

UFOS FILE DESCRIPTION

6.3. Vision file: parameters

The following section describes the vision file parameters

6.3.1. V#[filenr]

V# is a fixed field, this field indicates a vision file input. The [filenr] is the vision file number which is also used in other parts of UFOS (board and feeder files). The value can be 0 to 29. The [name] is a string of 1 to 8 characters which is the comment field. With this field you can give the vision file a name for easy recognition.

6.3.2. MODE

This field specifies the vision algorithm to be used.

Values:	BINARY	=	Binary trace
	FID	=	Fiducial Mark recognition
	QUAD	=	Detects center and inclination of Chip or PLCC
	SOP	=	Detects center and inclination of SOP
	QFP\	=	Detects center and inclination of QFP
	DISP	=	Needed when using a Dispense system.
	CON	=	Connector Recognition

6.3.3. CAMERA

Specifies the camera to be used for measuring the object.

Values:	1	=	The moving (fiducial) camera 1
	2	=	The fixed camera 2
	3	=	The fixed camera 3
	4	=	The fixed camera 4

6.3.4. OBJECT

The color of the object body to be measured, e.g. a reflective mark is WHITE, the contour of a component is BLACK.

Values:	WHITE	=	Object is more reflective than surrounding area
	BLACK	=	Object is less reflective than surrounding area

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C) MODE = SOP or QFP1

When the MODE field is set to SOP or QFP1 (Quad flat pack), the options have the following description:

Option 1	=	Lead width in 0.01 mm		
Option 2	=	Lead width tolerance in %		
	Values:	0	=	No check
		1 to 100	=	Tolerance
Option 3	=	Lead pitch in 0.01 mm		
Option 4	=	Lead pitch tolerance in %		
	Values:	0	=	No check
		1 to 100	=	Tolerance
Option 5	=	Vertical (Y) number of leads		
	Values:	0	=	No lead check
		1 to 100	=	Nr. of vertical leads
Option 6	=	Horizontal (X) number of leads		
	Values:	0	=	No lead check
		1 to 100	=	Nr. of horizontal leads
Option 7	=	Lead detection line offset		
	Values:	0	=	Default (2)
		1 to 255	=	Line Offset
Option 8	=	Standard and VICS1000: Lead detection start/end offset for recognition of QFP with bumper.		
	Standard Values:	0 to 255		
	SBIP Values:	0	=	QFP
		1	=	BQFP
Option 9	=	Algorithm selection		
	Standard Values:	0	=	Use method least square
		1	=	Use half-conversion of 0.5 degree unit
		2	=	Use half-conversion of 1 degree unit
	SBIP Values:	0	=	Normal rulers using correlators
		1	=	Normal rulers using video scan
		2	=	Fine rulers using correlators
		3	=	Fine rulers using video scan
	VICS100 Values:	0	=	Processing Algorithm A (default algorithm)
		1	=	Processing Algorithm B (for BQFP recognition)
Option 10	=	Standard: Rotation angle indication (0,90,180 or 10,100,190) SBIP/VICS1000: 0 = Standard recognition type 1 = Multi-Recognition type		
Option 11	=	Calibration eccentricity, is 0 when option10 is 0 degrees. Unit is 1/100 degree		
Option 12	=	Calibration eccentricity, is 0 when option10 is 90 degrees. Unit is 1/100 degree		
Option 13	=	Calibration eccentricity, is 0 when option10 is 180 degrees. Unit is 1/100 degree		
Option 14	=	Calibration eccentricity, is 0 when option10 is 270 degrees. Unit is 1/100 degree		
Option 15	=	Accumulated lead check tolerance in %. Values = 0 to 100		
Option 16	=	Absolute lead check in 0.01°		

At release of this manual, Option15 and 16 are only available with the VICS1000 vision system.

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6.3.9. WINDOW1

Describes the window within the field of view that is included for processing.
When WINDOW1 is used, WINDOW4 is always set to "OFF".

Values:	OFF	=	Window 1 not used
	ON+	=	Window 1 is used. Window size is specified behind ON+ via (x,x), the left bottom corner and (y,y), the right top corner.
			x = 0 to 255
			y = 0 to 239

6.3.10. WINDOW4

Describes the window within the field of view that is included for processing.
When WINDOW4 is used, WINDOW1 must be set to "OFF".

Values:	OFF	=	Window 4 not used
	ON+	=	Window 4 is used. Window size is specified behind ON+ via (x,y), the left bottom corner and (x,y), the right top corner.
			x = 0 to 255
			y = 0 to 239

6.3.11. OPTION01 to OPTION20

The description and use per option is dependent on the selected algorithm in the MODE field. When options are not mentioned, it indicates that these options are not used and are generally set to zero (0). The options 01 to 20, dependent on the MODE field, have the following meaning:

A) MODE = BINARY

When the MODE field is set to BINARY (BAD mark), all options are ignored.

B) MODE = FID

When the MODE field is set to FID (fudicial), the options have the following description:

Option01	=	Fiducial area in 0.01 mm ²
Option02	=	Fiducial area tolerance in % [1..100]. 0= no area check
Option03	=	Fiducial outline peripheral length (perimeter) in 0.01 mm
Option04	=	Fiducial outline peripheral length (perimeter) tolerance in %
Values:	0	= No Check
	1 to 100	= Tolerance
Option05	=	Length of the cursor
Values:	0 to 50 (pixels)	

NOTE:

At release of this manual, Option05 is used by the VICS1000 vision system only.

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6.3.5. BINARY

This selects the method by which the binary threshold value will be decided. There are 3 methods and numeric data that is used with each one. For more information read your Operating Manual section 7: Vision System.

Values:	AUTO	=	Automatic binary
	Manual	=	Fixed level binary
	Area	=	Fixed object binary, P-tile method.
	+	=	Level change (+ side)
	-	=	Level change (- side)
	+10	=	Level change (10-unit + side)
	-10	=	Level change (10-unit - side)

6.3.6. FILL

After the image undergoes binary processing with the BINARY function, it may, depending on the conditions, have shadowy characteristics or holes where binary processing could not be carried out cleanly. The hole FILL and area CUT functions are used to remove these. This option is not used if system is equipped with the SBIP vision system.

Values:	NO	=	No fill
	1 to 9	=	Hole filling 'n' times

6.3.7. CUT

After the image undergoes binary processing with the BINARY function, it may, depending on the conditions, have shadowy characteristics or holes where binary processing could not be carried out cleanly. The hole FILL and area CUT functions are used to remove these. This option is not used if system is equipped with the SBIP vision system.

Values:	No	=	No cut
	1 to 9	=	Small area cut 'n' times

6.3.8. DISPLAY

Indicates what should be displayed on the monitor when measuring the object. The meaning of these values depend on the type of vision system used and, within the particular vision system, what mode is being used. More detailed information can be found in Chapter 3, Section 7 (Standard Vision system), 8 (SBIP: Enhanced Vision System) and 9 (VICS1000: Enhanced Vision System)

Values:	INPUT0, INPUT1, EDGE0, EDGE1, CROSS0, CROSS1, ALL0 ALL1, TEST0, TEST1
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SECTION 7

ON-LINE COMMANDS

7.1. On-Line Commands: Introduction

This chapter discusses a set of commands that can be given through the serial line. This is only possible when the CSM is set in the CMU MODE = ONLINE (see machine parameter &H.CMU=0).

The commands can be grouped into the following sections:

- Key Operation commands
- Data Handling commands
- Utility commands
- Robot commands
- Error Messages

The robot commands are not discussed.

7.2. Key operation commands

Key operation commands are used to bring the robot in the various operational states. The commands are:-

MAIN
PCBRUN
ORIGIN
RESET
RUN
STOP
REMOTE
ERROR CLEAR

7.2.1. MAIN

When the MAIN command is issued, the 'MAIN MENU' is displayed on the monitor. The command has the same effect as pressing the "Main Menu" key on the control keyboard.

Precondition: Robot not in running mode

Syntax : @MAIN

Response on no error: OK

Response on error: 141:CANNOT EXECUTE. ROBOT IS RUNNING

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6.4. Example Vision File

An example of a vision files (abbreviation is VIS) is shown below. These files can be fetched by sending the command @READ VIS (= read all VIS files. File can be also written via the on-line command @WRITE VIS), or can be read by using the CSM Toolbox.

```
$VIS$  
V#0=FIDUCIAL ; Vision file 0 with the name 'FIDUCIAL'  
MODE :FID ; Algorithm mode is Fiducial  
CAMERA :1 ; Measuring camera is camera 1  
OBJECT :WHITE ; Object is more reflective than  
; surrounding area.  
BINARY :MANUAL( 98 ) ; Binary level fixed to 98  
FILL :NO ; Fill not used  
CUT :NO ; Cut not used  
DISPLAY :TEST1 ; Center of gravity or intersection + binary  
; image + numeric value
```

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6.3.12. HOLD

This specifies the type of camera, either a moving or a fixed one.

Values: MOVING = Camera 1
 FIXED = Camera 2

6.3.13. DIRECTION

Specifies the direction in which the camera looks. This is needed to determine how the measured offsets relate to the machine coordinate system.

Values: UP = Camera faces up
 DOWN = Camera faces down

6.3.14. SCALE

Specifies the size of a camera pixel in the area of measurements in mm per pixel. The camera scaling is given in the following format:-

x-scale y-scale
Values: x-scale = any real number
 y-scale = any real number

6.3.15. SHIFT

Specifies the system coordinates shift volume relative to those of the robot. The shift is given in the following format:-

x-shift y-shift r-shift
Values: x-shift = real number, giving the last measured x-shift in [mm]
 y-shift = real number, giving the last measured y-shift in [mm]
 r-shift = real number, giving the last measured rotationaly shift in degrees.

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D) MODE=QUAD (PLCC)

When the MODE field is set to QUAD, the options have the following description:

- Option 1 = Area of the object in mm²
- Option 2 = Area tolerance of the object in %.
Values: 0 = No Check
1 to 100 = Tolerance
- Option 3 = Peripheral length (perimeter) of the object in 0.01mm
- Option 4 = Peripheral length (perimeter) tolerance in %
Values: 0 = No Check
1 to 100 = Tolerance
- Option 11 = Calibration eccentricity, is 0 when option10 is 0 degrees.
Unit is 1/100 degree
- Option 12 = Calibration eccentricity, is 0 when option10 is 90 degrees.
Unit is 1/100 degree
- Option 13 = Calibration eccentricity, is 0 when option10 is 180 degrees.
Unit is 1/100 degree
- Option 14 = Calibration eccentricity, is 0 when option10 is 270 degrees.
Unit is 1/100 degree

E) MODE = DISP

When the MODE field is set to DISP(dispense), the options have the following description:

- Option 1 = Maximum area of collective dots. When there is no check, this field is set to zero (0). Units are specified in 1/100 square mm.
- Option 2 = Minimum area. When there is no check, this field is set to zero (0). Units are specified in 1/100 square mm.
- Option 3 = Shape code. Unit 1/100, is approximately 355 (2 Vpi)
- Option 4 = Shape tolerance in %
Values: 0 = No check
1 to 100 = Tolerance
- Option 5 = Head1 standard area
- Option 6 = Head2 standard area
- Option 7 = Head3 standard area
- Option 8 = Head1 dispensing timer
- Option 9 = Head2 dispensing timer
- Option 10 = Head3 dispensing timer
- Option 11 = Minimum number of objects
Values: 1 to 9 = Number of objects
- Option 12 = Algorithm selection (not used)= 0

NOTE:

Options 5 ot 11 are setup by the <CALIB> utility program and used by the <COMMON> program automatically.

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d) Read robot version number:

Precondition: None

Syntax: @? VER

Response: CSM84V,NONE Z,SERVO R V3.76
(example only)

7.3.2. READ

With the READ command you can read data files of the CSM. Various files exist, these are:

VIS	=	Vision file
PRD	=	All MIS data (3 subfiles)
PCB	=	All cumulative PCB data of MIS
TRP	=	Trip data of MIS
MCH	=	Machine configuration file
FDR	=	Feeder file
BRD	=	All board files together
B<pcb-name>	=	Single board file
B<>	=	Current selected board file
PGM*	=	Program data (COMMON)
MEM*	=	Memory image
DIn	=	Digital inputs of port n
DOm	=	Digital outputs of port n
SFT*	=	Shift data
LCK*	=	Lock data
VAR*	=	Variables (ALL)
ARY*	=	Array variables (ALL)
DIR*	=	Directory of programs (PGM)
BDIR	=	Directory of board files

The files marked with an asterisk () can only be accessed when the machine is configured in debug mode (dipswitch 2-6).*

When a file is read, the file data is sent, followed by an empty line. When a compound file is sent, like PRD, each subfile is ended by an empty line (no additional empty line after last subfile!).

Precondition: None, when used in running mode it may interrupt normal functioning of the program since the CMU has priority over program execution.

Syntax : @READ [datafile name]

Response: File data followed by empty line

Example: @READ VIS

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7.3. Data handling commands

Through data handling commands you can read data from and write data to the CSM.

The available data handling commands are:

- ?
- READ
- WRITE
- SPECIAL CODES

7.3.1. The ? command

Through the ? command, some status data can be obtained about the robot. Various forms of the command exists:

a) Request position of servo:

Precondition: None

Syntax : @? PXY

Response: X= 0.00 Y= 0.00 R= 0.00

b) Request status of robot:

Precondition: None

Syntax : @? MOD

Responses: MAIN MENU
RUNNING MODE
RUNNING MODE---RUNNING
MANUAL MODE
DATA IN MODE
M.I.S. MODE
OPTION MODE

Remark: The responses shown correspond to the menu names of the menus on the monitor

c) Read error message:

The ?MSG command returns the error message displayed on the monitor. If no error exists, OK is returned.

Precondition: None

Syntax : @? MSG

Response on no error: OK

Response on error: Error message shown on screen.

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7.2.5. RUN

The robot continues executing the selected program, in this case the selected board file. It proceeds from the point where it previously stopped (or at the beginning when a new board file is selected using the SWI program).

Precondition: Select Job menu displayed

Syntax: @RUN

Response on no error: OK

Response on error: 10:CANNOT EXECUTE

Remark: The RUN command can also be given in other modes, but it will have no effect, though OK is responded.

7.2.6. STOP

The robot stops execution of the current program immediately. This means that any active outputs remain active. So when the glue is flowing out of the dispense head, it will continue flowing out.

Precondition: None

Syntax: @STOP

Response: OK

7.2.7. REMOTE

The remote command lets you disable or enable the control keyboard.

Precondition: None

Syntax : @REMOTE ON = Disable control keyboard
@REMOTE OFF = Enable control keyboard

Response: OK

7.2.8. ERROR CLEAR

The error clear command is at this moment not implemented. However you can use the following command to generate the error clear:

Precondition: The yellow lamp and the buzzer is on

Syntax: @DO(03)=0

Response on noerror: OK

Response on error: 101:FORMAT ERROR

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7.2.2. PCBRUN

When the PCBRUN command is issued, the 'SELECT JOB' menu is displayed on the VDU. When this is the first time that the PCBRUN command is given since a SWI command, the new selected program is compiled. This includes initialisation of the TRP file.

Precondition: Robot not in running mode

Syntax : @PCBRUN

Response on no error: OK

Response on error: a) 141: CANNOT EXECUTE. ROBOT IS RUNNING
b) 74: UNDEFINED PCB NAME

Remark: You can only be sure about what board file will be selected if you first execute a SWI command before. If no board file is present, error 74 will appear, otherwise the last selected board file is selected.

7.2.3. ORIGIN

When this command is issued, the robot servo is returning to its origin. When it arrives at the origin it responds with its position in some undefined quantity.

Precondition: Main menu displayed and origin incomplete

Syntax: @ORIGIN

Response on no error: COMPLETED

55% 46% 52%

Response on error: 10:CANNOT EXECUTE

Remark: The actual value of the numbers may differ. The command will result in COMPLETED when the origin command has already been executed before. No physical action will be taken by the machine in this situation.

7.2.4. RESET

The execution of the current program is reset to its beginning. I/O ports are set to their default value (as with power-up of the system).

Precondition: Select Job menu displayed

Syntax: @RESET

Response on no error: OK

Response on error: 141: CANNOT EXECUTE. ROBOT IS RUNNING
10: CANNOT EXECUTE

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7.4.4. ATTR

The PGM memory contains a number of programs. One of these is COMMON. Through the ATTR command they can be made write protected or not. RW is Read/Write, RO is Read Only.

Precondition: Main menu must be displayed

Syntax: @ATTR <filename> TO RW
@ATTR <filename> TO RO

Response: OK

7.4.5. REN

With the RENAME command, files in the PGM memory can be given a new name. It can only be used when the debug mode is selected with the dip switches (switch 2-6).

Precondition: Main menu must be displayed

Syntax : @REN <oldfilename> TO <newname>

Response: OK

7.4.6. COPY

With the Copy command, files in the PGM memory can be copied to another file or point data lines can be copied. It can only be used when the debug mode is selected with the dip switches (switch 2-6).

Precondition: Main menu must be displayed

Syntax: @COPY <origname> TO <newname>

Response: OK

7.5. Error messages

When the parameter (in the CSM) MSG OUT TO CMU = YES (see machine parameter &H.MOUT=1) an the CMU MODE = ONLINE (see machine parameter &H.CMU=0) then the following error messages are send to the HOST port:

- #001: COMPLETED (mounting operation has ended)
- #002: MACH. ERR (yellow lamp is burning, buzzer is active)
- #010: PICK UP ERR
- #020: FIDUCIAL ERR
- #030: VISION ERR
- #108: SPEC. DISAGREEMENT

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7.4.1. INIT

The init commands initializes data. It can be performed on the files:

MEM
PRD
TRP

Precondition: Main menu must be displayed

Syntax : @INIT filename

Response: OK

Example : @INIT TRP

7.4.2. SWI

With the SWI command you can select a board file for execution. Before a new board file can be selected, a RESET command is required to free the old board file.

Precondition: Main menu displayed

Syntax: @SWI B<PCB filename>

Response on no error: OK

Response on error: 69:NO SUCH PCB
10:CANNOT EXECUTE

7.4.3. ERA

With the ERA command, files can be deleted or cleared (depending on the file).

Precondition: Main menu displayed

Syntax: @ERA filename

Response on no error: OK

Response on error: 78:CANNOT DELETE. PLEASE RESET

When you erase a B<xxxx> file then the MIS data for the PCB type (xxxx) is also deleted.

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7.3.3. WRITE

With the write command you can write data to files on the CSM.

Precondition: None, when used in running mode it may interrupt normal functioning of the program since the CMU has priority over program execution.

Syntax : @WRITE [datafile name]

Response CSM: *** PLEASE ENTER !

You send: File-data (file data must be followed by an empty line)

Response CSM on no error: OK

Response CSM on error: Error message. It is generated as soon as it detects an error.

7.3.4. Special codes

You can use two special codes. These codes are:-

[Ctrl Y]: This initializes the reception buffer of the CSM. It is used when online commands have been input up to a certain point but the user wants to cancel them (Ctrl Y = 19hex).

[Ctrl C]: This interrupts the online command presently being run (Ctrl C = 03hex).

If the CSM is in operation, this command also stops the operation. When an online command is interrupted, the following response is displayed:

*** ABORTED c/r

--- ENDS normally

7.4. Utility commands

Utility commands let you perform various functions. They are:

INIT

SWI

ERA

ATTR

REN