User Manual

Tektronix

BitWriter™

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This document applies to firmware version 1.0 and above.

Please check for change information at the rear of this manual.

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Getting Started

Getting Started

BitWriter is a software application for personal computers that runs under Microsoft *Windows*. BitWriter allows you to create and edit vector and setup files for use with the HFS 9000 Stimulus Systems. You can edit multiple files simultaneously and copy portions of one file to another file. You can transfer these files between your computer and the HFS 9000 Stimulus System through a GPIB interface, or you can save them to your hard disk as DOS files.

During execution on the HFS 9000 Stimulus System, the setup file accesses vector data that is stored at addresses specified in the setup file. However, in BitWriter the setup and vector files are independent; no data is shared between them. With BitWriter, you can develop either type of file without having a corresponding file loaded on BitWriter.

You do not need to connect an HFS 9000 Stimulus System to your computer in order to use BitWriter. Because you save the setup and vector files as DOS files, you can transfer them to another computer that is connected to an HFS 9000 Stimulus System via GPIB interface.

BitWriter makes no assumptions about how your HFS 9000 Stimulus System is configured. Check your HFS 9000 Stimulus System configuration so that the setup and vector files you create are compatible with your system.

You can also import data files with BitWriter. See Appendix A for import file format information. When you import a file, BitWriter automatically converts the file so you can edit it without further manipulation.

Setup and vector files created with BitWriter are GPIB command files. You can transfer these files between your computer and the HFS 9000 Stimulus System with BitWriter, or you can use another GPIB application.

System Requirements

BitWriter operates in a *Windows* environment, version 3.1 or higher. The computer must include at least an 80386 processor with at least 640 kbytes of RAM, a color monitor, a high-density 5.25-inch or 3.5-inch disk drive, a GPIB card, and a mouse. See Appendix C for a list of GPIB cards approved for use in the system.

Software Installation

To install BitWriter, run the program Instalit.exe located on the distribution diskette. After BitWriter is installed, double-click on the icon shown in Figure 1–1 to select and start the program.

Figure 1–1: Windows Icon for BitWriter

Hardware Installation

BitWriter can communicate with the HFS 9000 Stimulus System through a standard GPIB interface. Install the GPIB board in your computer according to the manufacturer's instructions and safety precautions. Note that you can use BitWriter for file development even without a GPIB card and the HFS 9000 Stimulus System.

Turn off your computer and the HFS 9000 Stimulus System, then install the GPIB cable between the GPIB connector in your computer and the GPIB connector at the front of the HFS 9000 Stimulus System (see Figure 1–2). For proper operation, the system requires the following conventions when you use the GPIB interface:

- Check the specification for the number of devices for your specific GPIB interface. If you have other GPIB-configured devices connected to your system, do not exceed the recommended maximum number of devices on the bus.
- Assign a unique address to each device.
- Connect one device for each 2 meters (6 feet) of cable.
- Do not exceed 20 meters (65 feet) total cable length.
- Turn on at least two-thirds of the connected devices when operating the network.
- Connect the network devices in a star or linear configuration rather than in a loop or parallel configuration.

See the *HFS 9000 Stimulus System User Manual* for GPIB commands and query formats and more information on using a GPIB interface.

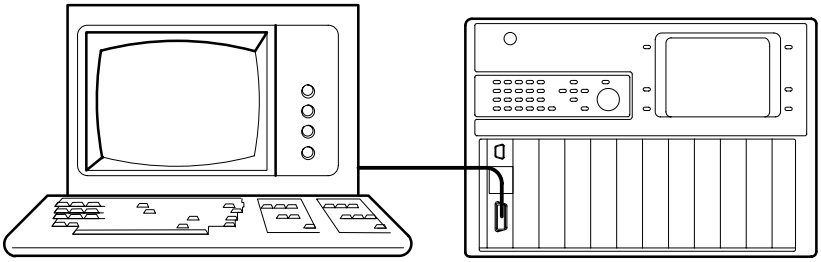


Figure 1–2: GPIB Cable Installation

Operating Basics

Operating Basics

This section includes discussions of BitWriter windows, mouse functions within the application software, and the system data transfer function.

BitWriter Windows

BitWriter consists of three types of windows: the Main Module, the Setup Editor, and the Vector Editor.

Main Module

The Main Module window appears when you start BitWriter and when all files are closed (see Figure 2–1). In this window, the file operation, transfer options, view options, and the help functions are available, but no editing functions are available.

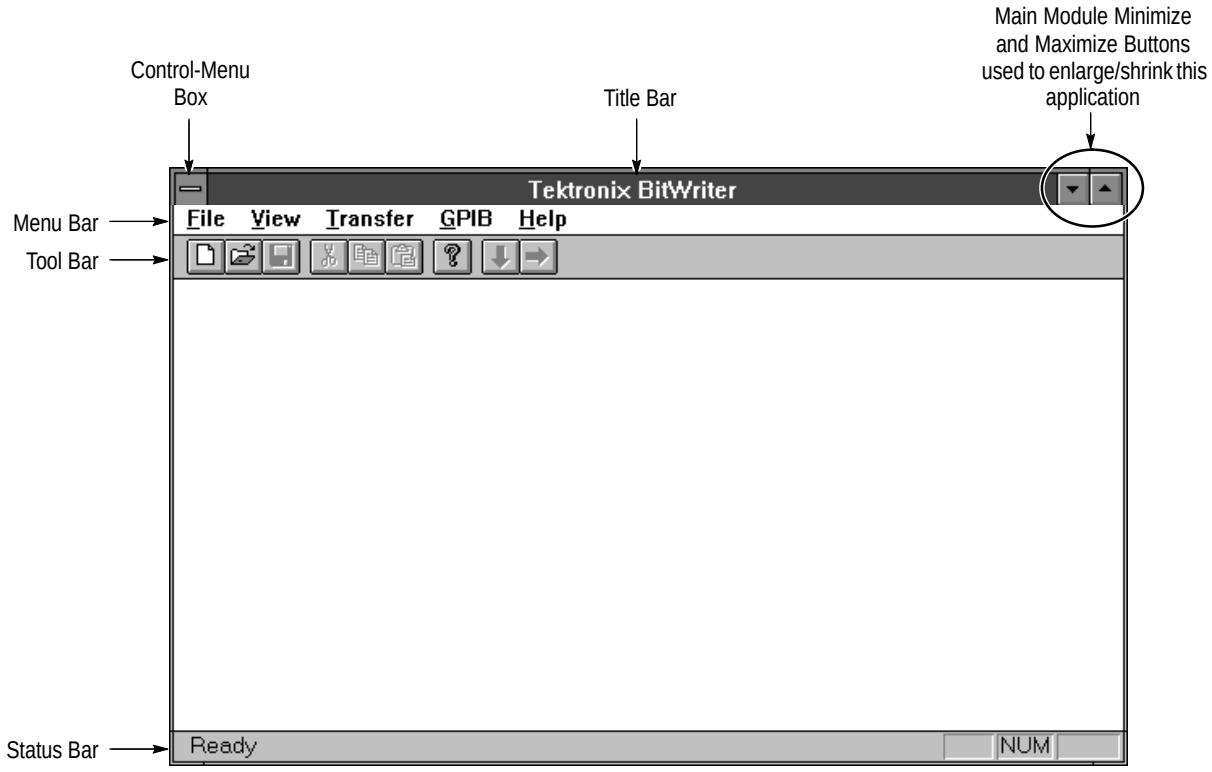


Figure 2–1: The Main Module Window

The Main Module contains the application window title bar, the Control-Menu box, and the application minimize and maximize buttons. The Menu Bar in this window includes the file and transfer function command menus. After you open a setup or vector file, the Menu Bar includes the commands for the editor window that you are working in. See the *Examples* portion of the *Reference* section for procedures to open setup and vector files.

Setup Editor

The Setup Editor window appears after you upload a setup from the HFS 9000 Stimulus System or open a new or existing setup data file (see Figure 2–2). Use this Editor window to set the parameters with which the HFS 9000 Stimulus System generates pulses.

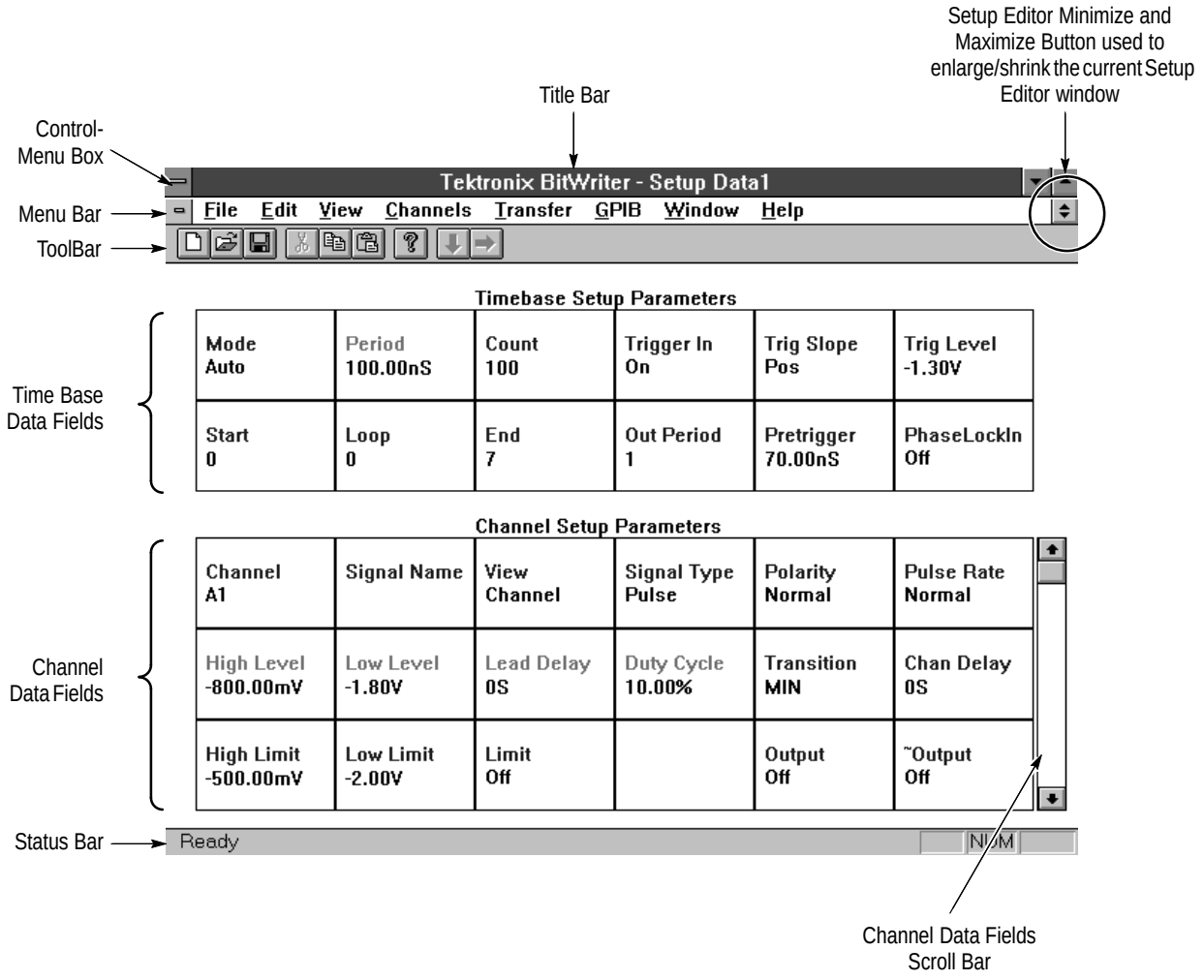


Figure 2–2: The Setup Editor Window

In the Setup Editor window, the Time Base Data Field editing functions are always available, but the Channel Data Field editing functions are only available after you add one or more channels to a new file. See *Using the Mouse* on page 2–5 for a description of mouse functions in the Setup Editor window.

The Time Base Data fields affect parameters for all channels simultaneously. In these fields, you define how and when the pulse generator creates pulses in relation to a trigger event or other external sources.

The Channel Data fields affect only the channel specified in the Channel field. Use the Scroll Bar at the right or click on the Channel name to move through the channels to enter the data for individual channels.

Vector Editor

The Vector Editor window appears after you upload vectors from the HFS 9000 Stimulus System or open a new or existing Vector Data file (see Figure 2–3). See the *Examples* portion of the *Reference* section for procedures to open vector files. All vector editing functions are available in this window. See *Using the Mouse* on page 2–5 for a description of mouse functions in the Vector Editor window.

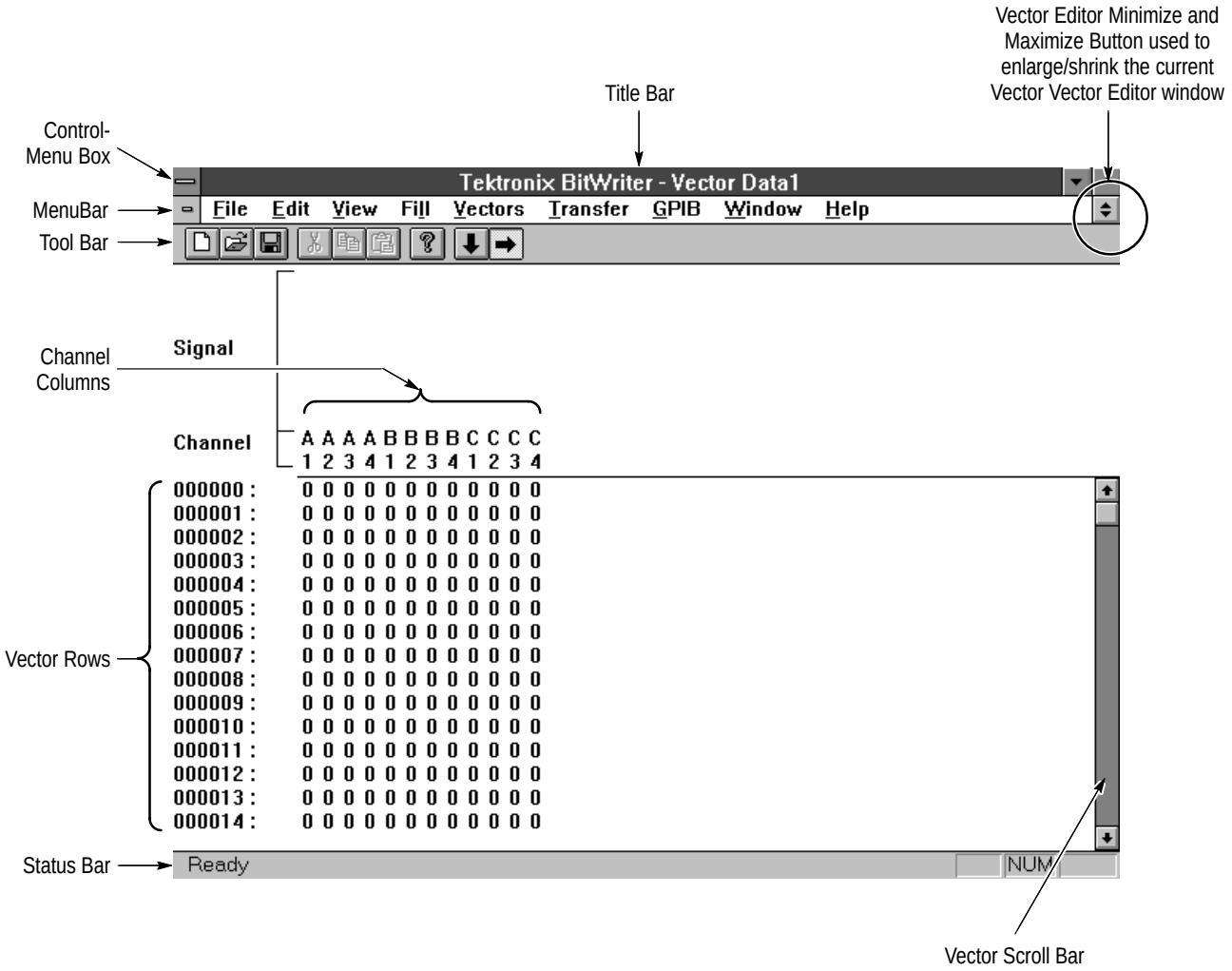


Figure 2–3: The Vector Editor Window

In the Vector Editor window, you set the binary stream that will stimulate the device under test. The bits can be set individually; in binary, octal, or hexadecimal groups, or in a block. The selected bits can be set with all ones or zeros, a constant, random data, or a count-up or count-down pattern; they may also be inverted as a group. You can create a data sequence, copy the block, and paste it elsewhere to create a unique pattern.

Use the Scroll Bar at the right to move through the vector rows to enter or edit the vector data. You can also select Vectors, then GoTo to select a vector from a pop-up menu.

You can arrange the Setup and Vector Editor windows in tiled or cascaded format. Click anywhere on a window to bring it to the front as the active window. See the *Reference* section in this manual for more information on Setup and Vector editing functions.

Using the Mouse

BitWriter uses one mouse button for most menu functions. You can use the left mouse button for all selections unless you have changed the mouse button configuration in the Windows Control Panel. Alternately, you can use the keyboard to select commands in the Menu Bar. Press the Alt key and the key for the underlined letter in the Menu Bar. For example, Alt-F selects the File command menu. A dimmed menu selection indicates an invalid choice and cannot be selected.

In the Main Module and Setup Editor windows, when the mouse is in the arrow-shaped (↖) mouse pointer mode, point the mouse at and then click on icons and buttons. The green-colored text includes two or more options that you can cycle through. Point the mouse at, then click the left mouse button on the green text to cycle through the options. Alternately, click the right mouse button on the green text to select an option from a pop-up menu.

When the mouse is in selection cursor (I) mode, move to the appropriate area of text, click on it, and delete, back space, or type to edit the data. If two related values conflict, for example if End is less than or equal to Start, both fields are highlighted in red to indicate the error condition.

Click the left mouse button in the Channel field to go to the next channel in the Setup Editor. Similarly, click the right mouse button to go to the previous channel in the Setup Editor.

In the Vector Editor window, the mouse click and drag functions vary according to which area of the vector display you are working in. Double-click the mouse in the channel name area to pop up the Name Channels dialog box. Double-click on a vector row number to pop up the Go To dialog box.

Point and click the mouse on a single vector data bit to edit data in individual bits. You can select vector rows or channel columns either singly or in groups to edit as a whole. You can also select a block of vector data to perform editing functions on.

Selecting Vectors in Vertical Channels

To select all vectors in a single channel, click the left mouse button on the channel in the Channel Name and Designator area near the top of the window (see Figure 2–4). Hold down the left mouse button and drag the mouse to the right or left to select all vectors in two or more adjacent channels.

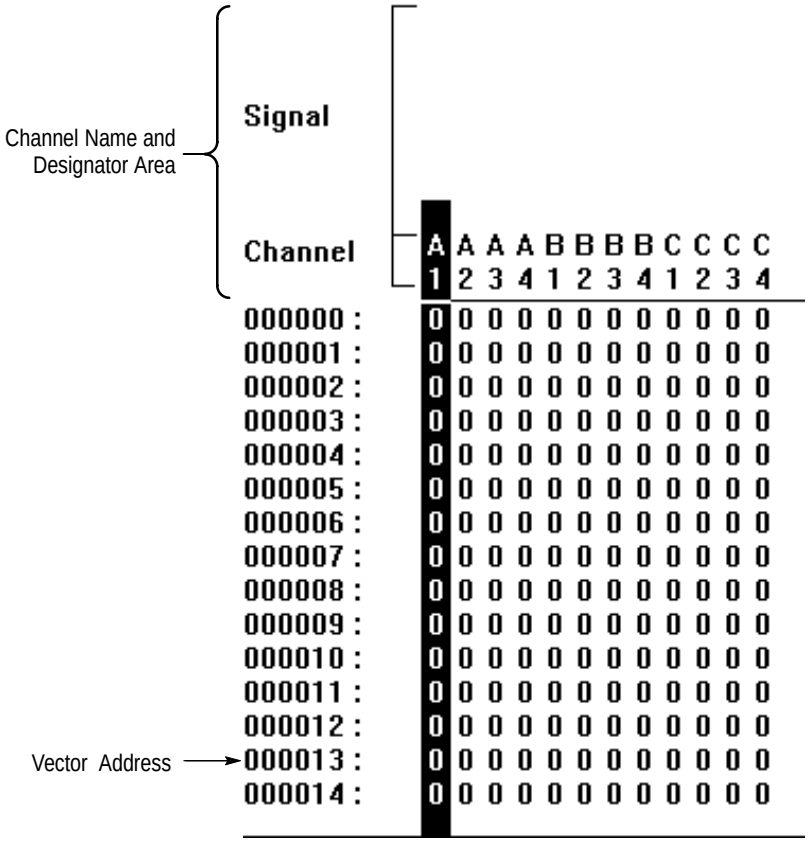


Figure 2–4: Selecting a Vector Channel

Selecting Vectors in Horizontal Rows

To select the vectors in all channels in a single row, click the left mouse button on the Row Number area at the left side of the window (see Figure 2–5). Hold down the left mouse button and drag the mouse up or down to select all vectors in two or more adjacent rows.

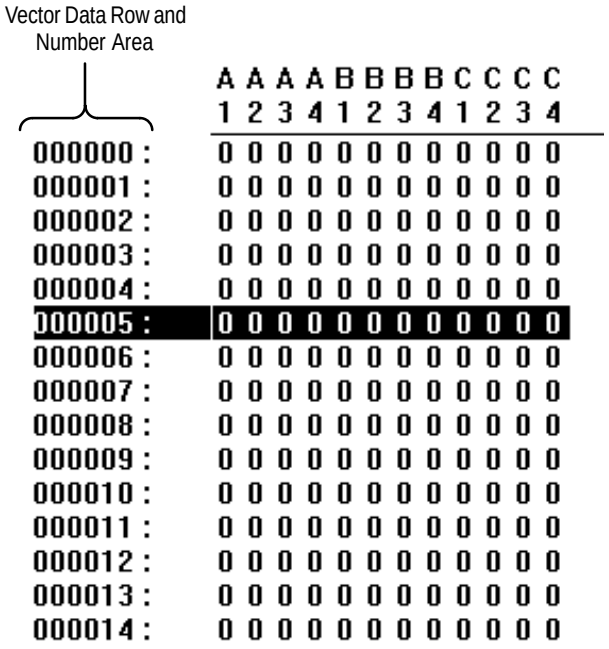


Figure 2–5: Selecting a Vector Row

Selecting a Vector Block

To select a block of data within several vector rows and channel columns, point the left mouse button at one corner of the block to be selected (see Figure 2–6). Hold down the left mouse button and drag the mouse until the entire block is highlighted (in reverse video).

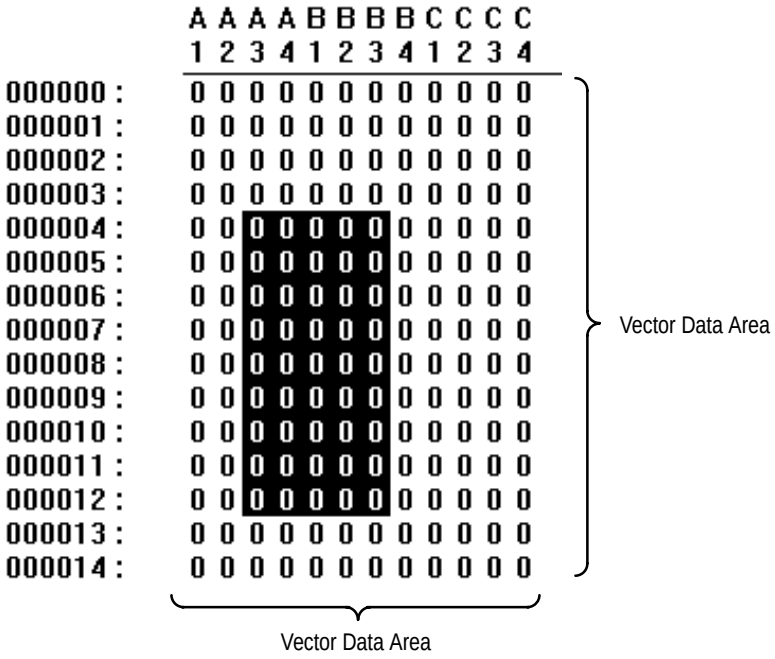


Figure 2–6: Selecting a Vector Block

System I/O

BitWriter transfers data to and from the HFS 9000 Stimulus System via a GPIB interface. See *Getting Started* for information on GPIB card installation and Appendix C for a list of GPIB cards approved for use in the system. See the *Examples* section procedure, *Transfer a File to the HFS 9000 Stimulus System*, on page 3–19 for more information on transferring files through the GPIB interface.

Setup files are saved and can be transferred in ASCII format. These file names default to *.set.

CAUTION. *If the setup file and the device under test are not compatible, the device under test can be damaged by improper voltages. When you transfer a setup file to the HFS 9000 Stimulus System, check the instrument to be sure it is compatible with your file and the device under test.*

NOTE. *When using the Setup Editor, the Start, Loop, and End addresses are available in only decimal format. In the Vector Data Editor, you may specify the vectors in decimal, octal, or hexadecimal radices. Be sure that the files you intend to use together refer to the same absolute Start and End addresses and use the same Channel and Signal Names.*

Vector files are saved and can be transferred in either ASCII or binary format. The *.vca file name indicates a vector file in ASCII format. The *.vcb file name indicates a vector file in binary format.

Files in ASCII format can be edited in any on-line editor. These files transfer to the HFS 9000 Stimulus System more slowly than files in binary format.

Files in binary format cannot be edited in an on-line editor. These files transfer to the HFS 9000 Stimulus System more quickly than files in ASCII format.

NOTE. *When you transfer a vector file to the HFS 9000 Stimulus System, you will write over any data that already exists at the vector data Start Address plus the file length.*

Setup and vector files created with BitWriter are GPIB command files. You can transfer these files between your computer and the HFS 9000 Stimulus System with BitWriter, or another GPIB application. You can send GPIB commands directly to the HFS 9000 Stimulus System through the GPIB menu. See the *HFS 9000 Stimulus System User Manual*, Reference section, for more information on GPIB commands.

You can import vector data files from other development sources. BitWriter automatically converts the file as you open it so you can edit the file without additional manipulation. However, the imported vector files must conform to the file format described in Appendix A.

Reference

Reference

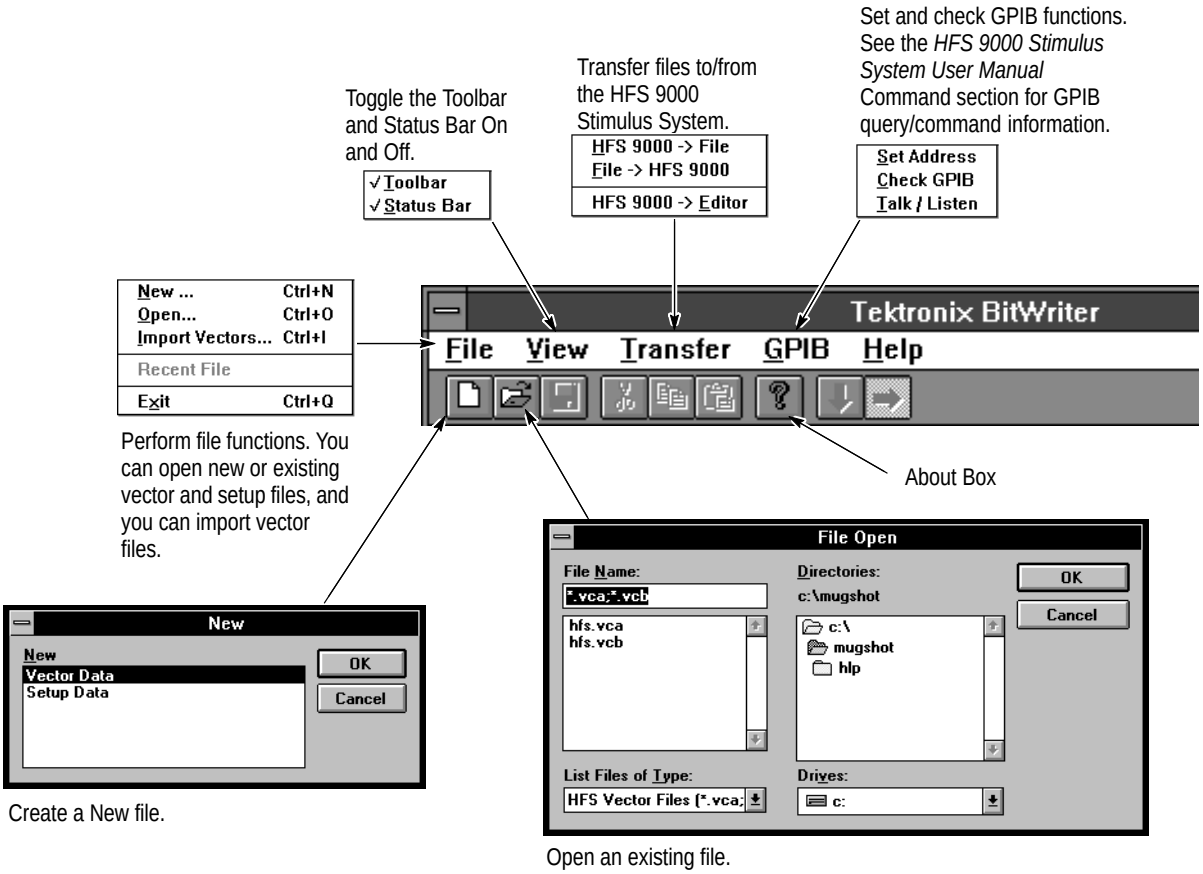
This section describes BitWriter windows and provides examples of common tasks you can perform with this software.

There are three types of windows in the BitWriter: the Main Module, the Setup Editor, and the Vector Data Editor. The availability of editing functions varies according to the condition of the working file. In all menus, the dimmed selections and buttons indicate selections that are not available. See *Using the Mouse* on page 2–5 for information on mouse functions in these windows.

During execution on the HFS 9000 Stimulus System, the setup file accesses vector data that is stored at addresses specified in the setup file. However, the setup and vector files are independent; changing the contents of one file has no affect on any other file. You can develop either type of file without having a corresponding file loaded on BitWriter.

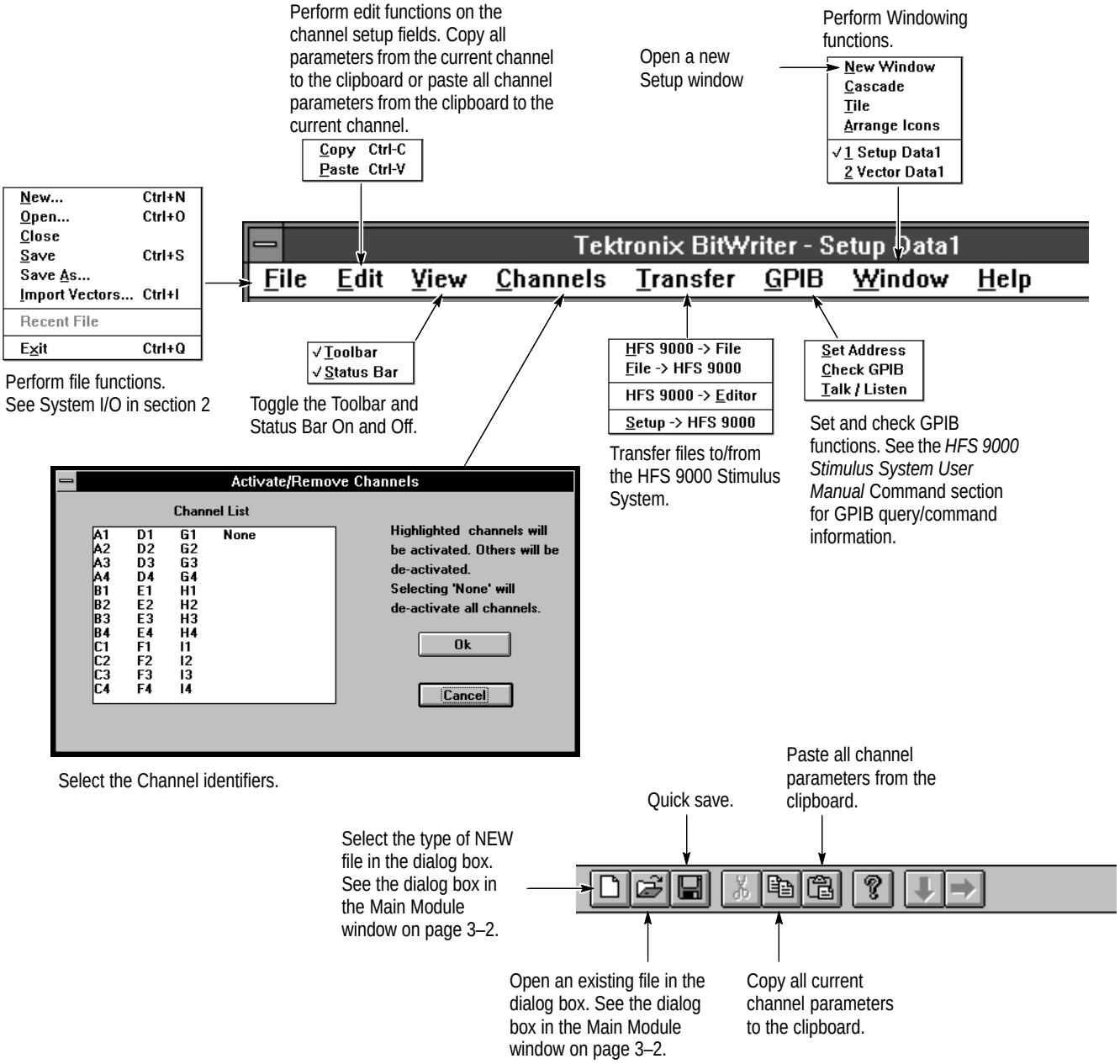
Main Module

The Main Module window appears when you initiate BitWriter and when all files are closed. Tasks that you can perform in this window are described below.



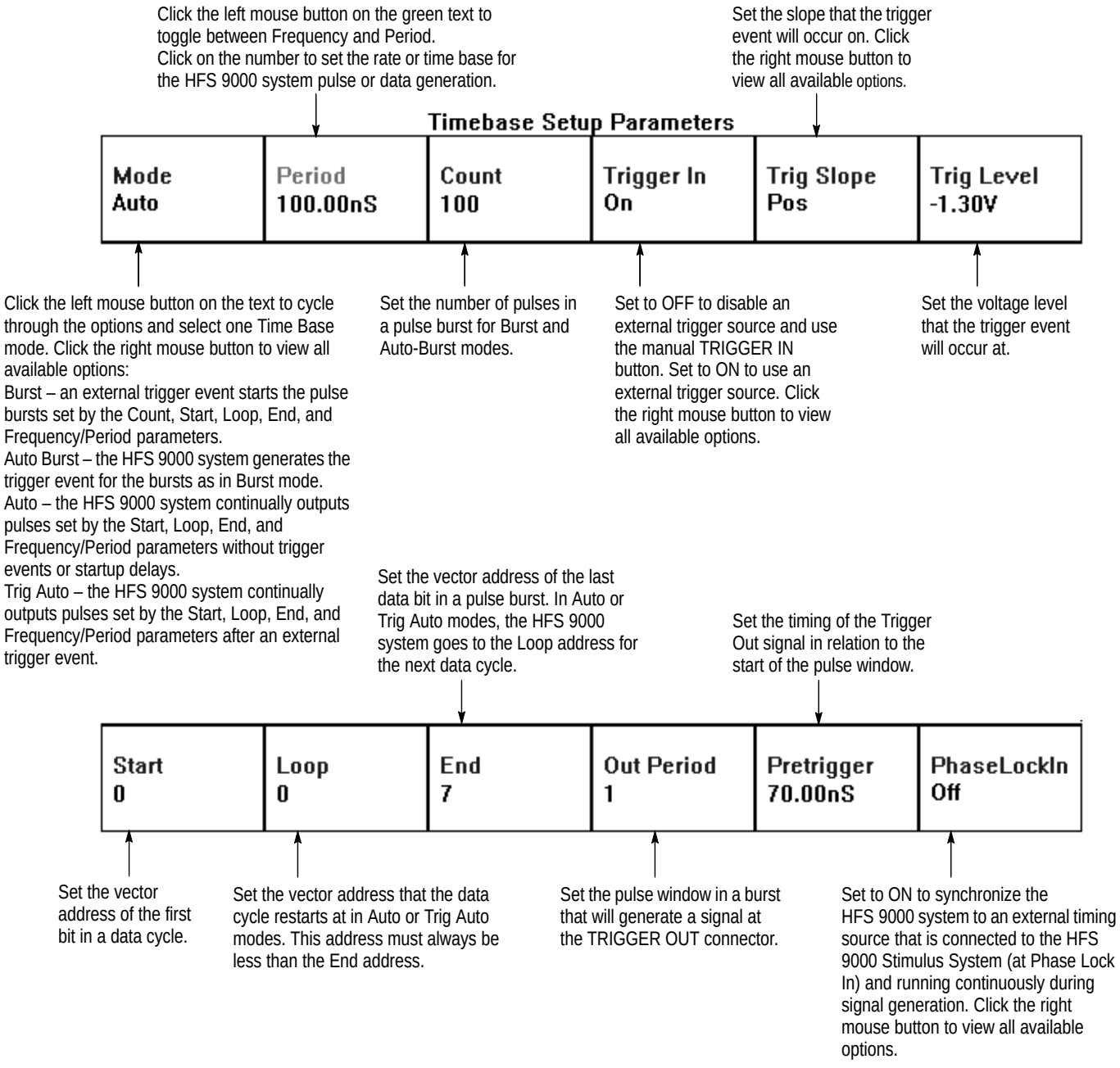
Setup Editor

The Setup Editor window appears after you open a new or existing setup data file. The tasks that you can perform in this window are described below.



NOTE. *When you transfer a setup file to the HFS 9000 Stimulus System, you will write over any active, preexisting setup parameters.*

Time Base Fields The parameters in the twelve fields affect all channels simultaneously.



NOTE. *When using the Setup Editor, the Start, Loop, and End addresses are available in only decimal format. In the Vector Data Editor, you may specify the vectors in decimal, octal, or hexadecimal radices. Be sure that the files that you intend to use together refer to the same absolute Start and End addresses.*

Channel Data Fields

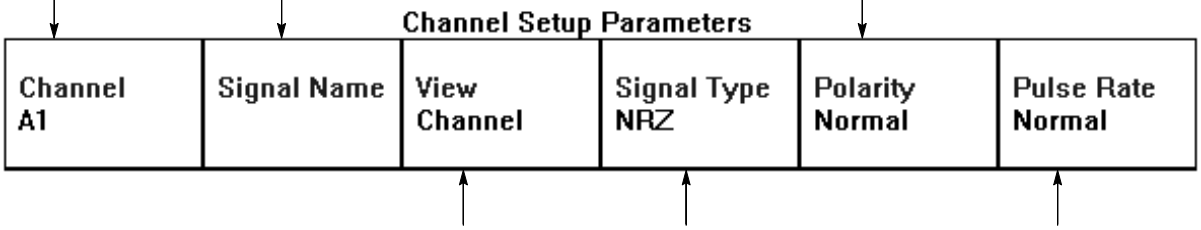
The parameters in the seventeen fields affect each channel individually. Setting these parameters is described next.

The Channel and Signal Name fields are independent in the BitWriter Setup and Vector Editors. However, these fields in the setup file must match the same fields in the vector file at the HFS 9000 Stimulus System. To prevent a possible error at the HFS 9000 Stimulus System, use the same signal name for a given channel in both the Setup and Vector editors. If possible, assign signal names to channels in the Setup editor, and then use only signal names in the Vector editor.

This is the alphanumeric identifier for the selected board and output channel. Note that this field is blank if a name is entered in the Signal Name field and the View data field is set to Group.

Enter a logical name, up to six characters long, to indicate the signal output on this channel.

Set the logic to normal or inverted.



Select whether the channel appears as a single channel or as part of a group, such as an address bus. Click the right mouse button to view all available options.

Click the left mouse button on the text to cycle through the signal types. Refer to the manual for the appropriate board(s) to determine valid signal types. Note that BitWriter does not read your system configuration. If you select an invalid signal type, no error appears until you load the setup file into the HFS 9000 Stimulus System. Click the right mouse button to view all available options.

Set the pulse generator to normal (whole), one-half, one-quarter, or one-eighth of the time base frequency. May also be set OFF. Click the right mouse button to view all available options.

The selections in these fields place the pulse edges and define the pulse width within the pulse window for this channel.

This field controls the occurrence of the leading edge of the pulse. Click on the green text to toggle the options: Lead Delay or Phase. Lead Delay – set the time between the start of the pulse window and the leading edge of the pulse.
Phase – set the percentage of the pulse window that occurs between the start of the pulse window and the leading edge of the pulse.

This field controls the occurrence of the trailing edge of the pulse. Click on the green text to cycle through the format options. Click on the numbers to set when the trailing edge occurs.
Width – set the time duration between the rising and falling edges of the pulse.
Duty Cycle – set the percentage of the pulse window that occurs between the rising and falling edges of the pulse.
Trail Delay – set the time from the beginning of the pulse window to the trailing edge of the pulse.

These fields work in tandem to define the HFS 9000 system output voltage levels. Click on the green text to toggle the options:
High and Low Levels OR Amplitude and Offset.
Click on the numbers to set the values:
Set the logical high and low values for High Level and Low Level. OR Set the difference between the logical high and low values for Amplitude and set Offset to the midpoint between the logical high and low voltage levels.

Set the pulse edge rise and fall time (for the HFS 9PG2 and HFS 9DG2 boards only).

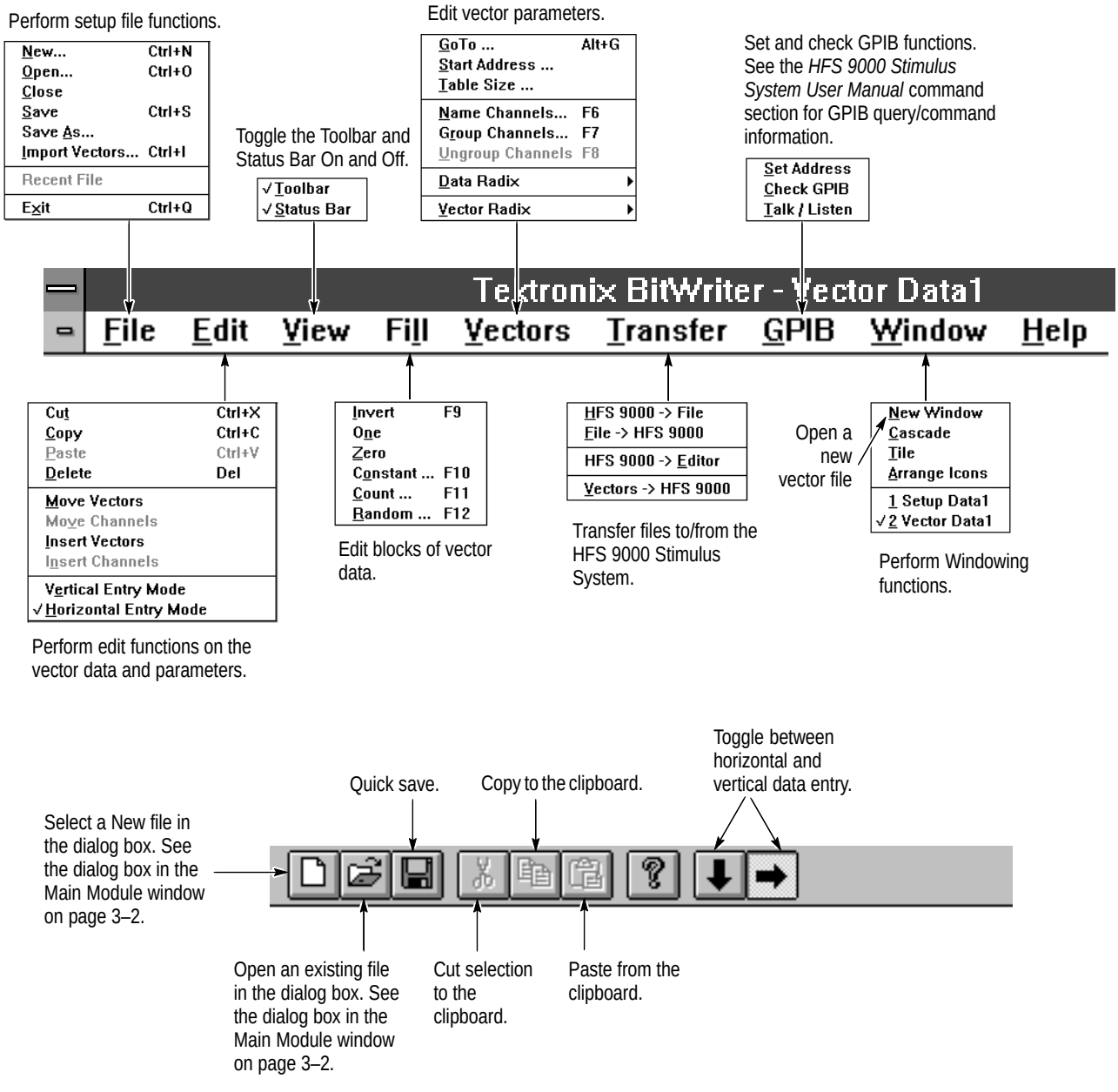
Set the output delay for this channel to match the reference channel.
(This is normally adjusted at the HFS 9000 Stimulus System Cal/Deskew Menu.)

These fields work together. Set the output voltage maximum and minimum levels when Limit On/Off is set ON. High and Low Limits have no effect and do not revert to original values when Limit On/Off is set OFF.

These fields work independently, but function the same way. Set the normal and complement (~) outputs ON or OFF. (~Output not available on HFS 9DG2 boards.)

Vector Editor

The Vector Editor window appears after you open a new or existing vector file. The tasks that you can perform in this window are described below.



NOTE. *When using the Setup Editor, the Start, Loop, and End addresses are available in only decimal format. In the Vector Data Editor, you may specify the vectors in decimal, octal, or hexadecimal radices. Be sure that the files you intend to use together refer to the same absolute Start and End addresses and have the same Channels and Signal Names.*

NOTE. *When you transfer a vector file to the HFS 9000 Stimulus System, you will write over any data that already exists at the vector data Start Address plus the file length.*

Examples

Here are five examples of tasks you will frequently perform with BitWriter. During execution on the HFS 9000 Stimulus System, the setup file accesses vector data that is stored at addresses specified in the setup file. However, in BitWriter the setup and vector files are independent; no data is shared between them. You can develop either type of file without having a corresponding file loaded on BitWriter.

You will need a GPIB connection to transfer your files to and from the HFS 9000 Stimulus System. You can also store files on disk for editing or for transfer to the HFS 9000 Stimulus System at another time or place.

Note that the file contents are GPIB commands to the HFS 9000 Stimulus System. Any program can transfer these files to the HFS 9000 Stimulus System. Also, you can concatenate a setup file and a vector file in a word processor and transfer them as a unit to the HFS 9000 Stimulus System. See your word processor software manual for more information.

CAUTION. *If the setup file, the HFS 9000 Stimulus System configuration, and the device under test are not compatible, the device under test can be damaged by improper voltages. When you transfer a setup file to the HFS 9000 Stimulus System, check the instrument to be sure it is compatible with your file and the device under test.*

NOTE. *When you transfer a setup file to the HFS 9000 Stimulus System, you will write over any active, preexisting setup parameters. When you transfer a vector file to the HFS 9000 Stimulus System, you will write over any data that already exists at the vector data Start Address plus the file length.*

Create a New Setup File

When you create a new setup file, it can be useful to have the associated vector file opened. Bitwriter does not check the setup parameters or vector data that you enter. Complete the following steps to create a new setup file:

1. Click on File in the menu bar, then click on New, or

   Click the New Document (🗋) icon.

2. Click on Setup Data, then click the OK button. The Setup Editor window does not yet include any channel data and will resemble Figure 3–1.

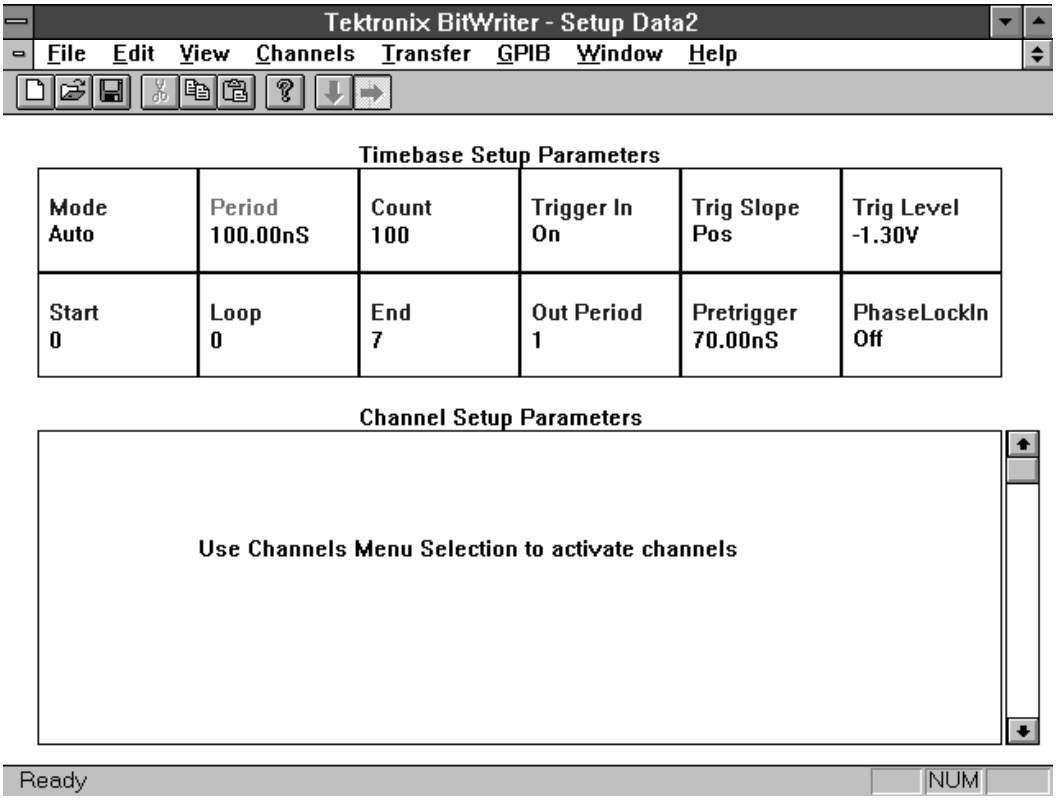


Figure 3–1: New Setup Screen with Default Parameters

3. Set your Time Base parameters.

NOTE. *When using the Setup Editor, the Start, Loop, and End addresses are available in only decimal format. In the Vector Data Editor, you may specify the vectors in decimal, octal, or hexadecimal radices. Be sure that the files you intend to use together refer to the same absolute Start and End addresses.*

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4. Click on Channels on the menu bar.
5. Select the alphanumeric channel identifier(s) that you will use for this application with one of the following methods*:*
   - Click the mouse pointer on a single channel.
   - Hold down the left mouse button, drag the mouse to highlight a group of contiguous channels, and release the button.
   - Click on the first channel, hold down the shift key, and then click on the last channel in a contiguous group of two or more channels.
   - Hold down the Control key and click on each channel in a non-contiguous group of channels.
   - Choose None (by itself) to deactivate all the channels.
6. When all the channels that you want to use are highlighted, click the OK button to confirm your selection(s) and return to the Setup Editor.
7. Set the channel setup parameters. The scroll bar for the channel setup parameters is located on the right-hand side of the channel fields.
8. Copy setup parameters from one channel to another as follows:
   a. Click on Edit, then select Copy or click the Copy button to copy all channel-specific parameters (except the Channel, Signal Name, View, and Chan Delay parameters) to the clipboard.
   b. Scroll to the new channel.
   c. Click on Edit, then select Paste or click the Paste button to copy all these parameters from the clipboard.

When naming channels, be sure to use consistent signal names in both the setup and vector editors. It is best to assign signal names to channels in the Setup Editor, and then only use signal names in the Vector Editor. Signal names may be up to six characters long, including any prefix.

You can assign prefixes to signal names for grouping purposes. All channels with the same prefix in the Signal Name field can be set as a group. For example, ADDR0 and ADDR1 are in the same group. ADDR0 and DATA0 are in different groups. The prefix may use up to five characters of the six characters allowed for the Signal Name.

9. To set a single parameter for all channels in a group, set the View field to Group, then set the parameter.

10. Click on Save As or Save in the menu bar to save your file in the *.set format.

NOTE*. When you transfer a setup file to the HFS 9000 Stimulus System, you will write over any active, preexisting setup parameters.*

11. To transfer your file(s) to the HFS 9000 Stimulus System, refer to the *Transfer a File to the HFS 9000 Stimulus System* procedure on page 3–19.

Create a New Vector File

When you create a new vector file, it can be useful to have the associated setup file opened. Bitwriter does not check the setup parameters or vector data that you enter. Complete the following steps to create a new Vector data file:

1. Click on File in the menu bar, then click on New.
   or
   Click the New Document (🗋) icon.
2. Click on Vector Data, then click the OK button.
3. You can change the table size for this vector file (that is, change the number of channels and/or number of vectors) from the default value for new files. To change the table size, click on Vectors in the menu bar, then on Table Size. The maximum number of channels is 36; the maximum number of vectors is 65,536. Set your Vector (row) and Channel (column) parameters. Click the OK button.
4. Enter your vector data.
   a. Click on Vectors, then Start Address to set the address of the first vector.

***NOTE**. The Start, Loop, and End addresses are available in only decimal format in the Setup Editor. In the Vector Data Editor, you may specify the vectors in decimal, octal, or hexadecimal radices. Be sure that the files you intend to use together refer to the same absolute Start and End addresses.*

---

   b. Click on Edit, then click on Vertical Entry or Horizontal Entry. Alternately, click on the vertical (⬇) or horizontal (➡) buttons. Data bits wrap automatically at the end of a line.
   c. Click on a single data bit then enter 1 or 0 in each succeeding horizontal or vertical bit.
   d. Select a block of data, channel(s), or vector row(s) then click on Edit or Fill and select the appropriate function.
   e. Click on Vectors, then Go To to move around the vector data file.
5. Click to select a vector. Click on Vectors, then Name Channels to assign a channel name or signal name to each channel.

6. Click on Save or Save As to save your file in either of the following formats:

- The .vca extension saves vector files in ASCII format. The ASCII format allows you to edit the file in any text editor. ASCII-formatted files transfer more slowly to the HFS 9000 Stimulus System than binary-formatted files.
- The .vcb extension saves vector files in binary format. The binary format cannot be edited in a text editor. Binary-formatted files transfer more quickly to the HFS 9000 Stimulus System than ASCII-formatted files.

NOTE. *When you transfer a vector file to the HFS 9000 Stimulus System, you will write over any data that already exists between the vector data Start Address plus the file length.*

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7. To transfer your file(s) to the HFS 9000 Stimulus System, refer to the *Transfer a File to the HFS 9000 Stimulus System* procedure on page 3–19.

Edit an Existing Setup File

When you edit an existing setup file, it can be useful to have the associated vector file opened. Bitwriter does not check the setup parameters or vector data that you enter. Complete the following steps to edit an existing setup file:

1. Open your file with one of the following methods:
   - Click on File in the menu bar, then click on Open. Click on the setup data file name, then click the OK button.
   - Click the File Open ( ) icon. Click on the setup data file name, then click the OK button.
   - To transfer the file from the HFS 9000 Stimulus System, click on Transfer in the menu bar, then HFS 9000 -> Editor.
2. Edit the time base setup parameters.

NOTE. *When using the Setup Editor, the Start, Loop, and End addresses are available in only decimal format. In the Vector Data Editor, you may specify the vectors in decimal, octal, or hexadecimal radices. Be sure that the files you intend to use together refer to the same absolute Start and End addresses.*

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3. Add channels if necessary. Click on Channels on the menu bar.
4. Select the alphanumeric channel identifier(s) that you will use for this application with the following methods:
   - Click the mouse pointer on a single channel.
   - Hold down the left mouse button, drag the mouse to highlight a group of contiguous channels, and release the button.
   - Click on the first channel, hold down the shift key, and then click on the last channel in a contiguous group of two or more channels.
   - Hold down the Control key and click on each channel in a non-contiguous group of channels.
   - Choose None to deselect all the channels.
5. When all the channels that you want to use are highlighted, click the OK button to confirm your selection(s) and return to the Setup Editor.
6. Edit the channel data parameters. The scroll bar for the channel data fields is located on the right-hand side of the channel fields.

7. Copy data from one channel to another as follows:

   a. Click on Edit, then select Copy or click the Copy button to copy all channel-specific parameters (except the Channel, Signal Name, View, and Chan Delay parameters) to the clipboard.

   b. Scroll to the new channel.

   c. Click on Edit, then select Paste or click the Paste button to copy all these parameters from the clipboard.

When naming channels, be sure to use consistent signal names in both the setup and vector editors. It is best to assign signal names to channels in the Setup Editor, and then only use signal names in the Vector Editor. Signal names may be up to six characters long, including any prefix.

You can assign prefixes to signal names for grouping purposes. All channels with the same prefix in the Signal Name field can be set as a group. For example, ADDR0 and ADDR1 are in the same group. ADDR0 and DATA0 are in different groups. The prefix may use up to five characters of the six characters allowed for the Signal Name.

8. To set a single parameter for all channels in a group, set the View field to Group, then set the parameter.

9. Click on Save as or Save in the menu bar to save your file in the *.set format.

NOTE. *When you transfer a setup file to the HFS 9000 Stimulus System, you will write over any active, preexisting setup parameters.*

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10. To transfer your file(s) to the HFS 9000 Stimulus System, refer to the *Transfer a File to the HFS 9000 Stimulus System* procedure on page 3–19.

Edit an Existing Vector File

When you edit an existing vector file, it can be useful to have the associated setup file opened. Bitwriter does not check the setup parameters or vector data that you enter. Complete the following steps to edit an existing vector data file:

1. Open your file using one of the following methods:

- Click on File in the menu bar, then click on Open. Click on the vector data file name, then click the OK button.
- Click the File Open ( ) icon. Click on the vector data file name, then click the OK button.
- To transfer the file from the HFS 9000 Stimulus System, click on Transfer in the menu bar, then HFS 9000 -> Editor.
- To import a file from another development system, the file must conform to the format specified in Appendix A. To import a vector file, click on File in the menu bar, then click on Import Vectors. Select the file name or indicate the path to the file at its name, then click the OK button.

2. You can change the table size for this vector file (that is, change the number of channels and/or number of vectors). To change the table size, click on Vectors in the menu bar, then on Table Size. The maximum number of channels is 36; the maximum number of vectors is 65,536. Set your Vector (row) and Channel (column) parameters. Click the OK button.

3. Edit your vector data using the following methods:

- Click on Vectors, then Start Address to set the address of the first vector.

NOTE. *When using the Setup Editor, the Start, Loop, and End addresses are available in only decimal format. In the Vector Data Editor, you may specify the vectors in decimal, octal, or hexadecimal radices. Be sure that the files you intend to use together refer to the same absolute Start and End addresses and Channel and Signal Names.*

- Click on Edit, then click on Vertical Entry or Horizontal Entry. Alternately, click on the vertical (⬇) or horizontal (➡) buttons. Data bits wrap automatically at the end of a line.
- Click on a single data bit in the vector data area, then enter 1 or 0 in each succeeding horizontal or vertical bit.
- Select a block of data, channel(s), or vector row(s), then click on Edit or Fill and select the appropriate function.
- Click on Vectors, then Go To to move around the vector data file.

4. Click on Save or Save As to save your file in either of the following formats:

   - The .vca extension saves vector files in ASCII format. The ASCII format allows you to edit the file in any text editor. ASCII-formatted files transfer more slowly to the HFS 9000 Stimulus System than binary-formatted files.
   - The .vcb extension saves vector files in binary format. The binary format cannot be edited in a text editor. Binary-formatted files transfer more quickly to the HFS 9000 Stimulus System than ASCII-formatted files.

5. To transfer your file(s) to the HFS 9000 Stimulus System, go to *Transfer a File to the HFS 9000 Stimulus System* on page 3–19.

***NOTE**. When you transfer a vector file to the HFS 9000 Stimulus System, you will write over any data that already exists between the vector data Start Address plus the file length.*

Transfer a File to the HFS 9000 Stimulus System

The setup and vector files are GPIB command files. You can transfer these files to the HFS 9000 Stimulus System with BitWriter or another GPIB application. BitWriter does not have to be running to transfer files.

Complete the following steps to transfer a setup or vectors from a file or BitWriter to the HFS 9000 Stimulus System:

1. Check the HFS 9000 Stimulus System pulse generator cards to verify that they are compatible with the parameters in the setup file and with the device under test.

CAUTION. *If the setup file, the HFS 9000 Stimulus System configuration, and the device under test are not compatible, the device under test can be damaged by improper voltage levels. When you transfer a setup file to the HFS 9000 Stimulus System, check the instrument to be sure it is compatible with your file and the device under test.*

2. Verify that the GPIB cable is connected between the HFS 9000 Stimulus System and your computer.
3. Turn on the HFS 9000 Stimulus System power.
4. Set the GPIB address.
   a. Click on GPIB on the menu bar.
   b. Click on Set Address, then enter the GPIB board number and the GPIB address.
   c. Click the OK button.
5. Check the GPIB interface.
   a. Click on GPIB on the menu bar, then Check GPIB.
   b. Click the Check GPIB button to verify that the GPIB interface is working properly.

Complete the following steps to transfer a setup or vector file to the HFS 9000 Stimulus System:

- Click on Transfer in the menu bar, then click on File –> HFS 9000.
- Select the file that you want to transfer.
- Click on the OK button.

Complete the following steps to transfer a working setup file from the Setup Editor to the HFS 9000 Stimulus System:

- Click on Transfer in the Setup Editor menu bar, then click on Setup –> HFS 9000.
- Click on the OK button.

Complete the following steps to transfer a working vector file from the Vector Editor to the HFS 9000 Stimulus System:

- Click on Transfer in the Vector Editor menu bar, then click on Vectors –> HFS 9000.
- Click on the OK button.

Appendices

Appendix A: File Formats

Importing Vector Files

Vector files can be imported from a development system to BitWriter for editing or conversion to a ASCII file (*.vca) or a binary file (*.vcb). The File Open dialog box contains the import information. You can edit the imported file without additional conversion. However, the imported file must conform to the sample import vector file shown in Figure A–1.

```
# This first record is the format record.
# B = binary, O = Octal, H = Hexadecimal
#
BBOOHHBOHBOHH
#
# The following records are data records.
#
0077FF07F07FF
0166EE16E16EE
1033A914C0289
1136E412810EE
0077FF07F07FF
1033A914C0289
1136E412810EE
0166EE16E16EE
```

Figure A–1: Example of an Imported File

HFS 9000 Stimulus System Command Files

Setup Editor files are saved and transferred in ASCII format. These files default to the .set extension.

Vector files are saved and can be transferred in either binary or ASCII format. The .vcb extension indicates a vector file in binary format. The .vca extension indicates a vector file in ASCII format.

Files in ASCII format can be edited in any on-line editor. These files transfer to the HFS 9000 Stimulus System more slowly than files in binary format.

Files in binary format cannot be edited in an on-line editor. These files transfer to the HFS 9000 Stimulus System more quickly than files in ASCII format. Figure A–2 shows the parts of the ASCII format as it may appear in an on-line editor.

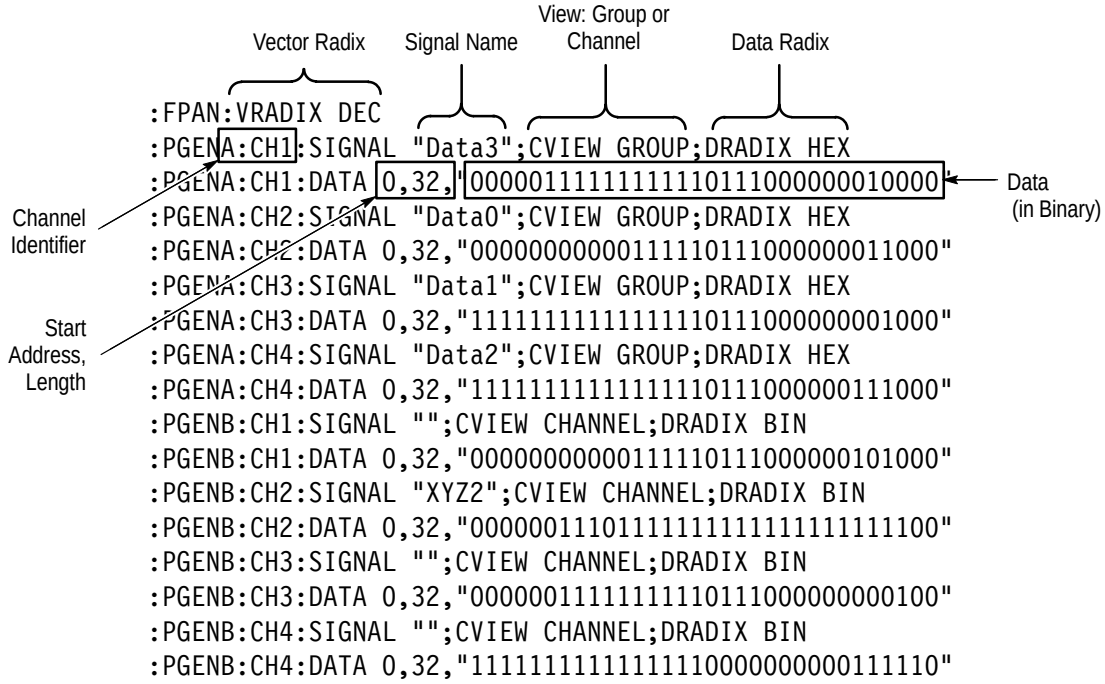

Figure A–2: Example of a .vca File

Appendix B: HFS 9000 Setup with Other Instruments

The HFS 9000 system can be part of a larger development, stimulus, and acquisition system. Connect the HFS 9000 system to a computer and other instruments through the GPIB interface as shown in Figures B–1 and B–2. Follow the GPIB conventions discussed in *Getting Started* on page 1–2 in this manual, the *HFS 9000 Stimulus System User Manual*, and the documentation supplied with the other instruments and the GPIB interface.

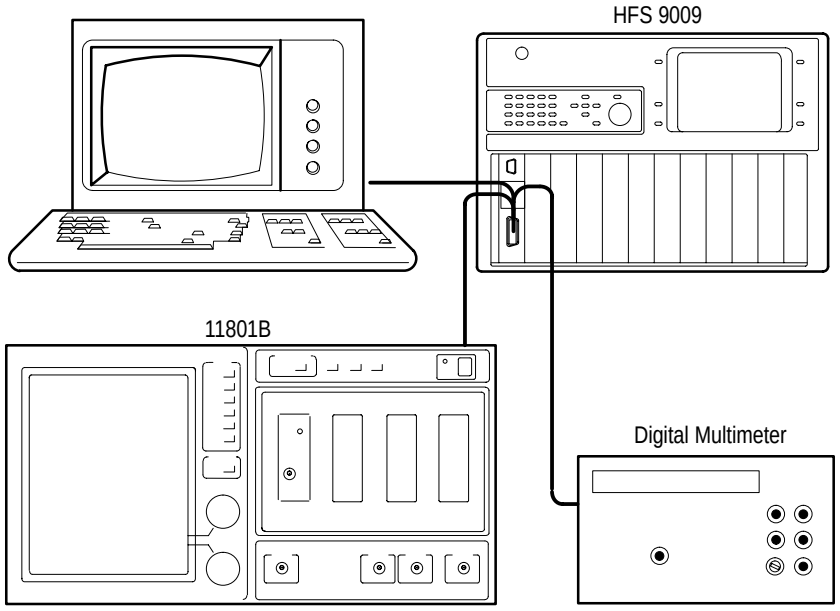

Figure B–1: The HFS 9000 System Connected to Other Instruments Through a GPIB Interface

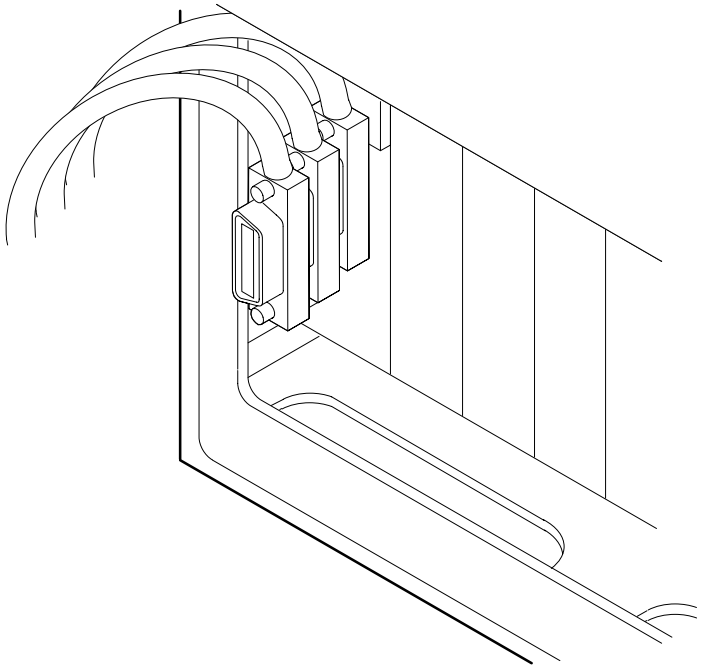

Figure B–2: Stacked GPIB Connectors

Appendix C: GPIB Boards Information

Three GPIB cards manufactured by National Instruments have been tested and approved for use with BitWriter.

Table C–1: Compatible GPIB Boards

Computer	GPIB Board	Software	Maximum Instruments Allowed in System
IBM PC AT and compatible	AT-GPIB	NI-488.2 for Windows Ver 2.1 or newer	13
IBM PC AT, PS/2 (Models 25 and 30) and compatible	GPIB-PCII/IIA	NI-488.2 for Windows Ver 2.1 or newer	14
IBM PS/2 and compatible with Micro-Channel plug-in slots	MC-GPIB	NI-488.2 for Windows Ver 2.1 or newer	14

Glossary and Index

Glossary

Channel Setup Parameters
The timing and voltage characteristics for each channel within a file. These may include rise and fall time, frequency, high and low voltage limits.

Click
To quickly press and release a mouse button, usually the left mouse button. The action places the cursor within the window or selects an option, such as from a menu.

Control-Menu Box
A small box in the upper left-hand corner of a Windows application. Click on this box for window options.

Dialog Box
A box that provides options or requests information. Many menu selections require additional information before completing an action.

Double-Click
To quickly press and release a mouse button twice in rapid succession. The action selects the default option from a menu, such as opening the file that the mouse is pointing to.

GPIB
IEEE Standard 488.2, the General Purpose Interface Bus. The communications protocol used by BitWriter to upload and download HFS 9000 system information.

Icon
A graphical representation of an application or file.

Main Module
The window that appears when no files are open. Only global commands are available.

Maximize Button
A button in the upper right-hand corner of the window with an up (▲) arrow. Click on this button to expand the window from half size to full size.

Menu Bar
The horizontal bar near the top of the window that contains all application menus.

Minimize Button
A button in the upper right-hand corner of the window with a down (▼) arrow. Click on this button to shrink the window from full size to half size to an icon.

Mode
A time base parameter that specifies how the HFS 9000 system generates all channel outputs. There are four modes:

Burst. A burst of pulses follows an externally generated trigger event

Auto Burst. A burst of pulses follows an HFS 9000 system-generated trigger event

Auto. A continuous train of pulses without a trigger event or startup delays

Trig Auto. A continuous train of pulses follows a trigger event

PhaseLockIn
The time base setup parameter that synchronizes the HFS 9000 system to an external timing source.

Setup Editor
The window that lets you select and set the time base and channel setup parameters.

Status Bar
The horizontal bar at the bottom of the window that displays information on the current status of the application.

Time Base Setup Parameters
The timing characteristics for all channels within a file. These include the system-wide parameters and the system input/output parameters.

Title Bar
The horizontal bar at the top of the window that contains the application software name and current file name.

Toolbar
The horizontal bar near the top of the window that contains the quick-select buttons.

Vector
The bit pattern for a single pulse window.

Vector Editor
The window that lets you set the stimulus data pattern.

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