

# CHAPTER 8

## UFOS FILE SPECIFICATION

### FOR CSM MKIII SYSTEMS

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## 8-2-2 Parameters

Parameter:	<b>&amp;H.ANST</b>
Meaning:	This parameter indicates if the CSM machine is equipped with automatic chuck exchanger. (No philips option)
Values:	0 - No 1 - Yes
Parameter:	<b>&amp;H.ANS* (* = 1,2,3,4,5,6)</b>
Meaning:	This parameter indicates if the chuck is present in the automatic station. (No philips option)
Values:	0 - No 1 - Yes
Parameter:	<b>&amp;H.AN*X &amp;H.AN*Y &amp;H.AN*R (* = 1,2,3,4,5,6)</b>
Meaning:	This parameter specifies the X,Y,R position of the each chuck position. (No philips option)
Values:	-999.99 to 999.9
Parameter:	<b>&amp;H.APG</b>
Meaning:	This parameter is not used in the CSM machines. It is only used in the YAMAHA machine when there is APG/LOP and LINE controller software.
Values:	0 - Japanese character code 1 - English character code
Parameter:	<b>&amp;H.BADX &amp;H.BADY</b>
Meaning:	Specifies the position of the beam sensor (if any mounted; see parameter BEMS).
Values:	-999.99 to 999.99 [mm]
Parameter:	<b>&amp;H.BEMS</b>
Meaning:	Specifies the existence of the beam sensor device. The position of the beam sensor on the beam is specified in the parameters BADX and BADY.
Values:	0 - No beam sensor exists 1 - Beam sensor exists

## 8-1 Introduction

To make this UFOS File Specification manual a 84V (MKIII) and LCS machine has been used.

All the differences between the UFOS File Specification document version 1.4 (for MKI and MKII) and this version has been distinguished in ***BOLD cursive*** characters.

## 8-2 The Machine Configuration File

### 8-2-1 Introduction

The machine file (MCH) describes to the <COMMON> program what the machine looks like. It specifies for instance what equipment is mounted on the machine, at what coordinates they are located, how to perform certain functions (eg. edge clamp..).

The machine file can be written by an on-line command:

```
@WRITE MCH
```

It contains a number of lines that all look like:

```
&H.MSG=1
```

The &H is obliged and specifies to common that a machine variable is involved. The .MSG indicates that the "MSG" parameter of the configuration gets a value. The number gives the value to which the configuration parameter must be set.

When sending the MCH file, not all parameters need to be specified. Parameters that are omitted default to 0.

The values in the MCH file are read when a new board type is started. They contain read-only values as far as <COMMON> is concerned. They can be changed by teaching through the user interface or writing through an on-line command.

The next section describes in detail what each parameters means.

A few parameters, related to pick-up shifts for different tape widths are not variable but 'hard-coded' into the software. These are also discussed.

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Parameter:	<b>&amp;H.FCNF</b>
Meaning:	Specifies if the component data & vision data is fixed or unfixed. When it is fixed the machine will load automatically the files; USER.MCH, USER.FDR and USER.VIS from floppy when the power is turned on. When it is unfixed the machine will only load the USER.MCH file.
Values:	0 - Fixed FDR (&VIS) 1 - Unfixed FDR (&VIS)
Parameter:	<b>&amp;H.FDTM</b>
Meaning:	Specifies to which feeder number (on the front feeder bar) the position given in parameters FLX and FLY belong. This means that the position of the feeder bar can be given by specifying the position of an arbitrary feeder number on the bar. See also parameter RDTM.
Values:	1..50
Parameter:	<b>&amp;H.FFMT</b>
Meaning:	This parameter specifies the floppy format type. This parameter is not used in the CSM machine.
Values:	0 - NEC 1 - IBM
Parameter:	<b>&amp;H.FLX</b> <b>&amp;H.FLY</b>
Meaning:	Give the position of the front feeder whose number is given in parameter FDTM.
Values:	-999.99 to 999.99 [mm]
Parameter:	<b>&amp;H.H1TM &amp;H.H2TM &amp;H.H3TM</b>
Meaning:	Not used. These are the old 'after-pickup-timers'. They are no longer used and the area is reserved for use by Yamaha.
Values:	0.00

Parameter:	<b>&amp;H.CONV</b>
Meaning:	Specifies the way the transport conveyor move the boards in and out of the machine. It can be Line, the boards enter the machine at the left side of the machine and leave then at the right hand side; it can be Return, the boards enter and leave the machine at the left hand side of the machine; or it can be Manual, the boards are placed in and removed from the machine by an operator.
Values:	0 - Line 1 - Return 2 - Manual
Parameter:	<b>&amp;H.DISX</b> <b>&amp;H.Disy</b> <b>&amp;H.DISR</b>
Meaning:	Specifies the position of the line dispenser.
Values:	-999.99 to 999.99 [mm] or [degree]
Parameter:	<b>&amp;H.DMPX</b> <b>&amp;H.DMPY</b>
Meaning:	Specifies the position at which components are dumped when they have to be discarded.
Values:	-999.99 to 999.99 [mm]
Parameter:	<b>&amp;H.ECLP</b>
Meaning:	Specifies whether an edge clamp device is present or not. Note that the board file parameter determine whether it is used or not (&B.FIX). See also parameters EDGX and EDGY.
Values:	0 - None existent 1 - Edge clamp exists
Parameter:	<b>&amp;H.EDGX</b> <b>&amp;H.EDGY</b>
Meaning:	Specifies the position of the edge clamp. Note: this position is not used by <COMMON> but by the utility programs.
Values:	-999.99 to 999.99 [mm]

Parameter:	<b>&amp;H.BMRK</b>
Meaning:	Specifies whether the BAD MARK position is related to BLOCK ORIGIN or PCB ORIGIN.
Values:	0 - BLOCK ORIGIN (default) 1 - PCB ORIGIN
Parameter:	<b>&amp;H.CAMX</b> <b>&amp;H.CAMY</b>
Meaning:	Specifies the position of the teaching camera on the beam. When this camera is present (see parameter MOVC), it is advised to use it as reference point for the beam, so set these coordinates both at 0.00.
Values:	-999.99 to 999.99 [mm] advised to be 0.00,0.00
Parameter:	<b>&amp;H.CHKT</b>
Meaning:	Specifies the time after which the pressure check is performed after picking or mounting a component when an AANC or Vision head is used. See also parameter MNTT.
Values:	0.00 to 999.99 [ms]
Parameter:	<b>&amp;H.CINW</b>
Meaning:	Specifies the initial conveyor width (TRACK WIDTH). This parameter will only be active when the CSM has an automatic width conveyor system.
Values:	The maximum conveyor width (z coordinate) - 0.5mm [mm]
Parameter:	<b>&amp;H.CMU</b>
Meaning:	Specifies whether the CMU (RS-232 port) is used in on-line or off-line mode. In on-line mode, you can give the robot controller command through the CMU, in off-line mode you cannot. The off-line mode can be used for instance to send an receive data under program control, the on-line mode to remotely control the robot. For CSM purposes, the on-line mode is used.
Values:	0 - On-line 1 - Off-line

Parameter:	&H.MA1X &H.MA2X &H.MA1Y &H.MA2Y &H.MA1R &H.MA2R
Meaning:	These parameters specifies the position of the mechanical alignment unit 1 and 2. The values are ignored when parameter MAL1 cq. MAL2 specify that the unit is not present. X and Y coordinates are given in milli-meter, the R in degrees.
Values:	-999.99 to 999.99 [mm] or [degrees]
Parameter:	&H.MAL1 &H.MAL2
Meaning:	Specifies whether the mechanical alignment units 1 and 2 are present on the machine or not. The position of the units are given in the parameters MA1X, MA1Y, MA1R and MA2X, MA2Y and MA2R.
Values:	0 - Unit does not exist 1 - Unit exists
Parameter:	&H.MNTT
Meaning:	Specifies the after mount timer. A mounting check is carried out right after mounting is finished. The after mount timer specifies the time after which the vacuum is turned on after mounting. This is only used for AANC and Vision head. See also parameter CHKT.
Values:	0.00 to 999.99 [ms]
Parameter:	&H.MOUT
Meaning:	Specifies if the output messages are send to the CMU or not
Values:	0 - No 1 - Yes
Parameter:	&H.MOVC
Meaning:	Specifies if a teaching camera is mounted on the beam or not. The position of this camera on the beam is specified in the parameters CAMX and CAMY. Note: When this camera is present, it is used as reference point for teaching etc. So CAMX and CAMY are advised to be set to 0.00.
Values:	0 - No teaching camera mounted on the beam 1 - Teaching camera mounted on the beam

Parameter:	&H.LMMMX &H.LMMMY &H.LMMMR &H.LMMMZ &H.LMMMW
Meaning:	Specifies the minimum (-) soft-limit coordinates in milli-meters (XYZW) or degrees (R) for the mounter.
Values:	-999.99 to 999.99 [mm] or [degrees]
Parameter:	&H.LMPMX &H.LMPMY &H.LMPMR &H.LMPMZ &H.LMPMW
Meaning:	Specifies the maximum (+) soft-limit coordinates in milli-meters (XYZW) or degrees (R) for the mounter. Note: LMPM* should be greater or equal to LMMM*.
Values:	-999.99 to 999.99 [mm] or [degrees]
Parameter:	&H.LMMLX &H.LMMLY &H.LMMLZ &H.LMMLT
Meaning:	Specifies the minimum (-) soft-limit coordinates in milli-meters (XYZT) for the tray handler (LCS).
Values:	-999.99 to 999.99 [mm].
Parameter:	&H.LMPLX &H.LMPLY &H.LMPLZ &H.LMPLT
Meaning:	Specifies the maximum (+) soft-limit coordinates in milli-meters (XYZT) for the tray handler (LCS). Note: LMPL* should be greater or equal to LMML*.
Values:	-999.99 to 999.99 [mm].
Parameter:	&H.LPTM
Meaning:	Locate pin timer value. It specifies the time that passes after the PCB is detected at the stopper and the moment that the location pins are raised.
Values:	0.00 to 99.99 [s]

Parameter:	&H.H1X &H.H1Y &H.H1R	&H.H2X &H.H2Y &H.H2R	&H.H3X &H.H3Y &H.H3R &H.H3Z
Meaning:	Specifies the position of the mount heads (1-2-3) relative to the reference point of the beampointer or fiducial camera (offset parameters). The point where the underside of the nozzle comes in contact with the surface of the PCB is the Z offset value (&H.H3Z). Normally this value will be between -20.00 mm and -21.00 mm.		
Values:	-999.99 to 999.99 [mm] or [degree]		
Parameter:	&H.H*M1R (offset angle of -90 degrees) &H.H*P1R (offset angle of +90 degrees) &H.H*P2R (offset angle of +180 degrees) &H.H*P3R (offset angle of +270 degrees)		
Meaning:	These parameters are used for compensation of R axis linearity and are hidden from the user. In the future it will be possible to determine these parameters by the utility program OFFSET (H*= H1 or H2 or H3)		
Values:	-9.99 to 9.99 [degree]		
Parameter:	&H.H*LVH &H.H*LVM &H.H*LVL		
Meaning:	These parameters specifies the vacuum levels HIGH, MEDIUM and LOW for all the three heads (H*= H1 or H2 or H3).		
Values:	-999.99 to 999.99		
Parameter:	&H.HED1 &H.HED2 &H.HED3		
Meaning:	Specifies the type of head that is mounted on each of the head positions.		
Values:	0 - No head available at the position 1 - Standard head 2 - IC head 3 - AANC head 4 - not used 5 - Vision head 6 - Dot dispenser 7 - Line dispenser 8 - Gripper		

Parameter:	<b>&amp;H.PUTM</b>
Meaning:	Push-up timer. Specifies the time that passes between detecting a board at the stopper and activating the push-up plate.
Values:	-999.99 to 999.99 [s]
Parameter:	<b>&amp;H.RATR</b>
Meaning:	With this parameter the definition of the Rotation (R) in the mount attribute is selectable between RELATIVE or ABSOLUTE.
Values:	0 - RELative 1 - ABSolute
Parameter:	<b>&amp;H.RTRY</b>
Meaning:	Specifies the value of the retry counter. This is the number of times that a pick action is repeated before giving up and reporting an error.
Values:	0..7
Parameter:	<b>&amp;H.RDTM</b>
Meaning:	Specifies to which feeder number (on the rear feeder bar) the position given in parameters RLX and RLY belong. This means that the position of the feeder bar can be given by specifying the position of a arbitrary feeder number on the bar. See also parameter FDTM.
Values:	51..100
Parameter:	<b>&amp;H.RLX</b> <b>&amp;H.RLY</b>
Meaning:	Specifies the position of the rear feeder whose number is given in parameter RDTM.
Values:	-999.99 to 999.99 [mm]
Parameter:	<b>&amp;H.SBST</b>
Meaning:	Specifies whether the sub-stopper is present on the machine. Whether it is used or not is determined in the board file (&B.SBST)
Values:	0 - No 1 - Standard type 2 - W Sensor type 3 - Moving type (this type is attached on the HSD machine)

Parameter:	<b>&amp;H.PFID</b>
Meaning:	Specifies whether the point (local) fiducials positions are related to the PCB mount point or the PCB block origin.
Values:	0 - related to PCB mount point (default) 1 - related to BLOCK origin
Parameter:	<b>&amp;H.PICLZ</b>
Meaning:	Specifies the Z position of the Tray handler (LCS) at which the LCS head in lower position touches the pallet guide. Note: this parameter is called PIC UP HEIGHT DATUM in UFOS.
Values:	-999.99 to 999.99 [mm]
Parameter:	<b>&amp;H.PINX</b> <b>&amp;H.PINY</b>
Meaning:	Specifies the position of the locating pin closest to the stopper. Note: this position is not relevant to <COMMON> but is used by the 'Utility' program.
Values:	-999.99 to 999.99 [mm]
Parameter:	<b>&amp;H.PITLZ</b>
Meaning:	Specifies the tray pitch for the tray handler (LCS).
Values:	10mm or 20mm
Parameter:	<b>&amp;H.PMAX</b>
Meaning:	Specifies the number of boards that may be processed without stopping. Whenever this number of boards are processed, the CSM will stop.
Values:	0 - infinite amount 1..255 - number of boards after which to stop
Parameter:	<b>&amp;H.PREG</b>
Meaning:	This parameter describes the point teach mode that must be used. In 1 point teach mode you teach the centre coordinate of each SMD. In 2 point mode you must teach 2 points of each SMD, the system then calculates the centre of these points (usefull to teach 2 leaded components by means of there pads).
Values:	0 - 1 Point teach mode 1 - 2 Point teach mode

Parameter:	&H.MSG		
Meaning:	Through the message parameter the language of the user interface can be selected.		
Values:	0 - Japanese, not supported on current UFOS version 1 - English		
Parameter:	&H.NSTA		
Meaning:	Specifies whether the Automatic Nozzle Exchange unit is present or not. The positions of the nozzles in this unit are given by the parameters NZ1X, NZ1Y, NZ1R, NZ2X, NZ2Y, NZ2R, NZ3X, NZ3Y and NZ3R.		
Values:	0 - No ANE unit exists 1 - AANC type 2 - Not used 3 - Vision head type		
Parameter:	&H.NZ1X    &H.NZ2X    &H.NZ3X &H.NZ1Y    &H.NZ2Y    &H.NZ3Y &H.NZ1R    &H.NZ2R    &H.NZ3R		
Meaning:	When the Nozzle exchange unit is present (see parameter NSTA), these parameters give the positions of the 3 nozzle exchange positions. When no nozzle exchange unit is present, the value of these parameters are ignored.		
Values:	-999.99 to 999.99 [mm]		
Parameter:	&H.PCBW		
Meaning:	Specifies if the CSM machine has an automatic width conveyor system.		
Values:	0 - No automatic conveyor system 1 - Automatic conveyor exists		
Parameter:	&H.PCNT		
Meaning:	This gives the number of processed boards so far (related to parameter PMAX). It is maintained by the system and is mainly meant for reading.		
Values:	0.255		

### 8-2-3 Fixed parameters

Parameter:	&H.VCHT
Meaning:	Specifies the Vacuum Change timer (future use). At the same moment that the vacuum injector is turned off (during mounting the component) the machine will turn on a special air valve. The air will be turned off after the specified timer.
Values:	0 to 255 [ms]
Parameter:	&H.WATX &H.WATY &H.WATZ
Meaning:	Specifies the position at which the head will be located when boards are moved in or out the workarea of the machine.
Values:	-999.99 to 999.99 [mm]

### 8-2-4 Example

Below, an example MCH file is shown for a CSM-84V MKIII machine. It is obtained by sending the on-line command "@READ MCH" through the serial line, or using the CSM TOOLBOX:

```

&H.SERIAL=/FF00606Y10001 / &H.RATR=0
&H.HED1=1 &H.APG=0
&H.HED2=2 &H.TECK=1
&H.HED3=5 &H.BMRK=0
&H.BEMS=1 &H.PFID=0
&H.MOVC=0 &H.FCNF=0
&H.CONV=2 &H.MOUT=0
&H.ECLP=1 &H.SMEMA=0
&H.SBST=0 &H.ANS1=1
&H.MAL1=0 &H.ANS2=0
&H.MAL2=0 &H.ANS3=1
&H.ANST=0 &H.ANS4=0
&H.NSTA=3 &H.ANS5=0
&H.THND=0 &H.ANS6=0
&H.VAL2=1 &H.LMMMX= -35.55
&H.VAL3=1 &H.LMPMX= 584.92
&H.VAL4=0 &H.LMMMY= -33.02
&H.PCBW=0 &H.LMPMY= 563.19
&H.MSG=1 &H.LMMMZ= -25.00
&H.CMU=0 &H.LMPMZ= 3.00
&&H.FFMT=1 &H.LMMMR=-800.00
&H.PREG=1 &H.LMPMR= 800.00

```

Parameter:	<b>&amp;H.TDTM2</b>
Meaning:	Specifies the traverser (T) position inside the mounter at which the parameters &H.ST1X, &H.ST1Y, &H.ST2X and &H.ST2Y are related too.
Values:	-999.99 to 999.99 [mm]
Parameter:	<b>&amp;H.TECK</b>
Meaning:	Specifies whether the TRAY EMPTY CHECK is carried out.
Values:	0 - No empty tray check (default) 1 - Yes empty tray check (UFOS will display "tray is empty" orange lamp is burning an beep is on, after access the last row & colum on the tray).
Parameter:	<b>&amp;H.THND</b>
Meaning:	Specifies what type of tray handling device is connected to the machine. When value "External Feeder" or "External Feeder and Manual" is specified, the parameters Z01..Z16 specify the tray Z-position of each tray (Z01..Z16 are used by the LCS).
Values:	0 - No tray feed device 1 - Tray stacker 2 - Tripple tray feeder 3 - External Feeder (LCS) 4 - External Feeder (LCS) and manual feeder
Parameter:	<b>&amp;H.VA2X &amp;H.VA3X &amp;H.VA4X &amp;H.VA2Y &amp;H.VA3Y &amp;H.VA4Y</b>
Meaning:	When the parameters VAL2, VAL3 and VAL4 specify that fixed camera 2/3/4 is present, these parameters give the position of these camera's on the machine.
Values:	-999.99 to 999.99 [mm]
Parameter:	<b>&amp;H.VAL2 &amp;H.VAL3 &amp;H.VAL4</b>
Meaning:	Fixed camera's are present or not. The VAL2 parameter relates to the Visual Alignment camera. The VAL3 and VAL4 parameter are reserved for future extensions and should be set to non-existing. The positions of the camera's are given in parameters VA2X, VA2Y, VA3X, VA3Y, VA4X and VA4Y.
Values:	0 - Camera does not exist 1 - Camera exists

Parameter:	<b>&amp;H.SERIAL</b>
Meaning:	This parameter is only an indication for the user, to show him that this machine data file (USER.MCH) belongs to a certain CSM machine.
Values:	/ABCDEFGH..12345../
Parameter:	<b>&amp;H.SMEMA</b>
Meaning:	Specifies if the machine is equiped with the SMEMA option.
Values:	0 - No 1 - SMEMA
Parameter:	<b>&amp;H.ST1X &amp;H.ST2X &amp;H.ST1Y &amp;H.ST2Y</b>
Meaning:	When an Tray handler (LCS; see parameter THND) is used, ST1 is the position on the traverser at which the mount head can pick the component, ST2 is the position at which the mount head can place a component back if vision fails or rejects the component.
Values:	-999.99 to 999.99 [mm]
Parameter:	<b>&amp;H.ST1LX &amp;H.ST2LX &amp;H.ST1LY &amp;H.ST2LY</b>
Meaning:	When an Tray handler (LCS; see parameter THND) is used, ST1L is the position on the traverser at which the LCS head can place the component, ST2L is the position at which the LCS head can pick a component which should be placed back in the tray (Tray back option = on)
Values:	-999.99 to 999.99 [mm]
Parameter:	<b>&amp;H.STKLZ</b>
Meaning:	Specifies the Z position in the tray handler (LCS) at which it can pull out very smoothly pallet no. 1. (Note: in UFOS this parameter is called Stacker height datum)
Values:	-999.99 to 999.99 [mm]
Parameter:	<b>&amp;H.TDTM1</b>
Meaning:	Specifies the traverser (T) position in the tray handler (LCS) at which the parameters &H.ST1LX, &H.ST1LY, &H.ST2LX and &H.ST2LY are related too.
Values:	-999.99 to 999.99 [mm]

Parameter:	<b>&amp;F().DMP</b>
Meaning:	Defines the action to be taken when vision fails on a component. It can be set to DUMP, in which case the component is dropped at the dump position (see MCH parameter DMPX). It can be set to TRAY BACK, in which case the component is placed back at the position it was picked from.
Values:	0 - Standard (Dump) 1 - Tray Back
Parameter:	<b>&amp;F().DSPF</b>
Meaning:	The 'display flag'. This field should never be written to. It is filled in by the system whenever any of the parameters is written to. It is used by the CSM to indicate that the entry in the feeder file for this part number contains data.
Values:	0 - no data in this entry 1 - data in this entry
Parameter:	<b>&amp;F().HIGHT</b>
Meaning:	The component height (thickness) parameter. With this parameter the Z coordinate for placing the component with head 3 will be calculated. &F().HIGHT - <Z offset (&H.H3Z)> = Z coordinate mount height head 3. Also the Z coordinate for picking from the LCS shuttle (when used) is calculated with this parameter. &F().HIGHT - <Z offset (&H.H3Z)> == Z coordinate pickup height.
Values:	Maximum value is approximately 6.00 mm (this depends of the mechanical position of the Z down sensor)
Parameter:	<b>&amp;F().LCHK</b>
Meaning:	This is the Lower Check parameter. If the lower check is used, the head will go up when the specified vacuum level has been reached. Normal for chip component this parameter should be set to; Not Use
Values:	0 - Use 1 - Not Use
Parameter:	<b>&amp;F().LCEN</b> <b>&amp;F().LCST</b>
Meaning:	These parameters give the start (LCST) and end (LCEN) tray pallet of this component type in the tray stacker.
Values:	0.255

&H.H1P1R= 0.00	&H.H3P3R= 0.15
&H.H1P2R= 0.00	&H.H1LVH=135
&H.H1P3R= 0.00	&H.H1LVM=132
&H.H2M1R= 0.00	&H.H1LVL=130
&H.H2P1R= 0.00	&H.H2LVH=133
&H.H2P2R= 0.00	&H.H2LVM=84
&H.H2P3R= 0.00	&H.H2LVL=33
&H.H3M1R= 0.00	&H.H3LVH=146
&H.H3P1R= -0.10	&H.H3LVM=113
&H.H3P2R= 0.00	&H.H3LVL=80

## 8-3 The Feeder Definition File

### 8-3-1 Introduction

The feeder definition file (FDR) describes all the information required to handle components to <COMMON>. It contains a number of entries, each describing one 'part type'. A 'part type' must be seen as an identification for a feeder, containing a certain type of components. Through this part type, the mount lines refer to this feeder. The location of the feeder on the machine is stored in the description of this part number.

Only one feeder file exists in the CSM. All board files refer to this file (through the part type).

The feeder file contains a number of lines with the following format:

&F(part-no).parameter=value

Where parameter is a parameters name.

### 8-3-2 Parameters

Parameter: &F().COMMENT

Meaning: Contains a comment field. The value may contain any character but NOT the "/" character. The characters in value are delimited by '/'. The comment may be upto 8 characters long.  
The comment value appears in the MIS data.

Values: /ABCDEFGHI/

Parameter: &F().DIMX  
&F().DIMY

Meaning: When the component is stored in a tray (see parameter TYPE), these parameters give the number of components in the tray matrix. DIMX gives the number of components in the X direction, DIMY in the Y direction (trays are assumed to be rectangular).  
See also parameters PITX, POSX and PTRX.

Values: 0..255

&H.LMMMW=-800.00	&H.AN5Y= 0.00
&H.LMPMW= 5.00	&H.AN5R= 0.00
&H.LMMLX= 0.00	&H.AN6X= 0.00
&H.LMPLX= 0.00	&H.AN6Y= 0.00
&H.LMMLY= 0.00	&H.AN6R= 0.00
&H.LMPLY= 0.00	&H.NZ1X= 582.16
&H.LMMLZ= 0.00	&H.NZ1Y= 619.59
&H.LMPLZ= 0.00	&H.NZ1R= -0.19
&H.LMMLT= 0.00	&H.NZ2X= 582.29
&H.LMPLT= 0.00	&H.NZ2Y= 604.55
&H.CAMX= 0.00	&H.NZ2R= -0.19
&H.CAMY= 0.00	&H.NZ3X= 582.33
&H.BADX= 95.93	&H.NZ3Y= 583.64
&H.BADY= -67.80	&H.NZ3R= -0.19
&H.H1X= 127.35	&H.MA1X= 508.24
&H.H1Y= -67.48	&H.MA1Y= 630.87
&H.H1R= -1.25	&H.MA1R= -90.25
&H.H2X= 63.43	&H.MA2X= 508.24
&H.H2Y= -67.58	&H.MA2Y= 630.85
&H.H2R= -5.92	&H.MA2R= -90.30
&H.H3X= -0.62	&H.VA2X= 335.32
&H.H3Y= -67.47	&H.VA2Y= 562.79
&H.H3Z= -20.20	&H.VA3X= 224.14
&H.H3R= 0.00	&H.VA3Y= 560.94
&H.PINX= 428.17	&H.VA4X= 0.00
&H.PINY= 96.55	&H.VA4Y= 0.00
&H.EDGX= 433.17	&H.ST1X= 421.01
&H.EDGY= 91.55	&H.ST1Y= 574.85
&H.WATX= 423.81	&H.ST2X= 420.48
&H.WATY= 129.71	&H.ST2Y= 625.19
&H.WATZ= 0.00	&H.CINW= 0.00
&H.DMPX= 300.00	&H.ST1LX= 0.00
&H.DMPY= 300.00	&H.ST1LY= 0.00
&H.FDTM=24	&H.ST2LX= 0.00
&H.FLX= 238.62	&H.ST2LY= 0.00
&H.FLY= 35.54	&H.STKLZ= 0.00
&H.RDTM=51	&H.PITLZ= 0.00
&H.RLX= -129.99	&H.PICLZ= 0.00
&H.RLY= 629.77	&H.TDTM1= 0.00
&H.AN1X= 464.99	&H.TDTM2= 0.00
&H.AN1Y= 425.85	&H.LPTM= 0.00
&H.AN1R= 0.00	&H.PUTM= 0.00
&H.AN2X= 464.87	&H.H1TM= 0.00
&H.AN2Y= 403.71	&H.H2TM= 0.00
&H.AN2R= 0.00	&H.H3TM= 0.00
&H.AN3X= 0.00	&H.CHKT= 0.05
&H.AN3Y= 425.48	&H.MNTT= 0.05
&H.AN3R= -45.00	&H.VCHT=0
&H.AN4X= 0.00	&H.RTRY=3
&H.AN4Y= 403.73	&H.PMAX=0
&H.AN4R= 45.00	&H.PCNT=0
&H.AN5X= 0.00	&H.H1M1R= 0.00

Parameter:	<b>&amp;F0.POSX</b> <b>&amp;F0.POSY</b>
Meaning:	Define the position at which the component is picked when TYPE is not 'Tray'. When parameter TECH is set to 'Auto', this position is ignored and the value is calculated as described under the parameter LCNO.
	Define the position of the first component in a tray when TYPE is 'Tray'. The first component is the one picked up when a new tray is placed and PTRX and PTRY are set to 0.
Values:	-999.99 to 999.99 [mm]
Parameter:	<b>&amp;F0.POSR</b>
Meaning:	Defines the rotation at which the components are picked in degrees.
Values:	-999.99 to 999.99 [degree]
Parameter:	<b>&amp;F0.PTRX</b> <b>&amp;F0.PTRY</b> <b>&amp;F0.PTRZ</b>
Meaning:	Specify the position within a tray where the next component should be picked. This parameter should normally not be written by the user, since the system then loses track of where it should continue within the tray.
Values:	0.255
Parameter:	<b>&amp;F0.PUSE</b>
Meaning:	This specifies whether the push rod will be used or not when picking a component. This parameter can only be used for a tray feeder and is only effective for the 84VZ machine (DC Z servo head).
Values:	0 - No use push rod 1 - use (Initial setting)
Parameter:	<b>&amp;F0.RTRY</b>
Meaning:	This parameter indicates the retry function (USE/Not USE) for each component. In normal operation this parameter is set to Not USE. The amount of retries is specified with the parameter <b>&amp;H.RTRY</b>
Values:	0 - USE 1 - Not USE

Parameter:	<b>&amp;F().MATP</b>
Meaning:	Specifies the use of the mechanical alignment units in relation to the use of vision. When it is set to NOT USE, no mechanical alignment will ever take place on the component. When it is set to ALWAYS, the component is first aligned with the unit specified in MALI and then presented to the vision system. When it is set to ERROR ONLY, the component is first presented to the vision system, if the vision measurement fails, it is aligned with the alignment unit specified in MALI and then presented to the vision system again.
Values:	0 - Not Use 1 - Error Only 2 - Always
Parameter:	<b>&amp;F().PCNT</b>
Meaning:	Specifies the push count. The pusher first transports the tape by pushing the number of times specified in this parameter before picking the component. It should be set to 0 when using trays.
Values:	0,1,2,3,4 Note: on the UFOS screen the values are 1,2,3,4,5
Parameter:	<b>&amp;F().PICZ</b>
Meaning:	This parameter specifies the component picking Z coordinate for head 3 and for the LCS (when it is used). Normally the Z coordinate value is the position at which the underside of the nozzle comes in contact with the surface of the component in the feeder or on the tray. (Feederheight = PCB height)
Value:	Initially the value is 0.0. pickup height : in machine from feeder      = &F().PICZ + &H.H3Z [mm] in LCS from tray            = &F().PICZ + &H.PICLZ [mm] on shuttle                    = &F().HIGHT + &H.H3Z [mm] ( LCS shuttle height must be adjusted at PCB height (is &H.H3Z) Maximum value is depending of the Z soft limit (+/-) [mm]
Parameter:	<b>&amp;F().PITX &amp;F().PITY</b>
Meaning:	When the component is located in a tray (see TYPE), these parameters specify the distance between two adjacent components in the tray in either X- or Y-direction. See also parameter DIMX, POSX and PTRX.
Values:	-999.99 to 999.99 [mm]

Parameter:	<b>&amp;F0.LCNO</b>
Meaning:	Defines the feeder plate hole number on which the feeder is mounted. It is only used when the TECH parameters is set to "Auto setting". In that situation, the CSM calculates the pick-up position for the component, based on LCNO, TYPE in relation with the tape feeder offset table (see MCH) and the machine file paremeters FFDT, RFDT, FLX, FLY, RLX and RLY. The pitch (P) between the feeder holes is fixed to 23.0 or 16.0 mm (depending on a DIP-switch setting). The formula used:  If LCNO <= 50 then x = &H.FLX + (LCNO - &H.FFDT) * P - X_OFFSET[ TYPE ] y = &H.FLY + Y_OFFSET[ TYPE ]  if 51 <= LCNO <= 100 then x = &H.RLX + (LCNO - &H.RFDT) * P + X_OFFSET[ TYPE ] y = &H.RLY - Y_OFFSET[ TYPE ]  if LCNO > 100 then the position is known by the LCS.  where X_OFFSET and Y_OFFSET are the feeder offset tables.
Values:	1..120
Parameter:	<b>&amp;F0.LCNT</b>
Meaning:	Specifies the head down time during pick and mount. After the head is lowered, it remains in the lowered position for this amount of time before it is raised again. During this time vacuum is established or released.
Values:	0.5 - in units of 50 ms.
Parameter:	<b>&amp;F0.LCST</b>
Meaning:	Refer to parameter LCEN
Parameter:	<b>&amp;F0.MALI</b>
Meaning:	Defines the mechanical alignment unit to be used for aligning the component. When set to 0, no mechanical alignment will take place. This parameter is also used when parameter VFNO is set to non-zero and MATP also set to non-zero (see parameter MATP).
Values:	0 - None 1 - Alignment unit 1 2 - Alignment unit 2

For the fixed (manual) tray, the system uses parameters DIMX/Y, PITX/Y, PTRX/Y, DMP.

For the tray on the LCS, tripple tray feeder or tray stack feeder the system used DIMX/Y, PITX/Y, PTRX/Y, DMP, LCST and LCEN.

### 8-3-3 Example

Below, an example FDR file is shown for a CSM-84V MKIII machine. It is obtained by sending the on-line command "@READ FDR" through the serial line, or using the CSM TOOLBOX:

```
&F(1).TYPE=0
&F(1).THND=0
&F(1).LCNO=0
&F(1).TECH=0
&F(1).COMMENT=/ 
&F(1).TUNT=0
&F(1).POSX= 0.00
&F(1).POSY= 0.00
&F(1).POSR= 0.00
&F(1).PCNT=0
&F(1).SLV= 0
&F(1).LCNT=0
&F(1).LCHK=0
&F(1).PICZ= 0.00
&F(1).HIGHT= 0.00
&F(1).RTRY=0
&F(1).MALI=0
&F(1).VFNO=0
&F(1).MATP=0
&F(1).PUSE=0
&F(1).DIMX=1
&F(1).DIMY=1
&F(1).PITX= 0.00
&F(1).PITY= 0.00
&F(1).PTRX=0
&F(1).PTRY=0
&F(1).LCST=1
&F(1).LCEN=1
&F(1).SCNT=0
&F(1).PTRZ=0
&F(1).DMP= 0
&F(1).DSPF=1
```

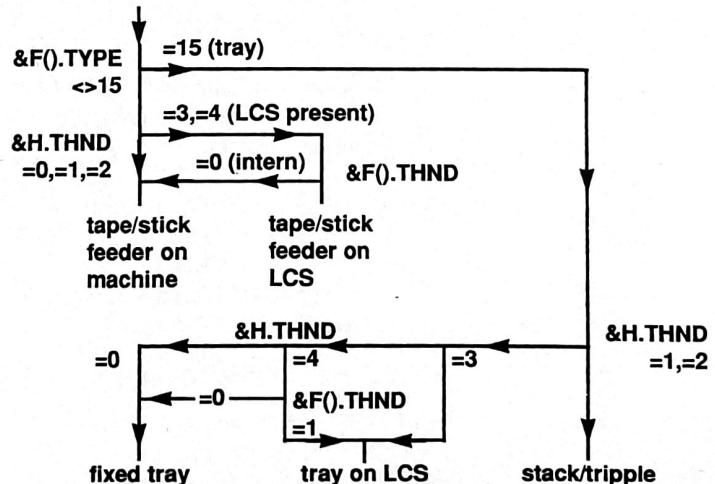
Parameter:	<b>&amp;F().TYPE</b>
Meaning:	Specifies the type of feeder this component type is held in. See also LCNO.
Values:	0 - 8mm tape 1 - 12mm tape 2 - 16mm tape 4 - 24mm tape 5 - 32mm tape 6 - 32mm embossed tape 7 - 44mm embossed tape 14 - stick feeder 15 - tray feeder
Parameter:	<b>&amp;F().VFNO</b>
Meaning:	The vision file to be used to measure and align the component.
Values:	0 - do not align with vision 1 - vision file 0 ..... 30 - vision file 29

### 8-3-3 Feeder Type Issues

The way the system handles feeders depends on a number of parameters.

- **&F().TYPE**
- **&F().THND**
- **&H.THND** in machine configuration file

Depending on the these parameters, the system expects the type of feeder as shown in the figure below:



Parameter:	<code>&amp;F().SCNT</code>
Meaning:	This parameter indicates the pallet pitch that the LCS is using.
Values:	0 - 10 [mm] 1 - 20 [mm]
Parameter:	<code>&amp;F().SLV</code>
Meaning:	The Check Sensor Level. Defines how the vacuum check should take place to ensure that a component was picked up.
Values:	0 - No vacuum check 1 - Low level 2 - Medium level 3 - High level
Parameter:	<code>&amp;F().TECH</code>
Meaning:	When this parameter is set to 'Auto', the pickup position of the component is calculated by the system (see LCNO). When it is set to Teach, the position is taken from POSX and POSY. Note: POSR is always used.
Values:	0 - Auto 1 - Teach
Parameter:	<code>&amp;F().THND</code>
Meaning:	Specifies the position of the tray handling. It can be on the machine or an external tray handler.
Values:	0 - on CSM 1 - external handler (LCS)
Parameter:	<code>&amp;F().TUNT</code>
Meaning:	Teaching unit. The value of this field is only relevant while teaching the coordinates of the pick-up position. It is not used during the normal mounting process.
Values:	0 - teaching with Beam Sensor 1 - teaching with Head 1 2 - teaching with Head 2 3 - teaching with Head 3 5 - teaching with Camera

Below, each possible parameter is discussed:

parameter: &B.ASFG

meaning: Specifies running mode 1. It can be set to the values AUTO, STEP, JOB CONDITION or OPTION PROGRAM  
 \* When set to AUTO, the CSM processes the board without operator assistance (except for error conditions).  
 \* When set to STEP, the CSM will execute a part of the process cycle and then stops, when the operator presses the run key, the next part of the cycle will be executed after which it stops etc.  
 \* When set to JOB CONDITION, a menu of condition settings will be shown to the operator. In this menu you can select:  
 1.DATA CHECK SEND (skip or exec.) this means that a data check is carried out or not.  
 2.DISPENSE CONTROL. You can only select this when there is DS (dispense) software in the machine.  
 \* OPTION PROGRAM. With this you can run special programs (only for service people available)

values: 0 - AUTO  
 1 - STEP  
 2 - JOB CONDITION  
 3 - OPTION PROGRAM

parameter: &B.BFNO

meaning: Specifies the vision file to be used for scanning the bad marks when the camera is used (see parameters BMRK and BSEN).

values: 0 to 29

parameter: &B.BMKX  
 &B.BMKY

meaning: Bad mark position. The bad mark position is given in block coordinates. The value of these parameters is only of interest when bad mark sensing is related to BLOCK origin (parameter &H.BMRK=0).

values: -999.99 to 999.99 [mm]

parameter: &B.BMLG

meaning: Specifies the logic of the beam sensor. When set to ON, the bad mark is reflective, when set to OFF, the bad mark is non-reflective. The value of this parameter is only of interest when bad mark sensing is related to BLOCK origin (parameter &H.BMRK=0).

values: 0 - ON  
 1 - OFF

## 8-4 The Board File

### 8-4-1 Introduction

Board files exist for each type of PCB that has to be processed by the machine. It specifies a number of processing parameters for the board and the positions for mounting components, placing glue dots, etc.

A board file consists of 2 groups of data:

- running conditions
- point data

A board file is related to one type of PCB. The name of this PCB type must be specified on the first line of the board file.

The board file has the following syntax:

```
board-file ::=  
    "PCBNAME="pcbname  
    running-conditions  
    point-data
```

where

```
pcbname ::= letter { ( letter | digit ) }  
letter ::= ( "A" | "B" | "C" | .. | "Z" )  
digit ::= ( "0" | "1" | "2" | .. | "9" )
```

The **pcbname** will appear in the MIS data. It may be upto 8 characters long.

### 8-4-2 Running Conditions

The running conditions specify the way in which a board should be handled, eg. the fixing method, bad mark sensing etc.

These parameters are specified in a block of lines, each containing one parameter. The lines look like:

**&B.ASFG=0**

Where the **&B** indicates that a running condition parameter will be specified, the **.ASFG** that the **ASFG** parameters is given a value.

Not all possible parameters need to be given a value. If a parameter is not specified, the value of it will default to 0 (zero).

The **&B** parameters are read when you start (switch) the board file.

	parameter: &B.DCHK
	meaning: With this parameter the selection is made for checking the component and board data
	values: 0 - Yes 1 - No
	parameter: &B.DDEX
	meaning: A flag to indicate that dot dispensing jobs must be executed.
	values: 0 - Skip dot dispense 1 - Execute dot dispense
	parameter: &B.FID1
	meaning: Specifies the way in which Origin fiducial corrections on the board is used. It can be set to "Not Use", in which case no fiducial measurement and correction will take place. It can be set to "PCB" in which case two fiducials are measured and all place actions are corrected according to these measurements. It can be set to "Block" in which case two fiducials are measured just before each block is processed. The measurements are only used to correct the specific block. The positions of the fiducials are specified in the point data part of the board file.
	values: 0 - Not use 1 - PCB 2 - Block
	parameter: &B.FIX
	meaning: Specifies the way in which the PCB is fixed during mounting.
	values: 0 - Pin 1 - Edge 2 - Pin and Push up
	parameter: &B.LDEX
	meaning: A flag to indicate that line dispensing jobs must be executed.
	values: 0 - Skip line dispense 1 - Execute line dispense

parameter:	<b>&amp;B.BMRK</b>
meaning:	Defines whether Bad mark check is used. It can be set to: NOT USE USE MASTER MARK * When set to 'NOT USE', no bad mark sensing is performed. * When set to 'USE', bad mark sensing is performed (depending off &H.BMRK = 0 or 1 related to BLOCK or PCB origin) * When set to 'MASTER MARK', the system first scans for a marker at the master mark position (see MBMX, MBMY). When such a mark is found, the bad marks are scanned. When the master mark is not found, the marks are not scanned and the system assumes that all blocks are good. The master mark is used as a signal to indicate that at least one block has a bad mark. By using this mechanism you can save cycle time.
values:	0 - Not use 1 - Use 2 - Master mark
parameter:	<b>&amp;B.BSEN</b>
meaning:	Defines the equipment that is used for bad mark sensing (if BMRK is not set to 'not use').
values:	0 - Beam sensor 1 - Camera
parameter:	<b>&amp;B.COMMENT</b>
meaning:	This can be used to add a comment to the board file. The comment string is delimited by "/". The string may be up to 8 characters in length. Example: &B.COMMENT=/comment/
values:	String, delimited by /'s, max. 8 characters in length (excl. /'s).
parameter:	<b>&amp;B.CONV</b>
meaning:	Defines the conveyor timer. This is the time that exit sensor of the conveyor must be free before the belt stops. This is used for odd shaped boards, that may free the exit sensor for a short time (e.g. due to a hole) before it is actually completely moved out of the machine.
values:	0 to 4 - time in units of 0.5 seconds

parameter:	<b>&amp;B.MBMX</b> <b>&amp;B.MBMY</b>
meaning:	Specify the master bad mark position in coordinates relative to the PCB origin.
values:	-999.99 to 999.99 [mm]
parameter:	<b>&amp;B.MTEX</b>
meaning:	A flag that indicates that mount jobs must be executed.
values:	0 - Skip mount lines 1 - Execute mount lines
parameter:	<b>&amp;B.OPMD</b>
meaning:	RUNNING MODE 2. This parameter can be set to 'Normal', 'Check' or 'Pass'. * When set to normal, the boards are processed normally, mounting/dispensing is performed. * When set to Check, the board is also processed as usual, only no checks on mounting or picking is performed. This allows you to run the machine in 'demo' mode. In this mode, the MIS data is not updated. * When set to Pass, all boards that enter the CSM leave it without being processed. This is only possible when parameter &B.ASFG is set to 0 (AUTO).
values:	0 - Normal 1 - Check (no checking performed) 2 - Pass
parameter:	<b>&amp;B.PCBW</b>
meaning:	Specifies the measured PCB width. This parameter will only be active when the CSM has an automatic width conveyor system.
values:	-999.99 to 999.99 [mm]
parameter:	<b>&amp;B.PDEX</b>
meaning:	A flag that indicates that pre-dispense jobs must be executed.
values:	0 - Skip pre-dispense lines 1 - Execute pre-dispense lines
parameter:	<b>&amp;B.SBST</b>
meaning:	This parameter specifies if the substopper must be used or not.
values:	0 - Do not use sub-stopper 1 - Use sub-stopper