JITTER GENERATION

Jitter Generation Definition

Bellcore TR-NWT-000499 (Issue 4), section 7.3.3 "Jitter generation is the process whereby jitter appears at the output port of an individual unit of digital equipment in the absence of applied input jitter."

Jitter Generation Requirement

Bellcore TA-NWT-000253 (Issue 2), section 5.6.5.2 "For Category II interfaces, jitter generation shall not exceed 0.01 UI rms. For OC-N and STSX-N interfaces, a high-pass measurement filter with a 12kHz cutoff frequency shall be used." The low-pass cutoff frequency of the measurement filter shall be higher than 5MHz.

The characteristic of the measurement filter is shown below.

SONET OC-12 Category II Jitter Generation Measurement Filter Characteristics

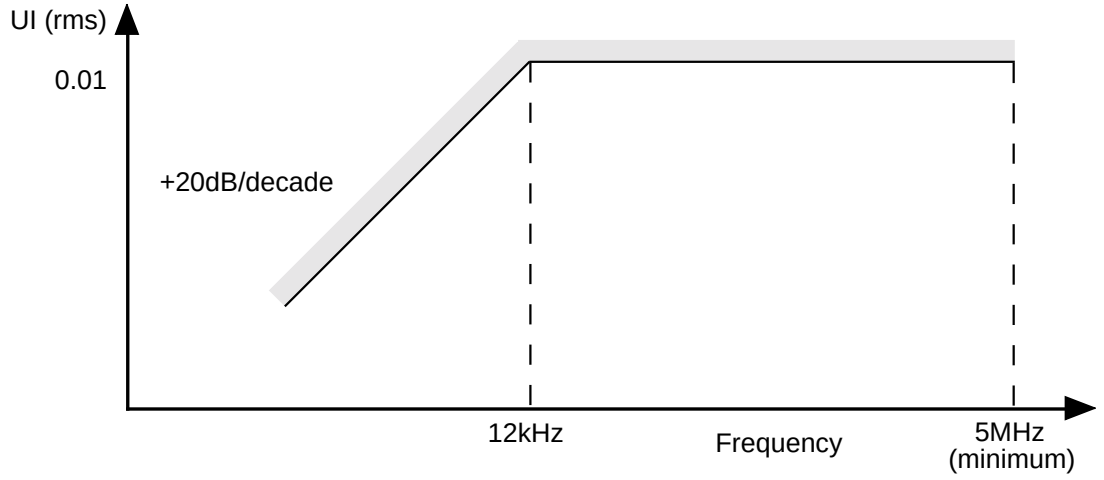

Figure 1

JITTER GENERATION (continued)

Measuring Jitter Generation on the SY69712 Transmit

Jitter generation is measured on the CKE622 output from the device. This output is a differential ECL signal at the 622.08MHz rate that is synthesized from the reference clock input of 77.76MHz, 51.84MHz or 19.44MHz. Figure 2a shows the test setup for measuring jitter generation on the SY69712 transmit.

Measuring Jitter Generation on the SY69712 Receive

Jitter generation is measured on the CKE622 (recovered clock) output from the device. This output is recovered from the clock recovery circuit. Figure 2b shows the test setup for measuring jitter generation on the SY69712 receive.

Test Setup for Measuring Jitter Generation on the SY69612 and SY69712 Transmit

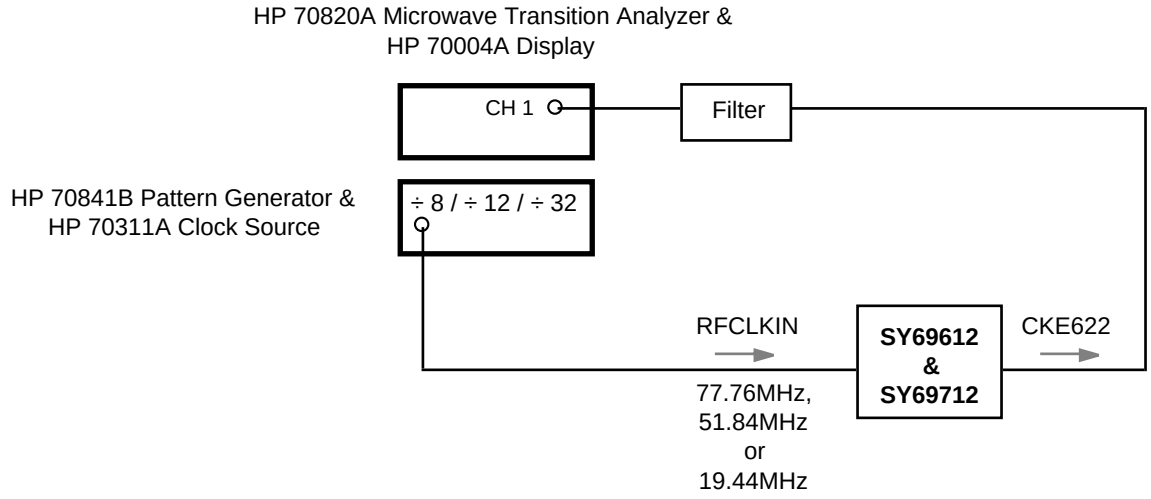

Figure 2a

Test Setup for Measuring Jitter Generation on the SY69712 Receive

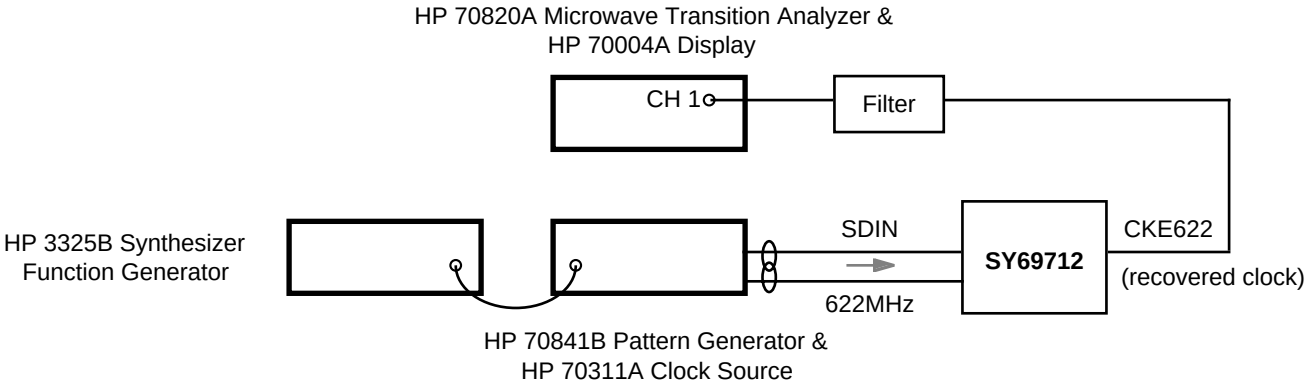

Figure 2b

JITTER TRANSFER

Jitter Transfer Definition

Bellcore TR-NWT-000499 (Issue 4), section 7.3.2:
"The transfer of jitter through an individual unit of digital equipment is characterized by the relationship between the applied input jitter and the resulting output jitter as a function of frequency. For equipment in which a linear process describes the transfer of jitter from the input to the output port, the jitter transfer function is the ratio of the output jitter spectrum to the applied (deterministic) input jitter spectrum. (The term transfer function implies a linear process, where the conventional definition of linearity applies, i.e., a process that is both additive and homegeneous.)"

Jitter Transfer Requirement

Bellcore TA-NWT-000253 (Issue 2), section 5.6.3.2: "For Category II interfaces, the jitter transfer function shall be under the curve in Figure 4, when input sinusoidal jitter up to the mask level in Figure 5 is applied, with the parameters specified in Figure 4 for each OC-N rate."

Figures 4 and 5 show the Bellcore specification for Jitter Transfer.

ITU/CCITT Recommendation G.958, section 6.3.2, is stated similarly to Bellcore specification.

Measuring Jitter Transfer on the SY69712

Jitter Transfer is measured by applying the appropriate reference frequency (77.76MHz, 51.84MHz or 19.44MHz) to the RFCLKIN. The jitter on the synthesized 622MHz Clock output is then measured and compared to the jitter on the RFCLKIN to determine the jitter transfer of the Transmit PLL.

Test Setup for Measuring Jitter Transfer on the SY69712

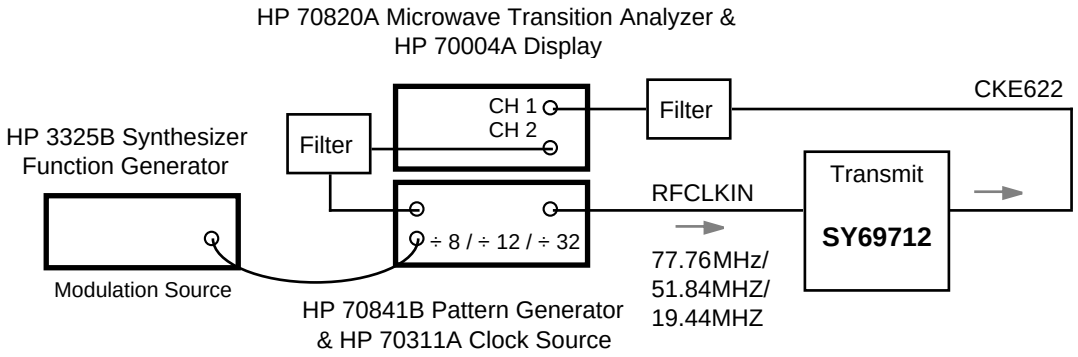

Figure 3a

JITTER TRANSFER (continued)

Measuring Jitter Transfer on the SY69712 Receive

Jitter transfer is measured at the CKE622 (recovered clock) output.

Figure 3b shows the test setup for measuring jitter transfer on the SY69712 receive.

Test Setup for Measuring Jitter Transfer on the SY69712 Receive

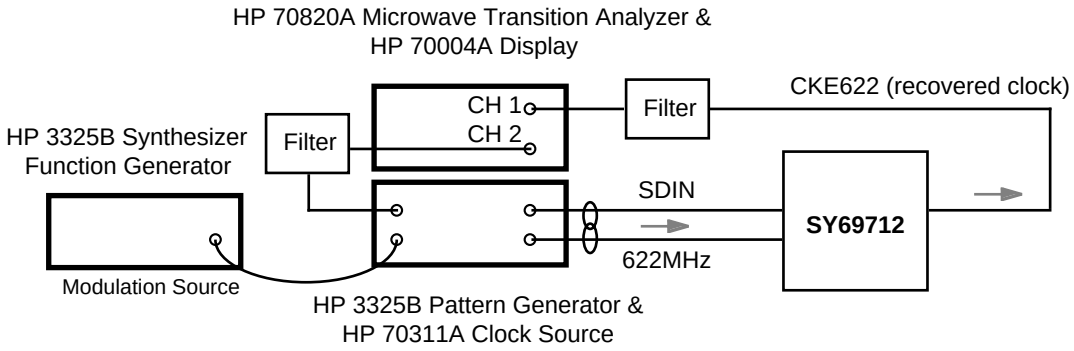

Figure 3b

SONET OC-12 Category II Jitter Transfer Function

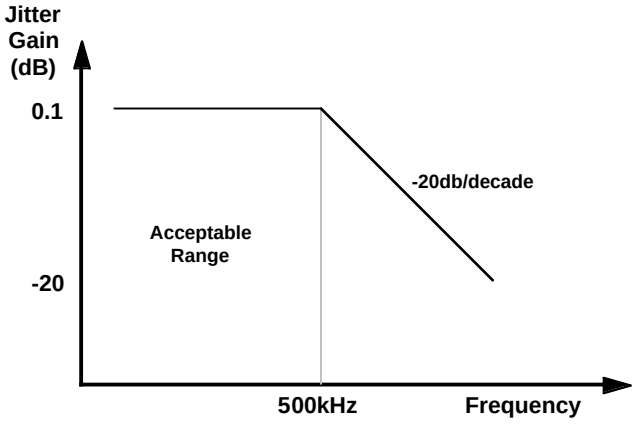

Figure 4

SONET OC-12 Category II Input Jitter Mask for Jitter Transfer and Jitter Tolerance Measurement

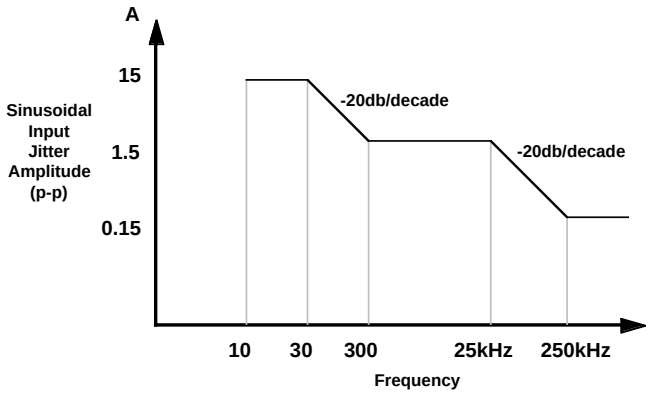

Figure 5

JITTER TOLERANCE

Jitter Tolerance Definition

Bellcore TA-NWT-000253 (Issue 2), section 5.6.4.2: “For Category II SONET interfaces, jitter tolerance is defined as the peak-to-peak amplitude of sinusoidal jitter applied on the input OC-N/STS-N signal that causes a 1-dB power penalty. This is a stress test intended to ensure that no additional penalty is incurred under operating conditions.”

Jitter Tolerance Requirement

Bellcore TA-NWT-000253 (Issue 2), section 5.6.4.2: "OC-12 Category II SONET interface shall tolerate, as a minimum, the input jitter applied according to the mask in Figure 4 and 5, with the parameters specified in the figure for OC-12."

Measuring Jitter Tolerance on the SY69712

On the SY69712 jitter tolerance is measured by applying sinusoidal input jitter at the serial data input. Jitter tolerance is measured at SDOUT (retimed data) with CKE622 (recovered clock). Figure 6 shows the test setup for measuring jitter tolerance.

Test Setup for Measuring Jitter Tolerance on the SY69712

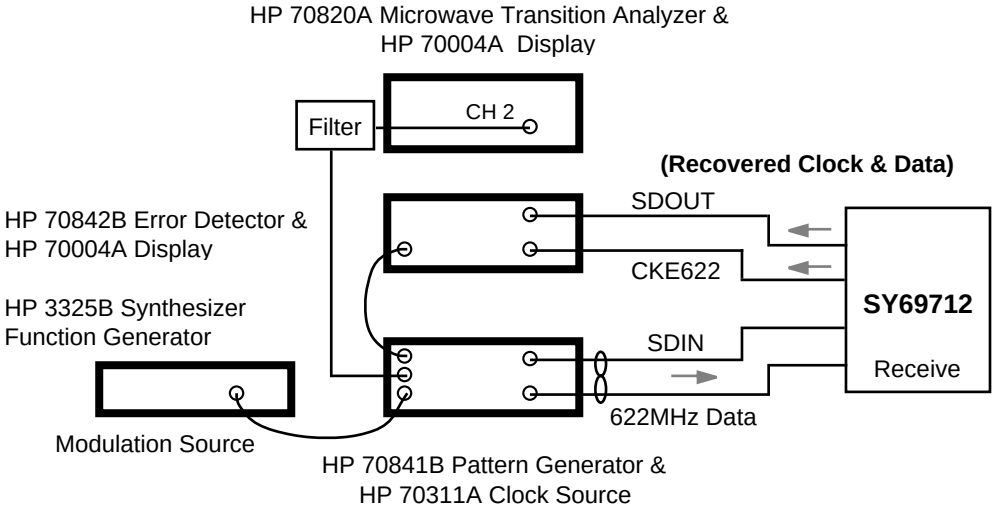

Figure 6

APPENDIX

Equipment List

HP 0955-0732 622 Mb/s Bandpass Filter (2)
HP 3325B Synthesizer Function Generator
HP 6623A System DC Power Supply
HP 7090A Measurement Plotting System
HP 8082A Pulse Generator
HP 8493C 6dB Attenuator
HP 70001A Mainframe
HP 70004A Color Display
HP 70311A Clock Source (Range 16.1MHz - 3.3GHz)
HP 70820A Microwave Transition Analyzer
HP 70841B Pattern Generator (Range 0.1 - 3 Gbit/s)
HP 70842B Error Detector (Range 0.1 - 3 Gbit/s)
HP 70874A Eye Diagram Analyzer Personality Card
HP 70874B Jitter Analyzer Personality Card
HP 53132A 225 MHz Universal Counter with high frequency option
HP 85700A 32 kbyte RAM Card
Tektronix 11801B Digital Sampling Oscilloscope
SD26 Sampling Heads (4)

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