

**INSTRUCTIONS FOR CONTINUED AIRWORTHINESS**

**DESIGN AND MAINTENANCE ANALYSIS INC.**

**REPORT 9-99-01**

**REVISION - 5**

**DECEMBER 8, 1999**

**PREPARED BY**

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**PREPARED IN SUPPORT OF PROJECT SA2419NY-A**

## REPORT 9-99-01 PREFACE AND TABLE OF CONTENTS

### **PREFACE:**

FAR 23.1529 requires instructions for continued airworthiness. This report includes the instructions provided by Design and Maintenance Analysis Inc. for the parameters added to the Beech 1900D flight data recorder system when STC SA00968NY is incorporated. These instructions address only the required changes to the maintenance manual and scheduled tasks that are necessitated by this modification.

The document is issued as supplemental information for the existing Aircraft Maintenance Manual. It provides instructions for integrating the new information into the current manual. The instructions for integration are based on the organization of the Maintenance Manual at the time of this report. Revisions to the existing manual may require relocation of these instructions for proper integration.

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**MAINTENANCE MANUAL SUPPLEMENT**

The following information is provided as instructions for continued airworthiness for the Beech 1900D aircraft after modification of the Flight Data Recorder System in accordance with STC SA00968NY. The data in the scheduled Maintenance Recommendations represent the initial recommendations for scheduled tasks and intervals. This data is to be considered approved through the Supplemental Type Certificate and are to be added to the operator's continuous airworthiness maintenance program. The balance of this supplement is normal maintenance manual information. This information is similar in scope to the maintenance manual data provided in the AMM. Since the Scheduled Maintenance Recommendations are FAA approved, revisions to this data will also be approved. Revisions to the normal maintenance manual supplement should be considered acceptable data for normal maintenance. The intent of these instructions is to allow the operator to integrate the data into the Beech 1900D aircraft Maintenance Manual.

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The information on this page provides a general Description and Operation of modifications to the Flight Data Recorder system through STC SA00968NY. This data should be considered a supplement to the Aircraft Maintenance Manual Supplied by Raytheon for maintenance of the Beech 1900D airliner. If the operator wishes to integrate this supplement into the AMM as supplied by Raytheon, then this document should be inserted in AMM 31-30-00 after page 202 in the Mar 28/97 revision. This location may change in later revisions.

**Description and Operation/ Scheduled Maintenance Recommendations**

**Description and Operation:**

This STC added the parameters necessary to comply with FAR 121.344a. The added parameters are Pitch Trim position, Yaw Control position, Roll Control position, and Lateral Acceleration. During the addition of these parameters, one existing parameter (Pitch Attitude) was relocated in the FDR data stream. Additionally the propeller beta indication, which originally used analog channels, has been converted to discrete channels. All other parameters are described in the original B1900D Maintenance Manual.

Pitch Trim position, Yaw Control position, and Roll Control position are obtained from potentiometers attached to the applicable control surface cable systems. These potentiometers provide a voltage signal to the FDR that transmits the control position information.

The original dual axis accelerometer is either replaced with a 3-axis accelerometer or a stand alone lateral accelerometer is installed alongside to provide the Lateral Acceleration parameter.

**Scheduled Maintenance Recommendations:**

The FAA has recommended that operators perform an annual FDR check. This task shall be accomplished by performing a recorder transcription at an initial interval of no more than 12 calendar months. This transcribed data shall be checked to assure that it is reasonable. Design and Maintenance Analysis Inc. can supply operators a possible check for reasonableness of transcribed data.

Interval	Task
12 months	FDR data transcription and check for reasonable data.
24 months	Bench Check of Accelerometer for Accuracy

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This data should be considered a supplement to the Aircraft Maintenance Manual Supplied by Raytheon for maintenance of the Beech 1900D airliner for aircraft modified by STC SA00968NY. The information on this page provides a supplement to the cable replacement instructions for the roll control system. If the operator wishes to integrate this supplement into the AMM as supplied by Raytheon, then this document should be inserted in AMM 27-10-02 after page 201 in the current revision. This location may change in later revisions.

FOR INSTALLATION AND REMOVAL OF THE FDR ROLL CONTROL POSITION SENSOR SEE SUPPLEMENT 1 AT END OF THIS SECTION

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SUPPLEMENT 1

This data should be considered a supplement to the Aircraft Maintenance Manual supplied by Raytheon for maintenance of the Beech 1900D airliner for aircraft modified by STC SA00968NY. The information on this page provides a supplement to the cable replacement instructions for the roll control system. If the operator wishes to integrate this supplement into the AMM as supplied by Raytheon, then this document should be inserted in AMM at the end of 27-10-02 in the current revision. This location may change in later revisions.

**Roll Control Position Sensor**

**A. Removal/Replacement**

**1. Removal**

- a. Gain access to the roll position sensor by removing floor panel.
- b. Attach temporary stop ball over cable at cable exit slot Disconnect the cable-clamping block through screws to release transducer displacement cable from the roll control cable.
- c. Disconnect the position sensor electrical harness at the connector.
- d. Remove and retain the screws securing the position sensor/bracket assembly. Remove the position sensor/bracket assembly.

**2. Installation**

- a. Secure the position sensor/bracket assembly with the screws retained in step 1.d.
- b. Connect the airframe connector to the transducer connector.
- c. Install rig pins to secure the roll control system in neutral. Refer to MM 27-10-00.
- d. Connect DFDR readout equipment to the DFDR or alternatively connect a DVM to fabricated breakout box (assy 1900-2-CPC1) installed between transducer connector and airframe connector.
- e. Connect the position transducer displacement cable-clamping block to the roll control cable, remove temporary stop ball.
- f. Utilize the position of the cable clamping block and cable clamping block adjusting screw obtain a decimal/volt reading corresponding "0 degrees" in accordance with "Check of the Roll Control parameter" IAW MM 31-30-00. Complete "Check of the Roll Control parameter" IAW MM 31-30-00.
- g. Ensure that the position transducer displacement cable is correctly routed over the idler pulley on the bracket assembly.
- h. Torque cable clamping block screws to 7 to 9 LBS./INS.
- i. Disconnect readout equipment from the DFDR or breakout box from transducer connector.
- j. Remove roll control system rigging pin.
- k. Secure the floor panel.

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This data should be considered a supplement to the Aircraft Maintenance Manual supplied by Raytheon for maintenance of the Beech 1900D airliner for aircraft modified by STC SA00968NY. The information on this page provides a supplement to the cable replacement instructions for the yaw control system. If the operator wishes to integrate this supplement into the AMM as supplied by Raytheon, then this document should be inserted in AMM before 27-20-01. This location may change in later revisions.

FOR INSTALLATION AND REMOVAL OF THE FDR YAW CONTROL POSITION SENSOR SEE SUPPLEMENT 1 AT THE END OF THIS SECTION.

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SUPPLEMENT 1

This data should be considered a supplement to the Aircraft Maintenance Manual Supplied by Raytheon for maintenance of the Beech 1900D airliner for aircraft modified by STC SA00968NY. The information on this page provides a supplement to the cable replacement instructions for the yaw control system. If the operator wishes to integrate this supplement into the AMM as supplied by Raytheon, then this document should be inserted in AMM at the end of 27-20-01. This location may change in later revisions.

**Yaw Control Position Sensor**

**A. Removal/Replacement**

**1. Removal**

- a. Gain access to the yaw position sensor by removing floor panel.
- b. Attach temporary stop ball over cable at cable exit slot Disconnect the cable-clamping block through screws to release transducer displacement cable from the yaw control cable.
- c. Disconnect the position sensor electrical harness at the connector.
- d. Remove and retain the screws securing the position sensor/bracket assembly. Remove the position sensor/bracket assembly.

**2. Installation**

- a. Secure the position sensor/bracket assembly with the screws retained in step 1.d.
- b. Connect the airframe connector to the transducer connector.
- c. Install rig pins to secure the yaw control system in neutral. Refer to MM 27-20-00.
- d. Connect DFDR readout equipment to the DFDR or alternatively connect a DVM to fabricated breakout box (assy 1900-2-CPC1) installed between transducer connector and airframe connector.
- e. Connect the position transducer displacement cable-clamping block to the yaw control cable, remove temporary stop ball.
- f. Utilize the position of the cable clamping block and cable clamping block adjusting screw to obtain a decimal/volt reading corresponding "0 degrees" in accordance with "Check of the Yaw Control parameter" IAW MM 31-30-00. Complete "Check of the Yaw Control parameter" IAW MM 31-30-00.
  - g. Ensure that the position transducer displacement cable is correctly routed over the idler pulley on the bracket assembly.
- h. Torque cable clamping block screws to 7 to 9 LBS./INS.
- i. Disconnect readout equipment from the DFDR.
- j. Remove yaw control system rigging pin.
- k. Secure the floor panel.

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This data should be considered a supplement to the Aircraft Maintenance Manual Supplied by Raytheon for maintenance of the Beech 1900D airliner for aircraft modified by STC SA00968NY. The information on this page provides a supplement to the cable replacement instructions for the pitch trim control system. If the operator wishes to integrate this supplement into the AMM as supplied by Raytheon, then this document should be inserted in AMM before 27-30-04 Page 201. This location may change in later revisions.

INSERT BEFORE 27-30-04 PAGE 201

FOR REMOVAL OF THE FDR PITCH TRIM CONTROL POSITION SENSOR SEE SUPPLEMENT 1 AT THE END OF THIS SECTION.

This data should be considered a supplement to the Aircraft Maintenance Manual Supplied by

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Raytheon for maintenance of the Beech 1900D airliner for aircraft modified by STC SA00968NY. The information on this page provides a supplement to the cable replacement instructions for the pitch trim control system. If the operator wishes to integrate this supplement into the AMM as supplied by Raytheon, then this document should be inserted in AMM before 27-30-04 Page 203. This location may change in later revisions.

INSERT BEFORE 27-30-04 PAGE 203

FOR INSTALLATION OF THE FDR PITCH TRIM CONTROL POSITION SENSOR SEE SUPPLEMENT 1 AT THE END OF THIS SECTION.

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SUPPLEMENT 1

This data should be considered a supplement to the Aircraft Maintenance Manual Supplied by Raytheon for maintenance of the Beech 1900D airliner for aircraft modified by STC SA00968NY. The information on this page provides a supplement to the cable replacement instructions for the pitch trim control system. If the operator wishes to integrate this supplement into the AMM as supplied by Raytheon, then this document should be inserted in AMM before 27-30-04, Page 203. This location may change in later revisions.

**Pitch Trim Position Sensor**

**A. Removal/Replacement**

**1. Removal**

- a. Gain access to the pitch trim position sensor by removing floor panel.
- b. Attach temporary stop ball over cable at cable exit slot Disconnect the cable-clamping block through screws to release transducer displacement cable from the pitch trim control cable.
- c. Disconnect the position sensor electrical harness at the connector.
- d. Remove and retain the screws securing the position sensor/bracket assembly. Remove the position sensor/bracket assembly.

**2. Installation**

- a. Secure the position sensor/bracket assembly with the screws retained in step 1.d.
- b. Connect the airframe connector to the transducer connector.
- c. Install rig pins to secure the pitch control system in neutral. Refer to MM 27-30-00. Streamline the pitch trim tab with the elevator.
- d. Connect DFDR readout equipment to the DFDR or alternatively connect a DVM to fabricated breakout box (assy 1900-2-CPC1) installed between transducer connector and airframe connector.
- e. Connect the position transducer displacement cable-clamping block to the pitch trim control cable, remove temporary stop ball.
- f. Utilize the position of the cable clamping block and cable clamping block adjusting screw to obtain a decimal/volt reading corresponding "0 degrees" in accordance with "Check of the Pitch Trim Control parameter" IAW MM 31-30-00. Complete "Check of the Pitch Trim Control parameter" IAW MM 31-30-00.
- g. Ensure that the position transducer displacement cable is correctly routed over the idler pulley on the bracket assembly.
- h. Torque cable clamping block screws to 7 to 9 LBS./INS.
- i. Disconnect readout equipment from the DFDR.
- j. Remove pitch control system rigging pin.
- k. Secure the floor panel.

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This data should be considered a supplement to the Aircraft Maintenance Manual Supplied by Raytheon for maintenance of the Beech 1900D airliner for aircraft modified by STC SA00968NY. The information on this page provides a supplement to the instructions for adjustment and testing of sensors for the flight data recorder. If the operator wishes to integrate this supplement into the AMM as supplied by Raytheon, then this document should be inserted in AMM 31-30-00 after page 215. This location may change in later revisions.

Check of the Roll Control Parameter.

1. Connect FDR readout equipment I/A/W the manufacturer's instructions so that Word 23 of all sub frames can be monitored. Alternatively, connect a DVM to fabricated breakout box (assy 1900-2-CPC1) installed between transducer connector and airframe connector.
2. Ensure the following results are observed.

<i>POSITION</i>	<i>WORD</i>	<i>DECIMAL COUNT</i>	<i>TOLERANCE</i>	<i>VDC</i>	<i>TOLERANCE</i>
0 Degrees	23	1644	+/-45	2.772	+/- .05
24 Degrees Up	23	580	+/-65	.855	+/- .05
17 Degrees Down	23	2593	+/-40	4.95	+/- .05

Note: The values above, 24 degrees up and 17 degrees down assume nominal rigging of aircraft. For aircraft with full deflection values between 23 degrees and 26 degrees adjust the values provided by subtracting .114 volt or 75 decimal counts for each degree from the nominal value of 24 degrees. For aircraft with a full deflection value of 16 degrees down use a value of 4.4 volts or a decimal count of 2355. For aircraft with a full deflection greater than 17 degrees the full scale value of 5 volts or 2596 decimal count should be achieved.

Check of the Yaw Control Parameter.

1. Connect FDR readout equipment I/A/W the manufacturer's instructions so that Word 13 of all sub frames can be monitored. Alternatively, connect a DVM to fabricated breakout box (assy 1900-2-CPC1) installed between transducer connector and airframe connector.
2. Ensure the following results are observed.

<i>POSITION</i>	<i>WORD</i>	<i>DECIMAL COUNT</i>	<i>TOLERANCE</i>	<i>VDC</i>	<i>TOLERANCE</i>
0 Degrees	13	1480	+/-50	2.448	+/- .05
25 Degrees Left	13	577	+/-65	.858	+/- .05
25 Degrees Right	13	2256	+/-40	4.12	+/- .05

Note: Values for 25 degrees left and right assume nominal rigging of aircraft. For aircraft with full deflection between 24 and 26 degrees, adjust the values given by subtracting .064 volts per degree or 42.3 decimal counts per degree for left readings and adding .064 volts per degree or 25.7 decimal counts per degree for right hand readings. Example for 26 degrees left the values should be  $(.858-.064) = .794$  volts or a decimal count of  $(577-50) = 527$ .

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Check of the Pitch Trim Control Parameter.

1. Connect FDR readout equipment I/A/W the manufacturer's instructions so that Word 51 of all sub frames can be monitored. Alternatively, connect a DVM to fabricated breakout box (assy 1900-2-CPC1) installed between transducer connector and airframe connector.
2. Ensure the following results are observed.

<i>POSITION</i>	<i>WORD</i>	<i>DECIMAL COUNT</i>	<i>TOLERANCE</i>	<i>VDC</i>	<i>TOLERANCE</i>
0 Degrees	51	2764	+/-75	3.54	+/- .05
16.5 Degrees Down	51	532	+/-75	.683	+/- .05
5.5 Degrees Up	51	3566	+/-75	4.57	+/- .05

Note: Values for 16.5 degrees down and 5.5 degrees up assume nominal rigging of aircraft. For aircraft with full deflection other than these nominal values, adjust the decimal count by adding .176 volts per degree up variance from nominal or adding 137 decimal count per degree up variance. For example for an aircraft with full travel of 17.5 degrees down the readings should be  $.683 - .176 = .507$  volts or  $532 - 137 = 395$  decimal counts value.

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Check of the Prop Reverse Parameter (if installed)

1. Connect FDR readout equipment I/A/W the manufacturer's instructions so that Word 11 of all subframes can be monitored. Alternatively, monitor reverse switch circuit with DVM between "C" terminal and "NO" terminal. Switches are located in the throttle quadrant.
2. Ensure the following results are observed.

<i>POWER LEVER POSITION</i>	<i>WORD</i>	<i>BIT READOUT</i>	<i>REVERSE SWITCH</i>	<i>OPEN/CLOSED</i>
Right Power lever Above Flight Idle	Word 11	Bit 4 = 1	S 160 Right	Open
Right Power Lever Below Flight Idle	Word 11	Bit 4 = 0	S 160 Right	Closed
Left Power Lever Above Flight Idle	Word 11	Bit 2 = 0	S 159 Left	Open
Left Power Lever Below Flight Idle	Word 11	Bit 2 = 1	S 159 Left	Closed

Check of the Lateral Acceleration Parameter

1. Connect FDR readout equipment I/A/W the manufacturer's instructions so that Word 6 of all subframes can be monitored. Alternatively, connect a DVM to fabricated breakout box (assy 1900-2-CPC2 or CPC3) installed between transducer connector and airframe connector.
2. Ensure the following results are observed.

<i>LATERAL ACCELERATION</i>	<i>WORD</i>	<i>DECIMAL COUNT</i>	<i>TOLERANCE</i>	<i>VDC</i>	<i>TOLERANCE</i>
0 G's	6	2028	+/-75	2.597	+/- .05
- 1 G	6	156	+/-75	.210	+/- .05
+ 1 G	6	3900	+/-75	4.978	+/- .05