

# Video Turnstile Condensed User Manual

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Manual Code: VTS-1.3

Issue Date: June 2008

Information in this document is subject to change without notice. For updates see  
<http://www.videoturnstile.com/manual.html>

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# 1 Introduction

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- Video Turnstile comprises one or more CCTV cameras, each associated with a Video Turnstile module (VT) to count people.
- The VT module may be held in a rack with several other modules, or it may be a boxed unit.
- Each VT counting module produces two count totals: one for people going up the video picture and one for people going down. In other words, a count of people going in and a count of people going out.
- The counter modules pass their counts to a VT Logger (LVT).
- The Logger can accept counts from up to 16 non-logging modules.
- At regular intervals the Video Turnstile software, running on a PC, collects the counts from the VT Loggers and saves them in a text file.

This is the short version of the *User Manual*. You can download the full version from [www.videoturnstile.com/manual.html](http://www.videoturnstile.com/manual.html). You may also find our on-line Installation Guide helpful at [www.videoturnstile.com/install/](http://www.videoturnstile.com/install/)

## 2 Installing Video Turnstile

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### 2.1 Installing the Software

1. Use the CD labelled: Video Turnstile. If the installation program doesn't start automatically, run the setup.exe program on the CD.
2. The software is normally installed into the:  
c:\program files\windmill software\videoturnstile\  
folder (where c: is the drive on which Windows is running). Two other folders are created,  
c:\videoturnstile\setups\for details of the program settings  
c:\videoturnstile\data\for your data files

### 2.2 Installing Video Turnstile on an Ethernet or Wi-Fi Network

An Ethernet network comprises a base station (or router) and a network adaptor for each PC and Video Turnstile Logger on the network.

For Wi-Fi networks use an Ethernet cable to connect the Logger to a Wi-Fi router.

At the PC, **install the Device Installer** from the Video Turnstile CD. You can now use the Device Installer to check and change the IP addresses of your Loggers.

1. Arm yourself with the necessary information from your network manager, namely: IP address for the LVT, Subnet mask, and, if appropriate, Gateway address
2. Connect your LVT to a network enabled PC. You can use a crossover cable to make a direct connection, or connect through a hub via normal UTP Ethernet cables. Allow 10 seconds for the Logger to boot-up.
3. Run Device Installer and click the Search button to find devices on the network. The Installer should find the eLVT at its default address: 169.254.117.220. If the **IP address is shown in black** then your LVT and PC have a full network connection on the same sub-net and you should have more icons available on the menu bar: Configure, Upgrade, Telnet, Web. **If the IP address is shown in Red**, or you get a *No network interface is available* or *No Devices were found* message, then see point 7. and onward below.
4. You may want to **change the IP address of the LVT** for use on your main network. Select the IP address by clicking it. Click Assign IP, and enter the new IP address and sub-net mask for this LVT. After assigning the IP address, the program will search again and should find the device at its new address. This takes around 10 seconds.
5. Click the Update button to set other parameters.
6. If the VT Setup and VT Collect software are not communicating with your LVT, check the Local Port and Port 1 baud rate settings (Section 2.2.1 refers).
7. If, on clicking Search (point 3.), the eLVT device is found but the **IP address is shown in RED** then the eLVT is on a different sub-net to your PC. You should change one or the other to get them to match. See point 4. and Section 2.2.2 for details.
8. If, on clicking Search, the response is: **No network interface is available** then
  - check the network cable is plugged into the PC Ethernet port
  - check that the LAN icon on the task bar hasn't a red cross.
9. If, on clicking Search, the response is: **No Devices were found** then the possibilities are:
  - The LVT has been given a default gateway IP address, and will only respond on a network where that gateway is present. Try restoring the LVT to the network and running Device Installer from a PC also on that network.
  - The LVT Ethernet circuit is not functioning correctly. Contact your supplier or Biodata Ltd about service or a replacement.

## 2.2.1 Restoring Default Settings for Local Port and Port 1 Baud Rate

1. Click the IP address to select a device from the list.
2. Click **Configure**.
3. Click the **Ports** tab.
4. Select Port #1 and click **Edit Settings...**
5. Click the **Advanced** tab to get a list of all the settings
  - Baud Rate: Select 9600 from the drop down list
  - Local Port: Enter the value 10001
  - Other settings
    - Stop Bits - 1
    - Parity - none
    - Flow Control - none
    - Password Required - default value is no
    - Accept Passive Connection - yes
  - Port 2 (if available) is not used
6. Click [OK] to save port settings and then the configuration.

## 2.2.2 Changing the IP Settings of your PC

1. From the Start menu select Control Panel then Network Connections.
2. Select Local Area Network.
3. Select Internet Protocol.
4. Select Properties. Make a note of the existing Properties in case you need to return to them (for example to restore internet access)
5. When setting up the eLVT you must use a fixed IP address.
6. Is **Use the following IP address** selected ?
  - Yes  
The IP address of your PC is shown as a 4 part number. The sub-net mask is also displayed also as a 4 part number. Where the sub-net value is 255 the IP address parts must match for two network devices to be able to communicate. Where the sub-net mask is 0, any value in that part of the IP address is acceptable.
  - No  
Select Use the following IP address.  
Enter an IP address which, for the first three parts, is the same as the one shown for the eLVT in Device Installer. For the last part enter a different value in the range 0 to 255.  
Set the sub-net mask to: 255.255.0.0 and click [OK]
7. Click [OK] to leave the Local Area Properties and save the changes.

## 2.3 Installing over RS232



If your Logger has an RS232 plug with 9-pins, use the RS232 cable provided to connect it to the PC's COM port. The plug is clearly labelled on the rack-based Logger, and on the back panel of a boxed Logger (LVT).

## 2.4 Installing over RS485

An RS485 plug has 9 pins. It will be clearly labelled on the frame-based Logger and on the back panel of a boxed Logger (LVT). You will have an RS485 output kit which includes an RS232-RS485 converter (called a Microlink 800 adaptor) for connection to the PC.



*Microlink 800 RS485 to RS232 Adaptor.*

1. Plug the Microlink 800 adaptor into the PC's COM (RS232) port.
2. Connect the RS485 cable between the Logger and the Microlink 800.

You would normally use the 12 V DC plug-top adaptor supplied to power the Microlink 800 adaptor. In some situations, if you have a local LVT unit, you can use power from its power supply.

<b>Logger</b>	<b>ML800 Adaptor</b>
<b>9-Pin Plug</b>	
5 (0 V)	6
9 (+12 V)	7

*Note: Only connect 12 V DC wires from one logging unit. All other sections of the RS485 should have 5 wire connections.*

When the flat side of the adaptor is on top, and the “curly” side underneath, pin 0 is to the left and pin 7 to the right.

### **Pin Connections of the RS485 Logger to Microlink 800 Adaptor**

<b>Logger</b>	<b>ML800 Adaptor</b>
<b>9-Pin Plug</b>	
6	1

1	2
2	3
3	4
5	5

You may also find Section 5.4 useful, *Problems with RS485 Units*.

## 2.5 Connecting Boxed Units Together

At the back of each boxed unit is a 37-way D socket. Use the ribbon cables provided to connect the LVT to the VTs in a "daisy-chain": LVT—VT—VT—VT, etc. Each LVT can log counts from up to 15 VTs.

### 2.5.1 Power In on Boxed Units

The 12 V Power In socket on a boxed Video Turnstile unit provides power enough for any linked units and cameras. You only need connect a power supply (12 VDC 1.25 A) to one unit.

## 2.6 Lights

### 2.6.1 Busy Light

The busy light is on the back panel of a boxed Logger, and on the Logger module in a rack-based system. It comes on when the software talks to that Logger, and remains on until the software talks to another Logger. If you only have one Logger then the light will remain permanently on. This is useful for diagnosing problems. If you remove the power supply from the unit and then reconnect it, the Busy light will be off. If it goes on when you talk to the unit then you can see to which one you are talking and confirm that the software has found it.

### 2.6.2 Count Up and Down Lights

The Count lights on the VT front panel flash when a person is counted.

## 2.7 More Connections and Pin-Outs

For full connections details see the complete *User Manual* (available from <http://www.videoturnstile.com/manual.html>)

## 2.8 Adding Units or Upgrade Chips

When you add a new unit, or upgrade chips, the Loggers default to address 0 and the non-logging units to address 16. You will need to change address 16, and possibly address 0. (If you only have one Logger in your system you can leave it at 0.) Use the VT Setup program to change addresses.

VT address 16 is special. The logger will only accept counts from VT

addresses 0-15. VT address 16 is therefore not counted by the logger. This means that when you plug a new unit or chip into a system it cannot modify data in existing VT units.

When adding units add one at a time and use the VT Setup software to change the address to the next value (0 up).

## 2.9 Positioning the Camera

We normally supply cameras with a 3.6 mm focal length lens. This is suitable when the camera is two to three metres above the floor. However, we can supply lenses for other floor-to-camera distances.

Lens Focal Length (mm)	2.9	3.6	4.6	6.0	8.0
Floor—Camera Height (m)	2.0–3.5	2.5–4.5	3.0–5.0	4.0–6.5	5.0–8.0

For focal lengths other than 3.6 mm, change the camera height setting in the VT Setup software. This will affect the size of the counting zone and the perceived person size, so do this first before installing the camera. Mount the camera looking directly down.

### 2.9.1 Positioning Cameras Next to Single Doors

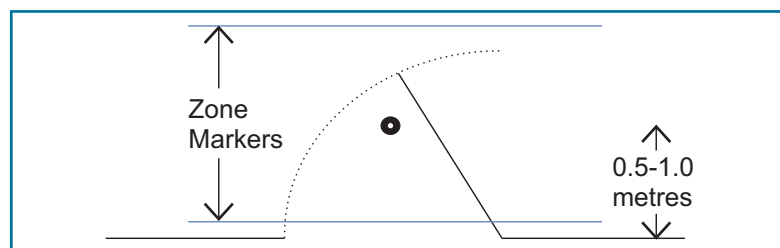
For an entrance the width of a single door, consider these factors.



*The counting zone is shown by the two white lines in the picture*

1. Does the door open **into** the zone detected by the Video Turnstile counters? If so it is important that the door does not completely cross the counting zone. You therefore need to mount the camera some distance inside from the door frame, typically 0.5 to 1 metre.
2. The counting zone should be reasonably well lit so that a good video picture is provided by the camera. You should also consider the lighting changes when the door opens or a person goes through the it. Do you need additional illumination from outside areas?

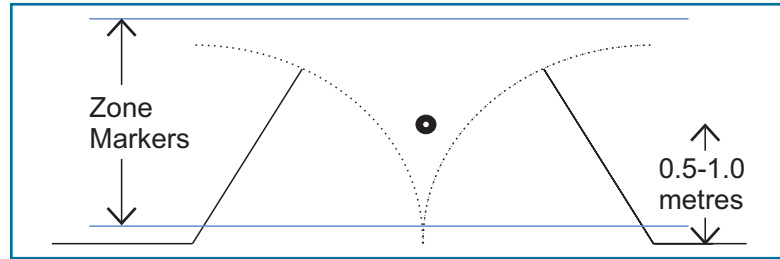
*Typical camera placement for a single door entrance, where the door opens into the counting zone.*



### 2.9.2 Positioning Cameras Next to Double Doors

For a double-width entrance mount the camera in the centre of the doorway, some distance in from the line of the closed doors. Consider also the previous guidance for a single door-width entrance.

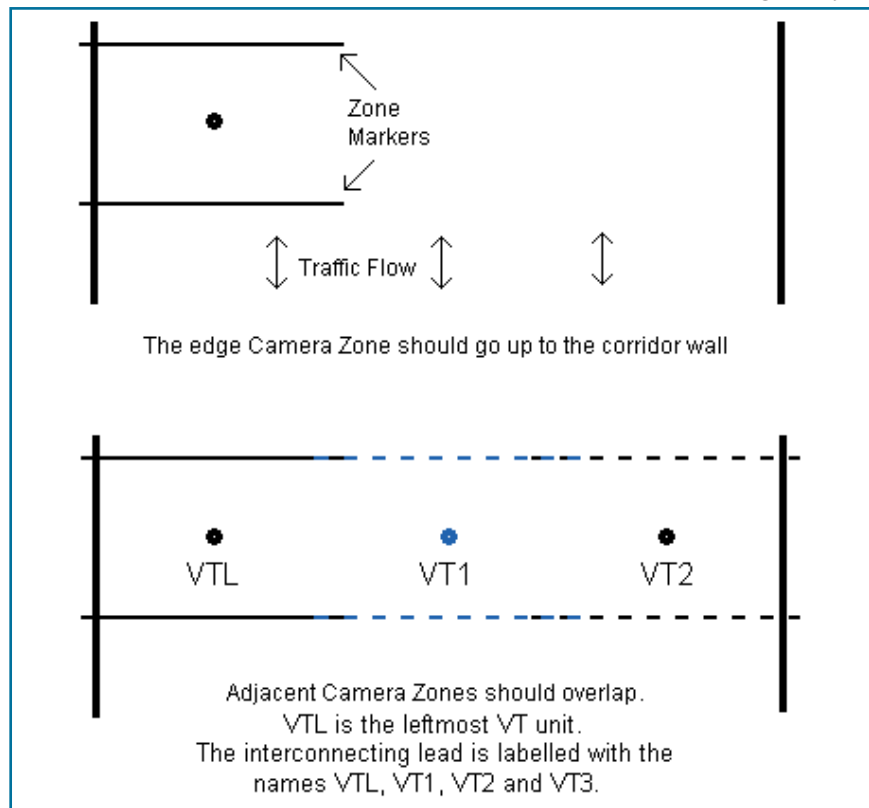
Typical camera placement for a double-door entrance, where the doors open into the counting zone.



### 2.9.3 Positioning Cameras in Corridors

For transit areas that are wider than a double-doorway, mount several CCTV cameras in a line across the ceiling with the field of view of each camera overlapping its neighbours by about 10%. Consider also...

1. Locate the counting zone where people are moving along the corridor: not stopposts to talk, look at exhibits or route signposts.
2. Ideally, start by temporarily fixing the cameras: you will probably need to move them after viewing the overlap of their counting zones.
3. The best position for the cameras is not necessarily evenly spaced. The cameras at the edge of the corridor may need to be closer to the edges of the wall than equidistant spacing might suggest.
4. People going through the overlapping zones between adjacent cameras must be picked-up by both cameras, and be at the edge of each camera's counting zone. The VT counter units tell each other about a person at the edge of the zone they are monitoring, so a person can be in the view of two cameras at once and can cross the zone diagonally.



5. Mount the cameras in a line across the corridor spaced so that the counting zones overlap by about 10% at each end—see the figure above.
6. Connect the Video output from the leftmost VT unit to a TV, so that you can see the camera image and the counting zone markers. Use the VT Setup software to adjust the counting zone edges.
7. Mark the edges of the counting zone on the floor using something easily removed like masking tape. A T-shaped piece of tape to show the end and direction of the line is useful.
8. Connect the output of the adjacent camera and its VT unit to the TV.
9. Position the second camera so that its zone markers are on top of those of the first camera, with an overlap of roughly 33 cm. Use the VT Setup software to adjust the size and position of the counting zone.
10. Repeat for the other cameras.
11. Use the VT Setup software to set up counting across wide entrances.
12. Check that someone following the walking line is detected only once.

## 3 Configuring the VT Units

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Use the VT Setup program to send instructions to the VT units. You can then run VT Collect to automatically collect people counts and perform calculations on the data. In subsequent sessions, unless you specify otherwise, everything will be done automatically.

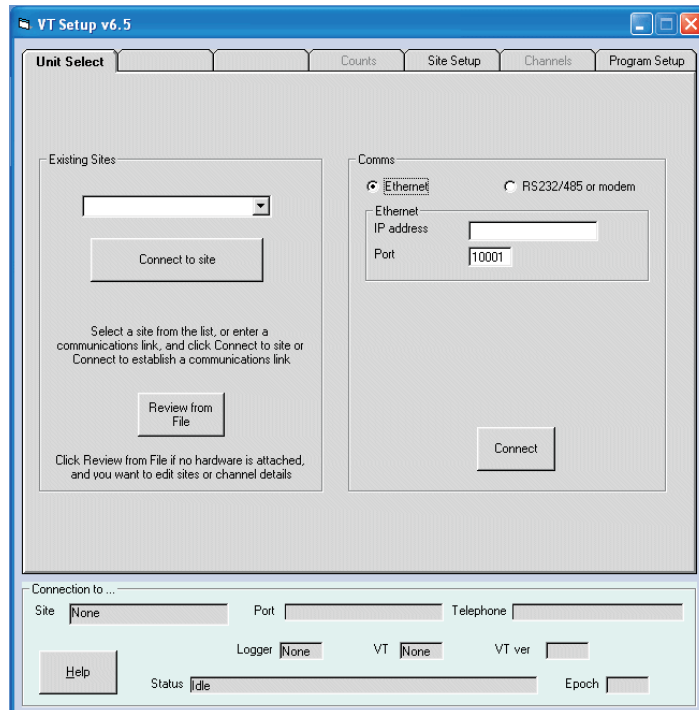
### 3.1 What you can do with VT Setup

- Open a communication link between the logger and the PC
- Change the settings of each counting zone: position, size, entry points, exit points and so on.
- Adjust settings for different situations: crowds, people size, shadows, etc.
- Set the interval over which the VT Logger is to save people counts—number of people per hour or per half-hour for example
- Check counting accuracy
- Schedule data collection

### 3.2 Running VT Setup

1. Make sure your Video Turnstile units are connected and switched on.

- From the Windows Start menu, choose the Windmill 6.0 program group then select VT Setup.



*VT Setup has a row of tabs across the top. These take you to screens which let you connect to, and configure, your VT modules.*

- Start with the Unit Select tab and click the **communications link** between the VT Loggers and the PC: Ethernet for instance. (For Wi-Fi check Ethernet.) Fill in the other sections such as IP Address. You can skip this step in future sessions and just connect to a site as in point 5. below.
- Use the Site Setup tab to **create a site** from which to collect data. Again, you can skip this step in future sessions and just connect to the site as in point 5. below.
- Select this site in the Unit Select tab. The operations you now make in VT Setup will apply to the Video Turnstile modules of this site.
- If necessary, use the Logger Setup tab to **change the addresses** of the **logging units**, and the VT Setup tab to change the addresses of the non-logging units. (See Section 2.8 for addressing notes.)
- Use the Logger Setup tab to set the **epoch length**. This is the interval over which counts are totalled, counts per hour for example.
- Use the VT Setup tab to **view the counting zone on a monitor**, set the **height of the camera** above the floor, the **position and size of the counting zone**, the **video format**, whether **wide entrances** are to be monitored and so on .
- Use the Channels tab to **name the individual people counters**.
- Use the VTSetup tab to **check the counting accuracy** (Section 3.5).

11. **Schedule data collection** with the Program Setup tab (Section 3.8.2).

Full instructions on using VT Setup are in its Help file (click the Help button), in the full *User Manual* ([www.videoturnstile.com/manual.html](http://www.videoturnstile.com/manual.html)) and in the on-line *Installation Guide* at [www.videoturnstile.com/install/](http://www.videoturnstile.com/install/)

## 3.3 Selecting a VT Module

Each non-logging VT module monitors one CCTV camera and counts people going in and out. It regularly passes the counts to its VT Logger, which saves the counts. You specify counting and camera settings (counting zone position, people sizes, etc) for individual modules, rather than for the site as a whole. To change a module's settings first select it in VT Setup.

1. If you haven't yet done so, in the Unit Select tab connect to a site.
2. Go to the Logger Setup tab and choose the controlling Logger.
3. Select the VT setup tab. More tabs appear.
4. Identify the VT module and choose its address in the Select VT tab.
5. Check you have the correct VT module: click the *Flash Up/Down on this VT* button. The module's count up/down lights flash three times.
6. If you are working with a VT module that is not the first in the list then the software needs to read its settings. Either click the Tune button, or move to the Settings tab and click button 1 *Read settings from module*. This might take a few moments. When you do this your VT module stops counting and its count lights flash.

## 3.4 Settings Summary

### **For Crowded Situations, consider changing these settings**

Timeout Restore to 1,  
MinSeparation to 3,  
Diagonal Splitting to 1,  
BlobMidSplit to 1,  
Double Probability to 1.

### **For Person Size, change these settings**

MinDetect ,  
Typical Width,  
Typical Area.

### **For Queuing and Waiting, change these settings**

Lengthen the FreezeTime,  
Diagonal Splitting to 1,  
BlobMidSplit to 1,

### **For Dark Entrances, reduce this setting**

ThresholdLevel.

**For Rapid Lighting Changes, change these settings**

Reduce the Freeze Time  
Increase the ThresholdLevel.

**For People Entering at One Point then Widely Dispersing**

On an escalator, for example, people may step off at a narrow point then disperse in all directions. Turn on the side exit lines and the splitting options—Diagonal Splitting and BlobMidSplit.

**For Cameras Mounted on Low Ceilings**

In this case people look very large in the picture. They may seem to break up and so you should turn off Diagonal Splitting (set to 0). Also turn off Double Probability and maybe BlobMidSplit.

## 3.5 Checking How Accurately Individuals are Counted

Send a person through the counting zone and make sure that the individual is counted properly. When you've done that send the person through the other way and check again. Do this for a few different people, one or two at a time. Finally monitor 50 or a 100 transits of one or two people. To do this:

1. Connect a monitor, hand-held TV or frame grabber.
2. Send a person through the counting zone. Check that the individual causes only one count—watch the count lights on the VT or the flashing zone lines.
3. From the Select VT tab click the Tune button. The VT Tuning screen appears and the diagnostic time is set to zero. This lets you see when events occurred relative to each other.
4. Depending on the direction the person walked, click the Analyse Single Transit Up or Analyse Single Transit Down button. You are asked some questions about the person, so that the system can make recommendations of settings to use.
5. At the bottom of the screen the software shows a list of the 10 most recent events. It marks in green the one it considers to be the transit of the person. Other events might include shadows or a door opening. This lets you see exactly what the system is detecting.
6. The software makes some recommendations in the Suggested column of the VT settings grid. To accept these click the Apply to VT button. You can edit the suggestions before doing so.
7. After adjusting your settings, send a person through the other way and repeat points 4-6 above. Do this a few times for each direction, sending one or two people through each time. Make sure that the system is counting correctly.
8. If people going in one direction are less easily counted this is usually

because of different lighting conditions on the two sides of the zone. Try lowering the value of the ThresholdLevel to help detection against darker backgrounds.

### 3.5.1 Identifying the Cause of Poor Counts: Decoding the Event Summary

Parameter	Value	Meaning
Direction	0 or 1	Whether the person is going up or down the screen. 0 is down-screen and 1 is up-screen.
Exit Line	0	An object going up-screen and exiting at the top reference line
	7	An object going down-screen and exiting at the bottom reference line
	1-6	The object has disappeared without crossing the reference line and will not be counted. This may be because of a shadow or a light reflection. Make sure that people passing through have enough contrast throughout the zone.
Width	1-32	The width of an object in pixels. (1 pixel is 1/32 of the zone width.) Compare this to the MinDetect and Typical Width values in the VT settings table and adjust if necessary.
Shadow Score	0-4	This is a probability score relating to shadow detection, where 0 is definitely not a shadow and 4 is very likely a shadow. If the score is greater than 0, the system tightens detection criteria in its Suggestions list to avoid counting shadows.
> MinDetect	0 or 1	1 indicates that the object was greater than the minimum person size and eligible for counting. 0 indicates it wasn't and will not be counted.
Transit Time	0 or 1	Indicates the time the object took to pass through the zone. If 0 indicates that the object passed through quickly and could possibly be a shadow.
All Lines	0 or 1	If 0 the reference lines in the zone have been triggered at once by a single object, which can indicate a shadow. Make sure that the zone is large enough that a single large person does not fill it from top to bottom. Alter the zone size or possibly the camera height.
Too Narrow	0 or 1	If 0 the object in the zone is considered to be too narrow to be a valid count, and is likely to be a shadow. If this is not so alter the minimum person size.
2*Min Detect	0 or 1	If 0 the object is smaller than the system expects an adult to be (an average adult should be more than twice the minimum person size). The width of objects are only measured on the middle line.

## 3.6 Checking How Accurately Groups of People are Counted

Proceed as for the checks on individuals but this time run the check with a

number of people going through the zone: fifty or a hundred for example. Manually count the people and check this against the electronic count. Keep a note of the direction they were going, and what percentage were in wheelchairs or pushchairs, or were children.

1. In the VT Tuning screen click the Start Group Count button.
2. Manually count at least 10 people passing through the zone. You can count in one direction or both.
3. Click the Analyse Group Count and enter the number that you have manually counted. You'll also be asked whether they were going up or down screen—if you don't know leave this blank. (Click the Change Group Facts button if you make a mistake.)
4. VT Setup fills in its Event Summary table and shows the percentages of single counts, double counts and no counts for Up and Down directions. Based on the accuracy percentages, the advice section suggests possible adjustments to improve accuracy. To accept this advice click the Apply to VT button.

## 3.7 What to do if the System is Under- or Over-Counting

Video Turnstile is a conservative system and tends to under-count rather than over-count. During validation, if you find the system is mis-counting follow these steps.

1. For under-counting, consider increasing the sensitivity of the people detection by adjusting the camera height (SelectVT tab, Tune button). Do this first before as this controls the size of a typical person in the picture. A person viewed in a camera 2 metres above the floor will appear around 3 times as large as when the camera is 3 metres above the floor.
2. If you find two people walking side-by-side are being counted as one, check the MinSeparation setting and the MaxDetect setting (SelectVT tab, Tune button).
3. If you find small people are not being counted, decrease the MinDetect setting (SelectVT tab, Tune button).
4. If you find large people are not being counted, increase the Typical Area or Typical Width setting (SelectVT tab, Tune button).
5. If you find that two people following one another are being counted as one, or if a person pushing a trolley is being counted twice, adjust the TimeoutRestore (SelectVT tab, Tune button), Double Probability, BlobMidSplit and Diagonal Splitting (Settings tab).
6. If you find that people are leaving the counting zone without being counted, adjust the turn left and right settings, or whether the person is going up or down screen (Zone tab).

7. If a person stays inside the zone and is therefore not counted, lengthen the freeze time (SelectVT tab, Tune button).
8. If you find poor counting from dark to light areas or delayed count registration from light to dark, reduce Threshold\_limit by 4 (SelectVT tab, Tune button). You may now need to compensate for wider perceived width of a person.

## 3.8 Scheduling Data Collection

There are two ways to schedule data collection.

1. Continually run VTCollect and schedule various times of day when it will collect data. See below for details.
2. Set VT Collect to run and collect data daily, weekly or monthly.

The program subtracts the previous count from the current count, so if running daily would show just the counts for that day.

You can also collect data at unscheduled times. Click the Load All Epochs to File button from the VT Setup Counts tab.

### 3.8.2 Collecting Data Several Times a Day

From the Program Setup tab select Schedule and set the times of day when VT Collect will collect data from all the Video Turnstile loggers. VT Collect must be running continuously to collect data.

### 3.8.1 Collecting Data Daily, Weekly or Monthly

Use Windows Task Manager or Scheduled Tasks (depending on your version of Windows) to schedule automatic data collection. For example, in Windows 98 you will find Scheduled Tasks in:

Start > Programs > Accessories > System Tools > Scheduled Tasks.

Look for the VT Collect program and click the Next button. Choose whether to collect data daily, weekly or monthly. Select the time for collection. Set VT Collect to run once then close after 23 hours. The command to initiate a download is the path of vcollect.exe. Eg.

C:\Program Files\Windmill Software\Videoturnstile\vtcollect.exe

## 4 Collecting and Displaying Data

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Run VT Collect to automatically collect people counts and perform calculations on the data. It saves the counts as a text file. You can then open this file in almost any report generator or analysis software.

### 4.1 Running VT Collect

You can either run VT Collect as a normal Windows application, or as a Windows service. A Windows service is an application that starts when Windows begins and runs in the background as long as Windows is running. The data is saved in an ASCII text file in

```
c:\videoturnstile\data\0707 for July 2007  
c:\videoturnstile\data\0807 for August 2007 etc.
```

You can change the folders it uses with the VT Setup program.

#### 4.1.1 Running VT Collect continually as a Windows service

You can set VT Collect to start with Windows and run continuously in the background. This lets you collect data one or more times a day.

1. Go to Windows Control Panel.
2. Select Administrative Tools.
3. Select Services.
4. Scroll down the list until you see Vtcollect service. Double-click or right-click to start and specify automatic start-up.
5. Should you wish to change, first stop the service then use UNINSTALL Vtcollect service.

Data will be collected according to your schedule in VT Setup .

#### 4.1.2 Running VT Collect as an Application

If you don't want VT Collect to run permanently in the background, you can schedule it to run and collect data daily, weekly or monthly using Windows Task Manager or Scheduled Tasks. See Section 3.8.2.

### 4.2 Displaying Live Counts

Use VTrealTime to check that the VT logging unit is collecting count data

from all its connected VT units. VTrealTime shows a live display of each count, so when a person goes through one of your entrances the program shows the updated total. It doesn't, however, save any data.

1. Run the VTrealTime from the Start menu or its desktop icon.
2. Click Inputs to change which counters and calculated channels are displayed.
3. To reset all counts to zero click the Zero Counts button. (This only resets the count in VTrealTime. It does not affect the logged count collected by VT Collect or stored in the VT Loggers.)

## 5 Fault Finding

### 5.1 No Counts are Recorded and the VT Lights Flash Regularly

This indicates that there is no video signal going into the Video Turnstile unit. Although the up and down lights flash briefly, the counts are not incremented. You need to determine why there is no video signal.

1. Check the cable connections between the VT unit and the camera.
2. Check with a multi-meter that 12 V DC is available at the camera end of the cable.
3. If you have more than one LVT or VT unit, swap the connection to the VT with another camera that is working.

### 5.2 Power Supply Problems

The plug-top power supplies for boxed units supply 12 VDC 1.25 A. For rack systems the power module supplies 12 VDC 5A. There are two ways to check the power supplies:

1. Use a multi-meter to check the voltage at the 2.1 mm in-line socket output from the power supply. (Remove the Rack system power supply module to do this check.)
2. If you have more than one plug-top supply, try swapping two over. The problem should move with the supply unit. If not you may have a problem with the VT unit itself.

### 5.3 A VT Module is Missing

If an VT Logger module, in a group of modules, suddenly disappears then the address of that module has probably been changed. This may be due to an electrical transient, in which case the address has probably been reset to 16.

Use VT Setup to find which module has lost its address. You may need to disconnect all the LVT modules and reconnect them one at a time to identify the correct one. Having found it you can use VT Setup to re-enter the address of the module.

1. Go to the Logger Setup tab and select a Logger.
2. Select the VT Setup tab. If any modules are listed in the Missing Units list, click the Retry Connection button to try and locate them.

3. To change an address select it from the list and click the Change Address button.
4. If you still have missing units, remove the power lead, unplug the units and then reconnect one-by-one.

## **5.4 Problems with RS485 Units**

Here are some tips on connecting Logging units using RS485 cables.

1. Try to arrange a local RS485 connection from your PC. Bring the LVT modules one-by-one to this local connection.
2. Use VT Setup to change the address of each LVT module in turn. LVT modules are sent out with default address 0. If you connect the LVT to your RS485 link, and power up the LVT, VT Setup should find it at address 0. You will need each LVT on an RS485 connection to have a different address. Start from 1 and work up. It is best to leave address 0 free so that you can add a new LVT to your system and find it while all the others remain connected.
3. If you do not arrange a local connection, check each LVT in turn. That is, go to the nearest LVT to the PC with only a single section of cable between the PC and LVT, and disconnect the rest of the LVTs.

Check the continuity of the cable by twisting the Tx<sup>+</sup> and Tx<sup>-</sup>, and the Rx<sup>+</sup> and Rx<sup>-</sup> wires at one end of the cable section and using a multimeter to check continuity at the other.

You can then check continuity of a new length of RS485 cable and attach it to the 5-way screw terminal block.

4. RS485 cable should be 2 twisted pairs + screen. Use: 1 pair for Tx pair, 1 pair for Rx pair and screen for signal ground.

## **5.5 More Fault Finding Tips**

If your problem isn't answered here then see the Video Turnstile web site at <http://www.videoturnstile.com/users/>