

DuraTrax™ & LaserLite™

Hardware Manual

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GCO# 1236

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LaserLite is covered by one or more of the following U.S. Patents:
U.S. Patent No. 4,360,798; 4,369,361; 4,387,297; 4,460,120; 4,496,831; 4,593,186; 4,603,262;
4,607,156; 4,652,750; 4,673,805; 4,736,095; 4,758,717; 4,816,660; 4,845,350; 4,896,026;
4,897,532; 4,923,281; 4,933,538; 4,992,717; 5,015,833; 5,017,765; 5,021,765; 5,021,641;
5,029,183; 5,047,617; 5,103,461; 5,113,445; 5,130,520; 5,140,144; 5,142,550; 5,149,950;
5,157,687; 5,168,148; 5,168,149; 5,180,904; 5,229,591; 5,230,088; 5,235,167; 5,243,655;
5,247,162; 5,250,791; 5,250,792; 5,262,627; 5,262,628; 5,280,163; 5,280,164; 5,280,498;
5,304,786; 5,304,788; 5,321,246; 5,377,361; 5,367,151; 5,373,148; 5,378,882; 5,396,053;
5,396,055; 5,399,846; 5,408,081; 5,410,139; 5,410,140; 5,412,198; 5,418,812; 5,420,411;
5,436,440; 5,444,231; 5,449,891; 5,449,893; 5,468,949; 5,479,000; 5,479,002; 5,479,441;
5,504,322; 5,528,621; 5,532,469; 5,543,610; 5,545,889; 5,552,592; 5,578,810; 5,589,680;
5,608,202; 5,612,531; 5,619,028.

Federal Communications Commission Statement: This equipment is a Class A computing device under the U.S. FCC rules and this warning is required.

Warning: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

If this equipment is operated from the same electrical wall circuit as other pieces of equipment and erratic operation of the unit occurs, it may be necessary to shut off other equipment or power the unit from a dedicated electrical circuit.

If this equipment has an FCC ID number affixed to the equipment, then the unit meets the limits for a U.S. Federal Communications Commission Class B computing device and the following information applies.

FCC Notice: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by disconnecting and reconnecting the equipment, the user is encouraged to try to correct the interference by one or more of the following measures.

Reorient the receiving antenna.

Relocate the computer with respect to the receiver.

Move the computer away from the receiver.

Plug the computer into a different outlet so that the computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

“How to Identify and Resolve Radio-TV Interference Problems.”

This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

CE Conformity



The device complies with the requirements of the EM89/336/EEC directive. Standards to which conformity is declared are EN50082-1 Immunity, EN60825-1 Laser Safety, EN55022 Emissions, IEC-825-1 (CE Laser Safety), and CFR 1040 (FDA Laser Safety). Complies with 21CFR 1040.10 and 1040.11.

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Chapter 1

DuraTrax and LaserLite

This chapter contains:

- An introduction to DuraTrax and LaserLite
- Basic instructions on DuraTrax and LaserLite operation

DuraTrax and LaserLite Portable Data Collectors

DuraTrax and LaserLite are innovative portable data collectors manufactured by Videx.

DuraTrax is a contact scanner that reads both bar codes and Touch Memory buttons, combining bar code and touch technologies in one durable easy-to-use package. LaserLite is a portable laser bar code reader.

Both units are housed in a durable cast and extruded aluminum case that provides protection and superior durability.

DuraTrax and the LaserLite share the following features:

- Scans all popular bar code symbologies
- Operates on 4 replaceable AA batteries
- Rechargeable lithium back-up battery
- IR communication to host computer or printer
- Strong metal case
- 32-character display
- Display scrolling capability
- 128K internal memory
- Real-time clock

The DuraTrax also features:

- Protected read head
- Sapphire scan tip
- Touch Memory button reader for communicating with Touch Memory buttons (also known as iButtons)

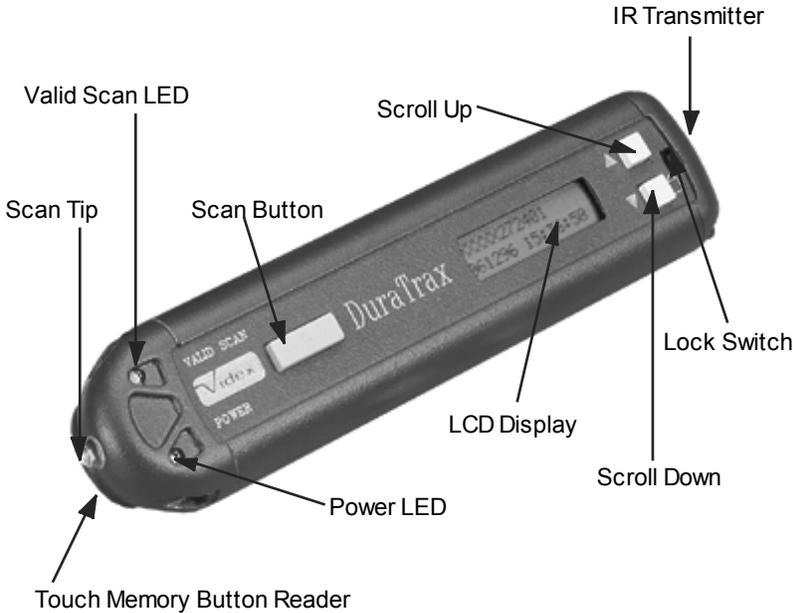


Figure 1-1 DuraTrax

The LaserLite also features:

- Visible-light laser diode
- Laser internally cushioned



Figure 1-2 LaserLite

Case

DuraTrax and LaserLite are made with a sturdy metal case. The case body is made of extruded aluminum, providing strength and durability in a lightweight package. The case is powder coated for a lasting protective finish. The combination of the case design and powder coating provides moisture and dust resistance.

DuraTrax measures a compact 6.25 x 1.45 x 1.05 inches and weighs less than nine ounces. LaserLite measures a compact 7.30 x 1.45 (handle)/1.89 (laser) x 1.05 (handle)/1.93 (laser) inches and weighs less than twelve ounces.

Display and Buttons

DuraTrax and LaserLite have a 2-line by 16-character LCD display and three buttons. The two gray buttons by the display are used to scroll through the data stored in the reader. The large yellow button is the scan button. The scan button is pressed and held while scanning a bar code.

DuraTrax and LaserLite have a lock switch, located near the end cap. The lock switch deactivates the unit and prevents unintentional pressing of buttons and unnecessary draining of the batteries while the unit is being stored or transported. Be sure the lock switch is in the unlocked position before attempting to use the DuraTrax or LaserLite.

Memory

DuraTrax and LaserLite have 128K (K = 1024 characters) of memory. This is enough storage capacity for over 3,700 5-digit bar code scans (with time and date stamp) to be stored in memory before it is necessary to transfer the data to the computer. More data can be stored by eliminating the time and date stamp from the application.

Clock

DuraTrax and LaserLite contain a real-time clock that is set to match the computer's clock each time the unit is programmed or its data is transferred. For the DuraTrax and LaserLite's clock to be correct, the date and time on the computer must be set correctly before communicating with the DuraTrax or LaserLite.

When a bar code is scanned, or a Touch Memory button is read successfully, the date and time may be recorded along with the entered data. This timekeeping feature makes it possible for you to use a database, spreadsheet, or other program to calculate beginning, ending, and intervals of time from data downloaded from the DuraTrax or LaserLite.

Batteries

DuraTrax and LaserLite are shipped with 4 AA alkaline batteries. DuraTrax and LaserLite can use either alkaline or nickel-cadmium batteries.



Figure 1-3 DuraTrax/LaserLite Batteries

Alkaline batteries require no recharging and typically provide several weeks of use between battery replacements. Exact battery life depends upon actual use; a fresh set of alkaline batteries will provide approximately 2,000 milliampere hours (mAh) capacity, which can provide up to 100,000 or more scans from one set of alkaline batteries.

If you choose to use nickel-cadmium (NiCad) batteries, you will need to remove them from the unit before you recharge them. You must recharge the NiCad batteries in an external battery recharger. The LaserLite DuraTrax Base Station does NOT recharge batteries. (Note: The DuraTrax/LaserLite lithium back-up battery will maintain the data and program while you recharge the NiCad batteries.)

NiCad batteries rated at 500 mAh, which can provide enough power for up to 25,000 scans from one set of batteries; NiCad batteries rated at 1200 mAh, should provide enough power for approximately 50,000 scans from one set of batteries.

The following chart shows the current draw of a DuraTrax or LaserLite during operations:

Operation	Approximate Current Draw
Sleep	1 mA
Idle (Display on)	10 mA
Processing	20 mA
Button read	21 mA
Contact on	80 mA
Laser on	100 mA

DuraTrax and LaserLite have a rechargeable lithium back-up battery that maintains the program and data while the batteries are being replaced. The battery cutoff voltage is approximately 4.0 volts. If the batteries drop below 4 volts, the unit will stop operating until the batteries are replaced. If you do not immediately replace the AA batteries, the lithium back-up battery will maintain the program and data for up to five days. The DuraTrax/LaserLite AA batteries recharge the lithium back-up battery. To keep the lithium back-up battery at full charge, the DuraTrax and LaserLite should always be stored with AA batteries installed.

Replacing the DuraTrax and LaserLite Batteries

You will need four (4) new AA alkaline or nickel-cadmium batteries. The following steps guide you through replacing the batteries:

1. Place the DuraTrax or LaserLite's lock switch in the locked position (switch towards picture of lock).
2. Remove the battery end cap by loosening the end cap screw and pulling out the end cap. Place the end cap in a safe place for later reassembly.
3. Remove the four old batteries and replace with four new AA batteries. Be sure the batteries are installed correctly. (Note: The correct battery polarity is etched on the data collector's case.)
4. Reinstall the end cap and tighten the end cap screw.
5. Flip the lock switch back to the unlocked position and your DuraTrax or LaserLite is now ready to use.

Battery Information and Warnings

Videx recommends using high-quality AA alkaline or nickel-cadmium batteries. Substitution of batteries other than those recommended by Videx could alter the operating life of your DuraTrax and LaserLite.

Note: The following warnings are very important:

- **Always** keep AA batteries installed in the DuraTrax/LaserLite. This practice will keep the rechargeable lithium back-up battery fully charged.
- **Do** install the batteries correctly, or you may damage your DuraTrax or LaserLite.
- **Do not** mix battery types (i.e., nickel-cadmium and alkaline).
- **Do not** mix new and used batteries. Replace all batteries for optimum battery performance.
- **Do not** dispose of batteries in fire.

DuraTrax Read Head

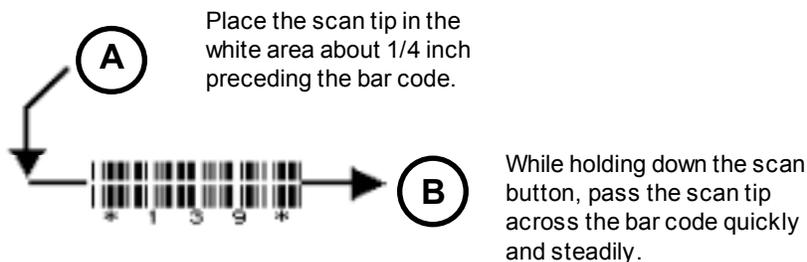
DuraTrax has a 655 nm visible light read head.

A 655 nm read head is in the visible light range and can read bar codes printed with a variety of printers, including direct thermal and thermal transfer. The 655 nm read head can also read bar codes where contrast has been a problem, such as bar codes printed on an ink-jet printer.

The read head is protected by a sapphire scan tip which keeps the read head clean and protects it from damage.

Scanning Bar Codes with a DuraTrax

To scan a bar code with a DuraTrax, press and hold the scan button while sweeping the scan tip across a bar code. (Note: Verify the lock switch is in the unlocked position before scanning.)



Be sure to start your scan in the white area in front of the bar code. This is the “quiet zone” and allows the DuraTrax to correctly recognize the first bars of the bar code. When scanning the bar code, use a quick motion. We have found that for most bar codes you cannot scan too fast for a DuraTrax, but it is possible to scan too slowly. Use about the same speed you would use to strike a match.

Experiment to find the speed and angle that works best for you. A successful scan is verified by both a flash of the valid scan LED and an audible tone.

DuraTrax can read Code 3 of 9, Interleaved 2 of 5, EAN, UPC, Codabar, and Code 128 bar code symbologies.

Key Points

- Keep the scan button pressed continually while scanning.
- Scan tip must contact the bar code.
- Begin scan in the white area preceding bar code.
- Use a quick scanning motion, like striking a match.
- To prolong battery life, release the scan button between scans.

Reading Buttons with a DuraTrax

To read a button, place the DuraTrax Touch Memory button reader over a Touch Memory button—the round rim of the button helps guide the DuraTrax for easy alignment. With a momentary touch, DuraTrax reads the button and stores the data in memory. DuraTrax emits an audible beep and the valid scan LED flashes with each successful read. (Note: Verify the lock switch is in the unlocked position before reading a button.)



Figure 1-4 Reading a Touch Memory Button with DuraTrax

DuraTrax can read the ID from DS1990, DS1991, DS1992, DS1993, DS1994, and other Touch Memory buttons.

Touch Memory Buttons

A Touch Memory button (also known as an iButton) is a memory chip housed in a stainless steel container. The stainless steel container protects the memory chip and also provides an electrical path for communication. The top of the button is connected to the enclosed memory chip circuit, and the bottom and sides of the button provide a signal ground. When the DuraTrax Touch Memory button reader touches a button, the top and the sides of the button are connected and an electrical path is established. Through this path, data is transferred at up to 16,000 bits per second.

All Touch Memory buttons contain a serial number that is programmed into the button at the factory. The serial number is unalterable and along with the family code, uniquely identifies each button. A DS1990 button is a read-only button. DS1991, DS1992, DS1993, and DS1994 buttons are read/write buttons.

Touch Memory buttons can be attached to virtually anything by using an adhesive backing, a mounting bracket, or a key chain.



Figure 1-5 Touch Memory Buttons

LaserLite Laser

LaserLite uses a visible-light laser diode to scan bar codes. The laser diode is internally cushioned to protect it from damage.

LaserLite can read Code 3 of 9, Interleaved 2 of 5, Codabar, UPC, EAN, and Code 128 bar code symbologies. The LaserLite can read bar codes printed with a variety of printers, including direct thermal and ink-jet printers.

Scanning Bar Codes with a LaserLite

To scan a bar code, point the laser towards a bar code and press the scan button. (Note: Verify the lock switch is in the unlocked position before scanning.) You will see a red laser beam. Align the red beam so that the bar code is centered within the beam. The laser beam must cross the entire bar code. Move the LaserLite towards or away from the bar code so that the bar code takes up approximately two-thirds the width of the beam.



Figure 1-6 LaserLite Scanning

When the scan button is pressed and the laser beam is emitted, the Power LED lights, indicating laser emission. Following a successful scan, the Valid Scan LED flashes to provide a visual indication of a successful scan. LaserLite also beeps to provide an audio indication of the scan. The laser beam is automatically turned off after scanning a bar code, and is ready to scan again when the scan button is pressed.

Key Points

- Keep the scan button pressed continually while scanning.
- Laser beam must cross the entire bar code.
- Align the laser beam so the bar code is centered.

Laser Warnings

LaserLite incorporates a Class II laser. The visible laser diode has a maximum output of one milliwatt. Laser light can be dangerous to you or others nearby if it is improperly used. Be sure to observe the caution label on top of the LaserLite along with the following cautions:

- Do not stare directly into the laser beam.
- Do not remove the laser caution label from the LaserLite.
- The laser is certified for use with the LaserLite only. Do not connect the laser to any other device.



Figure 1-7 LaserLite Caution Label

Communication to the Computer

DuraTrax and LaserLite communicate with the computer via an IR link, utilizing IrDA® technology. The DuraTrax and LaserLite's IR link is the IR transmitter on the end cap. The computer's IR link may be either a LaserLite DuraTrax Base Station or an external JetEye® PC IR station attached to your computer's serial port, or a built-in IrDA transceiver addressable as a serial port. DuraTrax and LaserLite establish two-way communication to the host computer using this IR link.

To communicate with the computer using a Base Station, insert the DuraTrax or LaserLite into one of the Base Station's slots (Figure 1-8). A LaserLite DuraTrax Base Station has two slots; either unit can use either slot. The Base Station must be connected to the computer's serial port with a Videx serial port cable. See pages 17-22 for instructions on connecting the Base Station to the computer. (Note: If the Base Station fails to communicate, reset it by unplugging it from the electric outlet and plugging it back in.)



Figure 1-8 LaserLite DuraTrax Base Stations

To communicate with a computer using a JetEye external IR station (Figure 1-9) or a built-in IrDA transceiver, point the DuraTrax or LaserLite's IR transmitter (located in the end cap) towards the computer's IR station. Space the data collector approximately four inches from the IR device during communication. (The optimum range for communication is approximately 3 to 12 inches. The range varies depending upon the type of IR station used and the ambient light conditions.)



Figure 1-9 JetEye PC IR Station

Use the Application Builder software or one of the download programs for communication. Consult the Application Builder Software manual for specific instructions.

LaserLite DuraTrax Base Station

The LaserLite DuraTrax Base Station provides communication between the DuraTrax or LaserLite and the computer.

The Base Station has three LEDs: Receive, Transmit, and Power. The Receive LED illuminates when the computer is sending information to the data collector. The Transmit LED will illuminate when the data collector is sending information to the computer. The Power LED will illuminate when the Base Station is plugged into an electric power outlet.

The **Computer** port, **Power** connection, and **Extension** port are located on the left side of the Base Station (Figure 1-10). The **Computer** port is where the computer's serial port cable connects to the Base Station. The **Power** connection is where the power transformer plugs into the Base Station. The **Extension** port allows you to connect up to ten Base Stations to a single computer serial port. This allows you to transfer data from more than one data collector during a single transfer process. (Note: The LaserLite DuraTrax Base Station is a communication device, not a recharger; it does not recharge batteries.)

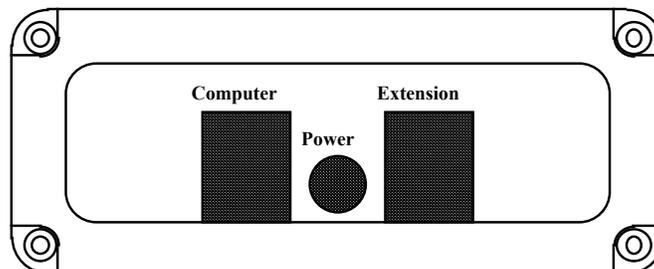


Figure 1-10 LaserLite DuraTrax Base Station - Side View

Connecting the Base Station to Your Computer

The following steps describe how to connect a Base Station to the computer's serial port. You will need a Base Station and a Videx serial port cable. Please shut down your computer before connecting the Base Station to the serial port.

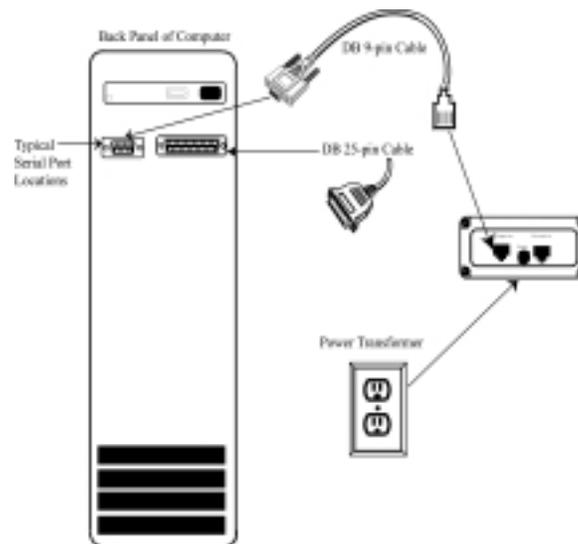


Figure 1-11 Base Station Connections

1. Plug the Base Station's power transformer (Output: 12 VDC 300 mA) into an electric outlet.
2. Insert the other end of the transformer cable into the **Power** connection on the side of the Base Station.

3. Verify that the **Power** light on the Base Station is lit.
4. Connect the serial port cable's connector to your computer's serial port. (Note: A computer's serial port is always a male connector on a DOS/Windows computer. Pin-outs for the Videx serial port cables are provided in Appendix C.)
5. Connect the serial port cable's RJ-11 plug (TWC-001 or TWC-008 for DOS/Windows; TWC-009 for Macintosh) to the **Computer** port of the Base Station.
6. The Base Station must be placed *at least* 3 inches away from your computer and monitor or high levels of electromagnetic interference could hinder communications.

Using Multiple Base Stations

The Base Station's "Extension" port is for connecting more than one Base Station to a computer serial port. To add additional Base Stations, connect one end of an interconnect cable (TWC-006) to the "Extension" port of the Base Station that is connected to the computer. Connect the other end of the interconnect cable into the "Computer" port on the next Base Station. Continue the same pattern of connection for each additional unit, see Figure 1-12.

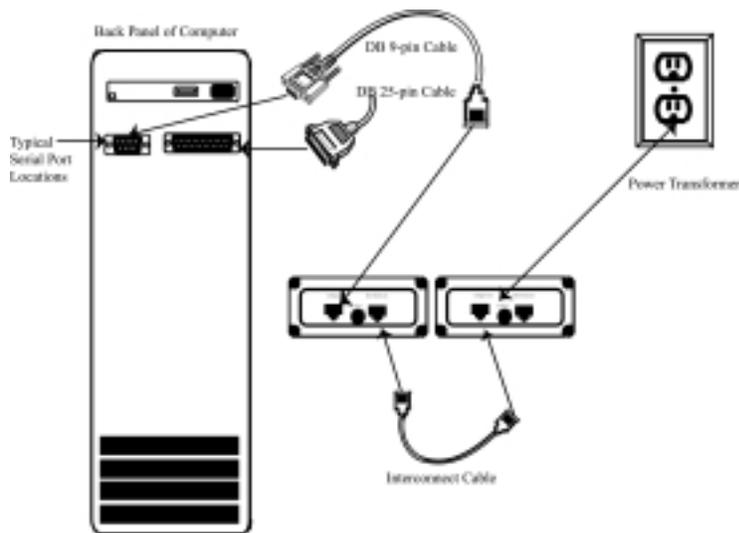


Figure 1-12 Base Stations in Series

The series arrangement allows you to transfer data from up to ten units in a single transfer process.

You can connect up to ten Base Stations using a single power transformer. Ten is the maximum number of Base Stations that can be connected to a single computer's serial port, even if you connect each Base Station to its own power transformer.

See Appendix E for information on using multiple data collectors and Base Stations.

To avoid any problems when using multiple Base Stations, you need to be aware of the following cautions:

- Each of the data collectors used in a multiple Base Station arrangement must have a unique ID. See Appendix E for information on changing a data collector's ID and downloading and uploading data with multiple data collectors.
- When the data transfer process begins, do not remove any of the data collectors from the Base Stations, quit the program, or shut down your computer until the transfer process is complete.

Caution:

Do not attempt to send an application to more than one unit at a time in a multiple Base Station set up. The data collectors will not be damaged, but they will not be programmed properly.

When transferring data from a data collector, do not interrupt the process by removing the unit from its Base Station or aborting the program. The system is designed to avoid data loss, but observing this caution provides added protection.

If you should inadvertently remove a data collector while it is in the process of transferring data, the software displays a message that it was unable to communicate with the unit and then continues to try to transfer the data from all of the other units. The data in the interrupted unit will not clear and can be transferred after the others have completed their data transfer.

Key Points on Using Multiple Data Collectors

- Each data collector must have a unique ID.
- When sending information to a data collector, it must be the only unit in a Base Station.
- Do not interrupt the data transfer by attempting to remove the data collector during the transfer process.
- Data is not cleared from a data collector until all of the data is correctly transferred to the computer.
- Complete information on using multiple data collectors is contained in Appendix E.

Notes:

Chapter 2

Bar Code Reference

This chapter contains:

- A description of the scanpad
- A description of bar code symbologies
- A discussion about bar codes

Scanpad

A scanpad is included with your DuraTrax and LaserLite. A scanpad is a card that contains printed Code 3 of 9 bar codes assigned to numbers, letters, and symbols. See Figure 2-1. You can scan the individual scanpad characters to enter any bar code. This allows manual entry of data; this is especially useful when you encounter a bar code that is torn, damaged, or otherwise unreadable.

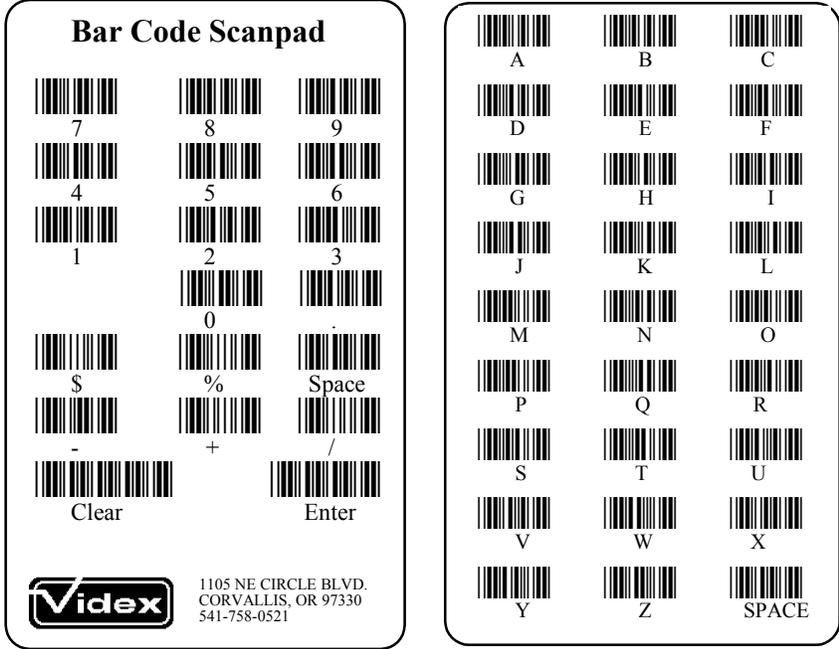


Figure 2-1 Scanpad

To use the scanpad to enter data, scan each of the characters in proper sequence and then scan the ENTER bar code. For example, to enter the characters AG-352, scan the letters A, then G, then the dash from the other side. Follow with the numbers 3, 5, 2, and then ENTER from the scanpad. DuraTrax and LaserLite make a short beep after each character entry and make a standard good-read beep when ENTER is scanned. The standard beep indicates that collective scanpad scans were recorded as a single bar code in the reader’s memory.

The CLEAR bar code on the scanpad acts as a backspace, deleting scanpad entries one character at a time to the beginning of the current entry. Scanning CLEAR will not delete any scanpad entries if the ENTER bar code has been scanned.

The ENTER bar code consists of two space characters, and the CLEAR bar code consists of three space characters.

Key Points

- Scanning ENTER saves the entry to the DuraTrax/LaserLite memory. Scanning CLEAR deletes the scanpad entry one character at a time.
- You will hear short beeps when scanning individual characters and a standard beep when you scan ENTER. Characters entered are saved as one record instead of individual records.
- ENTER bar code is a single bar code composed of two space characters.
- CLEAR bar code is a single bar code composed of three space characters.

Bar Code Symbolologies

There are many different bar code symbolologies. The following chart shows some of the more commonly used symbolologies.

Bar Code	Uses	Description
Code 3 of 9	Auto parts, labels for sorting, Dept. of Defense, purchasing, and supply control	The most popular industrial and government bar code symbology. Reliable. Variable length bar code with both numeric and uppercase letters.
Interleaved 2 of 5	Industry, cartons of food, labels for sorting, and supply control	A popular industrial bar code symbology. This is a numbers only code and requires an even number of digits to make a legal code.
EAN	European product code	European retail code symbology.
UPC	Universal Product Code; grocery, drug, and medical goods	A food and drug retail market symbology. This is a variable length code.
Codabar	Medical sample control, photo processing, and libraries	Used for Red Cross blood banking. This is a variable length code.
Code 128	Shipping/receiving, inventory	A popular high-density bar code symbology. Variable length with upper and lowercase letters, all ASCII control characters, and all numeric entries.

Figure 2-2 Bar Code Symbolologies

DuraTrax and LaserLite can read Code 3 of 9, Interleaved 2 of 5, EAN, UPC, Codabar, and Code 128 bar code symbolologies.

Where to Get Bar Codes

Printed sheets of high quality “peel-off” labels containing various bar codes are available from the vendors listed in Appendix D. The bar codes can be organized in many different ways to meet the requirements of numerous applications. For the best scanning results, it is important to use good quality bar code labels.

Bar Code Optimum Size

Bar code size can be specified by the width of the narrow bars and spaces, which should be equal to each other. Videx recommends that you use bar codes with this narrow element width (or X-dimension) equal to 15 thousandths of an inch. This size corresponds to about 5 bar code characters per inch. Be sure to include the start and stop characters when calculating characters per inch. Good scanning performance cannot be guaranteed with a narrow element width less than 10 thousandths of an inch. However, the DuraTrax and LaserLite will usually read good quality, high-contrast Code 3 of 9 symbology bar codes with narrow elements of 7.5 thousandths of an inch (9 characters per inch). They usually cannot read bar codes with minimum dimensions of 5 thousandths of an inch or less.



0.015 inch spacing

Bar Code Quality

Bar codes of poor quality reduce the read rate or in extreme cases are unreadable. Quality includes such elements as good contrast, clean printing, and correct dimensions.

The printing must be clean and have the correct dimensional relationships. Ragged edges, white specks in the bars, and black specks in the spaces or quiet zones at the beginning and end of the bar code reduce the reading performance. The narrow bars should be the same width as the narrow spaces, and likewise for the larger elements. The ratios between bars of different widths should be the values specified by the appropriate standard. Although the DuraTrax and LaserLite can compensate for a certain amount of deviation from nominal values, extreme deviation from the standards will produce unreadable bar codes.

A worn impact printer ribbon can cause loss of contrast. Any inked ribbons used to print bar codes must be renewed promptly when bar code darkness begins to diminish.

Be sure to test the bar codes with the DuraTrax or LaserLite before implementing them into your system.

Appendixes

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Appendix A Product Specifications

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P. 34	LaserLite
P. 35	DuraTrax
P. 36	LaserLite DuraTrax Base Station
P. 37	Touch Memory Buttons

LaserLite Specifications

Physical:	Extruded and cast aluminum case
Weight:	11.4 oz (322.96 g)
Dimensions:	Width 1.45"/1.89" (36.84 mm/48.01 mm) Depth 1.05"/1.93" (26.87 mm/49.03 mm) Length 7.30" (185.43 mm)
Memory:	128K RAM
Optics:	Visible laser diode, 670nm +/- 10nm
Humidity:	0 to 95% noncondensing
Keypad:	Scan, scroll
Display:	2-line x 16-character LCD
Power:	4 AA alkaline or nickel-cadmium
Back-up battery:	Rechargeable lithium, 10 year useful life, approximately 5 day capacity without batteries installed, 20 hour charge time
Indicators:	Valid Scan LED; Power LED
Audio:	Beeper
Internal clock:	Real-time and date
Input:	Laser bar code
Symbologies:	Code 3 of 9, Codabar, I-2 of 5, UPC, EAN, Code 128
Resolution:	Minimum 0.0075" width of narrow bar or space
Environment:	Water and dust resistant
Data Storage:	Bar code data Origin code Date and time
Output:	ASCII text file
Temperature:	
Storage	-4° to 140° F (-20° to 60° C)
Operating	32° to 122° F (0° to 50° C)

Warranty:	One year
Software:	
Application Builder	Windows and Macintosh
Developers Kit	BASIC

DuraTrax Specifications

Physical:	Extruded and cast aluminum case
Weight:	8.8 oz (249.30 g)
Dimensions:	Width 1.45" (36.84 mm) Depth 1.05" (26.87 mm) Length 6.25" (158.67 mm)
Memory:	128K RAM
Optics:	Visible light optics, 655 nm
Humidity:	0 to 95% noncondensing
Keypad:	Scan, scroll
Display:	2-line x 16-character LCD
Power:	4 AA alkaline or nickel-cadmium
Back-up battery:	Rechargeable lithium, 10 year useful life, approximately 5 day capacity without batteries installed, 20 hour charge time
Indicators:	Valid Scan LED; Power LED
Audio:	Beeper
Internal clock:	Real-time and date
Input:	Contact bar code and Touch Memory button
Symbologies:	Code 3 of 9, Codabar, I-2 of 5, UPC, EAN, Code 128
Resolution:	Minimum 0.0075" width of narrow bar or space
Scan Speed Tolerance:	3 to 30 inches per second
Environment:	Water and dust resistant
Buttons:	Dallas Semiconductor Touch Memory buttons
Data Storage:	Bar code data Origin/button family code Date and time
Output:	ASCII text file

Temperature:	
Storage	-4° to 140° F (-20° to 60° C)
Operating	32° to 122° F (0° to 50° C)
Warranty:	One year
Software:	
Application Builder	Windows and Macintosh
Developers Kit	BASIC

LaserLite DuraTrax Base Station Specifications

Weight:	7.4 oz (210 g)
Dimensions:	4.0" x 4.0" x 1.8" (102 x 102 x 46 mm)
Power supply adapters:	120 V (60 Hz) Input: 120 VAC, 60 Hz, 7 W Output: 12 VDC, 300 mA Plug Polarity: -  +
	220 V (50 Hz) Input: 220 VAC, 50 Hz, 9 W Output: 12 VDC, 300 mA, 3.6 VA Plug Polarity: -  +
Indicator lights:	Charge, Receive, Transmit, and Power
Connection ports:	Computer, Power, Extension
Series connections:	Up to 10 can be connected to single serial port
Serial communications:	Infrared to data collector; RS-232 to computer (via RJ-11 serial port cable)
Baud Rate:	9600 bps
Temperature:	Storage: -4° to 140° F (-20° to 60° C) Operating: 32° to 122° F (0° to 50° C)
Regulatory compliance:	FCC, CE

Touch Memory Button Specifications

Read-Only Button Specifications

Button Type:	DS1990
Physical:	Memory chip stored inside button-shaped, water-resistant, stainless steel case
Dimensions:	3 mil button: 0.642" diameter x 0.126" height (16.3 x 3.2 mm) 0.682" diameter mounting flange (17.3 mm) 5 mil button: 0.642" diameter x 0.23" height (16.3 x 5.9 mm) 0.682" diameter mounting flange (17.3 mm)
Weight:	3 mil button: 0.057 oz (1.6 g) 5 mil button: 0.08 oz (2.3 g)
Operating Temperature:	-40° to 185° F (-40° to 85° C)
Battery:	None
Data Storage:	Unique 12 character serial number (read only)

Read/Write Button Specifications

Button Types:	DS1991, DS1992, DS1993, DS1994
Physical:	Non-volatile memory chip stored inside button-shaped, water-resistant, stainless steel case
Dimensions:	0.642" diameter x 0.23" height (16.3 x 5.9 mm) 0.682" diameter mounting flange (17.3 mm)
Weight:	0.12 oz (3.4 g)
Operating Temperature:	-4° to 158° F (-20° to 70° C)
Battery:	Lithium
Data Storage:	Up to 4K-bit read/write memory plus unique 12 character serial number (read only)
Clock:	Real-time
Life Span:	10 years of data retention

Notes:

Appendix B Glossary

ASCII: A standard code for representing characters as binary numbers, used on most computers and printers. ASCII stands for *American Standard Code for Information Interchange*.

ASCII text file: A computer file containing only ASCII characters.

data file: A computer file containing data that is stored on a computer disk.

download: To transfer the data from the DuraTrax or LaserLite to the computer using the IR link.

hard disk: A rigid magnetic storage medium that can store large amounts of text. May be either internal or external to the computer.

hexadecimal: A number system with a base of 16. A Touch Memory button serial number is hexadecimal.

iButton: Dallas Semiconductor data button that contains unique serial number; also known as Touch Memory buttons.

IR: An abbreviation for infrared communication. Infrared communication provides wireless transfer of data between two IR devices.

IrDA: An abbreviation for the Infrared Data Association (IrDA). IrDA is an independent organization whose charter is to create interoperable, low cost IR data interconnection standards. Setting standards for IR communication is key to effortless communication between brands and type of equipment.

LCD: An abbreviation for Liquid Crystal Display. The DuraTrax and LaserLite displays are LCD devices.

LED: An abbreviation for Light Emitting Diode. An LED device will light up when the proper current passes through it. The Valid Scan indicator and Power indicator are LED devices.

program: To give instructions to the DuraTrax or LaserLite from the computer using the IR link, so that the data collector operates in a particular way.

serial number: Twelve digit hexadecimal number programmed into a Touch Memory button at the factory.

serial port: A connector or port on the computer that allows you to connect an external device to the computer, so that the computer and the device can communicate. The IR station is connected to the computer's serial port.

text editor: An editing program which enables you to edit ASCII text files.

Touch Memory Button: Dallas Semiconductor data button that contains unique serial number; also known as an iButton.

transfer: Send data from the DuraTrax or LaserLite to the computer by using the IR link. Also referred to as *download*.

Appendix C Cable Pin Out Configurations

Contents

- P. 42 25-Pin Serial Port Cable (TWC-001) to Connect DOS/Windows Computer to Base Station
- P. 44 9-Pin Serial Port Cable (TWC-008) to Connect DOS/Windows Computer to Base Station
- P. 46 DIN 8 Serial Port Cable (TWC-009) to Connect Macintosh Computer to Base Station
- P. 48 Base Station Interconnect Cable (TWC-006) to Connect Multiple Base Stations to One Computer

Note on Signal Direction Convention:

RS-232 signal wires are given names that stay with the same wire as it goes between the two devices being connected. Signals that imply a direction, such as “Receive Data,” are named from the perspective of the “Terminal” (DTE) device and may therefore appear to be backward in terms of signal direction when applied to the “Modem” (DCE) device on the other end of the cable. In the lists of pin assignments in this section, an indication of signal direction from the point of view of the device to which the connector is attached has been included in addition to the signal name.

25-Pin Serial Port Cable — DOS/Windows Computer to Base Station (TWC-001)

The cable used to connect the 25-pin serial port of a DOS/Windows computer to the Base Station is shown in Figure C-1.

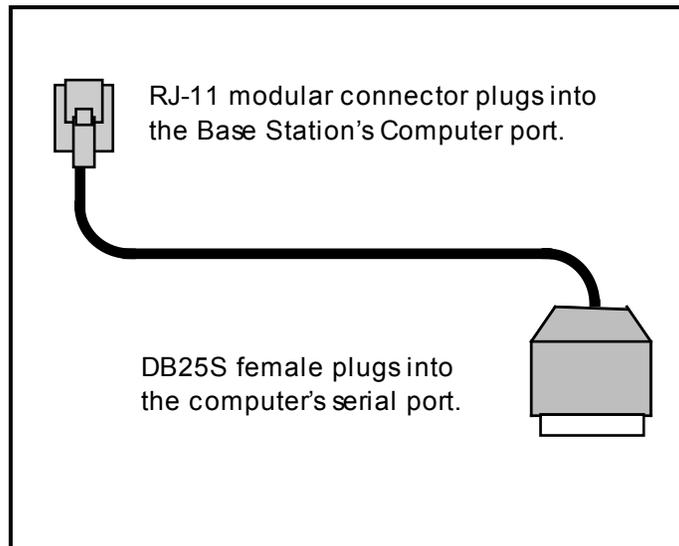


Figure C-1 25-Pin Serial Port Cable

Figure C-2 on the following page shows the pin configuration for the DB25S connector in relation to the RJ-11 modular connector.

25-Pin Serial Port Cable — DOS/Windows Computer to Base Station (TWC-001)

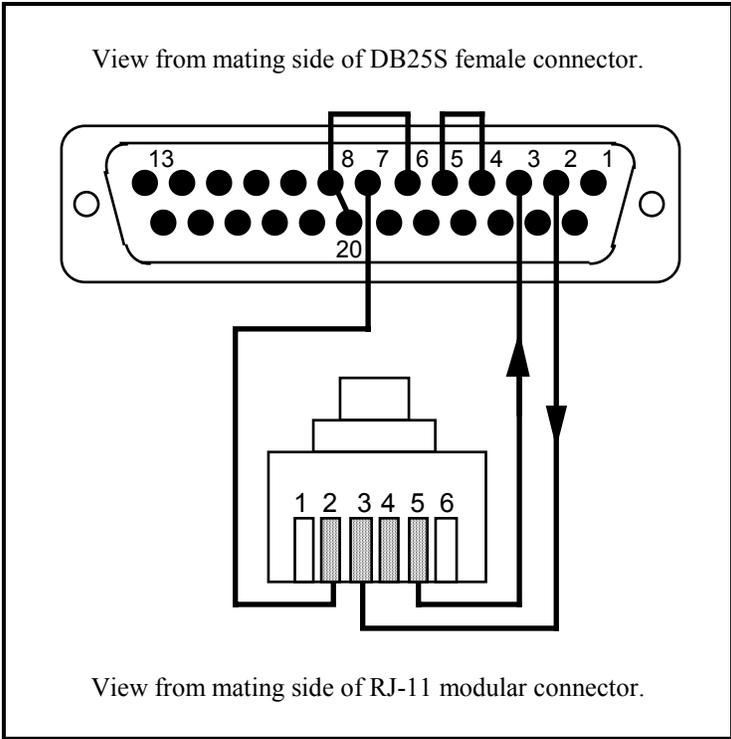


Figure C-2 25-Pin Serial Port Cable Configuration

25-Pin Assignment	RJ-11 Connector Pin Assignment
2 TXD Transmit Data (Out)	2 Ground
3 RXD Receive Data (In)	3 TXD (In)
4 RTS Request to Send (Out)	5 RXD (Out)
5 CTS Clear to Send (In)	
6 DSR Dataset Ready (In)	
7 Ground	
8 DCD Carrier Detect (In)	
20 DTR Data Terminal Ready (Out)	

9-Pin Serial Port Cable — DOS/Windows Computer to Base Station (TWC-008)

The cable used to connect the 9-pin serial port of a DOS/Windows computer to the Base Station is shown in Figure C-3.

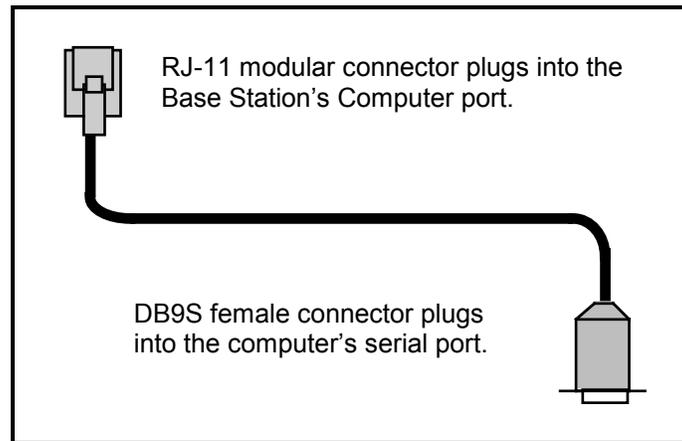


Figure C-3 9-Pin Serial Port Cable

Figure C-4 on the following page shows the pin configuration for the DB9S connector in relation to the RJ-11 modular connector.

9-Pin Serial Port Cable — DOS/Windows Computer to Base Station (TWC-008)

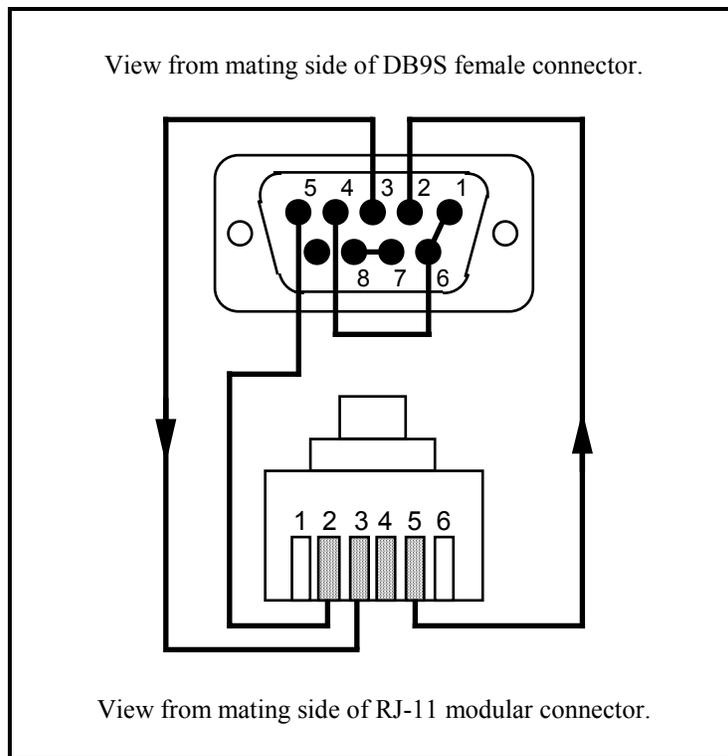


Figure C-4 9-Pin Serial Port Cable Configuration

9-Pin Assignment

- 1 DCD Carrier Detect (In)
- 2 RXD Receive Data (In)
- 3 TXD Transmit Data (Out)
- 4 DTR Data Terminal Ready (Out)
- 5 Ground
- 6 DSR Dataset Ready (In)
- 7 RTS Request to Send (Out)
- 8 CTS Clear to Send (In)

RJ-11 Connector Pin Pin Assignment

- 2 Ground
- 3 TXD (In)
- 5 RXD (Out)

DIN 8 Serial Port Cable—Macintosh Computer to Base Station (TWC-009)

The cable used to connect the Base Station to the serial port of a Macintosh computer is shown in Figure C-5.

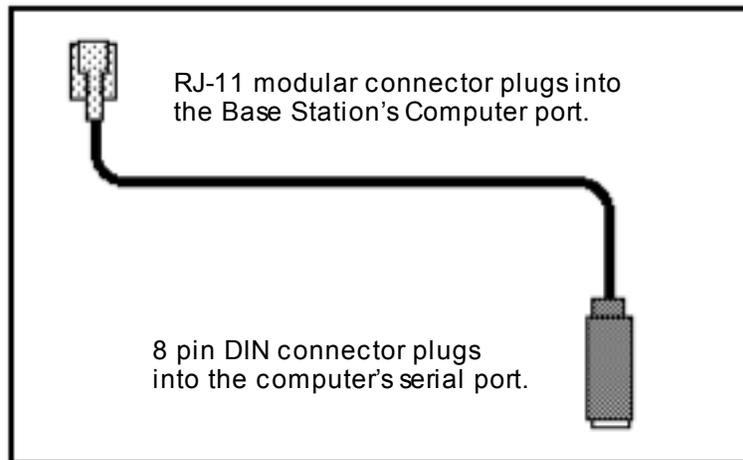


Figure C-5 DIN 8 Serial Port Cable

Figure C-6 on the following page shows the pin configuration for the 8 pin DIN connector in relation to the RJ-11 modular connector.

DIN 8 Serial Port Cable—Macintosh

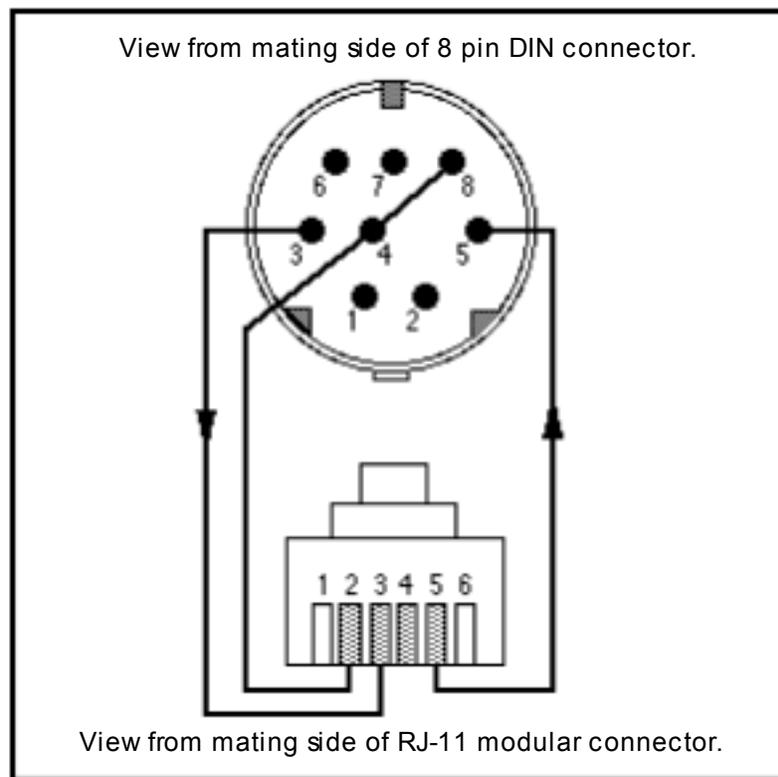


Figure C-6 DIN 8 Serial Port Cable Pin Configuration

DIN 8 Connector Assignment

- 3 TXD - Transmit Data (Out)
- 4 Ground
- 5 RXD - Receive Data (In)
- 8 RXD + Receive Data*

RJ-11 Connector Pin Assignment

- 2 Ground
- 3 Data In
- 5 Data Out

*Positive differential input of RS-422 grounded for noise immunity.

Base Station Interconnect Cable (TWC-006)

This is the cable used to connect multiple Base Stations in series. (See page 20 for information on connecting multiple Base Stations.)

The cable is a standard telephone extension cable. The TWC-006 interconnect cable from Videx is about eight inches long. The recommended maximum length for an interconnect cable is fifty feet.

Figure C-7 shows the pin configuration for the RJ-11 modular connectors at both ends of this cable.

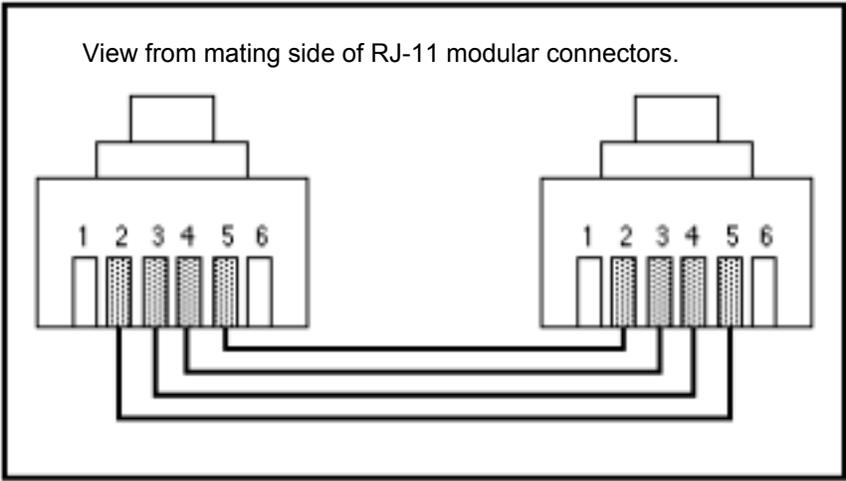


Figure C-7 Interconnect Cable

Appendix D Bar Code Label Vendors & Programs

Contents

- P. 50 Bar Code Label Vendors
- P. 52 Bar Code Printing Programs

Bar Code Vendors

Advanced Barcode & Label Technologies

5356 Five Forks Trickum
Lilburn, Georgia 30047
Phone: (770) 925-4834
(800) 321-3653
Fax: (770) 921-5849
Web site: www.ablt.com

Computype

2285 W. County Rd. C
St. Paul, Minnesota 55113
Phone: (800) 328-0852
Fax: (651) 633-5580
Web site: www.computypeinc.com

Data 2, Inc.

Sales Office
1099 Essex
Richmond, California 94801-2185
Phone: (510) 232-6200
(800) 227-2121 Outside California
Fax: (510) 235-2176
Web site: www.data2.com

D&K Laminex, Inc. *(Suppliers of ID badges)*

8350 Arrowridge Blvd.
Charlotte, NC 28273
Phone: (800) 438-8850
Fax: (704) 679-8453
Web site: www.laminex.com

Express, Inc. *(Suppliers of ceramic and steel bar codes)*

9235 Trade Place
San Diego, CA 92126
Phone: (800) 382-2323
(858) 549-9828
Fax: (858) 549-8708
Web site: www.expresscorp.com

Identatronics *(Suppliers of ID badges)*

425 Lively Blvd.
Elk Grove, Illinois 60007
Phone: (847) 437-2654
(800) 323-5403
Fax: (847) 437-2660
Web site: www.identatronics.com

Metalcraft *(Variety of materials available)*

149 Fourth St. SW
Mason City, Iowa 50401
Phone: (800) 437-5283
Fax: (515) 423-8898
Email: metalcraft@idplate.com
Web site: www.idplate.com

Watson Label Products

3684 Forest Park Blvd.
St. Louis, Missouri 63108
Phone: (314) 652-6715
Fax: (314) 652-8135
Web site: www.wlp.com

Bar Code Printing Programs

BarCode Labeler II (*Windows and Macintosh versions available*)

Videx, Inc.

1105 N.E. Circle Blvd.

Corvallis, Oregon 97330

Phone: (541) 758-0521

Fax: (541) 752-5285

Email: sales@videx.com

Web site: www.videx.com

Note: A laser printer is recommended for printing bar codes from a computer.

Appendix E Using Multiple Data Collectors and Base Stations

Contents

- P. 54 Connecting the Base Station
- P. 56 Changing a Data Collector's ID with a Windows or
DOS Computer
- P. 62 Changing a Data Collector's ID with a Macintosh
Computer
- P. 64 Transferring Data from Multiple Data Collectors
- P. 74 Notes on Using Multiple Data Collectors

Connecting the Base Stations

Videx Base Stations can be connected in series; this allows the user to transfer data from up to ten base stations (or 20 data collectors) in a single transfer process.

To connect multiple Base Stations:

- 1) Connect the first Base Station to the computer's serial port:
 - a) Plug the Base Station's transformer into an electric outlet and connect the other end into the Base Station's **Power** connection.
 - b) Use the serial port cable to connect the computer's serial port to the Base Station's **Computer** port.
 - c) The Base Station should be placed at least 3 inches away from the computer and monitor.

- 2) To add additional Base Stations:
 - a) Use an interconnect cable (TWC-006) to connect the **Extension** port of the first Base Station to the **Computer** port on the second Base Station. See Figure E-1.
 - b) Continue the same pattern of connection for each additional unit.

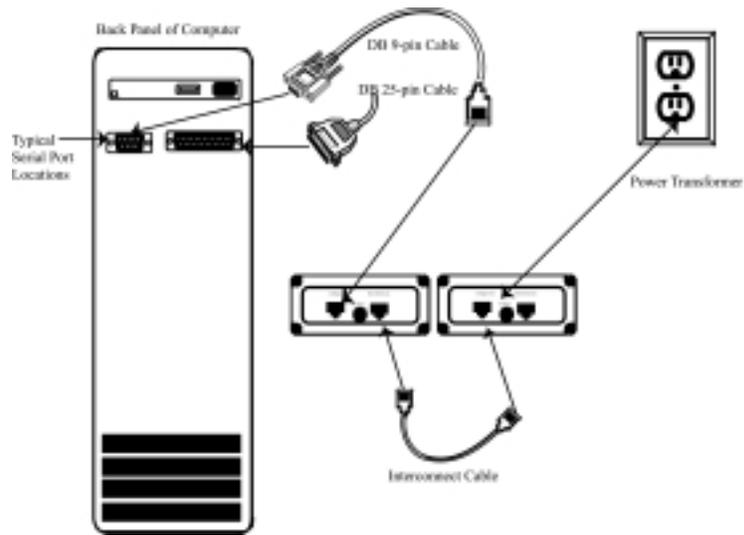


Figure E-1 Base Stations in Series

You can connect up to ten Base Stations to a single serial port.

Changing an ID with a Windows Computer

When using multiple Base Stations, you must give each data collector a unique ID; this allows the computer to access each data collector and verify that it has transferred the data from each one. To assign an ID, you must first create a commands text file, then click and drag the file onto the **Vxcomm.exe** icon. **Vxcomm.exe** then uses the commands file to unlock the unit and change the ID. (For complete information on **Vxcomm.exe** and using a commands text file, see Chapter 1 of the Developer's Reference manual.)

During normal operation, a unit is given an ID of ten zeros. To change the ID, you must create a text file consisting of the following three command lines:

- 1) an **I** command, followed by a space, followed by ten zeros to unlock the unit;
- 2) a **C** command, followed by a space, followed by the new ID for the unit;
- 3) and an **L** command to relock the unit.

- I 0000000000** Sends an unlock command to the data collector. (Note: Ten zeros will unlock any data collector.)
- C *new ID#*** Changes the unit's ID to the given ID. The ID can be any alphanumeric combination of up to ten characters in length. For example, if you want an ID of 1, this line should be **C 1**; if you want an ID of BuildingD, this line should be **C BuildingD**; if you want an ID of 123#_AB, this line should be **C 123#_AB**, and so on.
- L** Sends a **LOCK** command and puts the data collector to sleep. When the unit is awakened with a keypress, it immediately runs the current application.

For example, to change a unit's ID to **12345**:

1. Use your word processing program to create a text file containing the following three lines:

```
I 0000000000  
C 12345  
L
```

2. Save the file as a text file and quit the program. (Note: The text file must have a .txt extension.)
3. Place a data collector into the Base Station slot.

IMPORTANT: When you are sending a file to a data collector, it must be the ONLY data collector attached to the computer.

4. Click and drag the text file you created onto the **Vxcomm.exe** icon.
5. **Vxcomm.exe** executes the commands listed in the text file: it unlocks the unit, changes the ID to what is listed after the **C** command (in this case, 12345), and then relocks the unit.
6. Remove your data collector from the Base Station slot; your data collector is ready to use.

To continue changing other data collector's IDs:

1. Reopen the text file.
2. Change the ID listed after the **C** command by selecting **12345** and typing in a new ID. (Note: There must be a space character between the **C** and the ID.)
3. Save and close the text file. Remember, the text file must have a .txt extension.
4. Insert a data collector into the Base Station slot.
5. Click and drag the edited text file to the **Vxcomm.exe** icon.
6. **Vxcomm.exe** executes the commands listed in the text file: it unlocks the unit, changes its ID to what is listed after the **C** command, and then relocks the unit.
7. Continue these same steps until you have assigned a unique ID to each of your units.

Note: Keep a list of the IDs you are using to identify your data collectors. You will use this list in the section “Transferring Data from Multiple Units.”

Changing a Data Collector's ID with a DOS Computer

To assign a unique ID when using a DOS computer, you must first create a commands text file, then enter the name of the commands text file on the **Download.exe** command line. **Download.exe** then uses the commands file to unlock the unit and change the ID. (For complete information on **Download.exe** and using a commands text file, see Chapter 1 of the Developer's Reference manual

During normal operation, a unit is given an ID of ten zeros. To change the ID, you must create a text file consisting of the following three command lines:

- 1) an **I** command, followed by a space, followed by ten zeros to unlock the unit;
- 2) a **C** command, followed by a space, followed by the new ID for the unit;
- 3) and an **L** command to relock the unit.

- I 0000000000** Sends an unlock command to the data collector.
(Note: Ten zeros will unlock any data collector.)
- C *new ID#*** Changes the unit's ID to the given ID. The ID can be any alphanumeric combination of up to ten characters in length. For example, if you want an ID of 1, this line should be **C 1**; if you want an ID of BuildingD, this line should be **C BuildingD**; if you want an ID of 123#_AB, this line should be **C 123#_AB**, and so on.
- L** Sends a **LOCK** command and puts the data collector to sleep. When the unit is awakened with a keypress, it immediately runs the current application.

For example, to change a unit's ID to **12345**:

1. Use your word processing program to create a text file containing the following three lines:

```
I 0000000000
C 12345
L
```

2. Save the file as a text file and quit the program. (Note: The text file must have a .txt extension.)
3. Place a data collector into the Base Station slot.

IMPORTANT: When you are sending a file to a data collector, it must be the **ONLY** data collector attached to the computer.

4. Enter the name of the commands text file on the **Download.exe** command line use the following syntax:

```
DOWNLOAD commands.txt -pn -dn
```

where *commands.txt* is the name of the commands text file,

-*pn* specifies the serial port (default is 1), and -*dn* specifies the configuration (0 for Base Station or built-in IR transceiver (default), 1 for JetEye).

5. **Download.exe** executes the commands listed in the text file: it unlocks the unit, changes the ID to what is listed after the **C** command (in this case, 12345), and then relocks the unit.
6. Remove your data collector from the Base Station slot; your data collector is ready to use.

To continue changing other data collector's IDs:

1. Reopen the text file.
2. Change the ID listed after the **C** command, by selecting **12345** and typing in a new ID. (Note: There must be a space character between the **C** and the ID.)
3. Save and close the text file. Remember, the text file must have a .txt extension.
4. Insert a data collector into the Base Station slot.
5. Resend the **Download** command line containing the name of the commands text file.
6. **Download.exe** executes the commands listed in the text file: it unlocks the unit, changes its ID to what is listed after the **C** command, and then relocks the unit.
7. Continue these same steps until you have assigned a unique ID to each of your units.

Note: Keep a list of the IDs you are using to identify your data collectors. You will use this list in the section "Transferring Data from Multiple Units."

Changing an ID with a Macintosh Computer

To assign a unique ID when using a Macintosh computer, you must first create a commands text file, then click and drag the file onto the **Videx Download** icon. **Videx Download** then uses the commands file to unlock the unit and change the ID. (For complete information on **Videx Download** and using a commands text file, see Chapter 1 of the Developer's Reference manual.)

During normal operation, a unit is given an ID of ten zeros. To change the ID, you must create a text file consisting of the following three command lines:

- 1) an **I** command, followed by a space, followed by ten zeros to unlock the unit;
- 2) a **C** command, followed by a space, followed by the new ID for the unit;
- 3) and an **L** command to relock the unit.

For example, to change a unit's ID to **12345**:

1. Use your word processing program to create a text file containing the following three lines:

```
I 0000000000  
C 12345  
L
```

2. Save the file as a text file and quit the program. (Note: The text file must have a .txt extension.)
3. Place a data collector into the Base Station slot.

IMPORTANT: When you are sending a file to a data collector, it must be the **ONLY** data collector attached to the computer.

4. Click and drag the text file you created onto the **Videx Download** icon.

5. **Videx Download** executes the commands listed in the text file: it unlocks the unit, changes the ID to what is listed after the **C** command (in this case, 12345), and then relocks the unit.
6. Remove your data collector from the Base Station slot; your data collector is ready to use.

To continue changing other data collector's IDs:

1. Reopen the text file.
2. Change the ID listed after the **C** command by selecting **12345** and typing in a new ID. (Note: There must be a space character between the **C** and the ID.)
3. Save and close the text file. Remember, the text file must have a .txt extension.
4. Insert a data collector into the Base Station slot.
5. Click and drag the edited text file to the **Videx Download** icon.
6. **Videx Download** executes the commands listed in the text file: it unlocks the unit, changes its ID to what is listed after the **C** command, and then relocks the unit.
7. Continue these same steps until you have assigned a unique ID to each of your units.

Note: Keep a list of the IDs you are using to identify your data collectors. You will use this list in the next section “Transferring Data from Multiple Data Collectors.”

Transferring Data From Multiple Data Collectors

To transfer data from a group of data collectors in one transfer process, you must:

1. Create a commands text file that uses either the **FOREVER**, **FOREACH**, or **FORALL** looping commands to transfer the data from the data collectors. (Note: The commands file must have a .txt extension.)
2. Insert all of the data collectors into their Base Stations.
3. Click and drag the commands text file onto the **Vxcomm.exe** (**Vxcomxxx.exe**) icon if using Windows, enter the name of the commands text file on the **Download.exe** command line if using DOS, or click and drag the commands text file onto the **Videx Download** icon if using Macintosh.

The three looping commands provide transfer methods for three different situations. The **FOREVER** loop is useful if you have a computer dedicated to transferring the data from the data collectors; the **FOREACH** loop is useful if you will be transferring the data from only a portion of your data collectors; and the **FORALL** loop is useful if you require that all of the data collectors be transferred during the process.

The following table describes the looping commands:

FOREVER	For use with a computer that is dedicated to transferring data. This loop will transfer the data from any data collector it locates. This loop attempts to execute commands within a loop indefinitely.
FOREACH	This loop will search for each data collector in the list of IDs. If it locates the data collector with the ID, it executes the commands within the loop once; if it does not locate the data collector with the ID, it goes on to the next ID. This loop attempts to execute commands within a loop once for each ID listed.
FORALL	This loop will look for each listed data collector's ID until it has located and transferred the data from each ID in the list. This loop attempts to execute commands within a loop indefinitely, until all listed IDs have been located.

FOREVER Looping Command

The following example shows how the **FOREVER** loop is used in a commands text file to continually look for data collectors to transfer.

Example FOREVER Commands File:

Example:

FOREVER	'Begin the loop.
I 0000000000	'Unlock any unit.
M1 Transferring Data	'Put message on unit's display.
S	'Transfer data from unit.
Z	'Clear data from unit.
T	'Set time by computer's time.
G	'Restart the application.
END	'End loop, begin re-executing at top.

Note on the unlock command (I id): No additional characters should be included on the same line as the unlock command. Any characters after the unit ID (for example, space characters or comments) will cause this command to fail. In the above example, the comment associated with the unlock command is on a separate line.

FOREACH Looping Command

The following example shows how the **FOREACH** loop is used in a commands text file to attempt to transfer the data from each data collector in the list once.

Example FOREACH Commands File:

You can either list the IDs individually as in the first line of Example 1, or you can make a text file of the IDs and use the filename in quotes as on the first line of Example 2.

Example 1 Commands Text File for Transferring Data from Multiple Data Collectors (IDs listed on command line):

FOREACH ID1, ID2, ID3	'Begin the loop. All IDs listed on line.
I loop_id	'Unlock the unit using the special 'identifier. This identifier substitutes 'for 'all the units listed on the first line.
M1 Transferring Data	'Put message on unit's display.
S	'Transfer data from unit.
Z	'Clear data from unit.
T	'Set time by computer's time.
L	'Lock the unit and put it to sleep.
END	'End loop, begin re-executing at top.

Note on the loop_id argument: When the argument of the unlock command is a specific ID (as in the previous **FOREVER** example), the program attempts to unlock the unit eight times at five second intervals. This ensures that a unit is unlocked regardless of its sleep cycle (a unit sleeps for 25 seconds, then wakes for 5 seconds). If the program does not unlock a unit, the program returns an error and aborts. On the other hand, when the argument of the unlock command is loop_id (as in the **FOREACH** example), the program only makes one attempt to unlock the unit. If it is successful, it performs the remaining commands in the loop; if not successful, it moves on to the next value for loop_id without aborting the program. Given the unit's sleep cycle, it is unlikely that one attempt will successfully unlock a unit. Therefore, it would generally not be reasonable to use a **FOREACH** loop by itself as in the above

example. For examples showing appropriate use of a **FOREACH** loop, refer to the discussions of Scenarios 3 and 4 on pages 70–72.

Example 2 Commands Text File for Transferring Data from Multiple Data Collectors (IDs listed in **IDs.txt** file):

FOREACH "IDs.txt"	'Begins the loop. All IDs listed in the IDs.txt file.
I loop_id	'Unlock the unit using the special identifier. This identifier substitutes 'for all the units listed on the first line.
M1 Transferring Data	'Put message on unit's display.
S	'Transfer data from unit.
Z	'Clear data from unit.
T	'Set time by computer's time.
L	'Lock the unit and put it to sleep.
END	'End loop, begin re-executing at top.

The **IDs.txt** file must contain a list of the IDs. The IDs in the text file must be separated by commas or spaces.

FORALL Looping Command

The following two examples show how the **FORALL** loop is used in a commands text file to transfer the data from each data collector in the list.

Example FORALL Commands File:

You can either list the IDs individually as in the first line of Example 1, or you can make a text file of the IDs and use the filename in quotes as on the first line of Example 2.

Example 1 Commands Text File for Transferring Data from Multiple Data Collectors (IDs listed on command line):

FORALL ID1, ID2, ..., IDN	'Begins the loop. All IDs are listed on this line.
I loop_id	'Unlock the unit using the special identifier. This identifier substitutes 'for all the units in the IDs.txt file.
M1 Transferring Data	'Put message on unit's display.
S	'Transfer data from unit.
Z	'Clear data from unit.
T	'Set time by computer's time.
L	'Lock the unit and put it to sleep.
END	'End loop, begin re-executing at top.

Example 2 Commands Text File for Transferring Data from Multiple Data Collectors (IDs listed in **IDs.txt** file):

FORALL "IDs.txt"	'Begin the loop.
I loop_id	'Unlock the unit using the special 'identifier. This identifier substitutes 'for 'all the units in the IDs.txt file.
M1 Transferring Data	'Put message on unit's display.
S	'Transfer data from unit.
Z	'Clear data from unit.
T	'Set time by computer's time.
L	'Lock the unit and put it to sleep.
END	'End loop, begin re-executing at top.

The **IDs.txt** file must contain a list of the IDs. The IDs in the list must be separated by commas or spaces.

In order to clarify the functioning of these different looping structures, it is helpful to consider four different scenarios for downloading multiple units.

Scenario #1: The user has multiple data collectors to download, but only one at a time will be put in the Base Station or in front of the JetEye. A computer is dedicated to downloading the data collectors as they become available. In this situation, the units do not need to be assigned individual IDs and a **FOREVER** loop can be used:

```
FOREVER  
I 0000000000  
M1 Transferring Data  
S  
Z  
T  
L  
END
```

This loop will continue indefinitely, unlocking any data collector which is available. It is important that only one unit at a time be in the Base Station or in front of the JetEye when using this looping structure. This loop will unlock any data collector; if more than one data collector is unlocked at a time, communications will fail.

Scenario #2: The user has multiple data collectors to download. Some or all of them may be in the Base Station at any time. Each of the units must be downloaded exactly one time. A computer is dedicated to downloading the units as they become available. In this situation, each unit must be assigned a unique ID and the **FORALL** loop can be used:

```
FORALL "IDs.txt"  
  I loop_id  
  M1 Transferring Data  
  S  
  Z  
  T  
  L  
END
```

This loop will continue until each unit in the `IDs.txt` file has been downloaded once. Multiple units can be in the Base Station at one time because only one unit will be unlocked at a time.

Scenario #3: The user has multiple data collectors to download. Some or all of them may be in the Base Station at any time. Each unit is to be downloaded when it is placed in the Base Station; some of the units may be downloaded more than one time. A computer is dedicated to downloading the units as they become available. In this situation, each unit must be assigned a unique ID and a **FOREACH** loop nested inside a **FOREVER** loop can be used:

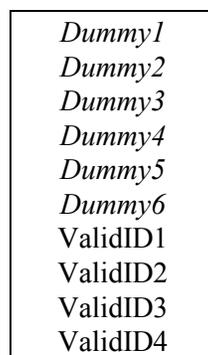
```
FOREVER
  FOREACH "IDs.txt"
    I loop_id
    M1 Transferring Data
    S
    Z
    T
    L
  END
END
```

This loop will continue indefinitely, continually attempting to unlock any units contained in the `IDs.txt` file. Unlike the **FORALL** loop in Scenario #2, this loop will continue attempting to download a data collector even after it has been successfully downloaded one time.

Scenario #4: The user has multiple data collectors to download; all of the units to be downloaded are in their Base Stations. However, some of the units (listed in the **IDs.txt** file) are not available to download. If the computer is unable to unlock a particular unit, the computer will stop trying to unlock that unit. In this situation, each unit must have a unique ID and a **FOREACH** loop can be used:

```
FOREACH "IDs.txt"  
    I loop_id  
    M1 Transferring Data  
    S  
    Z  
    T  
    L  
END
```

As was explained in the earlier discussion of the **FOREACH** loop, when the argument of the unlock command is `loop_id`, the program only makes one attempt to unlock the unit. Given the unit's sleep cycle, it is unlikely that one attempt will successfully unlock a unit. However, it is possible to ensure that each unit is awake when the program attempts to unlock it. This is done by placing six unused IDs at the beginning of the **IDs.txt** file (Figure E-2).



```
Dummy1  
Dummy2  
Dummy3  
Dummy4  
Dummy5  
Dummy6  
ValidID1  
ValidID2  
ValidID3  
ValidID4
```

Figure E-2 Sample IDs.txt File

If a unit is awake and receives an unlock command with the wrong ID, it will stay awake as long as it detects activity on the serial port. By placing six unused IDs at the beginning of the IDs.txt file, it is possible to ensure that each unit receives at least one unlock command with an invalid ID and then stays awake. Then each unit is awake when the **FOREACH** loop attempts to unlock it and the unit is downloaded. The program only attempts to unlock each unit one time; if a unit is not present, the program moves on to the next ID. The program quits after attempting one time to unlock and download each unit.

For complete information on using the commands file, see Chapter 1 of the Developer's Reference manual.

Notes on Using Multiple Data Collectors

To avoid problems when using multiple data collectors and Base Stations, you need to be aware of the following cautions:

- Each data collector used in a multiple Base Station arrangement must have a unique ID. See the preceding section in this appendix for information on changing a data collector's ID.
- When the data transfer process begins, do not remove a data collector from its Base Station, quit the program, or shut down your computer until the transfer process is completed.

Caution:

Do not attempt to send an application to more than one data collector at a time in a multiple Base Station set up. The units will not be damaged, but they will not be properly programmed.

When transferring data from data collectors, do not interrupt the process by removing the unit from its Base Station or aborting the program. The system is designed to avoid data loss, but observing this caution provides added protection.

If you should inadvertently remove a data collector while it is in the process of transferring data, the software displays a message that it was unable to communicate with the unit and then continues to try to transfer the data from all of the other data collectors. The data in the interrupted unit will not be cleared and can be transferred after the others have completed their data transfer.

Key Points on Using Multiple Data Collectors

- Each data collector must have a unique ID.
- When sending files to a data collector, it must be the only unit in a Base Station.
- Do not interrupt the data transfer process.
- Data is not cleared from a data collector until all of the data is correctly transferred to the computer.

Notes:

Appendix F Resetting the DuraTrax/LaserLite

In the unlikely event that your DuraTrax or LaserLite locks up and does not correct itself after sitting for 2 to 3 minutes, you will need to manually reset the unit to Monitor mode and resend the operating system software.

To manually reset the unit to Monitor mode:

- 1) Remove the battery end cap.
- 2) Hold the scan button down while replacing the battery end cap.
- 3) The unit will beep three times, indicating a successful reset.
- 4) The unit will show **VX1 Monitor 1.07** on the first line, and **Ready, bps=9600** on the second line of the display.
- 5) Verify that your computer's IR station (Base Station, JetEye, or internal IR transceiver) is attached to the computer and ready to use.
- 6) Position the DuraTrax/LaserLite to communicate with the computer, by either inserting the unit into the Base Station or by pointing its IR transmitter (located in the end cap) towards the JetEye or built-in IR transceiver.

The next steps guide you through resending the operating system software to the DuraTrax/LaserLite. You must use the appropriate steps for your computer system:

- If you are using Windows, go to Step 7 on page 76.
- If you are using DOS, go to Step 7 on page 80.
- If you are using a Macintosh computer, go to Step 7 on page 82.

For Windows users (from page 75):

If you have previously used **Vxcomm.exe** to transfer data from the unit, proceed to Step 9. If you have not used **Vxcomm.exe** to transfer data, complete Steps 7 and 8 before proceeding to Step 9.

- 7) Choose the **Run** command from the Windows **Start** menu and click **Browse** (Figure F-1).

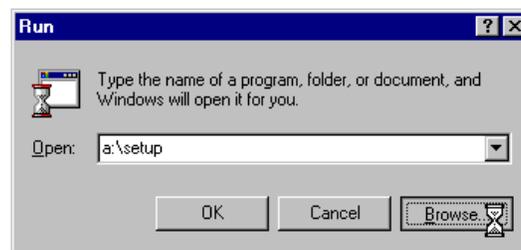


Figure F-1 Run Window - Click Browse

- 8) Locate and open **Vxcomm.exe**. Click at the end of the path name to add the parameters (Figure F-2). The syntax is:

`[-p<port number>] [-d<configuration>]`. Spaces are used to separate the parameters.

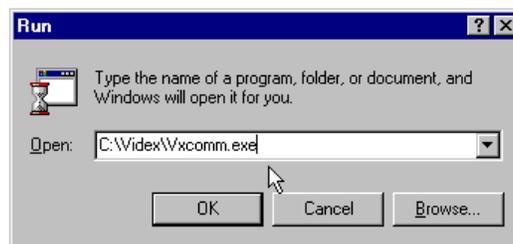


Figure F-2 Add Vxcomm.exe Parameters

The first parameter is the serial port (-p); the program uses 1 by default. If you are using serial port 1, you do not need to enter this parameter. If you are using serial ports 2, 3, or 4, you must enter a -p followed by the serial port number (that is, -p2 for serial

port 2, -p3 for serial port 3, -p4 for serial port 4).

The next parameter is configuration (-d); the program uses 0 by default. If you are using a Base Station or a built-in IR transceiver, you do not need to enter this parameter. If you are using a JetEye, you must enter a -d1.

Enter the appropriate parameters and click **OK** to close the **Run** window and save the entry. See Table F-1 on page 79 for a list of the transfer parameters. (Note: The transfer parameters need to be entered the first time you use **Vxcomm.exe**; you do not need to enter the parameters again unless the serial port or configuration settings are changed.)

- 9) Resend the operating system software to the unit by dragging the operating system file icon together with the Default.S icon to the **Vxcomm.exe** icon. For DuraTrax the operating system software is **Trax125a.OS**, and for LaserLite the operating system software is **Lite125a.OS**. (Note: The actual filename of your operating system files may be different, because the last characters of the name (*125a*) will change as new versions of the software are released. However, the filename will always begin with a **T** for a DuraTrax, an **L** for a LaserLite, and have a **.OS** extension.)

- 10) **Vxcomm.exe** begins looking for the DuraTrax/LaserLite. Press any button on the DuraTrax/LaserLite to begin the transfer. A window opens (Figure F-3) and reports the progress of the transfer.

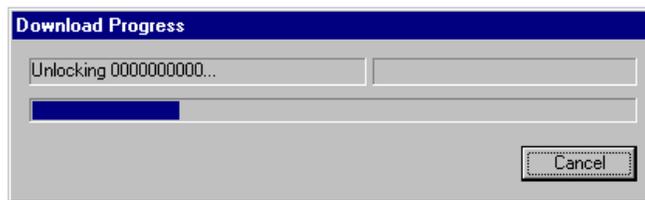


Figure F-3 Progress Window

(See Chapter 1 of the Developer's Reference manual for complete information on **Vxcomm.exe**.)

The following table summarizes the parameters for **Vxcomm.exe** and **DOWNLOAD.exe**:

Serial Port	IR Device	Parameters to Enter	Actual Parameters the Software Uses
1	Base Station or Built-in IR		-p1 -d0 (default)
2	Base Station or Built-in IR	-p2	-p2 -d0
3	Base Station or Built-in IR	-p3	-p3 -d0
4	Base Station or Built-in IR	-p4	-p4 -d0
1	JetEye	-d1	-p1 -d1
2	JetEye	-p2 -d1	-p2 -d1
3	JetEye	-p3 -d1	-p3 -d1
4	JetEye	-p4 -d1	-p4 -d1

Table F-1 Transfer Parameters

For DOS users (from page 75):

- 7) To resend the operating system software to the unit with **DOWNLOAD.exe**, use the following syntax:

DOWNLOAD sys.os -pn -dn

where sys.os is the name of the operating system file (Trax125a.OS for DuraTrax and Lite125a.OS for LaserLite); -pn specifies the serial port (default is 1); and -dn specifies the configuration (0 (default) for a Base Station or built-in IR transceiver, 1 for JetEye).

(Note: The actual filename of your operating system file may be different, because the last characters of the name (*125a*) will change as new versions of the software are released. However, the filename will always begin with a **T** for a DuraTrax, an **L** for a LaserLite, and have a **.OS** extension.)

See Table F-1 on page 79 for a list of the transfer parameters.

For example, to send the operating system file to a LaserLite using serial port 2 and a JetEye, you would type the following at the DOS prompt:

```
DOWNLOAD Lite125a.OS -p2 -d1
```

To send the operating system file to a DuraTrax using serial port 1 and a Base Station, you would type the following at the DOS prompt:

```
DOWNLOAD Trax125a.OS
```

To send the operating system file to a DuraTrax using serial port 3 and a Base Station, you would type the following at the DOS prompt:

```
DOWNLOAD Trax125a.OS -p3
```

(See the Developer's Reference manual for complete information on **DOWNLOAD.exe**.)

For Macintosh users (from page 75):

When loading the operating system with a Macintosh computer, you must also load an application file (.S extension) along with the operating system software. In the following example, we will load the default application (Default.S) with the operating system.

- 7) Resend the operating system software by selecting the operating system file (Trax125a.OS for DuraTrax or Lite125a.OS for LaserLite) and the Default.S application file.
- 8) Click and drag the two files to the **Videx Download** icon (Figure F-4). This will start the **Videx Download** program which transfers the files to the DuraTrax or LaserLite.



Figure F-4 Videx Download Icon

(Note: The actual filename of your operating system file may be different, as the last characters of the name (*125a*) will change as new versions of the software are released. However, the filename will always begin with a **T** for a DuraTrax, and an **L** for a LaserLite, and have a **.OS** extension.)

(See Chapter 1 of the Developer's Reference manual for complete information on **Videx Download**.)

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