



6400 Flying Cloud Drive
Eden Prairie, MN 55344
(6 12) 943-9020

DigiBoard GmbH
Domkloster 1
50667 **Köln**
Germany
+49 221 920520



Software Manual



LAN Distance Driver
for
DigiBoard Intelligent Asynchronous
Serial Communications Systems

92000181A

DigiBoard® is a registered trademark of Digi International Inc. **DigiWARE™, C/X™, C/CON-16™, Xem™, PC/Xem™, EISA/Xem™, MC/Xem™, PORTS/16em™, PORTS/8em™, PORTS/8emp™, PC/8e™, PC/4e™, PC/2e™, MC/8e™, MC/4e™, MC/2e™, PC/16i™, PC/8i™, MC/8i™** and **MC/4i™** are trademarks of Digi International Inc. All other brand and product names are the trademarks of their respective holders.

©Digi International Inc. 1994
All Rights Reserved

Information in this document is subject to change without notice and does not represent a commitment on the part of DigiBoard.

DigiBoard provides this document “as is”, without warranty of any kind, either expressed or implied, including, but not limited to, the particular purpose. DigiBoard may make improvements and/or changes in this manual or in the product(s) and/or the program(s) described in this manual at any time.

This product could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes may be incorporated in new editions of the publication.

Digi International Inc.,

d. b. a. DigiBoard

6400 Flying Cloud Drive
Eden Prairie, MN 55344

Phone (612) 943-9020

FAX (612) 943-5398

BBS (612) 943-0812

DigiBoard GmbH


Domkloster 1
50667 Köln
Germany

Phone +49 221 920520

FAX +49 221 9205210

BBS +49 221 9205211

Table of Contents

 Introduction	4
Hardware Installation.....	5
Software Installation	6
Updating CONFIG.SYS	9
Editing the Command Line.....	10
Global Parameters	10
Per-Card Parameters	11
Command Line Examples.....	13
Loading the Drivers	15
DGAFGP.OS2	15
DGANDIS.OS2	16
Error Messages.....	17
DGAFGP Errors.....	17
CONFIG.SYS Errors	17
Hardware Errors.....	18
FEP and BIOS Binary File Problems	18
DigiBoard Initialization Errors.....	19
OS/2 System Errors	19
Possible Hardware Problems	19
DGANDIS.OS2 Errors	20
Driver Registration Problems	20
PROTOCOL.INI Problems.....	20
OS/2 System Errors	21

Introduction

The DigiWARE LAN Distance device driver facilitates operation of **DigiBoard** intelligent serial communications products in LAN Distance servers and **remo**l workstations.


The device driver supports DigiBoard **PC/Xe**, **PC/Xi**, **MC/Xe** and **MC/Xi** boards, plus **C/X** and **Xem** systems in ISA, EISA and Micro Channel computer:

Important!

Software changes more rapidly than printed documentation can keep up.

Check the release notes (on the DigiWARE diskette) for updated information not available at the time this manual was printed.

Hardware Installation



Install the DigiBoard hardware according to the instructions in the *Installation Guide* for your board.

Choose a memory address and I/O port that does not conflict with other devices in your system. ISA and Micro Channel boards may be addressed up to the 16 megabyte boundary if your system does not have more than 12 megabytes of RAM installed (some memory cache controllers cause problems with boards installed above the 1 megabyte boundary-see “Memory Conflicts” in the *Installation Guide* for your board). On EISA machines, you may select memory addresses through the fourth gigabyte range.

Micro Channel users should beware of configuring I/O ports in the 100h-10fh range; the IBM configuration program will let you do this, but these addresses may be in conflict with the POS I/O space.

All boards may have their IRQ (Interrupt Request) disabled; the LAN Distance device driver does not use IRQs.



Software Installation

Begin the installation procedure by running the installation program on the DigiWARE diskette.

1. Insert the diskette into a floppy drive on your system and make that drive the current drive.
2. Enter the following command:

INSTALL *LAN_Distance_Drive* [*CONFIG.SYS_Drive*]

where *LAN-Distance-Drive* is the drive on which LAN Distance is installed, and *CONFIG.SYS_Drive* is the drive containing **CONFIG. SYS**, if different from the LAN Distance drive.

EXAMPLE: If LAN Distance and **CONFIG. SYS** are both on your C: drive, the command will be:

INSTALL C:

Several files will be copied to your **\IBMCOM\MACS** directory. These are:

DGAFGP.OS2, DGPOLLER.EXE and *.BIN

Next, **INSTALL.CMD** will add several lines to **CONFIG. SYS**. Note that most of the lines are “commented out” (“rem . .”). Later in the installation you will uncomment and edit the line that most closely corresponds to your board.

3. Finally, **INSTALL. CMD** will run LAPS to install the DigiBoard MAC driver so that the DigiBoard ports become available to LAN Distance. When LAPS is run, you will see a screen with the following options:

Install	Configure	Remove	Exit	Help
----------------	------------------	---------------	-------------	-------------

Click on the “**Install**” button. You will see a box titled “**Install Additional Network Drivers**”, and a dialog box requesting the source drive. Enter the drive letter for the diskette drive containing the DigiWARE diskette.

More files will be transferred and you will eventually be notified that the installation is complete and that LAPS has successfully installed the “DigiBoard Communication Ports”.

4. Click on “OK”. You will be returned to the main LAPS screen.
5. Click on “**Exit**”. You will see a dialog box titled “**CONFIG.SYS Updates**”. Click on “**Exit**” again to exit the LAPS program.

Now it is necessary to configure LAN Distance for the DigiBoard ports you wish to use. The configuration process is virtually the same for a server or a remote workstation.

6. Start LAN Distance.

7. From the **“LAN Distance - Workstations”** box:

Select **“Selected”** from the menu bar;

Select **“Open As ->”**;

Select **“Settings”**.

8. From the **“MyWorkstation - Settings”** box:

Select the **“Ports”** tab;

Press the **“Add”** button;

Highlight **“OEM DigiBoard Communication Ports”**.

If this option is not shown, you have not correctly installed the DigiBoard driver using LAPS (Steps 3-5, above). Go to an OS/2 command prompt and run **\ibmcom\laps**, or click on the OS/2

System icon and run LAPS from the System Setup folder to install LAPS support for the DigiBoard product from the **DigiWARE** diskette.

Push the **“OK”** button.

9. From the **“DigiBoard Communications Ports - Settings”** box:

Press the **“LAPS”** button.

You should now be in the Configure Workstation box in the LAN Adapter and Protocol Support Settings window.

10. Scroll down the **“Network Adapters”** list and highlight the **“DigiBoard Communications Ports”** selection.

11. Press the Add button. Verify that the **“DigiBoard Communication Ports...”** entry has been added and highlighted in the **“Current Configuration”** window.

12. Press the **“Edit”** button. Enter a new port name if the default name **DIG11** is not to your liking. If there is an error with the name you choose, LAPS will warn you. Be sure to use different names if adding more than one port. Press the **“OK”** button when you are finished.

Repeat Steps 10-12 for each DigiBoard port you wish to add.

13. Press "OK" to exit LAPS.

NOTE: If you are configuring a LAN Distance server, you may get an error message upon attempting to exit LAPS. The message will say something like:

"All LAN Adapter and Protocol Support combinations in the Current Configuration must contain at least one protocol driver".

Click on OK. The problem most likely lies with the entry that looks like this:

```
LAN Distance Logical Adapter . . . .  
[BRIDGEFH] . . . .  
1 - [SR_BRIDGE]
```

Highlight these lines one at a time, beginning with the last, and click on "Remove". These are entries in the \IBMCOM\PROTOCOL.IN1 file that are inserted by LAN Distance, but apparently not liked by LAPS. Removing them will cause no harm because LAN Distance will reinsert them before you exit. Now click on "OK" to exit LAPS.

14. You should now be back in the "DigiBoard Communications Ports - Settings" box. Double click on the box's upper left-hand corner to close it.

You should now be back in the "MyWorkStation - Settings" box, and should see the "DigiBoard Communications Ports" entry in the "Configured Ports" window. If this is the case, you have successfully added your DigiBoard ports.

You are now ready to customize the LAN Distance configuration for your individual needs. This will include assigning modems to each port you added, as well as setting up "Dial" and "Answer" parameters and making "Phone Book" entries using the "MyWorkstation - Setting" tabs. Refer to your LAN Distance documentation for information on these topics.

15. Now shut down LAN Distance to save the settings just made.

Updating CONFIG.SYS

Next you need to edit **CONFIG.SYS** to indicate the type of DigiBoard products you are installing. Use your favorite text editor to bring up the file. You will see that the following lines have been added near the bottom of the file:

```
rem DigiBoard PC/16e, PC & MC/8e, 4e, 2e and PC/Xi
rem DEVICE=C:\IBMCOM\MACS\DGAFGP.OS2 /M:D0000 /P:320

rem DigiBoard MC/16i, MC/8i, MC/4i
rem DEVICE=C:\IBMCOM\MACS\DGAFGP.OS2 /M:D0000 /P:F1F0

rem DigiBoard PC/Xem, MC/Xem
rem DEVICE=C:\IBMCOM\MACS\DGAFGP.OS2 /M:D0000 /P:324 1!:P

rem DigiBoard EISA/Xem, slot 3
rem DEVICE=C:\IBMCOM\MACS\DGAFGP.OS2 /M:D0000 /P:3005 T:P

rem DigiBoard ISA C/X, 1 concentrator
rem DEVICE=C:\IBMCOM\MACS\DGAFGP.OS2 /M:D0000 /P:328 T:I10

rem DigiBoard EISA C/X. 1 concentrator, slot 3
rem DEVICE=C:\IBMCOM\MACS\DGAFGP.OS2 /M:D0000 /P:3005 T:E10

rem DigiBoard Micro Channel C/X, 1 concentrator
rem DEVICE=C:\IBMCOM\MACS\DGAFGP.OS2 /M:D0000 /P:3005 T:M10

RUN=C:\IBMCOM\DG POLLER.EXE
DEVICE=C:\IBMCOM\MACS\DGANDIS.OS2
```

The lines above represent some of the more common installation configurations. One of them may be exactly right for your installation, but you will probably need to find one that's close to your setup and tune it to your exact configuration.

If you find a line that's already perfect, just delete the "**rem**" at the beginning of the line to make it visible to the system. You may also delete the other examples if you wish.

Editing the Command Line

All DigiBoard intelligent asynchronous serial communications boards must be installed from a single command line which contains complete setup information for each board. The format of the command line is:

DEVICE= [drive:] [path] **DGAFGP.OS2** [/a:a]/m:mem/p:port/t:card
[, /m:mem /p:port /t:card]
[, ...]

The above command must be entered on a single command line in the **CONFIG. SYS** file; this line may be up to 255 characters long.

The command line consists of one optional global parameter (affects all boards) and a number of per-card parameters which are required for each board to be supported by the device driver.

Global Parameters

There is currently one global parameter for **DGAFGP . OS2**:

/a:a Initializes all ports to use alternate wiring for the DCD (Data Carrier Detect) signal. This swaps the functions of DCD (Data Carrier Detect) and DSR (Data Set Ready) to make DCD available on an 8-pin RJ-45 connector. This parameter is necessary only when connecting modems to RJ-45 equipped DigiBoard products. See the Connecting Peripherals section of the **Installation Guide** for your board for more details.

Per-Card Parameters

The remaining three parameters are per-card parameters, and are used to inform the driver of the type of board and where it is to be addressed in the host's I/O and memory buses. These parameters are mandatory, and must be given for each board. The per-card parameters must be given in complete sets, and the sets must be separated by commas.

/M:mem Dual ported memory starting address. This is the full 32 bit hexadecimal address of the beginning of the board's dual ported memory.

/M:D0000

Sets dual-ported memory start address to 0D0000h (in the BIOS expansion area between 640K and 1 megabyte).

/M:E80000

Sets start address of E80000h (in the fifteenth megabyte).

ISA and EISA boards may all share the same memory start address. Micro Channel boards must each have unique memory addresses.

/P:port Defines the I/O port address for the card.

/P:300

Board is addressed at 300h.

/P:2005

EISA board (EISA C/X or EISA/Xem host adapter) is in slot 2 (EISA I/O addresses are four digits: the slot number, followed by 005). When installing an ISA board (PC/Xe, ISA C/X host adapter, etc.), use the three digit address as set on the board's DIP switches).

/T: card Defines the host adapter type for C/X and Xem systems. Not used for PC/Xe, PC/Xi, MC/Xe or MC/Xi boards. Possible values for **card** are:

I ISA C/X

E EISA C/X

M MC C/X

P Xem (PC/Xem, EISA/Xem or MC/Xem)

The C/X designators (I, E and **M**) must be followed by a two digit number which describes the number and arrangement of concentrators on each host adapter channel. If the concentrators are connected to the host adapter via a dial-up or leased line (remote concentrators), each of the two digits must be followed by a parameter, enclosed in parentheses, specifying the synchronous

communications mode to be used for that line. See the table on the next page for a list of available synchronous communications modes.

/t:i10

ISA C/X, one local concentrator on line 1 only.

/t:e11

EISA C/X, one local concentrator on each of lines 1 and 2.

/t:m21

MC C/X, two local concentrators on line 1 and 1 on line 2.

/t:e12

EISA C/X, one local concentrator on line 1, and two on line 2.

/t:i22

ISA C/X, two local concentrators on each of lines 1 and 2.

/t:p

PC/Xem, MC/Xem or EISA Xem

/t:i2(21)3(27)

ISA C/X, two remote concentrators on line 1, and three remote concentrators on line 2.

The concentrators on line 1 will use mode #21 (76,800 baud, g-wire, external clock) to communicate with the host adapter, and the concentrators on line 2 will use mode #27 (614,400 baud, g-wire, internal clock). See the table on the next page for a list of synchronous communications modes.

8-Wire Internal Clock		8-Wire External Clock		4-Wire Self Clock	
Mode	Baud	Mode	Baud	Mode	Baud
0	115K	15	2400	1	230K
3	2400	16	4800	2	460K
4	4800	17	9600		
5	9600	18	19.2K		
6	19.2K	19	38.4K		
7	38.4K	20	57.6K		
8	57.6K	21	76.8K		
9	76.8K	22	115K		
10	115K	23	230K		
11	230K	24	460K		
12	460K	25	920K		
13	920K	26	1.2M		
14	1.2M				
		29	614K		
		30	737K		
27	614K				
28	737K				

Command Line Examples

The following examples start out with just the minimum to install a board. After locating an example for your type of board, read the rest of the examples for optional situations that may be appropriate to your application. Default options will be altered by LAN Distance.

Example 1: One PC/Xe (or PC/Xi) at I/O port 220h, memory address D0000h.

DEVICE=C:\IBMCOM\MACS\DGAFGP.OS2 /m:d0000 /p:220

Example 2: One MC/Xi at I/O port F1F0h, memory address FC0000h.

DEVICE=C:\IBMCOM\MACS\DGAFGP.OS2 /m:FC0000 /p:F1F0

Example 3: Two board installation with Ah-Pin optional global parameter.
Two PC/Xe or PC/Xi boards at I/O ports 320h and 300h, with dual-ported memory of both starting at D0000h.

DEVICE=C:\IBMCOM\MACS\DGAFGP.OS2 /a:a /m:D0000 /p:320, /m:D0000 /p:300

(Note that the above must all appear on one line in **CONFIG.SYS**)

Example 4: Two board installation with Alt-Pin optional global parameter. One MC/Xe and one MC/Xi boards at I/O ports F1F0h and 320h, with different (can't be the same) dual-ported memory addresses. Alt-Pin enabled.

DEVICE=C:\IBMCOM\MACS\DGAFGP.OS2 /a:a /m:C0000 /p:F1F0, /m:C8000 /p:300

(Note that the above must all appear on one line in **CONFIG.SYS**)

Example 5: One PC/Xem at I/O port 224h, memory start address C8000h;

DEVICE=C:\IBMCOM\MACS\DGAFGP.OS2 /m:C8000 /p:224 /t:p

Example 6: One ISA C/X host adapter at I/O port 228h, memory address D0000h, with one concentrator on line 1 and two on line 2.

DEVICE=C:\IBMCOM\MACS\DGAFGP.OS2 /m:d0000 /p:228 /t:i12

Example 7: EISA C/X with a remote concentrator via an RS-232 synchronous modem. One EISA C/X host adapter in slot 3, memory address D8000h, with two local concentrators on line 1 and one remote concentrator at 9600 baud and external clocking on line 2.

DEVICE=C:\IBMCOM\MACS\DGAFGP.OS2 /m:d8000 /p:3005 /t:e21(17)

Example 8: One MC C/X host adapter at I/O port 228h, memory address D8000h, with one concentrator on line 1 and one concentrator on line 2; one MC/Xem at I/O Port 304h, memory address D0000h. Ah-Pin enabled

DEVICE=C:\IBMCOM\MACS\DGAFGP.OS2 /a:a /m:d8000 /p:228 /t:m11, /m:d0000 /p:304 t:p

(Note that the above must all appear on one line in **CONFIG.SYS**)

Loading the Drivers

The DigiBoard LAN Distance driver package is made up of two drivers. One driver interacts with the DigiBoard hardware (**DGAFGP.OS2**) and the other Interacts with the protocol driver (**DGANDIS.OS2**).

DGAFGP.OS2

When this driver loads, it attempts to find the DigiBoard hardware specified in the `DEVICE=` line in **CONFIG.SYS**, initialize it, and check for basic functionality. When the driver loads successfully, the following banner message will be displayed:

```
DigiBoard  ANDIS  Intelligent Board Driver          v 1.0.0
DGAFGP.OS2  Copyright (C) 1994
All Rights Reserved.
```

```
RESTRICTED RIGHTS LEGEND:
Use, duplication, or disclosure by the Government is
subject to restrictions set forth in sub-paragraph (c)
(1) (ii) of the Rights in Technical Data and Computer
Software clause at DFARS 252.227-7013.
```

```
Digi International Inc. U/b/a DigiBoard, 6400 Flying
Cloud Drive, Eden Prairie, MN 55344
```

Board Type	I/O Address	Memory Address	Channels
PC/Xem	324	0x000D0000	16

If any problems are encountered as the driver loads, error messages will be posted to alert you to the condition and OS/2 should stop the boot process and prompt you to continue.

DGANDIS.OS2

When this driver loads, it determines what LAN Distance ports you have configured through LAPS, and registers these with the protocol driver. The driver internal tables and memory are also allocated and initialized. The banner shown below is displayed when the driver loads successfully:



```
DigiBoard Intelligent Board ANDIS MAC Driver    v 1.0.0
DGANDIS.OS2  Copyright (C) 1994
All Rights Reserved.
```

```
Installing DGANDIS
Initializing port: DIG11
Initializing port: DIG12
DGANDIS is installed
```

If the driver encounters an error while loading, an error message will be displayed.



Error Messages

There are two sources of error messages: **DGAFGP.OS2**, and **DGANDIS.OS2**. The error messages will appear while each driver is loading and initializing.

DGAFGP Errors

These errors indicate possible software configuration errors, or hardware failure.

CONFIG.SYS Errors

Incomplete specification: need IO port AND memory for each board.
Unexpected character:
Too many boards: Only 4 Intelligent boards supported.
Unknown value assigned
Multiple IO port specifications: (/p:_)
Duplicate IO port address specifications: (/p:_)
Invalid IO port address specification: (/p:_)
Multiple memory address specifications: (/m:_)
Invalid memory address specification: (/m:_)
Invalid board type code: (/t:_)
No DigiBoards Specified on command line
Invalid Command Line Arguments
Zero DigiBoards Configured
Too many channels: maxi- = 256

Cause & Remedy

The driver has encountered the specified error as it was parsing the **CONFIG.SYS** "DEVICE=" line. You should check your **CONFIG.SYS** for accuracy.

Hardware Errors

```
Bailed to RESET the X/O PORT
I/O Port Not Responding
Failed Shared Memory Test near OFFSET: 0xXXXX
Failed to write to shared memory
```



Cause & Remedy

There is a memory or I/O port conflict with an other device in your system or you have a defective board. Try a different I/O port or memory address.

FEP and BIOS Binary File Problems


```
Invalid DATA FILES DIRECTORY
Failed to locate data files
Failed to STAT file
```

Cause & Remedy

These messages usually occur while the driver is attempting to locate and open the *.bin files for download to the DigiBoard card. First, make sure that the *.bin files on your driver diskette have been copied to the \ **ibmcom\macs** directory. If they are there, you may need to recopy them from the driver diskette in case a file was corrupted. If this fails to remedy the condition, you may need to add another command line argument to your DEVICE= statement in the **CONFIG.SYS** file. The argument is **/f:<path to *.bin files>**. This tells the driver where the files are located. If the errors persist, you may have a conflict with the DigiBoard hardware and your disk controller. Move the DigiBoard to another I/O port and memory address.



DigiBoard Initialization Errors




```
Failed to BOOT the BIOS
Failed to BOOT the uploaded FEPOS
Failed to Read Initialization Information
DigiBoard FEPOS will not execute commands
DigiBoard BIOS Will Not Boot
DigiBoard BIOS Will Not Respond
DigiBoard FBPOS Will Not Boot Unknown Fatal Error
```

Cause & Remedy

These messages usually indicate problems initializing the card's onboard software and are usually the results of a memory conflict with another device in your system, a corrupt *.bin file, or a faulty board. First, recopy the *.bin files from your driver diskette and reboot your system. If this doesn't work, relocate your board to another I/O port and/or memory address. If none of this works, you may have a bad board.

OS/2 System Errors



```
System Cannot Allocate Memory
Driver Failed to hook Timer
System Cannot Allocate Ctx Hook
Failed to make upload FILE memory
```


Cause & Remedy

Chances are your system resources are depleted. Try unloading any unnecessary drivers to see if the problem goes away.

Possible Hardware Problems

```
Zero channels installed.
```

Cause & Remedy



This usually means that the card's on-board code could not locate any ports. Usually you will see this message with the Xem and C/X products when you forget to connect the EBI or concentrators. Check this to see if that may be the case. Otherwise you may have a faulty card.

DGANDIS.OS2 Errors

If this driver encounters an error while loading, one of the following messages will be displayed. Since this driver does not deal directly with the DigiBoard hardware, errors are usually software-related.



Driver Registration Problems

Can not open PROTMAN
PROTMAN returns error on **config** read
Register **portto** **PROTMAN** returns **Failure**
DosDevIOctl Fails on register to **PROTMAN**
PROTMAN does **not support** **PPAT**
PPAT registration **Failed**
DosDevIOctl Failed on **GetPMInfo**

Cause & Remedy

PROTMAN.OS2, the protocol manager, and the driver are having some interaction difficulties. First, check to see that there is a

DEVICE=PROTMAN.OS2

statement is in your **CONFIG.SYS** file. Try recopying the **DGANDIS.OS2** driver from the driver diskette. Also, you may have a wrong version **PROTMAN.OS2**.



PROTOCOL.INI Problems

ProcessKeyWords Failed

Cause & Remedy

Check to see that your **\ibmcom\protocol.ini** file has a "**PORTNAME=**" line under **[DGANDIS_nif]** entry.



OS/2 System Errors

DGANDIS Failed to install

Internal Error

AllocPhysMem Failed

AllocGDT Failed

Phys2GDT Failed

VirtualAddr Failed

AllocSpareGDT Failed

Cause & Remedy

Chances are your system resources are depleted. Try unloading any unnecessary drivers to see if the problem goes away.