

# **Intel(R) Boot Agent release 4.1.13**

## **Release Notes**

3/16/04

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# 1. Intel Boot Agent release 4.1.13 Release Notes

## 1.1 General 10/100 release - Build V1.0C0148 TIC 83144 Build date 3/16/04

### General

This release of the Intel Boot Agent is designed for the Mobile and regular device IDs for the 82551QM, ICH6/82562. It is also backward compatible with the 8255x based LAN controller, ICH5, ICH4, ICH3, ICH2/82562 & CICH platform families. The IBAutil Utility is used to program adapters and is distributed as part of the Intel PRO Networking software releases, **but for LOM the IBABuild utility must be used to generate the Fast Ethernet Intel Boot Agent image of type and device ID to match the device ID programmed into the EEPROM. See section 1.1.4 for details.**

#### 1.1.1 New Features in 4.1.x

##### More Diagnostics information on Setup Screen

Anytime the configuration setup menu is displayed, you may press the **D** key to display *diagnostics* information in the lower half of the screen. This information includes PWA (board ID), MAC address, I/O address, Memory address and Slot number, and can be helpful during interaction with Intel Support personnel or your IT team members. Once you press the **D** key, the information displayed remains until you leave the configuration setup screen (either by pressing **F4**, pressing the **Esc** key, or by rebooting the computer).

##### Continuous retry mode

In a scenario where both PXE client and server are booting at the same time (for instance after the resumption of supply following a power outage) it is not uncommon for the client to attempt to connect to the server and timeout as the server is still booting. In this case, the user is prompted to hit a key to retry. However, if the system is unattended, or designed for use without keyboard or monitor, then the boot process cannot easily be completed. Version 4.1.04 of the Intel Boot Agent adds an unadvertised feature – the ability to continuously retry until the server becomes available. Contact your Intel technical support contact for details if you need to use this feature.

##### Fast Boot detection

Microsoft has defined a 'simple boot flag'. If the BIOS supports this flag, it will take the shortest possible route when booting the system. All non-essential activities, such as testing memory, are bypassed in this mode. Intel Boot Agent version 4.1.04 is able to scan the BIOS ACPI tables to access this flag. If the flag is found, and the diagnostics bit is not set, the Boot Agent will bypass the 2, 3 or 5 second delay that can be set to give the user time to access the pre-boot setup screen. In this case, the boot process acts as though the delay is set to 0 seconds (all initialization strings are suppressed, even if they are normally enabled in the EEPROM).

If the flag is found and the diagnostics bit is set, or if the flag is not found, the Boot Agent will provide the 0, 2, 3, or 5 second delay as set in the EEPROM to allow users to access the setup screen.

Users wishing to access this setup screen should be directed to disable fast booting in the BIOS. More details about the simple boot flag can be found at

[http://www.microsoft.com/hwdev/resources/specs/simp\\_bios.asp](http://www.microsoft.com/hwdev/resources/specs/simp_bios.asp)

#### 1.1.2 Known Issues

- Legacy free PCs: Intel has investigated a boot failure with platforms that do not have a floppy disk drive installed. In some scenarios, the diskette image fails to load from the PXE server when using a Windows 98 or Windows 95 boot image. Intel has not seen any failures booting with a DOS 6.22 boot image. The issue has been traced to the Network Bootstrap Program downloaded from the Intel PXE server included in the Intel IAL PXE PDK. This issue would likely affect other PXE servers based on that same toolkit. To work around this, either use DOS 6.22 formatted floppy images, or contact your commercial PXE vendor for an updated Network Bootstrap Program.

### 1.1.3 Fixed Issues

- 4.1.11 and 4.1.13, see Incremental Change Document for details.

- 4.1.10 provides improved handling of DHCP in spanning tree environments. If link is detected, but no packets of any type are received during the initial DHCP cycle, then the DHCP cycle will be extended as it is assumed that the spanning tree protocol is in operation. This change will have no impact in a normally active non-spanning tree environment.

- 4.1.09 fixes a rare condition where valid UDP packets might be discarded erroneously. This only happened when:-

- an application program is listening for UDP packets addressed to a specific port, but not to a specific IP address;
- the application provides a buffer for the UDP code to store the destination IP in when a packet is successfully received;
- on entry to the UDP read code, multiple UDP packets are queued in the UNDI driver, including the packet the application wants to read;
- the application's packet is not at the head of the queue;
- at least one of these UDP packets before the application's has a destination IP address that is not the client's IP address (such as a broadcast address) and whose port is not the port the application is listening for.

- Additionally 4.1.09 fixes an EEPROM timing issue and preserves keystrokes in the keyboard buffer when scanning for 'controls' used to enter the setup screen.

- 4.1.08 restored support for multiple ICHx device IDs without changing the device ID in the flash header (code was in 4.0.22, but was inadvertently removed in 4.1.04). As long as one ICHx device ID is in the option ROM header, the code will initialize and work with any other ICHx network device IDs. This is significant for the ICH5 where two network interfaces are supported, but each interface has a separate device ID. Additionally code was added to save and restore the BP register when updating the EEPROM to fix an issue with one specific BIOS.

- Extra validation code added to check that Microsoft Simple Boot Flag ACPI table is valid before use. Also a minor formatting change was made to the GUID display, to align with Microsoft's wire format description of the GUID.

- The code in release 4.1.05 has been improved to make the handling of fragmented UDP packets more robust. Under certain circumstances, Windows 2000 RIS would fail to complete when connected at 10Mbps. Additionally, DHCP timeouts have been increased to cope with non-optimized networks, and the Boot Agent now has better handling of referrals between PXE servers.

size option is not present. The boot file name is received and a pointer placed on the stack to point to this string to allow the null character to be appended. An extra TFTP request is made to retrieve the file size of the boot file. Unfortunately, the pointer is then destroyed before the boot file can be retrieved using TFTP. This issue has been corrected in Intel Boot Agent 4.0.22. This scenario can be avoided entirely by running a PXE server or by using the boot file field rather than the DHCP boot file field. Customers using IBA 4.0.19 and running into this issue can also work around it by setting DHCP boot file size tag 13 as a non-zero value (ideally the size of the boot file).

#### 1.1.4 Important – IBABuild tool must be used before code can be integrated.

Rather than continuing to supply an ever-increasing number of images, a new tool has been developed to allow BIOS writers to generate the specific image that they require. This IBABuild tool is a command line tool (DOS or Command box under Windows 2000 or XP) that takes a set of parameters that describe the type of image and device IDs, and generates the image, including changing the PCI Header to the correct device ID. See IBABuild.txt for usage details.

Device ID	Product
1229	8255x LAN controller family
2449	ICH2 based 82562 solutions (differentiated by Subsystem ID)
1031	ICH3 based Intel (R) PRO/100 VE Adapter (LOM)
1032	ICH3 based Intel (R) PRO/100 VE Adapter
1033	ICH3 based Intel (R) PRO/100 VM Adapter (LOM)
1034	ICH3 based Intel (R) PRO/100 VM Adapter
1035	ICH3 based 82562EH based Phoneline network connection (LOM)
1036	ICH3 based 82562EH based Phoneline network connection
1037	Reserved
1038	ICH3 based Intel (R) PRO/100 VM Adapter (Kinnereth M)
1039	ICH4 based Intel(R) PRO/100 VE Network Connection (LOM)
103A	ICH4 based Intel(R) PRO/100 VE Network Connection (CNR)
103B	ICH4 based Intel(R) PRO/100 VM Network Connection (LOM)
103C	ICH4 based Intel(R) PRO/100 VM Network Connection (CNR)
103D	ICH4 based Intel(R) PRO/100 VE Network Connection (Mobile platform)
103E	ICH4 based Intel(R) PRO/100 VM Network Connection (Mobile platform)
1050	ICH5 based Intel(R) PRO/100 VE Network Connection (LOM)
1051	ICH5 based Intel(R) PRO/100 VE Network Connection (CNR)
1052	ICH5 based Intel(R) PRO/100 VM Network Connection (LOM)
1053	ICH5 based Intel(R) PRO/100 VM Network Connection (CNR)
1054	ICH5 based Intel(R) PRO/100 VE Network Connection (Mobile platform)
1055	ICH5 based Intel(R) PRO/100 VM Network Connection (Mobile platform)
1056	Reserved
1057	Reserved
1059	82551QM mobile device ID
1064	ICH6 based Intel(R) PRO/100 VE Network Connection (LOM)
1065	ICH6 based Intel(R) PRO/100 VE Network Connection (CNR)
1066	ICH6 based Intel(R) PRO/100 VM Network Connection (LOM)
1067	ICH6 based Intel(R) PRO/100 VM Network Connection (CNR)
1068	ICH6 based Intel(R) PRO/100 VE Network Connection (Mobile platform)

### 1.1.5 Split ROM

Intel Boot Agent 4.1 is available for split ROM implementations for BIOS integration. OEMs should work with their BIOS vendors to ensure that their BIOS implementations support Split ROM architecture. Monolithic implementations will continue to be supplied for adapter implementations. OEMs with specific implementation requirements should contact their technical representatives to discuss possible support options.

### 1.1.6 Decoder Ring

File name	Description
BA41 <b>bb</b> M1.NIC	The PRO/100 adapter monolithic boot agent image (with PXE and RPL support and setup screen) for programming into an adapter or LOM with Flash attached to the LAN controller. ' <b>bb</b> ' is the build number.
BA41 <b>bb</b> M1.LOM	The PRO/100 adapter monolithic boot agent image (with PXE and RPL support and setup screen) for programming into a BIOS. ' <b>bb</b> ' is the build number.
BA41 <b>bb</b> L1.NIC	The PRO/100 adapter monolithic boot agent image (with PXE support and setup screen) for programming into an adapter or LOM with Flash attached to the LAN controller. ' <b>bb</b> ' is the build number.
BA41 <b>bb</b> L1.LOM	The PRO/100 adapter monolithic boot agent image (with PXE support and setup screen) for programming into a BIOS. ' <b>bb</b> ' is the build number.
BA41 <b>bb</b> M1.FLB	The PRO/100 boot agent flash image (with PXE and RPL support and setup screen) in the FLB format for combining with other FLB files. ' <b>bb</b> ' is the build number. For use in adapters.
BA41 <b>bb</b> BC.LOM	Base code for BIOS inclusion
BA41 <b>bb</b> S1.LOM	The PRO/100 split boot agent image (UNDI only) with RPL support for programming into BIOS flash memory. ' <b>bb</b> ' is the build number.
BA41 <b>bb</b> T1.LOM	The PRO/100 split boot agent image (with PXE support only) for programming into BIOS flash memory. ' <b>bb</b> ' is the build number.
BA41 <b>bb</b> N1.LOM	The PRO/100 adapter monolithic boot agent image (with PXE and RPL support no setup screen) for programming

	configuration menu. ' <b>bb</b> ' is the build number. The purpose of this image is having smaller memory requirement.
The following images are not distributed, but are available on request.	
BA41 <b>bb</b> Q1.LOM	The PRO/100 adapter monolithic boot agent image (with PXE only support, no setup screen) for programming into BIOS flash memory. ' <b>bb</b> ' is the build number.
BA41 <b>bb</b> R1.LOM	The RPL only (including setup screen) image for programming into BIOS flash memory. ' <b>bb</b> ' is the build number.
BA41 <b>bb</b> U1.LOM	The RPL image (no setup screen) for programming into BIOS flash memory. ' <b>bb</b> ' is the build number.

## 1.1.7 EEPROM Contents

### 1.1.7.1 Main Setup Options (Word 30h)

The configuration of the software is controlled by EEPROM on the adapter. The main setup options are stored in word 30h. These options are those which can be changed by the user via the Control-S setup menu or the IBAcfg utility. Word 30h has the following format:

BIT(S)	Name	Function
15	PPB	PXE Presence Bit – 0 Indicates that the image in the flash contains a PXE image. 1 indicates that no PXE image is contained. Default is 0 in order to be backwards compatible with units already in the field. If this bit is set to 0, EEPROM word 32h (PXE Version) is valid. When EPB is set to 1 and this bit is set to 0, it means both images are present in the flash.
14	EPB	EFI Presence Bit – 1 Indicates that the image in the flash contains an EFI image. 0 indicates that no EFI image is contained. Default is 0 in order to be backwards compatible with units already in the field. . If this bit is set to 1, EEPROM word 33h (EFI Version) is valid. When PPB is set to 0 and this bit is set to 1, it means both images (PXE and EFI) images are present in the flash.
13	RFU	Reserved. Must be 0.
12	FDP	Bit 12 will mean Force Full duplex. Bit 12 is meaningless unless 10 and 11 are set. 0 means Half Duplex, 1 means Full Duplex.

9	LWS	Legacy OS Wakeup Support. (For 82559-based adapters only) If set to 1, the agent will enable PME in the adapter's PCI configuration space during initialization. This allows remote wakeup under legacy operating systems that don't normally support it. Note that enabling this makes the adapter technically non-compliant with the ACPI specification, which is why the default is disabled. 0 = Disabled (Default Value) 1 = Enabled
8	DSM	Display Setup Message. If the bit is set to 1, the "Press Control-S" message is displayed after the title message. Default value is 1.
7-6	PT	Prompt Time. These bits control how long the "Press Control-S" setup prompt message is displayed, if enabled by DIM. 00 = 2 seconds 01 = 3 seconds 10 = 5 seconds 11 = 0 seconds All other values which are not defined are considered as 0 seconds.
5		Reserved
4-3	DBS	Default Boot Selection. These bits select which device is the default boot device. These bits are only used if the agent detects that the BIOS does not support boot order selection or if the MODE field of word 31h is set to MODE_LEGACY. 00 = Network boot, then local boot 01 = Local boot, then network boot 10 = Network boot only 11 = Local boot only
2	BBS	BIOS Boot Specification. <b>OBSOLETE</b> . In previous versions of the agent, this bit enables or disables use of the BBS to determine boot order. If set to 1, the BIOS boot order is used, and the DBS bits are ignored. <b>This bit is not used by the boot agent at runtime any more.</b> The runtime check for BBS/PnP and the setting in the MODE field of word 31h are used instead.
1-0	PS	Protocol Select. These bits select the boot protocol. 00 = PXE (default value) 01 = RPL protocol <b>Note:</b> IBACFG may allow this option to be set for Boot Agent images that do not support RPL. Other values are undefined

### 1.1.7.2 Configuration Customization Options (Word 31h)

Word 31h of the EEPROM contains settings that can be programmed by an OEM or network administrator to customize the operation of the software. These settings cannot be changed from within the Control-S setup menu. The lower byte contains settings that would typically be configured by a network administrator using the IBAUtil.exe utility; these settings generally control which setup menu options are changeable. The bits in the upper byte are generally settings that would be used by an OEM to control the operation of the agent in a LOM environment, although there is nothing in the agent to prevent their use on a NIC implementation. Word 31h has the following format:

BIT(S)	Name	Function
15 - 14	SIG	Signature. Must be set to <b>01</b> to indicate that this word has been programmed by the agent or other configuration software.
13	RFU	Reserved. Must be 0.
12	RFU	Reserved. Must be 0.
11	RFU	Reserved. Must be 0.
10-8	MODE	<p>Selects the agent's boot order setup mode. This field changes the agent's default behavior in order to make it compatible with systems that do not completely support the BBS and PnP Expansion ROM standards. Valid values and their meanings are:</p> <p>000b: Normal behavior. The agent will attempt to detect BBS and PnP Expansion ROM support as it normally does.</p> <p>001b: Force Legacy mode. The agent will not attempt to detect BBS or PnP Expansion ROM support in the BIOS and will assume the BIOS is not compliant. The user can change the BIOS boot order in the Setup Menu.</p> <p>010b: Force BBS mode. The agent will assume the BIOS is BBS-compliant, even though it may not be detected as such by the agent's detection code. The user can NOT change the BIOS boot order in the Setup Menu.</p> <p>011b: Force PnP Int18 mode. The agent will assume the BIOS allows boot order setup for PnP Expansion ROMs and will hook interrupt 18h (to inform the BIOS that the agent is a bootable device) in addition to registering as a BBS IPL device. The user can NOT change the BIOS boot order in the Setup Menu.</p> <p>100b: Force PnP Int19 mode. The agent will assume the BIOS allows boot order setup for PnP Expansion ROMs and will hook interrupt 19h (to inform the BIOS that the agent is a bootable device) in addition to registering as a BBS IPL device. The user can NOT change the BIOS boot order in the Setup Menu.</p> <p>101b: Reserved for future use. If specified, is treated as a value of 000b.</p> <p>110b: Reserved for future use. If specified, is treated as a value of 000b.</p> <p>111b: Reserved for future use. If specified, is treated as a value of 000b.</p>
7	RFU	Reserved. Must be 0.
6	RFU	Reserved. Must be 0.
5	DFU	Disable Flash Update. If this bit is set to 1, the user is not allowed to update the flash image using PROSet. Default value is 0.
4	DLWS	Disable Legacy Wakeup Support. If this bit is set to 1, the user is not allowed to change the Legacy OS Wakeup Support menu option. Default value is 0.
3	DBS	Disable Boot Selection. If this bit is set to 1, the user is not allowed to change the boot order menu option. Default value is 0.
2	DPS	Disable Protocol Select. If set to 1, the user is not allowed to change the boot protocol. Default value is 0.
1	DTM	Disable Title Message. If this bit is set to 1, the title message displaying the version of the Boot Agent is suppressed; the Control-S message is also suppressed. This is for OEMs who do not wish the boot agent to display any

### 1.1.7.3 Configuration Customization Options (Word 32h)

Word 32h of the EEPROM is used to store the version of the boot agent that is stored in the flash image. When the Boot Agent loads, it can check this value to determine if any first-time configuration needs to be performed. The agent then updates this word with its version. The format of this word is:

BIT(S)	Name	Function
15 - 12	MAJ	Boot Agent Major Version. Default value is 0
11 - 8	MIN	Boot Agent Minor Version. Default value is 0
7 - 0	BLD	Boot Agent Build Number. Default value is 0

### 1.1.7.4 IBA Capabilities (Word 33h)

Word 33h of the EEPROM is used to enumerate the boot technologies that have been programmed into the flash. This is updated by IBA configuration tools and is not updated or read by IBA.

BIT(S)	Name	Function
15 - 14	SIG	Signature. Must be set to <b>01</b> to indicate that this word has been programmed by the agent or other configuration software.
13 - 5	RFU	Reserved. Must be 0.
4	SAN	SAN capability is present in flash.
3	EFI	EFI UNDI capability is present in flash.
2	RPL	RPL capability is present in flash.
1	UNDI	PXE/UNDI capability is present in flash.
0	BC	PXE Base Code is present in flash.