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GRANDWAY OPTICAL INSTRUMENTS SERIES

User's Guide to the TLP-3C

2M Transmission Analyzer

TLP-3C | *English Version*

QUALITY ASSURED FIRM
ISO 9001
SGS

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1. Overview

2M Transmission Analyzer is a multi-functional and full- featured digital transmission system test device, designed for the installation test, engineering check and acceptance, daily maintenance of digital networks, mainly performing channel test, alarm analysis, fault finding and signalling analysis. In addition, this instrument further provides various protocol converters with one-way and bi-directional bit error test function. These capabilities make it ideal for field use.

1) 2M measurement

l 75Ω and 120Ω line interfaces

l HDB3 and AMI line codes

l Out-of-service 2Mb/s, N×64kb/s BER testing

l In-service framed and unframed double-channel testing

l “PCM simulator” mode testing

l Frame data control and monitoring

l Timeslot activity monitoring, FAS, N-FAS, TS16MFO analysis

l Built-in 64kb/s tone channel listen capability

l CAS and CCS signaling generation and monitoring

l Round trip delay measurement

l APS delay measurement

l Extensive error and alarm generation

l VF tone generation and measurement

l Level measurement

l Pulse mask measurement

l Clock slip measurement

l Up to ±999ppm transmit clock deviation

l Clock source: Internal, Interface or External 2M clock/signal

l Real-time transmit circuit open/short indication

2) Datacom measurement

l Datacom (V.24, V.35, V.36, X.21, RS-449, RS-485, EIA-530 and EIA-530A) interfaces BER Testing

l ASYNC BER testing with baud rate 300b/s～38..4Kb/s

l SYNC BER testing with data rate 300b/s～8Mb/s

l DTE or DCE emulation

l SYNC clock source and sense selection

l Frequency measurement

l Handshaking signals control and monitoring

3) G.703 CO measurement

l G.703 CO 64kb/s BER testing

l Octet timing control and monitoring

Clock source: Internal, Interface selectable

4) Protocol converter measurement

- 2M-Datacom SYNC 64k or N×64kb/s BER testing
- 2M-G.703 CO SYNC 64kb/s BER testing
- Frequency and offset measurement
- Handshaking signals monitoring
- 2M frame data and alarm monitoring

5) Other functions

- Real-time clock
- Test pattern: PRBS, Fixed Code and 16-BIT User Word

l Error injection: Single and Fixed Rate

l Manual and auto-timer measurement

l ITU-T G.821, G.826, and M.2100 performance analysis

6) **Optional Teting functions**

Jitter measurements to ITU-T standard O.172

l Frequency and offset measurement

2. Appearance

2.1 Front Panel

① Status、Alarm LEDs
② LCD Display
③ Speaker
④ Power
⑤ Operating Key
⑥ Functional Key
⑦ Cursor Move Key

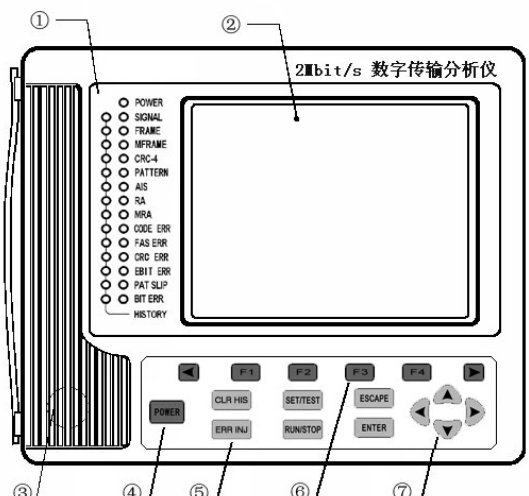


Figure2.1. Front Panel

2.1.1 Status, Alarm LED Indicators

As Figure 2.2, the LEDs indicate the port status of Rx1 or DATA.

The LEDs of right side indicate current status, the LEDs which light green indicate normal conditons, and the LEDs which light red indicate that any error or alarm conditions occur. When the event finish, the LEDs are turned off.

The LEDs of left side indicate history record, when the event occur, the correspond LED lights yellow even the event finish, until clear by pressing the key **CLR HIS.**

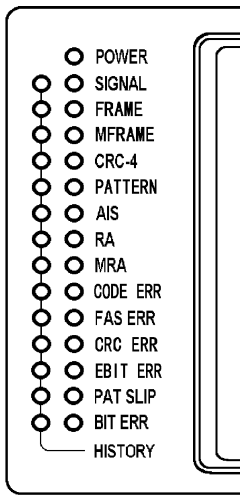


Figure2.2 LEDs Indicator

LED Indicators:

POWER Power indicator. the LED light green indicates that tester power is supplied by

built-in batteries or power charger normally, light red indicates that the power is supplied by built-in batteries and the power is low,light orange indicates that the power is supplied by power charger and the built-in batteries is recharging.

SIGNAL Rx1 or DATA Signal status indicator.

FRAME Rx1 signal Frame indicator

MFRAME Rx1 signal Multiframe indicator

CRC-4 Rx1 signal structure indicator

PATTERN Rx1 or DATA signal Pattern indicator

AIS Rx1 or DATA Alarm Indication Signal indicator

RA Rx1 signal Remote Alarm indicator

MRA Rx1 signal Multiframe Remote Alarm indicator

CODE ERR Rx1 signal Code Error indicator

FAS ERR Rx1 signal FAS Error indicator

CRC ERR Rx1 signal CRC Error indicator

EBIT ERR Rx1 signal EBit Error indicator

PAT SLIP Rx1 or DATA signal pattern slip indicator

BIT ERR Rx1 or DATA signal Bit Error indicator

2.1.2 LCD Display

LCD Display is made up of three parts, shown as Figure 2.3

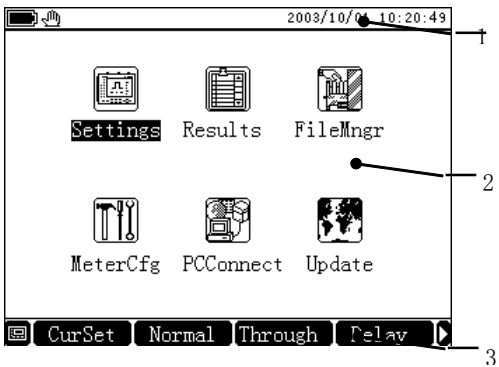


Figure 2.3 LCD Display

① Status Display

The Status Display part is at the upper side of LCD Display,day and time is displayed at the right side.The icons at the left side indicate the status of tester.

The tester power is supplied by built-in batteries,and indicate the left power of the batteries.

The tester power is supplied by power charger.

The tester is not testing.

 The automatic test timer has been set and indicates the timer tester will start the automatic test testing function at the specified time.

 The tester is running test.

 Error Code is being injected

 When Code Error or Alarm is detected,the speaker will beep out a warning

 Viewing saved Setting or Result record

 Printing

 Open Com for communication with PC

 The keypad is locked,only key ◀ and key POWER work, you can unlock the keypad by pressing key ◀.

 The screen is locked.

② Main Display

The Main Display part display test settings and results.

③ F1 F2 F3 F4 Function Key and和 ◀ ▶ Function Extend Key Display

The Function Key Display part is at the buttom of LCD Display, every function key correspond

to the function display at the Function Key Display area, the Function Extend Key extend more function of the function key.  is shortcut functional key.

2.1.3 Speaker

Listen in the channel, the volume can be adjusted at the menu “listen” or “Audio”.

2.1.4 Keypad

The Keypad is made up of 4 parts, power key, function key, operating key and cursor move key, shown as Figure 2.4

Figure 2.4 Keypad

①POWER Power key

Power on or off the tester

②Operating key

CLR HIS Clear History, clear the alarm history.

ERR INJ Error Injection, inject errors when sending signal.

SET/TEST Set/Test switch, switch between Settings and Results interface.

RUN/STOP Run/Stop, run testing or stop testing.

ESCAPE Escape key, escape to the upper interface, finally return to the main interface

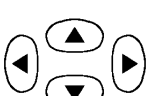
ENTER Enter key, perform the F1 key function.

③Functional key

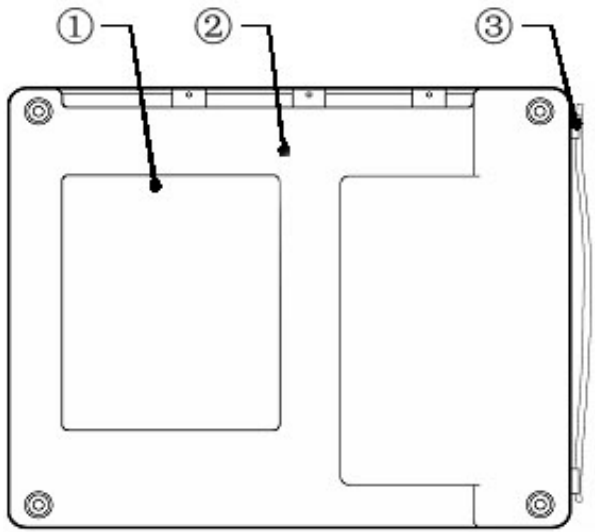
F1 F2 F3 F4 Functional Key(short for **F** key)。The function correspond to the Function Key Display.

◀ ▶ Function Extend Key, Extend the Function Key.

④Cursor Move Key



Move the Cursor towards the direction.



2.2 Back Panel

① Tester Information

② Reset Hole: Reset the tester

③ Carrying Case

Figure 2.5 Back Panel

2.3 Side Panel

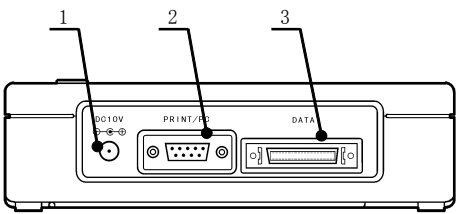


Figure 2.6 Side Panel

① External Power Supply socket.

② RS232, communicating with printer or PC

③ DATACOM,can be switch to various standard interface via switch cable.

2.4 Upper Panel

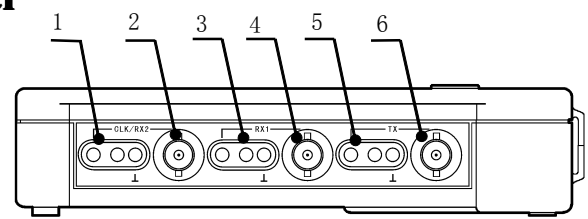


Figure 2.7 Upper Panel

② ④ ⑥ Unbalanced interface

3. Main Interface

You can enter Main Interface by performing below operation

(1) Power On

(2) Press Escape Key once or more times

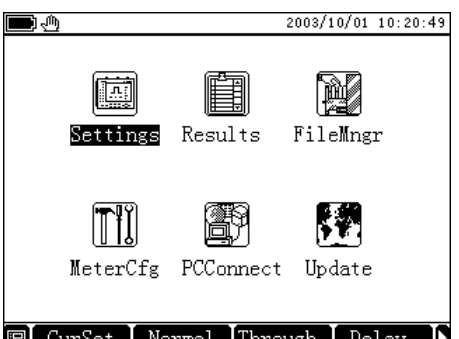


Figure 3.1 Main Interface

3.1 Interface select

You can enter the follow interface from Main Interface:

Settings

Move the cursor to the place of Settings, press Enter into the Settings Interface. When the cursor is at the place of Settings, you can set the Work Mode as Normal Test, or Through Test, or Delay Test, or Audio Test, or APS Test by pressing corresponding **F** key.

Results`

Move the cursor to the place of Results, press **Enter** into the Result interface.when the cursor is at the place of Results, you can enter the Results, TS Analysis, Listen, G.703 interface by pressing corresponding **F** key.

FileMngr

Move the cursor to FileMngr, you can enter the SetMngr or RsltMngr interface by pressing corresponding **F** key。

MeterCfg

Move the cursor to MeterCfg, you can set the configration of Display, Printset and Datetime in this interface.

PC Connect

Move the cursor to PC Connect, press **Enter** or **F1** to turn off the connection, press **F2** to turn on the connection, and the icon  is displayed at the Status Display.

Update

Move the cursor to Update, press Enter or F1 to enter the Update introduction interface.

3.2 Shortcut

You can enter some main interface from any interface fast, additionally you can perform keypad lock function by shortcut.

In any interface, when  is displayed at the Function Extend Key area, press ◀ , the left buttom of the LCD Display will popup a shortcut menu, press ◀ again, the menu disappear.

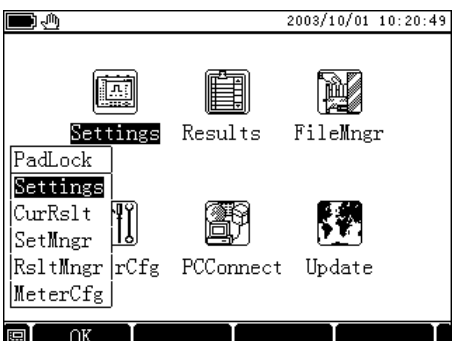


Figure 3.2 Shortcut Menu

Move the cursor to the item in the menu, press **Enter** or **F1** select **KeyPad Lock** or enter the interface **Settings**, **Results**, **SetMngr**, **RsltMngr** or **MeterCfg**.

4. Settings

In this interface, you can set the test items and parameters.

4.1 Tx/Rx1/DATACOM

It is the interface of 2Mbit/s, Tx is on the left side and Rx is on the right side, shown as Figure 4.3.

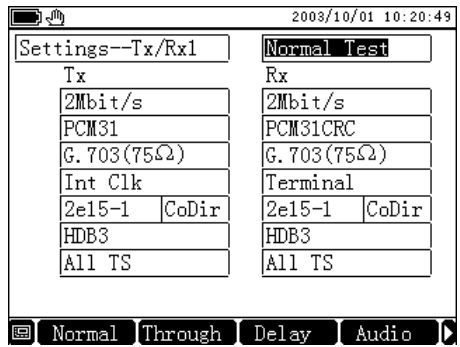
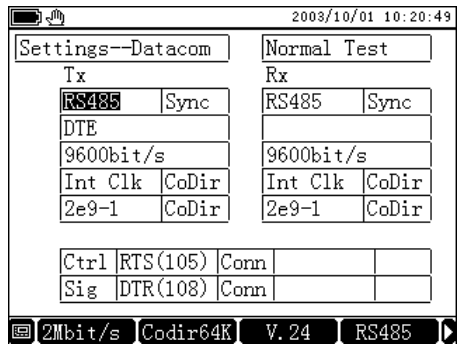


Figure 4.1 2Mbit/s

It is the interface of DATACOM, Tx is on the left side and Rx is on the right side, shown as Figure 4.2.



Figue 4.2 DATACOM

4.1.1 Interface Information

Move the cursor to **InfcInfo**, you can select **PrePage**, **NxtPage** or **ProSet**.this interface is made up of 4 parts: **Tx/Rx1/DATACOM**, **Clk/Rx2**, **OtherSet**, **PrintSet**.

4.1.2 Work Mode

Move the cursor to Work Mode,you can select the item below:

Normal Test: Normal Test is used for testing Error Code, Slip, Channel etc.

Through Test: Set the Work Mode as Through Test.

Audio Test: Set the Work Mode as Audio Test, you can test the Frequency, Level of the TS channel.

Delay Test: Test 2Mbit/s, n × 64kbit/s, V interface channel for Round trip delay measurement.

APS Test:` APS Test is used for testing Auto Protect Second

4.1.3 (Tx)、(Rx)

Move the cursor to the Rx,you can select the item below

Rx: Tx is independent of Rx parameter, can be set individually.

Rx=Tx: Rx parameter is same as Tx, when Tx is changed, Rx will be changed as Tx.

4.1.4 Interface Mode

Move the cursor to the Interface Mode, you can select the item below. The InfcMode of Rx is same as the one of Tx.

2Mbit/s: Test 2Mbit/s channel

Codirectional 64k: Test 64kbit/s channel

V.35: Test V.35 data channel

V.24: Test V.24 data channel

X.21: Test X.21 data channel

RS449: Test RS449 data channel

4.1.5 Signal Form

Move the cursor to Signal Form at Tx side, you can set item value below:

Unframed: Unframed signal form

PCM31: 31 signal form

PCM31CRC: 31 signal form with CRC-4

PCM30: 30 signal form, TS 16 transmit code

PCM30CRC: 30 signal form, TS 16 transmit code with CRC-4

4.1.6 DATA Port

Move the curor to Data Port, you can select the item below:

G.703(75Ω): 75Ω unbalanced interface.

G.703(120Ω): 120Ωbalanced interface.

4.1.7 Clock Mode

Move the curor to the Clock Mode, you can select the item below:

Internal Clock: Clock source is from Internal Clock.

Clock Derived : Clock source is the clock derived form input signal.

External Clock: Clock source is from External Clock. External Clock signal is 2.048MHz or 2.048Mbit/s.

4.1.8 Pattern

Move the curor to the Pattern of Tx, you can select the item below:

2e9-1: Set Pattern as 2e9-1. As ITU—T0.151 define.

2e11-1: Set Pattern as 2e11-1.

2e15-1: Set Pattern as 2e15-1.。

WORD: Set Pattern as 8bit code. When select the item WORD, the function of **F1** is set 1, and the function of **F2** is set 0. press ◀ or ▶ to move cursor, press F key to set value.

Online Test: It is used for 2Mbit/s Error Code Online Test, and Bit Error、Pattern Slip and Pattern Loss Test are unavailable.

4.1.9 Pattern Porality

Move the cursor to Pattern Porality, you can select the item below

Codirectional: The Pattern direction is codirectional as ITU—T0.151 defined.

Inverted: The Pattern direction is inverted as ITU—T0.151 defined.

4.1.10 Wave Form

Move the cursor to Wave Form, you can select the item below

HDB3: Input signal line code is HDB3.

AMI: Input signal line code is AMI.

4.1.11 Time Slot Select

Move the cursor to TS Select, you can select the item below

All TS: Press **F2** to select All TS.

it will set 30 timeslot as test channel while signal form is PCM30CRC or PCM30;

it will set 31 timeslot as test channel while signal form is PCM31CRC or PCM31.

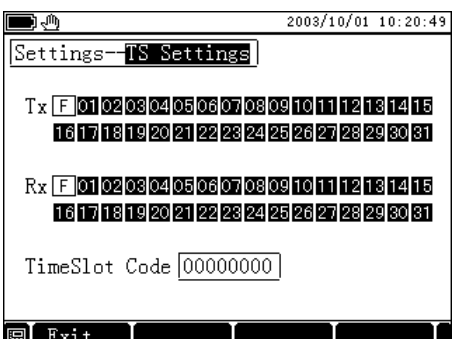


Figure 4.7 TS Settings

n*64k: Press **F1** to select n*64k, choose any timeslot as test channel.
Perform n*64k select function to enter TS Config interface shown as Figure 4.7。

Set Timeslot:

Move the cursor to the timeslot you want to set, press **F1** to select the timeslot, the timeslot No. is displayed black. Press **F2** to deselect the timeslot, the timeslot No. is display white.press **F3** to select all timeslots, press **F4** to clear all timeslot. The pattern will be injected into the selected timeslot.

Set Timeslot code

Move the cursor to the bit you want to set in the timeslot code, press **F1** to set it 1, press **F2** to set it 0.

4.1.12 Signal Port

Move the cursor to Signal Port, you can select the item below

Terminal：Signal input impedance is 75 Ω or 120Ω.

Bridge： 75Ω或120Ω.Signal input impedance is high, more than 75 Ω or 120Ω.

Monitor：Signal input impedance is 75 Ω or 120Ω and 26 dB plus for input signal.

4.1.13 Emulation Mode

Move the cursor to Emulation Mode, you can select the item below.

DTE：Emulation DTE mode.

DCE：Emulation DCE mode.

4.1.14 Speed

Move the curor to Speed, you can select the item below:

PreSpeed：Speed decrease.

NxtSpeed：Speed increase.

4.1.15 Clock Porality

Move the cursor to Clock Porality, you can select the item below:

CoDirect：Clock porality is codirectional.

Inverted：Clock porality is inverted.

4.1.16 Control Signal

Move the cursor to Control Signal, you can select the item below:

Connect:　　Control signal is connected.

Disconnect:　Control signal is disconnectd.

4.2 CLK/Rx2 Settings

Clk/Rx2 setings is shown as Figure 4.8.

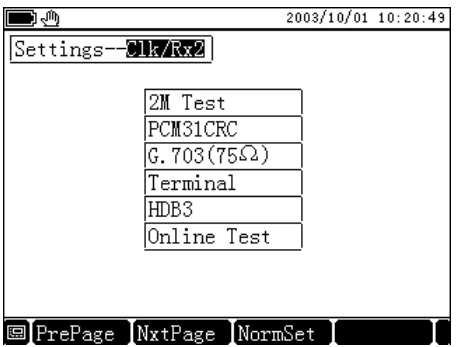


Figure 4.8 ClK/Rx2 Settings

4.2.1 Work Mode

Move the cursor to Work Mode, you can select the item below.

Clock Input: Clk/Rx2 port is set as external clock input, and the Signal Form and Wave Form is unavailable.

2M Test: Clk/Rx2 port is the second port to perform 2Mbit/s testing.

4.2.2 Signal Form

Move the cursor to Signal Form at Tx side, you can set item's value below:

Unframed: Unframed signal form

PCM31: 31 signal form

PCM31CRC: 31 signal form with CRC-4

PCM30: 30 signal form, TS 16 transmit code

PCM30CRC: 30 signal form, TS 16 transmit code with CRC-4

4.2.3 DATA Port

Move the curor to Data Port, you can select the item below:

G.703(75Ω): 75Ω unbalanced interface.

G.703(120Ω): 120Ω balanced interface.

4.2.4 Signal Port

Move the cursor to Signal Port, you can select the item below

Terminal: Signal input impedance is 75 Ω or 120Ω.

Bridge: Signal input impedance is high, more than 75 Ω or 120Ω.

4.2.5 Wave Form

Move the cursor to Wave Form, you can select the item below

HDB3: Input signal line code is HDB3.

AMI: Input signal line code is AMI.

4.3 OtherSet

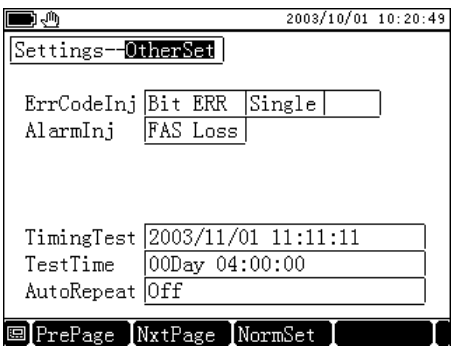


Figure 4.10 OtherSet

4.3.1 Error Code Injection

Move the cursor to Error Code Injection, you can select the item below

None: No Error Code injection.

Bit ERR: Select Bit Error injection, and the injection mode you can select Single or Speed. the Speed range is 1×10-2～1×10-6.

PAT Slip: Select PAT Slip injection, and the injection mode you can select Single.

FAS ERR: Select FAS Error injection, and the injection mode you can select single,continuous 2, continuous 3,continuous 4.

While select Error injection, if the injection mode is single, or continuous 2, or continuous 3, continuous 4, then press Key ERR INJ once, 1, or 2, or 3, or 4 Error Codes will be injected, and the icon is displayed for 0.5 second, and then disappears. If the injection mode is speed, then press Key ERR INJ once, Error Code is being injected, and the icon is being displaying. Press

Key ERR INJ again, Error Code injection stops, and the icon disappears.

4.3.2 Alarm Injection

Move the cursor to Alarm Injection, you can select the item below.

None: No Alarm injection

AIS: Select AIS injection

FAS Loss: Select FAS Loss injection

RA: Select RA injection

MRA: Select MRA injection

4.3.3 Timing Test

Move the cursor to Timing Test, you can select the item below

Off: Turn off the function of Timing Test.

On: Turn on the function of Timing Test, and the icon  is display at Status Area. When the function is on, the icon  is display at Status Area. And when the timer is up, test will start automatically.

4.3.4 Test Time

Move the cursor to Test Time, you can select the item below

Off: Turn off the function of Test Time.

On: Turn on the function of Test Time

When the function is on, and the timer is up, test will stop automatically.

4.3.5 Auto Repeat

Move the cursor to Auto Repeat, you can select the item below

Off: Turn off the function of Auto Repeat.

On: Turn on the function of Auto Repeat.

4.4 PrintSet

Icon☑ means that the function is on, while icon☒ is off, shown as Figure 4.11.

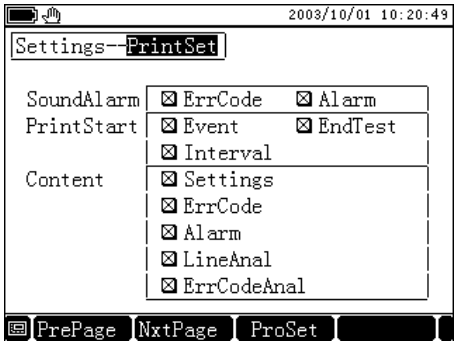


Figure 4.11 PrintSet

4.4.1 Sound Alarm

ErrCode: Tester beeps when Error Code is detected.

Alarm: Tester beeps when Alarm is detected.

4.4.2 Print Start

Functions work when test is started.

Event: Print start when error code or alarm event is detected.

EndTest: Print start when test end.

Interval: Print start when time interval arrive.

4.4.3 Print Content

Settings: Print content include Settings.

ErrCode: Print content include Error Code results.

Alarm: Print content include Alarm results.

LineAnal: Print content include Line Analysis results.

ErrCodeAnal: Print content include all analysis results.

5. Professional Setting

At Tx/Rx1/DATACOM interface, set InfcMode as 2Mbit/s, set Signal Form of Tx not as Unframed,

you can enter this ProSet.

At Settings interface, press ‘ProSet’,enter the professional setting interface.

5.1 Frame Information

Move the cursor to the bit you want to set, press **F1** to set it as 1, **F2** as 0, shown as Figure 5.1.

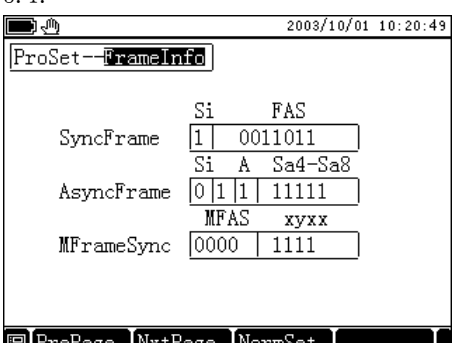


Figure 5.1 Frame Info

Bits that can be set in the Frame Information list below:

Sync Frame Si: Default as 1

Async Frame Si: Default as 1

Async Frame A: Default as 0

Multi Frame Sync Frame y: Default as 0

★Note: Incorrect setting will make error code or alarm, use default setting to test at normal time.

5.2 Sync Information

Move the cursor to the bit you want to modify, press **F1** to set it as 1, **F2** as 0, **F3** set all bits in the byte as 1.

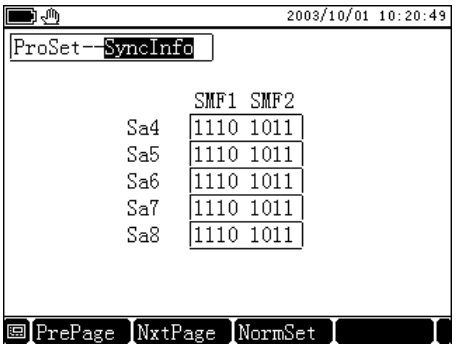


Figure 5.2 Sync Info

5.3 ABCD Setting

5.3 ABCD SettingMove the cursor to the bit you want to modify, press **F1** to set it as 1, **F2** as 0, **F3** set all bits in the byte as 1

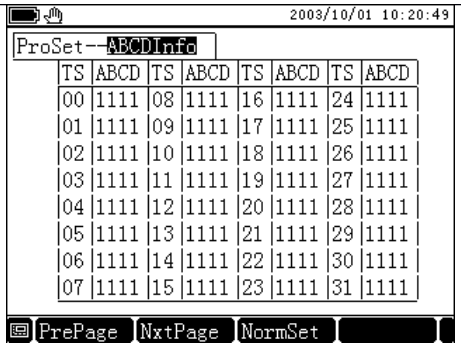


Figure 5.3 ABCD Setting

Note: every ABCD value can not be set as all 0.

6. Results

6.1 Normal Test Result

Set the Work Mode in Tx/Rx1/DATA interface as Normal Test or Through Test, the result is Normal Test Result.

6.1.1 Error Code Test Result

Error Code Test Result is shown as Figure 6.1.

①Test result info, test time
②spend time,remained time
③Test paramenter
④Test result content

Test result content:

Bit ERR: Bit Error

%Bit ERR: Pecent of Bit Error

Code ERR: Code Error

%Code ERR: Pecent of Code Error

FAS ERR: FAS Error

%FAS ERR: Pecent of FAS Error

CRC ERR: CRC-4 Error

%CRC ERR: Pecent of CRC-4 Error

Ebit ERR: Ebit Error

%Ebit ERR: Pecent of Ebit Error

PAT Slip: Pattern Slip

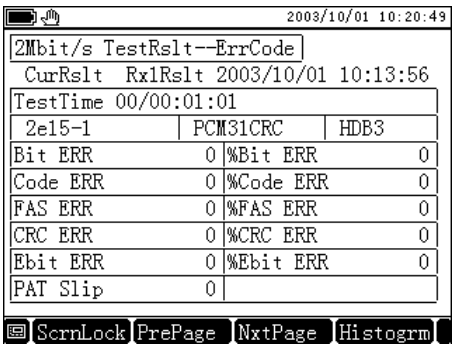


Figure 6.1 Error Code Test Result

Set the Interface Mode in Tx/Rx1/DATA interface as Datacom, the result is shown as Figure 6.2.

Results content:

Bit ERR: Bit Error

%Bit ERR: Pecent of Bit Error

PAT Loss: Pattern Loss

PAT Slip: Pattern Slip

SIG Loss: Signal Loss

Freq max: Frequency Max

Freq min: Frequency Min

Control Signal

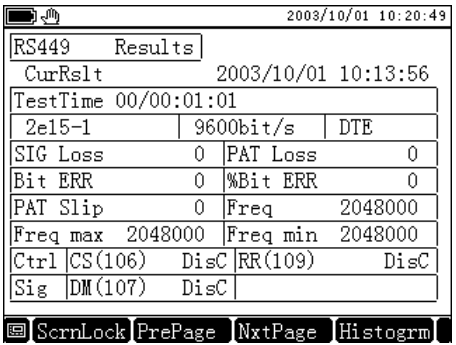


Figure 6.2 Datacom Test Result

6.1.2 Alarm Test Result

Alarm Test Result is shown as Figure 6.3:

Result content:

SIG Loss: Signal Loss

AIS: Alarm Indication Signal

FAS Loss: FAS Loss

PAT Loss: Pattern Loss

PWR Loss: Power Loss

RA: Remote Alarm

MRA: Multiple Remote Alarm

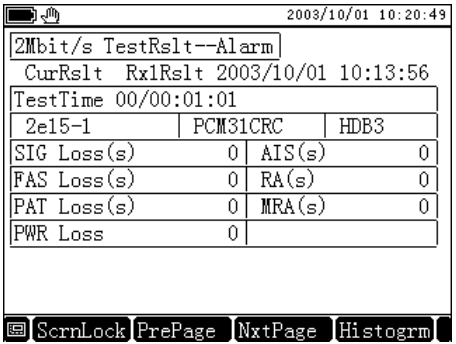


Figure 6.3 Alarm Test Result

6.1.3 Line Analysis

The Line Analysis Results are shown as Figure 6.4.

Result content:

Clock +Slip: Clock Slip positive

Clock -Slip: Clock Slip negative

Clock +Cpp: Clock Slip positive count

Clock -Cpp: Clock Slip negative count

Level +V(V): Line signal pulse positive level

Level -V(V): Line signal pulse negative level

Level Vp-p(V): Line signal pulse peak-peak level

Rx Freq RCV(Hz): Line signal pulse receive frequency

Rx Freq RCV(ppm): Line signal pulse receive frequency ppm

Rx Freq max(Hz): Line signal pulse receive max frequency

Rx Freq max(ppm): Line signal pulse receive max frequency ppm

Rx Freq min(Hz): Line signal pulse receive min frequency

Rx Freq min(ppm): Line signal pulse receive min frequency ppm

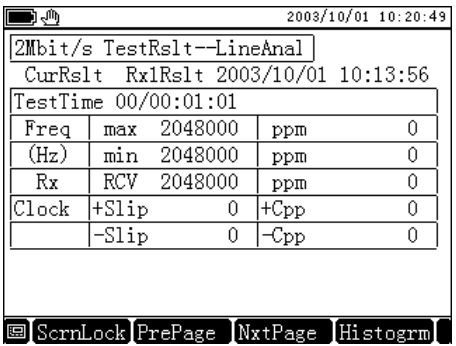


Figure 6.4 Line Analysis

6.1.4 Results Analysis

Results Analysis include G.821 Analysis, M.2100T Analysis, M.2100K Analysis. G.821 Analysis is shown as Figure 6.5

G.821 Analysis:

ES(s): Errored Second

%ES(s): Pecent of Errored Second

SES(s): Severe Errored Second

%SES(s): Pecent of Severe Errored Second

AS(s): Available Second

%AS(s): Pecent of Available Second

UAS(s): Unavailable Second

%UAS(s): Pecent of Unavailable Second

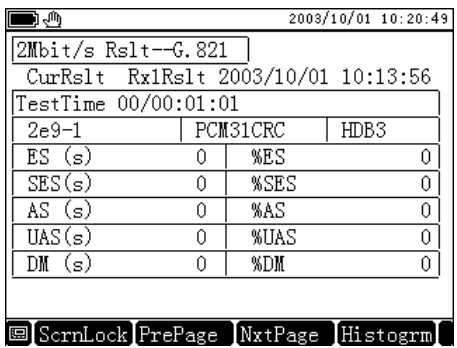


Figure 6.5 G.821 Analysis

G.826 Analysis:

ES(s): Errored Second

%ES(s): Pecent of Errored Second

SES(s): Severe Errored Second

%SES(s): Pecent of Severe Errored Second

AS(s): Available Second

%AS(s): Pecent of Available Second

UAS(s): Unavailable Second

%UAS(s): Pecent of Unavailable Second

BBE: Background Block Error

%BBE: Pecent of Background Block Error

M.2100T Analysis:

ES(s): Errored Second

%ES(s): Pecent of Errored Second

SES(s): Severe Errored Second

%SES(s): Pecent of Severe Errored Second

AS(s): Available Second

%AS(s): Pecent of Available Second

UAS(s): Unavailable Second

%UAS(s): Pecent of Unavailable Second

M.2100K Analysis:

ES(s): Errored Second

%ES(s): Pecent of Errored Second

SES(s): Severe Errored Second

%SES(s): Pecent of Severe Errored Second

AS(s): Available Second

%AS(s): Pecent of Available Second

UAS(s): Unavailable Second

%UAS(s): Pecent of Unavailable Second

6.2 Histogram

Set the Work Mode in Tx/Rx1/DATA interface as Normal Test or Through Test, the result can be illustated in Histogram.

In Normal Test Results interface, press Histogram Function Key to enter the interface, shown as Figure 6.6.

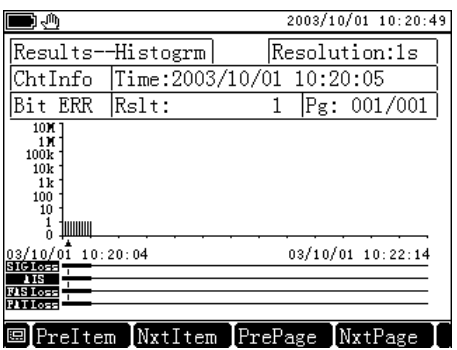


Figure 6.6 Histogram

In Histogram, the horizontal axis is test time, and the vertical axis is the value of selected event.

Error Code or Alarm type: press F1 or F2 to selct the type of Error Code or Alarm you want to analyze.

Resolution: Minimum unit at the horizon time axis in the histogram.

Press  to increase resolution

Press  to decrease resolution

▲: Cursor

Press  to move the cursor to left side by one step

Press  to move the cursor to right side by one step

Press **F3** to display the previous page content.

Press **F4** to display the next page content.

Cursor information - time: the time of cursor position, or the begin time of cursor position.

Cursor information - result: the error code or alarm of cursor position.

6.3 Audio Test Result

Set the Work Mode in Tx/Rx1/DATACOM interface as Audio Test, and the result will be Audio Test result, shown as Figure 6.6.

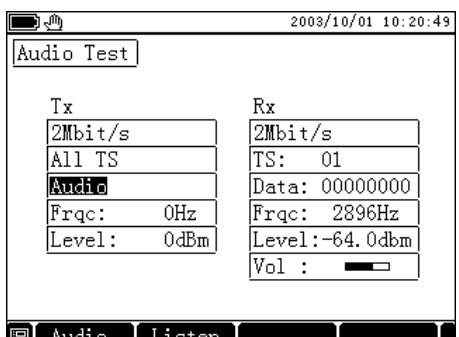


Figure 6.6 Audio Test Result

Configurable items:

Tx TS: Set the TS that used for testing Audio channel, refer to “Select TS”.

Work Mode: You can select Audio or Listen. When item Listen is selected, no audio signal is sent out.

Tx Frequency: Set the frequency of selected timeslot signal.

Tx Level: Set the level of selected timeslot signal.

Rx TS: Set the TS that used for testing Audio channel, only one can be selected to test.

Volume control: Adjust the volume of speaker.

Test Results:

Rx Frequency: Display frequency result of the selected timeslot.

Rx Level: Display level result of the selected timeslot.

6.4 Audio Listen Result

Set the Work Mode in Tx/Rx1/DATACOM interface as Audio Test, and the result will be Audio Test result, set Work Mode in this result interface as Listen, then the result is Audio Listen Result. shown as Figure 6.7.

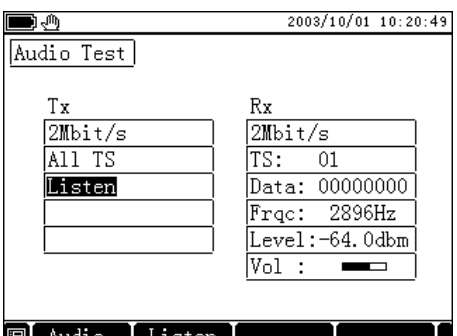


Figure 6.7 Audio Listen Result

Configurable items:

Rx TS: Set the TS that used for testing Audio channel, only one can be selected to test.

Volume control: Adjust the volume of speaker.

Test Results:

Rx Frequency: Display frequency result of the selected timeslot.

Rx Level: Display level result of the selected timeslot.

6.5 Delay Test Result

Set the Work Mode in Tx/Rx1/DATACOM interface as Delay Test, and the result will be Delay Test result, shown as Figure 6.8.

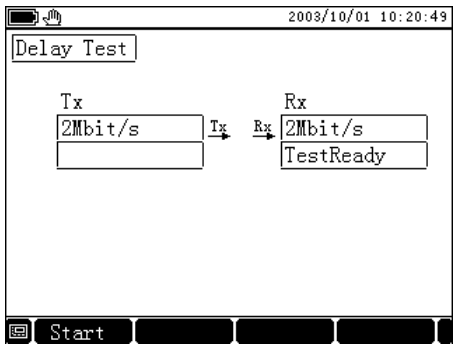


Figure 6.8 Delay Test Result

Press **F1** 'Start Test' to run testing. If the result is 'SignalBad',it means that the performance of the test line is bad. If Delay time is more than 2.5 second, the result is 'timeout'.

6.6 APS Test Result

Set the Work Mode in Tx/Rx1/DATACOM interface as APS Test, and the result will be APS Test result, shown as Figure 6.9.

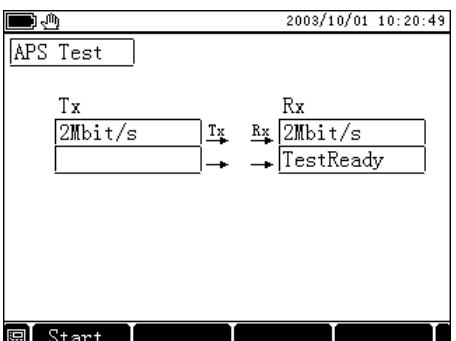


Figure 6.9 APS Result

Press **F1** ‘Start Test’ to run testing,when APS occur,test APS time and display the result.if APS is more than 2.5 second, the result is ‘timeout’.press **F1** again to stop the APS test.

6.7 Timeslot Analysis

Set the Work Mode in Tx/Rx1/DATA interface as Normal Test or Through Test, and the Signal Form of Rx is not unframed, you can view Timeslot Analysis in Results.

In the Main Interface, move the cursor to Results position, press TS Analysis functional key to enter this interface. Timeslot Analysis will not affect other ongoing test.

Timeslot Analysis results include TS Analysis, Frame Information, Sync Information, ABCD

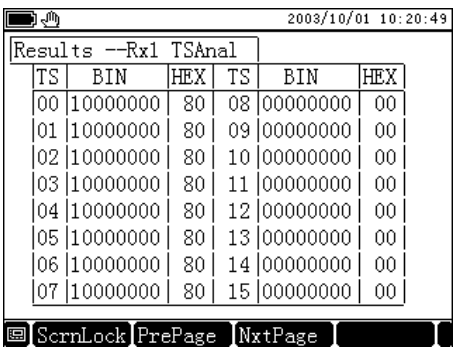
Information, shown as Figure 6.10、Figure 6.11、Figure 6.12 and Figure 6.13.

Timeslot Analysis:

TS : Timeslot No.

BIN : Binary Timeslot value

HEX : Hex Timeslot value



TS	BIN	HEX	TS	BIN	HEX
00	10000000	80	08	00000000	00
01	10000000	80	09	00000000	00
02	10000000	80	10	00000000	00
03	10000000	80	11	00000000	00
04	10000000	80	12	00000000	00
05	10000000	80	13	00000000	00
06	10000000	80	14	00000000	00
07	10000000	80	15	00000000	00

Figure 6.10 TS Analysis

Frame Information:

Sync Frame: c0011011, Binary format value of Sync Frame.

Async Frame: i1ssssss, Binary format value of Async Frame.

Multiple Sync Frame: 0000xyxx, Binary format value of Multiple Sync Frame.

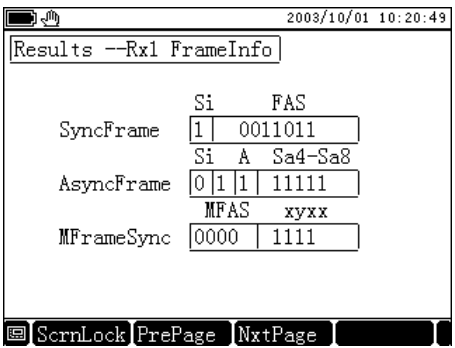


Figure 6.11 Frame Information

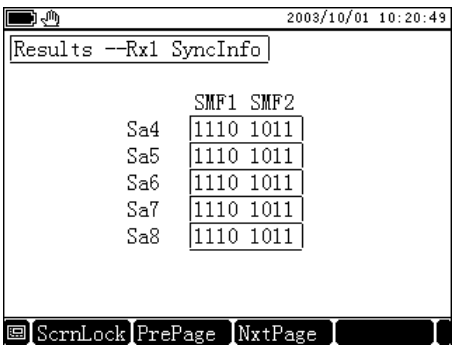
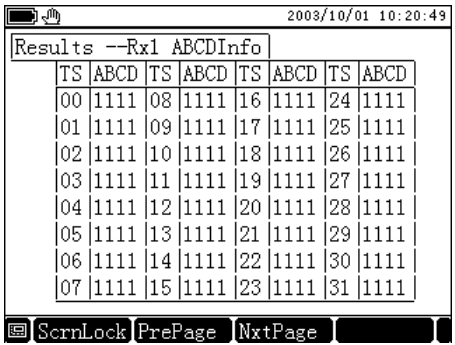


Figure 6.12 Sync Information



Figur 6.13 ABCD Information

6.8 G.703 Pulse Mask

In the Main Interface, move the cursor to Reults, you can see G.703 displayed in the menu, press corresponding F key to enter G.703 interface, shown as Figure 6.14.

Press **F1** to start test, press **F2** to test overshoot, **F3** to undershoot.

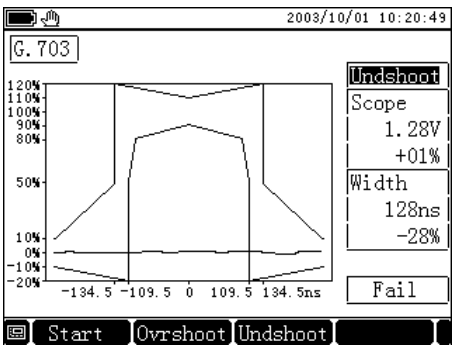


Figure 6.14 G.703 Pulse Mask

Results:

Scope(V) : The peak level of pulse

Scope Offset: Offset between peak level of pulse and standard value

Width(ns): Time of pulse’s width

Width Offset: Offset between pulse’s width and standard value.

Judgement: Judge the pulse is passed or fail.

7. FileManager

7.1 SetManager

In the interface of SetManger, Current Setting can be saved to flash, and the saved record can be loaded at any time. Saved records are displayed with parameter as SaveNo.,test tiem and interface mode in the table.

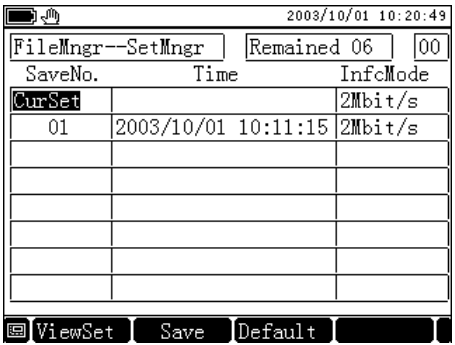


Figure 7.1 SetMngr

7.1.1 Default Setting

Move the cursor to CurSet, press **F3**, will load default setting.

7.1.2 Save Current Setting

Move the cursor to CurSet, press **F2**, will save the current setting to flash

7.1.3 Load Setting

Move the cursor to the record, press **F1** to view details, the icon is displayed at the

Status Display area under the condition. And it won't change the current settings. If press **F2** to load the setting, the current setting is replaced.

7.1.4 Delete record

Move the cursor to the record No. you want to delete, press **F3** to delete the record,press **F4** to clear all records.

7.2 ResultManager

In the interface of ResultManger, Current Result can be saved to flash, and the saved record can be viewed at any time. Saved records are displayed with parameter as SaveNo.,Test Tiem and Interface Mode in the table.

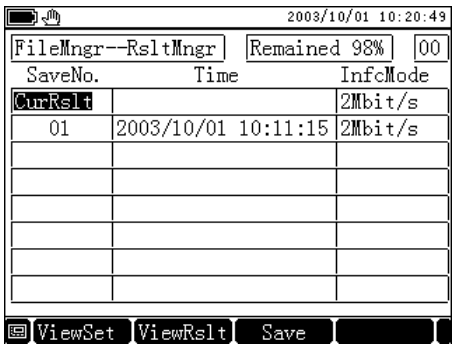


Figure 7.2 RsltMngr

7.2.1 Save Current Result

Move the cursor to current result, press F3 to save,and the current result is saved to flash

7.2.2 View Result

Move the cursor to the result No. you want to view, press F1 to view setting details, press F2 to view result details,

7.2.3 Delete record

Move the cursor to the record No. you want to delete, press F3 to delete the record,press F4 to clear all records.

★ Note: Delete the records you don't need any more, keep more space if possible to test much more time.

8. Meter Config

At Main Interface, move the cursor to MeterCfg, press the corresponding Functional Key to enter this interface, shown as Figure 8.1

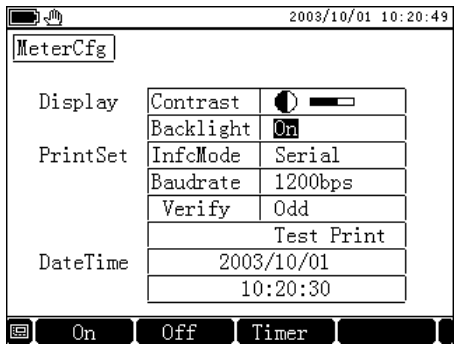


Figure 8.1 Meter Config

8.1 Display Config

Contrast: Move the cursor to constrast position, press Functional Key to adjust the constrast.

Backlight：Move the cursor to backlight position, press Functional Key to adjust the backlight.

EverOn：The backlight is always on.

EverOff：The backlight is always off.

Timer：The backlight is lighting on lasting for the time set by timer, until time is up, press any key the backlight light on again.

8.2 Print Config

Interface Port Mode：Series Port to connect with printer

Baudrate: set the baudrate that communicate between tester and printer

Verify: set the communication verify mode

Test Print: test the printer to see if the printer is ready

8.3 Daytime Config

Config the real time clock of the tester.

9. Technique Specification

TX:

- Output interface:

  75 Ohm balanced, 120 Ohm balanced, conforming to G.703 requirements

- Signal structure:

  Unframed

  Frame (PCM30, PCM31, PCM30CRC, PCM31CRC), conforming to G.704 n×64 Kbit/s structure

- Line code:

  HDB3 or AMI

- Signal rate:

2048 kbit/s

- Internal clock accuracy:

  ≤±10ppm

- Clocking:

  Internal, external and distill

- Output intrinsic twittering:

  <0.05UI(20Hz-100kHz)

- Test pattern:

  False random sequence 2E6-1,2E9-1,2E11-1,2E15-1, 2E20-1, 2E23-1, conforming to ITU-T0.151, man code 8 bit

- Free TS pattern:

  8bit man mode

- Code error insertion:

  FAS ERR: once, continuous twice, continuous 3 times, continuous 4 Times

  BIT ERR: single 1E-2～1E-7

- Pattern slip:

PAT slip

RX:

- Signal input impedance:
  terminal: 75 Ohm unbalanced, 120 Ohm balanced, Tx loss conforms to G.703
  bridge: ＞750 Ohm unbalanced, ＞1200 Ohm balanced
  monitor: 20 dB for input sensibility
- Signal input equalizing feature:
  0—9 dB
- Signal input twittering capacity:
  conforms to G.823
- Input anti-interference:
  conforms to G.703
- Signal structure:
  Unframed

Frame (PCM30, PCM31, PCM30CRC, PCM31CRC), frame signal conforms to G.704 n×64 kbit/s structure

- Line code:

HDB, or AMI

- Signal rate:

2048 kbit ±50ppm

- Test pattern:

False random sequence 2E6-1,2E9-1,2E11-1,2E15-1, 2E20-1, 2E23-1, conforming to ITU-T0.151, man code 8 bit

- Frequency test:

For line signal and voice channel signal

- Level test:

For line signal and voice channel signal

- Bit error monitoring:

FAS ERR, BIT ERR, CRC-4 code error performance test, CODE ERR

- Alarm monitoring:

AIS, SIG LOSS, RA, MAR, FAS LOSS, CRC LOSS, PAT LOSS, PAT SLIP

- Slip monitoring:

  PAT SLIP, CLK SLIP

- Time delay test:

  Test time delay performance

- Bit error analysis:

  G.821, G.826, M2100

- External clock input impedance:

  Terminal: 75 Ohm unbalanced, 120 Ohm balanced, Tx loss conforming to G.703

  Bridge: ＞750 Ohm unbalanced, ＞1200 Ohm balanced

- External clock input signal:

  HDB3/AMI conforming to G.703, pulse signal,＞2.5V_{p-p}

Technique support

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