Import/Export Data Reference Guide

FLOware® Software Ver 2.9.3P

Document Part No. 22100024R
July 19, 2019

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

Version 2.1 dated 06/14/04 CONTINUED

SHAPES	Remove all FidxUsed, BdmkUsed 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. Add PressRnge, AugerSpeed, SBOn.
SHAPEDETAIL	Change dlValve=>MicroSteps, dlAccel=>MicroAccel, dlSB=>MicroSB, ValveSpeed=>MicroSpeed, Remove dummy1. Add PressRnge, AugerSpeed, SBOn.
DEFAULTVALS	Change dlValve=>MicroSteps, dlAccel=>MicroAccel, dlSB=>MicroSB, ValveSpeed=>MicroSpeed. 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. 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. Added IGant, obsoleted Gantry.
CURINFOV	Removed Gauge, replaced with NeedleID.
DEFAULTGEN	Removed Gauge, replaced with NeedleID. Added IGant, obsoleted Gantry. Added MatCode, RecType, IGant, MountFlag, ProgCode, FeatureID, Color, MatGroup, MatlInfo, WtOnTimeFrPrg, WtOnTime1, WtOnTime2, WtOnTime3, WtOnTime4, WtOnTime5.
DEFAULTVALS	Added IGant, obsoleted Gantry. 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. 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. 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 lGant, obsoleted Gantry. Added SnapOffVel, SnapOffAccel, PreSnapDelay, dlAccel.
PROGRAMS	Move all fixed subboard info into PROGRAMS: ProbeSuppress, Fid*, Bdmk*, *Count, *Space all prefixed with "s". Added RecType=-1 normally: record type for default. Added PointSearch, SkpBdNoFid.
RETENTION	Added lGant, obsoleted Gantry.
SHAPEDETAIL	Added lGant, obsoleted Gantry. Added SnapOffVel, SnapOffAccel, PreSnapDelay, dlAccel.
SHAPES	Added RecType=-1 normally: record type for default
SPECIALLOCS	Added lGant, obsoleted Gantry.
UNIVERSALS	Added lGant, 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. Change definition for PurgeCup and add PurgeCup2 and PurgeCup3. 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. Delete UpFlag.
FIXLOC	Add for 1, 2, and 3 heads: Fid, FidnName, FidnUsed, and FidFlag.
ERRLOG	Add LogLevel, LogClass, BdCount, SubBdCount, MountLoc, and IVAL. Add Val.
PIDCFG	Change ReadID and CtlID from REQUIRED to Optional. Change PIDName from Optional to REQUIRED. Add SetPoint, SetRange, OpCtl, and ReadCtl.
VARIATION	Add.
ViEWS	Change all fields listed to capital letters. 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. Modify definition for AlignUsed.
BOARD MOUNT	Remove “future versions will allow selection or rejection of lines...” from FeatureID.
MOUNT	Expand definition of AirPressure. Expand definition of DotsWarn. 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. Delete PrintScaleValues and ScaleMultDots. Update FillWid definition.
SHAPEDET	Change number of levels in OpType from 8 to 14 levels. Update FillWid definition. Add “Typically, this is a board location...” to FeatureID.
HEAD	Add 12 Micro Dot Auger to HeadType.
MATERIAL	Delete UseTempCtl.
GENDFLT	Delete LevDetect. Delete InspectDelay.
SPECLOC	Add CleanNdl6X, CleanNdl6Y, and CleanNdl6Z.
SUBTYPE	Add to Operate: 17 Adjust lens and 18 Seat using a pressure foot. 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. Delete “Values are accumulated only...” from ValveTime1 through ValveTime5.
BASEINFO	Add “Superseded by Permanent Information...” to DBVer. Add “Superseded by Permanent Information...” to SWVer.
UNIVERSAL	Add definitions. Delete FlasherRate, ExitStation, and LiftDownSense. 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. Change integer value from 1-1000 to 0-255, and add “A value of -1 disables change.” for CGain, COffset, ccGain, ccOffset, DotGain, DotOffset. Change “Value” to “Relative value (0.0 to 1.0)” for CFocus, CFStop, ccFocus, ccFStop, DotFocus, DotFStop. Add CZoom, ccZoom, ccTuning, DotZoom. Add “fiducial and” to DotGain. Delete “(1-1000)” from CTuning. 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.
MatlID, MatlInfo	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 Pre-Scan Probes	PreScanVision 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 Length Thick	BdWid BdLen 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 BdY 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 Y Fiducial 2 X Y Fiducial 3 X Y	Fid1X Fid1Y Fid1Z Fid2X Fid2Y Fid2Z Fid3X Fid3Y 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) Pattern (Fiducial 2) Pattern (Fiducial 3)	FidName1 FidName2 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) Used (Fiducial 2) Used (Fiducial 3)	FidFlag1 FidFlag2 FidFlag3	Optional integer 0 or 1 indicating whether the associated fiducial is used. [Default 0]
Touch Span X Y	TouchSpanX 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 Y	Fid4X Fid4Y 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 Y Alignment Pt 2 X Y	Align1X Align1Y Align1Z Align2X Align2Y 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 Fiducial 1 Y	sFid1X sFid1Y sFid1Z sFid2X sFid2Y sFid2Z sFid3X sFid3Y sFid3Z	Optional fiducial coordinates (mm) relative to the subboard reference point. Zero, one, two, or three fiducials may be defined as needed. [Default NULL]
Fiducial 2 X Fiducial 2 Y		
Fiducial 3 X Fiducial 3 Y		
Fiducial 1 Pattern Fiducial 2 Pattern Fiducial 3 Pattern	sFidName1 sFidName2 sFidName3	Optional fiducial subboard pattern names up to 24 characters long for use with automatic vision. This name provides reference to the shape of the fiducial. [Default NULL]
Fiducial 1 Used Fiducial 2 Used Fiducial 3 Used	sFidFlag1 sFidFlag2 sFidFlag3	Optional integer 0 or 1 indicating whether the associated subboard fiducial is used. [Default “N”]
Bad Mark Location X Bad Mark Location Y	sFid4X sFid4Y sFid4Z	Optional bad mark indicator coordinates (mm) relative to the subboard reference point. [Default NULL]
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... Array Dimensions Y	sXCount sYCount	Not currently functional, however, values can be entered. 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... Array Dimensions Y	sXSpace sYSpace	Not currently functional, however, values can be entered. 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 Min Pixel Count	ccMaxPix ccMinPix	Maximum and minimum pixel counts for calibration dot.
Dot Volume	ccDotVol	Volume of dot for calibration dot.
Pre-Heat Temperature Pre-Heat Range Pre-Heat Heater On Post-Heat Temperature Post-Heat Range Post-Heat Heater On Work Area Temperatur Work Area Range Work Area Heater On	PreHeatTemp PreHeatTmpRnge PreHeatTmpCtl PostHeatTemp PostHeatTmpRnge PostHeatTmpCtl WorkAreaTemp WorkAreaTmpRnge 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 Post-Heat PID Work Area PID	PreHeatPIDname PostHeatPIDname 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 Post Press Range Post Press Time	PostSeatPress PostPressRnge PostPressTime	Pressure in grams for post-press pressure Range in grams for post-press pressure 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 Category	LotType 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"]
- -	Fid1XA Fid1YA Fid2XA Fid2YA Fid3XA Fid3YA	Fiducial adjustments (mm). These values are no longer used.

- - - -	BdsPerMag MagPitch Base2Slot1	These parameters are values downloaded to a magazine feeder if such a feeder is attached. They are the number of 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 ModifyLogin	Log in name used when this program was first entered/last modified. [Default UNKNOWN]
- - - -	EntryDayTime ModifyDayTime	Time stamp indicating when this program was first 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 Y Angle	BdX BdY BdZ 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.

VALVES

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	Value determines whether normal pump operation or deferred pump reverse operation will occur. The difference between the two operations occurs immediately after the servo pump is turned OFF at or near the end of a Line/Arc/Move operation.
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.

WEIGHT

Weighing On Time	WtOnTime WtOnTime1 WtOnTime2 WtOnTime3 WtOnTime4 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

CALIBRATION DOT

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.

XY CALIBRATION

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 Min Pixel Count	CMaxPix 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

OBSERVATION

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 Min Pixel Count	DotMaxPix DotMinPix	Maximum and minimum pixel counts for dot inspection.
Dot Volume	DotDotVol	Not yet implemented. Dispensed dot volume.

TEMPERATURE

Material Temperature Material Range Material Heater On	MatlTemp MatlTmpRnge MatlTmpCtl	Temperatures (degrees C) at which the material (tube/reservoir) 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	MatlPIDname	PID name for material temperature control.
Needle Temperature Needle Range Needle Heater On	NeedleTemp NeedleTmpRnge NeedleTmpCtl	Temperatures (degrees C) at which the needle 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	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)

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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
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 HdType2 HdType3 HdType4 HdType5	Head type if tool/valve is calibrated, -1 if not calibrated. Types are: 0 DUMMY 1 LX AUGER VALVE 2 SYRINGE 3 NEEDLE VALVE 4 ETCH HEAD 5 ROUT HEAD 6 UNKNOWN HEAD TYPE 7 PICKUP HEAD 8 DRIP_LESS (LX Auger Valve) 9 TWO PART 10 AIR DRILL 11 VARIABLE SPEED AUGER 12 MICRO-DOT AUGER 13 CARTRIDGE 14 MV50/400
CALfA CALfB CALfC CALfD	Transform parameters for forward vision calibration.
CALra CALrb CALrc CALrd	Transform parameters for reverse vision calibration.
Discriminant	Discriminant of forward transform.
Zoom	Camera zoom value for automatic camera.

Program Detail

@FORMAT,@DETAIL

Program detail records describe each operation performed for the program. 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 PARTITION 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 PARTITION record or the value of the system default.

As of Version 2.4, Program detail, Shape detail, and Default value records all have essentially the same form and the same display. This form is described in detail here with exceptions noted for Shape records. Default values now appear in the program named "...Defaults...".

Screen Display Name	Data Base Name	Description
Gantry...	IGant	Integer gantry ID. 0 runs on any gantry, 1 on Gantry A only, 2 on Gantry B only, etc.
Operation	OpType	**REQUIRED** name of the operation to perform, up to 12 characters long. This may be the name of one of the primitive operations (DOT, LINE, RECTANGLE, etc) or it may be the name of a shape or of a shape without a */ prefix (i.e., A/, S/, etc.). Required shapes must be present before running a program using the shapes. For details about primitive operations, see *FLOware™ Software Guide, Operation Types.*
SubOp	OpSubType	Optional name of a subtype, up to 12 characters long. This is used when the OpType field allows subtypes to modify the meaning of the OpType (e.g., to define a rectangle by a corner rather than its center). The name entered here must appear in the SUBTYPES table and must be allowed for OpType; otherwise, the subtype will be ignored.
Inspect	DotTest	One character 'Y' or 'N' indicating whether this dot is to be automatically inspected.
X Y	CoordX CoordY	Optional location (mm) where this operation is to occur relative to the board reference point. Although optional, most operations are of little use unless coordinates are supplied for the operation.
Theta	Theta	Optional rotation (radians) of the fourth axis for this valve/tool.
Object Rotation	AngA	Optional angle through which this operation/feature is to be rotated (radians). This angle applies to the shape, line, rectangle, etc. defined by OpType; rotation is performed about the point (CoordX, CoordY).
Size X or Start Dia Size Y or End Dia	SizeXStrtD SizeYEndD	These fields define the X and Y dimensions (mm) of a rectangle before rotation through AngA and before ScaleFactor adjustment, or the X and Y dimensions (mm) of a line before rotation through AngA and before ScaleFactor adjustment, or the start and end diameters (mm) of a circular ring before ScaleFactor adjustment.

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 Head	Copies from Head table. 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 On/Off Ctrl	MoveControl 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.

EXTRA CONTROL

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	Value determines whether normal pump operation or deferred pump reverse operation will occur. The difference between the two operations occurs immediately after the servo pump is turned OFF at or near the end of a Line/Arc/Move operation.
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 Y Count	Xcount Ycount	Integer number of array elements in the X and Y directions before rotation of the array. [These counts default to 1 for a non-array.]
X Space Y Space	XSpace YSpace	Space (mm) between array elements in the X and Y 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 Y Start Z End Z Velocity	TrackX TrackY TrackStartZ TrackEndZ TrackVel	Parameters to be used in backtracking.

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 Flag Value	FlagNumber FlagValue	Integer bit number (0-31) and value (0-1) to change or test bit flags.
Head Pressure	HeadPressure	Operating pressure (kPa) for this head.
Minimum Z value Maximum Z value	ZTestMin ZTestMax	Minimum and maximum Z coordinate values allowed (mm).

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.

VISION

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.

BLOBS

Blob Count	BlobCount	Integer number of blobs to be found by the vision system.
Low Gray High Gray	LowGray 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 Max Area	MinArea MaxArea	Minimum and maximum areas (pixels) of blobs for blob search. [Defaults 100, 15000]
Window Height Window Width	WinHeight 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).

SERVICE

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 Alternate PS Type MoPar Index Snap Mopar	PSType PSTypeAlt MoparIndex 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 Y	Fid1X Fid1Y Fid1Z	Fiducial coordinates (mm) relative to the shape origin (0,0). Zero, one, two, or three fiducials may be defined as needed.
Fiducial 2 X Y	Fid2X Fid2Y Fid2Z	
Fiducial 3 X Y	Fid3X Fid3Y Fid3Z	
Pattern (Fiducial 1) Pattern (Fiducial 2) Pattern (Fiducial 3)	FidName1 FidName2 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) Used (Fiducial 2) Used (Fiducial 3)	FidFlag1 FidFlag2 FidFlag3	Optional integer 0 or 1 indicating whether the associated fiducial is used. [Default 0]
Bad Mark X Y (Bad Mark)	Fid4X Fid4Y 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]

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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] Current values are: 0 NONE 1 LX AUGER VALVE 2 SYRINGE 3 NEEDLE VALVE 4 ETCH HEAD 5 ROUT HEAD 6 UNKNOWN HEAD TYPE 7 PICKUP HEAD 8 DRIP LESS (LX Auger Valve) 9 TWO PART 10 AIR DRILL 11 VARIABLE SPEED AUGER 12 MICRO-DOT AUGER 13 CARTRIDGE 14 MV50/400 15 ONE PART 16 NCM
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 values, see pages 31 through 32
	DispVel	Velocity (mm/sec).	
	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.

Safety Location	SafetyX SafetyY SafetyZ	Coordinates of a location where the gantry is in a safe (non-interfering) position.
Near Home Location	NearHomeX NearHomeY NearHomeZ	Coordinates where the gantry is out of the way, typically very close to the position of the gantry after homing.
Park Location	ParkX ParkY ParkZ	Coordinates where gantry rests when not processing.
Refresh Location	RefreshX RefreshY RefreshZ	Coordinates of the location where the gantry should move for valve/tool service.
Target	TargetX TargetY TargetZ	Coordinates placing the camera over a calibration target.
Head1	HdLoc1X HdLoc1Y 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 HdLoc2Y HdLoc2Z	
Head3	HdLoc3X HdLoc3Y HdLoc3Z	
Head4	HdLoc4X HdLoc4Y HdLoc4Z	
Head5	HdLoc5X HdLoc5Y HdLoc5Z	

TouchPad	TouchPadX TouchPadY 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 PurgeCup1Y PurgeCup1Z	Coordinates placing the camera over the purge cup for heads 1, 2, and 3.
Purge Cup 2	PurgeCup2X PurgeCup2Y PurgeCup2Z	
Purge Cup 3	PurgeCup3X PurgeCup3Y PurgeCup3Z	
Drill Pad	DrillPadX DrillPadY DrillPadZ	Coordinates placing the camera over the drill pad.
Camera Calibration A1	CamCal1X CamCal1Y CamCal1Z	Coordinates placing the camera over calibration dot 1.
Camera Calibration A2	CamCal2X CamCal2Y CamCal2Z	Coordinates placing the camera over calibration dot 2.
Camera Calibration B1	CamCal3X CamCal3Y CamCal3Z	Coordinates placing the camera over calibration dot 1.
Camera Calibration B2	CamCal4X CamCal4Y CamCal4Z	Coordinates placing the camera over calibration dot 2.
Camera Calibration C1	CamCal5X CamCal5Y CamCal5Z	Coordinates placing the camera over calibration dot 1.
Camera Calibration C2	CamCal6X CamCal6Y CamCal6Z	Coordinates placing the camera over calibration dot 2.
Paper Pad	PaperPadX PaperPadY PaperPadZ	Coordinates placing the camera over the paper pad.
Work Area Origin	OriginX OriginY 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 ProbeY ProbeZ	Coordinates placing the height sense device on mount location 1 over the calibration target.

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

RejectLocation	RejectX RejectY RejectZ	Coordinates placing the camera where rejected parts are dropped.
StampWell	StampWellX StampWellY StampWellZ	Coordinates of the Stamp Well.
Camera2	Camera2X Camera2Y Camera2Z	Coordinates of the second movable camera.
Fixed Camera	FixCameraX FixCameraY FixCameraZ	Coordinates of the fixed camera.
Tilt Calibration LF	TiltCal1X TiltCal1Y TiltCal1Z	Coordinates of the left front corner of the tilt fixture.
Tilt Calibration RF	TiltCal2X TiltCal2Y TiltCal2Z	Coordinates of the right front corner of the tilt fixture.
Tilt Calibration RR	TiltCal3X TiltCal3Y TiltCal3Z	Coordinates of the right rear corner of the tilt fixture.
Tilt Calibration LR	TiltCal4X TiltCal4Y 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] 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. Input/output numbers are: -1/-2 current Head I/O A/B 0 none 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 1 Plastic 2 One Piece 3 Tapered Plastic 4 Teflon Lined 5 Vacuum Cup 6 Flat Surface 7 Ceramic 8 Full Metal
Type of Tip	NeedleType	0 Flat 1 Conical 2 Round Tool 3 Square Tool 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.

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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 Gauge2 Gauge3 Gauge4 Gauge5	Optional needle gauge for each tool/valve used with this run. [Default 25] This field is obsolete.
NeedleID1 NeedleID2 NeedleID3 NeedleID4 NeedleID5	Optional name of each needle used with this run.
AirPressure1 AirPressure2 AirPressure3 AirPressure4 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] 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 Y Probe Offset	ProbeOffsetX ProbeOffsetY	ProbeOffsetX [Default 4] ProbeOffsetY [Default -4] 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] 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] 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] 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] 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] 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] 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] Time interval to repeat dot size inspection (sec).
Max Chip Index Drill Spacing	MaxChipIndex DrillSpacing	[Default 1] [Default 5.0 mm] 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] 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] 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] 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 Cleaning Velocity Cleaning Increment Cleaning Count	NeedleCleanType CleaningVel NeedleClnInc NeedleClnMax	[Default 0] [Default 0.0 mm/sec] [Default 0.0 mm] [Default 0] 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. 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 Scale Post-settle	ScalePreSettle ScalePostSettle	[Default 0 sec] [Default 0 sec] 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 Reset Scale when C...	ScalePrime ResetCalibWt	[Default Off] [Default Off] 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] 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] Number of days logging information is to be retained. The default value is 0 for which logging data is retained indefinitely.

Time Between Backup Prompts	BackupDays	[Default 0]
Time Between Backup Reminders	BackupNudge	[Default 0] 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] 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] 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	XDots	[Default 35]
Y Dots	YDots	[Default 35] 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: XDots = 35, YDots = 35 for an 18" x 18" glass plate XDots = 41, YDots = 41 for an 21" x 21" glass plate XDots = 53, YDots = 53 for an 27" x 27" glass plate
Map Area	MapArea	[Default 15000] 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] 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] 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] 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] 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] 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. A Air or safety problem. C Calibration errors (e.g., cannot find pattern). D Debug messages (should never appear). E Operator errors (e.g., bad password). H Hardware failure (e.g., no serial communication). I Information to operator (e.g., homing). M Maintenance (e.g., refresh material). N New names. O Operator instructions (e.g., clean a needle). P Program errors (e.g., missing shape definition). R Results (e.g., material weight). S System errors (e.g., missing files). U User messages (user defined). X Where multiple selects or multiple deletes are allowed. Z Post-press device. B, F, G, J-L, Q, T, V, W, Y 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 CalDot2 CalDot3	[Default 0] These fields contain the true (mm) sizes of the three calibration dots A, B, C.

CONVEYOR

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] 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] 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] 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] 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) Range (+/-) On	PreheatTemp PretheatTempRnge 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) Range (+/-) On	PostheatTemp PostheatTempRnge 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...) Range (+/-) On	WorkAreaTemp WorkAreaTempRnge WorkAreaOn	Temperatures (degrees C) at which the work area 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 (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 PreCoolOn PostCoolTemp PostCoolOn WorkAreaCool WorkAreaCoolOn	When temperatures at the stations may build up, cooling time must be allowed. These values provide cooling.
- - - -	ShutOffTime	Minimum time (ms) elapsed after dispenser stops to operate shutoff on a valve.
- - - - - - - -	dmaOffX dmaOffY	Offsets (memory bytes) in dma for video display.
- - - - - - - -	ModifyLogin ModifyDayTime	These fields are the user login and the date when this file was last modified. ModifyLogin [Default 'UNKNOWN'] ModifyDate [Default current date]

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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.
	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 Y	CoordX CoordY	**REQUIRED** absolute coordinates (mm) for this location (distance from the origin).
Start Z End Z	StartZ EndZ	Optional start and end absolute Z coordinates for this location. [Default 0.0,0.0]
X Count Y Count	XCount 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 Y Space	XSpace 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 End Index	StartIndex EndIndex	Start and end pallet indices. Pallet starts at StartIndex and ends when EndIndex is exceeded regardless of XCount and YCount. [Default 1,32000]
Multi X Adjust Multi Y Adjust	MPXAdj MPYAdj	Optional adjustment distances to move from one multi-pallet to the next. [Default 0.0, 0.0]
Multi X Count Multi Y Count	MPXCount MPYCount	Optional integer number of multi-pallets in the X and Y direction. [Default 1,1]
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 YAdj	Set internally; adjustments (mm) applied to CoordX, CoordY automatically zero (0) when a pallet is reset. [Default 0.0,0.0]
- - - - - - - -	CurIndex MPIndex	Set internally; current index. [Default 0] Set internally; multi-pallet index. [Default 0]
- - - -	Control	Optional code; determines pallet switching. [Default 0]

- - - -	Fid1X	Optional fiducial coordinates (mm) relative to the reference point. Zero, one, two, or three fiducials may be defined as needed. [Default 0]
- - - -	Fid1Y	
- - - -	Fid1Z	
- - - -	Fid2X	
- - - -	Fid2Y	
- - - -	Fid2Z	
- - - -	Fid3X	
- - - -	Fid3Y	
- - - -	Fid3Z	
- - - -	FidName1	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]
- - - -	FidName2	
- - - -	FidName3	
- - - -	FidFlag1	Optional integer 0 or 1 indicating whether the associated fiducial is used. [Default 0]
- - - -	FidFlag2	
- - - -	FidFlag3	
- - - -	FidFlag	Optional character “Y” or “N” indicating whether stretch is suppressed. [Default “N”]
- - - -	Fid4X	Optional bad mark coordinates (mm) relative to the reference point. [Default 0]
- - - -	Fid4Y	
	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).

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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 Yes/No status flags. [Default all 0]
	TI1	
	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 Syringe On Time	PurgeOnTime 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 WtOnTime1 WtOnTime2 WtOnTime3 WtOnTime4 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 Span Adjust Ramp Up	Toffset SpanAdj 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.
- - - - - - - -	SetPoint SetRange	Optional default set point and range (degrees C). [Default 37.0, 5.0]
- - - - - - - -	OpCtl 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.

Table 1: SubTypes & SubOps by Operation (Continued)

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.

Table 1: SubTypes & SubOps by Operation (Continued)

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 piggyback 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.

Table 1: SubTypes & SubOps by Operation (Continued)

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. Parameters for the analysis are determined by the vision pattern associated with the Picture operation: Light On Dark ....Y/N: Y = light on dark NumBlobs .....1-50: Max number blobs found LowGray .....1-254: Detection level for 0 HighGray .....1-254: Detection level for 1 MinArea .....Minimum blob area (pixels) MaxArea .....Maximum blob area (pixels) 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: • Gain to X Count if Use Camera Adjust is true and X Count is between 0 and 255. • Offset to Y Count if Use Camera Adjust is true and Y Count is between 0 and 255. • Focus to Fill Spacing if Fill Spacing is less than -1. • 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.

Table 1: SubTypes & SubOps by Operation (Continued)

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.