

FEEDING GOOD TIMING TO CUSTOMERS VIA SONET

THE PROBLEM

When a SONET system makes VT pointer adjustments, it injects phase steps into its DS1 payloads. This can cause some network elements such as MUX's and PBX's to lose synchronization momentarily, causing dropped calls and data errors.

For this reason, it is not advisable to use timing that arrives at a customer premise via DS1 payloads that have been carried by SONET.

How do we know if this is a problem? With the rapid deployment of SONET systems by the phone companies and by many private networks as well, the odds are very good that your DS1's are carried over SONET. If they are not carried this way now, they surely will be soon.

THE SOLUTION

The solution to this dilemma is provided by the SONET equipment itself. SONET terminals and add-drop MUX's have a special timing output port that is not one of the DS1 traffic ports. This port provides timing to customers so they won't need to use the potentially bad timing that comes in with each payload DS1. The timing that comes from this special port is derived from the SONET optical line rate and is free of the pointer adjustment phase jumps that are present on the DS1 traffic. This timing signal is sometimes referred to as the "Derived DS1." It is a true DS1 signal, but carries no traffic. The data bits are framed all ones to minimize timing jitter.

A clock distribution amplifier may be used to split the Derived DS1 signal to synchronize many network elements. In a customer premise building, each distribution amplifier output may be routed to a different tenant or network element.

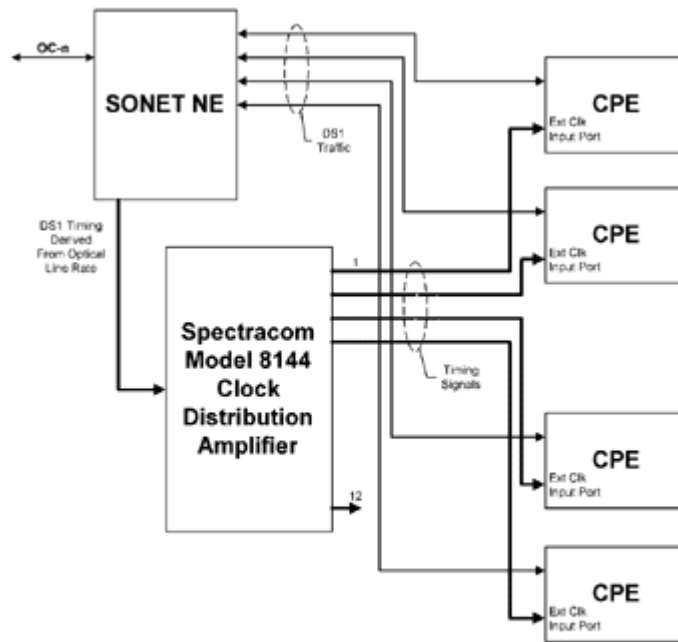


Figure 1: Timing Distribution from SONET to Customer Premise T1 Equipment

Figure 1, shows this timing distribution configuration, using a Spectracom Model 8144 Clock Selector/Distribution Amplifier. As the name implies, this unit is both a clock selector and a distribution amplifier with twelve individually buffered outputs. It can be furnished with either DS1 or RS-485 inputs or outputs. The RS-485 version distributes any clock frequency from 2048 kHz down to the lowest subrates.

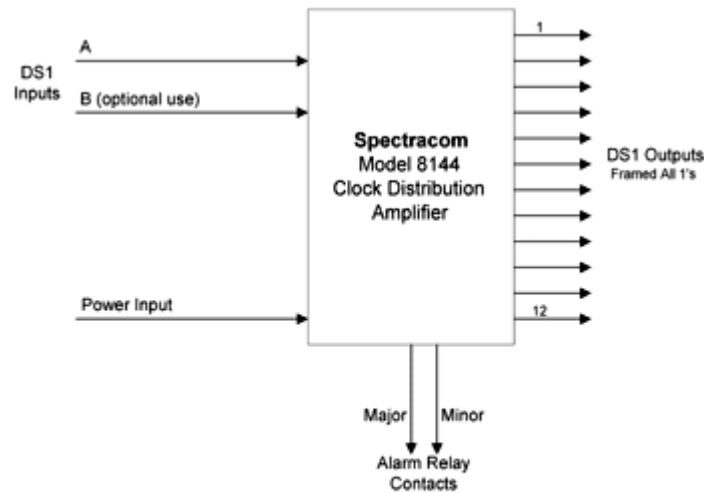


Figure 2: Interface Connections to the Spectracom Model 8144-DD Clock Selector/Distribution Amplifier

Figure 2, shows how the clock selector feature of the 8144 is used to provide automatic redundant clock backup to protect against clock signal failure. Two timing sources are fed to inputs A and B. The selected input is fed to all outputs. If the selected input is removed (LOS) or if it goes into alarm (AIS), the unit automatically switches the outputs to provide timing from the other input. If there is only one input signal, then the unit functions strictly as a distribution amplifier.

DS1 distribution outputs of the 8144-DD may each be set to drive line lengths of zero to 655 feet. Output signals are DS1 framed all ones. Because the outputs may be set to provide either D4 or ESF framing, the unit may be used to convert from either type of framing to the other. This is useful for installations with NE's that will not accept the type of framing that arrives from the network.

CONCLUSION

The Model 8144 solves timing problems in customer premise buildings where "fiber to the curb" is deployed. It distributes good timing from the "Derived DS1 Port" of the SONET equipment and eliminates the need for CPE to use SONET payload-transported DS1 traffic for timing.