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TX125

User Manual

telettech

TX125

User Manual



TX125 User Manual
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**To avoid injury read “Safety Information” and
“Warnings and Precautions” before using this
instrument**

1. Introduction

The TX125 consists of three hand held instruments that enable a sole operator to carry out a comprehensive series of tests to determine whether the cable under test can support high frequency systems such as Pair Gain, ISDN and xDSL.

Line performance is determined by injecting known signals and measuring the effect of the line on them.

2. Safety Information

Safe Working Practices

Review the safety information and adhere to the safe working practices described in this manual and elsewhere.

Protection may be impaired if the instruments are used for purposes other than described in this manual.

In this manual:

WARNING identifies conditions and actions that pose hazards to the user.

CAUTION identifies conditions and actions that may damage the instrument or the equipment under test.

The symbols used on the instrument and in this manual are:

	Safety Information, Refer to Manual
	Conforms to European Union Directives
	Earth Ground
	Battery

Table 1 Symbols

2.1.1.1.1. Warnings and Precautions



To avoid possible electric shock or personal injury, and to avoid possible damage to the instrument or to the equipment under test, adhere to the following practices:

- This equipment is to be used by trained operators only. Use caution when using this equipment. Voltages in excess of 30Vac or 42Vpeak or 60Vdc may be present on lines being tested. These voltages pose a potential shock hazard.
- Before using the equipment inspect the case. Do not use the equipment if it is damaged. Look for cracks in the case or missing parts. Pay particular attention to the insulation around the connectors.
- Inspect the test leads for damaged insulation or exposed metal. Check the test leads for continuity. Replace damaged test leads before using the equipment.
- Verify the equipment operation by measuring a known value. Do not use the equipment if it operates abnormally. Protection may be impaired. When in doubt have the equipment serviced.
- Do not apply more than the rated voltages to the equipment.
- Use the correct connections and functions for your measurements.
- When connecting the test clips be sure to keep your fingers away from potentially live metal parts.
- Take extra care when performing the Insulation Resistance test. There is nominally 500 volts applied to the Pair Under Test (PUT). Ensure you warn others when this is being carried out.
- Ensure that the equipment is removed from the PUT before opening the case. Do not operate the equipment with the case opened.

- Use the recommended battery only. Ensure it is installed correctly.
- Replace the battery as soon as the BATTERY FLAT message is displayed.
- When servicing the instrument, use only certified replacement parts.
- Breaking electrical connections may generate sparks. This instrument is not to be used in areas in which flammable gases exist, or may exist.

3. General Description

The TX125 consists of three units:

- Controller
- Remote
- Probe

Testing is controlled from the Controller. The Controller also displays and stores the test results.

The Remote places signals on the Pair Under Test (PUT) and terminates the Pair Under Test as commanded by the Controller.

The Probe is used to detect the ID tone placed on a PUT by the Remote.

The Remote and Controller have a two line by sixteen character alphanumeric LCD display for menu operation and results display. A membrane keyboard is used to select and start operations. A beeper provides audible feedback.

Each unit is powered by a 9V alkaline battery and utilises circuitry designed to maximise battery life. The Remote may also be powered from the 48V Exchange Battery.

3.1. Measurements and Functions

The TX125 performs the following measurements:

- Line AC and DC Voltage
- Insertion Loss over the [frequency](#) range of 50Hz to 2MHz with any available line termination
- Insertion Loss over user selected frequency ranges with multiple steps and any available termination
- Longitudinal [Conversion Loss \(Line Balance\)](#)
- Far and Near End Crosstalk (FEXT & NEXT)

- Loop Resistance
- Insulation Resistance (at nominally 500VDC)

The TX125 has the following functions:

- User defined sets of tests called Sequences
- Control of the termination of the Pair Under Test (PUT) at the exchange end: Open, Looped and terminated
- Pair Identification
- Store and View test results
- User Configuration of Date and Time, Date Format, Auto Termination and PC Connection

3.2. Remote

The Remote is the TX125 unit located at the exchange end of the line. It is controlled via commands from the Controller.

It contains the following subsystems:

- A calibrated signal source (50Hz to 2.000MHz)
- A line identification source - ID tone
- A set of line terminators: 100 Ω , 120 Ω , 135 Ω , 600 Ω , 900 Ω , TN12
- Exchange end connection switching (Exchange to PUT, PUT Open, PUT Looped and PUT terminated)

Up to three Remote's may be attached to the same PUT. Each is independently controlled by the Controller.

The address of a Remote is selected at the Remote only.

To extend battery life, the Remote automatically switches to low power, line monitor mode, a few seconds after completing the last function.

3.3. Controller

The Controller is the TX125 unit located with the operator.

It contains the following subsystems:

- Measurement instruments - AC and DC Voltmeter; Narrowband Voltmeters; Ohmmeter and Insulation Resistance Meter; Balance (Longitudinal Conversion Loss) Meter
- A calibrated signal source for Near End Cross Talk (NEXT) measurement (50Hz to 2.000MHz)
- A set of line terminations: 100 Ω , 120 Ω , 135 Ω , 600 Ω , 900 Ω , TN12 complex

To extend battery life, the Controller automatically switches off two minutes after the last keystroke or completion of a test sequence.

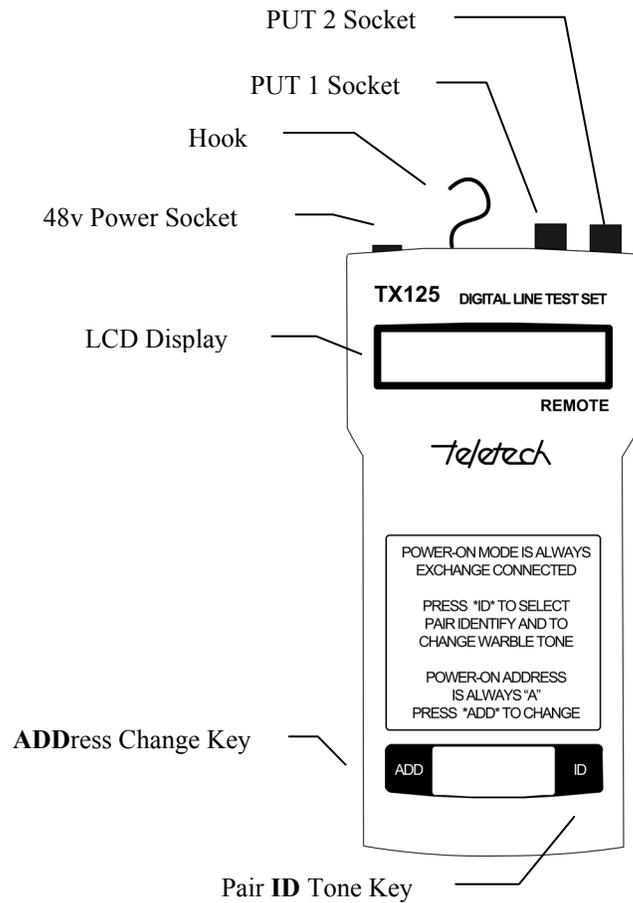
3.4. Probe

The Probe, in conjunction with the Remote, is used to identify the PUT.

The Probe only operates when its ON key is pressed.

4. The Remote

4.1. Features



4.2. Power On

The Remote is switched on by inserting the Line 1 test lead. It remains on while the test lead is inserted.

After power on the following message is briefly displayed:

```
T e l e t e c h   T X 1 2 5 R
S o f t w a r e   v e r   x x
```

Where: **xx** is the software version.

The display then briefly changes to:

```
c o p y r i g h t ( c )
2 0 0 2   T e l e t e c h
```

Then the battery is checked. The following message is briefly displayed:

```
B A T T E R Y   I S   n n n n
```

Where:

nnnn is either HIGH, GOOD, LOW or FLAT.

Caution !

Please replace batteries when the display shows FLAT.

After a few seconds the display changes to:

```
E X C H   C O N N E C T E D
A D D R E S S   n
```

Where:

n is either A, B or C.

The Remote now waits for commands from its keyboard or the Controller.

Caution !

To maximise battery life, remove Test Lead 1 after use.

4.3. Test Leads

Remotes are supplied, as standard, with the following test lead sets:

Line 1: Blue coloured multi-pin connector with two blue wires, two red wires and a white wire. All wires are 1 metre long and are terminated with alligator clips.

Line 2: Blue coloured multi-pin connector with two yellow wires. All wires are 1 metre long and are terminated with alligator clips.

The Line 1 Test lead is used to turn the Remote on and off.

Other test lead options are available and are listed in Appendix E. Except with the case of the alligator clip lead, the connections to the pair under test are made by inserting a polarised isolating plug into a connector block.

4.4. Test Lead Connections

At the Exchange MDF, remove the jumpers between exchange side and customer side. Connect the red leads to the exchange side and the blue leads to the customer side. Connections are not polarity sensitive.

4.5. 48 Volt Power Operation

When operating in an Exchange, the Remote may be powered from the exchange battery using the optional power lead. See Appendix E.

4.6. Sleep Mode

When the Remote is idle (not doing a test or generating an ID tone) battery life is extended by forcing some circuits into a low power sleep mode. The display stays alive. Sleep mode is activated approximately ten seconds after power-on, a keypad key release, the completion of a test or the reception of a valid message from the Controller.

4.7. Remote Operating Modes

4.7.1. Power On

When the Remote is first powered on (by inserting Line 1 test lead), it defaults to the EXCHANGE CONNECT mode. The Pair Under Test (PUT) is connected through to the Exchange line.

The following message is displayed:

EXCH CONNECTED
ADDRESS n

4.7.2. ID Tone

Pressing the **ID** key causes the Remote to place the ID tone on the PUT.

The following message is displayed during this time:

SENDING ID TONE
ADDRESS n

Press the **ID** key again to return to Exchange Connect.

4.7.3. ADDRESS

The Remote's address is changed, while the Address is being displayed, by repeatedly pressing the **ADD** key to sequence through each possible address (A, B or C).

If the address is not currently being displayed, press the **ADD** key to show the address and then press **ADD** repeatedly to select the desired address.

4.7.4. Remote Display States

As an operational aide, the Remote displays its operating mode. In addition to those already shown, the displays are:

```
SHORT  CIRCUITED
ADDRESS  n
```

```
OPEN  CIRCUITED
ADDRESS  n
```

```
LOSS TESTING
f f f f mHz  t t t t
```

```
BALANCE TESTING
ADDRESS  n
```

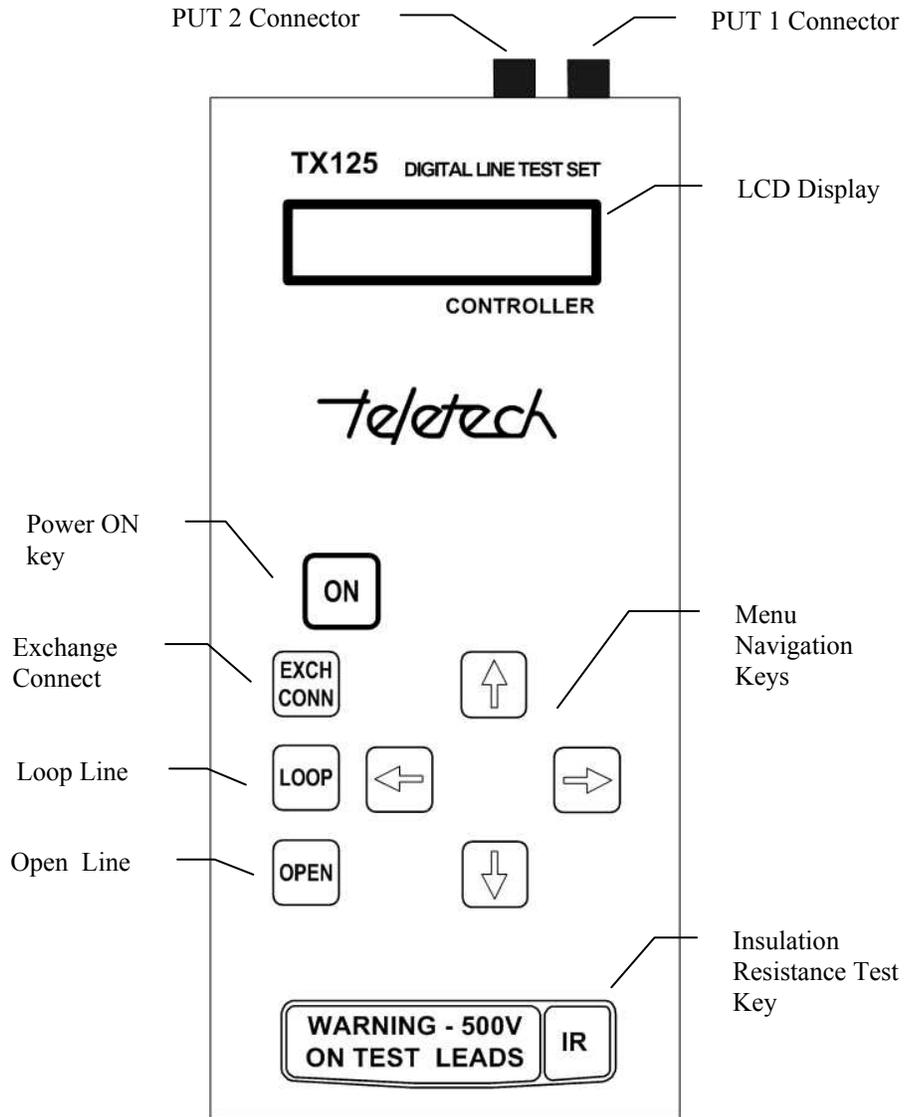
```
CROSSTALK TEST
f f f f mHz  t t t t
```

Where:

- ffff** is the frequency
- m** is the frequency multiplier (blank, K or M)
- tttt** is the termination setting at both ends of the line
- n** is a character A, B or C

5. The Controller

5.1. Features



5.2. Power On/Off Sequence

The Controller is switched on by inserting the Line 1 test lead and pressing the **ON** key. It is manually switched off by removing the Line 1 test lead. It automatically powers off approximately 2 minutes after the end of the last test or key press. The Controller will not automatically power off when in PC Connect Mode.

After Power On the following message is briefly displayed:

```
T e l e t e c h   T X 1 2 5 C
S o f t w a r e   v e r   x x
```

where **xx** is the software revision.

The display changes briefly to:

```
c o p y r i g h t ( c )
2 0 0 2   T e l e t e c h
```

The battery is checked and its state is indicated briefly as:

```
B A T T E R Y   I S   n n n n
```

Where:

nnnn is either HIGH, GOOD, LOW or FLAT

Caution !

Replace batteries when the display shows FLAT.

If the Controller has been set to an address other than A, the following message is briefly displayed:

ADDRESS n

Where:

n is either B or C.

The display then toggles between the following two states until a key is pressed. It is assumed the last test before power off was VIEW STORE.

Main Menu display is:

MAIN MENU	↑ ↓
VIEW STORE	→

Date and time display is:

26 / 11 / 01	12 : 06
VIEW STORE	→

When a key is pressed the display changes to:

MAIN MENU	↑ ↓
VIEW STORE	→

The display stays in this state until a key is pressed or the Controller powers off.

5.3. Controller Battery Check

The Controller checks the state of it's and the Remote's battery at the end of every test. If the Remote's battery is low or flat, the following message is displayed:

	R	E	M	O	T	E		B	A	T	T	E	R	Y	
	I	S		n	n	n	n								

Where:

nnnn is either LOW or FLAT.

Press any blue coloured key to clear this message.

5.4. Controller Address

The Controller's address must be the same as that of the Remote it is controlling i.e. A, B or C. The Controller remembers the address it was last set to.

5.5. Test Leads

Controllers are supplied, as standard, with the following test lead sets:

Line 1: Grey coloured multi-pin connector with two blue wires and a green wire. All wires are 1 metre long and are terminated with alligator clips.

Line 2: Grey coloured multi-pin connector with two yellow wires. Each wire is 1 metre long and is terminated with alligator clips.

Test lead options are listed in Appendix E. Except in the case of the alligator clip lead, the connections to the pair under test are made by inserting a polarised isolating plug into a connector block.

5.6. Connecting to the PUT

Isolate the Pair Under Test (PUT) from any line or equipment on the customer side and connect the blue leads to the PUT and the green lead to ground. The blue lead connections are not polarity sensitive.

Caution !

The green lead must be connected to a good earth if the instrument is to return meaningful results for the Line Balance, Open and IR tests.

5.7. Controller User Interface

The four most commonly used tests (Exchange Connect, Loop, Open and IR) have a dedicated key to invoke them. The remaining tests require the user to select operation via a menu system.

5.7.1. Menu Concepts

The menu system is navigated using the four arrow keys:



The position in the menu system is given by the state of the display. For example:



Whenever the top line shows the name of a menu, such as “MAIN MENU” or “VIEW STORE”, the bottom line shows one item from that menu.

In general, the four keys have the following functions:

- The  key is used to: move into a test set up; to select a value to alter; to accept the chosen value or option(s); and to start a test
- The  key is used to either select a value to alter or to back out of a test or setup.
- The  and  arrow keys are used to move through menus and menu options and to increment and decrement values

5.7.2. "Blue" Keys

A Blue key is either coloured blue or is the IR key. Blue keys operate the Menu system. The only key that is not a Blue key is the **ON** key.

5.7.3. Terminating Tests

Any Blue key press terminates a running test and returns the display to the Main Menu.

When a test has finished running and the display is showing the results any Blue key press returns the display to the Main Menu.

5.7.4. Controller Menus

The Controller has four menu systems:

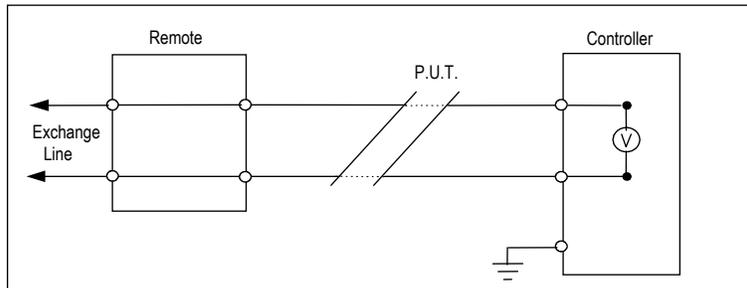
Main Menu	Sequences Menu	Set Up Menu
One Freq Loss	Sequence 1	PC Connection
Multi Freq Loss	Sequence 2	Serial Number
Line Balance	Sequence 3	Set Date/Time
Crosstalk	Set Auto Term
ADDR	Sequence N	Date Formats
Pair Id		
View Store		
Set Up		
Sequences		

Store Menu (example only)

other test results ←	Loss	Balance	IR	Loop	FEXT
	date/time	date/time	date/time	date/time	date/time
	freq&term	reading	reading	reading	freq&term
	reading		reading		reading

5.8. Exchange Connect

The PUT is connected through to the Exchange. The Controller measures the DC Line Voltage (A leg-B leg). Other test equipment may be used on the PUT and the Controller may be disconnected.



To Exchange Connect, press the **EXCH CONN** key.

The display changes to:

```
EXCHANGE CONNECT  
PROCESSING
```

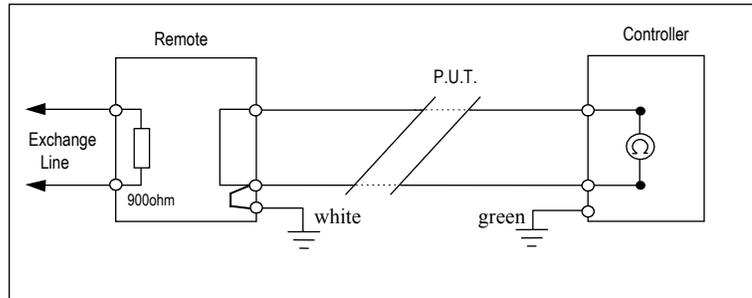
This message is displayed while the configuration is set up. The display then changes to indicate the DC voltage on the PUT:

```
EXCHANGE CONNECT  
LINE VOLTS - 49.8
```

The voltage is shown with one decimal place up to 99.9, then with no decimal places up to 400, then as “>400V” or “<-400V”.

5.9. Loop

The PUT is looped (short circuited) at the Remote. The Controller injects 1mA DC into the looped line to measure the Loop Resistance. The white wire at the Remote is shorted to the PUT to enable Resistive Fault Location Tests. With the Controller removed, other test equipment may be used on the looped line.



To Loop (short circuit) the PUT press the **LOOP** key. The display changes to:

```
LINE LOOPING  
PROCESSING
```

This message is displayed while the configuration is set up and the PUT resistance measured.

The display then changes to:

```
LINE LOOPING  
LOOPED      n n n n Ω
```

Where:

nnnn is the looped line resistance. It has a range of 0Ω to 3000Ω. Values greater than 3000Ω are shown as >3.0kΩ

The Loop Resistance is read every second and displayed until the Controller powers off automatically or another mode is selected.

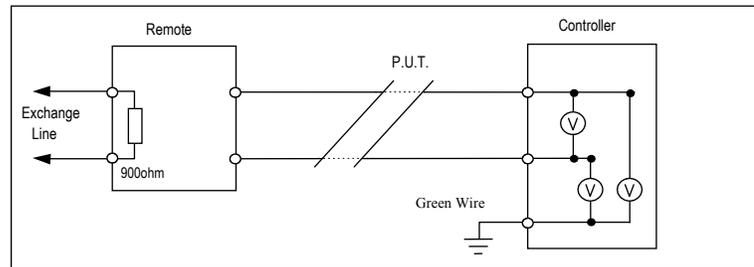
If a foreign battery is detected the PUT will not be looped. The following message is displayed:

FOREIGN BATTERY
LOOP NOT DONE

5.10. Open

The PUT is isolated from the exchange line and then open circuited. The exchange line is terminated with a 900 ohm resistor. The Controller measures, in turn, the six AC and DC Voltages: A leg-B leg; A leg-Ground; and B leg-Ground.

When the first voltage display appears, the PUT is open circuit at the Remote end and will stay open until set otherwise. Other test equipment may now be used on the open circuit line, and the Controller may be disconnected.



To open circuit the PUT at the Remote press the **OPEN** key.

The display changes to:

L I N E I S O L A T I O N
P R O C E S S I N G

This message is displayed while the configuration is set up.

The AC voltages on A-B, A-G and B-G are measured and progressively displayed:

A C v o l t s	A B = n n n n
A G = n n n n	B G = n n n n

Where:

nnnn is the AC Line voltage. Voltages are shown with one decimal place up to 99.9 volts. Then with no decimal places up to 275 volts and then as ">275V" for higher voltages

The DC voltages on A-B, A-G and B-G are measured and progressively displayed:

D C v o l t s	A B = n n n n
A G = n n n n	B G = n n n n

Where:

nnnn is the DC voltage. They are shown with one decimal place up to 99.9 volts, then with no decimal places up to 400 volts. If greater than +400 volts, >400 is displayed. If more negative than -400 volts, <-400 is displayed

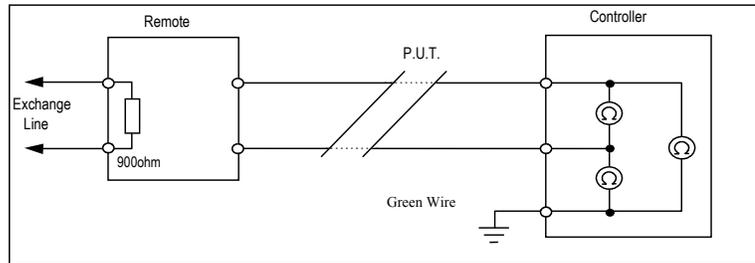
Two seconds later the display changes to:

L I N E I S O L A T E D
U S E E X T . I N S T R .

The Controller now sequences through the AC and DC measurements again.

5.11. Insulation Resistance

The Controller measures three Insulation Resistances: A-B, A-G and B-G using a 500V DC source. Each measurement is done after a soak period to allow weak insulation to fail.



To start the Insulation Resistance (IR) test, press the **IR** key.

The display changes to:

```
5 0 0 V  I R
P R O C E S S I N G
```

while the configuration is being set up. Provided no foreign battery is detected the display sequences through the following three states until the **IR** key is pressed again:

PRESS <IR>
TO START

PRESS ANY BLUE
BUTTON TO STOP

* WARNING * 500 V
ON TEST LEADS

NOTE:

To abort the test, press any Blue key.

Pressing the **IR** key again changes the display to:

500V IR (A - B)
10 SEC REMAINING

500 volts is impressed on the line. The time remaining before the IR (AB) measurement is made is shown.

After the measurement is made the display changes to:

IR (MΩ) AB = n n n n

Where:

nnnn is the insulation resistance in megohms.
Values are: with one decimal place between 1.0 and 99.9 megohm; with no decimal places between 100 and 200 megohms; "<1" if less than 1 megohm; ">200" if greater than 200 megohm

After two seconds the display changes to:

500V	IR (A - G)
10 SEC	REMAINING

while IR (AG) is measured.

The measured value is displayed for two seconds:

IR (M Ω)	AB = n n n n
AG = n n n n	

After which the display changes to:

500V	IR (B - G)
10 SEC	REMAINING

while IR (BG) is measured. Then finally to:

IR (M Ω)	AB = n n n n
AG = n n n n	BG = n n n n

This display remains until a key is pressed or the Controller powers off.

At the end of the last measurement, the 500V source is removed from the line and the line is discharged.

If a foreign battery is detected on the line, the display changes to:

FOREIGN	BATTERY
IR TEST	NOT DONE

This display remains until any blue key is pressed or the unit powers off.

WARNING !

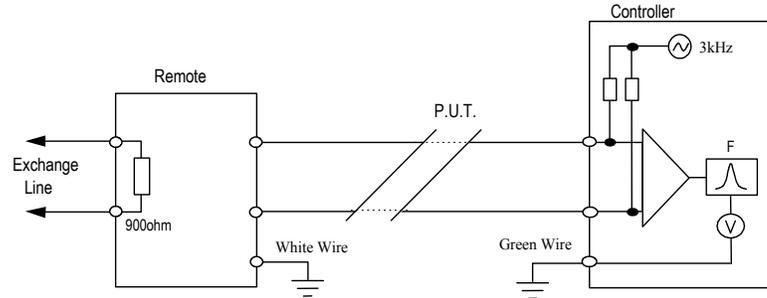
During this test, there is 500VDC present on the test leads and on the PUT. The high voltage can be removed at any time by pressing any BLUE key.

WARNING !

Do not disconnect the test leads from the PUT during an IR test as this may leave the line in a charged state capable of causing an electric shock. The TX125 discharges the line at the completion of the IR test.

5.12. Line Balance

The PUT is isolated from the exchange line and opened at the Remote. The Controller measures the LCL of the PUT at a frequency of 3kHz. An LCL better than 57dB indicates a well balanced line, less than 51dB, an unbalanced line, and if between 52dB and 57dB, a reasonably balanced line.



To start the Line Balance test, navigate to the Main Menu and use the and keys to locate the menu item "LINE BALANCE". The display shows:

```
MAIN MENU  ↑↓
LINE BALANCE  →
```

Press the key to enter the test. The display changes to:

```
LINE BALANCE
PROCESSING
```

This message is displayed while the configuration is set up and the Balance measured.

After the measurement is made the display changes to:

L I N E B A L A N C E
c c c c L C L = n n n d B →

Where:

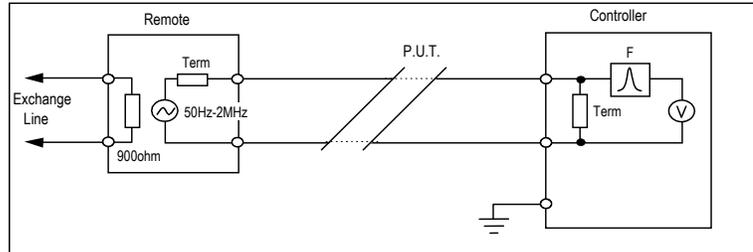
cccc is an assessment of the state of balance of the line and will be either GOOD; FAIR or BAD. The thresholds are GOOD >57dB; FAIR 51-57dB; BAD <51dB.

nnn is the Balance in dB. If the Balance is greater than 70dB it is shown as >70

The display will remain in this state until the Controller powers off automatically or another mode is selected.

5.13. Single Frequency Loss

A -10dBm (600Ω) or 0dBm (100Ω), sinusoidal signal is placed on the PUT by the Remote. The Controller measures the received level and calculates the Insertion Loss. Any available termination may be selected.



To run the Single Frequency Loss test, go to the Main Menu and use the and keys to locate the menu item "ONE FREQ LOSS".

The display shows:

```

MAIN MENU      ↑↓
ONE FREQ LOSS  →
    
```

Press the key to configure the test. The display changes to:

```

c h o o s e   f r e q   ↑↓←→
f f f f m H z
    
```

Where:

- ffff** is the frequency last used eg 121.6kHz
- m** is the frequency multiplier. eg k or M

To accept the frequency shown, press the  key. To change the frequency, press the  key and then the  and  keys to move the cursor, which is indicated by a flashing character, over the desired digit and use the  and  keys to change the value of the digit. When the frequency is set as desired, press the  key repeatedly to bring the cursor to the character immediately before the "H" character and then press it once more.

Note: The  and  auto-repeat if held pressed. Pressing the  key repeatedly will get back to the previous selection display.

The display changes to:

c	h	o	o	s	e		t	e	r	m		↑↓	
1	2	1	.	6	k	H	z		o	o	o	Ω	→

Where:

ooo represents the termination impedance last selected e.g. 135. It has values of 100, 120, 135, 600, 900, TN12 and AUTO.

Use the  and  keys to step through the available impedances. Pressing the  key will go back to the frequency selection display. When the required impedance is selected, press the  key to perform the test.

The display changes to:

l o s s t e s t i n g
1 2 1 . 6 k H z 1 3 5 Ω

When the measurement has been made the display changes to:

- n n n d B l o s s
1 2 1 . 6 k H z 1 3 5 Ω

where:

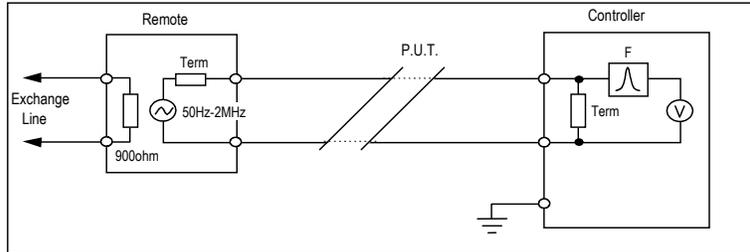
nnn is the loss value. It has two significant digits plus a decimal point (eg -26.3)

The display will remain in this state until a blue key is pressed or the unit powers off.

5.14. Multiple Frequency Loss

This measures the loss of the PUT at a series of frequencies. The user must specify the first (lowest) frequency, the last (highest) frequency, the number of steps and the termination impedance.

A -10dBm (600Ω) or 0dBm (100Ω), sinusoidal signal is placed on the PUT by the Remote. The Controller measures the received level and calculates the Insertion Loss. Any available termination may be selected.



To run the Multiple Frequency Loss test, go to the Main Menu and use the and keys to locate the menu item "MULTI FREQ LOSS".

The display shows:

```
MAIN MENU    ↑↓
MULTI FREQ LOSS →
```

Press the key to configure the test.

The display changes to:

f	i	r	s	t	f	r	e	q	↑	↓	←	→
f	f	f	f	m	H	z						→

Where:

ffff is the frequency last used eg 50.0 Hz

m is the frequency multiplier. e.g. k or M

To accept the frequency shown, press the **→** key.
To change the frequency, press the **←** key and then the **→** and **←** keys to move the cursor, which is indicated by a flashing character, over the desired digit and use the **↑** and **↓** keys to change the value of the digit. When the frequency is set as desired, press the **→** key repeatedly to bring the cursor to the character immediately before the "H" character and then press it once more.

Note: The **↑** and **↓** auto-repeat if held pressed.
Pressing the **←** key repeatedly will get back to the previous selection display.

The display changes to:

l	a	s	t	f	r	e	q	↑	↓	←	→
5	0	.	0	f	f	f	f	m	H	z	

Where:

ffff is the frequency last used eg 555.5kHz

To accept that frequency as shown, press the **→** key. To change the frequency, use the **←** key and then the **→** and **←** keys to move the cursor, which is indicated by a flashing character, over the desired digit and use the **↑** and **↓** keys to change the value of the digit.

When the frequency is set as desired, press the  key repeatedly to bring the cursor to the character immediately before the "H" and then press it once more.

Note: The  and  auto-repeat if held pressed. Pressing the  key repeatedly will eventually get you back to the previous selection display.

The display changes to:

f r e q	s t e p s	↑↓
n n	s t e p s	→

Where:

nn is an estimation the Controller makes for the number of frequency steps. It is based on the first and last frequencies and the step coarseness used last time.

To accept the steps as shown, press the  key. Use the  and  keys to select more of less steps and then press the  key to accept the setting and move to the next stage.

Note: The  and  auto-repeat if held pressed. Pressing the  key will go back to the previous selection display.

The display changes to:

L O G	T O	S T O R E ?	↑↓
N O			→

Use the  and  keys to select YES or NO. Pressing the  key will go back to the previous selection display. Press the  key to the final configuration step.

The display changes to:

```
choose term  ↑↓
                000Ω  →
```

Where:

000 represents the termination impedance last selected. It has values of 100, 120, 135, 600, 900, TN12 and AUTO.

Use the  and  keys to step through the available impedances. Pressing the  key will go back to the previous selection display. When the required impedance is set press the  key to start the measurements.

The display sequences through the following two displays until all frequencies have been cycled through:

```
loss testing
246.8 kHz  100Ω
```

```
-nnnn dB loss ←→
246.8 kHz  100Ω
```

Where:

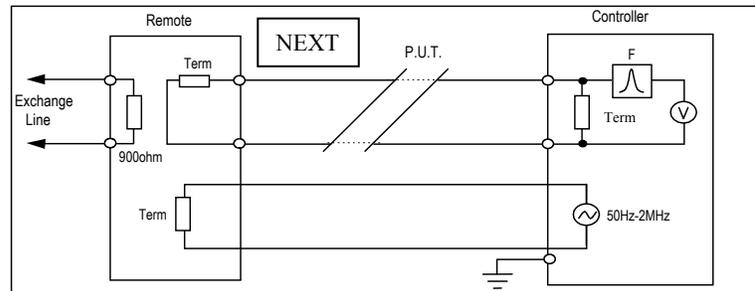
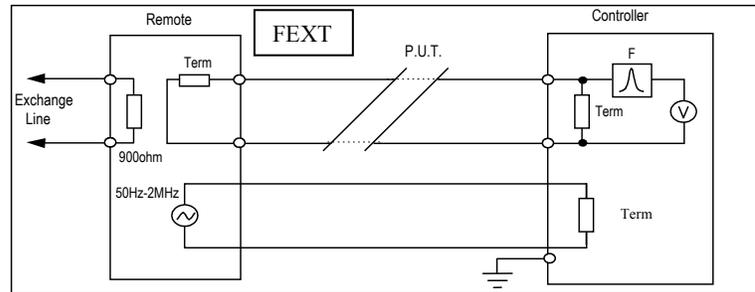
nnnn is the Loss. It is typically displayed as -26.3

The last result remains on the display until a blue key is pressed or the unit powers off.

5.15. Crosstalk

Crosstalk is measured by placing a signal of known level on a pair adjacent to the PUT and then measuring the signal level on the PUT. Either Far-End crosstalk (FEXT) or Near-End crosstalk (NEXT) is measured at one or a series of frequencies on the PUT.

The operator must specify the Near End or Far End, the first (lowest) frequency, the last (highest) frequency, the number of steps and the impedance.



To run Crosstalk, go to the Main Menu and use the and keys to locate the menu item "CROSSTALK".

The display shows:

```
MAIN MENU      ↑↓
CROSSTALK      →
```

Press the  key to configure the test. The display changes to:

```
choose end     ↑↓
nnnnnnnnnnnn  →
```

Where:

nn...nnn is the last "end" selected. It may either be "near-end (NEXT)" or "far-end (FEXT)"

Use the  and  keys to change between NEXT and FEXT. Pressing the  key will go back to the previous selection display. When the desired option is displayed, press the  key to move to the next stage.

The display changes to:

```
first freq     ↑↓←→
ffffmHz       →
```

Where:

ffff is the frequency last used eg 500.0 Hz

m is the frequency multiplier. eg k or M

To accept the frequency shown, press the  key. To change the frequency, press the  key and then the  and  keys to move the cursor, which is indicated by a flashing character, over the desired digit and use the  and  keys to change the value of the digit. When

the frequency is set as desired, press the  key repeatedly to bring the cursor to the character immediately before the "H" character and then press it once more.

Note: The  and  auto-repeat if held pressed. Pressing the  key repeatedly will get back to the previous selection display.

The display changes to:

l a s t	f r e q	↑↓←→
5 0 0 . 0	f f f f	m H z

Where:

ffff is the frequency last used eg 2.000MHz

To accept that frequency as shown, press the  key. To change the frequency, use the  key and then the  and  keys to move the cursor, which is indicated by a flashing character, over the desired digit and use the  and  keys to change the value of the digit. When the frequency is set as desired, press the  key repeatedly to bring the cursor to the character immediately before the "H" and then press it once more.

Note: The  and  auto-repeat if held pressed. Pressing the  key repeatedly will get back to the previous selection display.

The display changes to:

f r e q	s t e p s	↑↓
n n	s t e p s	→

Where:

nn is an estimation the Controller makes for the number of frequency steps. It is based on the first and last frequencies and the step coarseness used last time.

To accept the steps as shown, press the  key. Use the  and  keys to select more or less steps and then press the  key to accept the setting and move to the next stage.

Note: The  and  auto-repeat if held pressed. Pressing the  key will go back to the previous selection display.

The display changes to:

```
LOG TO STORE?  ↑↓
                NO  →
```

Use the  and  keys to select YES or NO. Pressing the  key will go back to the previous selection display. Press the  key to go the final configuration step.

The display changes to:

```
choose term    ↑↓
                0 0 0 Ω  →
```

Where:

ooo represents the termination impedance last selected. It has values of 100, 120, 135, 600, 900, TN12 and AUTO.

Use the  and  keys to step through the available impedances. Pressing the  key will go back to the previous selection display. When the required impedance is set press the  key to start the measurements.

The display sequences through the following two, typical, states until all frequencies have been measured:

F E X T t e s t i n g
2 4 6 . 8 k H z 1 0 0 Ω

n n n n d B F E X T ←→
2 4 6 . 8 k H z 1 0 0 Ω

where:

nnnn is Crosstalk level

The last result remains on the display until a blue key is pressed or the unit powers off.

5.16. Controller Address

The address in the Controller is changed to address of the Remote that is to be controlled.

To select the address go to the Main Menu and use the  and  keys to locate the menu item "ADDR".

The display shows:

MAIN MENU	↑↓
ADDR	→

Press  to enter the ADDR function. The display changes to:

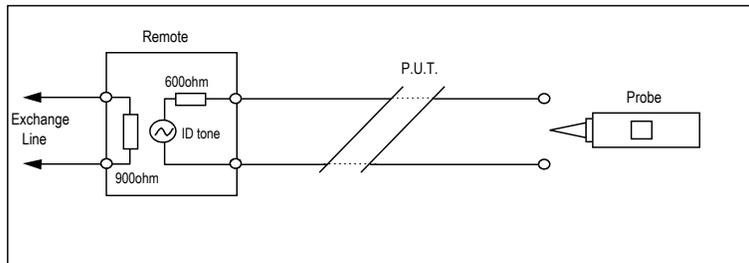
ADDRESS	↑↓
C	→

The Controller Address is shown on the second line. Press  or  to move between A, B or C and then  to accept the currently viewed address.

Pressing  backs out without changing the set address.

5.17. Pair Identify

Pair Identify operation may be selected from the Remote or from the Controller. A distinctive ID tone is placed on the PUT by the Remote. The ID Tone is detected by the Probe.



To select Pair Identify, go to the Main Menu and use the and keys to find the menu item "PAIR ID".

The display shows:

```
MAIN MENU    ↑↓
PAIR ID      →
```

Press the key to start Pair Identify. The display changes to:

```
PAIR IDENTIFY
PROCESSING
```

while the Remote is being configured after which the display changes to:

```
PAIR IDENTIFY
USE PROBE
```

The Remote has now placed the ID TONE on the PUT. The ID tone may only be removed by selecting another test.

The display will remain in this state until the Controller automatically powers off or a blue key is pressed.

5.18. View Store

Results of tests may be stored in non-volatile memory. The stored measurements may be viewed on the display, or may be uploaded to a computer via the PC Connection. Stored results may only be deleted using the TX125PCI Application.

Each test may be seen as being stored as a vertical column of data, with the test name at the top, then the date and time of the test, then the parameters for the test (if any) then the results of the test. Tests which repeat, such as OPEN and LOOP, save only the first set of measurements to the store. The most recent measurement is stored in the right most column and this is the measurement which is displayed when View Store is entered.

A typical stored could look like this:

least recent tests					most recent test
other test results ←	* Loss	* Balance	* IR	* Loop	* FEXT
	date/time	date/time	date/time	date/time	date/time
	freq&term	reading	reading	reading	freq&term
	reading		reading		reading

To View the Store, go to the Main Menu and use the  and  keys to find the menu item "VIEW STORE".

The display shows:

MAIN MENU	↑ ↓
VIEW STORE	→

Press the  key to begin the View Store process.

Press the  key to see the next line of the stored result:

```
V I E W  ↑↓←→  E X I T ←→  
2 7 / 1 1 / 0 1  1 4 : 5 7
```

Press the  key to see the next line of the stored result:

```
V I E W  ↑↓←→  E X I T ←→  
5 0 . 0 0  H z    1 0 0 Ω
```

Press the  key to see the last line of the stored result:

```
V I E W  ↑↓←→  E X I T ←→  
1 . 6 d B  l o s s
```

EXITING from VIEW STORE

Press the   keys simultaneously.

5.19. Sequences

Sequences are pre-defined sets of tests. These are created and uploaded to the Controller using the TX125PCI Application.

Sequences are identified by their name and many Sequences may be loaded in the Controller simultaneously.

Except for IR tests, no user intervention is required when Sequences are run. A running Sequence can be stopped at any time by pressing any Blue key.

To enter the Sequence Menu, go to the Main Menu and use the and keys to find the menu item "SEQUENCES".

The display shows:

MAIN MENU	↑↓
SEQUENCES	→

Press the key to enter the Sequence menu. The display changes to:

SEQUENCE MENU	↑↓
nnnnnnnnnnnnnnnnnn	→

Where:

nn..nnn is the name of one of the Sequences

Use the  and  keys to select the desired Sequence.

Press the  key to start the Sequence.

The display may show a message that is embedded in the Sequence before the first test is run. Do not press any key during this time.

When a Sequence which includes limits is complete the display changes to:

A	B	O	N	Z	A	S	E	T	↑↓
P	A	S	S	E	D				→

where the name of the Sequence is "A BONZA SET".

If there are not tests with limits in the Sequence the display reverts to:

M	A	I	N	M	E	N	U	↑↓	
S	E	Q	U	E	N	C	E	S	→

unless Pair ID was the last test in the Sequence and the PAIR IDENTIFY display is shown.

NOTE:

For safety issues **IR** tests MUST be **manually** started.

5.20.1. Date Format

The date format style can be set to dd/mm/yy or mm/dd/yy.

To select the date format, go to the Setup Menu and use the  and  keys to find the menu item "DATE FORMAT".

The display shows:

SETUP MENU	↑↓
DATE FORMAT	→

Press the  key to start. The display changes to:

DATE FORMAT	↑↓
dd / mm / yy	→

Use the  and  keys to toggle between the two available formats: **dd/mm/yy** and **mm/dd/yy**. When the desired option is displayed, press the  key to accept it.

Pressing the  key backs out of the set up without changing the currently set option.

5.20.2. Set Date And Time

Before setting the date and time, make sure the correct date format (dd/mm/yy or mm/dd/yy) is selected.

To set the date and time, go to the Setup Menu and use the  and  keys to find the menu item "SET DATE/TIME".

The display shows:

```
SETUP MENU   ↑↓
SET DATE / TIME →
```

Press the  key to start. The display changes to:

```
TIME SET     ↑↓←→
29 / 11 / 02 12 : 28 →
```

The cursor position is indicated by a flashing digit. Use the  and  keys to move the cursor to the digit to be changed. Then use the  and  keys to set it to the desired value. To abandon the changes and exit press the  key repeatedly. To apply the changes, press the  key when the cursor is on the right most digit.

5.20.3. Set Auto Termination

Auto termination allows the TX125 to determine the line termination based on the test frequency. The user must specify the two impedances to be used and the change-over frequency. Test results are always written to the store with the actual impedance used, never AUTO.

To set the auto termination, go to the Setup Menu and use the  and  keys to find the menu item "SET AUTO TERM".

The display shows:

```
SETUP MENU  ↑↓  
SET AUTO TERM  →
```

Press the  key to start. The display changes to:

```
l o f r e q t e r m  ↑↓  
t t t t  →
```

Where:

tttt represents the termination impedance. It has values of 100Ω, 120Ω, 135Ω, 600Ω, 900Ω, and TN12.

Use the  and  keys to step through the available impedances. Pressing the  key will go back to the previous selection display. When the required impedance is set press the  key to accept the value and move to the next stage.

The display changes to:

h	i	f	r	e	q	t	e	r	m	↑↓
1	0	0	Ω							→

Use the  and  keys to step through the available impedances. Pressing the  key will go back to the previous selection display. When the required impedance is set press the  key to accept the value and move to the next stage.

The display changes to:

h	i	s	t	a	r	t	s	a	t	↑↓
f	f	f	f	f	m	H	z			→

Where:

ffff is the frequency last used eg 10.0kHz

To accept that frequency as shown, press the  key. To change the frequency, use the  key and then the  and  keys to move the cursor, which is indicated by a flashing character, over the desired digit and use the  and  keys to change the value of the digit. When the frequency is set as desired, press the  key repeatedly to bring the cursor to the character immediately before the "H" and then press it once more.

5.20.4. Serial Number

TX125 Controller contains a unique serial number embedded in its hardware.

To view the serial number, go to the Setup Menu and use the  and  keys to find the menu item "SERIAL NUMBER".

The display shows:

```
SETUP MENU   ↑↓  
SERIAL NUMBER →
```

Pressing the  key changes the display to:

```
SERIAL NUMBER  
0 9 8 7 6 5
```

Pressing any arrow key returns the display to the Main Menu.

5.20.5. PC Connection

The PC connection is used to transfer Sequences and Results between the TX125 and Windows PC via a Windows PC serial port. This feature is fully described in the TX125PCI Application User Manual.

To enable PC Connection mode, go to the Setup Menu and use the  and  keys to find the menu item "PC CONNECTION".

The display shows:

```
SETUP MENU   ↑↓
PC CONNECTION →
```

Press the  key to start. The display changes to:

```
PC CONNECTION ←
      ENABLED
```

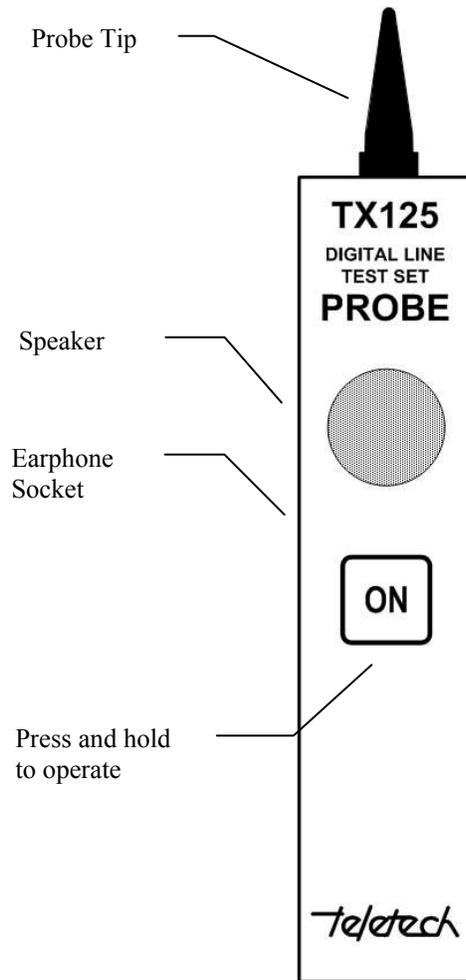
When the PC Connection is no longer required, press the  key to return to the Setup Menu.

Note

The TX125 does not autpower down in PC Connection.

6. The Probe

6.1. Probe Features



6.2. Probe Operation

Press and hold the **ON** key and position the tip in the vicinity of the pair to be identified.

The distinctive ID tone will be at a maximum level when the Probe is close to the correct pair. Due to capacitive coupling, the ID tone may be detected on pairs other than the correct one. The correct pair will have a null (minimum signal level) between the two wires. There will be no null between wires of other pairs.

An optional earphone (see Appendix E) may also be used with the Probe to increase audibility, particularly in areas with high background noise levels.

Appendix A: Applications

A.1 Using Multiple Remotes

A pair gain system is to be installed on a long line and two repeaters are to be used. The section of line from the exchange to the first repeater site is tested with a Remote and Controller set to Address A.

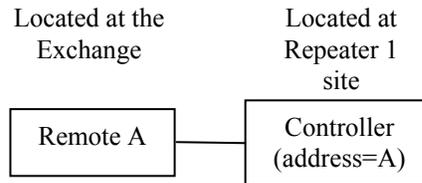


Fig A: Testing the First Section of a Long Line

The Remote at the Exchange is then set to EXCH CONN mode. A second Remote, set to Address B, is positioned at the first repeater site and the section of line from here to the second repeater site is then tested with the Controller set to Address B.

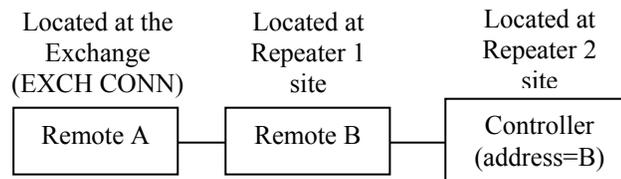


Fig B: Testing the Second Section of a Long Line

This process is then repeated one more time adding a Remote at the second repeater site. This Remote is set to address C.

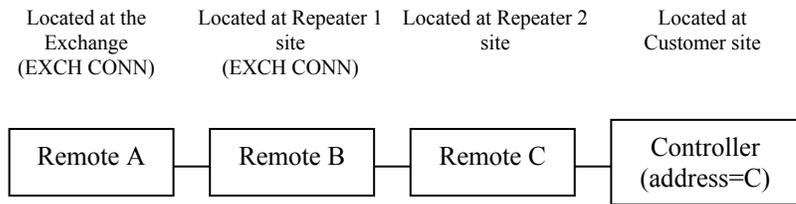


Fig C: Testing the Third Section of a Long Line

Appendix B: Self Test Sequence

This Sequence is commonly installed in all TX125 Controllers when they leave the factory.

To run the Self Test Sequence connect the Remote and Controller together with their Blue leads. Go to the Main Menu and use the  and  keys to find the menu item SEQUENCES. The display shows:

```
MAIN MENU    ↑↓  
SEQUENCES   →
```

Press the  key to enter the Sequence Menu system. Use the  and  keys to step through the available sequences to locate "SELF TEST". The display shows:

```
SEQUENCES   ↑↓  
SELF TEST   →
```

To start the sequence, press the  key. The display changes to:

```
M u s t   h a v e   r e m o t e  
c o n n e c t e d
```

Then each of the tests is executed.

If all tests pass, the display shows:

```
SELF TEST  
SEQUENCE PASSED
```

If any test fails, the failing test will be displayed in View Store mode.

The display remains in this state until a key is pressed or the Controller powers off.

The Self Test Sequence consists of the following tests:

Test	Condition	Limit
Loss Test	820Hz/600Ω	0.2dB
Loss Test	3kHz/600Ω	0.2dB
Loss Test	20kHz/100Ω	0.5dB
Loss Test	100kHz/100Ω	0.5dB
Loss Test	1MHz/100Ω	0.5dB
Loop Test		2Ω

Appendix C: Troubleshooting

CONTROLLER	
FAULT	ACTION
No display.	<ul style="list-style-type: none"> • Check that a correct test lead (Grey plug) is plugged in. • Press ON key. • Replace battery.
Does not respond to any key presses.	<ul style="list-style-type: none"> • Return to supplier for repair.
Remote does not respond but line is known to be good.	<ul style="list-style-type: none"> • Check that Controller address is set the same as Remote address. • Check that the Remote is connected correctly: Red leads to exchange, Blue leads to PUT. • Check that jumpers between exchange line and PUT are removed.
CAL CHECK fails.	<ul style="list-style-type: none"> • Check that the Remote blue test leads are clipped to the Controller blue test leads. • Try Remote with a different Controller and Controller with a different Remote to determine which unit is faulty. • Return faulty unit to supplier for repair.

REMOTE	
FAULT	ACTION
No display	<ul style="list-style-type: none"> • Check that a correct test lead (Blue plug) is plugged in. • Replace battery.
Does not respond to pressing ADD key.	<ul style="list-style-type: none"> • Return to supplier for repair.
Does not respond to pressing ID key.	<ul style="list-style-type: none"> • Return to supplier for repair.
Does not reset to EXCH CONN mode when test lead is removed and re-inserted.	<ul style="list-style-type: none"> • Return to supplier for repair.

PROBE	
FAULT	ACTION
No ID tone heard.	<ul style="list-style-type: none"> • Check that Remote display shows the ID Tone message. • Try the Probe with no line connected to Remote. • Replace battery.

Appendix D: Technical Specifications

DC VOLTAGE

OPEN test	A-B, A-GND, B-GND
EXCH CONN test	A-B
Range / Resolution	-400V to +400V / 1V
Input Impedance	200k Ω

AC VOLTAGE (True RMS)

OPEN test	A-B, A-GND, B-GND
Range / Resolution	zero to 275V / 1V
Input Impedance	200k Ω

LOW FREQUENCY INSERTION LOSS

Range / Resolution	0 to 20dB / 0.1dB
Send Level	-10dBm (600 Ω)
Impedance	600 Ω , 900 Ω , TN12

HIGH FREQUENCY INSERTION LOSS

Range / Resolution	0 to 60dB / 0.1dB
Send Level	0dBm (100 Ω)
Impedance	100 Ω , 120 Ω , 135 Ω

LINE BALANCE

(LONGITUDINAL CONVERSION LOSS)

Range / Resolution	45dB to 75dB / 1dB
Source	1Vrms, 3kHz, sinusoidal

LOOP RESISTANCE

Range / Resolution	0 to 3,000 Ω / 1 Ω
Current Source	1mA (5V max)

INSULATION RESISTANCE

Tests	A-B, A-GND, B-GND
Range / Resolution	0 to 200M Ω / 1M Ω
Source Voltage	500V \pm 10% between 1M Ω and >200M Ω
Duration	10sec x 3

Accuracy

Loss, Crosstalk, Balance

300Hz to 2MHz	±1dB
50Hz to 299Hz	±3dB

Other

Voltage DC	±1%
Voltage AC	±2%
Loop Resistance	±1% ±1Ω
Insulation Resistance	±2% ±1MΩ

Store Size

16K bytes is allocated to the Sequences and Results Store. Typically 100's of results can be stored with dozens of tests. When full the Store over writes the oldest results first

Remote Physical

Dimensions	216 x 100 x 40 mm
Power Supply	-48v exchange battery or internal battery
Internal Battery	9 volt alkaline
Battery Life	Typically 120 hours

Controller Physical

Dimensions	220 x 100 x 40 mm
Battery	9 volt alkaline
Battery Life	Typically 40 hours

Probe Physical

Dimensions	163 x 33 x 23 mm
Battery	9 volt alkaline
Battery Life	Typically 150 hours

Environmental

Operating Temperature	0 to 50°C
Ingress Protection	IP54

Appendix E: Order Codes

Digital Line Test Set	TX125
comprising -	
• 1 x TX125 Remote	
• 1 x TX125 Controller	
• 1 x TX125 Probe	
• 1 x 1m Remote Alligator Clip Test Lead Set	
• 1 x 1m Controller Alligator Clip Test Lead Set	
• 1 x Soft Carry Case	
• 1 x User Manual	
TX125 Remote	125TX
TX125 Controller	125RX
TX125 Probe	125PR
TX125 Soft Carry Case	125/SCC
1m Remote Alligator Clip Test Lead Set	125/10GP
1m Remote Siemens Series 71 Test Lead Set	125/10S1
1m Remote Siemens Series 2000 Test Lead Set	125/10S2
1m Remote Siemens Series 5000 Test Lead Set	125/10S3
3m Remote MDF Battery Jack Power Lead Set	125/10PL
1m Controller Alligator Clip Test Lead Set	125/12
1m Controller Krone Test Lead Set	125/12K2
Probe Earphone	EPC
User Manual	125/41

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