFERLINK are:

- STATIN: This port is used to provide the Z80 CPU with the status of the switches, the BUSY line of the printer, and the status of the input and output handshaking flip flops.
- CLRIN: This port is used to generate an ACK' pulse back to the Printer Interface and to clear the input handshaking flip flop.
- STROUT: This port is used to generate a STROBE' pulse out to the Printer and to set the output handshaking flip flop. This flip flop is cleared when the Printer sends an ACK' pulse back to the BUFFERLINK.
- CASOUT: This port is used to store one half of the DRAM addresses into U14.
- PRNCONTR: This port is used to provide some amount of control over the SELECT and PE lines going back to the printer interface.

The software or program memory is contained in an onboard 2716 EPROM (Erasable Programmable Read Only Memory). It is addressed by the Z80 CPU at a memory address of 0 through 7FF(hex).

6.2: SOFTWARE DESCRIPTION:

The BUFFERLINK has contained in it's software a number of functions and features. These features will briefly be outlined to aid the user in cases where questions might arise.

When the BUFFERLINK powers up it first of all goes through an initialization sequence to set up registers and port outputs and others such things. It then looks to see if either or both of the SWITCH BOARD's switches are depressed. If just the Form Feed switch is depressed it sets the Form Feed Mode Flag and then proceeds on as if no switch had been pressed. If both the Reset and the Form Feed Switch is pressed it transfers control over to the Auto Test Routine. If the Reset switch is pressed by itself the program will wait until the switch is released and then it will proceed as if no switch had been pressed. Whenever any switch is pressed the BUFFERLINK's software will wait until that switch has been released before it begins debouncing the switch.

From the switch testing routine the program continues on to go and examine the Dynamic memory addresses to determine just how many devices are installed in the BUFFERLINK. Once it knows how many devices are present it then goes and tests every address of the devices to make sure that each memory cell is in working order. Once it knows that all devices are intact and 100% functional control of the BUFFERLINK is turned to the main loop of the software. Should the program find a defective Dynamic Memory Device it will then send an error message to the user by sending a "BELL" character and the word "BEEP" out to the printer. In this case control would be transferred to a short loop where no buffering could occur and data would be handled on a character by character basis.

The main loop of the software is constructed so that it will first examine to see if data is waiting to come into the BUFFERLINK. If it finds this to be true it then goes and tests to see if the BUFFERLINK is full and cannot receive any more data. If it finds that there is room for the character it puts it onto the stack of data. Then the loop proceeds to see if there is data to put out. If it finds data available it will see if the printer is ready for more data. If the printer can take more data it goes and takes one byte from the stack and puts it out to the printer and then sends a STROBE' pulse out to the printer. The program then loops back to check for more input.

Just before each input check and output check the BUFFERLINK checks to see if either the Form Feed or the Flush Switch is depressed. If it finds that either or both are pushed it performs the following functions:

FLUSH (alone): Zero out the registers, go and jump to the beginning of the main loop. Clear the Form Feed Mode.

FORM FEED (alone): Nothing unless the Form Feed Mode is on and the last character sent to the printer was a Form Feed. In such a case a flag would be cleared to allow data output to the printer to resume.

FORM FEED+FLUSH: Zero out the registers, go and jump to the beginning of the Main Loop. Set the Form Feed Mode Flag.

If the Form Feed Mode is enabled the software will check just before every output to the printer whether or not the last character sent to the printer was a Form Feed character. If it found that it was it aborts the attempt to put a character out to the printer. The software checks to determine what the last character was by examining a flag in one of the Z80's registers. This flag can be cleared to allow data transfer by the user depressing the Form Feed Switch. This switch will be tested for status just before every test for a character waiting at the input.

The Auto Test Routine, which is executed when both the Flush and the Form Feed switches had been depressed, performs as complete a test as it is possible of doing to the hardware. First, it sees how Dynamic Memory Devices are installed. Once it knows the number it prints out to the printer what the memory configuration is; whether it is 8K, 16K, 32K or 64K. From here the routine proceeds to test the installed memory to determine whether the devices are 100% functional. The test performed here is a simple one and long time data retention is not tested for. The results of this test are printed out to the printer. Once this is done the routine performs a checksum on the program rom. The number obtained in this checksum is printed out on the printer once again. The number sent out is of sufficient size so that accuracy is not limited by too few digits. Once the checksum test is done control is handed over to the main body of the program. It assumes at that point that the Form Feed Mode had not been intended to be turned on. From that point operation resumes...

6.3: ADDING MORE MEMORY

The BUFFERLINK comes standard from the factory in either a 16K or a 32K configuration. Should you ever desire to increase the size of your memory a field upgrade is easy because all the devices on the BUFFERLINK are socketed. It is as simple as plugging a few new Dynamic Memory Devices into their respective sockets.

To increase the BUFFERLINK's memory you should first determine what the current configuration is. The table below should help you do this:

CONFIGURATION	MEMORY DEVICES INSTALLED
0 K	NONE
8 K	U8
16 K	U7+8
32 K	U5-8
64 K	U1-8

The BUFFERLINK will work with 1,2,4 or 8 Dynamic Memory Devices installed. All you have to do is determine how many more memory devices you need to get up to the required amount of buffering. Install the new devices in the appropriate sockets being careful to observe correct alignment of pin one.

The number of the required Dynamic Memory Devices is:

MCM6665NP-20 Motorola
M5K4164NP-20 Hitachi

....or their equivalent

6.4: CONNECTOR PINOUTS

The pinouts of the various connectors on the BUFFERLINK is as follows:

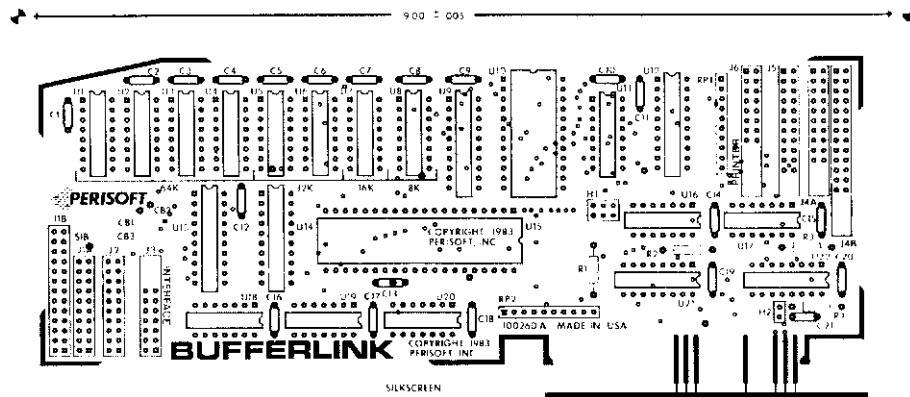
SIGNAL NAME	J1A	J1B	J2	J3	J4A	J4B	J5	J6
ACK'	19	19	2		19	19	2	
DATA 0	3	3	10	2	3	3	10	2
DATA 1	5	5	11	3	5	5	11	3
DATA 2	7	7	12	4	7	7	12	4
DATA 3	9	9	13	5	9	9	13	5
DATA 4	11	11	14	6	11	11	14	6
DATA 5	13	13	15	7	13	13	15	7
DATA 6	15	15	16	8	15	15	16	8
DATA 7	17	17	17	9	17	17	17	9
STROBE'	1	1	8	1	1	1	8	1
BUSY		21		10		21		10
SELECT		25		12		25		12
PE		23		11		23		11
GROUND					2	2	1	15
					4	4	20	16
					6	6		
					8	8		
					10	10		
					12	12		
					14	14		
					16	16		
					18	18		
					20	20		
						22		

6.5: PARTS LIST

REFERENCE	PART NUMBER	DESCRIPTION
C1-20	1500-2020-0	CAPACITOR, CERAMIC .01uF/20V
C21	1500-3020-47-5	CAPACITOR, TANTLUM 4.7uF/25V
R1	4700-1112-12	RESISTOR, 1.2K ohm, 1/4W 5%
R2	4700-1111-22	RESISTOR, 330 ohm, 1/4W 5%
R3,4	4700-1112-47	RESISTOR, 4.7K ohm, 1/4W 5%
U1 thru 8	3130-2-6665 or -4416	DYNAMIC RAMS, MCM6665NP-20 M5K4164NP-20
U9	3130-1-74244	INTEGRATED CIRCUIT, 74LS244
U10	3130-2-2716-BL	EPROM, PROGRAMMED 2716 BL
U11	3130-1-74368	INTEGRATED CIRCUIT, 74LS368
U12,13,14	3130-1-74374	INTEGRATED CIRCUIT, 74LS374
U15	3130-0-280	MICROPROCESSOR, Z80
U16	3130-1-7404	INTEGRATED CIRCUIT, 74LS04
U17	3130-1-7408	INTEGRATED CIRCUIT, 74LS08
U18	3130-1-7474	INTEGRATED CIRCUIT, 74LS74
U19	3130-1-7432	INTEGRATED CIRCUIT, 74LS32
U20	3130-3-7402	INTEGRATED CIRCUIT, 74C02
U21	3130-1-74155	INTEGRATED CIRCUIT, 74LS155
U22	3130-1-74368	INTEGRATED CIRCUIT, 74LS368

6.8: PARTS LOCATOR

6.6: SCHEMATIC



6.7: ROM VERSIONS

Per date of this Revision of the Manual there have been the following Versions of BUFFERLINK software:

VERSION	DESCRIPTION
1.0	Initial version, found to have a small bug which only surfaced if there was a defective DRAM and was in the 8K configuration. This version had the five Control F sequence and was prior to the SWITCH BOARD.
1.1	Same as above but had bug of defective DRAM in the 8K configuration removed.
1.2	Same as above but removed the 5 control F sequence.
1.3	Same as above but allowed for use of the SWITCH BOARD.
1.4	Same as above but added the Auto Test Feature. With this version the check sum is 03288B.

6.8: WARRANTY

Perisoft, Inc. (P.I.) warrants to the original user of this product that it shall be free of defects resulting from faulty manufacture of the product or its components for a period of 1 (one) year from the date of sale. P.I. makes no warranties, express or implied, regarding the satisfactory performance of this product. Defects covered by this warranty shall, at P.I.'s option, be corrected by repair or replacement. In the event of replacement, the product will be warranted for the remainder of the original 1 (one) year period. P.I. makes no warranties, express or implied, including but not limited to those of merchantability or fitness for a particular purpose, which extend beyond the duration and description set forth herein. The sole obligation of P.I. under this warranty is limited to repair or replacement of products which prove defective within 1 (one) year of purchase. P.I. shall not in any event be liable for any incidental or consequential damages of any kind resulting from use or possession of this product. Some states do not allow limitation of the duration of implied warranties, or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

