PacketBand-TDM-1 & -1MC
Technical Specification

NOTE: All references to the PacketBand-TDM-1 are also relevant for the TDM-1MC. The extra features on the TDM-1MC are briefly identified within.

1. Connectivity Overview
The PacketBand-TDM-1 (TDM-1) supplies a clock-locked clear channel or structured E1 or T1 circuit over Ethernet, IP, or MPLS networks.

It supports a single E1/T1 and can be used in pairs or with other members of the PacketBand range.

DIAGRAM 1
A 4-port PacketBand-TDM-4 as a central site unit for multiple single-port TDM-1s.

A 2U central site chassis is also available.

2. Interfaces
A single E1/T1 interface (user switchable)
- RJ45 120Ohm or 75Ohm (user switchable) via converter cable.
- Full E1/T1 (user selectable) or a fractional G.704
- 10/100/1GE UTP (Unshielded Twisted Pair RJ45) interface to the WAN
- A local 10/100/1GE UTP Ethernet port
- SFP cage with the appropriate SFP Module interconnects to a fibre WAN
- RJ12 management port (PacketBand is also manageable across the packet network)
- IEC connector for quality internal AC PSU (DC options available)

3. Clocking
Clock recovery, accuracy and stability is key to many TDM applications. This clock recovery performance must be maintained when migrating to an unclocked packet network solution.

Many types of equipment expect similar performance to that of traditional leased lines which are generally referenced to the G.823 Synchronous Interface mask. The PacketBand ranges are specifically designed and optimized to excel in this area and when used on high-quality networks can meet and exceed the G.823 requirements.

The clock recovery methods use a variety of mechanisms. These include sophisticated algorithms which allow users to "tune" the performance to match the network characteristics; after all, networks differ greatly – an extreme example being between the public Internet and a private managed networks supporting Quality of Service (QoS).

3.1 Clock Algorithms
The TDM-1 supports three advanced algorithms as standard. These are designed and optimized for different network types, broadly-speaking one for high quality managed networks with low jitter (PDV) and packet loss, one for networks with lower performance characteristics and one for applications where stability is paramount but the G.823 mask is not targeted. Within these options are two further settings allowing tighter optimization if required.

This means PacketBand can be configured to extract the best possible service for any given network.
3.2 Clock stability
Clock frequency stability performance can exceed AT&T TR-62411, T1.403, G.824 and G.823 on quality networks for both Traffic and the much more demanding Synchronization requirements. This is an important strength as many services will either require very accurate synchronization to run correctly (for example mobile backhaul) or there could be multiple clock sources within the network which all require aligning accurately to ensure error-free and reliable services.

PacketBand can deliver reliable services that clock as accurately as traditionally delivered leased lines.

PacketBand alarms to DbManager should the recovered clock’s stability move outside of configured historic thresholds, giving immediate information should the clock deteriorate for any reason.

3.3 Clock Sources and Clocking
Although easy to use and configure, PacketBand offers customers a number of solutions for different clocking scenarios as briefly described below. Most situations will use the first two options shown, however some applications, devices and networks will benefit from the others. The PacketBand’s advantage is not only very accurate clocking and reliability, but also the flexibility to work in different modes to suit a variety of situations and applications.

A clocking hierarchy is configurable and the PacketBand automatically switches between sources and generates an Alarm.

- TDM port
  Clock can be extracted from the attached user ports. This would normally be used at the “Master” end of a circuit with the remote “Slave” unit recovering clock across the packet network and clocking its attached equipment as described in “Adaptive” below.

- Adaptive
  Using sophisticated recovery algorithms, clock can be derived from any of the in-coming packet streams from a remote “Master” PacketBand. The remote “Master” would generally have a high quality clock source presented on its TDM port. This allows the “Slave” TDM-1 to adaptively recover this clock very accurately across the packet network, in effect synchronising both devices to a common clock.

- Loop-Timing
  In instances where both ends of the circuit have a good quality common clock source (for example ISDN clocks into PBXs) both TDM-1s can be set to clock from this local source.

- Plesiosynchronous – PacketBand-TDM-1 only
  Plesiosynchronous (or plesiochronous) working means the TDM-1 can support different clocks in different directions. The main application is where the TDM links at both ends provide clock and these clocks may be slightly different.

- Asymmetrical Working – PacketBand-TDM-1 only
  When running in G.703 unstructured mode, PacketBand-1 is able to transmit and receive packets of different sizes and for the packets to be sized down to the individual byte level. This configuration is used in certain types of networks, mainly wireless, where the transport is clocked at the 64KHz level and where a phenomenon called “beating” would otherwise be experienced. Please see the PacketBand-TDM-1 Application Overview or contact Transition Networks for more information.

- Multicast – PacketBand-TDM-1MC only
  The PacketBand-TDM-1MC supports an innovative out-of-band clocking method via Multicast services. This has important advantages for larger networks and some vertical markets such as broadcasting. Clocks can be recovered extremely accurately across very large networks yet the bulk of the traffic load (the user data) can be given a low priority. See separate TDM-1MC Application Overview.

- Internal
  If no external quality clock is available, the TDM-1 can use its internal oscillator.

- Clock Hold-Over
  Problems in the packet network, for example a sudden increase in jitter or an interruption in packet delivery, can cause an unwanted movement in the recovered clock. To avoid this PacketBand enters a “hold-over” state, maintaining the recovered clock at the last value prior to the problem. This means the clock is always stable irrespective of issues within the network. The mid range oscillator option and timing circuits within the TDM-1 maintain this hold-over clock to within 15ppb.
3.4 Oscillators
The quality of the oscillator when recovering the clock across the packet network is very important. The receive PacketBand running “Adaptive” clocking uses a variety of different information and many calculations to ascertain how to modify its on-board oscillator’s output to match the clock of the remote or “master” end. It can be seen that the more stable the on-board oscillator, the more stable the recovered clock.

TDM-1 is fitted as standard with a high quality Temperature Stabilized Enhanced Stratum3 TCXO oscillator which is ideal for all but the very most exacting applications. This delivers +/-12ppb over the full temperature range and typically in “Hold-Over” better than +/- 15ppb in a 24 hour period with the unit operating at ambient room temperature.

Note that the quoted figures are for the stability of the on-board oscillator itself, not the actual clock provided to attached devices. PacketBand adds/subtracts from this internal clock to derive the recovered clock which in the majority of instances is significantly superior to the base oscillator with zero wander/drift over a period of time.

Oscillators comply with G8261/Y.1361 and detailed specifications are available on request.

Actual MTIE report from a customer’s testing showing excellent adaptive clock results with PacketBand being close to the PRC reference source and significantly lower than the G.823 Synch mask.

5. Ethernet and Packet Handling
Support for 10/100/1GE. Support for packets up to 10,240 bytes in size. Single MAC and IP address, Default Gateway and SubNet Mask, support for DHCP. Disordered packets are reordered automatically.

5.1 Prioritization
TDM packets can be assigned IP Diffserv (DSCP) or ToS and 802.1p CoS values. Packetband supports full 802.1q tagging and the associated 802.1p CoS prioritization levels. All egress packets including TDM links can be prioritized across four output queues using CoS (802.1p) or Diffserv/ToS values.

5.2 VLAN Handling
PacketBand's powerful and latest-generation on-board packet switch offers advanced 802.1Q VLAN facilities such as multiple TAGing, TAG insertion/removal, port routing based on default TAG or a Global TAG table. Egress packets can be TAGed, have multiple TAGs or be stripped of TAGs according to configuration. PacketBand also supports Provider Mode whereby customer packets are TAGed for transport across the network with the TAGs being removed before passing back to the customer at the far end.

5.3 Link Aggregation Control Protocol (LACP)
PacketBand-TDM-1 and TDM-1MC
This powerful feature enables two or more Ethernet ports connected between PacketBand and the network switch to be aggregated together as defined in LACP IEEE 802.3-2005. This aggregation makes it appear as if the multiple links are acting as a single high capacity circuit. Furthermore, it adds a level of redundancy with automatic rerouting. See the TDM-1 and TDM-1MC Application notes for further information.

5.4 Rapid Spanning Tree Protocol (RSTP)
PacketBand-TDM-1 and TDM-1MC
RSTP (as defined in IEEE 802.1D-2004) identifies the means to build an Ethernet network which contains physical loops between bridges. This facility enables PacketBands to be connected to more than one network switch via different circuits and to provide an automatic fall-back in the case of a link failure. This is covered in more detail in the Packetband-TDM-1 and TDM-1MC Application Overviews.

5.5 Rate Limiting
Individual packet ports can have the traffic capacity restricted in various ways, even though the access is 10/100/1GE. This is particularly useful on the second Ethernet port when connected to user LANs where the main link to the network could be “swamped” by data from attached devices.

4. PDV (Packet Delay Variation or jitter)
The PacketBand-TDM-1 supports up to 400ms of PDV or jitter depending upon configuration parameters. This is normally far in excess of the PDV experienced on private networks and many Internet connections.

The jitter buffer can be set in msec granularity and adjusted manually or automatically whilst the circuit is in place, overcoming ‘skew’ at start up time caused by the first packet in the buffer arriving later or earlier than average.

The buffer re-orders out of sequence packets. If packets are lost by the network the data to be transmitted to the attached device by PacketBand is user configurable.

Statistics are available to provide information on usage.
6. Overheads
In order to transport TDM data over the packet network, there is some overhead caused by encapsulating the data inside the packet network protocol.

6.1 The Protocol
PacketBand supports a number of different packet network protocols. The user’s choice of a particular network will affect the overall size of packet headers.

6.2 Size of Packet
PacketBand supports a configurable packet size per Logical Link. There is a trade off between transmitting small packets at a fast rate (low latency, large overhead due to protocol headers) and transmitting larger packets at a slower rate (higher latency, smaller overhead).

Typical overheads are in the 5% to 10% range. Transition Networks has a spreadsheet available which identifies overheads based on a number of different parameters. Contact Transition Networks or your supplier.

7. Latency
The total end-to-end latency experienced between two devices using PacketBands is made up of four elements:

7.1 Processing Delay
The latency or processing delay through each PacketBand is optimized to be as low as possible. Typical processing delay is less than 1msec.

7.2 Transmit Delay
This is the time necessary to wait for sufficient incoming data to arrive from the attached device so a packet of the configured size can be built and transmitted over the network. This is typically around the 1msec range. See also 6.2 above.

7.3 Jitter
Packet network networks differ in how consistently packets pass through them; some packets take more or less time than the average. PacketBand provides a synchronized clocked circuit to the attached devices and therefore has to have data ready and available for the relevant clock pulse. PacketBand buffers the fast packets so as to ensure the slow ones can arrive in time to be used. The amount of buffering is user-configurable and will depend upon the performance of the network. Note that this buffering is only required on the PacketBand receive data path and the amount of buffering needed (which equates to latency) is a result of the network, not PacketBand.

7.4 Transit Delay
All IP networks have different average transit delays. These vary depending upon a large number of criteria, including the number of “hops” and whether satellites are involved. Typically, domestic links are very fast, inter-continental around 60msec and a satellite can add 250msecs. Please consult your network supplier.

Summary: between any pair of PacketBands on a terrestrial network, the most significant element contributing to latency is size of the Jitter Buffer (which is user configurable). This is directly dependant on the performance of the network and outside the control of PacketBand.

8 CESoP Modes
PacketBand supports both “Structure Aware” and “Structure Agnostic” modes.

Complies with ITU-T recommendation Y.1413, IETF PWE3 draft standards CESoPSN, SAToP and CES draft IAs from MEF and MFA.

9. “Logical Links” and “Grooming”
A Logical Link is a connection between any two PacketBands. In many applications the TDM-1 will be communicating with just one other PacketBand and thus needs 1 Logical Link. If the TDM-1 is running a channelised G.704 trunk then it may be communicating with many remote locations, grooming the multiple circuits into a single G.704. TDM-1 can optionally support 16 or 32 links. The IP ToS or Diff Serv and Ethernet VLAN Tagging is configurable on a per-Logical Link basis.

10. Approvals
All approvals completed in a UK Accredited laboratory. Reports available. CE marked.

Safety and Emissions (EMC) approvals (CE and FCC)
PacketBand TDM-1 is RoHS compliant without the use of any “exceptions”.

11. Management
11.1 Overview
PacketBand can be locally or remotely configured using Transition’s easy-to-use high functionality DbManager GUI software.

DbLite is supplied free with each unit.

Optionally available are different versions to support requirements for larger or more integrated networks. It is sophisticated but simple to use via an intuitive Graphical User Interface (GUI) which controls, configures and monitors individual units and complete networks, currently Microsoft-based, it can also generate SNMP Traps and Alarms.

The DbManager supplied with PacketBand (DbLite) allows control and visibility of a single PacketBand at any one time via a single PC. Other options support multiple real-time work-stations, a network of PacketBands and links, and have additional capabilities such as SNMP Traps & Alarms and continuous polling of devices.
Used by various organizations with different network sizes - up to and including carriers - versions of DbManager deliver a networkwide view of all PacketBands and links via a 4-layer “treestructured” overview. The status of all PacketBands and links are easy to identify with Alarms being colour coded and passed up the tree. Separate windows provide Event and Alarm information with the ability for operators to add comments etc. Different access levels and passwords provide operators with appropriate capabilities within the program.

An option to encrypt the management traffic across the packet network is available, together with a key management and update system.

Demonstration software is available which illustrates both the DbManager and the PacketBand features. Please ask for information.

11.2. Configuration Changes
Configuration changes on PacketBand are made via the DbManager. All configurations can be stored on DbManager. Installations require little or no expertise in the field as most configurations (other than IP address) can be performed remotely. Configurations are held in non-volatile memory. DHCP is supported.

11.3 Management Tools
A wide number of statistics are available for the E1/T1 circuit and Ethernet port.

11.3.1 Alarms/Events
All Alarms are reported back to the DbManager and presented in a dedicated window with descriptor.

Events and Alarms are held within non-volatile memory locally in the TDM-1 for access via DbManager.

A dry contact alarm relay is available in the RJ12 port.

11.3.2 Graphs
DbManager and PacketBand provide several network monitoring tools available with graphical output:

- Maximum, minimum and average jitter buffer usage over time. This useful screen shows how the network and link are performing. Particularly useful information includes Lost and Late packets and jitter buffer usage figures.

- Average network jitter over time A graphical representation showing Minimum, Maximum and average buffer usage which provides important information on network performance.

- Recovered clock movement over time This graph shows frequency stability and the status of the acquiring clock.

These are invaluable tools for optimising PacketBand and for acquiring information on network performance.

11.3.3 “Sniffer” port
The second Packet port on PacketBand can be configured as a “sniffer” port duplicating TX and/or RX packets on the network Packet Port. This is a very useful diagnostic tool.

11.3.4 Loop-Backs
Loops can be placed on the TDM port in either direction and at the Ethernet level.

11.3.5 Pings
PacketBand generates Ping/Trace Route and responds to Ping and UDP Echo requests.

11.3.6 Boot Test
Internal test on power-up with results visible via DbManager.

11.4 Software/Firmware Updates
New software can be loaded via the DbManager to PacketBand- TDM. New software is loaded to the off-line sector of Flash and is confirmed via a CRC. Users can switch to the new software at any time. DbManager can load new code to multiple PacketBands simultaneously.

12. Power

12.1 Internal High-Quality AC supply
Auto-sensing, standard IEC input.

12.2 Optional DC models with 48VDC or 24VDC
Replaces AC supply. Specify when ordering.
Specifications

A. Clock Recovery
Advanced algorithms tunable for different network characteristics as standard. Capable of exceeding G.823 Synchronous Interface requirements (subject to network performance)

B. TDM port (E1)
RJ45 connector
Presents as DCE (crossed cable for DTE)
120 Ohm
75 Ohm user-selectable via converter cable
G.703 unstructured
G.704 channelised
ITU G.706
Selectable CRC4/non-CRC4
HDB3
Transparent to user signaling

C. TDM port (T1)
RJ45 connector
Presents as DCE (crossed cable for DTE)
100 Ohm
Unframed 1.544Mbps
Framed 1.536Mbps (robbed-bit)
ESF or D4 selectable
B8ZS or AMI selectable
Transparent to user signaling

D. Ethernet Interfaces
2 x RJ45 UTP
10/100/1GE
Auto-sensing or manual
SFP cage (module not supplied) for various fibre modes
1 network and 1 or 2 user ports (second port using SFP)

E. Local Management Port
RJ12
Asynchronous
Auto-sensing to 115kbps
Also remote access via packet network

F. Oscillator Performance*
Hold-over 24hrs 4ppb
Aging per day 0.5ppb
Temperature Stability 14ppb

* Figures based on typical parts and performances. Individual oscillators may vary slightly either way. Temperature Stability range -5DegC to +70DegC assumes 20 minutes from power on. Aging and holdover at constant temperature

G. IP & MAC Address
Single MAC address, IP address, subnet mask and default gateway
Support for DHCP

H. Configuration
Held in non-volatile memory

I. Power (AC)
Internal via IEC connector
Auto-sensing 96VAC-240VAC
Max consumption 0.2Amps RMS @230VAC
MTBF 400,000hrs

J. Power (DC)
1. Nominal -48VDC
4mm terminal block
-33VDC to -75VDC
0.35A max
MTBF 1,790,000hrs

2. Nominal -24VDC
4mm terminal block
-18VDC to -75VDC
0.55A max
MTBF 800,000hrs

K. Dimensions & Environment
Metal chassis and front/rear panels
W – 225; D – 200; H – 44mm
Weight – 0.9Kg/2lb
Optional 19” rack-mount kit; 1 unit per 1U or 2 units side-by-side per 1U
Operating Temperature -20°C to +55°C
Humidity 10-90% non-condensing

L. Maintenance
There are no serviceable parts or maintenance required

M. Approvals
EMC
EN55022:1988
EN55014:1988
EN61000-3-2/3:1995
AS/NZ CISPR22:2000
FCC Part 15(B)
RoSH Compliant without the use of exceptions

N. Safety
EC EN60950-1:2002
ACA TS001:1997
ACS/NZ60950:2000
AS/NZS3260:1993
IEC950
## PacketBand-TDM-1 & -1MC

### Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PB-TDM-1-AC</td>
<td>Single T1/E1 CESoPSN unit. (2xUTP) 10/100/GE ports and (1xSFP) port for WAN with Asymmetrical and Plesiochronous clocking. Includes LACP, RSTP, Enhanced Clock, 32 logical links, serial control cable and DbManager Lite. AC Power.</td>
</tr>
<tr>
<td>PB-TDM-1-24VDC</td>
<td>Single T1/E1 CESoPSN unit. (2xUTP) 10/100/GE ports and (1xSFP) port for WAN with Asymmetrical and Plesiochronous clocking. Includes LACP, RSTP, Enhanced Clock, 32 logical links, serial control cable and DbManager Lite. 24 VDC Power.</td>
</tr>
<tr>
<td>PB-TDM-1-48VDC</td>
<td>Single T1/E1 CESoPSN unit. (2xUTP) 10/100/GE ports and (1xSFP) port for WAN with Asymmetrical and Plesiochronous clocking. Includes LACP, RSTP, Enhanced Clock, 32 logical links, serial control cable and DbManager Lite. 48 VDC Power.</td>
</tr>
<tr>
<td>PB-TDM-1MC-AC</td>
<td>Single T1/E1 CESoPSN unit. (2xUTP) 10/100/GE ports and (1xSFP) port for WAN with Asymmetrical and Plesiochronous clocking. Includes multicast option. Also includes LACP, RSTP, Enhanced Clock, 32 logical links, serial control cable and DbManager Lite. AC Power.</td>
</tr>
<tr>
<td>PB-TDM-1MC-24VDC</td>
<td>Single T1/E1 CESoPSN unit. (2xUTP) 10/100/GE ports and (1xSFP) port for WAN with Asymmetrical and Plesiochronous clocking. Includes multicast option. Also includes LACP, RSTP, Enhanced Clock, 32 logical links, serial control cable and DbManager Lite. 24 VDC Power.</td>
</tr>
<tr>
<td>PB-TDM-1MC-48VDC</td>
<td>Single T1/E1 CESoPSN unit. (2xUTP) 10/100/GE ports and (1xSFP) port for WAN with Asymmetrical and Plesiochronous clocking. Includes multicast option. Also includes LACP, RSTP, Enhanced Clock, 32 logical links, serial control cable and DbManager Lite. 48 VDC Power.</td>
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### Optional Accessories

<table>
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<th>Part Number</th>
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<tbody>
<tr>
<td>PB/RMK/3/S</td>
<td>19” rack kit for single unit (PB-TDM-1, PB-TDM-1MC, PB-TDM-4, PB-TDM-3MC, PB-TDM-V35 and PB-TDM-X21) (Excludes chassis based systems and extended temperature model)</td>
</tr>
<tr>
<td>PB/RMK/3/D</td>
<td>19” rack kit for 2 units side by side (PB-TDM-1, PB-TDM-1MC, PB-TDM-4, PB-TDM-3MC, PB-TDM-V35 and PB-TDM-X21) (Excludes chassis based systems and extended temperature model)</td>
</tr>
<tr>
<td>PB/RMK/W/1</td>
<td>Wall mount kit (PB-TDM-1, PB-TDM-1MC, PB-TDM-4, PB-TDM-3MC, PB-TDM-V35 and PB-TDM-X21 and extended temperature models) (Excludes chassis based systems)</td>
</tr>
<tr>
<td>PB/cpack/1P</td>
<td>Cable Pack for single E1/T1 PacketBand. 2m</td>
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<tr>
<td>PB/Xcpack/1P</td>
<td>Crossed-cable pack for single E1/T1 PacketBand if connecting to DCE. 2m</td>
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<tr>
<td>PB/cpack/75BNC/01</td>
<td>120 Ohm RJ45 to 75 Ohm dual BNC conversion cable 20cm</td>
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<tr>
<td>PB/cont</td>
<td>Replacement serial controller cable</td>
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## DbManager Options

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>DBM-NS-1-2</td>
<td>Single work-station DbManager with visibility/connectivity to 2 units. No SNMP Traps &amp; Alarms</td>
</tr>
<tr>
<td>DBM-NS-1-4</td>
<td>Single work-station DbManager with visibility/connectivity to 4 units. No SNMP Traps &amp; Alarms</td>
</tr>
<tr>
<td>DBM-NS-1-10</td>
<td>Single work-station DbManager with visibility/connectivity to 10 units. No SNMP Traps &amp; Alarms</td>
</tr>
<tr>
<td>DBM-NS-1-25</td>
<td>Single work-station DbManager with visibility/connectivity to 25 units. No SNMP Traps &amp; Alarms</td>
</tr>
<tr>
<td>DBM-NS-1-50</td>
<td>Single work-station DbManager with visibility/connectivity to 50 units. No SNMP Traps &amp; Alarms</td>
</tr>
<tr>
<td>DBM-NS-1-100</td>
<td>Single work-station DbManager with visibility/connectivity to 100 units. No SNMP Traps &amp; Alarms</td>
</tr>
<tr>
<td>DBM-NS-1-ULTD</td>
<td>Single work-station DbManager with visibility/connectivity unlimited number of units. No SNMP Traps &amp; Alarms</td>
</tr>
<tr>
<td>DBM-1-2</td>
<td>Single work-station DbManager with visibility/connectivity to 2 units. With SNMP Traps &amp; Alarms</td>
</tr>
<tr>
<td>DBM-1-4</td>
<td>Single work-station DbManager with visibility/connectivity to 4 units. With SNMP Traps &amp; Alarms</td>
</tr>
<tr>
<td>DBM-1-10</td>
<td>Single work-station DbManager with visibility/connectivity to 10 units. With SNMP Traps &amp; Alarms</td>
</tr>
<tr>
<td>DBM-1-25</td>
<td>Single work-station DbManager with visibility/connectivity to 25 units. With SNMP Traps &amp; Alarms</td>
</tr>
<tr>
<td>DBM-1-50</td>
<td>Single work-station DbManager with visibility/connectivity to 50 units. With SNMP Traps &amp; Alarms</td>
</tr>
<tr>
<td>DBM-1-100</td>
<td>Single work-station DbManager with visibility/connectivity to 100 units. With SNMP Traps &amp; Alarms</td>
</tr>
<tr>
<td>DBM-1-ULTD</td>
<td>Single work-station DbManager with visibility/connectivity unlimited number of units. With SNMP Traps &amp; Alarms</td>
</tr>
<tr>
<td>DBM-4-25</td>
<td>4 work-station DbManager with visibility/connectivity to 25 units. With SNMP Traps &amp; Alarms</td>
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<tr>
<td>DBM-4-50</td>
<td>4 work-station DbManager with visibility/connectivity to 50 units. With SNMP Traps &amp; Alarms</td>
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<tr>
<td>DBM-4-100</td>
<td>4 work-station DbManager with visibility/connectivity to 100 units. With SNMP Traps &amp; Alarms</td>
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<tr>
<td>DBM-4-ULTD</td>
<td>4 work-station DbManager with visibility/connectivity to unlimited number of units. With SNMP Traps &amp; Alarms</td>
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*Other versions of DBManager are also available to support 10 and 15 concurrent work stations. Please ask for details.*