JAY CLARK

WOSA/XMC MCAPI and MCSPI
DESIGN SPECIFICATION

ROY-G-BIV CORPORATION
EXHIBIT 2021-5
ABB v ROY-G-BIV
TRIAL IPR2013-00062

Revision:	Second Draft
Author:	Dave Brown
Date:	Friday, July 1, 1994
Project:	MOTION.100
Project Location:	\\rgbsrvr_2\master\cmpnt
Document Name:	\doc\des\des_2\design.doc
Description:	This document describes the software design of the WOSA/XMC MCAPI/MCSPI Motion Control software component.

Revision History:	4/15/94 (DB)	- First Draft: Initial writing.
	7/1/94 (DB)	- Second Draft: Split design off small business plan, incorporated suggestions.

ROY-G-BIV Corporation Confidential
© 1994 ROY-G-BIV Corporation. All rights reserved.

DOCKET ALARM
Find authenticated court documents without watermarks at docketalarm.com.

This is a preliminary release of the documentation. It may be changed substantially prior to final commercial release. This document is provided for discussion purposes only in strict confidence and subject to the non-disclosure agreement executed between ROY-G-BIV Corporation and Compumotor, a division of Parker Hannifin, dated May 19, 1994.

ROY-G-BIV, WOSA/XMC, MCAPI, and **MCSPI** are trademarks of ROY-G-BIV Corporation.

Microsoft, Microsoft Visual C++, Microsoft Visual Basic, WIN32, and **Microsoft Excel 5.0** are registered trademarks and **Windows, Windows NT, WIN32s, WIN32c,** and **OLE** are trademarks of Microsoft Corporation.

Borland and **Borland C++** are trademarks of Borland International, Inc.

Printed in the United States of America.

© 1994 ROY-G-BIV Corporation. All Rights Reserved.

DOCKET ALARM Find authenticated court documents without watermarks at docketalarm.com.

Table of Contents

TABLE OF CONTENTS i

1.0 OVERVIEW 1

1.1 DESIGN GOALS 1
1.2 DEFINITIONS 2
1.3 TARGET PLATFORMS 3
1.4 MAJOR CHANGE LIST 3

2.0 OVERALL DESIGN 5

2.1 INTERACTION-MAP DESCRIPTION 5
2.2 MAIN INTERACTION-MAP - LOCAL SEVER 6
2.3 MAIN INTERACTION-MAP - REMOTE SEVER [FUTURE FEATURE] 7
2.4 MODES OF OPERATION 8

3.0 SCENARIO MAPS 9

3.1 SCENARIO-MAP DESCRIPTION 9
3.2 INITIALIZATION (CORE MCAPI) 9
3.3 INITIALIZATION TUNING (CODE GENERATION MCSPI) 11
3.4 SERVO PID TUNING (EXTENDED AND EXTENDED UI MCSPI) 12
3.5 MOVING ABSOLUTE (CORE MCSPI) 13
3.6 MOVE RELATIVE USING A VISUAL BASIC APPLICATION 14
3.7 MULTI AXIS LINEAR INTERPOLATED MOVE (EXTENDED MCSPI) 15

4.0 C/C++ SUPPORT 17

4.1 C SKELETON 17
4.1.1 Initialization 17
4.1.2 Create The Motion Control Component 17
4.1.3 Use the Motion Control Component 18
4.1.4 End OLE 2.0 Session 19
4.2 C++ SKELETON [FUTURE FEATURE] 19
4.2.1 Initialization 19
4.2.2 Create The Motion Control Component 19
4.2.3 Use the Motion Control Component 20
4.2.4 End OLE 2.0 Session 20

5.0 VISUAL BASIC SUPPORT 21

5.1 OLE AUTOMATION 21
5.2 AUTOMATION EXAMPLE 21
5.3 OLE CUSTOM CONTROL [FUTURE FEATURE] 22

6.0 STANDARD OLE INTERFACES 23

6.1 ICLASSFACTORY INTERFACE 23
6.2 IDATAOBJECT INTERFACE 23
6.3 IDISPATCH INTERFACE 23
6.4 IMARSHAL INTERFACE [FUTURE FEATURE] 23
6.5 IUNKNOWN INTERFACE 24

7.0 DRIVER ADMINISTRATOR MCAPI OLE INTERFACES 25

7.1 STANDARD OLE INTERFACES 25
7.2 CUSTOM OLE INTERFACES 25

© 1994 ROY-G-BIV Corporation All rights reserved.

DOCKET ALARM Find authenticated court documents without watermarks at docketalarm.com.

7.2.1 IComponentEnv 25

8.0 MOTION CONTROL COMPONENT MCAPI OLE INTERFACES 26

8.1 STANDARD OLE INTERFACES 26
8.2 ATTACHMENT RELATIONSHIPS 26
8.3 CUSTOM OLE INTERFACES - GENERAL 28
8.3.1 IBatch Interface [FUTURE FEATURE] 28
8.3.2 ICounter Interface 28
8.3.3 ICurrentState Interface 28
8.3.4 IDisplay Interface [FUTURE FEATURE] 29
8.3.5 IEncoder Interface 29
8.3.6 IInterrupt Interface 30
8.3.7 IIO Interface 30
8.3.8 IJoystick Interface 30
8.3.9 ILimits Interface 31
8.3.10 IMotion Interface 31
8.3.11 ITimer Interface 32
8.4 CUSTOM OLE INTERFACES - CODE GENERATION 32
8.4.1 IConditional Interface 32
8.4.2 IOperator Interface 33
8.4.3 IProgram Interface 34
8.4.4 IProgramMgmt Interface 34
8.4.5 ISubroutine Interface 34
8.4.6 IVariable Interface 35
8.5 CUSTOM OLE INTERFACES - DIAGNOSTIC 35
8.5.1 IDebug Interface 35

9.0 MOTION CONTROL DRIVER MCSPI OLE INTERFACES 36

9.1 MCSPI CATAGORIES 36
9.1.1 Core MCSPI 36
9.1.2 Extended MCSPI 36
9.1.3 Extended UI MCSPI 37
9.1.4 Extended Code Generation MCSPI 37
9.1.5 Extended Vendor Specific SPI 37
9.2 INTERFACE MAP 38
9.3 STANDARD OLE INTERFACES 38
9.4 CUSTOM OLE INTERFACES - CORE 38
9.4.1 IDrvCore_AnalogIO Interface 39
9.4.2 IDrvCore_CurrentState Interface 39
9.4.3 IDrvCore_DigitalIO Interface 40
9.4.4 IDrvCore_Encoder Interface 40
9.4.5 IDrvCore_IO Interface 40
9.4.6 IDrvCore_Limits Interface 40
9.4.7 IDrvCore_Motion Interface 41
9.4.8 IDrvCore_Servo Interface 41
9.4.9 IDrvCore_Stepper Interface 41
9.5 CUSTOM OLE INTERFACES - EXTENDED 42
9.5.1 IDrvExt_Counter Interface 42
9.4.2 IDrvExt_Debug Interface (Private) 42
9.5.3 IDrvExt_Display Interface 42
9.5.4 IDrvExt_Encoder Interface 42
9.5.5 IDrvExt_Interrupt Interface 43
9.5.6 IDrvExt_IO Interface 43
9.5.7 IDrvExt_Joystick Interface 43

© 1994 ROY-G-BIV Corporation All rights reserved.

DOCKET ALARM Find authenticated court documents without watermarks at docketalarm.com.

9.5.8 IDrvExt_Limits Interface 43
9.5.9 IDrvExt_Motion Interface 44
9.5.10 IDrvExt_Timer Interface 44
9.6 CUSTOM OLE INTERFACES - EXTENDED UI 45
9.6.1 IDrvExtUI_AnalogIO Interface 45
9.6.2 IDrvExtUI_CurrentState Interface 45
9.6.3 IDrvExtUI_DigitalIO Interface 45
9.6.4 IDrvExtUI_Servo Interface 45
9.7 CUSTOM OLE INTERFACES - CODE GENERATION 45
9.7.1 IDrvExtCG_Conditional Interface 46
9.7.2 IDrvExtCG_Operator Interface 46
9.7.3 IDrvExtCG_Program Interface 47
9.7.4 IDrvExtCG_Subroutine Interface 47
9.7.5 IDrvExtCG_Variable Interface 48
9.8 CUSTOM OLE INTERFACES - VENDOR SPECIFIC 48

APPENDIX A 49

A.1 UNRESOLVED ISSUES 49
A.2 REVIEWER FEEDBACK 49
A.2.1 Correspondence 49

© 1994 ROY-G-BIV Corporation All rights reserved.

DOCKET ALARM Find authenticated court documents without watermarks at docketalarm.com.

DOCKET ALARM

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS
Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS
Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS
Sync your system to PACER to automate legal marketing.