Ascend

FAQ

# Multiband MAX

***1. What is the Multiband MAX product family?***

The Multiband MAX™ products are the newest members of the Multiband family of bandwidth-on-demand controllers. The Multiband MAX platforms position users for growth by providing remote networking upgrades and can be configured to a full MAX. Multiband MAX 1800, Multiband MAX 2000, Multiband MAX 4002, Multiband MAX 4004 and most recently the Multiband MAX 6000 constitute the product line.

The Multiband MAX 1800 is a chassis with two expansion slots, eight BRI interfaces, a DB9 (RS-232) console port interface and Ethernet interfaces (AUI or UTP). The base model offers a two-port module installed with all DTE features enabled.

The Multiband MAX 2000 is a chassis with two expansion slots, one T1 interface, a DB9 (RS-232) console port interface and Ethernet interfaces (AUI or UTP). The base model offers a two-port module installed with all DTE features enabled.

The Multiband MAX 4002 and Multiband MAX 4004 are chassis with six expansion slots, four T1 interfaces (two T1s are enabled for the 4002), a DB9 (RS-232) console port interface and Ethernet interfaces (AUI or UTP). The base model offers a two-port module installed with all DTE features enabled.

The Multiband MAX 6000 is a chassis with six expansion slots, four T1 interfaces, a DB9 (RS232) console port interface and Ethernet interfaces (UTP, autosensing 10/100 Base-T interface). The base model offers a two-port module installed with all DTE features enabled and MAXDAX.

The base configurations were designed to give the customer a platform to grow or customize his/her network needs.

***2. When should a Multiband MAX product be used versus a Multiband VSX or Multiband Plus?***

The Multiband Plus and Multiband VSX are products designed for multimedia and videoconferencing applications. The Multiband MAX products have the same capabilities but provide a scalable platform for upgrading to remote access capabilities.

***3. How is the Multiband MAX series scalable?***

The chassis have expandable slots, permitting users to customize application needs. Also, the Multiband MAX permits customers to fulfill initial needs of data backup/overflow or videoconferencing. The platform may be upgraded for use as a dial-up remote access, for telecommuting or Internet Access.

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***4. What is the difference between a Multiband MAX product and standard MAX products?***

Software is bundled in the Multiband MAX products that allows users to perform videoconferencing, backup and overflow management and disaster recovery today at affordable cost. The scalable Multiband MAX platform provides for incremental expansion to the power of a full MAX with the insertion of remote access modules. This provides users with a cost-effective solution for managing their growth needs. MAX products are multiprotocol Wide Area Network (WAN) access switches that allow corporations, carriers and service providers with immediate need for remote access capability to extend their backbone networks to support remote office access, telecommuting and Internet access.

***5. If I need remote access capabilities in the future, how do I upgrade?***

Customers may order the remote access upgrade through their sales representative. They will need to provide the unit serial number. Ascend provides software with instructions for enabling the remote access function.

***6. Is the Multiband MAX interoperable with all Ascend products?***

Yes. The Multiband MAX is fully interoperable with other Multiband products such as the Multiband Plus and the Multiband VSX. The Multiband products can manage remote units via inband management during an inverse multiplexing call (Manual or Delta modes). Furthermore, when the Multiband MAX is upgraded for remote access, it can interoperate with all of Ascend's Pipeline® products.

***7. How many applications on the Multiband MAX products can be used simultaneously?***

The only limitations are the combination of expansion slots, modules and network capacity.

***8. How far can a Remote Port Module (RPM) extend the distance between the DTE equipment and the Multiband MAX inverse multiplexing equipment?***

The RPMs can support a T1 rate up to 1700 feet and 384K at over 3000 feet.

***9. How many countries can I reach?***

Multiband MAX products are currently homologated in over 30 countries. Ascend is continually adding new countries to its list. You can obtain current listings at the Ascend web site (www.ascend.com).

***10. Can Multiband MAX products handle carrier diversity?***

Yes, many customers currently have T1 circuits from different carriers to ensure switched network access reliability for critical missions with the Multiband MAX 4002, the Multiband MAX 4004 and the Multiband MAX 6000.

***11. How can a Multiband MAX 4002, Multiband MAX 4004 and Multiband MAX 6000 be efficient with a full T1 access if only some channels are used?***

A T1 interface can be used for "drop-and-insert" or PRI-T1 conversion for taking PRI from a carrier and providing T1 tandem trunking to a PBX. In this way, extra channels can be used to carry voice circuits to and from a PBX. Also with the MAXDAX feature (which comes bundled on the MAX 6000) a flexible switch network infrastructure can be designed to use all the excess DS0 channels. This is advantageous for the customer since an underutilized network facility can only mean wasted dollars.

***12. What is MAXDAX?***

MAXDAX is a software feature available as an option on Ascend's MAX 4000/6000 products which permits the ability to connect DS0 channels based on configured parameters. By carefully constructing a switched network, there effectively are few limitations to prevent full utilization of the purchased network facilities. For example, if you have 3 of 4 T1s on private leased circuits and the fourth circuit is connected to public switched services, you may route calls to and from any of the private circuits to the public service. The routing is a "tandem trunk call" that can be based upon direct mapping or a simple decision process by the MAX using the destination dial numbers and channel service requests. This software feature is prebundled with the Multiband MAX 6000.

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***13. What does it take to install a Multiband MAX product?***

The Multiband MAX has a DB9 serial interface for console port connection with a VT100 monitor. Most customers use a PC which emulates a VT100 to manage the configuration and initial installation of the unit. The installation time can be as short as 10 minutes, depending upon the readiness of the carrier lines and the data terminal equipment. Another method of managing and configuring the Multiband MAX products is through the Ethernet connection via the AUI or 10Base-T connectors using Telnet. However, an initial setting of the Multiband MAX IP address must be registered.

***14. Why would I need to use an Ethernet interface?***

In some cases, it may never be necessary. In many cases it is a big advantage. Network configuration and control has become a necessity in today's datacommunications environment. Videoconferencing in its technical essence is a data device using the digital network. It's become convenient for many customers to have a central control site manage their equipment, which are placed over a wide geographic region using an Ethernet network. Call management, call detail reporting and remote configuration can all be accomplished via the Internet or intranet by a fewer number of managers. This eliminates the need to have a technical manager at every site.

***15. How large is the bandwidth on the MAX products provided to an inverse multiplexing port?***

The maximum bandwidth varies depending first upon the unit type. Since the Multiband MAX 1800 has a network maximum of 16 DSOs, the maximum bandwidth is 1024 Kbps. The Multiband MAX 2000 has a maximum network bandwidth of one T1 (1544 Kbps). The Multiband MAX 4002 and Multiband MAX 4004 have two T1s and four T1s respectively. The Multiband MAX 6000 has 4 T1s. The next limitations are in the inverse multiplexing modules. The AIM six-port module has 32 DSOs aggregate, while the AIM two-port module has 64 DSOs aggregate. Therefore, an individual port on the six-port module has a maximum throughput of 2048 Kbps. An individual port on the two-port module has two T1s.

***16. Can I run a data application through the AIM six-port module?***

Yes, it can be used as a dial backup port. It will require that the DTE device controls the dialing via the various dialing protocols or by toggling the Data Terminal Ready (DTR) lead.

***17. Do I have to buy my application cables from Ascend?***

The Ascend Imuxes use a DB44 interface, which combines RS-366, RS-449, and V.35 interfaces. Also, desktop equipment (such as codecs and routers) provided by most vendors use slightly different pinouts for the above interfaces. As a result, we have different cables for those vendors.

***18. How do I figure out what cable I need?***

The table below covers the vast majority of applications. If your system does not conform to these, ask your Ascend representative for further instruction.

| **CODEC Model Application Cable** | |
|---|---|
| CLI REMBRANDT | MBHD-V35CLI |
| PICTURETEL50 | MBHD-PT1000 |
| PICTURETEL1000 | MBHD-PT1000 |
| PICTURETEL2000 | MBHD-PT1000 or MBHD-449PT (check with CODEC representative) |
| PICTURETEL4000 | MBHD-449PT |
| PICTURETEL MCU | MB2VHD-3PT50 for use with 6 port AIM module |
| VTEL MEDIA MAX | MBHD-449VTC |
| VTEL non MEDIA MAX | (Vtel supplies the cable) |

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***19. What extended features does the AIM protocol offer that the BONDING standard does not?***

Currently, there is only one Bandwidth ON Demand INteroperability Group (BONDING) mode (Mode 1) ratified under the BONDING standard. Ascend supports this standard and is committed to implement any future ratified modes. However, Ascend feels that this is inadequate for some solutions required by the consumer. Ascend thus uses a propriety form called Ascend Inverse Multiplexing, or the acronym AIM. AIM includes support for three modes: Static, Manual and Delta. Static is effective the same as BONDING mode 1. When channels are aggregated, overhead management is removed and data is passed between the DTE devices. The downside of this mode is that if any of the channels being aggregated encounters a "hit," it may render any data passing through corrupted.

Manual mode has a 0.2% overhead while a session is up. Unlike the Static mode, if a network channel takes a hit, the unit attempts to recover the channel and maintain the call up and ensure data integrity. If the channel is corrupted to the point that it cannot be recovered, this mode resynchronizes the session by dropping the bad channel and resumes the session at a lower channel rate.

There are desktop equipment devices that require an NX64 data rate and cannot function at NX56. Ascend uses its Delta Mode for this requirement. For example, if a device is in an NX56 environment (T1, LECs with 56K only access, etc.), a 384K call can be made end to end by dialing seven channels for a network rate of 392K. Under Delta, a 384K data rate is passed between the DTE devices as if it were NX64. The Ascend Imux uses the leftover "8K" to monitor overhead and provide remote management capabilities. Ascend feels that it can provide the best solution to the customer when it comes to deciding whether or not to use BONDING. With an Ascend product, you can get both.

***20. What is inverse multiplexing?***

Inverse multiplexing is the ability to aggregate discrete data channels on one side of a “black box” and create a single large data channel out the other side. In the products discussed below, discrete switch digital channels (such as 56K or 65K) may be aggregated to deliver a single synchronous serial data stream on a V.35 or RS-499 interface.

***21. What applications use inverse multiplexing?***

The most common applications today use inverse multiplexing for direct dial videoconferencing and WAN connection backup/overflow over the switched digital network.

***22. What is BONDING, AIM and MP+?***

They are forms of inverse multiplexing. In 1990, Ascend created an inverse multiplexing protocol for serial synchronous data. This protocol provided five management methods of delivering data for specific applications. This became known as Ascend Inverse Multiplexing, or AIM.

In 1991, a consortium of companies including Ascend formed to agree on an interoperability standard for inverse multiplexing. This group became known as the Bandwidth On Demand Interoperability Networking Group, hence the acronym BONDING. Over time, the term bonding lost its specific meaning of aggregating channels to a wideband serial data stream. Its meaning came to include any form of data delivery sent across multiple channels. An example is Multilink Protocol (RFC1717) or Multilink Protocol Plus™ (MP+) which defines adding and/or deleting switched digital channels for the delivery of packet data in bridging and routing networks. When a Multiband MAX is upgraded for remote access, MP+ is available.

***23. What kind of inverse multiplexing equipment does Ascend provide?***

Ascend offers products for AIM, BONDING and MP+. The Pipeline series handles MP+ type of inverse multiplexing. The Multiband product line handles the AIM and BONDING version of inverse multiplexing.

***24. Why are Ascend Multiband inverse multiplexers a better choice?***

The BONDING consortium has only ratified one mode of operation at this time. While Ascend will upgrade at no charge for future modes, there are current needs for the five management modes that AIM can provide.

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### *25. What is important about RS-366, X.21 and V25bis dialing?*

They are dialing protocols which permit any data terminal equipment such as a router or video codec to communicate with a Multiband or Multiband MAX product for destination dialing. For example, most codecs have a keypad to send a data string. This string of numbers is relayed to the Multiband or Multiband MAX equipment via special data leads. The Multiband uses this information to interpret a programmed calling type (such as setting up a session of six channels) with a destination dial number to reach the far end. This method has become common in the industry to allow interoperability with most codecs available on the market today.

### *26. What is the Dynamic Bandwidth Allocation™ feature?*

The Multiband MAX products with the two-port AIM module can support leased circuit access for data and dynamically add channels when data traffic exceeds a utilization threshold, or remove channels when utilization falls below the user defined threshold. The Multiband MAX is actually monitoring the High-level Data Link Control (HDLC) to determine if data or "no data" characters are going across the host port. The Multiband MAX then averages the data percentage over a user-defined time frame and adds or removes channels as necessary.

This same feature also monitors the traffic across the switched network and leased channels with submanagement information. Its purpose is to ensure the integrity of each DSO channel. Should the error checking indicate a channel problem, the Multiband MAX removes the suspect channel. In the case of switched channels, it drops the suspect channel and, if necessary, redials to obtain a different channel circuit. In the case of the leased circuit, it is “placed aside” and is continuously monitored until the integrity of the circuit returns. When the integrity of the leased circuit is satisfactory, it is returned back to service.

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