



# Installation and Operation Manual

## Model 211 Voice Activated Switch



**SM211**

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**Model 211 Voice Activated Switch  
SM211 Installation and Operation Manual**

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**Northern Airborne Technology Ltd.**  
has acquired the assets of dB Systems Inc.,  
and has reissued this manual in  
full NAT format.

**Northern Airborne Technology Ltd.**  
will be responsible for all future  
amendments and revisions.









**Model 211 Voice Activated Switch  
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## Section 1 Description

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### 1.1 Introduction

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Information in this section consists of product description, design features and specifications for the Model 211 Voice Activated Switch. All derivative product information shall be contained in the applicable manual supplement, which may be obtained from NAT as required.

Review all notes, warnings and cautions.

### 1.2 Product Description

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The Model 211 Voice Activated Switch is designed to reduce noise from a HOT microphone when the operator is not talking. It activates on a preset voice level from an amplified dynamic microphone, and supplies the microphone with the correct bias current.

### 1.3 Design Features

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The unit turns on within 1.5 milliseconds after the operator starts talking, and turns off (attenuates microphone noise by 30dB minimum) within 2 seconds after the operator stops talking.

### 1.4 Specifications

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#### 1.4.1 Electrical Specifications

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|                |   |
|----------------|---|
| Power          | 28 Vdc, 80 Milliamps (max)                      |
| Squelch Level: |   |
| Internal       | 15 to 350 mVrms (accessible through cover)      |
| External       | 40 to 350 mVrms (via remote 10 K potentiometer) |

#### 1.4.2 Physical Specifications

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|          |                                     |
|----------|-------------------------------------|
| Height   | 1.60" (40.64 mm)                    |
| Depth    | 4.00" (101.60 mm) including flanges |
| Width    | 3.00" (76.20 mm)                    |
| Weight   | 0.35 lbs (15.9 g)                   |
| Mounting | Any attitude                        |

#### 1.4.3 Environmental Specifications

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Operating Temperature -55° to +79° C

**Section 1 ends**

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## Section 2 Installation

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### 2.1 Introduction

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Information in this section consists of unpacking and inspection procedures, installation procedures, post-installation checks and installation drawings for the Model 211 Voice Activated Switch.

Review all notes, warnings and cautions.

### 2.2 Unpacking and Inspection

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Unpack the equipment carefully and locate the warranty card. Inspect the unit visually for damage due to shipping and report all such claims immediately to the carrier involved. Check that all items listed below are present before proceeding and report any shortage immediately to your supplier:

- Warranty Card
- Certificate of Conformity or Release Certification

#### 2.2.1 Warranty

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All Northern Airborne Technology Ltd. products are warranted for 2 years from date of installation by an authorized NAT dealer, to be free of defects in workmanship or performance. This warranty covers all materials and labour, but is exclusive of any transport to deliver the defective unit to and from NAT or its designated warranty repair center, or any labour to remove or re-install the defective unit in the aircraft. Contact NAT for any questions regarding this warranty, its applicability to your units and/or for return authorization. NAT is the final arbitrator concerning warranty administration. Units which have been physically damaged, burned, immersed in water or otherwise abused beyond the scope of normal use will not be considered for warranty. **WARRANTY IS VOID UNLESS THE PRODUCT IS INSTALLED BY AN AUTHORIZED NAT DEALER.** Product for which a warranty card is not returned shall be warranted from date of manufacture.

### 2.3 Continued Airworthiness

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Maintenance of the Model 211 Voice Activated Switch is 'on condition' only. Periodic maintenance of this product is not required.

### 2.4 Installation Procedures

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#### 2.4.1 Warnings

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**WARNING:**  
High volume settings can cause hearing damage.  
Set the headset volume control to the minimum volume setting prior to conducting tests, and slowly increase the headset volume to a comfortable listening level.



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### 2.4.2 Cautions

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**CAUTION:**

In all installations, use shielded cable exactly as shown, and ground only as indicated. Significant problems may result from not following these guidelines.

Failure to follow the installation and wiring instructions provided in this manual for power and ground connections, including the rating of the circuit breaker, may lead to damage in the power input circuitry of the unit.

### 2.4.3 Cabling and Wiring

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All wire shall be selected in accordance with the original aircraft manufacturer's Maintenance Instructions or AC43.13-1B Change 1, Paragraphs 11-76 through 11-78. Unshielded wire types shall qualify to MIL-W-22759 as specified in AC43.13-1B Change 1, Paragraphs 11-85, 11-86, and listed in Table 11-11. For shielded wire applications, use Tefzel MIL-C-27500 shielded wire with solder sleeves (for shield terminations) to make the most compact and easily terminated interconnect. Follow the connector map in Section 2.7 as required.

Allow 3" from the end of the shielded wiring to the shield termination to allow the connector hood to be easily installed. Reference the interconnect drawing in Section 2.7 for shield termination details. Note that the hood is a "clamshell" hood, and is installed after the wiring is complete. Aircraft harnessing shall permit the unit to be lowered from the panel for easy access to all side adjustments. Do NOT mount the unit until all adjustments have been performed.

Maintain wire segregation and route wiring in accordance with the original aircraft manufacturers Maintenance Instructions. Coaxial cables shall be routed separately from existing wire bundles in the aircraft to minimize electromagnetic coupling effects.

Unless otherwise noted, all wiring shall be a minimum of 24 AWG, except power and ground lines, which shall be a minimum of 22 AWG. Reference the Interconnect drawing for additional specifications. Check that the ground connection is clean and well secured, and that it shares no path with any electrically noisy aircraft accessories such as blowers, turn and bank instruments or similar loads. Power to this unit must be supplied from a separate circuit breaker or fuse (fast blow), and not attached to any other circuit breaker without additional protection. Verify that the selected circuit breaker size and wire gauge are adequate for the installation using the techniques specified in AC43.13-1B Change 1, Paragraphs 11-47 through 11-51 and 11-66 through 11-69.

### 2.4.4 Mechanical Installation

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The Model 211 can be mounted in any orientation.

### 2.4.5 Post Installation Checks

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If any preset requires adjustment, ensure this is performed prior to flight, and that the unit and its mating connector are properly secured. Make all required log book entries, electrical load, weight and balance amendments and other paperwork as required by your local regulatory agency.



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### 2.4.5.1 Voltage/Resistance Checks

Do not attach the Model 211 until the following conditions are met.

Check the following:

- a) Check pin <7> for +28 Vdc relative to ground.
- b) Check pin <9> for chassis ground (less than 0.5  $\Omega$ ).

### 2.4.5.2 Power On Checks

**WARNING:**  
High volume settings can cause hearing damage.  
Set the headset volume control to the minimum volume setting prior to conducting audio tests, and slowly increase the headset volume to a comfortable listening level.

Power up the aircraft's systems and verify normal operation of all functions of the model 211.

Upon satisfactory completion of all performance checks, make all required log book entries, electrical load, weight and balance amendments and other documentation as required by your local regulatory agency before releasing the aircraft for service.

## 2.5 Adjustments and Connections

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### 2.5.1 Squelch Level Adjustments

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#### 2.5.1.1 External Adjustment

If a remote potentiometer is installed, the model 211 internal adjustment should be turned completely clockwise (cw), and pin 5 should be connected to a remote 10 kOhm ¼ watt (minimum) variable resistor. This will allow the squelch to be adjusted from 40 to 350 mVrms.

#### 2.5.1.2 Internal Adjustment

If a remote switch is not to be used, a jumper should be installed across pins 5 and 8. Rotating the internal potentiometer completely counterclockwise (ccw) will adjust the squelch from 16 mVrms minimum to a maximum of 350 mVrms when completely cw.

### 2.5.2 Pin Identification

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The model 211 Connection diagram is found on the 211 Outline drawing in Section 2.7 of this manual.



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The table below shows the pin identifications for the 9-pin connector:

| PIN | DESCRIPTION | PIN | DESCRIPTION       |
|-----|-------------|-----|-------------------|
| 1   | AUD IN LO   | 6   | AUD IN HI         |
| 2   | PWR GND     | 7   | POWER IN (28 VDC) |
| 3   | AUD OUT LO  | 8   |                   |
| 4   | AUD OUT HI  | 9   | CHASSIS GND       |
| 5   | THLD ADJ    |     |                   |

### 2.6 Accessories Required But Not Supplied

To complete the installation, the 211 requires a crimp Installation kit, **211-IKC**. The kit consists of the following:

Installation kit **211-IKC** (NAT Part #: **D09SL-IKC**)

| Quantity | Description            | NAT Part # |
|----------|------------------------|------------|
| 1        | D-min 9 Socket Housing | 20-21-009  |
| 9        | MS Crimp Socket        | 20-26-901  |
| 1*       | Jack Screw Set         | 20-27-002  |
| 1*       | Lock Clip set          | 20-27-004  |
| 1        | 9 Pin Connector Hood   | 20-29-009  |

\* Use as required. See below for assembly.

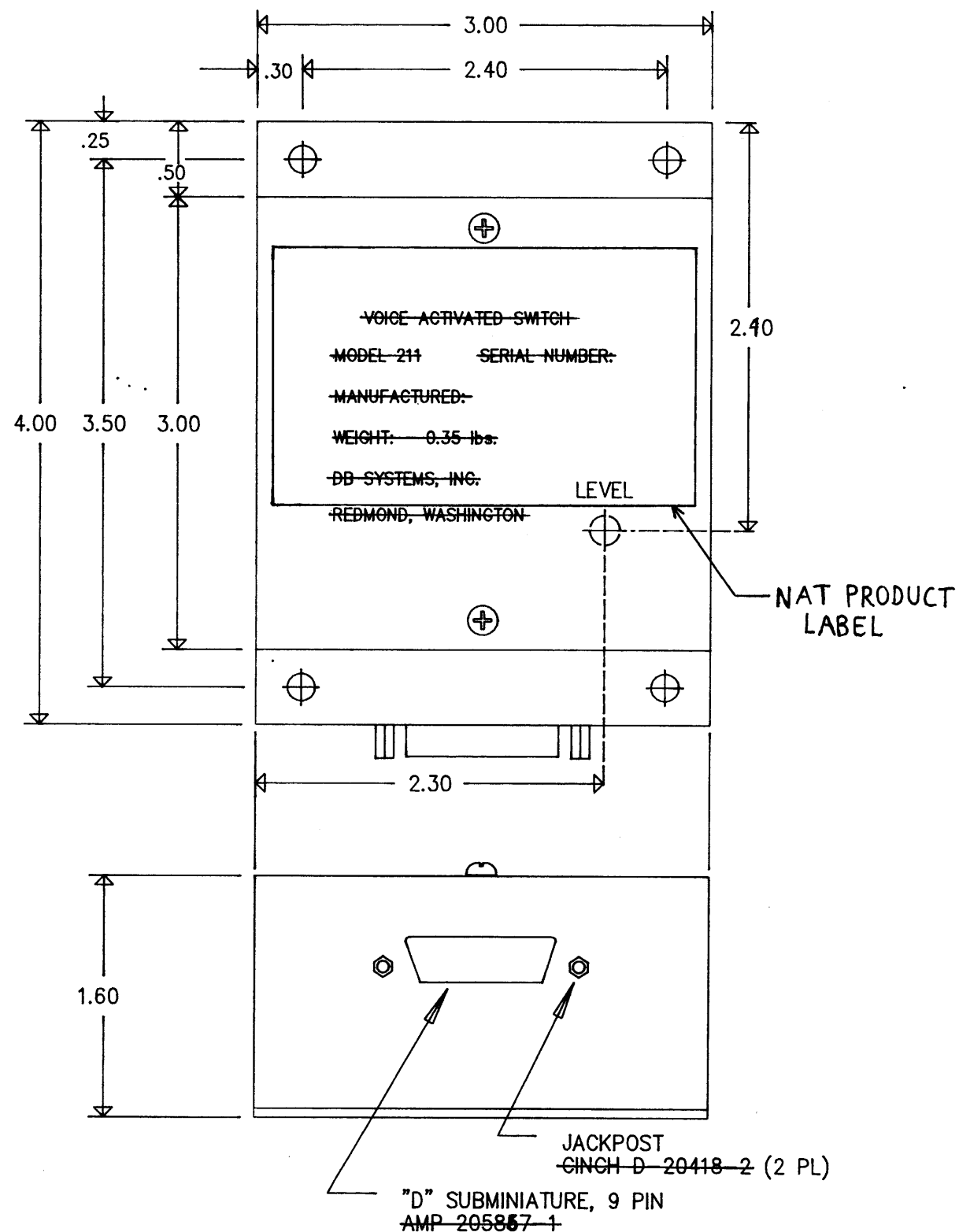
### 2.7 Installation Drawings

| DOCUMENT | REV. | DESCRIPTION            | TYPE                   | SERIAL NO. |
|----------|------|------------------------|------------------------|------------|
| 211\211  | 1.20 | Voice Activated Switch | Outline - Installation | All        |

Section 2 ends following the above documents

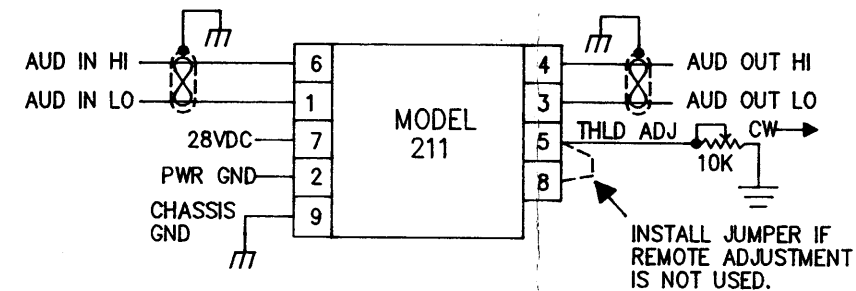
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NOTES:

- PURPOSE: REDUCE NOISE FROM A HOT MICROPHONE WHEN THE OPERATOR IS NOT TALKING. ACTIVATES ON VOICE (PRESET LEVEL) FROM AN AMPLIFIED DYNAMIC MICROPHONE. SUPPLIES THE MICROPHONE WITH PROPER BIAS CURRENT.
- SPECIFICATION:  
 ON: RESPONDS TO VOICE (ABOVE PRESET LEVEL) WITHIN 1.5 MILLISECONDS AFTER OPERATOR STARTS TALKING INTO MICROPHONE.  
 OFF: ATTENUATES MICROPHONE NOISE BY 30 dB (MINIMUM) WITHIN 2 SECONDS AFTER OPERATOR STOPS TALKING.
- POWER REQUIREMENT: 28VDC, 80 MILLIAMPERES (MAXIMUM)
- CONNECTION DIAGRAM:



- SQUELCH LEVEL: ADJUSTABLE FROM 16-350mVRMS FOR THE INTERNAL ADJUSTMENT AND 40 TO 350mVRMS FOR REMOTE EXTERNAL ADJUSTMENT. IF REMOTE ADJUSTMENT IS USED, TURN THE MODEL 211 INTERNAL ADJUSTMENT FULLY CLOCKWISE AND CONNECT A 10K OHM 1/4 WATT (MINIMUM) VARIABLE RESISTOR AS SHOWN ABOVE.
- OPERATING TEMPERATURE: -55 TO +70 DEGREES C.
- ENCLOSURE: ALUMINUM ALLOY CHROMATE CONVERSION COATED PER MIL-C-5544 FOR CORROSION RESISTANCE AND ELECTRICAL BONDING.
- MOUNTING: THE MODEL 211 MAY BE MOUNTED IN ANY POSITION. LISTED ON THE PRODUCT BUILD STANDARD.
- MODIFICATION STATUS: THE CURRENT MODIFICATION STATUS OF THE MODEL 211 IS "B". THE MODIFICATION STATUS OF THE UNIT IS IDENTIFIED BY A "B" STAMPED ON THE UNIT BASEPLATE (BOTTOM). ON THE PRODUCT LABEL.

**DB SYSTEMS, INC.** (206) 883-9910  
 2847 152nd AVE. N.E.  
 REDMOND, WA 98052

OUTLINE, MODEL 211  
 VOICE ACTIVATED SWITCH

|               |                    |                 |                       |
|---------------|--------------------|-----------------|-----------------------|
| SCALE<br>FULL | DRAWN<br>AP        | CHECK<br>AP     | APPROVED<br><i>AP</i> |
| USED ON       | DRAWING NO.<br>211 | SHEET<br>1 OF 1 | REV<br>-A-            |

| DOCUMENT ALTERATION             |                 |
|---------------------------------|-----------------|
| CR No.: DOCCRO2070              |                 |
| Altered By: Mike Hubert         | Date: May 16/07 |
| Approved By: <i>[Signature]</i> | Date: MAY 18/07 |

| REV  | DESCRIPTION   | DATE      | BY  |
|------|---|-----------|-----|
| 1.20 | DOCCRO2077 - REVISED NOTES, CHANGED TO NAT LABEL.                                   | MAY 16/07 | MJH |
| A    | REDRAWN FOR CLARITY, ADDED MOD B INFORMATION TYPE II, EFF. S/N 154 AND ALL RETURNS. | 3-4-93    | AP  |





## Model 211 Voice Activated Switch SM211 Installation and Operation Manual

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### Section 3 Operation

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#### 3.1 Introduction

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Information in this section consists of functional and operational procedures for the Model 211 Voice Activated Switch.

#### 3.2 General Information

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The Model 211 Voice Activated Switch is designed to reduce noise from a HOT microphone when the operator is not talking. It activates on a preset voice level from an amplified dynamic microphone.

The Model 211 Voice Activated Switch has no operator accessible controls. During installation, it may be determined that internal level adjustments are required. Qualified personnel only shall complete internal level adjustments.

#### 3.3 Remote Squelch Level

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A remote potentiometer may be fitted to adjust the squelch level.

Section 3 ends

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