

13 OpenTURBO emulator emulates almost 100% of TurboIMAGE calls, for details please refer to HP/TurboIMAGE/XL Database management System Reference Manual (Part Number: 30391-99011). Any discrepancies or specific to OpenTURBO emulator are addressed in this chapter.

OpenTURBO vs. TurboIMAGE General Differences:

DBBEGIN	Pseudo BEGIN Transaction - ORACLE Mode
DBCLOSE	100%
DBCONTROL	Supported Mode: 5 Turn CIUPDATE ON 6 Turn CIUPDATE OFF 7 Allow Dynamic Multiple DB Transaction OpenTURBO Mode: 88 Set OpenTURBO Debugger Level Remotely 89 Set OpenTURBO Debugger Output Filename Remotely 90 Set IGNORE_RETURN_STATUS ON 91 Set IGNORE_RETURN_STATUS OFF 92 Set ONE_DIRECTION_CHAIN_GET ON 93 Set ONE_DIRECTION_CHAIN_GET OFF 94 Enlarge MAX_CURSOR_ALLOWED (A.03.00 Version Only) 95 Clear All Open Cursors 96 Set OT_SERIALGET_ORDERBY ON 97 Set OT_SERIALGET_ORDERBY OFF 101 Set Last_Used_Sequence_No and Return its value 102 Set IMAXSOFT13_SEQ_NO = IMAGE_Recnum
DBDELETE	100%
DBEND	Pseudo END Transaction - COMMIT WORK
DBERROR	100%
DBEXPLAIN	100%
DBFIND	100% - Mode 10 (Not yet certified by TPI vendors); new Mode 80, Mode 88 and Mode 89 are used for specifying ORACLE search condition in free SQL form.
DBGET	100%
DBINFO	100% - Except the dataset spaces allocation related info which is not applicable in ORACLE
DBLOCK	100%
DBMEMO	N/A
DBOPEN	100%
DBPUT	100% - Except the path info is not updated, OpenTURBO doesn't not automatically adjust the current path linkage after the addition for continuing Mode 5 and 6 DBGET
DBUNLOCK	100%
DBUPDATE	100% - CIUPDATE is supported
DBXBEGIN	100%
DBXEND	100%
DBXUNDO	100%

OpenTURBO Performance Enhancements:

DBBEGIN	Commit Work and initiate a OpenTURBO transaction
DBCLOSE	N/A
DBCONTROL	N/A
DBDELETE	Elimination of AUTOMATIC Dataset
DBEND	Commit Work the OpenTURBO transaction initiated by DBBEGIN
DBERROR	In-memory Client or Server message mapping capability
DBEXPLAIN	In-memory Client or Server message mapping capability
DBFIND	Ignore status words 3 through 10, this option triggers subsequent DGBET(5/6) in NO-CURSOR, BULK-FETCH and PRE-FETCH mode. <ul style="list-style-type: none"> ▪ Mode = 80 (SQL SELECT condition clause - user must provide 'WHERE') ▪ Mode = 88 (SQL SELECT condition clause without 'WHERE'. Un-restricted condition clause syntax will be supported for Mode = 89, in A.02.01 official release) ▪ ITEM = an VALID ITEM NAME must be provided (PRIMARY PATH ITEM NAME) ▪ ARGUMENT contains the WHERE condition clause, but 'WHERE' itself is not included. <ul style="list-style-type: none"> ○ All operators must be UPPER CASE and must be surrounded by BLANKS ○ Allowed operators are =, >, <, >=, <=, <>, LIKE, AND, OR ○ ORDER BY is also supported; the ' ORDER BY ' must be UPPER CASE and must be at the last of the WHERE clause. ○ No special characters are allowed in the STRING literal ○ Use ORACLE column name, not TurboIMAGE field name; OpenTURBO doesn't parse nor translate them, simply attach it to the WHERE clause ○ Example: FLIGHT_KEY LIKE '20030915%' OR FLIGHT_KEY LIKE '20030914%' => FLIGHT_KEY is the column name, not the TurboIMAGE item name FILGHT-KEY, the FLIGHT_KEY must be an

	<p>INDEX for table COUPON, using LIKE is much faster than SUBSTRING() aggregate function.</p> <ul style="list-style-type: none"> o The entire ARGUMENT must be terminated by a NULL char which is HEX 0, '\0' for C/C++ or X"00" for COBOL.
DBGET	<p>Bulk fetch option supports one direction chain get DBGET(5 or 6) after a DBFIND, which is either forward chain get or backward chain get, but not both forward and backward in the same chain. This option triggers OpenTURBO BULK-FETCH and PRE-FETCH mode.</p> <p>Bulk fetch option also improves DBGET(2/3) serial get performance significantly, it triggers not only OpenTURBO BULK-FTECH and PRE-FETCH feature, it also triggers ORACLE pre-fetch between its client and server communication, with proper memory allocation, the performance can be improved by over 10 times.</p> <ul style="list-style-type: none"> ▪ Mode = 78 (Free form WHERE condition in ARGUMENT for Manual Master) ▪ ARGUMENT contains the WHERE condition clause, but 'WHERE' itself is not included. <ul style="list-style-type: none"> o All operators must be UPPER CASE and must be surrounded by BLANKS o Allowed operators are =, >, <, >=, <=, <>, LIKE, AND, OR o ORDER BY is also supported; the ' ORDER BY ' must be UPPER CASE and must be at the last of the WHERE clause. o No special characters are allowed in the STRING literal o Use ORACLE column name, not TurboIMAGE field name; OpenTURBO doesn't parse nor translate them, simply attach it to the WHERE clause o Example: FLIGHT_KEY LIKE '20030915%' OR FLIGHT_KEY LIKE '20030914%' => FLIGHT_KEY is the column name, not the TurboIMAGE item name FILGHT-KEY, the FLIGHT_KEY must be an INDEX for table COUPON, using LIKE is much faster than SUBSTRING() aggregate function. o The entire ARGUMENT must be terminated by a NULL char which is HEX 0, '\0' for C/C++ or X"00" for COBOL.
DBINFO	N/A
DBLOCK	Thick Client LOCK Manager Thin Server LOCK Manager
DBMEMO	N/A
DBOPEN	One DBSVR per DBOPEN The password - you must terminate it with a ';' character, when its length is less 8 bytes long.
DBPUT	Elimination of AUTOMATIC Dataset
DBUNLOCK	N/A
DBUPDATE	Elimination of AUTOMATIC Dataset No performance degradation for CIUPDATE, same as NON-CIUPDATE
DBXBEGIN	N/A
DBXEND	N/A
DBXUNDO	N/A

OpenTURBO Additional Features:

DBBEGIN	Commit Work and initiate a OpenTURBO transaction
DBCLOSE	N/A
DBCONTROL	<p>88 - Set OpenTURBO Debugger Level Remotely qualifier[0] = Debugger Level, valid values are 1 through 31 qualifier[1] = 1 (ON), 0 (OFF) qualifier[0] and qualifier[1] are 2-bytes short</p> <p>89 - Set OpenTURBO Debugger Output Filename Remotely qualifier[] contains Debugger Output Filename</p> <p>90 - Set IGNORE_RETURN_STATUS ON qualifier[] contains Dataset Name or Dataset Number (2-bytes short); if the first byte contains an @, sets all Datasets</p> <p>91 - Set IGNORE_RETURN_STATUS OFF qualifier[] contains Dataset Name or Dataset Number (2-bytes short); if the first byte contains an @, sets all Datasets</p> <p>92 - Set ONE_DIRECTION_CHAIN_GET ON qualifier[] contains Dataset Name or Dataset Number (2-bytes short); if the first byte contains an @, sets all Datasets</p> <p>93 - Set ONE_DIRECTION_CHAIN_GET OFF qualifier[] contains Dataset Name or Dataset Number (2-bytes short); if the first byte contains an @, sets all Datasets</p> <p>94 - Enlarge MAX_CURSOR_ALLOWED qualifier[0] = Max Number of Concurrent Cursors (2-bytes short)</p> <p>95 - Clear All Open Cursors</p> <p>96 - Set OT_SERIALGET_ORDERBY ON qualifier[] contains Dataset Name or Dataset Number (2-bytes short);</p>

	<p>if the first byte contains an @, sets all Datasets</p> <p>97 - Set OT_SERIALGET_ORDERBY OFF qualifier[] contains Dataset Name or Dataset Number (2-bytes short); if the first byte contains an @, sets all Datasets</p>
DBDELETE	N/A
DBEND	Commit Work the OpenTURBO transaction initiated by DBBEGIN
DBERROR	SQL Error
DBEXPLAIN	SQL Explain
DBFIND	<p>Exact, wildcard, range, relational operators search are all supported by default, no need for special settings.</p> <ul style="list-style-type: none"> ▪ Mode = 88 (Un-restricted condition clause syntax will be supported for Mode = 89, in A.02.01 official release) ▪ ITEM = an VALID ITEM NAME must be provided (PRIMARY PATH ITEM NAME) ▪ ARGUMENT contains the WHERE condition clause, but 'WHERE' itself is not included. <ul style="list-style-type: none"> ○ All operators must be UPPER CASE and must be surrounded by BLANKS ○ Allowed operators are =, >, <, >=, <=, <>, LIKE, AND, OR ○ ORDER BY is also supported; the ' ORDER BY ' must be UPPER CASE and must be at the last of the WHERE clause. ○ No special characters are allowed in the STRING literal ○ Use ORACLE column name, not TurboIMAGE field name; OpenTURBO doesn't parse nor translate them, simply attach it to the WHERE clause ○ Example: FLIGHT_KEY LIKE '20030915%' OR FLIGHT_KEY LIKE '20030914%' => FLIGHT_KEY is the column name, not the TurboIMAGE item name FILGHT-KEY, the FLIGHT_KEY must be an INDEX for table COUPON, using LIKE is much faster than SUBSTRING() aggregate function. ○ The entire ARGUMENT must be terminated by a NULL char which is HEX 0, '\0' for C/C++ or X"00" for COBOL.
DBGET	<ul style="list-style-type: none"> ▪ Mode = 78 (Free form WHERE condition in ARGUMENT for Manual Master) ▪ ARGUMENT contains the WHERE condition clause, but 'WHERE' itself is not included. <ul style="list-style-type: none"> ○ All operators must be UPPER CASE and must be surrounded by BLANKS ○ Allowed operators are =, >, <, >=, <=, <>, LIKE, AND, OR ○ ORDER BY is also supported; the ' ORDER BY ' must be UPPER CASE and must be at the last of the WHERE clause. ○ No special characters are allowed in the STRING literal ○ Use ORACLE column name, not TurboIMAGE field name; OpenTURBO doesn't parse nor translate them, simply attach it to the WHERE clause ○ Example: FLIGHT_KEY LIKE '20030915%' OR FLIGHT_KEY LIKE '20030914%' => FLIGHT_KEY is the column name, not the TurboIMAGE item name FILGHT-KEY, the FLIGHT_KEY must be an INDEX for table COUPON, using LIKE is much faster than SUBSTRING() aggregate function. ○ The entire ARGUMENT must be terminated by a NULL char which is HEX 0, '\0' for C/C++ or X"00" for COBOL.
DBINFO	<p>406 - Return Buffer's Half-word 16, 17, 18 and 19 are used for OpenTURBO Version, such as 'A.01.04 '</p> <p>406 - Return Buffer's Half-word 25 and 26 (starts from 1) contains the Number Of Concurrent DBOPEN including the calling process</p> <p>8001 - OpenTURBO Client Library Version</p> <p>8002 - OpenTURBO Server Program Version (DBSVR)</p> <p>8003 - RDBMS and OS Type, 515 for ORACLE on HP-UX</p> <p>8004 - RDBMS Database Name</p> <p>8005 - Host Name where RDBMS Database resides</p> <p>8006 - Service or Port Number that is used by OpenTURBO Listener</p> <p>8007 - RDBMS Logon</p> <p>8008 - OpenTURBO Server Program Full Name</p> <p>8009 - OpenTURBO TI Root-File Name</p> <p>8010 - OpenTURBO TI Root-File Version</p> <p>8011 - OpenTURBO CONFIG File Name</p> <p>8012 - OpenTURBO Reserve Word File Name</p> <p>8013 - OpenTURBO Error Message File Name</p> <p>8014 - Unconditional LOCK Pause and Re-try Count</p> <p>8015 - CIUPDATE Allow Indicator</p> <p>8016 - DBXBEGIN Allow Indicator</p> <p>8017 - DUALMODE Indicator</p> <p>8018 - DUALMODE HP/3000 Host Name</p> <p>8019 - DUALMODE HP/3000 Listener Service or Port Number</p> <p>8020 - DUALMODE HP/3000 Server Program Name (DMDRV)</p>

	8021 - IMAGEMODE Indicator - Access TurboIMAGE Only 8022 - IGNORE_RETURN_STATUS Indicator (IGNORE_CHAINSTATUS) Qualifier contains a Dataset Name or Dataset Number Return Buffer 1 st Half-word contains TRUE=1 or FALSE=0 8023 - ONE_DIRECTION_CHAIN_GET Indicator (BULKCHAINGET) Qualifier contains a Dataset Name or Dataset Number Return Buffer 1 st Half-word contains TRUE=1 or FALSE=0 8081 - Total SQL Calls since DBOPEN 8082 - Total Concurrent DBOPENS in the Client Process 8083 - Total Concurrent Open Cursors for the Database 8084 - Number of Chunks for the OpenTURBO Internal Cursor Pool Chunk Size is 30000 Bytes
DBLOCK	Entity LOCK support for ORACLE applications (ORACLE LOCK Object) OpenTURBO and ORACLE applications co-existence support
DBMEMO	N/A
DBOPEN	OpenTURBO and ORACLE applications co-existence support
DBPUT	N/A
DBUNLOCK	N/A
DBUPDATE	Update all fields (columns) always
DBXBEGIN	2PC Support A.02.00
DBXEND	2PC Support A.02.00
DBXUNDO	2PC Support A.02.00

DBPUT is mapped to ORACLE INSERT:

1. You may only insert Manual and Detail tables.
2. The Automatic table is automatically maintained by OPENTURBO.
3. You may not insert Detail row that has no corresponding key in Manual table, which is controlled by PRIMARY and FOREIGN constraint.
4. All unique sequence number is maintained by OPENTURBO in chronological order automatically, which is managed by trigger, sequence, and index constraint.
5. All Detail paths are also maintained by OPENTURBO automatically via trigger, sequence and index constraint.

DBUPDATE is mapped to ORACLE UPDATE:

1. You may update any columns in Detail tables.
2. You may only update non-key columns in Manual tables.
3. You may not update Automatic tables at all.
4. CIUPDATE or NO CIUPDATE are the same to OPENTURBO, we implement it simply for syntactic emulation purpose. OPENTURBO maintains path related adjustments with or without CIUDPATE, which is identical to TurboIMAGE CIUPDATE path handling.

DBDELETE is mapped to ORACLE DELETE:

1. You may not delete a Manual entry, unless its foreign constrains are all eliminated.
2. The Automatic entry is not deleted automatically, you need to run otCLEAN for clean-up. The Automatic tables have no value to OPENTURBO, since all Automatic datasets have already mapped to ORACLE indexes for each Detail table. In most cases, Automatic tables are not migrated, hence OPENTURBO does not spend extra performance cost for deleting entry from Automatic table when the entry has no foreign constrains attached to it.

All rules for INSERT, DELETE and UPDATE, such as triggers, primary and foreign constrains, unique constrain and path control, are also applied to native ORACLE applications.

Proper locks must be provided before updates, refer to HP TurboIMAGE/XL Database Management System Reference Manual.

DBPUT:

We will always be there for you.

I1 and I2 -> 32-bit integer
I4 -> 64-bit integer
I8 ->

J
K
K3, K5-255 -> RAW

E and R

P
U
X
Z -> Last digit
 {, A-I => 0-9 Positive
 }, J-R => 0-9 Negative