LanCaster Pro ST

User Manual

ENGLISH

BI Communications
Innovation through Technology

TABLE OF CONTENTS

TABLE OF CONTENTS

Section 1 - Introduction

⚠ Warning ⚠

- This instrument meets the safety requirements of IEC61010-1: 1995.
- The Lancaster Pro ST is designed for use on de-energized circuits only.
- Connection to line voltages will damage the instrument and could be hazardous to the operator.
- This instrument is protected against connection to telecom network voltages according to EN61326-1.
- Safety is the responsibility of the operator.

International Electrical Symbols

This symbol signifies that the instrument is protected by double or reinforced insulation. Use only specified replacement parts when servicing the instrument.

This symbol on the instrument indicates a WARNING and that the operator must refer to the user manual for instructions before operating the instrument. In this manual, the symbol preceding instructions indicates that if the instructions are not followed, bodily injury, installation/sample and product damage may result.

Risk of electric shock. The voltage at the parts marked with this symbol may be dangerous.

1.1 Receiving Your Shipment

Upon receiving your shipment, make sure that the contents are consistent with the packing list. Notify your distributor of any missing items. If the equipment appears to be damaged, file a claim immediately with the carrier and notify your distributor at once, giving a detailed description of any damage.

SECTION 2 - PRODUCT FEATURES

2.1 Description

The Lancaster Pro ST, is a hand held structured cabling tester and trouble shooter, designed for use on screened and unscreened cables. Fitted with RJ45 connectors and wired to either TIA568 A/B, U.S.O.C or I.S.D.N standards. It will store up to 1,000 test results for downloading to P.C to produce an installation test report, showing time and date of test, wiring standard, installed cable length, pass/fail result and location of site tested.

All test results for display textually and graphically along with cable length, wiring standard, V.P, an outlet address and smart remote ID number, audible pass/fail tone is emitted by the main unit with a red/green pass/fail LED on the remote unit.

When plugged into an active port it will emit an audible tone if telephone voltages are present on any of the pins and will identify 10 base T. Token Ring and 100 Mbit connections and inhibit testing, in the presence of live circuits an inbuilt tone generator can be selected for cable tracing.

Features:

- Stores up to 1,000 test results
- Complete with software for download to PC and generating test reports
- Rugged case design rated to IP54
- Scratch resistant front screen
- 128x64 Electro luminescent backlit display
- Detects open circuits, shorts, crossed wires, crossed pairs, reversed pairs, split pairs and screen faults
- Measures length of all 4 pairs and indicates distance to fault
- Tone generator for cable tracing
- Supports up to 16 uniquely numbered smart remote units

2.2 LanCaster Features

1 RJ45 Input connector
2 Graphical L.C.D
3 Service button
4 Length test button
5 Wire map test button
6 Address settings
7 Back light button
8 Power on/off button
9 Remote ID button
10 Pass/fail test BI colour L.E.D

Buttons 3 to 6 have the following functions, when menu is selected

5-To scroll cursor arrow
3-To increment setting
4-To decrement setting
6-Return to menu

SECTION 3 - SPECIFICATIONS

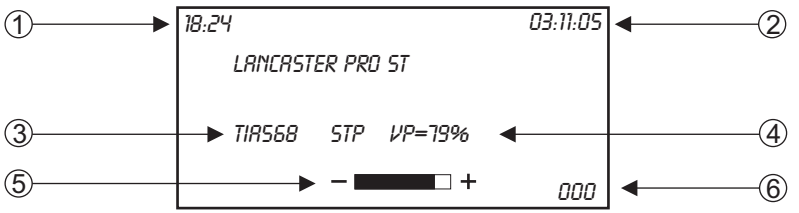
Range:	500 ft (150m)
Accuracy:	±5%
Cable Types:	UTP, STP, FTP & SSTP
Faults Indicated:	Short Circuit Pair Open Circuit Wire Short Between Pairs Split / Cross Pairs Pair Reversals Shield Continuity
Fault Location:	Near End, Remote End, or distance if midway
Wiring Schemes:	TIA 568A/B, USOC & ISDN
Service Indication:	Telephone, 10BaseT, 100Mbit+, Token Ring
Voltage Warning:	Warns of TNV (Telecom Network Voltage) presence
Test Inhibit:	Inhibits Testing in the presence of live voltages
Tone Generator:	Tone generator (oscillating) 810Hz - 1110Hz
Battery indicator:	"Gas Gauge" Bargraph
Main Unit Display:	128 x 64 pixel Graphical LCD
Fault Display:	All fault and setting info displayed textually and graphically
Display Backlight:	Electroluminescent
Remote Display:	Green/Red LED
Languages:	English (USA and UK), German, French, Spanish, Portuguese, Italian
Power Supply:	4 x 1.5V AA alkaline batteries
Auto Power Off:	Selectable, disabled 1, 2, 3 minutes or disabled

Battery Life:	Standby mode >4000hrs Continuous testing >7.5hrs
Storage Temperature:	-20 to 70°C (-4 to 158°F) 5 to 95% RH non-condensing
Operating Temperature:	0 to 40°C (32 to 112°F) 5 to 95% RH non-condensing
Main Unit Weight:	350g (12 oz)
Main Unit Dimensions:	165 x 90 x 37mm (6.5 x 3.5 x 1.5”)
Remote Weight:	40g (1.5 oz)
Remote Dimensions:	65 x 52 x 25mm (2.5 x 2.0 x 1.0”)
Safety:	IEC61010-1
EMC:	EN61326-1
CE:	Compliant with current EU directives
ESD:	EN61000-4-2
EM:	EN61000-4-3
Burst:	EN61000-4-4
Conducted RF:	EN61000-4-6

SECTION 4 - FIRST OPERATIONS

4.1 Prepairing Lancaster Pro ST For Use

Press button ● to power the tester, the following screen will be displayed



1 Time in 24 hour clock
2 Date DAY:MONTH:YEAR
3 Wiring Configuration
4 V.P (Velocity of propogation)
5 Battery condition Indicator
6 Number of test results stored (max 1,000)

The following parameters will need to be set prior to use (refer to 4.2 for menu locations)

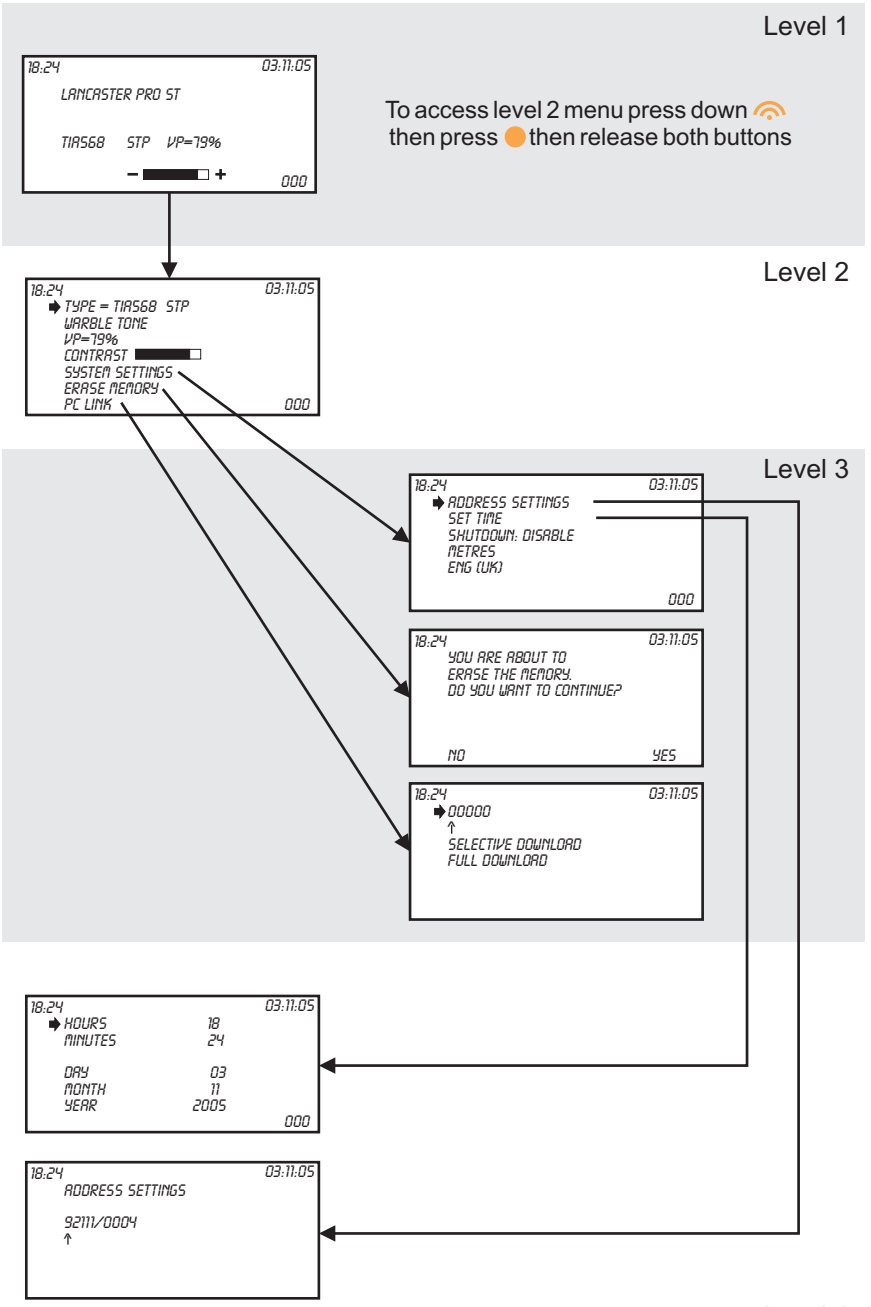
1-2 The Lancaster Pro ST time and date is set at G.M.T (Grenwich Mean Time). Prior to use the Lancaster Pro ST may need to be reset to “local time”, during the course of the year, it will need to be reset for day light saving
To change Time/Date see section 4.3

3 Wiring configuration see section 4.4

4 Set velocity of propogation for cable type and manufacturer see section 4.5 and 4.11

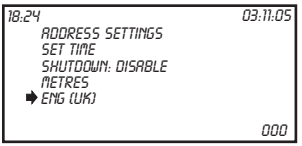
5 Set address settings see section 4.6

4.2 Menu Achitecture



4.3 Set Language

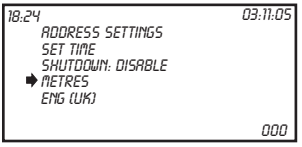
Menu Level 4



Press ● to move ➡ to display language. Press S or L to change between English (UK or USA), French, German, Italian, Spanish or Portugese. Press to return to menu

4.4 Unit of Measure

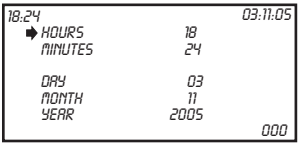
Menu Level 3



Press ● to move ➡ to displayed unit. Press S or L to change. Select for feet or meters, press to return to menu

4.5 Set Time and Date

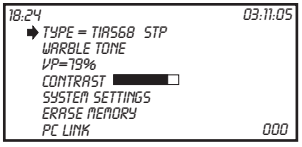
Menu Level 4



Press ● to move ➡ to desired position. Press **S** and **L** to incremen or decrement. When time and date are set correctly press to return to menu

4.6 Set Wiring Type

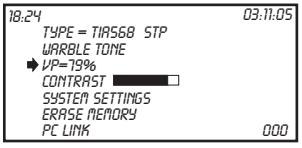
Menu Level 2



Press ● to move ➡ to type. Press **S** or **L** to select type "TIA568 UTP, USOC STP, USOC UTP, ISDN, when desired type is displayed, press to return to menu

4.7 Set Velocity of Propogation (VP)

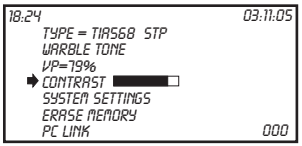
Menu Level 2



Press ● to move ➡ to V.P. Press **S** or **L** to increment or decrement value selectable between 50% and 99%, when required value is shown. Press to return to menu. See also section 4.11

4.8 Adjust Contrast

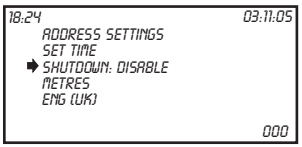
Menu Level 2



Press ● to move ➡ to contrast. Press **S** or **L** to increase or decrease contrast. Press to return to menu

4.9 Set Auto Shutdown

Menu Level 3



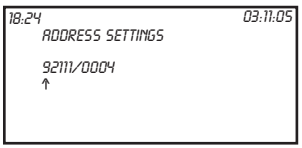
Press ● to move ➡ to shutdown. Press **S** or **L** to select between disabled 1, 3, 5 minutes. Press to return to menu

4.10 Address Settings

Menu Level 4

The Lancaster Pro ST will store up to 1,000 test results, each result is stored under a unique 9 character "address", these nine characters are divided into two groups (-----/----). The first comprises of five characters which may be used in a combination of alpha (A-Z) or numeric (0-9) allowing identification of customer, building, floor, number or cabinet etc. The last four characters are numeric only (0-9) for port identification and will automatically increment for each test result saved. The numbering sequence may be commenced at any number within the range 0001 to 9999. During testing the address may be amended prior to saving (see section 5.4(5).

The saved test results may be downloaded to PC using the software provided in selective or full download. Selective download will only transfer to PC those results that have been identified by the first five digits of the address. Full download will transfer to PC ALL stored results (refer to section 6) and section (4.10) to set address characters. Procede as follows:



Press ● to move ⬆. Press button **S** to decrement and button **L** to increment. Press to return to menu

4.11 Velocity of Propogation (VP)

Vp, or velocity of propogation, value are characteristic of each cable type and brand. The Vp is used to measure the length of a cable and to measure fault location. The more accurate the Vp, the more accurate the measurement result will be.

The Vp figure quoted when used will show a variation in length of each pair, this is caused by different twist ratios and conductor insulation, this difference is known as a skew. See section 5.6

The cable manufacturer may list the Vp on their specification sheet or may be able to provide it when asked. Sometimes this value is not readily available, or the user may wish to determine it specifically to compensate for each cable batch variations, or for special cable applications. This is quite easy:

1. Take a cable sample of exact length increment (ft of m) longer than 60ft (20m)
2. Measure the exact length of the cable using a tape measure
3. Connect one end of the cable to the Lancaster Pro ST . Leave the end un-terminated and make sure the wires do no short to each other
4. Measure the length and adjust the Vp until the exact length is displayed
5 When the exact length is displayed, Vp is established

SECTION 5 - USING THE LANCASTER PRO ST

5.1 TNV (Telecom Network Voltage) Testing and Warning

> ⚠ **The Lancaster Pro ST is designed to work on non-energized circuits only. Make sure that the circuit to be tested is not live before mapping.**

Turn the unit on and plug it into the port to be tested with a patch cord.

If a Telecom Network Voltage is present, the unit will give a continuous audible warning, and display the following:

! ! ! !
Telephone Voltage
detected on
Pin X
! ! ! !

NOTE: The pin on the RJ45 connection, on which the voltage is detected, is displayed.

> ⚠ **In the event of a TNV (Telecom Network Voltage) Warning, the unit should immediately be disconnected and testing stopped, since it is not designed for testing on live networks.**

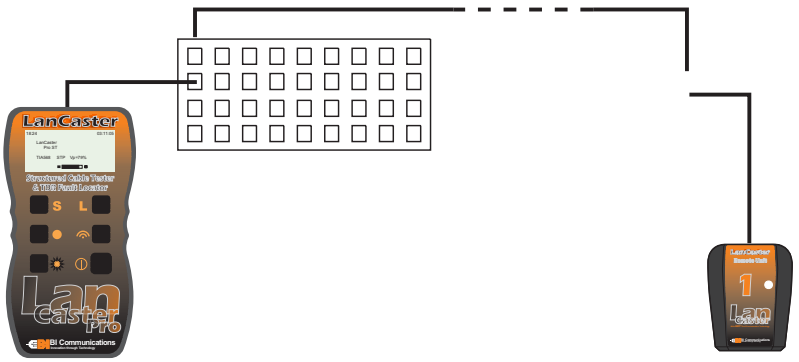
5.2 Service Detection

To detect an active data port, plug the unit into the port to be tested using a short patch cable and press the **L** button.

The display will show the type of data connection or service present from the following list:

Token Ring	10base T
100Mbit+	No Service
Unknown Service	

5.3 General Operation



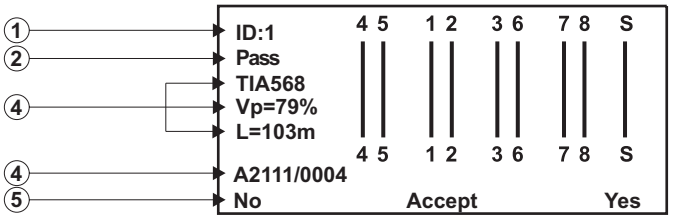
- Set the instrument to the desired VP and wiring scheme (see section 4.4, 4.5, 4.11).
- Make sure no Telecom Network Voltages or other services are detected (see 5.1).
- Attach the instrument to one end of the cable to be tested
- Attach the remote unit to the other end of the same cable
- Press the ● button.

The display will briefly show the following message while testing is being performed:

This screen is quickly followed by the test results screen.

- Test Pass/OK Screen
- Test Failed Screen

5.4 Test Pass/OK Screen



> **When testing ISDN wiring, any resistive terminators should be switched out of the circuit or disconnected. Failure to do so could lead to erroneous test results.**

The left side of the display shows information about the test performed and the status of the test result.

1 The first line shows the unique identity of the active remote unit connected to the far end (in this case, ID1). There are 15 additional active remote units available as optional accessories (ID#2 to ID#16).

2 The test status, **PASS** is indicated on the second line. A test PASS is confirmed by a double beep from the main unit and a double green flash on the LED of the active remote unit.

3 Next, information about the test type selected, along with a measured value of the cable length, and an indication of the current VP setting is displayed.

If a fault is found an appropriate message will be displayed, along with a warning tone on the main unit, and a red flashing LED on the remote unit.

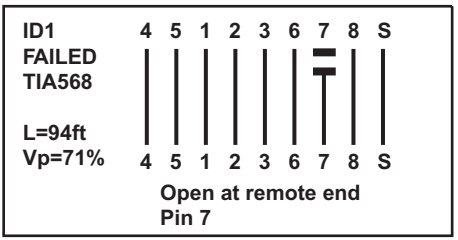
4 Shows the address identification which will be stored on acceptance.

5 Gives the option of storing the results under the number shown by pressing the button **L** or aborting by pressing button **S**. If **S** is pressed the option is given to change the address.

5.5 Test Failed Screen

5.5.1 Open and Short Fault

In the event of an **Open** fault, the following is displayed:

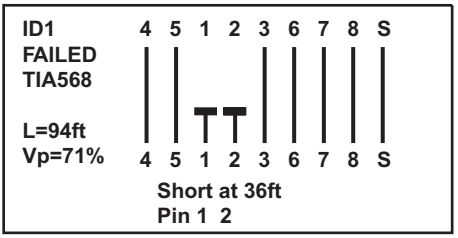


Notice the word **FAILED** under the cable ID1 and also the detailed message at the bottom of the display.

The graphical portion of the display also shows that the fault is an open on pin 7 at the remote end by showing a break in the line at this point.

> **NOTE:** In the event that an open or short circuit fault occurs at either end of a cable or link under test, the unit will show the fault as at the near end or the remote end. These faults are the most common and are mainly due to termination problems.
>
> If the fault occurs some way along the cable or link under test, then a display similar to the one shown below will occur. Notice, that on this occasion the actual measured distance to the fault is given.

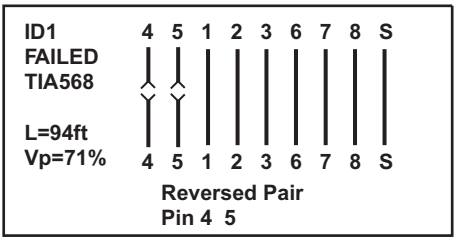
In the event of a **Short** fault, the following is displayed:



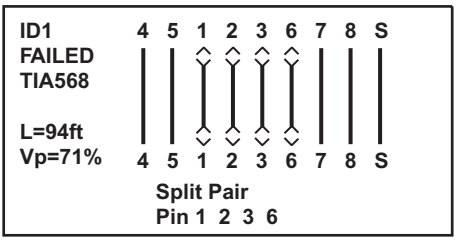
In this situation, the graphical portion of the display also shows that the fault is a short between pins 1 and 2 and the short is drawn at an approximation to the distance along the cable or link under test, at which it occurs.

5.5.2 Reversed and Split Pair Fault

In the event of a **Reversed Pair** fault, the following is displayed:



In the event of a **Split Pair** fault, the following is displayed:



NOTE: For cables less than 6 ft (2m) in length the tester is unable to distinguish a Split Pair condition.

In this event (cable too short), the following screen is displayed briefly, before the screen to warn the user that a Split Pair test has not been carried out.

5.5.3 Multiple Faults

In the event of a multiple fault, or a cable or link with more than one fault on it, the tester will report the faults in the following order of priority.

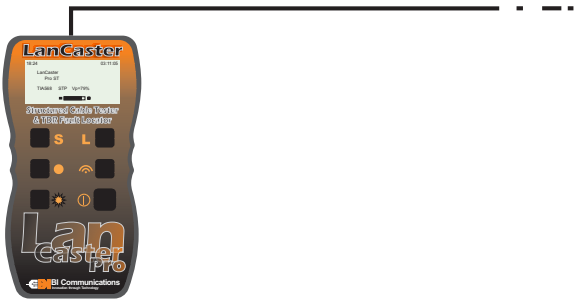
- Shorts
- Reversals
- Opens

For example, on a cable with an Open on pin 3 and a Short between pins 7 and 8, only the Short in pins 7 and 8 will be reported.

5.5.4 Missing Remote

If a wire map test is performed without a remote unit connected at the far end, the following screen will be displayed:

5.6 Cable Length Measurement



> **The remote unit does not need to be attached for this test to be performed. Although it does not matter if it is attached, any terminators on ISDN wiring or sockets should be switched out of the circuit or disconnected.**

Attach the main unit to one end of the cable and press the **L** button.

The length of all four pairs in the cable are measured, and the results displayed simultaneously, as shown below.

Pr.	**4-5**	**100m**
Pr.	**1-2**	**102m**
Pr.	**3-6**	**-----**
Pr.	**7-8**	**106m**

TIA568 UTP Vp=71%

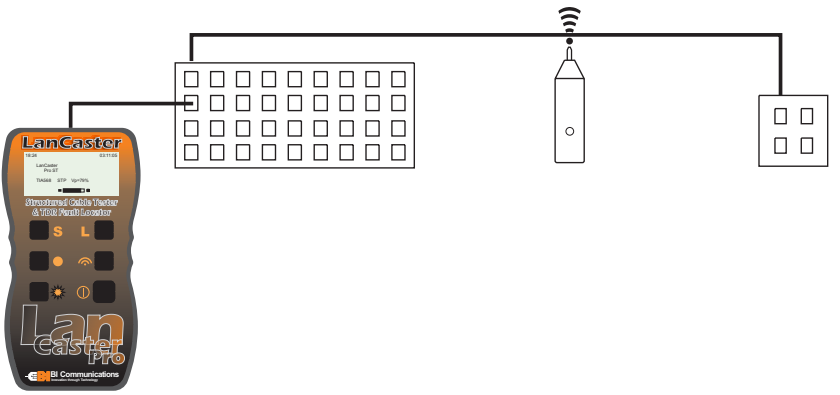
In this example, the length of pair 3 - 6 is missing, as there is a fault on the pair which is preventing the TDR circuit from measuring the length.

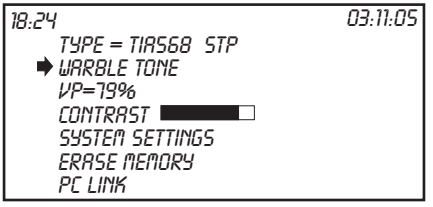
Length will be displayed in the selected units, either meters or feet, and the Vp and cable testing standard will also be displayed. Length measurement accuracy depends on the correct setting of the Vp (Velocity of Propagation) for the cable under test.

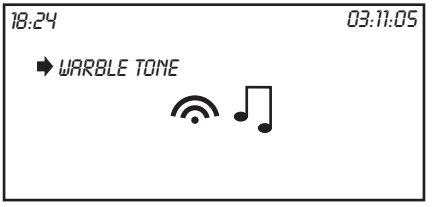
If the Vp is not known for a particular cable, then a known length of that cable (at least 60ft or 20m long) may be connected to the instrument and the Vp adjusted until the correct length reading is obtained (see 4.11).

5.7 Tone Generator

The LanCaster may also be used as a tone generator, to trace and identify cables and wires. The user will need a cable tone tracer.







To select Tone Generator : Menu level 2. Press ● to move ➡ to Warble Tone, press L to select. The warble tone screen will be displayed. To exit press

The injected signal oscillates between 810Hz and 1110Hz, six times per second.

NOTE: The auto-off function is disabled in Tone Generator mode, so that the tone can be injected into a cable for an extended period of time while tracing takes place.

5.8 Backlight

The display backlight is switched on and off with the ✹ button.

SECTION 6 - DOWNLOADING TO PC

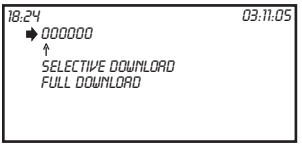
6.1 Linking Lancaster Pro ST to PC

Prior to commencing the operation, read section 3, using the application. Fit RS232 to RJ45 adaptor into the PC serial port using the longer RJ45 patch lead, plugging one end into the adaptor, the other into the RJ45 input connector on the Lancaster Pro ST main unit

ENSURE THE PC IS PREPARED AND READY TO ACCEPT TEST RESULTS

6.2 Selective Download

Menu Level 3



Press to move cursor ➡ **S** and **L** buttons will increment and decrement digits (0-9, A-Z). When the desired combination has been entered press

Press button ● to move ➡ to selective download.
Press **L** to commence download.

6.3 Full Download

Follow procedure in 6.1. Press ● to move ➡ to full download, press **L** to commence download

For both 6.2 and 6.3, progress of the download may be monitored on the PC. Download time will vary according to the number of results stored

6.4 Erasing Lancaster Pro ST Memory

Menu Level 3

WHEN THIS FUNCTION HAS BEEN COMPLETED, ALL STORED TEST RESULTS WILL BE DELETED. ENSURE RESULTS HAVE BEEN SAVED TO PC OR ARE NO LONGER REQUIRED. ONCE ERASED THEY CANNOT BE RECOVERED

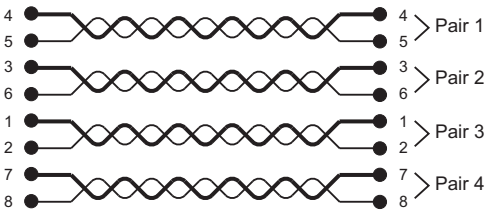
Press **L** to erase memory, press **S** to abort, press to return to menu

SECTION 7 - WIRING PROTOCOL

The following drawings are examples depicting cable faults:

CABLE OK (OK)

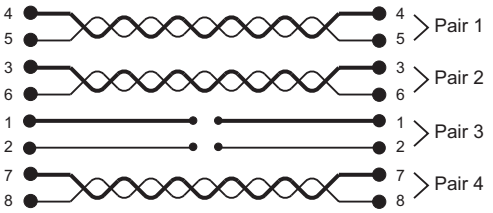
Cable is good.



Message: Cable OK

OPEN PAIR (OP)

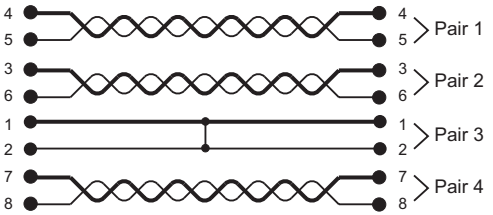
One specific pair is open. It may be one or two wires in the same pair. One or more pairs may also be opened in the same cable.



Message:
Open at Near End or Remote End
Pin 1 2

SHORTED PAIR (SH)

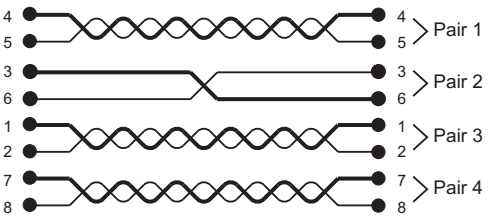
One specific pair is shorted.



Message:
Short at Remote End or Near End
Pin 1 2

REVERSED PAIR (RP)

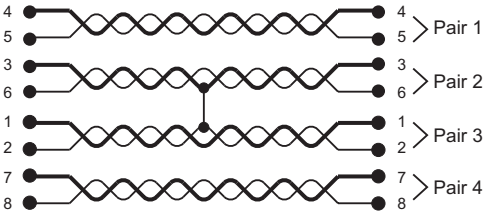
The wires in one specific pair are Reversed at one end.
One or more pairs may be reversed in the same cable.



Message:
Reversed Pair
Pin 3 6

SHORTED WIRES (SW)

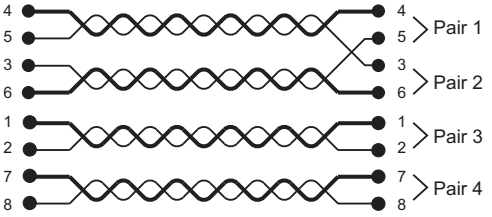
Two wires from different pairs are shorted.
Two or more wires and pairs may be affected in the same cable.



Message:
Short at Remote End or Near End
Pin 2 3

CROSSED WIRES (CW)

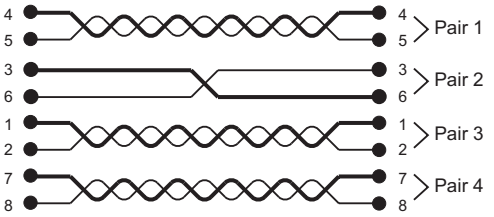
Two wires from different pairs are crossed at one end.
Two or more pairs may have wires crossed with another pair.



Message:
Crossed Wires
Pin 3 5 at Remote End or Near End

CROSSED PAIRS (CP)

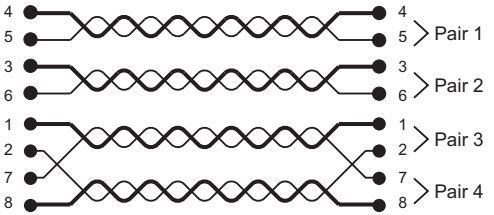
Two pairs are crossed at one end.
Two or more pairs may be crossed in the same cable.



Message:
Crossed Pairs
Pin 1 2 7 8

SPLIT PAIRS (SP)

One pair uses one wire from another pair. The cable will work, but cross-talk may occur. Two or more pairs in the same cable may be split.



Message:
Split Pairs
Pin 2 7

SECTION 8 - MAINTENANCE

Use only factory specified replacement parts. BI Communications Ltd will not be held responsible for any accident, incident, or malfunction following a repair done other than by its service centre or by an approved repair centre.

8.1 Changing the Battery

⚠ **Disconnect the instrument from any cable or network link.**

1. Turn the instrument OFF.
2. Loosen the 2 screws and remove the battery compartment cover.
3. Replace the batteries with 4 x 1.5V AA alkaline cells, observing the polarities.
4. Reattach the battery compartment cover.

8.2 Cleaning

⚠ **Disconnect the instrument from any source of electricity.**

- Use a soft cloth lightly dampened with soapy water.
- Rinse with a damp cloth and then dry with a dry cloth.
- Do not splash water directly on the instrument.
- Do not use alcohol, solvents or hydrocarbons.

8.3 Storage

If the instrument is not used for a period of more than 60 days, it is recommended to remove the batteries and store them separately.

SECTION 9 - LANCASTER PRO ST SOFTWARE

9.1 Introduction

This manual covers all aspects of the application. From installing, configuration and using the application, which, uses HTML/MHTML formatted results. This means that you don't have the have the latest office. It will run on older internet explorers.

The comprehensive addressing system on the LanCaster can be configured to identify different job or customers. This gives you the ability to store more one than, job or customer on the Lancaster Pro ST. The address setting on the Lancaster Pro ST corresponds to the Port identification on the PC application.

9.2 Requirements

Minimum requirements:
Processor Pentium 3 500Mhz or AMD K6 equivalent
Ram: 64 Mbytes
Operating system: windows 98, ME, XP or 2K

Other requirements:

- Internet explorer, Mozilla or Netscape navigator
- Internet explorer can be found at www.microsoft.com/ie
- Mozilla can be found at www.mozilla.org/products/firefox/
- Netscape navigator can be found at browser.netscape.com/ns8/

- Serial port.

SECTION 10 - INSTALLATION

10.1 To install Lancaster Pro ST on your System

There should not be the need to reconfigure your computer. However: if you need to change the port the manual will describe how to do this in section 14.

For some windows system's administrative access is required in order to install the software on the PC.

If set up does not start automatically then, click on the set up icon. And follow the installation process.

There are two major steps in the install process, and some choices.

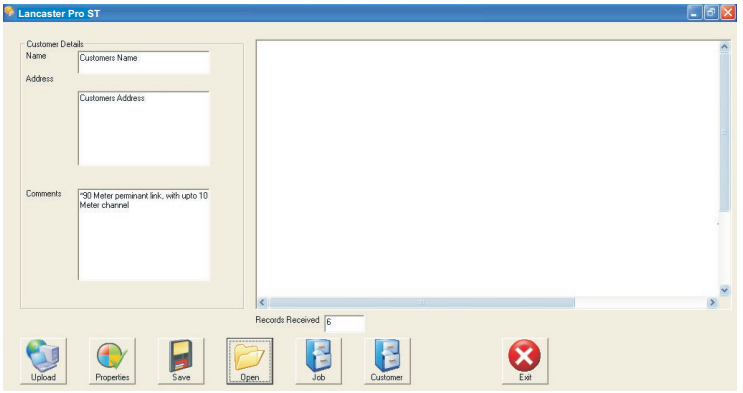
- You can the enter the ownership detail's, but there is no real need for this information
- You can change the directory, where the program will be stored

Click on finish to complete the installation

10.2 Running Programmes

Double click on the icon shortcut on the desktop, or select **Start>Programs>LanCaster**

The following screen will be displayed:



Click on **properties> bitmap** and select the bitmap that you desire, click Ok. Default C:\Program files\Lancaster Pro ST\bitmap.bmp

SECTION 11 - USING THE APPLICATION

11.1 Introduction

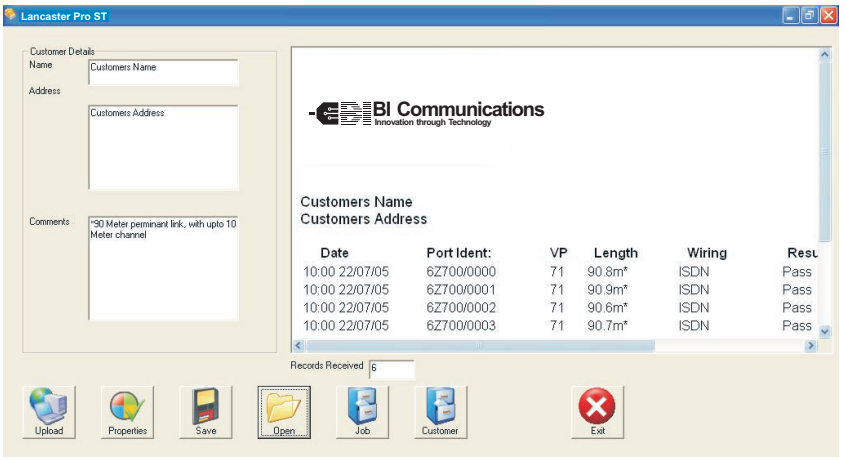
This chapter will describe how to use the application. If no results are stored, and download is attempted, the following message may be displayed, “Run Time 9 error”

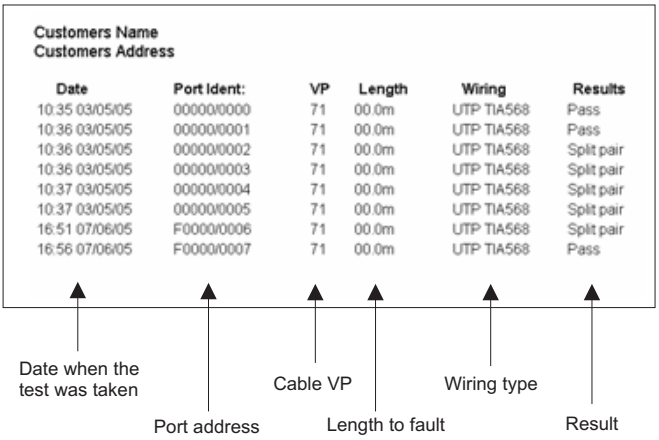
11.2 Downloading results to PC

Ensure the Lancaster Pro ST is correctly connected to the PC, see section 6.1

Commence download by clicking onto the upload button then press button L on the Lancaster Pro ST, see section 6.2 and 6.3

As the records download a progress bar will appear. And disappear, when the download has been completed. The main window will now show the new results. The number of test results received will be shown in the window above the tool bar.



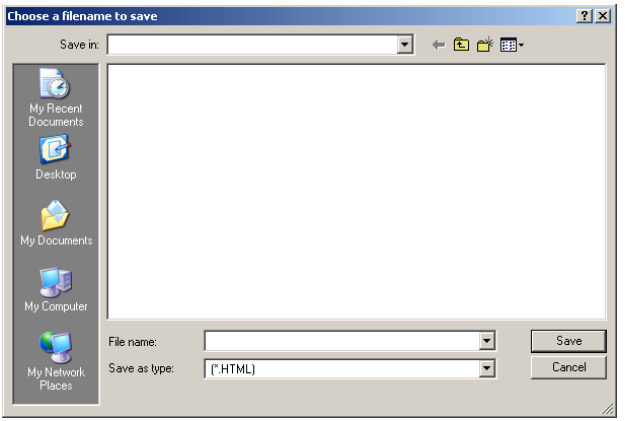


NB: The Port identification on the PC corresponds to the application address setting on the Lancaster Pro ST

SECTION 12 - SAVING RESULTS TO A HTML/MHTML FILE

Change the customer details. And press the 'Save' button.

This is will open a pop window, where you can select the directory. Choose the place, where you want the file to be stored. This allows you to store anywhere on your computer or your network.



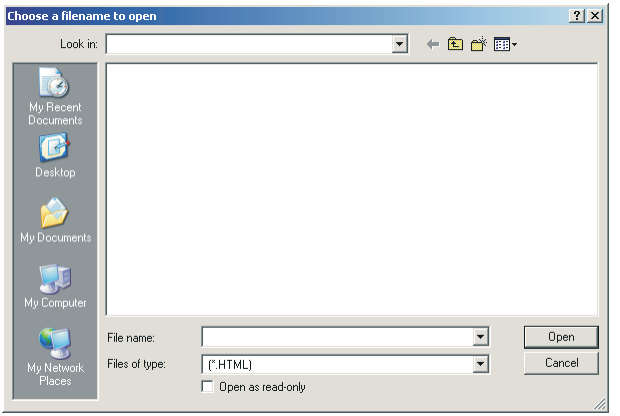
12.1 Sending files electronically

You have downloaded your results, and saved them. Now you want to email them to your clients.

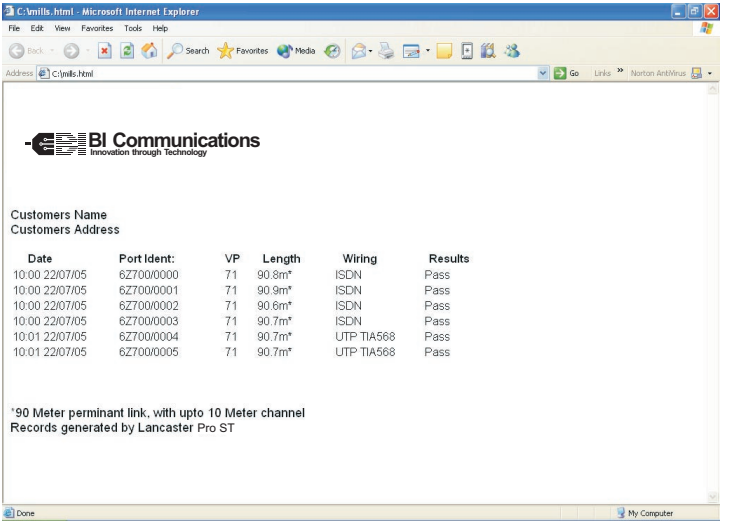
Select the MHT format. This will embed the image into the page.

12.2 Opening a file to print

Previous results can be viewed, in a HTML/MHTML viewer, for example: Internet explorer. Press the 'Open' button.



From here you can select the file and view it.

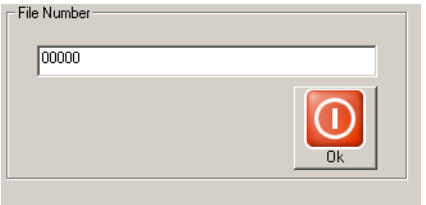


12.3 Using Job and Customer buttons

These features are to be used in conjunction with the Lancaster Pro ST.

Addressing by job

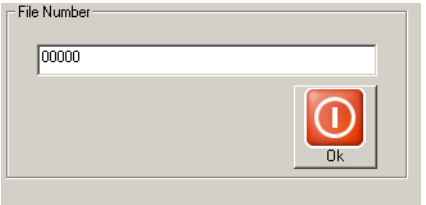
Depending which way you have configured your Lancaster Pro ST, this will determine which button you need press. To explain; the first five digits in address/port identification represent a job number, and next four would represent each of the results.



Fill the job number, in box. Then the 'Ok' button and the desired results will appear in the box on the right.

Addressing by Customer

The first digit represents the customer Identification, and next two would represent the floor number, the next two cabinet, the next four represent the port number.



Fill the job number, in box. Then click on the 'Ok' button and the desired results will appear in the results window on the right.

SECTION 13 - PROPERTISE

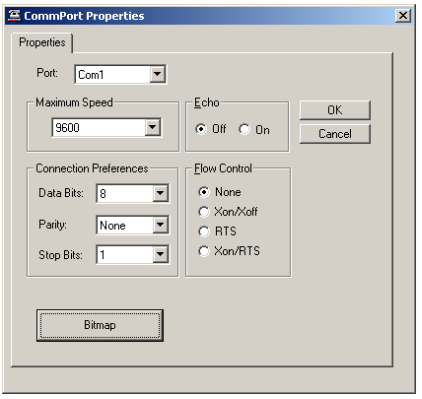
13.1 Introduction

In this short section, we will discuss com port settings. The bitmap can be changed to your company heading in HTML/MHTML.

13.2 Settings

Some computers have more than one communications port. In order to compensate for multiple ports, a properties window is provided by clicking on the properties icon.

This will enable you to change the port number to the port that the RS232 to RJ45 is connected to. Only the highlighted should be changed.



13.3 Changing the bitmap

The give the reports a sense of individuality, the application provides an opportunity to change the heading of the HTML/MHTML file. To give an idea of how to do this here two are suggestions.

? Open your website, and save the company logo to a directory. Press the 'Bitmap' button. And select the bitmap that you have just saved.

? Press the 'Bitmap' button. And select the bitmap of your choice.

? On completion of this operation, the logo permanently stored

SECTION 14 - TROUBLESHOOTING AND FREQUENTLY ASKED QUESTION

Question: Can I change the picture, in HTML/MHTML view?

Answer: Yes, change the bitmap.bmp in the program folder.
The default location for the program is: C:\Program Files\Lancaster Pro ST.
The bitmap can be edited in the paint program.

Question: I don't have serial ports; can I still use the Serial to RJ45 lead?

Answer: If you have USB port, then a serial to USB lead is available to connect the LanCaster.
You may have to change the port setting, in setting properties. To set this Right click on the **'my computer' > properties > hardware > device manager > ports > com port > properties > advanced setting** change to port 1.USB to Serial RS232 cable has to be connected with RS232 to RJ45 cable to link PC and LanCaster. When USB connection inserted the Windows will look for the driver. The driver provided by the cable supplier.

Question: I connected to the LanCaster to the PC and followed the steps to upload Procedure, but after awhile, I get an error message box "Run Time 9" what is wrong?

Answer: The most likely solution is that there are, no results stored in the LanCaster, or that the results are not getting through to the PC. Make sure that the port settings are correct.