Demonstration Disc

Introduction

The information provided here describes the test patterns stored on the demonstration disc supplied with each Agilent 71612 error performance analyzer system. The test patterns are picked to represent typical test data that may used in practical situations, or when demonstrating the instrument.

Note: The disc is intended for demonstration purposes and is not warranted or supported by Agilent Technologies.

The test pattern file names appear on the instrument display as: HPPAT05.DAT to HPPAT12.DAT

The test patterns are as follows:

1. Single SONET STS-12 frame
2. Single SONET STS-48 frame
3. CID test for 622 Mbit/sec
4. CID test for 2.488 Gbit/sec
5. Single SDH STM-4 frame
6. Single SDH STM-16 frame
7. FDDI 256 symbol Data Dependent Jitter pattern
8. FDDI baseline wander pattern

The test patterns are described in detail in the following pages.

SONET STS-12 Frame

The STS-12 test pattern was designed to represent a typical frame of test data that may be sent over a SONET high speed optical telecommunications network. The reference document for the SONET frame format is ANSI T1.105-1988, "Digital Hierarchy -Optical Interface Rates and Formats Specifications ".
The test pattern is defined in Table 1-1 below. The pseudo-random data is generated with a sequence length of 127 and a generating polynomial of 1 + x^6 + x^7. The initial value of the data is set to 1111111.

Table 1-1. STS-12 Frame Structure

SONET Mnemonic	Value (hex)	No. of bytes	Data Description
A1	F6	12	Framing byte
A2	28	12	Framing byte
C1	1 to C	48	Channel number
-	(PRBS)	38736	Pseudo-random data

SONET STS-48 Frame

The STS-48 frame is constructed in a similar manner to the STS-12 frame. The test pattern is defined in Table 1-2 below.

Table 1-2. STS-48 Frame Structure

SONET Mnemonic	Value (hex)	No. of bytes	Data Description
A1	F6	48	Framing byte
A2	28	48	Framing byte
C1	1 to C	48	Channel number
-	(PRBS)	38736	Pseudo-random data

CID immunity test for STM-4

The Consecutive Identical Digit immunity (CID) test is used to verify the adequacy of timing-recovery and low-frequency performance of STM-N equipments. The reference document for the CID test is CCITT/COMVX/RAPP /R042E2.TXS. The reference document for Synchronous Digital Hierarchy (SDH) frames is CCITT ICOMXV111/RAPP /R033E2. TXS.

The recommended test pattern is illustrated by Figure 1-1. It is comprised of consecutive blocks of data of the following types: -

A. All 1s (zero timing content, high average signal amplitude).

B. Pseudo-random data with a mark-density ratio of 1/2. The data is generated by the same algorithm as that used for an SDH frame scrambler, that is a sequence length of 127 and a generating polynomial of 1 + x^6 + x^7. The initial value of the data is set to 1111111.

C. All Os (zero timing content, low average signal amplitude).

D. A data block consisting of the first row of section overhead bytes for the STM-N system under test. This includes valid Cl bytes that are consecutive binary numbers starting from 1.

The lengths of the data blocks in the test pattern are given in Table 1-3.

Table 1-3. Lengths of data blocks in CID immunity tests

Data block	Block length (bytes)	
	STM-4	STM-16
A	9	9
B	1250	1250
C	9	9
D	36	144

CID immunity test for STM-16

The CID test for STM-16 is almost identical to that for STM-4. The only difference is in the length of the section overhead data block D. The block length is given in Table 1-3.

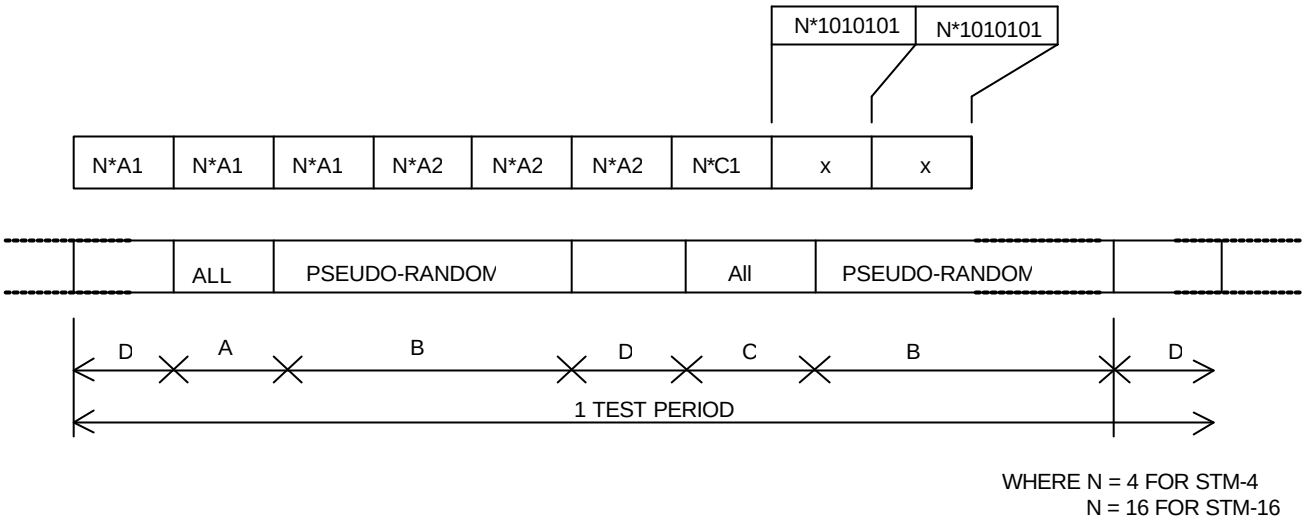

Figure 1-1. CID immunity test pattern

SDH STM-4 Frame

The Synchronous Digital Hierarchy (SDH) frames are very similar in structure and content to their equivalent SONET frames. The terminology for the frame elements is, however, very different. The reference document for the SDH frame structure is CCITT /COMXVIII/RAPP /R033E2.TXS.

The SDH STM-4 frame is equivalent in structure and bit rate to the SONET STS-12 frame. Its format is defined in Table 1-4.

Table 1-4. STM-4 Frame Structure

SDH Mnemonic	Value (hex)	No. of bytes	Data description
A1	F6	12	Framing byte
A2	28	12	Framing byte
C1	1	1	Channel number
C1	AA	11	(Undefined channel numbers)
-	(PRBS)	9684	Pseudo-random data

SDH STM-16 Frame

The STM-16 frame is constructed in a similar manner to the STM-4 frame. The test pattern is defined in Table 1-5.

Table 1-5. STM-16 Frame Structure

SDH Mnemonic	Value (hex)	No. of bytes	Data description
A1	F6	48	Framing byte
A2	28	48	Framing byte
C1	1	1	Channel number
C1	AA	47	(Undefined channel numbers)
-	(PRBS)	38736	Pseudo-random data

FDDI Data Dependent Jitter Pattern

Introduction

The Fibre Distributed Data Interface (FDDI) data dependent jitter test pattern is used for testing FDDI components or physical links. The pattern is 256 symbols long (1280 bits) and is transmitted continuously during the test by repeating the pattern. When correctly encoded, the sequence causes a near worst case condition for inter-symbol interference and duty-cycle base-line wander.

The test pattern is defined in ANSI X3.166-1990; ISO/IEC 9314-3: 1990(E), Annex A. The encoding of the data symbols is defined in ANSI X3.148-1988, Table 1.

Test Pattern

The test pattern is defined by the list of symbols below.

I, I, I, J, K, 4, D, 3, 1, 8, B, F, 8, E, 3, 9,
5, E, 6, 9, C, A, 0, 2, 4, 2, 4, 7, 0, 3, B, F,
1, 8, 1, 9, 3, E, 5, 9, 6, E, C, A, D, 7, 0, D,
7, 0, 7, 0, 7, 0, 2, 4, 2, 4, 2, 2, 4, 2, 7, 0,

4, 7, 0, 2, 7, 4, D, 3, 1, 8, B, F, 8, E, 3, 9,
5, E, 6, 9, C, A, 0, 2, 4, 2, 4, 7, 0, 3, B, F,
1, 8, 1, 9, 5, E, 5, 9, 6, E, C, E, D, 7, 0, D,
4, D, 2, 2, 7, 4, D, 3, 1, 8, B, F, 8, E, 3, 9,

5, E, 6, 9, C, A, T, R, S, R, S, T, 0, 3, B, F,
1, 8, 1, 9, 6, E, 5, 9, 6, E, C, E, 3, 9, 5, 1,
I, J, K, 2, 7, 4, D, 3, 1, 8, B, F, 8, E, 3, 9,
5, E, 6, 9, C, A, 0, 2, 4, 2, 4, 7, 0, 3, B, F,

1, 8, 1, 9, 3, E, 5, 9, 6, E, C, A, D, 7, 0, D,
D, 0, 7, D, 2, 7, 4, D, 3, 1, 8, B, F, 8, E, 3,
9, 5, E, 6, 9, C, A, 0, 2, 4, 2, 4, 2, 4, 2, 7,
0, 3, B, F, 1, 8, F, 9, C, E, 3, A, C, E, I, I,

Each symbol is encoded into a "code group" of 5 bits. The encoding is performed to ensure that there is always a sufficient number of transitions per symbol to allow clock recovery from the serial data stream. It also ensures that the dc level of the data stream stays within acceptable limits. Table 6 defines the code group encoding for each symbol.

FDDI Baseline Wander Pattern

The FDDI baseline wander test pattern is used to test FDDI components for the effects of a change in the average dc level of the signal.

The pattern is comprised of 9,000 symbols of the code group (01010) followed by 9,000 symbols of the code group (10101).

Table 1-6. FDDI Symbol Coding

Symbol	Code Group
0	11110
1	01001
2	10100
3	10101
4	01010
5	01011
6	01110
7	01111
8	10010
9	10011
A	10110
B	10111
C	11010
D	11011
E	11100
F	11101
I	11111
J	11000
K	10001
R	00111
S	11001
T	01101