IDFI USER'S MANUAL

PIKA TECHNOLOGIES INC.
155 Terence Matthews Crescent
Kanata, Ontario K2M 2A8
Canada

(613)591-1555
(613)591-1488 (fax)©

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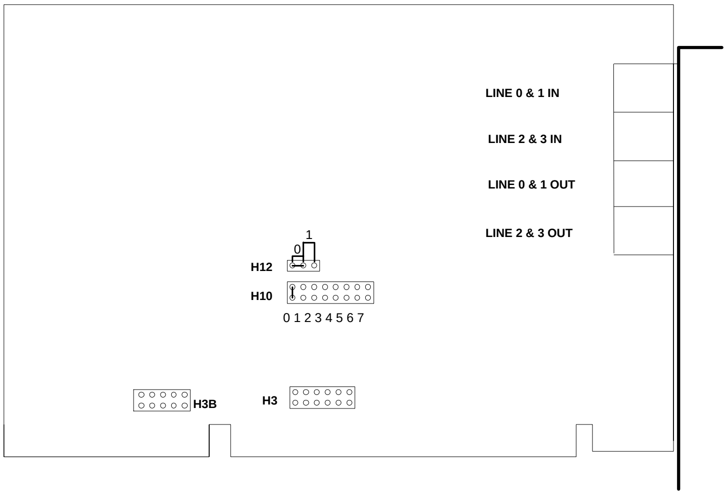
TABLE OF CONTENTS

1.0 HARDWARE

The IdFi card is an XT-height, half-length 8/16-bit card for ISA compatible computers. It is configurable to any one of 16 base addresses and can easily be integrated with existing hardware through the adjustment of a few jumpers. The IdFi occupies 16 I/O addresses which are user selectable, and uses no system memory space or interrupts

1.1 CARD INSTALLATION

The IdFi card can be installed in any 8- or 16-bit slot on any IBM-PC or compatible (including EISA-equipped) computer. Multiple cards can be installed as long as the base addresses are set to different values. Consult the diagram below for jumper locations:

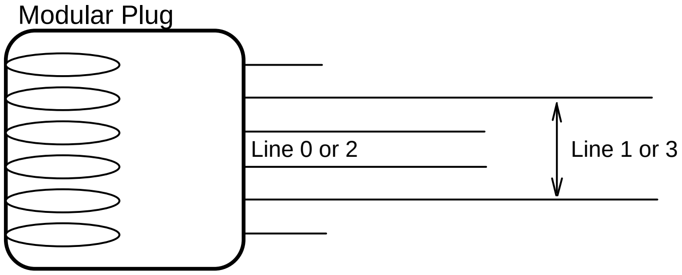


The base address of the card is set using H12 and H10 as per the following table:

H10 Jumper Position	H12 Position 0	H12 Position 1
0	200 (factory default)	600
1	220	620
2	240	640
3	260	660
4	280	680
5	2A0	6A0
6	2C0	6C0
7	2E0	6E0

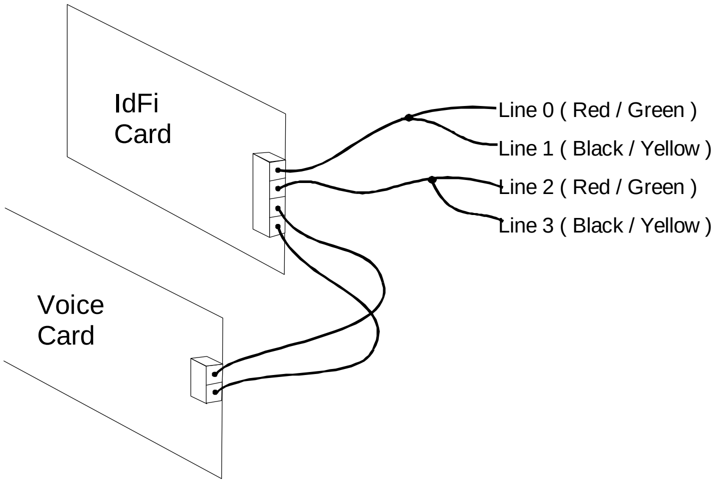
1.2 TELEPHONE SYSTEM INTEGRATION

The IdFi card is connected to the phone line via several standard modular phone sockets. Each socket services two telephone lines. On any given plug, the red/green (inner) wire pair represents the lower line number of the two lines and the black/yellow (outer) pair represents the higher line number. Thus the inner pair on the first modular socket from the top is the input to line 0 of the card and the outer pair on the fourth socket from the top is the output from line 3 of the card. Consult the diagram below for clarification.

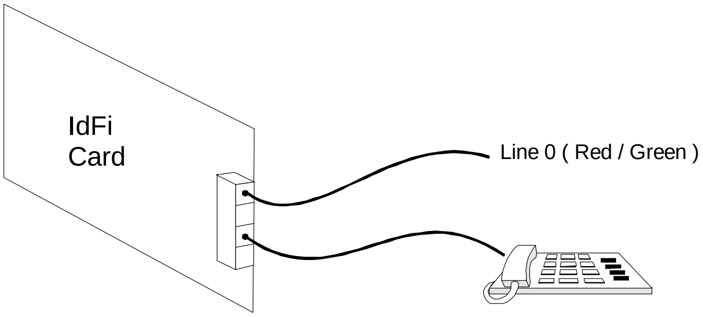


To integrate the IdFi card to a phone system, a pair of lines from the network should be placed on one of the inputs of the card and then that same pair of lines should be connected from the corresponding card output to the rest of the telephone system. Thus, two lines from the network would be connected to the first modular socket from the top and would then continue to the rest of the telephone system from the third modular socket from the top of the card.

The following figures illustrate connection examples.



VOICE CARD APPLICATION (4 LINES)



TELEPHONE APPLICATION (1 LINE)

2.0 MS-DOS SOFTWARE

The powerful MS-DOS TSR driver for the IdFi card contains 3 interfaces. The user can choose the one that best suits his/her needs when loading the driver. The default mode is a standard BIOS serial communications interface (**INT14h**). The second uses the same interface but creates a COM port for each channel installed (Multiple COM port mode). The third one supplies a callback function interface for IdFi-supporting applications.

The INT14h default mode and the Callback INT2Fh mode feed Caller-ID information to underlying applications. They do so using a well-defined format which alleviates the application from having to decode the many different Caller-ID message formats available. The INT14h Multiple COM port mode feeds the application with the information coming directly from the telephone line, leaving it to the application to decode all the messages.

2.1 LOADING THE SOFTWARE

The TSR driver is contained within the program **IDFI.EXE** supplied on the distribution diskette. IDFI.EXE has the following command line format:

```
IDFI -p<address> [-p<address> . -<mode>. . .]
```

where

<address> is the base address (in hex) of the card(s) installed on the system.

<mode> is the mode to be used with the application.

Valid modes are

- **c** for the Callback mode interface (MS-DOS Multiplex Services , INT2Fh)
- **m** for the Multiple COM port mode using the INT14 interface.
- **w** to install the Windows driver.

When there is no mode option on the IDFI.EXE command line, the default INT14 Serial interface for MS-DOS is activated.

Thus typing:

```
IDFI -p200 -p220 -p240
```

will load the driver to communicate with cards at the base addresses 200, 220 and 240 with the default INT14 interface. **It is vital that the base addresses be correctly specified on the command line!** Behavior of the driver is undefined if there is no card at a given base address.

In addition to the driver, the files **IDFI.A07** and **PDOWN.A07** must be in the current directory to allow the driver to load.

Note that the process of initializing the card is fairly slow. A "percentage done" counter is displayed by the driver as it executes to allow the user to monitor the progress of initialization.

Once the driver returns to the MS-DOS command line, the IdFi is active and looking for Caller-ID messages.

2.2 USING THE INT 14H DEFAULT INTERFACE

IDFI.EXE intercepts the BIOS INT 14h handler and pretends to be "COM5" (device 4) when the driver is being used in the default INT14 mode. Any calls for COM1, COM2, COM3 and COM4 are passed transparently to the BIOS (or FOSSIL or whatever other communications handlers are hooked onto INT 14h). Calls for COM5 services are handled by the IdFi driver.

Initialization Function (AH = 0)

This function does not affect the IdFi software or hardware in any way. All returned status bits are zeroed except for the data ready bit. If there is any data in the IdFi's queue, the data ready bit will be set.

Transmit Character Function (AH = 1)

This function will do nothing and is considered an error. If an underlying application tries to send a character to the IdFi driver, it will simply set the time-out error bit in the returned status. If there is any data in the IdFi's queue, the data ready bit will be set.

Receive Character Function (AH = 2)

This function will return the next character in the IdFi's queue if there is any data to retrieve. Further, if there is more data to receive after pulling the current piece, the data ready bit will be set. If there is no character waiting, the time-out error bit will be set to flag the error condition.

Get Serial Status Function (AH = 3)

This function will return with all status bits cleared with the possible exception of the data ready bit. If there is data waiting in the IdFi's queue, the data ready bit will be set.

2.3 USING THE INT 14H MULTIPLE COM PORT INTERFACE

IDFI.EXE used with the command line -m provides the Multiple COM port interface to the IdFi driver. **IDFI.EXE** intercepts the BIOS INT 14h handler as with the default INT14h interface. There are two differences with the previous mode:

Each line on the Caller ID boards will be assigned one “COM” port by the Multiple COM port interface. COM5 (device 4) will be the first line of the card with the lowest address, the second line being COM6 and so on up to the number of lines installed in the system. Any calls for COM1, COM2, COM3 and COM4 are passed transparently to the BIOS (or FOSSIL or whatever other communications handlers are hooked onto INT 14h). Call services for the COM ports (COM5, line 0, COM6, line 1 up to the number of lines installed.) are handled by the IdFi driver following the default INT14h mode interface.

The other difference is that the information passed to the application will be in a binary format. It comes directly from the line and represents exactly the information provided by the telephone company. The application must do its own decoding to extract useful information.

Initialization Function (AH = 0)

This function does not affect the IdFi software or hardware in any way. All returned status bits are zeroed except for the data ready bit. If there is any data in the IdFi's queue, the data ready bit will be set.

Transmit Character Function (AH = 1)

This function will do nothing and is considered an error. If an underlying application tries to send a character to the IdFi driver, it will simply set the time-out error bit in the returned status. If there is any data in the IdFi's queue, the data ready bit will be set.

Receive Character Function (AH = 2)

This function will return the next character in the IdFi's queue if there is any data to retrieve. Further, if there is more data to receive after pulling the current piece, the data ready bit will be set. If there is no character waiting, the time-out error bit will be set to flag the error condition.

Get Serial Status Function (AH = 3)

This function will return with all status bits cleared with the possible exception of the data ready bit. If there is data waiting in the IdFi's queue, the data ready bit will be set.

2.4 USING THE CALLBACK INTERFACE

IDFI.EXE used with the command line -**c** provides the callback interface to the IdFi driver. To access this functionality, the following protocol through **INT 2Fh** is used:

Function 0 -- Register Application

Call With

```
AX    = 0CDCDh
BX    = 0000h
DS:SI = pointer to signature string
"PIKA IDFI"
ES:DI = pointer to callback function
(detailed below)
```

Returns With

```
AX    = 0CDCDh
BX    = 0FFFFh
DS:SI = pointer to signature string
"Registered"
```

****** Important Note:** All signature strings must be NULL terminated! ********

This function registers an application's callback entry point with the IdFi driver. After this function call is issued, the IdFi driver will call the application's callback function whenever it has a CLID message available. When it makes its call, it will have the following register values:

```
AX    = 0CDCDh
BX    = 0FFFEh
CX    = Message length in bytes
DS:SI = Far pointer to message buffer
```

The callback function **must** copy the supplied message into its own RAM space as the IdFi driver will assume that the buffer is free when it returns from the callback function. Since the callback function is called asynchronously, it may not make use of any MS-DOS or BIOS services unless it has taken appropriate precautions.

Function 1 -- De-register Application

Call With

```
AX    = 0CDCDh
BX    = 0001h
DS:SI = pointer to signature string
"PIKA IDFI"
```

Returns With

```
AX    = 0CDCDh
BX    = 0FFFEh
DS:SI = pointer to signature string
"De-registered"
```

***** Important Note:** *All signature strings must be NULL terminated!* *****

This function de-registers the application's callback entry point. It must be called before the application can terminate. **Failure to de-register the application will result in unpredictable (and possibly destructive) system performance.**

2.5 RETURNED DATA FORMAT

The IdFi driver returns information to the application in the following 72-byte format, one byte at a time when using the default **INT 14h** mode or with a pointer to the entire block when using the callback mode functions. Note that all data is in ASCII printable format.

byte 0	board number from 0 to F (lowest address = 0)
byte 1	line number on board from 0 to 3
bytes 2-6	spaces
bytes 7-11	date (mm/dd)
bytes 12-16	spaces
bytes 17-21	time (hh:mm)
byte 22	space
bytes 23-24	AM or PM
bytes 25-29	spaces
bytes 30-43	telephone number (left filled with spaces), **or** OUT OF AREA (left filled with spaces), **or** PRIVATE (left filled with spaces)
bytes 44-48	spaces
byte 49	0 if call is local or 1 if call is long distance. If the card receives a single message format, the length of the phone number will determine if it is a long distance call.
bytes 50-54	spaces
bytes 55-69	caller name (left filled with spaces)
byte 70	ASCII carriage return
byte 71	ASCII line feed

Any fields which are not valid or which have no information supplied are filled with spaces (in keeping with the printable nature of the returned data).

2.6 SAMPLE SOFTWARE

The sample program file **TEST14.EXE** and its source file (for Borland C/C++ compilers) **TEST14.C** is included as a demonstration of how the IdFi driver interfaces with **INT 14h** applications using the default mode. This application also writes the information it gets from the driver into a file called TEST14.LOG.

The sample program file **TEST14M.EXE** and its source file (for Borland C/C++ compilers) **TEST14M.C** is included as a demonstration of how the IdFi driver interfaces with **INT 14h** applications using the Multiple COM port mode. As with the TEST14.EXE sample program, TEST14M.EXE also writes the information it gets from the driver into a file. This file is called TEST14M.LOG. Since the Multiple COM port mode doesn't convert and format the information in ASCII characters, the information contained in the TEST14M.LOG is in a binary format. You will need an editor that supports binary format to view the content of it.

The sample program file **TEST2F.EXE** and its source file (for Borland C/C++ compilers) **TEST2F.C** is included as a demonstration of how the IdFi driver interfaces with callback functions.

All of these applications will be updated as functionality is added to the IdFi card.

3.0 WINDOWS SOFTWARE

3.1 PIKA IDFI DDE SERVER OVERVIEW

The IdFi DDE Server is a Windows application that interacts with the Pika IdFi card to provide caller identification via DDE or Windows messages. It will allow applications written in macro languages such as Microsoft Excel and Microsoft Word for Windows to receive caller id without requiring special libraries. It will also allow applications written in C or other high level languages to receive caller id data through a windows message, without having to worry about the complexities of DDE messaging.

3.2 PIKA IDFI DRIVER OPERATION

The IdFi Windows driver consists of two parts, a DLL and the DDE Server. The DLL is used to allow applications to register with the IdFi server without having to use DDE messaging. Applications can receive caller id information through their window procedure by registering with the DLL, or they can register with the DDE Server to receive DDE messages. The application is notified using the appropriate message type whenever new caller id information is received by the IdFi card.

To inform the DDE server about the addresses used by the cards, you must enter them into the PCLID.INI file. This file is then placed this file in your Windows directory. The format of the PCLID.INI file is the following:

```
[ports]
port1 = (address of first card in hexadecimal format)
port2 = (address of second card in hexadecimal format)
```

Note that the DDE Server will not be able to detect that the IdFi card has not been loaded. If it is not operating as expected, the card most likely needs loading.

3.3 LOADING THE IDFI CARD

The IdFi card must be loaded and initialized before running Windows. We suggest you run IdFi.EXE with the -w option in your autoexec.bat file. IdFi.EXE can be run from a DOS prompt under Windows, but loading times are extended. The DDE Server will not be able to communicate with the card until it is loaded using IdFi with the Windows option. A typical command line to load the Windows driver would look like this:

```
IDFI -p200 -p220 -p240 -p600 -w
```

Typing this will load the driver into the cards at the base addresses 200, 220, 240 and 600. **It is vital that the base addresses be correctly specified on the command line!** Behavior of the driver is undefined if there is no card at a given base address.

In addition to the driver, the files **IDFI.A07** and **PDOWN.A07** must be in the current directory to allow the driver to load.

Note that the process of initializing the card is fairly slow. A "percentage done" counter is displayed by the driver as it executes to allow the user to monitor the progress of initialization.

3.4 USING DDE

Windows application programs using the PIKA IdFi DDE Server should be structured in the following way.

The application must first open a DDE channel to the DDE Server using DDE Initiate, using the application "IDFI" and topic "Info". The IdFi DDE server responds to the items . The application may now set up hot links (sometimes called ADVISE sessions) to the items "AllData" or "NameNumber". A DDE_DATA message containing caller id information will then be sent to the application whenever an incoming call with caller id information occurs on this line. The item "AllData" will supply a complete set of information, including date and time. The item "NameNumber" will provide the name and number of the caller only.

Note that the data returned when the link is first made will be the data returned from the last call, if there has been one since the card was loaded, or a blank string otherwise.

Terminate any open DDE links before closing the application.

DDE Message format:

"AllData" item:

<channel>:<number>:<name>:<type>:<date>:<time>:<ampm>

"Number" item

<channel>:<number>:<name>

Each field is separated by colon and has a fixed length.

Field descriptions:

<channel>

2 numeric digits, the first is the board number, the second is the line number from 0 of that board. Boards are numbered according to their port address.

<number>

14 character digits containing the calling number. If the number is less than 14 characters, it is left padded with spaces.

<name>

15 characters containing the name. If the name is not supplied, or less than 15 characters, it is left padded with spaces

<type>

a single character defining the type of message, 0 for local, 1 for long distance.

<date>

6 characters containing the date of this call in the format mm/dd.

<time>

5 characters containing the time of this call in the format hh:mm.

<ampm>

2 characters, either 'AM' or 'PM'

3.5 USING THE DLL

The DLL exports two functions:
pika_IdFi_register and pika_IdFi_deregister.

The functions are declared as:
int far pascal pika_IdFi_register(HWND hwnd);
int far pascal pika_IdFi_deregister(HWND hwnd);

Both functions return 0 if successful.

Windows application programs must register with the DLL using the function pika_IdFi_register. The application must supply a window handle which is to receive the caller id messages.

The IdFi DDE Server must be running, even if the DDE is not being used. The DDE Server polls the IdFi card is for incoming messages, and sends pika_IdFi_event messages to all registered applications. If the DDE Server is not running, the application will not receive caller id information.

When the DDE Server receives caller id information, it will send a windows user message to each registered application. The application can then retrieve the caller id data using the pointer supplied as part of the message. The windows message type is dynamically allocated using RegisterWindowsMessage with the string "PIKA_IDFI_MSG". This ensures that there will not be a message conflict with any other applications.

Applications should ensure that they call pika_IdFi_deregister before terminating.

IdFi Message format:

```
Message type:
       return value from RegisterWindowsMessage("IdFi");
wParam:
       channel
lParam:
       far pointer to a TCI_message struct:
struct {
char   line[2];   /* 0 = board, 1 = line number */
char   spaces1[5];
char   date[5];       /* 0,1 = mm, 2 = '/', 3,4 = dd */
char   spaces2[5];
char   time[5];       /* 0,1 = hh, 2 = ':', 3,4 = mm */
char   spaces3;
char   am_pm[2];      /* "AM" or "PM" */
char   spaces4[5];
char   number[14];    /* left filled with spaces */
char   spaces5[5];
char   type;          /* '0' = local, '1' = long distance */
char   spaces6[5];
char   name[15];      /* left filled with spaces *
char   cr_lf[2];      /* 0 = CR, 1 = LF */
} TCI_message;
```

3.6 WINDOWS DRIVER CONTENTS

The following are the IdFi Windows files. Windows must be able to find the DLL using its normal search algorithms. The directory must be the current directory when the application is launched, or in the Windows directory, or in the DOS path.

IDFIDDE.EXE
the IDFI DDE Server application.

IDFI.DLL
this is the Dynamic Link Library used by the DDE Server. It should be in your DOS path.

IDFIDLL.LIB
this file should be linked with your application if using the DLL. It will ensure that Windows loads the DLL when you run your application.

IDFIDLL.H
contains the C style function definitions for pika_IdFi_register and pika_IdFi_deregister.

IDFICLNT.EXE
A DDE client application that can be used to test and monitor the IdFi interface. Visual Basic source code is provided in the directory IDFICLNT.

IDFIMON.EXE
a C program that uses the Windows message interface. Source code is provided in the directory IDFIMON.