Remote Control System – HTC
User Manual

General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. To avoid potential hazards, use this product only as specified and according to consultation with HTC.

The term product in this document refers to the complete system consisting of a handheld unit and a fixed mounted control unit.

This product contains an intentional radiator. If the user modifies the equipment or in any other way departs from the installation and usage instructions in this document, the user is not allowed to operate this equipment

Do not modify the equipment

Any changes or modifications to the product not expressly approved by the HTC Sweden AB for may void the user's authority to operate the product.
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Do not operate without covers

Normal operation and installation of this product never requires covers to be removed. Covers may only be removed by authorized service personnel specifically appointed by HTC Sweden AB.

Do not operate with suspected failures

If you suspect there is damage to this product, have it inspected by HTC Sweden AB authorized service personnel. The product contains no user serviceable parts.

Do not operate in an explosive atmosphere

This product must not be used in an explosive atmosphere

Do not operate while charging

This product must not be operated while charging the handheld unit is in progress

Only use a specified charger

Use only a charger that is delivered with the product or a charger that complies with the requirements put forth in the section *Charging*

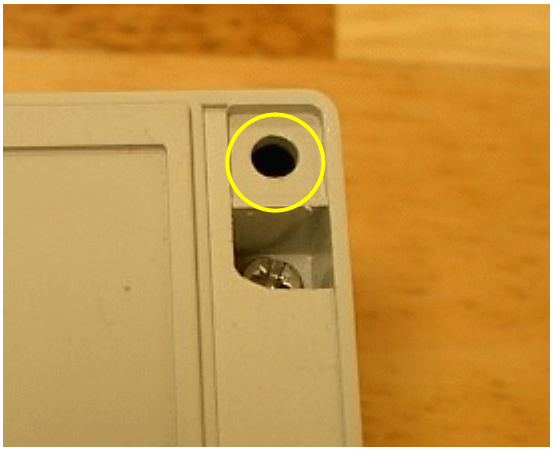
Certification and compliance

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.
If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
--Reorient or relocate the receiving antenna.
--Increase the separation between the equipment and receiver.
--Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
--Consult the dealer or an experienced radio/TV technician for help.

Installation

The unit must only be installed by HTC authorized service personnel in applications that has been verified by HTC. End users must contact HTC for verification of the suitability of the HTC remote control for their particular application. Also training of end user service personnel will be required from HTC.

After an application has been validated by HTC, the actual mounting consists of attaching the control-unit using extending mounting screws (circled in figure below) to a suitable location of the controlled object, and attaching a cable implementing the signal interface according to section *Control Signals.*



Holes for extended mounting screws

Careful selection of mounting position may increase the performance of the remote control application. Consult HTC for advice regarding placing.

Overview

This product is a generic remote control system manufactured by HTC.
The product consists of a battery operated hand held unit as seen in figure 1 below, and a fixed control unit as seen in figure 2 below.

The control unit is capable of transmitting control signals based on the position of the digital and analog attenuators of the hand held units.

The system is primarily intended to control two directional DC-servos via the left-right switch and speed actuator, but other applications are possible.

Figure 1 – hand-held unit

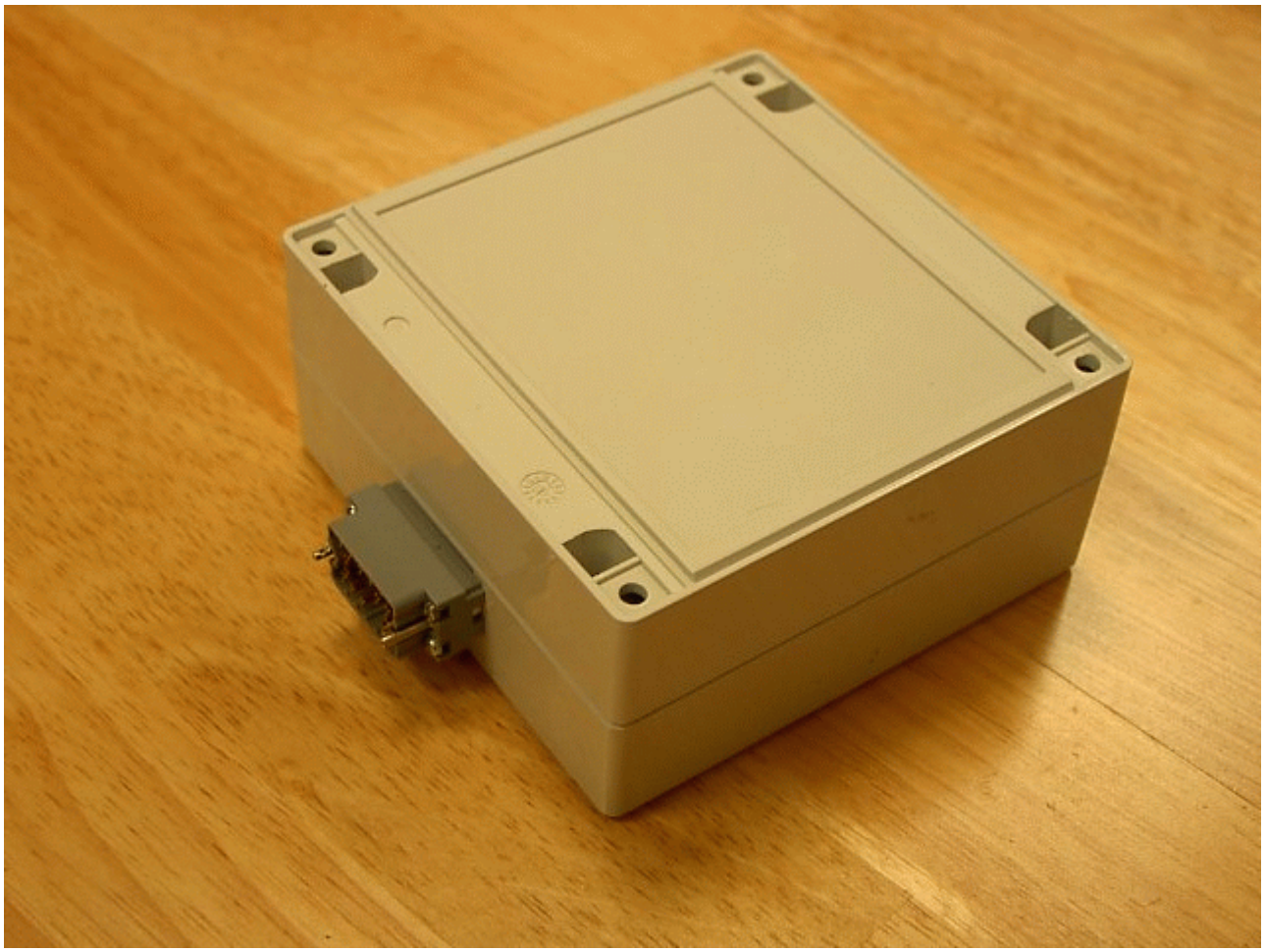


Figure 2 – Control Unit

Control signals

The output connector as seen on the box of the control unit is a standard XXXX YY-pin connector.
The signals are described in table 1 below

PIN No	Type/Direction (A)nalog or (Digital)/ (O)utput or (I)nput	Designation	Description
A	D/I	Enable	0/24 volt digital disable/enable Enables the radio on a logic one (24V). Input Impedance 10kOhm
B	D/O	Cen1	0/24 volt digital output Load Impedance 3.5kOhm
C	D/O	Cen2	0/24 volt digital output Load Impedance 3.5kOhm
D	GND	AOC_GND	Analog ground for AOC
E	A/O	AOC	Analog output C, range 0-10v Load impedance 30kOhm
F	N.C	N.C	N.C
H	GND	AOA_GND	Analog ground for AOA
J	N.C	N.C	N.C
K	N.C	N.C	N.C
L	A/O	AOA	2.5V +- 2.5V analog output Load Impedance 60kOhm
M	GND	AOB_GND	Analog ground for AOB
N	N.C	N.C	N.C
P	N.C	N.C	N.C
R	A/O	AOB	2.5V +- 2.5V analog output Load Impedance 60kOhm
S	D/O	LED1+	Positive digital output for direct drive of led
T	D/O	LED1-	Negative digital output for direct drive of led
U	D/O	LED2+	Positive digital output for direct drive of led
V	D/O	LED2-	Negative digital output for direct drive of led
W	Battery Input	-	Negative battery input, 0V
X	Battery Input	+	Positive battery input, 24V

Table 1 – Signals on the control unit connector

User Interface

The user interface consists of the following buttons/potentiometers, as indicated in figure 3 below:

A) on/off switch
B) Forward/Backward/Neutral switch
C) Speed
D) Right/Left Joystick
E) Right/Left trim
F) Auxilary C1/2 enable
G) Auxilary C output voltage
H) Stop Switch

I) Charge status, only active when charging, each green LED corresponds to 20% capacity, the red LED indicates error when charging, the yellow LED indicates that charging is in progress. If the red LED is activated, consult HTC authorized service personnel. The battery capacity LEDs will be active 4 s each 15 s period while not charging.

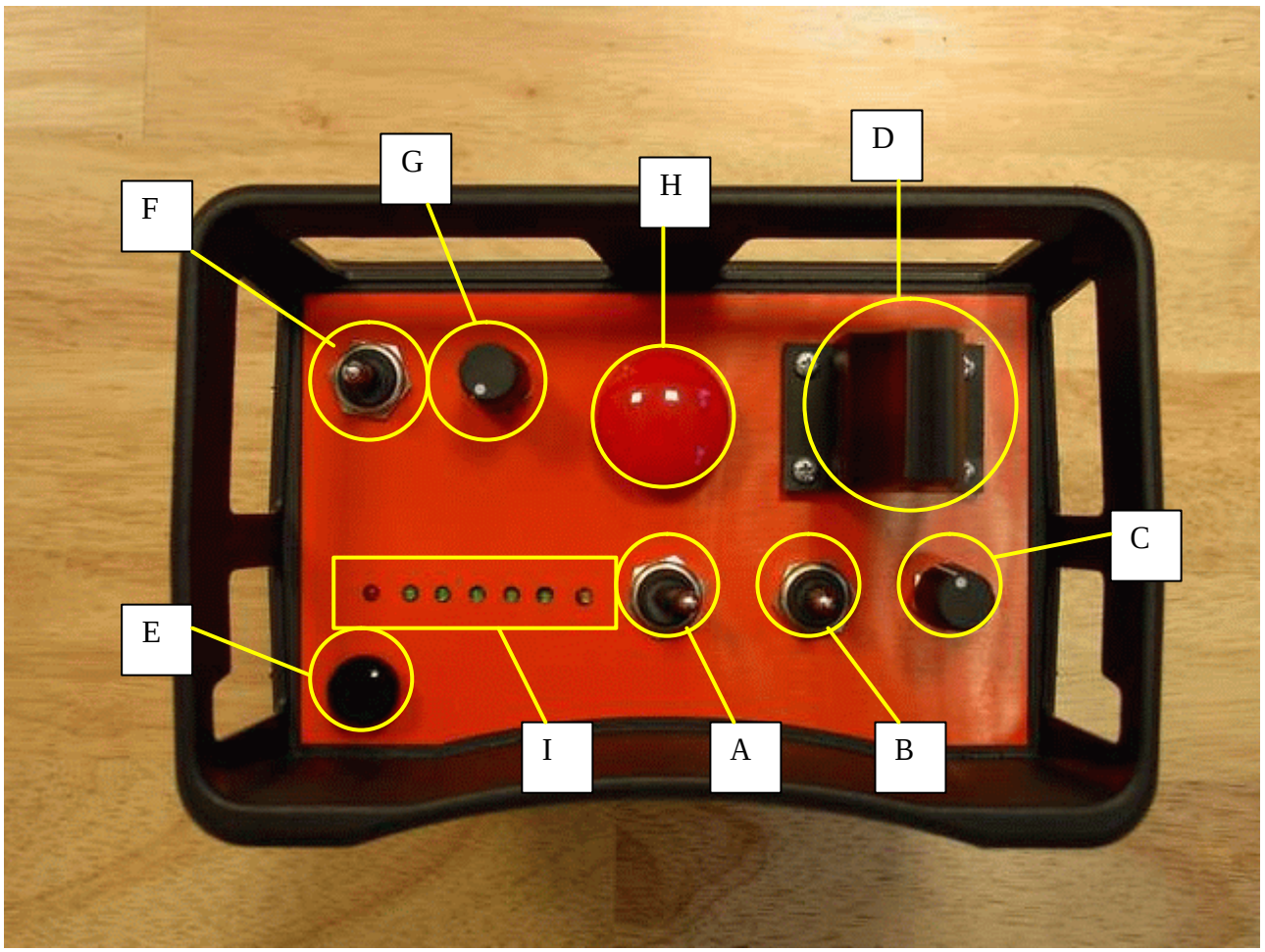


Figure 3 – Layout of the hand-held unit

Functional description motor control

The analog outputs AOA/AOB are inactive (outputlevels AOA/AOB are 2.5V) when switch B is in neutral mode.
When switch B is in forward position, increase in speed (potentiometer C) will rise both AOA continuously from 2.5V (low speed) to 5V (highest speed) and AOB continuously from 2.5V (low speed) to 0V (highest speed). The offset potentiometer (E) can be used to induce a small difference in the AOA/AOB output signals.
When switch B is in reverse position, increase in speed (potentiometer C) will lower both AOA continuously from 2.5V (low speed) to 0V (highest speed) and AOB continuously from 2.5V (low speed) to 5V (highest speed).
Similar to the offset potentiometer, the analog joystick (D) induces differences in the AOA/AOB output voltages.

Functional description Auxillary C output

The auxillary output C signals (AOC, Cen1, Cen2) are controlled by switch F and potentiometer G.
The switch F chooses between Cen1-Active, Not active and Cen2-Active. The output voltage AOC is only active when the F is in either Cen1-Active or Cen2-Active.
A logic table of the CenX outputs, AOC and F switch is given in table 2 below

Switch C position	Cen1	Cen2	AOC
Not Active	0V	0V	0V
Cen1 Active	24V	0V	0-10V according to G
Cen2 Active	0V	24V	0-10V according to G

Stop Switch

When the stop switch is enabled, AOA/AOB are set to 2.5V, AOC is set to 0V and Cen1/2 are set to 0V

When the stop switch is pressed the remote control must be restarted to resume operation.

Power-On sequence

The remote control requires that in order to start operation, the following conditions must be set.

1) Switch F must be set to Not Active (center position)
2) Switch B must be set to Neutral mode (center position)
3) Stop switch must be pulled out (deactivated)

Loss of communication

Should the control unit experience a loss of communication due to interference or battery shortage for a period longer than 0.5 seconds, all outputs are set to the stop-state (the same as stop-switch). The system must then be restarted according to the Power-On sequence.

Charging

When charging, use a charger supplied by HTC or an equivalent charger capable of delivering between 11-20VDC with current capacity of 1.2A.
The connector on the hand-held unit is a standard battery eliminator plug with the positive feed on the center pin. The connector is located on one of the sides of the hand-held unit. See figure 4 below for an illustration of the charge connector position.

Figure 4 – charge connector

The male connector for charging must an outer diameter of 5.5mm and a center pin diameter of 2.1mm. The positive supply is applied to the centre pin.