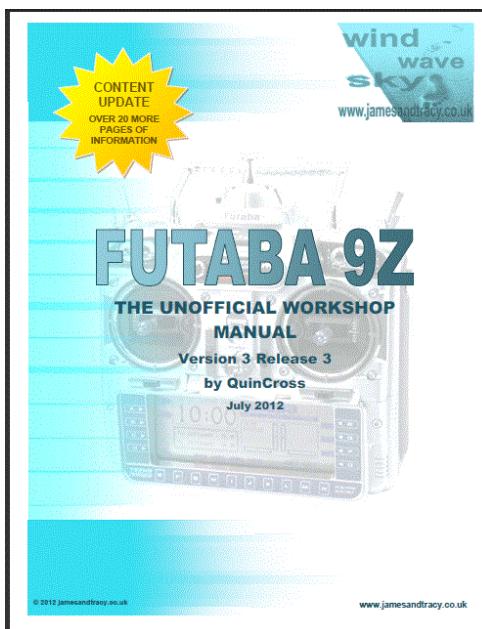


FUTABA 9Z – The Unofficial Workshop Manual



This is a document information sheet only, not the actual document. The document itself can be found at (see below):

INFORMATION ABOUT THIS DOCUMENT	
Title	FUTABA 9Z – The Unofficial Workshop Manual
Description	Comprehensive workshop manual for the Futaba 9Z series of transmitters (9Z, WCI and WCII), providing technical reference material and servicing, repair and upgrade procedures.
Author	QuinCross
Version and release	Version 3 Release 3 (Version 2B was a restricted Beta release for subscribers only)
Date	01/07/2012
Download updates from	http://www.jamesandtracy.co.uk
Copyright information	Copyright 2012 www.jamesandtracy.co.uk (All rights reserved)
Restrictions on Use	Please refer to section 1 (Introduction) in this document, specifically sections 1.3 and 1.4.

Contents

Contents.....	3
<i>List of Tables.....</i>	7
1. Introduction	8
1.1. Document Overview	8
1.2. Please help support this work.....	8
1.3. Disclaimer & Warning!	8
1.4. Distribution and Use	9
1.5. How to Report Errors and Get the Most Recent Version.....	9
1.6. The Different Futaba 9Z Models.....	10
2. How to use this Manual.....	13
2.1. Document Structure.....	13
2.2. Servicing and Upgrade Matrix	14
2.3. Preparation and Tools	16
2.3.1. General Tools.....	16
2.3.2. Specific Tools	17
2.3.3. Working with Printed Circuit Boards (PCBs)	18
2.3.4. Soldering	19
2.3.5. Working with Ribbon Cables	19
2.3.6. Attitude	19
3. Servicing the 9Z	20
3.1. User Password	20
3.2. 9Z Transmitter Calibration	20
3.3. Replacing Corner Switches	20
3.4. Front face controls, gimbals, and POTs	21
3.4.1. Removing the Throttle Ratchet for Flying Helicopters	21
3.4.2. Replacing the Joysticks and Potentiometers (POTS).....	23
3.5. Replacement of LCD button panels.....	28
3.6. 35MHz Aerial Replacement and Servicing	29
3.7. Backup (Lithium) Battery	30
3.8. Cleaning the LCD Screen.....	33
3.9. Replacing the LCD Screen	34
3.10. Transmitter battery pack	35
3.11. RF Module	37
3.12. Hard Resetting the 9Z Back to Factory Settings.....	38
4. Upgrading and Tailoring the 9Z.....	40

4.1.	Adding extra 3 position switches	40
4.2.	Tailoring the Reference Plane of Joysticks	40
4.3.	Strengthening and Repairing the Joysticks	41
4.4.	Backlit LCD Display	43
4.5.	9Z Mode and Version Change (e.g. ZAP to ZHP)	44
4.6.	Upgrading to 2.4GHz and Telemetry	45
4.6.1.	IMPORTANT: Antenna positioning for maximum range.....	46
4.6.2.	Upgrading to 2.4GHz using the FrSky DHT-U	47
4.6.3.	Upgrading to 2.4GHz using the Spektrum DM8 module	50
4.7.	Cycling and Fast Charging the Transmitter Battery Pack.....	51
4.8.	Building a DSC Cable for Direct Servo Control	54
4.9.	DIY CAMPAC's and "backing up" model memory to a PC	54
4.10.	Building a Training Cable for Buddy Boxing	55
4.11.	Futaba 10Z upgrade - Adding a 10 th Channel to the 9Z.....	56
5.	Disassembling and Reassembling the 9Z's Case.....	57
5.1.	Stage 1 – Module and Battery	59
5.2.	Stage 2 – Case Back.....	59
5.3.	Stage 3 – Case Sides and Corner Switches	65
5.4.	Stage 4 – LCD Panel.....	67
6.	The Futaba Service and Test Menu.....	73
6.1.	Overview.....	73
6.2.	How to Access and Use these Menus on the 9Z.....	73
6.3.	Service Menus (Calibration and Upgrade)	76
6.4.	Test Menus (Fault Finding & Checking)	77
APPENDIX A.	The (Almost) Universal Service Menu Enabler	78
APPENDIX B.	CONNECTION Port PIN-OUT Information.....	79
B.1.	9Z Transmitter Battery Cassette Pin-out Information.....	79
B.2.	Futaba RF Module Pin-out Information	79
B.3.	Futaba DSC/Trainer Pin-out Information.....	80
B.4.	CAMPAC Pin-out Information	81
APPENDIX C.	COMPONENT PART NUMBERS	82

List of Figures:

Figure 1 The 9ZA's 'Snap Roll' switches, that are missing in the 9ZH version	10
Figure 2 The First Version of the Futaba 9Z	11
Figure 3 The Futaba 9ZAW, the second version of the 9Z (aka the 9Z WC1).....	12
Figure 4 The FUTABA 9ZAW II, the final and most desirable version (aka the 9Z WC2).....	12
Figure 5 This Workshop's Manual Structure	13
Figure 6 General Tools Required.....	17
Figure 7 Specific Tools - The full toolset required.....	17
Figure 8 USB ICP PIC programmer with ZIF 'hook up' for the chip in green/blue.	18
Figure 9 Corner Switch Replacement - NOTE: 8U SWITCH PART NO. IS SHOWN! ...	21
Figure 10 Removing the main PCB	22
Figure 11 Lever up the PCB - Note: Metal Ratchet on Throttle at Right.....	22
Figure 12 Making and installing a "Ratchet Smoother".....	23
Figure 13 Another example of a ratchet smoother.....	23
Figure 14 Joystick gimbal removed (Note: new joystick parts for replacement on the right)	25
Figure 15 Disassemble the horizontal axis POT and joystick (new joystick parts in 1 & 6).....	25
Figure 16 Unscrew the ball bearing from the horizontal axis POT.....	26
Figure 17 Slice the heat-shrink tubing and desolder the POT	26
Figure 18 Assembling a new joystick (note: DIY strengthening collet modification)	27
Figure 19 Remove the vertical axis POT retaining plates and withdraw the POT	27
Figure 20 Desolder the connector PCB (green) from the POT	28
Figure 21 The three LCD Button Panels shown on a 9ZHP WC2	28
Figure 22 Allen head bolt at the bottom of the 9Z aerial (3/32" or 3mm head)	29
Figure 23 The access hole for the aerial retaining bolt in the battery compartment	30
Figure 24 Label and protect the new battery	31
Figure 25 Removing the top PCB of the LCD Assembly	32
Figure 26 Top PCB 'Flipped' and Battery Terminals Exposed.....	32
Figure 27 Removing the LCD Assembly	33
Figure 28 LCD Assembly removed and partially disassembled.....	34
Figure 29 Complete disassembly of middle PCB and LCD Panel	35
Figure 30 Blown Schottky Diode on Mini PCB.....	36
Figure 31 Futaba RF Module Pin-out Numbering	37
Figure 32 Weak solder joint in RF Module	38
Figure 33 Access holes for hard resetting a 9Z	39
Figure 34 Changing the Rotational Position of Joysticks.....	40
Figure 35 Crack in the base of a 9Z joystick adding significant play to the control.....	41

Figure 36 Metal joystick strengthening collet	42
Figure 37 How to repair a cracked joystick with a collet	42
Figure 38 A Backlit 9Z using the 'EL Panel' solution.....	43
Figure 39 Wiring in the EL Panel, voltage regulator and switch	43
Figure 40 Example Voltage Regulator (Check current handling capacity of 78L05)	44
Figure 41 Resistor or short for Mode/Version change	45
Figure 42 Optimal antenna position for 2.4 GHz.....	47
Figure 43 The DHT-U upgrade with connections through DIY RF Module	48
Figure 44 Modified RF Module for an FrSky DHT-U.....	49
Figure 45 Fitting a Spektrum DSM module antenna.....	50
Figure 46 Poor design of the connection on Spektrum DSM module	51
Figure 47 The 9Z transmitter pack diode jumper	52
Figure 48 9Z Transmitter Battery Disassembly.....	53
Figure 49 400mA diode on the mini PCB.....	53
Figure 50 New 3A diode soldered to PCB (Note: Silver line on diode indicating orientation)	54
Figure 51 Adding a 10th Channel to the 9Z	56
Figure 52 9Z Disassembly and Reassembly Process	57
Figure 53 Overview of 9Z Case Disassembly	58
Figure 54 Stage 1 Complete - Module and Battery Removed	59
Figure 55 Removing the comfort grips.....	60
Figure 56 Removing the bottom cover	60
Figure 57 Loosen these screws on top cover	61
Figure 58 Lever up back cover	62
Figure 59 Label all ribbons and cables on the PCB	62
Figure 60 Screws to loosen to allow play in case sides	63
Figure 61 Protect a screwdriver and lever case top up to refit case back	64
Figure 62 Refit battery hatch.....	64
Figure 63 Allen key screws to remove	65
Figure 64 Case corner removed and ribbons detached.....	66
Figure 65 Case sides slid outwards and removed	66
Figure 66 How the corners "Snap-Slide" into place	67
Figure 67 - Partial Step 3 Disassembly Option	68
Figure 68 Remove these cables to access LCD panel	69
Figure 69 Remove and loosen these screws (note those already removed in Stage 3, if they are still present remove them)	69
Figure 70 Lever up PCB panel.....	70
Figure 71 LCD Panel now completely removed (retaining plate/lugs on top)	70

Figure 72 LCD Panel flipped over backwards for access	71
Figure 73 Ribbon cables with masking tape fed back through case	71
Figure 74 Cables at sides of LCD Panel that get trapped.....	72
Figure 75 Overview Flowchart for Futaba 9Z Service and Test Menus.....	74
Figure 76 Futaba 9Z Service Menus Flowchart	76
Figure 77 Futaba 9Z Test Menus Flowchart.....	77
Figure 78 Futaba 9Z Transmitter Battery Pin-out	79
Figure 79 Futaba RF Module Pin-out Numbering	79
Figure 80 DSC/Trainer Port Pin-out (6 pin DIN)	80
Figure 81 CAMPAC Pin-Out (Note: Reversed pin numbering)	81

List of Tables

Table 1 Possible solutions to common faults and issues.....	14
Table 2 Service and Upgrade Matrix	16
Table 3 Upgrading to 2.4GHz - Compatibility & Recommendations	46
Table 4 Available DIY CAMPAC clones.....	55
Table 5 Selected component part numbers used in this manual	83