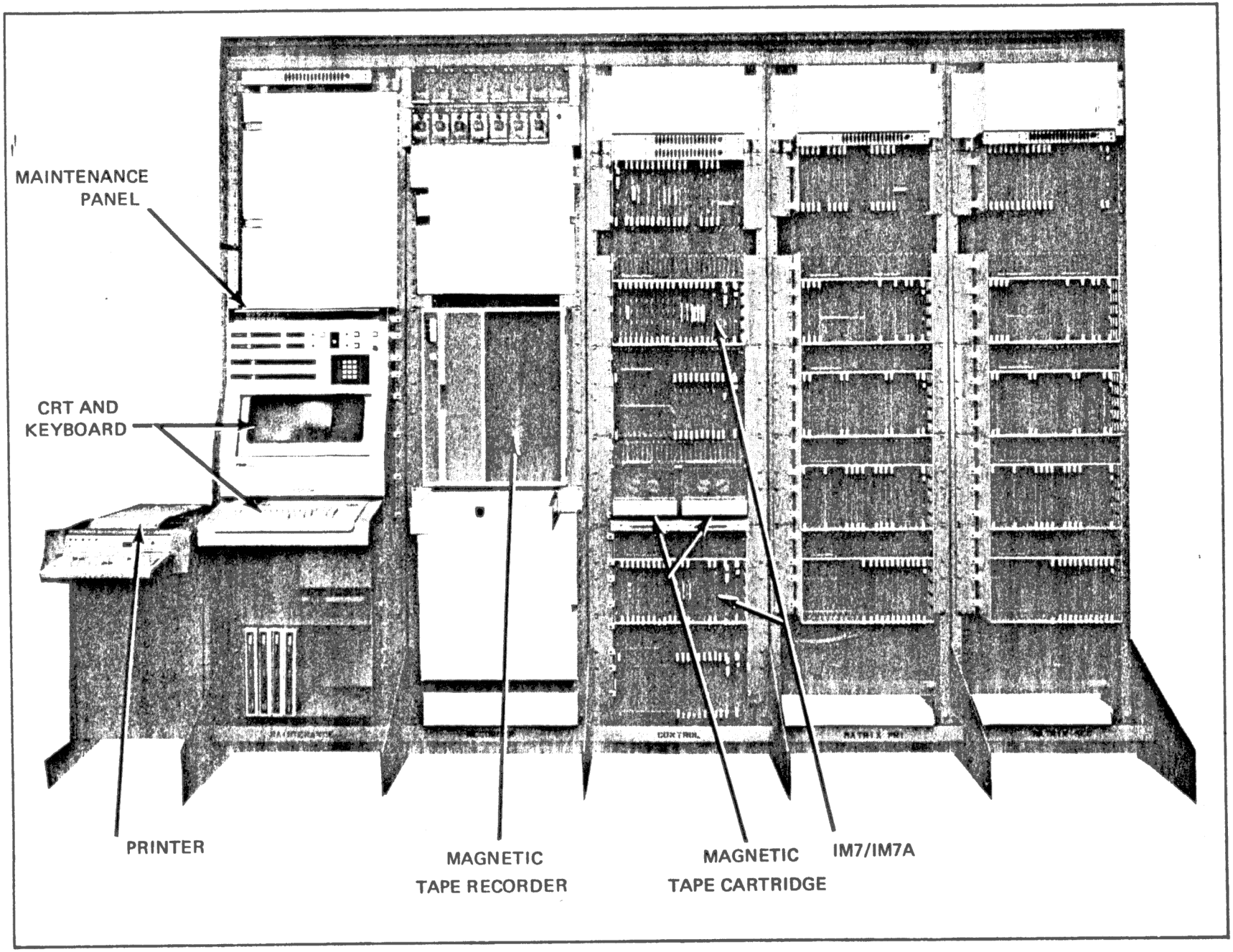

Figure 1. Operator Equipment Locations, Integrated Transmission and Switching (ITS) System

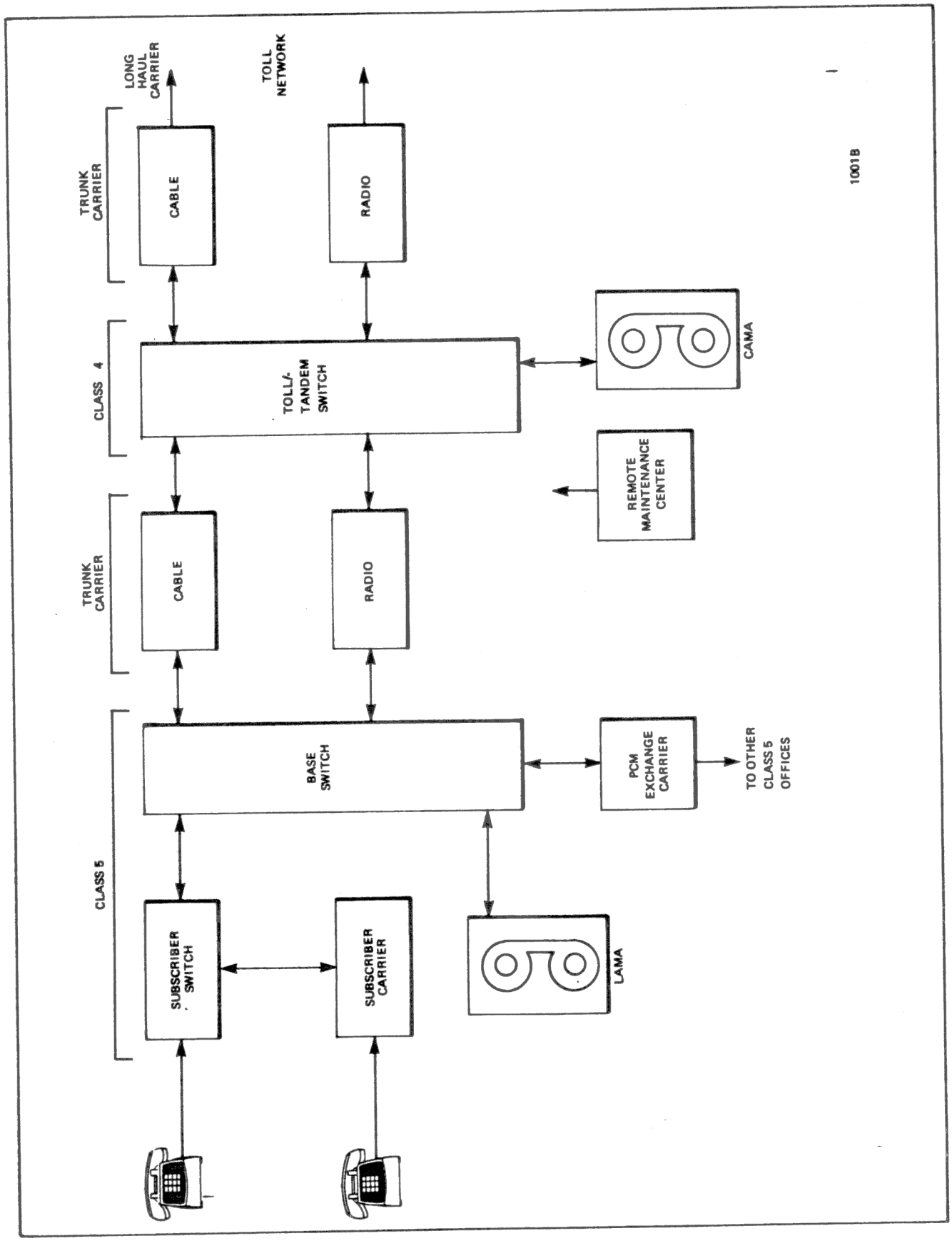

Figure 100-1

ITS System Overview

2. SYSTEM OBJECTIVES AND BENEFITS

2.001 During ITS System planning, technical and marketing studies led to establishment of a number of objectives. The ITS System objectives result in a number of benefits with economic, service and compatibility implications. These are listed in **Table 100-1.**

3. SYSTEM ARCHITECTURE

3.001 The overall System architecture which evolved from the above objectives is shown in **Figure 100-2.** System architecture is critical to system performance, and also to the success of the family of products offered over the life of a system. In telephone central office equipment, this life cycle is generally 20 years or longer.

3.002 The elements available to configure ITS Systems are summarized in **Table 100-2.** As an example of assembling the building block elements of Table 100-2 into an integrated system, consider the Vidar ITS System architecture of **Figure 100-2.** The first building block of ITS System architecture is a base switch with DS-1 interfaces and terminations. These are segregated for lines and trunks. All trunk-to-trunk switching is non-blocking. The only blocking in the system appears in the subscriber switch.

3.003 A key feature of the architecture is the interface to the base switch. All interfaces are at the North American standard 1.544 Mb/s T1 rate. These are referred to as DS-1 interfaces, since they operate at the Data Speed 1 rate. No conversion devices are needed at this interface point, since the base switch operates internally at the DS-1 rate.

3.004 Beginning at the bottom of **Figure 100-2,** it is possible to provide a direct digital interface between the base switch and Switched Digital Network (SDN). The ITS System architecture was designed to include this inherent ability to integrate with the SDN. Note that there is a substantial economic benefit in directly interconnecting two or more digital switches, since interswitch channel banks are then completely eliminated.

3.005 Thus, digital trunks (to other digital switches) are available without additional interfaces. The Bell System has established a nationwide plan for digital switching synchronization, where more than one digital switch operates in a "switched digital network." ITS Systems are compatible with this plan. When two digital switches are interconnected, synchronization between the two system clocks will be provided as an option, in accordance with the Bell System SDN master plan.

3.006 Continuing at the lower part of **Figure 100-2,** analog trunks interface the base switch through VB3 Voice Banks. If this were the only interface to the switch, the power of the digital switch would not be used to integrate transmission and switching or provide subscriber terminations. The first step in the integration of transmission and switching is shown in the third line from the bottom of **Figure 100-2.** There, a D bank interfaces with the base switch over a T1 repeatered line.

3.007 When the D bank is remoted over the span line, the cost of remoting is merely the cost of the T1 line. Therefore, T1 carrier proves-in over physical facilities based only on the cost of the span line, rather than the cost of the span line plus the cost of two banks. T1 carrier proves-in at a much shorter distance in this environment.

3.008 The first three lines from the bottom of **Figure 100-2** illustrate the system interfaces to digital trunks, analog trunks and combination trunks, respectively. Digital and combination trunks interface the base switch digitally at the DS-1 level. Analog trunks interface the base switch at analog levels. This completes the building blocks required for trunk switching.

3.009 Continuing the discussion of building blocks, consider the next block in **Figure 100-2** (the local subscriber switch, LSS). The local subscriber switch interfaces up to 336 subscriber lines and switches them into two DS-1 lines interfacing the base switch. (Remember that the base switch interfaces DS-1 lines directly.) The base switch provides a non-blocking, full-availability matrix for each of the digitally derived time slots.

3.010 A subscriber carrier terminal (SCT) is shown on the fifth line from the bottom in **Figure 100-2.** There, 24 subscriber lines are remoted from the LSS to provide a pair gain system. The cost of this pair gain system is the incremental cost of the T1 span line and the cabinet for the SCT. Thus, the point of conversion from analog to digital voice is placed in the subscriber feeder plant.

3.011 Some applications require a concentrated form of subscriber carrier to serve a large concentration of subscribers. This can be a pair gain system or a CDO rehoming application. This function is accomplished with the remote subscriber switch (RSS). The RSS differs from the LSS, in that it must have the capability to stand alone if the T1 lines to the base switch are cut. Thus, the RSS must have capabilities for intra-links, directory number translation, DTMF and stand alone POTS (Plain Old Telephone Service) capability independent of the base switch.