APPENDICES

INTRODUCTION

This System Generation process tailors MAS to the user's requirements for his particular P800 configuration, and is an important preliminary to the successful use of MAS. A large number of variables may be specified at system generation.
The variables concern:

- declaration of the devices connected to the P800 machine with their device addresses, their interrupt levels and some other characteristics.
- specification of the system machine.

GENERAL

The MAS System Generation Package is distributed on magnetic tape or on disc. When distributed on magnetic tape, the tape contains a copy of a disc with the System Generation package.

The generated system can be stored on any of the following disc types:
X1215
X1216
CDC-SMD 40mb
CDC-SMD 80mb
CDC-CMD.

The minimum configuration required for generating a MAS system (excluding the device from which the input generation package will be read) is:
- one of the disc storage units listed above (two is preferred)
- an operator`s console
- a P800 computer with at least 64K words of memory.

Summary of the Generation Process

The generation process can be broken down into 6 distinct phases, listed here and described fully under the appropriate headings:
- Creating the Starter Pack
- Creating the System Pack
- Creating the Configuration File
- Generating the MAS System Modules
- Assembling and Cataloguing the MAS Tables
- Link-editing the System.

CREATING THE STARTER PACK

If a MAS system is distributed on disc, the starter pack resides on that disc and can be used immediatily for System Generation.
If a MAS system is distributed on tape, a copy of a starter pack will reside on that tape and has to be stored on a disc.
This restoring is done by making an IPL from the tape. A stand alone program is then loaded to restore the information from the tape to a disc, which is identified by the following questions:

    DISK PHYSICAL ADDRESS (2 HEXA CHAR):

Reply the device address of the unit whereon the starter pack to be created has been mounted.

    Now the Volume Label of the mounted disc is listed to prevent writing of the tape information to the wrong pack and the program asks:

    IS THIS THE DISK YOU WANTED? (YES OR NO)

Reply YE(S) if it is the wanted disc and NO if the wrong disc was mounted. If NO is given, the restore program stops.

    Now the volume label and the creation date of the tape is listed, so that a check can be made, whether the right tape has been mounted, followed by the question:

    DO YOU WANT TO KEEP IT

Reply YE(S) OR NO. IF YES, the label and the packnumber of the disc stored on the tape are written to the disc and the restoring starts. If No is replied, the restore program asks for a new label (16 char) and packnumber (4 char) to be stored on the disc before starting the restoring.
When the restore is ready, the message:

    END OF RESTORING

is output and the starterpack is ready to be used.

CREATING THE SYSTEM PACK

Step 1 An IPL (Initial Program Load) is made with the starter pack as the load device. The method is described in Chapter 4, Operation.

Step 2 Give the replies requested by the system to the following messages:

1. CPU:
   Reply: 57, 58, 59 or 54, specifying the CPU type of the machine where the System Generation will take place.
2. DK1:
   Reply Format: /CO,disc,da,i
3. DK2:
   Reply Format: fc,disc,da,i
4. CR:
   Reply Format: either - da,i
   or - NO
5. LP:
   Reply Format: either - da,i
   or - NO

where
- disc = 1215, 1216, 40M or 80M.
- fc = disc filecode (/C1 - /CF).
- da = device address.
- i = interrupt level expressed in hexadecimal with preceding /. (Typical values: discs = /11, LP = /17; these are set by the engineer.)

Note: When creating a system using only one disc pack (only possible for CDC discs), question 2 above should be answered with SAME.

Step 3 Premark the System Disc Pack (if it is necessary), as follows:
Place the system disc pack on the disc drive (DK2).
Give the SCL BYE command to free the console.
Press the control panel interrupt button. The system will reply:
M:
Enter the command: PK Cx (Cx is the fc parameter from DK2 question)

The Premark procedure is then followed as under Operator Commands in Chapter 5, with the following advised parameter values:

DAD name: 'SUPERV'
Sectors per granule: 8
Userid: 'MASUP'.
Number of cylinders:
- $150 \leq n \leq 200$ for X1215
- $150 \leq n \leq 400$ for X1216
- $50 \leq n \leq 100$ for CDC.

Number of interlaces:
- 10 for CDC
- 5 for X1215/6 for efficiency
- 3 for X1215/6 for DOS compatibility.

For CDC, 2 extra questions are asked:
- SECTORS PER TRACK? - reply 39
- SECTOR LENGTH? - reply 410.

Note: If the user requires a premark date on the volume label, the date must be entered before the Premark is started. This can be done either by SCL/FCL or with an operator command. This date and time setting is, of course, only neceesary for those MAS release which do not ask the date and time before starting the FCL task of the system machine.

Step 4 Define a Background Machine using one of four catalogued procedures. The one chosen depends on the available peripherals; they are listed here together with the filecodes which will be assigned:

Procedure	Filecode /E0	Filecode /02
%%B2TY	TY	TY
%%B2LP	TY	LP
%%B2CR	CR	TY
%%B2CRLP	CR	LP.

Each of these catalogued procedures requires the following mandatory parameters in the invocation command:

%%B2xx dd,mm,yy,DSK2 = /Cx[,DAD0 = n]

where: dd, mm, yy is the date, not necessary for MAS releases asking for it.
n is the DAD name (the default name is SUPERV)
and /Cx is the filecode of the system disc, as specified in DK2. When generating with only one disc pack, /C0 should be specified.

Note: If the premark is attempted after the Batch machine has been declared and the system disc was on-line during this declaration, the user must re-IPL.

Note: The DSK2 parameter is set to /C0 omitted if only 1 disc pack and 1 DAD are being used.

Step 5 Start the background machine using the SCL command:

BYE BATCH

Step 6 Start a Job (with USID=SYSTEM) to create the DAD named D:CI on the system disc, using the catalogued procedure %%DCI (for a X1215/6 disc) or %%DCICDC (for a CDC disc). This last procedure also creates a DAD called D:MSEG for the MAS segments.

The invocation command for these procedures contains two parameters, DK (the filecode of the system disc) and CY (the number of cylinders required for the DAD). These are substituted for the DISC and NCYL parameters, respectively, in the LIB command DCD (declare DAD), which this catalogued procedure uses to create the DAD. If no parameters are entered when the procedure '%%DCI' is invoked, the following default values will apply:

Keyword Parameter	%%DCI Default	%%DCICDC Default
DK	/C2	/C6
CY	50	20

Step 7 Copy the starter pack system files onto the system pack. This can be done using the BCL catalogued procedure '%%CRESYS', using the following calls:

:JOB USID = SYSTEM
%%CRESYS [IUSI=u1][,OUSI=u2]
where u1 = Userid of the starter pack (default = MASUP)
u2 = Userid of the system pack (default = MASUP).

These are the names given to the system USERID when the packs were premarked.

The following steps (8 - 11), must use the Userid MASGEN.

Step 8 Create the Configuration File; this can be done by usig the catalogued procedure %%CONGEN.

It is strongly recommended that the configuration file is created by using this catalogued procedure, and that LIB and UPD processors are used only to update an existing file. It is the reason for the fact that the description of the used System Generation macro's is deleted from this Manual.

%%CONGEN consists of a series of questions, to which answers must be given in order to create the configuration file. These answers can be given conversationally, or they can have been set up as a sequential file. In the latter case, syntax errors in the answers can be corrected from a console.

The invocation command has two formats:

1) Answers to be supplied from non-disc device:

```
%%CONGEN [CONF=fn][,IN=dn[da]]
```

fn consists of 1-6 ASCII characters, specifying the name to be given to the configuration file, which will be catalogued under USID=MASGEN. The default value for CONF is CONFIG. If this filename is not CONFIG, the user must remember to specify it on the CONF= keyword parameter of the %%GENMAS.

dn is the device name, for example, TY, CR, PR, TK, MT. Not a disc device. Default is TY.

da is the device address; two hexadecimal digits without a / character, representing a 6-bit address. The default is the address of the first device of type dn in the system tables:

TY 10
CR 06
PR 20
TK 05
MT 04

If conversational mode is to be used, the IN parameter should not be specified. Questions and answers then appear on TY10.

2) Answers to be supplied from a disc file:

```
%%CONGEN CONF=fn,FNAM=fn2[,USID=u[,DAD=d]]
```

fn is the filename of the configuration file, as for the first type of invocation command.

fn2 is the name of the disc file containing the answers.

u is the USERID (default value is MASGEN).

d is the DAD (default value is /F0).

Syntax Rules

For any question ending with '?' the allowed replies are:

Y[ES] carriage-return
N[O] carriage-return
or carriage-return (assumed to be NO).

For any question ending with `:' the reply is one or two parameters separated by a comma. The first character of each character string must be alphabetic. Number strings must be decimal (or hexadecimal, if preceded by a slash).

If a syntax error occurs a meaningful error message is printed. No action is taken, but the parameter in error may then be re-input irrespective of the medium used for the conversational input.

The Conversation

If the conversational mode is selected the message:

    SELECT MONITOR   (this question is not asked in every release)

is printed. The user replies:

    MAS

then the message:

    CONTROL PANEL INTERRUPT LEVEL   (not asked for every release)

is printed. The user replies the interruprt level, normally: 07.
Then the message:

    SPECIFY CPU TYPE

is printed. Reply:

    P857, P858, P859 or P854 identifying the CPU where the system to be generated should run.

The System Generation dialogue starts with:

    SPECIFICATION OF DEVICES

followed by a serie of quesions which the user is required to answer.
From MAS 8.50, first is asked:

    DO YOU WANT A LIST OF DEVICES

reply Y(ES) or N(O). If N(O), the DEV: question is output, if Y(ES), a list of devices that can be generated is printed. For this list, see below.

The Device Macro Phase

DEV:

This is the first question, the reply to which specifies one device. The question is then repeated and the second device specified, and so on. When no more devices are to be specified the reply EN[D] should be given.

Reply Format

    dnda,lv

dn is the name of the device to be generated. The names are:

CC	CDC-SMD disc 40mb or 80mb
CD	X1215/X1216 disc
FH	DDC fixed head disc
FL	0.25mb floppy data disc
MT	magnetic tape
TK	cassette
LP	lineprinter
CR	cardreader
TY	typewriter
PR	papertapereader
PP	papertapepunch
DY	display device
PL	plotter
DM	AMA8
MF	1mb floppy disc
DF	CDC-CMD disc
AS	ASCU4Z
AZ	AMA4Z
PM	PRIAM DISK
WD	WINCH. (SEAGATE) DISK

When all devices have been specified, EN has to be typed.

da is the device address. For devices connected to the IOP the first device address must be specified.

lv is the device interrupt level, a value ranging from 4 to 61.

Error messages

ADDRESS OUT OF RANGE
ILLEGAL DEVICE NAME
ADDRESS ALREADY ASSIGNED
INT LEVEL OUT OF RANGE
INT LEVEL ALREADY ASSIGNED
FIRST DEVICE OF CONTROLLER PLEASE
4 CONSECUTIVE ADDRESSES MUST BE FREE (for ASCU4Z)
ADDRESS MUST BE A MULTIPLE OF 4 (for ASCU4Z)
LEVEL OF INPUT INT OF AMA8 MUST BE EVEN (for device DM)
LEVEL OF OUTPUT INT OF AMA8 ALREADY ASSIGNED (for device DM)
DEFINE AT LEAST ONE DISC FOR SUPERVISOR (EN given and no disc specified)

For some devices, device dependent questions are output:

CDC-SMD disc (device name is CC)

DISC TYPE (40, 80, 150, 300)

Reply: 40 or 80 being a 40mb or 80mb disc. The replies 150 and 300 are reserved for future implementation.

X1215/X1216 disc (device name is CD)

DISC TYPE (1215, 1216)

Reply: 1215 (X1215 2.5mb disc) or 1216 (X1216 5mb disc).

CDC-CMD disc (device name is DF)

DRIVE x?

Reply: YES or NO specifying whether drive x (0-3) is present or not.

TYPE OF FIXED PART? SIZE (16,48,80)

Reply: 16, 48 or 80 indicating the fixed part of the drive.

Cassette (TK) and 0.25mb floppy (FL)

PROGRAMMED CHANNEL?

Reply: YES, device connected to programmed channel, or NO, device connected to IOP.

Lineprinter (device name is LP)

PROGRAMMED CHANNEL?

NUMBER OF LINES/PAGES

Reply: a number from 10 to 99

Typewriter (device name is TY)

NUMBER OF LINES/PAGE

Reply: a number from 10 to 99 or 0. Zero indicates no Top-of-form skipping has to be done.

AMA8 (DM) and ASCU4Z (AS)

NUMBER OF LINES

Reply: 1-4 for ASCU4Z and 1-8 for AMA8

SAME DEFINITION FOR ALL LINES?

Reply: YES or NO. If YES, the line characteristics are only asked for the first line, if NO they are asked for every line.

LINE NUMBER?

Reply: a number from 0 to 3 for ASCU4Z and from 0 to 7 for AMA8. The linenumber specification need not to be in ascending order and identifies which lines are connected.

DEVICE TYPE (DY, TY, LP, TK)

Reply: TY, DY, LP or TK depending on the type of device connected to this line.

NB OF CHAR PER LINE

Reply: any positive value. This question is not output for a TK device.

NB OF LINES PER PAGE

Reply: any positive value. This question is not output for a TK device.

ECHO MODE?

Reply: YES or NO. This question is only output for AMA8, devices TY and DY.

RESTART TIME FOR PAGE HANDLING (0 TO 255 MN)

Reply: a value from 0 to 255, only output for a DY device. The page handling prevents lines racing over the screen without any possibility to read it for normal human beings. After n-2 lines in standard write mode (n being the number of lines per page) a message is written on the last line of screen to show the next possibilities:

- When the user inputs an 'S' the current standard writes are stopped and considered as ended. Any subsequent standard write is ignored, until a read or basic write has been executed.
- With any other character input, the standard writes are continued as if nothing has happened.
- Without inputting any character, the standard writes are continued after the number of minutes, specified in this Sysgen parameter.

TIME OUT (0 TO 255 MN)

Reply: a value from 0 to 255.

PARITY (N=NOPAR, O=ODD, E=EVEN)

Reply: N, O or E.

IOP devices

DEVICE xx ON THIS CONTROLLER?

Reply: YES or NO. The question is repeated if more than two devices can be connected to the controller, until the reply is NO or 4 devices have been declared.

Error messages On erroneous input on a device dependent question a self-explanatory error-message is printed.

When 'EN(D)' is entered to terminate device declaration, the system asks:

USER INT:

This requests the interrupt level to which any user written interrupt routines are to be linked.

Reply Format

lv,n or EN

lv is the user interrupt level, in the range 4 to 61.

n is a 4-character name which, when concatenated with 'I:', becomes the entry point label of the user interrupt routine. The user must be careful to choose a name not already in use. If the object code of his routine is kept in a MAS object library, it will be included automatically at link-edit time. This is an alternative method of specifying a user interrupt entry in the LOCAT module to that described in Appendix F. To include his DWT, the user may update the routine provided under the name USDWT, which is delivered on the starter pack.

EN signifies the end of replies to the DEVICE macro phase.

The SYSMAC Macro Phase

When EN(D) is given as a DEV reply it indicates that all devices have been defined. Definition of the MAS options resident in the system machine is now begun with the message:

DEFINITION OF SYSTEM MACHINE

The following is an example of the dialogue to define these options:

```
STACK SIZE (/200 (NORMAL) TO /800): (specify /200. Another value needs
                                     regeneration of all MAS overlay
                                     segments)
/200
RTC FREQUENCY (50, 60)
50
NB OF CHAR FOR SYSTEM DYN AREA :   (from /800 to /7FFE, or 0; 0 means give
                                    maximum at IPL time).
100
DYN AREA SIZE OUT OF RANGE    error
NB OF CHAR FOR SYSTEM DYN AREA :
0                                    (the maximum, = up to 32kw)
NB OF SOFTWARE LEVELS (MULT OF 30) : (from 30 to 240)
12
NB OF PROG OUT OF RANGE       error
NB OF SOFTWARE LEVELS (MULT OF 30) :
31
MULTIPLE OF 30, PLEASE        error
NB OF SOFTWARE LEVELS (MULT OF 30) :
120
DUMP STAND ALONE ?  (not asked for systems running in extended mode)
N
POST MORTEM DUMP IN BATCH ? (* see below, not asked for extended mode
N                            systems)
FLOATING POINT PROCESSOR ?
Y
TDFM ?
Y
MAX NB OF BUFFERS FOR TDFM :
60
OUT OF RANGE NUMBER           error
MAX NB OF BUFFER FOR TDFM : (from 1 to 49, advisable is a multiple of 3)
12
NETWORK ACCESS?   (reply YES, only if AMS is incorporated in the system)
N
CORE LKM OPTION?  (reply YES, if some disc resident LKM's should be core
                   resident, because they are used very often)
Y
LKM 17 CORE RESIDENT?    (get date and time)
Y
LKM 52 CORE RESIDENT?    (send/receive letter)
N
LKM 55 CORE RESIDENT?    (semaphore)
N
LKM 56 CORE RESIDENT?    (request/release pages)
N
LKM 57 CORE RESIDENT?    (connect/disconnect secondary load module)
N
```

* If this command is answered by NO, LKMs 45 and 53 will not work.

If Dump Stand Alone is selected, the whole memory will be dumped in the event of a fatal error. This facility adds about 500 words to the size of the resident part if the generated MAS does not run with extended mode. If it is not selected, the system will halt on encountering a fatal error, with an error code in A1.

When the definition of the system machine is complete, the message:

DEFINE SYSTEM FILE CODES

indicates that all the system filecodes must be specified by the replies to the following questions:

FCD:

The reply to this specifies one system filecode. The question is then repeated and the second filecode specified, and so on. When no more filecodes are to be specified the reply EN(D) should be given.

Reply Format

filecode,dnda

filecode is a valid filecode in the range /01 to /CF.
Minimally all connected disc units must be defined by a filecode (/C0-/CF), the filecodes /01 and /EF must be assigned to an interactive device, filecode /E0 must be assigned to an input device and filecode /02 must be assigned to an interactive or an output device.
If the user wants to utilize LKM 50 (submit a Job to the Batch machine, some filecode must be assigned to the CR, whether or not this device is physically present or not.

dnda are as explained in the replies of the DEV question.

Error Messages

FILE CODE OUT OF RANGE (from /01 to /CF)
ILLEGAL FILE CODE (disc filecode for non-disc device)
FOR DISC, FC RANGE FROM /C0 TO /CF
DEFINE A DISC FC FOR SUPERVISOR
UNKNOWN DEVICE
FILECODE ALREADY ASSIGNED
DISC ALREADY ASSIGNEDDEFINE FC /EF FOR OPERATOR CONSOLE
DEFINE FC /E0 FOR INPUT COMMAND

Following an FCD reply specifying a device name LP, PP, PL or CR the question:

SPOOLED DEVICE?

is asked, but only when the concerned device name was specified for the first time.

Reply Format

YES if spooling is to be used on this device.
NO if spooling is not planned for this device.

NUMBER OF STOP BIT (NORMAL VALUE=2):

Reply format

1 or 2. This question is output when filecode /EF is specified.

For a filecode assigned to an AMA8 device the question:

LINE NUMBER
is output, defining to which AMA8 line the filecode must be assigned.

Reply format
    0 to 7. The line must be defined in the device specification phase.

For CDC-CMD devices (device name is DF) there is asked for the drive number and the part:

DRIVE NUMBER

Reply format
    a number from 0 to 3.

FIXED PART?

Reply format
    YES (fixed part) or NO (removable part)

NAME OF SUPERVISOR DAD:
    The reply to this specifies the name of the system DAD (e.g. SUPERV).

Reply Format
    Up to six ASCII characters.

FILECODE OF DISC:
Enter a filecode in the range /C0 to /CF, previously specified using the FCD commands. This specifies the disc filecode (normally /C0) on which the system DAD is located.

Error Messages
    DISC FILECODE OUT OF RANGE
    FILE CODE NOT ASSIGNED

SWAPPABLE PROGRAMS?
    The reply to this specifies that the user intends to use swappable (or middleground) programs.

Reply Format
    NO if there are no swappable programs.
    YES if there are swappable programs. The following question is now asked:

FOR SWAP DAD, GIVE NOW

FILE CODE OF DISC:

Reply Format
The reply format is identical to that of the previous question: FILE CODE OF DISC:. It specifies the disc filecode on which the DAD D:CI will be set up.

The DTC Macro Phase

DO YOU WANT DATACOM? (Y/N)
If no Datacom device is used, the reply:
    N[O]
is given and the configuration definition is now complete. Otherwise, the reply:
    Y[ES]
leads to the following dialogue:

TWO SYSTEM GENERATIONS ARE AVAILABLE
WHICH SYSTEM GENERATION DO YOU NEED?
TMS OR DATEM2 (TMS=YES, DATEM2=NO)

Reply Format
{Y | N}

Y TMS is generated
N DATEM2 is generated.

The following dialogue is different for each controller type and also different for DATEM2 and TMS. As the questions appearing in DATEM2 are all contained in the TMS dialogue, only a description of the TMS dialogue is given here.

To keep the description simple, first all questions with their possible answers and their error messages are given, followed by the sequence of questions occurring per device. Defaults on questions only exist when the answer is YES or NO. In that case the default is always NO. Whenever YES or NO has to be given, Y or N suffices.
For each controller, the dialogue starts with:

CHOOSE YOUR CONTROLLER TYPE

Replies:	SA = SALCU	TMS only
	S2 = SLCU2	TMS & DATEM2
	S4 = SLCU4	TMS & DATEM2
	A2 = ALCU2	TMS & DATEM2
	A4 = ALCU4	TMS & DATEM2
	A8 = AMA8	TMS & DATEM2
	L6 = LSM16	TMS only
	H1 = HDLC	TMS only
	HV = HLVCU	TMS only
	SZ = SLCUZ	TMS only
	EN = all controllers have been specified.	

For DATEM2 the controller type has to be specified on the question DTC: the reply format is dnda,level
Error message: Illegal device name

HOW MANY LINES DO YOU WANT?
Reply 1-8 for AMA8 and 1-16 for LSM16.
Error message: Illegal number of lines.

ADDR:
Reply a value from 1 to 63. The value can be one or two decimal characters or one or two hexadecimal characters with a preceeding '/'.
Error messages: Address out of range
Address already assigned
Address of the device must be even
Address of output line already assigned

INT. LEVEL
Reply a value from 4 to 61.
Error messages: Int level out of range
Int level already assigned
Level of input int of AMA8 must be even
Level of output int of AMA8 already assigned

FULL DUPLEX?
Reply YES (full duplex) or NO (half duplex)

PROGRAMMED CHANNEL?
Reply YES (programmed channel) or NO (IOP)

DATEM2 STATUS MODE?
Reply YES or NO. YES means that the status values returned by TMS are compatible with the ones returned by DATEM2. No means they are not.

SWITCHED LINE?
Reply YES (switched line) or NO (leased line)

NB OF BITS/CHAR (5, 6, 7 OR 8):
Reply the number of bits per character.
Error message: Out of range number

CONNECTION MODE:
1=CT108/1, 2=CT108/2
Reply 1 or 2.
Error message: Illegal value.

PARITY?:
Reply 'O' (odd), 'E' (even) or 'N' (no parity).
Error message: Illegal value (N, O or E)

ASCII MODE?
Reply YES (ASCII) or NO (EBCDIC). The reply specifies which kind of characters is to be handled.

REDUNDANCY CHECK:
Reply 00 (or 0), 01 (or 1), 10 or 11, defining the CRC check.
Error message: Illegal parameter (00, 01, 10, 11)

HIGH FREQUENCY?
Reply YES or NO.

CARRIER ALWAYS ON?
Reply YES or NO.

PRECEEDING DEVICE IS FULL DUPLEX,
DEFINE NOW OUTPUT LINE
This is only a message, no reply is required. The message is followed by the 'ADDR:' and 'INT LEVEL:' questions.

SYNCHRONOUS MODE?
Reply YES (asynchronous mode) or NO (synchronous mode).

INHIBIT CHARACTER SYNCHRO?
Reply YES or NO.

AUTOMATIC SYN GENERATION?
Reply YES or NO.

HARDWARE CONTROL CHAR DETECTION?
Reply YES or NO.

FOR THE OTHER LINES DEFINE HALF OR FULL
This is only a message, no reply is required. The message is followed by the 'FULL DUPLEX' question.

INHIBIT CONTROL CHAR DETECTION IN OUT?
Reply YES or NO.

ITB PROCESS?
Reply YES or NO.

NO ACTIVITY TIMER VALUE
NO TIMER REPLY 0
FOR 650 MS REPLY 1
FOR 1.3 S REPLY 2
FOR 2.6 S REPLY 3
FOR 5.2 S REPLY 4
FOR 10.5 S REPLY 5
FOR 21 S REPLY 6
FOR 42 S REPLY 7
GIVE YOUR CHOICE:
Reply a value from 0 to 7.
Error message: Illegal value.

DOUBLE FREQUENCY?
Reply YES (double) or NO (SPLE)

SAME DEFINITION FOR ALL LINES?
Reply YES or NO. If YES is specified, it is assumed that all lines have the same characteristics. If NO, the characteristics for each line are asked separately.

NB OF STOP BIT (1, 2, 3 (FOR 1.5)
Reply 1, 2 or 3.
Error message: Out of range number.
DO YOU WANT HDLC PROCEDURE?
Reply YES or NO. IF YES the HDLC procedure is included in the TMS system, if NO, it is not.

HDLC procedure

The next questions are specifically for the HDLC procedure. The HDLC procedure can only be included for the HDLC and HLVCU controller in full duplex.
The dialogue starts with a print out of the default values:

DEFAULT VALUE:
K=NRT=7
LOCAL ADDRESS=01
MAX LENGTH=256
REMOTE ADDRESS=03

Then the questionning starts:
DEFAULT VALUE (YES OR NOT)
Reply YES or NO. If YES, the generation proceeds with the 'MAX NUMBER OF BUFFERS' question and the values printed above are assigned. If the reply is NO, the generation process asks for each parameter its value.
CURRENT VALUE OF CONSECUTIVE TIME OUT, NRT:
Reply a value from 0 to 7, specifying the value of the consecutive time out retransmission.
Error message: Out of range number.
MAX NUMBER OF OUTSTANDING FRAMES K
Reply one digit from 0 to 7.
Error message: Out of range number.
LOCAL STATION ADDRESS:
Reply two decimal or hexadecimal (with preceeding '/') digits, specifying the local staion address.
Error message: Out of range number.
REMOTE STATION ADDRESS:
Reply two decimal or hexadecimal digits.
Error message: Out of range number.
MAX LENGTH OF USER BUFFER:
Reply the maximum length of the user buffer from 0 to 4096 (decimal).
Error message: Out of range number.
MAX NUMBER OF BUFFERS GIVEN WITH OPEN REQUEST:
Reply a digit from 2 to 5.
Error message: Out of range number.
Now the default for each timer is printed. For the meaning of the timers, see the concerning questions. For all timers, the default value is /5A (*0.1 sec).
Then the generation proceeds with:
DEFAULT VALUE? (YES OR NOT)
Reply YES or NO. If YES, the HDLC procedure generation is ended, if NO, the value of each timer is asked:
TIME OUT VALUE IN NORMAL OPERATING STATE (*0.1S):
TIMER T1, (WAIT FOR F BIT AFTR TRANSMISSION OF P BIT):
TIMER T2, TIME OUT VALUE (WAIT FOR ACK) (*0.1S):
TIMER T3, TIME OUT VALUE (CHECK BUSY) (*0.1S):
TIMER T4, TIME OUT VALUE (VALUE OF RESET) (*0.1S):
All timer questions must be answered with a decimal value between 0 and 255 (0 and 255 excluded) or a hexadecimal value between /00 and /FF (with preceeding '/').
Error message: Out of range number.

Question sequence per device

SA - SALCU

-Addr:
For SALCU the address must be even. For the output line, an implicit address is assigned, one higher than the one for the input line.
-Int level:
-Full duplex?
-Programmed channel?
-Datem2 status mode?
-Switched line?
-Nb of bit/char?
-Parity?
-Redundancy check?
-Carrier always on?
Only asked for half duplex
-Synchronous mode?
-For output line define now:
    Int level:

S2 - SLCU2S

-Addr:
-Int level
-Full duplex?
-Programmed channel?
-Datem2 status mode?
-Switched line?
-Nb of bit/char?
-Parity
-High frequency?
-Carrier always on?
Only asked if half duplex
-Preceeding line is full duplex, define now output line:
Only asked if full duplex
-Addr:
Only asked if full duplex
-Int level
Only asked if full duplex
-Inhibit character synchro?
-Automatic syn generation?
-Hardware control char detection?
-Ascii code?
-Redundancy check?
Now, for half duplex, the generation asks for the specification of the second line, starting with 'ADDR:'. For full duplex, the generation for SLCU2S is ended.

S4 - SLCY4

-Addr:
-Int level:
-Full duplex?
-Programmed channel?
-Datem2 status mode?
-Switched line?
-Nb of bit/char:
-Parity:
-Ascii code?
-High frequency?
-Carrier always on?
Only output if half duplex
-Preceeding device is full duplex, define now output line
-Addr:
Only output if full duplex
-Int level
Only output if full duplex
Now the generation process starts with asking the specifications for the other three lines. The sequence is the same as for the first line, except for the question 'FULL DUPLEX', which is not asked for the 3rd and 4th line and for the 2nd line as follows:
-For the other lines define half or full
    Full duplex?

A4 - ALCU4

The question sequence for this device is excactly the same as for the SLCU4.

A8 - AMA8

-How many lines do you want?
-Addr:
-Int level:
The interrupt level must be even. It is the input interrupt level, the output interrupt level is implicitily assigned one level higher.
-Same definition for all lines?
-Switched line?
-Full duplex?
-Carrier always on?
Only asked if half duplex
The AMA8 controller is always connected to programmed channel.
-Nb of bit/char:
-Parity:
-Datem2 status mode?
Now, when for all lines the same definition was wanted, the AMA8 generation is ended. If not, the generation process asks for the next line, starting with 'SWITCHED LINE'. The specifications are asked for each line, as specified in the answer on the 'HOW MANY LINES DO YOU WANT' question.

H1 - HDLC

-Addr:
-Int level:
-Full duplex?
-Programmed channel?
-Switched line?
-Carrier always on?
Only output if half duplex
-Define now output line
-Addr:
-Int level:
-Do you want HDLC procedure?
This question is only output for full duplex mode. if the reply is YES, it is followed by the HDLC procedure dialogue as described above. If the reply is NO,the HDLC generation is ended.

L6 - LSM16

-How many lines do you want?
-Addr:
-Int level:
-Double frequency?
-Same definition for all lines?
-Nb of bit/char:
-Nb of stop bit:
The last two questions are repeated for each line if not all lines have the same definition.
Then the generation for the LSM16 is ended.

A2 - ALCU2

The question sequence for the ALCU2 is the same as for the SLCU4. Only the 'REDUNDANCY' question is asked additionally.

HV - HLVCU

The question sequence for the HLVCU is the same as for the HDLC.

End of Datacom generation

After the specification of all Datacom controllers, the system generation process outputs some general questions about it:

MAX NUMBER OF TIMER
Reply a value in the range 1-200, which specifies the highest number of pendingtime out requests in the system (only asked if DATEM2 is generated).

Error message
MAX NUMBER OF TIMER OUT OF RANGE

MAX VALUE OF TIME OUT DELAY (*0.1S)
Reply a hexadecimal number in the range /0A - /7FFF specifying the highest time out value in the system in tenths of a second (only asked if DATEM2 is generated).

Error message
DELAY OUT OF RANGE

TABLE NAME (2 CHAR)
Reply a two character name for a special character table. If all special character tables have been defined, reply END. Note that EN only is seen as a special character table name that does not end the generation.

Error message
TABLE ALREADY DEFINED

If a table name was entered, the system will require further information about the table contents and asks:

NB OF EDITION CHAR
Reply an integer specifying the number of edition characters that will be entered.

EDIT:
Reply p,c where:

p is a process value, one of the following values:

0 Delete the previous character and the special character
2 Delete all previous characters and the special character
4 Ignore the special character if it is a leading character
6 Ignore the special character in all cases.

c is the special character

Error messages
ILLEGAL PROCESS NUMBER
ILLEGAL CHARACTER VALUE

When all special characters have been input, the system will ask:

NB OF TERMINATION CHAR:
Reply aan integer, specifyng the number of termination characters to be entered in the table. For each character the system will prompt with:

TERM:
Reply the termination character.

The system will repeat the prompt until the specified number of termination characters have been entered and after that the system asks for the next special character table name. When all special character tables have been entered, the system outputs:

END OF SYSTEM GENERATION
it then creates the configuration file and returns to the BCP. Example

Listing of the Dialogue on the Typewriter

```
***MASR EXTENDED MODE VERSION 01 ***
   DATE:83,8,30
   TIME:17,00
FCL:%%B2LP DSK2=/C2
FCL:BYE BATCH
BCP::JOB USID=MASGEN
BCP:%%CONGEN
SPECIFY CPU TYPE:
P859
          SPECIFICATION OF DEVICES

DEV: TY10,6
```

```
NUMBER OF LINES/PAGE: 0
DEV: LP07,23
PROGRAMMED CHANNEL? N
NUMBER OF LINES/PAGE? 40
DEV: CD02,17
DISK TYPE (1215,1216): 1215
DEVICE 22 ON THIS CONTROLLER ? Y
DEVICE 12 ON THIS CONTROLLER ? N
DEV: CC16,16
DISK TYPE (40,80,150,300): 40
DEVICE 36 ON THIS CONTROLLER? N
DEV: MT04,19
DEVICE 14 ON THIS CONTROLLER? N
DEV: CR06,21
DEV: DM18,8
NUMBER OF LINES: 1
SAME DEFINITION FOR ALL LINES? Y
LINE NUMBER: 0
DEVICE TYPE (DY, TY, LP, TK): DY
NB OF CHAR PER LINE: 80
NB OF LINES PER PAGE: 24
ECHO MODE? Y
RESTART TIME FOR PAGE HANDLING(0 TO 255 MN): 2
TIME OUT(0 TO 255 MN): 7
PARITY(N=NOPAR, O=ODD, E=EVEN): E
DEV: MF03,18
DEVICE 13 ON THIS CONTROLLER? N
DEV: EN
USER INT: EN
                DEFINITION OF SYSTEM MACHINE

STACK SIZE (/200 (NORMAL) TO /800): /200
RTC FREQUENCY (50,60): 50
NB OF CHAR FOR SYSTEM DYN AREA : 0
NB OF SOFTWARE LEVELS (MULT OF 15) : 120
FLOATING POINT PROCESSOR ? N
TDFM ? N
MAX NB OF BUFFERS FOR TDFM : 12
NETWORK ACCESS? N
CORE LKM OPTION? Y
LKM 17 CORE RESIDENT? Y
LKM 52 CORE RESIDENT? N
LKM 55 CORE RESIDENT? Y
LKM 56 CORE RESIDENT? N
LKM 57 CORE RESIDENT? N

                DEFINE SYSTEM FILE CODES

FCD: 1,TY10
FCD: 2,LP07
SPOOLED DEVICE ? Y
FCD: 3,CR06
SPOOLED DEVICE ? Y
FCD: /E0,TY10
FCD: /EF,TY10
NUMBER OF STOP BIT (NORMAL VALUE 2): 2
FCD: /C0,CD22
FCD: /C1,CC16
FCD: /C2,CD02
FCD: /C3,MF03
```

```
FCD: EN
NAME OF SUPERVISOR DAD : SUPERV
FILE CODE OF DISK : /CO
SWAPPABLE PROGRAMS? Y
FOR SWAP DAD, GIVE NOW
FILE CODE OF DISC: /CO

       DO YOU WANT DATACOM (Y/N)? N

                END OF SYSTEM DEFINITION

BCP::EOB
END OF BATCH
```

Listing of the Generated File

```
000000          IDENT CONFIG
000001    MACRO DEVICE
000002    $MACRO DEVICE;
000003    $DEV   !DNAM=TY,ADDR=10,INT=06,PAGE=00;
000004    $DEV   !DNAM=LP,ADDR=07,INT=23,PAGE=40;
000005    $DEV   !DNAM=CD,ADDR=02,INT=17,TYPE=20;
000006    $DEV   !DNAM=CD,ADDR=22,INT=17,TYPE=21;
000007    $DEV   !DNAM=CC,ADDR=16,INT=16,TYPE=22;
000008    $DEV   !DNAM=MT,ADDR=04,INT=19;
000009    $DEV   !DNAM=CR,ADDR=06,INT=21;
000010    $DEV   !DNAM=DM,ADDR=18,INT=08,PAGE=024,ECHO=ECHO..,PAR=EVEN.,      *
000011       RSTIME=  2,TMEOUT= 7,CHPL=80,DTYP=DY,LNNB=0,MXLB=1,DADR=18;
000012    $DEV   !DNAM=MF,ADDR=03,INT=18;
000013    $MEND;
000014    EOS
000015    MACRO SYSMAC
000016    $MACRO SYSMAC;
000017    $HARD !CPU=P859;
000018    $SELECT  !MONITR=MAS8,STACK=0200;
000019    $RTC   !FREQ=50;
000020    $DYNAREA !SIZE=0000;
000021    $MAXPRO !NBPROG=120;
000022    $DUMPSA;
000023    $PMDUMP;
000024    $EDFM    !MAXBUF=12;
000025    $CORLKM !L17=Y,L52=N,L55=Y,L56=N,L57=N;
000026    $SYSFC   !FCOD=01,DNAM=TY,ADDR=10,LNB=0;
000027    $SYSFC   !FCOD=02,DNAM=LP,ADDR=07,SPOOLD=F3;
000028    $SYSFC   !FCOD=03,DNAM=CR,ADDR=06,SPOOLD=F2;
000029    $SYSFC   !FCOD=E0,DNAM=TY,ADDR=10,LNB=0;
000030    $SYSFC   !FCOD=EF,DNAM=TY,ADDR=10,NSBIT=2,LNB=0;
000031    $SYSFC   !FCOD=C0,DNAM=CD,ADDR=22,LNB=0;
000032    $SYSFC   !FCOD=C1,DNAM=CC,ADDR=16,LNB=0;
000033    $SYSFC   !FCOD=C2,DNAM=CD,ADDR=02,LNB=0;
000034    $SYSFC   !FCOD=C3,DNAM=MF,ADDR=03,LNB=0;
000035    $SUPERV !DADNAM=SUPERV,FCOD=C0,DNAM=CD,ADDR=22;
000036    $SWAP !FCOD=C0,DNAM=CD,ADDR=22;
000037    $MEND;
000038    EOS
000039    MACRO    DEVBIS
000040    $MACRO DEBIS;
000041    $MEND;
000042    EOS
000043    MACRO    DTC
000044    $MACRO DTC;
000045    $MEND;
000046    EOS
000047    :EOS
```

Step 9 - Generating the MAS System Modules

The BCL catalogued procedure %%GENMAS is invoked for this phase. The command format is:

```
%%GENMAS [CONF=filename][,SYS=mac]
```

filename	is the name of the configuration file. The default value is CONFIG.
mac	the macro file to be used for generation. The default is TABLC1, which is used for TMS and for a system without data communication. For DATEM2, the value must be DTCTB1.

Remarks The generated modules are kept on the MASGEN Userid.

Step 10 - Assembling and Cataloguing the MAS Tables

The BCL catalogued procedure %%ASMAS is used for this phase. The invocation command is:

```
%%ASMAS [LIST=b][,OUSI=u]
```

b is YES or NO, default is NO Assembly listing required.
u is the userid of the starter pack; the default value is MASGEN

Remarks
Before assembling the generated MAS modules, a possibility exists to alter some system default values, which cannot be specified during CONGEN. These values are contained in the CVT (communication vector table) in the generated module T:CVT. The values that can be altered are:

Max. number of Foreground segments - CVT displacement: /34 (default: 9)
Max. number of scheduled labels - CVT displacement: /32 (default: 7)
Max. number of filecodes - CVT displacement: /36 (default: 50)
Max. number of blocking buffers - CVT displacement: /38 (default: 10)
Swap minimum resident time (sec) - CVT displacement: /4A (default: 3)
Number of linecodes (datacom) - CVT displacement: /76 (default: 20)

For a non-MAS 8 system (MAS 6, MAS 7) the object modules produced will be catalogued in one of two object libraries:
MASOB - in userid MASGEN
LASTOB- in the system userid of the starter disc pack.
For MAS 8 systems (MAS 8.0, MAS 8.50) all produced modules are catalogued inthe library MASTAB in Userid MASGEN.

Step 11 - Link Editing the System

The BCL catalogued procedure %%OLEMU is used for this purpose. The format of the invocation command is:

```
%%OLEMU [USID=u][,DAD=d]
```

u is the userid of the generated system. Default is MASUP.
d is the DAD filecode of the generated system. Default is /F2.

Remarks A copy of the generated system is kept in the MASGEN library under the name SUP, type LM if a non-extended mode and MASR, type LM if anextended mode system has been generated.
The file SYSMAP, type UF, is catalogued on the system disc and also listed. It contains the Link Edit map of the generated supervisor.
The specification of the parameter DAD = /F0 is allowed for users having only one disc.

The OLEMU procedure links a supervisor. For non-extended mode systems all modules to be linked are contained in two or three libraries:

MASOB - MAS object library
MASTAB - Generated MAS modules (MAS 8.50)
LASTOB - Modules that has to be linked at the end of the monitor.

For extended mode systems, the modules to be linked are contained in a lot of libraries:

MASTAB - Generated modules
MASLIB - Monitor subroutines
EXECOB - Hardware interrupt routines, LKM handlers
IOCOOB - General I/O modules
IOCSOB - Divers
TMSOB - TMS modules
DT2OB - DATEM2 modules
HCPROB - HDLC procedure modules
SUPVOB - System programs
FMSOB - Disc I/O modules
TDFMSG - TDFM segment
TDFMOB - TDFM core resident part
TDFROT - TDFM root
SVCOB - Core resident LKM modules (17, 52, 55, 56, 57)
INIOB - Monitor initialization modules
DIVROB - Dump and Spool modules
ACROB - Network access modules (only for AMS systems).

The following syntax notations are used in this manual in order to make MAS as simple as possible to understand.

EXAMPLES

Several examples appear in this manual. Where an item is described as a part of a larger piece of coding it may be shown thus:

```
    .
    .
    .
    .
    %%PROC A,B,C
    .
    .
    .
```

This indicates that a PROC statement would be found amongst other statements or text.

FORMATS

Brackets

Two types of brackets are used to describe formats:

[] brackets enclose optional items.

{} brackets enclose items in two ways:

```
    {A,B,C}
```

Any number, but at least one of the items in the list must be coded (separated by commas.)

A vertical line is also used to indicate alternatives, thus:

```
{A | B}
```

means either A or B. (The spaces around the bar are not significant.)

The following are examples of the use of brackets:

```
{W,X,Y,Z}
```

Any number, but at least one of the items must be coded; each item separated by commas.

```
[{W,X,Y,Z}]
```

If desired any number of items may be coded, each item separated by commas.

```
{ABC | XYZ | {1,2,4,8}}
```

One of the three items must be coded. The item 1,2,4,8 is itself a list. If this item is to be coded any number, but at least one of the items in the list must be coded. Items are separated by commas.

Full stops (...) appear within formats to indicate the further occurrence of an item which has already been described.

Spaces

MAS is largely free form. However, spaces are significant in certain instances:

- Within formats spaces are shown as < > or [ ]. The use of < > indicates that at least one space must be coded. The use of [ ] indicates that if desired at least one space may be coded.
- Spaces and commas are not interchangeable. Where commas are shown as applicable they must be coded.

Commands

The following rules apply to the construction of SCL/FCL commands:
- Each command must be contained in one record, that is, one line on the console, one punched card, one paper tape record, one sequential disc record, etc.
- Each record must contain only one command.

Each command has the same basic format:
- A three character ASCII mnemonic code identifying the command type.
- One or more blanks.
- Parameters.

Parameters:
- May be optional.
- Are positional; position is implied by coding commas as separation characters. (Trailing commas are not necessary.)
- Are always positive integer decimal or hexadecimal values.
- Must not be separated by or contain blanks.

Procedure parameters:The maximum line lengths in procedures are for S:PROC/F:PROC 72 characters and for B:PROC 80 characters.
Key-word parameters may have a maximum length of 4 chaarcters, both in B:PROC and S:PROC/F:PROC.
Parameter values may be up to 8 characters in S:PROC/F:PROC and up to 40 characters in B:PROC. The maximum length of a procedure name is always 6 characters.

Each record must be terminated by the standard end-of-input record identifier:
CR for the console.
Blanks up to column 80 for the card reader.
Sector and displacement words (written by the sequential access method) for a disc file.