CD8Prep 0.12
6/8/2011 14:13:17
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Method

Author: Administrator

Description:

---------------------------------------------------------------------------
Start

---------------------------------------------------------------------------
Comment

Description:

Version History

Comment:

0.10 10-20-08 OS FillVials & CD8Prep combined (w/real rotating ALP)

---------------------------------------------------------------------------
Scripted Let

Bitmap: C:\Program Files\Biomek Software\Bitmaps\Vials.bmp

Description:

Caption: Scripted Let

Code: World.Globals.PropertyChanger.ClearGlobals

Set World.Volatile.Shell = CreateObject("WScript.Shell")

    Extend "MFX", CreateObject("MGH_FX.CCD8Prep3")
    Extend "KW", CreateObject("OSTools.CKeywords")
    Extend "TLS", CreateObject("OSTools.CTools")
    Extend "PC", World.Globals.PropertyChanger
    Extend "PG", World.Globals.PauseGenerator
    Extend "SIM", CBool(Pipettor.PipettorObject.Channel.Port = "Simulate")
    Extend "IsRunning", Not CreateObject("World.EngineObject").Simulating
Extend "SNStartBelowCM", 0.6
Extend "ZMinCryo", 0.5

Extend "RowWells", Array("", "1,2,3,4,5,6","7,8,9,10,11,12", "13,14,15,16,17,18", "19,20,21,22,23,24")
Extend "ColWells", Array("", "1,5,9,13,17,21", "2,6,10,14,18,22", "3,7,11,15,19,23", "4,8,12,16,20,24")
Prompt: [IDispatch]
Tooltip: Configure Step

Script
Description:
Demo UI: P=34363, Pod=464, Volume=0
Execute the following script code:

'Make the wash station visible so it can be used in the SN Dispense step
World.LabwareClasses.WashStation.Visible = True

PC.SetGlobal "VolMinSB", cint(StepDictionary.Let.minsb)
PC.SetGlobal "VolMaxSB", cint(StepDictionary.Let.maxsb)
PC.SetGlobal "MaxVolInTips", cint(StepDictionary.Let.maxvtip)
PC.SetGlobal "SettleTimeBlood", cstr(StepDictionary.Let.settletimeblood)
PC.SetGlobal "SettleTime", cstr(StepDictionary.Let.settletime)
PC.SetGlobal "WorkOffline", cbool(StepDictionary.Let.wkoffl)
PC.SetGlobal "SendSMS", "/doit=" & cbool(StepDictionary.Let.sndsms)
PC.SetGlobal "TipsUsed", 0
PC.SetGlobal "Col1", "1,7,13,19"
PC.SetGlobal "Col2", "2,8,14,20"
PC.SetGlobal "Col3", "3,9,15,21"
PC.SetGlobal "Col4", "4,10,16,22"
PC.SetGlobal "Col5", "5,11,17,23"
PC.SetGlobal "Col6", "6,12,18,24"

PC.SetGlobal "Col12", "1,7,13,19,2,8,14,20"
PC.SetGlobal "Col34", "3,9,15,21,4,10,16,22"
PC.SetGlobal "Col56", "5,11,17,23,6,12,18,24"

PC.SetGlobal "Wells", Array("",
"1,2,3,4,5,6","1,7,2,8,3,9,4,10,5,11,6,12","1,7,13,2,8,14,3,9,15,4,10,16,5,11,17,6,12,18",
Col1 & "," & Col2 & "," & Col3 & "," & Col4 & "," & Col5 & "," & Col6)

xCol0 = array("","","","",""")
xCol1 = array("","1","1,7","1,7,13","1,7,13,19")
xCol2 = array("","2","2,8","2,8,14","2,8,14,20")
xCol3 = array("","3","3,9","3,9,15","3,9,15,21")
xCol4 = array("","4","4,10","4,10,16","4,10,16,22")
xCol5 = array("","5","5,11","5,11,17","5,11,17,23")
xCol6 = array("","6","6,12","6,12,18","6,12,18,24")

PC.SetGlobal "Col", array(xCol0,xCol1,xCol2,xCol3,xCol4,xCol5,xCol6)

' Tip Patterns - single or pairs
PC.SetGlobal "OneTip", array("","1","1,2","1,2,3","1,2,3,4")
PC.SetGlobal "TwoTips", array("","1,5","1,2,5,6","1,2,3,5,6,7","1,2,3,4,5,6,7,8")
'---- Move pods to ZMax --------------

LeftPod.MoveZ LeftPod.Max.Z

On Error Resume Next ' in case there is no RightPod

zm = RightPod.Max.Z-1

ArrZ = array("z1","z2","z3","z4","z5","z6","z7","z8")

ArrZDisp = array(zm,zm,zm,zm,zm,zm,zm,zm)

ArrD = array("d1","d2","d3","d4","d5","d6","d7","d8")

ArrDDisp = array(0,0,0,0,0,0,0,0)

RightPod.AbsoluteMoveAxes ArrZ, ArrZDisp, RightPod.SpeedLimit

---------------------------------------------------------------------------

Group

---------------------------------------------------------------------------

Define EmptyTipsToWaste

fromtop = -0.2

---------------------------------------------------------------------------

Script

Description:

Disp&TouchOff

Execute the following script code:

Set WS = Pipettor.Deck.Positions.W1

RightPod.ApproachPosition "W1", WS.LabwareX+WS.WasteX, WS.LabwareY, 6.3

TipLength = World.TipClasses(RightPod.Tip1.Class.Name).Height

ZDisp = WS.Z1 + TipLength + FromTop
ArrZDisp = array(ZDisp,ZDisp,ZDisp,ZDisp,ZDisp,ZDisp,ZDisp,ZDisp)
ArrDDisp = array(0,0,0,0,0,0,0,0)

ArrZ = array("z1","z2","z3","z4","z5","z6","z7","z8")
ArrD = array("d1","d2","d3","d4","d5","d6","d7","d8")

RightPod.AbsoluteMoveAxes ArrZ, ArrZDisp,RightPod.SpeedLimit

RightPod.AbsoluteMoveAxes ArrD, ArrDDisp,30 ' was 10

RightPod.RelativeMoveAxes "x", -WS.WasteX,10
RightPod.RelativeMoveAxes "y", -0.3,4
RightPod.RelativeMoveAxes "y", 0.6,4

For i = 1 to 8
    If IsObject(RightPod.VariantDictionary.Get("Tip" & i)) Then
        Set Tip = RightPod.VariantDictionary.Get("Tip" & i)
        Set Contents = Tip.Contents
        For j = 1 to Contents.Count
            Tip.RemoveContent RightPod
        Next
    End If
Next

RightPod.MoveToMaxZ

Air = RightPod.SystemTrailingAirgap
ArrAirgap = array(Air,Air,Air,Air,Air,Air,Air,Air)

RightPod.AbsoluteMoveAxes ArrD, ArrAirgap,RightPod.STAGSpeed
End Procedure

Define GetNewTips

pattern = "1,2,3,4,5,6,7,8"

If

If "Not TipsLoaded":

Then

Span-8 Wash

Wash all probes of Pod2 at W1; do a passive wash by dispensing 0 mL while in the wells and 1 mL to waste. Delay for 300 ms after each dispense.

Span-8 New Tips

Get new Span_8_1000uL_LLS tips for probes specified by "=Pattern" on Pod2.

Script

Description:

Execute the following script code:

PG.StallUntilETSIs 0

PC.SetGlobal "TipsLoaded", True

' IMPORTANT
'don't use the SetGlobal step for this as it interprets False as a string.
' Example: In a SetGlobal step set MyGlobal False and test it subsequently
' in an If step with condition MyGlobal = False, the result is False i.e. MyGlobal was not
considered False.

Set "TipsLoaded" to "True"

End

Else

End

End Procedure

Define DropTips

Span-8 Discard Tips
Discard tips from all probes on Pod2.

Script
Description:
Execute the following script code:
PG.StallUntilETSI= 0
PC.SetGlobal "TipsLoaded", False

Set "TipsLoaded" to "False"

End Procedure

Define StartTimer

index = =""


timername = "Default"
waittime = "00:00:00"

End Procedure

End Procedure

Define WaitTimer
index = ""
setter = True
timername = ""
waittime = "00:00:00"

End Procedure

Script
Description:
Execute the following script code:
If IsRunning Then
    PG.StallUntilETSIs 0
    If 1>TLS.SecondsLeft(TimerName & index) Then TLS.SetTimer TimerName & index, WaitTime
End If

If IsRunning Then PG.StallUntilETSIs 0
If Not SIM And TimerName <> "" Then _
    Pipettor.LightCurtain.Pause
Script

Description:

Execute the following script code:

'Wait Timer

If IsRunning And TimerName <> "" Then
    If SetTimer Then TLS.SetTimer TimerName & Index, WaitTime
    If 0<TLS.SecondsLeft(TimerName & Index) Then TLS.WaitTimer TimerName & Index
End If

'Resume LightCurtain

If Not SIM Then Pipettor.LightCurtain.Resume

End Procedure

Define ParkInWashStation

    fromtop = -0.2
    rule = 3
    withtipwash = False

If

    If "WithTipWash"

Then

Configure

Bitmap: C:\Program Files\Biomek Software\Bitmaps\Vials.bmp

Description:
Caption: Configure

Code: ' Make the wellmap string. Depends on labware -
' if number of rows = 8 then tips 1-2-3-4
' can only use the upper 4 rows.
' Condition not implemented - always assumes 8 rows for now.

' First get the labware properties:
rows = Positions(Pipettor.Deck.FindLabwarePosition("WashTips")).Labware.Class.WellsY
cols = Positions(Pipettor.Deck.FindLabwarePosition("WashTips")).Labware.Class.WellsX

Select Case Rule
Case 2
   Extend "UseTips", "5,6,7,8"
   PC.SetGlobal "TipWashColLower", TipWashColLower + 1
   WA = Split(MFX.TB1.WellsInCol(TipWashColLower, rows*1, cols*1), ",")
   Extend "WellString", WA(4) & "," & WA(5) & "," & WA(6) & "," & WA(7)
Case Else ' 1 or 3
   Extend "UseTips", "1,2,3,4"
   PC.SetGlobal "TipWashColUpper", TipWashColUpper + 1
   WA = Split(MFX.TB1.WellsInCol(TipWashColUpper, rows*1, cols*1), ",")
   Extend "WellString", WA(0) & "," & WA(1) & "," & WA(2) & "," & WA(3)
End Select

Let: [IDispatch]
Weak: [IDispatch]
Prompt: [IDispatch]
Tooltip: Scripted Let
Transfer

Using Pod2, execute the following transfer:

From: WashTips, sections specified by "=WellString", BeadsplusCells

Proceed down first, then left to right.

Start from the beginning of the selection.

Do not set the mark.

Use the following custom technique:

Use the following pipetting template: OS Span-8 P1000 MixOnly

Calibration Offset: 0

Calibration Slope: 1

Minimum Pipetting Height: 1.5 mm

Prewet: False

Aspirate Blowout: True

Follow Liquid: True

Height: 0 mm from the top

Mix: True

Mix Aspirate Speed: 100µL/s

Mix Aspirate Height: -10 mm from the top

Mix Dispense Speed: 100µL/s

Mix Dispense Height: -10 mm from the top

Mix Count: 1

Mix Volume: =MaxVolInTips µL

Operation speed: 5µL/s

Tip Touch: True

Trailing Air Gap: False

Override Liquid Type Settings

Aspirate Delay: 200 ms

Aspirate Speed: 50 µL/s
Blowout Delay: 0 ms
Blowout Volume: 20 µL
Dispense Delay: 0 ms
Dispense Speed: 950 µL/s
Prewet Delay: 0 ms
Prewet Overage: 0 µL
Tip Touch Delay: 0 ms
Tip Touch Speed: 50 µL/s
Trailing Air Gap Volume: 1 µL

Override the technique height by moving to -10 mm from the top.
To: WashTips, 0µL, sections specified by "=WellString", BeadsplusCells
Proceed down first, then left to right.
Start from the beginning of the selection.
Do not set the mark.
Use the following custom technique:

Use the following pipetting template: Span-8 P1000
Calibration Offset: 2.54
Calibration Slope: 1.033
Minimum Pipetting Height: 0.5 mm
Prewet: False
Blowout: False
Follow Liquid: False
Height: 0 mm from the liquid
Mix: False
Mix Aspirate Speed: 100µL/s
Mix Aspirate Height: 0 mm from the liquid
Mix Dispense Speed: 100µL/s
Mix Dispense Height: 0 mm from the liquid
Mix Count: 1
Mix Volume: 900 µL
Operation speed: 70µL/s
Tip Touch: False
Override Liquid Type Settings
    Aspirate Delay: 10 ms
    Aspirate Speed: 300 µL/s
    Blowout Delay: 10 ms
    Blowout Volume: 20 µL
    Dispense Delay: 20 ms
    Dispense Speed: 200 µL/s
    Prewet Delay: 0 ms
    Prewet Overage: 0 µL
    Tip Touch Delay: 300 ms
    Tip Touch Speed: 70 µL/s
    Trailing Air Gap Volume: 10 µL

Override the technique height by moving to -10 mm from the top.
Dispense up to 1 time(s) per draw.
Create 1 replicate(s) of each source well.
Keep the current tips
Keep the tips when finished.
Stop when finished with Destinations.
Probes specified by "=UseTips" will be used.
---------------------------------------------------------------------------
End Scripted Let
---------------------------------------------------------------------------
End
Else

End

Script
Description:
Disp&TouchOff

Execute the following script code:

Rightpod.MoveZ Rightpod.Max.Z-0.5, False
Rightpod.AbsoluteMoveAxes "s", 6.3 ' close all the way

Set WS = Pipettor.Deck.Positions.W1
RightPod.ApproachPosition "W1", WS.LabwareX+WS.WasteX, WS.LabwareY

' At this point there may be tips on 1-4 or 1-8, but never just 5-8.
' Because of that checking Tip1 only is ok.

If IsObject(RightPod.Tip1) Then
    TipLength = World.TipClasses(RightPod.Tip1.Class.Name).Height
    zdsp = WS.Z1 + TipLength + FromTop
    ArrZ = array("z1","z2","z3","z4","z5","z6","z7","z8")
    ArrZDisp = array(zdsp,zdsp,zdsp,zdsp,zdsp,zdsp,zdsp,zdsp)
    ArrD = array("d1","d2","d3","d4","d5","d6","d7","d8")
    ArrDDisp = array(0,0,0,0,0,0,0,0)
RightPod.AbsoluteMoveAxes Arr2, ArrZDisp, RightPod.SpeedLimit

RightPod.AbsoluteMoveAxes ArrD, ArrDDisp, 30 ' was 10

RightPod.RelativeMoveAxes "x", -WS.WasteX, 10

RightPod.RelativeMoveAxes "y", -0.3, 4

RightPod.RelativeMoveAxes "y", 0.6, 4

For i = 1 to 8
    If IsObject(RightPod.VariantDictionary.Get("Tip" & i)) Then
        Set Tip = RightPod.VariantDictionary.Get("Tip" & i)
        Set Contents = Tip.Contents
        For j = 1 to Contents.Count
            Tip.RemoveContent RightPod
        Next
    End If
Next

ArrD = array("d1", "d2", "d3", "d4", "d5", "d6", "d7", "d8")

Air = RightPod.SystemTrailingAirgap

ArrAirgap = array(Air, Air, Air, Air, Air, Air, Air, Air)

RightPod.AbsoluteMoveAxes ArrD, ArrAirgap, RightPod.STAGSpeed

End If

End Procedure

Define CleanWashStation

dspeed = 200

fromtop = 0.6

yoffset = 0.35
Scripted Let

Description:

Code: ' Make sure no tips are loaded

Extend "HasTips", IsObject(RightPod.Tip1) OR _
    IsObject(RightPod.Tip2) OR _
    IsObject(RightPod.Tip3) OR _
    IsObject(RightPod.Tip4) OR _
    IsObject(RightPod.Tip5) OR _
    IsObject(RightPod.Tip6) OR _
    IsObject(RightPod.Tip7) OR _
    IsObject(RightPod.Tip8)

Prompt: [IDispatch]

If

If "HasTips":

Then

Script

Description:

Disp&TouchOff

Execute the following script code:

If IsRunning Then TLS.Msg "Cannot clean wash station while tips are loaded"

End

Else
Script

Description:

Disp&TouchOff

Execute the following script code:

```plaintext
Rightpod.MoveZ Rightpod.Max.Z-0.5, False
Rightpod.AbsoluteMoveAxes "s", 6.3 ' close all the way

Set WS = Pipettor.Deck.Positions.W1
RightPod.ApproachPosition "W1", WS.LabwareX+WS.WasteX, WS.LabwareY

ZDisp = WS.Z1 + FromTop

ArrZ = array("z1","z2","z3","z4","z5","z6","z7","z8")
ArrZDisp = array(ZDisp,ZDisp,ZDisp,ZDisp,ZDisp,ZDisp,ZDisp,ZDisp)
ArrD = array("d1","d2","d3","d4","d5","d6","d7","d8")
ArrDDisp = array(0,0,0,0,0,0,0,0)

' empty all tips
RightPod.ValvesToOutput 255
RightPod.AbsoluteMoveAxes ArrZ, ArrZDisp,RightPod.SpeedLimit
RightPod.AbsoluteMoveAxes ArrD, ArrDDisp,30 ' was 10

' move to flush position
ArrZDisp = array(ZDisp,ZDisp,ZDisp,ZDisp,ZDisp,ZDisp,ZDisp,ZDisp)
RightPod.AbsoluteMoveAxes ArrZ, ArrZDisp,RightPod.SpeedLimit
RightPod.RelativeMoveAxes "x", -WS.WasteX,10
```

Loop
Loop from "1" to "2", incrementing by "1".

Script
Description:
Disp&TouchOff
Execute the following script code:

```plaintext
RightPod.RelativeMoveAxes  "y", -YOffset,4
```

Script
Description:
Disp&TouchOff
Execute the following script code:

```plaintext
RightPod.ValvesToInput 255
ArrD      = array("d1","d2","d3","d4","d5","d6","d7","d8")
ArrDDisp  = array(900,900,900,900,900,900,900,900)
RightPod.AbsoluteMoveAxes ArrD, ArrDDisp,DSpeed ' was 10
```

Script
Description:
Disp&TouchOff
Execute the following script code:

```plaintext
RightPod.ValvesToOutput 255
ArrD      = array("d1","d2","d3","d4","d5","d6","d7","d8")
ArrDDisp  = array(0,0,0,0,0,0,0,0)
```
RightPod.AbsoluteMoveAxes ArrD, ArrDDisp, DSpeed ' was 10

Script
Description:
Disp&TouchOff
Execute the following script code:
RightPod.RelativeMoveAxes "y", 2*YOffset,4

Script
Description:
Disp&TouchOff
Execute the following script code:
RightPod.ValvesToInput 255

ArrD = array("d1","d2","d3","d4","d5","d6","d7","d8")
ArrDDisp = array(900,900,900,900,900,900,900,900)
RightPod.AbsoluteMoveAxes ArrD, ArrDDisp, DSpeed ' was 10

Script
Description:
Disp&TouchOff
Execute the following script code:
RightPod.ValvesToOutput 255

ArrD = array("d1","d2","d3","d4","d5","d6","d7","d8")
ArrDDisp = array(0,0,0,0,0,0,0,0)
RightPod.AbsoluteMoveAxes ArrD, ArrDDisp, DSpeed ' was 10

---------------------------------------------------------------------------
Script
Description:
Disp&TouchOff
Execute the following script code:
    RightPod.RelativeMoveAxes "y", -YOffset, 4

---------------------------------------------------------------------------
End Loop
---------------------------------------------------------------------------
Script
Description:
Disp&TouchOff
Execute the following script code:
    ArrD      = array("d1","d2","d3","d4","d5","d6","d7","d8")
    Air       = RightPod.SystemTrailingAirgap
    ArrAirgap = array(Air,Air,Air,Air,Air,Air,Air,Air)

    RightPod.AbsoluteMoveAxes ArrD, ArrAirgap, RightPod.STAGSpeed

---------------------------------------------------------------------------
End
---------------------------------------------------------------------------
End Scripted Let
---------------------------------------------------------------------------
End Procedure
Define CombineColumns

transfervolume = 100

Run getnewtips

pattern = =OneTip()(MFX.NumSamples)

Loop

Loop from "transfer" = "1" to "3", incrementing by "1".

Configure

Bitmap: C:\Program Files\Biomek Software\Bitmaps\Vials.bmp

Description:

Caption: Configure

Code: n=MFX.NumSamples

Select Case transfer

Case 1: scol = Col()(1)(n) & "," & Col()(2)(n): dcol = Col()(1)(n)

Case 2: scol = Col()(3)(n) & "," & Col()(4)(n): dcol = Col()(2)(n)

Case 3: scol = Col()(5)(n) & "," & Col()(6)(n): dcol = Col()(3)(n)

End Select

'determine the asp height

Set LW = Positions(Labware.Location("Cryo1")).Labware

LW.ConfigureAmounts TransferVolume

aspheightcm = LW.HeightFromVolume(TransferVolume, 1)

' this is the height in CM

' needs to be multiplied by 10 because the step expects MM

Extend "SrcCol", scol
Extend "DestCol", dcol

Extend "ZAsp", (aspheightcm * 10) - 3 ' convert cm to mm; 3 mm below liquid

Prompt: [IDispatch]
Tooltip: Scripted Let

Transfer

Using Pod2, execute the following transfer:

From: Cryo1, sections specified by ";=SrcCol", BeadsplusCells
Proceed down first, then left to right.
Start from the beginning of the selection.
Do not set the mark.

Use the following custom technique:

Use the following pipetting template: OS Span-8 P1000 SlowRetract
Calibration Offset: 2.54
Calibration Slope: 1.033
Minimum Pipetting Height: 0 mm
Prewet: False
Aspirate Blowout: True
Follow Liquid: True
Height: 0 mm from the liquid
Mix: False
Mix Aspirate Speed: =100µL/s
Mix Aspirate Height: =ZAsp mm from the liquid
Mix Dispense Speed: 100µL/s
Mix Dispense Height: 2 mm from the liquid
Mix Count: 1
Mix Volume: 0 µL
Operation speed: 70µL/s
Tip Touch: False
Trailing Air Gap: False

Override Liquid Type Settings
Aspirate Delay: 10 ms
Aspirate Speed: 80 µL/s
Blowout Delay: 1000 ms
Blowout Volume: 20 µL
Dispense Delay: 20 ms
Dispense Speed: 200 µL/s
Prewet Delay: 200 ms
Prewet Overage: 0 µL
Tip Touch Delay: 300 ms
Tip Touch Speed: 70 µL/s
Trailing Air Gap Volume: 10 µL

Override the technique height by moving to =ZAsp mm from the bottom.
To: Cryo2, =TransferVolumeµL, sections specified by "=DestCol", BeadsplusCells
Proceed down first, then left to right.
Start from the beginning of the selection.
Do not set the mark.

Use the following custom technique:

Use the following pipetting template: OS Span-8 P1000 Blowout at LiqLevel 2
Calibration Offset: 2.54
Calibration Slope: 1.033
Minimum Pipetting Height: 0.5 mm
Prewet: False
Blowout: False
Follow Liquid: True
Height: 0 mm from the liquid
Mix: False
Mix Aspirate Speed: 100µL/s
Mix Aspirate Height: 0 mm from the liquid
Mix Dispense Speed: 100µL/s
Mix Dispense Height: 0 mm from the liquid
Mix Count: 1
Mix Volume: 900 µL
Operation speed: 70µL/s
Tip Touch: False
Override Liquid Type Settings
   Aspirate Delay: 10 ms
   Aspirate Speed: 300 µL/s
   Blowout Delay: 10 ms
   Blowout Volume: 20 µL
   Dispense Delay: 20 ms
   Dispense Speed: 200 µL/s
   Prewet Delay: 0 ms
   Prewet Overage: 0 µL
   Tip Touch Delay: 300 ms
   Tip Touch Speed: 70 µL/s
   Trailing Air Gap Volume: 10 µL

Override the technique height by moving to 2 mm from the bottom.
Dispense up to 1 time(s) per draw.
Create 1 replicate(s) of each source well.
Keep the current tips
Keep the tips when finished.
Stop when finished with Sources.
Probes specified by "=OneTip()(MFX.NumSamples)" will be used.

End Scripted Let

End Loop

Run droptips

End Procedure

Define SetStepDone
   wait = False

Script
Description:
Execute the following script code:
If Wait Then PG.StallUntilETSIs 0
MFX.SetStepDone MFX.NextStep, True

End Procedure

End Group

Group:
Startup Group

Script
Description:
Initialize

Execute the following script code:

PC.SetGlobal "KFile", MFX.CMN.RuntimeFolder & "\CD8Prep.txt"

If Not KW.ExistFile(KFile) Then KW.CreateNewFile KFile

MFX.PrepareDialog KFile, "G:\Stepnames2.txt", IsRunning

SetStepNames

MFX.WorkOffline = WorkOffline

InitTimers

Sub SetStepNames
    'MFX.SetStepName 1, "  1: Downstack F-Plate"
    'MFX.SetStepName 2, "  2: Move F-Plate to DSP"
    ' etc.
End Sub

Sub InitTimers
    TLS.SetTimer "Shaking/Incubating", "00:00:00"
    TLS.SetTimer "Settling...", "00:00:00"
    TLS.SetTimer "Incubating...", "00:00:00"
    'TLS.SetTimer "xx", "00:00:00"
    'TLS.SetTimer "xx", "00:00:00"
    'TLS.SetTimer "xx", "00:00:00"
End Sub

---------------------------------------------------------------------------

If

If "Not IsNull ( LeftPod.GrippedLabware)":
Then

Script
Description:
Execute the following script code:
PG.StallUntilETSIs 0
If IsRunning AND NOT SIM Then Pipettor.LightCurtain.Pause

Script
Description:
Execute the following script code:
PG.StallUntilETSIs 0
If IsRunning Then
    TLS.Msg "The gripper seems to be holding something. Carefully remove it from the gripper and put it back where it came from. Then click ok."
    If NOT SIM Then Pipettor.LightCurtain.Resume
End If

Script
Description:
Execute the following script code:
PG.StallUntilETSIs 0
LeftPod.Gripper.Retrait

End
Else

Script
Description:
Execute the following script code:
PG.StallUntilETSIs 0
LeftPod.Gripper.Retract

End

Instrument Setup
Deck: FX1_RotatingALP
Items:
Cyto1: Nothing
Cyto2: Nothing
Orbital1: Nothing
P10: BD_50ml_1 named Blood with an unknown amount of an unknown liquid.
P11: Nothing
P2: db_4Qtr_45ml named Parked with an unknown amount of an unknown liquid.
P3: rm4_tubeholder named Cryo2 with an unknown amount of an unknown liquid.tipboxlid_lowgrip with an unknown amount of an unknown liquid.
P4: PlateRotator with an unknown amount of an unknown liquid.IM_6W_Portrait named Buffer with an unknown amount of an unknown liquid.
P5: Span_8_1000uL_LLS named Parked. Discard the tips to "<Tipbox>". When done, move the box to "<Home>". Use these tips "1" times.
P6: Span_8_200uL named TB1. Discard the tips to "<Tipbox>". When done, move the box to
<Home>". Use these tips "1" times. tipboxlid_lowgrip with an unknown amount of an unknown liquid.

P7: Nothing

P8: Span_8_1000uL_LLS. Use these tips 1 time.

P9: Span_8_1000uL_LLS named TB2. Discard the tips to "<Tipbox>". When done, move the box to "<Home>". Use these tips "1" times.

Pelt1: RM4_Magnet named Magnet with an unknown amount of an unknown liquid.

R1: rm4_tubeholder named Cryo1 with an unknown amount of an unknown liquid.tipboxlid_lowgrip with an unknown amount of an unknown liquid.

TL1: AP96_20uL named StoreLid. Discard the tips to "<Tipbox>". When done, move the box to "<Home>". Use these tips "1" times.

TR1: Nothing

TR2: Nothing

TS1: Nothing

W1: Nothing

---------------------------------------------------------------------------

Script

Description:

Execute the following script code:

PG.StallUntilETSIs 0

If IsRunning AND NOT SIM Then Pipettor.LightCurtain.Pause

---------------------------------------------------------------------------

Script

Description:

Execute the following script code

'MFX.DefineDefault ParameterName, Value

If IsRunning Then

    MFX.WorkOffline = WorkOffline
MFX.ShowDialog

If "" = MFX.P4ShakeTime Then
    If NOT SIM Then Pipettor.LightCurtain.Resume
    World.Globals.ErrorGenerator.AbortRun 0, LeftPod, True
Else
    Select Case MFX.NextStep
        Case 1,2,3:
            PosCryo1="R1"
            PosCryo2="P3"
            Cryo1HasLid = True
            Cryo2HasLid = True
        Case 4,5,6,10,11,12,13,17,18:
            PosCryo1="Orbital1"
            PosCryo2="P3"
            Cryo1HasLid = True
            Cryo2HasLid = True
        Case 7,8,9,14,15,16:
            PosCryo1= "Pelt1"
            PosCryo2="P3"
            Cryo1HasLid = True
            Cryo2HasLid = True
        Case 19,20,21:
            PosCryo1="Orbital1"
            PosCryo2="P3"
            Cryo1HasLid = True
            Cryo2HasLid = True
        Case 22, 23:
            PosCryo1="Pelt1"
PosCryo2="P3"
Cryo1HasLid = True
Cryo2HasLid = False

Case 24, 25, 29:
PosCryo1="Pelt1"
PosCryo2="P3"
Cryo1HasLid = False
Cryo2HasLid = False

Case 26, 27, 28, 30, 31:
PosCryo1="Orbital1"
PosCryo2="P3"
Cryo1HasLid = False
Cryo2HasLid = False

Case 32:
PosCryo1="P6"
PosCryo2="P3"
Cryo1HasLid = False
Cryo2HasLid = False

Case 33, 34, 35, 39, 40:
PosCryo1="P6"
PosCryo2="Pelt1"
Cryo1HasLid = False
Cryo2HasLid = False

Case 36, 37, 38:
PosCryo1="P6"
PosCryo2="Orbital1"
Cryo1HasLid = True
Cryo2HasLid = True
Case Else ' something's fishy - abort

TLS.Msg "Illegal state - NextStep = " & MFX.NextStep & vbCrLf & "Method will abort."

World.Globals.ErrorGenerator.AbortRun 0, LeftPod, True

End Select

' TB1 and Cryo1: Remove tipbox lid so that all volume
' manipulations are applied to the correct labware
' but store the lid type

POS = Pipettor.Deck.FindLabwarePosition("TB1")
Set LW = Positions(POS).Labware
Lid_TB1 = LW.Class.Name
Positions(POS).RemoveLabware ' lid
Pipettor.Deck.LabwareRemovedFromPosition LW, POS

POS = Pipettor.Deck.FindLabwarePosition("Cryo1")
Set LW = Positions(POS).Labware
Lid_Cryo1 = LW.Class.Name
Positions(POS).RemoveLabware ' lid
Pipettor.Deck.LabwareRemovedFromPosition LW, POS

POS = Pipettor.Deck.FindLabwarePosition("Cryo2")
Set LW = Positions(POS).Labware
Lid_Cryo2 = LW.Class.Name
Positions(POS).RemoveLabware ' lid
Pipettor.Deck.LabwareRemovedFromPosition LW, POS
Set LW = Positions(Labware.Location("TB1")).Labware ' 200 ul tips
For n = 1 to 96
    LW.ConfigureWellAmount n, MFX.TB1.HasTip(n)
Next

Set LW = Positions(Labware.Location("TB2")).Labware ' 1 ml tips
For n = 1 to 96
    LW.ConfigureWellAmount n, MFX.TB2.HasTip(n)
Next

' Now: Put the vials in the correct positions.
' C1 and C2 are the CURRENT positions
C1 = Pipettor.Deck.FindLabwarePosition("Cryo1") ' start position
C2 = Pipettor.Deck.FindLabwarePosition("Cryo2") ' start position

' record the vial rack types
LW_C1=Positions(C1).Labware.Class.Name
LW_C2=Positions(C2).Labware.Class.Name

' replace Cryo1 and put the new one in position PosCryo1
Set LW = Positions(C1).Labware
LWName = LW.Properties.Name
Positions(C1).RemoveLabware
Pipettor.Deck.LabwareRemovedFromPosition LW, C1
Positions(PosCryo1).AddNewLabware LW_C1, World
Pipettor.Deck.LabwareAddedToPosition LW, PosCryo1
Set LW = Positions(PosCryo1).Labware
LW.Properties.Name = LWName
' and Cryo2
Set LW = Positions(C2).Labware
LWName = LW.Properties.Name
Positions(C2).RemoveLabware
Pipettor.Deck.LabwareRemovedFromPosition LW, C2
Positions(PosCryo2).AddNewLabware LW_C2, World
Pipettor.Deck.LabwareAddedToPosition LW, PosCryo2
Set LW = Positions(PosCryo2).Labware
LW.Properties.Name = LWName

' put tipbox lids back on TB1, Cryo1, and Cryo2 (based on status from above)
POS = Pipettor.Deck.FindLabwarePosition("TB1")
Set LW = Positions(POS).Labware
Positions(POS).AddNewLabware Lid_TB1, World
Pipettor.Deck.LabwareAddedToPosition LW, POS

If Cryo1HasLid Then
    Set LW = Positions(PosCryo1).Labware
    Positions(PosCryo1).AddNewLabware Lid_Cryo1, World
    Pipettor.Deck.LabwareAddedToPosition LW, PosCryo1
End If

If Cryo2HasLid Then
    Set LW = Positions(PosCryo2).Labware
    Positions(PosCryo2).AddNewLabware Lid_Cryo2, World
    Pipettor.Deck.LabwareAddedToPosition LW, PosCryo2
End If
If NOT SIM Then Pipettor.LightCurtain.Resume

End If ' ShakeTime = ""
End If

'PC.SetGlobal "TipWashColUpper", 0
'PC.SetGlobal "TipWashColLower", 0

'If MFX.S3bDone Then
    MoveTopLW Pipettor.Deck.FindLabwarePosition("Cryo2"), "TR2"
    'In this case the lid is not automatically removed from TR2
    Positions.TR2.RemoveAllLabware
'End If

Sub MoveTopLW(From, PosTo)
    Set LW = Positions(From).Labware
    ' record the labwareclass
    LWClass = LW.Class.Name
    Positions(From).RemoveLabware
    Pipettor.Deck.LabwareRemovedFromPosition LW, From

    Positions(PosTo).AddNewLabware LWClass, World
    Pipettor.Deck.LabwareAddedToPosition LW, PosTo
End Sub

If "MFX.UsePeltier":

Then
Peltier1: Initialize
---------------------------------------------------------------------------
Incubate Pelt1 at =MFX.TempPeltierC for 00:00:01
Position: Pelt1
Command: Incubate
Module Name: Peltier1
Set Temperature?: -1
Temperature: =MFX.TempPeltier
Total Time: 00:00:01
---------------------------------------------------------------------------
TShake1: Initialize
---------------------------------------------------------------------------
Incubate TS1 at =MFX.TempPeltierC for 00:00:01
Position: TS1
_Commented: -1
Total Time: 00:00:01
Continue Shaking: -1
Deluxe Shake: 0
Shake RPM: 700
Shake Style: Diagonal (NE to SW)
Shake Style1: Horizontal
Shake Style2: Vertical
Shake Time1: 5
Shake Time2: 5
Temp Set Point: =MFX.TempPeltier
Use Shake: 0
Use Temp: -1
---------------------------------------------------------------------------
End

Else

End

Instrument Setup
Deck: FX1_RotatingALP
Pause to confirm layout.

Items:
Cyto1: As Is.
Cyto2: As Is.
Orbital1: As Is.
P10: As Is.
P11: As Is.
P2: As Is.
P3: As Is.
P4: As Is.
P5: As Is.
P6: As Is.
P7: As Is.
P8: As Is.
P9: As Is.
Pelt1: As Is.
R1: As Is.
TL1: As Is.
TR1: As Is.
TR2: As Is.
TS1: As Is.
W1: As Is.

Group:
Purge System

Run droptips

Script
Description:
Disp&TouchOff

Execute the following script code:

Rightpod.MoveZ Rightpod.Max.Z-0.5, False
Rightpod.AbsoluteMoveAxes "s", 6.3 ' close all the way

Set WS = Pipettor.Deck.Positions.W1
RightPod.ApproachPosition "W1", WS.LabwareX+WS.WasteX, WS.LabwareY

ZDisp     = WS.Z1 + 1 ' 1 cm above WS
ArrZ      = array("z1", "z2", "z3", "z4", "z5", "z6", "z7", "z8")
ArrZDisp  = array(ZDisp,ZDisp,ZDisp,ZDisp,ZDisp,ZDisp,ZDisp,ZDisp)
ArrD      = array("d1", "d2", "d3", "d4", "d5", "d6", "d7", "d8")
ArrDDisp  = array(0,0,0,0,0,0,0,0)

' empty all tips
RightPod.ValvesToOutput 255
RightPod.AbsoluteMoveAxes ArrZ, ArrZDisp,RightPod.SpeedLimit
RightPod.AbsoluteMoveAxes ArrD, ArrDDisp,30 ' was 10
' move to flush position

'ArrZDisp = array(ZDisp,ZDisp,ZDisp,ZDisp,ZDisp,ZDisp,ZDisp,ZDisp)

'RightPod.AbsoluteMoveAxes ArrZ, ArrZDisp,RightPod.SpeedLimit

'RightPod.RelativeMoveAxes "x", -WS.WasteX,10

---------------------------------------------------------------------------

Loop

Loop from "1" to "4", incrementing by "1".

---------------------------------------------------------------------------

Script

Description:

Disp&TouchOff

Execute the following script code:

RightPod.ValvesToInput 255

ArrD       = array("d1","d2","d3","d4","d5","d6","d7","d8")
ArrDDisp   = array(900,900,900,900,900,900,900,900)

RightPod.AbsoluteMoveAxes ArrD, ArrDDisp,100'DSpeed ' was 10

---------------------------------------------------------------------------

Script

Description:

Disp&TouchOff

Execute the following script code:

RightPod.ValvesToOutput 255

ArrD       = array("d1","d2","d3","d4","d5","d6","d7","d8")
ArrDDisp   = array(0,0,0,0,0,0,0,0)

RightPod.AbsoluteMoveAxes ArrD, ArrDDisp,100'DSpeed ' was 10
End Loop

Loop

Loop from "1" to "10", incrementing by "1".

Script

Description:

Execute the following script code:

PG.StallUntilETSIs 0

PC.SetGlobal "DonePurging", False

If IsRunning Then

' 7 = vbNo, 4 = vbYesNo

If 7 = TLS.MsgBx("Click" & vbCrLf & 
                   
                   "- Yes to continue purging" & vbCrLf & 
                   
                   "- No to stop purging", 4, "Continue Purging?") Then 

            PC.SetGlobal "DonePurging", True

End If 'IsRunning

If Not SIM Then Pipettor.LightCurtain.Resume

If "DonePurging = True":

Then

Script
Disp&TouchOff

Execute the following script code:

```
ArrD = array("d1","d2","d3","d4","d5","d6","d7","d8")
Air = RightPod.SystemTrailingAirgap
ArrAirgap = array(Air,Air,Air,Air,Air,Air,Air,Air)

RightPod.AbsoluteMoveAxes ArrD, ArrAirgap,RightPod.STAGSpeed
```

Break out of 1 loop(s).

Else

Loop

Loop from "1" to "4", incrementing by "1".

Script

Disp&TouchOff

Execute the following script code:

```
RightPod.ValvesToInput 255
```

```
ArrD = array("d1","d2","d3","d4","d5","d6","d7","d8")
ArrDDisp = array(900,900,900,900,900,900,900,900)

RightPod.AbsoluteMoveAxes ArrD, ArrDDisp,100"DSpeed ' was 10
Script

Description:

Disp&TouchOff

Execute the following script code:

RightPod.ValvesToOutput 255

ArrD      = array("d1","d2","d3","d4","d5","d6","d7","d8")
ArrDDisp  = array(0,0,0,0,0,0,0,0)
RightPod.AbsoluteMoveAxes ArrD, ArrDDisp,100'Speed ' was 10

End Loop

End

End Loop

End Group

Group:

Init Tips

Run droptips

Span-8 Wash

Wash all probes of Pod2 at W1; do a passive wash by dispensing 0 mL while in the wells and
6 mL to waste. Delay for 300 ms after each dispense.
Wash only the probes that have been used.

End Group

If
If "Labware.Location("Cryo1") = "Orbital1"":

Then

Device Action
Send the following command to "OrbitalShakerALP0": "Clamp".
Parameters:

End

Else

End

End Group

Group:
Steps

Group

If
If "MFX.NextStep = 1":
Script

Description:

Labware Pickup from Cryo1

Execute the following script code:

Option Explicit

' This script duplicates the functionality of the first half of the Move Labware step.
' Modified 3/7/2003 by MAG to lift the labware to a specific height off the deck
' (height measured at top of the labware) which was useful for a specific customer
' reading barcodes via their own reader, with labels always a certain distance from
' the top of the labware.

Set e = CreateObject("World.EngineObject")

Dim Source, Target, PodName
Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit

' PodName        The name of the pod to use
PodName = StepDictionary.Let.PodName
if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"
Set Pod = World.Devices.Pipettor1(PodName)
OrigPodSpeed = Pod.CurrentSpeed

Set CurDeck = World.Devices.Pipettor1.Deck

' Source         Name of the source position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location
Source = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Source))
'tls.msg MFX.NextStep & " " & source
if IsEmpty(Source) or Source = "" then err.raise 1050, , "Source must be defined"

' Get the depth to grab a piece of labware at.
Dim Depth
Depth = e.EvaluateExpression(StepDictionary.Let.Depth)
if IsEmpty(Depth) then err.raise 1050, , "Depth must be defined"
If Depth < 1 then err.raise 1050, , "Depth must be at least 1"

' Convert Source and Target names into objects
Dim Src
Set Src = Pipettor.Deck.Positions(Source)

' Get the Source Labware
Dim srcLabware
World.Volatile.Depth = Depth
Set srcLabware = Src.GetLabwareAtDepth(Depth)

' Get the source labware height  [DON'T NEED THIS ANYMORE]
' Dim srcLwHeight
' srcLwHeight = srcLabware.Class.Height

Dim Z
Z = CDbl(Src.Z(Pod))

' Get offsets from position to the labware at source position
Dim sx, sy, sz
sx = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "X"))
sy = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "Y"))
sz = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "Z"))

pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the labware gripper offsets and squeeze values
Dim gx, gy, gz, pd
Dim Squeeze, Unsqueeze
Select Case Pod.PodType
    Case "ATTILA"
        gx = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperXOffset)
        gy = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperYOffset)
        gz = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperZOffset)
        Squeeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
            CDbl(srcLabware.Class.GripperInfo.MultiChannel.Squeeze)))
        Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
            CDbl(srcLabware.Class.GripperInfo.MultiChannel.Unsqueeze)))
'tls.msg pod.podtype
'tls.msg gx & " " & gy & " " & gz & " " & Squeeze & " " & Unsqueeze
    Case Else ' need to fill in code for NX Gripper
End Select

' Get the Pod gripper offsets
Dim px, py, pz
px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
pz = CDbl(Pod.GripperZOffset)
Dim LiftHeight, e

LiftHeight = e.EvaluateExpression(StepDictionary.Let.LiftHeight)

' Temporarily save the height of the move
World.Volatile.LiftHeight = LiftHeight

' Reserve the resources used, i.e., the source position and the Pod
World.Globals.ResourceReserver.ReserveResources Array(Src, Pod)

' Open the source position
Src.Open True, Depth

' Start Moving
Pod.ApproachPosition Source, sx+gx-px, sy+gy-py, Z + sz+gz-pz, False, Unsqueeze

' Extend the grippers
Pod.GripperExtend

' Grab Labware
Pod.AbsMove ,,,Squeeze

' Enforce the labware's speed limit
LWSpeedLimit = srcLabware.Class.SpeedLimit
If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit

' Notify software that the source labware is now in the grippers
' Version 2.x syntax: Pod.GetLabware Source, Depth
Pod.Gripper.GetLabwareObject Source, Depth

' Move to a safe height above the position (original function commented out)
' Pod.MoveToSafe

If LiftHeight < 0 Then err.raise 1050, , "Lift Height too low ; would result in downward motion"

Pod.RelativeMoveAxes "Z", LiftHeight

' Close the source position
' Src.Close True, Depth

' Restore original pod speed now that the move is finished
Pod.SetSpeed OrigPodSpeed

---------------------------------------------------------------------------
RotatingALP
  Position: R1
    Rotate to Orientation: Portrait (90° counterclockwise)

---------------------------------------------------------------------------
Loop
Loop from "RoundsCompleted" = "=MFX.RoundsCompleted(1) " to "=MFX.TotalRounds(1)",
incrementing by "1".

If
If "MFX.RoundsCompleted(1)=MFX.TotalRounds(1)"
Then
Break out of 1 loop(s).

End

Else

End

Swap Labware, Configure Blood Step

Bitmap: C:\Program Files\Biomek Software\Bitmaps\Vials.bmp

Description:

Caption: Swap Labware, Configure Blood Step

Code: ALP = Labware.Location("Blood")

Set POS = Positions(ALP)

Set LW = POS.Labware

LWName = LW.Properties.Name

POS.RemoveLabware

Pipettor.Deck.LabwareRemovedFromPosition LW, ALP

POS.AddNewLabware "BD_50ml_" & (1+RoundsCompleted), World

Pipettor.Deck.LabwareAddedToPosition LW, ALP

Set LW = POS.Labware

LW.Properties.Name = LWName

LW.ConfigureAmounts (MFX.P1VolBlood * 6) ' for 6 vials

nTrips = TLS.NumTrips(MFX.P1VolBlood, 950)
Extend "NumTrips", nTrips
Extend "VolTrip", MFX.P1VolBlood/nTrips

Prompt: [IDispatch]
Tooltip: Scripted Let

Span-8 Discard Tips
Discard tips from all probes on Pod2.

Span-8 Wash
Wash all probes of Pod2 at the closest wash station; do a passive wash by dispensing 1 mL while in the wells and 1 mL to waste. Delay for 300 ms after each dispense.
Wash only the probes that have been used.

Span-8 New Tips
Get new Span_8_1000uL_LLS tips for probes 1-6 on Pod2.

Loop
Loop from "Trip" = "1" to "=NumTrips", incrementing by "1".

Calculate Asp & Disp Heights
Bitmap: C:\Program Files\Biomek Software\Bitmaps\Vials.bmp
Description:
Caption: Calculate Asp & Disp Heights
Code: ' Asp Height
Set LW = Positions(Labware.Location("Blood")).Labware
VolAfterAsp = 6 * (MFX.P1VolBlood - (Trip * VolTrip))
AspHeightCM = LW.HeightFromVolume(VolAfterAsp, 1)
' start aspirating at 3 mm below liqlevel
' then follow down

Extend "ZAsp", (AspHeightCM * 10) - 3

'------------------------------------------------------
' Disp Height
Set LW = Positions(Labware.Location("Cryo1")).Labware
VolBeforeDisp = VolTrip *(Trip-1)
DispHeightCM = LW.HeightFromVolume(VolBeforeDisp, 1)

' start dispensing at 2 mm below liqlevel
' then follow up & blowout at dispheight

Extend "ZDisp", (DispHeightCM * 10) - 2

Prompt: [IDispatch]
Tooltip: Scripted Let

Transfer
Using Pod2, execute the following transfer:
From: Blood, with the following pattern:
    1
    A ><
    , Blood_HighVol
Proceed down first, then left to right.
Start from the beginning of the selection.
Set the mark at the last well transferred.

Use the following custom technique:

Use the following pipetting template: OS Span-8 MultiDispense Slow Retract FillVials

Calibration Offset: 0
Calibration Slope: 1.05
Minimum Pipetting Height: 1.5 mm
Prewet: False
Aspirate Blowout: True
Follow Liquid: True
Height: 0 mm from the top
Mix: False
Mix Aspirate Speed: 100µL/s
Mix Aspirate Height: 0 mm from the top
Mix Dispense Speed: 100µL/s
Mix Dispense Height: 0 mm from the top
Mix Count: 1
Mix Volume: 10 µL
Operation speed: 70µL/s
Tip Touch: False
Trailing Air Gap: True
Override Liquid Type Settings
Aspirate Delay: 200 ms
Aspirate Speed: 200 µL/s
Blowout Delay: 0 ms
Blowout Volume: 20 µL
Dispense Delay: 0 ms
Dispense Speed: 200 µL/s
Prewet Delay: 0 ms
Prewet Overage: 0 µL
Tip Touch Delay: 0 ms
Tip Touch Speed: 50 µL/s
Trailing Air Gap Volume: 5 µL

Override the technique height by moving to =ZAsp mm from the bottom.

To: Cryo1, =VolTripµL, sections specified by "=ColWells()1+RoundsCompleted",
Blood_HighVol
Proceed down first, then left to right.
Start from the beginning of the selection.
Set the mark at the last well transferred.
Use the following custom technique:

Use the following pipetting template: OS Span-8 P1000 TouchOffOnLiquid 2
Calibration Offset: 0
Calibration Slope: 1
Minimum Pipetting Height: 1.5 mm
Prewet: False
Blowout: True
Follow Liquid: True
Height: 0 mm from the top
Mix: False
Mix Aspirate Speed: 100µL/s
Mix Aspirate Height: 0 mm from the liquid
Mix Dispense Speed: 100µL/s
Mix Dispense Height: 0 mm from the liquid
Mix Count: 1
Mix Volume: 10 µL
Operation speed: 70µL/s
Tip Touch: False
Override Liquid Type Settings

Aspirate Delay: 200 ms
Aspirate Speed: 50 µL/s
Blowout Delay: 200 ms
Blowout Volume: 20 µL
Dispense Delay: 5000 ms
Dispense Speed: 200 µL/s
Prewet Delay: 0 ms
Prewet Overage: 0 µL
Tip Touch Delay: 0 ms
Tip Touch Speed: 50 µL/s
Trailing Air Gap Volume: 10 µL

Override the technique height by moving to =ZDisp mm from the bottom.
Dispense up to 1 time(s) per draw.
Create 1 replicate(s) of each source well.
Keep the current tips
Keep the tips when finished.
Stop when finished with Destinations.
Probes 1-6 will be used.

-----------------------------------------------
End Scripted Let
-----------------------------------------------
End Loop
-----------------------------------------------
Span-8 Discard Tips
Discard tips from all probes on Pod2.
-----------------------------------------------
End Scripted Let

Run setstepdone
    wait = true

End Loop

RotatingALP
    Position: R1
    Rotate to Orientation: Landscape

Script
Description:
Labware Place to Cryo1
Execute the following script code:

Option Explicit

' This script duplicates the functionality of the Move Labware step.
' It has been modified to only place the labware after another step has picked it up.

Dim e
Set e = CreateObject("World.EngineObject")
Dim Target, PodName
Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit

' PodName        The name of the pod to use
PodName = StepDictionary.Let.PodName
if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"
Set Pod = World.Devices.Pipettor1(PodName)
OrigPodSpeed = Pod.CurrentSpeed
Set CurDeck = World.Devices.Pipettor1.Deck

' Target         Name of the target position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location
Target = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Target))

if IsEmpty(Target) or Target = "" then err.raise 1050, , "Target must be defined"

If Not IsObject(Pod.GrippedLabware) Then err.raise 1050, , "There is no labware in the gripper."
Dim glw
set glw = Pod.GrippedLabware(Pod.GrippedLabware.Count - 1) ' The gripped labware is an array with the bottom piece at the highest index

' Convert Source and Target names into objects
Dim Dst
Set Dst = Pipettor.Deck.Positions(Target)

Dim Z
Dim sx, sy, sz
' Dim gx, gy, gz, pd
'pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the squeeze values
'Dim Unsqueeze
'Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) + CDbl(glw.Class.Unsqueeze)))
'Get the Pod gripper offsets
Dim px, py, pz
px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
 pz = CDbl(Pod.GripperZOffset)

' Enforce the labware's speed limit
' LWSpeedLimit = srcLabware.Class.SpeedLimit
' If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit

' Get height of destination position
Z = CDbl(Dst.Z(Pod))

' Get offsets from position to the labware at target position
Dim tx, ty, tz, dx, dy, dz
tx = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "X"))
ty = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Y"))
tz = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Z"))

' Get the Target Labware
Dim dstLabware
dx = 0
dy = 0
dz = 0
dstLabware = Null
if (Dst.StackDepth > 0) then
    Set dstLabware = Dst.GetLabwareAtDepth(1)
end if
' Get Destination Stack Offsets (really Per-Labware Offsets)

dx = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "X"))
dy = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "Y"))
dz = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "Z"))

' Get the labware gripper offsets (added-in by MAG 3/7/2003)

World.Volatile.MyDest = Dst

'Dim gx, gy, gz, pd

'gx = CDbl(glw.Class.GripperXOffset)
'gy = CDbl(glw.Class.GripperYOffset)
'gz = CDbl(glw.Class.GripperZOffset)

pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the labware gripper offsets and squeeze values

Dim gx, gy, gz, pd
Dim Unsqueeze
Select Case Pod.PodType
  Case "ATTILA"
    gx = CDbl(glw.Class.GripperInfo.MultiChannel.GripperXOffset)
    gy = CDbl(glw.Class.GripperInfo.MultiChannel.GripperYOffset)
    gz = CDbl(glw.Class.GripperInfo.MultiChannel.GripperZOffset)
    Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbld(pd) + CDbld(glw.Class.GripperInfo.MultiChannel.Unsqueeze)))
  'tls.msg pod.podtype
  'tls.msg gx & " " & gy & " " & gz & " " & Unsqueeze
  Case Else ' need to fill in code for NX Gripper
End Select

' Open Destination
Dst.Open True, 0

' Start Moving
Pod.ApproachPosition Target, CDbl(tx+dx+gx-px), CDbl(ty+dy+gy-py), CDbl(Z + tz+dz+gz-pz), True

Pod.MoveZ CDbl(Z + tz + dz + gz - pz)

' Put Labware
Pod.AbsMove ,,Unsqueeze

' Notify software the labware that was in the grippers is now at the target
' old v. 2.x syntax Pod.PutLabware Target
Pod.Gripper.PutLabwareObject Target

' Retract grippers
Pod.GripperRetract

' Close the destination position
Dst.Close True, 0

'Restore original pod speed now that the move is finished
'Pod.SetSpeed OrigPodSpeed
' Move to a safe height
Pod.MoveToSafe

End

Else

End

End Group

Group

If
If "MFX.NextStep = 2":

Then

Move Labware

Move the top "1" plates at "Cryo2" to "StoreLid" using pod "Pod1".

Loop

Loop from "RoundsCompleted" = "=MFX.RoundsCompleted(2)" to "=MFX.TotalRounds(2)",
incrementing by "1".

If
If "MFX.RoundsCompleted(2)=MFX.TotalRounds(2)":
Then

Break out of 1 loop(s).

End

Else

End

Span-8 Wash

Wash all probes of Pod2 at the closest wash station; do a passive wash by dispensing 1 mL while in the wells and 2 mL to waste. Delay for 300 ms after each dispense. Wash only the probes that have been used.

Script

Description:

Labware Pickup from TB1

Execute the following script code:

Option Explicit

' This script duplicates the functionality of the first half of the Move Labware step.
' Modified 3/7/2003 by MAG to lift the labware to a specific height off the deck
' (height measured at top of the labware) which was useful for a specific customer
' reading barcodes via their own reader, with labels always a certain distance from
' the top of the labware.

Set e = CreateObject("World.EngineObject")
Dim Source, Target, PodName
Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit

' PodName        The name of the pod to use
PodName = StepDictionary.Let.PodName
if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"
Set Pod = World.Devices.Pipettor1(PodName)
OrigPodSpeed = Pod.CurrentSpeed

Set CurDeck = World.Devices.Pipettor1.Deck

' Source         Name of the source position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location
Source = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Source))
'tls.msg MFX.NextStep & " " & source
if IsEmpty(Source) or Source = "" then err.raise 1050, , "Source must be defined"

' Get the depth to grab a piece of labware at.
Dim Depth
Depth = e.EvaluateExpression(StepDictionary.Let.Depth)
if IsEmpty(Depth) then err.raise 1050, , "Depth must be defined"
If Depth < 1 then err.raise 1050, , "Depth must be at least 1"

' Convert Source and Target names into objects
Dim Src
Set Src = Pipettor.Deck.Positions(Source)
' Get the Source Labware
Dim srcLabware
World.Volatile.Depth = Depth
Set srcLabware = Src.GetLabwareAtDepth(Depth)

' Get the source labware height [DON'T NEED THIS ANYMORE]
' Dim srcLwHeight
' srcLwHeight = srcLabware.Class.Height

Dim Z
Z = CDbl(Src.Z(Pod))

' Get offsets from position to the labware at source position
Dim sx, sy, sz
sx = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "X"))
sy = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "Y"))
sz = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "Z"))

pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the labware gripper offsets and squeeze values
Dim gx, gy, gz, pd
Dim Squeeze, Unsqueeze
Select Case Pod.PodType
  Case "ATTILA"
    gx = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperXOffset)
gy = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperYOffset)
gz = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperZOffset)
    Squeeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
CDbl(srcLabware.Class.GripperInfo.MultiChannel.Squeeze))

    Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
CDbl(srcLabware.Class.GripperInfo.MultiChannel.Unsqueeze)))

'tls.msg pod.podtype
'tls.msg gx & " & gy & " & gz & " & Squeeze & " & Unsqueeze

    Case Else ' need to fill in code for NX Gripper
End Select

' Get the Pod gripper offsets
Dim px, py, pz
px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
pz = CDbl(Pod.GripperZOffset)

Dim LiftHeight, e

LiftHeight = e.EvaluateExpression(StepDictionary.Let.LiftHeight)

' Temporarily save the height of the move
World.Volatile.LiftHeight = LiftHeight

' Reserve the resources used, i.e., the source position and the Pod
World.Globals.ResourceReserver.ReserveResources Array(Src, Pod)

' Open the source position
Src.Open True, Depth

' Start Moving
Pod.ApproachPosition Source, sx+gx-px, sy+gy-py, Z + sz+gz-pz, False, Unsqueeze

' Extend the grippers
Pod.GripperExtend

' Grab Labware
Pod.AbsMove,,Squeeze

' Enforce the labware's speed limit
LWSpeedLimit = srcLabware.Class.SpeedLimit
If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit

' Notify software that the source labware is now in the grippers
' Version 2.x syntax: Pod.GetLabware Source, Depth
Pod.Gripper.GetLabwareObject Source, Depth

' Move to a safe height above the position (original function commented out)
' Pod.MoveToSafe

If LiftHeight < 0 Then err.raise 1050, , "Lift Height too low ; would result in downward motion"

Pod.RelativeMoveAxes "Z", LiftHeight

' Close the source position
' Src.Close True, Depth

'Restore original pod speed now that the move is finished
Pod.SetSpeed OrigPodSpeed
Span-8 New Tips
Get new TB1 tips for probes 1-6 on Pod2.

Script
Description:
Labware Place to TB1
Execute the following script code:

Option Explicit

' This script duplicates the functionality of the Move Labware step.
' It has been modified to only place the labware after another step has picked it up.
Dim e
Set e = CreateObject("World.EngineObject")
Dim Target, PodName
Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit

' PodName        The name of the pod to use
PodName = StepDictionary.Let.PodName
if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"
Set Pod = World.Devices.Pipettor1(PodName)
OrigPodSpeed = Pod.CurrentSpeed

Set CurDeck = World.Devices.Pipettor1.Deck

' Target        Name of the target position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location
Target = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Target))
if IsEmpty(Target) or Target = "" then err.raise 1050, , "Target must be defined"

If Not IsObject(Pod.GrippedLabware) Then err.raise 1050, , "There is no labware in the gripper."
Dim glw
set glw = Pod.GrippedLabware(Pod.GrippedLabware.Count - 1) ' The gripped labware is an array with the bottom piece at the highest index

' Convert Source and Target names into objects
Dim Dst
Set Dst = Pipettor.Deck.Positions(Target)

Dim Z
Dim sx, sy, sz
' Dim gx, gy, gz, pd
'pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the squeeze values
'Dim Unsqueeze
'Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) + CDbl(glw.Class.Unsqueeze)))

' Get the Pod gripper offsets
Dim px, py, pz
px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
pz = CDbl(Pod.GripperZOffset)

' Enforce the labware's speed limit
'LWSpeedLimit = srcLabware.Class.SpeedLimit

'If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit

'Get height of destination position
Z = CDbl(Dst.Z(Pod))

' Get offsets from position to the labware at target position
Dim tx, ty, tz, dx, dy, dz

tx = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "X"))
ty = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Y"))
tz = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Z"))

' Get the Target Labware
Dim dstLabware

dx = 0
dy = 0
dz = 0
dstLabware = Null

if (Dst.StackDepth > 0) then
    Set dstLabware = Dst.GetLabwareAtDepth(1)
end if

' Get Destination Stack Offsets (really Per-Labware Offsets)
dx = CDbl(Dst.GetOneStackOffset(glm, dstLabware, "X"))
dy = CDbl(Dst.GetOneStackOffset(glm, dstLabware, "Y"))
dz = CDbl(Dst.GetOneStackOffset(glm, dstLabware, "Z"))

' Get the labware gripper offsets (added-in by MAG 3/7/2003)
World.Volatile.MyDest = Dst

' Dim gx, gy, gz, pd
' gx = CDbl(glw.Class.GripperXOffset)
' gy = CDbl(glw.Class.GripperYOffset)
' gz = CDbl(glw.Class.GripperZOffset)

pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the labware gripper offsets and squeeze values
Dim gx, gy, gz, pd
Dim Unsqueeze
Select Case Pod.PodType
  Case "ATTILA"
    gx = CDbl(glw.Class.GripperInfo.MultiChannel.GripperXOffset)
    gy = CDbl(glw.Class.GripperInfo.MultiChannel.GripperYOffset)
    gz = CDbl(glw.Class.GripperInfo.MultiChannel.GripperZOffset)
    Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
      CDbl(glw.Class.GripperInfo.MultiChannel.Unsqueeze)))
    'tls.msg pod.podtype
    'tls.msg gx & " " & gy & " " & gz & " " & Unsqueeze
  Case Else ' need to fill in code for NX Gripper
End Select

' Open Destination
Dst.Open True, 0
' Start Moving
Pod.ApproachPosition Target, CDbl(tx+dx+gx-px), CDbl(ty+dy+gy-py), CDbl(Z + tz+dz+gz-pz),
True

Pod.MoveZ CDbl(Z + tz + dz + gz - pz)

' Put Labware
Pod.AbsMove ,,Unsqueeze

' Notify software the labware that was in the grippers is now at the target
' old v. 2.x syntax Pod.PutLabware Target
Pod.Gripper.PutLabwareObject Target

' Retract grippers
Pod.GripperRetract

' Close the destination position
Dst.Close True, 0

'Restore original pod speed now that the move is finished
'Pod.SetSpeed OrigPodSpeed

' Move to a safe height
Pod.MoveToSafe

---------------------------------------------------------------------------
Script
Description:
Labware Pickup from Cryo1

Execute the following script code:

Option Explicit

' This script duplicates the functionality of the first half of the Move Labware step.
' Modified 3/7/2003 by MAG to lift the labware to a specific height off the deck
' (height measured at top of the labware) which was useful for a specific customer
' reading barcodes via their own reader, with labels always a certain distance from
' the top of the labware.

Set e = CreateObject("World.EngineObject")

Dim Source, Target, PodName
Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit

' PodName        The name of the pod to use
PodName = StepDictionary.Let.PodName
if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"
Set Pod = World.Devices.Pipettor1(PodName)
OrigPodSpeed = Pod.CurrentSpeed

Set CurDeck = World.Devices.Pipettor1.Deck

' Source         Name of the source position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location
Source = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Source))
'tls.msg MFX.NextStep & " " & source
if IsEmpty(Source) or Source = "" then err.raise 1050, , "Source must be defined"
' Get the depth to grab a piece of labware at.

Dim Depth

Depth = e.EvaluateExpression(StepDictionary.Let.Depth)

if IsEmpty(Depth) then err.raise 1050, , "Depth must be defined"
If Depth < 1 then err.raise 1050, , "Depth must be at least 1"

' Convert Source and Target names into objects

Dim Src

Set Src = Pipettor.Deck.Positions(Source)

' Get the Source Labware

Dim srcLabware

World.Volatile.Depth = Depth

Set srcLabware = Src.GetLabwareAtDepth(Depth)

' Get the source labware height  [DON'T NEED THIS ANYMORE]

' Dim srcLwHeight

' srcLwHeight = srcLabware.Class.Height

Dim Z

Z = CDb1(Src.Z(Pod))

' Get offsets from position to the labware at source position

Dim sx, sy, sz

sx = CDb1(Src.GetOneLabwareOffsetAtDepth(Depth, "X"))
sy = CDb1(Src.GetOneLabwareOffsetAtDepth(Depth, "Y"))
sz = CDb1(Src.GetOneLabwareOffsetAtDepth(Depth, "Z"))
pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the labware gripper offsets and squeeze values
Dim gx, gy, gz, pd
Dim Squeeze, Unsqueeze
Select Case Pod.PodType
    Case "ATTILA"
        gx = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperXOffset)
        gy = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperYOffset)
        gz = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperZOffset)
        Squeeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
                        CDbl(srcLabware.Class.GripperInfo.MultiChannel.Squeeze)))
        Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
                        CDbl(srcLabware.Class.GripperInfo.MultiChannel.Unsqueeze)))
'tls.msg gx & " " & gy & " " & gz & " " & Squeeze & " " & Unsqueeze
    Case Else ' need to fill in code for NX Gripper
End Select

' Get the Pod gripper offsets
Dim px, py, pz
px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
pz = CDbl(Pod.GripperZOffset)

Dim LiftHeight, e

LiftHeight = e.EvaluateExpression(StepDictionary.Let.LiftHeight)
' Temporarily save the height of the move
World.Volatile.LiftHeight = LiftHeight

' Reserve the resources used, i.e., the source position and the Pod
World.Globals.ResourceReserver.ReserveResources Array(Src, Pod)

' Open the source position
Src.Open True, Depth

' Start Moving
Pod.ApproachPosition Source, sx+gx-px, sy+gy-py, Z + sz+gz-pz, False, Unsqueeze

' Extend the grippers
Pod.GripperExtend

' Grab Labware
Pod.AbsMove ,,Squeeze

' Enforce the labware's speed limit
LWSpeedLimit = srcLabware.Class.SpeedLimit
If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit

' Notify software that the source labware is now in the grippers
' Version 2.x syntax: Pod.GetLabware Source, Depth
Pod.Gripper.GetLabwareObject Source, Depth

' Move to a safe height above the position (original function commented out)
' Pod.MoveToSafe
If LiftHeight < 0 Then err.raise 1050, , "Lift Height too low; would result in downward motion"

Pod.RelativeMoveAxes "Z", LiftHeight

' Close the source position
' Src.Close True, Depth

'Restore original pod speed now that the move is finished
Pod.SetSpeed OrigPodSpeed

RotatingALP

    Position: R1
    Rotate to Orientation: Portrait (90° counterclockwise)

Configure Beads Step

Bitmap: C:\Program Files\Biomek Software\Bitmaps\Vials.bmp

Description:

Caption: Configure Beads Step

Code: ' DispHeightBeads

Set LW = Positions(Labware.Location("Cryo1")).Labware

DispHeightCM = LW.HeightFromVolume(MFX.P1VolBlood, (1+RoundsCompleted))

' start dispensing at 2 mm below liqlevel

Extend "ZDispBeads", (DispHeightCM * 10) - 2

Prompt: [IDispatch]
Transfer

Using Pod2, execute the following transfer:

From: Cryo2, with the following pattern:

```
1 2 3 4 5 6
A () () () () ()
B () () () () ()
C () () () () ()
D () () () >< () ()
```

Water

Proceed down first, then left to right.
Start from the beginning of the selection.
Set the mark at the last well transferred.
Use the following custom technique:

Use the following pipetting template: Span-8 P1000 2
Calibration Offset: 0
Calibration Slope: 1
Minimum Pipetting Height: 0.5 mm
Prewet: False
Aspirate Blowout: True
Follow Liquid: False
Height: -2 mm from the liquid
Mix: True
Mix Aspirate Speed: 300µL/s
Mix Aspirate Height: 1 mm from the liquid
Mix Dispense Speed: 300µL/s
Mix Dispense Height: 1 mm from the liquid
Mix Count: 2
Mix Volume: 200 µL
Operation speed: 40µL/s
Tip Touch: False
Trailing Air Gap: False
Override Liquid Type Settings
  Aspirate Delay: 10 ms
  Aspirate Speed: 100 µL/s
  Blowout Delay: 0 ms
  Blowout Volume: 20 µL
  Dispense Delay: 0 ms
  Dispense Speed: 100 µL/s
  Prewet Delay: 0 ms
  Prewet Overage: 0 µL
  Tip Touch Delay: 0 ms
  Tip Touch Speed: 50 µL/s
  Trailing Air Gap Volume: 1 µL

Override the technique height by moving to 0.5 mm from the bottom.
To: Cryo1, =MX.PZVolBeadsµL, sections specified by "=ColWells()1+RoundsCompleted",
Water
Proceed down first, then left to right.
Start from the beginning of the selection.
Set the mark at the last well transferred.
Use the following custom technique:
  Use the following pipetting template: Span-8 MultiDispense
  Calibration Offset: 0
  Calibration Slope: 1
  Minimum Pipetting Height: 1.5 mm
Prewet: False
Blowout: True
Follow Liquid: False
Height: 1.5 mm from the bottom
Mix: False
Mix Aspirate Speed: 100µL/s
Mix Aspirate Height: 0 mm from the liquid
Mix Dispense Speed: 100µL/s
Mix Dispense Height: 0 mm from the liquid
Mix Count: 1
Mix Volume: 10 µL
Operation speed: 40µL/s
Tip Touch: False
Override Liquid Type Settings
Aspirate Delay: 10 ms
Aspirate Speed: 50 µL/s
Blowout Delay: 0 ms
Blowout Volume: 20 µL
Dispense Delay: 0 ms
Dispense Speed: 25 µL/s
Prewet Delay: 0 ms
Prewet Overage: 0 µL
Tip Touch Delay: 0 ms
Tip Touch Speed: 50 µL/s
Trailing Air Gap Volume: 1 µL

Override the technique height by moving to -$ZDispBeads$ mm from the bottom.
Dispense up to 1 time(s) per draw.
Create 1 replicate(s) of each source well.

Keep the current tips

Unload the tips when finished.

Stop when finished with Destinations.

Probes 1-6 will be used.

End Scripted Let

RotatingALP

  Position: R1
  Rotate to Orientation: Landscape

Script

Description:

Labware Place to Cryo1

Execute the following script code:

Option Explicit

' This script duplicates the functionality of the Move Labware step.
' It has been modified to only place the labware after another step has picked it up.

Dim e

Set e = CreateObject("World.EngineObject")

Dim Target, PodName

Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit

' PodName            The name of the pod to use
PodName = StepDictionary.Let.PodName

if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"

Set Pod = World.Devices.Pipettor1(PodName)

OrigPodSpeed = Pod.CurrentSpeed
Set CurDeck = World.Devices.Pipettor1.Deck

' Target Name of the target position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location
Target = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Target))

if IsEmpty(Target) or Target = "" then err.raise 1050, , "Target must be defined"

If Not IsObject(Pod.GrippedLabware) Then err.raise 1050, , "There is no labware in the gripper."
Dim glw
set glw = Pod.GrippedLabware(Pod.GrippedLabware.Count - 1) ' The gripped labware is an array with the bottom piece at the highest index

' Convert Source and Target names into objects
Dim Dst
Set Dst = Pipettor.Deck.Positions(Target)

Dim Z
Dim sx, sy, sz
' Dim gx, gy, gz, pd
'pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the squeeze values
'Dim Unsqueeze
'Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) + CDbl(glw.Class.Unsqueeze)))
' Get the Pod gripper offsets
Dim px, py, pz
px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
pz = CDbl(Pod.GripperZOffset)

' Enforce the labware's speed limit
'LWSpeedLimit = srcLabware.Class.SpeedLimit
'If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit

'Get height of destination position
Z = CDbl(Dst.Z(Pod))

' Get offsets from position to the labware at target position
Dim tx, ty, tz, dx, dy, dz
tx = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "X"))
ty = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Y"))
tz = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Z"))

' Get the Target Labware
Dim dstLabware
dx = 0
dy = 0
dz = 0
dstLabware = Null
if (Dst.StackDepth > 0) then
    Set dstLabware = Dst.GetLabwareAtDepth(1)
end if
' Get Destination Stack Offsets (really Per-Labware Offsets)
dx = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "X"))
dy = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "Y"))
dz = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "Z"))

' Get the labware gripper offsets (added-in by MAG 3/7/2003)
World.Volatile.MyDest = Dst

'Dim gx, gy, gz, pd
'gx = CDbl(glw.Class.GripperXOffset)
'gy = CDbl(glw.Class.GripperYOffset)
'gz = CDbl(glw.Class.GripperZOffset)

pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the labware gripper offsets and squeeze values
Dim gx, gy, gz, pd
Dim Unsqueeze
Select Case Pod.PodType
  Case "ATTILA"
    gx = CDbl(glw.Class.GripperInfo.MultiChannel.GripperXOffset)
    gy = CDbl(glw.Class.GripperInfo.MultiChannel.GripperYOffset)
    gz = CDbl(glw.Class.GripperInfo.MultiChannel.GripperZOffset)
    Unsqueeze = CDbl(Pod.DAxisFromGripper(CDb(p) +
                          CDbl(glw.Class.GripperInfo.MultiChannel.Unsqueeze)))
'tls.msg pod.podtype
'tls.msg gx & " " & gy & " " & gz & " " & " " & Unsqueeze
Case Else ' need to fill in code for NX Gripper
End Select

' Open Destination
Dst.Open True, 0

' Start Moving
Pod.ApproachPosition Target, CDbl(tx+dx+gx-px), CDbl(ty+dy+gy-py), CDbl(Z + tz+dz+gz-pz), True

Pod.MoveZ CDbl(Z + tz + dz + gz - pz)

' Put Labware
Pod.AbsMove ,, Unsqueeze

' Notify software the labware that was in the grippers is now at the target
' old v. 2.x syntax Pod.PutLabware Target
Pod.Gripper.PutLabwareObject Target

' Retract grippers
Pod.GripperRetract

' Close the destination position
Dst.Close True, 0

'Restore original pod speed now that the move is finished
'Pod.SetSpeed OrigPodSpeed

' Move to a safe height
Pod.MoveToSafe

Run setstepdone
    wait = true

End Loop

Move Labware
Move the top "1" plates at "StoreLid" to "Cryo2" using pod "Pod1".

End

Else

End

End Group

Group

If
If "MFX.NextStep = 3":

Then
Move To
Move "Pod2" to deck position "W1" at offset (0,0).

Move Labware
Move the top "2" plates at "Cryo1" to "Orbital1" using pod "Pod1".

Move To
Move "Pod1" to deck position "P2" at offset (0,0).

Run setstepdone
wait = true

End

Else

End

Loop
Loop from "=MFX.RoundsCompleted(4)" to "=MFX.TotalRounds(4)", incrementing by "1".

If
If "MFX.NextStep = 4":

Then

Script
Description:
Labware Pickup from Cryo1
Execute the following script code:

Option Explicit

' This script duplicates the functionality of the first half of the Move Labware step.
' Modified 3/7/2003 by MAG to lift the labware to a specific height off the deck
' (height measured at top of the labware) which was useful for a specific customer
' reading barcodes via their own reader, with labels always a certain distance from
' the top of the labware.

Set e = CreateObject("World.EngineObject")

Dim Source, Target, PodName
Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit

' PodName        The name of the pod to use
PodName = StepDictionary.Let.PodName
if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"
Set Pod = World.Devices.Pipettor1(PodName)
OrigPodSpeed = Pod.CurrentSpeed

Set CurDeck = World.Devices.Pipettor1.Deck

' Source         Name of the source position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location
Source = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Source))
'tls.msg MFX.NextStep & " " & source
if IsEmpty(Source) or Source = "" then err.raise 1050, , "Source must be defined"
' Get the depth to grab a piece of labware at.
Dim Depth
Depth = e.EvaluateExpression(StepDictionary.Let.Depth)  
if IsEmpty(Depth) then err.raise 1050, , "Depth must be defined"
If Depth < 1 then err.raise 1050, , "Depth must be at least 1"

' Convert Source and Target names into objects
Dim Src
Set Src = Pipettor.Deck.Positions(Source)

' Get the Source Labware
Dim srcLabware
World.Volatile.Depth = Depth
Set srcLabware = Src.GetLabwareAtDepth(Depth)

' Get the source labware height [DON'T NEED THIS ANYMORE]
' Dim srcLwHeight
' srcLwHeight = srcLabware.Class.Height

Dim Z
Z = CDbl(Src.Z(Pod))

' Get offsets from position to the labware at source position
Dim sx, sy, sz
sx = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "X"))
sy = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "Y"))
sz = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "Z"))
pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))
' Get the labware gripper offsets and squeeze values
Dim gx, gy, gz, pd
Dim Squeeze, Unsqueeze
Select Case Pod.PodType
  Case "ATTILA"
    gx = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperXOffset)
    gy = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperYOffset)
    gz = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperZOffset)
    Squeeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
    CDbl(srcLabware.Class.GripperInfo.MultiChannel.Squeeze)))
    Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
    CDbl(srcLabware.Class.GripperInfo.MultiChannel.Unsqueeze)))
  'tls.msg pod.podtype
  'tls.msg gx & " " & gy & " " & gz & " " & Squeeze & " " & Unsqueeze
  Case Else ' need to fill in code for NX Gripper
End Select

' Get the Pod gripper offsets
Dim px, py, pz
px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
pz = CDbl(Pod.GripperZOffset)

Dim LiftHeight, e

LiftHeight = e.EvaluateExpression(StepDictionary.Let.LiftHeight)
' Temporarily save the height of the move
World.Volatile.LiftHeight = LiftHeight

' Reserve the resources used, i.e., the source position and the Pod
World.Globals.ResourceReserver.ReserveResources Array(Src, Pod)

' Open the source position
Src.Open True, Depth

' Start Moving
Pod.ApproachPosition Source, sx+gx-px, sy+gy-py, Z + sz+gz-pz, False, Unsqueeze

' Extend the grippers
Pod.GripperExtend

' Grab Labware
Pod.AbsMove ,,,Squeeze

' Enforce the labware's speed limit
LWSpeedLimit = srcLabware.Class.SpeedLimit
If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit

' Notify software that the source labware is now in the grippers
' Version 2.x syntax: Pod.GetLabware Source, Depth
Pod.Gripper.GetLabwareObject Source, Depth

' Move to a safe height above the position (original function commented out)
' Pod.MoveToSafe
If LiftHeight < 0 Then err.raise 1050, , "Lift Height too low ; would result in downward motion"

Pod.RelativeMoveAxes "Z", LiftHeight

' Close the source position
' Src.Close True, Depth

'Restore original pod speed now that the move is finished
Pod.SetSpeed OrigPodSpeed

Run getnewtips
    pattern = =TwoTips()(MFX.NumSamples)

Run starttimer
    index = ="
    timername =="Shaking/Incubating"
    waittime = =MFX.P4ShakeTime

Configure
    Bitmap: C:\Program Files\Biomek Software\Bitmaps\Vials.bmp
    Description:
    Caption: Configure
    Code: Set LW = Positions(Labware.Location("Cryo1")).Labware
    LW.ConfigureAmounts VolMinSB

' calculate the asp & dispense height for the mix step
' so we don't need to use LLS
' assume it's the same for all wells

AspHeightCM = LW.HeightFromVolume(VolMinSB, 1)
' this is the height in CM
' needs to be multiplied by 10 because the step expects MM

Vol = VolMinSB - MFX.P4MixVolume ' this is the volume
' that is left in the well
' after the aspiration

DispHeightCM = LW.HeightFromVolume(Vol, 1)

Extend "ZAsp", AspHeightCM * 10 ' convert cm to mm
Extend "ZDisp", 0.6 'DispHeightCM * 10 'was 0.2 before ver. 0.07
Extend "Delay", 0
Prompt: [IDispatch]
Tooltip: Scripted Let
---------------------------------------------------------------------------
Transfer
Using Pod2, execute the following transfer:
From: Cryo1, sections specified by "=Wells()(MFX.NumSamples)", BeadsplusCells
Proceed down first, then left to right.
Start from the beginning of the selection.
Do not set the mark.
Use the following custom technique:
    Use the following pipetting template: OS Span-8 P1000 LongTravelMix 2
    Calibration Offset: 2.54
    Calibration Slope: 1.033
    Minimum Pipetting Height: =0.5 mm
Prewet: False
Aspirate Blowout: True
Follow Liquid: False
Height: 0 mm from the liquid
Mix: True
Mix Aspirate Speed: =MFX.P4MixSpeedµL/s
Mix Aspirate Height: =ZAsp mm from the liquid
Mix Dispense Speed: =MFX.P4MixSpeedµL/s
Mix Dispense Height: =ZDisp mm from the liquid
Mix Count: =MFX.P4MixCycles
Mix Volume: =MFX.P4MixVolume µL
Operation speed: 70µL/s
Tip Touch: True
Trailing Air Gap: False
Override Liquid Type Settings
   Aspirate Delay: 10 ms
   Aspirate Speed: 300 µL/s
   Blowout Delay: =Delay ms
   Blowout Volume: 20 µL
   Dispense Delay: 20 ms
   Dispense Speed: 200 µL/s
   Prewet Delay: 200 ms
   Prewet Overage: 0 µL
   Tip Touch Delay: 300 ms
   Tip Touch Speed: 70 µL/s
   Trailing Air Gap Volume: 10 µL

Override the technique height by moving to =ZAsp mm from the bottom.
To: Cryo1, 0µL, sections specified by "=Wells()(MFX.NumSamples)". BeadsplusCells

Proceed down first, then left to right.

Start from the beginning of the selection.

Do not set the mark.

Use the following custom technique:

Use the following pipetting template: OS Span-8 P1000 MixOnly 2

Calibration Offset: 2.54

Calibration Slope: 1.033

Minimum Pipetting Height: =0.5 mm

Prewet: False

Blowout: False

Follow Liquid: False

Height: 0 mm from the liquid

Mix: False

Mix Aspirate Speed: 100µL/s

Mix Aspirate Height: 0 mm from the liquid

Mix Dispense Speed: 100µL/s

Mix Dispense Height: 0 mm from the liquid

Mix Count: 1

Mix Volume: 900 µL

Operation speed: 70µL/s

Tip Touch: False

Override Liquid Type Settings

Aspirate Delay: 10 ms

Aspirate Speed: 300 µL/s

Blowout Delay: 10 ms

Blowout Volume: 20 µL

Dispense Delay: 20 ms

Dispense Speed: 200 µL/s
Prewet Delay: 0 ms
Prewet Overage: 0 µL
Tip Touch Delay: 300 ms
Tip Touch Speed: 70 µL/s
Trailing Air Gap Volume: 10 µL

Override the technique height by moving to =ZDisp mm from the bottom.
Dispense up to 1 time(s) per draw.
Create 1 replicate(s) of each source well.
Keep the current tips
Keep the tips when finished.
Stop when finished with Destinations.
Probes specified by "=OneTip()(MFX.NumSamples)" will be used.

End Scripted Let

Script
Description:
Labware Place to Cryol
Execute the following script code:
Option Explicit
' This script duplicates the functionality of the Move Labware step.
' It has been modified to only place the labware after another step has picked it up.
Dim e
Set e = CreateObject("World.EngineObject")
Dim Target, PodName
Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit
' PodName        The name of the pod to use

PodName = StepDictionary.Let.PodName

if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"

Set Pod = World.Devices.Pipettor1(PodName)

OrigPodSpeed = Pod.CurrentSpeed

Set CurDeck = World.Devices.Pipettor1.Deck

' Target         Name of the target position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location

Target = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Target))

if IsEmpty(Target) or Target = "" then err.raise 1050, , "Target must be defined"

If Not IsObject(Pod.GrippedLabware) Then err.raise 1050, , "There is no labware in the
gripper."

Dim glw

set glw = Pod.GrippedLabware(Pod.GrippedLabware.Count - 1) ' The gripped labware is an
array with the bottom piece at the highest index

' Convert Source and Target names into objects

Dim Dst

Set Dst = Pipettor.Deck.Positions(Target)

Dim Z

Dim sx, sy, sz

' Dim gx, gy, gz, pd

'pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))
' Get the squeeze values
'Dim Unsqueeze
'Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) + CDbl(glw.Class.Unsqueeze)))

' Get the Pod gripper offsets
Dim px, py, pz
px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
pz = CDbl(Pod.GripperZOffset)

' Enforce the labware's speed limit
'LWSpeedLimit = srcLabware.Class.SpeedLimit
'If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit

' Get height of destination position
Z = CDbl(Dst.Z(Pod))

' Get offsets from position to the labware at target position
Dim tx, ty, tz, dx, dy, dz
tx = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "X"))
ty = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Y"))
tz = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Z"))

' Get the Target Labware
Dim dstLabware
dx = 0
dy = 0
dz = 0

dstLabware = Null

if (Dst.StackDepth > 0) then
    Set dstLabware = Dst.GetLabwareAtDepth(1)
end if

' Get Destination Stack Offsets (really Per-Labware Offsets)

dx = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "X"))
dy = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "Y"))
dz = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "Z"))

' Get the labware gripper offsets (added-in by MAG 3/7/2003)
World.Volatile.MyDest = Dst

'Dim gx, gy, gz, pd
'gx = CDbl(glw.Class.GripperXOffset)
'gy = CDbl(glw.Class.GripperYOffset)
'gz = CDbl(glw.Class.GripperZOffset)

pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the labware gripper offsets and squeeze values
Dim gx, gy, gz, pd
Dim Unsqueeze
Select Case Pod.PodType
    Case "ATTILA"
        gx = CDbl(glw.Class.GripperInfo.MultiChannel.GripperXOffset)
        gy = CDbl(glw.Class.GripperInfo.MultiChannel.GripperYOffset)
        gz = CDbl(glw.Class.GripperInfo.MultiChannel.GripperZOffset)
Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) + CDbl(glw.Class.GripperInfo.MultiChannel.Unsqueeze)))

'tls.msg pod.podtype
'tls.msg gx " " & gy " " & gz " " & " " & Unsqueeze

Case Else ' need to fill in code for NX Gripper
End Select

' Open Destination
Dst.Open True, 0

' Start Moving
Pod.ApproachPosition Target, CDbl(tx+dx+gx-px), CDbl(ty+dy+gy-py), CDbl(Z + tz+dz+gz-pz), True

Pod.MoveZ CDbl(Z + tz + dz + gz - pz)

' Put Labware
Pod.AbsMove ,,Unsqueeze

' Notify software the labware that was in the grippers is now at the target
' old v. 2.x syntax Pod.PutLabware Target
Pod.Gripper.PutLabwareObject Target

' Retract grippers
Pod.GripperRetract
' Close the destination position

Dst.Close True, 0

'Restore original pod speed now that the move is finished

' Pod.SetSpeed OrigPodSpeed

' Move to a safe height

Pod.MoveToSafe

Run parkinwashstation

  fromtop = -0.2
  rule = 3
  withtipwash = False

Run setstepdone

  wait = true

End

Else

End

If

If "MFX.NextStep = 5":

Then
Run starttimer

  index = ""
  timername = "Shaking/Incubating"
  waittime = =MFX.P4ShakeTime

Device Action
Send the following command to "OrbitalShakerALP0": "Shake".
Parameters: =MFX.P4ShakerSpeed, 1, CounterClockwise

Run waittimer

  index = ""
  settimer = False
  timername = "Shaking/Incubating"
  waittime = ""

Device Action
Send the following command to "OrbitalShakerALP0": "Stop".
Parameters: 1

Run setstepdone
  wait = true

End

Else

Run waittimer
  index = ""
settimer = False
timename = "Shaking/Incubating"
waittime = ""

End

End Loop

If
If "MFX.UsePeltier":

Then

TShake1: Initialize

End

Else

End

End Group

Group

If
If "MFX.NextStep = 6":

Then
Move To
Move "Pod2" to deck position "W1" at offset (0,0).

Move Labware
Move the top "2" plates at "Cryo1" to "Pelt1" using pod "Pod1".

Move To
Move "Pod1" to deck position "P2" at offset (0,0).

Run parkinwashstation
  rule = 3
  withtipwash = False

Run setstepdone
  wait = true

End

Else

End

If
If "MFX.NextStep = 7":

Then
Run waittimer
   index = ""
   settimer = True
   timername = "Settling..."
   waittime = SettleTimeBlood

Run setstepdone
   wait = true

End

Else

End

If
   If "MFX.NextStep = 8":

Then

Script
Description:
Labware Pickup from Cryol

Execute the following script code:

Option Explicit

' This script duplicates the functionality of the first half of the Move Labware step.
' Modified 3/7/2003 by MAG to lift the labware to a specific height off the deck
' (height measured at top of the labware) which was useful for a specific customer
' reading barcodes via their own reader, with labels always a certain distance from
' the top of the labware.

Set e = CreateObject("World.EngineObject")

Dim Source, Target, PodName
Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit

' PodName        The name of the pod to use
PodName = StepDictionary.Let.PodName
if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"
Set Pod = World.Devices.Pipettor1(PodName)
OrigPodSpeed = Pod.CurrentSpeed

Set CurDeck = World.Devices.Pipettor1.Deck

' Source         Name of the source position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location
Source = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Source))
'tls.msg MFX.NextStep & " " & source
if IsEmpty(Source) or Source = "" then err.raise 1050, , "Source must be defined"

' Get the depth to grab a piece of labware at.
Dim Depth
Depth = e.EvaluateExpression(StepDictionary.Let.Depth)
if IsEmpty(Depth) then err.raise 1050, , "Depth must be defined"
If Depth < 1 then err.raise 1050, , "Depth must be at least 1"
' Convert Source and Target names into objects
Dim Src
Set Src = Pipettor.Deck.Positions(Source)

' Get the Source Labware
Dim srcLabware
World.Volatile.Depth = Depth
Set srcLabware = Src.GetLabwareAtDepth(Depth)

' Get the source labware height [DON'T NEED THIS ANYMORE]
' Dim srcLwHeight
' srcLwHeight = srcLabware.Class.Height

Dim Z
Z = CDbl(Src.Z(Pod))

' Get offsets from position to the labware at source position
Dim sx, sy, sz
sx = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "X"))
sy = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "Y"))
sz = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "Z"))

pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the labware gripper offsets and squeeze values
Dim gx, gy, gz, pd
Dim Squeeze, Unsqueeze
Select Case Pod.PodType
    Case "ATTILA"

gx = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperXOffset)
gy = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperYOffset)
gz = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperZOffset)
Squeeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
CDbl(srcLabware.Class.GripperInfo.MultiChannel.Squeeze)))
Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
CDbl(srcLabware.Class.GripperInfo.MultiChannel.Unsqueeze)))
'tls.msg pod.podtype
'tls.msg gx & " " & gy & " " & gz & " " & Squeeze & " " & Unsqueeze
    Case Else ' need to fill in code for NX Gripper
End Select

' Get the Pod gripper offsets
Dim px, py, pz
px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
pz = CDbl(Pod.GripperZOffset)

Dim LiftHeight, e
LiftHeight = e.EvaluateExpression(StepDictionary.Let.LiftHeight)

' Temporarily save the height of the move
World.Volatile.LiftHeight = LiftHeight

'Reserve the resources used, i.e., the source position and the Pod
World.Globals.ResourceReserver.ReserveResources Array(Src, Pod)
' Open the source position
Src.Open True, Depth

' Start Moving
Pod.ApproachPosition Source, sx+gx-px, sy+gy-py, Z + sz+gz-pz, False, Unsqueeze

' Extend the grippers
Pod.GripperExtend

' Grab Labware
Pod.AbsMove ,,Squeeze

' Enforce the labware's speed limit
LWSpeedLimit = srcLabware.Class.SpeedLimit
If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit

' Notify software that the source labware is now in the grippers
' Version 2.x syntax: Pod.GetLabware Source, Depth
Pod.Gripper.GetLabwareObject Source, Depth

' Move to a safe height above the position (original function commented out)
' Pod.MoveToSafe

If LiftHeight < 0 Then err.raise 1050, , "Lift Height too low; would result in downward motion"

Pod.RelativeMoveAxes "Z", LiftHeight

' Close the source position
' Src.Close True, Depth

'Restore original pod speed now that the move is finished
Pod.SetSpeed OrigPodSpeed

Run getnewtips
  pattern = TwoTips()(MFX.NumSamples)

Configure Trips
Bitmap: C:\Program Files\Biomek Software\Bitmaps\Vials.bmp
Description:
Caption: Configure Trips
Code: '
  --- trip calculation for SN ---

  nTripsSN = TLS.NumTrips(VolMaxSB, MaxVolInTips)
  Extend "NumTripsSN", nTripsSN
  Extend "VolTripSN", VolMaxSB/nTripsSN

  Extend "VolSN", VolMaxSB

  CurrentVol = VolMaxSB+1  ' +1 takes care of a rounding error in RemoveSN
                      ' (cannot asp 866.667 because the well only has 866.667)

Set LW = Positions(Labware.Location("Cryo1")).Labware
LW.ConfigureAmounts CurrentVol

'tls.msg "SampleSN = " & ntripssn & " * " & (VolMaxSB/nTripsSN) & " µl = " & volmaxsb
Loop
Loop from "Trip" = "1" to "=NumTripsSN", incrementing by "1".

Calc Asp Height

Bitmap: C:\Program Files\Biomek Software\Bitmaps\Vials.bmp

Description:

Caption: Calc Asp Height

Code: ' calculate the asp height so we don't need to use LLS
' assume it's the same for all wells
' first calculate the current volume in the well
vol = VolSN - (VolTripSN * (Trip - 1))

Set LW = Positions(Labware.Location("Cryo1")).Labware

AspHeightCM = LW.HeightFromVolume(vol, 1) - SNStartBelowCM ' start below liq level
' this is the height in CM
' needs to be multiplied by 10 because the step expects MM

Extend "AspHeight", AspHeightCM * 10 ' convert cm to mm

'tls.msg "Trip " & trip & " of " & numtripssn & vbCrLf & "AspHeight = " & AspHeightCM * 10

Loop
Loop from "ColPair" = "1" to "3", incrementing by "1".
Set Well Pattern

Bitmap: C:\Program Files\Biomek Software\Bitmaps\Vials.bmp

Description:

Caption: Set Well Pattern

Code: Select Case ColPair

    Case 1
        Extend "Wells", Col()(1)(MFX.NumSamples) & "," & Col()(2)(MFX.NumSamples)

    Case 2
        Extend "Wells", Col()(3)(MFX.NumSamples) & "," & Col()(4)(MFX.NumSamples)

    Case 3
        Extend "Wells", Col()(5)(MFX.NumSamples) & "," & Col()(6)(MFX.NumSamples)

End Select

Prompt: [IDispatch]

Tooltip: Scripted Let

Transfer

Using Pod2, execute the following transfer:

From: Cryo1, sections specified by "Wells", BeadsplusCells

Proceed down first, then left to right.

Start from the beginning of the selection.

Do not set the mark.

Use the following custom technique:

    Use the following pipetting template: OS Span-8 P1000 SlowRetract 2

    Calibration Offset: 2.54

    Calibration Slope: 1.033

    Minimum Pipetting Height: -0.5 mm

    Prewet: False
Aspirate Blowout: True
Follow Liquid: True
Height: -2 mm from the liquid
Mix: False
Mix Aspirate Speed: 100µL/s
Mix Aspirate Height: 0 mm from the liquid
Mix Dispense Speed: 100µL/s
Mix Dispense Height: 0 mm from the liquid
Mix Count: 1
Mix Volume: 10 µL
Operation speed: 20µL/s
Tip Touch: False
Trailing Air Gap: False
Override Liquid Type Settings
Aspirate Delay: 10 ms
Aspirate Speed: 300 µL/s
Blowout Delay: 0 ms
Blowout Volume: 5 µL
Dispense Delay: 0 ms
Dispense Speed: 50 µL/s
Prewet Delay: 0 ms
Prewet Overage: 0 µL
Tip Touch Delay: 0 ms
Tip Touch Speed: 50 µL/s
Trailing Air Gap Volume: 1 µL

Override the technique height by moving to =AspHeight mm from the bottom.
To: Cryo1, =VolTripSNµL, sections specified by "=Wells", BeadsplusCells
Proceed down first, then left to right.
Start from the beginning of the selection.
Set the mark at the last well transferred.
Use the following custom technique:
   Use the following pipetting template: Do Nothing
   Calibration Offset: 2.54
   Calibration Slope: 1.033
   Minimum Pipetting Height: 0 mm
   Prewet: False
   Blowout: True
   Follow Liquid: False
   Height: 1.5 mm from the bottom
   Mix: False
   Mix Aspirate Speed: 100µL/s
   Mix Aspirate Height: 0 mm from the liquid
   Mix Dispense Speed: 100µL/s
   Mix Dispense Height: 0 mm from the liquid
   Mix Count: 1
   Mix Volume: 10 µL
   Operation speed: 5µL/s
   Tip Touch: False
Override Liquid Type Settings
   Aspirate Delay: 10 ms
   Aspirate Speed: 50 µL/s
   Blowout Delay: 0 ms
   Blowout Volume: 5 µL
   Dispense Delay: 0 ms
   Dispense Speed: 50 µL/s
   Prewet Delay: 0 ms
Prewet Overage: 0 µL
Tip Touch Delay: 0 ms
Tip Touch Speed: 50 µL/s
Trailing Air Gap Volume: 1 µL

Override the technique height by moving to 39.3 mm from the bottom.
Dispense up to 1 time(s) per draw.
Create 1 replicate(s) of each source well.
Keep the current tips
Keep the tips when finished.
Stop when finished with Destinations.
Probes specified by "=TwoTips(MFX.NumSamples)" will be used.

Run emptytipstowaste

End Scripted Let

End Loop

End Scripted Let

End Loop

Script

Description:
Labware Place to Cryo1

Execute the following script code:

Option Explicit

' This script duplicates the functionality of the Move Labware step.
' It has been modified to only place the labware after another step has picked it up.
Dim e
Set e = CreateObject("World.EngineObject")
Dim Target, PodName
Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit

' PodName        The name of the pod to use
PodName = StepDictionary.Let.PodName
if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"
Set Pod = World.Devices.Pipettor1(PodName)
OrigPodSpeed = Pod.CurrentSpeed

Set CurDeck = World.Devices.Pipettor1.Deck

' Target         Name of the target position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location
Target = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Target))

if IsEmpty(Target) or Target = "" then err.raise 1050, , "Target must be defined"

If Not IsObject(Pod.GrippedLabware) Then err.raise 1050, , "There is no labware in the gripper."
Dim glw
set glw = Pod.GrippedLabware(Pod.GrippedLabware.Count - 1) ' The gripped labware is an array with the bottom piece at the highest index

' Convert Source and Target names into objects
Dim Dst
Set Dst = Pipettor.Deck.Positions(Target)

Dim Z
Dim sx, sy, sz
' Dim gx, gy, gz, pd
'pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the squeeze values
'Dim Unsqueeze
'Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) + CDbl(glw.Class.Unsqueeze)))

' Get the Pod gripper offsets
Dim px, py, pz
px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
pz = CDbl(Pod.GripperZOffset)

' Enforce the labware's speed limit
'LWSpeedLimit = srcLabware.Class.SpeedLimit
'If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit

'Get height of destination position
Z = CDbl(Dst.Z(Pod))

' Get offsets from position to the labware at target position
Dim tx, ty, tz, dx, dy, dz
tx = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "X"))
ty = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Y"))
tz = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Z"))

' Get the Target Labware
Dim dstLabware

dx = 0
dy = 0
dz = 0
dstLabware = Null
if (Dst.StackDepth > 0) then
    Set dstLabware = Dst.GetLabwareAtDepth(1)
end if

' Get Destination Stack Offsets (really Per-Labware Offsets)
dx = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "X"))
dy = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "Y"))
dz = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "Z"))

' Get the labware gripper offsets (added-in by MAG 3/7/2003)
World.Volatile.MyDest = Dst

'Dim gx, gy, gz, pd
'gx = CDbl(glw.Class.GripperXOffset)
'gy = CDbl(glw.Class.GripperYOffset)
'gz = CDbl(glw.Class.GripperZOffset)

pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the labware gripper offsets and squeeze values
Dim gx, gy, gz, pd
Dim Unsqueeze

Select Case Pod.PodType
  Case "ATTILA"
    gx = CDbl(glw.Class.GripperInfo.MultiChannel.GripperXOffset)
    gy = CDbl(glw.Class.GripperInfo.MultiChannel.GripperYOffset)
    gz = CDbl(glw.Class.GripperInfo.MultiChannel.GripperZOffset)
    Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
    CDbl(glw.Class.GripperInfo.MultiChannel.Unsqueeze)))

    'tls.msg pod.podtyp
    'tls.msg gx & " " & gy & " " & gz & " " & " " & Unsqueeze

    Case Else ' need to fill in code for NX Gripper

End Select

' Open Destination
Dst.Open True, 0

' Start Moving
Pod.ApproachPosition Target, CDbl(tx+dx+gx-px), CDbl(ty+dy+gy-py), CDbl(Z + tz+dz+gz-pz), True

Pod.MoveZ CDbl(Z + tz + dz + gz - pz)

' Put Labware
Pod.AbsMove ,,,Unsqueeze
' Notify software the labware that was in the grippers is now at the target
' old v. 2.x syntax Pod.PutLabware Target
Pod.Gripper.PutLabwareObject Target

' Retract grippers
Pod.GripperRetract

' Close the destination position
Dst.Close True, 0

'Restore original pod speed now that the move is finished
'Pod.SetSpeed OrigPodSpeed

' Move to a safe height
Pod.MoveToSafe

Run droptips

Run cleanwashstation
dspeed = 200
fromtop = 0.6
yoffset = 0.35

Run setstepdone
wait = false

End Scripted Let
Else

End

If
If "MFX.NextStep = 9":  
Then

Move To
Move "Pod2" to deck position "W1" at offset (0,0).

Move Labware
Move the top "2" plates at "Cryo1" to "Orbital1" using pod "Pod1".

Move To
Move "Pod1" to deck position "P2" at offset (0,0).

Run setstepdone
    wait = true

End

Else

End
End Group

Loop

Loop from "WashCycle" = "MFX.RoundsCompleted(6)" to "MFX.TotalRounds(6)", incrementing by "1".

If

If "MFX.NextStep = 10":

Then

Run getnewtips
  pattern = =TwoTips()(MFX.NumSamples)

Script

Description:
Labware Pickup from Cryo1

Execute the following script code:

Option Explicit

' This script duplicates the functionality of the first half of the Move Labware step.
' Modified 3/7/2003 by MAG to lift the labware to a specific height off the deck
' (height measured at top of the labware) which was useful for a specific customer
' reading barcodes via their own reader, with labels always a certain distance from
' the top of the labware.

Set e = CreateObject("World.EngineObject")

Dim Source, Target, PodName
Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit

' PodName       The name of the pod to use
PodName = StepDictionary.Let.PodName
if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"
Set Pod = World.Devices.Pipettor1(PodName)
OrigPodSpeed = Pod.CurrentSpeed

Set CurDeck = World.Devices.Pipettor1.Deck

' Source       Name of the source position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location
Source = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Source))
'tls.msg MFX.NextStep & " " & source
if IsEmpty(Source) or Source = "" then err.raise 1050, , "Source must be defined"

' Get the depth to grab a piece of labware at.
Dim Depth
Depth = e.EvaluateExpression(StepDictionary.Let.Depth)
if IsEmpty(Depth) then err.raise 1050, , "Depth must be defined"
If Depth < 1 then err.raise 1050, , "Depth must be at least 1"

' Convert Source and Target names into objects
Dim Src
Set Src = Pipettor.Deck.Positions(Source)

' Get the Source Labware
Dim srcLabware
World.Volatile.Depth = Depth

Set srcLabware = Src.GetLabwareAtDepth(Depth)

' Get the source labware height  [DON'T NEED THIS ANYMORE]
' Dim srcLwHeight
' srcLwHeight = srcLabware.Class.Height

Dim Z
Z = CDbl(Src.Z(Pod))

' Get offsets from position to the labware at source position
Dim sx, sy, sz
sx = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "X"))
sy = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "Y"))
sz = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "Z"))

pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the labware gripper offsets and squeeze values
Dim gx, gy, gz, pd
Dim Squeeze, Unsqueeze
Select Case Pod.PodType
  Case "ATTILA"
    gx = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperXOffset)
gy = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperYOffset)
gz = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperZOffset)
    Squeeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) + CDbl(srcLabware.Class.GripperInfo.MultiChannel.Squeeze)))
Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) + CDbl(srcLabware.Class.GripperInfo.MultiChannel.Unsqueeze)))
'tls.msg pod.podtype
'tls.msg gx & " " & gy & " " & gz & " " & Squeeze & " " & Unsqueeze
    Case Else ' need to fill in code for NX Gripper
End Select

' Get the Pod gripper offsets
Dim px, py, pz
px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
pz = CDbl(Pod.GripperZOffset)

Dim LiftHeight, e
LiftHeight = e.EvaluateExpression(StepDictionary.Let.LiftHeight)
' Temporarily save the height of the move
World.Volatile.LiftHeight = LiftHeight

'Reserve the resources used, i.e., the source position and the Pod
World.Globals.ResourceReserver.ReserveResources Array(Src, Pod)

' Open the source position
Src.Open True, Depth

' Start Moving
Pod.ApproachPosition Source, sx+gx-px, sy+gy-py, Z + sz+gz-pz, False, Unsqueeze
' Extend the grippers
Pod.GripperExtend

' Grab Labware
Pod.AbsMove ,,Squeeze

' Enforce the labware's speed limit
LWSpeedLimit = srcLabware.Class.SpeedLimit
If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit

' Notify software that the source labware is now in the grippers
' Version 2.x syntax: Pod.GetLabware Source, Depth
Pod.Gripper.GetLabwareObject Source, Depth

' Move to a safe height above the position (original function commented out)
' Pod.MoveToSafe

If LiftHeight < 0 Then err.raise 1050, , "Lift Height too low ; would result in downward motion"

Pod.RelativeMoveAxes "Z", LiftHeight

' Close the source position
' Src.Close True, Depth

'Restore original pod speed now that the move is finished
Pod.SetSpeed OrigPodSpeed

---------------------------------------------------------------------------
Configure Step

Bitmap: C:\Program Files\Biomek Software\Bitmaps\Vials.bmp

Description:

Caption: Configure Step

Code: Select Case WashCycle

Case 0,1,2
    VolWB = MFX.P6VolWash(WashCycle+1) ' + 1 because WashCycle is 0 in the first round, 1 in the second etc.

Case Else
    VolWB = MFX.P6VolWash(4)

End Select

' --- trip calculation for WB addition ---
nTripsWB = TLS.NumTrips(VolWB, MaxVolInTips)
Extend "NumTripsWB", nTripsWB
Extend "VolTripWB", VolWB/nTripsWB

' set well volumes to empty
Positions(Labware.Location("Cryo1")).Labware.ConfigureAmounts 0

Prompt: [IDispatch]
Tooltip: Scripted Let

------------------------------------------------------------------------------------------------
Loop
Loop from "Trip" = "1" to "=NumTripsWB", incrementing by "1".
------------------------------------------------------------------------------------------------
Loop
Loop from "ColPair" = "1" to "3", incrementing by "1".

------------------------------------------------------------------------------------------------
Set Well Pattern; Refill Buffer
Set Well Pattern; Refill Buffer

Code:

```
Select Case ColPair
    Case 1
        Extend "Wells", Col()(1)(MFX.NumSamples) & "," & Col()(2)(MFX.NumSamples)
    Case 2
        Extend "Wells", Col()(3)(MFX.NumSamples) & "," & Col()(4)(MFX.NumSamples)
    Case 3
        Extend "Wells", Col()(5)(MFX.NumSamples) & "," & Col()(6)(MFX.NumSamples)
End Select
```

```
Set LW = Positions(Pipettor.Deck.FindLabwarePosition("Buffer")).Labware
LW.ConfigureAmounts 20000
Prompt: [IDispatch]
Tooltip: Scripted Let
```

Transfer

Using Pod2, execute the following transfer:

From: Buffer, sections specified by "=OneTip()(MFX.NumSamples)"; Water
Proceed down first, then left to right.
Start from the beginning of the selection.
Set the mark at the last well transferred.
Use the following custom technique:

- Use the following pipetting template: OS Span-8 P1000 SlowRetract 2
- Calibration Offset: 2.54
- Calibration Slope: 1.033
- Minimum Pipetting Height: 1.5 mm
Prewet: False
Aspirate Blowout: False
Follow Liquid: True
Height: -2 mm from the liquid
Mix: False
Mix Aspirate Speed: 100µL/s
Mix Aspirate Height: 0 mm from the liquid
Mix Dispense Speed: 100µL/s
Mix Dispense Height: 0 mm from the liquid
Mix Count: 1
Mix Volume: 10 µL
Operation speed: 70µL/s
Tip Touch: False
Trailing Air Gap: False
Override Liquid Type Settings
  Aspirate Delay: 10 ms
  Aspirate Speed: 300 µL/s
  Blowout Delay: 0 ms
  Blowout Volume: 5 µL
  Dispense Delay: 0 ms
  Dispense Speed: 50 µL/s
  Prewet Delay: 0 ms
  Prewet Overage: 0 µL
  Tip Touch Delay: 0 ms
  Tip Touch Speed: 50 µL/s
  Trailing Air Gap Volume: 1 µL

Override the technique height by moving to 1 mm from the bottom.
To: Cryo1, =VolTripWBµL, sections specified by "=Wells", Water
Proceed down first, then left to right.
Start from the beginning of the selection.
Set the mark at the last well transferred.

Use the following custom technique:

Use the following pipetting template: Span-8 P1000 2
Calibration Offset: 0
Calibration Slope: 1
Minimum Pipetting Height: 1.5 mm
Prewet: False
Blowout: True
Follow Liquid: False
Height: 1.5 mm from the bottom
Mix: False
Mix Aspirate Speed: 100µL/s
Mix Aspirate Height: 0 mm from the liquid
Mix Dispense Speed: 100µL/s
Mix Dispense Height: 0 mm from the liquid
Mix Count: 1
Mix Volume: 10 µL
Operation speed: 70µL/s
Tip Touch: False
 Override Liquid Type Settings
Aspirate Delay: 10 ms
Aspirate Speed: 300 µL/s
Blowout Delay: 0 ms
Blowout Volume: 5 µL
Dispense Delay: 0 ms
Dispense Speed: 300 µL/s
Prewet Delay: 0 ms
Prewet Overage: 0 µL
Tip Touch Delay: 0 ms
Tip Touch Speed: 50 µL/s
Trailing Air Gap Volume: 1 µL

Override the technique height by moving to -5 mm from the top.

Dispense up to 1 time(s) per draw.

Create 1 replicate(s) of each source well.

Keep the current tips

Keep the tips when finished.

Stop when finished with Destinations.

Probes specified by ";=TwoTips()(MFX.NumSamples)" will be used.

---------------------------------------------------------------------------
End Scripted Let
---------------------------------------------------------------------------
End Loop
---------------------------------------------------------------------------
End Loop
---------------------------------------------------------------------------
End Scripted Let
---------------------------------------------------------------------------

Script

Description:

Labware Place to Cryo1

Execute the following script code:

Option Explicit

' This script duplicates the functionality of the Move Labware step.

' It has been modified to only place the labware after another step has picked it up.
Dim e
Set e = CreateObject("World.EngineObject")
Dim Target, PodName
Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit

' PodName        The name of the pod to use
PodName = StepDictionary.Let.PodName
if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"
Set Pod = World.Devices.Pipettor1(PodName)
OrigPodSpeed = Pod.CurrentSpeed

Set CurDeck = World.Devices.Pipettor1.Deck

' Target         Name of the target position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location
Target = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Target))

if IsEmpty(Target) or Target = "" then err.raise 1050, , "Target must be defined"
If Not IsObject(Pod.GrippedLabware) Then err.raise 1050, , "There is no labware in the gripper."
Dim glw
set glw = Pod.GrippedLabware(Pod.GrippedLabware.Count - 1) ' The gripped labware is an array with the bottom piece at the highest index

' Convert Source and Target names into objects
Dim Dst
Set Dst = Pipettor.Deck.Positions(Target)

Dim Z
Dim sx, sy, sz
' Dim gx, gy, gz, pd
'pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the squeeze values
'Dim Unsqueeze
'Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) + CDbl(glw.Class.Unsqueeze)))

' Get the Pod gripper offsets
Dim px, py, pz
px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
pz = CDbl(Pod.GripperZOffset)

' Enforce the labware's speed limit
'LWSpeedLimit = srcLabware.Class.SpeedLimit
'If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit

'Get height of destination position
Z = CDbl(Dst.Z(Pod))

' Get offsets from position to the labware at target position
Dim tx, ty, tz, dx, dy, dz
tx = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "X"))
ty = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Y"))
tz = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Z"))
' Get the Target Labware

Dim dstLabware
dx = 0
dy = 0
dz = 0
dstLabware = Null
if (Dst.StackDepth > 0) then
    Set dstLabware = Dst.GetLabwareAtDepth(1)
end if

' Get Destination Stack Offsets (really Per-Labware Offsets)
dx = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "X"))
dy = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "Y"))
dz = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "Z"))

' Get the labware gripper offsets (added-in by MAG 3/7/2003)
World.Volatile.MyDest = Dst

'Dim gx, gy, gz, pd
'gx = CDbl(glw.Class.GripperXOffset)
'gy = CDbl(glw.Class.GripperYOffset)
'gz = CDbl(glw.Class.GripperZOffset)
pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the labware gripper offsets and squeeze values
Dim gx, gy, gz, pd
Dim Unsqueeze

Select Case Pod.PodType

  Case "ATTILA"
    gx = CDbl(glw.Class.GripperInfo.MultiChannel.GripperXOffset)
    gy = CDbl(glw.Class.GripperInfo.MultiChannel.GripperYOffset)
    gz = CDbl(glw.Class.GripperInfo.MultiChannel.GripperZOffset)
    Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
        CDbl(glw.Class.GripperInfo.MultiChannel.Unsqueeze)))
    'tls.msg pod.podtype
    'tls.msg gx & " " & gy & " " & gz & " " & " " & Unsqueeze

  Case Else ' need to fill in code for NX Gripper

End Select

' Open Destination
Dst.Open True, 0

' Start Moving
Pod.ApproachPosition Target, CDbl(tx+dx+gx-px), CDbl(ty+dy+gy-py), CDbl(Z + tz+dz+gz-pz), True

Pod.MoveZ CDbl(Z + tz + dz + gz - pz)

' Put Labware
Pod.AbsMove ,,Unsqueeze

' Notify software the labware that was in the grippers is now at the target
' old v. 2.x syntax Pod.PutLabware Target
Pod.Gripper.PutLabwareObject Target

' Retract grippers
Pod.GripperRetract

' Close the destination position
Dst.Close True, 0

'Restore original pod speed now that the move is finished
'Pod.SetSpeed OrigPodSpeed

' Move to a safe height
Pod.MoveToSafe

Run parkinwashstation
   withtipwash = False

Run setstepdone
   wait = False

End

Else

End

If
If "MFX.NextStep = 11":

Then

Configure Shake Time

Bitmap: C:\Program Files\Biomek Software\Bitmaps\Vials.bmp

Description:

Caption: Configure Shake Time

Code: Select Case WashCycle

Case 0,1,2
  Extend "P6ShakeTime", MFX.P6ShakeTime(WashCycle+1)

Case Else
  Extend "P6ShakeTime", MFX.P6ShakeTime(4)

End Select

Prompt: [IDispatch]

Tooltip: Scripted Let

Device Action

Send the following command to "OrbitalShakerALP0": "Shake".

Parameters: =MFX.P6ShakerSpeed, 1, CounterClockwise

Run waittimer

  index = ""
  settimer = True
  timername = "Shaking..."
  waittime = = P6ShakeTime

Device Action

Send the following command to "OrbitalShakerALP0": "Stop".
Parameters: 1

End Scripted Let

Run setstepdone
    wait = False

End

Else

End

If
If "MFX.NextStep = 12":

Then

Script
Description:
Labware Pickup from Cryol

Execute the following script code:
Option Explicit

' This script duplicates the functionality of the first half of the Move Labware step.
' Modified 3/7/2003 by MAG to lift the labware to a specific height off the deck
' (height measured at top of the labware) which was useful for a specific customer
' reading barcodes via their own reader, with labels always a certain distance from
' the top of the labware.
Set e = CreateObject("World.EngineObject")

Dim Source, Target, PodName
Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit

' PodName        The name of the pod to use
PodName = StepDictionary.Let.PodName
if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"
Set Pod = World.Devices.Pipettor1(PodName)
OrigPodSpeed = Pod.CurrentSpeed

Set CurDeck = World.Devices.Pipettor1.Deck

' Source         Name of the source position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location
Source = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Source))

if IsEmpty(Source) or Source = "" then err.raise 1050, , "Source must be defined"

' Get the depth to grab a piece of labware at.
Dim Depth
Depth = e.EvaluateExpression(StepDictionary.Let.Depth)
if IsEmpty(Depth) then err.raise 1050, , "Depth must be defined"
If Depth < 1 then err.raise 1050, , "Depth must be at least 1"

' Convert Source and Target names into objects
Dim Src
Set Src = Pipettor.Deck.Positions(Source)

' Get the Source Labware
Dim srcLabware
World.Volatile.Depth = Depth
Set srcLabware = Src.GetLabwareAtDepth(Depth)

' Get the source labware height [DON'T NEED THIS ANYMORE]
' Dim srcLwHeight
' srcLwHeight = srcLabware.Class.Height

Dim Z
Z = CDbl(Src.Z(Pod))

' Get offsets from position to the labware at source position
Dim sx, sy, sz
sx = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "X"))
sy = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "Y"))
sz = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "Z"))
pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the labware gripper offsets and squeeze values
Dim gx, gy, gz, pd
Dim Squeeze, Unsqueeze
Select Case Pod.PodType
  Case "ATTILA"
    gx = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperXOffset)
gy = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperYOffset)
gz = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperZOffset)
Squeeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
CDbl(srcLabware.Class.GripperInfo.MultiChannel.Squeeze)))
Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
CDbl(srcLabware.Class.GripperInfo.MultiChannel.Unsqueeze)))
'tls.msg pod.podtype
'tls.msg gx & " " & gy & " " & gz & " " & Squeeze & " " & Unsqueeze
    Case Else ' need to fill in code for NX Gripper
End Select

' Get the Pod gripper offsets
Dim px, py, pz
px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
pz = CDbl(Pod.GripperZOffset)

Dim LiftHeight, e
LiftHeight = e.EvaluateExpression(StepDictionary.Let.LiftHeight)

' Temporarily save the height of the move
World.Volatile.LiftHeight = LiftHeight

' Reserve the resources used, i.e., the source position and the Pod
World.Globals.ResourceReserver.ReserveResources Array(Src, Pod)

' Open the source position
Src.Open True, Depth
' Start Moving
Pod.ApproachPosition Source, sx+gx-px, sy+gy-py, Z + sz+gz-pz, False, Unsqueeze

' Extend the grippers
Pod.GripperExtend

' Grab Labware
Pod.AbsMove ,,Squeeze

' Enforce the labware's speed limit
LWSpeedLimit = srcLabware.Class.SpeedLimit
If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit

' Notify software that the source labware is now in the grippers
' Version 2.x syntax: Pod.GetLabware Source, Depth
Pod.Gripper.GetLabwareObject Source, Depth

' Move to a safe height above the position (original function commented out)
' Pod.MoveToSafe

If LiftHeight < 0 Then err.raise 1050, , "Lift Height too low; would result in downward motion"
Pod.RelativeMoveAxes "Z", LiftHeight

' Close the source position
' Src.Close True, Depth
'Restore original pod speed now that the move is finished
Pod.SetSpeed OrigPodSpeed

Run getnewtips
    pattern = TwoTips()(MFX.NumSamples)

Loop
    Loop from "ColPair" = "1" to "3", incrementing by "1".

Set Well Pattern
Bitmap: C:\Program Files\Biomek Software\Bitmaps\Vials.bmp
Description:
Caption: Set Well Pattern
Code: Select Case ColPair
    Case 1
        Extend "Wells", Col()(1)(MFX.NumSamples) & "," & Col()(2)(MFX.NumSamples)
    Case 2
        Extend "Wells", Col()(3)(MFX.NumSamples) & "," & Col()(4)(MFX.NumSamples)
    Case 3
        Extend "Wells", Col()(5)(MFX.NumSamples) & "," & Col()(6)(MFX.NumSamples)
End Select

Extend "Delay", 0 ' 

' New in 0.15: Start aspirating at 0.5 * liquid height, follow liquid
don to 2 mm above bottom. Dispense at 2 mm above bottom and follow the liquid up.

' determine the liquid height
Select Case WashCycle
      Case 0,1,2
          vol = MFX.P6VolWash(WashCycle+1)
      Case Else
          vol = MFX.P6VolWash(4)
      End Select

Extend "VolTipMix", TLS.LesserOf(MaxVolInTips, vol)

Set LW = Positions(Labware.Location("Cryo1")).Labware
zliqCM = 0.5 * LW.HeightFromVolume(vol, 1)
    ' this is the height in CM
    ' needs to be multiplied by 10 because the step expects MM
    ' also, ZOffset needs to be added

Extend "ZLiqHalf", ZOffset + (zliqCM * 10) ' convert cm to mm

Prompt: [IDispatch]
Tooltip: Scripted Let

Transfer
Using Pod2, execute the following transfer:
From: Cryo1, sections specified by "=Wells", Water
Proceed down first, then left to right.
Start from the beginning of the selection.
Do not set the mark.
Use the following custom technique:
    Use the following pipetting template: OS Span-8 P1000 MixOnly 2
Calibration Offset: 2.54
Calibration Slope: 1.033
Minimum Pipetting Height: 2 mm
Prewet: False
Aspirate Blowout: True
Follow Liquid: True
Height: 0 mm from the liquid
Mix: True
Mix Aspirate Speed: =MFX.P6MixSpeedµL/s
Mix Aspirate Height: =$ZLiqHalf mm from the liquid
Mix Dispense Speed: =MFX.P6MixSpeedµL/s
Mix Dispense Height: 2 mm from the liquid
Mix Count: =MFX.P6MixCycles
Mix Volume: =VolTipMix µL
Operation speed: 20µL/s
Tip Touch: False
Trailing Air Gap: False
Override Liquid Type Settings
Aspirate Delay: 10 ms
Aspirate Speed: 300 µL/s
Blowout Delay: =Delay ms
Blowout Volume: 20 µL
Dispense Delay: 20 ms
Dispense Speed: 200 µL/s
Prewet Delay: 200 ms
Prewet Overage: 0 µL
Tip Touch Delay: 300 ms
Tip Touch Speed: 70 µL/s
Trailing Air Gap Volume: 10 µL
Override the technique height by moving to 5 mm from the bottom.

To: Cryol, 0µL, sections specified by "=Wells", BeadsplusCells

Proceed down first, then left to right.

Start from the beginning of the selection.

Do not set the mark.

Use the following custom technique:

Use the following pipetting template: OS Span-8 P1000 MixOnly 2

Calibration Offset: 2.54

Calibration Slope: 1.033

Minimum Pipetting Height: 0.5 mm

Prewet: False

Blowout: False

Follow Liquid: False

Height: 0 mm from the liquid

Mix: False

Mix Aspirate Speed: 100µL/s

Mix Aspirate Height: 0 mm from the liquid

Mix Dispense Speed: 100µL/s

Mix Dispense Height: 0 mm from the liquid

Mix Count: 1

Mix Volume: 900 µL

Operation speed: 70µL/s

Tip Touch: False

Override Liquid Type Settings

Aspirate Delay: 10 ms

Aspirate Speed: 300 µL/s

Blowout Delay: 10 ms
Blowout Volume: 20 µL
Dispense Delay: 20 ms
Dispense Speed: 200 µL/s
Prewet Delay: 0 ms
Prewet Overage: 0 µL
Tip Touch Delay: 300 ms
Tip Touch Speed: 70 µL/s
Trailing Air Gap Volume: 10 µL

Override the technique height by moving to 2 mm from the bottom.
Dispense up to 1 time(s) per draw.
Create 1 replicate(s) of each source well.
Keep the current tips
Keep the tips when finished.
Stop when finished with Destinations.
Probes specified by "=OneTip()(MFX.NumSamples)" will be used.

End Scripted Let

End Loop

Script
Description:
Labware Place to Cryo1
Execute the following script code:
Option Explicit
' This script duplicates the functionality of the Move Labware step.
' It has been modified to only place the labware after another step has picked it up.
Dim e
Set e = CreateObject("World.EngineObject")
Dim Target, PodName
Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit

' PodName        The name of the pod to use
PodName = StepDictionary.Let.PodName
if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"
Set Pod = World.Devices.Pipettor1(PodName)
OrigPodSpeed = Pod.CurrentSpeed

Set CurDeck = World.Devices.Pipettor1.Deck

' Target         Name of the target position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location
Target = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Target))

if IsEmpty(Target) or Target = "" then err.raise 1050, , "Target must be defined"
If Not IsObject(Pod.GrippedLabware) Then err.raise 1050, , "There is no labware in the gripper."
Dim glw
set glw = Pod.GrippedLabware(Pod.GrippedLabware.Count - 1) ' The gripped labware is an array with the bottom piece at the highest index

' Convert Source and Target names into objects
Dim Dst
Set Dst = Pipettor.Deck.Positions(Target)
Dim Z
Dim sx, sy, sz
'Dim gx, gy, gz, pd
'pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the squeeze values
'Dim Unsqueeze
'Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) + CDbl(glw.Class.Unsqueeze)))

' Get the Pod gripper offsets
Dim px, py, pz
px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
pz = CDbl(Pod.GripperZOffset)

' Enforce the labware's speed limit
'LWSpeedLimit = srcLabware.Class.SpeedLimit
'If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit

'Get height of destination position
Z = CDbl(Dst.Z(Pod))

' Get offsets from position to the labware at target position
Dim tx, ty, tz, dx, dy, dz
tx = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "X"))
ty = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Y"))
tz = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Z"))
' Get the Target Labware

Dim dstLabware
dx = 0
dy = 0
dz = 0
dstLabware = Null
if (Dst.StackDepth > 0) then
    Set dstLabware = Dst.GetLabwareAtDepth(1)
end if

' Get Destination Stack Offsets (really Per-Labware Offsets)
dx = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "X"))
dy = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "Y"))
dz = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "Z"))

' Get the labware gripper offsets (added-in by MAG 3/7/2003)
World.Volatile.MyDest = Dst

'Dim gx, gy, gz, pd
'gx = CDbl(glw.Class.GripperXOffset)
'gy = CDbl(glw.Class.GripperYOffset)
'gz = CDbl(glw.Class.GripperZOffset)

pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the labware gripper offsets and squeeze values
Dim gx, gy, gz, pd
Dim Unsqueeze
Select Case Pod.PodType

    Case "ATTILA"
        gx = CDbl(glw.Class.GripperInfo.MultiChannel.GripperXOffset)
        gy = CDbl(glw.Class.GripperInfo.MultiChannel.GripperYOffset)
        gz = CDbl(glw.Class.GripperInfo.MultiChannel.GripperZOffset)
        Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbld(pd) + CDbl(glw.Class.GripperInfo.MultiChannel.Unsqueeze)))
        'tls.msg pod.podtype
        'tls.msg gx & " " & gy & " " & gz & " " & " " & Unsqueeze

    Case Else ' need to fill in code for NX Gripper

End Select

' Open Destination
Dst.Open True, 0

' Start Moving
Pod.ApproachPosition Target, CDbl(tx+dx+gx-px), CDbl(ty+dy+gy-py), CDbl(Z + tz+dz+gz-pz), True

Pod.MoveZ CDbl(Z + tz + dz + gz - pz)

' Put Labware
Pod.AbsMove ,,,Unsqueeze

' Notify software the labware that was in the grippers is now at the target
' old v. 2.x syntax Pod.PutLabware Target
Pod.Gripper.PutLabwareObject Target

' Retract grippers
Pod.GripperRetract

' Close the destination position
Dst.Close True, 0

'Restore original pod speed now that the move is finished
'Pod.SetSpeed OrigPodSpeed

' Move to a safe height
Pod.MoveToSafe

Run parkinwashstation
   withtipwash = False

Run setstepdone
   wait = False

End

Else

End

End

If

If "MFX.NextStep = 13":
Then

Move To

Move "Pod2" to deck position "W1" at offset (0,0).

Move Labware

Move the top "2" plates at "Cryo1" to "Pelt1" using pod "Pod1".

Move To

Move "Pod1" to deck position "P2" at offset (0,0).

Run parkinwashstation

    rule = 3
    withtipwash = False

Run setstepdone

    wait = true

End

Else

End

If

If "MFX.NextStep = 14":

Then
Run waittimer

    index = ="

    settimer = True

    timername = ="Settling..."

    waittime = =SettleTime

Run setstepdone

    wait = true

End

Else

End

If

If "MFX.NextStep = 15":

Then

Script

Description:

Labware Pickup from Cryo1

Execute the following script code:

Option Explicit

' This script duplicates the functionality of the first half of the Move Labware step.
' Modified 3/7/2003 by MAG to lift the labware to a specific height off the deck
' (height measured at top of the labware) which was useful for a specific customer
' reading barcodes via their own reader, with labels always a certain distance from
' the top of the labware.

Set e = CreateObject("World.EngineObject")

Dim Source, Target, PodName
Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit

' PodName        The name of the pod to use
PodName = StepDictionary.Let.PodName
if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"
Set Pod = World.Devices.Pipettor1(PodName)
OrigPodSpeed = Pod.CurrentSpeed

Set CurDeck = World.Devices.Pipettor1.Deck

' Source         Name of the source position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location
Source = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Source))
if IsEmpty(Source) or Source = "" then err.raise 1050, , "Source must be defined"

' Get the depth to grab a piece of labware at.
Dim Depth
Depth = e.EvaluateExpression(StepDictionary.Let.Depth)
if IsEmpty(Depth) then err.raise 1050, , "Depth must be defined"
If Depth < 1 then err.raise 1050, , "Depth must be at least 1"
' Convert Source and Target names into objects
Dim Src
Set Src = Pipettor.Deck.Positions(Source)

' Get the Source Labware
Dim srcLabware
World.Volatile.Depth = Depth
Set srcLabware = Src.GetLabwareAtDepth(Depth)

' Get the source labware height  [DON'T NEED THIS ANYMORE]
' Dim srcLwHeight
' srcLwHeight = srcLabware.Class.Height

Dim Z
Z = CDbl(Src.Z(Pod))

' Get offsets from position to the labware at source position
Dim sx, sy, sz
sx = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "X"))
sy = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "Y"))
sz = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "Z"))

pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the labware gripper offsets and squeeze values
Dim gx, gy, gz, pd
Dim Squeeze, Unsqueeze
Select Case Pod.PodType

    Case "ATTILA"
        gx = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperXOffset)
        gy = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperYOffset)
        gz = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperZOffset)
        Squeeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
                       CDbl(srcLabware.Class.GripperInfo.MultiChannel.Squeeze)))
        Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
                        CDbl(srcLabware.Class.GripperInfo.MultiChannel.Unsqueeze)))
        'tls.msg pod.podtype
        'tls.msg gx & " " & gy & " " & gz & " " & Squeeze & " " & Unsqueeze
        Case Else ' need to fill in code for NX Gripper
    End Select

' Get the Pod gripper offsets
Dim px, py, pz
px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
pz = CDbl(Pod.GripperZOffset)

Dim LiftHeight, e
LiftHeight = e.EvaluateExpression(StepDictionary.Let.LiftHeight)

' Temporarily save the height of the move
World.Volatile.LiftHeight = LiftHeight

'Reserve the resources used, i.e., the source position and the Pod
World.Globals.ResourceReserver.ReserveResources Array(Src, Pod)
' Open the source position
Src.Open True, Depth

' Start Moving
Pod.ApproachPosition Source, sx+gx-px, sy+gy-py, Z + sz+gz-pz, False, Unsqueeze

' Extend the grippers
Pod.GripperExtend

' Grab Labware
Pod.AbsMove,,,Squeeze

' Enforce the labware's speed limit
LWSpeedLimit = srcLabware.Class.SpeedLimit
If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit

' Notify software that the source labware is now in the grippers
' Version 2.x syntax: Pod.GetLabware Source, Depth
Pod.Gripper.GetLabwareObject Source, Depth

' Move to a safe height above the position (original function commented out)
' Pod.MoveToSafe

If LiftHeight < 0 Then err.raise 1050, , "Lift Height too low ; would result in downward motion"

Pod.RelativeMoveAxes "Z", LiftHeight
' Close the source position
' Src.Close True, Depth

'REstore original pod speed now that the move is finished
Pod.SetSpeed OrigPodSpeed

---------------------------------------------------------------------------
Run getnewtips
  pattern = =TwoTips() (MFX.NumSamples)
---------------------------------------------------------------------------

Configure Trips
Bitmap: C:\Program Files\Biomek Software\Bitmaps\Vials.bmp
Description:
Caption: Configure Trips
Code: Select Case WashCycle
  Case 0,1,2
    volsup = MFX.P6VolWash(WashCycle+1) * 1.05
  Case Else
    volsup = MFX.P6VolWash(4) * 1.05
End Select

' --- trip calculation for SN (WB) ---
nTripsSN = TLS.NumTrips(volsup, MaxVolInTips)
Extend "NumTripsSN", nTripsSN
Extend "VolTripSN", volsup/nTripsSN
Extend "VolSN", volsup
Loop
Loop from "Trip" = "1" to "=NumTripsSN", incrementing by "1".

Calc Asp Height

Bitmap: C:\Program Files\Biomek Software\Bitmaps\Vials.bmp
Description:
Caption: Calc Asp Height
Code: ' calculate the asp height so we don't need to use LLS
' assume it's the same for all wells
' first calculate the current volume in the well
vol = VolSN - (VolTripSN * (Trip - 1))

Set LW = Positions(Labware.Location("Cryo1")).Labware
AspHeightCM = LW.HeightFromVolume(vol, 1) - SNStartBelowCM ' start below liq level
' this is the height in CM
' needs to be multiplied by 10 because the step expects MM

Extend "AspHeight", AspHeightCM * 10 ' convert cm to mm
'tls.msg "Trip " & trip & " of " & numtripssn & vblf & "AspHeight = " & AspHeightCM * 10

Positions(Labware.Location("Cryo1")).Labware.ConfigureAmounts vol+1

' +1 takes care of a rounding error

because the well only has 866.667

Prompt: [IDispatch]
Tooltip: Scripted Let

---------------------------------------------------------------------------
Loop
Loop from "ColPair" = "1" to "3", incrementing by "1".
---------------------------------------------------------------------------
Set Well Pattern
Bitmap: C:\Program Files\Biomek Software\Bitmaps\Vials.bmp
Description:
Caption: Set Well Pattern
Code: Select Case ColPair
   Case 1
      Extend "Wells", Col()(1)(MFX.NumSamples) & "," & Col()(2)(MFX.NumSamples)
   Case 2
      Extend "Wells", Col()(3)(MFX.NumSamples) & "," & Col()(4)(MFX.NumSamples)
   Case 3
      Extend "Wells", Col()(5)(MFX.NumSamples) & "," & Col()(6)(MFX.NumSamples)
End Select
Prompt: [IDispatch]
Tooltip: Scripted Let

Transfer
Using Pod2, execute the following transfer:

From: Cryo1, sections specified by "=Wells", BeadsplusCells

Proceed down first, then left to right.

Start from the beginning of the selection.

Do not set the mark.

Use the following custom technique:

Use the following pipetting template: OS Span-8 P1000 SlowRetract 2

Calibration Offset: 2.54

Calibration Slope: 1.033

Minimum Pipetting Height: -0.5 mm

Prewet: False

Aspirate Blowout: True

Follow Liquid: True

Height: -2 mm from the liquid

Mix: False

Mix Aspirate Speed: 100µL/s

Mix Aspirate Height: 0 mm from the liquid

Mix Dispense Speed: 100µL/s

Mix Dispense Height: 0 mm from the liquid

Mix Count: 1

Mix Volume: 10 µL

Operation speed: 20µL/s

Tip Touch: False

Trailing Air Gap: False

Override Liquid Type Settings

Aspirate Delay: 10 ms

Aspirate Speed: 300 µL/s

Blowout Delay: 0 ms
Blowout Volume: 5 µL
Dispense Delay: 0 ms
Dispense Speed: 50 µL/s
Prewet Delay: 0 ms
Prewet Overage: 0 µL
Tip Touch Delay: 0 ms
Tip Touch Speed: 50 µL/s
Trailing Air Gap Volume: 1 µL

Override the technique height by moving to =AspHeight mm from the bottom.
To: Cryo1, =VolTripSNµL, sections specified by "=Wells", BeadsplusCells
Proceed down first, then left to right.
Start from the beginning of the selection.
Set the mark at the last well transferred.
Use the following custom technique:
  Use the following pipetting template: Do Nothing
  Calibration Offset: 2.54
  Calibration Slope: 1.033
  Minimum Pipetting Height: 0 mm
  Prewet: False
  Blowout: True
  Follow Liquid: False
  Height: 1.5 mm from the bottom
  Mix: False
  Mix Aspirate Speed: 100µL/s
  Mix Aspirate Height: 0 mm from the liquid
  Mix Dispense Speed: 100µL/s
  Mix Dispense Height: 0 mm from the liquid
  Mix Count: 1
Mix Volume: 10 µL
Operation speed: 5µL/s
Tip Touch: False
Override Liquid Type Settings
Aspirate Delay: 10 ms
Aspirate Speed: 50 µL/s
Blowout Delay: 0 ms
Blowout Volume: 5 µL
Dispense Delay: 0 ms
Dispense Speed: 50 µL/s
Prewet Delay: 0 ms
Prewet Overage: 0 µL
Tip Touch Delay: 0 ms
Tip Touch Speed: 50 µL/s
Trailing Air Gap Volume: 1 µL

Override the technique height by moving to 39.3 mm from the bottom.
Dispense up to 1 time(s) per draw.
Create 1 replicate(s) of each source well.
Keep the current tips
Keep the tips when finished.
Stop when finished with Destinations.
Probes specified by "=TwoTips()(MFX.NumSamples)" will be used.

---------------------------------------------------------------------------
Run emptytipstowaste
---------------------------------------------------------------------------
End Scripted Let
Option Explicit

' This script duplicates the functionality of the Move Labware step.
' It has been modified to only place the labware after another step has picked it up.

Dim e
Set e = CreateObject("World.EngineObject")

Dim Target, PodName
Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit

' PodName        The name of the pod to use
PodName = StepDictionary.Let.PodName
if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"
Set Pod = World.Devices.Pipettor1(PodName)
OrigPodSpeed = Pod.CurrentSpeed

Set CurDeck = World.Devices.Pipettor1.Deck

' Target        Name of the target position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location
Target = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Target))

if IsEmpty(Target) or Target = "" then err.raise 1050, , "Target must be defined"

If Not IsObject(Pod.GrippedLabware) Then err.raise 1050, , "There is no labware in the gripper."

Dim glw
set glw = Pod.GrippedLabware(Pod.GrippedLabware.Count - 1) ' The gripped labware is an array with the bottom piece at the highest index

' Convert Source and Target names into objects
Dim Dst
Set Dst = Pipettor.Deck.Positions(Target)

Dim Z
Dim sx, sy, sz
'Dim gx, gy, gz, pd
'pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the squeeze values
'Dim Unsqueeze
'Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) + CDbl(glw.Class.Unsqueeze)))

' Get the Pod gripper offsets
Dim px, py, pz
px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
pz = CDbl(Pod.GripperZOffset)

' Enforce the labware's speed limit
'LWSpeedLimit = srcLabware.Class.SpeedLimit
'If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit

'Get height of destination position
Z = CDbl(Dst.Z(Pod))

' Get offsets from position to the labware at target position
Dim tx, ty, tz, dx, dy, dz
tx = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "X"))
ty = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Y"))
tz = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Z"))

' Get the Target Labware
Dim dstLabware
dx = 0
dy = 0
dz = 0
dstLabware = Null
if (Dst.StackDepth > 0) then
    Set dstLabware = Dst.GetLabwareAtDepth(1)
end if

' Get Destination Stack Offsets (really Per-Labware Offsets)
dx = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "X"))
dy = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "Y"))
$$dz = \text{CDbl(Dst.GetOneStackOffset(glw, dstLabware, "Z"))}$$

' Get the labware gripper offsets (added-in by MAG 3/7/2003)
World.Volatile.MyDest = Dst

'Dim gx, gy, gz, pd
'gx = CDbl(glw.Class.GripperXOffset)
'gy = CDbl(glw.Class.GripperYOffset)
'gz = CDbl(glw.Class.GripperZOffset)

pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the labware gripper offsets and squeeze values
Dim gx, gy, gz, pd
Dim Unsqueeze
Select Case Pod.PodType
    Case "ATTILA"
        gx = CDbl(glw.Class.GripperInfo.MultiChannel.GripperXOffset)
        gy = CDbl(glw.Class.GripperInfo.MultiChannel.GripperYOffset)
        gz = CDbl(glw.Class.GripperInfo.MultiChannel.GripperZOffset)
        Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) + CDbl(glw.Class.GripperInfo.MultiChannel.Unsqueeze))
        'tls.msg pod.podtype
        'tls.msg gx & " " & gy & " " & gz & " " & Unsqueeze
    Case Else ' need to fill in code for NX Gripper
End Select
' Open Destination
Dst.Open True, 0

' Start Moving
Pod.ApproachPosition Target, CDbl(tx+dx+gx-px), CDbl(ty+dy+gy-py), CDbl(Z + tz+dz+gz-pz), True

Pod.MoveZ CDbl(Z + tz + dz + gz - pz)

' Put Labware
Pod.AbsMove ,,,Unsqueeze

' Notify software the labware that was in the grippers is now at the target
' old v. 2.x syntax Pod.PutLabware Target
Pod.Gripper.PutLabwareObject Target

' Retract grippers
Pod.GripperRetract

' Close the destination position
Dst.Close True, 0

'Restore original pod speed now that the move is finished
'Pod.SetSpeed OrigPodSpeed

' Move to a safe height
Pod.MoveToSafe
Run droptips

Run cleanwashstation

dspeed = 200
fromtop = 0.6
yoffset = 0.35

Run setstepdone

wait = false

End

Else

End

If

If "MFX.NextStep = 16":

Then

Move To

Move "Pod2" to deck position "W1" at offset (0,0).

Move Labware

Move the top "2" plates at "Cryo1" to "Orbital1" using pod "Pod1".
Move To

Move "Pod1" to deck position "P2" at offset (0,0).

---------------------------------------------------------------------------

Run setstepdone

    wait = true

---------------------------------------------------------------------------

End

---------------------------------------------------------------------------

Else

---------------------------------------------------------------------------

End

---------------------------------------------------------------------------

End Loop

---------------------------------------------------------------------------

Group

---------------------------------------------------------------------------

If

If "MFX.UsePeltier":

---------------------------------------------------------------------------

Then

---------------------------------------------------------------------------

Incubate Pelt1 at =23C for 00:00:01

Position: Pelt1

Command: Incubate

Module Name: Peltier1

Set Temperature?: -1

Temperature: =23

Total Time: 00:00:01

---------------------------------------------------------------------------
If "MFX.NextStep = 17": 

Then

Script 
Description: 
Labware Pickup from Cryo1 
Execute the following script code: 
Option Explicit

' This script duplicates the functionality of the first half of the Move Labware step.
' Modified 3/7/2003 by MAG to lift the labware to a specific height off the deck
' (height measured at top of the labware) which was useful for a specific customer
' reading barcodes via their own reader, with labels always a certain distance from
' the top of the labware.

Set e = CreateObject("World.EngineObject")

Dim Source, Target, PodName

Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit

' PodName        The name of the pod to use
PodName = StepDictionary.Let.PodName

if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"

Set Pod = World.Devices.Pipettor1(PodName)

OrigPodSpeed = Pod.CurrentSpeed

Set CurDeck = World.Devices.Pipettor1.Deck

' Source          Name of the source position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location
Source = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Source))

if IsEmpty(Source) or Source = "" then err.raise 1050, , "Source must be defined"

' Get the depth to grab a piece of labware at.
Dim Depth

Depth = e.EvaluateExpression(StepDictionary.Let.Depth)

if IsEmpty(Depth) then err.raise 1050, , "Depth must be defined"
If Depth < 1 then err.raise 1050, , "Depth must be at least 1"

' Convert Source and Target names into objects
Dim Src

Set Src = Pipettor.Deck.Positions(Source)

' Get the Source Labware
Dim srcLabware

World.Volatile.Depth = Depth

Set srcLabware = Src.GetLabwareAtDepth(Depth)
' Get the source labware height  [DON'T NEED THIS ANYMORE]
' Dim srcLwHeight
' srcLwHeight = srcLabware.Class.Height

Dim Z
Z = CDbl(Src.Z(Pod))

' Get offsets from position to the labware at source position
Dim sx, sy, sz
sx = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "X"))
sy = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "Y"))
sz = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "Z"))

pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the labware gripper offsets and squeeze values
Dim gx, gy, gz, pd
Dim Squeeze, Unsqueeze
Select Case Pod.PodType
   Case "ATTILA"
      gx = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperXOffset)
      gy = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperYOffset)
      gz = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperZOffset)
      Squeeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
CDbl(srcLabware.Class.GripperInfo.MultiChannel.Squeeze)))
      Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
CDbl(srcLabware.Class.GripperInfo.MultiChannel.Unsqueeze)))
'tls.msg pod.podtype
'tls.msg gx & " " & gy & " " & gz & " " & Squeeze & " " & Unsqueeze

    Case Else ' need to fill in code for NX Gripper

End Select

' Get the Pod gripper offsets
Dim px, py, pz
px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
pz = CDbl(Pod.GripperZOffset)

Dim LiftHeight, e

LiftHeight = e.EvaluateExpression(StepDictionary.Let.LiftHeight)

' Temporarily save the height of the move
World.Volatile.LiftHeight = LiftHeight

' Reserve the resources used, i.e., the source position and the Pod
World.Globals.ResourceReserver.ReserveResources Array(Src, Pod)

' Open the source position
Src.Open True, Depth

' Start Moving
Pod.ApproachPosition Source, sx+gx-px, sy+gy-py, Z + sz+gz-pz, False, Unsqueeze

' Extend the grippers
Pod.GripperExtend
' Grab Labware
Pod.AbsMove ,,Squeeze

' Enforce the labware's speed limit
LWSpeedLimit = srcLabware.Class.SpeedLimit
If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit

' Notify software that the source labware is now in the grippers
' Version 2.x syntax: Pod.GetLabware Source, Depth
Pod.Gripper.GetLabwareObject Source, Depth

' Move to a safe height above the position (original function commented out)
' Pod.MoveToSafe

If LiftHeight < 0 Then err.raise 1050, , "Lift Height too low; would result in downward motion"

Pod.RelativeMoveAxes "Z", LiftHeight

' Close the source position
' Src.Close True, Depth

'Restore original pod speed now that the move is finished
Pod.SetSpeed OrigPodSpeed

Script Description:
Execute the following script code:
Positions(Labware.Location("Cryo1")).Labware.ConfigureAmounts 0

Transfer

Using Pod2, execute the following transfer:

From: Buffer, with the following pattern:

1
A ()
B ()
C ()
D ()
E ()
F <>

, Media

Proceed down first, then left to right.
Start from the beginning of the selection.
Set the mark at the last well transferred.

Use the following custom technique:

Use the following pipetting template: OS Span-8 MultiDispense Slow Retract 2

Calibration Offset: 2.54
Calibration Slope: 1.033
Minimum Pipetting Height: 0.25 mm
Prewet: False
Aspirate Blowout: True
Follow Liquid: False
Height: 0 mm from the liquid
Mix: False
Mix Aspirate Speed: 250µL/s
Mix Aspirate Height: 1 mm from the liquid
Mix Dispense Speed: 250µL/s
Mix Dispense Height: 25 mm from the liquid

Mix Count: 1
Mix Volume: 800 µL
Operation speed: 70µL/s
Tip Touch: False
Trailing Air Gap: True
Override Liquid Type Settings
   Aspirate Delay: 10 ms
   Aspirate Speed: 300 µL/s
   Blowout Delay: 20 ms
   Blowout Volume: 10 µL
   Dispense Delay: 10 ms
   Dispense Speed: 200 µL/s
   Prewet Delay: 0 ms
   Prewet Overage: 0 µL
   Tip Touch Delay: 300 ms
   Tip Touch Speed: 85 µL/s
   Trailing Air Gap Volume: 0 µL

Override the technique height by moving to 1 mm from the bottom.
To: Cryo1, =MFX.P7VolMediaµL, sections specified by "=Wells()(MFX.NumSamples)”, Media
Proceed down first, then left to right.
Start from the beginning of the selection.
Set the mark at the last well transferred.
Use the following custom technique:
   Use the following pipetting template: OS Span-8 P1000 Blowout at LiqLevel 2
   Calibration Offset: 2.54
   Calibration Slope: 1.033
Minimum Pipetting Height: 0.5 mm
Prewet: False
Blowout: True
Follow Liquid: True
Height: 0 mm from the liquid
Mix: False
Mix Aspirate Speed: 100µL/s
Mix Aspirate Height: 2 mm from the bottom
Mix Dispense Speed: 100µL/s
Mix Dispense Height: 0.5 mm from the bottom
Mix Count: 1
Mix Volume: 10 µL
Operation speed: 70µL/s
Tip Touch: False
Override Liquid Type Settings
  Aspirate Delay: 10 ms
  Aspirate Speed: 30 µL/s
  Blowout Delay: 10 ms
  Blowout Volume: 10 µL
  Dispense Delay: 10 ms
  Dispense Speed: 200 µL/s
  Prewet Delay: 0 ms
  Prewet Overage: 0 µL
  Tip Touch Delay: 300 ms
  Tip Touch Speed: 85 µL/s
  Trailing Air Gap Volume: 0 µL

Override the technique height by moving to 1 mm from the bottom.
Aspirate at most =MaxVolInTips µL per transfer for repeated dispensing.
Create 1 replicate(s) of each source well.

Load Span_8_1000uL_LLS onto the pod.

Keep the tips when finished.

Stop when finished with Destinations.

Probes specified by "=TwoTips(MFX.NumSamples)" will be used.

---------------------------------------------------------------------------

Script

Description:

Labware Place to Cryo1

Execute the following script code:

Option Explicit

' This script duplicates the functionality of the Move Labware step.
' It has been modified to only place the labware after another step has picked it up.

Dim e

Set e = CreateObject("World.EngineObject")

Dim Target, PodName

Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit

' PodName        The name of the pod to use
PodName = StepDictionary.Let.PodName

if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"

Set Pod = World.Devices.Pipettor1(PodName)

OrigPodSpeed = Pod.CurrentSpeed

Set CurDeck = World.Devices.Pipettor1.Deck

' Target         Name of the target position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location

Target = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Target))

if IsEmpty(Target) or Target = "" then err.raise 1050, , "Target must be defined"

If Not IsObject(Pod.GrippedLabware) Then err.raise 1050, , "There is no labware in the gripper."

Dim glw
set glw = Pod.GrippedLabware(Pod.GrippedLabware.Count - 1) ' The gripped labware is an array with the bottom piece at the highest index

' Convert Source and Target names into objects

Dim Dst
Set Dst = Pipettor.Deck.Positions(Target)

Dim Z
Dim sx, sy, sz
' Dim gx, gy, gz, pd
'pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the squeeze values
'Dim Unsqueeze
'Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) + CDbl(glw.Class.Unsqueeze)))

' Get the Pod gripper offsets
Dim px, py, pz
px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
pz = CDbl(Pod.GripperZOffset)
' Enforce the labware's speed limit
LWSpeedLimit = srcLabware.Class.SpeedLimit
If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit

'Get height of destination position
Z = CDbl(Dst.Z(Pod))

' Get offsets from position to the labware at target position
Dim tx, ty, tz, dx, dy, dz
tx = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "X"))
ty = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Y"))
tz = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Z"))

' Get the Target Labware
Dim dstLabware
dx = 0
dy = 0
dz = 0
dstLabware = Null
if (Dst.StackDepth > 0) then
    Set dstLabware = Dst.GetLabwareAtDepth(1)
end if

' Get Destination Stack Offsets (really Per-Labware Offsets)
dx = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "X"))
dy = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "Y"))
dz = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "Z"))
'Get the labware gripper offsets (added-in by MAG 3/7/2003)

World.Volatile.MyDest = Dst

'Dim gx, gy, gz, pd
'gx = CDbl(glw.Class.GripperXOffset)
'gy = CDbl(glw.Class.GripperYOffset)
'gz = CDbl(glw.Class.GripperZOffset)

pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the labware gripper offsets and squeeze values
Dim gx, gy, gz, pd
Dim Unsqueeze
Select Case Pod.PodType
   Case "ATTILA"
      gx = CDbl(glw.Class.GripperInfo.MultiChannel.GripperXOffset)
      gy = CDbl(glw.Class.GripperInfo.MultiChannel.GripperYOffset)
      gz = CDbl(glw.Class.GripperInfo.MultiChannel.GripperZOffset)
      Unsqueeze = CDbl(Pod.DAxisFromGripper(CDBl(pd) +
                          CDbl(glw.Class.GripperInfo.MultiChannel.Unsqueeze)))
      'tls.msg pod.podtype
      'tls.msg gx & " " & gy & " " & gz & " " & Unsqueeze
      Case Else ' need to fill in code for NX Gripper
End Select
' Open Destination
Dst.Open True, 0

' Start Moving
Pod.ApproachPosition Target, CDbl(tx+dx+gx-px), CDbl(ty+dy+gy-py), CDbl(Z + tz+dz+gz-pz), True

Pod.MoveZ CDbl(Z + tz + dz + gz - pz)

' Put Labware
Pod.AbsMove ,,,Unsqueeze

' Notify software the labware that was in the grippers is now at the target
' old v. 2.x syntax Pod.PutLabware Target
Pod.Gripper.PutLabwareObject Target

' Retract grippers
Pod.GripperRetract

' Close the destination position
Dst.Close True, 0

'Restore original pod speed now that the move is finished
'Pod.SetSpeed OrigPodSpeed

' Move to a safe height
Pod.MoveToSafe

---------------------------------------------------------------------------
Run droptips

Run setstepdone
    wait = true

End

Else

End

If
If "MFX.NextStep = 18":
Then
Move Labware
Move the top "1" plates at "Cryo2" to "TR2" using pod "Pod1".

Run setstepdone
    wait = true

End

Else

End

If
If "MFX.NextStep = 19":

Then

Script

Description:
Labware Pickup from TB1

Execute the following script code:

Option Explicit

' This script duplicates the functionality of the first half of the Move Labware step.
' Modified 3/7/2003 by MAG to lift the labware to a specific height off the deck
' (height measured at top of the labware) which was useful for a specific customer
' reading barcodes via their own reader, with labels always a certain distance from
' the top of the labware.

Set e = CreateObject("World.EngineObject")

Dim Source, Target, PodName
Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit

' PodName        The name of the pod to use
PodName = StepDictionary.Let.PodName
if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"
Set Pod = World.Devices.Pipettor1(PodName)
OrigPodSpeed = Pod.CurrentSpeed

Set CurDeck = World.Devices.Pipettor1.Deck
' Source         Name of the source position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location
Source = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Source))

if IsEmpty(Source) or Source = "" then err.raise 1050, , "Source must be defined"

' Get the depth to grab a piece of labware at.
Dim Depth
Depth = e.EvaluateExpression(StepDictionary.Let.Depth)
if IsEmpty(Depth) then err.raise 1050, , "Depth must be defined"
If Depth < 1 then err.raise 1050, , "Depth must be at least 1"

' Convert Source and Target names into objects
Dim Src
Set Src = Pipettor.Deck.Positions(Source)

' Get the Source Labware
Dim srcLabware
World.Volatile.Depth = Depth
Set srcLabware = Src.GetLabwareAtDepth(Depth)

' Get the source labware height  [DON'T NEED THIS ANYMORE]
' Dim srcLwHeight
' srcLwHeight = srcLabware.Class.Height

Dim Z
Z = CDbl(Src.Z(Pod))
' Get offsets from position to the labware at source position

Dim sx, sy, sz
sx = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "X"))
sy = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "Y"))
sz = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "Z"))

pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the labware gripper offsets and squeeze values
Dim gx, gy, gz, pd
Dim Squeeze, Unsqueeze
Select Case Pod.PodType
    Case "ATTILA"
        gx = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperXOffset)
        gy = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperYOffset)
        gz = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperZOffset)
        Squeeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
                               CDbl(srcLabware.Class.GripperInfo.MultiChannel.Squeeze)))
        Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
                               CDbl(srcLabware.Class.GripperInfo.MultiChannel.Unsqueeze)))
    'tls.msg pod.podtype
    'tls.msg gx & " " & gy & " " & gz & " " & Squeeze & " " & Unsqueeze
    Case Else ' need to fill in code for NX Gripper
End Select

' Get the Pod gripper offsets
Dim px, py, pz
px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
pz = CDbl(Pod.GripperZOffset)

Dim LiftHeight, e

LiftHeight = e.EvaluateExpression(StepDictionary.Let.LiftHeight)

' Temporarily save the height of the move
World.Volatile.LiftHeight = LiftHeight

'Reserve the resources used, i.e., the source position and the Pod
World.Globals.ResourceReserver.ReserveResources Array(Src, Pod)

' Open the source position
Src.Open True, Depth

' Start Moving
Pod.ApproachPosition Source, sx+gx-px, sy+gy-py, Z + sz+gz-pz, False, Unsqueeze

' Extend the grippers
Pod.GripperExtend

' Grab Labware
Pod.AbsMove ,,Squeeze

' Enforce the labware's speed limit
LWSpeedLimit = srcLabware.Class.SpeedLimit
If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit
' Notify software that the source labware is now in the grippers
' Version 2.x syntax: Pod.GetLabware Source, Depth
Pod.Gripper.GetLabwareObject Source, Depth

' Move to a safe height above the position (original function commented out)
' Pod.MoveToSafe

If LiftHeight < 0 Then err.raise 1050, , "Lift Height too low; would result in downward motion"

Pod.RelativeMoveAxes "Z", LiftHeight

' Close the source position
' Src.Close True, Depth

' Restore original pod speed now that the move is finished
Pod.SetSpeed OrigPodSpeed

---------------------------------------------------------------------------
Span-8 New Tips
Get new TB1 tips for probes specified by "=OneTip() (MFX.NumSamples)" on Pod2.
---------------------------------------------------------------------------

Script
Description:
Labware Place to TB1
Execute the following script code:

Option Explicit
'This script duplicates the functionality of the Move Labware step.
'It has been modified to only place the labware after another step has picked it up.
Dim e
Set e = CreateObject("World.EngineObject")
Dim Target, PodName
Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit

' PodName        The name of the pod to use
PodName = StepDictionary.Let.PodName
if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"
Set Pod = World.Devices.Pipettor1(PodName)
OrigPodSpeed = Pod.CurrentSpeed

Set CurDeck = World.Devices.Pipettor1.Deck

' Target         Name of the target position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location
Target = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Target))

if IsEmpty(Target) or Target = "" then err.raise 1050, , "Target must be defined"

If Not IsObject(Pod.GrippedLabware) Then err.raise 1050, , "There is no labware in the gripper."
Dim glw
set glw = Pod.GrippedLabware(Pod.GrippedLabware.Count - 1) ' The gripped labware is an array with the bottom piece at the highest index

' Convert Source and Target names into objects
Dim Dst
Set Dst = Pipettor.Deck.Positions(Target)
Dim Z
Dim sx, sy, sz

' Dim gx, gy, gz, pd
'pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the squeeze values
'Dim Unsqueeze
'Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) + CDbl(glw.Class.Unsqueeze)))

' Get the Pod gripper offsets
Dim px, py, pz
px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
pz = CDbl(Pod.GripperZOffset)

' Enforce the labware's speed limit
'LWSpeedLimit = srcLabware.Class.SpeedLimit
'If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit

'Get height of destination position
Z = CDbl(Dst.Z(Pod))

' Get offsets from position to the labware at target position
Dim tx, ty, tz, dx, dy, dz
tx = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "X"))
ty = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Y"))
tz = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Z"))
' Get the Target Labware
Dim dstLabware
dx = 0
dy = 0
dz = 0
dstLabware = Null
if (Dst.StackDepth > 0) then
    Set dstLabware = Dst.GetLabwareAtDepth(1)
end if

' Get Destination Stack Offsets (really Per-Labware Offsets)
dx = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "X"))
dy = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "Y"))
dz = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "Z"))

' Get the labware gripper offsets (added-in by MAG 3/7/2003)
World.Volatile.MyDest = Dst

'Dim gx, gy, gz, pd
'gx = CDbl(glw.Class.GripperXOffset)
'gy = CDbl(glw.Class.GripperYOffset)
'gz = CDbl(glw.Class.GripperZOffset)

pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the labware gripper offsets and squeeze values
Dim gx, gy, gz, pd
Dim Unsqueeze
Select Case Pod.PodType

Case "ATTILA"
    gx = CDbl(glw.Class.GripperInfo.MultiChannel.GripperXOffset)
    gy = CDbl(glw.Class.GripperInfo.MultiChannel.GripperYOffset)
    gz = CDbl(glw.Class.GripperInfo.MultiChannel.GripperZOffset)
    Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) + CDbl(glw.Class.GripperInfo.MultiChannel.Unsqueeze)))
    'tls.msg pod.podtype
    'tls.msg gx & " " & gy & " " & gz & " " & " " & Unsqueeze
    Case Else ' need to fill in code for NX Gripper
End Select

'Dest.Open True, 0

' Start Moving
Pod.ApproachPosition Target, CDbl(tx+dx+gx-px), CDbl(ty+dy+gy-py), CDbl(Z + tz+dz+gz-pz), True
Pod.MoveZ CDbl(Z + tz + dz + gz - pz)

' Put Labware
Pod.AbsMove ,,,Unsqueeze

' Notify software the labware that was in the grippers is now at the target
old v. 2.x syntax Pod.PutLabware Target
Pod.Gripper.PutLabwareObject Target

' Retract grippers
Pod.GripperRetract

' Close the destination position
Dst.Close True, 0

'Restore original pod speed now that the move is finished
'Pod.SetSpeed OrigPodSpeed

' Move to a safe height
Pod.MoveToSafe

---------------------------------------------------------------------------
Script
Description:
Labware Pickup from Cryo1
Execute the following script code:
Option Explicit

' This script duplicates the functionality of the first half of the Move Labware step.
' Modified 3/7/2003 by MAG to lift the labware to a specific height off the deck
' (height measured at top of the labware) which was useful for a specific customer
' reading barcodes via their own reader, with labels always a certain distance from
' the top of the labware.

Set e = CreateObject("World.EngineObject")

Dim Source, Target, PodName
Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit

' PodName        The name of the pod to use
PodName = StepDictionary.Let.PodName
if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"
Set Pod = World.Devices.Pipettor1(PodName)
OrigPodSpeed = Pod.CurrentSpeed

Set CurDeck = World.Devices.Pipettor1.Deck

' Source         Name of the source position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location
Source = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Source))

if IsEmpty(Source) or Source = "" then err.raise 1050, , "Source must be defined"

' Get the depth to grab a piece of labware at.
Dim Depth
Depth = e.EvaluateExpression(StepDictionary.Let.Depth)
if IsEmpty(Depth) then err.raise 1050, , "Depth must be defined"
If Depth < 1 then err.raise 1050, , "Depth must be at least 1"

' Convert Source and Target names into objects
Dim Src
Set Src = Pipettor.Deck.Positions(Source)

' Get the Source Labware
Dim srcLabware
World.Volatile.Depth = Depth
Set srcLabware = Src.GetLabwareAtDepth(Depth)

' Get the source labware height [DON'T NEED THIS ANYMORE]
' Dim srcLwHeight
' srcLwHeight = srcLabware.Class.Height

Dim Z
Z = CDbl(Src.Z(Pod))

' Get offsets from position to the labware at source position
Dim sx, sy, sz
sx = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "X"))
sy = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "Y"))
sz = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "Z"))

pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the labware gripper offsets and squeeze values
Dim gx, gy, gz, pd
Dim Squeeze, Unsqueeze
Select Case Pod.PodType
  Case "ATTILA"
    gx = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperXOffset)
gy = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperYOffset)
gz = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperZOffset)
Squeeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
CDbl(srcLabware.Class.GripperInfo.MultiChannel.Squeeze)))
Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
CDbl(srcLabware.Class.GripperInfo.MultiChannel.Unsqueeze)))

'tls.msg pod.podtype
'tls.msg gx & " " & gy & " " & gz & " " & Squeeze & " " & Unsqueeze

Case Else ' need to fill in code for NX Gripper
End Select

' Get the Pod gripper offsets
Dim px, py, pz
px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
pz = CDbl(Pod.GripperZOffset)

Dim LiftHeight, e
LiftHeight = e.EvaluateExpression(StepDictionary.Let.LiftHeight)

' Temporarily save the height of the move
World.Volatile.LiftHeight = LiftHeight

' Reserve the resources used, i.e., the source position and the Pod
World.Globals.ResourceReserver.ReserveResources Array(Src, Pod)

' Open the source position
Src.Open True, Depth

' Start Moving
Pod.ApproachPosition Source, sx+gx-px, sy+gy-py, Z + sz+gz-pz, False, Unsqueeze
' Extend the grippers
Pod.GripperExtend

' Grab Labware
Pod.AbsMove,,,Squeeze

' Enforce the labware's speed limit
LWSpeedLimit = srcLabware.Class.SpeedLimit
If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit

' Notify software that the source labware is now in the grippers
' Version 2.x syntax: Pod.GetLabware Source, Depth
Pod.Gripper.GetLabwareObject Source, Depth

' Move to a safe height above the position (original function commented out)
' Pod.MoveToSafe

If LiftHeight < 0 Then err.raise 1050, , "Lift Height too low; would result in downward motion"

Pod.RelativeMoveAxes "Z", LiftHeight

' Close the source position
' Src.Close True, Depth

' Restore original pod speed now that the move is finished
Pod.SetSpeed OrigPodSpeed

------------------------------
Transfer

Using Pod2, execute the following transfer:

From: Cryo2, with the following pattern:

```
  1  2  3  4  5  6
  A ( ) ( ) ( ) ( ) ( )
  B ( ) ( ) ( ) ( ) ( )
  C ( ) ( ) ( ) ( ) ( )
  D ( ) ( ) ( ) >= ( ) ( )
```

detachabead

Proceed down first, then left to right.

Start from the beginning of the selection.

Set the mark at the last well transferred.

Use the following custom technique:

Use the following pipetting template: OS Span-8 MultiDispense Slow Retract 2

Calibration Offset: 0

Calibration Slope: 1

Minimum Pipetting Height: 0 mm

Prewet: False

Aspirate Blowout: False

Follow Liquid: False

Height: 0 mm from the bottom

Mix: False

Mix Aspirate Speed: 200µL/s

Mix Aspirate Height: 0.1 mm from the bottom

Mix Dispense Speed: 200µL/s

Mix Dispense Height: 0.1 mm from the bottom

Mix Count: 1

Mix Volume: 80 µL
Operation speed: 70µL/s
Tip Touch: False
Trailing Air Gap: False
Override Liquid Type Settings
Aspirate Delay: 1 ms
Aspirate Speed: 100 µL/s
Blowout Delay: 1 ms
Blowout Volume: 10 µL
Dispense Delay: 1 ms
Dispense Speed: 250 µL/s
Prewet Delay: 0 ms
Prewet Overage: 10 µL
Tip Touch Delay: 100 ms
Tip Touch Speed: 80 µL/s
Trailing Air Gap Volume: 0 µL

Override the technique height by moving to 0.5 mm from the bottom.
To: Cryo1, =MFX.P7VolDABµL, sections specified by "=Wells()(MFX.NumSamples)", detachabead
Proceed down first, then left to right.
Start from the beginning of the selection.
Set the mark at the last well transferred.
Use the following custom technique:
Use the following pipetting template: Step3_P200 MixXfer 2
Calibration Offset: 0
Calibration Slope: 1
Minimum Pipetting Height: 0.2 mm
Prewet: True
Blowout: False
Follow Liquid: True
Height: 0.5 mm from the bottom

Mix: False

Mix Aspirate Speed: 200µL/s

Mix Aspirate Height: 1 mm from the bottom

Mix Dispense Speed: 200µL/s

Mix Dispense Height: 1 mm from the bottom

Mix Count: 2

Mix Volume: 200 µL

Operation speed: 70µL/s

Tip Touch: False

Override Liquid Type Settings

Aspirate Delay: 1 ms

Aspirate Speed: 400 µL/s

Blowout Delay: 1 ms

Blowout Volume: 10 µL

Dispense Delay: 1 ms

Dispense Speed: 250 µL/s

Prewet Delay: 0 ms

Prewet Overage: 10 µL

Tip Touch Delay: 100 ms

Tip Touch Speed: 80 µL/s

Trailing Air Gap Volume: 0 µL

Override the technique height by moving to 3 mm from the bottom.

Dispense up to 6 time(s) per draw.

Create 1 replicate(s) of each source well.

Keep the current tips

Unload the tips when finished.
Stop when finished with Destinations.
Probes specified by "=OneTip()(MFX.NumSamples)" will be used.

Script
Description:
Labware Place to Cryo1
Execute the following script code:

Option Explicit

' This script duplicates the functionality of the Move Labware step.
' It has been modified to only place the labware after another step has picked it up.
Dim e
Set e = CreateObject("World.EngineObject")
Dim Target, PodName
Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit

' PodName        The name of the pod to use
PodName = StepDictionary.Let.PodName
if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"
Set Pod = World.Devices.Pipettor1(PodName)
OrigPodSpeed = Pod.CurrentSpeed

Set CurDeck = World.Devices.Pipettor1.Deck

' Target        Name of the target position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location
Target = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Target))

if IsEmpty(Target) or Target = "" then err.raise 1050, , "Target must be defined"
If Not IsObject(Pod.GrippedLabware) Then err.raise 1050, , "There is no labware in the gripper."

Dim glw

set glw = Pod.GrippedLabware(Pod.GrippedLabware.Count - 1) ' The gripped labware is an array with the bottom piece at the highest index

' Convert Source and Target names into objects
Dim Dst

Set Dst = Pipettor.Deck.Positions(Target)

Dim Z

Dim sx, sy, sz

' Dim gx, gy, gz, pd

'pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the squeeze values
'Dim Unsqueeze

'Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) + CDbl(glw.Class.Unsqueeze)))

' Get the Pod gripper offsets
Dim px, py, pz

px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
pz = CDbl(Pod.GripperZOffset)

' Enforce the labware's speed limit
'LWSpeedLimit = srcLabware.Class.SpeedLimit
' If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit

' Get height of destination position
Z = CDbl(Dst.Z(Pod))

' Get offsets from position to the labware at target position
Dim tx, ty, tz, dx, dy, dz

  tx = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "X"))
  ty = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Y"))
  tz = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Z"))

' Get the Target Labware
Dim dstLabware

  dx = 0
  dy = 0
  dz = 0
  dstLabware = Null

  if (Dst.StackDepth > 0) then
    Set dstLabware = Dst.GetLabwareAtDepth(1)
  end if

' Get Destination Stack Offsets (really Per-Labware Offsets)

  dx = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "X"))
  dy = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "Y"))
  dz = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "Z"))

' Get the labware gripper offsets (added-in by MAG 3/7/2003)
World.Volatile.MyDest = Dst
'Dim gx, gy, gz, pd
'gx = CDbl(glw.Class.GripperXOffset)
'gy = CDbl(glw.Class.GripperYOffset)
'gz = CDbl(glw.Class.GripperZOffset)

pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the labware gripper offsets and squeeze values
Dim gx, gy, gz, pd
Dim Unsqueeze
Select Case Pod.PodType
   Case "ATTILA"
      gx = CDbl(glw.Class.GripperInfo.MultiChannel.GripperXOffset)
      gy = CDbl(glw.Class.GripperInfo.MultiChannel.GripperYOffset)
      gz = CDbl(glw.Class.GripperInfo.MultiChannel.GripperZOffset)
      Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbI(pd) +
      CDbl(glw.Class.GripperInfo.MultiChannel.Unsqueeze)))
   'tls.msg pod.podtype
   'tls.msg gx & " " & gy & " " & gz & " " & " " & Unsqueeze
      Case Else ' need to fill in code for NX Gripper
End Select

' Open Destination
Dst.Open True, 0
' Start Moving
Pod.ApproachPosition Target, CDbl(tx+dx+gx-px), CDbl(ty+dy+gy-py), CDbl(Z + tz+dz+gz-pz),
True

Pod.MoveZ CDbl(Z + tz + dz + gz - pz)

' Put Labware
Pod.AbsMove ,,Unsqueeze

' Notify software the labware that was in the grippers is now at the target
' old v. 2.x syntax Pod.PutLabware Target
Pod.Gripper.PutLabwareObject Target

' Retract grippers
Pod.GripperRetract

' Close the destination position
Dst.Close True, 0

'Restore original pod speed now that the move is finished
'Pod.SetSpeed OrigPodSpeed

' Move to a safe height
Pod.MoveToSafe

---------------------------------------------------------------------------
Device Action
Send the following command to "OrbitalShakerALP0": "Timed Shake".
Parameters: 700, 1, 10, CounterClockwise

---------------------------------------------------------------------------
Run setstepdone
    wait = true

End

Else

End

If
If "MFX.NextStep = 20":

Then

Configure Tips
Description: Step 3b
Caption: Configure Tips
Code: ' How many tips need to be loaded? Depends on NumSamples
Select Case MFX.NumSamples
    Case 1
        Extend "LoadTips", "1,2,3,4"
    Case 2
        Extend "LoadTips", "1,2,3,4,5,6,7,8"
    Case 3
        Extend "LoadTips", "1,2,3,4,5,6"
End Select
Prompt: [IDispatch]
_Commented: 0
Group:
Incubate/Tipmix

Script
Description:
Execute the following script code:

If IsRunning Then
  PG.StallUntilETSIs 0
  TLS.SetTimer "Incubating...", MFX.P7IncTime
End If

Loop
Loop from "nTipMix" = "1" to "999", incrementing by "1".

If
If "MFX.P7DoTipMix":
  Then
    Run getnewtips
    pattern = =OneTip()(MFX.NumSamples)

Configure
Bitmap: C:\Program Files\Biomek Software\Bitmaps\Vials.bmp
Description:
Caption: Configure
Code: 'what is the mix volume?

mixvol = (MFX.P7VolDAB + MFX.P7VolMedia) * 0.8

'determine the correct height

Set LW = Positions(Labware.Location("Cryo1")).Labware

aspheightcm = LW.HeightFromVolume(mixvol, 1)

' this is the height in CM

' needs to be multiplied by 10 because the step expects MM

Extend "MixWells", xwells
Extend "UseTips", tips
Extend "VolMix", mixvol
Extend "ZAsp", aspheightcm * 10 ' convert cm to mm

Prompt: [IDispatch]
Tooltip: Scripted Let

---------------------------------------------------------------------------

Script

Description:
Labware Pickup from Cryo1

Execute the following script code:

Option Explicit

' This script duplicates the functionality of the first half of the Move Labware step.
' Modified 3/7/2003 by MAG to lift the labware to a specific height off the deck
' (height measured at top of the labware) which was useful for a specific customer
' reading barcodes via their own reader, with labels always a certain distance from
' the top of the labware.

Set e = CreateObject("World.EngineObject")
Dim Source, Target, PodName
Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit

' PodName The name of the pod to use
PodName = StepDictionary.Let.PodName
if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"
Set Pod = World.Devices.Pipettor1(PodName)
OrigPodSpeed = Pod.CurrentSpeed

Set CurDeck = World.Devices.Pipettor1.Deck

' Source Name of the source position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location
Source = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Source))
if IsEmpty(Source) or Source = "" then err.raise 1050, , "Source must be defined"

' Get the depth to grab a piece of labware at.
Dim Depth
Depth = e.EvaluateExpression(StepDictionary.Let.Depth)
if IsEmpty(Depth) then err.raise 1050, , "Depth must be defined"
If Depth < 1 then err.raise 1050, , "Depth must be at least 1"

' Convert Source and Target names into objects
Dim Src
Set Src = Pipettor.Deck.Positions(Source)
' Get the Source Labware
Dim srcLabware
World.Volatile.Depth = Depth
Set srcLabware = Src.GetLabwareAtDepth(Depth)

' Get the source labware height [DON'T NEED THIS ANYMORE]
' Dim srcLwHeight
' srcLwHeight = srcLabware.Class.Height

Dim Z
Z = CDbl(Src.Z(Pod))

' Get offsets from position to the labware at source position
Dim sx, sy, sz
sx = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "X"))
sy = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "Y"))
sz = CDbl(Src.GetOneLabwareOffsetAtDepth(Depth, "Z"))

pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the labware gripper offsets and squeeze values
Dim gx, gy, gz, pd
Dim Squeeze, Unsqueeze
Select Case Pod.PodType
  Case "ATTILA"
    gx = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperXOffset)
    gy = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperYOffset)
    gz = CDbl(srcLabware.Class.GripperInfo.MultiChannel.GripperZOffset)
Squeeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) + 
CDbl(srcLabware.Class.GripperInfo.MultiChannel.Squeeze)))

Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) + 
CDbl(srcLabware.Class.GripperInfo.MultiChannel.Unsqueeze)))

'tls.msg pod.podtype
'tls.msg gx & " " & gy & " " & gz & " " & Squeeze & " " & Unsqueeze
Case Else ' need to fill in code for NX Gripper
End Select

' Get the Pod gripper offsets
Dim px, py, pz
px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
pz = CDbl(Pod.GripperZOffset)

Dim LiftHeight, e

LiftHeight = e.EvaluateExpression(StepDictionary.Let.LiftHeight)

' Temporarily save the height of the move
World.Volatile.LiftHeight = LiftHeight

'Reserve the resources used, i.e., the source position and the Pod
World.Globals.ResourceReserver.ReserveResources Array(Src, Pod)

' Open the source position
Src.Open True, Depth

' Start Moving
Pod.ApproachPosition Source, sx+gx-px, sy+gy-py, Z + sz+gz-pz, False, Unsqueeze

' Extend the grippers
Pod.GripperExtend

' Grab Labware
Pod.AbsMove ,,Squeeze

' Enforce the labware's speed limit
LWSpeedLimit = srcLabware.Class.SpeedLimit
If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit

' Notify software that the source labware is now in the grippers
' Version 2.x syntax: Pod.GetLabware Source, Depth
Pod.Gripper.GetLabwareObject Source, Depth

' Move to a safe height above the position (original function commented out)
' Pod.MoveToSafe

If LiftHeight < 0 Then err.raise 1050, , "Lift Height too low ; would result in downward motion"

Pod.RelativeMoveAxes "Z", LiftHeight

' Close the source position
' Src.Close True, Depth

'Restore original pod speed now that the move is finished
Pod.SetSpeed OrigPodSpeed

Transfer

Using Pod2, execute the following transfer:

From: Cryo1, sections specified by "=Wells()(MFX.NumSamples)", BeadsplusCells

Proceed down first, then left to right.

Start from the beginning of the selection.

Do not set the mark.

Use the following custom technique:

Use the following pipetting template: OS Span-8 P1000 MixOnly 2

Calibration Offset: 2.54

Calibration Slope: 1.033

Minimum Pipetting Height: =ZMinCryo mm

Prewet: False

Aspirate Blowout: True

Follow Liquid: True

Height: 0 mm from the liquid

Mix: True

Mix Aspirate Speed: =MFX.P7MixSpeedµL/s

Mix Aspirate Height: =ZAsp mm from the liquid

Mix Dispense Speed: =MFX.P7MixSpeedµL/s

Mix Dispense Height: 2 mm from the liquid

Mix Count: =MFX.P7MixCycles

Mix Volume: =VolMix µL

Operation speed: 70µL/s

Tip Touch: True

Trailing Air Gap: False

Override Liquid Type Settings

Aspirate Delay: 10 ms
Aspirate Speed: 100 µL/s
Blowout Delay: 500 ms
Blowout Volume: 20 µL
Dispense Delay: 20 ms
Dispense Speed: 200 µL/s
Prewet Delay: 200 ms
Prewet Overage: 0 µL
Tip Touch Delay: 300 ms
Tip Touch Speed: 70 µL/s
Trailing Air Gap Volume: 10 µL

Override the technique height by moving to =ZAsp mm from the bottom.

To: Cryo1, 0µL, sections specified by "=Wells()\(=\text{MFX.NumSamples}\)\", BeadsplusCells

Proceed down first, then left to right.

Start from the beginning of the selection.

Do not set the mark.

Use the following custom technique:

Use the following pipetting template: OS Span-8 P1000 MixOnly 2
Calibration Offset: 2.54
Calibration Slope: 1.033
Minimum Pipetting Height: 0.5 mm
Prewet: False
Blowout: False
Follow Liquid: False
Height: 0 mm from the liquid
Mix: False
Mix Aspirate Speed: 100µL/s
Mix Aspirate Height: 0 mm from the liquid
Mix Dispense Speed: 100µL/s
Mix Dispense Height: 0 mm from the liquid
Mix Count: 1
Mix Volume: 900 µL
Operation speed: 70µL/s
Tip Touch: False
Override Liquid Type Settings
  Aspirate Delay: 10 ms
  Aspirate Speed: 300 µL/s
  Blowout Delay: 10 ms
  Blowout Volume: 20 µL
  Dispense Delay: 20 ms
  Dispense Speed: 200 µL/s
  Prewet Delay: 0 ms
  Prewet Overage: 0 µL
  Tip Touch Delay: 300 ms
  Tip Touch Speed: 70 µL/s
  Trailing Air Gap Volume: 10 µL

Override the technique height by moving to =ZAsp mm from the bottom.
Dispense up to 1 time(s) per draw.
Create 1 replicate(s) of each source well.
Keep the current tips
Keep the tips when finished.
Stop when finished with Destinations.
Probes specified by "=OneTip()(MFX.NumSamples)" will be used.

Script
Description:
Labware Place to Cryo1

Execute the following script code:

Option Explicit

' This script duplicates the functionality of the Move Labware step.
' It has been modified to only place the labware after another step has picked it up.
Dim e

Set e = CreateObject("World.EngineObject")

Dim Target, PodName

Dim Pod, CurDeck, OrigPodSpeed, LWSpeedLimit

' PodName        The name of the pod to use
PodName = StepDictionary.Let.PodName
if IsEmpty(PodName) or PodName = "" then err.raise 1050, , "PodName must be defined"
Set Pod = World.Devices.Pipettor1(PodName)
OrigPodSpeed = Pod.CurrentSpeed

Set CurDeck = World.Devices.Pipettor1.Deck

' Target         Name of the target position (string)
' Need to use Deck.FindLabwarePosition,
' in case labware is referred to by name instead of location
Target = CurDeck.FindLabwarePosition(e.EvaluateExpression(StepDictionary.Let.Target))

if IsEmpty(Target) or Target = "" then err.raise 1050, , "Target must be defined"

If Not IsObject(Pod.GrippedLabware) Then err.raise 1050, , "There is no labware in the gripper."

Dim glw
set glw = Pod.GrippedLabware(Pod.GrippedLabware.Count - 1) ' The gripped labware is an
array with the bottom piece at the highest index

' Convert Source and Target names into objects
Dim Dst
Set Dst = Pipettor.Deck.Positions(Target)

Dim Z
Dim sx, sy, sz
' Dim gx, gy, gz, pd
'pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the squeeze values
'Dim Unsqueeze
'Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) + CDbl(glw.Class.Unsqueeze)))

' Get the Pod gripper offsets
Dim px, py, pz
px = CDbl(Pod.GripperXOffset)
py = CDbl(Pod.GripperYOffset)
pz = CDbl(Pod.GripperZOffset)

' Enforce the labware's speed limit
'LWSpeedLimit = srcLabware.Class.SpeedLimit
'If LWSpeedLimit < OrigPodSpeed Then Pod.SetSpeed LWSpeedLimit

'Get height of destination position
Z = CDbl(Dst.Z(Pod))
'Get offsets from position to the labware at target position

Dim tx, ty, tz, dx, dy, dz

tx = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "X"))
 ty = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Y"))
tz = CDbl(Dst.GetOneLabwareOffsetAtDepth(1, "Z"))

'Get the Target Labware

Dim dstLabware

dx = 0
dy = 0
dz = 0
dstLabware = Null

if (Dst.StackDepth > 0) then
    Set dstLabware = Dst.GetLabwareAtDepth(1)
end if

'Get Destination Stack Offsets (really Per-Labware Offsets)

dx = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "X"))
dy = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "Y"))
dz = CDbl(Dst.GetOneStackOffset(glw, dstLabware, "Z"))

'Get the labware gripper offsets (added-in by MAG 3/7/2003)

World.Volatile.MyDest = Dst

'Dim gx, gy, gz, pd

'gx = CDbl(glw.Class.GripperXOffset)
'gy = CDbl(glw.Class.GripperYOffset)
'gz = CDbl(glw.Class.GripperZOffset)
pd = CDbl(Pod.VariantDictionary.GetDefault("GripperDOffset", 0.0))

' Get the labware gripper offsets and squeeze values
Dim gx, gy, gz, pd
Dim Unsqueeze
Select Case Pod.PodType
  Case "ATTILA"
    gx = CDbl(glw.Class.GripperInfo.MultiChannel.GripperXOffset)
    gy = CDbl(glw.Class.GripperInfo.MultiChannel.GripperYOffset)
    gz = CDbl(glw.Class.GripperInfo.MultiChannel.GripperZOffset)
    Unsqueeze = CDbl(Pod.DAxisFromGripper(CDbl(pd) +
                      CDbl(glw.Class.GripperInfo.MultiChannel.Unsqueeze)))
    'tls.msg pod.podtype
    'tls.msg gx & " " & gy & " " & gz & " " & Unsqueeze
  Case Else ' need to fill in code for NX Gripper
End Select

' Open Destination
Dst.Open True, 0

' Start Moving
Pod.ApproachPosition Target, CDbl(tx+dx+gx-px), CDbl(ty+dy+gy-py), CDbl(Z + tz+dz+gz-pz),
True

Pod.MoveZ CDbl(Z + tz + dz + gz - pz)
' Put Labware
Pod.AbsMove ,,Unsqueeze

' Notify software the labware that was in the grippers is now at the target
' old v. 2.x syntax Pod.PutLabware Target
Pod.Gripper.PutLabwareObject Target

' Retract grippers
Pod.GripperRetract

' Close the destination position
Dst.Close True, 0

'Restore original pod speed now that the move is finished
'Pod.SetSpeed OrigPodSpeed

' Move to a safe height
Pod.MoveToSafe

---------------------------------------------------------------------------
End Scripted Let
---------------------------------------------------------------------------
Run parkinwashstation
    rule = 3
    withtipwash = False

---------------------------------------------------------------------------
End
---------------------------------------------------------------------------
Else

End

If

If "IsRunning AND MFX.P7UseShaker":

Then

Group

Device Action
Send the following command to "OrbitalShakerALP0": "Shake".
Parameters: =MFX.P7ShakerSpeed, 1, Clockwise

Run waittimer
index = ="
settimer = True
timename = ="Shake Timer"
waittime = ="00:00:" & MFX.P7ShakeSeconds/2

Device Action
Send the following command to "OrbitalShakerALP0": "Stop".
Parameters: 1

End Group

Group
Device Action

Send the following command to "OrbitalShakerALP0": "Shake".
Parameters: =MFX.P7ShakerSpeed, 1, CounterClockwise

---

Run waittimer

index = ="
settimer = True
timename = ="Shake Timer"
waittime = ="00:00:" & MFX.P7ShakeSeconds/2

---

Device Action

Send the following command to "OrbitalShakerALP0": "Stop".
Parameters: 1

---

End Group

---

End

---

Else

---

End

---

Run waittimer

index = ="
settimer = True
timename = ="Pausing..."
waittime = =MFX.P7PauseTime

---
If

If "TLS.SecondsLeft("Incubating...") < MFX.P7ShakeSeconds + MFX.P7PauseSeconds":

Then

Break out of 1 loop(s).

Else

End

End Loop

Run waittimer

    index = ""
    settimer = False
    timername = "Incubating..."
    waittime = ""

End Group

Run droptips

Run setstepdone

    wait = true

End Scripted Let
Else

End

End Group

Group

If

If "MFX.NextStep = 21":

Then

Move Labware
Move the top "2" plates at "Cryo1" to "Magnet" using pod "Pod1".

Move To
Move "Pod1" to deck position "P2" at offset (0,0).

Run setstepdone
wait = true

End

Else
If "MFX.NextStep = 22":

Then

Run waittimer

index = ""
settimer = True
timername = "Settling..."
waittime = SettleTime

Run setstepdone

wait = true

End

Else

End

If "MFX.NextStep = 23":

Then

Move Labware
Move the top "1" plates at "Cryo1" to "TR2" using pod "Pod1".

Run setstepdone
  wait = true

End

Else

End

If
If "MFX.NextStep = 24":

Then

Run combinecolumns
  transfervolume = = (MFX.P7VolDAB + MFX.P7VolMedia) * 1.1

Run setstepdone
  wait = true

End

Else

End
If
If "MFX.NextStep = 25":

Then

Move Labware

Move the top "1" plates at "Cryo1" to "Orbital1" using pod "Pod1".

Move To

Move "Pod1" to deck position "P2" at offset (0,0).

Run setstepdone

wait = true

End

Else

End

If
If "MFX.NextStep = 26":

Then

Run getnewtips

   pattern = =TwoTips\(\)(MFX.NumSamples)

Transfer
Using Pod2, execute the following transfer:

From: Buffer, with the following pattern:

1
A ()
B ()
C ()
D ()
E ()
F ><

, Media

Proceed down first, then left to right.
Start from the beginning of the selection.
Set the mark at the last well transferred.

Use the following custom technique:

Use the following pipetting template: OS Span-8 MultiDispense Slow Retract 2
Calibration Offset: 2.54
Calibration Slope: 1.033
Minimum Pipetting Height: 0.25 mm
Prewet: False
Aspirate Blowout: True
Follow Liquid: False
Height: 0 mm from the liquid
Mix: False
Mix Aspirate Speed: 250µL/s
Mix Aspirate Height: 1 mm from the liquid
Mix Dispense Speed: 250µL/s
Mix Dispense Height: 25 mm from the liquid
Mix Count: 1
Mix Volume: 800 µL
Operation speed: 70 µL/s
Tip Touch: False
Trailing Air Gap: True
Override Liquid Type Settings
   Aspirate Delay: 10 ms
   Aspirate Speed: 300 µL/s
   Blowout Delay: 20 ms
   Blowout Volume: 10 µL
   Dispense Delay: 10 ms
   Dispense Speed: 200 µL/s
   Prewet Delay: 0 ms
   Prewet Overage: 0 µL
   Tip Touch Delay: 300 ms
   Tip Touch Speed: 85 µL/s
   Trailing Air Gap Volume: 0 µL

Override the technique height by moving to 1 mm from the bottom.
To: Cryo1, =MFX.P8VolMediaµL, sections specified by "=Wells((MFX.NumSamples))", Media
Proceed down first, then left to right.
Start from the beginning of the selection.
Set the mark at the last well transferred.
Use the following custom technique:
   Use the following pipetting template: OS Span-8 P1000 Blowout at LiqLevel 2
   Calibration Offset: 2.54
   Calibration Slope: 1.033
   Minimum Pipetting Height: =0.5 mm
   Prewet: False
   Blowout: True
Follow Liquid: True
Height: 0 mm from the liquid
Mix: False
Mix Aspirate Speed: 100µL/s
Mix Aspirate Height: 2 mm from the bottom
Mix Dispense Speed: 100µL/s
Mix Dispense Height: 0.5 mm from the bottom
Mix Count: 1
Mix Volume: 10 µL
Operation speed: 70µL/s
Tip Touch: False
Override Liquid Type Settings
   Aspirate Delay: 10 ms
   Aspirate Speed: 30 µL/s
   Blowout Delay: 10 ms
   Blowout Volume: 10 µL
   Dispense Delay: 10 ms
   Dispense Speed: 200 µL/s
   Prewet Delay: 0 ms
   Prewet Overage: 0 µL
   Tip Touch Delay: 300 ms
   Tip Touch Speed: 85 µL/s
   Trailing Air Gap Volume: 0 µL

Override the technique height by moving to 1 mm from the bottom.
Aspirate at most =MaxVolInTips µL per transfer for repeated dispensing.
Create 1 replicate(s) of each source well.
Keep the current tips
Keep the tips when finished.
Stop when finished with Destinations.
Probes specified by ":TwoTips\()(MFX.NumSamples)" will be used.

---

Run parkinwashstation
    withtipwash = False

---

Run setstepdone
    wait = true

---

End

---

Else

---

End

---

If

If "MFX.NextStep = 27":

Then

---

Device Action

Send the following command to "OrbitalShakerALP0": "Shake".
Parameters: =MFX.P8ShakerSpeed, 1, CounterClockwise

---

Run waittimer
    index = ="
    settimer = True
    timername = ="Shaking..."
waittime = =MFX.P8ShakeTime

Device Action
Send the following command to "OrbitalShakerALP0": "Stop".
Parameters: 1

Run setstepdone
    wait = true

End

Else
End

If
If "MFX.NextStep = 28":

Then

Move Labware
Move the top "1" plates at "Cryo1" to "Magnet" using pod "Pod1".

Move To
Move "Pod1" to deck position "P2" at offset (0,0).

Run setstepdone
    wait = true
End 

Else 

End 

End 

If 

If "MFX.NextStep = 29": 

Then 

Run waittimer 
  index =="" 
  settimer = True 
  timername =="Settling..." 
  waittime = =SettleTime 

Run setstepdone 
  wait = true 

End 

Else 

End 

End 

If 

If "MFX.NextStep = 30": 


Run combinecolumns

\[ \text{transfervolume} = \text{MFX.P8VolMedia} \times 1.1 \]

Run setstepdone

\[ \text{wait} = \text{true} \]

End

Else

End

If

If "MFX.NextStep = 31":

Then

Move Labware

Move the top "1" plates at "Cryo1" to "P7" using pod "Pod1".

Run setstepdone

\[ \text{wait} = \text{true} \]

End
Else

End

If
If "MFX.NextStep = 32":

Then

Move Labware
Move the top "1" plates at "Cryo2" to "Magnet" using pod "Pod1".

Move To
Move "Pod1" to deck position "P2" at offset (0,0).

Run setstepdone
  wait = true

End

Else

End

If
If "MFX.NextStep = 33":

Then
Run waittimer

   index = ""
   settimer = True
   timername = "Settlling..."
   waittime = "SettleTime"

---------------------------------------------------------------------------
Run setstepdone

   wait = true
---------------------------------------------------------------------------
End
---------------------------------------------------------------------------
Else
---------------------------------------------------------------------------
End
---------------------------------------------------------------------------
If
If "MFX.NextStep = 34":
---------------------------------------------------------------------------
Then
---------------------------------------------------------------------------
Run getnewtips

   pattern = =OneTip()(MFX.NumSamples)

---------------------------------------------------------------------------
Loop
Loop from "transfer" = "5" to "6", incrementing by "1".
---------------------------------------------------------------------------
Transfer Samples to Fresh Vials (Configure Step)

Bitmap: C:\Program Files\Biomek Software\Bitmaps\Vials.bmp
Description:

Caption: Transfer Samples to Fresh Vials (Configure Step)

Code: ' Note: each well in each src column contains 2*(MFX.P7VolDAB + MFX.P7VolMedia + MFX.P8VolMedia))
' but since we are doing two transfers the volume in each step is only half that

transvol = (MFX.P7VolDAB + MFX.P7VolMedia + MFX.P8VolMedia) * 1.1

Set LW = Positions(Labware.Location("Cryo2")).Labware
LW.ConfigureAmounts transvol

' volumes for the destination columns (5 & 6) need to be set to 0
LW.SetWellAmounts Array(0,0,0,0,0,0,0,0), Split(Col56,""), LeftPod

nTrips = TLS.NumTrips(transvol, MaxVolInTips)

Extend "NumTrips", nTrips
Extend "VolTrip", transvol/nTrips

Prompt: [IDispatch]
Tooltip: Scripted Let

Loop
Loop from "Trip" = "1" to "=NumTrips", incrementing by "1".

Calculate Disp Height
Bitmap: C:\Program Files\Biomek Software\Bitmaps\Vials.bmp
Description:
Caption: Calculate Disp Height

Code: Set LW = Positions(Labware.Location("Cryo2"))).Labware
VolBeforeDisp = VolTrip *(Trip-1)
DispHeightCM = LW.HeightFromVolume(VolBeforeDisp, 1)

' new in 0.25: start dispensing at 2 mm below liqlevel
' then follow up & blowout at dispheight

Extend "ZDisp", (DispHeightCM * 10) - 2

'if isrunning then
'PG.stalluntilletsis 0
'tls.msg (DispHeightCM * 10) - 2
'end if

Prompt: [Dispatch]
Tooltip: Scripted Let

---------------------------------------------------------------------------

Combine

Using Pod2, execute the following transfer:
From: Cryo2, =VolTripµL, sections specified by "=Col()(1)(MFX.NumSamples)", Water
Proceed down first, then left to right.
Start from the beginning of the selection.
Set the mark at the last well transferred.
Use the following custom technique:

Use the following pipetting template: OS Span-8 P1000 SlowRetract 2
Calibration Offset: 2.54
Calibration Slope: 1.033
Minimum Pipetting Height: 0 mm
Prewet: False
Aspirate Blowout: True
Follow Liquid: True
Height: -2 mm from the liquid
Mix: False
Mix Aspirate Speed: 100µL/s
Mix Aspirate Height: 0 mm from the liquid
Mix Dispense Speed: 100µL/s
Mix Dispense Height: 0 mm from the liquid
Mix Count: 1
Mix Volume: 10 µL
Operation speed: 50µL/s
Tip Touch: False
Trailing Air Gap: True
Override Liquid Type Settings
  Aspirate Delay: 10 ms
  Aspirate Speed: 100 µL/s
  Blowout Delay: 0 ms
  Blowout Volume: 10 µL
  Dispense Delay: 0 ms
  Dispense Speed: 200 µL/s
  Prewet Delay: 0 ms
  Prewet Overage: 0 µL
  Tip Touch Delay: 0 ms
  Tip Touch Speed: 50 µL/s
  Trailing Air Gap Volume: 1 µL

Override the technique height by moving to 0.5 mm from the bottom.
From: Cryo2, "VolTripµL, sections specified by "=Col(2)(MFX.NumSamples)", Water

Proceed down first, then left to right.

Start from the beginning of the selection.

Set the mark at the last well transferred.

Use the following custom technique:

Use the following pipetting template: OS Span-8 P1000 Blowout at LiqLevel 2

Calibration Offset: 2.54

Calibration Slope: 1.033

Minimum Pipetting Height: 1.5 mm

Prewet: False

Aspirate Blowout: True

Follow Liquid: True

Height: -2 mm from the liquid

Mix: False

Mix Aspirate Speed: 100µL/s

Mix Aspirate Height: 0 mm from the liquid

Mix Dispense Speed: 100µL/s

Mix Dispense Height: 0 mm from the liquid

Mix Count: 1

Mix Volume: 10 µL

Operation speed: 50µL/s

Tip Touch: False

Trailing Air Gap: True

Override Liquid Type Settings

Aspirate Delay: 10 ms

Aspirate Speed: 50 µL/s

Blowout Delay: 0 ms

Blowout Volume: 5 µL
Dispense Delay: 0 ms
Dispense Speed: 50 µL/s
Prewet Delay: 0 ms
Prewet Overage: 0 µL
Tip Touch Delay: 0 ms
Tip Touch Speed: 50 µL/s
Trailing Air Gap Volume: 1 µL

Override the technique height by moving to 0.5 mm from the bottom.

From: Cryo2, =VolTripµL, sections specified by "=Col(3)(MFX.NumSamples)", Water
Proceed down first, then left to right.
Start from the beginning of the selection.
Set the mark at the last well transferred.
Use the following custom technique:

Use the following pipetting template: OS Span-8 P1000 SlowRetract 2
Calibration Offset: 2.54
Calibration Slope: 1.033
Minimum Pipetting Height: 1.5 mm
Prewet: False
Aspirate Blowout: True
Follow Liquid: True
Height: -2 mm from the liquid
Mix: False
Mix Aspirate Speed: 100 µL/s
Mix Aspirate Height: 0 mm from the liquid
Mix Dispense Speed: 100 µL/s
Mix Dispense Height: 0 mm from the liquid
Mix Count: 1
Mix Volume: 10 µL
Operation speed: 50µL/s
Tip Touch: False
Trailing Air Gap: True
Override Liquid Type Settings
  Aspirate Delay: 10 ms
  Aspirate Speed: 50 µL/s
  Blowout Delay: 0 ms
  Blowout Volume: 5 µL
  Dispense Delay: 0 ms
  Dispense Speed: 50 µL/s
  Prewet Delay: 0 ms
  Prewet Overage: 0 µL
  Tip Touch Delay: 0 ms
  Tip Touch Speed: 50 µL/s
  Trailing Air Gap Volume: 1 µL

Override the technique height by moving to 0.5 mm from the bottom.
To: Cryo2, sections specified by "=Col()(transfer)(MFX.NumSamples) ", Water
Proceed down first, then left to right.
Start from the beginning of the selection.
Set the mark at the last well transferred.
Use the following custom technique:

  Use the following pipetting template: OS Span-8 P1000 Blowout at LiqLevel 2
  Calibration Offset: 2.54
  Calibration Slope: 1.033
  Minimum Pipetting Height: 0.5 mm
  Prewet: False
  Blowout: True
Follow Liquid: True
Height: 1.5 mm from the bottom
Mix: False
Mix Aspirate Speed: 100µL/s
Mix Aspirate Height: 0 mm from the liquid
Mix Dispense Speed: 100µL/s
Mix Dispense Height: 0 mm from the liquid
Mix Count: 1
Mix Volume: 10 µL
Operation speed: 60µL/s
Tip Touch: True
Override Liquid Type Settings
  Aspirate Delay: 10 ms
  Aspirate Speed: 50 µL/s
  Blowout Delay: 0 ms
  Blowout Volume: 5 µL
  Dispense Delay: 0 ms
  Dispense Speed: 50 µL/s
  Prewet Delay: 0 ms
  Prewet Overage: 0 µL
  Tip Touch Delay: 0 ms
  Tip Touch Speed: 50 µL/s
  Trailing Air Gap Volume: 1 µL

Override the technique height by moving to =ZDisp mm from the bottom.
Dispense up to 1 time(s) per draw.
Create 1 replicate(s) of each source well.
Keep the current tips
Keep the tips when finished.
Stop when finished with Sources.

Probes specified by "=OneTip()(MFX.NumSamples)" will be used.

End Scripted Let

End Loop

End Scripted Let

End Loop

Run droptips

Run setstepdone
  wait = true

End

Else

End

If

If "MFX.NextStep = 35":

Then

Move Labware
Move the top "1" plates at "Cryo2" to "Orbital1" using pod "Pod1".

Move To

Move "Pod1" to deck position "P2" at offset (0,0).

Run setstepdone

   wait = true

End

Else

End

If

If "MFX.NextStep = 36"

Then

Run getnewtips

   pattern = OneTip()(MFX.NumSamples)

Transfer

Using Pod2, execute the following transfer:

From: Buffer, with the following pattern:

   1
   A ()
   B ()
   C ()
Proceed down first, then left to right.
Start from the beginning of the selection.
Set the mark at the last well transferred.

Use the following custom technique:

Use the following pipetting template: OS Span-8 MultiDispense Slow Retract 2
Calibration Offset: 2.54
Calibration Slope: 1.033
Minimum Pipetting Height: 0.25 mm
Prewet: False
Aspirate Blowout: True
Follow Liquid: False
Height: 0 mm from the liquid
Mix: False
Mix Aspirate Speed: 250µL/s
Mix Aspirate Height: 1 mm from the liquid
Mix Dispense Speed: 250µL/s
Mix Dispense Height: 25 mm from the liquid
Mix Count: 1
Mix Volume: 800 µL
Operation speed: 70µL/s
Tip Touch: False
Trailing Air Gap: True
Override Liquid Type Settings
Aspirate Delay: 10 ms
Aspirate Speed: 300 µL/s  
Blowout Delay: 20 ms  
Blowout Volume: 10 µL  
Dispense Delay: 10 ms  
Dispense Speed: 200 µL/s  
Prewet Delay: 0 ms  
Prewet Overage: 0 µL  
Tip Touch Delay: 300 ms  
Tip Touch Speed: 85 µL/s  
Trailing Air Gap Volume: 0 µL

Override the technique height by moving to 1 mm from the bottom.

To: Cryo2, =MFX.P8VolMediامµL, sections specified by "=Col(1)(MFX.NumSamples)", Media Proceed down first, then left to right.
Start from the beginning of the selection.
Set the mark at the last well transferred.

Use the following custom technique:

Use the following pipetting template: OS Span-8 P1000 Blowout at LiqLevel 2  
Calibration Offset: 2.54  
Calibration Slope: 1.033  
Minimum Pipetting Height: ≈0.5 mm  
Prewet: False  
Blowout: True  
Follow Liquid: False  
Height: 0 mm from the liquid  
Mix: False  
Mix Aspirate Speed: 100µL/s  
Mix Aspirate Height: 2 mm from the bottom  
Mix Dispense Speed: 100µL/s
Mix Dispense Height: 0.5 mm from the bottom
Mix Count: 1
Mix Volume: 10 µL
Operation speed: 50 µL/s
Tip Touch: False
Override Liquid Type Settings
Aspirate Delay: 10 ms
Aspirate Speed: 30 µL/s
Blowout Delay: 10 ms
Blowout Volume: 10 µL
Dispense Delay: 10 ms
Dispense Speed: 200 µL/s
Prewet Delay: 0 ms
Prewet Overage: 0 µL
Tip Touch Delay: 300 ms
Tip Touch Speed: 85 µL/s
Trailing Air Gap Volume: 0 µL

Override the technique height by moving to 2 mm from the bottom.
To: Cryo2, =MFX.P8VolMediaµL, sections specified by "=Col()(2)(MFX.NumSamples)", Water
Proceed down first, then left to right.
Start from the beginning of the selection.
Set the mark at the last well transferred.
Use the following custom technique:
Use the following pipetting template: Span-8 MultiDispense
Calibration Offset: 2.54
Calibration Slope: 1.033
Minimum Pipetting Height: 1.5 mm
Prewet: False
Blowout: True
Follow Liquid: False
Height: 1.5 mm from the bottom
Mix: False
Mix Aspirate Speed: 100µL/s
Mix Aspirate Height: 0 mm from the liquid
Mix Dispense Speed: 100µL/s
Mix Dispense Height: 0 mm from the liquid
Mix Count: 1
Mix Volume: 10 µL
Operation speed: 50µL/s
Tip Touch: False
Override Liquid Type Settings
Aspirate Delay: 10 ms
Aspirate Speed: 50 µL/s
Blowout Delay: 0 ms
Blowout Volume: 5 µL
Dispense Delay: 0 ms
Dispense Speed: 50 µL/s
Prewet Delay: 0 ms
Prewet Overage: 0 µL
Tip Touch Delay: 0 ms
Tip Touch Speed: 50 µL/s
Trailing Air Gap Volume: 1 µL

Override the technique height by moving to 2 mm from the bottom.

To: Cryo2, =MFX.P8VolMediaµL, sections specified by "=Col(3)(MFX.NumSamples)", Water
Proceed down first, then left to right.
Start from the beginning of the selection.

Set the mark at the last well transferred.

Use the following custom technique:

Use the following pipetting template: Span-8 MultiDispense

Calibration Offset: 2.54

Calibration Slope: 1.033

Minimum Pipetting Height: 1.5 mm

Prewet: False

Blowout: True

Follow Liquid: False

Height: 1.5 mm from the bottom

Mix: False

Mix Aspirate Speed: 100µL/s

Mix Aspirate Height: 0 mm from the liquid

Mix Dispense Speed: 100µL/s

Mix Dispense Height: 0 mm from the liquid

Mix Count: 1

Mix Volume: 10 µL

Operation speed: 50µL/s

Tip Touch: False

Override Liquid Type Settings

Aspirate Delay: 10 ms

Aspirate Speed: 50 µL/s

Blowout Delay: 0 ms

Blowout Volume: 5 µL

Dispense Delay: 0 ms

Dispense Speed: 50 µL/s

Prewet Delay: 0 ms
Prewet Overage: 0 µL
Tip Touch Delay: 0 ms
Tip Touch Speed: 50 µL/s
Trailing Air Gap Volume: 1 µL

Override the technique height by moving to 2 mm from the bottom.

Aspirate at most \( \text{MaxVolInTips} \) µL per transfer for repeated dispensing.

Create 1 replicate(s) of each source well.

Keep the current tips

Keep the tips when finished.

Stop when finished with Destinations.

Probes specified by "\( =\text{OneTip()}(\text{MFX.NumSamples}) \)" will be used.

---------------------------------------------------------------------------
Run parkinwashstation
  withtipwash = False
---------------------------------------------------------------------------
Run setstepdone
  wait = true
---------------------------------------------------------------------------
End
---------------------------------------------------------------------------
Else
---------------------------------------------------------------------------
End
---------------------------------------------------------------------------
If
  If "\( \text{MFX.NextStep} = 37 \)"
    Then


Device Action
Send the following command to "OrbitalShakerALP0": "Shake".
Parameters: =MFX.P8ShakerSpeed, 1, CounterClockwise

Run waittimer
   index = ""
   settimer = True
   timername = "Shaking..."
   waittime = =MFX.P8ShakeTime

Device Action
Send the following command to "OrbitalShakerALP0": "Stop".
Parameters: 1

Run setstepdone
   wait = true

End

Else

End

If
If "MFX.NextStep = 38":

Then
Move Labware
Move the top "1" plates at "Cryo2" to "Magnet" using pod "Pod1".

Move To
Move "Pod1" to deck position "P2" at offset (0,0).

Run setstepdone
  wait = true

End

Else

End

If
If "MFX.NextStep = 39":

Then

Run waittimer
  index = ""
  settimer = True
  timername = "Settlling..."
  waittime = SettleTime

Run setstepdone
  wait = true
If "MFX.NextStep = 40":  
Then  
Run getnewtips  
    pattern = =OneTip()(MFX.NumSamples)  
Loop  
Loop from "transfer" = "6" to "5", incrementing by "-1".  
Transfer Samples to Fresh Vials (Configure Step)  
Bitmap: C:\Program Files\Biomek Software\Bitmaps\Vials.bmp  
Description:  
Caption: Transfer Samples to Fresh Vials (Configure Step)  
Code: ' this time transvol is the volume in the vial divided by two because  
' we are doing two trips (cols. 5 and 6)  
transvol = (MFX.P8VolMedia * 1.1)/2  
Positions(Labware.Location("Cryo2")).Labware.ConfigureAmounts transvol
nTrips = TLS.NumTrips(transvol, MaxVolInTips)

Extend "NumTrips", nTrips
Extend "VolTrip", transvol/nTrips

Prompt: [IDispatch]
Tooltip: Scripted Let

-------------------------
Loop
-------------------------
Loop from "Trip" = "1" to "=NumTrips", incrementing by "1".

-------------------------
Calculate Disp Height
-------------------------
Bitmap: C:\Program Files\Biomek Software\Bitmaps\Vials.bmp
Description:
Caption: Calculate Disp Height
Code: ' what is already in the wells in col 5/6 from the first transfer?
VolInWell =  2* (MFX.P7VolDAB + MFX.P7VolMedia + MFX.P8VolMedia)

' now add the trip volume
VolBeforeDisp = VolInWell + (VolTrip *(Trip-1))

Set LW = Positions(Labware.Location("Cryo2")).Labware
DispHeightCM = LW.HeightFromVolume(VolBeforeDisp, 1)

' new in 0.25: start dispensing at 2 mm below liqlevel
' then follow up & blowout at dispheight
Extend "ZDisp", (DispHeightCM * 10) - 2

'if isrunning then
'PG.stallunittletsis Ø
'tls.msg (DispHeightCM * 10) - 2
'end if

Prompt: [IDispatch]
Tooltip: Scripted Let

---------------------------------------------------------------------------

Combine

Using Pod2, execute the following transfer:

From: Cryo2, =VolTripµL, sections specified by "=Col(())(MFX.NumSamples)", Water

Proceed down first, then left to right.
Start from the beginning of the selection.
Set the mark at the last well transferred.

Use the following custom technique:

Use the following pipetting template: OS Span-8 P1000 SlowRetract 2

Calibration Offset: 2.54
Calibration Slope: 1.033
Minimum Pipetting Height: 0 mm
Prewet: False
Aspirate Blowout: True
Follow Liquid: True
Height: -2 mm from the liquid
Mix: False
Mix Aspirate Speed: 100µL/s
Mix Aspirate Height: 0 mm from the liquid
Mix Dispense Speed: 100µL/s
Mix Dispense Height: 0 mm from the liquid
Mix Count: 1
Mix Volume: 10 µL
Operation speed: 50µL/s
Tip Touch: False
Trailing Air Gap: True

Override Liquid Type Settings
Aspirate Delay: 10 ms
Aspirate Speed: 100 µL/s
Blowout Delay: 0 ms
Blowout Volume: 10 µL
Dispense Delay: 0 ms
Dispense Speed: 200 µL/s
Prewet Delay: 0 ms
Prewet Overage: 0 µL
Tip Touch Delay: 0 ms
Tip Touch Speed: 50 µL/s
Trailing Air Gap Volume: 1 µL

Override the technique height by moving to 0.5 mm from the bottom.
From: Cryo2, =VolTripµL, sections specified by "=Col(2)(MFX.NumSamples)", Water
Proceed down first, then left to right.
Start from the beginning of the selection.
Set the mark at the last well transferred.
Use the following custom technique:
Use the following pipetting template: OS Span-8 P1000 Blowout at LiqLevel 2
Calibration Offset: 2.54
Calibration Slope: 1.033
Minimum Pipetting Height: 1.5 mm
Prewet: False
Aspirate Blowout: True
Follow Liquid: True
Height: -2 mm from the liquid
Mix: False
Mix Aspirate Speed: 100µL/s
Mix Aspirate Height: 0 mm from the liquid
Mix Dispense Speed: 100µL/s
Mix Dispense Height: 0 mm from the liquid
Mix Count: 1
Mix Volume: 10 µL
Operation speed: 50µL/s
Tip Touch: False
Trailing Air Gap: True
Override Liquid Type Settings
Aspirate Delay: 10 ms
Aspirate Speed: 50 µL/s
Blowout Delay: 0 ms
Blowout Volume: 5 µL
Dispense Delay: 0 ms
Dispense Speed: 50 µL/s
Prewet Delay: 0 ms
Prewet Overage: 0 µL
Tip Touch Delay: 0 ms
Tip Touch Speed: 50 µL/s
Trailing Air Gap Volume: 1 µL
Override the technique height by moving to 0.5 mm from the bottom.

From: Cryo2, =VolTripmL, sections specified by "=Col(3)(MFX.NumSamples)", Water

Proceed down first, then left to right.

Start from the beginning of the selection.

Set the mark at the last well transferred.

Use the following custom technique:

Use the following pipetting template: OS Span-8 P1000 SlowRetract 2

Calibration Offset: 2.54

Calibration Slope: 1.033

Minimum Pipetting Height: 1.5 mm

Prewet: False

Aspirate Blowout: True

Follow Liquid: True

Height: -2 mm from the liquid

Mix: False

Mix Aspirate Speed: 100µL/s

Mix Aspirate Height: 0 mm from the liquid

Mix Dispense Speed: 100µL/s

Mix Dispense Height: 0 mm from the liquid

Mix Count: 1

Mix Volume: 10 µL

Operation speed: 50µL/s

Tip Touch: False

Trailing Air Gap: True

Override Liquid Type Settings

Aspirate Delay: 10 ms

Aspirate Speed: 50 µL/s

Blowout Delay: 0 ms

Blowout Volume: 5 µL
Dispense Delay: 0 ms
Dispense Speed: 50 µL/s
Prewet Delay: 0 ms
Prewet Overage: 0 µL
Tip Touch Delay: 0 ms
Tip Touch Speed: 50 µL/s
Trailing Air Gap Volume: 1 µL

Override the technique height by moving to 0.5 mm from the bottom.

To: Cryo2, sections specified by "=Col(transfer)(MFX.NumSamples)", Water
Proceed down first, then left to right.
Start from the beginning of the selection.
Set the mark at the last well transferred.

Use the following custom technique:

Use the following pipetting template: OS Span-8 P1000 Blowout at LiqLevel 2
Calibration Offset: 2.54
Calibration Slope: 1.033
Minimum Pipetting Height: 0.5 mm
Prewet: False
Blowout: True
Follow Liquid: True
Height: 1.5 mm from the bottom
Mix: False
Mix Aspirate Speed: 100µL/s
Mix Aspirate Height: 0 mm from the liquid
Mix Dispense Speed: 100µL/s
Mix Dispense Height: 0 mm from the liquid
Mix Count: 1
Mix Volume: 10 µL
Operation speed: 50µL/s
Tip Touch: True
Override Liquid Type Settings
  Aspirate Delay: 10 ms
  Aspirate Speed: 50 µL/s
  Blowout Delay: 0 ms
  Blowout Volume: 5 µL
  Dispense Delay: 0 ms
  Dispense Speed: 50 µL/s
  Prewet Delay: 0 ms
  Prewet Overage: 0 µL
  Tip Touch Delay: 0 ms
  Tip Touch Speed: 50 µL/s
  Trailing Air Gap Volume: 1 µL

Override the technique height by moving to =ZDisp mm from the bottom.
Dispense up to 1 time(s) per draw.
Create 1 replicate(s) of each source well.
Keep the current tips
Keep the tips when finished.
Stop when finished with Sources.
Probes specified by "=OneTip()(MFX.NumSamples)" will be used.

End Scripted Let

End Loop

End Scripted Let
End Loop

Run droptips

Run setstepdone
    wait = true

End

Else
End

If
    If "MFX.UsePeltier":
        Incubate Pelt1 at 20C for 00:00:01
        Position: Pelt1
        Command: Incubate
        Module Name:
        Set Temperature?: -1
        Temperature: 20
        Total Time: 00:00:01

End
Else
End
End Group
End Group
End Scripted Let
Finish
Method completed.
Remove the tips from all pods. Clear all labware from the deck. Clear all labware from SILAS devices. Clear all global variables.