Accu-Setup for AccuVision

Software Manual for Version 4.0

COMPATIBLE WITH VISIONCUBE DIMENSIONING
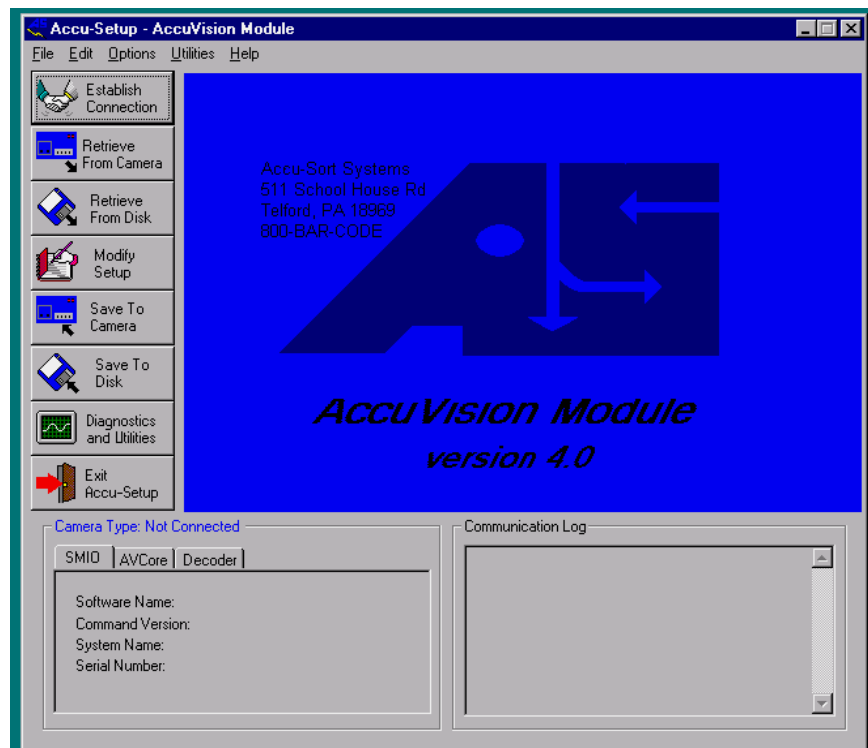
INTRODUCTION

This is the ***Accu-Setup for AccuVision Software Manual Version 4.0***.
It provides details on everything you need to operate the setup software provided
with your **AccuVision System**.

MANUAL NOTE BOXES

The following note boxes are used throughout this software manual to assist the
reader in finding and understanding many useful details regarding the **Accu-
Setup for AccuVision** software program.

> This note box is used to identify important **WARNINGS** and **CAUTIONS** regarding the
> use of certain procedures and functions available in Accu-Setup. In many cases,
> these WARNINGS and CAUTIONS advise you that use of a given function may
> adversely affect system performance or may require the assistance of an Accu-Sort
> trained and authorized technician.

> This note box is used throughout the manual to identify supplementary information
> important to the current topic. Important information, cross-references, and useful
> tips are contained in these note boxes throughout the manual.

MANUAL REVISION CONTROL

The ***Accu-Setup for AccuVision Software Manual Version 4.0*** is under revision
control. Any addenda or other documents associated with this manual are under
separate revision controls. A revision number is changed by 0.1 whenever
technical information is changed or added to a document. Any revision less than
1.0 is automatically considered preliminary. Any document with a revision 1.0 or
greater has been officially released by the Accu-Sort Systems ECN process. The
document **Revision History** can be found in **Appendix F** located in **Chapter 6**
of this manual.

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You have received, along with your Accu-Sort product, a copy of ***Accu-Setup for AccuVision***. This software is available for use on as many PCs as you require. You may have received a copy of Accu-Setup that can be used with your network and can be made available to all network users. Or, you may have received a single user version of Accu-Setup. Feel free to have this software in use by as many users as necessary or copy this program to as many PCs as you require.

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Accu-Sort Systems, inc.

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Hatfield, PA 19440	Telford, PA 18969	Hatfield, PA 19440

Phone: (215) 723-0981
1-800-BAR-CODE

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Table of Contents ▼

Chapter One
Introduction

Chapter Two
Button Menu

Chapter Three
Modify Setup

Chapter Four
Diagnostics and Utilities

Chapter Five
Drop-down Menus

Chapter Six
Appendices

Table of Figures   ▼

| Chapter One | ▼ | *Contents* |

Introducing Accu-Setup for AccuVision

CHAPTER 1: INTRODUCING ACCU-SETUP FOR ACCUVISION

Welcome to **Accu-Setup for AccuVision**, the Windows®-based program used to configure your **AccuVision Camera Systems**. It is the primary user interface to set up, monitor, and diagnose the operations of your AccuVision System. Accu-Setup also enables you to modify the operating parameters of your AccuVision System to accommodate any changes you may need to make in the future.
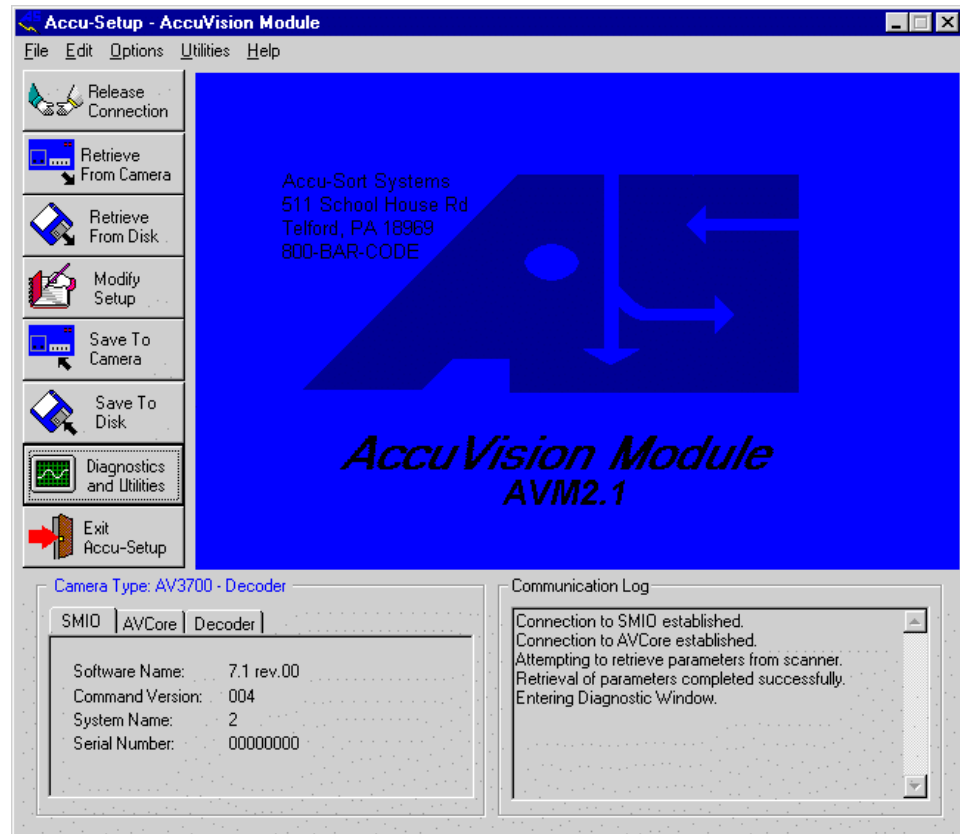
AccuVision: Accu-Setup Main Window (AVM4.0)

When Accu-Setup is launched, the **Accu-Setup Main Window** is displayed as shown above. There are several **drop-down menus** and a **button bar menu** available from the Accu-Setup Main Window as well as two **information windows, Camera Type** and **Communication Log**.

Before learning more about the Accu-Setup software, it is important to have a basic knowledge of the various components that are included in your AccuVision System. This background information will enable you to better understand how Accu-Setup works within your system.

> **NOTE:** It is not the intent of the _**Accu-Setup for AccuVision Software Manual**_ to cover any details specific to the camera, illumination, decoder, and other components of your AccuVision system. For further details on the components used in your system, please refer to the manuals provided with your system.

THE ACCUVISION SYSTEM

The **AccuVision System** incorporates a set of hardware modules (also referred to as the AccuVision system) that are utilized, along with the AccuVision software, to track packages through a scanning area while imaging and processing data from the surfaces of the packages.

What sets AccuVision Systems apart from other scanning systems is the use of a camera (i.e.: lens and single-line CCD sensor array) instead of a low-power laser, to image and decode bar code symbologies. While AccuVision Systems can be used in nearly all decoding applications to improve read rates at higher speeds, they are primarily used in applications where two-dimensional symbologies cannot be accurately decoded with a traditional laser scanner.

ACCUVISION APPLICATIONS

In addition to reading 2D symbologies, an AccuVision System can be used in a variety of imaging and decoding applications. For example: Data from the AccuVision System may be used for the sortation and routing of product. This data is also made available for transmission to a host computer.

Applications	Description
Image-Only	The AccuVision system is used to capture only images of the packages. These images are then sent to a peripheral for further processing.
Decoding	An AccuVision system is used to detect and decode valid bar code symbologies located on packages that pass through the scanning area.
Imaging & Decoding	AccuVision is used to both capture images and decode valid bar code symbologies detected on packages.
Tunnel	Two or more AccuVision cameras are clustered around the scanning area to detect bar codes from several package surfaces simultaneously.
OCR	Optical Character Recognition
VES	Video Encoding System

ACCUVISION HARDWARE COMPONENTS

All **AccuVision Systems** consist of three basic components: a camera, a light source (illumination), and a decoder as illustrated in the following block diagram.
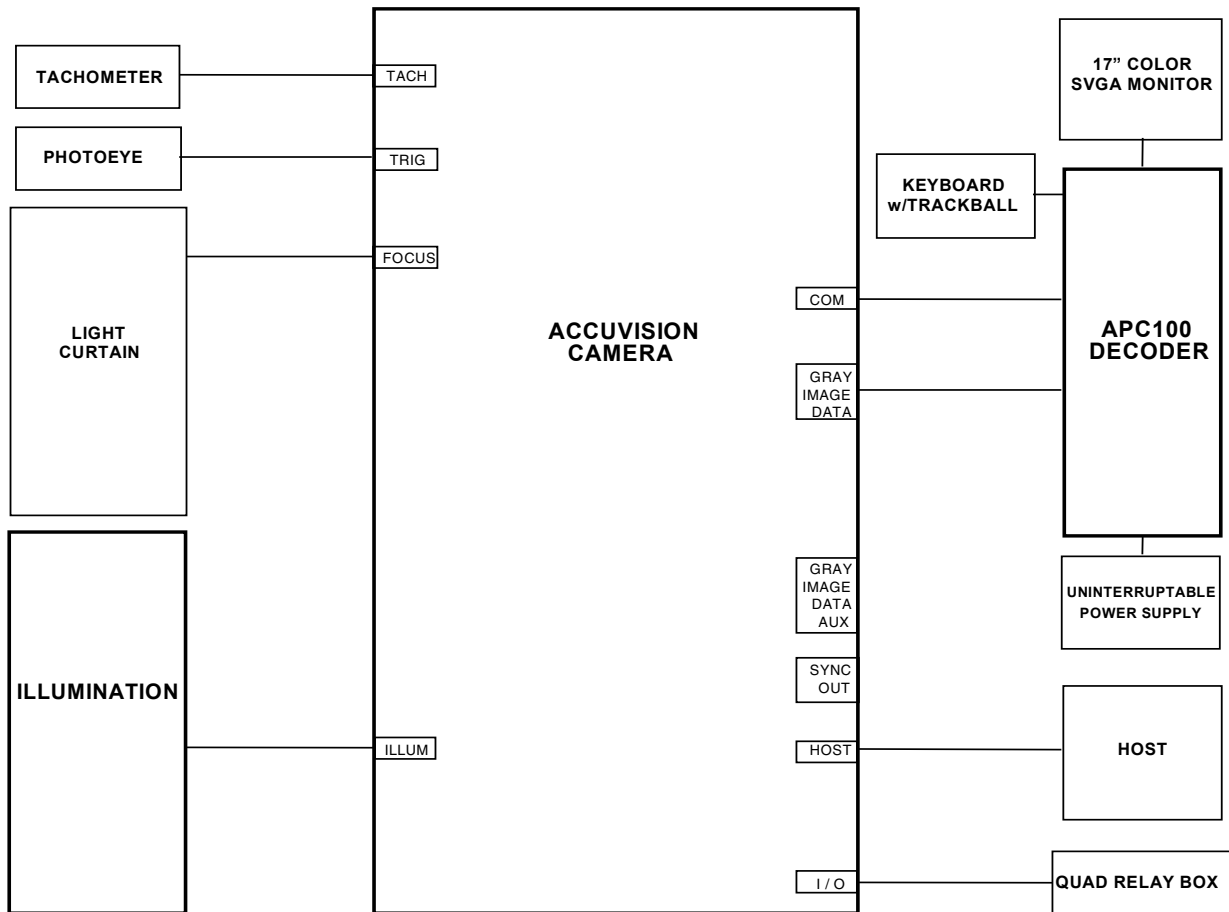
AccuVision System Block Diagram

The primary function of the basic AccuVision components is imaging and decoding. As the block diagram illustrates, an AccuVision System may include several additional hardware components. Your application requirements define the hardware configuration used for your system.

Hardware	Description
Camera	Also referred to as the imaging module, the camera is an integrated imaging system that incorporates a camera head, Smart Input/Output (SMIO) interface, and power supply. The camera also includes either a fixed-position or dynamically adjustable focusing mechanism.
Illumination	This device provides the lighting needed to adequately illuminate the scanning area where packages are imaged. Some cameras use a self-contained illumination source while others use an illumination module that is separate from the camera. The light source is either sodium or LED.
Trigger	This device is used to identify the presence of a package within the scanning area. The majority of applications use either a light curtain or photoeye as the trigger. When a light curtain is used, it also performs the focusing function.
Focusing	In applications where package sizes vary, typically a light curtain is used to detect the variations in package height as they enter the scanning area. (Also see Dimensioning option.)
Tracking	This device is used to monitor the travel of packages as they move through the scanning area. Either a tachometer or a signal from the transport is used or the camera is set up internally to handle tracking.
Decoder	Image data from the camera is sent to the decoder for analysis and decoding. Resident on the decoder are the Accu-Setup, AVCore, SMIO Talk, AVCHI, and Decode Engine software modules.
Monitor/Keyboard (optional)	This option is used, in conjunction with the decoder, to set-up, view, modify, and troubleshoot the AccuVision system using Accu-Setup.
Dimensioning (optional)	This optional approach is used instead of a light curtain trigger to provide more complete dimensioning information to the AccuVision system. Depending on the application, either VisionCube dimensioning software or a DM-3000 dimensioning unit may be used.
Quad Relay Box (optional)	This optional component is used to control the interface between up to four digital outputs from the camera and the external devices they are controlling (e.g.: alarms, diverters, etc.).

ACCUVISION SOFTWARE COMPONENTS

An AccuVision system also utilizes the AccuVision Suite of software. In most applications, all five software applications reside on the Accu-Sort APC100 Decoder. This manual covers the ***Accu-Setup for AccuVision Software version 4.0***.

Software	Description
Accu-Setup	The Windows®-based primary user interface that provides all the necessary functions to set up, monitor, and diagnose the operations of an AccuVision System.
AVCore	The main WindowsNT®-based application running on the decoder that provides a program interface for the decoder as well as advanced image collection and diagnostics. Additionally, AVCore contains multiple threads for real-time data movement and time critical processing.
AVCHI	The AccuVision Custom Host Interface (AVCHI) is a customer-specific application designed to provide a customized interface for systems utilizing a host computer. AVCHI provides all communications between the AccuVision system and host, including the formatting and transmission of messages and responses to host commands.
SMIO Talk	A WindowsNT® application that provides a TCP/IP communication interface from the camera's SMIO to the outside world. Enables multiple external processes to occur simultaneously. AVCore, Accu-Setup, and AVCHI communicate with the camera through SMIO Talk.
Decode Engine	The Decode Engine analyzes the image data and decodes valid bar codes based on the symbology parameters defined using Accu-Setup. All data from the Decode Engine is provided to AVCore for the necessary handling through AVCHI to the host computer or other customer-supplied device.

HOW ACCUVISION WORKS

The process starts when a light curtain or photoeye detects the leading edge of a package. Using transport speed information the camera tracks the package to the scan line. If the camera includes dynamic focusing, the focal point of the camera is adjusted to match the distance from the surface of the package.

As the package passes through the scan line (i.e.: the area imaged by the CCD sensor array) the reflected light from the surface is collected by the camera lens and focused on the CCD array. The array is a single line of photosites (commonly called pixels) that convert the light energy into electrical energy. The electrical signals are processed into gray scale image data, which is transmitted out the camera's **GRAY IMAGE DATA** port. Optional binary image data can be provided simultaneously over the same gray data port by adding a binary board to your system. The camera transmits height and speed information out a serial port.

The **AccuVision Camera,** also known as an imaging module, is positioned in a designated scanning area along the path of package travel. Camera(s) and their associated illumination modules are set up to read images from predetermined surface(s) of the packages. Where images must be read from more than one package surface, more than one camera may be used in what is called a **tunnel configuration**.

> **NOTE**: The camera used by your AccuVision System is identified in the **Camera Type** information window of the **Accu-Setup Main Window** when a connection with the camera is established. The AccuVision cameras that are compatible with your version of Accu-Setup are identified in the **Compatibility List** found in the **Help** drop-down menu. (See **Chapter 5** for details.)

The **camera head** (located inside the camera module) contains:
- the lens,
- auto-focusing optics, and
- a single-line CCD sensor array.

While the imaging module is referred to as a camera, it does not create images by taking "snapshots" of packages. Instead, the linear CCD sensor array uses a single scan line to build images, line-by-line, as packages move through the scanning area. For this reason, the speed at which a package travels through the scanning area must be consistent to assure proper imaging and/or decoding takes place. (For details, see *How Images Are Acquired* on *page 1-10.*)

The **illumination module** (connected to the camera's **ILLUM** port, unless self-contained within the camera) is the light source that is used to illuminate the packages to be imaged. While laser scanners rely on reflected laser light to perform the scanning process, cameras utilize either a line of LEDs or sodium lamp(s) as the light source for this task, depending on the depth of field required by the application. (For additional details, see the manual for your illumination module.)

Tracking of packages through the scanning area is of particular importance to an AccuVision system since the camera is dependent on consistent travel speeds in order to assure accurate imaging and/or decoding. In applications where the

conveyor may vary in speed or may be stopped and started frequently, a hardware tachometer is physically mounted to the conveyor and connected to the camera through the **TACH** port of the camera. (A direct signal from the transport may also be used for tracking.) If the conveyor is running at stable and regular speed with little chance of variation, a software tach is used, as programmed through Accu-Setup.

A **trigger** device provides package detection, alerting the AccuVision system when and where packages enter the scanning area. The trigger device being used varies depending on the application. In applications with a limited depth of field a photoeye is often used and is connected to the **TRIG** port of the camera. When a larger depth of field is needed, a light curtain is used to provide not only a trigger to identify the package presence but also to define the height of package. The light curtain, connected to the camera's **FOCUS** port, uses a series of emitters and receivers, positioned 0.25 inches apart, to provide package height information to the camera so it can dynamically focus its optics.

The relationship of the camera, illumination module, and trigger mechanism (either light curtain or photoeye) to the conveyor and direction of package travel are illustrated in the *AccuVision Scanning Area Diagram*.
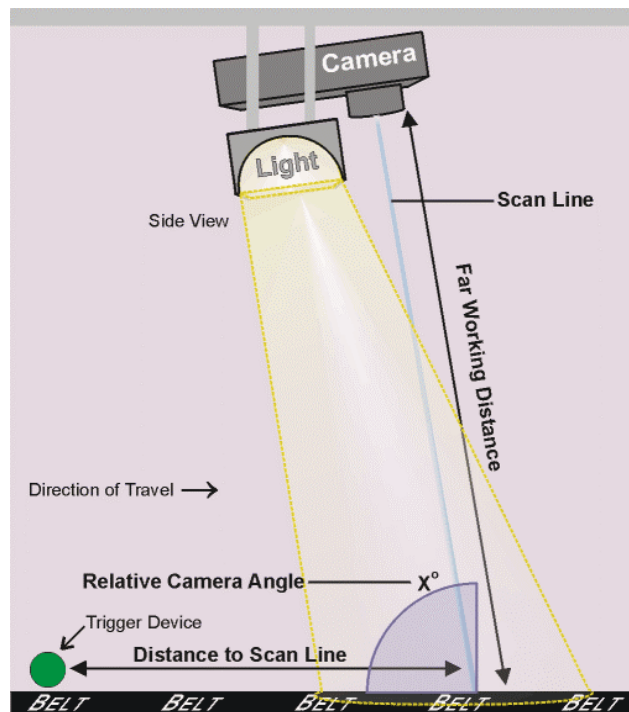
AccuVision Scanning Area Diagram (Side View)

> **NOTE**: In the *AccuVision Scanning Area Diagram*, DPI (Dots Per Inch) refers to the resolution of the camera at the far working distance. The camera optics disperses the scan line as the distance from the camera increases. Information about the camera head can be used to determine the DPI, minimum/maximum optical distances, and the DPI at those distances. For these details, see **About Camera Head** in the **Help** drop-down menu. (See **Chapter 5**.)

The gray data and package data are sent to the AccuVision APC100 Decoder Module (or other customer-supplied peripheral). Accu-Sort's decode software analyzes this image data to locate and decode bar code symbols on the surface of the package.

The decoded data is then available for other applications. Typically, this data would be transmitted via a serial port or an Ethernet connection to a sorter control system or to an inventory control database (or both).

The AccuVision camera is set up for **either fixed focus or dynamic focusing**. A fixed focus is used to image packages that are all the same height. The internal camera optics are set at a fixed focal point so it remains focused at the same height (within 0.50 inch). Dynamic focusing is used when package heights vary. The internal camera optics adjust their focal point based on parameters defined within Accu-Setup and physical package detection provided by the light curtain or dimensioning system.

The **Smart I/O (SMIO),** is located in the camera and is considered the AccuVision control center. All physical interconnections between the camera, other AccuVision modules, and the outside world occur through the SMIO. The SMIO is a single-board computer that provides real-time control of the illumination, package detection, and package tracking, while monitoring the operation of the system, controlling imaging, and handling all communications with the Accu-Setup user interface and the host computer.

The **Accu-Sort Decoder** (APC100), performs all pattern recognition functions to identify any data imaged by the camera that may be valid bar code symbologies. As shown in the *AccuVision Functional Block Diagram*, the decoder contains the AVCore, Accu-Setup, AVCHI, SMIO Talk, and Decode Engine software modules. The decode engine utilizes the majority of the decoder resources. Accu-Setup is accessed through a host network connection to the AccuVision System or by a remote PC connected to the Decoder.

Either the **VisionCube dimensioning software** or an **Accu-Sort Dimensioning System** (DM-3000) is used with an AccuVision System when imaging several sides of packages, as in a **tunnel configuration** when several cameras are used to image the top, bottom, front, and sides of products. The DM-3000 is mounted over the conveyor and uses a solid state laser diode and linear CCD array to provide width and height data to the AccuVision cameras. A tachometer and photoeye combination (separate from that used by the AccuVision System) is used to measure the length of packages and determine package orientation on the conveyor.

The following functional block diagram illustrates how the AccuVision hardware is interconnected and how the software handles data between the hardware and software components.
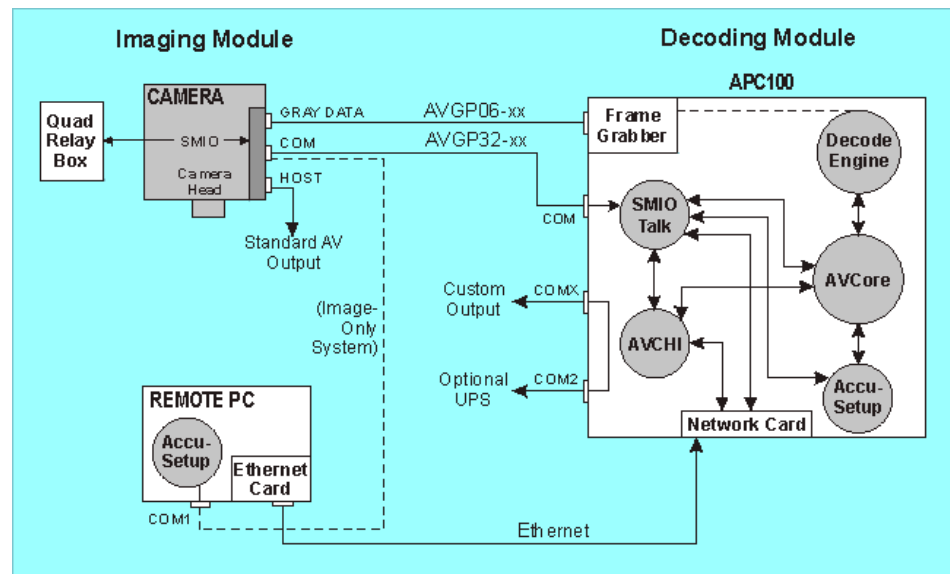
AccuVision Functional Block Diagram

HOW IMAGES ARE ACQUIRED

The camera is either preset at a fixed focus or is dynamically focused to compensate for variations in distance between the camera and packages in response to the signal from the light curtain or dimensioning system. When dynamically focused, the focus response time is ≤ 70 milliseconds.

The light reflected from the package is collected through the lens of the camera and focused onto the linear CCD sensor array.

When a 2-tap (i.e.: 2-channel) configuration is used, the light value for all odd numbered pixels (starting with pixel 1) are buffered through one channel while the light values from the even numbered pixels (starting at pixel 2) are buffered through the second channel. (See the illustration below, *Image Acquisition - 2 Channels*.)
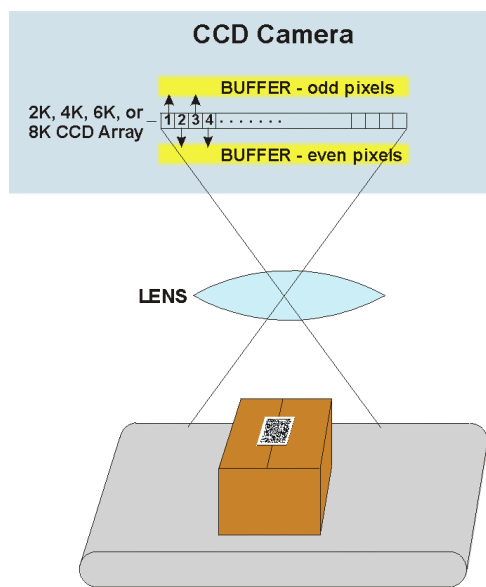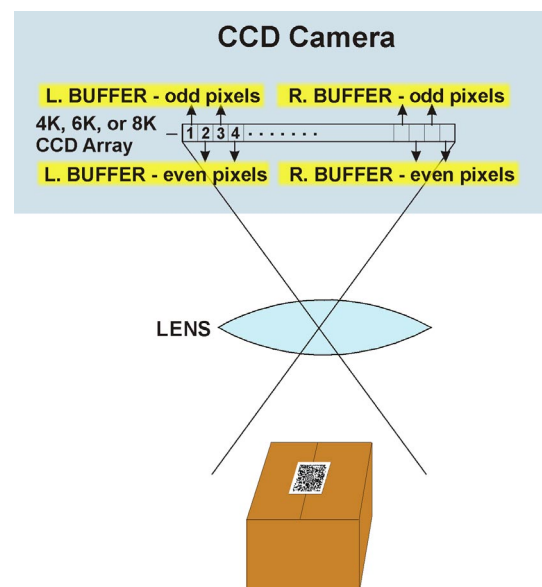
Image Acquisition – 2 Channels   *Image Acquisition – 4 Channel*

Lines per inch (LPI) defines the number of scan lines that the camera is required to generate per inch of conveyor travel. The ***scan line frequency*** *(also referred to as scan line rate)* represents the speed at which the camera needs to "clock" data out of the array to meet the required LPI. For example: A camera that has a 100 LPI requirement running at 500 FPM needs a scan line rate of 10,000 scans/second. If 100 LPI is required at 250 FPM, a scan line rate of 5,000 scans/second is required.

When a 4-tap (i.e.: 4-channel, 25MHz/channel) configuration is used, the scan line rate is approximately doubled. (See the illustration above, *Image Acquisition - 4 Channels*.) This is accomplished because the light values are buffered into even and odd buffers starting with both the left and right side of the array simultaneously.

The linear CCD sensor array converts the reflected light energy into an analog voltage. The analog information is then processed by the Decode Engine.

HOW IMAGES ARE PROCESSED

AccuVision Systems being used for image capture and processing convert gray scale data into binary image data on the SMIO. An example gray scale image and binary image are provided below. This data is output through the **GRAY IMAGE DATA** port on the camera. Each pixel's data is 8 bits (7 most significant bits are gray data and the last significant bit is binary image data, either 0 for black or 1 for white). This process is not required for bar code reading.

Gray Scale Data Image   *Binary Data Image*
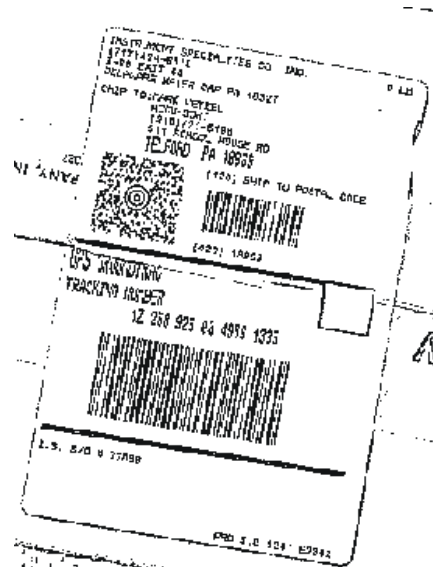
✌	**NOTE**: Additional details on the **GRAY IMAGE DATA** port (including mechanical and electrical interfaces) are available from Accu-Sort. Contact your customer service representative for more information on the document ***AccuVision Real Time Imaging Systems Camera Output Specifications***.

GETTING TO KNOW ACCU-SETUP

INFORMATION WINDOWS ON MAIN WINDOW

There are two information windows at the bottom of the **Accu-Setup Main Window** that provide basic information about your AccuVision: The **Camera Type** and **Communications Log** information windows.

Accu-Setup for AccuVision Main Window (AVM4.0)

Camera Type

The **Camera Type** information window identifies the type of camera used by the system and whether the system is **Image Only** or **Decoder** based. There are three tabs available in the Camera Type Window: **SMIO**, **AVCore**, and **Decoder**.

> **NOTE**: The information in all three tabs is useful for diagnostic purposes. Please have all Accu-Setup Main Window tab information available before contacting Accu-Sort customer service regarding your AccuVision System.

SMIO Tab

The SMIO (Smart I/O) is responsible for basic system control and internal/external data and communications interfaces. It provides real time gain and offset correction of raw pixel data from the sensor board.
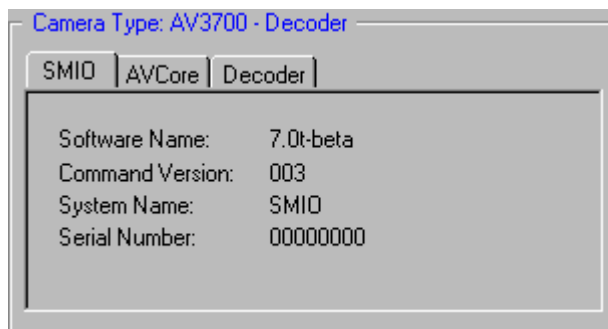
Camera Type Information Window – SMIO Tab

The **SMIO tab** provides the following details:

Tab Item	Description
Software Name	Version of SMIO software the system is currently running.
Command Version	Version of Accu-Setup SMIO command file.
System Name	User-definable name. For more information about entering a system name, or to change the name, see **Useful Tip** below.
Serial Number	Factory-set camera serial number. For more information, see **Useful Tip** below.

> **USEFUL TIP**: It is recommended that your camera have a descriptive name entered for **System Name**. This is especially important in systems with multiple cameras (e.g.: tunnel applications). Use a concise yet descriptive System Name, for example: *Camera1/Lane1* or *Camera1/TopRead*. To define the system name, use **Modify Camera Name and Serial Number** found in the **Utilities drop-down menu** for more information. (Go to **Chapter 5**.)

AVCore Tab

AVCore, a Windows NT® application, is the software interface between the decoder and camera. AVCore also provides TCP/IP communication interface from the SMIO to the outside world as well as advanced diagnostics and image collection.
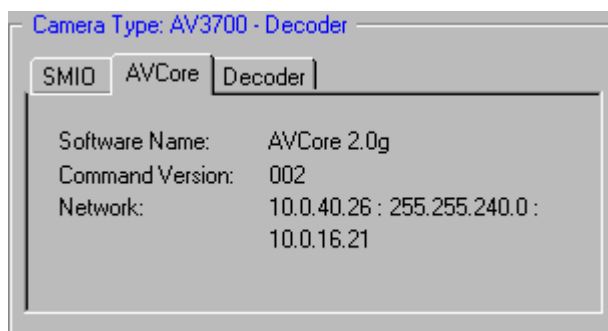
Camera Type Information Window - AVCore Tab

The **AVCore tab** provides the following details:

Tab Item	Description
Software Name	Version of AVCore software the system is currently running.
Command Version	Version of AVCore software command file currently running.
Network	Information about the camera IP address, Gateway address, and Netmask options if your system is connected to a network. In the example of the Camera Type Information Window - AVCore Tab, the IP address is 10.0.40.26, the Gateway address is 10.0.16.21, and the Netmask is 255.255.240.0. (For additional details on these settings, see **Modify Setup / Communication Tab / Advanced** in **Chapter 3**.)

NOTE: This tab will be blank if the system is not using a Decoder.

Decoder Tab

The decoder is responsible for locating and decoding bar codes from the data supplied by the camera through the SMIO. Decoded bar code data is processed through AVCore, which is also resident in the decoder.
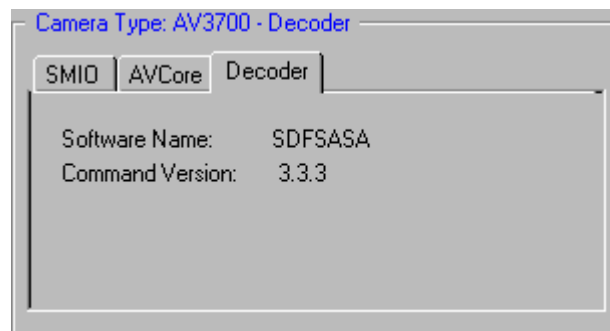
Camera Type Information Window – Decoder Tab

The **Decoder tab** provides the following details:

Tab Item	Description
Software Name	Name and version of the decoder software the system is using.
Command Version	Version of the decoder command file the system is currently using to communicate with the camera.

NOTE: This tab will be blank if the system is not using a Decoder.

Communication Log

The **Communication Log** information window on the Accu-Setup Main
Window shows a real-time scrolling list of messages about the status of the
AccuVision current operations. Additionally, any Accu-Setup functions
performed by the user are displayed along with any related responses from the
AccuVision system.
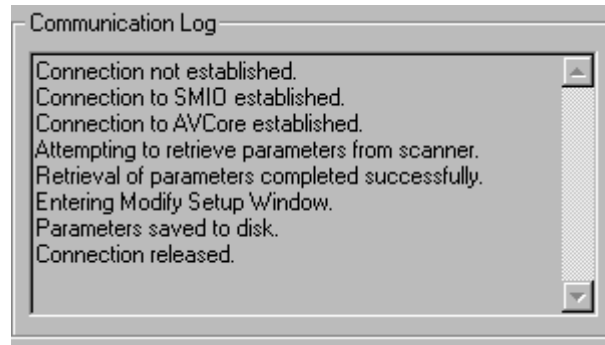
Communication Log

BUTTON MENU

Accu-Setup provides the following **Button Menu** selections from the *Accu-Setup Main Window*:

> **NOTE**: The following functions are also available from the drop-down menus provided across the top of the Accu-Setup Main Window: Retrieve from Camera, Retrieve from Disk, Save to Camera, Save to Disk, and Diagnostics and Utilities.
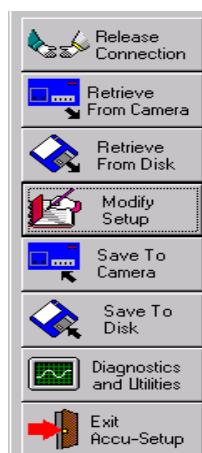
Button Menu

Button Menu	Description
Establish Connection	A toggle button that is used to establish and release connections to your camera(s).
Retrieve From Camera	Used to retrieve the current set of parameters being used by the camera connected to Accu-Setup.
Retrieve From Disk	Used to retrieve a set of parameters that have been stored to disk.
Modify Setup	Provides access to a series of 12 tabs that enables you to setup or modify these parameters: Symbologies, Communications, Trigger, Tracking, Imaging, Decoder Diagnostics, Package Management Diagnostics, Logging, Outputs, Tunnel, Decoder Display / Power Mgmt, and Dimensioning. (See **Chapter 3**.)
Save To Camera	Used to save a set of parameters to the camera connected to Accu-Setup, enabling the camera to operate using these parameters.
Save To Disk	Used to save a set of parameters to disk as a backup copy of the parameters that have been saved to camera.
Diagnostics and Utilities	Provides access to a series of eight diagnostic and utilities tabs including: System Status, SMIO Com, Decoder Monitor, Trigger, Imaging, Logging, Package History, and Outputs. (See **Chapter 4**.)
Exit Accu-Setup	Used to exit the Accu-Setup program after releasing a connection to a camera.

> **NOTE:** Details on the various selections available from the **Button Menu** are provided in **Chapter 2**. All **Modify Setup** functions are covered in **Chapter 3**. The **Diagnostics and Utilities** functions are outlined in **Chapter 4**.

DROP-DOWN MENUS

The Accu-Setup Main Window provides the following drop-down menus located across the top of the screen.

Accu-Setup Drop-down Menu Selections

Drop-down Menus	Description
File	Offers a series of options including: Compare, Retrieve From Camera, Retrieve From Disk, Save To Camera, Save To Disk, and Exit. Most of these functions are also available from the **Button Menu**.
Edit	Provides the option to save or restore a backup of the parameters by using either Create Backup File or Recover From Backup File. The **Modify Setup** functions (also available from the **Button Menu**) can also be accessed from the **E**dit **Menu**.
Options	Offers four options: Auto Backup, Auto Retrieve, Display Values in US Format, and Display Values in Metric Format.
Utilities	Offers eight utilities: Recover from Backup File, View Changes, Diagnostics and Utilities, Modify Gain Table, Modify Focus Table, Modify Camera Name and Serial Number, Smart Illumination Setup and Diagnostics, and Reboot Decoder. The **Diagnostics and Utilities** are also available from the **Button Menu.**
Help	This menu provides access to Accu-Setup online help through the Contents and Search functions. In addition, four functions enable you to get additional information: About Accu-Setup, About Camera, About Camera Head, and a Compatibility List.

Details on the various selections available from these drop-down menus are provided in **Chapter 5** of this manual.

ACCU-SETUP: ONLINE HELP

In addition to the ***Accu-Setup for AccuVision Software Manual***, you can also use online help when you need more information on using the many features of Accu-Setup.

Online help is accessed through the **Help Drop-down Menu** at the top of the **Accu-Setup Main Window** or when using the **Help** button located on any of the Accu-Setup window tabs. (For details, see **Chapter 5**.)

When selecting **Contents** from the **Help Drop-down Menu**, the Accu-Setup Online Help Home screen is displayed.
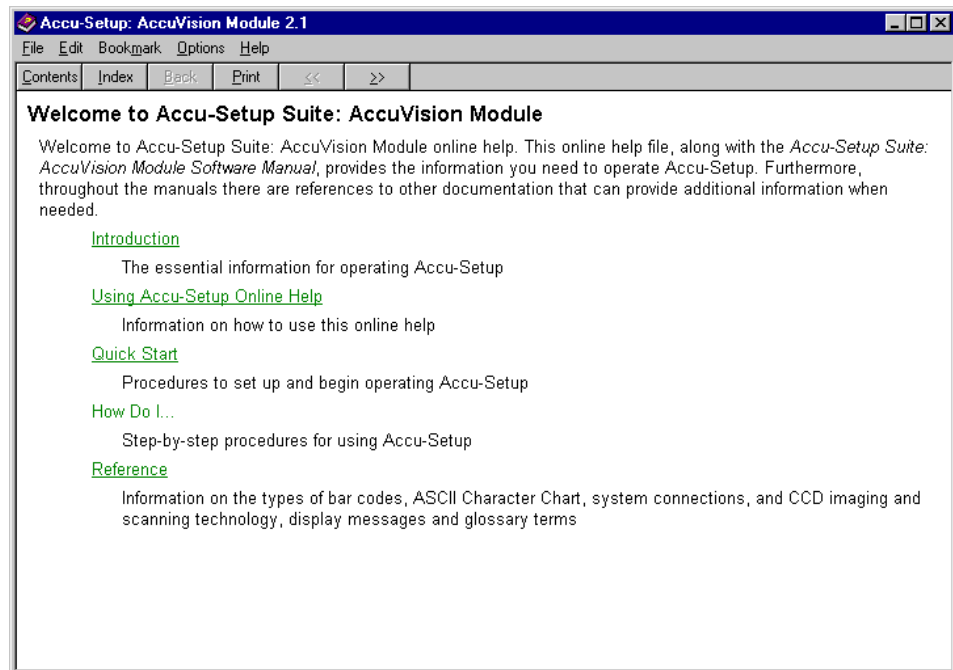
Accu-Setup Online Help Home Screen

Online help is structured to make information easy to find. Explanations of all Accu-Setup parameters are clearly defined. Through the use of the **Contents** and **Search** functions, you will be able to easily navigate through the wealth of information of the various features of Accu-Setup and your AccuVision System.

ACCUVISION SETUP SOFTWARE OPTIONS

WHAT WE DO PRIOR TO SHIPMENT

When your AccuVision system is manufactured and tested here at Accu-Sort, we use Accu-Setup to preset all of the system parameters to specifications provided for your AccuVision application. Therefore, although the ***Accu-Setup for AccuVision Software Manual*** provides details on the various parameters that can be set-up or modified, the majority of these parameters should not be altered in any way without first consulting an Accu-Sort customer service representative.

> ⚠ **CAUTION:** Be advised that arbitrary changes to your system parameters may seriously affect system performance. Adhere to all cautions and warnings regarding any parameter modifications made via the setup software, especially those requiring the assistance of an Accu-Sort trained and authorized technician. Training on the AccuVision hardware and software are available from Accu-Sort.

ACCU-SETUP FOR ACCUVISION

Accu-Setup for AccuVision is the Windows®-based program used by Accu-Sort to configure your system. It is the primary user interface to set up, monitor, and diagnose the operation of your AccuVision System. Accu-Setup also enables you to modify the operating parameters to accommodate any changes you may need to make in the future. You may use Accu-Setup, which is resident on the APC100 Decoder Module, via the optional monitor and keyboard or by loading it onto a PC or host computer connected to the system.

> ☞ **NOTE:** The **Accu-Setup for AccuVision** software provides an intuitive graphical user interface that includes several key function buttons, a series of drop-down menus, as well as the **Modify Setup** tabs and **Diagnostic and Utilities** tabs. The program's features are outlined in the document you are now reading.

ACCUVISION SMIO COMMANDS

The ***AccuVision SMIO Commands*** software may also be used to configure, monitor, or diagnose the operation of your system. The **SMIO Commands** are designed to work with a WYSE terminal or any PC with WYSE terminal emulation software (e.g.: ProComm Plus). Unlike the user-friendly user interface of **Accu-Setup for AccuVision**, the **SMIO Commands** use ASCII text characters to enter the commands/data.

> ☞ **NOTE:** The **SMIO Commands** provide a series of setup, diagnostics, and troubleshooting commands that can be used by entering ASCII characters. For details, reference the ***AccuVision SMIO Commands Manual***.

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| Chapter Two | ▼ | *Contents* |

Button Menu

CHAPTER 2: BUTTON MENU

The **Button Menu,** located on the main window of Accu-Setup, provides you with access to the various programmable parameters and diagnostic features of your AccuVision camera system.
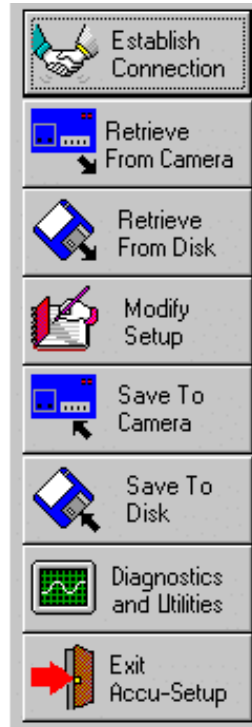
Button Menu Segment of Accu-Setup Main Window

NOTE: Several button menu functions are also available from the drop-down menus provided across the top of the Accu-Setup Main Window.

1) **Retrieve from Camera, Retrieve from Disk, Save to Camera, Save to Disk**, and **Exit** are also available from the **File** drop-down menu.
2) **Modify Setup** is also found in the **Edit** drop-down menu.
3) **Diagnostics and Utilities** can also be accessed from the **Utilities** drop-down menu.

ESTABLISH/RELEASE CONNECTION

The **Establish/Release Connection** button is used to establish and release the communications connection between Accu-Setup and your AccuVision camera. Before attempting to establish a connection, be sure that all the necessary hardware cable connections have been completed. (Details on these connections can be found in the reference manuals supplied with your equipment.)

Accu-Setup communicates with the AccuVision camera over a network or locally (decoder-to-camera via SMIO Talk and AVCore), depending on your application. The Accu-Setup communications connection with a camera is made using the **Establish Connection** button and the associated **System Connection** screen.

Establishing or Releasing a Camera Connection

The Establish/Release button on the Accu-Setup Main Window is a toggle button. If Accu-Setup is not connected to a camera, the button displays **Establish Connection**.

Establish Connection Button

When connected to a camera, **Release Connection** is displayed.

Release Connection Button

If the **Establish Connection** button is displayed, click on it to establish a connection to the camera. The **System Connection** window opens when a connection between Accu-Setup and a camera is established.
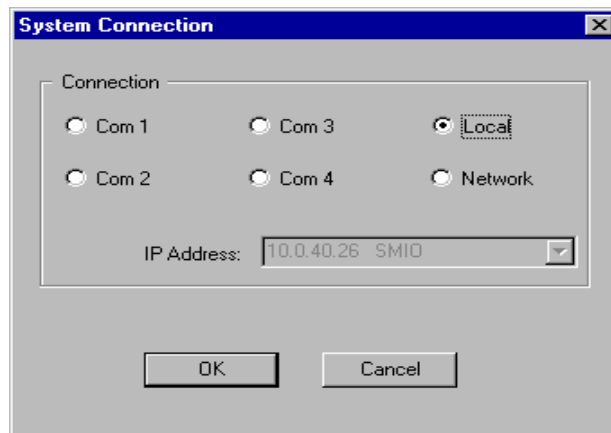
System Connection Window

From the **System Connection** window, select the required connections as outlined in the table below.

Connection	Description
Com 1-4	Enables serial connection between the decoder running Accu-Setup and the camera's SMIO port. Com1-4 are used in Image Only systems and do not work with Accu-Setup prior to version 2.0x.
Local	Indicates Accu-Setup is running on an Accu-Sort decoder communicating directly with the camera. The connection is made internally to SMIO Talk and AVCore.
Network	Indicates the connection to camera is established using the TCP/IP network. When using a network connection, it is necessary to enter a network address in the **IP Address** field.
IP Address	The network address of camera. Contact your network administrator for additional information on the camera IP address.

Once the **System Connection** is selected, click the **OK** button to establish a connection or **Cancel** to return to the Accu-Setup Main Window.

Once a connection is made, the toggle button displays **Release Connection**, the appropriate connection messages appear in the Communications Log, and the Camera Type information window of Accu-Setup's Main Window displays information in the SMIO, AVCore, and Decoder tabs.

Established/Released Connections and Communications Log

All established and released camera connection messages are displayed in the **Communication Log** of Accu-Setup's Main Window.
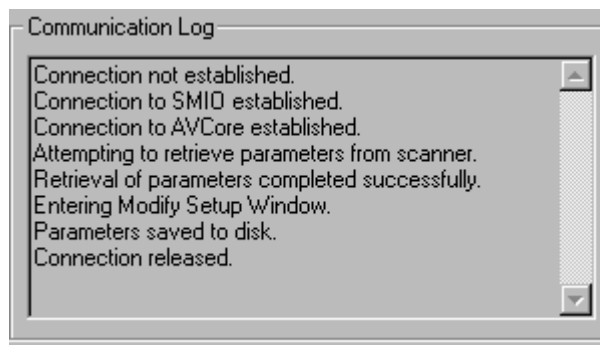
Example Communication Log of Accu-Setup Main Window

> **IMPORTANT:** Remember to use the **Release Connection** button before attempting to establishing a connection to another camera or exiting Accu-Setup.

Alert Message: Could Not Connect Camera via Network

If you are attempting to *connect to a camera via a network* and a connection is not made, an alert message is displayed.
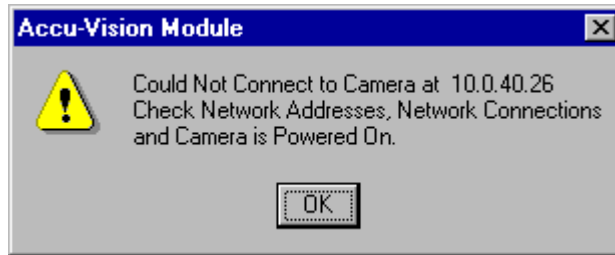
Alert Message - Could Not Connect Camera via Network

You should check the following:

- the camera is powered on,
- a physical interconnection is made between camera and network, and
- network address you are using is correct.

Alert Message: Could Not Connect Camera Locally

If you are attempting to *connect to a camera locally* and a connection is not made, an alert message is displayed.

Alert Message - Could Not Connect Camera Locally

You should check the following:

- the camera is powered on, and
- a physical interconnection is made between camera and decoder.

Alert Message: Lost Connection to Camera

If you *lose an established connection with a camera*, an alert message is displayed.

Alert Message – Lost Connection to Camera

You should check the following:

- the camera is powered on,
- a physical interconnection is made between camera and decoder, and
- release and re-establish the connection using the **Establish/Release Connection** button.

> **IMPORTANT:** If you have difficulty establishing a camera connection with Accu-Setup, reference the troubleshooting section of the Operations Manual. Remember that it is recommended to routinely use the **Release Connection** button before attempting to establish a connection to another camera.

RETRIEVE FROM CAMERA

Selecting the **Retrieve from Camera** function retrieves current parameters from the camera with which Accu-Setup has established communications. (This function also found in the **File** drop-down menu.)

Retrieve from Camera Button

> **IMPORTANT:** The **Retrieve from Camera** option is only accessible if a communication link has been established with the camera. The **Communication Log** field shows the condition of the communication link.

To retrieve setup parameters from the camera:

Step 1: Click on the **Retrieve from Camera** button or select this function from the **File** drop-down menu.

Step 2: Accu-Setup sends a message requesting the camera's current settings. While the parameters are being retrieved from the camera, the following messages are displayed along with the percentage of the parameters retrieved:

Retrieve SMIO Parameters
Retrieve Decoder Parameters

Step 3: Once all parameters are retrieved from the camera, the **Retrieve Parameters** window is opened and a message is displayed indicating Accu-Setup has been automatically updated to match the camera settings.

Retrieve Parameters Window

It is recommended that both the original settings and any changes be stored to a disk file in case you need to return the camera to a previous configuration. *(See Save to Disk on page 2-12.)*

RETRIEVE FROM DISK

Selecting the **Retrieve from Disk** function enables you to restore camera settings from a disk file that contains a copy of previously stored camera parameters. (This function is also found in the **File** drop-down menu.)

Retrieve from Disk Button

To retrieve setup parameters from disk:
Step 1: Selecting the **Retrieve from Disk** function opens a standard Windows **Open** file window.

Open File Window

Step 2: Locate the **Values** folder where the parameters are stored. (The **Open** file window should automatically default to the Values folder.)
Step 3: Click on the appropriate ***.VAL** file name.
Step 4: Click **Open** or press the <**Alt**><**O**> key.

Once parameters are retrieved, Accu-Setup is automatically updated to match the retrieved settings. To update the camera with the file you have retrieved, use the **Save to Camera** button. (See **Save to Camera** on page 2-11 for details.)

Parameters can be retrieved from disk only after they have been saved to disk. It is recommended that any changes be stored to a disk file, in case you need to return a camera to a previous configuration. (See **Save to Disk** for details.) The parameters are stored in files with a ***.VAL** extension.

> **IMPORTANT TIP:** It is good practice to store any ***.VAL** files in the Values folder of the Accu-Setup directory so that they can be easily located.

MODIFY SETUP

The **Modify Setup** button provides access to all the programmable operating parameters of the AccuVision camera system via the Modify Setup Window. (This function is also found in the **Edit** drop-down menu.)

Modify Setup Button

When **Modify Setup** is selected, the **Symbologies** tab is automatically displayed.

Modify Setup Window – Symbologies Tab

The modifiable parameters are organized into groups identified by 12 tabs across the top of the screen. Click on a tab to display the parameters that can be setup or modified from within that tab. The **Modify Setup** tabs and a brief description of each are provided in the following table.

Modify Setup Tabs	Tab Descriptions
Symbologies	Provides all settable bar code parameters including: the types of bar codes your system will decode, the sequence in which they are sent to the host, the minimum/maximum length, symbology options, postal symbology options, and advanced decoder options.
Communications	Used to define all communications parameters with the camera, decoder, and host including the baud rate, parity, data bits, stop bits, and format of messages sent to the host. Also provides settings for advanced network communications (i.e.: Decoder Network Adapter and Network Identification).
Trigger	Defines all settings for the light curtain and/or photoeyes used to trigger package detection including distance to scan line, maximum package length, minimum package height, debounce, and advanced light curtain settings. (See the **Diagnostic and Utilities / Trigger tab** in **Chapter 4**.)
Tracking	Contains all settable parameters for monitoring package travel through the system including tracking mode (leading, trailing, or immediate), distance to transmit point, belt speed settings, and camera mounting.
Imaging	Defines scanning parameters for the camera including focus, gain, and scan line clock mode. (See the **Diagnostic and Utilities / Imaging tab** in **Chapter 4**.)
Decoder Diag	Used to enable or disable diagnostics related to the decoder including unrestricted and conditional decoder action. (See the **Diagnostic and Utilities / Decoder Monitor tab** in **Chapter 4**.)
Pkg Mgmt Diag	Used to enable or disable diagnostics related to the management of packages as they are tracked through the system including unrestricted and conditional tracking action. (See the **Diagnostic and Utilities / Decoder Monitor tab** in **Chapter 4**.)
Logging	Used to enable or disable diagnostics logs related to the camera, decoder, and other system components and functions. (See the **Diagnostic and Utilities / Logging tab** in **Chapter 4**.)
Outputs	Defines the condition to activate, the active time (msec), and output signal of up to four optional digital outputs that may be used to control external devices (e.g.: alarms, package diverters, etc.). (See the **Diagnostic and Utilities / Outputs tab** in **Chapter 4**.)
Tunnel	Provides settings for applications where camera(s) are used to read bar codes on multiple sides of packages. The Tunnel tab is used to enable or disable multi-sided imaging mode, tunnel focus mode, and also identifies the active tunnel configuration.
Decoder Display/Power Mgmt	Used to enable or disable the remote display of the APC100 decoder and to protect the decoder in the event of a power failure or system shutdown.
Dimensioning	Provides access to the various dimensioning parameters that must be defined for the optional VisionCube dimensioning software. The Dimensioning Tab is disabled unless the VisionCube software is used by your system.

For detailed procedures on using the **Modify Setup** functions, reference **Chapter 3** of this manual.

SAVE TO CAMERA

Select the **Save to Camera** button on the Accu-Setup Main Window when you need to:

- send all **Modify Setup** parameters to the camera,
- send only the changes you have made to the parameters, or to
- send parameters to the camera that you have retrieved using the **Retrieve from Disk** function.

(These functions are also found in the **File** drop-down menu.)

Save to Camera Button

> **NOTE:** This option is only accessible if a communication link has been established with the camera. The **Communication Log** in the Accu-Setup Main Window shows the condition of the communication link.

To save setup parameters to the camera:
Step 1: When the **Save to Camera** function is selected, the **Send Parameters** screen is displayed.

Send Parameters Window

Send Functions	Description
Send Setup Parameters	Sends all of the current settings and any changes to the camera, unless **Send Changes Only** is enabled. Once saved to camera, the settings will not be lost if the camera loses power.
Send Changes Only	When a check appears in this box, only the parameters that have been changed will be sent to the camera.
Close	Use to close the Send Parameters screen.

Step 2: Determine whether you wish to send all parameters or only the changes to the camera. If you wish to send only changes, then be sure that the **Send Changes Only** box is checked, otherwise leave the box empty to send all parameters to the camera.

Step 3: Click on the **Send Setup Parameters** button. Once the parameters are received successfully by the camera, the following message appears in the **Communication Log**:

All Parameters were successfully sent.

Step 4: Click on the Close button to close the **Send Parameters** window.

> **NOTE:** To close **Send Parameters** window without sending the parameters, simply click on the **Close** button without using the **Send Setup Parameters** button.

SAVE TO DISK

To specify a file name and location to store the current settings contained in Accu-Setup, select the **Save to Disk** button from the Accu-Setup Main Window. (This function is also found in the **File** drop-down menu.)

Save to Disk Button

To save setup parameters to disk:
Step 1: Selecting the **Save to Disk** function opens a standard Windows **Save As** file window.

Save to Disk Window

Step 2: Locate the **Values** folder where the parameters are stored. (The **Save As** window should automatically default to the Values folder.)

Step 3: Enter a name for the file in the **File name** field. The **.VAL** extension will be added to the name when you save the file to disk.

Step 4: Click **Save** or press the <**Alt**><**S**> keys. When this operation is successfully completed, the following message appears in the **Communications Log**:

Parameters saved to disk.

If you have not already done so, be sure to update the camera with the file you have saved, using the **Save to Camera** button. (See **Save to Camera** on page 2-11 for details.)

It is recommended that the previous settings and any changes be stored in separate files, in case it becomes necessary to return the camera to a previous configuration. The default file extension for these files, as well as the default folder and directory, is ***.VAL**.

> **IMPORTANT TIP:** Parameters can be retrieved from disk only after they have been saved to disk. It is recommended that any changes be stored to a disk file in case you need to return a camera to a previous configuration. It is also a good practice to store any ***.VAL** files in a Values folder of the Accu-Setup directory so that they can easily be located.

### DIAGNOSTICS AND UTILITIES

Clicking the **Diagnostics and Utilities button** on the Accu-Setup Main Window opens a series of tabs used for monitoring system performance and diagnosing various operating conditions. (This function is also found in the **Utilities drop-down menu**.)

Diagnostics and Utilities Button

The **Diagnostics and Utilities** are particularly useful for monitoring how changes made using **Modify Setup** affect overall system performance.

When **Diagnostics and Utilities** is selected, the **System Status** tab is automatically displayed.

Diagnostics and Utilities Window – System Status Tab

The diagnostics and utilities are organized into eight groups identified by tabs across the top of the screen. Click on a tab to display the functions available from within that tab.

The **Diagnostic and Utilities** tabs and a brief description of each are provided in the following table.

Diagnostic Tabs	Tab Descriptions
System Status	Useful for checking performance of decoder, camera, and other system components. Enables user to monitor belt speed, tach, package count, error count, late decodes, and illumination.
SMIO Com	Used to send test messages to check if all system communications are functioning properly as well as provides a running count of various messages (Rx, Tx, framing, Rx overflow, Tx overflow) by communications port (host, com, and illum).
Decoder Monitor	Used to monitor the decoder and package tracking conditions that have been enabled using the **Modify Setup / Decoder Diag** and **Pkg Mgt Diag** tabs. Any enabled conditional or unrestricted action messages are displayed in the **Rolling Text** window. Any enabled conditional or unrestricted action images are displayed in the **Image Edit** window.
Trigger	Monitors the operation of all devices used to trigger package detection including light curtain, photoeye, and tach encoder and counts various errors (package too long, too short, too close). (See the **Modify Setup / Trigger** tab in **Chapter 3**.)
Imaging	Provides **AVScope** and manual control for testing the camera scanning parameters including focus, gain, and scan line frequency. Also includes error counts for focus faults, clipped focus, clipped gain, and clipped scan line clock. (See the Modify Setup / Imaging tab.)
Logging	Used to view diagnostics logs related to the camera, decoder, and other system components and functions. (See the **Modify Setup / Logging** tab in **Chapter 3**.)
Package History	Used to view a detailed history of the last 16 packages that have been tracked through the system.
Outputs	Defines the condition to activate, the active time (msec), and output signal of up to four optional digital outputs that may be used to control external devices (e.g.: alarms, package diverters, etc.). (See the **Modify Setup / Outputs** tab in **Chapter 3**.)

WARNING: A number of the diagnostic and utilities features (especially the log files) will adversely affect system performance. These functions are intended for diagnostic purposes only and should be disabled during normal system operation.

For detailed procedures on using the **Diagnostics and Utilities** functions, reference **Chapter 4** of this manual.

EXIT ACCU-SETUP

> **IMPORTANT TIP:** It is recommended that you release the connection to camera (by using the **Release Connection** button) before using the **Exit Accu-Setup** function.

Click on the **Exit Accu-Setup button** to leave the program. (This function is also found in the **File** drop-down menu.)

Exit Accu-Setup Button

If any changes made during the use of Accu-Setup were not saved, the following alert message appears.
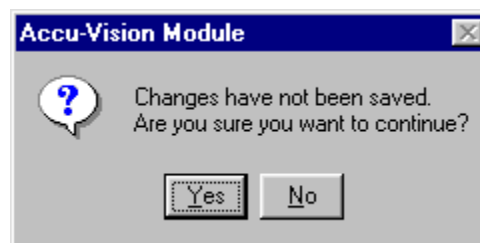
Alert Message – Changes Have Not Been Saved

Click **Yes** or press the <**Alt**><**Y**> keys to leave without saving changes.
Click **No** or press the <**Alt**><**N**> keys to remain in Accu-Setup. You will still be able to save changes before exiting Accu-Setup if you click **No**.

> **USEFUL TIP**: Before you exit Accu-Setup, did you remember to:
> 1. Save any necessary changes to camera
> 2. Save a backup file of changes to disk
> 3. Release the connection to the camera

Chapter Three ▼ *Contents*

Modify Setup

CHAPTER 3: MODIFY SETUP

The **Modify Setup** window provides access to all of the adjustable operating parameters of your AccuVision camera system through the Accu-Setup software interface. These parameters are organized into functional groupings identified by 12 tabs across the top of the screen.

Modify Setup Tab Selections

To access this screen, click the **Modify Setup** button on the **Accu-Setup Main Window** button menu.

Modify Setup Button

> **NOTE:** The **Modify Setup tabs** may also be selected from the **Edit drop-down menu** located at the top of the **Accu-Setup Main Window**. Note that when Modify Setup is selected, the **Symbologies tab** is automatically displayed.

In most cases, your AccuVision system has already been configured to your application's specifications prior to shipment to your facilities. However, you may find it necessary to use the Modify Setup features to update or change specific parameters to correct or improve overall system performance.

The Symbologies tab and Communications tab are two of the more commonly used features of Accu-Setup because they provide access to the bar code symbology and communication parameters used by your system.

> **NOTE ON DIMENSIONAL REFERENCES:** While this manual discusses all dimensional values in US format, Accu-Setup can display these values in either US or metric formats. To set this format, reference the **Options** drop-down menu in **Chapter 5**. A table that shows the settable parameters in both their US and metric values is also provided in **Chapter 6 / Appendix B**.

VIEWING PARAMETERS OR MAKING CHANGES

To access any tab and modify the parameters of the tab:

Step 1: Click on one of the tabs to view the parameters that can be set.

Step 2: Follow the procedures provided in this section of the manual for modifying the setup of any tab.

Step 3: When finished on any tab, to move to another tab without temporarily saving any changes, simply click another tab to view or change other parameters.

Step 4: To temporarily save changes made on any tab, click the **OK** button located on the bottom right of the tab's screen to return to the Accu-Setup Main Window.

> **IMPORTANT:** It is possible to make changes from within any tab, however, those changes will <u>only be enabled temporarily</u> in Accu-Setup if you click **OK**. Click **Cancel** to clear changes you have made. **OK** or **Cancel** also returns you to the **Accu-Setup Main Window**. (**Use Save To Camera** and **Save To Disk** to use and store a copy of any modified setup.)

Step 5: To leave any Modify Setup tab without making changes to the previously set values, click the **Cancel** button to return to the **Accu-Setup Main Window**.

> **USEFUL TIP:** The Accu-Setup tab screens provide a **Help** button at the bottom right-hand of each screen. By clicking the **Help** button, you can access topics related to that screen in ***Accu-Setup: AccuVision Module Help***. (If there is no information for that specific screen, an error message is displayed.) The online help **Contents** and **Search** features can also be accessed from the **Help drop-down menu**. (See **Chapter 5** for details.)

SYMBOLOGIES TAB

The **Symbologies** tab contains all adjustable parameters that define the type and size of bar code(s) that the camera reads. When the user clicks on the tab, the window displayed is divided into two areas: **Symbologies to Read** and **Postal Symbology Options**. There is also a button for **Advanced Decoder Options**.

> **NOTE:** The messages sent to the host are built in the same order that the *Active Symbology List* is created. In the example *Symbologies Tab Window*, the host message order would be Code 128, Interleaved 2 of 5, then Maxicode.

Modify Setup – Symbologies Tab

SYMBOLOGIES TO READ

This segment of the Symbologies tab provides a **Symbology** drop-down menu of all bar code types that can be read by your AccuVision camera. It also enables you to set the minimum and maximum length of each symbology. In addition, you may also set specific symbology options.

All symbologies that your system is already setup to read (i.e.: factory preset by Accu-Sort) are listed in the **Active Symbologies List** located to the right of the Symbology drop-down menu.

Symbology Drop-down Menu

The AccuVision System has the ability to decode many bar code symbologies. The bar code types that can be decoded by your system are listed in the **Symbology drop-down menu**. Before your system can scan and decode a symbology, that bar code symbology and its related minimum and maximum lengths and options must be added to the **Active Symbologies List**.
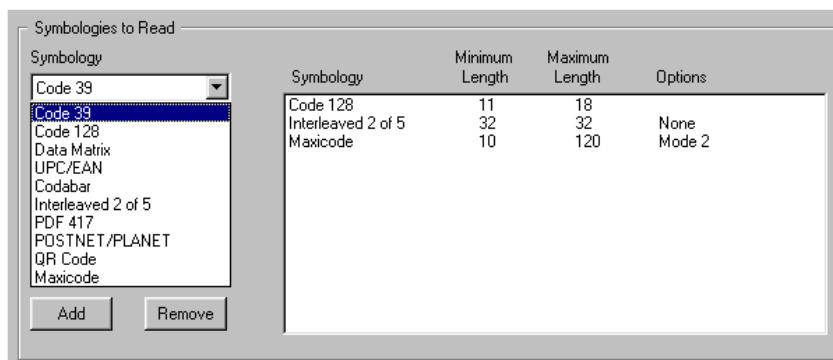
Symbology Drop-down Menu & Active Symbologies List (***updated***)

Active Symbologies List

In the **Symbologies to Read** segment of the Symbology Tab, the **Active Symbologies List** identifies all bar code types and their associated min/max lengths and options that your system has been setup to search for and decode.

> **IMPORTANT:** Before adding a symbology to this list, remember that the messages your AccuVision system sends to the host are built in the same order that the **Active Symbologies List** is created. In the example *Symbologies Tab Window*, the host message order would be Code 128, Interleaved 2 of 5, then Maxicode. If you wanted Maxicode sent first, Code 128 sent second, and Interleaved 2 of 5 sent third, you would need to remove all three symbologies from the active list and re-enter them in the correct order.

Adding A Symbology

To view the bar code list and add a symbology to the **Active Symbologies List**:

Step 1: Click the down arrow to the right of the symbology displayed. The **Symbology** drop-down menu is displayed.

Step 2: Scroll up and down the **Symbology** drop-down menu until the required code type is highlighted, then release the mouse button to select the highlighted code.

Step 3: The **Min Length**, **Max Length**, and **Options** fields appear in place of the list of symbologies. Set all parameters associated with the code (e.g.: minimum length, maximum length, and options).

Step 4: Click **Add**. The newly added code will appear in the **Active Symbologies List** field along with the minimum length, maximum length, and options.

If two or more variations of the same code are to be read by the system, repeat the process, making the necessary entries that will enable the system to differentiate between the code variations.

> **REMEMBER:** Build your **Active Symbologies List** of bar codes in the order in which you want them decoded and sent in your host messages.

Removing A Symbology

To remove a code from the **Active Symbologies List**:

Step 1: Click on the code to be removed from the **Active Symbologies List** on the right-hand of the screen.

Step 2: Click **Remove**. The highlighted code will no longer appear on the active symbologies list.

Min Length/Max Length Fields

Once a symbology is selected from the drop-down menu, the min/max lengths must be set.

Min/Max Length Field

Min Length is the minimum length of a bar code that the camera will read. The length is measured in the number of man-readable characters within the bar code. For example an 11-character Code 128 symbology is in the active list shown above.

Max Length is the maximum length of a bar code that the camera will read. The length is measured in the number of man-readable characters within the bar code. For example the same Code 128 symbology in the active list shown above has been set for a max length of 18-characters.

To enter the Min or Max Length:
Step 1: Place the cursor in either the Min or Max Length box and click.
Step 2: Type in the required minimum or maximum length of the code.

> **NOTE:** To read <u>any</u> bar code within a given symbology, set the **Min Length** as one (1) and the **Max Length** as 100. To read a <u>specific code length</u>, set the **Min Length** and **Max Length** for the same number of characters (e.g.: the Interleaved 2 of 5 code in our screen example for the **Symbologies Tab** is set for both a minimum and maximum length of 32). You <u>cannot</u> set a maximum length that is less than a minimum length.

Options

Options vary with the bar code types selected. The options menu will be different depending on which code name is displayed in the Symbology field. For more information about available options per code type, see the **Bar Code Options List**.

Example Options Drop-down Menu (for Code 39)

To view the options drop-down menu and choose an option:

Step 1: Click the down arrow to the right of the option displayed.

Step 2: Scroll up and down the list until the required option is highlighted.

Step 3: Release the mouse button to select the highlighted option.
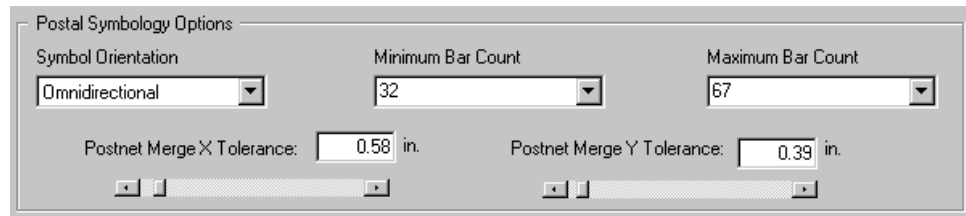
The **Bar Code Options** table lists the options associated with each of the symbologies that can be read by your AccuVision System.

Aztec	Normal Reverse Normal and Reverse
Codabar	No options
Code 128	No options
Code 39	None Mod 43
Code 93	No options
Data Matrix	Normal Reverse Normal and Reverse
Interleaved 2 of 5	None Mod 10
Maxicode	Mode 0 Mode 1 Mode 2 Mode 3 Mode 4 Mode 5 Mode 6 Any Mode
PDF 417	No options
POSTNET/PLANET	USA POSTNET USA POSTNET Extension Japan POSTNET Australian POSTNET USA PLANET
QR Code	Normal Reverse Normal and Reverse
RSS	Any Mode Regular & Truncated Limited Expanded
UPC/EAN	UPC A - 0 char ext UPC A - 2 char ext UPC A - 5 char ext UPC E0 - 0 char ext UPC E0 - 2 char ext UPC E0 - 5 char ext UPC E1 - 0 char ext UPC E1 - 2 char ext UPC E1 - 5 char ext EAN/JAN8 - 0 char ext EAN/JAN8 - 2 char ext EAN/JAN8 - 5 char ext EAN/JAN13 - 0 char ext EAN/JAN13 - 2 char ext EAN/JAN13 - 5 char ext

Bar Code Options List

POSTAL SYMBOLOGY OPTIONS

Postal symbology options are available for POSTNET and PLANET codes that are selected in the symbology field.

Postal Symbology Options

Symbol Orientation

Symbol orientation describes the presentation of the postal code to the camera. There are four options for presenting a code to the camera: horizontal, vertical, horizontal and vertical, and omnidirectional.
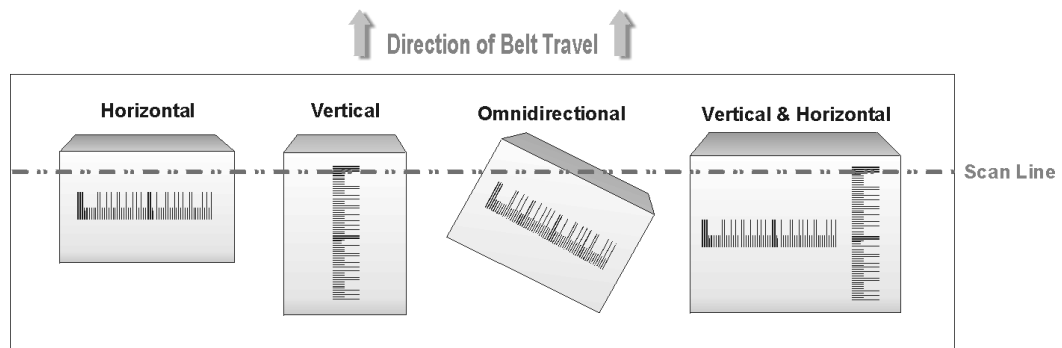
Example of Different Orientations

To view the **Symbol Orientation** list and choose an orientation:
Step 1: Click the down arrow to the right of the orientation displayed.
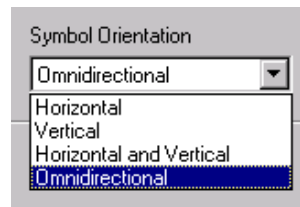
Symbol Orientation Field

Step 2: Scroll up and down the list until the required orientation is highlighted.
Step 3: Release the mouse button to select the highlighted orientation.

NOTE: Omnidirectional orientation requires more system resources and processing time. Use this orientation only in applications where it is necessary to do so.

Minimum Bar Count

Minimum bar count is the minimum number of bars that the postal code presents to the camera. Preset minimum bar count values are programmed into Accu-Setup and are selectable from the Minimum Bar Count drop-down menu.
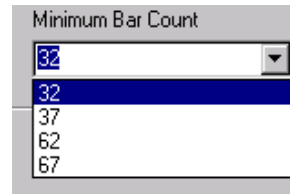
Minimum Bar Count Field

To view and select a Minimum Bar Count:
Step 1: Click the down arrow to the right of the minimum bar count displayed.
Step 2: Scroll up and down the list until the required minimum bar count is highlighted.
Step 3: Release the mouse button to select the highlighted count.

Maximum Bar Count

Maximum bar count is the maximum number of bars that the bar code presents to the camera. Preset maximum bar count values are programmed into Accu-Setup and are selectable from the Maximum Bar Count drop-down menu.
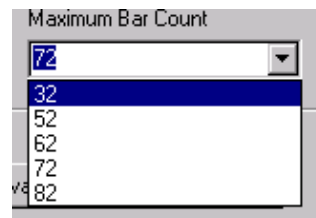
Maximum Bar Count Field

To view and select a Maximum Bar Count:
Step 1: Click the down arrow to the right of the maximum bar count displayed.
Step 2: Scroll up and down the list until the required maximum bar count is highlighted.
Step 3: Release the mouse button to select the highlighted count.

POSTNET Merge X Tolerance

POSTNET symbologies often contain only the single five-digit zip code, to which the Postal Service may add a four-digit extension code (there may be added an additional two-digit delivery point code, also). The result of this additional code is a nine-digit symbology (or eleven-digit symbology if the delivery point code is added) created from two separate bar codes.

The value for the **POSTNET Merge X Tolerance** specifies the maximum distance between the nearest edges of two POSTNET symbologies as they are aligned along the X-axis (horizontal, parallel to envelope length) orientation on a package.

> **NOTE:** If the symbologies are within the range as specified in both the **POSTNET Merge X and Y Tolerance** fields, the two symbologies are merged and read as a single symbology.

POSTNET Merge Y Tolerance

Similar to the POSTNET Merge X Tolerance, the value for the **POSTNET Merge Y Tolerance** specifies the maximum distance between the nearest edges of two POSTNET symbologies as they are aligned along the Y-axis (vertical, perpendicular to envelope length) orientation on a package.

> **NOTE:** If the symbologies are within the range as specified in both the **POSTNET Merge X and Y Tolerance** fields, the two symbologies are merged and read as a single symbology.

ADVANCED DECODER OPTIONS

To use the **Advance Decoder Options**, click on the button on the Symbologies tab window. This displays a separate window of advanced decoder options for the camera. These options are: Image Processing Mode, Active Image Width, Active Image Start Pixel, Maximum 1-D Code Length, Minimum 1-D Code Height, and Low Aspect Code Location.
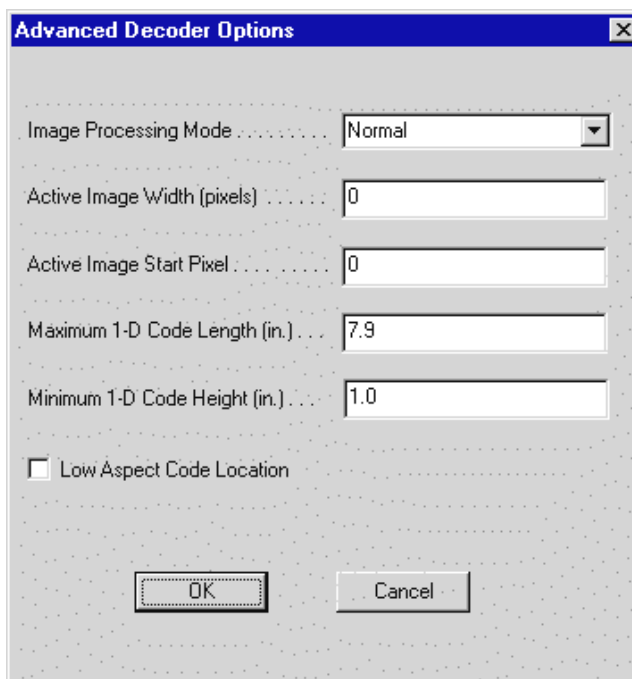
Advanced Decoder Options Window

> **NOTE:** Properly setting these options will speed up bar code data processing by reducing decoder processing requirements. These options are particularly critical to high-speed conveyor applications.

Image Processing Mode

This drop-down menu offers two options: **Normal** and **Mirrored**. When Normal is selected, the first pixel starts from the left side of the image. When Mirrored is used, the first pixel starts at the far right of the image and the last pixel is at the left of the image, in effect creating a mirrored or reversed image. Mirror image results from the camera mounting sensor clocking from left to right. The proper mode must be set for 2-D codes.

> **NOTE:** Using this option does not affect how the video image is displayed, but only how the Decoder processes the image. The **Image Processing Mode** selected should match how the image is processed. To determine how the image is processed, view the display of a scanned package in the **Diagnostics and Utilities / Decoder Monitor Tab**. (See **Chapter 4**.)

Active Image Width (pixels)

Sets the anticipated active image width by defining the remaining active pixels in an array based on the active image start pixel setting. (See **Active Image Start Pixel**.) Active Image Width is used, along with the Active Image Start Pixel, to define the narrowest possible active image width by reducing the overall area the camera will scan for valid bar codes. For example, in applications where bar codes always appear in one location on a package, the entire package does not need to be scanned, so the active image width can be set smaller, thus reducing decoding time and demand on processing resources. In high-speed tilt-tray applications where smaller packages are to be scanned (e.g.: cassettes and CDs), effectively narrowing the active image width to be scanned will speed system performance.

> **NOTE:** When the **Active Image Width** and **Active Image Start Pixel** are both set to zero (0), the decoder will default to using the entire scan line.

Active Image Start Pixel

Defines the start pixel on the array from which the decoder begins to collect and process data received from the camera. Active Image Start Pixel is used, along with Active Image Width, to define the narrowest possible active image width by reducing the overall area the camera will scan for valid bar codes. (See **Active Image Width**.)

> **NOTE:** When the **Active Image Width** and **Active Image Start Pixel** are both set to zero (0), the decoder will default to using the entire scan line.

Maximum 1-D Code Length (in.)

This is used together with **Minimum 1-D Code Height** to reduce the demand on processing time by defining tighter decoding parameters.

> **CAUTION:** While entering a value in this field may reduce decoder processing time, if the value is set too low, this will also adversely affect performance. Unless your camera was preset with a maximum code length, do not enter a value in this field unless instructed to do so by an Accu-Sort trained and authorized technician.

Click on this field and enter the required maximum code length dimension. The example screen shows that 7.9 inches was entered as the maximum code length. (Enter fractions of an inch in decimal.) When a value other than zero is entered in this field, the system will search for bar codes that fall within the maximum code length.

Minimum 1-D Code Height (in.)

This is used together with **Maximum 1-D Code Length** to reduce the demand on processing time by defining tighter decoding parameters. Click on this field and enter the required minimum code height dimension. The example screen shows that 1.0 inch was entered as the minimum code height. (Enter fractions of an inch in decimal.) When a value other than zero is entered in this field, the system will search for bar codes that fall within the minimum code height.

⚠	**CAUTION:** To avoid adversely affecting system performance, do not set the minimum code height below 0.5 inches (1.3 centimeters), unless instructed to do so by an Accu-Sort trained and authorized technician.

☞	**NOTE:** If the **Maximum Code Length** and **Minimum Code Height** settings are being used by your system, keep in mind that all codes in the active symbology list (as defined in **Modify Setup / Symbologies** tab) will still be processed, even if they fall outside the maximum length or minimum height limits.

Low Aspect Code Location

This function should only be enabled when all bar codes to be decoded by the system will have a low aspect ratio (e.g.: if code height is under 0.5 inches). When enabled, this function reduces decoder processing requirements.

⚠	**CAUTION:** When enabled, **Low Aspect Code Location** may adversely affecting system performance. Do not enable this function unless instructed to do so by an Accu-Sort trained and authorized technician.

COMMUNICATIONS TAB

The **Communications Tab** lets you set all AccuVision System communications port parameters and message formats for the following:

- camera (SMIO Ports – Illum, Host, and Com),
- decoder (Com Port Settings and Decoder Ports), and
- host computer or peripheral (Host Port Settings and Host Message).
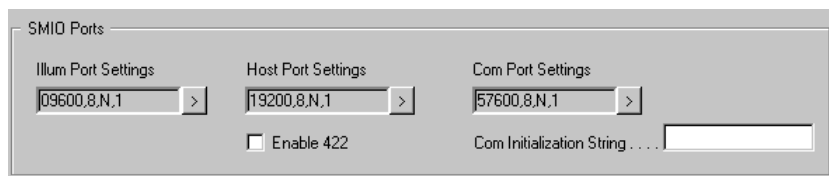
Modify Setup – Communication Tab

NOTE: You can **Send Test Messages** to the camera's SMIO ports (Host, Com, or Illum) using the **Diagnostics and Utilities / SMIO Com Tab** as outlined in **Chapter 4**.

SMIO PORTS

The **SMIO Ports** segment of the **Communication tab** contains three areas for port settings: **Illum**, **Host**, and **Com**. Each of these areas display the current communication settings for that port. The settings are shown in the following order: baud rate, number of data bits, parity setting, and stop bits. Each port can be set independently based on the device connected to it.

SMIO Ports Window Segment

Illum Port Setting

Defines the parameters used to communicate with the illumination module connected to the camera's **ILLUM** port. This is not applicable to cameras that use self-contained illumination. To modify the port settings, follow the *Changing SMIO Ports Settings* procedure outlined on page 3-17.

Host Port Setting

Defines the parameters used to communicate with the host computer or peripheral connected to the camera's **HOST** port. To modify the port settings, follow the *Changing SMIO Ports Settings* procedure outlined on page 3-17.

Enable 422

When this box is checked, the RS422 communications format is used for communications with the host computer or peripheral.

Com Port Setting

Defines the parameters used to communicate with the decoder connected to the camera's **COM** port. (See also *Decoder Ports / Com 1 on page 3-19*.) To modify the port settings, follow the *Changing SMIO Ports Settings* procedure outlined on page 3-17.

> **NOTE:** In systems using an Accu-Sort Decoder, the **Communications tab** settings must be the same for the **SMIO Ports / Com Port** and the **Decoder Ports / Com 1**. The **Enable Com 1** box should also have a check in it. If these settings are different, the system will not work properly.

Com Initialization String

The **Com Initialization String** is used with the **Com Port Settings** only.

Changing SMIO Ports Settings

To change the communication setting for any of the ports (e.g.: Illum, Host, and Com Port Settings):

Step 1: Locate the title of the port to change (e.g.: Host Port Settings).

Step 2: Click the arrow to the right of the current settings.

Step 3: When you click the arrow, a **Port Settings** window appears. This window contains the settings for each communication parameter. Upon opening, all values displayed in these fields are the current camera settings.
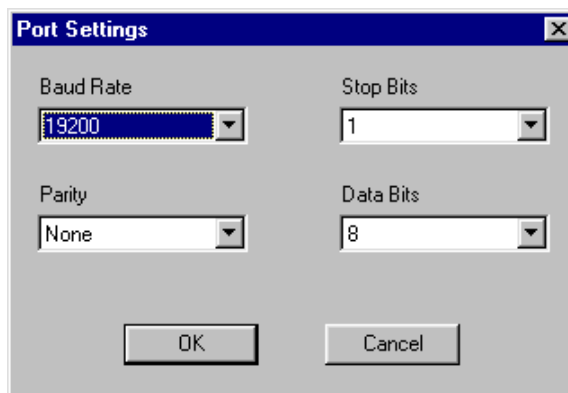
Port Settings Window

Step 4: Click the down arrow to the right of each current setting to display the choices available.

Step 5: Change the settings for any or all of the options as necessary. The options for any port's communication settings are as follows:

Settings	Available Options
Baud Rate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Stop Bits	1 or 2
Parity	None, Even, Odd
Data Bits	7 or 8

Step 6: Click **OK** to enable the new settings or **Cancel** to return to the previous settings.

HOST MESSAGE

This segment of the **Communications tab** is used to define the format for all messages that will be transmitted to the host for each package scanned by the AccuVision System.

> **NOTE:** Before setting or changing the host message parameters, be sure to consult with your system administrator to assure that the messages sent to the host will comply with all system requirements.

Host Message Window Segment

The messages you send to the host may include the following:

Host Message Elements	Description
Header	Identifies the beginning of the message (e.g.: <STX>). The header may include up to 10 characters.
Trailer	Identifies the end of the message (e.g.: <ETX>). The trailer may include up to 10 characters.
No Read Message	Indicate a package was present but either did not contain a bar code or was not properly decoded, thus resulting in a **no read** condition. **NOTE:** If you enter a tilde (~) and a single character, the character will be repeated to fill the entire field in the host message; otherwise, the literal character entered will be used.
Multiple Message	Indicates when more than one of the same type of symbology was read, but the system does not know which one to decode. **NOTE:** If you enter a tilde (~) and a single character, the character will be repeated to fill the entire field in the host message; otherwise, the literal character entered will be used.
Delimiter Between Codes	The separator used between multiple bar codes decoded and transmitted in the same message. The delimiter between codes may include up to 10 characters.
Data Verification	There are three selections in this drop-down menu: None, BCC (Block Check Character), CRC (cyclic redundancy check).
Add Sequence Number	A sequence number is added to all messages sent to the host when the box is checked. If this function is not checked, no sequence number is included in host messages. When enabled, the sequence numbering starts at one. If this function is disabled then enabled again later, the sequence numbering will begin again starting with the next number in the sequence since the function was previously disabled. Sequence numbering continues until the camera is shutdown. When restarted, numbering starts at one.
Unprintable Characters	Unprintable characters may also be entered in **the Header, Trailer, No Read Message, Multiple Message**, and **Delimiter Between Codes** fields. To enter unprintable characters, use one of the following methods: 1) Enclose **ASCII descriptors** in left and right brackets (e.g.: enter <**SOH**> for the Start of Header character). 2) Type in the **literal characters** (e.g.: type **Ctrl + A** to enter the Start of Header character). 3) Enclose the **hexidecimal value** of the character in left and right brackets (e.g.: <**0x01**> for the Start of Header character).

NOTE: The elements within the host message are constructed using ASCII characters. See **Appendix C: ASCII Character Chart** in **Chapter 6** of this manual.

DECODER PORTS

This segment of the **Communications tab** is used to set the communications parameters for your Accu-Sort decoder.

> ⚠ **IMPORTANT:** In systems using a decoder, the **Decoder Ports / Com 1** settings must match the **SMIO Ports / Com Port** settings and **Enable Com 1** should be enabled in order for the system to operate properly. These settings are factory-configured, so there should be no need to change it unless instructed to do so by an Accu-Sort trained and authorized technician.

Decoder Ports Window Segment

To set the parameters for the communications ports:
Step 1: Locate the title of the port to change (either Com 1 or Com 2).
Step 2: Click the arrow to the right of the current settings.
Step 3: When you click the arrow, a **Port Settings** window appears. This window contains the settings for each communication parameter.

Port Settings Window

Step 4: Use the down arrow to the right of each current setting to display the choices available. The options are as follows:

Settings	Available Options
Baud Rate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Stop Bits	1 or 2
Parity	None, Even, Odd
Data Bits	7 or 8

Step 5: Change the settings for any or all of the options.
Step 6: Click **OK** to enable new settings or **Cancel** to return to previous settings.
Step 7: To use the communications ports, make sure that the enable check boxes are checked.

ADVANCED COMMUNICATIONS

If the AccuVision System needs to communicate with a network, use the **Advanced Communications** to set your network parameters. Click the **Advanced>>** button on the Communication tab window to display the **Advanced Communications** window.

Advanced Communications Window

	NOTE: The following options apply only when connecting the decoder to a network. Consult your network administrator / MIS for details on how to set these parameters to meet your network's requirements.

Selections	Network Options	Description
Decoder Network Adapter	IP Address	An IP address specifies a unique host ID for the Decoder on a particular TCP/IP network. Consult your network administrator for a valid IP address for the camera.
	Gateway	A gateway allows the Decoder to reach other systems not on the local network and remote systems to reach the camera. If the camera requires external connectivity, consult your network administrator for a valid gateway address for the camera.
	Net Mask	A netmask modifies a standard IP address into subnets. Consult your network administrator to see if the network requires a net mask and, if needed, the value of the net mask. A default class C net mask should be valid in most cases (either 255.255.255.0 or 255.255.240.0).
Network Identification	Computer Name	Use this field to name the Decoder for the camera currently connected to Accu-Setup.
	Workgroup	Use this field to identify the group or area where the Decoder is located.

	NOTE: You may need to shutdown and restart the Decoder (Windows operating system) to assure that any changes to the Advanced Communications take effect.

TRIGGER TAB

The **Trigger tab** contains all of the parameters needed to set up the trigger device for the AccuVision System. The device used as a trigger provides a signal to the system indicating that it should begin scanning.
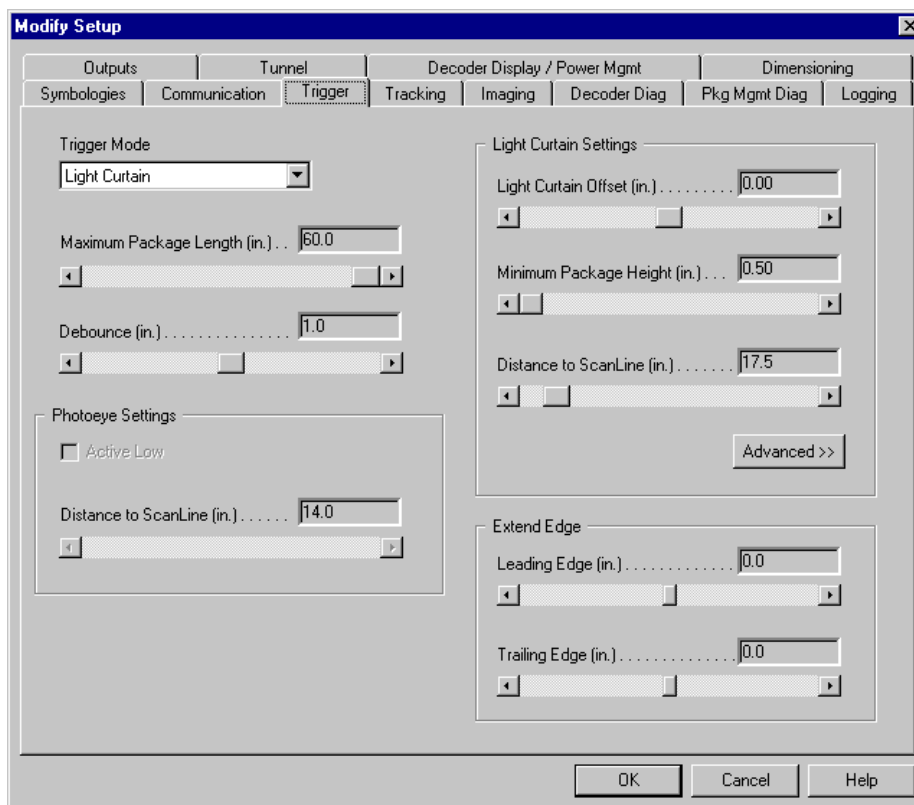
Modify Setup – Trigger Tab

TRIGGER MODE

The trigger mode setting determines what device triggers the camera to read a bar code. There are four Trigger Modes available from the drop-down menu: Photoeye, Light Curtain, Light Curtain and Photoeye, and Serial.
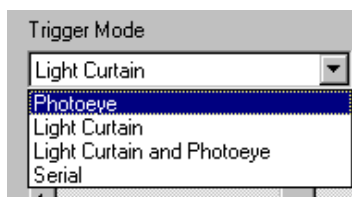
Trigger Mode Drop-down Menu

To select a trigger mode:
Step 1: Use the down arrow to the right of the current trigger mode.
Step 2: Scroll up and down the list until the required trigger mode is highlighted.
Step 3: Release the mouse button to select the highlighted trigger mode.

Photoeye Trigger Mode

This mode should be selected for detecting package presence when it is not necessary to adjust the camera focus. A photoeye (connected to the **TRIG** port of the camera) is used as the trigger. When this mode is selected, the **Photoeye Settings** segment of the **Modify Setup / Trigger Tab** must also be set. *(See page 3-23.)*

Light Curtain Trigger Mode

This mode should be selected for detecting package presence when it is also necessary to adjust the camera focus over a larger depth of field. When this is true, a light curtain (connected to the **FOCUS** port of the camera) is used as the trigger. When this mode is selected, the **Light Curtain Settings** segment of the **Modify Setup / Trigger Tab** must also be set. *(See page 3-23.)*

Light Curtain and Photoeye

When this trigger mode is selected, the photoeye (connected to the camera's **TRIG** port) is used to detect the presence of packages within the scanning area. Simultaneously, the light curtain (connected to the camera's **FOCUS** port) provides package height information so the camera can correctly adjust its focusing mechanism to variations in product height.

Serial Trigger Mode

(***Addition to options. Use of this mode to be defined.***)

MAXIMUM PACKAGE LENGTH (IN.)

Sets the maximum package length that the system will process without indicating an error.

To set the maximum package length:
Use the slider bar or the arrows to set the value from 4.0 to 60.0 inches.

> **NOTE:** Use the **Package Errors / Too Long Counter** located on the **Diagnostics and Utilities / Trigger Tab** to check for errors in maximum package length. (See **Chapter 4**.)

DEBOUNCE

Determines the distance the trigger signal must be active to be considered a valid trigger cycle.

To set the debounce:
Use the slider bar or the arrows to set the value from 0.0 to 2.0 inches.

PHOTOEYE SETTINGS

This section of the **Trigger tab** sets the photoeye parameters.

> **NOTE:** If you choose **Photoeye** as the Trigger Mode, the options for light curtain settings are not available.

Active Low

Photoeyes are either active when the signal is low or active when the signal is high. This setting determines when the photoeyes are active (i.e.: "low" if the check box is selected, "high" if not selected).

Distance to Scan Line

Defines the distance from the photoeye to the scan line of the camera. (Reference the *AccuVision Scanning Area Diagram* in **Chapter 1**. On this illustration, **trigger device** identifies the location of the light curtain.)

To set the Distance to Scan Line:
Use the slider bar or the arrows to set the value from 0.0 to 200.0 inches.

LIGHT CURTAIN SETTINGS

This section of the **Trigger tab** sets the light curtain parameters.

> **NOTE:** If you choose **Light Curtain** as the Trigger Mode, the options for photoeye settings are not available.

Light Curtain Offset

Defines the distance from the light curtain to the top of the conveyor belt.

To set the light curtain offset:
Use the slider bar or the arrows to set the value from –5.00 to 5.00.

A negative light curtain offset is used when the curtain is mounted below the belt. A positive light curtain offset is when the curtain is mounted above the belt. This distance is added to the package height reported from the light curtain to calculate the actual package height.

Minimum Package Height

Defines the shortest package the system will detect. The camera will not scan packages that are less than the minimum package height defined by this setting.

To set the minimum package height:
Use the slider bar or the arrows to set the value from 0.50 to 36.0.

Distance to Scan Line

Defines the distance from the light curtain to the scan line of the camera.
(Reference the *AccuVision Scanning Area Diagram* in **Chapter 1**. On this
illustration, **trigger device** identifies the location of the light curtain.)

To set the Distance to Scan Line:
Use the slider bar or the arrows to set the value from 1.0 to 200.0.

Advanced Button

The advanced light curtain settings are for adjusting the light curtain resolution
and focus port settings. (See **Advanced Light Curtain Settings** for details.)

ADVANCED LIGHT CURTAIN SETTINGS

Use this screen to set the light curtain resolution and focus port settings.

IMPORTANT: There is no reason to modify these settings unless instructed to do
so by an Accu-Sort trained and authorized technician.

To set advanced light curtain settings:
Click the **Advanced>>** button in the light curtain settings area of the Trigger tab.
The **Advanced Light Curtain Settings** screen is displayed.
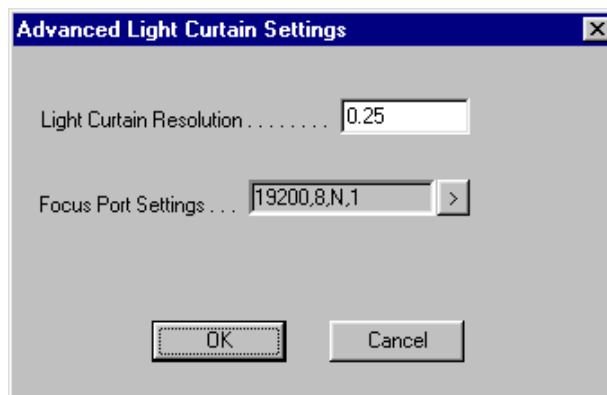
Advanced Light Curtain Settings

Light Curtain Resolution

Click in the field and enter the distance between the detection LEDs on the light
curtain (in increments of 0.25 inch).

Focus Port Settings

To set the communications parameters for the focus port:
Step 1: Click the arrow to the right of the current settings.
Step 2: When you click the arrow, a **Port Settings** window appears. This window contains the settings for each communication parameter.
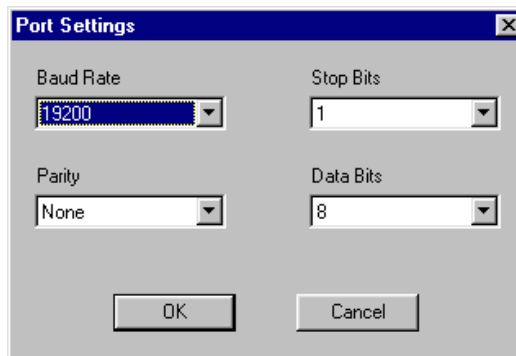
Port Settings Window

Step 3: Use the down arrow to the right of each current setting to display the choices available. The options are as follows:

Settings	Available Options
Baud Rate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Stop Bits	1 or 2
Parity	None, Even, Odd
Data Bits	7 or 8

Step 4: Change the settings for any or all of the options.
Step 5: Click **OK** to enable the new settings or **Cancel** to return to the previous settings.

EXTEND EDGE

In high-speed applications or in applications where the codes are close to the front or back of the boxes, extending the leading or trailing edge of box allows for more time to focus the camera and capture the image. For example: Extending the leading or trailing edge may be used in tray systems where the duration of the trigger signal must be different from the actual physical length of the tray to accommodate packages that are physically larger than the trays.

Leading Edge (in.)

To set the leading edge:
Use the slider bar or the arrows to set the value from -30.0 to 30.0.

Trailing Edge (in.)

To set the trailing edge:
Use the slider bar or the arrows to set the value from -30.0 to 30.0.

TRACKING TAB

The **Tracking Tab** contains all of the parameters associated with monitoring package travel on the conveyor.
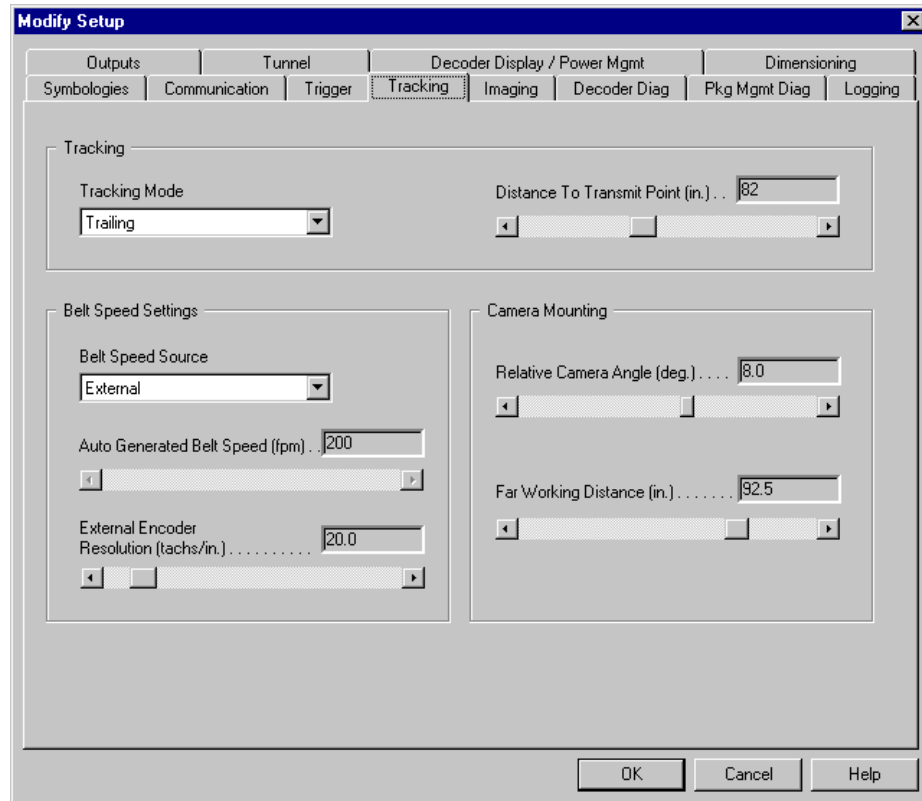
Modify Setup – Tracking Tab

TRACKING MODE

There are four tracking modes: none, leading, trailing, and immediate. For camera systems, use either leading or trailing tracking.
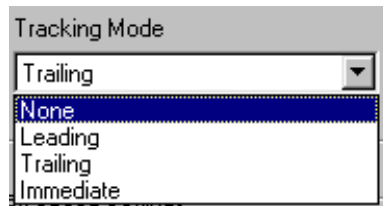
Tracking Mode Window Segment

To select a tracking mode:
Step 1: Click the arrow to the right of the current tracking mode.
Step 2: Scroll up and down the list until the required tracking mode is highlighted.
Step 3: Release the mouse button to select the highlighted tracking mode.

Tracking Mode – None

When this mode is selected, no tracking mode is enabled.

Leading Tracking Mode

When this mode is used, package tracking is timed through the scanning area based on when the front edge (leading edge) of a package is detected.

Trailing Tracking Mode

When this mode is used, package tracking is timed through the scanning area based on when the back edge (trailing edge) of a package is detected.

Immediate Tracking Mode

When this mode is selected, tracking is immediate.

Distance to Transmit Point

This function defines the distance from the trigger device (photoeye or light curtain) to the message transmit point determined by the tracking mode (i.e.: none, leading, trailing, or immediate). This feature maximizes available processing time by defining the best time to transmit tracking data.

To select a distance to transmit point:
Use the slider bar or arrows to select a value between 1.0 and 200 inches.

BELT SPEED SETTINGS

Belt Speed Source

There are two possible belt speed sources: It can either be internally generated or provided by an external device (e.g.: a tachometer).

The **internal** source gauges belt speed by the distance of belt travel per specific unit of time and therefore requires a very consistent/constant speed.

The **external** source gauges belt speed by counting the number of tach pulses (usually from a tachometer) per specific distance of belt travel.

To change the belt speed source:
Step 1: Click the arrow to the right of the current **Belt Speed Source**.
Step 2: Highlight the source (either **Internal** or **External**).
Step 3: Release the mouse button to select the highlighted source.

If **Internal** is selected, see **Auto Generated Belt Speed**.
If **External** is selected, see **External Encoder Resolution**.

Auto Generated Belt Speed

This option is active only when the belt speed source is **internal**.

To set the auto generated belt speed:
Step 1: Make sure that the belt speed source is set to internal.
Step 2: Use the slider bar or the arrows to set the value from zero to 600 FPM.

> **NOTE:** You must use the slider bar or arrows to set the **Auto Generated Belt Speed**. You cannot type a value into this field. The slider bar/arrows are disabled when an external tach encoder is being used. See **External Encoder Resolution**.

External Encoder Resolution

This option is active only when the belt speed source is **external**.

To set the External Encoder Resolution:
Step 1: Make sure that the belt speed source is set to external.
Step 2: Use the slider bar or arrows to set the value from 1.0 to 200.0 PPI (tach pulses per inch).

> **NOTE:** You must use the slider bar/arrows to set **External Encoder Resolution**. You cannot type a value into this field. The slider bar/arrows are disabled when the internal belt speed setting is used. (See **Auto Generated Belt Speed**.)

CAMERA MOUNTING

Relative Camera Angle (deg.)

Defines the relative camera angle (in degrees) as it relates to the package transport system (e.g.: conveyor belt, tilt-tray, etc.) and the direction of package travel. When a positive angle is used, the scan line is downstream from the camera lens facing in the direction of package travel. When a negative angle is used, the scan line is upstream from the camera lens facing the opposite direction of package travel. (See *Relative Camera Angle Illustrated* for an example of positive angle.)
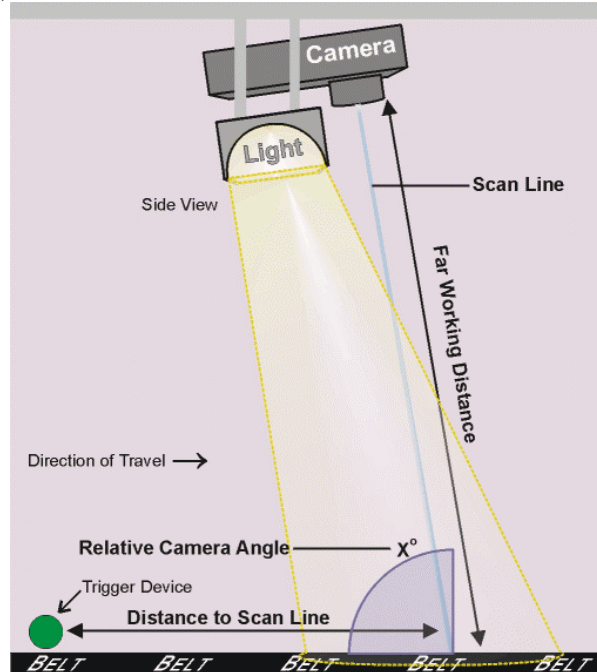
Relative Camera Angle Illustrated

To set the relative camera angle:
Use the slider bar or arrows to set the value from - 60.0 to 60.0 degrees.

> **NOTE:** You must use the slider bar or arrows to set the **Relative Camera Angle**. You cannot type a value into this field. Although this can be set for +/- 60 degrees, it is recommended to keep the camera angle between +/- 45 degrees.

The relative camera angle setting determines whether the camera is a top, front, or back read camera as shown in the **Active Tunnel Configuration** screen segment of the **Modify Setup / Tunnel Tab.** *(See page 3-56 for details.)*

Far Working Distance

The far working distance is the maximum distance at which optimal resolution of the camera may be retained. In applications with variable package height, far working distance is typically set to the belt. In applications with fixed package height, the far working distance typically is set to the actual package height.

To set the far working distance:
Use the slider bar or arrows to set the value from 10 to 200 inches.

> **NOTE:** You must use the slider bar or arrows to set the **Far Working Distance**. You cannot type a value into this field.

IMAGING TAB

The **Imaging Tab** contains the fields to set the scanning parameters for the camera. The window is divided into three areas: Focus, Gain, and Scan Line Clock.

Modify Setup – Imaging Tab

FOCUS MODE

There are three camera focus modes: Leading Edge, Profile or Fixed.
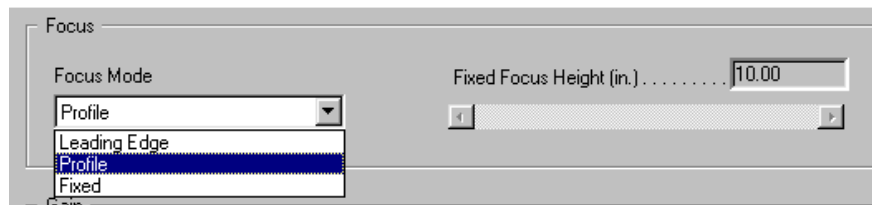
Focus Mode Window Segment

To select a focus mode:
Step 1: Click the down arrow to the right of the Focus Mode displayed.
Step 2: Scroll up and down the list until the required mode is highlighted.
Step 3: Release the mouse button to select the highlighted focus mode.

Leading Edge Focus Mode

This mode uses the leading edge of the package as the focus height for the entire length of the package, minimizing the time needed for focusing adjustments. This mode is most appropriate for square/rectangular shaped packages travelling at high belt speeds with tight spacing between packages. However, if this mode is selected, it will not allow effective focusing on irregularly shaped packages. To set the focus for irregularly shaped packages, see **Profile Mode**.

Profile Focus Mode

This mode enables the focusing to track the changing heights of packages. The Profile focus mode is used for irregular shaped packages so all portions of the package are kept in focus. The Profile focus mode is the standard for front read or top read applications.

Fixed Focus Mode

This focus mode always uses the same height for all packages, regardless of the actual package height. The Fixed mode is appropriate for bottom read or justified side read applications or when all packages are always the same shape and height. This focus mode may also be used for troubleshooting. When this focus mode is used, the **Fixed Focus Height** must also be set.

Fixed Focus Height Slider Bar

When using the **Fixed Focus Mode**, the fixed focus height must be set. Use the **Fixed Focus Height** slider bar or arrows to set the value. Values are between 0.00 to 51.00 inches.

> **NOTE:** You must use the slider bar or arrows to set the **Fixed Focus Height** value. You cannot type a value into the field. The slider bar/arrows are disabled if Fixed Focus Height is not used.

GAIN MODE

Gain is the amount of light reflected off of a package surface. Too little or too much gain can result in faded or saturated images that decrease contrast between positive spaces (range of 200-220 on the gray scale) and negative spaces (range of 40-80 on the gray scale). These reduced quality images can affect the decoding process, resulting in higher no read rates.

There are two types of gain: Compensated and Fixed.
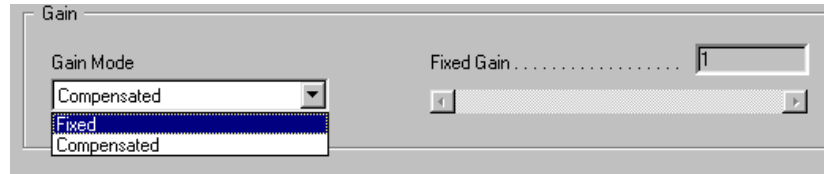
Gain Mode Window Segment

To select a gain mode:
Step 1: Click the down arrow to the right of the Gain Mode displayed.
Step 2: Scroll up and down the list until the required mode is highlighted.
Step 3: Release the mouse button to select the highlighted gain mode.

Compensated

The Compensated gain mode is used for normal system operation. This mode automatically adjusts the image gain to compensate for package height and belt speed using the values calculated from the gain table resident in the camera.

Fixed

Fixed gain mode always uses the same gain for all package heights and belt speeds. This is only appropriate for camera systems that do not focus and have a constant, fixed belt speed. It can also be used for troubleshooting camera operation. When fixed gain mode is used, the **Fixed Gain Slider Bar** must also be set.

Fixed Gain Slider Bar

When using the **Fixed Gain Mode**, the fixed gain must be set. Use the **Fixed Gain** slider bar or arrows to set the value. Values are between 0 to 255 in increments of one. The current value displays in the text box. The arrows change the value by one per click. What this does is sets a fixed gain for all packages, regardless of height.

> **NOTE:** You must use the slider bar or arrows to set the **Fixed Gain** value. You cannot type a value into the field. The slider bar/arrows are disabled if Fixed Gain is not used.

SCAN LINE CLOCK

Scan Line Clock controls the frequency at which the camera clocks the CCD
sensor. The rate at which one line of the image is taken is proportional to the belt
speed and DPI. There are four types of scan line clocks: Speed Compensated,
Height Compensated, Direct Tach, and Fixed Frequency.
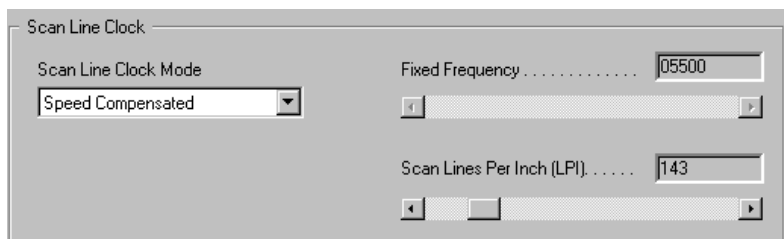
Scan Line Clock Window Segment

To select a **Scan Line Clock Mode**:
Step 1: Click the down arrow to the right of the mode displayed.
Step 2: Scroll up and down the list until the required mode is highlighted.
Step 3: Release the mouse button to select the highlighted mode.

Speed Compensated

This mode adjusts the scan line clock to compensate for the belt speed, to ensure
that the DPI in the direction of travel is consistent with the belt movement. This
mode is usually used in camera systems with fixed focus or with decoding
software that is unaffected by distorted images. AccuVisions systems using an
Accu-Sort decoder are usually set to use the speed compensated mode.

Height Compensated

This mode is used in OCR applications. This mode adjusts the scan line clock to
compensate for both belt speed and package height, so that the DPI in the
direction of travel always matches the image resolution DPI. This produces
square pixels necessary for OCR applications.

Direct Tach

This mode lets the belt encoder directly drive the scan line clock. The scan line is
strobed directly for each incremental move of the belt. This mode should only be
used if the encoder is of the proper resolution. This mode is only used in custom
applications or if instructed by Accu-Sort engineers.

Fixed Frequency

This mode sets the scan line clock at a fixed frequency regardless of the belt
speed. This mode is appropriate for certain non-typical applications that need to
define the DPI based on specific belt speed and camera optics. This mode may
also be used for troubleshooting. When this mode is used, the **Fixed Frequency
Slider Bar** must also be set.

Fixed Frequency Slider Bar

When using the **Fixed Frequency Scan Line Clock Mode**, the fixed frequency must be set. Use the **Fixed Frequency** slider bar or arrows to set the value. Values are between zero and 16,384.

> **NOTE:** You must use the slider bar or arrows to set the **Fixed Frequency** value. You cannot type a value into the field. The slider bar/arrows are disabled if Fixed Frequency is not used.

Scan Lines Per Inch Slider Bar

Use the **Scan Lines Per Inch** slider bar or the arrows to set the value. Values are between 80 and 500.

Hardware Pixel Correction

This box enables the camera's pixel correction circuitry. The image pixels are modified by calibration values learned at the factory to produce a more uniform image. This mode is enabled for normal use. Disabling it can result in poor image quality (individual pixel noise and non-uniform brightness). Disabling may be appropriate for troubleshooting to isolate image corruption problems or to have access to the raw pixel data that has not been modified in any way by the camera.

To enable or disable **Hardware Pixel Correction**:
Step 1: Click in the check box to activate **Hardware Pixel Correction**. A check mark appears in the box, indicating the function is enabled.
Step 2: If it is necessary to deactivate pixel correction and there is a check mark in the box, click the box to disable this mode.

> **NOTE:** There is no reason to disable hardware pixel correction except in trouble-shooting situations. Leave this function enabled for normal system operation.

DECODER DIAG TAB

The **Decoder Diag Tab** provides settings for enabling and disabling decoder diagnostics based on unrestricted or conditional decoder actions.

> ⚠ **WARNING:** The **Decoder Diag Tab** functions are intended for use by Accu-Sort trained and authorized technicians only. These actions should be enabled for diagnostic purposes only. They should not be left enabled after diagnostics are completed because they will dramatically affect decoder performance.

Modify Setup – Decoder Diag Tab

To view the diagnostic information and images that are enabled from the **Modify Setup / Decoder Diag Tab**, reference the **Diagnostics and Utilities / Decoder Monitor Tab** in **Chapter 4**.

UNRESTRICTED DECODER ACTION

If enabled, these unrestricted decoder actions will occur regardless of the conditions set in **Decoder Condition**.

Display Decode Messages on Decoder

Use this checkbox to enable or disable the systems ability to display all decoder messages. When enabled, these messages will appear in the **Rolling Text** window of the **Diagnostics and Utilities / Decoder Monitor Tab**.

Display Decode Images on Decoder

Use this checkbox to enable or disable the systems ability to display all decode images. When enabled, these package images will appear in the **Image Edit** window of the **Diagnostics and Utilities / Decoder Monitor Tab**.

DECODER CONDITION

Do Action when Decode String Found in List

When a bar code is decoded, the decoder compares the decode string with the strings entered in this list. If the decode string matches any string in this list, it will perform the enabled **Conditional Decoder Actions** located in the lower portion of the window.

To enable or disable Do Action when Decode String Found in List:

<u>**Step 1**</u>: Click in the check box to enable the action. A check mark will appear in the check box.

<u>**Step 2**</u>: If there is a check mark in the box, click the mark to disable the decoder condition.

To add strings to the list:

<u>**Step 1**</u>: Type the string into the field above the **Add** and **Remove** buttons.

<u>**Step 2**</u>: Click the **Add** button. The string will appear in the field below the **Add** button.

<u>**Step 3**</u>: To check the accuracy of the string you just entered, you can use the slider bar to view the entire string if it exceeds the width of the field.

To remove a string from the list:

Step 1: Click on the string to highlight it.

Step 2: Click the **Remove** button. The string will disappear from the field below the **Remove** button.

Do Action when Symbology Found in List

When a decode occurs, the decoder will compare the bar code data with the symbologies in this list. If the decoded bar code matches any symbology in this list, it will perform the enabled **Conditional Decoder Actions** located in the lower portion of the window.

To enable or disable Do Action when Symbology Found in List:

Step 1: Click in the check box to enable the action. A check mark will appear in the check box.

Step 2: If there is a check mark in the box, click the mark to disable the decoder condition.

To add symbologies to the list:

Step 1: Use the down arrow to display the drop-down menu of available symbologies.

Step 2: Highlight a symbology on the drop-down menu.

Step 3: Click the **Add** button. The selected symbology will appear in the field below the **Add** button.

To remove a symbology from the list:

Step 1: Click on the symbology to highlight it.

Step 2: Click the **Remove** button. The symbology will disappear from the field below the **Remove** button.

CONDITIONAL DECODER ACTION

> ⚠ **WARNING:** These actions should be enabled for diagnostic purposes only. They should not be left enabled after diagnostics are completed because they will dramatically affect decoder performance.

The enabled **Conditional Decoder Actions** occur if any of the conditions set in the **Decoder Conditions** are true.

To enable or disable Conditional Decoder Actions:

<u>**Step 1**</u>: Click in the check box to enable the action. A check mark will appear in the check box.

<u>**Step 2**</u>: If there is a check mark in the box, click the mark to disable the conditional decoder action.

Display Decode Image on Decoder

Use this checkbox to enable or disable the systems ability to display conditional decode images. When enabled, if any defined **Decoder Condition** is true (i.e.: found in list), these package images will appear in the **Image Edit** window of the **Diagnostics and Utilities / Decoder Monitor Tab**.

Save Decode Image on Decoder

> ⚠ **CAUTION:** If **Save Decode Image on Decoder** is enabled, this will create rather large files which will consume decoder resources and eventually affect performance. This function should not remain enabled during normal operation.

If any defined **Decoder Condition** is true (i.e.: found in list), the decoder will save the decode image to a sequential file name. The file name will be in the following format:

$$\text{SeqNum<SeqNum:10>\_<CodeNum:2>.Bmp}$$

where <SeqNum:10> is the 10 digit sequence number for the package and <CodeNum:2> is the code number for this decode. This first code number will be 1, the second will be 2, and so on.

For example: 0000000003_1.bmp is the file name for sequence number three, the first code read.

PKG MGMT DIAG TAB

The **Pkg Mgmt Diag Tab** provides settings for enabling and disabling diagnostics that can be used to monitor the tracking system. These diagnostics are used to determine whether or not the system is tracking packages correctly.

> ⚠ **WARNING:** The **Pkg Mgmt Diag Tab** functions are intended for use by Accu-Sort trained and authorized technicians only. These actions should be enabled for diagnostic purposes only. They should not be left enabled after diagnostics are completed because they will dramatically affect decoder performance.

Modify Setup – Pkg Mgmt Diag Tab

To view the diagnostic information and images that are enabled from **the Modify Setup / Pkg Mgmt Tab**, reference the **Diagnostics and Utilities / Decoder Monitor Tab** in **Chapter 4**.

UNRESTRICTED TRACKING ACTION

If enabled, these unrestricted tracking actions will occur regardless of the conditions set in **Tracking Condition**. *(See page 3-44 for details.)*

Display Box Image On Decoder

Use this checkbox to enable or disable the systems ability to display all box images. When enabled, these package images will appear in the **Image Edit** window of the **Diagnostics and Utilities / Decoder Monitor Tab**. *(These images are also displayed in the Decode View window located on the AVCore System Inspector Main Window.)*

Display Transmit Point Image On Decoder

Use this checkbox to enable or disable the systems ability to display all transmit point images. When enabled, these images will appear in the **Image Edit** window of the **Diagnostics and Utilities / Decoder Monitor Tab**. *(These images are also displayed in the Tracker View window located on the AVCore System Inspector Main Window.)*

Save Box Image On Decoder

> ⚠ **CAUTION:** If **Save Box Image On Decoder** is enabled, this will create rather large files which will consume decoder resources and eventually affect performance. This function should not remain enabled during normal operation.

When enabled, the Tracking Service saves the Box Image to a local sequential file name in the following bitmap format:

\Bmps\SeqNum<SeqNum:10>.Bmp

The bitmaps directory (Bmps) will be created as a subdirectory of the AVCore applications location.

PACKAGE DATABASE MODE

There are three **Package Database Modes**: Disabled, Transmit Point Image, and Box Image. The package database is a collection of package images stored in memory by AVCore. You can view the package database images by using the **Diagnostics and Utilities / Package History Tab**, *View Packages* feature. (See **Chapter 4**.)

(***add Package Database Mode drop-down menu here***)

Package Database Mode Window Segment

> ⚠ **WARNING**: A significant amount of processing resources (CPU time and memory) are used when a package database mode is used to save images. For this reason, the **Disabled** package database mode should be used during normal operations. *__Other modes should only be used for diagnostic purposes.__* To limit resource usage, only the most recent 16 package images are stored in the package database.

Disabled

When this mode is selected, the **Package Database Mode** is disabled. This mode should be selected during normal operation of your system.

Transmit Point Image

Select this mode for Transmit Point Images. When this mode is selected, AVCore copies Transmit Point Images from the Decode Engine's image buffer into the Package Database. A Transmit Point Image consists of the bounding edges of a package including the **Start Box** line (*green*) **End Box** line (*red*), **Decode Issue** line (*blue*), **Transmit Point** line (*white*) and **Decode dots** (*blue* for decoded bar code, *red* for bar codes not decoded). This image only includes valid image data within the bounding edges of a package, and excludes data before the Start Box line, after the End Box line and beyond the left and right edges of the package. The size of the image is determined by the **Image Compression Mode** selection. *(See page 3-48.)*

Box Image

Select this mode for Box Images. When selected, AVCore copies Box Images from the Decode Engine's image buffer into the Package Database. A Box Image consists of the entire width of the sensor, which is usually the width of the conveyor belt for the length (duration) of the package. This image includes the **Start Box** line (*green*) and the **End Box** line (*red*). The size of the image is determined by the **Image Compression Mode** selection. *(See page 3-48.)*

TRACKING CONDITION

The actions checked in this section occur as part of the tracking mechanism in the system. If enabled, these actions occur at the transmit point.

> ⚠ **USEFUL TIP:** When setting up a **Do Action** list, remember that as long as the **Do Action** box is not checked, no action is taken. To retain a list of actions, you may find it useful to simply disable the action by clicking on the checkbox rather than adding then removing an action from the list.

Do Action When Decode String Found In List

When transmit point occurs, the tracking service compares the decoded data strings in the current package's host message to the strings in this list. If any decode string matches any string in this list, it will perform the enabled **Conditional Tracking Actions** located in the lower portion of the window.

To enable or disable Do Action when Decode String Found in List:

Step 1: Click in the check box to enable the action. A check mark will appear in the check box.

Step 2: If there is a check mark in the box, click the mark to disable the decoder condition.

To add strings to the list:

Step 1: Type the string into the field above the **Add** and **Remove** buttons.

Step 2: Click the **Add** button. The string will appear in the field below the **Add** button.

Step 3: To check the accuracy of the string you just entered, you can use the slider bar to view the entire string if it exceeds the width of the field.

To remove a string from the list:

Step 1: Click on the string to highlight it.

Step 2: Click the **Remove** button. The string will disappear from the field below the **Remove** button.

Do Action When Symbology Found In List

When transmit point occurs, the tracking service will compare the decoded symbologies in the current package's host message to the symbologies in this list. If any symbology in the host message matches any symbology in this list, it will perform the enabled **Conditional Tracking Actions** listed in the lower portion of the window. *(For details, see page 3-47.)*

To enable or disable Do Action when Symbology Found in List:

<u>**Step 1**</u>: Click in the check box to enable the action. A check mark will appear in the check box.

<u>**Step 2**</u>: If there is a check mark in the box, click the mark to disable the tracking condition.

To add symbologies to the list:

<u>**Step 1**</u>: Use the down arrow to display the drop-down menu of available symbologies.

<u>**Step 2**</u>: Highlight a symbology on the drop-down menu.

<u>**Step 3**</u>: Click the **Add** button. The selected symbology will appear in the field below the **Add** button.

To remove a symbology from the list:

<u>**Step 1**</u>: Click on the symbology to highlight it.

<u>**Step 2**</u>: Click the **Remove** button. The symbology will disappear from the field below the **Remove** button.

Do Action When Number of Codes Found In List

When the transmit point occurs, the tracking service will compare the number of decodes in the current package's host message with the counts in this list. If the number of decodes in the host message matches any count in this list, it will perform the enabled actions listed in the lower portion of the window.

To enable or disable Do Action When Number of Codes Found In List:

Step 1: Click in the check box to enable the action. A check mark will appear in the check box.

Step 2: If there is a check mark in the box, click the mark to disable the tracking condition.

To add a count to the list:

Step 1: Use the down arrow to display the drop-down menu of numbers.

Step 2: Highlight a number on the drop-down menu.

Step 3: Click the **Add** button. The selected number will appear in the field below the **Add** button.

To remove a count from the list:

Step 1: Click on the number to highlight it.

Step 2: Click the **Remove** button. The number will disappear from the field below the **Remove** button.

CONDITIONAL TRACKING ACTION

The enabled **Conditional Tracking Actions** occur if any of the conditions set in the **Tracking Conditions** are true.

To enable or disable Conditional Tracking Actions:

Step 1: Click in the check box to enable the action. A check mark will appear in the check box.

Step 2: If there is a check mark in the box, click the mark to disable the conditional tracking action.

Display Transmit Point Image On Decoder

Use this checkbox to enable or disable the systems ability to display conditional transmit point images. When enabled, if any defined **Tracking Condition** is true (i.e.: found in list), these transmit point images will appear in the **Image Edit** window of the **Diagnostics and Utilities / Decoder Monitor Tab**.

Save Transmit Point Image On Decoder

> ⚠ **CAUTION:** If **Save Transmit Point Image on Decoder** is enabled, this will create rather large files which will consume decoder resources and eventually affect performance. This function should not remain enabled during normal operation.

If any defined **Tracking Condition** is true (i.e.: found in list), the Tracking Service will save the Transmit Point Image to a local sequentially named file in the following bitmap format:

\Bmps\SeqNum<SeqNum:10>.Bmp

The bitmaps directory (Bmps) will be created as a subdirectory of the AVCore applications location.

IMAGE COMPRESSION MODES

This feature enables you to select the type of image file compression used by the system. The more compressed a file is, the less disk space and resources used. The less compressed a file is, the more detailed the image, resulting in larger data files. Use the image compression modes in conjunction with the **Diagnostics and Utilities / Decoder Monitor and Package History Tabs** for monitoring and diagnosing decode performance. (See **Chapter 4**.)

ASI Compression

This image compression mode automatically uses an algorithm to compress the image file. This algorithmic computation is based on averaging the range of pixel variation in an image. Thus, the resulting file size is determined by the variation within the captured image. The more uniformity in an image, the greater the compression, which reduces the image file size. The less uniformity in an image (i.e..: the greater the variation), the lesser the compression, which increases the image file size.

> **NOTE:** When **ASI Compression** mode is selected, the **Down Sampled Image Divisor** slider bar cannot be used.

Down Sampling

This image compression mode enables you to determine the amount of file compression by down sampling the image. When an image is down sampled, only a selected number of pixels remain in the final image file, resulting in a reduced file size. The actual down sample number represents the number of pixels omitted in both the X and Y directions of the original image for the pixel-to-pixel display in the resulting image. The resulting image size will be determined by the following formula:

$$\textbf{Original image size} \div \textbf{n}^2$$

(Where "n" is your down sampled number.)

For example, with a down sample of eight every eighth pixel in both directions will be used for displaying or saving an image. Therefore, an image that is 10Mb in size will be displayed or saved as a 156K image.

> **NOTE:** When **Down Sampling** compression mode is selected, the **Down Sampled Image Divisor** slider bar can be used to define the amount of image down sampling (from zero to 16).

Down Sampled Image Divisor

> ⚠ **CAUTION:** While Accu-Setup provides the ability to save images in real-time by enabling functions such as **Save Box Image On Decoder** and **Save Transmit Point Image On Decoder**, these functions should only be used for diagnostic purposes since they seriously affect decoder performance. DO NOT leave these functions enabled during normal operation.

This feature is used to reduce the processing time and storage size of images that are saved or displayed when certain functions of the **Modify Setup / Pkg Mgmt Diag tab** and the associated **Diagnostic and Utilities / Decoder Monitor tab** have been enabled.

The larger the **Down Sampled Image Divisor** (between one and 16) the lower the image resolution. Since images can be as much as 5MB to 32MB, higher settings (eight or above) are recommended.

The lower the **Down Sampled Image Divisor** (especially when below five), the more storage and processing time is used, which will affect system performance.

To set the **Down Sampled Image Divisor**:
Use the scroll bar or the arrows to set the value from one to 16.
(The recommended setting is eight or higher. The default setting is eight.)

Since the down sampling setting can result in the storage of rather large files, an alert message, such as the one shown below, is displayed to warn you that you may be adversely affecting system performance, especially if setting down sampling lower than eight.
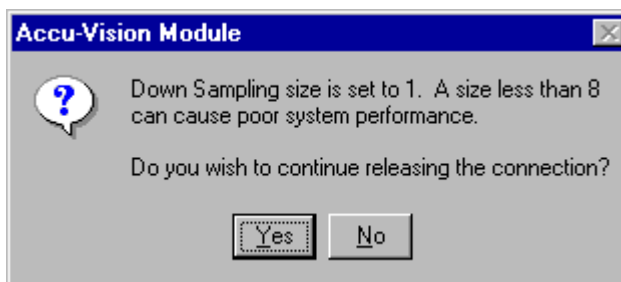
Alert Message – Down Sampling

> ✋ **NOTE:** The **Down Sampled Image Divisor** setting will only affect displayed or saved images. It does not affect images being processed by the decoder.

LOGGING TAB

The **Logging Tab** contains the names of all of the logs available through Accu-Setup. Enabling the logs can affect system performance so, be careful which logs are enabled. Log data is sent out the Host port on the SMIO. There are four categories of logs: SMIO, Decoder, Alarm Mask, and Message Mask.

> ⚠ **WARNING:** The **Logging Tab** functions are intended for use by Accu-Sort trained and authorized technicians only. These logs are for diagnostic purposes only. While these features can be enabled through Accu-Setup, some of them cannot be viewed via Accu-Setup. **No changes should be made to this tab** unless otherwise authorized by an Accu-Sort trained and authorized technician.

Modify Setup – Logging Tab

To view the SMIO and decoder logs enabled from **the Modify Setup / Logging Tab**, reference the **Diagnostics and Utilities / Logging Diagnostics Tab** in **Chapter 4**.

SMIO LOGGING

The SMIO automatically stores certain user-selectable events occurring on the SMIO board when these logs are enabled. Data can be collected on trigger, tracking, imaging, communication, and system status events. The SMIO log contains the last 30 events.

To enable or disable a log:

Step 1: Click in the box next to the SMIO log that the system should automatically maintain. A check will appear in the box.

Step 2: If a check appears in the box next to a log, the system is saving that item.

Step 3: To disable a log, clear the box by clicking the check mark. A log is disabled when the box is empty.

SMIO Logs	Description
Trigger Log	Details on the SMIO Logs are provided to Accu-Sort trained and authorized technicians only.
Tracking Log	
Imaging Log	
Communications Log	
System Status Log	

DECODER LOGGING

The system will automatically store certain user-selectable decoder data when these logs are enabled. Data can be collected on decoder, tracking, configuration, and system status. Each time a log is enabled, it overwrites the previous log information. All log files are stored (saved) in the application root directory of the AVCore executable.

> **CAUTION:** Use these logs for diagnostics purposes only. The **Decoder Logging** is not limited in size. Collecting data in this log during normal system operation will impact system performance and will expend hard drive space.

To enable or disable a log:

Step 1: Click in the box next to the decoder log that the system should automatically maintain. A check will appear in the box.

Step 2: If a check appears in the box next to a log, the system is saving that item.

Step 3: To disable a log, clear the box by clicking the check mark. A log is disabled when the box is empty.

Decoder Logs	Description
Decoder Log	Details on the Decoder Logs are provided to Accu-Sort trained and authorized technicians only.
Tracking Log	
Configuration Log	
System Status Log	

ALARM MASK

⚠	**NOTE:** The **Alarm Masks** are diagnostic messaging tools. They are factory preset. These should not be changed unless instructed to do so by an Accu-Sort trained and authorized technician. ***While the alarm masks are enabled through Accu-Setup, they cannot be viewed through Accu-Setup***.

Alarm Mask	Description
Focus Fault	
Illumination Fault	
Under Temperature	
Over Temperature	Details on the Alarm Masks are provided to Accu-Sort trained and authorized technicians only.
Right Lamp	
Left Lamp	
Main Temperature	
Display Status	

MESSAGE MASK

⚠	**NOTE:** The **Message Masks** are diagnostic messaging tools. They are factory preset. These should not be changed unless instructed to do so by an Accu-Sort trained and authorized technician. ***While the message masks are enabled through Accu-Setup, they cannot be viewed through Accu-Setup.***

Message Mask	Description
Start / End Package	
Carton Length	
Carton Height	
Conveyor / Errors	Details on the Message Masks are provided to Accu-Sort trained and authorized technicians only.
Alarms / Faults	
Image Valid Reset	
Power-up / Reboot	

OUTPUTS TAB

The **Outputs Tab** is used to define the active time, output signal, and condition that causes activation of up to four optional digital outputs. These outputs can be used to operate various external mechanisms including package diverters, warning lights, and visual and/or audible alarms.
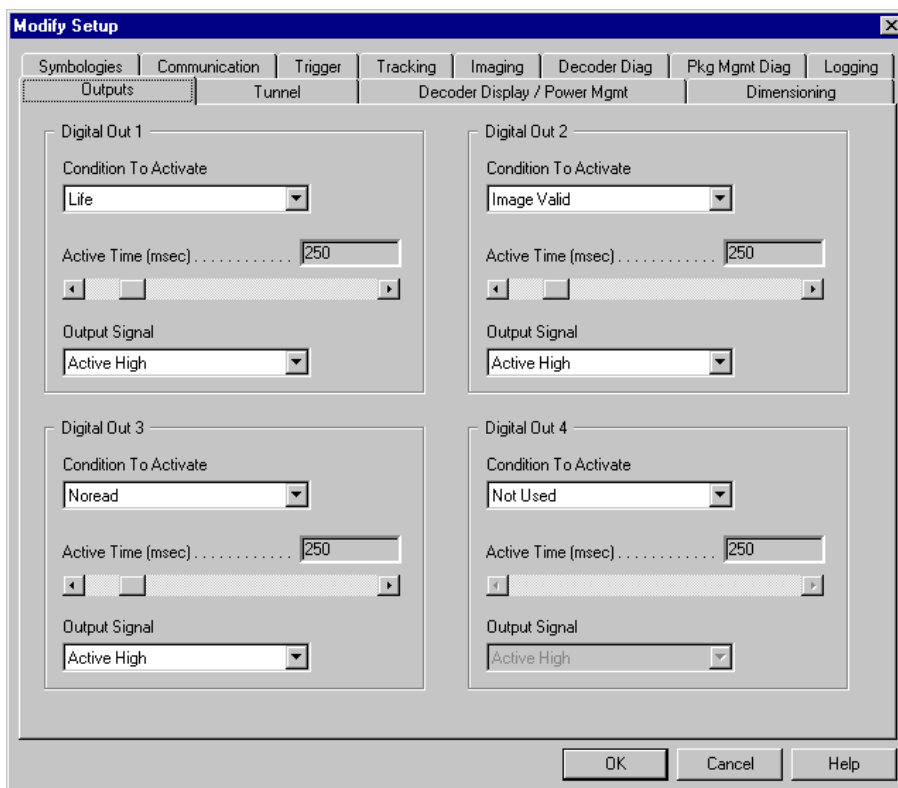
Modify Setup – Outputs Tab

Typically, when these outputs are used, it is through an Accu-Sort Quad Relay box that connects to the camera's **I/O** port. As an interface with the camera, Accu-Setup enables you to determine how the devices connected to these digital outputs will operate.

> **NOTE:** For details on the **Accu-Sort Quad Relay box** that can be used in conjunction with the **Modify Setup / Outputs Tab** to activate up to four external devices, contact your Accu-Sort representative. (Also see **the Diagnostics and Utilities / Output Tab** in **Chapter 4**.)

There are four window segments on the **Outputs Tab**, one for each of the four digital outputs (i.e.: Digital Out 1 through Digital Out 4). While each output may be assigned to manage individual tasks, setting the parameters for each is handled the same for all four digital outputs.

CONDITION TO ACTIVATE

Setting the **Condition To Activate** is dependent on what function the external device (to which the digital output is connected to) will be performing. There are six options available from the **Conditions To Activate** drop-down menu as defined below.
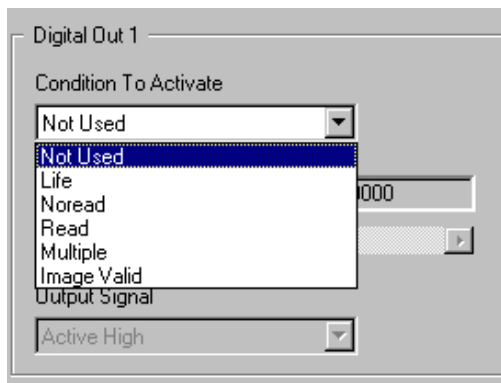
Condition to Activate Drop-down Menu

Conditions to Activate	Description
Not Used	The digital output is not used.
Life	Activates when SMIO powers up and initializes.
No read	Activates at transmit point if any field in the host message is a no read.
Read	Activates if all the fields in the host message are read data.
Multiple	Activates if more than one bar code of the type enabled is decoded.
Image Valid	Activates for the duration an image is valid or for a set period of time, whichever is shorter.

> **NOTE:** The Read, No read, and Multiple conditions are based on what bar codes your system is set-up to decode. See the **Modify Setup / Symbologies Tab** for details on how to define the symbologies your system will read.

Active Time

The active time defines the length of time the digital output signal is active. This time is dependent on your specific application. You need to determine the amount of time (in milliseconds) that the digital output signal should remain activated, then set the active time.

To set the active time:
Use the slider bar or the arrows to set the value in the window. Values in the window are between zero to 2000.

> **NOTE:** You must use the slider bar or arrows to set this value. You cannot type a value into the window. The slider bar/arrows are disabled if the digital output is not being used.

Output Signal

The output signal can be set for either **Active High** or **Active Low**.
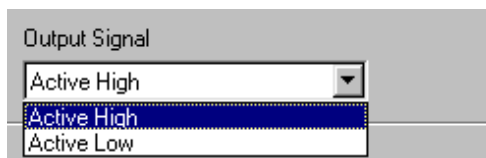
Output Signal Drop-down Menu

To select the **Output Signal**:

<u>Step 1</u>: Use the down arrow to display the drop-down window.

<u>Step 2</u>: Highlight either active high or low. The highlighted selection appears in the field under **Output Signal**.

Example Output Set-up

Set **Digital Output 1** to trigger an alarm for about 1000 milliseconds when a no read occurs with a high output signal when activated:

<u>Step 1</u>: In the **Digital Output 1** window segment of the **Outputs Tab**, use the **Condition To Activate** down arrow to display the drop-down menu.

<u>Step 2</u>: Highlight **Noread** on the drop-down menu. **Noread** will appear in the field under **Condition To Activate**.

<u>Step 3</u>: Go to the **Active Time (msec)** slider bar and use the slider bar or arrows to set the time for **1000**. This time will appear in the field to the right of the words **Active Time (msec)**.

<u>Step 4</u>: Use the **Output Signal** down arrow to display the drop-down menu.

<u>Step 5</u>: Highlight **Active High** on the drop-down menu. **Active High** will appear in the field under **Output Signal**.

TUNNEL TAB

The **Tunnel Tab** provides settings for applications where camera(s) are used to read bar codes on multiple sides of packages. The **Tunnel Tab** is used to enable or disable multi-sided imaging mode, tunnel focus mode for applications using an Accu-Sort DM-3000 dimensioning unit, and also identifies the active tunnel configuration for the camera currently connected with Accu-Setup.
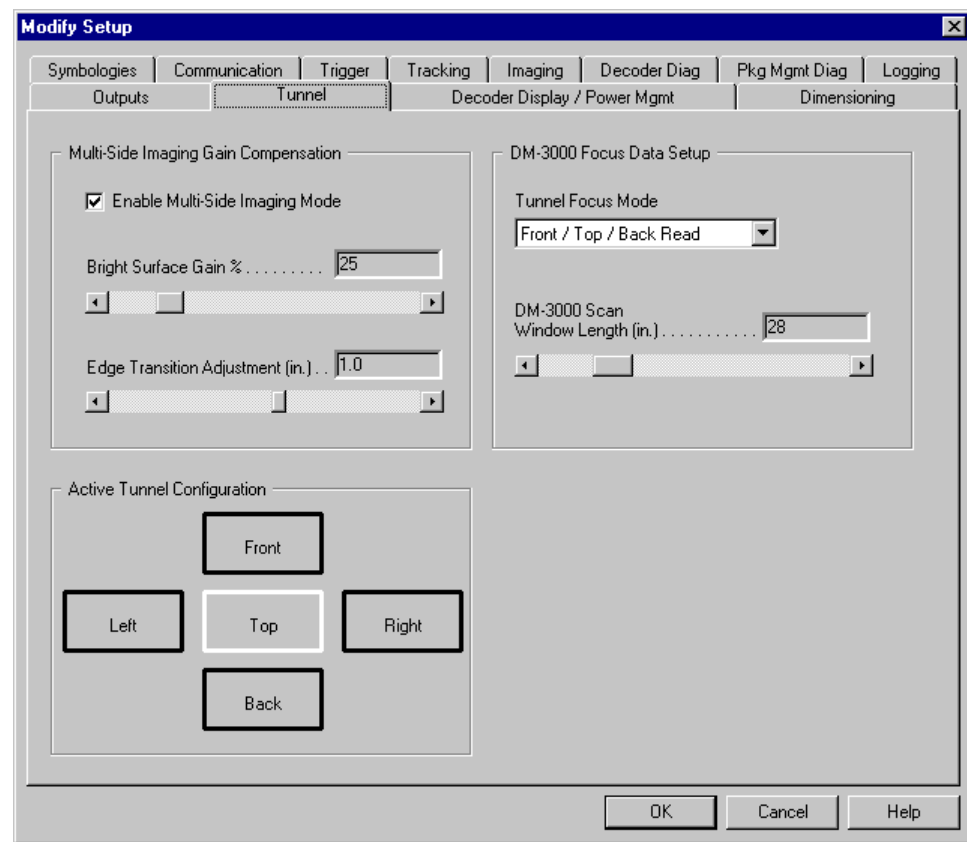
Modify Setup – Tunnel Tab

MULTI-SIDE IMAGING GAIN COMPENSATION

This function is used when a camera is mounted to read more than one surface of packages (e.g: codes are located on the front and top or top and back of packages passing through the scanning area). In multi-sided imaging applications, it is necessary to make adjustments to the bright surface gain percentage and edge transition to assure optimal system performance.

```
┌─ Multi-Side Imaging Gain Compensation ──────────┐
│                                                 │
│   ☑ Enable Multi-Side Imaging Mode              │
│                                                 │
│                                                 │
│   Bright Surface Gain % . . . . . . . . .  25   │
│   ◄ │     ▊                            │ ►       │
│                                                 │
│                                                 │
│   Edge Transition Adjustment (in.) . .  2.0     │
│   ◄ │                  ▊                │ ►       │
│                                                 │
└─────────────────────────────────────────────────┘
```
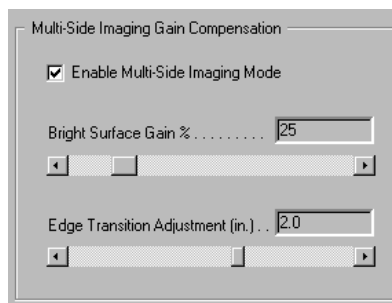
Multi-Side Image Gain Compensation Window Segment

Enable Multi-Side Imaging Mode

If the camera reads codes on more than one surface of a package, be sure this function is enabled. A checkmark should appear in the checkbox. When enabled, both the **Bright Surface Gain %** and **Edge Transition Adjustment (in.)** will also be activated.

Bright Surface Gain %

This slider bar is used to adjust the gain values to compensate for variations in light reflected back into the camera from the different surfaces of the packages.

> ⚠ **IMPORTANT TIP:** To adjust for the brightest surface, it is recommended that packages be run through the scanning area while making this adjustment.

To set the bright surface gain percentage:
Use the slider bar or arrows to set the value from zero to 150.

Edge Transition Adjustment (in.)

This slider bar is used to compensate for any slight offset from where the camera detects the package edge (or transition line) between two surfaces and where the edge physically is on the package.

To set the edge transition adjustment:
Use the slider bar or arrows to set the value from - 9.9 to 9.9.

DM-3000 FOCUS DATA SETUP

This **Tunnel Tab** window segment is used to identify the camera tunnel focus mode and set the DM-3000 scan window length for applications that are using the Accu-Sort DM-3000 dimensioning unit.
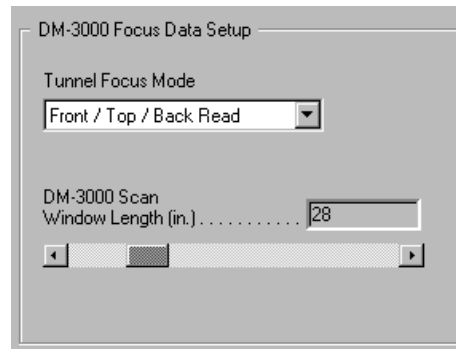
DM-3000 Focus Data Setup Window Segment

Tunnel Focus Mode

There are four options provided in the **Tunnel Focus Mode** drop-down menu: Off (No DM-3000), Front/Top/Back Read, Left Side Read, and Right Side Read.

DM-3000 Scan Window Length (in.)

This value needs to match the parameter set in the Accu-Sort DM-3000 dimensioning unit.

To set the DM-3000 scan window length:
Use the slider bar or the arrows to set the value from 20 to 60.

> **NOTE:** For details on the **Accu-Sort DM-3000** dimension unit, refer to the product manual provided with the equipment, or contact your Accu-Sort representative or Customer Service.

ACTIVE TUNNEL CONFIGURATION

This window segment identifies the type of camera mounting being used by the camera to which Accu-Setup is connected. This is determined by the **Tunnel Focus Mode** and **Relative Camera Angle**.
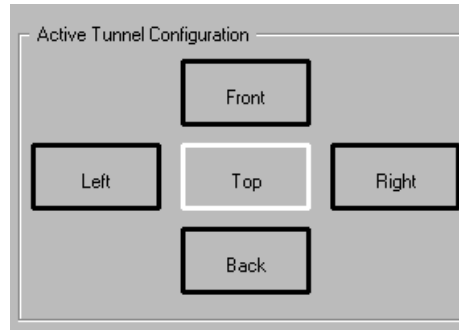
Active Tunnel Configuration Window Segment

There are five boxes displayed in this area: Top, Front, Back, Left, and Right. The **white box** indicates the type of configuration being used by the camera currently connected to Accu-Setup. In the example window segment, the Top configuration is being used.

The **Active Tunnel Configuration** is associated with the **Relative Camera Angle** that is set using the **Modify Setup / Tracking Tab / Camera Mounting** window segment. *(For details, see page 3-29.)*

Relative Camera Angle (deg.)	Active Tunnel Configuration
Between -45 and -16	Front
Between -15 and +15	Top
Between +16 and +45	Back

DECODER DISPLAY/POWER MGMT TAB

The **Decoder Display/Power Mgmt Tab** is provided for AccuVision Systems that utilize the Accu-Sort APC100 as the Decoder. Use this tab to enable the APC100 remote display and to protect the decoder in the event of a power failure or system shutdown.

> **WARNING:** These settings are factory-preset. They should not be changed unless you are instructed to do so by an Accu-Sort trained and authorized technician.
>
> If you physically switch the COM port of either the power monitor or UPS monitor and it is different than what is indicated in Accu-Setup, the system initiates a safe shutdown.

Modify Setup – Decoder Display/Power Mgmt Tab

> **NOTE:** These functions are only intended for use with an APC100 Decoder because of the specific internal hardware required. They are not intended for use on systems using a desktop PC.

REMOTE DISPLAY

When an APC100 Decoder is used, this feature is used to enable/disable communications with the APC100 and its two-line LCD display. This function should be disabled for applications not using an APC100. (For details on messages displayed on the APC100, go to the **Appendix D** in **Chapter 6**.)

Enable Remote Display

When checked, the remote display is enabled. To disable the remote display, click in the checkbox to remove the checkmark.

Com Port

The Com Port drop-down menu enables the selection of Com Port 1 through Com Port 4. The default for this setting is Com Port 2.

To change the Com Port setting:
Step 1: Use the **Com Port** down arrow to display the drop-down menu.
Step 2: Highlight the desired port setting on the drop-down menu. The selected port will appear in the field under **Com Port**.

Remote Display Port Settings

This field identifies the communications settings for the APC100.

To change the communication setting for the port:

Step 1: Click the arrow to the right of the current settings.

Step 2: When you click the arrow, a **Port Settings** window appears. This window contains the settings for each communication parameter. Upon opening, all values displayed in these fields are the current settings.
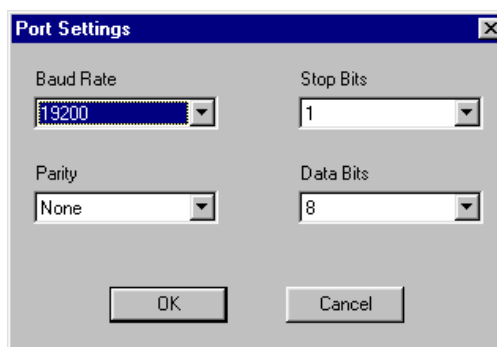
Port Settings Window

Step 3: Click the down arrow to the right of each current setting to display the choices available.

Step 4: Change the settings for any or all of the options as necessary. The options are as follows:

Settings	Available Options
Baud Rate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Stop Bits	1 or 2
Parity	None, Even, Odd
Data Bits	7 or 8

Step 5: Click **OK** to enable new settings or **Cancel** to return to previous settings.

POWER MONITOR

Enable Power Switch Monitor

Use this feature to enable the APC100 to monitor the power switch so that if the switch is set to the OFF position, the system will perform a "safe" shutdown. This is useful in applications where the entire system is shutdown from a single location. When enabled, the APC100 will perform a structured shutdown (i.e.: AVCore will shutdown and then perform a proper Windows shutdown).

True Level of a Soft Power Switch (power is on)
    Logic Zero (Low at Connector)
    Logic One (High at Connector)

Enable UPS Monitor

This feature enables the APC100 to perform a "safe" shutdown when the system uses an uninterruptable power supply for backup. If the UPS runs out of power, the APC100 will perform a structured shutdown (i.e.: AVCore will shutdown and then perform a proper Windows shutdown).

True Level of a Power Failure Notification
    Logic Zero (Low at Connector)
    Logic One (High at Connector)

DIMENSIONING TAB

The **Dimensioning Tab** is used with camera systems that incorporate the optional VisionCube dimensioning software. The VisionCube dimensioning software provides the AccuVision system with more complete product dimensioning information than available through the use of a light curtain without requiring the addition of a DM-3000 Dimensioning Unit.

Modify Setup – Dimensioning Tab

> **IMPORTANT:** For all VisionCube dimensioning functions, the APC100 must have a valid license that allows for the reception of dimensioning parameters. If the parameters are set in Accu-Setup, but there is no valid license on the Decoder, then the following message appears in the **Details** window of **AVCore**:
>
> **Dimensioning not allowed**
>
> For additional information on *VisionCube Dimensioning Software*, contact *Accu-Sort Customer Service at 1-800-BAR-CODE.*

If your system is capable of dimensioning, you will be able to access and modify the dimensioning parameters. In order to use dimensioning features, the **Dimensioning Enabled** checkbox should be checked.

DIMENSIONING PARAMETERS

> **NOTE:** Typically, the only values that will change based on your application are: **Camera Tilt Angle, Average Black Level, Minimum Package Dimension, Reference Heights, and Reference X Densities**. Both the Reference Heights and Densities are very important. Dimensioning will not work accurately unless these values are set correctly.

Left X

Use this field to set the number of pixels of the *left bound* (distance from the left side of package) in package dimensioning. The minimum value that can be entered in this field is 0; the maximum value is 20,000 pixels.

To reset the field to the default value of 0, click the **Default All** button.

Right X

Use this field to set the number of pixels of the *right bound* (distance from the right side of package) in package dimensioning. If this is set to 0, then the right bound is set to the farthest right pixel of the image. The minimum value that can be entered in this field is 0; the maximum value is 20,000 pixels.

To reset the field to the default value of 0, click the **Default All** button.

Vertex Offset

The value of this key is an offset, in inches (millimeters), which is used in computing the vertex element. The minimum value that can be entered in this field is 0; the maximum value is 20,000 inches.

To reset the field to the default value of 0, click the **Default All** button.

Optical Center X

Use this field to set pixel position of the optical centerline for dimensioning. This value should be set accurately for optimum dimensioning performance, and it is especially important when compensating package dimensioning for distortion due to perspective. The minimum value that can be entered in this field is -1; the maximum value is 20,000 pixels. If the **Optical Center X** is set to -1, then this value sets the position so the center pixel of the captured frame is used as the optical centerline.

To reset the field to the default value of -1, click the **Default All** button.

Reference Height 1

> **IMPORTANT:** Both the **Reference Heights** and **Reference X Densities** are very important. Dimensioning will not work accurately unless these values are set correctly. The decoder requires density samples at two heights in order to correctly dimension packages.

Use this field to set the height for specifying sampling density **Reference X Density 1**. The minimum value that can be entered in this field is 0; the maximum value is 200 inches (millimeters).

To reset the field to the default value of 0, click the **Default All** button.

Reference Height 2

Use this field to set the height for specifying sampling density **Reference X Density 2**. The minimum value that can be entered in this field is 0; the maximum value is 200 inches (millimeters).

To reset the field to the default value of 0, click the **Default All** button.

Reference X Density 1

> **IMPORTANT:** Both the **Reference Heights** and **Reference X Densities** are very important. Dimensioning will not work accurately unless these values are set correctly. The decoder requires density samples at two heights in order to correctly dimension packages.

Use this field to set the X-axis sampling density at **Reference Height 1**. This value together with the **Reference Density 2**, **Reference X Height 1** and **Reference X Height 2** are used to determine the sampling density in the X-axis direction as a function of package height, which is important when compensating package dimensioning for distortion due to perspective. Linear interpolation is used to determine sampling density at heights other than the reference heights. For greater accuracy, the values for **Reference Height 1** and **Reference Height 2** should be selected so they are as far apart as is practical for the application.

The minimum value that can be entered in this field is 0; the maximum value is 20,000 pixels/inch (pixels/meter).

To reset the field to the default value of 4000, click the **Default All** button.

Reference X Density 2

Use this field to set the X-axis sampling density at **Reference Height 2**. This value together with the **Reference Density 1**, **Reference X Height 1** and **Reference X Height 2** are used to determine the sampling density in the X-axis direction as a function of package height, which is important when compensating package dimensioning for distortion due to perspective.

The minimum value that can be entered in this field is 0; the maximum value is 20,000 pixels/inch (pixels/meter).

To reset the field to the default value of 4000, click the **Default All** button.

Minimum Package Dimension

Use this field to set the minimum height limit of a package that is to be detected by the object-sensing device. The minimum value that can be entered in this field is 0; the maximum value is 500 inches (millimeters).

To reset the field to the default value of 51, click the **Default <u>All</u>** button.

Expand Y

Adjust to the top (distance from the top side of package) and bottom (distance from the bottom side of package) bounds for dimensioning when the Top Y and/or Bottom Y parameters are defaulted as -1. Although normally this value will not be negative, a negative value may be used to contract the top and bottom dimensioning bounds. The unit of adjustment is millimeters. The minimum value that can be entered in this field is -500; the maximum value is 500 inches (millimeters).

To reset the field to the default value of 0, click the **Default <u>All</u>** button.

Average Black Level

Use this field to manually set the average black level of the background on which scanned objects travel (e.g., the value of the transport's black level). The application presumes that the level is basically uniform throughout the background, so the Average Black Level value is extrapolated for the entire background. The minimum value that can be entered in this field is 0 (solid black); the maximum value is 255 (solid white) as a RGB (red, green and blue color mode) pixel.

To reset the field to the default value of 20, click the **Default <u>All</u>** button.

Camera Tilt Angle

Use this field to set the tilt angle of the camera's imaging plane with respect to the standard plane that is relative to the transport's fixed plane. Positive angles indicate forward tilt (i.e., tilt in the direction of transport motion). Negative angles indicate backward tilt. When the tilt is accurately set, it improves the results of the dimensioning, especially for taller objects. The minimum value that can be entered in this field is -60; the maximum value is 60 degrees.

To reset the field to the default value of 8, click the **Default <u>All</u>** button.

Dimensioning Enabled

Use this checkbox to enable or disable the dimensioning function. To enable dimensioning, place a check in the **Dimensioning Enabled** field checkbox. Dimensioning will not be performed unless this field is enabled, even if your system includes dimensioning capabilities. To disable the dimensioning function, uncheck the **Dimensioning Enabled** checkbox.

Adjustment 1

> ⚠️ **WARNING:** Modify this parameter only when instructed to do so instructed by an Accu-Sort trained and authorized technician.

This field is for fine-tuning dimensioning and is customized to each specific application. The minimum value that can be entered in this field is 0; the maximum value is 200.

To reset the field to the default value of 8, click the **Default <u>A</u>ll** button.

<u>D</u>efault All

When you click this button, all dimensioning parameters are returned to the original factory-preset default parameters for dimensioning.

| Chapter Four | ▼ | *Contents* |

| **Diagnostics and Utilities** |

CHAPTER 4: DIAGNOSTICS AND UTILITIES

The **Diagnostics and Utilities** window provides access to a series of tools used for monitoring system performance and diagnosing and troubleshooting various operating conditions. These tools are organized into functional groupings identified by eight tabs across the top of the **Diagnostics and Utilities** screen.

Diagnostics and Utilities Tab Selections

To access this screen, click the **Diagnostics and Utilities** button on the Accu-Setup Main Window button menu.
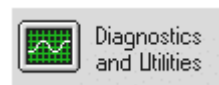
Diagnostics and Utilities Button

☞	**NOTE:** The **Diagnostics and Utilities** tabs may also be accessed through the **Utilities** drop-down menu located at the top of the **Accu-Setup Main Window**. Note that when Diagnostics and Utilities is selected, the **System Status** tab is automatically displayed.

The diagnostics and utilities features enable the user to check how changes made using the **Modify Setup** functions affect system performance or evaluate current system performance to see where improvements can be made.

⚠	**CAUTION:** Many of the features available through the **Diagnostics and Utilities** tabs are *__intended for diagnostic and troubleshooting purposes only__*. In many cases, it is recommended that these functions be used only by Accu-Sort trained and authorized service technicians. Since some of these diagnostic and utilities can significantly affect system performance, it is also recommended that these function should not remain enabled during normal system operations.

☞	**USEFUL TIP:** The Accu-Setup tab screens provide a **Help** button at the bottom right-hand of each screen. By clicking the **Help** button, you can access topics related to that screen in *__Accu-Setup: AccuVision Module Help__*. (If there is no information for that specific screen, an error message is displayed.) The online help **Contents** and **Search** features can also be accessed from the **Help drop-down menu**. (See **Chapter 5** for details.)

SYSTEM STATUS TAB

When the **Diagnostic and Utilities** function is selected (either from the button menu or **Utilities** drop-down menu), the first screen displayed is the **System Status** tab. This tab is the primary system status window containing all current system statistics. Accu-Setup updates these statistics approximately once per second. The window is divided into two parts: **SMIO Status** and **Decoder Status**.

Diagnostics and Utilities – System Status Tab

SMIO Status

The **SMIO Status** window segment of the **System Status** tab provides operational diagnostic information that may be used to evaluate the camera's performance. The information shown in this window segment is current (to within one second) and provides the data for the last package scanned by the camera.

SMIO Status Window Segment

Belt Speed (fpm)

Defines the current belt speed in feet per minute. The belt speed is used to adjust the camera scan line rate to produce the least amount of distortion and yield the highest scan rate. When an external tach encoder is used, the belt speed shown is provided by the device. If the system has been set to use an internal tach, this setting is displayed, regardless of the actual belt speed.

Focus Height

Indicates the current camera far distance focus height dimension (i.e.: the height of the box currently being imaged). The focus height should be set as closely as possible to the actual height of packages being scanned by the camera so that the camera will need to make little or no adjustment of its focus mechanism between packages. Fine-tuning the height adjustment can yield more accurate read rates during normal operation.

Gain Value

Displays the current analog-to-digital gain for the last package. The gain defines the intensity of light reflected from the package to the camera sensors. This value is defined by the Gain Table, which is uploaded to the camera's sensors, causing them to adjust the gain based on package height and belt speed. If either too much or too little light is received by the camera's sensors, it is possible that bar codes will not be decoded.

> **NOTE**: For further details on the gain table, see the **Modify Gain Table** selection located in the **Utilities** drop-down menu. (See **Chapter 5**.) Do not make changes to the gain table unless under the supervision of an Accu-Sort authorized and trained technician.

DPI

Displays the DPI (dots per inch) at the focus height of the last package scanned.

Temperature

Indicates the current internal temperature of the camera. The temperature indicator is either green or red. Green indicates that the temperature is within acceptable ranges. Red indicates that the temperature is out of range and the system should be shut down to cool.

Tach Count

Defines the total tach count (i.e.: the number of pulses received from the tachometer per minute). It is used to indicate that the belt is moving. The tach count shown in this field continues until either the counter rolls over or the system is restarted, at which point the count begins from zero. Because both the tach count and camera resolution are closely associated with each other, if you notice a change in camera performance, it may be as a result of changes in the tachometer.

Elapsed Time (sec)

Indicates the total elapsed time (in seconds), that the camera has been running. Compare this elapsed time with the elapsed time of the decoder (in the Decoder Status window segment) to determine if there was any time during which the camera was operational that the decoder was not or vice versa.

Lamp (No Status)

The **lamp** status indicator is not on this version of Accu-Setup. (For details on the **Smart Illumination Setup and Diagnostic** function available from the **Utilities** drop-down menu, see **Chapter 5**.)

> **NOTE: SMIO Status / Lamp** indicator on previous Accu-Setup versions - These indicators show that the SI20 sodium illumination (lamps) are lit and operating within a normal range. Green indicates the lamp is operating normally. Red indicates a fault. Single illumination systems have only one indicator and the on-screen text reads **Main Lamp** rather than **Left** and **Right**.

Total Package Count

Shows the total number of packages detected since the values were last cleared. To clear all counts, click on **Reset SMIO Counts** button. The counts are also cleared whenever the system is restarted.

Total Error Count

The total of all of the errors that have occurred since the SMIO was last cleared. If an excessive number of errors appears in this field, it indicates a problem with system performance. To clear all counts, click on **Reset SMIO Counts** button. The counts are also cleared whenever the system is restarted.

Decode Too Late

Defines the number of times the SMIO did not have the decode results at the transmit point. This is a valid value only in decoder systems. To clear all counts, click on **Reset SMIO Counts** button. The counts are also cleared whenever the system is restarted.

Current Package ID

Identifies the current package being detected. The system keeps data on the last 16 packages processed. ID numbers are between zero and 15.

> **NOTE**: The **Package ID** is a sequence number assigned to the package by the SMIO. This is an option that is activated when setting the host message. For details, see the **Modify Setup / Communications tab** in **Chapter 3**.

Reset SMIO Counts Button

Click this button to reset the following fields to zero: Total Package Count, Total Error Count, and Decode Too Late. These fields will continue to count until either the reset button is used or the system is restarted.

DECODER STATUS

This segment of the **System Status** tab is used to monitor the status of the decoder.

> **NOTE:** In an image-only application where a decoder is not used, the **Decoder Status** segment of the **System Status** tab will not be active.

```
Decoder Status
Belt Speed (fpm) . . 236        Mult Read . . . . . . . 0        Total Package Count . 40
Line Rate . . . . . . . 5907     Elapsed Time . . . . 935        Total Error Count . . . . . 0
Read Rate (%) . . . 100          No Read Count . . . 0          Current Scan Line . . . . 5280839
Decoder Mode . . . Framed Mode.                                 Current Package ID . . 39
     ● SMIO Link              ● Decoder Running          Reset Decoder Counts
```

Decoder Status Window Segment

Belt Speed (fpm)

The decoder belt speed should be nearly equal to the camera belt speed shown in SMIO Status. The decoder belt speed is defined by the decoder's sampling density (i.e.: the number of scan lines per inch of belt travel and the scan line frequency). If the SMIO and Decoder belt speeds are not comparable, it may require an adjustment to the belt speed from the SMIO.

> **NOTE**: A belt should be continuously moving during normal operations, preferably at the correct speed, to assure optimal system performance. It is recommended that a belt never be stopped when packages are present in the scan area.

Line Rate

Shows the number of scan lines the decoder collects each second.

Read Rate (%)

Defines the percentage of total packages that had all valid read fields transmitted in host message. This is calculated when the **No Read Count** is subtracted from the **Total Package Count**.

Decoder Mode

Defines the decoder is functioning in either Framed, Standby or SDFS Error mode.

Decoder Mode	Description
Framed	This is the normal tracking mode. The decoder is looking at sections of the conveyor where packages exist.
Standby	Identifies when the decoder is stopped externally through a software command or through AVCore's interface.
SDFS Error	Identifies when the decoder is not running due to an error condition. The decoder needs to be restarted.

SMIO Link

This SMIO status indicator is used to identify the following conditions.

Status Indicator	Description
Green	Connections are correct and operating properly (GO or OK status).
Yellow	A connection problem is causing an interruption of power or communications.
Red	Connection between Accu-Setup and the camera has been lost (No Go, disconnected, or error status).

Decoder Running

This decoder status indicator is used to identify the following conditions.

Status Indicator	Description
Green	Connections are correct and operating properly (GO or OK status).
Yellow	A connection problem is causing an interruption of power or communications.
Red	Connection between Accu-Setup and the camera has been lost (No Go, disconnected, or error status).

Mult Read

Identifies the number of packages that had at least one multiple field in the host message. This number cannot be higher than the total number of packages.

Elapsed Time

Shows number of milliseconds since AVCore initialized. Under normal operation, this should be close to the SMIO elapsed time.

No Read Count

Shows the number of packages that had all no-read fields in the host message.

Total Package Count

This count is the total number of packages detected since the values were last cleared. To clear all counts, click on **Reset Decoder Counts** button. The counts are also cleared whenever the system is restarted.

Total Error Count

This count is the total number of tracking errors since the last time the system was either initialized or reset. Tracking errors could be caused by:

- The decoder service cannot start a new decode frame, possibly because the previous frame was not ended.
- The tracker service cannot add the new package to the package table
- The decode service cannot end a frame, possibly because it was never started.

Current Scan Line

Displays the absolute scan line count (via 64-bit counter) since the system initialized.

Current Package ID

Identifies the current package being detected. The system keeps data on the last 16 packages processed. ID numbers are between zero and 15.

> **NOTE**: The **Package ID** is a sequence number assigned to the package by the SMIO. This is an option that is activated when setting the host message. For details, see the **Modify Setup / Communications tab** in **Chapter 3**.

Reset Decoder Counts

Click the **Reset Decoder Counts** button to reset the following counts to zero: Read Rate, Mult Read, No Read Count, Total Package Count, Total Error Count, and Current Package ID.

SMIO COM TAB

The **SMIO Com Tab** is used to test all system communication to assure everything is working correctly. The **SMIO Com tab** also displays a running count of various messages received and transmitted by the host, decoder, and illumination devices.

Diagnostics and Utilities – SMIO Com Tab

SEND TEST MESSAGE

This feature is used to send test messages to the selected communication ports. The ports available are the Host, Com, and Illum.

Send Test Message Window Segment

To send a test message:

Step 1: Select the port to which you want to send the test message. A checkmark appears in the box when this function has been enabled.

Step 2: Type the desired test message in the message field. You may enter only printable ASCII characters in the message field.

Step 3: Click the **Send** button to send the test message out of all of the enabled ports.

The message is sent only when the **Send** button is clicked and only to those ports that are selected as indicated by a checkmark in the box.

The test messages you send are restricted to printable ASCII characters. Non-printable ASCII characters will not be sent. The field only accepts printable characters. Also, the message is framed using the protocol of that port.

For example if you enter the characters **ABCDEFG** and select to send it out the Host port, and the Header and Trailer have been set to **<STX>** and **<ETX>** in **Modify Setup / Communications tab**, the output is going to be **<STX>ABCDEFG<ETX>**.

> **NOTE**: See **Appendix C: ASCII Character Chart** in **Chapter 6** of this manual.

COUNTERS

Counters run for the three SMIO com ports: Host, Com, and Illum.

Counters Window Segment

The counts shown are raw counts for the port regardless of the connection and regardless of the type of system.

Counters run up to 9999 and then stop incrementing until reset using the **Reset Counts button**.

Rx Messages

Counts the number of messages with valid header and trailer data received on the port.

Tx Messages

Counts the number of messages transmitted on the port.

Framing Errors

Counts the number of messages received with an invalid header and/or trailer.

Rx Overflow Errors

Displays the number of times the receive buffer overflowed. If this occurs, data could be lost.

Tx Overflow Errors

Shows the number of times the transmit buffer could not be emptied fast enough.

Reset Counts Button

Click this button to reset all of the counters for the Host, Com, and Illum ports.

DECODER MONITOR TAB

The **Decoder Monitor** tab is used to view the various images and messages based on unrestricted or conditional actions as defined and enabled in the **Modify Setup / Decoder Diag** and **Pkg Mgt Diag** tabs.

> ⚠ **WARNING:** The **Decoder Monitor Tab** functions are intended for use by Accu-Sort trained and authorized technicians only. These actions should be enabled for diagnostic purposes only. They should not be left enabled after diagnostics are completed because they will dramatically affect decoder performance.
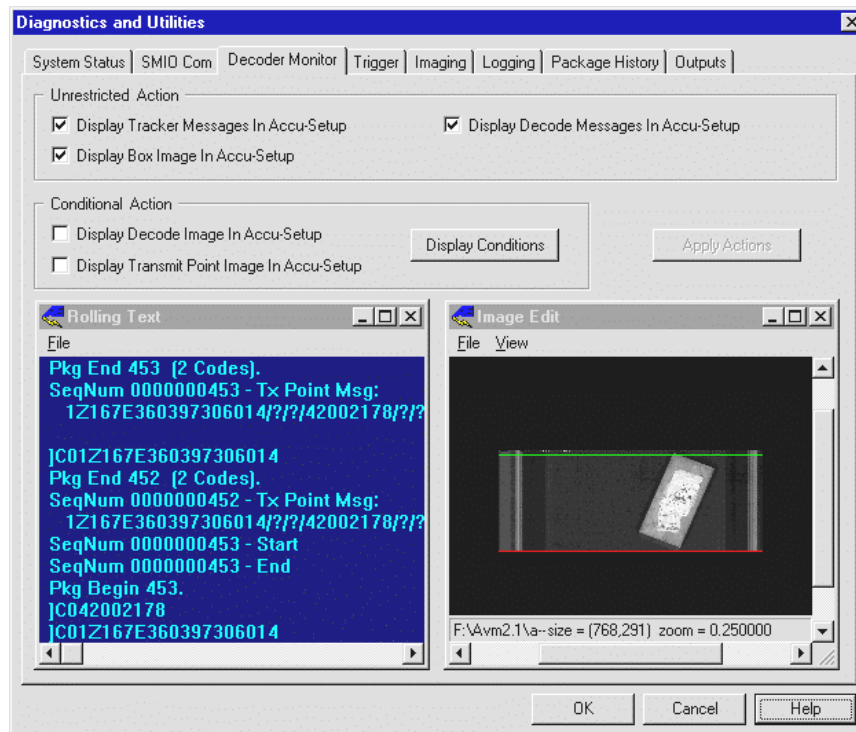
Diagnostics and Utilities – Decoder Monitor Tab

UNRESTRICTED ACTION

Display Tracker Messages In Accu-Setup

When this unrestricted action is enabled, the Tracking Service sends tracking messages to Accu-Setup's **Rolling Text** window. If AVCore is not successful sending data to Accu-Setup three consecutive times, it will no longer attempt to do so until the next time AVCore reads the registry.

Display Box Image In Accu-Setup

When this unrestricted action is enabled, the Tracking Service will send a box image to Accu-Setup's **Image Edit** window. If AVCore is not successful sending data to Accu-Setup three consecutive times, it will no longer attempt to do so until the next time AVCore reads the registry.

Display Decode Messages In Accu-Setup

When this unrestricted action is enabled, the decoder will send all decoded messages to Accu-Setup's **Rolling Text** window. If AVCore is not successful sending data to this address three consecutive times, it will no longer attempt to do so until the next time AVCore reads the registry.

CONDITIONAL ACTION

Display Decode Image in Accu-Setup

When this conditional action is enabled, the decoder will display any decode image in the **Image Edit** window based on the **Decoder Conditions** in the **Modify Setup / Decoder Diag tab**. Below is an example **Image Edit** window when **Display Decode Image** is enabled.
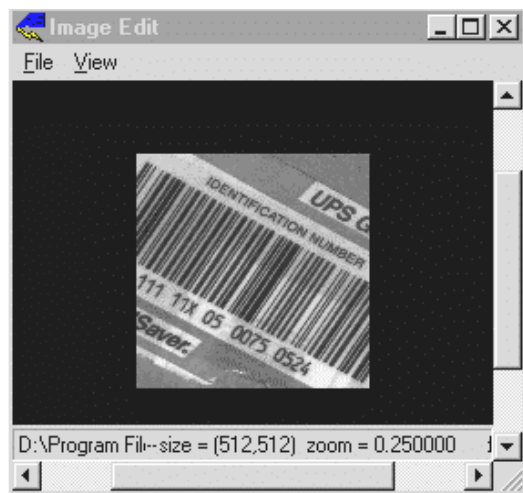
Example Image Edit Window – Display Decode Image

Display Transmit Point Image In Accu-Setup

When this conditional action is enabled, the decoder will display any transmit point image in the **Image Edit** window based on the **Tracking Conditions** in the **Modify Setup / Pkg Mgmt Diag tab**. Below is an example **Image Edit** window when **Display Transmit Point Image** is enabled.
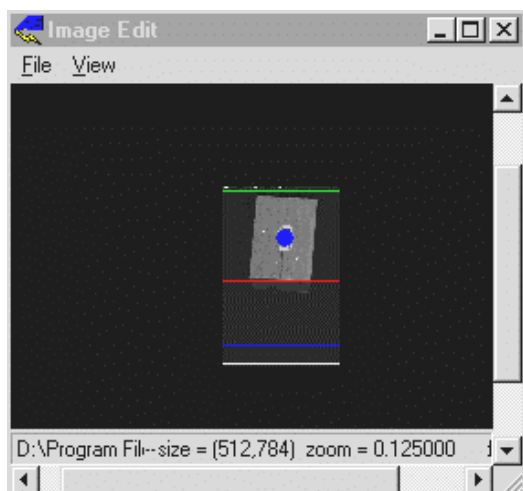
Example Image Edit Window – Display Transmit Point Image

Display Conditions Button

When you click the **Display Conditions** button, the **Decoder / Tracking Conditions window** is displayed.

Decoder / Tracking Conditions Window

All of the conditions shown in the fields of this window determine when a **Decode Image** or **Transmit Point Image** will be displayed in the **Image Edit** window of the **Decoder Monitor**.

> **NOTE**: Conditions may only be viewed in the **Decoder / Tracking Conditions window**. To make any changes to the Do Action list, use the appropriate **Modify Setup** tab. See the **Modify Setup / Decoder Diag tab** for details on setting Decoder Conditions. See **Modify Setup / Pkg Mgmt Diag tab** for details on setting Tracking Conditions. (For details, reference **Chapter 3**.)

Apply Actions Button

Any unrestricted actions or conditional actions that are enabled will take affect when the **Apply Action** button is clicked. The **Apply Actions** button is disabled if no action checkboxes are checked. Once a checkbox is checked, the **Apply Actions** button is enabled.

ROLLING TEXT WINDOW

The **Rolling Text** window displays the decode messages and tracker messages received from AVCore based on the unrestricted and/or conditional actions that have been enabled.
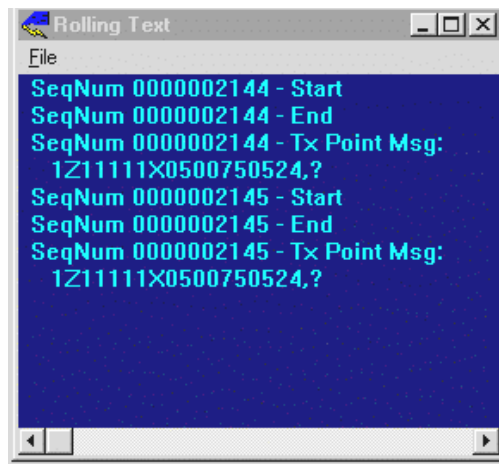
Example Rolling Text Window

The **Decode Messages** that appear in the Rolling Text window include the individual bar codes that are found on the package. These decode messages contain the type of bar code and the bar code data.

The **Tracker Messages** that appear in the Rolling Text window include the decode message sent to the SMIO. The SMIO passes this message through to the customer's proprietary bar code system. The decode message can be a string of bar code data or an informative message such as NOREAD. For instance, if there were two bar codes on a box and only one was read the string might look something like: **21349873450128463829292333,NOREAD**.

IMAGE EDIT WINDOW

The **Image Edit** window on the **Decoder Monitor** tab displays the box images and transmit point images based on the unrestricted and/or conditional actions that have been enabled.
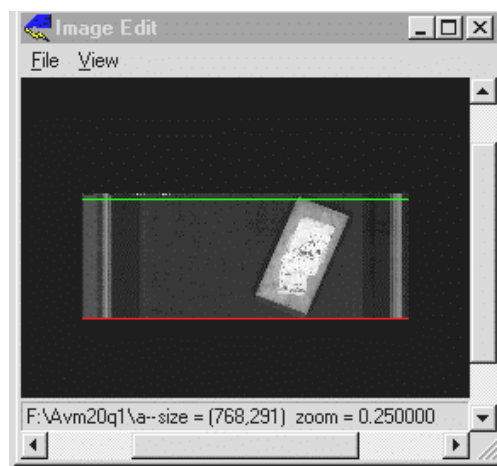
Example Image Edit Window

TRIGGER DIAGNOSTICS TAB

The **Trigger Diagnostics Tab** shows the current settings and activity of the system trigger devices.

Diagnostics and Utilities – Trigger Tab

LIGHT CURTAIN

This section of the Trigger Tab diagnostics is used to monitor the operation of the light curtain being used as the trigger device.

> **NOTE**: If the **Photoeye Trigger Mode** is used, the Light Curtain trigger diagnostics will not be active. The **Trigger Mode** is set using the **Modify Setup / Trigger tab**. (For details, see **Chapter 3**.)

Current Char (hex)

Displays the raw light curtain ASCII character as received from the camera's **FOCUS** port.

> **NOTE**: See **Appendix C: ASCII Character Chart** provided in **Chapter 6** of this manual.

Current Height (in)

Provides the converted height (in either inches/metric) of the light curtain character shown in the **Current Char (hex)** field. The current height accounts for the light curtain resolution and offset parameters as set via the **Modify Setup / Trigger tab**. (See **Chapter 3**.)

Package Present

This is a status indicator with two conditions: green or white.

Indicator	Package Present Condition Status
Green	SMIO believes there is a package present (i.e.: the signal from the light curtain is active for the minimum time limit).
White	No package is present.

Glitches

Displays the number of times that a height received from the light curtain fluctuated too greatly. For example, three consecutive light curtain samples of five inches, 29 inches, and five inches are considered a glitch because the middle sample varied greatly from the first and last.

Rcv Timeout Errors

Indicates the number of times an error occurred because there was a 100 millisecond period when no characters were received from the light curtain.

PHOTOEYE

This section of the **Trigger Tab** diagnostics is used to monitor the operation of the photoeye being used as the trigger device.

> **NOTE**: If the **Light Curtain Trigger Mode** is used, the Photoeye trigger diagnostics will not be active. The **Trigger Mode** is set using the **Modify Setup / Trigger tab**. (For details, see **Chapter 3**.)

Input State at Connector

Reports if the incoming photoeye signal is LOW or HIGH.

Input State	Indicates
LOW	Indicates whether or not the photoeye is active (i.e.: blocked by the
HIGH	presence of a package) based on the **Modify Setup / Trigger tab** photoeye settings. If the Active Low checkbox is enabled, the photoeye is active when the input state is LOW.

Package Present

This is a status indicator with two conditions: Green or white.

Indicator	Package Present Condition Status
Green	SMIO believes there is a package present (i.e.: the signal from the phototeye is active for the minimum time limit).
White	No package is present.

Glitches

Displays the number of times the photoeye changed to a new state and stays in that state for less than the debounce period and then returns to the previous state. The debounce period is set using the **Modify Setup / Trigger Tab**. (See **Chapter 3** for details.)

TACH ENCODER

This section of the Trigger Tab diagnostics is used to monitor the operation of the tach encoder being used to define the speed of package travel.

Tach Count

Defines the total tach count (i.e.: the number of pulses received from the tachometer per minute). It is used to indicate that the belt is moving. The tach count shown in this field continues until either the counter rolls over or the system is restarted, at which point the count begins from zero. Because the tach count and camera resolution are closely associated with each other, if you notice a change in camera performance, it may be as a result of changes in the tachometer. (The **Tach Count** on the **Diagnostics and Utilities / Trigger** and **System Status** windows should be the same or very close.)

Belt Speed (fpm)

Displays the current belt speed.

> **NOTE:** All of the belt speed information shown in the **Tach Encoder** segment of the **Diagnostics and Utilities / Trigger Tab** is in either feet per minute or the metric equivalent depending on the setting selected in the **Options** drop-down menu. (Reference **Options Menu** in **Chapter 5** for details.)

Min Belt Speed (fpm)

Displays the slowest belt speed in the last 30 seconds or since the last time the **Reset Counts** button was used.

Max Belt Speed (fpm)

Displays the fastest belt speed in the last 30 seconds or since the last time the **Reset Counts** button was used.

Deviation

Displays the averaged change in belt speed per second over a 30 second interval. Large deviation values could indicate inconsistent belt speed or a faulty tachometer.

PACKAGE ERRORS

Too Long

Displays the number of times a package greater than the maximum package length setting was detected. This value is defined on the **Modify Setup / Trigger tab**. (See **Chapter 3** for details.)

Too Short

Displays the number of times a package less than 4.0 inches long was detected.

Too Close

Displays the number of times the distance between packages was less than 2.0 inches.

Reset Counts Button

Click this button to reset all of the error counters for the **Diagnostics and Utilities / Trigger tab**.

IMAGING DIAGNOSTICS TAB

The **Imaging Diagnostics Tab** is used to manually adjust camera parameters. This makes it possible to temporarily test the effects of changes to camera imaging before making them and putting them to use during normal operations. Changes made in this window are only temporary: The camera is returned to the previously stored settings when you select another tab or exit this window.
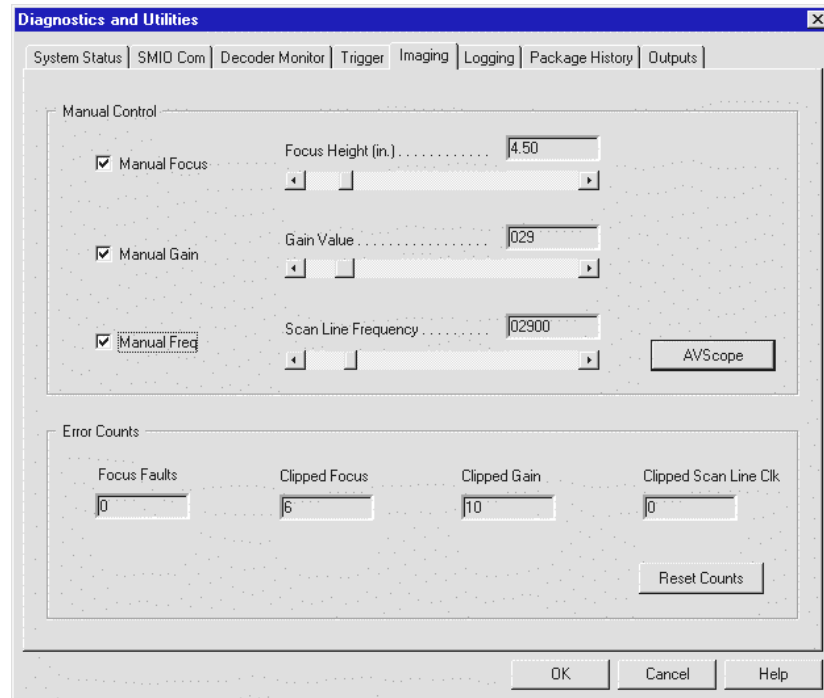
Diagnostics and Utilities – Imaging Diagnostics Tab

> **NOTE**: If Accu-Setup is not connected to a camera, the following message is displayed when any of the checkbox fields are enabled:
> ***There is no communication link. Cannot send command***.
> Use the **Establish Connection** button to connect to a camera before attempting to use the **Manual Controls**.

To make changes to camera imaging for use during normal operation, use the **Modify Setup / Imaging Tab**.

MANUAL CONTROL

Allows the user to manually set some of the camera parameters. These manual changes are for diagnostic purposes only and do not change the configuration of the camera. To change the configuration of the camera, see the **Modify Setup / Imaging Tab**.
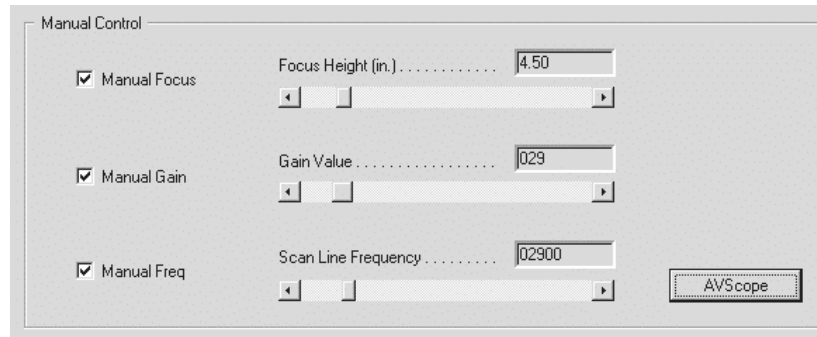
Manual Control Window Segment

Manual Focus

To set this value, click in the box to activate the parameter. Use the slider bar or arrows to set the Focus Height value from 0.00 to 36.00. The value for a camera's focus is referenced from its far working distance and represents the package height.

Manual Gain

To set this value, click in the box to activate the parameter. Use the slider bar or arrows to set the Gain Value from zero to 255. The value for gain is an increase or decrease in the amount of light reflected off a package surface.

Manual Frequency

To set this value, click in the box to activate the parameter. Use the slider bar or arrows to set the Scan Line Frequency value from zero to 20,000. The value for this frequency represents the scan line frequency.

> **NOTE**: If you set this above the Scan Line Frequency defined for the camera, it will default to the frequency shown at the **About Camera Head** window. (See the **About Camera Head** selection in the **Help Drop-down Menu** located at the top of the Accu-Setup Main Window. Reference **Chapter 5** for details.)

AV Scope

Click the **AV Scope** button to display the **Scope view** window. By monitoring the scope view while making manual adjustments to focus, gain, and frequency, you can check the effect these adjustments have on camera performance.

> **NOTE:** Based on the information gathered while using AVScope, camera imaging can then be setup for optimal performance when operational adjustments are made in the **Modify Setup / Imaging Tab**. (Reference **Chapter 3** for details.)

In the following example screen of the AV Scope view window:

- The X-axis shows all of the pixels the camera offers. This axis changes depending on the camera model used in the system.
- The Y-axis shows the brightness of each pixel.
- This also shows a graphic representation of the image at the scan line.
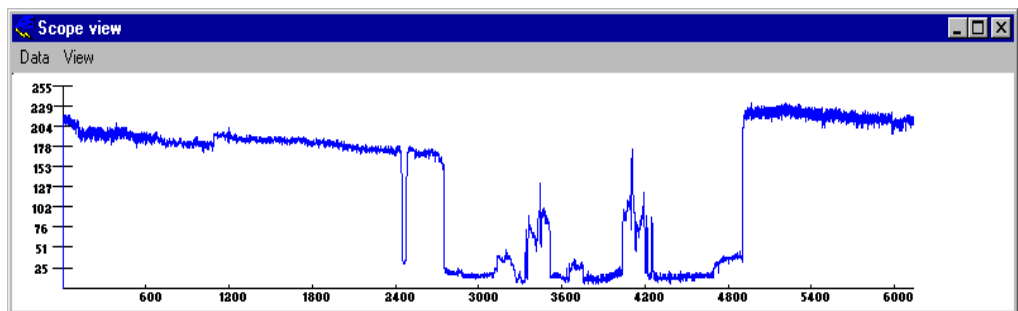
Scope View

Data

The **Data drop-down menu** on the Scope View window allows the user to: Save Data to Disk, Load Data from Disk, or Copy Image to the Windows Clipboard.

Data Menu Selection	Description
Save Data to Disk	Saves a scalable .wmf file to a user-designated location.
Load Data from Disk	Retrieves a scalable .wmf file from a user-designated location.
Copy Image to Clipboard	Copies the image displayed in the scope view to the Windows OS clipboard for use in another application.

To clear the image and reset the AVScope, simply close the AVScope window.

View

The **View drop-down menu** on the Scope View window allows the user to:
Change Start of Display, Change End of Display, Display All, and Show Current
Pixel Value.

View Menu Selection	Description
Change Start of Display	Enables you to narrow the scope view to a discrete set of camera pixels. Used in combination with **Change End of Display**.
Change End of Display	Enables you to narrow the scope view to a discrete set of camera pixels. Used in combination with **Change Start of Display.**
Display All	Resets the scope view to show all of the available camera pixels.
Show Current Pixel Value	This function places data on the window in the format (pixel #, value).

To Change Start of Display and Change End of Display

These two selections from the View drop-down menu work together to narrow
the scope view. To change the start and end of display:

Step 1: Choose **Start of Display** from the **View** drop-down menu.
Step 2: Use the mouse to position the cursor where you would like to set the start
of display, then double-click the left mouse button to place the line.
Step 3: You may double-click the right mouse button to turn the start of display
line off and not set the line.
Step 4: Choose **End of Display** from the **View** drop-down menu.
Step 5: Use the mouse to position the cursor where you would like to set the end
of display, then double-click the left mouse button to place the line.
Step 6: You may double-click the right mouse button to turn the end of display
line off and not set the line.
Step 7: Once the start of display and end of display lines are placed, the **Scope
View** window will adjust accordingly.

Display All

When this function of the **View** drop-down menu is selected, any adjustment of
the **Start of Display** and **End of Display** to narrow the scope view is eliminated
and the entire scope view is displayed.

To Show Current Pixel Value

As you move the mouse around the **Scope View**, the pixel values change
accordingly. It provides additional, precise data of the pixel values. This is a
toggle setting. Select it once to turn it on, select it again to turn it off.

ERROR COUNTS

There are four error counters associated with the camera imaging manual
controls. As you test the manual adjustment of the focus, gain, and scan line

frequency, monitoring these counts will assist you in the diagnostic process to fine-tune any adjustments before making any changes.

Error Counts			
Focus Faults	Clipped Focus	Clipped Gain	Clipped Scan Line Clk
0	6	10	0

Error Counts Window Segment

Focus Faults

Identifies the number of times the camera did not focus properly.

Clipped Focus

Shows the number of times the focus height exceeded the bounds set in the focus table (or fixed focus in the **Modify Setup / Imaging Tab**).

> **NOTE**: If fixed focus is used, problems with clipped focus may be tested with the **Manual Control** in **the Diagnostics and Utilities / Imaging Tab** and then corrected in the **Modify Setup / Imaging Tab**. (See **Chapter 3**.) You can **Modify Focus Table** from the **Utilities drop-down menu**. (See **Chapter 5**.)

Clipped Gain

Displays the number of times the gain setting exceeded the bounds set in the gain table (or fixed gain in the **Modify Setup / Imaging Tab**).

> **NOTE**: If fixed gain is used, problems with clipped gain may be tested with the **Manual Control** in **the Diagnostics and Utilities / Imaging Tab** and then corrected in the **Modify Setup / Imaging Tab**. (See **Chapter 3**.) You can **Modify Gain Table** from the **Utilities drop-down menu**. (See **Chapter 5**.)

Clipped Scan Line Clk

Counts the number of times the required scan line clock frequency exceeded the limits of the CCD sensor. (To adjust the Scan Line Clock, select the **Imaging Tab** found in **Modify Setup**. See **Chapter 3**.)

Reset Counts

Click this button to reset all error count fields to zero.

LOGGING DIAGNOSTICS TAB

The **Logging Diagnostics Tab** enables you to view the various SMIO and decoder log files that have been enabled using the **Modify Setup / Logging Tab**. (See **Chapter 3**.)

> ⚠ **WARNING:** The **Logging Tab** functions are intended for use by Accu-Sort trained and authorized technicians only. These logs are for diagnostic purposes only. They should not be left enabled after diagnostics are completed because they will dramatically affect decoder performance.
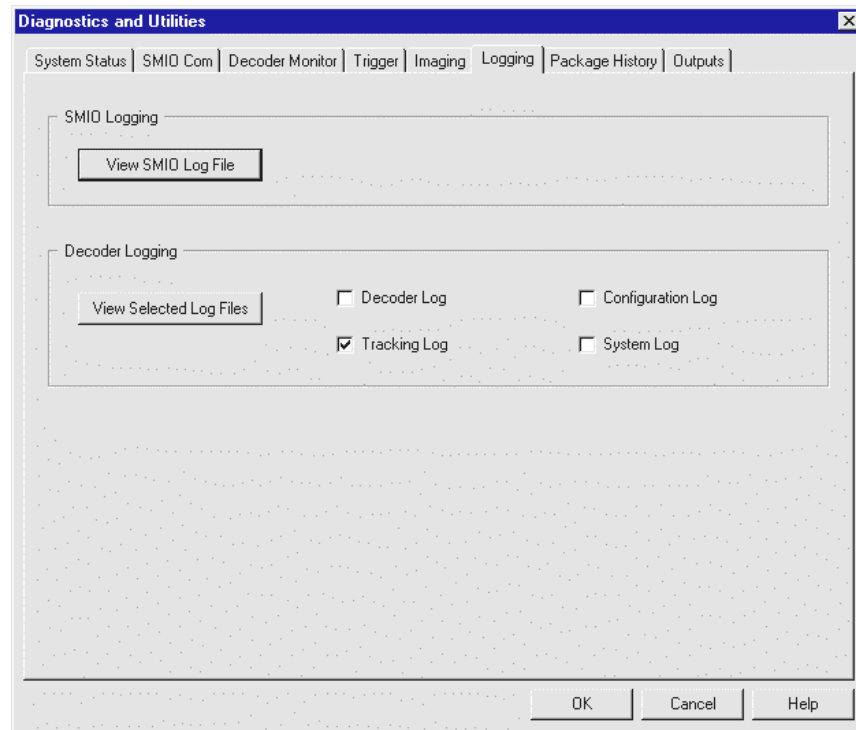
Diagnostics and Utilities – Logging Diagnostics Tab

Displaying log files can degrade system performance. If you chose to view a log file, the following warning message appears before any log files are displayed. The user has the opportunity to not display the log and maintain system performance.
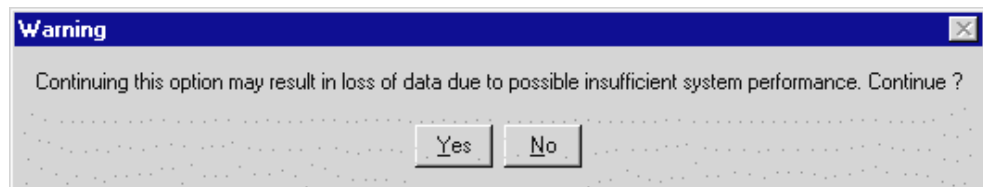
Log Display Warning Message

Click **No** to clear the screen and maintain system performance.
Click **Yes** to display the selected log file or no to clear the screen.

SMIO LOGGING

View SMIO Log File

Click the **View SMIO Log File button** to view the SMIO log file. Before the log file is displayed the warning (shown on the previous page) is displayed. The SMIO log file is limited to the last 32 events.

```
smiotemp.log - Notepad                                              _ □ ×
File  Edit  Search  Help
SMIO log file:

Secs  Tach  Dist  Cart
2099  4C3D  781.1  06   Rcv HostDat (?,?)
2099  4C43  781.7  05   Xmt HostDat (?,?)
2100  4D0D  801.9  06   Photo Eye   (Leading 039)
2101  4DA8  817.4  06   Photo Eye   (Trailing 039)
2103  4F22  855.2  06   Recv Window (Open)
2103  4F28  855.8  07   Rcv HostTyp (1/0003)
2103  4F28  855.8  07   Rcv HostDat (?,?)
2103  4F2E  856.4  06   Xmt HostDat (?,?)
2137  699B  532.9  07   Photo Eye   (Leading 040)
2137  69BD  536.3  07   Photo Eye   (Trailing 039)
2139  6B37  574.1  07   Recv Window (Open)
2139  6B3D  574.7  08   Rcv HostTyp (1/0003)
2139  6B3D  574.7  08   Rcv HostDat (?,?)
2139  6B43  575.3  07   Xmt HostDat (?,?)
2139  6B50  576.6  08   Photo Eye   (Leading 039)
2140  6BEB  592.1  08   Photo Eye   (Trailing 039)
2142  6D65  629.9  08   Recv Window (Open)
2142  6D6C  630.6  09   Rcv HostTyp (1/0020)
2142  6D6C  630.6  09   Rcv HostDat (1211111X0500751)
2142  6D71  631.1  08   Xmt HostDat (1211111X0500751)
2143  6E2D  649.9  09   Photo Eye   (Leading
```

Example SMIO Log File Screen

> **NOTE**: If Accu-Setup is not connected to a camera, the following message is displayed (after the warning message shown on the previous page):
> ***There is no communication link. Cannot send command***.
> The smiotemp.log displays the text: ***Error: Could not get data from the SMIO.***
> Use the **Establish Connection** button to connect to a camera before attempting to **View SMIO Log FIle**.

DECODER LOGGING

Decoder Log Files

There are four types of decoder log files: Decoder, Tracking, Configuration, and System. To view a selected log file, the file must first be enabled by placing a checkmark in the checkbox. Click on the **View Selected Log Files button** to view the files.

> **WARNING**: The **Decoder Log File** can become rather large and will therefore affect system performance. This file is intended for diagnostic purposes only and should be disabled during normal system operation.

PACKAGE HISTORY TAB

The **Package History Tab** is used to view the details about the last 16 packages. The Package History information is defined and enabled via the **Modify Setup / Pkg Mgmt Diag Tab**. (See **Chapter 3**.)
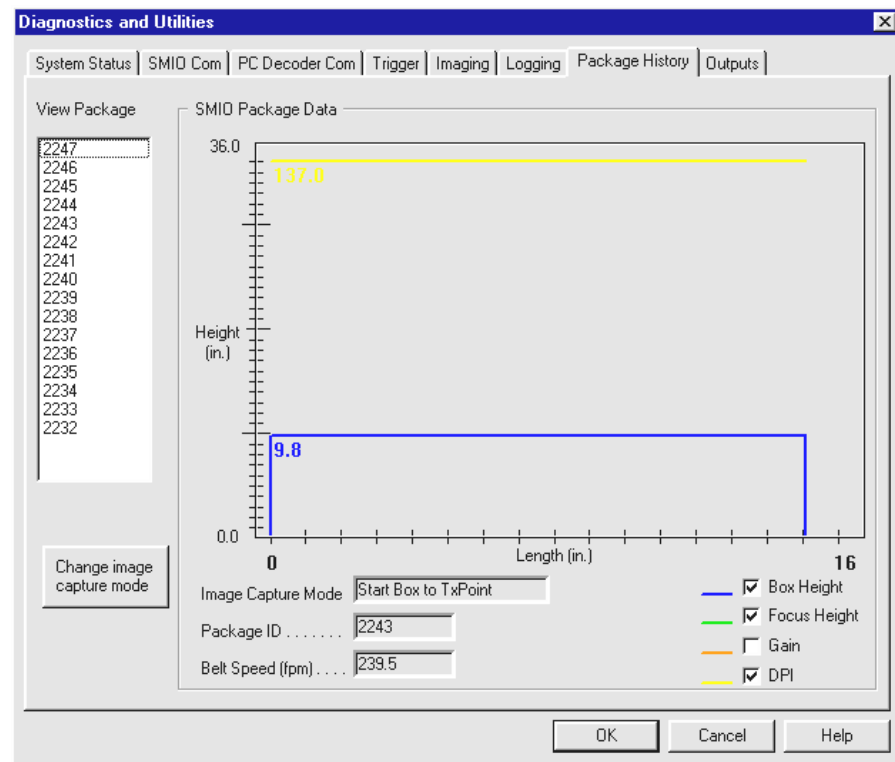
Diagnostics and Utilities – Package History Tab

VIEW PACKAGE

The view package list displays the ID numbers of the last 16 packages the system has processed. The top of the list is the most recent package.

- Click on a package ID number in **the View Package** field to display **SMIO Package Data**.
- Double-click the package ID to view the captured image for the package in the **Package Image Screen**.
- Enable specific details about the package data in the check boxes on the bottom right-hand of the window (e.g.: Box Height, Focus Height, Gain, and DPI).

CHANGE IMAGE CAPTURE MODE

Click the **Change Image Capture Mode button** to begin capturing images from the camera. The camera will not capture images until this button is clicked and an **Image Capture Mode** is enabled (e.g.: either *Start of Box to Tx Point* or *Start of Box to End of Box*).

SMIO PACKAGE DATA

Use the series of four check boxes in the lower right corner of the **Package History Tab** to display data about a selected package. The colored lines next to the check boxes indicate the color of the line shown in the corresponding SMIO Package Data graph.

Line Color	Description
Blue	Box Height – The height measurement of the package being scanned.
Green	Focus Height – Where the camera is focusing as it scans the package.
Orange	Gain – The gain value of the package surface.
Yellow	DPI – The resolution (Dots Per Inch) of the scanned image.

NOTE: If all of the boxes are checked and one of the lines does not appear to be visible, it is most likely hidden behind another. Try turning some of the data off to see if the line appears.
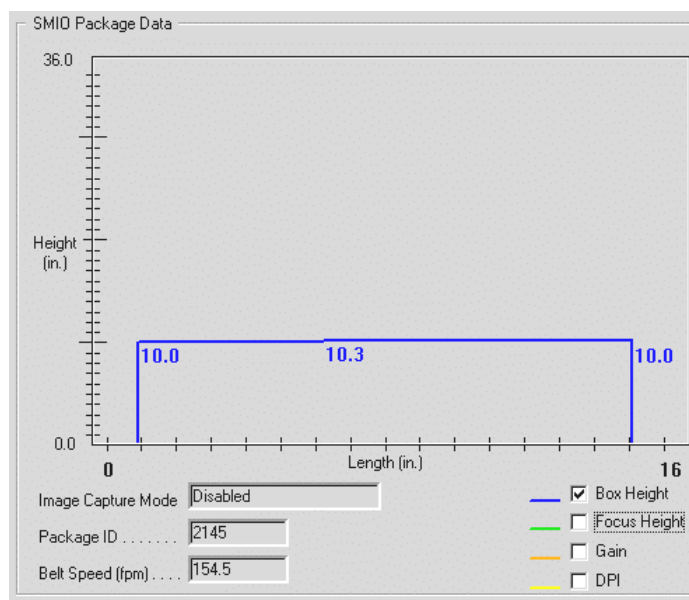
SMIO Package Data – Only Box Height Enabled

In the first example of the **SMIO Package Data graph** (shown above), only the box height is enabled. From the graph, it can be determined that the box height was approximately 10 inches and the length was 14 inches.
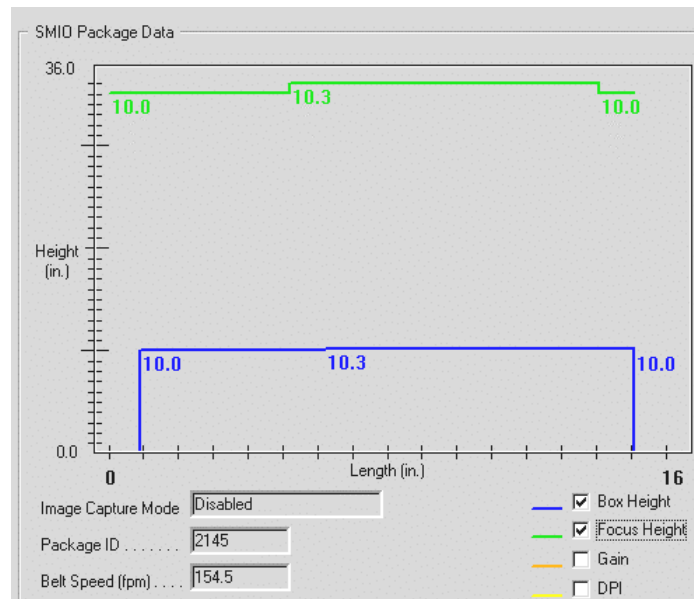
SMIO Package Data – Box Height and Focus Height Enabled

In the next example, the box height and focus height are enabled. From the graph, it can be determined that the box height was approximately 10 inches and the length was 14 inches.
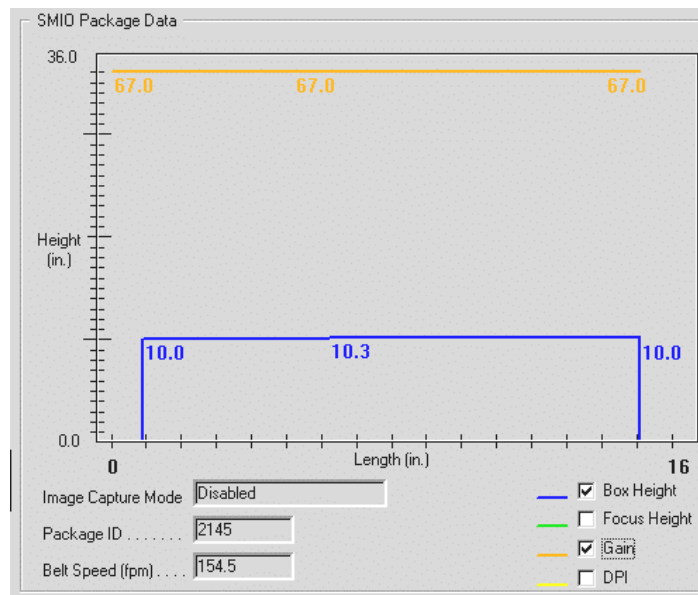
SMIO Package Data – Box Height and Gain Enabled

In another example, the box height and gain are enabled. From the graph, it can be determined that the box height was approximately 10 inches and the length was 14 inches. The gain value of the package surface was a consistent 67.0.
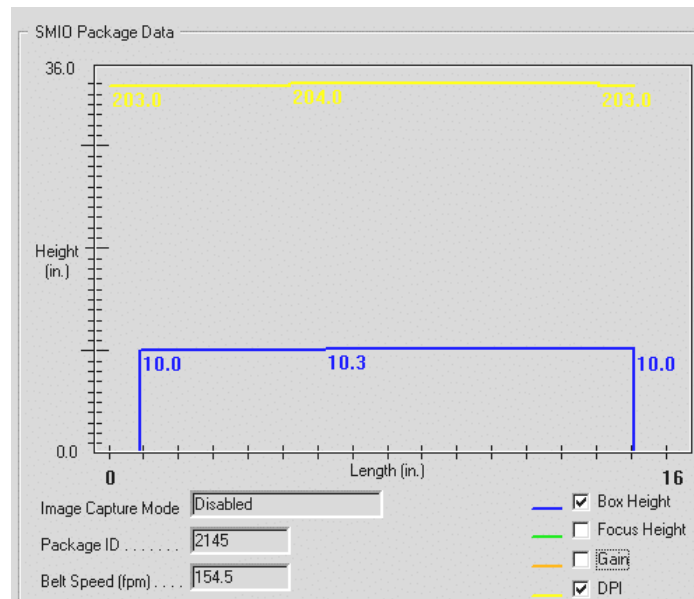
SMIO Package Data – Box Height and DPI Enabled

In this example above, the box height and DPI are enabled. From the graph, it can be determined that the box height was approximately 10 inches and the length was 14 inches. The DPI line shows as 203.3 at 36 inches.
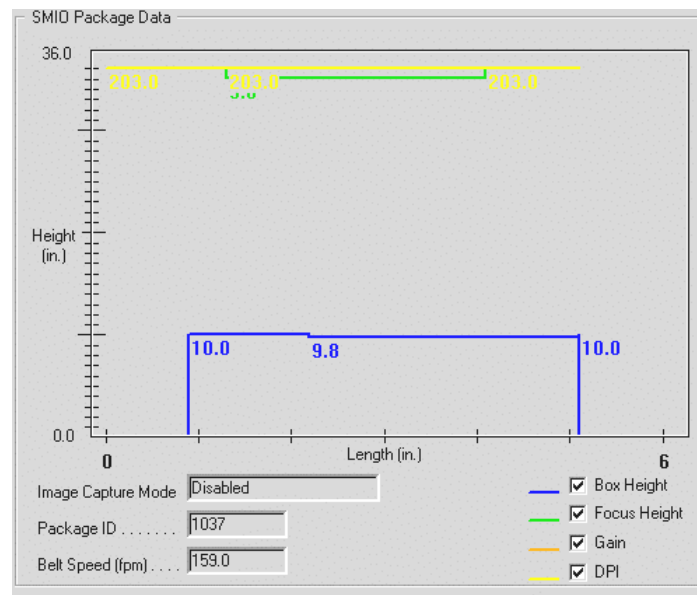
SMIO Package Data – Box Height, Focus Height, Gain and DPI Enabled

In the next example, the box height, focus height, gain, and DPI are enabled. From the graph, it can be determined that the box height was approximately 10 inches and the length was four inches. The focus height and gain are hidden behind the DPI line that shows as 203.3.
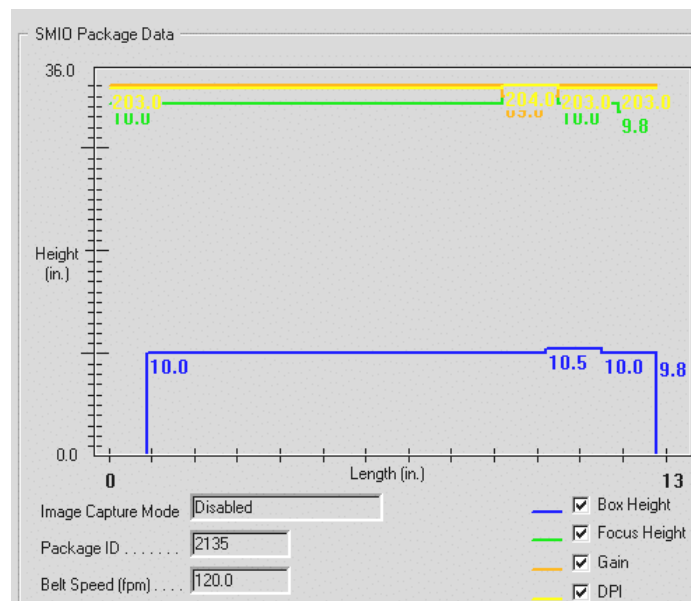
SMIO Package Data – Box Height, Focus Height, Gain and DPI Enabled

In the final example above, the box height, focus height, gain, and DPI are enabled. From the graph, it can be determined that the box height was approximately 10 inches and the length was under 13 inches. The focus height shows at about 34 inches, and the gain and DPI line (which shows as 203.3) practically overlap.

Image Capture Mode

This feature can be Disabled, or set to capture images from Start of Box to Tx Point, or Start of Box to End of Box. The capture mode determines the size of the image the system will collect.

Image Capture Mode	Description
Disabled	No images will be captured. Image Capture Mode should be left disabled during normal system operations.
Start of Box to Tx Point	This image is typically a smaller image than Start of Box to End of Box.
Start of Box to End of Box	This image is typically a larger image than Start of Box to Tx Point.

(***example screen shot here***)

Example Image Capture – Start of Box to Tx Point

(***screen shot here***)

Example Image Capture – Start of Box to End of Box

The system then applies four color-coded lines to the image as shown in the **Package Image Screen**.

Line Color	Description
Green	Identifies the start of package.
Red	Identifies the end of package.
Blue	Indicates a request from AVCore to the decoder for decode results
White	Indicates transmit point of data from AVCore to the host.

See **Package Image Screen** for more details. (The Package Image screen and **Image Edit window** found in **Diagnostics and Utilities / Decoder Monitor** provide the same image data.

Package ID

Displays the package identification number for the package selected from the View Package part of the window.

Belt Speed

Shows the average belt speed for the selected package ID.

PACKAGE IMAGE SCREEN

To see an image of a particular package captured by the camera, double-click the package ID number in **View Package list**. If an **Image Capture Mode** was enabled, the **Package Image Screen** opens and the package image is displayed.
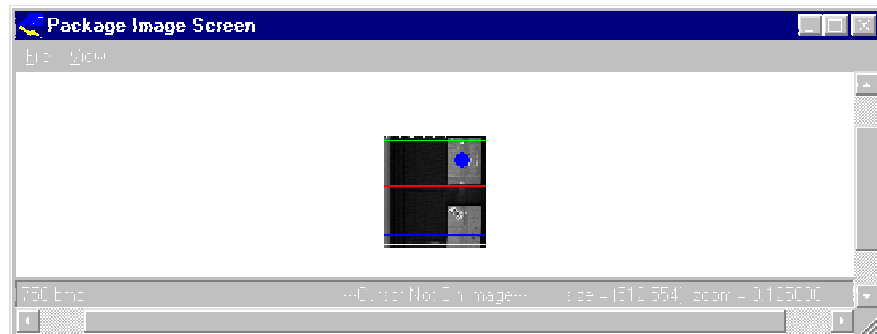
Package Image Screen

The system then applies four colored lines to the image:

Line Color	Description
Green	Start Box - Identifies the start of package.
Red	End Box - Identifies the end of package.
Blue	Decode Issue - Indicates a request from AVCore to the decoder for decode results.
White	Transmit Point - Indicates transmit point of data from AVCore to the host.
Blue Dot	Decoded – Indicates that the bar code identified by the dot has been decoded.
Red Dot	Not Decoded – Indicates that the bar code identified by the dot has not been decoded.

OUTPUTS DIAGNOSTICS TAB

The **Outputs Diagnostics Tab** is used to monitor the activity of the optional digital outputs. Their parameters are set using the **Modify Setup / Outputs Tab**. (See **Chapter 3** for details.)
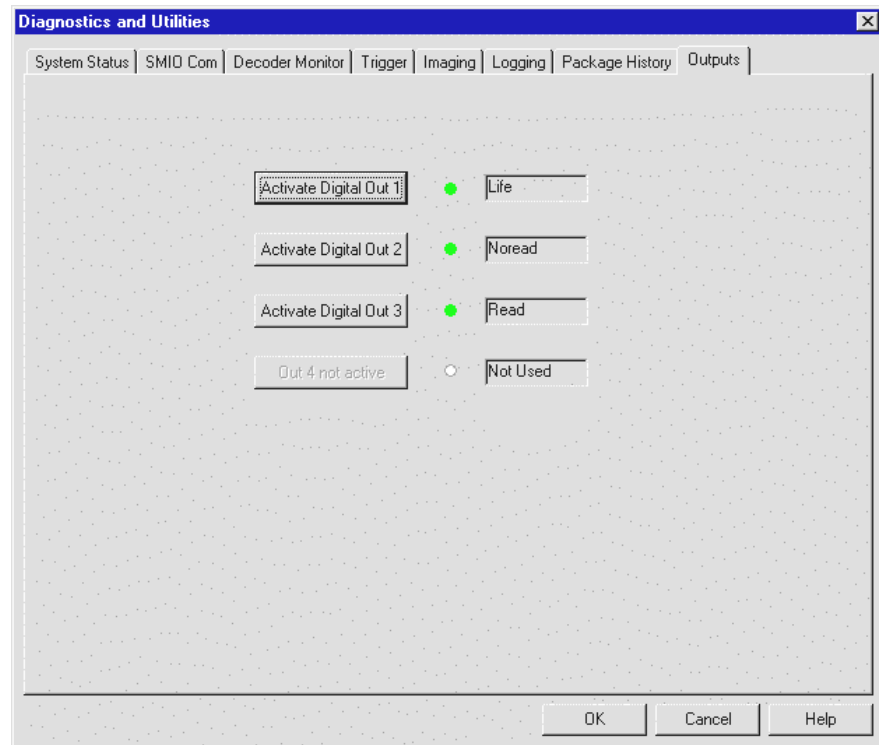
Diagnostics and Utilities – Outputs Diagnostics Tab

The system digital outputs are polled every 200 milliseconds and their activity is shown on this window. If an output is gray on this window, it was disabled in **Modify Setup**. (See the **Modify Setup / Outputs Tab** section of this manual.) The status indicators have three possible states:

Status Indicator	Description
White	Output is not being used.
Green	Output is not enabled (open).
Red	Output is enabled (closed).

When a digital output is enabled, it is activated for the time period set in the **Modify Setup / Outputs Tab**: This can be tested by clicking on the appropriate **Activate Digital Output** button. If a digital output is not used, the indicator is white, and the activate button for that output indicates **Out # Not Active**.

Drop-down Menus

CHAPTER 5: DROP-DOWN MENUS

The Drop-down Menus located across the top of the **Accu-Setup Main Window** provide you with access to all of the button menu functions and a number of additional features.

Accu-Setup Drop-down Menu Selections

Drop-down Menus	Description
File	Offers a series of options including: Compare, Retrieve From Camera, Retrieve From Disk, Save To Camera, Save To Disk, and Exit. Most of these functions are also available from the **Button Menu**.
Edit	Provides the option to save or restore a backup of the parameters by using either Create Backup File or Recover From Backup File. The **Modify Setup** functions (also available from the **Button Menu**) can also be accessed from the Edit Menu.
Options	Offers four options: Auto Backup, Auto Retrieve, Display Values in US Format, and Display Values in Metric Format.
Utilities	Offers eight utilities: Recover from Backup File, View Changes, Diagnostics and Utilities, Modify Gain Table, Modify Focus Table, Modify Camera Name and Serial Number, Smart Illumination Setup and Diagnostics, Reboot Decoder. The **Diagnostics and Utilities** are also available from the **Button Menu.**
Help	This menu provides access to Accu-Setup online help through the Contents and Search functions. In addition, four functions enable you to get additional information: About Accu-Setup, About Camera, About Camera Head, and a Compatibility List.

USEFUL TIP: You will note that the names of every drop-down menu and menu option contain one underlined character. You can use these characters to access the menus and menu options. For example: Pressing the <**Alt**><**F**> keys will open the **File Drop-down Menu**.

FILE MENU

The **File** drop-down menu offers the following options:
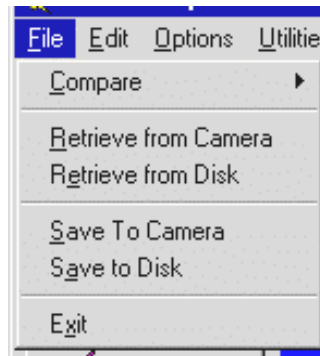
File Drop-down Menu

(The Retrieve, Save, and Exit functions can also be accessed using the **Accu-Setup Main Window / Button Menu**.)

File Menu Selections	Description
Compare	Use to compare two sets of parameters, either camera-with-file or file-to-file.
Retrieve from Camera	Retrieves the parameters from a camera.
Retrieve from Disk	Retrieves a file of parameters stored on disk.
Save to Camera	Use to upload parameters to a camera.
Save to Disk	Use to save parameters to a file on disk.
Exit	After saving any needed changes to camera and/or disk and releasing the connection to camera, use this selection to exit Accu-Setup.

> **USEFUL TIP**: The **File drop-down menu** options are only accessible if communications have been established with a camera. The **Communication Log** in the Accu-Setup Main Window shows the condition of the communication link.

COMPARE

This function enables you to compare two different sets of parameters in order to determine which set offers optimal system performance or to make changes to improve system performance, if necessary.

Comparison can be made between two files saved to disk (**File to File**) or between a file saved to disk and the camera parameters running on a camera connected to Accu-Setup (**Camera with File**). The parameters are compared in the **View Differences** window.

Compare Camera with File

To compare camera parameters to a file:

Step 1: Be sure a connection has been established with the camera.

> **NOTE:** If you attempt to use this function before a camera connection is established, Accu-Setup will display the message:
> ***Connect to a camera before comparing parameter values***.
> Use the **Establish Connection** button on the **Button Menu** of Accu-Setup.

Step 2: Select **Compare** from the **File Drop-down Menu**, then choose the **Camera with File** option, or press <**Alt**><**F**> and <**Alt**><**C**> and <**Alt**><**C**>. The **File 1** window opens. (This window automatically opens to the **Values** folder.)

> **NOTE:** If you have stored the **.VAL** file in a location other than the **Values** folder, you will need to go to that directory to open the desired .VAL file. However, since the system automatically opens to the Values folder, it is recommended that you save any .VAL files in that folder so they may be easily found.
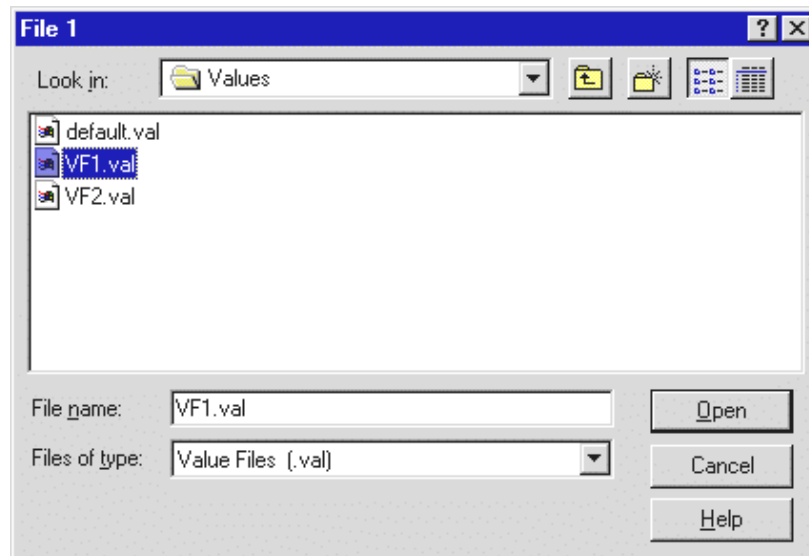
Compare Camera with File – File 1 Window, Defaults to Values Folder

Step 3: Select a .VAL file by highlighting it and then click **Open** to display the file in the **View Differences** window.

In the following examples of the **View Differences** window, notice how the various parameter names are listed along the left side of the window, followed by the .VAL file settings. Note that the camera settings are on the right side and can easily be compared to the .VAL file that was opened.

Since all of the parameters cannot be displayed on a single screen, use the vertical scroll bar to view the remaining parameters as illustrated by *Compare Camera with File – View Differences, Part 1* and *Compare Camera with File – View Differences, Part 2*.

The horizontal scroll bar at the bottom of the screen can be used to view the camera parameters that cannot be fully displayed on the screen.
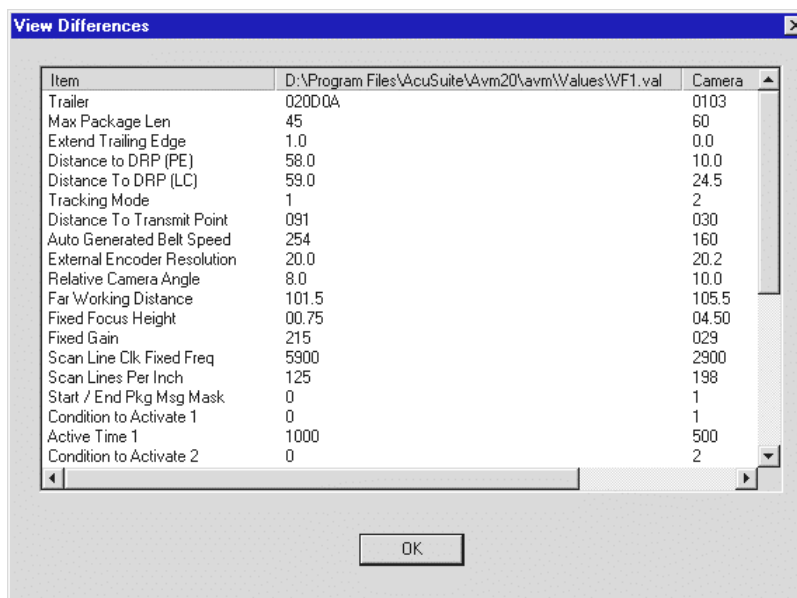
Compare Camera with File – View Differences, Part 1
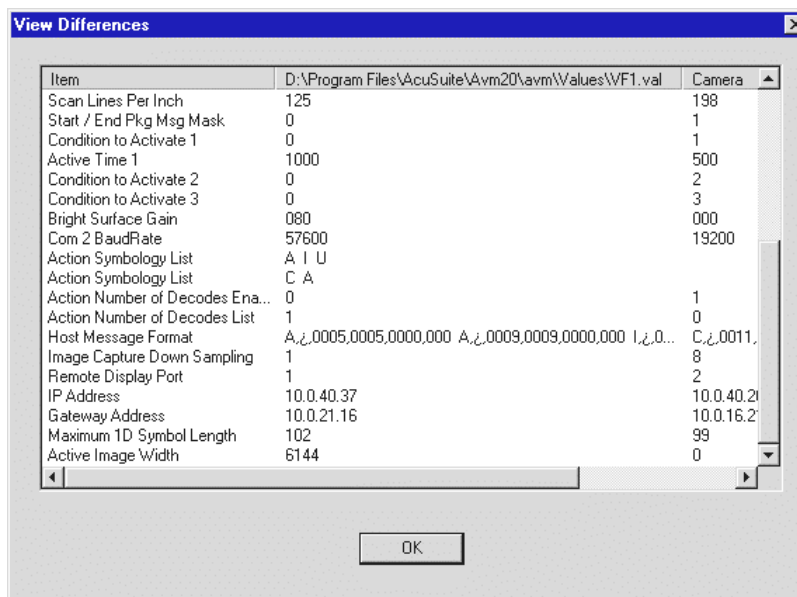
Compare Camera with File – View Differences, Part 2

Step 4: When you are finished comparing the camera to file parameters, click the **OK** button to close the **View Differences** window.

Compare File to File

To compare a setup parameters file to another file:

Step 1: Select **Compare** from the **File Drop-down Menu**, then choose the **File to File** option, or press <**Alt**><**F**> and <**Alt**><**C**> and <**Alt**><**F**>. The **File 1** window opens. (This window automatically opens to the **Values** folder.)

> **NOTE:** If you have stored the **.VAL** file in a location other than the **Values** folder, you will need to go to that directory to open the desired .VAL file. However, since the system automatically opens to the Values folder, it is recommended that you save any .VAL files in that folder so they may be easily found.
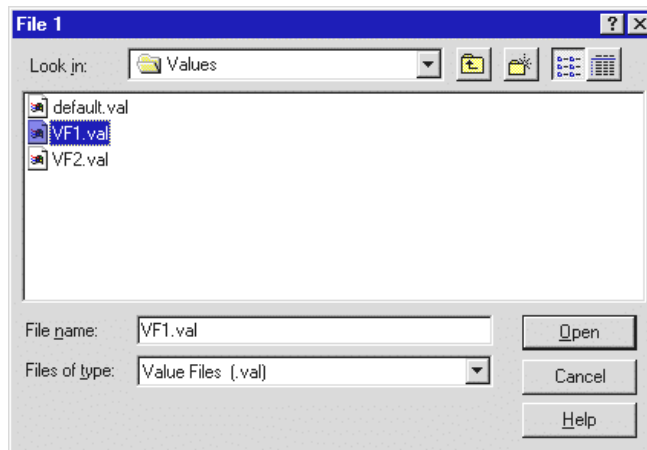
Compare File to File – File 1 Window

Step 2: Select a .VAL file by highlighting it and then click **Open** to display the **File 2** window.
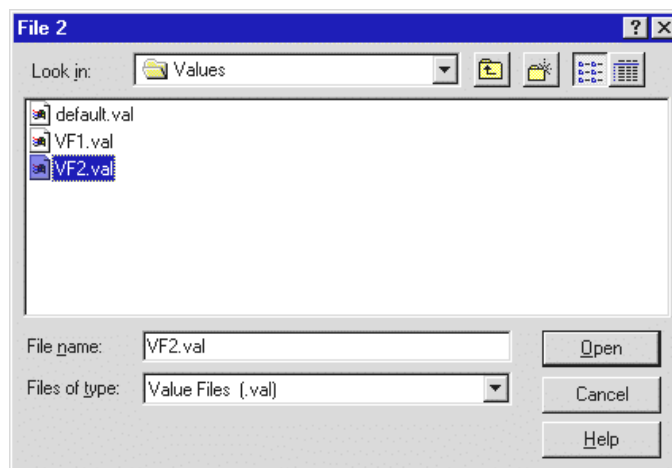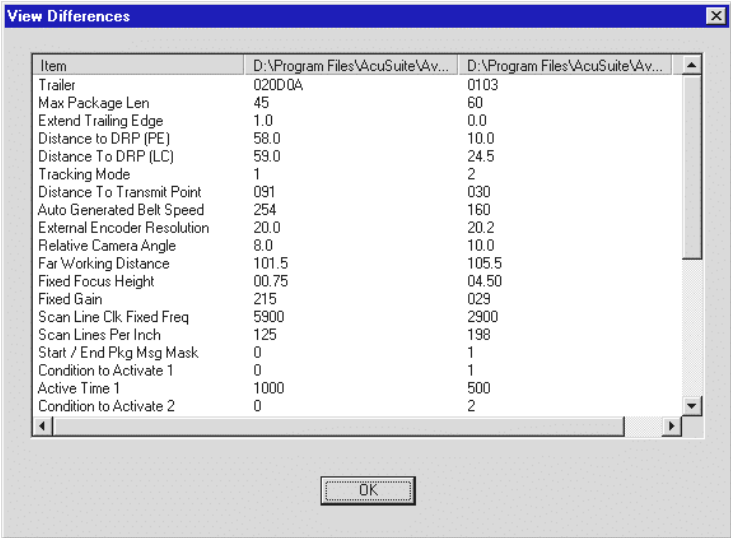
Compare File to File – File 2 Window

Step 3: When the **File 2** window opens, select another .VAL file and then click **Open** to display the **View Differences** window.

In the following examples of the **View Differences** window, notice how the various parameter names are listed along the left side of the window, followed by the .VAL file settings. Note that the second .VAL file settings are on the right side and can easily be compared to the first .VAL file that was opened.
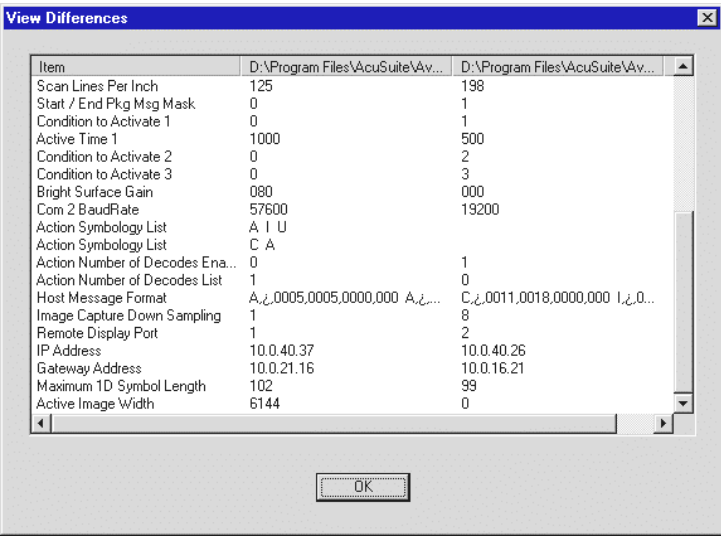
Since all of the parameters cannot be displayed on a single screen, use the vertical scroll bar to view the remaining parameters as illustrated by *Compare File to File – View Differences, Part 1* and *Compare File to File – View Differences, Part 2*.

Compare File to File – View Differences, Part 1

Compare File to File – View Differences, Part 2

Step 4: When you are finished comparing the parameters of the two .VAL files, click the **OK** button to close the **View Differences** window.

RETRIEVE FROM CAMERA

Selecting the **Retrieve from Camera** function retrieves current parameters from the camera with which Accu-Setup has established communications. (This function also found in the **Button** menu.)

> ⚠ **IMPORTANT:** The **Retrieve from Camera** option is only accessible if a communication link has been established with the camera. The **Communication Log** field shows the condition of the communication link.

To retrieve setup parameters from the camera:

Step 1: Select **Retrieve from Camera** from the **File drop-down menu** or press <**Alt**><**F**> and <**Alt**><**R**>.

Step 2: Accu-Setup sends a message requesting the camera's current settings. While the parameters are being retrieved from the camera, the following messages are displayed along with the percentage of the parameters retrieved:

Retrieve SMIO Parameters
Retrieve Decoder Parameters

Step 3: Once all parameters are retrieved from the camera, the **Retrieve Parameters** window is opened and a message is displayed indicating Accu-Setup has been automatically updated to match the camera settings.

Retrieve Parameters Window

It is recommended that both the original settings and any changes be stored to a disk file in case you need to return the camera to a previous configuration. (See **Save to Disk** on page 5-11.)

RETRIEVE FROM DISK

Selecting the **Retrieve from Disk** function enables you to restore camera settings from a disk file that contains a copy of previously stored camera parameters. (This function also found in the **Button** menu.)

To retrieve setup parameters from disk:

Step 1: Select the **Retrieve from Disk** function from the **File drop-down menu** or press <**Alt**><**F**> and <**Alt**><**E**>. This opens a standard Windows **Open** file window.

Open File Window

Step 2: Locate the **Values** folder where the parameters are stored. (The **Open** file window should automatically default to the Values folder.)

Step 3: Click on the appropriate ***.VAL** file name.

Step 4: Click **Open** or press the <**Alt**><**O**> key.

Once parameters are retrieved, Accu-Setup is automatically updated to match the retrieved settings. To update the camera with the file you have retrieved, use the **Save to Camera** button. (See **Save to Camera** on page 5-10 for details.)

Parameters can be retrieved from disk only after they have been saved to disk. It is recommended that any changes be stored to a disk file, in case you need to return a camera to a previous configuration. (See **Save to Disk** for details.) The parameters are stored in files with a ***.VAL** extension.

> **IMPORTANT TIP:** It is good practice to store any ***.VAL** files in the Values folder of the Accu-Setup directory so that they can be easily located.

SAVE TO CAMERA

Select the **Save to Camera** option of the **File Drop-down menu** when you need to:

- send all **Modify Setup** parameters to the camera,
- send only the changes you have made to the parameters, or to
- send parameters to the camera that you have retrieved using the **Retrieve from Disk** function.

(This function is also found in the **Button Menu** of Accu-Setup.)

> **NOTE:** This option is only accessible if a communication link has been established with the camera. The **Communication Log** in the Accu-Setup Main Window shows the condition of the communication link.

To save setup parameters to the camera:
Step 1: Select **Save to Camera** from the **File drop-down menu** or press <**Alt**><**F**> and <**Alt**><**S**>. The **Send Parameters** screen is displayed.

Send Parameters Window

Send Functions	Description
Send Setup Parameters	Sends all of the current settings and any changes to the camera, unless **Send Changes Only** is enabled. Once saved to camera, the settings will not be lost if the camera loses power.
Send Changes Only	When a check appears in this box, only the parameters that have been changed will be sent to the camera.
Close	Use to close the Send Parameters screen.

Step 2: Determine whether you wish to send all parameters or only the changes to the camera. If you wish to send only changes, then be sure that the **Send Changes Only** box is checked, otherwise leave the box empty to send all parameters to the camera.

Step 3: Click on the **Send Setup Parameters** button. Once the parameters are received successfully by the camera, the following message appears in the **Communication Log**:

All Parameters were successfully sent.

Step 4: Click on the **Close** button to close the **Send Parameters** window.

> **NOTE:** To close **Send Parameters** window without sending the parameters, simply click on the **Close** button without using the **Send Setup Parameters** button.

SAVE TO DISK

To specify a file name and location to store the current settings contained in Accu-Setup, select the **Save to Disk** option of the File Drop-down menu. (This function is also found on the **Button Menu** of Accu-Setup.)

To save setup parameters to disk:
Step 1: Selecting the **Save to Disk** function from the **File drop-down menu** or press <**Alt**><**F**> and <**Alt**><**A**>. This opens a standard Windows **Save As** file window.

Save to Disk Window

Step 2: Locate the **Values** folder where the parameters are stored. (The **Save As** window should automatically default to the Values folder.)

Step 3: Enter a name for the file in the **File name** field. The **.VAL** extension will be added to the name when you save the file to disk.

Step 4: Click **Save** or press the <**Alt**><**S**> keys. When this operation is successfully completed, the following message appears in the **Communications Log**:

Parameters saved to disk.

If you have not already done so, be sure to update the camera with the file you have saved, using the **Save to Camera** button. (See **Save to Camera** on page 5-10 for details.)

It is recommended that the previous settings and any changes be stored in separate files, in case it becomes necessary to return the camera to a previous configuration. The default file extension for these files, as well as the default folder and directory, is ***.VAL**.

> **IMPORTANT TIP:** Parameters can be retrieved from disk only after they have been saved to disk. It is recommended that any changes be stored to a disk file in case you need to return a camera to a previous configuration. It is also a good practice to store any ***.VAL** files in a Values folder of the Accu-Setup directory so that they can easily be located.

EXIT

> **IMPORTANT TIP:** It is recommended that you release the connection to camera (by using the **Release Connection** button) before using the **Exit** function.

Use this option to exit Accu-Setup by going to the **Exit** selection in the **File Drop-down Menu** or pressing <**Alt**><**E**>. If any changes made during the use of Accu-Setup were not saved, the following window appears.
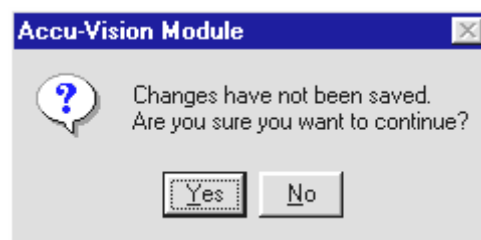
Click **Yes** or press <**Alt**><**Y**> to leave without saving changes.
Click **No** or press <**Alt**><**N**> to remain in Accu-Setup. You will still be able to save changes before exiting Accu-Setup if you click **No**.

> **USEFUL TIP**: Before you exit Accu-Setup, did you remember to:
> 1. Save any necessary changes to camera
> 2. Save a backup file of changes to disk
> 3. Release the connection to the camera

EDIT MENU

The **Edit** drop-down menu provides the options for creating and recovering a backup file of parameters and for modifying the parameters currently being used by your AccuVision System.
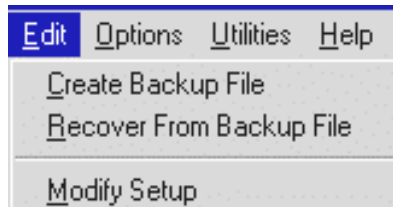
Edit Drop-down Menu

Edit Menu Selections	Description
Create Backup File	Use to save parameters from a camera directly to a backup file.
Recover From Backup File	Restores a set of parameters from an existing backup file.
Modify Setup	Accesses the **Modify Setup** window providing 12 tabs for setting or modifying the operating parameters. Also available from the **Button Menu**. (See **Chapter 3** of this manual for details.)

CREATE BACKUP FILE

Select the **Create Backup File** option to save the parameters from the scanner directly to a backup file. The fields in Accu-Setup will not change. The files are automatically stored in the Accu-Setup **Backup** directory.

> **NOTE**: Using the **Create Backup File** option will not overwrite any existing backup file in the directory.

To create a backup file:
Step 1: Select **Create Backup File** from the **Edit Drop-down Menu**, or press <**Alt**><**E**> and <**Alt**><**C**>.
Step 2: Accu-Setup creates a backup file and automatically names the file using a numerical sequence: The eight-digit serial number of the camera, followed by a three-digit extension that is a sequential number. For example: 12345678.001, 12345678.002, etc. where 12345678 is the camera serial number and 001 and 002 are the backup file sequence numbers.

RECOVER FROM BACKUP FILE

Changes made to the parameters in Accu-Setup can be reset or recovered from an existing backup file that was created using either the **Edit Menu / Create Backup File** option or the **Options Menu / Auto Backup** option.

> ⚠ **CAUTION:** When parameters from a backup file are loaded into Accu-Setup, the values update automatically to match the settings from that backup file. Be sure you are recovering from the correct backup file to assure proper system operation.

To recover parameters from a backup file:
Step 1: Select **Recover from Backup File** from the **Edit Drop-down Menu**, or press <**Alt**><**E**> and <**Alt**><**R**>. (This function is also available in the **Utilities Menu**.) This causes the **Recover from Backup File** window to open.

Recover from Backup File Window

Step 2: Select a backup file that matches the camera serial number for which you intend to recover the backup file. Click **Open** to load the parameters into Accu-Setup.

> ✌ **NOTE:** To recover from the most recent backup file for a particular camera, be sure to refer to the date, time, serial number and sequence number of the most recently saved file.

Step 3: Establish a connection with the appropriate camera. In applications using more than one camera, match the camera serial number to the serial number used in the name of the backup file.

Step 4: Use the **Save to Camera** function (found in the **File Menu** or on the **Button Menu**) to send the backup file parameters to the camera. (See page 5-10.)

MODIFY SETUP

This selection enables the user to edit all Accu-Setup parameters by opening the **Modify Setup** Window. (The same functions can be accessed using the **Modify Setup button** from the **Accu-Setup Main Window Button Menu**.) (For details, reference the **Modify Setup** section of this manual in **Chapter 3**.)

Modify Setup Tabs	Tab Descriptions
Symbologies	Provides all settable bar code parameters including: the types of bar codes your system will decode, the sequence in which they are sent to the host, the minimum/maximum length, symbology options, postal symbology options, and advanced decoder options.
Communications	Used to define all communications parameters with the camera, decoder, and host including the baud rate, parity, data bits, stop bits, and format of messages sent to the host. Also provides settings for advanced network communications (i.e.: IP address, gateway, and netmask).
Trigger	Defines all settings for the light curtain and/or photoeyes used to trigger package detection including distance to scan line, maximum package length, minimum package height, debounce, and advanced light curtain settings. (See the **Diagnostic and Utilities / Trigger tab** in **Chapter 4**.)
Tracking	Contains all settable parameters for monitoring package travel through the system including tracking mode (leading, trailing, or immediate), distance to transmit point, belt speed settings, and camera mounting.
Imaging	Defines scanning parameters for the camera including focus, gain, and scan line clock mode. (See the **Diagnostic and Utilities / Imaging tab** in **Chapter 4**.)
Decoder Diag	Used to enable or disable diagnostics related to the decoder including unrestricted and conditional decoder action. (See the **Diagnostic and Utilities / Decoder Monitor tab** in **Chapter 4**.)
Pkg Mgmt Diag	Used to enable or disable diagnostics related to the management of packages as they are tracked through the system including unrestricted and conditional tracking action. (See the **Diagnostic and Utilities / Decoder Monitor tab** in **Chapter 4**.)
Logging	Used to enable or disable diagnostics logs related to the camera, decoder, and other system components and functions. (See the **Diagnostic and Utilities / Logging tab** in **Chapter 4**.)
Outputs	Defines the condition to activate, the active time (msec), and output signal of up to four optional digital outputs that may be used to control external devices (e.g.: alarms, package diverters, etc.). (See the **Diagnostic and Utilities / Outputs tab** in **Chapter 4**.)
Tunnel	Provides settings for applications where camera(s) are used to read bar codes on multiple sides of packages. The Tunnel tab is used to enable or disable multi-sided imaging mode, tunnel focus mode, and also identifies the active tunnel configuration.
Decoder Display/Power Mgmt	Used to enable or disable the remote display of the APC100 decoder and to protect the decoder in the event of a power failure or system shutdown.
Dimensioning	Provides access to the various dimensioning parameters that must be defined for the optional VisionCube dimensioning software. The Dimensioning Tab is disabled unless the VisionCube software is used by your system.

OPTIONS MENU

The **Options** drop-down menu offers the options for automatically backing up or retrieving parameters as well as defining the measurement standard for your AccuVision System.

Options	Utilities	Help
Auto Backup		
Auto Retrieve		
✔ Display Values in US Format		
Display Values in Metric Format		
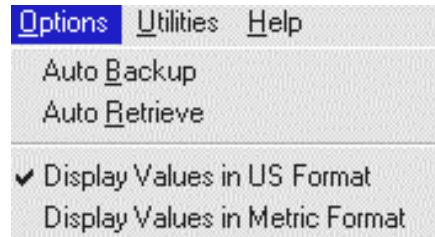
Options Drop-down Menu

> **NOTE:** Any of the selections available in the **Option Menu** that are preceded by a checkmark have been enabled.

Options Menu Selections	Descriptions
Auto Backup	Use to automatically save a backup settings file every time Accu-Setup is connected to a camera.
Auto Retrieve	Use to automatically download settings from a camera every time a camera is connected to Accu-Setup.
Display Values in US Format	Use to show all Accu-Setup dimensional values in US measurements (inches/feet).
Display Values in Metric Format	Use to show all Accu-Setup dimensional values in metric measurements (centimeters).

AUTO BACKUP

Use **Auto <u>B</u>ackup** function to automatically save a backup file of settings every time Accu-Setup is connected to a camera. When this function is enabled, a checkmark appears on the menu next to **Auto <u>B</u>ackup**. The fields in Accu-Setup will not change when **Auto <u>B</u>ackup** is enabled. The files are automatically stored in the Accu-Setup **Backup** directory.

> **NOTE**: Using the **Auto <u>B</u>ackup** function will not overwrite any existing backup file in the Backup directory.

To enable the **Auto <u>B</u>ackup** function:

<u>Step 1</u>: Select **Auto <u>B</u>ackup** from the **Options Drop-down Menu**, or press <**Alt**><**O**> and <**Alt**><**B**>. When enabled, a checkmark appears.

<u>Step 2</u>: When a camera connection is established, Accu-Setup automatically creates a backup file. The file is named using a numerical sequence: The eight-digit serial number of the camera, followed by a three-digit extension that is a sequential number. For example: 12345678.001, 12345678.002, etc. where 12345678 is the camera serial number and 001 and 002 are the backup file sequence numbers.

<u>Step 3</u>: To deactivate **Auto <u>B</u>ackup**, click on the option to turn it off. The checkmark is removed to indicate the function is disabled.

AUTO RETRIEVE

When the **Auto <u>R</u>etrieve** function is enabled, Accu-Setup automatically retrieves a backup file of settings from the camera once a connection to a camera is established.

> **NOTE**: The retrieved parameters will be automatically backed up if the **Auto Backup** function is also enabled.

To automatically retrieve parameters from a camera:

<u>Step 1</u>: Select **Auto <u>R</u>etrieve** from the **Options Drop-down Menu**, or press <**Alt**><**O**> and <**Alt**><**R**>. When enabled, a checkmark appears.

<u>Step 2</u>: When a connection is established with a camera, Accu-Setup automatically downloads the parameters of the camera.

<u>Step 3</u>: To deactivate **Auto <u>R</u>etrieve**, click on the option to turn it off. The checkmark is removed to indicate the function is disabled.

> **NOTE**: Both **Auto Backup** and **Auto Retrieve** are set as *enabled* when Accu-Setup is initially installed. You can change these settings at any time. Once changed, the revised settings remain in effect regardless of the number of times you enter and exit Accu-Setup, until such time as the settings are changed again.

DISPLAY VALUES IN US FORMAT

Use this function to display all dimensional camera settings in inches (US format).

To Display Values in US Format:

Step 1: Select **Display Values in US Format** from the **Options Drop-down Menu**. When enabled, a checkmark appears.

Step 2: All values in Accu-Setup will be shown in US Format. If the Display Values in Metric Format is selected, the US Format is disabled and all values will be converted automatically to their metric equivalent.

DISPLAY VALUES IN METRIC FORMAT

Use this function to display all dimensional camera settings in centimeters/meters (Metric format).

To Display Values in Metric Format:

Step 1: Select **Display Values in Metric Format** from the **Options Drop-down Menu**. When enabled, a checkmark appears.

Step 2: All values in Accu-Setup will be shown in Metric Format. If the Display Values in US Format is selected, the Metric Format is disabled and all values will be converted automatically to their US equivalent.

> **NOTE ON DIMENSIONAL REFERENCES:** While this manual discusses all dimensional values in US format, Accu-Setup can display these values in either US or metric formats. A table that shows the settable parameters in both their US and metric values is also provided in **Chapter 6 / Appendix B**.

UTILITIES MENU

The **Utilities** drop-down menu provides several options for recovering camera settings, modifying tables, diagnosing system operations, and monitoring the status of the system.

| Recover from Backup File |
| View Changes |
| Diagnostics and Utilities |
| Modify Gain Table ► |
| Modify Focus Table |
| Modify Camera Name and Serial Number |
| Smart Illumination Setup and Diagnostics |
| Reboot Decoder PC |
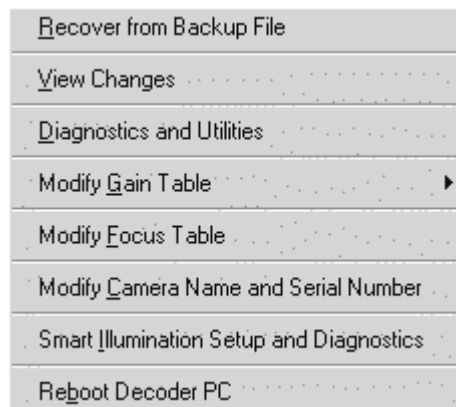
Utilities Drop-down Menu

Utilities Menu Selections	Descriptions
Recover from Backup File	Use to restore parameters from a backup file.
View Changes	Enables you to view the set of parameters currently in Accu-Setup before you save any changes to either the camera or disk.
Diagnostics and Utilities	Accesses the **Diagnostics and Utilities** window providing eight tabs for monitoring system performance and troubleshooting various operating conditions. Also available from the **Button Menu**. (See **Chapter 4** of this manual for details.)
Modify Gain Table	Use to adjust the table that defines the gain levels of a camera in order to achieve peak imaging performance. (For ASI trained and authorized technician use only.)
Modify Focus Table	Use to adjust the table that defines the camera focusing in order to achieve peak imaging performance. (For ASI trained and authorized technician use only.)
Modify Camera Name and Serial Number	Enables you to display or modify the name and serial number of the camera currently connected to Accu-Setup.
Smart Illumination Setup and Diagnostics	Enables you to check the setup and status of the systems sodium illumination module(s) as well as diagnose whether or not the illumination module is operating properly. (Disabled for systems using LED illumination modules.)
Reboot Decoder	Use this function to reboot the APC100 Decoder.

RECOVER FROM BACKUP FILE

The **Recover from Backup File** menu selection reads a computer file of all
parameters saved via **Auto Backup** (in the **Options** Menu) or **Create Backup
File** (in the **Edit** Menu.

> ⚠ **CAUTION:** When parameters from a backup file are loaded into Accu-Setup, the
> values update automatically to match the settings from that backup file. Be sure
> you are recovering from the correct backup file to assure proper system operation.

To recover parameters from a backup file:

Step 1: Select **Recover from Backup File** from the **Utilities Drop-down Menu**,
or press <**Alt**><**U**> and <**Alt**><**R**>. (This function is also available in the **Edit
Menu**.) This causes the **Recover from Backup File** window to open.

Recover from Backup File Window

Step 2: Select a backup file that matches the camera serial number for which you
intend to recover the backup file. Click **Open** to load the parameters into Accu-
Setup.

> ✍ **NOTE:** To recover from the most recent backup file for a particular camera, be
> sure to refer to the date, time, serial number and sequence number of the most
> recently saved file.

Step 3: Establish a connection with the appropriate camera. In applications using
more than one camera, match the camera serial number to the serial number used
in the name of the backup file.

Step 4: Use the **Save to Camera** function (found in the **File Menu** or on the
Button Menu) to send the backup file parameters to the camera. (See page 5-10.)

VIEW CHANGES

The **View Changes** menu selection displays any changes made to the copy of parameters held by Accu-Setup that have not been saved to the camera or have not been saved to a disk file, since the last retrieval. Any parameters that have been modified are temporarily reserved when **OK** is clicked from within **Modify Setup**. These reserved parameters can be viewed and compared with the original parameters by using the **View Changes** utility. This feature enables you to review any modifications before saving them to the camera or a disk.

To view parameter changes made while using **Modify Setup**:

Step 1: While in **Modify Setup** (available from the Button Menu or Edit Drop-down Menu), make any necessary changes and click **OK**. Once this is done, you are returned to the Accu-Setup Main window.

> **NOTE:** If you click **Cancel** while in **Modify Setup**, changes are not reserved and all parameters revert to the previous settings. If you retrieve settings from a camera before you save the new settings, Accu-Setup clears any changes that were made and temporarily reserved within Modify Setup.

Step 2: Select **View Changes** from the **Utilities** drop-down menu, or press <**Alt**><**U**> and <**Alt**><**V**>. The **View Changes** window will be opened.

View Changes Window

Step 3: The **View Changes** window enables you to compare the **Original Value** and **New Value** associated with each Accu-Setup parameter.

Step 4: Click **OK** to close the **View Changes** window.

Step 5: If you want to use the changes shown as **New Values** on the View Changes window, then save the new settings to the camera and save a backup to disk. (See **Save to Camera** on page 5-10 or **Save to Disk** on page 5-11.)

DIAGNOSTICS AND UTILITIES

The **Diagnostics and Utilities** menu selection enables the user to access a series of eight tabs for monitoring system performance and troubleshooting various operating conditions.

> **NOTE:** The same functions can be accessed using the **Diagnostics and Utilities Button** from the **Accu-Setup Main Window**. For details, reference the **Diagnostics and Utilities** section of this manual, **Chapter 4**.

Diagnostics	Descriptions
System Status	Useful for checking performance of decoder, camera, and other system components. Enables user to monitor belt speed, tach, package count, error count, late decodes, and illumination.
SMIO Com	Used to send test messages to check if all system communications are functioning properly as well as provides a running count of various messages (Rx, Tx, framing, Rx overflow, Tx overflow) by communications port (host, com, and illum).
Decoder Monitor	Used to monitor the decoder and package tracking conditions that have been enabled using the **Modify Setup / Decoder Diag and Pkg Mgt Diag** tabs. Any enabled conditional or unrestricted action messages are displayed in the **Rolling Text** window. Any enabled conditional or unrestricted action images are displayed in the **Image Edit** window.
Trigger	Monitors the operation of all devices used to trigger package detection including light curtain, photoeye, and tach encoder and counts various errors (package too long, too short, too close). (See the **Modify Setup / Trigger** tab.)
Imaging	Provides AVScope and manual control for testing the camera scanning parameters including focus, gain, and scan line frequency. Also includes error counts for focus faults, clipped focus, clipped gain, and clipped scan line clock. (See the **Modify Setup / Imaging** tab.)
Logging	Used to view diagnostics logs related to the camera, decoder, and other system components and functions. (See the Modify Setup / Logging tab.)
Package History	Used to view a detailed history of the last 16 packages that have been tracked through the system.
Outputs	Defines the condition to activate, the active time (msec), and output signal of up to four optional digital outputs that may be used to control external devices (e.g.: alarms, package diverters, etc.). (See the **Modify Setup / Outputs** tab.)

> **WARNING**: A number of the diagnostic and utilities features, especially the log files, will affect system performance. These functions are intended for diagnostic purposes only and should be disabled during normal system operation.

MODIFY GAIN TABLE

The **Modify Gain Table** menu selection is used to adjust the image brightness relative to package height and belt speed in order to optimize image quality. The camera gain mode is defined using the **Imaging** tab available from the **Modify Setup** window. If the **Compensated Gain Mode** is selected, the **Modify Gain Table** function is also enabled. **When Fixed Gain Mode** is used, Modify Gain Table is not available. (Reference the **Modify Setup** section of this manual for details.)

⚠️ **WARNING:** Since changes made to this table can dramatically affect camera performance, it is strongly recommended that you do not make modifications to this table unless directed to do so by an ASI trained and authorized technician.

To make changes to the gain table:

Step 1: Select **Modify Gain Table** from the **Utilities** drop-down menu. This opens the Modify Gain Table window. The message **"GAIN TABLE NOT LOADED"** is shown on the Modify Gain Table screen and the gain values are not displayed until one of the retrieve functions is used.
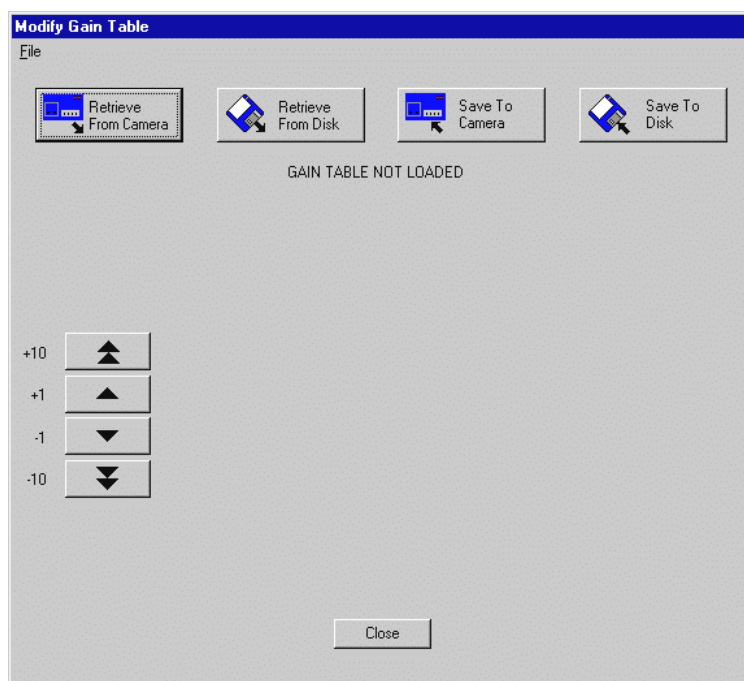
Modify Gain Table, Before Retrieve from Camera or Disk

Step 2: Use the **Retrieve From Camera** button to retrieve the gain table from a camera. Be sure to establish communications with the camera prior to using Retrieve from Camera. (To **Retrieve from Disk**, see **Step 3**.)

Step 3: Use the **Retrieve From Disk** button to open the Gain Table File window. From this window, select a ***.GAN** file, and click **Open** to retrieve the gain table.

Gain Table Files Window

Once the gain table is retrieved (from either camera or disk), the complete table is displayed as shown in the example below.
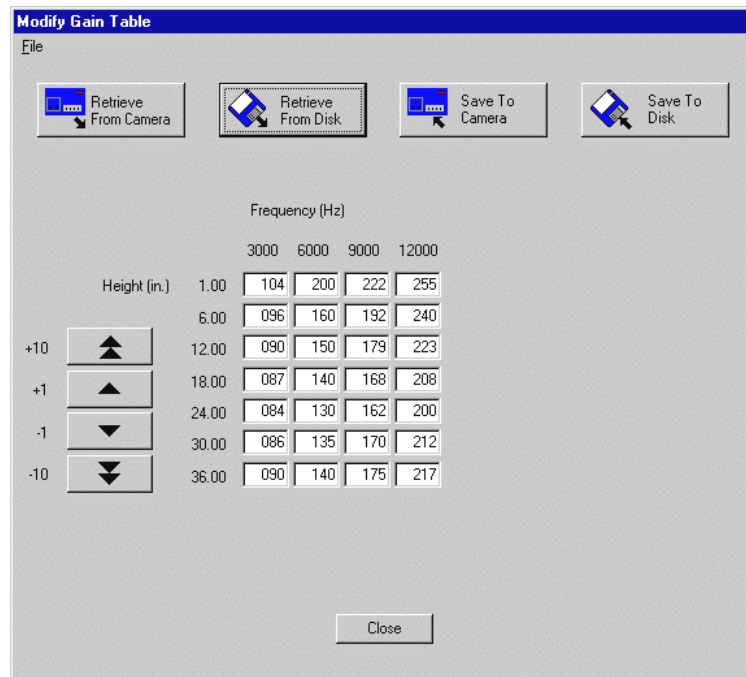
Modify Gain Table, After Retrieve from Camera or Disk

Step 4: Gain table values can be modified by changing individual values manually (typing in a new value) or through the use of the four arrow buttons (+10, +1, –1, and –10).

To manually change a value, double-click on the **Height/Frequency box** you wish to change. Once the value is highlighted, type in the new value.

When using the arrow buttons, place the cursor in the **Height/Frequency box** to be changed and press/hold the **<Ctrl>** key. Use the arrow buttons to increase/decrease the gain (incrementally by one or ten) either increasing (+10, +1) or decreasing (–1, –10) the gain value as required.

To change multiple values simultaneously, hold the **<Ctrl>** key as you click on several the Height/Frequency boxes. Then use the arrow buttons to change the highlighted gain values by the same amount.

To change the entire gain table by the same amount, first place the cursor in one of the Height/Frequency boxes and press/hold the **<Ctrl>** and **<A>** keys. The entire table will be highlighted and you can incrementally change all of the values using the four arrow buttons.

Whenever changes are made to the gain values, a warning message is displayed. Click **Yes** to continue to save to camera or disk.
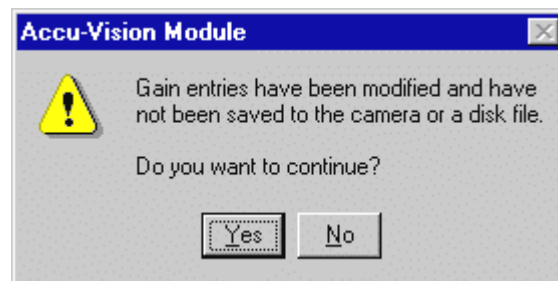
Step 5: To test the camera using the value changes you just made, click on the **Save To Camera** button. The new gain table values are then sent to the camera.

Step 6: After testing the gain table changes to assure improved system performance, be sure to save the gain table changes. Use the **Save To Disk** button to open the Gain Table Files window and type in a new file name. When you click on **Save**, the file is automatically stored in Accu-Setup's gain folder with the ***.GAN** extension added to the file name.

Step 7: To exit the Modify Gain Table window, click the **Close** button.

> **NOTE:** The gain table data is only retrieved or saved from within the **Modify Gain Table** window and cannot be retrieved or saved by using the buttons in the **Accu-Setup Main Window.**

Modify Gain Table File Menu

The **File Drop-down Menu** located on the **Modify Gain Table** window offers the retrieve and save functions also available as buttons on the Modify Gain Table window. In addition, the **Reload Default Gain Table** option is also included in the File Menu.

Reload Default Gain Table

When the **Reload Default Gain Table** option is used, it returns the camera to the factory settings.

> **WARNING:** Use caution if using **Reload Default Gain Table**. It resets the camera to factory defaults. The gain table will need to be reconfigured if this setting is invoked. (See **Modify Gain Table** in the **Utilities** menu of Accu-Setup.)

MODIFY FOCUS TABLE

The camera focus mode is defined using the **Imaging** tab available from the **Modify Setup** window. If either **Leading Edge Focus Mode** or **Profile Focus Mode** is selected, the Modify Focus Table function is also enabled. When **Fixed Focus Mode** is used, Modify Focus Table is not available. (Reference the **Modify Setup / Imaging Tab** section in **Chapter 3** for details.)

> ⚠ **WARNING:** Since changes made to this table can dramatically affect camera performance, it is strongly recommended that you do not make modifications to this table unless directed to do so by an ASI trained and authorized technician.

To change the values stored in the Focus Table:

Step 1: Select **Modify Focus Table** from the **Utilities** drop-down menu. This opens the Modify Focus Table window. Values are not displayed until one of the retrieve functions is used.

Modify Focus Table, Before Retrieve from Camera or Disk

Step 2: Use the **Retrieve From Camera** button to retrieve the focus table from a camera. Be sure to establish communications with the camera prior to using Retrieve from Camera. (To **Retrieve from Disk**, see **Step 3**.)

Step 3: Use the **Retrieve From Disk** button to open the Focus Table File window. From this window, select a ***.FOC** file, and click **Open** to retrieve the focus table.
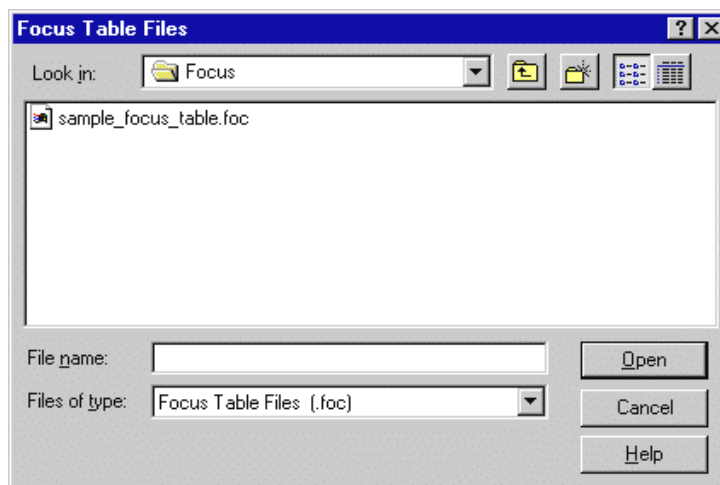
Focus Table Files Window

After a successful retrieve function is performed (from either camera or disk), the **Modify Focus Table** screen appears, as shown in the example below, with the complete table data listing. Use the slider bar to scroll through and view the table data.
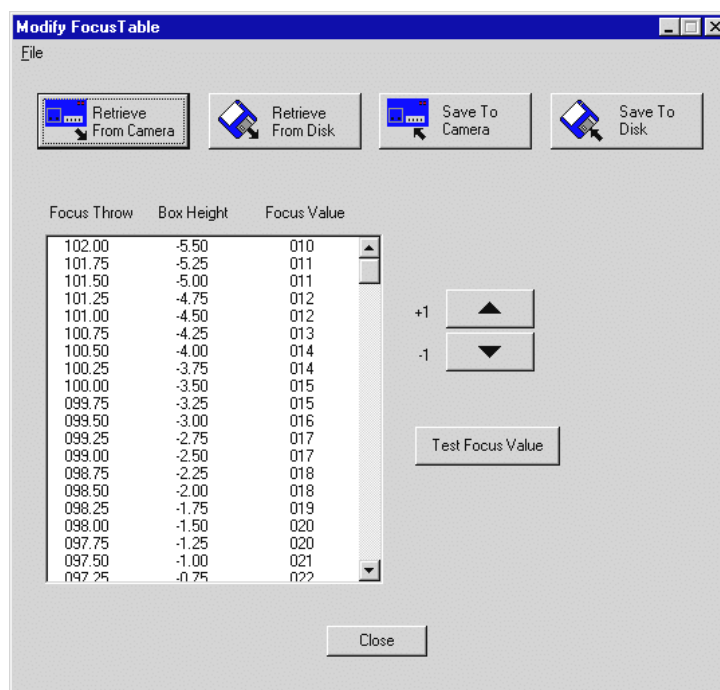
Modify Focus Table, After Retrieve from Camera or Disk

Step 4: Focus table values can be modified through the use of the two arrow buttons (+1 and −1).

To change a value using the arrow buttons, place the cursor on the focus value to be changed and press/hold the **<Ctrl>** key. Use the arrow buttons to increase/decrease the focus incrementally by one, either increasing (+1) or decreasing (−1) the focus value as required.

To change multiple values simultaneously, hold the **<Ctrl>** key as you click to highlight the values to be changed. Then use the arrow buttons to change the highlighted focus values by the same amount. Use the **<Shft>** key to select a range of focus values you want to modify.

To change the entire focus table by the same amount, first place the cursor on a focus value, then press/hold the **<Ctrl>** and **<A>** keys. The entire table will be highlighted and you can incrementally change all of the values using the arrow buttons.

Whenever changes are made to the focus values, a warning message is displayed. Click **Yes** to continue to save to camera or disk.

Accu-Vision Module ✕

⚠️ Focus entries have been modified and have not been saved to the camera or a disk file.

Do you want to continue?

[Yes]   [No]

Accu-Vision Module ✕

ℹ️ Focus changed to DAC Value of 011.

[OK]
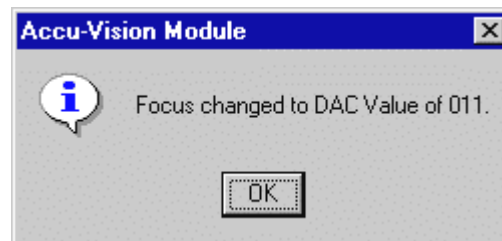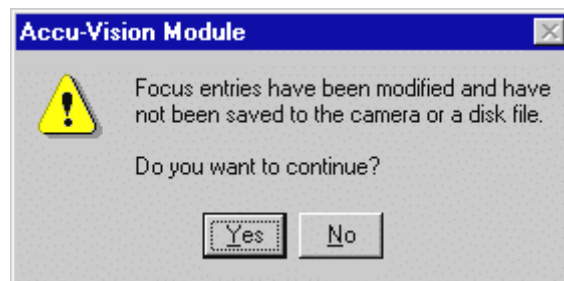
Step 5: To test the camera using the value changes you just made, use the **Test Focus Value button** (formerly Focus to DAC Value button). This button is used for diagnostic purposes to temporarily use a changed focus value to see how it performs.

Step 6: After testing the focus table changes to assure improved system performance, be sure to save the focus table changes. Click on the **Save To Camera** button to send the new focus table values to the camera. Use the **Save To Disk** button to open the Focus Table Files window and type in a new file name. When you click on **Save**, the file is automatically stored in Accu-Setup's focus folder with the ***.FOC** extension added to the file name.

Step 7: To exit the Modify Focus Table window, click the **Close** button.

✋	**NOTE:** The focus table data is only retrieved or saved from within **the Modify Focus Table** window and cannot be retrieved or saved by using the buttons in the **Accu-Setup Main Window.**
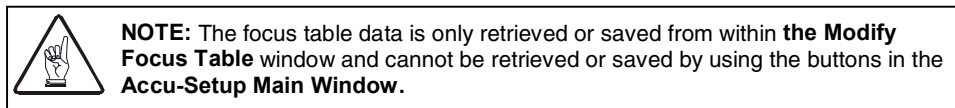
Modify Focus Table File Menu

The **<u>F</u>ile Drop-down Menu** located on the **Modify Focus Table** window offers the retrieve and save functions also available as buttons on the Modify Focus Table window. In addition, the **Reload Default Focus Table** option is also included in the File Menu.

Reload Default Focus Table

When the **Reload Default Focus Table** option is used, it returns the camera to the factory settings.

> ⚠ **<u>WARNING</u>**: Use caution if using **Save Default Table to Camera**. It resets the camera to factory defaults. The focus table will need to be reconfigured if this setting is invoked. (See **Modify Focus Table** in the **<u>U</u>tilities** menu of Accu-Setup.)

MODIFY CAMERA NAME AND SERIAL NUMBER

The **Modify Camera Name and Serial Number** option, when selected, opens a screen that enables you to view or modify the camera's factory-assigned serial number and user-defined name.
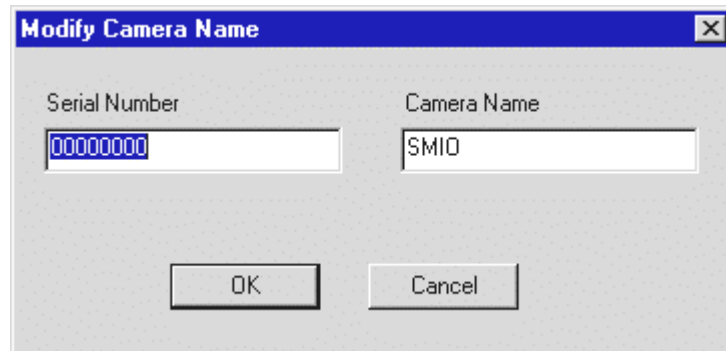
Modify Camera Name

In the event of a system default or power loss, the camera serial number is filled with zeros and must be re-entered in order for the system to operate properly. The serial number is located on the outside of the camera SMIO panel.

The user-defined camera name, which may be up to 15 characters, is especially useful when it is necessary to identify multiple cameras used within the same building or application.

> **USEFUL TIP**: It is recommended that your camera have a descriptive name entered for the **System Name**. This is especially important in systems where multiple cameras are used (e.g.: tunnel applications). Use a concise yet descriptive System Name, for example: Camera1/Lane1 or Camera1/TopRead.

If a connection between Accu-Setup and the camera is not established before attempting to modify the camera name or serial number, a warning message is displayed.
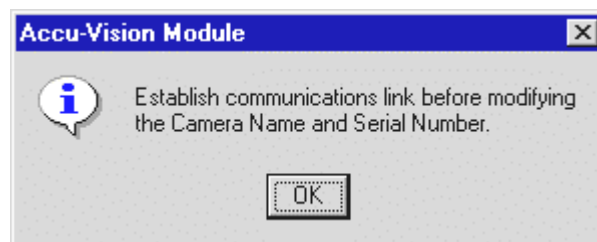
Warning: Establish Link Before Modifying Camera Name and Serial Number

Once you are finished with the **Modify Camera Name and Serial Number** screen, Click **OK** to save the change or **Cancel** to exit without making a change.

SMART ILLUMINATION CONTROL AND STATUS

> **NOTE**: This feature is for AccuVision Camera Systems using the SI-20 sodium illumination modules. It is not available to camera systems using either the self-contained sodium illumination or LED illumination (LIS or Coplanar).

Selecting **Smart Illumination Setup and Diagnostics** from **the Utilities drop-down menu** causes the **Smart Illumination Control and Status** screen to be displayed.
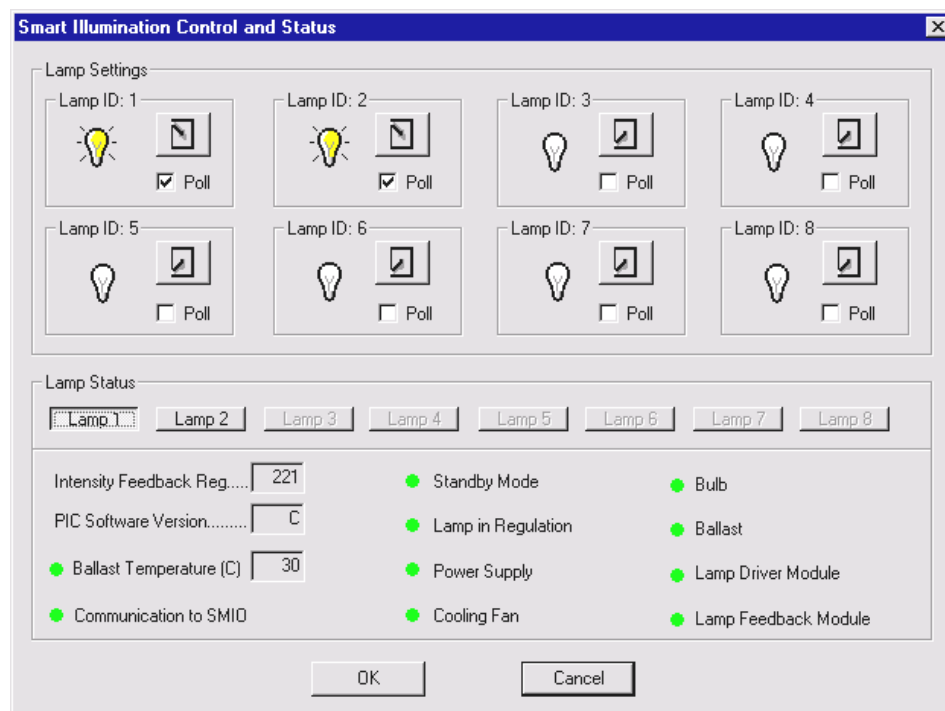
Smart Illumination Control and Status

Lamp Settings

Lamp ID

There are a total of eight Lamp ID boxes. Each contains the following:

Light Bulb indicates whether or not the bulbs of the SI20 illumination module are lit. (The light bulb graphic is **yellow** when lit.)

Polling of the SI20 illumination module is enabled when there is a checkmark in the **Poll** checkbox.

Lamp Status

The **Lamp 1** through **Lamp 8** buttons are used to activate the **Lamp Status** indicators for the selected lamp by clicking on the button associated with the lamp you wish to monitor.

Status Indicator	Description
Ballast Temperature	The ballast temperature is shown in the field to the right of the status indicator (either F or C). The status indicator defines the following: Green – Ballast is within acceptable temperature range. Red – Ballast temperature is too hot.
Communications to SMIO	Green – Pass Red – Fail, check connection with camera (ILLUM connector on camera's SMIO panel)
Standby Mode	Green – Pass Red – Fail
Lamp in Regulation	Green – Pass Red – Fail, determine why lamp is not in regulation
Power Supply	Green – Pass Red – Fail, replace power supply
Cooling Fan	Green – Pass Red – Fail, replace cooling fan
Bulb	Green – Pass Red – Fail, replace bulb
Ballast	Green – Pass Red – Fail, replace ballast
Lamp Driver Module	Green – Pass Red – Fail, replace lamp driver module
Lamp Feedback Module	Green – Pass Red – Fail, replace lamp feedback module
NOTE: If any of the status indicators are **white** in color, this indicates that the function is either not available or has not been selected.	

REBOOT DECODER

The **Reboot Decoder** option, when selected, initiates the restarting of the APC100 Decoder.

> **NOTE**: You must first establish a connection to a camera before you can reboot the APC100 Decoder. See **Establish Connection** in **Chapter 2**.

If there is no connection to a camera, then the following message appears:
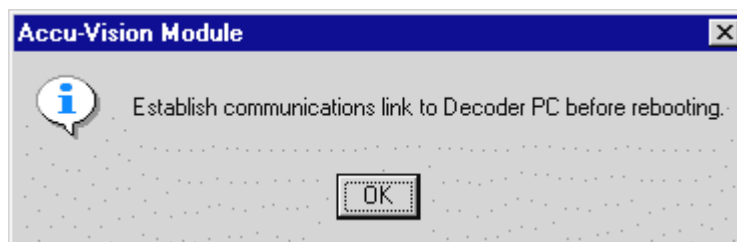
If the above message is displayed, click **OK**, and then establish the connection to the camera for the APC100 Decoder you want to reboot. Once a connection is established, select the **Reboot Decoder** option. Upon selection (and after establishing a camera connection), the following alert message appears:
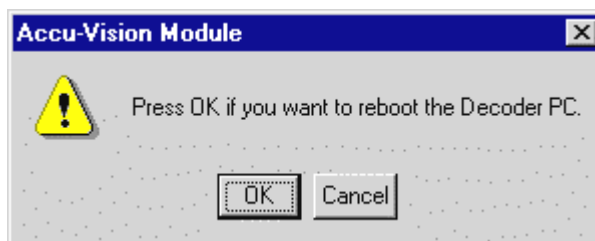
Select **OK** to reboot the decoder, otherwise click the **Cancel** button. When you reboot the decoder, Accu-Setup automatically releases the camera connection, since SMIO Talk, which is used to make the camera connection, has also be interrupted by the reboot function.

HELP MENU

The **Help Drop-down Menu** offers the following options for accessing ***Accu-Setup: AccuVision Module Help*** and other important information about your AccuVision System:

Help Drop-down Menu

Help Menu	Descriptions
Content	Use to access the content of Accu-Setup online help (***Accu-Setup: AccuVision Module Help***).
Search	Use to find a particular topic within Accu-Setup online help.
About Accu-Setup	Displays the Accu-Setup version and copyright information.
About Camera	Displays information about the camera that will be requested whenever you contact Accu-Sort Customer Service.
About Camera Head	Displays details on the camera head optics, sensor, DPI, etc. of the camera currently connected to Accu-Setup.
Compatibility List	Displays a list of camera models that are compatible with the version of Accu-Setup you are currently running.

CONTENTS

While the software manual provides comprehensive information on Accu-Setup, you may find it easier to search for and find the information you require by using ***Accu-Setup: AccuVision Module Help.***

To start using online help, use the **Contents** selection to view the contents of the Accu-Setup online help file.

To access the content of online help:
Select **Contents** from the **Help Drop-down Menu**
or press <**Alt**><**H**> and <**Alt**><**C**>.

When **Content** is selected from the **Help** menu, the **Accu-Setup Online Help Welcome screen** is displayed.

Accu-Setup: AccuVision Module Help has been developed similarly to other Windows-based online documentation. It contains context-sensitive topics that appear when you press <**F1**> or click **Help** on the current window of the Accu-Setup application. (If there is no **Help** info for that specific Accu-Setup screen, an error message is displayed.)
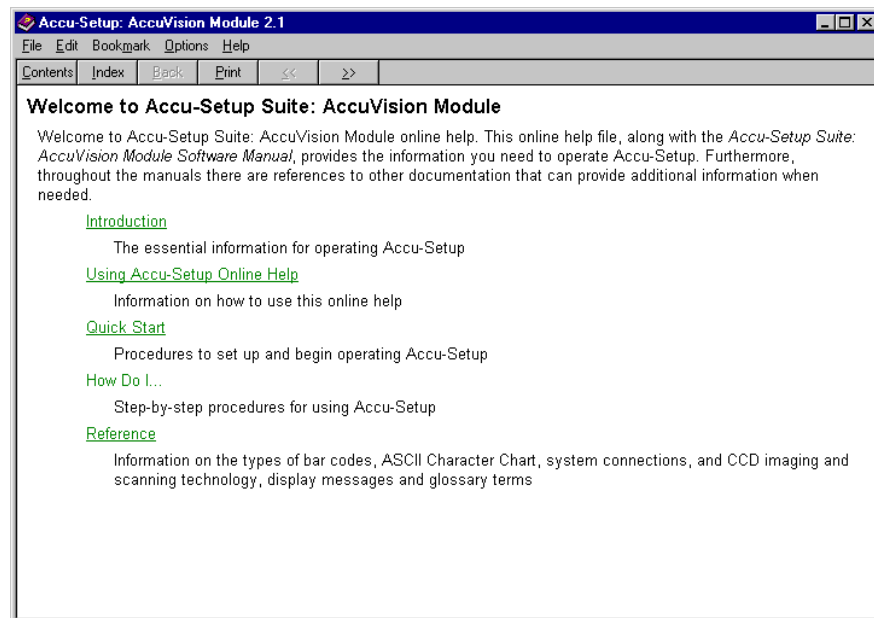
Accu-Setup Online Help Welcome Screen (***screen updated***)

Accu-Setup: AccuVision Module Help contains links that direct you to related topics. These links are words ***highlighted in green and underlined***. To return to the main topic click on the link captioned by ***Back to*** and located at the bottom of the topic. Related topics are captioned by ***See also*** and also appear at the bottom of the topic.

Some of the graphics in this online help have links to pop-ups that contain descriptions of the graphic elements. Click on an element in a graphic to view its description. Additionally, there are topics that contain a special graphic button. This button is a link to the procedure for that topic. Click on the button to view the topic's procedure.
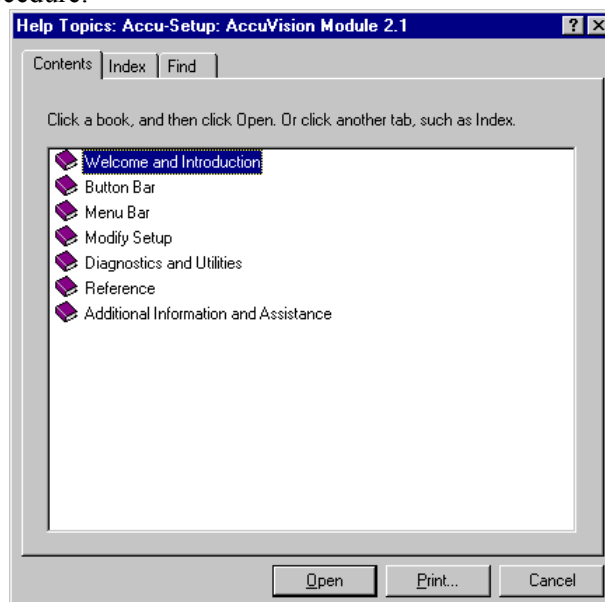
Accu-Setup Online Help Contents Tab (***screen updated***)

SEARCH

Use the **Search** selection to view the contents index of the Accu-Setup online help file.

To access the content of online help:
Select **Search** from the **Help Drop-down Menu**
or press <**Alt**><**H**> and <**Alt**><**S**>.

When **Search** is selected from the **Help** menu, the **Accu-Setup Online Help Index screen** is displayed.
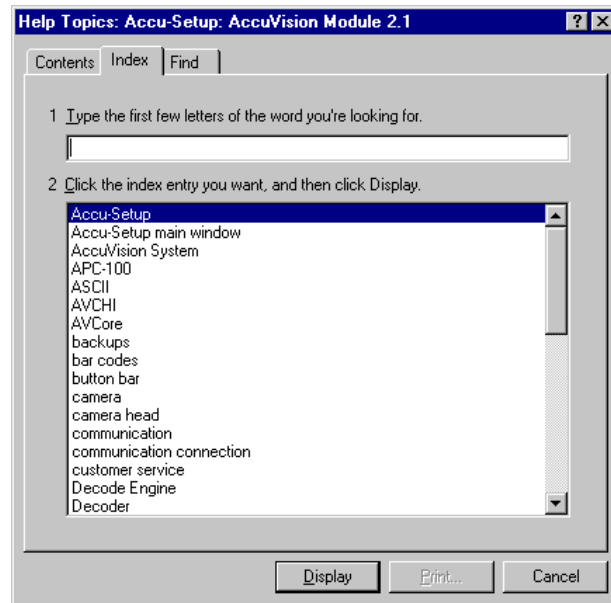
Accu-Setup Online Help Index Tab, Search Function (***screen updated***)

You can search through the index using one of two methods:
.
- Typing the first few letters of the word you're looking for or
- Scrolling through and double-clicking on index entry you want.

Once the index entry is selected, click on the **Display** button. A **Topics Found** window is opened listing all of the topics that match the index entry. Scroll through, select a topic, and then click on the **Display** button in the **Topics Found** window to view the information on that topic.

> **USEFUL TIP**: More advanced and comprehensive searching features are available from the **Find** tab available from the **Index** button of online help.

The following drop-down menus are provided at the top of the help screen:

Menus	Online Help Drop-down Menu Selection Descriptions		
File	**Open** – Provides a standard Windows Open screen displaying other files on the hard drive.		
	Print Topic – Opens a print window so you can printout a hardcopy of the currently display topic. (Requires that you be connected to a printer.)		
	Exit – Exits Accu-Setup online help.		
Edit	**Copy (Ctrl + C)** – Enables you to copy blocks of information from within the help file.		
	Annotate – Enables you to attach notes to specific help topics. You can save, delete, copy, and paste notes to any and all topics within online help.		
Bookmark	**Define** – Use to set-up and define names for multiple bookmarks within online help. A list of bookmarks is maintained so you can return to those topics by double-clicking on the bookmarks you have defined.		
Options	**Keep Help on Top**	**Default** – Sets the Help window to the default setting.	
		On Top – Places and keeps Windows Help on top of all open windows. Even when clicking on other windows, the Help window remains on top.	
		Not on Top – Places Windows Help so that it is not kept on top of all other open windows.	
	Display History Window – Opens the Windows Help History providing a list of topics you looked at while using help. Double-clicking on a topic will return you to the topic.		
	Font	**Small** – Reduces the size of the font to include more info on screen.	
		Normal – Returns the display font to its normal size.	
		Large – Increases the size of the display font for easier reading.	
	Use System Colors – Enables you to use the system colors. Requires that Windows Help be closed and restarted to take effect.		
Help	**Version** – Displays version information for Microsoft Windows Help used with Accu-Setup Online Help.		

There are several buttons at the top of the online help welcome screen that provide the following functions:

Buttons	Online Help Button Selection Descriptions
Contents	Opens the online help Contents tab.
Index	Opens the online help Index tab.
Back	Returns screen to the previously displayed information. Clicking this button several times allows you to page backwards through the help information you have reviewed.
Print	Prints the current topic being viewed on screen.
<<	Returns screen to the previously displayed information within a given topic. If you have returned to the beginning of the topic, this button wi
>>	Advances screen forward within a given topic.

ABOUT ACCU-SETUP

Select **About Accu-Setup** to display version and copyright information for the software you are currently running.

To view **About Accu-Setup**:
Select **About Accu-Setup** from the **Help Drop-down Menu**
or press <**Alt**><**H**> and <**Alt**><**A**>.

The **About Accu-Setup** information screen is displayed.

About Accu-Setup Information Screen (***Update for V4.0***)

ABOUT CAMERA

Select **About Camera** to display the camera type when a connection to a camera has been established. If a connection has not been established, the fields in the **About Camera** window will be blank.

To view the **About Camera** information screen:
Select **About Camera** from the **Help Drop-down Menu**
or press <**Alt**><**H**> and <**Alt**><**M**>.

The **About Camera** information screen is displayed.
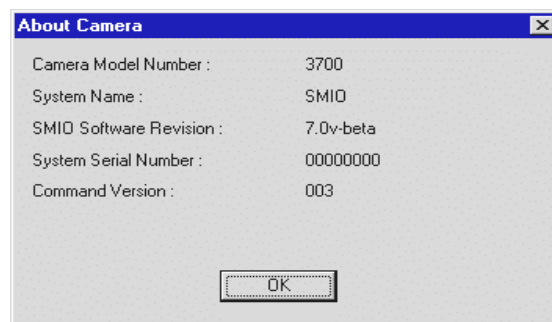
About Camera Information Screen

> **NOTE:** This information is needed whenever you contact Accu-Sort Customer Service regarding your AccuVision camera.

ABOUT CAMERA HEAD

Select to display useful information about the camera connected to Accu-Setup.
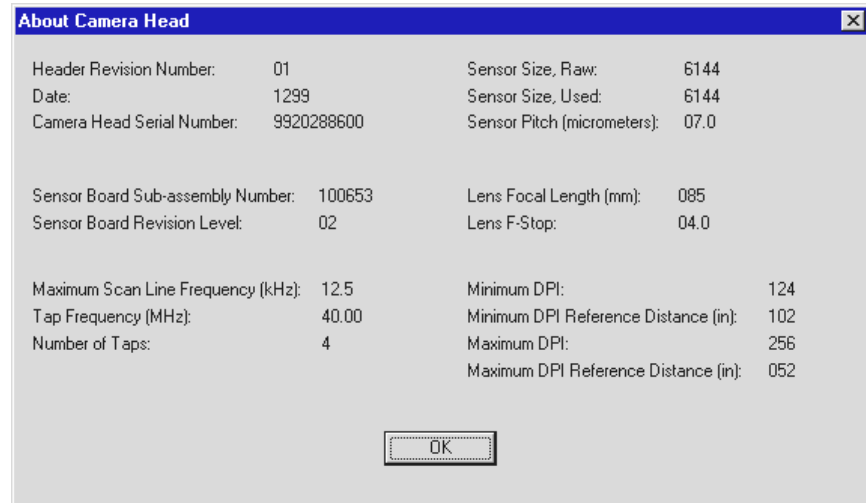
About Camera Head

COMPATIBILITY LIST

Select to display a list of AccuVision cameras that can be configured using the Accu-Setup program.
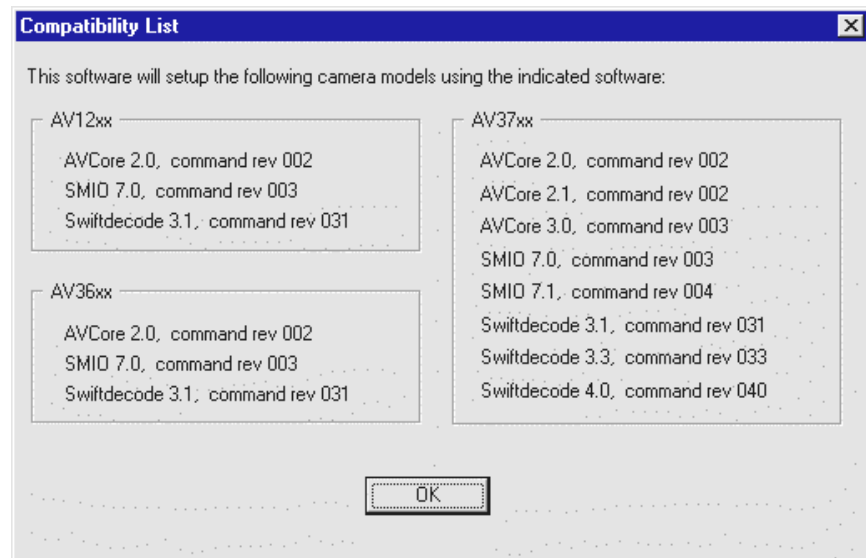
Compatibility List (***updated***)

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| Chapter Six | ▼ | *Contents* |

Appendices

CHAPTER 6: APPENDICES

This chapter provides several appendices of supplemental information that will assist you in using **Accu-Setup for AccuVision**. The appendices are described in the table below.

Appendices	Description
Appendix A: **Accu-Setup At-A-Glance**	Provides a series of tables that identify the various functions available in Accu-Setup in a simple, at-a-glance format. A table is provided for the Accu-Setup Main Window, Button menu, Drop-down Menus, Modify Setup Tabs, and Diagnostic and Utilities Tabs. The appendix includes cross-referencing to related topics within the manual.
Appendix B: **Min/Max Values Table**	This table lists the minimum and maximum settable parameter values that may be selected in the various **Modify Setup** and **Diagnostic and Utilities** tabs discussed in Chapters 3 and 4. These values can be displayed in either the US Format or Metric Format. (See **Options** drop-down menu in **Chapter 5**.)
Appendix C: **ASCII Characters Table**	This table is provided for use with the **Modify Setup / Communications Tab, Host Message** construction. (See **Chapter 3**.)
Appendix D: **APC100 Messages**	This table lists the possible AVCore status messages that may appear on the APC100 Decoder's 2-line LCD display. This display is called the **Remote Display** on the **Modify Setup / Decoder Display/Power Tab**. It must be enabled via this tab. (See **Chapter 3**.)
Appendix E: **Glossary of Terms**	An alphabetic listing of the various terms used in this manual. The glossary includes cross-referencing to related topics within the manual.
Appendix F: **Revision History**	This table lists the revision history for this manual as it relates to the Accu-Setup software versions. To assure that this manual is applicable to the software you are using, compare the software version number to the document revision history.

APPENDIX A: ACCU-SETUP AT-A-GLANCE

ACCU-SETUP FOR ACCUVISION MAIN WINDOW (AVM4.0)		
BUTTON MENU		
NOTE: Reference Chapter 2 for additional details on the various Button menu functions.		
Establish Connection	A toggle button that is used to establish and release connections to your camera(s).	
Retrieve From Camera	Used to retrieve the current set of parameters being used by the camera connected to Accu-Setup.	
Retrieve From Disk	Used to retrieve a set of parameters that have been stored to disk.	
Modify Setup	Provides access to a series of 12 tabs that enables you to setup or modify these parameters: Symbologies, Communications, Trigger, Tracking, Imaging, Decoder Diagnostics, Package Management Diagnostics, Logging, Outputs, Tunnel, Decoder Display / Power Mgmt, and Dimensioning. (See **Chapter 3**.)	
Save To Camera	Used to save a set of parameters to the camera connected to Accu-Setup, enabling the camera to operate using these parameters.	
Save To Disk	Used to save a set of parameters to disk as a backup copy of the parameters that have been saved to camera.	
Diagnostics and Utilities	Provides access to a series of eight diagnostic and utilities tabs including: System Status, SMIO Com, Decoder Monitor, Trigger, Imaging, Logging, Package History, and Outputs. (See **Chapter 4**.)	
Exit Accu-Setup	Used to exit the Accu-Setup program after releasing a connection to a camera.	
DROP-DOWN MENUS		
NOTE: See the Drop-down Menus At-A-Glance table in Appendix A. Reference Chapter 5 for additional details on the various Drop-down menus.		
<u>F</u>ile	Offers a series of options including: Compare, Retrieve From Camera, Retrieve From Disk, Save To Camera, Save To Disk, and Exit. Most of these functions are also available from the **Button Menu**.	
<u>E</u>dit	Provides the option to save or restore a backup of the parameters by using either Create Backup File or Recover From Backup File. The **Modify Setup** functions (also available from the **Button Menu**) can also be accessed from the **<u>E</u>dit Menu**.	
<u>O</u>ptions	Offers four options: Auto Backup, Auto Retrieve, Display Values in US Format, and Display Values in Metric Format.	
<u>U</u>tilities	Offers eight utilities: Recover from Backup File, View Changes, Diagnostics and Utilities, Modify Gain Table, Modify Focus Table, and Modify Camera Name and Serial Number, Smart Illumination Setup and Diagnostics, and Reboot Decoder. The **Diagnostics and Utilities** are also available from the **Button Menu.**	
<u>H</u>elp	This menu provides access to Accu-Setup online help through the Contents and Search functions. In addition, four functions enable you to get additional information: About Accu-Setup, About Camera, About Camera Head, and a Compatibility List.	
CAMERA TYPE INFORMATION WINDOW		
SMIO Tab	Software Name	Version of SMIO software the system is currently running.
	Command Version	Version of Accu-Setup SMIO command file.
	System Name	Shows the user-definable system name.
	Serial Number	Displays the factory-set camera serial number.
AVCore Tab	Software Name	Version of AVCore software the system is currently running.
	Command Version	Version of AVCore software command file currently running.
	Network	Information about the camera IP address, Gateway address, and Netmask options if your system is connected to a network. (For additional details on these settings, see **Modify Setup / Communication Tab / Advanced** in **Chapter 3**.)
Decoder Tab	Software Name	Name and version of the decoder software the system is using.
	Command Version	Version of the decoder command file the system is currently using to communicate with the camera.
COMMUNICATION LOG INFORMATION WINDOW		
The **Communication Log** shows a real-time scrolling list of messages about the status of the AccuVision current operations. Additionally, any Accu-Setup functions performed by the user are displayed along with any related responses from the AccuVision system.		

DROP-DOWN MENUS	Functions	Description
NOTE: Reference Chapter 5 for additional details on the various drop-down menus.
File	Compare	Use to compare two sets of parameters, either camera-with-file or file-to-file.
	Retrieve from Camera *	Retrieves the parameters from a camera.
	Retrieve from Disk *	Retrieves a file of parameters stored on disk.
	Save to Camera *	Use to upload parameters to a camera.
	Save to Disk *	Use to save parameters to a file on disk.
	Exit *	After saving any needed changes to camera and/or disk and releasing the connection to camera, use this selection to exit Accu-Setup.
		NOTE: File functions marked by an asterisk are also available from the **Button Menu**.
Edit	Create Backup File	Use to save parameters from a camera directly to a backup file.
	Recover From Backup File	Restores a set of parameters from an existing backup file.
	Modify Setup	Provides 12 tabs for setting or modifying the operating parameters. Also available from the **Button Menu**. (See the **Modify Setup Tabs At-A-Glance table** in **Appendix A**. For details, see **Chapter 3**.)
Options	Auto Backup	Use to automatically save a backup settings file every time Accu-Setup is connected to a camera.
	Auto Retrieve	Use to automatically download settings from a camera every time a camera is connected to Accu-Setup.
	Display Values in US Format	Use to show all Accu-Setup dimensional values in US measurements (inches/feet).
	Display Values in Metric Format	Use to show all Accu-Setup dimensional values in metric measurements (centimeters).
Utilities	Recover from Backup File	Use to restore parameters from a backup file.
	View Changes	Enables you to view the set of parameters currently in Accu-Setup before you save any changes to either the camera or disk.
	Diagnostics and Utilities	Provides eight tabs for monitoring system performance and troubleshooting various operating conditions. Also available from the **Button Menu**. (See the **Diagnostics and Utilities Tabs At-A-Glance table** in **Appendix A**. For details, see **Chapter 4**.)
	Modify Gain Table	Use to adjust the table that defines the gain levels of a camera in order to achieve peak imaging performance. (For ASI trained and authorized technician use only.)
	Modify Focus Table	Use to adjust the table that defines the camera focusing in order to achieve peak imaging performance. (For ASI trained and authorized technician use only.)
	Modify Camera Name and Serial Number	Enables you to display or modify the name and serial number of the camera currently connected to Accu-Setup.
	Smart Illumination Setup and Diagnostics	Enables you to check the setup and status of the systems sodium illumination module(s) as well as diagnose whether or not the illumination module is operating properly. (Disabled for systems using LED illumination modules.)
	Reboot Decoder	Used to reboot/restart the APC100 Decoder Module.
Help	Content	Use to access the content of Accu-Setup online help (***Accu-Setup: AccuVision Module Help***).
	Search	Use to find a particular topic within Accu-Setup online help.
	About Accu-Setup	Displays the Accu-Setup version and copyright information.
	About Camera	Displays information about the camera that will be requested whenever you contact Accu-Sort Customer Service.
	About Camera Head	Displays details on the camera head optics, sensor, DPI, etc. of the camera currently connected to Accu-Setup.
	Compatibility List	Displays a list of camera models that are compatible with the version of Accu-Setup you are currently running.

MODIFY SETUP TABS	Tab Screen Segments	Functions
NOTE: Reference Chapter 3 for additional details on the various Modify Setup tabs.		
Symbologies	Symbologies to Read	Add/Remove symbols from drop-down menus of code types and options (using Add or Remove (BT)). Active Symbologies List shows the enabled code types, min/max lengths, and options.
	Postal Symbology Options	Symbol Orientation (DD), Min. Bar Count (DD), Max. Bar Count (DD), POSTNET Merge X Tolerance (SB), POSTNET Merge Y Tolerance (SB)
	Advanced Decoder Options (BT)	Image Processing Mode (DD), Active Image Width, Active Image Start Pixel, Max 1D Code Length, Max 1D Code Height, Low Aspect Code Location (CB)
Communications	SMIO Ports *	Illum Port Settings, Host Port Settings, Enable 422 (CB) for Host, Com Port Settings; Com Initialization String.
	Host Message	Header, Trailer, Delimiter, Data Verification, No Read Message, Multiple Message, Add Sequence Number (CB)
	Decoder Ports *	Com 1 and Com 2 ports, Enable Com 1 (CB), Enable Com 2 (CB)
	Advanced (BT)	Advanced Communications: Decoder Network Adapter, Network Ident.
	* **NOTE:** Port Settings window offers drop-down menu for Baud Rate, Parity, Stop Bits, and Data Bits.	
Trigger	Trigger Mode	Modes: Light Curtain, Photoeye, Light Curtain & Photoeye, Serial (DD); Max. Package Length (SB); Debounce (SB)
	Light Curtain Settings	Light Curtain Offset (SB); Minimum Package Height (SB); Distance to Scan Line (SB); Advanced (BT)
	Photoeye Settings	Active Low (CB); Distance to Scan Line (SB)
	Extend Edge	Leading Edge (SB), Trailing Edge (SB)
Tracking	Tracking (DD)	Modes: None, Leading, Trailing, Immediate; Distance to Xmit Point (SB)
	Belt Speed Settings	Belt Speed Source: Internal or External (DD); Auto Generated Belt Speed (SB); External Encoder Resolution (SB)
	Camera Mounting	Relative Camera Angle (SB); Far Working Distance (SB)
Imaging	Focus	Modes: Leading Edge, Profile, Fixed (DD); Fixed Focus Height (SB)
	Gain	Modes: Fixed, Compensated (DD); Fixed Gain (SB)
	Scan Line Clock	Modes: Speed Compensated, Height Compensated, Direct Tach, Fixed Frequency (DD); Fixed Frequency (SB); Scan Lines Per Inch (SB)
	Hardware Pixel Correction	Enables camera's pixel correction circuitry (CB)
Decoder Diag	Unrestricted Decoder Action	Display Decode Messages on Decoder (CB) Display Decode Images on Decoder (CB)
	Decode Condition	Do Action When Decode String Found in List (CB), Do Action When Symbol Found in List (CB), each has an entry field, Add/Remove (BT)
	Conditional Decoder Action	Display Decode Image on Decoder (CB) Save Decode Image on Decoder (CB)
Pkg Mgt Diag	Unrestricted Tracking Action	Display Box Image on Decoder (CB); Display Transmit Point Image on Decoder (CB); Save Box Image on Decoder (CB)
	Package Database Modes	Modes: Disabled, Transmit Point Image, Box Image (DD)
	Tracking Condition	Do Action When Decode String Found in List (CB); Do Action When Symbology Found in List (CB); Do Action When Number of Codes Found in List (CB); each has an entry field, Add/Remove (BT)
	Conditional Tracking Action	Display Transmit Point Image on Decoder (CB) Save Transmit Point Image on Decoder (CB)
	Image Compression	Modes: ASI Compression, Down Sampling (DD); Down Sampled Image Divisor (SB)
Logging	SMIO Logging	Enables selected logs of events occurring on the SMIO (CB)
	Decoder Logging	Enables selected logs for the decoder (CB)
	Alarm Mask	Enables selected Alarm Masks (CB)
	Message Mask	Enables selected Message Masks (CB)
Outputs	Digital Out 1 – Digital Out 4	Condition to Activate: Not Used, Life, Noread, Read, Multiple, Image Valid (DD); Active Time (SB); Output Signal: Active High or Low (DD)
Tunnel	Multi-Side Imaging Gain Compensation	Enable Multi-Side Imaging Mode (CB); Bright Surface Gain % (SB); Edge Transition Adjustment (SB)
	DM-3000 Focus Data Setup	Tunnel Focus Mode: Off (No DM3000), Front/Top/Back Read, Left Side Read, Right Side Read (DD); DM-3000 Scan Window Length (SB)
	Active Tunnel Configuration	Front, Left, Top, Right, Back (white box indicates configuration in use)
Decoder Display/Power Mgmt	Remote Display	Enable Remote Display (CB); Com Port (DD); Remote Display Port Set.
	Power Monitor	Enable Power Switch Monitor (CB)
		Enable UPS Monitor (CB)
Dimensioning	Dimensioning Parameters	Left X, Right X, Vertex Offset, Optical Center X, Expand Y, Camera Tilt Angle, Reference Height 1, Reference X Density 1, Reference Height 2, Reference X Density 2, Average Black Level, Minimum Package Dimension, Adjustment 1, Dimensioning Enabled (CB), Default All (BT)
NOTE: The following abbreviations are used in this table. BT = Button, CB = Check Box, DD = Drop-down menu, SB = Slider Bar		

DIAGNOSTICS TABS	Tab Screen Segments	Functions
NOTE: Reference Chapter 4 for additional details on the various Diagnostic and Utilities tabs.	
System Status	SMIO Status	Displays current SMIO status or counter info for: Belt Speed, Focus Height, Gain Value, DPI, Temperature (with SI), Current Tach, Elapse Time, Total Package Count, Total Error Count, Decode to Late, Current Package ID; Reset SMIO Counts (BT)
	Decoder Status	Displays current Decoder status or counter info for: Belt Speed, Line Rate, Read Rate (%), Decoder Mode, Multi Read, Elapse Time, No Read Count, Total Package Count, Total Error Count, Current Scan Line, Current Package ID; Reset Decoder Counts (BT); SMIO Link (SI) Decoder Running (SI)
SMIO Com	Send Test Message	Enables the user to send a test message. User enters the test message in the entry field and then clicks on Send (BT). Test message is sent to any device for which the checkbox is enabled (e.g.: Host, Com or Illum (CB)).
	Counters	There are five counters for each device: Host, Com (Decoder) and Illum. The counters are: Rx Messages, Tx Messages, Framing Errors, Rx Overflow Errors, and Tx Overflow Errors. Use Reset Counts (BT) to reset all 15 counters.
Decoder Monitor	Unrestricted Action	Enable/disable the following in Accu-Setup: Display Tracker Messages (CB), Display Box Image (CB), Display Decode Messages (CB).
	Conditional Action	Enable/disable the following in Accu-Setup: Display Decode Image (CB), Display Transmit Point Image (CB). To review all Conditional Actions, click on Display Conditions (BT) to go to Decoder / Tracking Conditions window.
	Apply Actions (BT)	Click on this button to apply the enabled Unrestricted or Conditional actions. Details related to these actions are displayed in the Rolling Text and Image Edit windows.
	Rolling Text Window	Displays all text-based messages related to all enabled Unrestricted and Conditional Actions. (Can also be viewed in AVCore.)
	Image Edit Window	Displays all captured images related to the enabled Unrestricted and Conditional Actions. (Can also be viewed in AVCore.)
Trigger	Light Curtain	Current Char (hex), Current Height (in.), Glitches, Rcv Timeout Errors; Package Present (SI)
	Photoeye	Input State At Connector, Glitches; Package Present (SI)
	Tach Encoder	Tach Count, Belt Speed, Min Belt Speed, Max Belt Speed, Deviation
	Package Errors	Too Long, Too Short, Too Close
	Reset Counts (BT)	Click this button to reset all of the trigger counts.
Imaging	Manual Control	Manual Focus – Adjust from 0.00 to 36.00 (SB) when enabled (CB).
		Manual Gain – Adjust from zero to 255 (SB) when enabled (CB).
		Manual Freq – Adjust scan line from 0 to 20,000 (SB) when enabled (CB).
	AVScope (BT)	Click to view AVScope during any manually controlled adjustments.
	Error Counts	Focus Faults, Clipped Focus, Clipped Gain, Clipped Scan Line Clock Use Reset Counts (BT) to reset all imaging error counters.
Logging	SMIO Logging	Click View SMIO Log File (BT) to review the file.
	Decoder Logging	Enable/disable Decoder Log (CB), Tracking Log (CB), Configuration Log (CB), and System Log (CB). Click View Selected Log Files (BT) to review the enabled log files.
Package History	View Package	Click on one of the Package ID numbers to view the captured package image.
	SMIO Package Data	Displays graph data for Box Height (blue line), Focus Height (green line), Gain (orange line), & DPI (yellow line) when appropriate checkbox(es) are enabled.
	Image Capture Mode	Identifies the mode being used to capture images (e.g.: Start Box to Tx Point).
	Change Image Capture Mode	Click button to change image capture mode (BT).
	Package ID	Displays ID of package for which data is displayed in SMIO Package Data.
	Belt Speed	Displays belt speed at the time package data and image were captured.
	Box Height, Focus Height, Gain, & DPI (CB)	These checkboxes enable/disable the display of info on the SMIO Package Data graph. Each item is identified by colored line: Box Height (blue), Focus Height (green), Gain (orange), and DPI (yellow).
Outputs	Activate Digital Out 1 – 4 (BT)	Click on the appropriate button to activate any of the digital outputs.
	Indicators (SI)	Indicates output condition: white (not used), green (open), or red (closed).
	Fields	Identifies the condition for each output: Not Used, Life, Noread, Read, Multiple, Image Valid
NOTE: The following abbreviations are used in this table. BT = Button, CB = Check Box, DD = Drop-down menu, SB = Slider Bar, SI = Status Indicator	

APPENDIX B: PARAMETER MIN/MAX VALUES

Parameter	Description	Min	Max
MODIFY SETUP / TRIGGER TAB			
Trigger Mode *	Maximum Package Length (in.) [cm.] *	4.0 [10.2]	60.0 [152.4]
	Debounce (in.) [cm.] *	0.0 [0.0]	2.0 [5.1]
Photoeye Settings **	Distance to DRP (in.) [cm.] **	0.0 [0.0]	200.0 [508.0]
Light Curtain Settings *	Light Curtain Offset (in.) [cm.] *	-5.00 [-12.70]	5.00 [12.70]
	Minimum Package Height (in.) [cm.] *	0.50 [1.27]	36.0 [91.44]
	Distance to DRP (in.) [cm.] *	1.0 [2.5]	200.0 [508.0]
* Only for Light Curtain or Light Curtain and Photoeye Trigger Mode. ** Only for Photoeye or Light Curtain and Photoeye Trigger Mode.			
Extend Edge	Leading Edge (in.) [cm.]	-30.0 [-76.2]	30.0 [76.2]
	Trailing Edge (in.) [cm.]	-30.0 [-76.2]	30.0 [76.2]
MODIFY SETUP / TRACKING TAB			
Tracking	Distance To Transmit Point (in.) [cm.] (not for Immediate Tracking Mode)	1.0 [3]	200 [508]
Belt Speed Settings	Auto Generated Belt Speed (fpm) [mps] (only for Internal Belt Speed Settings)	0 [0.000]	600 [3.048]
	External Encoder Resolution ((tachs/in.) [tachs/cm.] (only for External Belt Speed Settings)	1.0 [2.5]	200.0 [508.0]
Camera Mounting	Relative Camera Angle (deg.)	- 60.0	60.0
	Far Working Distance (in.) [cm.]	10.0 [25.4]	200.0 [508.0]
MODIFY SETUP / IMAGING TAB			
Focus	Fixed Focus Height (in.) [cm.] (only for Fixed Focus Mode)	0.00	51.00 [129.54]
Gain	Fixed Gain (only for Fixed Gain Mode)	0	255
Scan Line Clock	Fixed Frequency (only for Fixed Frequency Scan Line Clock Mode)	0	16384
	Scan Lines Per Inch (only for Speed Comp. Scan Line Clock Mode)	80	500
MODIFY SETUP / PKG MGMT DIAG TAB			
Image Compression	Down Sample Image Divisor (only for Down Sampling Comp. Mode)	1	16
MODIFY SETUP / OUTPUTS TAB			
Digital Out (1 – 4)	Active Time (msec) (for all four Digital Outs)	0	2000
MODIFY SETUP / TUNNEL TAB			
Multi-Side Imaging Gain Compensation	Bright Surface Gain%	0	150
	Edge Transition Adjustment (in.) [cm]	-9.9 [-25.1]	9.9 [25.1]
DM-3000 Focus Data Setup	DM-3000 Scan Window Length (in.) [cm]	20 [51]	60 [152]
MODIFY SETUP / DIMENSIONING TAB			
Dimensioning Parameters	Left X (pixels)	0	20000
	Right X (pixels)	0	20000
	Vertex Offset	0	20000
	Optical Center X (Enter C for center of image)	0	20000
	Expand Y	-500	500
	Camera Tilt Angle	-60	60
	Reference Height 1	0	5000
	Reference X Density 1	0	20000
	Reference Height 2	0	5000
	Reference X Density 2	0	20000
	Average Black Level	0	255
	Minimum Package Dimension	0	500
	Adjustment 1	0	200
DIAGNOSTICS AND UTILITIES / IMAGING TAB			
Manual Control	Focus Height (in.) [cm.] (enable Manual Focus)	0.00	36.00 [91.44]
	Gain Value (enable Manual Gain)	0	255
	Scan Line Frequency (enable Manual Freq)	0	20000

APPENDIX C: ASCII CHARACTER CHART

The ASCII character set is used to create the host messages.
Below is a Hexadecimal and Decimal ASCII Character Chart.
See the **Modify Setup / Communications Tab** in **Chapter 3** for more details.

HEXADECIMAL & DECIMAL CHARACTER ASCII TABLE											
DEC	HEX	ASCII	DEC	HEX	ASCII	DEC	HEX	ASCII	DEC	HEX	ASCII
000	00	^@ NUL	032	20	SPC	064	40	@	096	60	'
001	01	^A SOH	033	21	!	065	41	A	097	61	a
002	02	^B STX	034	22	"	066	42	B	098	62	b
003	03	^C ETX	035	23	#	067	43	C	099	63	c
004	04	^D EOT	036	24	$	068	44	D	100	64	d
005	05	^E ENQ	037	25	%	069	45	E	101	65	e
006	06	^F ACK	038	26	&	070	46	F	102	66	f
007	07	^G BEL	039	27	'	071	47	G	103	67	g
008	08	^H BS	040	28	(	072	48	H	104	68	h
009	09	^I HT	041	29	)	073	49	I	105	69	I
010	0A	^J LF	042	2A	*	074	4A	J	106	6A	j
011	0B	^K VT	043	2B	+	075	4B	K	107	6B	k
012	0C	^L FF	044	2C	,	076	4C	L	108	6C	l
013	0D	^M CR	045	2D	-	077	4D	M	109	6D	m
014	0E	^N SO	046	2E	.	078	4E	N	110	6E	n
015	0F	^O SI	047	2F	/	079	4F	O	111	6F	o
016	10	^P DLE	048	30	0	080	50	P	112	70	p
017	11	^Q DC1 XON	049	31	1	081	51	Q	113	71	q
018	12	^R DC2	050	32	2	082	52	R	114	72	r
019	13	^S DC3 XOFF	051	33	3	083	53	S	115	73	s
020	14	^T DC4	052	34	4	084	54	T	116	74	t
021	15	^U NAK	053	35	5	085	55	U	117	75	u
022	16	^V SYN	054	36	6	086	56	V	118	76	v
023	17	^W ETB	055	37	7	087	57	W	119	77	w
024	18	^X CAN	056	38	8	088	58	X	120	78	x
025	19	^Y EM	057	39	9	089	59	Y	121	79	y
026	1A	^Z SUB	058	3A	:	090	5A	Z	122	7A	z
027	1B	^[ESC	059	3B	;	091	5B	[	123	7B	{
028	1C	^\ FS	060	3C	<	092	5C	\	124	7C	l
029	1D	^] GS	061	3D	=	093	5D	]	125	7D	}
030	1E	^^ RS	062	3E	>	094	5E	^	126	7E	~
031	1F	^_ US	063	3F	?	095	5F	_	127	7F	DEL

APPENDIX D: APC100 DISPLAY MESSAGES

The following is a list of possible AVCore status messages that may appear on the APC100 Decoder's 2-line LCD display:

AVCore Status Condition	Message on 2-Line Display
AVCore is starting.	Line 1: Accu-Sort Sys. Line 2: Loading
AVCore is ready for run-time operation (i.e.: ready to read).	Line 1: Accu-Sort Sys. Line 2: Ready
AVCore transmits a host message.	*(The next available line will display the data portion of the host message. It may be truncated if the message is too long for the display.)*
The Uninterruptible Power Supply (UPS, if equipped) signals AVCore that AC power has failed. AVCore has started the system shutdown process.	Line 1: Power Failure Line 2: Stand By
AVCore detects the software-controlled power switch on the APC100 has been switched to the "off" position. AVCore has started the system shutdown process.	Line 1: Powering Down Line 2: Stand By
AVCore has shutdown gracefully.	Line 1: Decoder Offline Line 2: Restart System

NOTE: The APC100 should also display its IP address for a few seconds when booting. Additional information on the APC100 is provided in the manuals provided with your equipment.

APPENDIX E: GLOSSARY OF TERMS

Accu-Setup
The Windows®-based primary user interface that provides all the necessary functions to set up, monitor, and diagnose the operations of an AccuVision System.

AccuVision System
This term identifies the Accu-Sort product line that utilizes CCD camera technology for imaging and decoding.

ACK
A control character sent to acknowledge that a transmission block has been received.

Active Image Width
Defines the narrowest possible active image by reducing the overall area the camera will scan for a valid bar code. For example: In applications where codes always appear in one location of packages, the entire package does not need to be scanned, so the active image width is set smaller, thus reducing decoding time and demand on processing resources. This is set in Accu-Setup using the *Modify Setup / Symbologies / Advanced Decoder Options (See Chapter 3.)*

Address
A unique designation for the location of data or the identity of a smart device; allows each device on a single communications line to respond to its own message.

Alignment
The position of the camera and/or light source as it relates to the target of a receiving element (i.e.: packages being tracked through the scanning area).

Alphanumeric
Consisting of letters, numbers, and symbols. *(See ASCII. Also reference the ASCII character chart, Appendix C.)*

Ambient Light
Refers to the uncontrolled lighting conditions in the scanning area (i.e.: all light that is not provided by the AccuVision illumination modules). Ambient light can interfere with successful scanning of bar codes.

Application
A use to which something is put, or how it is used. Throughout the AccuVision Sales Guide, the term application is used to reference the customer's needs and requirements as they relate to implementing an AccuVision solution.

ASCII (American Standard Code for Information Interchange)
Pronounced *as-kee*. A standard seven bit plus parity code, representing 256 characters, established by ANSI to achieve compatibility between data services. *(Reference the ASCII character chart, Appendix C.)*

Aspect Ratio
The ratio of height to width of a bar code symbol. A code twice as high as wide would have an aspect ratio of 2; a code twice as wide as high would have an aspect ratio of 0.5".

Asynchronous Transmission
Transmission in which the time intervals between transmitted characters may be of unequal length. Transmission is controlled by start and stop bits at the beginning and end of each character.

Autodistinguish
The ability of bar code reading equipment to recognize a selectable number of different symbologies (whether 1D, 2D, or both) and process the data without operator intervention; this is a prerequisite feature of bar code readers employed in open systems. Also referred to as *autodiscrimination*.

Auto Generated Belt Speed (AutoTach)
Use for belt speed timing instead of using a tachometer. AccuVision systems can be setup to generate a belt speed automatically for applications where belt speed does not vary more than 5%. This is generated by the camera's SMIO board when the function is selected from the *Accu-Setup Modify Setup / Tracking Tab*. Also referred to as *AutoTach*. *(See Chapter 3.)*

AVCHI (AccuVision Custom Host Interface)
The AccuVision Custom Host Interface (AVCHI) is a customer-specific application designed to provide a customized interface for systems utilizing a host computer. AVCHI provides all communications between the AccuVision system and host, including the formatting and transmission of messages and responses to host commands.

AVCore
The main WindowsNT®-based application running on the AccuVision decoder that provides a program interface for the decoder as well as advanced image collection and diagnostics. Additionally, AVCore contains multiple threads for real-time data movement and time critical processing.

Bar
The dark elements of a printed linear bar code symbology. (Referred to as *elements* in 2D symbologies.)

Bar Code
An array of rectangular bars and spaces arranged in a predefined pattern to represent elements of data referred to as characters. Also referred to as *bar code symbols* or *symbologies*. (See the term *Symbologies* for definitions of the bar codes that can be read by AccuVision cameras.)

Bar Code Character
A single group of bars and spaces that represent an individual number, letter, or other symbol.

Bar Code Density
The number of characters that can be represented in a linear unit of measure. Bar code density is often referred to in characters per inch (CPI).

Bar Height
The height of the bars in a bar code.

Bar Length
The bar dimension perpendicular to the bar width.

Bar Width
The thickness of a bar measured from the edge closest to the symbol start character to the trailing edge of the same bar.

Baud Rate
A unit used to measure communications speed or data transfer rate; represents the number of discrete conditions or events per second. (See BPS.)

BCC (Block Check Character)
Used to check transmission accuracy, a character transmitted by the sender after each message block and compared with a block check character computed by the receiver.

BEL
A control character that is used when there is a need to call for attention; it may control alarm or attention devices.

Bed Width or Belt Width
The useable width of the conveyor belt, i.e.: belt area on which packages are transported.

Bidirectional
A bar code symbol capable of being read successfully independent of scanning direction.

Bit (Binary Digit)
The contraction of binary digit, the smallest unit of information in the binary system; a one or zero condition.

Bottom Read
When the camera is mounted under the conveyor to read codes on the bottom of boxes or on the front or back of boxes.

BPS (Bits per Second)
Unit of data transmission rate. *See baud rate.*

Bright Surface Gain
This is a setting (by percentage) used when imaging multiple sides of packages, typically in a tunnel application. This is set via Accu-Setup. (See *Modify Setup / Tunnel Tab in Chapter 3*.)

Button
A graphic user interface that allows users to select a given software function. Instead of physically pressing a button, the user simply clicks on the desired button to access a menu, tab screen, or function.

Button Menu
A graphic user interface that offers several buttons. The Accu-Setup Main Window offers a menu of buttons that include Save to Camera, Modify Setup, Exit, etc. Instead of physically pressing a button, the user simply clicks on the desired button to access a menu, tab screen, or function.

Camera, Camera Module
Identifies the AccuVision module that is responsible for scanning and/or imaging packages that pass through the scanning area. The camera includes several sub-components (including the camera head and SMIO board) and is responsible for the interconnections with other devices (e.g.: decoder, trigger, tach, illumination, etc.).

Camera Head
Component subassembly of the AccuVision camera that includes the lens, auto-focusing optics (if applicable), and CCD sensor array.

Capture count
The number of consecutive identical valid decodes that result in a valid read.

CCD Sensor Array
A series of Charged Coupled Device (CCD) photo receptors used by the camera to convert light energy into electrical energy. (See also *Tap(s)*.)

Character
A single group of bars and spaces in a code that represent an individual number, letter, punctuation mark or other graphic element. Used as part of the organization, control, or representation of data.

Character, self-checking
The feature that allows a bar code reader to determine if a scanned group of elements is a valid symbol character. If a symbology is described as character self-checking, a single printed defect (edge error) in any symbol character does not produce a valid character.

Character set
Those characters available for encodation in a particular automatic identification technology.

Check Character
A character (usually at the end of the code) that is used to perform a mathematical check to ensure the accuracy of a scan of the bar code.

Codabar
For details, see Symbologies

Code 128
For details, see Symbologies

Code 39
For details, see Symbologies

Code 93
For details, see Symbologies

Code Length
The length of the bar code measured from the start of the first bar to the end of last bar.

Code Orientation
The relationship of the bar code with reference to the camera's reading zone. Typical code orientations are Ladder and Picket Fence.

Com Initialization String
A user-definable string of ASCII characters that can be set for the SMIO Ports by using the *Modify Setup / Communications Tab* of Accu-Setup. *(See Chapter 3.)*

Command Version
(See Accu-Setup *Main Window / Camera Type / SMIO Tab in Chapter 1.*)

Communications Protocol
The rules governing exchange of information between devices connected together on the same communications line.

Configuration
The arrangement and interconnection of hardware components within a system, and the hardware and software selections that determine the operating characteristics of the system.

Continuous code
A bar code symbology where all spaces within the symbol are parts of the characters (Interleaved 2 of 5). There is no interactive gap in a continuous bar code symbology.

Conveyor Speed
The speed that the conveyor is moving, typically measured in either feet per minute (FPM) or centimeters per second (CPS). AccuVision systems require stable/consistent conveyor speed to assure the accuracy of bar code reading.

Coplanar Illumination
An illumination source that is in the same plane / line of sight of the camera's CCD sensor array. The AV3700 offers an LED coplanar illumination option.

CR (Carriage Return)
An ASCII control character that moves the cursor or print mechanism to the left margin.

CRC (Cyclic Redundancy Check)
A CRC is generated by treating a message as a single, large binary number and dividing it by a specific number and keeping the remainder, which becomes the CRC. This can be set in Accu-Setup. (See *Modify Setup / Communications Tab / Host Messages / Data Verification in Chapter 3*.)

CTS (Clear to Send)
The Modem interface signal that indicates to the DTE device to begin transmission.

Data Bits
(See Serial Asynchronous Transmission Of Data.)

Data Matrix
For details, see Symbologies

Data Verification
There are three data verification options available when defining the host message via Accu-Setup: None, BCC, and CRC. (See *Modify Setup / Communications Tab / Host Message in Chapter 3*.)

Decode
The process of translating a bar code into data characters using a specific set of rules for each symbology.

Decode Engine
The component of the bar code reading system that decodes the bar codes. This term is used interchangeably with Decoder, but typically references the decoding software resident in the AccuVision APC100 Decoder.

Decoder
As part of a bar code reading system, the electronic package that receives the signals from the camera, performs the algorithm to interpret the signals into meaningful data and provides the interface to other devices. May also be referred to as *Decoder Logic*.

Default(s)
Original parameters as programmed by Accu-Sort at the factory. Accu-Setup can be used to review the default settings.

Delimiter Between Codes
The separator used between multiple bar codes decoded and transmitted to the host in the same message. The delimiter is set in Accu-Setup. (See *Modify Setup / Communications Tab / Host Message in Chapter 3*.)

Depth of Field (DOF)
The distance between the maximum and minimum plane in which a symbol can be read. This range is from the specified optical throw to the far reading distance.

Density
The number of data characters which can be represented in a linear unit of measure. Bar code density is often expressed in *characters per inch (CPI).*

Dimensioning system
Used in applications that require more than the package height data provided by a photoeye or light curtain. Currently, a DM-3000 is used to provide package dimensioning to camera-based systems.

Discrete code
A bar code or symbol where the space between characters, intercharacter gap, are not part of the code as with Code 39. See continuous code.

Dots Per Inch (DPI)
DPI is a measure of resolution and indicates the number of pixels per linear inch as measured at the object plane. Unless otherwise qualified, DPI generally refers to the camera's resolution perpendicular to the motion of the transport (i.e.: across the conveyor). *Minimum DPI* identifies the lowest DPI that occurs in the system. This figure generally limits the smallest symbology

element that may be detected. *Minimum DPI Reference Distance* is the linear measurement between the camera's reference plane (often the mounting base) and the point where the minimum DPI occurs. This is generally the largest possible distance to which the camera can be focused. *Maximum DPI* identifies the highest DPI that occurs in the system. *Maximum DPI Reference Distance* is the linear measurement between the camera's reference plane (often the mounting base) and the point where the maximum DPI occurs. This is generally the smallest possible distance to which the camera can be focused.

Downloading
The process of sending configuration parameters, operating software or related data from one source to another.

Down Sampling
A software function that reduces the amount of storage and processing time used when displaying or saving images from within Accu-Setup. This slider bar is found on the *Modify Setup / Pkg. Mgt. Diag. Tab*.

Drop-down menu
A graphical user interface that allows the user to select from a list of options that are displayed when a specific function has been selected. This options list "drops down" from the selected function. A list of drop-down menus can be found across the top of the Accu-Setup Main Window.

DSR (Data Set Ready)
An RS232 modem interface control signal which indicates that the terminal is ready for transmission.

DSR (Data Terminal Ready)
Modem interface signal which alerts the modem that the DTE device is ready for transmission.

Duplex Transmission
See Full and Half Duplex.

EAN
European Article Number System. The international standard bar code for retail packages.

EDI (Electronic Data Interchange)
A method by which data is electronically transmitted from one point to another.

EIA-232 (See RS-232)
EIA-422 (See RS-422)
EIA-485 (See RS-485)

Element
Dimensionally the narrowest width in a character - bar or space.

Element width
1) 1D codes: The thickness of a bar measured from the edge closest to the symbol start character to the trailing edge of the same element. 2) 2D codes: The thickness of any element within the 2-dimensional symbol.

Encoded area
The total linear dimension consisting of all the characters of a code pattern, including start and stop characters and data.

ENQ (Enquiry)
A transmission control character used as a request for a response from a remote station. (^E)

Error
A discrepancy between a computed, observed or measured value or condition and the true, specified or theoretically correct value or condition.

ESC (Escape)
A control character that is used to provide additional control functions. It alters the meaning of a limited number of continuously following bit combinations.

ETX (End of Text)
A transmission control character that terminates a text.

Even Parity
A data verification method in which each character must have an even number of on bits.

Far Distance
The distance (dimensional reference) from the face of the camera to the farthest point at which a code can be successfully scanned.

Feet Per Minute (FPM)
Typically used to define the speed of a conveyor. Conveyor speed may also be defined in meters per second.

Field of View (FOV)
Defines the coverage area across the conveyor belt width over which the camera can detect and read bar codes. FOV is a linear measurement of the length of the scan line and should be qualified with a "throw" distance (e.g.: 24" FOV @ 60" throw). A *maximum theoretical FOV* is the absolute maximum scan line length assuming sufficient uniform illumination along the whole scan line. *Effective FOV* is the useful length of the scan line as limited by the illumination and/or the camera. (For example: At a throw of 60", a camera may have a *maximum theoretical FOV* of 24" but the illumination may only cover a 20" FOV, so the *effective FOV* of the camera/illumination system would be 20".)

Flying Lead
A lead that exits the back of the connector hood on the outside of the cable jacket. It is normally attached to the drain wire or shield and connected to the chassis of the switch, modem, etc. It can also be a hardware control lead.

Focus, Focusing
As the term suggests, they identify the camera's means of gathering light onto the CCD sensor through the use of a lens and, in the case of some cameras, a focusing mechanism (e.g.: voice coil). *Dynamic Focusing* refers to adjusting the camera focal length "on the fly" to accommodate varying package heights or varying distances between the camera and packages. Input is required from a light curtain or dimensioning system. *Fixed Focus* identifies cameras with a focal length that remains the same (i.e.: fixed); used by cameras to image packages that are all the same distance from the camera. The *Focus Table* is one of three files stored on the APC100 that can be modified via the *Utilities Menu / Modify Focus Table. (See Chapter 5.)* Focus table modification should only be done by an ASI trained and authorized technician.

Frame Grabber
Board installed in APC100 that is used to capture image data. (See *GRAY IMAGE DATA*.)

Front Read
The camera is mounted to read bar codes on the front (leading edge) of a box as it passes the camera. In a front read application, the camera is typically setup at a 45 degree angle to the conveyor, mounted either above or on the side of the conveyor.

Front/Top Read
The camera is mounted to read the front and top of packages as they pass through the scanning area. In a front/top read application, the camera is usually mounted above the conveyor positioned at a 45 degree angle to enable it to scan both the front and top of packages.

Full Duplex (FDX)
Simultaneous, two-way, independent transmission in both directions.

Gain
A measure of amplification. More gain means more amplification. Too much gain may lead to saturation (i.e.: signals reaching a maximum value). Accu-Setup enables the user to define a *Gain Mode* via the *Modify Setup / Imaging Tab*. The *Gain Table* is a look-up table of gain setting values tabulated for various heights and speeds. It is one of three files stored on the APC100 that can be modified via the *Utilities Menu / Modify Gain Table*. (See *Chapter 5*.) Gain table modification should only be done by an ASI trained and authorized technician.

Gateway
A device used to connect networks using different protocols so that information can be passed from one system or network to the other(s). (See **Subnet Mask**.)

Gateway Address
Like all other devices on a network, the device serving as the Gateway must also have an IP address so that devices wishing to communicate with devices outside its own network can fine the Gateway which will forward its data. Like all other addresses, it is displayed in the "dotted-decimal" format.

Gray Image Data
Gray scale image data is the image captured by the camera of a product as it passes through the scanning area. The gray image data is not required for symbology decoding, but may be provided from the camera's GRAY IMAGE DATA port to the frame grabber in the APC100 and subsequently to the client's host computer for processing.

Guard bars
1) The bars at the ends and center of a UPC and EAN symbol that ensure a complete scan of the bar code. 2) The optional bars outside the quiet zone of an Interleaved 2 of 5 symbol that ensure a complete scan of the bar code.

Half Duplex (HDX)
Transmission in either direction, but not simultaneous.

Handshaking
Exchange of predetermined signals between two devices establishing a connection. Usually part of a communica-tions protocol.

Header
A means of identifying the beginning of a message to be sent to the host. One example is <STX> or Start of Text. *(See ASCII chart, Appendix C.)*

Hexadecimal
A base-16 numbering system that uses the symbols 0,1,2,3, 4,5,6,7,8,9,A,B,C,D,E,F. *(See ASCII chart, Appendix C.)*

Host
1) A central controlling computer in a network system.
2) Any device on a network system that provides a controlling function to another device on the network. 3) Any intelligent device for which another device is providing a communication interface to a network.

Illumination
Light source used with a camera to provide the lighting needed to illuminate the scanning area. Some cameras use self-contained illumination. There are three types of illumination used by AccuVision: 1) sodium, 2) LED, or 3) Coplanar LED.

Image Capture
Term used to define the process used by AccuVision cameras to acquire images of products as they pass through the scanning area.

Intercharacter Gap
The space between two adjacent bar code characters in a discrete code.

Interface
A shared boundary defined by common physical interconnection characteristics, signal characteristics and meanings of interchanged signals.

Interleaved Bar Code
A bar code that pairs characters together using bars to represent the first character and spaces to represent the second (e.g.: Interleaved 2 of 5).

Interleaved 2 of 5 (I 2 of 5)
For details, see Symbologies

Inter-symbol no-read count
The minimum number of no-reads that must occur between symbols scanned when Self-Triggered (continuous decode) is selected as the decode trigger. Symbols that are not preceeded by the minimum number of no-reads are ignored.

I/O
The abbreviation for input/output. The keyboard and a printer, are examples of I/O devices. I/O activity is different from computational activity. When a program sends a document to the printer, it is engaging in I/O activity; when the program sorts a list of terms, it is engaging in computational activity.

IP Address (Internet Protocol Address)
IP Address is the numeric address given to a network card which enables other devices on a network to find it. For readability, this number is displayed in "dotted-decimal" format (e.g.: 127.0.0.1)
as opposed to the binary equivalent
(e.g.: 01111111000000000000000000000001).

LAN
The acronym for local area network. A LAN system is usually confined to the same building or a few nearby buildings, with all equipment linked by wiring dedicated specifically to the LAN.

Laser Scanner
An optical bar code reading device using a low energy laser light beam as its source of illumination.

LCD (Liquid Crystal Display)
A low-power display on the APC100 Decoder. An LCD consists of a liquid crystal solution between two sheets of polarizing material. An electric current causes each crystal to act like a shutter that can open to allow light past or close to block the light. *(See Appendix D.)*

LED (Light Emitting Diode)
A semiconductor generally made from gallium arsenide, that can serve as a visible or near infrared light source when voltage is applied continuously or in pulses. LEDs have extremely long lifetimes when properly operated.

LED Illumination
Low-power light emitting diode (LED) light source used by cameras to illuminate the scanning area in applications with little or no DOF requirements where high speed is not a consideration.

Lens
Optics used in cameras for focusing light onto the CCD sensor array. _Lens Focal Length (mm)_ defines the lens focal length in millimeters. The AV3700 cameras have four lens options: 38 mm, 50 mm, 85 mm, and 135 mm.

LF (Line Feed)
An ASCII control character that moves the cursor or print mechanism to the next line. (^J)

Light Curtain
A sensing device connected to the AccuVision system that uses a series of transmitters and receivers to create a "curtain of light" that is both 90 degrees and perpendicular to the conveyor's direction of travel. This device is used by the system to detect either the presence and/or the height of packages as they enter the camera's scanning area.

Linear Bar Codes
Also referred to as 1D or 1-dimensional symbologies. Examples: Code 39, I2of5, UPC.

Lines Per Inch (LPI)
Identifies the lines per inch. LPI is a measurement of resolution that indicates the number of sensor scan lines that are collected for every inch of transport movement. In effect, LPI is the "DPI in the direction of conveyor travel".

Matrix 2D Symbology
Examples: Aztec, DataMatrix, MaxiCode, QR Code

MaxiCode
For details, see Symbologies

Memory
A computer can contain several different forms of memory, such as RAM, ROM, and video memory. The term *memory* is generally used to define RAM. When a computer has 8 MB of memory, it actually has 8 MB of RAM.

Memory Address
A specific location, usually expressed as a hexadecimal number, in the computer's RAM.

Message
1) A meaningful combination of alphanumeric characters that establishes the content and format of a report. 2) In a communication network, the unit of exchange at the application layer.

Message buffer
Storage register for the temporary storage of data that allows decoding to continue while the host is retrieving data from the serial port.

Message buffer warning
An output condition that occurs when the message buffer has used a defined amount of the message buffer.

MHz
The abbreviation for megahertz.

Microprocessor
The primary computational chip inside the computer, referred to as the "brain". The microprocessor contains an arithmetic processing unit and a control unit. Software written for one microprocessor must usually be revised to run on another microprocessor.

Mil
One thousandth of an inch (0.001 inch). Bars and spaces of codes are commonly referred to as being a certain number of mils wide.

Misread
The scanner incorrectly decodes a bar code as it passes through the scan zone.

Mouse
A pointing device that controls the movement of the cursor on a screen. Mouse-aware software allows the user to activate commands by clicking a mouse button while pointing at objects displayed on the screen. A mouse or trackball device is useful when using the Accu-Setup for AccuVision software.

Multidrop Line
A single communications circuit that interconnects many stations, each of which contains terminal devices. *See EIA-485.*

NAK (Negative Acknowledgment)
A control character used to indicate that the previous transmission block was in error and the receiver is ready to accept retransmissions.

Narrow Bar (NB) / Narrow Space (NS)
Smallest code element, bar or space, in the bar code symbol. Also known as the X dimension.

Near Distance
The distance from the face of the camera to the closest point at which a code can be successfully scanned.

Net Mask
A numeric value that is used by devices to determine whether the device it wishes to communicate with is on the same network. If not, the data must be forwarded via a Gateway. May also be referred to as Subnet Mask. (See *Gateway, Gateway Address*.)

Network
A series of stations (nodes) connected by some type of communication medium. A network may be made up of a single link or multiple links.

NVC
The acronym for non-valid code. Defines the condition that occurs when an object has been scanned and no bar code could be decoded. Usually, this indicates that either no code was on the object or the code was badly damaged and could not be decoded.

No-match
An output condition in which decoded data does not match an entry in the match code table.

No-Read
When the camera is unable to decode a bar code as it passes through the scan zone.

Non-Read
The absence of data at the camera output after an attempted scan due to no code, defective code, camera failure or operator error.

Odd Parity
A data verification method in which each character must have an odd number of on bits.

Omnidirectional
Bar code orientation is unpredictable and can be at any angle. A single scan line is not sufficient to scan bar codes oriented omnidirectionally.

One-dimensional Symbologies
Also referred to as linear codes. Examples: Code 39, I2of5, and UPC are all 1D or linear bar codes.

Operating Range
The sum of the camera's optical throw and depth-of-field.

Optical Throw
Measured distance from the camera's window to the near reading distance of the depth of field. Typically, this is the closest a bar code can be to the camera's window and still be properly decoded.

Optimum Reading Distance
Typically, the center of the depth of field (DOF).

OCR
Optical Character Recognition.

OCR Image Engine
Refers to a camera that does not include a bar code decoder. Image data is provided by the camera directly to a customer-supplied OCR decoder.

Orientation
The alignment of the code's bars and spaces to the camera. Often referred to as vertical (picket fence) and horizontal (ladder). Since cameras are capable of reading bar codes omnidirectionally, bar code orientation is not as critical as it used to be with single-line laser scanners.

Oversquare
Used to describe bar codes that are taller (from top to bottom of the bars) than they are wide (from first to last bar).

Package Spacing

This is the spacing between items on a conveyor. Package spacing is measured one of two ways: Leading edge of one box to leading edge of the next or trailing edge of one box to trailing edge of the next. Package spacing is critical to system operations, especially in front read applications.

Parameter
1) A value or opinion that you specify to a program. In Accu-Setup, all user-definable parameters are selected through the use of the various tab screens, drop-down menus, and slider bars. 2) In programming, a parameter is sometimes called a *switch* or an *argument*.

Parity Bit
A bit that is set at "0" or "1" in a character to ensure that the total number of 1 bits in the data field is even or odd.

PDF417
For details, see Symbologies

Percent good reads
The number of successful reads per refresh period. This is valid only when the refresh period is set to 0.

Performance indicator
A bar code decoder function that counts the number of decodes during a trigger period. When the period = 0, the performance indicator provides the number of decodes (up to 100 attempts). Use the performance indicator to provide a general indication of bar code symbol quality or verify proper setup of the scanner.

Peripheral Device
An internal or external device, such as a printer, a disk drive, or a keyboard, connected to a computer.

Photoeye
Sometimes used as a presence detector to identify objects in the camera's reading zone. The photoeye emits a beam and is used with a reflector to create a photoelectric circuit. When the beam is blocked by an object, breaking the circuit, a TRIGGER signal is sent to the camera. (See also *Light Curtain* and *Trigger*.)

PLANET
For details, see Symbologies

Polling
A means of controlling devices on a multipoint line.

Port
Refers to the physical connections made to the AccuVision camera and other devices. The AccuVision camera's ports include: COM, HOST, GRAY IMAGE DATA.

POSTNET
For details, see Symbologies

Protocol
A formal set of conventions governing the formatting and relative timing of message exchange between two communicating systems.

Pulses Per Inch (PPI)
Defines the number of pulses per inch of transport travel as provided by the tachometer.

Pulse Width
A change from the leading edge of a bar or space to the trailing edge of a bar or space over time. Pulse width is also referred to as a transition.

Quad Relay Box
Optional Accu-Sort hardware device used to control up to four parallel I/O from the camera's SMIO *I/O Port*.

QR Code
For details, see Symbologies

Queue
A buffer used to hold data in order until it is used or transmitted.

Quiet Zone
Required distance before the first bar and after the last bar of the code that must be free of marks or printing.

Read Zone

Area in front of the scanner's window in which the bar code should appear for scanning. This zone consists of the scan window and the raster width (if used).

Reflectance
The amount of light returned from an illuminated surface. A sodium illumination will provide more reflectance than an LED illumination.

Relative Camera Angle
The mounting angle of the camera as it relates to the conveyor surface and direction of travel. (See illustration *AccuVision Scanning Area Diagram* in *Chapter 1*.)

Relay
Relays are simply electrical switches that are typically used to control external diverts, alarms, etc. Relay types available are FORM A and FORM C. FORM C type relays have both normally open and normally closed contacts available while FORM A type relays have only normally open contacts available.

Relay Output Duration
This is the time (in seconds) after the relay is energized that it should be turned off.

Relay Output Delay
The time lapse between an event and the energizing of the relay.

Request To Send (RTS)
An RS232 modem interface signal which indicates that the DTE has data to transmit.

Resolution
1) Camera resolution is referenced in pixels per inch across the belt (DPI) and in the direction of travel (LPI). 2) The narrowest element dimension that can be distinguished by a particular reading device or printed with a particular device or method.

Response Time
The elapsed time between the generation of the last character of a message at a terminal and the receipt of the first character of the reply. It includes terminal delay and network delay.

ROM
The acronym for read-only memory. The computer contains programs essential to its operation in ROM. A ROM chip retains its contents even after you turn off your computer.

RS-232
Interface between data terminal equipment and data communication equipment employing serial binary data interchange.

RS-422
The Electronic Industries Association standard that specifies the electrical characteristics of balanced voltage digital interface circuits.

RS-485
The Electronic Industries Association standard that specifies the electrical characters of generators and receivers for use in balanced digital multipoint systems.

RS-644 (check for better definition)
Parallel Interface used with Gray Image Data and Gray Image Data Aux Ports of an AccuVision cameras

Scan Area (Scanning Area)
The location of the conveyor being scanned by the camera(s) for bar code symbologies and/or image data.

Scan Line
The line in the object plane that is currently being imaged by the camera. (See also *DPI, Dots Per Inch*.)

Scan Line Clock (SLC)
Identifies the signal that causes the camera to finish collecting light for the current scan and to shift the collected data out of the camera (and begin collecting light for the next scan).The frequency of the scan line clock may vary with object height and/or speed.

SLC (lines/sec. or hertz) = LPI * transport_speed (inches/sec.)

Self-checking
A bar code or symbol using a checking algorithm which can be independently applied to each character to guard against undetected errors.

Sensor
A device that detects or measures something and generates a corresponding electrical signal to an input circuit of a controller. In the case of AccuVision cameras, a CCD sensor array is used to collect light and convert it to an electrical signal. (See *How an Image is Acquired* in *Chapter 1*.)

Serial Port
1) I/O ports located on the AccuVision camera's SMIO panel that are used for communications with the HOST, APC100 (COM), etc. 2) An I/O port used most often to connect a modem or a mouse to your computer, identifiable by its 9-pin connector.

Serial Transmission
The most common transmission mode; serial, information bits are sent sequentially on a single data channel.

Serial Asynchronous Transmission Of Data
The following are common serial communications interfaces: RS232, RS422, and RS485.

When data is transmitted serially from a communications port, the information is transferred between the two devices one data bit at a time. The data flow can follow one of three different communications modes: simplex, half duplex, or full duplex. Each character of data within the data flow is transported in a binary bit frame called the asynchronous data frame.

The start bit begins each frame. A low voltage signal on the data communications line marks the beginning of the start bit, at which point the receiving device begins looking for binary zeros and ones (0's and 1's).The following five to eight data bits (the number depends on the format used) comprise the binary character. For error detection, an optional parity bit can define whether the total number of zeros or ones was even or odd. There are five different parity selections as shown below:

ODD
last data bit is a logical 0 if the total number of logical 1's in the first seven data bits is odd.

EVEN
last data bit is a logical 0 if the total number of logical 1's in the first seven data bits is even.

MARK
last data bit is always a logical 1 (i.e.: high/mark).

SPACE
last data bit is always a logical 0 (i.e.: low/space).

OFF (NONE)
last data bit is not present.

The method used to catch errors by using parity bits is as follows: When the transmitter frames a character, it tallies the number of 0's and 1's within the frame and attaches a parity bit. (The parity bit varies according to whether the total is even or odd.) The receiving end then counts the 0's and 1's and compares the total to the odd or even recorded by the parity bit. If a discrepancy is noticed by the receiving end, it can flag the error and request a retransmission of the data.

A stop bit is used to signal the end of the character. (Stop bits are typically one or two bits in length. The slower the transmission speed, the more stop bits required for recognition of the end of the data frame.)

In addition to the direction of data flow and the data framing, there are other considerations to insure uniform transmissions. Certain operating parameters must be followed to prevent the loss of valuable data.

The first consideration is the speed of transmission, known as baud rate. Serial data transmission is measured in bits per second (BPS). The baud rate selections typically available are: 1200, 2400, 4800, 9600 and 19200. To enable two devices to interact, they must both be transmitting/receiving data at the same baud rate. If it is not possible to do this, there must be a buffer (typically additional storage memory) that accommodates the differences in communications speed.

Many serial communications links also use a flow control system to handle data transmission in addition to memory buffers.

X-ON/X-OFF Protocol
A common type of flow control is the X-ON/X-OFF protocol. When a receive buffer nears its memory capacity, the receiving device sends an ASCII X-OFF signal to the transmitting device, telling it to stop sending data. When the memory buffer has enough space to handle more data, the X-ON signal is sent to the transmitting device, telling it to start sending data again.

ACK/NAK Protocol
Another common protocol is ACK/NAK protocol. When the device transmits a message to the host, the host responds with either an ACK (06H) or a NAK (15H). If the host transmits an ACK to the device, the device deletes its transmit message and the communication sequence is complete. If the host transmits a NAK, the device will retransmit. The device resends data a

maximum of three times. Optionally this may be changed to 1, 2, 3, or infinite retransmits by the user. If the device receives a fourth NAK, it will delete the data in its transmit buffer and display "MAX REXMITS".
A transmitting device ignores ACK and NAK characters received during data transmission. If, for example, a device receives a NAK during a data transmission, it will not resend the data at the completion of the transmission.

The device also has a retransmit timer. This timer is activated each time the device transmits data to the host. If the timer runs for two seconds (this is also changeable) and the device does not receive an ACK or NAK from the host, a timeout occurs and the device retransmits its data. Each time the device retransmits because of a timeout, it treats the timeout the same as receiving a NAK from the host computer. If the device does not receive an ACK before the end of the fourth timeout, it will delete the data in its transmit buffer and display "MAX REXMITS". The device deletes data in its transmit buffer and displays the error message when any combination of four timeouts and NAKs from the host occurs.

When the device receives a message from the host, it calculates the BCC for the message and compares the calculated BCC to the received BCC. If the two values match, the device transmits an ACK, ending the communication. If the values do not match, the device transmits a NAK to the host and waits for the host to retransmit the message. The host, like the device, should retransmit a maximum of three times.

The sequence number starts at zero (30H) and is incremented each time a device transmits a new message. When the sequence number reaches nine (39H), it wraps around to one (31H). If the sequence number skips a number, the receiving device knows that a message was lost. If the same sequence number is received on two sequential messages, the second message is responded to with an ACK or NAK (as appropriate) and ignored.

Shielding
Protective covering, typically around interconnection cabling, that eliminates electromagnetic and radio frequency interference. Proper shielding of all interconnections is necessary to assure correct operation of the AccuVision System.

Side Read
The camera is mounted to read the sides of packages as they pass through the scanning area. Sometimes side read cameras are also positioned to read codes on the front or back of boxes as well as the side.

Signal
An impulse or fluctuating electrical quantity (i.e.: a voltage or current) the variations of which represent changes in information.

Slider bar
A graphical user interface that enables the user to select an ascending/descending value for a definable parameter by clicking on the slider bar and then sliding (via the mouse) until the desired value is shown. For example: Maximum *Package Length* is selected using a slider bar on the *Modify Setup / Trigger Tab* screen.

Smart I/O (SMIO)
Also referred to as the SMIO, this term identifies both the main connector panel and internal board that acts as the control center of the AccuVision camera system. All physical interconnections between the camera, other AccuVision modules, and the outside world occur through the SMIO. The SMIO is a single-board computer that provides real-time control of the illumination, package detection, and package tracking, while monitoring the operation of the system, controlling imaging, and handling all communications with the decoder, Accu-Setup user interface, and host computer.

SMIO Talk
A WindowsNT® application that provides aTCP/IP communication interface from the camera's SMIO to the outside world. Enables multiple external processes to occur simultaneously. AVCore, Accu-Setup, and AVCHI communicate with the camera through SMIO Talk.

Sodium Illumination
High-power sodium lamp light source used by cameras to illuminate the scanning area in applications with larger DOF requirements and/or where faster conveyor speeds are a consideration.

Space
The lighter elements of a 1D bar code symbol formed by the background between bars.

Specular Reflections
A condition when light is reflected back from the code's surface at an angle equal, or nearly equal, to the angle of incidence of the laser light. This condition makes it difficult for the camera to detect the differences in light variation caused by the code's bars and spaces.

Spot
The undesirable presence of an area of low light reflectance in a space of a 1D symbology.

Start and Stop characters

1) Characters used to identify the beginning and end of a bar code. 2) Characters used to identify the beginning and end of messages sent to the host. (See Header, Trailer, Start Bit, and Stop Bit(s).)

Stacked 2D Symbology
Where a long symbol is broken into sections and "stacked" one upon another similar to sentences in a paragraph. Extremely compact codes. Example: PDF417.

Start Bit
In asynchronous transmission, the first bit or element in each character, normally a space, that prepares the receiving equipment for the reception and registration of the character.

Stop Bit(s)
The last bit in an asynchronous transmission, used to indicate the end of a character, normally a mark condition, that serves to return the line to its idle or rest state.

STX (Start of Text)
A transmission control character that precedes a text and is used to terminate a heading.

Symbol
A combination of characters including start/stop and checksum characters, as required, that form a complete scannable bar code.

Symbologies
Also known as bar codes or symbologies. There are many symbology standards being used for product identification. Symbologies can be divided into two main categories: linear and two-dimensional (2D). (See Appendix B of the AccuVision Sales Guide for additional information.) Below is a list of the symbologies that can be read by AccuVision Systems:

Codabar
Self-checking, numeric bar code encoding numbers and several characters (e.g.: $, -, +, ?) with a slightly higher density than Code 39. Includes two bar/space sizes.

Code 39 (Code 3 of 9)
A bar code with a full alphanumeric character set, a unique start and stop character, and three other characters. The name is derived from its code structure, which is 3 wide elements out of a total of 9 elements. The nine elements consist of five bars and four spaces.

Code 93
Similar to Code 39 but requires two check characters. Code 93 was designed to provide a higher density symbology with higher security than Code 39. Although code 93 is a higher density, it is not self-checking and therefore requires two checksums.

Code 128
A bar code symbology capable of encoding the full ASCII 128 character set. It encodes these characters using fewer code elements per character resulting in a more compact code. It features a unique start and stop character for bidirectional and variable length decoding, both bar and space character parity for character integrity, a check character for symbol integrity, a function character for symbol linking, and spare function characters for unique application definition and/or future expansion.

Data Matrix
2D (two-dimensional) symbology. Two distinct characteris-tics make it easy to identify: 1) a solid line along two adjacent sides, accompanied by 2) a pattern of alternating squares on the opposite sides. In the most common version of the symbol (known as ECC200), the alternating square side 'corner' is always a space.

EAN
European Article Numbering System used in retail industry (a superset of UPC) used on product packaging to uniquely identify a product and manufacturer.

Interleaved 2 of 5 (I 2of5)
A bar code with a numeric character set with different start and stop characters. The name is derived from the method used to encode two characters. In the symbol, two characters are paired together using bars to represent the first character and the spaces to represent the second. This interleaved structure allows information to be encoded in both the bars and the spaces. A start character, bar and space arrangement, at one end, and a different stop character bar and space arrangement at the other end, provide for bidirectional decoding of this symbol.

MaxiCode
2D (two-dimensional) symbology developed by the United Parcel Service. Square data elements and a round bullseye at the center of the symbol (known as the central finder character). Maxicode has been released to the public domain for use by anyone.

PDF417

2D (two-dimensional) symbology developed by Symbol Technologies. Appears like multiple linear codes stacked one on top of the other. As a result of being based on linear bar codes, PDF417 is one of a few 2D symbologies that can be scanned by laser scanners.

PLANET
Postal alpha numeric encoding technique is a tall bar/short bar symbology used by the United States Postal Service for special services such as CONFIRM and CIPS. PLANET digits consist of three tall and two short bars and is designed as a compliment of POSTNET.

POSTNET
Postal numeric encoding technique is a tall bar/short bar symbology used by the United States Postal Service to encode ZIP information on letter and flat mail. POSTNET is also being used overseas: AccuVision can read both the Japanese and Australian versions. POSTNET digits consist of two tall and three short bars.

QR Code
2D (two-dimensional) symbology. Easily recognized by square data elements and it's three part finder pattern. Sets of square-in-a-square patterns are located in three corners of this square symbol.

UPC
Acronym for Universal Product Code. The standard bar code type for retail packaging in the United States and Canada.

Syntax
The rules dictating how you must type a command or instruction so the computer will understand it.

***System.ini* file**
When you start Windows, it consults the system.ini file to determine a variety of options for the Windows operating environment. Among other things, the system.ini file records which video, mouse, and keyboard drivers are installed for Windows. Running the Control Panel or Windows Setup program may change options in the system.ini file.

Tach (Tachometer)
Hardware device used to provide conveyor speed information to the AccuVision camera in 20 pulses per inch (20 PPI).

Tag
A collection of information associated with a single variable or I/O point.

Tap(s)
Taps (or "channels") refer to the number of data paths out of the linear CCD sensor. A linear CCD sensor consists of a line of light-sensitive areas. The charge collected in all these areas is shifted to a parallel array of non-light sensitive holding areas all at once. The charges are then shifted along the second set of areas in a "bucket brigade" fashion with the last area's charge being shifted off the sensor entirely (for further processing). This holding area does not have to all be shifted out of a single port – the holding line may be broken into several sections, each with it's own "exit" from the sensor. Each "exit" is called a "tap" or "channel". Generally, the more "taps" the more quickly the image data may be shifted out of the sensor. Current camera configurations offer either 2 or 4 taps. *Tap Frequency (MHz)* is the clock rate at which pixels are shifted out of the CCD sensor.

TCP/IP
An industry standard suite of protocols providing communications in a heterogeneous network environment. TCP/IP stands for Transport Control Protocol/Internet Protocol**.**

Trailer
A means of identifying the end of a message sent to the host. One example is <ETX> or End of Text. (See *ASCII chart* in *Appendix C*.)

Two-width symbology
A bar code symbology whose bar and spaces are characterized simply as wide or narrow. Codabar, Code 39, and Interleaved 2 of 5 are examples of two-width symbologies.

Tracking
Process of keeping track of packages as they travel through the scanning area. Tracking can be done based on the leading edge or trailing edge of packages. Belt speed (as monitored via the TACH signal) and camera mounting also figure into the tracking process. (See *Modify Setup / Tracking tab* in *Chapter 3*.)

Transmit Point
The time it takes to transmit the decoded results from the time the object is first sensed (by PE or light curtain) until the completion of transmission to the host. Transmit point is shorter (faster) for cameras because it is not required to accommodate a scanning pattern length.

Trigger

(Formerly known as CART, short for Carton Present)
A signal, typically provided by a photoeye or light curtain, that informs the camera of the presence of an object within the scanning area. This signal defines for the camera the time period during which to capture image data.

Trigger Cycle
The time during which the camera is capturing image data and, in the case of symbology readers, attempting to read the bar code. (See the *Modify Setup / Trigger tab* and *Diagnostics & Utilities / Trigger tab*.)

Two-dimensional Symbologies
More complex bar code capable of containing much larger amounts of data in a smaller image size because of using either a stacked or matrixed construction when compared to the 1D codes. Example 2D codes: DataMatrix, MaxiCode, and PDF417.

UCC (Uniform Code Council)
The organization which administers the UPC and other retail standards.

Undersquare
Used to describe bar codes that are longer (from the first to last bar) than they are high (from the top to bottom of the bars).

UPC
For details, see Symbologies

UPS
The abbreviation for uninterruptible power supply. A battery-powered unit that automatically supplies power to your APC100 Decoder in the event of an electrical failure.

Utility, Utilities
1) A series of Accu-Setup features that enables the user to manage various functions of the AccuVision system. For further details on these functions, see the <u>*Diagnostics and Utilities tabs*</u> and the <u>*Utilities drop-down menu*</u> of Accu-Setup. 2) A program used to manage system resources including memory, disk drives, and printers.

Values File, VAL File
One of three files stored on the APC100 that can be modified via Accu-Setup. Values that are changed using the series of *Modify Setup* tabs will only be saved when the *Save to Camera* or *Save to Disk* functions are used.

Verifier
A device that makes measurements of the bars, spaces, quiet zones and optical characteristics of a symbol to determine if the symbol meets the requirements of a specification or standard.

Void
The undesirable presence of an area of high reflectance in a bar.

Wide Bar (WB) / Wide Space (WS)
Widest code element, bar or space, in the bar code symbol.

Wide to Narrow Ratio
Dividing the size of the wide elements by the size of the narrow elements of a bar code yields the bar and space ratios. Bar and space ratios can differ. NOTE: If the narrow bar and narrow space are equal and the wide bar and wide space are equal then you calculate only one ratio.

Window
A software graphical user interface that appears on a monitor with which the users interacts (via keyboard and/or mouse) to operate various user-definable functions. In both AVCore and Accu-Setup, there are several tabs, buttons, and drop-down menus available from the *Main Window*.

Write-protected
Read-only files are said to be *write-protected*. You can write-protect a 3.5-inch diskette by sliding its write-protect tab to the open position and a 5.25-inch diskette by placing an adhesive label over its write-protect notch.

"X" Dimension
The dimension of the narrowest bar and/or narrowest space in a bar code.

XON
A control character sent by the receiving device to signal the transmitting device to begin sending data.

XOFF
A control character sent by the receiving device to signal the transmitting device to stop sending data.

APPENDIX F: REVISION HISTORY

Manual Revision #	Software Version #	Date	Changes Made
0.3	3.1	1/23/01	Initial release of *Accu-Setup for AccuVision Software Manual for Version 3.1*
0.4	3.3	3/30/01	1. Define difference between **Accu-Setup** & **SMIO Commands**. (Chap.1, pg.1-18.) 2. Clarify the difference between LPI and scan line frequency pg. 1-10, 4-7). 3. **Network Identification** (Computer Name and Workgroup) added to the **Advanced Communications** found under *Modify Setup / Communications Tab*. (See Chapter 3.) 4. **Reboot Decoder** added to the *Utilities drop-down menu*. (See Chapter 5.) 5. Add notebox to **Auto Backup** and **Auto Retrieve** regarding default settings. 6. Removal of **Custom Tab** from *Modify Setup Tabs*. (See Chapter 3.) 7. Minor enhancements throughout document including bookmark/cross-references.
0.5 ECN S196	4.0	7/27/01	Revised to cover the new functionality of **Accu-Setup for AccuVision, Version 4.0** 1. Addition of compatibility with VisionCube dimensioning software. (See *Modify Setup / Dimensioning Tab* in Chapter 3.) 2. Support added for both the Aztec and RSS symbologies. (See *Modify Setup / Symbologies Tab* in Chapter 3.) 3. Supports POSTNET merging tolerances. (See *Modify Setup / Symbologies Tab* in Chapter 3.)