ACAD_db User Manual

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JTB World

ACAD_db Overview

ACAD_db makes it possible to synchronize block attribute data between AutoCAD and a database.

Any database like Access (MDB) or SQL Server that can be connected with dbConnect within AutoCAD is supported. Other examples are SQL Server Express, Oracle, ODBC, etc. AutoCAD 64-bit does not support 32-bit Access databases.

Compatibility with AutoCAD 2008 up to AutoCAD 2013 including verticals. Newer versions will be supported when they are released and older versions might be supported upon request.

Setup files

JTB.ACADdbMgd 2010-2012.dll for AutoCAD 2010-2012

JTB.ACADdbMg 2013d.dll for AutoCAD 2013

ACAD_db_Samples.mdb

ACAD_db_EmptyTemplate.mdb

ACAD_db Blocks and Tables - Metric.dwg

ACAD_db_samples.UDL

ACAD_db_license.txt (sent by email from JTB World upon request)

Setup procedure

1. Place the DLL file in a single local folder.
   For example C:\Program Files\JTB World\ACAD_db .
2. Place also the license file ACAD_db_license.txt in the same folder.
3. ACAD_db_samples.UDL should be placed in the Data Links folder. The location is found easiest by using Options>Files>Data Sources Location within AutoCAD.

The DLL needs to be loaded by your AutoCAD application and that can be done in different ways. Use one of the following options.

- Add the row below to your acad.lsp file so it loads automatically when AutoCAD starts.
  (command "netload" "C:/Program Files/JTB World/ACAD_db/JTB.ACADdbMgd 2013.dll")
- Use one of the AutoLoad...reg files that can be provided. Double click on the file and accept to merge to the registry. This will make sure that the commands are available whenever you run AutoCAD.
- Use the command NETLOAD and select the DLL. This loads the command in the current session only. This is not recommended for production usage.
- Create a menu command, toolbar button, ribbon button or palette tool using CUI and force load it before running the command.
  Macro or Command string:

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^c^c(command "netload" "C:/Program Files/JTB World/ACAD_db/JTB.ACADdbMgd 2013.dll") AcDbSettings;

This is not recommended way to load the DLL for production usage. But it can be used to run the ACAD_db commands.

Prepare the database that holds information on what block and attributes to synchronize and where.

Make sure there is an UDL file (data source) that points out the location of the main database.

In the CAD program use **AcDbSettings** command to specify what data source to use as the main database.

Run the **AcDbMake** command to make new/existing drawing possible to sync.

Now use either just open and save/close the drawing or use any of the commands **AcDbOut** or **AcDbIn** to sync information into CAD or out from CAD.

The command line will show full details on if there are any problems and what data has been synchronized.

ACAD_db consists of following 3 utilities.

1. ACAD_db Sync Utility.

2. ACAD_db Insert Block Utility.

3. ACAD_db Reporting Utility [Runs parallel with above 2 utilities.]

ACAD_db has following commands.

- **AcDbMake:** Use this command to make new/existing document ACAD_db compatible. This command save current file name to "JTBW_Files" table in the database. This needs only to be done once per drawing.

- **AcDbOut:** Use this command to force a sync of all existing block attributes **to** database. Creates new record in the database for newly inserted blocks having attributes and create links between block and database record.

- **AcDbIn:** Use this command to force attribute values to get updated **from** database based on sync dir.

- **AcDbInsert:** Use this command to insert blocks based on database information.

- **AcDbInsertBySort:** Same as AcDbInsert but with sorting of the inserted blocks.

- **AcDbStatus:** Use this command to know the number of block with attributes edited in the current session.

- **AcDbSettings:** Se below:

AcDbSettings

Use this command to indicate data source name where mandatory tables are defined and to control whether to sync attribute from database when document is opened next time.

Use either of the following commands:

AcDbSettings
-AcDbSettings

This command allows user to specify

1) Data source name if you want to change the default "JTBW_AttSync". This should match the name of the .UDL file that needs to be located in the Data Sources Location that is found running OPTIONS in AutoCAD.
2) Whether to sync attribute from database when drawing is opened next time.

Command **AcDbSettings** allows user to change ACAD_db settings through GUI.
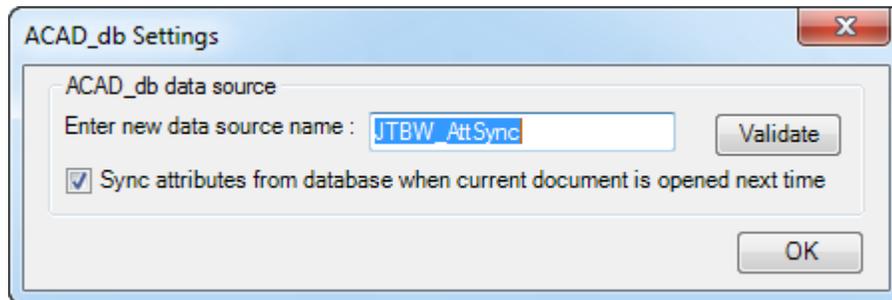
User can check whether specified new data source is available in the drawing or not using button "Validate". If data source is not available a message box will be displayed to user. To set data source name in dialog box, data source with specified name must be available

Command **-AcDbSettings** allows user to change ACAD_db settings through command line.

Enter new data source name <JTBW_AttSync>: JTBW1

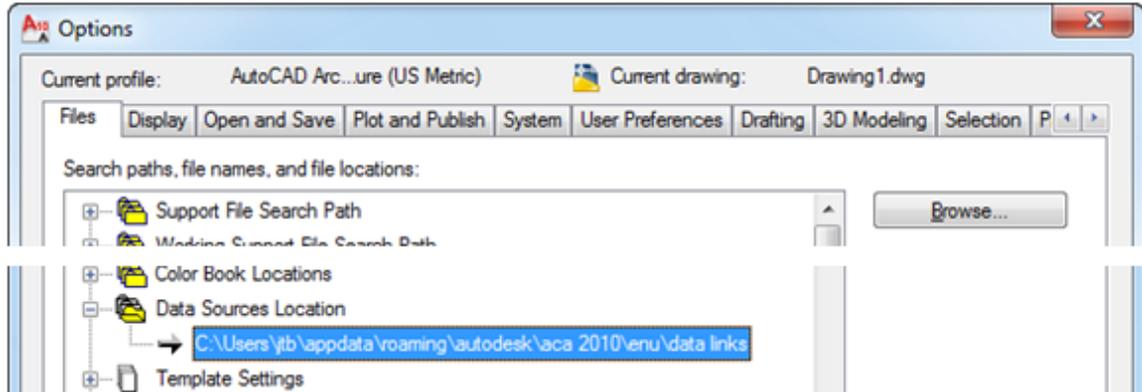Sync on opening this file <1>:

New Data source: JTBW1

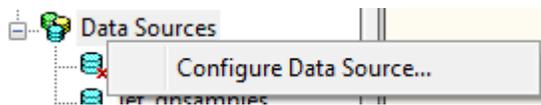This command will not check whether data source is available or not.

Data Source

Data Sources Location can be found here. This is also the location you need to visit to be able to delete a data source UDL file.

Options - > Files -> Data Sources Location.

Creation and modification of a Data Source can be done via DbConnect command.

Give the Data Source a name.

Specify Provider and Connection for the Data Source.

Modification of a Data Source can be done by double clicking on the UDL file in Windows Explorer.

A data source file can be created in Explorer by right click selecting New and Text Document. Rename the file to "ACAD_db_sample.udl" or whatever name you want on the data source and make sure that the text documents extension .txt also is renamed in the process. Double click on the .udl file.

When 64-bit AutoCAD is used make sure to use the Microsoft Office 12.0 Access Database Engine.
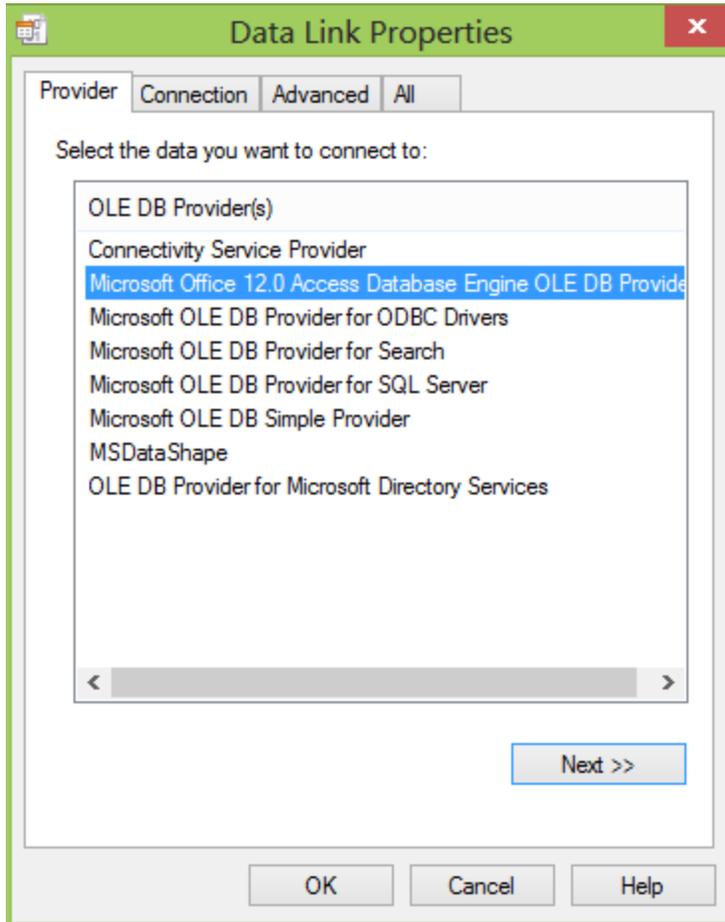
And as data source the full path to the database.
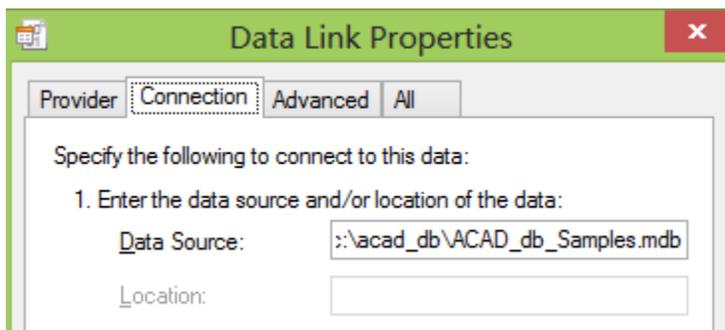
Program Events

ACAD_db handles following 5 Events. This shows what happens during different events within AutoCAD

1. **DocumentCreated**

   - This event is triggered when a new or existing file is opened.

   - ACAD_db uses this event to sync attribute from database.

2. **BeginSave**

   - This event is triggered when active file is saved.

   - ACAD_db uses this event to sync edited block attribute to database.

   - ACAD_db creates new records in database for newly inserted blocks with attribute and sync attribute to database.

   - ACAD_db marks -1 in the Handle field of a database record for all deleted block references in the session.

3. **SaveComplete**

   - This event is used to control flags used in the program.

4. **ObjectModified**

   - This event is triggered when an object is modified in the document.

   - ACAD_db uses this event to collect all edited blocks with attribute definitions in the current session.

5. **DocumentToBeDestroyed**

   - This event triggered when active file is closed.

   - This event releases "BeginSave" and ObjectModified events from the document

ACAD_db Sync Utility

1) Program looks for attribute sync details in the table "JTBW_AttSync".

JTBW_AttSync				
AttSyncID ▾	BlockName ▾	AttributeTag ▾	DBConnection ▾	SyncDir ▾
1	Window	SYM.	JTBW_AttSync!Windows!Sym	TwoWay
2	Window	WIDTH	JTBW_AttSync!Windows!Width	TwoWay
3	Window	HEIGHT	JTBW_AttSync!Windows!Height	TwoWay
4	Window	STYLE	JTBW_AttSync!Windows!Style	DBtoDWG
5	Window	REF#	JTBW_AttSync!Windows!RefNo	DWGtoDB

2) Program looks for attribute values in the database as per "DBConnection" field in above table.

Windows								
ID ▾	DWG ▾	Handle ▾	BlockName ▾	Sym ▾	Width ▾	Height ▾	Style ▾	RefNo ▾
1	D:\Blocks.dwg	3A5AC	Window	13	1.00	1.4 m		CN14
2	D:\Blocks.dwg	3A451	Window	2	1.00	1.4 m		CN14
3	D:\Blocks.dwg	3A438	Window	2	0.50	1.2 m		CN14
4	D:\Blocks.dwg	3A41F	Window	2	0.50	1.2 m		CN14

3) Program looks for matching handle number of a block in AutoCAD to establish connection between block attribute and database. You can find the Handle by using LIST on any block in AutoCAD. It can be selected or found if you use SELECT or MOVE command and enter (handent "41d78") where 41d78 is the Handle number.

```
BLOCK REFERENCE   Layer: "DB – Windows"
              Space: Paper space
             Layout: ISO A1
         Handle = 41d78
Block Name: "Window"
```

AcDbInsert - Insert Block Utility

Use AcDbInsert command to insert all block records in the database into the current drawing.

This utility will insert all the blocks in the table whose handle numbers are missing.

Run AcDbInsert command.

- Program searches database for any records having Handle number empty based on block details defined in the table JTBW_BlockLayer.
- Insert new block per each record.
- Checks on what layer block needs to be inserted in the table "JTBW_BlockLayer".
- Updates corresponding records with Block Handle number to establish link between block and record.

Note: If layer is not available in the drawing then program creates layer with default properties assigned.

Report generated by AcDbInsert command is made on the command line.

Requirement:

Block Definition should be available in the drawing file as specified in the field DWGFile of table "JTBW_BlockLayer".

Note:

1. File having the block must be available.
2. If block name and file name matches then the drawing itself is considered as a block.

AcDbInsertBySort - Insert Block Utility with sorting

Program flow for the command **AcDbInsertBySort:**

1. Gets data source name attached to the drawing.
2. Connects to database.
3. Checks whether drawing is compatible with the database by verifying whether drawing name is listed in the table "JTBW_Files".
4. Get all block names and its file name from the table "JTBW_BlockLayer".
5. Gets each blocks attribute DB Connection from table "JTBW_AttSync".
6. Collects all block references needs to be inserted into drawing from each block name.
7. Sorts collected block information based on MLC [primary key] and RLC [secondary key].
8. Inserts block references as per sort order.
9. Updates handle of each block references into database to establish link between block reference and database record.
10. Shows a dialog box listing all details of block reference inserted.

JtbPrimaryKey	JtbDataSourceName	JtbTableName	DBID	DWG	Handle	BlockName ▲	Label
DBID	JTBW1	Example	1	O:\customization...	1A6F	T-AVSY-ATT	ATT1
DBID	JTBW1	Example	2	O:\customization...	1B52	T-AVSY-ATT	ATT2
DBID	JTBW1	Example	3	O:\customization...	1AE7	T-AVSY-ATT	ATT3
DBID	JTBW1	Example	4	O:\customization...	1A8D	T-AVSY-ATT	ATT4
DBID	JTBW1	Example	5	O:\customization...	1AC9	T-AVSY-CLK	CLK5
DBID	JTBW1	Example	6	O:\customization...	1B16	T-AVSY-CLK	CLK6
DBID	JTBW1	Example	7	O:\customization...	1B34	T-AVSY-CLK	CLK7
DBID	JTBW1	Example	8	O:\customization...	1B9F	T-AVSY-CLK	CLK8
DBID	JTBW1	Example	9	O:\customization...	1BDB	T-AVSY-CLK	CLK9
DBID	JTBW1	Example	10	O:\customization...	1C28	T-AVSY-CLK	CLK2
DBID	JTBW1	Example	11	O:\customization...	1C93	T-AVSY-INT	INT1
DBID	JTBW1	Example	12	O:\customization...	1AAB	T-AVSY-INT	INT2
DBID	JTBW1	Example	13	O:\customization...	1B81	T-AVSY-INT	INT3
DBID	JTBW1	Example	14	O:\customization\Project-024_JTBWorld\Room Example.dwg			INT4
DBID	JTBW1	Example	15	O:\customization...	1C0A	T-AVSY-INT	INT5
DBID	JTBW1	Example	16	O:\customization...	1C46	T-AVSY-INT	INT6
DBID	JTBW1	Example	17	O:\customization...	1C64	T-AVSY-INT	INT7
DBID	JTBW1	Example	18	O:\customization...	1CB1	T-AVSY-INT	INT8
DBID	JTBW1	Horn	1	O:\customization...	1A51	T-AVSY-SPKR-H...	H1
DBID	JTBW1	Horn	2	O:\customization...	1CE0	T-AVSY-SPKR-H...	H2

Total number of blocks inserted = 21

Guideline:

1. Blocks to be inserted have its name listed in the table "JTBW_BlockLayer".
2. All attributes needs to be synced including MLC & RLC have DB Connection information in the table "JTBW_AttSync".
3. Any table storing attribute values has columns MLC and RLC.
4. All attribute values of a block is stored in single table.

Linking block reference to table record manually

User can establish link between AutoCAD block and database table record manually. Once link is established program starts syncing attributes on opening document and on saving document.

This section explains steps to establish link between block and table record.

This will be a onetime activity for each block

1. Insert a new block reference in AutoCAD.
2. Check the handle number of this new block reference using list command.
3. Open table used to store attribute values.
4. Create new or edit record and fill fields DWG [Stores file name], BlockName [Stores name of block], and Handle [Stores handle number of block reference]. Now link has been established between attribute and table record.

Note:

1. User can leave other fields in the table empty. On saving the document program stores attributes values from AutoCAD to table records.
2. Make sure file name is listed in the table "JTBW_Files". Use "AcDbMake" to add current document into below table.

		DWGNAME
	+	F:\Room Example.dwg
▶	+	F:\test.dwg
*		

JTBW_Files : Table

3. Make sure there is DBConnection details available for each attribute needs to be synced in the table "JTBW_AttSync". Any missing details will be ignored.

JTBW_AttSync : Table

	AttSyncID	BlockName	AttributeTag	DBConnection	SyncDir
	1	ROOMID	ROOMNO	JTBW_AttSync!Room!RoomNo	DWGtoDB
	2	ROOMID	OCCUPANT	JTBW_AttSync!Room!Occupant	DBtoDWG
	3	ROOMID	ROOMAREA	JTBW_AttSync!Room!RoomArea	TwoWay
✎	4	ROOMID	ITEM_NAME	JTBW_AttSync!Room!RoomNAME	TwoWay
*	(AutoNumber)				

Database Tables

ACAD_db supports multiple data source / table for a single drawing.

1. A master data source which has all mandatory tables defined.
2. Multiple data source can be used to store attribute values.

Note: It is suggested to store all attribute values of a block in a single table.

AutoCAD Database Program uses the following tables.

- **JTBW_Files** [Mandatory]
- **JTBW_AttSync** [Mandatory]
- **JTBW_BlockLayer** [Mandatory]
- **JTBW_SyncDir** [Mandatory]
- Tables that holds attribute data [Mandatory with names defined in JTBW_AttSync]

1) JTBW_Files:

This table stores all file names which has database connection.

DWGNAME
F:\Room Example.dwg
F:\test.dwg

DWGNAME is a Text field.

2) JTBW_AttSync:

Stores attribute database link details.

AttSyncID	BlockName	AttributeTag	DBConnection	SyncDir
1	ROOMID	ROOMNO	JTBW_AttSync!Room!RoomNo	DWGtoDB
2	ROOMID	OCCUPANT	JTBW_AttSync!Room!Occupant	DBtoDWG
3	ROOMID	ROOMAREA	JTBW_AttSync!Room!RoomArea	TwoWay
4	ROOMID	ITEM_NAME	JTBW_AttSync!Room!RoomNAME	TwoWay
(AutoNumber)				

AttSyncID is an Indexed AutoNumber field.

BlockName, **AttributeTag**, **DBConnection** and **SyncDir** are Text fields. SyncDir finds its values from the table JTBW_SyncDir.

DBConnection has the following syntax: [Data Source Name]![Database Table]![Database Field]

AttributeTag value and Database Field name doesn't need to be identical.

3) JTBW_BlockLayer:

Stores layer information on which block references needs to be inserted. This table does not need to be used for basic sync usage.

BlockName	LayerName	DWGFile
ROOMID	ROOMID	F:\ROOMID.dwg
T-AVSY-ATT	T-AVSY	F:\T-SERIES-SYMBOLS-AT.dwg
T-CPTH-CABLE TRAY	T-CPTH-CABLE TRAY	F:\T-SERIES-SYMBOLS-AT.dwg
TestMissingBlock	Test	F:\Missing.dwg

BlockName (indexed), **LayerName** and **DWGFile** are Text fields.

4) JTBW_SyncDir:

SyncDir
DBtoDWG
DWGtoDB
TwoWay

SyncDir (indexed) is a Text field.

These values are mandatory

5) Tables that holds attribute data:

The name of these tables is up to the user but needs to be specified in the DBConnection field in JTBW_AttSync table.

The following three fields needs to be added

DBID (indexed) AutoNumber Field.

DWG - Text Field.

Handle - Text Field.

BlockName - Text Field.

The other fields are free to specify but the field type must match the value that the attribute can hold. There can be extra fields besides the fields that are linked. Make sure to not use names that are reserved as SQL words like in these examples: http://msdn.microsoft.com/en-us/library/aa238507(v=sql.80).aspx

Relationships between tables
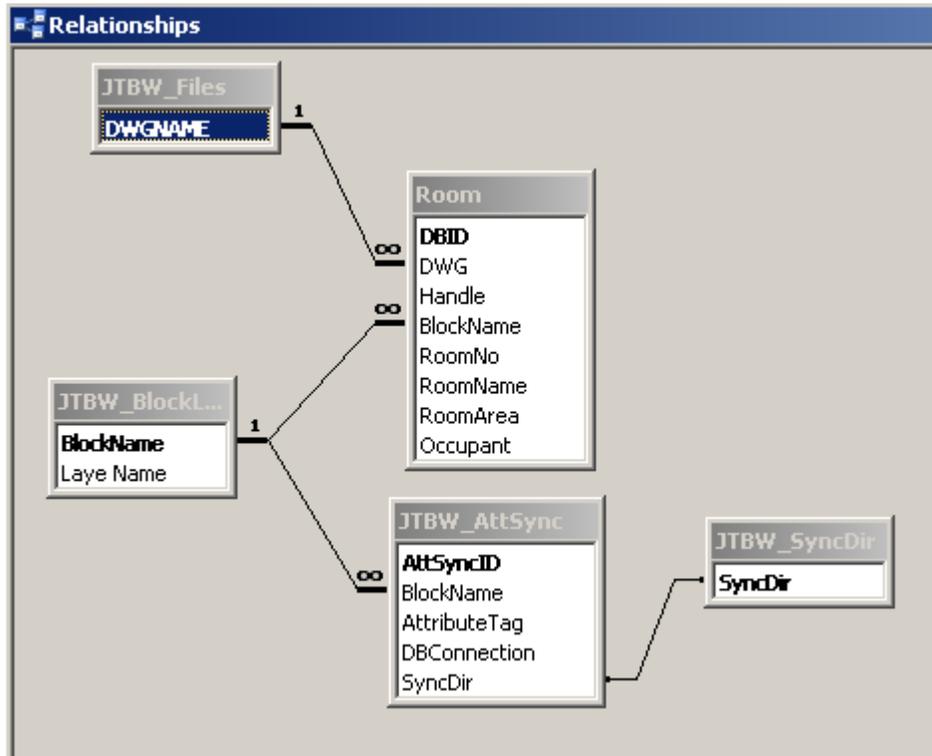
ACAD_db command line echoes and Error Reports

1) File is opened read only mode:

   Command line echo:
   Document is read only

   All ACAD_db commands and events are disabled on read only files.

2) File is opened which is not ACAD_db compatible [Not listed in table JTBW_Files]

   Command line echo:
   This document is not compatible with database.
   Use command "AcDbMake" to make this document compatible.
   Attribute to database sync utility is disabled for this document.

3) Use command "AcDbMake" converts this file to ACAD_db compatible.

   Command line echo:
   5 number of block with attributes edited in this session.
   "Data Source Location" = C:\path\Data Links
   This file is now compatible with database.
   Attribute to database sync utility is enabled for this document.

4) File is opened which is ACAD_db compatible [listed in table JTBW_Files] and no block definitions are available.

   Command line echo:
   No block definition with attribute is available to sync.

5) File is opened and no block references used in the drawing.

   Command line echo:
   BLOCKNAME1 Reference count 0
   BLOCKNAME2 Reference count 0
   No block definition with attribute is available to sync.

6) When "AcDbInsert" command used and has no new block records in the table. [No empty handle number in the field "Handle" of table for this file].

   Command line echo:
   BLOCKNAME1 : No missing blocks in database

7) When "AcDbInsert" command used and has no local block definition and block file name is mentioned incorrectly in the table.

Command line echo:
BLOCKNAME1: Block insertion failed.
Missing file error: BLOCKNAME1
Specify full file name in the table "JTBW_BlockLayer", for example : "F:\folder location\library.dwg"

8) When "AcDbInsert" command used and has no local block definition. [Copies definition from external file as specified in table]

Command line echo:
BLOCKNAME1: block definition added from file = F:\blocks.dwg
Block name: BLOCKNAME1, Handle = B45 "Inserted New Reference"

9) When blocks are erased and saved.

Command line echo:
Erased block reference BLOCKNAME1 with handle number "A24", "unmarked -1" in database.

10) When block reference inserted into drawing manually.

Command line echo:
Totally number of block attribute edited in this session = 1

11) When block reference copied in the drawing.

Command line echo:
Total number of block attribute edited in this session = 2

12) When drawing is saved and there are edited block references or new block references inserted.

Command line echo:
Attribute to database Sync Started….
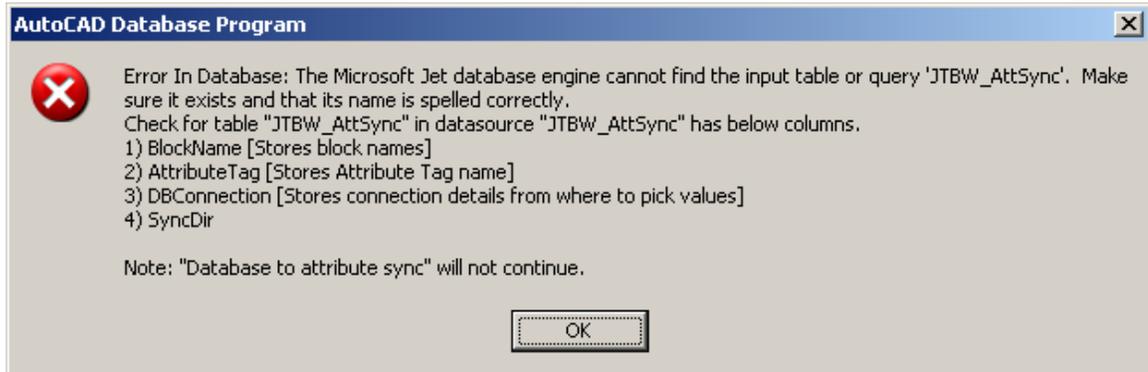Database = f:\mydatabase.mdb :
Block Name = BLOCKNAME1 ; Handle = BEB
etc…

13) Error : Syntax error in UPDATE statement
The reason for this can be that a database field is a reserved SQL word
Examples: http://msdn.microsoft.com/en-us/library/aa238507(v=sql.80).aspx
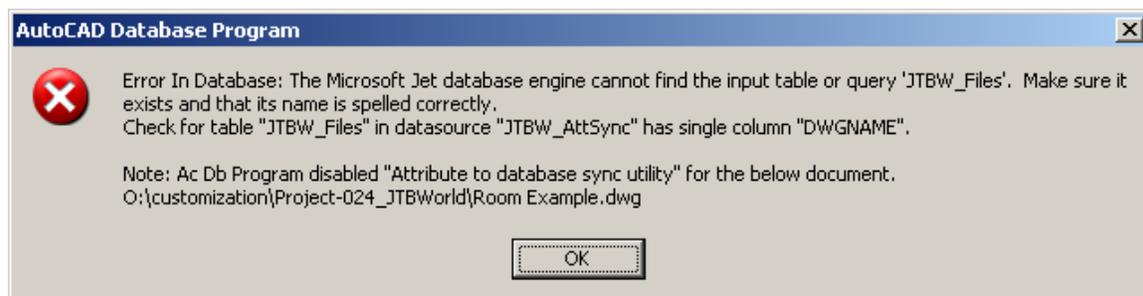
Error dialog box messages

1) When "JTBW_AttSync" table is missing table.

.

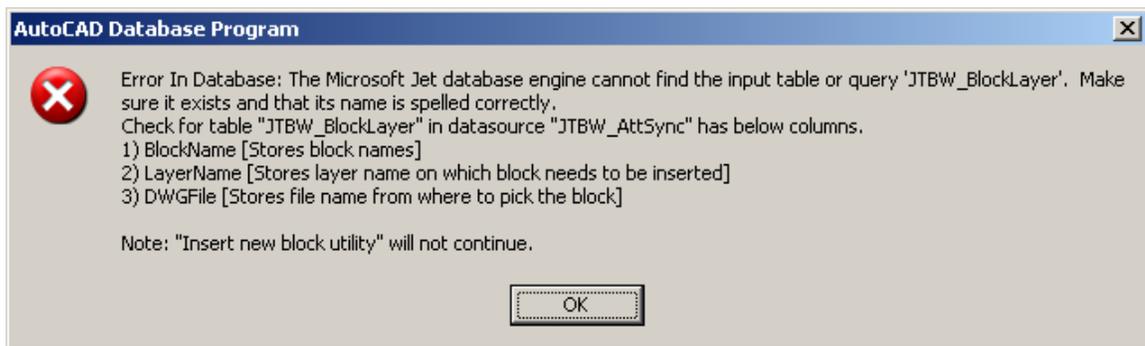2) When one of the required columns is missing in "JTBW_AttSync" table.
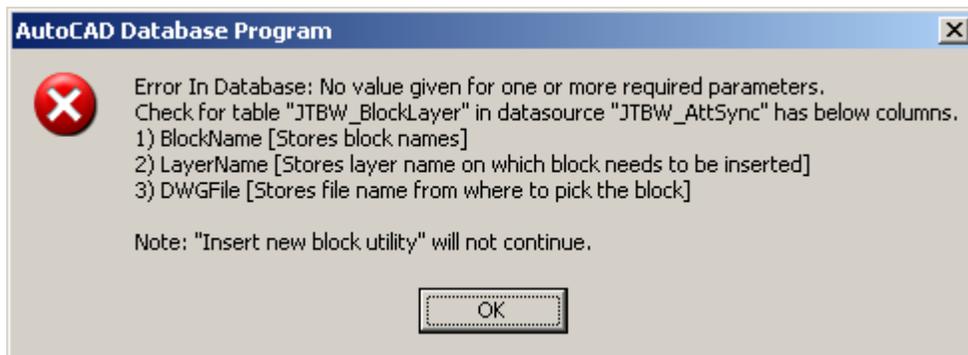

3) When "JTBW_Files" table is missing.

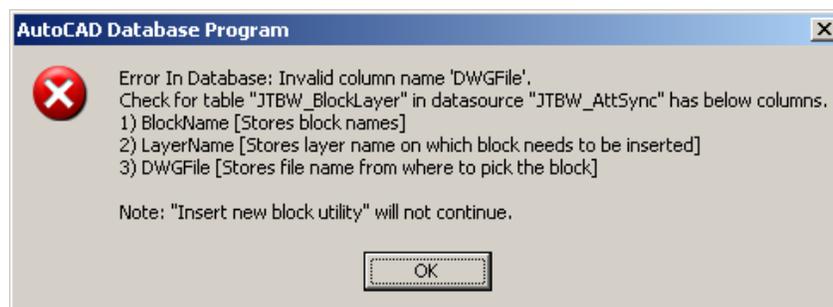4) When required column DWGNAME is missing in "JTBW_ Files" table.

5) When required column DWGNAME is missing in "JTBW_ BlockLayer" table.
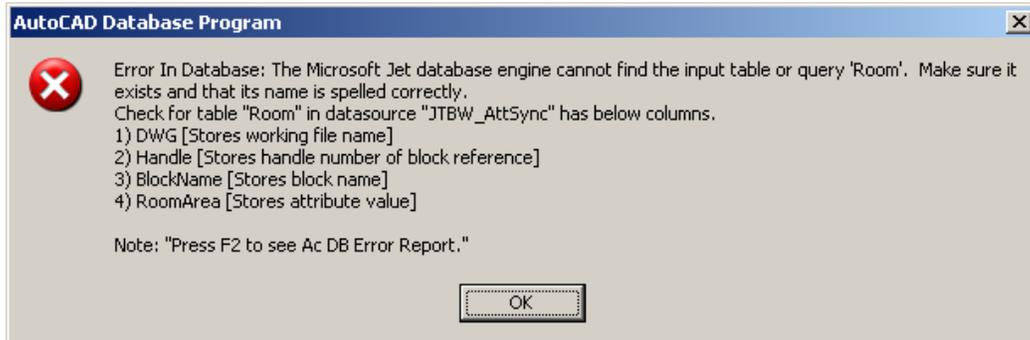

6) When required column(s) missing in "JTBW_ BlockLayer" table.

In case of SQL server:

7) When required table used to store attribute value is missing in the database.

Tutorial using SQL Server

Download the sample database for SQL Server/SQL Server Express.
http://www.jtbworld.com/download/ACAD_db_SQL.zip

Extract the files ACAD_db_samples_SQL.bak and ACAD_db_samples.sql to any folder.

ACAD_db_samples.sql can be used to create a new database from scratch.

ACAD_db_samples_SQL.bak can be used to create a new database with some sample data.

In SQL Server Management Studio right click in the Object Explorer on Databases and select Restore Database…
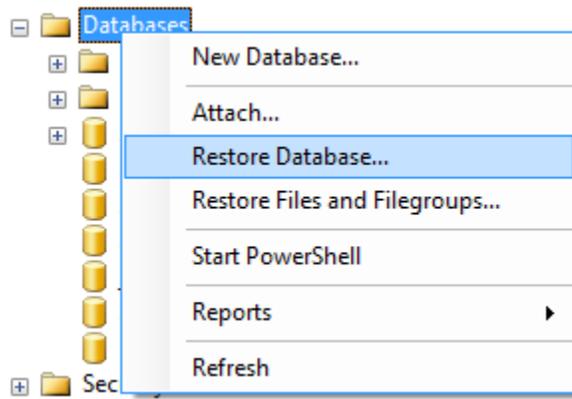
Give the new database a name and click on the tree dots to select From device.
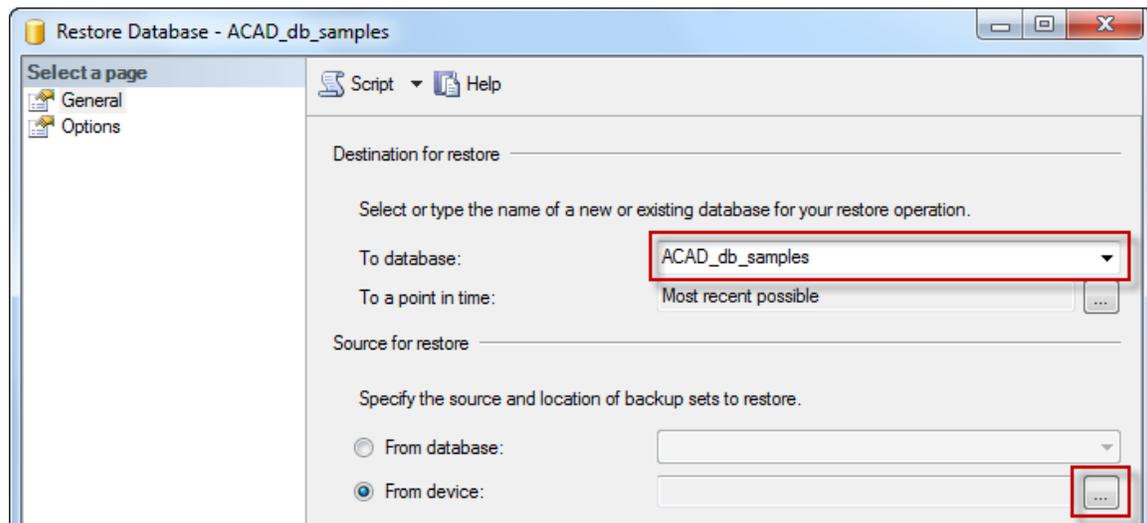
Backup media should be File, click on Add and browse for ACAD_db_samples_SQL.bak.

Click on the checkbox in the restore column

Click on OK to start restoring the database.

In the sample database table JTBW_AttSync the name of the database source is ACAD_db_SQLE.

This means that ACAD_db_SQLE.udl must be located in the folder specified in AutoCAD - > Options - > Files -> Data Sources Location.

It can be created in Explorer by right click selecting New and Text Document. Rename the file to "ACAD_db_SQLE.udl" and make sure that the text documents extension .txt also is renamed in the process. Double click on the .udl file.

Here is how to edit the Data Link Properties. Select a provider for SQL Server. Use Microsoft OLE DB Provider for SQL Server.

Locate the server name, security settings to log on to the server and the database.

Tutorial using Oracle

You probably will need Oracle.DataAccess.dll to be in same folder as the main ACAD_db DLL.

Then you need an UDL created in the AutoCAD data source folder that makes use of the Oracle Provider for OLE DB.

Example of script to create the needed database:

create tablespace AUTOCAD2
datafile 'L:/oracle/JTB/autocad2_01.dbf' size 50m autoextend on maxsize 100m;

CREATE SEQUENCE ACADDBSeq
    INCREMENT BY 1
    START WITH 1
    NOCACHE
    NOCYCLE;

CREATE TABLE Windows(
            ID number(10,1) NOT NULL,
            DWG varchar2(255) NULL,

```
            Handle varchar2(255) NULL,
            BlockName varchar2(255) NULL,
            Sym varchar2(255) NULL,
            Width varchar2(255) NULL,
            Height varchar2(255) NULL,
            Style varchar2(255) NULL,
            RefNo varchar2(255) NULL
) tablespace autocad2

CREATE TABLE JTBW_SyncDir(
            SyncDir varchar2(8) NULL
) tablespace autocad2

CREATE TABLE JTBW_Files(
            DWGNAME varchar2(150) NULL
) tablespace autocad2

CREATE TABLE JTBW_BlockLayer(
            BlockName varchar2(50) NULL,
            LayerName varchar2(50) NULL,
            DWGFile varchar2(50) NULL
) tablespace autocad2

CREATE TABLE JTBW_AttSync(
            AttSyncID int NOT NULL,
            BlockName varchar2(50) NOT NULL,
            AttributeTag varchar2(100) NULL,
            DBConnection varchar2(50) NULL,
            SyncDir varchar2(8) NULL
) tablespace autocad2
```
More details available upon request.

Tips & Tricks

ACAD_db is designed to sync AutoCAD attribute values **from database** when drawing is opened and when the command "AcDbIn" is used. In this case if attribute has sync dir "DWGtoDB", then attribute value will not be synced from database and instead shows message to user "Has DB->DWG Sync restriction".

ACAD_db is designed to sync database **from AutoCAD** attribute values when document is saved [Only edited or newly inserted blocks with attribute] or when command "AcDbOut" [All blocks with attribute] is used. In this case if attribute has sync dir "DBtoDWG" then attribute value will be not be synced from database and instead shows message to user "Has DWG->DB Sync restriction".

"When drawing is opened ACAD_db checks whether it is compatible by checking whether drawing full name is listed in the table "JTBW_Files". If drawing is compatible and not read only it attaches events to the drawing. Hence all commands and events will start to work.

"Drawing becomes compatible to database from the time the command "AcDbMake" is used. If any blocks with attribute were inserted before using the command "AcDbMake", those blocks will not be added to edit block collection. Only blocks edited or newly inserted after making drawing compatible are added to edit block collection. Hence preferably, user needs to make drawing compatible and insert the blocks. If user has some blocks inserted before making drawing compatible, then user needs to use command "AcDbOut" as it syncs all blocks.

But if drawing is newly created or not listed in the drawing, then user needs to use command "AcDbMake" to make it compatible. If there are any existing blocks in the drawing before making the drawing compatible, it is advised user to use command "AcDbOut" to sync all pre-existing blocks.

If a drawing is opened and you make a change in the database this change will be lost when you save the drawing unless the SyncDir is DBtoDWG. Make sure to change in the database only if the drawing is closed or if you directly after the change run AcDbIn.

If DWGtoDB is used as SyncDir on an attribute the database will not be updated if just the drawing is opened. You need to either make a change on the block attributes and save or run the "AcDbOut" command to have it updated.

If you make a change in a drawing that is ACAD_db compatible but not having the program loaded the changes might not be reflected to the database. Say you take a copy of a block that can be synchronized and make some changes to the attribute values. Now if you load the program and open the drawing and make some other changes and close and save the drawing the new block with its attributes will not be added to the database. To force an update you would need to run "AcDbOut".

The program does not write values from the database to the drawing if the attribute contains a field. In this case the sync is only done from the drawing to the database.

The command line history in AutoCAD is as default 400 rows and sometimes the status returned by ACAD_db can contain many more lines. One way is to increase this to 2048 rows using this method described here: http://www.jtbworld.com/lisp/historylines.htm

LOGFILEON, LOGFILENAME, LOGFILEMODE and LOGFILEPATH can in AutoCAD be used if you want to direct the command line history to a file so you can investigate the information that comes on the command line.

Wish list items

Be able to decide how much information is showed on the command line. For example only showing major information and problems.

What is your wish?