Intercoms Leap Virtual Hurdle

Part I of II
by Andrew Morris

ATLANTA

NBC's Olympic broadcast plan calls for a "virtual" broadcast center — the International Broadcast Center or IBC — that ties the network's New York broadcast facilities in 30 Rockefeller Center to facilities NBC is building in Atlanta for Olympic coverage. The glue that holds this "Virtual IBC" together is the communications system; the backbone of NBC's Olympic communications systems is an RTS intercom known as the ADAM.

INTRODUCING ADAM

The ADAM is the newest line of matrix intercom from RTS. All signal processing internal to the ADAM is handled in the digital domain, while the ADAM's control system is based on RTS' CS9000 line of intercoms. Key to NBC's Olympic operation is the fact that the ADAM is fully compatible with the entire line of RTS CS9000 intercoms.

NBC is taking advantage of this compatibility in a number of ways. First and foremost is through trunking. Trunking enables a user on one intercom system to talk to a user on another system. In the NBC headquarters in New York, there are 10 intercom systems used by various departments, including network news, WNBC, production videotape, graphics, entertainment and the network core plant.

The NBC intercoms share a controller called the "Trunkmaster," which has the capability to function as a traffic cop and arbitrate requests so that a user on one intercom can talk to a user on another intercom. The Trunkmaster determines which physical trunks are available for use and which crosspoints need to be enabled in each intercom.

The 10 existing intercoms within 30 Rockefeller Center are intercoms from all generations of the RTS matrix intercom line, including the 9500, 9600 and 9700 series as well as three new ADAM intercoms in the tape, news and graphics areas.

An ADAM CS (a smaller non-expandable version of the ADAM) lives in the network news field shop in Long Island and is earmarked for travel around the country to assist in news coverage of the political primaries and conventions. Another intercom is installed at WRC, the NBC-owned station in Washington D.C. Both the Long Island and the WRC intercoms are connected to the 30 Rockefeller Center intercoms via trunking.

For the Olympics, two ADAM intercoms will be installed in the IBC that NBC began building March 1. The Olympic unit purchased a 384 x 384 ADAM intercom and NBC's network news division is using a smaller 64 x 64 ADAM CS in Atlanta. Both
of these intercoms will connect to the 30 Rockefeller Center intercoms via trunking.

It is the trunking feature that enables NBC to use a “virtual IBC” for coverage of the 1996 Olympics. In order to build facilities in New York instead of Atlanta (for use after the Olympics), NBC decided to turn the New York and Atlanta broadcast facilities into one big “virtual” broadcast facility. Facilities have already been built in New York that will not only support the Olympic coverage, but will have a genuine afterlife in 30 Rockefeller Center. These include a massive videotape area known as PVT (production video tape) and graphics rooms as well as a control room in the graphics area that will integrate preproduced graphic packages, profiles and bumpers.

Without the trunking that enables these disparate areas to communicate with the production team in Atlanta, the virtual IBC concept could not succeed.

Because this sort of split production with its communication needs has never been attempted before, it is difficult to determine how many trunks will be required. The team planning the communications effort between New York and Atlanta — Jim Cordon, Bob Streeter, Frank Garofalo and myself — made an effort to identify the quantity of trunks needed for communication between New York and Atlanta at the point of estimated peak activity (10:30 PM EST while Prime Time is on the air and the Late Night crew is preparing for their show). It was estimated that 34 trunks would be required at the peak. The team decided to increase the number to 40 to meet unanticipated trunk demand.

In addition to the 40 trunks, NBC plans to use 12 dedicated PL’s (party lines) for production and engineering conferences. These conferences will extend to New York and appropriate parties will be able to join a conference via the various RTS intercoms. These will include the Control A director, another conference for the Control A producer and a third conference for the Control A AD (associate director). Identical conferences will be set up for the other active control room, Control B. In addition, there will be a video tape conference, an engineering conference, a graphics conference and a BOC (broadcast operation control) conference. These conferences are not trunked but are dedicated PL’s that are hard patched to the various intercoms in New York and Atlanta.

**PACK THE TRUNK**

Since the PL’s are active for hours at a time and consist of critical production communications, they will be transported between New York and Atlanta at 7.5 kHz quality. The trunked conversations on the other hand are point-to-point and tend to be brief. Trunks are therefore transported between New York and Atlanta at 3.4 kHz voice quality.

The transport of the intercom voice traffic and trunking control signals between Atlanta and New York will be handled by eight Intraplex T1 multiplexers (see Figure 1). These will be used over four AT&T-provided T1 circuits. The Intraplex multiplexers will be populated with the appropriate cards to carry the 40 3.4 kHz voice channels for the trunks, the 12 7.5 kHz voice channels for the PL’s and 38.4 kbps asynchronous trunking control data.

The Intraplex multiplexers will also carry a variety of other traffic in addition to the Intercom. These include voice traffic for a hot mic system and data for the remote control of a Pesa routing switcher. NBC is also planning to use the E&M leads available on the Intraplex 3.4 kHz voice cards to provide contact closure for tally status and for remote control of a Panasonic Quad Split unit.

As if hooking up New York and Atlanta into one giant intercom was not enough, NBC has also decided that each significant venue needs a keypanel that ties into the IBC ADAM intercom. The venues will not only be able to talk to the IBC in Atlanta but will also be able to talk to New York via trunking.

The primary function for these venue keypanels is to allow the AD at each Olympic venue to communicate with the video tape producer in New York. These keypanels will connect to the IBC ADAM via 4-wire voice circuits and 4-wire modems. The voice circuits will carry the transmit and receive audio while the modems will carry the control data between each venue keypanel and the ADAM intercom.

At each venue, NBC is planning to use a new RTS keypanel called the KP-12 at the venues. This is a 1 RU (1.75”) panel that uses a shaft encoder instead of a keypad to program the panel.

NBC is pushing the envelope with their use of remote keypanels at the venues, with the trunking interconnection of up to 14 intercoms and with the use of T1 carriers to turn their NBC and Atlanta communications facilities into one virtual intercom serving a virtual IBC.

In order to prove the trunking concept, NBC has conducted tests at various Atlanta-based sporting events in August and September of 1995. Another test is scheduled for March 5 in Atlanta. These tests involved a small subset of the Olympic ADAM intercom with six active trunks and four PLs.

At the end of March, NBC engineers will travel to the RTS manufacturing facility in Lincoln, Neb. in order to perform acceptance testing on the fully sized 384 x 384 ADAM they have purchased for Olympic coverage. A T1 has been ordered and an Intraplex mux will be shipped to Lincoln in order to test trunking with a fully loaded intercom.

The ultimate test, however, will take place beginning July 19 when Olympic coverage begins. NBC engineers will see communications begin between nearly 20 active venues, over 100 active keypanels within the IBC, and up to 40 active trunks and 12 PLs used by production and engineering personnel in Atlanta and New York.

*Editor’s Note: TV Technology news correspondent Andrew Morris is also an NBC project manager working for the Olympic unit. He is responsible for the system design and installation of NBC’s Olympic broadcast communications systems as well as most other things unrelated to video. He will continue his discussion of intercom systems in use at the Olympics next month.*