

PRESQL

A program to process SQL type syntax to be used with MySQL (or others via ODBC) for input to the GnuCobol compiler along with other support programs and files.

Set up and Usage Manual



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Pre processor for MySQL Tools Documentation.

The following tools originating from Currey+Atkins (Jim Currey) but somewhat modified by myself, will allow preprocessing of MySQL type commands into the source of a Cobol program prior to running the GnuCobol compiler, in addition other tools that act as support to this function are also included.

Note that this package does NOT use EXEC statements but a variation of the theme as extra commands are injected in to the source pack. See the Syntax on page 14 or syntax.pdf for full details. At some point in the future and if others request, I will add in direct support for EXEC SQL syntax that will support both fixed and free source formats.

As supplied, the tools will accept a source file in free or fixed format.

The primary benefit of using this sub system is that the pre processor accepts both free and fixed format program sources and provides additional tools for creating copy books used within a SQL based program along with prtschema that will print out the entire table structure of a given database. See page 10 for more information.

By using this software you are in law accepting the terms and conditions as given starting on page 19 and on page 25 of this manual. You should therefore read all before proceeding further.

Program and Files Listing

cobmysqlapi.005.c	Original Mysql client from Currey+Atkins (Jim Currey) but use the next one for maximum functions, including Rollback, Commit, Read-Parameters as well as usage of SQLState amongst others.
cobmysqlapi38.c	Source of Mysql client library that needs to be included for each compile. This originally came from dbpre and includes many extra functions and changes made by myself.
*presql.cbl	Source for the pre processor. Also supplied as presql2o and presql2M.
*bldcopy.cbl	Source for tool to create a copy book taken from a database table. Also bldcopy2
*prtschema.scb	Source fed to presql of the DB print schema program. Also prtschema2o & M.
prei.scb	Source demonstrating many of the sql syntax in a menu, based on sql.
preo.cbl	As above but o/p (output) from the presql processor.
Test1.cbl	Source that will show various Mysql system information.
Presql.pdf	This file.
COPYING.pdf	GNU General Public License

and lastly :

documentation_license.pdf	Documentation creative common License.
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Note that these following four copy books should be modified to work for your applications and site requirements and are as used but modified by myself for the open source ACAS application package.

+mysql-procedures.cpy	Cobol procedures to be included in to target source containing called routines introduced by the presql process. Free format.
+MYSQL-PROCEDURES.CPY	Likewise but for fixed format.
+mysql-variables.cpy	Cobol variables for WS to be included into target source needed by code introduced by the presql process, Free format.
+MYSQL-VARIABLES.CPY	Likewise but for fixed format.

The fixed format versions are not as up to date as the free one's.

Updated versions of these are also in the ACAS directory modified for the ACAS applications.

The following are bash scripts to compile the primary programs.

cobmysqlapi38.sh	Compiles cobmysql38.c using gcc with o/p named as cobmysqlapi.
cobmysqlapi.sh	Compiles cobmysql.005.c using gcc with o/p named as cobmysqlapi supplied for completeness but use above later version.
bldcopy.sh	Compiles bldcopy to executable.
presql.sh	Compiles presql.cbl to executable.
prtschema.sh	Compiles prtschema.scb to executable (must run presql first to create prtschema.cbl before using the Cobol compiler).

*Within the Variations directory are program names ending with 2o or 2M that have a call to read a param file where presql2 uses presql2M.param or presql2o.param, etc.
These files must be changed to reflect your set up, i.e., location of the sql server user and password names etc.*

The scripts have also been updated to reflect this change. These extra programs taken from the original supplied and modified sources, allow me to use both MySQL and MariaDB servers running on my development system (MariaDB as distro standard) and on a OSX based computer which have slight differences in the system tables.

Also note that when running presql2o (for processing with MySQL) it can create fields that are very large and the compiler objects to them, so I manually change these three fields to the values below and they are :

```
05  CB-COLUMN-DEFAULT          PIC X(1024000) .
05  CB-COLUMN-TYPE             PIC X(1024000) .
05  CB-GENERATION-EXPRESSION   PIC X(1024000) .
```

You may choose to use a smaller value but for me I use a value of 1Mb as they do not effect the data within any cobol source programs as none are used.

Again your Cobol source files will NOT be affected by this problem (unless your program actually uses the tables within information_schema which for any normal work is not used) only for the specific tool, prtschema created by presql2o and once created it should not need to be recompiled . I cannot think of a simple way of fixing this within presql2 or prtschema.

As far as I remember this does not happen with MariaDB

Clearly the sizing defaults for specific field types within the MySQL system for the version I am using are larger than MariaDB.

There are other differences between the two, within the information_schema which is why I have two versions for each program that will be affected.

For users sticking to usage of only one SQL server the problems should be reduced but be aware of this when compiling prtschema at any time.

Timing note:

On my systems when running prtschema against mariaDB (on a Mageia v5 distro using a AMD FX8350 8 core cpu and 16Gb ram) where MariaDB is the only one offered, it takes 15 seconds to run and when run against MySQL running on a Mac Pro (2008 model with 2 Xeon quad core cpu's & 24Gb ram) it is less than 1 second. Both SQL servers are at the basic configuration as out of the box. For production this might well be changed :)

Notes for above:

** Programs starting with '*' must be changed to reflect your MySQL installation such as user, password, socket location before compiling them.*

*+ Likewise you also might need to change these again to reflect your installation and applications
However if using the program names ending with 2 or 2o or 2M they will use a parameter file see above for more information that should remove the need for any code changes to the programs*

presql2, prtschema2 & bldcopy2 HOWEVER these param files must be in the current working directory. All comments regarding RDB for short should mean RDBMS.

In addition, I have included the Cobol + SQL source files for one of the ACAS FH (File Handlers) and a corresponding DAL (Data Access Layer) module that is called by any Cobol program requiring access to a specific RDB table (or in the case of acas011 a Cobol flat file). along with a data load program for the same table / Cobol flat file and these are in the ACAS directory. This application (ACAS) is available via SF if wanted, but the RDB version is still under development so it is not yet been uploaded – later this year.

A application program/module that requires access to a Cobol flat file or a RDB table calls in this instance, acas011 (FH) that will process the Cobol file or in turn call stockMT (DAL). Of course if a program only need to process tables it could, call the DAL directly.

The data for processing tables such as location of server, user name & password etc is held in the ACAS system file and this can be seen read by the stockLD program.

More information regarding these programs:

The input for file / table processing consists of two elements passed via linkage in File-Access that contains :

1. Two fields -

```
03 File-Function      pic 99.
  88 fn-open          value 1.
  88 fn-close         value 2.
  88 fn-read-next     value 3.
  88 fn-read-indexed  value 4.
  88 fn-write         value 5.
  88 fn-Delete-All    value 6.      *> 10/10/16 - Delete all records.
  88 fn-re-write      value 7.
  88 fn-delete        value 8.
  88 fn-start         value 9.
  88 fn-Read-Next-Row value 13.     *> 14/11/16 - Special 4 LD.
  88 fn-Write-Row     value 15.
  88 fn-Read-By-Name  value 31.     *> 15/01/17 for Salesled (SL160)
  88 fn-Read-By-Batch value 32.     *> 08/02/17 for OTM3 (sl095)
  88 fn-Read-By-Cust  value 33.     *> 09/02/17 for OTM3 (sl110, 120, 190)
*>
03 Access-Type        pic 9.      *> For rdbms 2 should cover all !!!
  88 fn-input         value 1.
  88 fn-i-o           value 2.
  88 fn-output        value 3.
  88 fn-extend        value 4.     *> not valid for ISAM
  88 fn-equal-to      value 5.
  88 fn-less-than     value 6.
  88 fn-greater-than  value 7.
  88 fn-not-less-than value 8.
  88 fn-not-greater-than value 9.  *> Not currently used (06/04/2012)
```

and these are set for every access prior to the call to (in this instance) acas011 or stockMT.

Also in File-Access are these fields (among others)

```
07 FA-File-System-Used pic 9.
  88 FA-FS-Cobol-Files-Used value zero.
  88 FA-FS-RDBMS-Used      value 1.
  88 FA-FS-Valid-Options   values 0 thru 1.
03 RDB-Data.
  05 DB-Schema  pic x(12) value spaces.
  05 DB-UName   pic x(12) value spaces.
```

```
05 DB-UPass      pic x(12)  value spaces.  
05 DB-Host       pic x(32)  value spaces.  
05 DB-Socket     pic x(64)  value spaces.  
05 DB-Port       pic x(5)   value spaces.
```

FA-File-System-Used specifies what data access is to be used, i.e., Cobol files or tables and the content of RDB-Data has the data needed to connect to a specific MySQL server and comes from the applications system file . It could be via a call to read_params but this method is not in use as it allows any application user to see the access data and password although there are ways around this under Linux such as execute only file settings for the .param file.

acas011.cbl	FH for Stock processing.
stockMT.scb	DAL for stock Table processing.
stockLD.cbl	Cobol file to table data loaded – used when migrating with example of calls to FH/DAL.
Fhlogger.cbl	Can be ignored, lit is called by some of the above modules.

Hopefully I have provided enough information for you to make sense of the source code. These sources are still subject to change, as this version of ACAS is still in active development.

Set up

The following assumes you have installed Mysql or MariaDB along with the same version or later of the C client libraries and include sources and have the RDB up and running, maybe using phpMyAdmin to verify operations or for MySQL using phpMyAdmin or MySQL workbench for the version of MySQL installed.

Of course you will also have installed the :

1. GCC development system
2. GnuCobolv2 system, compiled and installed it as needed. No testing of earlier compilers has been made and therefore may not work out of the box.
3. Extract the MySQL presql files to a directory that you can compile from or is linked.
4. Change the sources of mysql-* cpy (for free format) or MYSQL-*.CPY (for fixed) libraries to reflect your installation. You may well want to update the fixed ones to that of the free versions if being used.
5. Change the sources of *presql.cbl, *prtschema.scb, bldcopy.cbl to reflect your installation.
6. Using the included Bash scripts compile all but start with cobmysqlapi38.sh or cobmysqlapi.sh as cobmysqlapi.o is needed for the compile scripts for the Cobol programs.
Note that I used the former as I wanted access to Rollback, Commit along with using SQL-STATE error numbers which is not in the 005 version and this is useful for getting error info when using INSERT and UPDATE which may not provide errno output.

If you have not been able to compile all without errors you will need to find and fix all issues otherwise you can now move the binaries to your ~/bin directory where they can be found.

You are now ready to create Cobol & SQL source programs using the SQL syntax, see page 14.

Use the various source programs included, to give you an idea of coding styles and formats etc such as prei.scb, stockMT.scb (& stockLD.cbl), bldcopy.cbl, prtschema.scb and for that matter presql.cbl.

Note that stockMT. and stockLD has been run against MariaDB on a Mageia v5 X64 Linux installation , Mysql on a Mac Pro with OSX 10.11 and the *nix environment on a IBM m/f (mainframe).

If you wish to take a look at the ACASDB tables which is included within the ACAS directory, look at ACASDB.sql and that can be used to create the DB along with some rows used in basic unit testing for stock control and other areas. This is the latest output from a backup made when I built the tools. Note that there is some test data in tables STOCK-REC, SYSTEM-REC and you might want to modify the engine and character set used see lines with

```
) ENGINE=InnoDB DEFAULT CHARSET=utf8;.
```

Also present in same directory is the sources for :

acas011.cbl	Stock F.H. (Cobol File Handler) that has simple call to
stockMT.scb	Stock DAL (Data Access Layer) that accesses the data base table.
stockMT.cbl	Stock DAL as output from presql and l/p to cobc.
stockLD.cbl	Load the STOCK-REC table from a Cobol flat file when migrating.
fhlogger.cbl	Can ignore, but called by some of the above modules to create logging data which is used for testing..

Recommend you look closely at the code of stockMT.scb as it should help you in working out the flow of SQL for MySQL used with presql for all of the access types you will use in your own programs.

Performance considerations

This is very dependent on the set up of the RDB server but out of the box installations has shown no noticeable issues other than under Mariadb running prtschema which takes 15 seconds to list out (without printing) the test database (ACASDB with 25+ tables and one table having a large number of columns, e.g., 160). Have also run prtschema against Mysql running on OSX or the m/f which shows a performance improvement over mariadb when running prtschema as Mysql runs in under a second but as said above, Mariadb takes 15 seconds.

Running the ACAS applications during unit testing has not shown any delays but there is not a large amount of data records that at the moment that would help to show up such issues.

One area of possible concern is that there is no provision for prepared statements and this will not help when processing a large amount of data say in running a billing cycle batch job or again a large printing process but batch processes do not normally have a user watching while it runs.

There there are other issues that might slow down the job step/processes such as :

1. Speed of the dasd (Direct Access Storage Device – a hard drive) in data throughput that is holding the RDB.
2. Dasd partition type.
3. Dasd spare capacity – free space should be more than enough say 25% or better at any time.
- 4.. Spread of data across more than one dasd.
5. Frequency of clean up - removing dead rows etc from the server and any other re-organisation.
6. Usage of RDB parallel processing including back ups in real time when using more than one server.
7. Speed of the system used to hold the RDB including that of the connection to the LAN and the LAN itself. 1Gb is better than 100Mb. Large sites run =>10Gb LANs
8. If the applications and the RDB is running in 32 or 64 bit native mode.
9. Spare resources available on the server and for that matter the system any application is running on such as extra CPU's and Ram.
10. The platform in use, e.g., Windows or *nix – the later being faster and more efficient.

There is a lot more

Processing Steps for the Pre-Processor.

1. Having created tables in your MySQL database you can get a listing of them by running :

`prtschema DataBase-Name PrintSpool-Name`

This will create a file `schema.t` and print it out retaining the file. I use a non existent spool name to avoid printing.

For help on the parameters just use :

`prtschema help | HELP`

2. To create copy book entries that can be included within a Cobol source using copy `copybookname` run :

`bldcopy OutputFileName DataBaseName TableName FieldNamePrefix`

Where `FieldNamePrefix` = the letter used as `xyz-` that will prefix all Cobol field names.

For help on the parameters just use :

`bldcopy help | HELP`

You will need to do this for each table in the DB that you are going to use.

An example is in the ACAS directory for `stock-rec` and was created using :

`bldcopy stock-rec ACASDB STOCK-REC XYZ`

3. To create a Cobol source from the Sql source file where this file has extension of `.scb` (which stands for `s=sql`, `cb = cobol`) run :

`presql InputFileName.scb OutputFileName.cbl FIXED | FREE | fixed | free`

For help on the parameters just use :

`presql help | HELP`

Note that the `|` indicates “or” so, for the above you can use `help` or `HELP` etc.

This program will accept the GC `>>SOURCE FIXED` or `>>SOURCE FREE` source line but **MUST** be within records 1 or 2 of the source code. At this time it does **not** support extra examples of these further down in the sources so jumping from `fixed` to `free` and/or `free` to `fixed` within the sources is not supported in any way. Yet another thing to look at when I have time.

If the program find an error in your SQL syntax or lack of required parameters including lack of end sequence, e.g.,

`/MYSQL INIT\` without `/MYSQL-END\` or a missing line between such as `BASE=`

It will abort having displayed the error.

Did have a look at changing this but it would involve a lot of changes to the code and the coding structure and I had a more pressing need to just use it.

Does help to keep your coding some what more precise though !

Also, do **NOT** include any floating comments within the /MYSQL blocks. For example :

```
/MYSQL FETCH\           *> any comments
      TABLE=table name  *> or any other comments
/MYSQL-END\             *> or any more comments
```

I have not necessarily checked that this is fully working although 'should' be.

Also recommend that all the PSQL (presql SQL commands) are coded from CC 3 (Column 3) and **always** in upper-case. It will not find any on lower case or a mixture of both.

presql is not dealing with it correctly and can & will create broken Cobol.

Did have a quick look but ran out of time and it was easy to deal with – just don't do it..

I have starting looking at this problem and hopefully will deal with it, but avoid it anyway. Likewise using floating comments before the PSQL commands should be avoided but hopefully I will have fixed these issues although the Cobol output file (for processing with cobc) may have these comments removed but there again the primary source file is the one input to presql the pre-compiler.

Special versions of all three programs with '2' added to the names i.e., presql have also been created, named as :

```
presql2o
presql2M
```

Likewise :

```
prtschema2
```

and possibly with o or M as an extra letter signifying for use with Mariadb or Oracles Mysql.

```
prtschema2o
perschema2M
```

These are specific for MySQL (presql2o) and MariaDB (presql2M). There is a minor difference between these two RDB versions but not for normal programming and this causes a problem with prtschema/2.. Basically there is an extra column added to the COLUMNS table (in the information_schema database) along with differing data definitions and it was easier to just create two programs of each to handle it. The other two programs are just for my convenience as I use multi RDB servers on different boxes or systems. **MUST REMEMBER TO RE-LOOK AT THESE TO SEE IF I SHOULD INCLUDE THE VARIATIONS.**

They use a param file to hold the RDB information to connect to the right server, therefore simplifying the need to change the programs sources.

These file are called presql2o.param and presql2M.param respectively.

Here is a sample of a param file for the Mysql version running on a system other than the one for development :

```
DBHOST=192.168.1.5
DBUSER=mysql
DBPASSWD=mysqlpass
DBNAME=information_schema
DBPORT=3306
DBSOCKET=/tmp/mysql.sock
```

and here is one for running on the same as development but using mariadb :

```
DBHOST=localhost
DBUSER=dev-prog-001
DBPASSWD=mysqlpass
DBNAME=information_schema
DBPORT=3306
DBSOCKET=/home/mysql/mysql.sock
```

If you look at the code for presql2o you will see at paragraph 2131-Get-RDB-Params a call to cobmysqlapi using "read_params" and here is a snippet of the code for WS and procedure div:

WS Div :

```
copy "COPY MYSQL-VARIABLES"
```

This copybook contains all of the WS-Mysql variable required for your program.

Procedure Div :

```
2131-Get-RDB-Params.                *> reads file presql2.param
    move      spaces to              WS-MYSQL-Host-Name
                                      WS-MYSQL-Implementation
                                      WS-MYSQL-Password
                                      WS-MYSQL-Base-Name
                                      WS-MYSQL-Port-Number
                                      WS-MYSQL-Socket.
    Call      "read_params"          USING ws-parm-prog-name
                                      WS-MYSQL-Host-Name
                                      WS-MYSQL-Implementation
                                      WS-MYSQL-Password
                                      WS-MYSQL-Base-Name
                                      WS-MYSQL-Port-Number
                                      WS-MYSQL-Socket
    End-call
*
    display "Using as RDB calls ".
    display "Host=" WS-MYSQL-Host-Name.
    display "BaseName=" WS-MYSQL-BASE-NAME.
    display "User=" WS-MYSQL-Implementation.
    display "Password=" WS-MYSQL-Password.
    display "Port=" WS-MYSQL-Port-Number.
    display "Socket=" WS-MYSQL-Socket.
    Display " ".
```

Of course this code block can be used in your application program menu to obtain the RDB data. Note that the param file name is found through a variable set in the program containing the program name (see start of WS at variable :

```
160830 01  ws-parm-prog-name          pic x(8) value "presql2o".
```

The same changes also apply to bldcopy as bldcopy2 and prtschema as prtschema2 (o or M).

Problems or questions

Any issues please use the sourceforge forums for GnuCobol and I will respond as soon as practical marking subject with presql or if urgent you can email me direct at vbcoen at gmail dot com but use subject as presql.. Please report any bugs in programs or omissions in documentation.

Latest versions both tested and nightly when available can be found on my website at :

<http://www.applewood.dtdns.net/files/>

under JC MySQL-Precompiler

Once nightly builds are running, there will be a directory under that marked nightly but be warned they will have minimal testing as the code comes directly from my development environment and in some cases may well have not even been compiled yet. Yep straight from the text editor. So test before overwriting previous versions.

Syntax for MySQL Pre Processor Commands

This version only supports operations on **all** columns in a table (*) and only supports one instance of mysql at a time.

Note that all values shown as upper case is as required, so do NOT use lower or mixed case.

For example on DEFINE you cannot use

/mysql define\ or
table=table name,prefix

The underlined / Uppercase words MUST be typed in upper case as shown.

Parameters in braces {} are optional, defaults will be used if parameter not specified

[For examples of usage of these commands, see the source of stockMT.scb in the ACAS directory.]

I do not use the lock, unlock commands as the RDB using engine InnoDB deals with such at least according to the RDB docs.

Where it is indicated that generated code does not include a terminating period it can be included within one or more cobol IF statements but if before a paragraph or section will need to be inserted for statement termination.

Processes for Working-Storage

```
*****
*   DEFINE
*****
```

DEFINE is to be used to allow the programmer to have the row definitions of a table placed in a program. The programmer must provide the 01 level information in the actual Cobol program. The prefix must be less than 5 characters.

```
/MYSQL DEFINE\  
    TABLE=table name,prefix  
/MYSQL-END\  

```

```
*****
*   VAR
*****
```

VAR tells the Pre Processor where to place the variables (both static mysql routines) and dynamic (row names)) the programmer should specify with the TABLE= parameter for each table that will be accessed in the program and the prefix to apply to each column name when building the Cobol data name (prefix must be less than 5 characters). Remember you are limited to the maximum size of a Cobol user defined field name which includes the prefix. Base name = DB name.

```
/MYSQL VAR\  
    BASE=base name  
    TABLE=table name,prefix  
{    TABLE=table name,prefix } . . .  
    . . .  
/MYSQL-END\  

```

Processes for Procedure Division

```
*****
*   CLOSE
*****
```

CLOSE will generate "PERFORM MYSQL-1980-CLOSE THRU MYSQL-1999-EXIT"

Note No ending period.

```
/MYSQL CLOSE\
/MYSQL-END\
```

```
*****
*   DELETE
*****
```

DELETE will delete rows and WS-MYSQL-COUNT-ROWS will contain the number of rows deleted after the deletion occurs.

You should test this number to see if it contains the number of rows that you expect.

```
/MYSQL DELETE\
      TABLE=table name
      WHERE=variable containing conditions
/MYSQL-END\
```

```
*****
*   FETCH
*****
```

FETCH will generate CALL "MySQL_fetch_row" USING WS-MYSQL-RESULT,
COLUMN-NAME1 COLUMN-NAME2 COLUMN-NAME-3

Note No ending period.

WS-MYSQL-COUNT-ROWS will contain the number of rows found.

```
/MYSQL FETCH\
      TABLE=table name
/MYSQL-END\
```

```
*****
*   FREE
*****
```

FREE will generate CALL "MySQL_free_result" USING WS-MYSQL-RESULT

```
/MYSQL FREE\
      TABLE=table name
/MYSQL-END\
```

* INIT

INIT will populate the fields needed to open a data base and create
"PERFORM MYSQL-1000-OPEN THRU MYSQL-1090-EXIT"

Note: No ending period.

Note that if RUNTIME is used the program expects to open a base depending upon run-time variables. Consequently the preprocessor will not move anything into WS-MYSQL-BASE-NAME or WS-MYSQL-PASSWORD.

The programmer must perform the moves before invoking /MYSQL INIT\.

Data variables will be generated based upon the "base name" as a model.
That means that the run-time base must match the "base name" structure.

Also note that both /MYSQL INIT\ and /MYSQL VAR\ require the definition of the base name (BASE=). The base name in the VAR command is used to build the data structures.
The base name in the INIT command is used to open the data base.

```
/MYSQL INIT\  
  BASE=base name  
  {HOST}=host name                default="localhost"  
  {IMPLEMENTATION}=implementation name default="mysql"  
  PASSWORD=password  
  {PORT}=port number              default="3306"  
  {SOCKET}=socket name            default="var/run/mysqld/mysqld.sock"  
  {RUNTIME}                        Take database name only at run time.  
                                   WARNING I have not played with this option.  
                                   But guess it would have limited usage.  
  
/MYSQL-END\  

```

* INSERT

INSERT will generate "insert into TABLE-NAME set COLUMN-NAME1="data1",
COLUMN-NAME2="data2" ... for every column in a table.

WS-MYSQL-COUNT-ROWS will contain the number of rows successfully inserted and should be tested for (at least once). *Note: No ending period.*

You should test for any error arising using such coding sequence as

```
if      WS-MYSQL-Count-Rows = zero  
  call  "MySQL_errno" using WS-MYSQL-Error-Number  
  call  "MySQL_sqlstate" using WS-MYSQL-SQLstate  
  move  WS-MYSQL-SqlState to SQL-State  
  if    WS-MYSQL-Error-Number not = "0 "  
    move WS-MYSQL-Error-Number to SQL-Err  
    call "MySQL_error" using WS-MYSQL-Error-Message  
    move WS-MYSQL-Error-Message to SQL-Msg  
  end-if  
  any additional code . . .  

```

```
/MYSQL INSERT\  
  TABLE=table name  
/MYSQL-END\  

```

*** LOCK**

LOCK will lock a table

```
/MYSQL LOCK/  
    TABLE=table name  
/MYSQL-END\
```

*** PRO**

PRO tells the Pre Processor where to place the Mysql procedures [similar to using INCLUDE or COPY].

```
/MYSQL PRO\  
/MYSQL-END\
```

*** SELECT**

SELECT will generate "select COLUMN-NAME1, COLUMN-NAME2, COLUMN-NAME3, ...
from TABLE-NAME
WHERE variable name containing conditionals"
"PERFORM MYSQL-1200-MYSQL-SELECT THRU MYSQL-1209-EXIT"

Note that the SELECT statement will always select all columns (i. e. SELECT *) and that it only handles one table at a time (no joining)
SELECT will also perform a STORE RESULT.

Note: No ending period.

IN MySQL, the proper technique for getting rows (records) is:

- 1) SELECT (a STORE RESULT will automatically be performed)
- 2) FETCH the rows that you want one at a time
- 3) FREE to release the RESULT cursor set created at SELECT time

```
/MYSQL SELECT\  
    TABLE=table name  
    WHERE=variable name containing conditionals  
/MYSQL-END\
```

* SWITCHDB

SWITCHDB will insert a
MYSQL-1240-SWITCH-DB THRU MYSQL-1249-EXIT command.

Note that the programmer will need to insert the new base name into MYSQL-WS-BASE-NAME before executing this command.

```
/MYSQL SWITCHDB\  
/MYSQL-END\  

```

* UNLOCK

UNLOCK will unlock the data base

```
/MYSQL UNLOCK\  
/MYSQL-END\  

```

* UPDATE

UPDATE will generate "update TABLE-NAME set COLUMN-NAME1="data1",
COLUMN-NAME2="data2" ...
for every column in a table.

Note: No ending period.

In order to check the status of the UPDATE you should :

- 1) CALL "MySQL_errno" USING WS-MYSQL-ERROR-NUMBER
- 2) IF WS-MYSQL-COUNT-ROWS < the number of rows expected and
WS-MYSQL-ERROR-NUMBER not = "0 " then you have an error condition.

Use the ANSI SQL & ODBC 5 character codes in WS-MYSQL-ERROR-NUMBER.

Using v 38 of the api you can also use SQLSTATE which always will create a code, e.g.,

```
call  "MySQL_sqlstate" using WS-MYSQL-SQLstate  
move  WS-MYSQL-SqlState    to SQL-State
```

```
/MYSQL UPDATE\  
TABLE=table name  
WHERE=variable name containing conditionals  
/MYSQL-END\  

```

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