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CHAPTER 2
CONFIGURATION

This chapter describes the factory default configuration for the PCVISION*plus* and how to alter jumper settings for each of the following reconfigurable options:

- Memory base address
- Register base address
- Video source synchronization
- Video output connections
- Master/slave operation (true color operation)
- Memory map configuration

Read this chapter to make sure the board is configured for the intended application. This chapter does not describe converting from 60 Hz to 50 Hz operation. Contact the Customer Response Center for instructions and components needed.

2.1 USING THE FACTORY CONFIGURATION

The PCVISION*plus* is set at the factory as follows:

- The memory base address is set to A0000H.
- The register base address is set to 300H.
- Synchronization is stripped from a composite input video signal at Video Input 1 or 2.
- A composite video signal is output on the green channel.
- The memory is configured for dual–store mapping for the 10 MHz boards (512 pixels per line), and single–store for the 12.5 MHz version.

Table 2-1. Factory Default, PFGPLUS-512-3-60/50-AT

Jumper	Position	Function
J1	C	Strip vertical off external
J2	C	Strip synchronization from external
J3	In	Green channel synchronization output
J4	A	Internal synchronization
J5	B	Memory map dual-store
J6	In	Master
J7	In	Memory base address
J8	Out	A0000H
J9	Out	
J11	Out	Register base address
J12	Out	300H
J13	In	
J14	In	
J15	In	
J17	In	
J18	A	Memory map dual-store
J20	In	AT host
J36	B	Synchronization off video input

Figure 2-1 illustrates the meaning of "jumper position" in this manual.

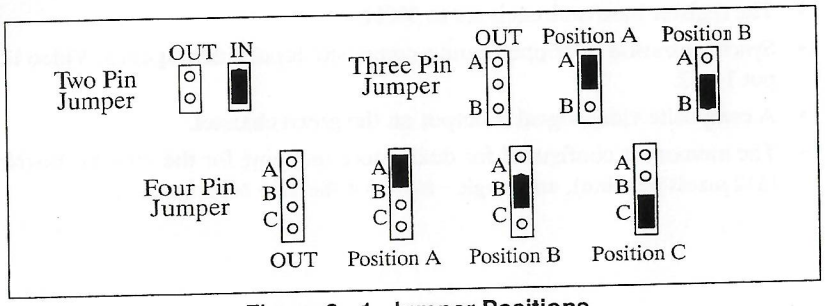


Figure 2-1. Jumper Positions

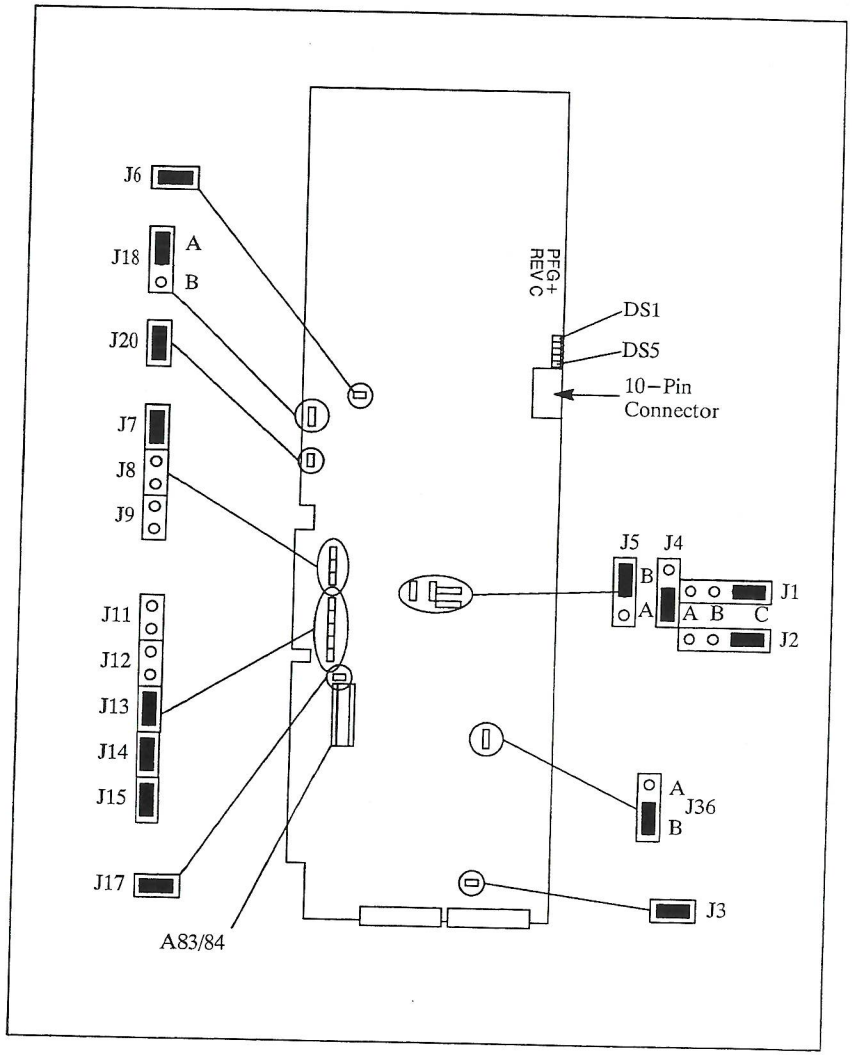


Figure 2–2. Jumper Locations, PFGPLUS–512–3–60/50–AT

Table 2-2. Factory Default, PFGPLUS-640-3-60-AT

Jumper	Position	Function
J1	C	Strip vertical off external
J2	C	Strip synchronization from external
J3	In	Green channel synchronization output
J4	A	Internal synchronization
J5	A	Memory map single-store
J6	In	Master
J7	In	Memory base address
J8	Out	A0000H
J9	Out	
J11	Out	Register base address
J12	Out	300H
J13	In	
J14	In	
J15	In	
J17	In	
J18	B	Memory map single-store
J20	In	AT host
J36	B	Synchronization off video input

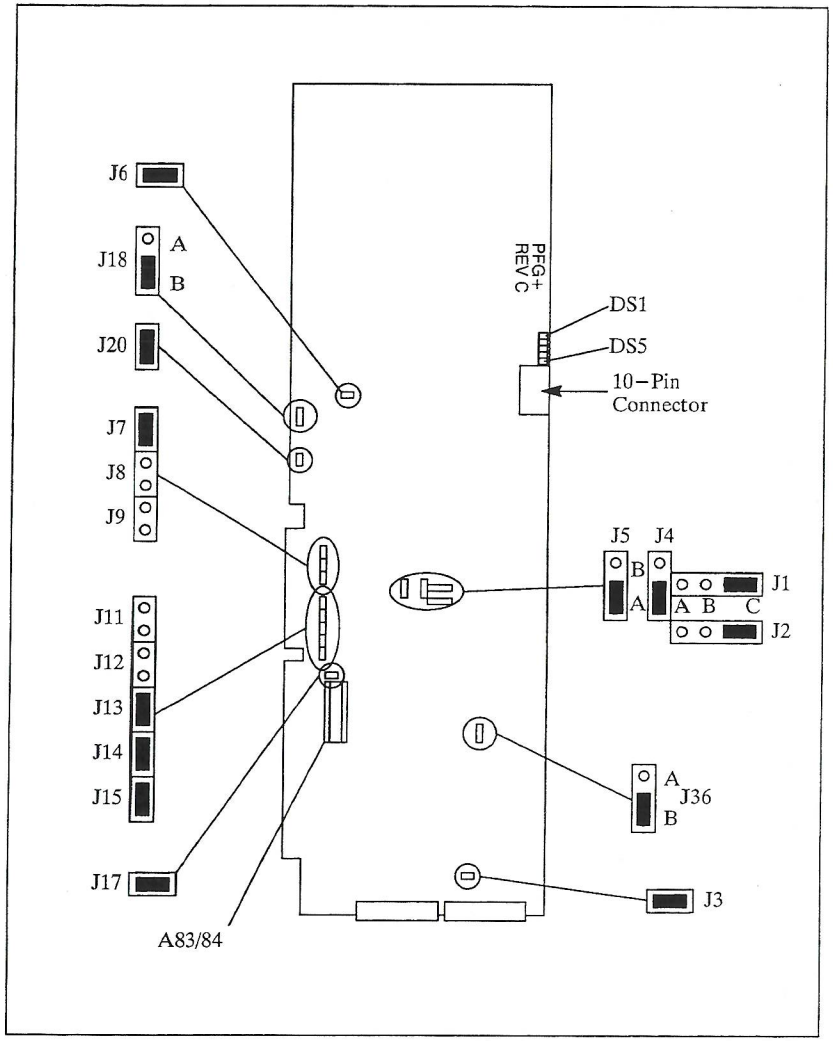


Figure 2–3. Jumper Locations, PFGPLUS–640–3–60–AT

2.2 COMPATIBILITY CONSIDERATIONS

Although the PC AT and compatibles come in different configurations, the typical minimum configuration is:

- 640 kilobyte Memory (640K)
- Hard Disk Drive and/or Floppy Disk Drive
- Monochrome or Color Console Monitor
- CGA-type or Monochrome Video Card
- Serial/Parallel Port

Refer to the following address information for the allowable PCVISION*plus* Frame Grabber memory and register base addresses if the PC AT or compatible has additional options.

Additional PC Options	Usable Memory Base Address	Usable Register Base Address
128K (total 640K) Memory	A0000H	300H
EGA Card and 128 kilobytes	D0000H*	300H
Virtual Disk (any amount)	D0000H*	300H
Network Card and 128 kilobytes	A0000H	340H
Network Card, EGA Card, 128 kilobytes	D0000H*	340H
Hercules (monochrome) Card	A0000H	300H

* Use the memory address C0000H instead of D0000H if the PC AT system ROM is mapped at D0000H. Do not use E0000H and F0000H for memory addresses. System ROM is mapped at those addresses.

The PC AT's Enhanced Graphics Adapter (EGA) reserves memory address space from A0000H to BFFFFH. Change the default address of the PCVISION*plus* Frame Grabber (to D0000H or higher). The PC AT Color Graphic Adapter (CGA) and Professional Graphics Adapter (PGA) reserve address space from B0000H to BFFFFH and are compatible with the factory configured PCVISION*plus* Frame Grabber address.

2.3 MEMORY BASE ADDRESS

The PCVISION*plus* Frame Grabber requires a single contiguous block of 64K bytes in the memory space of the IBM PC. The PCVISION*plus* contains 1/2

megabyte of frame memory. Only 1/8 of the frame memory is accessible at one time. Individual blocks of the frame memory are mapped into this space under software control. Five jumpers are used to select the memory base address, as shown in Table 2–3.

The memory base address is configured at the factory at address A0000H. The 64K address range from A0000H through AFFFFH is reserved for the PCVISION*plus* Frame Grabber. Do not allow any other memory or peripherals to use the area reserved for the PCVISION*plus* Frame Grabber.

Table 2–3. Memory Base Address

	Jumpers				Memory Base
	J20	**J9**	**J8**	**J7**	**Address (Hex)**
IBM PC and XT					
	Out	Out	Out	Out	90000H
(factory)	**Out**	**Out**	**Out**	**In**	**A0000H**
	Out	Out	In	Out	C0000H
	Out	Out	In	In	D0000H
IBM Personal Computer AT					
	In	Out	Out	Out	90000H
(factory)	**In**	**Out**	**Out**	**In**	**A0000H**
	In	Out	In	Out	C0000H
	In	Out	In	In	D0000H

All other combinations are reserved.

2.4 REGISTER BASE ADDRESS

The PCVISION*plus* Frame Grabber requires a block of 16 bytes in the I/O address space of the IBM PC for its registers. The twelve control registers are I/O mapped beginning at the register base address. Each register appears at an offset from this address. Address lines A3–A0 decode the offset. The functions of the PCVISION*plus* Frame Grabber are controlled by writing to these registers. Chapter 5 of this manual details the use of these registers. Use jumpers to select the register base address as shown in Table 2–4. Remove J14 to make the register base address 340H.

Table 2–4. Register Base Address (Factory Configuration)

Address Line	Address (Hex)	Address (Binary)	Jumper	State In/Out
(MSB) A11	3	0	N/A	
A10		0	N/A	
A9		1	**J11**	Out
A8		1	**J12**	Out
A7	0	0	**J13**	In
A6		0	**J14**	In
A5		0	**J15**	In
A4		0	**J17**	In
A3	0	*	N/A	
A2		*	N/A	
A1		*	N/A	
(LSB) A0		*	N/A	

N/A Not applicable: no jumper associated with this address line

* Address lines A3–0 decode offset to specific registers

2.5 VIDEO SOURCE SYNCHRONIZATION

The PCVISION*plus* Frame Grabber can be configured in many ways to achieve synchronization with the video source. This section describes the configurations most commonly used. Figure 2–4 illustrates the function of the jumpers. Cable references appear in parenthesis.

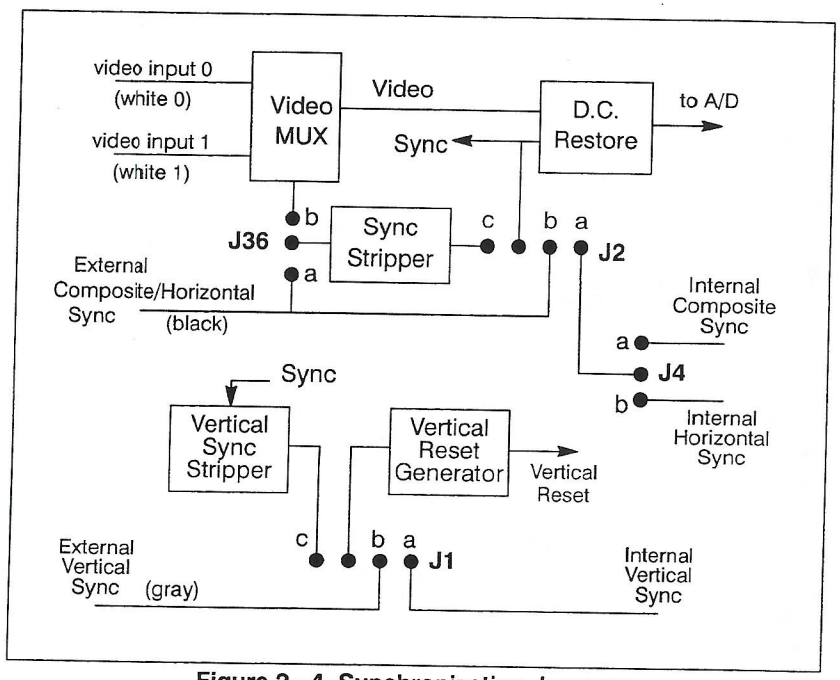


Figure 2–4. Synchronization Jumpers

The PCVISION*plus* Frame Grabber accepts the following from the video source:

- Composite video
- Separate video and composite synchronization (Requires optional synchronization cable)
- Separate video, and vertical and horizontal syncs (Requires optional synchronization cable)

The PCVISION*plus* Frame Grabber drives the video source with:

- Composite synchronization (TTL) (Requires optional synchronization cable)
- Separate vertical and horizontal syncs (TTL) (Requires optional synchronization cable)

If you do not have synchronization after configuring the PCVISION*plus* Frame Grabber, contact our Customer Service Department.

2.5.1 Accepting Synchronization from the Video Source

There are three modes of synchronization that allow the PCVISION*plus* Frame Grabber to accept synchronization from the video source. They are described in the following sections. To use phase–locked loop (PLL) synchronization, you must explicitly set (1) the CLOCK bit in the Acquire/Status Register (described in Chapter 5.)

2.5.1.1 Stripping Synchronization from Composite Video (Factory Configuration)

If the video source outputs standard RS–170/330 or CCIR composite video, the PCVISION*plus* Frame Grabber strips synchronization off of the video signal. Figure 2–2 shows what the board looks like for this configuration. The jumpers for this configuration are installed as follows:

Jumper	Position
J1	C
J2	C
J4	N/A
J36	B

In this configuration, the following input connections are used:

Cable	Signal
White	RS–170/330 composite video inputs, one on each cable (labeled 0 and 1)

The cables are identified by colored tapes or bands located next to the BNC connectors.

2.5.1.2 Separate Video and Composite Synchronization (non–TTL)

If the video source provides a composite synchronization that is separate from the video information, you must configure the PCVISION*plus* Frame Grabber as shown below. In this configuration, the synchronization signal by–passes the video multiplexer and is input directly to the synchronization stripper. This jumper configuration is used for standard RS–170/330 or NTSC signals. In this mode, the optional synchronization cable must be used.

Jumper	State
J1	C
J2	C
J4	N/A
J36	A

In this configuration, the following two input connections are used:

Cable	Signal
White	Video inputs, one on each cable, (labeled 0 and 1)
Black*	Composite synchronization input, RS–170/330 levels

* Found on optional synchronization cable.

2.5.1.3 Separate Video and Composite Synchronization (TTL)

If the video source provides a composite synchronization that is separate from the video information, you must configure the PCVISION*plus* Frame Grabber as shown below. The composite synchronization must be a TTL–level signal with active–low synchronization pulses. In this configuration, the synchronization

stripper is not used and composite synchronization is input directly into the DC restoration logic. In this mode, the optional synchronization cable must be used.

Jumper	State
J1	C
J2	B
J4	N/A
J36	Out

In this configuration, the following two input connections are used:

Cable	Signal
White	Video inputs, one on each cable, (labeled 0 and 1)
Black*	Composite synchronization input (TTL)

* Found on optional synchronization cable.

2.5.1.4 Separate Video, and Horizontal and Vertical Syncs (TTL)

In this configuration, the video source provides separate horizontal and vertical synchronization signals in addition to the video signal. Both horizontal and vertical synchronization must be TTL-level signals with active-low synchronization pulses. This mode also requires the optional synchronization cable. The jumpers for this configuration are installed as follows:

Jumper	State
J1	B
J2	B
J4	N/A
J36	Out

In this configuration, the following three input connection cables are used:

Cable	Signal
Gray*	Vertical synchronization input (TTL)
White	Video inputs, one on each cable, (labeled 0 and 1)
Black*	Horizontal synchronization input (TTL)

* Found on optional synchronization cable.

2.5.2 Driving the Video Source (TTL)

The PCVISION*plus* Frame Grabber drives the video source with synchronization information in two possible modes. When using these modes, software must initialize the board at start–up to use the internal crystal (CLOCK bit.) All synchronization signals output from the PCVISION*plus* Frame Grabber are TTL–level signals with active–low synchronization pulses. The optional synchronization cable is required in both of these modes.

2.5.2.1 Driving the Video Source with Composite Synchronization

In this mode, all timing is internally generated on the PCVISION*plus* Frame Grabber. The black connection becomes an output and is used to drive the video source with composite sync. The following jumpers are installed:

Jumper	State
J1	Out
J2	A and B (wire–wrap)
J4	A
J36	Out



The cable connections must be as follows:

Cable	Signal
White	Video inputs, one on each cable, (labeled 0 and 1)
Black*	Composite synchronization output (TTL)

* Found on optional synchronization cable.

2.5.2.2 Driving the Video Source with Horizontal and Vertical Syncs (TTL)

In this mode, the PCVISION*plus* Frame Grabber drives the video source with both horizontal and vertical syncs. The internal horizontal synchronization signal is connected to the BNC cable labeled with a black band, and the internal vertical synchronization is connected to the gray labeled cable. The jumpers necessary for this configuration are summarized below.

Jumper	State
J1	A
J2	A and B (wire-wrap) 
J4	B
J36	Out

The following cable connections are used:

Cable	Signal
White	Video inputs, one on each cable, (labeled 0 and 1)
Gray*	Vertical synchronization output (TTL)
Black*	Horizontal synchronization output (TTL)

* Found on optional synchronization cable.

2.6 VIDEO OUTPUT CONNECTIONS

There are five output connections available from the PCVISION*plus* Frame Grabber to the display monitor, as follows:

Color	Function
Gray*	Vertical synchronization (TTL)
Black*	Horizontal synchronization (TTL or EIA)
Brown*	Composite monitor synchronization (TTL)
Red	Red video output signal
Green	Green or monochrome video output signal with optional synchronization
Blue	Blue video output signal

* Found on optional synchronization cable.

2.7 SYNCHRONIZING THE DISPLAY MONITOR

The PCVISION*plus* Frame Grabber can drive the display monitor with synchronization information in two modes. The monitor can receive synchronization information on the green video channel, or accept separate synchronization inputs. All synchronization signals are TTL–level active–low pulses. Composite synchronization is always available on the optional brown cable. A jumper is necessary to make synchronization available on the green channel. This jumper is installed at the factory.

2.7.1 Composite Video

Jumper	State	Synchronization
J3	In	Composite synchronization available on GREEN connector (factory configuration)
J3	Out	No synchronization on green channel, use brown and gray cables

2.7.2 Separate Composite Synchronization

Composite synchronization is always available to the monitor on the BROWN connector.

2.7.3 Separate Vertical and Horizontal Synchronization

The black cable functions as the horizontal drive for the monitor, and is not available for the camera unless you provide a BNC Tee connector.

Jumper	State	Synchronization
J1	A	Vertical synchronization available on GRAY connector
J4	B	Select internal horizontal
J2	A	Connect internal horizontal to BLACK connector

2.8 MASTER/SLAVE OPERATION

The master/slave jumpers are only applicable in a system composed of multiple PCVISION*plus* Frame Grabbers being used in synchronization, as in true color applications. In this situation, one PCVISION*plus* Frame Grabber is a master, and the other two are slaves. The master and slaves are specially calibrated at the factory. Consult the price list or contact a sales representative for special ordering codes for these board sets. The jumper configuration on the slave boards is given below:

Jumper	State
J6	Out
J1	Out
J2	A to B (wire–wrap)
J4	A
J36	Out



2.9 FACTORY CONFIGURATION FOR TRUE COLOR SYSTEMS

Three PCVISION*plus* Frame Grabbers are required for true color image processing. When using this mode of operation, you must place each of the three at a different Register Base Address. The frame memory of each board is mapped into the same Memory Base Address. Configure one board as a master and the other two as slaves. This factory default configuration detailed in Table 2–5 is assumed by the software described in Chapter 6.

Table 2–5. Factory Color System

Board	Color	Master/ Slave	Register Base	Memory Base
0	Green	Master	300H	A0000H
1	Red	Slave	340H	A0000H
2	Blue	Slave	360H	A0000H

2.10 MEMORY MAP CONFIGURATION

Two hardware selectable memory–mapping schemes are available. The 10 MHz scanning version of the PCVISION*plus* Frame Grabber is factory configured for dual–store mapping (as shown in Figure 2–5), and the 12.5 MHz version is factory configured for single–store mapping, (as shown in Figure 2–6). In addition to moving jumpers, there is an IC chip that must be relocated. For dual–store, this chip is in location A83, the upper position. To change mapping, the chip must be removed, and replaced in location A84, the lower position. The two locations overlap. Refer to Figure 2–2 or 2–3 for the location of this IC. The mapping is independent of the scanning rate, and is reconfigured as follows:

	J5	J18	IC A83/84
Dual–Store Mapping	B	A	Location A83
Single–Store Mapping	A	B	Location A84

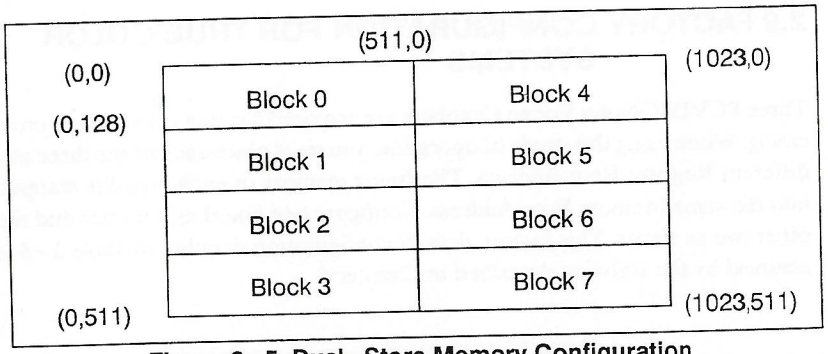


Figure 2-5. Dual-Store Memory Configuration

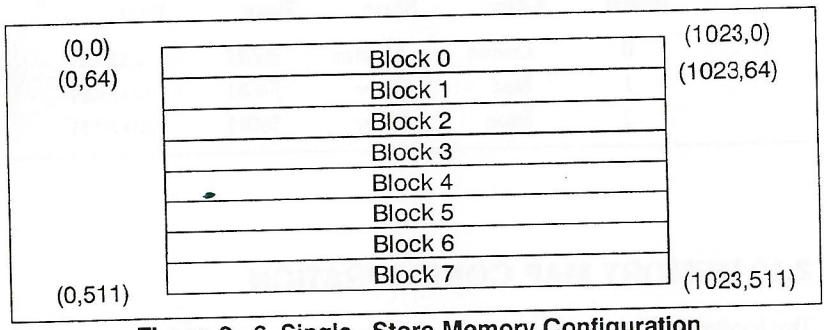


Figure 2-6. Single-Store Memory Configuration

NOTE

Some ITEX functions, like copy_area and warp functions require the single-store configuration.

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