

Section 1 –SynchroCast3 System Introduction

1.1 SynchroCast3 Simulcasting Capabilities

With the introduction of the SynchroCast3 simulcast system, Harris now provides an enhanced simulcast solution for use with modern communications networks. The SynchroCast3 system utilizes SNC-101S and SNC-101T modules installed in Intraplex Access Server multiplexers for T1 and E1 transport or in NetXpress multiplexers for IP communications links.

Simulcasting is a technique for transmitting to an extended geographic area using multiple, overlapping transmitters operating on the same frequency. Historically, transmissions from nearby transmitters on the same frequency have created serious reception problems where they overlap. The SynchroCast3 system can provide dramatically increased station coverage while reducing or eliminating unwanted artifacts at the listener's receiver.

The SynchroCast3 system maintains the phase alignment of transmitted signals at multiple locations using Global Positioning System (GPS) technology. Figure 1-1 shows how the SynchroCast3 system works. The next section provides more detailed information on system operations.

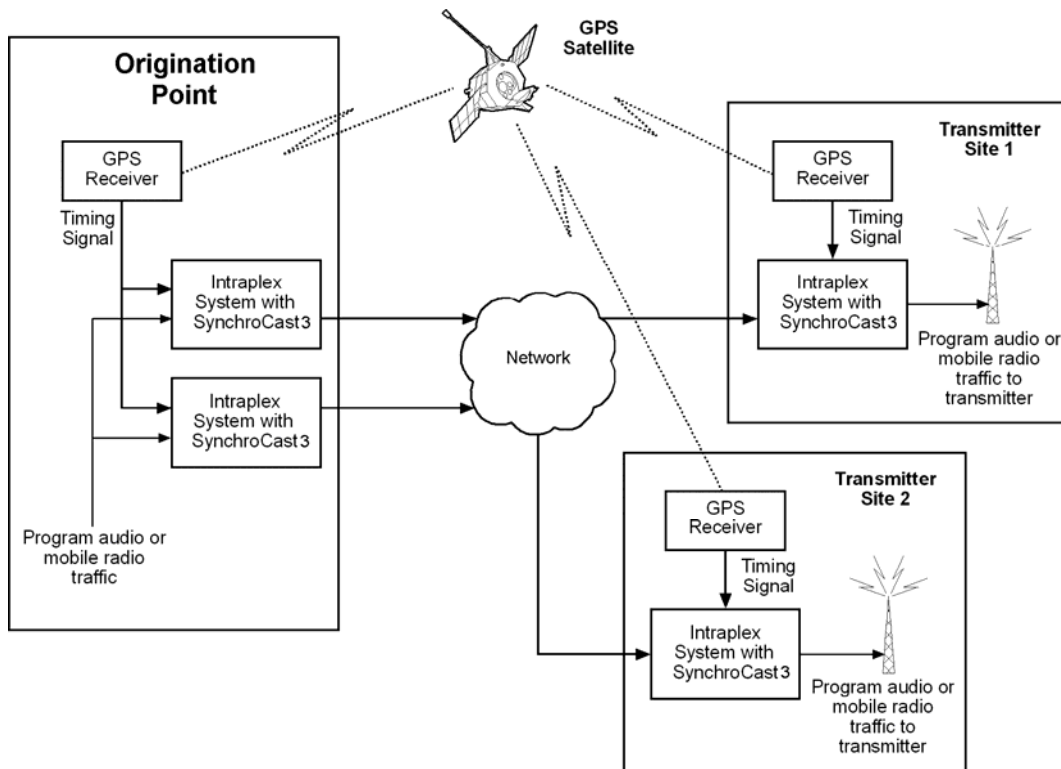


Figure 1-1. SynchroCast3 System Diagram

The SynchroCast3 system provides the following:

- GPS controlled carrier frequency synchronization
- GPS controlled precision audio phase alignment
- Dynamic adjustments to compensate for network routing changes

The SynchroCast3 system sends timing reference signals along with the audio content to each transmitter site. GPS receivers, placed at the origination point as well as the transmitter sites, provide a second timing reference. Timing signals arrive over the network connection from the origination point along with the audio content. SynchroCast compares the received signals with a local timing reference and introduces a precise amount of delay to correct the timing difference among the

transport paths. Once the signals are synchronized, the system operates automatically to keep the preset delay constant.

1.2 SynchroCast3 Components

The SynchroCast3 system includes the following components:

- **SynchroCast3 Modules**

The SNC-101S and SNC-101T modules accept the reference timing input from the GPS receivers at each location. The SNC-101S module at the origination point provides the timing reference signals. The SNC-101T module at each transmitter site compares the locally received GPS signal to the timing reference information arriving over the network connection from the origination point.

- **GPS Receivers**

The TRAK Microwave Model 8821H or the Spectracom Model 8195B GPS receivers provide reference timing input to the SNC-101S and SNC-101T modules.

- **MA-480 Module Adapter**

The SynchroCast3 MA-480 module adapter provides SNC-101S and SNC-101T modules with connections to the GPS receiver and timing connections to the system control module NIM-1, CM-5R-TD, or CM-7R-TD. Each SNC-101S or SNC-101T installed in the network requires a MA-480 module adapter (Appendix A – *MA-480 SynchroCast Module Adapter*).

1.2.1 SynchroCast3 over IP Networks

When using an IP connection to each of the transmission sites, the NetXpress NIM-1 network interface module automatically detects the presence of the SNC-101T module and enables a special *SynchroCast3* timing mode on the controller. With SynchroCast3 timing selected, the SNC-101T can modify the receive jitter buffer in the NIM-1 to reach a specified target delay. The *Intraplex NetXpress Installation and Operation Manual* gives more information on the NIM-1 module.

1.2.2 SynchroCast3 over T1 Networks

In SynchroCast3 installations using T1 circuits, a *CM-5R-TD* needs to be installed at each of the transmitter locations, replacing the CM-5 or CM-5R common module found in the standard Access Server multiplexer. The CM-5R-TD is a special network control module with a variable receive buffer that allows delays of up to 84 milliseconds to be introduced into the network. The SNC-101T module adjusts the network delay by modifying the receive buffer depth on the CM-5R-TD module.

1.2.3 SynchroCast3 over E1 Networks

In SynchroCast3 installations using E1 circuits, a *CM-7R-TD* needs to be installed at each of the transmitter locations, replacing the CM-7 or CM-7R common module found in the standard Access Server multiplexer. The CM-7R-TD is a special network control module with a variable receive buffer that allows delays of up to 66 milliseconds to be introduced into the network. The SNC-101T module adjusts the network delay by modifying the receive buffer depth on the CM-7R-TD module.