YuMi® App
User’s guide

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**Integrator functions**

Description of the Integrator YuMi App functions. As an integrator you can basically add all functions in RAPID. Most of this you can run with the App.

(no TPWrite yet, but TPreadFK is working)

If the routine is not visible => restart the app / create a new program

**Add Routines from RobotStudio®**

Add routines in a separate system module via RobotStudio => it is possible to call the routines and they will not be deleted when creating a new program

6.5 Create routines

Limit: a TPReadFK function pops up if you run the program in the main window, but not if you run it in the routine window

```java
MODULE AdditionalFunction (SYSMODULE)
PROC askQuestion()
    reg1:=0;
    WHILE reg1=0 DO
        TPReadFK reg1,"Wait","Yes","No", "", "", "";
    ENDWHILE
    IF reg1=1 THEN
        Waittime 5;
    ELSEIF reg1=2 THEN
        Waittime 1;
    ENDIF
ENDPROC
ENDMODULE
```

– **Tip:** Install RobotStudio on your tablet: Add TPReadFK to ask the operator
– **Tip:** Work with background task for "Waiting for Tap" or for "path recording"

**MultiMove Synchronized**
Add a MultiMove routine to both arms of your program.

You can use synchronous movement also from the App.
Left arm => will be moved by the other arm

```
MODULE MainModule
LOCAL CONST string YuMi_App_Program_Version:="1.0.1"; !Do not edit or remove this line!
LOCAL VAR robtarget point1 := 
    [-4.95,247.75,188.22],
    [0.988188,0.135211,0.0689391,-0.0212039],
    [-2,1,-1,1],
    [122.339,9E+09,9E+09,9E+09,9E+09,9E+09];
TASK PERS wobjdata wcoordL:=[FALSE,FALSE,"ROB_R",
    [[0,0,0],[1,0,0,0]],[[0,0,0],[1,0,0,0]]];
VAR syncident sync1;
VAR syncident sync2;
VAR syncident sync3;
PERS tasks all_tasks{2} := [
    ["T_ROB_L"],["T_ROB_R"]];
PROC main()
    WaitSyncTask sync1, all_tasks;
    SyncMoveOn sync2, all_tasks;
    MoveJ point1 \ID:=10, v100, z10, YuMi_App_move_tool_local \WObj:=wcoordL;
    MoveJ point1\ID:=20, v100, z10, YuMi_App_move_tool_local \WObj:=wcoordL;
    MoveJ point1\ID:=30, v100, z10, YuMi_App_move_tool_local \WObj:=wcoordL;
    MoveJ point1\ID:=40, v100, z10, YuMi_App_move_tool_local \WObj:=wcoordL;
    SyncMoveOff sync3;
ENDPROC
E NDMODULE

Right arm – will be moved

```

MODULE MainModule
LOCAL CONST string YuMi_App_Program_Version:="1.0.1"; !Do not edit or remove this line!

LOCAL VAR robtarget point1 :=
    [372.64,-193.70,43.74],
    [0.0318436,-0.018982,0.990476,0.132601],
    [-167.051,9E+09,9E+09,9E+09,9E+09,9E+09];
LOCAL VAR robtarget point2 := [[377.64,-193.70,43.74],[0.0318436,-0.018982,0.990476,0.132601],[0,-2,0,1],[167.051,9E+09,9E+09,9E+09,9E+09,9E+09]] ;
LOCAL VAR robtarget point3 := [[385.64,-193.70,43.74],[0.0318436,-0.018982,0.990476,0.132601],[0,-2,0,1],[167.051,9E+09,9E+09,9E+09,9E+09,9E+09]] ;
LOCAL VAR robtarget point4 := [[390.64,-193.70,43.74],[0.0318436,-0.018982,0.990476,0.132601],[0,-2,0,1],[167.051,9E+09,9E+09,9E+09,9E+09,9E+09]] ;

VAR syncident sync1;

VAR syncident sync2;

VAR syncident sync3;

PERS tasks all_tasks{2} := ["T_ROB_L", "T_ROB_R"]; PROC main()
  WaitSyncTask sync1, all_tasks;
  SyncMoveOn sync2, all_tasks;
  MoveJ point1 \ID:=10, v100, z10, YuMi_App_move_tool_local;
  MoveJ point2\ID:=20, v100, z10, YuMi_App_move_tool_local ;
  MoveJ point3\ID:=30, v100, z10, YuMi_App_move_tool_local ;
  MoveJ point4\ID:=40, v100, z10, YuMi_App_move_tool_local ;
  SyncMoveOff sync3;
ENDPROC
ENDMODULE

Questions:
Send an email to Katja.Butterweck@de.abb.com

Hide your routines
In the config file you can add your routines as hidden => in this case they are not visible in the App anymore.

Open Robotstudio for IV

Additional modules/programs
- Move between Calib- and Transportposition
- How to bring YuMi from Calib- to transport-position
- How to bring YuMi from transport- to calib-position
**Wait for Tap**
WaitForTap function is missing

**Tipps for an integrator**

- Change the Proc for hands if you have gripper fingers which grip from inward.
- MoveSync movements are possible also if just one arms is switched on Switch of one task in the settings.
- Build different fingers for YuMi.
- Use Torx screws if you change hands or fingers often.
FAQ

Update revolution counter => Calibration

To be calibrated YuMi needs to be in the calibration position (see picture and markers on the right and the left arm – some with R and L). This is possible by losing the brakes and moving the arms manual.

Go to menu and chose Calibration.
Click on Call Calibration Method.

(When YuMi is in the calibration position) Call Calibration routine

(Calibration – Select Arm – Call Calibration Method – in Manual mode)

Start Program on FlexPendant – Play
Chose Update of revolution counters

<table>
<thead>
<tr>
<th>Selection of joint(s) to update</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choose joint(s) to update revolution counters for ROB_R</td>
</tr>
<tr>
<td>1. [X]</td>
</tr>
<tr>
<td>2. [X]</td>
</tr>
<tr>
<td>3. [X]</td>
</tr>
<tr>
<td>4. [X]</td>
</tr>
<tr>
<td>5. [X]</td>
</tr>
<tr>
<td>6. [X]</td>
</tr>
<tr>
<td>7. [X]</td>
</tr>
</tbody>
</table>

Chose all

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<tr>
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</tr>
<tr>
<td>6. [X]</td>
</tr>
<tr>
<td>7. [X]</td>
</tr>
</tbody>
</table>

Wait until a message at the end shows up and indicates that everything is completed.

**Repeat for second arm.**

If YuMi does not find the hall sensors => manual calibration for this axis and repeat the call hall.

![Manual Calibration](image)

**How to change the Ip address of a WAN port?**

Chose menu on FlexPendant and make an advanced restart => Start Boot Application

Go to setting – IP set up

Start Boot Application

Set the IP address - Always Subnet mask: 255.255.255.0

Since RobotWare 6.03 it is also possible to change the WAN port via RobotStudio
How to bring YuMi from Calib- to transport-position

You can use this YuMi-Program (see attachments)

- mvCalibTransp_2.yumi
- Transportposition_DE_CallHall.docx
- Transportposition_EN.docx

Or Do it manually

Switch YuMi on -> Switch on lead through mode in jogging window for both arms

Start in calibration position

Move arms to the front and outward

Turn axis 7 outward
How to bring YuMi from transport- to calib-position

You can use this YuMi-Program (see attachments)

- mvCalibTransp_2.yumi
- Transportposition_DE_CallHall.docx
- Transportposition_EN.docx

Turn axes 7

Switch YuMi Off
Switch YuMi on -> Switch on lead through mode in jogging window for both arms

Start in transport position and remove packaging

Move arms outward

Turn axis 7 outward
Arms are moving to a wrong position

- Calibrate arms => see Update RevolutionCounter
- Check tooldata and first-hand settings

Predicted collision with the App

- Move hands to a better position (if hands are blocked – go back to Teach in Window)
  - see also Switch off Predicted Collision
- You might need to shift your point => use ModPos

With RobotStudio 6.05 you can visualize the collision position.
### Switch off / change predicted collision

To change value of the collision zone, go on FlexPendant to:

**Control Panel – Configuration**

**Chose topic Motion**

[Image of FlexPendant interface showing Motion system settings]

**Go to Motion System – System 1**

**Change Coll-Pred Safety Distance**

[Image of FlexPendant interface showing Motion system settings]

To switch collision protection off go on FlexPendant to:
Restart the system

In RobotWare 6.03 there is also a Signal to switch collision protection off- set this from the App

**Lead through is not working**

Check the tool and load data

**No connection to App**

Can you try RobotWare 6.05

Yes - do it => recommended

Have you run RobotStudio before?

Yes:

If you start and connect RobotStudio first it is not possible to connect with the App afterwards.
This happens because of the background processes from RobotStudio
=> ABB Industrial Robot Communication Server
+ ABB Industrial robot Discovery Server

Please stop this process from the Task manager first. Then it is possible to connect the App again.
Or use this RepairApp.exe to kill the task RepairApp (attached).

Run the file as an administrator.
- You can preselect it

No:
Check if WLAN is connected to Router
Check used WAN Port / Service Port
Check IP address of Tablet
Check if you use last version of the App.

Get Write Access back from App to FlexPendant (or RobotStudio)
Close App -
Chose manual mode – Automatic mode and Manual mode again
If nothing helps:
Make sure that you do not connect the LAN and the WiFi at the same time. If you run LAN disable WiFi.

**Wrong version of system modules**
Under construction
Delete all YuMi System Modules and start the App again

**Error Message on App - nothing works**

**Solution 1:**
- Got to FlexPendant => Cancel call routine
- Nothing is possible on the App and FlexPendant

**Solution 2:**
- Make sure, that there is no error message on the FlexPendant.
- e.g. with RobotWare 6.04.01 we have lots of lost revolution counters => this needs to be solved before you use the tablet

**Calibrate hands without the App**
Calibrate hands without the App (possible when there is connection problem to the hands).
Open Smart Gripper Add-in
Switch on both hands in next window
Wait about 1 min. until hand symbols get colored
Click on Right hand
Jog – until hands are closed – Press Calibrate
Repeat for second hand

If you do not have the smart gripper here => it is necessary to change your system => add smart gripper
**Hand not found**

If one hand is not found (hand in smart gripper add in main window does not get colored in violet) and manual switch on shown in 7.4 does not work, there are two main reasons for the problem.

1. Hand is damaged => Call ABB
2. Hands are both preconfigured for the same side (two right or two left hands)

To check the pre-configuration follow these steps:

- Switch both hands off. Wait 30 seconds.
- Switch the right flange on. Go to the main window. Wait 30 seconds. Check if right hand is switched on.
- If the left hand is switched on: Go to the Configuration window and click on “Left to right”.
- Switch hand off. This is an important step.
- Repeat for the left hand.
- Switch the left flange on. Go to the main window. Wait 30 seconds. Check if left hand is switched on.
- If the right hand is switched on: Go to the Configuration window and click on “Right to left”.
- Switch hand off. Wait 30 seconds. Switch both hands on and test the App again.

**Finger does not close - does not end at the same position**

Calibration error

Solution:

Close Finger

Restart the App

Finger get calibrated with closed fingers now

Check your values for the fingers
Calibration error - my YuMi program does not start from FlexPendant

After restart the hands are not calibrated anymore so you get a calibration error.

=> Go to the top left on FlexPendant
=> Open Smartgripper
=> Select one hand => Jog to minus until Fingers are closed
=> Press Calibrate-button
=> Press Close button
=> Select other hand => Jog to minus until fingers are closed
=> Press Calibrate-Button
=> Close the window
=> Set PPtoMain
=> Start your program

Online monitoring

It is possible to use the online monitoring function in RobotStudio during using the App.

Simulate App program in RobotStudio

- YuMi_App_Common.sys, please see attached

At the moment the YuMi hands are not supported for simulation in RobotStudio
During this time, you can use this module => replace the YuMi_App_Common.sys module in both arm tasks.
Attention! If you start the YuMi App on an empty system, the old System module will be installed from the App.
In the system module the following code is included:
IF RobOS() THEN
!use the normal instruction
ELSE
!no action if you use a virtual system.
ENDIF

Can I open the saved YuMi program in RobotStudio

No, it is not possible.
A YuMi program is just designed for the App.
If you want to see save the program for RobotStudio => Create a normal Backup via FlexPendant or RobotStudio

**Variable is decelerated twice**
Check if there is just one YuMi system module in each arm task. If there is still an old YuMi Modul => delete the old one (e.g. YuMi_App_L)

**Not possible to delete a function**
When you stop the program in the middle it is not possible to delete an instruction which was used last. The program / motion pointer is still in this routine.

=> Solution => Go back to play mode => Set start to beginning => now it is possible to delete all instructions

**WaitForTap function is missing**
You need a special module for this.

**TapMove for YuMi**
Add both modules manually (via RobotStudio or via FlexPendant) in both tasks.
- YuMi_TapMove_Base.sys, please see attached
- YuMi_TapMove_User.sys, please see attached

Now you can add the procedure from the tablet: 6.5 Create routines

**How to tap YuMi**
The code recognizes a speed peek on any of the axis of the arm. Pressing onto the arm (increasing force/torque) will not be recognized and might lead to a position error.

More information:
Version: v0.4
22.04.2016
Christian Goy
Description
The user may interact with YuMi by tapping on its arm. YuMi needs to stop in a waiting position before activating the waiting for tap.

Content
YuMi_TapMove_Base.sys – Contains the logging instruction (LogRobSpeed)
YuMi_TapMove_User.sys – Example procedure “WaitForTap” incl. gesture movements
– “WaitMove” (axis 5 movement, requesting the tap)
– “AcknowledgeMove” (elbow movement, acknowledging the tap)

Installation
- Both modules have to be loaded into both robot tasks

Configuration
The sensitivity of the recognized tap can be influenced by changing nTapSeedLimit
!Speed limits (rad/s), motor side
CONST num nTapSpeedLimit:=2.5;

Programming
Program the motion task like this:
MoveL pPreGrip,v100,fine,tGripper;
WaitForTap;

WaitForTap is part of YuMi_TapMove_User.sys and calls “WaitMove” and “AcknowledgeMove”
WaitMove -3; !create an axis 5 movement of -3 degree at the current position
AcknowledgeMove 3; !create an elbow movement of 3 degrees at the current position

Can I use RobotStudio together with the App
Yes, you can install RobotStudio on the same tablet e.g. to show integrated vision.
If you want to open both make sure you open the YuMi App first.
Else you cannot connect the app => see 9.2 no connection with the App
How to show the App on a bigger screen

We use a Wireless Display Adapter from Microsoft

Model 1733 5VDC 500ma

Note: You can wirelessly connect Wi-Fi CERTIFIED Miracast enabled devices to a TV or monitor (available HDMI port and USB power required).

Set up

1. Connect your Microsoft Wireless Display Adapter to the HDMI and powered USB ports on your TV or monitor

2. On the TV, set the channel to the HDMI source

Windows 10

- Slide with the Finger from right to the left on the screen (Action center) and click on "Connect" => "Select Wireless Display Adapter"
- => for adapter updates and additional settings,
- Microsoft Wireless Display Adapter app from the Windows store

Android (not for YuMi App)

- Slide from Top to Bottom
- Click on Streaming-Symbol
- Click on Monitro
- To stop presentation: Slide from top to bottom and disconnect
Can I run any program on the App

Yes, you can run every program, which starts in Mainmodule in main.

The App shows the main-Routine from MainModule

Behind there are two system Modules in each arm for the YuMi-App Functions.

Not full data for load data close hand is visible

Scroll down

Where is the version number?

The current version number is available here:

If you cannot find it, you have a version older than 2.1.1346.0.

In the YuMi-Moduls this line is added:

CONST string YuMi_App_Version_Arm := "1.0.1";

No connection with 6.04.01

Is it this error?

The error is due to both wired and wireless network interfaces enabled in Tab. If you disable wireless when working with service port, then this error should not appear.
If not do the following:

Might be this one

Was RobotStudio used? See no connection with app

=> Kill this task

ABB Industrial Robot Communication Server

+ ABB Industrial robot Discovery Server

If there is still an error:

Update your RobotWare to the latest version

Check if you have the Windows update anniversary
Use this App version

Install an App version manually

– YuMi_2.1.1354.0_Debug_Test.zip, please see attached file

If it is still not working.

Please send a system diagnostic and screenshots to Katja.Butterweck@de.abb.com

My arm is moving wild (with RobotWare 6.05)

The standard value for friction_comp_lead_through_facto (in Motion - Robot) is 0.6 =>

If you set this value to 0.2 => the lead through is working.

It is a setting in the robot configuration

hands move up

– IMG_6643.MOV, please see attached

Does it look like this?

Check the first settings:

3.4 First settings - Smart instructions