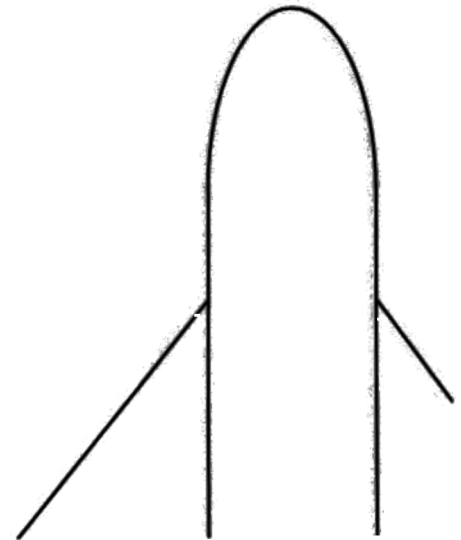


MAGNASTAR C-2000 DIGITAL AIRBORNE TELEPHONE SYSTEM**MagnaStar Aircraft Configuration Settings**
Aircraft Tail Number _____ Date: _____**System Configuration Settings:**

Maintenance Passcode: _____
Billing Mode: Direct / Credit Card
Aircraft Aircall Number: _____ PIN: _____
Direct Call Pickup: Y/N
Aircraft Satcom Terminal ID: _____
Call Waiting: Y/N
Mode (AIU): Satcom / GroundCell
Satcom Impedance (AIU): High/ Low
Satcom Mode (AIU): Handset / PBX
Aero-I Satcom Dialing: Enabled/Disabled
Aero-H+ Satcom Dialing: Enabled/Disabled
Auto Link Switch: Enabled/Disabled
Dialing Plan: US-Canada / Mexico
4800 MODEM Call Handoff Mode: Enabled/Disabled
9600 MODEM Call Handoff Mode: Enabled/Disabled
CAS Service Indicator: Air-Ground/Satcom/GroundCell
Auxiliary Call Alerter Cadence: 0 1 2 3 4 5 6 7 8 9
PC Station Uplink Call Mode: Voice/FAX/TDD
Programmed Speed Dial Numbers: Y / N
HF Decay Setting: _____
HF Sense Setting: _____
HF Label: _____
HF PTT: Enabled/Disabled

**Handset Configuration Settings:**

Handset location: _____
Inplane Number Assigned: 0 1 2 3 4 5 6 7 8 9
Inplane Label: _____
Station Aircall Number: _____
Station Aircall Pin: _____
Ring Handset w/Aircraft Aircall: Y/N
Link: Air-Ground/Satcom
Satcom Station Terminal ID: _____
Ring Handset w/Aircraft Satcom Term. ID: Y/N
Station Type: Cockpit/Cabin/Fax/Modem/TDD/PC
Station Baud Rate: 4800bps / 9600bps
Handset Ringer: Enabled / Disabled
Handset Alerter Gain: _____
Handset RJ-11 Gain: _____
Handset Coarse Speaker Gain: _____
Handset Fine Speaker Gain: _____
Handset Voice Sidetone Gain: _____
Handset DTMF Gain: _____
Handset DTMF Monitor Scale: _____
Handset DTMF Monitor Sense: _____
Handset Coarse Microphone Tx Gain: _____
Handset Fine Microphone Tx Gain: _____
Auxiliary Call Alerter: 0 1 2 3 4 5 6 7 8 9
Call In Progress Indicator: Enabled/Disabled
Inplane LED Blink Rate: _____
Uplink LED Blink Rate: _____

Handset location: _____
Inplane Number Assigned: 0 1 2 3 4 5 6 7 8 9
Inplane Label: _____
Station Aircall Number: _____
Station Aircall Pin: _____
Ring Handset w/Aircraft Aircall: Y/N
Link: Air-Ground/Satcom
Satcom Station Terminal ID: _____
Ring Handset w/Aircraft Satcom Term. ID: Y/N
Station Type: Cockpit/Cabin/Fax/Modem/TDD/PC
Station Baud Rate: 4800bps / 9600bps
Handset Ringer: Enabled / Disabled
Handset Alerter Gain: _____
Handset RJ-11 Gain: _____
Handset Coarse Speaker Gain: _____
Handset Fine Speaker Gain: _____
Handset Voice Sidetone Gain: _____
Handset DTMF Gain: _____
Handset DTMF Monitor Scale: _____
Handset DTMF Monitor Sense: _____
Handset Coarse Microphone Tx Gain: _____
Handset Fine Microphone Tx Gain: _____
Auxiliary Call Alerter: 0 1 2 3 4 5 6 7 8 9
Call In Progress Indicator: Enabled/Disabled
Inplane LED Blink Rate: _____
Uplink LED Blink Rate: _____

Speed Dial # _____
Speed Dial # _____
Speed Dial # _____
Speed Dial # _____
Speed Dial # _____

Label _____
Label _____
Label _____
Label _____
Label _____

Phone # _____
Phone # _____
Phone # _____
Phone # _____
Phone # _____

MAGNASTAR C-2000 DIGITAL AIRBORNE TELEPHONE SYSTEM**MagnaStar Aircraft Configuration Settings**
Aircraft Tail Number _____ Date: _____

Handset location: _____
Inplane Number Assigned: 0 1 2 3 4 5 6 7 8 9
Inplane Label: _____
Station Aircall Number: _____
Station Aircall Pin: _____
Ring Handset w/Aircraft Aircall: Y/N
Link: Air-Ground/Satcom
Satcom Station Terminal ID: _____
Ring Handset w/Aircraft Satcom Term. ID: Y/N
Station Type: Cockpit/Cabin/Fax/Modem/TDD/PC
Station Baud Rate: 4800bps / 9600bps
Handset Ringer: Enabled / Disabled
Handset Alerter Gain: _____
Handset RJ-11 Gain: _____
Handset Coarse Speaker Gain: _____
Handset Fine Speaker Gain: _____
Handset Voice Sidetone Gain: _____
Handset DTMF Gain: _____
Handset DTMF Monitor Scale: _____
Handset DTMF Monitor Sense: _____
Handset Coarse Microphone Tx Gain: _____
Handset Fine Microphone Tx Gain: _____
Auxiliary Call Alerter: 0 1 2 3 4 5 6 7 8 9
Call In Progress Indicator: Enabled/Disabled
Inplane LED Blink Rate: _____
Uplink LED Blink Rate: _____

Handset location: _____
Inplane Number Assigned: 0 1 2 3 4 5 6 7 8 9
Inplane Label: _____
Station Aircall Number: _____
Station Aircall Pin: _____
Ring Handset w/Aircraft Aircall: Y/N
Link: Air-Ground/Satcom
Satcom Station Terminal ID: _____
Ring Handset w/Aircraft Satcom Term. ID: Y/N
Station Type: Cockpit/Cabin/Fax/Modem/TDD/PC
Station Baud Rate: 4800bps / 9600bps
Handset Ringer: Enabled / Disabled
Handset Alerter Gain: _____
Handset RJ-11 Gain: _____
Handset Coarse Speaker Gain: _____
Handset Fine Speaker Gain: _____
Handset Voice Sidetone Gain: _____
Handset DTMF Gain: _____
Handset DTMF Monitor Scale: _____
Handset DTMF Monitor Sense: _____
Handset Coarse Microphone Tx Gain: _____
Handset Fine Microphone Tx Gain: _____
Auxiliary Call Alerter: 0 1 2 3 4 5 6 7 8 9
Call In Progress Indicator: Enabled/Disabled
Inplane LED Blink Rate: _____
Uplink LED Blink Rate: _____

Handset location: _____
Inplane Number Assigned: 0 1 2 3 4 5 6 7 8 9
Inplane Label: _____
Station Aircall Number: _____
Station Aircall Pin: _____
Ring Handset w/Aircraft Aircall: Y/N
Link: Air-Ground/Satcom
Satcom Station Terminal ID: _____
Ring Handset w/Aircraft Satcom Term. ID: Y/N
Station Type: Cockpit/Cabin/Fax/Modem/TDD/PC
Station Baud Rate: 4800bps / 9600bps
Handset Ringer: Enabled / Disabled
Handset Alerter Gain: _____
Handset RJ-11 Gain: _____
Handset Coarse Speaker Gain: _____
Handset Fine Speaker Gain: _____
Handset Voice Sidetone Gain: _____
Handset DTMF Gain: _____
Handset DTMF Monitor Scale: _____
Handset DTMF Monitor Sense: _____
Handset Coarse Microphone Tx Gain: _____
Handset Fine Microphone Tx Gain: _____
Auxiliary Call Alerter: 0 1 2 3 4 5 6 7 8 9
Call In Progress Indicator: Enabled/Disabled
Inplane LED Blink Rate: _____
Uplink LED Blink Rate: _____

Handset location: _____
Inplane Number Assigned: 0 1 2 3 4 5 6 7 8 9
Inplane Label: _____
Station Aircall Number: _____
Station Aircall Pin: _____
Ring Handset w/Aircraft Aircall: Y/N
Link: Air-Ground/Satcom
Satcom Station Terminal ID: _____
Ring Handset w/Aircraft Satcom Term. ID: Y/N
Station Type: Cockpit/Cabin/Fax/Modem/TDD/PC
Station Baud Rate: 4800bps / 9600bps
Handset Ringer: Enabled / Disabled
Handset Alerter Gain: _____
Handset RJ-11 Gain: _____
Handset Coarse Speaker Gain: _____
Handset Fine Speaker Gain: _____
Handset Voice Sidetone Gain: _____
Handset DTMF Gain: _____
Handset DTMF Monitor Scale: _____
Handset DTMF Monitor Sense: _____
Handset Coarse Microphone Tx Gain: _____
Handset Fine Microphone Tx Gain: _____
Auxiliary Call Alerter: 0 1 2 3 4 5 6 7 8 9
Call In Progress Indicator: Enabled/Disabled
Inplane LED Blink Rate: _____
Uplink LED Blink Rate: _____

MAGNASTAR C-2000 DIGITAL AIRBORNE TELEPHONE SYSTEM**MagnaStar Aircraft Configuration Settings**
Aircraft Tail Number _____ Date: _____

Handset location: _____
Inplane Number Assigned: 0 1 2 3 4 5 6 7 8 9
Inplane Label: _____
Station Aircall Number: _____
Station Aircall Pin: _____
Ring Handset w/Aircraft Aircall: Y/N
Link: Air-Ground/Satcom
Satcom Station Terminal ID: _____
Ring Handset w/Aircraft Satcom Term. ID: Y/N
Station Type: Cockpit/Cabin/Fax/Modem/TDD/PC
Station Baud Rate: 4800bps / 9600bps
Handset Ringer: Enabled / Disabled
Handset Alerter Gain: _____
Handset RJ-11 Gain: _____
Handset Coarse Speaker Gain: _____
Handset Fine Speaker Gain: _____
Handset Voice Sidetone Gain: _____
Handset DTMF Gain: _____
Handset DTMF Monitor Scale: _____
Handset DTMF Monitor Sense: _____
Handset Coarse Microphone Tx Gain: _____
Handset Fine Microphone Tx Gain: _____
Auxiliary Call Alerter: 0 1 2 3 4 5 6 7 8 9
Call In Progress Indicator: Enabled/Disabled
Inplane LED Blink Rate: _____
Uplink LED Blink Rate: _____

Handset location: _____
Inplane Number Assigned: 0 1 2 3 4 5 6 7 8 9
Inplane Label: _____
Station Aircall Number: _____
Station Aircall Pin: _____
Ring Handset w/Aircraft Aircall: Y/N
Link: Air-Ground/Satcom
Satcom Station Terminal ID: _____
Ring Handset w/Aircraft Satcom Term. ID: Y/N
Station Type: Cockpit/Cabin/Fax/Modem/TDD/PC
Station Baud Rate: 4800bps / 9600bps
Handset Ringer: Enabled / Disabled
Handset Alerter Gain: _____
Handset RJ-11 Gain: _____
Handset Coarse Speaker Gain: _____
Handset Fine Speaker Gain: _____
Handset Voice Sidetone Gain: _____
Handset DTMF Gain: _____
Handset DTMF Monitor Scale: _____
Handset DTMF Monitor Sense: _____
Handset Coarse Microphone Tx Gain: _____
Handset Fine Microphone Tx Gain: _____
Auxiliary Call Alerter: 0 1 2 3 4 5 6 7 8 9
Call In Progress Indicator: Enabled/Disabled
Inplane LED Blink Rate: _____
Uplink LED Blink Rate: _____

Handset location: _____
Inplane Number Assigned: 0 1 2 3 4 5 6 7 8 9
Inplane Label: _____
Station Aircall Number: _____
Station Aircall Pin: _____
Ring Handset w/Aircraft Aircall: Y/N
Link: Air-Ground/Satcom
Satcom Station Terminal ID: _____
Ring Handset w/Aircraft Satcom Term. ID: Y/N
Station Type: Cockpit/Cabin/Fax/Modem/TDD/PC
Station Baud Rate: 4800bps / 9600bps
Handset Ringer: Enabled / Disabled
Handset Alerter Gain: _____
Handset RJ-11 Gain: _____
Handset Coarse Speaker Gain: _____
Handset Fine Speaker Gain: _____
Handset Voice Sidetone Gain: _____
Handset DTMF Gain: _____
Handset DTMF Monitor Scale: _____
Handset DTMF Monitor Sense: _____
Handset Coarse Microphone Tx Gain: _____
Handset Fine Microphone Tx Gain: _____
Auxiliary Call Alerter: 0 1 2 3 4 5 6 7 8 9
Call In Progress Indicator: Enabled/Disabled
Inplane LED Blink Rate: _____
Uplink LED Blink Rate: _____

Handset location: _____
Inplane Number Assigned: 0 1 2 3 4 5 6 7 8 9
Inplane Label: _____
Station Aircall Number: _____
Station Aircall Pin: _____
Ring Handset w/Aircraft Aircall: Y/N
Link: Air-Ground/Satcom
Satcom Station Terminal ID: _____
Ring Handset w/Aircraft Satcom Term. ID: Y/N
Station Type: Cockpit/Cabin/Fax/Modem/TDD/PC
Station Baud Rate: 4800bps / 9600bps
Handset Ringer: Enabled / Disabled
Handset Alerter Gain: _____
Handset RJ-11 Gain: _____
Handset Coarse Speaker Gain: _____
Handset Fine Speaker Gain: _____
Handset Voice Sidetone Gain: _____
Handset DTMF Gain: _____
Handset DTMF Monitor Scale: _____
Handset DTMF Monitor Sense: _____
Handset Coarse Microphone Tx Gain: _____
Handset Fine Microphone Tx Gain: _____
Auxiliary Call Alerter: 0 1 2 3 4 5 6 7 8 9
Call In Progress Indicator: Enabled/Disabled
Inplane LED Blink Rate: _____
Uplink LED Blink Rate: _____

MAGNASTAR C-2000 DIGITAL AIRBORNE TELEPHONE SYSTEM**8.0 MMT SOFTWARE LOADING**

This section covers loading of MMT software onto the MMT host computer.

The host computer must be a 386 or faster IBM compatible computer with 4 Megabytes of RAM, a 3.5" high density floppy drive, and at least 1 Megabyte of memory available for use on the hard drive. For the MMT software to run properly it is important that the C: partition is no larger than 1.5 Gigabytes and be designated FAT or FAT 16. The MMT software must be executed from DOS and cannot be run from Windows or a Windows DOS shell. A RS-232C serial port and serial cable (P/N 422632-801) are necessary for connection to the MagnaStar C-2000 system.

Execution of the MagnaStar Maintenance Terminal (MMT) software can only occur after it is loaded in the host computer memory. This loading process will only be required to be performed the first time the MMT software is to be used or if an updated version is required. The host computer when loaded with the MagnaStar Maintenance Terminal software will be referred to as the MMT. Loading of the MMT software will automatically start the execution of the MMT after the completion of the software download to the computer's memory. The following steps are to be used if the MMT software has not been loaded into the host computers memory or if an updated version is to be loaded:

Power up the computer and wait for the computer to complete the boot process. After the computer has completed the boot sequence, insert the 3.5" MagnaStar Maintenance Terminal (MMT) software disk in the appropriate drive (A or B) of the computer.

If you placed the diskette in the A drive use the following commands: From the root directory type "A:\MMT COPY", then press "ENTER" to execute this command.

C:>A:\MMT COPY **ENTER**

If you placed the diskette in the B drive use the following commands: From the root directory type "B:\MMT COPY B", then press "ENTER" to execute this command.

C:>B:\MMT COPY B **ENTER**

The "MMT COPY" command will automatically load all the software files and create the necessary directories required to operate the MMT software. This command will also start the execution of the MMT software.

MAGNASTAR C-2000 DIGITAL AIRBORNE TELEPHONE SYSTEM**EQUIPMENT TROUBLESHOOTING PROCEDURES**

9.0 EQUIPMENT TROUBLESHOOTING PROCEDURES	... 9-1
9.1 TROUBLESHOOTING PROCEDURE FOR MMT INSTALLATION TUTORIAL	... 9-1
9.1.1 C-2000 SYSTEM POWER UP.....	... 9-1
9.1.2 MMT COMMUNICATION VERIFICATION	... 9-2
9.1.3 START ARTU OPERATIONAL SOFTWARE.....	... 9-3
9.1.4 LOCKED OFF-LINE STATE	... 9-5
9.1.5 ARTU MOUNTING TRAY FAN TEST.....	... 9-6
9.1.6 ARTU TRANSMITTER OUTPUT POWER	... 9-7
9.1.7 ARTU RECEIVE SIGNAL STRENGTH MEASUREMENT	... 9-9
9.1.8 HANDSET / LAN TEST	9-11
9.1.9 RESET MAINTENANCE ACCESS PASSCODE.....	9-12
9.1.10 UNLOCKED ONLINE STATE	9-13
9.1.11 RSS MEASUREMENT USING GENSTAR GROUND STATION.....	9-14
9.1.12 MMTI TROUBLESHOOT CONCLUSION	9-15
9.2 Additional MMTI Troubleshoot Information	9-16
9.2.1 Data Cable Pull Check	9-16
9.2.2 Fault Counter Check	9-17
9.2.3 Flight Test Log.....	9-17
9.2.4 L-Band Interference Tests.....	9-18
9.2.5 CEPT-E1 Communication Verification	9-18
9.3 MMTI Commanded Mode	9-20
9.3.1 MMTI Commanded Mode - C-2000 MMT Boot Menu	9-22
9.3.2 MMTI Commanded Mode - C-2000 MMT Radio Configuration Menu	9-23
9.3.3 MMTI Commanded Mode - C-2000 MMT Radio Installation/Test Menu.....	9-26
9.3.3.1 C-2000 MMT Commanded BIT Menu	9-27
9.3.3.2 C-2000 MMT RF Test Menu	9-27
9.3.3.3 C-2000 MMT Handset Test Menu	9-29
9.3.3.4 C-2000 MMT Radio Maintenance Operations Menu	9-30
9.3.3.4.1 C-2000 MMT Debug Menu.	9-30
9.4 Handset Text Messages.....	9-32

MAGNASTAR C-2000 DIGITAL AIRBORNE TELEPHONE SYSTEM

9.1.2 MMT COMMUNICATION VERIFICATION

The MMT Communications Verification test assures that the MMT software is properly communicating with the ARTU by checking the version of software that is loaded in the ARTU.

Symptom: "ERROR=> MMT communications failure - timed out"

The ARTU and the MMT are not communicating when this information is displayed in the Radio Responses window. Check the MMT cable connection between the MMT computer and the ARTU. Check for a damaged connector on RS-232 serial communications port of the computer. After checking these interface connections press "R" to repeat the test. If the same error is displayed, cycle power on the computer. If the same error message is displayed after cycling power on the computer then replace the ARTU.

Symptom: "Radio software executing in unlocked online state"

This message will be displayed on the screen if the ARTU was powered up before the computer with the MMT software running was connected to the ARTU. Remove power to the ARTU for greater than 20 seconds. Apply power to the ARTU and press "R" to repeat the test.

```

-----V4.0A MMT Radio Responses-----
Power-up Status: 80376 Microprocessor OK, SRAM OK.
  ARTC code File ARTCC40B.HEX Ver 0.0 Date 04/06/00 14:25 Bank 2 CRC:4CEB
  DSP code File MDSPC40B.HEX Ver 0.0 Date 03/27/00 12:13 Bank 4 CRC:1298
  BIT code File MBITC40A.HEX Ver 0.0 Date 05/18/99 16:03 Bank 1 CRC:209C
  Boot code File M_BTC31C.HEX Ver 0.0 Date 04/24/96 14:27 Bank 1 CRC:BBEE
Radio software is not executing.
-----MMT Tutorial-----
INS1A103
Symptom: "ERROR=> MMT communications failure - timed out."
a) Check that the MMT cable is properly connected to the ARTU.
b) Press "R" to repeat test step.
c) If the error message still appears, then cycle power on the computer
   and start again.
d) If error message still appears, turn power off to the ARTU for more
   than ten seconds. Apply power to the ARTU. Does the Fault indicator on
   the front of the ARTU illuminate for approximately one minute or more?
   If it does, check for a bad MMT cable or bad COM port on the computer.
e) If the fault indicator does not illuminate, then replace the ARTU.

(R)eturn:
-----

```

Figure 9.1.2. MMT Communications Verification MMTI Troubleshoot Screen.

MAGNASTAR C-2000 DIGITAL AIRBORNE TELEPHONE SYSTEM**9.1.3 START ARTU OPERATIONAL SOFTWARE**

When the ARTU is powered up with an MMT connected, the ARTU software will not execute and will be in what is termed a "boot" mode. When commanded by the MMT, the ARTU will start the operational software. The first step in starting the operational is for the ARTU to run Built-In-Test (BIT). The normal BIT process begins by turning "ON" the ARTU Fault indicator. The MMT will indicate that the ARTU has started software execution which is displayed in the Radio Responses window. The ARTU then begins an FEPRM test which takes approximately 15-20 seconds to complete. During this time there will be no new messages displayed in the Radio Responses window. BIT test result information will be reported in the Radio Responses window. Depending on how long the ARTU has been powered prior to executing power-up BIT, the screen may pause in the middle of the tests. This pause is to allow the ARTU oscillator to warm-up. This can take one to five minutes. After this pause, BIT will complete.

Symptom: Radio Responses window does not display test results.

If the Radio Responses window does not appear to change, the user should look to see if the red Fault light is illuminated. If the red Fault light is not illuminated then press "R" to repeat the test.

Symptom: ARTU fails power-up BIT.

If the ARTU fails a BIT test, note which test has failed and replace the ARTU.

After power up BIT has completed, it is possible to review the BIT test data by sending the following MMT commands:

Press "F1",	; scrolls screen to commanded mode menus
press "2" and then press ENTER,	; selects Radio Test Menu
press "2" and then press ENTER,	; selects Commanded Bit Menu
press "0" and then press ENTER.	; selects view BIT results

Pressing "N" for next, or "P" for previous, will scroll the user through the BIT test results.

Symptom: ARTU appears to pause during BIT for longer than ten minutes.

BIT will begin testing and stop during the middle of the tests to wait for the OCXO frequency reference to warm up. BIT testing will stop at the "QUERY AMX" test. If after stopping at the "QUERY AMX" test, the MMT BIT test times out after ten minutes and the RED Fault indicator is still illuminated, then the ARTU has faulted. Replace the ARTU and note that the ARTU has failed for OCXO warm up.

Symptom: BIT test appears to repeat.

If the BIT test appears to be repeating over and over then one of two conditions is occurring. One, the voltage at the ARTU is dropping below +20.5 volts DC during the power up BIT. Measure the voltage at the radio interface with ARTU attached. If the voltage drops below +20.5 VDC, check the gauge of wire used for the power cable to insure that it is of sufficient size to minimize the voltage drop from the circuit breaker to the ARTU. The second condition is current limiting. If the power system cannot support a 3-5 ampere current surge while maintaining a stable voltage then the ARTU will repeat BIT.

MAGNAStar C-2000 DIGITAL AIRBORNE TELEPHONE SYSTEM

```

-----V4.0A MMT Radio Responses-----
Power-up Status: 80376 Microprocessor OK, SRAM OK.
ARTC code File ARTCC40B.HEX Ver 0.0 Date 04/06/00 14:25 Bank 1 CRC:4CEB
DSP code File NDSPC40A.HEX Ver 0.0 Date 03/27/00 12:13 Bank 2 CRC:1298
BIT code File MBITC40A.HEX Ver 0.0 Date 05/18/99 16:03 Bank 1 CRC:209C
Boot code File M_BTC31C.HEX Ver 0.0 Date 04/24/96 14:27 Bank 1 CRC:BBE
Radio software is not executing.

-----V1A MMT Tutorial-----
INS1A104
This test step is informational only.
Pressing "C" will start Built-In-Test (BIT). The normal BIT process begins
by turning "ON" the ARTU Fault indicator. The MMT will indicate in that the
ARTU has started software execution which is displayed in the Radio
Responses window. The ARTU then begins an EPROM test which takes
approximately 15-20 seconds. During this time there will be no new messages
displayed in the Radio Responses window. BIT test result information will
be reported in the Radio Responses window. Depending on how long the ARTU
has been powered prior to executing power-up BIT, the screen may pause in
the middle of the tests. This pause is to allow the ARTU oscillator to
warm-up. This can take one to five minutes. After this pause, BIT will
complete.

(R)eturn: _

```

Figure 9.1.3.A. Start ARTU Operational Software MMTI Troubleshoot Screen.

```

-----V4.0A MMT Radio Responses-----

WAITING FOR POWER-UP BIT RESULTS (<5 MINUTE DELAY)
Press 'Esc' to Terminate Wait
Radio software starting execution.
The MMT has been reconfigured for COM Port 1 at 9.6 kbs.

-----V1A MMT Tutorial-----
INS1A105
Symptom: Radio Responses window does not change.
a) Did you wait for the EPROM test to complete, if so Press "R" for
retest.
b) Did the ARTU fault light illuminate?
Symptom: ARTU fails power-up BIT.
a) Determine the BIT fault and record for repair information. See
MagnaStar Installation Manual for steps required to view fault
information. Replace faulted ARTU.
Symptom: ARTU appears to pause during BIT for longer than ten minutes.
a) If the BIT testing stops at the "TEST AMX" test step for longer than
ten minutes at room temperature then note that the ARTU has failed
OCXO warm-up. Replace the failed ARTU.

(R)eturn: _

```

Figure 9.1.3.B. Start ARTU Operational Software MMTI Troubleshoot Screen.

MAGNASTAR C-2000 DIGITAL AIRBORNE TELEPHONE SYSTEM**9.1.4 LOCKED OFF-LINE STATE**

For the MMT to command certain tests for the installation checkout, the ARTU software must be placed in a mode which will allow the ARTU the flexibility to perform these tests. This mode of operation is called the "Locked Off-Line State". This test step is a mode change only. Failure of this mode change will only occur if the MMT is not communicating with the ARTU.

It should be noted that while the ARTU is in this mode, the Handset screen may go blank and will not respond to keypad inputs.

Symptom: ERROR=> MMT communications failure - timed out.

If this message is displayed in the Radio Responses window then check the cabling between the ARTU and the MMT. If the cabling is correct then press "R" to repeat the test.

```

-----V4.0A MMT Radio Respon
Radio software executing in locked offline state.

+-----+
+-----V1A MMT Tutorial-----+
|INS1A106|
|Symptom: ERROR=> MMT communications failure - tim
|a) Check the MMT cable connection.
|b) Press "R" for repeat.
|

```

Figure 9.1.4. Locked Off-Line State MMTI Troubleshoot Screen.

MAGNASTAR C-2000 DIGITAL AIRBORNE TELEPHONE SYSTEM**9.1.5 ARTU MOUNTING TRAY FAN TEST**

Under normal operational conditions, the ARTU Mounting Tray Fan is activated by a switch in the ARTU which is under software control. The ARTU monitors a temperature sensor located in the ARTU and is programmed to turn on the Fan when the temperature is at approximately room temperature. The ARTU Mounting Tray Fan test will command the ARTU to turn the fan "ON" to check operation.

Symptom: The ARTU Mounting Tray Fan is not operational.

If the ARTU Mounting Tray Fan is not operational, the problem can be caused by the ARTU, wiring to the ARTU Mounting Tray or the Mounting Tray Fan itself. Several steps will be required to determine the cause of failure. These steps may also vary depending on which assembly of the ARTU mounting Tray assembly that is used in the aircraft.

For -801 Tray: Remove power from system. Remove the power connector from ARTU J2 connector interface and ground pin P1-F of the ARTU Power cable. Apply power to the system. If the fan operates, perform a continuity check on the ARTU Tray - ARTU Power cable interface. If the wiring is correct, replace the ARTU. If the fan does not operate, replace the ARTU Mounting Tray.

For -802 Tray: Remove the P1 connector from the ARTU Mounting Tray. With power removed, ground pin J1-9 on the ARTU Tray. Apply power to the system. If the fan does not operate, replace the ARTU Mounting Tray. If the fan operates, perform a continuity check on the 802 ARTU Tray - ARTU Power cable. If the wiring is correct, replace the ARTU. If not replace cable.

-----V4.0A MMT Radio Response:

C-2000 reports engineering test FAN CONTROL performed.

```

+-----VIA MMT Tutorial-----+
|INS1A107|
|Symptom: Fan does not operate.|
|For -801 Tray: Remove power from system. Remove J2 connector from ARTU and|
|ground pin P1-F of the ARTU Power cable. Apply power to the system. If|
|the fan operates, replace the ARTU. If the fan does not operate, replace|
|the ARTU Mounting Tray.|
|For -802 Tray: Remove the P1 connector from the ARTU Mounting Tray. With|
|power removed, ground pin J1-9 on the ARTU Tray. Apply power to the|
|system. If the fan does not operate, replace the ARTU Mounting Tray. If|
|the fan operates, perform a continuity on the 802 ARTU Tray - ARTU|
|Power cable. If the continuity is correct, replace the ARTU. If not|
|replace cable.|
|-----|
| (R)eturn: _|
+-----+

```

Figure 9.1.5. ARTU Mounting Tray Fan MMTI Troubleshoot Screen

MAGNASTAR C-2000 DIGITAL AIRBORNE TELEPHONE SYSTEM**9.1.6 ARTU TRANSMITTER OUTPUT POWER**

During the ARTU Transmitter Output Power test, the ARTU will transmit a CW signal at a frequency of 894.9495 MHz. The power level transmitted by the ARTU will be 10 watts minimum. Measurement of the transmitted signal should be made as close to the Antenna as possible to check the functionality of the greatest number of the C-2000 components. The insertion loss of components in addition to the ARTU must be accounted for when measuring the output power of the C-2000 system. The maximum total cable loss that can be used with the C-2000 system is specified at 3 dB. The maximum specified insertion loss of the Duplexer is 1.4 dB. If power is measured at the Antenna connector, the minimum power measured should be no less than 4 watts.

It should be noted that the power meter or thru-line wattmeter used for this test must be capable of withstanding 16 Watts of RF energy and must be capable of operating at frequency of 1 Ghz for correct results.

Symptom: The MMTI appears stuck.

Wait for the MMTI to properly execute commands to ARTU (5-10 sec). Commands to the ARTU via the MMTI may take from 5 to 10 seconds to execute during which time the MMTI screens will appear to change and then stop before completing.

Symptom: Low output power / No output power.

If power measurements at the Antenna connector are low, it will be necessary to determine which component is responsible for the excessive loss by process of elimination. First, measure the output power directly out of the ARTU. If the power measurement is incorrect replace the ARTU. If the power measurement is correct, measure the output at the end of the transmit cable. If the power measurements is incorrect, replace the transmit cable. If the power measurement is correct, measure the power at the Antenna output of the Duplexer. If the power measurement is incorrect, replace the Duplexer.

```

-----V4.0A MMT Radio Responses-----
ing test PAN CONTROL performed.

-----V1A MMT Tutorial-----
INS1A108

This test step is instructional only.

During the next test step the ARTU will transmit a CW signal at a power
level of +40 to +42 dBm. The Duplexer is specified for a maximum loss
of 1.4 dB. The maximum system cable loss for the RF cables is specified
at 3 dB. The power meter should measure greater than +36 dBm when all
the above factors are taken into account.

```

(R)eturn

Figure 9.1.6.A. ARTU Transmitter Output Power MMTI Troubleshoot Screen.

MAGNASTAR C-2000 DIGITAL AIRBORNE TELEPHONE SYSTEM

```

-----V4.0A MMT Radio Responses-----
C-2000 reports engineering test PERFORM INITIAL PA EQUAL performed.

```

```

-----V1A MMT Tutorial-----
INS1A109

Symptom: MMTI appears stuck.
Wait for the MMTI to properly execute commands to ARTU (5-10 sec).

Symptom: Low output power / No output power.
Measure the output power directly out of the ARTU. If the power
measurement is incorrect replace the ARTU. If the power measurement is
correct, measure the output at the end of the transmit cable. If the
power measurements is incorrect, replace the transmit cable. If the power
measurement is correct, measure the power at the Antenna output of the
Duplexer. If the power measurement is incorrect, replace the Duplexer.

(R)eturn: _

```

Figure 9.1.6.B. ARTU Transmitter Output Power MMTI Troubleshoot Screen.

```

-----V4.0A MMT Radio Responses-----
C-2000 reports engineering test STOP TRANSMIT performed.

-----V1A MMT Tutorial-----
INS1A110

Symptom: ARTU does not stop transmitting.
If the ARTU does not stop transmitting check that the MMT cable is
properly connected. If the cable is properly connected, press "R" for
repeat.

(R)eturn: _

```

Figure 9.1.6.C. ARTU Transmitter Output Power MMTI Troubleshoot Screen.

MAGNASTAR C-2000 DIGITAL AIRBORNE TELEPHONE SYSTEM

9.1.7 ARTU RECEIVE SIGNAL STRENGTH MEASUREMENT

The ARTU Receive Signal Strength measurement test will verify the complete RF portion of the C-2000 system. This test will require the use of a MagnaStar Loop-Around test box. During this test a 16 QAM signal is transmitted by the ARTU. With the MagnaStar Loop-Around test box connected to the Antenna, the signal is coupled into the Loop-Around test box where it is mixed by 45 MHz and coupled back into the Antenna. A receive signal strength measurement using the ARTU checks out both the TSC and Pilot receive channels of the ARTU as well all the components between the ARTU and the Antenna. The frequency of the transmitted signal is 894.9495 MHz.

This test is to check for gross loss problems in the RF cables and associated hardware and is not intended to be a calibrated test measurement. Typically the value should be measured at -103 dBm +/- 6 dB with nominally valued components. Because the TSC and Pilot channels are separate receivers, variations between measurements are possible. If, however, there is a delta between the two receivers of greater than 10 dB, the ARTU is to be rejected.

The Loop-Around test box is powered by a 9 volt battery. The battery voltage must be greater than 6.0 volts to operate and provide the expected performance results. The Loop-Around test box provides the capability to check the battery to ensure that the voltage is correct. The Loop-Around test box attenuator setting should be set to the "ON" position for the first part of this test. Switching the attenuator to the "OFF" position should change the receive signal strength by approximately 30 dB.

Symptom: Reading between the TXRX and RX receivers greater than 10 dB.

If the delta between the TXRX (TSC) and RX (Pilot) receivers is greater than 10 dB, repeat the test. If after repeating the test the same results occur then replace the ARTU.

Symptom: RSS readings on both the TXRX and RX channels less than -109 dBm (-103 dBm - 6 dB)

If the RSS readings are less than -109 dBm then the lossy component needs to be located. If the ARTU Transmitter Output Power test has been successfully completed then the problem is either the Antenna, Duplexer, Receive cable or ARTU. If the ARTU has successfully passed BIT, then the most likely candidates are the Antenna, Duplexer or the receive cable. With the proper adapters, cable loss should be measured for the ARTU receive cable. Elimination of the receive cable as the problem leaves the Duplexer and Antenna. With the proper adapters and a 30 dB/25 Watt pad, the antenna cable can be directly attached to the Loop-Around test box bypassing the Antenna. If the loss problem still exists after bypassing the Antenna, replace the Duplexer.

-----V4.0A MMT Radio Responses

```

+-----+
+-----V1A MMT Tutorial-----+
|INS1A200|
|This test step is instructional only.|
|
|In preparation for measuring the system receive signal strength, the
|loop around test box must be configured and properly placed for expected
|results. Perform a battery check prior to use by turning "ON" the loop
|around test box and pressing the momentary battery check switch. The
|indicator light will illuminate if the battery is within operational
|requirements. Set the attenuator switch to the "ON" position. Place the
|cable clip-on clamp on the center of the blade antenna for best results.
|
+-----+

```

(R)eturn: _

Figure 9. 7A. ARTU Receive Signal Strength Measurement MMTI Troubleshoot Screen.

```

-----V4.0A MMT Radio Responses
:2000 reports status update ENABLED.

```

MAGNASTAR C-2000 DIGITAL AIRBORNE TELEPHONE SYSTEM

Press F2 to View Status Display

```
+-----+
|-----VIA MMT Tutorial-----|
|INS1A201|
|Symptom: RSS Value much lower than markings on Loop-Around Test Box.|
|  a) Are the ON/OFF and Attenuator switches in the correct position?|
|    Is the battery voltage greater than 6 volts?|
|  b) Move the Loop-Around Test Cable connection placement on the Antenna.|
|  c) Replace cables or C-2000 RF components one at a time to isolate the|
|      faulted unit.|
|Symptom: RSS value difference between the TXRX and RX is greater than 10 dB.|
|  If values of the RSS readings between the TSC (TXRX) and the Pilot (RX)|
|  receivers is greater than 10 dB replace the ARTU.|
+-----+
```

(R)eturn: .

Figure 9.1.7B. ARTU Receive Signal Strength Measurement MMTI Troubleshoot Screen.

MAGNASTAR C-2000 DIGITAL AIRBORNE TELEPHONE SYSTEM

9.1.8 HANDSET / LAN TEST

The Handset / LAN test will inform the installer of the number of CDBRs/AIUs and Handsets with which the ARTU can communicate. This test does not distinguish the difference between a CDBR or an AIU. Also, this test will not identify the presence of a CAS.

Symptom: The MMTI does not respond with the correct number of CDBRs or Handsets.

Isolation of the faulted component will require a process of elimination and possible component swapping. Start by disconnecting the Inter-CDBR cable from the J2 port of the second to last CDBR. Repeat the Handset/LAN test and determine if the correct number of components connected to the system is displayed. If an incorrect number of components is displayed, repeat the process until only the ARTU Data cable and one CDBR are connected to the system. If the Handset LAN test still fails, disconnect the ARTU Data cable from the ARTU. Perform a continuity check on the ARTU Data cable. Be sure to check for opens, pin to pin shorts and pin to shield shorts. Also check continuity of the shield from end to end. If the cable continuity checks correctly, swap CDBRs and reconnect the cable and CDBR. If the system still does not display the presence of a CDBR, then replace the ARTU.

```

+-----V4.0A MMT Radio Responses-----+
|
|  ENG Test ESTABLISH HANDSET LAN Results: Pass
|      TDM IN Sync
|      X Handsets Assigned
|      X CDBRs Present
|  C-2000 reports engineering test ESTABLISH HANDSET LAN performed.
|
+-----+
+-----V1A MMT Tutorial-----+
|
|  INS1A202
|
|  Symptom: No display in the MMT Radio Responses window.
|  Did you wait greater than 15 seconds for the test to complete?
|
|  Symptom: The wrong number of CDBRs and Handsets are displayed.
|  Starting with the last CDBR, disconnect the cabling from the J2 connector
|  of next CDBR in line. Then press "R" to repeat the test. If correct number
|  appears, check the cabling. If cabling is correct, replace CDBR. If the
|  incorrect number appears, repeat the above steps until the correct number
|  of CDBRs appears. If left with only one CDBR, check cabling and swap out
|  CDBR. If problem still exists replace ARTU.
|
|  (R)eturn: _
|
+-----+

```

Figure 9.1.8. Handset / LAN MMTI Troubleshoot Screen.

MAGNASTAR C-2000 DIGITAL AIRBORNE TELEPHONE SYSTEM**9.1.9 RESET MAINTENANCE ACCESS PASSCODE**

This test step will reset the Maintenance Access Passcode to the factory setting of 0000. If the Maintenance Access Passcode was previously set to a value other than 0000 for protection purposes, then the installer will want to reprogram the desired passcode into the system after completing the system check-out. Failure to reset the Maintenance Access Passcode will only occur if the MMT is not communicating with the ARTU.

Symptom: ERROR=> MMT communications failure - timed out.

If this message is displayed in the Radio Responses window then check the cabling between the ARTU and the MMT. If the cabling is correct then press "R" to repeat the test.

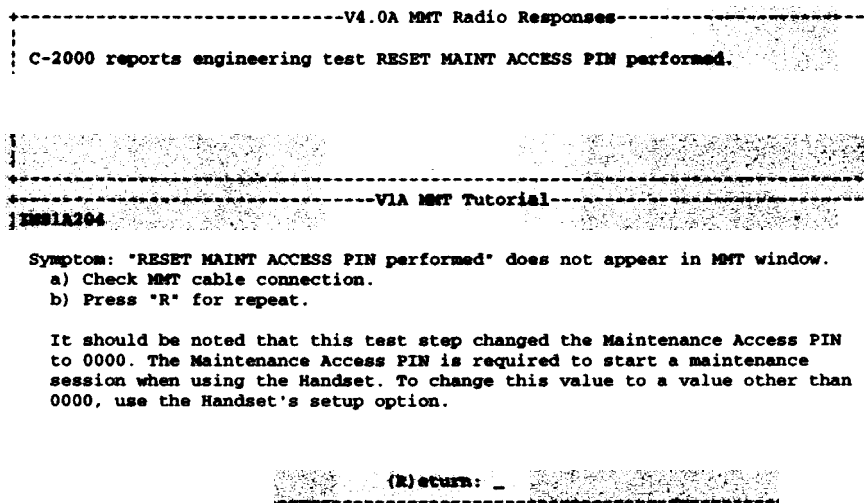


Figure 9.1.9. Rest Maintenance Access Passcode MMTI Troubleshoot Screen.