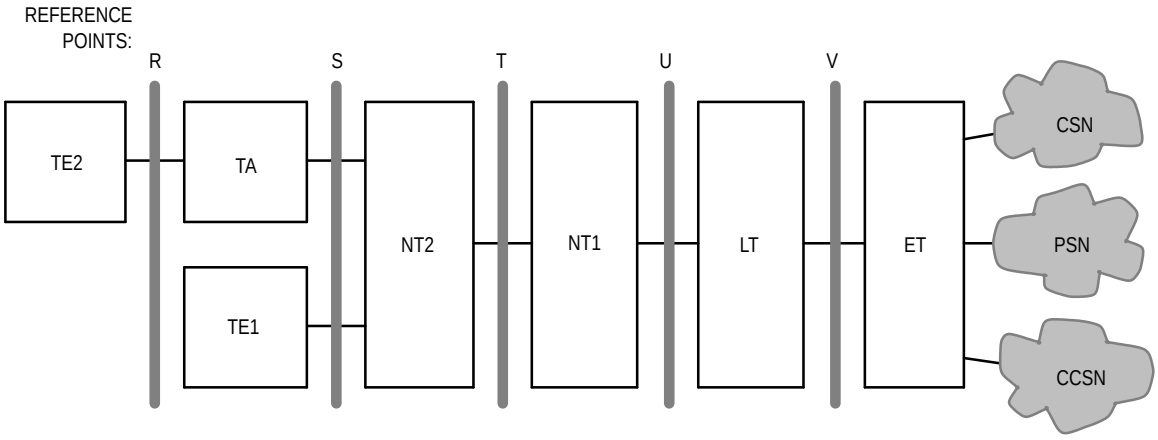
2
ISDN BASIC ACCESS SYSTEM OVERVIEW

2.1 ISDN REFERENCE MODEL

The Integrated Services Digital Network (ISDN) Reference Model is shown in Figure 2–1. This is a general model that can be adapted to many different implementations of the ISDN. The diagram indicates the position of the U–Reference Point between the Line Termination (LT) and the Network Termination 1 (NT1) blocks in the model.

The U–interface is the physical access point to the ISDN at the U Reference Point. This interface is a single twisted wire pair supporting full–duplex transmission of digital information at a rate of 160 kbps. The twisted wire pair can extend up to 18,000 feet and may include bridge taps. This interface is often referred to as a Digital Subscriber Line.



Key:

CCSN:	Common Channel Signalling Network	NT2:	Network Termination 2 (OSI Layers 2 and 3)
CSN:	Circuit Switched Network	PSN:	Packet Switched Network
ET:	Exchange Termination (C.O. Switch)	TA:	Terminal Adapter
LT:	Line Termination (Line Card)	TE1:	Terminal Equipment 1 (ISDN Terminal)
NT1:	Network Termination 1 (OSI Layer 1 Only)	TE2:	Terminal Equipment 2 (Non–ISDN Terminal)

Figure 2–1. ISDN Reference Model

2.2 U-INTERFACE TRANSCEIVER ISDN APPLICATIONS

Figure 2–2 shows some typical ISDN applications of the MC145572 U–interface transceiver as well as related ISDN applications for S/T–interface terminal equipment using Motorola semiconductor solutions.

The LT example shows the U–interface transceiver in a line card environment. This line card can be located in an ISDN central office switch or other ISDN compatible switching equipment, including a remote switch or carrier terminal. In this application, the Interchip Digital Link (IDL) and Serial Control Port (SCP) of the MC145572 are interfaced to the backplane of the switching equipment as required for the particular switch architecture.

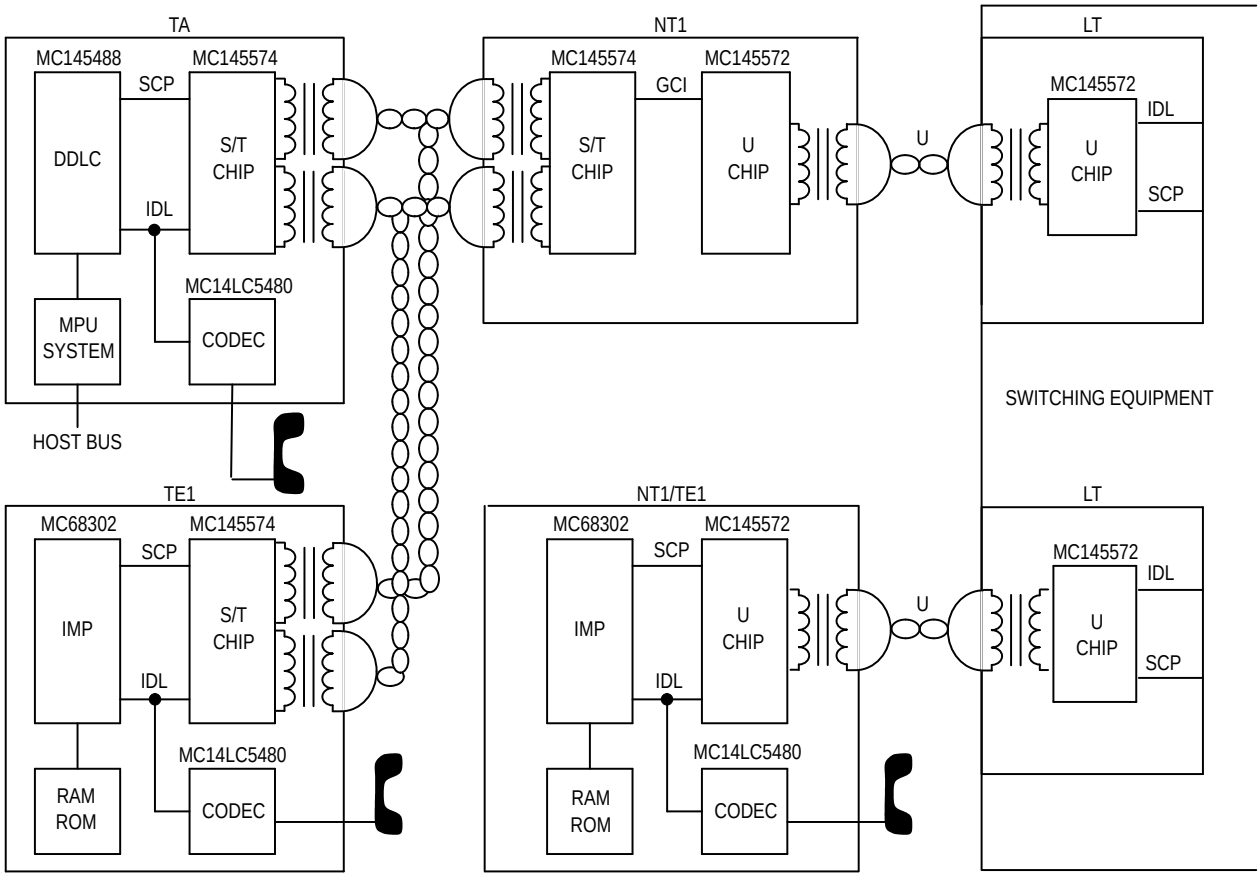


Figure 2–2. MC145572 Typical ISDN Applications

The NT1 converts the 2–wire U–interface to the 4–wire S/T–interface as shown. By combining an MC145572 with a Motorola MC145574 S/T–interface transceiver, an NT1 can be readily implemented.

Also shown is a highly integrated U–interface ISDN terminal, designated NT1/TE1, which implements a complete voice and data terminal with a U–interface for immediate and cost effective access to the ISDN. The MC145572 is shown interfaced to the M68000 core based MC68302 Integrated Multiprotocol Processor (IMP), which handles Layers 2–7 of the OSI Reference Model. Voice is supported with a conventional codec–filter device such as the MC14LC5480.

The network is completed with a Terminal Adaptor (TA) and an S/T–interface ISDN Terminal (TE1). Two different architectures are shown: the TA is implemented with the MC145488 Dual Data Link Controller and a host MCU system, and the TE1 is shown implemented with the MC68302 IMP.

2.3 NON-ISDN U-INTERFACE TRANSCEIVER APPLICATIONS

A typical non–ISDN pair gain application block diagram is shown in Figures 2–3 and 2–4. Pair gain is a technique to multiplex two or more analog phone lines over a single twisted pair.

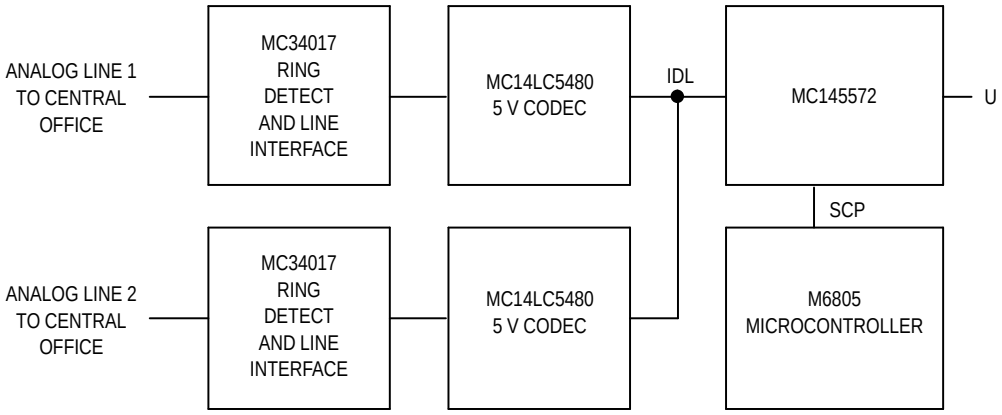


Figure 2–3. Pair Gain Application, Central Office Terminal

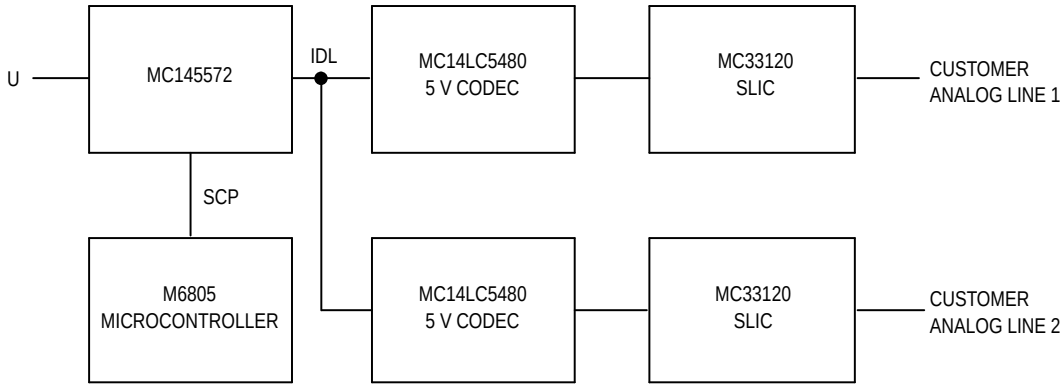


Figure 2–4. Pair Gain Application, Remote Terminal