```
PLACE BLOCK  C_1/CARRY<1>                 : GB
PLACE BLOCK  C_1/CARRY<2>                 : GC
PLACE BLOCK  CNT_OUT<1><8>                : GD
PLACE BLOCK  CNT_OUT<1><6>                : HB
PLACE BLOCK  CNT_OUT<1><10>               : HD

                    . . .

#--------------- SCALER 19 -----------------
PLACE BLOCK  LINK<20><0>                  : AM
PLACE BLOCK  LINK<20><2>                  : AN
PLACE BLOCK  LINK<20><4>                  : AO
PLACE BLOCK  LINK<20><6>                  : AP
PLACE BLOCK  CNT_OUT<19><0>               : BM
PLACE BLOCK  CNT_OUT<19><4>               : BN
PLACE BLOCK  LINK<20><8>                  : BO
PLACE BLOCK  LINK<20><10>                 : BP
PLACE BLOCK  CNT_OUT<19><2>               : CM
PLACE BLOCK  C_19/CARRY<1>                : CN
PLACE BLOCK  C_19/CARRY<2>                : CO
PLACE BLOCK  CNT_OUT<19><8>               : CP
PLACE BLOCK  CNT_OUT<19><6>               : DN
PLACE BLOCK  CNT_OUT<19><10>              : DP
```

Result SCALER.CST

```
#  test.cst Constraint file for XACT 5.00
#  Fri Jun 30 01:54:04 1961
#-----------------------------------
#  Constraint file for SCALER design
#-----------------------------------
#
# Define GROUPS
#
TIMEGRP="STAGES1=FFS(CNT_OUT*)";
#
# Timespecs
#
TIMESPEC="TS2=FROM:STAGES1:TO:STAGES1=12";
#
WEIGHT NET 99 CNT_OUT*;
WEIGHT NET 99 C*/CARRY*;
#
#----------------------
# Placement Constraints
#----------------------
# CLB's
#
#--------------- SCALER 0 -----------------
PLACE BLOCK  LINK<1><0>              : AA
PLACE BLOCK  LINK<1><2>              : AB
PLACE BLOCK  LINK<1><4>              : AC
PLACE BLOCK  LINK<1><6>              : AD
PLACE BLOCK  CNT_OUT<0><0>           : BA
PLACE BLOCK  CNT_OUT<0><4>           : BB
PLACE BLOCK  LINK<1><8>              : BC
PLACE BLOCK  LINK<1><10>             : BD
PLACE BLOCK  CNT_OUT<0><2>           : CA
PLACE BLOCK  C_0/CARRY<1>            : CB
PLACE BLOCK  C_0/CARRY<2>            : CC
PLACE BLOCK  CNT_OUT<0><8>           : CD
PLACE BLOCK  CNT_OUT<0><6>           : DB
PLACE BLOCK  CNT_OUT<0><10>          : DD
#--------------- SCALER 1 -----------------
PLACE BLOCK  LINK<2><0>              : EA
PLACE BLOCK  LINK<2><2>              : EB
PLACE BLOCK  LINK<2><4>              : EC
PLACE BLOCK  LINK<2><6>              : ED
PLACE BLOCK  CNT_OUT<1><0>           : FA
PLACE BLOCK  CNT_OUT<1><4>           : FB
PLACE BLOCK  LINK<2><8>              : FC
PLACE BLOCK  LINK<2><10>             : FD
PLACE BLOCK  CNT_OUT<1><2>           : GA
```

File 2 GENERAL.PAR:

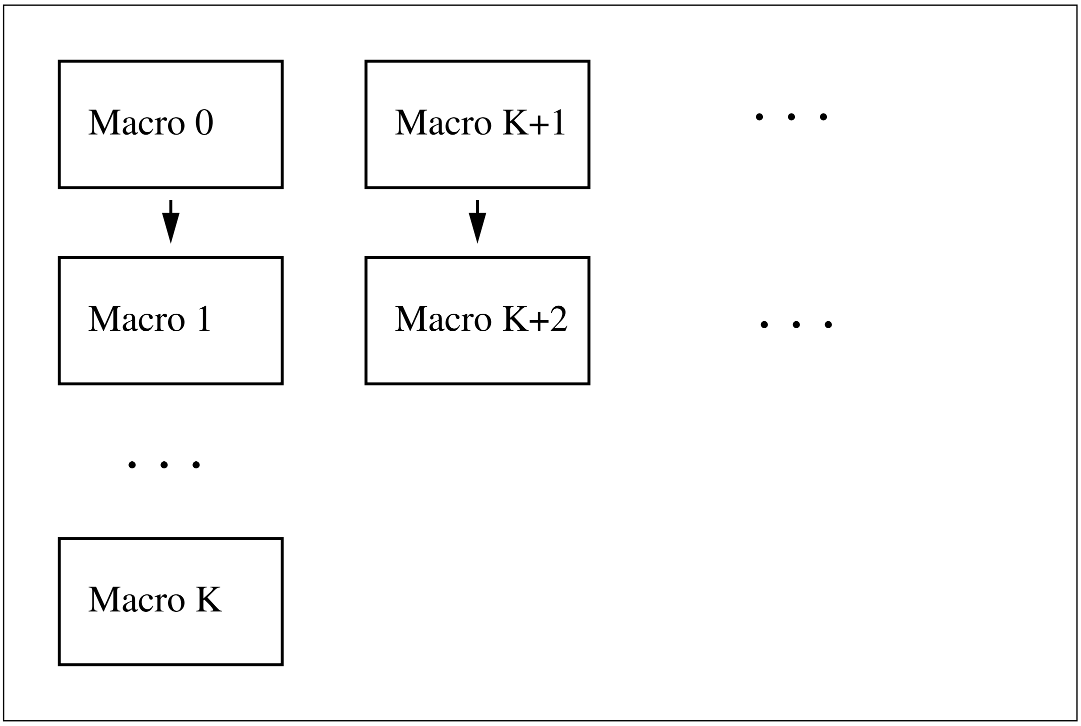
```
PRINT       "INCLUDE file general.par"
WRITE       #------------------------------------
WRITE       "#  Constraint file for SCALER design"
WRITE       #------------------------------------
WRITE       #
WRITE       "# Define GROUPS"
WRITE       #
WRITE       TIMEGRP="STAGES1=FFS(CNT_OUT*)";
WRITE       #
WRITE       "# Timespecs"
WRITE       #
WRITE       TIMESPEC="TS2=FROM:STAGES1:TO:STAGES1=12";
WRITE       #
WRITE       "WEIGHT NET 99 CNT_OUT*;"
WRITE       "WEIGHT NET 99 C*/CARRY*;"
WRITE       #
```

Design Example

File 1   CST.PAR:

```
PRINT               "Make PLACEMENT Constraint File for XACT 5.00"
PRINT               "(C)1995 O.BUYANOV CERN/ECP       Phone 4114"
CST_FILE            scaler.cst
CHIP_WIDTH          16
CHIP_HEIGHT         20
MACRO_WIDTH         4
MACRO_HEIGHT        4
MACRO_NUMBER        20
#MACRO_ORIGIN       CC
#MACRO_ORIGIN       HH
MACRO_HEADER        "#--------------- SCALER [0:20] -----------------"
MACRO_CHAIN         4
BLOCK_NAME          LINK<[1:20]><0>
BLOCK_NAME          LINK<[1:20]><2>
BLOCK_NAME          LINK<[1:20]><4>
BLOCK_NAME          LINK<[1:20]><6>
BLOCK_NAME          CNT_OUT<[0:19]><0>
BLOCK_NAME          CNT_OUT<[0:19]><4>
BLOCK_NAME          LINK<[1:20]><8>
BLOCK_NAME          LINK<[1:20]><10>
BLOCK_NAME          CNT_OUT<[0:19]><2>
BLOCK_NAME          C_[0:19]/CARRY<1>
BLOCK_NAME          C_[0:19]/CARRY<2>
BLOCK_NAME          CNT_OUT<[0:19]><8>
BLOCK_NAME          ""
BLOCK_NAME          CNT_OUT<[0:19]><6>
BLOCK_NAME          ""
BLOCK_NAME          CNT_OUT<[0:19]><10>
INCLUDE             general.par
WRITE               #----------------------
WRITE               "# Placement Constraints"
WRITE               #---------------------
WRITE               "# CLB's"
WRITE               #
```

MACRO_CHAIN = 3



MACRO_CHAIN = 4

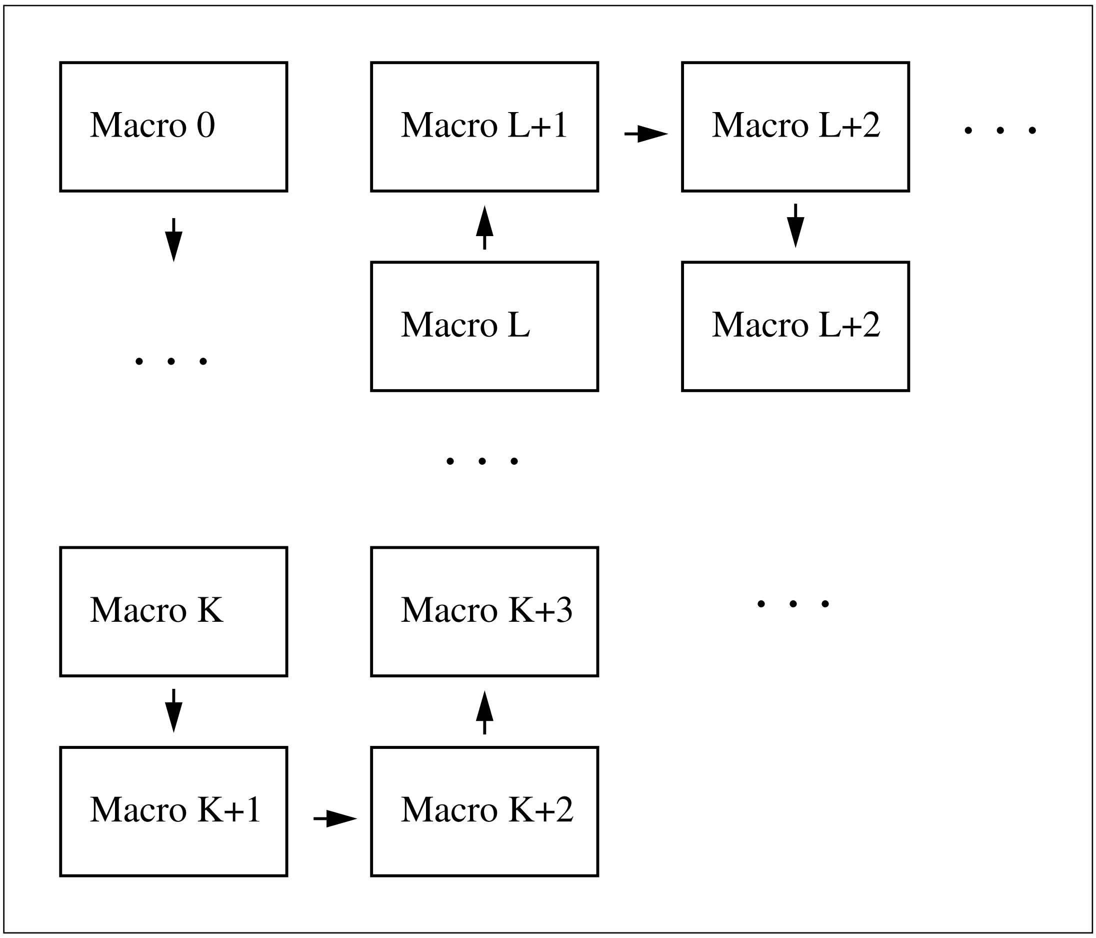
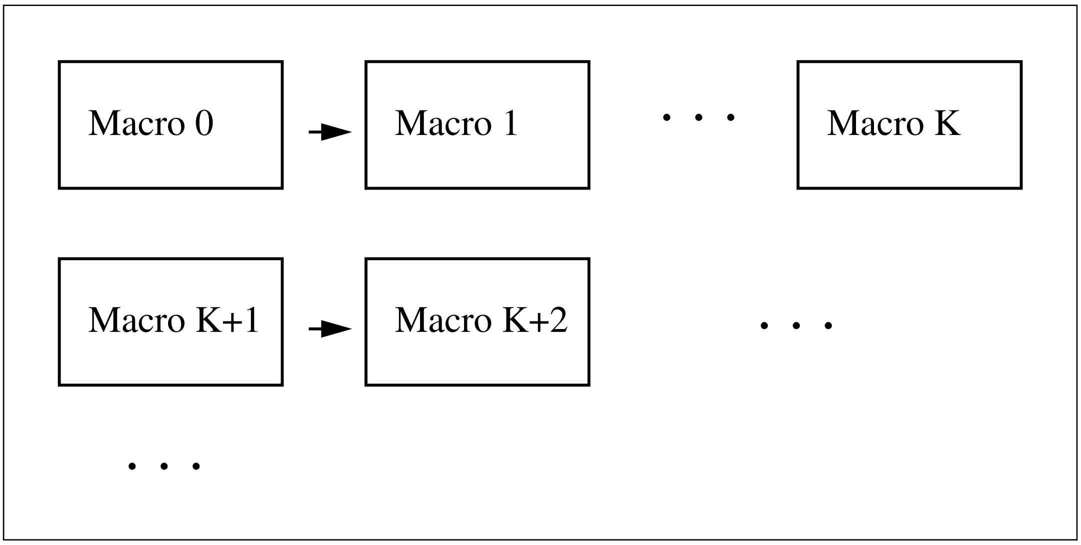


Figure 3. MACRO_CHAIN patterns

MACRO_CHAIN = 1 (Default)



MACRO_CHAIN = 2

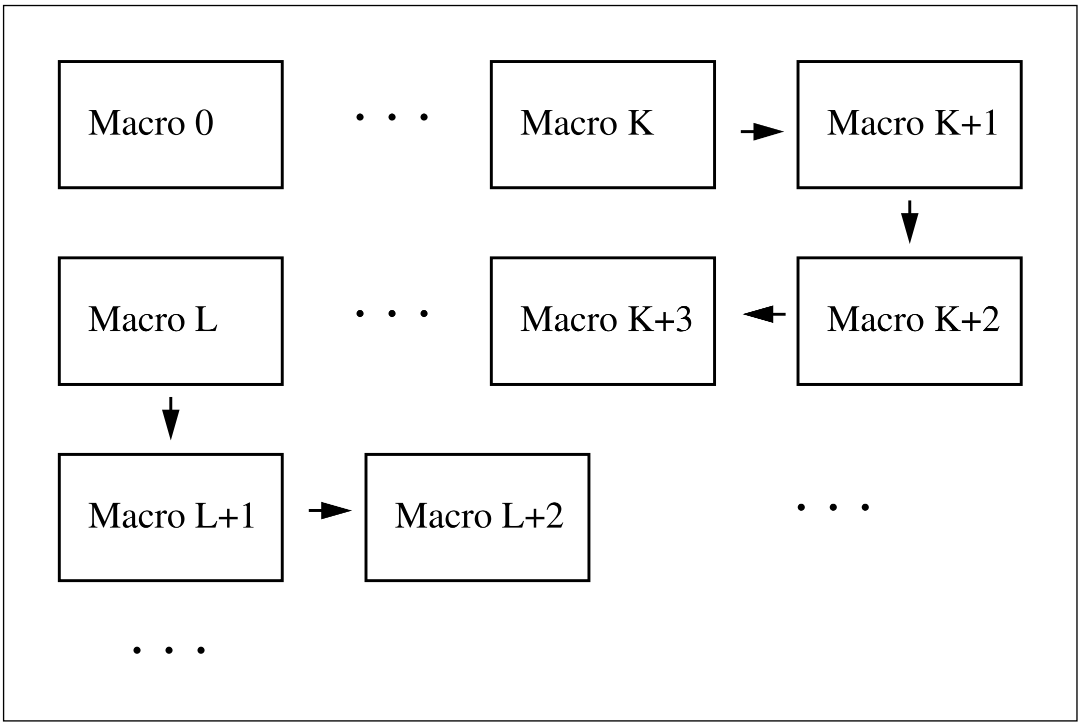


Figure 1. Chip Structure

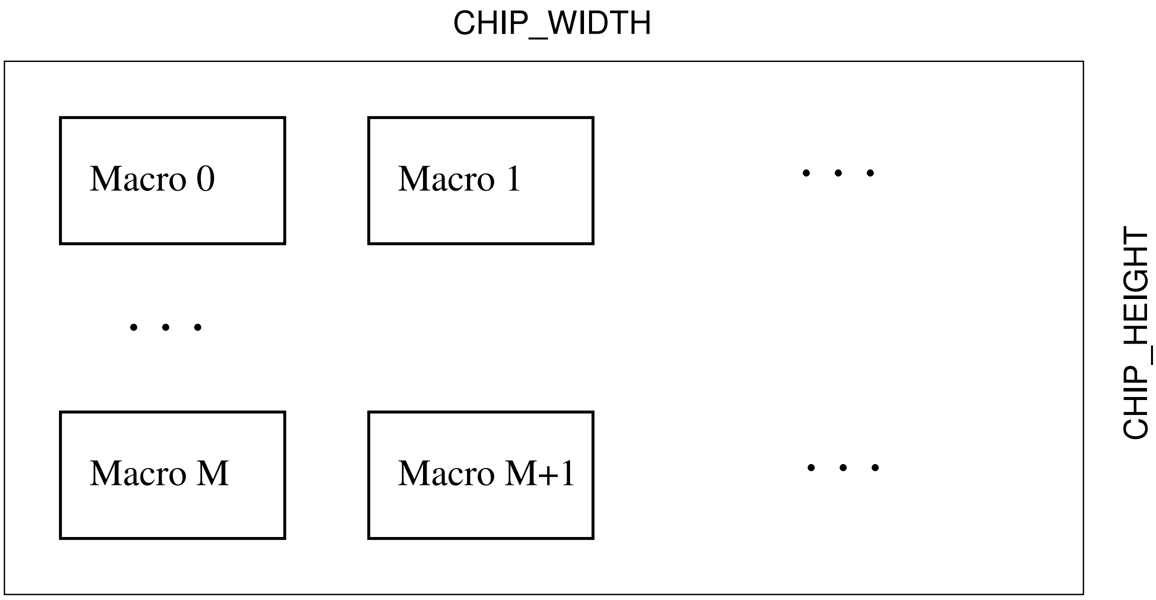
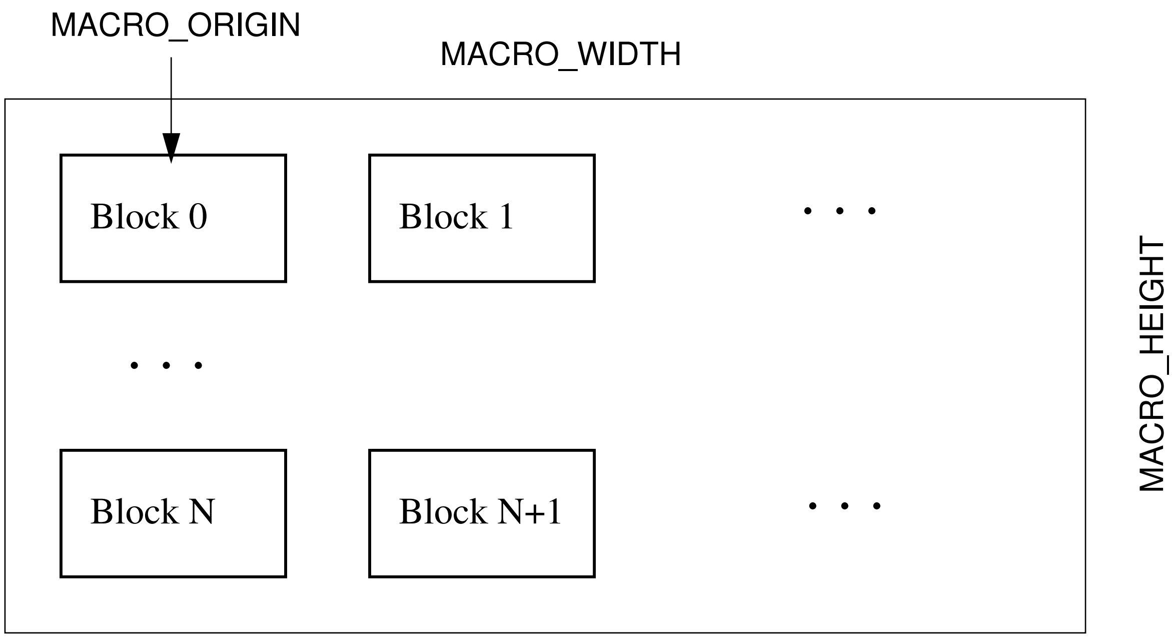


Figure 2. Macro Structure



Command list

CHIP_WIDTH	Horizontal dimension of used FPGA chip (Fig. 1).
CHIP_HEIGHT	Vertical dimension of FPGA chip used.
MACRO_WIDTH	Horizontal MACRO size (in #BLOCKs, Fig. 2).
MACRO_HEIGHT	Vertical MACRO size (in #BLOCKs).
MACRO_NUMBER	Total number of placed MACROs.
MACRO_CHAIN	Number, corresponding to the predefined placement pattern (Fig. 3).
MACRO_ORIGIN	For random placement of MACROs instead of MACRO_CHAIN, the individual MACRO origin may be specified for each MACRO (Fig. 2).
MACRO_HEADER	The string to be put into constraint file before each MACRO description.
BLOCK_NAME	Name, corresponding to the block name in the design; must be provided for the each BLOCK of MACRO in the order, described at Fig. 2. For missing BLOCKs an empty name ("") is specified.
CST_FILE	Output constraint file name.
PRINT	String to be put on the screen.
WRITE	String to be put into the output file.
INCLUDE	Name of file to be included into the current one.

Appendix 1

MAKECST 1.0

MACRO Placement Generation Tool

SYNTAX: MAKECST [filename]

MAKECST generates a constraint file (XACT 5.00 syntax) by using set of parameters, defined in the input command file. The default name for the command file is "CST.PAR", any other filename may be used by placing it as a command line parameter.

The general command file syntax:

COMMAND_NAME <parameter_value | text_string>

Any text line up to 80 characters may be used as a 'text_string'. If the text string contains TAB or SPACE symbol, it should be doublequoted. Any line, starting with '#' is treated as a comment.

If the text string contains a pattern "[X:Y]" than the number, starting with X and incrementing for every next MACRO will be inserted on its place. The range X:Y must be compatible with the MACRO number.

KNOWN BUGs:

A funny text string may appear as a file creation date in the output constraint file.