WinMarkpro®

Laser Marking Software

User Guide - v6.3

SYNRAD®

WinMark pro

Laser Marking Software

User Guide

Version 6.3

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SYNRAD

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Sales and Applications

SYNRAD's Regional Sales Managers work with customers to identify and develop the best CO_2 laser solution for a given application. Because they are familiar with you and your laser application, use them as a first point of contact when questions arise. Regional Sales Managers also serve as the liaison between you and our Applications Lab in processing material samples per your specifications.

Customer Service

For assistance with order/delivery status, service status, or to obtain a Return Authorization (RA) number, contact SYNRAD and ask to speak to a Customer Service representative.

Technical Support

SYNRAD's Regional Sales Managers are able to answer many technical questions regarding the installation, use, troubleshooting, and maintenance of our products. In some cases, they may transfer your call to a Laser, Marking Head, or Software Support Specialist. You may also email questions to the Technical Support Group by sending your message to support@synrad.com or to support@winmark.com.

Reference materials

Your Regional Sales Manager can provide reference materials including Outline & Mounting drawings, Operator's Manuals, Technical Bulletins, and Application Newsletters. Most of these materials are also available directly from SYNRAD's web site at http://www.synrad.com.

European headquarters

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Hazard information

Hazard information includes terms, symbols, and instructions used in this manual or on the equipment to alert both operating and service personnel to the recommended precautions in the care, use, and handling of Class 4 laser equipment.

Terms

Certain terms are used throughout this manual or on the equipment labels. Please familiarize yourself with their definitions and significance.

⚠ **Danger:** Imminent hazards which, if not avoided, will result in death or serious injury.

⚠ **Warning:** Potential hazards which, if not avoided, could result in death or serious injury.

⚠ **Caution:** Potential hazards or unsafe practices which, if not avoided, may result in minor or moderate injury.

Caution: Potential hazards or unsafe practices which, if not avoided, may result in product damage.

Important Note: Important information or recommendations concerning the subject under discussion.

Note: Points of particular interest for more efficient or convenient equipment operation; additional information or explanation concerning the subject under discussion.

General hazards

Following are descriptions of general hazards and unsafe practices that could result in death, severe injury, or product damage. Specific warnings and cautions not appearing in this section are found throughout the manual.

⚠ **Danger**
serious
personal
injury

SYNRAD CO_2 lasers are Class 4 laser products that emit *invisible* infrared laser radiation in the 10.6 μm CO_2 wavelength band.

Do not allow laser radiation to enter the eye by viewing direct or reflected laser energy. CO_2 laser radiation can be reflected from metallic objects even though the surface is darkened. Direct or diffuse laser radiation can inflict severe corneal injuries leading to permanent eye damage or blindness. All personnel must wear eye protection suitable for 10.6 μm CO_2 radiation when in the same area as an exposed laser beam. Eyewear protects against scattered energy but is not intended to protect against direct viewing of the beam—never look directly into the laser output aperture or view scattered laser reflections from metallic surfaces.

Enclose the beam path whenever possible. Exposure to direct or diffuse CO_2 laser radiation can seriously burn human or animal tissue, which may cause permanent damage.

| ⚠ **Danger**
serious
personal
injury | SYNRAD CO_2 laser products are not intended for use in explosive, or potentially explosive, atmospheres. |

| ⚠ **Warning**
serious
personal
injury | U.S. customers should refer to and follow the laser safety precautions described in the American National Standards Institute (ANSI) Z136.1-2007 document, *Safe Use of Lasers*. Procedures listed in this Standard include the appointment of a Laser Safety Officer (LSO), operation of the product in an area of limited access by trained personnel, servicing of equipment only by trained and authorized personnel, and posting of signs warning of the potential hazards.

European customers should appoint a Laser Safety Officer (LSO) who should refer to and follow the laser safety precautions described in EN 60825-1, 2007—*Safety of Laser Products*. |

| ⚠ **Warning**
serious
personal
injury | Materials processing with a laser can generate air contaminants such as vapors, fumes, and/or particles that may be noxious, toxic, or even fatal. Material Safety Data Sheets (MSDS) for materials being processed should be thoroughly evaluated and the adequacy of provisions for fume extraction, filtering, and venting should be carefully considered. Review the following references for further information on exposure criteria:

ANSI Z136.1-2007, *Safe Use of Lasers*, section 7.3.

U.S. Government's *Code of Federal Regulations*: 29 CFR 1910, Subpart Z.

Threshold Limit Values (TLV's) published by the American Conference of Governmental Industrial Hygienists (ACGIH).

It may be necessary to consult with local governmental agencies regarding restrictions on the venting of processing vapors. |

| ⚠ **Warning**
serious
personal
injury | The use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure. |

SYNRAD CO_2 laser products should be installed and operated in manufacturing or laboratory facilities by trained personnel only. Due to the considerable risks and hazards associated with the installation and operational use of any equipment incorporating a laser, the operator must follow product warning labels and instructions to the user regarding laser safety.

To prevent exposure to direct or scattered laser radiation, follow all safety precautions specified throughout this manual as well as precautions given in laser and marking head Operator's Manuals. Exercise safe operating practices per ANSI Z136.1-2007 at all times when actively lasing.

Always wear safety glasses or protective goggles with side shields to reduce the risk of damage to the eyes when operating the laser.

A CO_2 laser is an intense heat source and will ignite most materials under proper conditions. Never operate the laser in the presence of flammable or explosive materials, gases, liquids, or vapors.

The use of controls or adjustments or performance of procedures other than those specified herein may result in exposure to hazardous *invisible* laser radiation, damage to, or malfunction of the laser. Severe burns will result from exposure to the laser beam.

Safe operation of the laser requires the use of an external beam block to safely block the beam from traveling beyond the desired work area. Do not place your body or any combustible object in the path of the laser beam. Use a water-cooled beam dump or power meter, or similar non-scattering, noncombustible material as the beam block. Never use organic material or metals as the beam blocker; organic materials, in general, are apt to combust or melt and metals act as specular reflectors which may create a serious hazard outside the immediate work area.

Other hazards

The following hazards are typical for SYNRAD CO_2 laser products when incorporated for intended use: (A) risk of injury when lifting or moving the unit; (B) risk of exposure to hazardous laser energy through unauthorized removal of access panels, doors, or protective barriers; (C) risk of exposure to hazardous laser energy and injury due to failure of personnel to use proper eye protection and/or failure to adhere to applicable laser safety procedures; (D) risk of exposure to hazardous or lethal voltages through unauthorized removal of covers, doors, or access panels; (E) generation of hazardous air contaminants that may be noxious, toxic, or even fatal.

Additional laser safety information

The SYNRAD web site (http://www.synrad.com/LaserFacts/lasersafety.html) contains an online laser safety handbook that provides information on (1) Laser Safety Standards for OEM's/System Integrators including product classification, product housing, product features, and other CDRH requirements; (2) Laser Safety Standards for End Users including Class I installations, Class 4 installations, laser hazards, ANSI Standard, U.S. State requirements, and OSHA; (3) References and Sources including CDRH, ANSI/OSHA; and (4) Assistance with Requirements.

In addition, the Occupational Safety and Health Administration (OSHA) provides an online Technical Manual (located at http://www.osha.gov/dts/osta/otm/otm_iii/otm_iii_6.html). Section III, Chapter 6 and Appendix III are good resources for laser safety information.

Another excellent laser safety resource is the Laser Institute of America (LIA). Their comprehensive web site is located at www.laserinstitute.org.

Agency compliance

The *Agency compliance* section includes subsections:

◾ Center for Devices and Radiological Health (CDRH) requirements

◾ Federal Communications Commission (FCC) requirements

◾ European Union (EU) requirements

SYNRAD lasers are designed, tested, and certified to comply with certain United States (U.S.) and European Union (EU) regulations. These regulations impose product performance requirements related to electromagnetic compatibility (EMC) and product safety characteristics for industrial, scientific, and medical (ISM) equipment. The specific provisions to which systems containing SYNRAD lasers must comply are identified and described in the following paragraphs. Note that compliance to CDRH, FCC, and EU requirements depends in part on the laser version selected—Keyswitch or OEM.

In the U.S., laser safety requirements are governed by the Center for Devices and Radiological Health (CDRH) under the auspices of the U.S. Food and Drug Administration (FDA) while radiated emission standards fall under the jurisdiction of the U.S. Federal Communications Commission (FCC). Outside the U.S., laser safety and emissions are governed by European Union (EU) Directives and Standards.

In the matter of CE-compliant laser products, SYNRAD, Inc. assumes no responsibility for the compliance of the system into which the product is integrated, other than to supply and/or recommend laser components that are CE marked for compliance with applicable European Union Directives.

Because OEM laser products are intended for incorporation as components in a laser processing system, they do not meet all of the Standards for complete laser processing systems as specified by 21 CFR, Part 1040 or EN 60825-1. SYNRAD, Inc. assumes no responsibility for the compliance of the system into which OEM laser products are integrated.

Center for Devices and Radiological Health (CDRH) requirements

Keyswitch models

SYNRAD Keyswitch model lasers comply with requirements for Class 4 laser products imposed by the Radiation Control for Health and Safety Act of 1968. Under this Act, the U.S. Food and Drug Administration (FDA) issued a performance standard in the *Code of Federal Regulations* (CFR) for laser products. This performance standard, (21 CFR, Subchapter J, Part 1040.10) was developed to protect public health and safety by imposing requirements upon manufacturers of laser products to provide an indication of the presence of laser radiation, to provide the user with certain means to control radiation, and to assure that all personnel are adequately warned of potential hazards through the use of product labels and instructions.

Product features incorporated into the design of SYNRAD Keyswitch lasers to comply with CDRH requirements are integrated as panel controls or indicators, internal circuit elements, or input/output signal interfaces. Specifically, these features include a keyswitch (Keyswitch versions), lase and laser ready indicators, remote interlock for power on/off, a laser aperture shutter switch, and a five-second delay between power on and lasing. Incorporation of certain features is dependent on the laser version (Keyswitch or OEM).

OEM models

SYNRAD OEM lasers are OEM products intended for incorporation as components in laser processing systems. As supplied by SYNRAD, these lasers do not meet the requirements of 21 CFR, Subchapter J without additional safeguards. In the U.S., the Buyer of these OEM laser components is solely responsible for the assurance that the laser processing system sold to an end user complies with all laser safety requirements before the actual sale of the system. Under CDRH regulations, the Buyer must submit a report to the CDRH prior to shipping the system. In jurisdictions outside the U.S., it is the sole responsibility of the Buyer of these OEM components to ensure that they meet all applicable local laser safety requirements. In cases where the Buyer is also the end-user of the OEM laser product, the Buyer/end-user must integrate the laser so that it complies with all applicable laser safety standards as set forth above.

Federal Communications Commission (FCC) requirements

The United States Communication Act of 1934 vested the Federal Communications Commission (FCC) with the authority to regulate equipment that emits electromagnetic radiation in the radio frequency spectrum. The purpose of the Communication Act was to prevent harmful electromagnetic interference (EMI) from affecting authorized radio communication services. The FCC regulations that govern industrial, scientific, and medical (ISM) equipment are fully described in 47 CFR, Part 18, Subpart C.

FCC caution to the user

The Federal Communications Commission warns the user that changes or modifications of the unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

European Union (EU) requirements
Laser safety standards

Under the Low Voltage Directive, 2006/95/EC, the European Norm (EN) document EN 60825-1 was developed to protect persons from laser radiation by imposing requirements upon manufacturers of laser products to provide an indication of laser radiation; to classify laser products according to the degree of hazard; to require both user and manufacturer to establish procedures so that proper precautions are adopted; to ensure adequate warning of the hazards associated with accessible radiation through signs, labels, and instructions; to improve control of laser radiation through protective features; and to provide safe usage of laser products by specifying user control measures.

Keyswitch models

SYNRAD Keyswitch models are designed to comply with the requirements imposed by EN 60825-1 for Class 4 laser products.

OEM models

SYNRAD OEM lasers are OEM products intended for incorporation as components in laser processing systems. As supplied by SYNRAD, these lasers do not meet the requirements of EN 60825-1 without additional safeguards. European Union Directives state that "OEM laser products which are sold to other manufacturers for use as components of any system for

subsequent sale are not subject to this Standard, since the final product will itself be subject to the Standard." This means that Buyers of OEM laser components are solely responsible for the assurance that the laser processing system sold to an end-user complies with all laser safety requirements before the actual sale of the system. Note that when an OEM laser component is incorporated into another device or system, the entire machinery installation may be required to conform to EN 60825-1, EN 60204-1:2006, *Safety of Machinery*; the Machinery Directive EN 2006/42/EC; and/or any other applicable Standards. In cases where the Buyer is also the end-user of the OEM laser product, the Buyer/end-user must integrate the laser so that it complies with all applicable laser safety standards as set forth above.

Electromagnetic interference standards

The European Union's Electromagnetic Compatibility (EMC) Directive, 2004/108/EC, is the sole Directive developed to address electromagnetic interference (EMI) issues in electronic equipment. In particular, the Directive calls out European Norm (EN) documents that define the emission and immunity standards for specific product categories. For SYNRAD lasers, EN 55011 and CISPR:11 define radiated and conducted RF emission limits while the generic Standards EN 61326 and EN 50082-1 define immunity requirements published by the International Electromechanical Commission (IEC).

When integrating SYNRAD's OEM lasers, the Buyer and/or integrator of the end system is responsible for meeting all applicable Standards to obtain the CE mark.

Getting Started

Use information in this section to install WinMark Pro software and to create a sample drawing for laser marking.

This section contains the following chapters:

- **Chapter 1 – Introduction**
describes new features, computer system requirements, software upgrades, version information, mark file compatibility, and technical support availability.

- **Chapter 2 – Installation**
explains how to install WinMark Pro Laser Marking software.

- **Chapter 3 – Starting WinMark Pro**
explains basic concepts and initial setup of operating parameters.

- **Chapter 4 – WinMark Pro Drawing Editor**
describes WinMark Pro's drawing environment and tool set.

- **Chapter 5 – Creating a drawing**
steps through the creation of a sample mark file (drawing).

- **Chapter 6 – File development**
explains offline and on-line file development.

- **Chapter 7 – WinMark Launcher**
describes opening and marking WinMark Pro files using WinMark Launcher.

- **Chapter 8 – WinMark Digital Scope**
describes using Digital Scope to test and troubleshoot laser control and I/O problems.

1 Introduction

The *Introduction* chapter includes sections:

- New features

- Requirements

- Software upgrades

- Version 6.3 information

- Legacy version information

- WinMark Pro OS compatibility

- WinMark Pro hardware compatibility

- Mark file compatibility

- Technical support

Welcome to SYNRAD's WinMark Pro® Laser Marking Software—software that gives you the power to create mark files containing a variety of objects including text, bar code, and even imported professional graphics for laser marking your products. In addition to creating virtually any image, WinMark Pro is capable of controlling every aspect of the laser marking process including incrementing serial numbers, changing laser parameters, and interfacing with automated parts handling equipment.

New features

WinMark Pro version 6 software is specifically designed to support SYNRAD's new FH Series Flyer marking heads and Fenix™ Flyer Laser Markers. New software features found in version 6 include:

- MSI Microsoft® Windows® Installer

- 32-bit and 64-bit USB Drivers

- Improved file import functionality

- Object-specific PWM Frequency

- Imports DXF/DWG hatch fills

- Banner marking

- UID/Composite 2D Codes

- Rotate imported bitmaps at fractional angles

- Micro QR 2D Code

- MicroPDF barcodes

- Radial marking (around cylindrical objects)

- Abort mark from I/O

Please review the *Release Notes* included with your copy of WinMark Pro. The *Release Notes* describe new features added since the release of this manual.

Check the WinMark Pro web site (http://www.winmark.com/) frequently for the very latest program updates and releases.

Requirements

The *Requirements* section includes subsections:

■ Marking head requirements

■ WinMark Pro installation requirements

■ Operating System (OS) requirements

Important Note: Install WinMark Pro v6.3 <u>before</u> you connect FH Flyer or Fenix Flyer to your computer's USB port and power it up. If WinMark Pro is not installed first, the Windows operating system will arbitrarily assign a USB driver that is *not* compatible with Flyer's USB port protocols.

Note: WinMark Pro version 6 software is NOT compatible with Windows® 95 or Windows® 98 operating systems and is NOT compatible with computers or marking heads requiring ISA-bus Fiber Link Controller Card's.

Marking head requirements

WinMark Pro v6.3 is specifically designed to operate FH Flyer marking heads and Fenix Flyer Laser Markers over a Ethernet or USB connection; there is no additional hardware to install. An Ethernet connection is required if Flyer will operate over a network in WinMark control mode or access a network share file in Stand-alone mode.

In manufacturing environments we highly recommend the use of Ethernet communications instead of USB. The Ethernet protocol is better designed for noise immunity and error-free data transfer between devices.

Although legacy FH Index and Tracker marking heads, with PCI-bus Fiber Link Controller Cards (FLCCs), may function properly when driven by WinMark v6.3, these heads have not been fully tested for v6.3 compatibility. We highly recommend using WinMark Pro v4.6 when controlling non-Flyer heads.

WinMark Pro installation requirements

WinMark Pro v6.3 Laser Marking Software has the following minimum requirements:

■ 16-MB RAM

■ 30-MB of free hard disk space

■ CD-ROM drive

■ Two open USB ports

Operating System (OS) requirements

WinMark Pro v6.3 is designed to operate on Microsoft® Windows® 7, Vista®, and XP Operating Systems (OS). See the Microsoft web site for a list of minimum hardware requirements for your particular OS.

Software upgrades

Unlike many other software packages that cost hundreds of dollars to upgrade, WinMark Pro upgrades are made available free of charge on the WinMark Pro web site. Users should periodically check our web site at: http://www.winmark.com/ to download the latest released version of WinMark Pro Laser Marking Software.

Version 6.3 information (Flyer/Fenix Flyer)
(Windows 7/Vista/XP – Ethernet/USB compatible)

WinMark Pro version numbers (**6.3.0**.××××) and build numbers (×.×.×.**7317**) are used to track the introduction of new features. A detailed *Version History* is available from the WinMark Pro web site.

Version 6.3 allows WinMark Pro to operate SYNRAD FH Flyer marking heads and Fenix Flyer Laser Markers on Windows 7, Vista, and XP operating systems. Flyer marking heads and Fenix Flyer Laser Markers require an Ethernet or USB connection for communications.

WinMark Pro v6.3 is a Microsoft .NET Framework-based application. During installation, WinMark Pro v6.3 will install .NET Framework files onto your computer, if they do not currently exist. If WinMark Pro is un-installed, .NET files are not removed, because these files may now be used by other applications installed after the original WinMark installation.

Note: The WinMark Pro version 6.x mark file structure is <u>not</u> compatible with FH Smart marking heads and should not be used for FH Smart file development.

Legacy version information

The *Legacy version information* section includes subsections:

- Version 5.x

- Version 4.x

- Version 3.1

- Version 2.x

- WinMark Lite

- Version 1.x

Version 5.x (Flyer/Fenix Flyer)
(Windows Vista/XP/2000 - Ethernet/USB compatible)

Version 5, beginning with the release of 5.0.0.5558, was developed to support FH Flyer and Fenix Flyers on Windows Vista, XP, and 2000 operating systems. Version 5.0 is not recommended or tested to operate PCI-bus FH Index/Tracker marking heads. Version 5 does not support ISA-bus marking heads.

Note: The WinMark Pro version 5.x mark file structure is <u>not</u> compatible with FH Smart marking heads and should not be used for FH Smart file development.

Version 4.x (FH Index/Tracker/Fenix)
(Windows XP/2000/NT4/98 - PCI compatible)

Version 4, beginning with the release of 4.0.0.3773, extends WinMark Pro functionality to Windows XP, 2000, NT4, and 98 operating systems using PCI-bus Fiber Link Controller Cards. Version 4.0 does <u>not</u> support Windows 95 operating systems or ISA-bus FLCCs. The last version 4 release, 4.6.2.5245 is available from the WinMark Pro web site at: http://www.winmark.com/download.htm.

Version 3.1 (FH Index/Tracker/Fenix)
(Windows NT4 - PCI compatible)

Version 3.1.0.3767 (as well as build 2.1.0.3509NT) allows WinMark Pro to operate on Windows NT4 operating systems. These builds are compatible only with PCI-bus FLCCs.

Version 2.x (FH Index/Tracker/Fenix)
(Windows 98/95 — PCI/ISA/DAC compatible)

WinMark Pro versions 2.0.0.3087 through 2.1.0.3767 add support for FH Series Tracker marking heads on Windows 98/95 operating systems. Beginning with build 3468 (v2.1.0.3468), WinMark Pro supports PCI-bus FLCCs. The last version 2 release, 2.1.0.4056 is available from the WinMark Pro web site.

WinMark Lite (Fenix)

WinMark Lite was packaged with early Fenix Laser Markers, providing an inexpensive method for developing and marking simple files. Automation features such as I/O capability and serialization were <u>not</u> supported. Version 2.1.0.3767 is the last software build to support WinMark Lite functionality.

Version 1.x (DH/SH)
(Windows 98/95 — ISA/DAC compatible)

WinMark Pro versions 1.0.0.1150 through 1.0.3.2055 support legacy DH/SH Series heads running on Windows 98/95 operating systems using an ISA-bus Fiber Link Controller Card (DH Series) or a DDA06 Digital-to-Analog card (SH Series). Versions 1.0.5.2625 through 1.0.6.2856 added support for Fenix Laser Markers and FH Series Index marking heads on Windows 98/95 operating systems using an ISA-bus Fiber Link Controller Card (FLCC).

WinMark Pro OS compatibility

When upgrading your computer and/or operating system (OS), use the matrix shown in Table 1-1 to determine what WinMark Pro software version(s) and marking head/communication methods are supported.

Table 1-1 Operating system (OS) compatibility matrix

	Win 95	Win 98	Win NT4	Win 2000	Win XP	Vista	Win 7
WinMark Pro Version							
v2.1.x.xxxx	Yes	Yes	No	No	No	No	No
v3.1.0.xxxxNT	– –	– –	Yes	No	No	No	No
v4.x.x.xxxx	– –	Yes	Yes	Yes	Yes	No	No
v5.x.x.xxxx	– –	– –	– –	Yes	Yes	Yes[1, 2]	No
≥ v6.2.0.6977	– –	– –	– –	– –	Yes	Yes[1, 2]	Yes[1]
Communication Method							
ISA-bus DAC (SH w/ DDA06 card)	Yes	Yes[3]	No	No	No	No	No
ISA-bus FLCC (DH/Fenix/Index/Tracker)	Yes	Yes[3]	No	No	No	No	No
PCI-bus FLCC (DH/Fenix/Index/Tracker)	– –	Yes	Yes	Yes	Yes	No[4]	No[4]
Ethernet/USB (Flyer/ Fenix Flyer)	– –	– –	– –	Yes[5]	Yes	Yes[1]	Yes[1]

1   Builds 6977 and above incorporate new 64-bit and 32-bit USB drivers. All previous v6/v5 builds require a 32-bit computer when using a USB connection.

2   Because the Vista OS creates a separate "virtual" Registry for each user, WinMark Pro's *Application*, *Drawing*, and *Object* defaults could be user-configured differently for each account. In applications where mark file consistency is important, all users should login under same account.

3   WinMark Pro version 2.x only.

4   NOT recommended. A 64-bit FLCC driver does not exist. Do NOT upgrade firmware in FLCC-connected heads.

5   WinMark Pro version 5.x only.

WinMark Pro hardware compatibility

Use the hardware compatibility matrix shown in Table 1-2 to determine the highest WinMark Pro software upgrade possible based on your existing computer OS and marking head/communication method.

Table 1-2 Hardware compatibility matrix

	WinMark Pro v2.1.0.xxxx	WinMark Pro v3.1.0.xxxx	WinMark Pro v4.x.x.xxxx	WinMark Pro v5.x.x.xxxx	WinMark Pro > v6.1.0.6977
Operating System					
Windows 95	Yes	No	No	No	No
Windows 98	Yes	No	Yes	No	No
Windows NT4	– –	Yes	Yes	No	No
Windows 2000	– –	– –	Yes	Yes	No
Windows XP	– –	– –	Yes	Yes	Yes
Windows Vista	– –	– –	– –	Yes[1, 2]	Yes[1, 2]
Windows 7	– –	– –	– –	– –	Yes[1]
Communication Method					
ISA-bus DAC (SH w/ DDA06 card)	Yes	No	No	No	No
ISA-bus FLCC (DH/Fenix/Index/Tracker)	Yes	No	No	No	No
PCI-bus FLCC (DH/Fenix/Index/Tracker)	– –	Yes	Yes	No[3]	No[3]
Ethernet/USB (Flyer/Fenix Flyer)	– –	– –	– –	Yes	Yes

1 Version v6.1.0.6977 incorporates new 64-bit and 32-bit USB drivers. All previous v6/v5 builds require a 32-bit computer when using a USB connection. Ethernet communications supported on both 32-bit and 64-bit computers.

2 Because the Vista OS creates a separate "virtual" Registry for each user, WinMark Pro's *Application*, *Drawing*, and *Object* defaults could be user-configured differently for each account. In applications where mark file consistency is important, all users should login under same account.

3 NOT recommended. A 64-bit FLCC driver does not exist. Do NOT upgrade firmware in FLCC-connected heads.

Mark file compatibility

The *Mark file compatibility* section includes subsections:

- Across operating systems

- Across WinMark Pro versions

Across operating systems

WinMark Pro .mkh mark files are compatible across all supported Windows operating systems.

Across WinMark Pro versions

All WinMark Pro .mkh mark files are forward compatible—files created with older versions will run in newer versions of software. Mark files are not backwards compatible—files created in newer versions will not open in previous versions of WinMark because they may not function properly. The key is the build number. Mark files created with software build numbers less than or equal to the build number of the current marking software will always open and mark.

When using WinMark Pro v6.3 to open mark files created with software versions v4 and earlier, *Object* delays (Pline Start Delay, Pline End Delay, Interseg Delay, and Off Vector Delay) may require modification due to the development of an improved delay algorithm and FH Flyer's/Fenix Flyer's much faster optical scanners.

Technical support

For assistance with many common software and hardware issues, view our *Laser Marking FAQ* on the WinMark Pro web site at http://www.winmark.com/ or on the WinMark Pro CD.

For in-depth software or marking head support, contact the Technical Support Group via email at support@winmark.com or support@synrad.com.

By phone, contact us at 1.800.SYNRAD1 (1.800.796.7231) between the hours of 8:30 A.M. to 5:00 P.M. Pacific Standard Time. Outside the United States, dial +1.425.349.3500.

2 Installation

The *Installation* chapter includes sections:

- Inventory

- WinMark Pro installation

- WinMark File Import Filters

- Un-installing WinMark Pro

Inventory

The WinMark Pro® software package includes the following items:

Table 2-1 Shipping box contents

Shipping Box Contents	Qty
WinMark Pro Software CD	1
Hardlock (USB or parallel port)	1

WinMark Pro Software CD
containing WinMark Pro User Guide

USB Port Hardlock
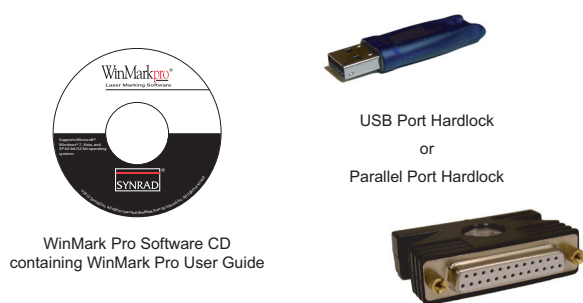or
Parallel Port Hardlock

Figure 2-1 WinMark Pro inventory

WinMark Pro installation

The *WinMark Pro installation* section includes subsections:

- WinMark Pro

- WinMark Launcher

- WinMark Digital Scope

- Samples folder

- Hardlock

- USB Device Drivers

WinMark Pro

To install WinMark Pro Laser Marking Software on your computer, perform the following steps:

Important Note: Before installing or upgrading WinMark Pro software, first remove power or unplug the USB cable from the Flyer/Fenix Flyer head to prevent Windows from arbitrarily assigning a USB driver that is ***not*** compatible with Flyer's USB port protocols.

Note: Before upgrading to a newer version of WinMark Pro, backup your existing .mkh mark files and then un-install any previous versions of WinMark Pro.

1   Locate the *WinMark Pro CD* included with the materials shipped with your WinMark Pro purchase.

2   Back up or archive any existing WinMark Pro .mkh mark files and un-install the previous version of WinMark Pro.

3   Exit all programs, turn off any antivirus software, then insert the *WinMark Pro CD* into the CD-ROM drive.

4   Use Windows Explorer to open the CD and then double-click the *WinMark_v6.3_Software* folder. Open the *Version 6.3.x.xxxx* folder to review the *Release Notes* and access WinMark's *setup.exe* file.

5a   To install WinMark Pro v6.3, and associated device drivers, on a Windows® 7 or Windows® Vista™ operating system, right-click the *setup.exe* file and choose "Run as Administrator…".

Important Note: When upgrading from a v4 build to version v6, the WinMark Pro installer automatically performs a "clean install" because v6 is uses a different subset of registry keys. The "Perform Clean Installation" and "Keep Current Program Settings" options are grayed out to indicate this installation is a "clean installation".

Upgrading from one v6 build to another does allow the option of preserving existing WinMark settings in the computer's *System Registry*. Choose *Yes* to preserve current WinMark Pro v6 registry settings including custom date code formats, object defaults, shift codes, auto startup info, and saved serial numbers. Choose *No* to erase all previous WinMark v6 Registry entries and perform a clean installation.

If you install WinMark Pro v6.3 and later decide to downgrade to WinMark v4, performing a clean installation of v4 will erase v4 <u>and</u> v6 *Registry* settings.

Note: Due to Microsoft's implementation of registry virtualization, Windows Vista may require you to log on as an Administrator to perform certain functions like file importation or to save custom date code formats.

5b   To install WinMark Pro v6.3, and associated device drivers, on a Windows® XP operating system, double-click the *setup.exe* file.

6   WinMark Pro v6.3 is a Microsoft .NET™ Framework-based application. If Microsoft .NET Framework Service Pack 1, or higher, is not installed on the computer, the installer will prompt you to click *Accept* to install the .NET Framework. You must have the .NET Framework runtime and associated files installed to run WinMark Pro.

   If WinMark Pro is un-installed, the .NET package is not removed, because these files may be used by other applications installed after the original WinMark installation.

7   When the .NET Framework installation us complete, reboot if prompted to do so. Otherwise the WinMark installer will continue.

8   If Microsoft C++ Redistributable x86 file runtime components are not installed on the computer, the installer will prompt you to click *Install* to install C++ Redistributable files. You must have these files installed to run WinMark Pro.

9   Follow instructions in the installer dialog boxes to complete the WinMark Pro installation. You must click "I Agree" to accept the WinMark Pro license agreement and continue the installation.

Note: Beginning with WinMark build 6.3.0.7328, the WinMark installer write Windows Registry values when installation is complete so there is no need to run WinMark once as an Administrator before other, more restricted users, log on to run WinMark.

10   After installation is complete, remember to turn on any antivirus software.

WinMark Launcher

As part of the software installation, WinMark Launcher (Launcher.exe) is placed in the *Program Files/WinMark* folder and a shortcut is placed on the desktop. Launcher allows operators to load existing .mkh files for marking without opening WinMark's *Drawing Editor*. Using WinMark Pro's *Startup Options…* menu, Launcher can be configured to load a specific file and to start marking automatically when the computer is powered up.

WinMark Digital Scope

Digital Scope (*DigScope.exe*) is a stand-alone program included in the *WinMark* folder. Use Digital Scope to test individual inputs and outputs, turn the laser beam on or off, or adjust the laser's output power level. This "manual" control is especially useful when testing or troubleshooting I/O connections to/from the Flyer/Fenix Flyer marking head.

Samples folder

A *Samples* folder is also placed in the WinMark folder during installation. This folder contains a sample communications DLL; Microsoft® Visual Basic®, Microsoft® Visual C++®, and Microsoft® C#® (in a .NET framework) sample code that demonstrates the use of WinMark's ActiveMark™ control methods; a folder of importable bitmap and vector graphics files; and sample mark files illustrating all of WinMark Pro's available stroke fonts.

Hardlock

A *Hardlock* is installed on the marking computer to prevent unauthorized use of WinMark Pro software. If the *Hardlock* is not installed, WinMark Pro is still fully functional except that (1) marking output is disabled and (2) with FH Flyer and Fenix Flyer, certain file operations are not allowed. In this "demo" or off-line mode, WinMark Pro is still able to develop, modify, and save new or existing mark files.

Important Note: When copying files from a computer or server to the Flyer/Fenix Flyer Filestore, the WinMark Pro *Hardlock* (USB or parallel port type) must be installed on the computer before the file transfer can proceed.

Note: With the exception of WinMark Lite *Hardlocks* (usually marked as "L" or "Lite"), any WinMark *Hardlock* will function with any version of WinMark Pro.

USB port Hardlock

To install a USB port *Hardlock*, perform the following steps:

1   Locate the USB *Hardlock* included with the materials shipped with your WinMark Pro purchase.

2   Connect the USB *Hardlock* to any USB port on your computer.

If the *Found New Hardware Wizard* dialog appears when the USB *Hardlock* is first connected to the computer's USB port, perform the following steps:

1   When asked, "Can Windows connect to Windows Update to search for software?", click **No, not this time** and then click *Next*.

2   When prompted, "What do you want the wizard to do?", click **Install the software automatically (Recommended)** and click *Next*.

3   Click *Finish* to complete the USB driver installation for the *Hardlock*.

Parallel port Hardlock

To install a parallel port *Hardlock*, perform the following steps:

1   Locate the parallel port *Hardlock* included with the materials shipped with your WinMark Pro purchase.

2   Disconnect the printer cable (if installed) from the back of your computer.

3   Connect the parallel port *Hardlock* to the computer's parallel port.

4   Connect the printer cable (if installed) to the opposite side of the parallel port *Hardlock*.

USB Device Drivers

Hardlock driver

WinMark Pro installs a driver that allows it to communicate with the USB port or parallel port *Hardlock*. During computer boot-up, the Windows OS automatically starts the Hardlock driver as a service. Once started, the driver can be accessed by WinMark Pro, WinMark Launcher, or Digital Scope.

WinMark Pro versions 6.2.0.6977 and above include both 32-bit and 64-bit USB drivers for Flyer/Fenix Flyer heads. The Windows OS automatically selects and loads the correct driver.

Flyer/Fenix Flyer USB driver

WinMark Pro installs a specialized USB driver that communicates with FH Flyer marking heads and Fenix Flyer Laser Markers. During computer boot-up, the Windows OS automatically starts the USB driver as a service. Once started, the driver can be accessed by WinMark Pro, WinMark Launcher, or Digital Scope.

Important Note: Before installing or upgrading WinMark Pro software, first disconnect power or un-plug the USB cable from the Flyer/Fenix Flyer head. This ensures that the Windows OS will load and install the latest Flyer USB driver; otherwise, Windows will arbi-trarily assign a USB driver that is **not** compatible with Flyer's USB port protocols. If this happens, see the *Troubleshooting* section of the *FH Flyer Marking Head Operator's Manual* or the *Fenix Flyer CO$_2$ Laser Marker Operator's Manual* for information on re-installing the correct USB driver.

If the *Found New Hardware Wizard* dialog appears when your Flyer/Fenix Flyer head is first connected to the computer's USB port, perform the following steps:

1   When asked, "Can Windows connect to Windows Update to search for software?", click **No, not this time** and then click *Next*.

2   When prompted, "What do you want the wizard to do?", click **Install the software automatically (Recommended)** and click *Next*.

3   Click *Finish* to complete the USB driver installation for the Flyer Laser Marking Device.

WinMark File Import Filters

WinMark Pro v6.3 automatically loads the File Import Filters during installation. These filters allow you to import a wide variety of graphic file formats. See Chapter 13, *WinMark Pro menu commands*, in the *Commands & Properties* section for a complete list of supported import file types.

Un-installing WinMark Pro

If you decide to remove WinMark Pro software from your computer, perform the following steps:

1   Click the *Start* button on the taskbar.

2   Select *Programs* and then locate the *Synrad WinMark* folder.

3   Click the *Uninstall Synrad WinMark* icon.

4   Follow the on-screen instructions.

After the un-install is complete, some WinMark components (like .MKH mark files) will remain. To completely remove all WinMark-related files, go to *C:\Program Files* and delete the *WinMark* folder.

Important Note: If you un-install build 6.3.0.7328 (or later) and then re-install WinMark version 6.1.0.6789 or earlier, you may need to run the Sentinel HASP Run-time Setup program (available at http://www3.safenet-inc.com/support/hasp-srm/vendor.aspx) to re-initialize WinMark Pro's USB or parallel port *Hardlock* functionality.

3 Starting WinMark Pro

The *Starting WinMark Pro* chapter includes sections:

◼ Basic concepts

◼ Opening WinMark Pro

◼ Changing focusing lens size

◼ Setting measurement units

Basic concepts

You create a mark file by placing text, barcodes, polyline objects, or imported graphics into a drawing. Each individual object, including the *Drawing Canvas* itself, has its own unique set of properties whose default settings can be modified by the user. Each class of objects has specific sets of properties where each property defines some characteristic of that object; for example, all text objects have a Text Height property. In addition, all objects share a set of general properties that define their position and how the laser transfers that object's image to the workpiece. This ability to precisely control marking output by customizing drawing and object properties is one of the strengths of WinMark Pro Laser Marking Software.

In automated marking systems, ultimate control is provided by WinMark Pro's ActiveMark™ technology. Adding WinMark Pro's ActiveMark (ActiveX®) controls to your Microsoft Visual Basic, MS Visual C++, or MS Visual C# program offers virtually unlimited control of the marking process. See Chapter 18, *ActiveMark (ActiveX) technology*, for an introduction to ActiveMark technology.

FH Flyer marking heads and Fenix Flyer Laser Markers, in conjunction with WinMark v6.3, support the Modbus I/P protocol for interaction with PLCs or other MODBUS network devices. See Chapter 19, *Flyer Modbus protocol*, for details.

Flyer control modes

WinMark control mode

When operating in WinMark control mode, WinMark Pro controls Flyer/Fenix Flyer heads through an Ethernet or USB connection. WinMark Pro asserts normal control of marking operations—initiating a mark manually (using the *Mark* button or F1 key) or automatically (by an input signal)—causes WinMark to stream vector data to the head where it is converted to microvector data and marked in real-time. Flyer/Fenix Flyer responds by sending cycle time and mark progress data back to WinMark Pro where it is displayed in the *Launcher* window.

Stand-alone mode

Stand-alone operation means that mark files are downloaded to Flyer's Filestore before a mark session begins so it is not necessary to transmit vector data to Flyer/Fenix Flyer during the mark. In stand-alone mode, Flyer/Fenix Flyer can operate autonomously—communicating to automation equipment using discrete I/O signals—with no connection to the WinMark Pro computer. In situations where it is desirable to monitor mark session progress, an Ethernet or USB connection to WinMark Pro allows you to monitor cycle time and mark progress information. See the Stand-alone Operation chapter in the *FH Flyer Marking Head Operator's Manual* or the *Fenix Flyer CO$_2$ Laser Marker Operator's Manual* for details.

Stand-alone Master Control File mode

Stand-alone Master Control File operation is a specialized subset of stand-alone operation where Flyer/Fenix Flyer loads a master file on boot-up. This Master Control File (MCF) is read once, only on boot-up, and configures the Flyer head to mark multiple files (previously stored in the Filestore or on a network share) in a user-controlled sequence determined by input bit status. If required, you can monitor cycle time and mark progress information from WinMark Pro through an Ethernet or USB connection. See the Stand-alone Operation chapter in the *FH Flyer Marking Head Operator's Manual* or the *Fenix Flyer CO$_2$ Laser Marker Operator's Manual* for details.

Opening WinMark Pro

Open WinMark Pro by double-clicking the *Shortcut to WinMark* icon ( ) on your desktop, or perform the following steps:

Note: When communicating with a Flyer marking head or Fenix Flyer Laser Marker, first apply power to the Flyer/Fenix Flyer head, wait 30 seconds for the head to boot-up, and then open WinMark Pro.

1   Click *Start* on the taskbar.

2   Select *Programs* and then locate the *Synrad WinMark* folder.

3   Click the *Synrad WinMark* icon.

If a user password is required, then the *Enter Password* dialog box opens. Type the correct case-sensitive password and click *OK*.

4   The first time WinMark Pro opens after a new installation, the *Lens Selection* dialog box appears and prompts you to enter the size of the focusing lens currently installed on the marking head. The lens size entered here determines overall dimensions of the *Drawing Canvas*.

Double-click the desired lens or make a lens selection and then click *OK*.

If no marking heads are connected when WinMark Pro opens, the *Device Simulation* dialog box appears (see Figure 3-1) and prompts you to search again for a Flyer/Fenix Flyer head. If no head is available, open WinMark in demo mode by clicking *Use Simulated Head* and then selecting a specific head type.
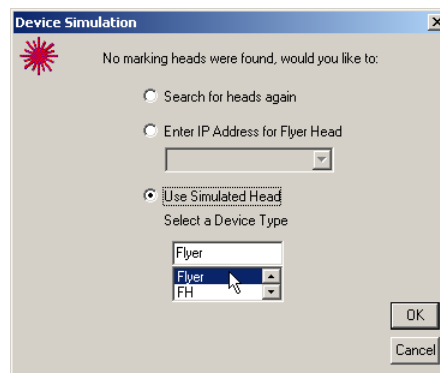

Figure 3-1 Device Simulation dialog box

Changing focusing lens size

If you change the focusing lens on your marking head to a lens with a different field size, you will need to enter the new lens size so that WinMark Pro properly scales the drawing when marking.

To change lens settings, perform the following steps:

1   From the *Tools* menu, select General Settings….

2   In the *Applications Settings* dialog box, click the "*Device*" tab that corresponds with the head you are currently using.

3   Click Lens, and then click the arrow button.

4   In the drop-down list (Figure 3-2), select the lens matching the one currently installed on your marking head.
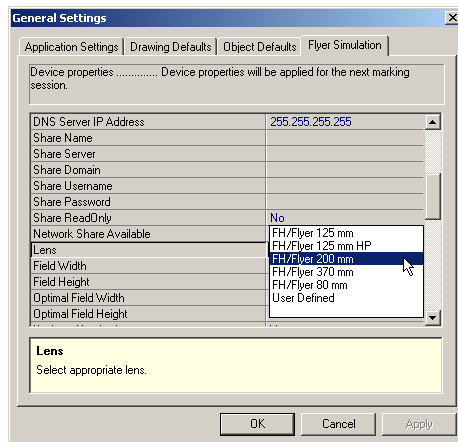

Figure 3-2 Lens Selection dialog box

Note: When using an FH Flyer marking head or Fenix Flyer Laser Marker, select a lens from the FH/ Fenix lens group only.

5   Click the *Apply* button. The *Drawing Canvas* display changes to show the new lens dimensions. Click *OK* when finished.

Tip: To use an existing mark file with a new lens having a different field size, follow Steps 1 through 5 above and then open your existing mark file. Select all objects (from the *Edit* menu, choose Select All) and paste them into your new, blank drawing. All selected objects <u>and</u> their corresponding object properties are pasted into the new drawing. Save this new drawing with another name or append the lens size to the existing filename.

Setting measurement units

You can set WinMark Pro to display all measurements in inches, centimeters, or millimeters.

To change measurement units, perform the following steps:

1   From the *Tools* menu, select General Settings….

2   In the *Applications Settings* dialog box, click the *Application Settings* tab.

3   Click Show Units Type (Figure 3-3), and then click the arrow button.

4   From the drop-down list, select the appropriate measurement units.

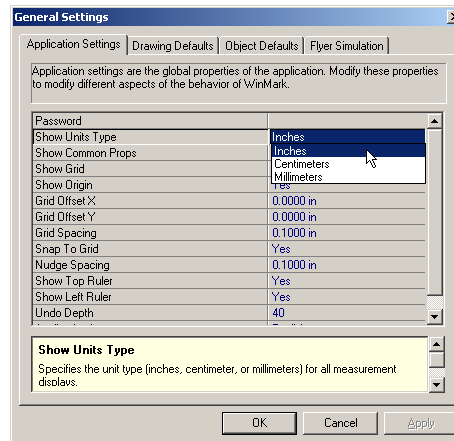**5**   Click *Apply* to apply the change, and then click *OK*.

Figure 3-3 Changing "Show Units Type"

Note: When using WinMark Pro's ActiveMark (ActiveX) controls, all units of measure are calculated in inches. Your application or user-interface must convert measurement values from centimeters or millimeters to inches as required. In your .mkh mark files, make sure that the Show Units Type property is set to inches—unpredictable object placement or operation may result if Show Units Type is set to millimeters or centimeters in ActiveX applications.

4 WinMark Pro Drawing Editor

The *WinMark Pro Drawing Editor* chapter includes sections:

- Main Window
- Toolbar
- Mark button
- Stand-alone Toolbar
- Tool Box
- Drawing Canvas

- Slide Bar
- Flyer Filestore
- Object List
- Property List
- Help Window
- Status Bar

Main Window

To aid creation of mark files, the *Drawing Editor's Main Window* (Figure 4-1) is divided into several distinct areas. Each item is described in further detail below.
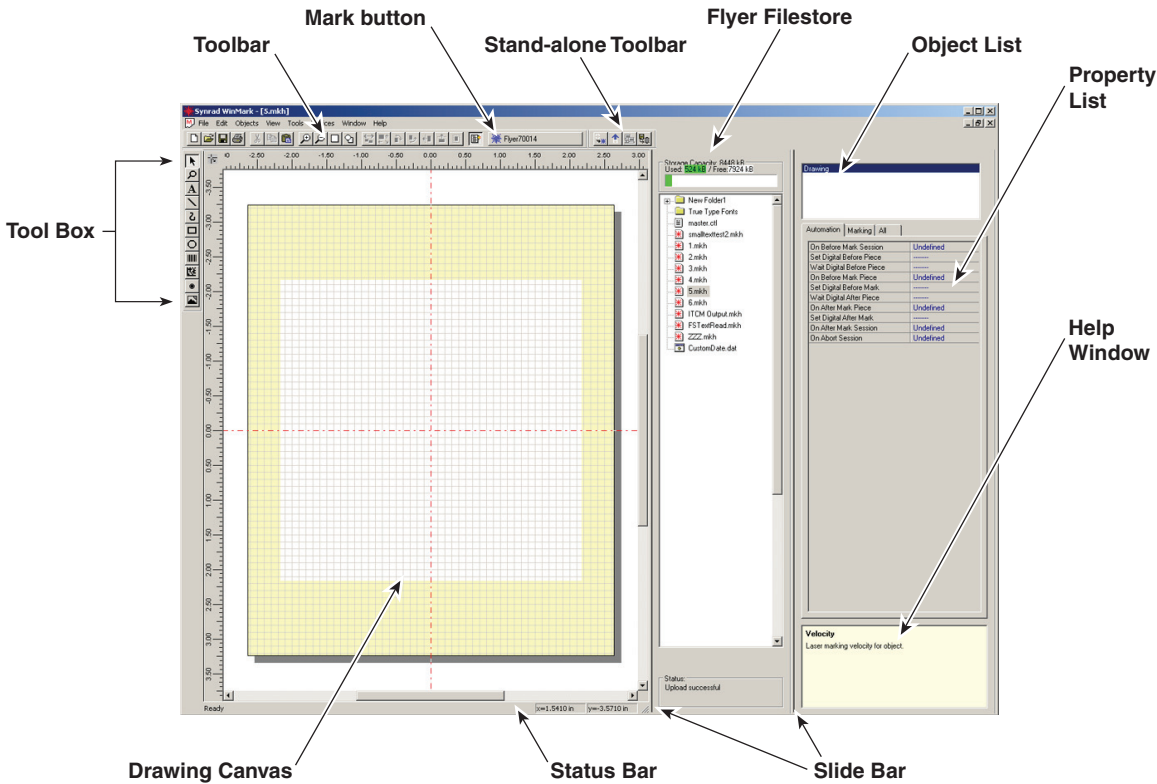

Figure 4-1 WinMark Pro Main Window

Toolbar

Icons on WinMark Pro's *Toolbar* (Figure 4-2) provide shortcuts to common editing functions. To use a shortcut, select one or more objects on the *Drawing Canvas* and click the appropriate *Toolbar* button.

Figure 4-2 Toolbar icons

The following shortcuts are provided on the *Toolbar*:

New – create a new, blank drawing. *Drawing Canvas* dimensions are based on the current Lens selection.

Open – open an existing WinMark Pro (.mkh) mark file.

Save – save the current active mark file.

Print Drawing – print the active drawing.

Cut – cut selected objects and place them on the Clipboard.

Copy – copy selected objects to the Clipboard.

Paste – paste the current Clipboard contents into the drawing.

Zoom In – Zoom in towards the center of the mark view.

Zoom Out – Zoom out away from the center of the mark view.

Zoom Page – Zooms the view to fit the *Drawing Canvas* in the Main Window.

Zoom Extents – Zooms the view to encompass all mark objects in the drawing, even those objects placed off the *Drawing Canvas*.

Align – opens a dialog box that allows you to align two or more objects horizontally and/or vertically.

Transform – opens a dialog box that allows you to precisely resize, scale, rotate, or position objects.

Rotate +45 – rotate selected objects clockwise in 45-degree increments.

Rotate –45 – rotate selected objects counterclockwise in 45-degree increments.

Mirror X – mirror selected objects in the X (horizontal) axis.

Mirror Y – mirror selected objects in the Y (vertical) axis.

Center – center selected objects around the (0, 0) origin point.

Toggle Property Window – toggle the *Property Window* display On or Off.

Mark button

Click the *Mark* button (Figure 4-3) to open the *Launcher* window, for the specified head, in preparation for marking. Once the *Launcher* window is open, click the *Start-F1* button or press F1 on the computer's keyboard to initiate marking. The *Launcher* window remains open until closed by the user. When marking in WinMark control mode (where WinMark streams vector data to the head in real-time), the laser "starburst" icon is displayed in red.
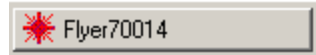

Figure 4-3   Mark button (WinMark control mode)

When operating in stand-alone mode (Standalone Marking property is *Yes*), the starburst icon on the *Mark* button changes to blue (Figure 4-4). During an actual stand-alone mark session, the blue starburst flashes on-off to provide a visual indication that marking is in progress. If the *Launcher* window is closed, you can still click the *Mark* button to open the window in order to inspect cycle time/mark progress data or halt marking.
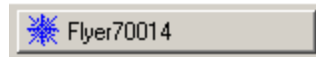

Figure 4-4   Mark button (Stand-alone control mode)

Tip: In either WinMark control mode or stand-alone control mode, you can **right**-click the *Mark* button to directly access the "*Device*" tab.

Stand-alone Toolbar

WinMark's *Stand-alone Toolbar* (Figure 4-5) appears when FH Flyer or Fenix Flyer is configured for stand-alone operation (when the Standalone Marking property is *Yes*).

Figure 4-5   Stand-alone Toolbar icons

The following operations are available from the *Stand-alone Toolbar*:

> ⚠ **Warning**
>
> serious
> personal
> injury
>
> Pressing the *Mark Current File on Canvas* button forces FH Flyer/Fenix Flyer to begin marking ***immediately*** after the mark file is downloaded into RAM.
>
> Before pressing the *Mark Current File on Canvas* button, ensure that all laser safety precautions described in laser and marking head manuals have been followed. To prevent injury, always ensure that all personnel in the area are wearing the appropriate protective eyewear and are physically clear of the mark area before starting a mark session.

Mark Current File on Canvas – When a file is created or opened on the *Drawing Canvas*, click this button to download the file to Flyer/Fenix Flyer RAM, where the vector elements are converted to microvectors **and immediately marked**. This button is grayed out (inactive) when the *Drawing Canvas* is empty or when the file on the *Drawing Canvas* was uploaded from Flyer's Filestore and has not been modified.

Note: The WinMark Pro *Hardlock* (USB or parallel port type) must be installed on the computer running WinMark before this operation can proceed.

Note: This action does not save the file to the Filestore. To save the file permanently, use the *Save Current File to Filestore* button.

Tip: To view the filename of the mark file currently residing in RAM (the file that will be marked in stand-alone mode), hover your cursor over the *Mark* button or right-click the *Mark* button to view head properties on the "*Device*" (Flyer) tab.

Upload Current Mark File – When a file exists in Flyer's RAM, click this button to upload the file to WinMark's *Drawing Canvas*. This allows you to view and/or change file properties. If the modification is intended to be permanent, you must resave the file to the Filestore.

Open Network Mark File – If FH Flyer or Fenix Flyer is configured for network file sharing through the FH Flyer or Fenix Flyer *Ethernet* port, use this button to open a .mkh mark file stored on a network server or drive. The *Open Network Mark File* button downloads the file to Flyer's temporary RAM for marking. This action does <u>not</u> save the file to the Flyer Filestore. The *Open Network Mark File* button is grayed out (inactive) if a network share is not available.

Save Current File to Filestore – Click the *Save Current File to Filestore* button to save the mark file displayed on the *Drawing Canvas* to the Flyer Filestore. You are prompted for a filename and can specify a path, if one or more subfolders exist in the Filestore.

Note: The WinMark Pro *Hardlock* (USB or parallel port type) must be installed on the computer running WinMark before this operation can proceed.

Tool Box

Icons in the *Tool Box* (Figure 4-6) represent the drawing and editing tools you use in WinMark Pro. To select a tool, place the cursor over the tool and click the left mouse button. The cursor changes into the appropriate icon. When drawing with a *Line*, *Freehand*, *Rectangle*, or *Arc Tool*, press and hold the left mouse button while dragging to create the desired size, length, or direction and then release the mouse button.

Figure 4-6 Tool Box

The following tools are available in the Tool Box:

Selection Tool – selects or deselects objects on the *Drawing Canvas*. Click the left mouse button to select an object. Hold the left mouse button and drag to select multiple objects within the selection area, or hold the CTRL key and left click objects to add them to the selection set. Click on a blank section of the drawing to deselect all objects. Click the *Selection Tool* icon to regain the arrow cursor after using a tool such as the *Zoom Tool*, which does not default to an arrow cursor.

Zoom Tool – zooms in or out of the *Drawing Canvas*. After selecting the *Zoom Tool*, click the left mouse button to zoom in; click the right mouse button to zoom out. The "zoomed" image is centered on the position of the *Zoom Tool* when you click. To enlarge a specific area, hold the left mouse button and drag to define the zoom area.

Tip: The following tools add or import objects onto the *Drawing Canvas* using WinMark Pro's default set of object properties. You can edit these properties (on the *Tools/General Settings…/Object Defaults* tab) so that any new objects created reflect the specific settings required for your application.

Text Tool – places a text object in the drawing. Click the *Text Tool* on the *Drawing Canvas* to set an insertion point and open the *Text Caption Editor* dialog box. After entering text in the dialog box, you can select the text box to modify its position or change text attributes such as font type or size using text properties shown in the *Property List*.

Line Tool – draws straight point-to-point lines. If Snap to Grid (*Tools/General Settings…/Application Settings* tab) is *Yes*, the line's origin and destination endpoints snap to the nearest grid line intersection.

Freehand Tool – draws irregular, freehand lines. If Snap to Grid is *Yes*, any curves drawn are snapped to the nearest grid line and intersection.

Rectangle Tool – draws square or rectangular objects. If Snap to Grid is *Yes*, lines and corners are snapped to the nearest grid line and intersection.

Arc Tool – draws elliptical and circular objects. By default, the *Arc Tool* draws ellipses; hold the SHIFT key down while dragging to constrain the object to a circle. If Snap to Grid is *Yes*, the arc's outer diameter is snapped to the nearest grid line.

Bar Code Tool – places a bar code object in the drawing. Click the *Bar Code Tool* then click in the drawing to set an insertion point. Barcode Number is highlighted on the *Format* tab. Type the characters you want converted into bar code form. Modify bar code attributes on the *Format* tab.

2D Code Tool – places a 2D Data Matrix, QR Code, or Micro QR Code object in the drawing. Click the *2D Code Tool* then click in the drawing to set an insertion point. 2D Barcode Text is highlighted on the *Format* tab. Type the characters you want converted into 2D code form. Modify 2D code attributes on the *Format* tab.

Spot Tool – places a spot on the drawing that represents the diameter of the laser beam. Spots are useful as guides for aligning the laser beam. If the correct Power and Spot Lase Duration values are specified in the *Property List*, spots can be perforate, or drill, the workpiece.

Graphic Tool – imports graphic image files into the drawing. Click the *Graphic Tool* to open the *Open* dialog box. Select a file type, click on the file to import, and then click *Open* to place the graphic on the *Drawing Canvas*.

Drawing Canvas

The *Drawing Canvas* is the area where graphics and text objects are arranged to create a mark file for laser marking the workpiece. The white center area on the *Drawing Canvas*, shown in Figure 4-7, is the optimal mark area for the currently installed lens. The yellow shaded border indicates the maximum marking field of the lens. Note that objects placed in the shaded area, especially near the corners, <u>may</u> exhibit a slight degradation in mark quality.

Overall dimensions of the *Drawing Canvas* correspond to the focusing lens size entered as the Lens property (on the *Tools/General Settings…/"Device"* tab). These dimensions, Field Width and Field Height, as well as Optimal Field Width and Optimal Field Height are now read-only properties in WinMark Pro v6.3. Modifying these property values in older versions of WinMark will affect the overall scaling and proportionality of the marked image.

Dotted *Origin Lines* running across the canvas identify the horizontal and vertical centers of the work area. The intersection of the *Origin Lines* (X=0, Y=0) indicates the center of the focusing lens field and provides a reference for aligning the image on the parts to be marked. Figure 4-5 shows X-Y values for the four quadrants defined by the *Origin Lines*. Note that WinMark Pro's XY coordinates are not Cartesian coordinates—positive X values are located to the right of the vertical origin while positive Y values are located <u>below</u> the horizontal origin.
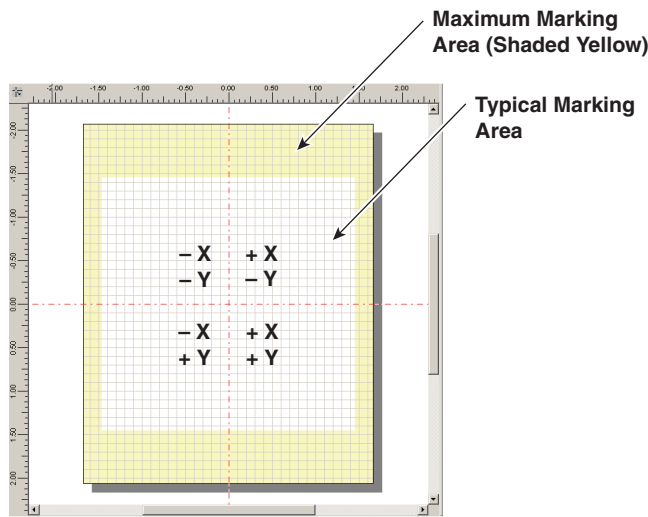
Figure 4-7 Drawing Canvas

Slide Bar

Grab the *Slide Bar* with the Pointer and pull to the left or right to change the horizontal display area of various sections of the *Main Window*.

Flyer Filestore

The *Flyer Filestore* window displays the contents of FH Flyer's/Fenix Flyer's Filestore. When connected to a Flyer head, use the *Flyer Filestore* to view contents of the Filestore. This window allows you to create, move, or delete files, subfolders, and folders. See the *FH Flyer Marking Head Operator's Manual* or the *Fenix Flyer CO₂ Laser Marker Operator's Manual* for details.

If the Filestore view is not shown when WinMark Pro connects to your Flyer/Fenix Flyer head, click Win-Mark's *View* menu and then click Flyer Files.

Object List

Each object placed on the *Drawing Canvas* is added to the *Object List* and is associated with a set of object properties that define some characteristic of that object. For example, drawing a single rectangle creates an entry in the *Object List* named "*Polyline1*". The *Drawing Canvas* itself also contains a unique set of properties and always appears first in the *Object List* as "*Drawing*".

Property List

The *Property List* consists of six tabs: *Special*, *Automation*, *Marking*, *Format*, and *All*. These tabs group sets of object properties by function. When an entity on the *Object List* is selected, properties that affect that entity are displayed on the appropriate tabs in the *Property List* window. You can then view or edit individual *Drawing* or object properties.

Note: The *Tracking* tab was removed from the *Property List* because tracking properties are specific to an individual marking head. These properties now reside on the "*Device*" tab. To access this tab, go to the *Tools* menu, select General Settings… , and choose the "*Device*" tab.

Tip: Use the *Toggle Property Window Toolbar* button ( ) to quickly show/hide *Object List*, *Property List*, and *Help Window* views.

To reposition or resize the *Object List*/*Property List*/*Help* Window or the *Flyer Filestore* Window, click the window and drag it across the screen until it is at the position and pre-set size you require.

Help Window

When a property is selected from the *Property List* tab, a description or explanation of that property appears in the *Help Window*.

Status Bar

The *Status Bar* displays information about tools and their current XY position as well as information about icons on the *Toolbar*.

5 Creating a drawing

The *Creating a drawing* chapter includes sections:

■ Opening a new drawing

■ Adding text

■ Adding bar codes

■ Adding other objects

■ Importing a graphics file

■ Precision positioning

Opening a new drawing

WinMark Pro creates a new drawing with a blank *Drawing Canvas* each time it opens. If WinMark Pro is already open, select *New* from the *File* menu or click the *New* button (⬚) on the *Toolbar*.

Note: When a Flyer marking head or a Fenix Flyer Laser Marker is connected and communicating with WinMark Launcher or Digital Scope, close Launcher or Digital Scope before opening WinMark Pro.

Adding text

1   Select the *Text Tool* (**A**) from the *Tool Box*.

2   Position the cursor on the *Drawing Canvas* and click the left mouse button to set an insertion point. The *Text Caption Editor* dialog box appears.

3   In the *Text Caption Editor* dialog box (Figure 5-1), enter the desired text string. If multi-line text is required, press ENTER to start a new line of text.
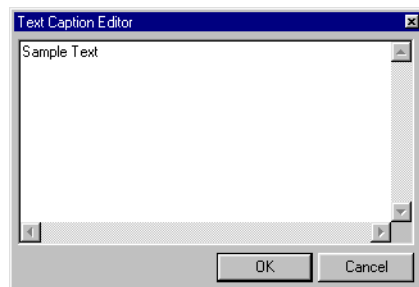
Figure 5-1 Text Caption Editor dialog box

4   Click *OK*. The text appears on the canvas within a bounding outline.

5   Use the Font Type property to select either stroke, TrueType®, or OpenType® (including PostScript®) formatted fonts. Any TrueType, OpenType, or PostScript formatted font installed in Window's *Fonts* folder is available for laser marking. Experiment with changing Font Type, Text Justification and other text properties on the *Format* tab.

Tip: When a text object already exists on WinMark's *Drawing Canvas*, simply double-click the text object to open the *Text Caption Editor* dialog.

Adding bar codes

The *Adding bar codes* section includes subsections:

■   1D bar codes

■   2D codes

1D bar codes

1   Select the *Bar Code Tool* (▥) from the *Tool Box*.

2   Position the cursor on the *Drawing Canvas* and click the left mouse button to set an insertion point.

3   In the *Property List*, click the *Format* tab and enter information in the Barcode Number field.

4   Select the appropriate Barcode Style for the code type you wish to mark. Experiment with changing various 1D bar code properties on the *Format* tab.

2D codes

1   Select the *2D Code Tool* (▦) from the *Tool Box*.

2   Position the cursor on the *Drawing Canvas* and click the left mouse button to set an insertion point.

3   In the *Property List*, click the *Format* tab and then enter data in the 2D Barcode Text field or click the ellipsis (…) to enter data in the *Text Caption Editor* dialog box.

4   Select the appropriate 2D Barcode Style for the 2D code type you wish to mark. Experiment with changing various 2D code properties on the *Format* tab.

Adding other objects

The *Adding other objects* section includes subsections:

■   Rectangles and circles

■   Spots

Rectangles and circles

1   Select the *Rectangle Tool* (⬚) or *Arc Tool* (◉) from the *Tool Box*.

2   Click and hold the left mouse button to set a starting point, and then drag to define the object's size and shape. Hold the SHIFT key down while dragging the mouse to create squares instead of rectangles (*Rectangle Tool*) or circles instead of ellipses (*Arc Tool*).

3   Release the mouse button when the desired size and shape is reached.

Tip: To precisely size objects, open the *Object Transformations* dialog, uncheck *Maintain Aspect Ratio*, and type in specific values (to four-digit accuracy!) in both *New Width* and *New Height* fields.

Spots

1   Select the *Spot Tool* (◉) from the *Tool Box*.

2   Position the cursor on the *Drawing Canvas* and click the left mouse button to set an insertion point.

3   In the *Property List*, click the *Format* tab and enter a Spot Lase Duration time in milliseconds (ms).

Importing a graphics file

1   Select the *Graphic Tool* (🖾) from the *Tool Box* or, on the *File* menu, click *Import*. The *Open* dialog box appears, asking you to locate a file for import. For demonstration purposes, we will import a sample vector graphics file included with WinMark Pro.

2   In the *WinMark* folder, double-click the *Samples* folder.

3   In the *Samples* folder, double-click the *SampleImports* folder.

4   In the *Files of type* drop-down list, select (*.eps) Encapsulated PostScript.

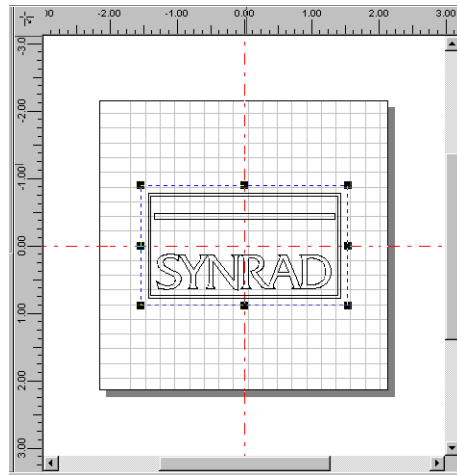5   Select the *Synrad.eps* file and click *Open*. The SYNRAD logo appears on the *Drawing Canvas* (Figure 5-2).

Figure 5-2 Sample imported graphic file

Tip: You can control scaling of imported vector files using Vector Import Scale and Vector Import Scale Value properties (*Tools/General Settings…/Object Defaults* tab). The default Vector Import Scale property value is "One to one", meaning that vector drawings import at full size. Depending on the lens field/*Drawing Canvas* size, the image may extend out of the marking field. If this occurs, change scaling to "Best Fit", "X axis", or "Y axis" and re-import the image.

You can also resize images manually by grabbing a corner handle of the bounding box with the *Selection Tool* and dragging the pointer. Remember that the marking head will not mark any portions of objects that extend off the *Drawing Canvas*.

WinMark Pro expects vector files to be drawn in inches, so a graphic file containing a 3 mm × 6 mm rectangle drawn in millimeters will import at a size of 3 inches by 6 inches (assuming that Vector Import Scale property is set to "One to one"). To scale imported vector files correctly, use the Vector Import Scale Value property. The default value is 1.0—a drawing scaled in inches imports as inches. For a drawing scaled in millimeters, enter a value of 0.3937008 (1/25.4) so that the drawing imports in the correct scaling units.

Importing files with arcs
Before importing files containing arcs, ellipses, or circles, set the Import Arcs as Polylines property (on the *Tools/General Settings…/Object Defaults* tab), to obtain the best results for your intended process. The default value, *Yes*, causes WinMark to import circular arcs as polylines. This is ideal for cutting applications where polyline objects are best marked (or cut) using continuous motion. Set Import Arcs as Polylines to *No* to import arcs as editable WinMark Pro circle (arc) objects. This setting is useful if arcs need to be edited or marked in a specific clockwise or counter-clockwise direction. When using this setting, WinMark processes each arc in a series of connected independently defined arcs, so Pline Start Delay/Pline End Delay values may produce hot spots on sensitive materials if not carefully adjusted.

Precision positioning

In many applications, very precise dimensioning and mark placement is required for objects in the drawing. In these cases, use the *Object Transformations* dialog box to precisely resize, scale, or position selected objects on the *Drawing Canvas*.

1   Add an object to the *Drawing Canvas* or use the *Selection Tool* and click an existing object in the drawing.

Note: When an object is selected, a bounding outline appears around the selected object or objects.

2   From the *Objects* menu, click Transformations… or click the *Transform* button (⬚) on the *Toolbar*.

3   In the *Object Transformations* dialog box (Figure 5-3), change X- and Y-position values (with four-digit accuracy!), scale the selection by entering a percentage or resize by entering precise width and height dimensions.
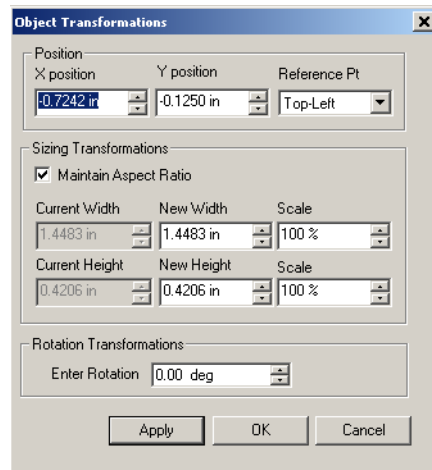
Figure 5-3 Object Transformations dialog box

4   Click *Apply* to preview transformed objects without closing the *Object Transformations* dialog box. Click *OK* to accept the transformation and close the dialog or click *Cancel* to leave the object unchanged.

6 File development

The *File development* chapter includes sections:

◼   On-line mark file development

◼   Off-line mark file development

On-line mark file development

On-line mark file development is possible when communicating in real-time with an FH Flyer marking head or a Fenix Flyer Laser Marker (via Ethernet or USB). The only requirement is to have a *Hardlock* and the appropriate communications link installed on the development or test computer.

Off-line mark file development

When WinMark Pro is installed on a computer that has no *Hardlock* or Flyer head connected, WinMark opens in "Device Simulation" (demo) mode as shown in Figure 6-1. You are prompted to select a specific head, which determines the types of properties that are available. After a head type is selected, WinMark prompts you to select a focusing lens, which determines the field size of the *Drawing Canvas*. In demo mode, WinMark Pro allows you to create and save mark files just as you normally would.

When connected to a Flyer/Fenix Flyer head without a *Hardlock* installed, the computer cannot send microvector (mark) data to the head and you cannot save, paste, or download files to the Flyer Filestore. In this case (no *Hardlock* installed), a dialog box asks if you want to continue in demo mode with marking output disabled. Click *Yes* to launch WinMark Pro, click *No* to close the WinMark application.

Note: To open demo files on another computer, the build number (×.×.×.**1234**) of the off-line WinMark Pro version must be <u>less than or equal to</u> the build number of the WinMark version installed on the marking computer.
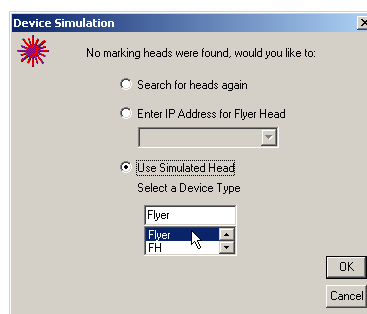

Figure 6-1 Device Simulation dialog box

Tip: When your development computer is used primarily for creating off-line mark files, use WinMark Pro's command line switch to open WinMark in demo mode with a simulated Flyer head and lens selection of your choice. This feature eliminates the need to make head/lens selections in multiple dialog boxes when WinMark opens.

To create the demo mode command line, right-click the WinMark Pro desktop icon and choose *Properties*. On the *Shortcut* tab, enter the command line string in the **Target:** box. Type this command line exactly as shown below including quote marks and spaces:

"C:\Program Files\WinMark\WinMark.exe" /demo /Flyer /"200 mm"

The lens selection option must be one of the following (with quotes and spaces): "80 mm", "125 mm", "125 mm HP", "200 mm", or "370 mm".

Click *Apply* and then click *OK*. Now, double-clicking the WinMark Pro desktop icon will immediately launch WinMark in Flyer simulation mode with a *Drawing Canvas* sized to the specified focusing lens. To reset the WinMark icon path, replace the command line with the string: "C:\Program Files\WinMark\WinMark.exe" (including the quote marks).

Note that only the Flyer head is recognized for demo mode. If the head or lens type is not specified or is entered incorrectly, WinMark will open in standard demo mode with all dialog box entry required.

Alternately, you can leave the WinMark icon in its default configuration for standard operation and use the *Start/Run…* dialog to launch WinMark in command line demo mode. To do this, click the *Start* button and choose *Run…* . In the *Run* dialog box, type the command line in the **Open:** box.

7 WinMark Launcher

The *WinMark Launcher* chapter includes sections:

- Introduction

- Launcher display

- Opening a drawing

- Marking parts

- Modifying a drawing

- Launcher in stand-alone mode

Introduction

WinMark Launcher allows you to open and mark existing mark files outside of the *Drawing Editor* environment. This eliminates the possibility of inadvertent changes to archival mark files and, as shown in Figure 7-1, provides a simplified graphical interface for operators.
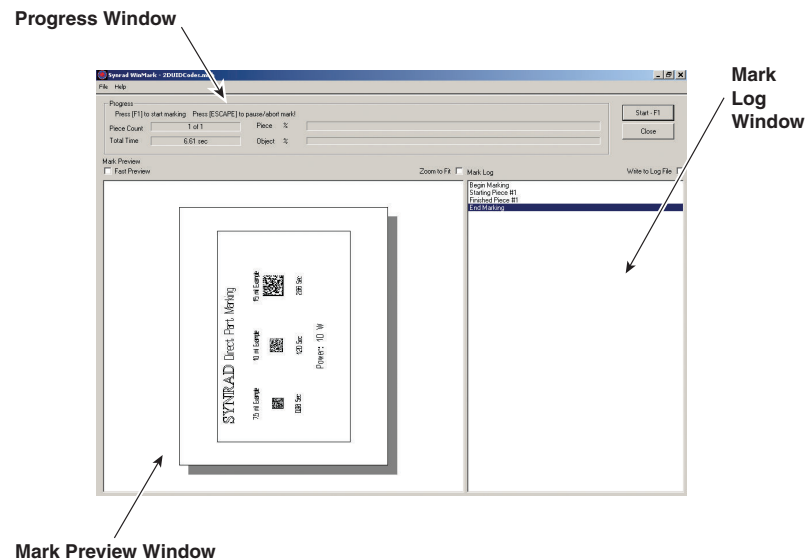

Figure 7-1 Launcher window

Note: When a Flyer/Fenix Flyer head is connected and communicating with WinMark Pro or Digital Scope, close WinMark or Digital Scope before opening WinMark Launcher.

Note: After installing, or upgrading to a newer version, open WinMark Pro first, before opening Launcher. This allows WinMark Pro to initialize lens selection and Device ID data in the computer's *System Registry* before a mark session begins.

Start WinMark Launcher by double-clicking the *Launcher* icon ( ) on your desktop or perform the following steps:

1   Click *Start* on the taskbar.

2   Select *Programs* and then locate the *Synrad WinMark* folder.

3   Click the *Synrad WinMark Launcher* icon.

4   Launcher opens and automatically loads the last file marked.

Launcher display

The *Launcher display* section includes subsections:

■   Progress window

■   Mark Preview window

■   Mark Log window

Launcher's graphical display comprises several distinct windows. Each is described below.

Progress window

The *Progress* window provides status information about the ongoing mark session. *Piece Count* provides a running total of pieces marked in the current mark session in cases where Mark Count is zero or greater than one. *Total Time* displays the total elapsed time in this mark session. *Piece %* is a progress bar illustrating percent of marking complete on the current piece (part to be marked). *Object %* illustrates the percent of marking complete on the current object in the mark file.

Mark Preview window

Mark Preview displays the actual mark being made in real-time. During marking, a red outline box surrounds the object currently being laser marked.

Fast Preview check box

Checking *Fast Preview* grays out individual elements in the mark file, showing only mark location. In time-critical applications, this option saves the small amount of time involved in redrawing the screen.

Zoom to Fit check box

Selecting the *Zoom to Fit* check box zooms the Launcher view to the extents of the mark. This view is useful when an operator must verify a manual text input, serial port read, or serialization event while marking very small objects.

Mark Log window

The *Mark Log* window records and displays every step or event in the mark sequence as it occurs in real-time during the marking process.

Write to Log File check box

Checking *Write to Log File* creates a Windows Log File (.log) and writes each log event displayed in the *Mark Log* window to the marking computer's hard drive or specified network location. Selecting the *Write to Log File* check box opens the *Save As* dialog box which prompts you for a filename and storage location. Using the *Write to Log File* feature will affect cycle times of the mark because each event is written to the hard drive or network location in real-time.

Data in the saved mark log is formatted as follows:

> DD MM HH:MM:SS "mark event description";

where DD is the two-digit day, MM is the two-digit month, and HH:MM:SS are Hours:Minutes:Seconds as read from the system clock. "Mark event description" is a copy of the same data displayed in the *Mark Log* window.

Opening a drawing

To open an existing mark file, perform the following steps:

1   Click Open… under the *File* menu.

2   In the *Open* dialog box, locate and select the file you wish to mark.

3   Double-click the file or click *OK* to load the selected mark file.

Marking parts

Once a mark file is loaded into WinMark Launcher, begin marking by pressing F1 or click the *Start-F1* button. By changing *Startup Option* settings in WinMark Pro, Launcher can be configured to (1) load a specific file when opened, (2) automatically launch when the computer boots-up, and (3) automatically start marking when Launcher opens.

⚠ **Danger**
serious personal injury

When the *Start marking immediately after Launcher loads* check box in the *Startup Options* dialog is selected, the laser will begin firing immediately after WinMark Launcher loads on start-up, provided that all input states set in the mark file's Event Automation, if any, are valid.

Because exposure to **invisible** infrared laser radiation in the 10.6 μm CO_2 wavelength band can inflict severe corneal injuries and seriously burn human tissue, appropriate safeguards must be in place to prevent serious personal injury or equipment damage.

Tip: When running time-sensitive applications, minimizing the Launcher window helps to shorten cycle times by reducing the time that the Windows Operating System spends on refreshing the display.

Modifying a drawing

To edit the currently open mark file, perform the following steps:

1   Click Modify Drawing… under the *File* menu.

2   If a user password is required, then the *Enter Password* dialog box opens. Type the correct case-sensitive password and click *OK*.

3   Edit the mark file as required in WinMark's *Drawing Editor*.

4   When editing is complete, save the file and close WinMark Pro before marking from Launcher.

Launcher in stand-alone mode

When Launcher is used with a Flyer or Fenix Flyer head in stand-alone mode, the Launcher display appears as shown in Figure 7-2.
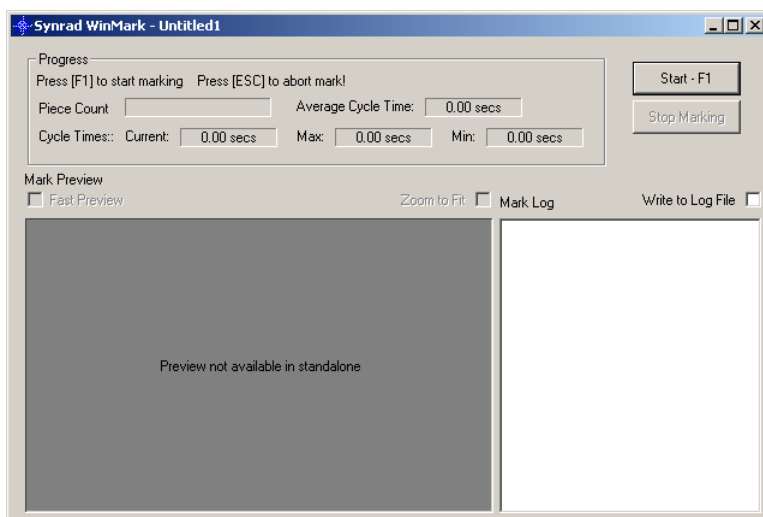
Figure 7-2 Launcher window in stand-alone mode

In this mode, Launcher is only receiving mark status information and starting/halting mark sessions. If a Startup Drawing is not specified, you can load any file in the head's Filestore. To do this, go to the *File* menu and choose Open Drawing on Head.

Note that the *Progress* window is grayed out since WinMark is not sending mark data to the head. In stand-alone mode, mark data is generated internally in the Flyer head.

8 WinMark Digital Scope

Digital Scope is a stand-alone program designed to test or verify the functionality of WinMark Pro's laser control and I/O capability.

Note: When a Flyer marking head or a Fenix Flyer Laser Marker is connected and communicating with WinMark Pro or WinMark Launcher, close WinMark or Launcher before opening Digital Scope.

Start Digital Scope by double-clicking the *Digital Scope* icon ( ) on your desktop or perform the following steps:

Note: After installing, or upgrading to a newer version, open WinMark Pro first, before opening Digital Scope. This allows WinMark Pro to initialize lens selection and Device ID data in the computer's *System Registry* before a mark session begins.

1   Click *Start* on the taskbar.

2   Select *Programs* and then locate the *Synrad WinMark* folder.

3   Click the *Synrad Digital Scope* icon.

4   Digital Scope opens as shown in Figure 8-1.
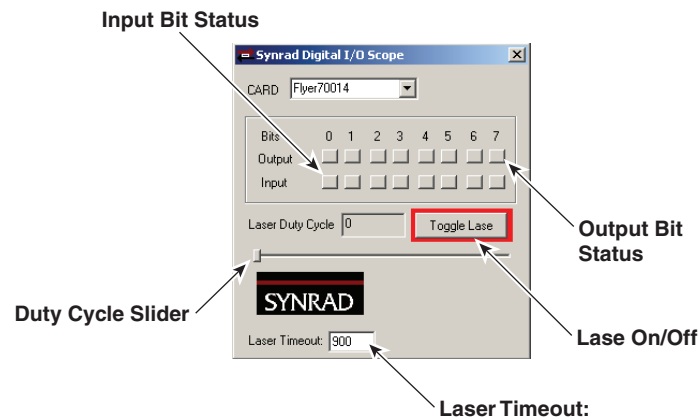
Figure 8-1 Digital Scope display

A description of each Digital Scope control follows:

Input Bit Status

Input bit "buttons" pop-in to indicate that an input connected to the Flyer head is active. See Chapter 11, *Automation basics*, for a list of valid FH Flyer/Fenix Flyer input bits.

Duty Cycle Slider

Click and drag the Duty Cycle Slider to set laser power by varying the laser's pulse width modulation (PWM) between 0–99% duty cycle. Power output is displayed in the *Laser Duty Cycle* display box.

Output Bit Status

Click an output bit "button" to activate an output connected to the Flyer head. See Chapter 11, *Automation basics*, for a list of valid FH Flyer/Fenix Flyer output bits.

Lase On/Off

Click the *Toggle Lase* button to turn the laser On. The laser will fire at the specified *Laser Duty Cycle*. Click again to toggle the laser Off.

Laser Timeout:

If you need to fire the laser (by clicking the *Toggle Lase* button), but need to halt firing automatically, enter a value in the *Laser Timeout:* field. You can enter integer values between 1 and 3600 seconds. After clicking *Toggle Lase*, a counter appears to count down the seconds remaining until lasing is halted.

Note: Digital Scope automatically sends a command to center FH Flyer or Fenix Flyer optical scanners when the *Toggle Lase* button is pressed.

Important Note: If the Fast Acting Safety Interlock (FASI) feature is enabled on the FH Flyer/Fenix Flyer head, then input *IN3* must be active (a high level voltage must applied) before the laser will fire.

Basic Operation

Use information in this section to begin laser marking.

This section contains the following chapters:

■ **Chapter 9 – Marking basics**
explains how font selections and graphics file formats affect mark speed and quality.

■ **Chapter 10 – Marking parts**
explains how to mark single pieces or parts in batches.

■ **Chapter 11 – Automation basics**
describes the basic procedures in connecting to automated parts handling equipment.

■ **Chapter 12 – ActiveMark automation**
describes the basics of WinMark Pro's ActiveMark (ActiveX) technology when used in a Microsoft Visual C++ or MS Visual Basic programming environment.

9 Marking basics

The *Marking basics* chapter includes sections:

- ◼ Types of marks

- ◼ Key marking parameters

- ◼ Optimization

When creating a mark file, your choice of font for text and your choice of file format for imported graphic images are the primary factors that influence the overall speed and quality of the mark. The following sections lead you through the creation of text and graphic files to illustrate how your choices affect marking. The *Optimization* section provides examples of how to optimize a file for speed or for mark quality.

⚠ **Danger** serious personal injury	Before performing the marking tutorials in this chapter, ensure that all personnel in the area are wearing protective eyewear. Read and follow all laser safety and fume extraction precautions described in your laser and marking head Operator's Manuals.
	CO_2 lasers emit *invisible* infrared laser radiation at the 10.6 μm CO_2 wavelength band. Since direct or diffuse laser radiation can inflict severe corneal injuries, always wear eye protection when in the same area as an exposed laser beam. Do not allow the beam to contact a person. CO_2 lasers emit an invisible beam that is capable of seriously burning human tissue.
	Always be aware of the beam's path and always use a beam block while testing.

⚠ **Warning** serious personal injury	In order to halt marking before a mark has been completed, you must press the ESC key on the keyboard. In some instances, you must press and hold the ESC key until marking is halted. Because WinMark Pro is busy sending microvector and control data to the marking head in real-time, keyboard status is checked only intermittently during a mark.
	To halt lasing immediately you can toggle the laser's *Keyswitch* to Off, open the laser's *Remote Reset* input, or open the FASI input (if the Fast Acting Safety Interlock is enabled). Although lasing is disabled immediately, WinMark Pro is unaware of laser status and will continue the mark session until it is complete or halted.

Important Note: Power settings provided in this tutorial are based on the use of a 25 W laser marking an anodized aluminum substrate through a 125 mm focusing lens. When working through the examples below, be sure to adjust power levels accordingly for higher or lower power lasers, for the spot size (power density) of your lens, and for the specific substrate you are marking.

Types of marks

The *Types of marks* section includes subsections:

- Text

- Graphics

- Bar codes

- 2D codes

There are two distinct methods used to mark objects. The first method, vector marking, is made by moving the beam from one X-Y point to another X-Y point (a vector) along a straight or curved path. This type of mark is very fast, limited only by the speed of the optical scanners moving the beam-steering mirrors. The second method of marking, raster marking, is accomplished by switching the beam on and off as it scans across the image area. At the end of a scan line, the beam is switched off, returns and moves down one step, and then is switched on and makes another pass. This raster scanning continues through the length of the image. If Bi-Directional Raster is enabled, marking occurs as the beam moves both directions across the image. In addition, you can specify either a horizontal or a vertical orientation for raster scanning. Raster marking is slower than vector marking, but raster scanning can create filled objects and text or even reproduce photographic images. Figure 9-1 illustrates both types of marking.

Vector outline   Raster fill
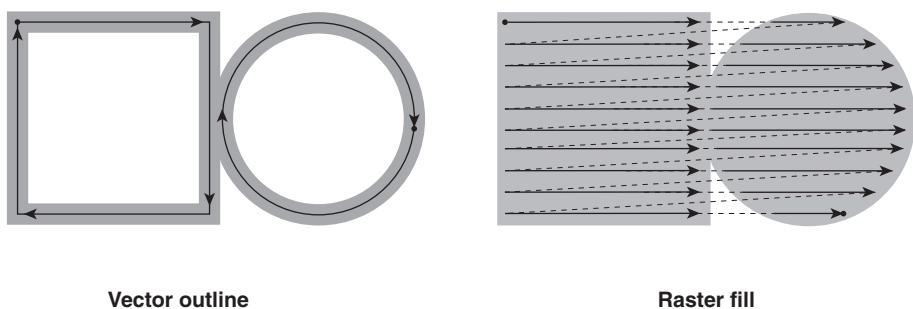
Figure 9-1 Vector versus raster marking

Text

When creating text, there are two basic categories of fonts to choose from: (1) stroke fonts or (2) vector outline fonts. Stroke fonts are the type of fonts typically used in CAD programs because they are drawn (or marked) very quickly using point-to-point vectors. Twelve different stroke font styles are built into WinMark Pro® to improve high-speed coding of text, date codes, and serial numbers.

Vector outline fonts include typefaces designed in TrueType®, OpenType®, and PostScript® formats. When *True Type* is the chosen Font Type, any TrueType (.ttf) formatted font installed in Windows's *Fonts* folder is available for use by WinMark Pro. When the Font Type is set to *Open Type*, any OpenType (.ttf or .otf) formatted font installed in the Windows' *Fonts* folder or any PostScript (.pfm) formatted font with a shortcut residing in the Windows' *Fonts* folder is available to WinMark Pro. If the Text Filled property is set to *No*, the font is marked as a vector outline; if Text Filled is *Yes*, the font is filled by raster scanning the beam, effectively "coloring in" the outline to produce a solid fill. Figure 9-2 illustrates examples of stroke, TrueType, and filled TrueType formatted fonts.
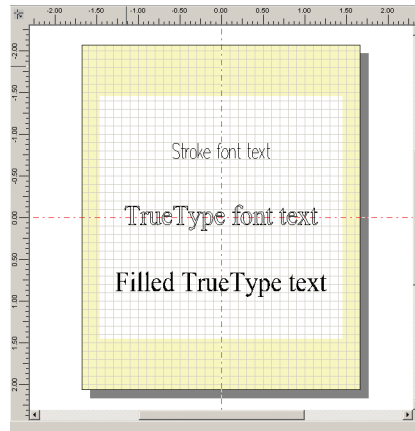
Figure 9-2 Font types

The tutorial section below illustrates the relative marking speeds of stroke and TrueType formatted fonts.

Mark a stroke font:

1   Select the *Text Tool* from the *Tool Box*, position it on the *Drawing Canvas*, and click the left mouse button to set an insertion point. The *Text Caption Editor* dialog box appears.

2   In the *Text Caption Editor* dialog box, type: "**ABCDEFG123**".

3   Click *OK*. ABCDEFG123 appears on the canvas within a bounding outline.

4   On the *Format* tab, set Font Type to *Stroke* and then in Stroke Font, select a stroke font to mark.

5   Choose a Text Height that will allow the text to easily fit on the *Drawing Canvas*.

6   Click the *Marking* tab. Set Velocity to *60* in./sec. and set Power (duty cycle percentage) to *60%*.

7   Position a sheet of anodized aluminum under the lens, ensure all personnel are wearing safety glasses, and then click the *Mark* button.

8   When the *Synrad WinMark* dialog box appears, click *Start-F1*.

9   Observe how the mark is produced. After completion of the mark, note the cycle time.

10   Save the file as *Stroke demo.mkh*.

Mark an unfilled TrueType font:

1   Open a new drawing.

2   Select the *Text Tool*, position it on the *Drawing Canvas*, and click the left mouse button to set an insertion point.

3   In the *Text Caption Editor*, type: "**ABCDEFG123**".

4   On the *Format* tab, set Font Type to *TrueType* and then in TrueType Font, select a font to mark. Set Text Filled to *No* and set Text Curve Detail to *500* (WinMark's default value).

5   Set Text Height to the same value used in the stroke font example.

6   Click the *Marking* tab. Set Velocity to *60* in./sec. and Power to *60%*.

7   Position a sheet of anodized aluminum under the lens, ensure all personnel are wearing safety glasses, and then click the *Mark* button.

8   When the *Synrad WinMark* dialog box appears, click *Start-F1*.

9   Observe how the mark is produced. After completion of the mark, note the cycle time.

10   Save the file as *Unfilled TrueType demo.mkh*.

Mark a filled TrueType font:

1   Open a new drawing.

2   Select the *Text Tool* and click to set an insertion point.

3   In the *Text Caption Editor*, type: "**ABCDEFG123**".

4   On the *Format* tab, set Font Type to *TrueType* and then in TrueType Font select the same font used in the unfilled font example above.

5   Set Text Filled to *Yes*, Filled Font Resolution to *500*, Text Curve Detail to *500*, and set Text Height to the same value used in the stroke and unfilled font examples.

6   Click the *Marking* tab. Set Velocity to *100* in./sec. and Power to *60%*.

7   Position a sheet of anodized aluminum under the lens, then mark the text.

8   Again, observe how the marking head is producing the mark and note the cycle time.

9   Save the file as *Filled TrueType demo.mkh*.

The three text examples just demonstrated show the importance of choosing fonts (and marking parameters) to match the marking application. In processes where speed is an issue such as in marking part numbers, date codes, or other identifying information at high throughput speeds, stroke fonts can mark $1^1/_2$ times faster than unfilled vector outline fonts and ten times faster than filled vector outline fonts. When filled vector outline fonts are required to convey a quality "look" or match a corporate logotype, longer cycle times are inevitable.

Graphics

When creating graphics, there are two basic types of file formats: (1) bitmap and (2) vector graphics. Bitmap (raster files) such as TIFF, BMP, and JPEG formats are the types of files created by pixel-based paint programs. Bitmap file elements are marked using a raster scanning technique. CAD and illustration programs generate vector files such as EPS and DXF formats that are marked quickly using mathematical-based vector movements. A third graphics format, metafile, can contain both bitmap and vector elements. Common metafile formats include WMF and CGM.

Mark a bitmap graphics file:

1   Open a new drawing and then click the *File Import Tool*. The *Open* dialog box appears, asking you to locate a file for import. For this example, we will import a sample file included with WinMark Pro.

2   In the *WinMark* folder, double-click the *Samples* folder.

3   In the *Samples* folder, double-click the *SampleImports* folder.

4   In the *Files of type* drop-down list, select (*.tif) Tagged Image File Format.

5   Select the *Family.tif* file and click *Open*. The bitmap file is shown in Figure 9-3.
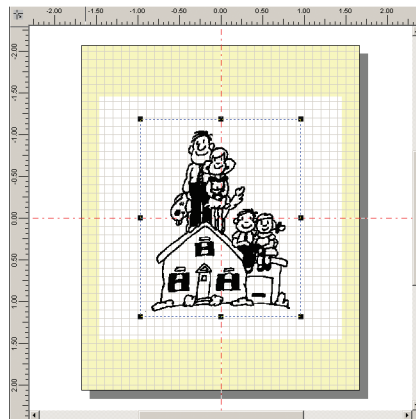
Figure 9-3 Family.tif

6   Click on the family image to select it, then use the *Object Transformations* dialog box to scale the image to fit the *Drawing Canvas*.

7   Click the *Marking* tab. Set Velocity to *175* in./sec., Power to *60%*, and Resolution to *600*.

8   Position a sheet of anodized aluminum under the lens, ensure all personnel are wearing safety glasses, and then click the *Mark* button.

9   When the *Synrad WinMark* dialog box appears, click *Start-F1*.

10   Observe how the mark is produced. After completion of the mark, note the cycle time.

11   Save the file as *Bitmap demo.mkh*.

Tip: For best results before importing bitmap images, re-size the image to its intended mark size and check image resolution in a photo-editing or paint program. Then, in WinMark Pro, go to the *Tools/ General Settings…/Object Defaults* tab and set Resolution to the resolution value of the image you plan to import. This step forces WinMark to import the image at full size.

If aliasing (Moire effect or stair-stepped edges) is seen in the mark, set the Resolution property (on the *Marking* tab) to a multiple of the native image resolution.

Mark a vector graphics file:

1   Open a new drawing and then click the *File Import Tool.* The *Open* dialog box appears, asking you to locate a file for import. For this example, we will import a sample file included with WinMark Pro.

2   In the *WinMark* folder, double-click the *Samples* folder.

3   In the *Samples* folder, double-click the *SampleImports* folder.

4   In the *Files of type* drop-down list, select (*.dxf) AutoCAD Drawing Interchange.

5   Select the *Chairbin.dxf* file and click *Open. Chairbin.dxf* (Figure 9-4) is a vector graphic illustrating an office chair as a wire-frame line drawing.
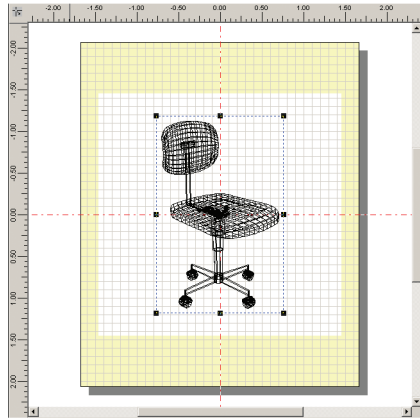
Figure 9-4 Chairbin.dxf

6   Click on the Chairbin image to select it.

7   Click the *Marking* tab. Set Velocity to *60* in./sec. and Power (duty cycle percentage) to 60%.

8   Position a sheet of anodized aluminum under the lens, then mark the drawing.

9   Observe how the mark is produced. After completion of the mark, note the cycle time.

10 Save the file as *Vector demo.mkh.*

Vector graphics are used for marking objects at high throughput speeds when cycle times are important. Bitmap graphics are appropriate when a filled logo or photographic image is being marked and quality is the most important marking factor. You can import both vector and bitmap files into the same drawing to shorten cycle times and obtain the best quality mark possible.

Bar codes

WinMark Pro's bar code library contains 23 different bar codes or bar code subsets for product coding. See Chapter 16, *Object properties*, in the Commands & Properties section for a list of available bar code formats.

1   Open a new drawing.

2   Select the *Bar Code Tool* and click to set an insertion point.

3   On the *Format* tab, in the Barcode Number field, type: "**123456**".

4   On the *Format* tab, set Barcode Style to *Code 3 of 9*, Barcode Resolution to *300*, and Barcode Show Text to *No*.

Note: Setting the Barcode Resolution value too high may introduce reader errors if line width begins to encroach on the white space between bars.

5   If coding a dark material that will mark lighter, set Barcode Inverted to *Yes*.

Tip: Most bar codes are marked, or printed, as dark lines on a light background because the bar code must create a sharp color contrast against the material's background in order for the bar code to be readable. When creating a contrasting mark on dark material, set Barcode Inverted to *Yes*. This causes WinMark to mark the spaces between bars (instead of the bars) and add a "quiet zone" around the code so that a contrasting space between dark bars is created.

6   Click the *Marking* tab and set Velocity to *80* in./sec. at a Power level of *60%*.

7   Position a sheet of anodized aluminum under the lens, then mark the bar code.

Tip: When marking heat-sensitive materials (like plastics), start with Barcode Resolution settings in the range of 200–250. Bar codes on materials such as mild or stainless steels mark best at resolutions around 600–650. To decrease mark (cycle) time, Barcode Resolution should not be set much higher than the lowest resolution that provides consistently readable results.

2D codes

When a 2D code is needed for your coding operation, choose from Data Matrix, QR Code, or Micro QR Code.

1   Open a new drawing.

2   Select the *2D Code Tool* and click to set an insertion point.

3   On the *Format* tab, in the 2D Barcode Text field, click the ellipsis (…). The *Text Caption Editor* dialog box appears.

4   In the *Text Caption Editor* dialog box, type: "**ABCDEFG123**" and click *OK*.

5   In the 2D Barcode Style field, select *Data Matrix*, *QR Code*, or *Micro QR Code*.

6   Set Barcode Inverted to *Yes* if marking a dark material.

7   Click the *Marking* tab and set Velocity to *80* in./sec., Power to *60%*, and Resolution to *300*.

Note: Setting the Resolution value too high may lead to cell growth errors if filled cells begin to encroach on the space allocated for unfilled cells.

8   Position a sheet of anodized aluminum under the lens, then mark the code.

Tip: When marking heat-sensitive materials, set the 2D code's, 2D Barcode Circle Radius property to a value in the range of 80–90%. This reduces the raster or vector cell size by the specified percentage to eliminate print growth reading errors.

Key marking parameters

The *Key marking parameters* section includes subsections:

- Velocity

- Power

- Resolution

- Delays

Once a decision is made to use either a stroke or vector outline font or to use either a bitmap or vector graphic, the three most important object properties are: (1) Velocity, (2) Power, and (3) Resolution. These three parameters plus object delays on the *Marking* tab are the primary factors that determine the speed and quality of the mark.

Velocity

Marking velocity (X-Y optical scanner speed) determines how fast each microvector is marked. Setting optical scanner velocity too high affects mark quality as delay settings become much more critical when velocity increases. Velocity also affects power since a faster moving beam has less heat effect on the material. The Velocity property is adjustable in a range of 0.01 to 400 inches/sec. (0.25–10,160 mm/sec.).

Power

Laser output power must be optimized for the material being processed and for the type of mark required. Power (duty cycle percentage) is adjustable between 0% and 100% of the laser's actual power output. Typically, a duty cycle of 70% to 80% equals the laser's specified output power in watts. Applying too much power may engrave too deeply or char the material unacceptably. In some cases, making multiple Mark Passes at a lower power level provides better results.

Tip: When marking certain plastics, such as PEEK, PVC, brown Bakelite and dark phenolic, contrasting marks are often achieved using very low power settings (1 to 2 watts).

Resolution

In WinMark Pro v6, the Resolution property is available for bitmap objects like imported bitmap graphics, 2D codes, and filled polyline objects. All other objects are marked at a default step resolution of 200 microvectors per inch. When marking filled vector outline text, use the Filled Font Resolution property (on the *Format* tab) and use Barcode Resolution (also on the *Format* tab) for 1D barcode objects.

Practical resolution values range from 50 for spot-style 2D codes to 200 for linear 1D bar codes up to 1000 for high-resolution graphics or filled text. Apparent resolution is also a function of the spot size of the focusing lens. The nominal spot size for an 80 mm lens is 116 microns (0.005") while a 370 mm lens produces a 540-micron (0.021") spot. This large difference in spot size must be taken into account when determining the smallest character height or 2D cell that can be marked. To obtain the best legibility when marking text objects, character (Text Height) values should be a minimum of seven to ten times the focused spot size.

Delays

It is sometimes possible for the marking head's optical scanner hardware to lag slightly behind software commands while marking. To compensate, WinMark Pro provides object-specific delays. Object delays for specific objects are controlled by selecting related objects in an open drawing file and then setting appropriate delays on the *Marking* tab. See Chapter 16, *Object properties*, for further information on delay properties.

Optimization

The *Optimization* section includes subsections:

- Vector objects

- Raster objects

Mark file optimization involves determining acceptable trade-offs in WinMark Pro's Velocity, Power, and Resolution settings for a given drawing. These settings along with object delays, which affect cycle time and mark quality, are best determined by careful experimentation.

Vector objects

When marking vector-type objects such as stroke fonts or imported vector graphics, the fastest mark possible is sometimes not legible enough to be practical. An acceptable high-speed mark is determined by each individual application and customer. The example below suggests one approach you might take to optimize vector marks for speed:

1   Open the *Stroke demo.mkh* file created earlier.

2   Click on the text object to select it.

3   Click the *Marking* tab and increase Velocity from *60* to *120* in./sec., increase Off Vector Velocity from *200* to *400* in./sec. and increase Power from *60%* to *90%*.

4   Position a sheet of anodized aluminum under the lens, ensure personnel are wearing safety glasses, and then fire a mark.

5   Compare mark quality and cycle time to the initial stroke font mark.

If mark quality is unacceptable after increasing Velocity, try modifying object delays first because delays have less effect on marking speed. For example, if the first vector is too short, change the Pline Start Delay property from *0* µsec to a negative value like *–500* µsec. If mark quality still suffers after optimizing object delays, try decreasing both Velocity and Resolution. Remember to change only one parameter at a time while comparing results.

Open the *Vector demo.mkh* graphic file, make similar changes and compare those results to the original marks.

Raster objects

When marking raster-type objects such as filled TrueType formatted fonts or imported bitmap graphics, the level of quality acceptable for a mark is again a subjective issue. The highest quality mark possible is often not fast enough from a production standpoint. As with speed, creating a quality raster mark involves trade-offs in Velocity, Power, Resolution, and delay settings and again is best determined by experimentation.

The following example suggests one approach you might take to optimize raster marks for best quality:

1   Open the *Filled TrueType demo.mkh* file created earlier.

2   Select the text object.

3   Click the *Marking* tab and decrease Power to *35%*. Keep Velocity set to *100* in./second.

4   Click the *Format* tab and increase both Filled Font Resolution and Text Curve Detail to *1000*.

5   Position a sheet of anodized aluminum under the lens, then make the mark.

6   Compare mark quality and cycle time to the initial filled TrueType text mark.

If mark time is too slow, try reducing Filled Font Resolution and Text Curve Detail together or try increasing Velocity and/or reducing Power. Experiment with changing only one parameter at a time while comparing results. Open the *Bitmap demo.mkh* file and make similar changes to Velocity, Power, and Resolution. Compare those mark results to the original bitmap marks.

10 Marking parts

The *Marking parts* chapter includes sections:

■ The mark session

■ Piece marking

■ Batch marking

The mark session

Throughout this manual, the term "mark session" is used. In WinMark terms, a mark session begins after pressing F1 on the keyboard, or clicking *Start-F1* in the *Synrad WinMark* dialog box or Launcher window and ends when the Mark Count property is satisfied (the number of parts marked equals the specified Mark Count value). In automated systems when Mark Count is set to zero (0) and marking proceeds continuously as directed by "start mark" signal inputs, the mark session does not end. When using ActiveMark™ control, Mark Count is typically set to 1 so that the mark session begins when WinMark's MarkDrawing method is called and ends after the mark is complete so that control is returned to the calling program.

You can halt a mark session at any time by pressing ESC on the keyboard, however this actually terminates or aborts the mark session; it does not end the session. This distinction is important to understand because On After Mark Session events defined on the *Automation* tab occur only when a mark session ends, not when the session is aborted. If your automated system requires a specific I/O state to occur when a mark session is aborted, you can define an output state using the On Abort Session property. Figure 10-1 illustrates the mark session flowchart.
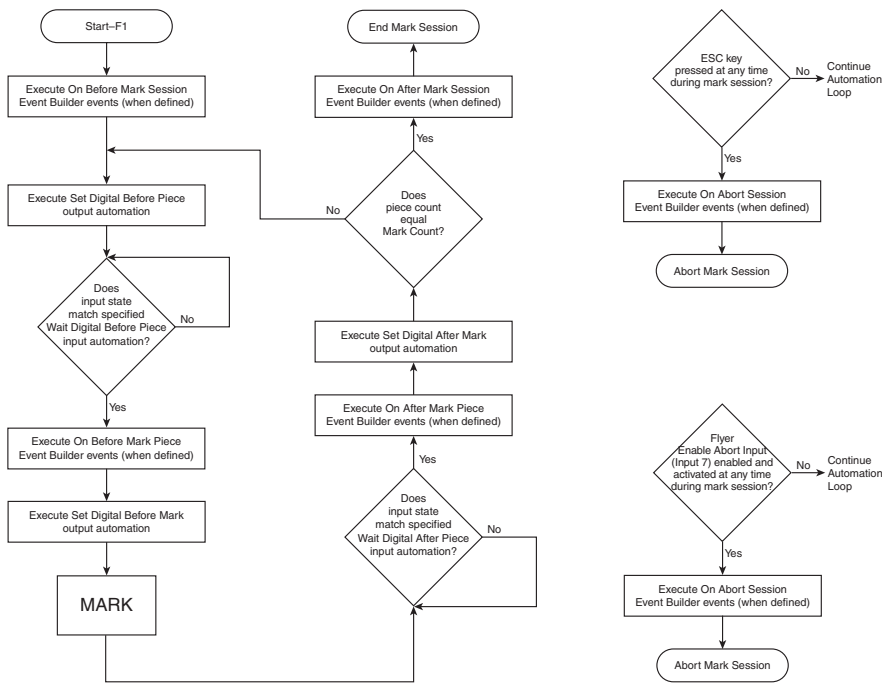
Figure 10-1 Mark session flowchart

Piece marking

In manufacturing processes that produce parts one at a time, piece marking is the most appropriate method of marking. The following procedure steps you through a sample parts marking session. This procedure may not meet your particular needs, but you can modify it as required by specifying different parameters.

To setup a single-piece marking operation, perform the following steps:

1 Use the *Drawing Editor* to create a file with text, artwork, or imported graphic images.

2 With the appropriate object or objects selected, set marking Velocity, Power, and Resolution (where applicable) on the *Marking* tab.

3 Position the cursor over a blank area of the *Drawing Canvas* and click the left mouse button or select *Drawing* in the *Object List* to deselect all objects.

4 In the *Property List*, click the *Marking* tab, and then click Mark Count. Click the arrow and set the Mark Count property to *1*.

Note: In automated piece marking applications, set Mark Count to zero (0) and set input/output automation as described in Chapter 11, *Automation basics*, or in our *Laser Marking FAQ* (available on the WinMark web site).

⚠ **Danger** serious personal injury	Before performing the marking tutorials in this chapter, ensure that all personnel in the area are wearing protective eyewear. Read and follow all laser safety and fume extraction precautions described in your laser and marking head Operator's Manuals. CO_2 lasers emit *invisible* infrared laser radiation at the 10.6 μm CO_2 wavelength band. Since direct or diffuse laser radiation can inflict severe corneal injuries, always wear eye protection when in the same area as an exposed laser beam. Do not allow the beam to contact a person. CO_2 lasers emit an invisible beam that is capable of seriously burning human tissue. Always be aware of the beam's path and always use a beam block while testing.

5 Place the part to be marked under the focusing lens at the point of focus.

6 On the *Toolbar*, click the *Mark* button (Figure 10-2).
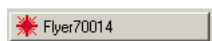
Figure 10-2 Mark button on the *Toolbar*

7   When the *Synrad WinMark* dialog box appears (Figure 10-3), click *Start-F1*.
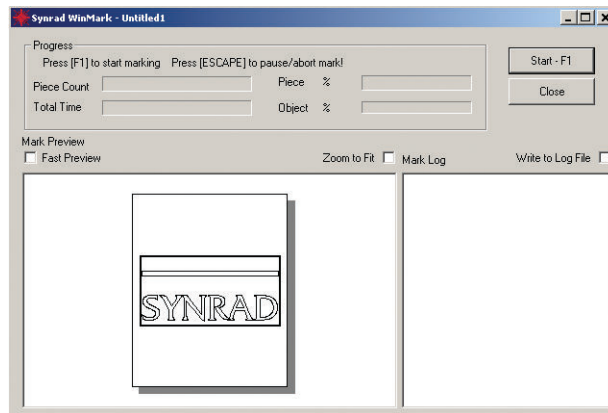
Figure 10-3 Synrad WinMark dialog box

Batch marking

If your manufacturing process produces parts in batches, trays of parts for example, batch marking is the most appropriate method for marking them. The following procedure steps you through a sample batch marking session. You will create an image to be marked then use WinMark's *Array* properties to duplicate the object and create an array that matches the group of parts to be marked. This procedure may not meet your particular needs, but you can modify it as required by specifying different parameters.

To setup a batch marking operation, perform the following steps:

Note: Although the entire batch or tray of parts does not need to fit within the mark field, the desired mark area on all parts within the batch must fit within the marking field of the selected focusing lens.

1   Use the *Drawing Editor* to create a file with text, artwork, or imported graphic images.

2   With the appropriate object or objects selected, set marking Velocity, Power, and Resolution (where applicable) on the *Marking* tab.

3   In the *Property List*, click the *Format* tab, and then click Array Columns (Figure 10-4).

4   Click the arrow to increase the number of columns.

The number of columns created should match the number of columns of parts in the batch.
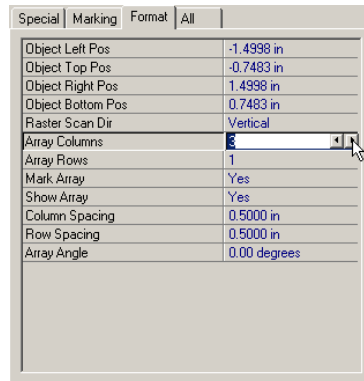
Figure 10-4 Setting number of Array Columns

5   In the *Property List*, click Array Rows (Figure 10-5), and then click the arrow to increase the number of rows.

The number of rows created should match the number of rows of parts in the batch.
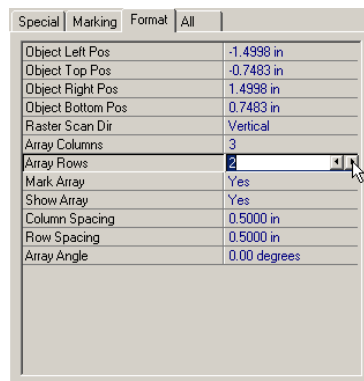
Figure 10-5 Setting number of Array Rows

6   From the *Objects* menu, click Center on Field to center the array in the marking field.

7   On the *Format* tab, adjust Column Spacing, Row Spacing, and Array Angle as required to position the arrayed image over the batch of parts.

8   Click a blank area of the *Drawing Canvas* or select *Drawing* in the *Object List* to deselect all objects.

9   In the *Property List*, click the *Marking* tab, and then click Mark Count. Click the arrow and set the Mark Count property to *1*.

Note: In automated batch marking applications, set Mark Count to zero (0) and set input/output automation as described in Chapter 11, *Automation basics*, or our *Laser Marking FAQ*.

10 Place the array of parts to be marked under the focusing lens at the point of focus.

⚠ **Danger** serious personal injury	Before performing the marking tutorials in this chapter, ensure that all personnel in the area are wearing protective eyewear. Read and follow all laser safety and fume extraction precautions described in your laser and marking head Operator's Manuals. CO_2 lasers emit ***invisible*** infrared laser radiation at the 10.6 µm CO_2 wavelength band. Since direct or diffuse laser radiation can inflict severe corneal injuries, always wear eye protection when in the same area as an exposed laser beam. Do not allow the beam to contact a person. CO_2 lasers emit an invisible beam that is capable of seriously burning human tissue. Always be aware of the beam's path and always use a beam block while testing.

11 On the *Toolbar*, click the *Mark* button (Figure 10-6).
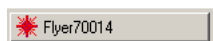
Figure 10-6 Mark button on *Toolbar*

12 When the *Synrad WinMark* dialog box appears (Figure 10-7), click *Start-F1.*
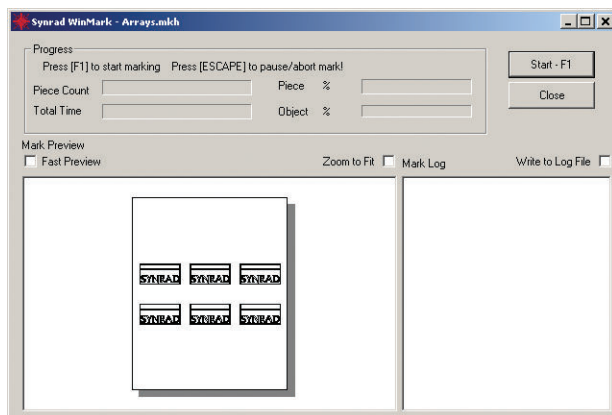
Figure 10-7 Synrad WinMark dialog box

11 Automation basics

The *Automation basics* chapter includes sections:

- System configuration

- Input/output configuration

- Fast Acting Safety Interlock (FASI) feature

- Developing a basic event sequence

- Automated serialization

System configuration

The *System configuration* section includes subsections:

- Multiple marking heads

- Additional peripheral cards

Multiple marking heads

WinMark Pro v6 can control multiple FH Flyer marking heads or Fenix Flyer Laser Markers through multiple instances of WinMark Pro. Each instance of WinMark communicates to the assigned head through its individual Ethernet or USB interface. Actual throughput speed may be slowed for all heads in this type of configuration because each additional instance of WinMark Pro is competing for system resources.

Additional peripheral cards

Microsoft® Windows® PCI device management means there are no restrictions to adding peripheral cards for networking, motion control, etc. to the marking computer. It should be noted however, that running background applications while marking may reduce overall cycle times since WinMark Pro is competing with other open applications for processor time.

Input/output configuration

The *System configuration* section includes subsections:

- I/O connections

- Voltage levels

I/O connections

Input/output (I/O) connections are available on the Flyer/Fenix Flyer head for routing control signals from/to parts handling equipment. In WinMark Pro v6, input bits IN0–IN7 and output bits OUT1–OUT7 correspond to the same eight inputs and outputs on Flyer marking heads and Fenix Flyer Laser Markers.

Inputs

There are several important differences between FH Flyer/Fenix Flyer and legacy FH Index/Tracker and Fenix input connections that must be considered. See the Technical Reference chapter in your marking head's Operators Manual for detailed input circuit diagrams, pin designations, and signal specifications including voltage levels. Below are brief summaries of available inputs.

FH Flyer/Fenix Flyer

FH Flyer marking heads and Fenix Flyer Laser Markers provide eight optoisolated inputs, *IN0–IN7*. Three of these inputs, *IN0–IN2*, have isolated returns and the other five inputs, *IN3–IN7*, share a common return to allow either high-side switching of all five inputs or low-side switching of all five inputs.

FH Index/Tracker and Fenix

All four FH Index/Tracker and Fenix inputs, *IN0–IN3*, have isolated return lines and can sink or source current independently of one another. Two more inputs (*IN4* and *IN5*) are available on the primary Fiber Link Controller Card. Additional inputs can be obtained by adding another PCI-bus FLCC to the computer. By installing a uniquely addressed FLCC, six more inputs (*IN0–IN5*) become available.

Note: Inputs on primary (or secondary) FLCCs are available only though WinMark Pro's Event Builder automation.

Outputs

See the Technical Reference chapter in your marking head's Operators Manual for detailed output circuit diagrams, pin designations, and signal specifications including voltage levels. Below are brief summaries of available outputs.

FH Flyer/Fenix Flyer

FH Flyer marking heads and Fenix Flyer Laser Markers provide eight optoisolated outputs, *OUT0–OUT7*. On these heads, two outputs, *OUT0* and *OUT1*, have isolated returns while the remaining six outputs, *OUT2–OUT7*, share a common return line so that all six outputs can function as either high-side or low-side switches.

FH Index/Tracker and Fenix

All four FH Index/Tracker and Fenix outputs, *OUT4–OUT7*, have isolated grounds providing either sinking or sourcing current. Two more outputs (*OUT1* and *OUT3*) are available on the primary Fiber Link Controller Card. Additional outputs can be obtained by adding another PCI-bus FLCC to the computer. By installing a uniquely addressed FLCC, five more outputs (*OUT1*, *OUT3–OUT6*) become available.

Note: Outputs on primary (or secondary) FLCCs are available only though WinMark Pro's Event Builder automation.

Voltage levels

FH Flyer/Fenix Flyer

Input/output voltage levels for FH Series Flyer and Fenix Flyer heads is between 5 V–24 VDC. Note that this voltage level is different from previous SYNRAD marking heads. These heads also incorporate an internal +15 VDC, 400 mA supply for powering input, output, and tracking components.

FH Series Index/Tracker, Fenix

All FH Index/Tracker marking heads and Fenix Laser Markers require I/O voltage levels in the range of 15 V–40 VDC for signals connected to the head.

Fast Acting Safety Interlock (FASI) feature

Many marking applications require a safety action to occur for each part that is marked. An example of this kind of action is a machine that lowers a shield over a part prior to marking, and then raises the shield to advance the part as soon as the mark is complete. SYNRAD lasers are equipped with a *Remote Interlock* feature that disables laser firing—typically when a switch on an access door or safety enclosure is opened. However in marking applications where a safety interlock is frequently cycled, the *Remote Interlock* creates an unacceptable delay. This delay occurs because after the interlock is closed, the laser's *Keyswitch* or remote keyswitch function must be cycled, which then invokes a built-in five-second delay prior to lasing.

To address this issue, all FH Series marking heads and Fenix markers provide an optional Fast Acting Safety Interlock (FASI) function. When enabled, the FASI function prevents the laser from firing unless a high level signal is present on input *IN3*. The marking head responds to this rising signal transition in less than 1 ms. To enable the FASI feature, refer to the Technical Reference chapter in your marking head's Operators Manual for details.

After your marking head is configured for FASI operation, you should modify each mark file as described below. Adding this modification in addition to the normal 'start mark' automation prevents WinMark Pro from beginning lasing until both the 'start mark' signal, typically input *IN0*, and FASI input *IN3* are active.

1   Configure WinMark's Wait Digital Before Piece command (on the *Drawing's Automation* tab) to wait for a "Set" state on input *IN3* before marking begins. This synchronizes marking operation with the FASI safety feature. Normally, input *IN0* will all ready have been "Set" in order to wait for the 'start mark' signal. See Figure 11-1.
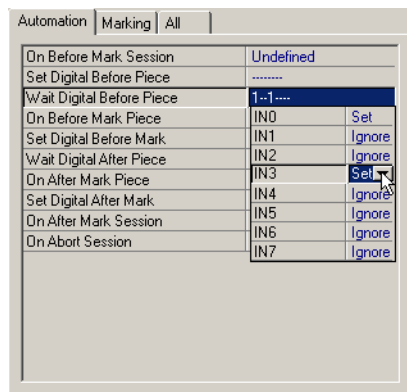
Figure 11-1 Start Mark/FASI automation setup

Note: When the FASI function is enabled, even manual firing of the laser using the *Test Mark* button requires an active input signal on *IN3*.

Developing a basic event sequence

The *Developing a basic event sequence* section includes subsections:

■ Event 0

■ Event 1

■ Event 2

■ Event 3

■ Event 4

Automated marking and parts handling control is typically controlled by a programmable logic control-ler (PLC), programmable automation controller (PAC), or a computer and control program capable of sending and receiving digital signals. The Flyer/Fenix Flyer head is directed by WinMark Pro, or a custom Microsoft VB or C++ application using WinMark Pro's ActiveMark™ (ActiveX®) control, to send outputs and read inputs as commanded by predefined Event Builder or *Automation* tab events. The parts handling or control system fully controls the automation sequence by setting or clearing marking head (or FLCC) input bits; WinMark Pro (or the marking head) responds by setting or clearing output bits.

The state diagram shown in Figure 11-2 below illustrates one method of defining the sequence of events necessary to coordinate parts handling and marking. Each event is numbered for cross-reference to the fol-lowing steps. Refer back to Chapter 10 (Figure 10-1, *Mark Session Flowchart*) or WinMark Pro's *Automation Flowchart* (*Help/Automation Flowchart…*) to review the automation sequence.

Note: The following example assumes that an input signal from parts handling equipment is connected to input *IN0*, and that an output signal to parts handling equipment is connected to output *OUT4*. Although applications for WinMark Pro vary widely in complexity, the following example describes a typical automated marking operation using WaitDigital and SetDigital functions on WinMark's *Automation* tab.

WaitDigital commands force WinMark Pro to wait indefinitely for the designated **input** logic state to occur. After the expected state is read on the I/O port, WinMark moves on to the next automation stage or event.

SetDigital commands tell WinMark Pro to write the designated **output** logic state to the I/O port. After doing so, WinMark moves on to the next automation stage or event.
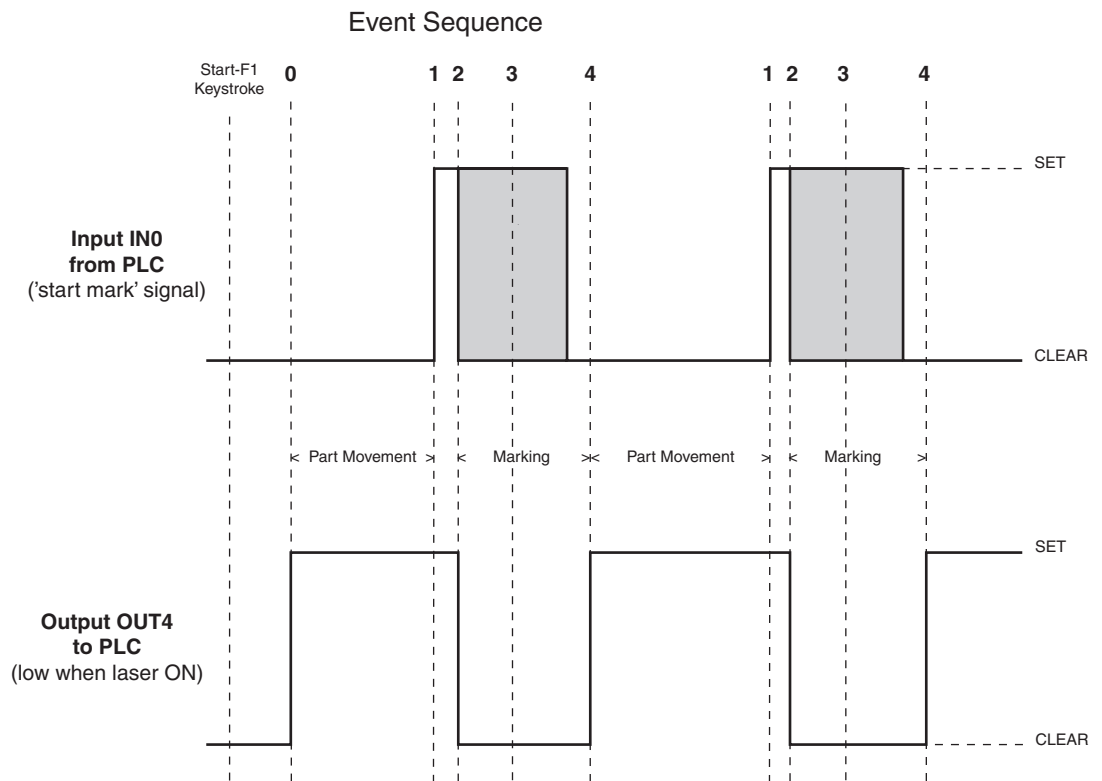
Figure 11-2 Sample state diagram

Event 0 – Once a mark session is started (when the *Start-F1* button in the *Launcher* window is pressed), WinMark Pro begins executing the automation sequence. WinMark sets output *OUT4* high, signaling parts handling equipment that WinMark is ready to begin marking.

Event 1 – WinMark Pro waits indefinitely until parts handling equipment sets input *IN0*, the 'start mark' signal, high. This action indicates that a part is in position and is ready to be marked.

Event 2 – As soon as WinMark Pro recognizes the 'start mark' signal from Event 1, WinMark clears output *OUT4* low to inform parts handling equipment that lasing is in progress.

Event 3 –   At any time after OUT4 goes low, parts handling equipment may clear input *IN0* low as indicated by the gray area in the state diagram. When lasing is complete, WinMark Pro verifies that the 'start mark' signal is disabled. This prevents another mark from lasing immediately if the 'start mark' signal persists for any reason.

Event 4 –   As soon as lasing is complete, WinMark Pro sets output *OUT4* high, signaling parts handling equipment to move another part into position.

Important Note: In order for the automation sequence to loop more than once, the *Drawing's* Mark Count property must be greater than 1, or be set to 0, which forces the mark session to continue until halted by the user.

Event 0

1   Select *Drawing* from the *Object List*.

2   Select the *Automation* tab on the *Property List*.

3   Select Set Digital Before Piece and click the down arrow.

4   Click on *OUT4*, click the down arrow, and then select *Set* from the drop-down list (Figure 11-3).

Selecting *Set* assigns a logic 1 value to output *OUT4*. This output signals parts handling equipment that WinMark is ready for a part to be moved into position under the marking head.
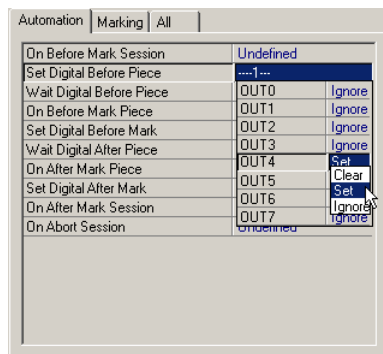
Figure 11-3 Setting "Set Digital Before Piece"

Event 1

1   Select Wait Digital Before Piece.

2   Click *IN0*, then select *Set* from the drop-down list (Figure 11-4).

Selecting *Set* assigns a logic 1 value as the required logic state on input *IN0*. In this example, parts handling equipment sets *IN0* high once a new part is in position to be marked. This input serves as the 'start mark' signal, commanding WinMark Pro to begin marking.
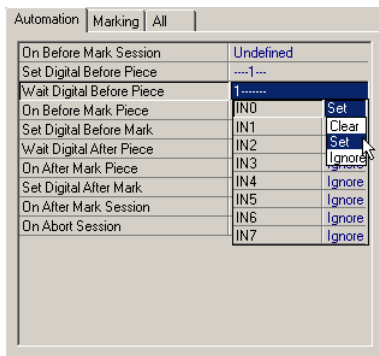
Figure 11-4 Setting "Wait Digital Before Piece"

Event 2

1   Select Set Digital Before Mark.

2   Click *OUT4* then select *Clear* from the drop-down list (Figure 11-5).

Selecting *Clear* assigns a logic 0 value to output *OUT4*. The digital output set here signals parts handling equipment that WinMark Pro is marking.

Important Note: WinMark Pro begins marking *immediately* after the Set Digital Before Mark automation step is executed.
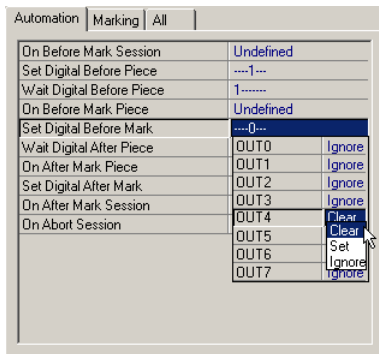
Figure 11-5 Clearing "Set Digital Before Mark"

Event 3

1   Select Wait Digital After Piece.

2   Click *IN0* then select *Clear* from the drop-down list (Figure 11-6).

Selecting *Clear* assigns a logic 0 value as the required input state on input *IN0*. In this example, parts handling equipment clears *IN0* to ensure that the "start mark" signal is disabled before a new part is staged. To speed throughput, parts handling equipment can clear this bit any time after Event 2 occurs so that the Wait Digital After Piece test is true immediately after marking is complete.
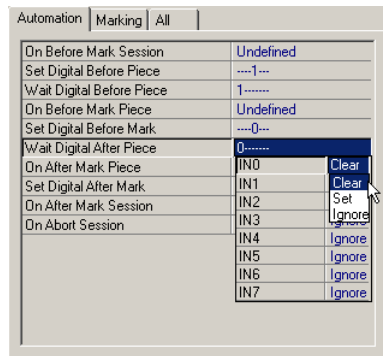
Figure 11-6 Clearing "Wait Digital After Piece"

Event 4

1   Select Set Digital After Mark.

2   Click *OUT4* then select *Set* from the drop-down list (Figure 11-7).

Selecting *Set* assigns a logic 1 value to output *OUT4*. The logic high value set here is an output signaling parts handling equipment that WinMark Pro has completed the mark and is ready to start the next mark when commanded.
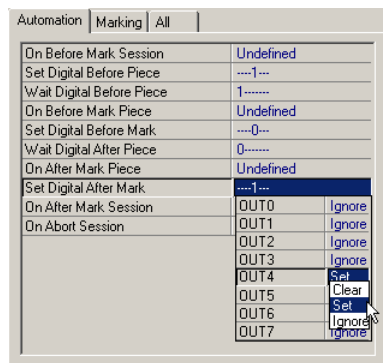
Figure 11-7 Setting "Set Digital After Mark"

Automated serialization

The *Automated serialization* section includes subsections:

- ■ Serial number setup

- ■ Marking setup

- ■ Automation setup

- ■ Begin automated marking

In addition to "communicating" or hand-shaking with parts handling equipment, WinMark Pro can also control serialization of part numbers and date or shift coding of products. The sections below describe one method of automating part serialization.

Serial number setup

1   Select the *Text Tool* and click to set an insertion point.

2   When the *Text Caption Editor* dialog box opens, type "**0000**" and then click *OK*.

  The number of characters entered should equal the maximum number of digits you plan to serialize. In our example, a maximum of 9999 parts are serialized before the counter resets back to 0000.

Note: WinMark Pro does not suppress leading zeros when marking. For example, if there are four place-holder digits, item number one is marked as 0001.

Tip: In addition to serializing alphanumeric or hexadecimal text, WinMark Pro can also serialize 1D and 2D bar code data.

3   With the text object still highlighted, select the *Automation* tab from the *Property List* and click Auto Text Type.

4   Click the down arrow and choose Serial Number Text from the drop-down list.

5   Next, select Save Last Serial and set to *Yes*.

  This ensures that the last serial number marked is saved after a mark session. The next mark session begins by retrieving the last saved number and incrementing it before marking the next piece.

6   Select Save Serial Name. The default location name for storing the last serial number is "*Slot-0*", which is located in the computer's *System Registry*. Although you cannot change the storage location, you can edit the location name to something more meaningful. By doing this, multiple mark files can have their own individual serial number strings.

Note: When your mark file is loaded into the Flyer/Fenix Flyer Filestore for stand-alone operation, the location name you provide for the Save Serial Name property ("*Slot-0*", for example) is created in an area of Flyer's battery-backed RAM memory.

7   Select Current Saved Value. If the value displayed is not zero, zero it out (0000 in our example) to initialize the serial number counter. Figure 11-8 shows how the screen should look after this step.
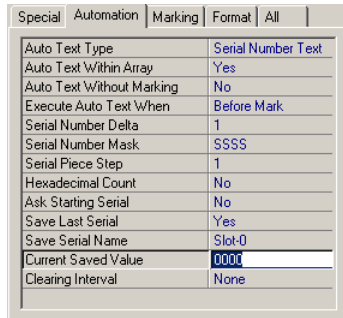
Figure 11-8 Serialization setup

Marking setup

1   Make sure the text you entered is still selected. Click the *Format* tab and go down the list, setting type characteristics as desired.

2   Click the *Marking* tab and set desired mark characteristics including Power and Velocity.

3   In the *Object List*, click *Drawing* (or click outside the text object on the *Drawing Canvas*) and then click the *Making* tab.

4   Set Mark Count to zero (*0*).

Figure 11-9 shows how the *Drawing's Marking* tab should look after this step. Once started, marking will continue until the ESC key is pressed. Automation signals from the control computer or PLC will determine when the laser fires. These signals will be configured in the next section.
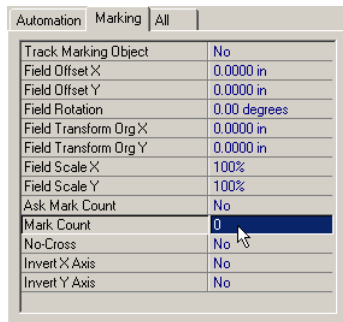
Figure 11-9 Marking setup

Automation setup

1   With the *Drawing* object still selected, click the *Automation* tab.

2   Select Set Digital Before Piece and click the down arrow.

3   Click on *OUT4*, click the down arrow and then select *Set* from the drop-down list.

   Set output *OUT4* to signal parts handling equipment that the laser is off and is ready for a new part.

4   Select Wait Digital Before Piece, click *IN0* and then select *Set* from the drop-down list.

   Input *IN0* is used as the 'start mark' signal from the PLC or automation controller. WinMark Pro's automation sequence will halt until the required logic state is matched. In this example, the PLC sets *IN0* high when all conditions for safely lasing the mark are met.

5   Select Set Digital Before Mark, click *OUT4*, and then select *Clear*.

   WinMark Pro clears this output prior to firing the laser. This bit notifies the PLC that the laser is on.

6   Select Wait Digital After Piece and clear *IN0*.

   This input from the PLC ensures that *IN0* is **low** (the 'start mark' signal is disabled) before continuing the automation loop.

7   Select Set Digital After Mark. Click *OUT4* and select *Set*.

   Setting this output informs the PLC that marking is complete and to stage another new part. Figure 11-10 shows how the *Automation* tab should look after this step is complete.

Important Note: When a logic state is specified for an input bit (or a combination of input bits) on the *Automation* tab, WinMark Pro will <u>not</u> execute the next step in the *Automation List* until an input state matching the specified state is read on the marking head input bus. In the Event Builder, the next event defined after a MatchDigitalState or WaitDigitalState command is <u>not</u> executed until either a matching input state is read on the input bus <u>or</u> the specified timeout period is exceeded.
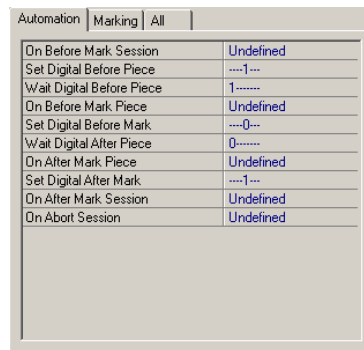
Figure 11-10 Automation setup

Note: WinMark Pro's automation loop runs in the sequence shown on the *Automation* tab. Refer back to Figure 10-1, *Mark session flowchart*, or to WinMark Pro under *Help/Automation Flowchart…* for diagrams showing how WinMark Pro steps through the automation sequence.

Begin automated marking

⚠ **Danger** serious personal injury	Before performing the marking tutorials in this chapter, ensure that all personnel in the area are wearing protective eyewear. Read and follow all laser safety and fume extraction precautions described in your laser and marking head Operator's Manuals. CO_2 lasers emit *invisible* infrared laser radiation at the 10.6 μm CO_2 wavelength band. Since direct or diffuse laser radiation can inflict severe corneal injuries, always wear eye protection when in the same area as an exposed laser beam. Do not allow the beam to contact a person. CO_2 lasers emit an invisible beam that is capable of seriously burning human tissue. Always be aware of the beam's path and always use a beam block while testing.

Click the *Mark* button and then click *Start-F1* when the *Synrad WinMark* dialog box (*Launcher* window) appears. Figure 11-11 shows the *Launcher* window after one iteration through the automation sequence.
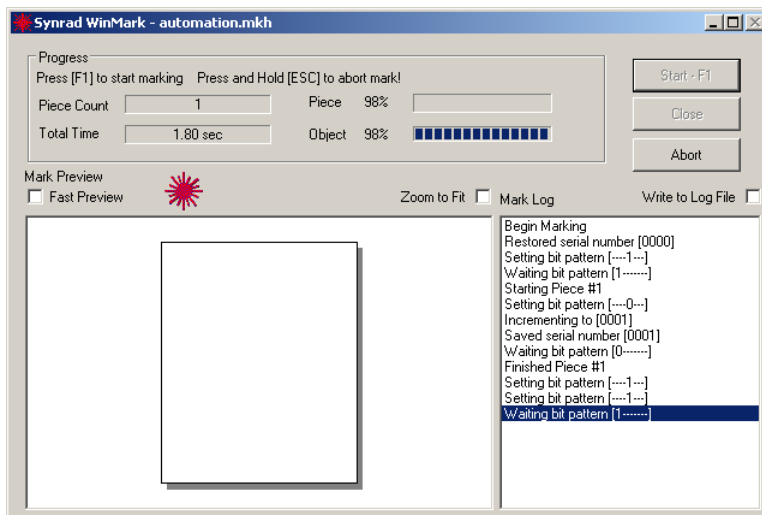
Figure 11-11 Launcher window

Note: In WinMark control mode, a *Hardlock* must be installed on your computer's USB or printer port <u>and</u> the appropriate automation signals must be present on marking head inputs before the laser will fire.

Important Note: When WinMark Pro v6 is operated in demo mode, (no marking head is connected or powered up), the *Mark* button is disabled. If Mark… or Quick Mark is chosen from the *File* menu and the *Start-F1* button is clicked, a dialog box appears to inform you that a marking head is not connected.

12 ActiveMark automation

The *ActiveMark automation* chapter includes sections:

■   ActiveMark technology

■   ActiveMark basics

■   Sample VB or C++ projects

ActiveMark technology

WinMark Pro's ActiveMark™ technology transforms Windows® ActiveX® automation into a powerful user-customizable laser marking interface. After generating a mark file or template in WinMark Pro, you can create a custom ActiveX application or user-interface using Microsoft® Visual C# ®, Visual C++® or Visual Basic® development tools. This custom program uses WinMark Pro's built-in ActiveX control methods to regulate every aspect of the marking process including object placement or manipulation and communication with parts handling automation.

ActiveMark basics

For a complete list of WinMark Pro v6 ActiveMark (ActiveX) methods, properties, and events, see our WinMark Pro v6 ActiveX Control white paper on the WinMark Pro web site at: http://www.winmark. com/products/winmark_activexsamples.html. The web site also contains several VB and C++ projects with sample code.

Important Note: Not all WinMark Pro v6 .NET ActiveX <u>Events</u> will work when compiled using Visual Basic 6.0 or below. To run a VB executable file containing Events, re-compile your source code using Microsoft Visual Studio 2003 or above. Refer to the Microsoft web site for details.

Note: When developing your automated control system using ActiveX control methods, do not place input automation into the mark file. Instead, perform any input automation functions within the ActiveX control program. By doing this, your control program remains in charge of pre-mark and post-mark automation and WinMark's MarkDrawing control method only maintains control of the operating system long enough to control laser on/off commands during the actual marking process. Performing input automation within the mark file may prevent the ActiveX control program from regaining control of system resources if the specified input state does not occur.

Note: When creating mark files for an ActiveX environment, always set the Mark Count property to "1". This ensures that only a single mark is made each time the MarkDrawing method is called.

Loading the WinMark Pro ActiveMark control

MS Visual Basic

The tutorial below describes how to add WinMark Pro's ActiveMark (ActiveX) control to a Visual Basic project.

To add WinMark ActiveMark control to a Visual Basic project, perform the following steps:

1   After installing WinMark Pro, open WinMark and select the correct focusing lens and then close the WinMark application. This ensures that WinMark Pro and its associated ActiveX components are properly initialized and registered with the Windows operating system.

2   Open your Visual Basic project or create a new project.

3   In Visual Basic under the Project menu, find and select the *Components* menu item.

4   When the *Components* dialog box opens, click the *Controls* tab. If the *Selected Items Only* check box is checked, deselect it so that all registered controls are displayed.

5   Scroll through the list until you find the Synrad WinMark v6 ActiveX control item and then place a check mark to the left of the Synrad WinMark control.

   If the Synrad WinMark control is not shown in the *Components* list, then the OCX has not been registered by the operating system. In this case, click the *Browse* button and use the *Add ActiveX Control* dialog box to locate and *Open* the SynMhAtx.ocx file in the *Program Files/WinMark* folder.

6   Click *OK*. A *Toolbox* window with the Synrad WinMark ActiveX control (laser starburst icon) should appear as shown in Figure 12-1.
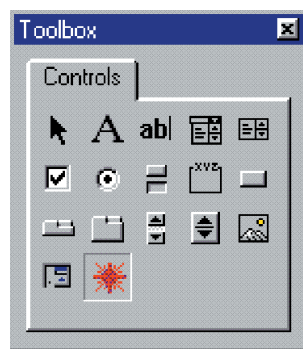
Figure 12-1 WinMark Pro's ActiveX control in VB Toolbox

7   Click the control and draw a preview window on the form.

Important Note: When the WinMark Pro v6 ActiveX control is drawn directly on a Visual Basic form, an instantiation error will occur in design mode unless you close the form before running your VB code.

MS Visual C++

The tutorial below describes how to add WinMark Pro's ActiveMark (ActiveX) control to the sample Visual C++ Container project. This same procedure is used to add the WinMark ActiveX control to any Visual C++ project or to update the ActiveX control after upgrading to a newer version of WinMark Pro.

To add WinMark ActiveMark control to a Visual C++ project, perform the following steps:

1   Make sure that you have installed WinMark Pro. After installation, open WinMark Pro to check that the correct lens is selected and then close WinMark Pro.

    This step ensures that WinMark Pro and its associated ActiveX components are properly initialized and registered with the Windows operating system.

2   Open the *Container* program (located in the *C:\Program Files\WinMark\Samples\VisualCPlusSample* folder) or create a new Visual C++ project.

3   In Visual C++ under *Project/Add to Project*, find and select the *Components and Controls…* menu item.

4   From the *Components and Controls Gallery* dialog box, select *Registered ActiveX Controls*.

5   Select the *Synrad WinMark PRO Control* and then click *Insert* (see Figure 12-2).
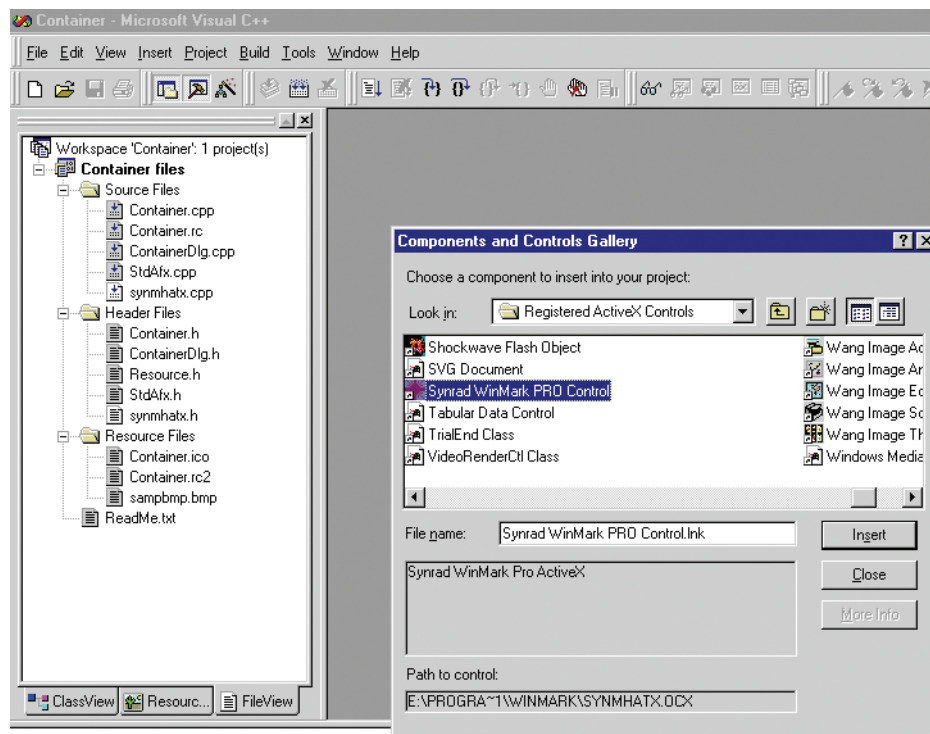
Figure 12-2 Inserting WinMark Pro's ActiveX control

6   When the *Microsoft Visual* C++ dialog box opens, click *OK* to "Insert this component".

7   When the *Confirm Classes* dialog box appears (Figure 12-3), click *OK*.

The text on the right-hand side of the *Confirm Classes* dialog tells you the control class has already been generated. When installing a new version of WinMark Pro, this is how the correct linkage to the control is updated. If this is the first time you are accessing the ActiveX control, the text note would indicate you are adding a control class.
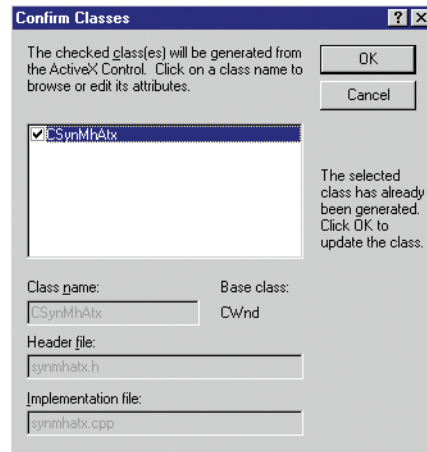
Figure 12-3 Confirm Classes dialog box

8   Click the *Close* button.

The WinMark Pro ActiveX control (*SynMhAtx.ocx*) has been added, or updated, in the open Visual C++ project. The application must be built, or rebuilt, in order to include the new control. Both the *SynMhAtx.cpp* and *SynMhAtx.h* files are machine-generated IDispatch wrapper classes created by MS Visual C++ and added to the project space. These files define the class that allows the Container project to access the methods, properties, and events in the SYNRAD ActiveX control.

See the *C:\Program Files\WinMark\Samples\VisualCPlusSample* folder for documentation and sample code illustrating two different methods of implementing the SynMhAtx control.

Sample VB and C++ projects

See the WinMark Pro web site at http://www.winmark.com/products/winmark_activexsamples.html or the WinMark Pro CD for both Visual Basic and Visual C++ sample code and mark files. These files include actual source code instead of an executable (.exe) file; therefore, your development computer must contain a version of Visual Basic or Visual C++.

Important Note: We strongly recommend that all ActiveX control methods use inches as the unit of measure. Program your application or user interface to calculate the conversion to inches from other units of measure. Unpredictable object placement may result if the Show Units Type property in the mark file is set to millimeters or centimeters.

Commands & Properties

Use information in this section as a reference to WinMark Pro's powerful command and automation controls.

This section contains the following chapters:

- **Chapter 13 – WinMark Pro menu commands**
  explains the commands available from WinMark Pro's menu bar.

- **Chapter 14 – Application Settings**
  lists all properties on the Application Settings tab (under *Tools/General Settings…*) and explains how they control application, Drawing, object, and head-specific parameters.

- **Chapter 15 – Drawing properties**
  describes Drawing properties and explains how they control global drawing parameters such as tracking, input/output, and communication.

- **Chapter 16 – Object properties**
  describes object properties and explains how they control object display, automation, and marking.

- **Chapter 17 – Event Builder commands**
  describes how these predefined commands provide automation functions during the marking process.

- **Chapter 18 – ActiveMark technology**
  describes WinMark Pro's implementation of ActiveX control.

- **Chapter 19 – Flyer Modbus protocol**
  references Flyer's implementation of Modbus® I/P control for Flyer/Fenix Flyer heads.

- **Chapter 20 – Troubleshooting**
  describes software-related troubleshooting issues for marking hardware and software.

  Note: For specific hardware troubleshooting, please refer to your laser or your marking head Operator's Manual.

13 WinMark Pro menu commands

The *WinMark Pro menu commands* chapter includes sections:

- ◼ File

- ◼ Edit

- ◼ Objects

- ◼ View

- ◼ Tools

- ◼ Devices

- ◼ Window

- ◼ Help

WinMark Pro® displays active commands on the menu bar's drop-down lists with dark type. Commands that appear dimmed are not available until a valid object selection is made.

File

File commands (Figure 13-1) allow you to perform common file operations such as opening, saving, and printing as well as specific functions like importing graphics files or starting the laser marking process.
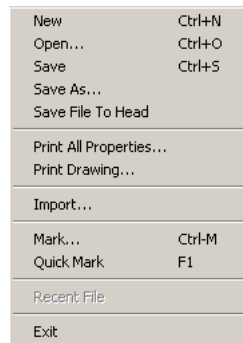
Figure 13-1 File menu

New

Open a new, untitled drawing window. You can also create a new drawing by clicking the *New* shortcut button (⬜) on the *Toolbar*.

Open...

Open the *Open* dialog box to navigate through your computer system to find and open existing .mkh mark files. You can also open an existing file by clicking the *Open* shortcut button (📂) on the *Toolbar*.

Save

Save changes to the current file. When saving a new drawing, the *Save As* dialog prompts you to enter a filename. You can also save a drawing by clicking the *Save* shortcut button (💾) on the *Toolbar*.

Save As...

Display the *Save As* dialog, which prompts you to save the current drawing with a new filename or path.

Save File to Head

When a Flyer/Fenix Flyer head is connected in stand-alone mode and the *Drawing Canvas* contains a new or modified mark file, click Save File to Head to open the *Save Flyer Files* dialog and download the current file to the Flyer Filestore.

Important Note: When the Flyer Filestore contains a file with the same name as the file you are saving, the existing file in the Filestore is overwritten without warning.

Print All Properties...

Print object property values for all objects contained in the active drawing. Use the *Print* dialog box to specify a printer or printer options.

Print Drawing...

Print the active drawing. Use the *Print* dialog box to specify a printer or printer options. You can also print by clicking the *Print Drawing* shortcut button (🖨) on the *Toolbar*.

Tip: Go to *Tools*/*General Settings…* , and on the *Application Settings* tab, set Show Grid to *No* before printing. This eliminates grid lines for a better view of objects in the mark file.

Import...

Import a graphics file for placement in the current drawing. Click Import… to open the *Open* dialog to find and open graphics files by filename or file extension.

WinMark Pro's Import… command relies on the File Import Filters to parse the selected file and convert the data into an importable graphic. This method is the most reliable way of opening graphics files for marking. In order to employ this approach, it is sometimes necessary to save your graphics files in an older

format (version number) so that the filters can correctly import the data. For example, when creating AutoCAD® files for WinMark Pro, *Save As* or **Export** the drawing in an AutoCAD 2010 format.

In order to import vector files from more recent programs like Adobe® Illustrator® CS5, WinMark Pro v6 provides Copy/Paste and Drag/Drop functionality. This feature allows you to *Copy* or *Drag* a graphic from your open drawing program and *Paste* or *Drop* it onto the *Drawing Canvas*. Because graphics files often contain multiple data formats internally, the *Choose Import Type* dialog box opens (Figure 13-2) when more than one acceptable format is available. In general, choose *Vector Image* for best marking results. In some cases, importing your graphics file through the File Import Filters may produce better results than using the Copy/Paste or Drag/Drop feature.
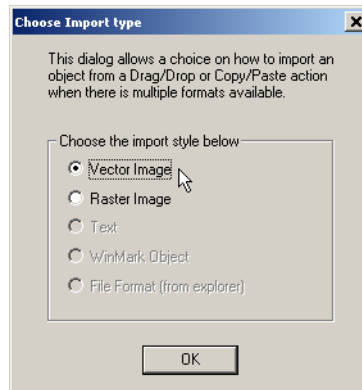
Figure 13-2 Choose Import Type dialog box

Note: File Import Filters are automatically loaded when installing WinMark Pro v6.

Tip: In addition to marking monochrome (1-bit) bitmap images, WinMark Pro v6 supports the importation and marking of grayscale (8-bit/256 level) bitmap images. See the *Bitmap format properties* chapter later in this section for further information on marking monochrome and grayscale images.

File import notes

◼   When deciding on an import file type, best results are often achieved by importing graphics files saved in .DWG, .DXF, or .EMF formats.

◼   AutoCAD .DWG files contain "units" information that allows WinMark to scale the drawing correctly when the Vector Import Scale property is 'One-to-one'. Not all .DXF files include "units" information so WinMark Pro defaults to inches as the unit of measure. If the original drawing is scaled in unit other than inches, the imported drawing will not be scaled correctly and must be resized on the *Drawing Canvas*.

- Imported bitmap images are resized according to the Resolution setting specified on the *Tools*/*General Settings…*/*Object Defaults* tab. WinMark Pro does not resample bitmap images but rather resizes them to preserve the image's total pixel count. For example, the overall dimensions of a 96 DPI image imported into WinMark at 300 DPI are automatically resized to 32% of their original height and width.

- Because laser marking (with the exception of the 8-bit *Grayscale* Color Reduction Method) is a monochrome—black & white or on/off process—color or continuous-tone bitmaps are converted to 1-bit images when imported. In previous versions of WinMark Pro, the 1-bit color reduction process (*Bayer Dithering*, *Error Diffusion*, *Halftone*, or *Threshold*) was the first step in the image transformation process; however, in WinMark Pro v6, color reduction is now applied to imported bitmap images as the last step in order to provide better raster print quality. After changing bitmap Resolution and/or resizing the image, use the Color Reduction Method property (on the *Format* tab) to change the color reduction algorithm as required. Although WinMark Pro now displays a more accurate view of actual mark quality, test marking is still recommended to determine powers and speeds that produce the best mark within the dynamic range of the material you are marking.

- Use the *Grayscale* Color Reduction Method to mark 8-bit grayscale images. Unlike *Bayer Dithering*, *Error Diffusion*, *Halftone*, or *Threshold* reduction methods where color bitmaps are converted to 1-bit images, *Grayscale* reduction provides 8-bit, 256 level grayscale marking of color or continuous-tone images.

- Imported vector files are deconstructed into an entity comprised of individual objects including lines, arcs, circles, and text. If the file imports as a "Group", then Ungroup-ing the "Group" object expands the entity into a "Polyline Set" (containing polylines and arcs) and individual "Circle" and "Text" objects. If the imported file imports as a "Polyline Set", Explode-ing the "Polyline Set" object expands the entity into its constituent polyline objects. In this case, elliptical or circular objects are converted to polyline objects comprised of a series of short microvectors or true mathematical arcs depending on the setting of the Import Arcs as Polylines property.

- Polyline objects are optimized and grouped into a "Polyline Set" to eliminate redundant off-vector moves by the galvanometers so that cycle times are reduced. After importation, you can Explode these *Polyline Sets* to edit or modify individual polylines as desired and then Unexplode them into a newly optimized "Polyline Set". Note that all polylines in the set are marked with the same properties, the properties of the first polyline or *Polyline Set*.

- Metafile formats (.CDR, .EPS, .EMF, .WMF, etc.) support both raster and vector objects in the same file. Although you can Explode and Ungroup vector components of a metafile into *Polyline Sets*, raster (bitmap) objects in the metafile remain whole and are not reduced to their individual components.

- When importing vector-based graphics files, WinMark Pro imports text and filled objects in addition to lines, arcs, and circles. Vector files are imported as grouped objects that can be Ungroup-ed to allow editing of individual polyline or text objects. Any filled objects in the import graphic are imported as unfilled polylines that can be individually selected (after Ungroup-ing) and filled as required. When importing vector files containing text composed of TrueType or OpenType formatted fonts not installed on the marking computer or fonts not recognized by WinMark Pro, you will need to export the file from your drawing program with text objects converted to outlines or paths in order to successfully import them into WinMark Pro.

- WinMark Pro v6 now imports hatch fills in .DWG and .DXF files. To mark a solid fill, use AutoCAD to set the hatch spacing to the spot size (or a multiple of the spot size) of the focusing lens. When using other drawing programs, create individual crosshatch lines within the program, but do not fill the object using a crosshatch or other pre-defined pattern because WinMark's import filters will strip out these fills during importation.

■   If text objects in your AutoCAD file must be filled, use AutoCAD's TrueType text tool to create the text then import into WinMark Pro and use WinMark's Text Filled property to create the text fill.

Table 13-1 lists current file formats and program versions supported by WinMark Pro's File Import Filters.
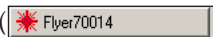
Table 13-1 Supported file formats

Extension	File Format	Extension	File Format
.AI – Adobe Illustrator Format (v4.0–v7.0)		.IMG – GEM Raster Format	
.BMP – Windows Bitmap		.JPG – JPEG File Format	
.CDR – CorelDRAW! Drawing File Format (v3.0–v8.0)		.MET – OS/2 PM Metafile (v3.0)	
.CGM – Computer Graphics Metafile		.NAP – NAPLPS Standard ANSI Profile	
.CH3 – Harvard Graphics 3.0 Chart File Format (DOS)		.PCD – Kodak Photo-CD Format	
.CMX – Corel ClipArt Format (v5–v7)		.PCT– Macintosh PICT Format (v2.0)	
.CTM – Clear Text CGM		.PCX – Zsoft PC Paintbrush Bitmap	
.DIB – MS Windows Device Independent Bitmap		.PDF – Adobe Portable Document Format (v3.0 – LZW)	
.DRW – Micrografx Designer 3.1		.PDI – NAPLPS IBM PC VideoTex	
.DSF – Micrografx Designer 6.0 (Win95)		.PIC – Lotus 123 Picture Format	
.DWF – AutoDesk Drawing Web Format		.PIF – IBM Picture Interchange Format	
.DWG – AutoCAD 2010 Native Drawing Format		.PLT – HP Graphics Language	
.DXF – AutoCAD 2010 Interchange Drawing Format		.PNG – PNG Internet Format (non-LZW)	
.EMF – Enhanced Windows Metafile (Win32)		.PRE – Lotus Freelance for Windows	
.EPS – Encapsulated PostScript File		.PS – PS Language Format* (*ImageStream Level 2 Native PS Interpretation) (LZW)	
.FMV – FrameMaker Vector and Raster Format			
.FPX – Kodak FlashPix File (v1.0)		.PSD – Adobe PhotoShop Document (through v4.0)	
.GDF – IBM Graphics Data Format (GDDM)		.RND – AutoShade Rendering File Format	
.GEM – Digital Research Graphics Environment Manager Metafile		.SH3 – Harvard Graphics 3.0 Show	
		.SVG – Scalable Vector Graphics (XML File Format)	
.GIF – Graphics Interchange Format – Internet (LZW)		.SY3 – Harvard Graphics 3.0 Symbol File	
.GP4 – Group 4 CALS Format		.TIF – Tagged Image File Format (v6)	
.HGL – HP Graphics Language (Level 2.0)		.VSD – Visio File Format	
.HPG – HP Graphics Language (Level 2.0)		.WMF – Microsoft Windows Metafile (Win16)	
.IGS – IGES Drawing Format (v5.1)		.WPG – WordPerfect Graphic File	

Tip: Although there is not a "built-in" method for exporting a WinMark drawing into a CAD format, it can be done using a vector drawing program such as Adobe® Illustrator® or CorelDRAW®. The steps below describe how to convert a WinMark Pro .mkh file into a PostScript® (.PS) file or AutoCAD® Drawing Interchange (.DXF) Format for archival or Quality Assurance reasons.

1   In Windows, add a new local virtual printer using the *Add Printer* wizard.

2   When prompted for a printer port, choose "FILE: (Print to File)".

3   Select a printer and then choose a virtual printer driver (if you have an HP printer selection, the "HP DesignJet 3500CP PS3" driver works well).

4   Finish the rest of the steps in the *Add Printer* wizard.

5   In WinMark Pro, under *Tools/General Settings…* , set Show Grid and Show Origin properties to *No* (to prevent grid lines from being exported along with drawing objects).

6   Under the *File* menu, click Print Drawing… .

7   For printer type, select the printer you just created.

8   Enter an output file name with a .PS extension. WinMark creates the file and places it in the WinMark folder (*C:\Program Files\WinMark*).

9   In Adobe Illustrator or CorelDRAW, open the PostScript (.PS) file.

10   Use the Direct Selection tool to select and delete the *Drawing Canvas* object, leaving just the mark object(s).

11   Export the drawing in the file format of your choice—a .DXF format for example. Illustrator's export dialog asks you to choose a .BMP or .JPG format (both are bitmap formats for display purposes only; however, the resulting .DXF file is composed of vector objects. Note that exported circles or irregular objects are individual connected points, not mathematical arcs).

Mark…

Initiate and preview marking of the current drawing through the *Synrad WinMark Launcher* dialog. The dialog box provides piece count and total elapsed time in addition to a mark log that displays real-time marking status. You can also click the *Mark* button () on the *Toolbar* to initiate marking.

Note: When entering FH Flyer's stand-alone marking mode (when Standalone Marking is *Yes*), the *Mark* button on the *Toolbar* changes color from red to blue to indicate the change in operational state. If the head is already in a stand-alone mark session, the blue *Mark* button blinks on-off.

Quick Mark

Initiates **immediate laser marking without prompting the user**. Pressing the F1 function key also begins *Quick Mark* marking of the current drawing.

All personnel in the marking area must be prepared and equipped as directed in the *Laser Safety* section for immediate laser output through the marking head.

Tip: When you chose Quick Mark from the *File* menu or press F1, the drawing is marked immediately and the *Synrad WinMark Launcher* window closes on completion of the mark. Use the *Mark* button on the *Toolbar* to open the *Launcher* window and keep it open in cases where you want to view *Mark Log* or cycle time information, or when multiple marks are performed. You must press F1 or click the *Start-F1* button to begin marking after the *Synrad WinMark* window is opened with the *Mark* button.

"recent files"

Display the four most recently opened files. Select a filename to open as the current drawing.

Exit

Close the WinMark Pro application. A dialog box prompts you to save any unsaved changes. Click the *Cancel* button to cancel the exit request.

Edit

Edit commands (Figure 13-3) perform common functions such as copying, pasting, and selecting.

Undo	Ctrl+Z
Redo	Ctrl+Y
Cut	Ctrl+X
Copy	Ctrl+C
Paste	Ctrl+V
Delete	Del
Duplicate	Ctrl+D
Select All	

Figure 13-3 Edit menu

Undo

Undo the last action. The number of undo levels is determined by WinMark Pro's Undo Depth property (*Tools/General Settings…/Application Settings* tab). Your computer's memory will limit the maximum number of undo levels actually available.

Redo

Redo the previously undone action.

Cut

Cut the selection and save to the Windows Clipboard. Only the last selection cut or copied to the Clipboard is available for use. You can also cut a selection by clicking the *Cut* shortcut button (✂) on the *Toolbar*.

Copy

Copy the selection to the Windows Clipboard. Only the last selection cut or copied to the Clipboard is available for use. You can also copy a selection by clicking the *Copy* shortcut button (▤) on the *Toolbar*.

Paste

Paste the current Windows Clipboard contents into the drawing. You can also paste a selection by clicking the *Paste* shortcut button (▤) on the *Toolbar*.

Delete

Delete the selection without saving to the Windows Clipboard.

Duplicate

Duplicate the selection and place into the drawing.

Tip: An object inserted into a drawing using Paste or Duplicate retains all properties of the original object, however you can edit those properties individually as required.

Select All

Select all objects in the currently active drawing.

Objects

Objects commands (Figure 13-4) perform common functions such as grouping, aligning, and transforming.
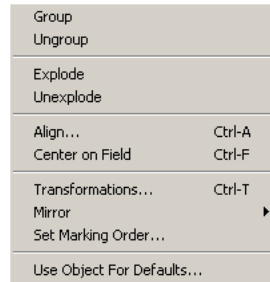
Figure 13-4   Objects menu

Group

Group selected objects into a single object. When objects are Grouped, WinMark Pro displays the group's default object properties although their previously defined individual mark properties are retained. Depending on the setting of Use Group Properties, all objects in a group are marked using their default group properties or are marked using their previously defined individual mark properties.

Tip: To mark a group using individual mark properties, first set Use Group Properties to *No* (from the *Tools*/*General Settings…*/*Object Defaults* tab) and then Group the desired objects.

Tip: Grouping is useful in cases where one set of objects is marked based on a specific digital or serial port input and another set of objects is marked based on another set of input conditions. For example, define a single MatchDigitalState event for a group instead of defining multiple MatchDigitalState commands for individual objects.

Tip: From the *Edit* menu, click Select All to select all objects in the drawing for grouping. If you want to select some, but not all objects for grouping, hold the CTRL key down while clicking on objects required in the selection set.

Ungroup

Separate a grouped object into its individual component objects. Ungrouped objects display all their previous user-defined properties.

When an imported graphic file opens as a "Group", you can Ungroup the object into its constituent parts.

Explode

When a *Polyline Set* exists, use Explode to break the set down into its constituent polylines for editing.

When an imported graphic file opens as a "Polyline Set", you can Explode the object into its constituent parts.

Unexplode

Converts selected polylines into a *Polyline Set* and optimizes polyline mark paths to obtain the fastest possible mark.

Note: All polylines in a *Polyline Set* are marked using the object properties of the first polyline or *Polyline Set* included in the selection set. Individual polyline properties are discarded and are only recoverable using the Undo command. To mark individual polylines using different mark parameters, you must Explode the *Polyline Set*.

Note: Object images may temporarily disappear from the screen display after performing an Explode or Unexplode operation. Click the *Drawing Canvas* to refresh the view.

Align...

Align two or more selected objects either horizontally or vertically using the *Align Objects* dialog box (Figure 13-5). You can also open the *Align Objects* dialog box by clicking the *Align* shortcut button (⬌) on the *Toolbar*.

Horizontal alignments are made from the selected objects' left, right, or horizontal centerlines while vertical alignments are made from the selected objects' top, bottom, or vertical centerlines.
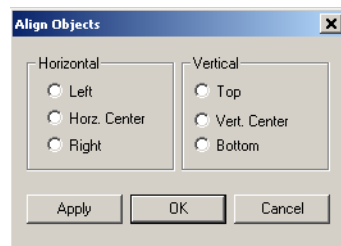
Figure 13-5 Align Objects dialog box

Center on Field

Center the selection set on the 0, 0 origin point of the *Drawing Canvas*. You can also center a selection by clicking the *Center* shortcut button ([■]) on the *Toolbar*.

Transformations...

Resize, scale, rotate, or precisely move the selection set using the *Object Transformations* dialog box (Figure 13-6). X-Y position and height/width resizing values are accurate to four decimal places (0.0001"). You can also transform a selection by clicking the *Transform* shortcut button ([⇄]) on the *Toolbar*. For ease of use, there are also *Rotate +45* ([↻]) and *Rotate –45* ([↺]) shortcut buttons located on the *Toolbar*. Note that 1D and 2D barcodes rotate only in 90-degree increments.
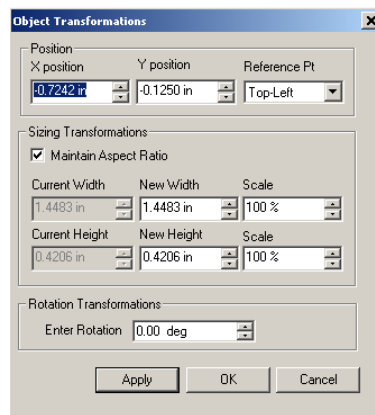
Figure 13-6 Transformations dialog box

Note: For TrueType and OpenType formatted text objects, the Text Height set on the *Format* tab will not match the Object Height shown in the *Object Transformations* dialog box. The value given as the Object Transformations Object Height is the sum of the uppercase cap height plus the space provided above and below for ascenders and descenders while, for TrueType/OpenType formatted fonts, the *Format* tab's Text Height value corresponds to the uppercase cap height of the font. Stroke font heights are variable (depending on the designer) and do not strictly conform to this description.

Tip: To obtain accurate text height, use only uppercase letters and do the following: In the *Object Transformations* dialog box, check *Maintain Aspect Ratio*, set the *Current Height* value to the desired size, and then press the TAB key to scale text. Click *Apply* and then click *OK*.

Mirror

Flip, or mirror, objects in the current selection set either horizontally or vertically. You can also mirror selected objects by clicking the *Mirror X* (![]) or *Mirror Y* (![]) shortcut buttons on the *Toolbar*.

Set Marking Order...

Select the order in which objects on the *Drawing Canvas* are marked. The *Configure Marking Order* dialog box displays a list of all objects in the current drawing so that you can move objects up or down in the marking order. By default, WinMark Pro marks objects in the order in which they were created or imported.

Tip: When marking sensitive materials, changing the mark order of objects helps limit the heat input into any one area of the material at one time.

Use Object For Defaults...

Use all properties of the currently selected object as the default for any new objects created in this or future drawings. Before overwriting existing property values, a dialog box asks you to confirm this action.

View

View commands (Figure 13-7) perform common functions such as zooming in or out of the drawing or showing/hiding window elements.
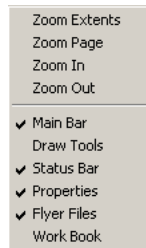
Figure 13-7 View menu

Zoom Extents

Maximize the display to encompass all objects on, or off, the *Drawing Canvas*. You can also "zoom all" by clicking the *Zoom Extents* shortcut button (![]) on the *Toolbar*.

Zoom Page

Display the entire *Drawing Canvas*. You can also click the *Zoom Page* shortcut button (⬜) on the *Toolbar* to maximize your view of the canvas.

Zoom In

Zoom in towards the center of the current view by a factor of two. You can also zoom in by clicking the *Zoom In* shortcut button (🔍) on the *Toolbar*.

Zoom Out

Zoom out from the center of the current view by a factor of two. You can also zoom out by clicking the *Zoom Out* shortcut button (🔍) on the *Toolbar*.

Main Bar (Toolbar)

Toggle the check mark to show/hide the Main Bar (the *Toolbar*).

Draw Tools

Customize views of the *Toolbar*, *Tool Box*, and *Stand-alone Toolbar* using the *Toolbars* dialog (Figure 13-8).
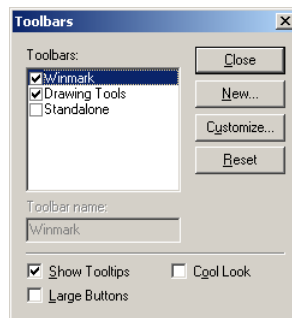
Figure 13-8 Toolbars dialog box

Status Bar

Toggle the check mark to show/hide the *Status Bar*.

Properties

Toggle the check mark to show/hide the *Object List*, *Property List* and *Help Window*.

Flyer Files

Toggle the check mark to show/hide the *Flyer Filestore* window when connected to an FH Flyer/Fenix Flyer head.

Work Book

Toggle the check mark to show/hide *Work Book* tabs. Each tab contains a separate open drawing.

Tools

Tools commands (Figure 13-9) perform functions that customize global settings and defaults or control startup options.
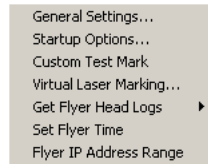
Figure 13-9 Tools menu

General Settings...

Located under General Settings… are four groups of parameters that define WinMark Pro's default Application, Drawing, Object, and "Device" properties. The "*Device*" tab (the "*Flyer*" tab when Flyer is connected) is new to WinMark Pro v6 and contains head-specific properties for each installed head.

See Chapter 14, *Application Settings*, for complete descriptions of properties on *Application Settings*, *Drawing Defaults*, *Object Defaults*, and "*Device*" tabs.

Note: More than one "*Device*" tab may exist depending on the number of marking heads connected to the computer. When the term ""*Device*" (Flyer) tab" is used in this manual, it refers to a "*Device*" tab showing Flyer-specific properties.

Startup Options...

Set startup option commands (Figure 13-10) to control WinMark or WinMark Launcher. You can command the Operating System to load WinMark Launcher automatically on computer startup, force WinMark Pro or WinMark Launcher to open a specific drawing when they open, or setup the Launcher application to start marking immediately after opening.
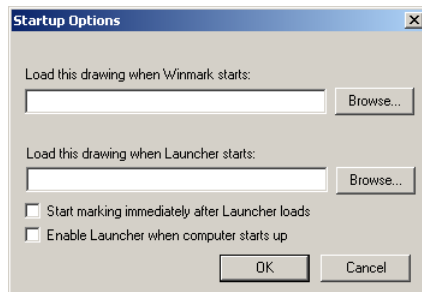
Figure 13-10 Startup Options dialog box

Custom Test Mark...

With Flyer marking heads and Fenix Flyer Laser Markers, you can load a WinMark Pro .mkh file into non-volatile memory, replacing the factory test mark pattern. Like the standard test mark, this custom file is marked each time the *Test Mark* pushbutton is pressed. However, unlike the standard test pattern, the custom test mark feature allows you to create a custom mark file with specific object properties and then perform Index marking without a computer connected to the marking head. See your Flyer or Fenix Flyer Operator's Manual for details on configuring a custom test mark.

Note: The Custom Test Mark... selection is only active when WinMark Pro senses it is actively communicating with an FH Flyer marking head or Fenix Flyer Laser Marker, otherwise the menu item is disabled (dimmed).

Virtual Laser Marking...

Place a high-resolution scanned image of the part to be marked underneath mark objects on the current drawing. Use this feature to precisely align mark objects to your part.

Get Flyer Head Logs

Download and view log files for historical purposes or when troubleshooting. Choose from among the Main Log (Main Messages.log), Last Bootup Log, Web Access Log, Web Error Log, Mark Log, and Head Configuration Log. By default, log files are downloaded and saved to the WinMark directory with the extension ".log". After the log file is saved, it automatically opens and displays in Windows Notepad.

Set Flyer Time

Click this property to display the *Set Date and Time* dialog box (Figure 13-11). You can synchronize Flyer's internal clock to your PC's clock or adjust it manually. You can also configure Flyer's clock for your local Coordinated Universal Time (UTC) zone.
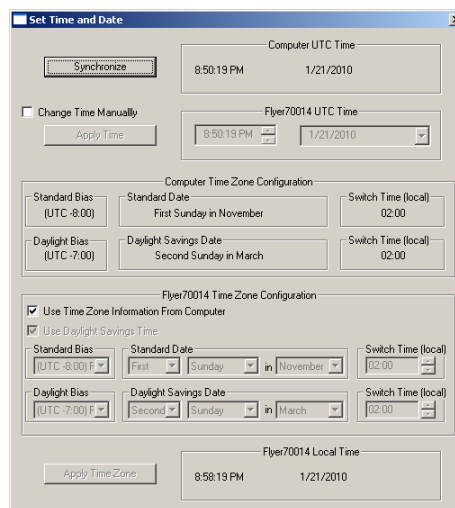
Figure 13-11 Set Date and Time dialog box

Flyer IP Address Range

As part of Flyer's Ethernet security options, the range of IP addresses that connect to the Flyer/Fenix Flyer head can be restricted. If there are no restrictions (if the address range is zero), Flyer will connect to any IP address. By adding a range of allowable IP addresses (up to ten ranges), Flyer is restricted to connecting to devices within the allowable range and will refuse all other connections.

To set-up Ethernet security, refer to Figure 13-12 and perform the following steps:
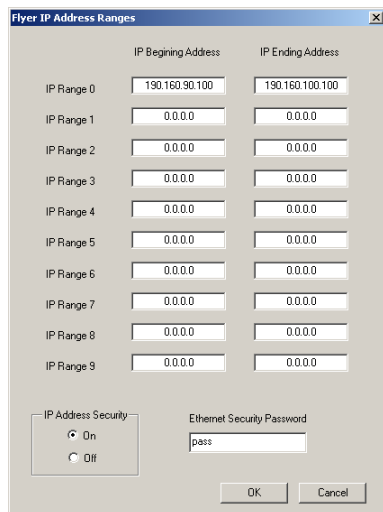
Figure 13-12 Flyer IP Address Ranges dialog box

1   In the *Tools* menu, click Flyer IP Address Range.

2   Enter your user password. The default factory password is "pass" (without the quotes).

3   After the *Flyer IP Address Ranges* dialog opens, enter a range of authorized IP addresses.

The beginning IP address should be "less than" the ending IP address. For example, 190.160.90.100 is considered less than 190.160.100.100. To allow access by only a single IP address, set the beginning IP address equal to the ending IP address. Clear a range of addresses by entering 0.0.0.0 for both beginning and ending addresses.

4   To enable the Ethernet security feature, click the "On" button in the *IP Address Security* section.

5   To safeguard your facility, we recommended changing the *Ethernet Security Password* from the factory default. To do so, enter a new case-sensitive password.

6   Click *OK* when done with changes.

Devices

New to WinMark Pro v6 is the *Devices* menu (See Figure 13-13). This menu lists all possible marking heads that WinMark v6 can connect to. A check mark next to the list of communication methods or head types indicates the currently selected head.

Note: The "*Devices*" menu is disabled when WinMark is opened in demo mode.

Figure 13-13 Devices menu

Flyer Ethernet

A check mark indicates that WinMark is communicating with a Flyer/Fenix Flyer head through the *Ethernet* port.

When an Ethernet-enabled Flyer head is connected after WinMark is open, go to *Flyer Ethernet* and select the highlighted head. If more than one Ethernet-enabled head exists, you can choose which one WinMark communicates with. Although a single instance of WinMark can communicate with only a single head, you can switch between multiple Ethernet-connected Flyer heads within a single WinMark instance.

Important Note: The ability to switching between multiple Ethernet-enabled heads is intended for use only while upgrading, testing, or troubleshooting. SYNRAD does not recommend designing a marking system where a single instance of WinMark switches from one Ethernet-enabled head to another every mark. This rapid switching methodology is likely to disrupt Ethernet connect/disconnect protocols. In multi-head applications, we highly recommend opening a separate instance of WinMark Pro for each Flyer/Fenix Flyer head.

Flyer USB

A check mark indicates that WinMark is communicating with a Flyer/Fenix Flyer head through a USB port connection.

When a Flyer head is connected through the *USB* port after WinMark is open, go to *Flyer USB* and select the highlighted head. If more than one USB-enabled head exists, you can choose which one WinMark communicates with. Although a single instance of WinMark can communicate with only a single head, you can switch between multiple USB-connected Flyer heads.

Important Note: The ability to switching between multiple USB-enabled heads is intended for use only while upgrading, testing, or troubleshooting. SYNRAD does not recommend designing a marking system where a single instance of WinMark switches from one USB-enabled head to another every mark. This rapid switching methodology is likely to disrupt USB connect/disconnect protocols. In multi-head applications, we highly recommend opening a separate instance of WinMark Pro for each Flyer/Fenix Flyer head.

FH/Fenix

A check mark indicates that WinMark is communicating with a FH Index/Tracker marking head or Fenix Laser Marker through a PCI-bus Fiber Link Controller Card (FLCC). When a head is connected through an FLCC after WinMark is open, go to *FH/Fenix* and select the highlighted head.

Important Note: We highly recommend using WinMark Pro version 4.6 with FH Series Index or Tracker marking heads and Fenix Laser Markers. WinMark Pro v6 is not designed or intended for use with pre-Flyer heads and has not been fully tested to operate FH Series Index/Tracker heads. Although WinMark Pro v6 may appear to work with these heads, SYNRAD cannot guarantee that they will work error-free in all circumstances.

Connect to Ethernet Flyer

If your Flyer/Fenix Flyer head is already configured for Ethernet operation, but has not connected, click *Connect to Flyer Ethernet* and, when the *Select Ethernet IP Address* dialog opens, type in the head's assigned Ethernet IP address.

Window

Window commands (Figure 13-14) allow you to perform functions such as switching between or re-arranging multiple drawing windows.
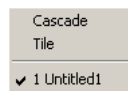
Figure 13-14 Window menu

Cascade

Overlap all open drawing windows.

Tile

Arrange all open drawing windows side-by-side.

"current active file"

Select any open drawing in the list as the currently active drawing.

Tip: You can also toggle the *Work Book* selection on the *View* menu to show/hide *Work Book* tabs. Click a tab to quickly display each currently open drawing.

Help

Help commands (Figure 13-15) display program and resource information.
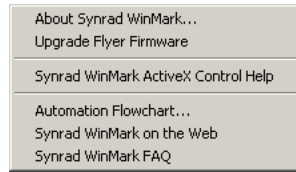
Figure 13-15 Help menu

About Synrad WinMark...

Display software version, copyright, and support information or check hardware/firmware status (*Head Info*) as shown in Figure 13-16. When a Flyer marking head or Fenix Flyer Laser Marker connection is active, the dialog box (Figure 13-17) also displays temperature status and uptime (the time elapsed since the last boot-up sequence) information.
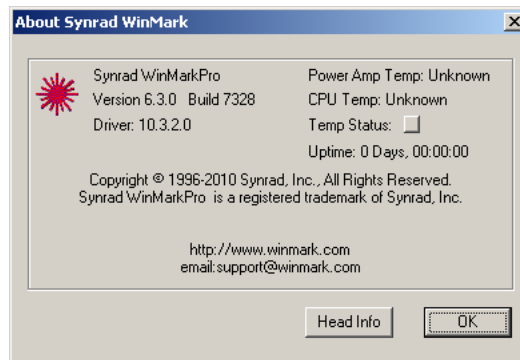
Figure 13-16 About Synrad WinMark dialog box (no head connected)
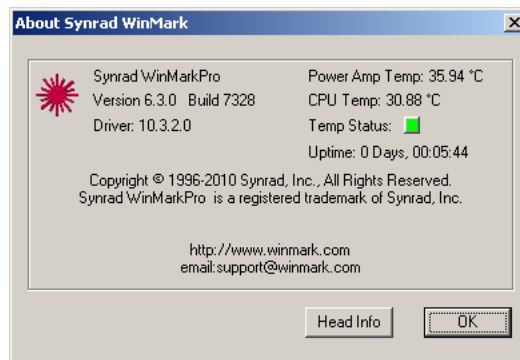
Figure 13-17 About Synrad WinMark dialog box (Flyer head connected)

Head Info button

When a Flyer or Fenix Flyer head is actively connected, click the *Head Info* button to view the "*Device*" (Flyer) tab (see Figure 14-5) showing head specific setup information such as firmware versions, Ethernet addressing, FASI and clearing mark status, tracking, and stand-alone configuration parameters.

Temperature status

When a Flyer head is connected, the *About Synrad WinMark* dialog (as shown back in Figure 13-17) displays internal air temperature near power amplifier and CPU components along with a color-coded *Status* indicator. If the *Status* indicator, normally green, turns yellow (indicating power amplifier air temperatures at or above 65 °C), then you should consider adding an external cooling fan (FH Flyer marking heads only). If the *Status* indicator turns red (when ambient air temperature surrounding the CPU reaches 65 °C), control circuitry in the Flyer head will halt marking. If this happens, marking is disabled until the head is cooled and ambient CPU air temperature drops below 60 °C.

Note: Real-time air temperature measurements at power amplifier and CPU locations inside Flyer have been correlated with optical scanner air temperatures after extensive testing. A measured air temperature of 65 °C at the CPU indicates that air temperatures surrounding the optical scanners are approaching their maximum operating temperature limit of 50 °C.

Upgrade Flyer Firmware

FH Flyer and Fenix Flyer flash memory contains the operating code—firmware—that controls the marking head. As improvements are made to the code, these firmware updates are posted to the WinMark Pro web site (www.winmark.com/products/winmark_firmware.html).

To upgrade the firmware in your Flyer/Fenix Flyer head, perform the following steps:

1   Power up the Flyer head and then open WinMark Pro v6.

2   From the *Help* menu, select Upgrade Flyer Firmware.

3   In the *Open* dialog, navigate to the location of the latest firmware update (*Update_x-xx.fhz*) file. By default, a copy is placed in the *C:\Program Files\WinMark* folder during the WinMark installation.

4   Select the appropriate .FHZ firmware file and then click *Open*.

5   A dialog box displays upgrade progress. After the new firmware is installed, the Flyer/Fenix Flyer head automatically reboots.

6   The dialog box disappears when the head is updated and ready to perform marking operations.

Note: If WinMark does not reconnect to the marking head after it reboots, an error dialog will appear. Click *Cancel*, then close and re-open WinMark Pro to reset the communications link.

Synrad WinMark ActiveX Control Help

Open an online Help window describing how to use WinMark Pro's ActiveMark™ (ActiveX®) control. The Help window includes an overview of using the control and a complete list of control methods and properties for developing an ActiveX Flyer application.

Automation Flowchart…

View a flowchart (Figure 13-18) indicating the sequence of events when using WinMark Pro automation features.
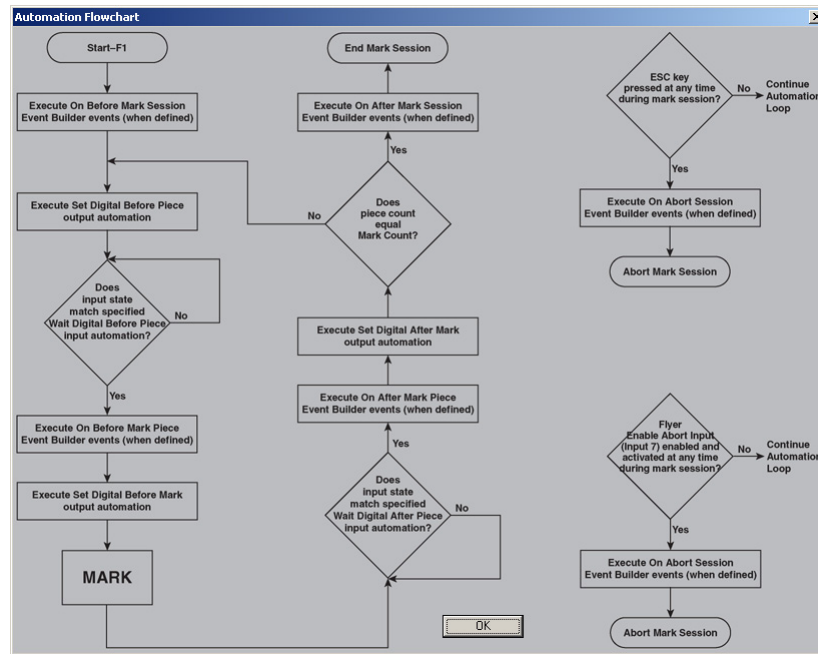
Figure 13-18 Automation flowchart

Synrad WinMark on the Web

Automatically link to the WinMark web site (http://www.winmark.com/) through your browser. The WinMark Pro web site contains a wealth of information including About WinMark Pro, Downloads (WinMark Pro, Flyer firmware, sample mark files, and ActiveX sample files for VB, VC++, and VC# applications), Laser Marking FAQs, User Guides and Operation Manuals, Application Notes, and product information about SYNRAD Marking Heads.

Synrad WinMark FAQ

Link directly to SYNRAD's online *Laser Marking FAQ* at http://www.winmark.com/Support/FAQs.html. This list of Frequently Asked Questions covers marking head and software topics in categories such as Software/Firmware, General Troubleshooting, WinMark Pro Automation, Serialization, Tracking Operation, and ActiveX.

14 Application Settings

The *Application Settings* chapter includes sections:

■   Application Settings tab

■   Drawing Defaults tab

■   Object Defaults tab

■   "Device" (Flyer) tab

Under *Tools/General Settings…* , the *General Settings* dialog box displays four tabs containing parameters that define WinMark Pro's default Application, Drawing, Object, and "Device" properties. The "*Device*" (Flyer) tab is new to WinMark Pro v6 and contains head-specific properties for each type of installed marking head. Each section below lists and describes the groups of properties available on each tab. Properties on the "*Device*" (Flyer) tab will vary depending on the type of marking head that is currently selected on the *Devices* menu.

Application Settings tab

The *Application Settings* tab lists properties that control global settings of the WinMark Pro application (see Figure 14-1).

Important Note: Properties on the *Application Settings* tab are not saved with the .mkh mark file. Instead, they are global application properties defined for a particular WinMark Pro installation on a specific marking computer.
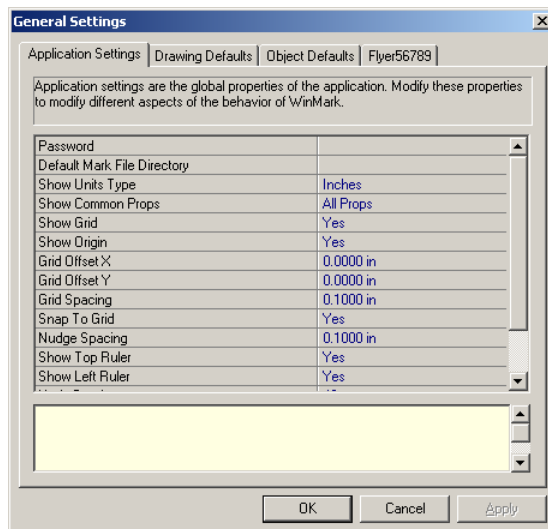
Figure 14-1   Application Settings tab

Password

Define a case-sensitive password to prevent unauthorized modification of .mkh mark files from WinMark Pro's *Drawing Editor*. When a password is specified, the *Enter Password* dialog box appears each time the WinMark Pro *Drawing Editor* is opened.

Default Mark File Directory

Specify a user-defined directory for opening/saving .mkh mark files. WinMark Pro defaults to the *C:\Program Files\WinMark* folder if this property is not defined.

Show Units Type

Select inches, millimeters, or centimeters as the display unit for all measurements.

Note: WinMark Pro's ActiveMark™ control uses inches as the unit of measure. When running a custom application program or user-interface based on our ActiveMark (ActiveX) control methods, you must set Show Units Type to inches and then program your application to calculate the conversion from other units of measure. Unpredictable object placement or operation may result if the Show Units Type property is set to millimeters or centimeters.

Show Common Props

Display all properties or only common properties when multiple objects are selected on the *Drawing Canvas*.

Show Grid

Toggle display of *Drawing Canvas* grid lines on (*Yes*) or off (*No*).

Show Origin

Toggle display of *Drawing Canvas X-Y Origin Lines* on (*Yes*) or off (*No*).

Grid Offset X

Offset the drawing grid in the X direction by a specified amount. This property changes only the grid display, it does not affect mark placement relative to the *Drawing Canvas*.

Grid Offset Y

Offset the drawing grid in the Y direction by a specified amount. This property changes only the grid display, it does not affect mark placement relative to the *Drawing Canvas*.

Grid Spacing

Change spacing between drawing grid lines to speed object layout while maintaining consistent spacing between elements.

Snap To Grid

Select *Yes* to constrain object placement, translation, or scaling to grid line intersections.

Nudge Spacing

Specify the distance (to 0.0001" accuracy) that selected objects are moved using the keyboard's arrow keys. If Snap to Grid is *Yes*, the distance moved is equal to the Grid Spacing value.

Show Top Ruler

Toggle display of the upper drawing ruler on (Yes) or off (*No*).

Show Left Ruler

Toggle display of the left drawing ruler on (*Yes*) or off (*No*).

Undo Depth

Set the number of undo levels. Available computer memory will affect the actual number of undo levels.

Banner View Size

When the Banner Marking property is enabled, adjust the *Drawing Canvas* viewport to display the extents of the banner mark.

Application Language

Choose one of the following languages as the default language for WinMark Pro—English, Dutch, French, German, Italian, Spanish, Japanese, or Chinese. After changing the *Application Language*, you must close and then re-open WinMark before the new language is displayed.

To use Japanese or Chinese languages with Windows XP or 2000, you must first load the correct Chinese or Japanese codepage and set it as the default from Regional Settings in the Windows Control Panel.

Drawing Defaults tab

Create default *Drawing* properties for all new drawings you open (Figure 14-2). These properties only affect the actual marking output; *Drawing Canvas* and *Launcher* screen displays do not change.
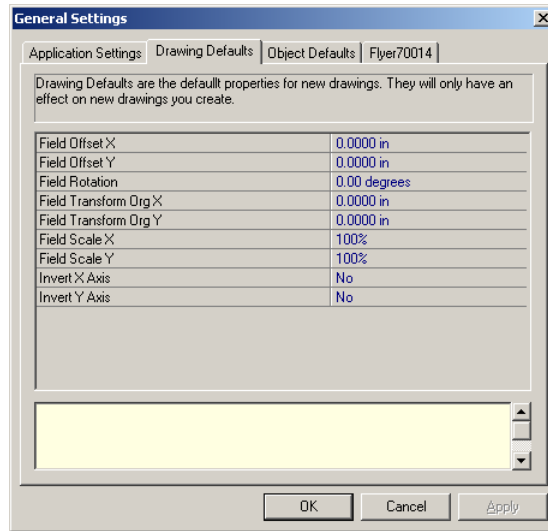
Figure 14-2 Drawing Defaults tab

Field Offset X

Enter the amount of drawing offset required in the X-direction when marking.

Field Offset Y

Enter the amount of drawing offset required in the Y-direction when marking.

Field Rotation

Enter the amount of drawing rotation required around the transformation origin when marking. Field Rotation is accurate to two decimal places (0.01 degrees).

Note: In WinMark Pro versions 6.3.0.7328 and above, when the *Drawing's* Field Rotation is set to other than 0.00 degrees, the *Mark Preview* window now displays the actual mark rotation referenced to the fixed *Drawing Canvas* display.

Field Transform Org X

Specify the transformation X-origin required when offsetting, rotating, or scaling a drawing for marking. The default X origin point is 0.0000 inches.

Field Transform Org Y

Specify the transformation Y-origin required when offsetting, rotating, or scaling a drawing for marking. The default Y origin point is 0.0000 inches.

Field Scale X

Specify the percentage of X-axis scaling around the transformation origin.

Field Scale Y

Specify the percentage of Y-axis scaling around the transformation origin.

Note: If Field Scale X and Field Scale Y properties are set to different values, the non-proportional field scaling will cause mark distortion.

Note: In WinMark Pro versions 6.3.0.7328 and above, Field Scale X and Field Scale Y values can be fine-tuned to accuracies of 0.01%.

Invert X Axis

Invert marking output along the X- (horizontal) axis.

Invert Y Axis

Invert marking output along the Y- (vertical) axis.

Object Defaults tab

Customize default object properties (Figure 14-3) for new objects you create in a new (or current) drawing.
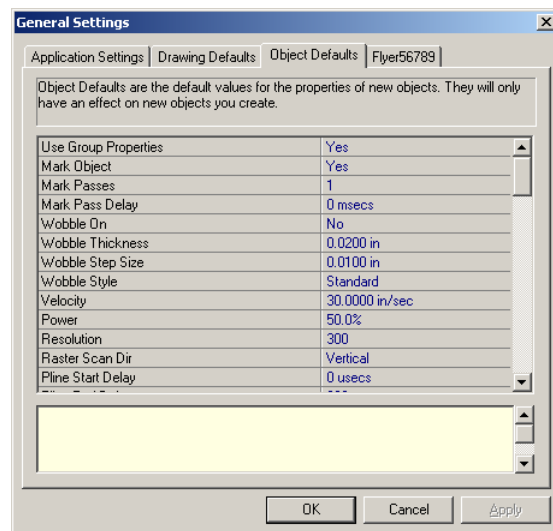
Figure 14-3 Object Defaults tab

Use Group Properties

Choose *Yes* to mark grouped entities using properties currently defined on the *Object Defaults* tab. Select *No* to mark grouped entities with their individual properties defined prior to grouping.

Note: In order to mark group entities using individual properties, set Use Group Properties to *No* and then perform the Group operation.

Mark Object

Select *Yes* to mark the current selection set. Choose *No* to disable marking of selected objects.

Tip: Mark Object, a Boolean object property, is often used with MatchDigitalState automation so that a *True* (1) input condition causes the specified object or group to mark. Objects/groups are not marked if the corresponding input condition is *False* (0).

Tip: It is often useful to place marking instructions or reminders on the *Drawing Canvas* for equipment operators. Simply enter the desired text, then size and position the text object. With only the instructional text selected, set Mark Object to *No*. Although visible, this text object will not mark and will not affect cycle times.

Important Note: The Mark Object property is specifically excluded from the list of properties that are bundled when objects are Grouped. When non-marking objects (Mark Object property is *No*) are Grouped, with marking objects (Mark Object is *Yes*), the Use Group Properties property is set to *Yes*, and the Mark Object property for the group is set to *Yes*, the Mark Object value of individual objects in the group still takes precedence over the group's Mark Object setting. Grouped non-marking objects will **not** be marked. To mark all objects in a group, you must set the Mark Object property of individual objects to *Yes* before performing a Group operation.

Mark Passes

Specify the number of passes required to mark selected objects.

Tip: Use the Mark Passes property to mark heat-sensitive materials. In many cases, multiple low-power passes can process parts that would otherwise be damaged by a single, higher power pass.

Mark Pass Delay

When Mark Passes is greater than 1, specify a delay (in milliseconds) between subsequent passes.

Wobble On

Select *Yes* to mark thicker polyline strokes by "wobbling" the laser beam. Lines are essentially thickened by marking shorter lines at right angles to the intended line segment. Line width is determined by the value specified for Wobble Thickness and line "resolution" is determined by Wobble Step Size.

Wobble Thickness

Specify the "Wobble" width (line thickness) for selected polyline objects.

Wobble Step Size

Enter a specific distance between "Wobble" steps. This value serves as the "resolution" of the line width—smaller steps equal higher resolution.

Wobble Style

WinMark v6 adds support for several different wobble 'styles'. *Standard* indicates that each wobble line is marked unidirectionally from the same side of the polyline. *Bidirectional* forces WinMark to mark wobble lines alternating from side to side and is the quickest of the three wobble styles. The *Sawtooth* style provides additional "fill' by marking a diagonal line from the bottom of one wobble line to the top of the next wobble line.

Note: Although the mark is created as specified, there is no visible change to 'wobbled' polyline objects on the *Drawing Canvas*.

Velocity

Specify a "laser on" optical scanner velocity for marking the selected object.

Power

Enter the duty cycle percentage of laser power required to mark the selected object. In WinMark Pro v6, you can change Power in 0.1% steps.

Tip: Typically, a value of 70–80% equals the laser's specified output power rating.

Resolution

Enter a marking resolution for the selected object. Units of measure are in microvectors per inch, which is

roughly analogous to the more common dots per inch (DPI) terminology.

When using WinMark Pro v6 with FH Flyer or Fenix Flyer heads, the Resolution property no longer applies except to filled *Polyline*, *Text*, *Bitmap*, and *2D Barcode* objects (*Barcode* objects have a Barcode Resolution property). All other objects mark at the maximum resolution possible.

Note: In WinMark Pro v6, imported bitmap images are resized according to the Resolution setting specified on the *Tools*/*General Settings…*/*Object Defaults* tab. Previously, WinMark Pro increased or decreased bitmap image size corresponding to a fixed bitmap resolution of 600 DPI. WinMark Pro does not resample bitmap images but rather resizes them to preserve the image's total pixel count. For example, the overall dimensions of a 96 DPI image imported into WinMark at 300 DPI are automatically resized to 32% of the original height and width.

Tip: In order to import a bitmap image at full scale, WinMark's Resolution setting must match the file's resolution. For example, to import a file saved at 225 DPI, first ensure that the Resolution property on the *Tools*/*General Settings…*/*Object Defaults* tab is set to 225 and then import the file.

Raster Scan Direction

Specify *Horizontal* or *Vertical* raster-scanning for filled objects.

Tip: When marking raster-scanned images such as imported graphics, filled TrueType/OpenType formatted text, or barcodes; one scan direction typically marks much faster than the other depending on the object's orientation. Optimize mark cycle time by ensuring that Bi-Directional Raster is *Yes* and then test mark each filled object using first *Horizontal* and then *Vertical* Raster Scan Direction.

Pline Start Delay

Use Pline Start Delay to minimize hot spots at the beginning of a polyline or the beginning of a series of polylines. See Chapter 16, *Object properties*, for a detailed description and illustration of Pline Start Delay functionality.

Pline End Delay

Pline End Delay maintains beam output at the end of a series of polylines to ensure that the current polyline is completed before moving to the next polyline vector. See Chapter 16, *Object properties*, for a detailed description and illustration of Pline End Delay functionality.

Interseg Delay

Interseg Delay sets a delay when marking connected polylines where the end point of the current polyline is the start point of the next polyline in the object. See Chapter 16, *Object properties*, for a detailed description and illustration of Interseg Delay functionality.

Off Vector Delay

Off Vector Delay sets a proportional delay during all laser off-vector moves to eliminate "tails" when moving between non-connected polylines. See Chapter 16, *Object properties*, for a detailed description and illustration of Off Vector Delay functionality.

Bi-Directional Raster

Choose *Yes* to enable bi-directional scanning, which reduces cycle time when marking a raster image. If set to *No*, laser marking of bitmap or filled images is done in only one raster direction.

Note: To achieve the best image quality when Bitmap Scan Type is set to *Continuous* (or when marking Grayscale images), Bi-Directional Raster is automatically disabled; marking occurs in only one direction although you can still specify a Raster Scan Direction.

Font Type

Select either a TrueType®, an OpenType®, or a stroke font for text. Use stroke fonts to mark text quickly at high throughput speeds. Use TrueType or Open Type formatted fonts to match a logo, maintain a corporate identity, or create a certain "look".

True-Type Font

Select a TrueType formatted font for marking text. You can laser mark any TrueType font installed in *C:\ WINDOWS\Fonts* folder. WinMark Pro's TrueType Font property supports TrueType (.TTF) fonts as well as the OpenType® (.TTF) fonts found on newer Windows operating systems.

Stroke Font

Select one of WinMark Pro's twelve built-in stroke (.SYF) fonts. Available fonts include Bold, European, Gothic, LiteCom, Little, Sans Serif, Script, Simple, Trip, Tscr (Trip Script), Complex, and Simplex.

Open Type Font

New to WinMark Pro v6 is support for OpenType® (.OTF) fonts and Adobe® PostScript® (.PFB) fonts. To access these fonts, create shortcuts and copy these shortcuts to the *C:\WINDOWS\Fonts* folder.

Text Height

Enter a character height for stroke or TrueType-style text.

Note: For TrueType-style fonts (TrueType, OpenType, and PostScript), Text Height is the approximate height of uppercase letters such as "M" or "W", although this height varies slightly depending

upon the metrics of the chosen typeface. In general, the Text Height for stroke fonts allows room for lowercase descenders. This means that uppercase stroke text will display and mark smaller than the value specified by Text Height.

Figure 14-4 (on the next page) compares both stroke and TrueType text strings. The *Drawing's* Grid Spacing is set to 0.25 inches and Text Height for both fonts is set to 1.0 inches. The *Simple* stroke text example shows that the 1.0-inch Text Height includes descenders for letters such as 'g', 'j', and 'y'. The *Times New Roman* TrueType example shows that uppercase letters are less than one inch high while descenders exceed the one-inch boundary. The TrueType font's *Current Height* value in the *Object Transformations* dialog box indicates the actual overall text height is 1.21 inches.
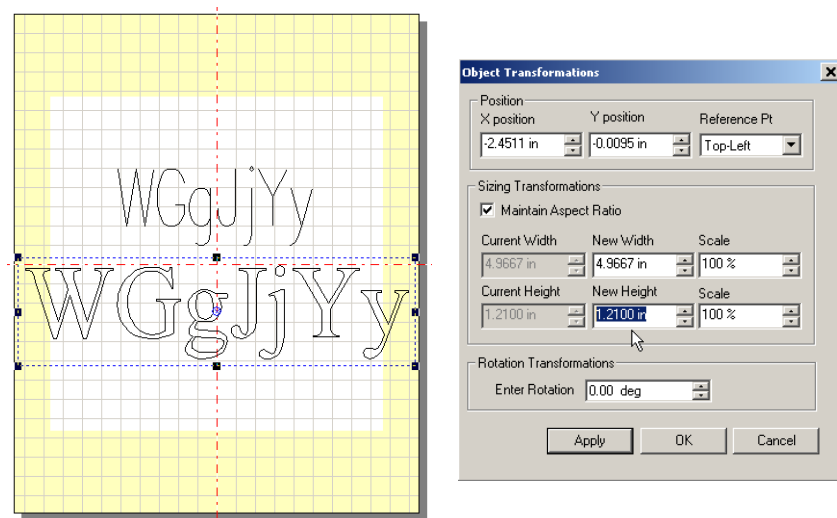
Figure 14-4 Stroke/TrueType height comparison

Tip: To obtain accurate text height, use only uppercase letters and do the following: In the *Object Transformations* dialog box, check *Maintain Aspect Ratio*, set the *Current Height* value to the desired size, and then press the TAB key to scale text. Click *Apply* and then click *OK*.

Text Bold

Toggle *Yes* to bold selected TrueType-style text.

Text Italics

Toggle *Yes* to italicize selected TrueType-style text.

Text Filled

Toggle *Yes* to fill the selected TrueType-style text. Choosing *Yes* fills text characters using a raster scanning method. Choosing *No* simply marks text characters as vector outlines.

Text Underline

Toggle *Yes* to underline selected TrueType-style text.

Text Justification

Select *Left*, *Right*, or *Center* justification for multiline text objects.

Text Curve Detail

Specify a curve resolution for TrueType-style fonts. Higher Text Curve Detail values create smoother curves especially when marking large font sizes.

Vector Import Scale

Select a method for scaling vector graphic files during importation. Choose from *1:1*; *X Axis*, which scales the graphic to the X (horizontal) *Drawing Canvas* extents; *Y Axis*, which scales the graphic to the Y (vertical) *Drawing Canvas* extents; or *Best Fit*, which scales the graphic to best fit the optimal mark area for the selected focusing lens.

Vector Import Scale Value

WinMark Pro's default unit of measure for imported vector files is inches. Changing the Vector Import Scale Value from its default setting of 1.0 allows you to import vector files that are drawn in units other than inches. For example, to import a file drawn at 1:1 scaling in millimeters, enter a Vector Import Scale Value of 1/25.4, which rounds off to 0.3937008. This conversion factor is used by the File Import Filters to properly scale the drawing on WinMark's *Drawing Canvas*.

Optimize Vector Import

For imported vector graphics, choose *Yes* to reorder (optimize) individual vectors to obtain the fastest cycle time. Choosing *No* forces WinMark to mark imported vectors in the order in which they were originally drawn and saved by the graphics program.

Import Arcs as Polylines

For imported vector graphics, Choose *Yes* to import circular arcs as polyline objects. In this case each polyline object marks as a continuous closed path. Choose *No* to import circular arcs as ellipse objects—real WinMark Pro circle (arc) objects—with editable Arc Start and Arc End points.

Text Width

Enter an average width (horizontal scale) for text characters. Enter zero (0) to return to the font's default width.

Line Spacing

Enter line spacing (leading) between lines of multiline text. Enter zero (0) to return to the font's default line spacing.

Extra Char Spacing

Enter additional spacing (tracking) between text characters. Enter zero (0) to return to the font's default character spacing.

Barcode Style

Select a 1D bar code from WinMark Pro's library of over twenty common bar code types or subsets. See *Bar code format properties* in Chapter 16 for a complete list of supported bar code formats

Barcode Quiet Zone Size

For inverted 1D barcodes, set the amount of marked quiet zone area around the code so that it reads properly.

Barcode Height

Set a specific bar code height.

Barcode Thin Width

Define a line width for thin bars in the bar code.

Tip: When setting Barcode Thin Width, do not enter a value smaller than the spot size of the selected focusing lens. Doing so results in thin bars that are wider than expected and encroach on the "white" space between bars. In some cases, this lack of sufficient white space makes the bar code unreadable.

Barcode Checksum

Toggle *Yes* to include a Barcode Checksum in the bar code if applicable for the Barcode Style selected. Although the checksum is appended to the bar code itself, it is not included to the human-readable text string (when Barcode Show Text is *Yes*).

Barcode Show Text

Toggle *Yes* to include human-readable text in the bar code. The text string marked is a filled (raster-scanned) TrueType formatted font.

Tip: Human-readable bar code text always uses filled TrueType formatted fonts. To reduce cycle times, set Barcode Show Text to *No* then create and position a new text object. Specify a stroke font for this new text object and then use the From Another Object and Assign From properties (on the *Automation* tab) to link the text object's Text Caption property to the bar code's Barcode Number value.

Barcode Text Position

If Barcode Show Text is *Yes*, select one of six locations for the placement of human-readable text around the bar code.

Barcode Text Font

Select any TrueType formatted font installed in your *C:\WINDOWS\Fonts* folder as the human-readable text type marked as part of the bar code.

Barcode Text Size

Enter a text size for the human-readable text included with the bar code.

Barcode Thick to Thin Ratio

Select a sizing ratio between thick and thin bars/spaces in the bar code. Preset ratios include 2:1, 2.5:1, and 3:1. Specifying a larger ratio increases the width of thick bars and thick spaces in the bar code.

PDF 417 X/Y Ratio

Enter a value (ranging from 1 to 10) for the ratio of the PDF 417 barcode cell height to width. The default is 4.

PDF 417 Security Level

Enter a value (ranging from 0 to 8) for the PDF 417 barcode security level with 0 as the lowest level. The default is 0. Higher levels of security create larger codes.

PDF 417 Truncated

When set to *Yes*, the right-hand side of the code is removed, or truncated. Although this creates a smaller physical code, it is more susceptible to damage.

MicroPDF Reader Init

When a MicroPDF code is created, this property indicates whether a reader initialization symbol is created within the code.

MicroPDF Mode

The MicroPDF Mode property indicates which MicroPDF size enumeration mode is used. Mode values range from 0 to 32 with 0 being the smallest code size. Higher mode values allow a larger number of encodable data characters and a higher graphical data density.

MicroPDF Code 128 Emulation

This property causes the barcode scanner to read the code is if it was a Code 128 barcode. Property value functions are listed below:

0 = No emulation

1 = Linked C1; Linked UCC/EAN-128 emulation (Transmit]C1 char)

2 = Unlinked C1; UCC/EAN-128 emulation (Transmit]C1 char)

3 = C0; Default encoding mode

4 = C2; Code 128 emulation (transmit]C2 char)

MicroPDF Disable Macro Character

Determines whether macro character substitution is enabled or disabled. The default setting, *No*, allows macro characters.

2D Barcode Fixed Cell Size

When *No*, overall code size is fixed and individual cells are sized to fit. When *Yes*, overall code size is determined by the number of cells and the specified 2D Barcode Cell Size property.

2D Barcode Cell Size

Specify the size of individual cells within the 2D code.

2D Barcode Inverted

When marking dark materials, invert marked/unmarked cells so that white cells are marked while black cells are not.

2D Barcode Quiet Zone

Select *Yes* (default), to mark a quiet zone around inverted 2D codes. This allows cells along the outer edges to be properly read by the barcode scanner.

2D Barcode Bitmap

When *Yes*, 2D codes are marked using a raster scanning technique. Choosing *No* causes WinMark Pro to mark each filled cell as an unfilled circle or square. This procedure works best for small 2D codes and greatly reduces cycle times.

2D Barcode Circle Radius

Reduce the percentage of fill below 100% to reduce cell size and eliminate print growth errors. In WinMark Pro v6, this property works on both raster-marked 2D codes (2D Barcode Bitmap property is *Yes*), and on vector-marked 2D codes (2D Barcode Bitmap property is *No*).

2D Barcode Rounding Percentage

When the 2D Barcode Bitmap property is *Yes* and cells are marked as vector circles, you can specify a rounding percentage. For example, a value of 100% creates circles, 0% causes WinMark to mark square cells, and a value of 50% creates rounded rectangles with a corner radius of 1/4 the cell size.

2D Barcode Style

Choose from among Data Matrix (ECC200), QR Code, and Micro QR Code formats.

2D Barcode Shape

When 2D Barcode Style is *Data Matrix*, choose a square or rectangular code shape.

Error Correction Mode

When 2D Barcode Style is *QR Code* or *Micro QR Code*, select one of four error correction levels to ensure that code data is readable if the mark is damaged.

Data Input Mode

When 2D Barcode Style is *QR Code* or *Micro QR Code*, select *Automatic* or *Manual* data input. See the *Format tab* section in Chapter 16, *Object properties*, for details.

Bitmap Scan Type

Choose *Normal* to mark bitmaps as a sequence of microvectors with corresponding Pline delays inserted between each segment. Select *Continuous* to mark at a constant mirror speed and laser power while cycling the laser on or off in accordance with bitmap data. When a *Grayscale* Color Reduction Method is used, Bitmap Scan Type is always *Continuous*.

Note: To enhance image quality, Bi-Directional Raster is automatically disabled when Bitmap Scan Type is *Continuous* or when the Color Reduction Method is *Grayscale*.

Interseg Break Angle

Specifies a break angle between two connected polylines. No Interseg Delay is used if the angle between two marked polylines is less than the specified break angle. If the polyline angle exceeds the Interseg Break Angle, then the Interseg Delay is executed. See Chapter 16, *Object properties*, for a detailed description and illustration of Interseg Break Angle functionality.

Off Vector Velocity

Set a non-marking galvanometer velocity when traveling between polyline endpoints.

Tip: Increasing Off Vector Velocity to several times the marking Velocity typically decreases cycle time without affecting mark quality.

Off Vector Resolution

Set a non-marking galvanometer resolution when traveling between polyline endpoints. Off Vector Resolution is not applicable to Flyer/Fenix Flyer; it is valid only for FH Index and Tracker heads.

Spot Marking Style

When set to *Yes*, the mark path is lased using individual spots instead of a continuous line. Spot spacing is proportional to the Resolution setting. Spot Marking Style is primarily used for drilling holes in materials or when marking glass to prevent or control micro-fracturing.

Spot Mark Duration

Set the lasing duration for the Spot Marking Style in 1/10 of a millisecond (100 microsecond) intervals.

Lens Spot Size

When using the *Spot Tool*, the Lens Spot Size property determines the size of the spot displayed on the *Drawing Canvas*. Set Lens Spot Size to *Yes* to view spots at the actual diameter created by the selected focusing lens. For example, when a 200 mm focusing lens is specified, a new spot object will display at a diameter of 0.011" (290 μm) instead of the default display size of 0.07" (1.78 mm).

Device (Flyer) tab (Flyer/Fenix Flyer heads)

The *Device (Flyer) tab* section includes subsections:

- ◼ Interface properties

- ◼ Set-up properties

- ◼ Tracking properties

- ◼ Maintenance properties

- ◼ Stand-alone properties

- ◼ I/O properties

The "*Device*" (Flyer) tab (or "*Flyer*" tab) lists head-specific properties for the currently detected FH Flyer marking head or Fenix Flyer Laser Marker.

Interface properties

Interface properties on the Flyer tab (Figure 14-5) include head-specific version information as well as communication parameters.
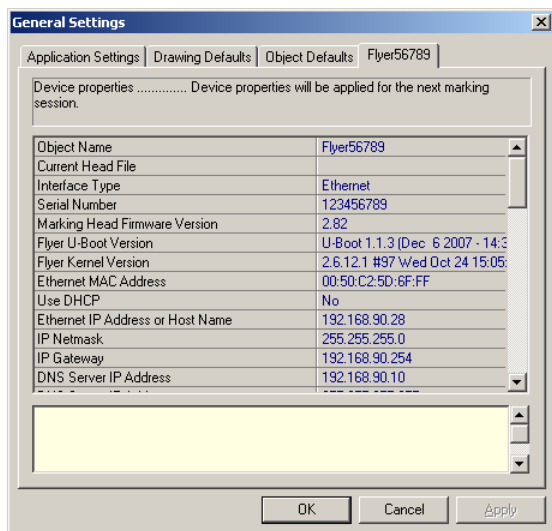
Figure 14-5 "Device" (Flyer) tab – Interface properties

Object Name

Enter a reference name for the device. This name is primarily used when referring to the head in an ActiveX application. The factory default name is "Flyerxxxxx"; where xxxxx are the last five digits of the head's unique serial number. The Object Name will always appear as the title of the "*Flyer*" tab.

Current Head File

This property displays the path and filename of the file currently loaded into Flyer/Fenix Flyer RAM.

Interface Type

This read-only property indicates the interface method used to communicate with the currently active marking head. In "demo" mode, the Interface Type is *None*.

Serial Number

This read-only property provides the nine-digit serial number of the currently active Flyer or Fenix Flyer head.

Marking Head Firmware Version

This read-only property displays the current firmware version detected in the Flyer head.

Flyer U-Boot Version

This read-only property displays the current version of Flyer U-Boot code.

Flyer Kernel Version

This read-only property displays the current version of the Flyer kernel.

Ethernet MAC Address

This read-only property displays Flyer's factory-set Ethernet MAC (Media Access Control) address.

Use DHCP

When set to *Yes*, Flyer will contact the network's DHCP (Dynamic Host Configuration Protocol) Server for IP Address, IP Netmask, IP Gateway, and DNS Server IP addresses. By default, Use DHCP is set to *No*.

Note: We do not recommend using DHCP. Under the DHCP scheme, Flyer's IP address <u>and</u> DNS name will change each time the head is turned off for a time period that exceeds the DHCP lease.

Ethernet IP Address or Host Name

Enter an IP Address for the Flyer/Fenix Flyer head in the form "xxx.xxx.xxx.xxx". Click the ellipsis to open the pre-formatted *Select Ethernet IP Address* dialog and enter an Ethernet IP address.

IP Netmask

Enter an IP Netmask address for the associated Ethernet IP Address or Host Name property when Use DHCP is set to *No*. Click the ellipsis to open the pre-formatted *Select Ethernet IP Address* dialog and enter an IP netmask address.

IP Gateway

Enter a IP Gateway address for the gateway used when the Ethernet IP Address or Host Name address resides outside your internal native Ethernet network. Click the ellipsis to open the pre-formatted *Select Ethernet IP Address* dialog and enter an IP gateway address.

DNS Server IP Address

A DNS Server resolves domain names or hostnames into IP addresses. If required in your application, enter a DNS Server IP Address. There are two property slots allowed for DNS server addresses. Click the ellipsis to open the pre-formatted *Select Ethernet IP Address* dialog and enter a DNS Server address.

Share Name

When using a network for mark file or font storage, enter the name of the share folder located on the specified server. For example, if the path to the folder is "*H:\Mark Files\Flyer Share*", enter "Flyer Share" (without the quotes) as the Share Name.

Share Server

Enter the IP address of the desired network server or computer where the share folder is located.

Share Domain

Enter a name for the domain to use to connect to a given server or share.

Share Username

Enter a legitimate user name from the list of users with access to the network share folder.

Share Password

Enter the user's password to gain access to the desired network share.

Share ReadOnly

Set the Share ReadOnly property to *No* to prevent Flyer from writing data to the network share. When set to *Yes*, Flyer is allowed to write to the share.

Network Share Available

This read-only property indicates that Flyer has successfully mounted the network share using the specified share properties.

Set-up properties

Flyer set-up properties (Figure 14-6) include focusing lens properties and miscellaneous configuration functions.
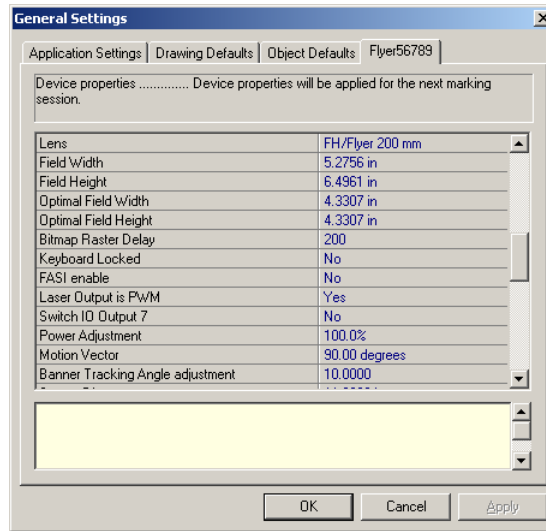
Figure 14-6 "Device" (Flyer) tab – Set-up properties

Lens

Select a lens corresponding to the currently installed focusing lens on your Flyer head. Click Lens and then click the down arrow to view a drop-down list showing available lenses. When using an FH Flyer marking head or Fenix Flyer Laser Marker, select a lens from the FH/Flyer lens group. Choosing a focusing lens automatically sets Field Width and Field Height parameters for WinMark Pro's *Drawing Canvas* and determines the lens correction data set used by the marking head.

In previous WinMark Pro versions, the property values for Field Width and Field Height indicated the maximum field extents for a given lens; however, they could be altered by the user. In cases where mark objects were inadvertently placed beyond the original field boundary or if field dimensions were changed non-proportionally, then incomplete or non-proportional marks would result. For this reason, these properties are now fixed as read-only properties in WinMark Pro v6.

When opening legacy files with modified field dimensions, WinMark Pro v6 will import mark objects as dimensioned and place them at the locations specified in the original drawing, even if they extend beyond the actual mark field.

Important Note: In WinMark Pro v6, field sizes automatically update when you choose a new lens setting. In previous versions of WinMark, you were required open a New drawing after selecting a different lens.

Tip: If you accidentally create a mark file using the wrong lens specification for your application, simply select the correct Lens (*Tools*/*General Settings… */"*Device*"), click *Apply* and then click *OK*. WinMark Pro v6 automatically generates the correctly scaled *Drawing Canvas* and any pre-existing objects remain at the X-Y coordinates where they were originally placed!

Table 14-1 lists FH Flyer/Fenix Flyer focusing lenses, nominal and maximum field sizes for each lens, typical working distance, focused spot size and depth of field dimensions. FH Flyer and Fenix Flyer use the same focusing lenses as previous FH Index/Tracker marking heads and Fenix Laser Markers.

Table 14-1 Flyer/Fenix Flyer lens specifications

Lens Focal Length	Nominal Field H×W, mm	Max. Field H×W, mm	Working Distance[1] typical, mm	Spot Size (1/e²), μm	Depth of Field, mm
370 mm	198 × 198	241.0 × 297.0	350 ±5	540	± 10
200 mm	110 × 110	134.0 × 165	190 ±3	290	± 2.5
125 mm	74 × 74	85.7 × 105.6	128 ±2	180	± 1.5
125HP[2]	66 × 66	80.4 × 99.0	125 ±2	180	± 1.5
80 mm	27 × 27	33.5 × 41.2	74 ±1	116	± 0.4

1 The typical working distance is marked on each lens mount. Consult your marking head's final test report for the actual working distance.

2 High-power 125 mm lens for use with lasers 40 W and higher.

New to WinMark v6 is the *No Lens* property. The *No Lens* selection is for specialized scientific applications where there is no lens mounted on the head. When you choose *No Lens* and then click *Apply*, a Working Distance property appears. Enter the working distance—in this special case, measured from the bottom of the Flyer/Fenix Flyer head to the work surface. Based on Working Distance and galvanometer geometry, new Field Width/Field Height values are calculated for the *Drawing Canvas*. The *No Lens* selection provides the ability to scan an unfocused beam to the extents of the galvanometer's mechanical limits for a given Working Distance.

Working Distance

Available only when the selected lens is *No Lens*. In this special case only, enter a Working Distance measured from the bottom of the Flyer/Fenix Flyer head to the work surface.

Field Width

A read-only property showing the maximum field width of the currently selected focusing lens.

Field Height

A read-only property showing the maximum field height of the currently selected focusing lens.

Note: The values for Optimal Field Width and Optimal Field Height properties below indicate the optimal field area for marking with a given lens. In previous WinMark Pro versions, these values could be changed. In WinMark Pro v6, these values are now fixed as read-only values.

Optimal Field Width

A read-only property showing the nominal field width of the currently specified focusing lens.

Optimal Field Height

A read-only property showing the nominal field height of the currently specified focusing lens.

Bitmap Raster Delay

This head-specific delay is used when marking grayscale images or when Bitmap Scan Type is set to *Continuous*. This delay compensates for the time required for the galvanometer mirrors to reach the commanded coordinates for each raster line. Adjust this value as required to eliminate any minute offset of the image from its intended mark coordinates.

Keyboard Locked

Lockout the *Test Mark* membrane pushbutton function on FH Flyer marking heads and Fenix Flyer Laser Markers.

Important Note: On Fenix Flyer markers, only the *Test Mark* button is locked; the *Emergency Off* pushbutton is <u>never</u> locked out.

FASI Enable

This read-only property displays the status of Flyer's Fast Acting Safety Interlock (FASI) setting. In Flyer heads, the FASI feature is set via an internal DIP switch in the head. When FASI is enabled, the laser will not fire unless an active high signal (5 V–24 VDC) is present on input *IN3*. See the *FH Flyer Marking Head Operator's Manual* for setup details. Fenix Flyer customers should contact SYNRAD Technical Support for instructions on enabling the FASI function.

Laser Output is PWM

This read-only property displays the status of Flyer's PWM/Gate setting. In Flyer heads, the PWM/Gate feature is set via an internal DIP switch in the head; for proper marking operation, "*PWM*" is the correct setting. In "*Gate*" mode, laser output is simply switched on or off at 100% duty cycle (100% power output); there is no output power control.

Switch IO Output 7

On FH Flyer marking heads and Fenix Flyer Laser Markers, you can configure output *OUT7* in one of two ways—as a normal output controlled by WinMark Pro or as an over-temperature warning. When Switch IO Output 7 is *No*, output *OUT7* functions as a normal output and is *Set* or *Cleared* by WinMark Pro's SetDigital commands.

When Switch IO Output 7 is *Yes*, output *OUT7* cannot be activated by SetDigital commands; instead, it serves as an over-temperature warning output and activates when the air temperature near Flyer's power amplifiers or CPU rises to 65 °C or above to indicate that additional cooling is required. See your *FH Flyer Marking Head Operator's Manual* or *Fenix Flyer CO_2 Laser Marker Operator's Manual* for setup details.

Power Adjustment

This global head property increases or decreases the mark file's Power setting by a fixed percentage to compensate for minor output power variations from one laser to another. This property allows the use of a single set of mark files by a number of individual Flyer/Fenix Flyer markers without having to create and maintain multiple mark files for each laser marker. The default value is 100%.

Tracking properties

Eleven tracking properties (Figure 14-7) are available when an FH Flyer or Fenix Flyer is the current "device". In WinMark Pro v6, these Flyer tracking properties are stored in the Flyer head because tracking properties are likely to vary for each individual installation due to small variances in line speeds and encoder setup. See the *FH Flyer Marking Head Operator's Manual* or *Fenix Flyer CO_2 Laser Marker Operator's Manual* for complete information on configuring a successful tracking application.
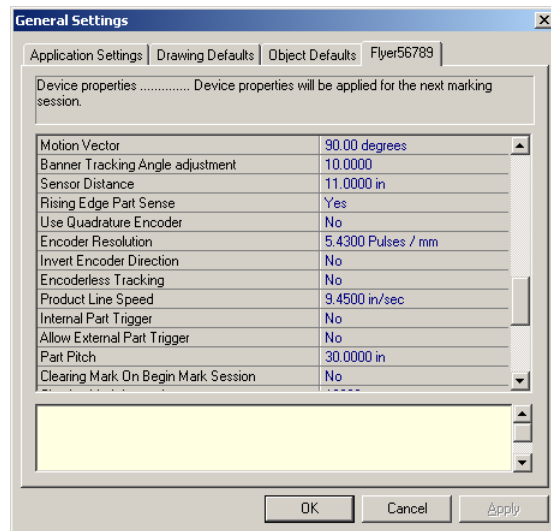
Figure 14-7 "Device" (Flyer) tab – Tracking properties

Motion Vector

Set the direction of part movement through the marking field. When looking at WinMark's *Drawing Canvas*, 0° is part movement towards the right, 90° is movement towards the bottom, 180° is towards the left, and 270° is part movement towards the top of the *Drawing Canvas*.

When Track Marking Object is set to *Yes*, a motion arrow appears to the left of the *Drawing Canvas* showing the direction of the currently entered Motion Vector.

Banner Tracking Angle Adjustment

Fine-tune any angular misalignment of the Flyer/Fenix Flyer head to part movement. The angle adjustment is accurate to 0.0001 degrees, but can only provide ±0.15° of adjustment. Any further adjustment must be made by physically moving the marking head or parts handling equipment. See WinMark Pro Application Note #8, *WinMark Pro's Banner Tracking Functionality* (on the WinMark web site at http://www.winmark.com/products/winmark_ApplicationsNotes.html), for details on banner tracking setup and optimization.

Sensor Distance

Use Sensor Distance (the distance, at the moment of part sense, from the centerline of the *Marking Window* to the leading edge of the desired mark location on the part) to change the location of the mark on the part in the axis of part motion. In WinMark Pro v6, Sensor Distance units correspond to the selected Show Units Type—*Inches*, *Millimeters* or *Centimeters*.

Tip: Position the physical location of the part sensor so that the sensor does not trigger while the Flyer head is marking a part. "Line speed too fast – missed start" errors may occur if the 'start mark' input is triggered while Flyer is marking in tracking mode.

Rising Edge Part Sense

Set to *Yes* to trigger marking on the rising edge of the part sensor's output signal. Select *No* to trigger marking on the sensor signal's falling edge.

Use Quadrature Encoder

Choose *Yes* to specify a quadrature encoder input where 'A' and 'B' phases generate direction and part movement information. If *No*, the expected input is a part movement signal from a unidirectional encoder. A unidirectional encoder is appropriate in applications where the product transport does not reverse direction during marking.

Encoder Resolution

Set the number of encoder pulses counted per millimeter of distance traveled by the product conveyor. Measurement units are fixed as pulses/mm even when WinMark is configured to display measurement units in *Inches* or *Centimeters*.

Invert Encoder Direction

Toggle *Yes/No* to invert phasing of a quadrature encoder's bi-directional output signal so that the actual direction of part movement through the mark field is correctly sensed as "forward". This property allows you to invert phasing of the encoder's 'A' and 'B' outputs without physically changing field wiring.

Encoderless Tracking

When set to *No*, XY position data is generated based on input signals from an external position encoder. This provides the most accurate mark results because Flyer compensates for any slight deviation in line speed.

If products travel through the marking area at a <u>constant</u> velocity and no encoder is installed, select *Yes*. This causes Flyer to generate XY data at a fixed rate determined by the Product Line Speed property.

Important Note: Use Encoderless Tracking only in applications where line speed is tightly regulated. Any variation in product speed may result in poor quality marks.

Product Line Speed

When the Encoderless Tracking property is *Yes*, enter a Product Line Speed value (in the selected units of measure) that is equal to conveyor or part velocity. Adjust Product Line Speed as required to fine-tune tracking to actual part motion.

Internal Part Trigger

Set to *No* if an external part sensor is connected to your system. If sensor installation is not feasible (for example, in a continuous web process), choose *Yes*. This causes Flyer to generate internal triggers at the distance interval specified by the Part Pitch property.

Note: When Internal Part Trigger is set to *Yes*, Flyer still accepts external triggers. This feature allows you to send an initial external trigger to synchronize mark placement to a specific area on the web. After the first externally triggered mark, subsequent marks are lased as the Internal Part Trigger property initiates marking at the Part Pitch interval *or* when the external trigger (*IN0*) goes active.

Allow External Part Trigger

When Internal Part Trigger is *Yes*, choose *Yes* to allow Flyer to accept external part trigger signals on input *IN0*. (for example, an initial external trigger can synchronize marking to a specific location on a continuous web with subsequent marks determined by the Part Pitch value). Choose *No* to ignore any signals on input *IN0*.

Part Pitch

When Internal Part Trigger is *Yes*, enter a Part Pitch in the selected units of measure. Part Pitch (or *Mark Pitch*) determines where the mark is placed on the part and is defined as the distance, in the axis of part motion, from the leading edge of the mark on one part to the leading edge of the mark on the following part.

Maintenance properties

Flyer maintenance properties (Figure 14-8) allow you to enable and configure the clearing mark function.
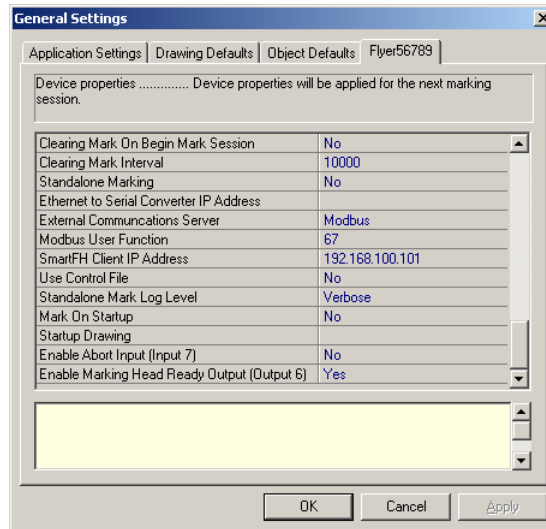
Figure 14-8 "Device" (Flyer) tab – Maintenance, stand-alone, and I/O properties

The clearing mark was developed to help a small segment of customers whose mark consists of long durations of high frequency, small angle movements. This non-lasing clearing move is designed to redistribute lubricant along the galvanometer's bearing raceway and to reposition ball bearings around the race to promote a continuous and evenly worn bearing race. For more information about the how the clearing mark feature can increase the service lifetime of FH Flyer marking heads and Fenix Flyer Laser Markers, refer to SYNRAD Technical Bulletin # 07 or see the *FH Flyer Marking Head Operator's Manual* or *Fenix Flyer CO$_2$ Laser Marker Operator's Manual* for details.

Clearing Mark On Begin Mark Session

When set to *Yes*, the Clearing Mark On Begin Mark Session initiates a clearing mark at the start of each mark session. The default setting is *No*.

Clearing Mark Interval

If Clearing Mark On Begin Mark Session is set to *No*, then select a Clearing Mark Interval. This enables a clearing mark after the specified number of marks has occurred, even across multiple mark sessions. For those customers who require a clearing mark, SYNRAD recommends an interval of once every 10,000 marks. The default is *Never*.

Stand-alone properties

Stand-alone properties (shown back in Figure 14-8) configure the Flyer head to function independently of a Windows computer. In stand-alone mode, Flyer operates autonomously—communicating to automation equipment using discrete I/O signals—with no connection to the WinMark Pro computer. Refer to the *FH Flyer Marking Head Operator's Manual* or *Fenix Flyer CO$_2$ Laser Marker Operator's Manual* for complete information on stand-alone setup and operation.

Standalone Marking

Set to *No* (the default setting) when you wish to control Flyer from the WinMark Pro computer—during mark file development, for example. When set to *Yes*, Flyer operates autonomously using mark files stored in its Filestore or on a network share.

Ethernet to Serial Converter IP Address

When using an Ethernet-to-serial converter to send serial port data to a Flyer/Fenix Flyer head operating in Stand-alone mode, enter the IP address of your converter. When configuring your converter, the converter's port address ***must*** be set to 7963.

External Communications Server

The SYNRAD external Ethernet communications server (SynComm), available on FH Flyer marking heads and Fenix Flyer Laser Markers running firmware version 2.59 or above over a network using the Modbus® protocol, allows users to access various marking head functions via Flyer's *Ethernet* port using one of four different protocols: (1) Modbus/IP protocol for interaction with PLCs or other MODBUS network devices; (2) Modbus-Asynchronous protocol, a SYNRAD-modified Modbus protocol for peer-to-peer communications; (3) SmartFH protocol, provided as legacy support for customers who have upgraded existing FH Smart systems to FH Flyer and wish to continue using custom programs written specifically for FH Smart marking heads over Ethernet; and (4) SmartFH-Client protocol, to allow a SmartFH application to communicate with Flyer through a serial-to-Ethernet converter.

Note: To enable the Flyer web page's *Mark*, *Abort*, and *Status* button functionality, set the External Communications Server property to *Modbus* or *Modbus-Async* and then set Standalone Marking to *Yes*.

For complete details about using the external Ethernet communications server using the Modbus protocol, see *WinMark Application Note # 05*, as well as sample Visual Basic and Visual C++ code on the WinMark web site at: http://www.winmark.com/products/winmark_activexsamples.html.

Modbus User Function

Specify a user function code when operating on a Modbus network. Valid codes are within the range of 65–72 and 100–110 decimal; the WinMark default value is 67. A Modbus user-defined function code allows you to perform many of the operations necessary for marking head control over a Modbus network.

SmartFH Client IP Address

In applications where a Flyer/Fenix Flyer unit is replacing an FH Smart marking head communicating to control equipment via an RS-232 link, use this property to set the IP address of the customer-supplied Ethernet to RS-232 converter.

Use Control File

When set to *Yes*, Flyer operates in subset of stand-alone mode based on configuration data from a pre-defined Master Control File. See the Stand-alone Operation chapter in your *FH Flyer Marking Head Operator's Manual* or *Fenix Flyer CO$_2$ Laser Marker Operator's Manual* for details.

Standalone Mark Log Level

When operating in stand-alone mode, choose a mark log level. Based on the Standalone Mark Log Level chosen, Flyer sends one of five types of information back to WinMark Pro (when connected to the Flyer head). From the least amount of logging to the most, the options are: *Errors Only*, *Light*, *Normal* (default), *Verbose*, and *Everything*.

Mark On Startup

When operating in stand-alone mode and Mark On Startup is set to *Yes*, Flyer automatically loads the specified Startup Drawing on boot-up and begins the mark session immediately.

Startup Drawing

Flyer loads the specified drawing when operating in stand-alone mode and Mark On Startup is set to *Yes*. The Startup Drawing may reside in Flyer's Filestore or on a network share.

I/O properties

I/O properties (shown back in Figure 14-8) allow you to configure the Flyer/Fenix Flyer head to interface in specific ways with automation equipment.

Enable Abort Input (Input 7)

On FH Flyer marking heads and Fenix Flyer Laser Markers, you can configure input *IN7* in one of two ways—as a normal input read by WinMark Pro or as an 'abort marking' input. When Enable Abort (Input 7) is *Yes*, an input signal on input *IN7* will halt the current mark session and execute any defined On Abort Session events. If set to *No*, input *IN7* functions as a normal automation input.

Enable Marking Head Ready Output (Output 6)

When set to *Yes*, Flyer/Fenix Flyer output *OUT6* is activated when the head is booted up. This action signals automation equipment that the head is operational and ready to accept commands.

15 Drawing properties

The *Drawing properties* chapter includes sections:

■   Tracking tab

■   Automation tab

■   Marking tab

■   All tab

All objects created or imported onto the *Drawing Canvas* have sets of properties associated with them. These properties allow you to define how each specific object is displayed or marked. In addition to objects you place on the *Drawing Canvas*, the *Drawing* object itself (the .mkh marking file) contains properties that allow you to apply global changes for tracking, marking output, or communication with automated parts handling equipment. Click on *Drawing* in the *Object List* or click the *Drawing Canvas* itself to select the *Drawing* object.

Drawing properties are classified by category in the *Property List* and include *Automation*, *Marking*, and *All* tabs. Click on the *All* tab to display all properties for the *Drawing* object.

Tracking tab

The *Tracking* tab no longer exists in WinMark v6. Because tracking properties are head-specific, tracking properties are now located on the "*Device*" (Flyer) tab (from the *Tools* menu under *General Settings…*). These properties are always available whether tracking is enabled or disabled.

To enable tracking, or banner marking, set the Track Marking Object property (located on the *Drawing's Marking* tab) to *Yes*.

Automation tab

Automation events for the *Drawing* (Figure 15-1) occur at various stages during the marking process as illustrated in the *Automation Flowchart* (refer back to Figure 13-19, *Automation flowchart*). Certain events execute predefined Event Builder commands that perform various automation functions while other events exert input/output (I/O) control through marking head I/O bits. These events establish interface protocols between WinMark Pro and your parts handling equipment and are specific to each individual drawing. Refer back to Chapter 10, *Marking parts*, for a detailed flowchart illustrating the marking automation sequence.
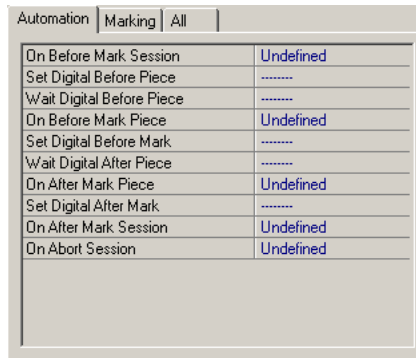
Figure 15-1 Automation tab Drawing properties

On Before Mark Session

Define events you wish to trigger only once prior to the start of part marking in the current mark session. Click the ellipsis (…) to open the *Event Builder* dialog box and view a list of definable events. See Chapter 17, *Event Builder commands*, for descriptions of available commands.

Set Digital Before Piece

Set a specific digital output state on any or all output bits prior to each piece being marked. For example, your parts handling equipment may require that a specific output bit be set or cleared to indicate the laser is off before staging a new part. See Chapter 11, *Automation basics*, for descriptions of available outputs.

Wait Digital Before Piece

Wait indefinitely for a specific digital input state on any or all input bits before program execution continues. For example, your parts handling equipment may set or clear a specific input bit to indicate a new part is properly positioned. See Chapter 11, *Automation basics*, for descriptions of available inputs.

Note: Typically, input *IN0* and the Wait Digital Before Piece event are used to provide 'start mark' signals to WinMark Pro. When *IN0* is specified as *Set*, WinMark waits until the specified input state is met—*Set* equals a logic high (1) state; *Clear* equals a logic low (0) state. WinMark continues executing the automation loop <u>only</u> after the specified input state is logically True.

Tip: When using the Fast Acting Safety Interlock (FASI) feature, configure inputs *IN0* and *IN3* as *Set*. This forces WinMark to wait for both the 'start mark' signal (*IN0*) **and** the FASI enable signal (*IN3*) to be active before marking. Waiting for *IN3* when FASI is enabled prevents unmarked parts from sequencing through the system.

On Before Mark Piece

Define events you wish to trigger once before each piece is marked. Click the ellipsis (…) to open the *Event Builder* dialog box and view a list of definable events. See Chapter 17, *Event Builder commands*, for descriptions of available commands.

Set Digital Before Mark

Set a specific digital output state on any or all output bits immediately before each piece is marked. For example, your parts handling equipment may require that a specific output bit be set or cleared to indicate the laser is on and marking. See Chapter 11, *Automation basics*, for descriptions of available outputs.

Important Note: WinMark Pro fires the laser <u>immediately</u> after the Set Digital Before Mark command is executed.

Wait Digital After Piece

Wait indefinitely for a specific digital input state on any or all input bits before program execution continues. For example, your parts handling equipment may set or clear a specific input bit to indicate a new part is being positioned. See Chapter 11, *Automation basics*, for descriptions of available inputs.

Note: Typically, input *IN0* and the Wait Digital After Piece event are used to provide the 'end mark' signal to WinMark Pro. When *IN0* is specified as *Clear*, WinMark waits until the specified input state is met—*Set* equals a logic high (1) state; *Clear* equals a logic low (0) state. WinMark continues executing the automation loop <u>only</u> after the specified input state is logically True.

> ⚠ **Warning**
>
> serious personal injury
>
> When the Wait Digital Before Piece Automation event is used to provide a 'start mark' signal, then Wait Digital After Piece <u>must</u> be used to verify that the 'start mark' signal has changed state. Failure to do so may cause unintended laser firing as WinMark Pro loops back through to the start of the automation sequence.

Tip: To minimize throughput delays, use Set Digital Before Mark to send a "laser on" signal to your automation controller. A signal at this step means that WinMark Pro has processed the 'start mark' signal. Your controller can then set the desired 'end mark' input state to ensure that there is no delay at the Wait Digital After Piece step after marking is complete.

On After Mark Piece

Define events you wish to trigger once after each piece is marked. Click the ellipsis (…) to open the *Event Builder* dialog box and view a list of definable events. See Chapter 17, *Event Builder commands*, for descriptions of available commands.

Set Digital After Mark

Set a specific digital output state on any or all output bits immediately after each piece is marked. For example, your parts handling equipment may require that a specific output bit be set or cleared to indicate the laser is off before staging a new part into position. See Chapter 11, *Automation basics*, for descriptions of available outputs.

On After Mark Session

Define events you wish to trigger only once after all marking in the current session is complete. Click the ellipsis (…) to open the *Event Builder* dialog box and view a list of definable events. See Chapter 17, *Event Builder commands*, for descriptions of available commands.
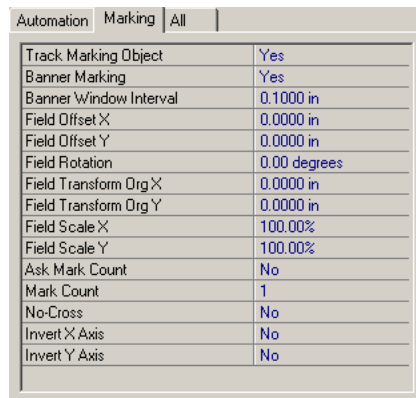
Note: A mark session ends when the number of parts marked equals the Mark Count value. In automated systems where Mark Count is zero (0) and marking proceeds continuously as directed by 'start mark' inputs, the mark session does not end, so On After Mark Session events are not executed.

On Abort Session

Define events you wish to trigger only once if the mark session is aborted or halted by the user (by pressing the ESC key, for example). Click the ellipsis (…) to open the *Event Builder* dialog box and view a list of definable events. See Chapter 17, *Event Builder commands*, for descriptions of available commands.

Marking tab

Marking properties for the *Drawing* (Figure 15-2) perform global drawing transformations such as positioning or scaling your drawing on the part. Drawing transformations only affect actual marking output; the *Drawing Canvas* display does not change.

Figure 15-2 Marking tab Drawing properties

Track Marking Object

Select *Yes* to mark moving parts "on-the-fly" with the Tracker feature or to enable Banner Marking. Choose *No* to mark stationary objects in Index (static) mode.

Banner Marking

When Track Marking Object is enabled (*Yes*), select *Yes* to track and mark objects that extend beyond the normal extents of the *Drawing Canvas*. See the WinMark Pro web site at http://www.winmark.com/products/winmark_ApplicationsNotes.html and download Application Note #8, *WinMark Pro's Banner Tracking Functionality*, that describes how to configure a Flyer/Fenix Flyer marking system for banner tracking.

Banner Window Interval

When Banner Marking is *Yes*, enter a length for the repeating banner tracking window. Ideally, the Banner Window Interval value should be no more than 50% to 75% of the focusing lens' maximum mark size.

Field Offset X

Enter the amount of offset required in the X-direction when marking. The drawing is offset from the transformation origin point specified by the Field Transform Org X and Field Transform Org Y properties.

Field Offset Y

Enter the amount of offset required in the Y-direction when marking. The drawing is offset from the transformation origin point specified by the Field Transform Org X and Field Transform Org Y properties.

Field Rotation

Enter the amount of drawing rotation required around the transformation origin when marking. Field Rotation is accurate to two decimal places (0.01°). The drawing is rotated from the transformation origin point specified by the Field Transform Org X and Field Transform Org Y properties.

Note: In WinMark Pro versions 6.3.0.7328 and above, when the *Drawing's* Field Rotation is set to other than 0.00 degrees, the *Mark Preview* window now displays the actual mark rotation referenced to the fixed *Drawing Canvas* display.

Field Transform Org X

Specify the transformation X-origin required when offsetting, rotating, or scaling a drawing. The default X origin point is 0.0000 inches.

Field Transform Org Y

Specify the transformation Y-origin required when offsetting, rotating or scaling a drawing. The default Y origin point is 0.0000 inches.

Field Scale X

Specify the percentage of X-axis field scaling around the transformation origin.

Field Scale Y

Specify the percentage of Y-axis scaling around the transformation origin.

Note: If Field Scale X and Field Scale Y are set to different values, the non-proportional field scaling will cause mark distortion.

Note: In WinMark Pro versions 6.3.0.7328 and above, Field Scale X and Field Scale Y values can be fine-tuned to accuracies of 0.01%.

Ask Mark Count

If set to *Yes*, the *Piece Count* dialog box appears before marking begins. This dialog prompts the operator to enter the total number of marks required during the current mark session.

Mark Count

Specify the number of marks required during the mark session. If zero (0) is entered, marking continues under the control of event automation indefinitely until halted by pressing the ESC key.

Important Note: When Mark Count is set to zero (0), you must configure WinMark Pro's automation and I/O features to wait for 'start mark' and 'end mark' signals from parts handling equipment so that marking continues only when an indication is received that another piece is in position and is ready to mark.

No Cross

Select *Yes* to prevent the beam from crossing a previously marked polyline. Use this feature to minimize hot spots on low threshold materials like plastics in situations where polylines intersect or cross each other.

No Cross Gap

If No Cross is set to *Yes*, enter a No Cross Gap dimension. No Cross Gap specifies the total non-marking gap across the intersected polyline.

Invert X Axis

Invert marking output along the horizontal axis.

Invert Y Axis

Invert marking output along the vertical axis.

All tab

All applicable drawing properties from *Automation* and *Marking* tabs are included on this single tab.

16 Object properties

The *Object properties* chapter includes sections:

- Special tab

- Automation tab

- Marking tab

- Format tab

- All tab

All objects created or imported on the *Drawing Canvas* have sets of properties associated with them. These properties allow you to define how each specific object is displayed and marked. Select an object on the *Drawing Canvas* or highlight an object name in the *Object List* to review or modify its properties. Object properties are classified by category in the *Property List* and include *Special*, *Automation*, *Marking*, *Format*, and *All* tabs.

Special tab

Special object properties (Figure 16-1) apply to objects contained within the drawing.
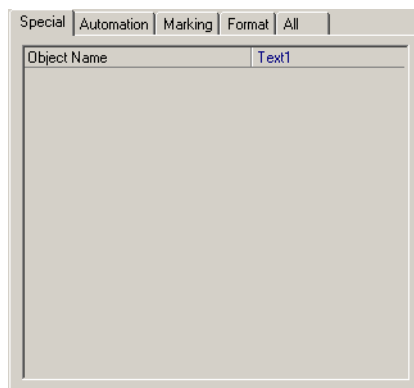
Figure 16-1 Special tab Object properties

Object Name

Enter a specific descriptive name for each object created or imported onto the *Drawing Canvas*.

Automation tab

Automation object properties (Figure 16-2) apply only to text, 1D, and 2D bar code objects contained within the drawing. These properties automate the serialization or coding of parts.

Special	Automation	Marking	Format	All	
Auto Text Type					Serial Number Text
Auto Text Within Array					Yes
Auto Text Without Marking					No
Execute Auto Text When					Before Mark
Serial Number Delta					1
Serial Number Mask					SSSS
Serial Piece Step					1
Hexadecimal Count					No
Ask Starting Serial					No
Save Last Serial					Yes
Save Serial Name					Slot-0
Current Saved Value					00001
Clearing Interval					None

Figure 16-2 Automation tab Object properties

Auto Text Type

Select the automated text input source from among *None*, *Serial Number Text*, *Date Code Text*, *Disk File Text* (Sequential or Fixed), *Serial Port Text*, *User Entry Text*, *From Another Object*, or *UID/Composite*. Your choice of automated input determines which associated properties appear on the *Automation* tab.

Note: Some automated text and barcode captions are updated on the *Drawing Canvas* when the object is selected or deselected. Dates, times, and From Another Object sources are updated. Serial numbers are updated if Save Last Serial is *Yes*. Serial port and disk file text is not updated until the source is read during the mark sequence.

None

No automation is performed on the text object. The Text Caption is marked as displayed in the *Text Caption Editor* dialog box.

Serial Number Text

Serialize numerals, alphabetic characters, or alphanumeric strings entered as the Text Caption. When Serial Number Text is selected, the following serialization sub-properties appear on the *Automation* tab: Serial Number Delta, Serial Number Mask, Serial Piece Step, Hexadecimal Count, Ask Starting Serial, Save Last Serial, Save Serial Name, Current Saved Value, and Clearing Interval.

Serial Number Delta

Choose a value with which to increment (positive values) or decrement (negative values) the serial number string before, or after, each mark.

Note: Only alphanumeric characters are serialized. Non-alphanumeric characters ("@", "*", etc.) remain as entered in the string.

Serial Number Mask

Specify which alphanumeric characters in the serial number string should be Serialized (the default setting) or Fixed. From the drop-down list, select a placeholder position and then choose *Serialize* or *Fixed*.

Tip: Non-alphanumeric characters are ignored by the serialization protocol so that characters such as dashes (–), colons (:), etc need not be *Fixed* by Serial Number Mask.

Serial Piece Step

Specify how many pieces (parts) to mark before the serial number is incremented or decremented.

Hexadecimal Count

Choose *Yes* to increment/decrement serial numbers using the hexadecimal (base 16) number system. Choose *No* to count in decimal (base 10).

Ask Starting Serial

When set to *Yes*, a dialog box opens at the beginning of each mark session prompting the operator to enter a starting serial number.

Save Last Serial

Restore the last serial number marked when the next mark session begins.

Save Serial Name

When Save Last Serial is *Yes*, use Save Serial Name to create a unique name for storing the Save Last Serial number. The actual number is stored in the computer's *System Registry* and so is not accessible by programs other than WinMark Pro. The default name is "Slot-0".

Important Note: If more than one mark file exists for serializing parts, each file must specify a different Save Serial Name to prevent serial values from being overwritten.

Note: In Flyer's stand-alone control mode (when mark files are saved in the Filestore), the Save Serial Name property stores the Save Last Serial number in Flyer's non-volatile memory.

Current Saved Value

Contains the current Save Last Serial number value. When creating a mark file, the initial value entered should contain as many placeholder zeros as the maximum number you wish to serialize before rolling back over to zero. For example, if only one zero is entered for Current Saved Value, then mark one =1, mark two = 2...... mark nine = 9, mark ten = 0, and mark eleven = 1.

Important Note: When serializing text and Save Last Serial is set to *Yes*, the character string entered for Current Saved Value, not Text Caption, is used for marking.

Clearing Interval

The Clearing Interval property allows you to select a time, to the minute, when the current serial number is reset to zero. The serial number can be reset *None* (never), *Hourly*, *Daily*, *Weekly*, *Bi-Weekly*, *Monthly*, *Quarterly*, *Bi-Annually*, or *Yearly*.

When Clearing Interval is set to other than *None*, the following Clearing Interval sub-properties appear on the *Automation* tab: Clearing Month, Clearing Day of Month, Clearing Day of Week, Clearing Hour, and Clearing Minute. Not all sub-properties are available for all Clearing Interval categories.

Clearing Month

Enter the month (January–December) in which to reset the current serial number.

Clearing Day of Month

Enter the day of the month (1–28) in which to reset the current serial number.

Clearing Day of Week

Enter the day of the week (Sunday–Saturday) in which to reset the current serial number.

Clearing Hour

Enter the hour (0–23) in which to reset the current serial number.

Clearing Minute

Enter the minute (0–59) in which to reset the current serial number.

Date Code Text

Mark standard or customized date and time formats. When Date Code Text is selected, the following date code sub-properties appear on the *Automation* tab: Assign Date Format, Time Offset: Days, Time Offset: Hours, and Time Offset: Minutes.

Assign Date Format

Click the ellipsis (…) to select or define specific date code formats. From the *Date Format Customization* dialog box, select from among *American Standard*, *European Standard*, *Week-Year*, or *Julian* formats or click the *Add Format* button to create an unlimited number of custom date formats. When coding by shift, the *Define Shifts* button allows you to customize shift start and shift end hours as well as shift codes.

Note:　In WinMark Pro v6, custom date formats are saved in the mark file as well as in the development computer's *System Registry*. This prevents an "undefined" format error from occurring when files with Custom Date Formats are loaded on different computers or on a Flyer head operating in stand-alone mode.

To create a custom date format:

1　In the *Date Format Customization* dialog box (Figure 16-3) click the *Add Format* button.
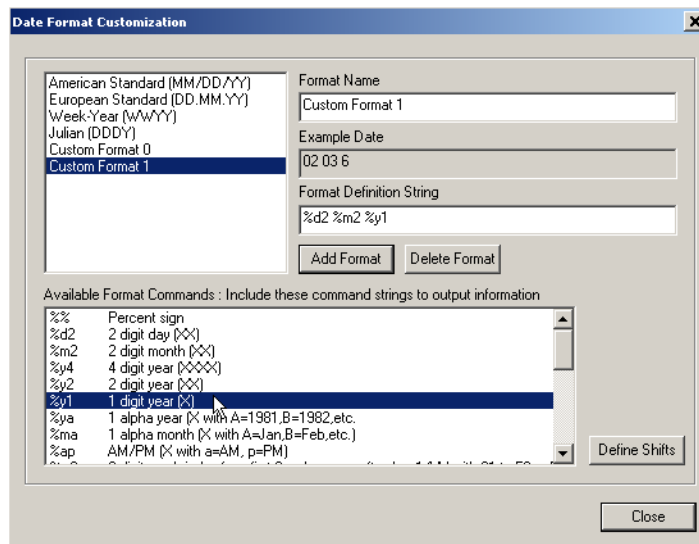
Figure 16-3　Date Format Customization dialog box

2　If desired, type a descriptive name in the *Format Name* box.

3　Browse the *Available Format Commands* box for available date or time formats.

4　Double-click the desired format commands or click in the *Format Definition String* box and type in commands to create a custom format string.

5　When done, click the *Close* button.

Tip: The percentage sign (%) is used by WinMark Pro to indicate a pre-defined date format command. To add a percentage sign to your date format, type %%.

Tip: The *Example Date* box shows how the *Format Definition String* will look when marked. You can add spaces, dashes, or other fixed alphanumeric characters within the string by typing characters between definitions in the *Format Definition String* box.

Time Offset: Days

Specify a positive or negative offset from the current day (–9999 to 9999); for example, when printing expiration dates.

Time Offset: Hours

Specify a positive or negative offset from the current hour (–23 to 23); for example, when printing expiration dates or fine-tuning shift code changes.

Time Offset: Minutes

Specify a positive or negative offset from the current minute (–59 to 59); for example, when printing expiration dates or fine-tuning shift code changes.

Disk File Text (Seq)

Automatically opens and reads a multi-line disk file (saved in a .TXT format). Beginning with the first line of text, each loop through the mark session causes WinMark to assign the next (sequential) line of text in the file as the text object's Text Caption. When Disk File Text (Sequential) is selected, the following disk file sub-properties appear on the *Automation* tab: Text Source Filename and Auto Text File Wrap.

Important Note: Because WinMark Pro reads the entire file when it is initially opened, you cannot update the file during the current mark session.

Note: When using Disk File Text (Seq) input, each text string must end with a Carriage Return (CR) character to indicate 'end of data'.

Tip: About Flyer/Fenix Flyer's Circular File feature when Auto Text Type is Disk File Text (Seq) or Disk File Text (Fixed):

FH Flyer marking heads and Fenix Flyer Laser Markers have the ability to sequentially read up to ten specially named data (.TXT) files when AutoText Type is either Disk File Text (Seq) or Disk File Text (Fixed). This feature provides the ability to update network data files using a third-party software process while WinMark is marking another data file.

To setup this Circular File feature, simply create one to ten data files using the format: "filename.0.txt", "filename.1.txt", ..., up through "filename.9.txt" (without quote marks); where filename can be any name, but must be the *same* name for all ten files. Enter the name of the first file in the list for Disk File Text's Text Source Filename property. After reading all lines of data in "filename.0.txt", Flyer will open "filename.1.txt" and continue marking. If Flyer does not see the next logical index in the series, it loops back to "filename.0.txt" and continues marking. Note that while WinMark has a file open for marking, you can use a separate third-party process to update closed files without interfering in the mark process.

Text Source Filename

Specify a path and filename pointing to the location of the text source file to read.

The format of the text source path depends on whether the file will be accessed by WinMark Pro, or a custom ActiveX application, (Windows OS) or by a Flyer head operating in Stand-alone mode (Linux OS). For Windows operations, pathnames must be written using a backslash (\) character; for example, *C:\MarkFileFolder\TextFile.txt*. For Linux operations, pathnames must be written using a forward slash (/) character; for example, */network/MarkFile-Folder/TextFile.txt*.

Auto Text File Wrap

If set to *Yes*, WinMark Pro reads each item in a sequential disk file and after the last item is read, wraps back around to the beginning item. Use Mark Count (on the *Marking* tab) to specify the number of iterations through the file. Because one line of text is read on each pass, each line in the disk file must end with a Carriage Return (CR) to provide the 'end of data' delimiter.

Serial Port Text

(For Flyer/Fenix Flyer heads operating in WinMark control mode) Automatically open, read, and mark a text string from your computer's serial communications port. Each time the specified communications port is read, serial port data is assigned to the text object's Text Caption. When Serial Port Text is selected, the following serial port sub-properties appear on the *Automation* tab: Text From Com Port, Com Port Timeout, and Close Comport After Read.

Note: When using Serial Port Text input, the text string must end with a Carriage Return (CR) character to specify 'end of data'. For multi-line text strings, use a Line Feed (LF) character to force a line wrap and then end the last line with a Carriage Return.

Text From Com Port

Specify which communications port on your computer contains the incoming serial text string.

Click the Text From Com Port property and then click the down arrow to see a list of available com ports detected on your computer.

Click the ellipsis (…) to open the *Serial Port Settings* dialog. This dialog allows you to view and modify WinMark's serial port settings (Figure 16-4) as required by your serial communications network. WinMark Pro v6 supports serial baud rates between 2400–115200 baud.
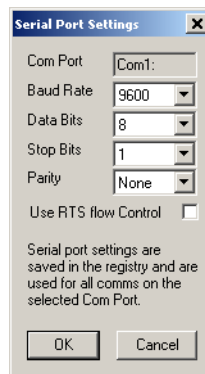
Figure 16-4 Serial Port Settings dialog box

Com Port Timeout

Set the communications port timeout period in milliseconds. The mark will fail if information is not available at the port within the specified time. A timeout value of –1 forces WinMark Pro to wait indefinitely until a message is received or the ESC key cancels the mark session.

Close Comport After Read

The recommended (default) setting is *No*, which means the computer's com port is opened during the initial com port read and remains open throughout the mark session. Choosing *Yes* forces the com port to close after each read operation in cases where subsequent serial data must be ignored. The com port is then reopened when the next serial port read is commanded.

User Entry Text

Prompt the operator to manually enter a text string for each piece in a mark session. When User Entry Text is selected, the following user entry sub-property appears on the *Automation* tab: Text User Prompt.

Text User Prompt

Create a customized dialog box prompting the operator to enter the required mark data.

Disk File Text (Fixed)

Open, read, and mark a text string from a predefined disk file. Each time the file is read, the text string in the file is assigned as the text object's Text Caption. When Disk File Text (Fixed) is selected, the following disk file property appears on the *Automation* tab: Text Source Filename.

Note: When using Disk File Text (Fixed) input, the text string must end with a Carriage Return (CR) character to specify 'end of data'.

Text Source Filename

Specify a path and filename pointing to the location of the text source to read.

The format of the text source path depends on whether the file will be accessed by WinMark Pro, or a custom ActiveX application, (Windows OS) or by a Flyer head operating in Stand-alone mode (Linux OS). For Windows operations, pathnames must be written using a backslash (\) character; for example, *C:\MarkFileFolder\TextFile.txt*. For Linux operations, pathnames must be written using a forward slash (/) character; for example, */network/MarkFile-Folder/TextFile.txt*.

Tip: Although only one line of text is read from the file, the specified text file can be updated between marks by external processes.

From Another Object

Assign a text caption for the currently selected *Text*, *Barcode*, or *2D Barcode* object from another *Text*, *Barcode*, or *2D Barcode* object. Use From Another Object to ensure that variable text data shared between two objects remains synchronized throughout a mark session. When From Another Object is selected, the following object reference sub-property appears on the *Automation* tab: Assign From.

Note: When an object's Auto Text Type is set to From Another Object, the Execute Auto Text When property is disabled; mark data is always assigned from the reference object <u>before</u> each mark.

Note: WinMark Pro will not link to reference objects in an array when the referenced object's Auto Text Within Array property is *Yes*. This occurs because each element in the array of reference objects is serialized and marked independently before the selected object or array of objects is marked. If these conditions are present, WinMark Pro will prevent the mark session from opening and display an error dialog.

Assign From

Assign or copy Text Caption data from the referenced *Text*, *Barcode*, or *2D Barcode* object. Use the Assign From property to link variable data between two or more text-based entities.

Tip: If the referenced object's Execute Auto Test When *Before Mark/After Mark* property is changed, WinMark Pro automatically changes the mark order of selected and referenced objects as required to ensure that Text Caption data remains synchronized. These automatic changes to mark order are recorded in the Text Caption *Mark Log* at the beginning of a mark session. Where mark order is important, as in some tracking applications, select the reference object and choose the appropriate Execute Auto Test When *Before Mark/After Mark* property value to force the desired mark order.

UID/Composite

Create a Unique Identification (UID) 2D code, composite 2D code, or composite text string. For UID codes, choose a pre-defined UID format or add a new format to fit your specific requirement. Use UID/Composite to create a composite 2D code or text string; for example, an object that combines both an auto-updating date code string and an auto-serializing serial number string in a single 2D code or text object. When UID/Composite is selected, the following object reference sub-property appears on the *Automation* tab: Assign UID/Composite.

Assign UID/Composite

Assign 2D code data from a pre-defined UID format definition or create a custom UID or composite format string to mark. See WinMark Pro Application Note #6, *WinMark Pro's UID/Composite Code Functionality*, (at http://www.winmark.com/products/winmark_ApplicationsNotes.html) for details and a short tutorial on creating UID or composite 2D codes.

Auto Text Within Array

Enable the desired automation action within any array elements that exist. Choose *Yes* to mark each array element with a different value. Choose *No* to mark all array elements with the same initial value.

Auto Text Without Marking

The default setting, *No*, prevents non-marking autotext objects (text, barcodes, and 2D codes) from updating or serializing during a mark session (maintaining consistency with prior WinMark Pro program logic and legacy mark files).

When non-marking autotext objects are linked to UID/Composite codes, this property automatically defaults to *Yes*, so these non-marking "placeholder" data strings can pass updated caption data to the marked object.

Tip: To use the linked object to your UID/Composite code as marked, human-readable text, position the text object(s) as required, set Auto Text Without Marking to *No* and then set Mark Object (on the *Marking* tab) to *Yes*.

Execute Auto Text When
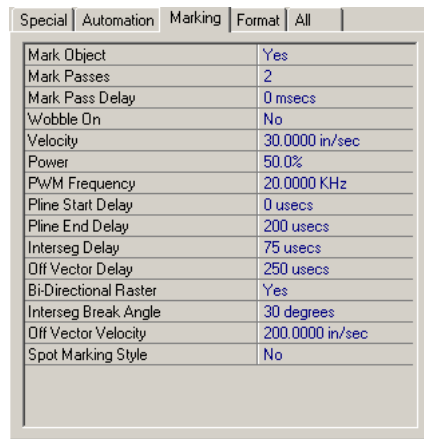
Set the desired automation action to occur either before or after the piece is marked. For example, if your starting serial number value is "000" and Execute Auto Text When is *Before Mark*, serialization occurs before the mark and the first value marked is "001".

Note: When an object's Auto Text Type is set to *Date Code Text*, the Execute Auto Text When property is disabled; date code data is always read from the computer's clock immediately <u>before</u> each mark.

Note: When the selected object's Auto Text Type property is set to: *From Another Object*, the Execute Auto Text When property is hidden and is replaced by the Assign From property. This occurs because the selected object derives its variable Text Caption data from the referenced object.

Marking tab

Marking object properties (Figure 16-5) apply to objects contained within the drawing and specify how a particular object will be laser marked. Most properties are common to all objects however; some properties apply only to specific types of objects, like text objects or bar code objects.

Special	Automation	Marking	Format	All	
Mark Object		Yes			
Mark Passes		2			
Mark Pass Delay		0 msecs			
Wobble On		No			
Velocity		30.0000 in/sec			
Power		50.0%			
PWM Frequency		20.0000 KHz			
Pline Start Delay		0 usecs			
Pline End Delay		200 usecs			
Interseg Delay		75 usecs			
Off Vector Delay		250 usecs			
Bi-Directional Raster		Yes			
Interseg Break Angle		30 degrees			
Off Vector Velocity		200.0000 in/sec			
Spot Marking Style		No			

Figure 16-5 Marking tab Object properties

Mark Object

Choose *Yes* to mark the current selection set. When *No* is selected, marking of selected objects is disabled. Although marking properties are hidden when marking is disabled, property values are retained by WinMark Pro.

Tip: The Boolean Mark Object property is often used in conjunction with MatchDigitalState Event Builder automation so that a *True* input condition causes the specified object or group to mark. Objects/groups are not marked (Mark Object set to *No*) if the corresponding input condition is *False*.

Tip: It is often useful to have marking instructions or reminders placed on the *Drawing Canvas* in view of the machine operator. Simply enter the desired instructional text, then size and position the text object. With only the text object selected, set Mark Object to *No*. Although visible, this text object will not mark and its presence on the *Drawing Canvas* does not affect mark cycle times.

Mark Passes

Specify the number of passes required to mark the selected object. On heat-sensitive materials, like plastics or glass, several low-power passes may be preferable to a single high-power pass.

Mark Pass Delay

When Mark Passes is greater than one, enter a delay, in milliseconds, between each pass.

Wobble properties

Wobble properties allow you to mark thick lines or strokes by "wobbling" the laser beam back and forth. Wobble lines are essentially thickened by marking shorter lines at right angles to the intended line segment. Line width is determined by the value specified for Wobble Thickness and line "resolution" is determined by Wobble Step Size. Although wobble provides the ability to create wide vector strokes, there is a significant increase in cycle time. Wobble is available for polyline, circle, stroke text, and imported vector objects.

Note: WinMark Pro imports some vector graphic files as a "*Polyline Set*" that must be exploded (*Objects/Explode*) into individual polylines before being "wobbled".

Wobble On

Choose *Yes* to mark thick line strokes by "wobbling" the laser beam.

Wobble Thickness

Specify the "wobble" width of line segments.

Wobble Step Size

Enter a specific distance between "wobble" steps.

Wobble Style

Choose one of three wobble styles. *Standard* indicates that each wobble line is marked unidirectionally from the same side of the polyline. *Bidirectional* forces WinMark to mark wobble lines alternating from side to side and is the quickest of the three wobble styles. The *Sawtooth* style provides additional "fill" by marking a diagonal line from the bottom of one wobble line to the top of the next wobble line.

Note: Although the mark is created as specified, there is no visible change to 'wobbled' polyline objects on the *Drawing Canvas*.

Velocity

Specify a galvanometer velocity when marking the selected object. When choosing Velocity values near the upper or lower limits, delay property values may require adjustment to prevent hot spots or "tailing". WinMark Pro limits Velocity values to a maximum of 300 inches per second (7620 mm/s).

Note: WinMark Pro allows a maximum marking Velocity of 300 inches per second (IPS); however, for Flyer/Fenix Flyer applications using the 80 mm focusing lens, Flyer limits actual optical scanner speed to a maximum value of 195 IPS (4953 mm/s) due to the 80 mm lens' small field size and angle of deflection.

Power

Enter a percentage of laser power required to mark the selected object. In WinMark Pro v6, you can change Power in 0.1% steps.

Min Power Threshold (Grayscale bitmap objects only)

For grayscale bitmaps, set a minimum power level. This value corresponds to the level of white in the grayscale image (when Bitmap Inverted is No). For example, if Min Power Threshold is 20.5% and Power is 65%, then 256 levels of gray are marked with white pixels marked using 20.5% of laser power and black pixels marked using 65% of laser power. In WinMark Pro v6, you can change Min Power Threshold in 0.1% steps.

PWM Frequency

Set a Pulse Width Modulation (PWM) frequency for each individual mark object in the drawing. FH Flyer marking heads and Fenix Flyer Laser Markers support PWM frequencies ranging from 1 to 50 kHz. Higher frequencies provide smoother lines while lower frequencies provide greater depth of modulation (greater optical output for a given Power—duty cycle percentage).

Resolution

Enter a marking resolution for the selected object. Units of measure are in microvectors per inch, which is roughly analogous to the more common dots per inch (DPI) terminology.

Important Note: In WinMark v6, *Polyline Set* and unfilled *Text*, *Polyline*, and *Circle* objects no longer have a Resolution property (unless Spot Marking Style is *Yes*). Flyer/Fenix Flyer heads mark these objects at the highest resolution possible for a given lens.

Note: Imported bitmap images are now resized according to the Resolution setting specified on the *Tools/General Settings…/Object Defaults* tab. Previously, WinMark Pro increased or decreased bitmap image size corresponding to a fixed bitmap resolution of 600 DPI. WinMark Pro does not resample bitmap images, but rather resizes them to preserve the image's total pixel count. For example, the overall dimensions of a 96 DPI image imported into WinMark at 300 DPI are automatically resized to 32% of the original height and width.

Tip: In order to import a bitmap image at full scale, WinMark's Resolution setting must match the file's resolution. For example, to import a file saved at 225 DPI, first check that the Resolution property on the *Tools/General Settings…/Object Defaults* tab is set to 225.

Delay properties

Because optical scanners require a finite amount of time to overcome mirror inertia and then move the mirror into position, optical scanner movement tends to lag slightly behind WinMark's software commands. Delay properties help "fine tune" the marking of each object in your drawing file.

Because Flyer's optical scanners exhibit a quicker response time than previous FH Series marking heads, you may need to adjust delay settings and Off Vector Velocity values in your existing mark files. If delay related marking problems occur when using WinMark Pro v6, adjust marking delays by performing the following steps:

1   Select an object or group of related objects on the *Drawing Canvas*.

2   In the *Property List*, click the *Marking* tab.

3   Scroll down to the delay section shown in Figure 16-6.
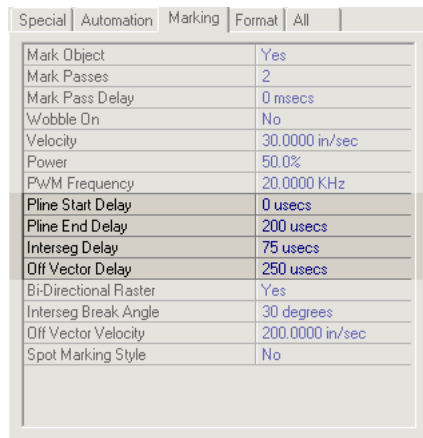
Figure 16-6 Delay settings

4   Write down your current delay settings for the problem objects.

5   Compare your delay settings with WinMark's default parameters for Flyer heads shown in Table 16-1:

Table 16-1 Default delay values

Delay	Flyer Default	FH Index/Tracker Default
Pline Start Delay	0 µs	100 µs
Pline End Delay	200 µs	450 µs
Interseg Delay	75 µs	350 µs
Off Vector Delay	250 µs	300 µs

6   Review Pline Start Delay, Pline End Delay, Interseg Delay, and Off Vector Delay descriptions on the following pages.

7   Make adjustments to the appropriate delays, ensuring that only one delay is adjusted at a time in order to avoid confusion and obtain the best trade-off between marking quality and marking speed.

Pline Start Delay

Use Pline Start Delay to minimize hot spots at the beginning of a polyline or the beginning of a series of polylines. See Figure 16-7 for illustrations of Pline Start Delay effects. Increase the delay to reduce dwell (hot spots) at the beginning of each polyline. If too large a delay is set, the beginning of a polyline may be shortened or shapes may not close properly. Pline Start Delay affects only the beginning of non-connected polylines.

Important Note: To compensate for Flyer's faster galvanometers, WinMark provides the ability to enter negative Pline Start Delay values. If polylines are shortened or shapes not closed when Pline Start Delay is at its default (0 µs) delay value, enter a negative value. For example, when marking alumina ceramic at high speeds, begin testing with a Pline Start Delay value of –1000.

Pline Start Delay   or   Pline Start Delay   Correct Use of
Too Short   Too Long   Pline Start Delay
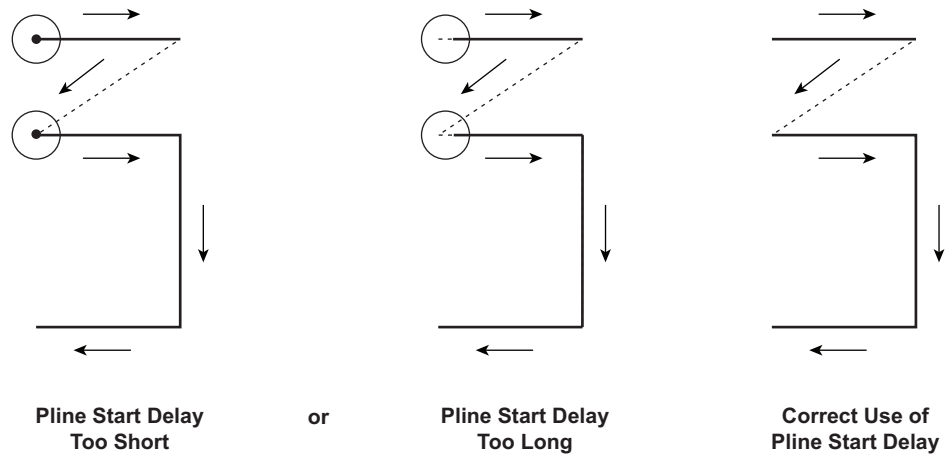
Figure 16-7 Pline Start Delay settings

Pline End Delay

Pline End Delay maintains "beam on" time at the end of a series of polylines to ensure that the current polyline is completed before moving to the next polyline vector. See Figure 16-8 for illustrations of Pline End Delay effects. Too much delay will create dwell, or hot spots, at the end of polylines; too little delay may cause short or incomplete polylines to be marked.

Pline End Delay   or   Pline End Delay   Correct Use of
Too Long   Too Short   Pline End Delay
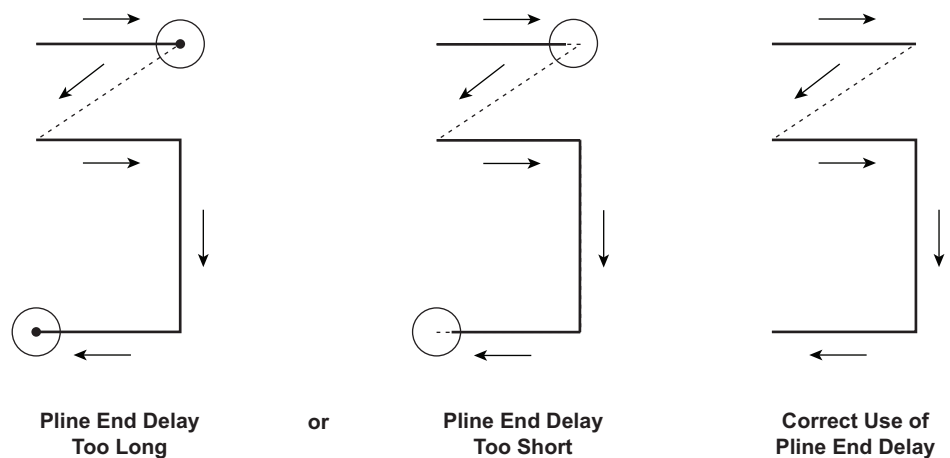
Figure 16-8 Pline End Delay settings

Interseg Delay

Interseg Delay sets a delay between marking connected polylines where the end point of the current polyline is the start point of the next polyline in the object. Interseg Delay increases the "sharpness" of points where polylines connect. See Figure 16-9 for illustrations of Interseg Delay effects. Too much delay creates dwell, or hot spots, at the end of polylines; too little delay causes corners to be rounded.

**Interseg Delay
Too Long**   **or**   **Interseg Delay
Too Short**   **Correct Use of
Interseg Delay**
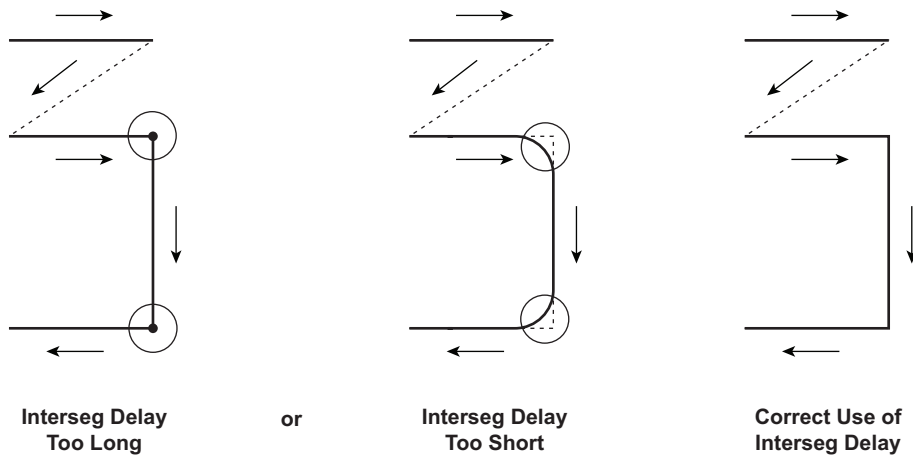
Figure 16-9 Interseg Delay settings

Off Vector Delay

Off Vector Delay sets a proportional delay during all laser off-vector moves to eliminate "tails" when moving between non-connected polylines. See Figure 16-10 for illustrations of Off Vector Delay effects. Too much delay will create a good mark, but marking throughput (cycle time) may be unacceptably slowed; too little delay may cause "tails", or leading marks, at the beginning of polylines.

**Off Vector Delay
Too Long (Causes
Long Cycle Times)**   **or**   **Off Vector Delay
Too Short**   **Correct Use of
Off Vector Delay**
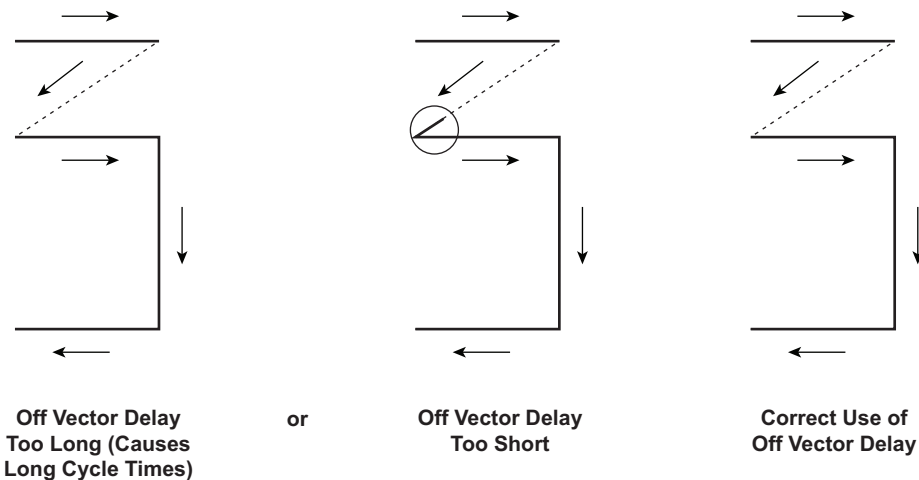
Figure 16-10 Off Vector Delay settings

Bi-Directional Raster (not available for unfilled arc or polyline objects)

Set Bi-Directional Raster to *Yes* to reduce cycle time when marking a filled (raster) image. If set to *No*, laser marking of bitmap or filled images is done in only one scan direction.

Note: When Bitmap Scan Type is set to *Continuous* (or when marking grayscale images), Bi-Directional Raster is disabled; marking occurs in only one direction although you can still specify a Raster Scan Direction.

Interseg Break Angle

Specifies a break angle between two connected polylines. No Interseg Delay is applied when the angle between two marked polylines is less than the specified angle. If the angle exceeds the Interseg Break Angle, then the Interseg Delay value is used. Figure 16-11 shows the results of marking two different angles using the default Interseg Break Angle of 30 degrees.

25° angles

90° angles

Angles are less than the specified Interseg Break Angle. No Interseg Delay is used.

Angles are greater than the specified Interseg Break Angle. Interseg Delay is used to prevent hot spots or rounded corners.
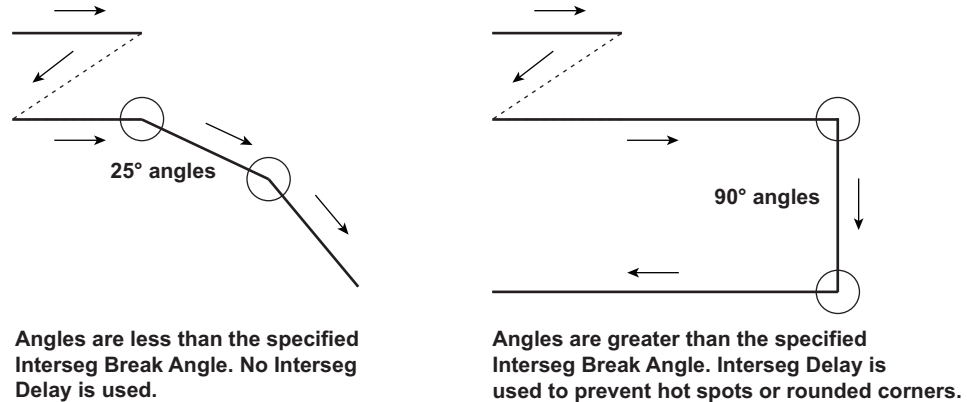
Figure 16-11 Interseg Break Angle settings

Off Vector Velocity

Set a non-marking velocity for galvanometers to travel between polyline endpoints.

Note: WinMark Pro allows a maximum marking Off Vector Velocity of 600 inches per second (IPS); however, because of lens field size and deflection angles, the Flyer head limits actual optical scanner speed to the following values: 80 mm lens – 195 IPS; 125 mm lens – 300 IPS; 200 mm lens – 480 IPS; 370 mm lens –600 IPS. Increasing Off Vector Velocity beyond these values may result in degraded mark quality.

Off Vector Resolution (not applicable with Flyer/Fenix Flyer heads)

Enter a non-marking resolution for the selected object. Units of measure are in microvectors per inch, which is roughly analogous to the more common dots per inch (DPI) terminology.

Important Note: Off Vector Resolution is fixed for FH Flyer and Fenix Flyer markers; these heads use the highest resolution possible for a given lens.

Spot Marking Style

When set to *Yes*, the mark is made using individual spots instead of a continuous line. Spot spacing is proportional to the Resolution setting.

Tip: The Spot Marking Style property is primarily used when marking glass to prevent fracturing or when marking very small vector-style 2D codes.

To mark 'spot-style' (one laser spot per cell) 2D codes with Flyer/Fenix Flyer heads using WinMark Pro v6, select the 2D code and, on the *Format* tab, set 2D Barcode Bitmap to *No*, 2D Barcode Circle Radius to 0%, and then on the *Marking* tab, set Spot Marking Style to *Yes*.

Spot Mark Duration

When Spot Marking Style is *Yes*, adjust the lasing duration in 1/10 of a millisecond (100 microsecond) intervals.

Lens Spot Size (Spot objects only)
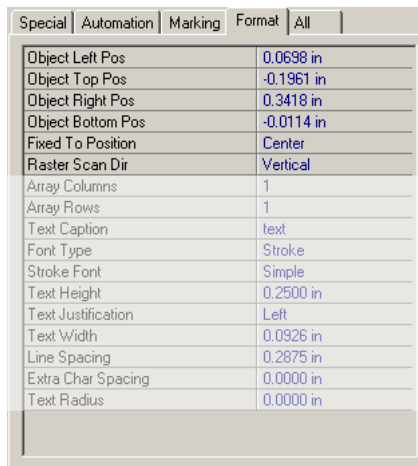
When using the *Spot Tool*, the Lens Spot Size property determines the size of the spot displayed on the *Drawing Canvas*. Set Lens Spot Size to *Yes* to view spots at the actual diameter created by the selected focusing lens. For example, when a 200 mm focusing lens is specified, a new spot object will display at a diameter of 0.011" (290 μm) instead of the default display size of 0.07" (1.78 mm).

Format tab

The *Format tab* section includes subsections:

- Object format properties

- Array format properties

- Text format properties

- Polyline format properties

- Arc format properties

- Bar Code format properties

- 2D Code format properties

- Spot format properties

- Bitmap format properties

Format properties (Figure 16-12) apply to objects contained within the drawing. These properties set object positions and allow formatting of text and bar code characteristics. Most properties are common to all objects however; some properties apply only to specific types of objects.

Figure 16-12 Format tab Object properties

Object format properties

Object properties allow you to define reference points for object position and specify a scan direction for filled or bitmap objects.

Object Left Pos

Set the left (X-coordinate) position for the selected object's bounding outline.

Object Top Pos

Set the top (Y-coordinate) position for the selected object's bounding outline.

Fixed To Position

Define a fixed reference point for positioning a text, bar code, or 2D code object when overall size is increased or decreased due to manual re-sizing, additional characters, etc. One of nine bounding outline handles is used as an anchor while the other bounding outline points are free to move as re-sizing occurs.

Tip: When serializing text strings containing lower case letters, the text string may shift up when lower case letters with descenders (g, j, p, q, s, y) are marked. This occurs because the Fixed To Position property defaults to *Center*. Set the text Fixed To Position property to *Top Left*, *Top Middle*, or *Top Right* for best results.

Use Group Properties

This property appears when a grouped object is selected. Choose *Yes* to mark grouped entities using properties currently defined on the *Tools/General Settings…/Object Defaults* tab. Select *No* to mark grouped entities with their individual properties defined prior to grouping.

Note: In order to mark group entities using individual properties, set Use Group Properties to *No* and then perform the Group operation.

Raster Scan Direction

Specify horizontal or vertical raster scanning for filled text, polyline, or bitmap objects.

Tip: When marking raster-scanned images such as imported graphics, filled TrueType-style text, or barcodes, one scan direction typically marks much faster than the other depending on the object's orientation. Optimize mark cycle time by ensuring that Bi-Directional Raster is *Yes* and then test mark each filled object using first a horizontal and then a vertical Raster Scan Direction.

Array format properties

Array properties (Figure 16-13) allow you to batch mark a group of parts. Select an object or objects to be marked as an array element then create an array by specifying rows, columns, and spacing. The batch of parts to be marked must all fit within the marking field of the selected focusing lens.
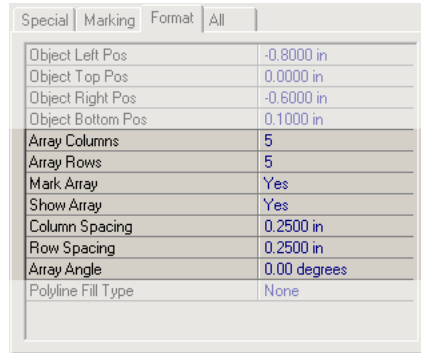
Figure 16-13 Format tab Array properties

Array Columns

Enter the number of element columns in the array.

Array Rows

Enter the number of element rows in the array.

Mark Array

Choose *Yes* to mark the array. If *No*, only the original object, not the array, will mark.

Show Array

Select *Yes* to display the selected array or *No* to display only a single array element.

Column Spacing

Enter the desired spacing between element columns in the array.

Row Spacing

Enter the desired spacing between element rows in the array.

Array Angle

Enter a baseline angle for rotating the array.

Text format properties

Text properties (Figure 16-14) apply to text objects within the drawing. These properties provide typographical control over specific text characteristics.
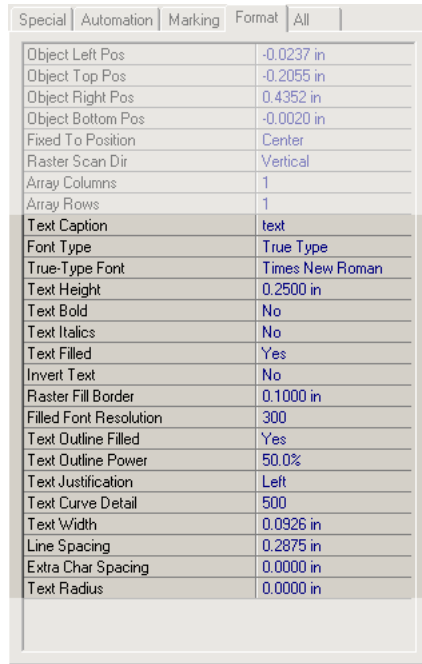
Figure 16-14 Format tab Text properties

Text Caption

Enter a caption for the currently selected text object. If the text string displayed in the *Property List* is highlighted, typing will replace any current text. To edit, click once in the highlighted field to establish an insertion point or click the ellipsis (…) to enter multiline text using the *Text Caption Editor* dialog box.

Note: If Auto Text Type is set to other than *None*, the Text Caption property is hidden and the existing text string serves only as a placeholder for the specified auto text. For example, when serializing text, the character string entered as the Current Saved Value, not Text Caption, is used for marking.

Tip: WinMark Pro v6 allows you to open the *Text Caption Editor* dialog by simply double-clicking the text object on the *Drawing Canvas*.

Tip: Unique Identification (UID) control codes.

To enter UID hexadecimal control codes into a text string using the *Text Caption Editor* dialog, type "\xXX" (without the quote marks); where XX is a 2-digit hexadecimal value. For example, a Group Separator ($^G/_S$) symbol is entered as \x1D.

Note: Some automated text and barcode captions are updated on the display when the object is selected or deselected. Dates, times, and From Another Object sources are updated in this manner; serial numbers are updated if Save Last Serial is *Yes*. Serial port and disk file text is not updated until the source is read during the mark sequence.

Font Type

Select a TrueType-style font (TrueType, OpenType, or PostScript) or a stroke font for text. Use stroke fonts for quick marks at high throughput speeds. Use TrueType-style fonts to match a logo, maintain a corporate identity, or create a certain "look".

Note: When a TrueType-style font is selected, the following typographical sub-properties appear on the *Format* tab: Text Bold, Text Italics, Text Filled, Invert Text, Raster Fill Border, Filled Font Resolution, Text Outline Filled, Text Outline Power, and Text Curve Detail.

Tip: Both stroke and TrueType-style fonts are marked as vector objects although TrueType-style fonts tend to have more complex path outlines. TrueType-style fonts are marked using a raster-scanning technique when they are filled.

TrueType Font

Select a TrueType® font for marking text. Any TrueType (.TTF) font installed in Window's *Fonts* folder is available to WinMark Pro.

OpenType Font

New to WinMark Pro v6 is support for OpenType® and PostScript® fonts.

Select an OpenType or PostScript font for marking text. Any OpenType (.OTF) font installed in Window's *Fonts* folder is available to WinMark Pro. PostScript (.PFB) fonts are available when a shortcut to the font is placed in the Window's *Fonts* folder.

Important Note: When operated in stand-alone mode, Flyer/Fenix Flyer heads do not support OpenType (.OTF) or PostScript (.PFB) fonts.

Stroke Font

Select one of WinMark Pro's twelve built-in stroke fonts (.SYF). Fonts available include Bold, European, Gothic, LiteCom, Little, Sans Serif, Script, Simple, Trip, Tscr (Trip Script), Complex, and Simplex.

Tip: Complex and Simplex stroke fonts are proportional, or monospaced, fonts meaning that a lowercase "i" takes up as much letterspace as an uppercase "W". All other stroke fonts and most TrueType-style fonts are non-proportional. A proportional font is useful in situations where alphanumeric text is being serialized and any possible combination of letters or numbers must remain within a specific boundary.

Text Height

Enter a base character height for text. Text Height is approximately the height of uppercase letters such as "M", "W", etc., although this height varies slightly depending upon the metrics of the chosen typeface. In general, Text Height for stroke fonts is padded to allow room for lower case descenders. This means that stroke text with only uppercase letters will display and mark slightly smaller than the value specified by Text Height.

Tip: Have you always specified point sizes when working with type? There are 72 points per inch so multiply your desired point size by 0.01389 to obtain a decimal value, in inches, for Text Height. For example, WinMark Pro's default Text Height is 0.25 inches, which corresponds to 19-point type.

Tip: To obtain an accurate Text Height for your mark, use only uppercase letters and do the following: In the *Object Transformations* dialog box, check *Maintain Aspect Ratio*, set the *Current Height* value to the desired size, and then press the TAB key to scale text. Click *Apply* and then click *OK*.

Text Bold

Toggle *Yes* to bold selected TrueType-style text.

Important Note: In Flyer's stand-alone mode, you <u>cannot</u> use WinMark's Text Bold property when your mark file uses 'bold" TrueType-style text. Instead, you must copy the font's bold typeface to the Flyer Filestore.

Text Italics

Toggle *Yes* to italicize selected TrueType formatted text.

Important Note: In Flyer's stand-alone mode, you <u>cannot</u> use WinMark's Text Italics property when your mark file uses "italic" TrueType-style text. Instead, you must copy the font's italic typeface to the Flyer Filestore.

Text Filled

Toggle *Yes* to fill selected TrueType-style text. Choosing *Yes* causes text characters to be filled by the raster scanning method. Choosing *No* simply marks text characters as vector outlines.

Note: When Text Filled is *Yes*, the following fill sub-properties appear on the *Format* tab: Invert Text, Raster Fill Border, Filled Font Resolution, Text Outline Filled, and Text Outline Power.

Note: When marking filled text, the value of the PWM Frequency property must greater than the product of the Resolution times Velocity (PWM Frequency > Resolution × Velocity), when Power is less than 100%. When PWM Frequency is too low, scan lines are broken (not marked) during the "off" portion of the PWM duty cycle.

Tip: When raster-filling objects, use a lower Power setting than with vector objects to prevent overburning or distortion of the part substrate.

Invert Text

Set to *Yes* to mark the border around TrueType-style text instead of the text.

Raster Fill Border

When Invert Text is *Yes*, use Raster Fill Border to specify a marked border dimension around the text object.

Filled Font Resolution

When Text Filled is *Yes*, set a fill resolution between 50 and 1000 microvectors per inch.

Text Outline Filled

Choose *Yes* to outline the edges of raster-filled TrueType-style fonts. This vector outline tends to smooth the character shape after the raster-filling process.

Note: When Text Outline Filled is *Yes*, the following fill sub-property appears on the *Format* tab: Text Outline Power.

Text Outline Power

Set a power level for marking TrueType text outlines.

Tip: Typically, the outline power setting is set higher than the power level used for filling text.

Text Justification

Select left, right, or center justification for multiline text objects.

Text Curve Detail

Specify a curve resolution for TrueType-style fonts. Higher values create smoother curves especially when marking large font sizes. The default value is 500, but can range from 20 to 1000.

Text Width

Enter an average width (horizontal scale) for text characters. Enter zero (0) to return to WinMark's default font width.

Line Spacing

Enter line spacing (leading) between lines of multiline text. Enter zero (0) to return to WinMark's default spacing value.

Extra Char Spacing

Enter additional spacing (tracking) between text characters. Enter zero (0) to return to WinMark's default character spacing.

Text Radius

Enter a radius for marking text on a curve. Use Text Radius to fit text inside or outside an arc or circle. Positive values cause text to radius in a convex form; negative values cause text to radius in a concave form.

Polyline format properties

Polyline properties (Figure 16-15) apply to polyline objects within the drawing. These properties give you the ability to customize polyline objects.
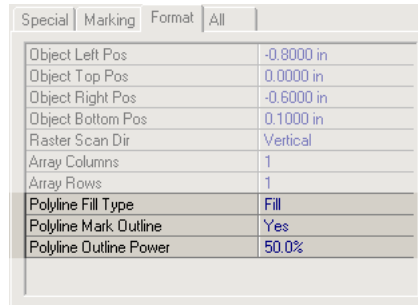
Figure 16-15 Format tab Polyline properties

Polyline Fill Type

Fill the selected polyline object. Choosing *Fill* causes polylines to be filled by raster scanning. Choosing *No* simply marks polylines as vector outlines.

Note: When Polyline Fill Type is *Yes*, the following fill sub-properties appear on the Format tab: Polyline Mark Outline and Polyline Outline Power.

Note: When marking filled polylines, the value of the PWM Frequency property must be greater than the product of the Resolution times Velocity (PWM Frequency > Resolution × Velocity), when Power is less than 100%. When PWM Frequency is too low, scan lines are broken (not marked) during the "off" portion of the PWM duty cycle.

Polyline Mark Outline

Choose *Yes* to outline polyline objects. This vector outline tends to smooth the polyline shape after raster filling.

Tip: When raster-filling objects, use a lower Power setting than with vector objects to prevent overburning or distortion of the part substrate.

Polyline Outline Power

Set a power level for marking polyline outlines.

Tip: Typically, the outline power setting is set higher than the power level used for filling.

Arc format properties

Arc properties (Figure 16-16) apply to arc, circular, and elliptical objects within the drawing. These properties give you the ability to create circles, ellipses, or arcs of varying sizes.
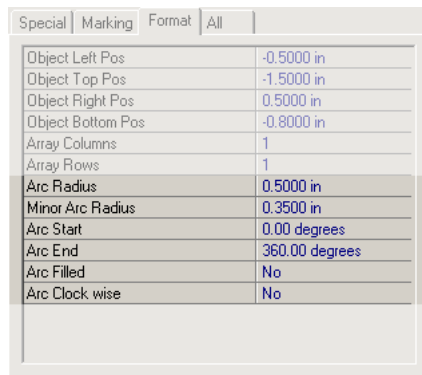
Figure 16-16 Format tab Arc properties

Arc Radius

Enter an exact radius for a circular object.

Minor Arc Radius

For elliptical objects, enter a minor radius. For circles, enter the same value as the specified Arc Radius.

Arc Start

Use Arc Start to create an arc or semicircular object by specifying a starting angle for the object. Larger values move the starting position of the arc in a counterclockwise direction from the zero point. When Arc Start is used in conjunction with Arc End, the open arc segment can be made to point in any direction.

Arc End

Use Arc End to create an arc or semicircular object by specifying an ending angle for the object. Smaller values move the ending position of the arc in a clockwise direction from the zero point. When Arc End is used in conjunction with Arc Start, the open arc segment can be made to point in any direction.

Tip: In WinMark v6, the Arc End property can be extended beyond 360°. This allows you to over-travel the start point to eliminate the "hanging chad" effect when cutting materials that exhibit melt-back or to make an additional partial pass when cutting through two overlapped materials.

Arc Filled

Fill the selected arc. The Arc Filled property is only available for circular or elliptical objects. Open arcs cannot be filled.

Note: When Arc Fill is *Yes*, the following fill sub-properties appear on the *Format* tab: Arc Mark Outline and Arc Outline Power.

Note: When marking filled arcs, the value of the PWM Frequency property must be greater than the product of the Resolution times Velocity (PWM Frequency > Resolution × Velocity), when Power is less than 100%. When PWM Frequency is too low, scan lines are broken (not marked) during the "off" portion of the PWM duty cycle.

Arc Mark Outline

Choose *Yes* to outline arc objects. This vector outline tends to smooth object edges after raster filling.

Tip: When raster-filling objects, use a lower Power setting than with vector objects to prevent overburning or distortion of the part substrate.

Arc Outline Power

Set a power level for marking arc outlines.

Tip: Typically, the outline power setting is set higher than the power level used for filling.

Arc Clock Wise

Choose *No*, the default, to mark the specified arc in a counter-clockwise direction (in relation to Arc Start and Arc End values). Choose *Yes* to mark the inverse of the specified arc in a clockwise direc-

tion (in relation to Arc Start and Arc End values). Figure 16-17 shows the results of changing the Arc Clock Wise property when the Arc Start property value is 0° and the Arc End value is 270°.

Note: To mark the specified arc (as drawn) in the opposite direction, simply swap Arc Start/Arc End values.
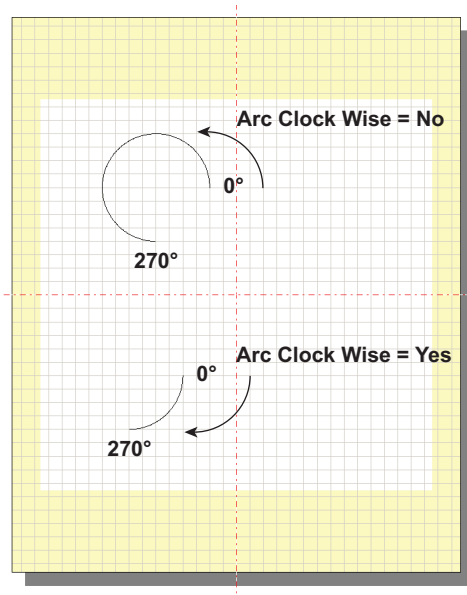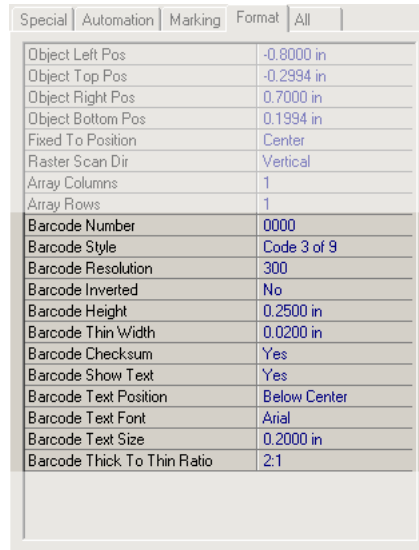
Figure 16-17 Arc Clock Wise mark characteristics

Bar Code format properties

Bar code properties (Figure 16-18) apply to 1D bar code objects within the drawing. You can select specific bar code types and customize bar code properties.

Figure 16-18 Format tab Bar Code properties

Barcode Number

Enter a caption for the currently selected bar code object. If the text string displayed in the *Property List* is highlighted, typing will replace any current text. To edit, click once in the highlighted field to establish an insertion point. For bar codes that support extended character sets, click the ellipsis (…) to enter multiline text using the *Text Caption Editor* dialog box. Barcodes supporting extended characters sets include Code 128 (all 128 characters), Code 128 Subset A, Extended Code 3 of 9, Extended Code 93, MicroPDF, and PDF417.

Note: If Auto Text Type is set to other than *None*, the Barcode Number string serves only as a placeholder and is replaced by the specified auto text during the mark session. For example, when serializing text, the character string entered as the Current Saved Value, not Barcode Number, is used for marking.

Note: Some automated text and barcode captions are updated on the display when the object is selected or deselected. Dates, times, and From Another Object sources are updated in this manner; serial numbers are updated if Save Last Serial is *Yes*. Serial port and disk file text is not updated until the source is read during the mark sequence.

Barcode Style

Select from over twenty common bar code types. Supported formats include:

Codabar	Code 3 of 9 (Code 39)	Extended Code 3 of 9
Code 93	Extended Code 93	Code 128 (all 128 characters)
Code 128 Subset A	Code 128 Subset B	Code 128 Subset C
Ean/Jan 8 Digit	Ean/Jan 13 Digit	HIBC Code 3 of 9
Interleaved 2 of 5	Micro PDF 417	MSI Plessey
Portable Data File (PDF) 417	Post Net 5, 9, 11 Digit	RSS14 Stacked Composite
UCC-128	UPC-A 11 Digit	UPC-E 6 Digit, 0 Type Code
UPC-E 6 Digit, 1 Type Code	UPC-E 11 Digit	

Tip: Bar codes not supported by WinMark Pro can often be created using third-party software. After creating the bar code, save it in a bitmap (.BMP) format, and then import the bitmap code directly into WinMark.

Barcode Resolution

Define line density for the rasterized bar code. This value is used as the marking resolution.

Barcode Inverted

Create a contrasting 'negative-image" of the bar code so that spaces between the bars are marked instead of the bars themselves. A "quiet zone" is added so that bar code readers can locate the first and last bars in the code. Barcode Inverted is useful for marking dark materials that produce a lighter, contrasting mark.

Barcode Quiet Zone Size

If Barcode Inverted is *Yes*, you can choose to increase or decrease the length of the quiet zone.

Barcode Height

Set a specific height for the long bars in the code.

Barcode Thin Width

Specify a line width for thin bars in the code. Horizontal spacing is then proportionally adjusted throughout the code.

Tip: Depending on desired cycle time and material type, Barcode Thin Width should generally be set to mark a width equal to, or some multiple of, the spot size of the focusing lens. Assuming Barcode Resolution is optimized, a Barcode Thin Width value equal to the spot size means that only one pass is required to mark the line. Too large a value means that multiple slightly offset passes must be made to generate the wider line, potentially slowing cycle time. Marking too wide a line will also encroach on the white space between bars, causing verification problems.

Barcode Checksum

Choose *Yes* to append a Barcode Checksum (if applicable for the Barcode Style selected) to the Barcode Number value. Although the checksum is incorporated into the Barcode Number, it does not display as human-readable text (when Barcode Show Text is *Yes*).

Note: The Barcode Checksum property is suppressed for barcodes that do not support, or that always use, a checksum.

PDF 417 X/Y Ratio (for PDF 417 and Micro PDF 417 barcodes only)

Set the barcode cell X/Y (height to width) ratio by entering an integer value between 1 and 10. The default value is 4, which is the ratio that most barcode scanners read best.

PDF 417 Security Level (for PDF417 barcodes only)

Choose from one of nine levels of data security (error correction and detection). Each higher level of security adds additional overhead and physical size to the printed symbol. Association for Automatic Identification and Mobility (AIM) standards recommend a security, or error correction, level of 2. The default value of 0 produces the most compact code.

PDF 417 Truncated (for PDF417 barcodes only)

When *Yes*, a truncated PDF 417 code is created. This creates a more compact code by removing or truncating the right-most side of the barcode; however, this is more susceptible to damage.

MicroPDF Reader Init (for MicroPDF 417 barcodes only)

Set to *Yes* to embed a reader initialization symbol in the code.

MicroPDF Mode (for MicroPDF 417 barcodes only)

This property indicates which MicroPDF size enumeration mode is used. Mode values range from 0 to 32 with 0 being the smallest code size. Higher mode values allow a larger number of encodable data characters and a higher graphical data density by varying the number of data columns and data rows in the code.

MicroPDF 128 Code Emulation (for MicroPDF 417 barcodes only)

This property causes the barcode scanner to read the code is if it was a Code 128 barcode. Property value functions are listed below:

0 = No emulation

1 = Linked C1; Linked UCC/EAN-128 emulation (Transmit]C1 char)

2 = Unlinked C1; UCC/EAN-128 emulation (Transmit]C1 char)

3 = C0; Default encoding mode

4 = C2; Code 128 emulation (transmit]C2 char)

MicroPDF Disable Macro Character (for MicroPDF 417 barcodes only)

Determines whether macro character substitution is enabled or disabled. The default setting, *No*, allows macro characters.

Barcode Show Text

Choose *Yes* to include human-readable text as part of the bar code object.

Barcode Text Position

If Barcode Show Text is *Yes*, select one of six locations for the placement of human-readable text.

Barcode Text Font

Select any TrueType formatted font on your computer system to use for the human-readable text included in the bar code. The barcode library does not recognize OpenType (.OTF) or PostScript (.PFB) fonts.

Tip: Human-readable bar code text always uses filled TrueType formatted fonts. To shorten cycle times, set Barcode Show Text to *No*, create a new text object, and set Font Type to *Stroke*. If Barcode Number is a static value, simply enter this information into the text object's Text Caption. If Barcode Number is variable, use From Another Object and Assign From properties to link bar code and text objects so that data remains synchronized throughout a mark session.

Barcode Text Size

Enter a text size for the human-readable text included in the bar code.

Barcode Thick to Thin Ratio

For barcode formats that allow it, define a ratio for the width between thin bars/thin spaces and thick bars/thick spaces in the bar code. Based on the selected ratio (2:1, 2.5:1, or 3:1), horizontal spacing of thick bars/thick spaces is proportionally adjusted throughout the code.

2D Code format properties

2D code properties (Figure 16-19) apply to 2D code objects within the drawing. You can choose to mark either Data Matrix or QR Code formats and customize 2D code properties.
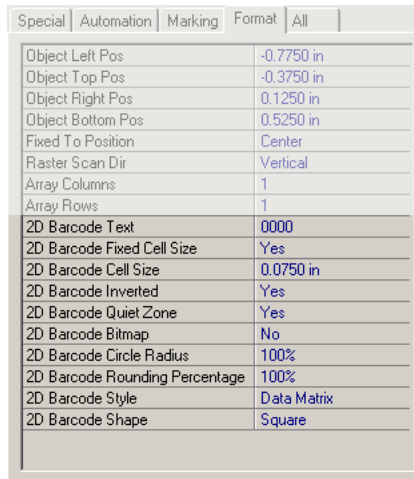
Figure 16-19 Format tab 2D Code properties

2D Barcode Text

Enter single or multiline text up to 500 characters. If the text string displayed in the *Property List* is highlighted, typing will replace any current text. To edit, click once in the highlighted field to establish an insertion point. Click the ellipsis (…) to enter multiline text using the *Text Caption Editor* dialog box.

2D Barcode Fixed Cell Size

If 2D Barcode Fixed Cell Size is *No*, then cells are sized to fit the existing bar code bounding box. If set to *Yes*, then overall 2D bar code size is based on the number of cells <u>and</u> the individual cell size as specified by 2D Barcode Cell Size.

2D Barcode Cell Size

Specify the size of an individual 2D bar code cell when 2D Barcode Fixed Cell Size is *Yes*.

2D Barcode Inverted

Create a contrasting "negative-image" of the bar code. The spaces between the cells are marked instead of the cells themselves and a "quiet zone" is added so that 2D code readers can locate the outside edges of cells. This feature is used for marking dark materials that produce a lighter, contrasting mark.

2D Barcode Quiet Zone

Defaults to *Yes*, if 2D Barcode Inverted is selected. This property creates a one-cell (Data Matrix) or four-cell (QR Code) quiet zone, around the code to aid readability.

2D Barcode Bitmap

Choose *Yes* to mark 2D code cells as standard bitmap (raster) squares. Select *No* to mark cells as unfilled vector circles. At small code sizes, the unfilled vector circle is properly read as a 'cell' with the primary advantage of substantially reduced cycle times. See WinMark Pro Application Note #1, *Marking 2D Matrix Codes*, at http://www.winmark.com/products/winmark_ApplicationsNotes.html for details on setting up and using this property.

2D Barcode Rounding Percentage

When 2D Barcode Bitmap is *No*, enter the amount of rounding percentage applied to vector circles that make up individual cells. A value of 100% marks circles, while a value of 0% marks a vector square. Entering a value of 50% produces a rounded rectangle with a corner radius that is one-quarter the cell size.

2D Barcode Circle Radius

For bitmap- or vector-style codes, enter a value less than 100% to scale down the marked cell size. Smaller diameter cells eliminate print growth errors and improve barcode grading.

2D Barcode Style

Select *Data Matrix*, *QR Code*, or *Micro QR Code* styles.

2D Barcode Shape

If 2D Barcode Style is *Data Matrix*, choose between square and rectangular code formats. Rectangular codes are useful for marking long thin parts but are limited to less than 98 digits or 72 alphanumeric characters. Entering characters beyond this limit forces the code to revert to a square.

Error Correction Mode

If 2D Barcode Style is *QR Code* or *Micro QR Code*, choose from one of four error correction modes. *High Density* creates the most compact code while *Ultra High Reliability* produces the highest accuracy when reading dirty or damaged codes.

Data Input Mode

If 2D Barcode Style is *QR Code* or *Micro QR Code*, choose *Automatic*, the default setting, or *Manual* data input. *Manual* input is used when multiple data types (numeric, alphanumeric, Kanji, and binary) are contained within a single data string.

For *Manual* data entry only, a character mode must precede the data string. Valid character modes are: N – Numeric; A – Alphanumeric; K - Kanji (Data Character String consists of shift JIS codes); and B - Binary (in Binary mode, the data is first preceded by the number of data characters represented as a four digit decimal number.)

To create a QR Code using *Manual* data input containing the numeric character data string "123456789012345", enter the following string in the 2D Barcode Text property: N1234567890123454. To enter data in *Manual* mode using more than one character mode, place a comma between the first data string and the new character data mode. For example to enter the numeric data string "12345" and the alphanumeric string "QRCode", enter the following string for 2D Barcode Text: N12345,AQRCode.

Spot format properties

Spot properties (Figure 16-20) apply to spot objects within the drawing.
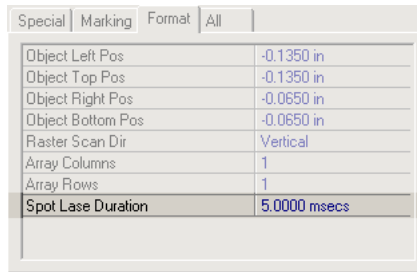
Figure 16-20 Format tab Spot properties

Spot Lase Duration

Enter a lasing duration in milliseconds. Spot Lase Duration is useful when marking a spot or drilling thru holes in material. The minimum lase duration is 0.001 milliseconds while the maximum duration is 1 hour (3600 seconds).

Bitmap format properties

Bitmap properties (Figure 16-21) apply to imported bitmap images within the drawing.

Special	Marking	Format	All

Object Left Pos	-1.0000 in
Object Top Pos	-0.5000 in
Object Right Pos	1.0000 in
Object Bottom Pos	0.5000 in
Raster Scan Dir	Vertical
Array Columns	1
Array Rows	1
Bitmap Inverted	No
Color Reduction Method	Gray Scale
Randomize Bitmap	No
Radial Marking	Yes
Part Moving Input	--------
Step Command Output	--------
Timeout (msec)	-1
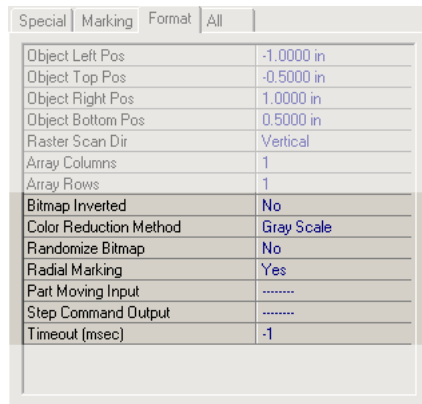
Figure 16-21 Format tab Bitmap properties

Bitmap Inverted

When set to *Yes*, imported bitmap (raster) images are inverted to create a contrasting "negative-image" of the bitmap. As shown in Figure 16-22, dark areas are laser marked, while light areas are unmarked. Use this feature to mark dark materials that produce a lighter, contrasting mark.
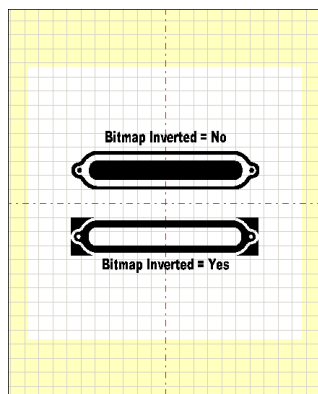
Figure 16-22 Normal and inverted bitmap images

Note: After changing Resolution and/or resizing the image, test mark the bitmap image. Use the Color Reduction Method property (*Format* tab) to change the color reduction algorithm as required. Any changes are performed on the original image, which is stored by WinMark during importation. Note that the screen display does not necessarily indicate the improved mark quality, so test marks are required.

Tip: For best results when marking bitmap (raster) images, set a Resolution value that corresponds to 100–150% of the spot size generated by the selected focusing lens. For example, a 200 mm lens with a spot size of 0.011" is capable of marking approximately 91 discrete dots per inch. Although Resolution values are somewhat material-dependent, generally, start with a Resolution equal to 200–300 when using an 80 mm lens; 143–214 for a 125 mm lens; 91–136 for a 200 mm lens; and 50–71 when marking with a 370 mm lens.

Color Reduction Method

When importing color (as opposed to monochrome) bitmaps, choose a Color Reduction Method from among *Bayer Dithering*, *Error Diffusion*, *Halftone*, *Threshold*, or *Grayscale*.

Color images

Bayer Dithering, *Error Diffusion*, *Halftone*, and *Threshold* methods covert color images into monochrome (1-bit) images suitable for laser marking. The differences in *Bayer Dithering*, *Error Diffusion*, and *Halftone* reduction methods are in the changes made to the size, shape, and spacing of pixels in the bitmap in order to create an illusion of shading, since all pixels in a 1-bit image are either black (marked) or white (unmarked). The *Threshold* import method uses a slider to customize the black/white threshold level in the range from 0 – white to 255 – black (the default is 128).

Figure 16-23 shows an original 8-bit image and the resulting 1-bit image after being processed through WinMark Pro's *Error Diffusion* color reduction algorithm.
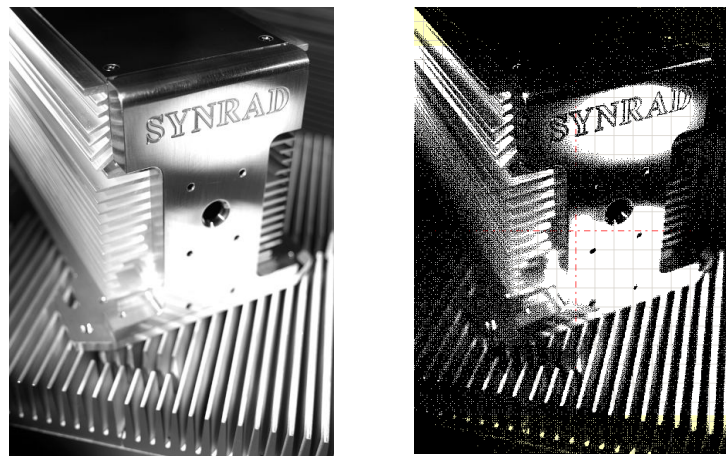
Figure 16-23 8-bit black and white image versus 1-bit Error Diffusion reduction

Note: Imported bitmap images are now resized according to the Resolution setting specified on the *Tools/General Settings…/Object Defaults* tab. Previously, WinMark Pro increased or decreased bitmap image size corresponding to a fixed bitmap resolution of 600 DPI. WinMark Pro does not resample bitmap images but rather resizes them to preserve the image's total pixel count – the overall dimensions of a 96 DPI image imported into WinMark at 300 DPI are automatically resized to 32% of the original height and width.

Tip: Many times after choosing an initial Color Reduction Method when importing images into WinMark Pro, bitmaps are resized or Resolution is altered. Because bitmap images are resolution-dependent (created for a particular display size and resolution), changing image size or resolution tends to degrade display and mark quality of the bitmap. If you must vary image size or resolution from the original settings, do so and then click Color Reduction Method. In some cases, changing the reduction method produces better results.

Grayscale images

Choose *Grayscale* (Figure 16-24) to convert color bitmaps into 8-bit grayscale images (an 8-bit grayscale image provides 256 levels of gray ranging from 0–white to 255–black). For Grayscale bitmaps, Power and Min Power Threshold properties on the *Marking* tab set the limits of laser power used to mark black (255) and white (0) pixels respectively.
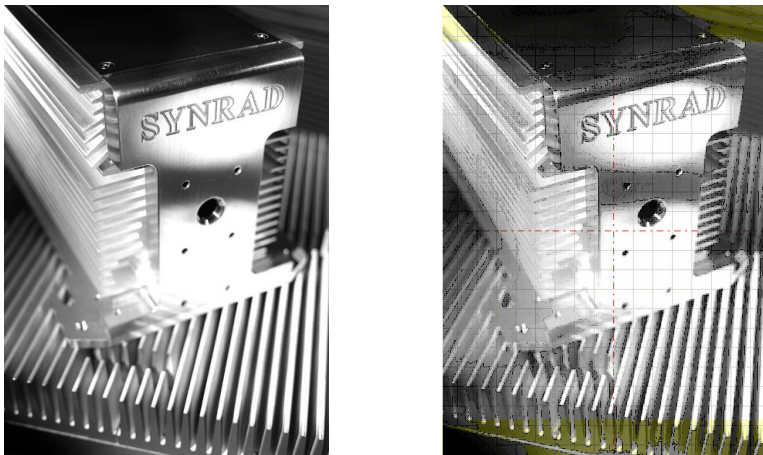
Figure 16-24 8-bit black and white image versus 8-bit Grayscale reduction

Tip: Before marking a *Grayscale* image, create a matrix of filled squares as shown in Figure 16-25. By choosing various ranges for Power and Velocity, you can quickly determine settings that provide the best dynamic range for your particular image.
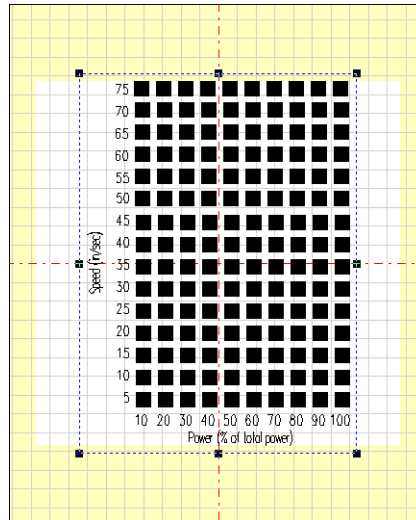
Figure 16-25 Sample Power/Velocity matrix file

Threshold Level

When the Color Reduction Method is set to *Threshold*, fine-tune the image's black/white threshold level for best reproduction within the range from 0 – white to 255 – black (the default is 128).

Bitmap Scan Type

Choosing *Normal* treats each scan line in a bitmap image as a sequence of microvectors that includes the corresponding Pline Start Delay, Pline End Delay, and Off Vector Delay times. Selecting *Continuous* forces each scan line to mark at a constant Velocity and Power, while cycling laser power on or off according to the bitmap data. Grayscale images are always marked using the *Continuous* scan method.

Note: Bi-Directional Raster is automatically disabled when Bitmap Scan Type is *Continuous*.

Note: If Bitmap Scan Type is *Normal* or the Color Reduction Method is other than *Grayscale* (which uses a *Continuous* scan method), then the value of the PWM Frequency property must be greater than the product of the Resolution times Velocity (PWM Frequency > Resolution × Velocity), when Power is less than 100%. When PWM Frequency is too low, scan lines are broken (not marked) during the "off" portion of the PWM duty cycle.

Randomize Bitmap

When marking *Grayscale* images, choose *Yes* to mark individual continuous scan lines in a random order. This helps eliminate any "banding" characteristics exhibited by the laser.

Radial Marking

With WinMark v6 and Flyer/Fenix Flyer heads you can perform radial marking on imported bitmap objects. Set Radial Marking to *Yes* and then setup part rotation using a rotary indexing method (like a stepper motor). Use Part Moving Input/Step Command Output properties below to indicate when marking or part rotation should occur. See WinMark Pro Application Note #8, WinMark Pro v6's New Radial Marking Property, on the WinMark web site at http://www.winmark.com/products/winmark_ApplicationsNotes.html for detailed setup information.

Note: Part Moving Input and Step Command Output commands run in the 'MarkDrawing' loop and are independent of any automation created on the *Drawing's Automation* tab.

Part Moving Input

Use the Part Moving Input property to indicate part movement (rotation) is occurring. When the specified input is *Set* (active), WinMark waits—until the Timeout (msec) property value is exceeded. When parts handling equipment *Clears* this input (when part movement has halted), WinMark marks a single raster line.

Step Command Output

The specified Step Command Output is *Set* (active) after marking to indicate that the raster line is complete and part movement (rotation) can begin. Flyer/Fenix Flyer automatically *Clears* (low or inactive) the specified output when the Part Moving Input is next *Set* (activated).

Timeout (msec)

Enter a timeout value in milliseconds (or –1 to wait indefinitely) for the next Part Moving Input transition to occur. When a Step Command Output transition occurs, the Part Moving Input must also transition—low/high or high/low—within the specified timeout period or the mark session will abort.

All tab

All applicable properties from *Special*, *Automation*, *Marking*, and *Format* tabs are included on this tab.

17 Event Builder commands

Event Builder commands (Figure 17-1) are available at five different stages (On Before Mark Session, On Before Mark Piece, On After Mark Piece, On After Mark Session, and On Abort Session) in the automation loop. These commands, described below, perform automation functions during the marking process. In most cases, these automation events are assigned to a specific property of the target mark object.
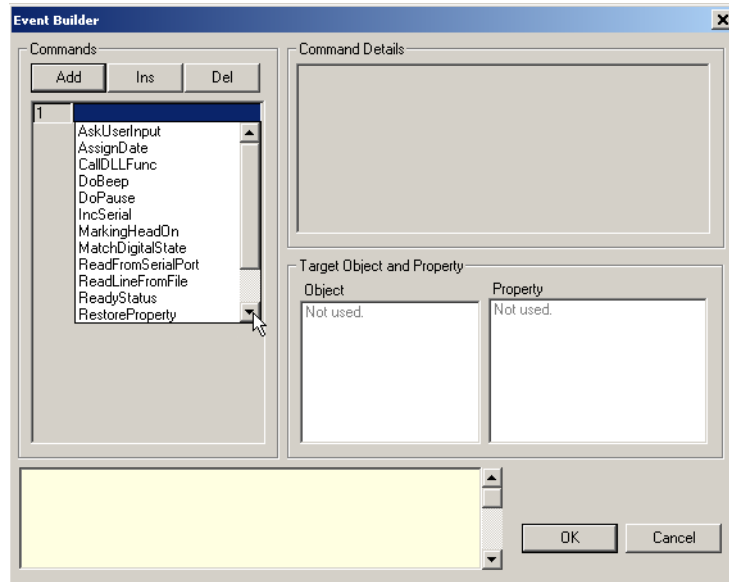
Figure 17-1 Event Builder dialog box

AskUserInput

Prompt the operator for keyboard input and assigns the resulting alphanumeric string to the specified target object and target property.

Note: The AskUserInput event is not available when operating in Flyer/Fenix Flyer stand-alone mode.

Command Details:

User Prompt

Create a custom User Prompt for the *User Input* dialog box.

Use Default

If a new operator input string is not required for every mark, set Use Default to mark a predefined text string using From Current Property Value or From Default Text entries.

Default Text

Mark a default text string if specific operator input is not required. The text entered here is marked when Use Default is set to From Default Text.

Tip: AskUserInput is often assigned to the Text Caption property of a text object.

AssignDate

Allows you to create and assign a standard or customized date code format to a target object and target property (see Figure 17-2), typically a Text Caption property.

Command Details:

Date Format

Click *Date Format* in the *Command Details* frame and then click the down arrow to select from a list of predefined standard or custom date formats or click the ellipsis (…) to open the *Date Format Customization* dialog and create new custom formats.
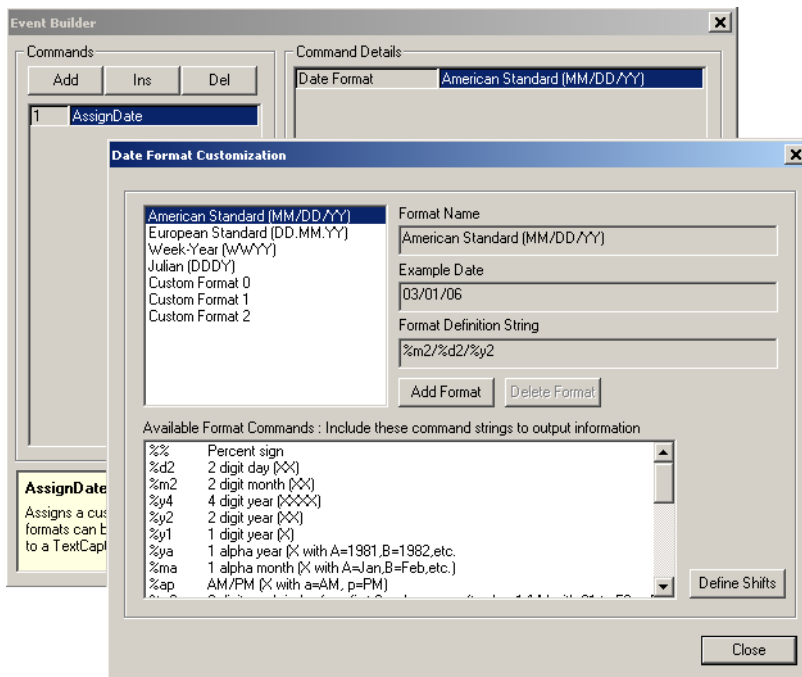
Figure 17-2 Event Builder - AssignDate command dialog boxes

To create a custom date format:

1   In the *Date Format Customization* dialog box click the *Add Format* button.

2   If desired, type a descriptive name in the *Format Name* box.

3   Browse the *Available Format Commands* box for available date or time formats.

4   Double-click the desired format commands or click in the *Format Definition String* box and type in commands to create a custom format string.

5   When done, click the *Close* button.

Note: In WinMark Pro v6, custom date formats are saved in the mark file as well as in the development computer's *System Registry*. This prevents an "undefined" format error from occurring when files with custom date formats are loaded on different computers or on a Flyer head operating in stand-alone mode.

Tip: The *Example Date* box shows how the *Format Definition String* will look when marked. You can add spaces, dashes, or other fixed alphanumeric text within the string by typing characters between definitions in the *Format Definition String* box.

CallDLLFunc

Call a custom user-written Dynamic Link Library (DLL) function. The DLL can pass a property and user arguments into WinMark Pro by specifying a *DLL Filename*, an export *Function Name*, and up to three user arguments.

Note: The CallDLLFunc event is not available when operating in Flyer/Fenix Flyer stand-alone mode.

Command Details:

DLL Filename

Enter the path and filename that points to the desired DLL file.

Function Name

Enter the DLL export function name (specified in the DLL's .def file).

User Arg #1

Enter the first argument, if any.

User Arg #2

Enter the second argument, if any.

User Arg #3

Enter the third argument, if any.

To activate a DLL from WinMark Pro, an event must be defined in the Event Builder via the *Automation* tab for the drawing. The following steps illustrate how to define a DLL using the example provided in the WinMark Pro *Samples* folder:

1   Open a New drawing and then place a text object on the *Drawing Canvas*.

2   Click the *Drawing Canvas* to select the *Drawing* object and then select the *Automation* tab from the *Property List*.

3   Select the marking event to be defined, such as On Before Mark Piece, and click the ellipsis (…).

4   In the *Event Builder* dialog box, click *Add* in the *Commands* frame.

5   In the field labeled *1* in the *Commands* frame, click the down arrow and select CallDLLFunc from the drop-down list.

6   In the *Command Details* frame, enter the DLL path and filename (*C:\Program Files\WinMark\ Samples\Sample Dll\CommPortDll.dll*); the DLL export Function Name (*ReadSerialPort*), found in the *CommPortDll.def* file; and up to three user arguments (in this example, only two are used – *com1* for *User Arg#1* and *10000* for *User Arg #2*).

7   In the *Target Object and Property* frame, select a target object (Text1) and corresponding object property (Text Caption). Your *Event Builder* dialog should look similar to the one shown in Figure 17-3.
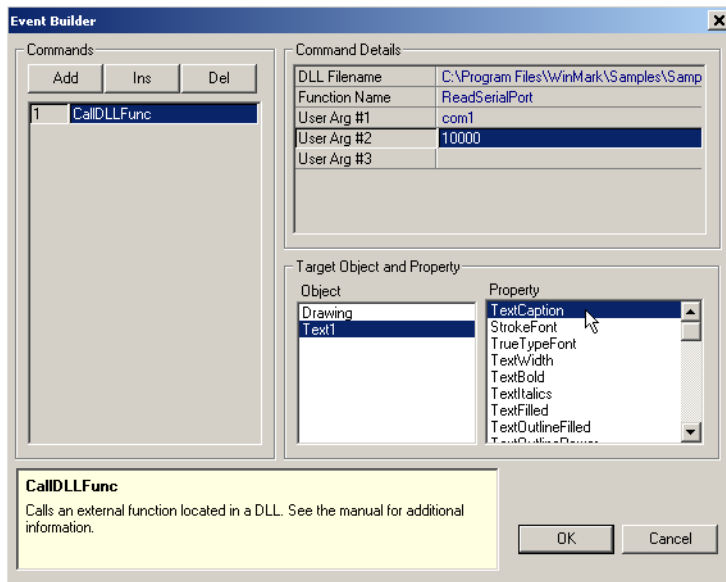
Figure 17-3 Event Builder - CallDLLFunc command dialog box

8   Click *OK*. When the drawing is marked, the DLL is executed.

This example opens the ComPortDll and calls SerialPortRead. If no data is read within the timeout period (10000 ms or 10 seconds), then the mark session aborts. If data is available on the designated serial port (COM1), then WinMark Pro reads the data, inserts a carriage return (CR) and line feed (LF) when a new line character is received, terminates the data input, and initiates the marking sequence when a "MARK" string is received. Serial data is stored in the *szPropBuffer* buffer and the *bBufferChanged* flag is set to a non-zero value. The flag tells WinMark that the received data should replace the current marking data.

To implement the DLL/WinMark interface, the DLL must use an argument structure with the following members:

```
struct _DLLStruct
{
    char szUserArg1[64]; // argument 1
    char szUserArg2[64]; // argument 2
    char szUserArg3[64]; // argument 3
    char szPropBuffer[128]; // data buffer
    WORD bBufferChanged; // data change flag (object data changed in current drawing)
    void* pfnFuncCallback;
    void* pfnCallbackData;
    HWND hwndWinMark;
};
```

Export functions of the DLL must be explicitly defined in the .DEF file (e.g. function1 @1, function2 @2).

DoBeep

Generate a beep from the computer's speaker.

Note: The DoBeep event is not available when operating in Flyer/Fenix Flyer stand-alone mode.

Tip: This command might be used to provide an audible prompt for user input or a signal that marking is complete.

DoPause

Pause program execution for the specified number of milliseconds.

Command Details:

Delay (msecs)

Enter a delay value in milliseconds. The default is 1000, which equals 1 second.

IncSerial

Increment or decrement alphanumeric characters in currently selected text string by the specified delta value. Non-alphanumeric characters are ignored. This command is normally assigned to the Text Caption property.

Note: Unlike the serialization feature from the Auto Text Type object property, Event Builder automation does not provide the ability to save the current serial value at the end of a mark session.

Command Details:

Delta

Enter a positive integer value (to increment) or a negative value (to decrement) the serial count.

MarkingHeadOn (FH Index/Tracker heads and Fenix Laser Markers only)

Note: The MarkingHeadOn event is a legacy support property not available when operating FH Flyer marking heads or Fenix Flyer Laser Markers.

Define an output signal (from the Fiber Link Controller Card only!) to parts handling equipment indicating a "No End of Mark Response" signal from a Fenix/FH Series marking head. Bits labeled IGNORE are not changed. A "No End of Mark Response" message is generated by WinMark Pro when the head fails to respond after mark data has been sent. This can occur if the head has lost power or the fiber optic communication link fails during a mark session. Output connections for the MarkingHeadOn event must be made to the FLCC since marking head outputs are obviously unavailable if the marking head is powered down.

Command Details:

PCI Card ID

Enter a card ID corresponding to the ID of the card used for the input/output (I/O) connection. Typically, this ID number corresponds to the ID of the card used for controlling the marking head (see *Tools/ General Settings … / "Device" tab/ Object Name*).

Output Bit 1

This output is available only from the output mini-DIN connector on the FLCC.

Output Bit 3

This output is available only from the output mini-DIN connector on the FLCC.

Output Bit 4

Corresponds to *OUT4* on Fenix/FH Series marking heads. This output is also available from the output mini-DIN connector on the FLCC.

Output Bit 5

Corresponds to *OUT5* on Fenix/FH Series marking heads. This output is also available from the output mini-DIN connector on the FLCC.

Output Bit 6

Corresponds to *OUT6* on Fenix/FH Series marking heads. This output is also available from the output mini-DIN connector on the FLCC.

Output Bit 7

Corresponds to *OUT7* on Fenix/FH Series marking heads. This output is also available from the output mini-DIN connector on the FLCC.

MatchDigitalState

Read the input bit pattern of the Flyer/Fenix Flyer head and assign the result of this Boolean test (Yes/True if all bits match; No/False if not) to the target property (see Figure 17-4). The input state of bits labeled IGNORE are disregarded. The MatchDigitalState result is normally passed to Boolean properties such as Mark Object to include or exclude an object from marking. See Chapter 11, *Automation basics*, for a table showing available inputs.
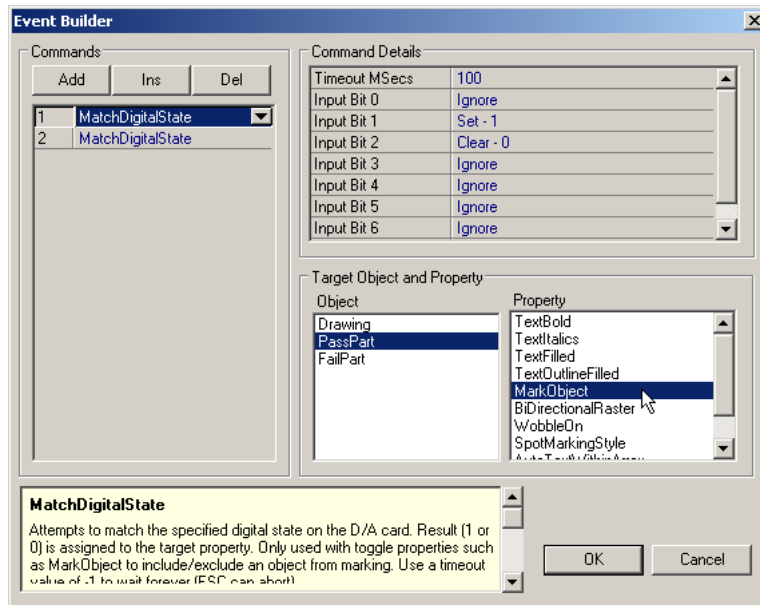
Figure 17-4 Event Builder - MatchDigitalState command dialog box

Command Details:

Timeout MSecs

Use a short timeout value (milliseconds or tens of milliseconds) to complete the input status scan immediately or enter a timeout value of –1, which forces WinMark to wait indefinitely for a valid match (or until the ESC key aborts the mark session).

Input Bit 0

Corresponds to *IN0* on Flyer/Fenix Flyer heads.

Input Bit 1

Corresponds to *IN1* on Flyer/Fenix Flyer heads.

Input Bit 2

Corresponds to *IN2* on Flyer/Fenix Flyer heads.

Input Bit 3

Corresponds to *IN3* on Flyer/Fenix Flyer heads.

Input Bit 4

Corresponds to *IN4* on Flyer/Fenix Flyer heads.

Input Bit 5

Corresponds to *IN5* on Flyer/Fenix Flyer heads.

Input Bit 6

Corresponds to *IN6* on Flyer/Fenix Flyer heads.

Input Bit 7

Corresponds to *IN7* on Flyer/Fenix Flyer heads.

Tip: MatchDigitalState is useful for selecting one of a number of objects (or group of objects) to mark during a single mark session. For example, if your production process randomly places different products on the marking conveyor asynchronously, the mark file can be configured to mark one of a number of specific marks as determined by the state of marking head inputs. See Chapter 11, *Automation basics*, for a table showing available inputs.

Follow the steps below to set up a demonstration file containing three different objects and then automate the file so that only one of the objects marks on each pass through the automation loop depending on the status of input bits *IN3* and *IN4*. MatchDigitalState works by evaluating the status, high or low, of the actual input bit(s) against the specified match values and assigns a Boolean value of True or False to the target object and target property.

Configure MatchDigitalState automation as follows:

1   Open a new mark file and place three text objects on the *Drawing Canvas*. Give each text object a different caption so that they are uniquely identified.

2   Click any blank area on the *Drawing Canvas* or highlight *Drawing* in the *Property List* and then click the *Automation* tab.

3   On the *Automation* tab, click the ellipsis (…) to the right of On Before Mark Piece to open the *Event Builder* dialog.

4   Click the *Add* button to add a new command.

5   Click on the drop down arrow and select MatchDigitalState.

6   Set the *Timeout Msecs* value (in the *Command Details* frame) to *100*.

7   Set the *Input Bit 3* state to '*Clear – 0*' and *Input Bit 4* to '*Set – 1*'. Leave all other bits set to '*Ignore*'.

8   In the *Target Object and Property* frame, select the first of the three text objects as the target object, and select Mark Object as the target property.

9   Follow Steps 4 and 5 to add a second MatchDigitalState command, but set *Input Bit 3* to '*Set – 1*', set '*Input Bit 4* to '*Clear – 0*', select the second text object as the target object, and choose Mark Object as the target property. The *Timeout Msecs* value should be set to '*0*'.

10   Follow Steps 4 and 5 to add a third MatchDigitalState command, but set *Input Bit 3* to '*Set – 1*', set *Input Bit 4* to '*Set – 1*', select the third text object as the target object, and choose Mark Object as the target property. . The *Timeout Msecs* value should be set to '*0*'. At this point, the Event Builder should look similar to the view shown in Figure 17-5 although your text object names may differ.
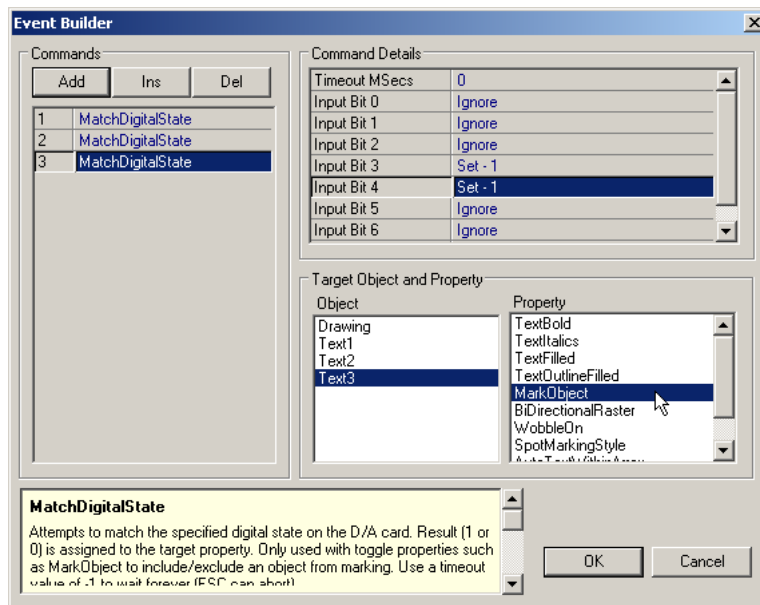
Figure 17-5 Event Builder dialog box for MatchDigitalState demo

11 Click *OK*, then save the mark file.

The *Timeout Msecs* property determines how many milliseconds WinMark Pro waits for input status to match the specified values before returning a value of False to the target object and property. WinMark Pro continuously checks the status of the input bits until the required bit pattern is matched or until the timeout value expires. As soon as the input pattern matches the specified input state, any remaining timeout period is ignored and WinMark Pro advances to the next step in the automation sequence.

Tip: When an Event Builder dialog contains a series of MatchDigitalState events and you require a timeout value, set a *Timeout Msecs* value for the *first* MatchDigitalState (for example, 100 msecs as described in the sample above) and set the *Timeout Msecs* value for remaining MatchDigitalState events to zero (0). This assures a consistent, timed response that is not dependent on the order in which the match is recognized.

The demo file described above is configured so that only one of the three MatchDigitalState commands will set its corresponding target object and property to True, provided that the state of the inputs are held steady during the succession of MatchDigitalState evaluations. This results in only one object being marked for each pass through the mark loop (see the *Automation Flowchart* under the *Help* menu). No mark is made if the states of the inputs do not match one of the three MatchDigitalState input conditions.

Once your MatchDigitalState automation works as desired, you can add 'start mark' inputs and setup the mark file to execute the mark loop as many times as desired using the basic automation scheme described in Chapter 11, *Automation basics*.

ReadFromSerialPort

Read a line of text from the specified serial port. The value read can be used to dynamically set the value of any target property. Since one text string is read from the serial port each time ReadFromSerialPort is called, you must end the line with a Carriage Return (CR) character to provide the 'end of data' delimiter. For multi-line text strings, use a Line Feed (LF) character to force a line wrap and then end the last line with a Carriage Return.

Note: The ReadFromSerialPort event is not available when operating in Flyer's stand-alone mode. Instead go to WinMark's *Automation* tab and use the Disk File Text (Fixed or Sequential) property.

Command Details:

COM Port

Specify a serial communications port on your computer, and then click the down arrow to see a list of available com ports detected on your computer. Click the ellipsis (…) to view and modify serial port settings (Figure 17-6) as required by your serial communications network. WinMark Pro v6 supports serial transfer rates between 2400–115200 baud.
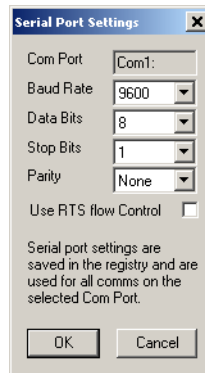
Figure 17-6 Event Builder - ReadFromSerialPort - Serial Port Settings dialog box

Timeout MSecs

Set a communications port timeout period in milliseconds. The mark will fail if information is not available at the port within the specified time. Entering a timeout value of –1 forces WinMark Pro to wait indefinitely until a message is received or the ESC key cancels the mark session.

Close After Read

Use *Close After Read* to determine whether the com port remains open or is closed after each serial port read. The default setting is *No*, which means the computer's com port is opened during the initial com port read and remains open throughout the mark session. Choosing *Yes* forces the com port to close after each read operation for cases where subsequent serial data must be ignored. The com port is reopened when the next serial port read is commanded.

Tip: While the Auto Text Type property simply assigns incoming serial data to the Text Caption property of the selected text object, the Event Builder's ReadFromSerialPort event provides much greater flexibility. For example, you can assign the serial port data to almost any marking or format property of the text object like Text Caption, Font Type, Text Height, etc.

ReadLineFromFile

Read a line of text from a text (.txt) file and assign it to any target property. Since one line of text is read each time ReadLineFromFile is called, you must end the string with a Carriage Return (CR) to provide the 'end of data' delimiter.

Command Details:

Filename

Enter the path and filename that points to the desired text file on your computer.

The format of the text source path depends on whether the file will be accessed by WinMark Pro, or a

custom ActiveX application, (Windows OS) or by a Flyer head operating in Stand-alone mode (Linux OS). For Windows operations, pathnames must be written using a backslash (\ ) character; for example, *C:\MarkFileFolder\TextFile.txt*. For Linux operations, pathnames must be written using a forward slash (/) character; for example, */network/MarkFileFolder/TextFile.txt*.

File Wrap

When *No*, WinMark marks each line in the file only once. If set to *Yes*, WinMark loops through the text file continuously.

Tip: Flyer/Fenix Flyer's Circular File feature:

FH Flyer marking heads and Fenix Flyer Laser Markers have the ability to sequentially read up to ten specially named data (.txt) files. This feature provides the ability to update network data files using a third-party process while WinMark is marking another data file.

To setup this Circular File feature, simply create one to ten data files using the format: "filename.0.txt", "filename.1.txt", …, up through "filename.9.txt" (without quote marks); where filename can be any name, but must be the SAME name for all ten files. Enter the name of the first file in the list for ReadLineFromFile's Filename property. After reading all lines of data in "filename.0.txt", Flyer will open "filename.1.txt" and continue marking. If Flyer does not see the next logical index in the series, it loops back to "filename.0.txt" and continues marking. Note that while WinMark has a file open for marking, you can use a separate third-party process to update closed files without interfering with the mark process

---

ReadyStatus (Fenix Laser Markers only)

Note: The ReadyStatus event is a legacy support property not available when operating FH Flyer marking heads or Fenix Flyer Laser Markers.

Define an output signal (from either the Fenix Laser Marker or the FLCC) to parts handling equipment indicating that Fenix did not mark due to a fault. Bits labeled IGNORE are not changed. This command queries Fenix for status after completion of a mark and sends the user-defined output signal if the marking head is not ready due to an error.

Command Details:

PCI Card ID

Enter a card ID corresponding to the ID of the card used for the input/output (I/O) connection. Typically, this ID corresponds to the ID of the card used for controlling the marking head (see *Tools/General Settings…/"Device" tab/Object Name*).

Output Bit 1

This output available only from the output connector on the FLCC.

Output Bit 3

This output available only from the output connector on the FLCC.

Output Bit 4

Corresponds to *OUT4* on Fenix/FH Series marking heads.

Output Bit 5

Corresponds to *OUT5* on Fenix/FH Series marking heads.

Output Bit 6

Corresponds to *OUT6* on Fenix/FH Series marking heads.

Output Bit 7

Corresponds to *OUT7* on Fenix/FH Series marking heads.

RestoreProperty

Restore the specified target property's value from a disk file. The disk file name is your mark file name appended with a .dat extension and is always located in the *C:\Program Files\WinMark* folder. Refer to the SaveProperty event for more detail.

Note: The RestoreProperty event is not available when operating in Flyer/Fenix Flyer stand-alone mode.

SaveProperty

Save the specified target property's value to a disk file. The .dat file is always located in the *C:\Program Files\WinMark* folder. The disk file name is your mark file name appended with a .dat extension. When using automation or serialization in your mark file, SaveProperty / RestoreProperty events are useful to ensure your mark file always close and reopen with a known or default set of property values.

Note: The SaveProperty event is not available when operating in Flyer/Fenix Flyer stand-alone mode.

Tip: Multiple SaveProperty and RestoreProperty events can be defined for a single drawing. Even though the data is stored in a single .dat file, a separate entry is created for each *Target Object* and corresponding *Target Property*.

SetDigitalState

Set individual output bits on the FH Flyer marking head or Fenix Flyer Laser Marker to the specified values. Bits labeled IGNORE are not changed. See Chapter 11, *Automation basics*, for a table showing available outputs.

Command Details:

Output Bit 0

Corresponds to *OUT0* on Flyer/Fenix Flyer heads.

Output Bit 1

Corresponds to *OUT1* on Flyer/Fenix Flyer heads.

Output Bit 2

Corresponds to *OUT2* on Flyer/Fenix Flyer heads.

Output Bit 3

Corresponds to *OUT3* on Flyer/Fenix Flyer heads.

Output Bit 4

Corresponds to *OUT4* on Flyer/Fenix Flyer heads.

Output Bit 5

Corresponds to *OUT5* on Flyer/Fenix Flyer heads.

Output Bit 6

Corresponds to *OUT6* on Flyer/Fenix Flyer heads.

Output Bit 7

Corresponds to *OUT7* on Flyer/Fenix Flyer heads.

WaitDigitalState

Wait for a specific input pattern to be read on FH Flyer marking head or Fenix Flyer Laser Marker inputs. Program execution continues if the required state is met before the specified timeout interval, if not, the mark will fail. Input bits labeled IGNORE are disregarded. See Chapter 11, *Automation basics* for a table showing available inputs.

Command Details:

Timeout MSecs

Use a short timeout value (milliseconds or tens of milliseconds) to complete the input status scan immediately or enter a timeout value of –1, which forces WinMark to wait indefinitely for a valid match (or until the ESC key aborts the mark session).

Input Bit 0

Corresponds to *IN0* on Flyer/Fenix Flyer heads.

Input Bit 1

Corresponds to *IN1* on Flyer/Fenix Flyer heads.

Input Bit 2
Corresponds to *IN2* on Flyer/Fenix Flyer heads.

Input Bit 3
Corresponds to *IN3* on Flyer/Fenix Flyer heads.

Input Bit 4
Corresponds to *IN4* on Flyer/Fenix Flyer heads.

Input Bit 5
Corresponds to *IN5* on Flyer/Fenix Flyer heads.

Input Bit 6
Corresponds to *IN6* on Flyer/Fenix Flyer heads.

Input Bit 7
Corresponds to *IN7* on Flyer/Fenix Flyer heads.

18 ActiveMark™ (ActiveX®) technology

The *ActiveMark (ActiveX) technology* chapter includes sections:

■ ActiveMark control overview

■ XY coordinate system

■ ActiveMark control events, properties, and methods

Important Note: When developing your automated control system using ActiveX® control methods, do not place input automation into the mark file. Instead, perform any input automation functions within the ActiveX control program. By doing this, your control program remains in charge of pre- mark and post-mark automation and WinMark's MarkDrawing control method only maintains control of the operating system long enough to control laser on/off commands during the actual marking process. Performing input automation within the mark file may prevent the ActiveX control program from regaining control of the operating system if the specified input state does not occur.

Important Note: If the WinMark Pro v6 ActiveX control is drawn directly on a Visual Basic form, an instantiation error will occur in design mode unless you close the form before running your VB code.

ActiveMark control overview

For best results, use the WinMark Pro application to layout drawing elements and then load and automate the drawing via the ActiveMark™ (ActiveX) control to create customized marking solutions. The customized WinMark Pro ActiveX control software usually does the following:

■   Loads one or more WinMark Pro drawings into the control

■   Operates in either WinMark control mode or Flyer stand-alone control mode

■   Manipulates the objects in the drawings either through property modification, position, or transformations

■   Synchronizes with custom part handling

■   Marks the drawing

Most ActiveX control methods return a numerical or Boolean value to the calling program. Returned values are one of seven types:

BOOLEAN – returns a Boolean (1=True, 0=False) value to indicate if the command was successful.

FLOAT – returns a floating-point value.

INTEGER – returns an integer value.

LONG – returns a long integer value.

SHORT – returns a short integer value.

STRING – returns an alphanumeric string.

VOID – no value returned by control method.

Sample Visual Basic® and Visual C++® code is provided in the *WinMark\Samples\VisualBasicSample* and *WinMark\Samples\VisualCPlusSample* folders respectively.

Additional VB code samples are available on the WinMark Pro web site at http://www.winmark.com/products/winmark_activexsamples.html.

Important Note:	We strongly recommend that all mark files run under ActiveX control use inches as the unit of measure. The calling program must calculate the conversion to inches from other units of measure. Unpredictable object placement may result if the Show Units Type property in the mark file is set to millimeters or centimeters.

In order to be recognized by the Synrad WinMark control (.ocx), ActiveX control methods and property names must be called using their internal name. These internal names are written without spaces in English. For example to add a text object with an Object Name and Text Caption when the Application Language is Spanish, you would follow this convention:

> **mh.AddText "Objeto 1 Del Texto", 0, 0, "Accionada por Synrad!"**

To change the Text Caption of an object (when the Application Language is German) and then command WinMark to mark the text using two Mark Passes, follow this convention:

> **mh.SetStringProp "Text1", "TextCaption", "Energie durch SYNRAD!"**
> **mh.SetIntProp „Text1", „MarkPasses", 2**

XY coordinate system

XY object positions specified in WinMark Pro are not Cartesian coordinates (refer back to Figure 4-7). On WinMark's *Drawing Canvas*, X-coordinate values are negative to the left of the origin; positive to the right while Y-coordinate values are negative above the origin and positive below.

ActiveMark control events, properties, and methods

For an up-to-date list of WinMark v6 ActiveMark events, properties, and methods, download our WinMark Pro v6 ActiveX Control document (PDF format) from the WinMark web site at: http://www.winmark.com/products/winmark_activexsamples.html.

Note:	Flyer and Fenix Flyer system parameters cannot be changed by ActiveX methods while the head is in a stand-alone mark session. System parameters may be changed only if the stand-alone head is idle.

19   Flyer Modbus protocol

The *Flyer Modbus protocol* chapter includes sections:

- Register-based Modbus implementation

- User-defined Modbus implementation

- Modbus command documentation

FH Flyer marking heads and Fenix Flyer Laser Markers (running firmware version 3.08 or above), can be controlled remotely using the SYNRAD external Ethernet communications server (SynComm). SynComm operates over an Ethernet network using the Modbus® protocol and allows users to access various marking head functions via Flyer's Ethernet port. There are two distinct "flavors" of SYNRAD's Modbus implementation. The first is a basic set of register-based commands and the second is an extended set of commands using Modbus user-defined function codes.

Register-based Modbus implementation

The register-based implementation uses Modbus function codes 3, 4, 6, and 16 that many PLCs support. Your Modbus master device (PLC) can read or write to dedicated registers in the Flyer/Fenix Flyer head to Get/Set I/O status, Get mark status, Get error codes, Get/Load mark files into RAM, Get/Set mark file properties, and Get/Set Flyer system parameters.

User-defined Modbus implementation

The user-defined function implementation provides an extended set of commands that includes advanced Filestore and head management options; however, user-defined Modbus functions are less widely supported by the PLC community. To use user-defined functions, your Modbus master device (PLC) must support Modbus user-defined function codes in the ranges of 65–72 or 100–110 hexadecimal.

With the user-defined implementation, there are three different protocols available: (1) a Modbus/IP protocol for interaction with Programmable Logic Controllers (PLCs) or other MODBUS network devices; (2) a Modbus-Asynchronous protocol (a SYNRAD-modified Modbus protocol) for peer-to-peer communications; and (3) a SmartFH protocol, provided as legacy support for customers who have upgraded existing FH Smart systems to FH Flyer and wish to continue using custom programs written specifically for FH Smart marking heads.

Modbus command documentation

For complete details about using Modbus register-based or user-defined commands, see the *WinMark Pro Application Note #5: Modbus® I/P Communication Protocol for Controlling Flyer/Fenix Flyer Marking Heads* located on the WinMark web site at: http://www.winmark.com/products/winmark_ApplicationsNotes. html. This document describes all the information necessary to control an FH Flyer marking head or Fenix Flyer Laser Marker using Modbus protocols including detailed descriptions of the SynComm/Modbus packet structure and all of the Flyer/Fenix Flyer commands available through SynComm.

In addition, refer to http://www.winmark.com/products/winmark_activexsamples.html on the WinMark web site for sample Visual Basic and Visual C++ code illustrating how to easily incorporate Flyer's Modbus functionality into your custom marking application.

20 Troubleshooting

The *Troubleshooting* chapter includes sections:

■ Flyer/Fenix Flyer

■ Stand-alone mode

■ Tracking mode

■ Automation I/O

■ Graphics imports

■ ActiveMark

■ Laser Marking FAQ

■ Resources

Flyer/Fenix Flyer

Symptom:

■ Flyer/Fenix Flyer and WinMark Pro are connected via USB, WinMark is open, and Flyer/Fenix Flyer is powered up, but the *Mark* button (and the "*Device*" (Flyer) tab) display "*Device ID 0*" and do not indicate an active Flyer device.

Possible Causes:

■ Communication between Flyer/Fenix Flyer and WinMark Pro is not synchronized and WinMark has recognized, and defaulted to, a Fiber Link Controller Card (FLCC) previously installed in the marking computer.

Close and then re-open WinMark Pro while the Flyer/Fenix Flyer head is powered up. This action forces WinMark Pro to re-initialize communications with Flyer. If communication is not established after this step, then close WinMark, power down the Flyer/Fenix Flyer head, wait 30 seconds, and then reapply power. Wait another 30 seconds for the Flyer/Fenix Flyer head to re-boot and then open WinMark Pro.

Symptom:

■ WinMark Pro v6 is installed, Flyer/Fenix Flyer is powered up, and the *USB Communication* cable is connected between Flyer/Fenix Flyer and the computer, but WinMark Pro v6 does not "see" the Flyer head. The "Search for heads again" option does not locate the head, forcing WinMark Pro v6 to open in demo mode with the *Mark* button grayed out.

Possible Causes:

■ FH Flyer's USB device driver is not installed.

Important Note: Before installing, re-installing, or upgrading WinMark, make sure the Flyer/Fenix Flyer head is powered down or the USB cable is disconnected. If the head is on and connected, Windows will assign a generic USB driver or fail to update the Flyer device driver.

In the Windows® Control Panel, open the *Add Hardware Wizard* and follow the instructions to scan for new Devices and install the appropriate Device Drivers. If this fails, restart your computer and/or reinstall WinMark Pro v6 Laser Marking Software. The first two screen shots in Figure 20-1 show that a hardware device exists, but a corresponding driver is not installed. The screen shot on the right-hand side shows the Flyer Laser Marking Device is properly installed and functioning.
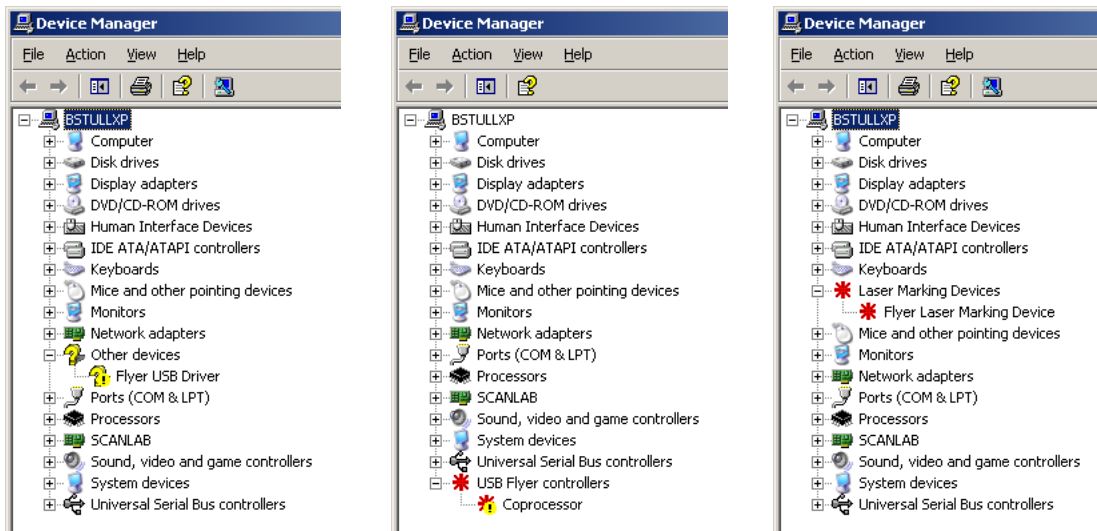
Figure 20-1 Windows Device Driver displays

Symptom:

- Flyer/Fenix Flyer is powered up and connected to WinMark Pro v6 via USB, WinMark is open, but the *Mark* button is grayed out and does not indicate an active device.

Possible Causes:

- Communications between Flyer and WinMark Pro are not synchronized.

In WinMark Pro, under the *Devices* menu, chose *Flyer USB* and select the appropriate Flyer/Fenix Flyer device. If a Flyer device is not available or the selection is grayed out, close and then re-open WinMark Pro while the Flyer head is powered up. This action forces WinMark Pro to re-initialize communications with Flyer/Fenix Flyer. If communication is not established after this step, then close WinMark, reboot your computer, power down the Flyer/Fenix Flyer head, wait 30 seconds, and then reapply power. Wait another 30 seconds for the Flyer/Fenix Flyer head to re-boot and then open WinMark Pro.

Symptom:

- The laser mark produced by Flyer/Fenix Flyer is much larger or much smaller than the image drawn on WinMark Pro's *Drawing Canvas*.

Possible Causes:

- The lens size specified in WinMark Pro does not match the lens installed on Flyer/Fenix Flyer.

Check that the lens specified in WinMark Pro matches the lens currently installed on Flyer/Fenix Flyer. In WinMark, go to the *Tools* menu, select General Settings… , and then click the "*Device*" (Flyer) tab. Check the Lens property to ensure the chosen lens is from the FH/Flyer list.

Symptom:

■   No marks or very light marks appear on the part.

Possible Causes:

■   The part is not positioned at the point of focus.

Locate the *Final Test Report* shipped with your marking head to determine the actual working distance of the focusing lens. Measure working distance from the bottom of the focusing lens <u>mount</u> to the surface of the part to be marked. Adjust the Z-axis of the mounting platform or the marking surface as required to obtain the correct working distance.

Symptom:

■   Mark quality deteriorates over time and/or laser power must be increased to maintain mark quality.

Possible Causes:

■   The focusing lens has become coated with marking debris or vapor.

Carefully inspect and clean the lens as described in the Maintenance/Troubleshooting chapter of the *FH Flyer Marking Head Operator's Manual* or the *Fenix Flyer CO_2 Laser Marker Operator's Manual*.

Symptom:

■   The Flyer/Fenix Flyer head is powered up, but no mark is made when the *Test Mark* pushbutton is pressed or when marking is commanded through WinMark Pro.

Possible Causes:

■   The laser is not enabled.

Check that the laser's *Ready* light is illuminated. On Fenix Flyer, Series 48, and Evolution lasers, check that the *Lase* indicator is glowing dimly (tickle mode) and that it appears brighter (lasing mode) as the mark is made. On Firestar lasers, check that *RDY* (Ready) and *SHT* (Shutter) indicators are lit and that the *LASE* indicator illuminates as the mark is being made. Refer to your laser's Operator's Manual if indicators do not illuminate as described.

■   The *Laser Control* cable is not connected between the laser and the Flyer marking head.

Refer to *Connecting* in the Getting Started chapter of the *FH Flyer Marking Head Operator's Manual* for information on connecting the *Laser Control* cable between Flyer and your particular laser.

■   The Fast Acting Safety Interlock (FASI) feature is enabled.

When the FASI feature is enabled (If the FASI Enable property on the "*Device*" (Flyer) tab under *Tools/ General Settings…* is *Yes*), then you must apply a 5 V–24 VDC signal on input *IN3* to fire the laser.

Symptom:

■ Flyer is not marking properly or there are indications of operational faults within the head.

Possible Causes:

■ Flyer/Fenix Flyer has, or is experiencing, one or more fault or error conditions.

Before contacting SYNRAD Technical Support, download and review Flyer's *Error Logs*. To do this, go to the *Tools* menu in WinMark Pro, highlight Get Flyer Head Logs, and select *Main Message Log*. WinMark prompts you for a location in which to save the .log file (the default is the WinMark installation folder – *C:\Program Files\WinMark*). After the file is saved to your hard drive, it opens to display a recent history of Flyer operation.

Stand-alone mode

Symptom:

■ Flyer/Fenix Flyer does not respond to WinMark Pro. The Filestore window displays few, if any files, and the blue starburst icon (the stand-alone *Mark* button) is flashing on-off.

Possible Causes:

■ The Flyer/Fenix Flyer head is in a stand-alone mark session—either actively marking or waiting for an input.

To abort the mark session, press the ESC key on the marking computer's keyboard.

Symptom:

■ The Flyer/Fenix Flyer head is powered up, but the head will not connect to and communicate with WinMark Pro through Ethernet or USB connections.

Possible Causes:

■ Flyer will not connect to Ethernet or USB ports while waiting for an input during a stand-alone mark session.

Press the ESC key on the marking computer's keyboard to abort the mark session. If Flyer/Fenix Flyer fails to respond, disconnect power from the head and then attach the appropriate Ethernet or USB connection between Flyer and your computer. Re-apply power to Flyer/Fenix Flyer. When the head boots up, it will re-establish communication with the computer before beginning the stand-alone mark session.

Tracking mode

Symptom:

■ FH Flyer/Fenix Flyer does not track moving parts.

Possible Causes:

■ Tracking is not enabled.

In WinMark Pro v6, check that Track Marking Object (on the *Drawing* object's *Marking* tab) is *Yes*.

■ Encoder pulses are not being read by the Flyer/Fenix Flyer head.

Close WinMark Pro and open Digital Scope (*DigScope.exe*). Rotate the conveyor or position encoder and verify that input *IN1* and input *IN2* toggle as the encoder rotates through its range of motion.

■ The part sensor signal is not being read by the Flyer/Fenix Flyer head.

Close WinMark Pro and open Digital Scope (*DigScope.exe*). Trigger the part sensor and verify that input *IN0* toggles as the part sensor activates.

■ Part movement is not being sensed in the proper direction.

In WinMark Pro, toggle the Invert Encoder Direction property on the "*Device*" (Flyer) tab under *Tools/ General Settings…* .

■ A physical part sensor is not installed.

Enable the Internal Part Trigger property on the "*Device*" (Flyer) tab under *Tools/General Settings…* and then enter a Part Pitch value.

■ A position encoder is not installed.

Enable Encoderless Tracking on the "*Device*" (Flyer) tab under *Tools/General Settings…* and then enter a Product Line Speed value equal to conveyor or part velocity.

Symptom:

■ Characters or graphics within the mark are missing.

Possible Causes:

■ The mark is not being completed within the extents of the *Tracking Window*.

Open the mark file in WinMark Pro and ensure that the mark is positioned as close to the upstream edge of the *Drawing Canvas* as possible.

■ Line speed is set too fast.

Lower line speed.

■ The mark is being made too slowly for the required line speed.

Open the mark file in WinMark Pro and do the following: (1) shorten mark time by changing fonts, decreasing font size, or reducing line spacing; (2) simplify or eliminate graphic objects in the mark; or (3) reduce graphic object size or resolution.

Symptom:

■ Tracking marks are skewed or distorted.

Possible Causes:

■ The Encoder Resolution value is set improperly.

Load and mark the appropriate *linestackxxx.mkh* file (located in the WinMark software folder). Refer to *Tracking hardware - position encoder* in the Tracking chapter in the *FH Flyer Marking Head Operator's Manual* or the *Fenix Flyer CO$_2$ Laser Marker Operator's Manual* for instructions on how to fine-tune encoder resolution settings.

■ The Product Line Speed value is set improperly.

If Encoderless Tracking is specified, check that Product Line Speed on the "*Device*" (Flyer) tab under *Tools/General Settings…* is equal to conveyor or part velocity. Adjust Product Line Speed as required to fine-tune tracking to actual part motion.

■ Line speed is set too fast.

Lower line speed.

■ The actual part motion vector is different from the value entered as the Motion Vector.

Check that actual part motion under the marking head equals the entered Motion Vector on the "*Device*" (Flyer) tab under *Tools/General Settings…*. WinMark Pro v6 and FH Flyer/Fenix Flyer support Motion Vector values in 0.01° increments.

Automation I/O

Symptom:

■ The Flyer/Fenix Flyer head is not responding to automation inputs or the automation controller is not "seeing" Flyer/Fenix Flyer outputs.

Possible Causes:

■ I/O voltage levels are incorrect.

Verify that I/O signals are in the correct voltage range of 5 V to 24 VDC for Flyer/Fenix Flyer heads. Use a voltmeter to measure your I/O signals while they are connected to Flyer's DB-25 *User Interface* connector or Fenix Flyer's DB-25 *Marking Head I/O* connection.

Note: Flyer's input/output voltage range is different from previous FH heads (Index/Tracker) where the allowable voltage range was 15 V–40 VDC. Flyer/Fenix Flyer I/O voltages must be in the range of **5 V–24 VDC**.

■ I/O wiring is not properly connected to the marking head.

Double-check field wiring to ensure that input/output signals are routed to the correct pins on the *User Interface/Marking Head I/O* connector and that their respective return (ground) paths are wired to the proper pins. Refer to the Technical Reference chapter in the *FH Flyer Marking Head Operator's Manual* or the *Fenix Flyer CO$_2$ Laser Marker Operator's Manual* for information about connecting signals to/from Flyer/Fenix Flyer. This section also contains information about converting an existing FH Index or Tracker system for Flyer-compatibility.

Important Note: Flyer's DB-25 *User Interface/Marking Head I/O* connector pinout does **not** match the pinout on the FH Smart DB-25 *Parts Handling Control* connector.

Use Digital Scope (*DigScope.exe*), shown in Figure 20-2, to verify proper I/O functionality between Flyer/ Fenix Flyer and the automation controller. Digital Scope's input "buttons" pop-in as an input is activated (when the correct voltage level is applied). Press an output "button" to activate an output.
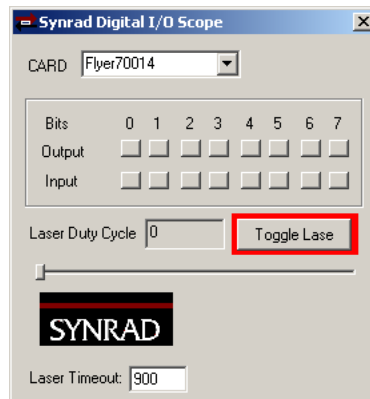
Figure 20-2 Synrad Digital I/O Scope dialog box

Graphics imports

The *Graphics imports* section includes subsections:

■   Vector graphics

■   Bitmap graphics

Vector graphics

Symptom:

■   The vector import filter dialog box appears, but when the progress bar ends and the dialog closes there is no import object on the *Drawing Canvas* and no additional objects are listed in the *Object List.*

Possible Causes:

■   The graphics file was created and saved using a newer version of software than is supported by Win-Mark's File Import Filters.

Open the graphics file using the graphics program that originally created it. Use the program's "Save As…" or "Export" command to resave the file in an older format. Refer to the *SupportedFileFormats* document on the WinMark Pro web site for a list of compatible graphics formats and versions. For example, you create an EPS graphics file using Adobe® Illustrator® version 10. Current WinMark Pro File Import Filters only import EPS files created in versions 4.0 through 7.0. You must resave the file in an Illustrator version 7.0, or earlier, format in order to import the file.

To import vector files from more recent programs such as AutoCAD 2008 or Adobe® Illustrator® CS3, WinMark Pro v6 provides Copy/Paste and Drag/Drop functionality. This feature allows you to *Copy* or *Drag* a graphic from your open drawing program and *Paste* or *Drop* it onto the *Drawing Canvas*. Because graphics files often contain multiple data formats internally, a dialog box opens when more than one acceptable format is available. In general, choose *Vector Image* for best marking results.

Bitmap graphics

Symptom:

◼ Imported bitmap graphics are rescaled when imported into WinMark Pro.

Possible Causes:

◼ The graphics file was created and saved at a resolution other than the Resolution setting specified on the *Tools/General Settings…/Object Defaults* tab.

WinMark Pro does not resample bitmap images during importation. WinMark Pro "expects" imported bitmaps to match the Resolution setting shown on the *Tools/General Settings…/Object Defaults* tab; if not, then image size is increased or decreased accordingly – the change in image size is inversely proportional to the change in image resolution.

Figure 20-3 shows the results of importing three filled squares when WinMark's default Resolution is set to 600. Each square measured one inch by one inch when drawn and was separately imported into WinMark Pro in a .TIF (bitmap) format. The square on the left is saved at 600 DPI and imports as designed; it measures one-inch across. The center square is saved at 300 DPI. Since the resolution increased by a factor of two to 600 DPI during importation, image size decreased by a factor of two. This imported square now measures one-half inch on a side. The right-hand square illustrates the third case. This time, the one-inch square is saved at 900 DPI and then imported into WinMark Pro. Since image resolution decreased by 67% during importation (600/900), image size increased by a factor of 1.5 (1/.67). The imported square now measures one and one-half inches on a side.
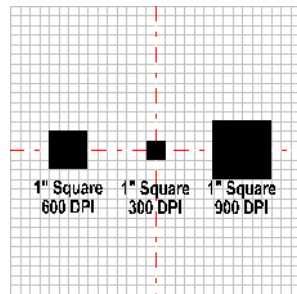
Figure 20-3 Bitmap image size/resolution comparison

Note: Older versions of WinMark Pro increased or decreased bitmap image size corresponding to a fixed bitmap resolution of 600 DPI.

Symptom:

■   Color bitmap mark quality is not as good as expected.

Possible Causes:

■   The Color Reduction Method property is not optimized.

Because laser marking (with the exception of the 8-bit *Grayscale* Color Reduction Method) is a mono-chrome–black and white or on/off–process, color or continuous-tone bitmaps are converted to 1-bit images when imported. This conversion is accomplished using *Bayer Dithering*, *Error Diffusion*, or *Halftone* algorithms. These algorithms create the illusion of color or continuous-tone by varying the size, shape, and/or spacing of the dots making up the image just as books, newspapers, and magazines do. WinMark Pro v6 retains a copy of the original bitmap image in memory after importation. After changing bitmap Resolution and/or resizing the image, use the Color Reduction Method property (on the *Format* tab) to change the color reduction algorithm as required. Although WinMark Pro now displays a more accurate view of actual mark quality, test marking is still recommended.

Use the *Grayscale* Color Reduction Method to mark true 8-bit images. An 8-bit grayscale image provides 256 levels of gray ranging from 0 (white) to 255 (black). WinMark Pro reproduces grayscale images by allocating 255 levels between the Min Power Threshold and the specified Power percentage. The *Grayscale* Color Reduction Method can be used to reproduce fine images on "hard" surfaces or to engrave "softer" materials.

■   The Resolution property value is not correct.

When marking bitmap (raster) images, set a Resolution value that corresponds to the spot size of the focusing lens. For example, a 200 mm focusing lens with a spot size of 0.011" is capable of marking approximately 91 discrete microvectors per inch. As a rule, set bitmap Resolution equal to 200 when using an 80 mm lens; 143 for a 125 mm lens; 91 for a 200 mm lens; and 48 when marking with a 370 mm lens. Higher Resolution values cause raster scan lines to overlap; the higher the Resolution, the greater the overlap. Start with the minimum specified Resolution for the selected lens and, if necessary, increase Resolution in multiples of the recommended values such as 2×, 3×, etc).

Symptom:

■   When importing a metafile (a graphics format containing both vector and raster graphics) into WinMark Pro the last raster object to import is "garbled".

Possible Causes:

■   An incompatibility exists with Windows® 2000 and Windows® XP operating systems.

Edit the graphics file so that vector and bitmap objects import separately.

ActiveMark

Symptom:

■ The ActiveX® application appears to "freeze" after the MarkDrawing method is called.

Possible Causes:

■ Input automation commands are specified in the .mkh mark file.

Performing input automation within the mark file may prevent the ActiveX application program from regaining control of the operating system if the MarkDrawing method is called and input signals are not available. Set up input automation functions within the ActiveX application (not in the .mkh file) so that your application or user-interface remains in charge of all pre-mark and post-mark automation. WinMark Pro's MarkDrawing method should only maintain control of the operating system long enough to control laser on/off commands during the actual marking process.

Symptom:

■ The WinMark Pro ActiveX control is not available after upgrading to a newer version of WinMark (Microsoft® Visual C++® only).

Possible Causes:

■ WinMark Pro's ActiveX control was not updated in the MS Visual C++ project.

After installing (or upgrading), WinMark's ActiveX control must be added (or updated) in the Visual C++ project. See *Adding ActiveX controls.pdf* on the WinMark web site for instructions on adding or updating ActiveX controls in Visual C++. Remember that the C++ application must be built to include the new control changes.

Laser Marking FAQ

SYNRAD's *Laser Marking FAQ* is available for downloading or browsing from the WinMark Pro web site at http://www.winmark.com/. You can also access the *Laser Marking FAQ* directly from WinMark by clicking *Help/Synrad WinMark FAQ*. Our Frequently Asked Questions database answers many common marking questions in categories including *General troubleshooting*, *WinMark Pro automation*, *Tracking operation*, *ActiveX*, and others. The *Laser Marking FAQ* also includes links to various SYNRAD technical bulletins.

Resources

See the *Release Notes* provided with each build of WinMark Pro for the latest information on new features, bug fixes, and miscellaneous issues.

Our WinMark Pro *Application Notes* provide detailed information on a variety of laser marking topics. See the WinMark web site at http://www.winmark.com/products/winmark_ApplicationsNotes.html for a complete listing.

Your SYNRAD Regional Sales Manager can provide reference materials including Outline & Mounting drawings, Operator's Manuals, Technical Bulletins, Application Newsletters, and much more. Most of these materials are also available directly from SYNRAD's web site at http://www.synrad.com/, the WinMark Pro web site at http://www.winmark.com.