

PowerFax M-SeriesTM

Installation Manual

Version 1.5



6400 Atlantic Blvd.
Suite 190
Norcross, GA 30071
Voice: (770) 449-7775
Fax: (770) 242-7353
e-mail: support@commetrex.com
<http://www.commetrex.com>

Doc. No. 290-100005-001

This manual is copyrighted and all rights are reserved by Commetrex Corporation. This product may not, in whole or in part, be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form without prior consent, in writing, from Commetrex Corporation.

Copyright © 1997-1999
Commetrex Corporation
All Rights Reserved

Microsoft and Windows NT are trademarks of Microsoft Corporation

PowerFax and Commetrex are registered trademarks of Commetrex Corporation.

M-Series, M-4, M-8, and M-T1 are trademarks of Commetrex Corporation.

Table of Contents

- 1. Introduction..... 2
 - 1.1. Hardware And Software Requirements 2
 - 1.2. What Is Included..... 2
 - 1.2.1. Installation Software 2
 - 1.2.2. PowerFax M-Series Fax Board..... 3
 - 1.2.3. License Key 3
 - 1.2.4. Analog Connection Cables 3
- 2. Configuring The Hardware 4
 - 2.1. Configuring The Interrupt 4
 - 2.2. Configuring The Board's I/O Address 4
- 3. Installing The M-Series Board 8
 - 3.1. Connecting To The Telephone Network..... 8
 - 3.1.1. Loopstart Interfaces (M-4 and M-8)..... 9
 - 3.1.2. DID Interfaces (M-4 and M-8)..... 10
 - 3.1.3. Connecting Analog Boards To Telephone Lines 11
 - 3.1.4. Connecting an M-T1 to the Network..... 11
- 4. Software Installation..... 13
- 5. Configuration Program 14
 - 5.1. Hardware Settings..... 15
 - 5.2. Board Settings 17
 - 5.3. Port Assignments 20
- 6. Registration and Support 22
- 7. Compliance Statements..... 23
 - 7.1. FCC Part 15 Class A Statement..... 23
 - 7.2. FCC Part 68 Statement 23
- 8. License and Warranty 27

1. Introduction

Welcome to the PowerFax M-Series family of multiline fax boards (M-4™, M-8™, and M-T1™). This installation manual and the accompanying software are designed to make the installation and configuration of the PowerFax M-Series fax boards quick and easy. Commetrex has made every attempt to ensure that your first encounter with an M-Series fax board is as straightforward as possible. If you have any difficulty with this installation please do not hesitate to contact Commetrex Customer Engineering by calling 770-449-7775 or via fax to 770-242-7353 or via e-mail to support@commetrex.com.

1.1. Hardware And Software Requirements

The PowerFax M-Series requires a 486- or Pentium-class PC running the Microsoft Windows NT 3.51 or 4.0 operating system. A minimum of 32 MB of RAM is recommended for the M-4 and M-8. A minimum of 64 MB of RAM is recommended for the M-T1.

1.2. What Is Included

The following components are shipped with each PowerFax M-Series fax board.

1.2.1. Installation Software

The PowerFax M-Series Runtime Software is contained on three diskettes marked PowerFax M-Series Runtime Software. These disks contain an automated procedure to install the boards and related software.

1.2.2. PowerFax M-Series Fax Board

PowerFax M-Series fax boards consist of a DSP-resource board and unique Commetrex fax software that transforms the board into a fax board. The M-4 and M-8 boards provide four and eight analog ports respectively of fax processing with either loopstart or DID interfaces. The M-T1 board provides 24 ports of fax processing and an integrated T1 interface.

1.2.3. License Key

Each PowerFax M-Series board requires a license key to activate its fax capabilities. The board's shipping box contains a document showing the board's serial number and corresponding license key. The license key may also be found on the back of the board. You will need this license key during the installation procedure to activate the M-Series card. After installation please keep this document for future reference.

1.2.4. Analog Connection Cables

Both the M-4 and M-8 are shipped with telephone cables to connect the fax lines to the local telephone jack provided by the your telephone company. Each cable provides two fax lines. An M-4 is shipped with two cables; an M-8 with four.

PowerFax M-Series Installation Hardware Configuration

2. Configuring The Hardware

The board is shipped in a protective anti-static container. Static electricity can severely damage any PC board. Please leave the board in its container until you are ready to install it. Handle the board carefully and hold it only by its edges. We recommend that you wear an anti-static wrist strap connected to a good earth ground whenever you handle the board. Do not touch the gold fingers that plug into the ISA bus connectors.

2.1. Configuring The Interrupt

PowerFax M-Series fax boards use one interrupt which is configured by the MConfig utility included in the *PowerFax M-Series Runtime* software. All M-Series boards share the same interrupt.

2.2. Configuring The Board's I/O Address

PowerFax M-Series boards each must have a unique I/O base address. Addresses must be unique and must not conflict with other devices in your system. The default factory setting for the base address is **0x2C0**.

If you must select another base address, find the I/O address DIP switches on the face of the card (S1 shown in Figure 1) and set them as directed in the I/O Address table below. Each board's address will be automatically detected by the configuration utility (MConfig).

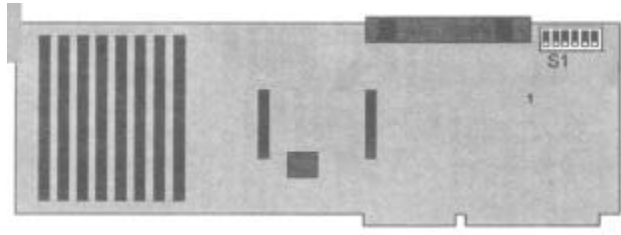


Figure 1. M-4/M-8 Board

Base Address (Hex)	Dip Switch Settings					
	1	2	3	4	5	6
02C0 (default)	on	on	on	on	on	on
22C0	off	on	on	on	on	on
42C0	on	off	on	on	on	on
62C0	off	off	on	on	on	on
82C0	on	on	off	on	on	on
A2C0	off	on	off	on	on	on
C2C0	on	off	off	on	on	on
E2C0	off	off	off	on	on	on
01C0	on	on	on	off	on	on
21C0	off	on	on	off	on	on
41C0	on	off	on	off	on	on
61C0	off	off	on	off	on	on
81C0	on	on	off	off	on	on
A1C0	off	on	off	off	on	on
C1C0	on	off	off	off	on	on
E1C0	off	off	off	off	on	on
02A0	on	on	on	on	off	on

PowerFax M-Series Installation Hardware Configuration

(Hex)	1	2	3	4	5	6
22A0	off	on	on	on	off	on
62A0	off	off	on	on	off	on
82A0	on	on	off	on	off	on
A2A0	off	on	off	on	off	on
C2A0	on	off	off	on	off	on
E2A0	off	off	off	on	off	on
01A0	on	on	on	off	off	on
21A0	off	on	on	off	off	on
41A0	on	off	on	off	off	on
61A0	off	off	on	off	off	on
81A0	on	on	off	off	off	on
A1A0	off	on	off	off	off	on
C1A0	on	off	off	off	off	on
E1A0	off	off	off	off	off	on
0280	on	on	on	on	on	off
2280	off	on	on	on	on	off
4280	on	off	on	on	on	off
6280	off	off	on	on	on	off
8280	on	on	off	on	on	off
A280	off	on	off	on	on	off
C280	on	off	off	on	on	off
E280	off	off	off	on	on	off
0180	on	on	on	off	on	off
2180	off	on	on	off	on	off
4180	on	off	on	off	on	off
6180	off	off	on	off	on	off
8180	on	on	off	off	on	off

PowerFax M-Series Installation Hardware Configuration

(Hex)	1	2	3	4	5	6
A180	off	on	off	off	on	off
C180	on	off	off	off	on	off
E180	off	off	off	off	on	off
2100	off	on	on	off	on	off
4100	on	off	on	on	off	off
6100	off	off	on	on	off	off
8100	on	on	off	on	off	off
A100	off	on	off	off	on	off
C100	on	off	off	on	off	off
E100	off	off	off	on	off	off
0340	on	on	on	off	off	off
2340	off	on	on	off	off	off
4340	on	off	on	off	off	off
6340	off	off	on	off	off	off
8340	on	on	off	off	off	off
A340	off	on	off	off	off	off
C340	on	off	off	off	off	off
E340	off	off	off	off	off	off

3. Installing The M-Series Board

1. If necessary, configure the board as described in Section 2.
Configuring The Hardware.
2. Turn off the computer. Disconnect it from the AC power source.
Remove the cover and set it aside.
3. Make sure each board's ISA bus connector is seated securely in a slot.
4. Fasten each board's end bracket to the chassis.
5. Replace the cover, and re-connect the computer to its AC power source.

3.1. Connecting To The Telephone Network

Important Safety Notes for Telephony Connections:

- *Installation of this board and associated telephony wiring is to be performed only by competent technical personnel.*
- *Never install telephone wiring during a lightning storm.*
- *Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.*
- *Use caution when installing or modifying telephone lines.*

3.1.1. Loopstart Interfaces (M-4 and M-8)

The loopstart boards have five RJ-61X connectors. For information on configuring the M-Series software for loop start lines see Section 5.3. Port Assignments.

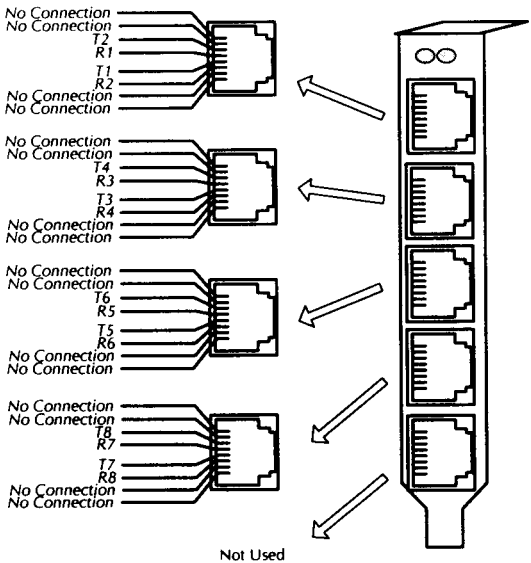


Figure 2. Loopstart Pinouts

3.1.2. DID Interfaces (M-4 and M-8)

The DID boards have five RJ-61X connectors as shown. For information on configuring the M-Series software for DID lines see Section 5.3. Port Assignments.

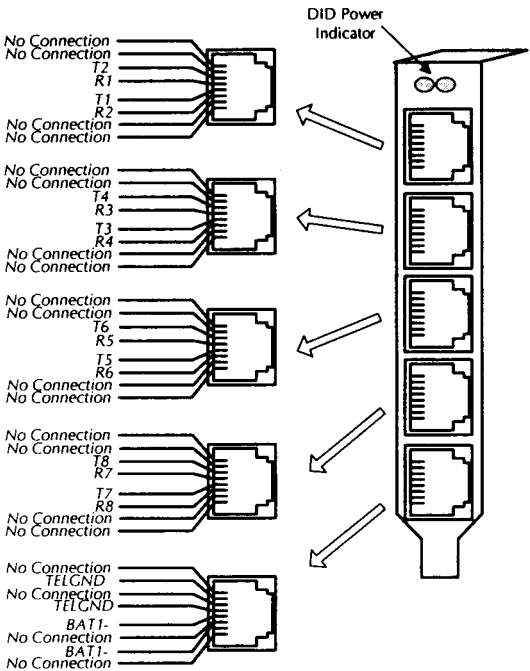


Figure 3. DID Pinouts

A -48V power supply must be connected to the bottom RJ-61X connector as indicated in Figure 3.

Connect the power supply GND terminal to TELCNG, pins 5 and 7.
Connect the -48V lead of the power supply to BAT-, pins 2 and 4.

3.1.3. Connecting Analog Boards To Telephone Lines

Each RJ-61X connector on the M-Series fax board provides two fax lines. The top connector provides lines one and two. The second connector provides lines three and four and so on.

Each M-4 and M-8 board is supplied with cables to connect the board to the local telephone jacks. The M-4 is supplied with two cables; the M-8 with four. Each cable is a “Y” cable with one male RJ-11 connector at one end and two male RJ-11 connectors at the other end marked line 1 and line 2 respectively.

Placing the single-connector end of a “Y” cable in the uppermost RJ-61X connector on the analog M-Series board will provide fax port one to the connector labeled “1” and port two to the connector labeled “2”. Placing the single-connector end of another “Y” cable in the second RJ-61X connector will provide fax port three to the connector labeled “1” and port four to the connector labeled “2”.

For the M-8 the remaining two cables are placed in the third and fourth connectors in a similar fashion. Cable three provides fax ports five and six; cable four provides fax ports seven and eight.

3.1.4. Connecting an M-T1 to the Network

The M-T1 has a DSX-1 trunk interface. For typical T1 communications it connects to a Channel Service Unit (CSU) that is connected to a T1 trunk line. The CSU provides a DSX-1 interface to the T1 line and also contains circuitry that allows remote diagnostic testing from the Central Office (CO). The CSU must be compatible with the DSX-1 specifications, particularly in maintaining the pulse amplitude level at between 2.3 and 4.2 volts. Alternatively, the board

can connect directly to the T1 line, without a CSU. This setup is most common in applications where the T1 line is proprietary, and is not connected directly to the public network.

To avoid causing alarms at the T1 service provider's end, be sure that a valid signal is continuously sent to them, either by looping the signal back at the CSU, or by connecting the CSU to a functioning M-T1 board. The best way to provide a loopback is simply to unplug the cable from the CSU. The modular connector on most CSUs will loop back the transmit signal to the receive signal when there is nothing plugged in.

When ordering basic T1 service for an M-T1 system in the United States be prepared to provide the telephone company with the following information:

1. FCC Registration: EMCUSA-21110-XD-N
2. USOC Jack Required: RJ48C or RJ48X
3. Service Type: T1, D4, or ESF format (B8ZS is also supported)
4. Interface Code: 04DU9-B
5. Service Code: 6.0P
6. Channels: 24 (typically)
7. Signaling: Four wire terminated E&M (robbed-bit)
8. Start: Wink start
9. Dial Tone: Enabled (standard frequency)
10. Digits: DTMF (pulse dial supported but DTMF preferred)
11. Ringer Equivalence: 0.0A
12. Outdial Senderized: Yes

4. Software Installation

To install the M-Series Runtime Software you must log on to Windows NT as a member of the Administrators group before inserting the *PowerFax M-Series Runtime Software Disk 1* into the computer's floppy drive (usually A:). Type X:\SETUP (where X is the letter that represents the floppy drive) at a DOS window command line and follow the install program's instructions.

5. Configuration Program

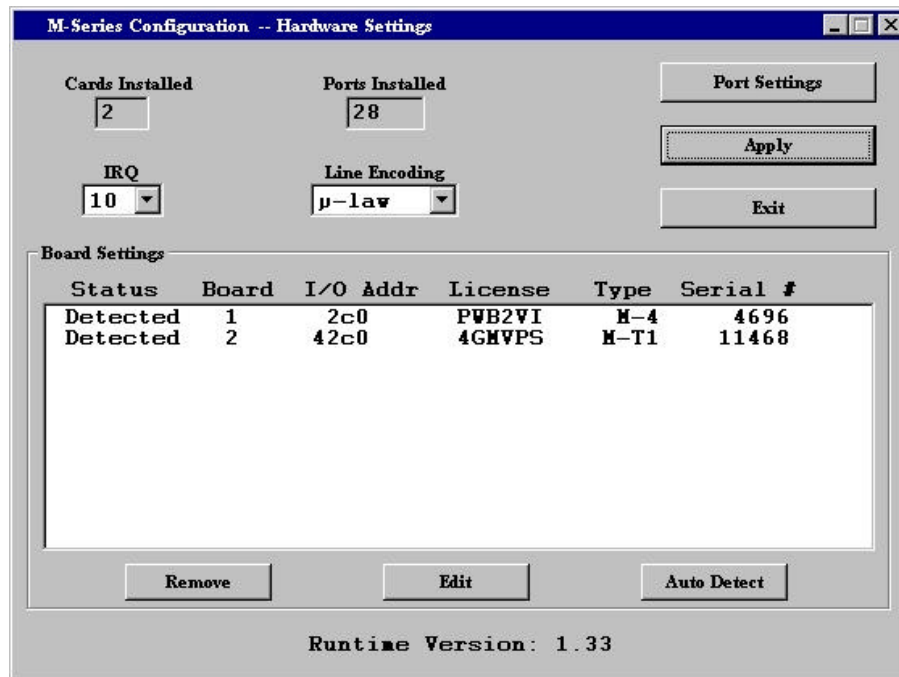
The configuration utility, MConfig, is a program that allows the M-Series board and port settings to be changed or viewed. **MConfig only allows members of the Windows NT Administrator group to change M-Series settings.** The program is automatically started at the end of the install process and may be subsequently started either by:

- 1) clicking on the MConfig icon in the *PowerFax M-Series Runtime* program group *or*
- 2) typing MConfig<↵Enter> from a Command Prompt window.

When started, MConfig will proceed to check for the existence of all the required M-Series files, noting those which may be misplaced or missing. After verifying the M-Series installation, MConfig will display the Hardware Settings window.

5.1. Hardware Settings

The Hardware Settings window allows the settings of installed M-Series cards to be viewed and modified.



This window contains the following items:

Cards Installed - The number of M-Series boards installed.

Port Settings - The total number of ports installed.

- IRQ** - A display area that allows selection of an interrupt setting (5, 7, 9, 10, 11, 12, or 15). Ensure that the selected interrupt number is not already being used by other devices in the system. Only one interrupt number is needed for all installed M-Series boards.
- Line Encoding** - A display area that allows selection of either **m-law** (USA and Japan) or **A-law** (Europe).
- Port Settings** - A button that displays the Port Assignments window.
- Apply** - A button that warns of any incorrect settings, records the changes, and makes the new settings available to M-Series applications. All M-Series applications should be stopped before the Apply button is pressed.
- Exit** - A button that exits the program after giving appropriate warning messages about incorrect settings or unapplied changes.
- Auto Detect** - A button that causes MConfig to search the system for installed boards. The I/O address and serial number of each board found will be displayed in the Hardware Settings window.
- Remove** - A button that removes the highlighted board from the list of installed boards.
- Edit** - A button that displays the Board Settings window which allows modification of the settings for the highlighted board.

5.2. Board Settings

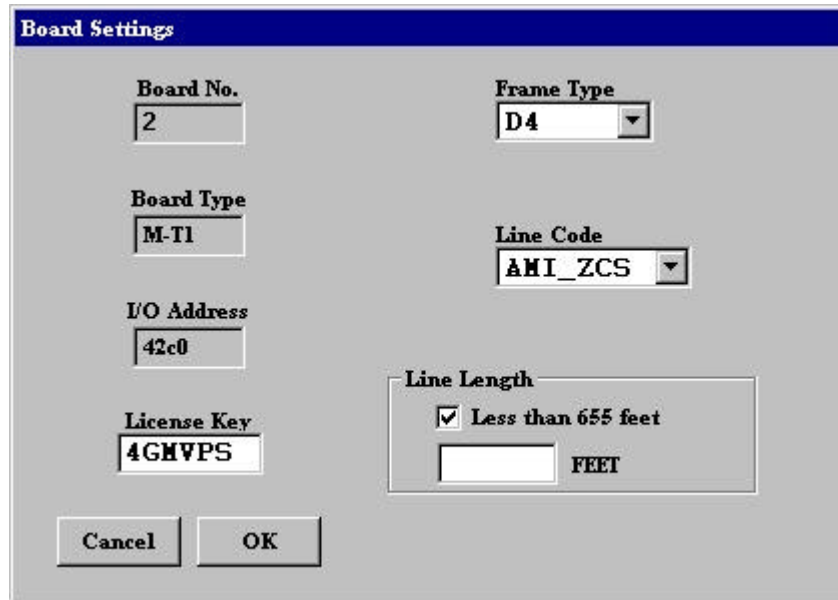
The Board Settings window can be displayed by pressing the Edit button on the Hardware Settings window.



The Board Settings window contains the following items:

- Board No.** - A display area that shows which board's settings are being edited.
- I/O Address** - A display area that shows the I/O address of the board.
- License Key** - The six-character, alphanumeric license key supplied with the M-Series board.

Board Type - A display area that shows the M-Series board type. The board type is only displayed after the board has been successfully configured. The board type will be one of **M-4**, **M-8**, or **M-T1**. If the board is an **M-T1** the Board Settings window will expand to show several T1-specific items.



Frame Type - A display area that allows selection of the T1 framing format. The available choices are D3/D4 framing and Extended SuperFrame (ESF).

Line Code - A display area that allows selection of a zero code suppression algorithm. The available choices are:

PowerFax M-Series Installation

Hardware Settings

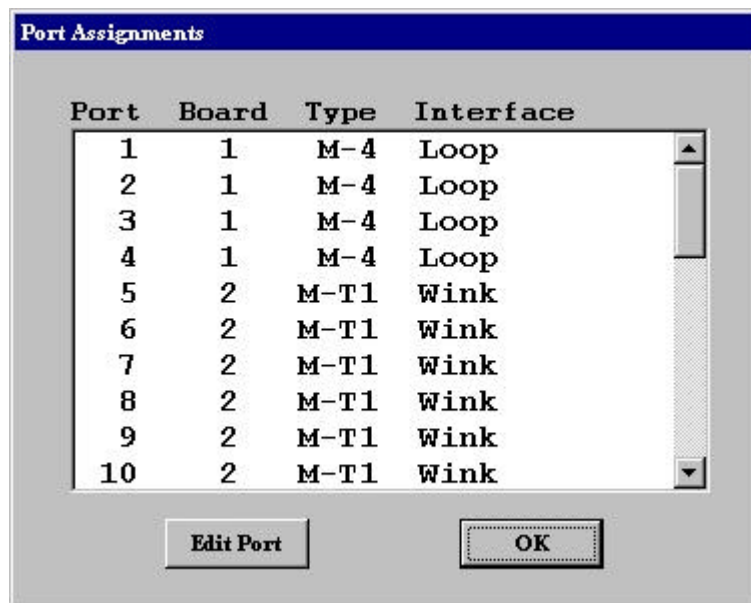
- AMI_ZCS - alternate mark inversion with “jammed bit 7” zero code suppression.
- AMI_GTE - alternate mark inversion with “jammed bit 8” zero code suppression, except in signaling frames when “jammed bit 7” is used if the signaling bit is zero.
- AMI_DDS - alternate mark inversion with zero data byte replaced with 10011000.
- B8ZS - binary 8-zero suppression (uses patterns of bipolar violations to replace zero data bytes; especially useful for clear channel transmission).

Line Length

- This field is used to allow the M-T1 to adjust its pulse shape appropriately when a long cable is used to connect the M-T1 to the network.

5.3. Port Assignments

The **Port Assignments** window is displayed when the **Port Settings** button on the Hardware Settings window is selected. The Port Assignments window allows the modification of each port's current line interface configuration.



Selecting the **Edit Port** button on the Port Assignments window will cause the **Port Interface** window to appear. The Port Interface window allows selection of the line interface protocol assigned to a port. Available options are **loop start**, **DID** (Direct Inward Dial), and **wink start**. A port will only function properly if its line interface hardware supports the protocol assigned to it in the Port Interface window. The default port protocol assignment for the M-4 and the

M-8 is loop start. The default port protocol assignment for the M-T1 is wink start.



PowerFax M-Series Installation Registration and Support

6. Registration and Support

In order to obtain technical support and warranty service you must register your PowerFax M-Series board and software with Commetrex. To register you must contact Commetrex Marketing by phone at 770-449-7775 ext. 370, or by fax at 770-242-7353, or via email at marketing@commetrex.com. Please be prepared to supply proof of purchase, your contact information and the serial number(s) of the boards purchased.

7. Compliance Statements**7.1. FCC Part 15 Class A Statement**

This board has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his or her own expense.

7.2. FCC Part 68 Statement

This equipment complies with Part 68 of the FCC rules. On the backside of this equipment is a label that contains, among other information, the FCC Registration Number and Ringer Equivalence Number (REN) for this equipment. If requested, provide this information to the telephone company. The REN is useful to determine the quantity of devices you may connect to your telephone line and still have all those devices ring when your number is called.

In most, but not all cases, the sum of the RENs should not exceed (5.0). To be certain of the number of devices you may connect to the line, as determined by the REN, you should call your local telephone company to determine the maximum REN for your calling area.

This equipment is registered with the FCC under Part 68 as a component device for use with any AT bus compatible PC. In order

for the FCC registration of this product to be retained, all other products used in conjunction with this product must also be FCC Part 68 registered for use with the host PC. If any of these components are not registered, then you are required to obtain FCC Part 68 registration of the assembled equipment prior to connection to the telephone network. Part 68 registration requires that you maintain this approval and as such are responsible for the following:

- Any component added to your equipment, whether it bears component registration or not, will require a Part 68 compliance evaluation. You may need to test and make modification filing to the FCC before that new component can be used;
- Any modification/update made by a manufacturer to any registered component within your equipment, will require a Part 68 compliance evaluation. You may need to test and make a modification filing to the FCC before that modified equipment can be used.
- If you continue to produce this compound, you are required to comply with the FCC's Continuing Compliance requirements.

Therefore it is recommended that only FCC Part 68 registered devices bearing the 'CN' or 'CE' equipment code as part of the FCC registration number, be used. To determine if your particular components are appropriately approved, look for the FCC registration number on all components and ensure that the equipment code '-CN-' or '-CE-' is part of the number. Refer to the FCC Registration number on this product as an example.

If at any time the ownership of this component device is transferred to someone else (whether independently or as part of a system), supply this manual to the new owner.

If this equipment causes harm to the telephone network, the telephone company may discontinue your service temporarily. But if advance notice isn't practical, you will be notified as soon as possible. You will be advised of your right to file a complaint with the FCC.

Your telephone company may make changes in its facilities, equipment, operations or procedures that could affect the proper operation of your equipment. If they do, you will be given advance notice so as to give you an opportunity to maintain uninterrupted service.

If you experience trouble with this equipment, please contact Commetrex Corporation for warranty/repair information. The telephone company may ask that you disconnect this equipment from the network until the problem has been corrected or until you are sure that the equipment is not malfunctioning.

This board may not be connected to party lines or used on coin service lines provided by the telephone company.

FCC Part 68 Direct Inward Dial Statement

Allowing this equipment to be operated in such a manner as to not provide for proper answer supervision is a violation of part 68 of the FCC's rules. Proper answer supervision is when:

- A. This equipment returns answer supervision to the PSTN when DID calls are:
 - Answered by the called station
 - Answered by the attendant
 - Routed to a recorded announcement that can be administered by the CPE user
 - Routed to a dial prompt

- B. This equipment returns answer supervision on all DID calls forwarded to the PSTN. Permissible exceptions are:
 - A call is unanswered
 - A busy tone is received
 - A reorder tone is received

8. License and Warranty

PowerFax[®] M-Series[™] License Agreement and Warranty

THIS LEGAL DOCUMENT IS AN AGREEMENT BETWEEN YOU, THE ORIGINAL PURCHASER, AND COMMETREX CORPORATION ("Commetrex"). BY INSTALLING THIS POWERFAX M-SERIES BOARD YOU ARE AGREEING TO BECOME BOUND BY THE TERMS OF THIS AGREEMENT.

- 1. LICENSE** - Licensee may use a single copy of this software on a single computer at any one time. Licensee may make a copy of the Software as required in support of Licensee's use of the Software in the reasonable performance of Licensee's normal business.
- 2. RESTRICTIONS** - Licensee may not reverse compile, reverse engineer or reverse assemble the Software.
- 3. WARRANTIES** - Commetrex warrants the diskette on which the Software is furnished to be free from defects in materials or workmanship under normal use for a period of ninety (90) days from the date of purchase by the Licensee. Commetrex does not warrant that the PowerFax M-Series Board (BOARD) or Software will meet Licensee's requirements or that the operation of the Software will be uninterrupted or error free. Commetrex warrants the BOARD to be free from defects in materials or workmanship under normal use for a period of seven (7) years from the date of purchase by the Licensee.
- 4. REMEDIES** - If, during the warranty period, a defect in the Software diskette or BOARD occurs, Licensee may contact Commetrex Customer Engineering to determine the cause of the failure. Upon determination by Commetrex that the Software or BOARD may be defective, it may be returned to Commetrex, shipping prepaid, and Commetrex will repair or replace it, at Commetrex's option, without charge to Licensee. If Commetrex is unable to deliver

a replacement which is free of defects, Licensee's money will be refunded.

5. LIMITATIONS - In no event will Commetrex be liable to Licensee for any damages, including any lost profits, lost savings, procurement of substitute goods or services, or other incidental or consequential damages even if Commetrex has been advised of the possibility of such damages. Because some states do not allow the exclusion or limitation of incidental or consequential damages the above limitations or exclusions may not apply to you.

6. TERM OF AGREEMENT - This Agreement shall become effective on the date this package is opened and shall terminate on (i) Licensee's discontinued use of the PowerFax M-Series Board or Software or (ii) upon Licensee's violation of all or any part of this Agreement, including but not limited to the non-payment of any license fees or (iii) Licensee's unauthorized release of any portion of the Software or (iv) by your terminating it at any time by destroying the Software together with all copies in any form.

YOU MAY NOT COPY, MODIFY OR TRANSFER THE SOFTWARE OR ANY COPY IN WHOLE OR IN PART, EXCEPT AS EXPRESSLY PERMITTED IN THIS AGREEMENT. IF YOU TRANSFER POSSESSION OF ANY COPY OF THE SOFTWARE TO ANOTHER PARTY YOUR LICENSE IS AUTOMATICALLY TERMINATED AND YOU MUST DESTROY ALL COPIES THAT REMAIN IN YOUR POSSESSION.

THIS LIMITED WARRANTY CONSTITUTES YOUR SOLE AND EXCLUSIVE REMEDY AND THE SOLE AND EXCLUSIVE LIABILITY OF LICENSOR AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED,

INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS AND FOR A PARTICULAR PURPOSE, AND ALL OTHER OBLIGATIONS OR LIABILITIES OF COMMETREX. IN NO CASE SHALL COMMETREX BE LIABLE FOR SPECIAL, INCIDENTAL, CONSEQUENTIAL OR INDIRECT DAMAGES. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS AND YOU MAY HAVE OTHER RIGHTS THAT VARY FROM STATE TO STATE. SOME STATES DO NOT ALLOW THE LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU.