APA-1460 Enabler for DOS

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Issue date 18-February-2004.
APA-1460 Enabler for DOS

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Introduction

This manual provides an overview of the Adaptec SCSI Host Adapter APA-1460 Card Enabler family for DOS. All released versions are collectively named “APA-1460 Enabler” or simple “Enabler” throughout this manual.

Enabler is a small, but powerful driver supporting Adaptec APA-1460 SCSI Host Adapter cards and fully compatible with Adaptec ASPI Manager ASPI2DOS.SYS.

Due to the small memory footprint of the resident part the enabler is an ideal solution for use in various disk-cloning schemes. Both, Symantec Norton Ghost and Power Quest Disk Copy, are supported.

Features and Limitations

Enabler supports both, original DOS (e.g. MS-DOS 6.22) as well as DOS included with Windows 95/98. Resident part of APA-1460 Enabler occupies approximately 1 kB of memory or larger, depend from used features.

Enabler can be loaded via CONFIG.SYS, AUTOEXEC.BAT, or simply started from DOS command prompt. However for use Enabler with Adaptec ASPI manager ASPI2DOS.SYS you have to load driver in CONFIG.SYS.

Enabler can be unloaded, except if it is loaded from CONFIG.SYS. Besides Enabler prevents second load of itself.

Enabler may provide support of Adaptec APA-1460 SCSI Host Adapter cards without load Adaptec ASPI Manager ASPI2DOS.SYS.

Enabler may provide support of ASPI devices without load additional driver for your device (e.g. ASPICD.SYS for CD-ROM device).

Enabler does not provide support of audio CD disks for ASPI CD-ROM devices without load additional driver for your device.

Enabler may provide full LBA support for disks of any size. Large disks are supported.

Enabler may provide full INT 13h support, including extension. Most utilities (FORMAT.COM, FDISK.EXE, Norton Utilities, etc.) are supported.

User may freely assign drive letters to partitions, except if Enabler is loaded from CONFIG.SYS.

Enabler may support simultaneously up to 8 SCSI Hard Disks per one Adaptec APA-1460 SCSI Host Adapter card. Number of supported partitions is limited only by number of available drive letters.

Enabler does not provide hot-swap support. The APA-1460 Card and all SCSI devices should be connected to the computer before APA-1460 Enabler is started.

Enabler configures Adaptec SCSI card to I/O address 0x340 with IRQ 9, 10, 11 or 12. No other resource combination is supported by APA-1460 SCSI card.

Enabler cannot be loaded in the Windows DOS session.

Enabler provides a set of flexible configuration options via command line or external .INI file.

Enabler Versions

There are three versions of APA-1460 Enabler released: EN1460, CB1460 and UN1460. All three versions share common features and differ only by a set of supported PC Card adapters.

EN1460

EN1460 is designed for Intel PCIC compatible PC Card adapters. (E.g., Intel Step A, B and C, Vadem VG-365/465/468/469, Ricoh RF5C266/366/269/369, Cirrus Logic CL-PD6710/6720/6722/6729/6730, Toshiba ToPIC, etc.)

EN1460 will also work on most CardBus adapters, but only if the CardBus adapter is properly configured by the Computer BIOS. Most of today's notebooks BIOS will provide proper CardBus initialization.

EN1460 will not work on CardBus adapters that are not initialized by BIOS.

CB1460

Compared to EN1460, CB1460 is especially designed to work on CardBus adapters.

In case a CardBus adapter is not properly initialized by BIOS, Enabler is able to update the CardBus adapter configuration. Most of the required initialization can be done automatically without user intervention. However, if required, user will be able to control most settings, either via command line parameters or, in complicate cases, via external .INI file

UN1460

UN1460 combines the best features of EN1460 and CB1460 in one driver; of course at a price of a slightly larger memory footprint compared to EN1460 and CB1460.

UN1460 is recommended for mixed CardBus/PCIC environments and for Toshiba Laptops where the PC Card adapter mode can be set via BIOS Setup (ToPIC 95/97/100 can work either in PCIC compatible or in CardBus mode).

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C H A P T E R 1

Installation

The Enabler may be installed either in CONFIG.SYS, AUTOEXEC.BAT or started from DOS command line. It's possible to relocate enabler into upper memory using DEVICEHIGH or INSTALLHIGH statements in CONFIG.SYS.

The Enabler provides several command line switches allowing fine-tuning of the driver. In more complicate cases you may create an initialization file with very detailed configuration instructions.

It is recommended that you fine-tune CardBus Enabler switches starting CardBus Enabler from the command line. After switches are set, you can place call of CardBus Enabler either to CONFIG.SYS or to AUTOEXEC.BAT.

Deployment

In order to use SCSI devices (such as JAZ drive or CD-ROM) you typically will need to load APA-1460 Enabler, Adaptec ASPI manager ASPI2DOS.SYS and driver for your device. E.g. usage of CD-ROM requires ASPICD.SYS; usage of SCSI Disk – ASPIDISK.SYS, etc. ASPI manager and required drivers could be found in the Adaptec EZ-SCSII package.

However APA-1460 Enabler may provide support of Adaptec APA-1460 SCSI Host Adapter cards and SCSI devices without load any additional drivers.

For use CD-ROM you will also need to load MSCDEX.EXE in your AUTOEXEC.BAT.

If you are trying to use SlimSCSI with IOMEGA JAZ device we recommend that you be using IOMEGA GUEST.EXE application rather then stack of ASPI drivers. It gives more compact image on the floppy.

Resource limitations

Adaptec SlimSCSI 1460 card supports very limited set of resources. Card Information Structure (CIS) allows using only I/O address at base 0x140 or 0x340 and IRQ 9, 10, 11 or 12 in ISA mode only (Level).

Please also notice that despite the fact that Adaptec documentation claims that I/O range 0x140 is supported, we were never able to use it. The I/O range 0x340 usually works fine.

If the I/O addresses is usually available the IRQ could be a problem on some of machines.

On today computer the IRQ 12 is never available (used by PS/2 mouse). PCI devices commonly use the IRQ 11. The IRQ 9 or 10 is available on most of the system, but not on all. E.g. BIOS of Toshiba Satellite 1625CDT uses IRQ 9 for USB, IRQ 10 for Rockwell modem and IRQ 11 for ATI Rage VGA. Since SlimSCSI 1460 Card declares that IRQs should be used in ISA mode only (i.e. IRQs are not shareable) Adaptec card will be never configured by Enabler on such PC. The only remedy is to get a BIOS update for such machine.

It's very important that IRQ used by APA-1460 Enabler is free and match to the IRQ that you specify in /Q parameter of ASPI2DOS.SYS. You may control which IRQ is used by APA-1460 Enabler using /CI switch. Exact the same IRQ should be specified in /Q parameter of ASPI2DOS.SYS.

In rare situations it happens that the above setup is not working. It usually due to one of two reasons:

- Resource conflict. Please see “Resource Management” chapter to find out how to check if the I/O range of 0x340-0x35F and IRQ 10 (9, 11, 12) are in use by other hardware. If they are and you cannot free them, there is no way to make 1460 work due to extremely limited set of resources supported by that card.

- Improper setup of CardBus adapter by BIOS. If you are sure that I/O range of 0x340-0x35F on your computer is free and IRQ 10 are not in use, you may have to adjust interrupt mode by adding some switches to APA-1460 Enabler. Please refer to chapter “

Memory Requirements

All versions of APA-1460 Enablers require 4 kB of memory to access the SCSI Card Information Structure (CIS). This memory is required only during initialization.

In addition CB1460 and UN1460 require 4 kB of memory per CardBus socket to establish the memory access to CardBus registers. This memory is required only during initialization.

Enabler may allocate the required memory automatically (see Resource management. chapter for details).

To be available inside of 1st MB (required for EN1460) memory should not be shadowed by BIOS and should be excluded from memory management by EMM386.EXE.

For CB1460 and UN1460 there is no need to allocate memory below the 1st MB (memory anywhere in 4GB address space may be used).

Example of config.sys

You can invoke APA-1460 enabler in the any point. For example:

```
…
DEVICE=C:\EN1460.EXE /CI:10
DEVICE=C:\DOS\HIMEM.SYS /TESTMEM:OFF
DEVICE=C:\DOS\EMM386.EXE NOEMS X=0xEF00-0xEFFF
DOS=HIGH,UMB
…
DEVICEHIGH=C:\ASPI2DOS.SYS /D /PCMCIA /Z /Q10 /P340
…
```

Please notice that used memory is excluded from EMM386.EXE memory management (via X=EF00-EFFF switch) thus enabling it for use by EN1460. For CB1460 and U1460 it's not necessary to exclude any memory from EMM386.EXE memory management since the whole 4GB address space may be used.

Special Note for Toshiba Notebooks.

If you are using EN1460 on Toshiba notebooks please make sure that you set the PC Card adapter either to Auto-Select mode, or to PCIC mode via BIOS setup. The CardBus/PC-Card 16 mode is not supported. When using CB1460 please make sure that you set the PC Card adapter to CardBus/PC-Card 16 mode. The PCIC and Auto-Select modes aren't supported. `The UN1460 works in either mode.

Fine-tuning

If your BIOS configure CardBus Adapter properly, no command line parameters are necessary. Otherwise fine-tuning could be required.

The fine-tuning could be performed either in standard installation mode via command line options, or in advanced installation mode via an external INI file.

Following chapters describe both modes in detail.

In both modes several optional parameters require a numeric value. Any numeric value could be entered as decimal (default form) or hexadecimal (with 0x prefix) number. For example: /PI:10 and /PI:0x0A both specify IRQ 10.

In both modes several optional parameters require <use> values. Use values may typically be specified as ON, OFF or AUTO in upper or lower case.

C H A P T E R 2

Resource management.

During the loading Enabler collects information about resources (IRQ, I/O and memory) used by PCI, PNP and Option ROMs. Enabler considers such resources as non-free and excludes them from hardware configuration procedure.

In non-PnP computer Enabler may be not able detect all used resources (e.g. resources used by Legacy ISA devices). In such case you can adjust resource filters manually by adding such resources into [Resource] section of the external .INI file. The list of all detected resources is displayed if Enabler is started with /V+ switch.

Algorithm of resource management is as follow:

1. Collect PCI, PnP and Option ROM resource information.
2. Result is combined with resource information in [Resources] section of .INI file (if file and section exist).
3. Resulting resources collection is used as resource filter.
4. Resource assignment via external .INI file (e.g. bridge filter settings or ExCA address register) overrides assigned resources unconditionally, even if specified resource is unavailable. If resource is unavailable and Enabler is started in verbose mode (with /V switch) - a warning is issued.
5. If specific resource is assigned by BIOS, Enabler keeps such resource (unless otherwise is directed by .INI file).
6. If specific resource is not assigned by BIOS and there is no .INI file settings, Enabler will allocate required resource automatically:
    a) Command line settings specify preferable resources to be used if available.
    b) If preferable resources are not available or if no preferable resources specified via command line, any available (according to filters set during the loading) resource will be used.

Note: For I/O and memory pools Enabler use preferable resource from bottom up (in other words, minimal possible address is used first).

Intel 16-bit PCIC compatible (non-CardBus) PC Card adapters are limited by using memory inside of 1st MB. PCI and CardBus adapters may use memory anywhere in 4GB address space.

CHAPTER 3

Command Line Options.

Command line options can be specified in any order, either in upper case or in lower case. Typical parameters start with slash (/) or dash (-) followed by one or two letters (e.g. /H or /VR).

Some command line options require an additional value. In this case parameters should be followed by colon (:) or equal (=) then value (e.g. /M:0xEC000).

Command line options are separated by spaces.

Common Command Line Options

Following options are common for all versions of APA-1460 Enablers.

`/H | ?`	Print online help
`/E`	Silent mode: No display output.

Resource Management

`/CI:n`	Card Functional Interrupt Line	(Default: 0x0A)
`/M:n`	Start address of memory pool	(Default: 0xD0000)
`/IO:n`	Start address of I/O pool	(Default: 0x340)

Diagnostics and Fine-tuning

`/F=filename` Specifies the initialization file pathname.

By default the initialization file has the same name as the Enabler, but with extension .INI (i.e., EN1460.INI, CB1460.INI and UN1460.INI correspondingly). Enabler will be looking for the .INI file in the same subdirectory where enabler itself is located.

Using /F parameter user may override path and name of the default initialization file. (E.g., /F:E:\Settings\en1460.ini)

`/V[:<file>]` Verbose mode: Configuration steps will be outlined on console or to file (if file pathname is specified).

`/FL` Flush log file to disk immediately after each update (may be useful in case of system hang).

`/ID` Displays identified drive information.

`/Ln:Letter` Specifies the drive letter assigned to partition 'n', where n could be in range of 0 to 9 (E.g., /L0:M /L1:K /L2:Z.)

Drive letters selected by the user can only be taken into account if the Enabler is loaded in TSR mode (e.g., from AUTOEXEC.BAT or command line), and will be ignored if the device driver is loaded from CONFIG.SYS.

User may assign more than 10 drive letters using the .INI file.

ASPI Management

`/NA` Skip ASPI initialization.

In this case Adaptec ASPI manager and driver for your device is required.

`/NU` Do not move part of resident code to upper memory.

`/I` Ignore (do not install) INT 13 interface support for ASPI hard disk devices. Also no drive letter will be created.

In this case driver for your device is required.

`/IC` Ignore (do not install) support for ASPI CD-ROM disk devices.

In this case driver for your device is required.

`/D:devname` Specifies device name of CD-ROM driver (Default: ASPICD01)

Can be used by MSCDEX.EXE to support ASPI CD-ROM disk devices.

`/RS` Reset SCSI bus during ASPI initialization.

`/HI:n` Specifies the Host Adapter SCSI ID (0 - 7).

`/DI:<use>` Allow SCSI targets to disconnect during command execution.

`/SN:<use>` Enable the Host Adapter to initiate negotiation with the target for synchronous data transfer.

`/PA:<use>` Enable SCSI bus parity check by the Host Adapter.

Unloading

`/UL` Unload resident part (not supported, if driver is loaded via config.sys)

EN1460 and UN1460 Specific Options

Following command line options are for EN1460 and UN1460 only. Using them the user may override the default base address of the PC Card adapter or override the default socket number.

In case of UN1460: Parameters only apply to non-CardBus sockets.

/B:n PCMCIA adapter base I/O address (Default: 0x03E0)

/S:n PCMCIA socket number (Default: 0)

Please notice, that if you want to support more than one non-CardBus socket using EN1460 or UN1460, you will have to create an INI file.

CB1460 and UN1460 Specific Options

Following command line options are for CB1460 and UN1460 only. Using them the user may control the initialization of CardBus sockets.

On most of recently made notebooks the BIOS will configure the interrupt mode properly. You should not specify /PI, /MI, /MX and /OZ options unless you are sure that the interrupt mode is not set properly.

`/PI:n` PCI Interrupt level (Default: 0x0B)

`/IB:B:D:F, <use>` Ignore PCI-2-PCI bridge. This switch may be used for subtractive-decode PCI-2-PCI bridges (bridges which pass all memory and I/O requests behind). B - bus (0-255), D - device (0-31), F - function (0-7).

ON	Bridge is ignored (i.e. bridge is subtractive).
OFF	Bridge is not ignored (even if physically subtractive).
AUTO	Bridge's decoding mode should be read out of bridge

`/FI` Force updating of PCI IRQ routing table for socket (even if selected IRQ is already in table.

`/BS` Performs PCI bus scan and termination. Information will be displayed on console

`/EC:<use>`

ON	Use external power switch clock for adapter.
OFF	Use power switch clock generated by PCI clock

Note: This switch is ignored for all PC Card adapters except Texas Instruments PCI121x/122x and TI PCI125x/14xx/44xx families.

`/IM:m` Set interrupt mode. Possible values are:

Par	TI1130/1x31:	use parallel ISA-type interrupts
	TI12xx/14xx/44xx:	use parallel ISA and PCI interrupts
	CL-6832, OZ6832:	use External-Hardware Interrupt mode
	Ricoh RB5C478:	use parallel interrupt mode
Ser	TI1130/1x31:	use serialized interrupt type scheme
	TI12xx/14xx/44xx:	use serialized ISA and PCI interrupts
	CL-6832, OZ6832:	use PC/PCI Serial Interrupt protocol
	Ricoh RB5C478:	use serialized interrupt mode

PPci TI 12xx/14xx/44xx, Cl-6832, OZ6832: use parallel PCI interrupts only

ISPP TI 12xx/14xx/44xx only: use serialized ISA and parallel PCI interrupts. Will be ignored for all other adapters.

Pway CL-6832, OZ6832: use PCI/Way Interrupt Signaling mode. Will be ignored for all other adapters

`/MX:<use>` Initialize the multiplex IRQ routing register. This switch is only used on TI PCI122x/125x/14xx/44xx adapters and is ignored for all other adapters.

`/OZ:97:<use>` O2Micro PC Card adapter only: set/reset PC97 IRQ bit

`/OZ:IL:<use>` O2Micro PC Card adapter only: set/reset ISA Legacy bit

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C H A P T E R 4

Initialization File

The initialization file is a text file that contains special settings. These settings allow you to configure computer hardware components so your CardBus adapters and/or APA-1460 card become functional.

Any text in the .INI file starting after the semicolon (;) to end of the line, is interpreted as a comment.

Using the INI file you may set both, system-wide and per-socket parameters in any combination.

There are two types of sections defined: Socket and PCI.

Socket Sections

Socket Sections is interpreted only by EN1460 and UN1460 and can only be used for non-CardBus sockets. Both enablers support up to 8 non-CardBus sockets. The socket configuration of such sockets should be described in sections [Socket0] to [Socket7].

Following values are defined for Socket Sections: ‘LegacyBase’, ‘Socket’, ‘CISBase’, ‘SkipSocket’.

Parameters in Socket Sections represent an alternative for command line options /B, /S, /M correspondingly.

There is no corresponding command line option for ‘SkipSocket’ parameter. It allows to skip (ignore) particular socket. Valid values are 0 and 1.

Parameters specified in Socket Sections override parameters specified in Common Section and Command Line. Using them you may control initialization order and execution mode. For example, you may enable LBA mode by default, but disable it for selected socket.

Example:

```
[Socket0]
LegacyBase = 0x3E2
Socket = 1
CISBase = 0xEC000
SkipSocket = 1                          Skip this socket
 [Socket1]
LegacyBase = 0x3E0
Socket = 0
SkipSocket = 0
```

Please note, that [Socket1] definition omits CISBase setting. In this case settings from command line will be used.

PCI Sections

PCI Sections is interpreted only by CB1460 and UN1460 and can only be used for CardBus sockets and PCI-2-PCI bridges. Both enablers support any number of CardBus sockets.

All section names are relative to original PCI subsystem configuration. You can see that configuration if you switch program to verbose mode. (/V key) or use the /BS switch.

In order to specify the required configuration of the PCI device, you need to know the location of the device. This location is specified in Bus:Device:Function form. Location 0:A:1 describes the first function of PCI device number 10 (“A” in hexadecimal format) located on PCI bus 0. Initialization file section used for the configuration of such a device should have the name [0:A:1].

Value names depend on device type.

For CardBus adapters, following values are defined: 'IoFilter0', 'IoFilter1', 'MemFilter0', 'MemFilter1', ‘ExCABase', 'LegacyBase', ‘IRQ’, ‘ISAEnable’, ‘VGAEnable’, ‘CISBase’, ‘SkipSocket’.

For PCI-to-PCI bridges, following values are defined: 'IoFilter', 'MemFilter', 'PreFilter', ‘IRQ’, ‘ISAEnable’, ‘VGAEnable’, ‘IgnoreBridge’.

MemFilter, PreFilter, MemFilter0, MemFilter1

These parameters define the CardBus or PCI-to-PCI bridge memory filter base and limit (or size) both memory filters (prefetcheable and non-prefetcheable).

The CardBus base and size values should have 4K alignments according to Yenta specification and limit (maximum address) should be aligned to 4K minus one.

Following formats could be used to specify bridge memory filter ranges:

BaseAddress:Limit. This means that we define the first and exactly the last integer number in a range (e.g., 0xA0000000:0xA0000FFF specifies 4K ranges). If you wish to disable positive decoding of PCI-to-PCI bridge's filter range, please specify something like: 200000:1fffff.

If you prefer to specify filter size rather than filter max address you should use BaseAddress,Size format, where Size by default is a literal decimal number. In this case you also could use 'M' or 'K' postfixes (e.g., 0xA0000000,1M specifies 1M memory filter starting at 0xA0000000 address).

Attention! All values are treated as hexadecimal even if there is no “0x” prefix.

Examples:

```
MemFilter0=A0000000h:A0000fffh      4K memory range
MemFilter0=A0000000h,4K             4K memory range
MemFilter0=A1000000h:A1001fffh,Pre  8K pref. memory
MemFilter0=A1000000h,8K,Pre         8K pref. memory
```

IoFilter, IoFilter0, IoFilter1

This is the bridge I/O range base and limit (or size). For CardBus base and size values must have double-word alignment.

Examples:

```
IoFilter = 0xD000:0xD00F            16-bytes I/O range
```

IRQ

CardBus interrupt line settings. According to PC/AT architecture this value must not exceed 15.

```
IRQ = 10                            10th interrupt
```

```
IRQ = 10                            10th interrupt
```

ISAEnable

Control setting of ISA Enable bit in Bridge Control Register. Valid values are 0 and 1.

Example:

```
ISAEnabe = 1                        Set ISA Enable bit
```

VGAEnable

Control setting of VGA Enable bit in Bridge Control Register. Valid values are 0 and 1.

Example:

```
VGAEnabe = 0                        Reset VGAEnabl bit
```

ExCABase

This option is used to mountain CardBus socket register/ExCA registers base address register. Available values: any 32-bit hexadecimal number aligned to 4K boundaries.

Example:

```
ExCABase = D8000000h
```

LegacyBase

This is PC Card 16-Bit IF legacy mode base address. Available values: any 16-bit hexadecimal number aligned to double-word boundary.

Example:

```
LegacyBase = 3e0h
```

PrimaryBus, SecondaryBus, SubordinateBus

These options control bus number assignments for PCI-to-PCI and CardBus bridges. Available values: any decimal number not greater than 255.

Example:

```
[0:A:0]                              TI PCI1131 socket
PrimaryBus      = 0
SecondaryBus    = 1                  Set sec. bus to 1
SubordinateBus  = 3                  Set sub. bus to 3

; Now socket 0 of TI PCI1131 CardBus adapter accepts
; I/O requests to buses from 1 to 3 inclusive

[0:A:1]                              TI PCI1131 socket
PrimaryBus      = 0
SecondaryBus    = 4                  Set sec. bus to 4
SubordinateBus  = 3                  Set sub. bus to 3
```

SkipSocket

Allows skip (ignore) particular CardBus socket . Valid values are 0 and 1

Example:

```
SkipSocket = 1                       Skip socket
```

IgnoreBridge

Allows ignore PCI-2-PCI bridge. This option may be used for subtractive-decode PCI-2-PCI bridges (bridges which pass all memory and I/O requests behind). Valid values are ON, OFF and AUTO. ‘ON’ means that bridge is ignored (i.e. bridge is subtractive). ‘OFF’ means that bridge is not ignored (even if physically subtractive). ‘AUTO’ means that bridge’s decoding mode should be read out of bridge.

Example:

```
IgnoreBridge = ON                    Ignore bridge
```

CISBase

Card entry ‘CISBase’ defines location of CIS access window.

Example:

```
[0:A:1]                                  Card in Socket 1
CISBase = 0xEC000
```

Resources Section

The Enabler INI file offers user an extended control over resource allocation. Using [Resources] section of the Enabler INI file user can include or exclude specific resources for use by Enabler.

During the loading Enabler collects information about resources (IRQ, I/O and memory) used by PCI, PNP and Option ROMs. Enabler considers such resources as non-free and excludes them from hardware configuration procedure. In non-PnP computer Enabler may be not able detect all used resources (e.g. resources used by Legacy ISA devices). Such undetected resources may cause resource conflict. In such case you can adjust resource filters manually by adding resources into this [Resources] section for the Enabler’s INI file.

Only one [Resources] section can be defined in INI file.

To add resource you should define its description in separate line.

Any resource may be either excluded or included to hardware configuration procedure. To exclude resource its description should start from ‘XMEM’ (for memory), ‘XIO’ (for I/O) or ‘XIRQ’ (for IRQ). To include resource its description should start from ‘MEM’ (for memory), ‘IO’ (for I/O) or ‘IRQ’ (for IRQ).

For memory and I/O you also specify base address and size of resource range separated by commas. For IRQ you specify only IRQ number separated by comma.

Finally for any resource you may specify sharable attribute separated by comma. There are next possible attributes:

- E - Resource is available for exclusive (non-shared) use.
- D - Resource is available for dynamic-shared use.
- T - Resource is available for time-shared use.

You may specify sharable attribute for any resource, either excluded or included. However for excluded resource it makes no sense (since excluded resource is unavailable for any using) and will be ignored.

If no shared attribute specified, resource is assumed as an exclusive use resource.

Example:

```
[Resources]
XMEM = 0xD0000, 0x400          ; Exclude memory
                               ; [0xD0000-0xD03FF]
XIO = 0, 0x100                 ; Exclude I/O [0-0xFF]
IRQ = 5, D                     ; Include IRQ 5 with dynamic
                               ; share
XIRQ = 6                       ; Exclude IRQ 6
XMEM = 0x100000, 0x7FF0000     ; Exclude memory
                               ; [1MB – 2GB]

; Exclude memory [0xE0000-0xE7FFF] except [0xE1000-0xE2FFF]

XMEM = 0xE0000, 0x8000, E      ; Exclude [0xE0000-0xE7FFF]
MEM = 0xE1000, 0x2000, E       ; Include  [0xE1000-0xE2FFF]
```

Additional information

How to get Technical Support for APA-1460 Enabler

Please send an E-mail in English (we can't process technical support questions in any other language) to technical support (support@tssc.de).

In your request please specify:

1. Description of your problem.
2. The card name exactly as it appears on the card.

Please attach to your e-mail following files:

1. Please run APA-1460 Enabler with /V+[:<file>] switch (plus all parameters you normally use), capture the output to the file and attach it to your e-mail. E.g.
   C:\>UN1460 /V+:LOG.TXT
   or
   DEVICE = UN1460.EXE /V+:LOG.TXT
2. CONFIG.SYS
3. AUTOEXEC.BAT
4. Enabler initialization file if one exists.

Example of INI file

Following sample shows an example of UN1460 initialization file for the system with one CardBus and one PCIC compatible adapter

```
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
;;           UN1460 Enabler. Sample of Initialization file
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;

; PCI-2-PCI Bridge between bus 0 and bus2
[0:1E:0]
PreFilter=0x60000000:0x60FFFFFF

; CardBus socket 0
[2:B:0]
ExCABase=0xD2000                         ; Set ExCA address to 0xD2000
CISBase=0xD3000
```

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