# Import/Export Data Reference Guide

## FLOware® Software Ver 2.9J+

Document Part No. 22100024R
May 18, 2018

# Table of Contents

# Revisions

**Version 2.9J+ dated 05/18/18**

| | |
|---|---|
| SUBTYPE | Expanded definition for Probe subop (used by Operate operation). |

**Version 2.9 dated 11/03/14**

| | |
|---|---|
| MOUNTS | Added NCM Close Time/nClose Time, NCM Open Time/nOpen Time. Added Default value to DotsWarn, OnTimeWarn, PurgeIdle, TotTimeWarn, WtDotCount, WtPartCount, ScaleRecal. Modified description for WtDotCount, WtPartCount |
| PROGDETAIL | Added NCM Close Time/nClose Time, NCM Open Time/nOpen Time. Modified description for SBOn |

**Version 2.9 dated 06/09/09**

Replace detailed listing of subtype codes with APPENDIX - SubTypes & SubOps by Operation.

| | |
|---|---|
| SUBTYPE | Relocated to table in APPENDIX. Added SubOp for each SubType Code. Added Weight to Calibrate, Calib Forwd and Calib Rearwd to Move, Resume Pt to Operate, and Auto Purge to Setup. |
| UNIVERSAL | Updated majority of definitions; at a minimum, True/False states replaced with On/Off. Change Backup Frequency to Time Between Backup Prompts, and Backup Reminder to Time Between Backup Reminders. Change Map On to Mapping On. |
| ERRORLOG | Update definition of IVAL. |

**Version 2.9 dated 04/10/08**

Updated various typos in Data Base Name column.

**Version 2.9 dated 10/25/07**

Updated to **version 2.9** of the FLOware® software.

**WARNING**: Back up the application or data after updating to version 2.9 and do not restore an earlier backup or import: variable auger speeds may be incorrect in the backup/import.

Note that any version 2.4x, 2.5x, 2.6x, 2.7x or 2.8x software as well as 1.9c can be updated to version 2.9 directly without updating to intermediate versions since version 2.9 has a database compatible with 2.4x-2.8x versions and a specific update from 1.9c is included.

| | |
|---|---|
| BASEINFO | Added ILastInfo, ILastBackup |
| DEFAULTVALS | Added MatlTime, MatlWarn |
| MATERIALS | Added MatlTime, MatlWarn |
| MOUNTS | Added MatlTime, MatlWarn |
| PROGDETAIL | Added RepeatMax, CoordZ, STFunction. |

| | |
|---|---|
| | Added Eaccel, Evelocity, Ebuff, EPSvolts, EZAdjust, EStartZ. Added EPassCt, ELength, EWidth, ECleanTime, EdryTime, EFillTime. |
| SHAPEDETAIL | Added RepeatMax, CoordZ, STFunction. Added Eaccel, Evelocity, Ebuff, EPSvolts, EZAdjust, EstartZ. Added EPassCt, ELength, EWidth, ECleanTime, EDryTime, EFillTime. |
| FIXEDLOCS | Added CoordZ |
| FIXEDLOCS | Added Fid1WinWid, Fid1WinHeight, F1d1WinFlag, Added Fid2WinWid, Fid2WinHeight, F1d2WinFlag, Added Fid3WinWid, Fid3WinHeight, F1d3WinFlag, Added Fid4WinWid, Fid4WinHeight, F1d4WinFlag Added FidP1x, FidP1Y, FidP1Z, FidP2X, FidP2Y, FidP2Z Added Fid3X, FidP3Y, FidP3Z, Added FidP1Flag, FidP2Flag, FidP3Flag. |
| SHAPES | Added Fid1WinWid, Fid1WinHeight, F1d1WinFlag, Added Fid2WinWid, Fid2WinHeight, F1d2WinFlag, Added Fid3WinWid, Fid3WinHeight, F1d3WinFlag, Added Fid4WinWid, Fid4WinHeight, F1d4WinFlag. Added FidP1x, FidP1Y, FidP1Z, FidP2X, FidP2Y, FidP2Z Added Fid3X, FidP3Y, FidP3Z, Added FidP1Flag, FidP2Flag, FidP3Flag. |
| PROGRAMS | Added Fid1WinWid, Fid1WinHeight, F1d1WinFlag, Added Fid2WinWid, Fid2WinHeight, F1d2WinFlag, Added Fid3WinWid, Fid3WinHeight, F1d3WinFlag, Added Fid4WinWid, Fid4WinHeight, F1d4WinFlag Added sFid1WinWid, sFid1WinHeight, sF1d1WinFlag, Added sFid2WinWid, sFid2WinHeight, sF1d2WinFlag, Added sFid3WinWid, sFid3WinHeight, sF1d3WinFlag, Added sFid4WinWid, sFid4WinHeight, sF1d4WinFlag. Added FidP1x, FidP1Y, FidP1Z, FidP2X, FidP2Y, FidP2Z Added Fid3X, FidP3Y, FidP3Z sFidP1x, sFidP1Y, sFidP1Z, Added sFidP2X, sFidP2Y, sFidP2Z, sFid3X, sFidP3Y, sFidP3Z, Added FidP1Flag, FidP2Flag, FidP3Flag, Added sFidP1Flag, sFidP2Flag, sFidP3Flag. |
| SUBTYPES | Added Function. |
| RETENTION | Added Codes RETMATTIME=4, RETMATCUR=5 (for material timers), RETCOUNTER=6 (for counters), RETMATSAV=7 (for material timers). |

SUBTYPE  Added OPERATOR/SUBTYPE Codes 38-44 (Set, Increment, Value testLE, Counter testLE, Display, Value testGT, Counter test GT) for counters and OPERATOR/SUBTYPE Codes 45&46 (Test, Function) for EST.  Also added SETUP/SUBTYPE code 9 for EST.

## Version 2.8 dated 09/20/05

Updated to **version 2.8** of the FLOware® software.

Note that any version 2.4x, 2.5x, 2.6x or 2.7x software as well as 1.9c can be updated to version 2.8 directly without updating to intermediate versions since version 2.8 has a database compatible with 2.4x-2.7x versions and a specific update from 1.9c is included.

PROGDETAIL  Add DotCalib, TargSize, TargRange
SHAPEDETAIL  Add DotCalib, TargSize, TargRange
UNIVERSALS  Add InspectInterval, CalDot1, CalDot2, CalDot3
PROGRAM  Add TestByShapenm, InspectAfter

## Version 2.7 dated 05/04/05

Updated to **version 2.7** of the FLOware® software.

PROGDETAIL  Add TMValveOff, TopZ; Correct illegal OnOffCtrl value
SHAPEDETAIL  Add TMValveOff, TopZ; Correct illegal OnOffCtrl value
SPECIALLOCS  Add TiltCal1, TiltCal2, TiltCal3, TiltCal4
ERRLOG  Increase size of MsgText to 250 characters
VARIATIONS  Add BlobSize
SUBTYPES  Add MOVE 4, 5, 6; Add OPERATE 27, 28, 29, 30, 31
UNIVERSALS  Add dmaOffX, dmaOffY, CupLocCount, CupRadius
MOUNTS  Add InspPartCount, InspTime
MATERIALS  Add InspPartCount, InspTime
GENDEFAULTS  Add InspPartCount, InspTime

## Version 2.6 dated 02/23/05

Fields were renamed in Version 2.5c, which should have been a new version.  Version 2.6 was created for the renamed fields.

## Version 2.5 dated 08/06/04

Updated to **version 2.5** of the FLOware® software.
PROGDETAIL  Added MixVel, WinWidth, WinHeight
SHAPEDETAIL  Added MixVel, WinWidth, WinHeight
SUBTYPES  Added OPERreload, SETminmixrld entries
MOUNTS  Removed xMicroAccel
MATERIAL  Removed xMicroAccel
DEFAULTGEN  Removed xMicroAccel
PATTERNS  Added ModelSize
SUBTYPES  Added records for OPERATE/ProbeSetup, OPERATE/ProbeSkip, OPERATE/ProbeReset,

OPERATE/MixerReload, SETUP/CancelMixLd
SPECIALLOCS  Renamed PurgeCup=>PurgeCup1, CleanNdl=>CleanNdl1, Scale=>Scale1, Hd#Loc=>HdLoc#, CamCal__=>CamCal#
PROGCAL  Renamed Hd#Adj=>HdAdj#, Hd#Loc=>HdLoc#, HD#type=>HDtype#
TWEAKS  Renamed all fields from (blank, 1-4) to (1-5)
FIXEDLOCS  Added Z Coordinates to fiducials; Renamed Fid#Name=>FidName#, Fid#Flag=>FidFlag#, Bdmk____=>Fid4____
SHAPES  Added Z Coordinates to fiducials; Renamed Fid#Name=>FidName#, Fid#Flag=>FidFlag#, Bdmk____=>Fid4____
PROGRAMS  Added Z Coordinates to fiducials and alignments, Bdz; Renamed Fid#Name=>FidName#, sFid#Name=>sFidName#, Fid#Flag=>FidFlag#, sFid#Flag=>sFidFlag#, Bdmk____=>Fid4____
BOARDS  Added BdZ
PROGDETAIL  Added WinWidth, WinHeight
SHAPEDETAIL  Added WinWidth, WinHeight

## Version 2.4 dated 06/18/04

Updated to **version 2.4** of the FLOware® software.
PROGDETAIL  Add MixVel
SHAPEDETAIL  Add MixVel
SUBTYPES  Add functions Operate/MixerReload/22, Setup/Cancel MixLd

## Version 2.3 dated 06/17/04

Updated to **version 2.4** of the FLOware® software.
*NOTE: Version 2.4 is the first version where all database detail is immediately available to the software.*
DEFAULTGEN  Remove AirPressureCtl, AirPressureMan, CDotArea, DotDotArea
DEFAULTGEN  Add PinchDelay, JogZ, DispensePress, IdlePress, PressTolerance
DEFAULTGEN  Add Backlight
DEFAULTVALS  Remove completely (Replace with ..defaults)
FIXEDLOCS  Remove sFid1Flag=>sFid3Flag
MATERIALS  Remove AirPressureCtl, AirPressureMan, CDotArea, DotDotArea
MATERIALS  Add PinchDelay, JogZ, DispensePress, IdlePress, PressTolerance
MATERIALS  Add Backlight
MOUNTS  Remove AirPressureCtl, AirPressureMan, CDotArea, DotDotArea
MOUNTS  Add PinchDelay, JogZ, DispensePress, IdlePress, PressTolerance
MOUNTS  Add Backlight
PATTERNS  Remove BlobRatio, LightOnDark, Low/HighGray, NumBlobs, DotArea
PATTERNS  Add Description
PERMINFO  Add Build
PIDCONFIG  Add Description

| | |
|---|---|
| PROGDETAIL | Add HeadLoc, STCode, Ident, NID, HeadType |
| PROGDETAIL | Add BlobRatio, LightOnDark, Low/HighGray, Min/MaxArea |
| PROGDETAIL | Add BackLight, PinchDelay, SBDead, Tuning, DotVol, TiltAngle |
| PROGRAMS | Rename BUsed to BackLight |
| SHAPEDETAIL | Add HeadLoc, STCode, Ident, NID, HeadType |
| SHAPEDETAIL | Change ShapeCode=>ProgCode, Dummy0=>ProgFlag, ShapeType=>SeqNo |
| SHAPEDETAIL | Change ShapeName=>Partition |
| SHAPEDETAIL | Add BlobRatio, LightOnDark, Low/HighGray, Min/MaxArea |
| SHAPEDETAIL | Add BackLight, PinchDelay, SBDead, Tuning, DotVol, TiltAngle |
| SHAPES | Rename BUsed to BackLight |
| PC | Remove completely |
| USC | Remove completely |
| UVC | Remove completely |
| VARIATIONS | Change VarType=>VarCode |
| ZCOLUMNS | Remove completely |

**Version 2.2 dated 06/16/04**

Updated to **version 2.3** of the FLOware® software.

| | |
|---|---|
| PATTERNS | Add DotArea, DotVol |
| SPECLOCS | Add CamCalA1X-XZ, CamCalA2X-Z, CamCalB1X-Z, CamCalB2X-Z |
| PROGRAM | Add Backlight Control: BlightLev, BLColor, Bused |
| SHAPES | Add Backlight Control: BlightLev, BLColor, Bused; TaughtAngle |
| MOUNTS | Add CpreSnapDelay |
| MATERIAL | Add CpreSnapDelay |
| DEFAULTGEN | Add CpreSnapDelay |
| UNIVERSALS | Add ShutOffTime |

**Version 2.1 dated 06/14/04**

Updated to **version 2.2** of the FLOware® software.

| | |
|---|---|
| AUTOINCR | Add New table. |
| NEEDLES | Reverse ID, OD for needles 31 & 32. |
| MOUNTS | Change xdlAccel=>xMicroAccel, DotdlValve=>DotMicroSpeed. Add Cal2Dot, CalEndZ, DotAugerSpeed, MicroSpeed, MicroAccel, MicroSB, ShutOffTime, AirPressureFlg PIDname for each of 5 temperatures. Remove conveyor temperature controls: PreHeatTemp, PreHeatTmpRnge, PostHeatTemp, PostHeatTmpRnge, WorkAreaTemp, WorkAreaTmpRnge, PreHeatTmpCtl, PostHeatTmpCtl, WorkAreaTmpCtl, PreHeatPIDname, PostHeatPIDname, WorkAreaPIDname. Remove 2-dot calibration parameters: ccFocus, ccZoom, ccFStop, ccLightLev, ccLColor, ccGain, ccOffset, ccTuning, ccMaxPix, ccMinPix, ccDotArea, ccDotVol, ccLightOnDark. Remove AirPressureCtl & AirPressureMan. |
| MATERIALS | Change xdlAccel=>xMicroAccel, DotdlValve=>DotMicroSpeed. |

Add Cal2Dot, CalEndZ, DotAugerSpeed, MicroSpeed, MicroAccel, MicroSB, ShutOffTime, AirPressureFlg PIDname for each of 5 temperatures. Remove conveyor temperature controls: PreHeatTemp, PreHeatTmpRnge, PostHeatTemp, PostHeatTmpRnge, WorkAreaTemp, WorkAreaTmpRnge, PreHeatTmpCtl, PostHeatTmpCtl, WorkAreaTmpCtl, PreHeatPIDname, PostHeatPIDname, WorkAreaPIDname. Remove 2-dot calibration parameters: ccFocus, ccZoom, ccFStop, ccLightLev, ccLColor, ccGain, ccOffset, ccTuning, ccMaxPix, ccMinPix, ccDotArea, ccDotVol, ccLightOnDark. Remove AirPressureCtl & AirPressureMan.

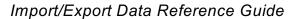| | |
|---|---|
| DEFAULTGEN | Change xdlAccel=>xMicroAccel, DotdlValve=>DotMicroSpeed. Add Cal2Dot, CalEndZ, DotAugerSpeed, MicroSpeed, MicroAccel, MicroSB, ShutOffTime, AirPressureFlg PIDname for each of 5 temperatures. Remove conveyor temperature controls: PreHeatTemp, PreHeatTmpRnge, PostHeatTemp, PostHeatTmpRnge, WorkAreaTemp, WorkAreaTmpRnge, PreHeatTmpCtl, PostHeatTmpCtl, WorkAreaTmpCtl, PreHeatPIDname, PostHeatPIDname, WorkAreaPIDname. Remove 2-dot calibration parameters: ccFocus, ccZoom, ccFStop, ccLightLev, ccLColor, ccGain, ccOffset, ccTuning, ccMaxPix, ccMinPix, ccDotArea, ccDotVol, ccLightOnDark. Remove AirPressureCtl & AirPressureMan. |
| MANY | Remove Gantry in preference to IGant from: DEFAULTVALS, PROGDETAIL, SHAPEDETAIL, DEFAULTGEN, MOUNTS, MATERIALS, BASEINFO PROGCAL, CURINFO, FIXEDLOCS, RETENTION ERRLOG, OFFLINE, UNIVERSALS, PIDCFG, SPECIALLOCS. |

| | |
|---|---|
| PROGRAMS | Add PIDname for each of 3 temperatures<br>Add Fid1Flag, sFid1Flag; update from Fid1Used, sFid1Used; same for Fid2, Fid3.<br>Add PostSeatPress, PostPressRnge, PostPressTime, BdmkCount.<br>Move conveyor temperature controls to PROGRAMS from MOUNTS:<br>PreHeatTemp, PreHeatTmpRnge, PostHeatTemp, PostHeatTmpRnge, WorkAreaTemp, WorkAreaTmpRnge, PreHeatTmpCtl, PostHeatTmpCtl, WorkAreaTmpCtl, PreHeatPIDname, PostHeatPIDname, WorkAreaPIDname.<br>Move 2-dot calibration to PROGRAMS from MOUNTS:<br>ccFocus, ccZoom, ccFStop, ccLightLev, ccLColor, ccGain, ccOffset, ccTuning, ccMaxPix, ccMinPix, ccDotArea, ccDotVol, ccLightOnDark.<br>Remove all FidxUsed, BdmkUsed |

**Version 2.1 dated 06/14/04** CONTINUED

| | |
|---|---|
| SHAPES | Remove all FidxUsed, BdmkUsed<br>Add Fid1Flag; same for Fid2, Fid3. |
| UNIVERSALS | Add ShutOffTime, PreHeatOn, PreCoolOn, PreHeatTemp, PreHeatTmpRnge, PreCoolTemp, PreHeatPIDname; also fields for PostHeat & WorkArea. |
| PROGDETAIL | Change dlValve=>MicroSteps, dlAccel=>MicroAccel, dlSB=>MicroSB, ValveSpeed=>MicroSpeed.<br>Add PressRnge, AugerSpeed, SBOn. |
| SHAPEDETAIL | Change dlValve=>MicroSteps, dlAccel=>MicroAccel, dlSB=>MicroSB, ValveSpeed=>MicroSpeed, Remove dummy1.<br>Add PressRnge, AugerSpeed, SBOn. |
| DEFAULTVALS | Change dlValve=>MicroSteps, dlAccel=>MicroAccel, dlSB=>MicroSB, ValveSpeed=>MicroSpeed.<br>Add PressRnge, AugerSpeed, SBOn. |
| SPECLOCS | Add Camera Selects: Change CamCal1X=>CamCalA1X, etc. -- then add 6 fields each for CamCalB, CamCalC. |
| HEADS | Add PressRnge, SBOn. |
| FIXLOCS | Add Fid1Flag; update from Fid1Used -- same for Fid2, Fid3.<br>Remove all FidxUsed, BdmkUsed. |

**Version 2.0 dated 10/31/02**

Updated to **version 2.1** of the FLOware® software.

| | |
|---|---|
| Warning preface | Updated referenced version to 2.1. |
| Pages 3, 5, 6 | Add @Tweaks. |
| PROGRAM | Add LiftSuppress, HoldDnSuppress, PauseOnBdmk. |
| MOUNT | Add xPreSnapDelay, xPostDelay, xSnapOffVel, xSnapOffAccel, xdlAccel. |
| TWEAKS | Add. |
| PROGCAL | Add Zoom. |
| DETAIL | Add OpPattern. Correct dlAccel to steps/mm/mm. |

| | |
|---|---|
| SHAPEDET | Add OpPattern. Correct dlAccel to steps/mm/mm. |
| HEAD | Add HeadDescr. |
| MATERIAL | Add xPreSnapDelay, xPostDelay, xSnapOffVel, xSnapOffAccel, xdlAccel. |
| GENDFLT | Add xPreSnapDelay, xPostDelay, xSnapOffVel, xSnapOffAccel, xdlAccel. |
| DFLTVAL | Add OpPattern. |
| SUBTYPE | Add SubTypeDescr. Add 20 to Operate SubTypeCode. Correct Setup subtype code for 0-3 to shapename. Add Setup subtype code for 200. |

**Version 1.11 dated 08/23/02**

Updated to **version 2.0** of the FLOware® software.

| | |
|---|---|
| BASEINFO | Added IGant, obsoleted Gantry. |
| BOARDS | Move all fixed subboard info into PROGRAMS: ProbeSuppress, Fid*, Bdmk*, *Count, *Space all prefixed with "s". |
| CURINFO | Removed Gauge, replaced with NeedleID.<br>Added IGant, obsoleted Gantry. |
| CURINFOV | Removed Gauge, replaced with NeedleID. |
| DEFAULTGEN | Removed Gauge, replaced with NeedleID.<br>Added IGant, obsoleted Gantry.<br>Added MatCode, RecType, IGant, MountFlag, ProgCode, FeatureID, Color, MatGroup, MatlInfo, WtOnTimeFrPrg, WtOnTime1, WtOnTime2, WtOnTime3, WtOnTime4, WtOnTime5. |
| DEFAULTVALS | Added IGant, obsoleted Gantry.<br>Added SnapOffVel, SnapOffAccel, PreSnapDelay, dlAccel. |
| ERRLOG | Added IGant, obsoleted Gantry. |
| FIXEDLOCS | Added IGant, obsoleted Gantry. |
| HEADS | Added MicroAccel. |
| MATDOTS | Removed Gauge, replaced with NeedleID. |
| MATERIALS | Removed Gauge, replaced with NeedleID.<br>Added IGant, Gantry, RecType, IGant, MountFlag, MountLoc, ProgCode, pattern, FeatureID, ccLightOnDark, SkipCalibStdAcc, WtOnTime1, WtOnTime2, WtOnTime3, WtOnTime4, WtOnTime5, InspectDelay, WtOnTimeFrPrg. |
| MOUNTS | Removed Gauge, replaced with NeedleID.<br>Added IGant, obsoleted Gantry. Added RecType, Color, MatGroup, MatlInfo, MatCode, ccLightOnDark, Pattern, InspectDelay, PreHeatTemp, PreHeatTmpRnge, PreHeatTmpCtl, PostHeatTemp, PostHeatTmpRnge, PostHeatTmpCtl, WorkAreaTemp, WorkAreaTmpRnge, WorkAreaTmpCtl. |
| OFFLINE | Added IGant, obsoleted Gantry. |
| PASSWORDS | Changed p19 to class restrictions: p19->ClassSel |
| PIDCFG | Added IGant, obsoleted Gantry. |
| PROGCAL | Added IGant, obsoleted Gantry. |

| | |
|---|---|
| PROGDETAIL | Added IGant, obsoleted Gantry. Added SnapOffVel, SnapOffAccel, PreSnapDelay, dlAccel. |
| PROGRAMS | Move all fixed subboard info into PROGRAMS: ProbeSuppress, Fid*, Bdmk*, *Count, *Space all prefixed with "s".<br>Added RecType=-1 normally: record type for default. Added PointSearch, SkpBdNoFid. |
| RETENTION | Added IGant, obsoleted Gantry. |
| SHAPEDETAIL | Added IGant, obsoleted Gantry. Added SnapOffVel, SnapOffAccel, PreSnapDelay, dlAccel. |
| SHAPES | Added RecType=-1 normally: record type for default |
| SPECIALLOCS | Added IGant, obsoleted Gantry. |
| UNIVERSALS | Added IGant, obsoleted Gantry. |

**Version 1.10 dated 02/01/02**

Updated to **version 1.9** of the FLOware® software.
All instances of auger valve changed to LX Auger valve.
All instances of micro dot changed to Micro-Dot valve.

| | |
|---|---|
| Pages 2,5,6 | Add @VCLASS, @PIDCFG, and @VARIATION. |
| MOUNT | Obsolete Gauge. Add NeedleID, CalibSB, CMaxPix, CMiniPix, CDotArea, CDotVol, ccMaxPix, ccMinPix, ccDotArea, ccDotVol, DotMaxPix, DotMinPix, DotDotArea, DotDotVol, and DotdlValve. Remove SkpStandoff. |
| PROGCAL | Add CALfA, CALfB, CALfC, CALfD, CALra, CALrb, CALrc, CALrd, and Discriminant. |
| DETAIL | Add Enabled, PSType, PSTypeAlt, TradeX, TradeY, TrackStartZ, TrackEndZ, TrackVel, ValveSpeed, dlSB, CameraSelect, Gain, CamOffset, FlagNumber, FlagValue, Retries, SkipLines, MessageNumber, HeadPressure, BlobCount, ZTestMin, ZTestMax, Optime, and BlowOff. |
| SHAPEDET | Add Enabled, PSType, PSTypeAlt, TrackNeedle, TradeX, TradeY, TrackStartZ, TrackEndZ, TrackVel, ValveSpeed, dlSB, CameraSelect, Gain, CamOffset, FlagNumber, FlagValue, Retries, SkipLines, MessageNumber, HeadPressure, BlobCount, ZTestMin, ZTestMax, Optime, and BlowOff. Change Backtrack to TrackNeedle. Update definitions for Focus, FStop, Zoom, LColor, LightLev, and dlValve. |
| HEAD | Add Cartridge and MV50/400 to HeadType. Add SkipStandoff, MicroSB, Zoffset, RetractSense, ExtraSense, Jaws, JawSense, HoldTime, HoldCenter, OpenTime, and OpenCenter. Remove Offset from definition for XOffset, YOffset, and Zoffset. |
| MATERIAL | Add NeedleID, CalibSteps, CalibSB, CMaxPix, CMiniPix, CDotArea, CDotVol, ccMaxPix, ccMinPix, ccDotArea, ccDotVol, DotMaxPix, DotMinPix, DotDotArea, DotDotVol, and DotdlValve. |

| | |
|---|---|
| DOTS | Obsolete Gauge. Add NeedleID, CalibSteps, CalibSB, CMaxPix, CMiniPix, CDotArea, CDotVol, ccMaxPix, ccMinPix, ccDotArea, ccDotVol, DotMaxPix, DotMinPix, DotDotArea, DotDotVol, and DotdlValve. |
| CROSSREF | Add XrefType. |
| NOTE | Change Login to LoginNm. |
| GENDFLT | Obsolete Gauge. Add NeedleID, CalibSteps, CalibSB, CMaxPix, CMiniPix, CDotArea, CDotVol, ccMaxPix, ccMinPix, ccDotArea, ccDotVol, DotMaxPix, DotMinPix, DotDotArea, DotDotVol, DotdlValve, and StdAcc. |
| DFLTVAL | Remove DEFINECHIP, FILLCHIP, and FILLETCHIP. Add Enabled, PSType, PSTypeAlt, TradeX, TradeY, TrackStartZ, TrackEndZ, TrackVel, ValveSpeed, dlSB, CameraSelect, Gain, CamOffset, FlagNumber, FlagValue, Retries, SkipLines, MessageNumber, HeadPressure, BlobCount, ZTestMin, ZTestMax, Optime, and BlowOff. Change Backtrack to TrackNeedle. |
| SUBTYPE | Add 19 to Operate. |
| PASSWORD | Change Login to LoginNm. Add PassType. |
| NEEDLE | Update introductory paragraph. Obsolete Gauge. Add NeedleID, NeedleCode, NeedleLength, NeedleDescr, and NeedleStyle. |
| VISION | Add AreaEdge, Accuracy, and Coarseness. |
| MGMTINFO | Obsolete Gauge1-5. Add NeedleID1-5. |
| FIXLOC | Add FixCode, OperateDelay, OperateTime, BdmkX, BdmkY, BdmkName, BdmkUsed, BdmkFlag, and FixDescr. |
| VARIATION | Add VarType. Change Variations to VarList. |
| SCRATCH | New. |

**Version 1.9 dated 05/18/01**

Updated to **version 1.9** of the FLOware® software.

| | |
|---|---|
| PROGRAM | Change ScanFirst definition. Add PreHeatTemp, PostHeat, and WorkArea definitions. Add PreScanProbe, PreScanVision, and VarName. |
| MOUNT | Add CLColor, CLightLev, ccLColor, ccLightLev, DotLColor, DotLightLev, and DotOnChip. Relocate PreHeatTemp, PostHeat, and WorkArea definitions to PROGRAM. |
| PROGDET | Add FillSpaceMM, Backtrack, Focus, Zoom, Fstop, LColor, LightLev, and dlValve. |
| SHAPEDET | Change ScanFirst definition. Add PreHeatTemp, PostHeat, and WorkArea definitions. Add PreScanProbe, PreScanVision, and VarName. |
| HEAD | Add MicroSpeed. |
| MATERIAL | Add CLColor, CLightLev, ccLColor, ccLightLev, DotLColor, DotLightLev, and DotOnChip. |

| | |
|---|---|
| GENDFLT | Add CLColor, CLightLev, ccLColor, ccLightLev, DotLColor, DotLightLev, and DotOnChip. |
| DFLTVAL | Add FillSpaceMM, Backtrack, Focus, Zoom, Fstop, LColor, LightLev, and dlValve. |
| SPECLOC | Add ParkX, ParkY, and ParkZ.<br>Change definition for PurgeCup and add PurgeCup2 and PurgeCup3.<br>Change definition for Scale and add Scale2 and Scale3. |
| VISION | Add VisionClass, Zoom, LColor, and LightLev. |
| BASEINFO | Add OPMode1 and OPMode2. |
| Page 66 | Add @FORMAT, @VCLASS and update introductory sentence. |
| UNIVERSAL | Change CaliperInc to BullsEyeShape.<br>Delete UpFlag. |
| FIXLOC | Add for 1, 2, and 3 heads: Fid, FidnName, FidnUsed, and FidFlag. |
| ERRLOG | Add LogLevel, LogClass, BdCount, SubBdCount, MountLoc, and IVAL.<br>Add Val. |
| PIDCFG | Change ReadID and CtlID from REQUIRED to Optional.<br>Change PIDName from Optional to REQUIRED.<br>Add SetPoint, SetRange, OpCtl, and ReadCtl. |
| VARIATION | Add. |
| ViEWS | Change all fields listed to capital letters.<br>Add UVC. |

## Version 1.8 dated 11/20/00

Updated to **version 1.8b** of the dispenser control software.

| | |
|---|---|
| Page 2 | Add "position [angle] is counterclockwise." |
| Page 13 | Change "fiducial" to "badmark" in definition for BdmkUsed.<br>Modify definition for AlignUsed. |
| BOARD MOUNT | Remove "future versions will allow selection or rejection of lines..." from FeatureID. |
| MOUNT | Expand definition of AirPressure.<br>Expand definition of DotsWarn.<br>Delete UseTempCtl. |
| PROGCAL | Add 10 Air Drill, 11 Variable Speed Auger, and 12 Micro Dot Auger to Hd1type through Hd5type. |
| DETAIL | Add "Typically, this is a board location..." to FeatureID.<br>Delete PrintScaleValues and ScaleMultDots.<br>Update FillWid definition. |
| SHAPEDET | Change number of levels in OpType from 8 to 14 levels.<br>Update FillWid definition.<br>Add "Typically, this is a board location..." to FeatureID. |
| HEAD | Add 12 Micro Dot Auger to HeadType. |
| MATERIAL | Delete UseTempCtl. |
| GENDFLT | Delete LevDetect.<br>Delete InspectDelay. |
| SPECLOC | Add CleanNdl6X, CleanNdl6Y, and CleanNdl6Z. |

| | |
|---|---|
| SUBTYPE | Add to Operate: 17 Adjust lens and 18 Seat using a pressure foot.<br>Add to Rectangle: 2 Center, spiral out; 3 Lower left corner, spiral out; 4 Center, spiral in; and 5 Lower left corner, spiral in. |
| MFMTINFO | Delete "Values are accumulated only..." from DotCount1 through DotCount5.<br>Delete "Values are accumulated only..." from ValveTime1 through ValveTime5. |
| BASEINFO | Add "Superseded by Permanent Information..." to DBVer.<br>Add "Superseded by Permanent Information..." to SWVer. |
| UNIVERSAL | Add definitions.<br>Delete FlasherRate, ExitStation, and LiftDownSense.<br>Add AlwaysLoadMixer, NeedleCleanType, TestTempRdy, IdlePurgeTime, PostPurgeDelay, VacReleaseDelay, EntryDwell, and ExitDwell. |
| ERRLOG7 | Add ErrTarget. |

## Version 1.7 dated 09/14/00

| | |
|---|---|
| UNIVERSAL | Change "StaleCalibration" unit of measure from "(sec)" to "(min)". |

## Version 1.7 dated 08/25/00

Updated to **version 1.8a** of the dispenser control software.

| | |
|---|---|
| PROGRAM | Add PrintScaleValues, ScaleMultDots. |
| MOUNT | Add AirPressureCtl, AirPressureMan.<br>Change integer value from 1-1000 to 0-255, and add "A value of −1 disables change." for CGain, COffset, ccGain, ccOffset, DotGain, DotOffset.<br>Change "Value" to "Relative value (0.0 to 1.0)" for CFocus, CFStop, ccFocus, ccFStop, DotFocus, DotFStop.<br>Add CZoom, ccZoom, ccTuning, DotZoom.<br>Add "fiducial and" to DotGain.<br>Delete "(1-1000)" from CTuning.<br>Add MatlTempRnge, MatlTempCtl, NeedleTempRnge, NeedleTempCtl, PreheatTempRnge, PreheatTempCtl, PostheatTempRnge, PostheatTempCtl, WorkAreaTempRnge, WorkAreaTempCtl, plus add "Range is a temperature...to be used." to definition for all these. |
| HEAD | Add Ramp. |
| MATERIAL | Add AirPressureCtl, AirPressureMan, CZoom, ccZoom, ccTuning, DotZoom, and MatlTempRnge, MatlTempCtl, NeedleTempRnge, NeedleTempCtl, PreheatTempRnge, PreheatTempCtl, PostheatTempRnge, PostheatTempCtl, WorkAreaTempRnge, WorkAreaTempCtl. |

GENDFLT          Add AirPressureCtl, AirPressureMan, CZoom, ccZoom, ccTuning, DotZoom, and MatlTempRnge, MatlTempCtl, NeedleTempRnge, NeedleTempCtl, PreheatTempRnge, PreheatTempCtl, PostheatTempRnge, PostheatTempCtl, WorkAreaTempRnge, WorkAreaTempCtl. Delete UseTempCtl.

PERMANENT    Add.

OFFLINE        Add LastCalib, SuppressCalib.

PIDCFG         Add.

VIEWS           Add.

## Version 1.6 dated 04/07/00

Updates and corrections to Subtypes section of System Table Definitions.

SUBTYPE, SubTypeCode:

| | |
|---|---|
| Calibrate | 2 and 3 - Not currently functional. |
| Operate | 0 and 2 - Obsolete. |
| | 14, 15, and 16 - New. |
| Rectangle | 0 - Locate by center. |
| | 1 - Locate by lower left corner. |

## Version 1.5 dated 02/23/00

Updated to **version 1.8** of the dispenser control software. Section tab label added in right margin of all odd pages.

PROGRAM       Add ScanFirst, FidFlag.

BOARD          Change BdmkUsed definition from "...fiducial is used." to "...bad mark is used."

MOUNT          Add ShutOffTIme, ScaleRecal, UseTempCtl, MatlTemp, NeedleTemp, PreHeatTemp, PostHeatTemp, WorkAreaTemp, and PastMatlLimit.

DETAIL          Add Theta, PrintScaleValues.

SHAPE          Add BdmkX, BdmkY, BdmkName, BdmkUsed, BdmkFlag.

SHAPEDET      Add Theta.

HEAD           Add Air Drill and Variable Speed Auger to HeadType. Change Speed1 to HeadVacuum; Speed2 to MixerSpeed; and delete "speed" from MixerSpeed definition Add ReloadSpeed, SeatPressure, AugerSpeed, StallAmps, KeepHeadStatus, and Yoffset.

MATERIAL      Add ShutOffTime, ScaleRecal, UseTempCtl, MatlTemp, NeedleTemp, PreHeatTemp, PostHeatTemp, WorkAreaTemp, and PastMatlLimit.

GENDFLT        Add ShutOffTime, ScaleRecal, UseTempCtl, MatlTemp, NeedleTemp, PreHeatTemp, PostHeatTemp, WorkAreaTemp, and PastMatlLimit.

DFLTVAL        Add Theta.

PECLOC         Add TargetZ. Change CleanNdl2X, Y, and Z definition from "camera at the end..." to "camera at the second point..." Add CleanNdl3X, Y, and Z; CleanNdl4X, Y, and Z; and CleanNdl5X, Y, and Z. Add CamCal1Z; CamCal2Z; OriginZ; Hd1LocZ; Hd2LocZ; Hd3LocZ; Hd4LocZ; and Hd5LocZ; StampWellX, Y, and Z; FixCameraX, Y, and Z; and Camera2X, Y, and Z.

UNIVERSAL    Add LogFlags, RetainDays, MapOn, WhiteDot, XDots, YDots, MapArea, BackupDays, BackupNudge, ScalePreSettle, NeedleClnInc., NeedleClnMax, ResetCalibWt, ScalePrime, ScalePostSettle, ModifyLogin, ModifyDayTime, and UpFlag.

RETENTION    Add B0 and B1.

## Version 1.4 dated 07/28/99

Updated to **version 1.7** of the dispenser control software.

BASEINFO      Add LastBackup, LastInfo

DEFAULTGEN   Add f-stop & focus for HeadCal, CameraCal, Finding, CalibDot. Add post-turn-off delay for drippy fills. Add PartCountScaleLimit, PurgeTime, MaxScaleAdj. MaxScaleRetryCt. Add SnapOffZ. Delete LevDetect.

HEADS          Add X,Y offsets for standoff needles; ShutOff flag.

MATERIALS     Add f-stop & focus for HeadCal, CameraCal, Finding, CalibDot. Add post-turn-off delay for drippy fills. Add suppress scale option. Add PartCountScaleLimit, PurgeTime, MaxScaleAdj, MaxScaleRetryCt. Add SnapOffZ.

MOUNTS        Remove LevDetect from DB, retain in structure. Add f-stop & focus for HeadCal, CameraCal, Finding, CalibDot. Add post-turn-off delay for drippy fills. Add PartCountScaleLimit, PurgeTime, MaxScaleAdj, MaxScaleRetryCt. Multiple ValveOnTimes for scale, Update times from prog flag. Add SnapOffZ.

PASSWORDS   RunHomeBack --> RunHome, p17 --> BackupDsp. New ModTables, copy ConfigTables to ModTables. Change "Engineer" to "GPD Engineer;" enable shell for Engineer. Add Align, TouchSpan Used flags, FidFlag for 2 Fids, no stretch. Add scan-first option, part of operator mounts.

SPECIALLOCS  Add second needle cleaner point, NearHome. Add reject station, Fill stn.

ERRLOG        Add new table to log errors, other events (e.g., weight calib).

OFFLINE        Add new table for off-line scale, purge, syringe fill.

UNIVERSAL    Add new table for customer-modifiable options.

**Version 1.3 dated 01/18/99**

Updated to **version 1.6** of the dispenser control software.

| | |
|---|---|
| AirMinTime | New. |
| BdsPerMag | New. |
| MagPitch | New. |
| Base2Slot1 | New. |
| BlobRatio | New. |
| CameraSelect | New. |
| Focus | New. |
| FStop | New. |
| Hd1LocZ | "Z" added to field name. |
| Hd2LocZ | |
| Hd3LocZ | |
| Hd4LocZ | |
| Hd5LocZ | |
| Hd1type | Additional head type added: |
| Hd2type | DRIP_LESS (auger valve) |
| Hd3type | |
| Hd4type | |
| Hd5type | |
| InspectDelay | Added to General Defaults listing. |
| UFlag | New. |
| LotType | New. |
| LotInfo | New. |
| LowGray | New. |
| High Gray | |
| MinArea | New. |
| MaxArea | New. |
| NumBlobs | New. |
| PASSWORD | Unused password options are now designated as p17 -p24. |
| RefreshX | New. |
| RefreshY | |
| RefreshZ | |
| ScaleX | New. |
| ScaleY | |
| ScaleZ | |

**Version 1.1 dated 01/15/98**

Updated to **version 1.4** of the dispenser control software.

| | |
|---|---|
| Fid1X | Required; no longer optional. |
| Fid1Y | Required; no longer optional. |
| Fid2X | Required; no longer optional. |
| Fid2Y | Required; no longer optional. |
| Fid3X | Required; no longer optional. |
| Fid3Y | Required; no longer optional. |
| Fid1Used | New. |
| Fid2Used | New. |
| Fid3Used | New. |
| BdmkUsed | New. |
| OperInstr | New. |
| SettleZ | This field added to Program Detail & Shape Detail; to be removed elsewhere. |
| AutoClean | New. CalibManual   New. |
| StandOffCalX | New. |
| StandOffCalY | New. |
| StandOffCalZ | New. |
| CGain | New. |
| COffset | New. |
| CTuning | New. |
| CLightOnDark | New. |
| ccGain | New. |
| ccOffset | New. |
| DotGain | New. |
| DotOffset | New. |
| DotTuning | New. |

| | |
|---|---|
| ShutOff | New. |
| SkipStandoff | New. |
| SkipScale | New. |
| TouchPadX | Added: "The Z coordinate should be |
| TouchPadY | taught with the piggyback down and |
| TouchPadZ | the probe just activated. |
| SQL Footnote | Add to manual's opening title. |
| Metric Note | Add to manual's Format & Data Files guidelines and Sample Data File. |
| MatIID, MatIInfo | Alter font in manual so capital "L" and "i" easily distinguished. |

**Version 1.2 dated 04/15/98**

Updated to **version 1.5** of the dispenser control software.
FORMAT,  RETENTION

| | |
|---|---|
| | New. |
| RETENTION | New. |
| Fid1XA | No longer used. |
| Fid1YA | No longer used. |
| Fid2XA | No longer used. |
| Fid2YA | No longer used. |
| Fid3XA | No longer used. |
| Fid3YA | No longer used. |
| Gantry | Now frequently used field. |
| Feature ID | Now frequently used field. |
| Login | Now LoginNm. |
| SubTypeCode | New 'Delay' selections 3 and 4. New 'Operate' selections 9 through 13. New 'Setup' selections 2 through 5. |
| MessageNo | New note: "When taking a picture...allow faster operation." |
| SWVer | Now 24 character field. First 3 characters must be = to DBVer. |
| Chip Index | New. |

FORMAT, TRANSFER

| | |
|---|---|
| | New. |
| DotLightOnDark | New. |
| Spec1X | Now defined; location of calibration scale, if any. |
| Spec1Y | Now defined; location of calibration scale, if any. |
| Spec1Z | Now defined; location of calibration scale, if any. |
| WtDotCount | New. |
| WtValue | New. |
| WtTolerance | New. |
| WtSettle | New. |
| WtOnTime | New. |
| FeatureId | Now works for program and shape detail. |
| ShapeType | Additional type codes added: DEFINECHIP, FILLCHIP, FILLETCHIP |
| SubTypeCode | New "Calibrate" subtype codes. Additional "Operate" subtypes codes added.  New "Shape" subtype codes. |
| Xname | New. |
| CalibrateSys | New. |
| ModelSize | Deleted. |
| CameraTuning | New. |
| LightonDark | New. |

# WARNING - Important Changes

**RECOMMENDATION**:  It is strongly recommended that your software be upgraded to version 2.4 and a complete export performed.  Read the following for an explanation of the reasoning behind this recommendation.

**CHANGES BETWEEN VERSIONS 1.9 AND 2.4**  Because of the changes discussed below, data exported from FLOware™ version 1.9 or below cannot be imported correctly in versions 2.0 and above unless the export file is edited manually.  Additional changes in versions 2.1,  2.2, and 2.4 preclude importing data exported at version 2.0 and below for similar reasons.  However, if the software is updated normally, the field changes are updated correctly.  *It is possible to import and export directly between versions 2.2 and 2.3 but not from 2.3 to 2.4.  Therefore, it is strongly recommended that your software be upgraded to version 2.4 and a complete export performed to provide a new base for exported data.*

Many changes in data base structure occurred between version 1.9 and version 2.4.  As a result, exported data from lower versions will not convey all data to version 2.4.  The most significant changes are:

> The character field "Gantry" is obsolete, replaced by the integer field "IGant".  "Gantry" will be a required field for import until version 2.2, when it will be replaced by "IGant".  Exports at version 2.0 and above should include the field "IGANT".

> The field "Gauge" is removed, replaced by the field "NeedleID".

> In version 1.9 and below many program detail fields served multiple purposes due to lack of space to display the data.  In version 2.0 these fields have been split into distinct fields for more effective operation.

> In version 1.9 and below subboard fields defining fiducials and bad marks were duplicated for each subboard, potentially creating out-of-sync conditions.  These fields have been moved to the Program table in version 2.0.

> For better data handling several tables have a new field "RecType" added to distinguish defaults and other types of data from each other.   Additional record type fields were added at version 2.1.

> At the request of several customers, some fields were moved from the Mounts table to the Program Detail table.  The fields were added back to the Mounts table in version 2.1 with an option to select which table is to be used for these fields.

> The Mounts, Materials, and General Defaults tables have had fields added as needed to synchronize these tables.  No fields are removed and new fields added for this purpose are ignored.

> In version 2.2, many fields were moved from one table to another and other fields were renamed.  In version 2.4, additional fields were moved and fields renamed.  Several tables no longer exist in version 2.4.

# Import/Export Data[1] Reference Guide

This document discusses data conversion from one machine to another (e.g., from a pick-and-place unit to a dispenser unit). The dispenser's import files are designed to be as flexible as possible. This allows you to create dispensing data easily from pick-and-place, or other mechanical data, or even create programs manually.

Dispensing program data, created offline in a GPD defined "generic" format, need only:
*   be in a generalized comma-delimited form,
*   contain only data significant to the operation, and
*   allow all other data to default. The defaults do not even need to be included with the data. They can be supplied after the data is imported, and dispensing can be tuned to perfection after a trial run.

(Export and import of data for the dispensers are handled by the modules exportX and importX (dbexport and dbimport are older modules). These functions each use two files:

FORMAT FILE     describes the names and the order of data fields.
DATA FILE       contains the actual import/export data.)

## Exporting Data

All exported files, including format files, have the same form. This form is a generalized version of comma-delimited files commonly used for data base and spreadsheet data transfers. When data is exported, the **format file** determines which fields are exported from the data base and the order in which the fields appear. The default file name of "exform" is created at Export and contains this data.

Unless suppressed, the formats are copied to the beginning of the exported data file, making correct formats available when importing the data. If a format file is specified, that file is used; otherwise, the file "exform" is used.

If the format file does not exist, it is created to export all data base fields.

## Importing Data

When data is imported, the specified format file (or "exform" if none is specified) is read, or is created as above if it does not exist. This file is used to describe the **data files** until format descriptions appear in the data.

Formats can appear in the data file before any data or between programs or shapes. Formats in the data override former formats, allowing a single data file to contain programs and shapes created with different formats or from different sources.

[1] Please refer to an SQL manual as reference for the information contained in this document.

# Format & Data Files

Format and data files both use a comma-delimited form which encompasses standard output formats available from most spreadsheets and data bases.


## Guidelines & Restrictions

> **NOTE**:  All values are metric units (mm).  All angles are radians; "positive" is counterclockwise; 0 degrees is along the positive X axis.


*   Format and data files appear in a generalized "comma-delimited" form.

*   Fields are delineated with commas, i.e. Individual items (fields) in the line are separated by commas and must appear in the proper order.

*   Each line (record) describes a single entity (the format for a single type of record, or a single data record) and is ended with a newline (or End-of-file for the final record).  As in most UNIX-like systems, a newline is a line feed character.

*   Carriage return bytes are ignored in all cases.

*   Any data item can be enclosed in quotes (double quotes) or apostrophes (single quotes).

*   Numeric values may be enclosed in quotes or apostrophes, but this is not required.

*   Text with embedded newlines, commas, or blanks must be enclosed in quotes or apostrophes.

*   Text with embedded apostrophes must be enclosed in quotes.

*   Text with embedded quotes must be enclosed in apostrophes or, as an alternative,  may be enclosed in quotes with the embedded quotes doubled.

*   If none of these characters (newlines, commas, apostrophes, quotes) are embedded and leading blanks are not significant, quoting is optional.


**Suggestion**:  If import files are created by the user, it is recommended that no numeric items be enclosed in quotes or apostrophes and that all text items (except items starting with "@") be enclosed in quotes for compatibility with other software.

# *Format File Records*

Format files and format specifications within a program consist of @FORMAT records with specific first and second fields, followed by a list of field names for the corresponding data records:

| | |
|---|---|
| @FORMAT, @PROGRAM, ... | Format for ensuing @PROGRAM records |
| @FORMAT, @BOARD, ... | Format for ensuing @BOARD records |
| @FORMAT, @MOUNT, ... | Format for ensuing @MOUNT records |
| @FORMAT, @TWEAKS, ... | Format for ensuing @TWEAKS records |
| @FORMAT, @VARIATION, ... | Format for ensuing @VARIATION records |
| @FORMAT, @PROGCAL, ... | Format for ensuing @PROGCAL records |
| @FORMAT, @DETAIL, ... | Format for ensuing @DETAIL records |
| | |
| @FORMAT, @SHAPE, ... | Format for ensuing @SHAPE records |
| @FORMAT, @SHAPEDET, ... | Format for ensuing @SHAPEDET records |
| | |
| @FORMAT, @HEAD, ... | Format for ensuing @HEAD records |
| @FORMAT, @MATERIAL, ... | Format for ensuing @MATERIAL records |
| @FORMAT, @DOTMAT, ... | Format for ensuing @DOTMAT records |
| @FORMAT, @CROSSREF, ... | Format for ensuing @CROSSREF records |
| @FORMAT, @NOTE, ... | Format for ensuing @NOTE records |
| | |
| @FORMAT, @GENDFLT, ... | Format for ensuing @GENDFLT records |
| @FORMAT, @SPECLOC, ... | Format for ensuing @SPECLOC records |
| @FORMAT, @SUBTYPE, ... | Format for ensuing @SUBTYPE records |
| @FORMAT, @PASSWORD, ... | Format for ensuing @PASSWORD records |
| @FORMAT, @NEEDLE, ... | Format for ensuing @NEEDLE records |
| @FORMAT, @VISION, ... | Format for ensuing @VISION records |
| @FORMAT, @MGMTINFO, ... | Format for ensuing @MGMTINFO records |
| @FORMAT, @BASEINFO, ... | Format for ensuing @BASEINFO records |
| @FORMAT, @FIXLOC, ... | Format for ensuing @FIXLOC records |
| @FORMAT, @PCLASS, ... | Format for ensuing @PCLASS records |
| @FORMAT, @SCLASS, ... | Format for ensuing @SCLASS records |
| @FORMAT, @VCLASS, ... | Format for ensuing @VCLASS records |
| @FORMAT, @RETENTION, ... | Format for ensuing @RETENTION records |
| @FORMAT, @ERRLOG, ... | Format for ensuing @ERRLOG records |
| @FORMAT, @UNIVERSAL, ... | Format for ensuing @UNIVERSAL records |
| @FORMAT, @OFFLINE, ... | Format for ensuing @OFFLINE records |
| @FORMAT, @PIDCFG, ... | Format for ensuing @PIDCFG records |

The formats can describe extraneous fields appearing in the data but not used by the import. Such a field is described by any name not appearing in the lists below. On export, these fields are exported as null fields. On import, they are ignored, but they must have the proper (comma-delimited) form.

**Guidelines & Restrictions**

•       Only the names used by the data are needed; all other values will default appropriately in the data base.

•       Any database columns in a format record can be named in any order, but the primary field names (listed on page 6) must appear somewhere in the record for import (with the exception described below) since they are required to enter the data.

     **Exception**: The detail records @SHAPEDET and @DETAIL may contain the field PartNo in lieu of or in addition to the OpType field provided appropriate data is available in the CROSSREF file. If the PartNo field is present but the OpCode field is not (i.e., the OpCode is not on the @FORMAT, or the OpCode data field is void), the OpCode is obtained from the CROSSREF entry corresponding to the PartNo.  If the OpCode field is present on both the @FORMAT and data records, the given value is used and the CROSSREF table is not referenced.

•       In addition to the field names from the database, any names not part of the database can be used for the name of a field to be ignored.  This is useful for files imported from external sources containing inapplicable fields.

•       No format fields are case sensitive: upper and lower case are not distinguished.

## Data File Records

Each record of a data file, except for detail program and shape records, begins with an "@" symbol followed by a word identifying the type of record as follows:

| | |
|---|---|
| @PROGRAM | **REQUIRED** first record for program data. |
| @BOARD | Optional description of boards on a pallet. |
| @MOUNT | Optional description of tools/valves to be mounted. |
| @TWEAKS | Optional list of tweaked values. |
| @VARIATION | Collections of feature Ids. |
| @PROGCAL | Calibration records. |
| @DETAIL | Program detail records. |
| | |
| @SHAPE | **REQUIRED** first record of a shape. |
| @SHAPEDET | Shape detail records. |
| | |
| @HEAD | Tool/Valve records. |
| @MATERIAL | Material records. |
| @DOTMAT | Dot sizes for materials records. |
| @CROSSREF | Cross reference records. |
| @NOTE | Note records. |
| | |
| @GENDFLT | Material default records. |
| @SPECLOC | Special location records. |
| @SUBTYPE | Subtype records. |
| @PASSWORD | Password records. |
| @NEEDLE | Needle records. |
| @VISION | Vision pattern records. |
| @MGMTINFO | Management information records. |
| @BASEINFO | Base machine records. |
| @FIXLOC | Fixed location records. |
| @PCLASS | Selected Program classes. |
| @SCLASS | Selected Shape classes. |
| @VCLASS | Selected Vision classes. |
| @RETENTION | Data retained across program runs. |
| @ERRLOG | Logged error/information messages. |
| @UNIVERSAL | Universal options. |
| @OFFLINE | Offline operation records. |
| @PIDCFG | PID configurations (e.g., for temperature control) |

Every **program** is introduced by an @PROGRAM record containing, as a minimum, the program name (field name "Program").

Every **shape** is introduced by an @SHAPE record containing, as a minimum, the shape name (field name "Shape").

The entries beyond the first two fields in each @FORMAT record below are the database names of **REQUIRED** fields:

```
@FORMAT, @PROGRAM, ..., Program, ...
@FORMAT, @BOARD, ...
@FORMAT, @MOUNT, ..., Head, IGant,...
@FORMAT, @TWEAKS,  ...
@FORMAT, @VARIATION, ..., VarName,...
@FORMAT, @PROGCAL, ..., IGant,...
@FORMAT, @DETAIL, ..., OpType, ...
@FORMAT, @SHAPE, ..., Shape, ...
@FORMAT, @SHAPEDET, ..., OpType, ...

@FORMAT, @HEAD, ..., Head, ...
@FORMAT, @MATERIAL, ..., MatlID, ...
@FORMAT, @DOTMAT, ..., MatlID, DotSize, NeedleID, ...
@FORMAT, @CROSSREF, ..., OpType, PartNo, ...
@FORMAT, @NOTE, ..., Daytime, LoginNm, ...

@FORMAT, @GENDFLT, ..., IGant, MountLoc, ...
@FORMAT, @SPECLOC, ..., IGant, ...
@FORMAT, @SUBTYPE, ..., OpType, OpSubType, ...
@FORMAT, @PASSWORD, ..., LoginNm, ...  (Password)
@FORMAT, @NEEDLE, ..., NeedleID, ...
@FORMAT, @VISION, ..., Pattern, ...
@FORMAT, @MGMTINFO, ..., Program, ...
@FORMAT, @BASEINFO, ..., IGant, ...
@FORMAT, @FIXLOC, ..., IGant, Location, ...
@FORMAT, @PCLASS, ..., Class, ...
@FORMAT, @SCLASS, ..., Class, ...
@FORMAT, @VCLASS, ..., Class, ...
@FORMAT, @RETENTION, ..., IGant, RType, SType, ...
@FORMAT, @ERRLOG, ..., IGant, ...
@FORMAT, @UNIVERSAL, ..., IGant, ...
@FORMAT, @OFFLINE, ..., IGant, MountLoc,...
@FORMAT, @PIDCFG, ..., IGant, PIDname,...
```

Although the position of data fields must agree with the position of the fields in the corresponding format, the agreement need not be one-to-one to import data.

## Guidelines & Restrictions

•       If a data record has more fields than the @FORMAT, the extra fields are ignored, allowing comments on a data line beyond any defined field.

•       If a data record has fewer fields than the @FORMAT, the missing fields are entered as NULLS and allowed to default to appropriate values.  Since required fields cannot be NULL (they have no defaults), all fields prior to a required field must be present although they can be void (consecutive commas).

- All database fields omitted from the format specification, as well as all empty fields in the data, are entered into the database as NULLs; these fields are therefore defaulted in the standard database manner. Note that even required fields such as OpType can be defaulted with an empty data field.

- Records starting with two "@" symbols are comments; such records may appear anywhere in the data.

## *Program Data Records*

The data records for a program always begin with the record

    @PROGRAM, ..., Program, ...

providing, at a minimum, the program name.

@BOARD and @MOUNT and @TWEAKS and @VARIATION records may follow intermixed in any order. Sequence numbers will be supplied in the order the records appear for @BOARD records; any sequence numbers in the data are ignored. For @MOUNT records, mount locations in the data are used; missing mount locations are supplied.

Detail records are any records with first field not one of the predefined record designators (@FORMAT, @GENDFLT, @PROGRAM, etc.). All records between a @PROGRAM record and the next record with first field one of the predefined designators belong to the program, except that any @TWEAKS, @MOUNT, @BOARD, or @VARIATION records encountered belong to the program. As in the case of other records, detail records are sequenced by position.

### Guidelines & Restrictions

- Detail records follow @PROGRAM records in the order in which they are executed.

- The detail records must contain, as a minimum, the type of operation to be performed (field name "OpType"). As an alternative, detail records can contain a PartNo field; the OpType is then obtained from the CrossRef file.

- The detail records may begin with "@DETAIL", or this identifier may be omitted entirely.

- To be useful, detail records must almost always contain additional fields such as the X and Y coordinates (field names "CoordX" and "CoordY") where the operation is to take place.

## *Shape Data Records*

The data records for a shape always begin with the record

> @SHAPE, ..., Shape, ...

providing at a minimum the shape name.  Otherwise, the shape is like a program except that @BOARD and @MOUNT records cannot be part of the shape.

### Guidelines & Restrictions

•  Detail records follow @SHAPE in the order in which they are executed.

•  The detail records must contain, as a minimum, the type of operation to be performed (field name "OpType").  As an alternative, detail records can contain a PartNo field; the OpType is then obtained from the CrossRef file.

•  The detail records may begin with "@SHAPEDET", or this identifier may be omitted entirely.

•  To be useful, detail records must almost always contain additional fields such as the X and Y coordinates (field names "CoordX" and "CoordY") where the operation is to take place.

## Sample Data File

The following example is a simple data file describing a program producing a single dot and a shape producing a single dot at relative coordinates (1",1").

---

**NOTE**: All values are expected to be in metric units (mm).  Angles are expected to be in radians.

---

```
(1)      @FORMAT,@PROGRAM, Bdx,  Bdy,  Program
(2)      @FORMAT,@DETAIL, OpType, CoordX, CoordY
(3)      @Program, 5.0, 0.5, myprog
(4)      dot,1.3,'2.4'
(5)
(6)      @FORMAT,@SHAPE, shape
(7)      @FORMAT,@SHAPEDET,"optype", zzz, CordX, CoordY
(8)      @SHAPE, "One 1"" Dot"
(9)      dot, abc def ,25.4,25.4
```

Line (1) describes @PROGRAM lines as containing the program name and the location of the reference point.  Note that leading and trailing blanks around "Bdy" are ignored, and that order of the fields need not be the same as data base order: fields can appear in any order.  Even the required "Program" field can appear anywhere provided it is present.

Line (2) describes program detail lines as containing the operation name and the (X,Y) coordinates of the operation.  Note that upper or lower case of the letters in "CoordX" and "CoordY" is not significant.  Note also the absence of @FORMAT,@MOUNT and @FORMAT,@BOARD lines; although they are permitted, they are not needed since there are no @MOUNT or @BOARD lines present.

Line (3) is an @PROGRAM line introducing a program.  The position of the fields agrees with the position of the field names in the corresponding @FORMAT line (1).  Since all measurements are metric, the reference point is 5.0 mm to the left and 0.5 mm above the lower right corner of the board.  Note that @Program is case insensitive; however, the data field "myprog" will appear on the displays in lower case since it is in lower case here.

Line (4) is a program detail line defining a "DOT" operation.  The position of the fields corresponds to the position of the field names in the corresponding @FORMAT line (2).  Note that "dot" is case insensitive and that one numeric field is enclosed in unnecessary apostrophes which do no harm.  (The "@DETAIL" is optional for detail records.)

Line (5) is a blank line.  Blank lines may appear anywhere and are ignored.

Line (6) describes an @SHAPE line as containing only a shape name. Since the appearance of any @FORMAT, @PROGRAM, or @SHAPE line terminates the detail for a program or shape, this line also marks the end of the program "myprog".

Line (7) describes shape detail lines as containing the operation name, an extraneous field (zzz does not appear in the field lists below), and the (X,Y) coordinates of the operation. As before, case of the letters in "optype", "CoordX" and "CoordY" is not significant. "optype" is enclosed in unnecessary quotes which do no harm. If this format line is used for export, the second field of shape detail records will always be void since the data base contains no field by the name "zzz". On import, whatever the second field contains will be ignored.

Line (8) is an @SHAPE line introducing a shape. Since the shape name contains an embedded quote, the name is enclosed in quotes and the embedded quote is doubled. This name could be equally well described by the field

'One 1" Dot'

using apostrophes to enclose the field with an embedded quote.

Line (9) is a shape detail line defining a "DOT" (optype) operation. The position of the fields corresponds to the position of the field names in the corresponding @FORMAT line (7). The second field is "abc def" (zzz) which is ignored per the @FORMAT; although it has an embedded blank, quotes are not needed to delimit this field. An equivalent line to import this data might be

(9) dot,,25.4,25.4

where the second field is void, since it will be ignored. The dot will be placed at coordinates (1",1") relative to the placement of the shape. (The "@DETAIL" is optional for detail records.)

# Programs

The following lists all pertinent information for all format fields at data base/software version 2.9. Additional fields may be added or some fields deleted for future versions, but since new fields can default and unused fields will be ignored, no problems should be created by changes.

## *Sample Program*

The following is a complete program with name "myprog-10".

> @FORMAT, @PROGRAM, program
> @format, @MOUNT, Head, Mountloc, IGant
> @FORMAT, @DETAIL, OpType, @SKIP, CoordX, CoordY
>
> @PROGRAM, myprog-10
> @MOUNT, "ETCH 1", 3, 1
> DOT, zzz, 1.0, 3.5
> dot, "", 2.45,2.45
> DOT,,5.0, 5.0

The format (@format) and the detail (DOT/dot) sections illustrate case-insensitivity, although the program name and any other text fields are entered into the data base in upper & lower case as supplied.

The second field of the detail is ignored, but as the second dot record shows, even ignored fields must have a correct format.

All numeric values are database values; i.e., measurements are metric and angles are in radians.

## *Program Definitions*

The field names for each format record are described in detail below. The first column contains the name of the field as displayed in the editor; the second column is the data base name (i.e., the name used for export/import).

## Program  (Program & Program Defaults)

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@PROGRAM**

Since an @PROGRAM record is required, there is usually a format for it.  Only the Program field is needed.

| Screen Display Name | Data Base Name | Description |
| --- | --- | --- |
| (Program List) | Program | **REQUIRED** text field up to 32 characters long containing the name of the dispenser program. |
| Class | ProgClass | Optional text field up to 12 characters long containing any text.  Used to select a class of program for display.  [Default blank] |
| Version | ProgVer | Optional one character field containing the program version (i.e., the prefix used when attempting to find a matching shape).  [Default blank] |
| Pre-Scan Patterns<br>Pre-Scan Probes | PreScanVision<br>PreScanProbe | Optional character "Y" or "N" indicating whether a complete probe or vision scan is to be performed before the program runs.  [Default "N", "N"] |
| Point Search | PointSearch | Optional character "Y" or "N" indicating limited vision search area.  [Default: "N"] |
| Skip if No Fiducial | SkpBdNoFid | Optional character "Y" or "N" indicating skip board, subboard, or shape if a fiducial is missing rather than stopping for operator intervention.  [Default: "N"] |
| Pause On Bad Mark | PauseOnBdmk | Optional character "Y" or "N" indicating whether bad mark detection pauses for operator intervention.  [Default "N"] |
| Suppress Lifter | LiftSuppress | Optional character "Y" or "N" indicating whether lifter operation is to be suppressed. [Default "N"] |
| Suppress Hold-Down | HoldDnSuppress | Optional character "Y" or "N" indicating whether hold-down vacuum is to be suppressed. [Default "N"] |
| Double Scan | DblScan | Optional character "Y" or "N" indicating whether calibration and fiducial scans are to be performed twice. |
| Test by Shape Name | TestByShapenm | Not yet implemented.  Perform dot tests exclusively for dots in shapes where shapename is flagged for inspection. [Default "N"] |
| Inspect After | InspAfter | Not yet implemented.  Perform dot inspection after all dispensing rather than during dispensing.  [Default "N"] |
| Width<br>Length<br>Thick | BdWid<br>BdLen<br>BdThick | Optional size of the board in mm.  BdWid may be used to set the width of an automatic conveyor; BdLen is used to improve conveyor operations; BdThick may be used to adjust camera calibration.  [Default NULL] |

| | | |
|---|---|---|
| Reference Point | BdX<br>BdY<br>BdZ | Optional position of the reference point of the board (the (0,0) point) from which all other measurements are made. BdX is the distance (mm) from the right edge of the board to the reference point; BdY is the distance (mm) from the bottom of the board to the reference point. [Default 0,0] |
| Description | ProgDescr | Optional text field up to 250 characters long containing any descriptive information. [Default blank] |
| Fiducial 1 X<br>Y<br><br>Fiducial 2 X<br>Y<br><br>Fiducial 3 X<br>Y | Fid1X<br>Fid1Y<br>Fid1Z<br>Fid2X<br>Fid2Y<br>Fid2Z<br>Fid3X<br>Fid3Y<br>Fid3Z | Optional fiducial coordinates (mm) relative to the reference point. Zero, one, two, or three fiducials may be defined as needed. [Default 0] |
| Pattern (Fiducial 1)<br>Pattern (Fiducial 2)<br>Pattern (Fiducial 3) | FidName1<br>FidName2<br>FidName3 | Optional fiducial pattern names up to 24 characters long for use with automatic vision. The name provides reference to the shape of the fiducial. [Default NULL] |
| Used (Fiducial 1)<br>Used (Fiducial 2)<br>Used (Fiducial 3) | FidFlag1<br>FidFlag2<br>FidFlag3 | Optional integer 0 or 1 indicating whether the associated fiducial is used. [Default 0] |
| Touch Span X<br>Y | TouchSpanX<br>TouchSpanY | X and Y spacing for automatic touch probe operation. When the gantry moves beyond these X and Y distances, the touch probe is automatically used to sense board Z coordinate. [Default NULL] |
| Used (Touch Span) | TouchSpanUsed | Optional character "Y" or "N" indicating whether the associated touch span is used. [Default "N"] |
| Bad Mark X<br>Y | Fid4X<br>Fid4Y<br>Fid4Z | Optional bad mark indicator coordinates (mm) relative to the reference point. [Default NULL] |
| Pattern (Bad Mark) | FidName4 | Optional pattern name up to 24 characters long for use with automatic vision. This name provides reference to the shape of a bad mark. [Default NULL] |
| Process if mark ... | FidFlag4 | Optional integer flag to determine how the bad mark is detected and used. A zero value indicates no bad mark indicators. If the value is 1, process if the mark is present; if 2, process if the mark is absent. [Default 0] |
| Alignment Pt 1 X<br>Y<br><br>Alignment Pt 2 X<br>Y | Align1X<br>Align1Y<br>Align1Z<br>Align2X<br>Align2Y<br>Align2Z | Alignment coordinates (mm) relative to the reference point If present, these two points define a horizontal or vertical line on the board to align arrays properly at 0 degrees. If they are used, at least two fiducials should be supplied. [Default NULL] |
| Used (Alignment) | AlignUsed | Optional character "Y" or "N" indicating whether the associated alignment is used. [Default "N"] |

| | | |
|---|---|---|
| Fiducial 1 X | sFid1X | Optional fiducial coordinates (mm) relative to the |
| Fiducial 1 Y | sFid1Y | subboard reference point.  Zero, one, two, or three fiducials |
| | sFid1Z | may be defined as needed.  [Default NULL] |
| Fiducial 2 X | sFid2X | |
| Fiducial 2 Y | sFid2Y | |
| | sFid2Z | |
| Fiducial 3 X | sFid3X | |
| Fiducial 3 Y | sFid3Y | |
| | sFid3Z | |
| Fiducial 1 Pattern | sFidName1 | Optional fiducial subboard pattern names up to 24 charac- |
| Fiducial 2 Pattern | sFidName2 | ters long for use with automatic vision.  This name provides |
| Fiducial 3 Pattern | sFidName3 | reference to the shape of the fiducial.  [Default NULL] |
| Fiducial 1 Used | sFidFlag1 | Optional integer 0 or 1 indicating whether the |
| Fiducial 2 Used | sFidFlag2 | associated subboard fiducial is used.  [Default "N"] |
| Fiducial 3 Used | sFidFlag3 | |
| Bad Mark Location X | sFid4X | Optional bad mark indicator coordinates (mm) relative to the |
| Bad Mark Location Y | sFid4Y | subboard reference point. [Default NULL] |
| | sFid4Z | |
| Bad Mark Location P... | sFidName4 | Optional pattern name up to 24 characters long for use with automatic vision.  This name provides reference to the shape of a subboard bad mark. [Default NULL] |
| Bad Mark Location P... | sFidFlag4 | Optional integer flag to determine how the subboard bad mark is detected and used.  A zero value indicates no bad mark indicators.  [Default 0] |
| Array Dimensions S... | sXCount | Not currently functional, however, values can be entered. |
| Array Dimensions Y | sYCount | For an array of subboards, integer number of array elements in the X and Y directions.  If an array of boards is used, only a single array should be defined. |
| Array Dimensions Co... | sXSpace | Not currently functional, however, values can be entered. |
| Array Dimensions Y | sYSpace | For an array of subboards, space (mm) between array elements in the X and Y directions. |
| Suppress Auto Height... | ProbeSuppress | Optional "Y" or "N" to suppress automatic probe operation on each board.  [Default N] |
| Gain | ccGain | Integer (0-255) camera calibration gain for calibration dot.  A value of –1 disables change. |
| Offset | ccOffset | Integer (0-255) camera calibration offset for calibration dot. A value of –1 disables change. |
| Tuning | ccTuning | Integer camera tuning for calibration dot. |
| Zoom | ccZoom | Relative value (0.0 to 1.0) of focal length for an auto focus camera for calibration dot. |
| Focus | ccFocus | Relative value (0.0 to 1.0) for focusing an auto focus camera for calibration dot. |
| f-stop | ccFStop | Relative value (0.0 to 1.0) of f-stop on an auto focus camera for calibration dot. |

| Light Level | ccLightLev | Integer level of lighting for calibration dot. |
|---|---|---|
| Light On Dark | ccLightOnDark | One character "Y" or "N", unused for mounts. |
| Light Color | ccLColor | Integer code for light color for calibration dot. |
| Max Pixel Count<br>Min Pixel Count | ccMaxPix<br>ccMinPix | Maximum and minimum pixel counts for calibration dot. |
| Dot Volume | ccDotVol | Volume of dot for calibration dot. |
| Pre-Heat Temperature<br>Pre-Heat Range<br>Pre-Heat Heater On<br>Post-Heat Temperature<br>Post-Heat Range<br>Post-Heat Heater On<br>Work Area Temperatur<br>Work Area Range<br>Work Area Heater On | PreHeatTemp<br>PreHeatTmpRnge<br>PreHeatTmpCtl<br>PostHeatTemp<br>PostHeatTmpRnge<br>PostHeatTmpCtl<br>WorkAreaTemp<br>WorkAreaTmpRnge<br>WorkAreaTmpCtl | Temperatures (degrees C) at which the preheat station, post heat station, and work area are to be maintained. "Range" is a temperature range (degrees C) plus or minus adjacent to the specified temperature. Control is a character "Y" or "N" indicating whether temperature control is to be used. |
| Pre-Heat PID<br>Post-Heat PID<br>Work Area PID | PreHeatPIDname<br>PostHeatPIDname<br>WorkAreaPIDname | Names of temperature PID controls at the stations. |
| Bad Mark Count | BdmkCount | If the bad mark count is exceeded, a request to rotate the board is issued. |
| Post Press<br>Post Press Range<br>Post Press Time | PostSeatPress<br>PostPressRnge<br>PostPressTime | Pressure in grams for post-press pressure<br>Range in grams for post-press pressure<br>Time in seconds for post-press pressure |
| Operator Instructions | OperInstr | Optional field up to 2,000 characters long containing instructions to the operator. This material displays when the program runs. |
| Type<br>Category | LotType<br>LotInfo | LotType and LotInfo are optional strings up to 18 characters long preserving the last entries for type and category entered when the software asks for valve/tool mounts. These strings are entered in the Mounts Table display rather than in the Program Editor. |
| - - - - | FidFlag | Optional unused character "Y" or "N". [Default "N"] |
| - - - - | ProgCode | Unused integer code to identify the program. Import creates a new value for this field. |
| - - - - | RecType | Integer code, normally -1. For the unique default this field contains the default record type. |
| - - - - | Validated | Unused one character "Y" or "N" value. [Default "N"] |
| - - - -<br>- - - -<br>- - - -<br>- - - -<br>- - - -<br>- - - - | Fid1XA<br>Fid1YA<br>Fid2XA<br>Fid2YA<br>Fid3XA<br>Fid3YA | Fiducial adjustments (mm). These values are no longer used. |

| - - - - | BdsPerMag | These parameters are values downloaded to a magazine |
|---|---|---|
| - - - - | MagPitch | feeder if such a feeder is attached.  They are the number of |
| - - - - | Base2Slot1 | boards in each magazine, the distance (mm) between slots in the magazine and the distance (mm) from the base of the magazine to the bottom slot. |
| - - - - | ScanFirst | Optional unused character "Y" or "N".  [Default "N"] |
| - - - - | UFlag | These items are used internally.  UFlag indicates the presence of sub-boards and is either "Y" or "N". |
| - - - - | EntryLogin | Log in name used when this program was first entered/last |
| - - - - | ModifyLogin | modified.  [Default UNKNOWN] |
| - - - - | EntryDayTime | Time stamp indicating when this program was first |
| - - - - | ModifyDayTime | entered/last modified.  [Default:  current date and time when imported] |
| - - - - | PrintScaleVals | Optional character "Y" or "N" indicating whether to print scale output directly to an attached printer.  [Default: "N"] |
| - - - - | ScaleMultDots | Count of multiple dots to use when weighing material.  [Default:  0] |
| - - - - | BLightLev | Integer level of lighting for backlight |
| - - - - | BLColor | Integer code for light color for backlight |
| - - - - | BackLight | One character "Y" or "N " for backlight used |
| - - - - | VarName | Optional variation name up to 36 characters long. [Default NULL] |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## Board

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@BOARD**

BOARD records describe boards on a pallet.  If BOARD records are present, all program coordinates are relative to the reference point of the board, not to the reference point of the pallet.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| Name | BdName | Optional name of this board up to 12 characters long. [Default blank] |
| Feature | FeatureID | Currently unused name of a feature, up to 12 characters long.  This field is used to describe the record as part of a discernable feature on the board. |
| X<br>Y<br><br>Angle | BdX<br>BdY<br>BdZ<br>BdAng | **REQUIRED** coordinates (mm) and rotation (radians) of this board relative to the pallet reference point; the pallet is assumed at 0 radians.  [Default (0,0), 0 radians] |
| - - - - | ProgCode | Internal integer code to identify the program.  The value is inherited from the @PROGRAM record. |
| - - - - | SeqNo | Internal integer code to sequence the boards.  Records are re-sequenced automatically as they are encountered. |
| - - - - | BoardFlag | Internal integer indicator used to select items. |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## Mount  (Material, Defaults)

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@MOUNT**

MOUNT records describe tools/valves and material to be mounted.  One record is ultimately required for each tool/valve needed by the dispenser program.

These records can be omitted when importing a program, but tools/valves must be defined before the program will run.  Omission of these records is the recommended procedure:  since tool/valve and material must match table entries, it is usually easier to omit these records and update the program after import.

As of Version 2.2, Mounts, Materials, and General Defaults all have essentially the same form and the same display.  This form is described in detail here with exceptions noted for materials and default records.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| Mount Position | MountLoc | **OPTIONAL for Mounts, REQUIRED for defaults** location (0-4) where this tool/valve is to be mounted.  If this is omitted, the first @MOUNT is automatically assigned 0, the second 1, etc.  This field does not apply to Materials. |
| Material | MatlID | **OPTIONAL for Mounts and Defaults, REQUIRED for Materials** name of the material to dispense, up to 32 characters long.  If present, this name must match the name of a material in the MATERIALS table; if it does not, the program is rejected. |
| Group | MatGroup | Optional group of the material, up to 32 characters long; copied from material. |
| Color | Color | Optional color of the material, up to 12 characters long; copied from material. |
| Needle | NeedleID | Name of the needle used with this valve. |
| Valve/Tool | Head | **REQUIRED for Mounts, OPTIONAL for Materials and Defaults** name of the tool/valve to mount, up to 18 characters long.  This name must match the name of a tool/valve in the HEADS table; if it does not, the program is rejected. |
| Gantry... | IGant | **REQUIRED for Mounts** Integer gantry ID, usually defaulted.  This field does not apply to Materials and Defaults. |
| Description | MatlInfo | Optional text field up to 250 characters long containing any descriptive information. [Default: blank] |
| Pattern Name | Pattern | Pattern name, up to 24 characters long for Defaults.  This field does not apply to Mounts and Materials. |
| Auto Clean | AutoClean | Optional character "Y" or "N" indicating automatic needle cleaning. |

| Manual Calibration | CalibManual | Optional character "Y" or "N" indicating forced manual calibration. |
| Skip Calibration | SkipCalib | One character "Y" or "N" value indicating omission of all calibration for this tool/valve. This field does not apply to Materials.  [Default "N"] |
| Feature ID | FeatureID | Currently unused name of a feature, up to 12 characters long.  This field is used to describe the record as part of a discernable feature on the board.  This field does not apply to Materials and Defaults. |
| Inspect Delay | InspectDelay | Time (ms) to delay for inspection.  This field does not apply to Mounts or Materials. |
| Double Find Dot | Cal2Dot | "Y" to use double inspect to find calibration dot. |

# V A L V E S

| Auger Speed | DotAugerSpeed | Percent of velocity for variable speed auger |
| Auger Idle | SBDead | Total time (ms) the valve is off between dispensing and reverse action. |
| Auger Reverse | SBOn | Total time (ms) the LX Auger valve will run in reverse to suckback material.  This only applies to the LX Auger Valve or other valves with similar control. |
| NCM Close Time | nClose Time | Total time (s) delay; the time between closing and opening a non-contact jetting pump. All fields using the seconds unit change to 4 place values (0.0000 rather than 0.000). |
| NCM Open Time | nOpen Time | Total time (s) the non-contact jetting pump will remain open. This only applies to the NCM5000 pump and other pumps with similar control. All fields using the seconds unit change to 4 place values (0.0000 rather than 0.000). |
| Micro Valve Reverse | MicroSB | Stepper valve suck-back steps |
| Minimum Shut-off | ShutOffTime | Minimum time (ms) elapsed after dispenser stops to operate shutoff on a valve.  This field does not apply to Materials. |
| SnapOff Z | SnapOffZ | Distance (mm) to move the tool/valve up during snap-off action to prevent tailing. |
| Pinch Delay | PinchDelay | Delay (ms) before operating a pinch tube |
| Micro Valve Speed | MicroSpeed | Stepper valve speed |
| Micro Valve Accelera... | MicroAccel | Stepper valve acceleration |

The following four values can be used from Mount or from Program/Shape Detail:

Pre SnapOff Delay     xPreSnapDelay     Time (ms) to delay after dispense but before beginning snap-off.

Post Delay     xPostDelay     Post operation delay (ms).

Snap Off Velocity     xSnapOffVel     Snap-off velocity (mm/sec).

Snap Off Acceleration     xSnapOffAcc     Snap-off acceleration (mm/sec/sec).

# PROCESS

Air Pressure     AirPressure     Value in kPa for the syringe air pressure. Pressure is automatically regulated via the system for MicroMax dispensers, but requires manual adjustment for DS Series dispensers.

Air Control     AirPressureFlg     An optional integer to determine the way air pressure is handled: 0=off, 1=on, 2=Automatic, 3=program control.

Minimum Air Time     AirMinTime     Maintains syringe pressure for this amount of time (ms) after the dispense has completed. This suppresses the constant pressure cycling to the syringe which can affect certain materials.

Purge Time     PurgeTime     Time (ms) to operate the valve for automatic purge.

Standard Acceleration     StdAcc     Acceleration (mm/sec/sec) to move the gantry for any operation with acceleration not otherwise specified. This field does not apply to Materials.

Dispense Pressure     DispensePress     Force (gm) applied to MV valve during dispense.

Idle Pressure     IdlePress     Force (gm) applied to MV valve when idle.

# LIMITS

Operation Limit     DotsWarn     Integer limit for number of operations (dots to dispense or holes to drill) before operator is warned to refresh the material or replace the drill bit. [Default 2000000.00]

On Time Limit     OnTimeWarn     Limit (ms) of total valve on time before operator is warned to refresh the material. [Default 2000000.00]

Idle Limit     PurgeIdle     Limit (ms) of tool/valve idle time before operator is warned of needed material purge. [Default 2000000.00]

Run Time Limit     TotTimeWarn     Limit (ms) of total elapsed time before operator is warned to refresh the material. [Default 2000000.00]

Re-calibrate Oper...     WtDotCount     Integer limit for number of dots to dispense before repeating Calibrate operation. [Default 2000000.00]

| Re-calibrate Board... | WtPartCount | Integer limit for number of boards to process before repeating Calibrate operation. [Default 2000000.00] |
|---|---|---|
| Re-calibrate Time | ScaleRecal | Elapsed time (ms) after which a valve is recalibrated with the scale. This field does not apply to Materials. [Default 2000000.00] |
| Inspection Board Count | InspPartCount | Board count before auto dot inspection. |
| Inspection Max Time | InspTime | Elapsed time before auto dot inspection. |
| Cup Clean Count | CupClnCt | Purge count before cleaning cup. |
| Limit Override | PastMatlLimit | Integer number of boards allowed after low material has been sensed. |
| Material Warning Time | MatlWarn | Time (min) to warn before material expiration. |
| Material Time Limit | MatlTime | Time (min) for material expiration. |

# W E I G H T

| Weighing On Time | WtOnTime<br>WtOnTime1<br>WtOnTime2<br>WtOnTime3<br>WtOnTime4<br>WtOnTime5 | Times (ms) for valve operation to perform a weight calibration. |
|---|---|---|
| Target Weight for O... | WtValue | Amount of material (grams) expected from WtOnTime. |
| Tolerance for Weight | WtTolerance | Tolerance (grams) within which WtValue will not change OnTime and DispVel values. |
| Scale Settle Time | WtSettle | Time (ms) allowed for scale to settle after dispensing. |
| Maximum Scale Adjust | MaxScaleAdj | Maximum percent weight variation allowed before operator notification. |
| Maximum Scale Retry | MaxScaleRetry | Integer limit of number of consecutive re-weighings before operator notification. |
| Multiple Dot Count | - - - - | Not yet implemented. |
| On Times from Pro... | WtOnTimeFrPrg | Not yet implemented. OnTimes obtained from the [uniquely defined] program. One character "Y" to obtain the on times from the first 6 active program lines, "N" to use the on times as they are entered. This field does not apply to Materials or Defaults. |
| Skip Weighing | SkipScale | One character "Y" or "N" value indicating omission of precision weighing for this tool/valve. |
| Scale Jog Z | JogZ | Distance (mm) to jog above scale after dispensing |

# C A L I B R A T I O N   D O T

| | | |
|---|---|---|
| On Time | CalibOn | Total time (ms) a valve is on to dispense a dot during calibration. |
| Approach Velocity | CAppVel | Velocity (mm/sec) of motion from SettleZ (where the gantry settles before calibration) to CStartZ (the Z location where dispensing or other operation takes place) during calibration. |
| Valve Prime | CValveOn | Time (ms) to start valve operation before reaching CStartZ (the Z location where dispensing or other operation takes place) during calibration; this is used to prime a valve. |
| Start Z | CStartZ | Distance (mm) above the board where dispensing or other operation is to take place during calibration; negative to drill into a drill pad. |
| SnapOff Z | CSnapZ | Height above Start Z to which the dispenser moves after a dispense is complete.  Used to help avoid material tailing. |
| Move Velocity | CMoveVel | Velocity (mm/sec) to move the gantry during calibration operations. |
| Dot on Chip | DotOnChip | One character "Y" or "N" value indicating whether a material dot is to be placed on the chip station rather than on the paper. [Default "N"] |
| Settle Z | SettleZ | Distance (mm) above StartZ (the Z location where dispensing or other operation takes place) where the gantry settles before the move to StartZ. |
| SnapOff Velocity | SnapOffVel | Velocity (mm/sec) of motion during snap-off action to prevent tailing. |
| SnapOff Acceleration | SnapOffAcc | Acceleration (mm/sec/sec) of motion during snap-off action to prevent tailing. |
| Post Delay | PostDelay | Delay time (ms) after the tool/valve has turned off and reached the SnapOffHeight.  Used to assist in material-to-needle separation for stringy materials. |
| Micro Valve Steps | CalibSteps | Number of steps for a Micro-Dot valve to dispense a calibration dot. |
| MicroValve Speed | DotMicroSpeed | Steps for a Micro-Dot valve. |
| Micro Valve Reverse | CalibSB | Number of reverse steps for a Micro-Dot valve to perform suck-back action. |
| End Z | CalEndZ | End Z distance for calibration dot |
| Pre Snap Delay | CPreSnapDelay | Time (ms) to delay after calibration dispense but before beginning calibration snap-off. |

# X Y   C A L I B R A T I O N

| Gain | CGain | Integer (0-255) camera gain for dispensed or drilled dot calibration. A value of –1 disables change. |
| --- | --- | --- |
| Offset | COffset | Integer (0-255) camera offset for dispensed or drilled dot calibration. A value of –1 disables change. |
| Tuning | CTuning | Integer camera tuning for dispensed or drilled dot calibration. |
| Zoom | CZoom | Relative value (0.0 to 1.0) of focal length for an auto focus camera for dispense or drilled dot calibration. |
| Focus | CFocus | Relative value (0.0 to 1.0) for focusing an auto focus camera for dispensed or drilled dot calibration. |
| F-stop | CFStop | Relative value (0.0 to 1.0) of f-stop on an auto focus camera for dispense or drilled dot calibration. |
| Light Level | CLightLev | Integer level of lighting for dot calibration. |
| Light on Dark | ClightOnDark | One character "Y" or "N" indicating light dot on dark background for dot calibration. |
| Light Color | CLColor | Integer code for light color for dot calibration. |
| Max Pixel Count<br>Min Pixel Count | CMaxPix<br>CMinPix | Maximum and minimum pixel counts for dispensed or drilled dot calibration. |
| Dot Volume | CDotVol | Volume of dot for dispensed dot calibration. |
| Backlight | CBacklight | Character "Y" or "N" to use backlit chip/paper to find a calibration dot |

# O B S E R V A T I O N

| Gain | DotGain | Integer (0-255) camera gain for fiducial and dot inspection on the board. A value of –1 disables change. |
| --- | --- | --- |
| Offset | DotOffset | Integer (0-255) camera offset for dot inspection on the board. A value of –1 disables change. |
| Tuning | DotTuning | Integer (1-1000) camera tuning for dot inspection on the board. |
| Zoom | DotZoom | Relative value (0.0 to 1.0) of focal length for an auto focus camera for dot/fiducial inspection. |
| Focus | DotFocus | Relative value (0.0 to 1.0) for focusing an auto focus camera for dot inspection on the board. |
| f-stop | DotFStop | Relative value (0.0 to 1.0) of f-stop on an auto focus camera for dot inspection on the board. |
| Light Level | DotLightLev | Integer level of lighting for dot inspection. |
| Light on Dark | DotLightOnDark | One character "Y" or "N" indicating light dot on dark background for dot inspection on the board. |

| | | |
|---|---|---|
| Light Color | DotLColor | Integer code for light color for dot inspection. |
| Max Pixel Count | DotMaxPix | Maximum and minimum pixel counts for dot inspection. |
| Min Pixel Count | DotMinPix | |
| Dot Volume | DotDotVol | Not yet implemented. Dispensed dot volume. |

# T E M P E R A T U R E

| | | |
|---|---|---|
| Material Temperature | MatlTemp | Temperatures (degrees C) at which the material |
| Material Range | MatlTmpRnge | (tube/reservoir) is to be maintained. "Range" is a |
| Material Heater On | MatlTmpCtl | temperature range (degrees C) plus or minus adjacent to the specified temperature. Control is a character "Y" or "N" indicating whether temperature control is to be used. |
| PID | MatlPIDname | PID name for material temperature control. |
| Needle Temperature | NeedleTemp | Temperatures (degrees C) at which the needle |
| Needle Range | NeedleTmpRnge | is to be maintained. "Range" is a temperature range |
| Needle Heater On | NeedleTmpCtl | (degrees C) plus or minus adjacent to the specified temperature. Control is a character "Y" or "N" indicating whether temperature control is to be used. |
| PID | NeedlePIDname | PID name for needle temperature control |

| | | |
|---|---|---|
| - - - - | ProgCode | Integer code to identify the program. The value is inherited from the @PROGRAM record for Mounts. It does not apply to Materials and Defaults. |
| - - - - | MountFlag | Integer indicator used internally to select items. |
| - - - - | RecType | Integer used internally indicating record type: Defaults less than 0, Materials equal to 0, Mounts greater than 0. |
| - - - - | MatCode | Integer normally 1, 0 for "NONE" records. This field does not apply to Mounts. |
| - - - - | PressTolerance | MV valve force tolerance (percent) |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

# Tweaks

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@TWEAKS**

Tweaks are alterations in parameters that can be performed while a program is running in order to fine tune the operation. Each value is a multiplier, default 1. Tweaks records are associated with the program and are created automatically when tweaks are requested.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| | ProgCode | **REQUIRED**. Integer code to identify the associated program. |
| | | Each value tweaks the indicated variable. Each of the following tweaks appears five times, once for each of the five tool positions. To simply their presentation here, each tweak is listed only once; the question mark represents the digits 0 through 4. |

| | |
|---|---|
| **Example:** | |
| Val?_OnTime     represents | Val1_OnTime |
| | Val2_OnTime |
| | Val3_OnTime |
| | Val4_OnTime |
| | Val5_OnTime |

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| On Time | Val?_OnTime | |
| Valve Steps | Val?_av3 | Valve steps (applies to micro steps). |
| Valve Prime | Val?_ValveOn | |
| Start Z Pause | Val?_StartDelay | |
| Start Z | Val?_DispHeight | |
| Approach Velocity | Val?_AppVel | For descriptions of these |
| Snap Off Z | Val?_SnapOffZ | tweak values, see pages |
| Settle Z | Val?_SettleZ | 29 through 32. |
| Fill Spacing | Val?_FillSpace | |
| Dispense Velocity | Val?_DispVel | |
| Valve Off | Val?_ValveOff | |
| End Z | Val?_EndZ | |
| | | |
| Valve Reverse | Val?_av2 | Valve reverse (applies to suckback). |
| - - - - | Val?_av1 | Not used. |
| - - - - | Val?_MoveVel | Not used. |
| - - - - | Val?_Weight | Not used. |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## *Variations*

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@VARIATION**

A variation is a collection of feature IDs that can be referenced by name.  This allows selection of a set of feature IDs without selecting individual items when a known selection is desired.

Since all data in this table is generated internally, there is no window displaying the fields.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| | VarName | **REQUIRED** text field of up to 36 characters long containing the name of this variation. |
| | VarCode | Type code:  −1 for default, else 0. |
| | ProgCode | Optional code indicating the program associated with this variation. |
| | VarDescr | Optional text field up to 250 characters long containing any descriptive information. [Default blank] |
| | VarList | Optional field of any length containing a list of feature IDs. |
| | BlobSize | Size of VarList. |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## Program Calibration

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@PROGCAL**

*Beginning with software version 1.2, these records cannot be exported or imported. This information is included for data base documentation only.* @PROGCAL records contain details of the last calibration for a tool/valve. There is no associated display: the records are created and used internally.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| | IGant | Integer gantry ID, usually defaulted. |
| | ProgCode | Unused integer code to identify the program. The value is inherited from the @PROGRAM record. |
| | Daytime | Date/time of this calibration. For import, this can have a wide variety of formats; refer to an SQL manual. [Default Current Date/Time when imported.] |
| | TouchPadZ PaperPadZ DrillPadZ | Z coordinates at calibration. |
| | HdAdjX1 HdAdjY1 HdAdjZ1 HdAdjX2 HdAdjY2 HdAdjZ2 HdAdjX3 HdAdjY3 HdAdjZ3 HdAdjX4 HdAdjY4 HdAdjZ4 HdAdjX5 HdAdjY5 HdAdjZ5 | (X, Y, Z) adjustments for each tool/valve at calibration. |
| | HdLocZ1 HdLocZ2 HdLocZ3 HdLocZ4 HdLocZ5 | Z coordinate for each tool/valve at calibration. |
| | Tpflag PPflag DPflag | Calibrate flags for touch pad, paper pad, drill pad. Value is 0 if not calibrated, else 1. |

| HdType1 | Head type if tool/valve is calibrated, -1 if not calibrated. |
| HdType2 | Types are: |
| HdType3 | |
| HdType4 | |
| HdType5 | |

| 0 | DUMMY | 8 | DRIP_LESS (LX Auger |
|---|---|---|---|
| 1 | LX AUGER VALVE | | Valve) |
| 2 | SYRINGE | 9 | TWO PART |
| 3 | NEEDLE VALVE | 10 | AIR DRILL |
| 4 | ETCH HEAD | 11 | VARIABLE SPEED AUGER |
| 5 | ROUT HEAD | 12 | MICRO-DOT AUGER |
| 6 | UNKNOWN | 13 | CARTRIDGE |
| | HEAD TYPE | 14 | MV50/400 |
| 7 | PICKUP HEAD | | |

| CALfA | Transform parameters for forward vision calibration. |
| CALfB | |
| CALfC | |
| CALfD | |

| CALra | Transform parameters for reverse vision calibration. |
| CALrb | |
| CALrc | |
| CALrd | |

| Discriminant | Discriminant of forward transform. |

| Zoom | Camera zoom value for automatic camera. |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

| | | |
|---|---|---|
| Fill Spacing | FillSpacing | For filled features such as circles and rectangles, this field defines spacing between successive lines of the fill in units of needle diameters.  A typical value is 1.5 needle diameters. |
| Fill Spacing | FillSpaceMM | Alternate value of Fill Spacing in mm rather than needle diameters. |
| Inspect | Dot Test | Optional character "Y" or "N" indicating whether to test dot size after dispense. |
| Enabled | Enabled | Optional character "Y" or "N" indicating whether this detail line is to be used. |
| Feature ID | FeatureID | Name of a feature, up to 12 characters long.  This field is used to describe the record as part of a discernable feature on the board to allow selection or rejection of lines of a program by FeatureID.  Typically, this is a board location (C10, U15, R25, etc.). |
| On Time | OnTime | Total time (ms) a valve is on to dispense, delay time, or any other time value required to perform an operation. |
| Fill Width | FillWid | "Wall" dimension of a hollow rectangle. |

Most of the following fields are allowed to default even when the program is taught on the machine.  The main exception is the appearance of these fields on a PARTITION record.  All fields needed on the PARTITION record must appear in the @FORMAT,@DETAIL, but if the usually-defaulted fields are last they can be simply omitted at the end of other detail records.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| Partition | Partition | Optional Partition/Shape name, up to 12 characters long.  This usually appears only on a PARTITION or SHAPE record and is allowed to default on subsequent records.  Embedded shapes use this field to define the shape name. |
| Comment | LComment | Optional comment applying to this line up to 72 characters long.  This field is usually filled in when converting P&P data to dispenser input format, where the text is a comment on the P&P line. |
| Valve/Tool n | HeadLoc<br>Head | Copies from Head table.<br>Optional name of the tool/valve to use, up to 18 characters long.  This name should match the name of a tool/valve in the MOUNTS table; if it does not, the program will not run.  This field usually appears only in a PARTITION record.  It may be omitted entirely for import and the name of the tool/valve entered through the edit menu after import is complete. |
| Part Number | PartNo | Optional part number up to 36 characters long.  This field is usually filled in when converting P&P data to dispenser input format.  Import uses this field to determine OpType from the  cross reference table. |

| Move Ctrl<br>On/Off Ctrl | MoveControl<br>OnOffCntrl | Most operations are performed in 3 stages: |
|---|---|---|

In the first stage, the gantry moves to the point (CoordX, CoordY, StartZ+SettleZ) where the Z coordinate is the distance to the board.  It then moves vertically to a Z coordinate StartZ, turning the valve on and performing additional operations while moving.

In the second stage with valve on, it performs the function at the target point (such as filling a rectangle or dispensing a dot, a line, or an arc) while moving linearly to StartZ + EndZ.

In the third stage, the valve moves to a Z coordinate of StartZ+EndZ+SnapOffZ at high speed & acceleration, turning the valve off and performing additional operations while moving.

Reminder:   All Z coordinates for these moves are measured from the top of the board.

To function continuously across several operations (e.g., when drawing a pattern), these stages must be performed independently.  MoveControl and OnOffCntrl are integer controls allowing the moves and on/off operations to be performed separately:

| 0 | Complete | Perform all three stages  [This is the default] |
|---|---|---|
| 1 | Start | Perform first & second stages only |
| 2 | Middle | Perform second and third stages only |
| 3 | End | Perform second stage only. |
| 4 | No Operation | For On/Off control, perform none of the stages |

# DISPENSE

| Settle Z | SettleZ | Distance (mm) above StartZ (the Z location where dispensing or other operation takes place) where the gantry settles before the move to StartZ. |
|---|---|---|
| Start Z | StartZ | Distance (mm) above the board where dispensing or other operation is to take place for this feature; negative to drill into a drill pad. |
| End Z | EndZ | Distance (mm) above StartZ (the Z location where dispensing or other operation takes place) for the operation to end.  This value is non-zero to create pillars or to dispense along an angle to the plane of the board. |
| Top Z | TopZ | Optional character "Y" or "N".  "Y" indicates adjust Z value to top of probed data +/- EndZ value. |
| Approach Velocity | ApproachVel | Velocity (mm/sec) of motion from SettleZ (where the gantry settles before the operation) to StartZ (the Z location where dispensing or other operation takes place). |

| Dispense Velocity | DispVel | Velocity (mm/sec) of any motion required during an operation (e.g., Z velocity while building a pillar, or coordinated motion velocity while drawing a line). |
|---|---|---|
| Valve Prime | ValveOn | Time (ms) to start valve operation before reaching StartZ (the Z location where dispensing or other operation takes place); this is used to prime a valve. |
| Start Z Pause | StartDelay | In-position delay (ms) between attaining StartZ position (the Z location where dispensing or other operation takes place) and start of any motion associated with the operation. |
| Valve Reverse | SBOn | Number of encoder counts to dispense desired dot size with Micro-Dot valve. Value is ignored if valve used is not a Micro-Dot valve. |
| NCM Open Time | nOpen Time | Total time (s) the non-contact jetting pump remains open. |
| Micro Valve Steps | MicroSteps | Integer number of encoder counts to dispense a dot with a Micro-Dot Valve. |
| Micro Valve Reverse | MicroSB | Integer number of encoder counts to reverse a Micro-Dot valve for suck-back. |
| Valve Off | ValveOff | When performing a fill, a needle may dribble unwanted material at the end of the operation.  To prevent this, the valve is turned off ValveOff mm before the fill ends.  When this applies only to the last line or circle of the fill, make sure the length of the last line/circle allows this. |
| Snap Off Z | SnapOffZ | Distance (mm) to move the tool/valve up during the snap-off action to prevent tailing. |

# E X T R A   C O N T R O L

| Move Velocity | MoveVel | Velocity (mm/sec) to move the gantry from the location of the last operation to (CoordX,CoordY). |
|---|---|---|
| Micro Valve Speed | MicroSpeed | Micro-Dot valve velocity. |
| Reverse Dead Time | SBDead | Time delay (ms) between turning off an LX Auger valve and starting the reverse suck-back action. |
| NCM Close Time | nClose Time | Time delay (s) between closing and opening a non-contact jetting pump. |
| Pinch Delay | PinchDelay | Delay (ms) before operating a pinch tube |
| Auger Speed | AugerSpeed | Optional relative speed (percent) to operate a variable speed auger.  [Default 0.0] |
| Pre Snap-off Delay | PreSnapDelay | Time (ms) to delay after dispense but before beginning snap-off. |
| Post Delay | PostDelay | Post-operation delay (ms). |
| Snap Off Velocity | SnapOffVel | Snap-off velocity (mm/sec/sec). |
| Snap Off Acceleration | SnapOffAcc | Snap-off acceleration (mm/sec). |

| Micro Valve Accelera... | MicroAccel | Micro-Dot valve acceleration (steps/sec/sec). |
| Scale Factor | ScaleFactor | Percent to scale this feature.  [Default 100.0] |
| Mixer Velocity | MixVel | Mixer Valve velocity (mm/s). |

# ARRAY & TRACK

(Note:  The following fields are used only to generate an array of OpType features.)

| Rotation | Rotation | Angle through which the array is to be rotated (radians). The entire array is rotated as a unit about the point (CoordX,CoordY).  Note that AngA rotates individual elements of the array, not the array itself; AngA rather than Rotation should be used to rotate a single item. |
| X Count | Xcount | Integer number of array elements in the X and Y |
| Y Count | Ycount | directions before rotation of the array.  [These counts default to 1 for a non-array.] |
| X Space | XSpace | Space (mm) between array elements in the X and Y |
| Y Space | YSpace | directions before rotation of the array and before ScaleFactor adjustment.  [This spacing defaults to zero (0).] |
| Needle Track | TrackNeedle | One character "Y" or "N" indicating whether to backtrack over last fill line. [Default "N"] |
| X | TrackX | |
| Y | TrackY | |
| Start Z | TrackStartZ | Parameters to be used in backtracking. |
| End Z | TrackEndZ | |
| Velocity | TrackVel | |

# OPERATE

| Max Repeat | PSTypeAlt | Maximum number of times to advance pallet if parts are missing. |
| Retries | Retries | Integer number of times to retry a failed operation. |
| Skip Lines | SkipLines | Integer number of program lines to skip forward (+) or backward (–). |
| Message | MessageNo | Integer message number (–1 and greater) associated with this operation. |
| Flag Number | FlagNumber | Integer bit number (0-31) and value (0-1) to change or test |
| Flag Value | FlagValue | bit flags. |
| Head Pressure | HeadPressure | Operating pressure (kPa) for this head. |
| Minimum Z value | ZTestMin | Minimum and maximum Z coordinate values allowed (mm). |
| Maximum Z value | ZTestMax | |
| Operation Time | Optime | Operating time (ms) for this operation. |
| Blow Off Time | BlowOff | Blow-off time (ms) to release a part. |

| Pattern | OpPattern | Optional name of a pattern, up to 24 characters long.  This field is used when an OPERATE line requires a vision pattern. |
|---|---|---|

# V I S I O N

| Camera Select | CameraSelect | Camera number to be used in this operation. |
|---|---|---|
| Gain | Gain | Integer (0-255) camera gain ( –1 to disable). |
| Offset | CamOffset | Integer (0-255) camera offset ( –1 to disable). |
| Zoom | Zoom | Relative value (0.0 to 1.0) of focal length for an auto focus camera for changes within the program. |
| Focus | Focus | Relative value (0.0 to 1.0) for focusing an auto focus camera for changes within the program. |
| f-stop | Fstop | Relative value (0.0 to 1.0) of f-stop on an auto focus camera for changes within the program. |
| Light on Dark | LightOnDark | One character "Y" or "N" indicating light dot on dark background for dot inspection on the board. |
| Light Level | LightLev | Integer level of lighting for changes within the program. |
| Light Color | Lcolor | Integer code for light color for changes within the program. |

# B L O B S

| Blob Count | BlobCount | Integer number of blobs to be found by the vision system. |
|---|---|---|
| Low Gray<br>High Gray | LowGray<br>HighGray | Gray level pixel values (0-255) for low limit (for 0) and high limit (for 1). [Defaults 120, 180] |
| Blob Ratio | BlobRatio | Minimum to maximum length ratio for blobs. [Default 50] |
| Min Area<br>Max Area | MinArea<br>MaxArea | Minimum and maximum areas (pixels) of blobs for blob search.  [Defaults 100, 15000] |
| Window Height<br>Window Width | WinHeight<br>WinWidth | Size of search window for blob searches. |
| Dot Volume | DotVol | Dispensed dot volume (cc) |
| Target Size | TargSize | Size of test target (mm). |
| Target Range | TargRange | Allowable range of target (mm). |

# S E R V I C E

| | | |
|---|---|---|
| Program Code | ProgCode | Internal integer code to identify the program or shape. The value is inherited from the @PROGRAM or @SHAPE record. |
| Program Flag | ProgFlag | Internal integer indicator used internally to select items. |
| Sequence Number | SeqNo | Internal integer code to sequence the detail records. Records are re-sequenced automatically as they are encountered. |
| PS Type<br>Alternate PS Type<br>MoPar Index<br>Snap Mopar | PSType<br>PSTypeAlt<br>MoparIndex<br>SnapMoPar | Internal integer fields. |
| ST Code | STCode | Internal integer: copied from SubType table |
| Ident | Ident | Internal integer: copied from SubType table |
| Needle Inside Diam... | NID | Internal float: copied from Needle table |
| Head Type | HeadType | Internal integer: copied from Head table |

| | | |
|---|---|---|
| - - - - | TiltAngle | Angle (radians) for tilt fixture |
| - - - - | PressRnge | Range in grams for Post-press pressure |
| - - - - | BackLight | One character "Y" or "N " for backlight used |
| - - - - | Tuning | Integer (1-1000) camera tuning for dot inspection on the board. |
| - - - - | TMValveOff | Turns valve off based on percent of move for tilt moves only. |
| - - - - | RepeatMax | Refer to PSTypeAlt listed under OPERATE (page 33). |
| - - - - | CoordZ | Z coordinate; refer to CoordX, CoordY (page 29). |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## *Shape Definitions*

Shapes are defined in almost the same way as programs, but there are no MOUNT or BOARD records and some almost-equivalent fields have names different from the names in the program records.

## Shape

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@SHAPE**

Since an @SHAPE record is required, there is usually a format for it.  Only the Shape field is needed.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| (Shape List) | Shape | **REQUIRED** text field up to 12 characters long containing the name of the shape. |
| Class | ShapeClass | Optional text field up to 12 characters long containing any text used for a class of a shape (used to select shapes to display).  [Default blank] |
| Taught Angle | TaughtAngle | Angle at which the shape was taught |
| Description | ShapeDescr | Optional text field up to 250 characters long containing any descriptive information.  [Default blank] |
| Fiducial 1 X<br>Y<br><br>Fiducial 2 X<br>Y<br><br>Fiducial 3 X<br>Y | Fid1X<br>Fid1Y<br>Fid1Z<br>Fid2X<br>Fid2Y<br>Fid2Z<br>Fid3X<br>Fid3Y<br>Fid3Z | Fiducial coordinates (mm) relative to the shape origin (0,0). Zero, one, two, or three fiducials may be defined as needed. |
| Pattern (Fiducial 1)<br>Pattern (Fiducial 2)<br>Pattern (Fiducial 3) | FidName1<br>FidName2<br>FidName3 | Fiducial pattern names up to 24 characters long for use with automatic vision.  The name provides reference to the shape of the fiducial. |
| Used (Fiducial 1)<br>Used (Fiducial 2)<br>Used (Fiducial 3) | FidFlag1<br>FidFlag2<br>FidFlag3 | Optional integer 0 or 1 indicating whether the associated fiducial is used.  [Default 0] |
| Bad Mark X<br>Y (Bad Mark) | Fid4X<br>Fid4Y<br>Fid4Z | Optional bad mark indicator coordinates (mm) relative to the reference point. [Default NULL] |
| Pattern (Bad Mark) | FidName4 | Optional pattern name up to 24 characters long for use with automatic vision.  This name provides reference to the shape of a bad mark. [Default NULL] |
| Process if mark pres... | FidFlag4 | Optional integer flag to determine how the bad mark is detected and used.  A zero value indicates no bad mark. [Default 0] |
| - - - - | ShapeCode | Internal integer code to identify the shape.  Import creates a new value for this field. |
| - - - - | RecType | Internal integer code, normally -1. |
| - - - - | ShapeType | Unused integer value forced to 0 by import. |

| - - - - | UFlag | One character "Y" or "N" value. "N" for a non-empty shape. "Y" if shape is empty. |
|---|---|---|
| - - - - | BlightLev | Integer level of lighting for backlight |
| - - - - | BLColor | Integer code for light color for backlight |
| - - - - | BackLight | One character "Y" or "N " for backlight used |
| - - - - | EntryLogin | Login name used when this program was first entered/last |
| - - - - | ModifyLogin | modified. [Default UNKNOWN] |
| - - - - | EntryDayTime | Time stamp indicating when this program was first |
| - - - - | ModifyDayTime | entered/last modified. [Default: current date and time when imported] |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## Shape Detail

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@SHAPEDET**                                       **Frequently used fields**

Shape detail records describe each operation performed for the shape.  One record is required for each operation, although a record may generate multiple operations if it refers to a shape or defines an array. An initial SHAPE OpType is nominally required, but one will be created if none is present.

In general, missing fields default to NULL, giving the field the value in the most recent SHAPE record or the value of the calling operation.

Shape detail records are almost identical to program @DETAIL records.  Refer to the description of Program Detail above (page 29) for shape detail information.

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

# Auxiliary Table Definitions

The dispenser software uses a number of auxiliary support tables to accomplish its operations.  This section lists all information for all format fields for auxiliary tables at data base/software version 2.9.

These records may be exported for import without change on other machines as needed.  Additional fields may be added or some fields deleted in future versions, but since new fields can default and unused fields will be ignored, no problems should be created by changes.

## *Head*

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@HEAD**

The head table describes properties and defaults for various tools/valves that might be mounted on the machine.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| Valve/Tool Name | Head | **REQUIRED** name up to 18 characters long for this tool/valve. |
| Type | HeadType | Optional integer tool/valve type as defined in the software. This value determines how the tool/valve is operated. [Default 0]<br>Current values are:<br>0 NONE      9 TWO PART<br>1 LX AUGER VALVE    10 AIR DRILL<br>2 SYRINGE     11 VARIABLE SPEED AUGER<br>3 NEEDLE VALVE    12 MICRO-DOT AUGER<br>4 ETCH HEAD    13 CARTRIDGE<br>5 ROUT HEAD    14 MV50/400<br>6 UNKNOWN    15 ONE PART<br>   HEAD TYPE    16 NCM<br>7 PICKUP HEAD<br>8 DRIP LESS (LX Auger Valve) |
| Description | HeadDescr | Optional text field up to 250 characters long containing any descriptive information. [Default blank] |
| Low Material Sensor | LowSense | Optional character "Y" or "N" indicating whether this tool/valve has a low material sensor.  [Default "N"] |
| Low Reservoir Sensor | LevDetect | Optional character "Y" or "N" indicating whether this tool/valve has a material level detector.  [Default "N"] |
| Other Sensor | Sensor | Optional character "Y" or "N" indicating whether this tool/valve has some other sensor.  [Default "N"] |
| Retract Sensor | RetractSense | Optional character ("Y" or "N") indicates presence of a retract sensor. |
| Extra Sensor | ExtraSense | Optional character ("Y" or "N") indicates presence of another sensor. |
| Jaw Sensor | JawSense | Optional character ("Y" or "N") indicates presence of a sensor for jaw position. |
| Has Standoff | StandOff | Optional character "Y" or "N" indicating whether this tool/valve uses a stand-off needle.  [Default "N"] |
| Has Shut Off | ShutOff | Optional character "Y" or "N" indicating whether this tool/valve has a shutoff control.  [Default "N"] |
| Has Jaws | Jaws | Optional character ("Y" or "N") indicates presence of centering jaws. |

| Skip Standoff Calibra... | SkipStandoff | Optional character ("Y" or "N") indicating whether to calibrate this standoff. |
|---|---|---|
| Keep Head Status | KeepHeadStatus | Optional character ("Y" or "N") indicating whether head status (on time, dots dispersed, idle time, etc.) is to be retained across programs. |
| Has Touch Probe | TouchProbe | Optional character "Y" or "N" indicating whether this tool/valve has an integral touch probe. [Default "N"] |
| X Offset Y Offset Z Offset | OffsetX OffsetY OffsetZ | Optional offsets (mm) of the operating point of this tool/valve from the calibration tool. These values allow calibration with the tool to be transferred to any tool/valve. [Default 0.0] |
| Standoff X Offset Standoff Y Offset | StandOffX StandOffY | Optional offsets (mm) to move a stand-off needle from center during calibration. These values depend on the position of the stand-off foot. [Default 0.0] |
| Stand Off Z | StandOffZ | Optional distance (mm) associated with a stand-off needle. [Default 0.0] |
| Valve Speed | AugerSpeed | Optional relative speed (percent) to operate a variable speed auger. [Default 0.0] |
| Valve Ramp | Ramp | Optional ramp up/down coefficient (% per ms) for controlling a variable speed LX Auger valve. |
| Stall Test | StallAmps | Optional test value (percent) to detect stall or over-use of an LX Auger valve. [Default 0.0] |
| Mixer Feed Rate | MixerSpeed | Optional value (mm/sec) of mix rate or feed rate associated with this tool/valve. [Default 0.0] |
| Reload Mix Rate | ReloadSpeed | Optional value (mm/sec) of mixer speed during reload [Default 0.0] |
| MicroValve Velocity | MicroSpeed | Optional value (counts/sec) of dispense speed for a Micro-Dot Valve. [Default 0.0] |
| Micro Valve Reverse | MicroSB | Optional value (counts) to operate a Micro-Dot valve in reverse for suck-back. |
| Micro Valve Accelera... | MicroAccel | Optional acceleration (mm/sec/sec) for a Micro-Dot valve. |
| Hold Time | HoldTime | Optional time (ms). Purpose to be determined. |
| Hold Center | HoldCenter | Optional time (ms). Purpose to be determined. |
| Air/Vacuum Pressure | HeadVacuum | Optional value (kPa) of vacuum, pressure, air pressure, etc. associated with this tool/valve. [Default 0.0] |
| Open Time | OpenTime | Optional time (ms). Purpose to be determined. |

| Open Center | OpenCenter | Optional time (ms). Purpose to be determined. |
|---|---|---|
| Seating Force | SeatPressure | Optional pressure (kPa) used to seat a part with a pressure sensor. [Default 0.0] |
| - - - - | PressRnge | Range in grams for Post-press pressure |
| - - - - | SBOn | Motor on time (ms) in the reverse direction to perform suck-back action for an LX Auger valve. |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## *Material*

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@MATERIAL**

The material table contains descriptions of various materials used by the dispenser as well as defaults associated with each material and parameters used to calibrate a tool/valve using the material. Most values are optional and can be allowed to default.

As of Version 2.2, Mounts, Materials, and general Defaults all have essentially the same form and the same display. This form is described in detail under Mounts with exceptions noted for materials and default records. Refer to the description of Mount above (page 18) for Material information.

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## *Dots*

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@DOTMAT**

The material/dots table provides on-time for a dot size using a specified material and needle. The table exists and can be exported and imported, but it is not currently used. When actually implemented, it will probably contain additional fields. Since it is unused, there is no display of any values.

| Screen Display Name | Data Base Name | Description | |
|---|---|---|---|
| | MatlID | **REQUIRED** name up to 32 characters long of material. | |
| | DotSize | **REQUIRED** diameter (mm) of the desired dot. | |
| | Gauge | Obsolete integer gauge of the desired needle. | |
| | NeedleID | **REQUIRED** name of needle. | |
| | OnTime | **REQUIRED** on time (ms) to produce the desired dot. | |
| | StartZ | Distance (mm). | |
| | EndZ | Distance (mm). | |
| | MoveVel | Velocity (mm/sec). | |
| | ApproachVel | Velocity (mm/sec). | For details about these default |
| | DispVel | Velocity (mm/sec). | values, see pages 31 through 32 |
| | ValveOn | Time (ms). | |
| | StartDelay | Time (ms). | |
| | ValveOff | Distance (mm). | |
| | SnapOffZ | Distance (mm). | |
| | CMaxPix | Pixels. | |
| | CMinPix | Pixels. | |
| | CDotArea | Dot area (mm$^2$). | |
| | CDotVol | Dot volume (mm$^3$). | |
| | ccMaxPix | Pixels. | |
| | ccMinPix | Pixels. | |
| | ccDotArea | Dot area (mm$^2$). | |
| | ccDotVol | Dot volume (mm$^3$). | |
| | DotMaxPix | Pixels. | |
| | DotMinPix | Pixels. | |
| | DotDotArea | Dot area (mm$^2$). | |
| | DotDotVol | Dot volume (mm$^3$). | |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## *Cross Reference*

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@CROSSREF**

Cross reference records are normally used by conversion programs when converting pick-and-place data to dispenser import format; otherwise, they are not essential to dispenser operation.

The cross reference file connects a shape with a part number by providing an OpType for known part numbers.  If part number-operation type equivalence is not needed, these records are not needed

| Screen Display Name | Data Base Name | Description |
| --- | --- | --- |
| Part Number | PartNo | **REQUIRED** part number up to 36 characters long. |
| Equivalent Shape | OpType | **REQUIRED** operation type (usually a shape name) up to 12 characters long. |
| Description | XrefDescr | Optional comment field up to 250 characters long.  This field usually comes from P&P data.  [Default " "] |
| - - - - | XrefType | Internal integer:  –1 for default, else 0. |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## *Notes*

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@NOTES**

The notes table holds operator notes.  Entries are typically examined by an engineer and deleted when they are no longer needed.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| (Notes Window) | NoteInfo | Optional field up to 2,000 characters long containing the operator note.  [Default " "] |
| - - - - | DayTime | Optional date & time of the note. [Default Current Date/Time when imported.] |
| - - - - | LoginNm | **REQUIRED** name up to 24 characters long of the log in when this note was generated. |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

# System Table Definitions

This section lists all information for all format fields for system tables at data base/software version 2.9. These records apply only to a specific machine and configuration, or they are essentially universal; they are therefore usually exported or imported only by experienced personnel for special operations. In general, they may be exported for import without change (i.e., as a backup).

**NOTE**
Fields may be added or some fields deleted in future versions. Since unused fields are ignored, deleted fields will present no problems. However, some format types
actually require ALL fields. In such cases, some fields may need to be created when importing material exported from earlier data base versions.

## General Defaults

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@GENDFLT**

General defaults are defined by each gantry and tool/valve mount location.  They provide the ultimate parameter values when there is no other way to determine the values; values supplied must therefore be "safe" values in some sense.  Most entries in this table are defaults for the Material table.

As of Version 2.2, Mounts, Materials, and general Defaults all have essentially the same form and the same display.  This form is described in detail under Mounts with exceptions noted for materials and default records.  Refer to the description of Mount above (page 18) for General Default information.

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## *Special Locations*
. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@SPECLOC**

The special locations define basic positions for each gantry.  They are taught where needed and should not be adjusted manually.  Values can and usually should be exported to permit reloading without re-teaching all points; they can be imported only with special system privilege.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| | IGant | **REQUIRED** integer gantry ID for this data. |

All values below are coordinates in millimeters of the gantry location used to reach hardware features.  All are nominally optional, but the dispense software will not operate if all values are not defined.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| Safety Location | SafetyX<br>SafetyY<br>SafetyZ | Coordinates of a location where the gantry is in a safe (non-interfering) position. |
| Near Home Location | NearHomeX<br>NearHomeY<br>NearHomeZ | Coordinates where the gantry is out of the way, typically very close to the position of the gantry after homing. |
| Park Location | ParkX<br>ParkY<br>ParkZ | Coordinates where gantry rests when not processing. |
| Refresh Location | RefreshX<br>RefreshY<br>RefreshZ | Coordinates of the location where the gantry should move for valve/tool service. |
| Target | TargetX<br>TargetY<br>TargetZ | Coordinates placing the camera over a calibration target. |
| Head1 | HdLoc1X<br>HdLoc1Y<br>HdLoc1Z | Coordinates placing mount locations 1-5 over the calibration target.  The calibration tool should be mounted to teach these coordinates.  Unavailable mount locations are typically taught as the coordinates of the last available location. |
| Head2 | HdLoc2X<br>HdLoc2Y<br>HdLoc2Z | |
| Head3 | HdLoc3X<br>HdLoc3Y<br>HdLoc3Z | |
| Head4 | HdLoc4X<br>HdLoc4Y<br>HdLoc4Z | |
| Head5 | HdLoc5X<br>HdLoc5Y<br>HdLoc5Z | |

| | | |
|---|---|---|
| TouchPad | TouchPadX<br>TouchPadY<br>TouchPadZ | Coordinates placing the camera over the touch pad. The Z coordinate should be taught with the piggyback down and the probe just activated. |
| Purge Cup 1 | PurgeCup1X<br>PurgeCup1Y<br>PurgeCup1Z | Coordinates placing the camera over the purge cup for heads 1, 2, and 3. |
| Purge Cup 2 | PurgeCup2X<br>PurgeCup2Y<br>PurgeCup2Z | |
| Purge Cup 3 | PurgeCup3X<br>PurgeCup3Y<br>PurgeCup3Z | |
| Drill Pad | DrillPadX<br>DrillPadY<br>DrillPadZ | Coordinates placing the camera over the drill pad. |
| Camera Calibration A1 | CamCal1X<br>CamCal1Y<br>CamCal1Z | Coordinates placing the camera over calibration dot 1. |
| Camera Calibration A2 | CamCal2X<br>CamCal2Y<br>CamCal2Z | Coordinates placing the camera over calibration dot 2. |
| Camera Calibration B1 | CamCal3X<br>CamCal3Y<br>CamCal3Z | Coordinates placing the camera over calibration dot 1. |
| Camera Calibration B2 | CamCal4X<br>CamCal4Y<br>CamCal4Z | Coordinates placing the camera over calibration dot 2. |
| Camera Calibration C1 | CamCal5X<br>CamCal5Y<br>CamCal5Z | Coordinates placing the camera over calibration dot 1. |
| Camera Calibration C2 | CamCal6X<br>CamCal6Y<br>CamCal6Z | Coordinates placing the camera over calibration dot 2. |
| Paper Pad | PaperPadX<br>PaperPadY<br>PaperPadZ | Coordinates placing the camera over the paper pad. |
| Work Area Origin | OriginX<br>OriginY<br>OriginZ | Coordinates placing the camera over the lower right corner of the dispense area, or over the nest pin on a conveyorized machine. |
| Touch Probe | ProbeX<br>ProbeY<br>ProbeZ | Coordinates placing the height sense device on mount location 1 over the calibration target. |

| StandOff Calibration | StandOffCalX<br>StandOffCalY<br>StandOffCalZ | Coordinates placing the camera over the stand-off calibration station. |
|---|---|---|
| Scale1 | Scale1X<br>Scale1Y<br>Scale1Z | Coordinates placing camera over the precision scale where material is to be dispensed for heads 1, 2, and 3. |
| Scale2 | Scale2X<br>Scale2Y<br>Scale2Z | |
| Scale3 | Scale3X<br>Scale3Y<br>Scale3Z | |
| NeedleClean1 | CleanNdl1X<br>CleanNdl1Y<br>CleanNdl1Z | Coordinates placing the camera at the start of the needle cleaner. |
| NeedleClean2 | CleanNdl2X<br>CleanNdl2Y<br>CleanNdl2Z | Coordinates placing the camera at the second point of the needle cleaner. |
| NeedleClean3 | CleanNdl3X<br>CleanNdl3Y<br>CleanNdl3Z | Coordinates placing the camera at the third point of the needle cleaner. |
| NeedleClean4 | CleanNdl4X<br>CleanNdl4Y<br>CleanNdl4Z | Coordinates placing the camera at the fourth point of the needle cleaner. |
| NeedleClean5 | CleanNdl5X<br>CleanNdl5Y<br>CleanNdl5Z | Coordinates placing the camera at the fifth point of the needle cleaner. |
| NeedleClean6 | CleanNdl6X<br>CleanNdl6Y<br>CleanNdl6Z | Coordinates placing the camera at the sixth point of the needle cleaner. |
| Special Location1 | Spec1X<br>Spec1Y<br>Spec1Z | Arbitrary fixed locations, usable by MOVE operations. |
| Special Location2 | Spec2X<br>Spec2Y<br>Spec2Z | |
| Special Location3 | Spec3X<br>Spec3Y<br>Spec3Z | |
| SyringeFill | FillStationX<br>FillStationY<br>FillStationZ | Coordinates placing the camera over a syringe fill station. |

| | | |
|---|---|---|
| RejectLocation | RejectX<br>RejectY<br>RejectZ | Coordinates placing the camera where rejected parts are dropped. |
| StampWell | StampWellX<br>StampWellY<br>StampWellZ | Coordinates of the Stamp Well. |
| Camera2 | Camera2X<br>Camera2Y<br>Camera2Z | Coordinates of the second movable camera. |
| Fixed Camera | FixCameraX<br>FixCameraY<br>FixCameraZ | Coordinates of the fixed camera. |
| Tilt Calibration LF | TiltCal1X<br>TiltCal1Y<br>TiltCal1Z | Coordinates of the left front corner of the tilt fixture. |
| Tilt Calibration RF | TiltCal2X<br>TiltCal2Y<br>TiltCal2Z | Coordinates of the right front corner of the tilt fixture. |
| Tilt Calibration RR | TiltCal3X<br>TiltCal3Y<br>TiltCal3Z | Coordinates of the right rear corner of the tilt fixture. |
| Tilt Calibration LR | TiltCal4X<br>TiltCal4Y<br>TiltCal4Z | Coordinates of the left rear corner of the tilt fixture. |
| - - - - | TouchPadAZ | Currently unused adjustment for the touch pad.  Normally given a value 0.0. |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## *Subtype*

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@SUBTYPE**

Subtypes define extensions to shape primitives.  Some subtypes are available for all machines and some apply only to unique features on a specific machine.

⚠ **CAUTION**
Care must be taken if subtypes are moved from one machine to another since subtypes are part of both the hardware and software.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| Operation | OpType | **REQUIRED** field up to 12 characters long defining the OpType to which this subtype applies. |
| SubType | OpSubType | **REQUIRED** field up to 12 characters long defining this subtype. |
| Sub Type Code | SubTypeCode | [Default 0]<br>Optional integer code for this subtype.  This must agree with an internal software code.  For a complete list of codes, refer to *APPENDIX - SubType Codes by SubOp and Operation*. |
| Description | SubTypeDescr | Optional text field up to 250 characters long containing any descriptive information. [Default blank] |
| Message Type | MessageNo | Optional integer code designating a user-defined message to be displayed when a test (InOff/InOn) fails.  Messages are numbered starting at 0; a value of -1 requests use of the internal message "I/O Test Timeout # #" where "# #" are the I/O numbers for InOff and InOn.  When taking a picture (sub-type 13), this may be set to -2, -3, etc. to identify each unique picture to allow faster operation.<br><br>Input/output numbers are:<br><br>-1/-2          current Head I/O A/B<br>0          none<br>1-10          work area I/O 1-10 |
| Set I/O Off | Off1 | Optional integer code.  For special I/O operations, this is an I/O number to turn off at the start of this operation.  [Default 0] |
| Set I/O On | On1 | Optional integer code.  For special I/O operations, this is an I/O number to turn on at the start of this operation.  [Default 0] |

| | | |
|---|---|---|
| Test I/O Off | InOff | Optional integer code.  For special I/O operations, this is an I/O number to test for off.  If both InOff and InOn are zero (0), the operation delays OnTime ms before executing Off2/On2.  [Default 0] |
| Test I/O On | InOn | Optional integer code.  For special I/O operations, this is an I/O number to test for on.  [Default 0] |
| Set I/O Off | Off2 | Optional integer code.  For special I/O operations, this is an I/O number to turn off at the end of this operation.  [Default 0] |
| Set I/O On | On2 | Optional integer code.  For special I/O operations, this is an I/O number to turn on at the end of this operation.  [Default 0] |
| Pattern | Xname | Name of a pattern used with dot tests. |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## *Password*

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@PASSWORD**

The passwords can neither be exported nor imported without special authorization.  Fields are described here only for those who may have special needs.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| Name | LoginNm | **REQUIRED** name up to 24 characters long of the person or group owning this password. |
| Password | Password | Optional Unique Password of up to 12 characters long.  If this field is NULL, it is equivalent to "Operator", allowing anyone to log in. |
| - - - - | PassType | **REQUIRED** internal integer flag: –1 for "operator" (default), else 0. |

The remaining fields are all optional one character fields containing "Y" if the feature is allowed for this log in, or "N" if the feature is not allowed.

| | | |
|---|---|---|
| Read | ReadAccess | Login has basic log in access.  [Default Y] |
| Run | RunHome | Login can home and run the machine.  [Default N] |
| Backup | BackupDsp | Login can back up the machine. [Default N] |
| Restore Backups | RestoreProg | Login can restore from backups. [Default N] |
| Save Programs | SaveProg | Login can edit and save programs/shapes. [Default N] |
| Modify Libraries | ModTables | Login can modify Heads, Materials, and other tables. [Default N] |
| Live Adjust | LiveAdjust | Login can perform live adjustments.  [Default N] |
| Save Adjustments | SaveTweaks | Login can save tweaked values.  [Default N] |
| Teach Vision Patterns | Teach pattern | Login can teach vision patterns.  [Default N] |
| Install Software Upd... | Install Updates | Login can install software updates.  [Default N] |
| Purge Management... | PurgeCurInfo | Login can purge current management information.  [Default N] |
| Select Classes | ClassSel | Login can select classes [Default N] |
| Calibrate | CalibrateSys | Login can calibrate various machine features. [Default N] |
| Configuration | ConfigTables | Login can change configuration tables.  [Default N] |
| System | Shell | Login can open a shell.  [Default N] |
| Change Passwords | ChangePasswrd | Login can alter passwords.  [Default N] |
| - - - - | DelPasswrd | Login can be deleted.  [Default Y] |
| - - - - | DsplLogin | Login name can be displayed.  [Default Y] |
| - - - - | ServiceClass | Login has Service privileges.  [Default N] |

There are a total of 24 password options, the remainder of which are not used and are designated as p19-p24.  All have "N" as a default.

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

# *Needle*

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@NEEDLE**

The Needle table provides characteristics of needles.  It is a table available for reference on all machines.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| NeedleID | NeedleID | **REQUIRED** 12-character name of this needle type. |
| Needle Style | NeedleStyle | 0  Steel<br>1  Plastic<br>2  One Piece<br>3  Tapered Plastic<br>4  Teflon Lined<br>5  Vacuum Cup<br>6  Flat Surface<br>7  Ceramic<br>8  Full Metal |
| Type of Tip | NeedleType | 0  Flat<br>1  Conical<br>2  Round Tool<br>3  Square Tool<br>4  Nozzle |
| Gauge | Gauge | Integer identifying the needle gauge. |
| Needle Length | NeedleLen | Length (mm) of the needle. |
| Outside Diameter | OD | Outside diameter (mm) of the needle.  [Default 0] |
| Inside Diameter | ID | Inside diameter (mm) of the needle.  [Default 0] |
| Description | NeedleDescr | Optional comment field up to 250 characters long. |
| - - - - | NeedleCode | Internal integer: –1 for default needle, else 1. |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

# *Vision*

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@VISION**

The vision records contain patterns from the COGNEX vision system and associated information.  A valid pattern is required (unless PattCode is zero), making it impractical to create records manually.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| Pattern Name | Pattern | **REQUIRED** 24 character name for this pattern. |
| Class | VisionClass | Optional text field up to 12 characters long containing any text.  Used to select a class of vision patterns for display. [Default blank] |
| Light Color | LColor | Color code for automatic lighting. [Default 0] |
| Camera n | CameraSelect | Optional number of the camera to be selected. [Default 0] |
| Camera Gain | CameraGain | Optional camera CCD gain when the pattern was taught. [Default 0] |
| Camera Offset | CameraOffset | Optional camera CCD offset when the pattern was taught. [Default 0] |
| Confusion Threshold | ConfuseThresh | Optional integer (0-1000)confusion threshold.  [Default 0] |
| Acceptance Threshold | AcceptThresh | Optional integer (0-1000) acceptance threshold.  [Default 0] |
| Zoom | Zoom | Camera zoom value for automatic camera. [Default 0] |
| Focus | Focus | Camera focus value for automatic camera. |
| f-stop | Fstop | Camera f-stop value for automatic camera. |
| Light Level | LightLev | Light level for automatic lighting. [Default 0] |
| Camera View | Model | Optional field up to 65,535 characters long containing a COGNEX pattern. |
| - - - - | WinDefined | Optional character "Y" or "N" indicating whether a search window is defined.  [Default "N"] |
| - - - - | PattDescr | Optional text field up to 250 characters long containing any descriptive information. [Default blank] |
| - - - - | PattCode | Internal  Integer code indicating the no-pattern default for pattern NONE if PattCode=0 or a normal pattern if PattCode=1.  If PattCode=1, a valid COGNEX pattern must be present in the record.  [Default 1] |

| - - - - | CameraTuning | Optional camera tuning value.  [Default 0] |
|---|---|---|
| - - - - | WinX | Internal integer pixel counts defining the upper left corner |
| - - - - | WinY | of the search window and its size.  [Defaults 0,0,0,0] |
| - - - - | WinWidth | |
| - - - - | WinHeight | |
| - - - - | MinArea | Minimum and maximum areas (pixels) of blobs for blob search. |
| - - - - | MaxArea | [Defaults 100, 15000] |
| - - - - | AreaEdge | Cognex codes. |
| - - - - | Accuracy | Cognex codes. |
| - - - - | Coarseness | Cognex codes. |
| - - - - | DotVol | Volume of dot for calibration dot. |
| - - - - | ModelSize | True size of the pattern. |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## *Management Information*

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@MGMTINFO**

Management Information records are available only if the Job Accounting option is turned on.  They provide detailed information by gantry about each run of the machine.  Since this information is for records only, any or all fields (except RecID)  may or may not be significant.

Since data for this table is generated internally there is no window to display the values.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| | IGant | **REQUIRED.**  Integer gantry indicator:  0 = runs on any gantry, 1 = Gantry A only, 2 = Gantry B only, 3 = Gantry C only.  [Default 1] |
| | Program | **REQUIRED** Name up to 32 characters long of the program selected for this run. |
| | RecID | Unused integer code to identify the record.  Import creates a new value for this field. |
| | EndFlag | Optional letter "N" or "Y" indicating whether the run completed normally.  If the run did not complete normally, data values may be incomplete for the last board of the run. [Default N] |
| | LoginNm | Optional name up to 24 characters long of the log in for this run.  [Default Operator] |
| | StartTime | Optional date and time of the start of run.  For import, this can have a wide variety of formats; refer to an SQL manual. [Default Current Date/Time when imported.) |
| | EndTime | Optional date and time of the end of run.  For import, this can have a wide variety of formats; refer to an SQL manual. [Default Current Date/Time when imported.] |
| | ElapsedTime | Optional active time (seconds) during the run.  This normally includes a decimal point for accuracy to the millisecond. [Default 0] |
| | IdleTime | Optional idle time (seconds) during the run.  This normally includes a decimal point for accuracy to the millisecond. [Default 0] |
| | BoardCount | Optional integer count of boards through the dispenser during this run.  [Default 0] |

| | |
|---|---|
| BadBdsIn | Optional integer count of boards determined to be bad when they came into the machine.  [Default 0] |
| BadBdsOut | Optional integer count of bad boards leaving the machine. The difference between this and BadBdsIn is the number of boards spoiled during dispensing.  [Default 0] |
| SboardCount | Optional integer count of subboards through the dispenser during this run. [Default 0] |
| SBadBdsIn | Optional integer count of subboards determined to be bad when they came into the machine. [Default 0] |
| SBadBdsOut | Optional integer count of bad subboards leaving the machine.  The difference between this and SBadBdsIn is the number of subboards spoiled during dispensing. [Default 0] |
| LotNo | Optional 18 character lot number. [Default blank] |
| LotType LotInfo | Optional type and category for this run.  These default to any values previously entered for this program. |
| MatlID 1 MatlID 2 MatlID 3 MatlID 4 MatlID 5 | Optional material name for each tool/valve during this run. [Default blank] |
| DotCount1 DotCount2 DotCount3 DotCount4 DotCount5 | Optional integer count of dots dispensed from each of the five valves during this run.  [Default 0] |
| ValveTime1 ValveTime2 ValveTime3 ValveTime4 ValveTime5 | Optional Total on-time (seconds, accurate to 1 ms) for each of five valves during this run.  [Default 0.0] |
| Head1 Head2 Head3 Head4 Head5 | Optional tool/valve name for each tool/valve during this run. [Default blank] |

| | | |
|---|---|---|
| | Gauge1<br>Gauge2<br>Gauge3<br>Gauge4<br>Gauge5 | Optional needle gauge for each tool/valve used with this run.  [Default 25]  This field is obsolete. |
| | NeedleID1<br>NeedleID2<br>NeedleID3<br>NeedleID4<br>NeedleID5 | Optional name of each needle used with this run. |
| | AirPressure1<br>AirPressure2<br>AirPressure3<br>AirPressure4<br>AirPressure5 | Air pressure (kPa) requested for each tool/valve for this run.  [Default 0.0] |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## *Base Information*

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@BASEINFO**

The Base information about the machine is retained by Gantry.  This information can be exported for informational purposes, but it can be imported only with special system privilege.  It includes summary information by gantry about all runs of the machine.  Since this information is for records only, any or all fields may or may not be significant.

Since data in this table cannot generally be modified by the user there is no window displaying the fields.

| Screen Display Name | Data Base Name | Description |
| --- | --- | --- |
| | IGant | **REQUIRED.**  Integer gantry indicator:  0 = runs on any gantry, 1 = Gantry A only, 2 = Gantry B only, 3 = Gantry C only. [Default 1] |
| | DBVer | Superseded by *Permanent Information*, page 67.  Optional field up to 6 characters long indicating the current data base level on the machine.  [Default ^^^^] |
| | SWVer | Superseded by *Permanent Information*, page 67.  Optional field up to 24 characters long indicating the current software level on the machine.  The first three characters of this field must be equal to DBVer.  [Default ^^^^] |
| | MachName | Optional field up to 32 characters long containing a name for this machine.  Typically, this is a combination of the site name and another identifier. |
| | StartDate | Date and time the machine was first placed in operation.  Refer to the SQL manual for formats.  [Default current date/time when imported.] |
| | PowerOnTime | Total time (seconds, accurate to ms) the machine was powered on for customer use.  [Default 0] |
| | PMOnTimeTot | Total time (seconds, accurate to ms) the machine was actually operating for Preventative Maintenance scheduling.  [Default 0] |
| | PMMaxTotal | Maximum time (seconds, accurate to ms) of operation before issuing an operator warning to schedule Preventative Maintenance.  [Default 0] |
| | JobCount | Integer total number of Jobs (Run selections) through the machine.  [Default 0] |
| | BoardCount | Integer total of boards through the machine.  [Default 0] |

| | | |
|---|---|---|
| BadBdsIn | Integer total of boards determined to be bad when they came into the machine.  [Default 0] |
| BadBdsOut | Integer total of bad boards leaving the machine.  The difference between this and BadBdsIn is the number of boards spoiled during dispensing.  [Default 0] |
| LastBackup | Date and time of the last machine backup (Data, Application, or System).  Refer to an SQL manual for formats.  [Default current date/time when imported.] |
| ILastBackup | System time for last backup. |
| ILast Info | System time for LastInfo. |
| LastInfo | Date and time the operator was last reminded to back up the system.  Refer to an SQL manual for formats.  [Default current date/time when imported.] |
| LastPowOn | Optional Date and time of last power on.  This is a scratch field used to compute total power on time.  [Default Current Date/Time when imported.] |
| LastFlag | Optional character "Y" if the machine was properly powered down the last time.  If this indicator is "N" upon power up, a warning is issued to the console and to the error log indicating that some information may be incomplete.  [Default N] |
| Chip Index | Optional small integer containing index on drill chip to provide multiple drills per chip.  [Default 0] |
| OpMode1 OpMode2 | Optional codes indicating operational mode. [Default 0] |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## *Permanent Information*

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@PERMINFO**

This file is used to prevent updates from writing erroneous data into BASEINFO.  It has only one record which cannot be exported or imported.  This information is included for data base documentation only.

Since data in this table can be modified only during software updates there is no window displaying the fields.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| | DBVer | Field up to 6 characters long indicating the current data base level on the machine. |
| | SWVer | Field up to 24 characters long indicating the current software level on the machine.  The first three characters of this field must be equal to DBVer. |
| | Build | Integer sequential build number for the currently installed software. |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## *Program/Shape Classes*

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@PCLASS,** and **@FORMAT,@SCLASS**, and **@FORMAT,@VCLASS**

Program, shape, and vision classes are selected by these tables consisting only of a list of selected classes.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| Class | Class | **REQUIRED** selected class. This cannot be NULL, but can consist of a single blank. |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## *Universal Constants*

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@UNIVERSAL**

The Universal constant table contains options values formerly located in the options file.  There is one record per gantry.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| System Move Velocity | SystemMoveVel | [Default 400.0 mm/sec]<br>SystemMoveVel provides a default velocity (mm/sec) for any move not otherwise defined. This does not normally need changing; slow moves can cause time-outs and fast moves can cause gantry movement to be unpredictable. |
| X Probe Offset<br>Y Probe Offset | ProbeOffsetX<br>ProbeOffsetY | ProbeOffsetX [Default 4]<br>ProbeOffsetY [Default -4]<br>ProbeOffsets are the X and Y distance (mm) to offset an etch tool from the center of the touch pad to calibrate the drill position.  These values should be chosen so the probe touches the calibration station itself, entirely missing the touch pad.  The default values are normally sufficient; they seldom, if ever, need changing. |
| Low Z Limit | LowZLimit | [Default Off]<br> If a board is missing, a surface sense may move the gantry low enough to damage fixtures.  If an appropriate Z coordinate is taught when teaching the Base Location for the probe, this coordinate can be used as a lower limit for Z axis movement.  Set this parameter True only after teaching such a coordinate. |
| Etch Clearance | EtchClearance | [Default 10.0 mm]<br>EtchClearance specifies the distance (mm) to lift the etch head above the board to prevent dragging.  Smaller values speed the use of the etch head but may cause unwanted contact with the board. |
| Touch Offset | TouchOffset | [Default 0.0 mm]<br>If TouchOffset has a positive value, motion of the Z axis during touch-off is fast until the probe is this distance (mm) above the board (actually, above the touch pad elevation). If it is 0.0, motion during touch-off is slow starting at the safety location. |
| Work Area Vac Delay | WVacControl | [Default -1 ms]<br>The work area vacuum control determines how hold-down vacuum is handled on a machine with no conveyor.  It has a value of -1 to suppress use of work area vacuum; otherwise, it is a delay (ms) introduced between operating the crowders and turning the vacuum on. |

| | | |
|---|---|---|
| Test Temp Ready | TestTempRdy | [Default Off]<br>If this parameter is On, temperature ready signals are tested before every board and the process is suspended until all temperatures are within range. |
| Always Load Mixer | AlwaysLoadMixerIf | [Default On]<br>AlwaysLoadMixer is On, the mixer valve is always reloaded when it is turned off. If it is Off, the valve is reloaded only when purging/filling and at the end of a board. |
| Time Interval | InspectInterval | [Default 0]<br>Time interval to repeat dot size inspection (sec). |
| Max Chip Index<br>Drill Spacing | MaxChipIndex<br>DrillSpacing | [Default 1]<br>[Default 5.0 mm]<br>Applies to dispensing on a chip or drilling holes on the calibration station. MaxChipIndex is the number of dots to dispense or holes to drill. Drill Spacing is the distance between dots or holes. |
| Paper Advances | PaperCount | [Default 1]<br>PaperCount is the number of steps the calibration station test paper is advanced each time an advance is made. The value is normally 1, but if the dispensed material spreads on the paper, several advances may be required to clear the paper area for the next dispense. |
| Purge Interval when... | IdlePurgeTime | [Default 0]<br>Limit of tool/valve idle time before the operator is warned of needed material purge. If this parameter is non-zero, the value is the time (ms) between purges when the dispenser is idle. |
| Post-Purge Delay | PostPurgeDelay | [Default 0 ms]<br>This parameter allows a delay (ms) after every purge to prevent dripping. (It is temporarily in OPTIONS; it will be moved later to the MATERIALS file.) |
| Type of Needle Cleaner<br>Cleaning Velocity<br>Cleaning Increment<br>Cleaning Count | NeedleCleanType<br>CleaningVel<br>NeedleClnInc<br>NeedleClnMax | [Default 0]<br>[Default 0.0 mm/sec]<br>[Default 0.0 mm]<br>[Default 0]<br>CleaningVel provides the velocity for movement through any automatic needle cleaner. This value is set to 0.0 if the machine has no automatic cleaner.<br><br>NeedleCleanType is set to 0 if there is no needle cleaner present or to 1-5 equal to the number of points needed if the machine has a needle cleaner requiring no operator intervention or to 6 to suppress cleaning altogether. If NeedleCleanType = 1, the first needle clean point alone is used with a 2 inch move in the X direction; if 2, or greater, the required number of needle points are used. |

If the machine is equipped with a scale-integrated cleaner, values of NeedleClnInc must be set to the increment (mm) between successive dispenses and NeedleClnMax to the maximum increments before operator intervention.  In this case, needle clean point 4 is the first dispense point of the integrated cleaner and needle clean point 5 is the withdrawal point above the last dispense point of the integrated cleaner; needle clean points 1-3 are usable for a standard needle cleaner if the machine is so equipped. NeedleCleanType is set to the value above plus 10 to indicate the presence of the scale-integrated cleaner, but values 14 and 15 should not be used.

If the machine is equipped with multiple standard needle cleaners, the value of NeedleCleanType is set to 21 or 22 where the value 21 indicates a single point used with a 2 inch move in the X direction and a value of 22 indicates the use of two points.  In these configurations, points 1 and 2 define the needle cleaner used for Head 1, points 3 and 4 the cleaner used for Head 2, and points 5 and 6 the cleaner used for Head 3.

| | | |
|---|---|---|
| Scale Pre-settle | ScalePreSettle | [Default 0 sec] |
| Scale Post-settle | ScalePostSettle | [Default 0 sec]<br>ScalePreSettle is the time (ms) to delay after moving to the scale but before dispensing.  ScalePostSettle is the time (ms) to delay after all other activity about the scale but before reading the scale. |
| Scale Prime | ScalePrime | [Default Off] |
| Reset Scale when C... | ResetCalibWt | [Default Off]<br>ScalePrime is On to dispense material to prime the valve before weighing a sample; if ScalePrime is Off, scale operations begin without the prime.  ResetCalibWt is On to use no adjustments when weighing; if Off, each weighing starts with the defined values rather than the adjusted values from prior weighings. |
| Cup Location Count | CupLocCount | The number of divisions around the circumference of the purge cup. |
| Cup Radius | CupRadius | The radius of the cup. |
| Job Accounting | JobAccounting | [Default Off]<br>JobAccounting is set to On to record details about each job run.  Information includes start/end times, operator, heads, materials, program name, etc.  If this is set to Off, no information is recorded. Note that this material must eventually be purged to prevent too much accumulation. |
| Log Retention | RetainDays | [Default 0]<br>Number of days logging information is to be retained.  The default value is 0 for which logging data is retained indefinitely. |

| | | |
|---|---|---|
| Time Between<br>Backup Prompts | BackupDays | [Default 0] |
| Time Between<br>Backup Reminders | BackupNudge | [Default 0]<br>BackupDays is the number of days between scheduled backups.  The default value of 0 equates to a setting of Off.  BackupNudge is the number of days between the display of reminder windows when a backup is overdue.  The default value of 0 equates to a setting of Off. |
| Mapping On | MapOn | [Default Off]<br>MapOn is Off to boot the system in normal operating mode.  Set MapOn to On and reboot to use DScal to map a glass plate (the system must be shutdown and restarted for MapOn to take effect).  A message at startup will state "Modified Servo call for Mapping".  After mapping is complete, set MapOn back to Off and reboot the system for normal operation. |
| White Dot | WhiteDot | [Default Off]<br>This applies only to mapping with DScal, not to normal operations.  Set WhiteDot to Off to map with DScal if the dot on the glass plate is black on a white background; set WhiteDot to On if the dot is white on a black background. |
| X Dots<br>Y Dots | XDots<br>YDots | [Default 35]<br>[Default 35]<br>There are several sizes of glass plates used for mapping with DScal.  On each plate, the physical size of the glass is 1 inch larger in length and height than the area of dots since the dots start ½ inch in from the edge on all sides.  The software needs to know the number of dots to be scanned, not where the edge of the glass is.  Therefore, count the number of dots:<br>XDots = 35, YDots = 35 for an 18" x 18" glass plate<br>XDots = 41, YDots = 41 for an 21" x 21" glass plate<br>XDots = 53, YDots = 53 for an 27" x 27" glass plate |
| Map Area | MapArea | [Default 15000]<br>Number of pixels in the area of a dot on the glass plate.  15000 is the default value for a standard lens. If the machine has a 2X or greater lens, this value must be increased. |
| Stale Calibration | StaleCalibration | [Default 480 minutes]<br>Provides an expiration time (min) for valve/tool calibration.  Even if calibration is suppressed, it will be performed if the last calibration is not within this time limit.  The default of 480 minutes = 8 hours forces recalibration for a new shift. |

| | | |
|---|---|---|
| Calibration Window | CalibrateWindow | [Default 5 mm]<br>Provides the size of a window of acceptance (mm) when calibrating a dispense valve or etch tool.  If the valve/tool must be moved outside this window to find the dot or hole, the operator is prompted to confirm the extent of movement.  Other than causing an extra operator prompt, this has no effect on operation. |
| Bull's Eye | BullsEye | [Default 0 mm]<br>Determines the size of the flashing Bull's Eye figure that displays in the center of the Jog and Pattern Trainer windows.  A zero value in this field turns off the Bull's Eye function.  A non-zero value in this field defines the diameter of the flashing figure.  After the first calibration at the dot on the calibration station, the flashing figure will display in the specified size in either the Jog window or the Pattern Trainer window. |
| Bull's Eye Shape | BullsEyeShape | [Default 1, 2, or 3]<br>Determines which figure (a circle, cross, or rectangle) will represent the Bull's Eye.  A zero value in this field turns off the Bull's Eye display.  The following values determine which figure will display: 1=circle, 2=cross, 3=rectangle. |
| Log Classes | LogFlags | [Default 0]<br>LogFlags is a set of selections for logging messages. Every message has a class (A-Z) associated with it. A message is logged and saved only if its class is selected in Log Classes. Note that a blank class is never logged.<br>A  Air or safety problem.<br>C  Calibration errors (e.g., cannot find pattern).<br>D  Debug messages (should never appear).<br>E  Operator errors (e.g., bad password).<br>H  Hardware failure (e.g., no serial communication).<br>I   Information to operator (e.g., homing).<br>M  Maintenance (e.g., refresh material).<br>N  New names.<br>O  Operator instructions (e.g., clean a needle).<br>P  Program errors (e.g., missing shape definition).<br>R  Results (e.g., material weight).<br>S  System errors (e.g., missing files).<br>U  User messages (user defined).<br>X  Where multiple selects or multiple deletes are allowed.<br>Z  Post-press device.<br>B, F, G, J-L, Q, T, V, W, Y<br>　Unassigned.  These log classes can be used to flag messages for which the user has manually changed the class in the resource file. |
| Cal Dot Sizes | CalDot1<br>CalDot2<br>CalDot3 | [Default 0]<br>These fields contain the true (mm) sizes of the three calibration dots A, B, C. |

# C O N V E Y O R

| Wait for Board | WaitForBoard | [Default 10 seconds] |
| Wait for Release | WaitForRelease | [Default 10 seconds] |

WaitForBoard is the time (seconds) the machine will wait for a board from upstream before requesting operator intervention.   WaitForRelease is the time (seconds) the machine will wait to release a board to downstream before requesting operator intervention.  These may be set to very high values on a continuous line to wait indefinitely for a board transfer without an operator present.

| Enter Dwell | EnterDwell | [Default 0 ms] |
| Exit Dwell | ExitDwell | [Default 0 ms] |

Some machines have heaters at the entry and exit stations. To heat the product properly, a dwell is required at these stations.  Set EntryDwell and ExitDwell to a default time (ms) needed on such a machine.  NOTE: These parameters are available to the program.

| Board Transit | BoardTransit | [Default 100.0 ms/in] |
| Slow Transit | SlowTransit | [Default 100.0 ms/in] |

BoardTransit is the time in milliseconds for the board to move one inch when the conveyor is running at high speed; i.e., it is the transit timing for a board (ms/in).  SlowTransit is the equivalent when a two-speed conveyor is running at low speed.  The value of 100 corresponds to a conveyor speed of 10 in/sec.  If these values are too low, the boards may not move to the stop pins before the conveyor stops.  If too high, premature timeouts may occur, in some cases, trapping a board in transit with a stop pin.  As of version 1.3, the conveyor speed can be determined by running the program conveyspeed.

| Slow Sensors | ConvSlowSensors | [Default Off] |

ConvSlowSensors is normally set to Off unless the conveyor has adjustable intermediate-position sensors used to slow the conveyor to prevent movement of mounted parts when the board stops at a stop pin.  The value of this parameter is ignored if a conveyor is not configured.

| Auto Width | AutoWidthAdjust | [Default On] |

AutoWidthAdjust determines whether to use the automatic width adjust feature on a conveyorized machine.  It is normally On, but may be set to Off if there is no automatic width adjust on the machine or if the width adjust is not operational.

| Max Conveyor Adj | ConveyAdjTime | [Default 30000 ms]<br>ConveyAdjTime is the maximum time (ms) required to adjust the conveyor width from minimum to maximum size. It is used to compute time-out and hang-ups when adjusting the conveyor width automatically. |
|---|---|---|
| Conveyor Clearance | ConveyClearance | [Default 1.0 mm]<br>ConveyClearance is the clearance (mm) allowed for the board motion when adjusting conveyor width. If this value is 1 mm and the board is 150 mm wide, the conveyor is adjusted to 151 mm. |
| Conveyor Calibrate | ConveyCalib | [Default 38.1 mm]<br>ConveyCalib is the conveyor width (mm) at calibration, hence the minimum width allowed for conveyor width adjustment. If board width is less than this value (normally 0 when board width is not specified), manual adjustment is required. The default value is 1.5 inches, the width of the standard gauge block. |
| Vacuum Release Delay | VacReleaseDelay | [Default 50 ms]<br>VacReleaseDelay is the time delay (ms) between turning lifter vacuum off and dropping the lifter. Increase this delay if the board is pulled down when the lifter drops. |

# TEMPERATURE

| Temperature (Entry)<br>Range (+/-)<br>On | PreheatTemp<br>PretheatTempRnge<br>PretheatOn | Temperatures (degrees C) at which the preheat station, is to be maintained. "Range" is a temperature range (degrees C) plus or minus adjacent to the specified temperature. Control is a character "Y" or "N" indicating whether temperature control is to be used. |
|---|---|---|
| PID Name (Entry) | PreHeatPIDname | Names of temperature PID controls at the preheat station. |
| Temperature (Exit)<br>Range (+/-)<br>On | PostheatTemp<br>PostheatTempRnge<br>PostheatOn | Temperatures (degrees C) at which the postheat station, is to be maintained. "Range" is a temperature range (degrees C) plus or minus adjacent to the specified temperature. Control is a character "Y" or "N" indicating whether temperature control is to be used. |
| PID Name (Exit) | PostHeatPIDname | Names of temperature PID controls at the postheat station. |

| Temperature (Work...) | WorkAreaTemp | Temperatures (degrees C) at which the work area is to |
|---|---|---|
| Range (+/-) | WorkAreaTempRnge | be maintained.  "Range" is a temperature range |
| On | WorkAreaOn | (degrees C) plus or minus adjacent to the specified |
| | | temperature.  Control is a character "Y" or "N" indicating |
| | | whether temperature control is to be used. |

| PID Name (Work...) | WorkAreaPIDname | Names of temperature PID controls at the work area. |
|---|---|---|

| - - - - | IGant | **REQUIRED.**  Integer gantry indicator: 1 = Gantry A, |
|---|---|---|
| | | 2 = Gantry B, 3 = Gantry C.  [Default 1] |

| - - - - | FillQuantity | Not used. [Default 0] |
|---|---|---|

| - - - - | PreCoolTemp | When temperatures at the stations may build up, cooling |
|---|---|---|
| - - - - | PreCoolOn | time must be allowed.  These values provide cooling. |
| - - - - | PostCoolTemp | |
| - - - - | PostCoolOn | |
| - - - - | WorkAreaCool | |
| - - - - | WorkAreaCoolOn | |

| - - - - | ShutOffTime | Minimum time (ms) elapsed after dispenser stops to operate |
|---|---|---|
| | | shutoff on a valve. |

| - - - - | dmaOffX | Offsets (memory bytes) in dma for video display. |
|---|---|---|
| - - - - | dmaOffY | |

| - - - - | ModifyLogin | These fields are the user login and the date when this file |
|---|---|---|
| - - - - | ModifyDayTime | was last modified. |
| | | ModifyLogin [Default 'UNKNOWN'] |
| | | ModifyDate [Default current date] |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

# *Retention*

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@RETENTION**

This table contains material retained across program executions.  It is typically used to hold current tool/valve status.

Since all data in this table is generated from program execution, there is no window displaying the fields.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| | IGant | **REQUIRED.**  Integer gantry indicator:  0 = runs on any gantry, 1 = Gantry A only, 2 = Gantry B only, 3 = Gantry C only.  [Default 1] |
| | Rtype Stype | **REQUIRED** short integers. |

| Record Type | Description |
|---|---|
| 0 | Head retention.  Stype is head number. |
| 1 | Cleaner retention.  Stype is cleaner number. |
| 2 | Purge location.  Stype is 0, I0 is purge index. |
| 3 | VCI calibration.  Stype is 0 (RL), 1 (RR), 2 (FL), 3 (FR).  I0 is Zadjust*10000, F0 is Xlength, F1 is Yadjust. |
| 4 | Material time retention.  Stype is head number.  I0 is time limit; I1 is warning limit, C0 is material, C1 is head, B0 is true if defined. |
| 5 | Current material time.  Stype is head number.  I0 is system time expired, I1 is time (min) warning before I0, C0 is material, C1 is head, B0 is true if active. |
| 6 | Counter value.  Stype is counter number, I0 is counter value, non-zero. |

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| | I0 I1 | Optional integer values.  For record type 0, IO contains dot count, I1 contains weight dot count.  [Default 0,0] |
| | F0 F1 | Optional real values.  For record type 0, F0 contains total OnTime, F1 contains idle time.  [Default 0,0] |
| | B0 B1 | Optional "Y" or "N" values. [Default "Y","Y"] |
| | C0 C1 | Optional character strings.  For record type 0, C0 contains tool/valve name, C1 contains material name.  [Default blank] |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## Fixed Locations

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@FIXLOC**

Fixed locations define positions on the table independent of board location.  These locations have various uses, such as pick up points for pallets.  They are taught as needed; coordinates should not be adjusted manually, but pallet detail can be changed within a program.  Values can and usually should be exported to permit reloading without re-teaching points; they can be imported only with special system privilege.

There is currently no window available for updating Fixed Locations.  Fixed Locations are changed with an interactive question/answer process.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| Name | FixLocName | Optional name up to 24 characters long for this location. [Default blank] |
| Location Number | Location | **REQUIRED** integer (0-99) identifying the location. |
| Gantry n | IGant | **REQUIRED.**  Integer gantry indicator:  0 = runs on any gantry, 1 = Gantry A only, 2 = Gantry B only, 3 = Gantry C only.  [Default 1] |
| Description | FixDescr | Optional text field up to 250 characters long containing any descriptive information. [Default blank] |
| X<br>Y | CoordX<br>CoordY | **REQUIRED** absolute coordinates (mm) for this location (distance from the origin). |
| Start Z<br>End Z | StartZ<br>EndZ | Optional start and end absolute Z coordinates for this location.  [Default 0.0,0.0] |
| X Count<br>Y Count | XCount<br>YCount | Optional integer number of pallet elements in the X and Y directions.  [Default 1,1] |
| Angle | Rotation | Optional pallet (array) rotation for this location. [Default 0.0] |
| Operate Time | OperateTime | Optional operate time (ms). [Default 0] |
| X Space<br>Y Space | XSpace<br>YSpace | Optional distance (mm) between pallet entries in the X and Y directions.  [Default 0,0] |
| Operate Delay | OperateDelay | Optional delay (ms). [Default 0] |
| Change Time | ChangeTime | Optional time (ms) to wait for a new pallet before asking operator.  [Default 0.0] |

| No Pallet | | 0 | Recycle without stop at pallet end. |
|---|---|---|---|
| Request New | | 2 | Ask operator for new pallet at pallet end. |
| Use I/O | | 4 | Use CHANGE I/Os at pallet end. |
| Multi Loop | | 1 | Recycle across multi-pallets. |
| Multi Request | | 3 | Ask operator for a new multi-pallet when all pallets are ended. |
| Multi Use I/O | | 5 | Use CHANGE I/Os for a new multi-pallet when all pallets are ended. |
| Start Index | StartIndex | | Start and end pallet indices.  Pallet starts at StartIndex and ends when EndIndex is exceeded regardless of XCount and YCount.  [Default 1,32000] |
| End Index | EndIndex | | |
| Multi X Adjust | MPXAdj | | Optional adjustment distances to move from one multi-pallet to the next.  [Default 0.0, 0.0] |
| Multi Y Adjust | MPYAdj | | |
| Multi X Count | MPXCount | | Optional integer number of multi-pallets in the X and Y direction.  [Default 1,1] |
| Multi Y Count | MPYCount | | |
| Multi Max Index | MPMaxIndex | | Set internally; total number of multi-pallets for this pallet. |
| Change Request | ChangeReq | | Optional integer work area output number (0-1) requesting a pallet change.  [Default 0] |
| Changed | ChangedAck | | Optional integer work area output acknowledging change of a pallet.  [Default 0] |
| Changed Acknowled... | ChangeAck | | Optional integer work area input (0-10) acknowledging pallet change request.  [Default 0] |
| Changed Flag | ChangedFlag | | Optional integer work area input (0-10) indicating a pallet was changed.  [Default 0] |
| - - - - | FixCode | | Internal integer type code:  −1 for default "NONE", else 0. |
| - - - - | XAdj | | Set internally; adjustments (mm) applied to CoordX, CoordY automatically zero (0) when a pallet is reset. [Default 0.0,0.0] |
| - - - - | YAdj | | |
| - - - - | CurIndex | | Set internally; current index.  [Default 0] |
| - - - - | MPIndex | | Set internally; multi-pallet index.  [Default 0] |
| - - - - | Control | | Optional code; determines pallet switching.  [Default 0] |

| - - - - | Fid1X | Optional fiducial coordinates (mm) relative to the |
| - - - - | Fid1Y | reference point.  Zero, one, two, or three fiducials |
| - - - - | Fid1Z | may be defined as needed.  [Default 0] |
| - - - - | Fid2X | |
| - - - - | Fid2Y | |
| - - - - | Fid2Z | |
| - - - - | Fid3X | |
| - - - - | Fid3Y | |
| - - - - | Fid3Z | |
| | | |
| - - - - | FidName1 | Optional fiducial pattern names up to 24 characters long for |
| - - - - | FidName2 | use with automatic vision.  The name provides reference to |
| - - - - | FidName3 | the shape of the fiducial.  [Default NULL] |
| | | |
| - - - - | FidFlag1 | Optional integer 0 or 1 indicating whether the |
| - - - - | FidFlag2 | associated fiducial is used.  [Default 0] |
| - - - - | FidFlag3 | |
| | | |
| - - - - | FidFlag | Optional character "Y" or "N" indicating whether stretch is |
| | | suppressed. [Default "N"] |
| | | |
| - - - - | Fid4X | Optional bad mark coordinates (mm) relative to the |
| - - - - | Fid4Y | reference point. [Default 0] |
| | Fid4Z | |
| | | |
| - - - - | FidName4 | Optional bad mark pattern name.  Up to 24 characters long. |
| | | [Default null] |
| | | |
| - - - - | BdmkUsed | Optional character "Y" or "N" indicating whether the |
| | | associated bad mark is used. |
| | | |
| - - - - | FidFlag4 | Optional integer flag to determine how the bad mark is |
| | | detected and used.  A zero value indicates no bad mark |
| | | indicators.  If the value is 1, process if the mark is present; if |
| | | 2, process if the mark is absent. [Default 0] |
| | | |
| - - - - | CoordZ | Z coordinate; refer to CoordX, CoordY (page 77). |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

# *ErrorLog*

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@ERRLOG**

The error log collects messages from the system based on a level ranging from Information Only to Abort severity.  Each site may set a level appropriate for their operations.

Since data for this table is generated internally there is no window to display the values.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| | IGant | **REQUIRED.**  Integer gantry indicator:  0 = runs on any gantry, 1 = Gantry A only, 2 = Gantry B only, 3 = Gantry C only.  [Default 1] |
| | RecID | Unused integer code to identify the record.  Import creates a new value for this field. |
| | CurTime | Date and time the message was issued.  For import, this can have a wide variety of formats; refer to an SQL manual. [Default current date/time when imported] |
| | Program | Name of program running when the message was produced. [Default "- - - -"] |
| | LogLevel | Code indicator severity level of the message. [Default 0] |
| | LogClass | Character containing class of message. [Default blank] |
| | BdCount SubBdCount | Board and subboard number when this message was generated. [Default 0] |
| | MountLoc | Head number for this message. [Default 0] |
| | IVAL | Response operator makes to the message. Value is the number (0-3). [Default -1] |
| | MsgTxt | Text of the message. [Default " "], up to 250 characters. |
| | ErrNo | Identification number of the message. [Default 0] |
| | ErrValue | Value associated with the error. [Default 0.0] |
| | ErrTarget | Intended target value. [Default 0.0] |
| | ErrCorrection | Value associated with correction of the error. [Default 0.0] |
| | Val | Currently unused float value. [Default 0.0] |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## *Transfer*

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@TRANSFER**                    **Typically unused fields.**

These records cannot be exported or imported.  This information is included for data base documentation only.  @TRANSFER is used to transfer status between gantries.  Only one record is present containing the items.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| | TI0 | Ten integer fields normally used as bit fields to transfer |
| | TI1 | Yes/No status flags.  [Default all 0] |
| | TI2 | |
| | TI3 | |
| | TI4 | |
| | TI5 | |
| | TI6 | |
| | TI7 | |
| | TI8 | |
| | TI9 | |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## *OffLine Operations*

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT**,**@OFFLINE**  **Typically unused fields.**

These records contain the last values used for offline purge, syringe fill, and weight determination.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| Mount Position | MountLoc | **REQUIRED** integer mount location for this data. [Default 0] |
| Suppress Calibration | SuppressCalib | Optional character "Y" or "N" indicating whether Z calibration is to be suppressed. |
| Valve | Head | Name of the tool/valve used for this data up to 18 characters long. |
| Material | MatlID | Name of the material dispensed with this data up to 32 characters long. |
| Program | Program | Optional program name to obtain scale on-times. [Default "- - - -"] |
| Expected Weight | WtValue | Weight (grams) expected from the given OnTimes. [Default 0] |
| Purge On Time<br>Syringe On Time | PurgeOnTime<br>FillOnTime | OnTimes (ms) for offline purging or syringe filling.  If these values are 0, purging or filling is under operator control. |
| Weight On Time(s) | WtOnTime<br>WtOnTime1<br>WtOnTime2<br>WtOnTime3<br>WtOnTime4<br>WtOnTime5 | OnTimes (ms) to weigh a shot offline.  WtOnTime must be non-zero to weigh; any or all other times may be 0. |
| Weight On Times fr... | WtOnTimeFrPrg | Optional character "Y" or "N" indicating whether OnTimes are to be obtained from a program. |
| - - - - | IGant | **REQUIRED.**  Integer gantry indicator:  0 = runs on any gantry, 1 = Gantry A only, 2 = Gantry B only, 3 = Gantry C only.  [Default 1] |
| - - - - | LastCalib | Optional last Z calibration value (mm) for this head. |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## *PID Configuration*

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@PIDCFG**

Temperatures are controlled using a PID loop.  At each control step, a correction is made based on the current temperature and the temperature history.  This file contains coefficients for the correction equation for each temperature controlled in the software.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| Control | PIDName | **REQUIRED** 18 character name for this temperature controller. [Default blank] |
| Sample Time | SampleTime | Optional sample time (ms) for control. [Default 0] |
| Proportional | Proportional | Optional proportional coefficient. [Default 0] |
| Derivative | Derivative | Optional derivative coefficient.  [Default 0] |
| Integral | Integral | Optional integral coefficient.  [Default 0] |
| DAC | ApproachCtl | Optional DAC approach (%).  [Default 0] |
| Absolute Max Temp | AbsMax | Optional maximum (safety) temperature.  [Default 0] |
| Power Limit | PowerLimit | Optional PWM duty cycle (%).  [Default 0] |
| Offset<br>Span Adjust<br>Ramp Up | Toffset<br>SpanAdj<br>RampUp | Optional correction factors.  [Default 0,0,0] |
| - - - - | IGant | **REQUIRED.**  Integer gantry indicator:  0 = runs on any gantry, 1 = Gantry A only, 2 = Gantry B only, 3 = Gantry C only.  [Default 1] |
| - - - - | PIDDescr | Optional text field up to 250 characters long containing any descriptive information.  [Default blank] |
| - - - - | ReadID | Optional A2D port number to read temperature. |
| - - - - | CtlID | Optional D2A port number to control temperature. |
| - - - -<br>- - - - | SetPoint<br>SetRange | Optional default set point and range (degrees C). [Default 37.0, 5.0] |
| - - - -<br>- - - - | OpCtl<br>ReadCtrl | Optional codes to control operation and temperature reading (Disable, Auto, Manual). [Default 0,0] |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## *Scratch*

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**@FORMAT,@SCRATCH**

The scratch file is used internally.  It can neither be exported nor imported.  The description is included for completeness.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| | RecID | Associated program index. |
| | Code | Source identifier. |
| | ScratchCode | –1 for default, else 0. |
| | Text | Scratch data. |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

## *Autoincr*

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

The Auto Increment file is used internally.  It can neither be exported nor imported.  The description is included for completeness.

| Screen Display Name | Data Base Name | Description |
|---|---|---|
| | Programs | Last Program ID |
| | Shapes | Last Shape ID. |
| | CurInfo | Last Job Accounting ID |
| | Scratch | Last Scratch Record ID |
| | Errlog | Last Error Log ID |
| | Spare1 | Unused |
| | Spare2 | Unused |
| | Spare3 | Unused |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

# Views

Several files in the data base are views; i.e., they are compilations of data from other files but do not really exist on their own. They may be neither exported nor imported. This information is included for data base documentation only.

| Screen Display Name | Data Base Name | Description |
| --- | --- | --- |
| | CURINFOV | Extracted fields from management information; one record per defined head. |
| | ZTEST | A scratch file used to test for valid dates. |

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

# APPENDIX - SubType Codes by SubOp & Operation

Each shape operation has at least a couple SubOps associated with it. Each of those SubOps is bound to a specific and unique Sub Type code.

SubOps are sub-operations; they modify the meaning of the operation. For example, the Rectangle operation can be defined by a corner rather than its center by selecting a corner SubOp rather than a center SubOp.

A specific Sub Type code is bound to each SubOp to define that SubOp. For example, the Center SubOp for the Rectangle operation is always a Sub Type code of 0.

> **NOTE:** Some Sub Type codes are available for all machines and some apply only to unique features on a specific machine.

> **WARNING** Care must be taken if subtypes are moved from one machine to another since subtypes relate to both the hardware and software.

As of FLOware software version 2.9J+, current subtype codes are as follows:

*Table 1: SubTypes & SubOps by Operation*

| Operation | SubOp | Sub Type Code | Description |
|---|---|---|---|
| Arc | Relative or blank | 0 | Ordinary center/angle arc. Arc starts at last head position with center of arc at X,Y and moves through an angle Object Rotation. |
|  | 3-Point | 2 | Allows arc to be defined with the three points of the arc. |
| Calibrate | Head | 0 | Calibrate a single, named head. |
|  | All | 1 | Calibrate all defined heads. |
|  | Dot | 3 | Not yet implemented. Recalibrate dot. |
|  | Fiducials | 2 | Not yet implemented. Recalibrate fiducials. |
|  | Weight | 4 | Calibrate weight for named head. |
| Circle | n/a | n/a | not applicable |
| Delay | Absolute or blank | 0 | Delay for specified on time. |
|  | Mark | 1 | Mark current time. |
|  | Limit | 2 | Limit delay at least On Time ms since last mark. |
|  | Entry | 3 | Delay override at Entry station. |
|  | Exit | 4 | Delay override at Exit station. |
| Dot | XMajor | 0 | For array of ordinary dots only. |
|  | YMajor | 1 | For array of ordinary dots only. |
|  | XStagger | 2 | For array of staggered dots only. |
|  | YStagger | 3 | For array of staggered dots only.. |
|  | Circular | 4 | Not currently functional; circular array. |

| Operation | SubOp | Sub Type Code | Description |
|---|---|---|---|
| Line | Direct or blank | 0 | Start a line at first point by moving to the defined point and dispensing a line defined by X, Y. |
| | Fast | 1 | Start a line at the nearest point. |
| Move | Relative or blank | 0 | Normal relative move. The head moves to coordinates relative to the current board/subboard. |
| | Special Locations | 1-3 | The head moves to Special Location 1, Special Location 2, or Special Location 3. |
| | Incremental | 4 | Move incremental. |
| | Tilt Minus | 5 | VCI move tilt minus. |
| | Tilt Plus | 6 | VCI move tilt plus. |
| | Calib Forwd | 7 | Tilts tilt fixture forward to calibrate. |
| | Calib Rearwd | 8 | Tilts tilt fixture rearward to calibrate. |
| Operate | Test | 0 | Operate I/O controls. Used as on/off controls for devices such as UV wand, etc. |
| | Probe | 1 | Operate probe, finding product Z height at specified coordinates. Tests the measured elevation against a set of <Hyperlink>Z Probe Limits (pg 3.139). Reset Z coordinate. |
| | - - - | 2 | Obsolete. |
| | - - - | 3 | Function without an assigned name. Operate input/output. Skip for success. |
| | Halt | 4 | Halt and cancel the program. |

| Operation | SubOp | Sub Type Code | Description |
|---|---|---|---|
| Operate (continued) | Pick | 5 | Operate pickup head to perform part pickup; incremental approach; skip for success. |
| | | | The selected head is moved to position (X, Y), the piggy-back dropped as needed, and the head moved to Settle Z. The head is then moved to Start Z, Pickup control is turned on, and after a delay of On Time, the head is moved to End Z and Pickup_Sense is tested. If Pickup_-Sense fails, this will be repeated up to X Count times before declaring total failure. Total failure turns off Pickup control and issues Message R26, allowing the operator to continue or to abort. If the test is successful, Y Count program lines are skipped. |
| | Place | 6 | Perform part placement operation with pickup tool with blow-off, pressure; skip for failure or success. |
| | | | The selected head is moved to (X,Y), the piggyback is dropped as needed, and the head moves to Settle Z. The head then moves to Start Z, Pickup is turned off, and after a delay of On Time, Release_Ctl is actuated. The time used for blow is controlled by Valve Prime. Release_Ctl is turned off, and then the head moves to End Z. |
| | Z Test | 7 | Test for missing/present part using test probe. Skip if in range. |
| | DotTest | 8 | Test for presence of a dot using the vision system; skip for success. |
| | | | Uses the result of a PICTURE operation to test for the presence of X Count blobs. If the specified number of blobs is present, the next Y Count program lines are skipped; otherwise, all program lines are executed. |
| | No Probe | 9 | Suppress all auto-probe operations. |
| | Prog Pause | 10 | Pause program for operator action. Displays a program pause message. Safety violations do not cancel the run, allowing the operator access to the work area. The operator can continue the run or cancel it. Custom versions of this function can be created with unique messages. |
| | Set Flag | 11 | Set a flag in the current flag word. Each board has an associated set of 31 status flags (numbered 1-31) that can be set/reset to indicate status conditions on the board. These flags are transported with the board on a multi-gantry system. All flags have the initial value 0 for the board at the first (A) gantry. Set Flag sets flag number (X Count) to on if X Count is less than 0 or to off if X COunt is greater than 0. The flag can be tested subsequently with the Test Flag sub-operation. |

| Operation | SubOp | Sub Type Code | Description |
|---|---|---|---|
| Operate (continued) | Test Flag | 12 | Test a flag in current flag word by testing the flag number (X Count). If X Count is greater than or equal to 0 and the addressed flag is off or if X Count is less than 0 and the addressed flag is on, the next Y Count program lines are skipped; otherwise, all program lines are executed. If X Count equals 0, Y Count program lines are skipped unconditionally. |
| | Picture | 13 | Take a picture with the camera at (X,Y) and begins a blob analysis. This operation is normally followed by a Dot Test operation to determine whether an acceptable number of blobs are present.<br><br>Parameters for the analysis are determined by the vision pattern associated with the Picture operation:<br>  Light On Dark ....Y/N: Y = light on dark<br>  NumBlobs .........1-50: Max number blobs found<br>  LowGray ...........1-254: Detection level for 0<br>  HighGray ..........1-254: Detection level for 1<br>  MinArea ............Minimum blob area (pixels)<br>  MaxArea ...........Maximum blob area (pixels)<br>  BlobRatio ..........Less than 1.0: Measure of elongation |
| | Advance Feed | 14 | Advance current pallet. |
| | Cln Needle | 15 | Clean needle for current head. |
| | Purge | 16 | Purge current head and then clean the needle. |
| | Set Lens | 17 | Adjust lens by setting camera parameters:<br>• Gain to X Count if Use Camera Adjust is true and X Count is between 0 and 255.<br>• Offset to Y Count if Use Camera Adjust is true and Y Count is between 0 and 255.<br>• Focus to Fill Spacing if Fill Spacing is less than -1.<br>• Zoom to Scale Factor if Scale Factor is less than -1. |
| | Press | 18 | Perform place operation with pickup tool by moving the gantry down slowly until a pressure head registers the pressure specified by the head. Pressure is maintained for On Time seconds. |
| | - - - | 19 | Function without an assigned name. Searches the current field of view for a camera/lens/light/trained pattern. Pattern name is the subop type. If the pattern is found, the next Y Count lines are skipped; otherwise, all program lines are executed. For a fixed upward looking camera, Z will move where taught in Base Locations for pattern training and searching |
| | Air Off | 20 | Turn air off to current head. |
| | - - - | 21 | Park head. |
| | Mixer Reload | 22 | Reload the mixer valve. |
| | Probe Setup | 23 | Initiate (VCI) probe operation. |

| Operation | SubOp | Sub Type Code | Description |
|---|---|---|---|
| Operate (continued) | Probe Part | 24 | Probe part without fixture rotation and save values. |
| | Probe Reset | 25 | Reset (VCI) probes. |
| | Probe Skip | 26 | Probe tilted (VCI) part and skip lines. |
| | Set Reject | 27 | Flag current board as Reject. |
| | Index Probe | 28 | Index tilt part location. |
| | Tilt Home | 29 | VCI home tilt fixture. |
| | Tilt Forwd | 30 | VCI tilt forward. |
| | Tilt Rearwd | 31 | VCI tilt rearward. |
| | Mark Repeat | 32 | Mark start of repeat prior scan/probe. |
| | Jump Repeat | 33 | Jump to repeat mark, prior scan/probe. |
| | Inspection | 34 | Test for dot inspection needed; then inspect within range. |
| | Dot Size | 35 | Obsolete. Get dot size; does nothing with dot size. |
| | Dot Inspect | 36 | Obsolete. Unconditional (without dot range set by calibration mirror) dot inspect within range. |
| | Flip | 37 | Flip and process second side of board. |
| | Ctr Set | 38 | Set/Reset a counter. |
| | Ctr Inc | 39 | Increment/Decrement a counter. |
| | Ctr ValueLE | 40 | Test a counter less than or equal to a fixed value. |
| | Ctr TestLE | 41 | Test a counter less than or equal to another counter. |
| | Ctr Show | 42 | Select a counter to display. |
| | CtrValueG | 43 | Test a counter greater than a fixed value. |
| | Ctr TestG | 44 | Test a counter greater than another counter. |
| | Resume Pt | 50 | Suspend program execution and resume it at a later point in time. |
| Partition | Optimize or omitted | 0 | Partition can be optimized. |
| | Fixed | 1 | Partition cannot be optimized. |
| Rectangle | Center | 0 | Locate by center. |
| | Corner | 1 | Locate by lower left corner. |
| | Center/out | 2 | Center, spiral out. |
| | Corner/out | 3 | Lower left corner, spiral out. |
| | Center/in | 4 | Center, spiral in. |
| | Corner/in | 5 | Lower left corner, spiral in. |

*Table 1: SubTypes & SubOps by Operation (Continued)*

| Operation | SubOp | Sub Type Code | Description |
|---|---|---|---|
| Setup | Stand Off or omitted | 0 | Set a standoff. Moves the camera to the (X,Y) coordinates of the setup line and asks the operator to place a stand-off in that location. *This feature should be used sparingly since placements require significant operator time.* |
| | Reset Pallets | 1 | Reset all pallets to start locations. |
| | Raise Lifter | 2 | Raise lifter plate. |
| | Lifter Down | 3 | Lower lifter plate. |
| | Entry Delay | 4 | Set entry station delay. |
| | Exit Delay | 5 | Set exit station delay. |
| | Skip Calibration | 6 | Skip calibration. |
| | Cancel MixLd | 7 | Cancel the AlwaysLoadMixer option. |
| | No Stretch | 8 | Cancel fiducial stretch calculation. |
| | Auto Purge | 9 | Valve purge during program run (inline applications). |
| | - - - | 100-199 | Reset specified pallet, alter pallet configuration 0-99. |
| | - - - | 200-299 | Alter pallet advance information 0-99. |
| shapename | XMajor | 0 | For array of ordinary shapes only. |
| | XStagger | 1 | For array of staggered shapes only. |
| | YMajor | 2 | For array of ordinary shapes only. |
| | YStagger | 3 | For array of staggered shapes only. |
| | - - - | 100-199 | Ignore CoordX, CorrdY; use pallet coordinates 0-99. |
| | - - - | 200-? | For future use. |