INSTALLATION AND OPERATIONS MANUAL

FOR

RC6000/A

AIRBORNE TRANSCEIVER REMOTE CONTROL
P/N: RC6000/A

Document No.: 740-0166

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2.00	JL	17/10/2011	Revised to add messaging and qualification data. Updated to new document numbering.

IMPORTANT NOTICES

Information in this document is subject to change without notice. Latitude Technologies reserves the right to change or improve their products and to make changes in the content of this material without obligation to notify any person or organization of such changes or improvements.

WARNING: This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

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1.0 SCOPE

This document describes the installation and operation of the RC6000/A Airborne Transceiver Remote Control manufactured by Technisonic Industries Ltd., as modified by Latitude Technologies Corporation. This document covers applications when using the RC6000/A in conjunction with Latitude SkyNode SATCOM equipment.

NOTE:
For assistance with RC6000/A installation or operation, please contact Latitude Technologies Corporation in Victoria, BC, Canada at +1 (250) 475-0203.

1.1 Qualification Information

The RC6000/A is manufactured by Technisonic Industries Limited (TiL) under P/N RC-6000 (Mod 5 or later) and modified, mainly with firmware, by Latitude Technologies Corporation, which then re-identifies the unit as P/N: RC6000/A.

The RC6000/A is a derivative of the RC-6000 (Mod 5 or later) with minor modifications, therefore the qualification testing performed on the RC-6000 by Technisonic are still applicable.

1.2 Definitions and Abbreviations

GPS	Global Positioning System
SMS	Short Message Service (standard "text messaging")
RSSI	Received Signal Strength Indicator

2.0 GENERAL INFORMATION

The RC6000/A is a remote control and display interface for Latitude Technologies' SkyNode family of products. Features include dialing control, phonebook, text messaging, event triggering, and basic system diagnostics.

There are two available versions of the RC6000/A defined by the backlight dimmer buss voltage to be used. For 28V dimmer buss option, order the RC6000/A. For 5V dimmer buss option, order the RC6000/A-1.

2.1 Technical Characteristics

Specification	**Characteristic**
Part Number	RC6000/A or RC6000/A-1
Physical Dimensions	14.6cm X 7.6cm X 3.3cm (5.75" X 3" X 1.3")
Weight	0.31 kg (0.69 lb)
Operating Temperature Range	-45°C to +70°C at 28VDC
	-25°C to +70°C at 14VDC
Ground Survival Low Temp	-55°C
Ground Survival High Temp	+85°C
Altitude	50000 feet
Overpressure	-15000 feet
Power Requirement:	
Voltage	14-28.0 VDC ±15%
Current	Min: 75mA
	Max: 150mA
Communication Protocol	RS-232 (38400,8,N,1)
Panel Back Lighting	28 VDC or 5V (5V is by special order)

2.2 Qualification Tests Table (DO-160C)

CONDITIONS	SECTION	DESCRIPTION OF CONDUCTED TESTS
Temperature and Altitude	4.0	Equipment qualified to Category B2
Vibration	8.0	Equipment is qualified without shock mounts to Test Curves S(M) and U2(F,F1)
Magnetic Effect	15.0	Equipment qualified to category Z.
Power Input	16.0	Equipment qualified to category B.
Voltage Spike	17.0	Equipment qualified to category B.
RF Emission	21.0	Equipment qualified to category B.

(RC6000/A Must be Mod 5 or Later)

Table 1 – Qualifications Tests Table (DO-160C)

3.0 OPERATING INSTRUCTIONS

3.1 Display

The RC6000/A has a two line, 48-character LED display. The top line shows the Iridium network signal strength ("RSSI"), menu items, or other information depending on what the user is doing. The bottom line displays the soft key menu and other information depending on what the user is doing.

In addition to the character display, there are two LED indicators on the left: The top LED is will be off if there are no messages in the Inbox, on if there are messages that have all been read, and blinking if there are messages in the inbox marked as unread (see section 3.6.3). The bottom LED does not have a function.

3.2 Start Up

On start up, the RC6000/A will display an animated curser moving right and left on the display's bottom line, while the top line will alternate between displaying the following two lines:

LATITUDE RC6000/A FW#.##
** SEARCHING FOR SkyNode **

Where "#.##" is the firmware version currently installed on the RC6000/A. Once the SkyNode is fully initialized and communication is established with the RC6000/A, the Home Screen will appear (see section 3.3).

3.3 Home Screen

Figure 1 shows the RC6000/A's root menu or "Home Screen." This is the starting point for reaching all other areas of the menu.

At any other screen, or during any function operation, it is possible to return to the Home Screen by pressing the HOME button.

Figure 1 – RC6000/A Home Screen

3.4 Keys

3.4.1 Home

The "HOME" key brings the user back to RC6000/A's main menu screen (the "Home Screen"; see section 3.3).

3.4.2 Menu

The "Menu" key does not yet have an associated function.

3.4.3 Soft Keys

The RC6000/A has three keys that are used as contextual buttons: "S1", "S2" and "S3". The functions and labels of these keys change depending on what the user is currently doing. These keys and their uses are explained in later sections.

3.4.4 Function Keys

The function keys ("F1", "F2" and "F3") do not yet have associated functions.

3.4.5 Alpha-Numeric Keys

There are 10 alpha-numeric keys similar to those found on a telephone. These can be used for dialing telephone numbers or entering text.

3.4.6 Arrow and Return Keys

The arrow keys and the return key (aka the enter key; "↵") are used to navigate the RC6000/A's menus. Use the arrow keys to navigate with the menus and use the return key to select a menu item.

3.4.7 Mark & DN/CLR

The "Mark" (aka "Mark Target", also labeled "#") and "DN/CLR" (aka "Down & Clear", also labeled "*") keys can be used as simple signaling inputs; pressing these keys triggers the SkyNode SATCOM to immediately generate and transmit a GPS position report with a special reason code that will be displayed in Web Sentinel*.

**NOTE:*
Please contact Latitude Technologies to ensure that this feature is enabled in your SkyNode's configuration.

3.4.8 May Day

The "MAY DAY" key can be used to place the SkyNode in Emergency Tracking mode. This means that the SkyNode will override the configured reporting interval and begin transmitting specially flagged GPS position reports every 10 seconds.

NOTE:
The destination to where the emergency messages are sent too is determined by the SkyNode SATCOM equipment that the RC6000/A is connected with. At minimum, the SATCOM must have an active satellite network account and have been configured for emergency reporting. Please contact Latitude Technologies to ensure that this feature is enabled.

To activate Emergency Tracking mode, simply press the "MAY DAY" key. Once Emergency Mode is initialized, the top line of the screen will display the flashing text:

* EMERGENCY MODE ACTIVE *

To deactivate Emergency Mode, press "S2" (labeled "END").

NOTE:
Please contact Latitude Technologies to ensure that this feature is enabled in your SkyNode's configuration.

3.5 Telephone

3.5.1 Main Telephone Screen

To use the RC6000/A's telephone features, start in the Home Screen (see section 3.3), then press "S1" (labeled "TEL"); this will bring up the Main Telephone Screen (see figure 2).

Figure 2 – Main Telephone Screen

3.5.2 Dialing

From the Main Telephone Screen, use the number keys to dial a phone number. The number you are entering will be displayed on the top line of the display. Once you have finished dialing, press "S1" (labeled "DIAL"). This will initiate your call.

NOTE:
When dialing a phone number, remember that all calls placed from an Iridium telephone are considered international calls and must begin with an international dialing code (for example, "001" for North America). Please see Latitude Technologies' document number 740-0149A ("Iridium Phone Tips") for further information about dialing.

3.5.2.1 Pressing Keys While in a Call

There are often instances when you must press keys during a voice call, such as remotely checking voicemail and navigating telephone menu systems. With the RC6000/A, when you press a key during the call, the bottom right corner of the screen will display the text:

Sending '#' tone

where "#" is the key that was pressed (i.e. 1-9, #, *). You must wait until this text disappears before pressing another key.

3.5.3 Answering a Call

When you receive a call on the RC6000/A, the top line of the screen will display the flashing text:

**** Incoming Call *****

When this happens, press "S2" (labeled "ANS") to answer the call.

The aural "ringing" alert can only be heard if the S200's receive channel is active on the aircraft audio system.

3.5.4 Ending a Call

To end a phone call that is in progress (i.e. "hang up"), press "S1" (labeled "END").

3.5.5 Redial

From the Main Telephone Screen, press "S3" (labeled "RDL") to place a call to the number you dialed last. The RC6000/A will ask for confirmation; press "S3" (labeled "YES") to place the call, or "S1" (labeled "NO") to cancel and return to the Main Telephone Screen.

3.5.6 Phonebook

To use the RC6000/A's Phonebook, first navigate to the Main Telephone Screen (see section 3.5.1), and then press "S2" (labeled "PBK"). The screen will now be displaying the first contact entry on the top line (alternating between contact name and phone number), and the soft key options on the bottom line (see figure 3).

Figure 3 – Phonebook Screen

3.5.6.1 Phoning a Contact

From within the Phonebook, scroll to the desired contact entry using the left and right arrow keys ("<" and ">"). Once the desired contact is displayed on the top line of the screen, press "S1" (labeled "DIAL") to place a call to this contact.

3.5.6.2 Adding a Contact

From the Phonebook's main screen, press "S2" (labeled "EDT"); this will take you to the Phonebook Editing Screen. To add a new entry at the first empty location, press "S1" (labeled "ADD"), then enter the name of the contact using the alpha-numeric keys (press "↵" when finished), and then enter the phone number of the contact (press "↵" when finished).

Once you are finished adding contacts, press "S3" (labeled "EXIT") to return to the Phonebook's main screen.

NOTE:
When entering a contact's phone number, remember that all calls placed from an Iridium telephone are considered international calls and must begin with an international dialing code (for example, "001" for North America). Please see Latitude Technologies' document number 740-0149A ("Iridium Phone Tips") for further information about dialing.

3.5.6.3 Deleting a Contact

From the Phonebook's main screen, press "S2" (labeled "EDT"); this will take you to the Phonebook Editing Screen. To delete a Phonebook entry, scroll to the desired entry using the arrow keys ("<" and ">"), and then press "S2" (labeled "DEL") to delete the entry. The RC6000/A will ask for confirmation; press "S3" (labeled "YES") to delete the entry, or "S1" (labeled "NO") to cancel and return to the Phonebook Editing Screen. When a contact is deleted, an empty slot will remain in its place.

3.5.6.4 Editing a Contact

Editing contacts is not supported. To edit a contact, simply delete the entry and re-enter it with the edits you wish to make (see sections 3.5.6.3 and 3.5.6.2).

3.6 Messaging

3.6.1 Main Messaging Screen

To use the RC6000/A's messaging features, start in the Home Screen (see section 3.3), then press "S2" (labeled "MSG"); this will bring up the Main Messaging Screen (see figure 4).

Figure 4 – Main Messaging Screen

3.6.2 Sending a Message

To send a text message, first navigate to the Main Messaging Screen (see section 3.6.1), and then press "S2" (labeled "NEW"). The screen will now be displaying the first of 9 canned messages on the bottom line (see figure 5). Use the arrow keys to navigate to your desired message, then press return (aka the enter key; "↵") to select the message.

Figure 5 – Canned Messages Menu

There are two types of canned message; Static and Hybrid. Canned messages can be configured remotely from a Web Sentinel administrator account (please see Latitude Technologies' Web Sentinel User Manual for details).

3.6.2.1 Static Canned Messages

Static Canned Messages are pre-configured messages that can be quickly sent without having to enter any text. When a Static Canned Message is selected, you will be prompted to confirm that you want to send the message (soft keys "S1" and "S3" will be flashing "NO" and "YES"); simply press "YES" and the message will transmit (pressing "NO" will return you to the Main Messaging Screen).

3.6.2.2 Hybrid Canned Messages

Hybrid Canned Messages are messages with a pre-configured portion, and an optional free-form text portion. These messages are displayed with an asterisk (*) in front of them. When a Hybrid Canned Message is selected, you will be prompted to enter additional text using the alphanumeric keypad. After entering text (or if do not want to enter text), press return (aka the enter key; "↵") and you will be prompted to confirm that you want to send the message (soft keys

"S1" and "S3" will be flashing "NO" and "YES"); simply press "YES" and the message will transmit (pressing "NO" will return you to the Main Messaging Screen).

NOTE: *Sent messages can be viewed in Web Sentinel. Forwarding to user-configured emails can also be set up in your Web Sentinel administrator account.*

3.6.3 Receiving a Message

3.6.3.1 New Message Indication

When a new text message is received, the LED at the left-side of the display's top line will begin to blink, and the word "*MESSAGE*" will begin to blink on the bottom line of the display (see figure 6). These indications will continue until all messages in the inbox have been read.

Figure 6 – New Message Indication

3.6.3.2 Viewing Inbox

Received text messages can be view from the Inbox (see figure 7). Navigate to the Inbox from the Main Messaging Screen by pressing "S3" (labeled "IBX"). Using the arrow keys, navigate to the desired message, then press "S2" (labeled "REP") to be taken to the New Message Screen (see section 3.6.2) or "S3" (labeled "DEL") to delete the message (you will be prompted to confirm deletion).

A message is marked as read after being displayed for a few seconds or after one complete scroll across the screen in the case of longer messages.

Figure 7 – Received Message Inbox

3.7 System Status (for set-up and troubleshooting)

3.7.1 System Menu

To access the RC6000/A's System Menu, start in the Home Screen (see section 3.3), then press "S3" (labeled "SYS"); this will bring up the System Menu.

3.7.1.1 GPS Status

The current status of the SkyNode's GPS fix can be monitored from the GPS Status section of the System Menu (see figure 8). Simply press "S2" (labeled "GPS") from within the System Menu. From here, you'll see the current Altitude, Latitude, and Longitude of you the SkyNode connected to the RC6000/A. This screen will refresh automatically if left on.

Figure 8 – GPS Status Screen

3.7.1.2 Screen Brightness

The RC6000/A's screen brightness can be adjusted from the Brightness section of the System Menu (see figure 9). Simply press "S3" (labeled "BRT") from within the System Menu. From here, you can adjust the screen brightness by using soft keys "S2" and "S3" or the arrow keys

Figure 9 – Setting Screen Brightness

3.7.2 Satellite Signal Strength

The current Iridium satellite signal strength ("RSSI") is displayed on the top line of the screen (left side) in the Home Screen and the Main Telephone Screen. It is given as a value from 0-5 and is represented as up to 5 "bars" of increasing size.

For voice calls, signal strength of 2 "bars" or higher is required.

4.0 INSTALLATION INSTRUCTIONS

4.1 General

This section contains information and instructions for the correct installation of the RC6000/A remote control. Close adherence to these suggestions will assure optimum performance of the system. It is the responsibility of the installer to design the installation on or within the limits specified in this manual. The installation approval by the relevant certification authority is the responsibility of the installer.

4.2 Equipment Packing Log

Following verification of shipping documents, move the case to a clean area. Remove packing material and keep ready. Remove the unit carefully and place it on a flat clean surface. Verify that the part and serial numbers on the shipping invoice matches the part and serial numbers on the unit label. In case of mismatch, contact Latitude Technologies for details. Perform a visual inspection of the unit to ensure that it was not damaged during shipment. If you ordered the installation kit ensure that all connectors are in the package.

4.3 Installation

4.3.1 Mounting

The RC6000/A Remote Control is designed to be DZUS mounted and should be installed in conjunction with an KT011. See figure 10 for an outline drawing of the unit with dimensions to facilitate the installation.

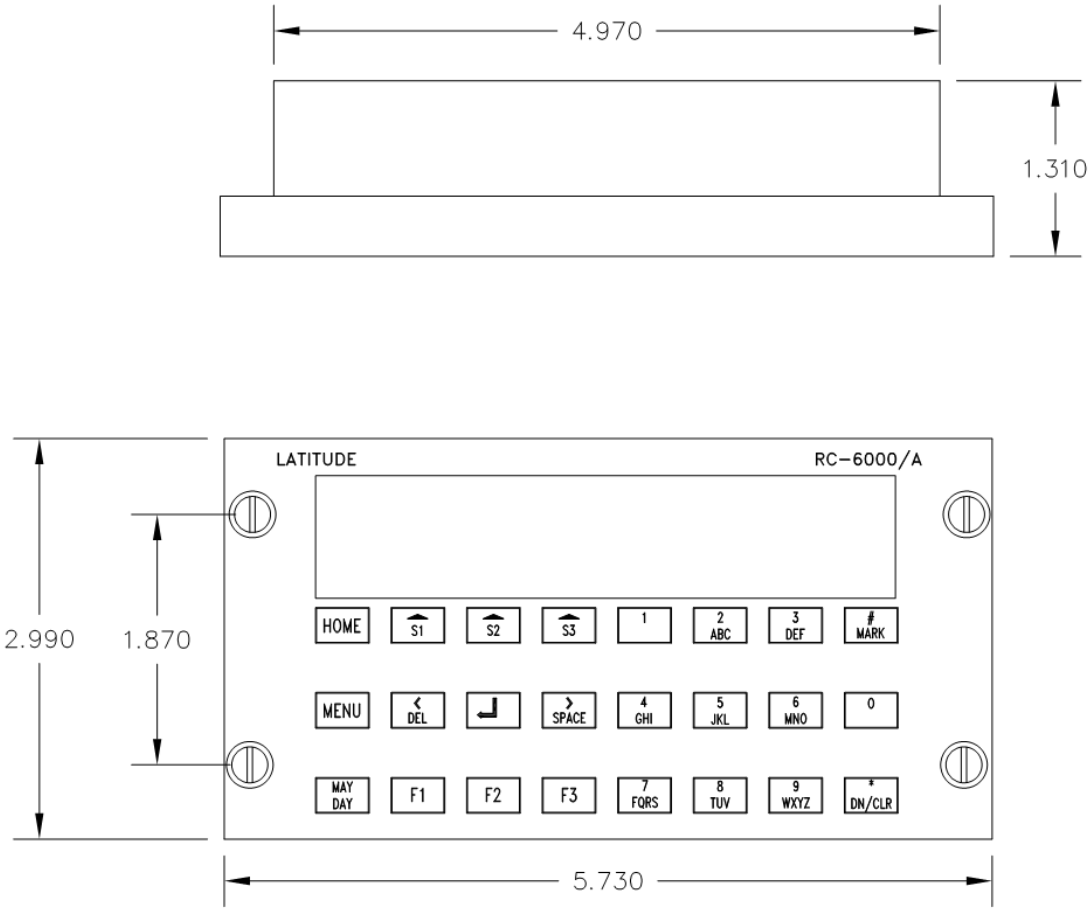

Figure 10 – Outline Drawing for RC6000/A

4.3.2 Installation Kit Contents

The RC6000/A installation kit (P/N KT011) consists of:

1. 9 Pin (DB9) Female Backshell
2. 9 Female Crimp Pins
3. DB9 Hood (Black Plastic)

4.3.3 Cable and Wiring

All wiring should be 22 AWG as a minimum and per M27500. Ensure all ground connections are clean and well secured. Failure to observe proper cable routing and shield terminations may result in significant noise problems for data transmission.

4.4 Pin Locations and Connections

Pin #	Description	Connection
1	Ground	Connect to ground. Pin internally connected to Chassis.

2	Debug	Do not connect. (For Factory Use)
3	Reset	Do not connect. (For Factory Use)
4	Power Input	28VDC or 14VDC. Connect to Aircraft Main Bus (not Emergency Bus) through 3 Amp breaker.
5	VCC	Do not connect. (For Factory Use)
6	Backlight	Connect to aircraft dimmer bus. - 28VDC for RC6000/A, or - 5V for RC6000/A-1
7	RX Data (RS232)	Connect to SkyNode auxiliary RS232 TX pin
8	TX Data (RS232)	Connect to SkyNode auxiliary RS232 RX pin
9	No Connection	Do not connect.

Table 2 – Pin Locations and Connections

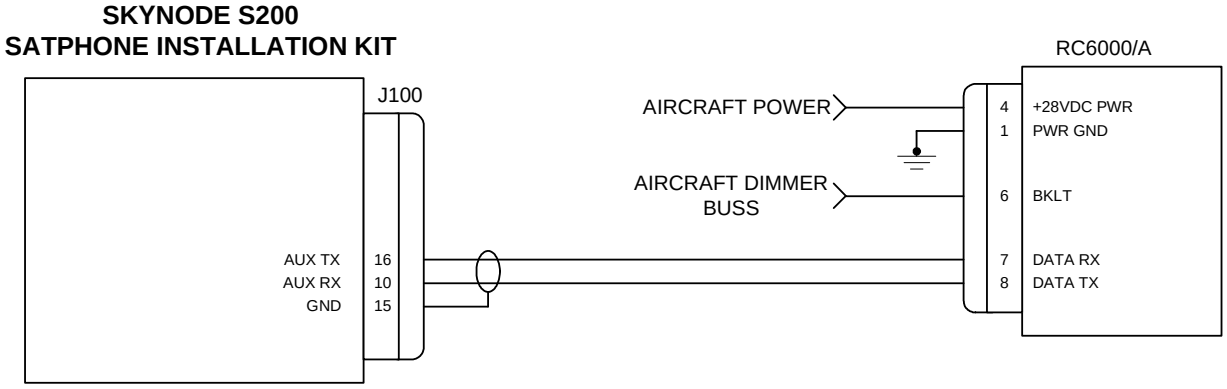

Figure 11 – S200 And RC6000/A Interconnect (Typical for All S200 Applications)

5.0 POST INSTALLATION SYSTEM CHECK

1. Turn ON System (RC6000/A and SkyNode).
   RC6000/A's screen should come on, displaying alternating lines of text:

   LATITUDE RC6000A FW#.##.#
   ** SEARCHING FOR SKYNODE **

   Where "#.##.#" is the current firmware version loaded into the RC6000/A. (*NOTE: Early versions of the RC6000/A will say "SEARCHING FOR S200" instead of "SEARCHING FOR SKYNODE")*

PASS	FAIL

2. Test Communication between SkyNode and RC6000/A.
   After the system has initialized, the RC6000/A's screen will switch to the Home Screen (see figure 1), indicating that it is communicating with the SkyNode.

PASS	FAIL

3. Place a Test Phone Call.
   Following the instructions in Sections 3.5.1 and 3.5.2, place a phone call to the Iridium Test Line (the phone number is **6868**). Ensure the voice quality is acceptable. (*NOTE: This test requires that the aircraft is outside away from tall structures and that the S200 is activated for voice service*)

PASS	FAIL

APPENDIX A: POST INSTALLATION EMI TEST

A.1 PURPOSE

The purpose of this test is to identify any potential interference that the RC6000/A remote control head, as interfaced with the S200 system may cause to existing aircraft systems.

A.2 TEST CONDITIONS

The RC6000/A must have been functionally tested per paragraph 5.0 above, prior to performing the EMI tests. The S200 device must be operational and turned on prior to EMI testing.

A.3 METHODOLOGY

All EMI tests can be accomplished on the ground with the engine(s) running and away from buildings.

The navigation GPS (if installed) shall be operational with at least the minimum compliment of satellites for the type installed. The VHF comm(s) (all) shall have the squelch open. VOR/DME receivers (all installed) shall be selected for display. If installed, set the ADF to a nearby station.

Observe the navigation GPS (if installed) for any degradation of satellite status and signal strength (if available). Listen for any noise or detected audio signals on the VHF comm(s). Listen for any noise or detected audio signals on the VOR/LOC receiver audio; look for any moment of flags or needles on the VOR/LOC/GS navigation display(s).

List the power plant, fuel and other electric instruments not already in the chart provided and note any anomalies that occur due to operation of the RC6000/A. Assess the results.

If the aircraft is equipped with an autopilot or stability augmentation system, then test fly the aircraft and verify that operation of the RC6000/A does not have adverse effects on these systems.

A.4 RESULTS

If the installed system passes all of the applicable EMI tests, then no further action is required. If interference is observed then the interference must be addressed and corrected.

A.5 PROCEDURE

A.5.1 RC6000/A as a Source

List any equipment not included in the list such as added communication, navigation and engine/transmission instruments. Indicate N/A if the equipment is not installed.

1. Turn the RC6000/A on and off and observe the behaviors below
2. Transmit Text messages (2-3) on the RC6000/A through the S200 system and observe the behavior as outlined below.

Observe the navigation GPS (if installed) for any degradation ofsatellite status and signal strength (if available). Listen for any noise or detected audio signals on the VHF Comm(s). Listen for any noise or detected audio signals on the VOR/LOC receiver audio and the ADF; look for any moment of flags or needles on the VOR/LOC/GS navigation display(s). Tune the Transponder to an assigned code and request monitoring for potential dropouts.

Step	System	Pass	Fail	Notes
1	Com 1			
2	Com 2			
3	Com 3			
4	Transponder & Encoder			
5	ADF 1			
6	ADF 2			
7	VOR/LOC 1			
8	VOR/LOC 2			
9	HIS			

10	Fuel Pressure (both if applicable)			
11	Oil Temp (both if applicable)			
12	Amps (both if applicable)			
13	Bus Voltage (both if applicable)			
14	Fuel Qty (both if applicable)			
15	Ng or N1 (both if applicable)			
16	Np or N2 (both if applicable)			
17	TOT (both if applicable)			
18	Torque % (all if applicable)			
19	Master Caution Annunciators			
20	Clock			
21	Oil Pressure (both if applicable)			
22	DME 1			
23	DME 2			
24	GPS 1			
25	GPS 2			

26	Autopilot			
27	Stability Augmentation Systems			

Table 3 – Post Install EMI Test Results Sheet RC6000/A as a Source

A.5.2 RC6000/A as a Victim

List any equipment not included in the list such as added communication, navigation and engine/transmission instruments.

Observe the RC6000/A throughout the test and observe any dropout or glitch in the display.

Step	System	Pass	Fail	Notes
1	Transmit on COM 1 at 3 different frequencies and for 5 seconds			
2	Transmit on COM 2 at 3 different frequencies and for 5 seconds			
3	Transmit on COM 3 at 3 different frequencies and for 5 seconds			
4	Turn all electrical equipment (i. E. Landing Lights, Taxi Lights, Heaters, Pitot Heat, etc.) "OFF" the "ON"			

Table 4 – Post Install EMI Test Results Sheet RC6000/A as a Victim

APPENDIX B: ENVIRONMENTAL TESTS TABLE

RC6000/A (TECHNISONIC/LATITUDE TECHNOLOGY)

NOMENCLATURE: RC6000/A REMOTE CONTROL

TYPE/MODEL/PART NO: RC6000/A, Mod5 * TSO NUMBER: N/A

MANUFACTURER'S SPECIFICATION AND/OR OTHER APPLICABLE SPECIFICATION: N/A

MANUFACTURER: *LATITUDE TECHONOLOGIES/TECHNISONIC INDUSTRIES LIMITED*

ADDRESS: 101-3375 Whittier Ave. Victoria, British Columbia, V8Z3R3 , CANADA

REVISION & CHANGE NUMBER OF DO-160: Revision **F**

* Technisonic Unit RC6000 is modified (minor) by Latitude Technologies and re-identified as RC6000/A

Condition	Section	Description of tests conducted
Temperature and Altitude	4.0	Equipment tested to Categories B2
Low Temperature	4.5.2	Operating: -45°C (See Note 1)
Ground Survival Low Temperature	4.5.1	Non-Operating: -55°C
Short Time Low Temperature	4.5.1	Operating: -45°C
High Temperature	4.5.4	Operating: +70°C
Ground Survival High Temperature	4.5.3	Short time high temperature: +85°C
Short Time High Temperature	4.5.3	Operating: +70°C
Altitude	4.6.1	50,000 feet
Decompression	4.6.2	8000 feet to 50000 feet
Overpressure	4.6.3	-15000 feet
Operational Crash Safety	7.0	Equipment tested to Category B
Crash Safety	7.3.1	20 G for 11ms in all axes
Vibration	8.0	Equipment tested to Categories SM and U2FF1
	8.5.1	Sinusoidal: 0.1" from 5 to 15 Hz 0.01" from 15 to 55 Hz 1.5G from 55 to 500 Hz Unknown Helicopter Frequencies
	8.8.3	Vibration Profile F- Random Vibration Profile F1-Random
Operational Shock and Crash Safety	7.0	Equipment tested to Category B
Crash Safety	7.3.1	20 G for 11ms in all axes
	7.3.3	Sustained Acceleration
Magnetic Effect	15.0	Equipment tested to Category Z
Power Input	16.0	Equipment tested to Category B Tests performed for both 14VDC and 28VDC systems See Note 2
Voltage spike	17.0	Equipment tested to Category B 56Vpk for 10µs
Radio Frequency Susceptibility	20.0	Equipment identified as Category X, no test performed
Radio Frequency Emissions	21.0	Equipment identified as Category B

NOTES:

1- Equipment will only function to -25C with a 14VDC input
2- With 14 VDC Input, unit will restart after power interruptions of 25msec or more.