

## MEMORANDUM REPORT

**To:** (A Manufacturer of Fiber Optic Telco Terminals)  
**Date:** 8 January 1990  
**Subject:** DEMAND FOR FIBER OPTIC TELCO TERMINALS, 1990-1994

### PURPOSE AND SCOPE

The purpose of the research project summarized here was to estimate the number of fiber optic terminals at OC-12 and higher bandwidths which will be deployed by telcos over the next five years, and to determine what features and functions will be most important. Implied in that objective is the question: "Is OC-12 a hole in your product line?"

There were two elements to the research. One was to interview some 15 planners at the seven RBOCs. I have submitted to you separately reports of each of the 15 interviews.

The other element of the research was to find and analyze statistics describing the Bell Operating Company's office and loop feeder plant. I conducted extensive discussions with the FCC's Industry Analysis and Accounting Practices branches, and obtained three FCC reports: *Statistics of Communications Common Carriers*, 1989; *Fiber Deployment Update*, 1989, and *Docket 89-624, December 7, 1990*. The last sets a rate of return for interstate access of local exchange carriers, and includes attachments projecting the deployment of central office and outside plant through 1994 for the Bell Operating Companies. Copies of each of those documents have been sent to you separately, too.

### SUMMARY

#### FIBER DEPLOYMENT

1. Fiber terminals and multiplexers will account for almost all Bell companies' interoffice and loop feeder carrier plant expansion from 1991 on. Copper carrier spans in use will decline in the interoffice plant, and will drop as a percentage of the local loop and feeder plants.
2. By 1994 99% of interoffice spans will be digital, and fiber will account for 65% of interoffice spans. But only 20% of the offices will have fiber spans.

3. Ten percent of loop feeders have fiber in them today, a percentage that will increase to 20% by 1994, with 50% or more of the feeders in metro areas having fiber in them.
4. All Digital Loop Carrier (DLC) terminals deployed in 1991 and 1992 will be OC-1 or OC-3, with the exception of trial installations. After 1992, most Bell companies will begin deployment of OC-12 and higher carrier equipment in the interoffice plant, with many systems expecting to deploy only the higher bandwidth equipment interoffice from 1993 on. Driving telco demand for OC-12 is the expectation of rapidly growing customer demand for DS3 service, the installation of ADM rings, and the deployment of self-healing or redundant networks.

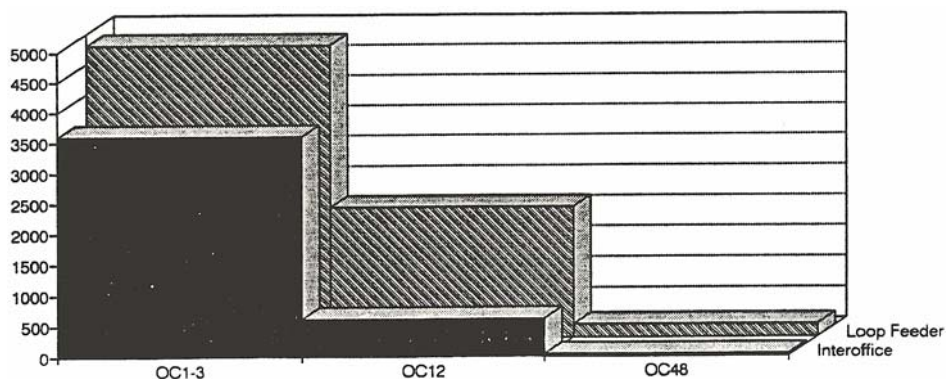
### Fiber Terminal Demand

5. Figure 1 is my estimate of the number of fiber terminals and multiplexers deployed from 1990 to 1994 in Bell companies, based on the assumptions discussed later in this report.

Figure 1

#### NUMBER OF NEW FIBER TERMINALS NEEDED

1990 - 1994 Bell Operating Companies



Source: laird Durham Estimate

6. The split among OC-*n* equipment will be highly price elastic. It also will depend in part on the development of electronic technology with reduced cooling needs. A third uncertainty which will impact the split will be the architecture of ADM rings. One system told us that it is planning for OC-48 rings in the offices, feeding multiple OC-3 rings in the loop feeder plant. Another is considering an OC-48 backbone serving lower-bit-rate systems. Some such architectural schemes might bypass OC-12 altogether.

### Topology

7. Some RBOCs expect ADM rings to account for 50% of new interoffice fiber plant and loop feeder fiber plant from 1992 on, especially in metropolitan areas.

That view is reflected in Figure 1. I expect most of the OC-12 and OC-24 loop feeder terminals to be deployed in rings in the central offices, feeding remote OC-3 terminals, many of which also will be in OC-3 rings.

### **Bare Bones vs Full-Features**

8. There is no clear delineation between what telephone engineers regard as a bare bones terminal and a fully-featured ADM machines. They see at least three price-performance points, often more. Therefore, modularity in the design of terminals is essential.

## **CONCLUSIONS**

Bell Operating Company staff engineers and planners are still in early stages of planning for fiber optic deployment. They are seeking information from equipment suppliers about cost and performance options which they believe they need in order to make deployment decisions.

Demand for fiber optic equipment is highly price elastic. The final architecture of systems, and the extent to which asynchronous terminals are replaced by optical equipment, will depend on fiber optic equipment pricing, and on the product strategies of the major competitors;

*Is OC-12 a hole in your product line?* Almost certainly. As Figure 1 shows, OC-12 will account for a 25% share of combined interoffice and loop feeder growth. But, if you develop an OC-12 terminal, you may then find that OC-48 is a hole, too.

There may be some market circumstances under which you would not need an OC-12 machine.

1. The market for OC-3, in units, is by far the largest segment of the market, and is likely to become increasingly important after 1994 as fiber is deployed to the smaller offices which make up 80% of the Bell. Gompany networks.
2. The purpose of SONET is to make equipment from various manufacturers compatible. If you can demonstrate that *Litespan-2000* works with other manufacturers' OC-12 and OC-24 equipment, you may not need to develop OC-12 yourself. That would be particularly attractive if you can find a manufacturer who makes OC-12 and OC-24, but not OC-3, with whom you can form an alliance.
3. Manufacturing economies are more likely to accrue to OC-3 because of the unit volumes, and the maturity of the technology. By concentrating resources on that product line, and developing superior features, as you have done, you may be able to capture a higher share of the market than by offering a full line.
4. You may have more credibility as a supplier by being an expert in smaller DLCs, and, at the same time, helping expand the market for such systems. Among the major concerns of our respondents is their ability to support broadband systems, particularly in the ADM, dual access mode, which they all are considering. Features which would reduce the administrative overhead, yet be flexible enough to accommodate different needs for detail which are yet to be specified, might gain you more market than having a broad line.