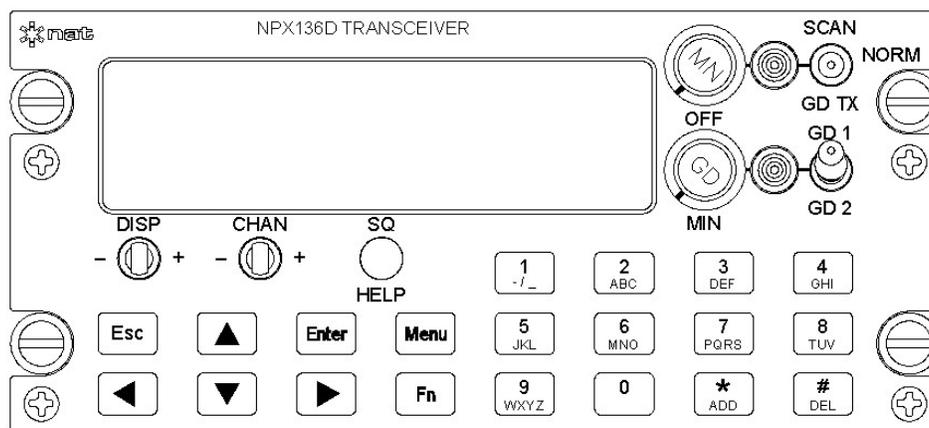# nat

SM68

NPX136D Series VHF P25
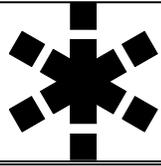## Panel Mount Transceiver

INSTALLATION AND OPERATION MANUAL

REV 4.00   February 8, 2005

Northern Airborne Technology Ltd.
1925 Kirschner Road
Kelowna, BC, Canada.
V1Y 4N7

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Periodically NAT will release manual amendments. In order to maintain the most accurate and up to date manual these amendments should be carried out immediately upon receipt and recorded on the following amendment record.

AMENDMENT RECORD

Amendment Number	Amendment Date	Section(s) Changed	Date Entered	Entered By
1	Jan 26/07	1,3		**Performed at factory**

Insert any Amendment Instruction sheets after this page.

ENG-FORM: 820-0109.DOT

INSTALL_OPS
MANUAL AMENDMENT

Manual: SM68 (NPX136D)	Amendment #: 1
Document # SM68\ Install_Ops\809-0001	**Amendment Date:** Jan 26, 2007

The purpose of this amendment is to modify some of the descriptions in the manual.

Amendment Instructions:

1

Remove Pages	Replace With Pages
1-1 to 1-5 Rev 4.00	1-1 to 1-5 Rev 4.00 Amendment 1
3-3 to 3-8, 3-13 to 3-14 and 3-20 to 3-21 Rev 4.00	3-3 to 3-8, 3-13 to 3-14 and 3-20 to 3-21 Rev 4.00 Amendment 1

Note: Ensure that all drawings are inserted in the order shown on the latest drawing lists.

5   Update the Amendment Record sheet at the front of the manual.

6   Insert this page into the manual after the Amendment Record sheet (page ii).

Manual Amendment ends after the following amended pages

Table of Contents

ENG-FORM: 820-0109.DOT

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3   Operation

ENG-FORM: 820-0109.DOT

Section 1 Description

1.1   Introduction

This section of the manual contains information on the NPX136D Series Panel Mount P25 VHF Transceiver.

The NPX136D incorporates NAT's proven user-friendly operating system with on-line help, making it easy to program and use. The small size makes this radio ideal for airframes where size and weight are a factor.

1.2   Purpose of Equipment

The NPX136D panel mount P25 VHF transceiver is a stand-alone radio designed for the single mission user. It provides all the features needed to satisfy communications within the VHF high band.

1.3   Features

The radio covers a frequency range of 136.0000 to 173.9975 MHz in 2.5/6.25 kHz increments. Each of the 255 available channels can operate in one of three modes: wide band analog, narrow band analog or digital P25 Phase I.

A SCAN function allows scanning of selected channels. Transmit power of either 1 watt or 10 watts is selectable from the front panel. Simplex and semi-duplex operations are available. A guard receiver is standard with the -070 model.

Conveniently located beside the display are separate main volume, guard volume and transmit select switches. Easily identified along the bottom of the front panel are squelch test, channel up/down and display controls. The aircraft dimmer bus provides control for the panel lighting.

1.4   Specifications

1.4.1   Radio Specifications

+28Vdc Power	Nominal:	+27.5 Vdc	
	Maximum:	+30.3 Vdc	
	Minimum:	+22.0 Vdc	
	Emergency:	+18.0 Vdc	

		NPX136D-000	NPX136D-070
Current (Under standard conditions)			
	Idle:	330 mA (max.)	380 mA (max.)
	Receive:	380 mA (max.)	430 mA (max.)
	Transmit:	2.6 A (max.)	2.6 A (max.)

+28V Lights	+28 Vdc, 300 mA (max.)
Frequency Range	136.000 – 173.9975 MHz
Operating Modes	Project 25 and conventional Analog Simplex or Semi-Duplex
Channels	255 max. Plus GD1 and GD2
Zones	16 max.
Sub-audible signaling	CTCSS - 42 tones from 67.0 to 254.8 Hz CDCSS - 83 data patterns
Remote Interface	RS232C Data, to PC for Channel Loading and Firmware Loading
RF Input/Output Impedance	50 ohms
Voice Digital Mode	IMBE 4.4 kb
Frame Re-sync Interval	180 ms
Error Correction Algorithms	RS / Golay / Hamming
Channel Increments	2.5 / 6.25 kHz
Channel Separation	12.5 / 25 kHz
Scan Capability	16 channels max. 1 home, 1 priority, 14 list.
Scan Rate	8 channels per second.

1.4.2   Main Receiver

Reference Sensitivity (12 dB SINAD)	≤-113 dBm
Reference Sensitivity (5% BER)	≤-113 dBm
Adjacent Channel Rejection	≥70 dB (25 kHz BW)
Spurious Response Rejection	≥70 dB
Intermodulation Rejection	≥70 dB

Audio Output Power	100 mW (600 ohms) rated
Audio Dynamic Range	≥37 dB
Audio Frequency Response	300 – 3000 Hz, Standard: EIA Std. -6 dB (+1/-3 dB) / oct de-emphasis. 300 – 500 Hz, Standard with an additional +6 dB/oct permitted. 2500 – 3000 Hz, Standard with an additional -12 dB / oct permitted.
Audio Distortion	4% typ. (10% max.)
Conducted Spurious Emissions	≤-57 dBm
FM Hum and Noise	≥34 dB (12.5 kHz BW) ≥40 dB (25 kHz BW) ≤-57 dBW squelched

1.4.3   Guard Receiver (NPX136D-x70 only)

All specifications are identical to the main receiver with the following exception.

    Audio Output Power, minimum: 10 mW (adjustable)

Note: Main and Guard cannot be 455 kHz from each other due to 2nd IF interference

1.4.4   Transmitter

Carrier Output Power	1 or 10 W ±1 dB
Time-out Timer	30-300 s (Factory Set to 60 s)
Duty Cycle	20% (1 min Tx, 4 min Rx.)
VSWR	20:1 (30 sec duration - undamaged)
Transmitter Stability into VSWR (3:1): Spurious Output	≤ -13 dBm
Rated Deviation	±5.0 kHz (25 kHz BW) ±2.5 kHz (12.5 kHz BW)
Carrier Frequency Stability	±2.5 ppm
Conducted Spurious Emissions	≤-20 dBm
Adjacent Channel Power	≤-70 dBc (25 kHz BW)
FM Hum and Noise	≥40 dB (25 kHz BW) ≥34 dB (12.5 kHz BW)
Microphone Input Impedance	150 Ω ±20 %

Audio Frequency Response	300 – 3000 Hz, Standard: EIA Std. +6 dB (+1/-3 dB) / oct pre-emphasis. 300 – 500 Hz, Standard with an additional +6 dB/oct permitted. 2500 – 3000 Hz, Standard with an additional -6 dB / oct permitted.
Audio Distortion	4% typ. (10% max.)
Audio Input Sensitivity	100 mV rms (60% of rated deviation)
Sidetone Audio Level	25 mW (Adjustable)
Transmitter CTCSS Tone Deviation	475 ± 125 Hz (12.5 kHz BW) 750 ± 250 Hz (25 kHz BW)
Carrier Attack Time/Duration	≤100 ms

1.4.5   Physical Specifications

Height	2.65" (67.2 mm) max
Depth behind panel	7.02" (178.2 mm) not including connectors
Width	5.77" (146.6 mm), 4.97" behind panel
Weight	3.2 lbs. (max.)
Mounting	Four standard Dzus-rail fasteners
Connectors	One 25-pin male D-sub, with JVL locking hardware. One 15-pin male D-sub, with JVL locking hardware (reserved). One BNC female RF connector

1.4.6   Environmental Specifications

Temperature	-30 C to +60 C
Altitude	50,000 feet
Humidity	95 %
Shock	6g (any axis)

RTCA/DO-160D Env. Cat.
[(A4)(D1)]BAB(SBM)[1]XXXXXXZBABA[UUX]MXXXX

---

[1] Vibration also qualified to DO-160C, Sec. 8, Cat. N.

1.5 Unit Nomenclature

NPX136D radios are identified as follows:

NPX136D – 000

Lighting Power   Special Options
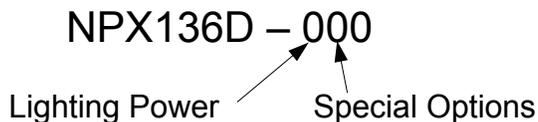
1.5.1 Lighting Power

The digit in the first position of the unit suffix indicates the lighting power used.

NPX136D - **0**00

0   **=**   28 Vdc Lights

1.5.2 Special Options

The digit in the second position of the unit suffix indicates any special options installed.

NPX136D - 0**0**0

0   **=**   No Guard installed
7   **=**   Two channel synthesized Guard

1.5.3 Other Options

The digit in the third position of the unit suffix is currently not assigned.

NPX136D - 00**0**

1.6 Accessories

Installation Kit   NPX-IKC

Serial Load Kit   FC51-000
        Consists of:
            PC Serial Load (CD)   NUDP-006
            Data Transfer Cable   FC51-001
            PC Cable   FC47-001

TFM138 Harness to NPX   FC45-002

End of section 1

| Section 2 Installation |

2.1 Introduction

Information in this section consists of unpacking and inspection procedures, installation procedures, post-installation checks, and installation drawings.

2.2 Unpacking and Inspection

Unpack the equipment carefully and locate the warranty card. Inspect the unit visually for damage due to shipping and report all such claims immediately to the carrier involved. Note that each unit should have the following:

- NPX136D Panel Mount Radio
- Warranty Card
- Operator's Manual
- Release certification

Verify that all items are present before proceeding and report any shortage immediately to your supplier.

2.2.1 Warranty

Complete the warranty card information and send it to NAT when the installation is complete. If you fail to complete the warranty card, the warranty will be activated on date of shipment from NAT.

Note: An appropriately rated facility, e.g. Certified Aircraft Repair Station, must install this equipment in accordance with applicable regulations. NAT Ltd's warranty is not valid unless the equipment is installed by an authorized NAT Dealer. Failure to follow any of the installation instructions, or installation by a non-certified individual or agency will void the warranty, and may result in a non-airworthy installation.

2.3 Installation Procedures

2.3.1 Note on Cable Routing

Do not bundle any lines from this unit with **transmitter coax lines**. Do not bundle any logic, audio, or DC power lines from this unit with 400 Hz synchro wiring or AC power lines. Do not position this unit next to any device **with a strong alternating magnetic field such as an inverter or significant interference to operation will result.** In all installations, use shielded cable **exactly as shown and ground as indicated**. Significant problems may result if these guidelines are not followed.

ENG-FORM: 805-0106.DOT

2.3.2   Notes on Cable Wiring and Shielding

All audio installations can be severely degraded by incorrect wiring and shielding, and may result in much higher cross-talk, hum, and ground-loop interference. This should be considered when audio wiring to and from the radio installation is performed.

2.3.3   Notes on Grounding

The case of the radio must be electrically grounded for maximum resistance to low frequency interference. A pin on the connector (Chassis ground) is provided and must be connected by a short wire to a clean ground, NOT jumpered to the power ground wire connection.

Refer to the aircraft structural repair manual and maintenance manual for instructions and information pertinent to this installation.

2.3.4   Cable and Wiring

All unshielded wire shall be selected in accordance with AC43.13-1B Change 1, Paragraphs 11-76 through 11-78. Wire types should be to MIL-W-22759 as specified in AC43.13-1B Change 1, Paragraphs 11-85, 11-86, and listed in Table 11-11. For shielded wire applications, use Tefzel MIL-C-27500 shielded wire with solder sleeves (for shield terminations) to make the most compact and easily terminated interconnect. Follow the wiring diagrams in Section 2.6 as required.

Allow 3 inches from the end of the wire to the shield termination to allow the hood to be easily installed. Note that the hood is installed after the wiring is complete.

Installation cabling must allow the radio to be easily withdrawn for disconnection and field service adjustments. Ensure an adequate service loop in the routing of the cables. It can be a serious issue if the unit is installed with the cables so short that the unit cannot be removed without disassembly of the surrounding structures. At least 30 cm (1 foot) of free cable is recommended.

All wiring should be 22 AWG minimum, except power and ground connections, which must be 20 AWG or larger, as indicated on the installation drawings. Ensure that the ground connection is clean and well secured. To prevent inadvertent system failure, power to this system must be supplied from a separate breaker or fuse and not connected to any other device. A 5 A fuse or breaker is recommended (28 Vdc).

Coaxial cable should be in accordance with MIL-C-17 unless otherwise specified. Do not use coax with PVC insulation. Teflon dielectric cable is encouraged at or above VHF frequencies or where cable runs exceed 8 feet. Note that at VHF frequencies, cable losses due to long cable runs and tight bends may cut the ERP (Equivalent Radiated Power) to less than 50% of spec.

ENG-FORM: 805-0106.DOT

In communication-intensive applications, poor cable routing and shielding may drastically compromise over-all system performance. Symptoms may be spurious squelch opening, RFI (Radio-Frequency Interference), and garbled reception.

RF cables must be neatly terminated (solder or crimp), and tested for shorts prior to system check-out (**not** while connected to the radio or antenna). Keep cable bends to a minimum at the antenna. Avoid sharp bends in the coax cables (minimum 3" radius) to prevent severe reflections. If sharp bends are required, use 90° elbow adapters.

Fabrication & installation of wiring harness should be in accordance with AC 43.13-1A chapter 11, sections 3 and 7.

Grounding and bonding should be in accordance with AC 43.13-1A chapter 11, section 3.

2.3.5   Antennas

Warning

To limit exposure to radio frequency fields that exceed exposure limits for people occupying the aircraft, install the antenna such that it is mounted **either** on a ground plane that is between the antenna and the occupants of the aircraft, **or** further than 32 inches (80cm) from the occupants of the aircraft.

Correct antenna placement and mounting is critical in order to achieve the best possible performance. In general, keep all antennas as widely separated as possible and clear of any large airframe obstructions.

Installation of the antenna should be in accordance with AC 43.13-1A chapter 2, section 3, chapters 5 & 6, and AC 43.13-2A chapter 3. If possible, the antenna should be located a minimum of 12 ft from aircraft navigation receiver antennas and a minimum of 4 feet from aircraft communications and ELT antennas. Be careful not to choose separations that closely approximate ¼, ½ or whole-number multiples of the navigation or communications system wavelength.

Note: Avoid any placement that puts antennas of like frequencies close together.

Bottom mounted antennas will perform best in flight, but poorest on the ground during testing. Antennas may be severely degraded by 'masking' effects of the fuselage or stabilizers, and generally give best performance when bottom mounted.

To reduce interference from rotor modulation and other undesirable stimuli, any blade or whip antenna must be surrounded by a ground plane surface (metallic, grounded material) with a radius equal to or greater than the height of the antenna. Under the same conditions, the antenna is also much less likely to cause interference to other aircraft systems (e.g. coupling into audio system, fluctuations in instrumentation, etc). Poor grounding will result in severe reflected power and high levels of RFI throughout the airframe.

Avoid antenna locations that will become fouled with oil, water, fuel or dirt, as this will degrade performance. Roof mounts (in close proximity to rotor blades) are permissible.

2.3.6   Mechanical Mounting

Installation of the transceiver should be in accordance with AC 43.13-1A chapter 2, section 3, and AC 43.13-2A, chapter 2. Pr 35 Dzus rail or equivalent may be used.

Mounting the radio requires a Dzus rail assembly with an opening width of 5 inches (127 mm) and a front clearance width of 5.75 inches (146.1 mm). Height requirement is 2.65" max (67.2 mm max). Refer to the mounting drawings and unit mechanical specifications to determine proper clearance dimensions. Be sure that adequate clearance is allowed for the cable connections to each unit.

2.3.7   Post-Installation Checks

If any preset requires adjustment, be sure this is carried out before the aircraft leaves, and that the unit and its mating connector are secured before departure. Make all required log book entries, electrical load, weight and balance amendments and other paperwork as required by your local regulatory agency.

2.3.7.1   Voltage/resistance checks

Do not attach the radio until the following conditions are met.

Check the following:

a)   P1 pins **<12>** and **<13>** for +28 Vdc relative to ground.

b)   P1 pins **<22>, <23>, <24>** and **<25>** for continuity to ground (below 0.5 Ω).

c)   Light voltage as per table below.

	P1 Pin #	Voltage
28 Volt Models	11	28 Vdc
14 Volt Models	10	14 Vdc
5 Volt Models	10	5 Vdc

Light Voltage

Ensure that the antenna is disconnected for the following test or erroneous readings may be obtained

d)   Radio coax connector for continuity to the antenna coax connector (shield and centre conductor), and for open circuit from the centre conductor to ground and open circuit from the centre conductor to the shield.

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2.3.7.2   Power On Checks

a)   Install the radio and power up the ship's systems. Turn on the radio. Check the operation of all front panel controls. Adjust brightness and volume levels as required.

b)   Check all transmit and receive functions. Ensure the RX/TX status indicator lights green when the radio is keyed to transmit and amber when receiving.

c)   Check the SCAN function.

      Note: You **may be unable to hear the received audio** if the tones do not match those set in the radio. To avoid any confusion, tones should be set to **OFF** (via the settings menu) before scanning so that all channels will be heard.

d)   Check the antenna feedline at the R/T with a through-line wattmeter and suitable frequency elements to ensure correct antenna matching. Reflected power in excess of 25% represents a serious problem, and should be investigated carefully, or serious RFI and system interference as well as possible radio damage may result. A VSWR measurement over 3.0:1 represents a significant loss in signal power to the antenna. Check that forward power is to specifications over the frequency band of the radio.

Upon satisfactory completion of all performance checks, make the required log entries and complete the necessary Regulatory Agency paperwork before releasing the aircraft for service.

2.3.8   Post Installation EMI Test

The purpose of this test is to identify any interference that the radio may cause with existing aircraft systems. The radio should be tested in accordance with the Installation Approval Test Procedure (see section 2.6), and the test results documented on the record sheets.

2.4   Continued Airworthiness

Maintenance of the NPX136D is 'on condition' only. Periodic maintenance of this product is not required.

2.5 Accessories Required But Not Supplied

Installation kit p/n **NPX-IKC** (crimp) is required to complete the installation. The kit consists of the following:

Quantity	Description	NAT Part #
1	D-min 25 Pin Female Crimp Installation Kit	D25SV-IKC
1	Field Serviceable BNC Coax Connector	20-51-001

The NAT Part **D25SV-IKC** Crimp Installation Kit consists of:

Quantity	Description	NAT Part #
1	D-min 25 Socket housing	20-21-025
25	MS Crimp Socket	20-26-901
1	25 pin JVL Hood/Locklever	20-29-250

2.6 Installation Drawings

DRAWING	REV.	DESCRIPTION	TYPE
NPX136D\403-0	1.00	Panel Mount Transceiver	Interconnect
NPX136D\403-1	1.00	Panel Mount Transceiver	Interconnect
NPX136D\405-0	1.00	Panel Mount Transceiver	Connector Map
NPX136D\905-0	1.00	Panel Mount Transceiver	Faceplate
NPX136D\922-0	1.00	Panel Mount Transceiver	Mechanical Installation
NPX136D\634-0	1.00	Panel Mount Radio	Installation Approval Test Procedure

| Section 2 ends after these Drawings |

ENG-FORM: 805-0106.DOT

J1 PRIMARY CONNECTOR
NPX136D
P25 VHF TRANSCEIVER

P1
25 PIN FEMALE DMIN
MATING CONNECTOR

Signal	Pin
+28VDC POWER	12
+28VDC POWER	13
POWER GROUND	24
POWER GROUND	25
+28V LIGHTS	11
+5V/+14V LIGHTS	10
LIGHTS GROUND	22
PHONES HI	9
PHONES LO	21
MIC KEYLINE	8
MIC AUDIO HI	7
MIC AUDIO LO	19
AUDIO GROUND	18
CHANNEL UP	4
CHANNEL DOWN	3
SERIAL DATA RX IN	2
SERIAL DATA TX OUT	1
DIGITAL GROUND	14
RECEIVE ACTIVE	20
RESERVED	5
RESERVED	6
RESERVED	15
RESERVED	16
RESERVED	17
CHASSIS GROUND	23

18 AWG or 2 x 20 AWG
3A +27.5 VDC AVIONICS POWER

18 AWG or 2 x 20 AWG

+28 VDC LIGHTS
+5/14 VDC LIGHTS △1.

150/600 Ohm nominal

150 Ohm nominal
(carbon equivalent)

CHANNEL UP

△3.

CHANNEL DOWN

TX DATA
RX DATA
DIGITAL GROUND △4.

△2.

} △5.

△8.

BNC-MALE

J2 RF CONNECTOR

RF TX/RX

△9.

P2
MALE BNC
MATING CONNECTOR

NOTES:

△1. CONNECT ONE LINE ONLY AS REQUIRED TO MATCH LIGHTING VOLTAGE STATED ON ID/MFG LABEL.

△2. OPTIONAL CONNECTION TO CC450 COMM CONTROLLER OR OTHER DEVICE.
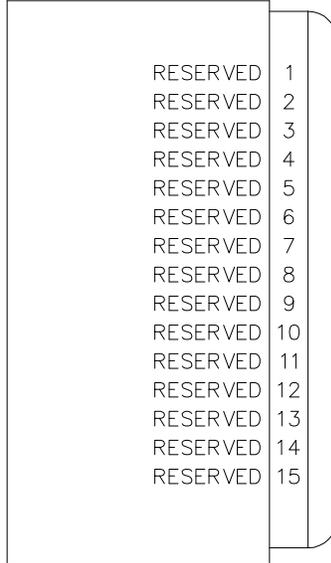
△3. OPTIONAL REMOTE CHANNELLING SWITCH. MAY BE LOCATED ON CYCLIC CONTROL, ETC.

△4. OPTIONAL SERIAL COMMUNICATION DEVICE.

△5. NO CONNECTION TO THIS PIN. RESERVED FOR OTHER FEATURES, FUTURE UPGRADES.

6. ALL WIRES SHOULD BE 22 AWG UNLESS OTHERWISE SPECIFIED. ALL WIRE SHOULD BE IN ACCORDANCE WITH MIL-W-22759. ALL SHIELDED WIRE/CABLE SHOULD BE IN ACCORDANCE WITH MIL-C-27500.

7. INSTALLATION KIT REQUIRED: NAT P/N NPX-IKC (CRIMP PINS).

△8. VHF-FM COMMUNICATIONS ANTENNA. COMANT P/N CI 177-13 OR EQUIVALENT.

△9. USE RG400 COAXIAL CABLE OR EQUIVALENT.

DESIGNED	TLS/SRM	❋nat NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	MWS/TAT					
DATE	JUL 22/04	TITLE	P25 VHF PANEL MOUNT TRANSCEIVER			
CHECKED	NAT 221 / NAT 249					
APPROVED	NAT 114	SIZE: A	CAGE CODE: 3AB01	PART NO.: NPX136D	REV.: 1.00	SHEET: 1/1
FILE	403-0.DWG	DWG. TYPE	INTERCONNECT	DWG. NO.	NPX136D\403-0	

J3
NPX136D
P25 VHF TRANSCEIVER
DATA CONNECTOR

P3
15 PIN FEMALE DMIN
MATING CONNECTOR

RESERVED	1
RESERVED	2
RESERVED	3
RESERVED	4
RESERVED	5
RESERVED	6
RESERVED	7
RESERVED	8
RESERVED	9
RESERVED	10
RESERVED	11
RESERVED	12
RESERVED	13
RESERVED	14
RESERVED	15

DEFINITIONS:

RESERVED: MAY BE CONNECTED AND USED IN THE FUTURE.
THE CIRCUITRY MAY BE PRESENT OR ADDED TO
ACTIVATE THE FUNCTION. THE PIN MAY BE USED
FOR TEST PURPOSES.
THERE IS NO EXTERNAL CONNECTION.

NOTES:

1. ALL WIRES SHOULD BE 22 AWG UNLESS OTHERWISE SPECIFIED.
ALL WIRE SHOULD BE IN ACCORDANCE WITH MIL−W−22759. ALL
SHIELDED WIRE/CABLE SHOULD BE IN ACCORDANCE WITH MIL−C−27500.

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DESIGNED	SRM	✱nat NORTHERN AIRBORNE TECHNOLOGY LTD.					
DRAWN	MWS/TAT						
DATE	JUL 27/04	TITLE	P25 VHF PANEL MOUNT TRANSCEIVER				
CHECKED	NAT 221 NAT 249						
APPROVED	NAT 114	SIZE A	CAGE CODE 3AB01	PART NO. NPX136D		REV. 1.00	SHEET 1/1
FILE	403−1.DWG	DWG. TYPE		INTERCONNECT	DWG. NO.	NPX136D\403−1	

P1

25 PIN FEMALE D-MIN
MATING CONNECTOR

Pin	Signal
1	SERIAL DATA TX OUT
2	SERIAL DATA RX IN
3	CHANNEL DOWN
4	CHANNEL UP
5	RESERVED
6	RESERVED
7	MIC AUDIO HI
8	MIC KEYLINE
9	PHONES HI
10	+5V/+14V LIGHTS
11	+28V LIGHTS
12	+28VDC POWER
13	+28VDC POWER
14	DIGITAL GROUND
15	RESERVED
16	RESERVED
17	RESERVED
18	AUDIO GROUND
19	MIC AUDIO LO
20	RECEIVE ACTIVE
21	PHONES LO
22	LIGHTS GROUND
23	CHASSIS GROUND
24	POWER GROUND
25	POWER GROUND
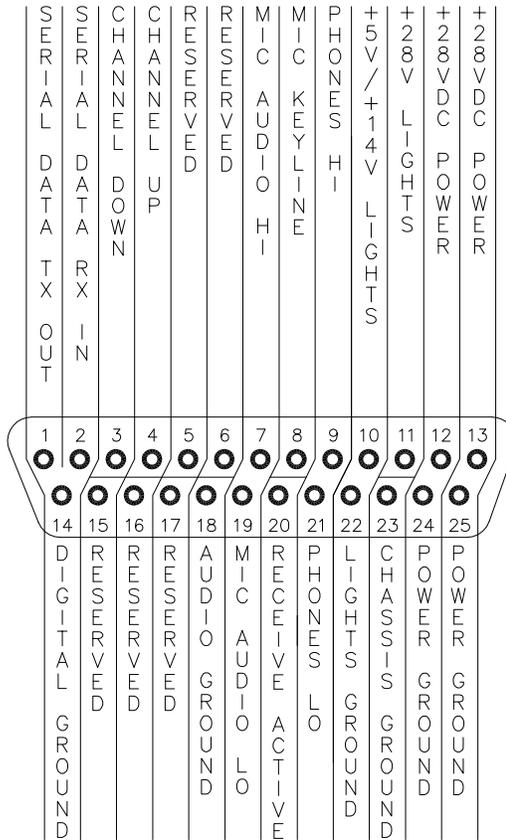
VIEW IS FROM REAR OF AIRFRAME CONNECTOR

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DESIGNED	TLS	nat NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	MWS					
DATE	MAY 28/04	TITLE P25 VHF PANEL MOUNT TRANSCEIVER				
CHECKED	NAT 221 / NAT 255					
APPROVED	NAT 114	SIZE A	CAGE CODE 3AB01	PART NO. NPX136D	REV. 1.00	SHEET 1/1
FILE 405-0.DWG		DWG. TYPE	CONNECTOR MAP	DWG. NO. NPX136D\405-0		

NPX136D TRANSCEIVER

nat

SCAN
NORM
GD TX
OFF
GD 1
GD 2
MIN

DISP   CHAN   SQ
− +   − +
HELP

1 -/_	2 ABC	3 DEF	4 GHI
Esc	▲	Enter	Menu	5 JKL	6 MNO	7 PQRS	8 TUV
◄	▼	►	Fn	9 WXYZ	0	* ADD	# DEL

DESIGNED	SRM	nat NORTHERN AIRBORNE TECHNOLOGY LTD.					
DRAWN	MWS						
DATE	JUN 08/04	TITLE	P25 VHF PANEL MOUNT TRANSCEIVER				
CHECKED	NAT 267 NAT 249						
APPROVED	NAT 117	SIZE A	CAGE CODE 3AB01	PART NO. NPX136D		REV. 1.00	SHEET 1/1
FILE	905-0.DWG	DWG. TYPE		FACEPLATE	DWG. NO.	NPX136D\905-0	

NOTES:
1. DIMENSIONING AND TOLERANCING
   IN ACCORDANCE WITH ASME Y14.5M-1994

8.84 [224.6] MAX

1.06 [26.92] EST.

CENTER OF GRAVITY

3.75 [95.25] EST.

2.38 [60.45] EST.

4.97 [126.2] MAX

PRODUCT LABEL

TOP OF LABEL

7.02 [178.2] MAX

0.77 [19.6] MAX

1.05 [26.6] MAX

2.65 [67.2] MAX

5.77 [146.6] MAX

NPX136D TRANSCEIVER

SCAN NORM
MN GD TX GD1 GD2
OFF GD MIN

SQ
HELP
DISP CHAN
Menu Fn
Enter
Esc

CONFIDENTIAL AND PROPRIETARY TO NAT LTD.

NORTHERN AIRBORNE TECHNOLOGY LTD.

TITLE P25 VHF PANEL MOUNT
TRANSCEIVER

PART NO. NPX136D
CAGE CODE 3AB01
MECH. INSTALLATION
SIZE B
DWG. TYPE

DESIGNED TLS
DRAWN MWS
DATE MAY 21/04
CHECKED
APPROVED
FILE 922-0.DWG

NAT 221 NAT 249 NAT 114

DIMENSIONS
ARE INCHES [mm]
THIRD ANGLE
PROJECTION
MASS: 3.2 lbs. (1.5 kg) MAX
MATERIAL —
FINISH —

REV. 1.00
SHEET 1/1
DWG. NO. NPX136D\922-0

1.   Post Installation EMI Test

The purpose of this test is to identify any interference that the NPX136D may cause with existing aircraft systems.

2.   Test Conditions

The NPX136D should be installed and function tested. The antenna VSWR should be checked. A forward/reverse power check with an in-line wattmeter should show no more than 10% reflected power. For the following tests, insure that the transmit power is set to HI.

3.   Methodology

Most of the EMI tests can be accomplished on the ground. In some cases, flight testing is required or is easier. If the aircraft is approved for IFR operations, then it is mandatory that interference between the NPX136D and the approach aids be checked in flight.

The GPS should be operational and navigating with at least the minimum compliment of satellites. The VHF comm should be set to the frequencies indicated with the squelch open. VOR/ILS/GS receivers should be set to the frequencies indicated and selected for display. If possible, set up a VOR/ILS ramp test set on the frequencies indicated and adjust the output until the flags are out of view. The transponder and encoder should be monitored with ramp test equipment. If possible set the ADF to a nearby navigation station.

Modulate the NPX136D transmitter on the indicated frequencies for at least 20 seconds. Observe the GPS for any degradation in satellite status or availability or flags. Listen for any noise or detected audio signals on the VHF comm(s). Listen for any noise or detected audio signals on the VOR/LOC receiver audio; look for any movement of flags or needles on the VOR/LOC/GS navigation display(s).

List the power plant, fuel and other electric instruments in the chart provided and note any anomalies that occur while transmitting. Assess the results.

If the aircraft is equipped with an autopilot or a stability augmentation system, then test fly the aircraft and verify that the operation of the NPX136D transceiver does not have adverse effects on these systems. After checking for gross effects at a safe altitude, fly an approach with each of the different navigation systems coupled to the autopilot (ILS, GPS etc.) and look for any anomalies.

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4.   Results

If the installed system passes all of the applicable EMI tests, then no further action is required.   If interference is observed, then the interference must be assessed against the appropriate standards of airworthiness for the system in question. For example: it is permissible for a VFR certified GPS to lose navigation capability while the NPX136D is transmitting, providing that it recovers properly and promptly, but it is not permissible for an IFR Approach certified GPS to be affected in the same way. A complete discussion of all the standards of airworthiness to be applied in assessing EMI effects is beyond the scope of this document.

5.   Procedure

A.   Operate the NPX136D transmitter on the following frequencies for at least 20 seconds. Observe the GPS for any degradation in satellite status, or availability, or flags.

FREQUENCIES	GPS #1		GPS #2	
NPX136D	PASS	FAIL	PASS	FAIL
143.2187 MHz				
143.2200 MHz				
153.4500 MHz				
157.5400 MHz				
157.5437 MHz				

NOTES:

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B.   Determine if the image frequency for the VHF Comm falls within the range of the NPX136D unit. If so, select a set of frequencies that will cause the NPX136D to be set as close as possible to the image frequency. Any one of the many possible sets will suffice. Record these values in the spaces provided in the following chart. Modulate the NPX136D transmitter on the following frequencies for at least 20 seconds. Listen for any noise or detected audio signals on the VHF comm.

Example - Bendix/King KY 196A:
The first IF frequency is 11.4 MHz. The L.O. is above the received frequency (high side injection), therefore the image frequency is 22.8 MHz above the selected frequency. Set the KY 196A to 120.000 MHz and the NPX136D to 142.8000 MHz.

FREQUENCIES		RESULTS	
VHF #1	**NPX136D**	**PASS**	**FAIL**
135.975	138.0000		
121.150	157.5000		
131.250	157.5000		
Image:			

FREQUENCIES		RESULTS	
VHF #2	**NPX136D**	**PASS**	**FAIL**
135.975	138.0000		
121.150	157.5000		
131.250	157.5000		
Image:			

NOTES:

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C.   Determine if the image frequency for the VOR/ILS Nav falls within the range of the NPX136D unit. If so, select two sets of frequencies that will cause the NPX136D to be set as close as possible to the image frequency. Choose one set in the localizer frequency range, and one in the VOR frequency range. Record these values in the spaces provided in the following chart. Modulate the NPX136D transmitter on the following frequencies for at least 20 seconds. Listen for any noise or detected audio signals on the receiver audio; look for any movement of flags or needles on the navigation display.

FREQUENCIES		RESULTS	
VOR/ILS #1	**NPX136D**	**PASS**	**FAIL**
108.000	162.0000		
108.100	162.1500		
Image:			
Image:			

FREQUENCIES		RESULTS	
VOR/ILS #2	**NPX136D**	**PASS**	**FAIL**
108.000	162.0000		
108.100	162.1500		
Image:			
Image:			

NOTES:

E NG-FORM: 634-0100.DOT

D.   Modulate the NPX136D transmitter on the following frequencies for at least 20 seconds. Look for any movement of flags or needles on the navigation display.

FREQUENCIES		RESULTS	
G/S #1	**NPX136D**	**PASS**	**FAIL**
334.7 (108.1)	167.3500		

FREQUENCIES		RESULTS	
G/S #2	**NPX136D**	**PASS**	**FAIL**
334.7 (108.1)	167.3500		

NOTES:

Note: For the following tests, select frequencies at the top, middle and bottom of the range of the NPX136D.

Frequency #1 _____   Frequency #2 _____

Frequency #3 _____

E.   At a safe altitude, engage the autopilot or stability augmentation system. Modulate the NPX136D transmitter on the above frequencies for at least 20 seconds. Observe any effect on the autopilot or stability augmentation system.

Observations:

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F. Perform a coupled ILS approach to the aircraft's certified limits. Modulate the NPX136D transmitter on the above frequencies for at least 20 seconds. Observe any effect on the autopilot. Repeat for each different system such as ILS #2, GPS, FMS etc.

Observations:

G. List the power plant, fuel and other electric instruments in the chart provided and note any anomalies that occur while transmitting. Assess the results.

STEP	SYSTEM	PASS	FAIL	NOTES
1	Xponder & Encoder			
2	ADF 1 & 2			
3	VG			
4	Compass			
5	Directional Gyro			
6	Oil Pressure			
7	Fuel Pressure			
8	Oil Temp			
9	Amps			
10	Bus Voltage			
11	Fuel %			
12	Ng			
13	TOT			
14	Torque %			
15	Annunciators			
16	Digital Clock			

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STEP	SYSTEM	PASS	FAIL	NOTES

NOTES:

End of Installation Approval Test Procedure

E NG-FORM: 634-0100.DOT

Section 3 Operation

3.1   Introduction

Information in this section consists of the functional and operational procedures for the NPX136D-000 and NPX136D-070 Panel Mount P25 VHF Transceivers.

The NPX136D incorporates NAT's proven user-friendly operating system with on-line help, making it easy to program and use. The small size makes this radio ideal for airframes where size and weight are a factor.

3.2   Purpose of Equipment

The NPX136D panel mount P25 VHF transceiver is a stand-alone radio designed for the single mission user. It provides all the features needed to satisfy communications within the VHF high band.

3.3   General Features

The NPX136D covers a frequency range of 136.0000 to 173.9975 MHz in 2.5/6.25 kHz increments. Each of the 255 available channels can operate in one of three modes: wide band analog, narrow band analog or digital P25 Phase I.

A SCAN function allows scanning of selected channels. Transmit power of either 1 watt or 10 watts is selectable from the front panel. Simplex and semi-duplex operations are available. A separate two-channel guard receiver is standard with the -070 model. The guard receiver is not installed in –000 models, and the guard controls in these transceivers provide no function.

Conveniently located beside the display are separate main volume, guard volume and transmit select switches. Easily identified along the bottom of the front panel are squelch test, channel up/down and display controls. The aircraft dimmer bus provides control for the panel lighting.

3.4   Operation

3.4.1   Introduction

In addition to the general features that are available, the NPX136D has several features that extend its capability and make it easier to use. These features include alphanumeric channel labelling, and built-in operator help.

For ease of use and operability, the NPX136D series of radios uses a control layout and operating system similar to the popular NAT Tac/Com™ family of radio control heads.

In addition to this manual, most operational questions can be addressed by the comprehensive Help function built into the radio.

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3.4.2   Power On

3.4.2.1   Power-up Screen

Turn the NPX136D on by rotating the main (MN) volume control clockwise, away from the off (detent) position. The software revision number is shown briefly on the top display line and the status of the installed transceiver modules is shown on the lower display line. If enabled, the operator is able to choose between starting normal operation or being shown a tutorial on the operation of the radio.
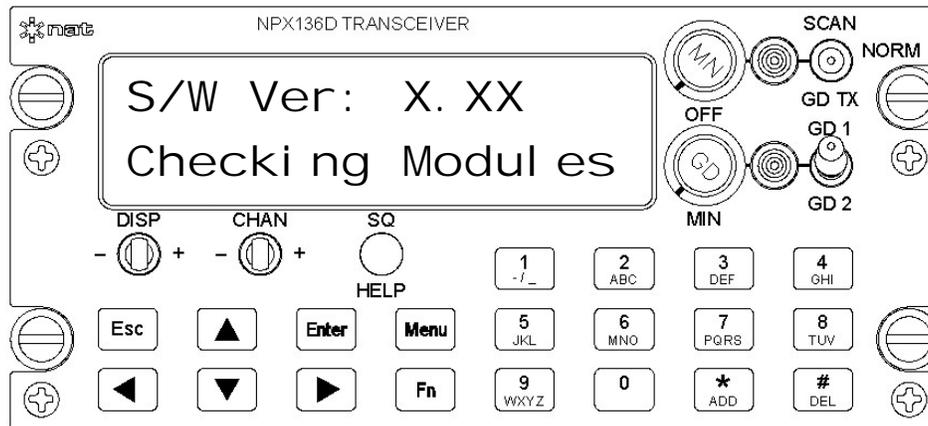

To display a tutorial on the operation of the NPX136D press the SQ/HELP button. To exit the tutorial, press the ESC button.

To decline Help, press the Enter or Esc button. The NPX136D will then display a summary of the installed functions and current settings. (This feature can be disabled for faster start-up – see section 3.7.8.3 Power up Help) The NPX136D is then ready for normal operation, referred to as **Normal Operating Mode** throughout this manual.
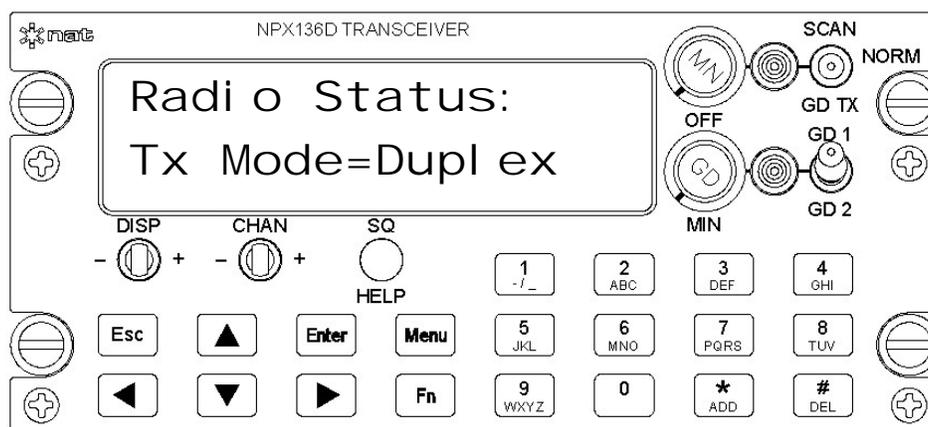
Note: Any activity that causes the radio to reprogram the transceiver modules (changing the guard channel, enabling or disabling squelch, changing channel parameters, etc) may cause the receive audio to mute momentarily.

ENG-FORM: 806-0106.DOT

3.4.3   Controls and Indicators
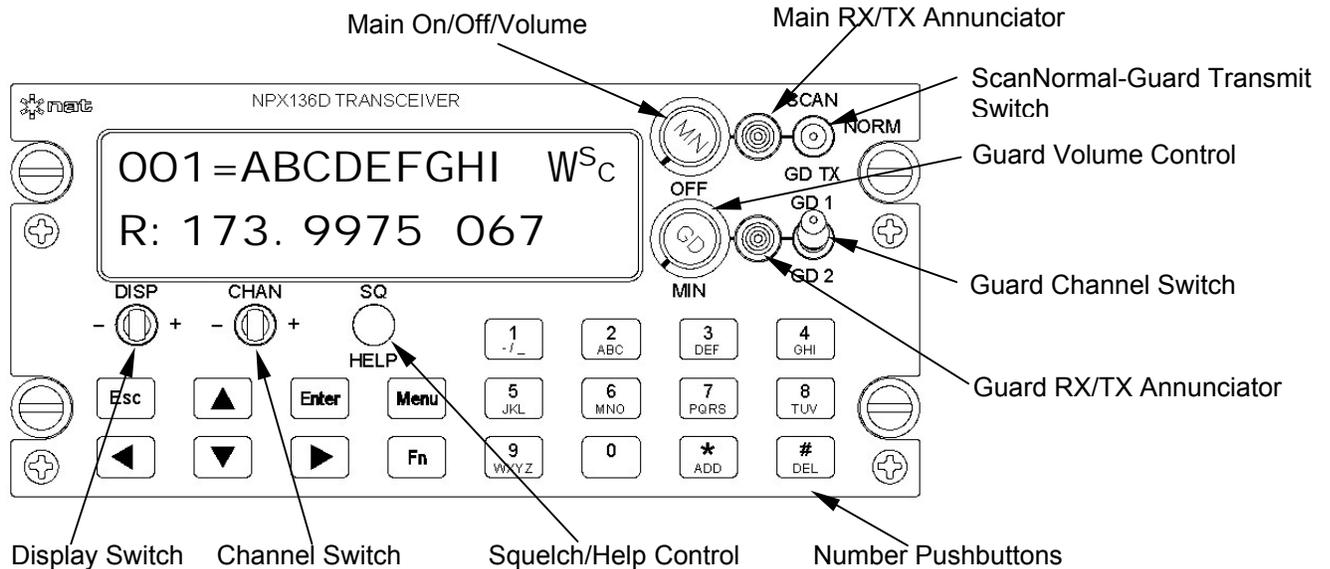
3.4.3.1   Main Receive Volume and Power On / Off Control (MN)

The MN knob controls the main receiver volume; rotating it clockwise (cw) increases the volume, and counterclockwise (ccw) decreases it. When rotated fully ccw past the detent, the NPX136D will be turned off.

3.4.3.2   Guard Receive Volume (GD) (–070 only)

To increase the volume of the guard receiver, turn this knob cw; to decrease the volume turn it ccw. When rotated fully ccw, the guard receive audio will be at the preset minimum level.

3.4.3.3   Main RX/TX Status Annunciator

The main RX/TX annunciator displays the RX (Receive) and the TX (Transmit) status of the main transceiver. When transmitting, the LED will light green. When an RF signal is received that matches the main channel's receive frequency, the LED will light amber. When idle (not receiving or transmitting), the LED will be dark. The colour coding used for these functions corresponds to standard aircraft FM radio conventions. Note that this is the reverse of standard vehicular conventions used with land mobile equipment.

Note: A NPX136D that is receiving may not produce any audio if the analog tones or digital squelch mode present on the receive signal do not match those set for the current channel.

3.4.3.4   Guard RX/TX Status Annunciator (–070 only)

The guard RX/TX annunciator displays the RX (Receive) and the TX (Transmit) status of the guard channel. When an RF signal is received that matches the guard channel's receive frequency, the LED will light amber. When the main transceiver is transmitting on the guard channel, the LED will light green. When idle (not receiving or transmitting), the LED will be dark.

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3.4.3.5   SCAN / NORM / GD TX Switch

The SCAN / NORM / GD TX switch is a three-position centre-off toggle switch used to select the mode of the transceiver. The scan mode is turned on by putting the SCAN / NORM / GD TX switch in the SCAN position. For details on scanning operation see section 3.11.

Turn on the GD TX mode (–070 only) by putting the SCAN / NORM / GD TX switch in the GD TX position. For details on Guard Transmit operation see section 3.4.3.6.

To turn off the scan mode (or GD TX mode in the –070 only) and put the NPX136D into normal operating mode, put the SCAN / NORM / GD TX switch in the NORM position.

3.4.3.6   Guard Transmit Mode (–070 only)

To select the guard channel for transmit or to review the guard channels' parameters put the SCAN / NORM / GD TX switch in the GD TX position. All radio transmissions will be on the selected guard channel's transmit frequency. To use the main transceiver's channel for the transmit frequency put the SCAN / NORM / GD TX switch in the NORM position.

This function only applies to NPX136Ds with the guard receiver option installed. If not installed, GD NOT INSTALLED will be displayed on the upper line when the switch is set to the GD TX position.

When the SCAN / NORM / GD TX switch is placed in the GD TX position all other modes of operation are cancelled and the NPX136D is put in to the guard transmit mode.

3.4.3.7   Guard Channel Switch (GD 1/GD 2) (–070 only)

The guard channel switch is a two-position toggle switch that selects either guard channel GD 1 or GD 2.

3.4.3.8   Display Switch (DISP)

The display switch is a two-position momentary toggle switch used to change the channel parameters shown on the lower display. By toggling the switch left or right, the operator can select between the channel's receive frequency, the channel's transmit frequency, the current zone (if enabled), or the channel's talk group IDs (if enabled),

3.4.3.9   Channel +/- Switch

The Channel +/- switch is a two-position momentary toggle switch used to select channels. For full information, see section 3.5.2

4.3.10   Squelch/Help Button (SQ / HELP)

The SQ/HELP button is a momentary pushbutton used to disable squelch (in normal operating mode) or to display help screens (in any menu mode).

3.4.3.10.1   Squelch (normal operating mode)

The first press of the SQ button disables the main receiver squelch, and the lower display will show `MAIN SQ DISABLED` (on an analog channel), or `MAIN MONITOR` (on a digital channel).

The second press of the SQ button disables the guard receiver squelch, and the lower display will show `GD SQ DISABLED` when on an analog channel, or `GD MONITOR` when on a digital channel.

Press the SQ button a third time or press the Esc button to return to normal squelch operation. The lower display will return to its previous condition. On a digital channel with squelch set to monitor, no audio will be heard unless receiving a digital transmission.

3.4.3.10.2   HELP (menu mode)

To read the help for any menu item press the help (SQ / HELP) button. The HELP text scrolls across the lower display. Press the Enter button to pause and resume scrolling. Use the CHAN +/- switch to increase/decrease the scroll rate. Press the ◄ arrow to scroll backwards, and the ► arrow to scroll forward quickly. To return to the menu or field in use when HELP was selected, press the Esc button.

3.4.3.11   Menu Button

Pressing the Menu button advances through the available menu choices. For details see section 3.6.

3.4.3.12   Enter Button

Pressing the Enter button selects a menu item or value. For details see the relevant sections.

3.4.3.13   Function Button (Fn)

The Fn button is used to provide access to special functions. See section 3.10.

3.4.3.14   Escape Button (Esc)

The Escape button is pressed to exit a menu or to discard changes. For details see the relevant sections.

3.4.3.15   Arrow and Number Pushbuttons

The number buttons (0-9, ✳ and #) and arrow buttons - right ►, left ◄, up ▲ and down ▼, are momentary pushbuttons used to enter information, or to select specific channel numbers.

In Normal Operating mode, the ► and ◄ buttons change the channel, and (if enabled) the ▲ and ▼ buttons change the zone (see section 3.5.3). The number buttons enter the Goto channel mode (see section 3.5.2).

In Menu mode, the ► and ◄ buttons change the cursor position or select channels, the ▲ and ▼ buttons change the value of certain fields, and the number buttons allow entry of alphanumeric information into frequency and name fields (see section 3.6).

Full details on use are given in the relevant sections.

Note: The ✳ and # keys are used as ADD and DELETE keys in some sections of the menus.

3.5   **Displays - Normal Operating Mode**
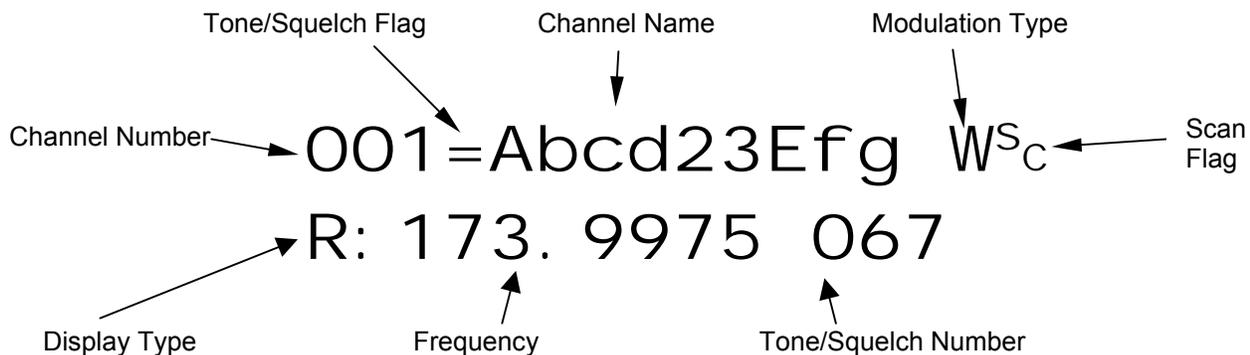
The upper row of the display contains the channel number, channel name and various flags. The channel's tone/squelch flag shows the state of analog tones or digital squelch mode. The channel's modulation type flag shows the modulation mode. The scan flag shows if the current channel is in the scan list or is a priority scan channel.

The lower row of the display contains current channel information for one of the following: the receive information, the transmit information, the current zone (if zones are turned on), and the receive or transmit talk group id (if talk group display is turned on).

3.5.1   Display Details

3.5.1.1   Channel Number:

Channel numbers for the main receiver are 001 – 255. This may be changed to include letters and other characters if the display settings channel number mode is set to alphanumeric. Channel numbers allowed for the guard receiver are GD1 and GD2.

3.5.1.2   Tone/Squelch Flag

The tone squelch flag shows the status of analog tones and digital squelch as set from the settings menu. This flag is shown as follows:
" "   Blank, for analog tones off. (Not applicable for digital channels.)
"–"   Dash, for analog tones set to *transmit only* or digital squelch set to *monitor*.
"="   Equal Sign, for analog tones on or digital squelch set to *per chan*.

3.5.1.3   Channel Name

The channel name is a nine-character alphanumeric name for the channel.

3.5.1.4   Modulation Type

The modulation type for the current channel may be: `w` for wideband analog; `n` for narrowband analog; `D` for P25 Phase I digital.

3.5.1.5   Scan Flags

Scan flags denote the channels that will be checked during scanning. S_C indicates the current channel is checked when list scanning. P_1 indicates the current channel is checked during priority scan. If a channel is set as a priority scan channel and a list scan channel just the priority scan flag is shown.

3.5.1.6   Display Type

The display type is selected with the Display switch. The display types are `R:` for receive display, `T:` for transmit display. `S:` for simplex display, `Z:` for zone display, `Rx TGI D:` for receive talk group, `Tx TGI D:` for transmit talk group and `Spl x TGI D:` for simplex talk group. The display types shown are dependent on the current radio configuration.

3.5.1.6.1   Receive Display (Duplex Mode)

```
R: 173.9975 ---
```
Shows the receive frequency in MHz to four decimal places and the receive squelch mode. For analog channels the receive squelch mode is the analog tone frequency or code, or dashed lines if no tone is selected. For digital channels the receive squelch mode is the receive network access code or `MON` if the digital

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squelch mode is set to monitor. Also, for digital channels, the talk group flag ^{T}G is shown if the channel's digital squelch mode is set to select. See section 3.7.3.

3.5.1.6.2   Transmit Display (Duplex Mode)

```
T: 173. 9975 ---  LO
```

Shows the transmit frequency in MHz to four decimal places and the transmit squelch mode. For analog channels the transmit squelch mode is the analog tone frequency or code, or dashed lines if no tone is selected. For digital channels this is the transmit network access code. Also shown is the transmit power flag ^{L}o or ^{H}I for the NPX136D's transmit power setting. See section 3.7.3.

3.5.1.6.3   Simplex Display (Simplex Mode)

```
S: 173. 9975 ---  LO
```

If the Transmit mode is set to Simplex, the simplex display shows the receive and transmit frequency in MHz to four decimal places, and the receive and transmit squelch mode. The transmit power flag ^{L}o or ^{H}I is also shown. See section 3.7.3.

3.5.1.6.4   Zone display

```
Z: Al l  ALL CHANS
```

Shows the zone number and zone name for the current zone. The zone display is shown when zones are turned on from the edit zone menu.

3.5.1.6.5   Receive Talk Group ID (Duplex Mode)

```
Rx TGI D:  12345
```

Shows the receive talk group ID for the channel. Shown for digital channels with the digital squelch set to select when turned on from the display settings talk group field.

3.5.1.6.6   Transmit Talk Group ID (Duplex Mode)

```
Tx TGI D:  12345
```

Shows the transmit talk group ID for the channel. Shown for digital channels when turned on from the display settings talk group field.

3.5.1.6.7   Simplex Talk Group ID (Simplex Mode)

```
Spl x TGI D:  12345
```

Shows the receive and transmit talk group ID for the channel. Shown for digital channels with the digital squelch set to select when turned on from the display settings menu's talk group field.

3.5.2   Changing channels on the main receiver

There are two different ways to select a channel on the main transceiver:

Step or scroll through the channels using the CHAN switch or the ► and ◄ arrow buttons. To sequentially change channels; press the CHAN switch right (+), or the right arrow button ► to increment by one channel, press the CHAN switch left (-) or the left arrow button ◄ to decrement by one channel. Holding the switch or button causes the transceiver to scroll through the channels. A remote channel switch may also be connected to the rear connector of the transceiver to provide the same function.

Jump directly to a specific channel by pressing the keypad buttons of the required channel number and then press the Enter button. When the channel number setting is numeric `Goto Channel:` is displayed. When the channel number setting is alphanumeric `Goto Label:` is displayed. See section 3.7.8.5 for more information on setting the channel number mode.

If the channel number entered is too big, a message indicating the maximum channel number `CH #> MAX (---)!` is displayed briefly. If the channel number entered is not in the current zone then the message `CH# Not In Zone!` is displayed briefly. If the channel number entered is not valid then the message `Invalid CH#!` is displayed briefly. The channel numbers that must be entered depend on the display setting's channel number mode field (Chan #). When the channel number mode is set to numeric, leading zeros are not required; in alphanumeric, all three channel characters must be entered.

3.5.3   Changing zones on the main receiver

When zones are turned on (from the edit zones menu) the lower display can show the current zone. To show the current zone, press the DISP +/- switch until `Z: xx Zone Name` is shown. To change the current zone press the up and down arrow buttons. Only the channels in the current zone and channels with zone set to All may be selected. If the current zone is the All zone then every channel may be selected.

3.6   Menus and Settings
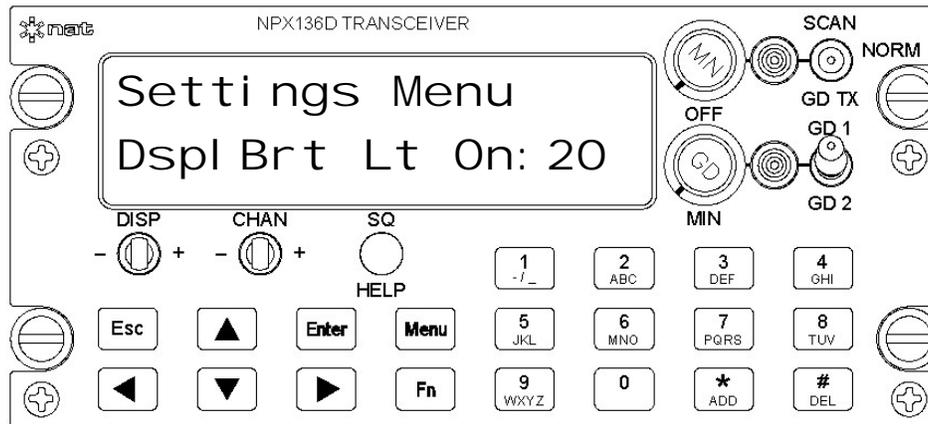
All of the parameters of the NPX136D that are not controlled from a front panel switch may be changed or reviewed from fields within a menu. These fields are made available by entering Menu mode.

To access the menu mode, press the Menu button. The first menu shown is the Settings Menu. Press the Menu button again to show the Channel Menu, and again to show the Maintenance Menu. Each press of the Menu button advances to the next menu screen. When the required menu is shown, press the Enter button to select it. The first of the available sub-menus or editable fields will be displayed.

When a menu has been selected, press the Menu button again to advance to the next menu or editable field. Pressing the Esc button will exit a menu and move to the previous menu level, and from the top level menu, pressing the Esc button will return to normal operating mode. When any field is changed the operator is prompted `Save Changes?`. Press the Enter button to save the changes or press the Esc button to discard changes.

The Settings Menu contains the fields that control general operation of the entire NPX136D. For details on the settings menu see section 3.7.

The Edit Menu contains the sub-menus for editing channels, guards, zones and scanning. For details on the edit menu see section 3.8.

The Maintenance Menu contains the sub-menus and fields that are not normally used, or that should only be changed by a knowledgeable user. For details see section 3.9.

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3.7 Settings Menu

The settings menu allows changing of general NPX136D settings.

3.7.1 Brightness

```
Dspl Brt LtOff: 01-20
Dspl Brt Lt On: 01-20
```

The display is dimmable in 20 steps. Two settings for the display brightness are stored in non-volatile memory: one level for when panel lights are off and one for when panel lights are on. Both of these settings are changed from the brightness settings menu. To switch between levels turn the panel lights on or off.

Note: In a well-lit area, such as daylight in an aircraft cockpit, brightness settings below 10 may be difficult to read. If the display cannot be read properly, follow these instructions for a 'short-cut' to changing the brightness:

1. Turn the NPX136D radio off and then back on.

2. Wait for 12 seconds, or until the HELP screen is displayed.

3. Press the Esc button three times.

4. Press the Menu button and then the Enter button.

5. The NPX136D should be in the brightness field of the Settings Menu.

6. Press the up or down arrow until the display can be read.

7. If this does not work, repeat starting at step 1.

3.7.2 Transmit Power

```
Tx Pwr: Lo, Hi, Per Chan
```

The transmit power level for all channels can be changed from Lo (1 Watt) or Hi (10 Watts) or may be set to Per Chan where the power setting from the channel is used to control the transmit power level.

3.7.3 Transmit Mode

```
Tx Mode: Simplex, Duplex
```

There are two modes possible: DUPLEX (repeater) operation, and SIMPLEX (direct) operation. Duplex means that the NPX136D uses both the RX and TX frequencies programmed into the selected channel. When in duplex mode the display shows both the receive (preceded by the text R:) and transmit (preceded by the text T:) frequencies and squelch mode. Simplex means that the NPX136D uses the RX frequency and tone or digital squelch programmed into the selected channel for both RX and TX purposes. When in simplex mode the display shows the text S: and the channel frequency and squelch mode.

ENG-FORM: 806-0106.DOT

3.7.4 Squelch Mode, Analog Tones

`Anlg Tone: On, Off, TxOnly`

For analog channels, CTCSS and DCS tones are selectable to on, off or transmit only.

3.7.5 Squelch Mode, Receive Digital Squelch

`Dgtl Sq: Mon, Per Chan`

For digital channels, the receive digital squelch mode may be changed globally from monitor (MON) to per channel (Per Chan). When the receive digital squelch is set to monitor, audio is heard on digital channels. When the receive digital squelch is set to Per Chan, audio is heard when the received digital squelch meets the digital squelch setting for the channel.

3.7.6 Power Up Channel

`Pwr Up Chan: PrDn, 001-255`

The power up channel is the channel the NPX136D tunes to after power up and may be set as the power down channel (PrDn) or to a specific channel number.

3.7.7 Squelch Setting

`Noise Sq: 01-16`

The noise squelch setting, for analog channels with no CTCSS or DCS squelch mode, may be set from 1 to 16. Displayed when enabled from the configuration menu.

Note: If the noise squelch is set incorrectly, the NPX136D may not receive properly.

3.7.8 Display Menu

`Set Disp Menu?`

The Display menu is a sub-menu of the Settings menu, and is used to change the way information is shown on the display.

3.7.8.1 CTCSS Display

`CTCSS Disp: Freq, Mtrla`

CTCSS tones may be displayed as one of two methods: Motorola Code, or Frequency. See section 3.12.1 for a list of CTCSS tones.

3.7.8.2 Talk Group ID Display

`Talk Groups: On, Off`

For digital channels, the display of talk group IDs may be turned on or off.

3.7.8.3 Power Up Help

`PwrUp Help: On, Off`

Display of help screens at power up can be turned on and off.

3.7.8.4 Power Up Status

`PwrUp Status: On, Off`

Display of status screens at power up can be turned on and off.

3.7.8.5 Channel Number Mode

`Chan#: Numeric, Alphanum`

The channel number may be set as Numeric or Alphanumeric.

When set to Numeric, the channel numbers are 001-255. When in Numeric mode the Goto channel uses numbers for selecting a channel and leading zeros are not required.

When set to Alphanumeric, the channel label is used in place of the channel number, and may include letters and symbols. When in Alphanumeric mode the Goto channel function uses numbers and letters for selecting channels and the entire three-character channel label must be entered.

3.8 Channel Menu

The channel menu allows access to the menus for editing main channels, guard channels, zones and scan lists. See sections 3.8.1 thru 3.8.4 for details.

3.8.1 Edit Main Channel Menu (Edit Main)

```
Channel Menu...
Edit Main?
```
The Edit Main menu allows the operator to change the parameters of the channels on the main transceiver. To edit guard channels see the Edit Guard menu, section 3.8.2.

The Main receiver continues to operate with the original settings until the Edit Main menu is exited and normal operating mode is entered. The transmitter is locked out from operation when in the Edit Main menu.

Select a different channel using the CHAN +/– switch to scroll to the required channel. Only unlocked channels may be edited from the Edit Main menu. Channels may be locked from the serial load program. When channels are locked the message `LOCKED!` is shown on the lower display and no channel parameters are displayed.

To edit a locked channel (all channel parameters can be changed), turn the Master Edit mode 'on' from the maintenance menu (Section 3.9). If master edit mode is on when the Edit Main menu is entered, the message `MASTER EDIT MODE` is flashed three times.

To ensure that no channel parameters may be changed, a shorting block may be installed on the agile edit jumper. In this case, when the Edit Main menu is entered, the message `EDIT DISABLED!` is flashed three times and the Edit Main menu is shown.

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When allowed, the channel's parameters that may be changed from the Edit Main menu are listed as follows.

3.8.1.1   Channel's receive and transmit frequency

`RxFreq, TxFreq: 136.0000 - 173.9975`

The channel's receive and transmit frequency may be changed from 136.0000 to 173.9975 MHz in 2.5 or 6.25 kHz increments. After entering a new receive frequency the transmit frequency is set to the same frequency.

Only the numbers shown in bold may be edited. The leading number "1" is always shown. Numbers shown in italics are not displayed.

<div align="center">Table of allowed frequencies:</div>

1**xx.x000**0	1**xx.x250**0	1**xx.x500**0	1**xx.x750**0
1**xx.x025**0	1**xx.x275**0	1**xx.x525**0	1**xx.x775**0
1**xx.x050**0	1**xx.x300**0	1**xx.x550**0	1**xx.x800**0
1**xx.x062**5	1**xx.x312**5	1**xx.x562**5	1**xx.x812**5
1**xx.x075**0	1**xx.x325**0	1**xx.x575**0	1**xx.x825**0
1**xx.x100**0	1**xx.x350**0	1**xx.x600**0	1**xx.x850**0
1**xx.x125**0	1**xx.x375**0	1**xx.x625**0	1**xx.x875**0
1**xx.x150**0	1**xx.x400**0	1**xx.x650**0	1**xx.x900**0
1**xx.x175**0	1**xx.x425**0	1**xx.x675**0	1**xx.x925**0
1**xx.x187**5	1**xx.x437**5	1**xx.x687**5	1**xx.x937**5
1**xx.x200**0	1**xx.x450**0	1**xx.x700**0	1**xx.x950**0
1**xx.x225**0	1**xx.x475**0	1**xx.x725**0	1**xx.x975**0

Note: ∗∗∗.∗∗∗∗ is displayed if the frequency is not valid. To enter an invalid number press the zero button when on the tens-of-megahertz number. Invalid frequencies are used to disable a channel and prevent its use.

3.8.1.2   Channel Name

`Name: xxxxxxxxx` Allowed characters: `0-9 A-Z a-z / _ * #`

The channel name can be up to 9 characters in length. The character to be edited flashes. Press the 0–9, ∗ or # button until the required character (`0-9 A-Z a-z / _ * #)` is displayed at the flashing position. Press a different button to advance to the next character. If the same key is needed for adjacent digits, it may be necessary use the arrow buttons to advance to the required position. Move the flashing position left or right by pressing the left ◄ or right ►arrow buttons. To insert a space press ▲, and to delete a character press ▼.

3.8.1.3   Modulation Type

`Type: Wide, Narrow, Digital`

The channel modulation type may be set to analog wide band, analog narrow band or digital.

3.8.1.4   Transmit Power

`Tx Power: Hi, Lo`

The channel's transmit power level may be set to Hi or Lo. This field is shown when the NPX136D's transmit power setting is set to Per Chan from the settings menu.

3.8.1.5   Zone

`Zone: All, 01-16, None`

A channel may be set to a single zone (01–16), to all zones (All), or to no zones (None). The zone field is shown when zones are turned on from zone menu.

3.8.1.6   Channel Label

`New Label: XXX` Allowed characters: `0-9 A-Z a-z / _ * #`

The channel label field is shown when master edit mode is on.

Note: Use this feature with care. Duplicate channel labels can be entered. Channels are not sorted by the label. The channel label must be in alphanumeric mode (see section 3.7.8.5.)

3.8.1.7   Analog Receive Subaudible Tone Type

`Rx Tn Type: None, Ctcss, Dcs`

The receive subaudible tone type field is shown when the channel's modulation type is set to wide or to narrow.

3.8.1.8   Analog Receive Subaudible Tone

`Rx Tone: 067 - 254, 023 - 754`   CTCSS frequency, Motorola or DCS Code

The receive subaudible tone field is shown when the receive subaudible tone type is set to CTCSS or DCS.

3.8.1.9   Analog Transmit Subaudible Tone Type

`Tx Tn Type: None, Ctcss, Dcs`

The transmit subaudible tone type field is shown when the channel's modulation type is set to wide or to narrow.

ENG-FORM: 806-0106.DOT

3.8.1.10   Analog Transmit Subaudible Tone

`Tx Tone: 067 - 254, 023 - 754` CTCSS frequency, Motorola or DCS Code

The transmit subaudible tone field is shown when the transmit subaudible tone type is set to CTCSS or DCS.

3.8.1.11   Receive Digital Squelch

`Rx Dgtl Sq: Mon, Norm, Sel`

The receive digital squelch field is shown when the channel's modulation type is digital. The receive digital squelch may be monitor (Mon), where all audio is heard; or normal (Norm), where audio is heard when the received network access code (NAC) matches the channel's NAC; or select (Sel), where audio is heard when the received NAC and talk group ID match the channel's NAC and talk group ID.

3.8.1.12   Receive Network Access Code

`Rx NAC: 000h - FFFh`

The receive Network Access Code (NAC) field is shown when the receive digital squelch is set to normal or to select. The NAC is a hexadecimal number, the allowed characters are 0–9, A–F.

3.8.1.13   Receive Talk Group ID

`Rx TGID: 00000 - 65535`

The receive talk group ID is shown when the receive digital squelch is set to select. The Rx TGID field is a decimal number with allowed characters 0–9.

3.8.1.14   Transmit Network Access Code

`Tx NAC: 000h - FFFh`

The transmit NAC field is shown when the channel's modulation type is set to digital. The NAC is a hexadecimal number with allowed characters 0–9, A–F.

3.8.1.15   Transmit Talk Group ID

`Tx TGID: 00000 - 65535`

The transmit talk group ID field is shown when the channel's modulation type is set to digital. The Tx TGID is a decimal number, the allowed characters are 0–9.

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3.8.2   Edit Guards (Edit Guard Channel) Menu (-070 only)

```
Edit Menu...
Edit Guards?
```

The Edit Guards menu is a sub-menu of the Channel Menu.

Allows editing of the guard channels' parameters. The channel being edited can be changed at any time using the GD1 / GD2 switch. Guard Channels are always locked, and can only be edited if the master edit mode is on.

The guard receiver continues to operate with the original settings until the field is saved and normal operating mode is entered.

All fields are the same as for the main channels except that no zones may be selected and channel labels are not editable.

3.8.3   Edit Zone Menu

```
Edit Menu...
Edit Zone?
```

The Edit Zone menu is a sub-menu of the Channel Menu.

The Edit Zone menu allows the zone feature to be turned on or off, allows editing of the zone's name, and allows review and selection of the channels that belong to a zone.

There are 16 zones. A channel may belong to all zones, one of the 16 zones or to no zone. When a zone is selected only the channels assigned to that zone and to all zones are displayed.

3.8.3.1   Turn Zones on and off.

```
Use Zones: Off, On
```

Zones may be turned on or off from this field. In normal operating mode, when zones are off, all channels may be selected and the zone display is not shown.

3.8.3.2   Edit Zone

```
Edit Zone: 01-16
Name: XXXXXXXXX
```

The edit zone menu is shown when zones are turned on. The edit zone menu allows changing the name of the current zone. Use the up and down arrow buttons to select a different zone. The All Channels zone name may not be changed.

ENG-FORM: 806-0106.DOT

3.8.3.3   Zone List

```
Zone All, 01-16 [List]:
123 Chan Name
```

The zone list field shows the channels assigned to each zone.

Use the CHAN switch or ► and ◄ arrows to show channels currently in the zone. Use the up and down arrow buttons to select different zones. Use the DEL button to remove a channel from a zone. To add a channel to the zone press the ADD button, scroll to the desired channel and press Enter.

3.8.4   Edit Scan Menu

The Edit Scan menu is a sub-menu of the Channel Menu. From the Edit Scan menu the operator may select the scan mode, select the channel numbers used for priority scanning and add or delete channels from scan list.   For details on scanning see section 3.11.

3.8.4.1   Scan Mode

```
Scan Menu...
Scan Mode: List, Pri, L+P
```

The scan mode may be set to scan the list channels (List), the priority channel (Pri), or both (L+P).

3.8.4.1.1   Priority Channel

```
Scan Menu...
Pri 1 Chan: 001 – 255, ---
```

The priority channel is set from this menu field. Set to --- to disable (no priority channel).

3.8.4.1.2   Scan List Review/Edit

```
Review Scan List
001 Forestry
```

The scan list channels are selected from this menu. There may be up to 14 channels in the scan list. Use the CHAN +/- switch or the ► and ◄ keys to scroll through the channels in the scan list. Press the DEL button to remove the displayed channel from the scan list. Press the ADD button to enter Scan List Add mode. Use the CHAN +/- switch to scroll to the channel required in the scan list, and press the Enter button.

Note: Before returning to normal operating mode, the messages Loading P1... and Loading List... are displayed if changes have been made to the priority or list channels.

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3.9　　　　Maintenance Menu

3.9.1　　　Master Edit Mode

Enter the master edit password to be allowed to edit locked channels or channel numbers. Master Edit menu is not shown when the agile edit jumper is installed or when master edit mode is turned on.

```
Maint. Menu...
Mstr Edit Mode?

Mstr Edit Mode
Password: ___
```

At the prompt, enter the master edit password "NAT" to turn master edit mode on. `Master Edit Mode` flashes three times, and then the main edit menu is shown.

When master edit mode is on, each time main edit or guard edit is entered the `Master Edit Mode` message is flashed three times.

If master edit mode is on, the master edit menu is not shown in the maintenance menu.

To exit master edit mode, turn the NPX136D off and then on.

3.9.2　　　Configuration Menu

Note: Incorrect use of this mode may render the NPX136D INOPERABLE! Use this function with extreme care.

```
Maint. Menu
Config Menu?
```

The configuration menu allows setting of NPX136D parameters that should only be carried out by qualified technicians or experienced operators.

```
Config Menu...
Password: ___
```

At the prompt, enter the configuration password to edit the configuration information. Refer to the Maintenance section of the Service Manual for the configuration password.

To enter this mode requires a special code, and should be USED ONLY AT THE FACTORY OR BY QUALIFIED SERVICE PERSONNEL. It is possible to completely DISABLE the NPX136D by incorrect settings in this mode, so considerable care is required.

ENG-FORM: 806-0106.DOT

3.9.2.1   User ID

```
Config Menu...
User ID: 0000001 - 9999999
```

Enter the User ID of the NPX136D. This field sets the NPX136D's ID number when transmitting with digital modulation. The NPX136D's default setting for the user ID is 0000001. Consult authorized personnel for the correct code number if needed.

3.9.2.2   Test Menu

```
Config Menu...
Test Menu?
```

Refer to the NPX136D Alignment Procedure for instructions on using the tests accessed from the test menu.

3.9.2.2.1   Switch Test

```
Test Menu...
Switch Test?
```

The lower display shows the number of the switch being operated and the action or value of the switch. Press and hold the Esc button for 5 seconds to exit the test.

```
F/P Switch Test
Press a key...
```

3.9.2.2.2   Display Test.

```
Test Menu...
Display Test?
```

The display's characters are cycled between three states: All odd pixels on, all even pixels on, and all characters displayed as the pound sign #.

3.9.2.2.3   RF PA Power Input Test.

```
Test Menu...
Pwr Input Test?
```

The main module's transmit power may be set to 1 W to test the RF PA subassembly's power input protection circuit.

3.9.2.3   Noise Squelch Settings Display Menu

```
Config Menu...
Display Sq: On, Off
```

This configuration field controls display of the noise squelch field in the settings menu.

3.9.2.4   Guard Module Enable

```
Config Menu...
Gd Enable: Off, On
```

The guard receiver may be enabled or disabled from this field. After this field is changed, the NPX136D must be turned off and then on again before the new setting will take effect.

Note: For the –000 model, this field must be set to 'Off'. When the guard module is not installed and 'Guard Enable' is set to 'Off', this field will not be shown.

3.9.2.5   Guard Receiver Volume

```
Config Menu...
Gd Vol Min: 00 - 64
```

The minimum volume allowed for the guard receiver can be adjusted from 00 (off) to 64 (max). Only shown when the guard receiver is enabled.

3.9.2.6   Sidetone Volume

```
Config Menu...
Sidetone Vol: 00 - 64
```

The level of the sidetone volume can be adjusted from 00 (off) to 64 (max).

3.9.2.7   Transmit Time-out Timer

```
Config Menu...
Tx Time-out: 30,60...300
```

The transmit time-out timer sets the duration, in seconds, for which the transmitter is allowed to transmit.

3.9.2.8   Priority Scan Period

```
Config Menu...
Pri Scan: 1, 2, 3
```

When priority scanning, and stopped on a list channel, the period (in seconds) at which the priority channel is checked for a valid RF signal.

3.9.2.9   Number of Channels

```
Config Menu...
Num of Chans: 032 - 255
```

The number of channels available on the main transceiver may be set from 32 to 255. Only the available channels, as set from this field, are written during data transfer.

3.9.3   Data Transfer Menu

Allows copying of channel and configuration data from the source transceiver to the destination transceiver over a data transfer cable connected to another NPX136D.

To use this feature connect the data transfer cable to a +28 Vdc power supply. Connect one of the cable's 25-pin dmin connectors to the source transceiver's J1 connector and the cable's other 25-pin dmin connector to the destination transceiver's J1 connector.

Turn on both transceivers. Leave the destination transceiver in the help screen. On the source transceiver, enter the Data Transfer mode from the maintenance menu.

When `Data Xfer?` is shown, data transfer starts immediately after the Enter button is pressed. The destination transceiver screen will change to display the messages shown below in response to the messages displayed on the source transceiver.

Source Transceiver	Destination Transceiver
`Maint. Menu`	`Help=Instruction`
`Data Xfer?`	`Enter=Operation`
`Source Xcvr -->`	`--->Destination`
`Connecting...`	`Connecting...`
`Connected`	`Connected`
`Writing XXX`	`Reading...`
`Finished Writing`	`Finished Reading`
`Please Press Esc`	`Please restart`

On the destination transceiver, turn the transceiver off and then on to exit data transfer mode.

3.9.4   Software Version

```
Maint. Menu...
Show Version?
```

Press Enter to view the revision and date of the NPX136D's MCU application, and the Build Date of the software in the Main and Guard Modules.

3.10   Function Mode (Fn)

The Fn button is used to provide quick access to often used functions. Pressing Fn from normal operating mode displays the first available function. Subsequent presses will advance to the next function.

Currently, there is only one direct function option available: The CALL Menu. Press the Fn button to enter the call menu. The call menu is only available for analog channels on the main transceiver.

When entering a number or name, the ▶ and ◀ buttons move the editing cursor left and right, the up arrow inserts a space in the number and the down arrow deletes a single number or character.

ENG-FORM: 806-0106.DOT

3.10.1   Call Menu for Analog Channels.

The analog call menu allows DTMF sequences to be transmitted. The DTMF sequences may be added as new (New Number?), redialled from previously transmitted sequences (Redial Number?) or recalled from the memory (Find Number?). Twelve DTMF numbers are supported: 0-9,*,#. Spaces may also be included in the sequence. Each space will add a delay of approximately 350 ms to the sequence.

3.10.1.1   New Number

```
Analog Call...
New Number?
```

Press Enter to select the new number menu.

```
New Number...
123456789
```

Press the numbers 0-9, *, # required for the new number.

Press Enter to advance to the next screen
```
Fn = Send
ADD = Save
```

Press Fn to transmit the DTMF sequence and be returned to the Analog Call menu.
```
Calling...

123456789
```

Press ADD to store the number in the next available memory location and then be prompted to enter a name.

```
Edit Number
MO1:
```

If required edit the number.

Press Menu to enter the name.

```
Edit Number
Name:
```

Press the number buttons to enter a name.
Press Menu to edit the number
Press Esc when done.

Ten DTMF sequences may be stored in memory locations M01 – M10. When every memory location contains a DTMF sequence, the `List is Full!` message is displayed when attempting to add a number.

3.10.1.2   DTMF Redial

```
Analog Call
Redial Number?
```

The NPX136D stores the last ten transmitted DTMF sequences in a redial memory. To select the redial number menu, press Enter.

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```
Redial Number
RO1: 123456789
```

Use the up and down arrows to find the required previously sent number. If no sequence has been transmitted, the message **<Empty List>** is shown.

Press Enter to advance to the next screen

```
Fn = Send
ADD = Save
```

Press Fn to transmit the DTMF sequence and be returned to the Analog Call menu.

```
Calling...
```

Press ADD to store the number in the next available memory location and then be prompted to enter a name.

```
Edit Number
MO1:
```

3.10.1.3   DTMF Recall Preset Numbers

```
Analog Call
Find Number?
```

Press Enter to select the find number menu.

```
Find Number
MO1: 123456789
```

Press the up and down arrows to scroll through the numbers.

```
Name: ABCDE
```

Press the DISP + / - switch to toggle between the name and the number.

Press Enter to advance to the next screen.

```
Enter = Edit, Fn = Send, DEL = Delete
```

Press Fn to transmit the DTMF sequence and be returned to the Analog Call menu.

```
Calling...
```

Press Enter to edit the number and name.

Press Menu to toggle between the name and the number.

```
Edit Number
123456789

Edit Number
Name:
```

3.10.2   Call Menu for Digital Channels

There is no call menu implemented for digital channels.

ENG-FORM: 806-0106.DOT

3.11   Scanning

Turn scan mode on by putting the SCAN / NORM / GD TX switch in the SCAN position. The lower display will briefly show `Enabling List...` and then `XXX SCANNING,` where XXX is the current scan mode: LIST, PRI or L+P. The scan mode, and list and priority channels, are set from the edit scan menu (section 3.8.4).

To turn scan mode off put the SCAN / NORM / GD TX switch in the NORM position.

When the SCAN / NORM / GD TX switch is placed in the SCAN position all other modes of operation are cancelled and the NPX136D starts scanning.

The NPX136D can scan up to 16 channels. This includes 14 list channels, 1 priority channel and the home channel.

The home channel is the current channel, shown when scanning is turned on.

When list scanning, the NPX136D checks for an RF signal on the list channels and the home channel. When an RF signal is detected which meets the channel's squelch requirements, the NPX136D stops on that channel until there is no receive or transmit for 5 seconds, and then scanning is started.

When priority scanning the NPX136D checks for an RF signal on the priority channel and the home channel. If an RF signal is detected on the home channel the NPX136D checks the priority channel for an RF signal once every three seconds. To check for a priority channel the NPX136D must retune the main receiver to the priority channel. The main receive audio is muted during this check. There is no priority scanning for 5 seconds after transmitting.

When list and priority scanning, the priority channel is added to the list channels and when the NPX136D stops on a home or list channel the priority channel is checked for an RF signal the same as when priority scanning.

Note that the selected zone has no effect on scanning. Channels that are not in the current zone but are still in the scan list are still checked for carrier when scanning.

When the NPX136D is stopped on a list channel, the list channel may be temporarily removed from the scan list by pressing the DEL button or CHAN – switch. To re-enable these channels, scanning is turned off and then on.

ENG-FORM: 806-0106.DOT

3.12   CTCSS and CDCSS Tone Lists

3.12.1   CTCSS Tones

Tone Frequency	Displayed Frequency	Displayed Motorola Code	Tone Frequency	Displayed Frequency	Displayed Motorola Code
67.0 Hz	067	XZ	136.5 Hz	136	4Z
69.3 Hz	069	WZ	141.3 Hz	141	4A
71.9 Hz	071	XA	146.2 Hz	146	4B
74.4 Hz	074	WA	151.4 Hz	151	5Z
77.0 Hz	077	XB	156.7 Hz	156	5A
79.7 Hz	079	WB	162.2 Hz	162	5B
82.5 Hz	082	YZ	167.9 Hz	167	6Z
85.4 Hz	085	YA	173.8 Hz	173	6A
88.5 Hz	088	YB	179.9 Hz	179	6B
91.5 Hz	091	ZZ	186.2 Hz	186	7Z
94.8 Hz	094	ZA	192.8 Hz	192	7A
97.4 Hz	097	ZB	203.5 Hz	203	M1
100.0 Hz	100	1Z	206.5 Hz	206	8Z
103.5 Hz	103	1A	210.7 Hz	210	M2
107.2 Hz	107	1B	218.1 Hz	218	M3
110.9 Hz	110	2Z	225.7 Hz	225	M4
114.8 Hz	114	2A	229.1 Hz	229	9Z
118.8 Hz	118	2B	233.6 Hz	233	M5
123.0 Hz	123	3Z	241.8 Hz	241	M6
127.3 Hz	127	3A	250.3 Hz	250	M7
131.8 Hz	131	3B	254.8 Hz	254	0Z

3.12.2   CDCSS Tone Codes

023	114	205	306	411	503	606	703
025	115	223	311	412	506	612	712
026	116	226	315	413	516	624	723
031	125	243	331	423	532	627	731
032	131	244	343	431	546	631	732
043	132	245	346	432	565	632	734
047	134	251	351	445		654	743
051	143	261	364	464		662	754
054	152	263	365	465		664	
065	155	265	371	466			
071	156	271					
072	162						
073	165						
074	172						
	174						

ENG-FORM: 806-0106.DOT

3.13   Error Messages

Error Message	Problem Description
STOP MODULE COM ERROR XX (MN, GD, MN+GD)	Failed Communication with the main and/or guard transceiver module at power up.
STOP: EEPROM ERR REQUIRES SERVICE	Failed memory test at power up
MODULE COM ERROR RESETTING	Failed Communication with the main or guard transceiver after power up.
Pri List Empty! Release Scan Key	No priority channel set when priority scanning turned on.
Scan List Empty! Release Scan Key	No list channel set when list scanning turned on.

End of section 3

ENG-FORM: 806-0106.DOT