



# UltraForce

## Amateur 10 m Transceiver



# OPERATING MANUAL

ALAN Electronics GmbH  
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## ■ TABLE OF CONTENTS

Introduction .....	2
Installation .....	3 - 4
Front Panel Controls and Functions .....	4 - 8
Other Features .....	8
Specifications .....	10

## European Warranty Conditions

Your distributor, where You have purchased this radio warrants this product to be free of defects for a period of two (2) years from the original date of purchase. This warranty is non-transferable. This warranty is subject to repair or replacement of defective components only. This warranty is void if the radio has been tampered with or misused. Whenever Your radio should become defective during the warranty period, please contact Your dealer and ask him for his service proceedings. The distributor or dealer may repair the radio, replace it or arrange repair by an authorised Albrecht / ALAN Service subcontractor.

Addresses of authorised service subcontractors will be also available from

**[www.hobbyradio.de/service-anschriften.htm](http://www.hobbyradio.de/service-anschriften.htm)**

### **IMPORTANT: RETAIN YOUR SALES RECEIPT**

Please keep your sales receipt of the purchase and send this or a copy of this together with the radio for any repair during the warranty period. If the sales receipt or it's copy is not enclosed, the radio cannot be repaired under the warranty conditions.

## INTRODUCTION

Congratulations on your purchase of this **Albrecht UltraForce** 10 meter FM/AM/SSB/CW transceiver. Your transceiver is designed to provide years of enjoyment and trouble-free service. There are many features and functions designed into this transceiver. To ensure that your investment is enjoyed to it's fullest extent please take a few moments and thoroughly read this manual.

Your UltraForce amateur radio transceiver is a microprocessor controlled, user programmable radio combining both high RF performance with a user-friendly environment. The radio is built rugged to withstand years of use in harsh mobile environments. Although engineered with mobile use in mind the radio, with the addition of a high quality 10 Amp regulated power supply, may be easily adapted to fixed station operation.

Some of the features of the UltraForce are:

- an advanced design liquid crystal display that provides the operator with a full visual account of the transceivers operating status,
- automatic frequency scanning from either the front panel or microphone, memory storage of your favorite frequencies,
- programmable frequency resolution of either 1 kHz, 10 kHz or 100 kHz, and split (offset) frequency operation for repeater use.

These are just a few of the features that make the UltraForce a pleasure to own and operate.

**IMPORTANT:** The UltraForce is designed for entry level amateur use. The transmitter of this radio can be operated in most countries of the world only with a valid amateur radio operator's licence.

If you are studying for your license and want to familiarize yourself with the operation of the radio, the receiver may be operated with or without a licensed operator present under the condition, that essential parts of the transmit section have been made temporarily inoperable.

Under no circumstances it is allowed to use this amateur radio as "CB-Transceiver" . Even licensed amateur radio operators are not allowed to use this transceiver for CB radio purposes. The regulations require that a dedicated notified or approved CB transceiver will be used for CB radio purposes.

For more information regarding amateur licensing, contact your nearest amateur radio dealer, or for complete details contact one of the world-wide amateur radio clubs, e.g. in Germany the "DARC-eV". You can also find more informations via [www.darc.de](http://www.darc.de)

## INSTALLATION

### 1. Contents

Unpack and inspect your UltraForce for missing or damaged components. Your UltraForce includes the following items:

- UltraForce Transceiver
- Up / Down Microphone
- Mounting Bracket and Installation Hardware
- Power Cord
- Operating Manual

### Install the UltraForce

Choose a location where there is easy access to all front panel controls and air circulation available to the rear panel and aluminum heatsink. Do not install the transceiver in any compartment that restricts airflow. Attach the mounting bracket to the vehicle first then mount the transceiver to the bracket. If the rear panel is not easily accessible you may want to attach the power cord and antenna feed line prior to mounting.

### Make Electrical Connections

The transceiver is designed to work on any 13.8 VDC power source with a negative ground. The condition of a vehicle's electrical system can affect operation. A low battery, worn generator/alternator, or poor voltage regulator will seriously impair the performance of the transceiver.

Any of the above conditions could result in a high level of receiver noise generation or a substantial loss of the transmitter's RF output. Make sure that all of these components of your vehicle's electrical system are in good condition prior to installing the transceiver. Before making any electrical connections make sure the AF gain (volume) control on the transceiver is in the "OFF" position. Connect the positive (+) red wire and negative (-) black wire from the transceiver directly to the battery. Connecting directly to the battery has several benefits, the first of which is to maximize RF output.

Secondly, the battery is a very large capacitor and will help eliminate certain types of ambient and vehicle noise. Depending on your mounting location, additional power cable may be required. On additional runs of 2 m or less use 2.5 qmm stranded wire. Use thicker wire for longer longer runs.

### CAUTION!

- **ANY VOLTAGE EXCEEDING 15 VDC WILL DAMAGE THE RADIO**
- **MEASURE VOLTAGE AT BATTERY TERMINALS, WITH ENGINE RUNNING, PRIOR TO INSTALLATION!**

### Legal information

The presently valid European "Automotive Directive" does not allow to operate this transceiver from the car's DC network in cars during motion.

Please do not use this transceiver while You are riding the car. However, the "Automotive Directive" is under revision, and a new issue will soon again allow to use non-safety-relevant CE marked after-market equipment in car installations. Because of EMC reasons, the car manufacturers have the right to issue installation rules and instructions for installing transmitters and their antennas in cars. These rules and instructions are valid for amateur radio installations as well as for any other transmitting device in cars.

### Connect the Antenna

The transceiver will operate using any standard 50-ohm ground-plane, vertical, mobile whip, long wire or similar antenna. The antenna should be rated at 50 watts PEP minimum. A standard SO-239 type connector is provided on the rear panel of the transceiver. Connection is made using a PL-259 and high grade coaxial cable (RG213 or RG58A/U is recommended).

A ground-plane antenna provides greater coverage and is recommended for fixed station-to-mobile operation.

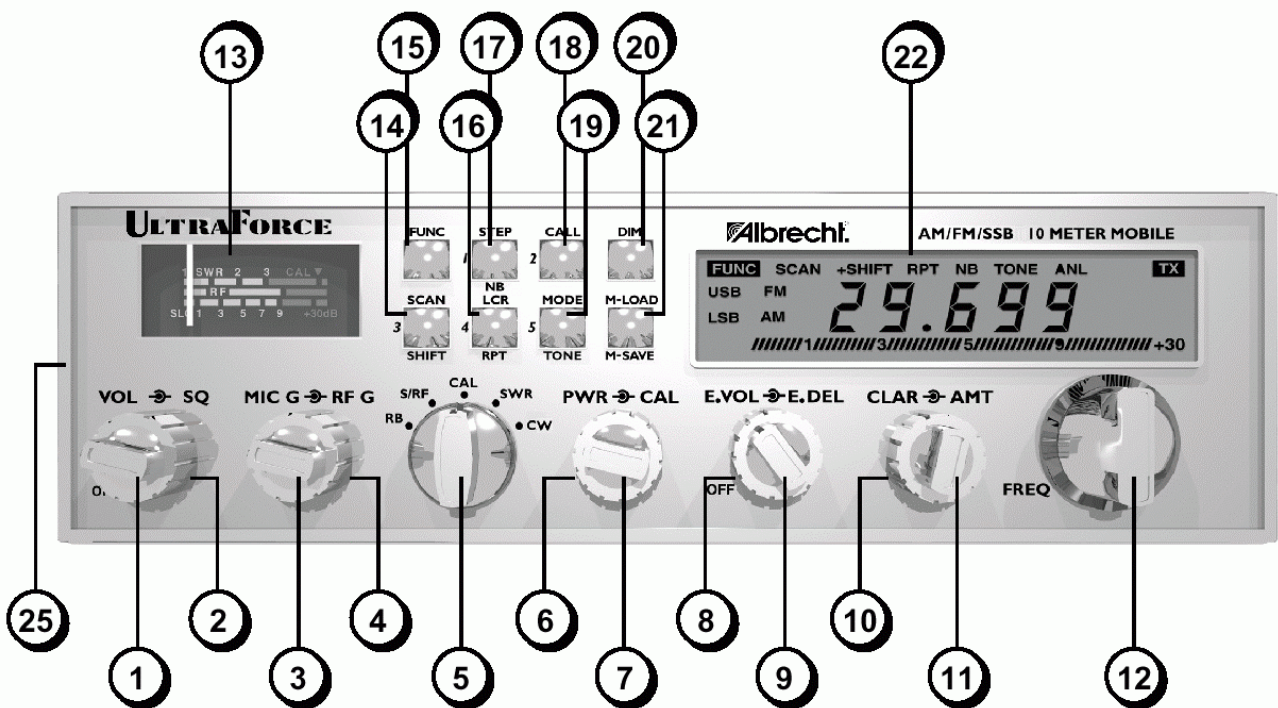
For point-to-point fixed station operation, a directional beam antenna operates at greater distances even under adverse conditions. A non-directional antenna should be used in a mobile installation; a vertical whip is best suited for this purpose. The base loaded whip antenna normally provides effective communications. For greater range and more reliable operation, a full quarter wave whip may be used. Either of these antennas use the metal vehicle body as a ground plane.

**SWR Adjustment of the Antenna**

After you have determined that the installation is correct and the radio is operational, it is important to determine the antenna system’s SWR (Standing Wave Ratio). Prior to taking any measurements make sure the SWR bridge (meter) is in good working order and is calibrated. To ensure your radio is performing properly the SWR should never exceed 1.5 to 1. This is critical due to the high level of gain developed in the RF deck. Never transmit on any antenna system where the SWR exceeds 1.8 to 1. This will stress the output stage and could destroy the RF transistors; this type of misuse and failure is not covered under warranty.

**FRONT PANEL CONTROLS AND FUNCTIONS**

*Reference Front Panel Diagram*



**(1) POWER ON/OFF and VOLUME CONTROL**

Turns the transceiver on and off, and adjusts the AF gain, or volume.

**(2) SQUELCH CONTROL**

Used to eliminate background or “white” noise when monitoring strong signals. Also used to activate SCAN feature (see 14). To properly adjust squelch circuit, slowly rotate the control clockwise until the received audio disappears. Now turn the control slightly counterclockwise - this will keep the threshold right on the edge so you will not miss any incoming signals.

**(3) MICROPHONE GAIN CONTROL**

Increases or decreases the energy developed in the microphone amplifier circuit. The gain increases as the control is rotated clockwise. For optimum setting, press the push-to-talk switch on the microphone (see 23) and speak in a constant tone into the microphone. A good test tone is to say the word “four” in a long, drawn out tone. While speaking, rotate the mic gain control clock-wise until the modulation LCD display reads +30(see 22). Next, rotate the control counterclockwise until the +30 segment of the display starts to flicker.

#### **(4) RF GAIN CONTROL**

Adjusts the receiver sensitivity to both signals and background noise. This affects the distance at which a signal can be detected. Turning the control counter-clockwise reduces the receiver sensitivity. This is particularly useful in areas where large volumes of traffic (signals) are present.

#### **(5) ROGER BEEP CONTROL**

RB position activates the end of transmission, or roger beep, tone. When activated a 1 kHz tone will automatically transmit upon release of PTT switch (see 23). This notifies contacts that your transmission has ended and you are ready to receive their signal. To turn off the roger beep, put the switch in the S/RF position. NOTE: In the RB position, the meter (see 13) measures S/RF.

#### **SIGNAL STRENGTH / RF METER CONTROL**

S/RF position activates the meter (see 13) to measure receive signal strength and transmitter RF output power.

#### **CALIBRATE CONTROL**

CAL position activates the meter to calibrate for SWR measuring. To calibrate for SWR, set the switch to the CAL position, press the PTT switch (see 23) and rotate the calibrate control (see 6) until the meter (see 13) needle lines up with the CAL mark on the far right side of the meter. Once lined up, release the PTT. The transceiver is now ready to measure SWR.

#### **NOTE:**

*When first attempting to calibrate make sure the transceiver is in the AM mode (see 19). If it is not possible to calibrate in AM, then switch to FM mode.*

#### **STANDING WAVE RATIO CONTROL**

SWR position activates the meter to measure the standing wave ratio of the transceiver and antenna system. After the meter is calibrated, set the switch to the SWR position and press the PTT switch (see 23). The meter (see 13) will measure the SWR. For optimum performance the SWR should be below 1.5 – the first green segment on the SWR portion of the meter indicates an acceptable standing wave ratio.

#### **CW**

CW position activates a separate connected CW key to make transmissions in Morse Code /CW instead by microphone.

#### **(6) CALIBRATE CONTROL**

Rotate to calibrate the meter (see 13) for SWR measurements. See instruction 5 for more information.

#### **(7) RF OUTPUT POWER CONTROL**

Continuously variable control for adjusting the RF output power of the transmitter in all modes for QRP operation. To reduce the RF output power rotate the control counterclockwise. To increase rotate the control clockwise. The power output is a linear control, therefore the peak to average output power ratios remain constant regardless of power level.

#### **(8) ECHO DELAY CONTROL**

Varies the amount of delay, or duration of the echo repetition. Rotate clockwise to increase the amount of delay and counterclockwise to decrease.

#### **(9) ECHO ON/OFF and VOLUME CONTROL**

Turns on and off the echo feature, and varies the volume or number of echo repetitions. To turn on the echo feature and increase the echo volume, rotate the control clockwise. To turn off the echo feature rotate the control completely counterclockwise to the OFF position.

#### **(10) ALL MODE TALK BACK CONTROL**

All Mode Talk Back is an independent talk back monitor. The AMT functions in all modes and allows the operator to monitor the transmitted audio of the UltraForce. To increase the volume of the talk back rotate the control clockwise. To decrease rotate counterclockwise. To turn off the talk back rotate the control completely counterclockwise.

#### **(11) CLARIFIER**

Allows variation of the receiver operating frequency above and below the indicated frequency in all modes. The receive clarifier is primarily used in tuning to an SSB signal. The receive clarifier has a range of +/-1 kHz above and below the indicated frequency.

## **(12)FREQUENCY**

Rotate clockwise to increase the operating frequency and counterclockwise to decrease the operating frequency.

## **(13)METER**

The meter indicates receive signal strength, RF output power, SWR calibrate and SWR. The top horizontal bar graph indicates calibration and measuring of the standing wave ratio. The center bar graph indicates RF output power. The bottom bar graph indicates receive signal strength.

## **IMPORTANT!**

***Operating some of the features in 14 through 21 require the use of the function control. To activate the function control, momentarily push the FUNC (15) control, the FUNC prompt will be displayed in upper left-hand corner of LCD. Push the control again to deactivate the function control.***

## **(14)SCAN**

Scans frequencies in increments of 10 kHz. There are two ways to scan using front panel entry.

(1) Receive Audio On Scanning: Press the SCAN button. Scan rate is one step every 5 seconds. To stop scanning press the SCAN button again, or momentarily press the PTT button on the microphone (scanning will stop without transmitting).

(2) Receive Audio Mute Scanning: Carefully rotate squelch control to the threshold (see 2). The receiver scan rate will now be five steps per second. When a signal is detected the squelch is automatically disengaged and the scanning is paused. The squelch circuit will automatically reengage and the receiver will continue to scan until to the moment the received signal is no longer detected. To stop scanning, press the SCAN button, or momentarily press the PTT button on the microphone (scanning will stop without transmitting).

## **SHIFT**

Used for programming offsets to operate repeater networks.

The UltraForce can transmit and receive on different frequencies. To program the offset, press the FUNC button and hold down the SHIFT button for 3 or more seconds.

Three digits will appear on the LCD. This is the offset frequency in kHz. Rotate the FREQUENCY control until the desired offset frequency is displayed. To return to the main display press the FUNC button and hold down the SHIFT button for 3 or more seconds, or momentarily press the PTT button on the microphone (the transmitter will not be engaged).

To activate the programmed offset frequency, press the FUNC button, and then press the SHIFT button once. +SHIFT is displayed on the LCD. The UltraForce will now transmit on the frequency that is XXX kHz greater than the displayed, or receive, frequency (XXX represents the programmed offset frequency in kHz units).

To transmit on the frequency that is XXX kHz lower than the displayed, or receive, frequency press FUNC, then the SHIFT button. Repeat this until -SHIFT is displayed on the LCD.

To disengage the programmed offset frequency, press the FUNC button and then press the SHIFT button. Repeat this until the SHIFT indicator is no longer displayed on the LCD.

## **MEMORY CHANNEL 3**

After programming this button is memory channel 3. See M.LOAD \ M.SAVE control for programming instructions.

## **(15)FUNCTION**

This control is used to operate the functions that are printed below the control buttons. Press and release, FUNC will be displayed on the LCD indicating that the function command is activated. After you have pressed one of the buttons the FUNC will disappear from the screen.

## **(16)LAST CHANNEL RECALL**

Press the LCR button to return to the last frequency that was transmitted on for more than 3 seconds.

## **REPEATER (interesting for USA repeaters only)**

Repeater access tone on and off control. Most repeaters (in USA only) require an 88.5 Hz tone burst to access. To activate the 88.5 Hz tone burst, press the FUNC control and then press the RPT button. RPT will appear on the LCD indicating that the tone burst will now automatically be transmitted whenever the PTT is pressed. To deactivate, repeat the same process.

#### **MEMORY CHANNEL 4**

After programming, this button is memory channel 4. See M.LOAD \ M.SAVE control for programming instructions.

#### **(17)STEP**

The STEP button selects frequency resolution in either 1 kHz, 10 kHz or 100 kHz steps. Press the STEP button, one of the digits will flash on and off. Press the STEP button again to change stepping resolution. To tune frequencies in either 10 kHz or 100 kHz increments, press the STEP button until the desired digit is flashing. Rotate the FREQUENCY control in either direction.

The entire frequency range of the UltraForce can be stepped through in 10 or 100 kHz increments.

To tune in 1 kHz increments, press the STEP button until the 1 kHz digit flashes on and off. Rotate the FREQUENCY control.

**NOTE:** When stepping in 1 kHz increments, you are limited to tuning within a 10 kHz frequency range.

#### **NOISE BLANKER and AUTOMATIC NOISE LIMITER**

Noise blanker on and off control. This circuit eliminates pulse type interference usually associated with automotive ignition systems. To activate the noise blanker, press the FUNC control and then press the NB button. NB will appear on the LCD indicating the noise blanker is turned on. To turn off the noise blanker, repeat the same process.

#### **MEMORY CHANNEL 1**

After programming, this button is memory channel 1. See M.LOAD \ M.SAVE control for programming instructions.

#### **(18)CALL**

The USA national call frequency for SSB is 28.400 MHz. The radio's operating frequency is automatically reset to this frequency when the CALL button is pressed.

#### **MEMORY CHANNEL 2**

After programming this button is memory channel 2. See M.LOAD \ M.SAVE control for programming instructions.

#### **(19)MODE**

Each time the button is pressed the operating mode is changed. The operating mode is indicated on the liquid crystal display: AM, FM, USB, or LSB.

#### **TONE LOW**

To activate the tone low feature, press the FUNC button, and then press the T. Low button to turn on the receive audio tone control. LOW will appear on the LCD when the low tone is activated. This feature will roll-off high frequency noise (i.e. "white" noise). Under many operating conditions this will improve the clarity and understanding of received signals.

#### **MEMORY CHANNEL 5**

After programming this button is memory channel 5. See M.LOAD \ M.SAVE control for programming instructions.

#### **(20)DIMMER**

Press the DIM, or dimmer control to decrease the amount of back-lighting on the front panel and LCD screen.

#### **(21)MEMORY SAVE**

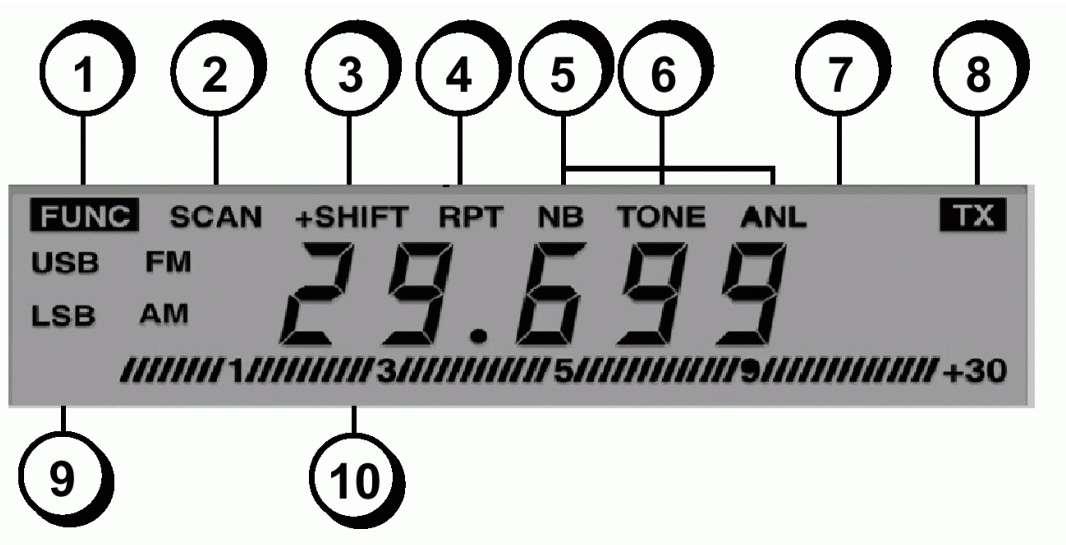
To save in memory a specific frequency and operating mode, select the desired mode and rotate the FREQUENCY control to the desired frequency. Press the FUNC button, and then press the M.SAVE button. S will appear on the LCD next to the frequency. While S is displayed, immediately press any of the memory channel buttons (1 - 5). The mode and frequency is now saved into memory. If the S indicator disappears before you press the memory channel button, the information will not be saved and the process must be repeated.

#### **MEMORY LOAD**

To load, or recall, any of the saved memory channels press the M.LOAD button. L will appear on the LCD for several seconds. While the letter is displayed press the desired memory channel button (1 - 5). The programmed mode and frequency will be displayed.

## (22) LIQUID CRYSTAL DISPLAY

The LCD screen is the status display for the majority of the transceiver's functions.



### (3) +SHIFT \ -SHIFT

Indicates that the split or offset frequency function is activated.

### (4) RPT

Indicates that the repeater access tone burst function is active.

### (5) NB and ANL

Indicates that both the noise blanker and the automatic noise limiter are active.

### (6) TONE

Indicates that the receive audio tone low feature is active.

### (7) 5 DIGIT FREQUENCY DISPLAY

Indicates transmit and receive operating frequencies.

### (8) TX

Indicates that the transmitter is on.

### (9) USB \ LSB \ FM \ AM

Indicates the selected operating mode.

### (10) PEAK READING RF POWER METER

Indicates relative peak RF output power.

## (23) PUSH-TO-TALK (PTT) CONTROL

Activates the transmitter and/or receiver. Push and hold the PTT control to transmit. Release the PTT control to receive.

## (24) UP and DOWN FREQUENCY CONTROLS

Allows remote control of frequency control. Press the up arrow to increase in frequency and press the down arrow to decrease in frequency.



**(25)MICROPHONE INPUT JACK (not shown)**

6-pin, lock ring type, microphone connector located on side chassis of transceiver.  
Mic wiring is as follows:

- Pin 1 : Microphone Audio**
- Pin 2 : Receive**
- Pin 3 : Transmit**
- Pin 4 : Down (Up w/ 22K Ohm Resistor)**
- Pin 5 : Ground**
- Pin 6 : +13.8 VDC**

**(26)EXTERNAL SPEAKER JACK (not shown)**

External speaker jack, marked EXP SP, is located on the rear panel of transceiver. For use with 4 to 8 ohm external speaker.

**(27) CW KEY JACK (not shown)**

The CW key jack is located on the rear panel. The CW Key is used for Morse Code transmission. You will need a 3.5mm Mono connector.

## **OTHER FEATURES**

### **PROGRAMMING KEY TONE**

This tone sounds each time the CPU is being programmed. It is helpful, in the beginning so you can be sure the command has been entered. You may eliminate the tone by simply pressing the PTT switch while turning on the ON/OFF POWER switch.

### **(1) FUNCTION**

Indicates the function button has been activated and that the function dependent controls may be accessed.

### **(2) SCAN**

Indicates that the transceiver is in scan mode..

# TECHNICAL SPECIFICATIONS

## TRANSMITTER

<b>Frequency Range:</b>	28.000 - 29.699 MHz
<b>Tuning Steps:</b>	1 kHz, 10 kHz, 100 kHz
<b>Emission Types:</b>	LSB, USB (J3E), AM (A3E), FM (F3E), CW
<b>Carrier Suppression:</b>	Better than 40 dB below peak output
<b>Unwanted Sideband Suppression:</b>	Better than 50 dB below peak output (1 kHz tone)
<b>Spurious Radiation:</b>	Better than 50 dB below peak output
<b>Frequency Accuracy:</b>	Better than +10 ppm from 0 – 40° C after 15 minute warm up
<b>Modulation Type:</b>	J3E: Balanced Modulator A3E: Voltage Modulator F3E: Frequency Modulator
<b>Maximum FM Deviation:</b>	+/-2 kHz
<b>Output Impedance:</b>	50 ohms (nominal), unbalanced
<b>Microphone Impedance:</b>	Dynamic, 600 ohms
<b>Power Consumption:</b>	6 amps maximum
<b>Power Output:</b>	FM: 30 Watts (Max.) AM: 8 Watts Average (Max.) SSB: 30 Watts Peak (Max.) PEP

## RECEIVER

<b>Frequency Range:</b>	28.000 - 29.699 MHz
<b>Circuit Type:</b>	Superheterodyne, Dual Conversion
<b>Clarifier Range:</b>	+/-1.0 kHz
<b>Sensitivity:</b>	SSB and AM 0.25uV (SSB and AM figures measured for 10 dB S+N/N) FM better than 0.3uV for 12 dB SINAD Minimum discernable signal -135 dBm
<b>Intermediate Frequencies:</b>	1st IF: 10.695 MHz 2nd IF: 455 kHz SSB IF: 10.695 MHz
<b>Image Rejection:</b>	Better than 70 dB
<b>IF Rejection:</b>	Better than 80 dB for all frequencies
<b>Selectivity:</b>	-6 dB -60 dB SSB: 4.2 kHz 8.5 kHz AM, FM: 6.0 kHz 18 kHz
<b>Noise Blanker:</b>	All mode, seven stage high gain type
<b>Dynamic Range:</b>	Better than 100 dB
<b>Audio Output Power:</b>	2 watts minimum (into 8 ohms, with less than 7% THD)
<b>Audio Output Impedance:</b>	8 - 16 ohms
<b>Power Consumption:</b>	500 milliamps
<b>Dimensions:</b>	7.75(L) x 10.75(W) x 2.5(H) Inches

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## Declaration of Conformity



We hereby declare that our product:

**10 m Amateur Radio AM/FM/SSB/CW Transceiver**

**Brand: Albrecht      Model: UltraForce**

satisfies all technical regulations applicable to the product within the scope of EU Council Directives and harmonised European Standards:

**73/23/EEC, 89/336/EEC and 99/5/EC  
ETS 301 489-01 / EN 301 489-15  
EN 301 783-2, EN 60 950**

All essential radio test suites have been carried out.

**MANUFACTURER:  
ALAN Electronics GmbH  
Daimlerstr. 1 k  
63303 Dreieich  
GERMANY**

This declaration is issued under the sole responsibility of the manufacturer according to the procedure of Annex III R&TTE directive. Basing on this declaration, the amateur radio may be used only by authorized persons having a valid amateur radio licence, and only for the purpose of amateur radio service in the dedicated frequency ranges.

**Point of contact:** Wolfgang Schnorrenberg

**Place and date of issue:** Dreieich, 21.1.2004

**(Signature)**

Dipl.-Phys. Wolfgang Schnorrenberg  
ALAN Electronics GmbH