

**DIY Modification of MSM-equipped Data I/O Programmers
for Parallel Port Interface (XPi option)**
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Intended Audience

This document is written for those who own Data I/O Unifamily device programmers equipped with the mass-storage module (hard drive) option, and who wish to make use of the parallel interface port in conjunction with Data I/O's TaskLink software without having to spend at least \$675 per programmer for the "official" upgrade kit.

It is assumed that the reader has an advanced level of experience with electronics, including mechanical and electrical fabrication and assembly practices, and that they have the proper tools to perform the procedures described.

This information is provided strictly for educational purposes and on an 'as-is' basis. The author of this document cannot accept any responsibility for voided warranties, damage to equipment, or other problems arising from your use (or misuse) of this information. Know what you're doing, and have the right tools, BEFORE you start!

Background & Purpose

The 'Unifamily' group of memory/logic device programmers were introduced in the late 80's. Their purpose was to replace the aging 29 series with a completely new architecture called 'pin driven.' The idea was to be able to program any given pin of any given programming socket (DIP, PLCC, PGA, whatever) with Vcc, ground, programming waveforms, fixed logic states, or any other signal that might be required for reading or programming of a device.

This group of units consists of the 2900 (discontinued, but still supported), 3900 (discontinued, still supported), 3980, UniSite, Autosite (for factory floor applications), and (most current) the 3980XPi and UniSite XPi. The **only** difference between the 3900 and the 3980 is that the 3980 has the hard drive option installed.

The 3980-XPi and Unisite-XPi are, as of the date of this writing (December 2007), still current products. They are distinguished from other Unifamily members by the inclusion of a parallel port, and the fact that they have the MSM (mass-storage module) as standard equipment. The MSM is nothing more than a small form-factor hard disk drive in a custom interface module. Its presence allows the programmer to boot and run without the need for floppies.

With the development of the MSM, Data I/O also designed in a parallel port (known as the 'XPi' option) as part of the MSM's interface board. I speak from personal experience when I say that this option becomes very useful when dealing with device data files larger than 512K.

Example: Using the standard serial interface, operating at 19200 baud, it took me nearly forty minutes to transfer a 4-megabyte file. After upgrading my primary Unisite programmer with the parallel port kit, the transfer time for the same file was less than two minutes.

While Data I/O does sell upgrade kits, blowing \$675 (\$900 if you let Data I/O install it) per programmer is not my idea of fun. With that in mind, I made a careful study of my own kit, and used the information thus gained to create this guide. I hope to provide all the information necessary for you to take full advantage of the existing parallel port in your Unifamily programmer for (hopefully) no more than 10% of what Data I/O charges.

Equipment and tools needed

1. A programmer that is to be the target of the modification. Said programmer can be any of the Unifamily listed above as long as it already has the MSM (hard drive) option. Let me emphasize that again: Your programmer **MUST** already be equipped with an MSM for the process to work because the parallel port connection is an integral part of the MSM's interface board.
2. You must have Data I/O's 'TaskLink' Windows-based control software for the Unifamily programmers, and it must be version 4.21 or higher.
3. Your programmer's system software must be version 6.6 or higher.
4. One Ea. dual-row 26-position Berg-type receptacle with 0.100 by 0.100 contact spacing, plus appropriate contacts (if you're not using flat cable) and tooling.
5. Appropriate cabling, and an intermediate connector of your choice to mount on the programmer's back panel. Data I/O uses something that I think is called a "Micro Centronics" No matter what, you will need to allow for 23 conductors.
6. A set of step-drills (also known as Unibits) for holes up to 1 inch in diameter.
7. A sheet-metal nibbling tool if you decide to use a rectangular connector on the back panel.

MSM Connector details

You will encounter one of two MSM revisions and connector orientations in your efforts. If your MSM is an early revision unit, the parallel port header will be oriented vertically (with the pins sticking straight up) towards the left side of the MSM as you're looking at the programmer's guts from the front.

The following table represents a simplified drawing of that header, with pin numbers and functional designations. For correct orientation, the MSM should be positioned so that the drive assembly is on your right side, and the 26-pin header is to the left of it.

The notations in parenthesis are the pin functions corresponding to the matching pin on a standard PC parallel port. A slash preceding a function label indicates an active low for the signal to be asserted.

The numbers closest to the bullet symbols are the pin number according to Data I/O's layout. Note that these are **different** from the pattern of a standard Berg header, which usually has even numbers on one side and odd on the other. The numbers in square brackets are the pin numbers of the D-sub 25 connector at the PC end.

Terminals designated 'NC' are 'No Connection' and should be left open. It should come as no surprise that the header's pin numbers appear to correspond to a straight-through configuration with the pin numbers on the D-sub 25.

[1] (/STRB) 1 ●	● 14 (/FEED) [14]
[2] (D0) 2 ●	● 15 (/ERR) [15]
[3] (D1) 3 ●	● 16 (/INIT) [16]
[4] (D2) 4 ●	● 17 (NC)
[5] (D3) 5 ●	● 18 (NC)
[6] (D4) 6 ●	● 19 (GND) [19]
[7] (D5) 7 ●	● 20 (GND) [20]
[8] (D6) 8 ●	● 21 (GND) [21]
[9] (D7) 9 ●	● 22 (GND) [22]
[10] (/ACK) 10 ●	● 23 (GND) [23]
[11] (BSY) 11 ●	● 24 (GND) [24]
[12] (PE) 12 ●	● 25 (GND) [25]
[13] (SEL) 13 ●	● 26 (NC)

If your MSM is a later revision unit, it will have a horizontally-mounted 26-position header designed to mate with a standard 0.100 pitch flat-cable receptacle. I've seen the cable that goes from the MSM to the back panel for this later-revision MSM, and it appears to be a straight-through pin-for-pin equivalency. There are pictures of both cables in the Data I/O-provided PDF.

What Next?

At this point, you're on your own. Choose your intermediate connector type, drill and/or cut an appropriate hole for such in the back panel, fabricate appropriate cabling, wire the connector and mount it. If you're feeling lazy about cutting a hole in the Unisite's back panel, you might be able to order a finished from Data I/O under part number 750-2283-001. Don't forget to move your model/serial label if you do this. The label can be pulled up easily enough with the help of a razor blade.

Next, fabricate your programmer-to-computer cable, put everything back together and plug in BOTH your programmer's serial and parallel ports (TaskLink uses both to communicate with the programmer).

Next, warm up your programmer and put it into CRC (Computer Remote Control) mode. Make sure that your serial side from the computer is connected to the 'Remote' port on the back of the programmer, and that your settings for that port and that of the computer's serial port match.

Finally, go into TaskLink's options menu (under 'System'), select the 'Port Options' tab, and enable the parallel port feature. You should also press 'Configure' for the parallel port to get TaskLink to install the parallel driver (you may or may not need to restart your PC).

Next, click 'Contact Programmer.' TaskLink should, after no more than 15 or so seconds, show 'Programmer Contacted.'

If it produces an error instead, recheck EVERYthing from your internal cable on out to your COM port settings. The other file in this archive is a copy of Data I/O's installation instructions. They're full of helpful pictures of the entire mod process.

Cosmetic Cleanup

You might be able to order cosmetic parts (such as plastic top covers), which are imprinted with the 'XPi' logo, directly from Data I/O. The part numbers are as follows.

For the 3980-XPi: 615-2030-001

For the Unisite-XPi: 616-1749-001

Happy tweaking.