"PCBX^{TM}"

BASIC INFORMATION

MAY, 1988

PCBX

BASIC INFORMATION

Introduction

PCBX is a professional Private Branch Exchange (PBX)
Telephone system that doesn't require costly, button laden
extensions. It enables small/medium size businesses to custom
build their own telephone system to suit their specific needs for
a surprisingly low cost.

Basically, the PCBX is a single board system with 3 optional
interface boards. They are as follows:

1.   4 trunks, 12 stations (main board or optional)
2.   8 trunks, (optional)
3.   16 station (optional)

These boards are compatioble with the AT&T 6300, AT&T
6300 plus, and IBM PC,XT, AT COMPAQ 386 or Compatible personal
computers. The above may be used in any possible configutations.
The basic card contains the logic to support all PCBX standard
features.

Connections to the cards are made with a standard Amphenol RH21X
that is provided with the card. this provides s simple interface
incoming telephone lines as well as standard interface connection
(RJ11) for almost all telephone handsets.

Protection

The system is designed to prevent foreign voltages from reaching
the trunk under any circumstances. Transformer coupling and over-
voltage protection are used for total isolation.

KEY SYSTEM ARCHITECTURE

The trunk interfaces provide all necessary protection to meet the
FCC requirements, plus voice and signal conditioning. Voice and
data information are passed to a matrix where the information goes to
the system to indicate the current system condition.

The voice matrix is an analog crosspoint CMOS switch. The basic
system consists of two 8X12 and two 8X4 crosspoint switches.
Music-on-hold, station Touch Tones and System Progress Tones are
sepatated to alleviate crosstalk within the switching structure.

PCBX has a battery reversal detector that alerts the CPU when
the tip and ring polarity has been reversed. A loop detect
circuit indicates when the connection has been terminated by the
outside caller. Call progress detection is used to detect BUSY,
RINGING, CONNECTION, DISCONNECTION and DIAL TONE. The ground
loop detector is used to detect grounds on a groundstart trunk.

SYSTEM SETUP SCREEN

Provides for system configuring; i.e. comprter type, processor
speed and type, and terminal type. Also this screen allows
entering of night-transfer numbers, adjustable timing values, and
entering system programmable messages.

ÎMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM

```
Comprter Type                                 IBM PC/XT
        Screen Type                           monochrome
        Clock Speed                           4.77 MHZ XT standard
        CPU Type                              8088 standard PC/XT

Hold Recall Time                              30      seconds
Automatic Extension Callback Time             05      minutes
Redial wait Time                              05      minutes
Call Transfer Pick-up wait Time               10      seconds

Night Transfer Number Trunk 1                 27
Night Transfer Number Trunk 2                 9 839-0122
Night Transfer Number Trunk 3                 8 1 (818) 445-6754
Night Transfer Number Trunk 4

Programmable Message 1                        IN LAB ROOM
Programmable Message 2                        NEW YORK OFFICE
Programmable Message 3                        CONFERENCE RM#556
Programmable Message 4                        OUT ON DEMO
Programmable Message 5

Report Information File Name                   report
```
HMMMMMMMMMMM use cursor keys to select item or hit (end) to exit MMMMMMMMMMM

```
PG-UP               -               to terminate program/with save
END                 -               to terminate program/with save
ARROW KEYS          -               to select item
+ or -              -               to modift a numeric item
char/num keys       -               to enter programmable message
del                 -               to delete message
backspace           -               to delete last char in message
(return)            -               to accept message entry
ESC                 -               to save last changes to disk
∧C                  -               to terminate program/no save
```

OUTSIDE LINE RESTRICTION SCREEN

Allows for the review and the modification of individual trunk restrictions. Prefixes, area codes, operator, information and any specific number maybe restricted of allowed. Access codes for a long distance service are also a part of this screen, along with trunk time restrictions.

IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM

STATION SPECIFIC PARAMETERS

Trunk #1 Dial table
    Valid Area Codes
    Dis-allowed Area Codes
    Allowed prefix numbers
    Un-Valid prefix numbers
    Access Code
    Time restrictions

Trunk #2 Dial Table
    Valid Area Codes
    Dis-allowed Area Codes
    Allowed prefix numbers
    Un-valid prefix numbers
    Access Code
    Time restrictions

HMMMMMMMMMMM use cursor keys to select item or hit (esc) to exit MMMMMMMMMM

3

SYSTEM COMMAND CODE SCREEN

This screen allows the modification of the command
code set for emulation of other PBX systems.

IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM

SYSTEM DIAL COMMAND PARAMETERS

Intercom Dialing	2
Redial Last Number	5
Call Forward Set	*72
Call Forward Clear	*73
Operator Message Set	#6
Operator Message Clear	#5
Alternate Answer Set	*71
Message Setting	*6
Message Clear	*5
Convenience Deal Programming	*75
Convenience Dial Execute	*2
Trunk Pick Up	*8
Station Group Pick Up	*##
Directed Station Pick Up	***
CAll Hold	*9
Conference Hold	**9
Conference Drop	**8
Trunk Orbit Hold	*#1
Trunk Orbit Drop	*#2
Trunk Orbit Pull	*#3
Trunk Switch Hook	*#4
Trunk Forward Set	*#72
Trunk Forward Clear	*#73
Call Transfer	#
Local Dial	9
Long Distance Dial	8
Operator Call	0
Station Reset	611
Print Convenience Dial Numbers	*#*
Auto Operator On	##345
Auto Operator Off	##567
Auto Orbit On	##234
Auto Orbit Off	##432
Account System Set	###543
Account System Reset	###765
Set Dial Campon	#8
Clear Dial Campon	#9
Auto Extension Redial	#0
Night Transfer On	#321
Night Transfer Off	#123
Print key Codes	#***65#4
Direct Connect Trunk	*#5
Operator STation Forward Set	#72
Operator Station Forward Reset	#73
Operator Station Alternate Answer Set	#71
Operator Station Reset	#411

HMMMMMMMMM use cursor keys to select item or hit (esc) to exitMMMMMMMMMMMMMMM

```
PG-UP          -    to return to previous screen menu
PG-DN          -    to View next screen menu
END            -    to exit current screen menu set
ARROW KEYS     -    to select item
+ or -         -    to modify a numeric item or to toggle on/off feat.
Char/num keys  -    to enter programmable message
DEL            -    to delete message
Backspace      -    to delete last char. in message
```

ALL-EXTENSION ACTIVITY ACREEN

Displays the name and extension number of every user, plus the
current station of each station. The receptionist knows exactly
what an extension is doing at any given moment and if the station
is on an outside line, how long the call has been in progress.

```
1111111111111111111111111111111111111111111111111111111111111111111111
1    STATION 1. (200)1   STATION 2.   (201) 1    STATION 3.(202) 1 STATION 4 (20
1 Lobby              1Receptionist        1 Marketing Dept.   1President
1 On-Hook            1talking             1 On-Hook           1Trunk Dialing
1    OPERATOR        1                     1                   1
1                    1To 14 for 00:07:24   1                   1 9 839-012
1111111111111111111111111111111111111111111111111111111111111111111111
1    STATION 5 (204) 1   STATION 6.   (205) 1   STATION 7.(206)  1 STATION 8(207
1 Accounting         1Sales Department     1 Production         1Shipping
1 On-Hook            1On-Hook              1 Intercom Dialing   1On-Hook
1  CALLS FORWARDING  1  ALTERNATE ANSWER   1                    1   ON BREAK
1 9 839-1212         1201                  1 210                1
1111111111111111111111111111111111111111111111111111111111111111111111
1                    1                     1   STATION 11.(210)1
1   STATION 9. (208) 1   STATION 10   (209) 1 Fax System        1 STATION 12.(
1 Engineering        1Customer service     1 On-Hook           1 Computer Syst
1 On-Hook            1On-Hook              1                   1 On-Hook
1                    1                     1                   1
1                    1                     1                   1
1111111111111111111111111111111111111111111111111111111111111111111111
1                    1                     1                   1
1  TRUNK 1.          1  TRUNK 2.           1                   1 TRUNK 4.
1 Orange County TK#1 1Orange County TK#2   1  TRUNK 3.          1Out Wats
1 Trunk Orbit Hold   1On- Hook             1 Los Angeles Wats   1On-Hook
1                    1                     1 Talking            1
1 To 01 for 00:01:51 1                     1 to 02 for 00:00:24 1
1111111111111111111111111111111111111111111111111111111111111111111111
```

6

Gives a summary of the features for which each station has been orogrammed. You cam see at a glance the 9 or 8 dialing status, Operator Assignment (OPR), Call Conferencing (CC), Call Forward (FWD), Call Transfer Status (TRN), Trunk pickup (TPU), Trunk Orbiting Capability (ORB) [also known as parking], Convenience (speed) Capability (CNV), do Not Disturb (DND), Privacy (PRV) and Call Group (GRP).

```
ĪMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
```

"	ST. Description	9	8	OPR	CC	FWD	TRN	TPU	ORB	CNV	DND	PRV	GRP	"
"	# 1 Lobby	ON	ON	ALT	ON	ON	ON	ON	ON	ON	OFF	OFF	00	"
"	#2 Receptionist	ON	ON	PRI	ON	ON	ON	ON	ON	ON	OFF	OFF	04	"
"	#3 Marketing Dept.	ON	ON	ALT	ON	ON	ON	ON	ON	ON	OFF	OFF	02	"
"	#4 President	ON	OFF	ALT	ON	ON	ON	ON	ON	ON	OFF	OFF	00	"
"														"
"	#5 Accounting	ON	NO	NO	ON	ON	ON	ON	ON	ON	OFF	OFF	77	"
"	#6 Sales Department	ON	ON	NO	ON	ON	ON	ON	ON	ON	OFF	OFF	01	"
"	#7 Production	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	10	"
"	#8 Shipping	OFF	OFF	NO	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	03	"
"														"
"	#9 Engineering	OFF	OFF	NO	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	03	"
"	#10 Customer Service	OFF	OFF	NO	NO	OFF	OFF	OFF	OFF	OFF	OFF	OFF	01	"
"	#11	OFF	OFF	NO	NO	OFF	OFF	OFF	OFF	OFF	OFF	OFF	06	"
"	#12	OFF	OFF	NO	NO	OFF	OFF	OFF	OFF	OFF	OFF	OFF	09	"
"														"
"	#13 Orange County TK#1	ON	ON	*	ON	ON	ON	*	*	*	*	*	29	"
"	#14 Orange County TK#2	ON	ON	*	ON	ON	ON	*	*	*	*	*	05	"
"	#15 Los Angeles Wats	ON	ON	*	ON	ON	ON	*	*	*	*	*	13	"
"	#16 Out Wats	ON	ON	*	ON	ON	ON	*	*	*	*	*	06	'
"														"
"														"

HMMMMMMMMMM use cursor keys to select item or hit (esc) to exit MMMMMMMMMMMM

STATION MESSAGE DETAIL RECORDING

The SMDR is stored to disk in a RAW data style format. From this
file detailed report information can be obtained. Specific data
on any long distance calls, calls on hold, conferencing, call
of day each call was made, plus theduration minus any hold time.
Hold times are also recorded. Lets you monitor phone expenses and
alerts you to phone abuse.

STATION MESSAGE RECORDING LESEND

B - PCBX system startup time
E - PCBX system termination time
C - Connection starion number number dialed/station number date time
D - Disconnection station number station number connect time

NUMBER DIALED IDENTIFIERS

```
        #       - call transfer
        *8      - trunk pickup
```

SAMPLE RECORD

```
B TUE MAY 10, 13:38:00 1988
C 01 812132936773          Tue May 10 13:40:00
C 15 01                    Tue May 10 13:40:00
D 01 15                    00:02:00
D 15 01                    00:02:00
C 01 812137354423          Tue May 10 13:40:00
C 15 01                    Tue May 10 13:40:00
D 01 15                    00:01:09
D 15 01                    00:01:09
C 01 202                   Tue May 10 13:40:54
C #98531212                Tue May 10 13:45:12
C 15 01                    Tue May 10 13:45:12
D 03 #9853121              00:00:27
D 15 01                    00:00:11
C 03 15                    Tue May 10 13:45:22    1988
C 15 03                    Tue May 10 13:45:22    1988
D 03 15                    00:00:08
D 15 03                    00:00:08
C 15:01                    Tue May 10 13:54:40    1988
D 01 15                    00:00:06
D 15 01                    00:00:06
C 01 8121232936773         Tue May 10 13:56:00    1988
C 15 01                    Tue May 10 13:56:00    1988
D 01 15                    00:00:18
D 15 01                    00:00:18
C 03 *8                    Tue May 10 13:56:26    1988
C 13 2 0                   Tue May 10 13:56:26    1988
```

CALLSTAR

List of Features

Dsitinctive Ringing
Call Waiting
Call Transfer
Trunk Pickup
Intercom Dialing
Call Holding
Convenience/Speed Dealing
Call Restricting
* Operate in Background
Call Camp-On
Priority Interrupt
Menu Driven
On Hook Dialing
Night Call Transfer
Automatic Transfer Recall
Do Not Disturb
Pulse or Touch Tone Dialing
Music Hold
Direct Line Access
Station Messaging System
* Automatic Operator System
Privacy on all Stations
* Live System Programming
Automatic Call Distributing
* Remote Configuration Modifying

Distinctive Dial Tones
Alternate Answering
Call Forwarding
Directed Station Pickup
Outside Dealing
Trunk Park/Orbit Holding
Unlimited Call Conferencing
Per Station Feature Restricting
* Call Reporting System
Trunk Forwarding
* Least Cost Routing
* On Line Help System
Hands Free Conversation
Automatic Hold Recall
Group Pickup
Last Number Redial
* Busy Lamp Display
* Compatible With 1A2 Key Sets
Call Screening
External Page Interface
Uses Standard Phone Sets
Relocatable Operator Station
Feature Key Dialing Compatible
* Remote diagnostics
* Hotel Motel System with PMS interface

Station status Display Console
Adjustable Recall and Call Back Times
Printing of Stored Speed Dial Numbers
* Client Tracked Call Accounting System
Operation on DOS and OS/2 UNIX/XENIX systems.

* Non standard Option

9

SUMMARY

Through State-of-the-art miniaturization, High-Technology design
and user friendly software, CALLSTAR is capable of handling an
innumerable array of applications.
From small companies to large corporations, from schools to the
Armed Forces, the benefits are to numerous to mention.
                    CALLSTAR... THE ULTIMATE PBX...

   small
        lightweight
             portable
                  a plug-in computer card
                            software programmable
                                 remotely controlable
                                      completely versatile
                                           audit (history) tracking
                                                maximum security

SAMPLE APPLICATIONS

   A. Companies

   B. Corporations

   C. Military units in combat

   D. Mobile command centers

   E. Airborne command centers

   F. Shipboard command centers

   G. Hospitals

   H. Portable hospital communication centers

   I. Replaces 1A2 key systems

   J. And etc., etc., etc.,.............................

(John or Ron / Engineers)

PCBX™

COMPUTER-CONTROLLED

BUSINESS TELEPHONE SYSTEM

FROM

Sanbar

A simple-to-use yet extremely powerful PC-based PABX... feature-by-feature, today's most advanced solution for your demanding business communications needs.

U.S. TRADE RESEARCH INFORMATION SYSTEMS
16800 HARBOR BLVD.
FOUNTAIN VALLEY, CA 92708
714/839-5727

FCC REGULATORY INFORMATION

REGULATORY REQUIREMENTS

The Federal Communications Commission (FCC) has established Rules that permit the PCBX to be directly connected to the telephone network. A jack is provided by the telephone company, as described below. Jacks for this type of equipment will not be provided on party line or coin lines.

A malfunction in the operation of the PCBX may adversly affect the telephone network. In the event of a PCBX malfunction, it should be disconnected until the problem can be corrected. If this is not done, the telephone company may temporarily disconnect service.

The telephone company has the right to make changes in its technical operations and procedures. If such changes affect the compatibility or use of the PCBX, the telephone company is required to give adequate notice of the changes.

The following statement is provided in compliance with FCC Rules, Part 15:

WARNING: This equipment generates, uses and can radiate radio frequency energy and if not used and installed with proper shielding in accordance with the instruction manual, it may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of the FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

COMPANY NOTIFICATION

Before connecting the PCBX to the telephone network, the telephone company must be provided with the following information:

1. Your telephone number:

   _____

2. The FCC registration number:

   _____Pending_____

3. The ringer equivalence number:

   _____Pending_____

4. The USOC jack required:

   RJ21X for   2-wire Loop Start

WARRANTY

Product Warranty: All products manufactured by San/Bar Corporation are warranted for one year from the date of shipment from the factory or, if installed by San/Bar personnel, for one year from the date of customer acceptance, against defects in material and workmanship. San/Bar Corporation agrees to correct by replacement or repair, at its discretion, any such defects without charge during the warranty period, provided that the defective unit is returned with transportation prepaid to: San/Bar Corporation, 9999 Muirlands Parkway, Irvine, California 92718.

Equipment subjected to improper handling, improper installation, neglect, misuse or alteration by other than San/Bar Corporation personnel will void this warranty. In any event, San/Bar assumes no liability for installation labor, lost revenue and/or consequential damages. The warranty extended to equipment supplied but not manufactured by San/Bar Corporation is limited to that provided by the manufacturer.

Before returning defective material, you must first obtain a Material Return Authorization (MRA) number from your San/Bar Customer Service Representative at the following telephone number: (714) 855-9911. Include this number on the packing slip along with your name, company name, telephone number, return address and a description of the nature of the defect.

Extended Warranty and Maintenance Services: San/Bar Corporation provides repair services after the period of the normal warranty period at published rates. Extended warranty and on-premise maintenance services are also available; contact your San/Bar customer service representative for additional information.

Excusable Delay: A mutually agreed-upon delivery date extension shall be negotiated in the event of any delay in the delivery of products or installation services provided by San/Bar Corporation which is caused by, but not limited to, earthquake, acts or omissions of the buyer, riot, acts of God, civil strike, unsuitable weather, labor dispute, transportation delays, energy shortage, government or military authorities or any event beyond the reasonable control of San/Bar Corporation or its suppliers.

RESTRICTIONS OF USE AND
PROPRIETARY INFORMATION

HOW TO USE THIS MANUAL

This manual describes how to install the PCBX System, how to configure the system by entering system parameters such as Extension Features and Command Codes, and how to operate the system from the attendant console position and from station telephones.

Before setting up the system, first brouse through this manual to get a general idea of how the information is presented:

The General Description Section introduces the PCBX System and lists the Technical Specifications.

The Installation Section lists the PCBX System equipment contained in the VAR Demonstration System and illustrates cable connections and pin designations. The VAR System is pre-assembled and tested at the factory, so installation in the field is a simple matter, consisting primarily of connecting cables.

The Operation Section describes how to configure the system. The use of the interactive menus makes the initial configuration a simple task, even though an extensive list of operating parameters and system features are involved. Each system configuration menu is illustrated and each parameter listed on the screen is described on the same page or a facing page of the manual.

The system parameters are initially defined during the installation phase and then seldom need to be changed unless the system hardware changes, e.g., when additional trunks or lines are added.

The Station Features and Attendant Features Sections describe how to use the PCBX System in day-to-day operation. Master copies of both Feature Sections are also provided in a reduced, convenient-to-use format; you may want to use these to make pamphlets for the attendant and each station user.

The Administrative Features Section defines supervisory functions and capabilities, along with maintenance and alarm features.

If you have any comments or suggestions that would make this manual better or easier to use, we would like to hear from you. Please call the Technical Publication Department at(714) 855-9911 or send your response to:

Sanbar Corp.
Technical Publications Department
9999 Muirlands Parkway
Irvine, CA 92718

TABLE OF CONTENTS

General System Description

The PCBX™ is a PC-based telephone exchange designed to meet modern communications requirements. The PCBX™ offers a host of features to provide advanced communications capabilities for small and medium size businesses.

The current PCBX™ version supports four trunks and 12 stations. Future versions will offer 16-Station and 8-Trunk plug-in expansion modules. These modules can be configured in any combination to accommodate individual user requirements. As requirements grow, the system can be expanded to its maximum capacity of 256 ports, again in any combination of trunks and lines.

Connections to PCBX cards are made with 50-contact Amphenol 57 Series connectors. This interconnection provides an easy link via modular adapters to telephone industry standard RJ11 (station) and RJ21X (trunk) cross-connect systems.

The PCBX is designed to be totally non-blocking: it is always capable of connecting any idle (not already connected) port to any other idle port, regardless of any connections that have already been established. Menu-driven software enables the system attendant to restrict cross-connects according to particular requirements.

The PCBX employs the data processing capacity of a host computer to reduce equipment costs. The PCBX communication modules plug into the expansion slots of IBM PC and compatible machines (IBM PC/XT/AT, Compaq 386, ATT 6300, etc.) running under DOS or XENIX operating systems. A PCBX expansion shelf is available to accommodate communications modules when the computer expansion slot capacity is exceeded.

The PCBX system requires only a portion of the PC's RAM (approximately 64k to 256k, depending on the configuration), leaving ample capacity to run other programs simultaneously. The PC can also be configured with a second video monitor for simultaneous display of concurrently running programs.

An optional modem plug-in board is available to support remote administration such as data base editing, call detail recording, testing and diagnostics and alarm reporting.

TECHNICAL SPECIFICATIONS*

Crosstalk Attenuation:	More than 60 dB at 1 kHz
Idle Circuit Noise:	Less than -70 dBmP
Insertion Loss (Relation to 1 kHz -10 dBmp)	
Station to Station:	2 dB (±0.8 dB) with 16LC
Station to Trunk:	5 dB (±0.8 dB)
Trunk to Trunk (Analog 2 wire):	4 dB (±0.8 dB)
Longitudinal Balance:	More than 40 dB (300-600 Hz)
	More than 46 dB (600-3400 Hz)
	More than 20 dB (300-3400 Hz,
	600 ohms termination)
Loop Resistance:	1200 ohms
Line Impedance:	Station (Analog) 600 ohms
	Trunk (Analog) 600 ohms
Leakage Resistance:	More than 20,000 ohms

Rotary dial pulse and DTMF signalling characteristics are as follows:

Rotary Dial Pulse:

    Receiving Conditions:

Speed:	8 to 12 pps
Break ratio:	55 to 77% (10 pps)
Minimum interdigit pause:	300 ms
Switch hook flash detection:	500 ms to 1600 ms programmable

DTMF Signalling

    Receiving Conditions (measured at receiver input):

Signal duration:	More than 40 ms
Interdigit pause:	More than 30 ms
Signal level:	More than 0 to -30 dBm
	(S/N of more than 20 dB)

DTMF Signalling

Sending Conditions:

Signal duration:	More than 50 ms
Interdigit pause:	More than 30 ms
Signal level:	-6.5 to -10 dBm

*Preliminary Specifications - Subject to change without notice

Ringing signal data is as follows:

Conventional Instrument

Signal voltage	95V rms (±10V rms)
Frequency:	30 Hz (±1 Hz)

Interruption (Internal/External Calls):

Software selectable in any one second increment combination

    1 to 15 seconds ON...................1 to 15 seconds OFF

Feature Ringing:

    0.4 seconds ON........................ 0.2 seconds OFF

    0.4 seconds ON........................ 1 second OFF

Audible tone characteristics are defined in Table 1-1

TABLE 1-1 AUDIBLE TONES

Tone	Definition	Freq (Hz)	Interruption
Dial Tone (DT)	Originate call	350 + 440	Continuous
Special Dial Tone (SPDT)	Require any service with switchhook flash	350 + 440	240 IPM
Ring Back Tone (RBT)	Calling the destination	440 + 480	1 sec. ON 3 sec. OFF
Call Waiting Tone (CWT)	Inform waiting call to called party	440	80 ms ON 80 ms OFF 80 ms ON
Busy Tone (BT)	Called party busy	480 + 620	60 IPM
Reorder Tone (ROT)	For restricted call	480 + 620	120 IPM
Service Set Tone (SST)	Confirmation of Service Set	440	Continuous
Warning Tone (WT)	For executive right of way/ Attendant override	440	80 ms ON 80 ms OFF 80 ms ON
Camp On Tone (CPT)	Confirms Camp On set	440	200 ms ON
Second Dial Tone (SDT)	Incoming call from distant PBX	350 + 440	Continuous

*Preliminary Specifications - Subject to change without notice

INSTALLATION

Installation Practices

This section describes the components of the PCBX configured as a VAR Demonstration System. The VAR PCBX System is shipped with all plug-in boards installed, including the PCBX board, EGA (color) Adapter board and Monochrome Adapter board . All cables and peripheral equipment required to configure the VAR demonstration system, with the exception of telephone sets, telephone and trunk modular plug extension cables, are also provided.

A simplified diagram of the VAR Demonstration System is shown below. The VAR Demonstration System has been configured with all the hardware and software required for PCBX operation and thoroughly tested at the factory. If any problems are experienced in installing the equipment, or in the course of operating the system, contact your Sanbar representative immediately.

Unpacking and Invoice Check

Before you assemble your VAR PCBX system, check

that it includes the following items:
AST Premium/286 Model 80 Computer equipped with:
    MS-DOS 3.2 and Double DOS
    1.2 MB Floppy Disk Drive
    360k Floppy Disk Drive
    Hard Disk/Floppy Disk Controller Board
    FASTRAM Memory Board
    AST Utility & Diagnostic Software
    101 Key AST Keyboard
    AST User & Oper. System Manuals
SEAGATE ST225 Hard Drive (Installed)
EVEREX EGA Board (Installed)
EVEREX Mono Adapter Board (Installed)
TAXAN 14-inch Color Display/Cable
SAMSUNG 12-inch Mono Display/Cable
DAYTON Voltage Surge and Noise Suppressor power outlet.
ORTRONICS OR-25-12/4 Multi-Jak Adapter
ORTRONICS OR-4019 Multi-Jak Adapter
ELGIN ELECTRIC EAK-4 Key System Power Supply with cable.
PCBX 4x12 Board with piggyback (installed). Station Cable and Trunk Cable.
PCBX Program Diskette & Instruction Manual

VAR PCBX DEMONSTRATION SYSTEM
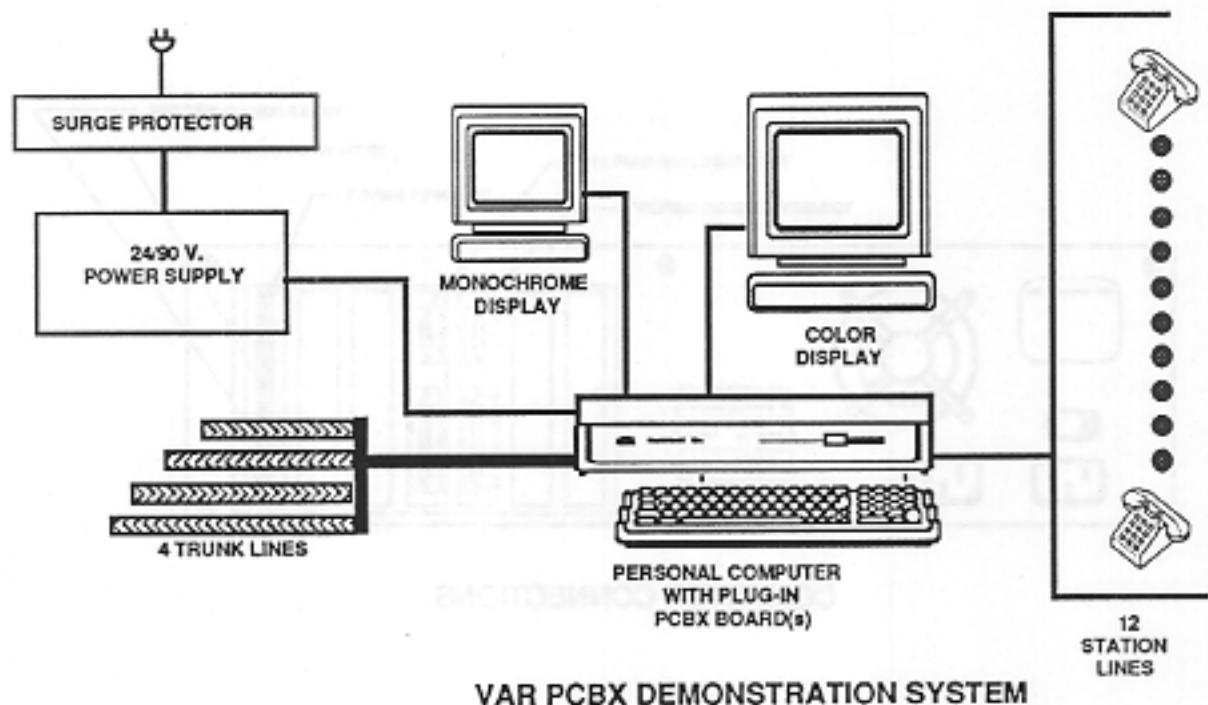
PCBX System Assembly

Diagrams to aid you in assembling the PCBX System are shown below and on the following page.

Connect the power supply connector, trunk connector and station connector to the appropriate computer connector, as shown below. Because of the tight fit of the station, trunk and power supply connectors on the PCBX board , they should be connected in the following order: first the power supply connector, then the station connector and lastly the trunk connector. To remove these connectors, the order should be: station connector first (wedge a thin screwdriver between the station and trunk connectors to release the upper lock on the station connector), trunk connector second and finally the power supply connector.

Connect the color and monochrome monitors to the appropriate video adapter board, using the cables packed with the monitors. Refer to the manuals packed with the AST Computer, Samsung and Taxan Monitors if you need additional information.

Connect the Multi-Jak Modular Adapters to the trunk and station connectors as shown on the following page; then connect the telephone and trunk extension cables to the modular adapters.

Pin designations for the power supply, station and trunk cables are shown on the following pages. If you wish to interface with station equipment and trunks via a punch down block instead of using the modular adapters supplied, connections to the PCBX cables should be made as shown in the accompanying wire lists.

COMPUTER CONNECTIONS

TRUNK CABLE CONNECTOR

STATION CABLE CONNECTOR

PCBX

50-CONTACT AMPHENOL 57 SERIES

MULTI-JAK MODULAR ADAPTER

EXT. 202
EXT. 201
EXT. 200
EXT. 203
EXT. 204
EXT. 205
EXT. 206
EXT. 207
EXT. 208

SINGLE LINE SET (TYP.)

TO TRUNKS 1 - 4

MULTI-JAK MODULAR ADAPTER

EXT. 211
EXT. 210
EXT. 209
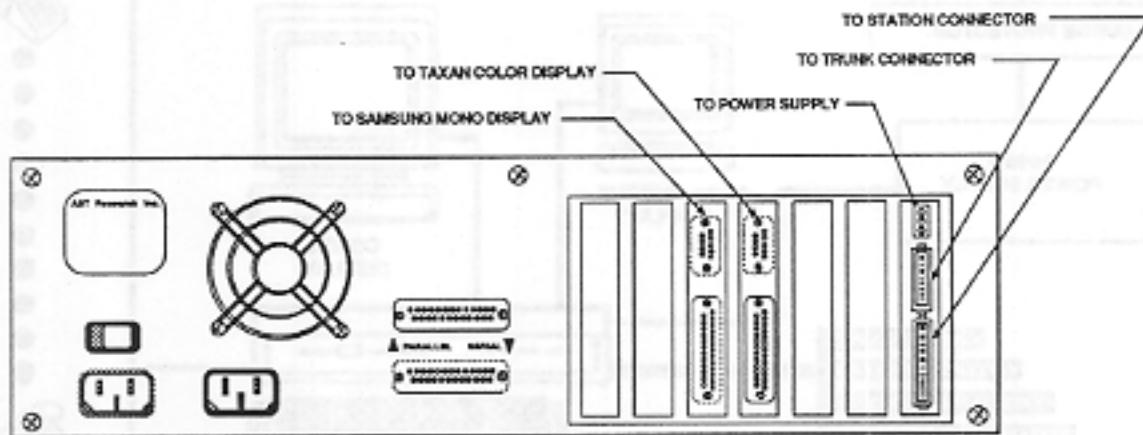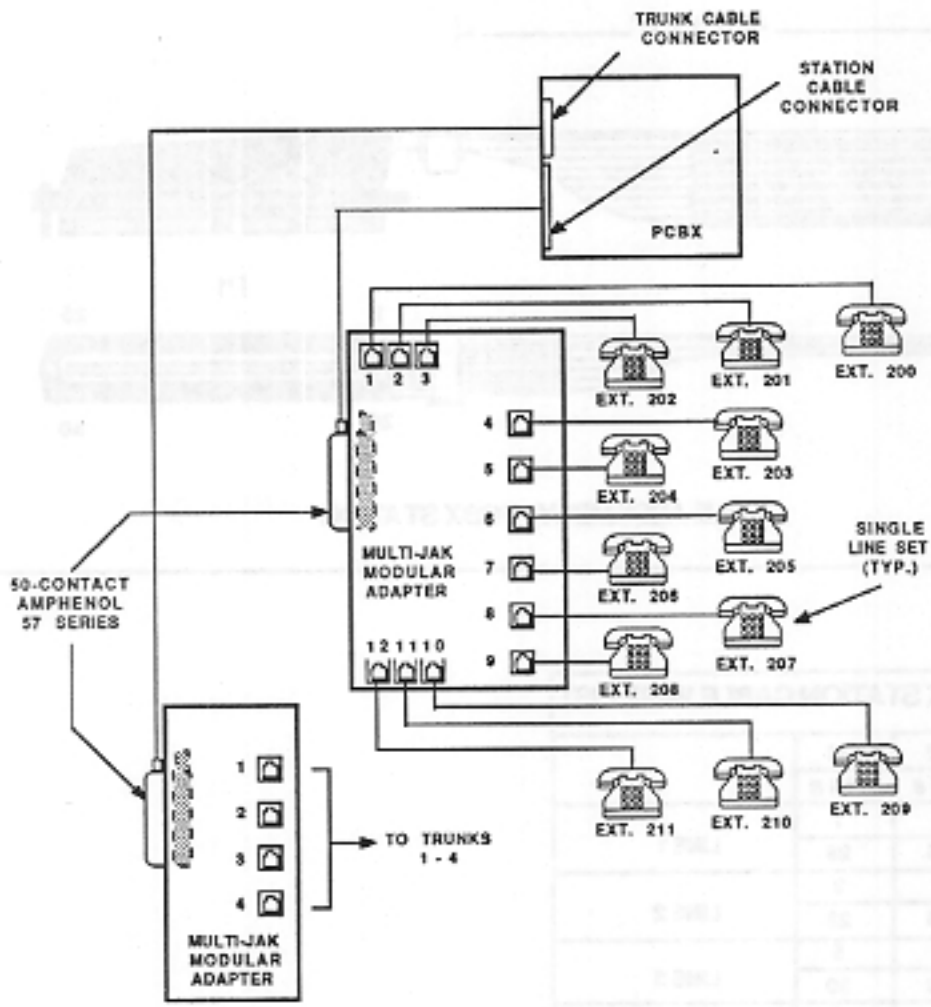
TYPICAL VARS SYSTEM INTERCONNECTION DIAGRAM

42.0" ±1.0"

1   26

25   50

P2

P1

1   25

26   50

CABLE ASSEMBLY, PCBX STATION
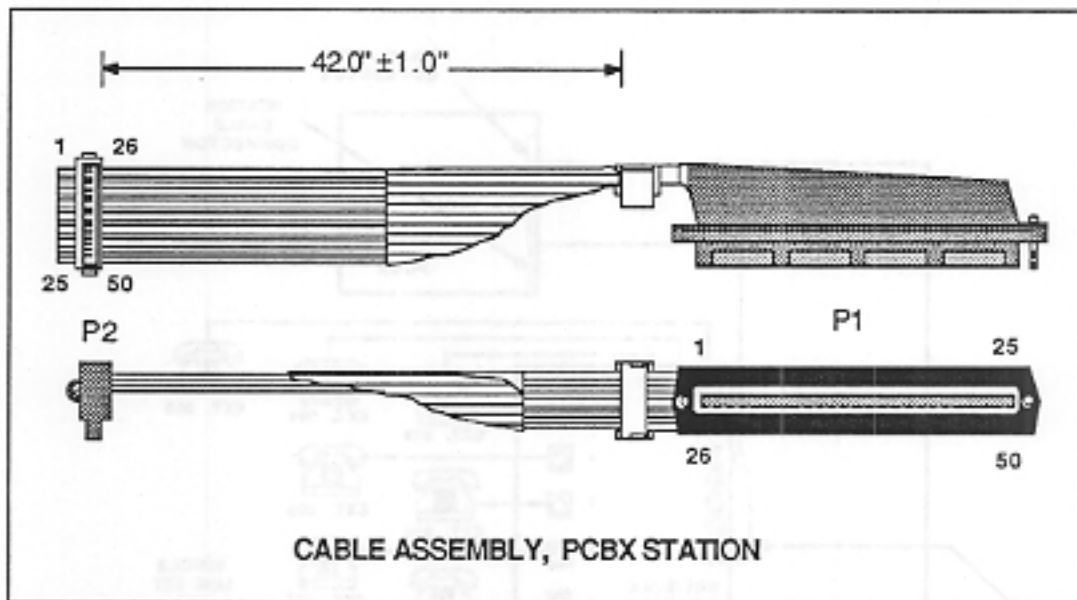
PCBX STATION CABLE WIRE LIST

P2	P1	
PIN #	PIN #	
1	1	LINE 1
26	26	
3	3	LINE 2
28	28	
5	5	LINE 3
30	30	
7	7	LINE 4
32	32	
9	9	LINE 5
34	34	
11	11	LINE 6
36	36	
17	17	LINE 9
42	42	
19	19	LINE 10
44	44	
21	21	LINE 11
46	46	
23	23	LINE 12
48	48	
15	15	LINE 8
40	40	
13	13	LINE 7
38	38	

CABLE ASSEMBLY, PCBX TRUNK
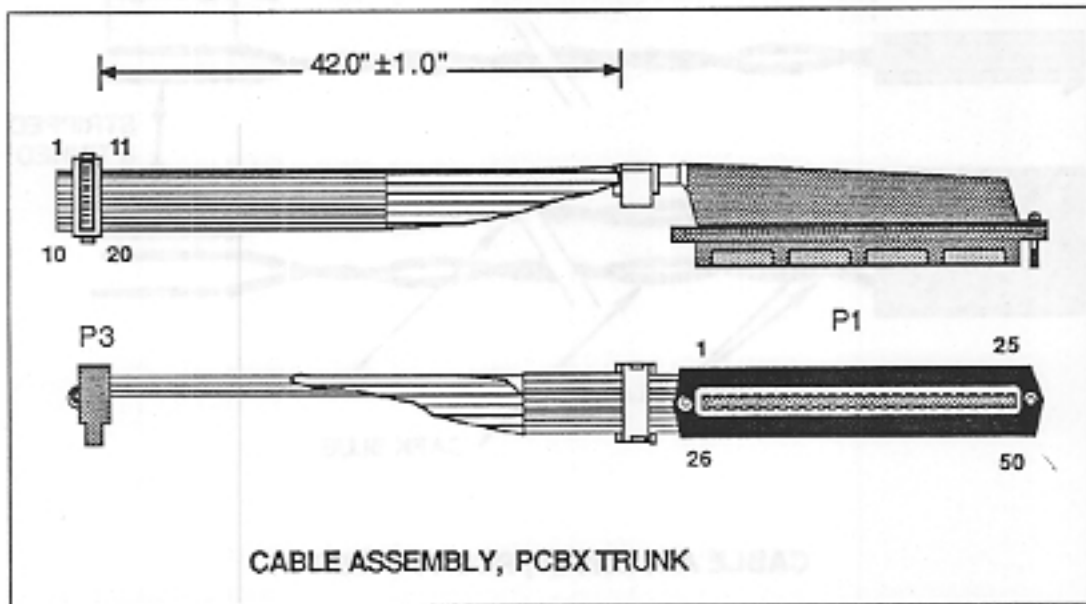
PCBX TRUNK CABLE WIRE LIST			
P3 PIN #		P1 PIN #	
1	TRUNK 1	1	RING
11		26	TIP
3	TRUNK 2	3	RING
13		28	TIP
5	TRUNK 3	5	RING
15		30	TIP
7	TRUNK 4	7	RING
17		32	TIP

CABLE ASSEMBLY, PCBX POWER

KEY SYSTEM POWER SUPPLY - REFERENCE ONLY
ELGIN EAK -1 OR -2 OR -4 OR EQUIVALENT
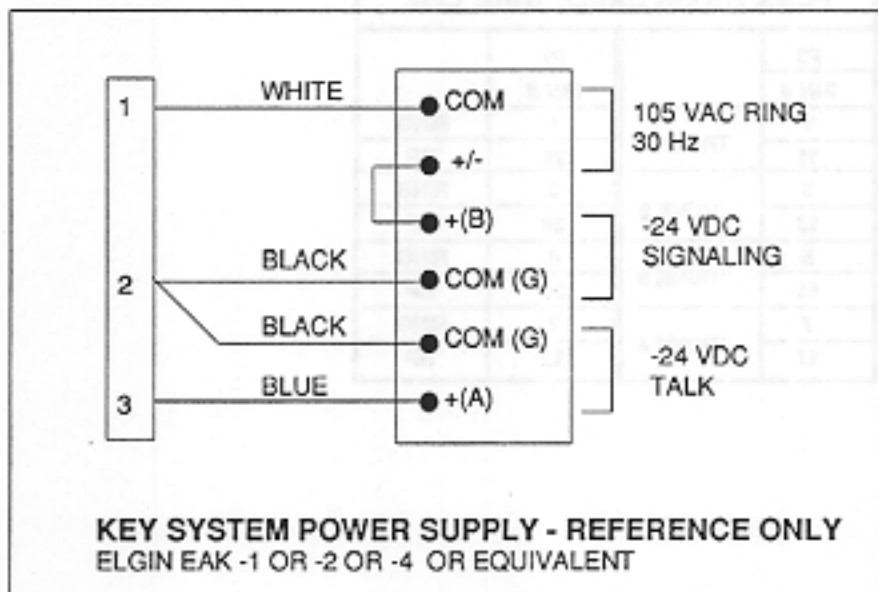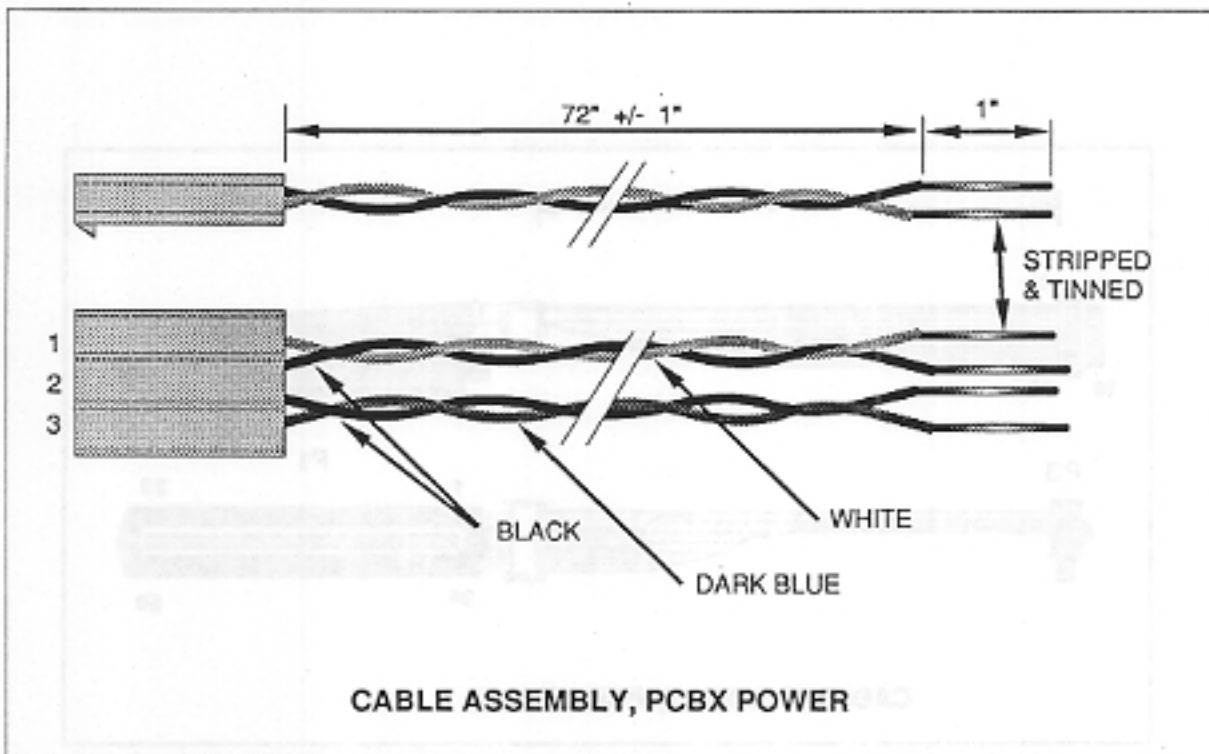
PCBX SOFTWARE INSTALLATION

PCBX System Software Installation Procedure

The four files of the PCBX system can be installed on a hard disk by using the "INSTALL" batch file on the PCBX program floppy disk. The PCBX program disk is copy protected and can only be run on a single computer at any given time. However, the RECALL facility is provided to recall the program from the hard disk back to the PCBX program disk floppy, and then to install the PCBX program on a different computer.

To install the PCBX Program:

Type	C:
Press	ENTER
Type	cd \
Press	ENTER

Insert the PCBX distribution disk in Drive A

Type	A:
Press	ENTER

The screen now displays the prompt   A:\>

Type	INSTALL A: C:
Press	ENTER

Follow the on-screen instructions; when installation is done, the message "PCBX INSTALLATION SUCCESSFULLY COMPLETE" will appear.

Follow the instructions in the OPERATION section to bring up the PCBX system.

To Recall the PCBX Program:

Type	C:
Press	ENTER
Type	cd \
Press	ENTER

Insert the PCBX distribution disk in Drive A

Type	A:
Press	ENTER

The screen now displays the prompt   A:\>

Type RECALL C: A:	
Press	ENTER

NOTE: The PCBX system will not operate if the files are merely copied from the distribution disk; the files *must* be transferred using the INSTALL command. Once the PCBX system is installed, the files cannot be moved to another subdirectory; attempting to move the files will cause an installation error to appear.

A batch file on the distribution diskette provides detailed instructions for installing and recalling the PCBX program. To view this batch file:
Insert the distribution disk in Drive A:

Type	A:
Press	ENTER

The screen prompt changes to A:\>

Type INSTALL

The detailed Installation instructions appear on the screen.

Type RECALL

The detailed RECALL instructions appear on the screen.

SYSTEM OPERATION

Feature Cross Reference Table

The PCBX System Configuration Menus consist of a Main Menu, three system menus and an exit. To facilitate finding the features in the menus, we have listed the features provided in Version 1.0 in two categories - Attendant Features and Station Features. The location of the system configuration information for each feature is indicated in the following tables. The legend for the columns next to the features is as follows:

      F1 = System Setup Menu
      F2 = Extension Feature Restriction Menu
           1 = Screen 1 of 2
           2 = Screen 2 of 2
      F3 = System Dial Codes
           1 = Screen 1 of 3
           2 = Screen 2 of 3
           3 = Screen 3 of 3
      NV = Feature with a Non-Variable dial code.

ATTENDANT FEATURES	F1	F2	F3	NV
Intercom Dialing		x	x	
Incoming Trunk To Attendant Position				x
Local Call Dial		1	2	
Long Distance Dial		1	2	
Call Hold	x			x
Call Transfer		1	2	
Unanswered Transfer Call Return				x
Three Way Conference Call		2		
Set Dial Camp On			3	
Redial Last Number		2	1	
Convenience Dial Execute		1	1	
Convenience Dial Programming		1	1	
Operator Station Forward Set		1	3	
Operator Station Alternate Answer Set		2	3	
Trunk Forward Set			2	
Trunk Forward Clear			2	
Directed Station Pick Up			1	
Direct Connect Trunk		2	3	
Hang Up Trunk			3	
Set Station to Operator		1	2	
Operator Message Set			1	
Operator Message Clear			1	
Night Transfer On	x		3	
Night Transfer Off	x		3	
Operator Station Reset			3	

STATION FEATURES	F1	F2	F3	NV
Intercom Dialing		2	1	
Operator Call			2	
Local Call Dial		1	2	
Long Distance Dial		1	2	
Call Hold			1	
Automatic Hold Recall	x			x
Call Transfer		1	2	
Unanswered Transfer Call Return				x
Three Way Conference Call		2		x
Station Group Pick Up		1,2	1	
Set Dial Camp On			3	
Redial Last Number		2	2	
Convenience Dial Execute		1	1	
Convenience Dial Programming		1	1	
Call Forward Set		1	1	
Alternate Answer Set		2	1	
Trunk Forward Set			2	
Trunk Forward Clear			2	
Directed Station Pick Up		2	1	
Hang Up Trunk			3	
Direct Connect Trunk		2	3	
Message Setting			1	
Message Clear			1	

PCBX KEYBOARD COMMAND SUMMARY		
To start the configuration program from DOS:	Type	PCBX_CFG
	Press	ENTER
To terminate the configuration screen display:	Press	F4
To bring up the PCBX:	Type	PCBX
	Press	ENTER
To change monitors:	Press	ALT + ESC
To change attendant extension activity screens:	Press	ESC
To terminate the PCBX extension activity screen:	Type	QUIT
To move updates into the PCBX system:	Type	SHIFT 1 (!)

How to Use your System Via the Menu Screens

The PCBX software contains special menu screens to help you configure the operating parameters for your particular system. Follow the sequence given below to bring up the PCBX Main Menu Screen.

1. Initially, the PCBX program must be installed on the hard disk as described in the Installation section. After the PCBX program has been installed on the hard disk, the PCBX program will load automatically when system power is turned on . The Main Menu shown below will be displayed on the monochrome monitor and the Extension Summary Menu shown on the following page will be displayed on the color monitor.

To return to the system configuration menu from DOS:
        At the prompt C:\> type: **PCBX_CFG** ENTER .
The Main Menu shown below should be displayed on the monochrome monitor.

```
                        MAIN MENU

        PCBX SYSTEM CONFIGURATION MENU


    F1       •      System Setup

    F2       •      Extension Feature Restriction

    F3       •      System Dial Codes

    F4       •      Exit Program
```
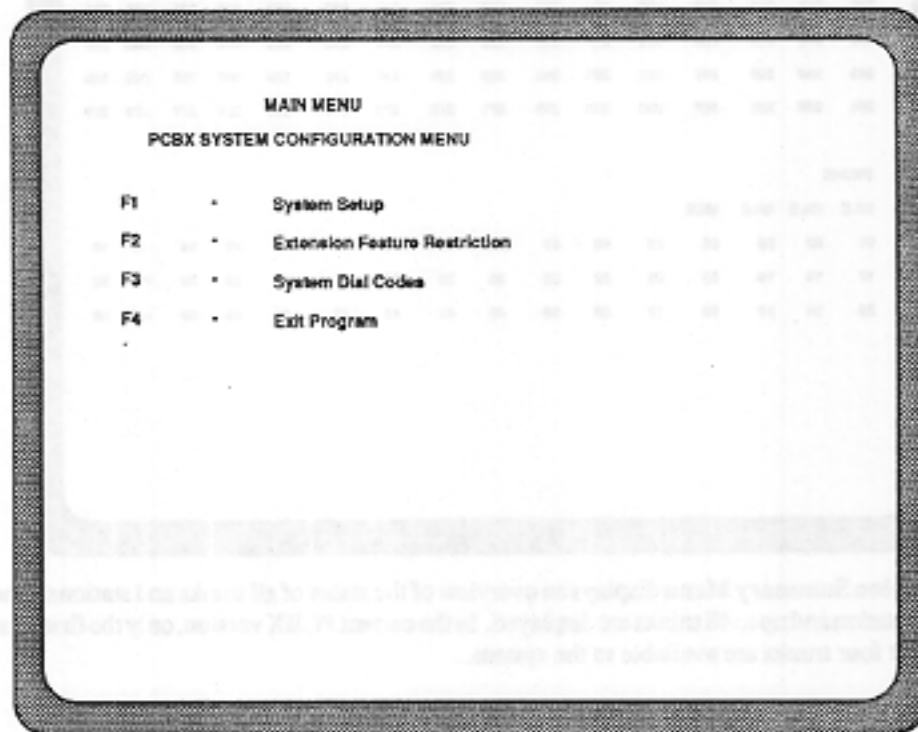
Main Menu Screen - allows you to display the PCBX System Configuration Menus and to exit the PCBX program by using Function Keys F1-F4.

2. To activate the Extension Summary Menu on the color monitor, depress $\boxed{\text{ALT}}$ + $\boxed{\text{ESC}}$. The cursor will move from the monochrome monitor to the color monitor.

3. To shift from the Extension Summary Menu to theExtension Activity Menu, press $\boxed{\text{ESC}}$. Pressing $\boxed{\text{ESC}}$ repeatedly will cause the display to toggle between the Extension Summary and Extension Activity Menus.

4. To return to the Main Menu, press $\boxed{\text{ALT}}$ + $\boxed{\text{ESC}}$. The cursor will return to the monochrome Main Menu display. Pressing $\boxed{\text{ALT}}$ + $\boxed{\text{ESC}}$ repeatedly will cause the cursor to toggle between the monochrome and color monitors.

```
STATIONS

DIAL  DIAL  DIAL  DIAL  IDLE  DIAL  IDLE  IDLE  IDLE  IDLE  IDLE  IDLE

200   201   202   203   204   205   206   207   208   209   210   211   212   213   214   215

216   217   218   219   220   221   222   223   224   225   226   227   228   229   230   231

232   233   234   235   236   237   238   239   240   241   242   243   244   245   246   247

248   249   250   251   252   253   254   255   256   257   258   259   260   261   262   263

264   265   266   267   268   269   270   271   272   273   274   275   276   277   278   279


TRUNK

IDLE  IDLE  IDLE  IDLE

01    02    03    04    05    06    07    08    09    10    11    12    13    14    15    16

17    18    19    20    21    22    23    24    25    26    27    28    29    30    31    32

33    34    35    36    37    38    39    40    41    42    43    44    45    46    47    48
```

The Extension Summary Menu displays an overview of the status of all trunks and stations. The status of up to 80 station and up to 48 trunks are displayed. In the current PCBX version, only the first 12 stations and the first four trunks are available to the system.

STATION 1. (20)	STATION 2. (21)	STATION 3. (22)	Station 4. (23)
Lobby	Receptionist	Marketing Dept.	President
On-Hook	Talking	On-Hook	Trunk Dialing
OPERATOR			
	To 24 for 00:00:24		9 239-0121

STATION 5. (24)	STATION 6. (25)	STATION 7. (26)	STATION 8. (27)
Accounting	Sales Department	Production	Shipping
On-Hook	On-Hook	Intercom Dialing	On-Hook
CALLS FORWARDING	ALTERNATE ANSWER		ON BREAK
25	21	21	

STATION 9. (28)	STATION 10. (29)	STATION 11. (30)	STATION 12. (31)
Engineering	Customer Service	On-Hook	On-Hook
On-Hook	On-Hook		

TRUNK 1. (32)	TRUNK 2. (33)	TRUNK #3. (34)	Trunk #4. (35)
Orange County Trk#1	Orange County Trk#2	Los Angeles Watts	Out Watts
Trunk Orbit Hold	On-Hook	Talking	On-Hook
to 21 for 00:02:51		To 21 for 00:00:24	

The Extension Activity Screen displays the name and extension number of every user, plus the current status of each station. The receptionist knows exactly what an extension is doing at any given moment, how long a call has been in progress and if the station is connected to an outside line.

Operator-entered and station-entered messages such as "ON BREAK" are entered using the System Dial Codes described on following pages.

Additional Extension Activitity Screen Pages will be provided with subsequent PCBX versions to display activity for systems with greater than 12 stations/4 trunks.

SYSTEM CONFIGURATION

The System Configuration Menu Screens (System Setup Menu, Extension Feature Restriction Menu and System Dial Code Menu) are shown on the following pages.

The **System Setup Screen** - allows you to enter information about the system characteristics and outside trunk lines. Each listed parameter is defined below. Use the arrow keys located to the left of the numeric keypad to move the cursor to the field you want to change. Then use the + and - keys on the numeric keypad to scroll to the desired value.

SYSTEM SETUP MENU

Screen Type	Color
System Dial Speed	01
Hold Recall Time	30 seconds
Call Waiting Beep Interval Time	20 seconds
Pick Up Wait Time	10 seconds
Ring Wait Time on Phone Before Intercept	60 seconds
Ring Wait Time Total Before Intercept	120 seconds
Night Transfer Trunk 1 to Station	200
Night Transfer Trunk 2 to Station	202
Night Transfer Trunk 3 to Station	211
Night Transfer Trunk 4 to Station	205

Page Down or End to return to Main Menu

Function Definitions - System Setup Menu

Feature	Options	Default	Description
Screen Type	Color/Mono	Color	Matches PCBX software to the type of monitor used.
System Dial Speed	00-10	01	Defines the rate at which DTMF tones are transmitted
Hold Recall Time	01-999 secs	30 secs	Defines the automatic ring-back time for a call placed on hold - prevents a call on hold from being forgotten.
Call Waiting Beep Interval Time	01-999 secs	20 secs	Defines the interval of the tone indicating that an incoming call is waiting to be answered.
Pick-Up Wait Time	01-999 secs	10 secs	Defines the time period after which a non-answered phone will default to ring at the operator console.
Ring Wait Time on Phone Before Intercept	01-999 secs	60 secs	Not currently available.
Ring Wait Time Total Before Intercept	01-999 secs	120 secs	Not currently available.
Night Transfer Trunk No. 1-4 to Station	Any Station	Any Station	Causes incoming trunk calls to ring at the designated station instead of at the operator console.

The Extension Feature Screens let you activate the features and functions you want to assign to each telephone. The screen displays a summary of the features for each extension; note that each phone can be assigned a different set of features, such as Call Conferencing (CC) and Do Not Disturbe (DND).

Use the arrow keys located to the left of the numeric keypad to move the cursor to the field you want to change. When the field of interest is highlighted, press the DELETE key to remove the inwanted information and then type in the new information.

St.	Description	LOC	LNG	OPR	UNL	FWD	TRN	TPU	ORB	CNV	DND	PRV	GRP
#01	Receptionist	ON	ON	PRI	ON	ON	ON	ON	ON	ON	ON	ON	00
#02	President	ON	ON	PRI	ON	ON	ON	ON	ON	ON	ON	ON	00
#03	Marketing	ON	ON	PRI	ON	ON	ON	ON	ON	ON	ON	ON	00
#04	Accounting	ON	ON	PRI	ON	ON	ON	ON	ON	ON	ON	ON	00
#05	Production	ON	ON	PRI	ON	ON	ON	ON	ON	ON	ON	ON	00
#06	Engineering	ON	ON	PRI	ON	ON	ON	ON	ON	ON	ON	ON	00
#07	Shipping	ON	ON	PRI	ON	ON	ON	ON	ON	ON	ON	ON	00
#08	Sales	ON	ON	ALT	ON	ON	ON	ON	ON	ON	ON	ON	00
#09	Quality Assur.	ON	ON	PRI	ON	ON	ON	ON	ON	ON	ON	ON	00
#10	FAX Machine	OFF	OFF	PRI	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	00
#11	Computer Modem	ON	ON	ALT	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	00
#12	Paging System	OFF	OFF	NO	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	00
Trunks													
#01	Local Line	OFF	OFF	*	ON	ON	ON	*	*	*	*	*	00
#02	Watts Line	OFF	OFF	*	ON	ON	ON	*	*	*	*	*	00
#03	MCI Line	OFF	OFF	*	ON	ON	ON	*	*	*	*	*	00
#04	Sprint Line	ON	ON	*	ON	ON	ON	*	*	*	*	*	00

EXTENSION FEATURE RESTRICTION MENU   SCREEN 1 OF 2
Page Down for Screen 2   Page Up or End for Main Menu

Function Definitions - Extension Features Menu - Screen 1 of 2

LOC-Local Calls — -When set to ON, the station or trunk has the capability to process outgoing calls to a local telephone number (in the same area code)

LNG-Long Distance Calls — -When set to ON, the station or trunk has the capability to process outgoing calls to long distance numbers (in other area codes).

OPR-Operator Capability — -When set to ON, the station has the capability to be designated as an operator, capable of performing the attendant functions.

UNL-Unlimited Call Conferencing -Not currently available.

FWD-Call Forwarding — -When set to ON, forwards all calls to another designated station.

TRN -Call Transfer — -When set to ON, allows the station to transfer calls to another station.

TPU-Trunk Pick Up — -Not currently available.

ORB-Trunk Orbiting — -Not currently available.

CNV-Convenience — -(Speed Dialing) When set to ON, equips the station with 50 office and 20 station speed dial codes.

DND-Do Not Disturb — -Not currently available.

PRV-Privacy — -Not currently available.

GRP-Group — -Sets "Group" numbers for the Group Pick-Up Feature which provides the capability to pick up calls to other stations in the same group nunber.

St.	Description	INT	3WY	ALT	HOT	PAG	AUT	ACS	CWT	SCR	GPU	SPU	REP
#01	Receptionist	OFF	ON	ON	OFF	OFF	ON	ON	ON	OFF	ON	ON	00
#02	President	OFF	ON	ON	OFF	OFF	ON	ON	ON	OFF	ON	ON	00
#03	Marketing	OFF	ON	ON	OFF	OFF	ON	ON	ON	OFF	ON	ON	00
#04	Accounting	OFF	ON	ON	OFF	OFF	ON	ON	ON	OFF	ON	ON	00
#05	Production	OFF	ON	ON	OFF	OFF	ON	ON	ON	OFF	ON	ON	00
#06	Engineering	OFF	ON	ON	OFF	OFF	ON	ON	ON	OFF	ON	ON	00
#07	Shipping	OFF	ON	ON	OFF	OFF	ON	ON	ON	OFF	ON	ON	00
#08	Sales	OFF	ON	ON	OFF	OFF	ON	ON	ON	OFF	ON	ON	00
#09	Quality Assur.	OFF	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	00
#10	FAX Machine	OFF	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	00
#11	Computer Modem	OFF	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	00
#12	Paging System	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	00
Trunks													
#01	Local Line	OFF	ON	*	*	*	*	*	*	*	*	*	00
#02	Watts Line	OFF	ON	*	*	*	*	*	*	*	*	*	00
#03	MCI Line	OFF	ON	*	*	*	*	*	*	*	*	*	00
#04	Sprint Line	OFF	ON	*	*	*	*	*	*	*	*	*	00

EXTENSION FEATURE RESTRICTION MENU   SCREEN 2 OF 2
Page Up for Screen 1   Page Down or End for Main Menu

Function Definitions - Extension Features Menu - Screen 2 of 2

INT-Intercom	-(Station-To-Station Dialing) When set to ON, allows station to station call dialing.
3WY-Three Way Conference	-When set to ON, the user can establish three-way conference calls.
ALT-Alternate Answer	-When set to ON, calls to a station that is busy or does not answer are forwarded to another designated station.
HOT-Hotel Feature	-Not currently available.
PAG-Paging Feature	-Not currently available.
AUT-Auto Redial	-When set to ON, can be used to repeat the last number dialed by entering a code instead of reentering the entire number.
ACS-Direct Line Access	-When set to ON, the user can access a specific outgoing trunk by entering ACS code and the trunk number.
CWT-Call Waiting	-Not currently available.
SCR-Call Screening	-Not currently available.
GPU-Group Pick-Up	-When set to ON, provides the station the capability to pick up calls to other stations in the same group.
SPU-Station Pick-Up	-When set to ON, provides the capability to pick up calls ringing at another station.
REP-Group Identity Number for Group Pick-Up	-Used to set the "Group" number for the group pick-up feature. This number must be the same as the GRP field number.

System Dial Code Menu Screens - lets you define the codes that are entered by telephone users to dial system features. For example, the code "*7" is typically used to transfer a call. If your users are familiar with some other code set, you can define the system command codes accordingly. This means that users will not have to learn new command codes except for new features available with the PCBX.

Use the arrow keys located to the left of the numeric keypad to move the cursor to the field you want to change. When the field of interest is highlighted, press the `DELETE` key to remove the inwanted information and then type in the new information.

```
        SYSTEM DIAL CODES        SCREEN 1 OF 3

                                 TEL SET DIAL CODES
      Intercom Dialing                   2
      Redial Last Number                 5
      Call Forward Set                  *72
      Call Forward Clear                *73
      Operator Message Set              #6
      Operator Message Clear            #5
      Alternate Answer Set              *71
      Message Setting                   *6
      Message Clear                     *5
      Convenience Dial Programming      *75
      Convenience Dial Execute           1
      Trunk Pick Up                     N/A
      Station Group Pick Up             *#
      Directed Station Pick Up          **
      Call Hold                         *9

      Page Down for Screen 2     Page Up or End for Main Menu
```

Function Definitions - System Dial Code - Screen 1 of 3

Intercom Dialing	Provides the capability to make calls from one station to other stations. Also known as Station-to-Station Calling.
Redial Last Number	Used to automatically redial the last number dialed. Allows the user to place a subsequent call to a dialed number without having to re-enter the whole number.
Call Forward Set	All incoming calls to your phone are automatically transferred to another station. The system allows an unlimited number of stations to be in the call forward mode. If a circular problem should arise from a call forwarding request (A forwarded to B and B forwarded to A), the system rejects the call forward attempt which would have created the circular problem.
Call Forward Clear	Discontinues the call forwarding function. This command is also used to discontinue the alternate answer function which forwards calls during a busy or no answer condition.

Function Definitions - System Dial Code - Screen 1 of 3 (continued)

Operator Message Set	Allows the attendant to indicate the status of a particular station with nine pre-programmed system-wide messages: 1 - In Meeting 2 - Do Not Disturb 3 - At Customers 4 - Not Returning 5 - Out Sick 6 - Out to Lunch 7 - On Vacation 8 - Not In Today 9 - On Break] The message appears at the attendants position on the Extension Activity Screen for the station specified.
Operator Message Clear	Clears the message at the attendants position for the station specified.
Alternate Answer Set	Forwards calls to a specified station when a called station is busy or does not answer. Also known as Call Forwarding on Busy/No Answer.
Message Setting	Allows users to provide the attendant with a personal status message in the form of nine pre-programmed system-wide messages (same messages 1-9 as Operator Message Set) The Message appears at the attendants position on the Extension Activity Screen for the station that set the message.
Message Clear	Allows the station to clear the message at the attendants Extension Activity Screen.
Convenience Dial Programming	Allows users to program frequently dialed numbers into a speed dial list. Also known as Programming Speed Dial Numbers.
Convenience Dial Execute	Allows users to use a three digit code to dial frequently used numbers. The system provides for up to 50 system-wide numbers and 20 station-specific numbers. Each number can be up to 30 digits in length. The system-wide numbers must be entered from the attendants position. The station-specific numbers are entered by each user at the station instrument. Also known as Speed Dialing.
Trunk Pick-Up	Not currently available.
Station Group Pick Up same group.	Allows the user to pick up a call ringing at any station within the
Directed Station Pick Up	Allows the user to answer a ringing phone from another idle phone.
Call Hold	Places a connected call in a standby condition to allow the user to interrupt a current telephone conversation.

```
          SYSTEM DIAL CODES      SCREEN 2 OF 3

                               TEL SET DIAL CODES

        Trunk Orbit Hold            N/A
        Trunk Orbit Drop            N/A
        Trunk Orbit Pull            N/A
        Trunk Switch Hook           N/A
        Trunk Forward Set           *#72
        Trunk Forward Clear         *#73
        Call Transfer               #
        Local Dial                  9
        Long Distance Dial          8
        Operator Call               0
        Station Reset               N/A
        Print Convenience Dial Numbers   N/A
        Set To Operator             N/A
        Set Station To Operator     #2

     Page Down for Screen 1   Page Down for Screen 3   End for Main Menu
```

Function Definitions - System Dial Code - Screen 2 of 3

Trunk Orbit Hold	Not currently available.
Trunk Orbit Drop	Not currently available.
Trunk Orbit Pull	Not currently available.
Trunk Switch Hook	Not currently available.
Trunk Forward Set	Forwards incoming trunk calls to a specified extension.
Trunk Forward Clear	Stops Trunk Forward function and routes incoming trunk calls to the attendants position.
Call Transfer	A connected call can be connected to another internal station with or without a voice announcement from the transferring party.
Local Dial	Permits an internal station to place an outgoing station call within the same area code.
Long Distance Dial	Permits an internal station to place an outgoing station call to other (long distance) area codes.
Operator Call	Allows an internal station to call the system attendant.
Station Reset	Not currently available.
Print Convenience Dial Numbers	Not currently available.
Set to Operator	Not currently available.
Set Station to Operator	The attendant can transfer the attendant functions to another station. The return transfer must be performed from the station that is currently designated as the operator position.

```
            SYSTEM DIAL CODES        SCREEN 3 OF 3

                                     TEL SET DIAL CODES

     Transfer Camp On                      N/A
   Set Dial Camp On                        #8
   Clear Dial Camp On                      #9
   Set Auto Pickup No Music                N/A
   Night Transfer On                       #321
   Night Transfer Off                      #313
   Print Key Codes                         N/A
   Direct Connect Trunk                    *#5
   Operator Station Forward Set            #72
   Operator Station Forward Reset          #73
   Operator Station Alternate Answer Set   #71
   Operator Station Reset                  #411
   Hang Up Trunk                           *#6


        Page Up for Screen 2    Page Down or End for Main Menu
```

Function Definitions - System Dial Code - Screen 3 of 3

Transfer Camp On	Not currently available.
Set Dial Camp On	When a user encounters a busy condition on a call to an internal station, the camp on busy feature places a call waiting tone on the busy line. When the busy station becomes idle, the camped on call will be automatically connected. Also known as Camp On Busy.
Clear Dial Camp On	Should the user decide not to wait for the busy station to become idle, this command cancels the camp on busy condition.
Set Auto Pick Up No Music	Not currently available.
Night Transfer On	Allows trunk calls to be rerouted to a specific station for special night-time handling.
Night Transfer Off	Discontinues the night transfer condition
Print Key Codes	Not currently available.
Direct Connect Trunk	Provides the capability to connect a specific trunk for establishing an outgoing call.
Operator Station Forward Set	Allows the operator to set the condition for the system to forward all calls from a station to another station.
Operator Station Forward Reset	Allows the operator to instruct the system to discontinue forwarding all calls from one station to another. Also used to discontinue call forwarding on busy/no answer.
Operator Station Alternate Answer Set	Allows the operator to redirect calls from one station to another when the originator encounters busy or no answer.
Operator Station Reset	Allows the operator to reset all features and messages currently active for a specific station.
Hang Up Trunk	Allows a user to disconnect the call that is established on a specific trunk.
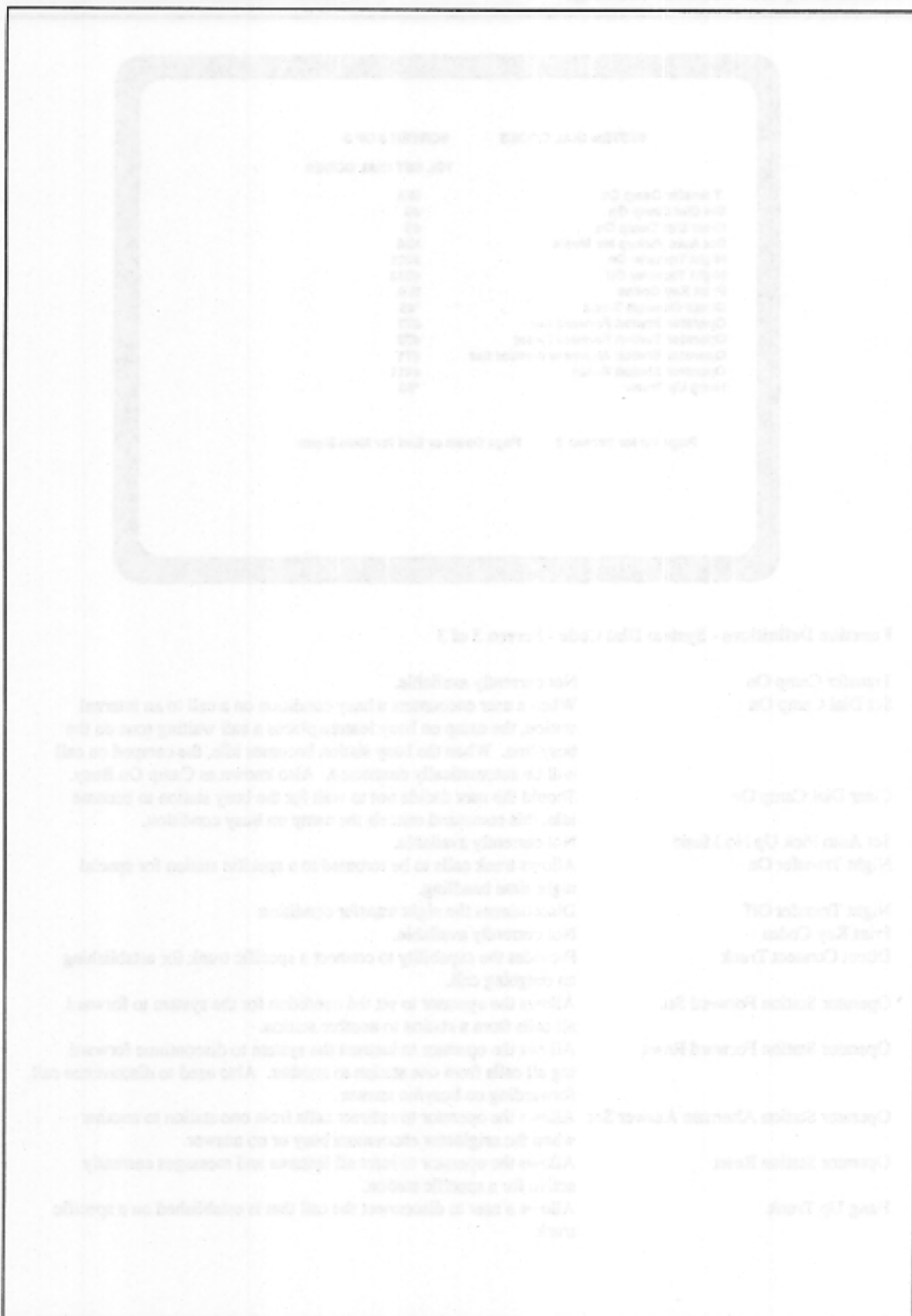
ATTENDANT FEATURES

HOW TO USE YOUR PCBX SYSTEM VIA THE ATTENDANT POSITION...

INCOMING TRUNK TO ATTENDANT POSITION: Calls coming in on a trunk are automatically routed to the attendant position unless the system dial code has been entered to forward incoming trunk calls to a station.

OPERATOR STATION FORWARD SET: To set the call forwarding feature to forward calls to a specific internal station to another internal station:

Receive:	Dial Tone
Push:	# , 7 , 2
Enter:	Origination Extension
Enter:	Destination Extension
Receive:	Dial Tone (confirms activation)
	Busy Tone (activation denied)

OPERATOR STATION FORWARD RESET: To deactivate operator station call forwarding:

Receive:	Dial Tone
Push:	# , 7 , 3
Enter:	Origination Extension

OPERATOR STATION ALTERNATE ANSWER SET: To redirect calls from an unanswered or busy station:

Receive:	Dial Tone
Push:	# , 7 , 1
Enter:	Extension from which calls will be forwarded.
Enter:	Destination Extension
Receive:	Dial Tone (confirms activation)
	Busy Tone (activation denied)

OPERATOR STATION ALTERNATE ANSWER RESET: To deactivate the operator station alternate answer set feature:

Receive:	Dial Tone
Push:	# , 7 , 3
Enter:	Extension from which calls were forwarded

SET STATION TO OPERATOR: To transfer attendant functions to another station:

Receive:	Dial Tone
Push:	# , 2
Enter:	Designated Extension Number

OPERATOR MESSAGE SET: To set a message at the attendant screen for a station:

Receive:	Dial Tone
Push:	# , 6
Enter:	Extension
Enter:	Message Number (1-9)

OPERATOR MESSAGE CLEAR: To clear the message set at the attendant screen for a station:

Receive:	Dial Tone
Push:	# , 5
Enter:	Extension of message to be erased

NIGHT TRANSFER ON:

To transfer night calls to a PCBX station:

Receive:	Dial Tone
Push:	# , 3 , 2 , 1
Enter:	Station Extension

NIGHT TRANSFER OFF:

To disable the night transfer function:

Receive:	Dial Tone
Push:	# , 3 , 1 , 3

OPERATOR STATION RESET:

To reset the messages and features for a station from the attendant position:

Receive:	Dial Tone
Push:	# , 4 , 1 , 1
Enter:	Extension Number

INTERCOM DIALING:

To make a call from one PCBX extension to another PCBX extension:

Receive:	Dial Tone
Enter:	Extension

OPERATOR CALL:

To call the operator from a station:

Receive:	Dial Tone
Push:	0

LOCAL CALL DIAL:

To dial a local (same area code) telephone number:

Receive:	Dial Tone
Push:	9
Enter:	Local telephone number

LONG DISTANCE CALL:

To dial a long distance (other area code) telephone number:

Receive:	Dial Tone
Push:	8
Enter:	Long distance telephone number

CALL HOLD:

To place a call on hold:

Flash:	Hookswitch
Receive:	Dial Tone
Push:	* , 9

AUTOMATIC HOLD RECALL:

To reconnect to a call on hold:

1. Place the telephone on-hook
2. The telephone will ring back
3. Answer the phone; the caller on hold will be on the line.

CALL TRANSFER:

To transfer a call to another station:

Flash:	Hookswitch
Push:	#
Enter:	Extension of the station to receive the call.

UNANSWERED CALL RETURN:

Automatic Function - When a call transfer from your telephone is not answered at the designated extension within a set time period, your telephone will ring back; when you pick up the receiver, you will be reconnected to the party on hold.

THREE-WAY CONF. CALL: To establish a three-way conference call:
1. Call the first party.
2. Flash: Hookswitch
3. Call the second party
4. Flash: Hookswitch

All three parties will now be connected together.

STATION GROUP PICK UP: To pick up a call to another party within the same group:

Receive:	Dial Tone
Push:	* , # , *

You will then be connected to the ringing call line.

SET DIAL CAMP ON: To camp on to a busy station:

Receive:	Busy Tone
Flash:	Hookswitch
Receive:	Dial Tone
Push:	# , 8
Receive:	Dial Tone

Place phone on hook.
When the called station goes idle, your phone will ring;
when you pick up the receiver, the called station will ring.

CLEAR DIAL CAMP ON: To deactivate a camp on or call back on busy:

Receive:	Dial Tone
Push:	# , 9
Receive:	Dial Tone

REDIAL LAST NUMBER:

Receive:	Dial Tone
Push:	5

CONVENIENCE DIAL EXECUTE: To make a convenience dial (Speed Call):

Receive:	Dial Tone
Push:	1
Enter:	Two-digit speed dial code (see local listing).

CONVEN. DIAL PROGRAMMING: To program a speedcode from your station:

Receive:	Dial Tone
Push:	* , 7 , 5
Enter:	Personal speed dial code (70-89)
Enter:	Telephone number

CALL FORWARD SET: To activate call forwarding on all calls:

Receive:	Dial Tone
Push:	* , 7 , 2
Enter:	Destination Extension
Receive:	Dial Tone (confirms activation)
	Busy Tone (activation denied)

CALL FORWARD CLEAR: To deactivate call forwarding:

Receive:	Dial Tone
Push:	* , 7 , 3

ALTERNATE ANSWER SET: To forward calls to another station on busy/no answer:

Receive:	Dial Tone
Push:	* , 7 , 1
Enter :	Destination Extension
Receive:	Dial Tone (confirms activation)
	Busy Tone (activation denied

ALTERNATE ANSWER CLEAR: Same as call forward clear.

TRUNK FORWARD SET: To forward incoming trunk calls to another extension:

Receive:	Dial Tone
Push:	* , # , 7 , 2
Enter:	Trunk number for incoming calls
	Extension number of destination station.

TRUNK FORWARD CLEAR: To deactivate trunk forwarding:

Receive:	Dial Tone
Push:	* , # , 7 , 3
Enter:	Trunk Number (01-04)

DIRECTED STATION PICK UP: To answer a call ringing at another station:

Receive:	Dial Tone
Push:	* , * , *
Enter:	Extension number of ringing phone.

HANG UP TRUNK: To disconnect an established trunk call:

Receive:	Dial Tone
Push:	* , # , 6
Enter:	Trunk Number (01-04)

DIRECT TRUNK CONNECT: To specify a specific trunk for an outgoing call:

Receive:	Dial Tone
Push:	* , # , 5
Enter:	Trunk Number

MESSAGE SETTING: To set a message at the attendants screen for your station:

Receive:	Dial Tone
Push:	* , 6
Enter:	Message Number (see below)

MESSAGE CLEAR: To clear your station message at the attendants console:

Receive:	Dial Tone
Push:	* , 5

PRE-PROGRAMMED MESSAGE CODES:

1 - In Meeting
2 - Do Not Disturb
3 - At Customers
4 - Not Returning
5 - Out Sick
6 - Out To Lunch
7 - On Vacation
8 - Not In Today
9 - On Break

STATION FEATURES

HOW TO USE YOUR PCBX SYSTEM VIA THE TELEPHONE

INTERCOM DIALING: To make a call from one PCBX extension to another PCBX extension:
Receive: Dial Tone
Enter: Extension

OPERATOR CALL: To call the operator from a station:
Receive: Dial Tone
Push: 0

LOCAL CALL DIAL: To dial a local (same area code) telephone number:
Receive: Dial Tone
Push: 9
Enter: Local telephone number

LONG DISTANCE CALL: To dial a long distance (other area code) telephone number:
Receive: Dial Tone
Push: 8
Enter: Long distance telephone number

CALL HOLD: To place a call on hold:
Flash: Hookswitch
Receive: Dial Tone
Push: * , 9

CALL WAITING: To respond to a call waiting beep tone:
a. Put the current call on hold and answer the waiting call, then hang up; the call on hold will then ring through.
b. Hang up the current call; the waiting call will then ring through.

AUTOMATIC HOLD RECALL: To reconnect to a call on hold:
1. Place the telephone on-hook
2. The telephone will ring back
3. Answer the phone; the caller on hold will be on the line.

CALL TRANSFER: To transfer a call to another station:
Flash: Hookswitch
Push: #
Enter: Extension of the station to receive the call.

UNANSWERED CALL RETURN: Automatic Function - When a call transfer from your telephone is not answered at the designated extension within a set time period, your telephone will ring back; when you pick up the receiver, you will be reconnected to the party on hold.

THREE-WAY CONF. CALL: To establish a three-way conference call:
1. Call the first party.
2. Flash: Hookswitch
3. Call the second party
4. Flash: Hookswitch
All three parties will now be connected together.

STATION GROUP PICK UP: To pick up a call to another party within the same group:
Receive: Dial Tone
Push: * , # , *
You will then be connected to the ringing call line.

SET DIAL CAMP ON: To camp on to a busy station:
Receive: Busy Tone
Flash: Hookswitch
Receive: Dial Tone
Push: # , 8
Receive: Dial Tone
Place phone on hook.
When the called station goes idle, your phone will ring;
when you pick up the receiver, the called station will ring.

CLEAR DIAL CAMP ON: To deactivate a camp on or call back on busy:
Receive: Dial Tone
Push: # , 9
Receive: Dial Tone

REDIAL LAST NUMBER: Receive: Dial Tone
Push: 5

CONVENIENCE DIAL EXECUTE: To make a convenience dial (Speed Call):
Receive: Dial Tone
Push: 1
Enter: Two-digit speed dial code (see local listing).

CONVEN. DIAL PROGRAMMING: To program a speedcode from your station:
Receive: Dial Tone
Push: * , 7 , 5
Enter: Personal speed dial code (70-89)
Enter: Telephone number

CALL FORWARD SET: To activate call forwarding on all calls:
Receive: Dial Tone
Push: * , 7 , 2
Enter: Destination Extension
Receive: Dial Tone (confirms activation)
Busy Tone (activation denied)

CALL FORWARD CLEAR: To deactivate call forwarding:
Receive: Dial Tone
Push: * 7 , 3

ALTERNATE ANSWER SET: To forward calls to another station on busy/no answer:
Receive: Dial Tone
Push: * 7 , 1
Enter : Destination Extension
Receive: Dial Tone (confirms activation)
Busy Tone (activation denied

ALTERNATE ANSWER CLEAR: Same as call forward clear.

TRUNK FORWARD SET:
To forward incoming trunk calls to another extension:
Receive: Dial Tone
Push: * , # , 7 , 2
Enter: Trunk number for incoming calls
             Extension number of destination station.

TRUNK FORWARD CLEAR:
To deactivate trunk forwarding:
Receive: Dial Tone
Push: * , # , 7 , 3
Enter: Trunk Number (01-04)

DIRECTED STATION PICK UP:
To answer a call ringing at another station:
Receive: Dial Tone
Push: * , * , *
Enter: Extension number of ringing phone.

HANG UP TRUNK:
To disconnect an established trunk call:
Receive: Dial Tone
Push: * , # , 6
Enter: Trunk Number (01-04)

DIRECT TRUNK CONNECT:
To specify a specific trunk for an outgoing call:
Receive: Dial Tone
Push: * , # , 5
Enter: Trunk Number

MESSAGE SETTING:
To set a message at the attendants screen for your station:
Receive: Dial Tone
Push: * , 6
Enter: Message Number (seel list below)

MESSAGE CLEAR:
To clear your station message at the attendants console:
Receive: Dial Tone
Push: * , 5

PRE-PROGRAMMED MESSAGE CODES:

1 - In Meeting
2 - Do Not Disturb
3 - At Customers
4 - Not Returning
5 - Out Sick
6 - Out To Lunch
7 - On Vacation
8 - Not In Today
9 - On Break

Convenience Dial (Speed Call) Codes

System Codes (20-69)	Telephone Number	Name	System Codes	Telephone Number	Name
20			45		
21			46		
22			47		
23			48		
24			49		
25			50		
26			51		
27			52		
28			53		
29			54		
30			55		
31			56		
32			57		
33			58		
34			59		
35			60		
36			61		
37			62		
38			63		
39			64		
40			65		
41			66		
42			67		
43			68		
44			69		

Station Codes (70-89)	Telephone Number	Name	Station Codes	Telephone Number	Name
70			80		
71			81		
72			82		
73			83		
74			84		
75			85		
76			86		
77			87		
78			88		
79			89		

ADMINISTRATIVE FEATURES

ALTERNATE ANSWERING ATTENDANT
The PCBX can configure any station as an alternate attendent position when the primary attendent is absent. When the primary attendent is absent, the alternate attendent (any compatible 2500 style set) has full console capabilities.

ATTENDANT INFORMATION CENTER
The configuration editor monitor (PC) provides varying levels of information to the attendent from as simple as a busy lamp field to as detailed as the specific number a station is speaking with, how long they havebeen on the call, and what features they have activated, i.e., one of 10 pre-programmed messages (Call Forward, Do Not Disturb, etc).

DIRECT OUTWARD DIALING (TRUNK ACCESS)
Allows users to make outside calls through central office facilities. The user simply dials the trunk access code and the desired telephone number.

DIRECT TRUNK TO STATION TERMINATION
Provides the System Administrator with the ability to configure any trunk to ring directly at any station.

DISTINCTIVE RINGING
Incoming trunk calls are distinctive from incoming station calls, single ring cadence for stations and double ring cadence for trunk calls.

FLEXIBLE STATION NUMBERING & FEATURE ACCESS CODES
The System Administrator can configure the system's dialing plan & feature access codes according to the user's needs, i.e. 3 or 4 digit dialing plan, and any access codes which don't cause circular problems.

GROUP PICK-UP
Each station in the system may be assigned to a "pick-up group." The PCBX accommodates up to 100 pick-up groups. Pick-up groups are usually chosen on the basis of physical or departmental boundaries. A ringing phone in a pick-up group can be answered from any other station in the same pick-up group whose class of service includes the Group Pick-up feature. To answer another phone, the station user dials an assigned pick-up code. If more than one station is ringing, the call that has been ringing the longest will be picked-up first.

SPEED DIAL (SYSTEM & STATION)
Allows users to access frequently dialed via a short access code instead of a regular telephone number. The PCBX provides for up 50 system-wide and 20 station-specific speed dial numbers up to 30 digits in length. The system-wide speed dial numbers are configurable from the system's configuration editor, whereas the station specific speed dial numbers are configurable from the station instrument.

OUTGOING CALL RESTRICTION (TRUNK & STATION)
Depending upon the user's extension features and/or the trunk type selected, the system can allow/deny callers from making local or long distance calls.

TRUNK FORWARDING
Trunks can be forwarded to any station in the system. This feature is configurable via the configuration editor.

MAINTENANCE & ALARM

Maintenance and Alarm features allow the system administrator to verify that the system is operating correctly. Some Maintenance and Alarm features allow the system administrator to locate and resolve problems that are detected.

ALARM REPORTING Detailed information on the occurrence and nature of major & minor alarms is reported to the attendent console/configuration editor. The alarms can differentiate between major alarms (service affecting) and minor alarms (still in service), and isolate the problem down to the specific failed module.

MAINTENANCE FEATURES Trunks can be taken out of service via the configuration editor. An outgoing call to a trunk removed from service will receive a busy signal.

POWER FAILURE RESTART (FROM DISK) Power failure restarts take less than 15 seconds for the system to reconfigure itself and become fully operational. All existing calls are reconnected, while partially initiated calls will be dropped.

DISK MEMORY All configuration data is stored in non-volitile disk memory which ensures that no vital system information will be lost in the event of a power loss. The only information which can be lost due to power failure is parially initiated calls or features.

FEATURES NOT YET AVAILABLE ON PCBX

SYSTEM DRIVERS TO INTEGRATE MULTIPLE BOARDS, I.E. 4X12, 8, & 16

ALARM REPORTING

TOLL RESTRICTION

HELP MENUS FOR CONFIGURATION

ATTENDENT RECALL IDENTIFICATION (CURRENT STATUS WINDOW)

CAMP-ON

FLEXIBLE NUMBERING PLAN

POWER-UP DIAGNOSTICS

MASTER NUMBER HUNTING

CALL MONITOR OR BARGE-IN

HOT LINE

LEAST COST ROUTING

AUTOMATED ATTENDENT/VOICE MAIL
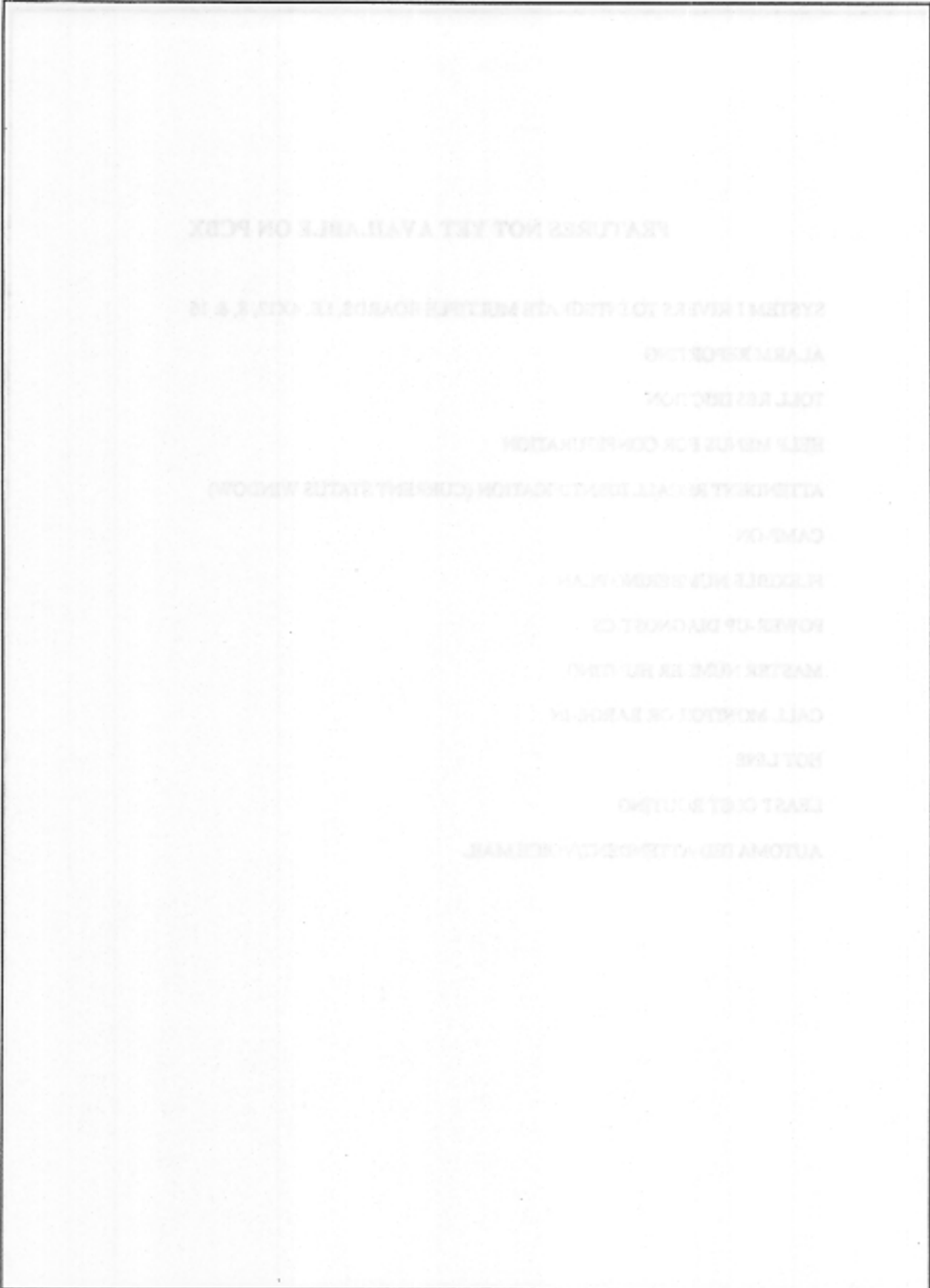
FOCUS ON TELECOMMUNICATIONS

Circuitry allows PC to run small phone system

By MICHELLE VRANIZAN

Sometimes selling a simple idea isn't as simple as it seems.

When Laslo Beresh and John Alkire came up with an innovative way for a personal computer to run a small business phone system, they expected potential investors to share their excitement.

They were wrong.

Beresh and Alkire, who form the management core of U.S. Trade Research in Fountain Valley, were turned down by every telecommunications company they approached for seed capital.

Most of the people even laughed at their idea, Beresh said.

But now Beresh, U.S. Trade's chairman and CEO; Alkire, the company's president, and a faithful crew of four employees are having the last laugh.

Sanbar Corp., a telecommunications company in Irvine, has bought exclusive licensing rights to manufacture and market U.S. Trade's PCBX phone system, and Beresh expects Sanbar to sell at least 25,000 units during 1988.

Another Orange County firm, EECO in Santa Ana, has agreed to test the product and could possibly integrate it into the systems the electronics firm sells to the lodging industry. U.S. Trade Research is negotiating with General Motors' EDS computer systems division, which wants to test the PCBX, Beresh said.

And industry analysts who've just discovered the product admit they're intrigued.

The product is a private branch

From left, John Alkire, Laslo Beresh and Ron Botts show off PCBX card.

exchange, or PBX, that runs on an IBM PC AT or the equivalent. While other companies market PC-based PBXs, this one is different, explains Alkire, the system's designer.

The difference is in the circuitry, which is 10 times smaller than the standard PBX circuitry, so small the hardware that controls 16 phones fits into one expansion slot in a PC, he said.

When installed, the PCBX uses the computer's central processing unit or CPU to control switches, relays, tone generators and trunk interfaces, all of the components of a private branch exchange.

Unlike other PC-based PBX systems, the PCBX doesn't interrupt the computer's main processor to operate the PBX, Alkire explained. This

leaves the CPU free to process other information while simultaneously controlling the phone system.

PBX systems running up to 40 phones could be run on the same computer a receptionist uses for word processing or an office manager uses for running spread sheets, Alkire explained. Systems handling more phone lines, 200 for example, would need a dedicated computer.

Developing the system didn't take magic; most of the technology had been on the market, Alkire said. However, some of the PCBX's circuitry didn't come out until last year, he said, adding that U.S. Trade has a two-year jump on competitors bent on copying the technology.

The system includes a PC, printer, phones and a separate monitor for

tracking incoming and outgoing calls. Its three circuit boards allow the computer to run the PBX and a modem and to function like a telex machine. It costs less than $300 per installed telephone line, according to Beresh. Less expensive systems are available for companies that already have PCs and telephones, he added.

The PCBX has the ability to manage a local area network (LAN) using the same computer, said Nina Burns, senior consultant with Infometrics, a Santa Clara high-tech market research firm.

According to Burns, the product is a great fit in the small business market niche, which Beresh says hasn't been as well served as the market for large-scale phone systems.

Beresh admits that rather than selling licensing rights to Sanbar, he would have preferred to manufacture the product himself. But lack of capital forced his hand.

"We'll make just as much this way," Alkire said.

However, neither he nor Beresh would disclose their financial projections for 1988, saying only that they had 8,500 committed buyers before they struck a deal with Sanbar.

Instead of asking for cash or stock in the deal, Beresh took royalties, which he said will be used to fund future research and development of new products.

However, U.S. Trade retains the right to sell the product on a private label basis into specific vertical markets and countries, subject to Sanbar's approval. The company is running initial tests of the PCBX and hopes to begin shipping during the first quarter of 1988.

COMMUNICATIONS

Local-Area Networks/Modems & Multiplexers/Communications Software

Start-Up Introduces Board That Transforms PC To PBX

Distribution Pact Signed For Multisystem Add-In Board

BY SAROJA GIRISHANKAR
Special to CSN

SAN DIEGO — Start-up U.S. Trade Research Inc. has unveiled an add-in board that can transform a Personal Computer into a PBX.

Called the PCBX, the board operates with both MS-DOS and Unix and was in development for two years by the Fountain Valley, Calif. company. U.S. Trade Research has signed Sanbar Corp., Irvine, Calif., to manufacture and distribute the board on a non-exclusive basis.

"We have reduced the functionalities of a PBX to a single printed circuit board," said Leslie Beresh, Chairman and CEO of U.S. Trade Research. He said no one else, including AT&T, has achieved that feat.

Beresh said the PCBX uses the PC to activate PBX features that reside in software on the board. A single PC can usually support up to six PCBX boards, which translates into a PBX

with up to 200 lines, according to software development manager Ronald Bolts.

The first board installed in the PC provides 4 trunk lines and 12 lines for telephones, and each additional board provides 8 trunk lines and 16 telephones, Bolts said.

Company officials said they were in talks with several OEMs interested in selling the board as a private-label product.

The PCBX supports many regular PBX features, including call transfer, call holding and outside dialing. In addition, it lets a system operator perform attendant operations from any station within the system; it supports conferencing involving as many as 16 or more locations; has an automated answering feature; and can ring phones using one of three different tones.

Configuration changes can be made dynamically, without bringing the system down. The

initial version will provide station message detail recording, and subsequent releases are promised to include least-cost call routing and automatic call distribution.

Sanbar president Charles Von Urff said Sanbar will sell the PCBX in selected markets in Australia, New Zealand, the Far East, North America and South America, except Brazil. U.S. Trade Research, however, retains rights to the lodging industry and selected markets in the Far East. Beresh declined to identify the Far East markets.

Beresh said his company is about to seal deals similar to the one with Sanbar with two other companies: Esco Corp., Santa Ana, Calif., and Ledgstix Corp., Wichita, Kan.

The PCBX is priced at slightly below $300 per telephone line, Beresh said. The system is scheduled for approximately 10 test trials before first quarter 1988, when it will become generally available.

First PC-Based PBX Makes Debut At TCA Exposition

By Eric Hindin
and David Strom

SAN DIEGO —Sanbar Corp. joined a growing number of vendors using PCs as a platform for building telecommunications equipment by unveiling the first PC-based PBX (Private Branch Exchange) at the Telecommunications Association show here last week.

Sanbar's PCBX connects up to 250 telephones or modems with each other or with the public-switched telephone network. The PCBX consists of standard PC adapter boards and software for PC XTs or ATs.

The PCBX software includes features usually found on more expensive PBXs, said John Albritte, president of U.S. Trade Research, a Fountain Valley, Calif. company that makes the PCBX for Sanbar, based in Irvine, Calif.

These features include usage reports (called station message detail recording), least-cost routing, automatic redialing of busy numbers and conference calling. Callers using PCBX, Mr. Albritte said, can dial individual stations directly instead of going through an operator or receptionist.

Sanbar's product marks the continued emergence of PCs in a telecommunications environment. Add-in boards and software have to date given PCthe ability to emulate facsimile machines, Asmart Inc. several months ago debuted software into X.25 switches for building packet-switching networks.

The PCBX's price makes it ideal for small companies, said Ronald Bolts, director of software development at USTR. Costs average $250 per connected device. Sanbar also is offering additional add-in boards that support 12 devices and four connections to a telephone company's central office. Additional configurations include boards that add up to 16 central-office connections to the PCBX.

Small PBX systems from companies such as AT&T and Northern Telecom cost $400 per port, according to Mr. Bolts. Adding the features provided in the PCBX to the Northern Telecom or AT&T PBXs raises their prices further, Mr. Bolts said.

Sanbar will ship the PCBX system within a few months, Mr. Bolts said.

For more information, contact U.S. Trade Research at 16600 Harbor Blvd., Fountain Valley, Calif. 92706 (714) 839-5727.

COMPUTERIZED PHONE EXCHANGES FOR THE LITTLE GUYS

Computer technology long ago revolutionized the private branch exchange. Replacing switchboards, modern PBX systems run off large minicomputers and route calls to the correct phone extensions. But with price tags of up to $350,000, PBXs are too expensive for small companies. Now U.S. Trade Research of a computerized phone system can bring nesses with fewer than 250 phones for less than $300 per line.

The Fountain Valley (Calif.) startup has designed circuit boards that let personal computers made by International Business Machines Corp. and Apple Computer Inc. operate as PBXs. USTR says that it's the first such system available and has signed an agreement with Sanbar Corp., based in Irvine, Calif., to build the boards. The new system will enable small businesses to monitor phones from their PC screens and send messages from one computer to another. Additionally, the system can transfer calls and double as a Telex terminal.

NEW PRODUCTS

Turning Your PC into a PBX

It was bound to happen sooner or later. With basic telecom hardware evolving into essentially commodity-type procurements, somebody was going to look at PBX technology and ask the question: How can a PC be used to produce voice communications service?

A small company in Fountain Valley, CA, called U.S. Trade Research Information Systems (USTR) has been trying to address that question for the past couple years and has found an answer. Their product is called the PCBX and it is a PBX expansion card that plugs into an IBM XT, AT or compatibles.

USTR designed the board and has sold a manufacturing license to San/Bar who also markets the system. USTR retained marketing rights to the hotel industry and to certain countries, but USTR's vice president of engineering John Alkire said, "It is a combined marketing effort between San/Bar and ourselves."

According to Alkire, the card "provides full PBX features. The basic card handles four trunks and 12 stations, and we also have an eight trunk/16 station card. The system can go up to 256 stations or trunks depending on how many cards you put into the system."

The PCBX cards fit into expansion slots in a PC chassis. Alkire said, "Normally in an AT or XT you have four or five spare slots after you have configured for a hard drive, color monitor or other boards. The spare slots can be used for the PBX boards. If you need more slots you can use a standard IBM expansion chassis that handles up to 19 slots. For a 256 port system, 17 slots are needed. A separate board is needed to put message waiting lamps on all the phones."

The price for the PCBX depends on system size. Alkire said that a 4x12 system would cost just under

$300 per line installed. He continued, "The larger the system gets, the less it costs per line. We just configured a 70 station/20 trunk system that came out at $188 per line, including the phone."

Alkire maintains that the PCBX will work with Type 500 and 2500 sets, as well as other single-line sets. The system uses single-pair, tip and ring cabling to the single line phones. Lines and trunks connect to the plug-in cards in the PC using two, high-density, 25-pair connectors.

USTR advertises the PCBX with over fifty different features. While their brochures say the SMDR will be optional, Alkire believes that it will become standard. "SMDR is built into the system. We're constantly printing all the activities that are going on in the system to the disk, and I can't can't see shutting it off because someone didn't pay $50 more." While the system provides the raw data, complete call accounting requires software from an outside supplier. The PCBX also offers least cost routing, but this feature is optional.

The PCBX handles data communications as a separate subsys-

tem. Alkire said, "The PCBX isn't ISDN or a local area network. It is an analog system and the switches can pass data up to 64 Kbps...We're coming out with an adaptor that will make a data terminal look like a phone to the system for switching to other computers. You'll need an optional board to connect RS-232 ports, and that will add $80 per line for each computer that is to be connected. The computers don't require subscriber line interfaces, they need switching and some way to tell the main switch how to get to the other computer. But the data communications doesn't go through the voice network, it goes through the cross-line switches."

Alkire claims that several systems have been sold, but shipping is not scheduled to begin until February, 1988. As of mid-December, the PCBX had been installed in three beta sites and Alkire claimed that USTR had "orders for some 7,000 boards. Some of that is being sold to China and to other countries. In the U.S. we are selling to VARs and interconnect companies. Most of the distributors just want the cards and will configure the

Figure 1
PCBX System Configuration
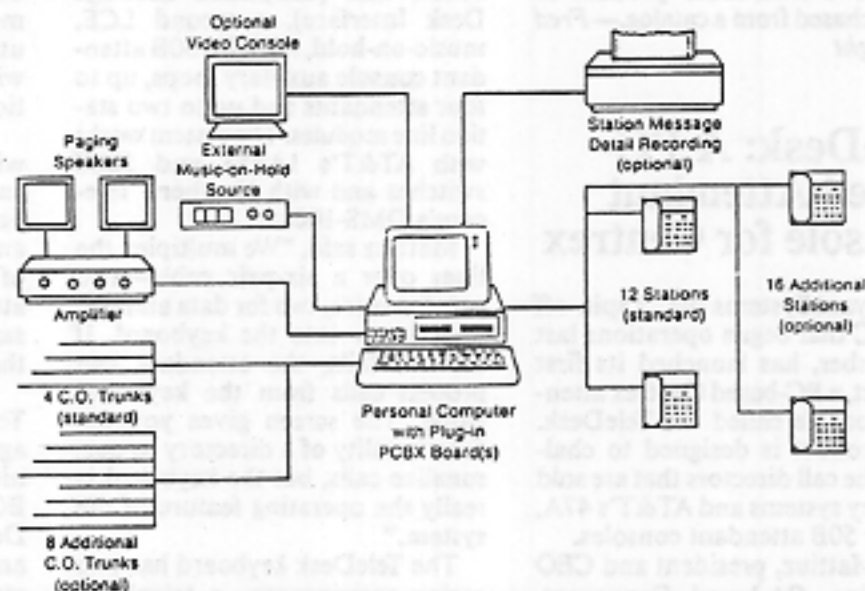
Source: U.S. Trade Research Information Systems

NEW PRODUCTS

system themselves."

The PCBX was designed for small business and goes up to 256 ports because, as Alkire explains, "an expansion chassis will expand to that size. We've set up our cross-line switches so they are non-blocking up to that point." But he added, "We don't recommend that someone who needs a 250 port system buy ours because, for now, there would be no expansion. It is mainly for small and medium-sized locations who need an upgrade path...You can start out with a basic AT or XT and if you need to expand you can get an expansion chassis."

As the power of PCs increases, it probably was inevitable that someone would decide to use one to control a PBX. PBXs, after all, are special purpose computers that process and switch voice communications. Whether a microcomputer is a good device to control a telephone switch remains to be seen, but at $200 to $300 a line it certainly looks attractive.

Small PBXs have become commodity products over the past few years. But if all that is needed is two or three printed circuit boards and some software to be plugged into a PC, the switch may soon become a mail-order product to be purchased from a catalog.—*Fred S. Knight*

TeleDesk: A PC-Based Attendant Console for Centrex

Conveyant Systems Inc., a spin-off of CXC that began operations last September, has launched its first product, a PC-based Centrex attendant console called the TeleDesk. The product is designed to challenge the call directors that are sold with key systems and AT&T's 47A, 50A or 50B attendant consoles.

Ed Mattiuz, president and CEO of Irvine, CA-based Conveyant claims that unlike competitive prod-

ucts, TeleDesk combines "a PC and our customized keyboard, our own common equipment hardware and, most importantly, applications level software that facilitates call processing." Mattiuz had been president of CXC prior to the formation of Conveyant.

The TeleDesk software runs on an IBM AT or compatible. For $8,500 the customer gets the customized keyboard, local common equipment and a call processing package. There are two optional features: an integrated directory capability costing $1,100, and a busy lamp field-type capability that costs around $900. Mattiuz said that there were two systems in initial field trials as of late December and he expects to be in full production by February, 1988.

The local common equipment (LCE) can be wall-mounted and is essentially a cabinet with a couple of circuit boards. It connects to the attendant lines and other stations that are monitored at the distribution frame over 25-pair cable connectors. One unit can support up to four attendant consoles and two LCEs can be linked together.

Each LCE contains 16 direct terminations for Centrex lines and connectors to support AT&T's SMDI link (Simplified Message Desk Interface), a second LCE, music-on-hold, AT&T's 50B attendant console auxiliary loops, up to four attendants and up to two station line modules. The system works with AT&T's 1AESS and 5ESS switches and with Northern Telecom's DMS-100s.

Mattiuz said, "We multiplex the lines over a six-pair cable—two pair for voice, two for data and two for power—into the keyboard. If the PC fails, the attendant can process calls from the keyboard alone. The screen gives you the functionality of a directory to personalize calls, but the keyboard is really the operating feature of the system."

The TeleDesk keyboard has two major components—a telephone console and a PC keyboard. The

telephone console comes with sixteen analog Centrex line keys and associated lamps, a standard DTMF dial pad, four Centrex programmable keys, and feature and function keys. The attendant also has on-line access to reference manuals and "help" features.

The software creates what Conveyant calls, "call information windows," that present the attendant with information fields on the status of current calls, company directories or busy lamp fields.

Mattiuz told *BCR* "Our optional integrated directory allows the attendant to do name dialing. As a call comes in, for example, to Mr. Jones, the attendant can depress the *J* key and scroll through the directory. If there are a lot of employees whose name begins with *J*, by adding more letters the attendant can find the name of the called party and is also presented with that person's job function and extension number. Once the name is found, the attendant hits the *enter* and *release* keys to complete the call."

When an attendant tries to reach a busy line, the type face of the called party on the directory screen changes color and there is an icon that appears on the directory screen. That triggers the appearance of a message screen from the message utility that presents the attendant with a representation of the traditional pink message slip.

There is also a "message count" window that gives the attendant a summary of the messages currently held in disk for the station users, and the attendant has the option of displaying the messages. The attendant can either read the messages to the called-party or print them out.

Conveyant plans to distribute TeleDesk through Centrex sales agents and interconnect companies. Mattiuz is hoping that the BOCs will not only market Tele-Desk, but also that they will be among his best customers for installation within their own facilities. —*FSK*

market. Here is a look at a trio of new offerings, each being presented in a
different manner by 3 dissimilar companies.

U.S. TRADE RESEARCH TO LAUNCH 'PBX-ON-A-BOARD'

     U.S. Trade Research is a start-up company that has spent 2-1/2 years
developing a PBX that would fit on an expansion card in a PC. This fall, it
announced what it calls the "PCBX System." The PCBX runs in the background on
a PC and is compatible with all telephone sets. Prices have not been released
except to say that it will cost less than $300 per line.
     "No company really believed that we could do it," says Chairman and CEO
Laslo Beresh. "We talked to everybody from AT&T on down--and they all just
laughed at us, saying, 'I'll believe it when I see it', and showed no
interest." But Beresh says his company went ahead and developed the PC-based
system anyway.
     Beresh says the board has all the features of a full-fledged PBX, for
one-third to one-half the cost. Final testing is under way, he said, and the
switch is scheduled for availability the first of the year.
     "People in the telephone industry are skeptical of the abilities of
computers, for some reason, although most telephones are computerized," said
Beresh. We talked to John Alkire, the product's designer and vice president
of engineering, for a better idea of how the PCBX works.
     "We built all of the telephone switching functions into the IBM PC-type
board. Also we built in the tone generators, the dialing tones, the station
interface and the cross-line switches," says Alkire. "Basically, the board is
a complete PBX, with one exception: it doesn't have a central processor on
board. It uses the PC's processor."
     Alkire had worked in the telecom business for 9 years, with Anaconda,
before moving into the computer field in 1971. Then, several years ago, he
met Beresh. "I had an idea, and Laslo was dealing with us in foreign trade,"
recalls Alkire. "He said he had some money and wanted to start a company, and
I said I had an idea."

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+----------------------+
|                      |
|      PBXs            |
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But can someone from outside the ever-
developing telecom industry jump in and design a
viable PBX product? "I went into it with an
open mind, and I had to do a lot of research,"
said Alkire. "I found out that universities
have a tremendous amount of information in their
libraries that nobody knows about. I did 4 months of research before I drew a
line. Most of the information we developed on requirements came from
interconnect people. That was the best place to find what we needed."
     Three boards comprise the PCBX system. One is a 4x12 PBX, another is a
card that accepts 8 incoming trunks, and the third distributes out to 16
stations.
     Thus, a customer can use the 4x12 card, expand by adding trunks in
increments of 8 and stations in increments of 16--or simply start with an 8x16
system using one trunk and one station card.
     Only time will tell if the product is a match for its more traditionally
designed rivals, but there seems little doubt that if the PCBX matches its
developer's claims, the low-priced system has the potential to grab no small
part of the small-end PBX market. Fulfilling that potential, though, requires
savvy marketing in an arena where even revolutionary and outstanding products
can be overlooked. Because of that, U.S. Trade Research has signed a
marketing agreement with San/Bar Corp. while retaining many foreign rights.
     U.S. Trade Research is a company of 9 people, with just 3 products.
Besides the PCBX, it has released a version that enables the host PC to be
used as a telex terminal. Also, it makes both 1200- and 2400-baud PC modems.
(U.S. Trade Research, 16600 Harbor Blvd., Fountain Valley, CA 92708, 714/839-
5727; Sanbar Corp., 9999 Muirlands Fwd., Irvine CA 92713, 714/855-9911.)

Trade Research and the "PBX In A PC," or PCBX. John Alkire made the hardware and Ron Bolts is the software guy. There are 10 man-years of work in the PCBX, much of it from these two.
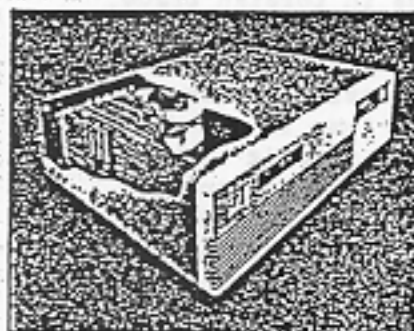
There are some major advantages to this idea:

1. Price. The system will sell retail for under $300 a line, including an IBM-clone PC, single line phones and installation.

2. Space. All the cards fit into a PC and an expansion chassis, which you need for more than 70 lines. (You can get up to 70 lines with five empty slots in a PC.)

3. Software Flexibility. The software is written in C. This means that any talented person could change

it to their tastes. This marks a first in the phone industry, which has traditionally refused to let anyone touch its beloved software — in contrast to the computer industry, which encourages outsiders.

4. Unlimited Conference Calls. Tie every line and every trunk together in one gigantic conference — with no degradation.

5. Operator Interface. The attendant's "console" — the PC's screen — is basically one gigantic busy lamp field — which changes colors depending on what's happening in the system. It's really beautiful. The colors are stunning.

6. Neat Features. Growth is reasonably modular. Remote diagnostics is through a 2400 baud modem. There's lots more features. No support, yet, for electronic phones. Just single-line phones. This doesn't stop you from using single-line feature phones, like Panasonic's.

7. The PC Still Works. The PC will drive the PBX and still work as a PC — doing word processing, etc. In short, the PBX is an afterthought!

8. Voice store and forward board. An automated attendant/voice mail add-on is a $500 option! Repeat — $500!

ielephone 312|676-1750

U.S. Trade Research's PCBX

What promises to be the most important technological PBX breakthrough in years, U.S. Trade Research's PCBX turns a personal computer in a fully functional PBX with up to 250 lines.

This is the ultimate add-on — a PBX that's an add-on to a PC (or is it the PC that's the add-on to the PBX?)

Our heads are reeling. This may be the most important add-on in the history of our industry!

A tiny company in Fountain Valley, CA (Silicon Valley) called U.S. Trade Research Information Systems has come up with an up-to-250 line PBX in a PC. Sanbar is distributing.

There are two guys behind U.S.

Circle reader service card number 9

TRAVELS

VOICE MESSAGING AND T-1 NETWORKING EXPLODE AS WE VISIT TCA, ATMS AND PC EXPO; THE FIRST PBX IN A PC QUIETLY APPEARS

by Andy, Marc and Harry

Here are the major trends we've noticed in recent weeks.

● **Voice Processing Becomes an Industry:** Voice mail/audiotex/voice response etc. is booming. There are forecasts by learned gurus of a continuing 50% compounded annual growth for the next five years.

But we've always been skeptical of the "expert" predictions.

But when our backwoods book printer (unreachable by next day Fed ...) bought a combination automated attendant/voice mail unit, we knew the boom had really heated up. And maybe the 50% compounded forecasts were even conservative.

● **T-1 Networking Software/ Hardware:** The boom in T-1 multiplexers and switches is upon us in a major way. The economics of putting in T-1 equipment — transmission and/or switching — is staggering. Paybacks of under six months are common.

Companies are doubling their size every few months with booming sales of T-1 stuff.

Industry watchers say 53% of the 1,500 largest US companies have already gone with T-1. By 1990, 83% will have given T-1 the nod. Sales are expected to rise to around $600 million in 1990, from today's $202 million.

We're also seeing a growing number of PBXs, voice messaging systems and LANs with T-1 interfaces built-in.

● **PBX in a PC:** All great breakthroughs — inventions that change the course of an industry — are rarely made by the existing industry players. So it may be with the first "PBX in a PC."

A tiny company in Fountain Valley, CA (Silicon Valley), called U.S. Trade Research Information Systems has come up with an up-to-250 line PBX in a PC. We saw it work. There are major advantages:

1. **Price.** The system will sell retail for under $300 a line, including an IBM-clone PC, single line phones and installation.

2. **Space.** All the cards fit into a PC and an expansion chassis, which you need for more than 70 lines. (You can get up to 70 lines with five empty slots in a PC.)

3. **Software Flexibility.** The software is written in C. This means that any talented person could change it to their tastes. This marks a first in the phone industry, which has traditionally refused to let anyone touch its beloved software — in contrast to the computer industry, which encourages outsiders.

4. **Unlimited Conference Calls.** Tie every line and every trunk together in one gigantic conference — with no degradation.

5. Operator Interface. The attendant's "console" — the PC's screen — is basically one gigantic busy lamp field — which changes colors depending on what's happening in the system. It's really beautiful. The colors are stunning.

6. Neat Features. Growth is reasonably modular. Remote diagnostics is through a 2400 baud modem. There's lots more features. No support, yet, for electronic phones. Just single-line phones. This doesn't stop you from using single-line feature phones, like Panasonic's.

7. The PC Still Words. The PC will drive the PBX and still work as a PC — doing word processing, etc. In short, the PBX is an afterthought!

8. Voice store and forward board. An automated attendant/voice mail add-on is a $500 option! Repeat — $500!

How significant is this invention? True story: When looking for money to fund this venture, the principals visited a major computer company who's also in the telephone business.

The computer company set up one of their PCs in the boardroom. The people from U.S. Trade Research brought in their phones and their boards, dropped the boards into the PC and had the PBX running in minutes.

The two guys behind U.S. Trade Research and the "PBX In A PC." Left, the big guy is John Alkire. He made the hardware. Right, smaller guy, is Ron Bolts. He's the software guy. This could be the premise of a TV sitcom. Except it's VERY real, and hugely significant. There are 10 man-years of work in the PCBX, much of it from these two.

The computer company's comment: "God!!! If this thing flies, we should get out of the phone business."

Sanbar Corp. is distributing the "PBX in a PC." They'll be at NATA and so will the guys from U.S. Trade Research (see photo). Highly recommended.

● The Huge Number of Used Equipment Dealers: TCA was the first end-user show with a major used equipment vendor presence. The hottest magazine at our booth was Telecom Gear.

Until last two or three years, the used equipment business was largely from a broker to interconnect company, who then installed the equipment.

In the past several years, the big users have become their own phone company. Now they're buying equipment directly from the resellers in Telecom Gear. Huge sales are being reported.

An ecstatic Arthur Schwartz, president of Tele-Computer Systems, breathlessly told us he'd just sold a Rolm two-node, four cabinet VL-9000 with 400 Rolmphones for $325,000. He figures the new price to be $700,000.

Our friends at Single Point of Contact, resellers of L-1 and Rolm, gave away a suite for two on a Caribbean cruise. You had to be a TCA member to participate in the drawing. Shucks!

● Portable Combination Fax/Anything and Everything: Facsimile machines are booming. They've now reached critical mass — they have plenty of other fax machines to talk to.

Fax machines are popping up with phones, PC to fax capabilities, answering machines, copiers and high-speed interfaces built into them.

Anyone who's not selling these things is crazy. They're great.

Start-Up Company Claims To Have Solved PBX Puzzle

U.S. Trade Claims Secret Of New PBX Is Circuit Board

Top Of The News

New Software From Telex

US트레이드 리서치회사의 레슬로 버러수회장

[U S트레이드리서치회사(USTR)의 ㅇ 안기호사장, 재율로 에러어회장, 료날드 본 호애너저(파른부러)가 지사제품을 설명하고있다]

그 사람 그 일터

컴퓨터와 텔리커뮤니케이션 시설 집중 개발해
황무지인 분야에 뛰어들어 중소기업에 큰기여

이 제대로 되지않아 머머 단 많은 비용을 쓰고 있는 형편이다.

설은 개발에 관여하는것을 독적으로 신넘진 회사가 US 보네이도 디서치회사

이선 시설 개방이 거의 황무지에 가깝다는 사실을 간전하고 수출입업무더어 이 분야를 집중 연구 크은 성과를 거두고 있다.

ㅇㅇ테ㅇ사장은 「중소기업에 적당한 컴듀더와 덜 리커뮤너이션 시설을 저

이런방접부의 풍치에 따르면 미국내에 2때년 이하의 종업원을 가린 중소기업의 수가 1백45만개이 며 이룬의 민간 매상액은 2 존4친억달러인 것으로 나타나 있다.

모은 분야에서 첨단과닥 기술이 풍신꿈에 따다 이 중소기업들도 비지니스를 위대 컴퓨더와 덥리커뮤 네이션 시설을 이용하는 빈도가 높아지고 있지만 중소기업에 적합한 컴퓨더 와 덥리커뮤니케이신 개발

컴퓨더와 덜리커뮤니케 이선 시설에 드는 덤금 비 용을 보면 종업원 1~4명 규모가 인간 1 만2천달러, 9~99명 규모가 ㅇ반4천 달러, 1백~2백명 규모가 8 만달러어 이로고 있다.

바로 이번 점에 착안, 풍업원이 ㅇ~2백명 규모 인 중소기업을 주시장으로 더 이들에게 적당한 컴퓨 더와 덥리커뮤니케이션 사

(USTR)이다.

UCLA 대서 닥시다체를 받은 뒤 지난 1965년 갈리 포니아의 파은더 밀리에서 그 회사를 설넘한 래은 도·버머워 기상은 처음에 는 하이데크 제품의 수출 입 관덕에 무덕여 현간 심 적이 1천2 억50만달러어 단탄다.

그러다 중소기업에 적합 한 컴퓨더와 덜리커뮤니케

덤당 가격으로 제공대 수 소기임 경영에 큰 도움을 주고 있다」고 자랑하고 「인인비지니스업들도 우 리 회사 저끔등 단번 사용 대 즐 것을 간라고 싶다」고 말했다.

USTR 전화번스는 (714) 852-0772

STEMS

Equipment, CPE, Distribution Channels

Changes Furious

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Peterson

Distribution

U.S. Trade Research To Deliver PCBX Soon

U.S. Trade Research, Fountain Valley, Calif., the company that caused a stir at the Tele-Communications Association '87 show with its PBX that operates with personal computers, is close to delivering its Personal Computer Branch Exchange, or PCBX, for volume shipments. FCC approval for the PCBX is expected within the next two months, company officials said. According to the company's chairman and CEO, Laslo Beresh, U.S. Trade Research is negotiating with more than 20 distributors that want to sell the PCBX in the United States. The company has already signed sales arrangements with a Panama City, Fla.-based distributor, **Better Management Concepts Inc.** Under an earlier licensing agreement, Irvine, Calif.-based **Sanbar Corp.** bought the manufacturing and sales rights to the PCBX in the domestic market. But U.S. Trade Research has retained the rights to sell the PCBX for lodging industry applications as well as under OEM, private label and value-added reseller arrangements in the United States. Beresh said the company also has rights to sell the PCBX in Communist-bloc nations. Beresh said a leading Canadian data communications vendor wants to integrate the PCBX into its data commuications products. Beresh, however, was reluctant to reveal the name of the company because the deal has not been finalized as yet. The officials at the Canadian company confirmed Beresh's claim and said the company wants to offer total a computer and communications solution to its customers and the PCBX seemed like a viable component in that solution. According to William Barisa, systems engineer with **Better Management Concepts,** the PCBX does everything a PBX does and even more. In addition to providing typical PBX features, "it can emulate any other telephone system," he said. The PCBX uses circuit boards that fit inside a PC and offers a series of features, such as multiparty conferencing involving as many as 15 locations, automatic attendant and the ability to do on-line adds, moves and changes to system configuration. The PCBX is being tested at seven cusotmer sites, Beresh said.

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Equipment, CPE, Distribution, Channels