TFN

TFN-T1000M
User's Manual

TFN

Contents

Chapter 1 T1000M Overview

1.1 Introduction

T1000M is a color-LCD, graphics, handheld E1 transmission analysis instrumentation. Devoted to E1/G.703 line maintenance and analysis for field, G.703-64K bit error testing, PCM31/30 then monitor the road and audio signal insertion, E1 jitter testing. T1000M features a comprehensive, easy to operate, both in accordance with G.821, G.826, M.2100 and other international standards for the analysis of the test results, that can also, according to the user's requirements for storage of test data, statistics, analysis of line quality measurement analysis is the ideal tool.

1.2 Function
- E1 BERT Analysis:E1 frame,code.
- Supports CRC,and BPV performance analysis and generator.
- Alarm Setting:Manual or automatic alarm setting.
- Signal Result:E1 PCM frequency, level,mask analysis.
- Signal Result:E1 PCM Jitter analysis.
- Two-way voice monitoring function, bugging E1 in the voice slot.
- Inserted audio and DTMF in the voice Slot
- Inserted error and Alarm in E1 Channel.
- Pass Through test function
- IP ping test
- Signaling Setting:ABCD bit setting.
- Signaling Display:Display all channels of ABCD bits.
- Examine Analysis:Off-line analysis of BERT performance.
- User Programmable Pattern Setting:There are three 32 bit programmable patterns,which can be inserted onto the E1 line and drop for analysis.
- Timeslot Setting:Available,bypassed,or idle timeslot,Drop and Insert N*64k data onto E1 line.
- Timeslot Mapping Data:Analyze any channel data of two frames.
- File Management:100 configurations and result memory locations can be stored/recalled by user.
- Round Trip Delay Measurement.

1.3 Overall Specifications

1.3.1 E1 Specifications:

1). E1 Receiving Interface
- Line code：　HDB3/AMI
- Pulse characteristics：　in conformity with ITU G.703

● Jitter tolerance: in conformity with ITU G.823
● Input port Type：
    Coaxial twin: BNC (L9，unbalance)
    Symmetrical twin: RJ45 (balance)
● Input mode:
    Terminal mode:
        Coaxial Pair Impendance：   75ohm (unbalance)
        Symmetrical Pair Impendance ：   120ohm (balance)
    Bridging mode:
        Impedance: > 1000 ohm

2). E1 Transmission Interface
● Line code：   HDB3/AMI
● Pulse characteristics：in conformity with ITU G.703
● Pulse amplitude: nominal value of 2.37V for 75ohm of coaxial pair
        Nominal value of 3.00V for 120 ohm of symmetrical pair
● Zero amplitude: ± 0.1 V at max
● Jitter tolerance: in conformity with ITU G.823
● Output port model:
    Coaxial Pair：   BNC (L9，unbalance)
    Symmetrical Pair：   RJ45 (balance)
● Source of clock transmission:
    Internal Timing：   2.048 MHz±50ppm, ±100ppm.
    External Timing：   take clock from external clock interface
    Recovery Timing：   take clock from receiving terminal

3). E1 Frame Format
● PCM31
● PCM31+CRC
● PCM30
● PCM30+CRC
● Unframed
● Automatic detection

1.3.2 Error Rate Test (BERT Test):

1). BERT Pattern (Patterns)
511, 2047, 2E15-1, 2E15-1 (reverse), 2E20-1, 2E20-1 (reverse), QRSS,
2E23-1, 2E23-1 (reverse), all 1, all 0, alternate, 1100, 3 IN 24, 1 IN 16, 1 IN 8,
1 IN 4, User Programmble ，LIVE

2). BERT Display Format
● Error counting
● Alarm counting

- ITU G.821
- ITU G.826
- M.2100
- Histogram

3). Event Insert
- Alarm Insert
- Force code Error
- Force FAS Error
- Force Single Error
- Force Single Error
- Force 10-3-10-7 Error Rate

4). Quality Analysis:
- Receiving seconds
- Error seconds
- Alarm seconds
- Error Free seconds
- Error rate
- Available seconds
- Serious error seconds
- G.821 error seconds
- G.826 error seconds
- Unavailable seconds

5). G703-64K Test

1.3.3 Other Functions:

1). Color Display Screen
- Character/graphic mode

2). Test Results Report
- 100 pieces of test results at max available in storage
- Direct display on LCD screen
- Print via printer port available

3). Portable for Field Use
4). Modular Design for Easy Update
5). Rechargeable lithium battery and electric quantity Indication
6). Scope of temperature: 0 °C-50 °C (operating temperature)
          -20 °C-60 °C (storage temperature)
7). Humidity: up to 95% at max
8). Power supply source: AC-230V / DC9V/2000mA power Switch Adapter
9). Dimensions

178.5mm (L) × 133.5 mm (L) × 68 mm (H)
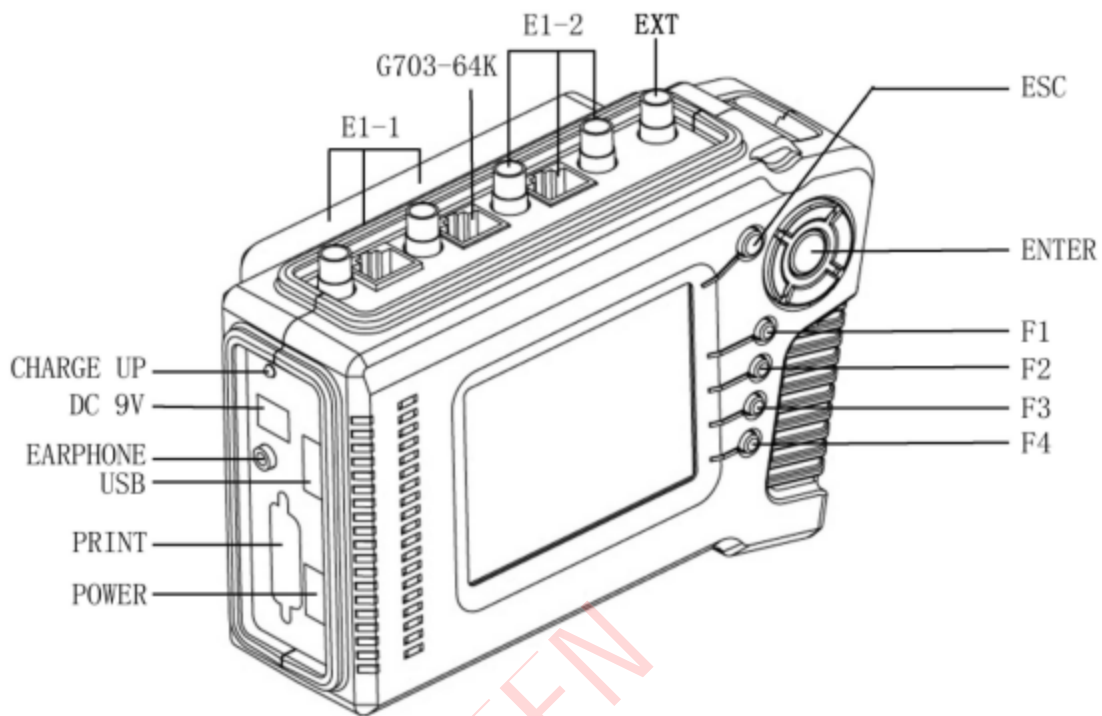
10). Weight

0.8kg (net weight)

1.3.4 Interface profile：

Figure 1-1 T1000M Profile

1.4 LED Status Display

T1000M LED is on the left side of front panel and displays as follows:

Color	definition
GREEN	G.703-64K
RED	LOS
RED	AIS
RED	LOP
RED	EBR
GREEN	E1
RED	LOS
RED	AIS
RED	LOF
RED	LOMF
RED	LOCRC
RED	RAI

RED	MRAI
RED	LOP
RED	CODE ERR
RED	FAS ERR
RED	BIT ERR
RED	CRC ERR
RED	E BIT ERR

Detailed introductions are as follows:

1) G.703-64K Signal Display

G.703-64K：When G.703-64K port is currently engaged, LED displays green.

LOS：(Loss of Signal)，Red LED means that the signal received is too weak.

AIS：(Receive Alarm Indication Signal ,all are the frame of 1).

LOP：Red LED means Loss of Pattern synchronization.

EBR：Red LED means bit error detected in the test of testing pattern

2) E1 Signal Display

Terminal (terminal mode):

Green LED means that DTA-BERT/C E1 reception is set up in terminal mode and the impedance may be E1 75 ohm or E1 120ohm.

Bridge (bridging mode):

Green LED means that DTA-BERT/C E1 reception is set up in high-impedance bridging mode.

E1:

Green LED means that DTA-BERT/C works in E1 test mode.

LOS: (Loss of Signal):

Red LED means that the signal received via E1 receiving port is too weak and is equal to or less than 35db, with detection time: 10≤code element quantity ≤255.

AIS: (Receive Alarm Indication Signal, all are the frame of 1)

Red LED means that there is some criteria in ITU G.775 detected and released by RAIS. In E1 mode, in case that there are two consecutive twin frames (500us), each 512 bit contains two or less than two 0 and moreover, FAS alignment doesn't exist, the light will turn on; and release condition of RAIS is that in two consecutive twin frames (500us), 512 bit contains three or more 0 received, or FAS alignment resumes.

LOF:

Red LED means Loss of Frame Alignment

LOMF:

Red LED means Loss of CAS multi-frame alignment

LOCRC:

Red LED means Loss of CRC-4 multi-frame alignment

RAI: (Receive Remote Alarm Indication)

Red LED means that in E1 mode, if in two consecutive NFAS, TS0 bit 3=1, the light will turn on; and if in two consecutive NFAS frames, TS0 bit 3=0, the light will turn off.

MRAI:

Red LED means Multi-frame Remote Alarm Indication

Multi-frame remote-end alarm indication

LOP:

Red LED means Loss of Pattern synchronization

CODE ERR:

Red LED means HDB3 code alternation-polarity error. We can find out breakdown point firstly and check if the polarity of breakdown point is altered. In case of no alternation, coding error should be confirmed.

FAS ERR:

Red LED means error in frame alignment signal (0011011)

BIT ERR:

Red LED means bit error detected in the test of testing pattern.

CRC ERR:

Red LED means that CRC-4 error is calculated

E-BIT ERR:

Red LED means that CRC-4 error occurs to remote and is indicated with E bit.
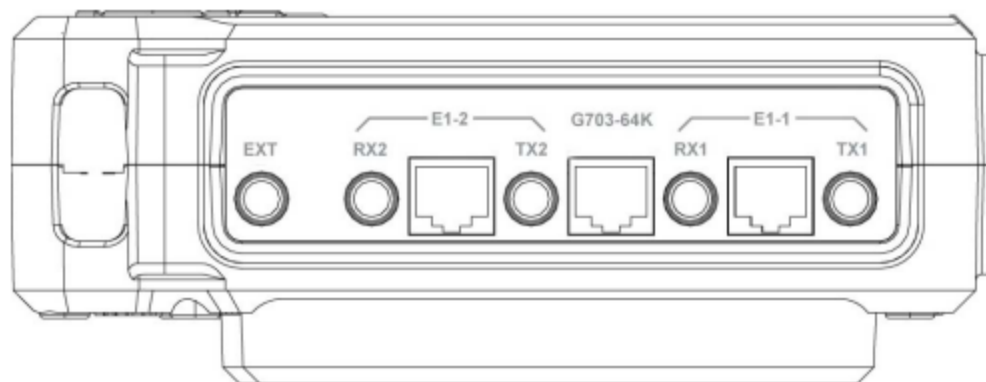
1.5 Interface Panel

Figure 1-2 Front Panel of T1000M

Description:

E1-1：

TX (BNC):

Unbalance transmission port of E1, and BNC-L9 Type

RX (BNC):

Unbalance receiving port of E1, BNC-L9 Type

RJ45:

 Balance interface of E1 for transmission (TX) and receiving (RX)

TX(BNC)：

G. 703-64K：

RJ45 interface.

E1-2：

TX (BNC):

Unbalance transmission port of E1, and BNC-L9 Type

RX (BNC):

Unbalance receiving port of E1, BNC-L9 Type

RJ45:

 Balance interface of E1 for transmission (TX) and receiving (RX)

 TX(BNC)：

EXT(external clock):
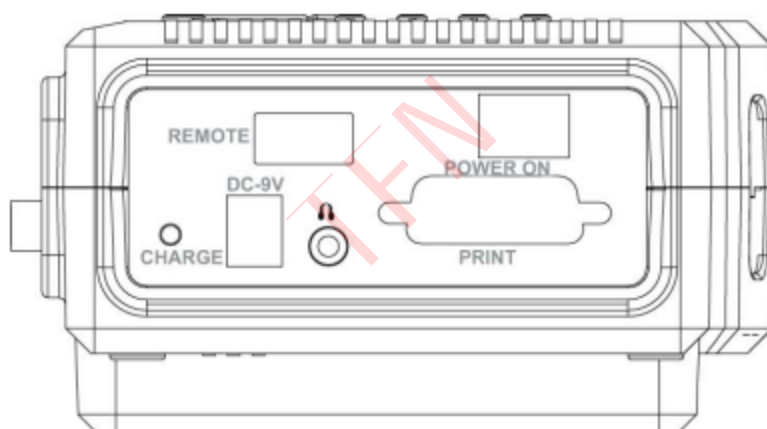
 Input interface of reference clock of external E1

Figure 1-3 Side Panel of T1000M

Description:

POWER ON:

Switch of power supply

REMOTE:

It is a communication port between instrument and PC (USB interface). The user can configure the instrument or update its software in adoption of PC via USB interface.

DC-9V:

When external power adapter (DC9V/2A adapter) is used, insert the adapter into the socket for power supply. In case of inadequate electric energy of battery, please use external power adapter for charging.

CHARGE UP:

It is indicator light of charging. When external power adapter is inserted, LED turn-on means charging goes on and turn-off means adequate electric energy of the battery.

Printer (printer):

If accessory printer cable of the device is used, it can be connected to average printer port.

Ω：earphone.

Chapter 2   E1 Test

2.1 Normal test

2.1.1 Parameter Setup

When T1000M stays in the main menu, press ⇦,⇨ keys of cursor to select "E1 Analyzer". The interface displays various configurations as in Figure 2-1:
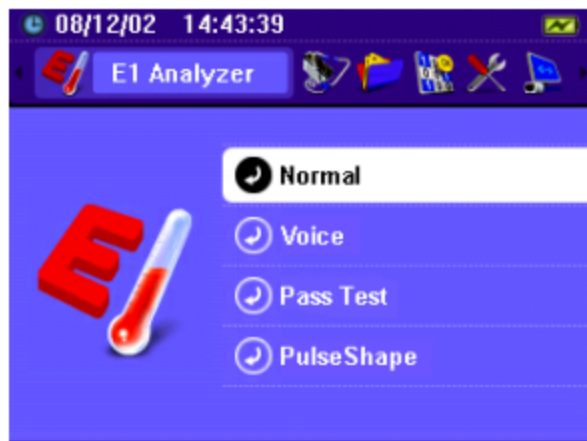
Figure 2-1 Configuration Setup Interface of E1 Analyzer

Four items i.e. "Normal","Voice", "Pass test" and "Pulse Shape"are included, with meanings as follows:

Normal: The user can move the cursor by ⇧, ⇩ keys and select different parameter setup files by ⊙ key as in Figure 2-2.
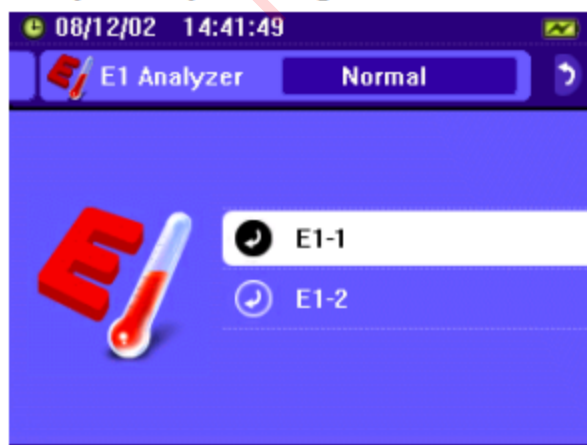
Figure 2-2 Normal Interface of E1 Test
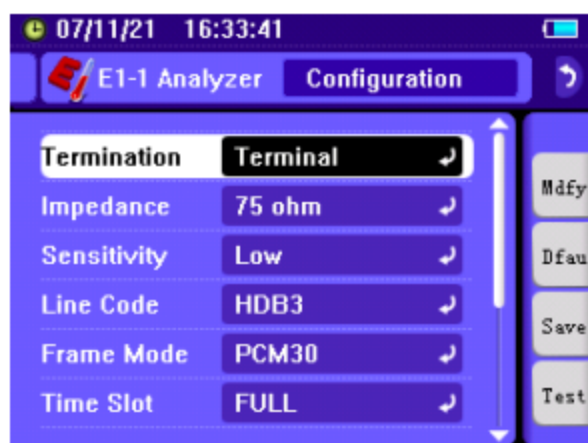
E1-1 Parameter Configuration interface as in Figure 2-3.

Figure 2-3 Configuration Interface of E1-1

There are parameters available for setup in the interface. Move the cursor by ⇧, ⇩ keys, and select relevant items by ⊙ key. Popup dialog box will list out the options for a parameter as in Figure 2-4.
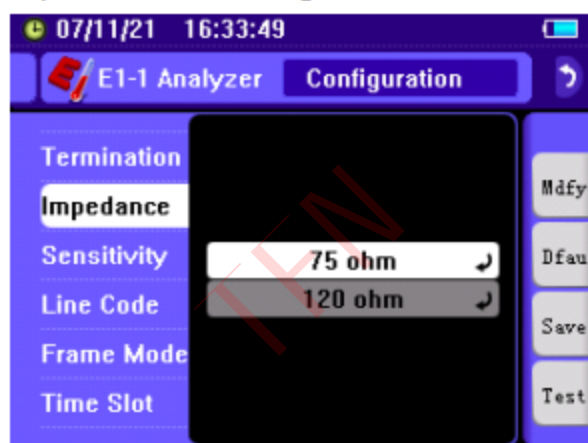

Figure 2-4 Parameter Value Selection Interface of E1-1

In the interface of Figure 2-4, move the cursor by ⇧, ⇩ keys to select different parameter options, and use ⊙ key to confirm. For the meaning of each parameter, please refer to "2.2 Parameter Explanations".

On the right side of " Configuration interface (Figure 2-3), there are four function keys i.e. "Mdfy", "Default ", "Save", and "Test", which correspond with F1, F2, F3 and F4 keys. Press relevant keys to call corresponding functions rapidly.

Mdfy：Call a parameter setup file pre-stored in the instrument.

Default: set up all parameters as default values.

Save: in Configuration interface, press F3 key, and select "Save " function to save up current parameter setup in a file. In later operation, use Mdfy function to call corresponding parameter. Select "Save " function interface as in Figure 2-5.
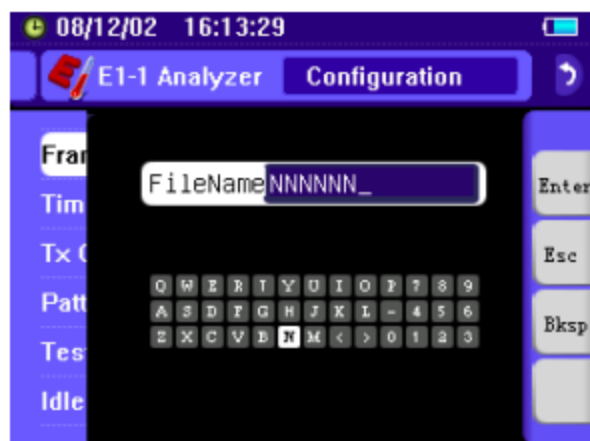
Figure 2-5 Parameter Setup Saving Interface

Move the cursor by ⇦, ⇨, ⇧ & ⇩ keys to the letter or digit in demand, and press the key of letter or digit as file name. " Enter, " Ecs & "Backspace" keys on the right side correspond with F1, F2 & F3 keys respectively.

2.1.2 Parameter Explanations

Valid parameter setups of **T1000M** and meanings are as follows:

Parameter	Option	Description
Connection Type	Terminal	Set up **T1000M** transmitting and receiving ports in E1 terminal mode.
	Bridge	Set up **T1000M** in E1 bridge mode. Receiving terminal impedance ≥1Kohm .
Impedance	75ohm	Set up **T1000M** port impedance as 75ohm.
	120ohm	Set up **T1000M** port impedance as 120ohm.
Sensibility	High	Set up the highest receiving sensibility
	Low	Set up the lowest receiving sensibility
Code	HDB3	Set up line coding mode as HDB3.
	AMI	Set up line coding mode as AMI.
Framing	PCM31	PCM31 mode. When time slot is set up as FULL, all FAS+ time slots from TS1-TS31 are set up as being engaged; When time slot is set up as N*64, time slot is TS that FAS+ sets up as being engaged (other TS set up as being idle). Note: TS: time slot
	PCM30	PCM30 mode. When time slot is set up as FULL, the FAS+CAS+time slots including TS1-TS15 and TS17-TS31 all are set up being engaged; When time slot is set up as N*64, FAS+CAS+TS are set up as being engaged (other TS set up being idle).

	PCM31+CRC	PCM31 mode, CRC4 start-up. When time slot is set up as FULL, FAS time slot TS1-TS31 all are set up being engaged; When time slot is set up as N*64 时, time slot is TS that FAS+ sets up being engaged (other TS being idle).
	PCM30+CRC	PCM30 mode, CRC4 start-up. When time slot is set up as FULL, FAS+CAS+time slot TS1-TS15 and TS17-TS31 all are set up being engaged; When time slot is set up as N*64, FAS+CAS+ sets up as engaged TS (other TS being idle).
	Non-framing	Non-framing mode. TS0-TS31 all are set up being engaged.
	Automatic detection	Automatic detection mode. T1000M will automatically identify framing model of E1 interface of terminal according to the status of current line.
Time slot setup	Full	Select according to framing model, and set up all time slots available as being engaged (see "framing model" description).
	N*64	Select a time slot available, and set up as being engaged or idle (see "framing model" description). For detailed setup, please refer to 3.3 Time Slot Setup.
Transmit clock	Recovery clock	Transmit clock, and take the clock from E1/T1 receiving port (Recovery), and use it as reference clock.
	Internal clock	Transmit clock, and take the frequency produced by internal quartz vibrator of **T1000M** i.e. 2048K bps.
	External clock	Transmit clock, and take clock input via external (reference clock) port of **T1000M**, and use as reference clock.
	50ppm	Transmit clock, and take the frequency produced by internal quartz vibrator of **T1000M** plus a deviant of 50ppm, and use as reference clock.
	100ppm	Transmit clock, and take the frequency produced by internal quartz vibrator of **T1000M** plus a deviant of 100ppm, and use as reference clock.
	-50ppm	Transmit clock, and take the frequency produced by internal quartz vibrator of **T1000M** plus a deviant of -50ppm, and use as reference clock.
	-100ppm	Transmit clock, and take the frequency produced by internal quartz vibrator of **T1000M** plus a deviant of -100ppm, and use as reference clock.
Test pattern	511	Pseudo-random sequence pattern: 2E9-1 (O.153)
	2047	Pseudo-random sequence pattern: 2E11-1 (O.152 and O.153)
	2E15-1	Pseudo-random sequence pattern: 2E15-1 (O.151)
	2E15-1 (reverse)	Pseudo-random sequence pattern: 2E15-1 (O.151 reverse)
	2E20-1	Pseudo-random sequence pattern: 2E20-1 (O.153)

	2E20-1 (reverse)	Pseudo-random sequence pattern: 2E20-1 reverse)
	QRSS	Pseudo-random sequence pattern: 2E20-1 (O.151 QRSS)
	2E23-1	Pseudo-random sequence pattern: 2E23-1 (O.151)
	2E23-1 (reverse)	Pseudo-random sequence pattern: 2E23-1 (O.151 reverse)
	All 1	Repetitive pattern: all 1 (11111...)
	All 0	Repetitive pattern: all 0 (00000...)
	Alternate	Repetitive pattern: alternate 1 & 0 (10101010...)
	1100	Repetitive pattern: all 1100
	3 IN 24	Repetitive pattern: 3 "1" in 24 bits
	1 IN 16	Repetitive pattern: 1 "1" in 16 bits
	1 IN 8	Repetitive pattern: 1 "1" in 8 bits
	1 IN 4	Repetitive pattern: 1 "1" in 4 bits
	User pattern 1	User programmable pattern 1 with pattern length of 1-32 bit. For detailed setup, please refer to 5.4 User Programmable Test Pattern.
	User pattern 2	User programmable pattern 2 with pattern length of 1-32 bit. For detailed setup, please refer to 5.4 User Programmable Test Pattern.
	User pattern 3	User programmable pattern 3 with pattern length of 1-32 bit. For detailed setup, please refer to 5.4 User Programmable Test Pattern.
Test time	Consecutive	Execute BERT test all the time
	15 minutes	Execute BERT test for 15 minutes
	30 minutes	Execute BERT test for 30 minutes
	1 hour	Execute BERT test for one hour
	24 hours	Execute BERT test for one day
Idle code	7E	The time slot preset as idle will be filled with a hexadecimal 0x7E code during the time slot transmitted.
	7F	The time slot preset as idle will be filled with a hexadecimal 0x7E code during the time slot transmitted.
	Pass	If the clock transmission is set up as "recovery clock", the data received by idle time slot will be used as "idle code" and be transmitted via the time slot again.

After the parameter is set up, carry out "test" function. The instrument will run E1 error analysis function. For detailed operations, see Chapter 6 Error Analysis Function.

2.1.3 Time Slot Setup

When a time slot of T1000M is set up as N*64 as in Figure 2-6, enter time slot setup interface as in Figure 2-7.
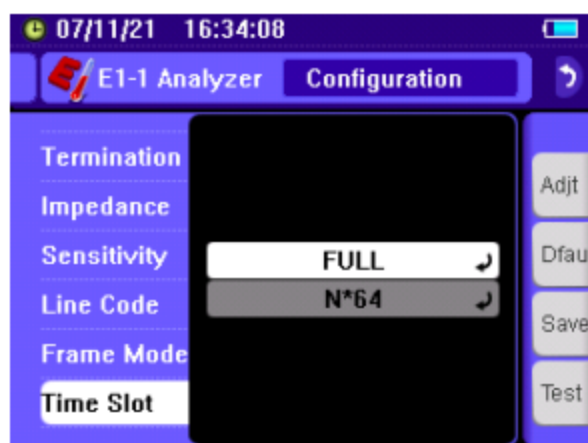
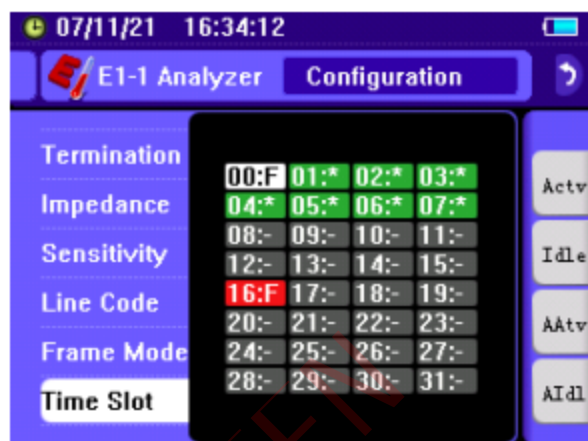Figure 2-6 Time Slot Setup Interface

Figure 2-7 N*64 Mode Time Slot Setup Interface

In case of framing type of PCM31 or PCM31+CRC, 31 time slots (time slot 1-31) can be set up. In case of framing type of PCM30 or PCM30+CRC, 30 time slots (time slot 1-15, and time slot 17-31) can be set up. In case of framing type of Unframe all 32 time slots (time slot 0-31) can be set up as engaged.

In Figure 2-7 N*64 Mode Time Slot Setup Interface, there are 32 digits and symbols such as "*" & "-" on the screen, of which each symbol represents current setup status of one time slot as follows:

*   The time slot is set up as being engaged and can be loaded with data transmission and receiving.

-    The time slot is set up as being idle, and can transmit idle code via the transmission part.

F   The time slot cannot be set up.

Moreover, small check that each represents one time slot displays current status with color.

Red: the time slot cannot be set up.

Green: the time slot is set up as being engaged.

Black: the time slot is set up as being idle.

White: the position of time slot where current cursor stays.

In time slot figure, white small check represents the time slot where the current cursor stays. Press "⇧", "⇩", "⇦" or "⇨" key to move the cursor. Function keys including "Active, "Idle", "All Active & "All idle" on the right side correspond with F1, F2, F3 & F4 respectively. The function keys can change the setup of time slot where current cursor stays, or use/not use all time slots.

    Detailed meaning and action of various function keys are as follows:

    [F1] Active Set up the time slot as being engaged.

    [F2] Idle   Set up the time slot as being idle.

    [F3] All Active   Set up all time slots as being engaged.

    [F4] All idle   Set up all time slots as being idle.

After the status of time slot is changed, use ◎ key for confirming.

2.1.4 User Programmable Test Pattern

    If T1000M stays in the main menu, press ⇦ & ⇨ keys of the cursor to select "Advanced options". The menu will display advanced configurations for selection as in Figure 2-8:

Figure 2-8 Advanced Options Setup Interface

    Use ⇧ & ⇩ keys to move the cursor to "Pattern Editor, and press ◎ key to enter the editing interface of user test pattern as in Figure 2-9.

    For error test analysis, three user-programming patterns can be set up.

    The repetitive character length in user programmable test pattern is 32 bits. The length of current test pattern displays on each user test pattern.

Figure 2-9 User Test Pattern Editing Interface

The function key "1", "0", "-" and "Save-" on the right side correspond with the key F1, F2, F3 & F4 respectively. The explanation of each function key is as follows:

[F1] 1   Set up the bit as "1".
[F2] 0   Set up the bit as "0".
[F3] -   Delete the bit. When the cursor stays on the final bit of the character, press "-" key to delete the whole bit and cut off the length of the whole character by 1 accordingly.
[F4] Save   Save up current user pattern setup.

2.2 Audio test

Audio test shown in Figure 2-10, including : monitoring, listening, audio insertion and DTMF insertion.
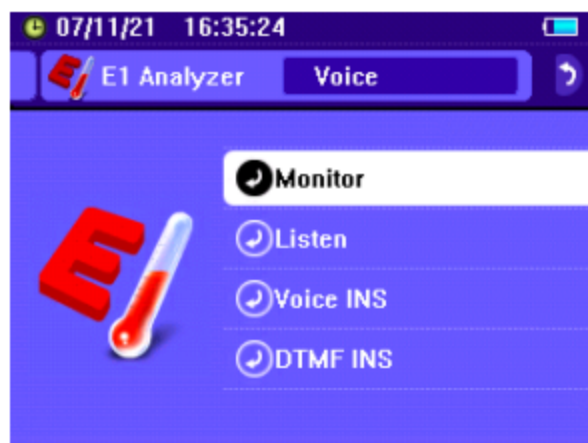
Figure 2-10 State monitoring

2.2.1 State monitoring

Condition monitoring is used to monitor E1-1 and E1-2 occupancy status, access to state monitoring as shown in Figure 2-11:
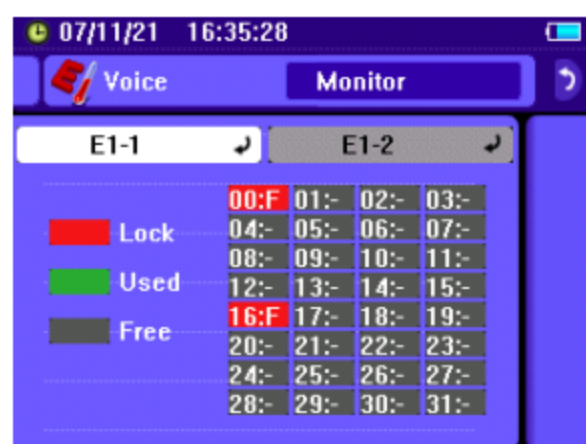
Figure 2-11State monitoring

Into the condition monitoring interface, E1-1 shows the various time slots occupied by the state, right-click E1-2 to switch to the state, according to left return to the E1-1 Monitoring, "ESC" from the condition| monitoring.

2.2.2 Audio listening

Listen to audio interface as shown in Figure 2-12:
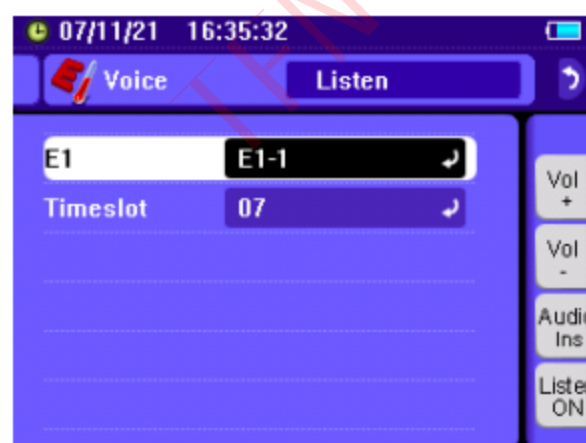
Figure 2-12 Audio listen

Audio interface into the listen, first of all, choose to listen the E1 port, you can choose to E1-1, E1-2, or E1-1 & E1-2, not only can be listen E1-1 and E1-2 in any way, or E1-1 & E1 - 2 At the same time listen. Figure 2-13 below:
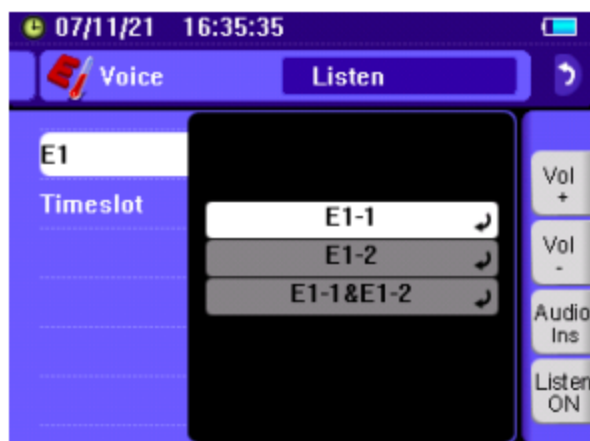
Figure 2-13 E1 Select

Select the E1 port, and then choose to listen the slot, as shown in Figure 2-14:

Figure 2-14 Select listen time slot

Move the cursor to select the time slot, button to confirm, if the monitor E1-1 & E1-2 2 E1 port, it is necessary to separate the two time slot port E1 set.

Audio interface in the monitor corresponding to the four function keys: F1-volume +, F2-volume -, F3-inserted audio / Cancel insert, F4-monitor on / monitor clearance.

2.2.3 Audio insertion

Audio insertion interface, as shown in Figure 2-15:

Figure 2-15 Audio insertion interface

Select E1 into the DTMF insertion interface , as shown in Figure 2-16:
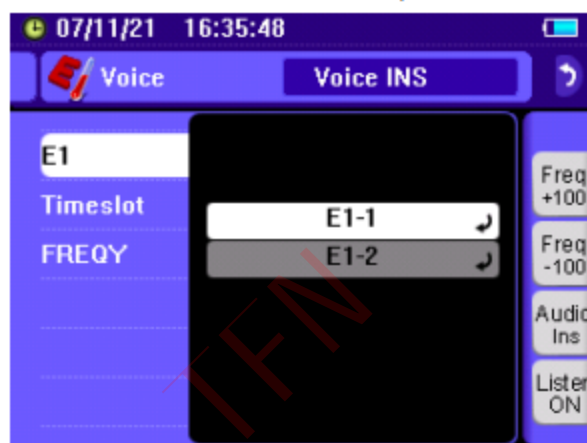
Figure 2-16 E1 select

Inserted in the audio setting can only choose to E1-1 or E1-2, can not select two E1.Choose E1 time slot, and then select Insert audio frequency signal, as shown in Figure 2-17:

Figure 2-17 Frequency select

Insert the audio signal from the frequency of 300Hz - 3400Hz, step 100Hz adjustable. Insert the interface in the audio corresponding to the four function keys: F1-frequency +100, F2-frequency -100, F3-inserted audio / Cancel insert, F4-monitor on / monitor clearance.

2.2.4 DTMF insertion

DTMF insertion interface, as shown in Figure 2-18:

Figure 2-18 DTMF insertion interface

Select E1 into the DTMF insertion interface, as shown in Figure 2-19:

Figure 2-19 E1 select

Inserted in the DTMF setting can only choose to E1-1 or E1-2, can not select the two E1. Choose E1 time slot, and then select Insert DTMF signal, as shown in Figure 2-20:
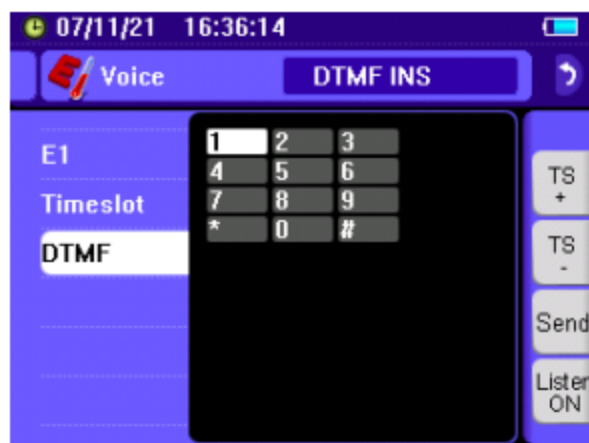
Figure 2-20 DTMF Signal select

Move the cursor to select the DTMF signal, button to confirm. Inserted in the DTMF interface corresponding to the four function keys: F1-slot +1, F2-slot -1, F3-Send / cancel, F4-monitor on / monitor clearance.

2.3 Pass through Test

Select the E1 interface testing "pass test" to confirm to enter the set interface, shown in Figure 2-21.
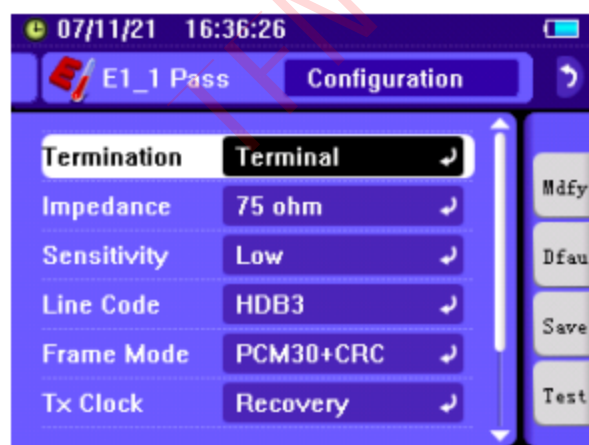
Figure 2-21 Pass test interface

E1 settings to pass the test methods and the same set of conventional tests, in which "Termination", "Tx clock" and "test pattern" can not be amended, and other parameters of the same with the conventional test.

2.4 Pulse Shape test

E1-1 test in interface select "mask test" to confirm the test interface to enter the mask, as shown in Figure 2-22.
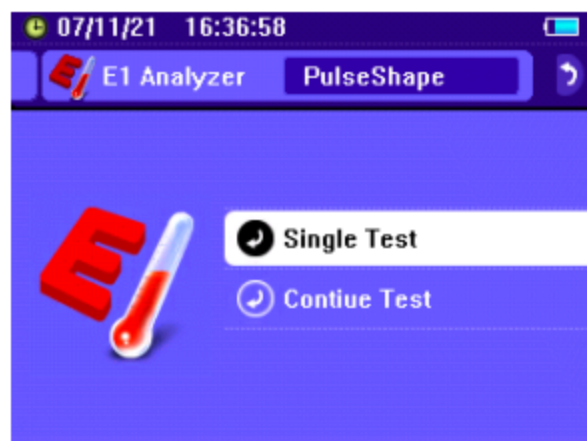
Figure 2-22 Pulse shape test

Mask testing is divided into single and continuous grab grab two options, a single real-time to seize the moment to test the mask, continuous monitoring for grab is a Mask, updated once per second, the results of the interface shown in Figure 2-23.
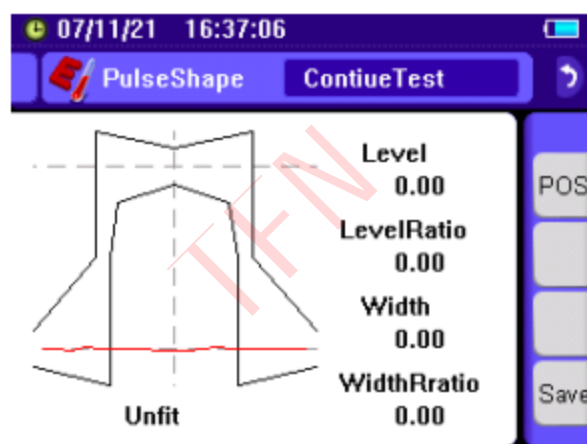
Figure 2-23 Pulse shape result Interface

The results of the interface in the F1 function key to switch positive pulse / negative pulse, F4-storage.

Chapter 3   Result Analysis

3.1 Introduction

When T1000M stays in the E1 normal test menu, select "Start test" to enter BERT test and analysis, or press F4 key in the menu interface of "Parameter setup" and enter the test.

Once the function starts, it will immediately execute the real-time mode of quality analysis of E1 line, including errors counting, alarm seconds counting, 821 analysis, G.826 analysis, M.2100 analysis, alarm-time chart and error-time histogram analysis. Moreover, error insertion operation is available. Execute a test according to "Test time" in "Parameter". Once "15 minutes", "30 minutes", "1 hour" or "24 hours" is selected, the test will automatically stop after the time is over; and once "Consecutive" is selected, press F4 Stop to stop the test.

When a test is executed, the interface displays as in Figure 3-1:
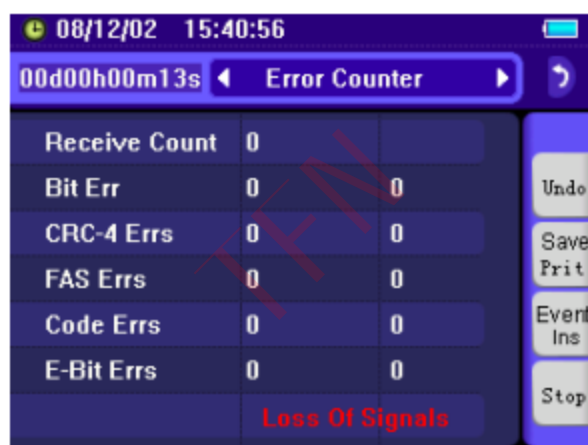
Figure 3-1 Error Counting Interface

There is a display of execution time on left upper corner of the interface after the test starts. **d**h**m**s means **day**hour**minute**second that the test has spent.

Error counting, alarm second counting, G.821 & G.826 analyses, M.2100 analysis, alarm indicator diagram or error histogram display on the right upper corner, and indicate the analysis display mode of the instrument at present.

"Undo", "Save/Printer","Event insert" and "Stop" on right side correspond with the key F1, F2,F3 & F4 respectively.

Undo: press F1 to execute reset function, and return all counts to zero.

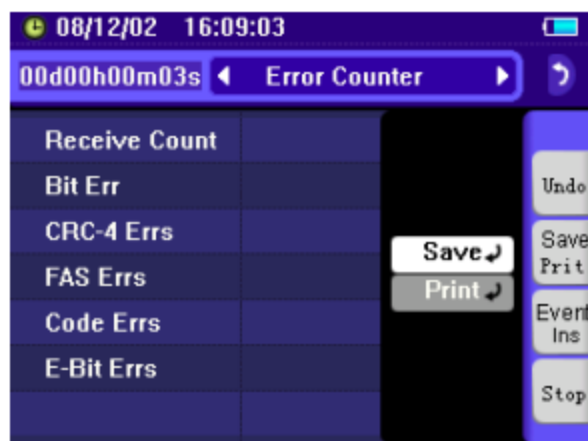Save/Print: press F2 to execute Save/Print function,and save/print current result in Figure 3-2.

Figure 3-2 Save/Print Interface

Select "Save " function interface as in Figure3-3. Move the cursor by ⇦, ⇨, ⇧ & ⇩ keys to the letter or digit in demand, and press the key of letter or digit as file name. " Enter, " Ecs & "Backspace" keys on the right side correspond with F1, F2 & F3 keys respectively.

Select the "Print" is the implementation of printing operation, the test results will be linked with the instrument out of the printer. Print Settings in detail please refer to Chapter7of the miscellaneous settings Print settings.

Figure 3-3 Result save interface

Event insert: press F3 to execute error insertion function as in Figure 3-4. Select to insert CODE ERROR ,FAS ERROR,a single error, or press error rate to insert error for 1e-3, 1e-4, 1e-5, 1e-6 and 1e-7.Alarm：LOS、AIS、LOF、LOMF、CRC、RAI、MRAI、LOP.

Figure 3-4 Event Insertion Setup

Pause: press F4 to execute the pause function to suspend the test as in Figure 3-5.
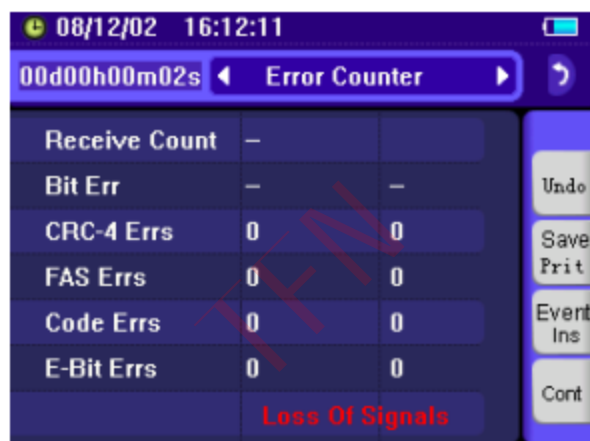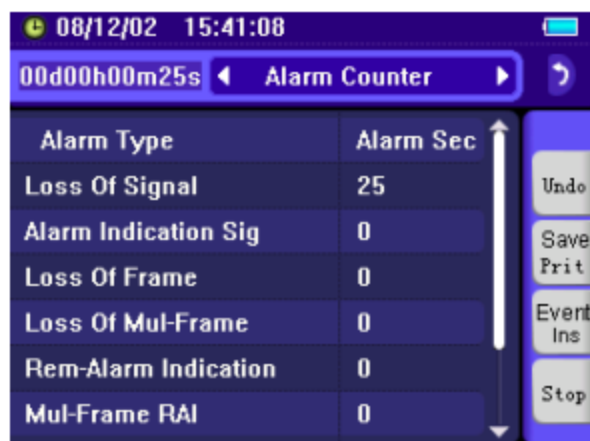
Figure 3-5 Test Pause Interface

Pay attention to the additional "Save print" function on the right side, which corresponds with the key F2. The function of the key F4 changes to "Continue test". Press F4 to continue the test and change the status of the interface as in Figure 3-1.

Press the ⇦ and ⇨ keys to view a display menu of other analysis results. The following is an example:

Alarm Counting Interface

G.821 Analysis Interface

G.826 Analysis Interface

M.2100 Analysis Interface

Alarm Diagram Interface

 The abbreviations on left side in above figure are explained as follows:

LOS: Loss of Signal

AIS: Alarm Indication Signal
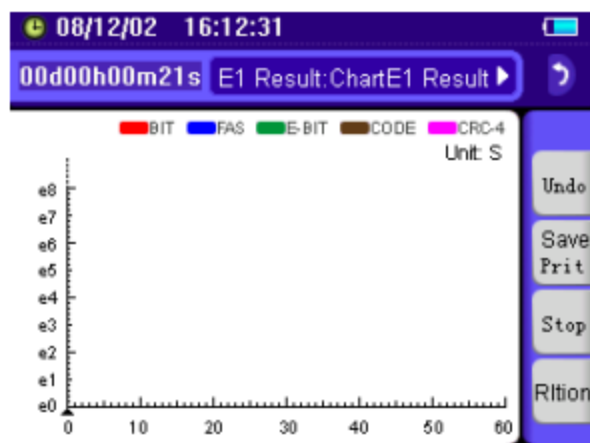
LOF: Loss of Frame Alignment

RAI: Remote Alarm Indication

LOMF: Loss of CAS multi-frame alignment

MRAI: Multi-frame Remote Alarm Indication

CRC: Loss of CRC-4 multi-frame alignment

LOP: Loss of Pattern synchronization

Error Histogram Interface

The abbreviations in upper part in above figure are explained as follows:
BIT: bit error
FAS: frame alignment signal (0011011) error
E-BIT: remote CRC-4 error, with a display of E bit
CODE: HDB3 code alternate polarity error
CRC-4: CRC-4 error
Pay attention to the definition change of function keys on right side in the interfaces of alarm indicating diagram & error histogram. "Pause" corresponds with F3 key; and F4 key is "Resolution". "Resolution" is used for selecting a unit for horizontal coordinate of the diagram on right side, which can be set up as second, minute, hour and day as in Figure 3-6.
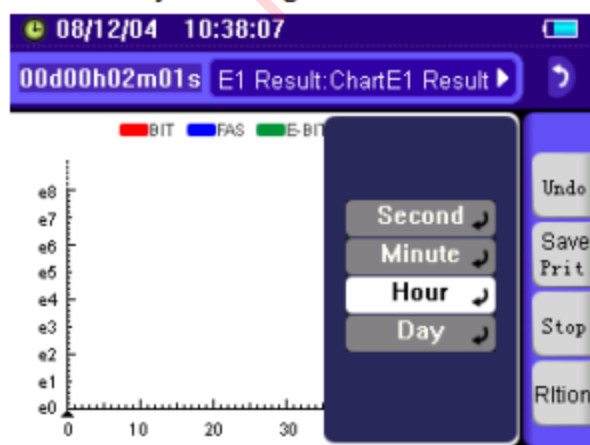

Figure 3-6 Resolution Selection

Chapter4 G.703-64K Test

DTA-BERT / T has G703/64K test function. In the main menu interface in accordance with the arrow   Select "G703/64K test" as shown in Figure 4-1.
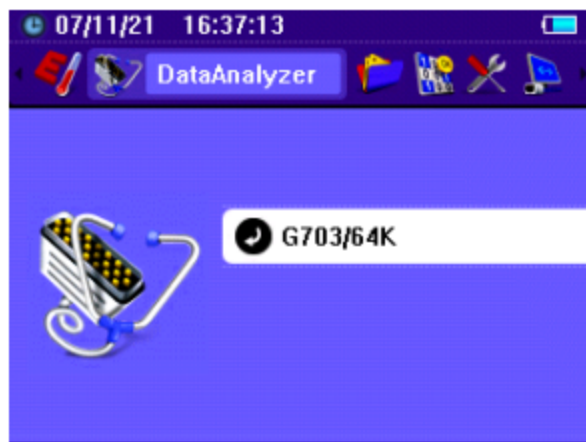

Figure 4-1 G703/64K select interface

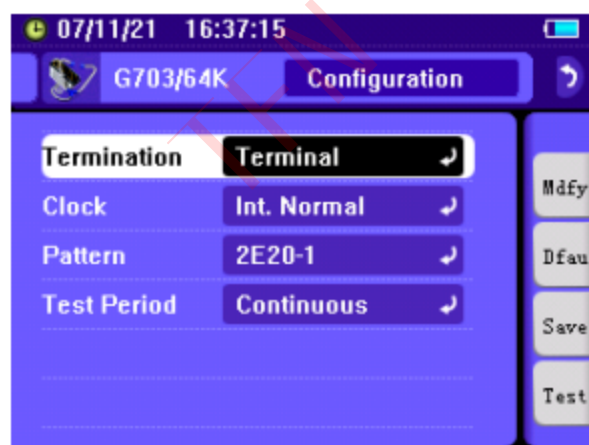Test set G703/64K interface shown in Figure 4-2:

Figure 4-2 G703/64K set interface

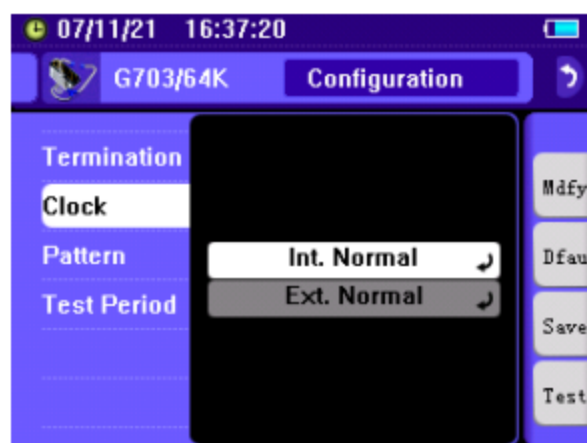CLOCK: internal and external normal clock, as shown in Figure 4-3.

Figure 4-3 Clock set interface
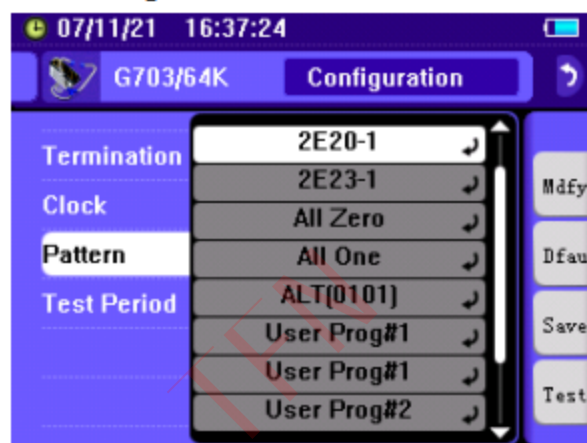
Pattern select shown in Figure 4-4

Figure 4-4 Pattern set interface

Test pattern option in the following table:

Test pattern	511	Pseudo-random sequence pattern: 2E9-1 (O.153)
	2047	Pseudo-random sequence pattern: 2E11-1(O.152 & O.153)
	2E15-1	Pseudo-random sequence pattern: 2E15-1 (O.151)
	2E20-1	Pseudo-random sequence pattern: 2E20-1 (O.153)
	QRSS	Pseudo-random sequence pattern: 2E20-1 (O.151 QRSS)
	2E23-1	Pseudo-random sequence pattern: 2E23-1 (O.151)
	All 1	Repetitive pattern: all 1 (11111...)
	All 0	Repetitive pattern: all 0 (00000...)
	Alternate	Repetitive pattern: alternate 1 & 0 (10101010...)
	1100	Repetitive pattern: 1100
	3 in 24	Repetitive pattern: 3 "1" in 24 bits
	1 in 16	Repetitive pattern: 1 "1" in 16 bits
	1 in 8	Repetitive pattern: 1 "1" in 8 bits
	1 in 4	Repetitive pattern: 1 "1" in 4 bits

	User pattern 1	User programmable pattern 1 with pattern length of 1-32 bit. For detailed setup, please refer to 5.4 User Programmable Test Pattern.
	User pattern 2	User programmable pattern 2 with pattern length of 1-32 bit. For detailed setup, please refer to 5.4 User Programmable Test Pattern.
	User pattern 3	User programmable pattern 3 with pattern length of 1-32 bit. For detailed setup, please refer to 5.4 User Programmable Test Pattern.

Test time setting options are: continuous, 15 minutes, 30 minutes, 1 hour, 24 hours, as shown in Figure 4-5.
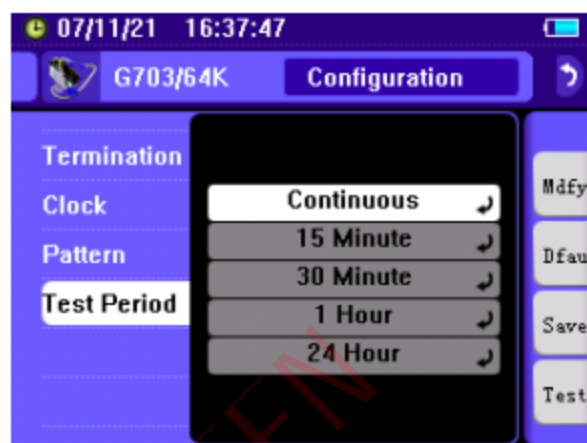

Figure 4-5 time set interface

Set up after the completion of the implementation by the F4 key to testing, the interface display shown in Figure 4-6:

Figure 4-6 result interface

Press ⇐ & ⇒ keys to view the display menu of other analysis results. Figure 4-7 is G.821 analysis interface.

Figure 4-7 G.821 Analysis Interface

Chapter 5   Document Management

5.1 Introduction

When **T1000M** stays in the main menu, press ⇦ & ⇨ keys of the cursor to select " File. The interface displays as in Figure 5-1 and includes "Configuration File and "Result File.
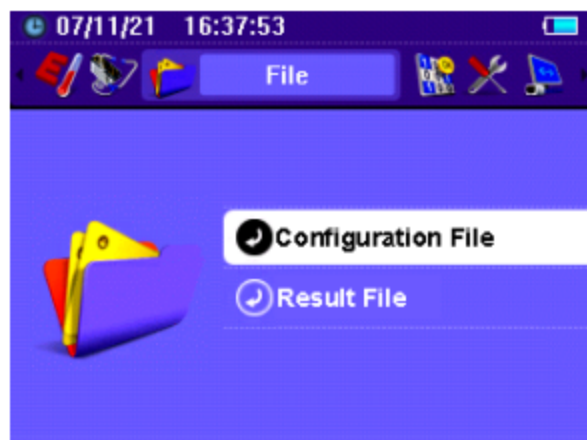

Figure 5-1 Document Management Interface

5.2 Configuration File

Use ⇧ & ⇩ keys to move the cursor to "Configuration File, and press ⊘ **key** to select the function. The instrument displays as in Figure 5-2.

The documents where setup is saved up can be called out, including "E1 ", "High-speed data", "Low-speed synchronous data " and "Low-speed asynchronous data " (for relevant contents, please refer to Chapter 2 E1 Test and Chapter 4 Data Test) as in Figure 5-3. Use ⇧ & ⇩ keys move the config document where the cursor stays. Press F3 to delete a configuration document; and press ⊘ **key** to select a configuration document for calling and viewing, of which all parameters and selected values of the configuration will display on the screen.

Figure 5-2   E1 Config Document Calling Interface

5.3 Result File

Use ⇧ & ⇩ keys to move the cursor to "Result File, and press ⊘ **key** to select the function. The instrument displays as in Figure 5-2.

The documents where test results are saved up can be called out, including "E1 ", "High-speed data ", "Low-speed synchronous data " and "Low-speed asynchronous data " (for relevant contents, please refer to Chapter 2 E1 Test and Chapter 4 Data Test) as in Figure 5-3. Use ⇧ & ⇩ keys move the result document where the cursor stays. Press F3 to delete a result document; and press ⊘ **key** to select a result document for calling and viewing, of which all results of the test will display on the screen.
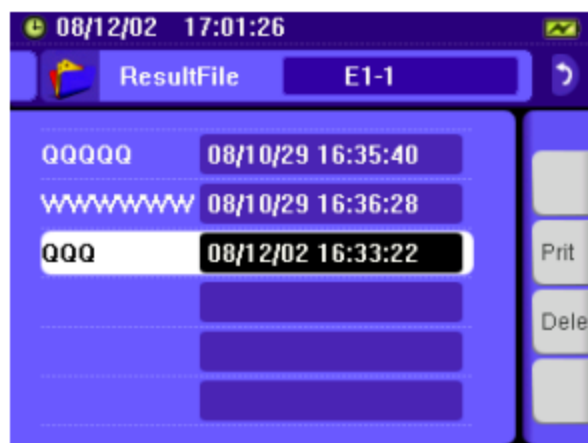

Figure 5-3   E1 Test Result Document Calling Interface

Chapter 6   Advanced Options

6.1 Introduction

When **T1000M** stays in the main menu, press ⇐ & ⇒ keys of the cursor to select "Advanced". The interface displays as in Figure 6-1. "Advanced" comprise several parts including "E1 frequency ", "Pattern Editor, " Round Trip delay", " Signal Bit test"," Signal Bit Editor and "IP PING",which are described as follows.

Figure 6-1 Advanced Options Interface

6.2 E1 Frequency Test

In setup interface of "Advanced options" as in Figure 6-1, use ⇑ & ⇓ keys to move the cursor to "E1 frequency Offset test", press ⊙ **key** to select the function and start E1 frequency deviation test. The instrument displays as in Figure 6-2.
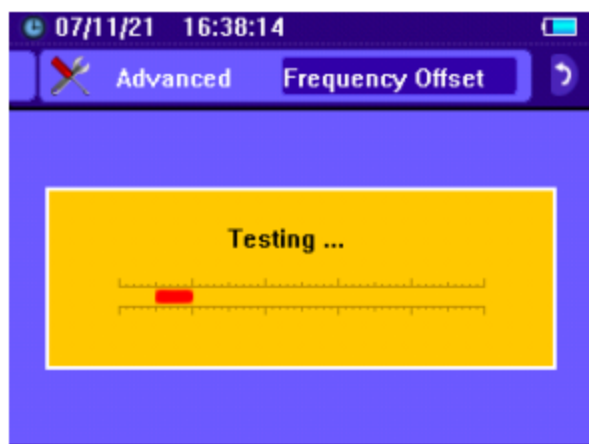

Figure 6-2 E1 Frequency Offset Test Interface

After the test finished, the results display as in Figure 6-3.

Figure 6-3 E1 Frequency Offset Test Result

6.3 Pattern Editor

The pattern editing function is described in Chapter 2 in details. Please refer to 2.1.4 User Programmable Test Pattern for details.

6.4 Round Trip Delay

In setup interface of "Advanced options" of Figure 7-1, use ⇧ & ⇩ keys to move the cursor to " Round Trip delay", and press ⊙ **key** to select the function. The instrument displays as in Figure 6-4. "Round Trip delay" test includes two parts i.e. "E1 channel" delay test and "N*64K channel " delay test.
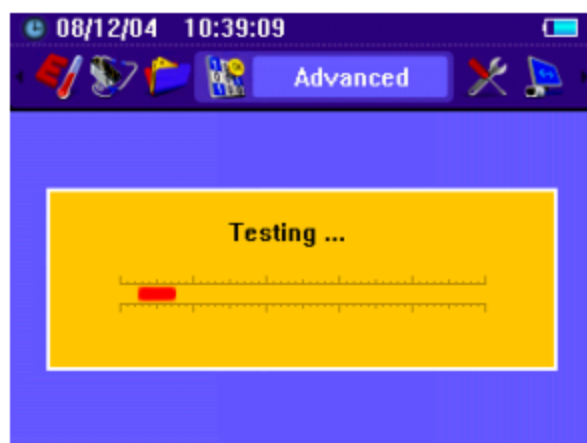

Figure 6-4   Round Trip Delay Test Interface

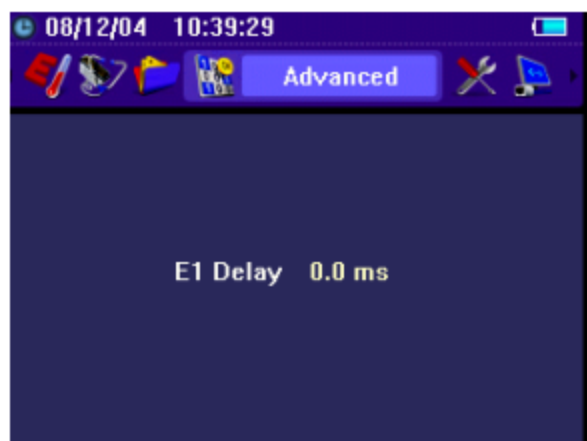After the test finished, the results display as in Figure 6-5.

Figure 6-5 E1 Channel Round Trip Delay Test Result

6.5 Overhead Test

In setup interface of "Advanced options" of Figure 6-1, use ⇧& ⇩ keys to move the cursor to " Signal Bit test", and press ☺ key to select the function. The instrument displays as in Figure 6-7. "Signal Bit test" comprises four parts including "Si-bit test", "Sa bit test", "MFAS test" and " CAS test".
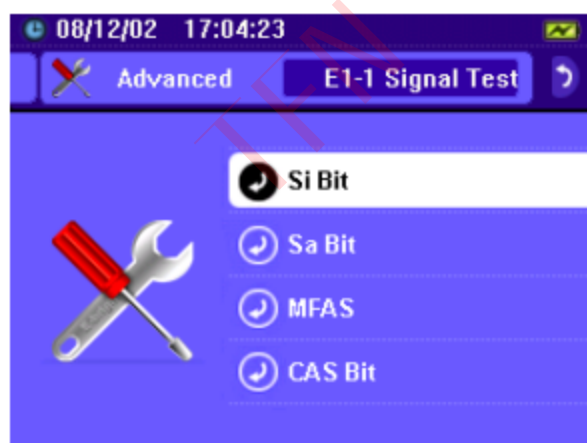

Figure 6-6   overhead Test Selection Interface

6.5.1 Si-Bit Test

Use ⇧ & ⇩ keys to move the cursor to "Si-bit test ", press ☺ key to select the function and start Si-bit test. Test result is as in Figure 6-7.

Figure 6-7   Si-bit Test Result

6.5.2 Sa-bit Test

Use ⇧ & ⇩ keys to move the cursor to "Sa-bit test", press ☉ **key** to select the function and start Sa-bit test. The instrument displays as in Figure 6-8. Sa4–Sa8 bits are the spare bits of E1 and can be applied in unit-to-unit application recommended in ITU-T. The address of Sa4-Sa8 bits is in E1 frame of odd number and inside time slot 0. In one E1 multi-frame, eight E1 frames have Sa bit. Sa bit received will display on the screen in real time as in Figure 6-8.

Figure 6-8 Sa-bit Test Result

6.5.3 MFAS Test

Use ⇧ & ⇩ keys to move the cursor to "Fastest ", press ☉ **key** to select the function and start MFAS test. The instrument displays as in Figure 6-9.
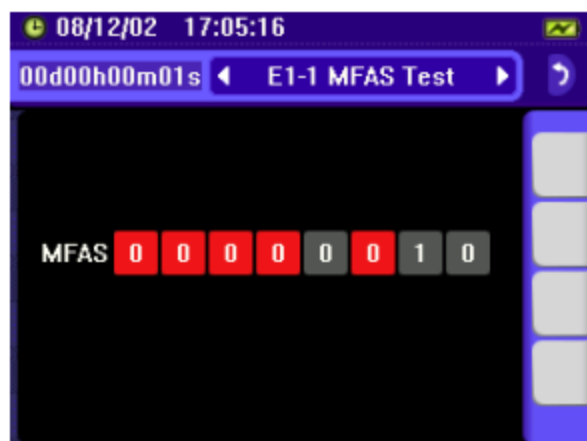
Figure 6-9 MFAS Test Result

6.5.4 CAS Test

Use ⇧ & ⇩ keys to move the cursor to "Signaling test", press ☺ **key** to select the function and start CAS test. The instrument displays as in Figure 6-10.
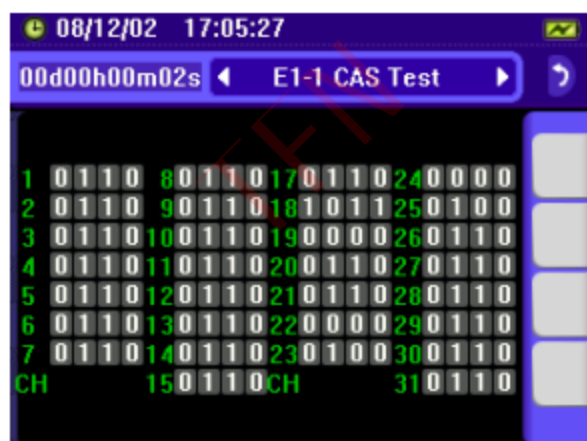

Figure 6-10 CAS Test Result

The menu displays receiving port, each time slot and A, B, C & D signaling bits. (Actual position of A, B, C & D of E1 is time slot 16 of E1 CAS framing mode). When **T1000M** is not in CAS mode, the option will be unavailable.

6.6 overhead Editor

In setup interface of "Advanced options" of Figure 6-1, use ⇧ & ⇩ keys to move the cursor to "Signal Bit Editor, press ☺ key to select the function. The instrument displays as in Figure 6-11. "Signal Bit Editor comprises four parts i.e. "Si-bit setup", "Sa-bit setup", "MFAS setup" and "CAS setup".
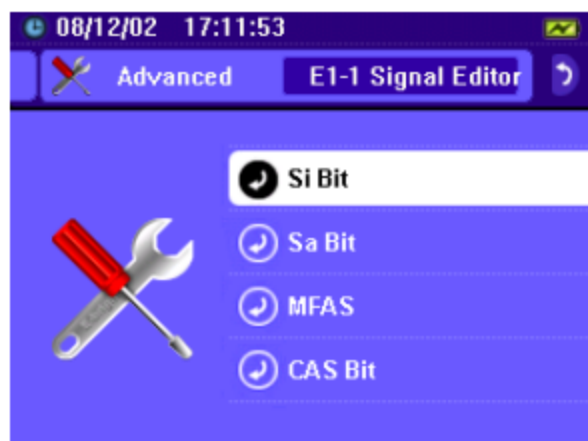
Figure 6-11 Signal Bit Editor Selection Interface

6.6.1 Si-bit Setup

Use ⇧ & ⇩ keys to move the cursor to "Si-bit setup", press ☺ **key** to select the function. The instrument displays as in Figure 6-12

The function keys "1", "0" & "Save setup" on right side correspond with the key F1, F2 & F4 respectively. Various function keys are explained as follows:

[F1] 1   Set up the bit as "1".
[F2] 0   Set up the bit as "0".
[F4] Save setup   Save up current setup.
Each small check that represents one bit displays current status with color.
Red: the bit cannot be set up.
Black: the bit can be set up.
White: the current position of cursor.

Figure 6-12 Si-bit Setup Interface

6.6.2 Sa-bit Setup

Use ⇧ & ⇩ keys to move the cursor to "Sa-bit setup", press ☺ **key** to select the function. The instrument displays as in Figure 6-13. White check indicates current position of cursor.

The function keys "1", "0" & "Save setup" on right side correspond with the key F1, F2 & F4 respectively. Various function keys are explained as follows:

[F1] 1   Set up the bit as "1".
[F2] 0   Set up the bit as "0".
[F4] Save setup   Save up current setup.

Figure 6-13 Sa-bit Setup Interface

6.6.3 MFAS Setup

Use ⇧ & ⇩ keys to move the cursor to "MFAS setup", press ☺ **key** to select the function. The instrument displays as in Figure 6-14.

The function keys "1", "0" & "Save setup" on right side correspond with the key F1, F2 & F4 respectively. Various function keys are explained as follows:

[F1] 1   Set up the bit as "1".
[F2] 0   Set up the bit as "0".
[F4] Save setup   Save up current setup.
Each small check that represents one bit displays current status with color.
Red: the bit cannot be set up.
Black: the bit can be set up.
White: the current position of cursor.

Figure 6-14 MFAS Setup Interface

6.6.4 CAS Setup

Use ⇧ & ⇩ keys to move the cursor to " CAS setup", press ⊙ key to select the function. The instrument displays as in Figure 6-15. When HCT-BERT/C is set up as in E1 CAS framing mode, "Signaling setup" function is available. If HCT-BERT/C isn't in CAS mode, it will be unavailable.

The function keys "1", "0" & "Save setup" on right side correspond with the key F1, F2 & F4 respectively. Various function keys are explained as follows:

[F1] 1   Set up the bit as "1".
[F2] 0   Set up the bit as "0".
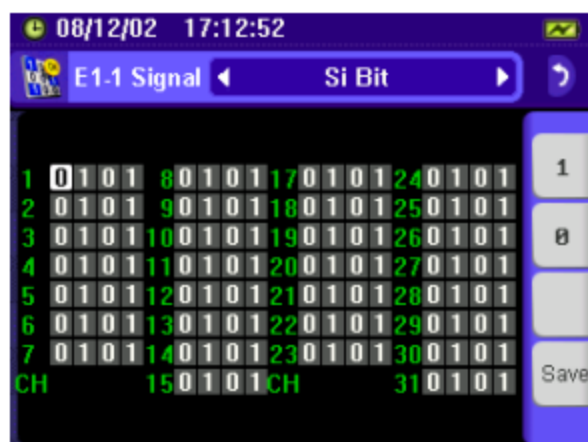[F4] Save setup   Save up current setup.

Figure 6-15 CAS Setup Interface

6.7 IP PING

In setup interface of "Advanced options" of Figure 6-1, use ⇧ & ⇩ keys to move the cursor to "IP PING", press ⊙ key to select the function. The instrument displays as in Figure 6-16.

Figure 6-16 IP PING Interface

In the interface of instrumentation ,IP address, mask, gateway, destination IP address, packet length and quantity. Set the interface as shown in Figure 6-17.
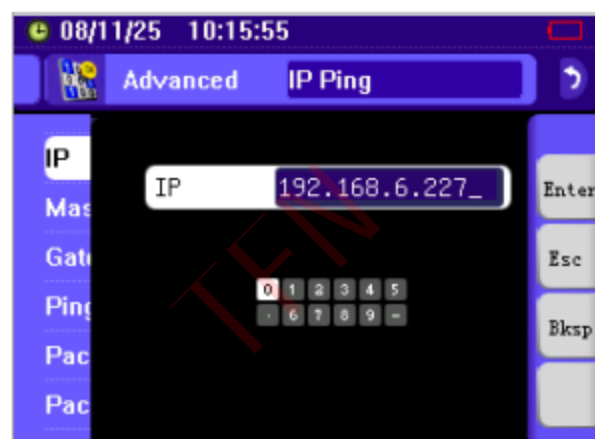

Figure 6-17 Parameter setting interface

Settings are completed, press F1 start PING test, the test results shown in Figure 6-18.

Figure 6-18 IP PING test results interface

Chapter 7 Device

7.1 Introduction

When **T1000M** stays in the main menu, press ⇦ & ⇨ keys of the cursor to select " Device. The interface displays as in Figure 7-1. "Instrument setup" includes "version information", " Factory Default, "Language Select, " Sound setup" & "Miscellaneous setup", which are described as follows.
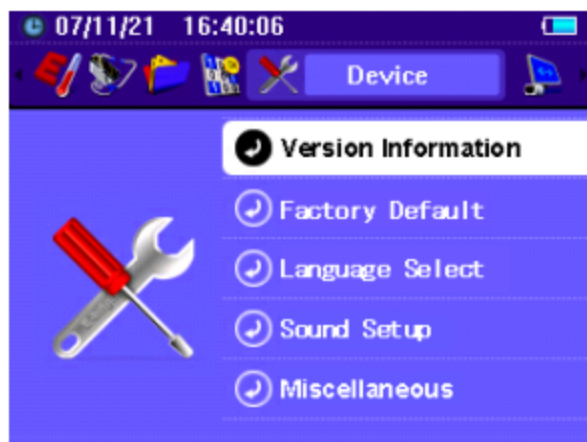

Figure 7-1 Device Setup Interface

7.2 Version Information

In the interface of " Device of Figure 7-1, use ⇧ & ⇩ keys to move the cursor to "Version information", press ⊙ **key** to select the function. The instrument displays hardware and software versions as in Figure 7-2.

Figure 7-2 Version Information Interface

7.3 Factory Default

In the interface of "Device of Figure 7-1, use ⇧ & ⇩ keys to move the cursor to "Factory Default, press ☉ **key** to select the function. The instrument displays as in Figure 7-3. The user can use ⇧ & ⇩ keys to select "Yes", and press ☉ **key** to confirm the operation and restore various parameters of the device to the default setup when it is issued from the factory; and select "No" to cancel the operation and return the interface to Figure 7-1.
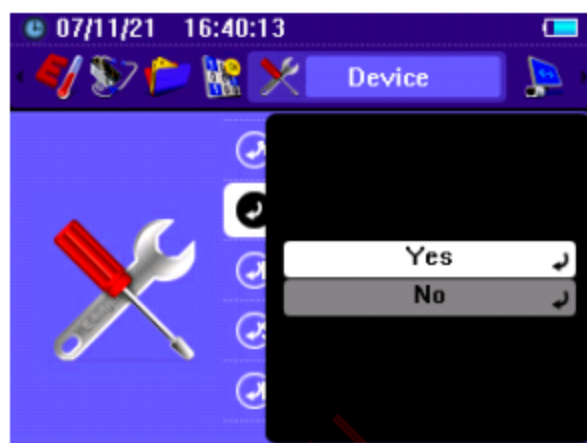

Figure 7-3 Default Setup Confirming Interface

7.4 Language Select

In the interface of "Device of Figure 7-1, use ⇧ & ⇩ keys to move the cursor to "Language Select, press ☉ **key** to select the function. The instrument displays as in Figure 7-4.

Display interface in Chinese or English is available. Use ⇧ & ⇩ keys to move the cursor to the language type to be selected, and press ☉ **key** to confirm.

Figure 7-4 Language Select Interface

7.5 Sound Setup

In the interface of "Device of Figure 7-1, use ⇧ & ⇩ keys to move the cursor to " Sound setup", press ☉ **key** to select the function. The instrument displays as in Figure 7-5.

Sound setup includes "Key Sound setup" and "Alarm Sound setup". Use ⇧ & ⇩ keys to move the cursor to the option to be set up, and press ☉ **key** to select the function. The instrument displays as in Figure 7-6. Use ⇧& ⇩ keys to open or close Sound function, and press ☉ **key** to conform.
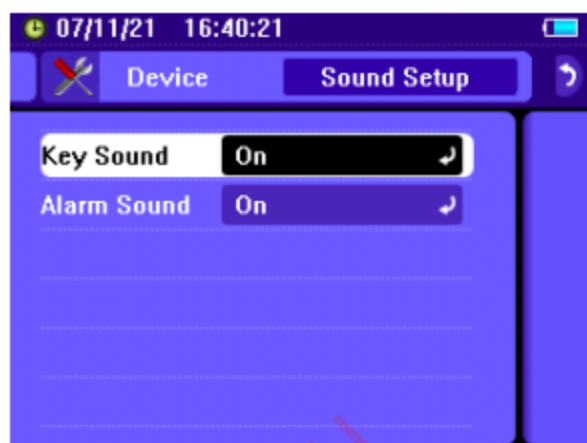

Figure 7-5 Sound Setup Interface

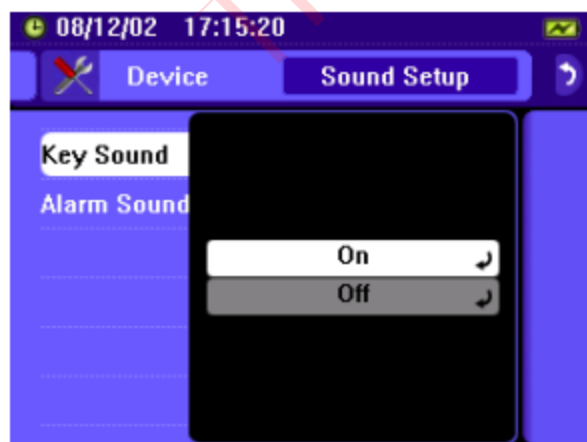Figure 7-6 Sound Setup Selection Interface

7.6 Miscellaneous Setup

In the interface of "Device of Figure 7-1, use ⇧ & ⇩ keys to move the cursor to "Miscellaneous ", press ☉ **key** to select the function. The instrument displays as in Figure 7-7.

"Miscellaneous setup" includes "Printing mode setup", "Interval timing" and "Date setup", "Time setup" and "Screen backlight", which are described as follows.

Figure 7-7 Miscellaneous Setup Interface

7.6.1 Print Mode Setup

In "Miscellaneous setup" interface as in Figure 7-7, use ⇧ & ⇩ keys to move the cursor to "Print mode setup", and press ⊘ **key** to select the function. The instrument displays as in Figure 7-8.

Three print modes are available:

Handle: i.e. manual print function. In test interface, press the function key "Save print" on right side of the instrument, and select print to start print function (for detailed operation, please refer to Chapter 3 E1 Test and Chapter 4 Data Test);

Print on Error: i.e. start to print automatically in case of an error in the test;

Interval print: i.e. print the test result at an interval of time set up by "Print timing" (for detailed setup, please refer to 8.6.2 Print Timing).
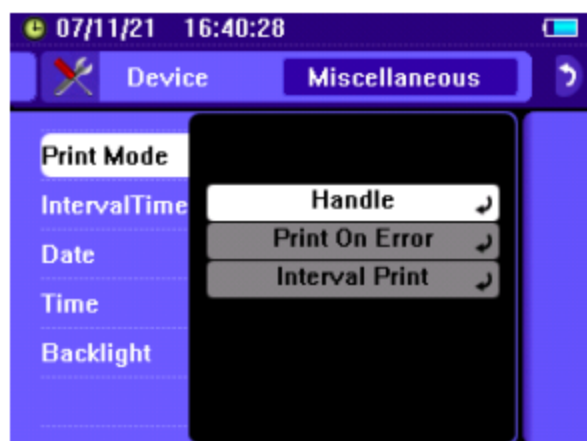

Figure 7-8 Print Mode Setup Interface

7.6.2 Interval print

In "Miscellaneous setup" interface as in Figure 7-7, use ⇧ & ⇩ keys to move the cursor to "Print timing", press ☉ **key** to select the function. The instrument displays as in Figure 7-9.

In case of Interval print in "Print mode setup", the instrument will print the test result at an interval of time set up by "Print timing". The interval of time can be 5 minutes, 15 minutes, 30 minutes or 1hour.
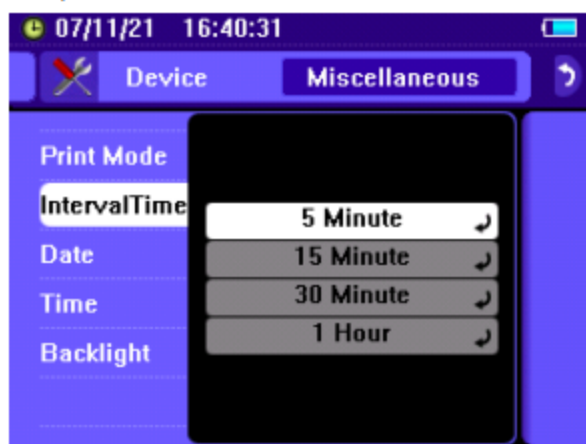

Figure 7-9 Print Timing Setup Interface

7.6.3 Date Setup

In "Miscellaneous setup" interface as in Figure 7-7, use ⇧ & ⇩ keys to move the cursor to "Date setup", press ☉ **key** to select the function. The instrument displays as in Figure 7-10.

Figure 7-10 Date Setup Interface

Use ⇦ & ⇨ keys to select the year, month & day for modifying. Highlight check is the area where the cursor stays. Use ⇧ & ⇩ keys to change the value of date, and press ☉ **key** to confirm.

7.6.4 Time Setup

In "Miscellaneous setup" interface as in Figure 7-7, use ⇧ & ⇩ keys to move the cursor to "Time setup", press ☻ **key** to select the function. The instrument displays as in Figure 7-11.

Use ⇦ & ⇨ keys to select the hour, minute & second for modifying. Highlight check is the area where the cursor stays. Use ⇧ & ⇩ keys to change the value of time, and press ☻ **key** to confirm.

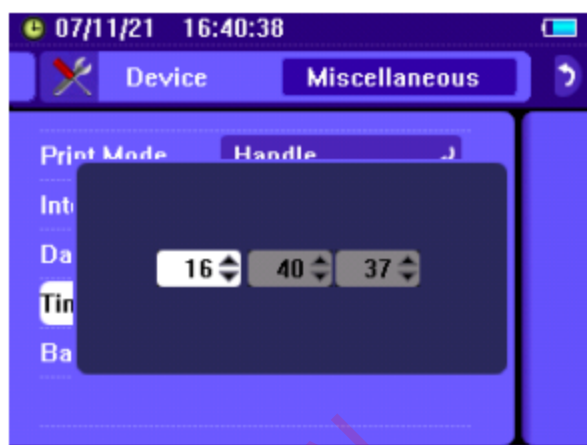Figure 7-11 Time Setup Interface

7.6.5 Screen Backlight Setup

In "Miscellaneous setup" interface as in Figure 7-7, use ⇧ & ⇩ keys to move the cursor to "Screen backlight", press ☻ **key** to select the function. The instrument displays as in Figure 7-12.

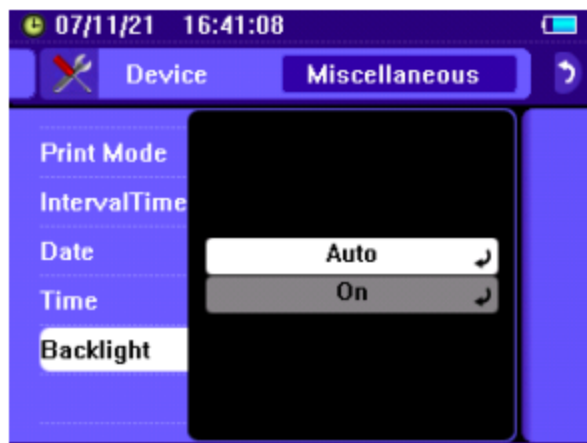Figure 7-12 Screen Backlight Setup Interface

"Automatic" or "Normally on" is available for "Screen backlight selection". In case of "Automatic", the backlight turns off when the instrument doesn't act within two minutes consecutively. The screen becomes blank automatically if it doesn't act within five minutes consecutively. In case of "Normally on", the backlight of instrument will always turn on.

Chapter 8 Terminal

The instrument is controlled via remote terminal. PC can finish instrument programming & various operations via USB interface of the instrument in virtue of terminal software.

The instrument can update software and download file via USB interface and be output to peripheral equipments.

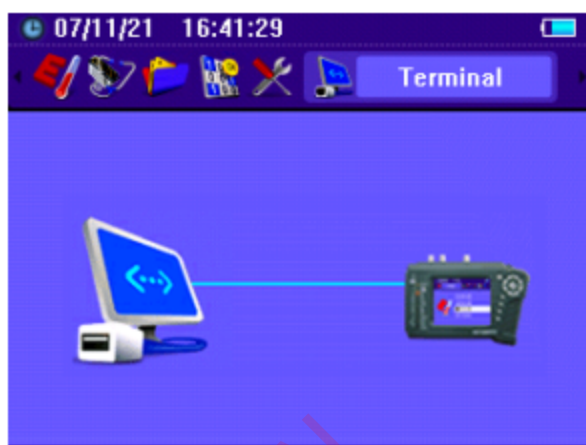The instrument is connected with PC via USB cable as in Figure 8-1:

Figure 8-1 Terminal Connection

In this status, the documents of the instrument stored on PC can be accessed, including result document and config document, and can be saved up in PC or be printed.

Appendices:

1. DB26 Pin Assignment as follows:

Pin	Signal	Notes
1	/STROBE	/STROBE pulse sent out along with data
2	DATA 1	Parallel data 1-8 bits signal. In case that the data is logic 1, it is high level. In case that the data is logic 0, it is low level.
3	DATA 2	
4	DATA 3	
5	DATA 4	
6	DATA 5	
7	DATA 6	
8	DATA 7	
9	DATA 8	
10	GND	
11	BUSY	In case high received signal, printer cannot receive data. High signal due to reasons as follows: In case of vacant data In case of printing In case of being offline In case of printer failure
12	GND	
13	GND	
14	/AUTO FEED XT	Supply to the printer via 10K resistance+5V
15	/SLCT IN	Grounding (GND).

2. E1 Balance Interface (RJ-45) Pin Assignment:

Pin 1	Receive
Pin 2	Receive
Pin 3	
Pin 4	Transmit
Pin 5	Transmit
Pin 6	
Pin 7	GND
Pin 8	GND

3. G.703-64K Interface (RJ-48) Pin Assignment：

Pin 1	
Pin 2	
Pin 3	Transmit
Pin 4	Receive
Pin 5	Receive
Pin 6	Transmit
Pin 7	
Pin 8	

4. T1000M parts list：

Ref	Item	Product name	Qty
1	Main machine	T1000M (including 7.5V Li-battery)	1
		Instrument handle tape	1
2	Standard parts	L9BNC-BNC cable	4
3		earphone	1
4		USB interface cable (straight-through cable)	1
5		Print cable DB26C36M-Printer	1
6		220V-9V/2A power adapter	1
7		DB26-RJ45 Adaptor	1
8		Operating manual	1
9		Pack	1
10		External packing carton	1

Contacting Customer Service

Please check our website (www.tfngj.com) for updates to this manual and additional application information. If you need technical or sales support, please contact local TFN Technologies Customer Service.

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THANK YOU FOR CHOOSING

TFN-QINGDAO FATE TECHNOLOGY