IBM

IBM Personal Computer Voice Communications Option

IBM Personal Computer Voice Communications Option (6294771)

The IBM Personal Computer Voice Communications Option is a multi-function adapter card that may be installed in an IBM Personal Computer, IBM Personal Computer XT™ system, or an IBM Personal Computer AT® system. When this option is installed, the IBM Personal Computer is extended to provide voice command recognition, synthetic voice (text-to-speech), voice (audio) record/playback, line monitoring, telephone management, and an internal modem (Bell 103/212A standards).

The Voice Communications Operating Subsystem Program, provided with the Voice Communications Option, and which may be purchased separately, provides the functional programs for the adapter and allows new application programs to access adapter functions. The Voice Communications Application Program Interface (API) defines the base set of resource management functions and discrete function sets available in the IBM PC Voice Communications Operating Subsystem to application programs. Its program interface is designed for application development for the following function sets:

- Asynchronous Data Communications – Asynchronous Communications protocols and modem functions are emulated. No external modem is required. Full duplex Bell 103 (110 or 300 bps) and Bell 212A (1200 bps) modem compatible capabilities are supported and selectable by communication applications.
- Voice Command Recognition – Recognition is based on speaker-dependent, discrete-utterance recognition (words and/or phrases). A speaker may train one or more vocabularies to be shared by speech-based applications. Each application will provide a speech language that defines the spoken commands that it accepts and groups the vocabulary into sub-vocabularies to activate at the appropriate time.

- Text-to-Speech (Synthetic Voice) – Any serial ASCII data stream directed to the Voice Communication Text-to-Speech component will be transformed into synthetic voice (speech). Rules provide for abbreviations, acronyms, and other variances. For example, in "Dr. Jekyl" and "Sunset Dr.," Doctor and Drive will be spoken, respectively.
- Voice (Audio) Record/Playback – The Operating Subsystem digitizes voice and mathematically compresses it. Three compression options are provided to meet differing voice quality and storage requirements. Recording rates and minutes per megabyte of storage are:

bytes/second	minutes/megabyte
3.6K	4.5
2.4K	6.8
1.8K	9.2

Periods of silence in speech are compressed and will require less storage.
- Line Monitoring – Applications can be written to receive touch-tone signals from remote telephones to be used as commands or data entry.
- Telephone Management – Applications can initiate telephone calls (autodial) and support other PBX functions (such as "Adding a Party"), and can receive telephone calls by taking advantage of the telephone management component of the Voice Communications Application Program Interface.

Highlights

With the appropriate programming, the IBM Personal Computer Voice Communications Option:
- Attaches one telephone, one or two telephone lines, one microphone, and one speaker
- Emulates MODEM (Modulate/Demodulate) functions compatible with Bell 103A and Bell 212A standards
- Uses voice as input for data entry or commands through a connected microphone or telephone
- Generates synthetic English speech from ASCII data streams to read text and data through a connected telephone, telephone line, or speaker

- Digitizes and compresses voice or other audio received through a connected telephone, telephone line or microphone
- Reconstructs and plays back voice through a connected telephone, telephone line or speaker
- Detects and/or generates touch-tone signals. Detection allows remote keyboard entry. Generation allows autodialing.
- Generates pulse dial tones to allow autodialing on pulse phone systems
- Detects call progress signals: busy, ringing, voice, silence, etc.
- Supports data transmission rates of 110, 300 or 1200 bits per second using Asynchronous Data Communication protocols

System Requirements

- The IBM Personal Computer Voice Communications Option can be installed in a full-size system expansion slot on any of the following IBM Personal Computers:
  – IBM Personal Computer
  – IBM Personal Computer XT
  – IBM Personal Computer AT
- DOS 2.10 or higher
- One double-sided diskette drive
- Connected telephone lines (one or two) for asynchronous communications. Communications programs must be written to the Voice Communications Application Program Interface.
- Connected telephone and line for telephone management and voice conversations
- Connected microphone or telephone for voice command recognition or voice recording
- Connected speaker, telephone or telephone line for audio output from record/playback or text-to-speech
- Interrupt level 2, 3, 4 or 7 must be available. Applications written in BASIC may preclude use of levels 3 and 4.

Note: This option includes the IBM Voice Communications Adapter and the Voice Communications Operating Subsystem Program. This software, in connection with the appropriate application programs, enables the adapter

to provide voice record/playback, voice recognition, text-to-speech, telephone management and asynchronous communications functions.

Note: Memory requirements depend upon DOS level, application requirements, and functions in use serially or concurrently. Functions can be memory resident for performance reasons, or loaded as required. Voice Communications Operating Subsystem memory needs will vary from 22KB to 256KB. Each IBM application will indicate its own memory requirements. The Exploring IBM Voice Communications demonstration program, provided with the Voice Communications Option, requires an IBM Personal Computer with 320KB of memory.

Technical Information
The adapter contains the following major functional components:
- Texas Instruments TMS320 programmable signal processor
- 20KB of RAM
- Interrupt level jumper for levels 2, 3, 4, and 7
- Connectors for attachment of one telephone and one or two telephone lines
- Special telephone cables included. Cables use RJ11C connectors to connect to modular telephone wall outlets and telephones.
- Sub-miniature audio-type connectors for attachment of a microphone and an external speaker
- The Operating Subsystem enables the adapter to provide the voice, telephone management, and communications functions indicated under application program control. A subsystem kernel residing both in IBM Personal Computer memory and adapter memory manages the adapter.
- The IBM Voice Communications Adapter has the capacity to execute certain combinations of voice communications functions concurrently. The

Operating Subsystem manages memory on the adapter card in two partitions. A function can be active in one partition, concurrent with a function in the other. The functions are uniquely assigned to partitions, as follows:
- One partition is used to execute either local telephone management services or remote phone line monitoring
- The other partition is used to execute the following, one at a time: voice record/playback, voice recognition, text-to-speech, or asynchronous communications

Further limitations on the concurrent operation of voice communications functions may be imposed by the IBM Personal Computer system, the particular operating system being used, or the nature of the applications.

Limitations
- Only one adapter may be installed in a system unit, and it must not be in a slot adjacent to an IBM Enhanced Display Station Emulation Adapter (for attachment to System/36-System/38).
- The FCC registration of the adapter is valid only when used with the IBM Voice Communications Operating Subsystem Program.
- Connected telephone lines must be analog, a special feature if on a digital PBX or CBX.
- Voice-Activated Keyboard Utility runs with applications that do not interfere with normal BIOS or DOS keystroke data stream buffer operations. You must have a fixed disk drive to run this utility.
- Only application programs written for the IBM Voice Communications Adapter and Operating Subsystem can use these products. Programming requires assembly language or higher-level language linked with assembler.
- For multi-line phones, a locally purchased adapter may be required to allow attachment to this adapter.

Compatibility
The following IBM Personal Computer hardware options have been tested and are compatible with the IBM Personal Computer Voice Communications Option:
- IBM Asynchronous Communications Adapter
- IBM SDLC Communications Adapter
- IBM PC Network Adapter
- IBM Personal Computer Cluster Adapter
- IBM 3278/79 Emulation Adapter
- IBM Monochrome Display and Printer Adapter
- IBM Color/Graphics Monitor Adapter with IBM Color Display or IBM Enhanced Color Display
- IBM Enhanced Color/Graphics Adapter
- IBM Printer Adapter
- IBM 256KB Memory Expansion Option
- IBM 512KB Memory Expansion Option
- IBM Enhanced Display Station Emulation Adapter for the IBM Personal Computer XT or IBM Personal Computer AT only. This adapter and the Voice Communications Adapter must not be installed in adjacent expansion slots.

Demonstration
An Exploring Voice Communications diskette is included in the option so each user can demonstrate the highlighted functions. This demonstration requires an IBM Personal Computer with 320KB of memory.

In order to demonstrate the functions provided by Exploring Voice Communications, please ensure that correct installation of this option and of attachments, such as the telephone line, is performed.

The Telephone Management demonstration component of the Exploring Voice Communications Program permits placing of local telephone calls. In certain areas, the telephone company may charge a toll for certain exchanges. Therefore, you may wish to control access to this component of the demonstration to prevent toll charges.

Application Development Tools
- Voice Communications Application Program Interface Reference – Provides information needed for experienced assembly language programmers to write application programs for voice record/playback, voice recognition, text-to-speech, telephone management, and communications functions that use the IBM Personal Computer Voice Communications Option. A tool kit diskette of programs provides aids to developers of voice command-driven applications, and provides examples of voice record/playback, text-to-speech and telephone dialing programs.
- Voice-Activated Keyboard Utility – Allows users with programming aptitude to develop, and all users to execute, audio application interfaces to control existing applications with voice commands

Installation and Operation
Information pertaining to the installation and operation of the IBM Personal Computer Voice Communications Option is contained in the documentation shipped with the product. It is the user's responsibility to install and operate this option following the guidelines contained in the documentation.

Security, Auditability and Control
The IBM Personal Computer with IBM Personal Computer Voice Communications Option can be used and managed so as to limit the risk of unintended modification, destruction or disclosure of sensitive data. User management is responsible for evaluation, selection and implementation of these features; for administrative procedures; and for appropriate controls in application systems. If sensitive data is sent over external communications facilities, user management may wish to pursue the application of cryptography.

Packaging and Publications
The IBM Personal Computer Voice Communications Option is packaged with the following:
- Voice Communications Adapter
- Telephone cables
- Installation and Setup Guide (6280713)
- Four double-sided diskettes:
  - Operating Subsystem Program
  - Exploring the Voice Communications Adapter
  - Adapter and System Diagnostics (IBM Personal Computer and IBM Personal Computer XT)
  - Adapter and System Diagnostics (IBM Personal Computer AT)

Updates
- Hardware Maintenance and Service Manual Update IBM Personal Computer (6280704)
- Hardware Maintenance and Service Manual Update IBM Personal Computer XT (6280697)
- Hardware Maintenance and Service Manual Update IBM Personal Computer AT (6280690)
- Technical Reference Update (55X8864)
  - available only to subscribers of Hardware Technical Reference service for options and adapters

Customer Responsibilities
To install this option, the customer is responsible for configuring the system with the necessary hardware to serve the option hardware and programming, including the application program. The customer is also responsible for program setup and operation, implementation of backup procedures, and applicable problem determination procedures. The user should be familiar with the operation of both the IBM Personal Computer and the IBM Personal Computer Disk Operating System.

Warranty
The adapter is warranted for one year. The standard IBM Program License Agreement provisions apply to this product. A copy of the Agreement is included in the program package.