



Service Manual

**Frameworkx Scorer
with CCD**

August 2000 / 57-900422-000

Brunswick® 

CUSTOMER SERVICE

A tradition in excellence.

Statement of Intent

This manual is provided to be used by qualified bowling center personnel. Customer accepts responsibility for safety training of all personnel who service and maintain this product.

Frameworkx Scorer Service Manual with CCD

© August 2000 by the Brunswick Bowling and Billiards Corporation. All rights reserved.

Frameworkx, Cashworx, Command Network, Desk Command, Rockworx, GS-Series, and A-2 Pinsetters are registered trademarks of the Brunswick Bowling and Billiards Corporation.

Reorder Part No. 57-900422-000

Confidential proprietary information. All information contained in this document is subject to change without notice. Do not reproduce or disclose without the written consent of the Brunswick Indoor Recreation Group.

Notice: If available, updates to this manual can be found on-line at www.centermaster.com.

Brunswick Indoor Recreation Group
525 West Laketon Avenue
P.O. Box 329
Muskegon, MI 49443-0329
U.S.A.

231.725.3300

Table of Contents

Section 1: Introduction

Purpose of Manual	1
Arrangement of Manual	1
Computer Characteristics and Communication Concepts	2
Computer Hardware	3
The “Brain” of the Computer	3
CPU Comparisons	4
Storing Information	6
Disks	6
Floppy Disks	6
Fixed Disks	7
Memory	7
How the CPU Uses Disks and Memory	8
What is a Byte?: How Memory and Disks are Measured.....	9
Ethernet Communication History	10
Communication Overview	11
Glossary of Terms	1
CenterMaster	2
Teamworx	11
Powerworx	14
Uniworx	17
Bowler’s Area	22
Overhead Monitors (Teamworx, Powerworx, Touchworx, and Uniworx [Optional])	22
Scorer Consoles (Powerworx and Uniworx)	22
Keypad (Teamworx Only)	23

Flatscreen (Touchworx Only)	23
Pinsetter Area	23
Ethernet Hub(s)	23
Pinsetter Interface Box	24
CCD Scanner Camera and Processor	24
Pinsensors	24
Lane Group Processor	25
Control Desk/Office Area	25
Intelligent Cash Drawer	25
Audio/Video Unit	25
Intercom Handset	25
Scoresheet Printer	26
High Speed Computer(s)	26

Section 2: System Overview

Glossary of Terms	1
CenterMaster	2
Teamworx	11
Powerworx	14
Uniworx	17
Bowler's Area	22
Overhead Monitors (Teamworx, Powerworx, Touchworx, and Uniworx [Optional])	22
Scorer Consoles (Powerworx and Uniworx)	22
Keypad (Teamworx Only)	23
Flatscreen (Touchworx Only)	23
Pinsetter Area	23
Ethernet Hub(s)	23

Pinsetter Interface Box	24
CCD Scanner Camera and Processor	24
Pinsensors	24
Lane Group Processor	25
Control Desk/Office Area	25
Intelligent Cash Drawer	25
Audio/Video Unit	25
Intercom Handset	25
Scoresheet Printer	26
High Speed Computer(s)	26

Section 3: Scorers

Glossary of Terms	1
Teamworx Overview	3
Powerworx, Touchworx Console, and Uniworx Overview	4
Touchworx Flatscreen Overview	5
Lane Group Processor	6
Lane Group Processor (Teamworx and Touchworx Flatscreen) .	7
Lane Group Processor (Powerworx, Touchworx Consoles, and Uniworx)	9
Motherboard	11
Ethernet Card	13
Remote Video PCB	14
Console Video PCB	16
I/O PCB	18
Sound PCB	20
Power Supply	21
Selecting Input Voltage for Power Supply	22
Hard Drive	23

Console Electronics	25
Primary Console (Powerworx, Touchworx Console, and Uniworx)	25
Secondary Console (Powerworx and Touchworx Console)	27
Bowler Entry Station/Keypad (Teamworx Only)	29
Touchworx Controller (Touchworx Flatscreen)	30
Console Controller PCB (All Models)	31
Console Audio PCB (All Models)	33
Options PCB (Touchworx Models Only)	35
Power Supply/Control PCB (Touchworx Flatscreen)	36
Touchscreen Controller (Touchworx Console)	37
Transformers (Powerworx , Touchworx Console, and Uniworx).....	39
Auxiliary Transformer (Primary Consoles Only)	39
Secondary Power Transformer (Powerworx, Touchworx Console, and Uniworx)	40
Selecting Input Voltage for Auxiliary or Secondary Transformers	43
Video Processor PCB (Powerworx, Touchworx Console, and Uniworx).....	45
Adjustment PCB	46
LCD Controller (Touchworx Flatscreen)	47
Flatscreen Adjustment Procedure	48
Basic Adjustments	49
Image Position Adjustment	50
Touchscreen Calibration (All Touchworx Models)	51
Circuit Board and Component Removal	54
Motherboard Removal	56
Motherboard Installation	56
ISA Bus Board Removal	57
ISA Bus Board Installation	57
Circuit Board Setup Procedures	58
Motherboard	58
CMOS Maintenance Board	60
CMOS RAM Setup	61

CMOS Setup Using a CMOS Maintenance Board	61
Updating the CMOS Maintenance Board	61
Hard Drive	62
Remote Video PCB	64
Console Video PCB (Powerworx, Touchworx Consoles, and Uniworx)	65
Console Controller PCB	66
Console Audio PCB	68
Options PCB (Touchworx Only)	69
Standard CRT Removal	70
Touchscreen CRT Removal	71
CRT Installation	72
Keyboard/Keyboard Insert Removal (Powerworx, Touchworx Console, and Uniworx)	73
Keyboard/Keyboard Insert Installation (Powerworx, Touchworx Console, and Uniworx)	74
Maintenance	75
Daily	75
NV RAM Clear	75
Quarterly (Powerworx, Touchworx Consoles, and Uniworx)	75
Clean and Adjust CRT Assembly as Needed	75
Semi-Annually	75
Clean Circuit Boards	75
Inspect Cables	75
Annually	75
Clean Connections	75
Clean Power Supply Fan	75
Rotate Spare Parts	75
Maintenance Menu	76
Cable Diagrams	79
Section 4: CenterMaster	
Glossary of Terms	1
Overview	2

CenterMaster Computer(s)	11
Connections	12
Front Panel Control and Connectors	12
Rear Panel Connectors and Voltage Select Switch.....	14
VGA Color Monitors	16
Printers	16
Receipt Printer Upgraded System	16
Receipt Printer Non-Upgrade System	17
Pole Display	18
Pole Display Upgraded System	18
Pole Display Non-Upgraded System	18
Cash Drawer	20
Cash Drawer Upgraded Systems	20
The functions of the connections on the intelligent cash drawer are:	20
Cash Drawer Non-Upgraded Systems	21
Beeper Box	22
Intercom Handset/Switch Box	23
Audio/Video Control Unit	25
External	25
Internal	27
Composite to RGB PCB	28
Audio PCB	33
Power Supply Unit	35
Ethernet Hub	36
CenterMaster Scorer Maintenance	46
Operations	47
Password	49
Screen Saver	50
Cable Diagrams	51

Section 5: CCD Scanner

General Description	1
Data Processor Box	3
Power Supply PCB	4
Data Processing Module	5
CCD Scanner Module DIP Switch Setup	8
Camera Assembly	11
Scanner Tester Connector	11
Ball Detect	12
Ball Detect Adjustments	13
Brunswick A-2 Pinsetter Modifications	14
Switch Cluster	14
44°/144° Switch (“Take Data”)	14
0° Switch	14
Adjustments	15
0° Switch	15
44°/144° Switch	16
New Pins Solenoid and Cycle Link	17
Cycle Link Operation	19
Adjustments	21
AMF Pinspotter Modification	22
Switch Overview	22
Sweep Switch	22
Sweep Up Switch	22
Table Switch	22
AMF 82-30 Model Pinspotter Switch Adjustments	23
Sweep Up Switch (0°)	23
Table Switch	24
Sweep Switch	25
Chassis Cam Switch	26
AMF 82-70 Model Pinspotter Switch Adjustments	26
Sweep Up Switch (0°)	28
Table Switch	28
Sweep Switch	29

AMF Interface PCBs	30
AMF Third Ball, Tenth Frame/No Tap Relay	34
AMF 82-30 Pinspotter	34
AMF 82-70 and 82-70 SS Pinspotters	34
Brunswick A-2 Pinsetter Scoring Sequence of Events	36
First Ball	36
Second Ball	37
First Ball Foul	38
Third Ball, Tenth Frame	39
No Tap Cycling	40
Brunswick GS-10/GS-92 Pinsetter Scoring Sequence of Events	41
First Ball	41
Second Ball	42
First Ball Foul	43
AMF Pinspotter Scoring Sequence of Events	44
First Ball	44
All Models	44
Second Ball	45
All Models	45
First Ball Foul	46
All Models	46
Third Ball, Tenth Frame	47
AMF 82-30, 82-70, and 82-70 SS Pinspotter with Version 1.35 or Higher CCD Software	47
AMF 82-70 and 82-70 SS Pinspotters with Version 1.31 and 1.32 CCD Software	48
No Tap	49
AMF 82-30, 82-70, and 82-70 SS Pinspotters with Version 1.35 or Higher CCD Software	49
Double Diamond Cycles	50
Scanner Tester	51
Overview	51

Displays	51
Normal Display	52
“Align L. Side” Display	53
“Align R. Side” Display	54
“Cal Pins” Display	55
Camera Adjustments	56
Scanner Tester Messages	58
Cable Diagrams	59

Section 6: Pinsensors

General Description	1
5-Pin String Machine	2
10-Pin String Machine	6
Ball Detect	8
Ball Detect Adjustments	8
5-Pin String Machine Scoring Cycle Sequence of Events	10
First or Second Ball	10
Third Ball	10
First, Second, and Third Ball Fouls	11
10-Pin String Machine Scoring Cycle Sequence of Events	12
First Ball	12
Second Ball	12
First or Second Ball Foul	13
Cable Diagrams	14

Section 7: Pinsetter Interface

External Pinsetter Interface Box	1
Internal Pinsetter Interface Box (Non-“GS” Series Pinsetters, Earlier “GS” Series Pinsetter Installations)	3

Pinsetter Controller PCB	4
Adaptor PCB	7
“GS” Series Pinsetter Controller	9
“GS” Series Pinsetter Setup	11
PCB Replacement Setup	12
Pinsetter Controller PCB	12
Configuration Jumpers (JP1, JP2, and JP3)	12
Termination Jumper (JP4)	12
S1- ID Switch	13
“GS” Controller PCB	13
Termination Jumper (J8)	13
Cable Diagrams	14

Section 8: Ceronix Overheads

Glossary of Terms	1
Overview	2
Regular Monitor	4
TV Only Monitor	4
Cabinet Access	5
Overhead Replacement	6
Lowering the Monitor	6
Raising the Monitor	9
Overhead Electronics	11
Selecting the Input Voltage	12
Receiver PCB	14
TV Only PCB	15
Video Processor PCB	17
Discharge Procedure	18
Video Output PCB	19
Power Transformer	20
Power Relay	22

Adjustments	23
Focus	23
Pincushion	24
Screen Size Adjustments	24
Screen Brightness	25
Maintenance	25
Monthly	25
Quarterly	25
Cable Diagrams	26

Section 9: Appendices

Special Maintenance Procedures	1
Clearing NV RAM	1
Clearing the NV RAM from the Console	1
Clearing the NV RAM from the Control Desk Terminal	1
Updating the Scorer Program from the Control Desk Terminal ...	2
CMOS RAM Setup	2
CMOS Setup Using a CMOS Maintenance Board	2
Changing the Scorer Maintenance Menu Password from the Control Desk Terminal	3
Updating the CMOS Maintenance Board from the Control Desk Terminal	3
System Switch and Jumper Definition	4
LGP I/O PCB	4
Remote Video PCB	5
Console Video PCB	5
Console Controller PCB	5
Console Audio PCB	6
Video Receiver PCB	6
CMS Handset PCB	6
CMS Audio PCB	6

Composite-to-RGB Converter PCB	7
TV-Only PCB	7
Pinsetter Controller PCB	7
Adaptor PCB	8
Console Option PCB	8
LGP Motherboard A	9
LGP Motherboard B	10
LGP Motherboard C	13
Ethernet PCB	14
Repair Center Information	15
Shipping Defective Material to Brunswick Electronic Repair Center	15
Non-Repairable Conditions	16
Exchange Depot Information	16
Emergency Preshipments - Lane or Desk Down	17
Customer Response Center Information	18
Customer Support	18
Response Center Hours and Telephone Numbers	18
General Guidelines	18
Glossary	20