CARDINAL TECHNOLOGIES, INC.
PROFESSIONAL MESSAGE CENTER
USER MANUAL

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Warning: The equipment described herein has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC rules. Operation with non-certified equipment is likely to result in interference to radio and television reception. Only shielded cables may be attached to this device.

Instructions To User

This equipment generates and uses radio frequency energy and if not installed and used properly, i.e., in strict accordance with the manufacturer's instructions, may cause interference to radio or television reception. It has been tested and found to comply with the limits for a Class B computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a residential installation.

If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- *Reorient the receiving antenna.*
- *Relocate the equipment with respect to the receiver.*
- *Move the equipment away from the receiver.*
- *Plug the equipment into a different outlet so that the equipment and receiver are on different branch circuits.*
- *Ensure that card mounting screws, attachment connector screws, and ground wires are tightly secured.*
- *Ensure that shielded, grounded cables are used.*
- *If necessary consult your dealer service representative for additional suggestions.*

The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. It is the responsibility of the user to correct such interference.

1.0 About the Professional Message Center

The Professional Message Center (PMC) is designed for database time sharing and dedicated direct computer connected applications. With a simple connection to your existing telephone line, the PMC can give you access to many public and private information services stored in large computers anywhere in the U.S. A single keypress dials a stored number, adjusts the PMC's personality to match the host computer, sends the required passwords and logon sequence, then turns over control to the user.

- Menu Controlled Operation for easy selection of telephone directory maintenance and terminal setup.
- Built-in 1200/300 baud modem with "originate" and "auto-answer" modes.
- Magnetic Card Reader to read standard bank cards for online transactions or for specially formatted cards for online services which may be provided for your PMC.
- Auto Dial for tone or pulse dialing of up to 26 stored telephone numbers for voice or data calls.
- Manual Dial to dial numbers directly using the keyboard.
- Automatic logon scripts can enter logon sequences automatically when connection to host computer is made. Easy-to-use format to program scripts.
- RS-232C Serial port allows PMC to be used as direct connect terminal to local computer or to use the PMC with a high speed modem.
- Parallel printer port can connect the PMC to a standard Centronics-type printer.
- Password protection is optional to prevent access to individual entries, or a system password can prevent unauthorized access to any programming information.
- Status line remains active while online to display telephone status, online status, time and date.
- Function keys can be programmed to send multiple character sequences to a host with one keypress.
- Protects display screen by dimming screen after 10 minutes of inactivity to reduce screen burn. A key touch instantly restores the screen to standard brightness.

2.0 Getting Acquainted

Since a terminal is not a computer; it cannot process data or store it except for on the screen. In order to operate, a terminal must be connected to a computer. The PMC is a special type of terminal that has the capability to communicate with computers either via standard telephone line or direct connection.

2.1 The PMC

The PMC looks like a keyboard 18″ x 7″ x 2″ but it contains all components of a terminal, plus a modem and a magnetic card reader. All that is required is a data display monitor on which information can be displayed.

2.2 Connections

On the rear panel of the PMC, you will find 7 jacks for connection to other devices:

- Two RJ11C phone jacks for connection to the phone line and a telephone.
- An RCA phono jack for connection to a Composite Video monitor, the display device.
- An RS-232, 25 pin 'D' connector for direct serial connection to a computer or a high speed modem.
- A 34-pin Card Edge connector for a Parallel Printer.
- A Memory Expansion Slot for special applications.
- A 5-pin 'DIN' to connect to the power supply.

3.0 Getting Started

Before you install your PMC be sure you have everything you will need.

3.1 What you get

In additional to this manual, your PMC package contains

- The PMC
- PMC power supply (the black box which plugs into the wall outlet)
- One modular telephone cable with jack plugs
- One video cable terminated with RCA phono plugs

Be sure the package contains all of these items.

3.2 Other things you will need

In addition to the items that come with your PMC, you will need:

- A composite video display monitor. The Cardinal MM1220 is excellent for this purpose.
- A modular phone outlet nearby

The following items are optional but are needed to take advantage of some of the PMC's capabilities.

- A telephone and connecting cord, if you want to connect a telephone
- A printer cable, if you wish to use a printer. The Cardinal CP300 cable allows you to connect to a standard parallel Centronics type PC printer.
- A printer, if you wish to use one
- RS-232 cable, if you wish to connect to a local computer or an external high speed modem

4.0 Installing your PMC

Use the parts list to identify all of the parts included with the PMC.

4.1 Connection to a Monitor

A monitor is required to use the PMC. Connect the monitor to the PMC with the video cable. Insert one end of the video cable in the output labeled COMPOSITE VIDEO on the rear of the PMC. Connect the opposite end to the monitor having 75 ohm input. (An adapter from your electronics dealer may be required if the monitor does not have a RCA phono jack input.)

4.2 Connection to Power

Make sure the PMC is turned off or "out" at the in/out switch on the rear of the PMC. Plug the 'DIN' connector on the end of the power cord into the connector marked POWER. Plug the power supply box into a standard AC outlet. Ensure that the proper AC voltage (110 Volt, 60 Hz) is utilized to prevent damage to the PMC.

4.3 Turn on PMC

First, turn on display monitor, then turn on the PMC with the switch at the rear of the unit. The POWER light on the keyboard should light up. If not, check to ensure that there is power at the outlet and that all connections are tight. "Checking System..." will flash on the display screen followed by the "System okay" message. If nothing is displayed on the screen, check that the display monitor is turned on and that you have made the correct connections between the monitor and the PMC. If "System okay" followed by the INFO SERVICES Menu does not appear in one minute, the unit may have failed. Call your dealer for service.

4.4 Connection to the Telephone line

Your PMC comes with a cable that enables you to connect it directly to any modular phone jack. If your phone system does not have a modular jack, you can purchase an adapter from any local phone or electronics store. Ask for an adapter to convert your jack into a RJ11C jack.

Connect one end of the cable provided to the PMC modular jack which is labeled FROM WALL. Connect the other end to the telephone line jack in the wall. If you wish to use a telephone on the same line, plug the telephone's cable into the PMC's jack marked TO PHONE. The telephone can be used as normal but will be disabled when the PMC modem is in use.

5.0 Using the PMC

5.1 Using the Menus

Menu selections are made by either pressing the number corresponding to the selection or by positioning the highlighted cursor bar with the UP and DOWN arrow keys (on the F1, F2, F3, F4 keys on the far right of the keyboard), then pressing RETURN. Most menus have the ability to return to the previous menu by pressing the ESC key.

To enter requested information to be stored in memory, press RETURN unless use of the SELECT OPTION key is indicated.

Data Entry may be edited by using the BACKSPACE key to delete characters before the cursor bar; DELETE key to delete characters at the cursor; the LEFT and RIGHT arrow keys to position the cursor and insert characters.

In some menus the values for a field are limited to series of choices. To change a selection, choose a field with the UP and DOWN arrows and press the SPACE BAR to toggle the choices.

Menu selections are presented in this manual by reference number and title followed by the list of choices available. The "default" value is the first value listed. The default value is built in and works with most databases.

5.2 The Speaker

The speaker built into the PMC allows monitoring of the telepone line prior to connection to host. Volume control is located on the left side of the PMC.

6.0 The Menus

6.1 The INFO SERVICES Menu

This is the main menu of the PMC, displayed after the unit is powered up. From the INFO SERVICES Menu you may dial into a selected information service (database), program an entry, manual dial from the keyboard, or go into the PHONE BOOK Menu.

1. LOG ON TO AN ENTRY SERVICE

   By pressing a key (A-Z), the PMC autodials and logs onto the preprogrammed entry corresponding to the letter pressed. A box displaying the telephone number will be displayed while the PMC attempts to connect with the host computer. Pressing ESC before connection is complete will return you to the INFO SERVICES Menu and stop the dialing sequence.

2. ADD OR CHANGE ENTRY

   By pressing a key (A-Z), INFO SERVICES: CHANGING ENTRY corresponding to the letter selected. Respond to the message on line 2 of the screen asking to input information.

   - NAME: asks for the name to assign to this entry. Up to 16 characters are allowed.
   - PASSWORD: asks for your own special password to restrict dialing of that entry to you or someone else who knows the password. You may use up to 16 characters and need not match the password the host requires. This password must be used to change the entry and cannot be accessed if you forget it; the entry will have to be deleted and re-enterd.
   - PHONE NUMBER: asks for the telephone number to be dialed. Any valid telephone number may be used. If you are connecting directly to a computer through the RS-232 port, enter no phone number. DIRECT will be displayed to show that the RS-232 port is active. When entering a phone number, separators such as).(- can be used but will not be read by the PMC. The following characters are valid:

0 through 9 * #	are numbers to be dialed.
,	is a 2 second pause in dialing
T	switch to TONE dialing
P	switch to PULSE dialing

   - Pauses are useful when access numbers are used or you must wait for a second dial tone.
   - SCREEN COLUMNS: can be 40 or 80 characters across screen.
   - TERMINAL EMULATION: identifies the type of terminal to be used for the online session. Special emulations must be programmed in the SETUP Menu (see Appendix). The default "VT52" is generally sufficient for use on most online services.
   - BAUD: asks for the communication rate of the connection. If you are connecting through telephone the only options are 300 and 1200 baud. For direct connect all choices are available.
   - DUPLEX: depends on the database you are calling.
   - PARITY: depends on the database you are calling.

- AUTO LOGON: NO allows you to enter your logon information each time you access the database. YES permits you to have PMC automatically send the logon information you program from the AUTO LOGON SEQUENCE Menu (below).
- AUTO LOGOFF: NO allows you to enter signoff information manually prior to HANG UP. YES instructs signoff information to be automatically sent to the host prior to HANG UP.
- FUNCTION KEYS: allows you program up 80 characters to be sent upon pressing a F key. Standard characters as well as control characters may be used.

3. ERASE AN ENTRY

   Erases and entry (A-Z).

4. MANUAL DIAL FROM KEYBOARD

   Allows dial directly from the keyboard. The last terminal personality used will be used for this call.

5. RE-CONNECT TO:

   Redials the last entry called. Has the same effect as pressing the letter (A-Z) next to the entry. If you are still online with the entry, you will be reconnected without redialing.

6.2 The PHONE BOOK Menu

This menu is accessed by pressing the PHONE DIAL key. Up to 26 frequently used telephone numbers can be stored for speedy one touch dialing. The PHONE BOOK Menu operates the same way as the INFO SERVICES Menu. Press ESC to return to the INFO SERVICES MENU.

6.3 The AUTO LOGON SEQUENCE Menu

This menu is accessed from the INFO SERVICES: CHANGING ENTRY Menu to allow the programming of autologon scripts to automate the logon procedure. To use this function, make your connection to the host in the normal way. From the moment of connection to the host, note all information the host sends out followed by your responses. When offline, use the Menu to program the sequence into the entry. This utility provides for some special keywords to make it easier to use.

(PAUSE): to pause for 5 seconds.
(ANY): respond to any character sent from the host.
(INV): what is sent from the PMC is invisible to the user during the autologon.
(RET) is the RETURN key, (CRTL) is the CONTROL key, (ESC) is the escape key.

An Example (CompuServe):

SEND: (PAUSE)(CRTL)C
RECEIVED: ID:
SEND: ????,????(RET) (User account # from CompuServe)
RECEIVED: :
SEND: AAAA AAAAA(RET) (Your personal password)

6.4 The AUTO LOGOFF SEQUENCE Menu

Operates in the same way as the AUTO LOGON.

7.0 Using the PMC Online

Once a successful connection to a host has been made, control is returned to the keyboard for a standard session. In addition to the familiar keys, the following special keyboard keys are active for terminal control.

40/80 COL key can switch the PMC between 40 and 80 column character mode while online. Must be used in combination with the SHIFT key.

PRINTER ON/OFF puts the PMC into line print mode if the PMC has a printer installed. Once the PMC is in print mode all subsequent data sent from the host is printed. Must be used in combination with the Shift key.

PRINT SCREEN causes all data showing on the screen to be printed. The PMC does not have to be in print mode for this function to be activated. If the PMC is in print mode, the data will be reprinted. Must be used in combination with the SHIFT key.

CAPS LOCK causes all letters to be sent out in uppercase. The CAPS LOCK light will be displayed on the keyboard.

SELECT OPTION controls the PMC connection with the host. Pressing this key brings up the ONLINE menu. You can select from the following options:

- HANGUP (LOGOFF) will send out the preprogrammed logoff sequence and disconnect the telephone line. If no autologoff sequence is present, the line will be disconnected.
- GO BACK ONLINE returns to the online session.
- GO TO INFO MENU (STAY CONNECTED) allows you to return to the INFO SERVICES Menu to change parameters. To go back online, RECONNECT to the entry specified from the INFO SERVICES Menu.
- TURN PRINTER ON/OFF has the same effect as pressing the PRINTER ON/OFF key.

PHONE DIAL/HANGUP will disconnect the telephone line to end the online session or a voice call from the PHONE BOOK.

Appendix A. The SETUP Menu

This menu is used to alter the PMC for some of its advanced capabilities. Press CONTROL SHIFT S simultanously from the INFO SERVICES MENU to access. WARNING: Do not change any of these parameters unless you have a clear understanding of the operation of the INFO SERVICES section as well as of data communications.

TEXT: On a color monitor the color of the displayed text can be changed. For display on a monochrome monitor the default WHITE should be used.

BACKGROUND: On a color monitor the background color can be changed.

DIALING: Selects the type of dialing, pulse or tone, to be used.

ANSWER RINGS: The PMC can be set to automatically answer the telephone and go on-line. The number of rings can be set from 1 to 9 or the "auto answer" function can be turned off.

LINE WRAP: If lines of data sent from the host are longer than the screen, the PMC will automatically go to the next line. OFF will disable this function.

BEEPER: Determines if the PMC responds to the BELL command. Also an audio click keypress can be activated.

TERMINAL ID: These characters are the PMC's response to a host sent Terminal Enquiry code.

USER EMULATIONS: Specifies PMC terminal control codes. The default control codes for the enhanced VT52 emulation are in the COMMAND CODES Appendix. Up to 3 other sets of control codes can be specified.

DATE/TIME: Sets the calendar and time clock.

Appendix B. Video Outputs

The terminal video output is compatible with most low-cost monitors. It is also directly compatible with televisions with monitor inputs but will only work well in 40 column mode.

The video output has the following specifications:

video timing:	NTSC (EIA RS-170)
horizontal frequency:	15.734 khz
horizontal pixels:	240 (40 column mode) 480 (80 column mode)
vertical frequency:	60.05 hz
vertical lines:	200

In order to display a clear 80 column screen, the monitor should have at least 20 MHz of video bandwidth. The Cardinal MM1220 monitor is excellent for this purpose.

Appendix C. Printer Port

The printer port is compatible with practically all parallel (i.e. Centronics) type printers. When the terminal is online this port allows: 1) screen dumps to the printer, 2) characters to be printed on the printer as they are received. (Note: all escape character sequences are stripped out in the latter mode.) Use the Cardinal CP300 cable or use the following information to make your own cable.

The printer port uses a 34-position card edge connector. The signals on this connector are:

Position	Signal	Centronics Position
1	STROBE-N	1
2	GND	19
3	DATA1	2
4	GND	20
5	DATA2	3
6	GND	21
7	DATA3	4
8	GND	22
9	DATA4	5
10	GND	23
11	DATA5	6
12	GND	24
13	DATA6	7
14	GND	25
15	DATA7	8
16	GND	26
17	DATA8	9
18	GND	27
21	BUSY	11
22	GND	29
24	GND	30
26	INIT-N	31

All signals are TTL compatible. The BUSY is an input to the terminal; all other signals are outputs.

The terminal contains a 2,000 character printer buffer. The terminal can send characters to the printer at a maximum rate of 1000 characters per second.

Appendix D. Serial Port

An asynchronous, RS-232C port is utilized for direct (i.e.non-modem) communications. The baud rates supported range from 300 to 19200.

This port uses a 25 position D-subminature connector. The signals on this connector are:

Position	Signal	Description
1	GND	
2	TXD	transmitted data (output)
3	RXD	received data (input)
4	RTS	+ 12v (output)
7	GND	
11	GND	
12	GND	
13	GND	
15	TXM	auxiliary modem data (input)
16	RXM	received modem data (output)
17	DCD	+ 12v when terminal online; else -12v (output)
20	DTR	+ 12v (output)

Appendix E. Command Codes

The command sequences which are recognized by the terminal are user-programmable. The terminal defaults to a group of commands which is a super-set of those provided by the Digital Equipment Corporation VT52 terminal. These commands are adequate for practically all applications.

The commands are modified by selecting "user emulations" on the terminal setup screen. Three custom sets of emulation command sequences can be created (user#1, user#2, and user#3).

The available commands, with the default sequences, consist of the following:

Command	Default Sequence
position cursor	< ESC > Y < val > < val >
cursor up	< ESC > A
cursor down	< ESC > B
cursor right	< ESC > C
cursor left	< ESC > D
cursor home	< ESC > H
erase to end of line	< ESC > K
erase to end of screen	< ESC > J
erase screen	< FF >
carriage return	< CR >
linefeed	< LF >
return + linefeed	(not implemented)
tab	< HT >
backspace	< BS >
bell	< BEL >
insert character	< ESC > P
delete character	< ESC > Q
insert line	< ESC > L
delete line	< ESC > M
scroll up	< ESC > I
enable printer	< DC2 >
disable printer	< DC4 >
print screen	< ESC > O
identify	< ESC > Z
send terminal status	< ESC > N
program function key	< ESC > < ESC > F < dig > < nstr >
screen off	< ESC > < ESC > D0
screen on	< ESC > < ESC > D1
40 column screen	< ESC > < ESC > D2
80 column screen	< ESC > < ESC > D3
enable cursor	< ESC > < ESC > C0
disable cursor	< ESC > < ESC > C1

blinking cursor	< ESC > < ESC > C2
non-blinking cursor	< ESC > < ESC > C3
push cursor	< ESC > < ESC > C4
pop cursor	< ESC > < ESC > C5
read character at cursor	< ESC > < ESC > C6
send cursor position	< ESC > < ESC > C7
block cursor	< ESC > < ESC > C8
underline cursor	< ESC > < ESC > C9
disable text attributes	< ESC > < ESC > S0
enable text attributes	< ESC > < ESC > S1
normal text	< ESC > < ESC > S2
enable reverse video	< ESC > < ESC > S3
enable blinking	< ESC > < ESC > S4
enable underlining	< ESC > < ESC > S5
enable graphics	< ESC > < ESC > S6
disable reverse video	< ESC > < ESC > S7
disable blinking	< ESC > < ESC > S8
disable underlining	< ESC > < ESC > S9
disable graphics	< ESC > < ESC > SA
set background color	< ESC > < ESC > B < dig >
set text color	< ESC > < ESC > T < dig >
directory entry inquire	< ESC > < ESC > I0 < nstr >
directory entry add	< ESC > < ESC > I1 < nstr >
directory entry delete	< ESC > < ESC > I2 < nstr >

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Cardinal Technologies, Inc. reserves the right to refuse repair on any Cardinal Product which has been abused, altered or damaged beyond our reasonable ability to repair.

Technical Difficulties

If you are unable to resolve any technical difficulty with your Cardinal Product, write to: Cardinal Technologies, Inc., P.O. Box 7628, Lancaster, PA 17604-7628.

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