NCT6500 Series

NAV/COM Transceiver

Operating Instructions

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WARNING - USER RESPONSIBILITY

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Becker Avionics provide product or system options for further investigation by users who have technical knowledge. The user is responsible for making the final selection of the system and components. The user has to assure that all performance, endurance, maintenance, safety requirements of the application are met and warnings be obeyed.

For this the user has to include all aspects of the application to be compliant with the applicable industry standards and the requirements of the responsible aviation authority. The product documentations from Becker Avionics have to be obeyed. To the extent that Becker Avionics provides component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

Term definition: User in the sense of user, installer, installation company.

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List of Abbreviations

List of Abbreviations	
AGC	Automatic Gain Control
AlMg	Aluminum-Magnesium Alloy
ATT	Attenuation
CBIT	Continuous Built-In Test
CFG	Configuration
CH	Channel, Control Head
COM	Communication area (display), Communication port
CU	Control Unit
ETSO	European Technical Standard Order
EUROCAE	European Organization for Civil Aviation Equipment
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FREQ	Frequency
GS	Glide Slope
HS	Headset
HMI	Human Machine Interface
HRTF	Head-Related-Transfer Function
HS	Headset
HW	Hardware
IC	Intercom
ILS	Instrument Landing System
LOC	Localizer
MON	Monitoring
N/A	Not Applicable
NAV	Navigation, Navigation area (display), Navigation port
NO	Normally Open (switch)

List of Abbreviations	
PBIT	Power-On Built-In Test
PTT	Push To Talk
PWR	Power
QR	Quick Response (two-dimensional code)
RCENT	Recent
RX	Receive, Receiver
SD	Secure Digital (memory card)
SPKR	Speaker
SQ, SQL	Squelch
SRC	Source
STB	Standby (frequency)
SW	Software
TRX	Transceiver
TSO	Technical Standard Order
VHF	Very High Frequency
VOL	Volume
VOR	VHF Omnidirectional Radio Range Localizer
TX	Transmit, Transmission, Transmitter
VOX	Voice Operated Switch, Voice Transmission

Units

Units	
A, mA	Ampere, Milliampere
°C	Degree Celsius
g, kg	Gram, Kilogram
kHz	Kilohertz
lb	Pound
MHz	Megahertz
mm	Millimeter
Ω	Resistance in Ohm
s	Second
V, mV	Volt, Millivolt
W, mW	Watt, Milliwatt

1 Introduction

Before starting operation of the device(s) please read this manual carefully, with particular attention to the description referring to your device(s).

This manual must be available during performance of all tasks.

1.1 General Safety Definitions

⚠DANGER	Indicates a hazardous situation which, if not prevented, will result in death or serious injury.
⚠WARNING	Indicates a hazardous situation which, if not prevented, could result in death or serious injury.
⚠CAUTION	Indicates a hazardous situation which, if not prevented, could result in minor or moderate injury.
NOTICE	Is used to address practices not related to physical injury.
SAFETY INSTRUCTIONS	Safety instructions (or equivalent) signs indicate specific safety-related instructions or procedures.

1.2 Packaging, Transport, Storage

Visually inspect the package contents for signs of transport damage.

⚠CAUTION	The packaging material is inflammable, by burning, toxic fumes may develop.

Keep the packaging material and use it in the case of a return shipment. Improper or faulty packaging may lead to transport damages.

Make sure to transport the device always in a safe manner and with the aid of suitable lifting equipment if necessary. Do never use the electric connections for lifting. Before the transport, a clean, level surface should be prepared to put the device on. The electric connections may not be damaged when placing the device.

First Device Checkup

- Do a check for signs of transport damages.
- Please make sure that the indications on the type plate agree with your purchase order.
- Make sure that the equipment is complete ("Scope of Delivery", page 14).

Storage

If you do not install the device immediately, make sure to store it in a dry and clean environment. Make sure that the device is not stored near strong heat sources and that no metal chippings can get into the device.

1.3 Disposal

⚠CAUTION The packaging material is inflammable, by burning toxic fumes may develop.

This product contains materials that fall under the special disposal regulation. We recommend the disposal of such materials in accordance with the current environmental laws.

- Dispose circuit boards by a technical waste dump which is approved to take on e.g. electrolytic aluminum capacitors. Do under no circumstances dump the circuit boards with normal waste dump.

1.4 Warranty Conditions

⚠CAUTION The device(s) may be installed on an aircraft only by an approved aeronautical company (e.g. Part 145) which shall also examine the installation.

Any change made by the user excludes any liability on our part (excluding the work described in this manual).

1.5 Conditions of Utilization

With this device you bought a product which was manufactured and tested before delivery with the utmost care.

Please take your time to read the instructions which you ought to follow closely during installation and operation.

Otherwise all claims under the warranty will become void and a decreased service life or even damages must be expected.

⚠CAUTION The user is responsible for protective covers and/or additional safety measures in order to prevent damages to persons and electric accidents.

1.6 Non-Warranty Clause

We checked the contents of this publication for compliance with the associated hard- and software. We can, however, not exclude discrepancies and do thus not accept any liability for the exact compliance. The information in this publication is regularly checked, necessary corrections will be part of the subsequent publications.

1.7 Cleaning and Disinfection of Devices

It is recommended that devices and systems that are directly accessible to people, are disinfected as required. This particularly applies to the controls on avionics devices.

NOTICE Not all commercially available cleaning agents/disinfectants are suitable for use on the surfaces of our devices. Many of the agents contain solvents or greasing components that can cause undesired effects on the controls and the display.
Example:
- Do not use aggressive cleaning agents e.g. Acetone.
  - These cleaning agents can cause damages.

Procedure:

NOTICE Do not clean/disinfect the device(s) during operation.

Device body and the controls:

- Clean the device body and the controls with a clean, soft, lint free cloth moistened with clean water.

To reduce the risk of infection, it helps to disinfect the controls before/after changing the operator.

- As a disinfectant, we recommend diluted monohydric alcohols such as Isopropanol or Ethanol.
  - Wear suitable protective gloves that are disinfected.
  - Moisten a clean, soft, lint free cloth with the related liquid to clean all controls.
  - Please obey the usual protective measures when using monohydric alcohols for cleaning purposes.
- Do not use spray bottles or evaporators to apply disinfectants or cleaning liquids to the Becker Avionics devices. Liquids could penetrate the devices and can result in damage.

LCD screen:

- Clean the LCD screen with a clean, soft, lint free cloth moistened with clean water and take care not to scratch the surface.
- Cleaning agents suitable for cleaning TFT screens and LCD displays can also be used. Obey the related instructions from manufacturer.

Blank

2 Device Description

The technical information in this document applies to the described products and variants of the Becker Avionics NAV/COM transceiver NCT6500 series.

- We also use the terms NCT6500, NCT65, RFA6500, RFA65, MT6500 for descriptions instead writing the complete model number.
- If a description refers to only one of the product variants its full name is used.

2.1 Purpose of Equipment (Operator)

The NCT6500 series is a modern family of navigation and communication equipment.

The NCT6500 is a single block device with control panel and combines a navigation receiver (NAV) and a VHF communication transceiver (COM) in one device.

- The NAV subsystem and the COM subsystem work independently each other.
- The control head with modern HMI design works as interface between the pilot and the NAV/COM subsystems.
- All control elements and indicators are on the front panel.
- The devices(s) are made for cockpit installation in fixed wing or rotary wing aircraft.
- The devices(s) are compatible with 14 and 28 V systems.

Features COM subsystem:

- The devices are for voice communication between aircraft or between aircraft and ground.
  The devices use the VHF-band between 118.000...136.9916 MHz respectively 136.9750 MHz with a selectable channel spacing of 8.33 or 25 kHz.
- The sensitive receiver obeys the requirements of ED-23C.
  - It includes the ability to work in the offset-carrier (climax) operation in 25 kHz and 8.33 kHz channel spacing.
- The receiver includes a monitoring mode (dual watch). This is for monitoring two different VHF frequency channels at the same time while the communication on the active frequency.
- Squelch function.
- The intercom function is for voice communication between aircraft crew, pilot and copilot and passengers.
- The extended built-in intercom can work as:
  - 4-way intercom with isolation mode – passengers could continue conversation or listen to the music from a MP3 player at the same time while pilots talk through intercom or communicate with the tower.
- The device has a non-volatile memory for the storage of:
  - 50 channels for storage of VHF frequencies with customized labels.
  - 10 recently selected VHF frequencies (LAST).

Features NAV subsystem:

The scope of the NAV subsystem depends on the variant and can include the functions VHF omnidirectional receiver ((VOR), localizer (LOC) and glide slope (GS).

- The VOR receiver tunes frequencies between 108.00…117.95 MHz.
  - The VOR receiver provides a demodulated composite signal. It can be connected to the external converter or directly to the analog indicator with embedded composite signal converter.
- The localizer receiver provides a demodulated composite signal. It can be connected to the external converter or directly to the analog indicator with embedded composite signal converter.
  - Depending on the device variant the receiver gives digital signals left, right, and flag.
- The glide slope receiver tunes frequencies between 329.15…335.00 MHz.
  - The receiver includes an internal converter to change the composite signals to digital and analog signals up, down and flag.
- The device has a serial interface to tune the external DME equipment.
- The device has a non-volatile memory for the storage of:
  - 50 channels for storage of NAV frequencies.
  - 10 recently selected NAV frequencies (LAST).

2.2 Device Assignment

This manual is valid for the devices:

- NCT6500 + accessories

2.3 General Notices

The word "frequency" is also used in the sense of "channel name", as defined in EUROCAE, document ED 23C chapter 1.3.2, Volume II.

In this document the word "memory channel" or "channel" is also used in the sense of a memory position identified by a channel number, where a frequency is stored for later use.

2.4 Scope of Delivery

- Manuals
  - Operating Instructions
- For NCT6500:
  - Device in accordance with your order
  - Authorized Release Certificate (EASA Form 1)

2.5 State of Delivery

The device is delivered with a default configuration.

2.6 Additional Required Equipment

- Connectors + cables
- MT6500 mounting tray for panel installation of NCT6500 without RFA6500
- Antennas for NAV and COM
- Headset
- Power supply

2.7 Registration of the Device

Obey the national requirements for the operation of radio equipment.

2.8 Type Plate

The device type is specified by the type plate (on the housing):

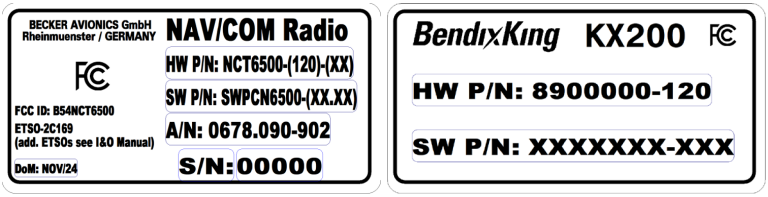


Figure 1: Type plate (example)

Explanation:

UNIT A/N:	**Article number (device order number)**
HW P/N:	**Type/variant designation:** **NCT** = NAV/COM transceiver **200** = Device series **Options*:** **-(0X0)**: Standard **-(1X0)**: without VOR/LOC converter **-(X0X)**: COM/VOR/LOC **-(X2X)**: COM/VOR/LOC+GS **-(XX0)**: Standard; black, RGB illumination **Change Index:** **-(XX)**: Modification state (00...99) *NOTICE: -(1XX) device without VOR/LOC converter = retrofit for KX155
SW P/N:	**Related software part number**
S/N:	Unique number of the device
	Compliance and Certifications: Refer to the text and logos on the device type plate

2.9 Software

For a check of the software version and other device data see "Type Plate" page 15.

3 Operation

This chapter contains general information and instructions for safe operation of the device(s).

NOTICE

- Some functions and adjustments are only available in the password-protected configuration setup - installation mode*
- Some functions are only available when they are enabled for the user in the password-protected configuration setup - installation mode*.

* Details available at Becker Avionics.

3.1 Registration of the Device

Obey the national requirements for the operation of radio equipment.

3.2 Device Description

The NCT6500 is a single block device with control panel. It combines a navigation receiver (NAV) and a VHF communication transceiver (COM) in one device.

- All control and display elements are on the front side.

NOTICE The scope of functions and operation depends on the device variant.

3.3 Controls and Indications

The front panel with display is divided into a COM area and a NAV area.

3.3.1 User Interface

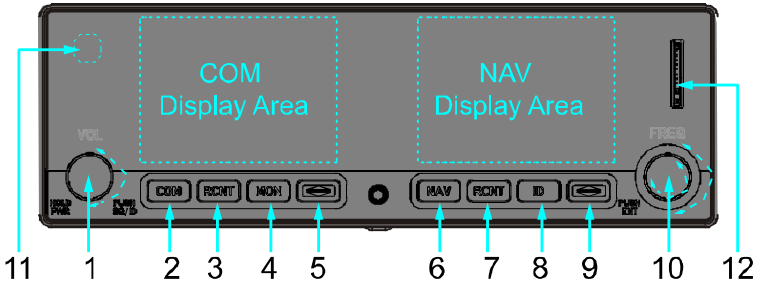


Figure 2: NCT6500 - User Interface

	Element	Description	Function
1		Rotary encoder, left side Single rotary encoder +push function	Power ON/OFF, volume, functions ON/OFF • Short push to power up the device. • Long push to turn off the device. • Rotate to adjust the COM and NAV volume level of received signals. **During COM mode:** • Short push starts/stops the COM squelch function. • The squelch function remains active when NAV mode is selected. **During NAV mode:** • Short push to toggles between ID, voice, audio mode (details see description for no.8).
2	**COM**	Pushbutton	• Short push starts the COM mode. **During COM mode:** • Long push shows the list "MENU".

	Element	Description	Function

3	**RCNT** (COM)	Pushbutton, "Recent" (frequency)	**During COM mode:**
			• Short push to toggle and leave the lists "RCNT" and "USER".
			  ○ "RCNT" list, with up to ten recently selected active COM frequencies.
			  ○ "USER" list with up to 50 stored COM frequencies.
			During NAV mode:
			• Short push starts the COM mode and the list of recently selected active COM frequencies.

4	**MON**	Pushbutton, "Monitoring"	**During COM and NAV mode:** • Short push starts/stops the COM frequency monitoring function. • The monitoring function remains active when NAV mode is selected.
5	(COM)	Pushbutton, "COM transfer"	**During COM and NAV mode:** • Short push toggles between active and standby frequency.
6	**NAV**	Pushbutton	• Short push starts the NAV mode. **During NAV mode:** • Long push shows the list "MENU".

7	**RCNT** (NAV)	Pushbutton, "Recent" (frequency)	**During NAV mode:**
			• Short push to toggle and leave the lists "RCNT" and "USER".
			  ○ "RCNT" list with the recently selected active NAV frequencies.
			  ○ "USER" list with up to 50 stored NAV frequencies.
			During COM mode:
			• Short push starts the NAV mode and the list of recently selected active NAV frequencies.

	Element	Description	Function

8	**ID**	Pushbutton	**During COM and NAV mode:**
			• Short push to ID toggles between ID, voice, audio mode.
			  ○ ID: To hear only the ident signal (morse-code identification of the station).
			  ○ V (voice): To hear only voice (ID is cut from signal).
			• No icon (audio): To hear both voice and ident signal.

9	 (NAV)	Pushbutton, NAV transfer	**During COM and NAV mode:** • Short push toggles between active and standby frequency.
10	 inner rotary	Rotary encoder, inner and outer rotary encoder +push function	• Turn the rotary encoder to change the selected parameters (frequency, …). • Push to the rotary encoder to select the entry. • Push to the rotary encoder to confirm the adjustment.
11		Light sensor	Light sensor for brightness control (depends on configuration).
12		SD card slot	Used to update the channel database with external prepared settings (additional equipment necessary).

3.3.1.1 HMI Operation

The device identifies a:

"Long push": when you push and hold a key for > 2 seconds.
"Short push": when you push and hold a key for < 2 seconds.

3.3.2 Description - COM Display

NOTICE The view and colors of the elements depend on the system status.

3.3.2.1 COM Main View

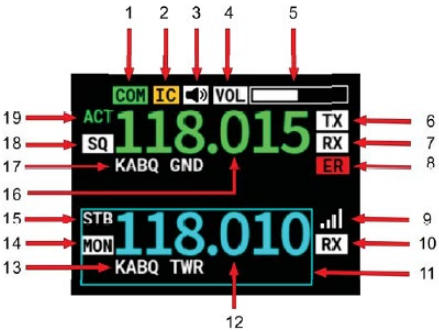


Figure 3: NCT6500 – COM Main View

	Icon/Indication
1	COM Mode Status
2	Intercom Status
3	Speaker Status
4	Volume
5	Volume Level
6	Transmit Mode
7	Receive Mode
8	Error (ER) or Warning (WR)
9	Signal Detection
10	Receive for monitored Frequency
11	Frame
12	Standby Frequency
13	Station Identifier of Standby Frequency
14	Monitoring Status
15	Standby Frequency Label
16	Active Frequency
17	Station Identifier of Active Frequency
18	Squelch Status
19	Active Frequency Label

3.3.2.2 COM Menu Mode

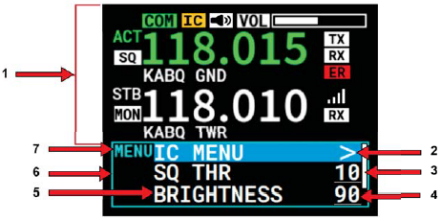


Figure 4: NCT6500 – COM Menu View

	Icon/Indication
1	Elements of the COM main screen see "COM Main View" page 21.
2	Selected list entry
3	Scroll bar
4	Parameter value
5	Parameter name
6	Frame
7	List label "MENU"

3.3.2.3 COM Recent and User Frequency Menu

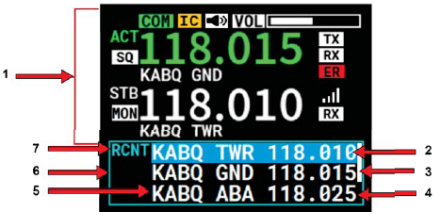


Figure 5: NCT6500 – COM Recent Frequency View

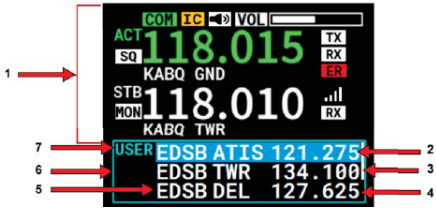


Figure 6: NCT6500 – COM User Frequency View

	Icon/Indication
1	Elements of the COM main screen see "COM Main View" page 21.
2	Selected list entry
3	Scroll bar
4	Frequency value
5	Station Identifier
6	Frame
7	List label "RCENT", "USER"

3.3.2.4 COM Error and Warning View

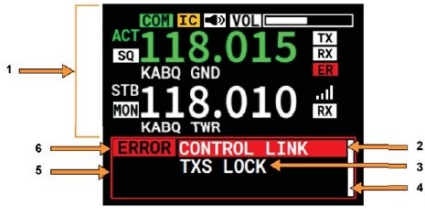


Figure 7: NCT6500 – COM Error View

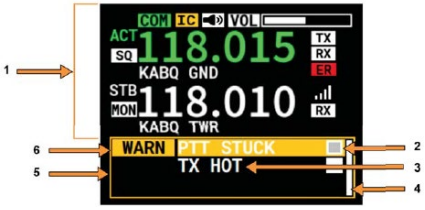


Figure 8: NCT6500 – COM Warning View

	Icon/Indication
1	Elements of the COM main screen see "COM Main View" page 21.
2	Selected list entry
3	Error name, Warning name
4	Scroll bar
5	Frame
6	List label "ERROR", "WARN"

3.3.2.5 COM Incorrect Parameter (Example)

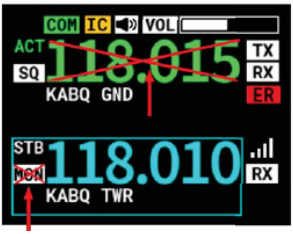


Figure 9: NCT6500 – COM Incorrect Parameter View

	Icon/Indication
	Incorrect settings are crossed out with a red "X"

3.3.3 Description - NAV Display

NOTICE The view and colors of the elements depend on the system status.

3.3.3.1 NAV Main View

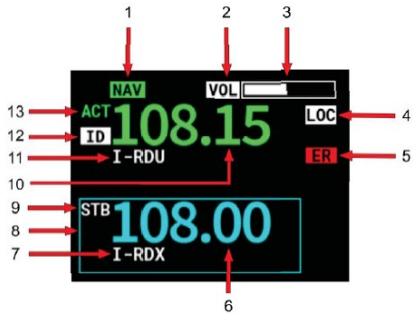


Figure 10: NCT6500 – NAV Main View

	Icon/Indication
1	NAV Mode Status
2	Volume
3	Volume Level
4	Localizer Mode
5	Error (ER) or Warning (WR)
6	Standby Frequency
7	Station Identifier of Standby Frequency
8	Frame
9	Standby Frequency Label
10	Active Frequency
11	Station Identifier of Active Frequency
12	NAV Audio Mode Status (ID, V, empty indication)
13	Active Frequency Label

3.3.3.2 NAV Menu Mode

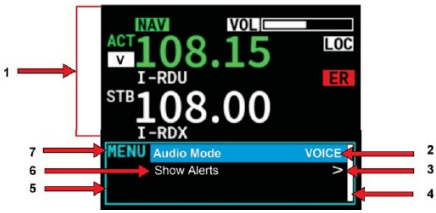


Figure 11: NCT6500 – NAV Menu View

	Icon/Indication
1	Elements of the NAV main screen see "NAV Main View" page 24.
2	Selected list entry
3	Parameter value
4	Scroll bar
5	Frame
6	Parameter name
7	List label "MENU"

3.3.3.3 NAV Recent and User Frequency Menu

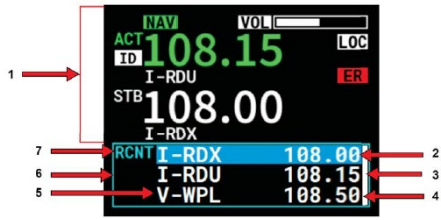


Figure 12: NCT6500 – NAV Recent Frequency View

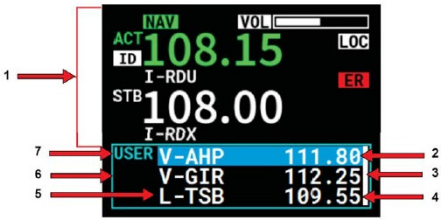


Figure 13: NCT6500 – NAV User Frequency View

	Icon/Indication
1	Elements of the NAV main screen see "NAV Main View" page 24.
2	Selected list entry
3	Scroll bar
4	Frequency value
5	Station Identifier
6	Frame
7	List label "RCENT", "USER"

3.3.3.4 NAV Error and Warning View

Figure 14: NCT6500 – NAV Error View

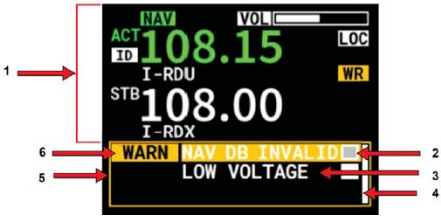


Figure 15: NCT6500 – NAV Warning View

	Icon/Indication
1	Elements of the NAV main screen see "NAV Main View" page 24.
2	Selected list entry
3	Error name, Warning name
4	Scroll bar
5	Frame
6	List label "ERROR", "WARN"

3.4 Start-Up

SAFETY INSTRUCTIONS

Excessive pulses on the DC bus of the aircraft can cause damage on electrical circuits of any installed instrument.
Do not turn on the device during engine start or shutdown

NOTICE

Polarizing sunglasses can reduce the readability of the display.

Power up the device:

- Short push to the rotary encoder (left) or power ON signal of the aircraft installation.
  - The initialization and self-test (PBIT) start.
  - The display shows the start screen with the company logo and the device/system name.
- After successful start-up the device is ready to use.

Figure 16: NCT6500 - Ready for Operation (example)

NOTICE

- Some functions and adjustments are only available in the password-protected configuration setup - installation mode*
- Some functions are only available when they are enabled for the user in the password-protected configuration setup - installation mode*.

* Details available at Becker Avionics.

3.4.1 Prevent Hearing Damage

⚠CAUTION

- Listening at high volumes through headphones, headsets or in close distance to a loudspeaker can cause hearing damage.
- The longer you are exposed to a high acoustic sound level, the more quickly your hearing can be damaged.

SAFETY INSTRUCTIONS

- Obey the operating instruction of the used equipment.
- Do not increase the volume to suppress ambient noise.
- Recommendation: Use noise-canceling headphones (reduces ambient noise, volume can be turned down to minimum).
- Slowly increase the volume until you can hear the sound clearly and without distortion.

3.5 COM Operation

Figure 17: NCT6500 - COM Mode active (example)

3.5.1 Start COM Mode

COM Pushbutton

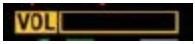
Display Status Icon

- Short push to COM pushbutton starts the COM mode.
  - The backlight color of the pushbutton is green (intensity depends on the brightness settings).
  - The COM mode status icon is highlighted in green.

3.5.2 COM - Volume Adjustment

⚠CAUTION Obey the safety instructions "Prevent Hearing Damage" page 27.

Volume Control



Minimum Level

- Turn the left rotary encoder to adjust the volume level.
- If the volume level is set to the minimum, the color of the volume elements changes to amber.

3.5.3 COM - Receive Operation Mode

Receive Mode

- If no PTT button (Push To Talk) is active, the transceiver stays in receive mode.
  - The "RX" symbol shows that the device is in receive mode.
- A mixed signal is supplied on the headphone(s) outputs (if enabled), it is mixed of the:
  - Received signal from antenna.
  - Intercom signal from intercom circuit one and two (depends on configuration).
  - Signal from auxiliary input (depends on configuration).
- A mixed signal is supplied on the speaker output (if enabled), it is mixed of the:
  - Received signal from antenna.
- Signal from auxiliary input (depends on configuration).

3.5.4 COM - Transmit Operation Mode

Transmit Mode

- If a PTT button (Push To Talk) is active (Push To Talk button is pushed) the transceiver is set to transmit mode.
  - The "TX" symbol shows that the device is in transmit mode.
  - The PTT 1 input starts transmission from microphone path 1.
  - The PTT 2 input starts transmission from microphone path 2*.
  - If "BOTH MIKES"* is enabled in the configuration, each input (PTT 1 or 2) can start the transmission from both microphone paths at the same time.
- The sidetone (demodulated audio of the emitted signal) is available on the headphone output.
- The transmit mode automatically deactivates the speaker.
- For transmission is always the active frequency (ACT) used, also if the monitored frequency is currently audible.
- If TX on the standby frequency (STB) is required, push the COM transfer pushbutton to change active and standby frequency.

COM Transfer Pushbutton

NOTICE: NCT6500 with RFA6500

- Functions "PTT 2 on microphone path 2" and "BOTH MIKES" are not applicable to this/these device(s).

NOTICE

- In transmit mode some user actions are blocked which are normally permitted in receive mode.
- Changes e.g. the standby frequency are possible during transmission.
- In transmit mode the intercom operation behavior depends on configuration.
  - If the PTT1 input is started and ISOL is active the passenger intercom operation on second intercom circuit is still possible.
- The transmit mode is automatically terminated (return to receive mode) after 35 s of continuous transmitting.
  - The display shows " PTT STUCK".
  - For the start of a new transmission first it is necessary to set the PTT line inactive.

3.5.5 COM – Channel Spacing

The transceiver can operate in 25 kHz frequency channel spacing or in 8.33/25 kHz mixed mode.
The channel spacing for operation is adjustable see "COM - Menu Mode" page 38.

3.5.6 COM - Select a Standby Frequency

COM Pushbutton

Condition: The COM area is selected. The standby frequency frame is in view.

- Turn the right rotary encoder (inner and outer) to adjust a standby frequency.

inner rotary
Inner/Outer Rotary Encoder
(right side)

- Turn the outer rotary encoder clockwise/counterclockwise to change the values in one MHz steps.
  - Range: MHz steps between 118…136 MHz.
- Turn the inner rotary encoder clockwise/counterclockwise to change the values in 25/8.33 kHz steps.
  - Range: 25 kHz steps between 000…975 kHz.
  - Range: 8.33 kHz steps between 000…990 kHz.

NOTICE:

- Changes of the standby frequency is possible during transmission.
- If the selected frequency is available in the user frequency list, the related station ID is shown below the frequency.
- If more than one station IDs are assigned to the selected frequency, the first station ID from the list is shown.

3.5.7 COM - Select an Active Frequency

COM Transfer Pushbutton

During COM and NAV mode:

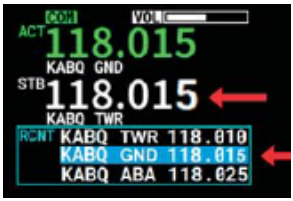
- Push the COM transfer pushbutton to change active and standby frequency.

Conditions and procedure see "COM - Select a Standby Frequency" page 30.

NOTICE:

- It is not possible to toggle between the active and standby frequencies during transmission.

3.5.8 COM - Select a Recent Frequency



Recent Frequency List

During COM and NAV mode:

- Push on the COM "RCNT" pushbutton starts the recent frequency list.
- Turn the right rotary encoder to scroll through the entries.
- A short push to the right rotary encoder confirms the selection.
  - The frequency with the related station identifier is set as the standby frequency.

Menu content:

- List of the recent 10 (active) frequencies.

Leave menu:

- A short push on the "COM" pushbutton leaves the menu.
- The COM main view is shown.

3.5.9 COM - Select a User Frequency

User Frequency List

During COM mode:

- Push on the "RCNT" pushbutton starts the recent frequency list.
- Push on the COM "RCNT" pushbutton:
  - The user frequency list is shown.
- Turn the right rotary encoder to scroll through the entries.
- A short push to the right rotary encoder confirms the selection.
  - The frequency with the related station identifier is set as the standby frequency.

Menu content:

- List with up to 50 stored user frequencies with an assigned station identifier.

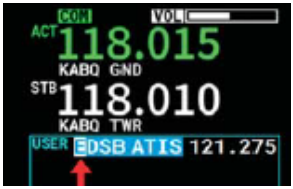
Leave menu:

- A short push on the "COM" pushbutton leaves the menu.
- The COM main view is shown.

NOTICE:
If no frequencies are stored only the entry "Add New" is listed. To add, edit, delete and store user frequencies see:
"COM – Edit, Add, Store a User Frequency" page 33.
"COM – Delete a User Frequency" page 34.

3.5.10 COM – Edit, Add, Store a User Frequency

User Frequency List

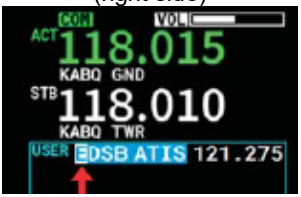


inner rotary
Inner/Outer Rotary Encoder
(right side)

It is possible to store up to 50 user frequencies with related station identifier for each of them in the COM user frequency list.

During COM mode:

- Push on the "RCNT" pushbutton starts the recent frequency list.
- Push on the "RCNT" pushbutton again:
  - The user frequency list is shown.
- Turn the right rotary encoder to scroll through the entries and select one list entry to change it or select "Add New" to add one more.
- A short push to the right rotary encoder confirms the selection.
  - The user frequency edit mode is shown.
- The digits of the station identifier are highlighted.
- Turn the inner rotary encoder to move between station ID and frequency and select the entry to edit.
- A short push to the right rotary encoder confirms the selection.
  - The adjustable value is shown inverted.



Edit Station ID

Edit the station ID:

- Turn the outer rotary encoder to change the value of the digit.
  - Max. 8 digits are possible for the station ID label.
  - The possible values are:
    blank space , A…Z, 0…9, ., _, :, <, >, =.
- Turn the inner rotary encoder to move between the digits.
- A short push to the right rotary encoder confirms the completed setting.

Edit Frequency

Edit the frequency:

- Turn the inner rotary encoder to select the frequency.
- A short push to the right rotary encoder confirms the selection.
  - The adjustable value is shown inverted.
- Turn the outer rotary encoder clockwise/counterclockwise to change the values in one MHz steps.
  - Range: MHz steps between 118…136 MHz.
- Turn the inner rotary encoder clockwise/counterclockwise to change the values in 25/8.33 kHz steps.
  - Range: 25 kHz steps between 000…975 kHz.
  - Range: 8.33 kHz steps between 000…990 kHz.
- A short push to the right rotary encoder confirms the selection.

NOTICE:

- The adjustable frequency range and the frequency steps depend on the set channel spacing.

Leave the mode:

- A long push to the right rotary encoder leaves the edit mode.
  - The user frequency list is shown.
  - The new and/or the changed entries are available.

3.5.11 COM – Delete a User Frequency

Delete List Entry

During COM mode:

- Push on the "RCNT" pushbutton starts the recent frequency list.
- Push on the "RCNT" pushbutton again:
  - The user frequency list is shown.
- Turn the right rotary encoder to scroll through the entries and select the list entry to delete.
- A long push to the "RCNT" pushbutton deletes the selected list entry.

3.5.12 COM – Squelch

Squelch ON

Condition: The COM area is selected.

- Push the left rotary encoder toggles between squelch ON/OFF.
  - The "SQ" symbol shows that squelch is on.
- If the received signal is too weak, it is muted when squelch is on. This prevents interference noise.
  - The signal suppression depends on the set squelch threshold.

NOTICE:

- The squelch threshold is adjustable see "COM - Menu Mode" page 38.

3.5.13 COM - Frequency Monitoring

COM Monitoring Pushbutton

The function enables monitoring of the COM standby frequency, while listening to the COM active frequency.

- Push the MON pushbutton toggles between monitoring ON/OFF.
  - The "MON" symbol shows that the device is in monitoring mode.

Monitoring ON

NOTICE:
It is possible to toggle between monitoring ON/OFF during the device is in NAV operation.

Signal detected on the monitored frequency:

- A symbol shows that a signal is detected on the standby frequency.

Conditions:

- Monitoring function is ON.
- A signal is detected on the active frequency and is heard through the speaker or headphone (depends on device variant and configuration).
- A signal is detected on the standby frequency.

Receive mode of the monitored frequency:

- A "RX" symbol shows that a signal is detected on the standby frequency.

Conditions:

- Monitoring function is ON.
- Squelch function is ON.
- A signal is detected on the standby frequency and is heard through the speaker or headphone (depends on device variant and configuration).

NOTICE:

- If the active and standby frequency detects a signal at the same time, the active frequency has priority.
- For transmission the active frequency is always used, also if the monitored standby frequency is currently audible.
- If transmission on the standby frequency is required, push the COM transfer pushbutton to change active and standby frequency.

COM Transfer Pushbutton

3.5.14 COM – Intercom (IC)

The intercom operation depends on device intercom settings and wiring.

- The intercom operation can be started automatically with VOX (with adjustable threshold) or externally with an intercom switch.

The VOX function cannot operate in:

- Installations with high level of ambient noise.
- Operation when speaker is enabled.

If installed:

- An external switch makes it possible to select the intercom operation manually.

NOTICE:
The settings of VOX ON/OFF, IC volume and VOX threshold are adjustable see "COM - Menu Mode" page 38.

Condition: The COM area is selected.

Intercom active

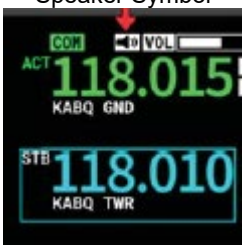
- The white "IC" symbol shows that intercom is active.

Intercom inactive

- The amber "IC" symbol shows that intercom is inactive.
- The automatic start through VOX is off.

3.5.15 COM – Speaker

Speaker Symbol



Speaker active

The speaker operation depends on device variant, configuration and wiring (one or more speakers).

- The speaker symbol shows that the speaker is active.

NOTICE: NCT6500 with RFA6500

- The operation with speaker is not applicable to this/these device(s).

3.5.16 COM - Menu Mode

Figure 18: NCT6500 – COM Menu View

During COM mode:

- A long push on the "COM" pushbutton starts the user menu.
- Turn the right rotary encoder to scroll through the entries.
- A short push to the right rotary encoder selects the highlighted entry or starts the related submenu.
  - The adjustable value is shown inverted.
- Turn the right rotary encoder to adjust/select the function.
- A short push to the right rotary encoder confirms the setting.

Menu content:

- Intercom Menu: Submenu for intercom settings.
  - IC volume, VOX on/off, VOX threshold.
- Squelch Thr (dB): Squelch threshold level*.
- SPACING: Channel spacing.
  - 25 kHz only or 8.33 kHz (=25 +8.33 kHz).
- Brightness: Display and pushbutton brightness (function depend on configuration).
- SHOW ALERTS: List of COM errors and warnings, check if errors are active.

Leave menu:

- A short push on the "COM" pushbutton leaves the menu.
- The COM main view is shown.

Notice*SQ TRH:
Minimum adjustment of 6:
Weak RF signals can trigger the squelch threshold but the audio signal might be low combined with a noisy background.
Maximum adjustment of 26:
Only strong RF signals will trigger the squelch threshold. The audio signal is audible very clear with very low background noise.
Weak RF signals cannot trigger the squelch threshold, so the user cannot hear the audio.

3.5.17 COM - Error and Warning Message

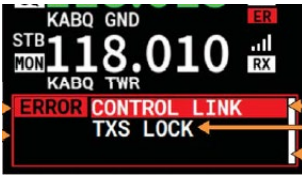


Figure 19: NCT6500 – COM Error View

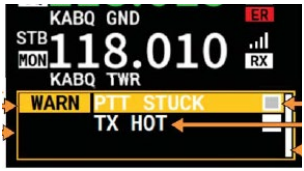


Figure 20: NCT6500 – COM Warning View

The COM error or COM warning list comes into view if at least one COM error/warning is found.

- Error (ER) or Warning (WR) is shown on the COM display.
- Some messages can be reset manually.

Move through the list:

- Turn the right rotary encoder to scroll through the entries.
- A short push to the right rotary encoder selects the highlighted entry.
  - The adjustable entry is shown inverted.
- A short push to the right rotary encoder reset the message.
  - Errors/warning messages are removed from the list if they are reset manually or are no longer active.

Leave view:

- All active acknowledgeable errors/warnings are confirmed.
- All active errors/warnings become inactive.

3.6 NAV Operation

Figure 21: NCT6500 - NAV Mode active (example)

3.6.1 Start NAV Mode

NAV Pushbutton

Display Status Icon

- Short push to NAV pushbutton starts the NAV mode.
  - The backlight color of the pushbutton is green (intensity depends on the brightness settings).
  - The NAV mode status icon is highlighted in green.

3.6.2 NAV - Volume Adjustment

⚠CAUTION Obey the safety instructions "Prevent Hearing Damage" page 27.

Volume Control

Minimum Level

- Turn the left rotary encoder to adjust the volume level.
- If the volume level is set to the minimum, the color of the volume elements changes to amber.

3.6.3 NAV – VOR/LOC/GS Mode

Localizer Channel Selected

The VOR/LOC/GS operation depends on device variant, configuration and the installed navigation equipment.

3.6.4 NAV – Audio Mode Control

During COM and NAV mode:

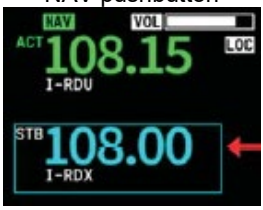
- Short push to ID toggles between ID, voice, audio mode.
  - ID: To hear only the ident signal (morse-code identification of the station).
  - V (voice): To hear only voice (ID is cut from signal).
- No icon (audio): To hear both voice and ident signal.

During NAV mode:

- Short push to the left rotary encoder or the ID pushbutton toggles between ID, voice, audio mode.

3.6.5 NAV - Select a Standby Frequency

NAV pushbutton



Condition: The NAV area is selected. The standby frequency frame is in view.

- Turn the right rotary encoder (inner and outer) to adjust a standby frequency.

inner rotary
Inner/Outer Rotary Encoder
(right side)

- Turn the outer rotary encoder clockwise/counterclockwise to change the values in one MHz steps.
  - Range: MHz steps between 108…117 MHz.
- Turn the inner rotary encoder clockwise/counterclockwise to change the values in 50 kHz steps.
  - Range: kHz steps between 0…950 kHz.

NOTICE:

- If the selected frequency is available in the user frequency list, the related station ID is shown below the frequency.
- If more than one station IDs are assigned to the selected frequency, the first station ID from the list is shown.

3.6.6 NAV - Select an Active Frequency

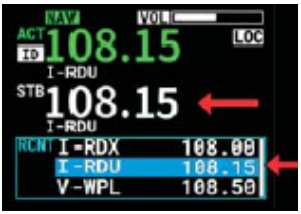
NAV Transfer Pushbutton

During COM and NAV mode:

- Push the NAV transfer pushbutton to change active and standby frequency.

Conditions and procedure see "NAV - Select a Standby Frequency" page 42.

3.6.7 NAV - Select a Recent Frequency



Recent Frequency List

During COM and NAV mode:

- Push on the NAV "RCNT" pushbutton starts the recent frequency list.
- Turn the right rotary encoder to scroll through the entries.
- A short push to the right rotary encoder confirms the selection.
  - The frequency with the related station identifier is set as the standby frequency.

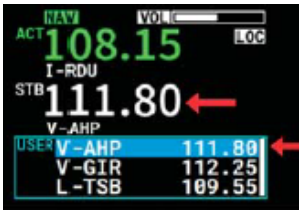
Menu content:

- List of the recent 10 (active) frequencies.

Leave menu:

- A short push on the "NAV" pushbutton leaves the menu.
  - The NAV main view is shown.

3.6.8 NAV - Select a User Frequency



User Frequency List

During NAV mode:

- Push on the "RCNT" pushbutton starts the recent frequency list.
- Push on the "RCNT" pushbutton again:
  - The user frequency list is shown.
- Turn the right rotary encoder to scroll through the entries.
- A short push to the right rotary encoder confirms the selection.
  - The frequency with the related station identifier is set as the standby frequency.

Menu content:

- List with up to 50 stored user frequencies with an assigned station identifier.

Leave menu:

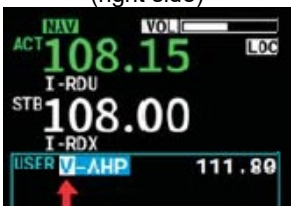
- A short push on the "NAV" pushbutton leaves the menu.
  - The NAV main view is shown.

NOTICE:
If no frequencies are stored only the entry "Add New" is listed. To add, edit, delete and store user frequencies see:
"NAV – Edit, Add, Store a User Frequency" page 45.
"NAV – Delete a User Frequency" page 46.

3.6.9 NAV – Edit, Add, Store a User Frequency

User Frequency List

inner rotary
Inner/Outer Rotary Encoder
(right side)



Edit Station ID

It is possible to store up to 50 user frequencies with related station identifier for each of them in the NAV user frequency list.

During NAV mode:

- Push on the "RCNT" pushbutton starts the recent frequency list.
- Push on the "RCNT" pushbutton again:
  - The user frequency list is shown.
- Turn the right rotary encoder to scroll through the entries and select one list entry to change it or select "Add New" to add one more.
- A short push to the right rotary encoder confirms the selection.
  - The user frequency edit mode is shown.
  - The digits of the station identifier are highlighted.
- Turn the inner rotary encoder to move between station ID and frequency and select the entry to edit.
- A short push to the right rotary encoder confirms the selection.
  - The adjustable value is shown inverted.

Edit the station ID:

- Turn the outer rotary encoder to change the value of the digit.
  - Max. 8 digits are possible for the station ID label.
  - The possible values are:
    blank space , A…Z, 0…9, ., _, :, <, >, =.
- Turn the inner rotary encoder to move between the digits.
- A short push to the right rotary encoder confirms the completed setting.

Edit Frequency

Edit the frequency:

- Turn the inner rotary encoder to select the frequency.
- A short push to the right rotary encoder confirms the selection.
  - The adjustable value is shown inverted.
- Turn the outer rotary encoder clockwise/counterclockwise to change the values in one MHz steps.
  - Range: MHz steps between 108…117 MHz.
- Turn the inner rotary encoder clockwise/counterclockwise to change the values in 50 kHz steps.
  - Range: kHz steps between 0…950 kHz.
- A short push to the right rotary encoder confirms the selection.

Leave the mode:

- A long push to the right rotary encoder leaves the edit mode.
  - The user frequency list is shown.
  - The new and/or the changed entries are available.

3.6.10 NAV – Delete a User Frequency

Delete List Entry

During NAV mode:

- Push on the "RCNT" pushbutton starts the recent frequency list.
- Push on the "RCNT" pushbutton again:
  - The user frequency list is shown.
- Turn the right rotary encoder to scroll through the entries and select the list entry to delete.
- A long push to the "RCNT" pushbutton deletes the selected list entry.

3.6.11 NAV - Menu Mode

Figure 22: NCT6500 – NAV Menu View

During NAV mode:

- A long push on the "NAV" pushbutton starts the user menu.
- Turn the right rotary encoder to scroll through the entries.
- A short push to the right rotary encoder selects the highlighted entry or starts the related submenu.
  - The adjustable value is shown inverted.
- Turn the right rotary encoder to adjust/select the function.
- A short push to the right rotary encoder confirms the setting.

Menu content:

- AUDIO MODE: Selection of filters for the NAV audio output.
  - ID: To hear only the ident signal (morse-code identification of the station).
  - V (voice): To hear only voice (ID is cut from signal).
  - No icon (audio): To hear both voice and ident signal.
- BRIGHTNESS: Display and pushbutton brightness (function depend on configuration).
- SHOW ALERTS: List of NAV errors and warnings, check if errors are active.

Leave menu:

- A short push on the "NAV" pushbutton leaves the menu.
  - The NAV main view is shown.

3.6.12 NAV and Control Head - Error and Warning Messages

Figure 23: NCT6500 – NAV Error View

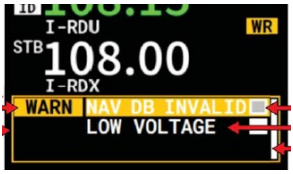


Figure 24: NCT6500 – NAV Warning View

The NAV error or NAV warning list comes into view if at least one COM error/warning is found.
The failure messages from control head (CH) are also shown on the NAV display.

- Error (ER) or Warning (WR) is shown on the NAV display.
- Some messages can be reset manually.

Move through the list:

- Turn the right rotary encoder to scroll through the entries.
- A short push to the right rotary encoder selects the highlighted entry.
  - The adjustable entry is shown inverted.
- A short push to the right rotary encoder reset the message.
  - Errors/warning messages are removed from the list if they are reset manually or are no longer active.

Leave view:

- All active acknowledgeable errors/warnings are confirmed.
- All active errors/warnings become inactive.

3.7 Database Update Mode

NOTICE

For requirements of a valid database (file format, etc.) please contact Becker Avionics.
For relevant department and addresses, please see contact info page 2.

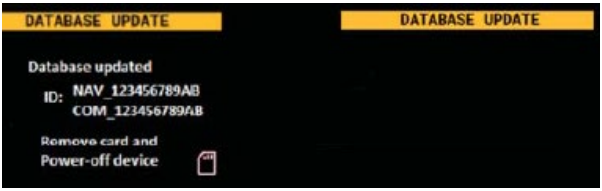
3.7.1 Start Database Update Mode

	Start Database Update Mode

microSD card
 	
Push and hold
3 s = power up
 	
COM + NAV RCNT Knob
	Assemble microSD card:
	• Insert the microSD card into the card slot.
	  ○ The contacts must point towards the slot (left, cutout downwards).
	• Push the card in carefully until it clicks into place.
	
	Start database update mode:
	• Push and hold the "COM RCNT + NAV RCNT" pushbutton during power up.
	  ○ The database update mode starts.
	  ○ The backlight of "VOL", "'FREQ" inscriptions change to white color.
	  ○ The main screen is shown on the COM display (left).
	  ○ The additional screen is shown on the NAV display (right).
	
	Figure 25: Database Update Mode - No SD card found
	
	Figure 26: "Database Update Mode - Database found

 SD card icon	**Information and instructions on COM display (left)** **Text:** • Status of the device and possible procedures. **SD card icon:** • No SD card icon: SD card not inserted. • Red SD card icon: Database not found. • White SD card icon: Database found.

3.7.2 Start Database Update Procedure

	Start Database Update Procedure
 Figure 27: "Database Update Mode - Database found	**Condition: Successful identification of the database** • Short push on the right rotary encoder. ○ The database update starts. ○ The COM display (left) shows "Wait until update is ready". ○ The NAV display (right) shows the status of the procedure.
 Push and hold 3 s = power up/off	**After successful database update:** • The COM display (left) shows "Database updated". • Remove SD card. • Power off the device.  • Power up the device. ○ The new database is available.

3.7.3 Leave the Database Update Mode

- Turn "OFF" the device to leave this mode (long push to left rotary encoder).
- All changes made up to this time are automatically stored.

3.7.4 Remove microSD card

- Push on the card.
  - The card is unlocked, ejected and can be removed.
- Power up the device.

3.8 Troubleshooting - Error List for User

General:
If you cannot correct the problem, stop the use of the device(s) and contact authorized maintenance shop for assistance, please.

3.8.1 Error List

Details about operation while there is an error see:

"COM - Error and Warning Message" page 39 and "NAV and Control Head - Error and Warning Messages" page 48.

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4 Technical Data

Certifications	
NCT6500 (020) ( ), NCT6500 (120) ( ) **RFA6500 (120) ( ), RFA6500 (121) ( )** **MT6500 (000) ( )** **SWPCN6500-(01.00)**	EASA.21O.10086103, in accordance with Commission Regulation (EU) No. 748/2012, Part 21, Section A, Subpart O and ETSO 2C128, 2C169A, 2C34f, 2C36f, 2C40c

4.1 NCT6500

NCT6500	Specifications
Nominal voltage	11.0…30.2 V
Emergency operation	9.0...10.25 V
Recommended external fuse protection in the application	Main Power: 7.5 A
Operating altitude	35 000 ft
Illumination	Backlight for the complete front panel
Operating temperature	-20...+55 °C
Installation	Panel mount 160 mm (6.3 inch), lock mechanism

4.2 FCC Approval

Radiofrequency radiation exposure information:

The approved equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. The equipment should be installed and operated with minimum distance of 50 cm between the radiator and your body.

This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

NOTICE:

The approved equipment has been tested and found to comply with the limits for a 'Licensed Non-Broadcast Station Transmitter' (VHF-Transceiver), pursuant to Part 87 of the FCC Rules. It is designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

NOTICE:

This device complies with Part 87 of the FCC Rules. The antenna(s) used for this transmitter must be fixed-mounted on outdoor permanent structures.

Operation is subject to the two conditions that follow:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

NOTICE:

Changes or modifications made to the approved equipment not expressly approved by Becker Avionics may void the FCC authorization to operate this equipment.

5 Contact Data

In case of additional questions contact your local Becker Avionics dealer or forward your request direct to Becker Avionics "Customer Service".

In the event of damage or a defect, the entire device must be returned for repair. The repair must be done by trained Becker Avionics personnel.

For relevant department and addresses, please see contact info page 2.

Any change by the user excludes any liability on our part (excluding the work described in this manual).

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We reserve the right to make technical changes.
The data match to the current status at the time of printing.
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