Lynx ® NGT-9000
MultiLink Surveillance System

Model: NGT-9000, NGT-9000+, NGT-9000D, and NGT-9000D+
Part Number: 9029000-20000 (Panel Mount)

Model: NGT-9000R, NGT-9000R+, NGT-9000RD, and NGT-9000RD+
Part Number: 9029000-40000 (Remote Mount)

Installation Manual

This manual contains installation instructions and recommended flightline maintenance information for the Lynx NGT-9000 MultiLink Surveillance System, Configuration Module, and Directional Antenna. Guidelines for external equipment necessary for installation are included. This information is supplemented and kept current by revisions, service letters and service bulletins.

ACSS ®
An L3Harris & Thales Company

Foreword

This manual provides information intended for use by persons who, in accordance with current regulatory requirements, are qualified to install this equipment. Installation requirements may vary, depending on the particularities of each aircraft, and this manual is intended as a guideline for that purpose. This manual assumes familiarity with the setup and operation of the aircraft systems that interface with the Lynx NGT-9000.

If further information is required, please contact:

> **Aviation Communications & Surveillance Systems**
> 19810 North 7th Avenue
> Phoenix, AZ. 85027-4741, USA
> Attn: Customer Order Administration
> Phone: +1 (623) 445-7040
> Fax: +1(623) 445-7004
> E-mail: acss.orderadmin@L3Harris.com
> Web: https://www.l3commercialaviation.com/avionics

If the Lynx is showing failed conditions or if troubleshooting support is needed, you may contact the 24/7 Customer Support at the below number. If a warranty exchange or repair is needed, direction will be given on this.

> Telephone: (623) 445-6999, or Email: crc.acss@L3Harris.com

To submit your P.O. for new purchases, enablement codes, to inquire about lead times or for out-of-box failures, please contact the L3 ACSS Order Admin Team:

> Telephone: (623) 445-7040, or Email: ACSS.Orderadmin@L3Harris.com

Should Lynx customers need to send their unit in for a warranty exchange or repair, contact the L3 ACSS Repair Center at:

> Telephone: (623) 445-7030, or Email: ACSS.PHXRepair@L3Harris.com

We welcome your comments concerning this manual. Although every effort has been made to keep it free of errors, some may occur. When reporting a specific problem, please describe it briefly and include the manual part number, the paragraph/figure/table number, and the page number. Send your comments to the address or email above:

The NGT-9000 is covered by one or more of the following patents: 9,285,472 and 8,736,465. Other patents pending.

About This Manual

SECTION 1 – GENERAL INFORMATION

    This section provides the following information: unit configurations, unit functionality, items required but not supplied with the unit, equipment specifications, interfaces, and installation approval/limitations.

SECTION 2 - INSTALLATION

    This section contains instructions to locate, assemble and install the Lynx NGT-9000 MultiLink Surveillance System as well as information for unpacking equipment, and inspection procedure for in-shipment damage.

SECTION 3 – INSTALLATION CHECKOUT

    This section contains instructions for post installation setup, post installation and return to service checkout.

SECTION 4 – MAINTENANCE

    This section contains general flightline maintenance procedures. It includes periodic maintenance, troubleshooting and instructions for the return of defective components.

APPENDIX A – SIGNAL AND CABLE CHARACTERISTICS

    This appendix defines the electrical characteristics of all input and output signals.

APPENDIX B – ENVIRONMENTAL QUALIFICATION FORM

    This appendix provides the environmental qualification test data.

APPENDIX C – EQUIPMENT COMPATIBILITY AND DIAGRAMS

    This appendix provides specific information on compatible multi-functional displays.

APPENDIX D – TSO AND FAILURE CLASSIFICATION INFORMATION

    This appendix provides TSO and Failure Classification information for the Lynx NGT-9000 and NGT-9000R.

APPENDIX E – LYNX EVENT QUESTIONNAIRE

    This appendix provides a customer form that may be filled out and returned along with a returned unit to ACSS.

Descriptions for Warnings, Cautions, and Notes are used throughout the manual to highlight important information.

    A WARNING is used to give notice to or call one's attention to beforehand especially of danger (such as a warning to a Flight Crew person or a warning to a mechanic before performing a dangerous task).

    A CAUTION is a statement that expresses the need for heightened awareness to conditions that can cause damage to equipment.

    A NOTE is used to point out a procedure, event, or practice that it is desirable to highlight.

Disclaimer

This manual contains information that is considered relevant only at the time of distribution with the ACSS product for which it is shipped. Information in this manual is subject to change without notice.

References

To get an up-to-date listing of all ACSS technical publications and service literature go to http://support.acsscustomerservices.com.

Contact Customer Service [(623) 445-7070] to determine availability of technical publications and directives.

Service Literature	Description
SB9029000-1	Service Bulletin to inform customers of Software Release 1.2 for the panel-mount models of the NGT-9000.
SB9029000-2	Service Bulletin to inform customers of Software Release 2.0.
SB9029000-3	Service Bulletin to inform customers that due to variability in 14 VDC aircraft power sources, Hardware MOD A may be required to ensure consistent power up operation. (Compliance is optional.)
SB9029000-4	To inform customers of a TAS antenna calibration error causing the bearing calibration performed by the NGT to become corrupted and fail. MOD B is recommended.
SB9029000-5	Service Bulletin to inform customers of Software Release 2.1.
SB9029000-6	Service Bulletin to inform customers of Software Release 3.0.
SB9029000-7	Service Bulletin to inform customers of Software Release 3.1.
SB9029000-8	Service Bulletin to inform customers of Software Release 3.2.
SB9029000-9	Service Bulletin to inform customers of Software Release 3.2.1.
SB9029000-10	Service Bulletin to inform customers of Software Release 3.2.2.
8210400-001	Service Bulletin to update power amplifier component and change the label with new FCC identification. MOD C is optional.
SL-300	Service Letter to alert dealers and end customers of a requirement for the aircraft owner or owner proxy to sign and return the attached database end user license agreement (EULA).
SL-303	Service Letter to provide information on availability of coax pigtail assemblies to ease installation and reduce installation time
SL-304	To inform customers of the approval of deviations to the Lynx NGT-9000.
SL-306	To provide notification to installers concerning connector engagement issues causing intermittent operation of the NGT-9000.
SL-308	To provide information about audio noise being heard in the audio system.
SL-310	The FAA has released new guidance streamlining the installation of TSO authorized ADS B out systems meeting certain conditions.

Service Literature	Description
SL-313	To inform customers of ForeFlight app compatibility with PIM-9000 and provide instructions to configure the PIM-9000 for its use. (Cancelled)
SL-317	To inform customers that Release 2.1 requires the 68DC, 71DC, and 72DC databases be obtained from Jeppesen®.
SL-318	To inform installers that Avionics equipment that does not meet the ARINC 735B standard should not be connected to the suppression bus of the Panel Mount NGT-9000.
SL-319	To provide customers with a list of GPS Antennas that are approved for use with the NGT-9000/-9000R.
SL-326	To provide customers with information on recent activity involving the repositioning and activation of additional SBAS/WAAS satellites that has resulted in a sequencing issue that can degrade Lynx GPS satellite accuracy calculations. See SW3.1 for resolution.
SL-336	To inform customers that technical manuals, software, databases, and STC's for the Lynx® Series product line are to be obtained from ACSS.

PUBLICATION	DESCRIPTION
0040-17000-01	Pilot's Guide for the NGT-9000
0040-17250-01	Pilot's Guide for the CP-2500
0040-17251-01	Installation Manual for the CP-2500
009-11501-001	User Guide for the WX-500
009-11500-001	Installation Manual for the WX-500
0031-17001-01	AML STC SA02444AK for the NGT-9000/-9000R
0031-17003-01	AML STC SR02471AK for the NGT-9000/-9000R (for rotorwing)

List of Effective Pages

<u>Revision History</u>

Revision A ....January 15, 2015
Revision B..February 60, 2015
Revision C...March 12, 2015
Revision D ....June 10, 2015
Revision E.. July 24, 2015
Revision F ....September 15, 2015
Revision G .... November 23, 2015
Revision H ....June 8, 2016
Revision J.. November 7, 2016
Revision K .... November 30, 2016
Revision L..March 20, 2017
Revision M... July 13, 2017
Revision N ....March 15, 2018
Revision P...June 19, 2018
Revision R.. September 10, 2018
Revision T..May 2, 2019
Revision U ....June 10, 2019
Revision V ....June 20, 2019
Revision W...August 29, 2019

<u>Total number of pages in this publication consists of the following:</u>

Title page
A Page
i thru xviii
1-1 thru 1-50
2-1 thru 2-34
3-1 thru 3-54
4-1 thru 4-52
A-1 thru A-24
B-1 thru B-4
C-1 thru C-12
D-1 thru D-14
E-1 thru E-2

Record of Temporary Revisions

Instructions on each page of a temporary revision tell you where to put the pages in your manual. Remove the temporary revision pages only when discard instructions are given. For each temporary revision, put the applicable data in the record columns on this page.

TEMPORARY REVISION NUMBER	TEMPORARY REVISION DATE	TEMPORARY REVISION STATUS	DATE PUT IN MANUAL	BY*	DATE REMOVED FROM MANUAL	BY*
01	April 26, 2019	Inactive	April 26, 2019	A	May 2, 2019	A

*The initial A in this column indicates ACSS has done this task.

Revision Highlights

Revision W is a republication. This republication completely replaces the existing book. Discard all previous revisions of this manual.

- Update company logo.
- Update references.
- Pg. A: Update email addresses to (L3Harris.com).
- Pg. 1-19, 1-22, 1-25: Incorporate Modification C (Update FCC Identifier for MOD C and later).
- Pg. 2-10: Add recommended lamp statement to Traffic Alert bulletin in para. 2.3.5.
- Pg. 3-20: Add note concerning hyphen in foreign tail numbers (para 3.7.1).
- Pg. 3-40: Add notes concerning foreign tail numbers (para. 3.11).
- Pg. 4-3: Add new paragraph with website information for fault and installation support.
- Pg. C-3: Add note for RS-422 baud rate setting.
- Pg. E-1 and E-2: Incorporate new Appendix E for customer questionnaire.

Revision V History:
- Pages 1-33 thru 1-36: Updated grounding clip description and added Grounding Clip, P/N 9002463-001 to Table 1-11 thru Table 1-14.
- Page 1-37: Added new Table 1-15 for Remote Mount Installation Kit P/N 9060-17500-03 for OEM Specific Installations.
- Page 2-3: Added information for Installation Kit P/N 9060-17500-03.
- Page 2-21: Updated Paragraphs 2.3.7.2.1.4 and 2.3.7.2.2.4, and Figure 2-12 to include information for the new Grounding Clip, P/N 9002463-001.

Table of Contents

Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

List of Illustrations

List of Illustrations (continued)

List of Tables

Abbreviations, Acronyms, and Symbols

ITEM	DEFINITION
°	Degrees
°C	Degrees Celsius
°F	Degrees Fahrenheit
1090ES	1090 megahertz extended squitter
AC	Advisory Circular
Ack	Acknowledge
ACSS	Aviation Communications & Surveillance Systems
ADF	Automatic Direction Finder
ADS-B	Automatic Dependent Surveillance-Broadcast
ADS-R	Automatic Dependent Surveillance - Rebroadcast
AHRS	Attitude & Heading Reference System
AIRB	Basic Airborne Situation Awareness
AIRMET	Airmen's Meteorological Information
AML	Approved Model List
amp	Ampere
APP	Applications
ARINC	Aeronautical Radio, Incorporated
APS	Aviation Products Sector
ASA	Aircraft Surveillance Applications
ASSAP	Airborne Surveillance and Separation Assurance Processing
ATAS	ADS-B Traffic Advisory System
ATC	Air Traffic Control
ATCRBS	Air Traffic Control Radar Beacon System
ATM	Air Traffic Management
AWG	American Wire Gauge
BCD	Binary Coded Decimal
BDC	
BIT	Built In Test
BNR	Binary
Cal	Calibration
CAWS	Caution And Warning System
CAZ	Collision Airspace Zone
CCW	Counter Clock Wise
CD	Compact Disc
CDTI	Cockpit Display of Traffic Information
CFIT	Controlled Flight Into Terrain
CFR	Code of Federal Regulations
Com or COM	Communication
CONUS	Continental United States
CW	Clock Wise
dB	Decibel
dBm	Decibels referenced to one Milli-watt
dc	Direct Current
DCM	Detachable Configuration Module
DB	Database
dens	Antenna Diversity, Extended Squitter, Enhanced Surveillance, Surveillance Identifier Code (DO-181E, section 1.4.4: optional features designations)
DL	Data Loading
DISC	Discrete
DME	Distance Measuring Equipment
DO-	RTCA Document Number Prefix (i.e., DO-160)

Abbreviations, Acronyms, and Symbols

ITEM	DEFINITION
DTIF	Display Traffic Information File
EFD	Electronic Flight Display
EHS	Enhanced Surveillance
EGNOS	European Geostationary Navigation Overlay Service
EMI	Electro-Magnetic Interference
ESDS	Electrostatic Discharge Sensitive
EULA	End User License Agreement
EVAcq	Enhanced Visual Acquisition Application
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FAQ	Frequently Asked Questions
FCC	Federal Communications Commission
FIS-B	Flight Information Services - Broadcast
fl	Foot-Lambert
FMS	Flight Management System
FPGA	Field Programmable Gate-Array
FSS	Flight Service Station
Ft	Feet
FW	Firmware
g	Gravitational Acceleration
GAGAN	GPS-Aided GEO Augmented Navigation
GHz	Giga Hertz
GPS	Global Positioning System
GNSS	Global Navigation Satellite System
HFOM	Horizontal Figure of Merit
H/W or HW	Hardware
hPa	Hectopascal
Hz	Hertz
ICAO	International Civil Aviation Organization
i.e.	That is
IAW	In Accordance With
in.	Inches
ID	Identification
in Hg	Inches of Mercury
JSF	Jeppesen Security File
Kg	Kilogram
kHz	Kilohertz
Kts	Knots
I/O	Input / Output
lb.	pounds
LLC	Limited Liability Company
LRU	Line Replaceable Unit
Lynx MAT	Maintenance Application Tool (term replaced by MPC (MAT))
m	Meter
Max	Maximum
MFD	Multi-Functional Display
MHz	Megahertz
mb	Millibars

Abbreviations, Acronyms, and Symbols

ITEM	DEFINITION
MCP	Mode Control Panel
METAR	Meteorological Aerodrome Reports
MOPS	Minimum Operational Performance Standards
MPC	Maintenance Personal Computer
MPC (MAT)	Maintenance Personal Computer (Maintenance Application Tool)
mm	Millimeter
MSAS	MTSAT Satellite-based Augmentation System
MSG	Message
MSS	MultiLink Surveillance System
mW	milliwatt
N/A	Not Applicable
NACp	Navigation Accuracy Category for position
NACv	Navigation Accuracy Category for velocity
NAR	Non Altitude Reporting
NAS	National Airspace System
NC	Not Connected
NEXRAD	Next Generation Radar Reflectivity
NGT	Not an abbreviation
NIC	Navigation Integrity Category
No.	Number
NOTAM	Notice to Airmen
NVM	Non-Volatile Memory
NVIS	Night Vision Imaging System
OEM	Original Equipment Manufacturer
Orig	Original
PAZ	Protected Airspace Zone
PC	Personal Computer
P/N	Part Number
PBIT	Periodic Built-In Test
PED	Personal Electronic Device
PFD	Primary Flight Display
RAM	Random Access Memory
RAIM	Receiver Autonomous Integrity Monitoring
RBA	Risk-Based Authentication
RMA	Return Material Authorization
RMS	Radio Management System or Root Mean Square
RF	Radio Frequency
RTCA	RTCA, Inc.
Rx	Receive
SAE	Society of Automotive Engineers
S/N	Serial Number
SATCOM	Satellite Communications
SIGMET	Significant Meteorological Information
S/W or SW	Software
SBAS	Satellite Based Augmentation systems
Sec	Seconds
SPI	Special Position Identification

Abbreviations, Acronyms, and Symbols

ITEM	DEFINITION
STC	Supplemental Type Certification
STAB	Stabilization
STIF	Standard TCAS Intruder File
SUA	Special Use airspace
SURF	Basic Surface application
TA	Traffic Advisory
TAF	Terminal Area Forecasts
TAS	Traffic Advisory System
TAWS	Terrain Awareness and Warning System
TCAS	Traffic Alert and Collision Avoidance System
TFR	Temporary Flight Restrictions
TIS-B	Traffic Information Service – Broadcast
TSAA	Traffic Situational Awareness with Alerts (i.e. ATAS)
TSO	Technical Standard Order
TAWS	Terrain Awareness and Warning System
UAT	Universal Access Transceiver
USB	Universal Serial Bus
UTC	Coordinated Universal Time
Vdc	Volts Direct Current
VFR	Visual Flight Rules
VHF	Very High Frequency
VOR	VHF Omni-directional
VSWR	Voltage Standing Wave Ratio
W	Watts
WAAS	Wide Area Augmentation System
WiFi	Wireless Fidelity
WOW	Weight On Wheels
Wx	Weather

Section 1
General Information

1.1   INTRODUCTION

This section includes descriptions, specifications, TSO information, equipment required but not supplied, and installation approval and limitations for the Lynx® MultiLink Surveillance System Lynx NGT-9000 family (Release 1, Release 2, and Release 3).

Available models of the panel mount NGT-9000 are detailed in Table 1-1 and an example of the unit is shown in Figure 1-1. Available models of the remote mount NGT-9000R are detailed in Table 1-2 and an example of the unit is shown in Figure 1-2.

Figure 1-1: Panel mount NGT-9000

Table 1-1: System Components Panel mount NGT-9000

COMPONENT	MODELS (1) (2)	H/W PART NO.	S/W PART NO. (3)

MultiLink Surveillance System	NGT-9000
	NGT-9000+
	NGT-9000D
	NGT-9000D+
		9029000-20000	Release 1
			  9020010-001
			  9020010-002
			  9020010-003
			Release 2
			  9020010-004
			  9020010-005
			Release 3
			  9020010-006
			  9020010-007
			  9020010-008
			  9020010-009
			  9020010-010

Table 1-1: System Components Panel mount NGT-9000

COMPONENT	MODELS [(1) (2)]	H/W PART NO.	S/W PART NO. [(3)]
Detachable Configuration Module	DCM	9230-17003-01	- -
WiFi Module	PIM-9000	9230-17005-01	- -
Enablement Certificate [(4)], for activating TAS, TCAS, Diversity, TAWS, or Terrain Display Only (i.e. Terrain Vision)	See Table 1-3	- -	- -
Directional Antenna (optional)	See Table 1-21	- -	- -
GPS Antenna	See Table 1-24	- -	- -
L-Band Antenna	See Table 1-26	- -	- -

Notes:

(1) The "+" at the end of the model number indicates Active Traffic Interrogation (TAS or TCAS) functionality. The "D" at the end of the model number indicates Diversity functionality.

(2) Models NGT-9000D, +, and D+ require a function activation code that is set up during installation. See paragraph 1.3.5.

(3) Details on software releases are located in paragraph 1.9. [Release 1 is SW Release 1.0, 1.1, 1.2. Release 2 is SW Release 2.0, 2.1. Release 3 is SW Release 3.0, 3.1, 3.2, 3.2.1, 3.2.2].

(4) For Release 3.2 and later, the ATAS option is always available and no longer requires an enablement certificate.

Figure 1-2: Remote Mount Lynx NGT-9000R

Table 1-2: System Components Remote Mount Lynx NGT-9000R

COMPONENT	MODELS [1] [2]	H/W PART NO.	S/W PART NO. [3]

MultiLink Surveillance System	NGT-9000R
	NGT-9000R+
	NGT-9000RD
	NGT-9000RD+
		9029000-40000	Release 1
			    9020010-002
			    9020010-003
			Release 2
			    9020010-004
			    9020010-005
			Release 3
			    9020010-006
			    9020010-007
			    9020010-008
			    9020010-009
			    9020010-010

Detachable Configuration Module	DCM	9230-17003-01	- -
WiFi Module	PIM-9000	9230-17005-01	- -
Enablement Certificate [4], for activating TAS, TCAS, Diversity, or TAWS	See Table 1-3	- -	- -
Directional Antenna (optional)	See Table 1-21	- -	- -
GPS Antenna	See Table 1-24	- -	- -
L-Band Antenna	See Table 1-26	- -	- -
CP-2500 Control Panel	See Table 1-32	9080-17250-( )	- -

Notes:

(1) The "+" at the end of the model number indicates Active Traffic Interrogation (TAS or TCAS) functionality. The "D" at the end of the model number indicates Diversity functionality.

(2) Models NGT-9000RD, R+, and RD+ require a function activation code that is set up during installation. See paragraph1.3.5.

(3) Details on software releases are located in paragraph 1.9. [Release 1 is SW Release 1.0, 1.1, 1.2. Release 2 is SW Release 2.0, 2.1. Release 3 is SW Release 3.0, 3.1, 3.2, 3.2.1, 3.2.2].

(4) For Release 3.2 and later, the ATAS option is always available and no longer requires an enablement certificate.

1.2   FUNCTIONAL DESCRIPTION

The Lynx MultiLink Surveillance System (also referred to in this manual as the Lynx NGT-9000) is a Mode S Level 2 dens Class 1 Transponder providing Automatic Dependent Surveillance-Broadcast (ADS-B) out on 1090 MHz with an integrated GPS receiver. The unit also receives ADS-B data via 978 MHz and 1090 MHz. Some models support optional Active Traffic (TAS or TCAS) and/or antenna Diversity functionality.

Maintenance and configuration setup is accomplished via the USB port located on the front of the unit or by an optional WiFi connection.

1.2.1   Software Release Summary

Release 2.0 provides the optional functions of ATAS (ADS-B Traffic Advisory System) and Class B TAWS (Terrain Awareness and Warning System).

Release 2.1 provides the optional function of Lightning Detection, a discrete switch option for setting the transponder to Standby, additional display interfaces, and an option to display terrain without audio and visual alerting.

Release 3.0 provides the optional function of Traffic Alert and Collision Avoidance System (TCAS) that would be used in place of the TAS function. Note – This is a TCAS I system that will be referenced as "TCAS" throughout the manual.

Release 3.1 improves SBAS GNSS satellite tracking and HFOM reporting.

Release 3.2 incorporates a new ARINC 429 Control Panel interface and an option for dual ARINC 429 Control Panels. Allow ATAS to be enabled without enablement code. See Service Bulletin SB9029000-8 for other resolved issues. New RS-232 Control Panel feature for Reply Rate (not used by the CP-2500).

An upgrade to Release 3.2 requires certain configuration options be selected for the dual Control Panel feature. If the configuration settings are not made, the unit reverts to Release 3.0/3.1 behavior but with Release 3.2 fixes. The NGT-9000R cannot meet both Release 3.0/3.1 and Release 3.2 ARINC 429 Output capabilities because the single ARINC 429 output is used for either Display (CDTI) output associated with Release 3.0/3.1 or Control Panel feedback associated with Release 3.2.

In addition updates to the MPC (MAT) include removing selection of NY-164 and changing the "save" button function into a "save all" button.

Release 3.2.1 is a minor software update to fix GPS Epoch Rollover issue that results in the panel mount versions of the NGT-9000 System (HW Part No. 9029000-20000) with Software Release Versions 1.0, 1.1, 1.2, 2.0, 2.1, 3.0, 3.1, and 3.2 not providing the full TSO-C157a FIS-B functionality during the period of 6 April 2019 thru 31 December 2019. See SB9029000-9.

Release 3.2.2 is a minor software update that will reduce Traffic Fail message messages and correct ground velocity computations. See SB9029000-10. This updated includes an update to the MPC (MAT) software.

1.2.2   Transponder Functional Overview

The unit receives Mode A, Mode C, and Mode S interrogations on 1030 MHz and replies on 1090 MHz. The unit is equipped with IDENT capability that activates the Special Identification (SPI) pulse for 18 seconds.

Ground stations and airborne TCAS can interrogate Mode S Transponders individually using a 24-bit ICAO Mode S address, which is unique to the particular aircraft. In addition, ground stations may interrogate the unit for its transponder data capability and the aircraft's Flight ID.

1.2.3   GPS Functional Overview

The GPS function utilizes signals from Global Positioning System (GPS) satellite constellation and Satellite-Based Augmentation Systems (SBAS) such as the USA Wide Area Augmentation System (WAAS), European EGNOS, Indian GAGAN, and the Japanese MSAS. Currently it supports WAAS and WAAS compatible SBAS systems.

The internal GPS function provides position, velocity, time, and integrity (NIC, NACp, etc.) information to the ADS-B functions and meets the requirements of 14 CFR 91.227.

1.2.4   Lightning Detection (optional)

Release 2.1 and later. The WX-500 Stormscope is a Weather Mapping System that provides lightning discharge information. This information is shown on the right application screen of the NGT-9000 Panel Mount unit.

1.2.5   ADS-B System Overview

The ADS-B system has the following capabilities:

- 1090ES In (1090MHz) - Receive ADS-B, ADS-R and TIS-B

- 1090ES Out (1090MHz) - Transmit ADS-B

- UAT In (978MHz) - Receive ADS-B, ADS-R, TIS-B, and FIS-B data

The Automatic Dependent Surveillance-Broadcast (ADS-B) improves situational awareness and flight safety by providing real time traffic information. The ADS-B In function is used to receive ground station supported TIS-B and ADS-R traffic, and direct communication with ADS-B out equipped aircraft.

The ADS-B Out (1090MHz) function is used to periodically broadcast (without interrogation) information about the aircraft that includes aircraft identification, position, altitude, velocity and other aircraft status information.

The Automatic Dependent Surveillance – Re-broadcast (ADS-R) is a ground based broadcast service that repeats ADS-B messages from one link (1090ES or UAT) to the other link for aircraft with ADS-B In.

Traffic Information Service Broadcast (TIS-B) is a ground based broadcast service that provides secondary surveillance radar (SSR) derived traffic data (ATC transponder equipped aircraft not equipped with ADS-B Out capability) to ADS-B In equipped aircraft.

1.2.6 Traffic Display Functional Overview

The Lynx NGT-9000 monitors the airspace around the aircraft using ADS-B In (and TAS/TCAS if equipped) to show other aircraft on the screen. When within range of a participating ground station TIS-B and ADS-R traffic services are also shown on the screen. Traffic is identified on the screen using corresponding traffic symbols.

The unit also provides TAS, TCAS, and ATAS traffic advisories when TAS, TCAS, and/or ATAS configurations are enabled. A voice audio output announces relative altitude and traffic alerts. The unit has multiple transmit/receive ARINC 429, RS-422, and RS-232 data ports used to transmit data to traffic, weather, and PED displays.

The unit provides the transponder code, reply symbol, and mode of operation to the display.

1.2.7 FIS-B System Overview

The Flight Information Services - Broadcast (FIS-B) function provides pilots with a cockpit display of certain aviation weather and aeronautical information for awareness of own aircraft location with respect to reported weather, including hazardous meteorological conditions (CONUS/ NEXRAD /AIRMETS/ SIGMETS/ NOTAMS/ METARS, etc.), TFR, and TAF (FIS-B products).

NOTE

> CONUS and Regional NEXRAD may not always contain complete data. The data is refreshed every 15 minutes and it is likely to be updated in a future cycle.

FIS-B is advisory information only and is intended to enhance pilot decision-making during strategic flight planning. FIS-B augments traditional sources of this information such as ATC and Flight Service Station (FSS). FIS-B information is provided over the ADS-B Services network on the 978 MHz UAT link when in ground station coverage.

1.2.8 Traffic Awareness System (option) Overview

The Traffic Awareness System (TAS) option is an active system that operates as an aircraft-to-aircraft interrogation device. The unit interrogates transponders in the surrounding airspace similar to ground based radar. When replies to these active interrogations are received, the responding aircraft's range, altitude, and closure rates are computed to plot traffic location and predict collision threats. The unit alerts the flight crew to nearby transponder-equipped aircraft and assists the pilot in the visual acquisition of aircraft that may represent a danger. Traffic information, out to a selected range, is graphically displayed on the unit or alternate display. See Figure 1-3 for an example of own aircraft traffic (UAT, 1090ES, TIS-B, and TAS).

- The system display shows the relative position of traffic using text, shapes and colors.
- The effective active-mode surveillance range is 35 nmi and track 35 ATCRBS intruders simultaneously with the target bearing relative to the nose of own aircraft.
- The tracking of targets is in a cylindrical volume centered on own aircraft that has, at a maximum, a radius of 35 nmi and extends 10,000 ft. above and 10,000 ft. below own aircraft.

1.2.9   ADS-B Traffic Advisory System Overview (optional)

Release 2.0 and later. The ADS-B Traffic Advisory System (ATAS) [previously referred to as TSAA] function provides traffic advisories using ADS-B In information via aural announcements over the cockpit speakers or headset and visually via the display or a cockpit lamp. ATAS and TAS/TCAS may operate at the same time with traffic information being correlated by the unit.

- The system display shows the relative position of traffic using text, shapes and colors.
- The dimensions of Collision Airspace Zone (CAZ) are 500 ft. horizontal radius and +/- 200 relative altitude.
- The dimension of the Protected Airspace Zone (PAZ) is dependent on closure rate. The PAZ dimension decreases as closure rate decreases with a minimum 500 ft. horizontal radius and +/- 300 ft. (Sensitivity A) or +/- 500 ft. (Sensitivity B) relative altitude.
- The effective active-mode surveillance range is 40 nmi and track 60 ATCRBS intruders simultaneously with the target bearing relative to the nose of own aircraft.
- The tracking of targets is in a cylindrical volume centered on own aircraft that has, at a maximum, a radius of 20 nmi and extends 10,000 ft. above and 10,000 ft. below own aircraft.

1.2.10   Traffic Alert and Collision Avoidance System (option) Overview

Release 3.0 and later. The Traffic Alert and Collision Avoidance System (TCAS I) option is an active system that operates as an aircraft-to-aircraft interrogation device. The unit interrogates transponders in the surrounding airspace similar to ground based radar. When replies to these active interrogations are received, the responding aircraft's range, altitude, and closure rates are computed to plot traffic location and predict collision threats. The unit alerts the flight crew to nearby transponder-equipped aircraft and assists the pilot in the visual acquisition of aircraft that may represent a danger. Traffic information, out to a selected range, is graphically displayed on the unit or alternate display.

- The system display shows the relative position of traffic using text, shapes and colors.
- The effective active-mode surveillance range is 35 nmi and track 35 ATCRBS intruders simultaneously with the target bearing relative to the nose of own aircraft.
- The tracking of targets is in a cylindrical volume centered on own aircraft that has, at a maximum, a radius of 35 nmi and extends 10,000 ft. above and 10,000 ft. below own aircraft.

1.2.11   Terrain Awareness and Warning System Overview (optional)

Release 2.0 and later. The `Class B` Terrain Awareness and Warning System (TAWS) function continuously monitors the aircraft's position, altitude, speed, track, and phase of flight and compares the information to an internal terrain, obstacle, and runway database. If TAWS predicts a potential Controlled Flight Into Terrain (CFIT) situation, the system alerts the pilot visually on the Lynx NGT-9000 display, aural announcements over the cockpit speakers or headset, or via cockpit lamps (caution and warning).
- The Remote Mount NGT-9000R does not have a TAWS display available (audio and lamps only).

1.2.12 TerrainVision™

Release 2.1 and later. This optional function provides a terrain display ("TERR Advisory") similar to the TAWS display but without visual or audio alerts.
- This function is not available for the Remote Mount NGT-9000R.
- TerrainVision™ is not considered a Class B TAWS.

1.2.13 Discrete Inputs and Outputs Functional Overview

The Lynx NGT-9000 has discrete inputs and outputs available that can be interfaced to indicator lamps and cockpit switches. The discretes are optional except as noted in the instructions found in the installation section. Input and output discretes are normally open and are set to ground when active, unless otherwise indicated.

- (Discrete Input 1) The IDENT switch activates the IDENT pulse, which highlights the aircraft's symbol on the ATC's radar screen and is identified on the Lynx NGT-9000 or external display / control panel when active.

- (Discrete Input 2) The Audio Mute input is used to mute all audio outputs coming from the Lynx NGT-9000. Audio mute can be connected to other Caution and Warning Systems (CAWS) if required (i.e. TAWS) that needs to mute the traffic system for a higher priority audio annunciation.

- (Discrete Input 3) The On-Ground input (i.e. WOW) is used to signal the Lynx NGT-9000 that the aircraft is on ground. The input can be connected to a squat switch, airspeed monitor, or a collective switch. This discrete can be set in the DCM settings to either ground on ground, open on ground, or not used.

- (Discrete Input 4) The Audio Acknowledge input is used to cancel the audio from a TAWS or Traffic Aural. This discrete is used only when the optional TAWS, TAS/TCAS, or ATAS functionality is configured.

- (Discrete Input 5) Release 3.2 and later. The Control Panel Select input is used to select ARINC 429 interfaced Control Panel #1 or #2. This input must be connected to the control panel LRU that performs this selection.

- (Discrete Input 6) The Standby Mode input is used to place the unit's transponder into Standby. It is intended for use when dual transponders are installed on the aircraft.

- (Discrete Output 1) The TAWS Caution lamp (amber) is used to indicate a terrain caution advisory is present.

- (Discrete Output 2) The TAWS Warning lamp (red) is used to indicate a terrain warning is present.

- (Discrete Output 3) The Traffic Alert lamp (amber) is used to indicate a TAS/TCAS, or ATAS Traffic Advisory (TA).

- (Discrete Output 5) The Audio Mute can be connected to other CAWS alerting systems, if required, that need to mute the traffic system (i.e. TAS/TCAS) for a higher priority audio annunciation (i.e. TAWS). This output will be active when the Audio Mute Input (Discrete Input 2) is active.

- (Discrete Output 6) The ADS-B Out Fail lamp (amber) is used to indicate that ADS-B out is not providing ADS-B output data. The lamp has multiple visual cues used to identify operational status. Refer to the installation checkout section for details.
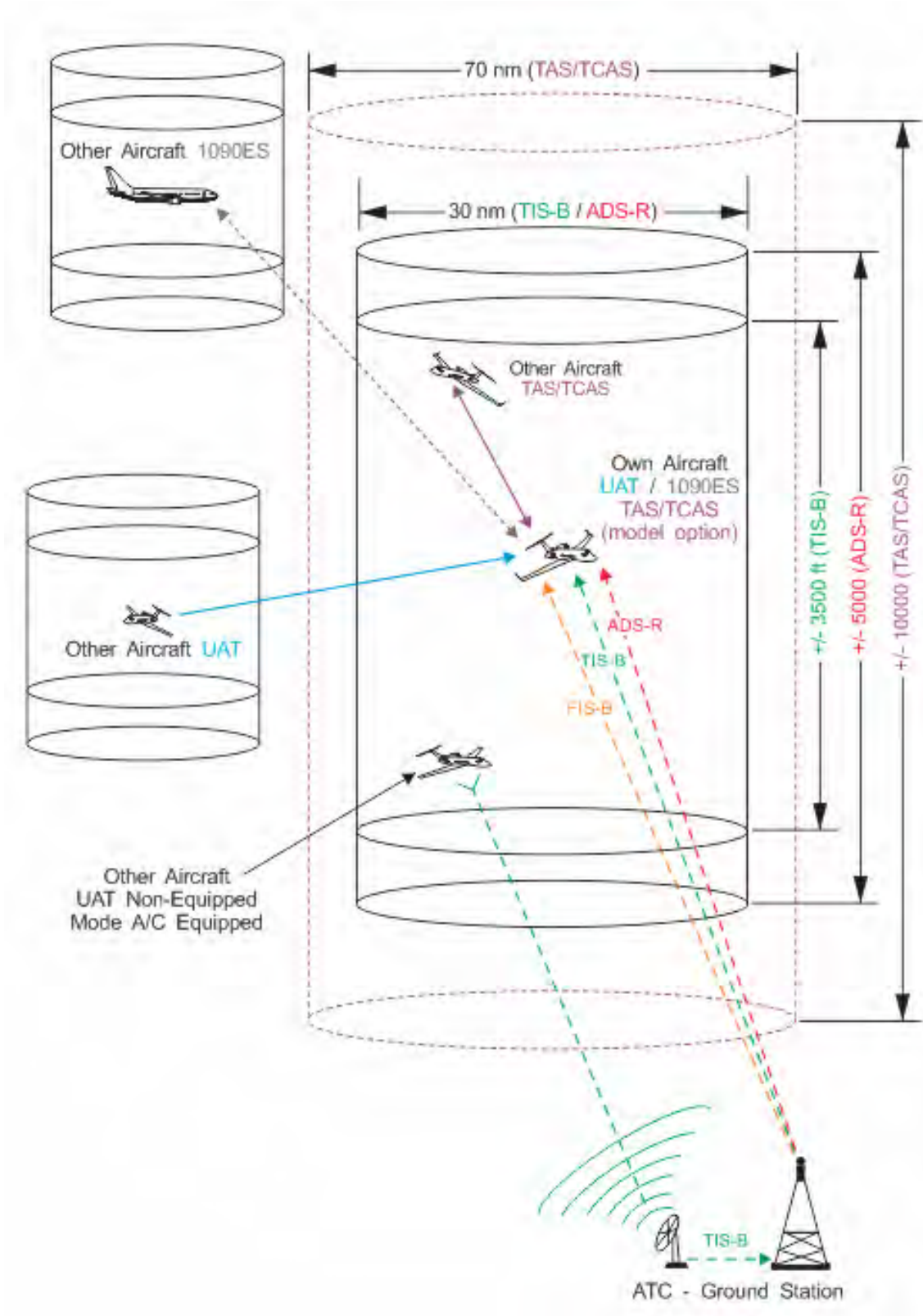
Figure 1-3: Example of Own Aircraft UAT, 1090ES, and TAS/TCAS Traffic

1.3   EQUIPMENT DESCRIPTIONS

1.3.1   Panel mount NGT-9000

The panel mount NGT-9000 includes a Detachable Configuration Module (DCM). The unit is equipped with a main sub-D connector (J1) and RF connectors. A USB port is available to establish communication between the unit and a maintenance computer for installation and maintenance activities.

A panel-mounted rack is required for installation. Additional third party components are necessary to complete the installation. Refer to paragraph 1.5 for component requirements and installation considerations. Details on these components are provided in paragraph 1.11.

The unit has a bezel containing a multifunction touch screen that is designed to fit into a MARK width panel. LED backlighting is controlled by the auto-dimming functionality provided by the ambient light sensor or by using the pilot adjustable brightness control.

The multifunction touch screen has full operational control providing the means to select screen views and interface with transponder, traffic, weather, and TAWS information. The following information is available for display and control:

- Flight ID or aircraft Tail Number

- Transponder and Traffic Mode of Operation

- ADS-B Status

- VFR Select and Squawk Code Input

- IDENT

- Audio Acknowledge (available when Class B TAWS, TAS, TCAS, or ATAS is enabled)

- Traffic

- TAS Mode (optional - model specific)

- TCAS Mode (optional - model specific)

- ATAS Mode (optional)

- Weather (FIS-B graphic)

- Weather (FIS-B graphical winds and temps aloft)

- Weather (FIS-B textual data)

- TAWS (optional)

- TerrainVision^{TM} (optional)

- Lightning Detection (optional)

1.3.2   Remote Mount Lynx NGT-9000R

The remote mount NGT-9000R includes a Detachable Configuration Module (DCM). The unit is equipped with a main sub-D connector (J1) and RF connectors. A USB port is available to establish communication between the unit and a maintenance computer for installation and maintenance activities.

A mounting tray is required for installation. Additional third party components are necessary to complete the installation. Refer to paragraph 1.5 for component requirements and installation considerations. Details on these components are provided in paragraph 1.11.

The remote mount NGT-9000R provides the same functionality as the panel mount in regards to the available outputs for display of traffic and weather data, but is controlled using a Control Panel.

The CP-2500 Control Panel transmits and receives information via RS-232. Refer to Appendix A for details.

Release 3.2 or later. An ARINC 429 interface is available to transmit and receive information to a compatible Control Panel (such as the RMS-555). In addition, the ARINC 429 interface can be configured for dual Control Panels (used one at a time). Note - that this A429 control panel interface does not include necessary TCAS traffic or TAWS control information. Refer to Appendix A for details.

1.3.3   Model and Feature Options

- The Diversity option is a specific model of the Lynx NGT-9000 that offers enhanced traffic awareness receiving data via 1090MHz using the ADS-B service.

- The TAS and TCAS options have a specific model of the Lynx NGT-9000 that provides additional traffic awareness when ADS-B equipped aircraft are not in the area providing Traffic Alert (TA) warnings to the flight crew. See paragraph 1.2.8 for TAS functionality or 1.2.10 for TCAS functionality.

- The Diversity and TAS and TCAS options require a function activation code that is entered using the MPC (MAT) during installation. Models with Diversity require the installation of an additional L-Band antenna. The TAS and TCAS options require the installation of a directional antenna. If the TAS or TCAS option is enabled on a Lynx NGT-9000 model with Diversity (D+ or RD+), the TAS/TCAS directional antenna is used as the diversity antenna. See paragraph 1.2.9 and 1.2.11 for an overview of this feature.

- The ATAS, Class B TAWS, and Terrain Advisory (no audio or visual alerts) features are configuration options that require a function activation code that is entered using the MPC (MAT) during installation. For Release 3.2 and later, the ATAS option is always available and no longer requires an enablement certificate. See paragraph 1.2.9 and 1.2.11 for an overview of these features.

1.3.4   Detachable Configuration Module (DCM)

The DCM part number 9230-17003-01 is part of the Lynx NGT-9000 and is used for the storage of configuration data. The DCM is permanently installed with the wire harness and interfaces to the unit via a 4-wire interface from the DCM.

The configuration settings are stored in the unit's non-volatile memory and are entered via commands sent over the maintenance interface to configure such items as input / output interface options, aircraft specific options (including TAS, TCAS, Diversity, ATAS, and TAWS) and installation calibration parameters.

When the configuration data is set, Lynx NGT-9000 units may be swapped and the configuration remains with the aircraft.

1.3.5   Function Activation Code

Table 1-3 provides the list of enable certificates for each function available from ACSS. Function activation codes are required if installing and activating TAS, TCAS, Diversity, and TAWS options. The Function activation is a 10-digit code that is entered during installation using the MPC (MAT) to install either of these options. The function activation may be purchased and shipped with the unit. If the function activation code is not included, contact ACSS *After Market Customer Service* to obtain the code. Be sure to have the Mode S ID (e.g. ICAO) available for the service representative. The function activation is associated with the aircraft ICAO address and will only work for that aircraft ID.

Table 1-3: Enablement Certificate Part Numbers

DESCRIPTION	PART NUMBER
Enablement Certificate, NGT-9000, TAS	0035-17001-01
Enablement Certificate, NGT-9000, Diversity	0035-17002-01
Enablement Certificate, NGT-9000, ATAS[1]	0035-17004-01
Enablement Certificate, NGT-9000, Class B TAWS (TAWS for fixed wing aircraft only)	0035-17005-01
Enablement Certificate, NGT-9000, TCAS I and ATAS [1]	0035-17006-01
Enablement Certificate, NGT-9000, Terrain Display Only (No Alerts) (i.e. Terrain Vision)	0035-17010-01
Enablement Certificate, NGT-9000, TAS Ground Filtering Altitude	0035-17011-01

Note:
 (1) For Release 3.2 and later, the ATAS option is always available and no longer requires an enablement certificate.

1.4 INTERFACES

The unit supports a number of built-in interfaces as described in Table 1-4. A system block diagram is provided in Figure 1-4. Additional information on these interfaces is detailed below. Refer to Appendix A for interface options and Appendix C for interconnect diagrams.

Table 1-4: Built-in Interfaces

Interface (No.)	Function
ARINC 429 Input (4)	Receive ADC and AHRS data. Release 3.2 Optional Transponder Control Panel interface (Remote Mount Lynx NGT-9000R).
ARINC 429 Output (1)	Transmit to a traffic display. Release 3.2 Optional Transponder Control Panel interface (Remote Mount Lynx NGT-9000R).
Discrete Inputs (17)	Receive Gillham Altitude Encoder, IDENT Command, Audio Mute, In Air / On Ground (WOW) status, Audio Acknowledge, and Standby Mode
Discrete Output (9)	TAWS Alert (caution / warning), Traffic Advisory (TAS / ATAS / TCAS), Audio Mute indicator, and Transmit ADS-B Out Fail
RS-232 Unidirectional (1)	Altitude Encoder port
RS-232 Input-Output (2)	Wi-Fi accessory port Receive Lightning data (panel mount NGT-9000) CP-2500 Control Panel interface (Remote Mount Lynx NGT-9000R) GPS Position Output (see WAAS/GPS Output)
RS-422 Input (1)	Receive Lightning data (panel mount NGT-9000)
RS-422 Output (1)	External display port GPS Position Output (see WAAS/GPS Output)
WAAS/GPS Output	Certified 5 Hz, RS-422/RS-232 and WiFi Class Beta 1 GPS output. Qualified for LNAV approaches only per TSO-C129d Table 1-1. (Configuration setting listed as L-3 Protocol 1)
RF Suppression Input-Output (1)	Provides on aircraft suppression of the L-band equipment
Analog Audio Output (1)	Connects to Audio Panel un-muted input
I2C Port (1)	Detachable configuration module
GPS Antenna Port	Connect to a top mount antenna providing GPS data to support ADS-B functionality
L-Band Antenna Port	Connects to the bottom mount antenna. Provides UAT 978 MHz input, 1030/1090 MHz extended squitter input/output to support ADS-B/ATAC Transponder functionality
Extra Antenna Ports	Connects to a top mounted antenna (L-Band or Directional) providing optional TAS, TCAS or Diversity functionality
USB	Maintenance Interface

Note: Not all interfaces are used. Some are spares, reserved for future use, or optional.

Figure 1-4: System Block Diagram
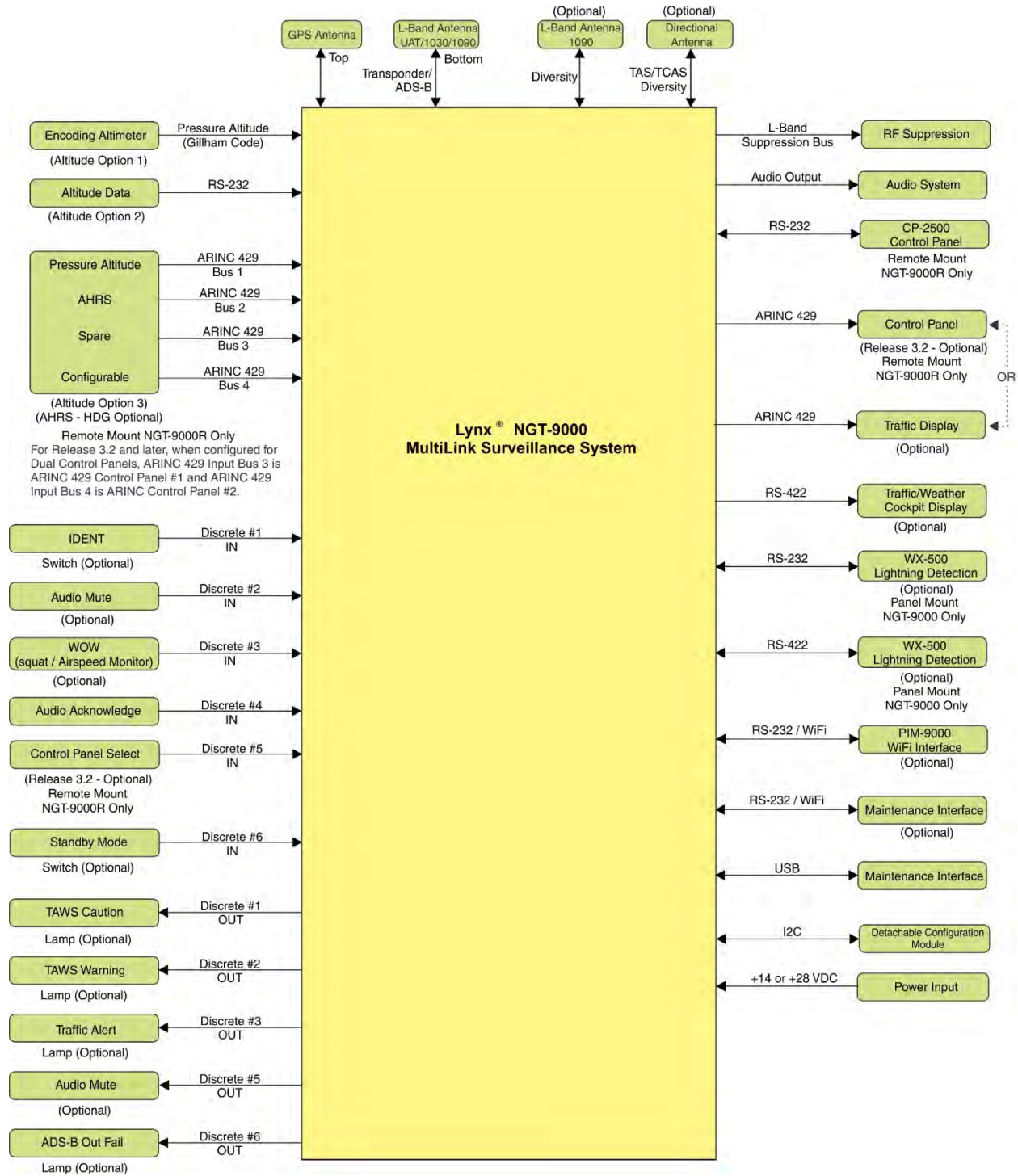
Note - This diagram has release 1, 2, and 3 information. Review the interface information in this section for specific details.

1.4.1   ADS-B Out Fail

The ADS-B Out Fail is a discrete output that provides an indication of when there is a loss of ADS-B Out. The discrete output is a ground/open type and is able to sink 250mA.

1.4.2   AHRS Input

An optional ARINC 429 input is provided to interface to an AHRS (heading) system in order to provide data for Enhanced Surveillance (EHS) and ADS-B data.

Note - If interfaced with a WX-500 that has a synchro heading input, which may be used as the heading (AHRS) input.

1.4.3   Altitude Encoder Input

Pressure altitude input is required on either an RS-232 input port, 11 Wire Gillham Input Port or ARINC 429 Input Port.

1.4.4   Audio Out

One audio out discrete outputs is available that can output a 40 mW signal to equipment with a load of 600 Ohms.

1.4.5   Standby Mode

An optional Standby Mode discrete input is available to place the unit's transponder into Standby. The discrete input is a ground/open type with the GND position setting the unit to standby.

1.4.6   Audio Mute In and Out

The Audio Mute In is used to mute all audio outputs coming from the Lynx NGT-9000 and is required if a CAWS alerting system (i.e. an external TAWS) is installed. The Audio Mute Out is an indication (lamp) that the unit is being muted. The Audio Mute Out can be connected to other CAWS alerting systems if required (i.e. TAS or TCAS) that need to mute the traffic system for a higher priority audio annunciation (i.e. when TAWS is installed).

1.4.7   Audio Acknowledge

Available with Release 2.0 and later, the Audio Acknowledge is used to cancel the audio from a TAWS or Traffic Aural. It is used only when the optional TAWS, TAS, TCAS, or ATAS functionality is configured.

1.4.8   RF Suppression Input/output

The mutual suppression input/output meets the hardware characteristics as defined in ARINC 735B Attachment 8 and is used to provide suppression of L-band equipment on the aircraft. The transponder uses the signal as an input to inhibit decoding of receiver signals when other equipment on the aircraft is transmitting. When the transponder transmits, it asserts a positive voltage on the output to provide the suppression to other systems on the airplane. Avionics equipment that does not meet the ARINC 735B standard should not be connected to the Lynx NGT-9000 suppression bus input/output

1.4.9 Traffic Alert

Traffic Alert is a discrete output that provides an indication (lamp) of a TAS, TCAS, or ATAS Traffic Advisory. The TAS, TCAS, and ATAS are configuration options that are set during installation.

- The TAS traffic advisory requires the Lynx NGT-9000 models with the TAS option (+, D+, R+, or RD+).

- The ATAS traffic advisory is an option that can be used by any model of the Lynx NGT-9000 with Release 2.0 and later.

- The TCAS traffic advisory is an option that can be used by any model of the Lynx NGT-9000 with Release 3.0 and later.

1.4.10 TAWS Caution and Warning Alert

Available with Release 2.0 and later, the TAWS Alerts are discrete outputs that provide an indication (lamp) of a terrain or obstacle Caution or Warning Alert.

Available with Release 2.1 and later, TerrainVision^{TM} is a Terrain Advisory with no audio or visual alerting is available for panel mount NGT-9000.

1.4.11 WiFi Interface

The unit uses a RS-232 bus to interface with the PIM-9000 RS-232. This interface provides traffic and weather information on a personal electronic device via a software application (APP).

1.4.12 WOW Input

The WOW input discrete is optional. The input signals the On Ground status to the unit via squat switch, Airspeed monitor, or a collective switch.

- Do not connect this to a gear switch or a manual pilot switch input.

- An internal algorithmic override that uses ground speed and altitude inputs may override this input and change the air/ground state (ex. a WOW "in-air" state could be changed back to on ground if the Aircraft is sitting on the ground). This is expected behavior. If simulated in-air test is required, use the ground test mode.

1.4.13 Maintenance Interface

The unit can interface to a maintenance computer using either the WiFi interface or the USB port located on the front of the unit. This interface is used for installation setup and fault isolation and is only available while on ground.

1.4.14 GPS Antenna

Antenna performance is critical to the operation of the Unit. The unit requires that the GPS Antenna meet performance requirements specified in TSO-190. Refer to paragraph 1.11.2.

1.4.15 L-Band (978/1030/1090 MHz) Antenna

The L-Band antenna is used by the Unit to receive 978 MHz, 1030 MHz, and transmit/receive 1090 MHz.

If the NGT-9000 is configured for Diversity, then two L-Band antennas are required. If the TAS or TCAS and Diversity option (models D+ or RD+) is used then a top directional antenna may be used instead of the top L-Band antenna. Refer to paragraph 1.11.3.

1.4.16 Directional Antenna

Two models of Directional Antenna available: the NY156 (P/N 805-10003-001) and NY164 (P/N 805-10890-001).The directional antenna is sealed against environmental extremes. The NY156 and NY164 can both be used by the unit to receive Active Traffic (TAS) information. The NY156 is required to receive TCAS information. Refer to paragraph 1.11.1 for details and equivalent NY156 part numbers.

1.4.17 Traffic Display

Traffic information is output to a compatible traffic display from the unit using an ARINC 735B interface format or using RS-422. Possible traffic output format selections include Standard TCAS intruder File (STIF or TIF) and Display Traffic Information File (DTIF). The unit allows installed configuration selection of TIF, DTIF, or both formats of output data via the ARINC 429 or RS-422 bus to the traffic display. Refer to paragraph 1.11.4.

1.4.18 Weather Display

The Unit interfaces to supported FIS-B Wx displays via a RS-422 Input and Output data bus. Refer to paragraph 1.11.5

1.4.19 Lightning Detection (WX-500)

Available with Release 2.1 and later for the NGT-9000 Panel Mount version only. This interface is used to receive and control the information from a WX-500 Stormscope using either RS-232 or RS-422. The Lightning data is depicted as cells or strikes on the right application screen of the NGT-9000. Refer to paragraph 1.11.8.

1.4.20 Control Panel

The remote mount NGT-9000R requires a Control Panel.

- The CP-2500 Control Panel uses RS-232 to display messages and transmit commands. The CP-2500 has control features for the Transponder, Traffic and TAWS functions.

  - Release 3.2 and later. The Control Panel (such as RMS-555) uses ARINC 429 to display messages and transmit commands. The ARINC 429 Control Panel has control features for the Transponder only. In addition, the NGT-9000R can be configured for dual Control Panels (used one at a time). The dual configuration requires a discrete output for panel selection.

Refer to paragraph 1.11.9 for Control Panel compatibility.

1.5 INSTALLATION CONSIDERATIONS

The installation of the following equipment is the minimum required by the Lynx NGT-9000 to provide ADS-B functionality as well as the optional TAS and Diversity functionality.

- Each installation requires at a minimum the following equipment installed:
    1. Lynx NGT-9000
    2. Detachable configuration module
    3. GPS Antenna
    4. L-Band (978/1030/1090 MHz) Antenna
    5. Altitude Source (ARINC 429, RS-232, or Gillham Code)
    6. Remote mount models only – Control Panel

- A unit with TAS (model: NGT-9000+ or NGT-9000R+) also requires the following:
    1. Function activation code to unlock TAS option via the MPC (MAT)
    2. Directional Antenna (NY-156 or NY-164)

- A unit with TCAS requires the following:
    1. Function activations code to unlock TCAS options via the MPC (MAT)
    2. Directional Antenna (NY-156)

- A unit with Diversity (model: NGT-9000D or NGT-9000RD) also requires the following:
    1. Function activation code to unlock Diversity option via the MPC (MAT)
    2. Additional L-Band Antenna, located on the top of the aircraft

- A unit with TAS and Diversity (model: NGT-9000D+ or NGT-9000RD+) also require the following:
    1. Function activations code to unlock TAS and Diversity options via the MPC (MAT)
    2. Directional Antenna (NY-156 or NY-164). Used for both the TAS and Diversity

- A unit with TCAS and Diversity (model: NGT-9000D+ or NGT-9000RD+) also require the following:
    1. Function activations code to unlock TCAS and Diversity options via the MPC (MAT)
    2. Directional Antenna (NY-156). Used for both TCAS and Diversity

- A unit with ATAS also requires the following:
    1. Function activations code to unlock ATAS options via the MPC (MAT)
       Note - For Release 3.2 and later, the ATAS option is always available (configuration option) and no longer requires an enablement certificate.

- A unit with Class B TAWS also requires the following:
    1. Function activations code to unlock TAWS options via the MPC (MAT)

- The following equipment for Lynx NGT-9000 system is optional:
    1. WiFi Accessory and PED (provides traffic and weather data)
    2. Weather Display (used to display FIS-B weather)
    3. Traffic Display (used to display STIF (TIF) on common display or DTIF on CDTI display)
    4. Lightning Detection (Requires a WX-500 Stormscope and Antenna)

1.6   SPECIFICATIONS

Table 1-5: Specifications for Panel Mount NGT-9000

PART NUMBERS:	9029000-20000
CERTIFICATION:	Release 1
	USA (FAA): TSO-C112d, C113a, C145c, C147, C154c, C157a, C166b, C195a
	Release 2
	USA (FAA): TSO-C112d, C113a, C145c, C147, C151c, C154c, C157a, C166b, C195b
	Release 3
	USA (FAA): TSO-C112d, C113a, C145c, C147, C151c, C154c, C157a, C166b, C195b, C118a
	See paragraph 1.7 for specific TSO information.
	Listed are current authorizations at time of publication, contact Field Service Engineering for latest certification information
ADVISORY CIRCULARS:	AC20-21-46, AC20-115B, AC20-152, AC20-165B, AC20-172A
RTCA COMPLIANCE:	Environmental Category: DO-160G (See Environmental Qualification Form in Appendix B.) Software Category: DO-178B, Design Assurance Level C Hardware Category: DO-254, Design Assurance Level C
	Other: DO-181E, DO-197A, DO-229D, DO-260B, DO-267A, DO-282B, DO-317A, ARINC 718A-4 and SAE AS8034B.
COMPLIANCE:	ATC transponder functionality: 14 CFR 91.215, 91.217, 91.413
	ADS-B Out functionality: 14 CFR 91.225, and 91.227
	The Lynx NGT-9000 has been shown to meet the requirements in TSO-C166b and meets the requirements of 14 CFR 91.225a installed in accordance with these installation instructions.
FCC:	FCC Identifier 2ACTZMSS90 Hardware MOD B and earlier.
	FCC Identifier 2ACTZMSS9019 Hardware MOD C and later.
SIZE:	See the following figures for dimensions: Figure 2-1: Outline Dimensions for Panel Mount NGT-9000 Figure 2-2: Outline dimensions for Panel Mount Mounting Rack NGT-9000 Note: Unit Fits into a standard MARK width (6.25 in) panel.
WEIGHT:	2.96 Lbs. (1.35 kg)
CHASSIS GROUND:	Bonding impedance between aircraft ground and the Lynx NGT-9000 Chassis must be less than 2.5 milliohms.
POWER REQUIREMENTS:	+14.0 VDC nominal. 19.0 watts nominal (24.0 Watts maximum)
	+28.0 VDC nominal. 19.0 watts nominal (24.0 Watts maximum)
	Note - Due to variability in 14 VDC aircraft power sources, Hardware Mod A may be required to ensure consistent power up operation.

Table 1-5: Specifications for Panel Mount NGT-9000

ELECTRICAL CONNECTORS:	• 78-position d-subminiature connector receptacle (shell size 5) with swaged float plate. Connector insert per MIL-DTL-24308, Appendix A, Figure A-5, Arrangement 2. Connector insert shall accommodate 22D removable crimp contacts (socket) per M39029/57-354, or equivalent. • RF Connectors: 5W5 Coax D-Sub • Mini-B USB: Maintenance Port
INTERFACE (S):	• ARINC 429 • RS-422 • RS-232 • Discrete Input/Outputs • RF Suppression Bus • I^2C serial interface (detachable configuration module interface) Note: Refer to Appendix A for signal names and characteristics
OPERATING TEMPERATURE:	-20° to +55°C (-4° to +131°F)
STORAGE TEMPERATURE:	-55° to +85°C (-67° to +185°F)
MAXIMUM ALTITUDE:	55,000 ft. (installation environment)
FUNCTIONALITY:	Release 1, 2, and 3 • Mode S Transponder • Global Positioning System (GPS) • ADS-B / TIS-B Receive: (1090ES/UAT) • ADS-B Transmit: (1090ES) • FIS-B (UAT) • Mode S Transponder Diversity (optional) • Traffic Awareness System (TAS) (optional) Release 2 and 3 only • ADS-B Traffic Awareness System (ATAS) (optional) • Class B Terrain Awareness and Warning System (TAWS) (optional) • Terrain Display Only (No Alerts) (i.e. Terrain Vision) (optional) • Lightning Detection (optional) Release 3 only • Traffic Alert and Collision Avoidance System (TCAS) (optional)

Table 1-5: Specifications for Panel Mount NGT-9000

OPERATION:	Start Up Time:	On Ground 20 seconds or less
		In air 5 seconds or less
	Display Luminance:	Range 0.05 fL to 150 fL
	Built In Test:	Fault Monitoring on all stages of operation from start up to power down.
	UAT Receiver Sensitivity (Class A1S)	-95.0dBm for 90% Message Decoding for Long ADS-B Messages
		-96.0dBm for 90% Message Decoding for Short ADS-B Messages
		-93.0dBm for 90% Message Decoding for Ground Uplink Messages
	1090 ADS-B Receiver Sensitivity (class A2):	-79dBm for 90% message decoding for 1090MHz ADS-B messages
	Mode S Transponder Power	(Class 1 Transponder). 125W minimum, 250 W maximum (Part 43 Appendix F: Class 2A)
	TAS/TCAS Output Power	(Class A TAS) (TCAS I) 125W minimum, 250 W maximum
	TAS/TCAS Receiver Sensitivity	-74.5 dBm +/- 3 dB (referenced at rear connector)
SCHEDULED MAINTENANCE:	No scheduled maintenance is required. As a transponder device, FAA document 91.413 requires testing and inspection of a transponder every 24 months.	
SERVICE LIFE:	The Lynx NGT-9000 has unlimited service life.	
REPAIRABILITY:	Repairs performed at the FAA certificated Repair Station co-located at the OEM (equipment) facility.	

Table 1-6: Specifications for Remote Mount Lynx NGT-9000R

PART NUMBERS:	9029000-40000
CERTIFICATION:	Release 1
	USA (FAA): TSO-C112d, C145c, C147, C154c, C157a, C166b, C195a.
	Release 2
	USA (FAA): TSO-C112d, C145c, C147, TSO-C151c, C154c, C157a, C166b, C195b.
	Release 3
	USA (FAA): TSO-C112d, C113a, C145c, C147, C151c, C154c, C157a, C166b, C195b, C118a
	See paragraph 1.7 for specific TSO information.
	Listed are current authorizations at time of publication, contact Field Service Engineering for latest certification information.
ADVISORY CIRCULARS:	AC20-21-46, AC20-115B, AC20-152, AC20-165B, AC20-172A
RTCA COMPLIANCE:	Environmental Category: DO-160G (See Environmental Qualification Form in Appendix B.)
	Software Category: DO-178B, Design Assurance Level C
	Hardware Category: DO-254, Design Assurance Level C
	Other: DO-181E, DO-197A, DO-229D, DO-260B, DO-267A, DO-282B, DO-317A, ARINC 718A-4 and SAE AS8034B.
COMPLIANCE:	ATC transponder functionality: 14 CFR 91.215, 91.217, 91.413
	ADS-B Out functionality: 14 CFR 91.225, and 91.227
	The Lynx NGT-9000R has been shown to meet the requirements in TSO-C166b and meets the requirements of 14 CFR 91.227 installed in accordance with these installation instructions.
FCC:	FCC Identifier 2ACTZMSS90 Hardware MOD B and earlier.
	FCC Identifier 2ACTZMSS9019 Hardware MOD C and later.
SIZE:	See the following figures for dimensions:
	Figure 2-3: Outline Dimensions for Remote Mount NGT-9000R
	Figure 2-4: Outline dimensions for Remote Mount Mounting Tray NGT-9000R
WEIGHT:	2.75 Lbs. (1.25 kg)
CHASSIS GROUND:	Bonding impedance between aircraft ground and the Lynx NGT-9000 Chassis must be less than 2.5 milliohms.
POWER REQUIREMENTS:	+14.0 VDC nominal. 17.0 watts nominal (24.0 Watts maximum)
	+28.0 VDC nominal. 17.0 watts nominal (24.0 Watts maximum)
	Note - Due to variability in 14 VDC aircraft power sources, Hardware Mod A may be required to ensure consistent power up operation.

Table 1-6: Specifications for Remote Mount Lynx NGT-9000R

ELECTRICAL CONNECTORS:	• 78-position d-subminiature connector receptacle (shell size 5) with swaged float plate. Connector insert per MIL-DTL-24308, Appendix A, Figure A-5, Arrangement 2. Connector insert shall accommodate 22D removable crimp contacts (socket) per M39029/57-354, or equivalent. • RF Connectors: 5W5 Coax D-Sub • Mini-B USB: Maintenance Port
INTERFACE (S):	• ARINC 429 • RS-422 • RS-232 • Discrete Input/Outputs • RF Suppression Bus • I^{2}C serial interface (detachable configuration module interface) Note: Refer to Appendix A for signal names and characteristics
OPERATING TEMPERATURE:	-45° to +70°C (-49° to +158°F)
STORAGE TEMPERATURE:	-55° to +85°C (-67° to +185°F)
MAXIMUM ALTITUDE:	55,000 ft. (installation environment)
FUNCTIONALITY:	Release 1, 2 and 3 • Mode S Transponder • Global Positioning System (GPS) • ADS-B / TIS-B Receive: (1090ES/UAT) • ADS-B Transmit: (1090ES) • FIS-B (UAT) • Mode S Transponder Diversity (optional) • Traffic Awareness System (TAS) (optional) Release 2 and 3 only • ADS-B Traffic Awareness System (ATAS) (optional) • Class B Terrain Awareness and Warning System (TAWS) (optional) Release 3 only • Traffic Alert and Collision Avoidance System (TCAS) (optional)

Table 1-6: Specifications for Remote Mount Lynx NGT-9000R

OPERATION:	Start Up Time:	On Ground 20 seconds or less
		In air 5 seconds or less
	Built In Test:	Fault Monitoring on all stages of operation from start up to power down.
	UAT Receiver Sensitivity (Class A1S)	-95.0dBm for 90% Message Decoding for Long ADS-B Messages
		-96.0dBm for 90% Message Decoding for Short ADS-B Messages
		-93.0dBm for 90% Message Decoding for Ground Uplink Messages
	1090 ADS-B Receiver Sensitivity (class A2):	-79dBm for 90% message decoding for 1090MHz ADS-B messages
	Mode S Transponder Power	(Class 1 Transponder). 125W minimum, 250 W maximum (Part 43 Appendix F: Class 2A)
	TAS/TCAS Output Power	(Class A TAS) 125W minimum, 250 W maximum
	TAS/TCAS Receiver Sensitivity	-74.5 dBm +/- 3 dB (referenced at rear connector)
SCHEDULED MAINTENANCE:	No scheduled maintenance is required. As a transponder device, FAA document 91.413 requires testing and inspection of a transponder every 24 months.	
SERVICE LIFE:	The Lynx NGT-9000R has unlimited service life.	
REPAIRABILITY:	Repairs performed at the FAA certificated Repair Station co-located at the OEM (equipment) facility.	

Table 1-7: Specifications for Detachable Configuration Module

PART NUMBER:	9230-17003-01
CERTIFICATION:	USA (FAA): TSO-C145c, C154c, C157a, C195a.
	See paragraph 1.7 for specific TSO information.
	Listed are current authorizations at time of publication, contact Field Service Engineering for latest certification information
RTCA COMPLIANCE:	The DCM is tested as part of the Lynx NGT-9000
WEIGHT:	Negligible
SIZE:	Length: 6 inches (includes wires)
POWER REQUIREMENTS:	3.3 Vdc (regulated via J1 connector)
INTERFACE (S):	I_2C serial interface
OPERATING TEMPERATURE:	-45° to +70°C (-49° to +158°F)
STORAGE TEMPERATURE:	-55° to +85°C (-67° to +185°F)
MAXIMUM ALTITUDE:	55,000 ft. (installation environment)
SCHEDULED MAINTENANCE:	None
SERVICE LIFE:	Unlimited
REPAIRABILITY:	Replacement only

1.7   TSO INFORMATION

TSO and Failure Classification Information is located in Appendix D.

1.8   MODIFICATIONS

Modifications (MODS) are identified by an entry on the I.D tag on individual units. A list of modifications to the Lynx NGT-9000 is identified below:

Table 1-8: Hardware Modifications

MOD #	EFFECTIVITY / COMPLIANCE	DESCRIPTION
A	9029000-20000 and 9029000-40000 MOD A is Optional for installations with 14 VDC aircraft power sources.	To inform customers that due to variability in 14 VDC aircraft power sources, Hardware MOD A may be required to ensure consistent power up operation. Service Bulletin SB9029000-3.
B	9029000-20000 and 9029000-40000 MOD B is recommended.	To inform customers of a TAS antenna calibration error causing the bearing calibration performed by the NGT to become corrupted and fail. Service Bulletin SB9029000-4.
C	9029000-20000 and 9029000-40000 MOD C is optional.	To update a power amplifier component and change the label with new FCC identification. Service Bulletin 8210400-001.

1.8.1   NVIS Compatible Filter MOD

A NVIS Filter is available for the panel mount NGT-9000. The MOD will make the display lighting compatible with Class B NVIS equipment as defined in DO-275 MOPS for Integrated NVIS equipment.

Customers wanting this MOD are to send the unit to the following location.

Aviation Specialties Unlimited, Inc.
4632 Aeronca Street
Boise, ID 83705
Telephone: (208) 426-8117

Units with this MOD will have a placard placed on the outside of the unit identifying the NVIS MOD.

1.9   SOFTWARE REVISIONS

Flight and Firmware revisions are displayed on the splash screen when power is cycled. Additional Software and database revisions can be viewed using the MPC via the Maintenance Application Tool.

A list of current software revisions is identified in Table 1-9.

Table 1-9: Software Revisions

Note (1):   The listed MPC (MAT) are current at time of publication; contact Field Service Engineering at ACSS for latest information.

REVISION	S/W PART NUMBER	S/W DESCRIPTION	COMPATIBLE MPC (MAT)[1]
1.0	9020010-001	Programming Composite SW 8040-17000-0100 which includes • Ops SW (8010-17000-0100) • Maint. S/W (8010-17001-0100) • Firmware (8000-17000-0100) GPS/UAT Composite SW 9021105-005 which includes • GPS/UAT RX (9021100-005) • Firmware (9021120-005)	8010-17002-0104
1.1	9020010-002	Programming Composite SW 8040-17000-0103 which includes • Ops SW (8010-17000-0103) • Maint. S/W (8010-17001-0103) • Firmware (8000-17000-0100) GPS/UAT Composite SW 9021105-005 which includes • GPS/UAT RX (9021100-005) • Firmware (9021120-005)	8010-17002-0104
1.2	9020010-003	Programming Composite SW 8040-17000-0104 which includes • Ops SW (8010-17000-0104) • Maint. S/W (8010-17001-0104) • Firmware (8000-17000-0100) GPS/UAT Composite SW 9021105-005 which includes • GPS/UAT RX (9021100-005) • Firmware (9021120-005)	8010-17002-0105

Table 1-9: Software Revisions

Note (1): The listed MPC (MAT) are current at time of publication; contact Field Service Engineering at ACSS for latest information.

REVISION	S/W PART NUMBER	S/W DESCRIPTION	COMPATIBLE MPC (MAT)[1]
2.0	9020010-004	Programming Composite SW 8040-17000-0200 which includes • Ops SW (8010-17000-0200) • Maint. S/W (8010-17001-0200) • Firmware (8000-17000-0100) GPS/UAT Composite SW 9021105-005 which includes • GPS/UAT RX (9021100-005) • Firmware (9021120-005)	8010-17002-0200
2.1	9020010-005	Programming Composite SW 8040-17000-0201 which includes • Ops SW (8010-17000-0201) • Maint. S/W (8010-17001-0201) • Firmware (8000-17000-0100) GPS/UAT Composite SW 9021105-009 which includes • GPS/UAT RX (9021100-202) • Firmware (9021120-005)	8010-17002-0201
3.0	9020010-006	Programming Composite SW 8040-17000-0300 which includes • Ops SW (8010-17000-0300) • Maint. S/W (8010-17001-0300) • Firmware (8000-17000-0100) GPS/UAT Composite SW 9021105-009 which includes • GPS/UAT RX (9021100-202) • Firmware (9021120-005)	8010-17002-0300
3.1	9020010-007	Programming Composite SW 8040-17000-0300 which includes • Ops SW (8010-17000-0300) • Maint. S/W (8010-17001-0300) • Firmware (8000-17000-0100) GPS/UAT Composite SW 9021105-010 which includes • GPS/UAT RX (9021100-009) • Firmware (9021120-005)	8010-17002-0300
3.2	9020010-008	Programming Composite SW 8040-17000-0301 which includes • Ops SW (8010-17000-0301) • Maint. S/W (8010-17001-0301) • Firmware (8000-17000-0100) GPS/UAT Composite SW 9021105-011 which includes • GPS/UAT RX (9021100-010) • Firmware (9021120-005)	8010-17002-0301

Table 1-9: Software Revisions

Note (1):   The listed MPC (MAT) are current at time of publication; contact Field Service Engineering at ACSS for latest information.

REVISION	S/W PART NUMBER	S/W DESCRIPTION	COMPATIBLE MPC (MAT)[1]
3.2.1	9020010-009	Programming Composite SW 8040-17000-0301 which includes • Ops SW (8010-17000-0301) • Maint. S/W (8010-17001-0301) • Firmware (8000-17000-0100) GPS/UAT Composite SW **9021105-012** which includes • GPS/UAT RX (**9021100-011**) • Firmware (9021120-005)	8010-17002-0301
3.2.2	9020010-010	Programming Composite SW 8040-17000-0302 which includes • Ops SW (8010-17000-0302) • Maint. S/W (8010-17001-0302) • Firmware (8000-17000-0100) GPS/UAT Composite SW 9021105-012 which includes • GPS/UAT RX (9021100-011) • Firmware (9021120-005)	8010-17002-0302

1.10 EQUIPMENT REQUIRED NOT SUPPLIED

Use Table 1-10 to identify equipment required for installation, calibration, and testing. Refer to Appendix C for equipment compatible with the Lynx NGT-9000.

NOTE

Equivalent tools, equipment, and hardware may be used.

Table 1-10: Equipment List

ITEM	DESCRIPTION
Cables and Wiring:	The installer supplies all system wires and cables. Mating Connector (P1) • Wires are #22 or #24 AWG as noted on interconnect wiring diagram in section 2. Use M22759 or equivalent wire and use M27500 or equivalent for twisted shielded wire for installation. Antenna Cables • L-Band and GPS Antenna Require M17/128-RG400 or equivalent coaxial cable. For the L-Band antenna the attenuation must not exceed 1.5 dB per cable (including the connectors). For the GPS antenna, the attenuation should not exceed 10 dB per cable (including the connectors). **NOTE** RG type coaxial cable insertion loss can vary significantly between manufacturers. Refer to the cable manufacturer's specification sheet for actual attenuation (insertion loss) for the cable being used. • Directional Antenna (Required only for models with TAS or TCAS) The Directional Antenna (NY156 or NY164) requires three cable assemblies; sum (Sigma Port), bit probe (Probe Port) and difference (Delta Port). Cable attenuation for the sum and difference ports must not exceed 1.5 db. Table 1-19 identifies U. S. vendors who sell approved cables by the foot. Table 1-20 provides a cable to connector cross-reference. M17/128-RG-400 or equivalent may be used for the bit probe cable. Attenuation for the bit probe cable must not exceed 6 dB. Note – Antenna NY156 must be used with TCAS. The NY164 cannot be used with the TCAS.
Circuit Breaker:	Installer is responsible for determining appropriate circuit breakers needed to protect aircraft wiring. Manufacturer recommends the following: • 2.0 Amp "pull style" circuit breaker for the unit with 28Vdc input • 3.0 Amp "pull style" circuit breaker for the unit with 14Vdc input
Consumables:	Antenna Sealant • For pressurized aircraft, use a sealant that meets the requirements of SAE AMS-S-8802 such as Flamemaster® CS3204 class B. For non-pressurized aircraft, use a non-corrosive sealant that meets the physical requirements of MIL-A-46146 such as General Electric RTV162. Surface Preparation • Alodine® No. 1001 required for installation of the antenna. Tie Wraps or Lacing Cord • Commercially available

Table 1-10: Equipment List

ITEM	DESCRIPTION
Hardware:	The following items are commercially available and are the responsibility of the installer: • Cockpit Switch Switch is optional and is dependent on the installation. Placard is recommended. (1) IDENT Input, momentary switch, placard "IDENT" (2) Audio Acknowledge, momentary (yoke) switch, placard "Alert Ack" (3) Standby Mode, Locking switch. Placard "Standby" • Ring Terminals (For Grounding). • Solder Sleeves • Cable tie/Tie wrap. • Coaxial connectors • Fusion tape • Optional. ¼ amp in line fuse if Wi-Fi adapter if installed • Optional GPS Splitter. Recommend GPS Networking LDCBS1x2 Passive with one DC blocked Input. (https://www.gpsnetworking.com/products/ldcbs1x2) • Status Indicator Lamps Lamps are optional and are dependent on the installation. See the general information section for details. (1) Amber colored "ADS-B Out Fail" lamp (2) Amber colored "Traffic Alert" (TA) lamp (3) Amber colored "TAWS Caution" lamp (4) Red colored "TAWS Warning" lamp Placards are recommended. Use a Type 313 Lamp. (Colored as described above). Lamps can be 12 or 28V dc with maximum current 250 mA. An isolation relay is required for ac operation. • Four #8-32 fasteners (screws) and lockwashers to secure mounting tray for the remote mount models.

Table 1-10: Equipment List

ITEM	DESCRIPTION
Installation Tools:	<u>Twisted Shield Wire Stripper Tool:</u> Used for preparing wires for the P1 mating connector. • EDMO Distributors, TSK7000QC <u>Crimp Hand Tools:</u> • Crimp Tool: M22520/2-01. For mating connector (P1) Positioner M22520/2-06 Insert / Extract M81969/1-02 • Crimp Tool: M22520/5-01. For coaxial contact shield crimp termination. Die Set (HX4) Insert M22520/5-05 (hex crimp die is .213 flat-to-flat) • Coax Removal Tool: Daniels Manufacturing Corp. (DMC) P/N DRK38 Tools can be purchased from: Amphenol Industrial; 40-60 Delaware Avenue; Sidney, NY 13838 Phone: 800-678-0141 Fax: 607-563-5157 <u>Panel Retainer Tool:</u> • Allen Hex Socket Screwdriver, 3/32 head. Used to secure and remove the unit from the rack.
Installation Kits:	The following installation kits are available. PIM-9000 and Antenna Cables are optional. The Panel and Remote install kits come with the order. Additional RF Adaptor Cables for Lynx NGT-9000 models (+, D, D+, R+, RD, or RD+) will need to be ordered. Refer to the following paragraph for ordering information and a list of components: • Panel Mount NGT-9000, Paragraph 1.10.1 • Remote Mount NGT-9000R, Paragraph 1.10.2 • PIM-9000, paragraph 1.10.3 • Antenna Cables, paragraph 1.10.4
Software:	Software can be obtained over the ACSS website. Refer to paragraph 1.12 for details on the different software available and on how to obtain a copy or Contact ACSS Field Service for more information. <u>Lynx Maintenance Application Tool (MPC (MAT))</u> This tool used for diagnostics, set up configuration options, and software downloading. The tool is only available to an ACSS Authorized Installer. The software is bundled with software releases. <u>LynxMSS USB Drivers and USB Driver Installation Utility</u> A USB driver is required for communication between the MPC and the Lynx NGT-9000 via the USB interface. The software is bundled with software releases. Procedures to install the LynxMSS USB Driver are found in paragraph 3.4. <u>WinZip 22</u> Used to unzip the S/W and MPC files. This software is free from the web.

Table 1-10: Equipment List

ITEM	DESCRIPTION
System Components:	The following system components must be purchased separately and do not come with the unit: DCM, GPS antenna, L-Band antenna, Directional antenna, install kits, any display, and CP-2500 Control Panel (remote mounts only). A list of compatible components is found in paragraph 1.11.
Test Equipment:	<u>Air Data Test Set</u> Required to test altitude inputs. <u>Maintenance Computer (MPC)</u> • The MPC is a laptop computer used to operate the MPC (MAT) for system setup, post installation checkout, and troubleshooting. The computer should be using Windows 7, 8, and 10 as the operating system, 1.3 GHz processor and later and 512 MB or more of RAM. Other configurations may operate normally, but they have not been tested. The computer must also have an USB connection and the installation of the correct Lynx MSS USB Driver Utility for Windows 7, 8, and 10. <u>Mini-b USB Cable</u> • Required if using the USB port to interface the MPC to the Lynx NGT-9000. <u>Flightline Tester</u> • IFR-6000 Ramp Test Set (with upgrade package Option #3 (1090) and #5 (UAT), Manufacturer: AEROFLEX. <u>Milliohm Meter</u> Required to check installation bonding to aircraft structure.

1.10.1 Installation Kits for the Panel mount NGT-9000

Ordering Installation Kits is a customer option. Item numbers are identified in the installation section. Refer to the following for ordering information. See Table 1-11 or Table 1-12 for a list of components.

Table 1-11: Panel Mount Installation Kit P/N 9060-17000-01 for Straight RF Connector

DESCRIPTION	PART NUMBER	QTY	ITEM
Panel Mount Rack Assembly	9010-17022-01	1	1
Rack Rear Plate Panel Mount	9000-17025-02	1	2
Screw, F100 4-40 x 0.438	NAS514-P-440-7	4	3
Screw, F100 4-40 x 0.312	NAS514-P-440-5	4	4
Floating Nut Plate D-Sub Shell Size 3	9000-17036-01	1	5
Floating Nut Plate D-Sub Shell Size 5	9000-17034-01	1	6
Screw F100 2-56 X 0.250 SS Pass W/ Vibra-Tite	2000-10085-01	8	7
Shield Clamp .55 Mounting Center	9010-17012-01	1	9
Wire Clamp	9000-17076-01	2	10
Contact Socket Crimp Size 22D	M39029/57-354	78	11
Screw, Machine	MS35206-230	6	12
Connector D-Sub 78 Position Float Mount Assembly	9080-17006-01	1	14
Connector D-Sub 5 Position 5W5 Float Mount Assembly	9080-17007-01 or 9080-17011-01	1	15
Grounding Clip	9002463-001 or 9001963-001	1	16
Screw 4-40 X 0.312 Pass W/ Vibra-Tite	2000-10087-01	10	22
Cable Assembly, Size 8 Straight Plug with BNC Jack [1]	9020-17009-01	1	23
Float RF backshell 5W5 d-sub shell size 3	9000-17106-01	1	24
Cable Tie 4.1x0.098 NYL 6.6 Black Low Pro PBF	1040-10002-01	15	26
Cable Ground Strap	9020-17002-01	2	27
Wire Clamp Pad	9000-17132-01	2	30
Cable Assembly, Size 8 Straight Plug with TNC Jack [1]	9020-17008-01	1	31

Note:

(1): Additional cable assemblies are required for NGT-9000+ (TAS/TCAS), NGT-9000D (Diversity), and NGT-9000D+ (TAS/TCAS and Diversity) as detailed below:

- For TAS/TCAS functionality, three additional (pigtail) cable assemblies are required for active traffic directional antenna connection. Refer to Table 1-18 for a list of available cable assembly part numbers.

- For Diversity functionality, one additional (pigtail) cable assembly is required for upper L-Band antenna connection. Refer to Table 1-18 for a list of available cable assembly part numbers.

- For TAS/TCAS and Diversity functionality, three additional (pigtail) cable assemblies are required for active traffic directional antenna connection. (Note - The TAS/TCAS directional antenna is also used as the diversity antenna.) Refer to Table 1-18 for a list of available cable assembly part numbers.

Table 1-12: Panel Mount Installation Kit P/N 9060-17000-02 for Right Angle RF Connector

DESCRIPTION	PART NUMBER	QTY	ITEM
Panel Mount Rack Assembly	9010-17022-01	1	1
Rack Rear Plate Panel Mount	9000-17025-02	1	2
Screw, F100 4-40 x 0.438	NAS514-P-440-7	4	3
Screw, F100 4-40 x 0.312	NAS514-P-440-5	4	4
Floating Nut Plate D-Sub Shell Size 3	9000-17036-01	1	5
Floating Nut Plate D-Sub Shell Size 5	9000-17034-01	1	6
Screw F100 2-56 X 0.250 SS Pass W/ Vibra-Tite	2000-10085-01	8	7
Enclosed Backshell, Shell Size 5	9010-17012-01	1	9
Wire Clamp	9000-17076-01	2	10
Contact Socket Crimp Size 22D	M39029/57-354	78	11
Screw, Machine	MS35206-230	6	12
Connector D-Sub 78 Position Float Mount Assembly	9080-17006-01	1	14
Connector D-Sub 5 Position 5W5 Float Mount Assembly	9080-17007-01 or 9080-17011-01	1	15
Grounding Clip	9002463-001 or 9001963-001	1	16
Float RF Backshell 5W5 D-Sub Shell Size 3 90deg Right Angle	9000-17105-01	1	17
Cable Assembly, Size 8 Right Angle Plug with BNC Jack [1]	9020-17011-01	1	18
Screw 4-40 X 0.312 Pass W/ Vibra-Tite	2000-10087-01	8	22
Cable Tie 4.1x0.098 NYL 6.6 Black Low Pro PBF	1040-10002-01	15	26
Cable Ground Strap	9020-17002-01	2	27
Screw, 4-40 x 0.188 with Vibra-Tite	101-10114-011	2	29
Wire Clamp Pad	9000-17132-01	2	30
Cable Assembly, Size 8 Right Angle Plug with TNC Jack [1]	9020-17010-01	1	31

Note:

(1) Additional cable assemblies are required for NGT-9000+ (TAS/TCAS), NGT-9000D (Diversity), and NGT-9000D+ (TAS/TCAS and Diversity) as detailed below:

- For TAS/TCAS functionality, three additional (pigtail) cable assemblies are required for active traffic directional antenna connection. Refer to Table 1-18 for a list of available cable assembly part numbers.

- For Diversity functionality, one additional (pigtail) cable assembly is required for upper L-Band antenna connection. Refer to Table 1-18 for a list of available cable assembly part numbers.

- For TAS/TCAS and Diversity functionality, three additional (pigtail) cable assemblies are required for active traffic directional antenna connection. (Note - the TAS/TCAS directional antenna is also used as the diversity antenna.) Refer to Table 1-18 for a list of available cable assembly part numbers.

1.10.2 Installation Kits for the Remote Mount Lynx NGT-9000R

Ordering Installation Kits is a customer option. Item numbers are identified in the installation section. Refer to the following for ordering information. See Table 1-13, Table 1-14, Table 1-15 or for a list of components.

Table 1-13: Remote Mount Installation Kit P/N 9060-17500-01 for Straight RF Connector

DESCRIPTION	PART NUMBER	QTY	ITEM
Mounting Tray Assembly NGT-9000 Remote Mount	9002018-001	1	1
Rear Plate Panel Mount Rack	9000-17025-02	1	2
Screw P F100 4-40 X .438 ALY Steel Cad	NAS514-P-440-7	4	3
Screw P F100 4-40 X .312 ALY Steel Cad	NAS514-P-440-5	4	4
Floating Nut Plate D-Sub Shell Size 3	9000-17036-01	1	5
Floating Nut Plate D-Sub Shell Size 5	9000-17034-01	1	6
Screw F100 2-56 X .250 SS Pass W/ Vibra-tite	2000-10085-01	8	7
Enclosed Backshell, Shell Size 5	9010-17012-01	1	9
Wire Clamp	9000-17076-01	2	10
Contact Socket Crimp Size 22d	M39029/57-354	78	11
Assembly Connector D-Sub 78 Position Float Mount	9080-17006-01	1	14
Assembly Connector D-Sub 5 Position 5w5 Float Mount	9080-17007-01 or 9080-17011-01	1	15
Grounding Clip	9002463-001 or 9001963-001	1	16
Screw 4-40 X .312 Pass W/ Vibra-tite	2000-10087-01	10	22
Cable Assembly, Size 8 Straight Plug with BNC Jack [1]	9020-17009-01	1	23
Float RF Backshell 5w5 D-Sub Shell Size 3	9000-17106-01	1	24
Cable Tie 4.1x0.098 NYL 6.6 Black Low Pro	1040-10002-01	15	26
Cable Ground Strap	9020-17002-01	2	27
Wire Clamp Pad	9000-17132-01	2	30
Cable Assembly, Size 8 Straight Plug with TNC Jack [1]	9020-17008-01	1	31

Note:

(1) Additional cable assemblies are required for NGT-9000R+ (TAS/TCAS), NGT-9000RD (Diversity), and NGT-9000RD+ (TAS/TCAS and Diversity) as detailed below:

- For TAS/TCAS functionality, three additional (pigtail) cable assemblies are required for active traffic directional antenna connection. Refer to Table 1-18 for a list of available cable assembly part numbers.

- For Diversity functionality, one additional (pigtail) cable assembly is required for upper L-Band antenna connection. Refer to Table 1-18 for a list of available cable assembly part numbers.

- For TAS/TCAS and Diversity functionality, three additional (pigtail) cable assemblies are required for active traffic directional antenna connection. (Note - the TAS/TCAS directional antenna is also used as the diversity antenna.) Refer to Table 1-18 for a list of available cable assembly part numbers.

Table 1-14: Remote Mount Installation Kit P/N 9060-17500-02 for Right Angle RF Connector

DESCRIPTION	PART NUMBER	QTY	ITEM
Mounting Tray Assembly NGT-9000 Remote Mount	9002018-001	1	1
Rear Plate Panel Mount Rack	9000-17025-02	1	2
Screw P F100 4-40 X .438 ALY Steel Cad	NAS514-P-440-7	4	3
Screw P F100 4-40 X .312 ALY Steel Cad	NAS514-P-440-5	4	4
Floating Nut Plate D-Sub Shell Size 3	9000-17036-01	1	5
Floating Nut Plate D-Sub Shell Size 5	9000-17034-01	1	6
Screw F100 2-56 X .250 SS Pass W/ Vibra-tite	2000-10085-01	8	7
Enclosed Backshell, Shell Size 5	9010-17012-01	1	9
Wire Clamp	9000-17076-01	2	10
Contact Socket Crimp Size 22d	M39029/57-354	78	11
Assembly Connector D-Sub 78 Position Float Mount	9080-17006-01	1	14
Assembly Connector D-Sub 5 Position 5w5 Float Mount	9080-17007-01 or 9080-17011-01	1	15
Grounding Clip	9002463-001 or 9001963-001	1	16
Float RF Backshell 5W5 D-SUB Shell Size 3 90DEG Right Angle	9000-17105-01	1	17
Cable Assembly, Size 8 Right Angle Plug with BNC Jack [1]	9020-17011-01	1	18
Screw Pp 4-40 X .312 Pass W/ Vibra-tite	2000-10087-01	10	22
Cable Tie 4.1x0.098 NYL 6.6 Black Low Pro	1040-10002-01	15	26
Cable Ground Strap	9020-17002-01	2	27
Screw 4-40 X .188 PP SS W/Vibra-tite	101-10114-011	2	29
Wire Clamp Pad	9000-17132-01	2	30
Cable Assembly, Size 8 Right Angle Plug with TNC Jack [1]	9020-17010-01	1	31

Note:

(1) Additional cable assemblies are required for NGT-9000R+ (TAS/TCAS), NGT-9000RD (Diversity), and NGT-9000RD+ (TAS/TCAS and Diversity) as detailed below:

- For TAS/TCAS functionality, three additional (pigtail) cable assemblies are required for active traffic directional antenna connection. Refer to Table 1-18 for a list of available cable assembly part numbers.

- For Diversity functionality, one additional (pigtail) cable assembly is required for upper L-Band antenna connection. Refer to Table 1-18 for a list of available cable assembly part numbers.

- For TAS/TCAS and Diversity functionality, three additional (pigtail) cable assemblies are required for active traffic directional antenna connection. (Note - the TAS/TCAS directional antenna is also used as the diversity antenna.) Refer to Table 1-18 for a list of available cable assembly part numbers.

Table 1-15: Remote Mount Installation Kit P/N 9060-17500-03 for OEM Specific Installations

DESCRIPTION	PART NUMBER	QTY	ITEM
Rear Plate Panel Mount Rack	9000-17025-02	1	2
Screw P F100 4-40 X .438 ALY Steel Cad	NAS514-P-440-7	4	3
Screw P F100 4-40 X .312 ALY Steel Cad	NAS514-P-440-5	4	4
Floating Nut Plate D-Sub Shell Size 3	9000-17036-01	1	5
Floating Nut Plate D-Sub Shell Size 5	9000-17034-01	1	6
Screw F100 2-56 X .250 Pass W/ Vibra-tite	2000-10085-01	8	7
Enclosed Backshell, Shell Size 5	9010-17012-01	1	9
Wire Clamp	9000-17076-01	2	10
Contact Socket Crimp Size 22d	M39029/57-354	78	11
Assembly Connector D-Sub 78 Position Float Mount	9080-17006-01	1	14
Assembly Connector D-Sub 5 Position 5w5 Float Mount	9080-17007-01 or 9080-17011-01	1	15
Grounding Clip	9002463-001 or 9001963-001	1	16
Screw 4-40 X .312 Pass W/ Vibra-tite	2000-10087-01	10	22
Cable Assembly, Size 8 Straight, Plug with BNC Jack (1)	9020-17009-01	1	23
Float RF Backshell 5w5 D-Sub Shell Size 3	9000-17106-01	1	24
Cable Tie 4.1x0.098 NYL 6.6 Black Low Pro	1040-10002-01	15	26
Cable Ground Strap	9020-17002-01	2	27
Wire Clamp Pad	9000-17132-01	2	30
Cable Assembly, Size 8 Straight Plug with TNC Jack (1)	9020-17008-01	1	31

Note (1): Additional cable assemblies are required for NGT-9000R+ (TAS/TCAS), NGT-9000RD (Diversity), and NGT-9000RD+ (TAS/TCAS & Diversity) as detailed below.

- For TAS/TCAS functionality, three additional (pigtail) cable assemblies are required for active traffic directional antenna connection. Refer to Table 1-18 for a list of available cable assembly's part numbers.

- For Diversity functionality, one additional (pigtail) cable assembly is required for upper L-Band antenna connection. Refer to Table 1-18 for a list of available cable assembly's part numbers.

- For TAS/TCAS and Diversity functionality, three additional (pigtail) cable assemblies are required for active traffic directional antenna connection. (Note – The TAS/TCAS directional antenna is also used as the diversity antenna.) Refer to Table 1-18 for a list of available cable assembly's part numbers.

1.10.3 PIM-9000 Installation Kit

Table 1-16: PIM-9000 Installation Kit P/N 9060-17001-01

DESCRIPTION	PART NUMBER	QTY	ITEM
Connector D-Sub 9 Pin Female	614A0022	1	1
Backshell 9 POS w/ Slide Lock	3050-10081-01	1	1

1.10.4 Antenna Cables

For L-Band and GPS antenna cables, Table 1-17 lists examples of the recommended antenna cable vendors and the type of cable to be used for specific lengths of cable.

Short, pre-fabricated coax cables are available from ACSS. Table 1-18 lists the available part numbers. Required quantity is dependent on installation configuration. Note – These are also a part of the panel and remote mount installation kits Table 1-11, Table 1-12, Table 1-13, and Table 1-14.

For Directional antenna cables, Table 1-19 identifies U. S. vendors who sell approved cables by the foot. Table 1-20 provides a cable to connector cross-reference.

Any cable meeting specifications is acceptable for the installation.

Table 1-17: Coaxial Cable Specifications

INSERTION LOSS (DB/100FT) [1]	CARLISLE IT TYPE [2]	MIL-C-17 TYPE [3]	RG TYPE
18.5	N/A	M17/128-RG400	RG-400
11.1	N/A	M17/112-RG304	RG-304
9.2	N/A	M17/127-RG393	RG-393
15.2	3C142B	N/A	N/A
9.2	311601	N/A	N/A
7.5	311501	N/A	N/A
5.8	311201	N/A	N/A
3.8	310801	N/A	N/A

[1]　RG type coaxial cable insertion loss can vary significantly between manufacturers. The insertion loss for RG type cables shown in this column is considered 'worst case'. Refer to the cable manufacturer's specification sheet for actual attenuation (insertion loss) for the cable being used.

[2]　Supplier information (for reference only):
Carlisle IT
5300 W. Franklin Drive
Franklin, WI 53132
Tel: 800-327-9473
414-421-5300
Fax: 414-421-5301
www.carlisle.com
Alternate cable suppliers: Pic Wire (www.picwire.com) and EMTEQ (www.emteq.com)

[3]　Supplier information: See current issue of Qualified Products List QPL-17.

Table 1-18: Pre-Fabricated Coaxial Cable Assemblies

PART NUMBER	DESCRIPTION	SPECIFICATIONS
9020-17008-01	Cable Assembly, Straight Plug with TNC Jack	Length: 8.00 +/- 0.50 inches Max Loss: 0.50 dB Max VSWR: 1.5:1
9020-17009-01	Cable Assembly, Straight Plug with BNC Jack	
9020-17010-01	Cable Assembly, Right Angle Plug with TNC Jack	
9020-17011-01	Cable Assembly, Right Angle Plug with BNC Jack	

Table 1-19: Directional Antenna SIGMA and DELTA Port Cable Vendors

Manufacturer: Electrical and Mechanical Technologies (EMTEQ)				
Part Number	Attenuation (dB/100 ft. 1.0 GHz)	Weight (lb.) (per 100 ft.)	Maximum Length (ft.)	Minimum Bend Radius (in)
Polyethylene				
PFLX195-500	10.93	2.6	10	0.50
PFLX240-500	8.79	3.8	12	0.75
PFLX240-501	7.9	4.5	13	0.85
PFLX340-500	5.25	7.4	20	1.00
PFLX400-500	4.0	6.8	27	1.00
PFLX500-500	3.31	11.8	35	1.25
Teflon				
TFLX130-100	16.7	1.4	6	0.50
TFLX165-100	13.8	2.2	8	0.85
TFLX205-100	9.9	3.2	11	0.75
TFLX225-100	7.9	4.1	14	2.0
TFLX295-100	5.95	7.2	18	1.5
TFLX480-100	3.5	19	31	4.5
Frequency: 1030 MHz Loss: <1.5 dB at 1030 MHz (includes all cables and connectors) VSWR: <1.5:1 at 1030 MHz Connectors have 0.2dB loss each				
Manufacturer: Carlisle IT				
Part Number	Attenuation (dB/100 ft. 1.0 GHz)	Weight (lb.) (per 100 ft.)	Maximum Length (ft.)	Minimum Bend Radius (in)
352001	12.2	2.7	9	0.81
311601	8.7	5.5	12	1.15
311201	5.56	8.5	19	1.59
310801	3.63	16.1	30	2.26
Manufacturer: PIC Wire and Cable				
Part Number	Attenuation (dB/100 ft. 1.0 GHz)	Weight (lb.) (per 100 ft.)	Maximum Length (ft.)	Minimum Bend Radius (in)
S33141	7.2	6.5	15	1.5
S55122	5.7	8.2	19	1.6
S22089	3.8	18	29	2.5

NOTE

If cable weight is not a consideration, select lowest loss cable. Contact cable vendors before installation. New low-loss lightweight cables may be available.

Table 1-20: Cable to Connector Reference

Cable Part Number	TNC Straight	TNC Right Angle	BNC Straight	BNC Right Angle
Electrical and Mechanical Technologies (EMTEQ)				
Polyethylene				
PFLX195-500	TMS195-1	TMR195-1	BMS195-1	BMR195-1
PFLX240-500	TMS240-1	TMR240-1	BMS240-1	BMR240-1
PFLX240-501	TMS240-1	TMR240-1	BMS240-1	BMR240-1
PFLX340-500	TMS340-1	TMR340-1	BMS340-1	BMR340-1
PFLX400-500	TMS400-1	TMR400-1	BMS400-1	BMR400-1
PFLX500-500	TMS500-1	TMR500-1	BMS500-1	BMR500-1
Teflon				
TFLX130-100	TMS130-1	TMR130-1	BMS130-1	BMR130-1
TFLX165-100	TMS165-1	TMR165-1	BMS165-1	BMR165-1
TFLX205-100	TMS205-1	TMR205-1	BMS205-1	BMR205-1
TFLX225-100	TMS225-1	TMR225-1	BMS225-1	BMR225-1
TFLX295-100	TMS295-1	TMR295-1	BMS295-1	BMR295-1
TFLX480-100	TMS488-1	TMR488-1	BMS488-1	BMR488-1
Electronic Cable Specialists				
Cable Part Number	TNC Straight	TNC Right Angle	BNC Straight	BNC Right Angle
311601	CTS922	CTR922	CBS922	CBR922
311201	CTS122	CTR122	CBS122	CBR122
310801	CTS022	CTR022	CBS022	CBR022
352001	CTS3522	CTR3522	CBS3522	CBR3522
PIC Wire and Cable				
Cable Part Number	TNC Straight	TNC Right Angle	BNC Straight	BNC Right Angle
S33141	190308	190309	190312	190313
S55122	190608	190609	190612	190613
S22089	190408	190409	190412	190413

1.11 EQUIPMENT INTERFACES

The equipment listed here is compatible with the Lynx NGT-9000. Equipment interfaces not listed in this section can still be found to be compatible for installation, but must meet the same requirements. When interfacing to compatible equipment there may be set-up steps for the equipment that need to be done before it can communicate with the unit. Specific diagrams of some of these interfaces are detailed in Appendix C.

NOTE

Listed software versions are the versions that were tested by the manufacturer.

1.11.1 Directional Antenna

The antennas listed in Table 1-21 have been tested for compatibility. Antennas not listed below can still be approved for installation but must meet the specifications for Directional antenna that support TCAS or TAS operation and meet the specifications required by the Lynx NGT-9000 models (+, D+, R+, RD, or RD+).

NOTE

The NY156 and NY164 Directional Antenna may be used as a top transponder antenna for diversity.

To fit specific airframes, a special adapter plate is also required. The adapter plate is included in the installation kit shipped with each system. Table 1-22 lists the contents of each installation kit. The installation kits differ only in the size of the special airframe adapter plate.

Table 1-23 lists of installation kits associated with various airframes. For aircraft not listed, contact the aircraft manufacturer for information relative to the radius of the area where the antenna is to be mounted.

Table 1-21: Directional Antenna Model Options and Specifications

PART NUMBER:	• 805-10003-001 (NY156 - White Paint) (Also available as Sensor System p/n S72-1744) Used for Installations with TCAS or TAS • 805-10890-001 (NY164 - White Paint) (Also available as Sensor System p/n S72-1746) Used for Installations with TAS • 805-10890-002 (NY164 - Black Paint) Used for Installations with TAS Note – Antenna NY156 must be used with TCAS. Either the NY156 or the NY164 can be used with the TAS.
MANUFACTURER	L3 Aviation Products (and Sensor Systems)
CERTIFICATION:	TSO-C118a and TSO-C147
RTCA COMPLIANCE:	DO-160C (For further details refer to Appendix B - Environmental Qualification Form)
SIZE:	1.3 inches (3.25 cm) high 6.23 in (15.82 cm) wide 11.12 in (27.94 cm) deep
WEIGHT:	2.3 lb. (1.04 kg)
SPEED:	Rated to 600 knots (0.9 Mach) @ 25,000 feet
FREQUENCY:	1030-1090 MHz
FINISH:	Gloss white or black Skydrol resistant polyurethane paint.
OPERATING TEMPERATURE:	-55° to +70°C (-67° to +185°F)
STORAGE TEMPERATURE:	-55° to +85°C (-67° to +185°F)
MAXIMUM ALTITUDE:	55,000 ft. (installation environment)
SCHEDULED MAINTENANCE:	None
SERVICE LIFE:	Unlimited
REPAIRABILITY:	Replacement only

Table 1-22: Directional Antenna Installation Kit 817-10009-xxx

KIT PART NUMBER	SUPPLIED PARTS *		
	PART NUMBER	**DESCRIPTION**	**QTY**
817-10009-001	800-10066-001	Special Adapter Plate, 40 Inch (101.6 cm) Radius	1
817-10009-002	800-10066-002	Special Adapter Plate, 63 Inch (160.0 cm) Radius	1
817-10009-003	800-10066-004	Special Adapter Plate, 80 Inch (203.2 cm) Radius	1
817-10009-004	800-10066-003	Special Adapter Plate, 32 Inch (81.3 cm) Radius	1
817-10009-005	800-10066-005	Special Adapter Plate, 47 Inch (119.4 cm) Radius	1
817-10009-006 (No Adapter Plate)	100-10022-001*	Screw, 10-32 x 1 PPH SS (MS51958-67)	4
	101-10027-001*	Stop Nut, 10-32 (MS21044C3)	4

* Hardware supplied with all kits.

Table 1-23: Airframe Installation Kits

MANUFACTURER	AIRFRAME	INSTALLATION KIT P/N
AEROSPATIALE	ATR-42	817-10009-001
AGUSTA	A109	817-10009-006
BAE/RAYTHEON	HAWKER 400, 600, 700, 800, and 1000	817-10009-004
BEECH	BEECHJET, KING AIR 90, 100, 200, 300, and 350	817-10009-001
	BARON 33, 35, 36, 55, 58, BE-99, 1300, and 1900C/D	817-10009-002
BELL	206, 407, 427	817-10009-006
CANADAIR	CHALLENGER 600 and 601	817-10009-005
CESSNA	CITATION III, VI, VII	817-10009-001
	CITATIONJET, CITATION I, II, V	817-10009-004
	182, 210, 337, 401, 414, 425, 441	817-10009-006
COMMANDER	114	817-10009-006
DASSAULT	FALCON 10, 20, 50	817-10009-001
	FALCON 900	817-10009-005
DEHAVILLAND	Dash 7/8	817-10009-001
EMBREAR	EMB 110, 120	817-10009-001
EUROCOPTER	EC135	817-10009-006
FAIRCHILD	METROLINER, METROLINER III, MERLIN	817-10009-001
FOKKER	F28	817-10009-003
GULFSTREAM	G-I, G-II, and G-III	817-10009-001
IAI	WESTWIND 1125	817-10009-001
LEARJET	LEARJET 31, 35, 36, 55, and 60	817-10009-004
MITSUBISHI	MU-2 Marquise	817-10009-004

MANUFACTURER	AIRFRAME	INSTALLATION KIT P/N
MOONEY	M20	817-10009-006
PILATUS	PC-12	817-10009-001
PIPER	CHEYENNE 400LS NAVAJO MIRAGE, MALIBU SARATOGA, SENECA	817-10009-001 817-10009-002 817-10009-005 817-10009-006
SAAB	SF-340	817-10009-001
SABRELINER	SABRE 65	817-10009-001
SHORTS	360	817-10009-001
SIKORSKY	S-76	817-10009-006
SOCATA	TBM-700 TB20	817-10009-001 817-10009-006

1.11.2 GPS Antenna

The antenna performance is critical to the operation of GPS in the unit. The antennas listed in Table 1-24 meet the requirements of TSO-C190. The unit may be installed on aircraft with existing antenna if that antenna complies with TSO-C144a or TSO-C145c and has been tested for compatibility. All listed GPS antennas have a TNC connector. Refer to the general information section for cable specifications.

Table 1-24: GPS Antennas

MANUFACTURER	PART NUMBER
AeroAntenna	AT575-326W-TNCF-000-RG-30-NM
AeroAntenna	AT575-343W-TNCF-000-RG-33-NM
AeroAntenna	AT575-493W-TNCF-000-RG-29.5-NM
AeroAntenna	AT575-516W-TNCF-000-RG-29-NM
AeroAntenna	AT575-93
AeroAntenna	AT575-43F
AeroAntenna	AT135-3
Comant	CI-2580-200
Comant	CI-2728-410
Comant	CI 419-200
Comant	CI 428-200
Comant	CI 429-200
Comant	CI 429-410
Sensor Systems	S67-1575-135
Sensor Systems	S67-1575-137
Sensor Systems	S67-1575-145
Sensor Systems	S67-1575-160
RAMI	AV-801

1.11.2.1 GPS Antenna Accessories

The accessories listed in Table 1-25 are optional equipment. See Appendix C for interface drawings.

The compatible GPS Antenna Splitter or Coupler should be installed using the guidance of AC 43.13-2B or other FAA Approved guidance deemed appropriate for each specific aircraft model.

Table 1-25: GPS Antenna Accessories

DESCRIPTION	MODEL OR PART NUMBER	MANUFACTURER
GPS Splitter Passive with one DC blocked. (TNC) (Type N)	LDCBS1x2N or LDCBS1x2T	GPS Networking Recommended - https://www.gpsnetworking.com Refer to manufacturer's drawings for splitter environmental compliance.
GPS Coupler Coupler that will utilize DC from either output source.	PD2ORG	AeroAntenna Technology, Inc Recommended - http://aeroantenna.com Refer to manufacturer's drawings for coupler environmental compliance.

1.11.3 L-Band Antenna

The L-Band antenna listed in Table 1-26 meet the requirements of TSO-C66b (or more recent) and TSO-C74c (or more recent). The unit may be installed on aircraft with existing antenna if that antenna complies with TSO-C66b and TSO-C74c and has been tested for compatibility. Antennas not listed may still be used. Contact ACSS for further information regarding compatibility. Refer to Table 1-17 for cable specifications.

Table 1-26: L-Band Antennas

MANUFACTURER	PART NUMBER	CONNECTOR TYPE
Comant/Cobham	CI-101	TNC
Comant	CI-105	BNC
Comant	CI-105-11	TNC
Comant	CI-105-16	BNC
Comant/Cobham	CI-105-17-L	TNC
DandM/EDO	DMNI50-9-2	TNC
RAMI	AV-74	BNC
RAMI	AV-22	BNC
Sensor Systems	S65-5366-895L	TNC

1.11.4 Traffic Displays

Traffic information is output to a compatible traffic display from the unit using an ARINC 735B interface format or serial RS-422. Possible traffic output format selections include Standard TCAS intruder File (STIF or TIF) and Display Traffic Information File (DTIF). The unit allows installed configuration selection of TIF and DTIF or both formats of output data via the ARINC 429 bus to the traffic display. Displays not listed is Table 1-27 can still be found to be compatible for installation, but must meet the same specifications. See Appendix C for interconnect information.

Table 1-27: Traffic Displays

MANUFACTURER	MODEL	SW VERSION
Aspen	EFD1000 PFD, or EFD1000 MFD, or EFD500 MFD 910-00001-XXX (except -004)	MAP SW 2.8.1 or later IOP SW2.0.5 or later
Avidyne	IFD-4xx / 5xx	SW 10.2.x [3] [4]
Avidyne	EX5000	SW 8.2 or later
Bendix/King	KMD 550/850[2]	SW Version – 02/02
Garmin [5]	GNS 430W/530W and GNS 430/530 (Standard traffic only, set to TIF)	5.0 GPS SW / Version 5.10
Garmin	GMX 200 [1] with Traffic I/O	Version - 2.13
Garmin	MX 20 [1] with Traffic I/O	Version – 5.7
Garmin [5]	G500/600 (Standard traffic only, set to TIF)	GDU-620 Version 6.11 FPGA and I/O Version – 2.1
Garmin [5]	GTN 650/750 (Standard traffic only, set to TIF)	4.0 GPS / SW Version – 5.0 6.11 GPS / SW Version – 5.0
Genesys	IDU-450 / 680	EFIS Version 8.0F and later

Notes:

(1) If Traffic I/O is installed, either the RS-422 or ARINC 429 may be used for display of traffic.

(2) Requires either ATAS, TAS or TCAS enabled in order to be compatible.

(3) An Aspen display and the IFD-4xx / 5xx Software level 10.2.1 or higher can both be connected to the NGT-9000.

(4) The IFD-4xx / 5xx RS232 in setting of Capstone HS Trfc+Wx is 115.2 Kb rate compatible with the Aspen. Versions earlier than 10.2.1 support 38.4 Kb only. Wiring is RS-422 output from NGT-9000 to an RS-232 input on the IFD-4xx/5xx.

(5) No weather is displayed on Garmin displays.

1.11.5 Weather Display

Weather information is output to a compatible weather display from the unit using serial RS-422. Displays not listed in Table 1-28 can still be found to be compatible for installation, but must meet the same specifications. See Appendix C for interconnect information.

Table 1-28: FIS-B WX Displays

MANUFACTURER	MODEL	SW VERSION
Aspen	EFD1000 PFD [1], or EFD1000 MFD, or EFD500 MFD 910-00001-XXX (except -004)	MAP SW 2.8.1 or later IOP SW2.2.5 or later
Avidyne	IFD-4xx / 5xx	SW 10.2.x [2] [3]
Avidyne	EX5000	SW 8.2
Garmin	MX 20	Version – 5.7
Garmin	GMX 200	Version - 2.13
Genesys	IDU-450 / 680	EFIS Version 8.x

Notes:

(1) PFD only displays graphical weather and does not display textural weather.

(2) An Aspen display and the IFD-4xx / 5xx Software level 10.2.1 or higher can both be connected to the NGT-9000.

(3) The IFD-4xx / 5xx RS232 in setting of Capstone HS Trfc+Wx is 115.2 Kb rate compatible with the Aspen. Versions earlier than 10.2.1 support 38.4 Kb only. Wiring is RS-422 output from NGT-9000 to an RS-232 input on the IFD-4xx/5xx

1.11.6   WIFI Module (PIM-9000)

The PIM-9000 provides a WiFi connection from the Lynx MSS UAT Device and the MPC (MAT).

Table 1-29: PIM-9000 WiFi Module

DESCRIPTION	MODEL - PART NUMBER /MANUFACTURER
Lynx WiFi Module [1]	PIM-9000 / P/N 9230-17005-01 / L3 Aviation Products

Note:

(1) The voltage input for the PIM-9000 is rated from 4.5VDC to 32VDC. Input power is rated at 0.75W max. The Lynx PED Interface Module PIM-9000 is preconfigured by the manufacturer. An Installation Kit is available P/N 9060-17001-01. Refer to the general information section for details.

1.11.7 Applications (APPS)

APPS are used with the PED (e.g. tablet or smartphone). Other apps may also operate, but have not been tested.

Table 1-30: APPS for PED

MANUFACTURER	NAME
123 west	Naviator
Aerovie	Aerovie EFB
AvPlan	AvPlan EFB
Fltplan	Flight Plan Go
ForeFlight Mobile	ForeFlight
Hilton Software LLC	Wing X PRO
Sennheiser	iFlightPlanner
Seattle Avionics, Inc	FlyQ EFB
Sky Radar Radenna LLC	Sky Radar

1.11.8 WX-500 (Stormscope)

The WX-500 Stormscope is required for installation configured for lightning detection. The WX-500 detects electrical discharges from thunderstorms within a 200 nmi radius of the aircraft. This information plots the location of the thunderstorms and is shown on the right application screen of the NGT-9000.

Table 1-31: WX-500 (Stormscope)

DESCRIPTION	MODEL - PART NUMBER /MANUFACTURER
Stormscope Series II Weather Mapping System	WX-500 / P/N 805-11500-001 / L3 Aviation Products

Note:
  (1)   When interfacing the NGT-9000 to the WX-500, the system must be wired so that the NGT-9000 is the master/sole controller for the WX-500.

1.11.9 Control Panel

The Remote Mount Lynx NGT-9000R requires a Control Panel to display messages and transmit commands. The NGT-9000R has two available interfaces, the RS-232 and ARINC 429 (requires Release 3.2 or greater).

Table 1-32: **Control Panel**

MANUFACTURER	MODEL	DESCRIPTION	SW VERSION	COMPATIBLE
ACSS	CP-2500 (9080-17250-01) [1]	2 1/4-inch bezel Data Format RS-232	FW Rev 09. HW Rev 01	Compatible with NGT-9000R Release 1.1.
ACSS	CP-2500 (9080-17250-02)	2 1/4-inch bezel Data Format RS-232	FW Rev 15 & 16. HW Rev 01	Compatible with NGT-9000R Release 2.0, 2.1, 3.0, 3.1 & 3.2.
ACSS	CP-2500 (9080-17250-02)	2 1/4-inch bezel Data Format RS-232	FW Rev 17 or greater. HW Rev 01	Compatible with NGT-9000R Release 2.0, 2.1, 3.0, 3.1 & 3.2.
ACSS	CP-2500 (9080-17250-12)	3 1/8-inch bezel Data Format RS-232	FW Rev 15 & 16 HW Rev 01	Compatible with NGT-9000R Release 2.0, 2.1, 3.0, 3.1 & 3.2.
ACSS	CP-2500 (9080-17250-12)	3 1/8-inch bezel Data Format RS-232	FW Rev 17 or greater. HW Rev 01	Compatible with NGT-9000R Release 2.0, 2.1, 3.0, 3.1 & 3.2.
Cobham	RMS-555 [3]	Data Format ARINC 429	SWID 02/05	Compatible with NGT-9000R Release 3.2.

Note:

(1) CP-2500 (P/N 9080-17250-01) is no longer procurable.

(2) Updates to Firmware require the CP-2500 be sent to the ACSS.

(3) RMS-555, works with as a single Controller or with a dual Controller option that includes: RMU-556 P/N 066-04028-1006 and KDA-557 P/N 066-04029-0106.

1.12   OBTAINING SOFTWARE

Software is available on the ACSS Publications website. If you have access to the ACSS Technical Publications website go to https://support.acsscustomerservices.com/ACSS/support.aspx. refer to the LYNX 9000 SW folder for each software package.

If you do not have access go to and select the "Request Account Button" and fill out the form. After completing the form press Submit.

If you cannot access the software or databases please contact ACSS via phone +1 (623) 445-7070 option 3 or via email at crc.acss@l3t.com.

The MPC (MAT) is installed on the Maintenance PC and is used to transfer application software and database data to the Lynx NGT-9000.

NOTES

1.   Software tools are located in the equipment list (paragraph 1.10).

2.   System software updates may only be accomplished by maintenance personnel.

3.   Starting with Release 2.1 updates to the 68DC and 72DC databases must be purchased from Jeppesen. See Paragraph 1.12.1.

1.12.1 Obtaining Databases from Jeppesen

Databases for Airport (68DC), Map (72DC), and Terrain (71DC) are must be purchased from Jeppesen ®. Updates and subscriptions can be purchased for all the databases. The (71DC) Terrain database is required for Release 3.0 and later. The 68DC, 72DC and 71DC databases are included in the product. See Service Bulletin SB9029000-5 for more information.

NOTES

1.   71DC Terrain Database (World Terrain coverage) is updated on a 28-day cycle to provide high resolution terrain co-located with airport runway thresholds from the same cycle 68DC Navigation Database. The Jeppesen Data Service has been setup to deliver cyclic updates of both 68DC and 71DC databases.

2.   For international customers it is necessary that the PC or laptop is set for an American Windows installation (not only the language setting), in order for the MPC (MAT) tool to operate correctly.

Jeppesen processes, compiles, reproduces, and provides the subscription service for the databases used in the Lynx NGT-9000. Like all aviation databases, the information is ultimately supplied by government agencies or other publicly available data. Because the information is provided by third party sources, Jeppesen cannot guarantee the accuracy and completeness of the data. Jeppesen is continually working towards improving the databases, so please report any irregularities or anomalies to Jeppesen at www.jeppesen.com.

Use the following procedure to obtain a database subscription from Jeppesen:

1.   Contact Jeppesen via the web at http://www.jeppesen.com/company/feedback.jsp and fill out the form or contact Jeppesen directly at 1-800-353-2107 (direct - 1-303-799-9090).

2.   A customer account will be established by Jeppesen and login credentials provided.

3.   Once the order is placed, download the JDM software at www.jeppesen.com/JDM/download. The JDM software is used to update databases. See example in the figure below.

NOTE

The JDM software will only transfer database information for the NGT-9000 to a USB drive formatted to FAT32. It will not transfer the database information to a computer.
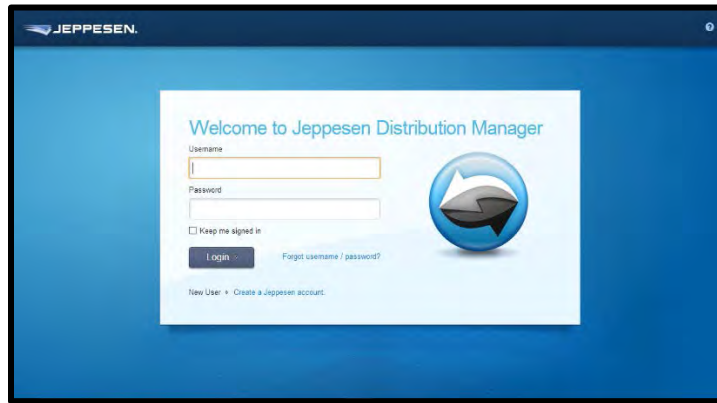
The database part numbers (and order codes) are listed in Table 1-33. The part numbers are used by ACSS for identification purposes only and are not used by Jeppesen.

Table 1-33: Database Part Numbers

JEPPESEN ORDER CODE	DATABASE NAME AND DESCRIPTION	L3 PART NUMBER
DLN224	68DC Airport Database Worldwide The Airport database provides the latest obstacle, runway, and magnetic variation (MagVar) information. The airport database expires every 28 days; however there is no requirement to update this because it is used only for informational purposes	8010-22320-0001
DLN272	72DC Map Database – North American Extended The Map Database contains geographic boundaries for both states and countries including lakes and rivers. There is no expiration associated to this database.	8010-12004-0001
DLN372	71DC World Terrain (WTA) The Terrain database provides the latest terrain information. The terrain database is updated every 28 days. There is no requirement to update this because it is used only for informational purposes.	8010-23010-001

1.13   INSTALLATION PROCEDURE FOR LYNXMSS USB DRIVER

This procedure is located in paragraph 3.4 of the Installation Checkout section.

1.14   INSTALLATION APPROVAL AND LIMITATIONS

1.   This article meets the minimum performance and quality control standards required by the applicable technical standard orders (TSOs). Those installing this article, on or in a specific type or class of aircraft, must determine that the aircraft installation conditions are within the applicable TSOs standards. TSO articles must have separate approval for installation in an aircraft. The article may be installed only according to 14 CFR parts 43 or the applicable airworthiness requirements.

2.   All antennas used in the installation must meet the requirements specified in this manual.

3.   The GPS receiver must use antenna meeting the requirements specified in this manual.

4.   The use of a frequency diplexer is not supported and as such, the L-Band antenna cannot be diplexed with another L band antenna.

5.   A GPS Splitter or Coupler may be used. Refer to paragraph 1.11.2.1 for recommended model. Install the compatible GPS Splitter or Coupler using the guidance of AC 43.13-2B or other FAA Approved guidance deemed appropriate for each specific aircraft model.

6.   It is the installer's responsibility to ensure the ADS-B Out system is compliant with AC 20-165B, 14 CFR 91.225 (b) and 91.227 when installed in accordance with ACSS installation instructions.

7.   If aircraft ground speed is less than 14 knots, and there is not a valid heading input into the unit, then "Traffic Unavailable" TAS traffic data only may be displayed. No traffic is displayed if TAS/TCAS is in standby.

8.   The Lynx NGT-9000 may be optionally configured to support the following functions: TAS, TCAS, Diversity, ATAS, TAWS (except on helicopters), and Terrain Display Only (No Alerts) (i.e. Terrain Vision).

9.   The Class B TAWS function may only be activated on fixed wing aircraft.

10.   A heading source is required for helicopter installations with the ATAS functions.

11.   The Terrain Display Only (No Alerts) (i.e. Terrain Vision) function option may be activated on either fixed wing aircraft or helicopters.

12.   The NGT-9000RD or RD+ is not capable of driving a terrain display.

13.   In compliance with FAA Advisory Circular AC20-172B Section 2-8e, if the NGT-9000 is installed in an aircraft with an existing traffic system that generates traffic alerts, the NGT-9000 ATAS and TAS/TCAS functions must be disabled. This ensures that only one traffic system is alerting.

14.   Panel mount versions of the NGT-9000 System (HW Part No. 9029000-20000) with Software Release Versions 1.0, 1.1, 1.2, 2.0, 2.1, 3.0, 3.1, and 3.2 will not provide the full TSO-C157a FIS-B functionality during the period of 6 April 2019 thru 31 December 2019. Due to the GPS Epoch rollover on 6 April 2019, the Lynx weather products such as the METARS, Winds Aloft, and Temperatures Aloft are unavailable on the NGT-9000 panel mount display. Lynx weather products will continue to display via an external display or via WiFi to a portable electronic device. The Lynx Transponder and Lynx ADS-B Out functions are not impacted and the system continues to comply with these regulatory requirements. This issue will re-occur approximately every 20 years when the Epoch rollover occurs.

15.   Panel mount versions of the NGT-9000 System (HW Part No. 9029000-20000) with Software Release Versions 3.2.1 or later will not provide the full TSO-C157a FIS-B functionality after 20 November 2038. Due to the GPS Epoch rollover that will occur 21 November 2038, the Lynx weather products such as the METARS, Winds Aloft, and Temperatures Aloft will be unavailable on the NGT-9000 panel mount display. Lynx weather products will continue to display via an external display or via WiFi to a portable electronic device. The Lynx Transponder and Lynx ADS-B Out functions are not impacted and the system continues to comply with these regulatory requirements.

This page intentionally blank

Section   2

Installation

2.1 INTRODUCTION

This section describes the installation of the Lynx NGT-9000 Multilink Surveillance System. Qualified personnel, in conformance with applicable government regulations, must make installation. The information furnished is for convenience only.

Tolerances (unless otherwise indicated):

ANGLES ARE	± 0.5°
0.00 TWO PLACE DECIMALS ARE	± 0.02
0.000 THREE PLACE DECIMALS ARE	± 0.010

All dimensions are in decimal inches unless otherwise specified.

2.2 UNPACKING AND INSPECTING

Carefully unpack the unit and note any damage to shipping containers or equipment. Visually inspect each component for evidence of damage. Compare the equipment received with that noted on the packing list. Report immediately any missing items or evidence of damage to the carrier making the delivery. To justify a claim, retain the original shipping container and all packing materials.

Every effort should be made to retain the original shipping containers for storage. If the original containers are not available, a separate cardboard container should be prepared that is large enough to accommodate sufficient packing material to prevent movement.

2.2.1   Transport and Storage Considerations

Transport of the avionics equipment should be done in accordance with standard procedures, i.e. hand carried or transported in the original container. The container limits the shock to the indicator at a maximum of 20g's when dropped from a distance of 36 inches.

Storage of avionics equipment must be consistent with industry standards for avionics equipment and performs satisfactorily after periods of storage up to 24 months. The ambient temperature of the storage area should not fall below -55° C (-65° F) or rise above +85° C (+185° F).

2.3 INSTALLATION PROCEDURES

1. The installer must consider the following prior to installation. Specific procedures for installation of the Lynx NGT-9000, Detachable Configuration Module, Mounting Rack or tray, and Directional Antenna (for TAS or TCAS option) are detailed in their respective paragraphs below.

    • The installer must obtain installation approval (i.e. Supplemental Type Certification).

    • Follow the acceptable avionics installation practices in FAA Advisory Circulars AC 43.13-1B and AC 43.13-2B or later revision of these documents.

    • It is the responsibility of the equipment installer to determine that the required aircraft viewing envelope for the panel mount NGT-9000 is within the specified display viewing envelope(s). Refer to paragraph 2.3.1.

    • Bonding impedance between aircraft ground and the unit chassis must be less than 2.5 milliohms.

    • It is recommended that the aircraft battery be disconnected before performing installation procedure.

    • Installers are responsible for obtaining installation hardware (i.e. screws, supporting plates, etc.) beyond those parts that come with the installation kits.

    • All antenna cables should be clearly marked to prevent inadvertent installation into the wrong connector position.

    • Tighten all screws to snug (i.e. only such torque that can be applied by hand) unless specific torque instructions are given.

    • After installation, refer to the Installation Checkout section for calibration, power-up and ground testing procedures.

    • When installing a remote mount NGT-9000R a CP-2500 Control Panel (or compatible control panel) is required. Refer to the CP-2500 Installation Manual (0040-17251-01) for installation procedures (or third party publication for other compatible control panels).

2. Electrical equipment chassis, shield/ground terminations, antennas, supporting brackets, and racks must be electrically bonded to the aircraft's main structure (metallic aircraft) or instrument panel (composite aircraft). Compliance of the electrical bonding should be verified by inspection using a calibrated milliohm meter. An equivalent OEM procedure may also be substituted.

    • The electrical bond should achieve direct current (DC) resistance less than or equal to 2.5 milliohms to structure local to where the equipment is mounted for metallic aircraft or tube and fabric aircraft.

    • The electrical bond should achieve direct current (DC) resistance less than or equal to 5.0 milliohms to the instrument panel for composite aircraft.

    The antenna ground plane must be electrically bonded to the antenna baseplate. Do not remove paint on outer skin of aircraft under the footprint of the antenna baseplate unless necessary to meet bonding requirements. Refer to antenna manufacturer's installation instructions.

2.3.1   Panel Mount Location

1. The unit is mounted in the instrument panel where the touch screen display can be used to view aircraft flight information and provide operational control.

    • When installing with the TAWS Option, mounting this in the pilots primary field of view allows the on-screen indications to meet the TAWS visual alerting requirements. Otherwise, accommodations should be made to install the TAWS Caution and Warning lamps in the primary field of vision.

2. The unit should be accessible for inspection, maintenance, or removal, and free from instrument panel structural flexure and excessive vibration or heat.

3. The wiring and antenna cables should not run adjacent to heaters, engine exhaust, or heat sources.

4. The viewing envelope of the display has a viewing angle of at least ±45° in the horizontal plane and at least -10º to +30º in the vertical plane as seen from an eye position of 30 inches from the front of the display.

5. The unit should be located in an area where the touch screen control is within easy reach of the pilot and cannot be obstructed from continuous view (i.e. behind a control yoke).

6. A Mounting Rack is required to install the panel mount NGT-9000. Two installation kits are available each with their own mounting rack. See details below:

    - Installation Kit P/N 9060-17000-01 for Mounting Rack Assembly with Straight Connector

    - Installation Kit P/N 9060-17000-02 for Mounting Rack Assembly with Right Angle Connector

    Ordering information and a parts list for the installation kits are found in the General Information section (para. 1.10.1). Additional coaxial cable assemblies are required for NGT-9000+, NGT-9000D, and NGT-9000D+.

7. Compare the space requirements of the Mounting Rack with the installation area being considered. The outline drawing for the unit is located in Figure 2-1. The outline drawing of the Rack Assembly is located in Figure 2-2. The installer is advised to consider the space requirements (2-3 inches) needed for the connector backshell and the cable bend radius.

2.3.2   Remote Mount Location

1. The unit should be accessible for inspection, maintenance, or removal, and free from instrument panel structural flexure and excessive vibration or heat.

2. The wiring and antenna cables should not run adjacent to heaters, engine exhaust, or heat sources.

3. A Mounting Tray is required to install the remote mount NGT-9000R. Three installation kits are available each with their own mounting tray. Four #8-32 fasteners with lockwashers are required to secure the Mounting Tray. See details below:

    - Installation Kit P/N 9060-17500-01 for Mounting Tray with Straight Connector

    - Installation Kit P/N 9060-17500-02 for Mounting Tray with Right Angle Connector

    - Mounting Tray P/N 9002018-001 for use with OEM Specific Installation Kit P/N 9060-17500-03.

    Ordering information and a parts list for the installation kits are found in the General Information section (para. 1.10.1). Additional coaxial cable assemblies are required for NGT-9000R+, NGT-9000RD and NGT-9000RD+.

4. The remote mount NGT-9000R is designed with a front and rear attachment plate.

5. Compare the space requirements of the Mounting Tray with the installation area being considered. The outline drawing for the NGT-9000R is located in Figure 2-3. The outline drawing of the Tray Assembly is located in Figure 2-4. The installer is advised to consider the space requirements (2-3 inches) needed for the connector backshell and the cable bend radius.

6. The unit has a minimum operating temperature of -45°C (-49°F) (see specifications table). Consideration should be made to installing it within the cabin, or other temperature-controlled area, on aircraft, which operate in OAT environments less than this temperature.

6.04 +/- 0.02
(15.34 +/- 0.05)

10.14 +/- 0.04
(25.76 +/- 0.10)

0.11
(0.28)

0.63
(1.60)

9.50 +/- 0.02
(24.13 +/- 0.05)

1.440
(3.660)

LRU Hold-Down
(Retracted Prior To Install)

0.226
(0.570)

5.27
(13.39)

6.25
(15.88)

1.80
(4.57)

1.526 +/- 0.012
(3.88 +/- 0.030)

2.921 +/- 0.01
(7.42 +/- 0.03)

0.11 (0.28)

0.055 (0.140)

0.922 +/- 0.012
(2.342 +/- 0.030)

78 POSITION D-SUB PLUG

5W5 COAXIAL D-SUB RECEPTACLE

0.185
(0.47)
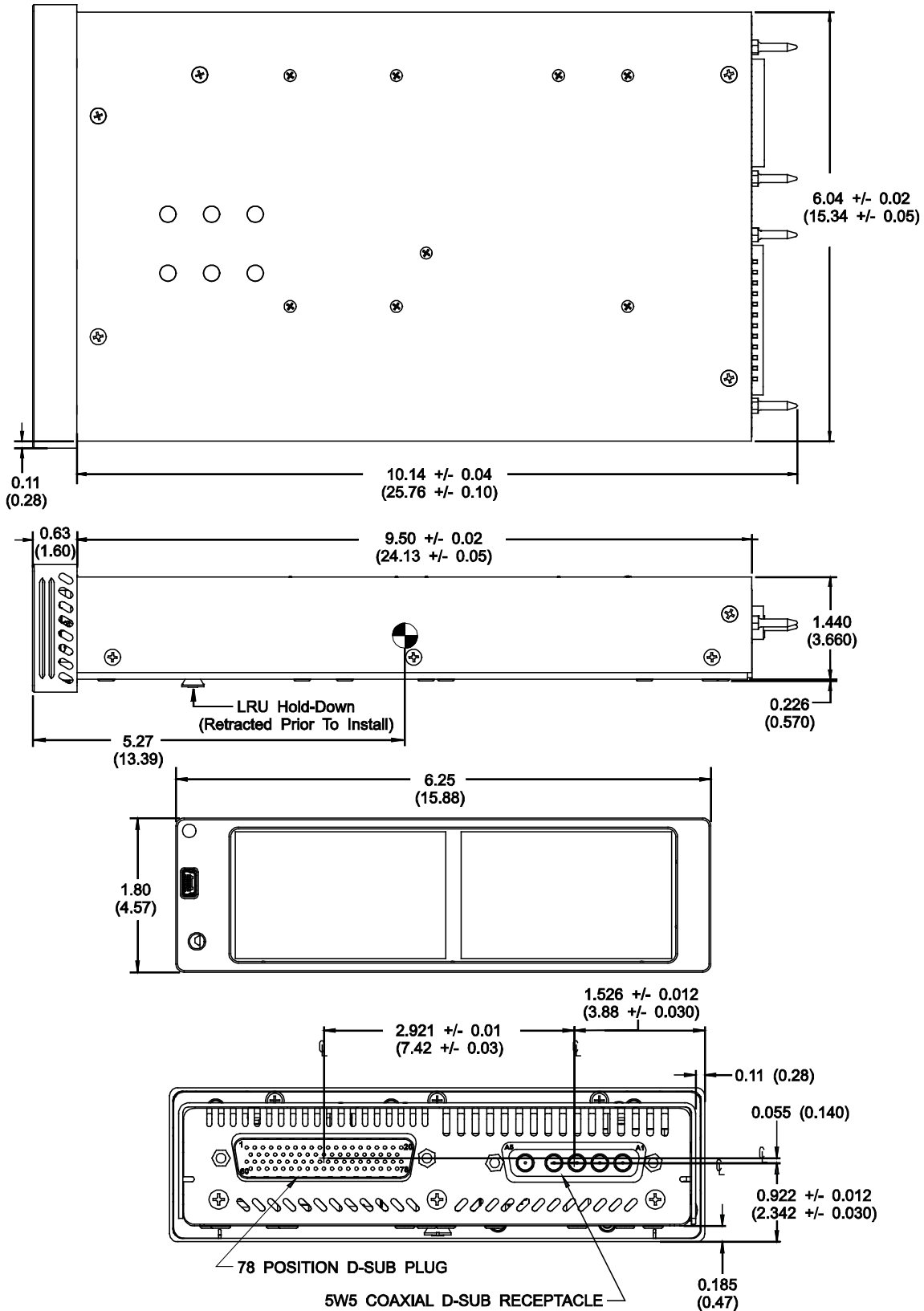
NOTE
ALL DIMENSIONS ARE IN INCHES (CENTIMETERS).

Figure 2-1: Outline Dimensions for Panel Mount NGT-9000
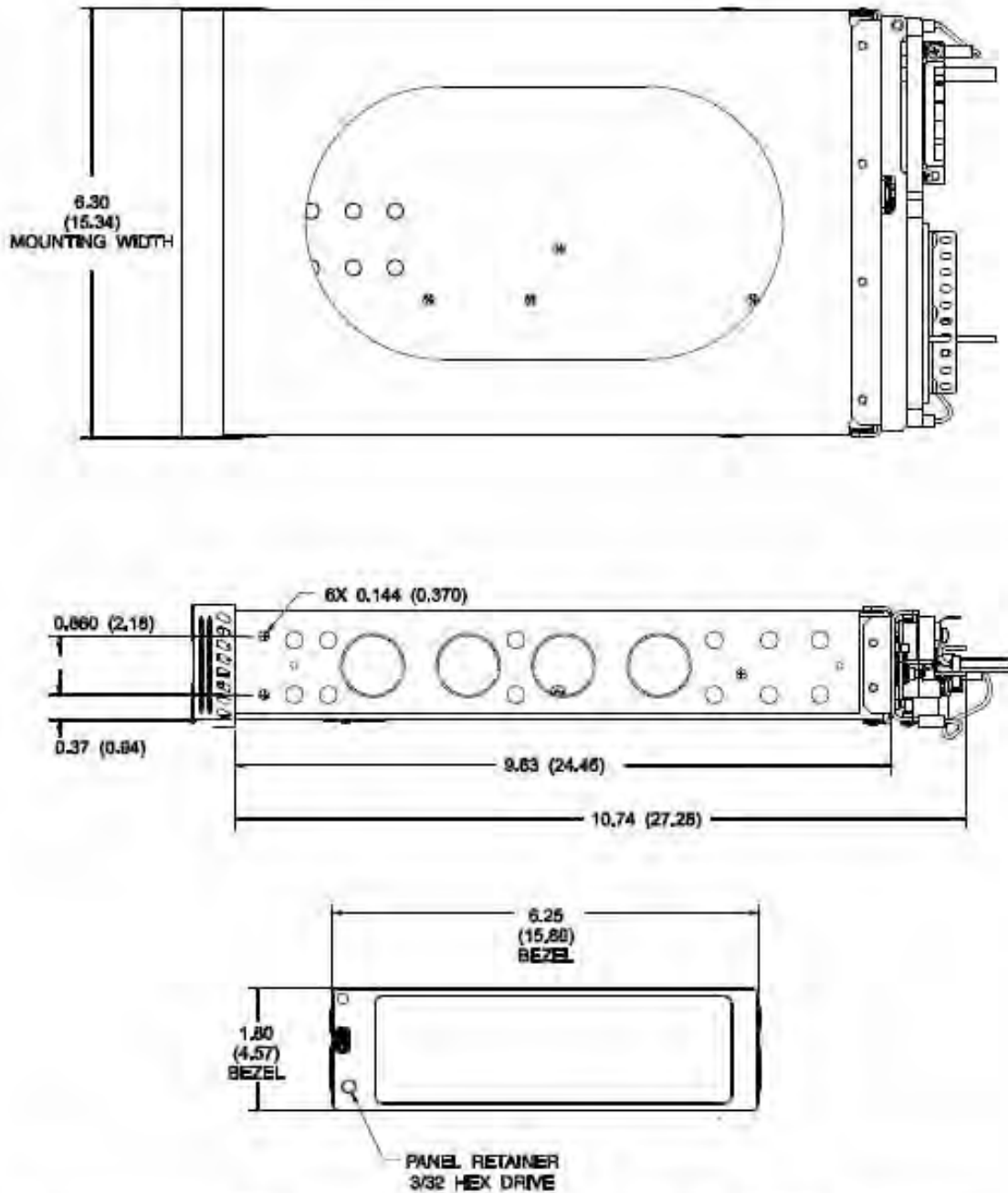
Part of Installation Kit 9060-17000-( ).

Figure 2-2: Outline Dimensions for Panel Mount Mounting Rack NGT-9000

6.04 +/- 0.02
(15.34 +/- 0.05)

4.61
(11.71)

9.50 +/- 0.02
(24.13 +/- 0.05)

10.14 +/- 0.04
(25.76 +/- 0.10)

1.47 +/- 0.02
(3.73 +/- 0.05)

COG

6.68 +/- 0.01
(16.97 +/- 0.03)

3.57
(9.07)

COG

0.76
(1.93)

1.46 +/- 0.01
(3.71 +/- 0.03)

2.921 +/- 0.01
(7.42 +/- 0.03)

1.693 +/- 0.012
(4.30 +/- 0.030)

5W5 COAXIAL
D-SUB RECEPTACLE

78 POSITION
D-SUB PLUG

0.63
(1.60)

0.055
(0.140)

0.748 +/- 0.012
(1.90 +/- 0.030)
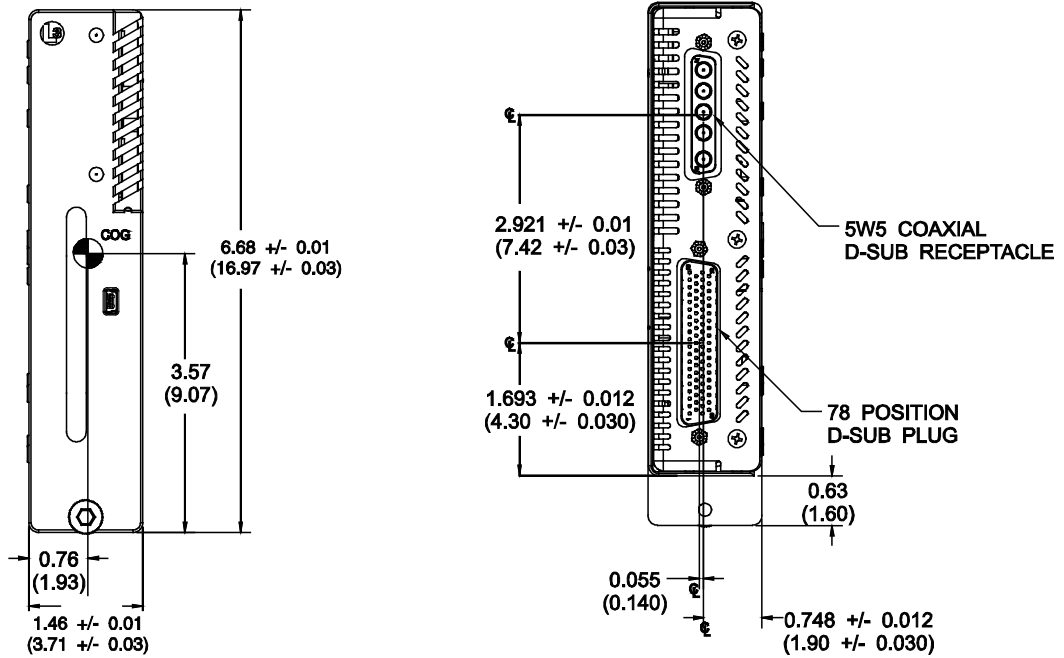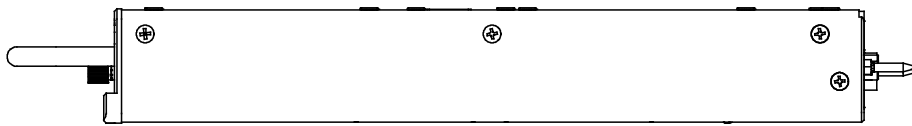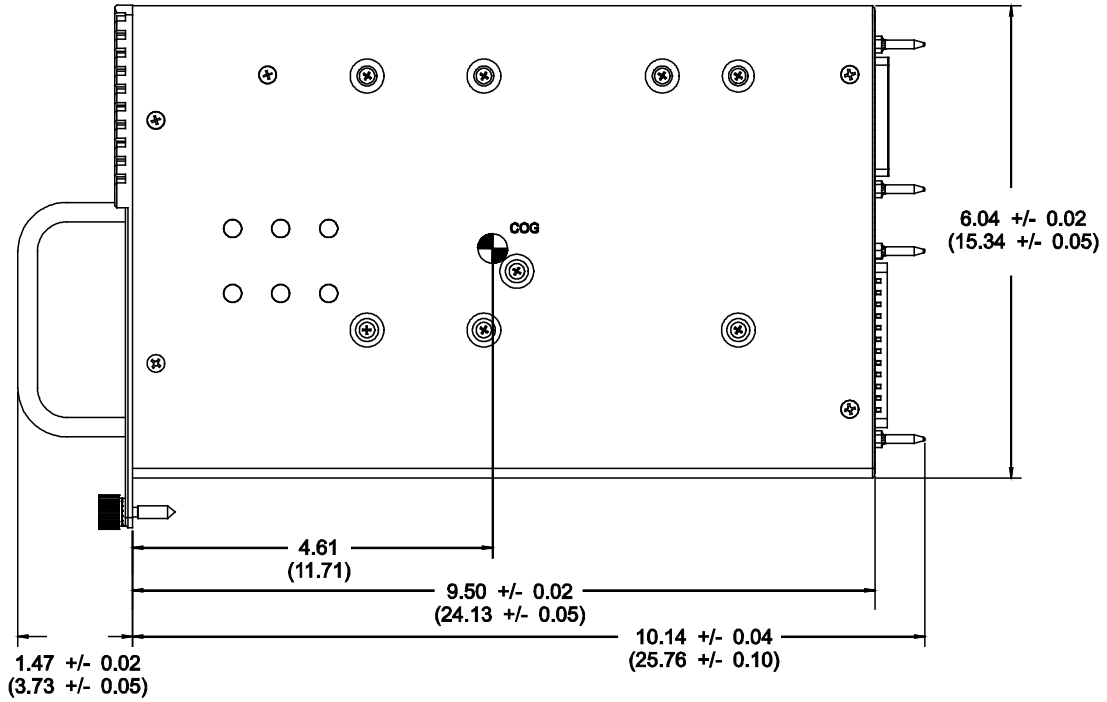
<u>NOTE</u>
ALL DIMENSIONS ARE IN INCHES (CENTIMETERS).

Figure 2-3: Outline Dimensions for Remote Mount NGT-9000R

2X 1.756   2X 6.769   4PL

2X 0.800

2X 0.455

9.65

10.04

10.81

12.28

6.90

1.71

1.47

Thumbscrew

NOTE
ALL DIMENSIONS ARE IN INCHES.
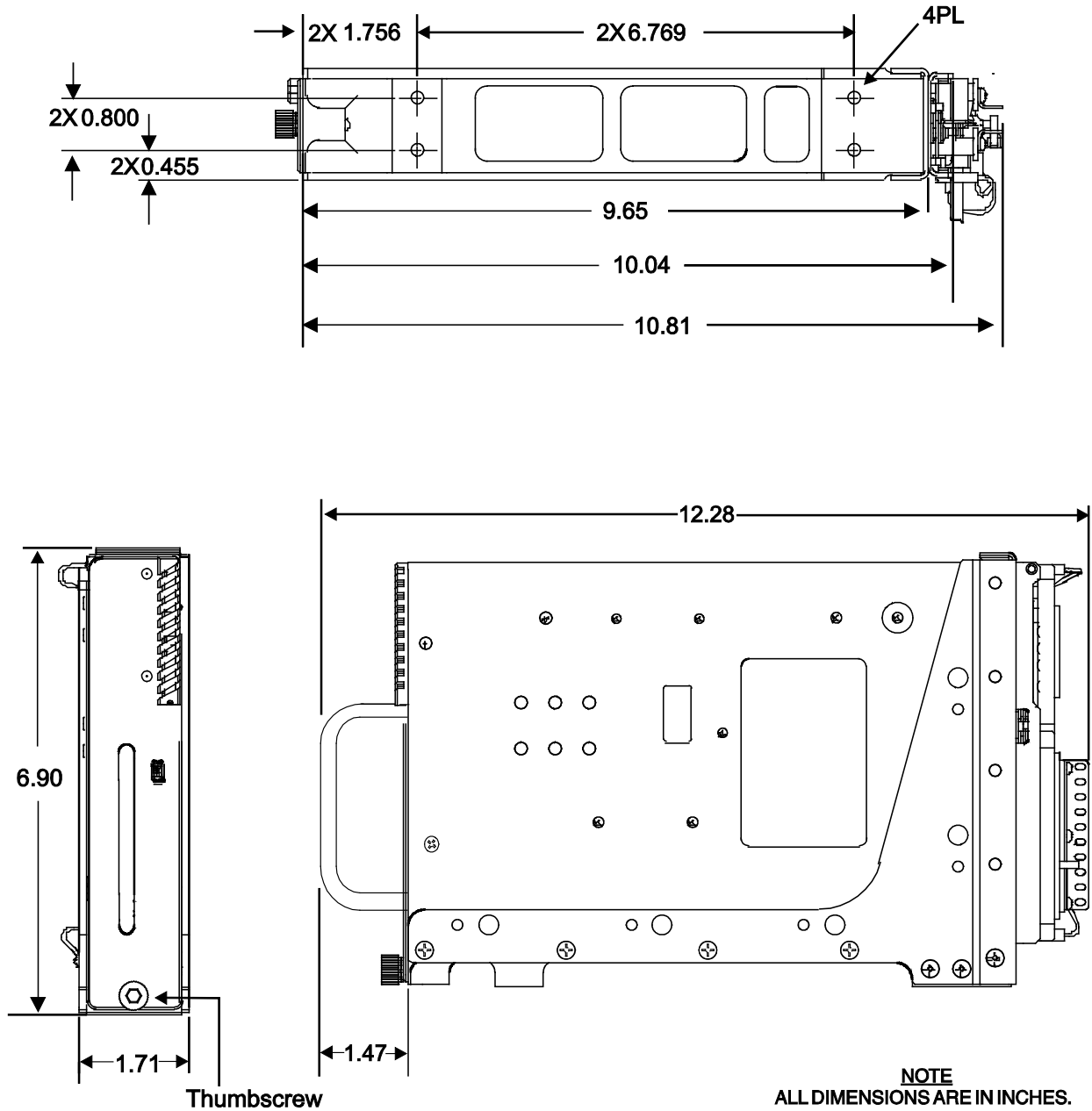
Part of Installation Kit 9060-17500-( ).

Figure 2-4: Outline Dimensions for Remote Mount Mounting Tray NGT-9000R

2.3.3 Electrical Connections

1. The installer must take the following into consideration before installation:

   - Use of any wire or cable not meeting specification voids all warranties.

   - The installer is responsible for supplying wires, cables, and connectors.

   - Wire-marking identification is at the discretion of the installer.

   - All wiring must be in accordance with industry-accepted methods, techniques, and practices.

   - The assembly guidelines for the antenna cables are detailed in paragraph 2.3.7.1.

   - Refer to Appendix A for signal name and cable characteristics prior to wiring installation.

   - Refer to Appendix C for Interconnect Diagrams of External Displays, Control Panels, and other Equipment (i.e. GPS Splitter and Coupler).

   - The length and routing of the external cables must be carefully studied and planned before attempting installation of the equipment.

   - The wiring harness should not run adjacent to heaters, engine exhaust, and heat sources or be located near fuel lines, high electrical capacity lines, flight control cables, and protected areas of the aircraft or be exposed to wire chafing.

   - Avoid sharp bends while routing the cables.

   - Keep the cables run as short as possible. Grounding pigtails (if installed) should not exceed more than 3 inches in length. Terminate shields in the backshell of the mating connector (at P1).

   - Required connectors and contact pins are supplied in the installation kits.

   - All wires should be 24 AWG unless otherwise noted in the interconnect diagram. Use M22759 or equivalent wire and Tefzel Wire M27500 or equivalent for twisted shielded wired for installation.

   - Installer is responsible for determining appropriate circuit breakers needed to protect aircraft wiring. Manufacturer recommends the following:
     - o 3.0 amp "pull style" circuit breaker for the installations with 14VDC input.
     - o 2.0 amp "pull style" circuit breaker for the installations with 28VDC input.
     - o For installations with a CP-2500 Control Panel, a single circuit breaker can be used for the CP-2500 and the Remote Mount NGT-9000R, RD, & R+.

   - Cable specifications and approved vendors are provided in Equipment Required Not Supplied.
     - o The L-Band and GPS Cables must be RG-400 or equivalent. Refer to paragraph 2.3.7.1 for location and fabrication information. Cable attenuation must not exceed 1.5 dB (including the connectors).
     - o The Directional Cables (required only for models with TAS/TCAS and TAS/Diversity or TCAS/Diversity) requires three cable assemblies; sum (Sigma Port – blue band), bit probe (Probe Port) and difference (Delta Port – red band). Cable attenuation for the sum and difference ports must not exceed 1.5 dB.

2. Refer to Figure 2-6 (sheet 1 thru 4) for Interconnect Wiring Diagram. Interconnect diagrams for alternate equipment is provided when available.

3. Refer to Figure 2-7 for pin locations, signal names, and function. Connector information for P1 is supplied in the recommended installation kit. The assembly requirements for the P1 mating connector are shown in Figure 2-9. An example of the assembled wiring harness is provided in Figure 2-10.

4. It is recommended that the installer perform the following wiring checks during installation:

   - Check all wiring, point-to-point, for continuity before connecting components.

   - Ensure voltages are not applied to signal wires.

   - Inspect cables for correct connection.

2.3.4   Compatible Equipment Installation Information

Use the information in this section for installing compatible equipment. Additional information may be found in the General Information section under Equipment Interfaces and Appendix C (Equipment Compatibility and Diagrams.).

2.3.4.1   PIM-9000

The PIM-9000 WiFi Module is preconfigured by the manufacturer. The PIM-9000 WiFi Module may be connected to the NGT-9000 circuit breaker through a 1/4 amp in line fuse. Refer to Figure 2-5 for dimensional information.
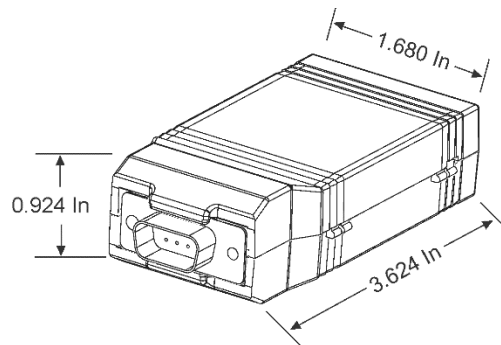
Figure 2-5: PIM-9000

2.3.4.2   WX-500

Release 2.1 or greater. The WX-500 Weather Mapping System (lightning detection) has multiple installation options available as defined below. The WX-500 interface is not available on the Remote Mount version NGT-9000R.

- WX-500 transmits data to the NGT-9000 via RS-232 #1 or RS-422 #1. Configured using the MPC (MAT).

- WX-500 receives heading from RS-232 #1 from the NGT-9000 (which receives heading via ARINC 429) or the WX-500 has heading input from a Synchro system and outputs that heading information to the NGT-9000 via RS-232 #1 or RS-422 #1.

- Use the MPC (MAT) to review configuration information and Fault data. Refer to the installation checkout section (3.9.5) for details.

- Noise Monitor, Test Strikes, and Self-Test procedures for testing and troubleshooting an installation are available in the Maintenance section (para 4.4.5) of this manual. Additional information is provided in the WX-500 Installation Manual.

2.3.5 Discrete Inputs and Output Connections

Refer to the wiring diagrams (Figure 2-6) to view connection details. Refer to functional description in the General Information section for details. Installations with a compatible control panel may need to use the discretes if a function is missing or if the display is not within the pilot primary field of view. Use the following information to review connection options.

- TAWS Caution (Disc 1 Out, pin 21) status lamp (amber color). Power should be connected to dimming bus or day/night switch. Label lamp "TAWS Caution". This lamp is required when TAWS is installed and the NGT-9000 panel display is not within the pilot's primary field of view.

- TAWS Warning (Disc 2 Out, pin 22) status lamp (red color). Power should be connected to dimming bus or day/night switch. Label lamp "TAWS Warning". This lamp is required when TAWS is installed and the NGT-9000 panel display is not within the pilot's primary field of view.

- Traffic Alert (Disc 3 Out, pin 23) status lamp (amber color). Power should be connected to dimming bus or day/night switch. Label lamp "Traffic Alert". Installation necessary when no traffic display is installed. This lamp is recommended when the Traffic Alert lamp is installed and the NGT-9000 panel display is not within the pilot's primary field of view.

- Audio Mute Out (Disc 5 Out, pin 25). The Audio Mute can be connected to other CAWS alerting systems if required that need to mute the traffic system for a higher priority audio annunciation.

- ADS-B Out Fail (Disc 6 Out, pin 26) status lamp (amber color). Power should be connected to dimming bus or day/night switch. Label lamp "ADS-B Fail".

- IDENT input (Disc 1 In, pin 27) switch (momentary). It is required if other equipment does not have the capability to activate the IDENT pulse. Label switch "IDENT".

- Audio Mute input (Disc 2 In, pin 28). Connected to other CAWS alerting systems that need to mute the traffic system for a higher priority audio annunciation.

- On-Ground input (Disc 3 In, pin 29). Connected to a squat switch, airspeed monitor, or a collective switch. This discrete can be set in the DCM settings to either ground on ground, open on ground, or not used.

- Audio Acknowledge (Disc 4 In, pin 30). Used to cancel the audio from a TAWS or Traffic Aural. This discrete is used only when the optional TAWS, TAS, TCAS, or ATAS functionality is configured. Available with Release 2.0 and later.

- Control Panel Select (Disc 5 In, pin 31). Release 3.2 and later. Optional connection used to select ARINC 429 compatible Control Panel #1 or #2. When set to Ground, Control Panel #1 (ARINC 429 input pins 44 – 45) are used. When set to Open, Control Panel #2 (ARINC 429 input pins 46 – 47) is used.
  Note – Automatic control panel source selection is not available via the NGT-9000 (i.e. a selection of an inactive or failed control panel will not automatically switch back to the operational Control Panel.) The control panel system is intended to automatically set this discrete to perform this switching. Control Panel #1 is located in front or left side of the aircraft. Control Panel #2 is located in Aft or right side of the aircraft.

- Standby Mode (Disc 6 In, pin 32). Used to place the unit's transponder in Standby Mode. This is an optional connection typically used when dual transponders are installed. Available with Release 2.1 and later.
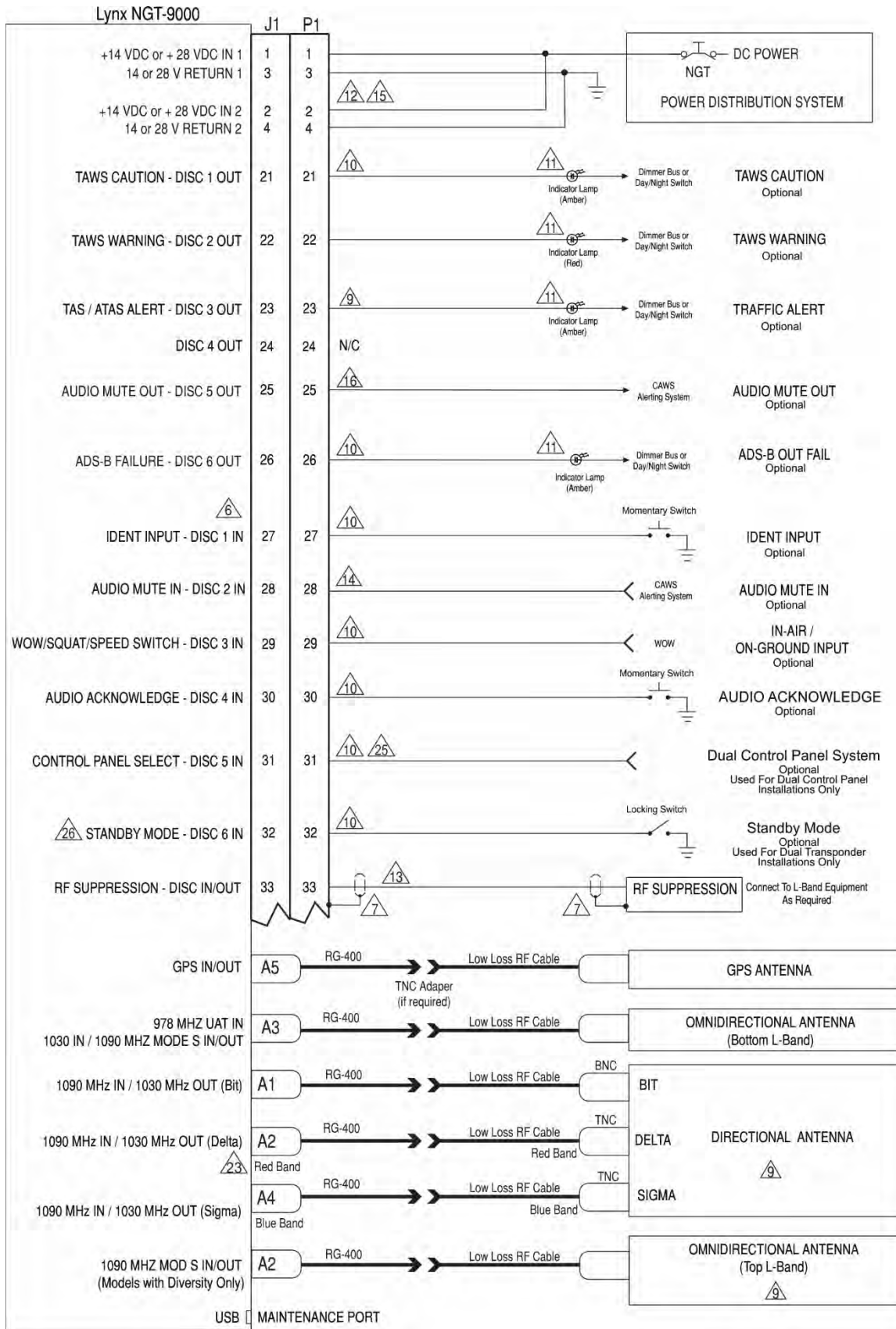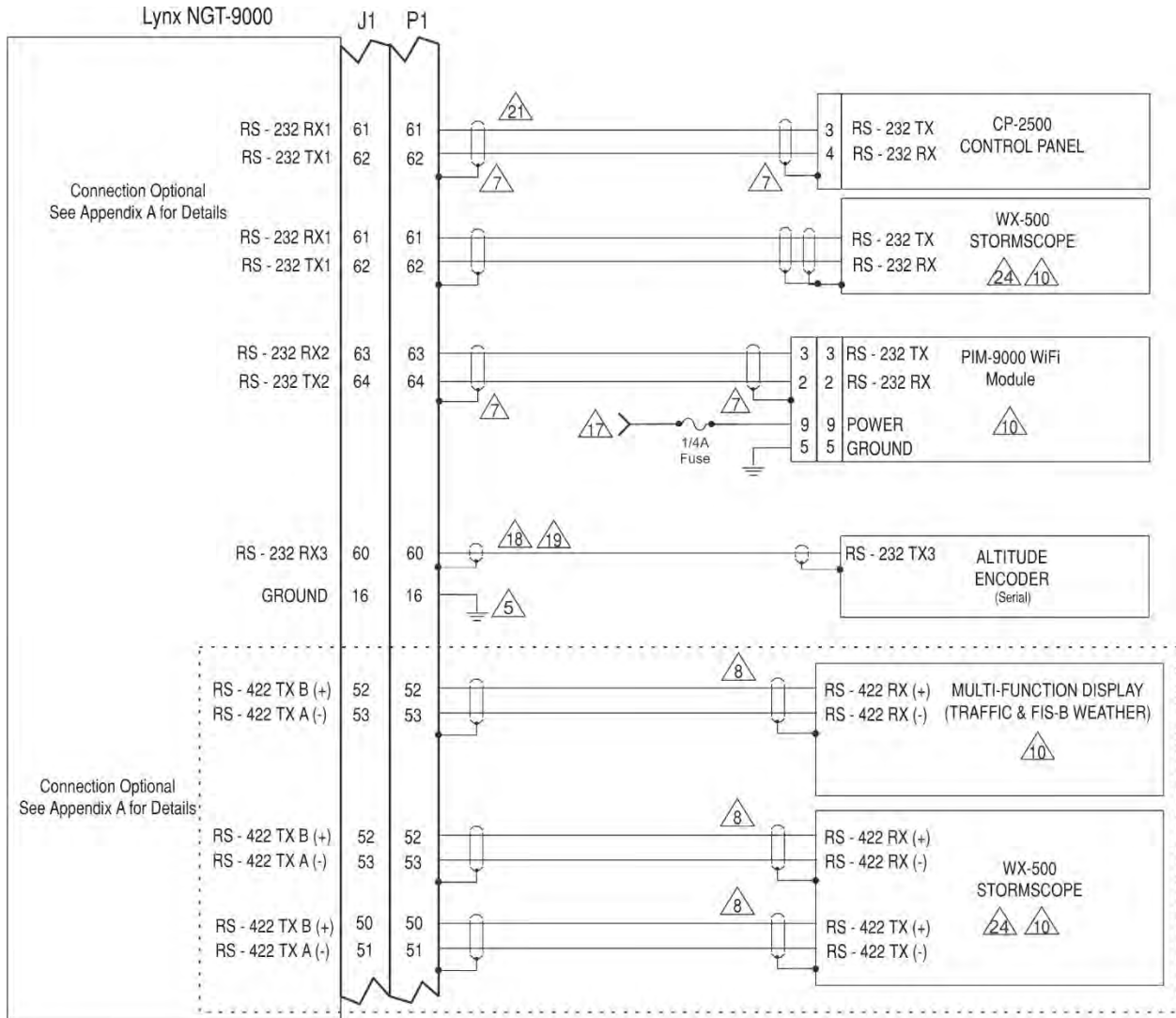
Notes located on sheet 4 of 4

Figure 2-6: Interconnect Wiring Diagram
(Sheet 1 of 4)

Notes located on sheet 4 of 4

**Figure 2-6: Interconnect Wiring Diagram
(Sheet 2 of 4)**
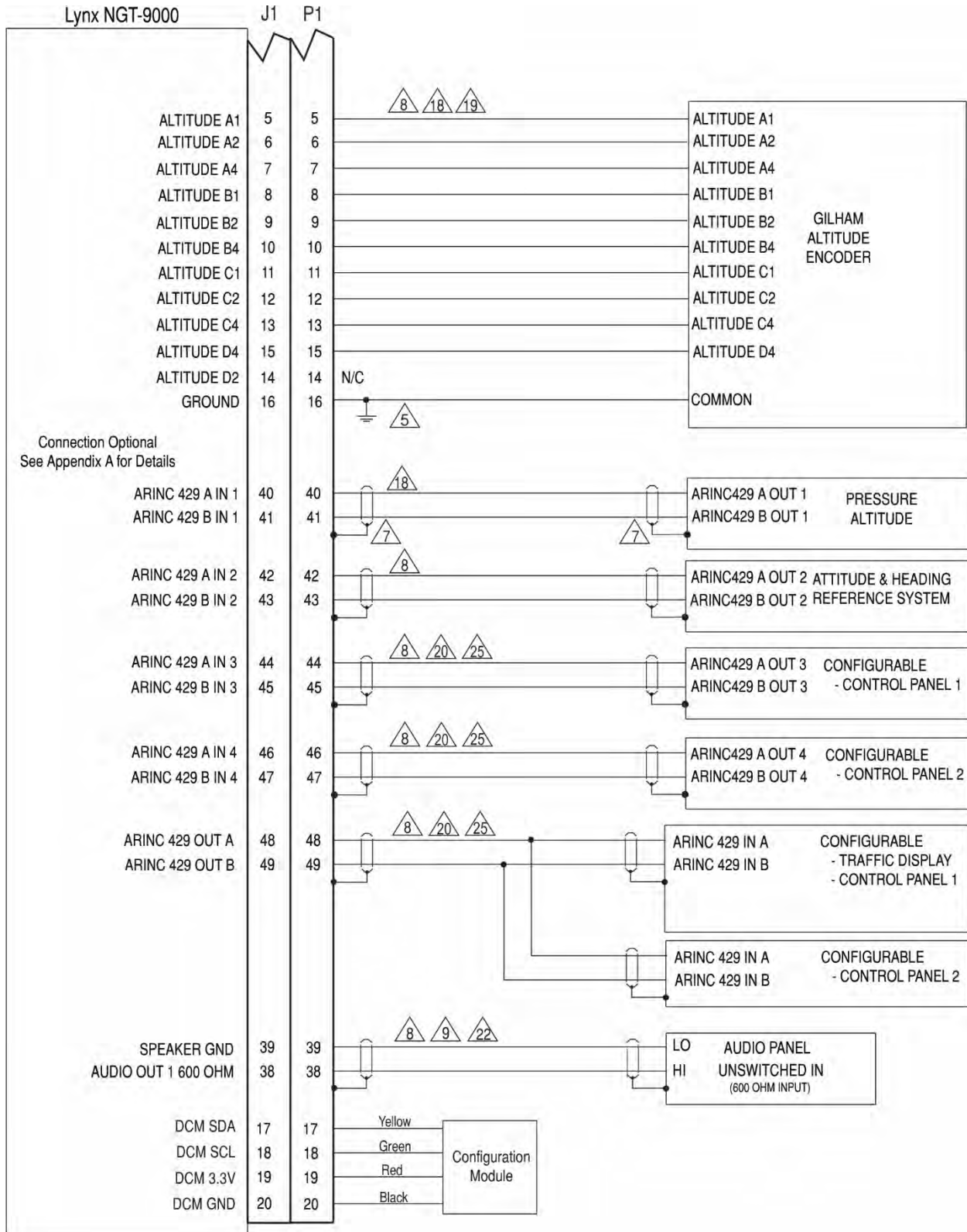
Figure 2-6: Interconnect Wiring Diagram
(Sheet 3 of 4)

Notes located on sheet 4 of 4

NOTES:

1. ALL WIRES ARE 24 AWG UNLESS OTHERWISE NOTED. REFER TO P1 MATING CONNECTOR ASSEMBLY FOR WIRING DETAILS.

2. ⬔ INDICATES TWISTED SHIELDED WIRE.

3. ⏚ DENOTES POWER RETURN GROUND.

4. ⏛ DENOTES CHASSIS OR AIRFRAME GROUND. CHASSIS GROUND WIRES MUST BE AS SHORT AS PRACTICAL MEETING COMMON INDUSTRY STANDARDS AND PRACTICES.

△5 DC POWER RETURNS & CHASSIS/SIGNAL GROUNDS TO BE CONNECTED TO AIRFRAME GROUND USING SEPARATE TERMINATING POINTS.

△6 DISC IN RETURN ARE CONNECTED INTERNALLY TO POWER GROUND.

△7 GROUNDED PIGTAILS MUST NOT EXCEED 3 INCHES IN LENGTH. TERMINATE INSIDE BACKSHELL.

△8 PIN-OUT & INTERCONNECT INFORMATION IS DEPENDENT ON THE EQUIPMENT CHOSEN FOR INSTALLATION. A LIST OF APPROVED EQUIPMENT IS PROVIDED IN THE GENERAL INFORMATION SECTION.

△9 CONNECTION DEPENDENT ON THE MODEL OF THE LYNX NGT-9000.

△10 CONNECTION IS OPTIONAL. SEE APPENDIX A AND APPENDIX C FOR DETAILS.

△11 LAMP MUST BE COMPATIBLE WITH AIRCRAFT VOLTAGE. AN EXISTING ANNUNCIATOR DIMMER MAY BE USED OR DIMMING SWITCH (DAY/NIGHT) MAY BE INSTALLED. CLEARLY LABEL LAMPS AS INDICATED.

△12 THE RECOMMENDED CIRCUIT BREAKER RATING IS 3A FOR 14VDC INSTALLATIONS AND 2A FOR 28 VDC INSTALLATIONS.
28VDC INSTALLATIONS USE 22 AWG WIRE FOR LENGTHS OF 30 FT OR LESS. 14VDC INSTALLATIONS USE 22 AWG WIRE FOR LENGTH OF 6 FT OR LESS. IF WIRE RUN MUST EXCEED 6FT, IT IS THE RESPONSIBILITY OF THE INSTALLER TO DETERMINE ACCEPTABLE WIRE SIZE IAW AC 43.13-1B.

△13 UNSHIELDED PORTION OF SUPPRESSION LINE NOT TO EXCEED 1 INCH.

△14 AUDIO MUTE IN IS ONLY REQUIRED IF INSTALLED WITH AN AUDIO ALERTING SYSTEM (IE. CAWS, TAWS, GPWS, TAS) WITH A HIGHER PRIORITY AUDIO ANNUNCIATION.

△15 TWO POWER INPUT AND TWO POWER GROUND PINS ARE PROVIDED.
FOR 14V INSTALLATIONS - BOTH SETS OF POWER/GROUND INPUT PINS SHOULD BE CONNECTED.
FOR 28V INSTALLATIONS - ONLY ONE SET OF POWER/GROUND INPUTS ARE REQUIRED, BUT BOTH SETS MAY BE USED FOR EASE OF CONNECTING LARGER WIRES SIZES (OPTIONAL).

△16 AUDIO MUTE OUT IS ONLY REQUIRED TO MUTE A LOWER PRIORITY AUDIO ANNUNCIATION SUCH AS A TRAFFIC SYSTEM.

△17 PIM-9000 (P/N 9230-17005-01): 4.5 TO 32 VDC INPUT. 1/4 AMP IN LINE FUSE RECOMMENDED.

△18 PRESSURE ALTITUDE REQUIRED - MAY BE EITHER SERIAL RS-232 OR GILLHAM GRAYCODE OR ARINC 429.

△19 REFER TO THE INSTALLATION MANUAL OF THE ALTITUDE ENCODER SELECTED FOR PIN-OUT & INTERCONNECT INSTRUCTIONS.

△20 CONNECTION IS OPTIONAL. SEE APPENDIX A FOR DETAILS.

△21 CP-2500 CONTROL PANEL IS ONLY REQUIRED FOR THE REMOTE MOUNT LYNX NGT-9000R. COMPATIBLE CONTROL PANELS MAY BE USED IN PLACE OF CP-2500.)

△22 AUDIO CONNECTION TO AN UN-MUTED AUDIO INPUT IS REQUIRED IF THE TAS/TCAS, ATAS, or TAWS OPTION IS INSTALLED.

△23 THE DELTA CONNECTION IS USED FOR DIVERSITY ON MODELS WITH TAS/TCAS + DIVERSITY.

△24 WHEN INTERFACING THE NGT-9000 TO THE WX-500, THE SYSTEM MUST BE WIRED SO THAT THE NGT-9000 IS THE MASTER/SOLE CONTROLLER FOR THE WX-500.

△25 RELEASE 3.2, OPTIONAL CONNECTION FOR DUAL ARINC 429 CONTROL PANELS. PIN 31 CONTROL PANEL SELECT, PIN 44 - 45 INPUT FROM CONTROL PANEL 1. PIN 46 - 47 INPUT FROM CONTROL PANEL 2. PIN 48 - 49 OUTPUT TO CONTROL PANEL 1.

△26 THE REMOTE STANDBY DISCRETE FUNCTIONALITY IS ENABLED IN THE DCM USING THE MPC ON THE SETTINGS>CONFIGURATION>MISC. PAGE.

Figure 2-6: Interconnect Wiring Diagram
(Sheet 4 of 4)

Socket Side
(Front View)

Pin Insert Side
Rear View)

J1	Signal Name	Function
1	PWR_14_28VDC_IN	+ 14/28 VDC Power IN 1
2	PWR_14_28VDC_IN	+ 14/28 VDC Power IN 2
3	Ground	14/28 V Power Return 1
4	Ground	14/28 V Power Return 2
5	ALT_IN_A1	Gilham Altitude Encoder
6	ALT_IN_A2	Gilham Altitude Encoder
7	ALT_IN_A4	Gilham Altitude Encoder
8	ALT_IN_B1	Gilham Altitude Encoder
9	ALT_IN_B2	Gilham Altitude Encoder
10	ALT_IN_B4	Gilham Altitude Encoder
11	ALT_IN_C1	Gilham Altitude Encoder
12	ALT_IN_C2	Gilham Altitude Encoder
13	ALT_IN_C4	Gilham Altitude Encoder
14	ALT_IN_D2	Gilham Altitude Encoder
15	ALT_IN_D4	Gilham Altitude Encoder
16	Ground	Signal Ground
17	SDA2_3V	I2C Data Line
18	SCL2_3V	I2C Clock Line
19	+3.3V_DCM	3.3V Output
20	Ground	3.3V Return
21	DISC_OUT1	TAWS Caution
22	DISC_OUT2	TAWS Warning
23	DISC_OUT3	Traffic Alert
24	DISC_OUT4	Spare
25	DISC_OUT5	Audio Mute Out
26	DISC_OUT6	ADS-B Out Fail
27	DISC_IN1	IDENT
28	DISC_IN2	Audio Mute
29	DISC_IN3	ON Ground Input
30	DISC_IN4	Audio Acknowledge
31	DISC_IN5	Spare (Rel 3.2) A429 Control Panel Sel
32	DISC_IN6	Standby Mode (Rel 2.1)

J1	Signal Name	Function
33	SUPPR_BUS	RF Suppression Input
34	N/C	Spare
35	N/C	Spare
36	N/C	Spare
37	N/C	Spare
38	AUDIO	Audio Out 600 Ohm H
39	GROUND	Audio Out 600 Ohm L
40	RX1_429A	Pressure Altitude Input ARINC 429
41	RX1_429B	Pressure Altitude Input ARINC 429
42	RX2_429A	AHRS Input ARINC 429
43	RX2_429B	AHRS Input ARINC 429
44	RX3_429A	Reserved (Rel 3.2) Input Control Panel 1
45	RX3_429B	Reserved (Rel 3.2) Input Control Panel 1
46	RX4_429A	Configurable Input ARINC 429 #2 (Rel 3.2) Input Control Panel 2
47	RX4_429B	Configurable Input ARINC 429 #2 (Rel 3.2) Input Control Panel 2
48	TX_429A	ARINC 429 Output for CDTI Display (Rel 3.2) Output Control Panel 1 & 2
49	TX_429B	ARINC 429 Output for CDTI Display (Rel 3.2) Output Control Panel 1 & 2
50	RS422_RX2B	RS-422
51	RS422_RX2A	RS-422
52	RS422_TX2B	RS-422
53	RS422_TX2A	RS-422
54	N/C	Spare
55	N/C	Spare
56	N/C	Spare
57	N/C	Spare
58	N/C	Spare
59	N/C	Spare
60	RS232_RX3	Altitude Encoder RS-232 RX
61	RS232_RX1	RS-232 TX Control Panel
62	RS232_TX1	RS-232 RX Control Panel
63	RS232_RX2	RS-232 Wi-Fi Device
64	RS232_TX2	RS-232 Wi-Fi Device
65	N/C	RS-232 (Factory Only)
66	N/C	RS-232 (Factory Only)
67	N/C	RS-232 (Factory Only)
68	N/C	RS-232 (Factory Only)
69	N/C	Spare
70	N/C	Spare
71	N/C	Spare
72	N/C	Spare
73	N/C	Spare
74	N/C	Spare
75	N/C	Spare
76	N/C	TCAS Pretrigger test output
77	N/C	XPDR Pretrigger test output
78	N/C	Antenna Top/Bottom test output

Figure 2-7: Mating Connector (P1) and Pin Assignments

2.3.6 Installation Guidelines for the DCM

Use the following information when locating and installing the DCM in the aircraft.

1. Refer to Figure 2-10 for DCM mounting location.
2. The DCM is permanently attached to the mating connector during wire installation. Outline dimensions for the configuration module is shown in Figure 2-8.
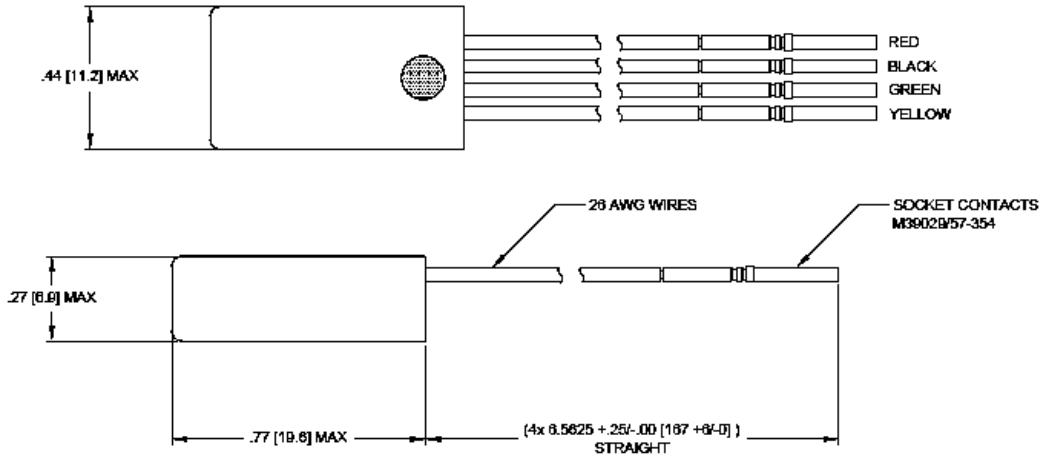
Note: Dimensions are in Inches [mm]

Figure 2-8: Outline Dimensions for the Detachable Configuration Module (9230-17003-01)

2.3.7 P1 Mating Connector Assembly

Installer must take into consideration the length of the wiring harness to ensure an adequate service loop before installing the unit. Refer to Figure 2-9.

1. Assemble Connector Pins P/N M39029/57-354 (item 11) to wires using Crimp Tool M22520/5-01 and Insert M22520/5-05.

2. Secure Backshell P/N 9010-17012-01 (item 9) to P1 Mating Connector P/N 9080-17006-01 (item 14) using 4 Screws P/N 2000-10085-01 (item 7).

3. Remove liners from two Wire Clamp Pads P/N 9000-17132-01 (item 30) and attach to back of both Wire Clamps P/N 9000-17076-01 (item 10).

4. Insert aircraft wiring and wires of the DCM to the P1 Mating Connector (item 14).

5. Route wire shields between Wire Clamp Pads (item 30) and Backshell (item 9).

6. Secure two Wire Clamps P/N 9000-17076-01 (item 10) and 1 Cable Ground Strap P/N 9020-17002-01 (item 27) to Backshell (item 9) using 6 Screws P/N 2000-10087-01 (item 22). (Refer to Figure 2-13 for the installation location of the other side of the cable ground strap.)

7. Secure Wires to Wire Clamps (item 10) using Cable Ties P/N 1040-10002-01 (item 26) as required.
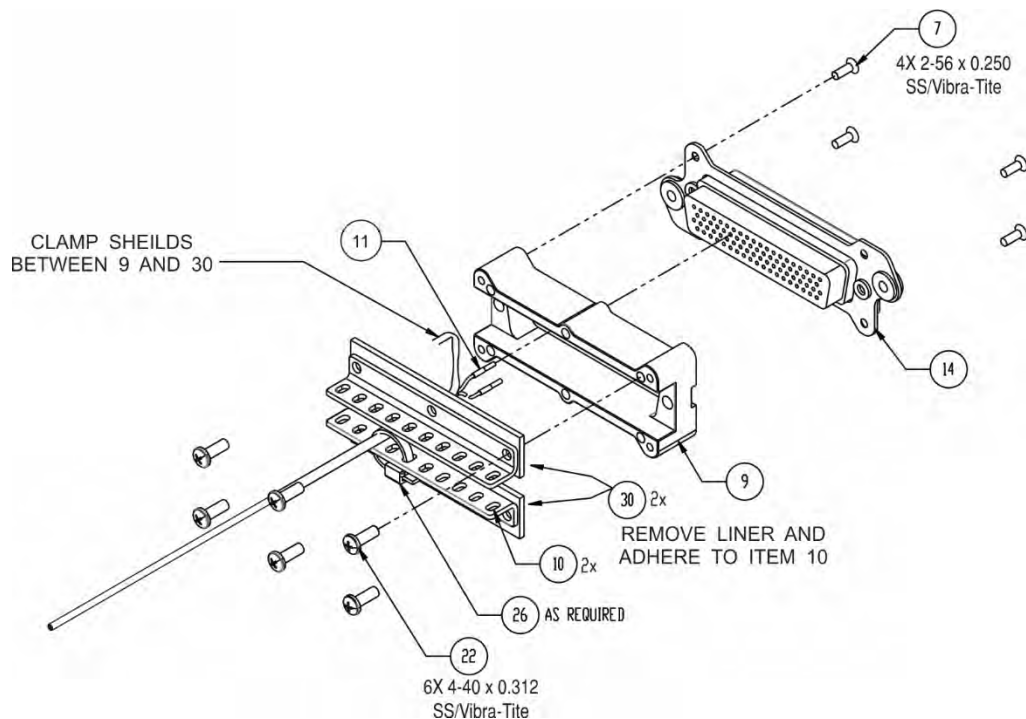
Figure 2-9: P1 Mating Connector Assembly

8. Secure the wires and the DCM using Cable Ties as shown in Figure 2-10.

9. If WiFi is used, a 9-Pin Sub-D Connector P/N M24308/2-1 or equivalent is required for installations intending to use the WiFi interface. Installation Kit 9060-17001-01 is available for from ACSS. Refer to the installation kits in the general information section.

10. If applicable to the installation, connect the PIM-9000 Wifi Module.
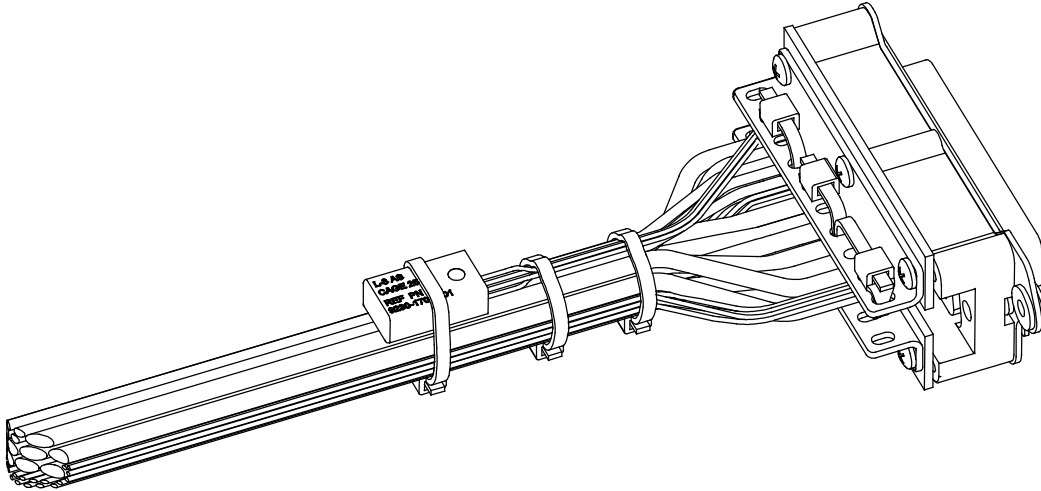
Figure 2-10: Example of P1 Mating Connector and Wiring Harness

2.3.7.1   Antenna Cable Assembly

The instructions below provide the information necessary to assemble the contacts required to connect the coaxial cable to the unit. If low loss cables are required, the opposite/other end of the cables typically have TNC Adapters installed that connect to low loss RF cables. See Figure 2-11.

All models of the Lynx NGT-9000 are required to have GPS and Omnidirectional (UAT) cable connections (A5 & A3, respectively). Models with TAS or TCAS have three cables connecting to A1, A2, and A4. Models with Diversity only have one cable connecting to A2.

NOTES

1. The cable attenuation and VSWR ratings must be verified to not exceed the specified values.

2. Place 4-6 inches (10.2 to 15.2 cm) of heat shrink tubing over each antenna connector and cable to add strain relief and alleviate stress caused by aircraft vibration.

When routing antenna cables, observe the following precautions:

*   All cable routing should be kept as short (do not exceed maximum cable length detailed in the vendor tables, paragraph 1.10.4, in the General Information section) and direct as possible.

*   Avoid sharp bends (do not exceed maximum bend radius detailed in the vendor tables in the General Information section, paragraph 1.10.4.

*   Avoid routing cable near power sources (e.g., 400 Hz generators, trim motors, etc.) and near power for fluorescent lighting.

*   Avoid routing cable near Automatic Direction Finder (ADF) antenna cable (allow at least a 12-inch (30.5) separation).

View looking at the back of the unit

A5 A4 A3 A2 A1

Directional Antenna, BIT (1090/1030 MHZ)
Directional Antenna, (red) DELTA (1090/1030 MHZ)
Top Omnidirectional Antenna (1090MHZ)
Bottom Omnidirectional Antenna (978MHZ UAT / 1090 MHZ 1090ES)
Directional Antenna, (blue) SIGMA (1090/1030 MHZ)
GPS Antenna

RG400 COAX CABLE

BNC or TNC CONNECTION

LOW LOSS RF CABLE

NOTE
The A2 port is either:

*   Top L-Band omnidirectional antenna for Diversity installs without TAS.
*   Directional antenna Delta (red) input port for TAS installs with or without Diversity

The A3 connection is the bottom mount omnidirectional L-Band antenna that must be installed.

Figure 2-11: Example of Assembled RF Cable

2.3.7.1.1   Directional Antenna Cables

The directional antenna installation is optional and used only for models with Traffic Alert System (TAS) or TCAS or models with either TAS/Diversity or TCAS/Diversity functionality.

1.   The directional antenna requires three cable assemblies; sum (Sigma Port), bit probe (Probe Port) and difference (Delta Port). Cable attenuation for the sum and difference ports must not exceed 1.5 dB. Attenuation for the bit probe cable must not exceed 6 dB. VSWR, on cables attached to the sum, bit probe, and difference ports, must not exceed 1.5:1. (See paragraph 1.10.4 for antenna cable vendors and specifications.)

2.   At the antenna, each connector has an identifying color band. To ensure the cables are connected to the correct port, affix the following marking at the termination points of each cable:

- Sum (Sigma) Port   The Sum (Sigma) port is the forward antenna connector. It is marked with a <u>blue band</u>. Fabricate the sum antenna cable with a TNC connector at each end. Affix a <u>blue marking</u> band on each connector. At the NGT-9000, the sum port (A4) must be identified with blue marking.

- Bit Probe Port   The Bit Probe port (A1) is the center antenna connector. Fabricate the probe cable with a BNC connector at each end.

- Difference (Delta) Port The Difference (Delta) port is the rear antenna connector. It is marked with a <u>red band</u>. Fabricate the difference antenna cable with a TNC connector at each end. Affix <u>red marking</u> band on each connector. At the NGT-9000, the difference port (A2) must be identified with red marking.

2.3.7.2   Coax Connector Assembly

The number of antenna cables required for installation is based on the model of Lynx NGT-9000. The basic model has a GPS and omnidirectional (bottom mounted L-Band) antenna connection. Models with Diversity only have a secondary top mounted L-Band antenna connection. Models with TAS/TCAS have three directional antenna connections.

2.3.7.2.1   Straight Coax Connector

1.   Refer to Figure 2-12 for connector assembly and Figure 2-13 for cable ground-strap location.

2.   Secure Backshell P/N 9000-17106-01 (item 24) to Connector P/N 9080-17011-01 (item 15) using 4 Screws P/N 2000-10085-01 (item 7).

3.   Insert Cables (23 or 31) into the appropriate slots of Connector P/N 9080-17011-01 (item 15).

4.   Secure 1 Clip P/N 9002463-001 or 9001963-001 (item 16) and 1 Cable Ground Strap P/N 9020-17002-01 (item 27) to Backshell P/N 9000-17106-01 (item 24) using 2 Screws P/N 2000-10087-01 (item 22).
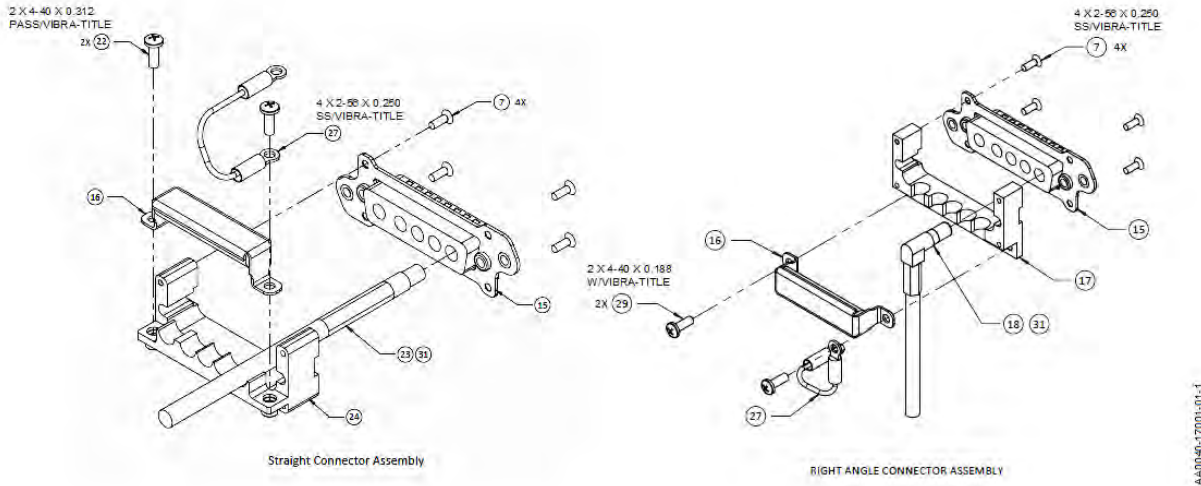
Figure 2-12: Connector Assembly

2.3.7.2.2   Right Angle Coax Connector

1.   Refer to Figure 2-12 for connector assembly and Figure 2-13 for cable ground-strap location.

2.   Secure Backshell P/N 9000-17105-01 (item 17) to Connector P/N 9080-17011-01 (item 15) using 4 screws P/N 2000-10085-01 (item 7).

3.   Insert Cables (18 or 31) into the appropriate slots of Connector (item 15).

4.   Secure 1 Clip P/N 9002463-001 or 9001963-001 (item 16) and 1 Cable Ground Strap P/N 9020-17002-01 (item 27) to Backshell (item 17) using 2 Screws P/N 101-10114-011 (item 29).

2.3.8   Panel mount NGT-9000 Installation

This procedure assumes that the mating connector and Antenna Cables are assembled. Refer to Figure 2-13.

1.   Secure P1 Mating Connector to Rear Plate P/N 9000-17025-02 (item 2) using Nut Plate P/N 9000-17034-01 (item 6) and 2 Screws P/N NAS514-P-440-7 (item 3).

2.   Secure assembled Antenna Connector to Rear Plate P/N 9000-17025-02 (item 2) using Nut Plate P/N 9000-17036-01 (item 5) and 2 Screws P/N NAS514-P-440-7 (item 3).

3.   Attach end of Cable Ground Straps P/N 9020-17002-01 (item 27) to Rear Plate (item 2) using 2 screws P/N 2000-10087-01 (item 22).

4.   Secure Rear Plate (item 2) to Panel Rack P/N 9010-17022-01 (item 1) using 4 Screws P/N NAS514-P-440-5 (item 4).

5.   Place the assembled Panel Rack P/N 9010-17022-01 (item 1) in the location selected in paragraph 2.3.1.

6.   Secure Panel Rack using 6 Screws P/N MS35206-230 (item 12).

2X 4-40 x 0.312

4X 4-40 x 0.438

ATTACH LOOP

ATTACH LOOP

22 2X 4-40 x 0.312
Pass/Vibra-Tite

Cable Ground Strap Location

NOTE
The Strap is used to electrically connect the
floating connector to the mounting rack.
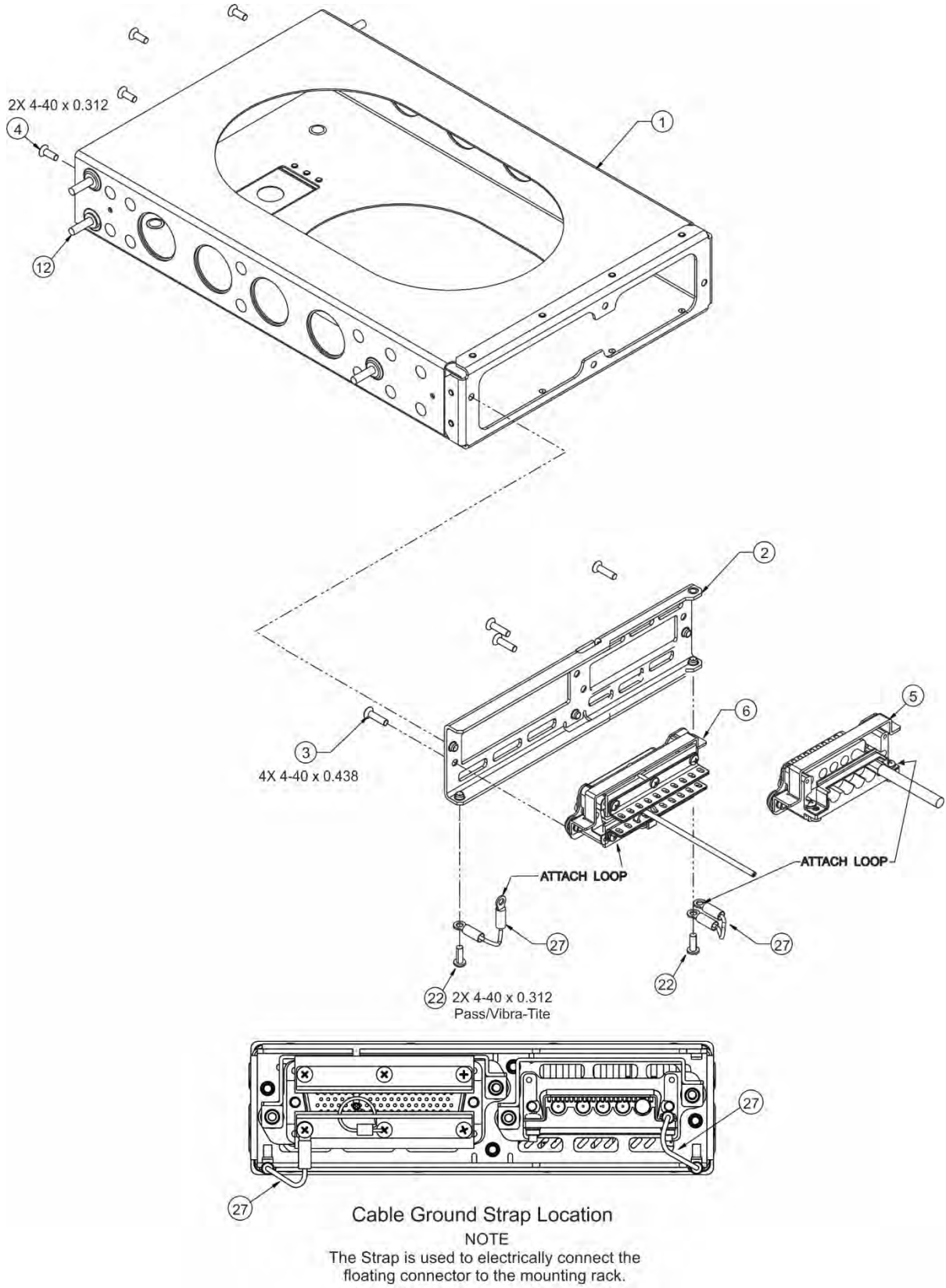
Figure 2-13: Panel Assembly

2.3.8.1   Installation

┌─────────────────┐
│   **CAUTIONS**   │
└─────────────────┘

1. Do not press or contact the display surface of the unit when inserting into the Rack.

2. Panel Retainer torque limit is 5.0 inch-pounds.

3. Prior to inserting the NGT-9000 into the rack, sight down the inside of the mounting tray to assure that the RF-connectors (A-1 thru A-5) are aligned facing straight toward the tray opening. If these connectors are angled, damage to the connectors or the NGT-9000 may result.

1. When installing the panel rack make sure that it is installed flush or slightly forward of the instrument panel as shown in Figure 2-14.

2. Before inserting the NGT-9000 into the Panel Rack, rotate the Panel Retainer screw CCW using a 3/32 Hex Head Driver until it stops (fully disengaged).

3. Insert the NGT-9000 in Panel Rack allowing the alignment guides to settle the unit into place. *Do not press or contact the display surface of the unit when inserting into the Rack.*

4. Rotate the Panel Retainer CW (approximately 40 turns) to lock the unit in place. The Panel Retainer torque limit is 5.0 inch-pounds.

5. Observe that a small gap is showing between the NGT-9000 bezel and the A/C Instrument panel. *Contact between the NGT-9000 bezel and the A/C Instrument panel may prevent the unit from fully seating in the Panel Rack.*
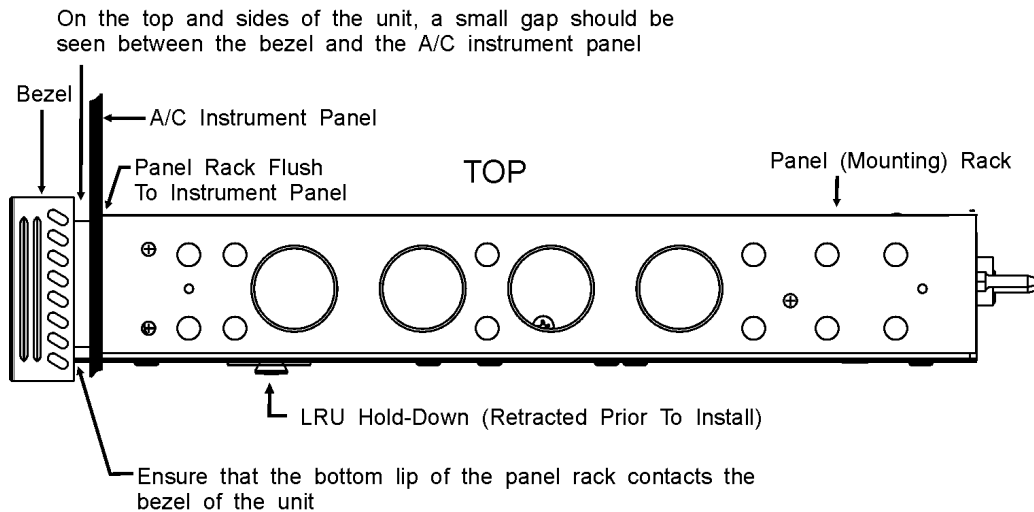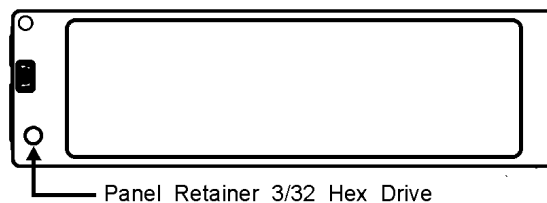
Figure 2-14: Panel Installation

2.3.9   Remote Mounted Lynx NGT-9000 Installation

This procedure assumes that the mating connector and Antenna Cables are assembled.

NOTES

1.   Tighten all screws to snug unless specific torque instructions are given.

2.   The ruggedized mounting tray must be channel mounted for installations in a high vibration environment.

1.   Place the Mounting Tray P/N 9002018-001 (item 1) in the location selected in paragraph 2.3.2.

2.   Determine centers for mounting holes, and drill for required fasteners. See Figure 2-15.

3.   Secure the Mounting Tray P/N 9002018-001 (item 1) in place using #8-32 fasteners and lockwashers. Torque fasteners (screws) to 20 In-Lbs.

4.   Secure P1 Mating Connector to Rear Plate P/N 9000-17025-02 (item 2) using Nut Plate P/N 9000-17034-01 (item 6) and 2 Screws P/N NAS514-P-440-7 (item 3).

5.   Secure assembled Antenna Connector to Rear Plate P/N 9000-17025-02 (item 2) using Nut Plate P/N 9000-17036-01 (item 5) and 2 Screws P/N NAS514-P-440-7 (item 3).

6.   Attach end of Cable Ground Straps P/N 9020-17002-01 (item 27) to Rear Plate (item 2) using 2 screws P/N 2000-10087-01 (item 22).

7.   Secure Rear Plate (item 2) to Mounting Tray P/N 9002018-001 (item 1) using 4 Screws P/N NAS514-P-440-5 (item 4).

8.   Lay unit flat against the base of the tray. Push unit into the connectors allowing the alignment guides to settle the unit into place.

9.   Secure the unit to the tray using the thumbscrew in front of the unit. Tighten thumbscrew (3/16 hex) until unit front plate contacts the tray face.

Cable Ground Strap Location
NOTE
The Strap is used to electrically connect the
floating connector to the mounting rack.

Attach loop
under screw 22

CAUTION
CARE MUST BE TAKEN TO INSTALL THE
REAR PLATE (ITEM 2) AND CONNECTORS
CORRECTLY (NOT REVERSED).

Attach loop
under screw 22
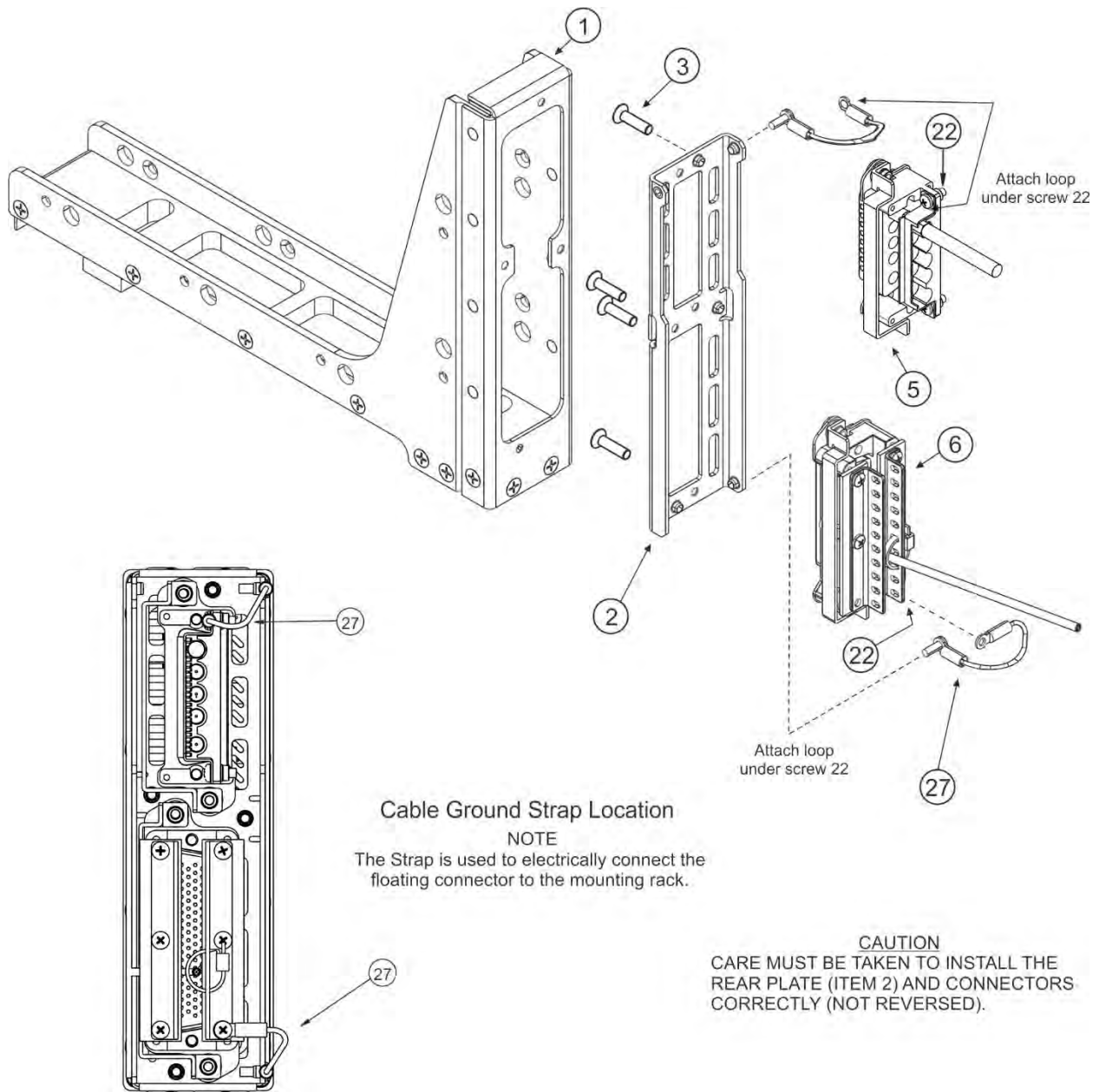
Figure 2-15: Remote Assembly

2.3.10 CP-2500 Installation Guidelines

Use the following guidelines if the CP-2500 Control Panel is used with the NGT-9000R, RD, and R+. For additional installation, instructions see the CP-2500 Installation Manual, P/N 0040-17251-01.

- The ADS-B Out Fail (amber) lamp installation is optional.

- The Traffic Alert (amber) lamp installation is required when TAS, TCAS, or ATAS used and the control display is not within the pilot's primary field of view.

- The TAWS Caution (amber) lamp installation is required when TAWS is used and the control display is not within the pilot's primary field of view.

- The TAWS Warning (red) lamp installation is required when TAWS is used and the control display is not within the pilot's primary field of view.

2.3.11 Antenna Installation Guidelines

This information provides general installation guidance to ensure the installed antennas meet the requirements for the Lynx NGT-9000.

- Installation approval for the GPS and L-band antennas is not provided by the instructions provided in this manual.
- All antenna cables should be clearly marked as both connections use TNC connectors.
- Cable requirements are located in paragraph 2.3.3. Cable vendors and approved antenna manufactures are located in the General Information section.
- An example of antenna placement is shown in Figure 2-16. Refer to the aircraft manufacturer's data and the antenna manufacturer's installation instructions to mount the antenna. The installer may use other FAA approved data to gain a separate antenna installation approval. Four L-band antenna location configurations are available and are detailed below:
- Single bottom omnidirectional (L-band) antenna (no TAS/TCAS, no diversity)
- Bottom omnidirectional (L-band), top omnidirectional (no TAS/TCAS, diversity capable)
- Bottom omnidirectional (L band), top directional (TAS/TCAS capable, diversity capable)
- Bottom omnidirectional (L-band), bottom directional (TAS/TCAS capable, no diversity) due to both being bottom mount (Helicopter)
- All configurations have a top GPS antenna
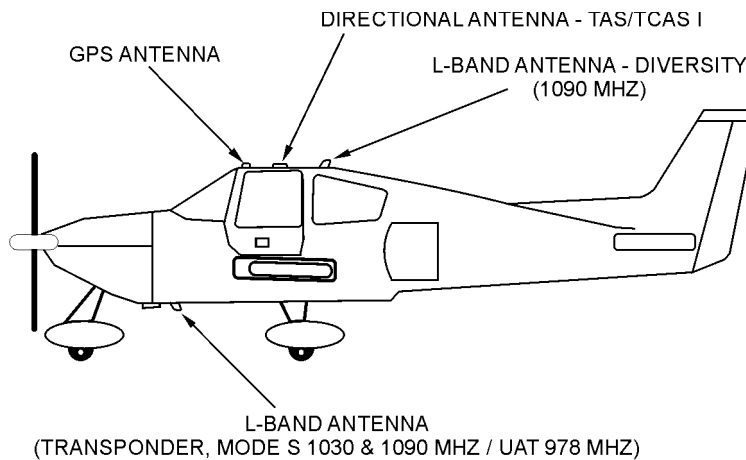
Figure 2-16: Example of Antenna Mounting Locations

Lynx NGT-9000
Installation Manual

2.3.11.1 GPS Antenna

The GPS antenna performance is critical to the performance of the Lynx NGT-9000. The antenna must meet the minimum performance requirements for the Lynx NGT-9000.

• The recommended antenna is a DO-301 compliant antenna meeting the requirements of TSO-C190. For installations where the aircraft has an existing antenna complying with DO-228 (TSO-C144a), the unit may be installed utilizing this antenna, as per DO-229D Note 1, Section 2.1.1.10. Use the antenna location information below to verify an existing antenna location is acceptable for use.

• The performance of the unit is affected by the gain, noise figure, impedance, and frequency selectivity characteristics of the antenna. The unit should be used only with the recommended antenna and cable. Use of other antennas or cables may not meet all the performance characteristics specified in DO-229D.

• The cable including connectors, loss should not exceed 10dB.

2.3.11.1.1 GPS Antenna Location

The following guidance provides information to aid the installer in determining the best location is selected for the installation of the GPS Antenna.

The installation guidelines presented here meet the intent of AC 20-138C Chapter 12, Section 12-1.

NOTE

Not all the listed installation guidelines may be possible on all aircraft. The guidelines are listed in order of importance. The chances of optimal signal strength are decreased if the guidelines are not followed.

1. The antenna must be located on the top of the aircraft and should be mounted in a location to minimize the effects of airframe shadowing during typical maneuvers. Typically mounting farther away from the tail section reduces signal blockage seen by the antenna.

2. Mount the antenna as close to level as possible with respect to the normal cruise flight attitude of the aircraft. If the normal flight attitude is not known, substitute with the waterline, which is typically referenced as level while performing a weight and balance check. A shim may be used to level the antenna.

3. The antenna should be mounted no closer than 2 feet from any VHF COM antenna or any other antenna, which may emit harmonic interference at the L1 frequency of 1575.42 MHz. An EMI check can verify the degradation of GPS in the presence of interference signals.

   • If an EMI check reveals unacceptable interference, either insert a GPS notch filter in line with the offending VHF COM or select a different GPS Antenna location.

4. The antenna should be mounted no closer than 15 inches from the SATCOM antenna.

   • An EMI check can be used to verify if interference signals cause GPS degradation.

5. It is permissible to temporarily locate the GPS Antenna with a coaxial cable connected to the unit and check the GPS performance as described in the installation checkout section. Permanently mount the antenna once a suitable location has been verified.

6. Once the antenna mounting position has been established, route the coaxial cable from the antenna to the Lynx NGT-9000. Proper selection of coaxial cable and assembly of connectors is critical to GPS signal performance.

7. For installations on rotorcraft, ensure that the rotor blades do not interfere with the GPS received signal. This problem has been experienced in some rotorcraft and varies with rotation rate.

2.3.11.1.2 GPS Antenna Installation

Refer to the aircraft manufacturer's data and the antenna manufacturer's installation instructions to mount the antenna. The installer may use other FAA approved data to gain a separate antenna installation approval.

1. Electrical Bonding Requirements:

    The GPS/WAAS antenna requires a minimum ground plane radius of 7.5 inches around the perimeter of the antenna. For metal aircraft, the surrounding metal skin on which the antenna is mounted supplies the ground plane. For non-metal aircraft, the ground plane can be composed of heavy duty aluminum foil tape, such as 3M PIN 438 or other adhesive backed dead soft aluminum foil minimum 0.012 inches thick. It should be noted that if the antenna is struck by lightning, the foil by itself might not be sufficient to dissipate lightning currents. Additional protection may be needed depending on the construction of the structure to which the antenna is mounted.

    - Refer to paragraph 2.3 step 2 for antenna electrical bonding requirements.
    - To prepare an aluminum surface for proper bonding, refer to SAE ARP1870.

2. Connection to the antenna should be made in accordance with the system interconnect diagram Figure 2-6.

2.3.11.2 L-Band Antenna

The L-band antenna is used to must meet the minimum performance requirements for the Lynx NGT-9000.

Antennas meeting the minimum performance specifications needed by the Lynx NGT-9000 may already be installed in the aircraft and may be available for use. Use the antenna location information below to verify an existing antenna location is acceptable for use.

2.3.11.2.1 L-band Antenna Location

The L-band antenna installation should be installed in accordance with AC 43.12-2A Chapter 3. The following guidance provides information to aid the installer in determining that the best location is selected for the installation of the L-band Antenna.

- The primary L-Band antenna (978 MHz /1030 & 1090 MHz) must be mounted vertically on the bottom of the aircraft fuselage. The antenna shall be located to minimize obstruction to fields in the horizontal plane.
- The optional Diversity L-Band antenna (1090 MHz) must be mounted vertically on the top of the aircraft as shown in Figure 2-16. Horizontal separation from the bottom mounted L-band antenna must be no more than 25 feet (7.6 meters).
- The total attenuation including connectors shall not exceed 1.5 dB. Based on this, the length of the cable can be decided assuming RG-400 cable. RG type coaxial cable insertion loss can vary significantly between manufacturers. Refer to the cable manufacturer's specification sheet for actual attenuation (insertion loss) for the cable being used.
- The Antenna(s) should be located away from major protrusions, such as engine(s), propeller(s), and antenna masts. It should be as far as practical from landing gear doors, access doors, or other openings that could affect its radiation pattern.
- The Antenna(s) must be mounted no closer than 20 inches from any FADEC (Full Authority Digital Engine Control).
- The bottom L-Band must be mounted no closer than 7 feet to any DME antenna.
- The Antenna(s) must be mounted no closer than 36 inches to any TAS/TCAS antenna.
- The Antenna(s) should be mounted no closer than 3 feet from any GPS antenna.

2.3.11.2.2 L-Band Antenna Installation

Refer to the aircraft manufacturer's data and the antenna manufacturer's installation instructions to mount the antenna(s). The installer may use other FAA approved data to gain a separate antenna installation approval.

- Electrical Bonding Requirements:

  Each L-Band antenna requires a minimum ground plane radius of 12 inches of contiguous metal (no access panels, etc.) around the perimeter of the antenna. For metal aircraft, the surrounding metal skin on which the antenna is mounted supplies the ground plane. For non-metal aircraft, the ground plane can be composed of heavy duty aluminum foil tape, such as 3M PIN 438 or other adhesive backed dead soft aluminum foil minimum 0.012 inches thick. It should be noted that if the antenna is struck by lightning, the foil by itself might not be sufficient to dissipate lightning currents. Additional protection may be needed depending on the construction of the structure to which the antenna is mounted.

- Connection to the antenna should be made in accordance with the system interconnect diagram Figure 2-6.

- All antenna cables should be clearly marked as both connections use TNC connectors.

- Acceptable coaxial cable attenuation including connectors shall be less than 1.5 dB at 978 MHz.

- Reference General Information Section – Antenna Cables for L-Band Antenna cable loss and minimum antenna spacing requirements.

- Refer to General Information Section - lists some suitable cable types. Any 50ohm, double-shielded coaxial cable assembly that meets airworthiness requirements and the acceptable attenuation requirements (including connectors) may be used.

- Refer to paragraph 2.3 step 2 for antenna electrical bonding requirements.

2.3.11.3 Installation Guidelines for NY156 (TCAS or TAS) or NY164 (TAS) Directional Antenna

Connections are made through two TNC and one BNC connector. To ensure a tight seal between the airframe and antenna, an O-ring seal (i.e., an O-ring groove for an MS28775-044 O-ring) has been incorporated into the design. An O-ring is supplied with each antenna and must be installed when mounting the antenna. Installation kits associated with various airframes are described in the General Information section along with the contents of each kit.

2.3.11.3.1 Directional Antenna Location

Location is an important factor for maximum antenna performance. Optimum location for a particular aircraft type is usually available from the aircraft manufacturer. See Figure 2-18 for Antenna Outline dimensions.

1. In selecting a location, consider the following:

    *   The mounting site should be on the top forward fuselage, as close to the centerline as possible, and within -10° of the in-flight horizon (see Figure 2-17).

    *   The optimum mounting point for maximum coverage is as far forward as possible without exceeding the -10° forward pitch.

    *   If necessary, consideration should be given to relocating other antennas to obtain the furthest forward location for the directional antenna.

    *   The antenna should be mounted on the aircraft with at least 20 dB isolation (about 30 inches (76.2 cm)) from other L-band frequency antennas and 24 inches (61.0 cm) from other antennas or obstructions.

    *   The ground-plane should be as large as possible, a 30-inch (76.2 cm) ground-plane diameter is recommended.

    *   Refer to the guidelines given for the GPS Antenna and L-Band (UAT/1090) Antennas for additional spacing requirements.

    *   The directional antenna can be bottom mounted only if a suitable top mount location is not available. Each bottom mount installation must be evaluated on a case-by-case basis. If further questions on the bottom mount installation occur, contact Field Service Engineering at (623) 445-7070.
        Note - The bottom mount directional antenna eliminates the diversity option.
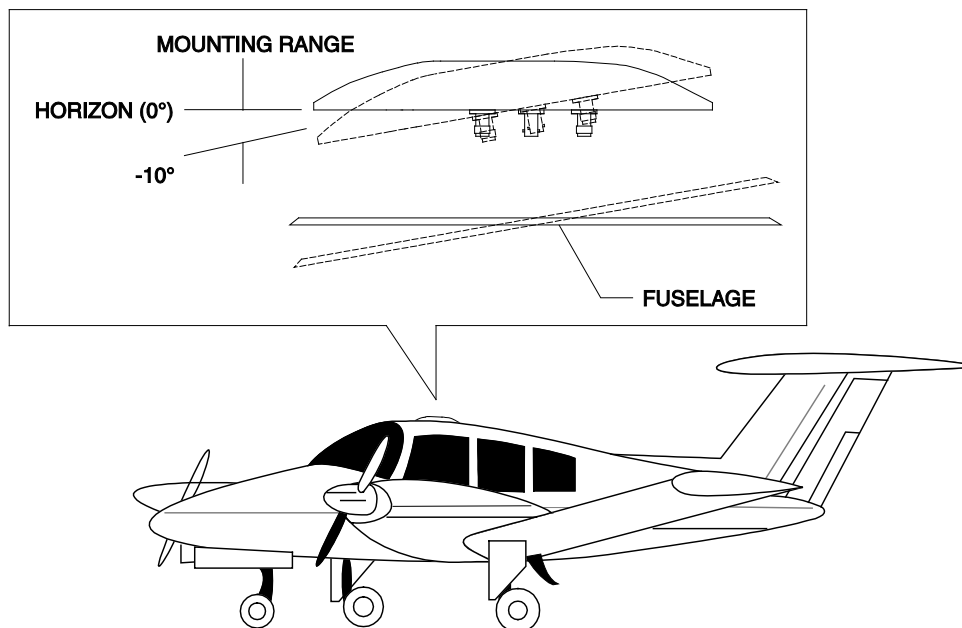
Figure 2-17: Directional Antenna Mounting Location

NOTE
DIMENSIONS ARE IN INCHES (MILLIMETERS)
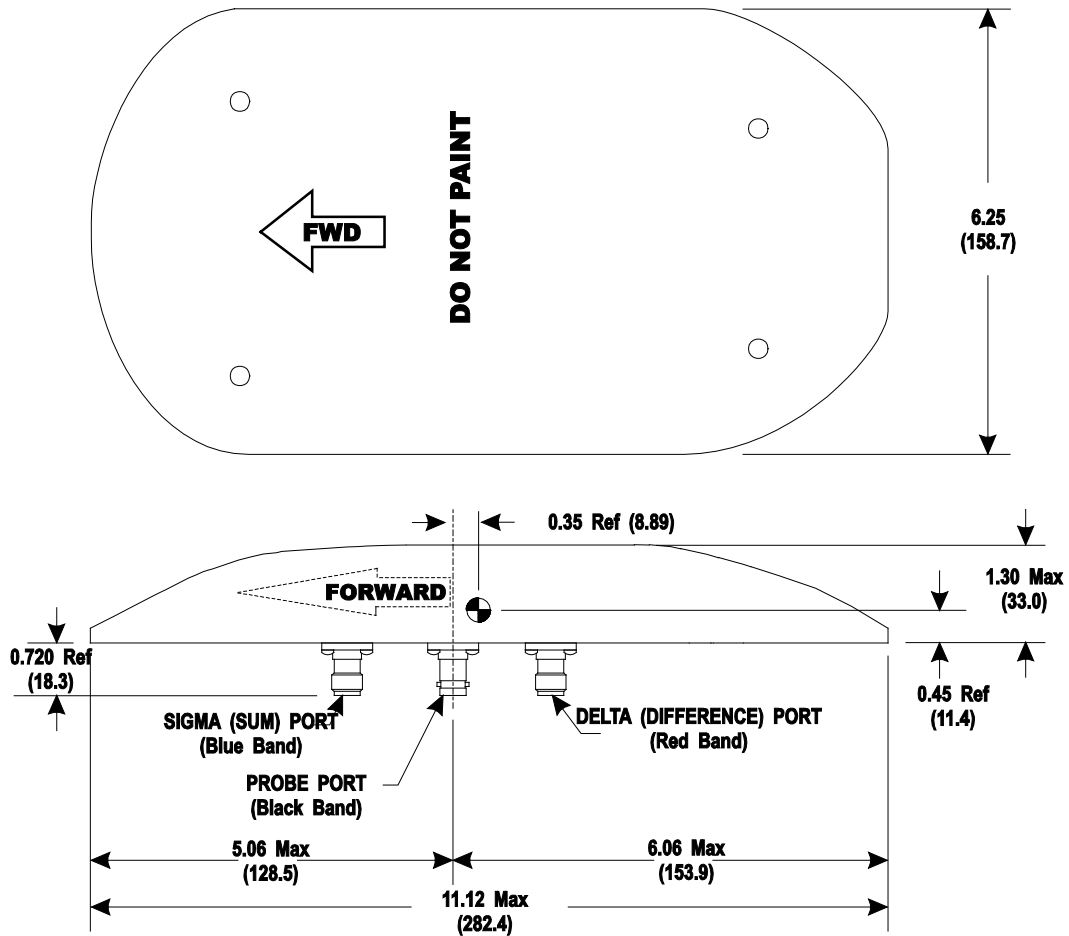
Figure 2-18: NY156 / NY164 Directional Antenna Outline Dimensions

2.3.11.4 Installation

1. Use the following information to the extent necessary to install the directional antenna.

    - Standard installation practices prescribed in FAA Advisory Circular 43.13 must be followed.

    - The installer must ensure the immediate antenna installation area is clean and prepared so that the antenna is electrically bonded (metal-to-metal contact) to the aircraft. To provide optimum bonding through the mounting holes, prepare the surfaces with Alodine No. 1001.

    - To facilitate mounting to the airframe, the dimensions shown in Figure 2-19 can be used to locate and drill mounting and connector access holes.

    - Connection to the antenna should be made in accordance with the system interconnect diagram Figure 2-6.

<div align="center">

NOTE

A doubler plate (not supplied) is required to reinforce the aircraft skin.

</div>

2. Connect each of the three antenna cables. Check to ensure that each cable is connected to the correct antenna connector. Each connector/cable has a matching color band (see note paragraph.).

3. Attach the antenna to the aircraft, with the special adapter plate and o-ring, using 10-32 hardware provided. See Figure 2-20.

<div align="center">

NOTES

</div>

1. Before installing the antenna on an aircraft remove the tape, which holds the O-RING gasket in place during shipment. If the O-ring is in a separate bag, remove and install it in the O-ring groove on the bottom of the antenna.

2. For pressurized aircraft, use a sealant that meets the requirements of SAE AMS-S-8802 such as Flamemaster CS3204 class B. For non-pressurized aircraft, use a non-corrosive sealant that meets the physical requirements of MIL-A-46146 such as General Electric RTV162.

NOTE
DIMENSIONS ARE IN INCHES (MILLIMETERS)

NOT TO SCALE

6.648
(168.86)

3.241
(82.32)

3.407
(86.54)

1.460
(37.08)

1.360
(35.54)

1.760
(44.70)

1.412
(35.86)

3.520
(89.41)

2.824
(71.73)

FORWARD

1.00 (25.40) DIA CONNECTOR
CLEARANCE HOLE
3 PLACES

0.218 to 0.229 (5.54 to 5.82) DIA HOLES
(4 PLACES)
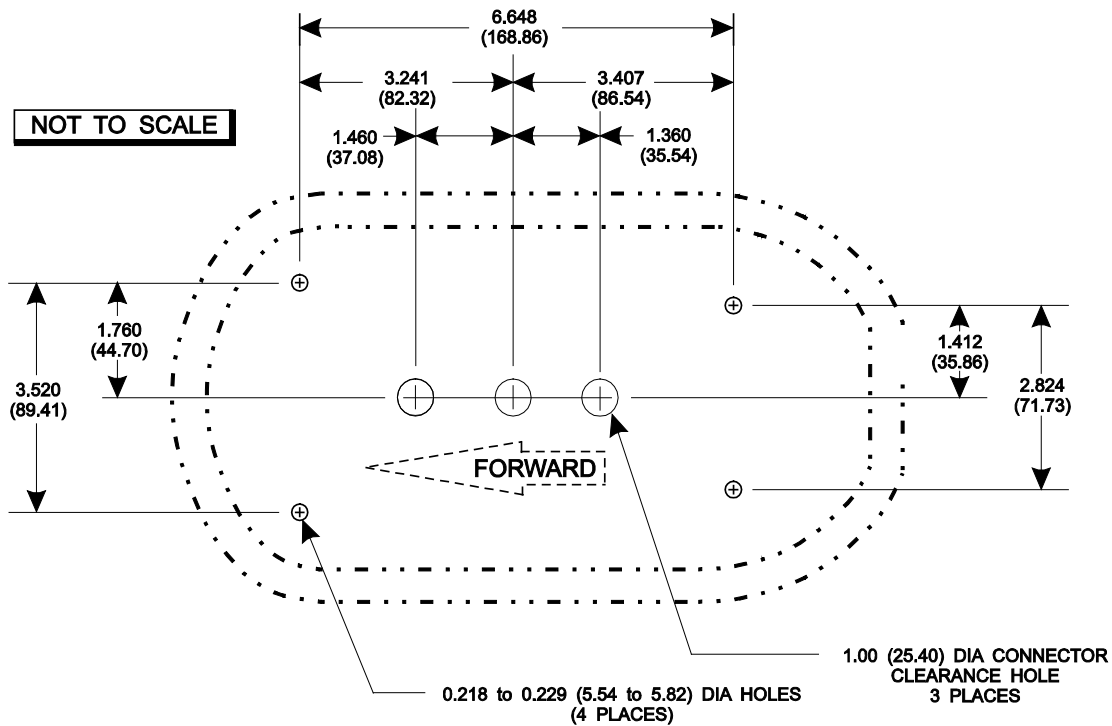
Figure 2-19: Antenna Mounting Holes

10-32 x 1 PAN HEAD SCREW
MS51958-67
(4 PLACES)

DIRECTIONAL ANTENNA

ADAPTER PLATE

AIRCRAFT FUSELAGE

DOUBLER PLATE

10-32 STOP NUT
MS21044C3
(4 PLACES)
INSTALLER MAY USE A NUTPLATE.

FORWARD

DIRECTIONAL ANTENNA
O-RING
MS28775-044
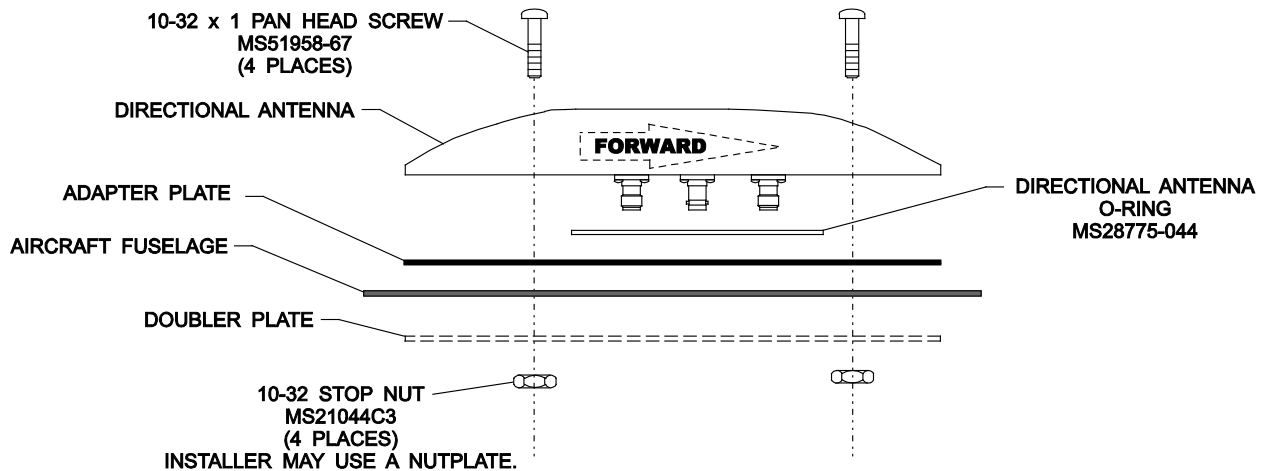
Figure 2-20: Directional Antenna Installation

This page intentionally blank

Section 3
Installation Checkout

3.1 INTRODUCTION

This section contains instructions for the configuration and checkout of the Lynx NGT-9000. Refer to the fault isolation information provided in the maintenance section for help in correcting installation issues found during checkout. Refer to the General Information section - Equipment Required Not Supplied for details on equipment used in this section.

NOTE

These procedures assume that the mounting, wiring, power, and antenna requirements have been checked out according to the instructions given in the installation section.

CAUTIONS

1. Operating the unit with the GPS antenna connected and the L-Band antenna NOT connected may damage the unit.
2. All antenna connections must be connected prior to operation.

3.2 BASIC OPERATION

3.2.1 Panel Mount NGT-9000

The panel mount NGT-9000 uses a touch screen display to select, input, and adjust information on the screen using gestures (actions); such as tap, momentary press, drag, or swipe. See Figure 3-1. The figure below is not a typical screen and is meant to provide instructions of display information only.

- Buttons are typically gray background color with white or green text. When a button is pressed, the background highlights in blue. A button function that is inhibited has its button label grayed out. Buttons with an amber background color is inactive.

- The display for the unit is divided into a left and right screen. Each screen has access to a particular application. Accessing the applications is done using a horizontal Slide action to drag the desired application screen into view.

  An Application indicator is located at the bottom of the left and right screen. The indicator shows the number of available applications for that side of the display as well as the current application setting. Each application can slide into view using both Drag and Swipe actions.

  The left screen applications are designated as "Transponder" and "Alternate Traffic", but also include the information screens (GPS, brightness control, etc.).

  The right screen applications are designated as "Traffic", "Graphic Weather ", "Winds & Temp aloft", and "Textual Weather Reports". Release 2.0 also includes the optional "TAWS" screen.

- A version screen is shown at start up. It identifies version information for the unit's Application Software (Flight SW), Firmware (Platform and GPS), GPS/UAT Receiver SW, Airport (Navigation) Database (Airport DB), Map Database (Map DB), and Terrain Database (Terrain DB).

- The display brightness is automatically adjusted using an ambient light sensor and can also be adjusted pressing the Options icon on the right application screen followed by the dimming button.
- An optional cockpit switch and status lamps may be installed to initiate commands or provide operational status. See paragraph 3.2.2.4 for operational details.

NOTE

The Lynx NGT-9000 can also be interfaced to compatible cockpit displays or a Personal Electronic Device (PED) used to view traffic and weather. The operation of other third party equipment (i.e. PED or display) is not provided in this manual. Refer to the operations manual for the third party equipment for command instructions.
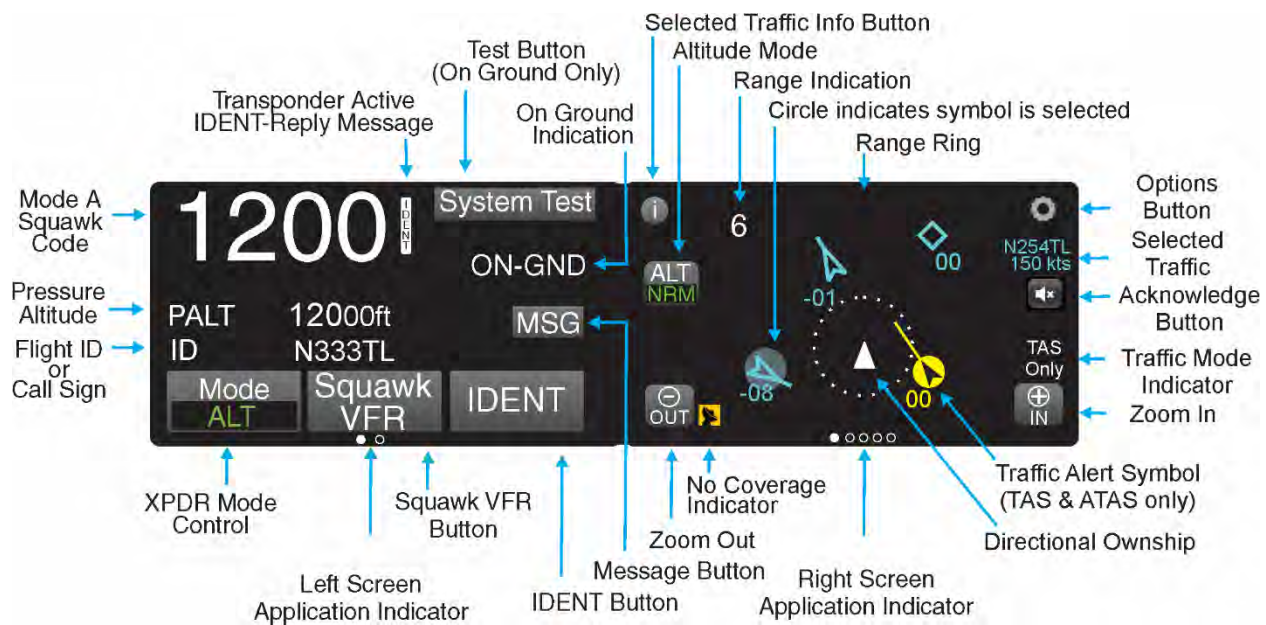
Figure 3-1: Transponder/Traffic Screens

3.2.1.1   Power On

1. Verify the circuit breaker for the Lynx NGT-9000 is closed.
2. Connect aircraft to external power source to conserve aircraft battery power.
3. Apply power to the unit and system component using applicable essential or emergency electrical buses.
   - Initialization and self-tests begin.
4. The splash screen is displayed in less than 5 seconds.
   - The company name/Logo is shown on the left side and the product name on the right.
5. The System Status is shown on the left side in less than 20 seconds
   - If a System Status is "System Fail" or "System Degraded" message is shown, then tap the Continue button to proceed to normal operation. See Figure 3-23.

3.2.2   Remote Mount Lynx NGT-9000R

The remote version of the Lynx NGT-9000 uses a compatible display and a control panel to view and initiate commands. An optional cockpit switch and status lamps may be installed to initiate commands or provide operational status.

- The CP-2500 Control Panel provides all the necessary command and annunciation functions. Refer to paragraph 3.2.2.2 for operating instructions. Detailed operating instructions for the CP-2500 are provided in the Pilot Guide for the CP-2500.

  The CP-2500 displays GPS INIT, indicating that the GPS is initializing. After 2 minutes, the CP-2500 displays ADS-B SYSTEM FAIL if the GPS position was not acquired. If the CP-2500 displays ADS-B SYSTEM FAIL in less than 2 minutes, then a different problem has been detected. Cycle power to the unit. If the problem continues, refer to the troubleshooting section for possible corrective actions.

- The Lynx NGT-9000 can also be interfaced to compatible cockpit displays or a Personal Electronic Device (PED) used to view traffic and weather. The operation of other third party equipment (i.e. PED, display, or control panel) is not provided in this manual. Refer to the operations manual for the third party equipment for command instructions.

3.2.2.1   Power On

There is no power on/off switch for the Lynx NGT-9000. Depending on the aircraft, use either the battery switches or avionics master switch to apply power.

NOTE

> The CP-2500 Control Panel has a power on/off button. Press the small knob button to apply power to the control panel.

1. Verify the circuit breaker for the Lynx NGT-9000 is closed.
2. Connect aircraft to external power source to conserve aircraft battery power.
3. Apply power to the unit and system components using applicable essential or emergency electrical buses.
4. Verify power on messages via the CP-2500 or similar messages on other control systems.
5. Normal operation begins within 10 seconds of applying power. During start up, the unit checks for valid configuration data and initializes self-tests. Refer to the CP-2500 operating instructions in paragraph 3.2.2.2 for startup messages.

3.2.2.2   CP-2500 Control Panel

The operational information provided in this section is limited. Refer to the CP-2500 Pilot's Guide or Installation Manual for details. Refer to the References information in the front section for details.

1. Press the small knob button to apply power to the control panel. To remove power to the unit press and hold the small knob button until the message "Power Down" is shown on the display.
2. After power is applied, if the self-test passes, the CP-2500 briefly displays "OK". That is followed by the scrolling of the firmware and hardware levels of the CP-2500 (approximately 15 seconds). The CP-2500 then reverts to normal operation.
3. The display of the CP-2500 shows the operational mode on the left side of the display and the squawk code on the right side of the display as shown in Figure 3-2.
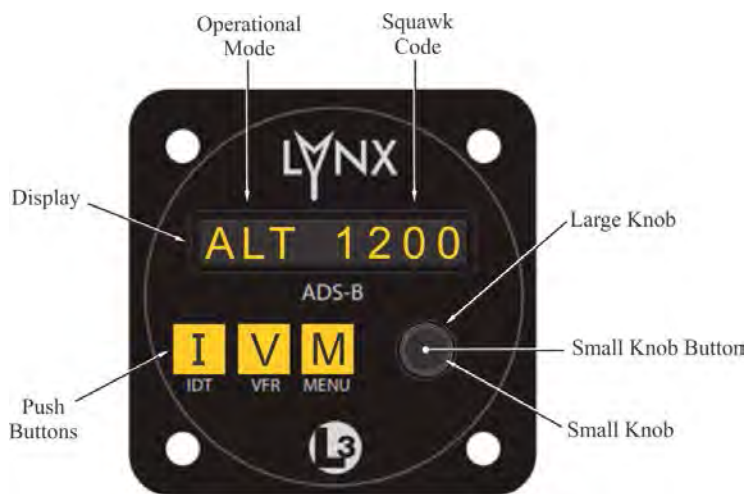
Figure 3-2: CP-2500 Normal Mode

4. In normal operation, the user can change the operational mode, set the squawk code, and view the current pressure altitude. The following optional functions are part of the configuration options set during installation of the Lynx NGT-9000R: set a flight ID mode, Traffic, and Class B TAWS functions. *Select the items by rotating the large knob.*

   • The operational mode is changed by rotating the small knob and can be set to Altitude, On, or Standby. The Altitude (Alt) mode should always be selected unless Air Traffic Control (ATC) requests a change or if there is a known problem with the control panel or Lynx NGT-9000.

     Note – Release 2.1 and greater. If the optional external Standby Mode switch is active, then "STANDBY" is shown and the operation mode cannot be changed from the CP-2500.

   • Change the squawk code by rotating the large knob to select and press the small knob. Observe that the left most digit blinks. Rotate the small knob to change the number, rotate the large knob to select the next digit. Repeat until all digits are changed. Press the small knob or allow the screen to time out to commit the change.

   • View the pressure altitude by rotating the large knob unit the "Altitude" is shown. Press the small knob to view. Press the small knob again to return to normal operation.

   • If configured rotate the large knob to select flight ID. Press the small knob to select the first digit. Rotate the small knob to change the digit (CCW) or character (CW). Rotate the large knob clockwise to move the cursor to the next digit. Press the small knob to commit. Deactivate the Flight ID by rotating the large knob CW to move the cursor off the right side of the display. Continue rotating unit only dashes fill the display. Press the small knob to commit.

   • When a Traffic Advisory is heard press the small knob button to acknowledge the audio alert and cancel the current audio message. Press the small knob button again to replay the traffic advisory if still available. Press and hold the small knob button to remove the audio and traffic message from the display.

   • The TAS/TCAS On Ground Setting is available only when the aircraft is on ground. TAS (or TCAS) operation may be "Enable" or "Disable" automatically when the aircraft status changes to on ground. Press the small knob to change the setting. The message "TAS OPR" (or TCAS OPR) is shown when enabled is selected and begins TAS (or TCAS) operation.

   • When a TAWS alert (i.e. "Pull Up", "Terrain") is heard press the small knob button to acknowledge the audio alert and cancel the current audio message. Press and hold the small knob button to remove the audio and traffic message from the display.

- The <u>TAWS option</u> default setting is "Enable". Press the small knob to change the setting to "Inhibit". Selecting inhibit removes the TAWS alert message from appearing on the CP-2500 display and stops all TAWS aural alerts from occurring. The message "TAWS INH" is shown on the display while the TAWS option is inhibited.

- The <u>TAWS Obstacle option</u> default setting is "Enable". Press the small knob to change the setting to "Inhibit". Selecting inhibit removes the TAWS terrain alert message from appearing on the CP-2500 display and stops the audio 500ft altitude call-out caused by obstacles. The message "OBST INH" is shown on the display while the obstacle option is inhibited.

5. The CP-2500 has three buttons identified as I (Ident), V (VFR), and M (Menu).

- Pressing the "I" button activates the IDENT message to be sent by the ADS-B unit for 18 sec. IDENT is momentarily displayed while this message is being sent. The use of this button is directed by Air Traffic Control (ATC).

- Pressing the "V" button sets the squawk code to a programmed VFR code that is set in the menu. Pressing the button again returns the code to the previous squawk code.

- Pressing the "M" button gains access to the menu, as well as the firmware and hardware status. Rotating the large knob allows the pilot to access different modes. The Menu button also allows access to the Maintenance Mode, where the pilot can conduct a self-test. Press the M button to exit to normal operation. (Alternately rotate the large knob to scroll the screen to "Done and then press the knob to return to the normal operation screen.)

    o Self-Test operation:
    - a. Rotate the large knob to scroll the menu to Maintenance
    - b. Press the small knob to enter "Self TST".
    - c. Press small knob again to activate self-test. When activated, the screen momentarily displays "TEST STARTED" followed by "TEST IN PROGRESS", each lasting for 5 seconds.
        - "TEST PASS". Unit returns to previous operation.
        - "TEST FAIL". After this message is seen, additional messages are shown for each test that failed. Possible messages: "NO LRU RESPONSE", "XPDR FAIL", "ADS-B OUT FAIL", "ADS-B IN FAIL", "FIS-B FAIL", "GPS FAIL", "TAS FAIL", TCAS FAIL, "TAWS FAIL".
        - If a degraded condition is detected a degraded message is flashed on the CP-2500 screen. The possible degraded messages are "ADS-B OUT DEGRADED", "ADS-B IN DEGRADED", "TAS DEGRADED", TCAS DEGRADED, "GPS INIT", "CONFIG MODULE - SERVICE SOON".
        - If the optional ADS-B Out Fail lamp is installed it will be illuminated for 10 seconds during the test.
    - d. While the test is in progress observe that 3 targets are shown on the PED or traffic display (if installed) used by the Lynx MSS. If installed the ADS-B Out Fail lamp (located on instrument panel) will flash for a couple of seconds.
        - One traffic should be at a -90 degree bearing, -200 feet relative altitude and have a climb vertical sense. Another traffic should be a -34 degree bearing, +1,000 feet relative altitude with a level vertical sense. The last traffic should be a +34 degree bearing, -1,000 feet relative altitude with a descending vertical sense.
        - If no targets are seen or the lamp does not flash, then troubleshoot the installation, including the Lynx MSS and associated systems to determine cause. Refer to section 4 of this manual for assistance.

6. Messages are either received from the NGT-9000R or being annunciated from the CP-2500. Messages have priority over normal display operation and is seen scrolling across the display. Rotating the large knob scrolls through unseen messages and the normal display operation (showing operational mode and squawk code). The display begins showing the high priority message again after 10 seconds of no activity. The priority of the messages is discussed in the CP-2500 product manuals.

The TAWS and Traffic messages are dependent on the installation options setup for the Lynx NGT-9000R. The messages have evolved with the model and software releases. The following messages may be seen during normal operation and are listed from highest to lowest priority.

NGT-9000R Release 1.2

- NO LRU RESPONSE: The CP-2500 has detected loss of communication with the NGT-9000R. This is a CP-2500 message that was incorporated in Firmware 15 and later.

- TAS FAIL: The TAS function has failed.

- XPNDR FAIL: The transponder function of the NGT-9000R has failed.

- ADS-B OUT FAIL: The ADS-B out is not being transmitted by the NGT-9000R due to the GPS position not being available for more than 2 minutes or possibly a failure of the NGT-9000R.

- GPS FAIL: The GPS derived position input is not functioning.

- IDENT: The IDENT message is being sent by the NGT-9000R to Air Traffic Control (ATC). (CP-2500 message.)

- GPS INIT: GPS Initialization –The GPS contained within the NGT-9000R is not ready. This message is removed after the GPS completes initialization.

- NO ADS-B COVERAGE: This message is removed once the NGT-900R begins receiving an ADS-B ground station signal.

- GND MODE: Unit is in ground test mode.

NGT-9000R Release 2.0 & 2.1

- NO LRU RESPONSE: The CP-2500 has detected loss of communication with the NGT-9000R. This is a CP-2500 message that was incorporated in Firmware 15 and later.

- GPS FAIL (Priority On Ground): The GPS derived position input is not functioning.

- GPS INIT (Priority On Ground): GPS Initialization –The GPS contained within the NGT-9000R is not ready. This message is removed after the GPS completes initialization.

- PULL UP: This is a TAWS Warning Alert that is accompanied by an aural announcement.

- TERRAIN: This is a TAWS Caution Alert that is accompanied by an aural announcement.

- TRAFFIC: This is an TAS or ATAS Traffic Advisory that is accompanied by an aural announcement.

- GND MODE: Unit is in ground test mode.

- STANDBY: The STANDBY message is seen only when the transponder is in Standby Mode. (Release 2.1 or later, CP-2500 Firmware 15 or later.)

- IDENT: The IDENT message is being sent by the NGT-9000R to Air Traffic Control (ATC).(Release 2.1 or later, CP-2500 Firmware 15 or later) (CP-2500 message.)

NGT-9000R Release 2.0 & 2.1 (continued)

- TAWS FAIL: The TAWS function has failed.

- TAWS UNAVAILABLE: The TAWS function is unavailable due to not having a GPS position solution of sufficient quality.

- TAS FAIL: The TAS function has failed.

- ADS-B IN FAIL: The ADS-B In and ATAS functions have failed.

- ADS-B IN UNAVAIL - POS: The ADS-B In and ATAS functions are unavailable due to not having a GPS position solution of sufficient quality.

- XPDR FAIL: The transponder function has failed.

- ADS-B OUT FAIL: The ADS-B out is not being transmitted by the NGT-9000R due to the GPS position not being available for more than 2 minutes or possibly a failure of the NGT-9000R.

- TAWS INH: The TAWS function is currently inhibited.

- OBST INH: The TAWS function is not alerting on obstacles.

- TAS DEGRADED: The TAS function is operating in a degraded condition.

- ADS-B OUT DEGRADED: The ADS-B out function is operating in a degraded condition.

- GPS FAIL (Priority In Air): The GPS derived position input is not functioning.

- GPS INIT (Priority In Air): GPS Initialization –The GPS contained within the NGT-9000R is not ready. This message is removed after the GPS completes initialization.

- NO ADS-B COVERAGE: This message is removed once the NGT-900R begins receiving an ADS-B ground station signal.

- FIS-B FAIL: The FIS-B function has failed.

- TAS OPR: TAS is operating while the aircraft is on ground.

- CONFIG MODULE - SERVICE SOON: Indicates a problem being detected with the configuration module.

NGT-9000R Release 3.0, 3.1, 3.2, 3.2.1, & 3.2.2

- NO LRU RESPONSE: The CP-2500 has detected loss of communication with the NGT-9000R. This is a CP-2500 message that was incorporated in Firmware 15 and later.

- GPS FAIL (Priority On Ground): The GPS derived position input is not functioning.

- GPS INIT (Priority On Ground): GPS Initialization –The GPS contained within the NGT-9000R is not ready. This message is removed after the GPS completes initialization.

- PULL UP: This is a TAWS Warning Alert that is accompanied by an aural announcement.

- TERRAIN: This is a TAWS Caution Alert that is accompanied by an aural announcement.

- TRAFFIC: This is an TAS/TCAS or ATAS Traffic Advisory that is accompanied by an aural announcement.

- GND MODE: Unit is in ground test mode.

NGT-9000R Release 3.0, 3.1 3.2, 3.2.1, & 3.2.2 (continued)

- STANDBY: The STANDBY message is seen only when the transponder is in Standby Mode. (CP-2500 Firmware 15 or later.)

- IDENT: The IDENT message is being sent by the NGT-9000R to Air Traffic Control (ATC). (CP-2500 Firmware 15 or later) (CP-2500 message.)

- TAWS FAIL: The TAWS function has failed.

- TAWS UNAVAILABLE: The TAWS function is unavailable due to not having a GPS position solution of sufficient quality.

- TAS FAIL: The TAS function has failed.

- TCAS FAIL: The TCAS function has failed.

- ADS-B IN FAIL: The ADS-B In and ATAS functions have failed.

- ADS-B IN UNAVAIL - POS: The ADS-B In and ATAS functions are unavailable due to not having a GPS position solution of sufficient quality.

- XPDR FAIL: The transponder function has failed.

- ADS-B OUT FAIL: The ADS-B out is not being transmitted by the NGT-9000R due to the GPS position not being available for more than 2 minutes or possibly a failure of the NGT-9000R.

- TAWS INH: The TAWS function is currently inhibited.

- OBST INH: The TAWS function is not alerting on obstacles.

- TAS DEGRADED: The TAS function is operating in a degraded condition.

- TCAS DEGRADED: The TCAS function is operating in a degraded condition.

- ADS-B OUT DEGRADED: The ADS-B out function is operating in a degraded condition.

- GPS FAIL (Priority In Air): The GPS derived position input is not functioning.

- GPS INIT (Priority In Air): GPS Initialization –The GPS contained within the NGT-9000R is not ready. This message is removed after the GPS completes initialization.

- NO ADS-B COVERAGE: This message is removed once the NGT-900R begins receiving an ADS-B ground station signal.

- FIS-B FAIL: The FIS-B function has failed.

- TAS OPR: TAS is operating while the aircraft is on ground.

- TCAS OPR: TCAS is operating while the aircraft is on ground.

- CONFIG MODULE - SERVICE SOON: Indicates a problem being detected with the configuration module.

3.2.2.3   Third Party Control Panel General Information

The operational information provided in this section is limited. Refer to the third party Pilot's Guide or Installation Manual for details.

- Release 3.2 or later. The RS-232 Control Panel interface has a Reply Rate Feature (XPDR REPLY message) available that is an indication that the transponder is active. Note – This is not available on the CP-2500.

- Release 3.2 or later. A Control Panel discrete switch (Discrete 5, P1-31) may be used to select Control Panels in installations with dual ARINC 429 Control Panels. This function is detailed in the installation and Appendix A sections of this manual.

3.2.2.4   Cockpit Switch and Status Lamps

The IDENT and Audio Acknowledge switch and status lamps are optional installations.

- Pressing the remote IDENT switch activates the IDENT message to be sent by the unit via ADS-B Out. An IDENT pulse highlights the aircraft's symbol on the ATC's radar screen and is identified on the control panel when active.

- Pressing the Audio Acknowledge cancels the audio from a TAWS or Traffic Aural. This function is available with Release 2.0 and greater.

- Placing the Standby Mode switch in the active position puts the transponder in Standby Mode. It will remain in this mode unit the switch is placed in the inactive position. The active position also overrides the CP-2500 Mode control. This function is available with Release 2.1 and greater.

- The Traffic Alert lamp (amber) illuminates when:
  o TAS/TCAS is enabled and there is a traffic alert condition (only possible when TAS/TCAS is activated).
  o TAS/TCAS is enabled and Self-test is run, the lamp will be "ON" for approx. 8-10 seconds.
  o ATAS is enabled and there is a traffic alert condition (ATAS uses ADS-B In traffic data).

- The ADS-B Out Fail lamp primarily indicates when the Lynx NGT-9000 is not providing ADS-B output data. The lamp may be illuminated (ON) for any of the following reasons:
  1. When Lynx NGT-9000 is not powered, lamp defaults to "ON".
  2. When the aircraft is On-Ground and the self-test is run, the lamp is "ON" for approx. 8-10 seconds.
  3. When the aircraft is On-Ground, the lamp is "ON" until the Lynx NGT-9000 has started and is operational after which the lamp will extinguish.
  4. When the GPS has "failed", the lamp is "ON". GPS failures happen when:
     a. The Lynx NGT-9000 internal GPS indicates a failure.
     b. Aircraft is On-Ground and the GPS has acquired position, but the signal is lost for more than 2 minutes.
     c. Aircraft is In-Air and the GPS has not acquired position within 2 minutes (either startup or had position and lost it).
  5. The lamp begins to flash for the following reasons:
     a. Aircraft On-Ground, there is a 2 minute "quiet period" when the GPS is expected to acquire position. After 2 minutes, the lamp will flash indefinitely while the GPS has never acquired, but is not failed.
     b. Aircraft In-Air, at startup or if GPS had position and then lost it, then the lamp will flash for 2 minutes while trying to acquire position, then become failed (see 4.c. above).

- The TAWS Caution lamp (amber) illuminates when a terrain caution advisory is present.

- The TAWS Warning lamp (red) illuminates when a terrain warning advisory is present.

3.3 MPC (MAT) OPERATION

The procedures for installation checkout require the use of a Maintenance PC, MPC (MAT), LynxMSS USB Driver, and a USB cable.

The LynxMSS USB driver (Zadig utility) must be installed first, prior to connect to the Lynx NGT-9000.

A compatible MPC (MAT) revision must be used to communicate successfully with Lynx NGT-9000. Refer to the Software Revisions information in the General information section (para. 1.12) for details.

NOTES

1. The revision of the MPC (MAT) must be compatible with the unit's software release. Refer to software revisions in the General information section for details. The revision of the MPC (MAT) can be found in the Help/About menu item at the top of the screen.

2. The screen information for MPC (MAT) is very similar between the panel and remote mount models of the Lynx NGT-9000. Differences in appearance either are noted or will be shown in the following procedures.

3. Multiple connections to the NGT-9000 are typical when going through the setup steps. If more than ten (10) MPC-to-NGT-9000 connections are made over a single MPC session, shutting down and restarting the MPC may be necessary. In some instances, multiple MPC connections to the NGT-9000 within a single MPC session (MPC never shut down) can result in connection problems or Windows related failure messages.

4. For international customers it is necessary that the PC or laptop is set for an American Windows installation (not only the language setting), in order for the MPC (MAT) tool to operate correctly.

Persons performing the checkout should monitor the MPC (MAT) status bar. The bottom left corner of the screen provides information on connection type and communication status.

- The communication status is either "Connected – green indicator" or "Not Connected – red indicator".
- Messages are also shown on the right side of the status bar providing guidance to the user.
- The operational status of the unit is shown on the MPC (MAT) and is located at the top of the panel (next to the model ID) and on the status bar.
  The operational status is either "Flight" or "Maint". When "Flight" status is shown, the unit is in either "Normal Operation" or in "Ground Test" modes. When "Maint" status is shown, the unit is in "Maintenance" mode, with or without WiFi. The Restart function of the MPC (MAT) may be used to restart into Normal Operational mode, Maintenance mode (with or without WiFi), or Ground Test mode.
- Maintenance mode (Maint) can be entered within the first 2 minutes from power-on irrespective of Air/Ground state. After 2 minutes, maintenance mode can only be entered if the Air/Ground state is On-Ground.
- The Air/Ground state is determined through an optional Weight On Wheels (WOW) input and GPS Groundspeed. The air/ground state is initially determined based on the last known air/ground state saved in non-volatile memory. When sensor inputs have become available and the state may be determined based on sensors, the installed configuration is used to guide the air/ground algorithm to update the current air/ground state.

NOTE

When the unit is restarted in maintenance mode, the cooling fan is enabled and the ADS-B discrete output is set to ground, which enables the ADS-B Out Fail Annunciator lamp if installed.

3.4 INSTALLATION PROCEDURE FOR LYNXMSS USB DRIVER

The following procedure assume the following:

- The Lynx NGT-9000 and MPC have power applied.

- The LynxMSS USB Driver Installation Utility for Win 7, 8, and 10 has been downloaded from the website (see para. 1.12.1). [Note - The "LynxMSS USB Driver Installation Utility" is also known as "Zadig utility" and can also be downloaded from the internet (search for Zadig utility).

- The Lynx NGT-9000 is connected to the MPC via USB cable (a device icon may be seen on the task bar).

1. Click the "Zadig_2.1.2.exe" (or newer) file to start the Zadig program.
2. A screen prompt is shown on the MPC. Click on the "Yes" button to allow the application to make changes to the MPC. The verified publisher is Akeo Consulting. See below.
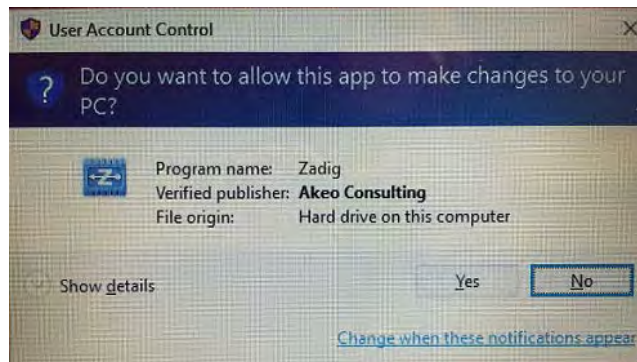
3. If the USB driver has not been installed the following screen is shown. (May need to click "options", select "list all devices", and select NGT9000 from the drop-down list.)
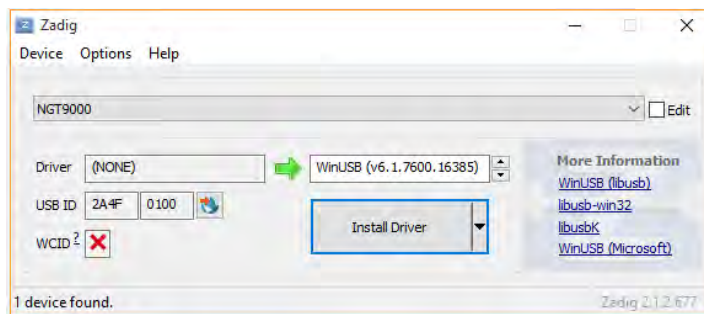
4. Click the "Install Driver" button to begin the installation process. The dialog screen below is shown:
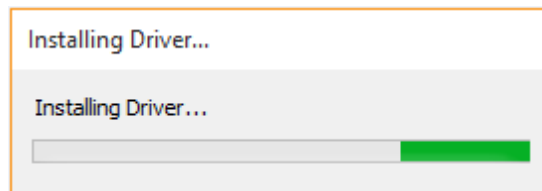
5. The following dialog shown after installation is complete. Click the "Close" button.
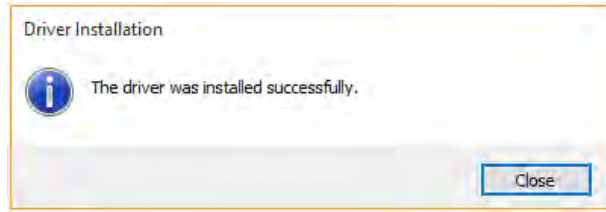
6. The following dialog is shown indicating a successful installation.
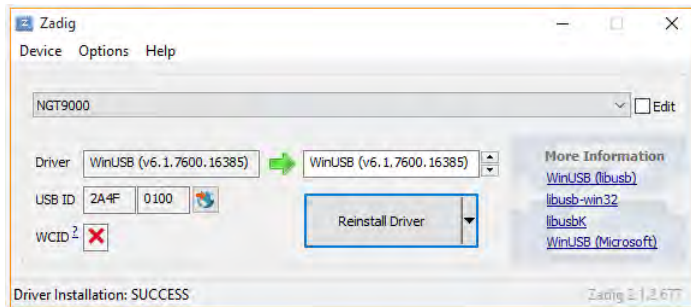
7. If a USB driver has already been installed for the NGT9000, the NGT-9000 will not be listed when Zadig first starts. The following screen is shown
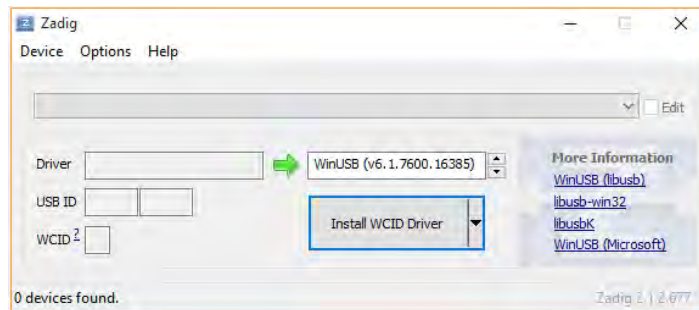
8. Select the "List All Devices" item from the "Options" menu. See below.
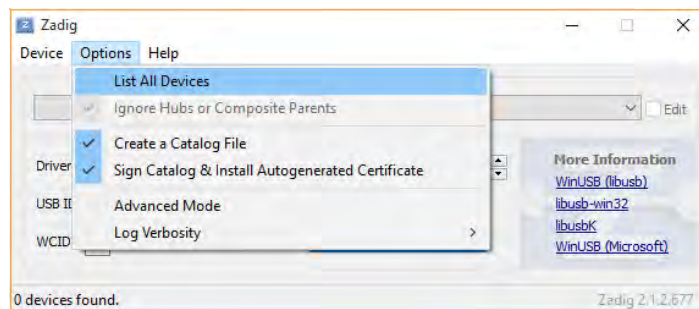
9.   All USB devices are listed.
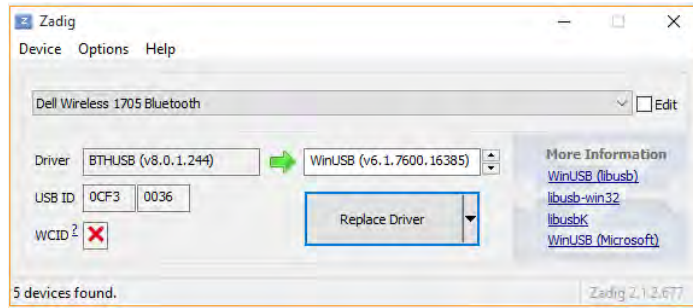
10.   Use the drop-down to select NGT9000.
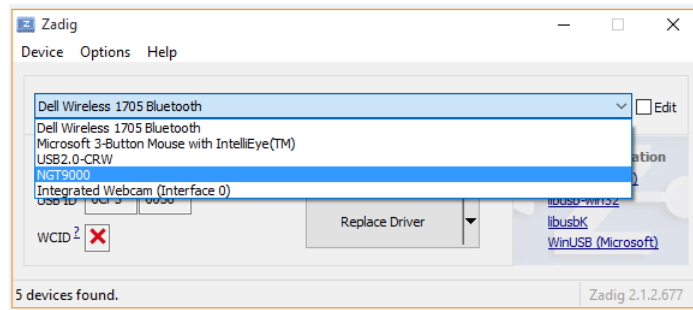
11.   Now the driver can be re-installed if necessary.
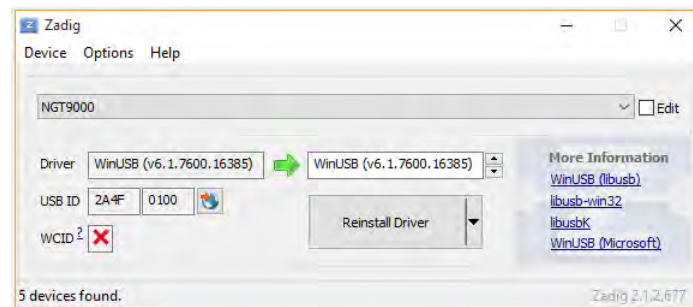
3.4.1   Enable MPC to NGT-9000 Communication via USB Connection

Do the following to connect and establish communication.

1.   Apply power to the unit as indicated in paragraph 3.2.1.1 (panel mount) or 3.2.2.1 (remote mount).

2.   Connect USB cable between MPC and the unit.

3.   From the MPC (MAT) menu, select Connect > NGT9000 > USB. See Figure 3-3.
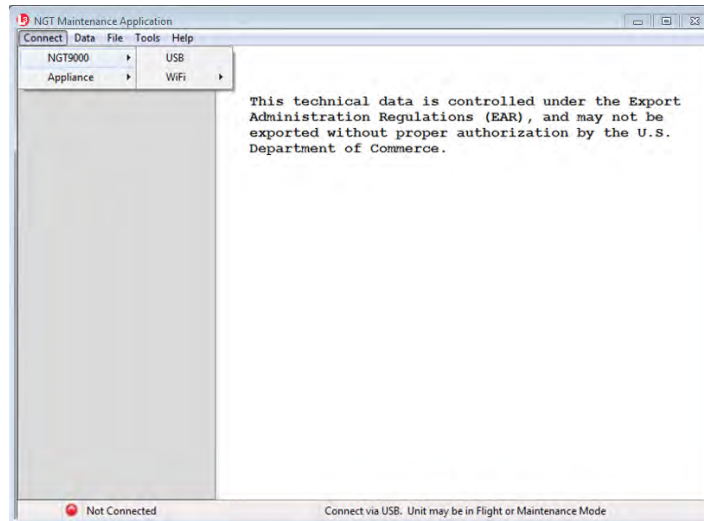
Figure 3-3: Maintenance Application Tool – Main Page – Connect via USB

4.   Communication is established when the MPC (MAT) left view panel changes from grey to tan and the message "Connected" is shown in the lower communication bar. See Figure 3-4.

- If "Not Connected – red indicator" is shown, then check the USB cable for proper connection.

- If a "Response timeout for write request" message is seen on the status bar, then the unit is not responding to requests. Cycle power to the unit.

- When the unit is in maintenance mode the ADS-B Out Fail lamp is ON (if installed).
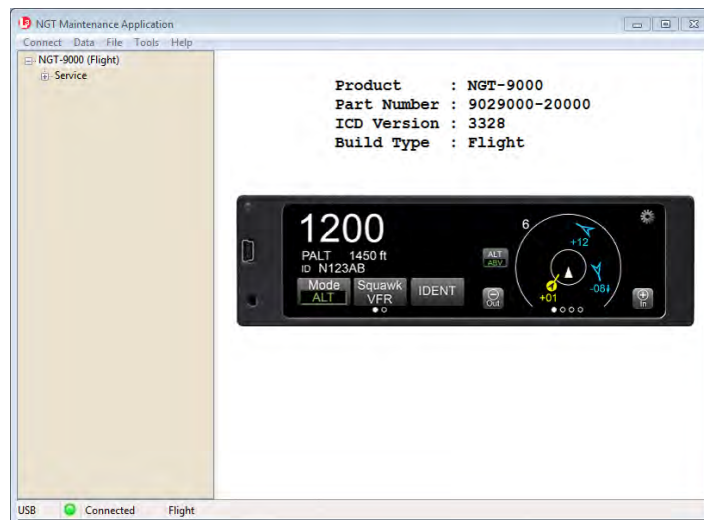
Panel Mount page showing

Figure 3-4: MPC (MAT) – Main Screen

5. Restart the unit in <u>maintenance mode</u> (power cycled) without a WiFi connection (step a) or with a WiFi connection (step b).

    a. No WiFi connection (maintain USB connection)

        (1) From the MPC (MAT) panel select Service > Restart Unit. See Figure 3-5.

        (2) From the Restart Unit screen select Maintenance (No WiFi)

        (3) Click on the Restart Unit button at the bottom of the main screen.

        (4) The unit is ready for configuration setup when the maintenance screen is shown on the unit display.
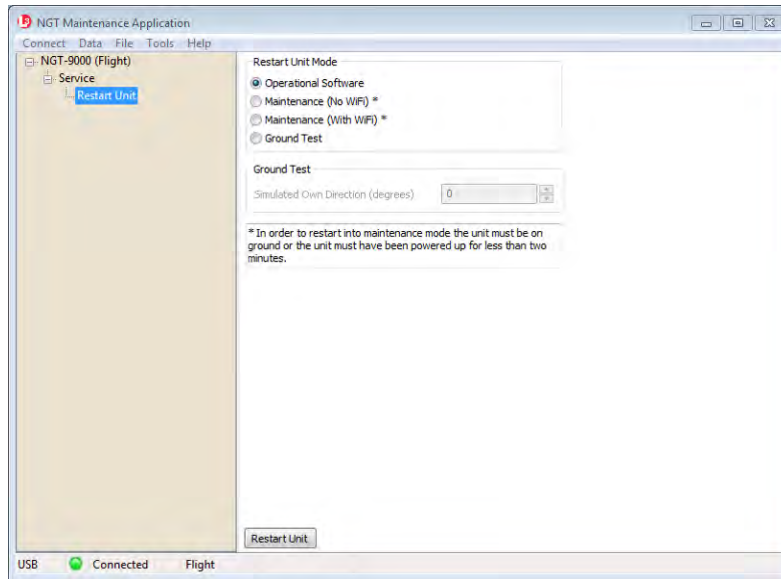
Figure 3-5: MPC (MAT) – Restart Unit

    b. WiFi Connection

        The WiFi connection is optional and requires a WiFi Module as part of the installation.

        (1) From the MPC (MAT) panel select Service→Restart Unit.

        (2) Select Maintenance (With WiFi)

        (3) Press the Restart Unit button.

        (4) From the MPC (MAT) menu, select Connect→NGT9000→WiFi→Connect to Maintenance Mode.

        (5) Connection should be established. If not, then restart the process begun in step (1).

        (6) Remove USB cable.

3.4.2 Enable MPC to NGT-9000 Communication via WiFi Connection

The WiFi connection is optional and requires a WiFi Module (PIM-9000) as part of the installation. Do the following to connect and establish communication between the MPC and the unit via the WiFi. This procedure bypasses the WiFi connection that started out using the USB connection in paragraph 3.4.1.

NOTE

> The MPC wireless connection must be set to the dongle WiFi network.

1. Apply power to the unit as indicated in paragraph 3.2.1.1. The unit starts up in normal flight mode.
2. From the MPC (MAT) menu, select Connect→NGT9000→WiFi→Restart into Maintenance Mode. See Figure 3-6. This must be accomplished within 2 minutes of the Lynx NGT-9000 having power applied while on ground.
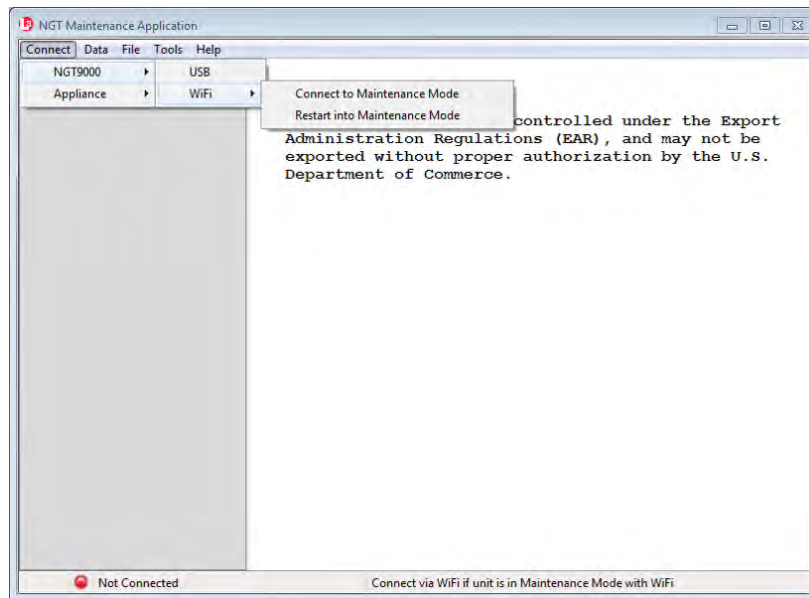
Figure 3-6: Maintenance Application Tool – Main Page – Connect Via WiFi

3. The following Info box is shown on the screen. Select "OK".
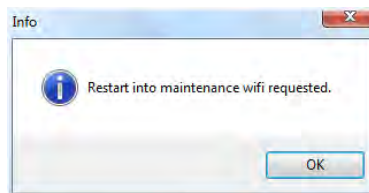
4. From the MPC (MAT) menu, select Connect→NGT9000→WiFi→Connect to Maintenance Mode.

3.5   MAINTENANCE MODE

The unit can enter Maintenance mode without the use of a MPC using the following procedure. This procedure may only be used while the unit is on ground and within the first two minutes of operation.

1.   Apply power to the unit as indicated in paragraph 3.2.1.1.
2.   After the splash screen is shown (i.e. L3 Logo) and begins to dim, press and hold in the lower left corner (see red target below) of the display (continue holding when the status and version screens are showing) until the Activate Maintenance Mode window is shown on the right screen. See Figure 3-7.

Figure 3-7: Activate Maintenance Mode Window

3.   Tap the Yes button to restart the unit in Maintenance Mode. Note - Tapping the No screen button or 10 seconds of inactivity starts normal operation mode. The Maintenance Mode windows are shown in Figure 3-8.

- Note: Some failure conditions automatically activate the maintenance mode. The reason for the automatic activation is shown on the screen.

Main Screen   Reboot Screen
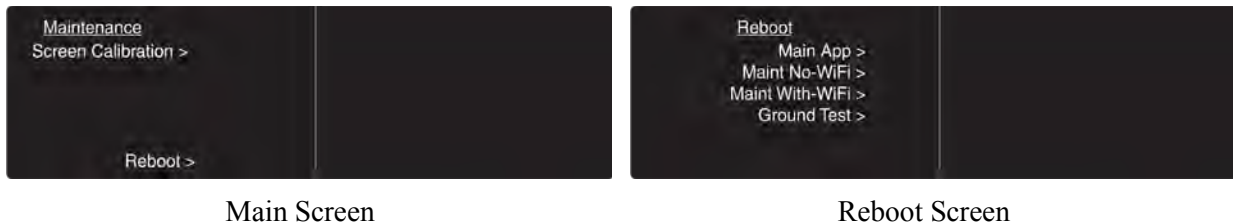
Figure 3-8: Maintenance Mode Screens

4.   From the Main Screen tap the Reboot text.
5.   From the Reboot menu tap the Maint No-WiFi > .

- A maintenance screen is shown on the unit while in maintenance mode.

3.6   VERIFY SOFTWARE VERSION

The Maintenance PC (MPC) and Maintenance Application Tool (MPC (MAT)) are used to interface with the unit to load software/firmware/databases, view factory / version data, and retrieve fault / event logs.

These procedures assume the following:

- Power is being supplied to the aircraft and unit.
- The MPC (MAT) is active on the MPC. Refer to the General Information section, paragraph 1.9 for details on the correct MPC (MAT) that must be used for specific software revisions (Release's).
- The MPC is connected to the unit via the USB interface.
- The MPC and unit are communicating. From the MPC (MAT) panel select Connect→NGT9000→USB. This is required each time the unit power is cycled.

1. MPC (MAT) 8010-17002-010x

    a. From the MPC (MAT) select Info→Versions. See Figure 3-9 (top).

    b. Use the Versions screen to verify that the field loadable software is correct for this installation. Details on software part numbers and versions are available in the General Information section, paragraph 1.9.

       • If a software version is found to be incorrect, update using the procedures located in the maintenance section of this manual.

2. MPC (MAT) 8010-17002-020x and 8010-17002-030x

    a. From the MPC (MAT) select Info→Versions→Software. See Figure 3-9 (bottom).

    b. Use the Software screen to verify that the field loadable software is correct for this installation. Details on software part numbers and versions are available the General Information section, paragraph 1.9.

       • If a software version is found to be incorrect, update using the procedures located in the maintenance section of this manual.
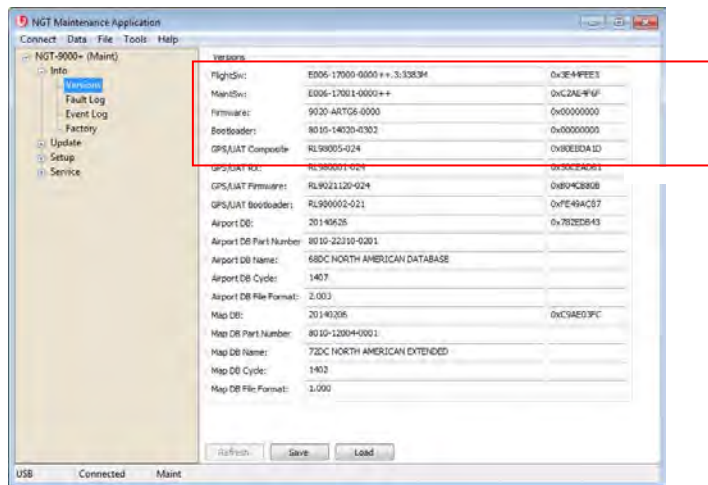
MPC (MAT) 8010-17002-010x
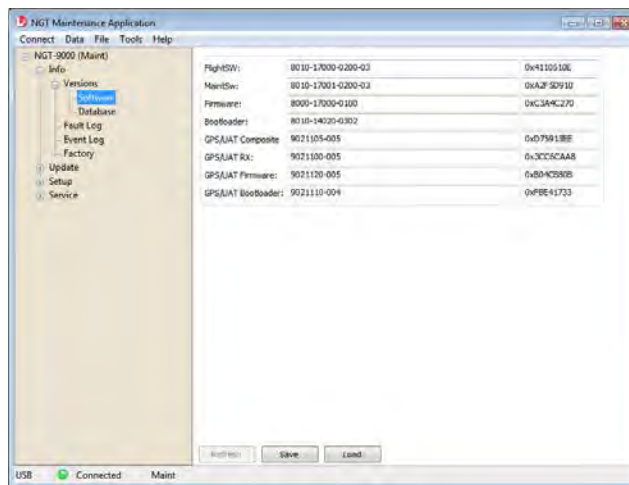
MPC (MAT) 8010-17002-020x (shown above) and 8010-17002-030x

Figure 3-9: MPC (MAT) – Check Versions

3.7   SELECT CONFIGURATION OPTIONS

This procedure is used to configure the Lynx NGT-9000 and must be completed prior to performing the Installation Checkout for first time installations.

```
┌─────────────┐
│   CAUTION   │
└─────────────┘
```

A "Warning" message is shown when the user first attempts an operation that requires confirmation from the user stating, "Changes should be done by trained service personnel". The user will need to press the confirm button to acknowledge this warning.

This message is to warn unauthorized or untrained personnel to stop what they are doing before they mis-configure or damage the unit.

- If a configuration file has already been created using the MPC (MAT) Backup function, then it may be used to load the data options. The configuration restore procedure is located in the maintenance section of this manual.
  - Function activation codes are required to enable Diversity, TAS, TCAS, ATAS (see note below), TAWS, Terrain Display Only (i.e. Terrain Vision), and TAS Ground Filtering Altitude configuration selections. The function activation codes are typically shipped with the unit. If the function activation codes are not included, contact ACSS Customer Service to obtain the codes. Note - For Release 3.2 and later, the ATAS option is always available and no longer requires an activation code.
- If the MPC (MAT) is not connected or is disconnected the left side panel color changes to a light grey and the "Not Connected" message is displayed at the bottom of the tool screen. Re-connect by doing the following - from the MPC (MAT) panel select Connect→NGT9000→USB. This is required each time the unit power is cycled.
- Place the curser over option titles to view tool tips (not always available).
- No configuration changes take effect until they are entered, applied, and the unit is restarted.
- Pressing "Apply" from any setup/configuration/modify screen will apply, or save, all changes from all screens. Successful saving of data to DCM is indicated by the following message being displayed in the lower communication bar of the MPC, "Write to DCM succeeded. Write to NVM backup succeeded"

These procedures assume the following:
- Power is being supplied to the aircraft and unit.
- The MPC (MAT) is active on the MPC. Refer to the General Information section, paragraph 1.9 for details on the correct MPC (MAT) that must be used for specific software revisions (Release's).
- The MPC is connected to the unit via the USB interface
- The MPC and unit are communicating.

3.7.1 Aircraft Specific Options

From the MPC (MAT) select Setup… Configuration→Modify→Aircraft Specific. See Figure 3-10. Enter the information specific to the installation for the intended certification.
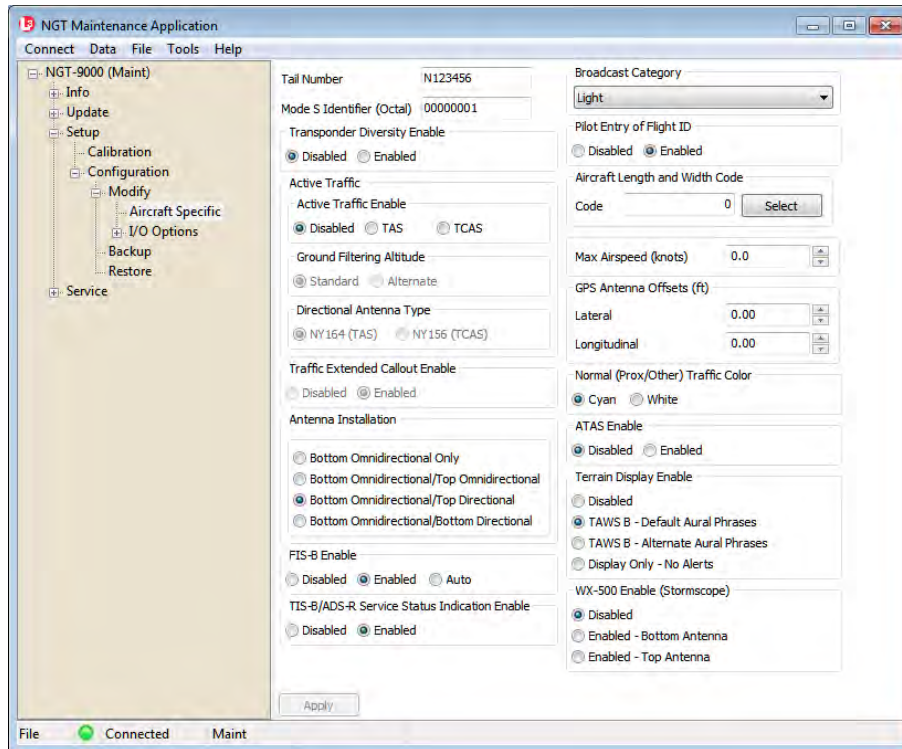
Figure 3-10: MPC (MAT) –Aircraft Specific Options

1. **Tail Number**: Enter the tail number the aircraft that the unit is being installed.

    *   For aircraft that have tail numbers which include a hyphen, the hyphen should be omitted when entering the tail number in this field. When ground testing the transponder, the broadcast tail number may not be reported correctly on some test equipment for some countries.

2. **Mode S Identifier**: 24 bit ICAO address code. Eight octal digits. The code can be obtained from either the aircraft registration certificate or the N number inquiry page http://registry.faa.gov/aircraftinquiry/.

3. **Transponder Diversity Enable**: Select Disabled or Enabled. This function must be enabled for installation with Diversity (NGT-9000D, and D+, or NGT-9000RD, and RD+).

    *   This feature requires a Mode S Identifier to be entered.
    *   This feature requires a function activation code.

4. **Active Traffic**
   a. **Active Traffic Enable**: Select Disabled, TAS, or TCAS. This function must be enabled for installation with TAS/TCAS ((NGT-9000+, D+, or NGT-9000R+, RD+).
      - This feature requires a function activation code. Refer to the general information section of this manual for details on how to obtain this code.
      - This feature requires a Mode S Identifier to be entered. If the Mode S Identifier is modified the diversity and TAS/TCAS enable options, if currently enabled, will be disabled. See the maintenance section for details.
      - When enabled the aural alert "Traffic" and the clock bearing callout (e.g., 12 O'clock) is heard over the audio system when traffic advisory (TA) is first detected.
      - When enabled, while a traffic advisory (TA) is active, the Traffic Alert lamp is illuminated.
   b. **Ground Filtering Altitude**: This option sets the altitude the display of traffic is shown.
      - This feature requires "**Active Traffic** Enable" or "ATAS Enable" to be enabled.
      - The "Standard" selection inhibits the display of traffic below 380ft AGL.
      - The "Alternate" selection inhibits the display of traffic below 5ft AGL.
   c. **Directional Antenna Type**:
      - This feature requires "**Active Traffic** Enable" or "ATAS Enable" to be enabled.
      - Select either NY164 (TAS) or NY156 (TCAS).

5. **Traffic Extended Callout Enable:**
   - This feature requires "**Active Traffic** Enable" or "ATAS Enable" to be enabled.
   - When enabled the extended aural alerts heard over the audio system when traffic advisory (TA) is first detected. The extended callout consists of "Traffic", clock bearing, relative altitude, range, and vertical sense (e.g., Traffic, 2 o'clock, low, 2 miles, climbing).
   - The callouts have the following parameters: Relative altitude terms are High, Low, Same Altitude, or if Relative altitude is unknown (NAR). Range values are in whole nmi starting with less than one mile, one mile, two miles, and ten miles (ten miles is used for all ranges greater than or equal to 10 nmi). Vertical Sense terms are climbing, descending, level, or NAR (if vertical rate is unknown).

6. **Antenna Installation**: This setting is dependent on both the TAS/TCAS enabled and diversity enabled settings. The options available change depending on current Diversity enabled and TAS/TCAS enabled settings. Select the antenna installation using the following guidelines.
   - When Diversity is disabled and TAS/TCAS is disabled, then the only valid antenna selection is Bottom Omnidirectional only.
   - When Diversity is enabled and TAS/TCAS is disabled, then the only valid antenna selection is Bottom Omnidirectional/Top Omnidirectional.
   - When Diversity is disabled and TAS/TCAS is enabled, then antenna install may be either Bottom Omnidirectional/Top Directional or Bottom Omnidirectional/Bottom Direction.
   - When Diversity is enabled and TAS/TCAS is enabled, then the only valid antenna install is Bottom Omnidirectional/Top Directional

   Note - When changes are applied, validation occurs and if a valid option is not selected then a warning message is shown. No changes are applied.

7. **FIS-B Enable:**
   - Selecting Enabled activates all the FIS-B screens and shows the FIS-B No Coverage Indicator when there is a loss of FIS-B data. The enabled setting is the default for aircraft in the United States.
   - Selecting Disabled deactivates Winds & Temps and FIS-B textual data screens. The FIS-B No Coverage Indicator is disabled. The graphical map is shown with no weather indicated.
   - Selecting Auto sets FIS-B to disable. When the FIS-B weather message threshold is reached, FIS-B is switched to enable. When enabled a button appears on the screen that is used to disable/enable FIS-B function.

8. **TIS-B/ADS-R Service Status Indication Enable:**
   This setting enables or disables the TIS-B No Coverage Indicator from appearing on the screen when there is a loss of TIS-B/ADS-R data. The enabled setting is the default for aircraft in the United States.

9. **Broadcast Category**: This information provides an indication of the aircrafts size and performance capabilities. Emitter categories are defined in Table 3-1.

Table 3-1: Aircraft Broadcast Category Description

EMITTER CATEGORY	DESCRIPTION
Unknown	No aircraft type information. If no emitter category fits the installation, seek guidance from the FAA.
Light	Light (ICAO) < 15,500 lbs. This includes very light aircraft (light sport aircraft) that do not meet the requirements of 14 CFR 103.1.
Small	Small – 15,500 to 75,000 lbs.
Large	Large – 75,000 to 300,000 lbs.
High Vortex Large	High Vortex Large - 75,000 to 300,000 lbs. that has been determined to generate a high wake vortex. (e.g., B757).
Heavy	Heavy (ICAO) - > 300,000 lbs
High Performance	Highly Maneuverable > 5G acceleration and > TAS/TCAS high speed.
Rotorcraft	Any rotorcraft regardless of weight.
Glider/Sailplane	Any Glider/Sailplane regardless of weight.
Lighter than Air	Any lighter than air (airship or balloon) regardless of weight.
Parachutist	Sky diver
Ultra-Light	A vehicle that meets the requirements of 14 CFR 103.1. Light sport aircraft should not use the ultra-light emitter category unless they meet 14 CFR 103.1.
UAV	Any unmanned aerial vehicle or unmanned aircraft system regardless of weight.
Space	Trans-atmospheric vehicle
Surface - Emergency	Emergency vehicle
Surface - Service	Service vehicle
Point Obstacle	Includes tethered balloons
Cluster Obstacle	Cluster Obstacle
Line Obstacle	Line Obstacle

10. **Pilot Entry of Flight ID**:
  * Selecting Enabled provides an entry box at start up.

11. **Aircraft length and Width Code**: Click on the Select button to open a code selection window.
  * Options for No data and from 49.2 up to 295.3 (feet).

  Note - If the "OK" and "cancel" buttons are not visible at the bottom of the box when this selection is opened, contact L-3 Field service for Windows help.

12. **Max Airspeed (knots)**: Enter the maximum allowable airspeed of the aircraft.

13. **GPS Antenna Offsets (ft.)**. (Length and Width offset) The GPS antenna offset indicates the longitudinal distance between the nose of the aircraft and the GPS antenna and the lateral distance between the longitudinal center line of the aircraft and the GPS antenna. See AC 20-165B, Appendix 1.
  * **GPS Antenna Offset Lateral (feet)**. (Width offset) This is to provide the position offset of the GPS antenna from the longitudinal center line of the aircraft.
    A negative "-" offset value is left of the centerline and a "+" positive offset value is right of the centerline as viewed when standing at the tail of the aircraft and looking toward the nose of the aircraft.
  * **GPS Antenna Offset Longitudinal (feet)**. (Length offset) This is to provide the position offset of the GPS antenna from the nose of the aircraft.

14. **Normal Traffic Color**: Select Cyan or White (default). This selection is used for the panel mount version of the unit to allow the NGT-9000 traffic color to match existing cockpit traffic displays.

15. **ATAS Enable:**
  * When enabled the aural alert "Traffic" and the clock bearing callout (e.g., 12 O'clock) is heard over the audio system when traffic advisory (TA) is first detected.
  * When enabled and a traffic advisory (TA) is first detected the ATAS Alert lamp is illuminated.
  * Enabling this feature allows the Traffic Extended Callout feature to be enabled.

  Note – Release 3.1 and earlier required a function activation code for this feature. For release 3.2 or later the ATAS function is always available, but must still be enabled via the tool.)

16. **Terrain Display Enable**:

This option requires a function activation code. The two TAWS B options are available only for fixed wing aircraft. The Display Only – No Alerts option is available to fixed wing or rotorcraft.

- **TAWS B – Default Aural Phrases**: Refer to Table 3-2 for details for Primary alerts.
- **TAWS B – Alternate Aural Phrases**: Refer to Table 3-2 for details for Secondary alerts.
- **Display Only – No Alerts:** Enabling this feature shows terrain on the display only without any audio alerts.
- When enabled and a Terrain Caution is first detected the Terrain Caution lamp is illuminated.
- When enabled and a Terrain Warning is first detected the Terrain Warning lamp is illuminated.

Table 3-2: Class B TAWS Alert Description

PRIORITY	TAWS ALERT	ALERT	INTERVAL	PRIMARY (DEFAULT) AURALS TERRAIN	SECONDARY (ALTERNATE) AURALS TERRAIN	PRIM/SEC AURALS OBSTACLE
1	GPWS Excessive Descent Rate (Mode 1)	Warning	2 sec	"Pull-Up"	"Pull-Up"	N/A
2	FLTA Warning (RTC & ITI)	Warning	4 sec	"Terrain, Terrain; Pull-Up, Pull-Up"	"Terrain Ahead, Pull-Up; Terrain Ahead, Pull-Up"	"Obstacle, Obstacle; Pull-Up, Pull-Up"
3	FLTA Caution (RTC & ITI)	Caution	7 sec	"Caution, Terrain; Caution, Terrain"	"Terrain, Ahead; Terrain, Ahead"	"Caution, Obstacle; Caution, Obstacle"
4	Premature Descent Alert (PDA)	Caution	7 sec	"Too Low Terrain"	"Too Low Terrain"	N/A
5	Altitude Callout (500)	Advisory	N/A	"Five Hundred"	"Five Hundred"	N/A
6	GPWS Excessive Descent Rate (Mode 1)	Caution	7 sec	"Sink Rate"	"Sink Rate"	N/A
7	GPWS Excessive Descent Rate (Mode 3)	Caution	7 sec	"Don't Sink"	"Too Low Terrain"	N/A

17. **WX-500 Enable (Stormscope)**:

- This feature requires an interface with a WX-500 Stormscope.
- Enabling this feature also selects the installation location of the Stormscope antenna.

18. Click on the Apply button after all information is entered. This information is saved to the configuration module. Note – The apply button saves all configuration options from each page.

19. Ensure the "Write to DCM succeeded. Write to NVM backup succeeded" message is displayed in the lower communications bar.

3.7.2   I/O Options – AHRS and Altitude

From the MPC (MAT) select Setup➔Configuration➔Modify➔I/O Options➔AHRS and Altitude. See Figure 3-11. Enter the information specific to the installation for the intended certification.
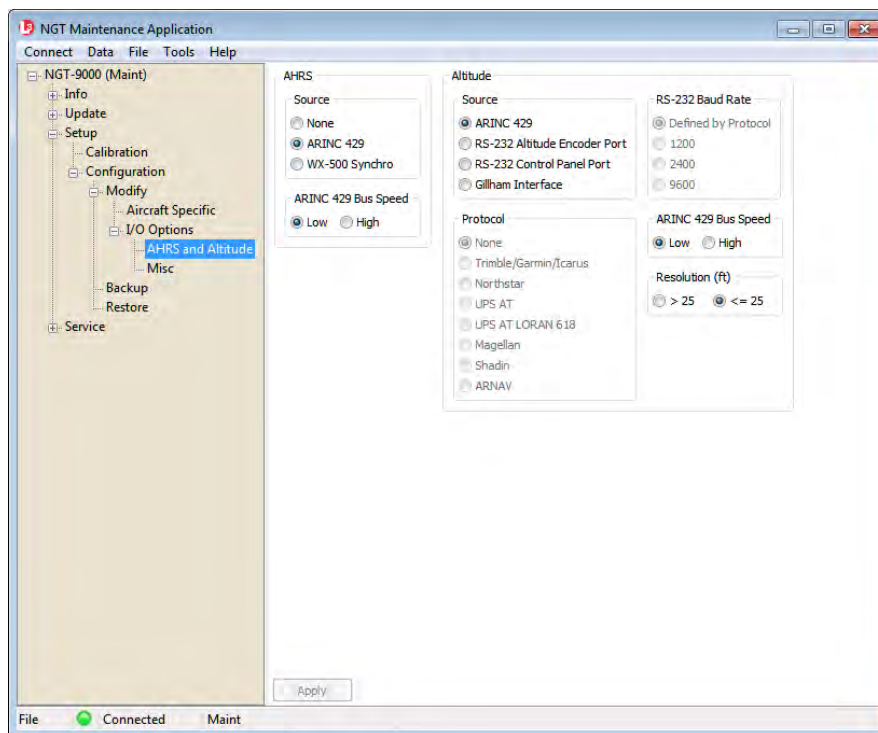
Figure 3-11: MPC (MAT) – I/O Options – AHRS and Altitude

1. AHRS
    a. **Source**: Select none if not using active traffic (TAS/TCAS).
        - **ARINC 429:** This option enables heading to be input on the ARINC 429 #2 bus.
        - **WX-500 Synchro**: This option sets the Lynx NGT-9000 to input heading from the WX-500 that has a synchro heading input.
    b. **ARINC 429 Bus Speed**: If the source selected is ARINC 429 select Low (12.0 to 14.5 Kbps) or High (100 kbps) bus speed.

2. Altitude
    a. **Source**: Select from one of the following:
        - ARINC 429
        - RS-232 Altitude Encoder Port
        - RS-232 Control Panel Port (This option is not available. Do not select).
        - Gillham Interface. (Selecting this option sets the resolution to > 25ft.)
    b. **Protocol**: These options are available only when the selected source is "RS-232 Altitude Encoder Port".
    c. **RS-232 Baud Rate**: These options are available only when the selected source is "RS-232 Altitude Encoder Port" or "RS-232 Control Panel Port".
    d. **ARINC 429 Bus Speed**: If the source selected is ARINC 429 select Low (12.0 to 14.5 Kbps) or High (100 kbps) bus speed.

    e.   **Resolution (ft)**: Select > 25 or <=25 based on the encoder increment rate.

- The resolution is automatically changed to > 25 ft. when Gillham Interface source is selected.
- Selecting > 25 sets the Altitude Thresholds for GPS altitude and Pressure Altitude to 150ft.
- Selecting <=25 sets the Altitude Thresholds for GPS altitude and Pressure Altitude to 50ft.

3.   Click on the Apply button after all information is entered. This information is saved to the configuration module.

4.   Ensure the "Write to DCM succeeded. Write to NVM backup succeeded" message is displayed in the lower communications bar.

3.7.3   I/O Options – Misc

From the MPC (MAT) select Setup…Configuration→Modify→I/O Options→Misc. See Figure 3-12. Enter the information specific to the installation for the intended certification.
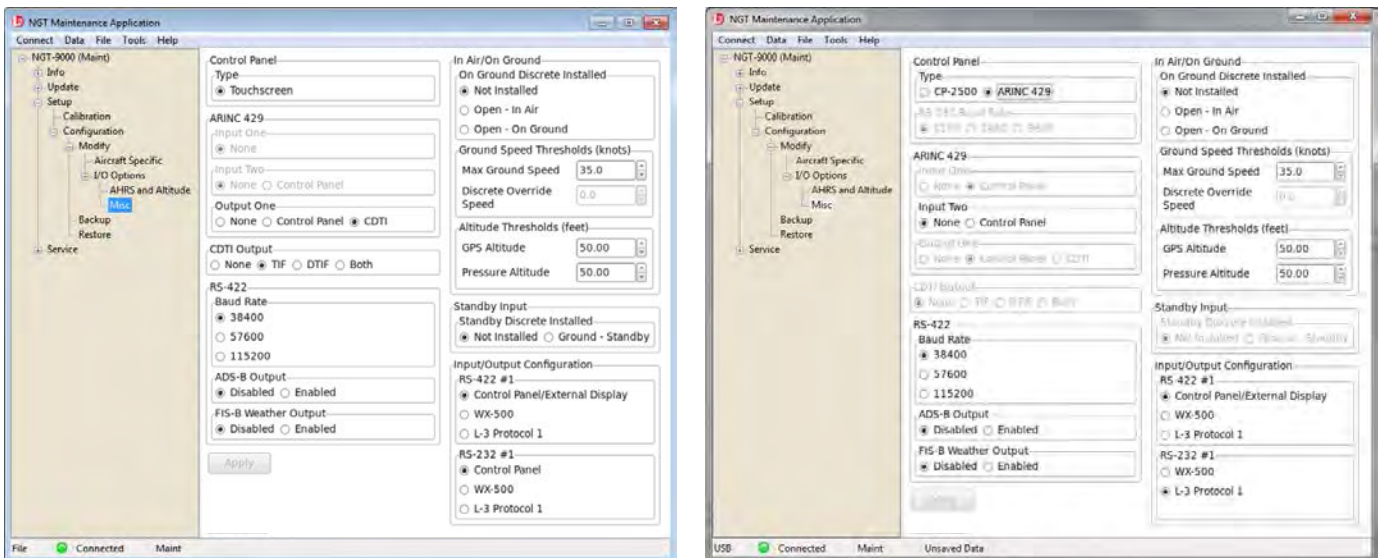
            NGT-9000   NGT-9000R

Figure 3-12: MPC (MAT) – I/O Options – Misc

1.   **Control Panel:** This option is shown as Touch Screen for NGT-9000 or CP-2500 and ARINC 429 (Release 3.2 and later) for NGT-9000R.
- **Touch Screen:** This is set for Touchscreen for panel mount NGT-9000.
- **CP-2500:** This option must be selected for the remote mount NGT-9000R installed with a CP-2500.
- **ARINC 429:** Only applicable to a remote mount NGT-9000R, this option is selected for ARINC 429 Control Panels. Note: this option includes Transponder control only.

RS-232 Baud Rate: 9600 baud rate must be selected for the CP-2500 and is normally selected to 9600 for other controllers.

2. ARINC 429: Set up the ARINC Input and Output bus using the following:
   a. **Input One**: None.
      NGT-9000R only: Release 3.2 (None, Control Panel).

   b. **Input Two**: None.
      NGT-9000R only: Release 3.0 & 3.1 (None, Combo Bus). Release 3.2 and later (None, Control Panel).

   c. **Output One**: Select either None or CDTI. Selecting CDTI sets the ARINC 429 Output to transmit traffic data from the unit to an approved traffic display.
      NGT-9000R only: Release 3.0 & 3.1 (None, CDTI). Release 3.2 or later (None, CDTI, Control Panel).

   NOTE: Use the Control Panel settings for dual panel installations.

3. **RS-422**: Set up the RS-422/RS-232 interface as follows:
   a. **Baud Rate**: Select a baud rate appropriate to the equipment connected via the RS-422 or RS-232 bus.
   b. **ADS-B Output**: This option enables or disables output of traffic on the RS-422 and RS-232 output bus. Note: Must be enabled for RS-232 output.
   c. **FIS-B Weather Output**: This option enables or disables output of weather on the RS-422 and RS-232 output bus. Note: Must be enabled for RS-232 output.

4. **CDTI Output**: This option enables or disables output of TIF or DTIF data to a CDTI ARINC 429 interface. It is recommended to set to TIF and not DTIF or Both.

5. **In Air / On Ground**
The following options are setup based on the emitter category selected (aircraft type) and the In Air / On Ground selections.

- A <u>fixed wing aircraft with a ground discrete installed</u> requires the following options: "Max Ground Speed" and "Discrete Override Speed".

- A <u>fixed wing without discrete</u> requires the following options: "Max Ground Speed", "GPS Altitude", and "Pressure Altitude".

- A <u>rotorcraft with discrete</u> requires the following option: "Max Ground Speed".

- A <u>rotorcraft without discrete</u> requires the following options: "Max Ground Speed", "GPS Altitude", and "Pressure Altitude".

   a. **On Ground Discrete Installed**: This is the WOW input, Discrete 3 input. See J1 Pin 29.

      - Not Installed
      - Open – Ground on Ground
      - Open – On Ground

  b. Ground Speed Thresholds (knots)

   • **Max Ground Speed**: The valid range is 30 to 100. Typically, 70% of Vs0. Must be less than the Discrete Override Speed.

    This is the upper threshold speed which aircraft is considered on ground. Ground speeds below this level place the unit in the Ground state. Fields that become inhibited get set to zeros. As fields become uninhibited, the values are reset to defaults.

   • **Discrete Override Speed**: Applicable only when On Ground Discrete installed and not a Rotorcraft. When applicable, the valid range is 30 to 100, typically 130% of Vs1, and must be greater than Max Ground Speed.

    This is the lower threshold speed which aircraft is considered in air. Ground speeds above this level place the unit in the In Air state, overriding the discrete switch.

  c. Altitude Thresholds (feet)

   • **GPS Altitude**: The valid range is 0 to 500.

    This value is used for fixed wing and rotorcraft installs that do not have an air/ground discrete. This is the lower limit threshold difference in GPS altitude after Power ON at which aircraft is considered in air. A change in GPS altitude above this level places the unit in the In Air state.

   • **Pressure Altitude**: The valid range is 0 to 500.

    This value is used for fixed wing and rotorcraft installs that do not have an air/ground discrete. This is the lower limit threshold difference in pressure altitude after Power ON at which aircraft is considered in air. A change in pressure altitude above this level places the unit in the In Air state.

    - Set the pressure altitude at 150 if Gillham/Gray-code is used.

6. **Standby Input**:

This setting is used to set the transponder function of the Lynx NGT-9000 into standby. It is typically used in dual installations. Available with Release 2.1 and greater.

  a. **Standby Discrete Installed**

   • Not Installed: Normal setting for single installation.

   • Ground – Standby: This setting activates Discrete In 6 (pin 32). When an external switch is set to ground the NGT-9000 transponder function is set to standby.
Note – Transponder mode cannot be changed using a control panel when this external discrete is grounded, though the Mode A code can be set for eventual use.

7. **Input/Output Configuration**:

The following settings are based on equipment interfaces setup during installation.

  a. **RS-422 #1**

   • Control Panel/External Display: Typically used by the remote mount NGT-9000R to output traffic and FIS-B information.

   • WX-500: Alternate method of interfacing with the WX-500 Stormscope. Panel mount NGT-9000 only. Depending on settings this input can also be used by the NGT-9000 for heading.

   • L-3 Protocol 1: This setting outputs GPS Position Source.
WAAS/GPS Output: Certified 5 Hz, RS-422/RS-232 and WiFi Class Beta 1 GPS output. Qualified for LNAV approaches only per TSO-C129d Table 1-1.

    b.   **RS-232 #1**

- Control Panel: One of two options for the remote mount NGT-9000R to interface. This applies to the CP-2500 or any compatible RS-232 controller.

- WX-500: Alternate method of interfacing with the WX-500 Stormscope. Panel mount NGT-9000 only. Depending on settings this input can also be used by the NGT-9000 for heading.

- L-3 Protocol 1: This setting outputs GPS Position Source.
  WAAS/GPS Output: Certified 5 Hz, RS-422/RS-232 and WiFi Class Beta 1 GPS output. Qualified for LNAV approaches only per TSO-C129d Table 1-1.

8. Click on the Apply button after all information is entered. This information is saved to the configuration module.
9. Ensure the "Write to DCM succeeded. Write to NVM backup succeeded" message is displayed in the lower communications bar.

3.7.4 Backup

1. From the MPC (MAT) select Setup > Configuration > Backup.

- When this screen is entered, the MPC makes a backup copy of the configuration file, if it is not already loaded.

2. Click "Save" to copy the configuration information to a file on the MPC. See Figure 3-13.

- If operation worked... status bar indicates: "Save of DCM succeeded"

- If the DCM data is not loaded after the Save button is pressed a message is shown on the screen to indicate this. Instructions are given on how to attempt to get the data loaded. If MAINT mode cannot be entered, then cycle power to the unit and try again.

- After saving these settings, the file acquired can then be used to restore an aircraft's configuration settings later. The restore command instructions are found in section 4.5.4 of this document.
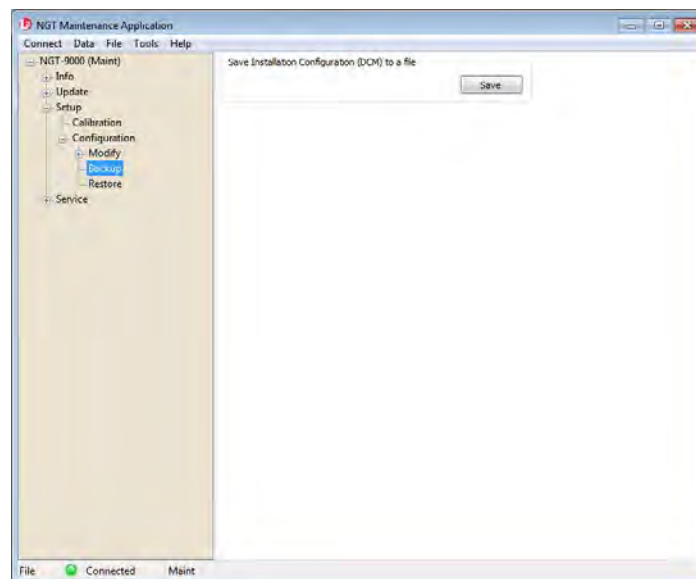
Figure 3-13: MPC (MAT) – Configuration - Backup

3.8   CALIBRATION SETUP

This procedure is used to calibrate the unit and must be completed prior to performing the Installation Checkout for first time installations.

These procedures assume the following:

- Power is being supplied to the aircraft and the unit.
- The MPC (MAT) is active. Refer to the General Information section, paragraph 1.9 for details on the correct MPC (MAT) that must be used for specific software revisions (Release's).
- The MPC is connected to the unit via the USB or WiFi interface.
- The MPC and unit are communicating.

3.8.1   Audio Calibration and Test

1. From the MPC (MAT) select Setup > Calibration. See Figure 3-14.
2. Set the Audio Volume Level % and click on the Apply button.
3. Click "Test" to listen to the audio level selected.
    - Each click of the "Test" button should result in a single "Traffic" annunciation being heard.
4. Repeat step 2 and 3 until audio volume is set to the level desired.
    - The audio test may need evaluation with both low and high cockpit noise present.
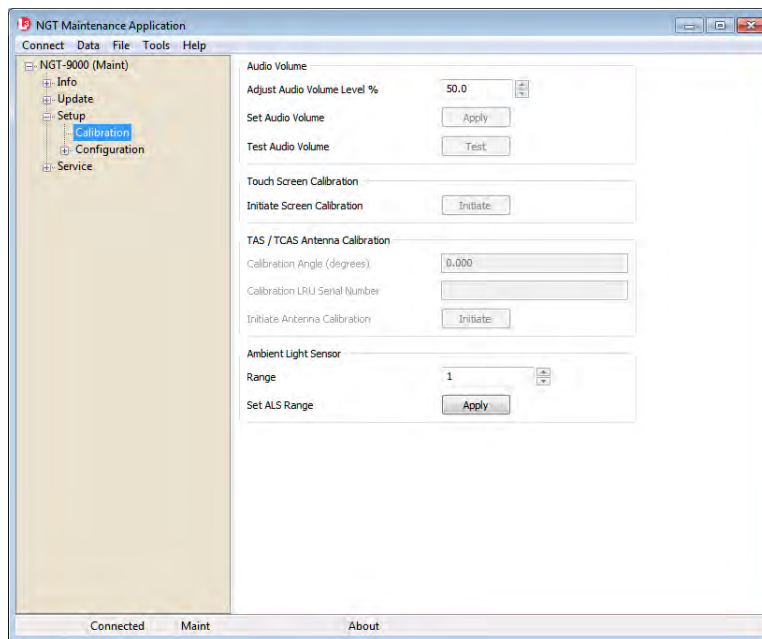
Figure 3-14: MPC (MAT) – Setup - Calibration

3.8.2   Screen Calibration

When performing this calibration, the user must be as accurate as possible. For best results, a stylus is recommended. Note - This procedure is not recommended unless an issue with touch screen response is observed.

1. From the MPC (MAT) select Setup > Calibration.
2. Press the Initiate button within the "touch Screen Calibration" box on the MPC (MAT) and observe that the maintenance screen on the unit is showing the calibration screen.
3. In the Calibration screen touch and release each target shown. (Four calibration targets and two verification targets.) Each target must be touched within 15 seconds of the last touch or a Calibration Timeout message is shown. The unit returns to the main screen.

3.8.3   TAS/TCAS Antenna Calibration

This calibration is available only if the Lynx NGT-9000 with TAS/TCAS option is installed and the TAS/TCAS option is selected in the aircraft specific options. If information is showing in the Calibration angle and LRU S/N fields then the calibration has already been accomplished.

1.   From the MPC (MAT) select Setup > Calibration.

2.   Press the Initiate button within the TAS/TCAS Antenna Calibration box to activate the "TAS/TCAS Antenna Calibration" status dialog window.

- A dialog window is shown stating, "The request succeeded and the calibration will be performed on the next boot of operational software".

3.   Restart the unit by selecting Service > Restart Unit Mode in Operational Software Mode.

4.   When the unit is calibrating in normal operation the message "Calibrating Antenna" is shown on the traffic application screen (right side).

- If the calibration passes, the LRU serial number (obtained from the factory configuration) and calibration angle is written into the configuration module for subsequent use.

- If calibration fails, then the message "Calibration Failed" is shown on the traffic application screen for a short duration. The system continues to try to calibrate the antenna once each boot until it is successful.

   Refer to the troubleshooting information in the maintenance section if the TAS/TCAS continues to fail. A TAS or TCAS fail will also be shown on the message screen. The MSG button does not appear on the screen until after 2 minutes of the unit being in normal operation.

3.8.4   Ambient Light Sensor

Use this function to adjust how the ambient light sensor dims or brightens the NGT-9000 display.

1.   From the MPC (MAT) select Setup > Calibration.

2.   Set the Ambient Light Sensor Range from 1 to 5 and press the Apply button. The higher the range the greater the brightness in the lowest ambient cockpit light. Note - Does not affect maximum brightness in full sunlight.

3.8.5   Viewing and Downloading Fault Log

If an anomaly occurs, viewing of the fault log can distinguish between an external equipment problem (i.e. input to the NGT-9000) or a NGT-9000 internal problem.

To view the fault log, in maintenance mode, select Info -> Fault Log. By clicking on a given fault, a Fault Description and Loss of Functionality indication is made in the upper panel of this screen as seen in Figure 3-15.

In some cases, the file may be returned to ACSS for evaluation by performing a fault download. In order to download the fault log, perform the following steps.

1.   In maintenance mode, select Info > Fault Log. See Figure 3-15.

2.   Select the Save button at the bottom of this screen.

3.   Name the file with a tail number or other identifying name. This log is written to the location chosen as a generic file (no extension needed).

4.   This file can then be provided to ACSS for evaluation.

3.8.6   Clear Fault Log

It is recommended that the fault log be cleared after completion of installation and service.

1.   Clear the fault log from the MPC (MAT) by selecting Info > Fault Log. See Figure 3-15.

2.   Select Clear button.

3.   Answer "Yes" to confirmation dialogs.

4.   Cycle power to the unit.

5.   The calibration and configuration setup is complete.
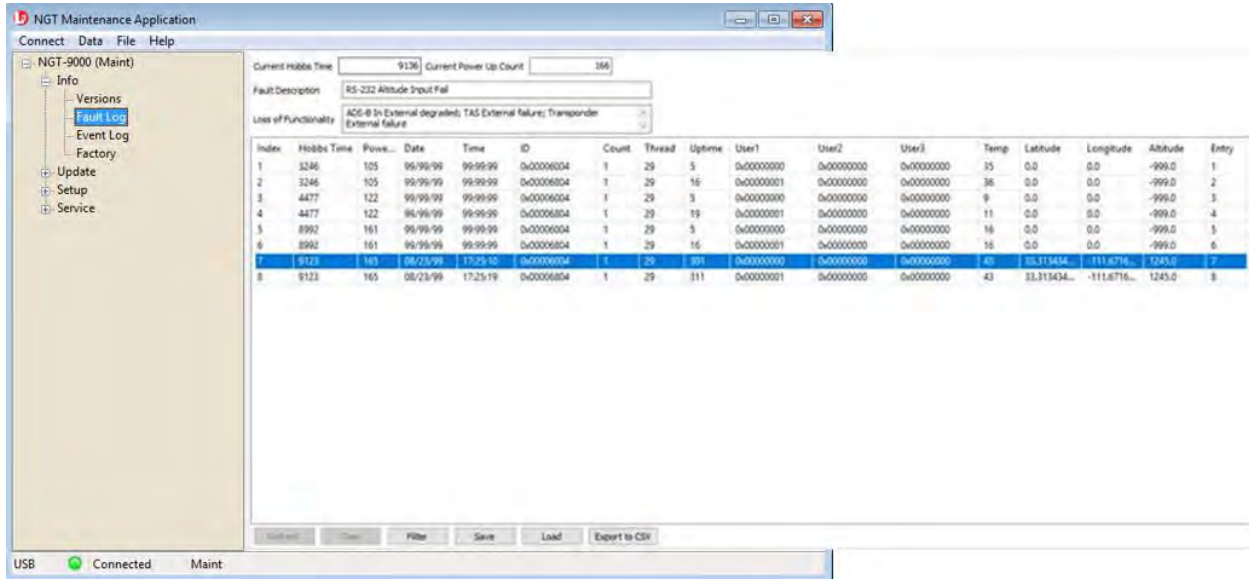
Note – screen extended to show log data.

Figure 3-15: MPC (MAT) – Info – Fault Log

3.9   INTERFACE CHECK

Use this procedure to check input and output signals. These procedures assume the following:

- Power is being supplied to the aircraft and the unit.

- The MPC (MAT) is active on the MPC. Refer to the General Information section, paragraph 1.9 for details on the correct MPC (MAT) that must be used for specific software revisions (Release's).

- The MPC is connected to the unit via the USB interface

- After configuration options and calibration procedures where completed, power has been cycled to the unit.

- The MPC and unit are communicating and the MPC (MAT) has been restarted the unit in Maintenance (no WiFi).

3.9.1 Live Data - Discrete Inputs, Altitude, and Heading

1. From the MPC (MAT) select Service > Live Data > Discrete Inputs, Altitude, and Heading. An example of this page is shown in Figure 3-16.

   - Review the information seen on the inputs page.

   - The Audio Ack In Active discrete input is available only using the MPC (MAT) 8010-17002-020x or 8010-17002-030x.

   - The True/False indication of the current state of the discrete (e.g., True for the squat on ground means that the aircraft is on ground. A false would mean that the aircraft was not on the ground, at least according to the discrete).

     Note – when the audio mute discrete is grounded, it is considered active l (i.e. muted). The Audio Mute In active indication shows "True" when this discrete is active (grounded).

   - The Overall Discretes Validity is an indication of the remaining discrete states. A "True" indicating that these indications are valid. A "False" indication with red text indicates that the input is not being detected by the unit and a problem exists. If a problem is noted, do the following.
     - Check the configuration setup options for correct settings.
     - Check the fault log (Info > Fault Log) for issues.
     - Check wiring or equipment.

   - Compare the altitude and heading values to an outside source.
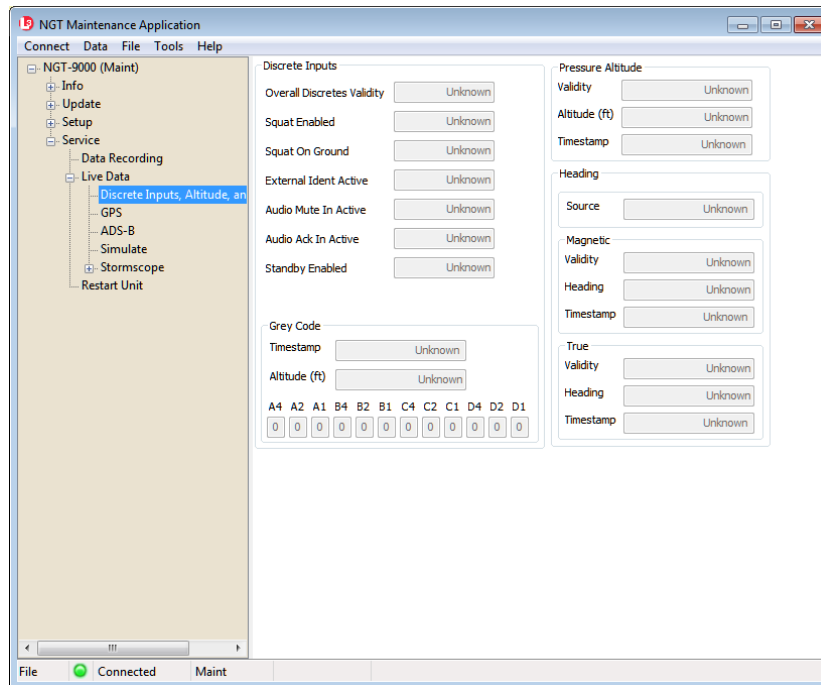
Figure 3-16: MPC (MAT) – Live Data – Inputs

3.9.2   Live Data - GPS

1. From the MPC (MAT) select Service > Live Data > GPS. An example of this page is shown in Figure 3-17.

2. Observe that the GPS data is being received.

3. If data is being received, verify that the Day, Month, and Year data is correct.

    *   Observe that the GPS data is being received and signal strength is within 30 to 50 db. Note – the Navigation State shows "RAIM" or "RAIM WAAS" when the device is actually in WAAS mode.

4. If data is not being received do the following:

    *   The GPS signal may be blocked; move the aircraft to an open environment or input a GPS signal using test equipment.
    *   Check the fault log (Info > Fault Log) for issues.
    *   Check wiring or GPS antenna for installation issues.
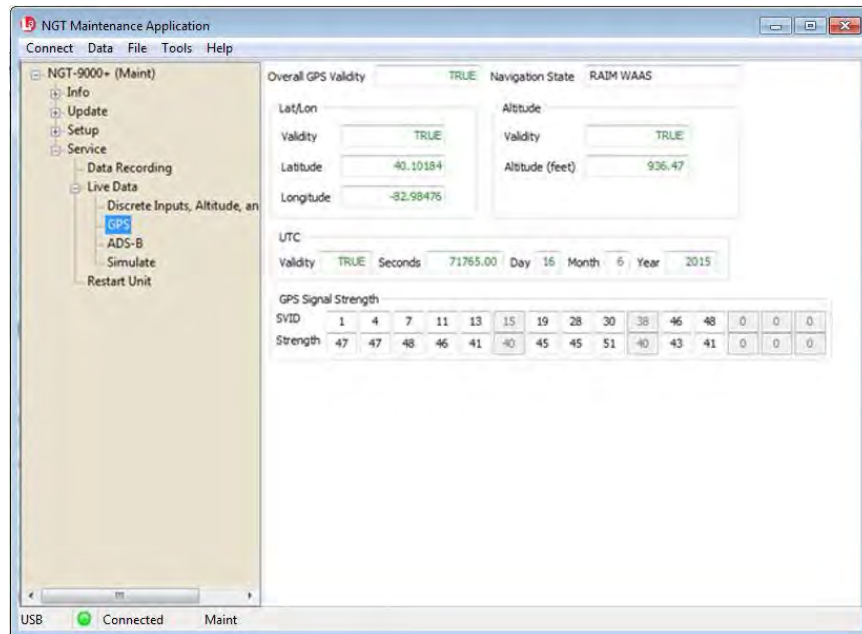
Figure 3-17: MPC (MAT) – Live Data - GPS

3.9.3 Live Data – ADS-B

1. From the MPC (MAT) select Service > Live Data > ADS-B. An example of this page is shown in Figure 3-18.

2. Observe that both data fields are showing a count tally of received messages (A zero is a valid number if the unit is not in range of a signal). If data is not being received do the following:

    *   The signal may be blocked; move the aircraft to an open environment or input a signal using test equipment.

    *   Check the fault log (Info > Fault Log) for issues.

3. Check wiring or antenna for installation issues.
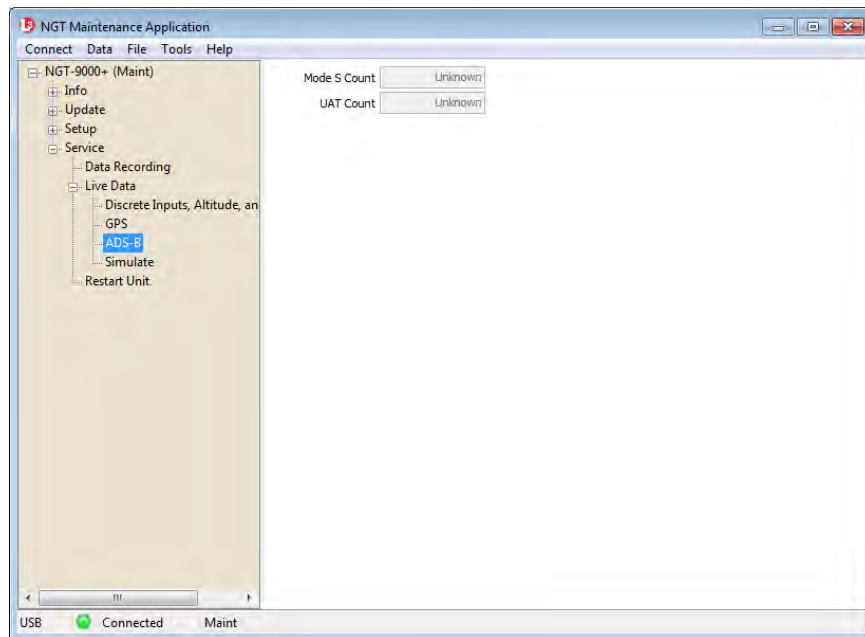
Figure 3-18: MPC (MAT) – Live Data – ADS-B

3.9.4   Live Data – Simulate

1. From the MPC (MAT) select Service > Live Data > Simulate. An example of this page is shown in Figure 3-19.

2. Check the following. Perform only the checks necessary for the installation.

    *   Click either simulated "ground" or "open" (per the installation – typically ground activates the lamp) from the ADS-B Out inoperative to check the ADS-B Out Fail lamp is working correctly. Click "Not simulating" to remove simulated data.

    *   Setup a cockpit audio signal. Click either simulated "ground" or "open" (per the installation – typically ground mutes the signal) from the Audio Mute Out to check the Audio Mute is working correctly. Click "Not simulating" to remove simulated data.

    *   Click either simulated "ground" or "open" (per the installation– typically ground activates the lamp) from the Traffic Alert to check the Traffic Alert lamp is working correctly. Click "Not simulating" to remove simulated data.

3. Check the following necessary for the installation.

    *   Click either simulated "ground" or "open" (per the installation – typically ground activates the lamp) from the TAWS Caution to check the TAWS Caution lamp is working correctly. Click "Not simulating" to remove simulated data.

    *   Click either simulated "ground" or "open" (per the installation – typically ground activates the lamp) from the TAWS Warning to check the TAWS Warning lamp is working correctly. Click "Not simulating" to remove simulated data.
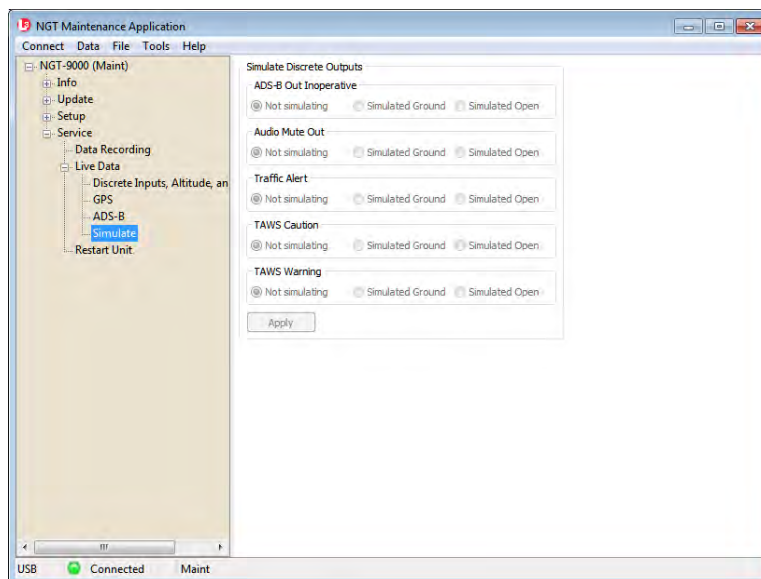
Figure 3-19: MPC (MAT) – Live Data - Simulate

3.9.5   Stormscope

Check the following. Perform only the checks necessary for installations with WX-500.

1. The System Data screen (see Figure 3-20) contain software versions, installation configuration and environmental information. The system data screens contain data that is only read at start-up (i.e., the information is not updated again, unless the power is cycled or the refresh button is pressed).

2. Review the Configuration settings for the Stormscope and observe that they are correct based on the WX-500 installation.

3. Review the Fault logs for possible error messages. Refer to the WX-500 Installation Manual for details on fault log error codes (ID).
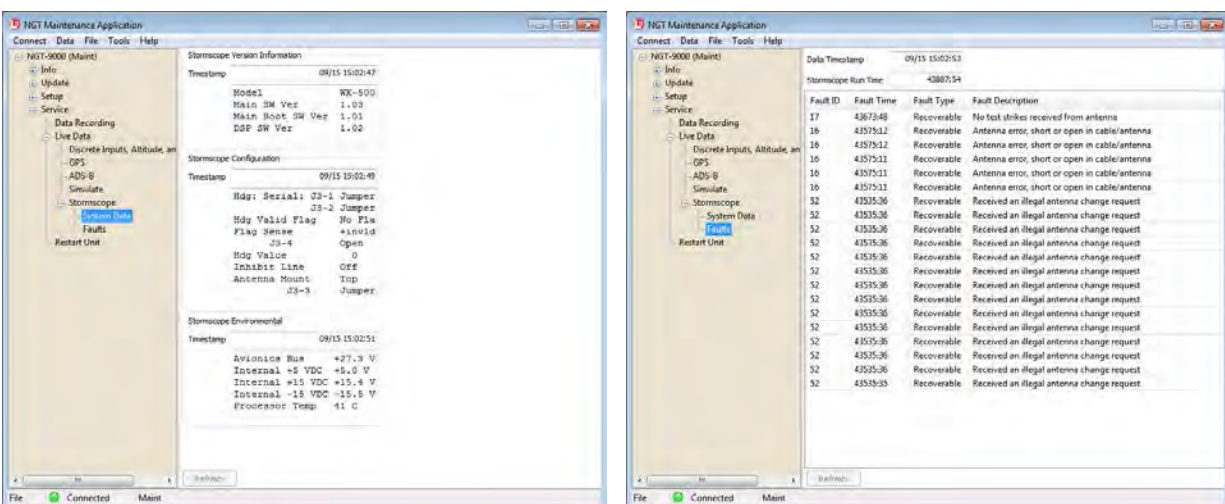
Figure 3-20: MPC (MAT) – Stormscope –System Data & Fault Data

3.9.6   Configuration Check Complete

1. If needed, clear the fault log from the MPC (MAT) by selecting Info > Fault Log and selecting the Clear button. See Figure 3-15.

2. Disconnect the MPC from the unit.

3. Cycle power to the unit.

4. Proceed to the Installation Checkout procedure paragraph 3.11.

3.10 SETUP PIM-9000 WIFI MODULE

The following procedures may be needed to setup the PIM-9000 using the MPC (MAT) 8010-17002-0xxx (Note - The PIM-9000 is pre-setup at the factor and typically does not require this procedure.)

3.10.1 Set WiFi SSID

Use this procedure to set the SSID over WiFi. Do NOT connect the MPC to the NGT-9000 using a USB cable. The SSID is the name of the WiFi Module seen by other devices.

1. Apply power to the NGT unit (and WiFi Module).

2. Turn On the Maintenance Computer, Open the MAT program, and connect the Maintenance Computer's WiFi to the Lynx Serial Adapter (it will be shown in the MPC's wireless connections as "Lynx XXXX").

3. From the MPC (MAT) menu, select Tools→Set WiFi Dongle SSID via WiFi. See Figure 3-21 (A).

4. Enter a new SSID identifier in the dialog box. We normally recommend setting the SSID to the tail number of the airplane. The Set SSID button becomes enabled when the new SSID is entered. See Figure 3-21 (B).

5. Click on the "Set SSID".

6. A progress dialog may be shown. See Figure 3-21 (C). A status dialog box is shown with the message "SSID set to *identifier*" when the operation is complete.

7. Disconnect the MPC (MAT) from the old SSID and connect to the new SSID.

(A)   (B)   (C)
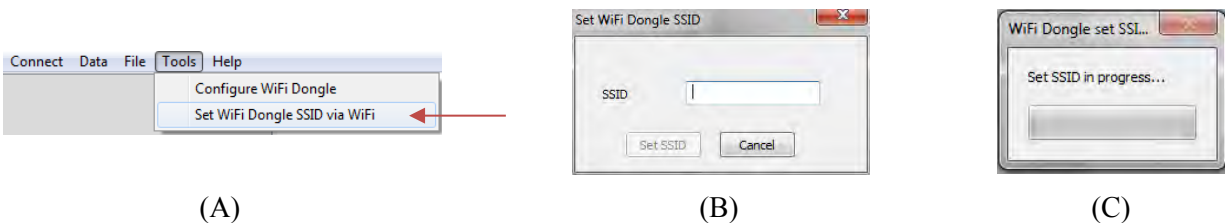
Figure 3-21: Setup WiFi SSID

3.10.2 Set WiFi Module APP Support

Use this procedure to set up the PIM-9000 ip remote port to communicate with certain APP software.

1. Apply power to the NGT unit (and WiFi Module).

2. Prepare the Maintenance Computer and the MPC (MAT) for use and connect WiFi per 3.4.2.

3. From the MPC (MAT) menu, select Tools→Set WiFi Dongle Application via WiFi. See Figure 3-22 (A).

4. Click the button to the right of the Application text and select either "SkyRadar" or "All Other". See Figure 3-22 (B).

    - Selecting "SkyRadar" sets the ip remote port to 43211.

    - Selecting "All Other" sets the ip remote port to 4000.

5. Click the "Set Application" button.

6. A progress dialog may be shown.

(A)   (B)

Figure 3-22: Set WiFi APP Support

3.11 INSTALLATION CHECKOUT

This procedure validates the installation, calibration, and configuration setup of the Lynx NGT-9000 and secondary equipment. Installers are advised to read the entire procedure and ensure all the necessary tool, equipment, and data are available before performing the checkout.

Installations using the remote mount version of the NGT-9000R requires a Control Panel (RS-232 or ARINC 429 Control Panel interface available). Depending on the installation, an approved display is also needed for checkout. Note that approved display may not operate exactly as stated in this checkout. Refer to the operating instructions for the display for details.

NOTE

When a procedure calls out to verify data on the Lynx NGT-9000 it is assumed that the remote mount is verifying this same data via the display.

Consider the following prior to installation.

- Perform the installation checkout procedure with aircraft on ground.
- Perform only those checks that are applicable to the installation.
- To conserve aircraft battery power, it is recommended that the aircraft be connected to an external aircraft power source during installation and checkout.
- An IFR-6000 (or equivalent) Ramp Test Set is required. These checks assume familiarity with the set up and operation of the ramp test set.
- All test equipment shall be calibrated in accordance with the manufacturer's recommendations.
- If the ADS-B Out Fail lamp is installed it flashes ON/OFF while the unit is starting and GPS is initializing (acquiring signal).
- Make sure that power is cycled to the unit and that the unit is in normal operation.
- Be aware that foreign tail numbers may not be indicated correctly on the test equipment.

3.11.1 Functional Checks

Use the following procedure to check that the Lynx NGT-9000 (the unit) and secondary equipment is operating properly.

3.11.1.1 WiFi Check

This check required only if the WiFi option is installed and requires a WiFi Module (i.e. WiFi dongle) connected to the wiring harness. The PED requires a compatible APP be installed.

1. The PED, WiFi interface, and WiFi Dongle must be configured. Refer to paragraph 3.10.
2. Verify the Lynx PIM-9000 WiFi is available in the PED WiFi networks and that the PED can connect to the Lynx WiFi signal.

3.11.1.2 System Status Check

Use the following procedure to check equipment interfaces and operation of the panel mount NGT-9000. (This check is not required for the remote mount unit).

1. Cycle power to the unit.

    - Initialization and self-tests begin.

2. The splash screen is displayed in less than 5 seconds. See Figure 3-23.

    - The company name/Logo is shown on the left side and the product name on the right.

Splash Screen

System Status (Passed) and Versions

System Status (Failed)

System Status (Degraded)
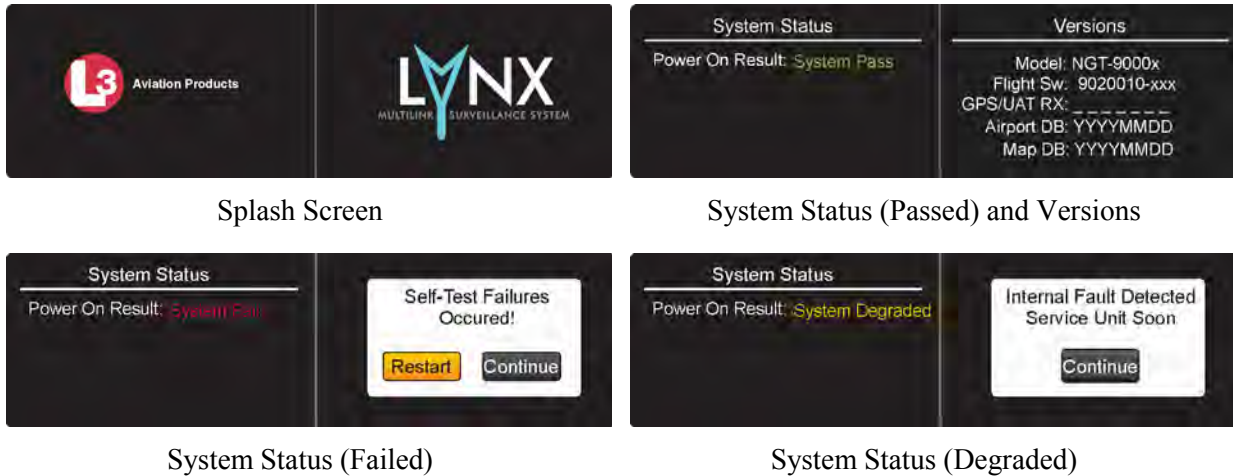
Figure 3-23: Examples of Start-up Screens

3. The System Status is shown on the left side in less than 20 seconds

    - If System Status is "System Pass", then the Versions screen is shown on the right of the display. The version screen identifies software and database information currently loaded on the unit. Verify that the information is correct for this installation.

    - If System Status is "System Fail", then the message "Self-Test Failures Occurred" is shown on the right side of the display. The option to restart the unit or to continue start up in a degraded mode is shown on the right side of the display. Press the Restart or Continue button to proceed.

    - If System Status is "System Degraded", then the message "Internal Fault Detected Service Unit Soon" is shown on the right side of the display. Press the Continue button to proceed.

4. When normal operation begins, the left screen shows the Transponder Application screen and the right screen shows the Traffic screen. See Figure 3-24.

Figure 3-24: Example of Normal Operation

- • If configured the Flight ID Screen is shown before the normal operation screen is shown. See Figure 3-25.

  The Flight ID Number is entered using the keypad. For Release 1 and 2 the keypad will change to numbers after three alpha characters are entered. For Release 3 or greater tap the "123", "A-M" or "N-Z" button to change the keyboard buttons as needed. When complete, tap the Done button to proceed.

Screen seen on Release 1 or Release 2   Screen seen on Release 3 or greater
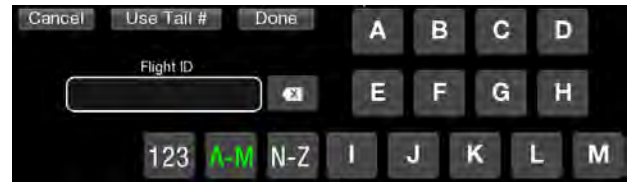
Figure 3-25: Example of Flight ID Input Screen

5.   Press the System Test button located on the left screen. See Figure 3-26. The system test is used to test the internal unit operation and determines if the external inputs are providing valid data. Failures due to external input data loss will be cleared once those inputs are working properly.

6.   During the System Test, the user functions are disabled and the right screen shows a preset traffic display with the message "Self Test In Progress" at the top of the screen. See Figure 3-26. The left screen shows the test results of the functional areas indicated and not specific test failures.

NOTES

Release 1: Functions that are not part of the installation (no function activation) will not be shown.

Release 2: TAS, ATAS, and TAWS are listed with a "disabled" indication if not installed. FIS-B is removed from the list if it is disabled.

Release 3: TCAS listed with a "disabled" indication if not installed.
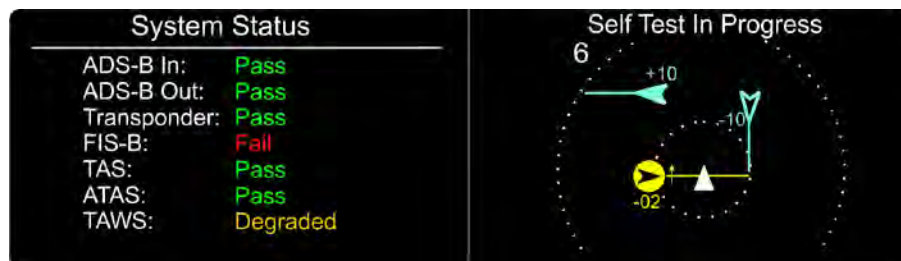
Figure 3-26: Example of System Test Results

7. The unit returns to normal operation if no failures are detected and a "System Test Pass" message is heard through the aircraft audio system.

- If a "Fail" or External Fail" is shown for any of the system functions, then the message "Self-Test Failure" is shown on the right side of the display (and is heard through the aircraft audio system) as well as the option to restart the unit or to continue start up in a degraded mode. Press the "Restart" button and perform the System Test again. If the failures continue, press the "Continue" button to proceed.

- If "Degraded" is shown for any of the system functions, then the message "Service Unit Soon" is shown on the right side of the display (and is heard through the aircraft audio system). Press Continue screen button to proceed.

8. Correct failures before going any further with the functional check.

- A "Fail" indicates an internal unit error. Refer to the fault isolation information provided in the maintenance manual for detailed information.

- An "External Fail" indicates an external signal loss. Check antenna and data source signals and connections. Refer to the fault isolation information provided in the maintenance manual for detailed information.

- Press the "MSG" button located on the Transponder Application screen to view fail messages. A No TIS-B Coverage Indicator, located on the traffic screen next to the zoom out button, may be seen due to the unit being out of range of a ground station. This is normal and the checks may proceed.

- If the problem is persistent, it may be necessary to connect the MPC and use the MPC (MAT) to view live data, see paragraph 3.9 for details.

3.11.1.3 Options Screen

Use the following procedure to check the operation of the panel mount NGT-9000. (This check is not required for the remote mount unit).

1. Press the gear shaped "Options" button located at the top right of the traffic screen. See Figure 3-27.
2. Press the Done button when the checks below are complete.
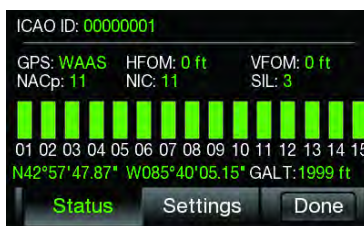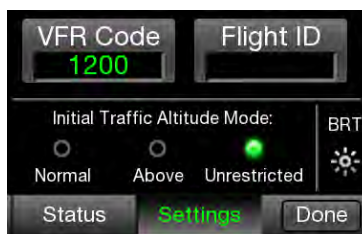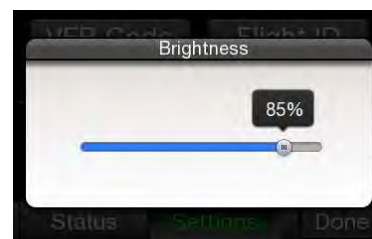
| Status | Settings | Brightness |

Figure 3-27: Options Screen…

3.11.1.3.1 GPS Operation Check

1. Press the Status button to open the GPS Status screen.
2. Verify that GPS information is being displayed and that the "GPS" operating mode is "WAAS". If the information is missing perform the following:
   - The unit may not be able to establish communication with a satellite due to an obstruction of the GPS reception. Either move the aircraft to an area with better GPS reception or use a GPS Simulator to generate the necessary signal.
   - If the GPS reception continues to be a problem, check the GPS antenna installation.
3. Verify that the GPS position agrees with a known reference point.
4. Verify that the signal bars are showing at least 40 -50% in the GPS Receiver Information Packet for all the GPS/SBAS satellites in view.
5. Power ON other avionics and verify that the signal bars are showing at least 40 -50% in the GPS Receiver Information Packet for the satellites do not degrade significantly and position remains steady.
6. Power ON VHF Com radios (if applicable also power ON the SATCOM System). Verify that the signal bars are showing at least 40 -50% in the GPS Receiver Information Packet for the satellites do not degrade significantly and position remains steady.
7. If the aircraft is TAS/TCAS equipped, turn on the TAS/TCAS system and verify that the signal bars are showing at least 40 -50% in the GPS Receiver Information Packet for the satellites do not degrade significantly and position remains steady.
8. Any GPS interference (significant degrade in signal strength) must be resolved prior to completing the installation. Use the troubleshooting procedures in the maintenance section for help.

3.11.1.3.2 Initial Traffic Altitude Mode

1. Press the Settings button.
2. Verify that unrestricted traffic Altitude Mode annunciator is green. Change the setting if needed by pressing the indicator near the unrestricted text to select. Note - This is how the pilot selects the default traffic altitude filter mode.

3.11.1.3.3 Set Display Brightness

1. Press the BRT button located on the right side of the screen to open the brightness scale bar.
2. Press and slide the scale button to adjust the Display Brightness Trim to the desired percentage.
3. The brightness screen times out after a few moments returning to the settings screen.

NOTE

This dimming setting only affects the NGT-9000 display brightness.
Optional lamps (if installed) required external dimming control.

3.11.1.4 TAWS Operational Check

Use the following procedure to check the operation of the panel mount NGT-9000. (This check is not required for the remote mount unit). The Terrain Awareness and Warning System (TAWS) is optional requiring a Function Activation code to be entered via the MPC (MAT).

1. After power is applied to Lynx NGT-9000, wait 3-5 minutes to let the GPS to initialize.
2. Slide each screen (right side) application until the TAWS application is shown. Verify that the screen is showing terrain and obstacles information of local area.

3.11.1.5 WX-500 Lightning Operational Check

Use the following procedure to check the operation of the WX-500 and its interface with the panel mount NGT-9000. Lightning detection is an optional function requiring the installation of a WX-500 (Stormscope) and having the option enabled via the MPC (MAT).

1. After power is applied to the WX-500 and Lynx NGT-9000, wait 3-5 minutes to let the GPS to initialize.

2. Slide each screen (right side) application until the Lightning application is shown Verify that the screen is normal and not showing a "Lightning Failed" message. See example screen in Figure 3-28. Refer to the WX-500 Installation Manual for new WX-500 installations for additional checkout procedures. Test mode procedures are available for testing and troubleshooting the WX-500 in the Maintenance section (para. 4.4.5) of this manual. Fault data is available using the MPC (MAT) see section (3.9.5) for details.
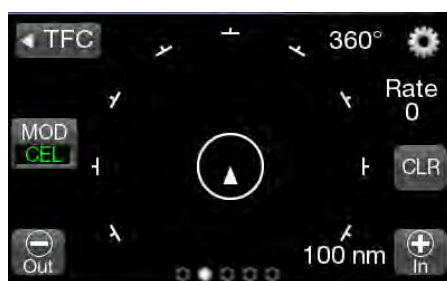
Figure 3-28: Lightning Screen

3.11.1.6 Status Lamp Check

Verify the following status lamps functioning properly (if installed) during the checkout. The MPC can be used to validate lamp operation. See paragraph 3.9.4 for details.

- Traffic Alert (TAS/TCAS and/or ATAS)
- ADS-B Out Fail
- Audio Mute
- TAWS Caution
- TAWS Warning

1. If a lamp dimming switch was installed, verify all lamps are illuminated full bright when BRT is selected.

2. Verify all lamps are illuminated at the desired dimming level when DIM is selected.

3. Traffic Alert – This lamp is ON when a TA (Traffic Advisory) is detected by the TAS/TCAS or ATAS functions. Verify the operation of this lamp when performing tests for TAS/TCAS and ATAS.

4. ADS-B Out Fail – This amber lamp does the following depending on the situation:

- Flashes at a slow rate (1 sec On and 1 sec Off) while the GPS is initializing. Check by cycling power to the unit. Lamp continues flashing until GPS position is acquired.

- The lamp is ON when the ADS B has failed, GPS has failed, or if installed, the lamp self-test is active.

5. TAWS Caution– This lamp is ON after a particular TAWS alert is detected. Verify the operation of this lamp when performing tests for TAWS.

6. TAWS Warning– This lamp is ON after a particular TAWS alert is detected. Verify the operation of this lamp when performing tests for TAWS.

3.11.1.7   Discrete Switch Checks

Verify the following external switches are functioning properly (if installed). Note: The MPC can be used to validate the inputs for the external checks. See paragraph 3.9 for details.

1.   If installed verify that the Audio Mute feature inhibits audio messages sent by the unit. This is connected to a CAWS alerting system.

2.   If installed verify that the Standby Mode input switch places the unit's transponder into Standby Mode.

   •   The Panel Mount NGT-9000 Transponder screen indicator displays "STANDBY".

   •   The Remote Mount NGT-9000R with a CP-2500 will display "STANDBY" for Release 2.1 or later.

3.   Verify that the IDENT Input switch causes the unit transponder to transmit the "ident" flag in transponder interrogation replies. This check may be skipped if verified during the configuration setup procedure.

4.   The On-Ground switch function is verified by the operation of the System Test button (panel mount version only) and is available on the Transponder Application screen and the ON-GND message located on the transponder screen.

5.   The Audio Acknowledge switch cancels the audio from a TAWS or Traffic Aural. This check may be skipped if verified during the configuration setup procedure.

3.11.1.8   Alternate Display Check

The Lynx NGT-9000 may be interfaced to a compatible traffic display (ARINC 429 or RS-422) and weather display (RS-422). The instructions provided in this manual are generic. Refer to the manufacturers display manual for operation and checkout procedures.

   •   A functional check with the Lynx NGT-9000 is accomplished during the check of the ADS-B In, TIS-B, FIS-B, and any other checks requiring the use of the alternate display.

3.11.1.9   CP-2500 Control Panel Check

The checkout of the CP-2500 Control Panel is accomplished using the instructions found in the CP-2500 Installation Manual. Refer to the References information in the front section for details.

3.11.2   Ground Checks

Perform only those checks that are applicable to the installation. An IFR-6000 (or equivalent) Ramp Test Set is required.

NOTES

1.   These checks assume familiarity with the set up and operation of the ramp test set.

2.   All test equipment used in completing these tests shall be calibrated in accordance with the manufacturer's recommendations.

3.11.2.1 Ground Test Mode

Use the following instructions to place the unit into Ground Test Mode using the MPC (MAT).

Placing the unit in the Ground Test Mode does the following:

*   Simulation of heading or track (pointing the traffic on the screen in the correct orientation).
*   Sets the unit to "In-Air" status allowing Mode C (altitude) output and additional ADS-B output messages (sent at a higher rate).
    *   In-Air status also allows Mode C (Pressure Altitude). While on-ground; all calls and Mode C replies are inhibited.
    *   This allows the IFR-6000 to test the encoding altimeter input (Mode C).

These procedures assume the following:

*   Power is being supplied to the aircraft and the unit.
*   The MPC (MAT) is active on the MPC. Refer to the General Information section, paragraph 1.9 for details on the correct MPC (MAT) that must be used for specific software release's.
*   The MPC is connected to the unit via the USB interface
*   The MPC and unit are communicating. From the MPC (MAT) panel select Connect→NGT9000→USB. This is required each time power is cycled.

1. From the MPC (MAT) panel select Service > Restart Unit in Ground Test. See Figure 3-29.
2. If heading is not being input to the Lynx NGT-9000, then select Ground Test and enter a Simulated Own Direction (0 – 359 deg.). The own direction is the current **true heading** of the aircraft. A unit with a heading input can ignore this step. (Note – A heading input will overwrite a simulated heading).

NOTES

1. When entering heading information into the IFR-6000 UUT HDG entry field make sure to enter either the same simulated heading as was entered into the MPC (MAT) own direction field or the actual aircraft heading (true heading) as appropriate.
2. Determine true heading by adding and East Variation to the aircraft current magnetic heading or subtracting the West Variation to the aircraft current magnetic heading (e.g. airport KGRR has a 04W variation so with a magnetic heading of 290 the true heading would be 286). Go to AirNav.com and type in the airport location to find the variation for that area.
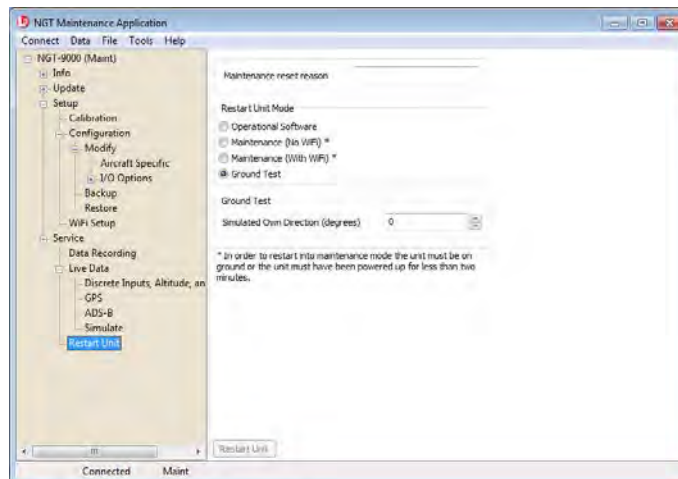
Figure 3-29: MPC (MAT) – Ground Test

3. Click on the Restart Unit button.

4. The unit starts up in normal operation, with an amber "Ground Test" message shown below the options button on the right side of the display.

   • Cycling power at any time takes the unit out of Ground Test Mode. (Note: Ground Test Mode is automatically, without cycling power, exited if aircraft flight is detected).)

5. Continue with the checkout procedures below.

The Panel Mount NGT-9000 may alternately use the touch display to place the unit in Ground Test.

This is done by first placing the unit in Maintenance Mode per paragraph 3.5 and selecting "Reboot>" and then "Ground Test>". The unit will start up in normal operation, with an amber "Ground Test" message shown below the options button on the right side of the display.

NOTE

There is no prompt for Simulated Own Direction in this mode. The unit will default to a North Up track, which may differ from the real time true heading. In the Panel Mount Ground Test mode therefore, a "Cross Check Heading" message may be seen.
This message can be ignored if the following precautions are taken (IFR-6000 ramp tester example):

   • The default 0 degree track angle should be set on the IFR-6000 UUT HDG entry field when testing ADS-B GEN entries on the IFR-6000

   • The current heading should be set on the IFR-6000 UUT HDG when testing TCAS intruders on the IFR-6000. If there is no current heading source, the default 0 degree track angle should be set on the IFR-6000 UUT HDG entry field.

If there is no heading input or heading is inactive to the Lynx NGT-9000, then select Ground Test and enter a Simulated Own Direction (0 – 359 deg.). The own direction entry should be set to the current true heading of the aircraft. A unit with a heading input must have an entry of the current heading, so that track and heading are in agreement.

1. When entering heading information into the IFR-6000 UUT HDG entry field make sure to enter one of the following:

   • If there is no heading input or heading is inactive, the same simulated heading as was entered into the MPC (MAT) own direction field should be set in the UUT HDG field

   • If there is a heading source, the actual aircraft heading (true heading) should be set in the UUT HDG field.

3.11.2.2 Altitude Check

1. Perform the altitude check per 14 CFR Part 91.411 and 14 CFR Part 43 Appendix E & F.

2. Verify that the displayed altitudes of the panel mount NGT-9000 or alternate display or CP-2500 and the primary display (PFD) or equivalent instrument are within the required range shown below (per the installation):

   • Gillham Code altitude source the range is +/- 100 ft.

   • Other altitude source the range is +/- 25 ft.

3.11.2.3 Transponder Output Check (In Air)

Verify that the Transponder test performed by the test set is successful and that the test set is receiving the correct transponder information (i.e. Mode S Identifier, Flight ID, etc.). This check requires an IFR-6000 (or equivalent) Ramp Test Set and the MPC (MAT). <u>The Transponder check while in ground test mode will load the ICAO address automatically into the IFR-6000.</u>

1. Set NGT-9000 to **Ground Test mode** (in air) (see para. 3.11.2.1) using MPC (MAT).
2. Enter the XPDR setup page of the IFR-6000 and ensure that the antenna/cable loss setup is correct.
3. Run the Generic Mode S test and verify "PASS" (in air).
   - The IFR-6000 must be located in the nominal position or the power/frequency test may fail.

3.11.2.4 ADS-B In Check

Before performing this check, ensure that the GPS position on the NGT-9000 is acquired, and that the NGT-9000 is in **Ground Test mode** (in air). If installed, the ADS-B Out Fail lamp is OFF and the display/PED/CP-2500 is showing standby mode. Perform the ADS-B In check using an IFR-6000 (or equivalent) Ramp Test Set using the latest ADS-B update.

- Perform the ADS-B In check using an IFR-6000 (or equivalent) Ramp Test Set using the latest ADS-B update.
- The test set simulates ADS-B intruders by manually defining a position over the earth. Intruding flight parameters are programmed from the IFR-6000 screen.
- If the WiFi option is installed the PED requires a compatible APP be installed. The PED and Lynx NGT-9000 WiFi interface must be configured. Refer to paragraph 3.10. Verify that the PED is receiving data from the unit and that traffic and weather (if available) data is being displayed.

NOTE

This check requires a valid signal (ADS-B In with TIS-B and/or FIS-B service). It is also possible to use an IFR-6000 set up and simulate the information.

- Installations with the ATAS activated can verify that it is active, by viewing the system status and observing that the ATAS status is not listed as "Disabled".

1. From the ADS-B/GICB/UAT screen on the IFR-6000, select UAT, then GPS Status, and allow the unit to acquire a GPS position (GPS SYNC).
2. Verify <u>978 MHz ADS-B In</u> traffic information is being displayed on the unit/display/PED with that being transmitted by the test set.
   a. From the ADS-B/GICB/UAT, select UAT main, then UAT GEN, then ADS-B.
      - Ensure targets are defined and UUT heading is equal to aircraft **true heading**.
      - Ensure that IFR-6000 ALT is equal to the current pressure ALT shown on the Lynx NGT-9000 or CP-2500.
      - Ensure UUT LAT and UUT LON match aircraft's present position (use GPS Status Screen on the panel mount NGT-9000).
      - Select Run Test.
   b. Observe that targets on the IFR-6000 are showing in the correct location on the display (s).

3. Verify <u>978 MHz TIS-B In</u> traffic information is being displayed on the unit/display/PED with that being transmitted by the test set.

    a. Using the IFR-6000, from the UAT GEN LIST, Select TIS-B. (This is from the ADS-B/GICB/UAT main screen).

        - Ensure targets are defined and UUT heading is equal to aircraft **true heading**.
        - Ensure that IFR-6000 ALT is equal to the current pressure ALT shown on the Lynx NGT-9000 or CP-2500.
        - Ensure UUT LAT and UUT LON match aircraft's present position (use GPS Status Screen on the panel mount NGT-9000).
        - Ensure TIS-B SITE ID is set to 1 (or any number between 1 and 15).
        - Select Run Test

    b. Observe that targets are showing in the correct location on the display (s). A difference of 100ft between the test set data and the displayed information is acceptable.

4. Verify <u>1090 MHz ADS-B In</u> traffic information is being displayed on the unit/display/PED with that being transmitted by the test set.

    a. Using the IFR-6000, from the UAT GEN LIST, Select ADS-B GEN. (This is from the ADS-B/GICB/UAT main screen).

    b. Enable at least item 1 - Airborne Position and item 4 - Airborne Velocity making sure the NACv is set to a valid number (1 or greater).

        - Enabling Item #3 - Ident & Cat makes it easy to determine that the target you have defined is the one being displayed, especially if using a PED to double check.
        - Ensure targets are defined and UUT heading is equal to aircraft **true heading**.

    c. Observe that targets are showing in the correct location on the display (s).

3.11.2.5 FIS-B Uplink Check

Before performing this check, ensure the following:

- GPS position is acquired
- The Lynx NGT-9000 is in **Ground Test mode** (in air)
- If installed the ADS-B Out Fail lamp is OFF
- If installed weather display/PED is in ON operational mode
- If installed the CP-2500 mode is in ALT

1. Perform the FIS-B check using the IFR-6000 (or equivalent) Ramp Test Set. The test set simulates FIS-B ground base uplink (such as a METAR).

2. Set the unit to each of the FIS-B screens listed below and verify that information (such as a METAR) is being displayed.

    - FIS-B Graphic Application screen (requires an ADS-B ground station in range)
    - FIS-B Graphic Winds and Temp (requires an ADS-B ground station in range)
    - FIS-B Text data

3.11.2.6 TAS/TCAS Traffic Check

Test required only for models with TAS/TCAS. The TAS/TCAS antenna calibration needs to be completed prior to this test.

Before performing this check, ensure that the NGT-9000 is in **Ground Test mode** (in air).

1. Perform the check using the IFR-6000 (or equivalent) Ramp Test Set. The test set simulates TAS/TCAS intruders by manually defining a scenario and can then verify the correct Traffic Advisories have occurred on the unit. Intruding flight patterns are programmed from the IFR-6000 screen.

2. Verify that Traffic information displayed on the unit or alternate display/PED with that being transmitted by the test set.

3. Compare and verify the heading data transmitted by the test set is being displayed correctly on the unit or alternate display/PED.

4. Verify audio alerts are being heard through the audio system. Adjustment of the audio volume may be required. Refer to the configuration setup for instructions.

3.11.2.7 Transponder Output Check (On Ground)

Verify that the Transponder test performed by the test set is successful and that the test set is receiving the correct transponder information (i.e. Mode S Identifier, Flight ID, etc.). This check requires an IFR-6000 (or equivalent) Ramp Test Set and the MPC (MAT).

1. Set the Lynx NGT-9000 to **Normal Mode** (on ground) using the MPC (MAT) (restart unit in operational software mode) or cycling power to the Lynx NGT-9000.

2. Enter the XPDR setup page of the IFR-6000 and ensure that the antenna/cable loss setup is correct.

3. If the IFR-6000 has been power cycled since the Transponder Output Check (In Air), a manual address entry must be made for this normal mode (on ground) XPDR test. Enter "Manual" and the HEX Mode S address on the SETUP-XPDR page.

4. Run Generic Mode S test using the IFR-6000. Verify that a "PASS" is shown at the top of the IFR-6000 on-ground results page.

3.11.2.8 ADS-B Out Check

Before performing this check, ensure that the GPS position on the Lynx NGT-9000 is acquired. If installed the ADS-B Out Fail lamp is OFF, and the external display/PED/CP-2500 is set to ALT (if installed).

1. Set Lynx NGT-9000 to **Normal Mode** (on ground) using the MPC (MAT) (restart unit in operational software mode) or cycling power to the Lynx NGT-9000.

2. From the ADS-B/GICB/UAT main screen on the IFR-6000, select ADS-B MON.

   • It may be necessary to ensure correct AA (Aircraft ICAO Address) in HEX is entered into the IFR-6000 set-up screen when running a surface position report.

3. Verify that the ADS-B Out test indicates correct data or Press BDS data to check for correct data on the Surface Position pages.

4. Set Lynx NGT-9000 to Ground Test Mode (which simulates the unit being In-Air).

5. Verify that the ADS-B Out test indicates correct data on the Airborne Position pages.

3.11.3 Electromagnetic Interference (E.M.I.) Check

Check the following applicable aircraft systems, as well as any other system or device that is not listed, for interference. Initial tests are to be conducted with the aircraft operating on external ground power. Disregard any system or device that does not apply.

NOTE

The Electromagnetic Interference Check is required only for initial system installations and not required if the unit is removed or replaced.

1.   Communications

   a.   Cockpit Intercom

   Using the cockpit intercom, verify interference free communications between the crew while monitoring the effects of the unit.

   b.   VHF Communications

   Set VHF communications radios to multiple frequencies and monitor effects of unit while transmitting and receiving. At a minimum, the frequencies listed below should be tested, in addition to locally available frequencies:

   Check the GPS signal status of each satellite being received does not drop while transmitting each frequency for a period of 35 seconds. Degradation of individual received satellite signals below a point where navigation is no longer possible is not acceptable and will require that additional isolation measures be taken.

   For installations on rotorcraft, ensure that the rotor blades do not interfere with the received GPS signals. This problem has been experienced in some rotorcraft and varies with the rotation rate.

   Test the following frequencies for 25 kHz COM channel spacing:

121.150 MHz	121.200 MHz	121.250 MHz	131.225 MHz	131.275 MHz	131.325 MHz
121.175 MHz	121.225 MHz	131.200 MHz	131.250 MHz	131.300 MHz	131.350 MHz

   In addition, test the following frequencies for VHF radios with 8.33 kHz channel spacing:

121.185 MHz	121.190 MHz	130.285 MHz	131.290 MHz

   c.   SATCOM Communications

   If aircraft is equipped with a SATCOM system, operate the SATCOM equipment while monitoring the GPS Satellite Status Page. Verify GPS position remains valid.

2.   Navigation

   a.   VOR / ILS

   Verify the operation of each VHF Nav receiver in both VOR and ILS modes (including glideslope) while monitoring the effects of the unit.

   b.   DME

   Verify the operation of each DME while monitoring the effects of the unit. The same frequencies used for VOR and ILS testing may be used for this test.

   c.   Marker Beacon

   Verify the operation of the Marker Beacon Receiver while monitoring the effects of the unit.

   d.   ADF

   Verify the operation of the ADF receiver while monitoring the effects of the unit. Frequencies from each band should be tested when possible. Public broadcast stations are acceptable for conducting test.

3.   Flight Director / Autopilot

   Operate the flight director/autopilot system and verify it responds to commands from the flight guidance panel while monitoring the effects of the unit.

4.   Compass System

   Verify each compass system is presenting correct information while monitoring the effects of the unit.

5.   Attitude System

   Verify each attitude system is presenting correct information while monitoring the effects of the unit.

6.   Safety Equipment

   a.   Class B TAWS (If Installed)

   Verify the function of the TAWS and Terrain Display while monitoring the effects of the unit.

   b.   Weather Monitoring System (If Installed)

   Verify the function of the weather monitoring system while monitoring the effects of the unit.

7.   RF Transmissions

   Check other avionics equipment on the aircraft when activating the following functions of the Lynx NGT-9000: Mode S Transponder, ADS-B Out, TAS, and TCAS as applicable to the installation.

3.11.4 Panel mount NGT-9000 Display Check

1.   Position the aircraft outside with an unobstructed view of the sky. Apply power to the unit and supporting equipment.
2.   Verify that system status has passed.
3.   Verify that there are no new system messages, indicated by a blinking MSG button.
4.   Verify that the Transponder Application (left screen) and the Traffic Application (right screen) are providing data. Note – The data may be degraded until the GPS has acquired a position fix.

3.11.5 Flight Test

It is recommended that a flight test be conducted after installation to verify proper operation of the Lynx NGT-9000 system per the AML STC.

3.11.6 Installation Checkout Complete

This completes the Checkout procedure.

This page intentionally blank

Section 4
Maintenance

4.1 INTRODUCTION

This chapter contains general flightline maintenance and fault isolation procedures. Fault isolation is intended to aid in identifying and correcting invalidities or isolating failures to a defective assembly.

4.2 CONTINUED AIRWORTHINESS

Regular maintenance of the Lynx NGT-9000 is not required except as included in this section and is to be maintained on a "Condition Monitored" basis. Condition monitoring is based upon the following:

- Visual observation by the user.
- All units have unlimited service life, where service life is defined as that point in time when repair is no longer economical.

The unit is subject to the following requirements:

- Title 14 CFR Part 91.411 (Altimeter)
- Title 14 CFR Part 91.413 (Transponder)
- Title 14 CFR Part 43 Appendix E & F

The Directional Antennas (NY156 or NY164) do not require scheduled maintenance or scheduled overhaul and shall be maintained on a "Condition Monitored" basis.

4.3 PERIODIC MAINTENANCE

Perform the following at regular aircraft inspection intervals:

- Visually inspect for signs of corrosion.

- Visually Inspect for condition of wiring, shield terminations for proper grounding, routing, and attachment/clamping.

- Visually inspect the unit mounting to the aircraft, verify visually that the screw heads are in full contact with the mounting holes etc. Re-torque the screws if required.

- Panel Mount NGT-9000 only. Check the display for cleanliness. The bezel, ambient light sensor, and display glass can be cleaned with a damp lint-free, static-free cloth. If necessary, clean with a soft cloth moistened with a mild solution of soap and water. Care should be taken to avoid scratching the surface of the display or getting water inside the USB maintenance port. Do not spray cleaner directly on the screen.

- If the touch screen does not respond to a tap in the right location, perform the screen calibration in paragraph 4.3.1.

- It is recommended that an electrical bond check be performed between the unit and nearby exposed portion of the aircraft metallic structure and verify that the measured value is less than or equal to 2.5 milliohms.

  In the event of bonding check failure, remove the unit and clean it and its mounting holes at both the unit and the aircraft structure and reattach the unit. Re-verify the resistance between the unit and nearby exposed portion of aircraft metallic structure, and ensure it is less than or equal to 2.5 milliohms.

- For installation configurations using the 68DC (airport), 71DC (terrain), or 72DC (map) databases, update information may be available. Updates to the databases are not mandatory and are updated at the discretion of the user. Update procedures are located in paragraph 4.5.2.

4.3.1   Screen Calibration

Use this procedure to calibrate the panel mount Lynx NGT-9000 touch screen for more accurate display control. When performing this calibration, the user must be as accurate as possible. For best results, a stylus is recommended. This procedure can also be accomplished using the MPC and MPC (MAT). Refer to procedure in Calibration and Test in the installation checkout section. Note: If the screen is severely out of calibration, this procedure will not work and the screen calibration procedure in the MPC (MAT) will need to be performed.

1. Apply power to the unit using applicable essential or emergency electrical buses.

    - Initialization and self-tests begin.

2. After the splash screen is shown (i.e. L3 Logo) and begins to dim, press and hold in the lower left corner (see red target below) of the display (continue holding when the status and version screens are showing) until the Activate Maintenance Mode window is shown on the right screen. See Figure 4-1.

Figure 4-1: Activate Maintenance Mode Window

3. Tap the Yes button to restart the unit in Maintenance Mode. Note - Tapping the No screen button or 10 seconds of inactivity starts normal operation mode.

4. The Maintenance Mode windows are shown in Figure 4-2.

Main Screen   Calibration Screen

Calibration Timeout   Reboot Page

Figure 4-2: Maintenance Mode Screens

5. Tap the Screen Calibration text.
6. In the Calibration screen touch and release each target shown. (Four calibration targets and two verification targets). This must be completed within 15 seconds for each touch or the Calibration Timeout message is shown. The unit returns to the main screen.
7. If normal operation is desired cycle power to the unit or tap the Reboot text on the main screen followed by tapping the Main App > text to perform a warm startup.
8. When in normal operation check that the touch screen accuracy has improved. If the accuracy has not improved, try the calibration procedure again. If the issue continues contact ACSS Field Service for help in resolving the issue prior to removing the unit for repair.

4.3.2   Directional Antenna (NY156 and NY164)

<div style="text-align:center">

CAUTION

</div>

> Do not paint the antennas. Do not use cleaning solvents on the antennas.

- Check for dents, cracks, and punctures.
- Remove all dirt and grease from surface areas. Clean with a soft cloth moistened with mild soap and water.
- Visually inspect sealant around the antenna base. Reapply sealant if required.

4.4 FAULT ISOLATION

In addition to this manual, the Support Videos and FAQS page on the L3Harris Lynx website (https://www.l-3lynx.com/support-videos-and-faq) provides assistance through instructional videos and Frequently Asked Questions (FAQ) for common problems faced during installation or operation. If the support webpage does not address the area of concern, the following subsections provide more detailed guidance on troubleshooting issues and isolating faults.

4.4.1   Panel Mount NGT-9000

Use the following information for initial installations and debugging issues that may appear during operation.

Use Table 4-1 to view observed failures or conditions and possible cause and corrective actions. The symptoms listed are for all the possible equipment installations. It is up to the user to identify their particular installation.

Use Table 4-2 to review system status messages that may be seen on the screen during start up or when the system test button is pressed.

<div style="text-align:center">

NOTE

</div>

> The information listed in the Symptoms column encompass all the possible issues that a technician may observe, but only some of the items may actually be seen depending on model options and secondary equipment being used.

A MPC connected to the USB port of the Panel Mount NGT-9000 is essential in troubleshooting. Refer to paragraph 4.5.3.2 (list of fault log messages) and Table 4-4 for instructions on viewing fault logs and using the service functions of the MPC (MAT). The information provided here should be in conjunction with the information provided in Table 4-1 and Table 4-2.

It should be noted that the ADS-B Out Fail Lamp (if installed) will be ON when the unit is in maintenance mode (via the MPC (MAT)).

If the only corrective action left is to contact L 3 Field Service, then L 3 Field service personnel may request that a file be created using the MPC that would provide them with information on the unit (i.e. version, faults, and configuration). Create this file by going to the File menu of the MPC (MAT), selecting Save, and placing the file in a location that can be easily located for transfer to L 3 Field Service.

Table 4-1: Troubleshooting The Panel Mount NGT-9000

SYMPTOM	SCREEN	CAUSE/CORRECTIVE ACTIONS
• Blank display. • ADS-B Fail lamp is OFF.	All	Loss of power or damaged unit. 1. Check power connections, breakers, and main avionics switch. 2. Verify Battery (BAT) Master switch is on. 3. Check the MPC (MAT) fault log. 4. Contact ACSS Field Service before removal of unit.
The unit has manual brightness adjustment only. Note: It may take several seconds for the display to fully dim after covering the ambient light sensor. This is normal operation.	All	Loss of light sensor data. 1. Try clearing the failure by restarting the unit by tapping the Restart button. 2. Check System Status Messages. 3. Check the MPC (MAT) fault log. 4. Contact ACSS Field Service before removal of unit.
When touching the screen, the command function seems to be slightly off from the center of the screen symbol or area.	All	The screen calibration is out of tolerance. 1. Perform the Screen Calibration has described in paragraph 4.3.1. 2. Contact ACSS Field Service before removal of unit.
• No communication between NGT-9000 and MAT tool. • Panel Mount Display is NOT blank	**All**	1. Check Device Manager and look for NGT-9000 on USB port. 2. If Device Manager shows no USB connection of NGT-9000, troubleshoot USB cable. Check laptop for ability to connect USB to other device (printer, etc.). 3. If Device Manager shows USB connection to a generic device, right click on this connection and load Zadig driver for this connection.
Internal fan is always active. MSG button on screen.	N/A	Loss of temperature sensor data. The message seen is "Unit Over Temp Service Soon". 1. Try clearing the failure by restarting the unit by tapping the Restart button. 2. If in maintenance mode, the fan remains active. This is normal. 3. Check System Status Messages. 4. Check the MPC (MAT) fault log. 5. Contact ACSS Field Service before removal of unit.
Message page contains messages that do not indicate a functional failure on the system status page.	N/A	The following internal tests do not create a fail message in the system status page. • Configuration Module Test • Configuration Module Configuration Validity • Mutual Suppression Bus Self-Test • Over-Temperature Monitor (in air) • Power Fail Monitor Although no immediate loss of function is occurring, an undesired condition is taking place. At the earliest convenience, perform the following action: 1. Try clearing the failure by restarting the unit by tapping the Restart button (or cycling power). 2. Contact ACSS Field Service before removal of unit.

Table 4-1: Troubleshooting The Panel Mount NGT-9000

SYMPTOM	SCREEN	CAUSE/CORRECTIVE ACTIONS
Unit does not operate in normal mode and starts in Bootloader or maintenance mode. MSG button on screen.	N/A	The following internal hardware test failures cause the unit to automatically reset. This happens without cycling power to the unit. If the hardware failure being detected does not clear, a system fail message is sent. • ARINC 429 Receiver Loop Back Self-Test • Panel Mount Refresh Display Test • Panel Mount Frozen Display Test • SDRAM Self-Test • Persistent Memory Self-Test • FPGA CBIT Test/Monitor • System Clock Test/Monitor • RAM Continuous Monitor • NVM Copy Test • Flash Copy OPS Test • Flash Copy Airport DB Test • Flash Copy Map DB Test • SW Exception Interrupt Monitor 1. Cycle power to the unit. 2. Contact ACSS Field Service before removal of unit.
Display indicator CALIBRATING ANTENNA	Traffic	This indication is shown on the traffic map and all other screen information is not shown. • A Calibration Complete indicator is shown after calibration is finished. • A CALIBRATION FAILED indicator is shown after calibration is complete, but it did not work. • Perform calibration again. Check antenna installation. • Contact ACSS Field Service before removal of unit.
Display indicator GROUND TEST	Traffic	This indication is shown in the upper right hand corner of the traffic screen. It is shown when the unit is connected to the MPC and the MPC (MAT) is active with the ground test function started. Cycle power to the NGT-9000 to return to normal operation.
Display indicator TRK (Track)	Traffic	Indicates that the traffic display orientation is true track. 1. This is a normal condition used for pilot information.
• Display indicator ADS ONLY (Models with TAS/TCAS only) showing on traffic screen. • MSG button on screen.	Traffic	A traffic mode indicator that is shown when TAS/TCAS is failed (or not available) and ADS-B is operating. 1. Possible problem with directional antenna or internal hardware. 2. Cycle power to the unit. 3. Check System Status Messages. 4. Check the MPC (MAT) fault log. 5. Contact ACSS Field Service before removal of unit.

Table 4-1: Troubleshooting The Panel Mount NGT-9000

SYMPTOM	SCREEN	CAUSE/CORRECTIVE ACTIONS
• Display indicator TAS ONLY or TCAS ONLY (Models with TAS/TCAS only) showing on traffic screen. • MSG button on screen.	Traffic	A traffic mode indicator that is shown when TAS/TCAS is in operation but ADS-B traffic information is not available 1. The TAS/TCAS is operational but ADS-B Data is not available e.g. on the ground with no heading or track input (track invalid when ground speed is < 7kts). 2. Check System Status Messages possible for cause of loss of ADS-B data. 3. The GPS is failed (GPS has not acquired). 4. Possible problem with L-Band antenna or internal hardware. 5. Cycle power to the unit. 6. Check the MPC (MAT) fault log. 7. Contact ACSS Field Service before removal of unit.
Display indicator TAS/TCAS STBY (Models with TAS/TCAS only) showing on traffic screen.	Traffic	A traffic mode indicator that is shown when the TAS/TCAS system is in standby. 1. This is a normal condition when the aircraft is on ground. 2. If the indication is seen during flight. Contact ACSS Field Service before removal of unit.
• Display indicator TRAFFIC FAILED (Amber text) showing on traffic screen. • MSG button on screen.	Traffic	Displayed if both ADS-B and TAS/TCAS (optional) have failed. 1. Cycle power to the unit. 2. Check the secondary equipment (antenna) for problems. (May need to calibrate Directional antenna.) 3. Check System Status Messages. 4. Check the MPC (MAT) fault log. 5. Contact ACSS Field Service before removal of unit.
Display indicator TRAFFIC UNAVAILABLE (Amber text) showing on traffic screen. Indicates both TAS/TCAS and ADS-B traffic sources are not available for a variety of reasons: However, both are not failed. If all available traffic sources are unavailable due to failure, 'Traffic Failed' will be indicated. This will be the normal indication for units on the ground with no heading input. (TAS/TCAS in standby).	Traffic	ADS-B is operational but heading and track are invalid or GPS is failed. TAS/TCAS is in Standby. Transponder Mode Control is "ON" which inhibits the display of relative altitude so traffic is unavailable. 1. This is normal operation if the aircraft is less than 14 knots, TAS is not installed or in standby and there is no heading input. Check traffic display in Ground Test mode or at speeds greater than 7 knots. 2. View the GPS page under the information button and verify GPS is operational. If not, check the GPS antenna location and ensure that the aircraft is not inside the hangar or repeater is on if inside the hangar, GPS antenna is exposed to clear sky. 3. Cycle power to the unit. 4. Check the GPS antenna for problems. 5. Check System Status Messages. 6. Check the MPC (MAT) fault log. 7. Contact ACSS Field Service before removal of unit.

Table 4-1: Troubleshooting The Panel Mount NGT-9000

SYMPTOM	SCREEN	CAUSE/CORRECTIVE ACTIONS
• Other aircraft are not shown on the traffic screen. • Ownship data is displayed. • Alternate display shows normal operation. • ADS-B Out Fail lamp is OFF. • No Coverage Indicator is showing on the display.	Traffic	The aircraft is not in an ADS-B (UAT / 1090ES) coverage area, or the targets are not transmitting ADS-B data, or the ground station is not transmitting TIS-B data. 1. The symptoms are normal if the target or ground station is not transmitting TIS-B data. 2. The target or ground station needs to be within line-of-site range. 3. Contact ACSS Field Service before removal of unit.
• Other aircraft are not shown on the traffic screen. • Ownship data may or may not be displayed on the weather screen. • MSG button on screen.	Traffic	Possible hardware problem with the unit. 1. Cycle power to the unit. 2. Check System Status Messages. 3. Check the MPC (MAT) fault log. 4. Contact ACSS Field Service before removal of unit.
• Ownship is shown, but no traffic is being displayed. • ADS-B Out Fail lamp is OFF.	Traffic	Possible problem with the UAT/1090 antenna or RF cables. 1. Cycle power to the unit. 2. Check cable connections. 3. Check System Status Messages. 4. Check the MPC (MAT) fault log. 5. Contact ACSS Field Service before removal of unit.
The traffic symbols on the traffic display are non-directional (diamond shape).	Traffic	Non-directional traffic symbols on the traffic display is due to one of the following reasons: 1. The traffic information that is being received by the unit does not have directional data. The unit continues to transmit non-directional data to the traffic display. Note - TAS/TCAS traffic is not displayed as directional. A TAS/TCAS and ADS-B correlated target will use the ADS-B/TIS-B directional information. 2. An alternate (secondary STIF) traffic display does not support the DTIF data format necessary to show directional data provided by ADS-B.
Traffic display is working correctly, but some aircraft are not showing up on the display.	Traffic	Lack of data as described below: 1. The ADS-B In requires other aircraft to be equipped with ADS-B Out. 2. The TIS-B and ADS-R services are supported when in range of ground stations and are providing the service. 3. If receiving the TIS-B service, but the Mode C and Mode S transponder equipped aircraft that do not provide altitude information are not seen on the traffic display. 4. If receiving the TIS-B service, but aircraft not equipped with a transponder, or equipped with a Mode A transponder are not part of the TISB data and will not be seen on the traffic display. Refer to the NGT-9000 Pilot guide for more information regarding what traffic can be displayed.

Table 4-1: Troubleshooting The Panel Mount NGT-9000

SYMPTOM	SCREEN	CAUSE/CORRECTIVE ACTIONS
Traffic display is working correctly, but TAS/TCAS aircraft are not showing up on the display.	Traffic	Lack of data as described below: 1. Aircraft is out of the selected TAS/TCAS altitude range. (Above/Below/Unrestricted). 2. The installed Lynx NGT-9000 does not have the TAS/TCAS functionality. 3. The TAS/TCAS Configuration option is not active. 4. The TAS/TCAS requires other aircraft to be equipped with equipped with an active ATCRABS transponder.
TIS-B No Coverage Indicator It is located on the traffic screen next to the Zoom Out button. Note: The indicator is suppressed when TAS/TCAS is operational (i.e. installed, not failed, not in standby). It can be disabled via configuration options.	Traffic	The No Coverage Indicator is shown on the traffic display for the following reasons: 1. No TIS-B / ADS-R data available in the area • Aircraft is not within range of an ADS-B ground station. Move aircraft in location where information can be received. 2. UAT-In test fails (indicator seen after 60 seconds of test failure) 3. 1090 Receiver fails • Try clearing the failure by cycling power to the unit. • Check the L-Band antenna or cables for possible errors. • If the problem continues, replacement of the L-Band antenna or the unit may be required. Contact ACSS Field Service before removal.
Display indicator ON-GND showing on transponder screen.	Transponder	Transponder is operating in the on-ground mode. 1. This is a normal condition when the aircraft is on ground. 2. If the indication is seen during flight. Contact ACSS Field Service.
• Display indicator XPDR FAIL (Amber text) showing on transponder screen. • MSG button on screen.	Transponder	Transponder data is invalid. This indication is shown on the transponder screen and alternate traffic screen. 1. Possible problem with internal hardware. 2. Cycle power to the unit. 3. Check System Status Messages. 4. Check the MPC (MAT) fault log. 5. Contact ACSS Field Service before removal of unit.
Pressure Altitude digits replaced with amber dashes.	Transponder	Invalid Pressure Altitude. Note: Some altitude encoders may not provide pressure altitude until after 1-3 minutes of operation. 1. Cycle power to the unit. 2. Check System Status Messages. 3. Check the MPC (MAT) fault log. 4. Check the wiring between the unit and the secondary equipment supplying the pressure altitude. 5. Check the secondary equipment for problems. 6. Contact ACSS Field Service before removal of unit.

Table 4-1: Troubleshooting The Panel Mount NGT-9000

SYMPTOM	SCREEN	CAUSE/CORRECTIVE ACTIONS
• No data on the weather display. • ADS-B Out Fail lamp is OFF.	Weather	The FIS-B data is not being transmitted to the weather display. Note: NEXRAD data is only transmitted every 5 minutes. CONUS data is only transmitted every 15 minutes. 1. No ground station is in range. 2. The ground station may not provide FIS-B service.

FIS-B No Coverage Indicator
 	
It is located on the Weather screens at the bottom center.
 	
Note: It can be disabled via configuration options.
	Weather	The No Coverage Indicator is shown on the weather display for the following reasons:
		1. No FIS-B data available in the area
		   • Aircraft is not within range of an ADS-B ground station. Move aircraft in location where information can be received.
		2. UAT-In test fails (indicator seen after 15 minutes of test failure)
		   • Try clearing the failure performing a warm startup by tapping the Restart button or cycling power to the unit.
		   • Check the L-Band antenna or cables for possible errors.
		   • If the problem continues, replacement of the L-Band antenna or the unit may be required. Contact ACSS Field Service before removal.

• Display indicator INITIALIZING (white text) showing on FIS-B application screen. • ADS-B Out Fail lamp is Off for 2 minutes and then flashes (1 second On/Off) indefinitely until a GPS position is acquired. • Compatible displays may indicate "STANDBY" or "DATA-FAIL" and WI-FI information is not available.	Weather	The indication is shown on the weather map indicating that GPS is Acquiring (On Ground – no previous position fix). 1. This is a normal condition. It continues to be shown until internal operations have completed. The GPS may need up to 4 minutes to provide a position after power is applied to the unit. 2. The GPS signal may be weak. Move the aircraft into an area where the unit can acquire the GPS signal. 3. Make sure nothing is covering or blocking the GPS antenna. 4. Cycle power to the unit. 5. Check System Status Messages. 6. Check the MPC (MAT) fault log. 7. Check for a short to ground on the GPS Antenna pin. 8. Observe the GPS Receiver Information MPC (Service – GPS) for correct signal strength (C/No) of the GPS satellites. This has a range from 30 dB to 50 dB. If this is not the case, then check if the antenna cable loss is more than 10 dB. 9. Check if 12V power is available at GPS antenna port, when the unit is powered on. 10. Contact ACSS Field Service before removal of unit.

Table 4-1: Troubleshooting The Panel Mount NGT-9000

SYMPTOM	SCREEN	CAUSE/CORRECTIVE ACTIONS
• ADS-B Out Fail lamp flashes (1 second On/Off) for 2 minutes, and then remains ON indefinitely until a GPS position is acquired. • Compatible displays may indicate "STANDBY" or "DATA-FAIL" and WI-FI information is not available.	Weather	GPS is Acquiring (In Air – no previous position fix). 1. The GPS may need up to 4 minutes to provide a position after power is applied to the unit. 2. The GPS signal may be weak. Move the aircraft into an area where the unit can acquire the GPS signal. 3. Cycle power to the unit. 4. Contact ACSS Field Service before removal of unit.
• Display indicator MAP FAIL (red text) showing on FIS-B application screen. • ADS-B Out Fail lamp is Flashing (1 second On/Off) for 2 minutes and then remains ON. • Compatible displays may indicate "STANDBY" or "DATA-FAIL" and WI-FI information is not available.	Weather	GPS-Acquiring (previous position fix - On Ground or In Air) This means only GPS data is not available however, the GPS position was available once during this power ON or it is shown when a fault is detected that prevents the FIS-B data from showing on the screen. 1. The GPS signal may be weak. Move the aircraft into an area where the unit can reacquire the GPS signal. 2. Cycle power to the unit. 3. Possible problem with L-Band antenna or internal hardware. 4. Check System Status Messages. 5. Check the MPC (MAT) fault log. 6. Observe the GPS Receiver Information using the MPC (MAT) (Service – GPS) for correct signal strength. Verify that the signal bars are showing at least 40 -50% in the GPS Receiver Information Packet. If this is not the case, then check if the antenna cable loss is more than 10 dB. 7. Check if 12V power is available at GPS antenna port, when the unit is powered ON. 8. Contact ACSS Field Service before removal of unit.
• Display indicator TAWS UNAVAILABLE (White text) showing on TAWS screen. • MSG button on screen.	TAWS	Displayed when TAWS is not available. 1. Cycle power to the unit. 2. Check System Status Messages. 3. Check the MPC (MAT) fault log. 4. Contact ACSS Field Service before removal of unit.
• Display indicator TAWS FAILED (Amber text) showing on TAWS screen. • MSG button on screen.	TAWS	Displayed when TAWS is Failed. 1. Cycle power to the unit. 2. Check System Status Messages. 3. Check the MPC (MAT) fault log. 4. Contact ACSS Field Service before removal of unit.
• Display indicator TERRAIN DISPLAY FAILED (Amber text) showing on TAWS screen. • MSG button on screen.	TAWS	Displayed when an alert fault causing loss of terrain display. Alerting is still operational. 1. Cycle power to the unit. 2. Check System Status Messages. 3. Check the MPC (MAT) fault log. 4. Contact ACSS Field Service before removal of unit.

Table 4-1: Troubleshooting The Panel Mount NGT-9000

SYMPTOM	SCREEN	CAUSE/CORRECTIVE ACTIONS
• Display indicator Lightning Failed (amber text) showing on Lightning screen.	Lightning	Displayed when Lightning detection is not available. 1. Cycle power to the unit. 2. Cycle power to the WX-500. 3. Check System Status Messages. 4. Check the MPC (MAT) fault log. 5. Contact ACSS Field Service before removal of unit.
• Heading shows "- - -" on Lightning screen.	Lightning	Heading input is missing. 1. Verify "STAB" is set to "ON" (see lightning setting page) 2. Cycle power to the unit. 3. Cycle power to the WX-500. 4. Check System Status Messages. 5. Check heading source for failure. 6. Contact ACSS Field Service before removal of unit.

4.4.2   System Status Messages

The system status messages are seen on the panel mount Lynx NGT-9000 during either start up or when the System Test button is pressed. The typical meanings of the messages are detailed in the bullets below. Use the information in Table 4-2 to help determine cause and corrective actions.

- A "Fail" message is caused by something internal to the unit.

- An "External Fail" message is caused by a problem with the external equipment input signals. The unit continues to attempt to acquire the signal without rebooting. These messages automatically clear once communications have been restored to the external equipment.

- A "Degraded" message indicates a function has limited capability due to an internal failure.

- An "External Degraded" message indicates a function has limited capability due to an external failure.

- A "Coverage" or "No Signal" message indicates that no signal is being received from a ground station.

Attempt to clear fail or degraded messages by cycling power to the unit. View the message list and use the MPC (MAT) to access the configuration and fault logs to isolate this issue.

The Continue button is active whenever a failure or degraded window message is shown. It may be used to begin normal operation with degraded performance.

The unit continues to operate non-fatal failures detected during the System Test by providing any functionality unaffected by the failures. If one or more of the secondary faults are detected, then the unit displays the "Service Unit Soon" as part of the message. (That information is recorded in the maintenance log, but is not displayed. These faults do not directly affect the operation and function of the NGT-9000.)

Tap the MSG button located on the Transponder Application screen to view fail messages during normal operation. The MSG button blinks when new messages have been received and have not yet been viewed. When all the faults are cleared, the MSG button is removed from the screen.

Table 4-2: System Status Messages

SYMPTOM	CAUSE/CORRECTIVE ACTIONS
ADS-B In – External Degraded ATAS – External Degraded (if ATAS enabled)	The message is seen due to the following failure(s): • ARINC 429 AHRS Input • Altimeter – Gillham Altitude Input • Altimeter – RS-232 Input • Altimeter – ARINC 429 Input 1. Cycle power to the unit to try clearing the failure. 2. If the problem continues check, the interface devices listed above for possible errors. 3. If the problem continues, replacement or the listed input device may be required. Contact ACSS Field Service before removal.

Table 4-2: System Status Messages

SYMPTOM	CAUSE/CORRECTIVE ACTIONS
ADS-B In – Fail * ATAS – Fail (if ATAS enabled)	The message is seen due to the following failure(s): • GPS Sensor • Bus Monitor • 1090 ADS-B In Receiver [For international (non U.S.) installations] 1. Try clearing the failure performing a warm startup by tapping the Restart button. 2. Check GPS equipment for errors. 3. If the problem continues, replacement of the unit or GPS antenna may be required. Contact ACSS Field Service before removal.
ADS-B In – External Fail ATAS – External Fail (if ATAS enabled)	The message is seen due to the following failure(s): • GPS Antenna/Cable 1. A reboot may clear the failure. Tap the Restart screen button to perform a warm startup. 2. Incorrect configuration options have been selected. 3. If the problem continues check, the interface devices listed above for possible errors. 4. Message is seen when aircraft is on ground and audio is muted. 5. If the problem continues, replacement of the interface device may be required. Contact ACSS Field Service before removal.
ADS-B In – Degraded ATAS – Degraded (if ATAS enabled)	The message is seen due to the following failure(s): • 1090 ADS-B In Receiver. • GPS Signal still searching. • UAT In 1. Wait 2-3 minutes for the GPS signal to acquire. 2. Move aircraft in area where the GPS signal is not being blocked. 3. Cycle power to the unit to try clearing the failure. 4. If the problem continues check, the interface devices listed above for possible errors. 5. If the problem continues, replacement of the unit or the listed input device may be required. Contact ACSS Field Service before removal.
ADS-B Out – External Degrade	The message is seen if a failure of the GPS Antenna/Cable is detected. 1. Try clearing the failure performing a warm startup by tapping the Restart button. 2. If the problem continues, check the GPS equipment for errors. Contact ACSS Field Service before removal.
ADS-B Out - Degrade	The message is seen if a failure of the GPS Sensor is detected. 1. Try clearing the failure performing a warm startup by tapping the Restart button. 2. If the problem continues, replacement of the unit may be required. Contact ACSS Field Service before removal.

Table 4-2: System Status Messages

SYMPTOM	CAUSE/CORRECTIVE ACTIONS
ADS-B Out – Fail *	The message is seen due to the following failure(s): • 1090 Transmitter • GPS Sensor • Bus Monitor • Transponder Rate • Invalid Mode S ID (ICAO Code) 1. Try clearing the failure performing a warm startup by tapping the Restart button. 2. If the problem continues, replacement of the unit may be required. Contact ACSS Field Service before removal.
Airport DB Fail	Airport Database (68DC) compatibility failure. 1. Try clearing the failure performing a warm startup by tapping the Restart button. 2. Reload the airport database using the MPC (MAT). 3. If the problem continues. Contact ACSS Field Service.
Ambient Light Sensor Fail	Ambient Light Sensor communication failure. 1. Try clearing the failure performing a warm startup by tapping the Restart button or cycling power. 2. If the problem continues, replacement of the unit may be required. Contact ACSS Field Service before removal.
Audio External Fail	The message is seen if a failure of the Audio Mute Discrete (audio suppression) is detected. This only occurs when aircraft is On Ground. 1. Try clearing the failure performing a warm startup by tapping the Restart button. 2. Check the audio mute wiring or interface for possible errors. 3. Contact ACSS Field Service if problem continues. Note: The following messages will also be seen: TAS/TCAS Fail (when TAS/TCAS installed), TAWS Fail (when TAWS installed), and ADS-B/ATAS/TCAS Fail (when ATAS installed).
Audio Fail	The message is seen if the Internal audio test fails. 1. Try clearing the failure performing a warm startup by tapping the Restart button. 2. If the problem continues, replacement of the unit may be required. Contact ACSS Field Service before removal. Note: The following messages will also be seen: TAS/TCAS Fail (when TAS/TCAS installed), TAWS Fail (when TAWS installed), and ADS-B/ATAS/TCAS Fail (when ATAS installed).

Table 4-2: System Status Messages

SYMPTOM	CAUSE/CORRECTIVE ACTIONS
Config Module Service soon	Configuration module is not attached, signal is intermittent, or the data on Configuration Module failed has failed. 1. Use the MPC (MAT) (via the MPC) to retrieve configuration data and verify that the Configuration Module is attached and working correctly. 2. Use the MPC (MAT) (via the MPC) to save configuration data to DCM. 3. If the problem continues, replacement of the DCM or unit may be required. Contact ACSS Field Service before removal.
Cross Check Heading	The message is seen when the GPS ground track is 60 degrees different from the external heading input. 1. Try clearing the failure performing a warm startup by tapping the Restart button or cycling power to the unit. 2. Check heading source for errors. 3. If in ground test mode, ensure that the "Simulated Own Direction" field is set to the current actual heading, where the Simulated Own Direction is entered as the ground track. 4. If the problem continues, contact ACSS Field Service.
FIS-B - Fail *	The message is seen if the following test fails or signal is lost: • L-Band (UAT/1090) Antenna • UAT Module Failure 1. Try clearing the failure performing a warm startup by tapping the Restart button. 2. Check the L-Band antenna or cables for possible errors. 3. If the problem continues, replacement of the L-Band antenna or the unit may be required. Contact ACSS Field Service before removal.
FIS-B Degraded	Airport or Map Database compatibility failure. 1. Try clearing the failure performing a warm startup by tapping the Restart button or cycling power to the unit. 2. Reload the Databases using the MPC (MAT). 3. If the problem continues, contact ACSS Field Service.
GPS – Acquiring	The message is seen if the GPS is searching for a signal: 1. Move the aircraft in an area that does not block the GPS signal. 2. Wait for signal to connect. New installations can take longer than normal operation. 3. Try clearing the failure performing a warm startup by tapping the Restart button. 4. If the problem continues, check the GPS Antenna or cable for problems. Replacement of the GPS antenna or unit may be required. Contact ACSS Field Service before removal.

Table 4-2: System Status Messages

SYMPTOM	CAUSE/CORRECTIVE ACTIONS
GPS – External Fail	The message is seen due to the following failure(s): • GPS Antenna/Cable 1. Try clearing the failure performing a warm startup by tapping the Restart button. 2. If the problem continues, check the GPS antenna or cables for possible errors. 3. If the problem continues, replacement of the GPS antenna may be required. Contact ACSS Field Service before removal.
GPS – Fail *	The message is seen due to the following failure(s): • GPS Sensor • Bus Monitor 1. Try clearing the failure performing a warm startup by tapping the Restart button. 2. If the problem continues, replacement of the unit may be required. Contact ACSS Field Service before removal.
Lightning External Degraded	The message is seen if heading data is no longer being received. 1. Try clearing the failure performing a warm startup by tapping the Restart button. 2. Try restarting the heading source. 3. Check the heading source for installation issues or failures. 4. If using the WX-500 as the heading source, check the configuration settings on the WX-500. The MPC (MAT) may be used to view (Procedure in Installation Checkout section). 5. If the problem continues, replacement of the unit may be required. Contact ACSS Field Service before removal.
Lightning External Fail	The message is seen due to the failure of the WX-500 Stormscope or missing data. 1. Restart the WX-500 LRU. 2. Check the Stormscope antenna or cables for installation issues or failures. Refer to the WX-500 Installation Manual for more details. Fault data can be viewed using the MPC (MAT). 3. Check the configuration settings on the WX-500. The MPC (MAT) may be used to view (Procedure in Installation Checkout section). 4. If the problem continues, Contact ACSS Field Service before removal.
Map DB Fail	Map Database (72DC) compatibility failure. 1. Try clearing the failure performing a warm startup by tapping the Restart button or cycling power. 2. Reload the map database using the MPC (MAT). 3. If the problem continues. Contact ACSS Field Service.

Table 4-2: System Status Messages

SYMPTOM	CAUSE/CORRECTIVE ACTIONS
System Degraded (This message is not indicated in the system message window but on the status screen after system startup or self test has executed)	The message is seen during start up due to the following failure(s): • CRC Failure • Configuration • Other system functions indicated as degraded 1. Cycle power to the unit to clear the failure. 2. The configuration module data may be corrupted or missing. The original configuration settings are still present, but the backup copy is corrupt. Using the instructions provided in this manual to load the configuration data. 3. Replacement of the configuration module may be required. Contact ACSS Field Service before removal.
System Fail (This message is not indicated in the system message window but on the status screen after system startup or self test has executed)	The message is seen during start up due to the following failure(s): • AHRS ARINC 429 Receiver • ADC ARINC 429 Receiver • Mode S Address • Factory Data CRC or Compatibility • Config Data NVM CRC or Compatibility • Other system functions indicated as failed. 1. Clear the failure by tapping the Restart button to perform a warm startup. 2. The unit configuration data may be corrupted or missing. Using the instructions provided in this manual to load the configuration data 3. Replacement of the unit may be required. Contact ACSS Field Service before removal.
TAS – External Degrade TCAS – External Degrade	The message is seen if any of the following signals are degraded: • AHRS - ARINC 429 Input Bus 1. Try clearing the failure performing a warm startup by tapping the Restart button. 2. If the problem continues, replacement of the unit may be required. Contact ACSS Field Service before removal.

Table 4-2: System Status Messages

SYMPTOM	CAUSE/CORRECTIVE ACTIONS
TAS – External Fail TCAS – External Fail	The message is seen due to the following failure(s): • Altimeter – Gillham Altitude Input • Altimeter – RS-232 Input • Altimeter – ARINC 429 Input • ARINC 429 AHRS Input 1. Try clearing the failure performing a warm startup by tapping the Restart button. 2. If the problem continues, check the directional antenna or cables for possible errors. 3. Message is seen when aircraft is on ground and audio is muted. 4. If the problem continues, replacement of the directional antenna may be required. Contact ACSS Field Service before removal.
TAS - Fail * TCAS - Fail *	The message is seen due to the following failure(s): • 1090 ADS-B In Receiver • 1030 Transmission • 1030 Transponder Receiver • TAS/TCAS 1030 Transmission • TAS/TCAS 1090 Receiver 1. Try clearing the failure performing a warm startup by tapping the Restart button. 2. Try clearing the failure by calibrating the directional antenna per section 3.8.3. 3. If the problem continues, replacement of the unit may be required. Contact ACSS Field Service before removal.
TAWS - Degraded or Terrain Degraded	The message is caused by an internal issue with the software. 1. Try clearing the failure performing a warm startup by tapping the Restart button or cycle power to the unit. 2. If the problem continues, replacement of the unit may be required. Contact ACSS Field Service before removal.
TAWS - External Fail Or Terrain External Fail	The message is seen due to the following failure(s): • GPS Antenna/Cable • Audio Mute Failure 1. Try clearing the failure performing a warm startup by tapping the Restart button. 2. If the problem continues, check the GPS antenna (short), cables, or Audio Mute wiring/switch for possible errors. 3. Message is seen when aircraft is on ground and audio is muted. 4. If the problem continues, replacement of the GPS antenna may be required. Contact ACSS Field Service before removal.

Table 4-2: System Status Messages

SYMPTOM	CAUSE/CORRECTIVE ACTIONS
TAWS – Fail * Or Terrain Fail *	The message is seen due to the following failure(s): • GPS Fail • Terrain (71DC) or Airport (68DC) Database compatibility failure. 1. Try clearing the failure performing a warm startup by tapping the Restart button or cycling power to the unit. 2. Reload the Databases using the MPC (MAT). 3. If the problem continues, contact ACSS Field Service.
TAWS Unavailable Or Terrain Unavailable	The message is seen when the GPS quality is not great enough for TAWS/Terrain to operate or by flying into an area outside of the terrain database (71DC) coverage. 1. The message is removed after the conditions listed above causing the issue are resolved.
Transponder – External Fail	The message is seen due to the following failure(s): • 1090 Invalid Mode S Address • Altimeter – Gillham Altitude Input • Altimeter – RS-232 Input • Altimeter – ARINC 429 Input 1. Try clearing the failure performing a warm startup by tapping the Restart button. 2. Check that the equipment listed above is operational. 3. If the problem continues, replacement or the listed input device may be required. Contact ACSS Field Service before removal.
Transponder – Fail *	The message is seen due to the following failure(s): • 1090 Transmission • 1030 Transponder Receiver 1. Try clearing the failure performing a warm startup by tapping the Restart button. 2. An invalid Mode S Address fault may indicate that the address was not properly entered during configuration setup. Refer to the Installation checkout for details. 3. If the problem continues, replacement of the unit may be required. Contact ACSS Field Service before removal.
Unit Over Temp Service Soon	Internal over temperature condition detected. 1. Make sure the ventilation holes are clear to permit sufficient airflow for cooling. 2. If the problem continues, replacement of the unit may be required. Contact ACSS Field Service before removal.

* Note: There are internal hardware failures that could occur, which will cause all of the system functions to indicate failure.

4.4.3 Remote Mount NGT-9000R

Use the following information for initial installations and debugging issues that may appear during operation.

- An invalidity may not stop operation of the unit, but may degrade performance. Invalidities may self-correct depending on the issue.

- Verify that the aircraft has a clear view of the sky for good GPS Operation.

A failure indicates a problem with the interface to the Remote Mount NGT-9000R or that a problem exists with the Lynx MSS or one of the system components. If a "Fail" message (or No LRU response) is observed cycle power to the Remote Mount NGT-9000R system. If the problem continues refer to Table 4-3 for possible cause and corrective actions. The symptoms listed are for all the possible equipment installations. It is up to the user to identify their particular installation. Failures are typically observed via messages displayed on the CP-2500 Control Panel or indicator lamps (ADS-B Fail) depending on the particular installation.

A message being received by the CP-2500 from the Remote Mount NGT-9000R has priority over normal display operation and is seen scrolling across the display. Rotating the large knob scrolls through unseen messages and the normal display operation (showing operational mode and squawk code). The display begins showing the highest priority message again after 10 seconds of no activity.

NOTE

The information listed in the Symptoms column encompass all the possible issues that a technician may observe, but only some of the items may actually be seen depending on model options and secondary equipment being used.

A MPC connected to the USB port of the Remote Mount NGT-9000R is essential in troubleshooting. Refer to paragraph 4.5.3.2 (list of fault log messages) and Table 4-4 for instructions on viewing fault logs and using the service functions of the MPC (MAT). The information provided here should be in conjunction with the information provided in Table 4-3.

It should be noted that the ADS-B Out Fail Lamp will be ON when the unit is in maintenance mode (via the MPC (MAT)).

If the only corrective action left is to contact L 3 Field Service, then L 3 Field service personnel may request that a file be created using the MPC that would provide them with information on the unit (i.e. version, faults, and configuration). Create this file by going to the File menu of the MPC (MAT), selecting Save, and placing the file in a location that can be easily located for transfer to L 3 Field Service.

Table 4-3: Troubleshooting The Remote Mount NGT-9000R

SYMPTOMS	CAUSE / CORRECTIVE ACTIONS
- No sign of power: - CP-2500 displays "No LRU Response" (FW 15 and later). - Cannot communicate to the unit with the MAT tool. - ADS-B Out Fail lamp is ON. - Traffic (STIF) displays indicate "DATA-FAIL" and no WI-FI information is available.	The Lynx NGT-9000R is not operating. 1. Verify that the mating connector is secure. 2. Verify the breaker is closed. Check and reset the circuit breaker. 3. Verify power and ground supplied to the unit. 4. If lamps do not illuminate, but you can connect to the unit with the MAT, then verify that the lamps have power from the aircraft dimming circuit. 5. Replacement of the unit may be required. Contact ACSS Field Service before removal of the unit.

Table 4-3: Troubleshooting The Remote Mount NGT-9000R

SYMPTOMS	CAUSE / CORRECTIVE ACTIONS
• No communication between NGT-9000R and MAT tool. • CP-2500 does NOT display "No LRU Response" (FW 15 and later).	1. Check Device Manager and look for NGT-9000 on USB port. 2. If Device Manager shows no USB connection of NGT-9000R, troubleshoot USB cable. Check laptop for ability to connect USB to other device (printer, etc.). 3. If Device Manager shows USB connection to a generic device, right click on this connection and load Zadig driver for this connection.
The CP-2500 menu Initiated Self Test shows Fail.	A fail condition is detected on the Lynx NGT-9000R. 1. Cycle power to the NGT-9000R and the CP-2500. 2. Replacement of the unit may be required. Contact ACSS Field Service before removal of the unit.
• CP-2500 displays "ADS-B SYSTEM FAIL". • ADS-B Out Fail lamp flashes for 2 minutes and then remains ON or ADS-B Out Fail lamp illuminates without flashing • Traffic (STIF) displays indicate "DATA-FAIL" and WI-FI information is not available.	The unit is operating, but has failed. <u>If installation was previously operational:</u> 1. Connect to MAT and view fault logs and status screens to troubleshoot cause of the failure. 2. Replacement of the Unit may be required. Contact ACSS Field Service before removal of the unit. <u>In new installation (Assuming wiring has been verified):</u> 1. Verify DCM was configured properly, applied, and the power to the Unit was cycled to apply those settings. 2. Connect to MAT and view fault logs and status screens to troubleshoot cause of the failure. 3. Replacement of the Unit may be required. Contact ACSS Field Service before removal of the unit.
• CP-2500 displays "NO ADS-B COVERAGE". • Displays – Normal operation. **NOTE** The lamp does not illuminate and the CP-2500 message is not shown if TAS/TCAS is active, if so equipped.	A ground station is not being detected by the Lynx NGT-9000R. 1. Aircraft may not be within range of a local ground station. 2. Replacement of the Unit may be required. Contact ACSS Field Service before removal of the unit. **NOTE** When crossing boundaries between ground station coverage areas, out of coverage indications are normal.

Table 4-3: Troubleshooting The Remote Mount NGT-9000R

SYMPTOMS	CAUSE / CORRECTIVE ACTIONS
• CP-2500 displays no message for first 2 minutes, then displays "GPS-INIT" indefinitely until a GPS position is acquired. • ADS-B Out Fail lamp is Off for 2 minutes and then flashes (1 second On/Off) indefinitely until a GPS position is acquired. • Compatible displays may indicate "STANDBY" or "DATA-FAIL" and WI-FI information is not available.	GPS is Acquiring (On Ground – no previous position fix). 1. The GPS may need up to 4 minutes to provide a position after power is applied to the unit. 2. The GPS signal may be weak. Move the aircraft into an area where the unit can acquire the GPS signal. 3. Make sure nothing is covering or blocking the GPS antenna. 4. Cycle power to the unit. 5. Check System Status Messages. 6. Check the MPC (MAT) fault log. 7. Check that GPS Antenna Short pin doesn't get grounded. 8. Observe the GPS Receiver Information MPC (Service – GPS) for correct signal strength (C/No) of the GPS satellites. This has a range from 30 dB to 50 dB. If this is not the case, then check if the antenna cable loss is more than 10 dB. 9. Check if 12V power is available at GPS antenna port, when the unit is powered on. 10. Contact ACSS Field Service before removal of unit.
• CP-2500 displays "GPS-INIT" for first 2 minutes and then changes to "ADS-B System Fail" and "GPS Fail" indefinitely until a GPS position is acquired. • ADS-B Out Fail lamp flashes (1 second On/Off) for 2 minutes, and then remains ON indefinitely until a GPS position is acquired.	GPS is Acquiring (In Air – no previous position fix). 1. The GPS may need up to 4 minutes to provide a position after power is applied to the unit. 2. The GPS signal may be weak. Move the aircraft into an area where the unit can acquire the GPS signal. 3. Cycle power to the unit. 4. Contact ACSS Field Service before removal of unit.
• CP-2500 displays "GPS-INIT" for 2 minutes, and then displays "ADS-B System Fail" and "GPS Fail". • ADS-B Out Fail lamp is Flashing (1 second On/Off) for 2 minutes and then remains ON. • Compatible displays may indicate "STANDBY" or "DATA-FAIL" and WI-FI information is not available.	GPS-Acquiring (previous position fix - On Ground or In Air) This means only GPS data is not available however, the GPS position was available once during this power ON or it is shown when a fault is detected that prevents the FIS-B data from showing on the screen. 1. The GPS signal may be weak. Move the aircraft into an area where the unit can reacquire the GPS signal. 2. If inside a hangar, verify GPS repeater is operational and is within line of site of the aircraft GPS antenna. 3. Verify correct wiring of the GPS antenna. Verify that the GPS and L-band antenna cables are not swapped. 4. Observe the GPS Receiver Information using the MPC (MAT) (Service – GPS) for correct signal strength. Verify that the signal bars are showing at least 40 -50% in the GPS Receiver Information Packet. If this is not the case, then check if the antenna cable loss is more than 10 dB. 5. Remove the GPS antenna connector from the Unit, and verify that approx +12 VDC is available at the center pin of the GPS connector of the Unit. 6. Remove power from other broadcasting equipment and wait 2 minutes for the GPS to acquire a signal. 7. Replacement of the Unit may be required. Contact ACSS Field Service before removal of the unit.

Table 4-3: Troubleshooting The Remote Mount NGT-9000R

SYMPTOMS	CAUSE / CORRECTIVE ACTIONS
• CP-2500 - Normal operation. • Lamps - Normal operation. • Traffic (STIF) displays continues to show "DATA-FAIL" even though no ADS-B Out Fail lamp or message is indicated.	Display is not receiving 429 STIF data. Normal operation is that "DATA-FAIL" is displayed until GPS is acquired, and then the STIF display should indicate Standby mode. 1. Verify DCM and display are configured for STIF traffic only (not set to both, i.e. not set to DTIF or Both) and the correct speed. The Unit emulates L3 Avionics System SKY497 format. This is a high speed 429 bus. Consult display manufacturer's installation manual for proper set-up procedures. 2. Replacement of the Unit may be required. Contact ACSS Field Service before removal of the unit.
• CP-2500 - Normal operation. • Lamps - Normal operation. • Traffic symbols on the Traffic display are open diamonds and not directional traffic (arrowheads or triangles).	This is normal for all STIF displays. Directional symbology can only be displayed on a DTIF display. 1. The traffic display does not support the DTIF format necessary to show directional data provided by ADS-B. 2. The directional information that is being received by the Unit does not have directional data. The Unit continues to transmit non-directional data to the traffic display.
The four digit squawk code is missing from the "ALT" and "ON" screen of the CP-2500. NOTE: Code appears OK in "STB" mode.	This is an indication that the Lynx NGT-9000R has failed and may also be seen if the aircraft is in the hanger with no GPS signal for > 2 minutes. 1. Move the aircraft into an area with access to a GPS signal. 2. Cycle power to the Lynx MSS. 3. Replacement of the Lynx MSS or system component may be required. Contact ACSS Field Service before removal of the unit.
• XPDR FAIL is displayed on the CP-2500. • The CP-2500 altitude page displays "INVLD PA". • Baro Altitude (Pressure altitude) is not being transmitted as indicated by the IFR-6000 in Monitor mode. • Geometric altitude is being transmitted from the Unit, and all other information is available. • Lamps - Normal operation. • Display/PED – Altitude information is shown as dashes.	Either the Unit is not receiving BARO-ALT (Pressure altitude), or the control panel is set to ON mode. 1. Verify that the CP-2500 is set to ALT Mode. 2. Verify that the Unit is receiving BARO-ALT (Pressure altitude). On the CP-2500 go to the Altitude page. The page should display the altitude for example as: 800PA (for 800 ft pressure altitude). In the case of missing altitude, it displays "INVLD PA". Pressure altitude is a required output for FAA compliance. In the event of the loss of Pressure altitude, the UAT device continues to operate by reverting to GPS altitude as a back-up. The GPS altitude can be viewed with the MAT device. **NOTE** Some altitude encoders can take 1-3 minutes to output data after initial power on.

Table 4-3: Troubleshooting The Remote Mount NGT-9000R

SYMPTOMS	CAUSE / CORRECTIVE ACTIONS
• CP-2500 - Normal operation. • Lamps - Normal operation. • No traffic or weather information is being displayed on the PED over WI-FI.	1. Verify WI-FI module is receiving data from the Unit. For example, on the RN-370M models, this is indicated from visually seeing the blue flashing light on the unit. If indicator light is not flashing, verify WI-FI is configured properly in the DCM settings. Also, verify the device has power (batteries) and that the connections between the WI-FI module and the Unit are correct. 2. If WI-FI module is indicating it is receiving data, verify that the PED WI-FI connection is configured to receive the correct device name. (I.E. "WI-FLY-100"). 3. Verify PED App is compatible with the Unit. 4. Verify the configuration setting for the PED App being used. 5. Replacement of the Unit may be required. Contact ACSS Field Service before removal of the unit.
• CP-2500 - Normal operation. • Lamps - Normal operation. • FIS-B weather (such as METARS, NEXRAD, CONUS Data) is not being seen on the weather displays.	Ground testing with the IFR-6000 can only simulate textural data such as METARS. 1. When used in flight, the aircraft must be within range of a ground station NEXRAD information is only transmitted every 5 minutes, and CONUS information is only available from certain ground stations, and is only transmitted every 15 minutes.
• Cannot connect to the Unit with the MPC/MAT tool. • Lamps - Normal operation. • CP-2500 - Normal operation. • Displays - Normal operation.	1. Verify that the Lynx NGT-9000R is on ground. It is only possible to connect to the maintenance mode for the first 2 minutes after power on if the unit is "in-air". 2. The USB connection to the unit requires special drivers that must be installed on the MPC being used (see the general information section for details). If that has been successfully accomplished, replacement of the Unit may be required. Contact ACSS Field Service before removal of the unit. 2. Verify that the MAT being used is compatible with the software in the Unit being serviced. Contact ACSS Field service for more information.
• XPDR FAIL is displayed on the CP-2500. • If installed, ADS-B Fail lamp is OFF.	The transponder function of the Lynx NGT-9000R has failed or is not communicating with the CP-2500. 1. At next power cycle if symptoms persist, contact ACSS Field Service before removal of the unit or other equipment.

• TAWS FAIL is displayed on the CP-2500.
Release 2.0 or later
	The TAWS function of the Lynx NGT-9000R has failed or is not communicating with the CP-2500.
	1. One of the following failure(s) has been detected:
	  • GPS Fail
	  • Terrain (71DC) or Airport (68DC) Database compatibility failure.
	2. Reload Database (71DC) and (68DC) using the MPC (MAT).
	3. If the problem continues, replacement of the unit may be required. Contact ACSS Field Service before removal.

• Any of the following messages displayed on the CP-2500:
  • GPS FAIL
  • TAWS UNAVAILABLE
  • ADS-B IN UNAVAIL - POS
Release 2.0 or later
	An insufficient quality to the GPS position.
	1. The GPS may be acquiring a signal. The GPS may need up to 4 minutes to provide position
	2. The GPS signal may be weak. Move the aircraft into an area where the unit can receive a better GPS signal.
	3. Cycle power to the NGT-9000R and the CP-2500.
	4. If the problem continues, replacement of the unit may be required. Contact ACSS Field Service before removal.

Table 4-3: Troubleshooting The Remote Mount NGT-9000R

SYMPTOMS	CAUSE / CORRECTIVE ACTIONS

• The following message displayed on the CP-2500:
  • ADS-B IN UNAVAIL - POS (NGT-9000R)
 • Release 2.0 or later
	No valid track/heading information:
	 1. ADS-B Data is not available e.g. on the ground with no heading or track input (track invalid when ground speed is < 7kts). This can be overcome via a ground override step shown in section 3.10.2.1.
	 2. Insufficient GPS quality:
	  • The GPS may be acquiring a signal. The GPS may need up to 4 minutes to provide position.
	  • The GPS signal may be weak. Move the aircraft into an area where the unit can receive a better GPS signal.
	  • Cycle power to the NGT-9000R and the CP-2500.
	  • If the problem continues, replacement of the unit may be required. Contact L-3 Field Service before removal.

• ADS-B OUT FAIL displayed on CP-2500. Release 2.0 or later	The ADS-B OUT function of the Lynx NGT-9000R has failed or GPS position has not been available for more than 2 minutes. 1. The GPS may need up to 4 minutes to provide position. 2. Cycle power to the NGT-9000R and the CP-2500. 3. If the problem continues, replacement of the unit may be required. Contact ACSS Field Service before removal.

• Any of the following messages displayed on the CP-2500:
  • ADS-B IN FAIL
  • FIS-B FAIL
  • TAS/TCAS FAIL
 Release 2.0 or later
	The function on the Lynx NGT-9000R has failed or the Lynx NGT-9000R is not communicating with the CP-2500.
	 1. Cycle power to the NGT-9000R and the CP-2500.
	 2. If the problem continues, replacement of the unit may be required. Contact ACSS Field Service before removal.

• NO LRU RESPONSE displayed on CP-2500. Release 2.0 or later	The Lynx NGT-9000R is not communicating with the CP-2500. 1. Cycle power to the NGT-9000R and the CP-2500. 2. If the problem continues, replacement of the unit may be required. Contact ACSS Field Service before removal.
• CONFIG MODULE - SERVICE SOON displayed on CP-2500. Release 2.0 or later	A problem has been detected with the configuration module. • Replacement of the configuration module may be required. Contact ACSS Field Service before removal.

• Any of the following messages displayed on the CP-2500:
  • TAS/TCAS Degraded
  • ADS-B IN Degraded
  • ADS-B OUT Degraded
  • FIS-B Degraded
 Release 2.0 or later
	A Degraded message is not a failure, and is an indication to the user that the function is operating in a degraded condition.

• CP-2500 will not allow operational mode changes to on or alt, (stuck in standby). Release 2.1 or later	External "Standby" discrete is active (grounded). • Place external "Standby" discrete in Off (open) position.

4.4.4   Antenna Coax Ohm Check

Use the following procedure to check the directional antenna (i.e. NY 156 or NY 164) used by TAS or TCAS function.

The following Ohm check is accomplished by using a typical Ohmmeter and placing one lead on the center pin and the second lead on the outer shield of the coax.

PORT NAME	DESCRIPTION	TEST RESULT
Sum (Sigma) Port	The Sum (Sigma) port is the forward antenna connector marked with a blue band. Connected to the NGT-9000 (A4) Sum Port	< 1 ohm
Bit Probe Port	The Bit Probe port is the center antenna connector. Connected to the NGT-9000 (A1) Bit Port.	85 +/- 5 ohms
Difference (Delta) Port	Difference (Delta) port is the rear antenna connector marked with a red band. Connected to the NGT-9000 (A2) Difference Port.	< 1 ohm

4.4.5   WX-500 Stormscope

Press the Options Icon ⚙ on the Stormscope screen to access the System Data and Test Modes for the WX-500.

NOTE

> The MPC (MAT) is required to view installation configuration, environmental information, and fault data. See Installation Checkout Section (para. 3.9.5).

4.4.5.1   System Data

System Data is viewed on the Settings Screen (see Figure 4-3). This screen shows model information, software versions, status information, and status. The Settings screen contains data that is only read at start-up (i.e., the information is not be updated again, unless the power is cycled).

In addition to the system data as the following functions:

- Press the View button to set the View Mode to "120°" and "360°".
- Press the STAB button to set the Heading Stabilization Mode to "On" or "Off".
  Note - Heading stabilization uses the aircraft heading source as a reference for the display to maintain the storm display orientation relative to the aircraft. If STAB is turned off, the heading on the main screen appears as amber dashes (---).
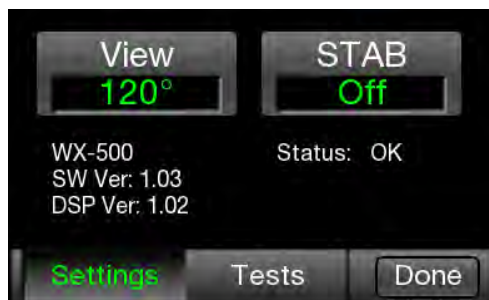
Figure 4-3: WX-500 Settings Screen

Status Information provides functional status of the WX-500 at power up. This information is not updated during operation. Use the Self Test button on the Tests screen to determine current status.

- An "OK" message indicates that the WX-500 is operational and no errors are being detected.

- A "Degraded" message has amber text and is followed by a "Fault Code" number and a display of the problem.
  Cycle power to the WX-500 and the NGT-9000 if a degraded message is shown. Check the startup test again to see if the degraded message has been cleared. If not note the fault code and description. Refer to the WX-500 Installation Manual for fault isolation information.

- A "Failed" message has red text and is followed by a "Fault Code" number and a display of the problem.
  Cycle power to the WX-500 and the NGT-9000 if a failed message is shown. Check the startup test again to see if the failed message has been cleared. If not note the fault code and description. Refer to the WX-500 Installation Manual for fault isolation information. Errors 01 thru 15, 21, 25 thru 36, 40 thru 42 typically indicate an internal failure and that the unit needs to be sent to the factory for repair.

4.4.5.2 Test Modes

The test modes are intended as aids in installing, testing and troubleshooting the WX-500. These test modes are to be used only for testing and troubleshooting an installation.

The test modes provide the following options:

- Noise Monitor
- Test Strikes
- Self Test

Test Modes are viewed on the Test Screen (see Figure 4-4). Press the Tests button (if not done already). Individual tests are explained in the following paragraphs.
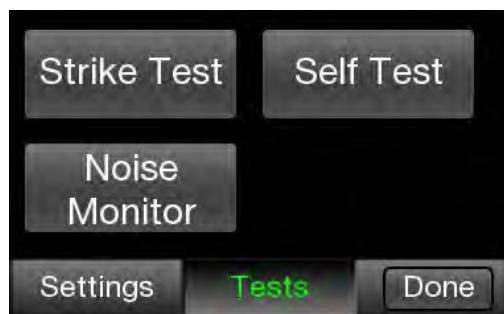
Figure 4-4: Tests Screen

4.4.5.3 Noise Monitor

The Noise Monitor screen (see Figure 4-5) displays indications of electrical noise as well as lightning/atmospheric electrical discharge activity that occurs within electrical range of the WX-500 system. It is used to see if electrical noise that will interfere with normal system operation is present. No compression is applied to the strikes.

The circle (solid ring) provides a reference for an acceptable noise level. No range markings are displayed. Old data is removed (bumped off) after 3 minutes or when the CLR (Clear) button is pressed.

A counter that indicates the number of triggers detected (i.e., electrical discharges including noise and/or strikes) is shown at the top of the figure. The counter rolls over at 99999, and is reset using the CLR button. It should be noted that noise can cause triggers, but not result in a strike symbol.

Figure 4-5: Noise Monitor

NOTES

1. Thunderstorm activity within the inner and outer circle will register on the Noise Monitor and may affect the Test Strike display causing the test strikes to fall outside the box.

2. The NGT-9000 display refresh rate may delay the appearance of noise.

1. Press the "Noise Monitor" button to start test (see Figure 4-4).
2. Verify no triggers or strikes are present.
3. Press CLR to erase the screen and then check for electrical noise indications. Compare the results with the PASS and FAIL instructions listed below.

   PASS There should normally be no noise indications inside the solid ring. (A small number of triggers and/or random noise points inside the displayed ring is acceptable.)

   FAIL Reoccurring and/or persistent indications of electrical noise inside the solid ring are unacceptable (i.e. strikes in same location each time). (Troubleshooting electrical noise is discussed in in the WX-500 Installation Manual.)

4. If the noise monitor test is satisfactory, perform the Test Strikes test.
5. Press the "Exit" button to return to the Tests Screen.

4.4.5.4 Test Strikes

The Test Strikes (see Figure 4-6) test is used by installers to visually verify the operation of the internal strike test signal. No range indication is displayed. The rectangular shaped box is displayed on the screen to enclose the area in which the test strikes should appear.

Test strikes are generated and sent to the antenna at a rate of one pulse per every 2 seconds. The resulting test strike received by the system is displayed on the screen, and is indicated by a single strike symbol (+). The last strike is erased before the next strike is generated.

Figure 4-6: Test Strikes

1. Press the "Strike Test" button to start test (see Figure 4-4).
2. Verify the test strike is inside the box. The test strike screen verifies the processing and plotting of electrical discharge data. A strike indication ("+") should appear inside the displayed box every 2 seconds.

   PASS A strike indication is typically displayed and cleared every 2 seconds (timing may be affected by the MFD refresh rate), so that it appears to flash. The strike symbol should appear inside the box.

   FAIL If the generated strike indications appear outside of the box, or do not appear at all.

NOTE

Occasional strikes appearing outside the box or, that do not appear at all, should not be interpreted as failing the test.

3. Switch back and forth between the Test Strikes and Noise Monitor to check for accurate plotting of the internally generated test strikes and for electrical noise that could interfere with weather mapping. (Troubleshooting electrical noise is discussed in in the WX-500 Installation Manual.)

NOTE

The system must pass both the Noise Monitor and Test Strikes criteria to ensure proper operation.

4. Press the "Exit" button to return to the Tests Screen.

4.4.5.5 Self-Test

The Self-Test (see Figure 4-4) is used to check the status of WX-500 after power up.

1. Press the "Self-Test" button to start test.

2. During the test an "In Progress" message is shown.

3. The results of the test are Passed, Degraded, or Failed.

- A "Passaged" message indicates that the WX-500 is operational and no errors are being detected.

- A "Degraded" message has amber text and indicates that information is missing.
Cycle power to the WX-500 and the NGT-9000 and check the startup self-test to see if the degraded status has been cleared. If not note the fault code and description. Refer to the WX-500 Installation Manual for fault isolation information.

- A "Failed" message has red text and is followed by a "Fault Code" number and a display of the problem.
Cycle power to the WX-500 and the NGT-9000 and check the startup self-test to see if the failed status has been cleared. If not note the fault code and description. Refer to the WX-500 Installation Manual for fault isolation information. Also the MPC (MAT) can be used to view fault data (see Installation Checkout section).
Errors 01 thru 15, 21, 25 thru 36, 40 thru 42 typically indicate an internal failure and that the unit needs to be sent to the factory for repair.

4.5 USING THE MAINTENANCE PC

The Maintenance PC (MPC) and Lynx Maintenance Application Tool (MPC (MAT)) are used to interface with the Lynx NGT-9000 to load software/firmware/databases, view factory / version data, retrieve fault / event logs, data recording, and simulating live data.

These procedures assume the following:

- Power is being supplied to the aircraft and unit and system components.

- The correct MPC (MAT) software is being used to load software. See the General Information section (Software Versions) for software details. Note - Each version of software for the Lynx NGT-9000 requires a specific MAT software version that is compatible.

- The software to be loaded is available on the MPC being used.

- The MPC (MAT) is active on the MPC.

- The MPC is interfaced to the unit.

- The MPC and unit are communicating and the unit is in Maintenance Mode.

Additional instructions on using the MPC are given in the Installation Checkout section.

4.5.1   Load Software

This procedure is used to update the system software used by the unit. The MPC must be connected via the USB connection for this procedure. The WiFi interface is not supported.

1.   From the MPC (MAT) select Update→Load Software. See Figure 4-7.The tool has the option of loading either of the following software files. Note - Do not remove power to the unit or disconnect the MPC during this procedure.

- Lynx NGT-9000 Software Package File (composed of Flight and Maintenance)

- GPS/UAT Composite Binary file (composed of CCA Operation SW and Firmware)

- Press the Browse button to open a file window. Select the appropriate file. (i.e. 1090MSS.pkg / GPS-UAT.bin or similar looking file). The MAT verifies the contents of the file to be loaded. This takes approximately 5 seconds.

- Press the Upload button to begin loading the software to the unit. A progress bar is shown for each SW load.
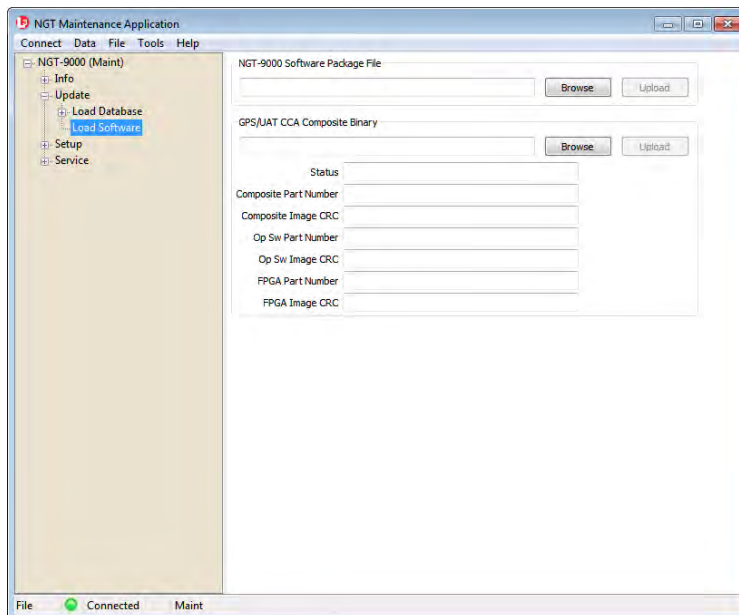
Figure 4-7: MPC (MAT) – Update Software

2.   An upload completed message is shown when the procedure has finished.

- A failure message is shown if a problem loading the Lynx NGT-9000 Software Package File is detected. Check that the file being loaded is correct and try the procedure again. If the problem continues cycle power to the unit.

- A problem is detected for the GPS/UAT Composite Binary File if the validation check of the file has failed. Check that the file being loaded is correct and try the procedure again. If the problem continues cycle, power to the unit and try again.

- When upload of Lynx NGT-9000 Software Package File is complete the unit will automatically reset into maintenance mode. When upload of GPS/UAT Composite Binary File is complete, a dialog will instruct the operator to cycle power on the unit.

3. After the unit restarts, re-connect the unit to the MPC (MAT).

4. This step is only required only when uploading GPS/UAT Composite Binary File. Re-connect the unit to the MPC (MAT). From the MPC (MAT) select Service→Restart Unit Mode→ Maintenance.

5. Verify that the software was updated by going to the Versions page. From the MPC (MAT) select Info→Versions.

6. Cycle power to the unit. (Note –The MPC (MAT) and PC may be disconnected at this time if no other maintenance is required.

7. Perform a functional check (paragraph 3.10.1) to verify unit is functioning correctly. Refer to the fault isolation section if errors are detected.

4.5.2 Load Databases

This procedure is used to update the databases used by the Lynx NGT-9000. Updates to the databases are not mandatory and are updated at the discretion of the user. Refer to Obtaining Software in the General Information section for details on obtaining new database files. Refer to Figure 4-8 specifically for MPC (MAT) versions 8010-17002-0201 and 8010-17002-030x. The previous MPC (MAT) versions do not have the Jeppesen Security File (JSF) requirements so appear slightly different.

1. MPC (MAT) 8010-17002-010x

   a. From the MPC (MAT) select Update→ Load Database. The tool has the option of loading the following database files: 68.bin - Airport Database, 72.bin - Map Database.

2. MPC (MAT) 8010-17002-020x and 8010-17002-030x

   a. From the MPC (MAT) select Update→ Load Database.
      Upload the following databases as needed.

   b. Select Airport to load the 68.bin - Airport Database.

   c. Select Terrain to load the 71.bin - Terrain Database.

   d. Select Map to load the 72.bin - Map Database.

3. Press the Browse button to open a file window. Select the appropriate file.
   Note – MPC (MAT) 8010-17002-0201 and MPC (MAT) 8010-17002-030x. When loading Airport and Map databases, the file to be selected is the Jeppesen Security File (JSF) associated with the database to be loaded. Once this file is loaded the Upload Button is made available. The JSF has a limited amount of uploads. This information is shown on the screen (Uploads Available).

4. Press the Upload button to begin loading the database to the unit.

5. An upload completed message is shown when the procedure has finished.

   • A failure message is shown if a problem loading the database is detected. Check that the file being loaded is correct and try the procedure again. If the problem continues cycle power to the unit.

6. When the procedures are complete cycle power to the unit and perform a functional check (paragraph 3.10.1) to verify unit is functioning correctly. Refer to the fault isolation section if errors are detected.
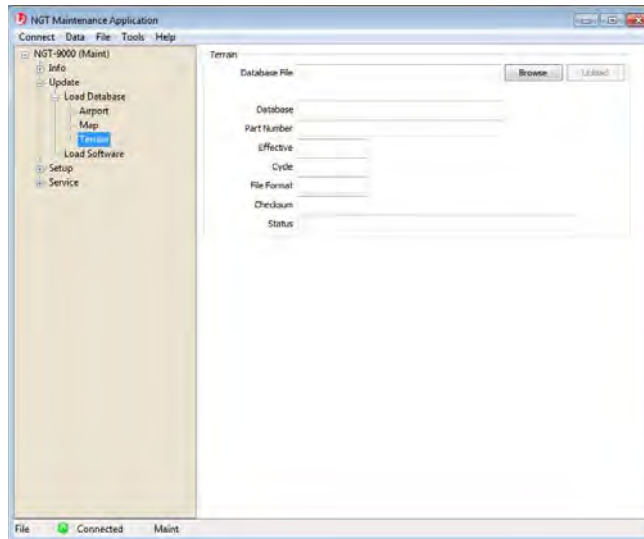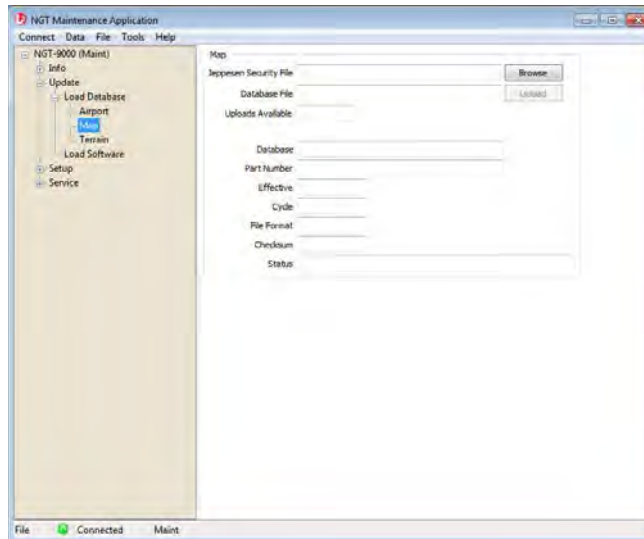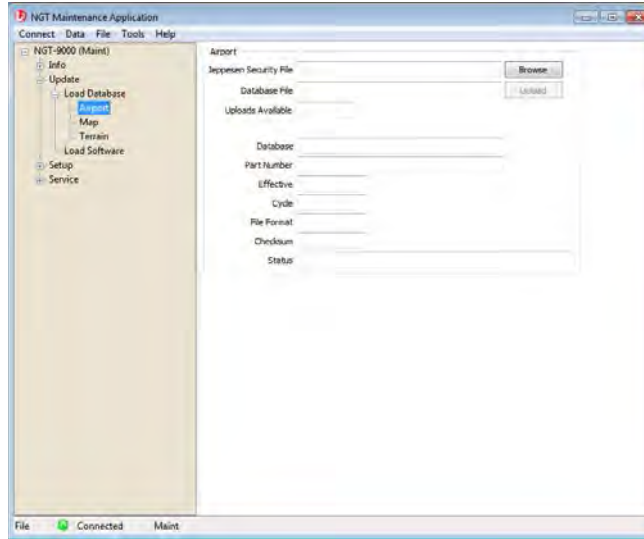
Figure 4-8: MPC (MAT) – Update Database

4.5.3 View or Retrieve Data

Use the MPC (MAT) to view versions and factory information and retrieve fault and event logs. See Figure 4-9. The versions data, event log, and factory log can be saved to a file for later viewing.
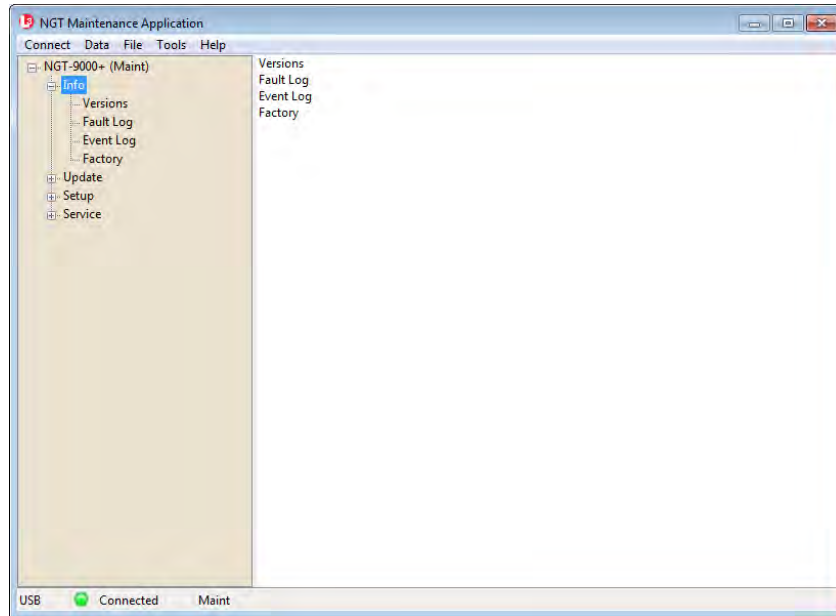
Figure 4-9: MPC (MAT) – Information

4.5.3.1   Versions

The Versions pages show the current software and database versions on the unit. Buttons on the bottom of both pages provide the user the options of 'Refresh', 'Save', and 'Load'.
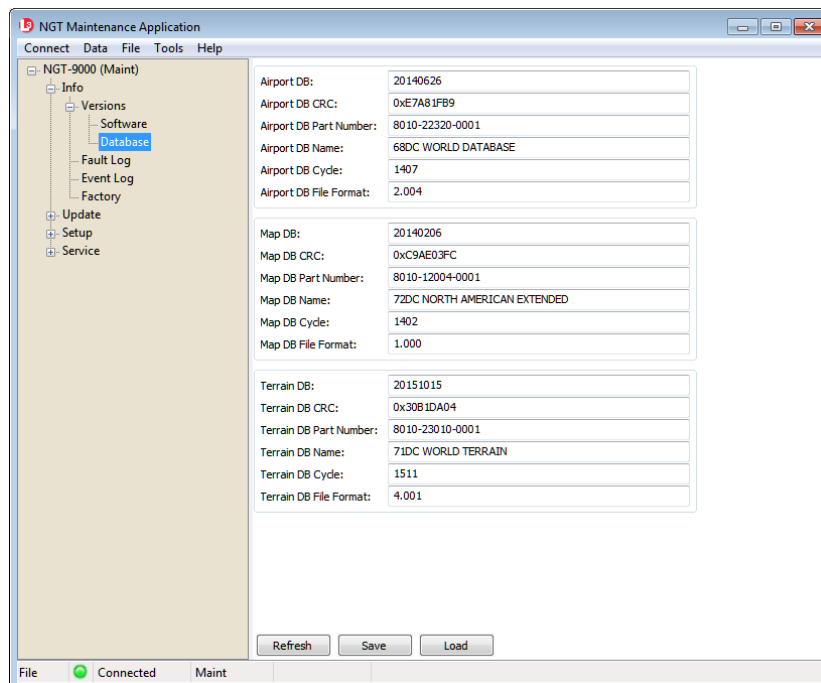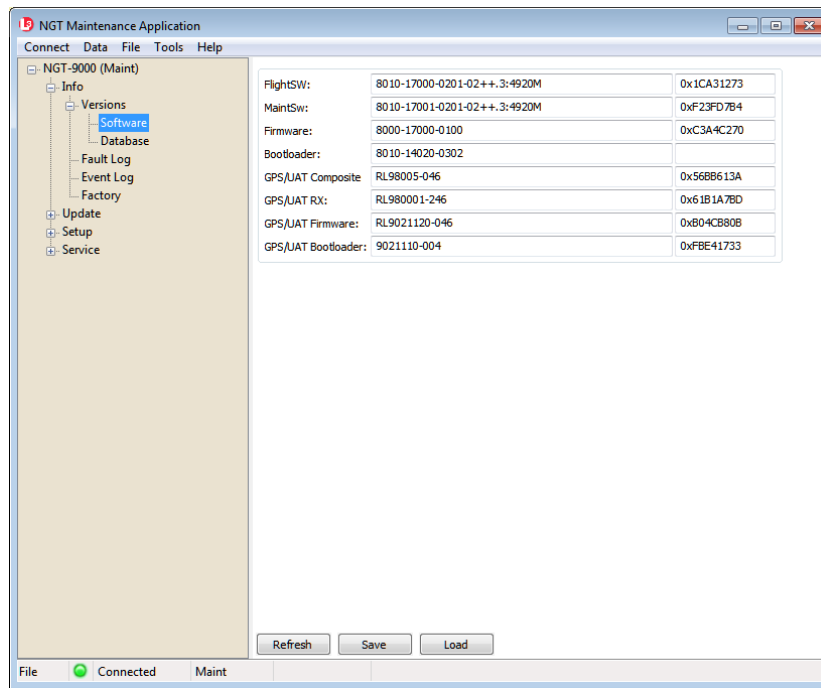
Figure 4-10: MPC (MAT) – Versions

4.5.3.2 Fault Log

The Fault Log can be used for troubleshooting. Each fault is entered on its own indexed row, with details for date, time, etc. Clicking on a row provides the user with additional information at the top of the page. This information includes a fault description and a possible description of the loss of functionality. Buttons on the bottom of the page provide the user the options of 'Refresh', 'Clear', 'Filter', 'Save', 'Load', and 'Export to CSV'. The fault data can be cleared at the option of the user.

NOTE

Typically, the fault log should not be cleared unless instructed by ACSS Field Service personnel.

A saved fault log can be viewed by the MPC (MAT) when the unit is not connected by using the Load function.

Table 4-4: List of Fault Log Messages

FAULT ID/ CODE (HEX)	FAULT DESCRIPTION	CORRECTIVE ACTION
0x00000001	Kernel Fault Wd Expire	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00000002	Kernel Fault Process Term	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00000003	Kernel Fault Thread Term	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00000004	Kernel Fault Thread Timeout	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00000005	Kernel Fault Trap	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00000006	Kernel Fault BIT Wd	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00000007	Kernel Fault BIT Clock	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00000008	Kernel Fault CBIT CRC	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00000009	Kernel Fault ISR Limit	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x0000000A	Kernel Fault CBIT FPGA	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x0000000B	Kernel Fault CBIT SW Exception	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00000021	Touch INIT Fault	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.

Table 4-4: List of Fault Log Messages

FAULT ID/ CODE (HEX)	FAULT DESCRIPTION	CORRECTIVE ACTION
0x00000033	IODC INIT Fault	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00000034	IODC Read Fault	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00000035	IODC Overflow Fault	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00000036	IODC Buffer Overflow Fault	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00000037	IODC Parity Fault	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00000047	Fault ID for the watchdog test failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00000048	Fault ID for the memory test failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00000049	Fault ID for the DSP Clock test failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x0000004A	Fault ID for the FPGA test failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x0000004B	Fault ID for the Power management test failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x0000004C	Fault ID for the Primary Image failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x0000004D	Fault ID for the Secondary Image failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00001001	Oscillator Synthesizer Out of Lock <u>Possible Cause</u> ADS-B In Internal Degraded ADS-B Out Internal Failure TAS Internal Failure TCAS Internal Failure Transponder Internal Failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00001002	Mutual Supp Bus Failed to Assert No failures of the box only log the fault	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00001003	Mutual Supp Bus Stuck High No failures of the box only log the fault	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.

Table 4-4: List of Fault Log Messages

FAULT ID/ CODE (HEX)	FAULT DESCRIPTION	CORRECTIVE ACTION
0x00001004	DCM CRC Failure No failures of the box only log the fault	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00001006	DCM Configuration Failure	Reboot the unit and check if the fault persists. May need to update or load configuration data. Contact ACSS Field Service before removal.
0x00001007	Over Temp on Ground <u>Possible Cause</u> ADS-B In Internal failure ADS-B Out Internal failure TAS Internal failure TCAS Internal failure Transponder Internal failure GPS Internal failure FIS-B Internal failure TAWS Internal failure	Log the fault and allow the unit to cool down. If the fault continues to be seen contact ACSS Field Service before removal.
0x00001008	Over Temp in Air No failures of the box only log the fault	Log the fault and allow the unit to cool down. If the fault continues to be seen contact ACSS Field Service before removal.
0x00001009	Failure of Power Monitor	Reboot the unit and check if the fault persists. May need to update or load configuration data. Contact ACSS Field Service before removal.
0x0000100A	Power Out of Tolerance <u>Possible Cause</u> ADS-B In Internal failure ADS-B Out Internal failure TAS Internal failure TCAS Internal failure Transponder Internal failure GPS Internal failure FIS-B Internal failure TAWS Internal failure	Reboot the unit and check if the fault persists. May need to update or load configuration data. Contact ACSS Field Service before removal.
0x0000100B	Airport DB Flash CRC Failure <u>Possible Cause</u> Airport database failure FIS-B internal degraded TAWS Internal failure	Reboot the unit and check if the fault persists. May need to update or load navigation database data. Contact ACSS Field Service before removal.
0x0000100C	Airport DB Flash Compatibility Failure <u>Possible Cause</u> Airport database failure FIS-B internal degraded TAWS Internal failure	Reboot the unit and check if the fault persists. May need to update or load navigation database data. Contact ACSS Field Service before removal.

Table 4-4: List of Fault Log Messages

FAULT ID/ CODE (HEX)	FAULT DESCRIPTION	CORRECTIVE ACTION
0x0000100D	Map DB Flash CRC Failure Map database failure FIS-B internal degraded	Reboot the unit and check if the fault persists. May need to update or load map database data. Contact ACSS Field Service before removal.
0x0000100E	Map DB Flash Compatibility Failure Map database failure FIS-B internal degraded	Reboot the unit and check if the fault persists. May need to update or load map database data. Contact ACSS Field Service before removal.
0x0000100F	TAWS Terrain DB Flash Failure <u>Possible Cause</u> TAWS Internal failure	Reboot the unit and check if the fault persists. May need to update or load TAWS database data. Contact ACSS Field Service before removal.
0x00001010	TAWS Airport DB Flash Failure <u>Possible Cause</u> Airport database failure TAWS Internal failure	Reboot the unit and check if the fault persists. May need to update or load airport database data. Contact ACSS Field Service before removal.
0x00001011	Operational SW RAM CRC Failure Failure causes a reset	Log the fault.
0x00001012	Airport DB RAM CRC Failure Failure causes a reset	Reboot the unit and check if the fault persists. May need to update or load airport database data. Contact ACSS Field Service before removal.
0x00001013	Map DB RAM CRC Failure Failure causes a reset	Log the fault.
0x00001014	TAWS Terrain Block CRC Failure	Log the fault.
0x00001015	Factory Data RAM CRC Failure Failure causes a reset	Log the fault.
0x00001016	Config Data RAM CRC Failure Failure causes a reset	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00001017	Factory Data NVM CRC Failure Failure causes a reset	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00001018	Factory Data Compatibility Failure Failure causes a reset	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00001019	Config Data NVM CRC Failure Failure causes a reset	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x0000101A	Config Data NVM Compatibility Failure Failure causes a reset	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x0000101B	Power Loss In Air	Check Table 4-1, Table 4-3, or Table 4-2
0x0000101C	Ambient Light Sensor Failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.

Table 4-4: List of Fault Log Messages

FAULT ID/ CODE (HEX)	FAULT DESCRIPTION	CORRECTIVE ACTION
0x00001801	Clear Oscillator Synthesizer Out of Lock	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00001802	Clear Mutual Supp Bus Failed to Assert	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00001803	Clear Mutual Supp Bus Stuck High	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00001804	Clear DCM CRC Failure	Log the fault.
0x00001806	Clear DCM Configuration Fail	Log the fault.
0x00001807	Clear Over Temp on Ground	Log the fault.
0x00001808	Clear Over Temp in Air	Log the fault.
0x00001809	Clear Failure of Power Monitor	Log the fault.
0x0000180A	Clear Power Out of Tolerance	Log the fault.
0x0000180B	Clear Airport DB Flash CRC Failure	Log the fault.
0x0000180C	Clear Airport DB Flash Compatibility Failure	Log the fault.
0x0000180D	Clear Map DB Flash CRC Failure	Log the fault.
0x0000180E	Clear Map DB Flash Compatibility Failure	Log the fault.
0x00001811	Clear Operational SW RAM CRC Failure	Log the fault.
0x00001812	Clear Airport DB RAM CRC Failure	Log the fault.
0x00001813	Clear Map DB RAM CRC Failure	Log the fault.
0x00001815	Clear Factory Data RAM CRC Failure	Log the fault.
0x00001816	Clear Config Data RAM CRC Failure	Log the fault.
0x00001817	Clear Factory Data NVM CRC Failure	Log the fault.
0x00001818	Clear Factory Data Compatibility Failure	Log the fault.
0x00001819	Clear Config Data NVM CRC Failure	Log the fault.
0x0000181A	Clear Config Data NVM Compatibility Failure	Log the fault.
0x0000181B	Clear Power Loss In Air	Log the fault.
0x0000181C	Clear Ambient Light Sensor Failure	Log the fault.
0x00002001	Audio Mute While On Ground Audio external failure	Log the fault.
0x00002002	TAS Antenna Failure TAS External failure TCAS Antenna Failure TCAS External failure	Check Table 4-1, Table 4-3, or Table 4-2
0x00002003	1090 ADSB Rcvr Btm Power Failure ADS-B In Internal degraded TAS Internal failure TCAS Internal failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.

Table 4-4: List of Fault Log Messages

FAULT ID/ CODE (HEX)	FAULT DESCRIPTION	CORRECTIVE ACTION
0x00002004	1090 ADSB Rcvr Top Power Failure ADS-B In Internal degraded TAS Internal failure TCAS Internal failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00002005	TAS/TCAS 1090 (ATCRBS) Receiver Data Failure TAS Internal failure TCAS internal failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00002008	FPGA TAS/TCAS 1030 transmission failure TAS Internal failure TCAS internal failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00002009	TAS/TCAS 1030 Transmission Power Failure TAS Internal failure TCAS internal failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00002801	Clear audio Mute While On Ground	Log the fault.
0x00002802	Clear AS Antenna Failure	Log the fault.
0x00002803	Clear 1090 ADSB Rcvr Btm Power Failure	Log the fault.
0x00002804	Clear 1090 ADSB Rcvr Top Power Failure	Log the fault.
0x00002805	Clear TAS/TCAS 1090 (ATCRBS) Receiver Failure	Log the fault.
0x00002808	Clear FPGA TAS/TCAS 1030 transmission failure	Log the fault.
0x00002809	Clear TAS/TCAS 1030 Transmission Power Failure	Log the fault.
0x00003001	Invalid Mode S Address Transponder External failure ADS-B Out Internal failure	Change DCM setting (ICAO address should be other than 00000 or FFFFFF in hex). See installation checkout for details.
0x00003002	FPGA 1090 Transmission Failure Transponder Internal failure ADS-B Out Internal failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00003003	Squitter rate failure ADS-B Out Internal failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00003004	Squitter scheduler process not running at expected rate ADS-B Out Internal failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00003005	1090 ATCRBS Rx Failure(loopback without TAS antenna) Transponder Internal failure ADS-B Out Internal failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00003006	1030 Rcvr Btm Power Failure Transponder Internal failure TAS Internal failure TCAS Internal failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.

Table 4-4: List of Fault Log Messages

FAULT ID/ CODE (HEX)	FAULT DESCRIPTION	CORRECTIVE ACTION
0x00003007	1030 Rcvr Top Power Failure Transponder Internal failure TAS Internal failure TCAS Internal failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00003008	1030 Rcvr Btm PIN Isolation Failure Transponder Internal failure TAS Internal failure TCAS Internal failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00003009	1030 Rcvr Top PIN Isolation Failure Transponder Internal failure TAS Internal failure TCAS Internal failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x0000300A	1030 Rcvr Btm TR Isolation Failure Transponder Internal failure TAS Internal failure TCAS Internal failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x0000300B	1030 Rcvr Top TR Isolation Failure Transponder Internal failure TAS Internal failure TCAS Internal failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x0000300C	1030 XPDR ATCRBS Receiver Failure Transponder Internal failure TAS Internal failure TCAS Internal failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x0000300D	XPDR 1090 XMIT Bottom Power Failure Transponder Internal failure ADS-B Internal failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x0000300E	XPDR 1090 XMIT Top Power Failure Transponder Internal failure ADS-B Internal failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00003801	Clear Invalid Mode S Address	Log the fault.
0x00003802	Clear FPGA 1090 Transmission Failure	Log the fault.
0x00003803	Clear Squitter rate failure	Log the fault.
0x00003804	Clear Squitter scheduler process not running at expected rate	Log the fault.
0x00003805	Clear 1090 ATCRBS rx Failure(without directional antenna)	Log the fault.
0x00003806	Clear 1030 Rcvr Btm Power Failure	Log the fault.
0x00003807	Clear 1030 Rcvr Top Power Failure	Log the fault.
0x00003808	Clear 1030 Rcvr Btm PIN Isolation Failure	Log the fault.
0x00003809	Clear 1030 Rcvr Top PIN Isolation Failure	Log the fault.
0x0000380A	Clear 1030 Rcvr Btm TR Isolation Failure	Log the fault.

Table 4-4: List of Fault Log Messages

FAULT ID/ CODE (HEX)	FAULT DESCRIPTION	CORRECTIVE ACTION
0x0000380B	Clear 1030 Rcvr Top TR Isolation Failure	Log the fault.
0x0000380C	Clear 1030 XPDR ATCRBS Receiver Failure	Log the fault.
0x0000380D	Clear XPDR 1090 XMIT Bottom Power Failure	Log the fault.
0x0000380E	Clear XPDR 1090 XMIT Top Power Failure	Log the fault.
0x00004001	GPS Sensor Fail ADS-B In Internal failure ADS-B Out Internal Degraded GPS Internal failure	Check Table 4-1, Table 4-3, or Table 4-2
0x00004002	GPS Antenna Open/Short ADS-B In External failure ADS-B Out External Degraded GPS External failure	Check if GPS antenna is properly connected.
0x00004003	GPS/UAT LVDS Bus ADS-B In Internal failure ADS-B Out Internal Degraded GPS Internal failure FIS-B Internal failure	Check Table 4-1, Table 4-3, or Table 4-2
0x00004801	Clear GPS Sensor Fail	Log the fault.
0x00004802	Clear GPS Antenna Open/Short	Log the fault.
0x00004803	Clear GPS/UAT LVDS Bus	Log the fault.
0x00005001	UAT Sensor Failure ADS-B In Internal degraded FIS-B Internal failure	Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00005801	Clear UAT Sensor Failure	Log the fault.
0x00006003	Gillham C Bit Error ADS-B In External failure TAS External failure TCAS External failure Transponder External failure	Check wiring Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00006004	RS232 Altitude Input Fail ADS-B In External failure TAS External failure TCAS External failure Transponder External failure	Check wiring Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00006005	ARINC 429 Altitude Input Fail ADS-B In External failure TAS External failure TCAS External failure Transponder External failure	Check wiring Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00006006	ARINC 429 AHRS Input Fail ADS-B In External degraded TAS External degraded TCAS External degraded	Check wiring Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x00006007	ARINC 429 Receiver #1 Loop Back Failure causes a reset	Log the fault.

Table 4-4: List of Fault Log Messages

FAULT ID/ CODE (HEX)	FAULT DESCRIPTION	CORRECTIVE ACTION
0x00006008	ARINC 429 Receiver #2 Loop Back Failure causes a reset	Log the fault.
0x00006009	Control Panel Input Fail Transponder External failure	Check Control Panel wiring. Reboot the unit and check if the fault persists. Contact ACSS Field Service before removal.
0x0000600A	WX-500 Synchro Heading Input Fail Fault causes the following: ADS-B In External Degraded TAS External Degraded TCAS External degraded Lightning External Degrade	Check WX-500 wiring to the synchro heading input and Synchro LRU. Reboot the unit and WX-500 system and check if the fault persists. Contact ACSS Field Service before removal.
0x0000600B	Lightning Sensor Fail	Check WX-500 and Antenna. Reboot the unit and WX-500 system and check if the fault persists. Contact ACSS Field Service before removal.
0x00006803	Clear Gillham C Bit Error	Log the fault.
0x00006804	Clear RS232 Altitude Input Fail	Log the fault.
0x00006805	Clear ARINC 429 Altitude Input Fail	Log the fault.
0x00006806	Clear ARINC 429 AHRS Input Fail	Log the fault.
0x00006807	Clear ARINC 429 Receiver #1 Loop Back	Log the fault.
0x00006808	Clear ARINC 429 Receiver #2 Loop Back	Log the fault.
0x00006809	Clear Control Panel Input Fail	Log the fault.
0x00008xxx	Fault codes with the "8xxx" are all clear codes that log the moment a fault has been cleared.	Log the fault.

4.5.4   Configuration Restore

This procedure is used to automatically fill in the configuration options from a backup file. See Figure 4-11. Perform the following procedure using a MPC and MPC (MAT). This procedure assumes that the unit is in Maintenance Mode and the MPC is interfaced to the unit using either the USB.

These procedures assume the following:

* Power is being supplied to the aircraft and Lynx NGT-9000.

* The MPC (MAT) is active on the MPC.

* The MPC is connected to the unit.

* A DCM is connected (via the mating connector)

* The MPC and unit are communicating. If not then from the MPC (MAT) panel, select Connect➜NGT9000➜USB. This is required each time the unit power is cycled.

1. From the MPC (MAT) select Setup ➔ Configuration ➔ Restore. See Figure 4-11.
2. Click on the Load button to 'Load a Pre-Existing Configuration File' to load the configuration data into the MPC (MAT). After the file is loaded into the MPC (MAT) click on any of the Apply buttons to save all the configuration options (see Note below). Note - A dialog window is shown asking if changes should be saved immediately. See instructions given in the Installation Checkout section.

NOTE

The Tail Number and Mode S Identifier are unique for every aircraft. From the MPC (MAT) select Setup ➔ Configuration ➔ Modify ➔ Aircraft Specific and enter the new data before pressing the Apply button.

3. Click on the Restore button to Restore Installation Configuration from Backup (NVM) to save the backup configuration module data stored in the unit's memory to the configuration module.
4. Click on the Set Defaults button to load default information to the configuration module.
5. From the MPC (MAT) select Service➜Restart Unit Mode➔ Maintenance.
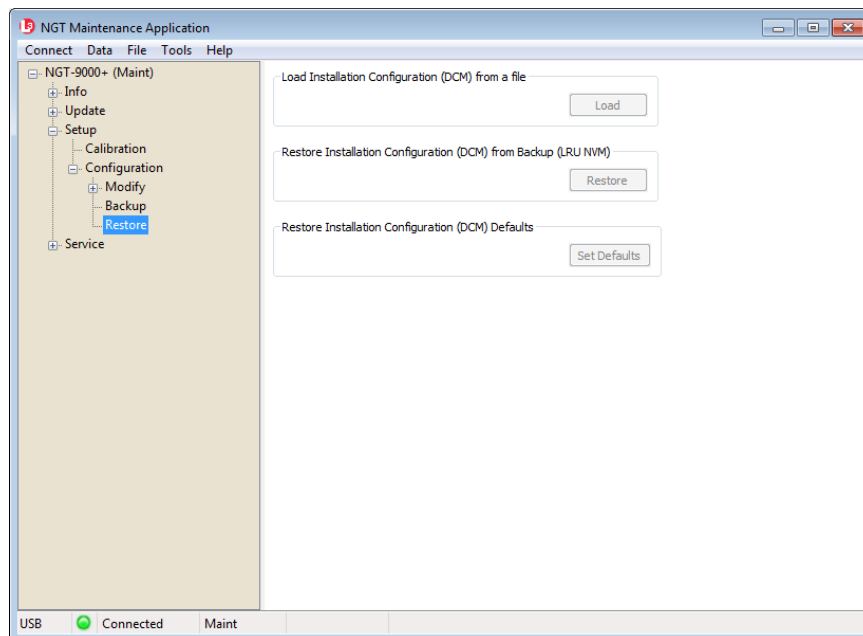
Figure 4-11: MPC (MAT) –Configuration – Restore

4.5.5   Service

This procedure is used to service and troubleshoot the Lynx NGT-9000. See Figure 4-12.

4.5.5.1   Data Recording

The information generated by the Data Recording page is not typically used unless requested by the factory during service.

1.   From the MPC (MAT) select Service➜Data Recording.
2.   Select the MMC Mode.
     *   Selecting Truncate restarts the recording.
     *   Selecting Append adds any new recording to the end of the current data recording.
3.   Click on the "Enable" button.
4.   From the MPC (MAT) select Service➜Restart Unit➜ Operational Mode.
5.   Data recording begins. Recording continues until the unit is restarted again.
6.   When needed use the 'Clear' button' to erase the current recorded data.
7.   The data can be stored to a file using the 'Browse' and "Download' buttons.

4.5.5.2   Live Data

The Live Data function is used for troubleshooting. Instructions on how to use live data are located in the Installation Checkout section under configuration check.
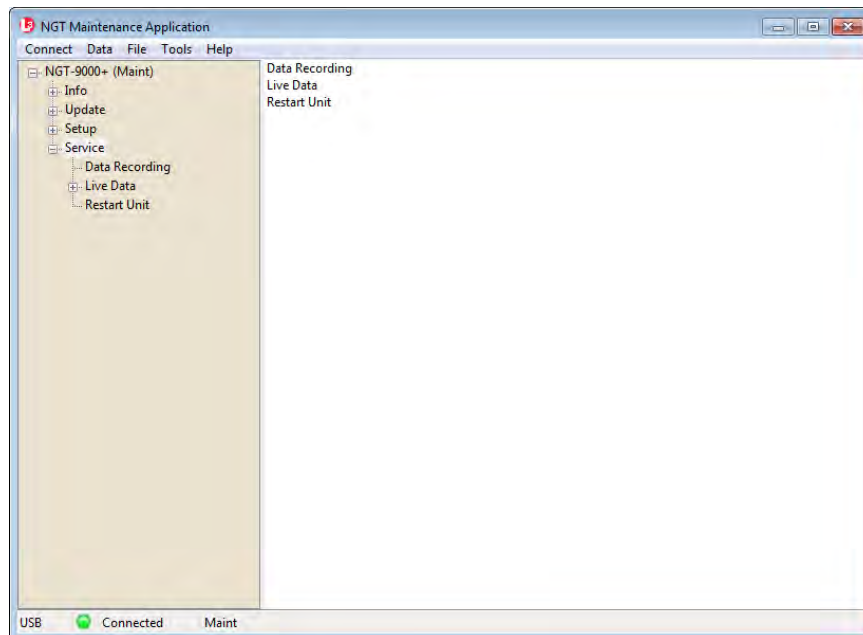
Figure 4-12: MPC (MAT) – Service

4.6 RETURN TO SERVICE

Use this section to validate the return to service of the Lynx NGT-9000 and system components.

4.6.1   Panel Mount NGT-9000

Use this procedure to remove and replace all models of the panel mount Lynx NGT-9000. The instructions herein are generic in scope. The best established methods, techniques and practices should be used where no specific procedure is given.

1. Removal Procedure
    a.   Locate the Panel Retainer access on the bottom left of the bezel.
    b.   Rotate the Panel Retainer CCW using 3/32 Allen Hex Socket Screw Driver. Rotate Panel Retainer, approximately 40 turns, until it stops. Do not exceed 5.0 inch-pounds of torque.
    c.   Pull the unit from panel separating the main connector and antenna connections.

2. Installation Procedure
    a.   Use 3/32 Allen Hex Socket Screw Driver to rotate the Panel Retainer CCW to avoid interference with the bottom edge of the panel.
    b.   Insert the unit in panel allowing the alignment guides to settle the unit into place.
    c.   Press the sides of the unit until the back side of the bezel is against the panel.
    d.   Rotate the Panel Retainer CW (approximately 40 turns) to lock the unit in place. The Panel Retainer torque limit is 5.0 inch-pounds.

4.6.2   Remote Mount NGT-9000R

Use this procedure to remove and replace all models of the Remote Mount Lynx NGT-9000R. The instructions herein are generic in scope. The best established methods, techniques and practices should be used where no specific procedure is given.

1. Removal Procedure
    a.   Rotate the Retainer Knob CCW until loose.
    b.   Pull the unit from tray separating the main connector and antenna connections.

2. Installation Procedure
    a.   Insert the unit in tray allowing the alignment guides to settle the unit into place.
    b.   Rotate the Retainer Knob CW to snug.

4.6.3   Lynx NGT-9000 Functional Check Procedure

1.   Cycle power to the unit and system components.
2.   The Lynx NGT-9000 contain a GPS receiver that requires a full functional check (paragraph 3.10, Installation Checkout) be performed to verify unit is functioning correctly.
3.   Models of NGT-9000 with the TAS/TCAS function must perform the Directional Antenna Calibration (installation checkout paragraph 3.8.3) prior to doing a functional check.
4.   Refer to the fault isolation section if errors are detected.

4.6.4 Detachable Configuration Module

Use this procedure to remove and replace the DCM. The instructions herein are generic in scope. The best established methods, techniques and practices should be used where no specific procedure is given.

NOTE

Before removal (and if possible) the configuration data should be saved. Refer to the MPC (MAT) Backup instructions located in the installation checkout section.

1. Removal Procedure

    a. Locate the Panel Retainer access on the bottom left of the Lynx NGT-9000 bezel.

    b. Rotate the Panel Retainer CCW using 3/32 Allen Hex Socket Screw Driver.

    c. Pull the unit from panel separating the main connector and antenna connections.

    d. Remove 6 screws securing panel rack and remove panel.

    e. Remove 4 screws securing rear plate to panel rack.

    f. Remove 2 screws securing P1 mating connector and nut plate. Remove screw securing ground strap to rear plate.

    g. If installed - Remove tie wraps securing overbraid to the wire bundle.

    h. If installed - Slide overbraid to expose configuration module.

    i. Remove configuration module contacts from the P1 mating connector.

2. Installation Procedure

    a. Insert contacts of new configuration module into P1 mating connector. Refer to Installation Guidelines for the Configuration Module in the installation section for details on the configuration module and configuration module electrical interface.

    b. If installed - Slide overbraid back into position, and use a new tie wraps to secure overbraid.

    c. Secure P1 mating connector to rear plate using nut plate and 2 screws.

    d. Secure cable ground strap to rear plate using 1 screw.

    e. Secure rear plate to panel rack using 4 screws.

    f. Insert panel in installation location and secure panel using 6 screws.

    g. Secure panel rack using 6 screws.

    h. On the Lynx NGT-9000 use 3/32 Allen Hex Socket Screw Driver to rotate the panel retainer counterclockwise to avoid interference with the bottom edge of the panel.

    i. Insert the Lynx NGT-9000 in panel allowing the alignment guides to settle the unit into place.

    j. Press the sides of the unit until the back side of the bezel is against the panel.

    k. Rotate the panel retainer clockwise to lock the Lynx NGT-9000 in place. The Panel Retainer torque limit is 5.0 inch-pounds.

3. Functional Check Procedure

    a. Cycle power to the Lynx NGT-9000 and system components.

    b. Ensure no failure messages are annunciated on the controller/display/PED and fail lamp is extinguished after GPS has acquired a signal.

    c. Use the installation checkout section to perform the select configuration options procedure or use the maintenance sections configuration restore is the original configuration (.bin) file can be retrieved from the original installer of the configuration module.

    d. Perform the checkout procedure provided in the installation checkout to verify unit is functioning correctly.

    • Refer to the fault isolation section if errors are detected.

4.6.5 Directional Antenna (NY156 and NY164)

The Directional Antenna Calibration (installation checkout paragraph 3.10.2.8) must be performed anytime the Lynx NGT-9000 or Directional Antenna is removed from the aircraft. Specific details on the installation of the antenna can be found in the installation section.

1. Removal Procedure
    a. Remove 10-32 hardware (nut and bolts) Qty 4, O-ring, and adapter plate.
    b. Disconnect three antenna cables.

2. Installation Procedure
    a. Connect each of the three antenna cables. Check to ensure that each cable is connected to the correct antenna connector. Each connector/cable has a matching color band.
    b. Attach the antenna to the aircraft, with the special adapter plate and o-ring, using 10-32 hardware. Ensure correct direction of antenna. Refer to Figure 2-15 for details.
        - Before installing the antenna on an aircraft remove the tape, which holds the O-RING gasket in place during shipment (refer to SL-206). If the O-ring is in a separate bag, remove and install it in the O-ring groove on the bottom of the antenna.
        - For pressurized aircraft, use a sealant that meets the requirements of SAE AMS-S-8802 such as Flamemaster CS3204 class B. For non-pressurized aircraft, use a non-corrosive sealant that meets the physical requirements of MIL-A-46146 such as General Electric RTV162.

3. Functional Check Procedure
    a. Cycle power to the Lynx NGT-9000 and system components.
    b. Perform the Directional Antenna Calibration (installation checkout paragraph 3.10.2.8) prior to doing a functional check.
    c. Perform a functional check (paragraph 3.10, Installation Checkout) to verify unit is functioning correctly.
        - Refer to the fault isolation section if errors are detected.

4.6.6 L-Band (UAT/1090) Antenna

1. Refer to the aircraft manufacturer's data and the antenna manufacturer's installation instructions to remove and replace the antenna(s).
    a. Perform a functional check (paragraph 3.10, Installation Checkout) to verify unit is functioning correctly.
        - Refer to the fault isolation section if errors are detected.

4.6.7 GPS Antenna

1. Refer to the aircraft manufacturer's data and the antenna manufacturer's installation instructions to remove and replace the antenna(s).
    a. Perform a functional check (paragraph 3.10, Installation Checkout) to verify unit is functioning correctly.
        - Refer to the fault isolation section if errors are detected.

4.7 DISPOSITION OF FAILED ITEMS

1. The Lynx NGT-9000 can only be repaired by a ACSS Certified Repair Station Center.

2. The configuration module, NY156, and NY164 cannot be repaired and must be replaced.

3. Contact ACSS Customer Service to obtain a Return Material Authorization (RMA). Shipping Instructions will be provided with the RMA.

4. Refer to the manufactures data for external displays, controllers, and antennas interfaced to the Lynx NGT-9000.

5. If available, pack components in their original shipping container. If the original container is not available, pack them as follows:

> ### CAUTION
>
> Do not use desiccant crystals when packaging electronic assemblies. Since the assembly must be packed tightly, crystals in bag form cannot be used. The use of loose crystals may cause unnecessary damage resulting in a cleaning problem.

   a. Ensure that conductive covers/caps are installed on the exposed terminals of connector, if applicable.

   b. LRU's that are marked as electrostatic discharge sensitive (ESDS) must be wrapped in static protective materials.

   c. Wrap with bubble pack. Secure bubble pack with reinforced tape.

   d. Place assembly in a cardboard box.

   e. Wrap any accessories in tissue and place in the box. Fill spaces with bubble pack.

   f. Place an explanation letter in the box with the following information.

- Your name, address, and telephone number
- Purchase order number
- Description of component including, when applicable, model and serial number
- A brief description of the difficulty

   g. Shut box, and seal with reinforced tape.

   h. Attach packing list to outside of box.

Appendix A
Interface Signal Name & Cable Characteristics

A.1 INTRODUCTION

This appendix defines digital interface label information and electrical characteristics of all input and output signal names to the Lynx NGT-9000. Sufficient data is included to use a bus reader for the purpose of identifying signal input and output characteristics and perform an electrical load analysis for the aircraft. The input and output interfaces are sometimes configurable as noted in the following paragraphs.

The interface characteristics contained in this appendix are fully compatible with ARINC specifications where noted. Connection information identifies the connector-pin and signal names as shown on the external interconnect wiring diagram in the installation section.

A.2 INPUT AND OUTPUT INTERFACES

A.2.1   Input Power

The unit has two power inputs available for either +14 VDC or +28VDC operation. The inputs are not diode isolated and are intended to be tied to the same power input device in order to handle the required current.

A.2.2   RF Suppression Bus

The transmission asserts a positive voltage on the output to provide the suppression to other L-band equipment on the airplane. The suppression pulse output is DC coupled, and drives positive pulses not less than 18 Vdc or greater than 70 Vdc into system loads from 300 to 2000 Ohms with a shunt capacitance of up to 1850 pF. The signal meets the hardware characteristics as defined in ARINC 735B Attachment 8.

The Suppression pulse (Discrete #2 out) is 100 µs ±5µs, +28V dc when the unit is transmitting TAS/TCAS data. There are 2 other lengths of suppression pulses that will be seen when the transponder is operating (1 longer and 1 shorter than 100us)

A.2.3   Audio Output

The audio output is capable of supplying up to 40 milli Watts (RMS) at 1000 Hz into a 600-Ohm audio distribution system. This output is directly compatible with industry standard audio panels.

A.2.4   Gillham Input (Altitude Input)

The Gillham interface is optional. Only one altimeter input source (gray code, ARINC-429 or RS-232) may be connected. The Gillham interface consists of 11 discrete lines. These 11 discrete lines represent 11 binary digits representing the Gillham encoded pressure altitude. The Gillham code uses a modified Gray code algorithm to ensure that no more than one-bit changes between adjacent altitudes. The three lowest significant bits represent 100-foot increments. The eight highest significant bits represent 500-foot increments.

The digits are labeled as follows beginning with the most significant bit to the least significant bit (D2, D4, A1, A2, A4, B1, B2, B4, C1, C2, and C4).

A.2.5 RS-232 Interface

The RS-232 is a serial interface used to receive and/or transmit the following data. Note -An ARINC 429 interface is available. See section A.2.7 for this option.

- Control Panel (CP-2500 and other compatible control panels)
- Wi-Fi Device (PIM-9000)
- Altitude Data
- WX-500 Lightning Detection

A.2.5.1 Control Panel Interface

A Control Panel is required when installing a remote mount NGT-9000R. When configured the NGT-9000R outputs test and error messages, ownship pressure altitude, transponder modes, and traffic/TAWS alerts.

The RS-232 Control Panel connects to the NGT-9000R via Rx1 & Tx1 (pins 61 & 62) and transmits the following information to the NGT-9000R:

- Pilot Selectable Flight ID (optional - enabled during installation)

- Set Operation Mode

- VFR Code Select

- IDENT

- Mode A Squawk Code

- Activation of Self-Test

- Audio Acknowledge for TAS, TCAS, ATAS, or `Class B` TAWS functions

- Release 3.2 and later. Reply Rate feature (not used by the CP-2500)

The RS-232 Control Panel receives the following information from the NGT-9000R:

- Fault Indications

- Fault Messages

- Pressure Altitude

- TAWS Warning Messages

A.2.5.2 WiFi Output (PIM-9000)

The RS-232 WiFi interface is optional. When configured the NGT-9000 outputs the following information to a WiFi connection (PIM-9000). NGT-9000 connections are Rx2 & Tx2 (pins 63 & 64).

- FIS-B Weather Data
- ADS-B Traffic Data
- Ownship Data

A.2.5.3 Altitude Data

The RS-232Altitude Data interface is optional. Only one altimeter input source (gray code, ARINC-429 or RS-232) should be connected. NGT-9000 connection is unidirectional RS-232 (Rx3, pin 60).

1. When the Trimble/Garmin/Icarus protocol option is used, the following characteristics are set: Requires Altitude Encoder and Control Panel interface, Baud rate is set to 9600 bps, Data bits 8, Parity none.

2. When the Northstar protocol option is used, the following characteristics are set: Requires Altitude Encoder and Control Panel interface, Baud rate is set to 2400 bps, Data bits 8, Parity none.

3. When the UPS AT protocol option is used, the following characteristics are set: Requires Altitude Encoder and Control Panel interface, Baud rate is set to 1200 bps, Data bits 8, Parity none.

4. When the UPS AT Loran 618 protocol option is used, the following characteristics are set: Requires Altitude Encoder and Control Panel interface, Baud rate is set to 1200 bps, Data bits 7, Parity odd.

5. When the MAGELLAN protocol option is used, the following characteristics are set: Requires Altitude Encoder and Control Panel interface, Baud rate is set to 1200 bps, Data bits 8, Parity even.

6. When the SHADIN protocol option is used, the following characteristics are set: Requires Altitude Encoder and Control Panel interface, Baud rate is set to 9600 bps, Data bits 8, Parity odd.

7. When the ARNAV protocol option is used, the following characteristics are set: Requires Altitude Encoder interface, Baud rate is set to 9600 bps, Data bits 8, Parity odd.

A.2.5.4 WX-500 Interface

The RS-232 interface to the WX-500 is optional. The WX-500 provides range and bearing of lightning discharge points in relation to the aircraft. In addition, the NGT-9000 can also be configured to receive AHRS information from the WX-500 (using synchro heading). NGT-9000 connections are Rx1 & Tx1 (pins 61 & 62). When interfacing the NGT-9000 to the WX-500, the system must be wired so that the NGT-9000 is the master/sole controller for the WX-500.

A.2.5.5 GPS Position Source

The RS-232 interface can be used to output the GPS position information of the aircraft. NGT-9000 connections are Rx1 & Tx1 (pins 61 & 62).

WAAS/GPS Output: Certified 5 Hz, RS-422/RS-232 and WiFi Class Beta 1 GPS output. Qualified for LNAV approaches only per TSO-C129d Table 1-1. (Configuration setting listed as L-3 Protocol 1).

A.2.6 RS-422 Interface

The RS-422 is a serial interface used to output weather and traffic data to a compatible display or interface with the WX-500 for lightning detection.

The RS-422 standard used in this manual matches the ANSI Standard (i.e. the data lines on the RS-422 signals are labeled with an "A" for (-) negative (inverting), or "B" for (+) positive (non-inverting). RS-422 can be configured with a Baud rate of 38400, or 57600, or 115200 using the MPC (MAT).

A.2.6.1 RS-422 Interface to Display

The RS-422 interface to a compatible display is optional. The NGT-9000 provides the following information: GPS Positon, maintenance flag, IDENT, seconds since 0000 UTC, UTC validation, and message counts. NGT-9000 connections are Tx2B & Tx2A (pins 52, & 53).

A.2.6.2 RS-422 Interface to WX-500

The RS-422 interface to the WX-500 is optional. The WX-500 provides range and bearing of lightning discharge points in relation to the aircraft. In addition, the NGT-9000 can also be configured to receive AHRS information from the WX-500 (using synchro heading). This interface requires two transmit and two receive connections with the WX-500. NGT-9000 connections are Rx2B, Rx2A, Tx2B, Tx2A (pins 50, 51, 52, & 53). When interfacing the NGT-9000 to the WX-500, the system must be wired so that the NGT-9000 is the master/sole controller for the WX-500.

A.2.6.3 GPS Position Source

The RS-422 interface can be used to output the GPS position information of the aircraft. NGT-9000 connections are Tx2B & Tx2A (pins 52, & 53).

A.2.7   ARINC 429 Input

Four ARINC 429 Input receivers are available. The ARINC 429 input can be configured to receive data at low (12.0 to 14.5 kbps) or high (100 kbps). The ARINC Bus is dedicated to the functions listed below:

- ARINC 429 Bus 1 used to input Pressure Altitude data.
- ARINC 429 Bus 2 used to input AHRS data.
- ARINC 429 Bus 3 is spare. Release 3.2 or later Control Panel #1 data.
- ARINC 429 Bus 4 is configurable. Release 3.2 or later Control Panel #2 data.

A.2.7.1 ARINC 429 Input Labels

1. The following ARINC 429 labels are inputs from Pressure Altitude on Bus #1:
    - Label 203 – Pressure Altitude Uncorrected (BNR)
    - Label 204 – Baro Corrected Altitude (BNR)
    - Label 205 – Mach (BNR)
    - Label 206 – Computed Airspeed (BNR)
    - Label 210 – True Airspeed (BNR)
    - Label 212 – Altitude Rate (BNR)
    - Label 234 – Baro Correction, mB (BCD)

2. The following ARINC 429 labels are inputs from an Attitude and Heading Reference System (AHRS) on Bus #2:
    - Label 314 – True Heading
    - Label 320 – Magnetic Heading
    - Label 325 – Roll Angle (BNR)
    - Label 335 – Track Angle Rate

3. The following ARINC 429 labels are inputs on bus #4 when configured for Combo Bus:
    - Label 101 – Selected Heading
    - Label 102 – FMS Selected Altitude (SDI set to FMS)
    - Label 102 – MCP Selected Altitude (SDI set to MCP)

    Note 1: The Bus is configured for high speed (100 kbps).
    Note 2: Release 3.2 or later - The Bus may be configured for high or low speed (12.0 to 14.5 kbps).

4. NGT-9000R, Release 3.2 or later. The following ARINC 429 labels are inputs from Control Panel #1 (Front or Left) on Bus #3 [Pins J1-44 & 45] for use by the embedded transponder only and not the TAS/TCAS or TAWS function. Data speed is low:

- Label 013 – Display Control (DISC)
- Label 016 – Transponder Control (DISC)
- Label 233 – Flight ID 1 (DISC)
- Label 234 – Flight ID 2 (DISC)
- Label 235 – Flight ID 3 (DISC)
- Label 236 – Flight ID 4 (DISC)

NGT-9000R, Release 3.2 or later. The following ARINC 429 labels are inputs from Control Panel #2 (Aft or Right) on Bus #4 [Pins J1-46 & 47]. Data speed is low:

- Label 013 – Display Control (DISC)
- Label 016 – Transponder Control (DISC)
- Label 233 – Flight ID 1 (DISC)
- Label 234 – Flight ID 2 (DISC)
- Label 235 – Flight ID 3 (DISC)
- Label 236 – Flight ID 4 (DISC)

A.2.8   ARINC 429 Output

The unit has one ARINC 429 Output that transmits data at high (100 kbps). The Lynx NGT-9000 have the option of interfacing to the Traffic display over the ARINC 429 bus using the standard traffic display (STIF) format as defined in ARINC 735 and the Display Traffic Information File (DTIF) as described in ARINC 735B. The specific display format is configurable through the DCM.
Release 3.2 or later the ARINC 429 Output can be configured to transmit information to a Control Panel. The ARINC 429 Output can only be configured for one of these functions not both.

NOTE

The Lynx NGT-9000 follows the same STIF display as the L3 SKY-497 TAS and SKY899 TCAS system. Select that option (if available) in the STIF display configuration settings.

A.2.8.1   ARINC 429 Output Labels

1. The following ARINC 429 labels are output to a Traffic Display (CDTI) on Bus #1:
    - Label 013 - TCAS Display Control (DSC)
    - Label 015 - Altitude Select Limits (DSC)
    - Label 016 - Mode S Control Panel Data (DSC)
    - Label 103 - - Own Aircraft True Track Angle (BNR)
    - Label 162 - Generic Discrete Word #1 (DSC) [Note 1]
    - Label 163 - Application Availability (DSC)
    - Label 270 - Vertical Resolution Advisories (DSC)
    - Label 274 - Selected Sensitivity Level (DSC)
    - Label 350 - TCAS Fault Summary (DSC)
    - Label 371 - GA Equipment ID (DSC)
    - Label 377 - Equipment ID (DSC)
    - Label 110 - Own Aircraft Latitude - Coarse (BNR)
    - Label 111 - Own Aircraft Longitude - Coarse (BNR)

A.2.8.1 Continued
- Label 120 - Own Aircraft Latitude - Fine (BNR)
- Label 121 - Own Aircraft Longitude - Fine (BNR)
- Label 203 – Own Aircraft Barometric Altitude (Uncorrected) (BNR)
- Label 204 - Own Aircraft Altitude (Baro Corrected) (BNR)
- Label 310 - Own Aircraft Latitude - Coarse (BNR)
- Label 311 - Own Aircraft Longitude - Coarse (BNR)
- Label 312 - Own Aircraft Ground Speed (BNR)
- Label 313 - Own Aircraft True Track Angle (BNR)
- Label 314 - Own Aircraft True Heading (BNR)
- Label 320 - Own Aircraft Magnetic Heading (BNR)
- Standard TCAS Intruder File (when enabled)
- Display Traffic Information File (when enabled)

Note - 1: Main function of label 162 is (TIS-B/ADS-R Coverage Active (1 = Receiving Station coverage, 0 = Not receiving Station coverage).

Note - 2: The following labels are not transmitted when CDTI Output is 'TIF': 103, 162, 163, 371, 110, 111, 120, 121, 204, 310, 311, 312, 313, and 314. The labels are transmitted when CDTI Output is 'DTIF' or 'Both TIF and DTIF'.

2. NGT-9000R, Release 3.2 or later. The following ARINC 429 labels are Outputs [Pins J1-48 & 49] to Control Panel #1. Requires configuration setup option for ARINC dual display. Data speed is High:
- Label 013 – Display Control (DISC)
- Label 016 – Transponder Control (DISC)
- Label 233 – Flight ID 1 (DISC)
- Label 234 – Flight ID 2 (DISC)
- Label 235 – Flight ID 3(DISC)
- Label 236 – Flight ID 4 (DISC)
- Label 276 – Standby Status (DISC)
- Label 350 – Maintenance, Transponder (DISC)
- Label 352 – Discrete Input Status (DISC)

A.2.9 Discrete Input

The unit has six discrete inputs that are GND/Open. The GND position is typically (depending on configuration options) the active (ON) position.

This discrete input provides 1.0 ± 0.25 mA of current when the input is grounded. The input is in the ground state when input voltage is less than or equal to 3.5Vdc, or there is less than 10 Ohms impedance to ground. The input is in the open state if the input voltage is greater than or equal to 18.0Vdc, or there is greater than 100K Ohms impedance to ground.

- Discrete #1 (pin 27) is used to activate the IDENT pulse, which highlights the aircraft's symbol on the ATC's radar screen and is identified on the Lynx NGT-9000 or external display / control panel when active.

- Discrete #2 (pin 28) is used to mute all audio outputs coming from the Lynx NGT-9000. Audio mute can be connected to other CAWS alerting systems if required (i.e. TAWS) that needs to mute the traffic system for a higher priority audio annunciation.

- Discrete #3 (pin 29) is used to signal the Lynx NGT-9000 that the aircraft is on ground. The input can be connected to a squat switch, airspeed monitor, or a collective switch. The discrete can be set in the DCM settings to either ground on ground, open on ground, or not used.

- Discrete #4 (pin 30) is used to cancel the audio from a TAWS or Traffic Aural. This Audio Acknowledge discrete is used only when the optional TAWS, TAS, TCAS, or ATAS functionality is configured.

- Discrete #5 (pin 31) is reserved. Release 3.2 and later. Optional connection used to select ARINC 429 Control Panel #1 or #2. When set to Ground, Control Panel #1 is used. When set to Open, Control Panel #2 is used.

- Discrete #6 (pin 32) is used to place the unit's transponder in Standby Mode. This is an optional connection typically used when dual transponders are installed. Release 2.1 and later.

  Note - The remote standby discrete functionality is enabled in the DCM using the MPC on the Settings>Configuration>Misc. page.

A.2.10 Discrete Output

The unit has six discrete outputs are internally set to GND/Open. The GND (active) position illuminates the lamp.

The ground logic state has an output voltage of < 3.0Vdc when sinking 250mA of current. The open logic state has an output impedance of > 100K ohms to ground for voltages applied to the output of 0.0 to 36.0Vdc.

The outputs have the capability of driving a Type 313 lamp. The lamp must have an initial resistance at turn ON (cold) of 28Ω minimum and a steady state ON resistance of 280Ω minimum.

The discretes are dedicated or reserved as stated below:

- Discrete Output #1 (pin 21) is used to indicate that a terrain caution advisory is present.
- Discrete Output #2 (pin 22) is used to indicate that a terrain warning is present.
- Discrete Output #3 (pin 23) is used to indicate Traffic Alert (TA).
- Discrete Output #4 (pin 24) is reserved.
- Discrete Output #5 (pin 25) is connected to other CAWS alerting systems if required (i.e. TAS or TCAS) that need to mute the traffic system for a higher priority audio annunciation (i.e. TAWS). This output will be active when the Audio Mute Input (Discrete Input 2) is active.
- Discrete Output #6 (pin 26) is used to indicate that ADS-B out is not providing ADS-B output data. The lamp has multiple visual cues used to identify operational status.

A.2.11 I²C Serial Bus (Detachable Configuration Module)

The I²C serial bus is used to communicate with the Detachable Configuration Module to store the configuration options set up in the Installation Checkout section using the MPC (MAT).

A.2.12 Antenna Connections

The unit has 5 antenna connections labeled A1 thru A5. All models of the Lynx NGT-9000 are required to have GPS and Omnidirectional (UAT) cable connections (A5 & A3). Models with TAS/TCAS have three cables connecting to A1, A2, and A4. Models with Diversity only (no TAS/TCAS) have one cable connecting to A2.

A.3 PIN DEFINITION SUMMARY

Table A-1: Connector (P1) Pin Assignments

* Signal Functions: I = Signal Input   O = Signal Output   B = Bidirectional Signal   P = Power Input
                       C = Common or Ground   S = Spare Pin   R = Reserved (Do Not Connect)

Pin	Function Name	Type*	Pin	Function Name	Type*
1	+14/28VDC POWER IN 1	P	40	ARINC 429 1 INPUT A (PRES. ALT.)	I
2	+14/28VDC POWER IN 2	P	41	ARINC 429 1 INPUT B (PRES. ALT.)	I
3	+14/28VDC POWER RETURN 1	C	42	ARINC 429 2 INPUT A (AHRS)	I
4	+14/28VDC POWER RETURN 2	C	43	ARINC 429 2 INPUT B (AHRS)	I
5	GILLHAM ALTITUDE ENCODER A1	I	44	RESERVED / (RELEASE 3.2 OR LATER) ARINC 429 3 INPUT A (CONTROL PANEL 1)	R I
6	GILLHAM ALTITUDE ENCODER A2	I	45	RESERVED / (RELEASE 3.2 OR LATER) ARINC 429 3 INPUT B (CONTROL PANEL 1)	R I
7	GILLHAM ALTITUDE ENCODER A4	I	46	ARINC 429 4 INPUT A (CONFIG.) / (RELEASE 3.2 OR LATER) ARINC 429 4 INPUT A (CONTROL PANEL 2)	I I
8	GILLHAM ALTITUDE ENCODER B1	I	47	ARINC 429 4 INPUT B (CONFIG.) / (RELEASE 3.2 OR LATER) ARINC 429 4 INPUT B (CONTROL PANEL 2)	I I
9	GILLHAM ALTITUDE ENCODER B2	I	48	ARINC 429 OUTPUT A (CDTI DIS.) / (RELEASE 3.2 OR LATER) ARINC 429 OUTPUT A (CONTROL PANEL)	O O
10	GILLHAM ALTITUDE ENCODER B4	I	49	ARINC 429 OUTPUT B (CDTI DIS.) / (RELEASE 3.2 OR LATER) ARINC 429 OUTPUT B (CONTROL PANEL)	O O
11	GILLHAM ALTITUDE ENCODER C1	I	50	RS-422 INPUT #1 B (+) (CONFIG.)	I
12	GILLHAM ALTITUDE ENCODER C2	I	51	RS-422 INPUT #1 A (-) (CONFIG.)	I
13	GILLHAM ALTITUDE ENCODER C4	I	52	RS-422 OUTPUT #1 B (+) (CONFIG.)	O
14	GILLHAM ALTITUDE ENCODER D2	I	53	RS-422 OUTPUT #1 A (-) (CONFIG.)	O
15	GILLHAM ALTITUDE ENCODER D4	I	54	SPARE	S
16	GROUND	C	55	SPARE	S
17	I2C DATA LINE	I	56	SPARE	S
18	I2C CLOCK LINE	I	57	SPARE	S
19	3.3V OUTPUT	O	58	SPARE	S
20	3.3V RETURN	C	59	SPARE	S
21	DISC OUT 1 TAWS CAUTION	O	60	RS-232 RX3 (ALT. ENCODER)	I
22	DISC OUT 2 TAWS WARNING	O	61	RS-232 RX1 (CONFIG.)	I
23	TRAFFIC ALERT INDICATOR	O	62	RS-232 TX1 (CONFIG.)	O
24	RESERVED	O	63	RS-232 RX2 (WI-FI DEVICE)	I

Table A-1: Connector (P1) Pin Assignments

* Signal Functions: I = Signal Input   O = Signal Output   B = Bidirectional Signal   P = Power Input
                            C = Common or Ground   S = Spare Pin   R = Reserved (Do Not Connect)

Pin	Function Name	Type*	Pin	Function Name	Type*
25	DISC OUT 5 AUDIO MUTE OUT	O	64	RS-232 TX2 (WI-FI DEVICE)	O
26	ADS-B OUT FAIL INDICATOR	O	65	RS-232 (FACTORY ONLY)	R
27	DISC IN 1 IDENT	I	66	RS-232 (FACTORY ONLY)	R
28	DISC IN 2 AUDIO MUTE	I	67	RS-232 (FACTORY ONLY)	R
29	DISC IN 3 SQUAT / AIR SPEED MONITOR	I	68	RS-232 (FACTORY ONLY)	R
30	DISC IN 4 AUDIO ACKNOWLEDGE	I	69	SPARE	S
31	SPARE (DISC IN 5) / (RELEASE 3.2 OR LATER) DISC IN 5 CONTROL PANEL SELECT	S I	70	SPARE	S
32	RESERVED / (RELEASE 2.1 OR GREATER) DISC IN 6 STANDBY MODE	R I	71	SPARE	S
33	RF SUPPRESSION INPUT	I	72	SPARE	S
34	SPARE	S	73	SPARE	S
35	SPARE	S	74	SPARE	S
36	SPARE	S	75	SPARE	S
37	SPARE	S	76	TCAS PRETRIGGER TEST OUTPUT	R
38	AUDIO OUT 600 OHM H	O	77	XPDR PRETRIGGER TEST OUTPUT	R
39	AUDIO OUT 600 OHM L	C	78	ANT. TOP/BOTTOM TEST OUTPUT	R

A.4 [J1 CONNECTOR]

PIN 1

Signal Name:	PWR_14_28VDC_IN
Signal Function:	+ 14/28 VDC Power IN 1
Electrical Characteristics:	30.0 watts maximum average
Connection:	Aircraft 28V BUS. 22 AWG wire
Comments:	

PIN 2

Signal Name:	PWR_14_28VDC_IN
Signal Function:	+ 14/28 VDC Power IN 2
Electrical Characteristics:	30.0 watts maximum average
Connection:	Aircraft 28V BUS. 22 AWG wire
Comments:	

PIN 3

Signal Name:	Ground
Signal Function:	14/28 V Power Return 1
Electrical Characteristics:	--------
Connection:	Aircraft 14 or 28V Return BUS 22 AWG wire
Comments:	

PIN 4

Signal Name:	Ground
Signal Function:	14/28 V Power Return 2
Electrical Characteristics:	--------
Connection:	Aircraft 14 or 28V Return BUS 22 AWG wire
Comments:	

PIN 5

Signal Name:	ALT_IN_A1
Signal Function:	Gillham Altitude Encoder
Electrical Characteristics:	+30 V input max, < 1 mA sourced per line Frequency: 20 Hz, Source Z: > 10 kΩ per line Max Capacitance: < 20 pF per line
Connection:	See paragraph A.2.4 24 AWG wire
Comments:	

PIN 6

Signal Name:	ALT_IN_A2
Signal Function:	Gillham Altitude Encoder
Electrical Characteristics:	+30 V input max, < 1 mA sourced per line Frequency: 20 Hz, Source Z: > 10 kΩ per line Max Capacitance: < 20 pF per line
Connection:	See paragraph A.2.4 24 AWG wire
Comments:	

PIN 7

Signal Name:	ALT_IN_A4
Signal Function:	Gillham Altitude Encoder
Electrical Characteristics:	+30 V input max, < 1 mA sourced per line Frequency: 20 Hz, Source Z: > 10 kΩ per line Max Capacitance: < 20 pF per line
Connection:	See paragraph A.2.4 24 AWG wire
Comments:	

PIN 8

Signal Name:	ALT_IN_B1
Signal Function:	Gillham Altitude Encoder
Electrical Characteristics:	+30 V input max, < 1 mA sourced per line Frequency: 20 Hz, Source Z: > 10 kΩ per line Max Capacitance: < 20 pF per line
Connection:	See paragraph A.2.4 24 AWG wire
Comments:	

PIN 9

Signal Name:	ALT_IN_B2
Signal Function:	Gillham Altitude Encoder
Electrical Characteristics:	+30 V input max, < 1 mA sourced per line Frequency: 20 Hz, Source Z: > 10 kΩ per line Max Capacitance: < 20 pF per line
Connection:	See paragraph A.2.4 24 AWG wire
Comments:	

PIN 10

Signal Name:	ALT_IN_B4
Signal Function:	Gillham Altitude Encoder
Electrical Characteristics:	+30 V input max, < 1 mA sourced per line Frequency: 20 Hz, Source Z: > 10 kΩ per line Max Capacitance: < 20 pF per line
Connection:	See paragraph A.2.4 24 AWG wire
Comments:	

PIN 11

Signal Name:	ALT_IN_C1
Signal Function:	Gillham Altitude Encoder
Electrical Characteristics:	+30 V input max, < 1 mA sourced per line Frequency: 20 Hz, Source Z: > 10 kΩ per line Max Capacitance: < 20 pF per line
Connection:	See paragraph A.2.4 24 AWG wire
Comments:	

PIN 12

Signal Name:	ALT_IN_C2
Signal Function:	Gillham Altitude Encoder
Electrical Characteristics:	+30 V input max, < 1 mA sourced per line Frequency: 20 Hz, Source Z: > 10 kΩ per line Max Capacitance: < 20 pF per line
Connection:	See paragraph A.2.4 24 AWG wire
Comments:	

PIN 13

Signal Name:	ALT_IN_C4
Signal Function:	Gillham Altitude Encoder
Electrical Characteristics:	+30 V input max, < 1 mA sourced per line Frequency: 20 Hz, Source Z: > 10 kΩ per line Max Capacitance: < 20 pF per line
Connection:	See paragraph A.2.4 24 AWG wire
Comments:	

PIN 14

Signal Name:	ALT_IN_D2
Signal Function:	Gillham Altitude Encoder
Electrical Characteristics:	+30 V input max, < 1 mA sourced per line Frequency: 20 Hz, Source Z: > 10 kΩ per line Max Capacitance: < 20 pF per line
Connection:	Not Connected
Comments:	This input used for high altitude aircraft.

PIN 15

Signal Name:	ALT_IN_D4
Signal Function:	Gillham Altitude Encoder
Electrical Characteristics:	+30 V input max, < 1 mA sourced per line Frequency: 20 Hz, Source Z: > 10 kΩ per line Max Capacitance: < 20 pF per line
Connection:	See paragraph A.2.4 24 AWG wire
Comments:	

PIN 16

Signal Name:	GROUND
Signal Function:	Signal Ground
Electrical Characteristics:	---
Connection:	Ground
Comments:	

PIN 17

Signal Name:	CM SDA
Signal Function:	SDA Serial Data
Electrical Characteristics:	See paragraph A.2.11
Connection:	Detachable Configuration Module – Yellow wire
Comments:	

PIN 18

Signal Name:	CM SCL
Signal Function:	SCL Serial Clock
Electrical Characteristics:	See paragraph A.2.11
Connection:	Detachable Configuration Module – Green wire
Comments:	

PIN 19

Signal Name:	CM 3.3V
Signal Function:	SPWR Serial Power (3.3 Vdc Power), 50ma max
Electrical Characteristics:	See paragraph A.2.11
Connection:	Detachable Configuration Module – Red wire
Comments:	

PIN 20

Signal Name:	CM GND
Signal Function:	SGND Serial Ground
Electrical Characteristics:	See paragraph A.2.11
Connection:	Detachable Configuration Module – Black wire
Comments:	

PIN 21

Signal Name:	DISC_OUT1 (Discrete Output No. 1)
Signal Function:	TAWS Caution
Electrical Characteristics:	GND/Open (GND active) Ground State < 3.0Vdc when sinking 250mA. Open State has an impedance of >100K ohms to ground for voltages applied to the output of 0.0 to 36.0Vdc.
Connection:	Indicator Lamp 24 AWG wire
Comments:	Release 2. See paragraph A.2.10.

PIN 22

Signal Name:	DISC_OUT2 (Discrete Output No. 2)
Signal Function:	TAWS Warning
Electrical Characteristics:	GND/Open (GND active) Ground State < 3.0Vdc when sinking 250mA. Open State has an impedance of >100K ohms to ground for voltages applied to the output of 0.0 to 36.0Vdc.
Connection:	Indicator Lamp 24 AWG wire
Comments:	Release 2. See paragraph A.2.10.

PIN 23

Signal Name:	DISC_OUT3 (Discrete Output No. 3)
Signal Function:	Traffic Alert (TAS, TCAS, or ATAS)
Electrical Characteristics:	GND/Open (GND active) Ground State < 3.0Vdc when sinking 250mA. Open State has an impedance of >100K ohms to ground for voltages applied to the output of 0.0 to 36.0Vdc.
Connection:	Indicator Lamp 24 AWG wire
Comments:	See paragraph A.2.10.

PIN 24

Signal Name:	DISC_OUT4 (Discrete Output No. 4)
Signal Function:	Reserved
Electrical Characteristics:	GND/Open (GND active) Ground State < 3.0Vdc when sinking 250mA. Open State has an impedance of >100K ohms to ground for voltages applied to the output of 0.0 to 36.0Vdc.
Connection:	No Connection
Comments:	See paragraph A.2.10.

PIN 25

Signal Name:	DISC_OUT5 (Discrete Output No. 5)
Signal Function:	Audio Mute Command
Electrical Characteristics:	GND/Open (GND active) Ground State < 3.0Vdc when sinking 250mA. Open State has an impedance of >100K ohms to ground for voltages applied to the output of 0.0 to 36.0Vdc.
Connection:	CAWS System 24 AWG wire
Comments:	Release 2. See paragraph A.2.10.

PIN 26

Signal Name:	DISC_OUT6 (Discrete Output No. 6)
Signal Function:	ADS-B Fail Indicator
Electrical Characteristics:	GND/Open (GND active) Ground State < 3.0Vdc when sinking 250mA. Open State has an impedance of >100K ohms to ground for voltages applied to the output of 0.0 to 36.0Vdc.
Connection:	Indicator Lamp 24 AWG wire
Comments:	See paragraph A.2.10.

PIN 27

Signal Name:	DISC_IN1 (Discrete Input No. 1)
Signal Function:	IDENT
Electrical Characteristics:	GND/Open (GND active) The GND position is typically (depending on configuration options) the active (ON) position. Ground State ≤ 3.5Vdc, Open State ≥ 18Vdc
Connection:	Momentary Switch 24 AWG wire
Comments:	See paragraph A.2.9.

PIN 28

Signal Name:	DISC_IN2 (Discrete Input No. 2)
Signal Function:	Audio Mute
Electrical Characteristics:	GND/Open (GND active) Ground State ≤ 3.5Vdc, Open State ≥ 18Vdc
Connection:	24 AWG wire
Comments:	When active all traffic alerts are suppressed. Connected to other CAWS alerting systems if required (i.e. TAWS) that needs to mute the traffic system for a higher priority audio annunciation. See paragraph A.2.9.

PIN 29

Signal Name:	DISC_IN3 (Discrete Input No. 3)
Signal Function:	WOW (Squat / Air Speed Monitor input/ Collective Switch)
Electrical Characteristics:	DCM selectable for GND active or Open active. Ground State ≤ 3.5Vdc, Open State ≥ 18Vdc
Connection:	On/Off Switch 24 AWG wire
Comments:	See paragraph A.2.9.

PIN 30

Signal Name:	DISC_IN4 (Discrete Input No. 4)
Signal Function:	Audio Acknowledge
Electrical Characteristics:	GND/Open (GND active) Ground State ≤ 3.5Vdc, Open State ≥ 18Vdc
Connection:	Momentary Switch 24 AWG wire
Comments:	Only used when the optional TAWS, TAS, TCAS, or ATAS functionality is configured. See paragraph A.2.9.

PIN 31

Signal Name:	DISC_IN5 (Discrete Input No. 5)
Signal Function:	Spare Release 3.2 - Control Panel Select
Electrical Characteristics:	GND/Open (GND active) Ground State ≤ 3.5Vdc, Open State ≥ 18Vdc Release 3.2 – GND = Control Panel 1, Open = Control Panel 2)
Connection:	No Connection Release 3.2 – Configuration Option. Used on NGT-9000R for dual ARINC 429 control panels.
Comments:	See paragraph A.2.9.

PIN 32

Signal Name:	DISC_IN6 (Discrete Input No. 6)
Signal Function:	Standby Mode
Electrical Characteristics:	GND/Open (GND active) Ground State ≤ 3.5Vdc, Open State ≥ 18Vdc
Connection:	Locking Switch 24 AWG wire
Comments:	Optional. Used to place the unit's transponder in Standby Mode. Available with Release 2.1. See paragraph A.2.9.

PIN 33

Signal Name:	SUPPR_BUS
Signal Function:	RF Suppression Output
Electrical Characteristics:	See paragraph A.2.2
Connection:	Aircraft Suppression Bus 24 AWG twisted shielded wire
Comments:	

PIN 34 thru 37

Signal Name:	Spare
Signal Function:	Spare pin
Electrical Characteristics:	---
Connection:	No Connection
Comments:	

PIN 38

Signal Name:	AUDIO OUT
Signal Function:	Audio Out 600 Ohm H
Electrical Characteristics:	40 milli Watts (RMS) at 1000 Hz into a 600 Ohm audio distribution system.
Connection:	Audio Panel 24 AWG twisted shielded pair wire
Comments:	See paragraph A.2.3

PIN 39

Signal Name:	GROUND
Signal Function:	Audio Out 600 Ohm L
Electrical Characteristics:	Ground
Connection:	Audio Panel 24 AWG twisted shielded pair wire
Comments:	See paragraph A.2.3

PIN 40

Signal Name:	RX1_429A (ARINC 429_1_IN A)
Signal Function:	Pressure Altitude Input ARINC 429

Electrical Characteristics:	Configuration Option:
	  Low Speed ARINC 429 (12.0 to 14.5 kbps)
	  High Speed ARINC 429 (100 kbps)

Connection:	24 AWG twisted shielded pair wire
Comments:	See paragraph A.2.7.

PIN 41

Signal Name:	RX1_429B (ARINC 429_1_IN B)
Signal Function:	Pressure Altitude Input ARINC 429

Electrical Characteristics:	Configuration Option:
	  Low Speed ARINC 429 (12.0 to 14.5 kbps)
	  High Speed ARINC 429 (100 kbps)

Connection:	24 AWG twisted shielded pair wire
Comments:	See paragraph A.2.7.

PIN 42

Signal Name:	RX2_429A (ARINC 429_2_IN A)
Signal Function:	AHRS Input ARINC 429

Electrical Characteristics:	Configuration Option:
	  Low Speed ARINC 429 (12.0 to 14.5 kbps)
	  High Speed ARINC 429 (100 kbps)
	  Combo Bus

Connection:	24 AWG twisted shielded pair wire
Comments:	See paragraph A.2.7.

PIN 43

Signal Name:	RX2_429B (ARINC 429_2_IN B)
Signal Function:	AHRS Input ARINC 429

Electrical Characteristics:	Configuration Option:
	  Low Speed ARINC 429 (12.0 to 14.5 kbps)
	  High Speed ARINC 429 (100 kbps)
	  Combo Bus

Connection:	24 AWG twisted shielded pair wire
Comments:	See paragraph A.2.7.

PIN 44

Signal Name:	RX3_429A (ARINC 429_3_IN A)
Signal Function:	Reserved Release 3.2 and later - ARINC 429 3 Input A (Control Panel 1 –– Front or Left).

Electrical Characteristics:	Configuration Option:
	  Low Speed ARINC 429 (12.0 to 14.5 kbps)
	  High Speed ARINC 429 (100 kbps)
	Release 3.2 – Configuration Option. Used on NGT-9000R for dual ARINC 429 Control Panel.
	Data speed is low

Connection:	24 AWG twisted shielded pair wire
Comments:	See paragraph A.2.7.

PIN 45

Signal Name:	RX3_429B (ARINC 429_3_IN B)
Signal Function:	Reserved Release 3.2 and later - ARINC 429 3 Input B (Control Panel 1 –– Front or Left).

Electrical Characteristics:	Configuration Option:
	  Low Speed ARINC 429 (12.0 to 14.5 kbps)
	  High Speed ARINC 429 (100 kbps)
	Release 3.2 – Configuration Option. Used on NGT-9000R for dual ARINC 429 Control Panel.
	Data speed is low

Connection:	24 AWG twisted shielded pair wire
Comments:	See paragraph A.2.7.

PIN 46

Signal Name:	RX4_429A (ARINC 429_4_IN A)
Signal Function:	Configurable - Combo Bus 429 #2 Release 3.2 and later - ARINC 429 4 Input A (Control Panel 2 – Aft or Right)

Electrical Characteristics:	Configuration Option:
	  Release 3.2 and later: Low Speed ARINC 429 (12.0 to 14.5 kbps) only.
	  High Speed ARINC 429 (100 kbps). Release 3.1 or earlier.
	Release 3.2 – Configuration Option. Used on NGT-9000R for dual ARINC 429 Control Panel 2.

Connection:	24 AWG twisted shielded pair wire
Comments:	See paragraph A.2.7.

PIN 47

Signal Name:	RX4_429B (ARINC 429_4_IN B)
Signal Function:	Configurable - Combo Bus 429 #2 Release 3.2 and later - ARINC 429 4 Input B (Control Panel 2 – Aft or Right)

Electrical Characteristics:	Configuration Option:
	  Release 3.2 and later: Low Speed ARINC 429 (12.0 to 14.5 kbps) only.
	  High Speed ARINC 429 (100 kbps). Release 3.1 or earlier.
	Release 3.2 – Configuration Option. Used on NGT-9000R for dual ARINC 429 Control Panel 2.

Connection:	24 AWG twisted shielded pair wire
Comments:	See paragraph A.2.7.

PIN 48

Signal Name:	TX_429A (ARINC 429_OUT A)
Signal Function:	ARINC 429 Output for CDTI display Release 3.2 and later - ARINC 429 Output A (Control Panel 1)
Electrical Characteristics:	High Speed ARINC 429 (100 kbps) L-3 Sky-497 STIF format (config option) Control Panel (Release 3.2 config option) Used on NGT-9000R for dual ARINC 429 Control Panel.
Connection:	24 AWG twisted shielded pair wire
Comments:	See paragraph A.2.8

PIN 49

Signal Name:	TX_429B (ARINC 429_OUT B)
Signal Function:	ARINC 429 Output for CDTI display Release 3.2 and later - ARINC 429 Output B (Control Panel 1)
Electrical Characteristics:	High Speed ARINC 429 (100 kbps) L-3 Sky-497 STIF format (config option) Control Panel (Release 3.2 config option) Used on NGT-9000R for dual ARINC 429 Control Panel.
Connection:	24 AWG twisted shielded pair wire
Comments:	See paragraph A.2.8

PIN 50

Signal Name:	RS422_RXB (+) (non-inverting)
Signal Function:	RS-422 Input # 1
Electrical Characteristics:	Data bits 8, Parity none, Stop bit 1, Start bit 1, Data format is ASCII, Flow control is none. Baud Rate: (configuration option) 38400, 57600, or 115200. Depending on the equipment manufacturer
Connection:	Optional. 24 AWG twisted shielded pair wire
Comments:	See paragraph A.2.6

PIN 51

Signal Name:	RS422_RXA (-) (inverting)
Signal Function:	RS-422 Input # 1
Electrical Characteristics:	Data bits 8, Parity none, Stop bit 1, Start bit 1, Data format is ASCII, Flow control is none. Baud Rate: (configuration option) 38400, 57600, or 115200. Depending on the equipment manufacturer
Connection:	Optional. 24 AWG twisted shielded pair wire
Comments:	See paragraph A.2.6

PIN 52

Signal Name:	RS422_TXB (+) (non-inverting)
Signal Function:	RS-422 Output # 1
Electrical Characteristics:	Data bits 8, Parity none, Stop bit 1, Start bit 1, Data format is ASCII, Flow control is none. Baud Rate: (configuration option) 38400, 57600, or 115200. Depending on the equipment manufacturer
Connection:	Optional. 24 AWG twisted shielded pair wire
Comments:	See paragraph A.2.6

PIN 53

Signal Name:	RS422_TXA (-) (inverting)
Signal Function:	RS-422 Output # 1
Electrical Characteristics:	Data bits 8, Parity none, Stop bit 1, Start bit 1, Data format is ASCII, Flow control is none. Baud Rate: (configuration option) 38400, 57600, or 115200. Depending on the equipment manufacturer
Connection:	Optional. 24 AWG twisted shielded pair wire
Comments:	See paragraph A.2.6

PIN 54 thru PIN 59

Signal Name:	Spare
Signal Function:	Spare pin
Electrical Characteristics:	---
Connection:	No Connection
Comments:	

PIN 60

Signal Name:	RS232_RX3
Signal Function:	Altitude Encoder RS-232 RX (Encoder Input)
Electrical Characteristics:	Data bits (configuration option) 7 or 8, Parity none, Stop bit 1, Start bit 1, Data format is ASCII, Flow control is none. Baud Rate: (configuration option) 1200, 2400, 4800, 9600, 12000, 19200, 28800, 38400, 57600, or 115200 bps. Depending on the equipment manufacturer and selected in the DCM.
Connection:	Optional. 24 AWG twisted shielded pair wire
Comments:	See paragraph A.2.5.2

PIN 61

Signal Name:	RS232_RX1
Signal Function:	RS-232 Input #1
Electrical Characteristics:	Data bits 8, Parity none, Stop bit 1, Start bit 1, Data format is ASCII, Flow control is none. Baud Rate: 1200 bps.
Connection:	CP-2500 or other serial RS-232 controller (Remote Mount Lynx NGT-9000R only). 24 AWG twisted shielded pair wire
Comments:	See paragraph A.2.5.2

PIN 62

Signal Name:	RS232_TX1
Signal Function:	RS-232 Output #1
Electrical Characteristics:	Data bits 8, Parity none, Stop bit 1, Start bit 1, Data format is ASCII, Flow control is none. Baud Rate: 1200 bps.
Connection:	CP-2500 or other serial RS-232 controller (Remote Mount Lynx NGT-9000R only). 24 AWG twisted shielded pair wire
Comments:	See paragraph A.2.5.2

PIN 63

Signal Name:	RS232_RX2
Signal Function:	RS-232 Input #2 (Wi-Fi Device)
Electrical Characteristics:	Data bits 8, Parity none, Stop bit 1, Start bit 1, Data format is ASCII, Flow control is none. Baud Rate: 115200 bps.
Connection:	Optional. 24 AWG twisted shielded pair wire
Comments:	See paragraph A.2.5.1

PIN 64

Signal Name:	RS232_TX2
Signal Function:	RS-232 Output #2 (Wi-Fi Device)
Electrical Characteristics:	Data bits 8, Parity none, Stop bit 1, Start bit 1, Data format is ASCII, Flow control is none. Baud Rate: 115200 bps.
Connection:	Optional. 24 AWG twisted shielded pair wire
Comments:	See paragraph A.2.5.1

PIN 65 thru 68

Signal Name:	RESERVED
Signal Function:	RS-232 (Factory Only)
Electrical Characteristics:	---
Connection:	No Connection
Comments:	

PIN 69 thru PIN 75

Signal Name:	Spare
Signal Function:	Spare pin
Electrical Characteristics:	---
Connection:	No Connection
Comments:	

PIN 76 thru PIN 78

Signal Name:	RESERVED
Signal Function:	test output
Electrical Characteristics:	---
Connection:	No Connection
Comments:	FACTORY ONLY

Appendix   B
Environmental Qualification Form

B.1 INTRODUCTION

This appendix includes the environmental qualifications form required for the Lynx NGT-9000, Detachable Configuration Module, NY156, and NY164 Directional Antenna.

B.2 LYNX NGT-9000 ENVIRONMENTAL QUALIFICATION FORM

PRODUCT DESCRIPTION:	Multilink Surveillance System Panel Mount	Multilink Surveillance System Remote Mount
TYPE DESIGNATION:	NGT-9000D Release 1, 1.1 (HW) Release 1, 2, or 3 (SW)	NGT-9000RD Release 1, 1.2 (HW) Release 1, 2, or 3 (SW)
MODEL:	NGT-9000, NGT-9000+, NGT-9000D, NGT-9000D+	NGT-9000R, NGT-9000R+, NGT-9000RD, NGT-9000RD+
HARDWARE PART NO.:	9029000-20000	9029000-40000
MANUFACTURER:	Aviation Communication and Surveillance Systems	
ADDRESS:	ACSS 19810 N. 7th Avenue Phoenix, AZ 85027-4741	

PRODUCT DESCRIPTION::	Detachable Configuration Module
PART NUMBERS:	9230-17003-01
MANUFACTURER:	Aviation Communication and Surveillance Systems
ADDRESS:	ACSS 19810 N. 7th Avenue Phoenix, AZ 85027-4741

	DESCRIPTION	SECT. NO.	CAT.	DESCRIPTION
Temperature and Altitude	Low Temperature	4.5.1 4.5.2	A1/F1	Panel Mount: -20° C Operating -40° C Short Time Operating. -55° C Ground Survival
			B2	Remote Mount: -45° C Operating -45° C Short Time Operating. -55° C Ground Survival
	High Temperature	4.5.3 4.5.4	A1/F1	Panel Mount: +55° C Operating +70° C Short Time Operating +85° C Ground Survival
			B2	Remote Mount: +70° C Operating +70° C Short Time Operating +85° C Ground Survival
	In-Flight Loss of Cooling	4.5.5	X	Not Applicable, Not Tested. External Cooling Not Required
	Altitude	4.6.1	A1/F1	Tested to 55,000 ft. Maximum Operating Altitude
	Decompression	4.6.2	A1/F1	8,000 ft. to 55,000 ft.

DESCRIPTION		SECT. NO.	CAT.	DESCRIPTION
	Overpressure	4.6.3	A1/F1	-15,000 ft.
Temperature Variation		5.3.1	B	5° C/min Non-controlled temperature, Equipment mounted internal in aircraft
Humidity		6.3.1	A	Standard Humidity Environment
Operational Shocks and Crash Safety	Operational Shocks	7.2	B	3 shocks of 6g in both directions of the three orthogonal axes.
	Crash Safety	7.3	B	One 20g Impulse shock in both directions of each orthogonal axis for a total of 6 shocks. Sustained Aircraft Type 5 (Helicopter and All Fixed-Wing) Test Type R (Random Orientation)
Vibration		8	S	Panel Mount: Fixed Wing, Curve M, Sine Remote Mount: Assuming Fuse Mount: Cat S, Curve L
			R	Panel Mount: Robust Fixed Wing, Curves B & B1, Random Remote Mount: Curve C/C1
			U2	Rotorcraft, Curve F and F1
Explosive Atmosphere		9	X	Not Applicable, Not Tested.
Waterproofness		10	X	Not Applicable, Not Tested.
Fluids Susceptibility		11	X	Not Applicable, Not Tested.
Sand and Dust		12	X	Not Applicable, Not Tested.
Fungus Resistance		13	X	Not Applicable, Not Tested.
Salt Spray		14	X	Not Applicable, Not Tested.
Magnetic Effect		15	Z	<0.3m for deflection of D_c.
Power Input		16	BXX	14V and 28V DC inputs
Voltage Spike		17	A	Aircraft Power 28V (no Mod) or Aircraft Power 14V with HW Mod A (see SB9029000-3): 600 V/2 μs from 50 Ω source impedance
			X	Aircraft Power 14V (without HW Mod A): Not Applicable, Not Tested.

DESCRIPTION	SECT. NO.	CAT.	DESCRIPTION
Audio Frequency Conducted Susceptibility	18	Z	Engine driven alternator / generator with battery.
Induced Signal Susceptibility	19	ZC	Interference free operation
RF Susceptibility (Radiated and Conducted)	20	TT	Conducted Susceptibility: 10KHz to 400MHz, 7.5mA CW & SW modulation Radiated Susceptibility: 100MHz to 8GHz, 5V/m CW & SW modulation
Emission of RF Energy	21	M	Interference free operation

Lightning Induced Transient Susceptibility	22	A3J3L3	A3: Pin Injection Waveform Tests:
			 Waveform 3 600 VOC/24 ISC
			 Waveform 4 300 VOC/60 ISC
			 J3: Cable Bundle Single Stroke:
			 Waveform 1 300 VT/600IL
			 Waveform 3 600 VT/120IL
			 J3: Cable Bundle Multiple Stroke:
			 Waveform 1
			   First Stroke 300 VL/600 IL
			   Sub Strokes 150 VL/150IT
			 Waveform 3
			   First Stroke 600 VL/120 IL
			   Sub Strokes 300 VL/60IL
			 L3: Cable Bundle Multiple Burst:
			 Waveform 3: 360 VT/6IL

Lightning Direct Effects	23	X	Not Applicable, Not Tested.
Icing	24	X	Not Applicable, Not Tested.
Electro Static Discharge	25	A	15 kv/330 Ω/150pf
Fire, Flammability	26	X	
Other Tests			None

B.3 NY156 & NY164 ENVIRONMENTAL QUALIFICATION FORM

MANUFACTURER: Sensor Systems, Inc.
ADDRESS: 8929 Fullbright Ave., Chatsworth, CA 91311 USA (818) 341-5366
APPLICABLE SPEC. NO.:
REVISION & CHANGE NUMBER OF DO-160: C

PRODUCT DESCRIPTION: Antenna
MODEL: NY156   NY164
L3 PART NUMBERS: 805-10003-001 805-10890-001
SENSOR SYSTEM PART NUMBERS: S72-1744   S72-1746

CONDITIONS	SECTION	TEST DESCRIPTION
Temperature and Altitude	4.0	Equipment tested to Categories F2.
Low Temperature	4.5.1	-55º Degrees Celsius
High Temperature	4.5.2 & 4.5.3	+70º Degrees Celsius
In-Flight Loss of Cooling	4.5.4	- Not Applicable -
Altitude	4.6.1	55,000 Feet
Decompression	4.6.2	- Not Applicable -
Overpressure	4.6.3	- Not Applicable -
Temperature Variation	5.0	Equipment tested to Category A.
Humidity	6.0	Equipment tested to Category C.
Operational Shock and Crash Safety	7.0	Operation and Crash
Vibration	8.0	Equipment tested to Category C, L, M, and Y.
Explosion	9.0	Category X - No test performed.
Waterproofness	10.0	Equipment tested to Category S.
Fluids Susceptibility	11.0	Equipment tested to Category F.
Sand and Dust	12.0	Equipment tested to Category D.
Fungus	13.0	Equipment tested to Category F.
Salt Spray	14.0	Equipment tested to Category S.
Magnetic Effect	15.0	Category X - No test performed.
Power Input	16.0	Category X - No test performed.
Voltage Spike	17.0	Category X - No test performed.
Audio Frequency Susceptibility	18.0	Category X - No test performed.
Induced Signal Susceptibility	19.0	Category X - No test performed.
Radio Frequency Susceptibility	20.0	Category X - No test performed.
Radio Frequency Emission	21.0	Category X - No test performed.
Lightning Induced Transient Susceptibility	22.0	Equipment tested to Category L.
Lightning Direct Effects	23.0	Equipment tested to Category 2A.
Icing	24.0	Category X - No test performed.
Other Tests		No test required

Appendix C
Equipment Compatibility and Diagrams

C.1 INTRODUCTION

This information should be used in conjunction with the primary interconnect drawing in the installation section of this manual, as well as the display and equipment manufacturers installation instructions in the applicable installation manual. Refer to Section 1 – Paragraph 1.11 for details on the equipment listed in this appendix.

C.2 TRAFFIC DISPLAYS

MANUFACTURER	MODEL	DATA FORMAT	NOTES
Aspen	EFD1000 PFD EFD1000 MFD EFD500 MFD See Figure C-1	RS-422 RS-232	SW Version MAP SW 2.8.1 or later IOP SW2.0.5 or later 910-00001-XXX (except -004) (Set RS-422 Baud Rate on MPC (MAT) for 115200)
Avidyne	IFD-4xx / 5xx See Figure C-6	RS-232	SW 10.2.0.0 [3] SW 10.2.x [4]
Avidyne	EX5000 Figure C-9	ARINC 429	SW 8.2 or later
Bendix/King	KMD 550/850 [2] See Figure C-7	ARINC 429	SW Version – 02/02
Garmin	GMX 200 [1] With Traffic I/O See Figure C-2	RS-422 ARINC 429	SW Version 2.13 If Traffic I/O is installed, either the RS-422 or ARINC 429 may be used for display of traffic.
Garmin	MX 20 [1] With Traffic I/O See Figure C-2	RS-422 ARINC 429	SW Version– 5.7 If Traffic I/O is installed, either the RS-422 or ARINC 429 may be used for display of traffic.
Garmin [5]	GNS 430W/530W GNS 430/530 See Figure C-3	ARINC 429	(Standard traffic only.) 5.0 GPS SW / Version 5.10
Garmin [5]	G500/600 See Figure C-4	ARINC 429	(Standard traffic only) GDU-620 Version 6.11 FPGA and I/O Version – 2.1
Garmin [5]	GTN 650/750 See Figure C-5	ARINC 429	(Standard traffic only) 4.0 GPS / SW Version – 5.0 6.11 GPS / SW Version – 5.0
Genesys	IDU-450 IDU-680 See Figure C-8	RS-422	EFIS Version 8.0F and later

Note:

(1) If Traffic I/O is installed, either the RS-422 or ARINC 429 may be used for display of traffic.

(2) Requires either ATAS, TAS or TCAS enabled in order to be compatible.

(3) An Aspen display and the IFD-4xx / 5xx Software level 10.2.1 or higher can both be connected to the NGT-9000.

(4) The IFD-4xx / 5xx RS232 in setting of Capstone HS Trfc+Wx is 115.2 Kb rate compatible with the Aspen. Versions earlier than 10.2.1 support 38.4 Kb only. Wiring is RS-422 output from NGT-9000 to an RS-232 input on the IFD-4xx/5xx.

(5) No weather is displayed on Garmin displays.

C.3   WEATHER DISPLAYS

MANUFACTURER	MODEL	DATA FORMAT	NOTES
Aspen	EFD1000 PFD [1] EFD1000 MFD EFD500 MFD See Figure C-1	RS-422 / RS-232	SW Version MAP SW 2.8.1 or later IOP SW2.0.5 or later 910-00001-XXX (except -004, used on Pt23 Class 3 aircraft) (EFD1000 PFD only - displays graphical weather and does not display textural weather.)
Avidyne	IFD-4xx / 5xx See Figure C-6	RS-232	SW 10.2.x [2] [3]
Avidyne	EX5000 Figure C-9	RS-422 / RS-232	SW 8.2 or later
Garmin	MX 20 See Figure C-2	RS-422	SW Version– 5.7
Garmin	GMX 200 See Figure C-2	RS-422	SW Version 2.13
Genesys	IDU-450 / 680 See Figure C-8	RS-422	EFIS Version 8.x

Notes:

(1) PFD only displays graphical weather and does not display textural weather.

(2) An Aspen display and the IFD-4xx / 5xx Software level 10.2.1 or higher can both be connected to the NGT-9000.

(3) The IFD-4xx / 5xx RS232 in setting of Capstone HS Trfc+Wx is 115.2 Kb rate compatible with the Aspen. Versions earlier than 10.2.1 support 38.4 Kb only. Wiring is RS-422 output from NGT-9000 to an RS-232 input on the IFD-4xx/5xx.

Figure C-1: Interconnect Wiring Diagram for Aspen EFD1000 & EFD500
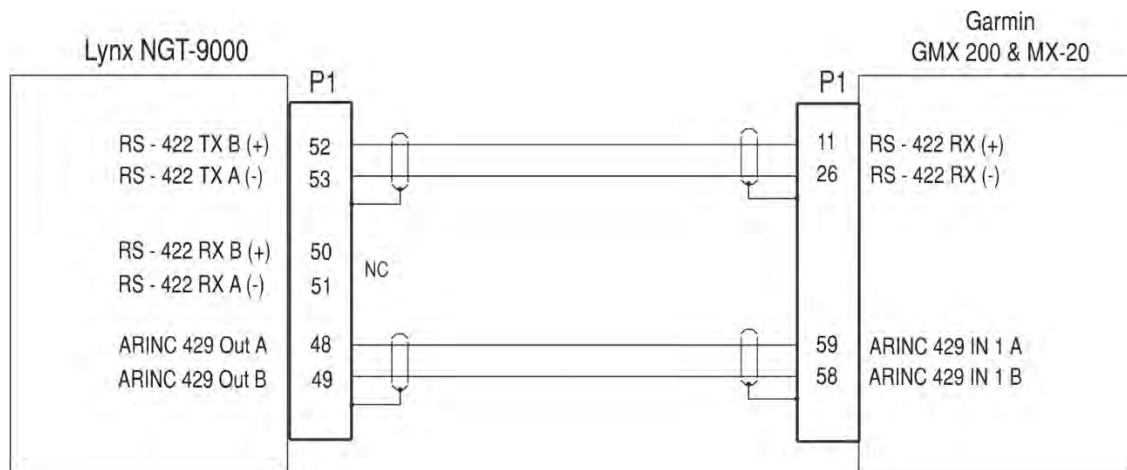
Note – The RS-422 (pin 52 & 53) must be set to a baud rate of 38,400.

Figure C-2: Interconnect Wiring Diagram for Garmin GMX200 and MX-20

Figure C-3: Interconnect Wiring Diagram for Garmin GNS 430 / 430W / 530 / 530W

Figure C-4: Interconnect Wiring Diagram for Garmin G500/600

Figure C-5: Interconnect Wiring Diagram for Garmin GTN 650/750

Note:
(1) An Aspen display and the IFD4xx/5xx Software level 10.2.1 or higher can both be connected to the NGT-9000.

(2) The IFD4xx/5xx RS232 in setting of Capstone HS Trfc+Wx is 115.2 Kb rate compatible with the Aspen.
Versions earlier than 10.2.1 support 38.4 Kb only. Wiring is RS-422
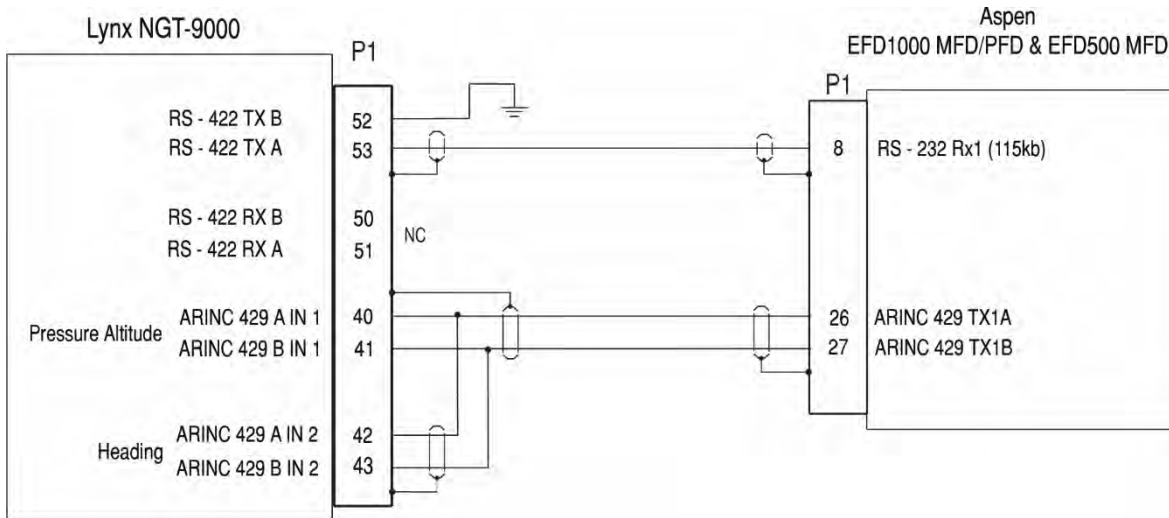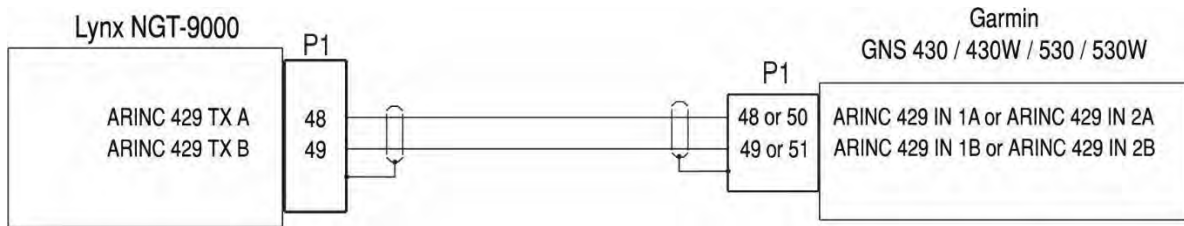output from NGT-9000 to an RS-232 input on the IFD-4xx/5xx.

Figure C-6: Interconnect Wiring Diagram for Avidyne IFD-4xx / 5xx
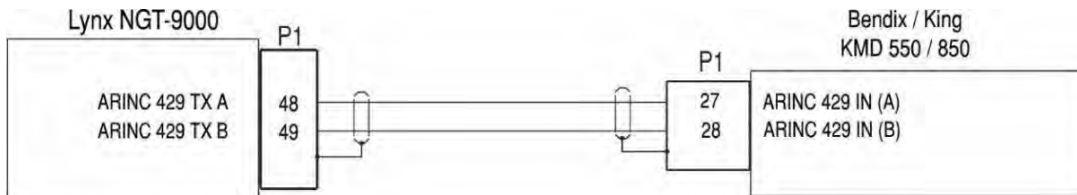
Note:
(1) Set Traffic Display ARINC Format to TIF (STIF)

Figure C-7: Interconnect Wiring Diagram for Bendix/King KMD 550/850
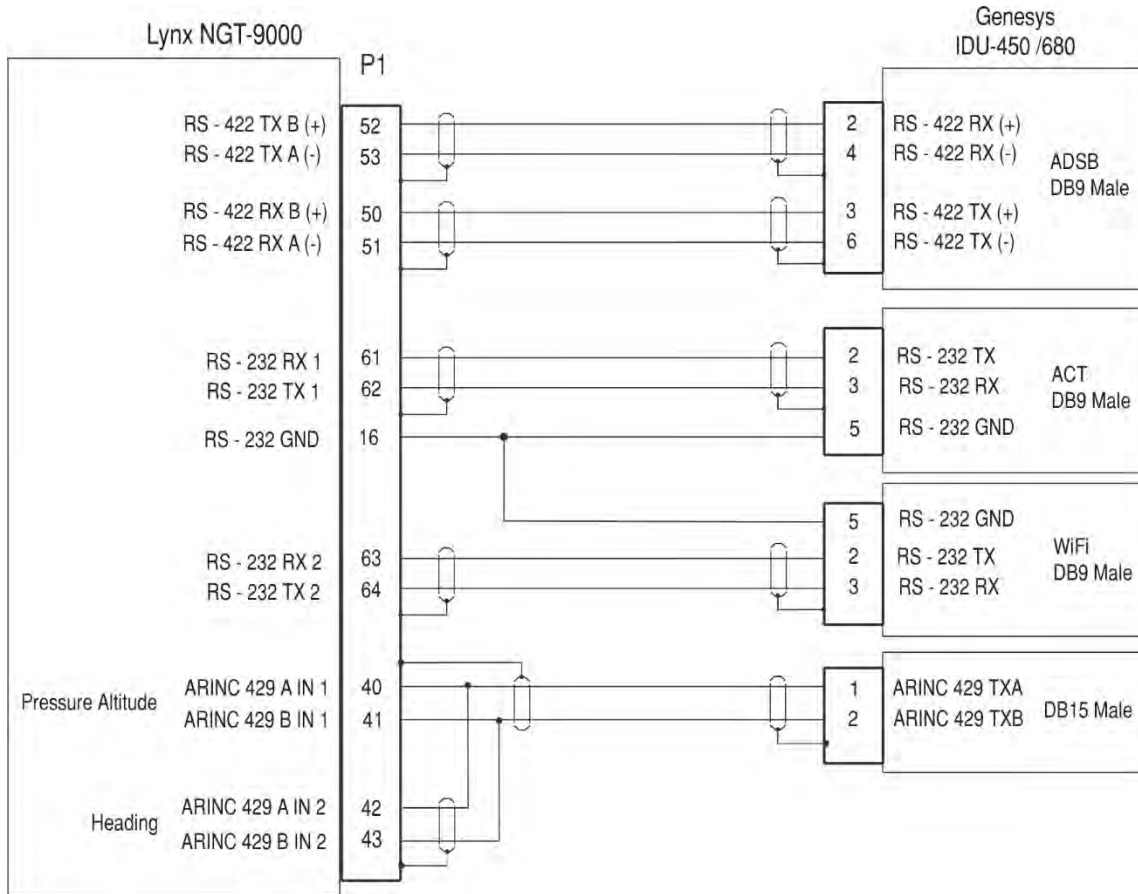
Figure C-8: Interconnect Wiring Diagram for Genesys IDU-450 / IDU-680
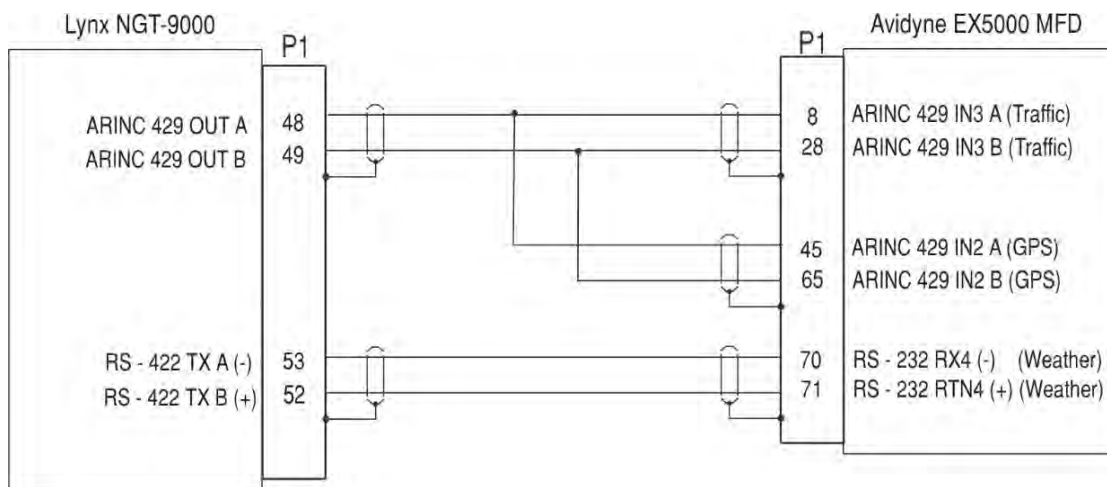
Figure C-9: Interconnect Wiring Diagram for Avidyne EX5000

C.4 CONTROL PANEL

MANUFACTURER	MODEL	DESCRIPTION	SW VERSION	COMPATIBLE
ACSS	CP-2500 (9080-17250-01) See Figure C-10	2 1/4-inch bezel Data Format RS-232	FW Rev 09. HW Rev 01	Compatible with NGT-9000R Release 1.1.
ACSS	CP-2500 (9080-17250-02) See Figure C-10	2 1/4-inch bezel Data Format RS-232	FW Rev 15 & 16. HW Rev 01	Compatible with NGT-9000R Release 2.0, 2.1, 3.0, 3.1 & 3.2.
ACSS	CP-2500 (9080-17250-02) See Figure C-10 [(1)]	2 1/4-inch bezel Data Format RS-232	FW Rev 17 or greater. HW Rev 01	Compatible with NGT-9000R Release 2.0, 2.1, 3.0, 3.1 & 3.2.
ACSS	CP-2500 (9080-17250-12) See Figure C-10 [(1)]	3 1/8-inch bezel Data Format RS-232	FW Rev 15 & 16 HW Rev 01	Compatible with NGT-9000R Release 2.0, 2.1, 3.0, 3.1 & 3.2.
ACSS	CP-2500 (9080-17250-12) See Figure C-10	3 1/8-inch bezel Data Format RS-232	FW Rev 17 or greater. HW Rev 01	Compatible with NGT-9000R Release 2.0, 2.1, 3.0, 3.1 & 3.2.
Cobham	RMS-555 See Figure C-12	Data Format ARINC 429		Compatible with NGT-9000R Release 3.2.

Notes:

(1)   See Figure C-11 for dual NGT-9000 interconnect wiring diagram.

(2)   The remote standby discrete functionality is enabled in the DCM using the MPC on the Settings>Configuration>Misc. page.
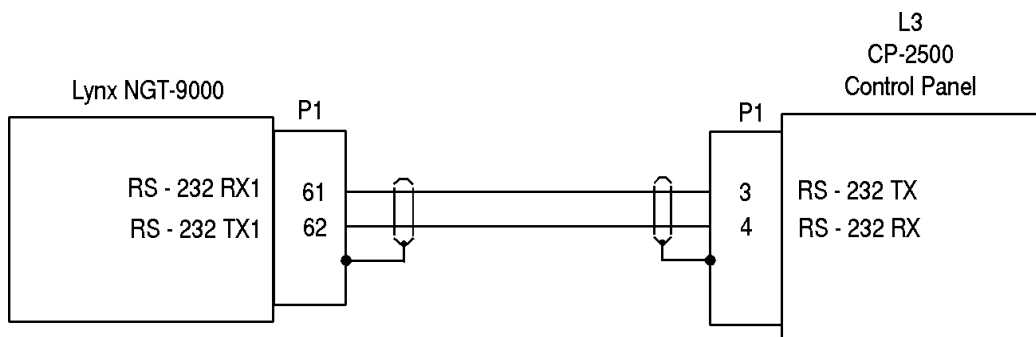
Figure C-10: Interconnect Wiring Diagram for CP-2500
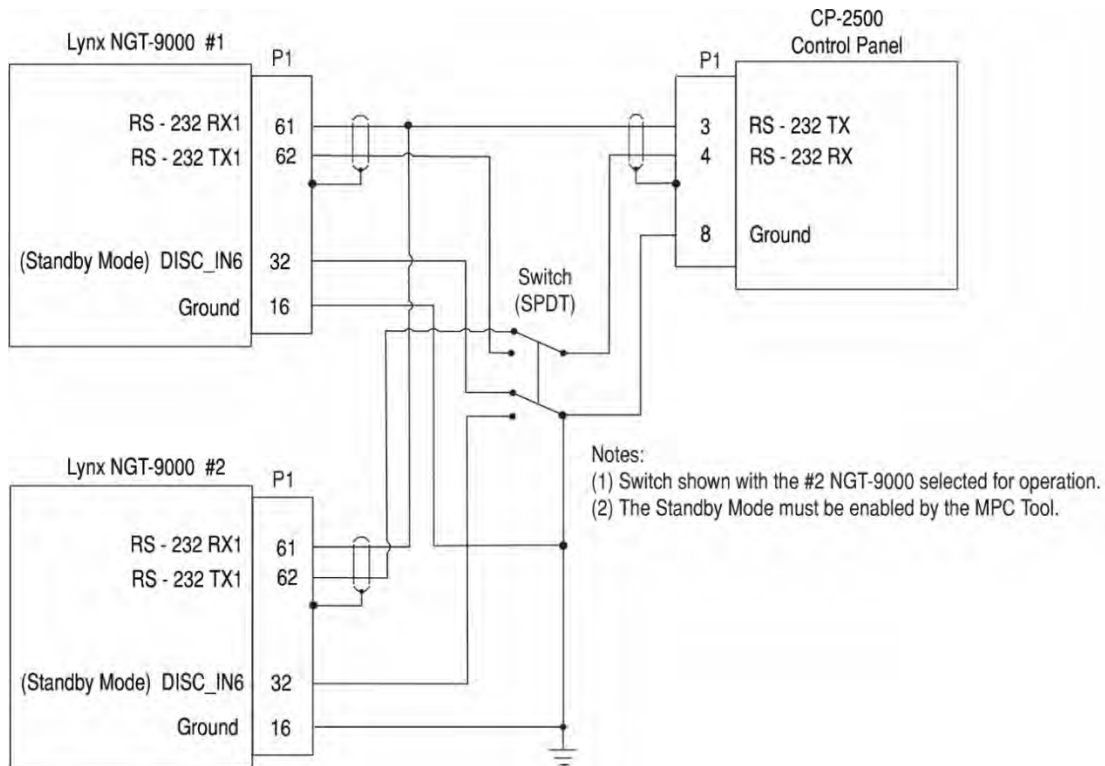
Figure C-11: Interconnect Wiring Diagram for CP-2500 with Dual NGT-9000
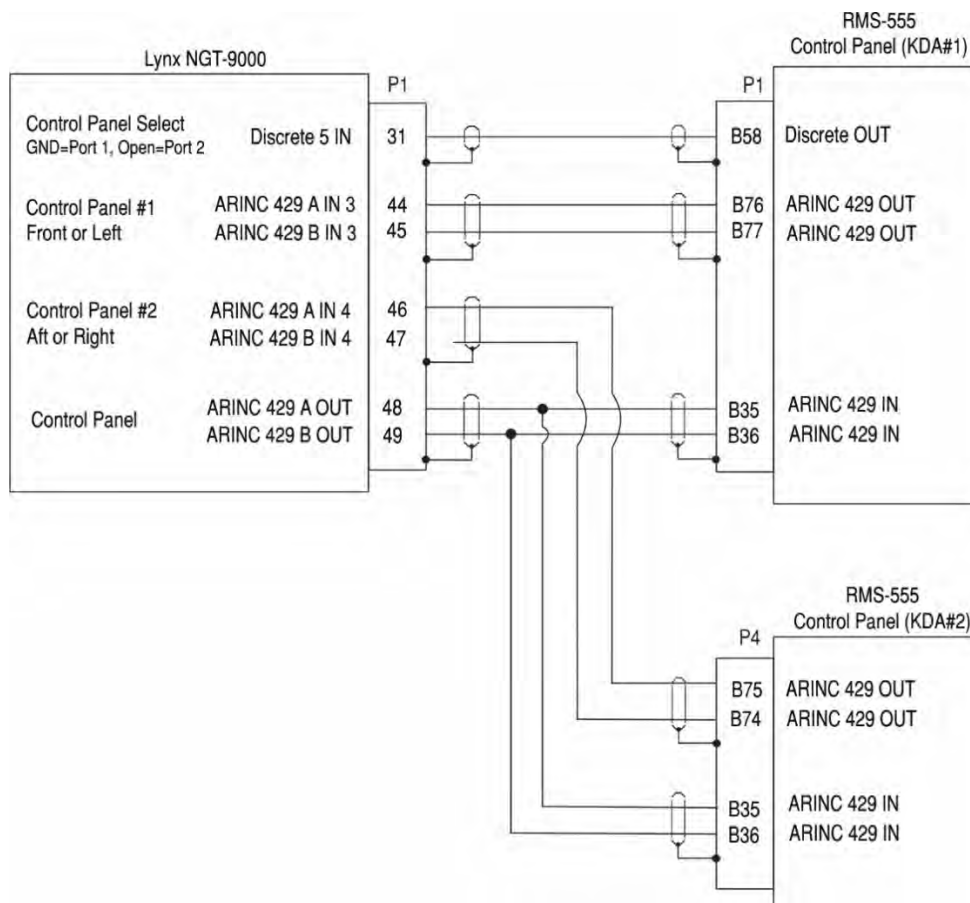
Figure C-12: Interconnect Wiring Diagram for RMS-555

C.5   GPS SPLITTER & COUPLER

MANUFACTURER	MODEL	DESCRIPTION	NOTES
GPS Networking	LDCBS1x2N LDCBS1x2T See Figure C-13	GPS Splitter (TNC) (Type N)	Passive with one DC blocked.
AeroAntenna Technology, Inc	PD2ORG See Figure C-14	GPS Coupler	Coupler that will utilize DC from either output source.

NOTE

When using an existing GPS antenna to a navigation system, the recommendation is to use the splitter. The original source navigation system is maintained by using the splitter and connecting the NGT-9000 to the DC blocked input, preventing the NGT-9000 from powering the antenna. When sharing an antenna between two Lynx units, the GPS Coupler is recommended, so that the antenna remains powered should one of the dual install units fail.
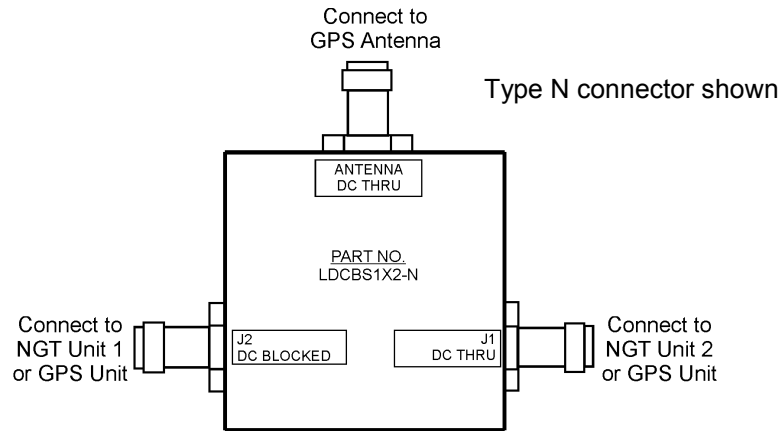
Figure C-13: GPS Splitter Connection Diagram
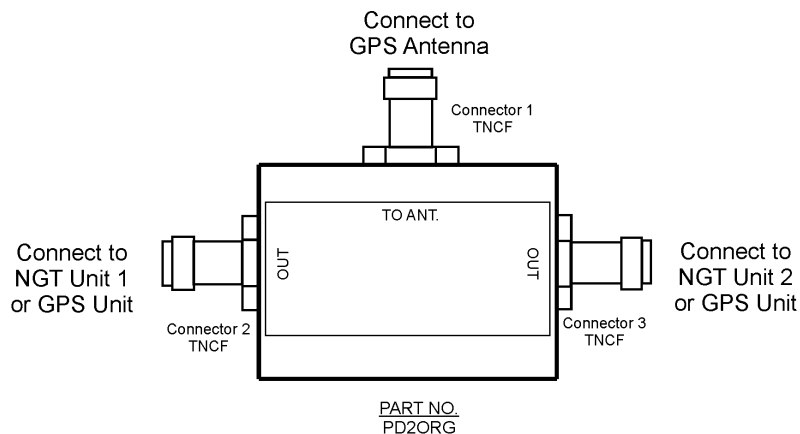
Figure C-14: GPS Coupler Connection Diagram

C.6   WX-500 (STORMSCOPE)

MANUFACTURER	MODEL	DATA FORMAT	NOTES
L3 Aviation Products	WX-500 P/N 805-11500-001	RS-232 See Figure C-15 Or RS-422 See Figure C-16	Stormscope Series II Weather Mapping System When interfacing the NGT-9000 to the WX-500, the system must be wired so that the NGT-9000 is the master/sole controller for the WX-500.
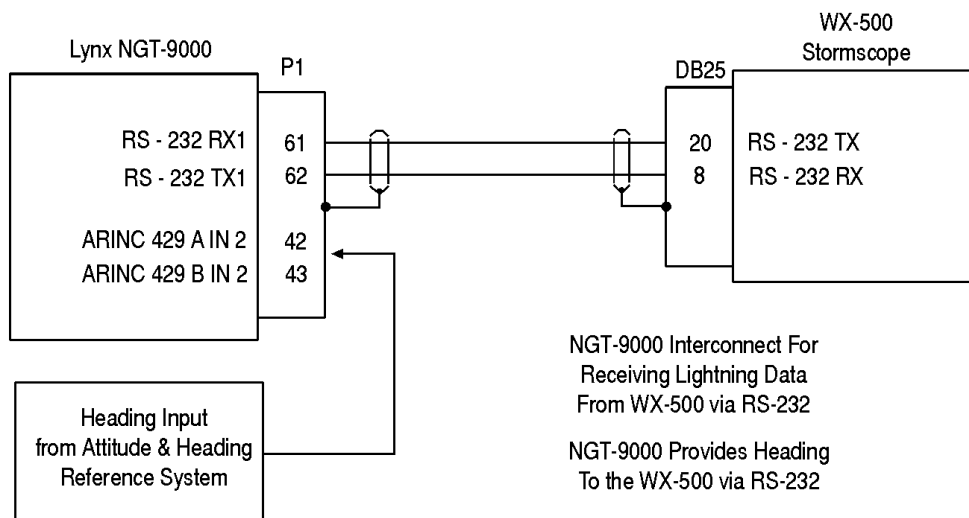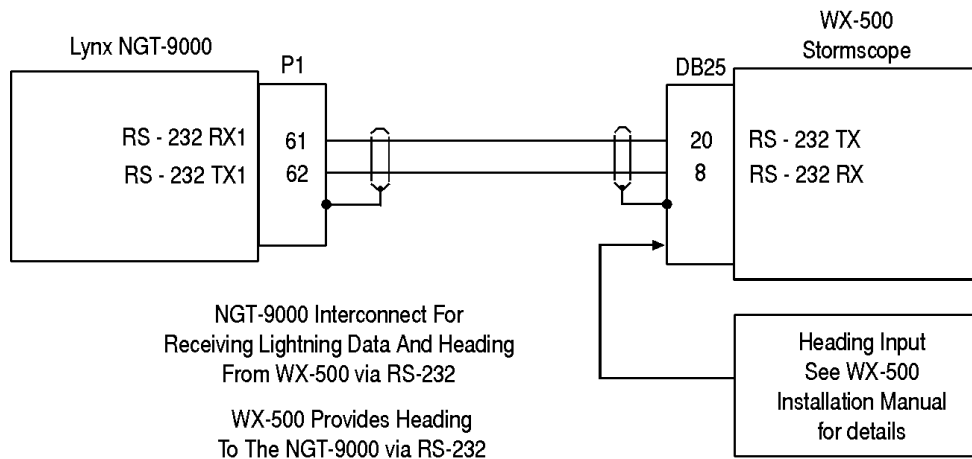
Figure C-15: Interconnect Wiring Diagrams for WX-500 (RS-232)

Lynx NGT-9000

RS - 422 TX B	52
RS - 422 TX A	53
RS - 422 RX B	50
RS - 422 RX A	51
ARINC 429 A IN 2	42
ARINC 429 B IN 2	43

P1

WX-500 Stormscope

DB25

24	RS - 422 RX +
12	RS - 422 RX -
25	RS - 422 TX +
13	RS - 422 TX -

Heading Input from Attitude & Heading Reference System

NGT-9000 Interconnect For Receiving Lightning Data From WX-500 via RS-422

NGT-9000 Provides Heading To the WX-500 via RS-422

Lynx NGT-9000

RS - 422 TX B	52
RS - 422 TX A	53
RS - 422 RX B	50
RS - 422 RX A	51

P1

WX-500 Stormscope

DB25

24	RS - 422 RX +
12	RS - 422 RX -
25	RS - 422 TX +
13	RS - 422 TX -

NGT-9000 Interconnect For Receiving Lightning Data And Heading From WX-500 via RS-422

WX-500 Provides Heading To The NGT-9000 via RS-422

Heading Input See WX-500 Installation Manual for details

Figure C-16: Interconnect Wiring Diagrams for WX-500 (RS-422)

C.7 WIFI MODULE (PIM-9000)

MANUFACTURER	MODEL	DATA FORMAT	NOTES
L3 Aviation Products	PIM-9000 P/N 9230-17005-01 See Figure C-17	RS-232	The voltage input to the PIM-9000 is rated from 4.5VDC to 32VDC.
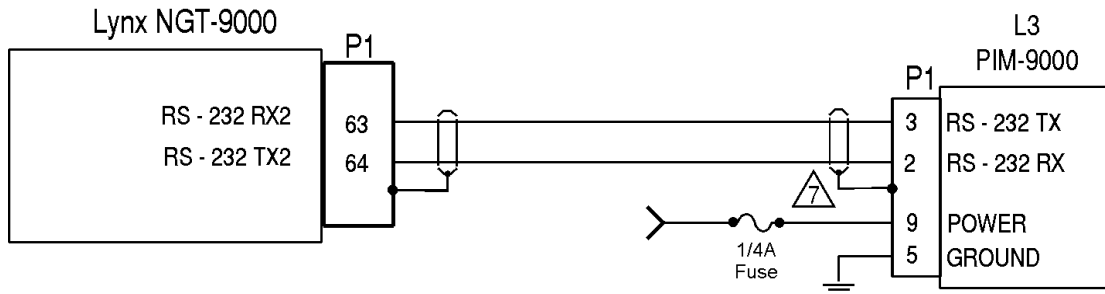
Figure C-17: Interconnect Wiring Diagram for PIM-9000

Appendix   D
TSO and Failure Classification Information

D.1   NON-TSO FUNCTIONS

The Lynx NGT-9000 Release 1 and DCM Release 1 do not have any Non-TSO functions.
The Lynx NGT-9000 Release 2 and DCM Release 2 do not have any Non-TSO functions.
The Lynx NGT-9000 Release 3 and DCM Release 3 do not have any Non-TSO functions.

D.2   PANEL MOUNT NGT-9000

NOTE

1. Unless otherwise specified Release 1 refers to Release 1.0 and any subsequent minor changes to Release 1.0.

2. Unless otherwise specified Release 2 refers to Release 2.0 and any subsequent minor changes to Release 2.0.

3. Unless otherwise specified Release 3 refers to Release 3.0 and any subsequent minor changes to Release 3.0.

The NGT-9000D Release 1 / 2 / 3 and DCM Release 1 / 2 / 3 meet the requirements of the following TSO's listed in Table D-1.
See Limitation Paragraph 14 in Section 1.14 regarding TSO-C157a.

Table D-1: Applicable TSO and Deviations for NGT-9000D

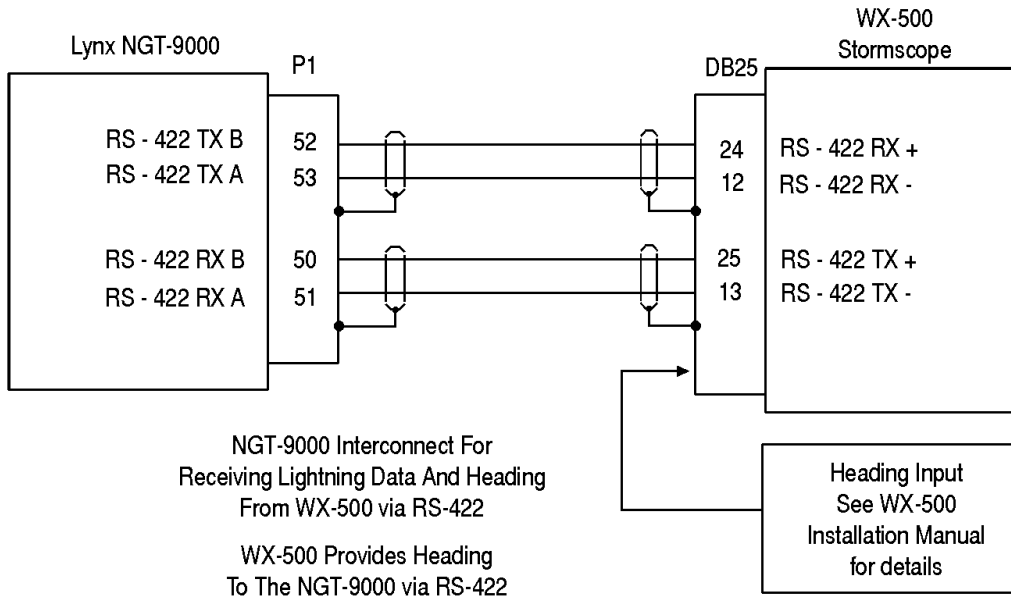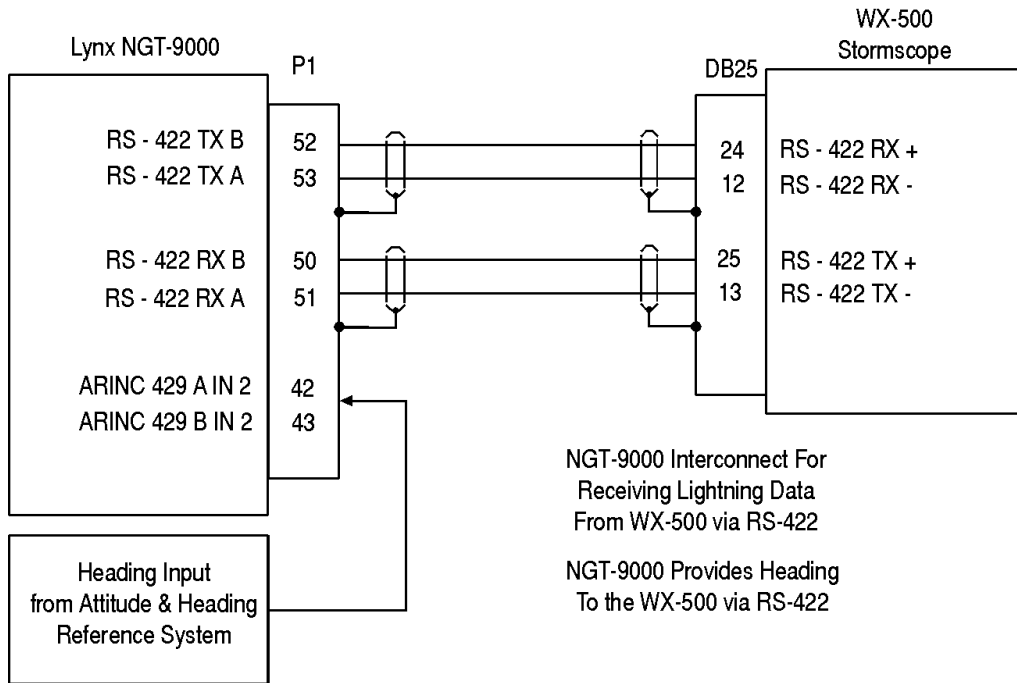| HW PART NO / SW PART NO / TYPE DESIGNATION	DESCRIPTION	APPLICABLE TSO AND DEVIATIONS	CLASS, COMMENTS
9029000-20000 9020010-001 NGT-9000D 1.0	Supports GPS, WiFi, and ADS-B In via 1090ES and ADS-B Out via 1090ES and UAT. Specific models support TAS and Diversity and TAS/Diversity. Interfaces with traffic (RS-422 and ARINC 429) and weather (RS-422) displays.	TSO-C112d – Deviation Note 4, 6, 10	Level 2 dens Class 1
		TSO-C113a – Deviation Note 2	
		TSO-C145c – Deviation Note 1, 2, 5	Class Beta 1 (GPS SBAS Output)
		TSO-C147 – Deviation Note 1, 2, 3, 5, 7	Class A
		TSO-C154c – Deviation Note 2, 5	Class A1S (receive only)
		TSO-C157a – Deviation Note 2	Class 2
		TSO-C166b – Deviation Note 2, 4, 5, 10	Class A2
		TSO-C195a – Deviation Note 2, 8	Class B1, B5, C1, C5
9029000-20000 / 9020010-002 / NGT-9000D 1.1	Supports GPS, WiFi, and ADS-B In via 1090ES and ADS-B Out via 1090ES and UAT. Specific models support TAS and Diversity and TAS/Diversity. Interfaces with traffic (RS-422 and ARINC 429) and weather (RS-422) displays.	TSO-C112d – Deviation Note 4, 6, 10	Level 2 dens Class 1
		TSO-C113a – Deviation Note 2	
		TSO-C145c – Deviation Note 1, 2, 5	Class Beta 1 (GPS SBAS Output)
		TSO-C147 – Deviation Note 1, 2, 3, 5, 7	Class A
		TSO-C154c – Deviation Note 2, 5	Class A1S (receive only)
		TSO-C157a – Deviation Note 2	Class 2
		TSO-C166b – Deviation Note 2, 4, 5, 10	Class A2
		TSO-C195a – Deviation Note 2, 8	Class B1, B5, C1, C5

Table D-1: Applicable TSO and Deviations for NGT-9000D

HW PART NO / SW PART NO / TYPE DESIGNATION	DESCRIPTION	APPLICABLE TSO AND DEVIATIONS	CLASS, COMMENTS
9029000-20000 / 9020010-003 / NGT-9000D 1.2	Supports GPS, WiFi, and ADS-B In via 1090ES and ADS-B Out via 1090ES and UAT. Specific models support TAS and Diversity and TAS/Diversity. Interfaces with traffic (RS-422 and ARINC 429) and weather (RS-422) displays.	TSO-C112d – Deviation Note 4, 6, 10	Level 2 dens Class 1
		TSO-C113a – Deviation Note 2	
		TSO-C145c – Deviation Note 1, 2, 5	Class Beta 1 (GPS SBAS Output)
		TSO-C147 – Deviation Note 1, 2, 3, 5, 7	Class A
		TSO-C154c – Deviation Note 2, 5	Class A1S (receive only)
		TSO-C157a – Deviation Note 2	Class 2
		TSO-C166b – Deviation Note 2, 4, 5, 10	Class A2
		TSO-C195a – Deviation Note 2, 8	Class B1, B5, C1, C5
9029000-20000 / 9020010-004 / NGT-9000D 2.0	Supports GPS, WiFi, and ADS-B In via 1090ES and ADS-B Out via 1090ES and UAT. Specific models support TAS and Diversity and TAS/Diversity. Interfaces with traffic (RS-422 and ARINC 429) and weather (RS-422) displays. Supports ATAS and Class B TAWS functionality.	TSO-C112d – Deviation Note 4, 6, 10	Level 2 dens Class 1 (diversity configuration
		TSO-C113a – Deviation Note 2	
		TSO-C145c – Deviation Note 1, 2, 5	Class Beta 1(GPS SBAS Output)
		TSO-C147 – Deviation Note 1, 2, 3, 5, 7	Class A
		TSO-C151c – Deviation Note 2	Class B
		TSO-C154c – Deviation Note 2, 5	Class A1S (receive only)
		TSO-C157a – Deviation Note 2	Class 2
		TSO-C166b – Deviation Note 2, 4, 5, 10	Class A2
		TSO-C195b – Deviation Note 2,9	Class B1, B5, B7, C1, C5, C7
9029000-20000 / 9020010-005 / NGT-9000D 2.1	Supports GPS, WiFi, and ADS-B In via 1090ES and ADS-B Out via 1090ES and UAT. Specific models support TAS and Diversity and TAS/Diversity. Interfaces with traffic (RS-422 and ARINC 429) and weather (RS-422) displays. Supports ATAS and Class B TAWS functionality. Supports Terrain Display Only (No Alerts) Functionality	TSO-C112d – Deviation Note 4, 6, 10	Level 2 dens Class 1 (diversity configuration
		TSO-C113a – Deviation Note 2	
		TSO-C145c – Deviation Note 1, 2, 5	Class Beta 1(GPS SBAS Output)
		TSO-C147 – Deviation Note 1, 2, 3, 5, 7	Class A
		TSO-C151c – Deviation Note 2	Class B
		TSO-C154c – Deviation Note 2, 5	Class A1S (receive only)
		TSO-C157a – Deviation Note 2	Class 2
		TSO-C166b – Deviation Note 2, 4, 5, 10	Class A2
		TSO-C195b – Deviation Note 2,9	Class B1, B5, B7, C1, C5, C7

Table D-1: Applicable TSO and Deviations for NGT-9000D

HW PART NO / SW PART NO / TYPE DESIGNATION	DESCRIPTION	APPLICABLE TSO AND DEVIATIONS	CLASS, COMMENTS
9029000-20000 / 9020010-006 / NGT-9000D 3.0	Supports GPS, WiFi, and ADS-B In via 1090ES and ADS-B Out via 1090ES and UAT.	TSO-C112d – Deviation Note 4, 6, 10	Level 2 dens Class 1 (diversity configuration
		TSO-C113a – Deviation Note 2	
	Specific models support TAS and Diversity and TAS/Diversity.	TSO-C118a – Deviation Note 2, 3, 11, 12, 13, 14	
	Interfaces with traffic (RS-422 and ARINC 429) and weather (RS-422) displays.	TSO-C145c – Deviation Note 1, 2, 5	Class Beta 1(GPS SBAS Output)
		TSO-C147 – Deviation Note 1, 2, 3, 5, 7	Class A
	Supports ATAS and Class B TAWS functionality.	TSO-C151c – Deviation Note 2	Class B
		TSO-C154c – Deviation Note 2, 5	Class A1S (receive only)
	Supports Terrain Display Only (No Alerts) Functionality	TSO-C157a – Deviation Note 2	Class 2
		TSO-C166b – Deviation Note 2, 4, 5, 10	Class A2
	Supports TCAS Functionality.	TSO-C195b – Deviation Note 2,9	Class B1, B5, B7, C1, C5, C7
9029000-20000 / 9020010-007 / NGT-9000D 3.1	Supports GPS, WiFi, and ADS-B In via 1090ES and ADS-B Out via 1090ES and UAT.	TSO-C112d – Deviation Note 4, 6, 10	Level 2 dens Class 1 (diversity configuration
		TSO-C113a – Deviation Note 2	
	Specific models support TAS and Diversity and TAS/Diversity.	TSO-C118a – Deviation Note 2, 3, 11, 12, 13, 14	
	Interfaces with traffic (RS-422 and ARINC 429) and weather (RS-422) displays.	TSO-C145c – Deviation Note 1, 2, 5	Class Beta 1(GPS SBAS Output)
		TSO-C147 – Deviation Note 1, 2, 3, 5, 7	Class A
	Supports ATAS and Class B TAWS functionality.	TSO-C151c – Deviation Note 2	Class B
		TSO-C154c – Deviation Note 2, 5	Class A1S (receive only)
	Supports Terrain Display Only (No Alerts) Functionality	TSO-C157a – Deviation Note 2	Class 2
		TSO-C166b – Deviation Note 2, 4, 5, 10	Class A2
	Supports TCAS Functionality.	TSO-C195b – Deviation Note 2,9	Class B1, B5, B7, C1, C5, C7

Table D-1: Applicable TSO and Deviations for NGT-9000D

HW PART NO / SW PART NO / TYPE DESIGNATION	DESCRIPTION	APPLICABLE TSO AND DEVIATIONS	CLASS, COMMENTS
9029000-20000 / 9020010-008 / NGT-9000D 3.2	Supports GPS, WiFi, and ADS-B In via 1090ES and ADS-B Out via 1090ES and UAT. Specific models support TAS and Diversity and TAS/Diversity. Interfaces with traffic (RS-422 and ARINC 429) and weather (RS-422) displays. Supports ATAS and Class B TAWS functionality. Supports Terrain Display Only (No Alerts) Functionality Supports TCAS Functionality.	TSO-C112d – Deviation Note 4, 6, 10	Level 2 dens Class 1 (diversity configuration
		TSO-C113a – Deviation Note 2	
		TSO-C118a – Deviation Note 2, 3, 11, 12, 13, 14	
		TSO-C145c – Deviation Note 1, 2, 5	Class Beta 1(GPS SBAS Output)
		TSO-C147 – Deviation Note 1, 2, 3, 5, 7	Class A
		TSO-C151c – Deviation Note 2	Class B
		TSO-C154c – Deviation Note 2, 5	Class A1S (receive only)
		TSO-C157a – Deviation Note 2	Class 2
		TSO-C166b – Deviation Note 2, 4, 5, 10	Class A2
		TSO-C195b – Deviation Note 2,9	Class B1, B5, B7, C1, C5, C7
9029000-20000 / 9020010-009 / NGT-9000D 3.2.1	Supports GPS, WiFi, and ADS-B In via 1090ES and ADS-B Out via 1090ES and UAT. Specific models support TAS and Diversity and TAS/Diversity. Interfaces with traffic (RS-422 and ARINC 429) and weather (RS-422) displays. Supports ATAS and Class B TAWS functionality. Supports Terrain Display Only (No Alerts) Functionality Supports TCAS Functionality.	TSO-C112d – Deviation Note 4, 6, 10	Level 2 dens Class 1 (diversity configuration
		TSO-C113a – Deviation Note 2	
		TSO-C118a – Deviation Note 2, 3, 11, 12, 13, 14	
		TSO-C145c – Deviation Note 1, 2, 5	Class Beta 1(GPS SBAS Output)
		TSO-C147 – Deviation Note 1, 2, 3, 5, 7	Class A
		TSO-C151c – Deviation Note 2	Class B
		TSO-C154c – Deviation Note 2, 5	Class A1S (receive only)
		TSO-C157a – Deviation Note 2	Class 2
		TSO-C166b – Deviation Note 2, 4, 5, 10	Class A2
		TSO-C195b – Deviation Note 2,9	Class B1, B5, B7, C1, C5, C7
9029000-20000 / 9020010-010 / NGT-9000D 3.2.2	Supports GPS, WiFi, and ADS-B In via 1090ES and ADS-B Out via 1090ES and UAT. Specific models support TAS and Diversity and TAS/Diversity. Interfaces with traffic (RS-422 and ARINC 429) and weather (RS-422) displays. Supports ATAS and Class B TAWS functionality. Supports Terrain Display Only (No Alerts) Functionality Supports TCAS Functionality.	TSO-C112d – Deviation Note 4, 6, 10	Level 2 dens Class 1 (diversity configuration
		TSO-C113a – Deviation Note 2	
		TSO-C118a – Deviation Note 2, 3, 11, 12, 13, 14	
		TSO-C145c – Deviation Note 1, 2, 5	Class Beta 1(GPS SBAS Output)
		TSO-C147 – Deviation Note 1, 2, 3, 5, 7	Class A
		TSO-C151c – Deviation Note 2	Class B
		TSO-C154c – Deviation Note 2, 5	Class A1S (receive only)
		TSO-C157a – Deviation Note 2	Class 2
		TSO-C166b – Deviation Note 2, 4, 5, 10	Class A2
		TSO-C195b – Deviation Note 2,9	Class B1, B5, B7, C1, C5, C7

Deviation Notes:

Deviation 1: TSO-C145c, TSO-C147. Require the use of DO-160E for environmental qualification testing; DO-160G was used instead.

Deviation 2: TSO-C113a, TSO-C118a, TSO-C145c, TSO-C147, TSO-C151c, TSO-C154c, TSO-C157a, TSO-C166b, TSO-C195a, TSO-C195b Per the guidance in FAA Order 8150.1c, the units are marked with the primary TSO along with a reference to the Installation Manual for the other TSO information (other applicable TSO's, deviations, etc.).

Deviation 3: TSO-C118a, TSO-C147. Due to the RF power requirement and inherent non-linearity in RF transmitters, the harmonics of the transmitter exceed the RF radiated emissions limit in DO-160G. ACSS deviates from DO-160G Section 21 Category M Radiated RF Emissions in the following frequency bands when the transmitter is active:

- 2060MHz ± 5MHz (2nd Transmitter harmonic) Exceeds Cat M by as much as15.6dB

- 3090MHz ± 5MHz (3rd Transmitter harmonic) Exceeds Cat M by as much as 16.7dB

- 4120MHz ± 20MHz (4th Transmitter harmonic) Exceeds Cat M by as much as 22.7dB

- 5150MHz ± 5MHz (5th Transmitter harmonic) Exceeds Cat M by as much as 12.2dB

Deviation 4: TSO-C112d, TSO-166b. The Lynx NGT-9000 has an RF transmitter, which is used to generate both the 1030MHz and 1090MHz waveforms for Mode S Transponder, ADS-B Out, and TAS functions. Due to the RF power requirement and inherent non-linearity's in RF transmitters, the harmonics of the transmitter exceed the RF radiated emissions limit in DO-160G. ACSS deviates from DO-160G Section 21 Category M Radiated RF Emissions in the following frequency bands when the transmitter is active:

- 2180MHz ± 7MHz (2nd Transmitter harmonic) Exceeds Cat M by as much as 19.3dB

- 3270MHz ± 23MHz (3rd Transmitter harmonic) Exceeds Cat M by as much as 22.0dB

- 4360MHz ± 23MHz (4th Transmitter harmonic) Exceeds Cat M by as much as 24.4dB

- 5450MHz ± 23MHz (5th Transmitter harmonic) Exceeds Cat M by as much as 21.4dB

Deviation 5: TSO-C145c, TSO-C147, TSO-C154c, TSO-C166b. The Lynx NGT-9000 utilizes electronic part marking for the software part number, which is stored in non-volatile memory.

Deviation 6: TSO- C112d. The NGT-9000 does not perform Comm-A (broadcast or addressed) or Comm-B Air-Initiated ADLP (Airborne Data Link Processor) link operations. The NGT-9000 meets the certification of Level 2 transponders except for the support of the above listed ADLP functions.

Deviation 7: TSO-C147. The use of traffic symbology as defined in DO-317A is equivalent level of safety to the symbols define in TSO-C147. ACSS submits that the use of the 0.1 inch character size for the TAS characters (relative altitude tag) and use of 0.163 inch traffic symbols provides an equivalent level of safety to the TSO-C147 specified character and symbol sizes.

Deviation 8: TSO-C195a. The ACSS ATCRBS and ADS-B traffic in a track-up orientation when heading source is unavailable. ACSS believes that removing the ADS-B traffic or ATCRBS traffic from the display when the heading input is not available would significantly reduce the value of the CDTI's support in the pilot's see and avoid responsibilities.
DO-317A ASA AIRB application display TIS-B traffic, with a NACv of 0, as a non-directional track similar to EVAcq. This removes the contradiction between requirements and is in-line with updates in the next revision of the MOPS (i.e., DO-317B).
DO-317A ASA AIRB application will send TIS-B traffic display data by reporting the most recent non-zero NACv reading confirmed over a 60 second interval.
The EVAcq and AIRB functions are set to unavailable when ownship position is beyond 85 degrees North or South latitude. The result is a display of "Traffic Unavailable" on Panel mount units and an indication of "Standby" for remote displays. However, for NGT-9000 installations, where TAS is enabled, the range/bearing based TAS targets are displayed.

Deviation 9: TSO-C195b. The ACSS ATCRBS and ADS-B traffic in a track-up orientation when heading source is unavailable. ACSS believes that removing the ADS-B traffic or ATCRBS traffic from the display when the heading input is not available would significantly reduce the value of the CDTI's support in the pilot's see and avoid responsibilities.
DO-317B ASA AIRB application display TIS-B traffic by reporting the most recent non-zero NACv reading confirmed over a 60-second interval.
The EVAcq and AIRB functions are set to unavailable when ownship position is beyond 85 degrees North or South latitude. The result is a display of "Traffic Unavailable" on Panel mount units and an indication of "Standby" for

Deviation Notes:

remote displays. However, for NGT-9000 installations, where TAS is enabled, the range/bearing based TAS targets are displayed.
Deviation 10: TSO-C112d, TSO-C166b. For diversity configurations, only where the top mounted TAS antenna is operating as an augmentation to a fully qualified bottom blade antenna. In this given configuration, the NGT-9000D+ uses the top directional antenna with reduced 1090MHz gain of minus 5dB as compared to a matched quarter wave stub.
Deviation 11: TSO-C118a. (In-band Acceptance) Given a valid transponder reply signal in the absence of interference or overloads, the minimum trigger level (MTL) is defined as the input power level that results in a 90% ratio of decoded to receive replies. The MTL over the frequency range of 1,087 to 1,093 MHz shall be no greater than -70 dBm.
Deviation 12: TSO-C118a. (Transmitter RF Power Output) When transmitting at full (un-attenuated) output power, the peak RF output power delivered to a quarter wave stub antenna will have a minimum RF power of 50 dBm.
Deviation 13: TSO-C118a. (GPS Altitude Derived Height Above Geoid) Above Ground Level (AGL) height will be calculated by subtracting local terrain elevation provided by the terrain database from the GPS altitude provided by the internal GPS receiver.
Deviation 14: TSO-C118a. (Aural Alert for Rotorcraft installations) Aural annunciations will not be suppressed at any altitude while ownship is "in air".

D.3   REMOTE MOUNT LYNX NGT-9000R

NOTE

1. Unless otherwise specified Release 1 refers to Release 1.0 and any subsequent minor changes to Release 1.0.

2. Unless otherwise specified Release 2 refers to Release 2.0 and any subsequent minor changes to Release 2.0.

3. Unless otherwise specified Release 3 refers to Release 3.0 and any subsequent minor changes to Release 3.0.

The NGT-9000RD Release 1 / 2 / 3 and DCM Release 1 / 2 / 3 meet the requirements of the TSO's listed in Table D-2.

Table D-2: Applicable TSO and Deviations for NGT-9000RD

HW PART NO / SW PART NO / TYPE DESIGNATION	DESCRIPTION	APPLICABLE TSO AND DEVIATIONS	CLASS, COMMENTS
9029000-40000 / 9020010-002 / NGT-9000RD 1.0	Supports GPS, WiFi, and ADS-B In via 1090ES and ADS-B Out via 1090ES and UAT. Specific models support TAS and Diversity and TAS/Diversity. Interfaces with traffic (RS-422 and ARINC 429) and weather (RS-422) displays. Interfaces with control panel (CP-2500 via RS-232).	TSO-C112d – Deviation Note 3, 5, 8	Level 2 dens Class 1
		TSO-C145c – Deviation Note 1, 2, 4	Class Beta 1 (GPS SBAS Output)
		TSO-C147 – Deviation Note 1, 2, 4	Class A
		TSO-C154c – Deviation Note 2, 4	Class A1S (receive only)
		TSO-C157a – Deviation Note 2, 4	Class 2 incomplete
		TSO-C166b – Deviation Note 2, 3, 4, 8	Class A2
		TSO-C195a – Deviation Note 2, 4, 6	Class C1
9029000-40000 / 9020010-003 / NGT-9000RD 1.1	Supports GPS, WiFi, and ADS-B In via 1090ES and ADS-B Out via 1090ES and UAT, Specific models support TAS and Diversity and TAS/Diversity. Interfaces with traffic (RS-422 and ARINC 429) and weather (RS-422) displays. Interfaces with control panel (CP-2500 via RS-232).	TSO-C112d – Deviation Note 3, 5, 8	Level 2 dens Class 1
		TSO-C145c – Deviation Note 1, 2, 4	Class Beta 1 (GPS SBAS Output)
		TSO-C147 – Deviation Note 1, 2, 4	Class A
		TSO-C154c – Deviation Note 2, 4	Class A1S (receive only)
		TSO-C157a – Deviation Note 2, 4	Class 2 incomplete
		TSO-C166b – Deviation Note 2, 3, 4, 8	Class A2
		TSO-C195a – Deviation Note 2, 4, 6	Class C1

Table D-2: Applicable TSO and Deviations for NGT-9000RD

HW PART NO / SW PART NO / TYPE DESIGNATION	DESCRIPTION	APPLICABLE TSO AND DEVIATIONS	CLASS, COMMENTS
9029000-40000 / 9020010-004 / NGT-9000RD 2.0	Supports GPS, WiFi, and ADS-B In via 1090ES and ADS-B Out via 1090ES and UAT. Specific models support TAS and Diversity and TAS/Diversity. Interfaces with traffic (RS-422 and ARINC 429) and weather (RS-422) displays. Interfaces with control panel (CP-2500 via RS-232). Supports ATAS and Class B TAWS functionality.	TSO-C112d – Deviation Note 3, 5, 8	Level 2 dens Class 1
		TSO-C145c – Deviation Note 1, 2, 4	Class Beta 1 (GPS SBAS Output)
		TSO-C147 – Deviation Note 1, 2, 4	Class A
		TSO-C151c – Deviation Note 2, 9	Class B
		TSO-C154c – Deviation Note 2, 4	Class A1S (receive only)
		TSO-C157a – Deviation Note 2, 4	Class 2 incomplete
		TSO-C166b – Deviation Note 2, 3, 4, 8	Class A2
		TSO-C195b – Deviation Note 2,4, 7	Class C1, C5, C7
9029000-40000 / 9020010-005 / NGT-9000RD 2.1	Supports GPS, WiFi, and ADS-B In via 1090ES and ADS-B Out via 1090ES and UAT. Specific models support TAS and Diversity and TAS/Diversity. Interfaces with traffic (RS-422 and ARINC 429) and weather (RS-422) displays. Interfaces with control panel (CP-2500 via RS-232). Supports ATAS and Class B TAWS functionality.	TSO-C112d – Deviation Note 3, 5, 8	Level 2 dens Class 1
		TSO-C145c – Deviation Note 1, 2, 4	Class Beta 1 (GPS SBAS Output)
		TSO-C147 – Deviation Note 1, 2, 4	Class A
		TSO-C151c – Deviation Note 2, 9	Class B
		TSO-C154c – Deviation Note 2, 4	Class A1S (receive only)
		TSO-C157a – Deviation Note 2, 4	Class 2 incomplete
		TSO-C166b – Deviation Note 2, 3, 4, 8	Class A2
		TSO-C195b – Deviation Note 2,4, 7	Class C1, C5, C7
9029000-40000 / 9020010-006 / NGT-9000RD 3.0	Supports GPS, WiFi, and ADS-B In via 1090ES and ADS-B Out via 1090ES and UAT. Specific models support TAS and Diversity and TAS/Diversity. Interfaces with traffic (RS-422 and ARINC 429) and weather (RS-422) displays. Interfaces with control panel (CP-2500 via RS-232). Supports ATAS and Class B TAWS functionality. Supports TCAS Functionality.	TSO-C112d – Deviation Note 3, 5, 8	Level 2 dens Class 1
		TSO-C118a – Deviation Note 2, 3, 10, 11, 12, 13	
		TSO-C145c – Deviation Note 1, 2, 4	Class Beta 1 (GPS SBAS Output)
		TSO-C147 – Deviation Note 1, 2, 4	Class A
		TSO-C151c – Deviation Note 2, 9	Class B
		TSO-C154c – Deviation Note 2, 4	Class A1S (receive only)
		TSO-C157a – Deviation Note 2, 4	Class 2 incomplete
		TSO-C166b – Deviation Note 2, 3, 4, 8	Class A2
		TSO-C195b – Deviation Note 2,4, 7	Class C1, C5, C7
9029000-40000 / 9020010-007 / NGT-9000RD 3.1	Supports GPS, WiFi, and ADS-B In via 1090ES and ADS-B Out via 1090ES and UAT.	TSO-C112d – Deviation Note 3, 5, 8	Level 2 dens Class 1
		TSO-C118a – Deviation Note 2, 3, 10, 11, 12, 13	
		TSO-C145c – Deviation Note 1, 2, 4	Class Beta 1 (GPS SBAS Output)

Table D-2: Applicable TSO and Deviations for NGT-9000RD

HW PART NO / SW PART NO / TYPE DESIGNATION	DESCRIPTION	APPLICABLE TSO AND DEVIATIONS	CLASS, COMMENTS
	Specific models support TAS and Diversity and TAS/Diversity. Interfaces with traffic (RS-422 and ARINC 429) and weather (RS-422) displays. Interfaces with control panel (CP-2500 via RS-232). Supports ATAS and Class B TAWS functionality. Supports TCAS Functionality.	TSO-C147 – Deviation Note 1, 2, 4	Class A
		TSO-C151c – Deviation Note 2, 9	Class B
		TSO-C154c – Deviation Note 2, 4	Class A1S (receive only)
		TSO-C157a – Deviation Note 2, 4	Class 2 incomplete
		TSO-C166b – Deviation Note 2, 3, 4, 8	Class A2
		TSO-C195b – Deviation Note 2,4, 7	Class C1, C5, C7
9029000-40000 / 9020010-008 / NGT-9000RD 3.2	Supports GPS, WiFi, and ADS-B In via 1090ES and ADS-B Out via 1090ES and UAT. Specific models support TAS and Diversity and TAS/Diversity. Interfaces with traffic (RS-422 and ARINC 429) and weather (RS-422) displays. Interfaces with control panel (CP-2500 via RS-232) or (other LRUs via ARINC 429). Supports ATAS and Class B TAWS functionality. Supports TCAS Functionality.	TSO-C112d – Deviation Note 3, 5, 8	Level 2 dens Class 1
		TSO-C118a – Deviation Note 2, 3, 10, 11, 12, 13	
		TSO-C145c – Deviation Note 1, 2, 4	Class Beta 1 (GPS SBAS Output)
		TSO-C147 – Deviation Note 1, 2, 4	Class A
		TSO-C151c – Deviation Note 2, 9	Class B
		TSO-C154c – Deviation Note 2, 4	Class A1S (receive only)
		TSO-C157a – Deviation Note 2, 4	Class 2 incomplete
		TSO-C166b – Deviation Note 2, 3, 4, 8	Class A2
		TSO-C195b – Deviation Note 2,4, 7	Class C1, C5, C7
9029000-40000 / 9020010-009 / NGT-9000RD 3.2.1	Supports GPS, WiFi, and ADS-B In via 1090ES and ADS-B Out via 1090ES and UAT. Specific models support TAS and Diversity and TAS/Diversity. Interfaces with traffic (RS-422 and ARINC 429) and weather (RS-422) displays. Interfaces with control panel (CP-2500 via RS-232) or (other LRUs via ARINC 429). Supports ATAS and Class B TAWS functionality. Supports TCAS Functionality.	TSO-C112d – Deviation Note 3, 5, 8	Level 2 dens Class 1
		TSO-C118a – Deviation Note 2, 3, 10, 11, 12, 13	
		TSO-C145c – Deviation Note 1, 2, 4	Class Beta 1 (GPS SBAS Output)
		TSO-C147 – Deviation Note 1, 2, 4	Class A
		TSO-C151c – Deviation Note 2, 9	Class B
		TSO-C154c – Deviation Note 2, 4	Class A1S (receive only)
		TSO-C157a – Deviation Note 2, 4	Class 2 incomplete
		TSO-C166b – Deviation Note 2, 3, 4, 8	Class A2
		TSO-C195b – Deviation Note 2,4, 7	Class C1, C5, C7

Table D-2: Applicable TSO and Deviations for NGT-9000RD

HW PART NO / SW PART NO / TYPE DESIGNATION	DESCRIPTION	APPLICABLE TSO AND DEVIATIONS	CLASS, COMMENTS
9029000-40000 / 9020010-010 / NGT-9000RD 3.2.2	Supports GPS, WiFi, and ADS-B In via 1090ES and ADS-B Out via 1090ES and UAT.	TSO-C112d – Deviation Note 3, 5, 8	Level 2 dens Class 1
		TSO-C118a – Deviation Note 2, 3, 10, 11, 12, 13	
	Specific models support TAS and Diversity and TAS/Diversity.	TSO-C145c – Deviation Note 1, 2, 4	Class Beta 1 (GPS SBAS Output)
	Interfaces with traffic (RS-422 and ARINC 429) and	TSO-C147 – Deviation Note 1, 2, 4	Class A
	weather (RS-422) displays.	TSO-C151c – Deviation Note 2, 9	Class B
	Interfaces with control panel (CP-2500 via RS-232) or (other LRUs via	TSO-C154c – Deviation Note 2, 4	Class A1S (receive only)
	ARINC 429).	TSO-C157a – Deviation Note 2, 4	Class 2 incomplete
	Supports ATAS and Class B TAWS functionality.	TSO-C166b – Deviation Note 2, 3, 4, 8	Class A2
	Supports TCAS Functionality.	TSO-C195b – Deviation Note 2,4, 7	Class C1, C5, C7

Deviation Notes:

Deviation 1: TSO-C145c, TSO-C147. DO-160G was used instead of earlier versions.

Deviation 2: TSO-C118a, TSO-C145c, TSO-C151c, TSO-C147, TSO-C154c, TSO-C157a, TSO-C166b, TSO-C195a, TSO-C195b Per the guidance in FAA Order 8150.1c, the units are marked with the primary TSO along with a reference to the Installation Manual for the other TSO information (other applicable TSO's, deviations, etc.).

Deviation 3: TSO-C112d, TSO-C166b. The Lynx NGT-9000 has an RF transmitter, which is used to generate both the 1030MHz and 1090MHz waveforms for Mode S Transponder, ADS-B Out, and TAS functions. Due to the RF power requirement and inherent non-linearity's in RF transmitters, the harmonics of the transmitter exceed the RF radiated emissions limit in DO-160G. ACSS deviates from DO—160G Section 21 Category M Radiated RF Emissions in the following frequency bands when the transmitter is active:

TSO-C112d

- 2180 MHz ± 78 MHz (2nd Transmitter Harmonic) Exceeds Cat M by as much as 23 dB

- 3270 MHz ± 23 MHz (3rd Transmitter Harmonic) Exceeds Cat M by as much as 13 dB

- 4360 MHz ± 23 MHz (4th Transmitter Harmonic) Exceeds Cat M by as much as 14 dB

TSO-C166b

- 2180MHz ± 7MHz (2nd Transmitter harmonic) Exceeds Cat M by as much as 19.3dB

- 3270MHz ± 23MHz (3rd Transmitter harmonic) Exceeds Cat M by as much as 22.0dB

- 4360MHz ± 23MHz (4th Transmitter harmonic) Exceeds Cat M by as much as 24.4dB

- 5450MHz ± 23MHz (5th Transmitter harmonic) Exceeds Cat M by as much as 21.4d

Deviation 4: TSO-C145c, TSO-C147, TSO-C154c, TSO-157a, TSO-C166b, TSO-195a, TSO-195b. The Lynx NGT-9000 utilizes a Maintenance Computer (i.e., a "special tool") as its primary support tool required for installation and debug effort. All installations will require that the Maintenance Computer be used to verify the software part number that is stored electronically in the unit thereby ensuring the part has been installed in compliance to the type design data. All software updates will also require that the Maintenance Computer be used to verify the software part number that is stored electronically in the unit thereby ensuring the part is in compliance to the type design data.

Deviation 5: TSO- C112d. The NGT-9000 does not perform Comm-A (broadcast or addressed) or Comm-B Air-Initiated ADLP (Airborne Data Link Processor) link operations. The NGT-9000 meets the certification of Level 2 transponders except for the support of the above listed ADLP functions.

Deviation Notes:

Deviation 6: TSO-C195a. When a heading source is unavailable, ATCRBS and ADS-B traffic are respectively oriented in a heading and track-up orientation. ACSS believes that removing the ADS-B traffic or ATCRBS traffic from the data sent to the display when the heading input is not available would significantly reduce the value of the CDTI's support in the pilot's see and avoid responsibilities.

DO-317A ASA AIRB application will send TIS-B traffic display data, with a NACv of 0, as a non-directional track similar to EVAcq. This is in-line with updates in the next revision of the MOPS (i.e., DO-317B).

DO-317A ASA AIRB application will send TIS-B traffic display data by reporting the most recent non-zero NACv reading confirmed over a 60 second interval.

The EVAcq and AIRB functions are set to unavailable when ownship position is beyond 85 degrees North or South latitude. The result is an indication of "Standby" for remote displays. However, for NGT-9000 installations, where TAS is enabled, the range/bearing based TAS targets are sent to the display.

Deviation 7: TSO-C195b. The ACSS ATCRBS and ADS-B traffic in a track-up orientation when heading source is unavailable. ACSS believes that removing the ADS-B traffic or ATCRBS traffic from the display when the heading input is not available would significantly reduce the value of the CDTI's support in the pilot's see and avoid responsibilities.

DO-317B ASA AIRB application will send TIS-B traffic display data by reporting the most recent non-zero NACv reading confirmed over a 60 second interval.

The EVAcq and AIRB functions are set to unavailable when ownship position is beyond 85 degrees North or South latitude. The result is a display of "Traffic Unavailable" on Panel mount units and an indication of "Standby" for remote displays. However, for NGT-9000 installations, where TAS is enabled, the range/bearing based TAS targets are displayed.

Deviation 8: TSO-C112d, TSO-C166b. For diversity configurations only where the top mounted TAS antenna is operating as an augmentation to a fully qualified bottom blade antenna. In this given configuration, the NGT-9000RD+ uses the top directional antenna with reduced 1090MHz gain of minus 5dB as compared to a matched quarter wave stub.

Deviation 9: TSO-C151c. Class B equipment are not required to include a terrain display. For installers desiring a terrain display, the Remote mount NGT-9000R does not include a terrain display. If a terrain display is required, the Panel mount NGT-9000 provides a display.

Deviation 10: TSO-C118a. (In-band Acceptance) Given a valid transponder reply signal in the absence of interference or overloads, the minimum trigger level (MTL) is defined as the input power level that results in a 90% ratio of decoded to receive replies. The MTL over the frequency range of 1,087 to 1,093 MHz shall be no greater than -70 dBm.

Deviation 11: TSO-C118a. (Transmitter RF Power Output) When transmitting at full (un-attenuated) output power, the peak RF output power delivered to a quarter wave stub antenna will have a minimum RF power of 50 dBm.

Deviation 12: TSO-C118a. (GPS Altitude Derived Height Above Geoid) Above Ground Level (AGL) height will be calculated by subtracting local terrain elevation provided by the terrain database from the GPS altitude provided by the internal GPS receiver.

Deviation 13: TSO-C118a. (Aural Alert for Rotorcraft installations) Aural annunciations will not be suppressed at any altitude while ownship is "in air".

D.4   FAILURE CLASSIFICATION

Table D-3 summarizes the potential hazards associated with the Lynx NGT-9000 functions and the associated failure condition severity classifications per AC 23.1309-1E. Hazards with classifications less than Major are not listed in this table.

Table D-3: Failure Classification

Functional Description	Hazard Classification	Failure Condition
TAS Traffic Advisory TCAS Traffic Advisory	Major AC 120-55C, §12.b.(1) TSO-C118a §3.b (1)	Relative position of traffic associated with Traffic Advisory is incorrectly indicating (either visually or aurally or both). Per operational procedures, crew will not deviate from assigned clearance based only on TA information. Confusion of crew to locate traffic associated with advisory. Significant increase in workload on crew.
ATAS Traffic Alert	AC 20-172B, § 2-8.d. TSO-C166b, § 3.b TSO-C154c, § 3.b. TSO-C195b, § 3.b	Incorrect ATAS alerts given to the flight crew. Incorrect visual cues are displayed, and/or misleading aural alerts provided. Crew confusion with traffic situation. Flight crew uses visual cues and ATC traffic advisories or instructions to avoid traffic. Significant increase in crew workload.
Mode S Transponder Response to SSR and TCAS interrogations	Major TSO-C112d §3.b.	Incorrect reply to an SSR or TCAS interrogation. Significant reduction in safety margins or functional capabilities
ADS-B Output	Major AC 20-165B, Appendix 1, §cc TSO-C166b, § 3.b TSO-C154c, § 3.b.	Incorrect position or velocity data reported to ground surveillance system providing aircraft separation services. Significant reduction in safety margins.
Enhanced Visual Acquisition (EVAcq) Basic Airborne Traffic Situational Awareness (AIRB)	Major AC 20-172A, § 2-7.d. TSO-C166b, § 3.b TSO-C154c, § 3.b. TSO-C195a, § 3.b	Traffic is incorrectly displayed relative to own ship position on the CDTI or displayed traffic information is incorrect. Crew confusion with traffic situation. Flight crew uses visual cues and ATC traffic advisories or instructions to avoid traffic. Significant increase in crew workload.
Class B TAWS Mode 1 False Warning Alert	AC 23-18 §7.d(2)(b)	False warning alert due to undetected or latent failures. Crew confusion with terrain situation. Crew initiates corrective maneuver immediately Significant increase in crew workload
Class B TAWS Mode 1 Un-annunciated loss of both Aural and Visual Alert	AC 23-18 §7.d(2)(c)	Failure of the function to provide the required alerting functions. Crew uses visual clues and any other available information to avoid terrain. Increased risk of CFIT. Significant increase in crew workload

Table D-3: Failure Classification

Functional Description	Hazard Classification	Failure Condition
Class B TAWS Mode 3 Incorrect TAWS Caution Alert	AC 23-18 §7.d(2)(c)	False Caution alert due to undetected or latent failures. Crew confusion with terrain situation. Crew initiates corrective maneuver immediately Significant increase in crew workload
Un-annunciated loss of all FLTA Terrain or Obstacle alerts (RTC and/or ITI)	AC 23-18 §7.d(2)(c)	Failure of the function to provide all warning alert messages (Aural, Visual, and Terrain Display). Crew uses visual cues and any other available information to avoid terrain. Increased risk of CFIT. Significant increase in crew workload
False FLTA Terrain or Obstacle Warning Alert	AC 23-18 §7.d(2)(b)	False Warning alert due to undetected or latent failures. Crew confusion with terrain situation. Crew initiates corrective maneuver immediately Significant increase in crew workload
Class B TAWS (all modes) Un-annunciated loss of all Alerts	AC 23-18 §7.d(2)(a)	Failure of the function to provide the required alerting functions. Crew uses visual clues and any other available information to avoid terrain. Increased risk of CFIT. Significant increase in crew workload

This page intentionally blank

Appendix   E
LYNX Event Questionnaire

E.1   GENERAL

If a unit is to be returned to ACSS due to faulty operation, photocopy or print this form to fill out the information requested by each question to give ACSS personnel a better understanding of the situation and the issue(s) encountered. Include this questionnaire along with the other documentation associated with the return.

1.   With whom did you speak in ACSS Customer Support?

2.   What is the unit serial number?

3.   Is this a new installation or one previously installed more than 1 month ago? Please include install date, if known.

4.   Does the unit pass the System Test?

5.   What failed? What is the fault message displayed (Panel Mount) or external symptom observed (Remote Mount)?

6. Did this issue just become apparent after the unit operated in good standing for a period of time? If so, for how long?

7. Is this problem intermittent or continuous? If intermittent, what was the time of occurrence (in UTC)?

8. Did this issue occur while in-air or on ground?

9. Did this issue occur in a certain location? Specify altitude, location relative to an aircraft, and location relative to other traffic.

10. What are the last three digits of the OPS software part number as seen at power-on (Panel Mount only)?

11. Any other information related to this event that may be helpful to ACSS?