EPSON RC+ Robot Maintenance
SCARA

Day 1

A. Introduction
   A.1. Safety Overview (Lecture)
      A.1.1. Power on, Power off
   A.2. Robot Coordinate system
   A.3. Z brake release button
   A.4. Identification
   A.5. Specification
   A.6. Cable Connections
   A.7. Controller Models

B. Replacing the Motors, Ball screw spline and Reduction Gears
   B.1. Removing the covers
   B.2. Joint 3 Motor
   B.3. Joint 3 Brake
   B.4. Joint 4 Motor (Brake on some models)
   B.5. Ball Screw Spline Replacement
      B.5.1 Zero backlash gear service (G10+)
   B.6. Harmonic Drive Video
   B.7. Joint 2 Motor
   B.8. Joint 1 Motor
   B.9. HD Reduction Gear Unit (Lecture and demo unit)
   B.10.

C. Cable Replacement
   C.1 Procedure Review

D. Calibration
   D.1. Robot Coarse Calibration (Lecture)
      D.1.1. Using Specifications to position J3 & J4
   D.2. Robot Fine Calibration (Lecture)
   D.3. HOFS
   D.4. CALPLS
   D.5. CALIB
   D.6. Monument Position
      D.6.1. Calibrating motors to a known position

Day 2

E. Encoder and Battery Board Maintenance
   E.1. Absolute (Lecture)
   E.2. Battery Replacement
   E.3. Back up battery ports

F. Maintenance backup procedures
   F.1. Backup Controller
   F.2. Controller Status
   F.3. Recovery
Day 2 - continued

G. Description and Function
   G.1. Standard specification
   G.2. Front and Rear Panels
      G.2.1. Connections
      G.2.2. Filter
      G.2.3. LEDs
   G.3. Optional Device Connector
   G.4. Teach/Auto Mode

H. EPSON RC+ Overview (Lecture notes only)
   H.1. Introduction to EPSON RC+
      H.1.1. Command Mode
   H.2. Points
      H.2.1. Point Files
      H.2.2. Point File Editor
      H.2.3. Jog and Teach Screen Basics
      H.2.4. Direct Teaching
   H.3. Beginning SPEL Commands
      H.3.1. MOTOR ON/OFF
      H.3.2. RESET
   H.4. Motion Commands
      H.4.1. GO
      H.4.2. JUMP
      H.4.3. MOVE

I. Inputs and Outputs (Lecture notes only)
   I.1. I/O Monitor
   I.2. Inputs
      I.2.1. WAIT SW
      I.2.2. PRINT SW
   I.3. Outputs
      I.3.1. ON
      I.3.2. OFF

J. Lab 1
   J.1. Objective: Using the GO, JUMP and MOVE commands, robot motion between two points using all three commands.
   J.2. Review Lab - discussion

K. EPSON RC+ Controller
   K.1. Power
      K.1.1. Power Requirements
   K.2. Controller Schematic
   K.3. CPU Board
      K.3.1. CPU Replacement battery
   K.4. Servo pack service
   K.5. Integrated Digital Inputs & Outputs
      K.5.1. PNP / NPN
L. Controller components
   L.1. Layout
   L.2. Switching Power Supply
   L.3. Drive Power Board
   L.4. Drive Main Board
      L.4.1. Jumper settings
   L.5. Motor Power Module
   L.6. Motor Driver Module
   L.7. Regeneration Module
   L.8. Cooling Fans
   L.9. Filters
   L.10. Review of Emergency Stop & Safeguard Circuit
   L.11. Error Codes
      L.11.1. Refer to Epson RC+ help file
   L.12. CPU Boards
      L.12.1 Compact Flash

M. Troubleshooting and Overview
   M.1. Discussion
   M.2. (3) labs covering actual problem solving

N. Course Review / Question and answer

O. Preventative Maintenance

P. Spares