

Getting Started Guide



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P E R S I S T O R
I n s t r u m e n t s I n c.

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About the CF8V2 Getting Started Guide

This Getting Started Guide is the only printed document that comes with your Persistor. Using just this, you will quickly have the Persistor running on your Tattletale® Model 8 (TT8) and have access to the development tools and supplemental electronic documentation installed onto your PC from the included PicoDOS8 diskette.

Installation will be very simple if you follow the step-by-step instructions and should complete without fuss in less than ten minutes. These instructions assume that you have already installed the TT8 C or TxBASIC development tools and are familiar with the communications programs CrossCut, MotoCross, or TxBASIC needed to install software into the TT8.

How to use the CF8V2 Getting Started Guide

New to the Tattletale Model 8...

If you are new to the TT8, you really owe it to yourself to master some of the concepts of running a TT8 by working through Onset's tutorials and building some of the sample programs before tackling the Persistor. You will encounter much TT8 terminology in our documentation that will have no meaningful context until you understand the TT8 and its programming tools. Put this away for now and go work with the TT8 tutorials, then come back and start again at the next paragraph.

New to the Persistor...

If you know the TT8 but this is your first experience with a Persistor, you are probably in for a pleasant surprise - you should have this running and begin to be productive in well under an hour. Review the short CF8V2 Data Sheet to get a good overview of its key features and a picture of what goes where, then work through the step-by-step installation instructions described ahead.

If you're migrating to a V2 Persistor...

If you're migrating from a classic to the V2 Persistor, you should read the following short list of key differences between the classic Persistor and the new V2 version. See if any of these new features inspire you to review earlier design decisions and optimize for the V2, then work through the step-by-step installation instructions described ahead.

Key Differences Between the CF8V2 and the Classic CF8

We designed the V2 Persistor to allow you to migrate to the new TT8V2 without having to make any changes to your existing programs - even without recompiling new binaries! However, we did take advantage of years of experience with memory card technology and customer requests to improve the second generation devices. The key visible changes are listed ahead along with relevant commentary.



Type I and II CompactFlash Cards

Type II CompactFlash memory cards are thicker (5.0mm) versions of the original (3.3mm) Type I cards. This allows more flash memory chips to fit into the cards, but also means they won't fit into headers designed for the first generation cards. The CF8V2 will accommodate either type of card. There is no downside to this unless you also happen to be responsible for processing and archiving all the extra data the scientists can now collect.

Industrial Temperature Range

The V2 Persistor was designed to match the TT8's industrial temperature range of -40°C to +85°C. Even so, you should keep in mind that most memory cards are specified for operation in the commercial temperature range of 0°C to +60°C. This includes standard Persistor brand cards though we can provide industrial rated cards for a premium price and with generally longer lead times.

New PicoDOS8 Flash Footprint

PicoDOS versions 150 and later PicoDOS8 have a slightly larger flash memory footprint than previous releases. These now begin at location 0x28000 instead of 0x2BCF8 to allow some long needed enhancements and to provide a little room for some possible future enhancements. For backward compatibility, both 0x28000 and 0x2BCF8 are valid vectors to enter PicoDOS8, but that extra 16KB of flash between them is now used by PicoDOS8 and unavailable to your applications. This change will only impact users whose flash applications fall in the range of 155KB to 172KB. PicoDOS versions 1.60 and later will work with both V2 and classic TT8s.

Buffered Bus Connections

The classic Persistor design presented the flash memory card bus signals directly to the 68332 data bus and all was well until the surge in popularity of flash memory cards spawned a slew of odd brand cards with less than friendly electrical interfaces. Though never a problem for Persistor brand memory cards, the new buffers protect the TT8's CPU from evil cards and allow the new full power-down features described ahead.

Complete Card Shutdown

The V2 Persistor can completely remove power to the flash memory card dropping the Persistor plus flash memory card current contribution to typically about 5µA. Shutdown mode happens automatically whenever the Persistor is first powered, reset, or dropped into 3.3V operation (ala LPSleep), and can be commanded to shutdown using the new V2CardPower(0) PicoDOS8 service call. The Persistor automatically exits Shutdown mode whenever PicoDOS8 makes any kind of file or card service request, or whenever you call V2CardPower(1). This means you do not have to make any software changes to take advantage of this new feature.

Like the buffered bus connections, this new shutdown capability has become even more important as the competition heats up to provide cheap digital film to the amateur photographers who don't buy cards based on esoteric current ratings. We screen all of our Persistor brand cards to meet the 200µA@3.3V and 500µA@5V sleep specification. You might be surprised that we've seen some non-Persistor brand cards that exceed 5mA sleeping! Either way, 5µA is a significant improvement.



About the other CF8V2 Documentation

Your Persistor is supported by three other supplemental documents covering hardware details and PicoDOS8 programming information.

CF8V2 Getting Started Guide

This CF8V2 Getting Started Guide introduces you to the basic concepts and specifications of the Persistor hardware, its PicoDOS8 software support, and the characteristics of the flash memory cards it controls. Here you will find all of the detailed electrical, mechanical, and environmental specifications you may need to design your experiment along with the operational information you may need to ensure its success.

PicoDOS8 User's Manual

PicoDOS8 is our DOS-like operating system for the CF8/TT8 combination that provides both a command line user interface for common card and file operations as well as the underlying DOS FAT file system. It's this that lets your C and BASIC programs easily create and manipulate files that can later be read directly by your PC using inexpensive flash memory card readers. Here you will find descriptions of how to use the DOS-like commands and details of how PicoDOS8's presence impacts the amount of TT8 onboard flash and ram memory usage available to your applications.

PicoDOS8 TxBASIC Guide

The PicoDOS8 TxBASIC Guide shows you how to use the Persistor and PicoDOS8 to save acquired data, stored in TxBASIC datafiles, to Windows compatible files on the flash memory card.

PicoDOS8 C Programming Guide

The PicoDOS8 C Programming Guide shows you how to adapt your C programs to take advantage of standard ANSI C file system capabilities that become possible with the addition of a Persistor and memory cards. This guide assumes that you are familiar with C programming and the ANSI C file functions, while describing the subtle differences between coding for desktop applications with unlimited processing power, memory space, and disk speed and coding for embedded applications where processing power is limited, battery power is precious, and file I/O takes considerably longer.

Installation and Setup Details

Installing the Persistor Hardware

1. Confirm that your TT8 is currently working and signs on when you apply power.
2. Remove power from the TT8.
3. Plug the Persistor onto the TT8. The CF8V2 headers are polarized with bent pins where the TT8V2 has the missing socket holes so you cannot mismount them (without extreme force). Use the asymmetrical mounting holes of the two boards as a coarse initial alignment guide. When the Persistor is properly inserted, none of the gold from its pins will be visible when viewed from any edge.



4. Insert a CompactFlash card into the Persistor's card slot. When fully inserted, the flash memory card should be far enough into the CF8V2 to expose about 1/8" of the board's surface and the ejector arm should protrude about 1/8" past the board's edge.

Be aware that most CompactFlash cards have a tiny lip on their bottom edge that will put up a fight with the edge of the board at the end of the insertion if you apply even a slight downward force while pushing. You can counter this with a slight upward pull and the card will slide fully inside the header.

5. Apply power to the TT8 and it should sign on just as in the first step. This indicates that installing the CF8 has not done anything to interfere with the TT8's operation. You won't be able to do anything interesting with the Persistor until you install the PicoDOS8 software as described in the following steps.

Installing the PicoDOS8 Software into your PC

Note: In the following instructions, several files will be specified that will have names containing the string ###. When you go looking for those files on your PC, you'll need to mentally replace the ### with three digits representing the version number of the software which will be something like **150**.

For example, when the instructions specify 8PICO###Setup.exe, you'll look on your PC for something that begins with **8PICO**, has three digits, and ends with **Setup.exe**. If this is a first-time installation, there will likely be only one filename that even comes close. If this is an update installation, you may find several close matches - and in almost every case, you'll be wanting the one with highest numeric value, representing the latest release. If the latest release was 1.50, you'd see 150 as the three digit string, with 8PICO###Setup.exe meaning you want 8PICO150Setup.exe, and 8PICO###.AHX meaning you want 8PICO150.AHX.



1. Have ready the PicoDOS8 installer program named 8PICO####Setup.exe (see the earlier “###” note). This software comes on a floppy disk or CD with your Persistor and the latest version is always available from our web site at www.persistor.com using one of the download links on the web page for the Persistor CF8V2.

2. From Windows, run the installer program 8PICO####Setup.exe and follow the prompts. If you accept the default installation directory of C:\TT8\ (highly recommended) you will end up with a directory mapping similar to the abbreviated version shown below:

```
C:\TT8\  
  INCLUDE\ <merges with TT8 headers>  
    PicoDOS8.h  
    PicoDCF8.h  
  PicoDOS8\  
    BIN\  
      8PICO####.AHX    <used in next step>  
      CHECKOUT.RHX  
    DOC\  
      PicoDOS8UsersManual.pdf  
      PicoDOS8TxBASICGuide.pdf  
      PicoDOS8CProgGuide.pdf  
      <various other PDF and HTML>  
    EXAMPLES\  
      8TXB\  
        PICOTEST.TXB  
        LOGCF8.TXB  
      TESTARGS\  
      TESTEXEC\  
      LOGCF8\  
      DUNGEON\  
      PICOLOG\
```

Installing PicoDOS8 into your TT8 for C Development

1. With the TT8 powered and showing the TOM8> monitor prompt, load 8PICO####.AHX using Cross-Cut or MotoCross. At the completion of the load, answer Y<enter> to the confirmation prompt.

2. PicoDOS8 is now resident in the top (unused) portion of the TT8’s onboard flash memory and is ready to service your programs file system requests. You can get to the PicoDOS8 command shell from the TOM8 monitor at any time by typing GO 28000<enter>.

In addition to providing DOS like commands such as DIR, TYPE, COPY, batch files, and the like, PicoDOS8 also replicates all of the basic TOM8 functionality so you may find it convenient to have your TT8 automatically start PicoDOS8 at power up.

From the PicoDOS8 prompt you can switch startup action by typing BOOT PICO or BOOT TOM8. However, you do not want to use BOOT PICO if you are running TxBASIC or want to run your own application from the TT8’s onboard flash memory.

3. Run PicoDOS8 with the GO 28000<enter> and begin to explore. Use the HELP command to get a list of commands and the DIR command to see what’s on the card (probably nothing yet!).

4. Become familiar with your Persistor by reading the other PicoDOS8 and Persistor documentation listed earlier, and by building and running one or more of the example programs in the directory:

C:\TT8\PicoDOS8\EXAMPLES\



TxBASIC Notes

Before installing PicoDOS8 into your TT8 you need to be aware of considerations that are unique to the TxBASIC environment.

- 1. TxBASIC is the startup program that will run in your TT8's onboard flash memory, so you cannot automatically run the PicoDOS8 command shell, nor do you normally see the TOM8> monitor prompt which is where you need to be to load programs.*
- 2. The TxTools communications window does not know the shortcuts that CrossCut and MotoCross use to quickly load TT8 programs, so you have to perform additional steps and the program loads work at 9600 baud instead of 57600 baud and therefore take quite a bit longer.*
- 3. The order in which you install TxBASIC and PicoDOS8 does not matter, though it may change the startup behavior and what you see in your communications window which can be confusing when you're trying to follow step-by-step installation instructions.*

Installing PicoDOS8 into your TT8 for TxBASIC Development

1. If you are running TxTOOLS and already see the TOM8> monitor prompt then skip the next step which forces TxBASIC to enter the TOM8 monitor.
2. If instead you are seeing the TxB# prompt, you will need to force TxBASIC to enter the TOM8 monitor by typing a CTRL-X then replying "Y" to the confirmation prompt. You should now see the TOM8> monitor prompt.

3. Type "LO"<enter> into the TxTools communication window, then use the "Send File ASCII..." command from the TxTools "CommPort" menu and use the file navigation dialog to select 8PICO###.AHX (see the "###" note in the main installation instructions). This is a large file that loads slowly and TxTools will display a progress dialog while the load proceeds. When it completes, the TOM8 monitor will ask for confirmation to burn the TT8's onboard flash memory, to which you should reply "Y"<enter>.

4. PicoDOS8 is now resident in the top (unused) portion of the TT8's onboard flash memory and is ready to service your programs file system requests. You can get to the PicoDOS8 command shell from the TOM8 monitor at any time by typing GO 28000<enter>.

5. Run PicoDOS8 with the GO 28000<enter> and explore. Use the HELP command to get a list of commands and the DIR command to see what's on the card (probably nothing yet!).

6. Become familiar with your Persistor by reading the other PicoDOS8 and Persistor documentation listed above, and by building and running one or more of the example programs in the directory:

C:\TT8\PicoDOS8\EXAMPLES\8TXB\



Environmental

Operating Temperature -45°C to +85°C
 Storage Temperature -45°C to +85°C
 Relative Humidity 0 to 95% (non-cond.)

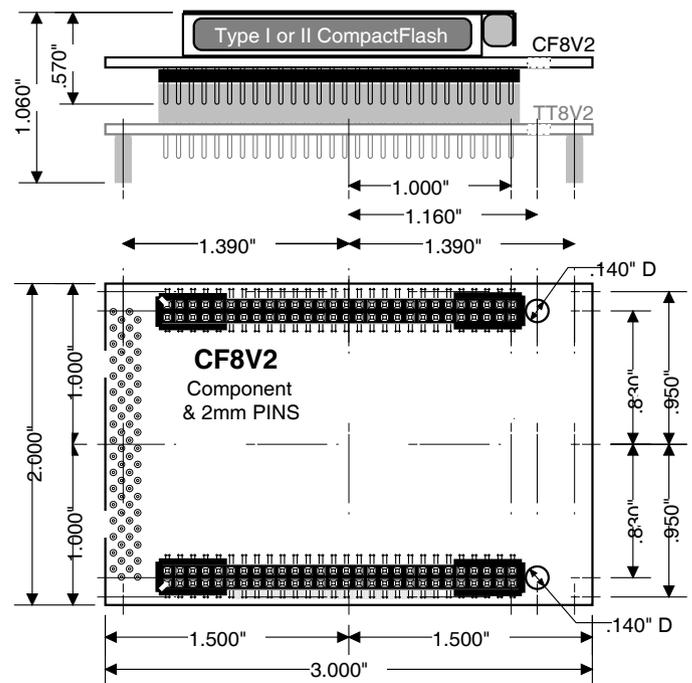
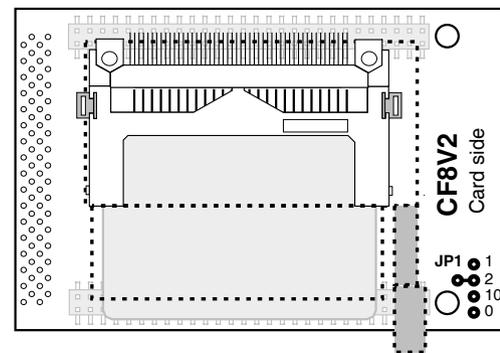
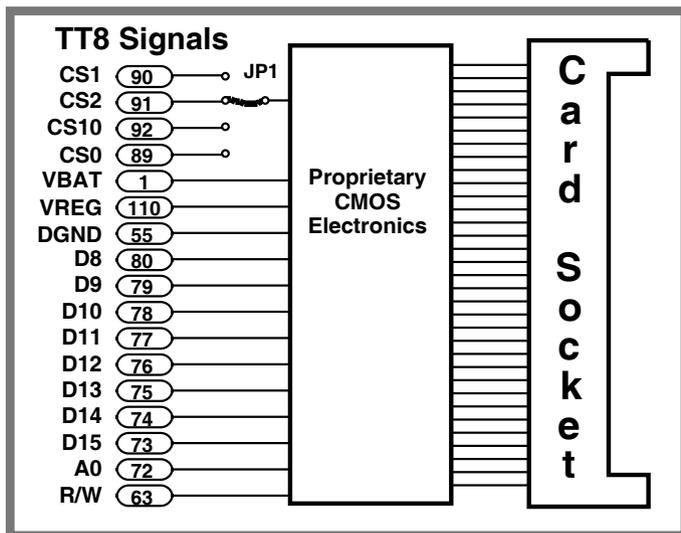
Power Requirements

PARAMETER	MIN	TYP	MAX
Operating Voltage	4.5 V	5.0 V	5.5 V
Sleep Voltage	3.0 V	3.3 V	5.5 V
Write Current at 5V <i>(note 1)</i>		40 mA	65 mA
Read Current at 5V <i>(note 1)</i>		35 mA	50 mA
Sleep Current at 5V <i>(note 1)</i>		150 µA	500 µA
Shutdown Current at 5V		5 µA	25 µA
Shutdown Current at 3.3V		5 µA	15 µA

Dimensions

PARAMETER	SI	US
Weight	28 g	1.0 oz
with card	71 g	2.5 oz
Length	76.2 mm	3.0 in
Width	50.8 mm	2.0 in
Thickness	14.4 mm	0.57 in

Connections



Notes

1. Specification only valid when used with Persistor brand flash memory cards.

