

# Video Turnstile User Manual

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**BIODATA**

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# Chapter 1: Introduction

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The Video Turnstile system counts people entering and leaving premises such as retail outlets, banks, galleries and museums. It is designed to be easily installed and in most cases will require minimal set-up procedures. The system comprises one or more black and white CCTV cameras each associated with a Video Turnstile (VT) detection unit. When monitoring several entrances, or wide doorways, we provide leads to connect the VT units together. A lead is also provided to connect the video output from the VT unit to a television monitor.

The detection unit produces a switch closure signal (a pulse) each time a person crosses the detection zone within the video picture. There are two pulse trains, one for people going up the video picture, and one for people going down the video picture. With a Logging Video Turnstile (LVT) unit, pulses from itself and up to three other VT units can be logged and later transferred to a PC via a serial link. A cable for connecting the PC to the LVT unit is supplied.



*An example from a video clip showing the two detection zone markers.*

There are switches on the back of each VT unit that can be used to fine tune the detection to the installation. In most circumstances the default settings should be adequate. However, if the system is missing counts or counting people twice, then change the switch settings (Section 2.2).

This Manual tells you how to:

- Install the Video Turnstile units and cameras (Chapter 2).
- Use Windmill software to configure the system and collect data (Chapter 3).
- Deal with any installation problems (Chapter 4).

# Chapter 2: Installing Video Turnstile

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When installing Video Turnstile units it helps to have a television monitor available. This lets you check that the picture produced by the camera corresponds to the installation suggestions provided in this chapter.

## 2.1 Camera Positioning

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

Lens Focal Length (mm)	Floor—Camera Height (m)
3.6	2–3
6	3.5–4.5
8	4–6
12	6–9

Mount the camera looking directly down.

### 2.1.1 Positioning Cameras Next to Single Doors

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

1. Does the door open **into** the zone used by the Video Turnstile detector? If so it is important that the door does not completely cross

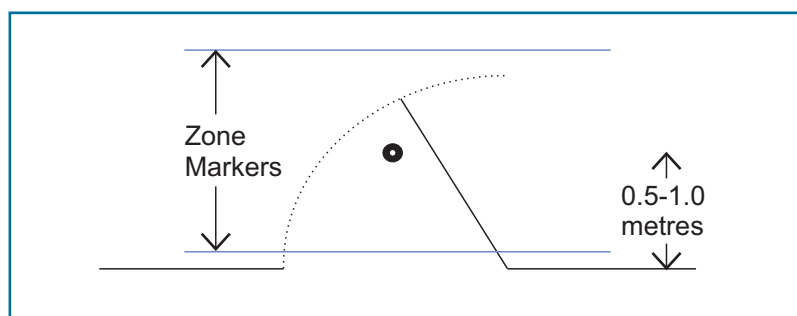
the detection zone. You therefore need to mount the camera some distance inside from the door frame. This distance is typically 0.5 to 1 metre.

2. Where do people go after coming through the door? It is important that people cross from one zone line to the other in order to be counted. People who turn left or right immediately on coming through the door, and who do not cross the second zone line, may not be counted. Similarly people who enter the detection zone from the side then go out of the door may be missed. (Note: you can count people entering or leaving through the side by altering the unit's switch settings, see Section 2.2 for details.)



Example of zone lines in the video picture.

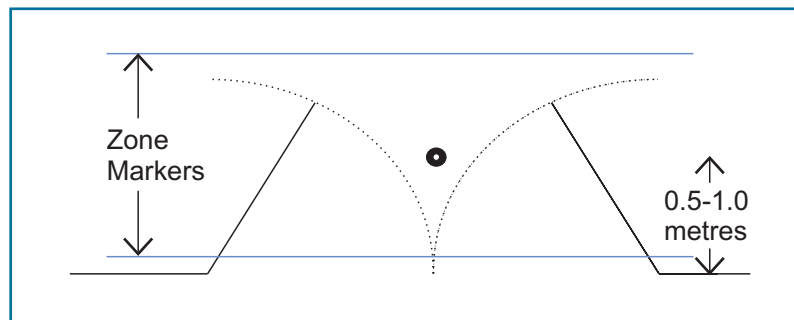
3. The detection zone should be reasonably well illuminated (so that a good video picture can be provided by the camera). You should also consider the lighting changes when:
  - i. The door opens. This may mean additional illumination from outside areas, or changes in reflected light according to door position.
  - ii. A person enters or leaves through the door. The person may block out sources of normal illumination, or reflect additional light back to the camera. A shadow may also be associated with the person crossing the zone. The detection unit will normally cope with changes to ambient light levels associated with people crossing the zone. However shadows preceding, following or to the side of people, may cause additional counts.



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

## 2.1.2 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.



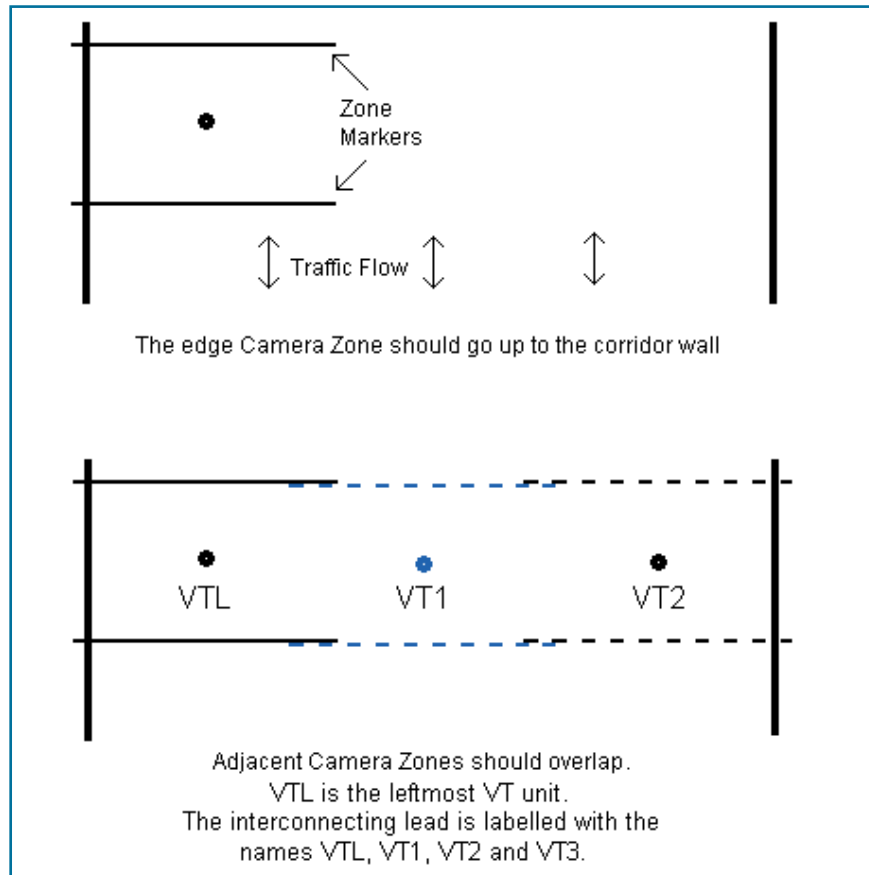
*Typical camera placement for a double-door entrance, where the doors open into the detection zone.*

## 2.1.3 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 with its neighbours. Consider also the following points.

1. The transit zone should be located where people are moving along the corridor: a point where people stop to talk, look at exhibits, advertising or route signposts, is not really appropriate.
2. Ideally, start by temporarily fixing the cameras: you will probably need to move them after viewing the overlap of their detection zones.
3. The best position for the cameras is not necessarily evenly spaced across the corridor. 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 detection zone. The VT detection units tell each other of the presence of a person at the edge of the zone they are monitoring. This means that the system handles a person being in the view of two cameras at once, and can pick up people crossing the zone diagonally.
5. The cameras must be mounted in a line across the corridor spaced so

that the detection zones overlap by about 10% at each end—see the figure below and the Fine Tuning Camera Placement notes.

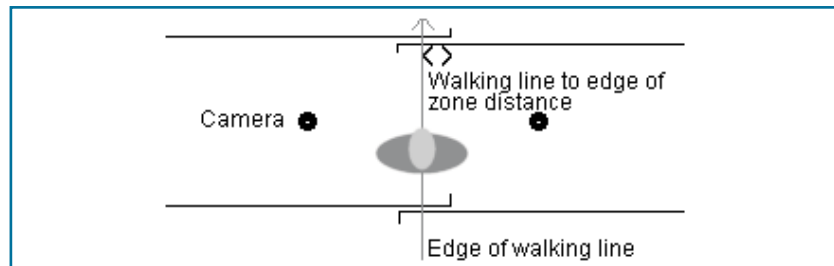


### Fine Tuning Camera Placement in Corridors

To optimise the overlap between the zones from adjacent cameras, follow these steps.

1. Disconnect the VT-VT loom (which connects the 25-way connectors on the Video Turnstile detector units).
2. Connect the Video output from the leftmost VT unit to a TV, so that you can see the camera image and the detection zone markers.
3. Mark the edges of the detection zone on the floor using something easily removable like masking tape. A T-shaped piece of tape to show the end and direction of the line is useful.
4. Connect the output of the adjacent camera and its VT unit to the TV.
5. Position the second camera so that its detection zone markers are on top of those of the first camera with an overlap of roughly a third of a metre.

6. Repeat for the other cameras
7. Reconnect the VT-VT unit loom (which connects the 25-way connectors on the Video Turnstile detector units), and check that someone following the walking line is detected only once.



## 2.2 Rear Panel Switches

On the rear panel of the VT unit are eight switches. These allow you to optimise the VT for its location. You must always switch the VT off and back on again after altering the switches since it only reads them at power up. The switches are numbered 1 to 8, left to right. The numbers are visible through the panel. The default position of the switches is all UP. This is a good starting position for a new installation.

The switch functions are as follows.

**Switches 1 and 2:** These control some of the VT settings that vary as the camera is positioned at different distances above the floor. 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, so these switches will need adjusting to suit. The settings are :

SW1	SW2	
UP	UP	Maximum Distance from the floor (over 3 m)
DOWN	UP	Next Setting
UP	DOWN	Next Setting
DOWN	DOWN	Minimum Distance from the floor (around 2 m)

If you find that people are being missed then move the setting to a greater distance which in effect increases the sensitivity. Double counts would indicate a move to a nearer setting.

**Switches 3 and 4:** There are many situations where people coming through a doorway have a tendency to turn sharply left or right in order to reach some particular attraction. To cater for this the VT can either count only people who cross both upper and lower counting lines, or it can count people who cross the lower counting line but enter or leave by the edges of the counting area. To use this facility the camera must be mounted so that the lower 'must cross' line is in the correct position. The switches then allow entry and exit by left and right edges.

SW3	SW4	
UP	UP	Straight Through only
DOWN	UP	Straight Through + Left Edge
UP	DOWN	Straight Through + Right Edge
DOWN	DOWN	Straight Through + Both Edges

**Switch 5:** This controls the ease with which one person following another can be detected. In a very crowded situation where people are packed closely together then this must be easily done. In a less crowded situation then a more conservative option would be better since it prevents false detections of shopping trolleys and the like.

SW5  
UP            Makes Following difficult  
DOWN        Makes Following easy

SW6,7       Not Used

**Switch 8:** This sets the detector for the picture format from the camera. Two frame rates are used for different camera types: 60 frames per second for NTSC (or EIA for monochrome), and 50 frames per second for PAL (or CCIR for monochrome). The switch adjusts the parameters in the detector to cope with the different frame rates.

SW8  
UP            PAL - 50 fps  
DOWN        NTSC - 60 fps

**Remember to switch the Video Turnstile unit off and on again for the switch settings to take effect.**

## 2.3 Connections

### 2.3.1 Camera Din Plug

Pin	Purpose
1	Video
2	0V
3	0V
4	+12V

### 2.3.2 240 DIN Connector Pin Out

Pin	Purpose
1	VIDEO IN
2	0V
3	0V
4	12V
5	NC

### 2.3.3 9 Way D Plug Pin Out

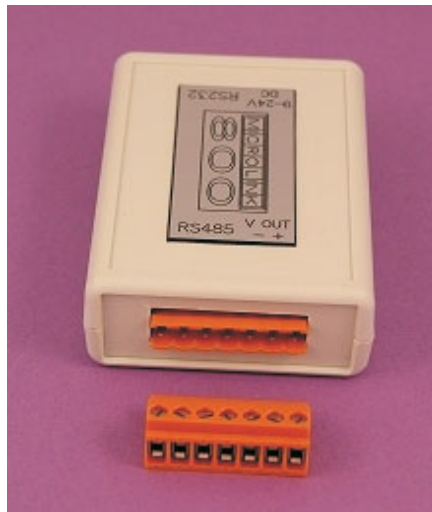
	RS232	RS485
1		Transmit-
2	Receive Data	Receive+
3	Transmit Data	Receive-
4		
5	0V	0V
6		Transmit+
7		
8		
9	+12V	+12V

### 2.3.4 LVT to Microlink 800 Adaptor

When you are using RS485 connections, use the Microlink 800 to connect to the computer's COM (RS232) port.

LVT 9-Pin Plug	ML800 Adaptor
6	1
1	2
2	3
3	4
5	5

(Note, 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. See the photo below.)



*Microlink 800 RS485 to RS232 Adaptor.*

#### Powering the Microlink 800 Adaptor

You would usually use the 12 V DC plug-top adaptor supplied to power the Microlink 800.

In some situations, if you have a local LVT module, you can use power from its power supply as follows.

LVT 9-Pin Plug	ML800 Adaptor
5 (0 V)	6
9 (+12 V)	7

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

### 2.3.5 25 Way D Socket Pin Out

Pin	Purpose	
1	0V	
2		
3		
4	INPUT 6	Logger Input from other VTs
5	INPUT 4	Logger Input from other VTs
6	INPUT 2	Logger Input from other VTs
7	OUTPUT 0 DOWN	Count Output
8	LINE SHOW	Connect to 0V to disable the limit lines
9	DISPLAY CLOCK	Manufacturer use only
10	DISPLAY STROBE	Manufacturer use only
11		
12	RIGHT DIR	Used in Camera Arrays
13	LEFT DIR	Used in Camera Arrays
14	12V	
15		
16	INPUT 7	Logger Input from other VTs
17	INPUT 5	Logger Input from other VTs
18	INPUT 3	Logger Input from other VTs
19	OUTPUT 1 UP	Count Output
20	0V	
21	0V	
22	DISPLAY DIN	Manufacturer use only
23	0V	
24	RIGHT CLAIM	Used in Camera Arrays
25	LEFT CLAIM	Used in Camera Arrays

### 2.3.6 Connecting More Than One LVT

When you are connecting more than one LVT, use the ribbon cables and adaptors provided.



Use the adaptor labelled *WIDE-A* when monitoring wide entrances



Use this adaptor when monitoring one of several single entrances. The adaptor you use defines its VT unit: VT1, VT2 or VT3.

# Chapter 3: Using the Windmill Software

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## 3.1 Introduction

Use the Windmill software to communicate with the Video Turnstile units. With Windmill you can:

- Set the interval over which the LVT unit is to log people counts—number of people per hour or per half-hour for example;
- Tell the LVT unit the correct date and time;
- Regularly collect logged data from the LVT unit and save it in a text file;
- See live people counts.

Windmill comprises a suite of programs, each program performing a specific task. The main program you will use is VTupload. Once set up this automatically collects the people counts from all the LVT units and saves them in a text file. You can then open this file in almost any report generator or analysis software.

VTupload subtracts the previous count from the current count, so if running hourly would show just the counts for that hour. You can choose how often VTupload is to run.

Other Windmill programs are included in your package, such as Logger, Chart and DDE Panel. For details of these see Section 3.15.

### **3.1.1 Using Windmill for the First Time**

1. Install the software (see Section 3.2 for details).
2. Run Windmill VTupload (Sections 3.3—3.14) to: confirm communications with the VT units, automatically collect people counts and perform calculations on the data.
3. If desired run Windmill Logger, Windmill Chart or Windmill DDE Panel (Section 3.15).

In subsequent sessions, unless you specify otherwise, everything will be done automatically.

## 3.2 Installing the Windmill Software

To install Windmill use the CD labelled:

Windmill 6.0  
For Video Turnstile

Insert the CD-ROM into the CD drive. Windows should automatically start the installation program. If it doesn't, then run the setup.exe program on the CD.

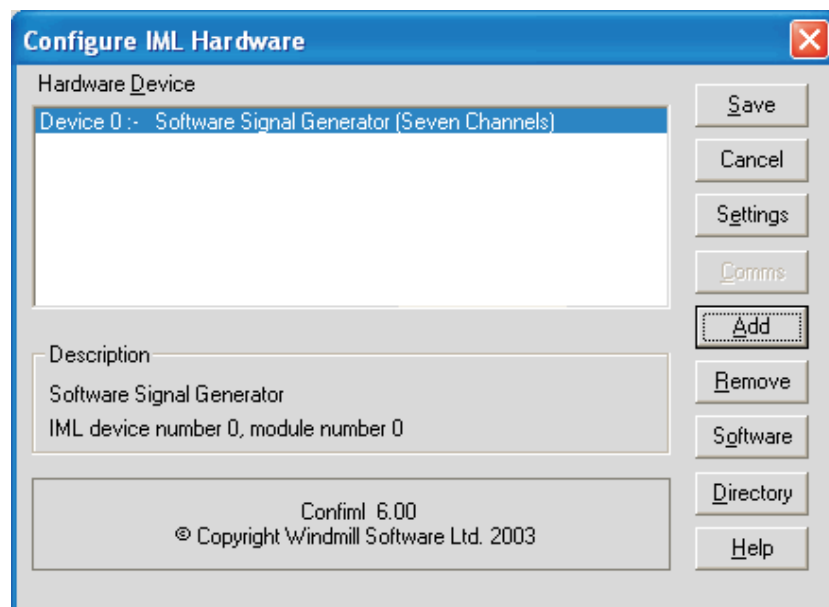
The software is normally installed into the:

c:\program files\windmill software\windmill for videoturnstile\  
folder (where c: is the drive on which Windows is running.). Two other folders are created, c:\videotunstile\setups\ that will hold details of the program settings and c:\videoturnstile\data\ that will hold your data files.

At the end of installation the Configuration program—ConfIML—is run to begin the setup process for your system. After using ConfIML run VTupload to confirm communications and set up regular data collection from the Video Turnstile Loggers.

### 3.2.1 Using Windmill ConfIML

You need to run ConfIML to register your Windmill system correctly. Simply open the program then click the Save button. You should not need to use this program again.



Now start the Windmill VTupload program(Section 3.4) and confirm that you can communicate with the Video Turnstile devices you have just defined.

## 3.2.2 Installing over a Network

From the CD install the Lantronix Xport Installer and the Devicecomm.exe program.

### Setting the Address for the eLVT

1. Arm yourself with the necessary information from your network manager, namely
  - IP address for the eLVT
  - Subnet mask
  - If appropriate, Gateway address
2. Connect your eLVT device 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.
3. Run Xport Installer and click the Search button. The Installer should find the eLVT as its default address: 169.254.117.220. You can change the IP address of the eLVT by selecting an existing IP address and then clicking the Assign IP button. After setting a new IP address into the device, it will need to reboot. This takes around 10 seconds.
4. Click the Update button to set other parametres.

## 3.2.3 Assigning a Virtual COM Port

The eLVT appears as a serial device on your network. You can access this with the VTupload program by specifying the COM port to which the eLVT is attached. In Windows, go to Control Panel and select the DeviceComm manager. This shows you a list of COM ports, and which have been allocated. Select an unused COM port, and click Edit to enter the IP details for the eLVT.

## 3.3 Using VTupload

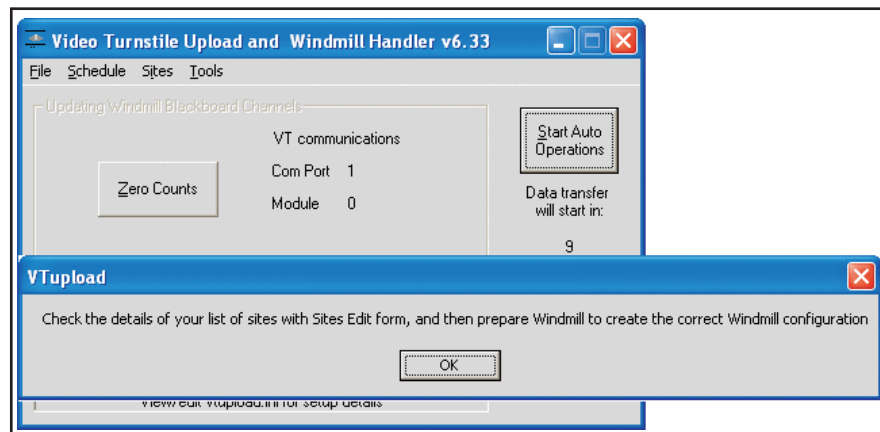
VTupload is the main program of the Video Turnstile system. It lets you:

- Tell the LVT unit the correct date and time;
- See live people counts;
- Set the interval over which the LVT unit is to log people counts—number of people per hour or per half-hour for example;
- Give sensible names to each counter, such as PeopleIn;
- Transfer data from the VT loggers to the PC and save in a text file.

## 3.4 Starting VTupload

1. Make sure your Video Turnstile units are connected and switched on.
2. From the Windows Start menu, choose the Windmill 6.0 program group then select VTupload.

The first time you use VTupload it starts like this.



VTupload knows that this is the first time you have run the program and asks you for the details it needs. Click OK and it will present you with the Site Details dialogue.

The first thing to do is to create at least one site from which to download data. A site may be a collection of Video Turnstile units, or may be just one unit. For instance, you could specify a site to be all units connected to one COM port, or all units dialled from one telephone number. The program starts by assuming you have a single site, with one Logging Video Turnstile unit and up to 3 non-logging units, connected to port COM1 of the computer.

### Site Name

Enter a meaningful name such as "Oxford Branch" or "Bakery Line 4". This tells the user exactly which circuit they are dealing with, so be sure to enter a clear definition.

### File Prefix

This is an alphanumeric identifier which ties together several sites: the data for all sites with an identical File Prefix will be collected together as a single overall site. For example, a school may have three sites with the names Classrooms, Kitchen and Boiler House. At these three locations, there are loggers gathering data. The file prefixes are defined identically as S1. This means that all logged data will be sent to the same file, under directory name S1.

### Installation Date

Defaults to today's date. This defines the date from which VTupload will scan for accrued data.

### Connections to Logger Units

**COM port number:** You must specify the correct COM port i.e. the one to which the LVT is connected. If the loggers are on an Ethernet connection, create the virtual port using the virtual port software provided (Section 3.2.3) and use this COM port number. If you are

using a modem, choose the number of the COM port to which the modem is attached.

**Baud Rate:** Leave the baud rate at 9600.

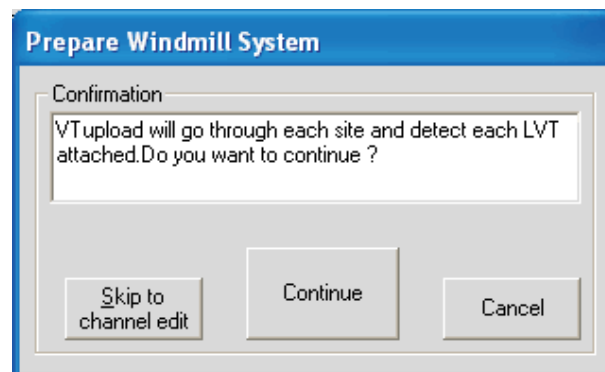
**Modem Telephone Number:** When using a modem to transfer data, enter the modem's dial-up number here. Include only figures: not spaces, modem pause commas, etc. Remember to allow for additional dialling numbers, such as those required for external lines.

Press OK and VTupload creates the site, storing the details in a text file called sites.ini. The Prepare Windmill System window appears—see below for details.

To change the settings you entered, or delete the site entirely, select the Sites menu and choose Edit Site List. When you do this you must again prepare the Windmill system. Select the Sites menu and choose Prepare Windmill System. See the next section for more details.

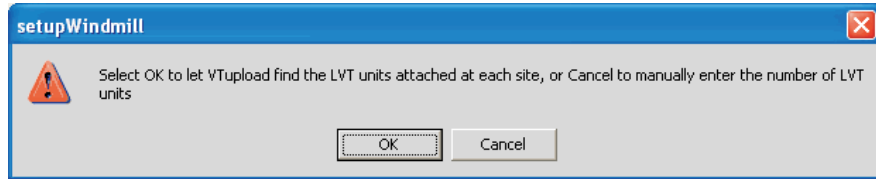
## 3.5 Checking Communications and Configuring the System

When you add a new site (or select the Sites menu and choose Prepare Windmill System) VTupload gets ready to check your settings.



It asks whether you want to try to contact each Logger to confirm its communications integrity. To do so click the Continue button. The program checks the COM port that you specified in the Site Details dialogue (page 3.6) and looks for all the LVT units attached to that port. On completion the Edit Channel Details box appears for you to name your counters (Section 3.5.1).

If your loggers are not yet ready and you don't want to contact them, select instead Cancel. You can then enter the number of loggers at the site.



If you neither want to detect or enter loggers, you can proceed to giving names to the counters. Press the Skip to Channel Edit button.

If you cannot establish communications, check the:

- wiring at the RS485 adaptor (if using);
- specified COM port;
- baud rate;
- Ethernet communications (Section 4.4).

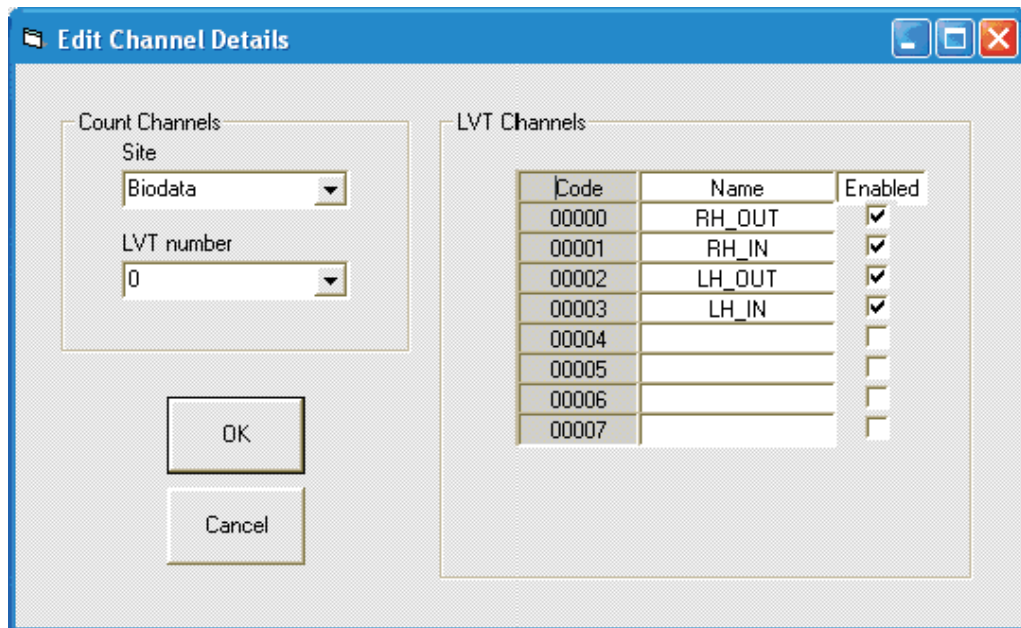
*Notes: When the system is configured what actually happens is an iml.ini file is prepared and stored in*

*c:\program files\windmill software\windmill\*

*The system also creates a file called vttown.ims If you wish to review the system configuration you can do so with ConfIML.*

### 3.5.1 Giving Each People Counter a Name

After preparing the system (Section 3.5) you are given the opportunity to name your people counters.

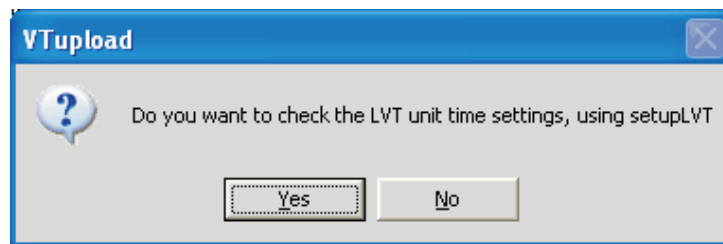


The counters are also known as channels. The ones on the first LVT unit in your site are shown. These are initially called “00000”, ”00001”, ”00002”, etc. To rename them to something more easily understood simply type a name into the Name box, for example: IN\_DOOR1 or RH\_OUT. Make sure the Enabled box is checked for each counter you plan to use. When you make a change, buttons to Accept Changes or Ignore Changes appear. Where a site comprises two or more LVTs, press Accept Changes before moving on to the next LVT in the drop-down list.

If you have several sites, choose the one on which you want to work from the Site list.

Press OK to permanently save the changes in a file called `vttoom.ims`.

You are now ready to make sure the VT loggers’ clocks match your computer’s clock, and set the epoch length for each logger—as detailed in the Section 3.6. An epoch is the duration over which a set of counts is stored, an hour or a day for example. The unit can store 256 epochs of data from each counter. If your epoch is a day, therefore, 256 days of data would be stored before the first was overwritten. If your epoch was an hour, only 10 full days of data would be held at any one time.



## 3.6 Configuring the Video Turnstile Logging Units

From the Tools menu select Run SetupLVT.

The screenshot shows the 'setupLVT' configuration window. It is divided into several sections:

- Site:** Site Name: Test, COM port: 8, Modem Number: (empty)
- Module:** Module: 02, Epoch (mins): 60 (Change buttons are present)
- HW type:** HW type: 825A, Next Epoch (secs): 3110
- Clock:** Clock: Fri Oct 08 14:08:10 2004, Current Epoch: 125 (Reset button is present)
- Reading count data:** Current Channel Counts: 00200: 4, 00201: 3, 00202: 0, 00203: 0, 00204: 0, 00205: 0, 00206: 0, 00207: 0
- Raw Count Data:** Upload to File button, Data will be saved as File Name: c:\videoturnstile\data\BVT\setupLVT\LVT\_2.WL
- Close:** Close button at the bottom center.

Here you can adjust the LVT units' clocks to match the computer clock and change the epoch length. (The count is logged in memory at the end of each epoch.)

1. Select which site's modules (LVT units) you want to configure from the Site Name drop-down list. The list has an extra item: Direct to COM... If you select this you are asked for the COM port number and baud rate. Details for any LVT modules in that site, or connected to that COM port, will be made available.
2. Choose a Video Turnstile Logging unit from the Module drop-down list and press the Change button. The settings for that unit are shown.

### 3.6.1 Updating the Video Turnstile Unit's Clock

The clock will probably be wrong. To adjust it click the Reset button. The time and date are updated to match those of the computer.

*Note: The clocks in the LVT units are updated each time you download data.*

### 3.6.2 Changing the Length of the Logging Epoch

The count is logged in memory at the end of each epoch. Type an epoch length into the Epoch box (in minutes) and press the Change button. When you change the epoch you should also update the clock by pressing the Reset button. This ensures that the number of seconds to the end of the epoch is calculated correctly.

The VT unit can store 256 epochs of data from each counter. If your epoch is a day, 256 days of data would be stored before the first was overwritten. If your epoch was an hour, only 10 full days of data would be held at any one time.

The numbering system starts at 0, so the Current Epoch shown in the setupLVT window will be between 0 and 255 inclusive.

### 3.6.3 Viewing the Updating People Counts

The setupLVT window shows the updating people counts for your selected VT Logger and its associated non-logging units. This is useful during set-up to confirm that each counter is doing its job and counting correctly. For example, Counter Channel 00000 may be counting people going in through doorway one and Counter Channel 00001 may be counting people going out of doorway one. You can send someone through the doorway and see the count update on-screen.

*Note: You can also use the Windmill DDE Panel to do this (Section 3.15.3).*

### 3.6.4 Collecting Raw Count Data

You can collect the raw counts from **all** the VT Loggers attached to the selected site. The counts from the 256 epochs will be stored in an ASCII text file. (You wouldn't normally use this method to download data, but it is sometimes useful when setting-up the system. For details of normally scheduling data collection see Section 3.8.)

Press the Upload to File button.

The data file is stored in a setupLVT sub-folder and given the name LVT\_XX.wl, where xx is the number of the LVT unit. The name is shown in the File Name box. This is for information only: you can't edit the name there.

The raw data thus saved are accumulating counts—the Video Turnstile counters are not reset to 0 at the end of each epoch. This allows the two logging processes—one local at the VT Logger and one at Windmill software to computer disk—to proceed without interfering with each other. This means that if 10 people entered during the first epoch, and 6 during the second, epoch 0's count would be 10 and epoch 1's 16.

### 3.6.5 Closing the setupLVT Window

To close the window select the Close button. The length of the epoch is saved in a file called sites.ini, by default in the c:\videoturnstile\setups\ folder.

## 3.7 Performing Calculations

You can instruct VTupload to perform calculations on the count data and store the results in the logged data file. You can thus group data from individual VT counters. For example, if you have several cameras monitoring the width of a corridor, you can add together the up-corridor counters for the total people entering, and the down-corridor counters for total people leaving. You could also combine the people going in through several entrances to get the total visitors to a store.

When you haven't defined any calculations, VTupload's stored data file might look like this.

```
Windmill VTupload -
File opened at: 00:00:00
File closed at: 23:59:59
```

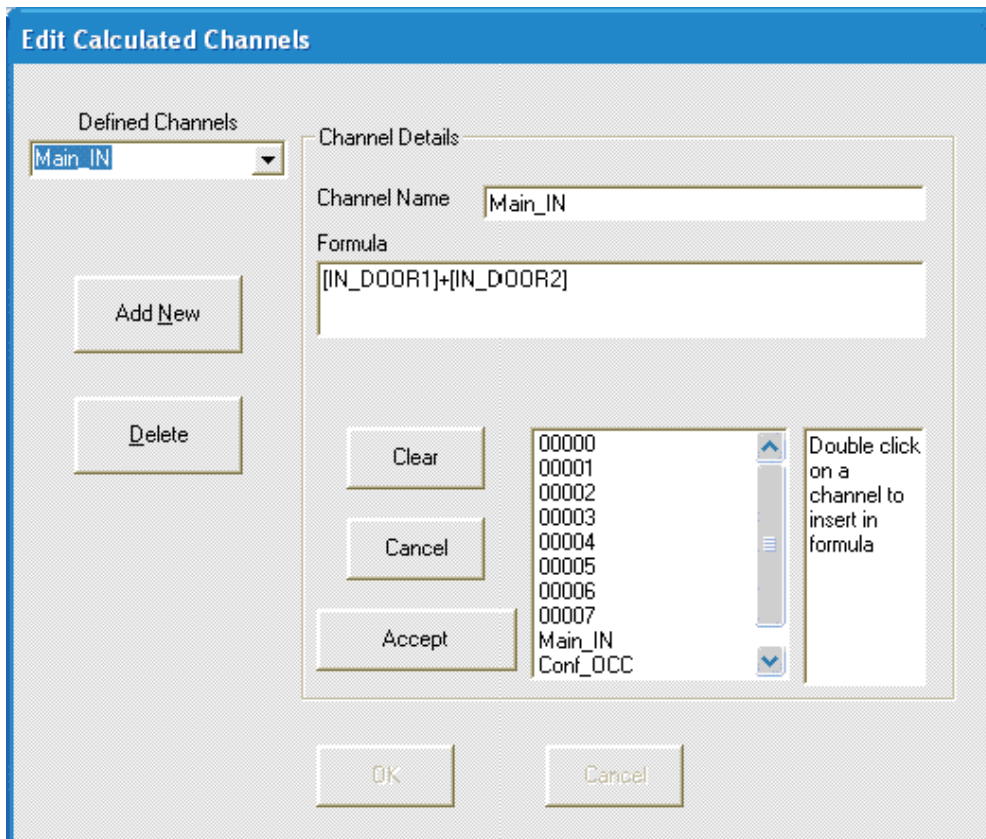
Time	IN_1	OUT_1	IN_2	OUT_2
Secs	events	events	events	events
01:00:00	0	0	0	0
02:00:00	0	0	0	0
03:00:00	0	0	0	0
04:00:00	0	0	0	0
05:00:00	0	0	0	0
06:00:00	0	0	0	0
07:00:00	0	0	0	0
08:00:00	3	1	15	0
09:00:00	52	53	1	0
10:00:00	8	7	0	0
11:00:00	12	11	0	0
12:00:00	18	21	6	8
13:00:00	21	22	8	7

The data from each counter channel is stored in its own column. VTupload sees your calculations as more channels of data. If calculating total visitors from several entrances, for example, you might create a calculated channel called All\_In which added together totals from IN\_1 and IN\_2. Daily and weekly totals for this channel will be calculated.

*Note: to perform calculations make sure the "Additional Reports" box is checked in the Edit Setup Options screen, Section 3.11.*

### 3.7.1 Defining Calculations

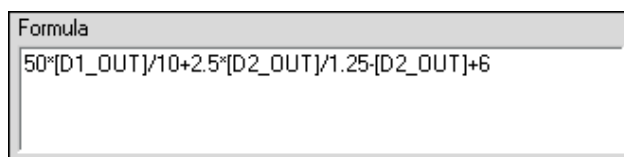
In the main VTupload window select the Sites menu and choose Edit Calculated Channels.



1. Press the Add New button. The Channel Details area appears.
2. Type a name for the channel into the Channel Name box.
3. Construct a formula for calculating the new value. Double-click a count channel to add it to the formula.
4. Press Accept to save the new calculated channel.
5. Repeat for as many calculated channels as you need, then press OK.

Typically in Video Turnstile applications the formula will be a simple sum of count channels, as in the example above. For the formula to work count inputs need to be enclosed in square brackets. This is done automatically if you double click a channel in the list.

More complicated formulae can be constructed if required. The Operators / \* - + are supported.



The formula shown above involves two channels called D1\_OUT and D2\_OUT. The order of operations is: / \* - +, so the above formula is evaluated as:

$$(50*([D1\_OUT]/10))+(2.5*([(D2\_OUT]/1.25)-[D2\_OUT]))+6$$

### Deleting Calculated Channels

To delete a calculated channel, select it from the Defined Channels list and press the Delete button. If you are part way through creating a new channel, and have not yet pressed the Accept button, you can just press the Cancel button. The Clear button removes the formula, leaving you with a blank box, but does not remove the channel.

### Saving Calculated Channels

When you have created as many calculated channels as you need, press OK. VTupload updates the calculated channels file. If no file yet exists it will ask you to give the new file a name.

### Turning Off Calculations

If you wish to temporarily turn off calculations, but don't wish to delete all the ones you have entered, you can do so. Select the Tools menu and choose Edit Setup Options. When the Additional Reports box is ticked, daily and weekly totals are created according to your calculated channel definitions. When the box is not ticked, your calculated channel settings are ignored. For more details see Section 3.11.

### The Results of the Calculation

When a complete set of data for a particular day has been read from the VT loggers, the calculated channels file is processed and the calculation results appended to the file. Weekly files containing the daily totals are also prepared.

Depending on your default folder (Section 3.9), the final directory structure will be something like this:

```
c:\videoturnstile\data\site code\mmyy\  
c:\videoturnstile\data\site code\weeks\  

```

The mmyy directory is named according to the month and year, for example 1103 for November 2003. It holds the raw data files in the format

[SITE CODE]\_DAYddmmyy.txt

Where [SITE CODE] is the file prefix you entered (page 3.6).



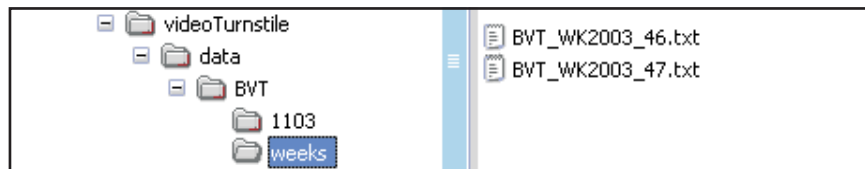
The weeks directory holds the weekly totals data files for this site in the format

[SITE CODE]\_WKyyyy\_ww.txt

Where:

yyyy is the year,

\_ww is the number of that week (between 01 and 53)



## 3.8 Scheduling Data Collection

You can either continually run VTupload and schedule various times of day when it will collect data, or you can set VTupload to run and collect data once a day. The program subtracts the previous count from the current count, so if running daily would show just the counts for that day.

*Note: If you plan to use the other Windmill programs like Logger and Chart, you must run VTupload continuously. You also need to select the “Source of Data for Windmill” box in the Edit Setup Options screen (Section 3.13).*

### 3.8.1 Continually Running VTupload and Collecting Data Several Times a Day

From the Schedule menu select Upload times. This lets you set the times of day when VTupload will collect data from all the Video Turnstile loggers. This assumes that the program is running continuously and be available to perform data collection.

You also need to select the Tools menu, choose Edit Setup Options, and tick “Source of Data for Windmill”.

Consider these factors when deciding how often to collect data.

- **Epoch length:** With 30-minute epochs (Section 3.6.2), 5 days of data would be stored before the first was overwritten. If collecting data daily then this means that if there are problems with the computer then 4 consecutive communications failures can be tolerated before data is over-written. If you are considering collect data less frequently then this time factor should be borne in mind.
- **Patterns of use of the host computer:** If the host PC is being used during working hours as a user’s main PC, the schedule for download should be set to a time during lunch time or evening when the PC is not in use. This is especially important when large numbers of sites are used which will mean longer periods of potentially slow PC performance.
- **Telephone line use:** If the telephone line being used for dialling to a logger is less likely to be used for voice calls at a particular time, favour the scheduling of downloads for this time.
- **Network traffic:** If TCP/IP network is being used, it is good practice to favour times of low network traffic for data transfers.
- **Likelihood of communications failures:** If a telephone line being used for data transfer is likely to be used for voice telephony at times when downloads are initiated, the scheduled task repeat

should be sympathetic to this and should repeat a dial-out more frequently than would otherwise be necessary.

You are also able to collect data at unscheduled times. Click the Upload Logged Data button from the VTupload main window (page 3.23).

### **3.8.2 Running VTupload Once a Day (or less Frequently)**

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 VTupload program and click the Next button. Choose whether to collect data daily, weekly or monthly. Select the time for collection.

The command to initiate a download is the path of VTupload.exe. For example:

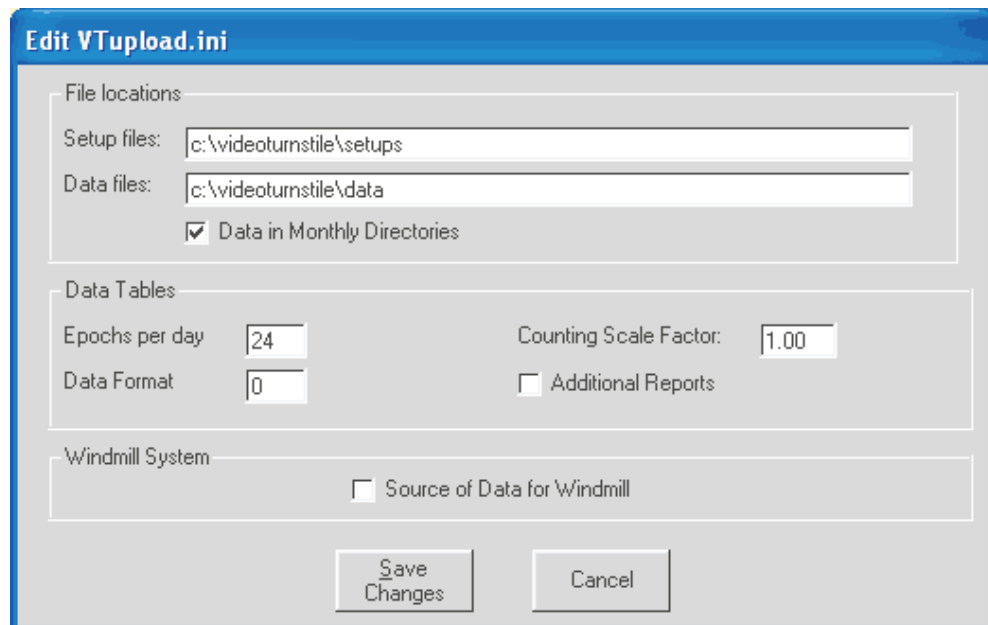
```
"C:\Program Files\Windmill Software\Windmill\VTupload.exe"
```

When deciding the time of day to start VTupload and download data, consider the points detailed in Section 3.8.1.

## 3.9 Changing Default Folders

When you use Windmill you will create two types of files, those which hold data and those which hold the Windmill programs' settings. You choose which folders are to store these files. We recommend using `c:\videoturnstile\setups\` and `c:\videoturnstile\data\` where `c:\` is the drive on which you installed Windmill.

If you do wish to change this select the Tools menu and choose Edit Setup Options.



Erase the current file locations and enter two new folders (directories). If you want to save each month's data in its own sub-folder, make sure the Data in Monthly Directories box is ticked. The sub-folders will be named according to the month and year. For example:

`c:\videoturnstile\data\0704` for July 2004

`c:\videoturnstile\data\0804` for August 2004 etc.

This dialogue also lets you

- Compensate for under counting (Section 3.10)
- Turn off calculated channels (Section 3.11)
- Specify whether data should be made available to the other Windmill programs (Section 3.13)
- Specify VTupload's epochs per day (Section 3.12)
- Change the data format. However, you should leave this at 0 as this indicates integer data.

*Note: What this dialogue is actually doing is editing the vtupload.ini file. Notes on the ini file are in Section 3.9.1 below. You can ignore this if you wish.*

### 3.9.1 The vtupload.ini File

The starting data in this file is:

```
[VT]
setup directory=c:\videoturnstile\setups
data directory=c:\videoturnstile\data
data format=0
rem if you change readings per day then backup
rem existing data files
rem the first valid day in the VT logger will overwrite
rem the existing file with a partial set of data
readings per day=24
demo=0
monthly directories=true
reports=false
counting scale factor=1.0
windmill handler=0
```

#### Notes on the ini File

- These setup and data directories are created when you install VTupload. You can change them to more suitable directories.
- Data format=0 is for integer data (or 0.0 for one decimal place, but this is not suitable for counting people)
- Readings per day is the number of time epochs in a 24 hour period—so 24 for hourly, 48 for half hourly counts etc.
- Monthly Directories=true sets a flag so that subdirectories created from the month and year (MMYY e.g. 0103) will be used to save the data files. If the right hand side of the expression is not true (e.g. false or 0) or the entry is not included then monthly subdirectories will not be used.
- Calculated channels are enabled if reports=true. If a calculated channel file exists then these definitions are used. Otherwise the sum of odd channels and the sum of even channels and daily totals are calculated. If reports=false then no calculations are performed.
- Windmill handler determines whether data will be made available to the other Windmill programs (Logger, Chart, etc.). If windmill handler=0 then no data is provided to them.

You can either edit the vtupload.ini file directly, in Notepad for example, or use VTupload to do so (by selecting the Tools menu and choosing Edit Setup Options). If editing directly please make a backup copy before doing so.

## 3.10 Compensating for Under-Counting

Video Turnstile is a conservative system and tends to under-count rather than over-count. When validating your system, you can increase the sensitivity of the people detection using switches on the back of the Video Turnstile logging units. See Section 2.2 for details.

If you have adjusted the switches and the count is still low, then you can scale the count up. Select the Tools menu, choose Edit Setup Options and enter an appropriate scale factor.

If the system consistently misses 5% of people for example, you can compensate for this by entering a scale factor of 1.05 (to the nearest 2 decimal places).

## 3.11 Turning off Weekly and Daily Total Calculations

If you have defined calculated channels, for example to combine the counts from several doors, then daily and weekly totals will normally be calculated. However, if you want to turn off the calculations you can do so.

Select the Tools menu and choose Edit Setup Options. Remove the tick from the Additional Reports box.

If you tick Additional Reports, but have not specified any calculated channels (Section 3.7) then the sum of odd channels, the sum of even channels and daily totals are calculated.

## 3.12 Setting VTupload's Epochs per Day

Counts are saved in epochs. If there are 24 epochs in a day then the total counts each hour are logged. To change the number of epochs VTupload logs in a day, select the Tools menu and choose Edit Setup Options.

The epoch times for each VT logging unit can be different (set with the setupLVT window, Section 3.6.2). VTupload compares the actual epoch time with its epoch per day setting. If the epoch time is shorter than the

epochs per day setting—for example if the epoch time is 30 minutes but there are 24 epochs per day in VTupload—then the epochs are added together. So two VT unit epochs will be combined into one VTupload epoch. Similarly, if the VT unit's epoch is 120 minutes and there are 24 epochs per day in VTupload, then every other one of the 24 epochs will be 0.

## 3.13 Running the Other Windmill Programs

If you wish to use the other Windmill data collection and display programs, such as Windmill Logger and Windmill Chart, you should instruct VTupload to make the data available to Windmill. Select the Tools menu and choose Edit Setup Options. Make sure the “Source of Data for Windmill” box is checked (marked with a tick). VTupload needs to be running for the other Windmill programs to collect the data.

If you are not planning to use the other Windmill programs, you can set VTupload to run daily (for example), collect the data and update the daily data files. See Section 3.8.2 for details.

The benefit of using the other Windmill programs is that you will be able to

- see real-time data (the current counts at that moment);
- log accumulating counts at a rate you choose, every 5 minutes for example, independent of the logging epoch in the Video Turnstile units;
- chart the count;
- purchase additional programs to let you, for example, see a floor plan with incrementing counts at each doorway.

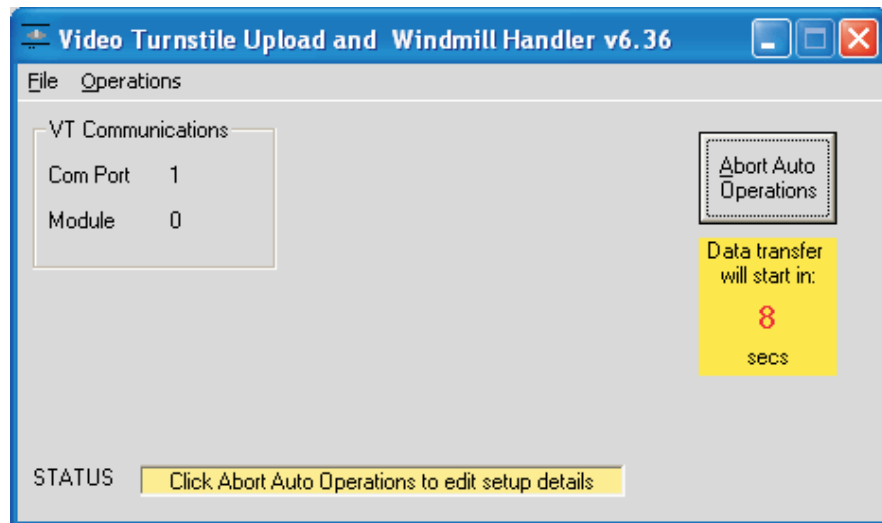
For more on the Windmill programs see Section 3.15, their Help files or <http://www.windmill.co.uk/>

## 3.14 Closing VTupload

To use the changed set-up, you need to:

1. Close VTupload: select the File menu and choose Exit.
2. Close any Imblkbrd device handlers that are on the Windows toolbar.
3. Re-open VTupload.

When you re-open VTupload it looks like this.



If you want to change any settings you need to **click the Abort Auto Operations button**. If you don't do so within 10 seconds, then press the Cancel Auto Transfer button that appears. The program will close and you will have to restart. This happens because VTupload normally runs once a day, collects data from the logging units, and then shuts down. It waits 10 seconds before doing so though, to give you a chance to change its settings.

## 3.15 The Other Windmill Programs

As well as VTupload, several other Windmill programs are included in your package.

- **Windmill Logger** displays people counts and stores them in a file on the PC's hard disk at regular intervals—every 5 minutes for example. This rate is independent of the Video Turnstile unit's logging intervals. So you could, for instance, use the VT unit to log counts every hour and Windmill to log counts every 5 minutes.
- **Windmill Chart** displays the accumulating people counts as a graph.
- **Windmill DDE Panel** shows a live display of each count but doesn't save any data. You can use DDE Panel as a DDE server. This means that other programs, such as spreadsheets like Excel, can request and save live counts.

### The IML Device Icon

Whenever you run a Windmill program one or more IML Device icons appear. Different icons identify different hardware drivers. The Windmill applications can't run without these, so don't close them whilst using Windmill.

If Windmill Logger, Chart or DDE Panel fail to display any data, make sure you have enabled their use in VTupload. Section 3.13 refers.

Notes on using the other Windmill programs are given below. For full details see the programs' Help.

### 3.15.1 Using Windmill Logger

Windmill Logger displays people counts and stores them in a file on the PC's hard disk at regular intervals—every minute for example.

1. Load the vttowm.ims file you created with VTupload.
2. Connect the count channels.
3. Type a name for the file you want to hold the people counts into the Data File box, for example retail.wl. This file is in ASCII text and you can open it using any word processor, spreadsheet or other Windows analysis software.
4. Press Start to begin logging data.

Time	IN events	OUT events
14:29:00	409	410
14:30:00	409	410
14:31:00	412	411
14:32:00	415	413
14:33:00	415	413
14:34:00	419	417
14:35:00	420	417
14:36:00	420	417
14:37:00	420	417

Running Interval: 1.00 second

With Logger you can periodically create a new file—every day or every week for example. For full details of this and other features select the Logger’s Help menu.

You can use VTupload to zero Windmill Logger. For example, if you zeroed Logger at the start of the day it would show just today’s count. To do this, in the VTupload main window (page 3.23) click the Zero Counts button.

You can log VTupload’s calculations with Windmill Logger (assuming you have enabled this in VTupload—Section 3.13). Use Logger’s Inputs menu to select the calculated channels.

To backup the data you are saving with Windmill Logger, you should also schedule VTupload to regularly collect data (Section 3.8.1).

### 3.15.2 Using Windmill Chart

Chart shows a graph of occupancy (the difference between the IN and OUT counts) against time. To use Chart follow steps 1 and 2 above as for Logger then press Start. For full details of using Chart select its Help menu.

### 3.15.3 Using Windmill DDE Panel

Use DDE Panel to check that the VT logging unit is collecting count data from all its connected VT units. (A VT Logging unit stores counts from itself and up to three other non-logging VT units.) DDE Panel shows a live display of each count, so when a person goes through one of your

entrances the program shows the updated total. DDE Panel, however, doesn't save any data.

DDE Panel's display is regularly updated according to its Refresh Rate. This can be from 0.5 seconds upwards. There is no point in setting the update rate faster than the computer can acquire the data. This is especially relevant with serial links, which are relatively slow.

You can also use DDE Panel as a DDE server. This means that other programs, like Excel, can request and save live counts.

It's easy to use DDE Panel

1. Load the \*.ims file you created VTupload. This is called `c:\videoturnstile\setups\vttowm.ims`.
2. Connect the count channels.

That's it. DDE Panel will show the incrementing counts from the Video Turnstile units. For full details of using DDE Panel select its Help menu.

# Chapter 4: Troubleshooting

---

Here are the solutions to five potential problems with the Video Turnstile system.

1. No counts are recorded and the Up and Down lights on the VT module flash regularly.
2. Counts are missed when two or more people go through together.
3. A VT module is missing.
4. You cannot get reliable communications with an LVT over Ethernet.
5. You have problems connecting the units over RS485.

## 4.1 No Counts are Recorded and the Up and Down Lights on the VT Unit Flash Regularly

This indicates that there is no video signal going into the Video Turnstile unit. Although the 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.

## 4.2 Counts are Missed when Two or More People go through Together

By adjusting switches on the back of the VT unit you can increase or decrease the sensitivity of people detection. Switch number 5 controls how the unit reacts to people following close behind each other against the alternative of someone pushing a shopping trolley or baby walker.

If people side by side are being counted as one person, try changing switches 1 and 2 which control the size of a typical person in the picture.

Between 2 and 3 metres above the floor, the area of screen taken up by a 1.8 m tall person changes considerably. 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.

For more on the switch settings see Section 2.2.

If you have adjusted the switch settings and you are still under-counting, you can scale the count in software. See Section 3.10 for details.

## 4.3 A VT Module is Missing

If an LVT 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 0. You may then have two modules with address 0.

Use VTupload 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 VTupload to re-enter the address of the module.

## 4.4 You cannot get Reliable Communications with an LVT over Ethernet

Check with Hyperterminal that you can talk to the module (see Section 4.4.1 for details). Follow the steps to *Request the Hardware Type*. Did you get back the correct reply?

**No: You need to check the setup of the Lantronix virtual COM port and the Ethernet connection.**

Use the Xport Installer program to check the setup.

1. Use the Search button to get a list of LVT units (and any other Lantronix Xport devices) on your local network.
2. “Ping” the LVT unit to confirm that there is a network connection to it: click the Ping button and enter the IP address of the LVT unit you want to check.

The response time for communications with a locally connected LVT unit will typically be 0 msec.

**Yes: Wait 10 seconds then repeat the steps to Request the Hardware Type.**

Did you still get back the correct reply? If not your LAN is probably routing your messages out to a WAN, as well as to the LVT. Check the GATEWAY setting with your network manager.

### 4.4.1 Using Hyperterminal to talk to a LVT module

Load the Windows Hyperterminal program  
(c:/program files/accessories/hypterterminal/hypertm.exe)  
and set up the communications as follows:

Connect To tab

Connect using:

Direct to COMx

(where x is the port number to which your LVT is connected.)

Configure ...:

Bits per second 9600

Data bits 8

Parity None

Stop Bits 1

Flow Control None  
Settings tab  
  Ascii Setup ...:  
    Ascii Sending  
      Echo characters typed locally - Checked  
      others as default  
    Ascii Receiving  
      Default settings

You should now be able to communicate with a module over the serial link created. To **request the hardware type** you need to know the address of the module with which you are trying to communicate. The default address for a single LVT module is 0. (You can check and change the module address using the VTupload program)

Using Hyperterminal to read the hardware type for a module with address x you need to type:

```
*x DCO HT
```

(and press Enter)

the reply will be:

```
x: ML825
```

(possibly followed by another letter)

e.g. for address 0

you send \*0 DCO HT

and get back 0: ML825

You will not get a reply if:

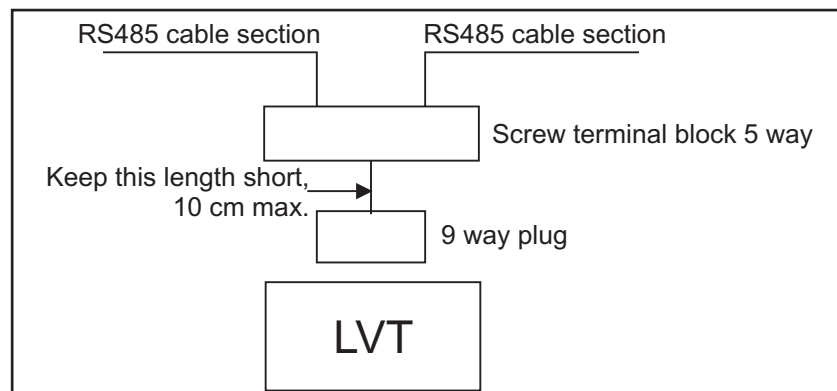
- There is no communications link between the PC and the LVT—check the cable(s).
- You have sent the wrong address—check with VTupload.
- The LVT is not powered.

## 4.5 Problems Connecting RS485 Units

Here are some tips on connecting LVT 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 SetupLVT (Section 3.6) 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, SetupLVT 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.

Ethernet cable can also be used in non-hostile environments.

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