Abstract

Function and basic configuration of a subscriber station with decentralized exchange are described. Emphasis is given to concentrator-type stations interfacing numerous subscribers to the loop. The discussion of concentration techniques covers both the control and the switching area.
1 Introduction

Due to their high degree of flexibility there is a considerable interest in loop systems with decentralized exchange particularly for integrated local communications [1-3]. In networks with decentralized exchange all control and switching functions have been transferred to an "intelligent" subscriber station. The subscriber station must perform complicated data processing functions and must cope with the high bit rate of the loop. In order to reduce the expenditure in hardware and to provide economic solutions, concentration techniques are called for.

This contribution describes the development of such a concentrator-type subscriber station for use in an experimental digital network featuring service integration and decentralized exchange. This network has been built in the Heinrich-Hertz-Institut, Berlin, and is in operation since the end of 1980 [4]. Figure 1 shows a subscriber loop, which is the basic building block of the system. The subscriber stations of the loop communicate with each other - and with other stations of other loops - via a two-way optical fibre-link.

The interface between electrical and optical signals is provided by the repeaters of the loop. A central synchronization generator feeds a time-multiplex frame into the loop, defining 2048 time slots, grouped to 256 full duplex channels of 64 kbit/s and 2 broadband channels of 49 Mbit/s.

The synchronization reflex extracts the synchronization information from the receiving line and retransmits it on the transmitting line.

Using a method of multiple access, dynamic allocation of time slots is provided. Inband-signalling is used to transmit calls and acknowledgement signals of the subscribers. Switching from signalling mode to data transfer mode is indicated by the appropriate setting of the signalling bit. Finally, call clearing is established by the exchange of empty time slots.