ing full compatibility with the installed base of existing IEEE 802.11 equipment. This decoupling can result in the savings of tens or hundreds of millions of dollars to semiconductor, computer, and networking companies.

FIG. **4** depicts a conceptual architectural diagram of the partitioned medium access control disclosed in U.S. patent application Ser. No. 10/421,265. As shown in FIG. **4**, medium access control **320** is partitioned into upper medium access control **410** and lower medium access control **420**, interconnected as shown. Upper medium access control **410** provides a subset of medium-access-control services that are independent of physical control **330**, including transmit queuing, encryption, decryption, authentication, association, re-association, scanning, distribution, and traffic categorization (for the purposes of, for example but without limitation, quality-of-service (QoS) provisioning), as is well known in the art. The upper medium access control may also perform those functions within MAC data service and MAC management service that are independent of physical control **330**, including power management, queue management, duplicate detection and filtering, fragmentation, defragmentation, queue management.

Lower medium access control **420** provides remaining medium-access-control services (i.e., those that are dependent on physical control **330**), including channel access, receive validation (e.g., frame control sequence, forward error correction, etc.), and those that involve hard real-time functions and/or are physical layer-implementation dependent, such as response control (e.g., clear-to-send [CTS], acknowledgement [ACK], etc.), as are well known in the art.

There are four criteria for determining which functions belong to lower medium access control **420**:

i. Functions that are specific to a given physical layer or given type of physical layer;

ii. Functions that require knowledge of the internal state of the physical layer or knowledge of implementation-specific operational characteristics of the physical layer;

iii. Hard real-time functions necessary to generate conformant communication (signaling) sequences as viewed on the (wireless) medium; and

iv. Particular other functions that "belong" in the lower medium access control because of general implementation considerations, or because a party with sufficient clout (e.g., Microsoft, etc.) wants them to be there.

SUMMARY OF THE INVENTION

The present invention recognizes that the bifurcation of the medium access control into upper and lower medium access controls, while providing the advantages described above, also imposes two demands on the medium access control architecture. First, it requires means for transferring data between the upper and lower medium access controls, which might increase the cost of the wireless station (e.g., by adding a dedicated communication interface, etc.) or might consume precious existing connectivity resources. Second, it requires means for coordinating the transfer of data between the upper and lower medium access controls (e.g., interrupts, handshaking, etc.), which typically requires an additional layer of software (e.g., drivers, etc.), and, therefore, increases the complexity of designing, maintaining, and modifying the wireless station.

The illustrative embodiment of the present invention is a partitioned medium access control architecture that addresses these two demands. In particular, the upper and lower medium access controls communicate via a bus that is already present in wireless terminals for transferring data between the host processor (i.e., the processor of the host device) and one or more peripherals (e.g., the wireless station, a printer, a memory, etc.). This enables the upper and lower medium access controls to transfer data without adding any communication means to the wireless station. In addition, the illustrative embodiment utilizes the memory-mapped master mode of the bus to pass native data structures between the upper and lower medium access controls by reference (i.e., by passing their memory addresses), thereby reducing some of the software required for coordinating data transfer.

Furthermore, the illustrative embodiment of the present invention recognizes that since

(i) the integrated circuit for the host processor typically has a significant number of unused transistors, and

(ii) the upper medium access control is independent of the lower medium access control and of the physical control, and

(iii) the bus enables communication between the host computing device and the wireless station,

then the upper medium access control can be embedded along with the logical link control and higher layers into the host processor's integrated circuit and software, resulting in a lower-cost implementation.

For the purposes of this specification, the term "peripheral" is defined as an auxiliary apparatus (e.g., an input/output device, a memory, etc.). For the purposes of this specification, the term "shared bus" is defined as a bus that enables the transfer of signals between a processor and one or more peripherals. As is well known in the art, signals can be transferred between a shared bus and a peripheral via an input/output controller, for example, or by a direct connection.

The illustrative embodiment comprises: (a) a processor for generating an outgoing message to be transmitted to a remote terminal via a first service data unit; (b) a first circuit for: providing a first medium-access-control service, and generating a first protocol data unit based on the first service data unit; (c) a second circuit for: providing a second medium-access-control service, and generating a second protocol data unit based on the first protocol data unit; (d) a physical control for: generating a third protocol data unit based on the second protocol data unit, and transmitting a first signal based on the third protocol data unit to the remote terminal; and (e) a bus for: transferring signals between the processor and a peripheral, and transferring the first protocol data unit from the first circuit to the second circuit.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** depicts a schematic diagram of wireless local area network **100** in accordance with the prior art.

FIG. **2** depicts a schematic diagram of wireless terminal **101**-*i*, as shown in FIG. **1**, in the prior art.

FIG. **3** depicts a conceptual architectural diagram of wireless station **202**, as shown in FIG. **2**, in accordance with the prior art.

FIG. **4** depicts a conceptual architectural diagram of the partitioned medium access control disclosed in U.S. patent application Ser. No. 10/421,265.

FIG. **5** depicts a schematic diagram of a wireless terminal in accordance with the illustrative embodiment of the present invention.

FIG. **6** depicts a block diagram of host computing device **501**, as shown in FIG. **5**, in accordance with the illustrative embodiment of the present invention.